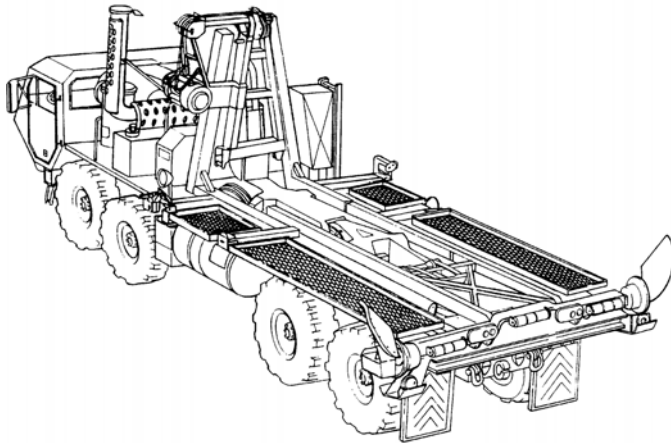


## TECHNICAL MANUAL

### OPERATOR'S UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)



**TRUCK, CARGO, 10-TON, 8X8,  
COMMON BRIDGE TRANSPORTER,  
M1977 WITHOUT WINCH  
NSN 2320-01-442-1940, EIC: DVZ  
M1977A2 WITHOUT WINCH  
NSN 2320-01-492-8218  
M1977A2R1 WITHOUT WINCH  
NSN 2320-01-492-8228  
M1977 WITH WINCH  
NSN 2320-01-443-8023, EIC: DV4  
M1977A2 WITH WINCH  
NSN 2320-01-492-8219  
M1977A2R1 WITH WINCH  
NSN 2320-01-492-8229  
AND  
PALLET, BRIDGE ADAPTER, M15  
NSN 3990-01-442-1939  
EIC: DV5**

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Approved for public release; distribution unlimited.



FOR INFORMATION ON FIRST AID, REFER TO FM 21-11.

**WARNING**

**MODIFICATION HAZARD**

Unauthorized modifications to, alterations to, or installations of this equipment are prohibited and are in violation of AR 750-10. Any unauthorized modifications, alterations, or installations could result in death or injury to personnel or damage to equipment.

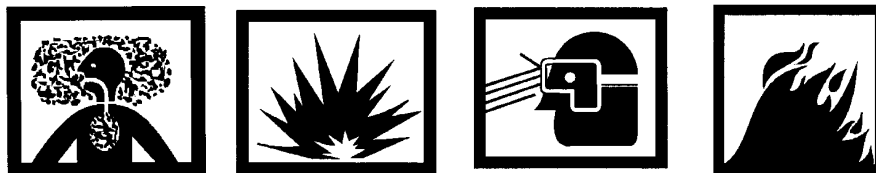
**WARNING**

**HIGH-PRESSURE HYDRAULIC SYSTEM**

- Hydraulic systems can cause serious injuries if high-pressure lines or equipment fails.
- Never work on hydraulic systems or equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and can give first aid.
- Never disconnect any hydraulic hose or part while the engine is running. Allow several minutes to elapse after shutting off engine, to allow pressure to relieve itself, before attempting to remove hoses. Failure to comply with this warning may result in injury to personnel.
- The Load Handling System hydraulic system operates at oil pressures up to 3625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping the pressure to zero. Failure to comply with this warning may result in serious injury to personnel.

**WARNING**

**DRYCLEANING SOLVENT**



- Drycleaning solvent is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and DO NOT breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.
- If personnel become dizzy while using drycleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush them with water and get immediate medical attention.

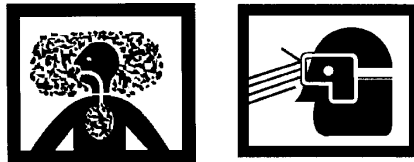
**WARNING**

**DRYCLEANING SOLVENT (continued)**

- When drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.
- Do not use drycleaning solvent on winch rope (cable). Solvent will soak into rope strands and rust, causing rope to deteriorate. This may result in the rope breaking under normal loads and could cause death or injury to personnel.

**WARNING**

**ADHESIVE**



Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use in a well-ventilated area. If adhesive gets in your eyes, try to keep them open; flush them with water for 15 minutes and get immediate medical attention.

**WARNING**

**FLAMMABLE LIQUID AND COMBUSTIBLE VAPOR**



Gasoline, fuel oil, lubricating oil, grease, paint, paint thinner, cleaning solvents, and other combustible liquids present a serious fire hazard. Always store combustible liquids in approved containers and in their designated compartments or deck storage locations. Make sure exhaust and ventilation fans are operating while using cleaning solvents or paint products. Never store or charge batteries in a confined space without ventilation or near electrical equipment.

**WARNING****CHEMICAL AGENT RESISTANT COATING (CARC)**

- Unusable CARC mixtures are considered hazardous waste and will require disposal in accordance with Federal, state, Department of Defense, Department of the Army, and local installation hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC is extremely flammable. Use only in well-ventilated areas. Keep away from open flames, sparks, and other ignition sources.
- CARC paint contains isocyanate (HDI), which is highly irritating to skin and respiratory system. High concentrations of HDI can produce symptoms of itching and reddening of skin, a burning sensation in throat and nose, and watering of the eyes. In extreme concentrations, HDI can cause cough, shortness of breath, pain during respiration, increased sputum production, and chest tightness. The following precautions must be taken whenever using CARC paint:
  - Always use air-line respirators when using CARC paint unless air sampling shows exposure to be below standards. Use chemical cartridge respirator if air sampling is below standards.
  - DO NOT use CARC paint without adequate ventilation.
  - NEVER weld or cut CARC-coated materials.
  - DO NOT grind or sand paint equipment without high-efficiency, air-purifying respirators in use.
  - BE AWARE of CARC paint exposure symptoms; symptoms can occur a few days after initial exposure. Seek medical help immediately if symptoms are detected.

**WARNING****LIFTING OPERATIONS**

- All personnel must stand clear during lifting operations. A swinging or shifting load may cause death or injury to personnel.
- Never crawl under equipment when performing maintenance unless equipment is securely blocked. Equipment may fall and cause death or serious injury to personnel.
- Keep clear of equipment when it is being raised or lowered. Equipment may fall and cause serious death or injury to personnel.
- Do not work on any item supported only by lift jacks or hoist. Always use blocks or proper stands to support the item prior to any work. Equipment may fall and cause death or injury to personnel.

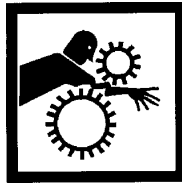
**WARNING**

**LIFTING OPERATIONS (continued)**

- **Do not lift a load greater than the rated load capacity of the crane or materiel-handling equipment. Failure to heed this warning could result in death or injury to personnel or damage to equipment.**
- **Do not allow heavy components to swing while hanging by a lifting device. Equipment may strike personnel and cause injury.**
- **To avoid personal injury, use a hoist or get assistance when lifting components that weigh more than 50 pounds (23 kg). Make sure all chains, hooks, and slings are in good condition and are of correct capacity. Make sure hooks are positioned correctly.**

**WARNING**

**MOVING MACHINERY**



**Be very careful when operating or working near moving machinery. Running engine, rotating shafts, and other moving parts could cause personal injury or death.**

**WARNING**

**WINCH OPERATION**

- **All personnel must stand clear during winching operations. A snapped cable or shifting load could cause death or injury to personnel.**
- **When hooking up for winching operations, position throat (open part) of hook upward in case overloading straightens out hook. Failure to do this may result in death or injury to personnel.**
- **The cable drum requires a minimum of three or four wraps of wire rope (cable) for safety. Failure to obey this warning could result in death or injury to personnel or damage to equipment.**
- **Be careful when handling the winch cable. Make sure cut ends are taped. Make sure cut ends of cable on winch assembly are securely fastened down. Failure to heed this warning may result in injury to personnel.**
- **Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.**
- **The cable drum requires a minimum of three or four wraps of wire rope (cable) for safety. Failure to obey this warning could result in death or injury to personnel or damage to equipment.**

**WARNING****LOAD HANDLING SYSTEM (LHS) OPERATION**

Check for overhead power lines or other obstructions before attempting operation of the LHS. The LHS reaches a height of 22 feet, 2 inches (6.7 m). Serious injury or death could result from contact with electric power lines.

**WARNING****BRIDGE ADAPTER PALLET (BAP) OPERATION**

- Keep hands and fingers clear of all locks and rollers while operating the BAP. Failure to heed this warning may result in serious injury to personnel.
- Make sure all switches, locks, and rear guide assemblies are in the correct position for loading or unloading the BAP or bridge bay. Incorrectly positioned switches, locks, and/or rear guide assemblies could allow load to shift or fall, resulting in death or injury to personnel.
- Prior to and during any load or unload cycle, all personnel should stay clear of the LHS and the BAP or death or serious injury to personnel could result.

**WARNING****BRIDGING OPERATIONS**

- Make sure a ground guide is used for all bridging operations. Failure to use a ground guide could result in the Transporter crashing into an obstruction or coming in contact with power lines, resulting in death or injury to personnel.
- After releasing rear guide locks, only the winch hook secures bridge bay to the BAP. Personnel must not mount the BAP and must stay clear of the area around rear of Transporter. The load could shift, release, or fall, resulting in death or injury to personnel.
- Make sure all appropriate bridge bay latches are hooked during operation or death or injury to personnel could result.
- Unloading the BAP without disengaging hold-down locks could result in death or injury to personnel or damage to equipment.
- Before performing bridging operations, conduct a site survey and make sure side-to-side slope does not exceed 8 percent (5 degrees), the ground in the transport area is firm, the area around the Transporter is free of personnel and obstructions, and overhead clearance is at least 22 feet, 2 inches (6.7 m) above the loading area. Failure to conduct a site survey could cause the Transporter to slip, turn over, crash into an obstruction, or come into contact with power lines, resulting in death or injury to personnel. Water velocity should not be greater than 8 feet (2.4 m) per second (TM 5-5420-209-12). See page 2-64 for water velocity requirements for all launch conditions.

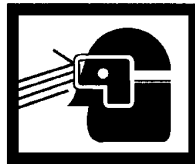
**WARNING**

**BRIDGING OPERATIONS (continued)**

- After water operations, Transporter brakes will be wet and will not stop as quickly as usual. Care must be taken and extra distance allowed for slowing or stopping the Transporter. Slipping brakes could result in death or injury to personnel or damage to equipment.
- When the NO TRANSIT WHEN LIT indicator light is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator light is illuminated could result in death or injury to personnel or damage to equipment.
- Trailer wheels must be chocked during transfer operations or death or serious injury to personnel could result.
- Reposition and lock both rear guides after bridge bay retrieval. Failure to reposition and secure rear guides after bridge bays are loaded could result in lost bridge bays or Transporter rollover during transport, causing death or severe injury to personnel.

**WARNING**

**PARTS UNDER PRESSURE**



Wear safety goggles and use caution when removing or installing springs, snaprings, retaining rings, and other parts under spring tension. These parts can act as projectiles, resulting in serious injury to personnel.

**WARNING**

**HEAVY PARTS**

- The compression frame weighs 835 pounds (379 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.
- The hook weighs 200 pounds (91 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.
- The hook arm weighs 1025 pounds (465.35 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.
- The hook arm cylinder weighs 210 pounds (95 kg), and the main frame cylinder weighs 325 pounds (148 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.



**WARNING****HEAVY PARTS (continued)**

- **Cylinder weight exceeds the handling weight for one person. Two people are required to lift and handle the cylinder. Failure to comply with this warning may result in injury to personnel.**
- **The main frame weighs 925 pounds (419.95 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.**
- **The main frame and hook arm have a combined weight of 1950 pounds (885.3 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.**
- **The rear roller assembly weighs 375 pounds (170 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.**
- **The support frame weighs 115 pounds (52.2 kg). Attach a suitable lifting device prior to removal or installation, to prevent possible injury to personnel.**
- **A suitable lifting device is required for removing or installing the Bridge Adapter Pallet catwalk because each large catwalk section weighs approximately 160 pounds (72.6 kg) and each small catwalk section weighs approximately 68 pounds (30.8 kg). Failure to use a lifting device could result in injury to personnel.**
- **After removing deck, caution must be used as brackets are sharp. Failure to use care in this area may result in injury to personnel.**



Change  
No. 3

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C. 11 September 2005

**OPERATOR'S, UNIT, DIRECT SUPPORT,  
AND GENERAL SUPPORT MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)  
FOR  
TRUCK, CARGO, 10-TON, 8X8  
COMMON BRIDGE TRANSPORTER,  
M1977 WITHOUT WINCH NSN 2320-01-442-1940, EIC: DVZ  
M1977A2 WITHOUT WINCH NSN 2320-01-492-8218  
M1977A2R1 WITHOUT WINCH NSN 2320-01-492-8228  
M1977 WITH WINCH NSN 2320-01-443-8023, EIC: DV4  
M1977A2 WITH WINCH NSN 2320-01-492-8219  
M1977A2R1 WITH WINCH NSN 2320-01-492-8229  
AND  
PALLET, BRIDGE ADAPTER, M15  
NSN 3990-01-442-1939, EIC: DV5**

Current as of: 30 Mar 2004

TM 5-5420-234-14&P, 15 July 1999, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page. Changes to illustrations are indicated by miniature pointing hands.
3. New or changed material to existing text in the Repair Parts and Special Tools List (RPSTL) is indicated by an asterisk (\*) placed to the left of the item number. The asterisk indicates the current change only.
4. New or revised illustrations and text pages in the RPSTL are identified by a change number (C03) placed to the right of the TM designation at the top of the effective page.
5. This change implements Army Maintenance Transformation and changes the MAC to support Field and Sustainment Maintenance.

**Remove Pages**

LOEP A through D (blank)  
i through iv  
1-9 and 1-10  
2-35 and 2-36  
2-39 and 2-40  
2-43 and 2-44  
2-47 and 2-48  
2-115 through 2-118  
2-123 and 2-124  
2-133 and 2-134  
2-143 and 2-144  
3-1 and 3-2  
3-11 and 3-12

**Insert Pages**

LOEP A through D (blank)  
i through iv  
1-9 and 1-10  
2-35 and 2-36  
2-39 and 2-40  
2-43 and 2-44  
2-47 and 2-48  
2-115 through 2-118  
2-123 and 2-124  
2-133 and 2-134  
2-143 and 2-144  
3-1 and 3-2  
3-11 and 3-12

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

**TM 5-5420-234-14&P**

**Remove Pages**

3-15 and 3-16 (blank)  
4-1 and 4-2  
4-17 and 4-18  
4-429 through 4-436  
4-451 through 4-456  
4-469 and 4-470  
4-503 through 4-508  
4-572.1 and 4-572.2  
4-574.1 through 4-576  
5-103 through 5-106  
B-1 through B-12 (blank)  
1-1 through Figure 3  
9-1 through Figure 11  
Figure 13 through Figure 14  
15-1 and Figure 16  
23-1 and Figure 24  
Figure 34A through 35-2  
Figure 37 through Figure 38  
41A-1 through Figure 43  
48-1 and Figure 49  
50-1 and 50-2  
BULK-1 and Figure 57  
F-1 through F-39  
H-1 and H-2


**Insert Pages**

3-15 and 3-16 (blank)  
4-1 and 4-2  
4-17 and 4-18  
4-429 through 4-436  
4-451 through 4-456  
4-469 through 4-470  
4-503 through 4-508  
4-572.1 and 4-572.2  
4-574.1 through 4-576  
5-103 through 5-106  
B-1 through B-12  
1-1 through Figure 3  
9-1 through Figure 11  
Figure 13 through Figure 14  
15-1 and Figure 16  
23-1 and Figure 24  
Figure 34A through 35-2  
Figure 37 through Figure 38  
41A-1 through Figure 43  
48-1 and Figure 49  
50-1 and 50-2  
BULK-1 and Figure 57  
F-1 through F-39  
H-1 and H-2

5. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

Official:

  
SANDRA R. RILEY  
*Administrative Assistant to the  
Secretary of the Army*  
0425401

PETER J. SCHOOMAKER  
*General, United States Army  
Chief of Staff*

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256521, TM 5-5420-234-14&P.

CHANGE

NO. 2

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON , D.C., 1 October 2003

**OPERATOR'S, UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT  
MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)  
FOR  
TRUCK, CARGO, 10-TON, 8X8,  
COMMON BRIDGE TRANSPORTER,  
M1977 WITHOUT WINCH NSN 2320-01-442-1940, EIC: DVZ  
M1977A2 WITHOUT WINCH NSN 2320-01-492-8218  
M1977A2R1 WITHOUT WINCH NSN 2320-01-492-8228  
M1977 WITH WINCH NSN 2320-01-443-8023, EIC: DV4  
M1977A2 WITH WINCH NSN 2320-01-492-8219  
M1977A2R1 WITH WINCH NSN 2320-01-492-8229  
AND  
PALLET, BRIDGE ADAPTER, M15  
NSN 3990-01-442-1939, EIC: DV5**

Current as of: 1 Oct 2000

TM 5-5420-234-14&P, 15 July 1999, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration.
4. New or changed material to existing text in the Repair Parts and Special Tools List (RPSTL) is indicated by an asterisk (\*) placed to the left of the item number. The asterisk indicates the current change only.
5. New or revised illustrations and text pages in the RPSTL are identified by a change number (C01) placed to the right of the TM designation at the top of the effective page.

**Remove Pages**

Cover  
None  
  
i and ii  
None  
2-23 and 2-24  
2-37 through 2-40  
2-45 through 2-48  
2-103 through 2-108  
2-117 and 2-118

**Insert Pages**

Cover  
Change 2 List of Effective  
Pages  
i and ii  
2-22.1 and 2-22.2 (blank)  
2-23 and 2-24  
2-37 through 2-40  
2-45 through 2-48  
2-103 through 2-108  
2-117 and 2-118

**Remove Pages**

2-123 and 2-124  
2-133 and 2-2-134  
2-137 through 2-140  
2-143 and 2-144  
4-584.5 through 4-584.10  
5-75 and 5-76  
None  
5-77 and 5-78  
C-3 and C-4  
Figure 34A through 35-2  
47-1 through Figure 47B

**Insert Pages**

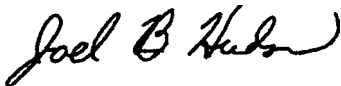
2-123 and 2-124  
2-133 and 2-2-134  
2-137 through 2-140  
2-143 and 2-144  
4-584.5 through 4-584.10  
5-75 and 5-76  
5-76.1 and 5-76.2 (blank)  
5-77 and 5-78  
C-3 and C-4  
Figure 34A through 35-2  
47-1 through Figure 47B

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By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON  
*Administrative Assistant to the  
Secretary of the Army*

0322402

ERIC K. SHINSEKI  
*General, United States Army  
Chief of Staff*

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CHANGE

NO. 1

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON , D.C., 15 December 2000

**OPERATOR'S, UNIT, DIRECT  
SUPPORT, AND GENERAL SUPPORT  
MAINTENANCE MANUAL(INCLUDING  
REPAIR PARTS AND SPECIAL  
TOOLS LIST)  
FOR  
TRUCK,CARGO, 10-TON, 8X8 COMMON BRIDGE  
TRANSPORTER, M1977 WITHOUT WINCH  
NSN 2320-01-442-1940, EIC: DVZ  
WITH WINCH  
NSN 2320-01-443-8023, EIC: DV4  
PALLET, BRIDGE ADAPTER, M15  
NSN 3990-01-442-1939, EIC: DV5**

Current as of: 1 Oct 2000

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5. New or revised illustrations and text pages in the RPSTL are identified by a change number (C01) placed to the right of the TM designation at the top of the effective page.

<b>Remove Pages</b>	<b>Insert Pages</b>	<b>Remove Pages</b>	<b>Insert Pages</b>
	Change 1 List of Effective Pages	2-23 and 2-24	2-23 and 2-24
g and h (blank)	g and h (blank)	2-31 through 2-34	2-31 through 2-34
i through vi	i through vi	3-1 and 3-2	3-1 and 3-2
1-1 through 1-8	1-1 through 1-8	3-13 through 3-16	3-13 through 3-16
1-13 and 1-14	1-13 and 1-14	(blank)	(blank)
2-1 through 2-8	2-1 through 2-8	4-1 through 4-4	4-1 through 4-4
2-13 through 2-18	2-13 through 2-18	4-9 and 4-10	4-9 and 4-10
		4-13 through 4-18	4-13 through 4-18

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Remove Pages	Insert Pages	Remove Pages	Insert Pages
	4-20.1 through 4-21.1 (blank)	5-107 through 5-110	5-107 through 5-110
4-45 through 4-262	4-45 through 4-262	5-113 and 5-114	5-113 and 5-114
4-265 through 4-276	4-265 through 4-276	5-121 and 5-122	5-121 and 5-122
4-297 through 4-300	4-297 through 4-300	5-137 through 5-144	5-137 through 5-144
4-349 and 4-350	4-349 through 4-350		
4-361 and 4-362	4-361 and 4-362	5-149 through 5-160	5-149 through 5-160
4-387 through 4-416	4-387 through 4-416		
4-417 through 4-526	4-417 through 4-526	B-3 through B-10	B-3 through B-10
	4-530.1 and 4-530.2 (blank)	C-3 and C-4	C-3 and C-4
			C-5 and C-6
4-531 and 4-532	4-531 and 4-532	D-1 and D-2	D-1 and D-2
4-537 through 4-540	4-537 through 4-540	E-1 through E-4	E-1 through E-4
	4-540.1 through 4-540.8 (blank)		F-1 through F-40
	4-542.1 through 4-542.4 (blank)	1-1 through 56-1	1-1 through 56-1
		KITS-1 and KITS-2	KITS-1 and KITS-2
4-543 through 4-546	4-543 through 4-546	BULK-1 and Figure 57	BULK-1 and Figure 57
4-551 through 4-594	4-551 through 4-594		
4-605 through 4-664	4-605 through 4-664	57-1	57-1
4-667 through 4-672	4-667 through 4-672		J-9
4-675 and 4-676	4-675 and 4-676	K-1 through K-6 (blank) (blank)	K-1 through K-6
5-1 and 5-2	5-1 and 5-2		L-1 through L-4 (blank)
5-75 through 5-80	5-75 through 5-80	Index-1 through Index-6	Index-1 through Index 6
5-97 and 5-98	5-97 and 5-98		
5-103 and 5-104	5-103 and 5-104	Rear Cover	Rear Cover

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON

*Administrative Assistant to the  
Secretary of the Army*  
0027801

ERIC K. SHINSEKI  
*General, United States Army*  
*Chief of Staff*

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# LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: The portion of text or illustration effected by the updates is indicated by a vertical line in the outer margin of the page.

Dates of issue for original and updated pages/work packages are:

Original.....0.....15 JUL 99                      Change.....2.....1 OCT 03  
 Change.....1.....15 DEC 00                      Change.....3.....11 SEP 05

**TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 40 AND TOTAL NUMBER OF PAGES IS 1,590 CONSISTING OF THE FOLLOWING:**

Page/WP No.	*Change No.	Page/WP No.	*Change No.	Page/WP No.	*Change No.
Front cover .....	2	2-31 through 2-33 .....	1	4-2 and 4-3 .....	1
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**OPERATOR’S, UNIT, DIRECT SUPPORT, AND  
GENERAL SUPPORT MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)  
FOR  
TRUCK, CARGO, 10-TON, 8X8, COMMON BRIDGE TRANSPORTER,  
M1977 WITHOUT WINCH NSN 2320-01-442-1940, EIC: DVZ  
M1977A2 WITHOUT WINCH NSN 2320-01-492-8218  
M1977A2R1 WITHOUT WINCH NSN 2320-01-492-8228  
M1977 WITH WINCH NSN 2320-01-443-8023, EIC: DV4  
M1977A2 WITH WINCH NSN 2320-01-492-8219  
M1977A2R1 WITH WINCH NSN 2320-01-492-8229  
AND  
PALLET, BRIDGE ADAPTER, M15  
NSN 3990-01-442-1939, EIC: DV5**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (*Recommended Changes to Equipment Technical Publications*), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeprs.ria.army.mil>. If you need a password, scroll down and click on “ACCESS REQUEST FORM”. The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or e-mail your letter, DA Form 2028 direct to: AMSTA-LC-CI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is: TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

Approved for public release; distribution is unlimited

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## HOW TO USE THIS MANUAL

### SCOPE.

This technical manual provides you with the information you will need to operate and maintain the M1977 Common Bridge Transporter (CBT) and the M15 Bridge Adapter Pallet (BAP). You will also need the M977 Heavy Expanded Mobility Tactical Truck (HEMTT) technical manuals (TM 9-2320-279-Series) for vehicle operation and maintenance. Bridging operations are covered in FM 90-13. The ribbon bridge is covered in TM 5-5420-209-12. For any HEMTT item or procedure not included in this manual, refer to the appropriate HEMTT technical manual referenced in Appendix A.

The information contained in this manual is presented in 6 chapters and 11 appendixes, one of which is a repair parts and special tools list (RPSTL). The chapters are divided into sections covering operation or maintenance procedures and/or other information for specific systems or components.

Note that Appendix A gives the title of every manual, form, pamphlet, or other document referenced in this manual.

### INDEXING.

Three indexing procedures are used to help you locate information quickly:

- Cover index. Lists chapter and appendix titles and other important parts of the manual, with corresponding page numbers. Each chapter/appendix or part listed is boxed in.
- Table of contents. The table of contents follows the warning summary. The table of contents lists all chapters and sections numerically, with corresponding page numbers.
- Chapter indexes. Each chapter starts with a numerical listing of all sections and paragraphs in that chapter.
- Index. The alphabetically arranged subject index starts on page Index-1.

### WARNINGS, CAUTIONS, AND NOTES.

You must read and understand this manual BEFORE operating the CBT and the BAP.

Throughout this manual you will see WARNING, CAUTION, and NOTE headings. There are good reasons for every one of these notices.

#### WARNING

**A WARNING is used to alert the user to hazardous operating and maintenance procedures, practices, or conditions that could result in injury or death. WARNINGS must be strictly observed.**

**WARNINGS, CAUTIONS, AND NOTES (continued).**

**CAUTION**

A **CAUTION** is used to alert the user to hazardous operating and maintenance procedures, practices, or conditions that could result in damage to, or destruction of, equipment or mission effectiveness. **CAUTIONs** must be strictly observed.

**NOTE**

A **NOTE** highlights an essential operating or maintenance procedure, condition, or statement.

**WARNINGs** and **CAUTIONs** appear immediately preceding the step to which they pertain. It is important to read and thoroughly understand the **WARNINGs** and/or **CAUTIONs** before beginning maintenance.

**NOTEs** may precede or follow the steps to which they pertain, depending on what makes the most sense.

# CHAPTER 1

## INTRODUCTION

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### Section I. GENERAL INFORMATION

**1-1. SCOPE.**

This chapter provides general information, equipment descriptions, and principles of operation for the Common Bridge Transporter (CBT) and the M15 Bridge Adapter Pallet (BAP).

- a. Type of Manual.** This technical manual (TM) provides CBT Operator’s instructions; Unit, Direct Support, and General Support maintenance instructions; and a Repair Parts and Special Tools List (RPSTL). Troubleshooting procedures and preventive maintenance checks and services procedures are also included.
- b. Equipment Name.**

  - (1) The M1977 CBT consists of a modified M977 Heavy Expanded Mobility Tactical Truck (HEMTT) (with or without a winch) and a Load Handling System (LHS), which together are called the “CBT” (Model A or B) (often referred to as “Transporter”). See page 1-7 for identification of Model A and B.
  - (2) The CBT System consists of an M1977 CBT and either an M15 BAP or an M14 Improved Boat Cradle (IBC).
- c. Purpose of Equipment.** The CBT provides the capability for transporting, launching, and retrieving elements of the rapidly deployable Military Load Class 70 Improved Float Bridge (Ribbon Bridge) and the Bridge Erection Boat, Twin Jet, Aluminum Hull (Models USCSBMK1, national stock number [NSN] 1940-01-105-5728, and USCSBMK2, NSN 1940-01-218-2165). The CBT also provides the capability for performing cargo-hauling missions using the Palletized Load System (PLS) flatrack loaded to 10 tons (9 metric tons). The CBT is capable of towing the PLS trailer to increase hauling capabilities.

**1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in the Maintenance Management Update.

**1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.**

Procedures for the destruction of Army materiel to prevent enemy use are contained in TM 750-244-3.

**1-4. PREPARATION FOR STORAGE OR SHIPMENT.**

Information on preparing the CBT for storage or shipment is in Section VIII of Chapter 4.

**1-5. QUALITY ASSURANCE.**

- a. No specific quality assurance manual pertains to the M1977 CBT and the M15 BAP.
- b. Defective material received through the supply system should be reported on SF Form 368. Instructions for preparing the reports are provided in AR 702-7. Mail your completed form directly to:

Commander  
U.S. Army Tank-automotive and Armaments Command  
ATTN: AMSTA-TR-E-MPA  
Warren, MI 48397-5000

**1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS.**

If your CBT needs improvement, let us know. Send us an equipment improvement recommendation (EIR). You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Describe the problem on an SF Form 368 (Product Quality Deficiency Report) and mail it to us at Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E-MPA, Warren, MI 48397-5000. We will send you a reply.

**1-7. WARRANTY INFORMATION.**

For complete information covering the warranty for the CBT, refer to TB 5-5420-234-15, *Warranty Program for the Common Bridge Transporter (CBT)*. There is no warranty for the BAP.

## 1-8. CORROSION PREVENTION AND CONTROL.

- a.* Corrosion prevention and control (CPC) of Army materiel is a continuing concern, particularly since the CBT usually operates in a wet environment. It is important that any corrosion problems be reported so they can be corrected and improvements can be made to prevent problems in the future.
- b.* While corrosion is typically associated with the rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.
- c.* If a corrosion problem is identified, it can be reported using SF Form 368. The use of key words, such as "corrosion," "rust," "deterioration," and "cracking," will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA Pam 738-750.

## 1-9. LIST OF ABBREVIATIONS AND ACRONYMS.

AMDF	Army Master Data File
AOAP	Army Oil Analysis Program
BAP	Bridge Adapter Pallet
BII	basic issue items
BOI	basis of issue
CAGEC	Commercial and Government Entity Code
CARC	chemical agent resistant coating
CBT	Common Bridge Transporter
cm	centimeter
COEI	components of end item
CPC	corrosion prevention and control
CTA	Common Table of Allowances
dia.	diameter
DS	Direct Support
EIC	end-item code
EIR	Equipment Improvement Recommendation
ft	foot
GAA	grease, automotive and artillery
gal.	gallon
gpm	gallons per minute
GS	General Support
HEMTT	Heavy Expanded Mobility Tactical Truck
IBC	Improved Boat Cradle
in.	inch
JTA	Joint Table of Allowances
kg	kilogram
km	kilometer
lb	pound
LED	Light Emitting Diode
LH	left-hand
LHS	Load Handling System
MAC	maintenance allocation chart
mi	mile
MLC	military load class
MTOE	Modified Tables of Organization and Equipment

**1-9. LIST OF ABBREVIATIONS AND ACRONYMS (continued).**

NIIN	national item identification number
NSN	national stock number
OEA	oil, engine, arctic
OE/HDO	oil, engine/hydraulic oil
oz	ounce
PLS	Palletized Load System
PMCS	preventive maintenance checks and services
PTO	power takeoff
Qty. Recm.	quantity recommended
Qty. Rqr.	quantity required
RCU	remote control unit
RH	right-hand
RPSTL	repair parts and special tools list
SMR	source, maintenance, and recoverability
SRA	specialized repair activity
TDA	Tables of Distribution and Allowances
TM	technical manual
TMDE	test, measuring, and diagnostic equipment
TOE	Tables of Organization and Equipment
u/m	unit of measure
UOC	usable-on code
V dc	Volts, direct current



Section II. EQUIPMENT DESCRIPTION

**1-10. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.**

*a. Characteristics.* The M1977 CBT is made up of a Transporter, consisting of a remanufactured and modified M977 HEMTT truck chassis with a self-contained LHS and either a BAP or an IBC. The CBT is used for loading, transporting, and unloading bridge erection boats and interior bridge bays and ramp bridge bays. The CBT is also capable of launching and retrieving the bridge bays and bridge erection boats. The operator can manipulate the LHS through controls mounted in the truck cab or through an external hand-held remote control unit provided the power takeoff (PTO) switch is engaged. For a detailed explanation of support equipment characteristics, capabilities, and features, refer to TM 9-2320-279-10 for the HEMTT, to TM 5-1940-277-10 for the bridge erection boat, and to TM 5-5420-277-14&P for the IBC.

*b. Capabilities and Features.*

**HEMTT:** See TM 9-2320-279-10

**Bridge Erection Boat:** See TM 5-1940-277-10

**IBC:** See TM 5-5420-277-14&P

**Ribbon Bridge:** See TM 5-5420-209-12

**LHS:**

Maximum lifting load 20,000 lb (9080 kg)

Operational modes Automatic  
Manual

Operational controls Cab control  
Remote control

Night operation Worklight  
Spotlight

**BAP:**

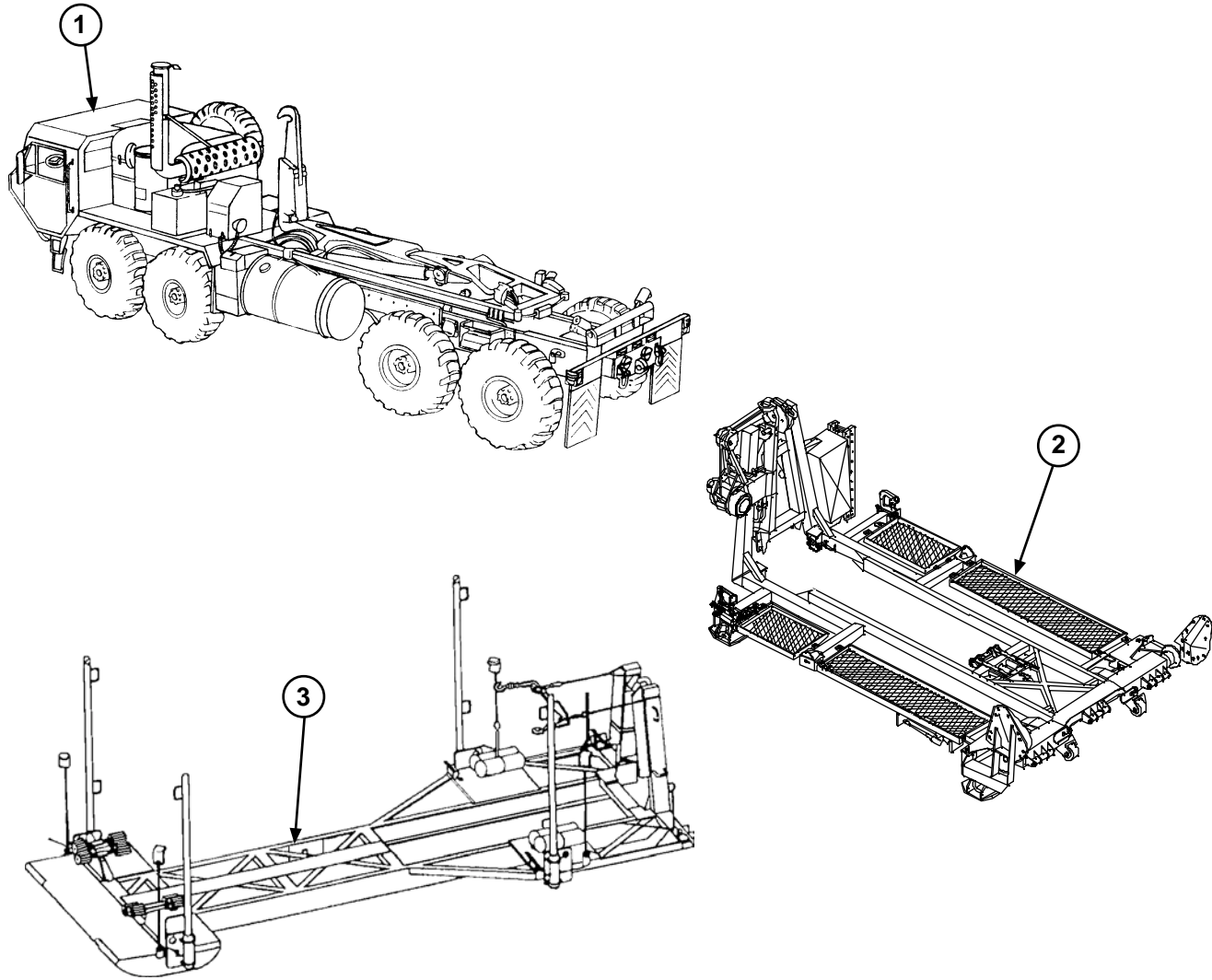
Multipurpose flatrack Accommodates interior bay and ramp bay

Winch frame Can be secured to the LHS or the BAP

Winch Hydraulic

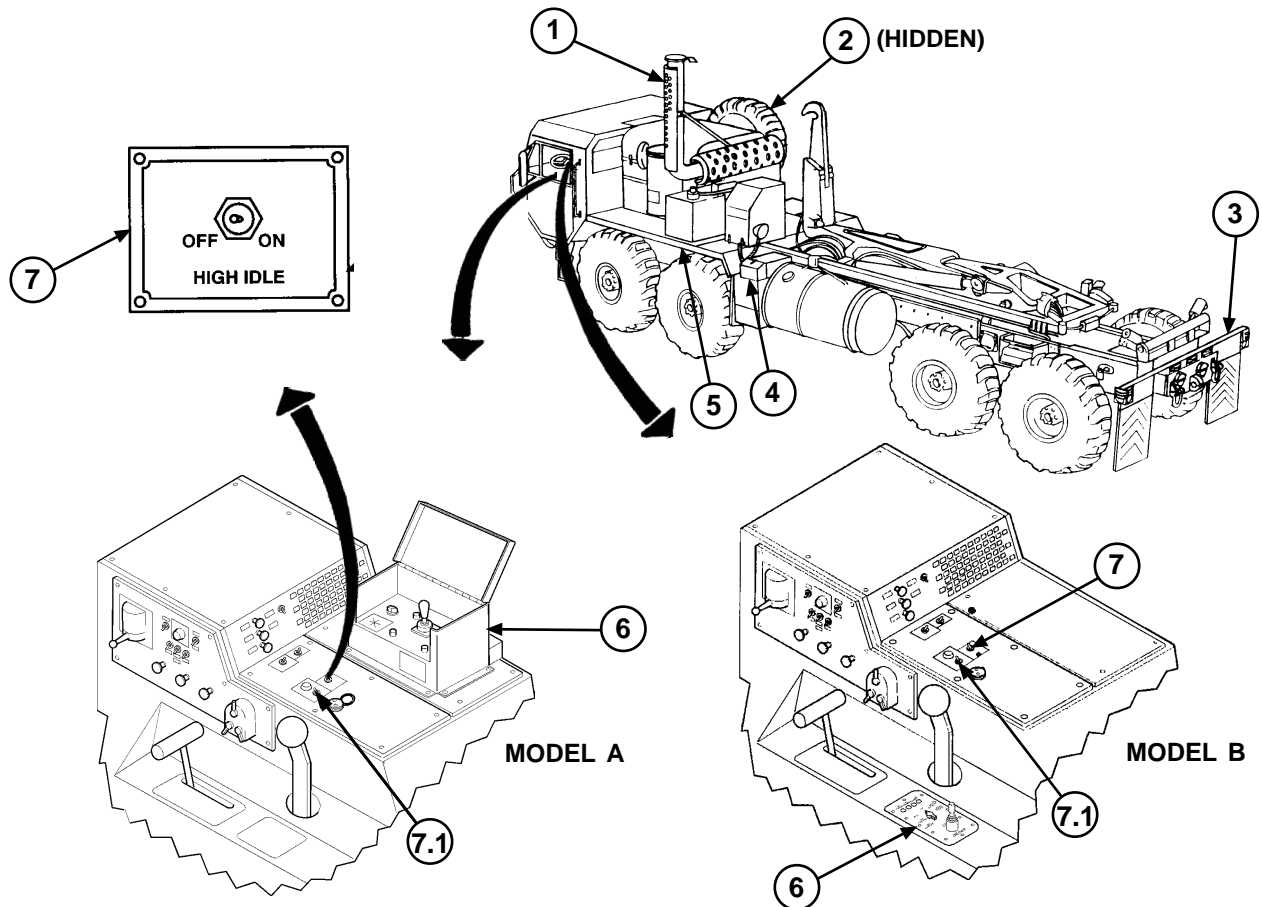
**1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.**

Major components and accessories found on the CBT are illustrated and described on pages 1-5 through 1-11.



**Figure 1-1. CBT System Components**

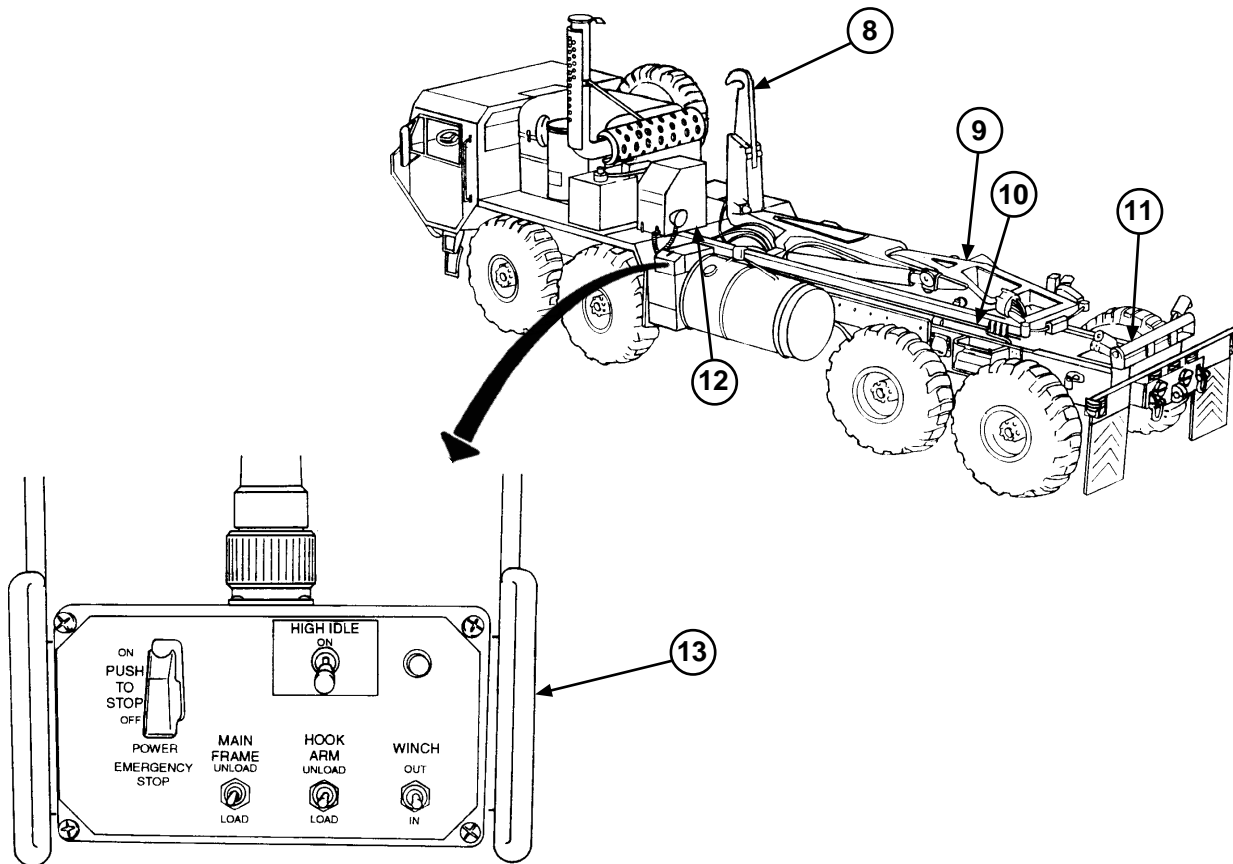
1. **CBT (M1977).** A modified M977 HEMTT with an LHS provides load/unload capability for a BAP, an IBC, or a NATO flatrack.
2. **BAP.** A special multipurpose removable flatrack used to transport and load or unload an interior bridge bay or a ramp bridge bay section.
3. **IBC.** The IBC is used to adapt the CBT for transport, launch, and retrieval of the Bridge Erection Boat.

**1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).**


**Figure 1-2. CBT (M1977) Components (Sheet 1 of 2)**

1. **EXHAUST EXTENSION ASSEMBLY.** (Model A only) Raises exhaust system above the operator's area.
2. **MOUNTING LADDER.** Provides for easy access to work platform.
3. **MUDFLAP ASSEMBLY.** Provides a mounting bracket for reflectors and running lights.
4. **REMOTE CONTROL STOWAGE BOX.** Provides stowage location for remote control box when not in use.
5. **FENDER SUPPORT ASSEMBLY.** Provides additional support for fender.
6. **LHS CAB CONTROL BOX.** Contains all switches necessary for operating the CBT from inside the truck cab. Mounted on center console.
7. **HIGH IDLE CONTROL SWITCH.** Switches engine into a high idle to increase hydraulic pressure. Added to center control console.
- 7.1 **PTO ENGAGE SWITCH AND INDICATOR.** Engages and disengages PTO and illuminates when PTO is engaged.

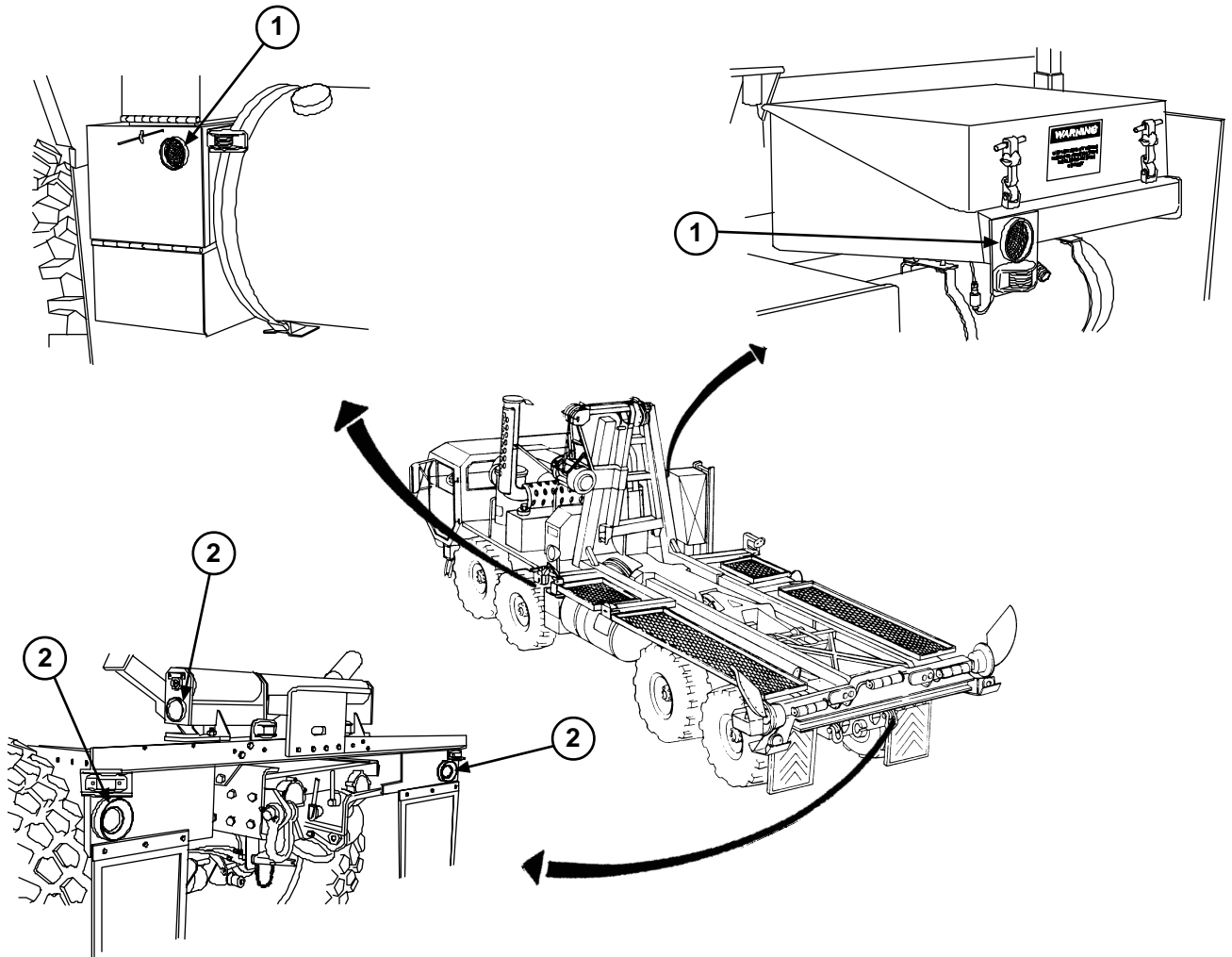
**1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).**



**Figure 1-2. CBT (M1977) Components (Sheet 2 of 2)**

- 8. LHS HOOK ARM ASSEMBLY.** Serves as a lifting device for the IBC, NATO flatrack, BAP, and BAP winch assembly during loading, unloading, and launching operations for other auxiliary equipment.
- 9. LHS MAIN FRAME.** Used in conjunction with LHS hook arm assembly during loading, unloading, and launching operations for other auxiliary equipment.
- 10. LHS COMPRESSION FRAME.** Mounted to Transporter, it serves as a stable platform for operations involving LHS hook arm assembly and LHS main frame.
- 11. LHS REAR ROLLER ASSEMBLY.** Captures and guides the BAP and IBC during loading operations. Angled rollers centralize the BAP, and horizontal rollers support the BAP.
- 12. HYDRAULIC CABINET ASSEMBLY.** Houses the hydraulic unit, consisting of manifold assemblies, valves, and solenoids for LHS hydraulics and BAP winch assembly. Also used in an emergency to operate LHS using another truck.
- 13. REMOTE CONTROL UNIT.** Located in the remote control stowage box, it provides the controls necessary to operate the system outside the truck cab from road side or curb side.

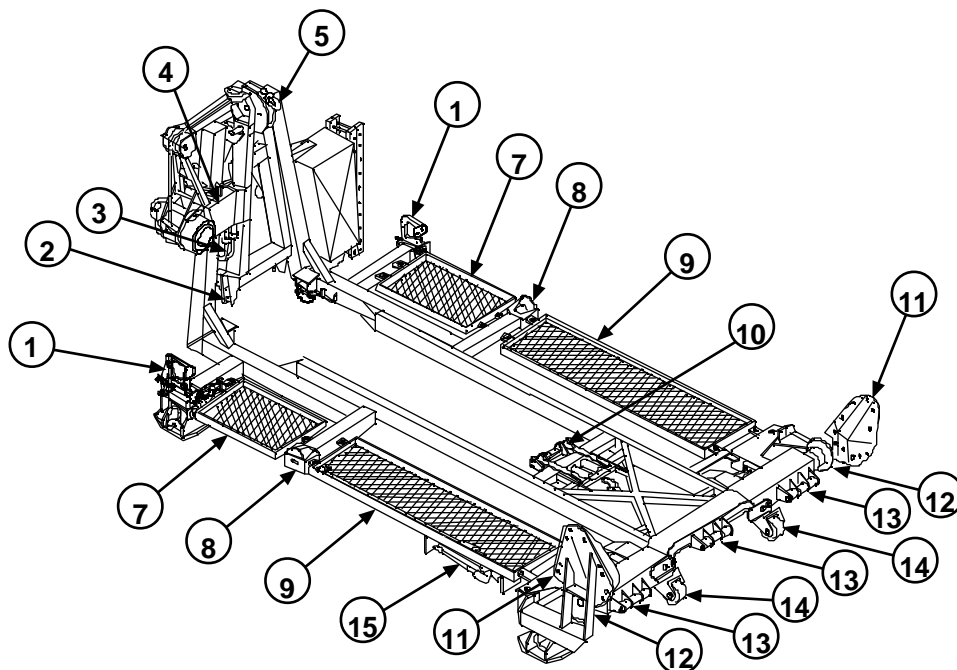
**1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).**



**Figure 1-3. CBT (M1977) Reflectors**

- 1. AMBER REFLECTORS.** Located at curb side and road side of the CBT.
- 2. RED REFLECTORS.** Located on mudflap assembly at the rear of the CBT.

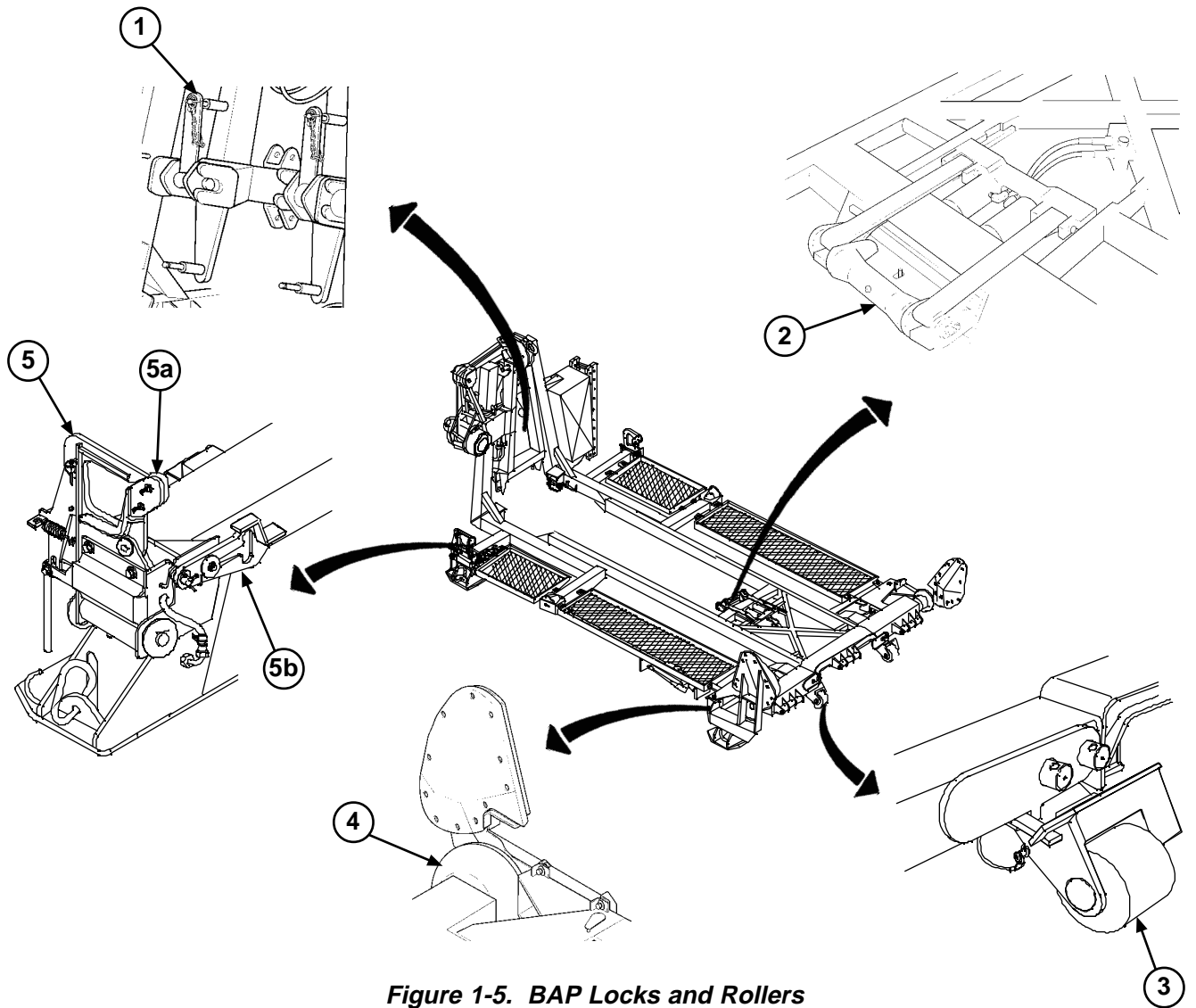
**1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).**



**Figure 1-4. BAP Components**

1. **FRONT PIN LOCK ASSEMBLY.** Locks front pins of the bridge bay assembly.
2. **WINCH FRAME LOCKING LEVERS.** Lock winch frame to the BAP or the LHS for specific operations.
3. **WINCH HYDRAULIC HOSES.** Provide interface between LHS hydraulics and winch assembly.
4. **WINCH AND FRAME ASSEMBLY.** Lifts, loads, launches, retrieves, and unloads various bridge bays.
5. **HOOK ASSEMBLY.** Provides the means to attach winch cable to load being lifted.
6. (Deleted)
7. **FRONT CATWALK.** Provides a walkway and work platform when the BAP is empty.
8. **FRONT ROLLER ASSEMBLY.** Provides support and smooth movement for bridge bay assembly.
9. **REAR CATWALK.** Provides a walkway and work platform when the BAP is empty.
10. **CENTER ROLLER ASSEMBLY.** Provides support and smooth movement for free launch of bridge bay.
11. **REAR GUIDE.** Provides guidance for bridge bay during loading and locks rear bay pin.
12. **REAR ROLLER ASSEMBLY.** Provides support and smooth movement for bridge bay.
13. **REAR BUMPER ASSEMBLY.** Provides guidance for the BAP during loading and unloading.
14. **TRANSLOAD ROLLER ASSEMBLY.** Provides guidance for boat cradle during loading, a means to lock rear pins during transit, and support and smooth movement for boat cradle.
15. **HYDRAULIC HAND PUMP.** Extends center roller and transload roller cylinders.

**1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (continued).**



**Figure 1-5. BAP Locks and Rollers**

- 1. WINCH FRAME LOCKING LEVERS.** Lock winch frame to the BAP or the LHS for specific operations.
- 2. CENTER ROLLER.** Provides support and smooth movement for free launch of bridge bay.
- 3. TRANSLOAD ROLLERS.** Provide guidance for the BAP during transloading to the PLS trailer.
- 4. REAR GUIDES AND ROLLERS.** Guide the bridge bay into position on the BAP during loading.
- 5. FRONT PIN LOCKS.** Lock front pins of the bridge bay assembly.
  - 5a. JAW.**
  - 5b. LATCH.**

**1-12. EQUIPMENT DATA.**

Refer to the following tables for specific equipment data.

**Table 1-1. Transporter**

Item	Specification
Equipment data .....	See TM 9-2320-279-10
Transporter range .....	300 mi (483 km)
Dimensions and weight (ready for travel)	
Not loaded (BAP installed):	
Weight .....	36,068 lb (16,374 kg)
Length .....	393.5 in. (999 cm)
Width .....	138.6 in. (352 cm)
Height .....	148.5 in. (377 cm)
Loaded with ramp bay on the BAP:	
Weight .....	54,106 lb (24,564 kg)
Length .....	431.9 in. (1097 cm)
Width .....	138.6 in. (352 cm)
Height .....	157.25 in. (399 cm)
Loaded with interior bay on the BAP:	
Weight .....	54,406 lb (24,700 kg)
Length .....	460 in. (1168 cm)
Width .....	138.6 in. (350 cm)
Height .....	157.25 in. (399 cm)

**Table 1-2. The LHS**

Item	Specification
Maximum lifting load .....	20,000 lb (9080 kg)
Electric power:	
Voltage .....	24 V dc

**Table 1-3. The BAP (Empty)**

Item	Specification
Dimensions:	
Weight .....	5810 lb (2637 kg)
Length .....	256 in. (650 cm)
Width .....	134 in. (340 cm)
Height .....	107 in. (271 cm)



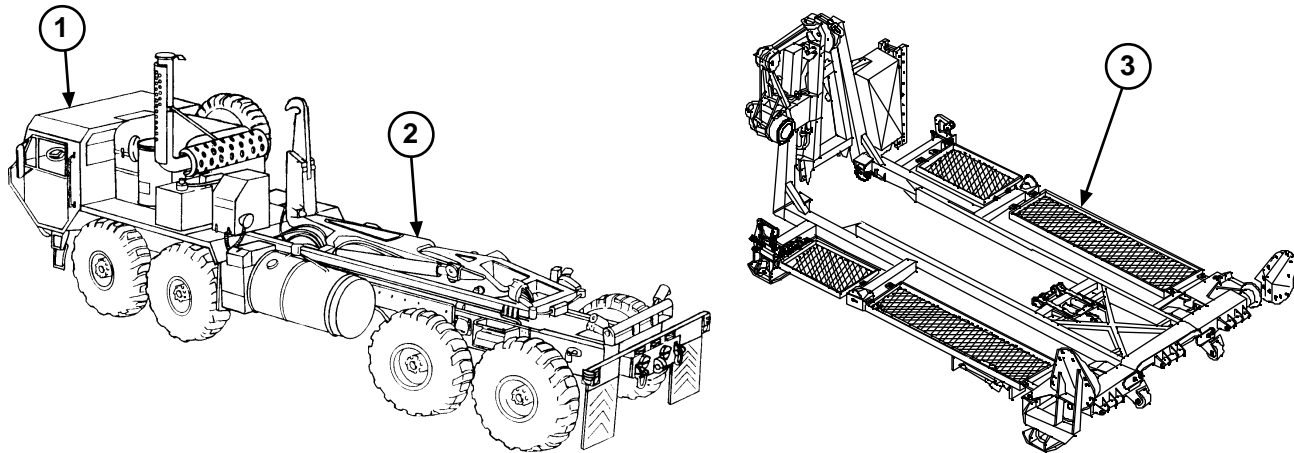
**1-12. EQUIPMENT DATA (continued).**

*Table 1-4. Military Load Class (MLS) Ratings*

<b>Configuration</b>	<b>MLC</b>
CBT, unloaded	18
CBT, unloaded with empty M1076 trailer	22
CBT with loaded BAP (with interior bay)	24
CBT with loaded BAP (with ramp bay)	23
CBT with IBC and boat	22
CBT, maximum load	27
CBT with loaded M1076 trailer and loaded BAP (one interior bay and one ramp bay)	34
CBT and M1076 trailer; with loaded BAP, or IBC and boat	33
CBT with M1076 trailer, maximum load	39

### Section III. PRINCIPLES OF OPERATION

The function of the CBT is to allow a bridge company to rapidly transport bridge components that provide the means for military load class 70 vehicular equipment or personnel to cross large, nonfordable streams or rivers.



1. **Truck.** Transports bridge components and support equipment to and from a bridge construction site. Also provides basic electric power and hydraulic pressure that operates the LHS. Refer to TM 9-2320-279-10 for specific technical principles of operation of the truck.
2. **LHS.** The CBT is operated by using controls located in the cab or by using a hard-wired remote control unit (RCU). The RCU can be operated from connectors located on the left or right side of the vehicle. BAP winch operation is possible only from the RCU. Model A trucks include an analog type electrical system, while Model B trucks are equipped with a digital type electrical system.

Electric power to operate the CBT is provided by a supply harness wired into the HEMTT electrical system. The LHS MODE SELECT switch, RCU switches, and electrical relays located in the cab control box determine which individual function is activated. Proximity switches mounted on the LHS permit simple load/unload operation of the LHS when in the AUTO mode (cab controls only).

Hydraulic pressure is provided by a PTO-driven hydraulic pump located on the HEMTT transmission. The CBT hydraulics are connected to the HEMTT chassis via quick-connect fittings.

Hydraulic pressure is controlled by relief valves and directional control valves. A vented relief valve limits the maximum system pressure to 3100 psi (21,374 kPa). In addition, the winch circuit has tandem relief valves that limit pressure in the winch circuit to 2100 psi (14,479 kPa).

Electrically activated directional control valves control the flow of fluid to individual components. When no CBT functions are being used, a free-flow valve vents the main relief valve, which returns all fluid flow directly to the reservoir. The moment a function is activated, the free-flow valve closes and pressurized oil is delivered to the winch or LHS hydraulic cylinders.

Counterbalance (holding) valves located in the hydraulic cylinder manifolds support the payload whenever hydraulic pressure is not provided. Transit valves in the main frame manifolds open during CBT transit operations. This relieves the system of hydraulic pressure and allows the payload to be supported by the physical structure rather than the system hydraulics.

3. **BAP.** A special flatrack that contains a detachable winch frame assembly. When the BAP is loaded on the CBT and secured to the LHS, it serves as the base support for interior or ramp bays during movement. It provides a means to load and unload the interior ramp bays. It also converts the LHS into a ribbon bridge launch and retrieval arm.

## CHAPTER 2

### OPERATING INSTRUCTIONS

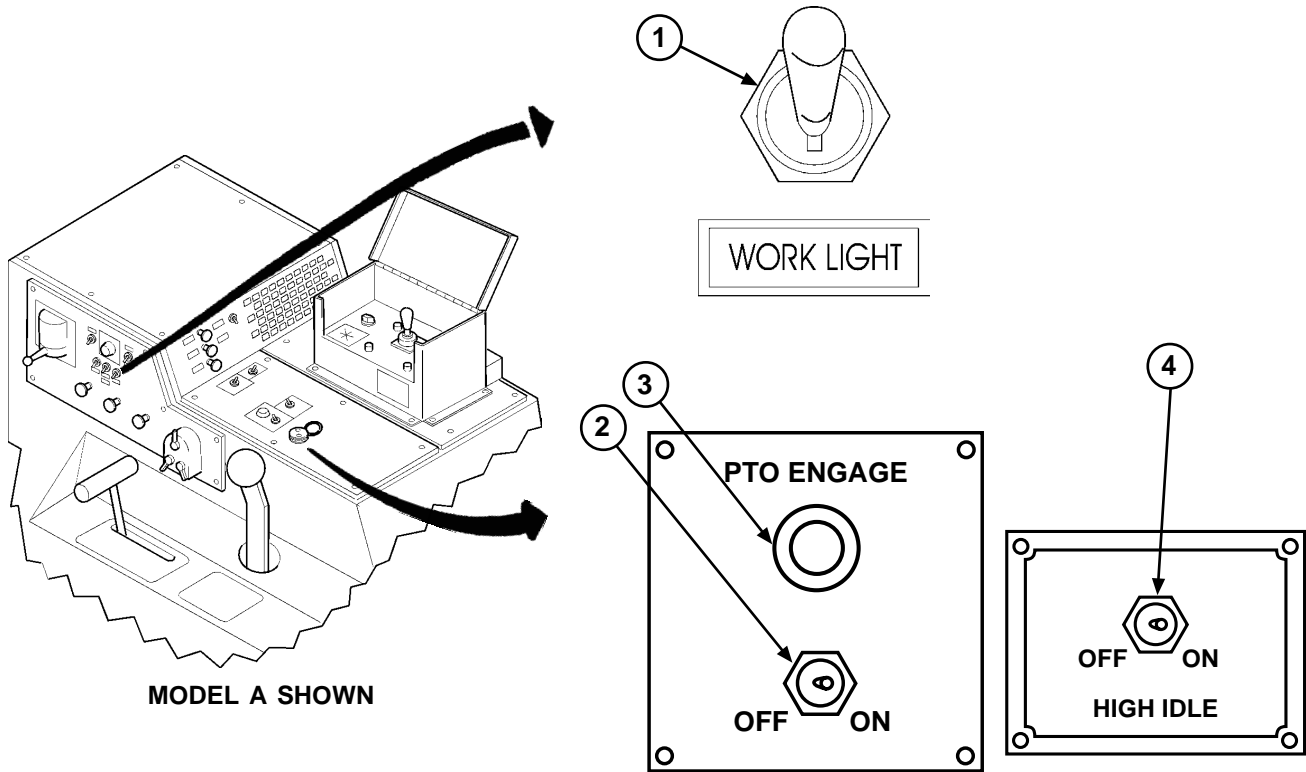
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**Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS**

**2-1. GENERAL.**

This section addresses the location and use of controls and indicators used to operate the M1977 Common Bridge Transporter (CBT) and the Bridge Adapter Pallet (BAP). You should know the location and proper use of every control and indicator before operating the vehicle.

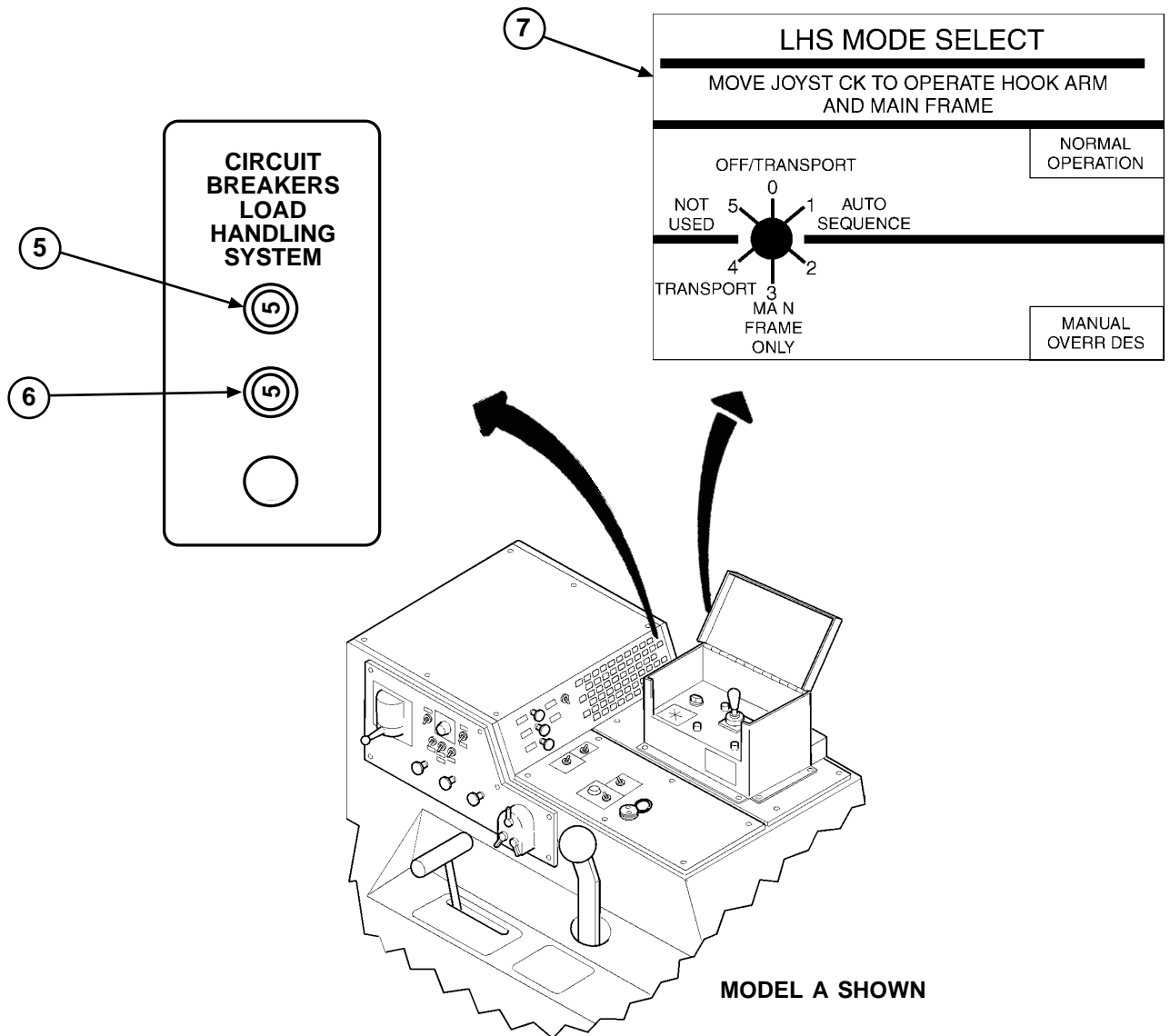
**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS.**



**Figure 2-1. Load Handling System (LHS) Cab Controls and Indicators**

Key	Control or Indicator	Function
1	WORK LIGHT Switch	Turns on and off the worklight located between the arms of the main frame on the LHS, and the spotlight located on the hydraulic cabinet assembly.
2	PTO [Power Takeoff] ENGAGE Switch	When placed in the ON position, hydraulic pressure is supplied to operate the LHS and BAP.
3	PTO ENGAGE Indicator	Indicates when the PTO switch is in the ON position.
4	HIGH IDLE Switch	When placed in the ON position, increases the truck's idle speed from low to high (1200 rpm) for LHS operation.

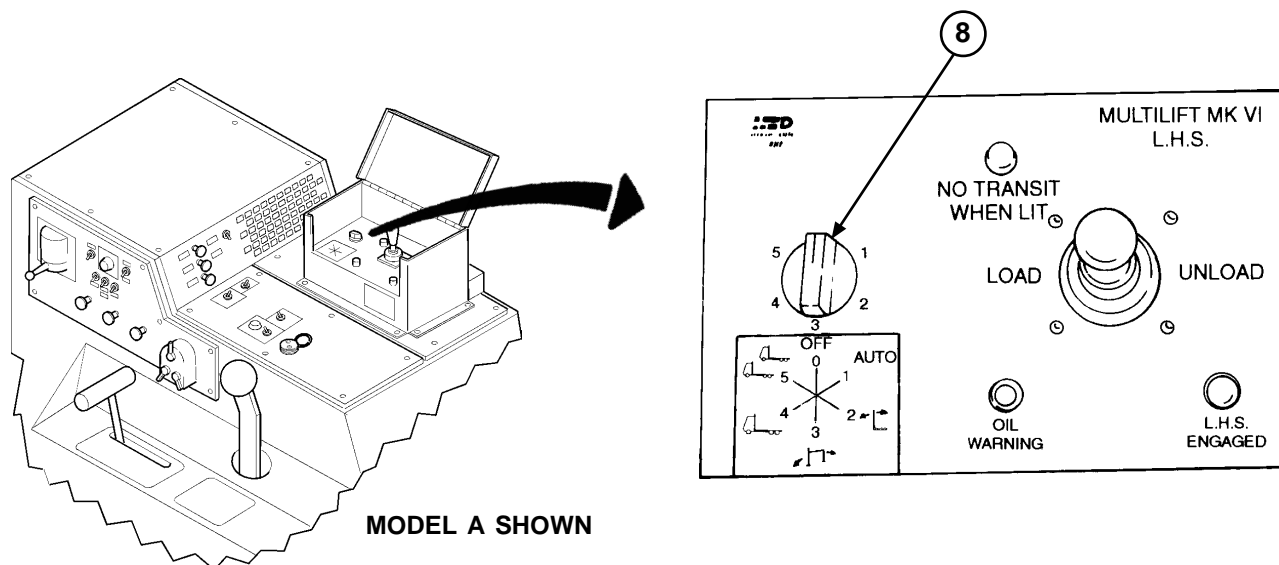
**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**



**Figure 2-1. Load Handling System (LHS) Cab Controls and Indicators (continued)**

Key	Control or Indicator	Function
5	Emergency Stop Circuit Breaker	Stops the flow of electric current to the cab control box.
6	Headlights Circuit Breaker	Stops the flow of electric current to the headlights.
7	LHS MODE SELECT Switch Position Decal (Model A only)	Identifies the functions of the numbered positions of the LHS MODE SELECT switch.

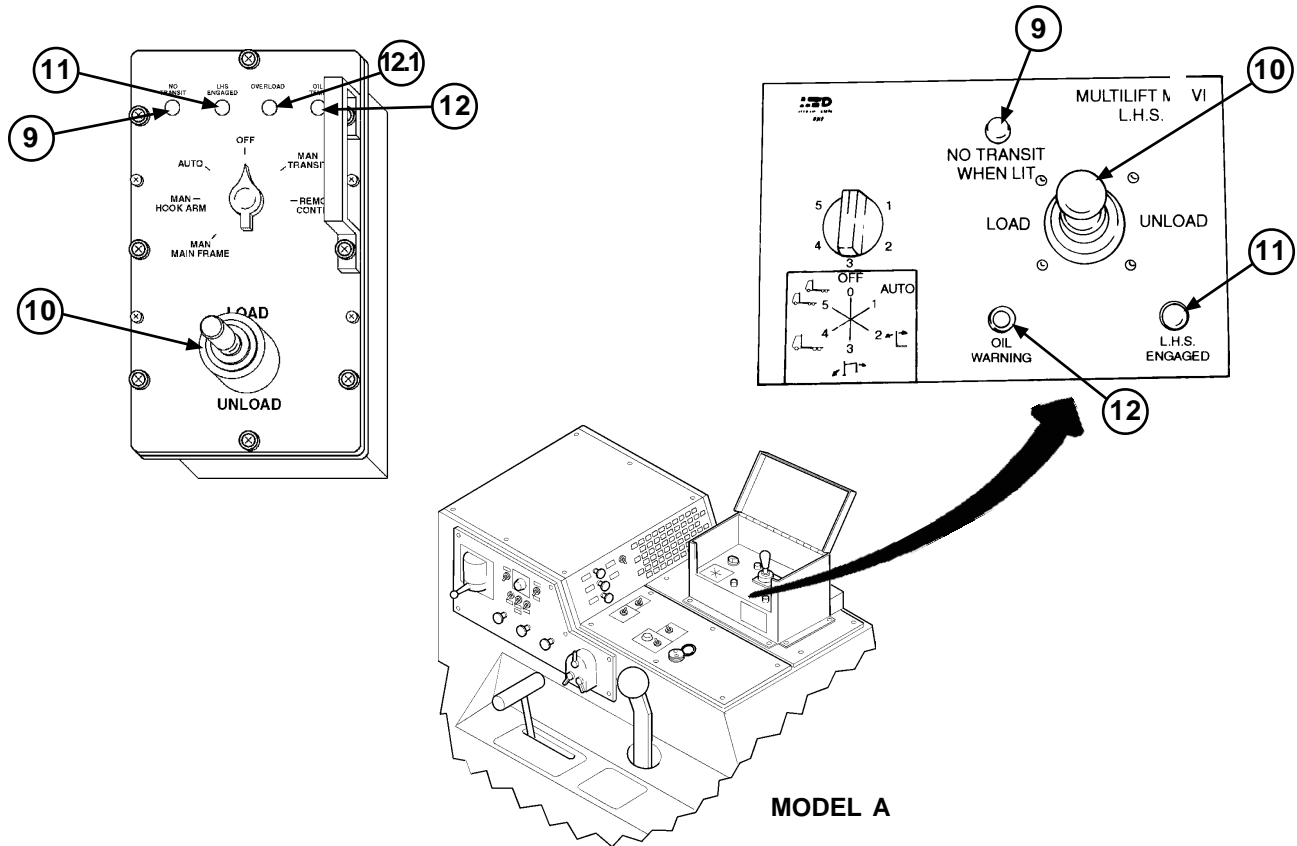
**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**



**Figure 2-1. Load Handling System (LHS) Cab Controls and Indicators (continued)**

Key	Control or Indicator	Function
8	LHS MODE SELECT Switch	<p>Used to select the functional modes for the LHS. Positions and functions are:</p> <ul style="list-style-type: none"> <li>0 OFF/TRANSPORT — The LHS is not operational.</li> <li>1 AUTO SEQUENCE — Provides automatic operation of the LHS during NATO flatrack retrieval.</li> <li>2 HOOK ARM ONLY — Places the hook arm in the manual mode for moving the hook arm when the AUTO mode electric circuit is malfunctioning.</li> <li>3 MAIN FRAME ONLY — Places the main frame in the manual mode for moving the main frame when the AUTO mode electric circuit is malfunctioning.</li> <li>4 TRANSPORT — Provides for safe travel when the AUTO mode electric circuit has failed and the HOOK ARM ONLY and MAIN FRAME ONLY positions have been used.</li> <li>5 NOT USED — Not used.</li> </ul>

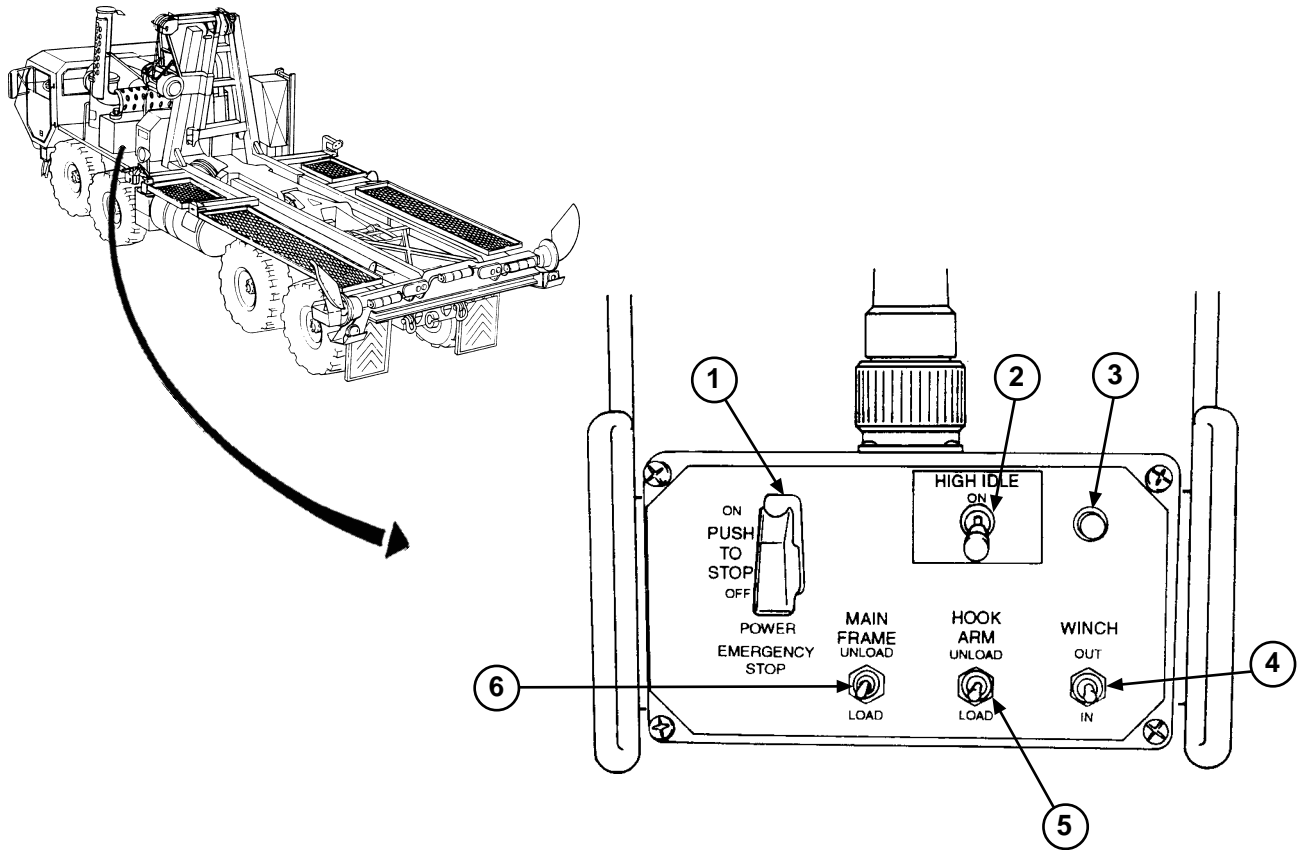
**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**



**Figure 2-1. Load Handling System (LHS) Cab Controls and Indicators (continued)**

Key	Control or Indicator	Function
9	NO TRANSIT WHEN LIT Indicator	Lights when the hook arm assembly is not in the completely stowed position. The CBT is not to be driven except in the immediate loading and unloading area as long as this indicator is lit.
10	Joystick	Used to operate the LHS from the cab controls. The function being controlled is determined by the LHS MODE SELECT switch.
11	L.H.S. ENGAGED Indicator	Lights when hydraulic pressure is supplied to the LHS.
12	OIL WARNING Indicator	Lights when oil temperature exceeds the limits.
12.1	LHS OVER LOAD Indicator	Illuminates whenever main hydraulic relief valve is opened during loading or unloading. Indicates LHS has reached an overload condition or that hydraulic system is lifting very near maximum capacity. If the LHS is overloaded, the light illuminates and the system is automatically blocked out.

**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**

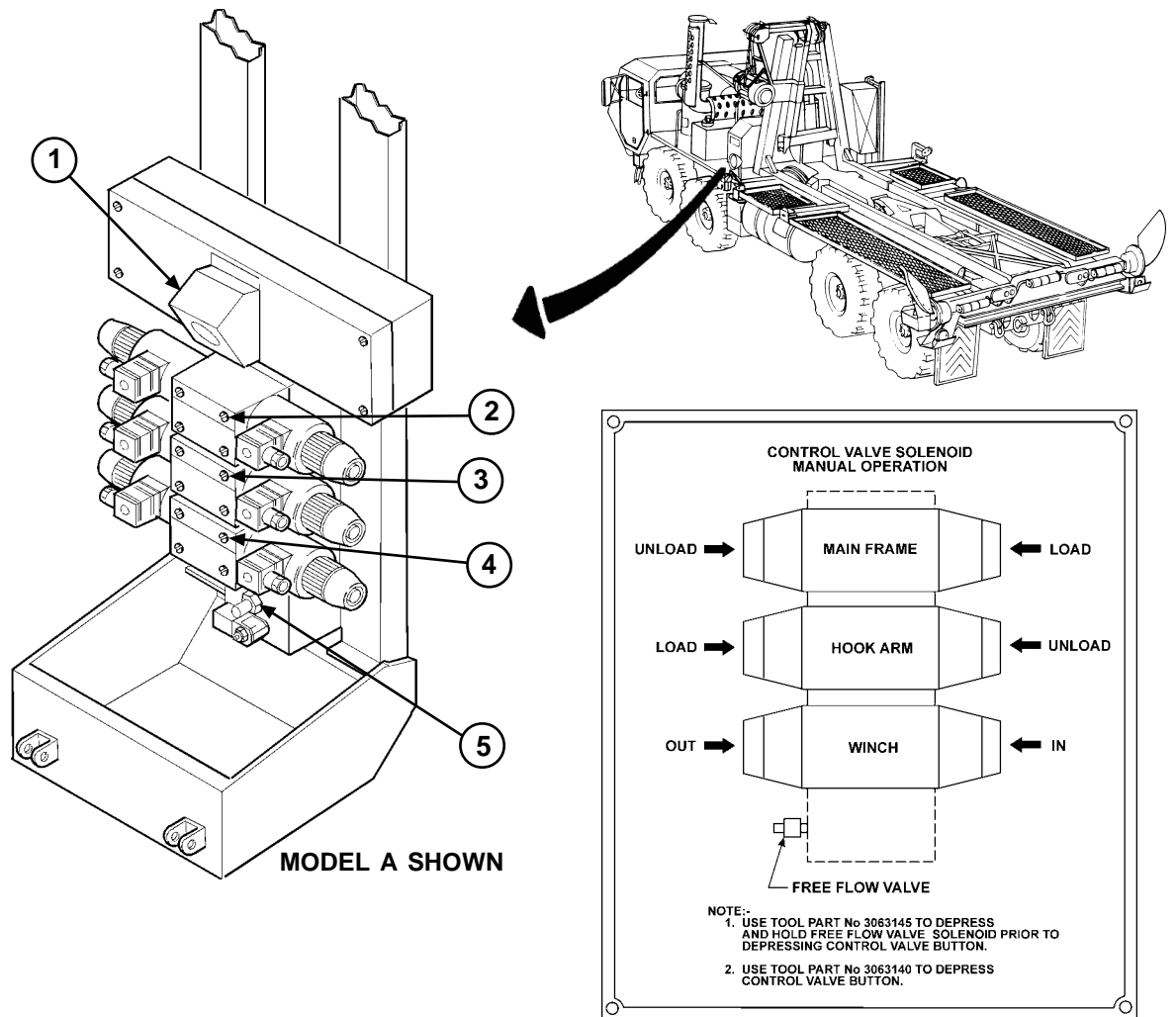


**Figure 2-2. LHS Remote Control Unit**

Key	Control or Indicator	Function
1	EMERGENCY STOP Switch	When pushed, shuts down operation of the LHS.
2	HIGH IDLE Switch	When placed in the ON position, increases the truck's idle speed from low to high (1200 rpm) for LHS operation.
3	Panel Illumination Light	Provides panel illumination for night operations.
4	WINCH Switch	OUT Position (push) — Pays out the winch cable. IN Position (pull) — Retrieves the winch cable.
5	HOOK ARM Switch	UNLOAD Position (push) — Moves the hook arm up and to the rear (unload). LOAD Position (pull) — Moves the hook arm down and forward (load).
6	MAIN FRAME Switch	UNLOAD Position (push) — Moves the main frame up and to the rear (unload). LOAD Position (pull) — Moves the main frame down and forward (load).



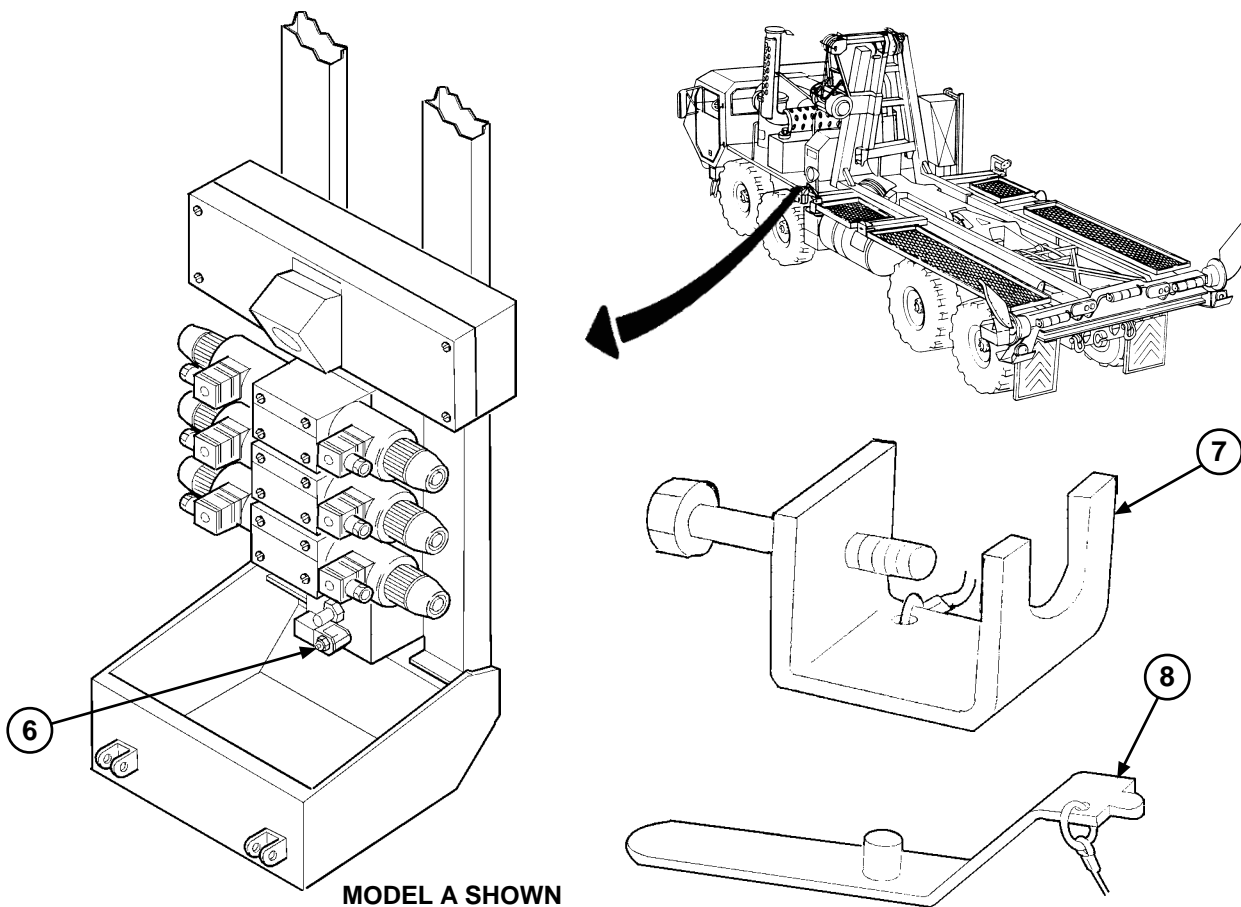
**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**



**Figure 2-3. Main Hydraulic Manifold**

Key	Control or Indicator	Function
1	Hourmeter (Model A only)	Records the number of hours the hydraulic unit is in operation.
2	Main Frame Solenoid	Raises the main frame during emergency operations when electric power is lost.
3	Hook Arm Solenoid	Raises the hook arm during emergency operations when electric power is lost.
4	Winch Solenoid	Pays out the winch cable during emergency operations when electric power is lost.
5	Main Relief	Is the main hydraulic relief valve.

**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**

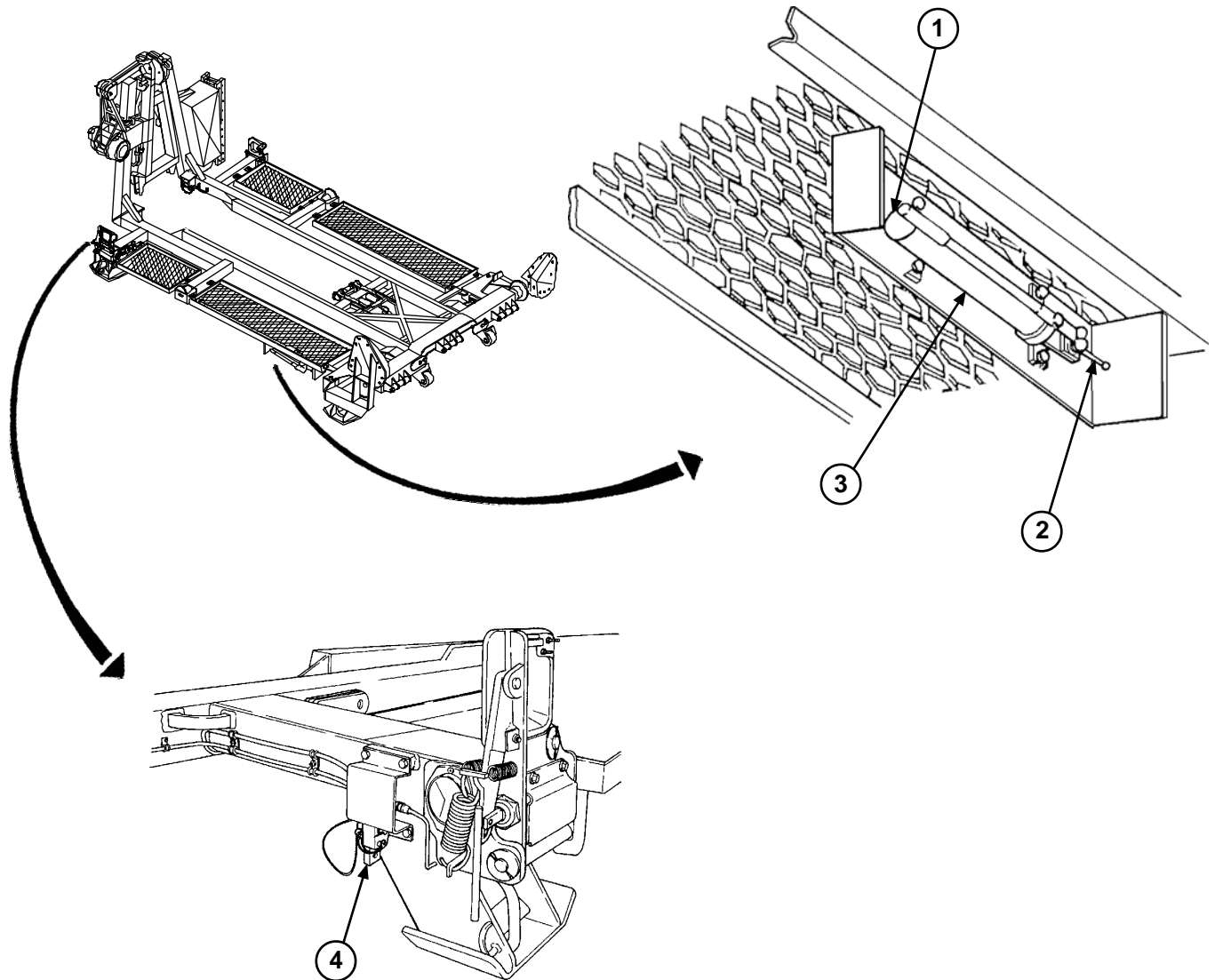


**MODEL A SHOWN**

**Figure 2-3. Main Hydraulic Manifold (continued)**

Key	Control or Indicator	Function
6	Free-Flow Valve Solenoid Button	Must be depressed during emergency operation of the hydraulic system when electric power is lost.
7	Free-Flow Tool	Used to lock the free-flow valve in the ON position when operating the solenoids manually.
8	Solenoid Tool	Used to operate the solenoids manually.

**2-2. LOCATION AND USE OF CONTROLS AND INDICATORS (continued).**



**Figure 2-4. Hydraulic Hand Pump and Control Valve**

Key	Control or Indicator	Function
1	Hydraulic Pump Handle	Used to operate the pump to move the center roller and transload roller cylinders.
2	Hydraulic Pressure Select Valve	Used to control the hydraulic pressure to the center roller and transload roller cylinders.
3	Hydraulic Hand Pump	Provides hydraulic pressure to the center roller and transload roller cylinders.
4	Control Valve	Releases front pin locks for bridge bay free launching.

## Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

### 2-3. GENERAL.

- a.* To ensure that the CBT and the BAP are ready for operation at all times, they must be inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel. This section contains systematic instructions on inspections, adjustments, and corrections to be performed by the operator/crew.
- b.* While performing preventive maintenance checks and services (PMCS), read and follow all safety instructions found in the warning summary at the beginning of this manual. Keep in mind all WARNINGS and CAUTIONS. Failure to observe the WARNINGS and CAUTIONS could result in death or injury to personnel or damage to equipment.

### 2-4. GENERAL PMCS PROCEDURES.

#### WARNING

- **Drycleaning solvent is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and DO NOT breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.**
  - **If personnel become dizzy while using drycleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush them with water and get immediate medical attention.**
  - **When drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.**
  - **Do not use drycleaning solvent on winch rope (cable). Solvent will soak into rope strands and rust, causing rope to deteriorate. This may result in the rope breaking under normal loads and could cause death or injury to personnel.**
- a.* Keep equipment clean. Dirt, grease, oil, and debris may cover up a serious problem. Clean as you work and as needed. Use drycleaning solvent (Item 13, Appendix E) on all metal surfaces. Use detergent (Item 12, Appendix E) and water on rubber, plastic, and painted surfaces.
  - b.* While performing specific PMCS procedures, inspect the following components:
    - (1) *Bolts, nuts, and screws.* Make sure they are not loose, missing, bent, or broken. Report loose or missing bolts, nuts, and screws to Unit maintenance.
    - (2) *Welds.* Inspect for gaps where parts are welded together. Check for loose or chipped paint, rust, and cracks. Report bad welds to Unit maintenance.

## 2-4. GENERAL PMCS PROCEDURES (continued).

- (3) *Wiring harnesses, wires, and connectors.* Inspect for cracked or broken wiring harness insulation, bare wires, and loose or broken connectors. Report loose connections and faulty wiring to Unit maintenance.
  - (4) *Hydraulic lines and fittings.* Inspect for wear, damage, and leaks. Carefully inspect the winch hydraulic lines in the area of the winch frame to make sure the lines have not chafed during operation. Make sure fittings are tight. A stain around a fitting or connector can mean a possible leak during operation. Report any damage, leaks, or loose fittings to Unit maintenance.
  - (5) *Air system components.* Inspect for wear, damage, and leaks. Make sure clamps and fittings are tight. Report any damage, leaks, or loose fittings to Unit maintenance.
- c. Check to see that components are adequately lubricated in accordance with Appendix G. For the LHS and the BAP, inspect all the grease fittings and make sure the rollers are operating freely. Report any problems to Unit maintenance for correction. Once a week or every 50 hours of operation, whichever occurs first, use an oil can to lubricate all pivots, shackles, screw threads, hinges, and other components that require lubrication but are not provided with lubrication fittings.
  - d. All defects that the operator cannot fix must be reported on a DA Form 2404 immediately after completing PMCS. If a serious problem is found, IMMEDIATELY report it to your supervisor.
  - e. Extreme weather conditions, periods of high use, or combat conditions may dictate that PMCS procedures be performed more often than required in the PMCS table.

## 2-5. SPECIFIC PMCS PROCEDURES.

- a. Operator/Crew PMCS procedures are provided in Table 2-1 (p. 2-14). Always perform PMCS procedures in the order listed; see Figure 2-5 (p. 2-13). Once the procedures become routine, problems can be easily recognized.
- b. Before performing PMCS, read all the checks required for the applicable interval and prepare all the tools needed for the task. Have several clean rags (Item 19, Appendix E) ready for use. Perform ALL inspections at the applicable intervals.
- c. If any problems are discovered through PMCS, perform the appropriate troubleshooting task as described in Chapter 3. If any component or system is not serviceable, or if a given service does not correct the problem, notify your supervisor.
- d. Explanations of the column headings in the PMCS table are as follows:
  - (1) *Item No.* The item number column of your PMCS table is to be used for reference. When completing DA Form 2404, include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must do checks and services for the intervals listed.

## 2-5. SPECIFIC PMCS PROCEDURES (continued).

- (2) *Interval.* This column of your PMCS table tells you when to do the check or service:
- Perform *Before* PMCS just before operating the vehicle.
  - Perform *During* PMCS while operating the vehicle.
  - Perform *After* PMCS immediately following operation of the vehicle.
- (3) *Item To Check/Service.* This column names the item to be checked or serviced.
- (4) *Procedure.* This column tells you how to do the required checks and services. Follow these instructions carefully. If tools are not available or if the procedure says to, have Unit maintenance do the work.

### NOTE

The term “mission capable” refers to equipment being on hand and able to perform its combat mission (refer to AR 700-138).

- (5) *Not Fully Mission Capable If:* This column explains when and why your equipment cannot be used. If PMCS reveals faults listed in this column, do not operate the equipment. Follow standard operating procedures for maintaining the equipment or reporting equipment failures.

## 2-6. LEAKAGE DEFINITIONS.

- a. It is important to know how fluid leakage affects the status of the CBT. The following are types/classes of leakage an operator must know to determine if the CBT is mission capable. Learn these leakage definitions. When in doubt, notify your supervisor.

Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II Leakage of fluid great enough to form drops, but not great enough to cause drops to drip from the item being inspected.

Class III Leakage of fluid great enough to form drops that fall from the item being inspected.

### CAUTION

- **Equipment operation is allowable with minor leakages (Class I or Class II). Of course, you must consider the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor. When operating with Class I or Class II leaks, continue to check fluid levels as required in your PMCS.**
  - **Class III leaks should be reported immediately to your supervisor or Unit maintenance.**
- b. Equipment operation is allowed with minor (Class I or Class II) leakage. Fluid levels in an item/system affected with such leakage must be checked more frequently than required in PMCS. When in doubt, notify your supervisor.
- c. Report Class III leaks IMMEDIATELY to your supervisor or Unit maintenance.

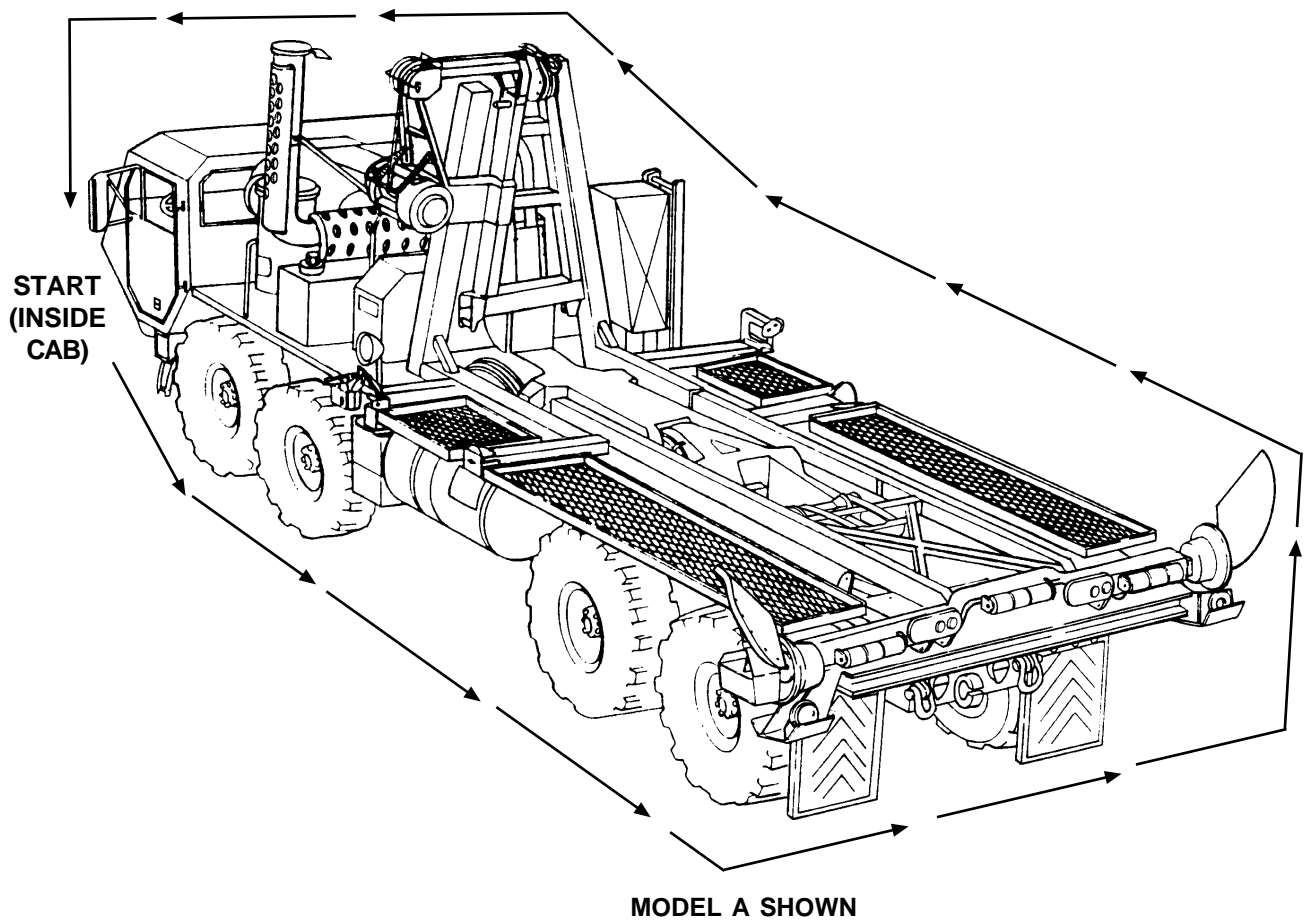
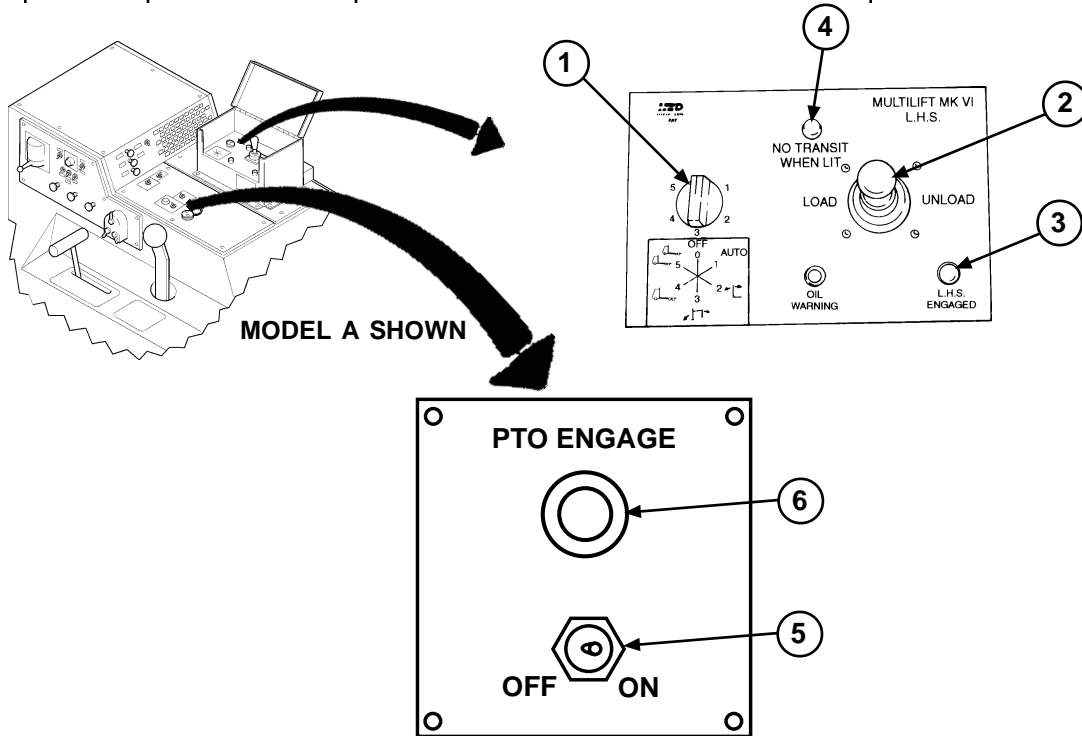


Figure 2-5. The arrows indicate the sequence for performing PMCS procedures, as listed in Table 2-1.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS)

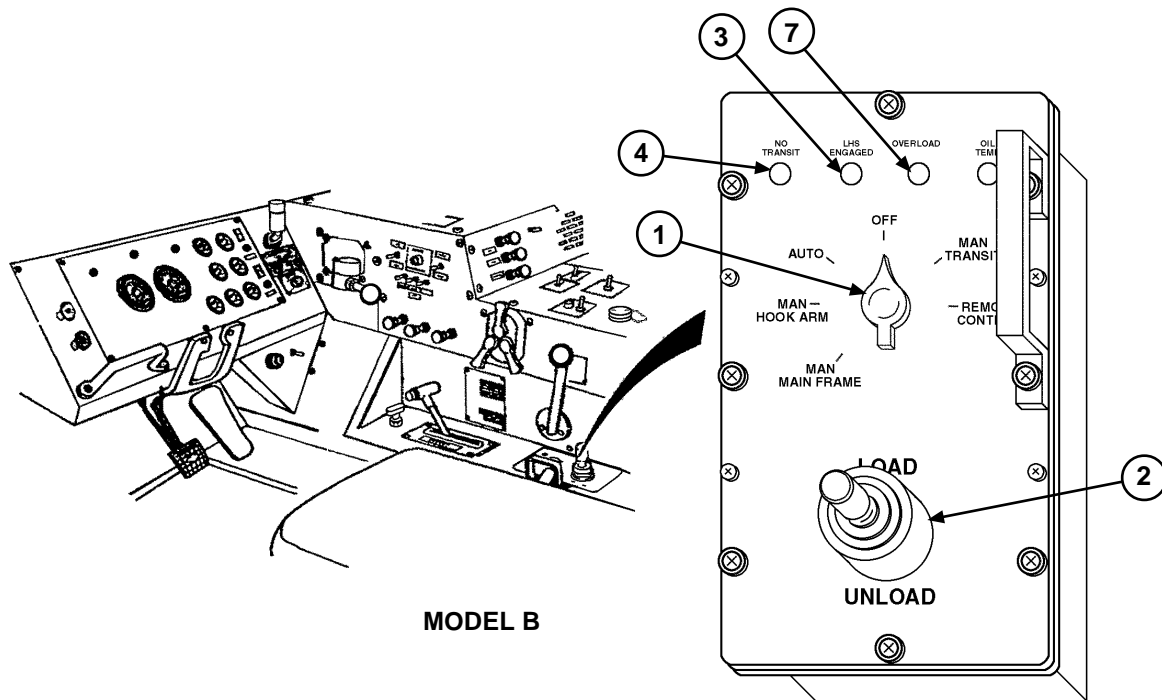
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
1	Before	Load Handling System (LHS) Controls	<p style="text-align: center;"><b>NOTE</b></p> <p>Perform HEMTT PMCS before performing PMCS for the LHS and the BAP. (Refer to TM 9-2320-279-10.)</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Check for overhead power lines or other obstructions before attempting operation of the LHS. The LHS reaches a height of 22 feet, two inches (6.7 m). Serious injury or death could result from contact with electric power lines.</b></p> <p><b>a.</b> Check for proper operation of LHS MODE SELECT switch (1) and joystick (2). Verify by placing LHS MODE SELECT switch (1) in AUTO position.</p> <p><b>aa. MODEL B ONLY.</b> Place PTO ENGAGE switch (5) in ON position. Ensure indicator light (6) comes on.</p>	<p><b>a.</b> LHS will not operate.</p>





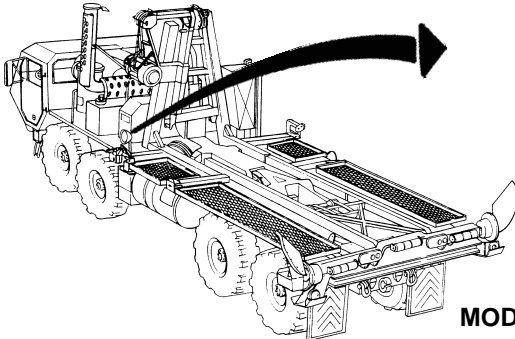
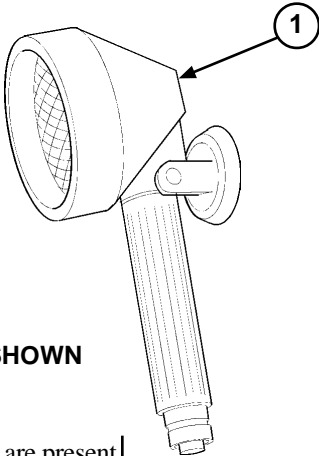
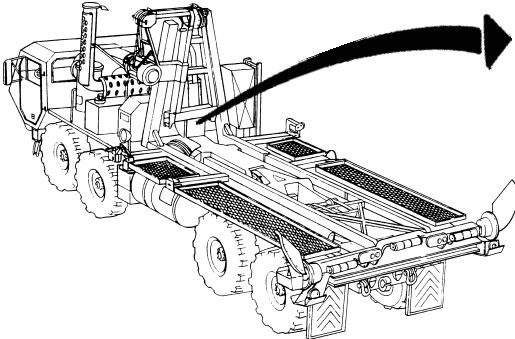
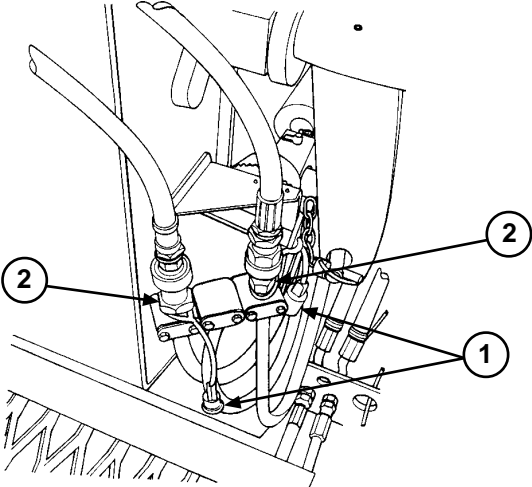
**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
			<p><i>b.</i> Pull joystick (2) to UNLOAD to raise the LHS about one to two feet (0.305 to 0.610 m). L.H.S. ENGAGED indicator (3) light will light green, and NO TRANSIT WHEN LIT indicator (4) light will light red.</p> <p><i>ba. MODEL B ONLY.</i> LHS OVERLOAD indicator (7) may light yellow if system is overloaded.</p> <p><i>c.</i> Push joystick (2) to LOAD position. NO TRANSIT WHEN LIT indicator (4) light will go out.</p> <p><i>d.</i> Turn LHS MODE SELECT switch (1) to OFF. L.H.S. ENGAGED indicator (3) light will go out.</p> <p><i>da. MODEL B ONLY.</i> Place PTO ENGAGE switch (5) in OFF position. Ensure indicator light (6) goes off.</p> <p><i>e.</i> Shut off engine.</p>	



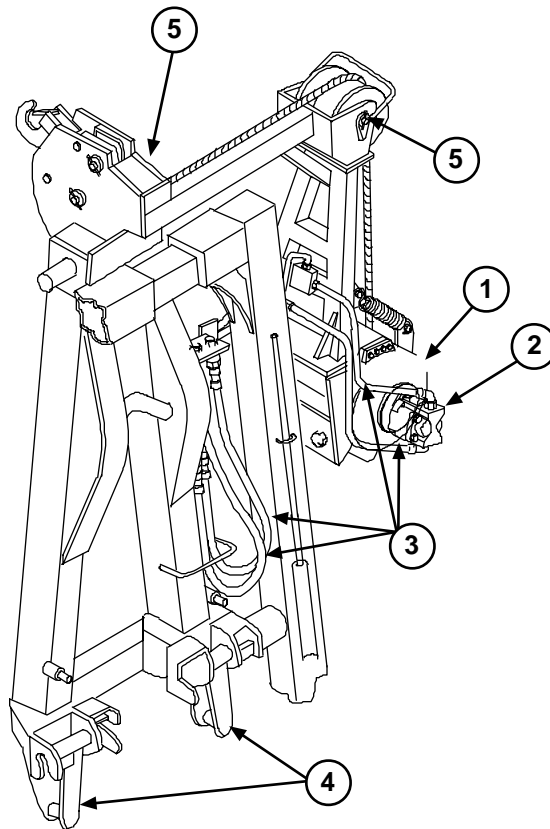


**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
<p><b>NOTE</b></p> <p>If leakage is detected, further investigation is needed to determine the location and cause of the leak. If there is any doubt, contact your supervisor or Unit maintenance.</p>				
2	Before	Leaks	Check underneath truck for evidence of obvious fluid leakage.	Any Class III leak is evident.
3	Before	Spotlight	Check to see if spotlight (1) is damaged.	
<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"><b>MODEL A SHOWN</b></p>				
4	Before	Dust Covers	Check to see if dust covers (1) are present and installed on winch hose quick-disconnect couplings (2).	
<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"><b>MODEL A SHOWN</b></p>				

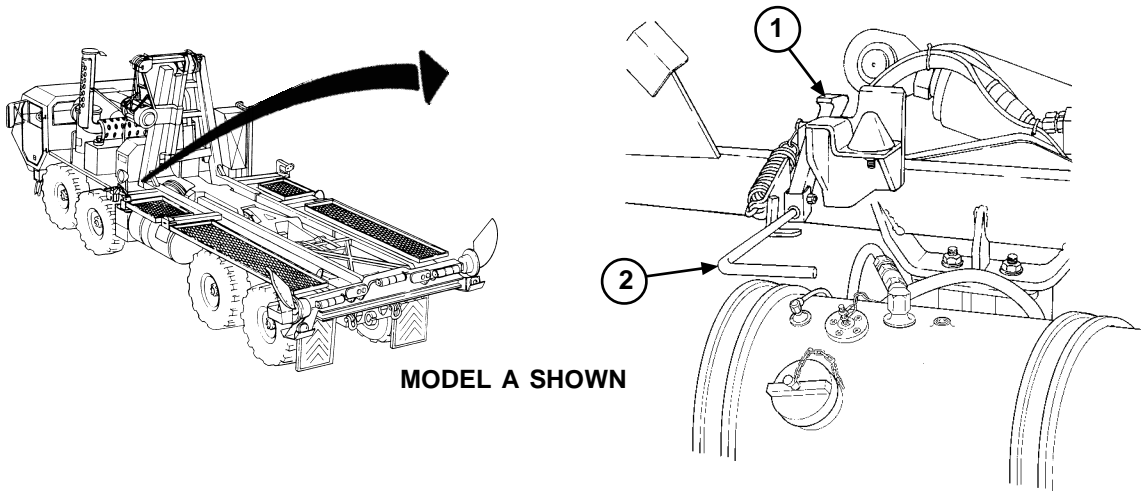
**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
5	Before	BAP Winch Assembly	<p><i>a.</i> Check winch (1) for obvious damage and loose or missing hardware.</p> <p><i>b.</i> Check winch hydraulic pump (2) and hoses (3) for leaks or damage.</p> <p><i>c.</i> Check winch frame locking levers (4) for damage or missing parts.</p> <p><i>d.</i> Check sheave assembly and roller and pulley grease fittings (5) for damaged or missing hardware.</p>	<p><i>a.</i> Hardware is missing.</p> <p><i>b.</i> Any Class III leaks are detected. Winch is damaged or parts are missing.</p> <p><i>c.</i> Locks are damaged or will not operate.</p> <p><i>d.</i> Rollers are damaged or binding.</p>



**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
6	Before	BAP Hold-down Lock	<p><i>a.</i> Check lock (1) for damage or missing parts.</p> <p><i>b.</i> Pull locking handle (2) to see if lock disengages.</p>	<i>b.</i> Hold-down lock does not engage.



**MODEL A SHOWN**

7	Before	BAP PLS Foot	Check BAP PLS foot (1) for damage or missing hardware.
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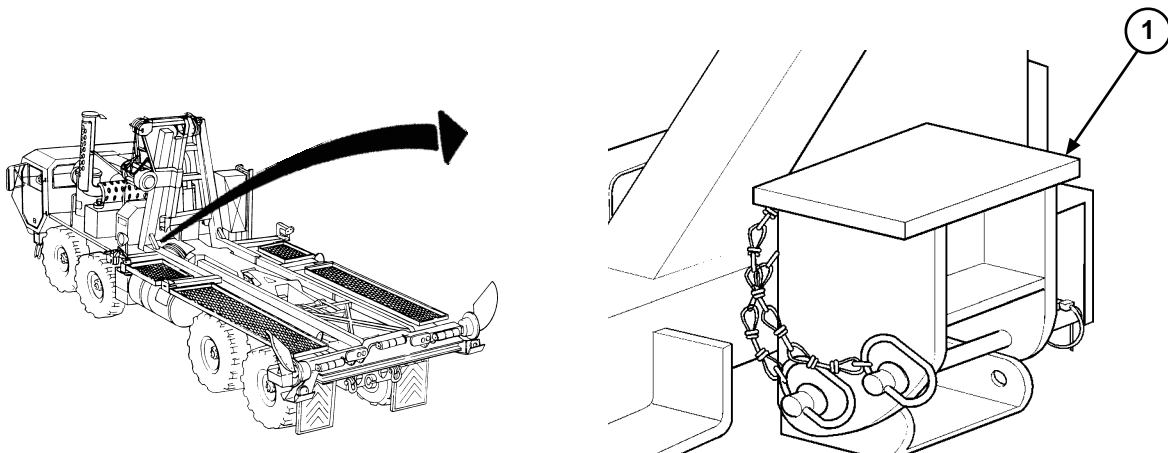
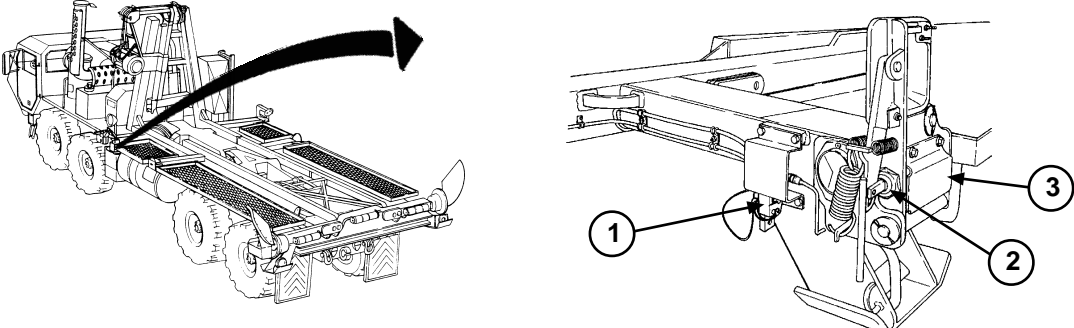
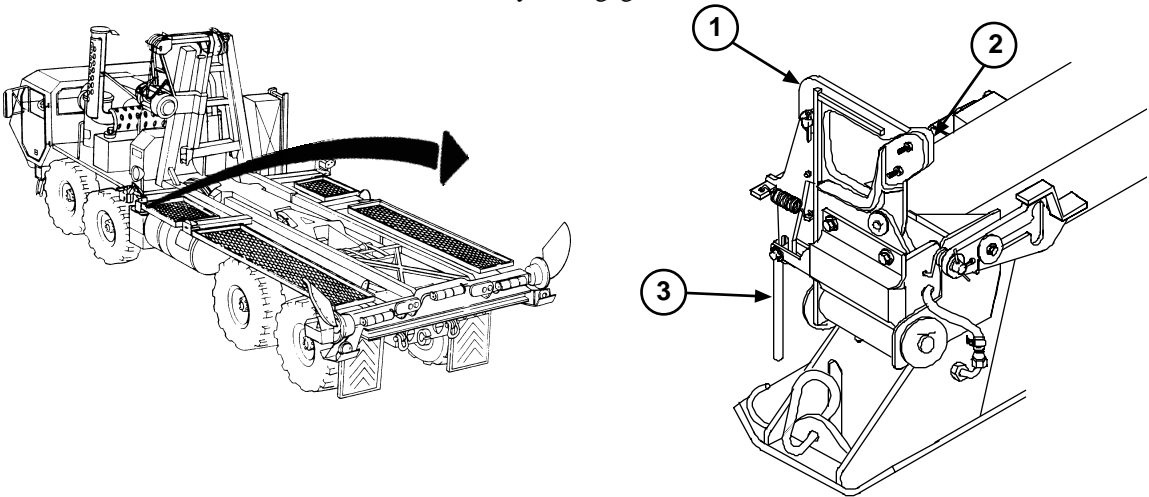
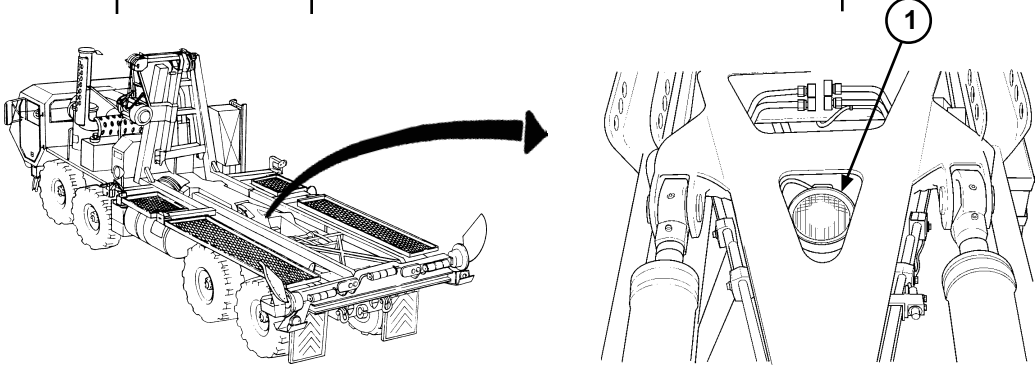
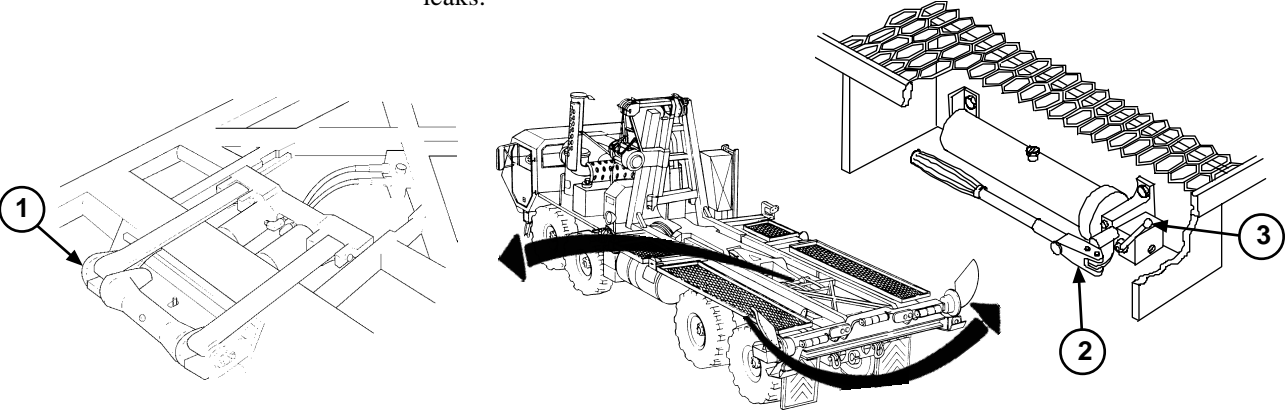


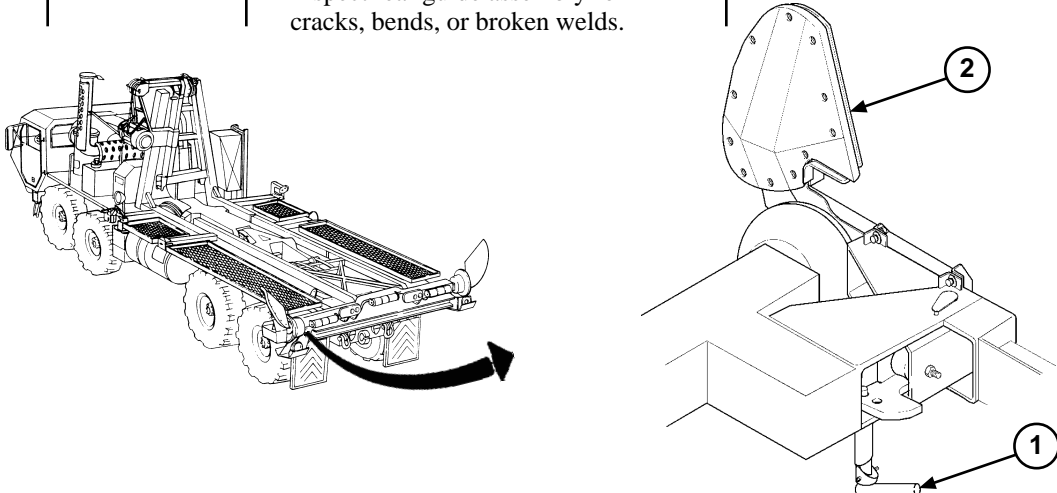
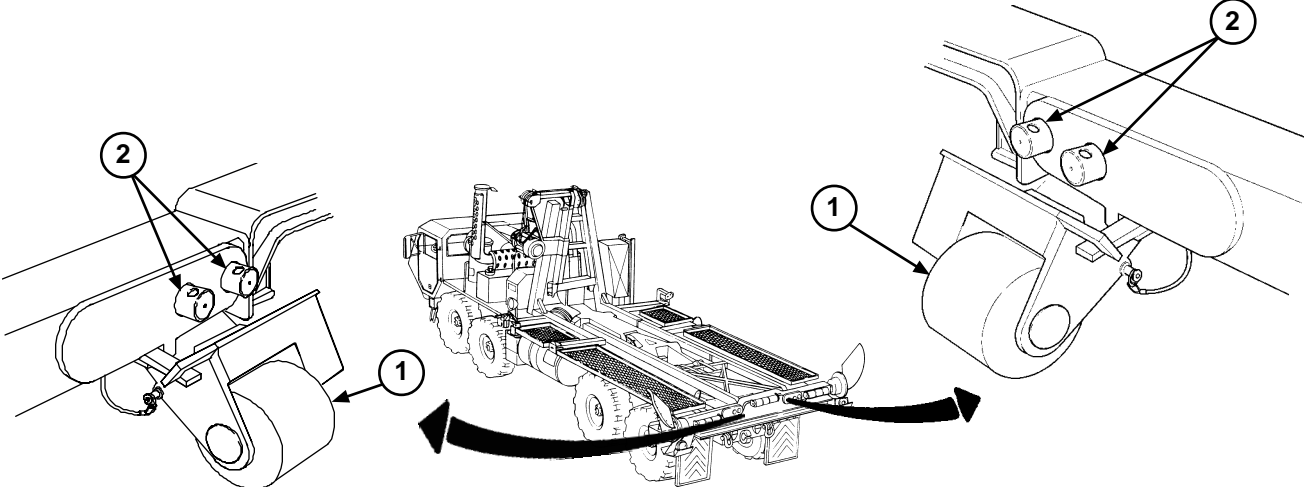
Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
8	Before	Control Valve and Air Cylinder	<p><i>a.</i> Inspect control valve (1) for damaged or missing hardware.</p> <p><i>b.</i> Inspect air cylinder (2) and guard (3) for damaged or missing hardware.</p>	
				
9	Before	Front Pin Lock	<p><i>a.</i> Check locking mechanism (1) for damaged or missing parts.</p> <p><i>b.</i> Check front pin lock wear pad (2) for excessive wear. Notify Unit maintenance to turn over wear pad (2) if it is worn to within 1/16 inch (1.59 mm) of screw heads, or if top edge is worn down to 1/16 inch (1.59 mm) of metal contact. If bottom edge has already been worn down, notify Unit maintenance to replace wear pad (2).</p> <p><i>c.</i> Pull locking handle (3) to see if assembly disengages.</p>	<p><i>a.</i> Front pin lock is damaged or has missing parts.</p> <p><i>c.</i> Front pin lock does not engage.</p>
				

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

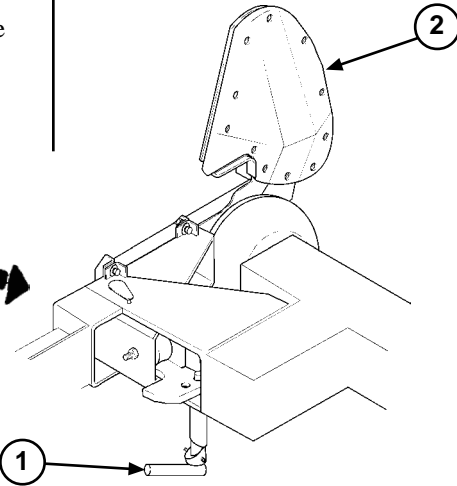
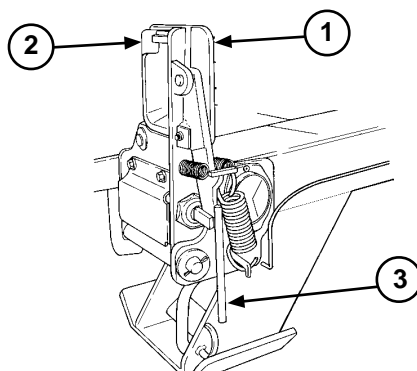
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
10	Before	Worklight	Check to see if worklight (1) is damaged.	
				
11	Before	Center Roller Assembly	<p><i>a.</i> Inspect center roller assembly (1) for damage and make sure it is free to move.</p> <p><i>b.</i> Inspect hydraulic pump assembly (2) for proper operation:</p> <ul style="list-style-type: none"> <li>• Position select lever (3) to center roller position (up).</li> <li>• Pump hydraulic pump assembly (2), making sure center roller assembly (1) is free to move.</li> <li>• Position select lever (3) to OFF position (center).</li> </ul> <p><i>c.</i> Inspect center roller hydraulics for leaks.</p>	<p><i>a.</i> Center roller is damaged or will not move properly.</p> <p><i>b.</i> Hydraulic pump assembly will not operate properly.</p> <p><i>c.</i> Any Class III leak is evident.</p>
				

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

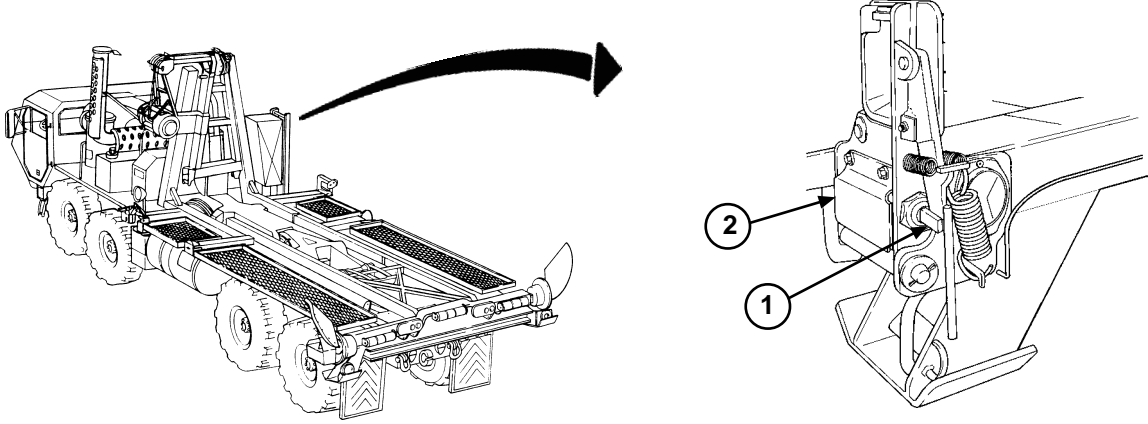
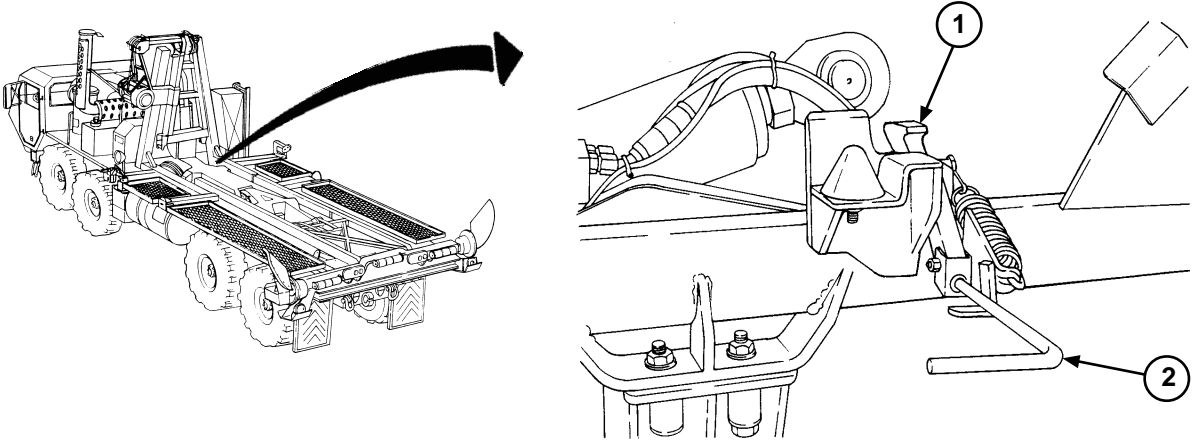
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
12	Before	Rear Guide Assembly	<p>Check for loose or binding handle (1):</p> <ul style="list-style-type: none"> <li>• Rotate handle (1).</li> <li>• Move rear guide (2) to its fullest open and closed positions. Rear guide (2) and handle (1) should move freely.</li> <li>• Inspect rear guide assembly for cracks, bends, or broken welds.</li> </ul>	<p>Handle is missing or inoperative. Rear guide assembly will not operate.</p>
				
13	Before	Transload Rollers	<p>Inspect transload rollers (1) and extension cylinders (2) for damage and to see if they move freely.</p>	<p>Transload rollers are damaged or will not move freely.</p>
				



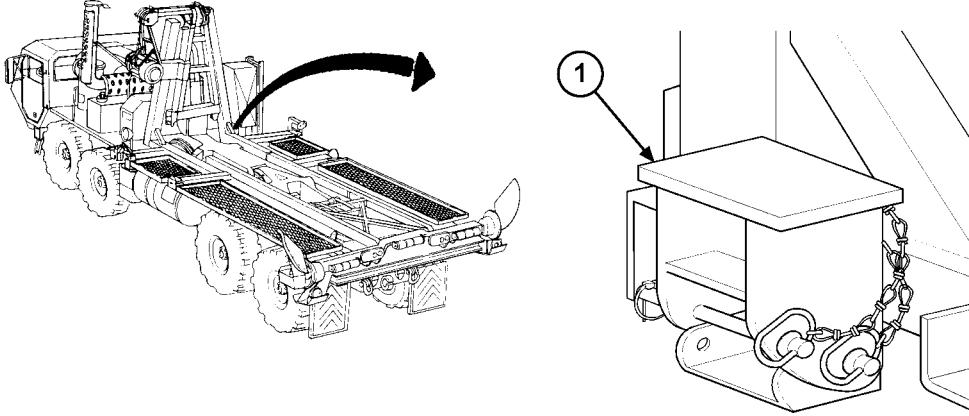
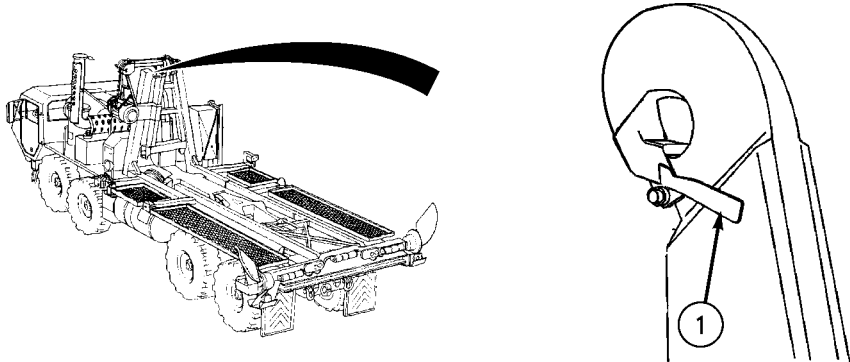
**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
14	Before	Rear Guide Assembly	<p>Check for loose or binding handle (1):</p> <ul style="list-style-type: none"> <li>• Rotate handle (1).</li> <li>• Move rear guide (2) to its fullest open and closed positions. Rear guide (2) and handle (1) should move freely.</li> <li>• Inspect rear guide assembly for cracks, bends, or broken welds.</li> </ul>	<p>Handle is missing or inoperative. Rear guide assembly will not operate.</p> 
15	Before	Front Pin Lock	<p><i>a.</i> Check locking mechanism (1) for damaged or missing parts.</p> <p><i>b.</i> Check front pin lock wear pad (2) for excessive wear. Notify Unit maintenance to turn over wear pad (2) if it is worn to within 1/16 inch (1.59 mm) of screw heads, or if top edge is worn down to 1/16 inch (1.59 mm) of metal contact. If bottom edge has already been worn down, notify Unit maintenance to replace wear pad (2).</p> <p><i>c.</i> Pull locking handle (3) to see if assembly disengages.</p>	<p><i>a.</i> Front pin lock is damaged or has missing parts.</p> <p><i>c.</i> Front pin lock does not engage.</p> 

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
16	Before	Air Cylinder	Inspect air cylinder (1) and guard (2) for damaged or missing hardware.	
				
17	Before	BAP Hold-down Lock	<p><i>a.</i> Check lock (1) for damage or missing parts.</p> <p><i>b.</i> Pull locking handle (2) to see if lock disengages.</p>	<i>b.</i> Hold-down lock does not engage.
				

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
18	Before	BAP PLS Foot	Check BAP foot PLS (1) for damage or missing hardware.	
				
18.1	Before	LHS Hook Safety Bail Bar Lock	Check LHS hook bail bar lock (1) for damage or missing hardware.	LHS hook bail bar lock hardware missing or damaged.
				
19	During	Bap Air Lines, Hoses, and Fittings	Check air lines, hoses, and fittings for leaks, dents, cracks, and kinks.	



**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

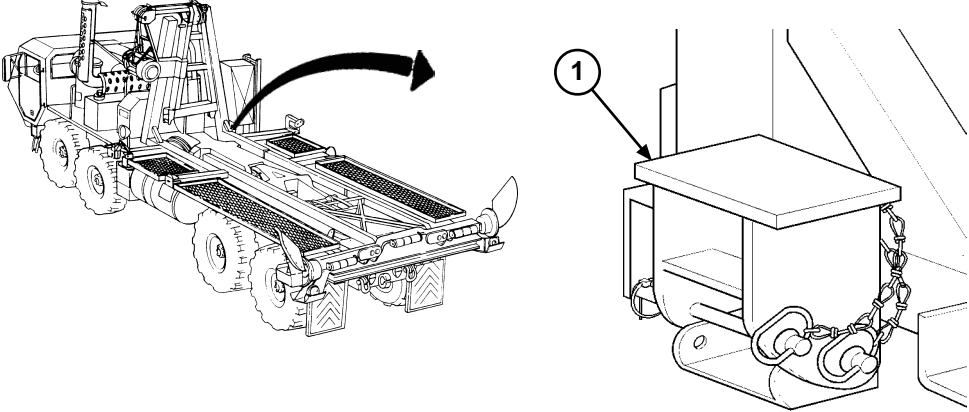
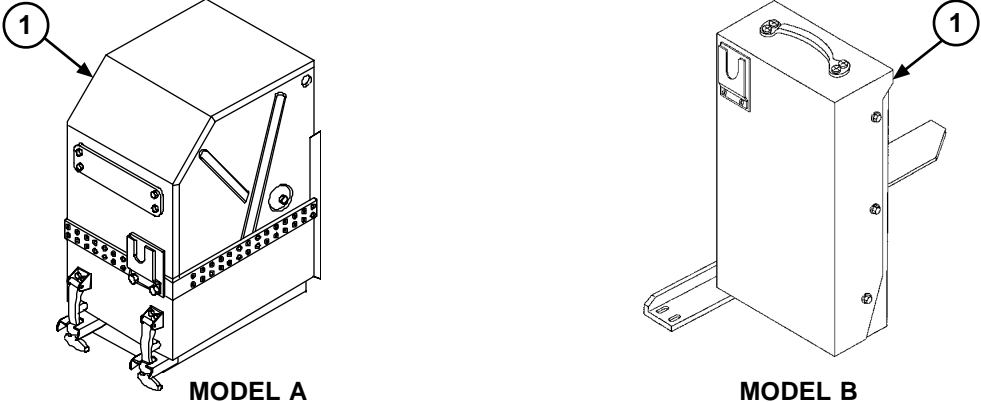
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
18	Before	BAP PLS Foot	Check BAP foot PLS (1) for damage or missing hardware.	
				
19	During	BAP Air Lines, Hoses, and Fittings	Check air lines, hoses, and fittings for leaks, dents, cracks, and kinks.	
20	During	Hydraulic Cabinet Assembly	<p><i>a.</i> Inspect cabinet assembly (1) for dents or damaged or missing hardware.</p> <p><i>b.</i> Inspect weldment for breaks, cracks, or damage. Inspect cabinet assembly (1) for rust, corrosion, or chipped paint.</p>	
				

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
21	During	BAP Winch Assembly	Check winch cable (1) for broken wires and kinks. If in doubt, notify Unit maintenance.	Winch cable has more than three broken wires per 3-inch section on same strand. The maximum number of broken wires shall not occur in any two consecutive 3-inch sections of cable; that is, if six wires are broken in one 3-inch section of cable, none would be allowed in the next 3-inch section.

The diagram illustrates the inspection criteria for a winch cable. It shows a cross-section of a cable with individual strands and wires. Below this, a longitudinal view of the cable is divided into four 3-inch sections. The first, third, and fourth sections are labeled 'SERVICEABLE', while the second section is labeled 'UNSERVICEABLE'. A broken wire is indicated by a dashed line and labeled 'INDICATES BROKEN WIRE'. On the right, a technical drawing of a winch assembly shows the winch cable labeled with a circled '1'.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
22	During	Remote Control Unit	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Check for overhead power lines or other obstructions before attempting operation of the LHS. The LHS reaches a height of 22 feet, two inches (6.7 m). Serious injury or death could result from contact with electric power lines.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>BAP must be unloaded and winch frame unlocked from the BAP before checking remote control unit or damage to equipment will result.</p> <p><i>a.</i> Remove remote control unit (1) from stowage box (2) and check for damage.</p> <p><i>b.</i> Remove remote control cable (3) and connect it to left or right LHS receptacle (4).</p>	

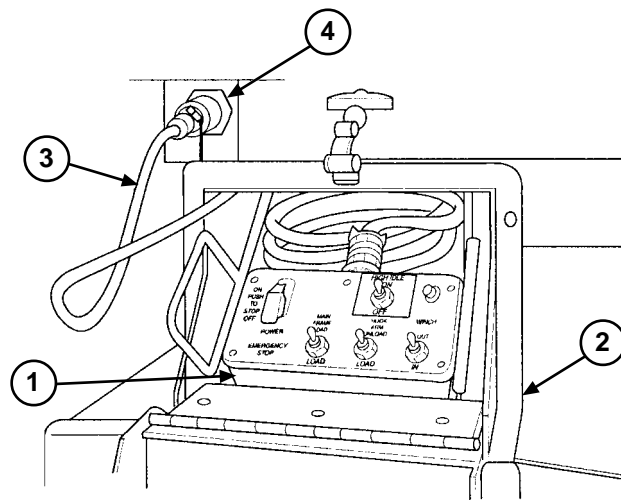
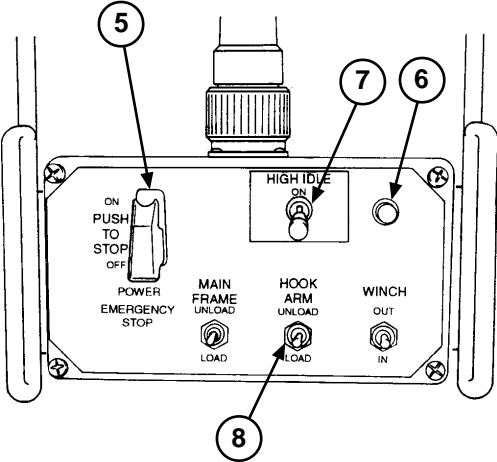
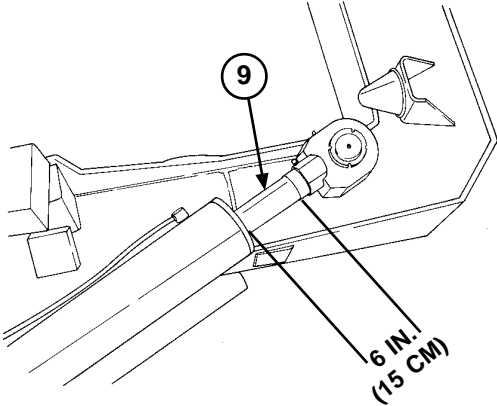


Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
22	During	Remote Control Unit (continued)	<p><i>c.</i> Check to make sure remote controls do not operate when remote control EMERGENCY STOP switch (5) is in OFF position.</p> <p><i>d.</i> Turn remote control EMERGENCY STOP switch (5) to ON position. Lamp (6) should light.</p> <p><i>e.</i> Position HIGH IDLE switch (7) to ON. Engine rpm should increase audibly. Turn HIGH IDLE switch (7) to OFF.</p>	
			 <p><i>f.</i> Position remote control HOOK ARM switch (8) to unload until hook arm cylinders (9) are extended approximately 6 inches (15 cm).</p>	
				



**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

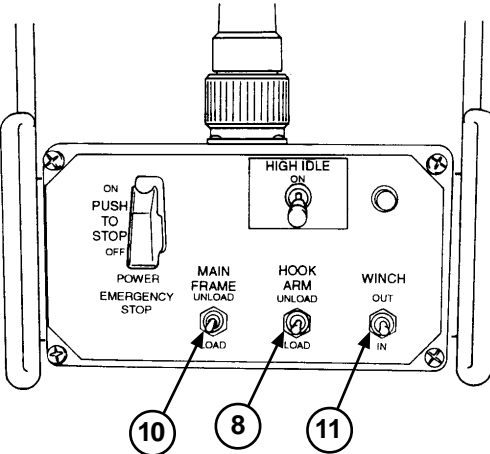
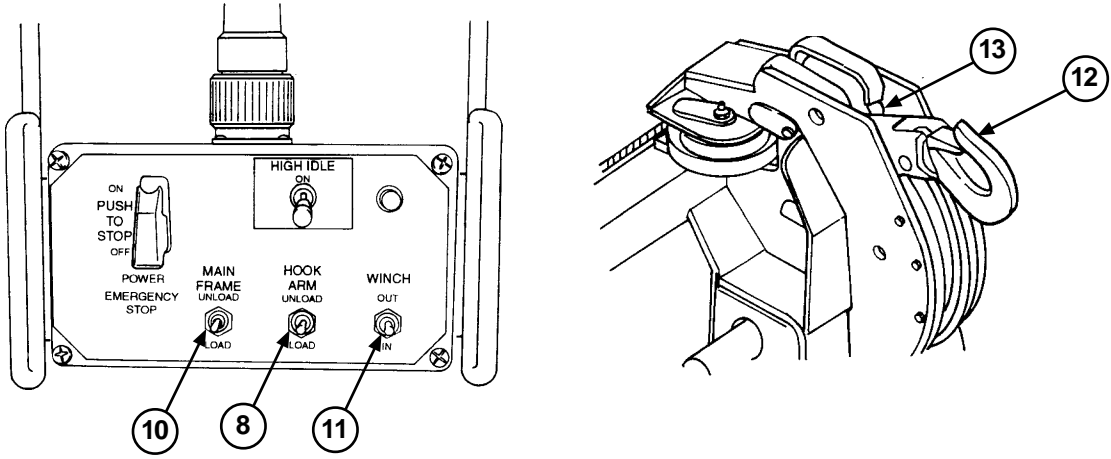
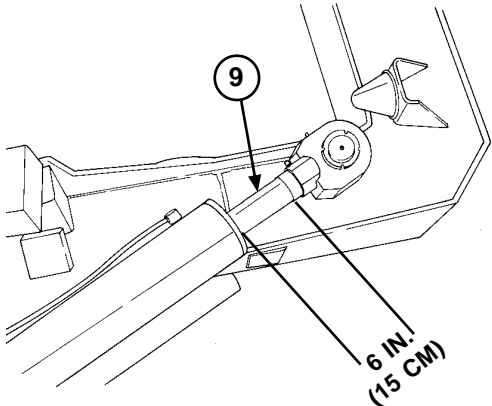
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
22	During	Remote Control Unit (continued)	<p><i>g.</i> Position remote control MAIN FRAME switch (10) to UNLOAD and release when main frame is extended fully. Make sure main frame extends fully.</p>  <p><i>h.</i> Position HOOK ARM switch (8) to UNLOAD and release when winch cable hook can be reached from the ground.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p><b>Be careful when handling the winch cable. Always wear leather gloves and make sure cut ends are taped. Make sure cut ends of cable on winch assembly are securely fastened down. Failure to heed this warning may result in injury to personnel.</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p>Have an assistant maintain tension on cable.</p> <p><i>i.</i> Position remote control WINCH switch (11) to OUT and release when cable has been wound out about 8 feet (2.4 m). Winch cable should wind out.</p>	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
22	During	Remote Control Unit (continued)	<p><i>j.</i> Position remote control WINCH switch (11) to IN until winch cable hook (12) is in saddle (13).</p>	
 <p>The diagram shows the Remote Control Unit (RCU) on the left and a close-up of the winch cable hook on the right. The RCU has several switches: a 'POWER EMERGENCY STOP' switch (10) with 'ON' and 'OFF' positions, a 'MAIN FRAME UNLOAD' switch (8) with 'LOAD' and 'UNLOAD' positions, a 'HOOK ARM UNLOAD' switch (11) with 'LOAD' and 'UNLOAD' positions, and a 'WINCH OUT' switch (11) with 'IN' and 'OUT' positions. A 'HIGH IDLE ON' indicator is also present. The winch cable hook (12) is shown with a saddle (13) where the cable is seated.</p>				
<p><i>k.</i> Position HOOK ARM switch (8) to load position until hook arm cylinders (9) are extended approximately 6 inches (15 cm).</p>				
 <p>The diagram shows a close-up of the hook arm mechanism. A hook arm cylinder (9) is shown extending. A dimension line indicates that the cylinder should be extended approximately 6 inches (15 cm).</p>				
<p><i>l.</i> Position MAIN FRAME switch (10) to LOAD until main frame is in stowed position.</p> <p><i>m.</i> Position HOOK ARM switch (8) to LOAD until hook arm is in stowed position.</p>				

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

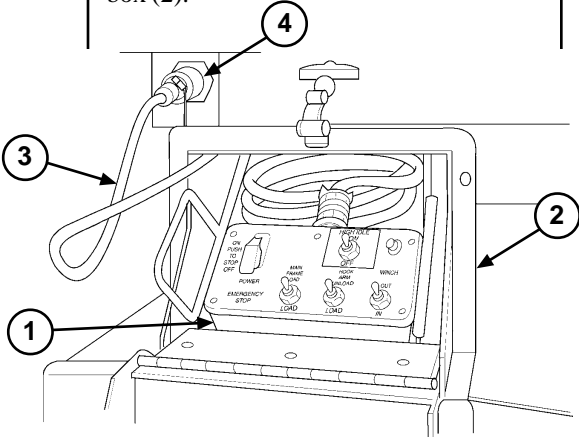
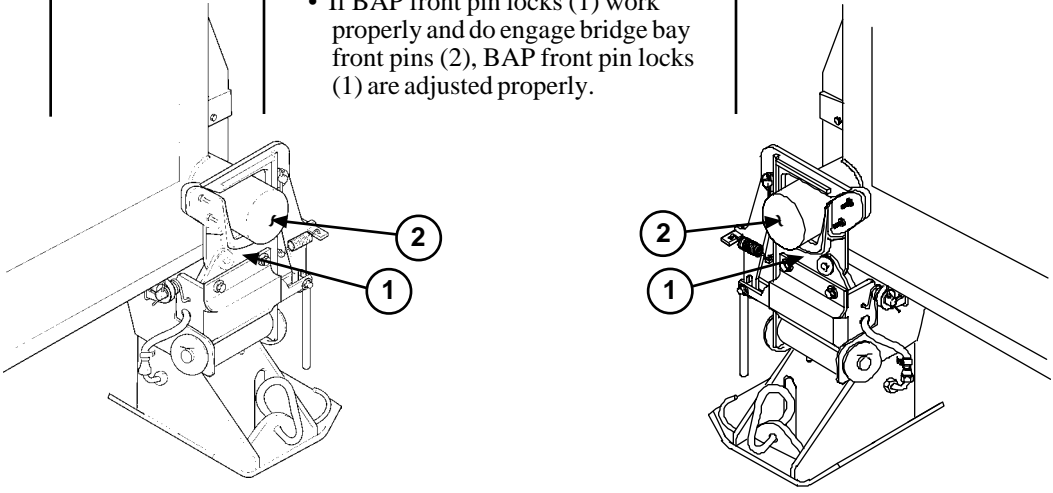
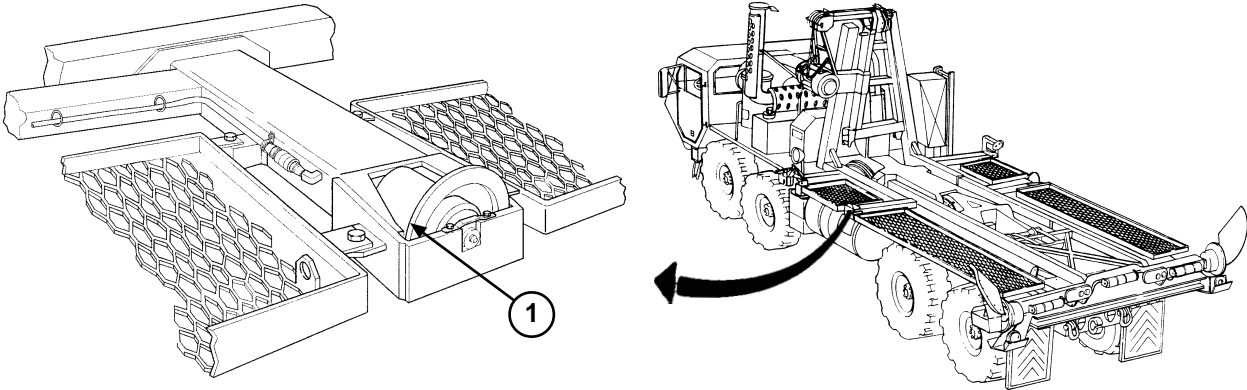
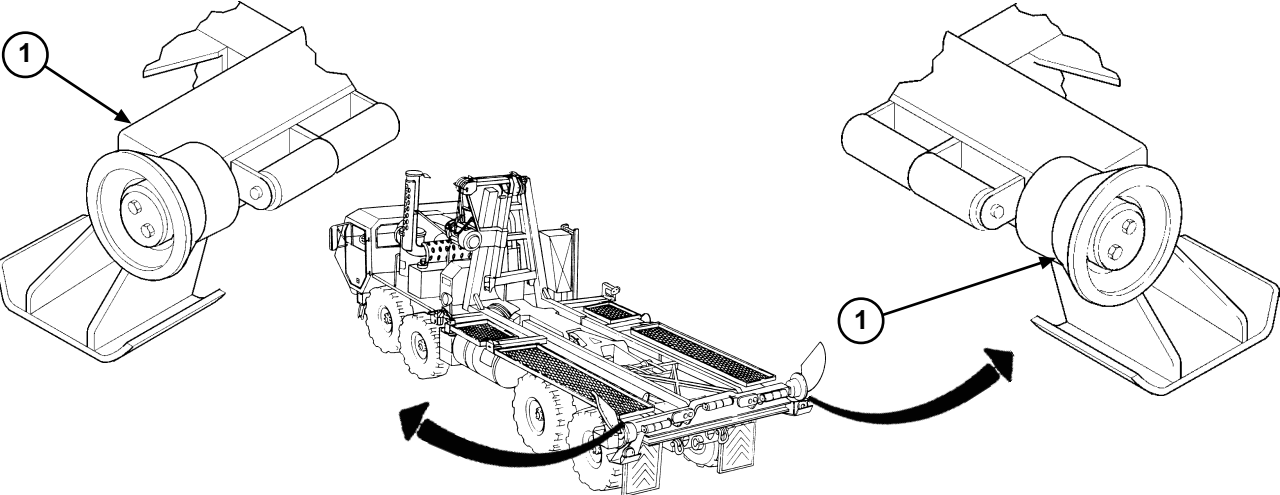
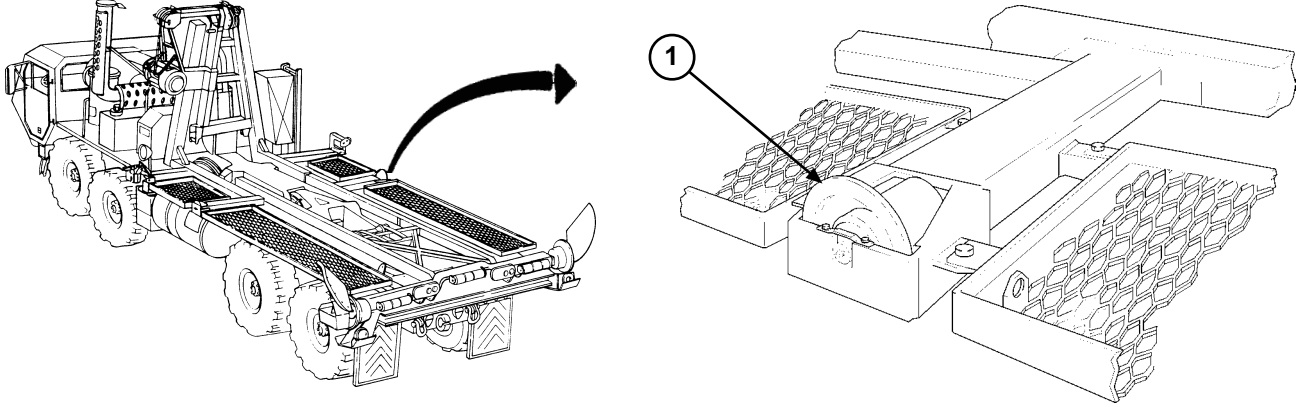
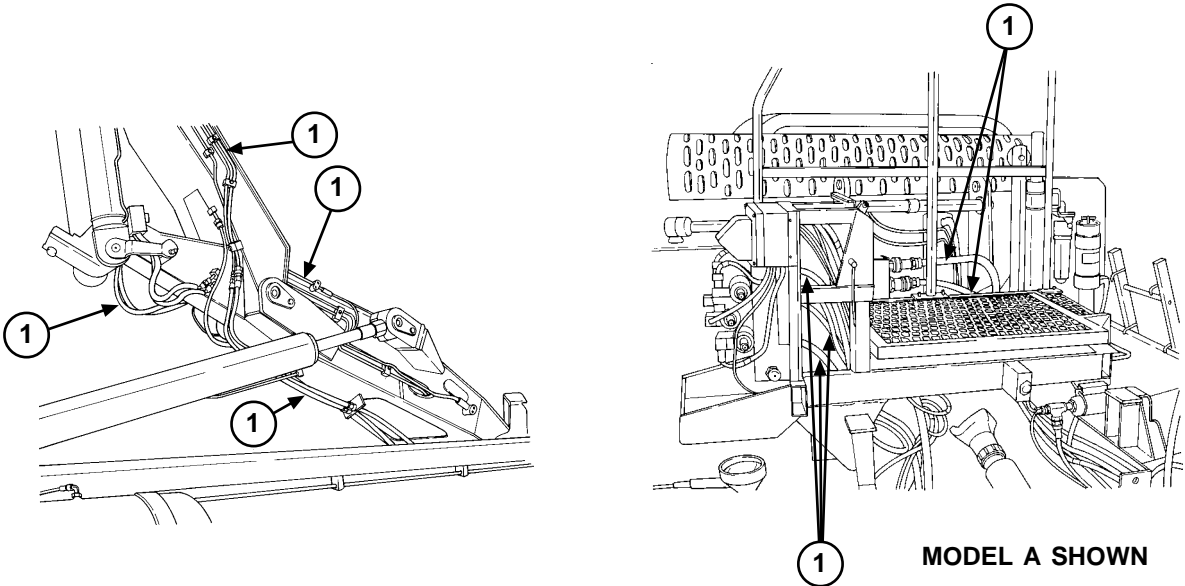
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
22	During	Remote Control Unit (continued)	<p><i>n.</i> Disconnect remote control cable (3) from LHS receptacle (4), and stow cable (3) and remote control unit (1) in stowage box (2).</p> 	
23	During	Front Pin Locks	<p><b>NOTE</b></p> <p>This check must be made while bridge bay is being loaded onto the BAP.</p> <p>Check to make sure BAP front pin locks (1) are adjusted properly:</p> <ul style="list-style-type: none"> <li>• If BAP front pin locks (1) work properly but do not engage bridge bay front pins (2), notify Unit maintenance to adjust BAP front pin locks.</li> <li>• If BAP front pin locks (1) work properly and do engage bridge bay front pins (2), BAP front pin locks (1) are adjusted properly.</li> </ul> 	<p>Front pin locks do not engage bridge bay front pins.</p>

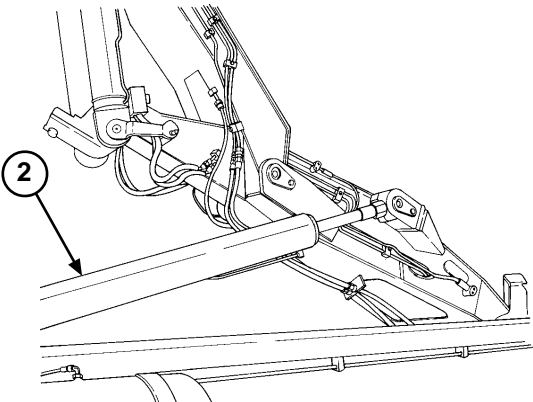
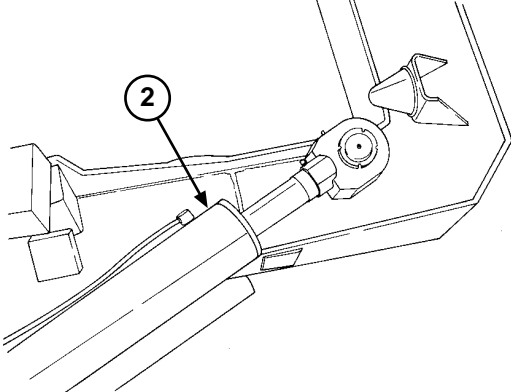
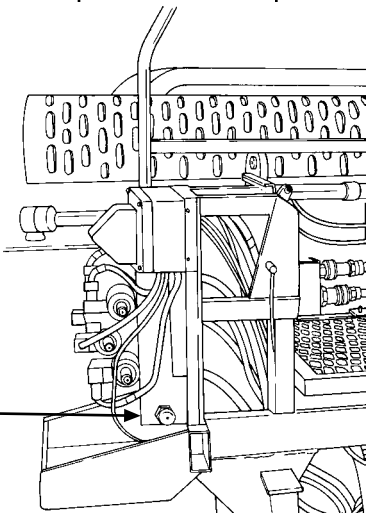
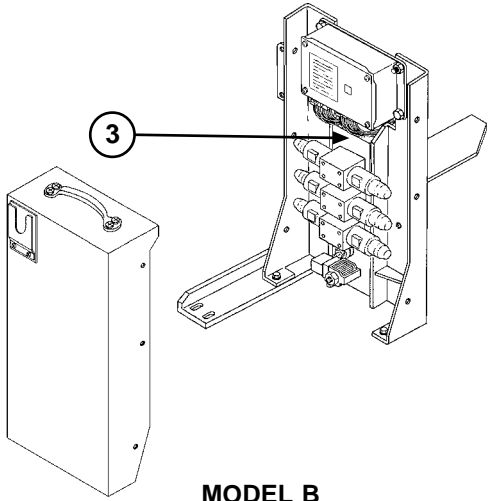
Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
24	During	Front Roller Assembly	Check roller (1) for damage or binding.	Front roller is damaged or binding.
				
25	During	Rear Roller Assembly	Check rear rollers (1) for damage or binding.	Rear rollers are missing, broken, or inoperative.
				

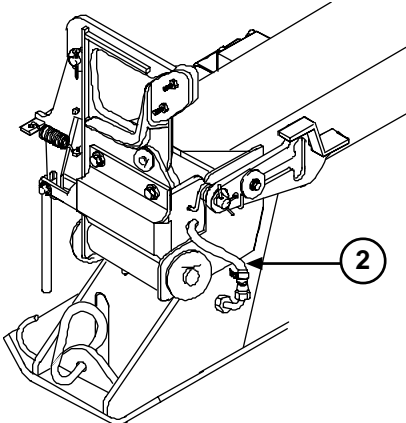
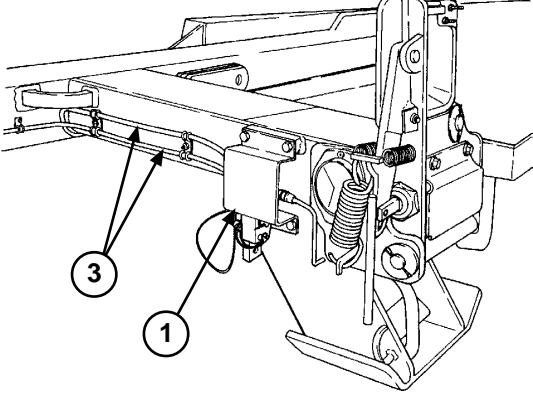
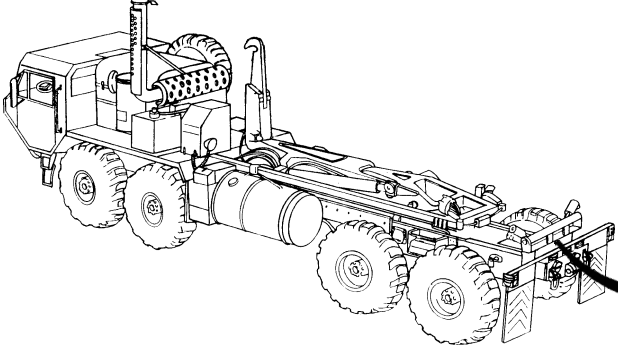
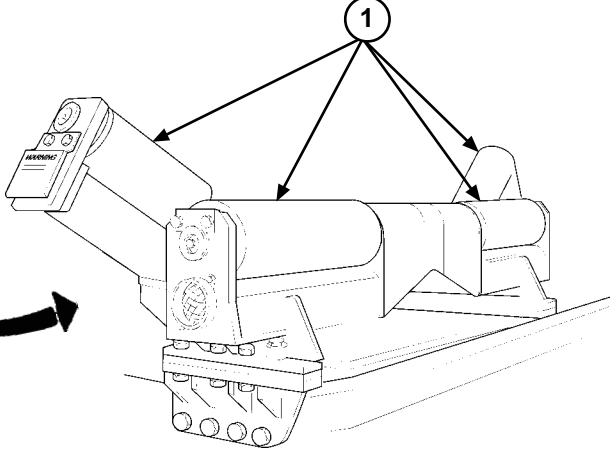
**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
26	During	Front Roller Assembly	Check roller (1) for damage or binding.	Front roller is damaged or binding.
				
27	After	LHS	<p><i>a.</i> Check the LHS for loose or missing mounting hardware.</p> <p><i>b.</i> Visually check hydraulic lines and hoses (1) for leaks.</p>	<p><i>a.</i> Mounting hardware is missing.</p> <p><i>b.</i> Any Class III leaks are detected.</p>
 <p style="text-align: right;"><b>MODEL A SHOWN</b></p>				

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
27	After	LHS (continued)	<p><i>c.</i> Visually check for cracked and kinked lines.</p> <p><i>d.</i> Visually check lift cylinders (2) for leaks or damaged or missing hardware.</p>	<p><i>c.</i> Cracked or kinked lines that will impair operation are present.</p> <p><i>d.</i> Class III leaks are detected or cylinders are damaged.</p>
				
			<p><i>e.</i> Visually check hydraulic manifold (3) for leaks or damaged hardware.</p>	
<p><b>MODEL A</b></p>			 <p><b>MODEL B</b></p>	

**Table 2-1. Operator/Crew Preventive Maintenance Checks and Services (PMCS) (continued)**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
28	After	BAP Air Lines, Hoses, and Fittings	Check air lines, hoses, and fittings for leaks, dents, cracks, and kinks.	
29	After	Control Valve	Inspect control valve (1), air hose (2), and lines (3) for kinks or missing hardware.	
				
30	After	LHS Rollers	Check rollers (1) for damage and binding.	Any rollers are broken, missing, or inoperative.
				<p style="text-align: center;"><b>MODEL A SHOWN</b></p>

### Section III. OPERATION UNDER USUAL CONDITIONS

#### 2-7. GENERAL.

- a.* This section contains instructions for safely operating the CBT and the BAP under usual conditions. Unusual conditions are defined and described in Section IV.
- b.* Before operating a new or reconditioned CBT, make sure Unit maintenance services the vehicle.
- c.* Perform all *Before* PMCS procedures listed in Table 2-1 (p. 2-14) before operating the CBT and the BAP, to make sure all adjustments and checks are completed.
- d.* Review all instructions in TM 9-2320-279-10 before operating the CBT.

#### 2-8. PREPARATION FOR USE.

*Transporter Operations Site Survey.* A site survey must be conducted to make sure the site meets the criteria cited in the warning below.

#### WARNING

- **Make sure a ground guide is used for all bridging operations. Failure to use a ground guide could result in the Transporter crashing into an obstruction or coming in contact with power lines, resulting in death or injury to personnel.**
- **Before performing bridging operations, make sure a site survey is conducted, side-to-side slope does not exceed 8 percent (5 degrees), the ground in the transport area is firm, the area around the Transporter is free of personnel and obstructions, and overhead clearance is at least 22 feet, 2 inches (6.7 m) above the loading area. Failure to conduct a site survey could cause the Transporter to slip, turn over, crash into an obstruction, or come into contact with power lines, resulting in death or injury to personnel.**
- **Unloading the BAP without disengaging hold-down locks could result in death or injury to personnel or damage to equipment.**
- **Water velocity should not be greater than 8 feet (2.4 m) per second (TM 5-5420-209-12). See page 2-64 for water velocity requirements for all launch conditions.**



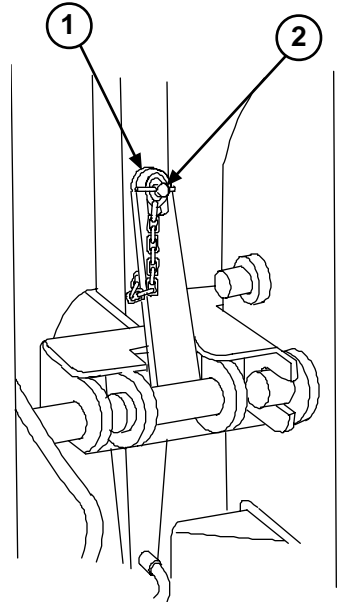
## 2-9. LOADING THE BAP FROM THE GROUND.

### NOTE

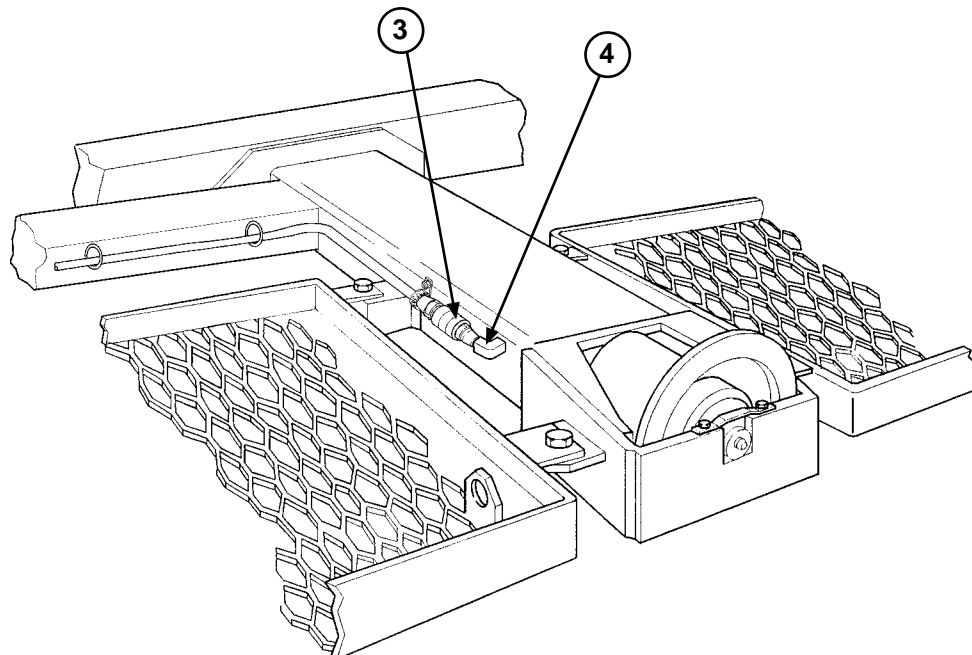
During all Transporter operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for directing the operator using hand signals, operating the remote control box and winch, and assisting the operator as needed.

- a.* Secure winch frame to the BAP. Make sure both winch frame locking levers (1) are in the up position. If locking levers (1) are not up:

- (1) Remove lockpin (2) from each locking lever (1).
- (2) Swing each locking lever (1) to the up position.
- (3) Insert lockpin (2) into each locking lever (1).



- b.* Make sure air hose (3) located on road side of the BAP is in the stowed position, connected to elbow (4).



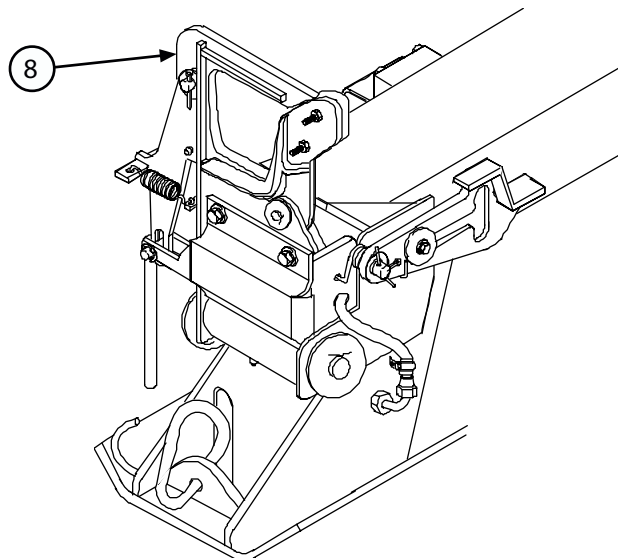
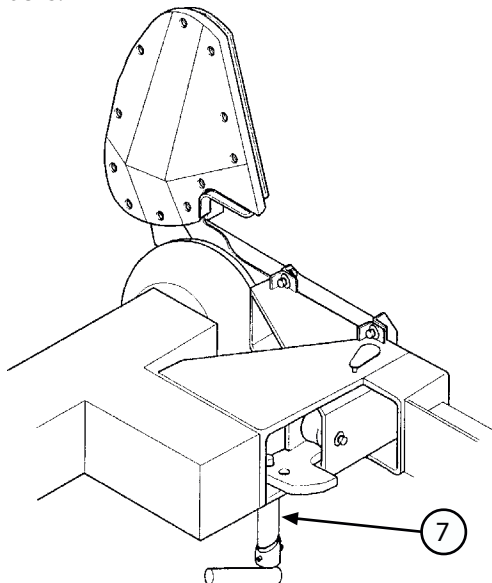
2-9. LOADING THE BAP FROM THE GROUND (continued).

c. Deleted.

WARNING

Reposition and lock both rear guides after bridge bay retrieval. Failure to reposition and secure rear guides after bridge bays are loaded could result in lost bridge bays or Transporter rollover during transport, causing death or severe injury to personnel.

d. If the BAP is loaded, inspect load and make sure curb-side and road-side rear guide latch pins (7) and front pin lock assemblies (8) are in the locked position and secure. See Table 2-2 (p. 2-37) for the proper position of all locks.



**2-9. LOADING THE BAP FROM THE GROUND (continued).**

**Table 2-2. BAP Locks Checklist. This table shows the various positions locks should be in for all BAP operations.**

CONDITION	BAP Hold-down Locks <sup>1</sup>	Winch Frame Locking Levers <sup>2</sup>	Front Pin Locks			Rear Guides	Center Roller	Transload Rollers	PLS Feet	Hydraulic Lines
			Lock	Jaw <sup>3</sup>	Latch <sup>3</sup>					
1 Free Bridge Bay Launch	OUT	UP	UP	CLOSED	N/A	OUT	UP	STOWED	STOWED	ENGAGED
2 Controlled Bridge Bay Launch	IN	DOWN	DOWN	N/A	DOWN	OUT	DOWN	STOWED	STOWED	ENGAGED
3 Water Bridge Bay Retrieval	IN	DOWN	DOWN	CLOSED	UP	MID	DOWN	STOWED	STOWED	ENGAGED
4 Unload Bridge Bay to Ground	IN	DOWN	DOWN	N/A	DOWN	OUT	DOWN	STOWED	STOWED	ENGAGED
5 Load Bridge Bay from Ground	IN	DOWN	DOWN	CLOSED	UP	MID	DOWN	STOWED	STOWED	ENGAGED
6 Load BAP from Ground <sup>8</sup>	OUT	UP	UP <sup>4</sup>	CLOSED <sup>4</sup>	N/A	MID <sup>4</sup>	DOWN	STOWED	STOWED	STOWED
7 Unload BAP to Ground	OUT	UP	UP <sup>4</sup>	CLOSED <sup>4</sup>	N/A	MID <sup>4</sup>	DOWN	STOWED	STOWED	STOWED
8 Transport Mode <sup>8</sup>	IN	UP/DOWN	UP	CLOSED <sup>4</sup>	N/A	MID <sup>5</sup>	DOWN	STOWED	STOWED	EITHER
9 Transload BAP to Trailer	OUT	UP	UP	CLOSED <sup>4</sup>	N/A	MID <sup>5</sup>	DOWN	DOWN <sup>6</sup>	DOWN	STOWED
10 Transload BAP to Truck <sup>8</sup>	OUT	UP	UP	CLOSED <sup>4</sup>	N/A	MID <sup>5</sup>	DOWN	DOWN <sup>7</sup>	STOWED	STOWED

<sup>1</sup> BAP hold-down locks are located on the Transporter.

<sup>2</sup> UP is locked on the BAP; DOWN is locked on the LHS hook arm.

<sup>3</sup> Jaw and latch are illustrated on page 1-11.

<sup>4</sup> N/A for an empty BAP.

<sup>5</sup> IN for an empty BAP.

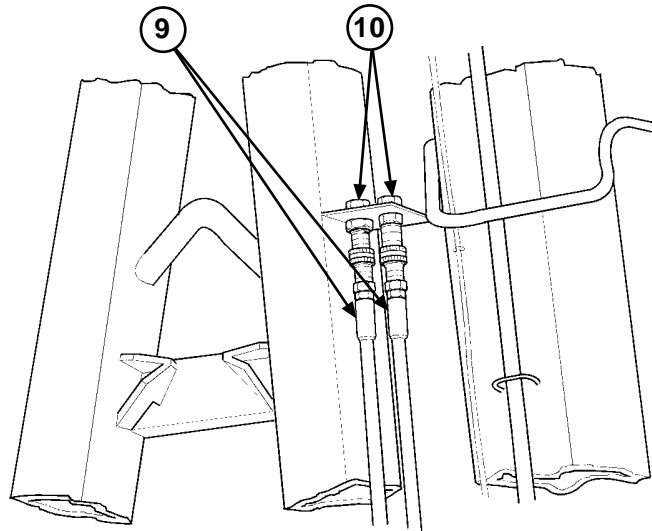
<sup>6</sup> Moved to UP position after the BAP is fully on trailer.

<sup>7</sup> Moved to STOWED position after the BAP is fully on truck.

<sup>8</sup> Bail bar lock and pin must be installed on hook when BAP is loaded on LHS.

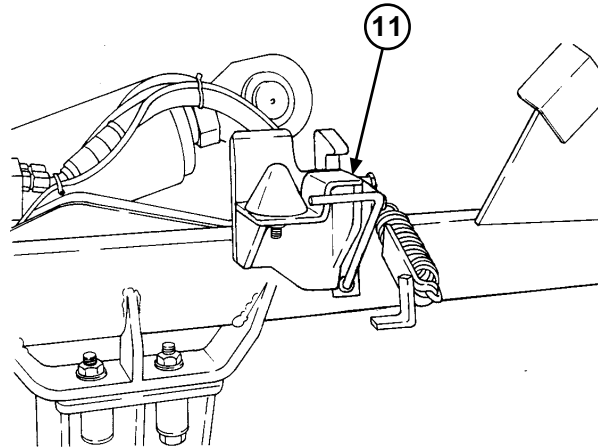
**2-9. LOADING THE BAP FROM THE GROUND (continued).**

- e. Connect two hydraulic hoses (9) to the stowed location connections (10).

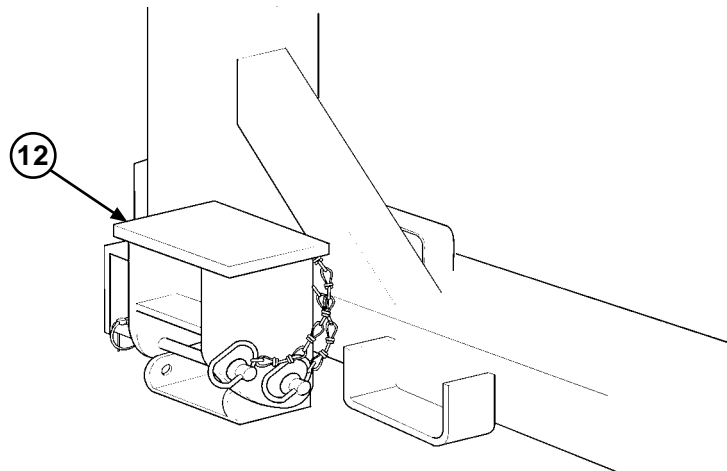


- f. If the BAP is loaded, make sure all bridge latches are secured (refer to TM 5-5420-209-12).

- g. Make sure BAP hold-down locks (11) are in the auto engage position (handle pushed in).



- h. Make sure PLS feet (12) are in the stowed position (up).



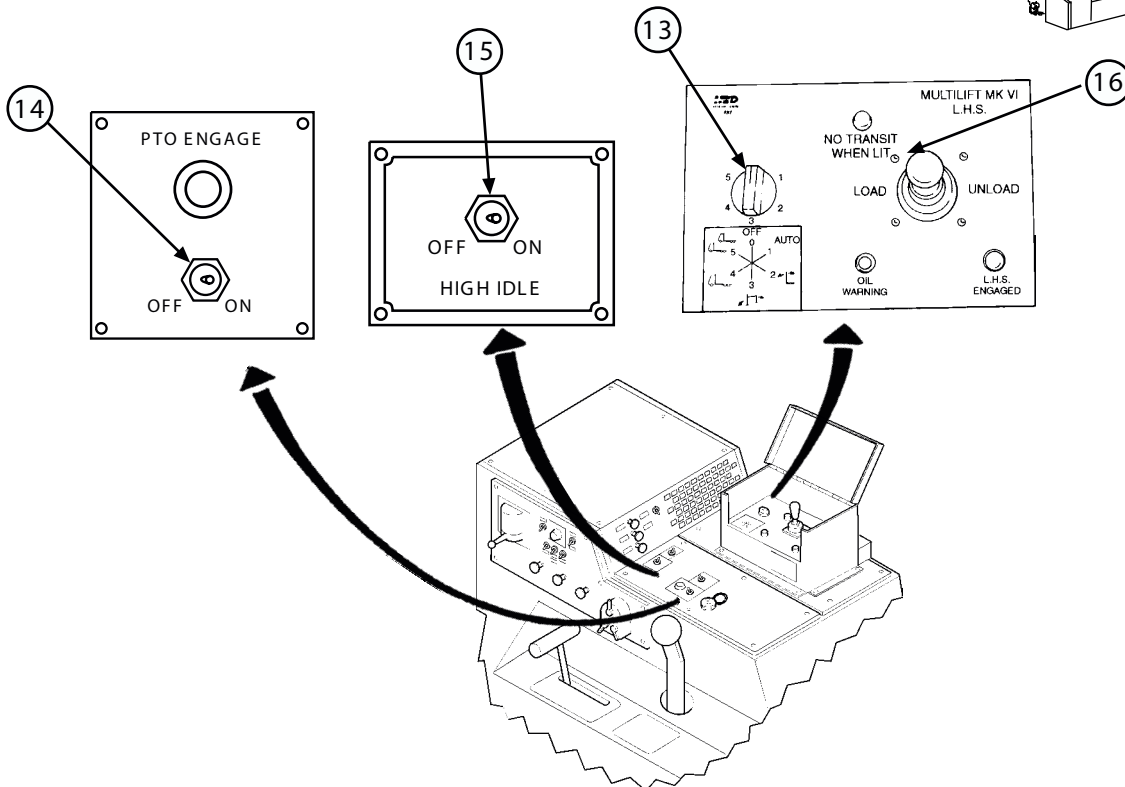
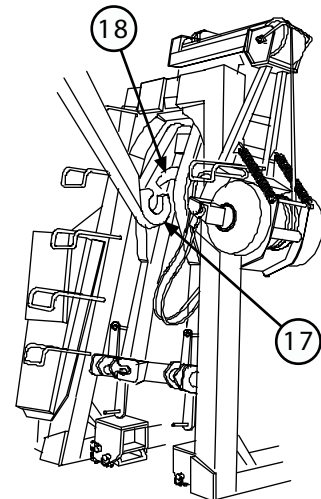
2-9. LOADING THE BAP FROM THE GROUND (continued).

- i. Back up Transporter so that at least 5 or 6 feet (1.5 to 1.8 m) of clearance is available behind Transporter for loading the BAP.
- j. Set parking brake or apply service brake and place transmission in neutral.

CAUTION

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe damage to equipment could result.

- k. Turn LHS MODE SELECT switch (13) to AUTO, and turn PTO ENGAGE switch (14) to ON.
- l. Turn HIGH IDLE switch (15) to ON.
- m. Move joystick (16) to UNLOAD and hold to automatically raise and move hook arm and main frame toward the BAP. Release joystick (16) when tip of LHS hook (17) is just below level of BAP hook bar (18).
- n. Turn HIGH IDLE switch (15) to OFF.



**2-9. LOADING THE BAP FROM THE GROUND (continued).**

**CAUTION**

To avoid damage to equipment, have an assistant act as a ground guide when backing up Transporter.

- o. Put transmission in reverse, release Transporter parking brake or service brake, back up Transporter while steering as necessary to align tip of LHS hook (17) under BAP hook bar (18), and stop.

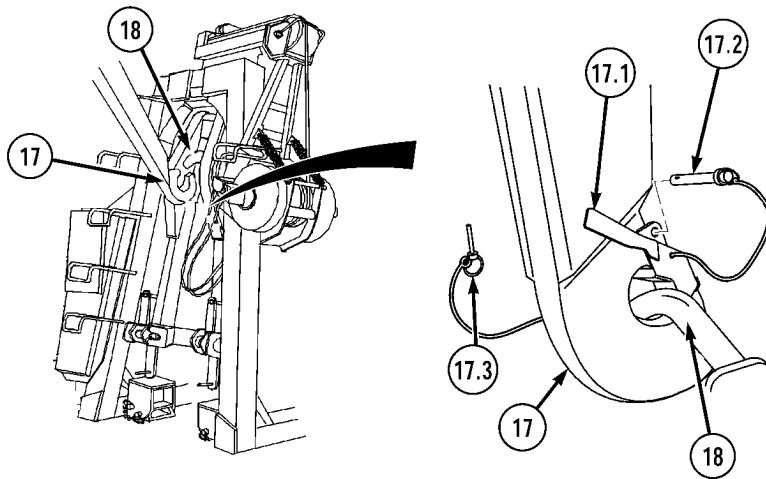
**NOTE**

Make sure tip of LHS hook is slightly below and in line with middle of BAP hook bar.

- p. Place transmission in neutral, and apply service brake.

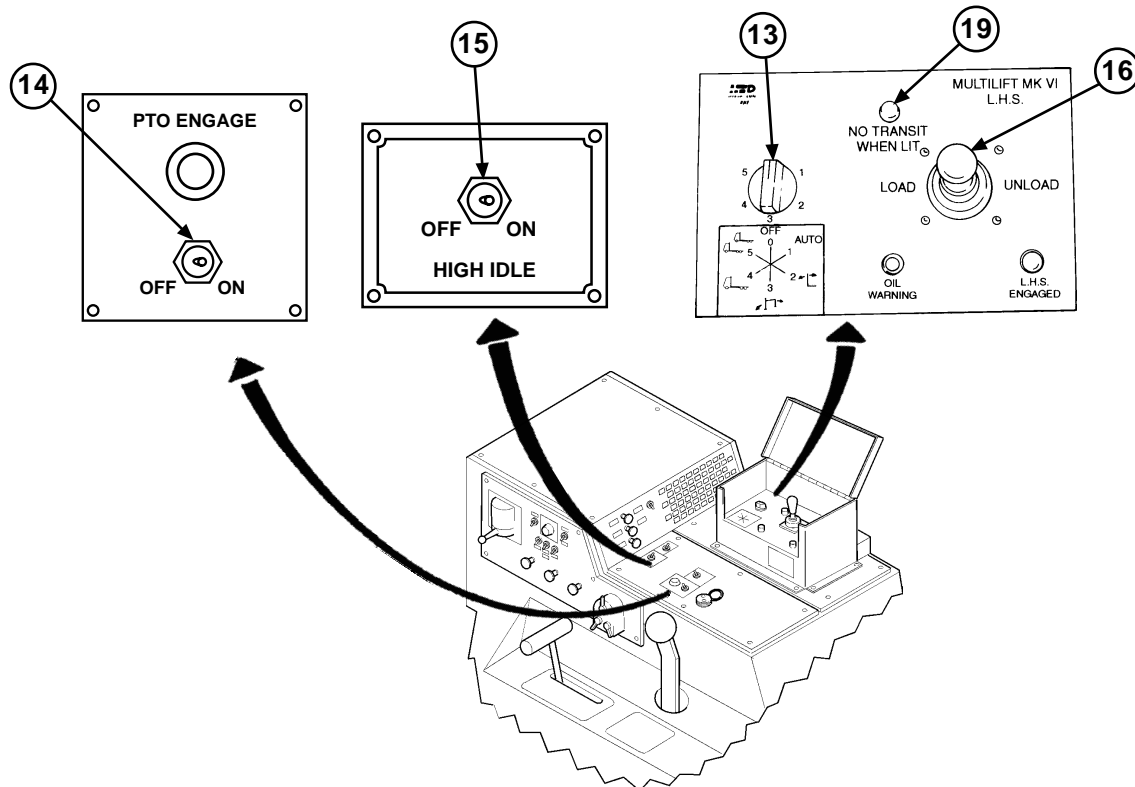
**NOTE**

If LHS hook and BAP hook bar are not properly engaged, move Transporter away from the BAP and repeat Steps o and p.



- q. Move joystick (16) to LOAD until LHS hook (17) engages BAP hook bar (18).
- q.1 Install bail bar lock (17.1) on LHS hook (17) with pin (17.2) and lock pin (17.3).
- r. Release service brake.
- r.1 Move joystick (16) to LOAD.
- s. Turn HIGH IDLE switch (15) to ON.
- t. To ensure that BAP runners engage LHS rear rollers, steer Transporter straight under the BAP as the BAP rises.

## 2-9. LOADING THE BAP FROM THE GROUND (continued).



- u. Apply parking brakes when BAP runners come onto LHS rear rollers and the BAP clears the ground.
- v. Turn HIGH IDLE switch (15) to OFF.
- w. Hold joystick (16) in LOAD position until the BAP is loaded and NO TRANSIT WHEN LIT indicator light is off.

### WARNING

When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.

- x. Release joystick (16) when hook is fully stowed and NO TRANSIT WHEN LIT indicator light (19) is off.

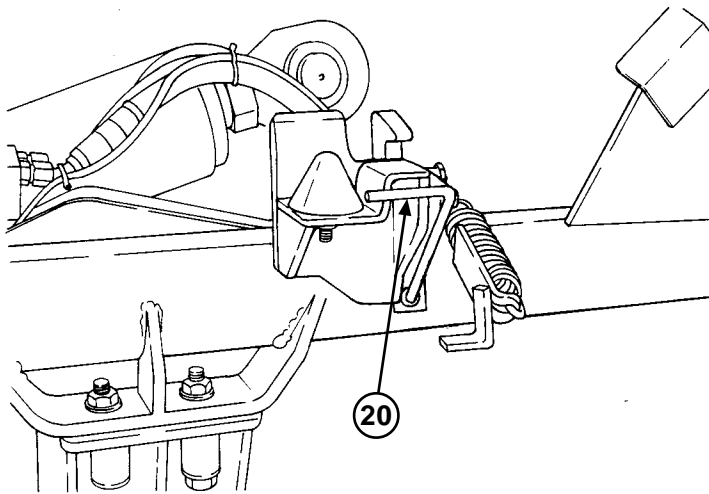
### CAUTION

While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.

- y. Turn LHS MODE SELECT switch (13) to OFF/TRANSPORT, and turn PTO ENGAGE switch (14) to OFF.

**2-9. LOADING THE BAP FROM THE GROUND (continued).**

- z. Make sure the BAP is locked to the Transporter [BAP hold-down locks (20) are pushed in].





## 2-10. UNLOADING THE BAP TO THE GROUND.

### NOTE

During all Transporter operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for directing the operator using hand signals, operating the remote control and winch, and assisting the operator as needed.

*a.* Position Transporter with its rear about 16 feet (4.9 m) in front of where the rear of the BAP is to be set on the ground.

*b.* Apply service brake or parking brake and place transmission in neutral.

*c.* Secure winch frame to the BAP. Make sure two winch frame locking levers (1) are in the up position. If locking levers (1) are not up:

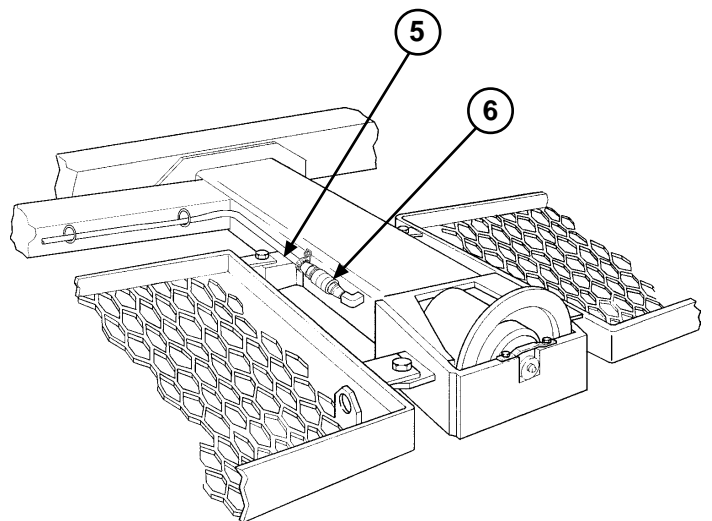
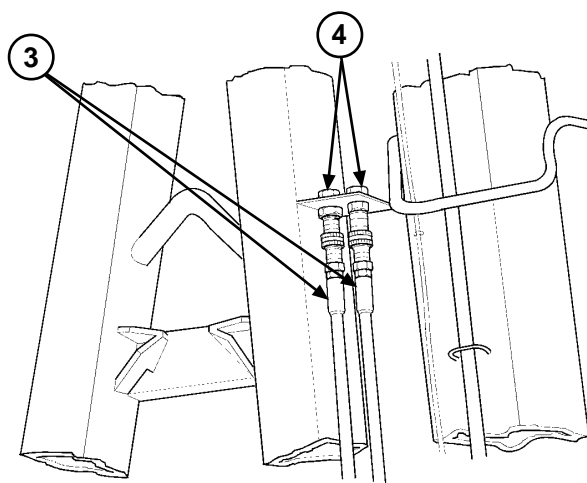
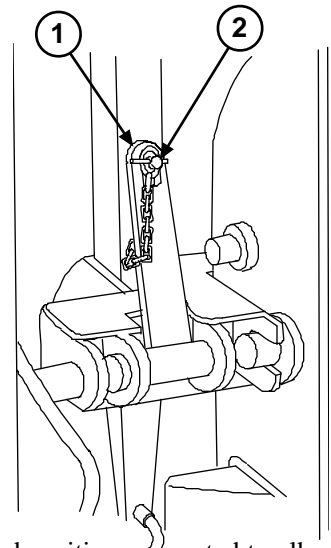
(1) Remove lockpin (2) from each locking lever (1).

(2) Swing each locking lever (1) to the up position.

(3) Insert lockpin (2) into each locking lever (1).

*d.* Connect two hydraulic hoses (3) to the stowed location connections (4).

*e.* Make sure BAP air hose (5) located on road side of the BAP is in the stowed position connected to elbow (6).



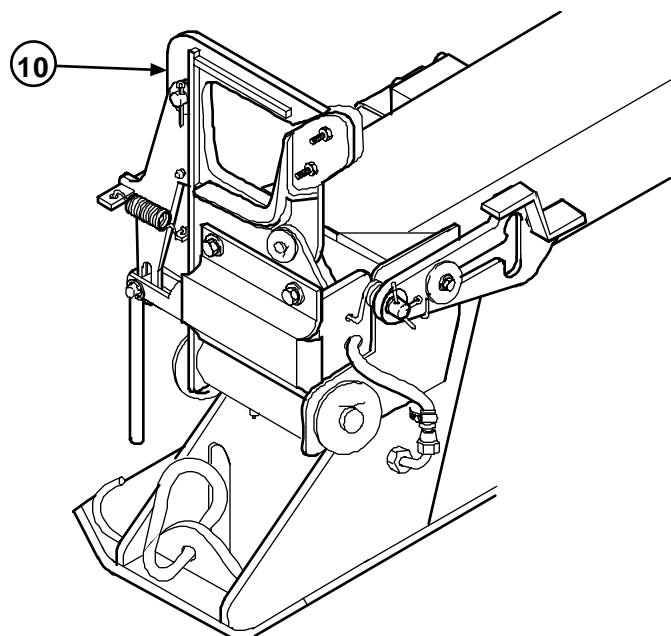
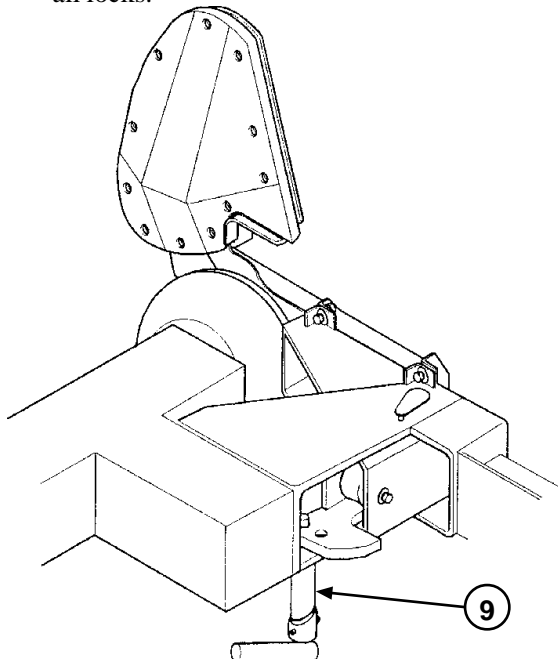
## 2-10. UNLOADING THE BAP TO THE GROUND (continued).

f. Deleted.

### WARNING

**Reposition and lock both rear guides after bridge bay retrieval. Failure to reposition and secure rear guides after bridge bays are loaded could result in lost bridge bays or Transporter rollover during transport, causing death or severe injury to personnel.**

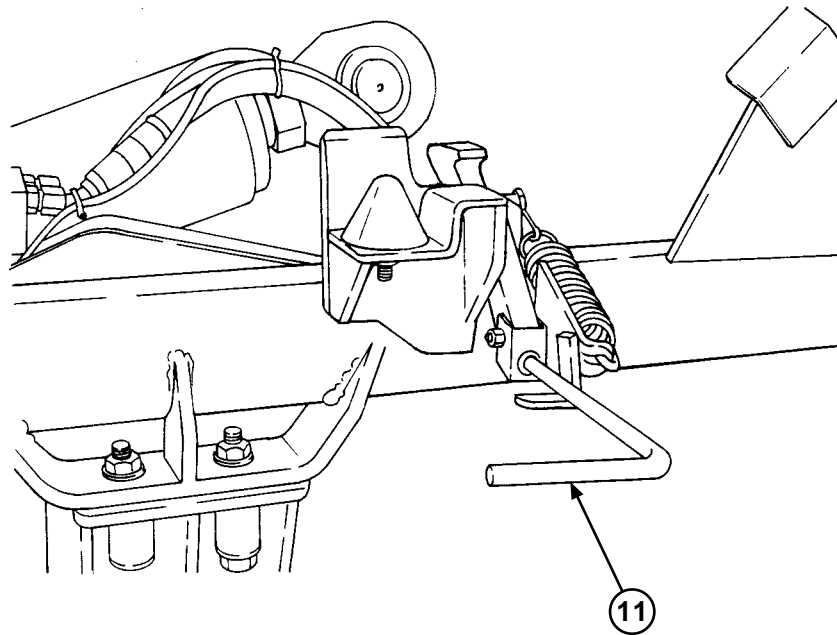
- g. If the BAP is loaded, inspect load and make sure both curb-side and road-side guide latch pins (9) and front pin lock assemblies (10) are in the locked position and secure. See Table 2-2 (p. 2-37) for proper position of all locks.



**2-10. UNLOADING THE BAP TO THE GROUND (continued).****CAUTION**

**BAP hold-down locks must be unlocked from the LHS prior to commencing BAP unloading operations. Failure to release BAP hold-down locks could result in damage to equipment.**

- h.* Release two BAP hold-down locks by pulling handle (11) out.

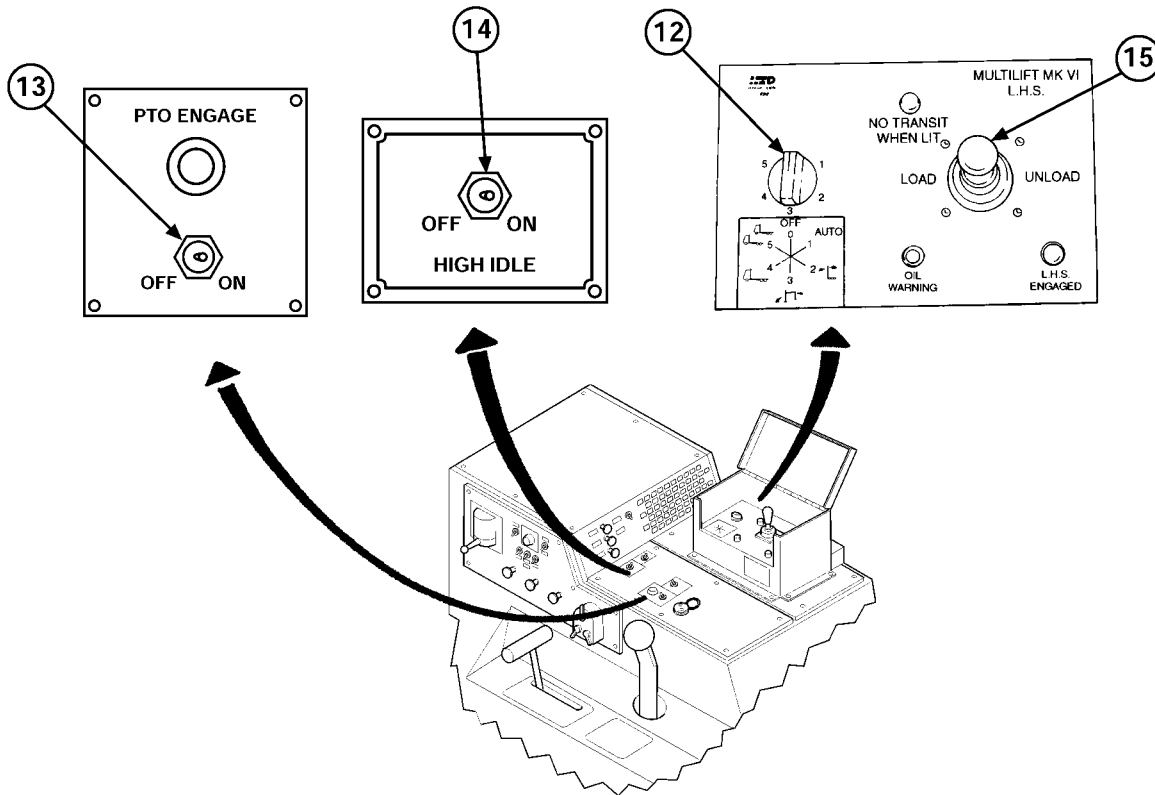


**2-10. UNLOADING THE BAP TO THE GROUND (continued).**

**CAUTION**

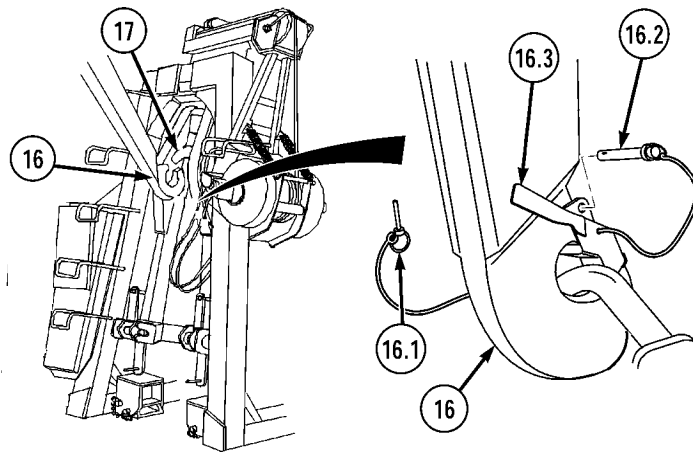
- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe damage to equipment could result.

i. Turn LHS MODE SELECT switch (12) to AUTO, and turn PTO ENGAGE switch (13) to ON.



- j. Turn HIGH IDLE switch (14) to ON.
- k. Move joystick (15) to UNLOAD and hold while LHS hook arm rises and moves the BAP to the rear.
- l. Release parking brake or service brake when back edge of the BAP touches the ground.
- m. Continue unloading while allowing Transporter to roll forward.
- n. Release joystick (15) when front end of the BAP is about 1 foot (0.3 m) off the ground.
- o. Turn HIGH IDLE switch (14) to OFF.
- p. Move joystick (15) to UNLOAD and continue unloading until the BAP rests on the ground and weight of load is off of LHS hook. Apply parking brake or service brake.
  - p.1 Remove lock pin (16.1), pin (16.2), and bail bar lock (16.3) from LHS hook (16).
  - p.2 Move joystick (15) to UNLOAD.

**2-10. UNLOADING THE BAP TO THE GROUND (continued).**



- q. Release joystick (15) when LHS hook (16) is slightly below BAP hook bar (17).

**NOTE**

If LHS hook does not disengage, drive Transporter forward approximately two inches (5 cm) and repeat Step s.

- r. Release parking brake or service brake.
- s. Drive forward slowly about 5 feet (1.5 m) to clear LHS hook (16) from BAP hook bar (17).
- t. Stop Transporter.
- u. Set parking brake, and place transmission in neutral.
- v. Turn HIGH IDLE switch (14) to ON.
- w. Move joystick (15) to LOAD position.

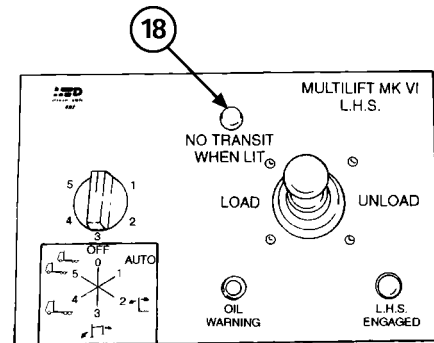
**WARNING**

When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.

- x. Release joystick (15) when main frame and hook arm are fully stowed and NO TRANSIT WHEN LIT indicator (18) light is OFF.
- y. Turn HIGH IDLE switch (14) to OFF.

**CAUTION**

While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.



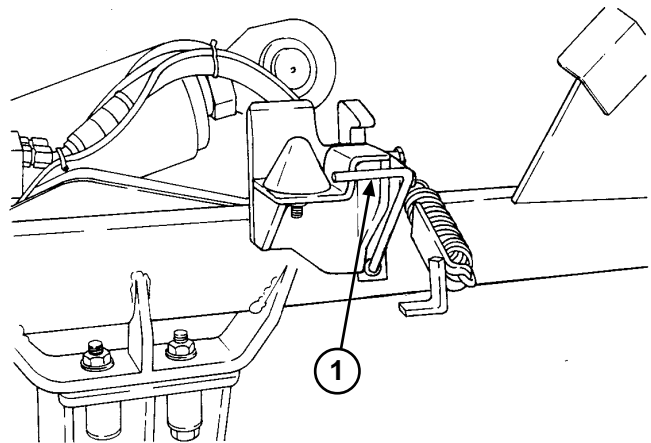
- z. Turn LHS MODE SELECT switch (12) to OFF/TRANSPORT, and turn PTO ENGAGE switch (13) to OFF.

**2-11. LOADING BRIDGE BAY FROM THE GROUND.**

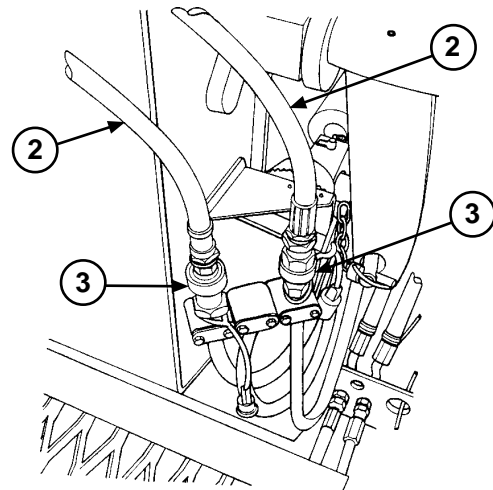
**NOTE**

- During all bridge bay operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for directing the operator using hand signals, operating the remote control box and winch, and assisting the operator as needed.
- In case of emergency while the remote control is in use, push the emergency stop switch to shut down operation of the LHS.

- a. The BAP must be loaded on the Transporter before loading bridge bay.
- b. Make sure all bridge bay latches and locks are locked and secured (refer to TM 5-5420-209-12).
- c. Put transmission in reverse, and back up Transporter so there is about 5 feet (1.5 m) of clearance between Transporter and lifting hook end of bridge bay.
- d. Set parking brake, and place transmission in neutral.
- e. Secure the BAP to the Transporter. Make sure BAP hold-down lock handles (1) are pushed in.



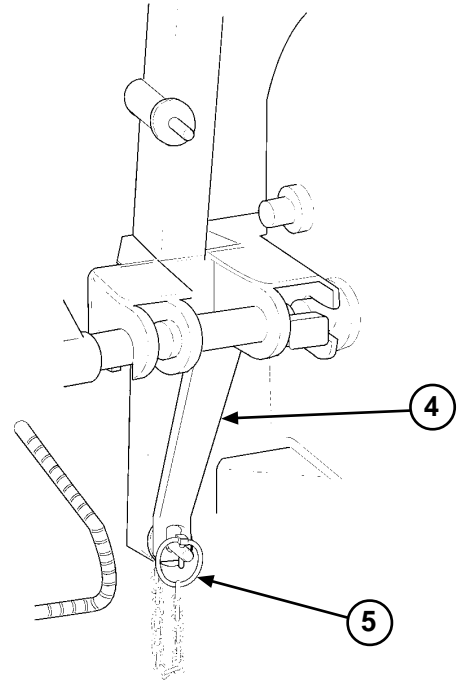
- f. Connect two BAP winch hydraulic pressure hoses (2) to male connector and female connector (3) located on bottom of hook arm assembly.



## 2-11. LOADING BRIDGE BAY FROM THE GROUND (continued).

- g.* Secure winch frame to LHS hook arm. Make sure two winch frame locking levers (4) are in the down position.  
If locking levers (4) are not down:

- (1) Remove lockpin (5) from each upper locking lever (4).
- (2) Swing each locking lever (4) to the down position.

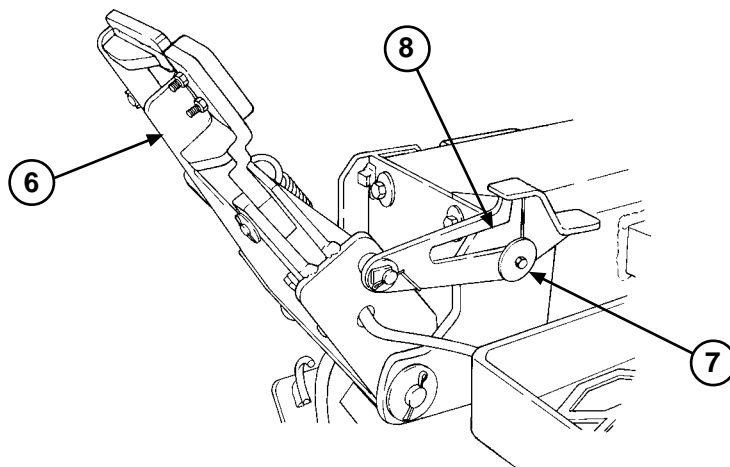


- (3) Insert lockpin (5) into each locking lever (4).

### **WARNING**

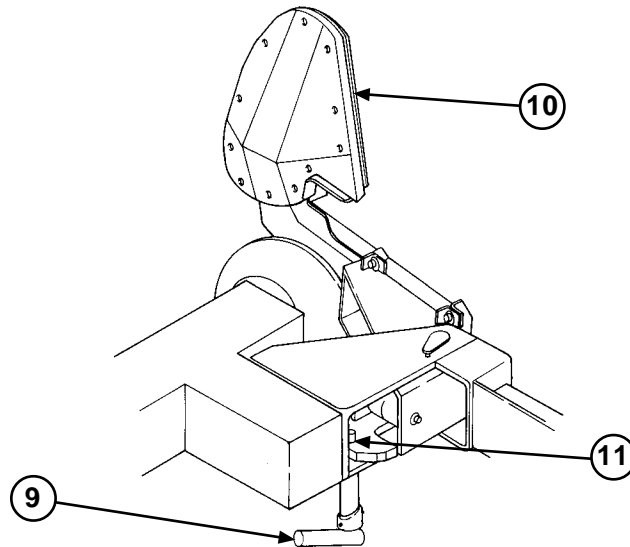
**Keep hands and fingers clear of front pin lock assemblies when in the auto engaged position. Failure to follow this warning could result in injury to personnel.**

- h.* Secure curb-side and road-side front pin lock assemblies (6) in the auto engage position. See Table 2-2 (p. 2-37) for proper position of all locks.
- i.* Pull back front pin lock assemblies (6) until latch lever pin (7) rests in base of verticle slot (8).



**2-11. LOADING BRIDGE BAY FROM THE GROUND (continued).**

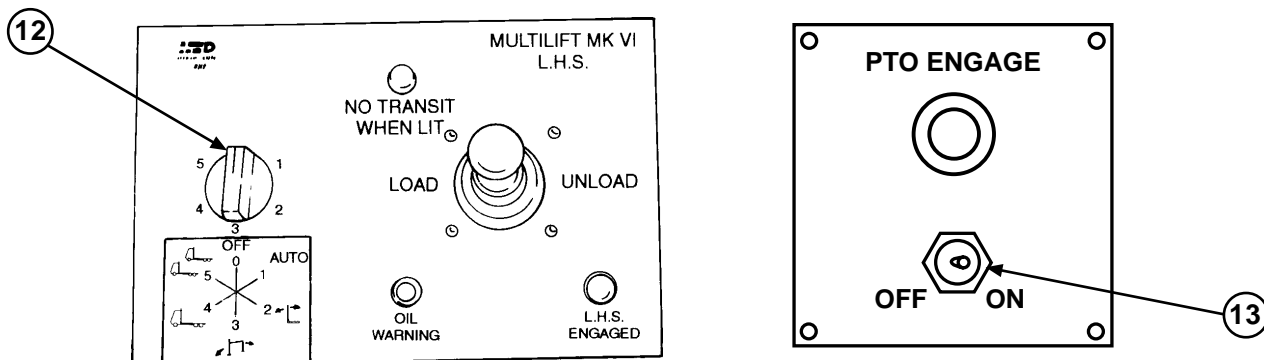
- j.* Secure curb-side and road-side rear guides (10) in the engaged position:
- (1) Rotate latch pin (9), and swing rear guide (10) to the intermediate position.
  - (2) Make sure each latch pin (9) engages hole (11) in rear guide (10).



**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

- k.* Turn LHS MODE SELECT switch (12) to OFF, and turn PTO ENGAGE switch (13) to ON.



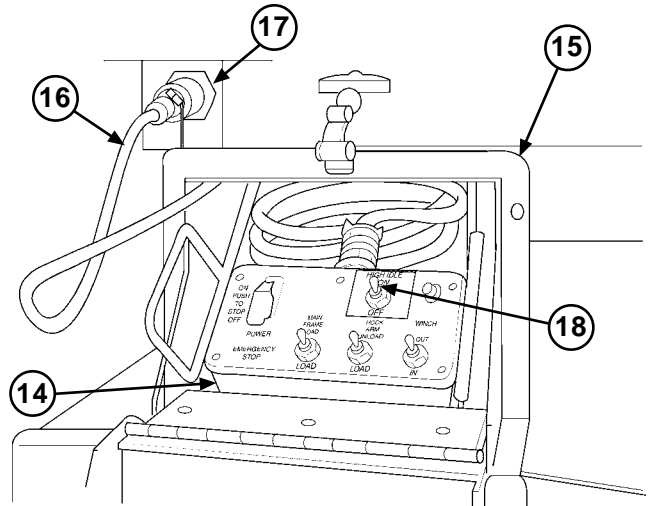


**2-11. LOADING BRIDGE BAY FROM THE GROUND (continued).**

*l.* Install remote control unit (14):

- (1) Remove remote control unit (14) and cable (16) from stowage box (15).
- (2) Connect cable (16) to curb-side or road-side LHS receptacle (17).

*m.* Turn HIGH IDLE switch (18) on remote control unit (14) to ON.

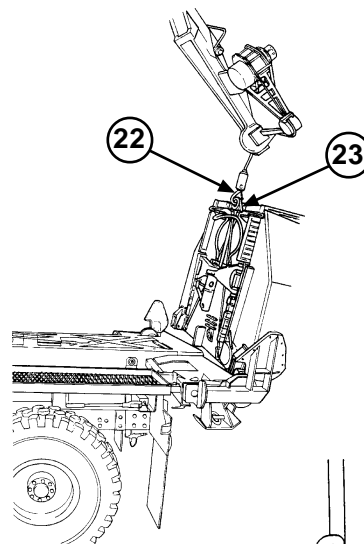
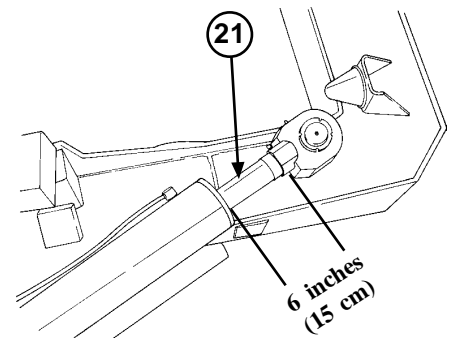


**CAUTION**

**While moving LHS hook arm rearward, make sure winch hydraulic hoses are not trapped or damaged. Operating equipment with trapped or damaged hydraulic hoses will cause damage to equipment.**

*n.* Position HOOK ARM switch (19) to UNLOAD and release when hook arm cylinders (20) are extended approximately 6 inches (15 cm).

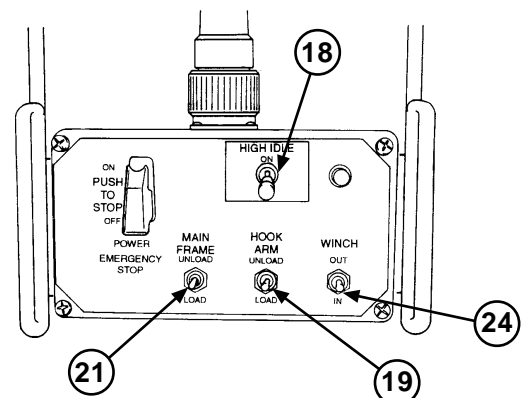
*o.* Position MAIN FRAME switch (21) to UNLOAD and release when main frame has moved rearward and winch cable hook (22) is about 2 feet (0.6 m) above bridge bay lifting eye (23).



**WARNING**

- Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.
- The cable drum requires a minimum of three or four wraps of wire rope (cable) for safety. Failure to obey this warning could result in death or injury to personnel or damage to equipment.

*p.* While an assistant maintains tension on winch cable, position remote WINCH switch (24) to OUT and release when winch cable hook (22) can be attached to bay lifting eye (23).

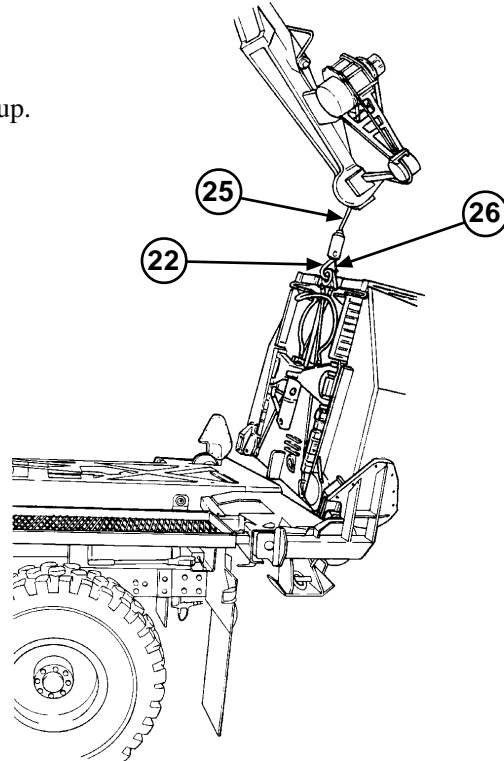


**2-11. LOADING BRIDGE BAY FROM THE GROUND (continued).**

**CAUTION**

To prevent damage to bridge bay, pick up bridge bay only on the spreader cable and stationary hook eye end of bridge bay.

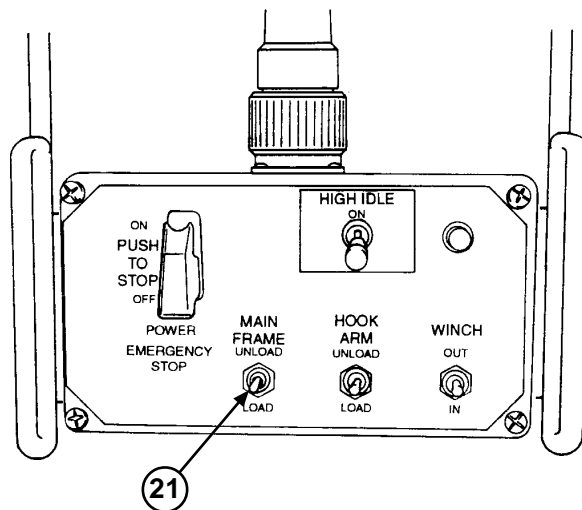
- q.* Attach winch cable (25) to bridge bay.
  - (1) Winch cable hook (22) should face rear with throat up.
  - (2) Hook latch (26) should be closed.



**WARNING**

All personnel should stay clear of the Transporter during bridging operations or death or serious injury could result.

- r.* Position MAIN FRAME switch (21) to LOAD and release when there is no cable slack.



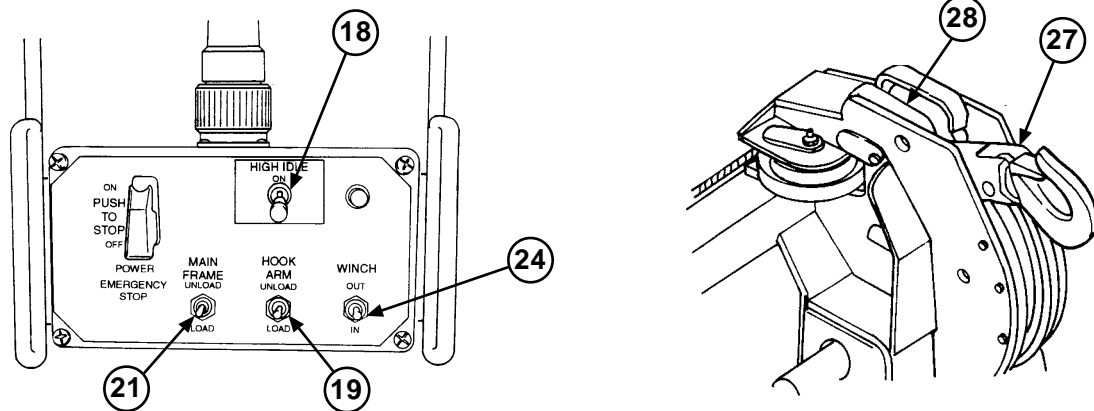
## 2-11. LOADING BRIDGE BAY FROM THE GROUND (continued).

- s. Release parking brake.

### CAUTION

**Be sure hook holder is stowed in saddle or damage to hook could result.**

- t. Position WINCH switch (24) to IN and release when hook holder (27) is in saddle (28).



- u. Position remote MAIN FRAME switch (21) to LOAD.
- v. Steer Transporter as necessary to guide bridge bay onto BAP rear rollers.
- w. Set parking brake when bridge bay contacts rear rollers and clears the ground.
- x. Continue to hold remote MAIN FRAME switch (21) to LOAD until main frame is fully stowed.
- y. As main frame moves into stored position, turn HIGH IDLE switch (18) to OFF.

### WARNING

**When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.**

- z. Position HOOK ARM switch (19) to LOAD until LHS hook arm has been fully stowed.

### WARNING

**Reposition and lock both rear guides after bridge bay retrieval. Failure to reposition and secure rear guides after bridge bays are loaded could result in lost bridge bays or Transporter rollover during transport, causing death or severe injury to personnel.**

- aa. Make sure curb-side and road-side front pin lock assemblies and rear guides are locked on bridge bay pins.

### CAUTION

**Always release tension on winch cable after operation, to avoid undue strain on frame and cable and to prevent damage to equipment during transit.**

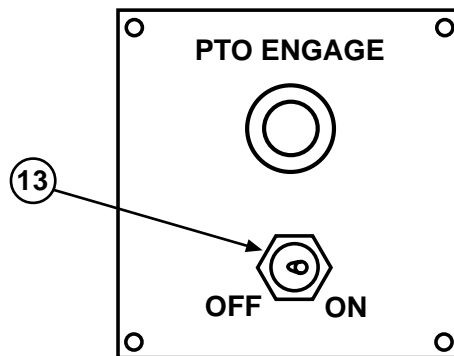
- ab. Position WINCH switch (24) to OUT and release when winch cable tension is released.

**2-11. LOADING BRIDGE BAY FROM THE GROUND (continued).**

**CAUTION**

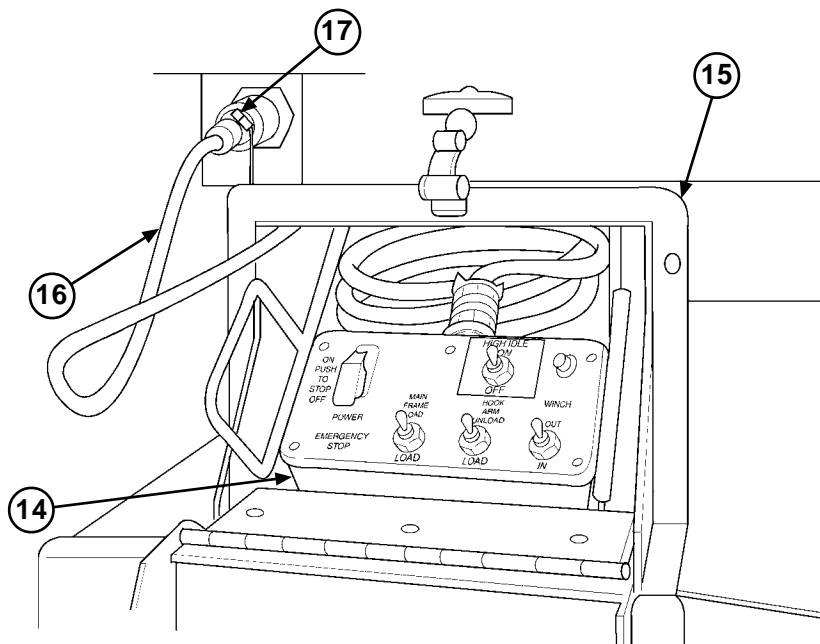
While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.

*ac.* Position PTO ENGAGE switch (13) to OFF.



*ad.* Disconnect and stow remote control unit (14):

- (1) Disconnect cable (16) from LHS receptacle (17).
- (2) Coil and stow cable (16) in rear of stowage box (15).
- (3) Stow remote control unit (14) in stowage box (15).

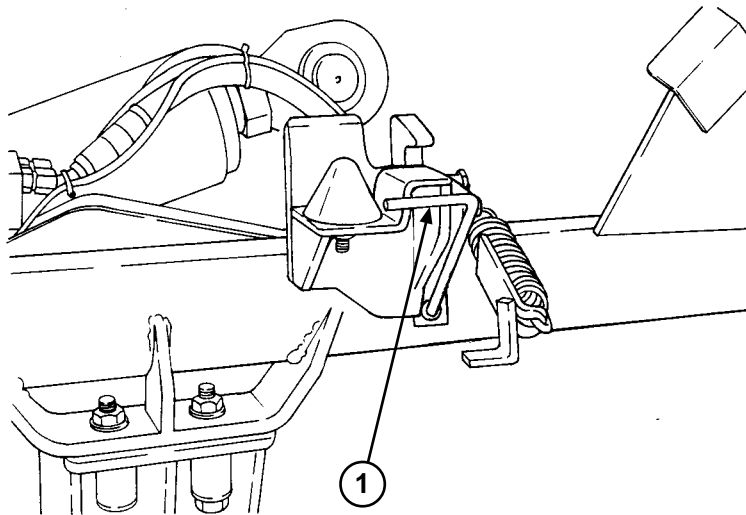


## 2-12. UNLOADING BRIDGE BAY TO THE GROUND.

### NOTE

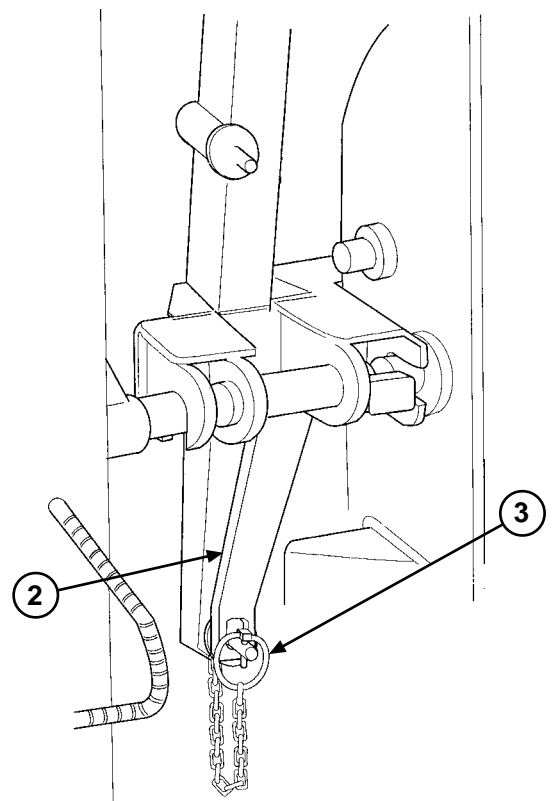
In case of emergency while the remote control is in use, push the emergency stop switch to shut down operation of the LHS.

- a.* Secure the BAP to the LHS. Make sure both BAP hold-down lock handles (1) are pushed in.



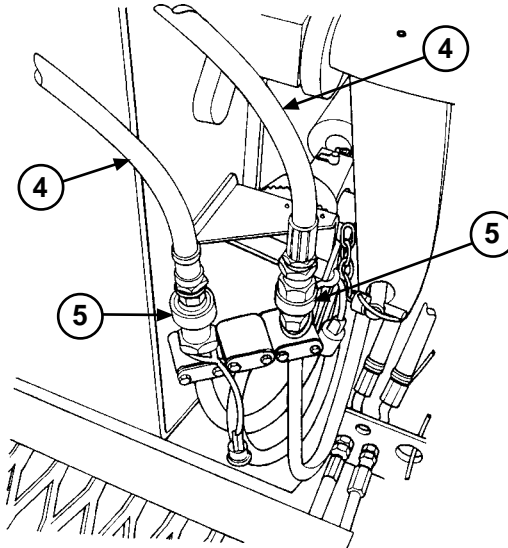
- b.* Secure winch frame to LHS hook arm. Make sure two winch frame locking levers (2) are in the down position. If locking levers (2) are not down:

- (1) Remove lockpin (3) from each locking lever (2).
- (2) Swing each locking lever (2) to the down position.
- (3) Insert lockpin (3) into each locking lever (2).



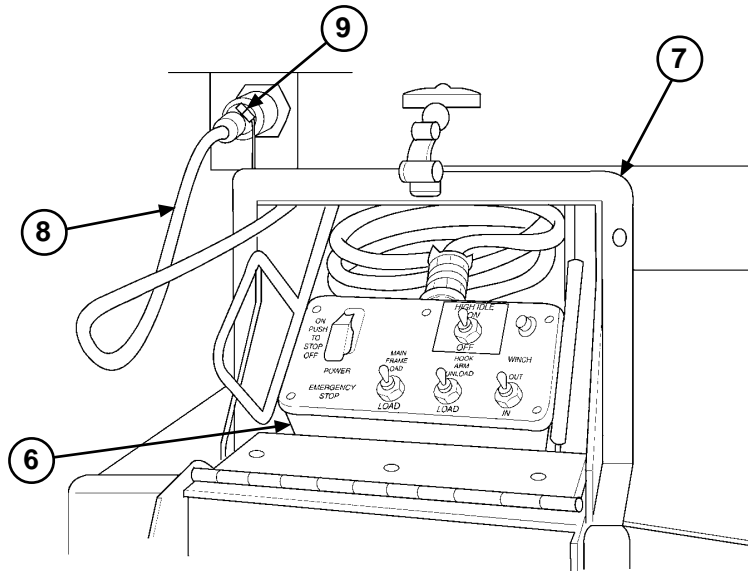
**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

- c. Connect two winch hydraulic pressure line hoses (4) to male connector and female connector (5) located on bottom of hook arm assembly.



- d. Install remote control unit (6):

- (1) Remove remote control unit (6) and cable (8) from stowage box (7).
- (2) Connect cable (8) to curb-side or road-side LHS receptacle (9).



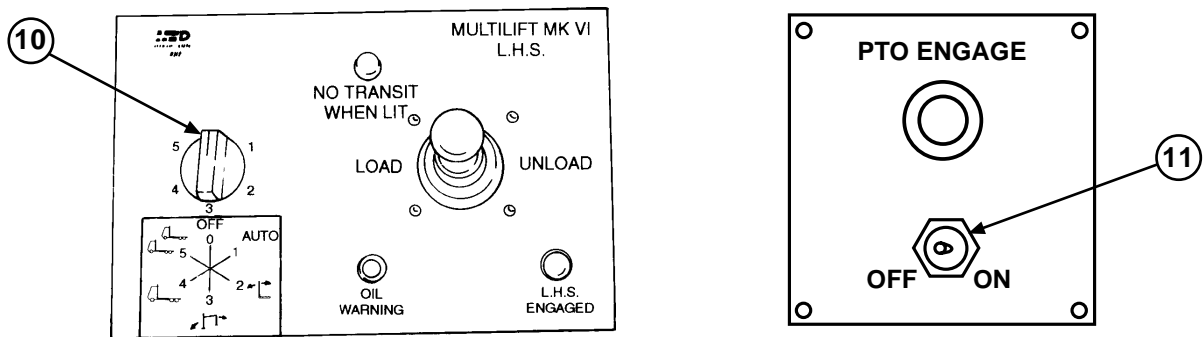
- e. Position Transporter with its rear 5 to 6 feet (1.53 to 1.83 m) from where rear of bridge bay is to sit on the ground.
- f. Apply parking brake and place transmission in neutral.

**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

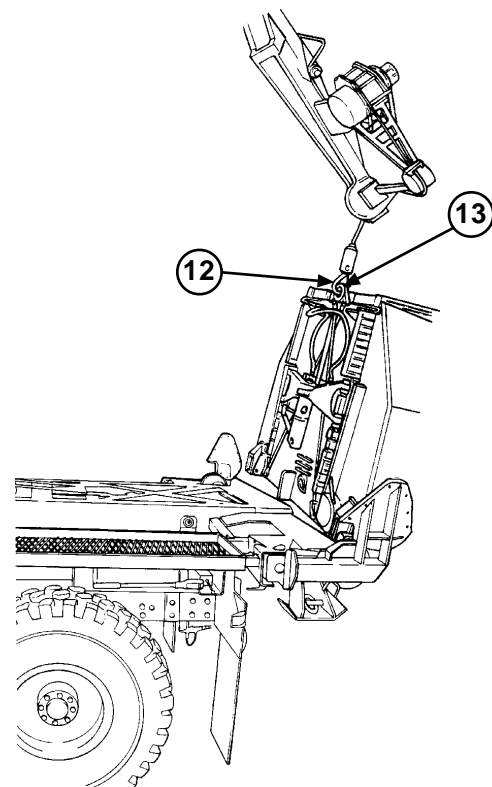
**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

g. Turn LHS MODE SELECT switch (10) to OFF, and position PTO ENGAGE switch (11) to ON.

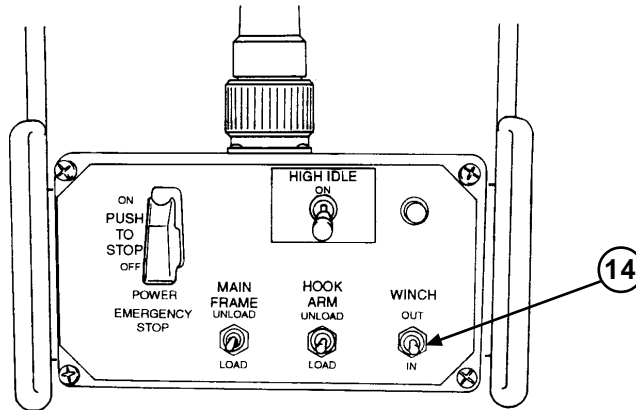


h. Make sure winch cable hook (12) is securely attached to stationary bay lifting eye (13) (refer to TM 5-5420-209-12). Make sure winch cable hook (12) is facing rear with throat up.



**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

- i. Position WINCH switch (14) to IN. Release when tension is applied to winch cable.



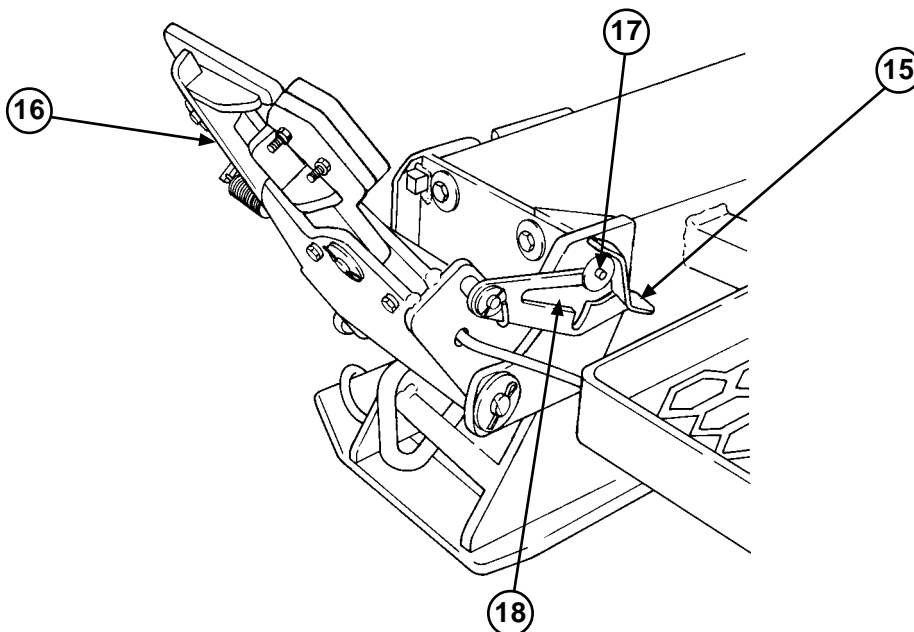
**WARNING**

**Keep hands and fingers clear of front pin lock assemblies when in the disengage position. Failure to follow this warning could result in injury to personnel.**

**NOTE**

To release front pin lock assemblies, movement of the LHS hook arm may be required.

- j. Release curb-side and road-side front pin lock assemblies: Press latch levers (15) down, and pull back front pin lock assemblies (16) until latch lever pin (17) rests at top of vertical slot (18).



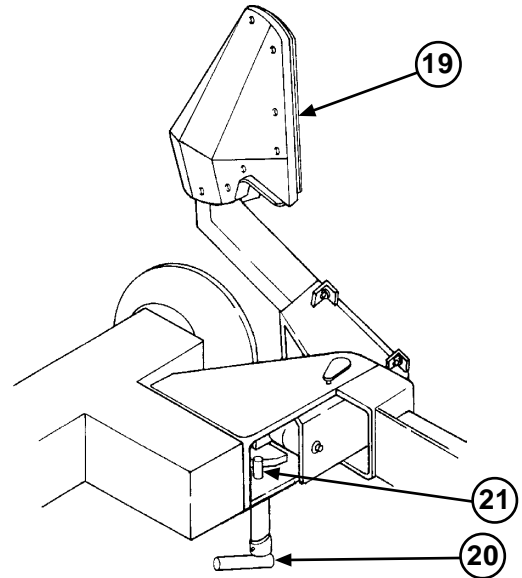


**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

**WARNING**

After releasing rear guides, only the winch hook secures bridge bay to the BAP. Personnel must not mount the BAP and must stay clear of the area around rear of Transporter. The load could shift, release, or fall, resulting in death or injury to personnel.

- k. Set curb-side and road-side rear guides (19) to full open position:
  - (1) Rotate latch pin (20) until rear guide (19) disengages.
  - (2) Swing rear guide (19) until pin (21) clicks into hole.

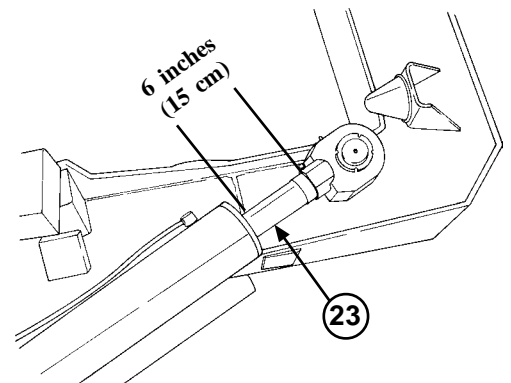
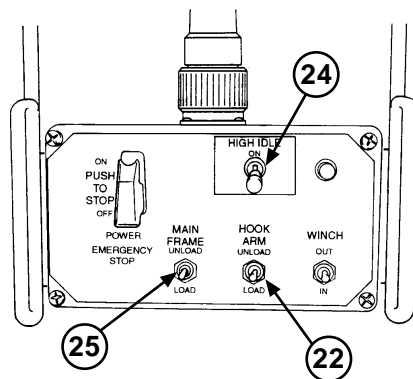


- l. Position HOOK ARM switch (22) to UNLOAD and release when hook arm cylinders (23) are extended approximately 6 inches (15 cm).

**CAUTION**

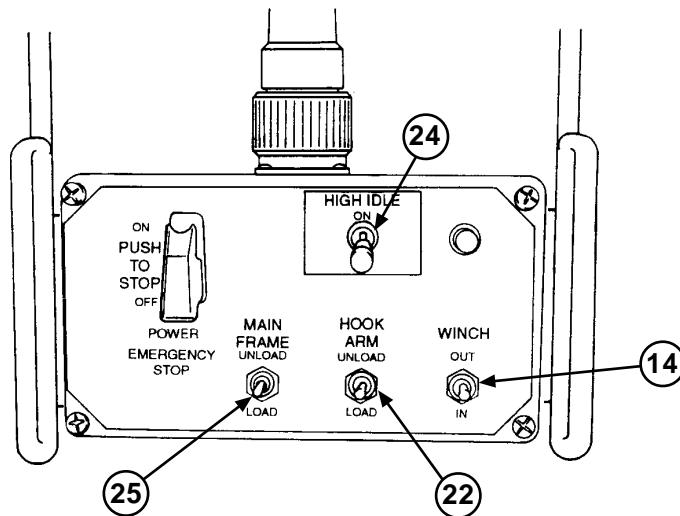
While moving LHS hook arm rearward, make sure winch hydraulic hose lines are not trapped or damaged.

- m. Position HIGH IDLE switch (24) to ON.
- n. Position MAIN FRAME switch (25) to UNLOAD.



**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

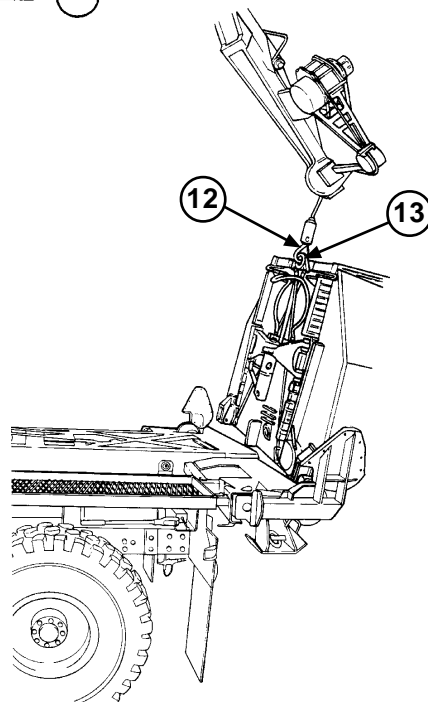
- o.* Immediately release parking brake when rear of bridge bay touches the ground.
- p.* Continue unloading while steering Transporter as it rolls forward. Release MAIN FRAME switch (25) when front of bridge bay is approximately 2 feet (0.6 m) above the ground.
- q.* Position HIGH IDLE switch (24) to OFF.
- r.* Position WINCH switch (14) to OUT until bridge bay is resting on the ground.
- s.* Apply parking brake.
- t.* Position MAIN FRAME switch (25) to UNLOAD to release tension on winch cable. Release when cable is slack enough so winch hook may be unhooked from bay lifting eye (13).



**WARNING**

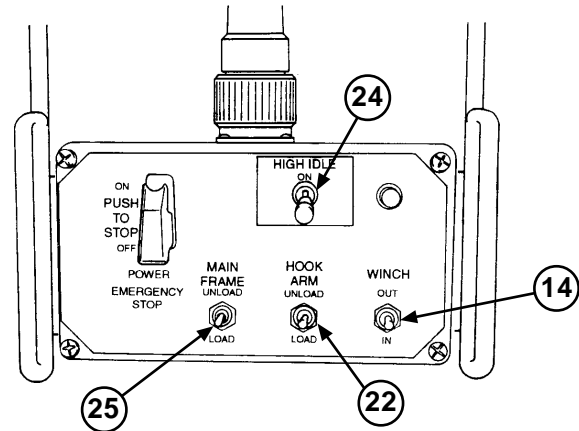
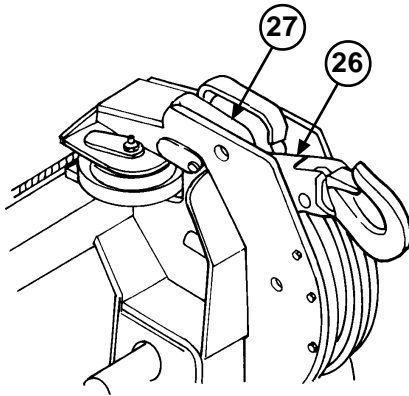
Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.

- u.* Remove winch cable hook (12) from stationary bay lifting eye (13).



**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

- v. While assistant maintains tension on winch cable, position WINCH switch (14) to IN. Release when hook holder (26) is in saddle (27).



- w. Position HIGH IDLE switch (24) to ON. Position MAIN FRAME switch (25) to LOAD.
- x. As main frame moves to stowed position, turn HIGH IDLE switch to OFF.

**WARNING**

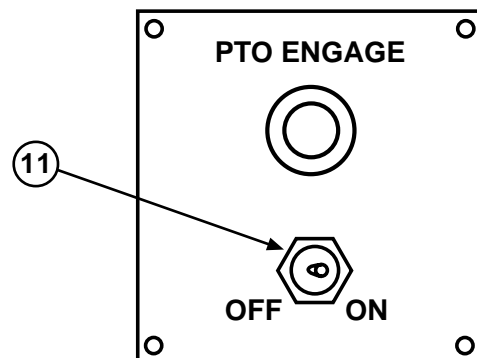
**When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.**

- y. Position HOOK ARM switch (22) to LOAD until LHS hook arm has been fully stowed.

**CAUTION**

**While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.**

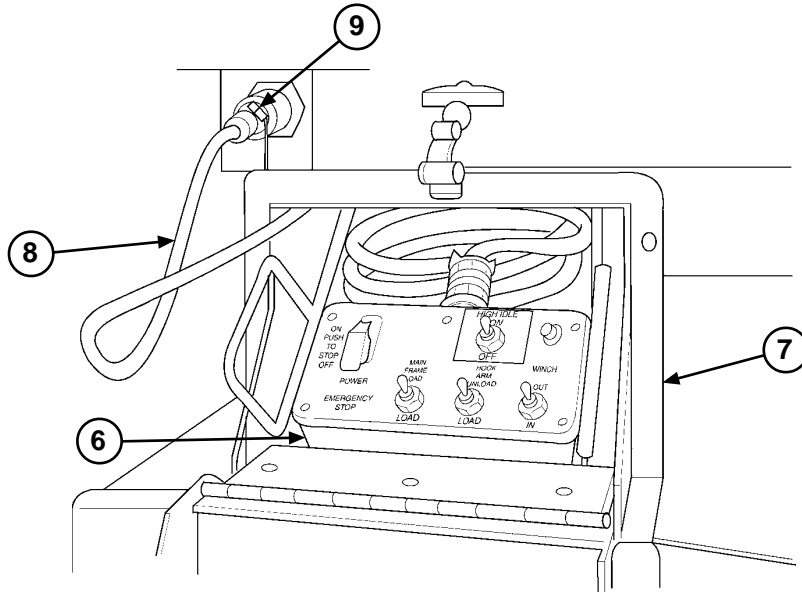
- z. Turn PTO ENGAGE switch (11) to OFF.



**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

*aa.* Disconnect and stow remote control unit (6):

- (1) Disconnect cable (8) from curb-side or road-side LHS receptacle (9).
- (2) Coil and stow cable (8) in rear of stowage box (7).
- (3) Stow remote control unit (6) in stowage box (7).

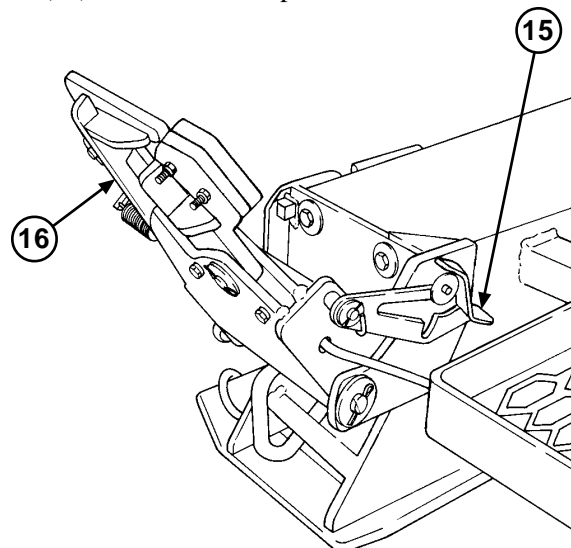


**WARNING**

**Keep hands and fingers clear of front pin lock assemblies when in the disengaged position. Failure to follow this warning could result in injury to personnel.**

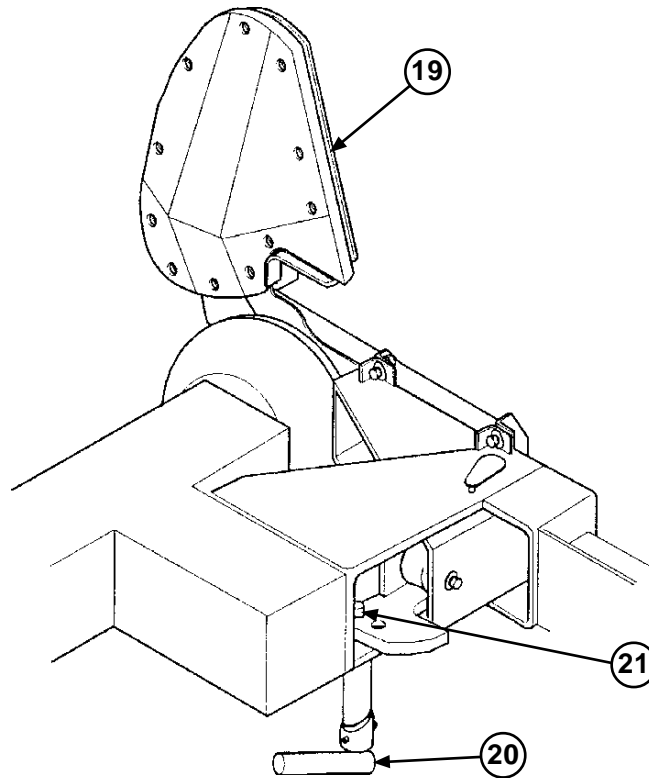
*ab.* Secure curb-side and road-side front pin lock assemblies (16) to their inboard position.

- (1) Pull front pin lock assembly (16) toward you while moving latch lever (15) to center position.
- (2) Allow front pin lock assembly (16) to slide inboard.



**2-12. UNLOADING BRIDGE BAY TO THE GROUND (continued).**

*ac.* Secure curb-side and road-side rear guides (19) to their stowed position.



- (1) Rotate latch pin (20) until rear guide (19) disengages.
- (2) Swing rear guide (19) to full inboard position, and make sure pin (21) clicks into hole.

<b>2-13. BRIDGE BAY LAUNCH.</b>
---------------------------------

**CAUTION**

**Water depth for fording should not exceed 4 feet (1.2 m) or damage to equipment could occur.**

**NOTE**

- During all bridge bay launching operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for assisting and directing the operator. The operator, assistant, and boat crew will prepare bridge bay and Transporter for launch. The operator is responsible for the completion of all tasks.
- In case of emergency while the remote control unit is in use, push the emergency stop switch to shut down operation of the LHS.

**a. *Launch Methods.*** There are three recommended launch methods: controlled launch, free launch, and high-bank launch. The launch method depends on terrain, water conditions, and tactical requirements. The free-launch method requires the least amount of time and is normally used. Water and bank conditions best suited for each type of launch are described below. For information on the operation of interior bay and ramp bay, refer to TM 5-5420-209-12.

**b. *Launch Conditions.*** In addition to site survey conditions for normal Transporter operations (para 2-8), the following specific conditions apply for bridge bay launching:

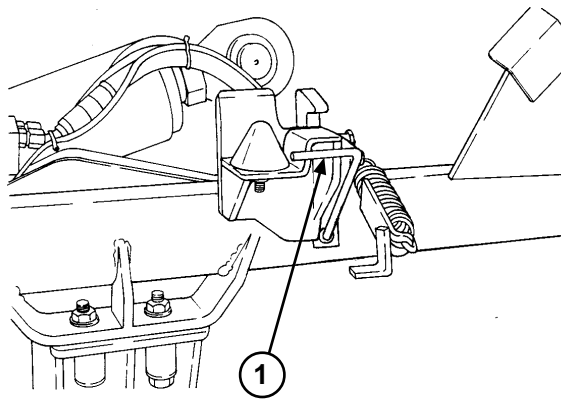
- (1) *Controlled Launch (para 2-14).* For a controlled launch, shore slope should be uniform, with a slope of not more than 20 percent. Water velocity should not be greater than 5 feet (1.5 m) per second. In swift water of about 6 feet (1.8 m) per second, a Y-shaped bridle is attached to the bridge bay. With a 20 percent slope, interior bay requires a water depth of at least 42 inches (1.0 m), with the top of back tire hubcap at the water line (whole hubcap in the water). Ramp bay requires a water depth of at least 50 inches (1.2 m), with the top of back tire rim at the water line (whole rim in the water). In addition, one travel latch on bridge bay must remain in the secured position when launching. The boat crew will install a lanyard to release latch after the bridge bay is in the water, and will open the bridge bay.
- (2) *Free Launch (para 2-15).* For a free launch, shore slope should be uniform, with a slope of not more than 20 percent. Water velocity should not be greater than 8 feet (2.44 m) per second. With a 20 percent slope, interior bay requires a water depth of at least 42 inches (106.7 cm), with the top of back tire hubcap at the water line (whole hubcap in the water). Ramp bay requires a water depth of at least 50 inches (127 cm), with the top of back tire rim at the water line (whole rim in the water).
- (3) *High-Bank Launch (para 2-16).* For a high-bank launch, shore slope should be uniform, with a slope of not more than 5 percent. On slopes greater than 5 percent, front end of launching Transporter must be anchored using self-recovery winch of another Transporter or self-recovery winch of launching Transporter. Bank height should be no greater than 28 feet (8.5 m) and near vertical for bridge bay to clear the side while launching. There also must be room to operate Transporter perpendicular to the bank while still maintaining room for a bridge bay to be set behind Transporter, parallel to the bank. Water depth should be at least 30 inches (76.2 cm). If necessary, bridge bay can be launched in 17 inches (43.2 cm) of water. Water velocity should be less than 5 feet (1.5 m) per second. In swift water (6 feet [1.8 m] per second), a Y-shaped bridle is attached to bridge bay.

## 2-14. CONTROLLED BRIDGE BAY LAUNCH.

### NOTE

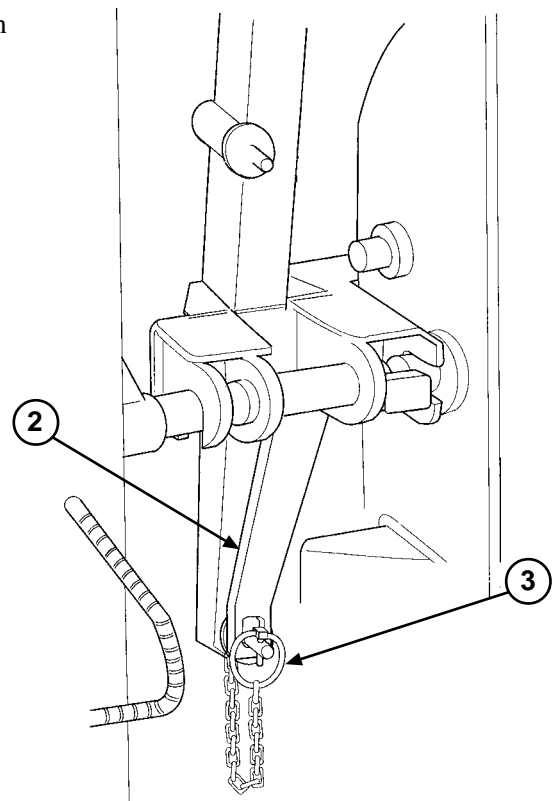
In case of emergency while the remote control unit is in use, push the emergency stop switch to shut down operation of the LHS.

- a. Make sure launch conditions comply with paragraph 2-13b(1).
- b. Make sure the BAP is locked to the Transporter and that BAP hold-down lock handles (1) are pushed in.



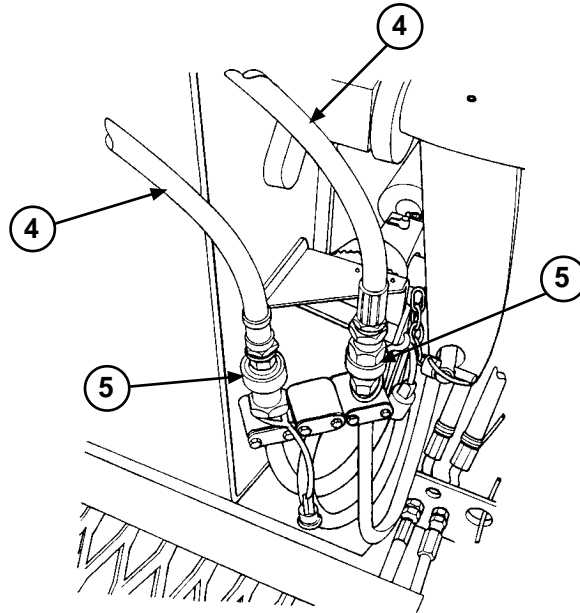
- c. Secure winch frame to LHS hook arm. Make sure two winch frame locking levers (2) are in the down position. If locking levers (2) are not down:

- (1) Remove lockpin (3) from each locking lever (2).
- (2) Swing locking lever (2) to the down position.
- (3) Insert lockpin (3) into locking lever (2).



**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

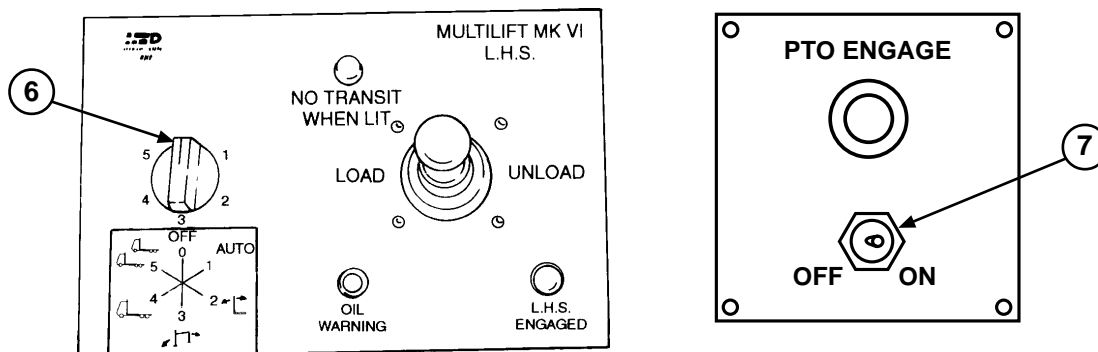
- d. Connect two winch pressure lines (4) to male connector and female connector (5) located on bottom of hook arm assembly.



**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

- e. Position LHS MODE SELECT switch (6) to OFF, and turn PTO ENGAGE switch (7) to ON.

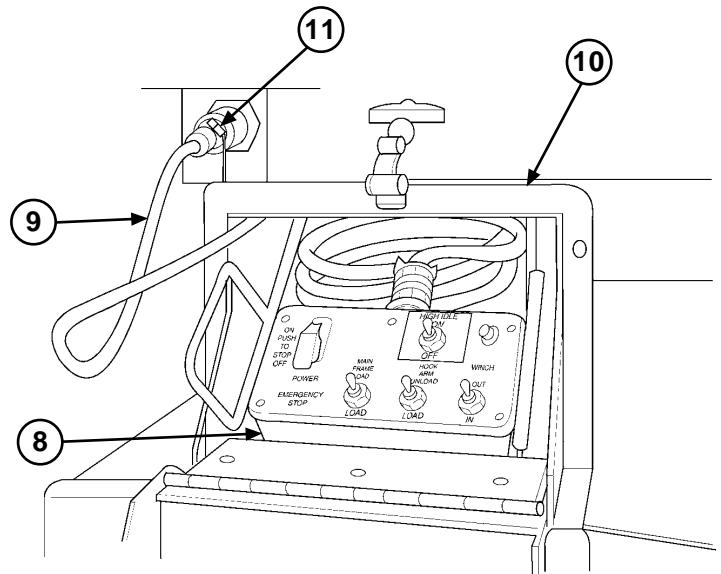




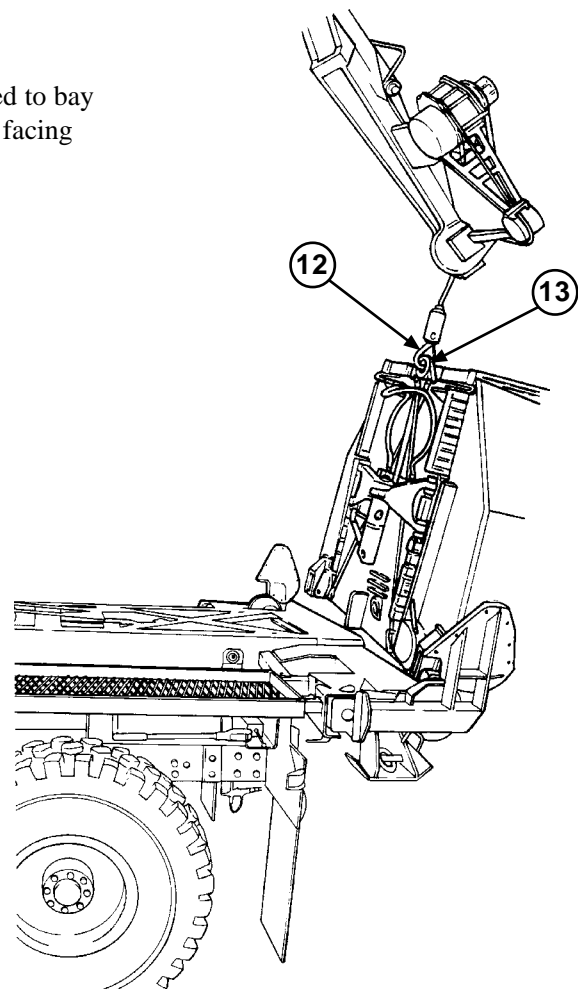
**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

*f.* Install remote control unit (8):

- (1) Remove remote control unit (8) and cable (9) from stowage box (10).
- (2) Connect cable (9) to curb-side or road-side LHS receptacle (11).



*g.* Make sure winch cable hook (12) is securely attached to bay lifting eye (13). Make sure winch cable hook (12) is facing rear with throat up.



**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

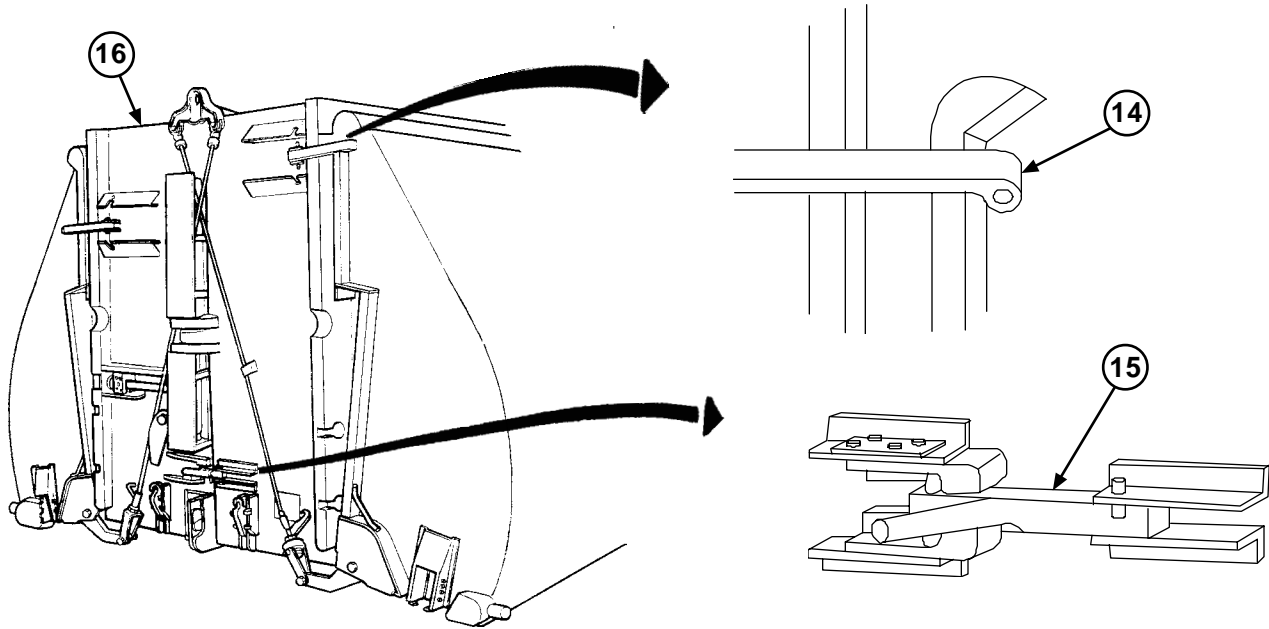
**WARNING**

**Make sure appropriate bridge bay latches are hooked or death or injury to personnel could result.**

**NOTE**

- Interior bay has four foldlock latches, two at each end; ramp bay has two foldlock latches at one end only.
- Interior bay has two travel latches, one at each end; ramp bay has one travel latch at one end only.

- h.* Interior bay: release front and rear foldlock latches (14) and travel latch (15) at rear of bridge bay (16).  
Ramp bay: release two foldlock latches (14) at front of bridge bay (16).

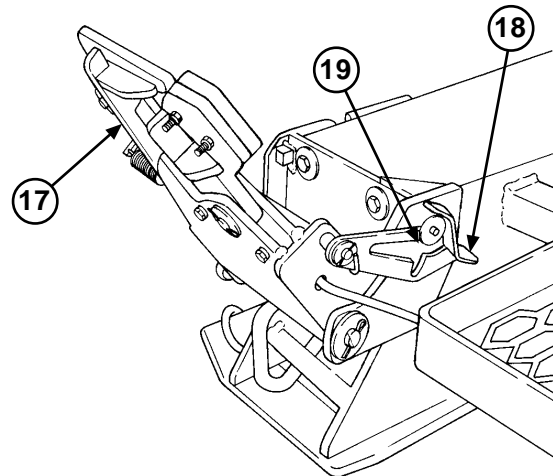


**CAUTION**

**If BAP front pin lock assemblies cannot be unlocked, use remote controls to maneuver LHS hook arm to move the load slightly to free the lock. Failure to free the lock will result in damage to equipment.**

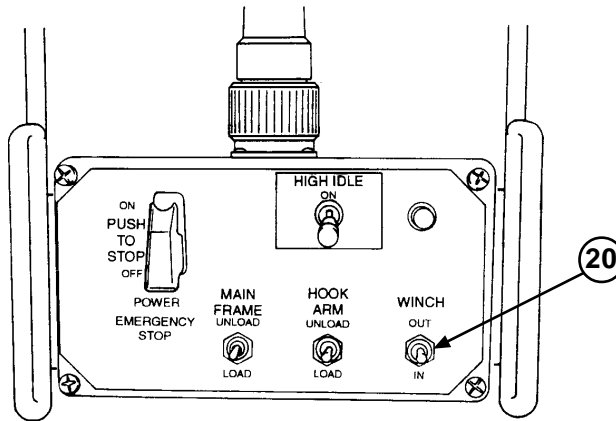
- i.* Release curb-side and road-side BAP front pin lock assemblies (17).

Pull front pin lock assembly (17) out while pushing latch lever pin (18) down until it rests at top of vertical slot (19).



**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

- j.* Position WINCH switch (20) to IN and release when cable slack is removed.

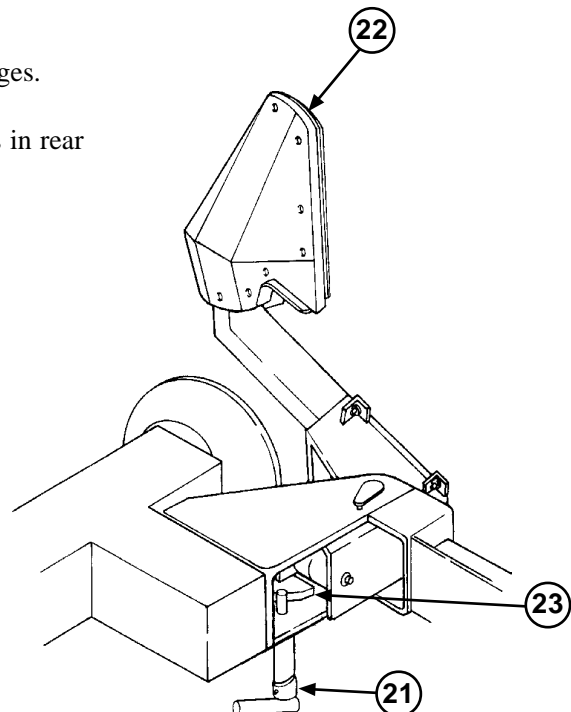


**WARNING**

After releasing rear guides, only the winch hook secures bridge bay to the BAP. Personnel must not mount the BAP and must stay clear of the area around rear of Transporter. The load could shift, release, or fall, resulting in death or injury to personnel.

- k.* Set curb-side and road-side rear guides (22) to fully open position:

- (1) Rotate latch pin (21) until rear guide (22) disengages.
- (2) Swing rear guide (22) until latch pin (21) engages in rear of bay guide (23).



**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

- l.* Release parking brake.

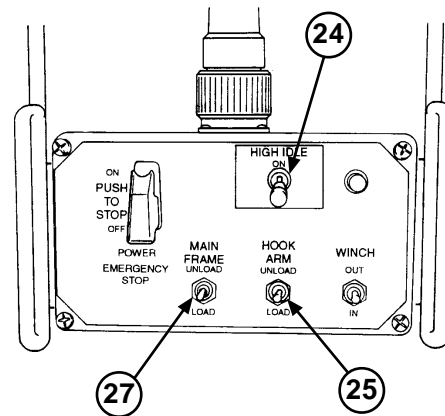
**NOTE**

- Place CBT transfer case in low setting prior to backing Transporter into the water.
  - Do not exceed fording depth of Transporter.
  - If launching interior bay, go to Step m. If this is a ramp bay, go to Step n.
- m.* Back Transporter into the water and stop when top of back tire hubcap is at the water line (hubcap is in the water).
  - n.* Back Transporter into the water and stop when top of back tire rim is at the water line (rim is in the water).

**CAUTION**

**Before continuing operations and after entry of Transporter into the water, make sure parking brake is engaged and Transporter is motionless. Otherwise, parking brake may slip, allowing Transporter to roll into deeper water and resulting in damage to equipment.**

- o.* Apply parking brake and place transmission in neutral.

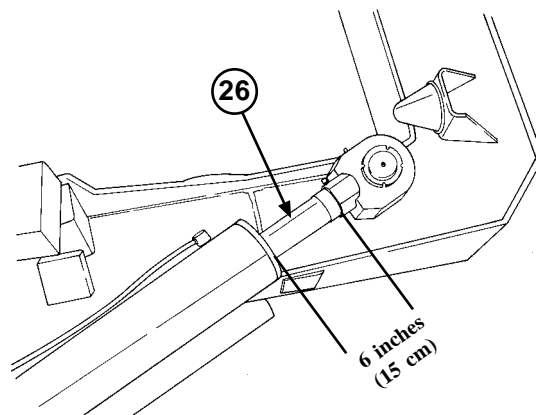


- p.* Turn HIGH IDLE switch (24) to ON.

**CAUTION**

**When moving LHS hook arm rearward, make sure winch hydraulic hose lines are not trapped or damaged.**

- q.* Position HOOK ARM switch (25) to UNLOAD and release when both hook arm cylinders (26) are extended approximately 6 inches (15 cm).



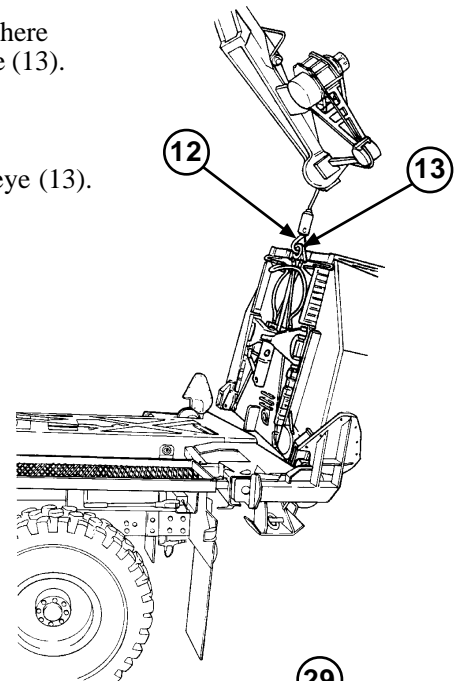
**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

- r. Position MAIN FRAME switch (27) to UNLOAD and release when bridge bay is clear of Transporter and the BAP.
- s. Position WINCH switch (15) to OUT and release when bridge bay floats.

**NOTE**

Refer to TM 5-5420-209-12 for bridge bay operations.

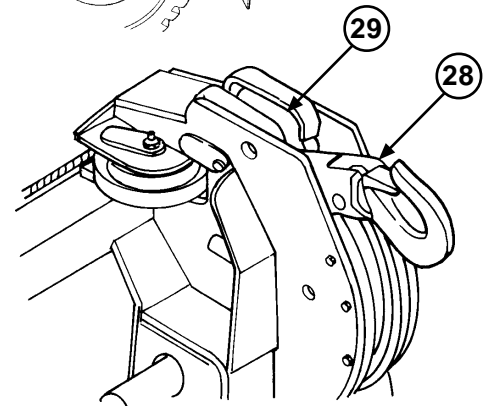
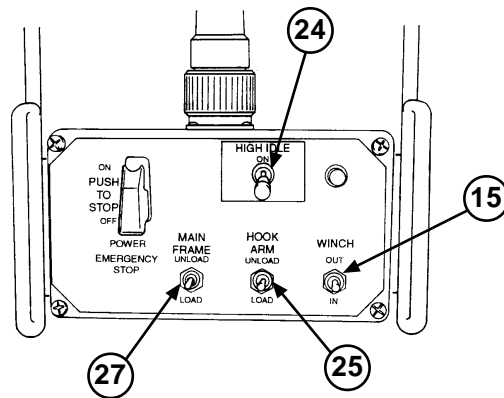
- t. Have boat crew move in toward bridge bay and install pin and lanyard in secured travel latch.
- u. Position MAIN FRAME switch (27) to UNLOAD and release when there is enough slack in cable to remove cable hook (12) from bay lifting eye (13).
- v. Turn HIGH IDLE switch (15) to OFF.
- w. Have boat crewman remove winch cable hook (12) from bay lifting eye (13).



**WARNING**

**After water operations, Transporter brakes will be wet and will not stop as quickly as usual. Care must be taken and extra distance allowed for slowing or stopping Transporter. Slipping brakes could result in death or injury to personnel or damage to equipment.**

- x. Release parking brake and drive Transporter out of the water. Stop, put transmission in neutral, and set parking brake.
- y. Have boat crew move away from bridge bay and pull lanyard to unfold bridge bay.
- z. Turn HIGH IDLE switch (24) to ON.



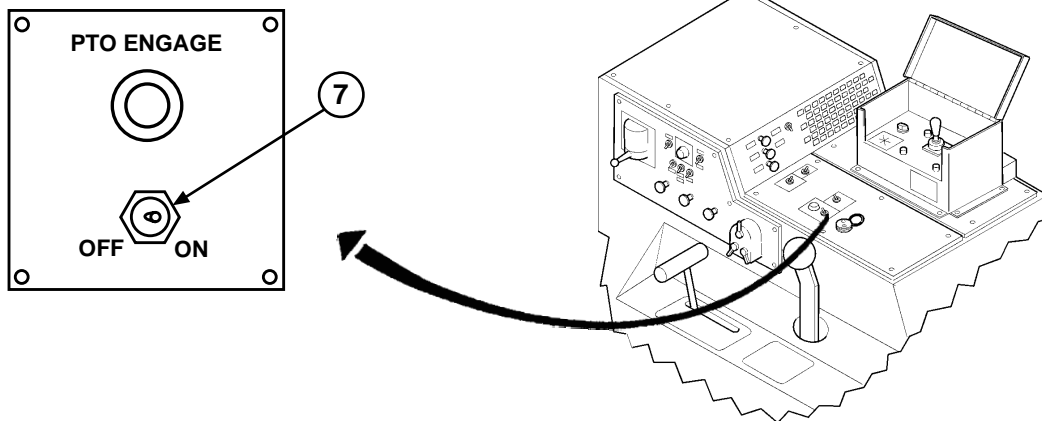
- aa. While maintaining tension on winch cable, position WINCH switch (24) to IN and release when hook holder (28) is in saddle (29).
- ab. Position MAIN FRAME switch (27) to LOAD.
- ac. As main frame moves into stowed position, position HIGH IDLE switch (24) to OFF.
- ad. Position HOOK ARM switch (25) to LOAD and release when hook arm is fully stowed.

**2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).**

**CAUTION**

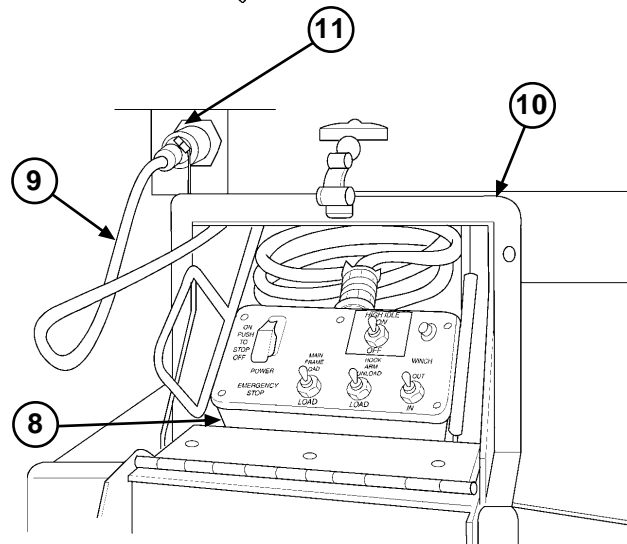
**While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.**

*ae.* Turn PTO ENGAGE switch (7) to OFF.



*af.* Disconnect and stow remote control unit (8):

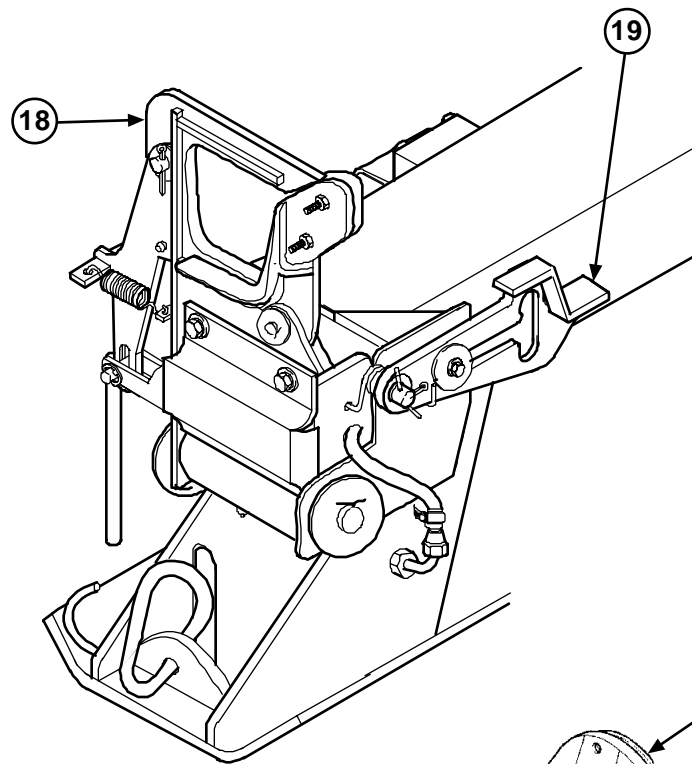
- (1) Disconnect cable (9) from LHS receptacle (11).
- (2) Coil and stow cable (9) in rear of storage box (10).
- (3) Stow remote control unit (8) in storage box (10).



## 2-14. CONTROLLED BRIDGE BAY LAUNCH (continued).

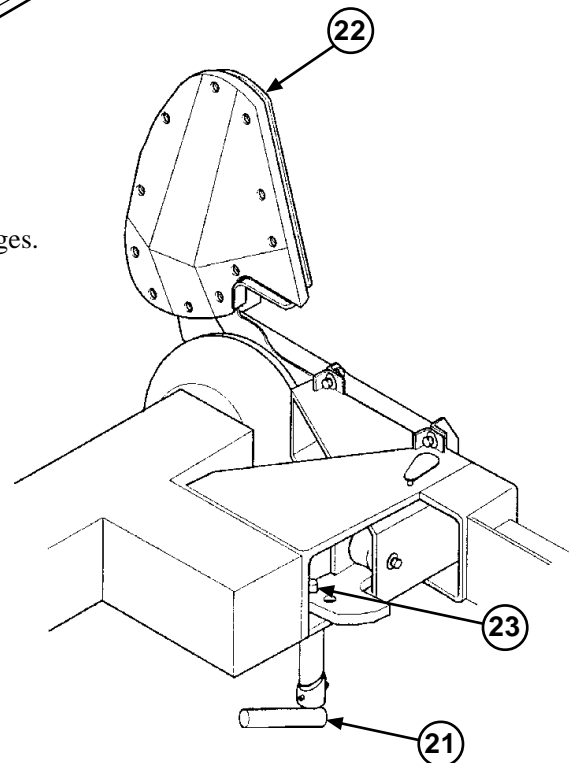
*ag.* Secure curb-side and road-side front pin lock assemblies (18) to their inboard position.

*ah.* Pull front pin lock assembly (18) to release latch lever (19), then let lock move in.



*ai.* Secure curb-side and road-side rear guides (22):

- (1) Rotate latch pin (21) until rear guide (22) disengages.
- (2) Swing rear guide (22) to full inboard position, until latch pin (21) engages in rear of bay guide (23).

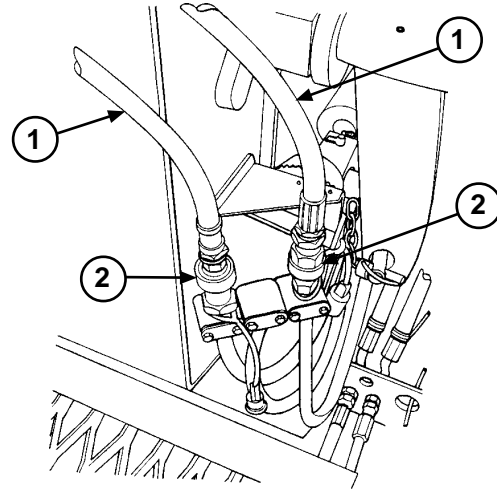


**2-15. FREE BRIDGE BAY LAUNCH.**

**NOTE**

In case of emergency while the remote control unit is in use, push the emergency stop switch to shut down operation of the LHS.

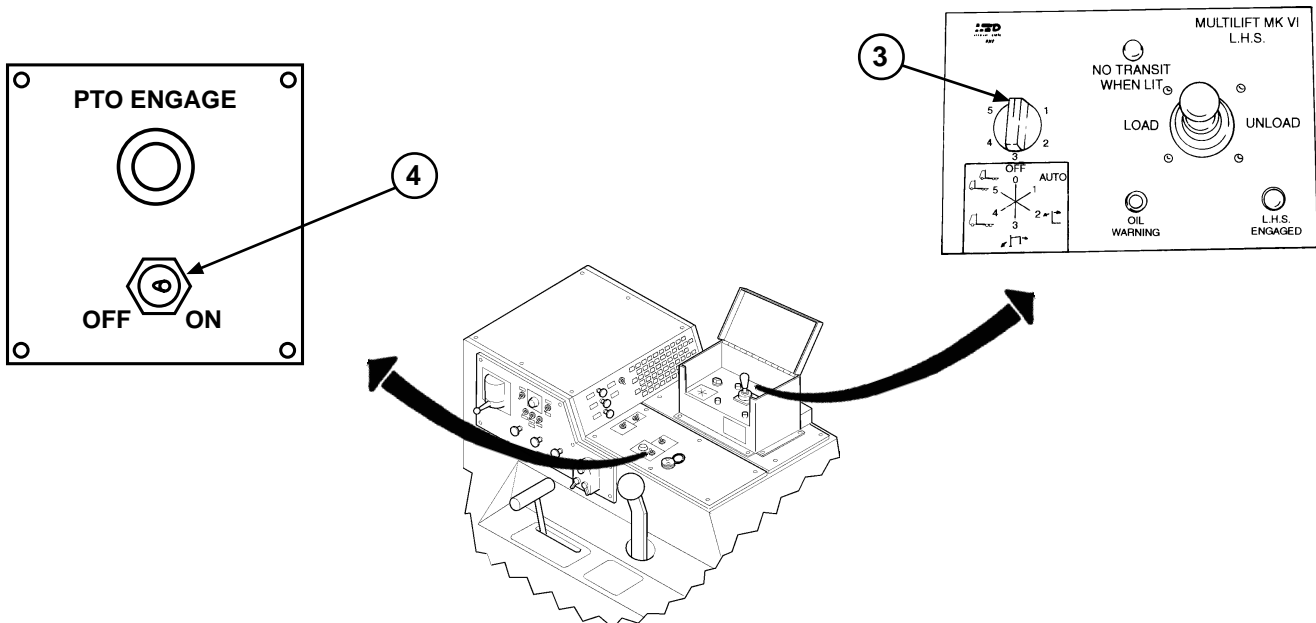
- a. Make sure launch conditions comply with paragraph 2-13b(2).
- b. Back up Transporter to within 15 feet of water, apply parking brake, and place transmission in neutral.
- c. Connect two winch pressure lines (1) to male connector and female connector (2) located on bottom of hook arm assembly.



**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

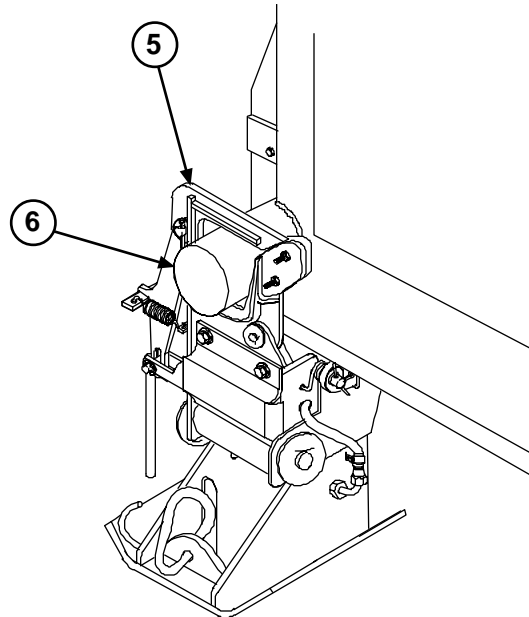
- d. Turn LHS MODE SELECT switch (3) to AUTO, and turn PTO ENGAGE switch (4) to ON.





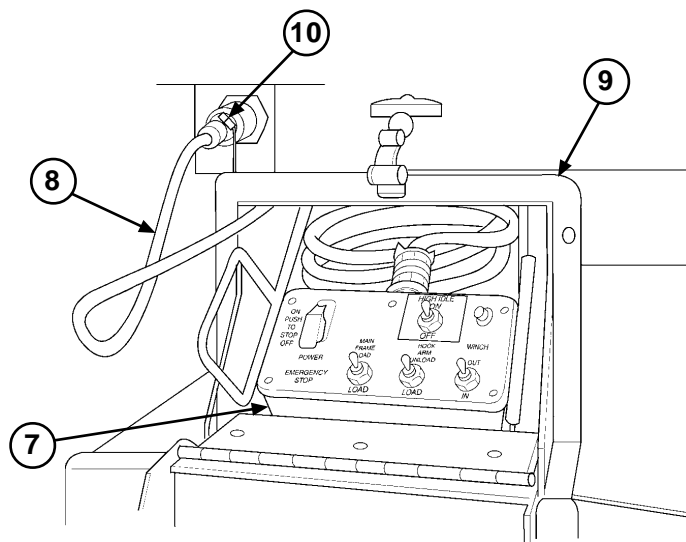
**2-15. FREE BRIDGE BAY LAUNCH (continued).**

- e. Check to see that curb-side and road-side front pin lock assemblies (5) are engaged onto bay pins (6).



- f. Install remote control unit (7).

- (1) Remove remote control unit (7) and cable (8) from stowage box (9).
- (2) Connect cable (8) to curb-side or road-side LHS receptacle (10).

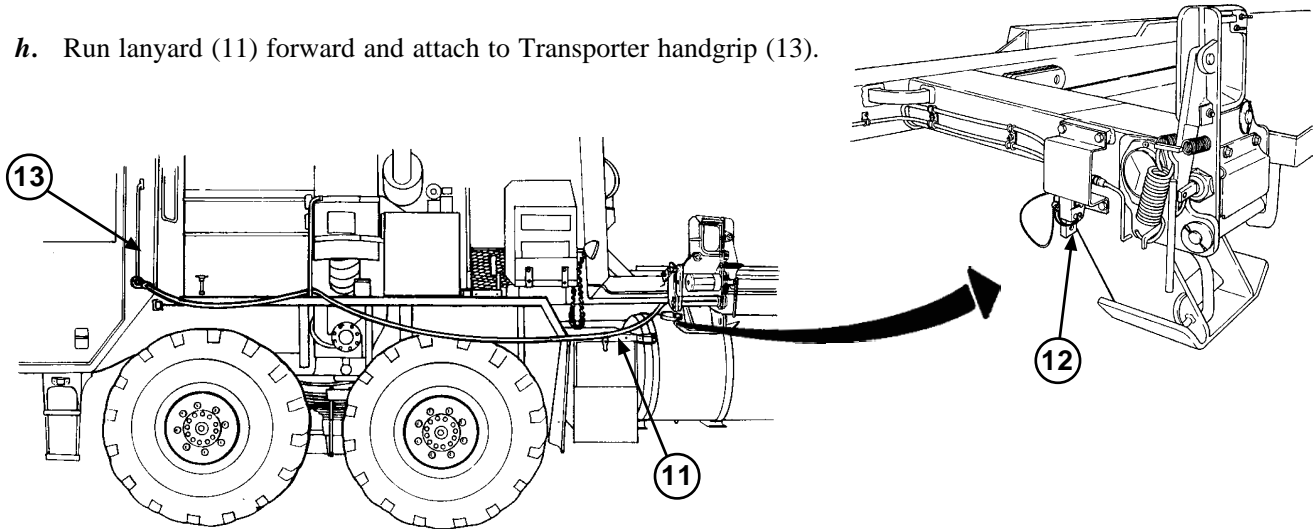


**2-15. FREE BRIDGE BAY LAUNCH (continued).**

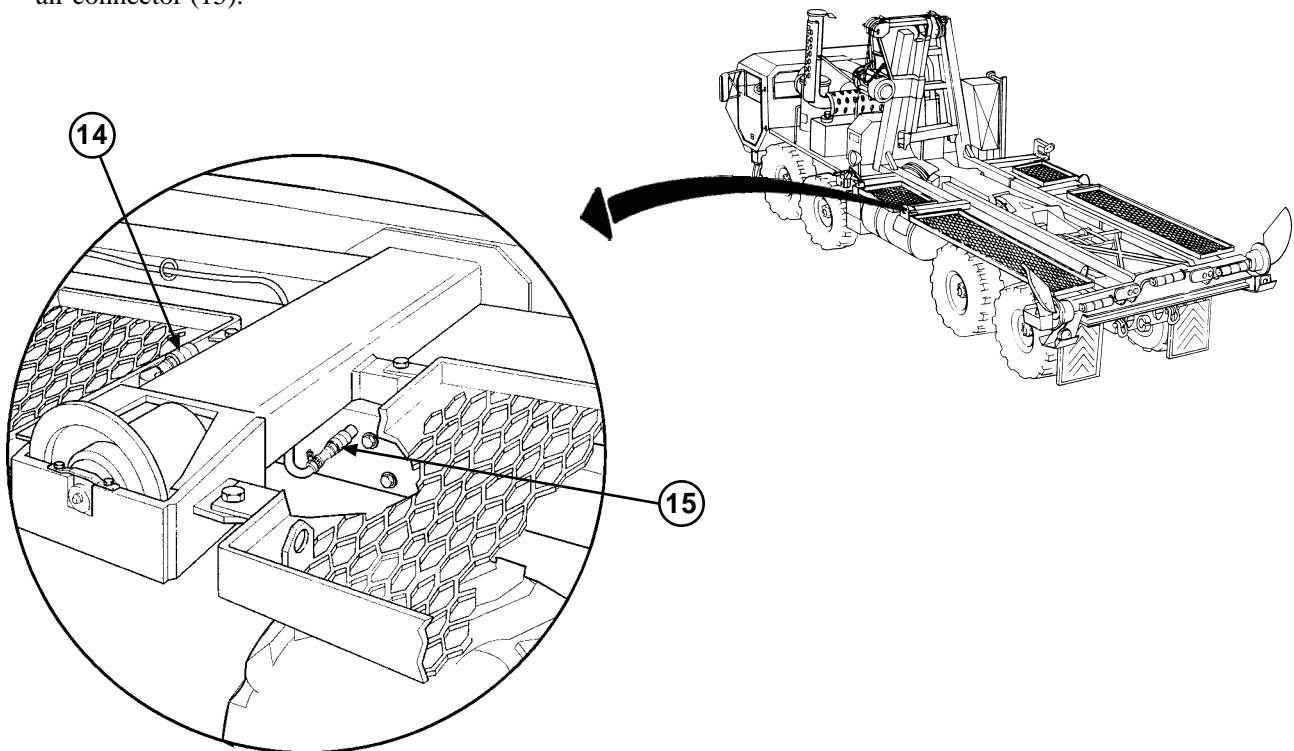
**NOTE**

Be sure air release valve lever safety pin is engaged through release lever.

- g.* Attach lanyard (11) to front bridge lock air release valve lever (12).
- h.* Run lanyard (11) forward and attach to Transporter handgrip (13).



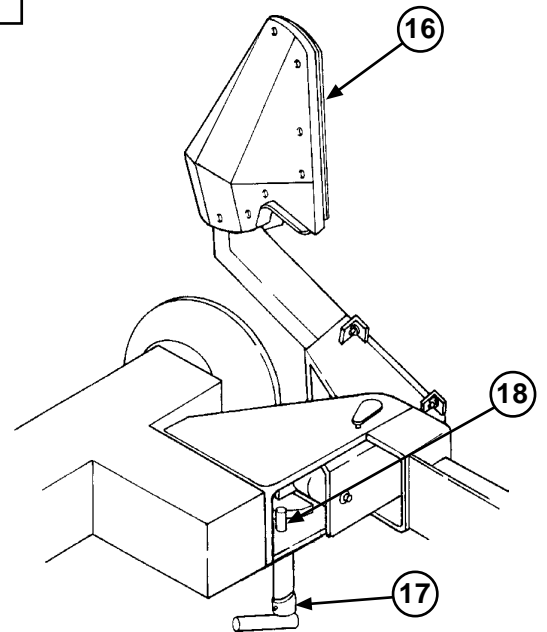
- i.* Remove air hose from stowage connector (14) (road side of the BAP) and connect to Transporter tire inflation air connector (15).



**2-15. FREE BRIDGE BAY LAUNCH (continued).**

*j.* Set curb-side and road-side rear guides (16) in the disengage position:

- (1) Rotate latch pin (17) until rear guide (16) disengages.
- (2) Swing rear guide (16) to fully open position, and make sure pin (18) engages rear guide (16).



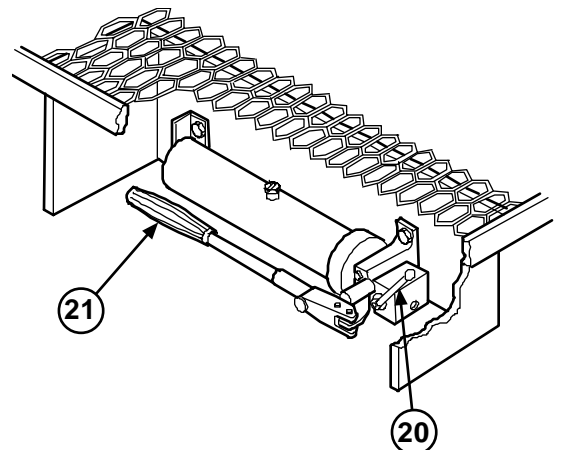
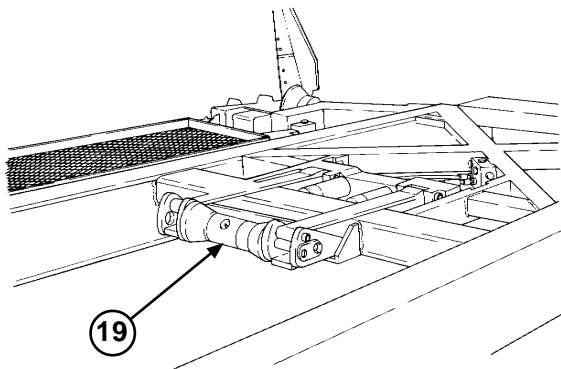
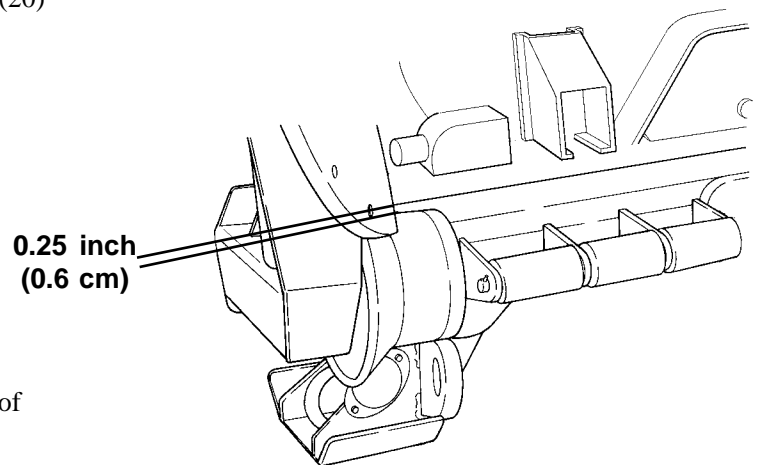
*k.* Raise center roller (19):

- (1) Place hand pump selector valve lever (20) in center roller up position.

**NOTE**

- There should be a 0.25-inch gap (0.6 cm) between rear rollers and ramp bay.
- Interior bay does not require use of hydraulic pump.

- (2) Pump hydraulic pump (21) until rear of bridge bay lifts off rear rollers.

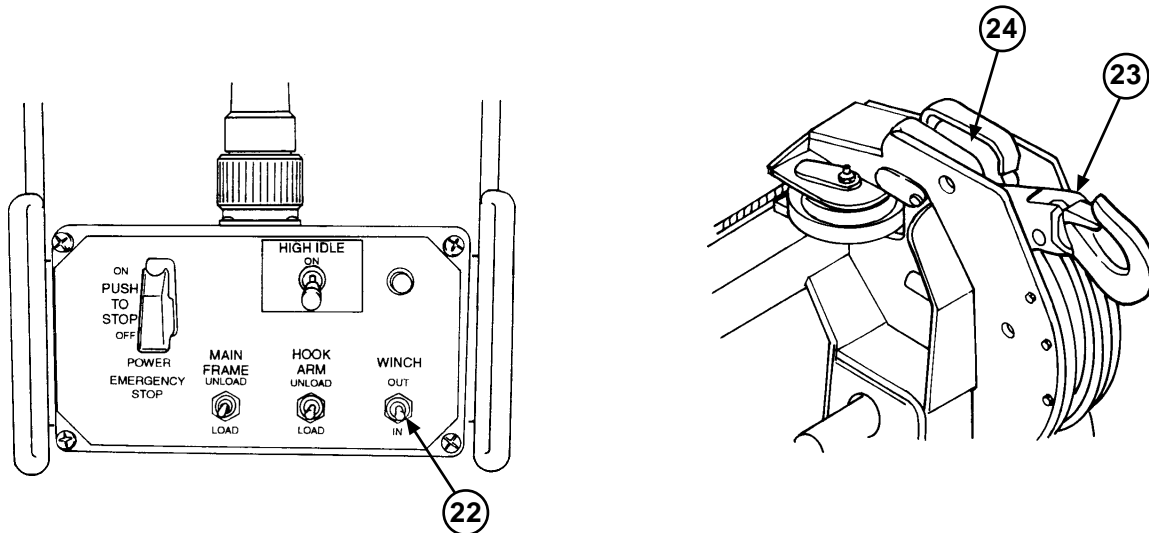


**2-15. FREE BRIDGE BAY LAUNCH (continued).**

**WARNING**

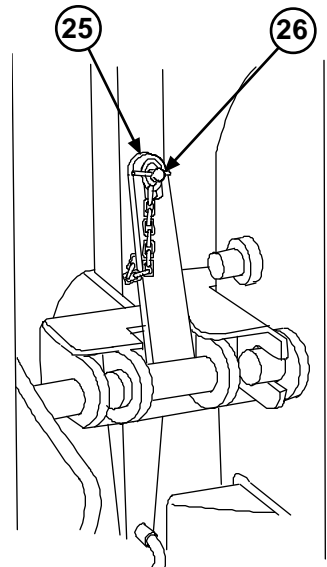
**Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.**

- l.* While assistant maintains tension on winch cable, position WINCH switch (22) to OUT and stop when there is sufficient slack to remove hook from bay lifting eye.
- m.* Disconnect cable hook from bay lifting eye.
- n.* While assistant maintains tension on winch cable, position remote WINCH switch (22) to IN.
- o.* Release WINCH switch (22) when hook holder (23) is in saddle (24).



- p.* Secure winch frame to the BAP. Make sure two winch frame locking levers (25) are in the up position. If locking levers (25) are not up:

- (1) Remove lockpin (26) from locking lever (25).
- (2) Swing locking lever (25) to the up position.
- (3) Insert lockpin (26) into locking lever (25).

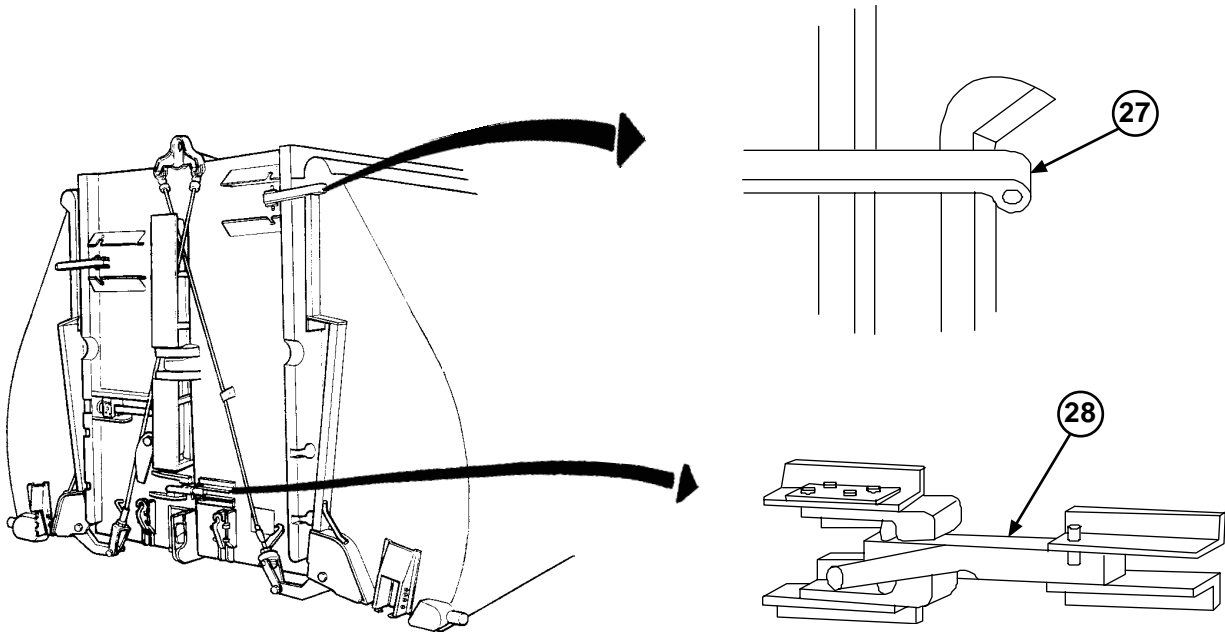


**2-15. FREE BRIDGE BAY LAUNCH (continued).**

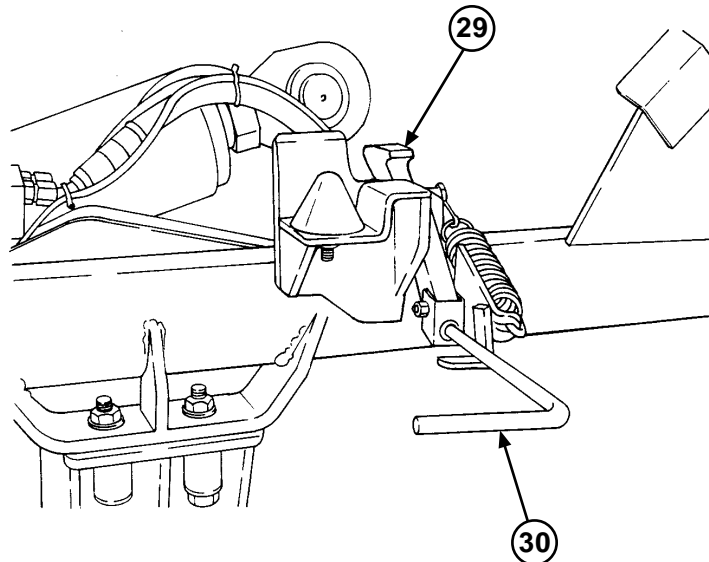
**NOTE**

Interior bay has four foldlock latches (27) and two travel latches (28). Ramp bay has two foldlock latches and one travel latch.

- q.* Release all bay foldlock latches (27) and all travel latches (28).

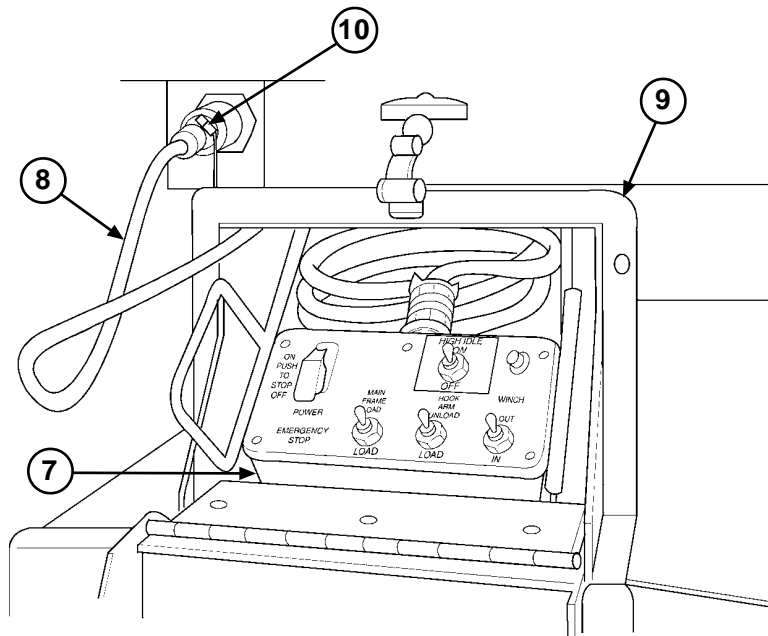


- r.* Release two BAP hold-down locks (29) by pulling handle (30) out.



**2-15. FREE BRIDGE BAY LAUNCH (continued).**

- s. Disconnect and stow remote control unit (7).
  - (1) Disconnect cable (8) from LHS receptacle (10).
  - (2) Coil and stow cable (8) in rear of stowage box (9).
  - (3) Stow remote control unit (7) in stowage box (9).



**CAUTION**

**Be sure not to pull or catch lanyard connected to air release valve lever or premature launching can occur, resulting in damage to equipment.**

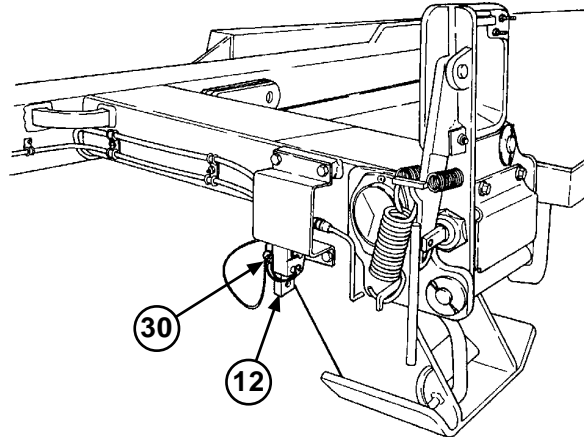
- t. Release parking brake.

## 2-15. FREE BRIDGE BAY LAUNCH (continued).

### WARNING

After safety pin is disengaged, make sure all personnel are clear of back of Transporter.

- u. Just before Transporter enters the water, pull safety pin (31) from air release valve lever (12).



### NOTE

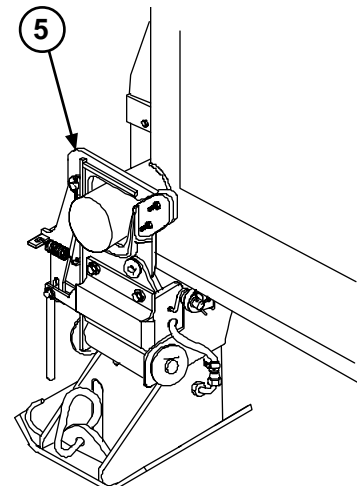
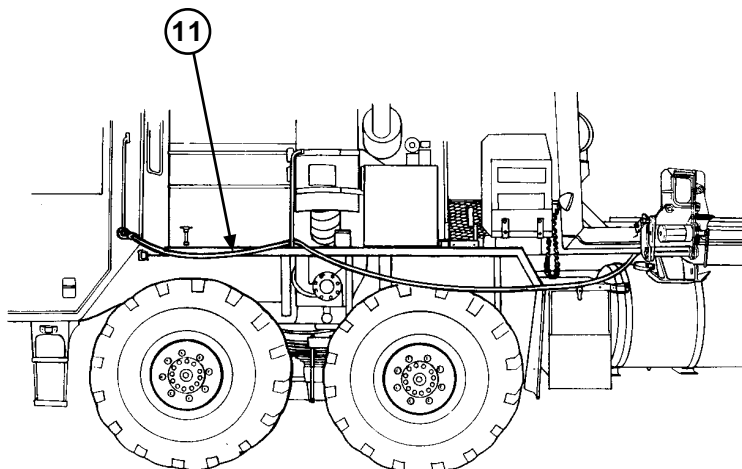
Place CBT transfer case in low setting prior to backing Transporter into the water.

- v. Back Transporter into the water. Do not exceed fording depth of Transporter (4 ft, or 1.2 m).

### CAUTION

After entry of Transporter into the water the parking brake may slip, allowing Transporter to roll into deeper water and resulting in damage to equipment.

- w. Apply parking brake and place transmission in neutral.
- x. When directed, pull lanyard (11) to release front pin lock assemblies (5), allowing bridge bay to roll off Transporter.

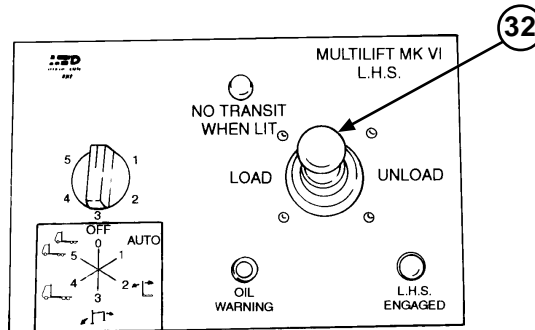


**2-15. FREE BRIDGE BAY LAUNCH (continued).**

**CAUTION**

**Do not let bridge bay roll more than 2 feet (.6 m) or hydraulic and/or air lines can be damaged.**

- y. If bridge bay does not roll off, move joystick (32) to UNLOAD and release when bridge bay starts to roll.



**WARNING**

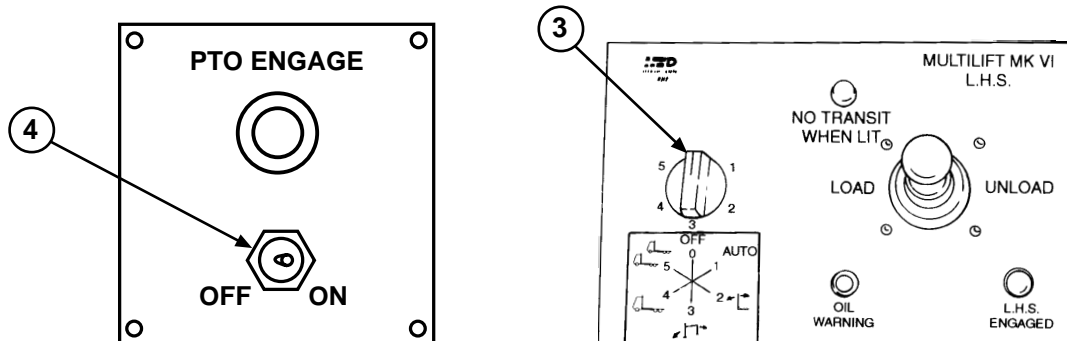
**After water operations, Transporter brakes will be wet and will not stop as quickly as usual. Care must be taken and extra distance allowed for slowing or stopping Transporter. Slipping brakes could result in death or injury to personnel or damage to equipment.**

- z. Place transmission in forward, release parking brake, and drive Transporter forward until clear of launch area.
- aa. Apply parking brake and place transmission in neutral.
- ab. Move joystick (31) to LOAD and release when NO TRANSIT WHEN LIT indicator light goes out.

**CAUTION**

**While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.**

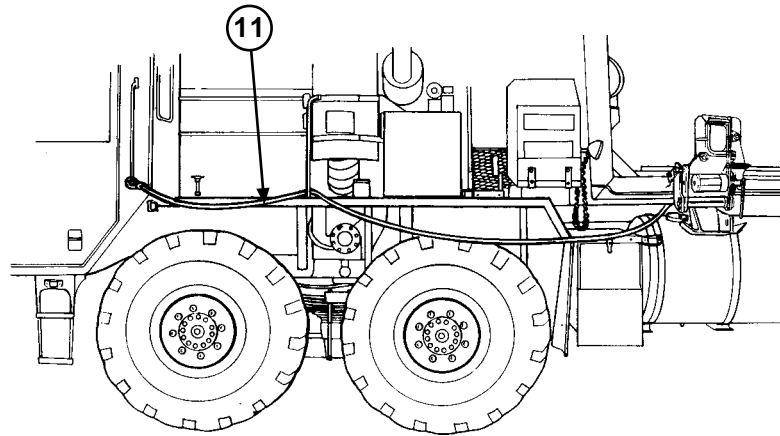
- ac. Turn PTO ENGAGE switch (4) to OFF, and turn LHS MODE SELECT switch (3) to OFF/TRANSPORT.



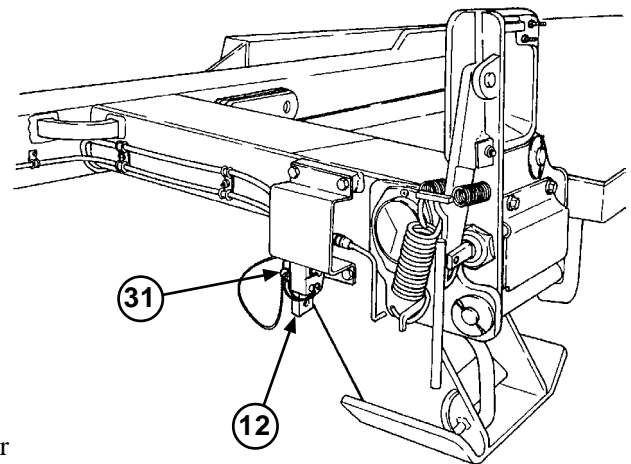


**2-15. FREE BRIDGE BAY LAUNCH (continued).**

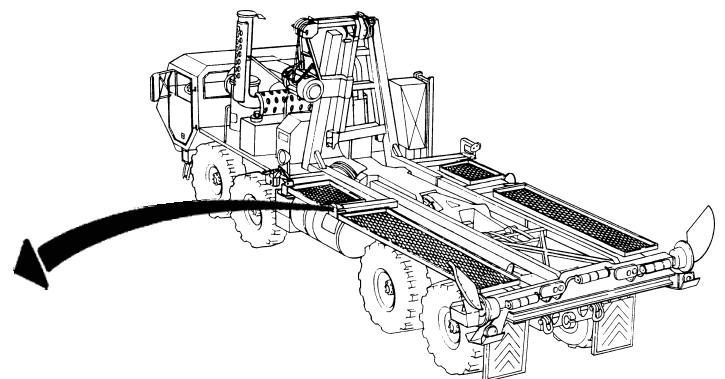
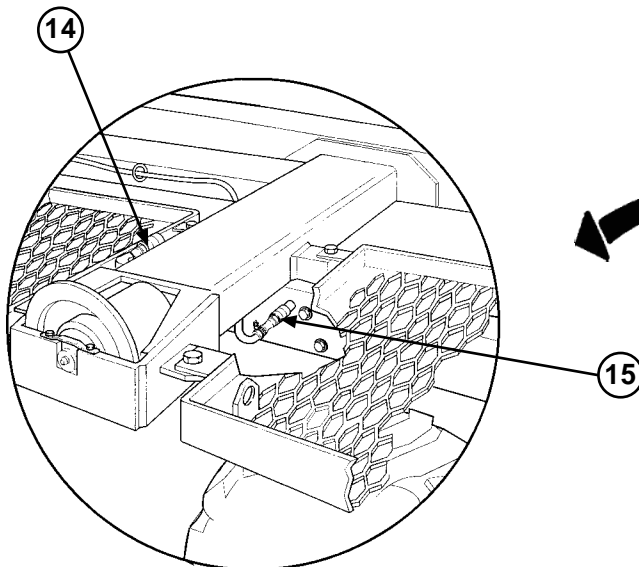
*ad.* Remove lanyard (11) from air release valve lever (12) and Transporter handgrip (13) and stow.



*ae.* Insert safety pin (31) in air release valve lever (12).



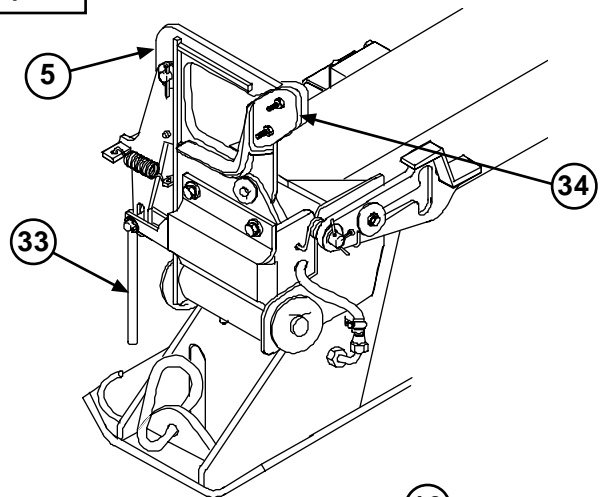
*af.* Disconnect air hose from Transporter tire inflation air connector (15) and connect to stowage connector (14) on the BAP.



**2-15. FREE BRIDGE BAY LAUNCH (continued).**

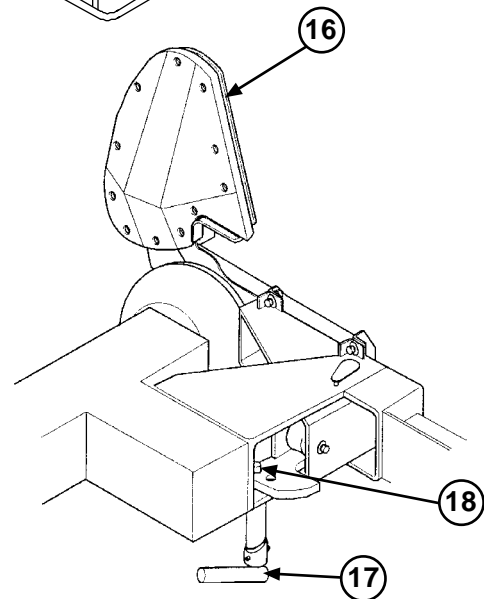
*ag.* Disengage curb-side and road-side front pin lock assemblies (5):

- (1) With one hand, pull release handle (33) toward front of Transporter.
- (2) With other hand, lift locking lever (34) into position.
- (3) Let go of release handle (33).



*ah.* Secure curb-side and road-side rear guides (16):

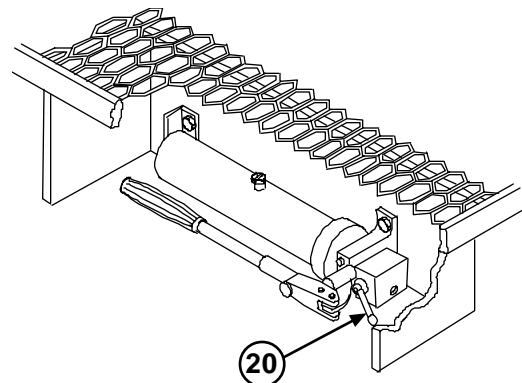
- (1) Rotate latch pin (17) until rear guide (16) disengages.
- (2) Swing rear guide (16) to full inboard position and make sure pin (18) engages.



**CAUTION**

**Always make sure pressure relief valve is returned to the closed position after lowering center roller. Failure to close pressure relief valve could cause all fluid to drain out of lines and render center roller inoperable until hydraulic system is bled.**

- ai.* Move hand pump selector valve (20) to down position.
- aj.* After center roller returns to stowed position, move hand pump selector valve (20) to center position.



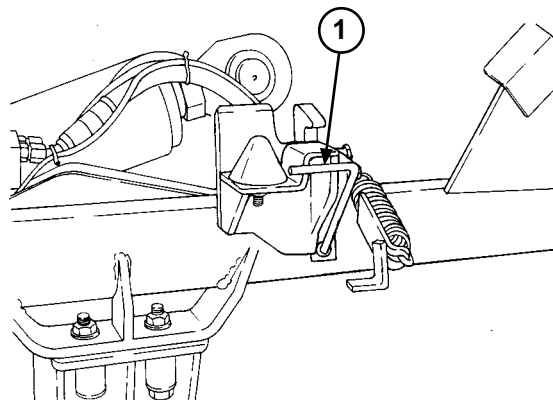
## 2-16. HIGH-BANK BRIDGE BAY LAUNCH.

### NOTE

In case of emergency while the remote control unit is in use, push the emergency stop switch to shut down operation of the LHS.

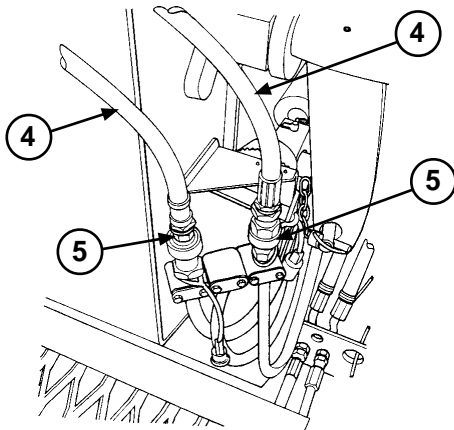
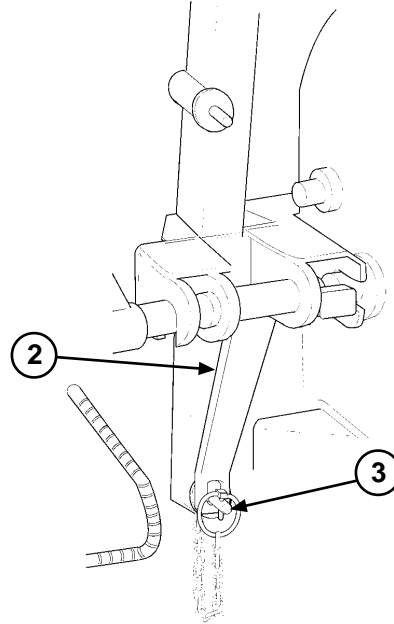
High-bank launch of a bridge bay makes possible launching of a bridge bay from a 28-foot (8.5 m) vertical river bank. This method should be used only if no other method can be performed. There are two operations for a high-bank launch: unloading the bridge bay and launching the bridge bay. Unloading the bridge bay consists of unloading the bridge bay from the Transporter and setting it on the ground parallel to the bank. High-bank launch requires the extension assembly (Appendix D) and the HEMTT self-recovery winch snatch block (TM 9-2320-279-10).

- a. **Unloading Bridge Bay for a High-Bank Launch.** To unload the bridge bay for a high-bank launch, follow the procedures for unloading a bridge bay to the ground (para 2-12) with the following exceptions:
  - (1) Make sure launch conditions comply with paragraph 2-13b(3).
  - (2) Back up Transporter parallel to the bank so bridge bay will be unloaded about 8 feet (2.5 m) from bank.
  - (3) Position rear of unloading Transporter parallel to bridge bay and centered.
  - (4) Make sure there is enough room to maneuver launching Transporter perpendicular to bank on the side of the bridge bay away from the water.
  - (5) Follow the remainder of the procedures for unloading a bridge bay to the ground (para 2-12).
  - (6) Make sure all bay foldlock latches and travel latches are engaged before unloading bridge bay to the ground.
  
- b. **High-Bank Launch of Bridge Bay.** If several bridge bays are to be high-bank launched, Transporters must be positioned perpendicular to the water. All bridge bays are launched from these Transporters. The bridge bays on the other Transporters are unloaded parallel to the water behind the launching Transporters. Perform Steps (1) and (2) if required.
  - (1) Lock the BAP to the Transporter. Push curb-side and road-side BAP hold-down lock handles (1) in.

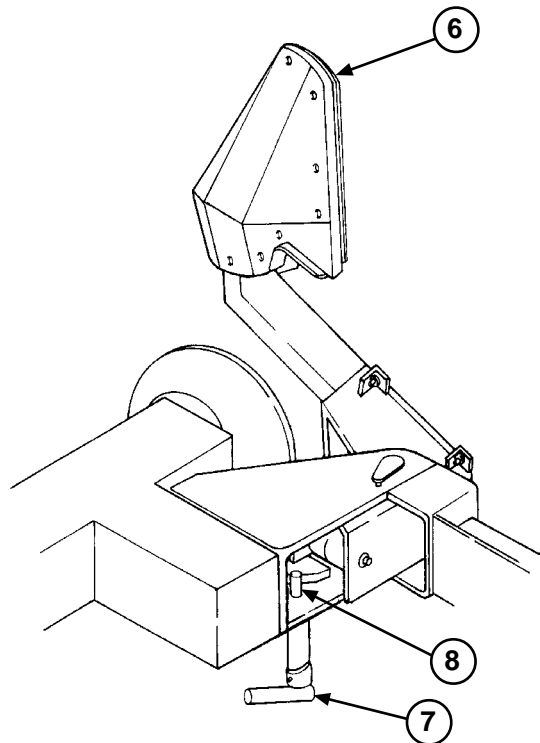


**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

- (2) Secure winch frame to LHS hook arm assembly. Make sure two winch frame locking levers (2) are in the down position. If locking levers are not down:
  - (a) Remove lockpin (3) from locking lever (2).
  - (b) Swing locking lever (2) to the down position.
  - (c) Insert lockpin (3) into locking lever (2).
- (3) Connect two winch hydraulic pressure hoses (4) to male connector and female connector (5) located on bottom of hook arm assembly.



- (4) Back up Transporter perpendicular to bank and centered with bridge bay, stopping about 10 feet (3 m) away from bridge bay.
- (5) Apply parking brake and place transmission in neutral.
- (6) Set curb-side and road-side rear guides (6) in the disengage position:
  - (a) Rotate latch pin (7) until rear guide (6) disengages.
  - (b) Swing rear guide (6) to fully open position, and make sure latch pin (7) clicks pin in hole (8) in rear guide (6).

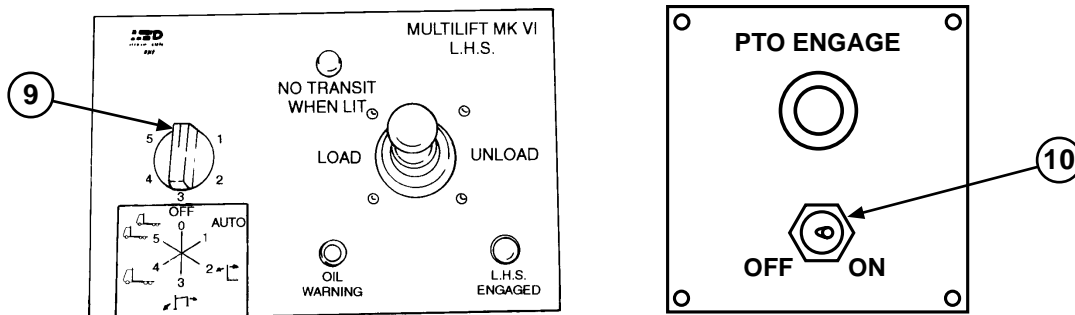


**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

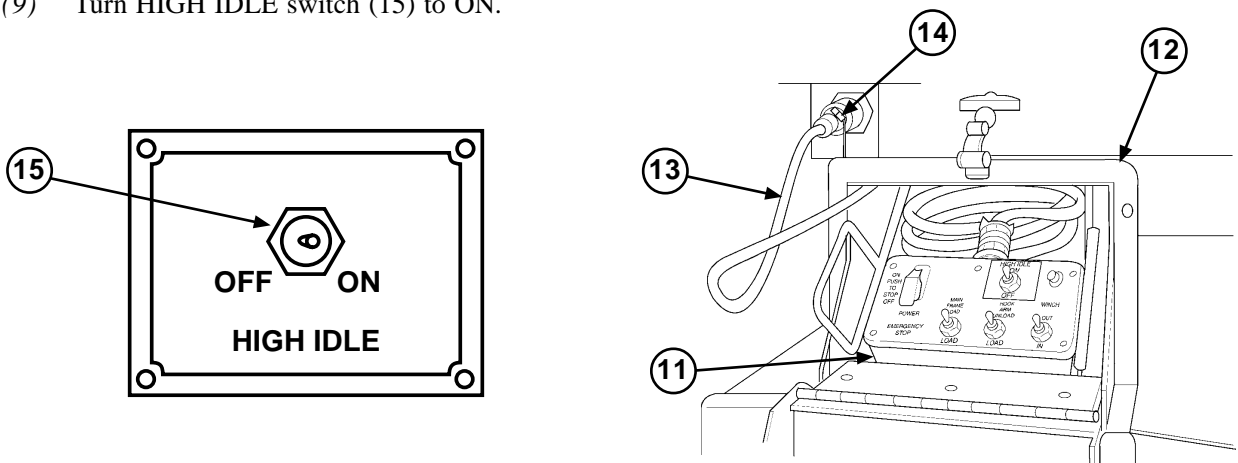
(7) Turn LHS MODE SELECT switch (9) OFF, and turn PTO ENGAGE switch (10) to ON.



**CAUTION**

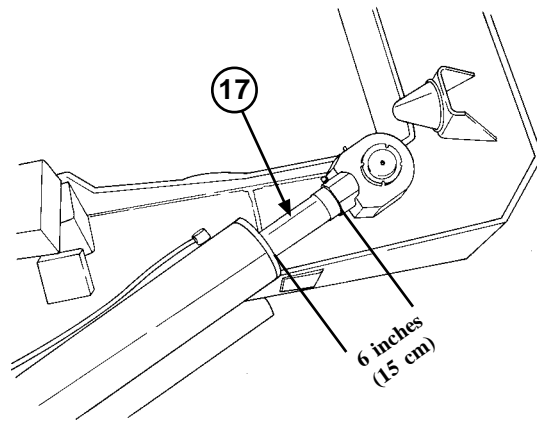
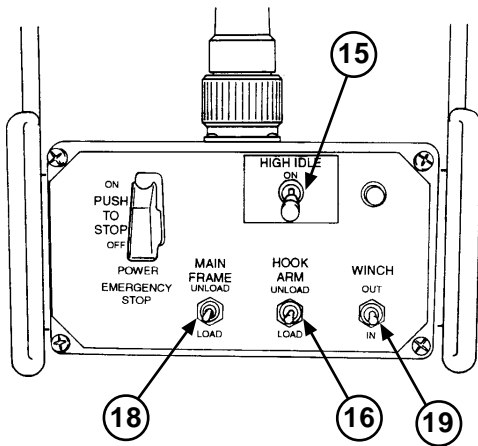
**While moving LHS hook arm rearward, make sure winch hydraulic hose lines are not trapped or damaged.**

- (8) Install remote control unit (11):
- Remove remote control unit (11) and cable (13) from stowage box (12).
  - Connect cable (13) to curb-side or road-side LHS receptacle (14).
- (9) Turn HIGH IDLE switch (15) to ON.



**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

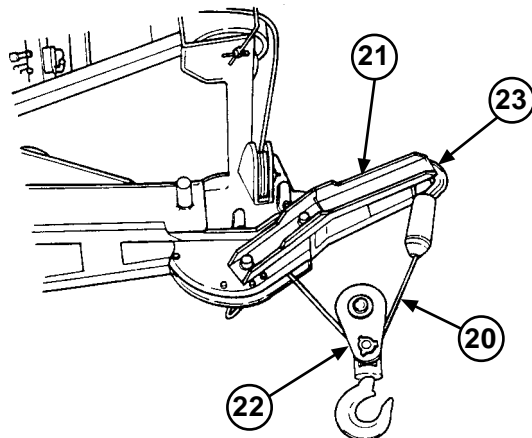
- (10) Position HOOK ARM switch (16) to UNLOAD and release when hook arm cylinder (17) is raised about 6 inches (15 cm).
- (11) Position MAIN FRAME switch (18) to UNLOAD and release when main frame is fully extended.
- (12) Position HOOK ARM switch (16) to UNLOAD and release when cable hook is about 5 feet (1.5 m) above the ground.



**WARNING**

**Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.**

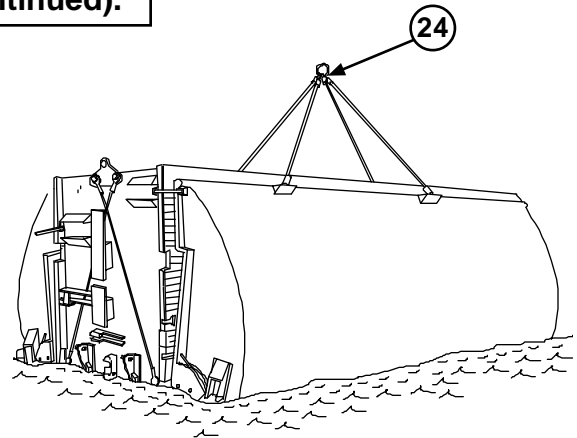
- (13) Have assistant pull on winch cable (20), position WINCH switch (19) to OUT, and release WINCH switch (19) when winch cable (20) is winched out about 4 feet (1.2 m).
- (14) Turn HIGH IDLE switch (15) to OFF.
- (15) Install winch extension assembly (21) and snatch block (22) on winch cable (20):
  - (a) Attach extension assembly (21) to winch frame.
  - (b) Attach winch cable hook (23) to extension assembly (21).
  - (c) Attach snatch block (22) to winch cable (20).



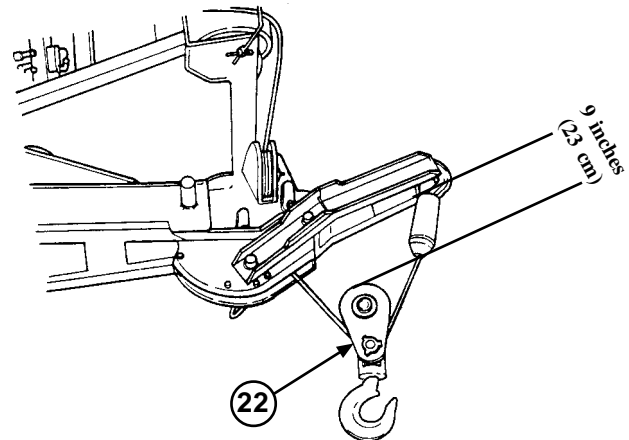
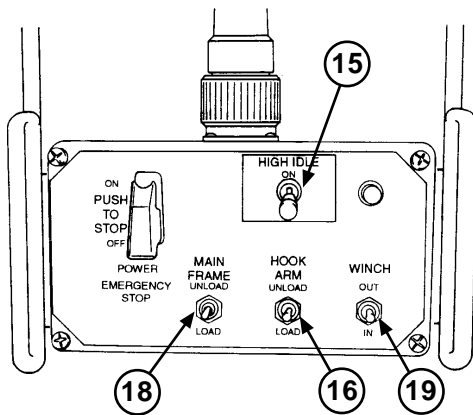
**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

**NOTE**

The slings and hardware required for this operation are found in the Bridge Supplementary Set, SC 5420-97-E51, NSN 5420-00-071-5273.



- (16) Attach large ring of bridge bay sling (24) to hook of snatch block (22).
- (17) Turn HIGH IDLE switch (15) to ON.
- (18) If this is an interior bay, attach intermediate cable hooks on two sling legs to large ring of sling.
- (19) Position HOOK ARM switch (16) to LOAD and release when hook arm is fully retracted.
- (20) Position remote WINCH switch (19) to IN and release when top of snatch block (22) is about 9 inches (23 cm) from bottom of extension assembly (21).



- (21) Position MAIN FRAME switch (18) to load and release when snatch block (22) is about 9 feet (2.8 m) above ground.
- (22) Turn remote HIGH IDLE switch (15) to OFF.
- (23) Release parking brake.

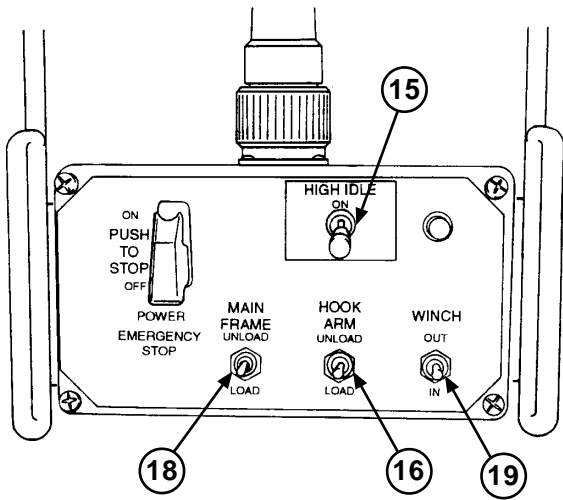
**CAUTION**

**Damage to equipment may occur if Transporter is backed up and the BAP makes contact with bridge bay.**

- (24) Put transmission in reverse, back up Transporter, and stop when 6 to 8 inches (15.24 to 20.32 cm) of clearance exist between bridge bay bow point and the closer part of BAP rear rollers (bumper or rear rollers) or Transporter pintal hook assembly.
- (25) Apply parking brake and place transmission in neutral.

**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

- (26) Attach sling hooks to bow lifting eyes, making sure sling cable lengths are as follows:
  - (a) Interior bay—four short sling cable lengths connected to bridge bay.
  - (b) Ramp bay—two long sling cable lengths connected at ramp end and two short sling cable lengths connected to other end.
- (27) Turn HIGH IDLE switch (15) to ON.
- (28) Position MAIN FRAME switch (18) to LOAD and release when bridge bay is about 1 foot (0.3 m) above the ground.
- (29) Turn HIGH IDLE switch (15) to OFF.
- (30) Release parking brake.



**NOTE**

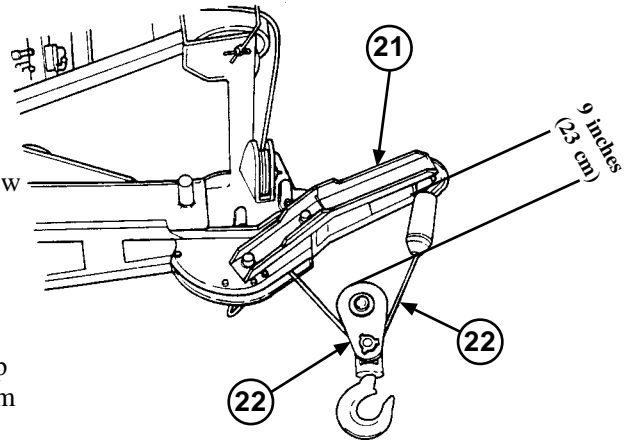
Care must be taken when backing Transporter so back wheels remain on top of bank, providing sufficient support.

- (31) Put transmission in reverse, and slowly back up Transporter. Stop when bridge bay is hanging over edge of bank.
- (32) Apply parking brake and place transmission in neutral.
- (33) Pass tag lines and bridle line to boat crew.
- (34) Turn remote HIGH IDLE switch (15) to ON.
- (35) Position MAIN FRAME switch (18) to UNLOAD and release when main frame is fully extended.



## 2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).

- (36) Have boat crew use tag lines to keep bridge bay from swinging while lowering bridge bay.
- (37) Position WINCH switch (19) to OUT to lower bridge bay into the water. Release WINCH switch (19) when bridge bay enters the water (30 in. [0.75 m] water depth desired) and sling slackens to allow removal.
- (38) Position HIGH IDLE switch (15) to OFF.
- (39) Signal boat crew to approach from downstream.
- (40) Have boat crew remove four sling hooks from bow lifting eyes.
- (41) Position HIGH IDLE switch (15) to ON.
- (42) When sling is released, position WINCH switch (19) to IN. Release WINCH switch (19) when top of snatch block (22) is about 9 inches (23 cm) from bottom of extension assembly (21).
- (43) Position MAIN FRAME switch (18) to load and stop when large ring of bay sling is about 9 feet (2.7 m) above high bank ground.
- (44) Position HIGH IDLE switch (15) to OFF.



### **WARNING**

**Releasing travel latch will cause bridge bay to unfold, resulting in injury or death to personnel or damage to equipment.**

### **NOTE**

Refer to TM 5-5420-209-12 for bridge bay operations.

- (45) Have boat crew release all bridge bay foldlock latches and all travel latches except one.
- (46) Have boat crew unfold bridge bay by completing the following procedures:
- Insert handle with lanyard into the one engaged bay travel latch.
  - Keep free end of lanyard aboard boat.

### **WARNING**

**Failure to maintain at least two boat lengths from unfolding bridge bay may result in injury or death to personnel or damage to equipment.**

- Move boats clear of area required for unfolding bridge bay.
- Pull lanyard to release bridge bay unfolding operation.
- Secure bridge bay to boat after unfolding.

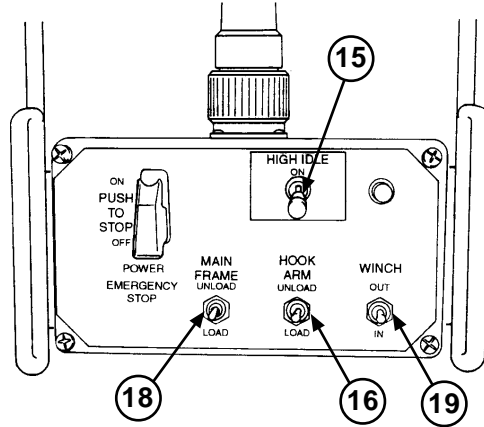
**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

- (47) Put transmission in forward, and release parking brake.
- (48) Move Transporter forward sufficiently for another bridge bay to be unloaded next to edge of high bank.

**NOTE**

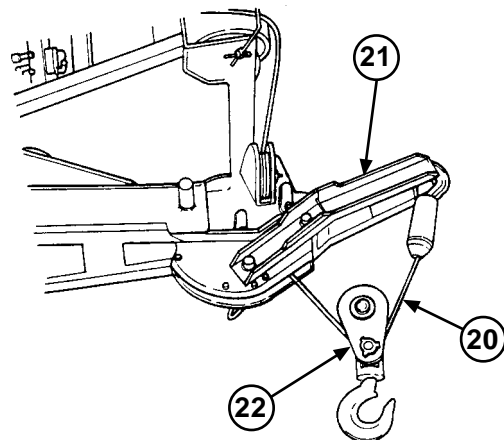
If this is the last bridge bay to be launched, go to Step 50. Otherwise, go to Step 49.

- (49) Repeat Steps 23 through 48.
- (50) Position HIGH IDLE switch (15) to ON.



- (51) Position MAIN FRAME switch (18) to UNLOAD and release when main frame is fully extended.
- (52) Position HOOK ARM switch (16) to UNLOAD and release when winch cable hook is about 5 feet (1.5 m) above the ground.
- (53) Position HIGH IDLE switch (15) to OFF.
- (54) Remove lifting sling from snatch block (22) hook.
- (55) Return sling to stowage.
- (56) Remove snatch block (22) and extension assembly (21) from winch frame.

- (a) Remove snatch block (22) from winch cable (20).
- (b) Remove winch cable (20) from extension assembly (21).
- (c) Remove extension assembly (21) from winch frame.
- (d) Return snatch block (22) and extension assembly (21) to stowage.



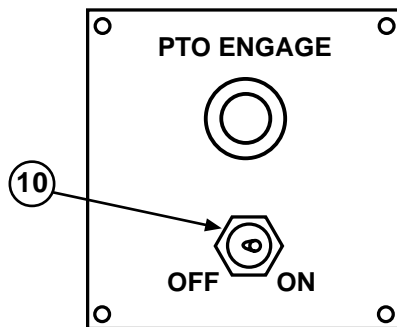
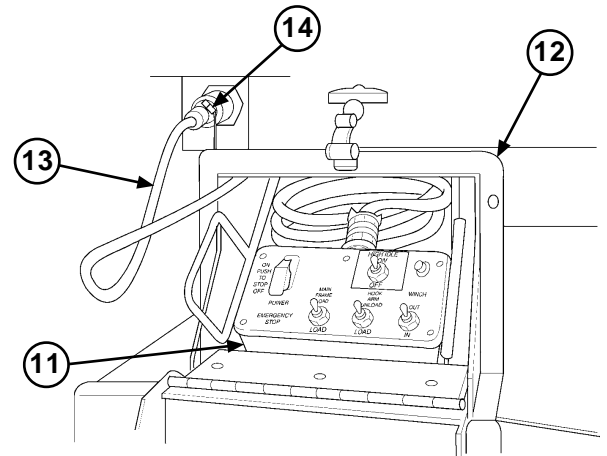
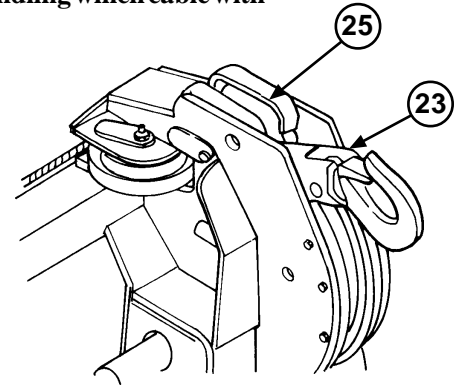
- (57) Position WINCH switch (19) to IN.

**2-16. HIGH-BANK BRIDGE BAY LAUNCH (continued).**

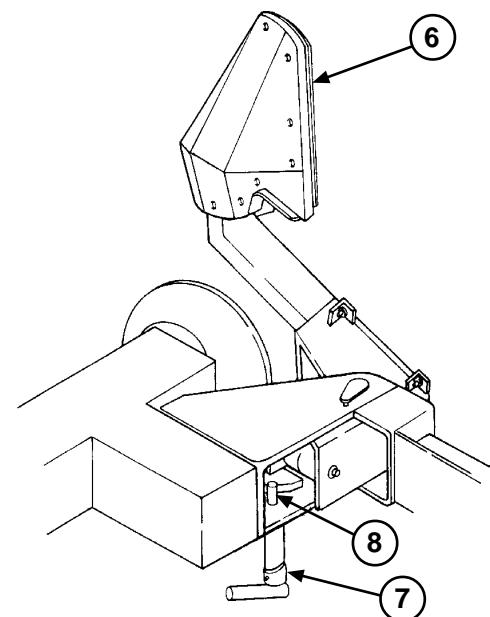
**WARNING**

**Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.**

- (58) While assistant maintains tension on winch cable, release WINCH switch (19) when hook holder (23) is in saddle (25).
- (59) Position MAIN FRAME switch (18) to LOAD and release when main frame is fully stowed.
- (60) Position HOOK ARM switch (16) to LOAD and release when hook arm is fully stowed.
- (61) Position PTO ENGAGE switch (10) to OFF.



- (62) Disconnect and stow remote control unit (11):
  - (a) Disconnect cable (13) from LHS receptacle (14).
  - (b) Coil and stow cable (13) in rear of stowage box (12).
  - (c) Stow remote control unit (11) in stowage box (12).
- (63) Secure curb-side and road-side rear guides (6):
  - (a) Rotate latch pin (7) until rear guide (6) disengages.
  - (b) Swing rear guide (6) to full inboard position and make sure latch pin (7) clicks in hole (8).

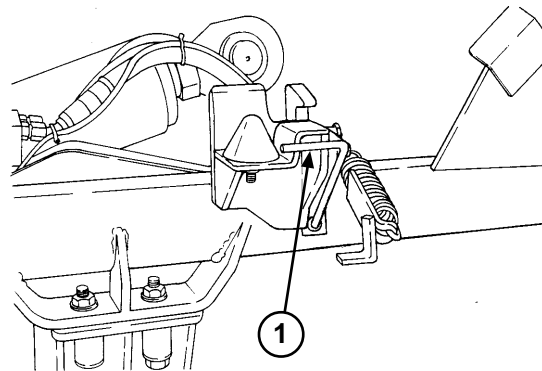


**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL.**

**NOTE**

- With a 20 percent slope, interior bay requires a water depth of at least 42 inches (1.07 m). Ramp bay requires a water depth of at least 50 inches (1.27 m).
- In case of emergency while the remote control unit is in use, push the emergency stop switch to shut down operation of the LHS.
- The BAP must be loaded on Transporter before retrieval of bridge bays.

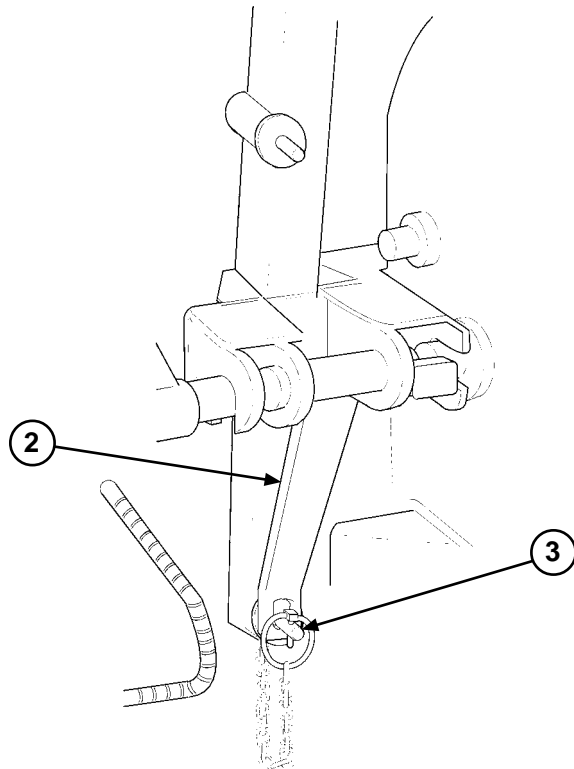
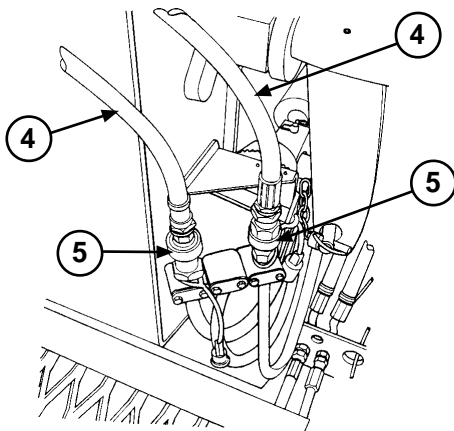
*a.* Secure the BAP to the LHS. Make sure curb-side and road-side BAP hold-down lock handles (1) are pushed in.



*b.* Secure winch frame to LHS hook arm. Make sure two winch frame locking levers (2) are in the down position. If locking levers (2) are not down:

- (1) Remove lockpin (3) from each locking lever (2).
- (2) Swing locking lever (2) to the down position.
- (3) Insert lockpin (3) into locking lever (2).

*c.* Connect two winch hydraulic pressure hoses (4) to male connector and female connector (5) on bottom of hook arm assembly.

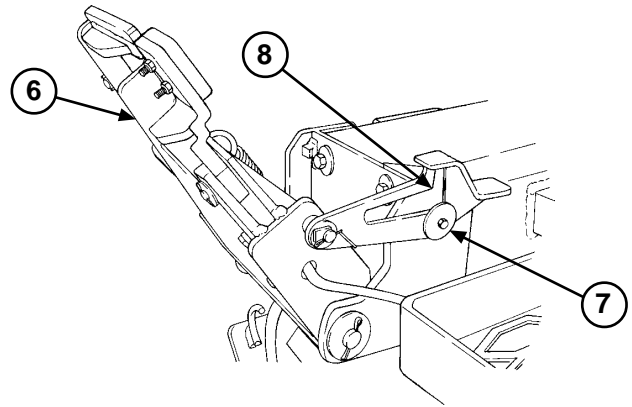


**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).**

**WARNING**

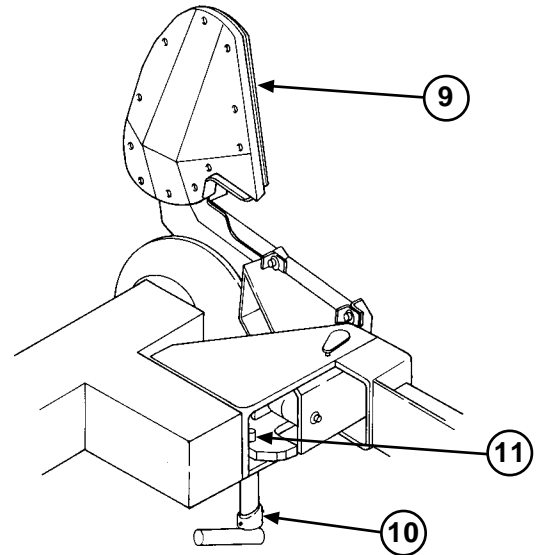
**Keep hands and fingers clear of front pin lock assemblies when in the auto engaged position. Failure to follow this warning could result in injury to personnel.**

- d. Secure two front pin lock assemblies (6) in the auto engage position. Pull back curb-side and road-side lock assemblies (6) until each latch lever (7) rests in base of vertical slot (8).



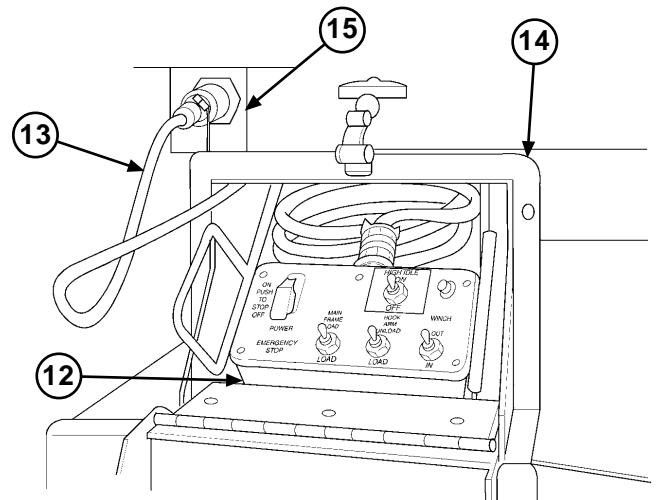
- e. Secure curb-side and road-side rear guides (9) in the engaged position.

- (1) Rotate latch pin (10) and swing rear guide (9) to the engaged (intermediate) position.
- (2) Make sure latch pin (10) engages hole in rear bay guide (11).



- f. Install remote control unit (12):

- (1) Remove remote control unit (12) and cable (13) from stowage box (14).
- (2) Connect cable (13) to curb-side or road-side LHS receptacle (15).

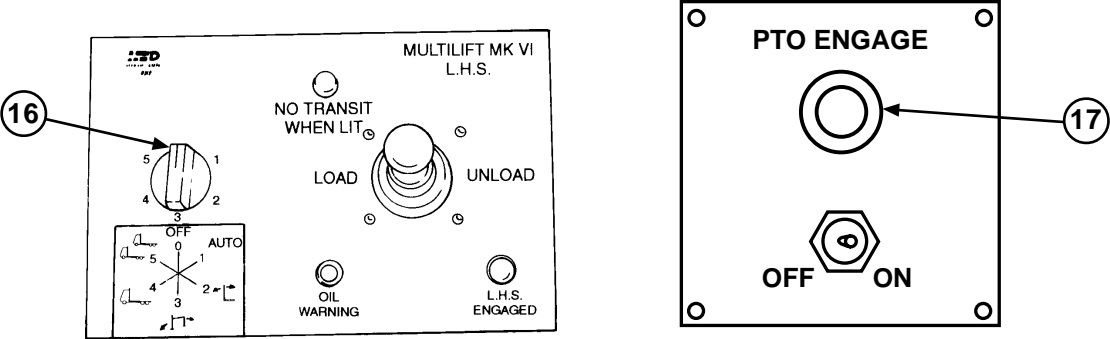


**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).**

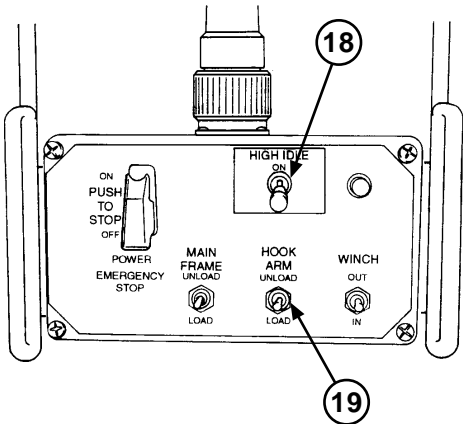
**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

g. Turn LHS MODE SELECT switch (16) to OFF, and position PTO ENGAGE switch (17) to ON.



h. Position HIGH IDLE switch (18) to ON.



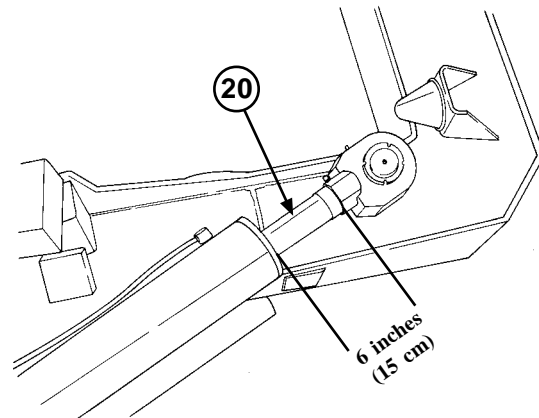
**CAUTION**

**While moving LHS hook arm rearward, make sure BAP winch hydraulic hose lines are not trapped or damaged.**

i. Position HOOK ARM switch (19) to UNLOAD.

**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).**

- j.* Release HOOK ARM switch (19) when cylinders (20) are extended approximately 6 inches (15 cm).

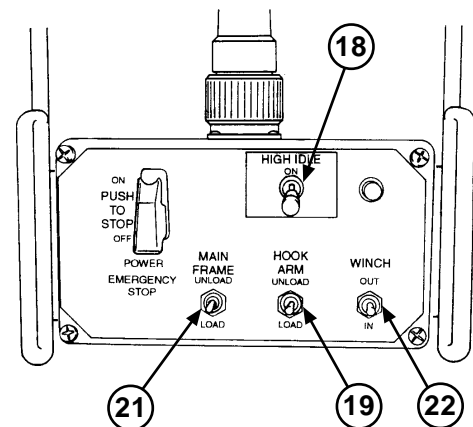


- k.* Position MAIN FRAME switch (21) to UNLOAD and release when main frame is fully extended.
- l.* Position HOOK ARM switch (19) to UNLOAD and release when winch cable hook can be reached from the ground.

**WARNING**

**Always wear leather gloves when handling winch cable. Handling winch cable with bare hands could result in injury to personnel.**

- m.* Have assistant maintain tension on cable.
- n.* Position WINCH switch (22) to OUT and release when cable has been winched out about 8 feet (2.4 m). Return hook arm to 6 inches (15 cm).
- o.* Turn HIGH IDLE switch (18) to OFF.
- p.* Release parking brake.



**CAUTION**

**Water depth for fording should not exceed 4 feet (1.2 m) or damage to equipment could result.**

**NOTE**

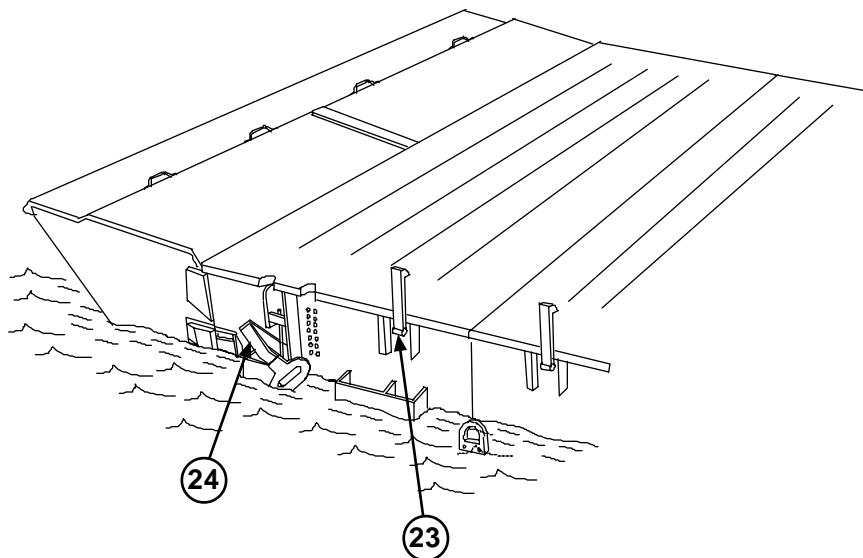
- If this is an interior bay, go to Step q. If this is a ramp bay, go to Step r.
- Place transfer case in low setting prior to backing Transporter into the water.
- q.* Back Transporter into the water and stop when top of back tire hubcap is at the water line (hubcap is in the water). Go to Step s.
- r.* Back Transporter into the water and stop when top of back tire rim is at the water line (rim is in the water).

**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).**

**CAUTION**

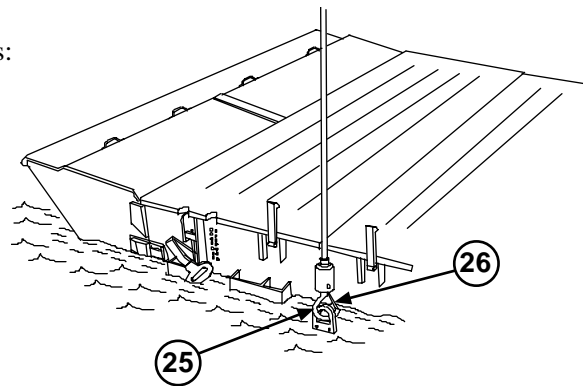
**After entry of Transporter into the water the parking brake may slip, allowing Transporter to roll into deeper water and resulting in damage to equipment. Use care when setting parking brake.**

- s. Set parking brake and place transmission in neutral.
- t. Have boat crew engage all bay foldlock latches (23) and travel latches (24) in the engage position.



- u. Have boat crew attach winch cable to bridge bay as follows:

- (1) Cable hook (25) should face rear with throat up.
- (2) Hook latch (26) should be closed.



**CAUTION**

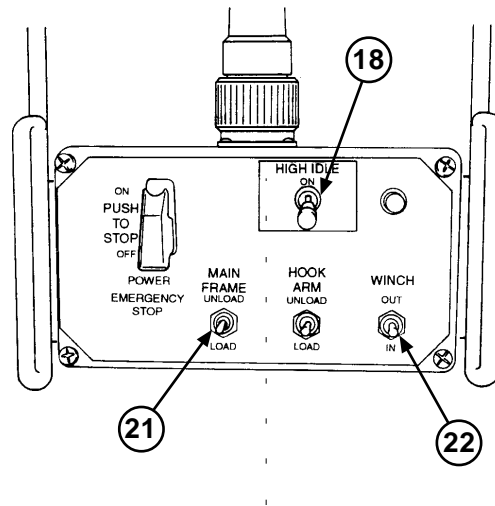
**During bridge bay retrieval, axis of cable hook must be vertical and in line with axis of cable. Failure to maintain this axis may bend or break cable hook.**

- v. Have boat operator maintain bridge bay in alignment with Transporter for loading.



## 2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).

- w. Position HIGH IDLE switch (18) to ON.
- x. Position MAIN FRAME switch (21) to LOAD and release when cable slack has been removed.



### WARNING

**Make sure bridge bay is clear of boat crew personnel and obstructions before winching in bridge bay. Being caught between Transporter and bridge bay could result in death or injury to personnel or damage to equipment. Make sure crewman is safely off bridge bay before lifting.**

### **NOTE**

During bridge bay recovery in fast moving water or strong crosswinds, it may be necessary to position a boat with the push knees against the downstream bow to keep bridge bay aligned with Transporter.

- y. Position WINCH switch (22) to IN.
- z. Steadily winch in cable as bridge bay folds and automatically latches.
- aa. Release WINCH switch (22) when cable hook holder is in saddle.

**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).**

**NOTE**

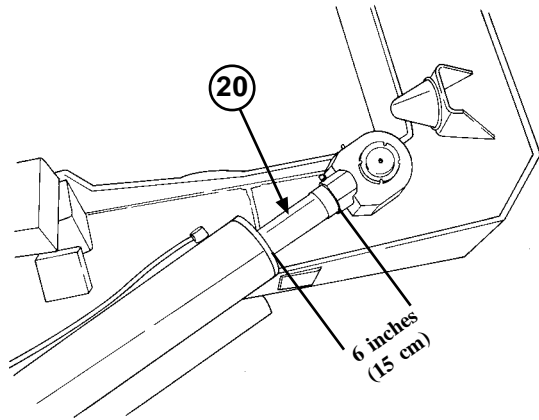
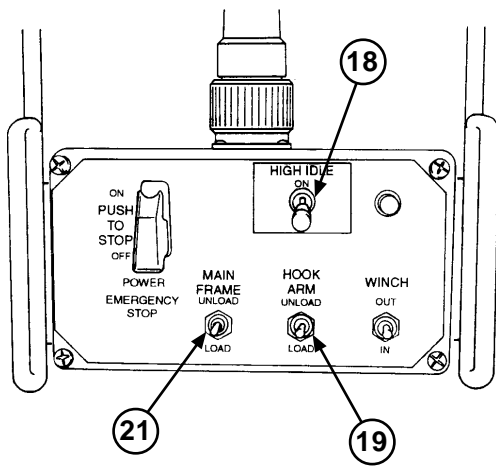
While continuing to move bridge bay forward, it may be necessary to adjust MAIN FRAME switch to keep bridge bay properly positioned in BAP rear guides.

- ab.* Position remote MAIN FRAME switch (21) to LOAD to bring bridge bay onto Transporter rear rollers.

**NOTE**

If bridge bay fails to contact Transporter properly, partially unload bridge bay and redo Step ab.

- ac.* Position HOOK ARM switch (19) to UNLOAD as necessary to keep bridge bay positioned in rear guide arms until cylinder (20) is extended 6 inches (15 cm).



- ad.* Continue holding MAIN FRAME switch (21) in LOAD position and release when main frame is in stowed position.
- ae.* Position HIGH IDLE switch (18) to off.
- af.* Turn HOOK ARM switch (19) to LOAD until LHS hook arm has been fully stowed.

**WARNING**

**After water operations, Transporter brakes will be wet and will not stop as quickly as usual. Care must be taken and extra distance allowed for slowing or stopping Transporter. Slipping brakes could cause death or injury to personnel or damage to equipment.**

- ag.* Put transmission in forward, release parking brake, drive Transporter from the water, apply parking brake, and place transmission in neutral.

**2-17. CALM OR FAST WATER BRIDGE BAY RETRIEVAL (continued).**

**WARNING**

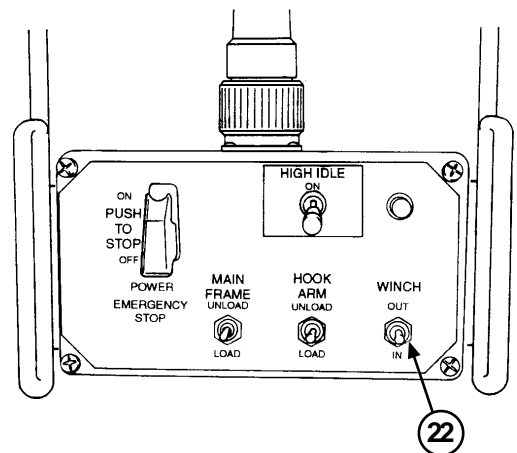
Reposition and lock both rear guides after bridge bay retrieval. Failure to reposition and secure rear guides after bridge bays are loaded could result in lost bridge bays or Transporter rollover during transport, causing death or severe injury to personnel.

- ah.* Make sure both front pin lock assemblies are secured to bridge bay pins and both rear guides are properly locked.

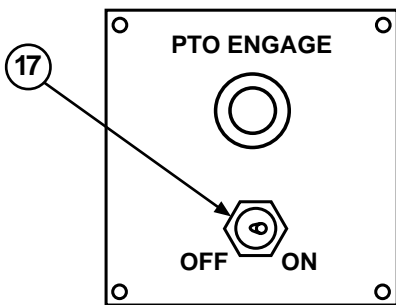
**CAUTION**

While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.

- ai.* Position WINCH switch (22) to OUT and release when winch cable tension is released.

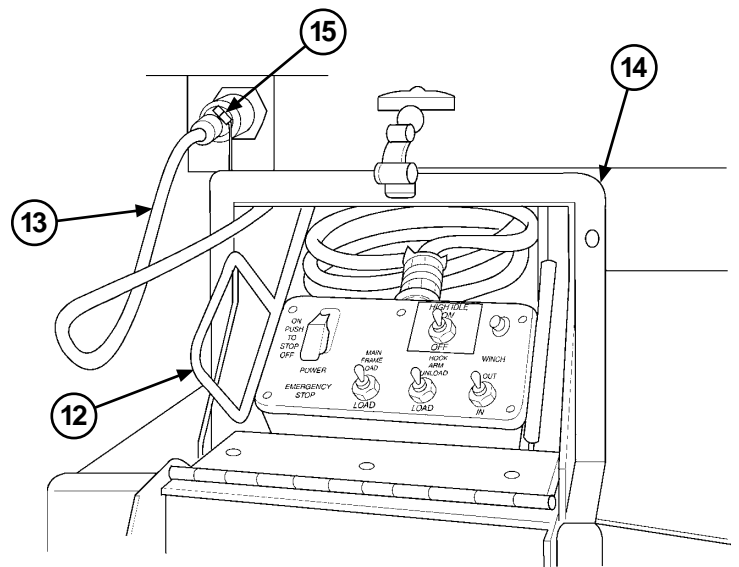


- aj.* Position PTO ENGAGE switch (17) to OFF.



- ak.* Disconnect and stow remote control unit (12):

- (1) Disconnect cable (13) from LHS receptacle (15).
- (2) Coil and stow cable (13) in rear of storage box (14).
- (3) Stow remote control unit (12) in storage box (14).



**2-18. LOADING NATO FLATRACK FROM THE GROUND.**

**WARNING**

The load-carrying capacity of the CBT is 10 tons (9 metric tons). Since the lifting capabilities of the LHS will allow loading of more than 10 tons (9 metric tons), care must be taken to make sure the load does not exceed the 10-ton (9 metric ton) limit. Failure to heed this warning could result in death or injury to personnel and/or damage to equipment.

**NOTE**

During all Transporter operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for directing the operator using hand signals, operating the remote control box and winch, and assisting the operator as needed.

- a. Unload the BAP if it is on the Transporter (para 2-10).

**CAUTION**

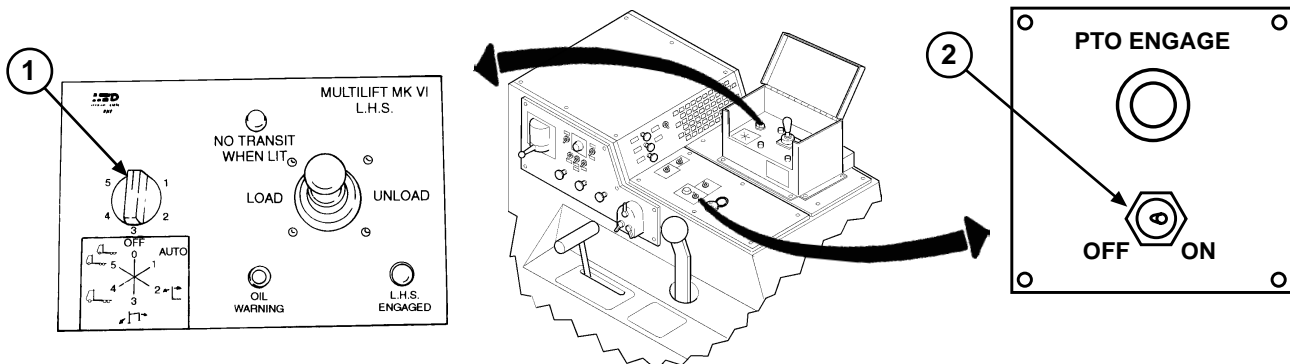
**BAP hold-down locks must be unlocked from the LHS prior to commencing BAP unloading operations. Failure to release BAP hold-down locks could result in damage to equipment.**

- b. If NATO flatrack is loaded, inspect load and make sure it is secure and weight of load does not exceed 10 tons (9 metric tons).
- c. Put transmission in reverse and back up Transporter so there is at least 6 feet (2 m) of clearance behind Transporter for loading NATO flatrack.
- d. Apply parking brake and place transmission in neutral.

**CAUTION**

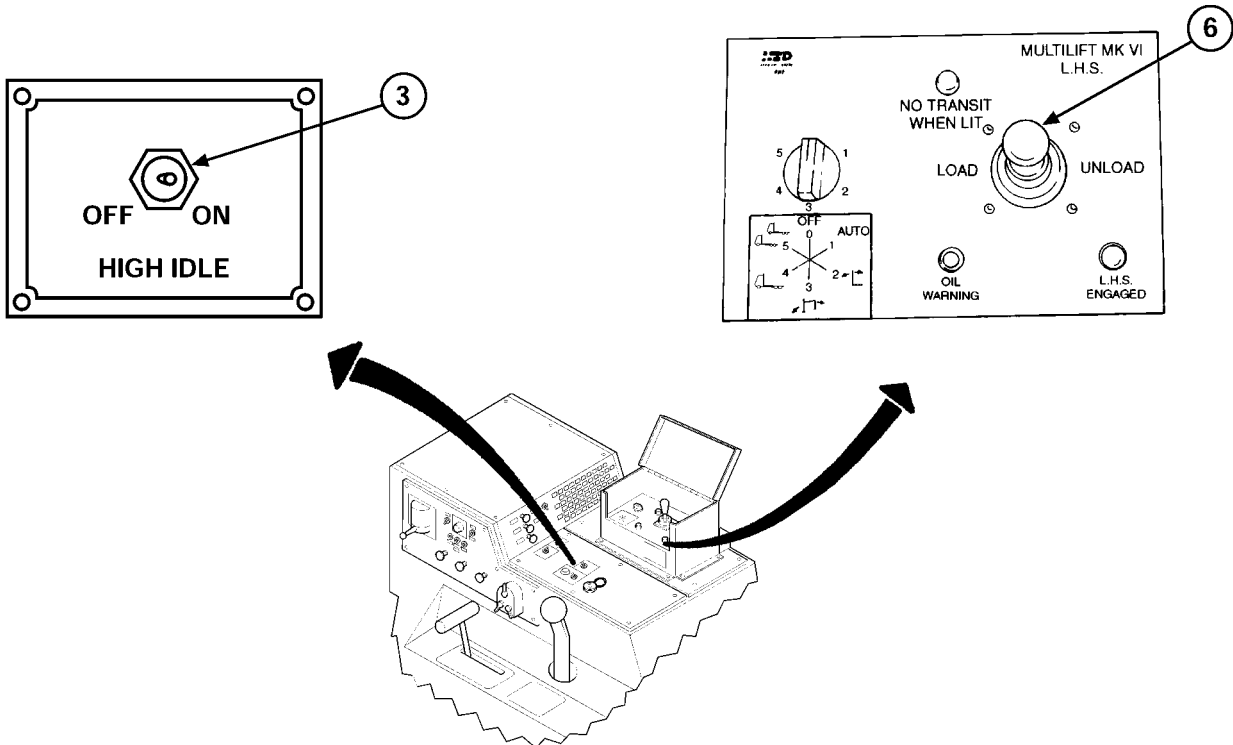
- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO engage switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

- e. Turn LHS MODE SELECT switch (1) to AUTO SEQUENCE, and turn PTO ENGAGE switch (2) to ON.

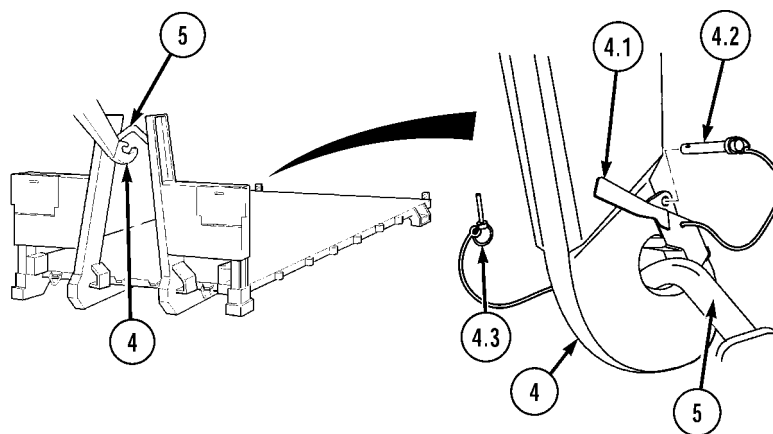


**2-18. LOADING NATO FLATRACK FROM THE GROUND (continued).**

- f. Turn HIGH IDLE switch (3) to ON.
- g. Move joystick (4) to UNLOAD and hold in order to raise and move LHS hook arm and main frame toward NATO flatrack.



- h. Turn HIGH IDLE switch (3) of OFF.
- i. Release parking brake.
- j. Put transmission in reverse and back up Transporter, steering as necessary to align hook tip under NATO flatrack hook bar.
- k. Make sure LHS hook tip (4) is slightly below and in line with middle of NATO flatrack hook bar (5).
- l. Place transmission in neutral and apply service brake.
- m. Move joystick (6) to LOAD, until LHS hook (4) touches flatrack hook bar (5).
- m.1 Install bail bar lock (4.1) on LHS hook (4) with pin (4.2) and lock pin (4.3).

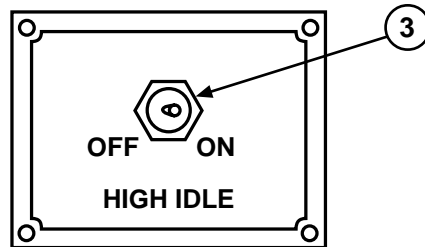


**2-18. LOADING NATO FLATRACK FROM THE GROUND (continued).**

**NOTE**

If LHS hook and NATO flatrack hook bar are not properly engaged, move joystick to unload and release when hook tip is below NATO flatrack hook bar, release Transporter parking brake, move Transporter away from NATO flatrack, and repeat Steps (j) through (m).

- n. Turn HIGH IDLE switch (3) to ON.
- o. Release service brake.
- p. Move joystick (6) to LOAD. Allow Transporter to move underneath NATO flatrack. Make sure NATO flatrack runners engage LHS rear rollers.
- q. Set parking brake when NATO flatrack runners come onto LHS rear rollers and NATO flatrack clears the ground.



- r. Hold joystick (6) in LOAD position until NATO flatrack is loaded. As NATO flatrack reaches stowed position, position HIGH IDLE switch (3) to OFF.

**WARNING**

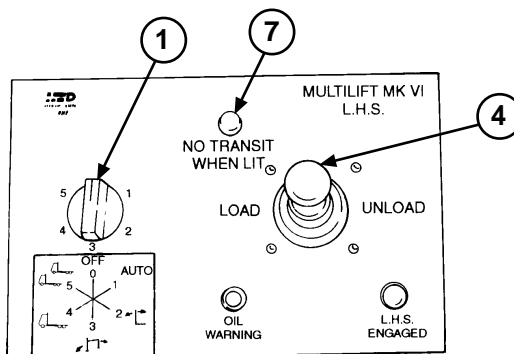
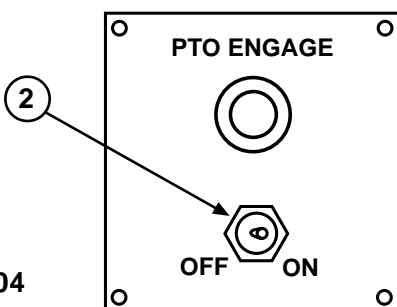
**When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.**

- s. Release joystick (6) when hook is fully stowed and NO TRANSIT WHEN LIT indicator (7) light has gone out.

**CAUTION**

**While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.**

- t. Position PTO ENGAGE switch (2) to OFF, and turn LHS MODE SELECT switch (1) to OFF/TRANSPORT.



**2-19. UNLOADING NATO FLATRACK TO THE GROUND.**

**NOTE**

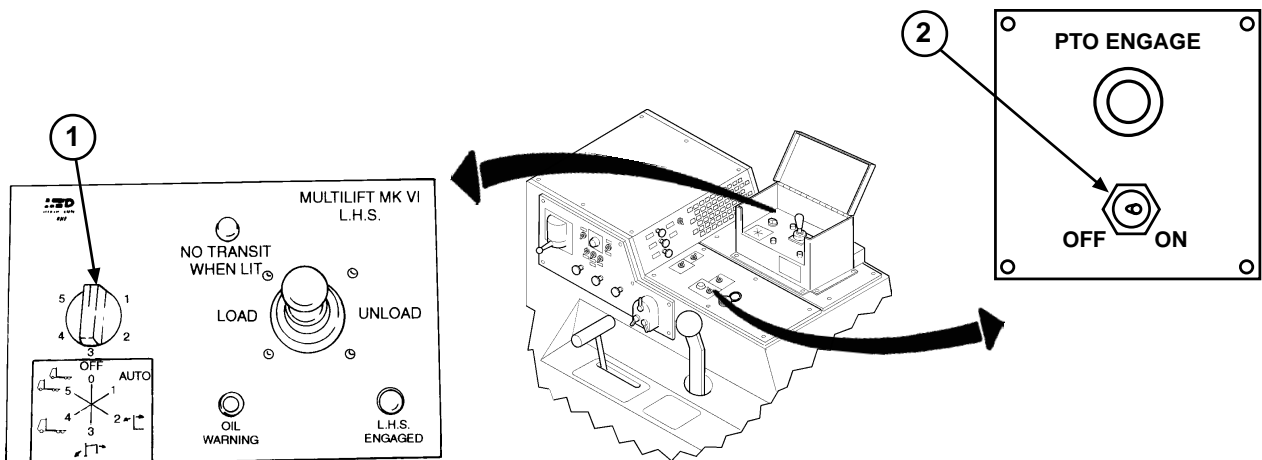
During all Transporter operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for directing the operator using hand signals, operating the remote control unit and winch, and assisting the operator as needed.

- a. Place transmission in forward and drive Transporter to unloading area, with rear of Transporter about 16 feet (4.9 m) in front of where rear of NATO flatrack is to be set on the ground.
- b. Apply service brake and place transmission in neutral.
- c. If NATO flatrack is loaded, inspect load and make sure it is secure.

**CAUTION**

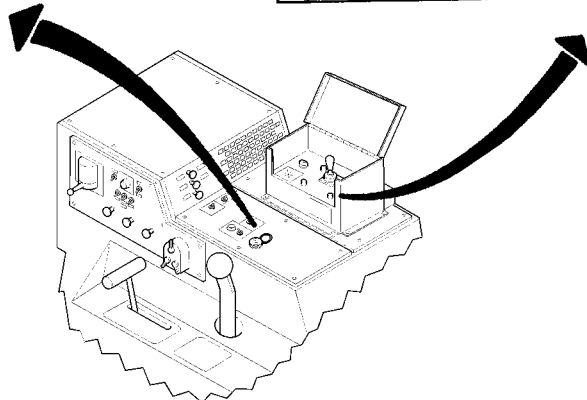
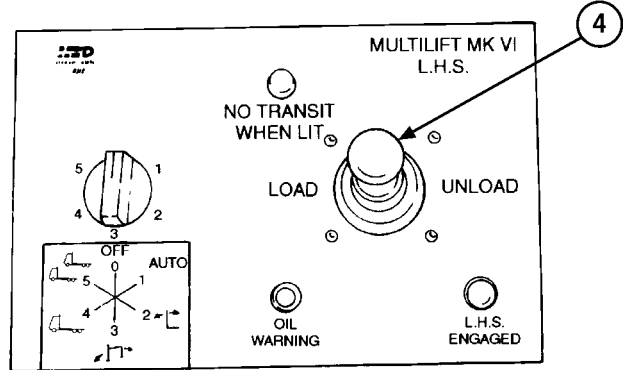
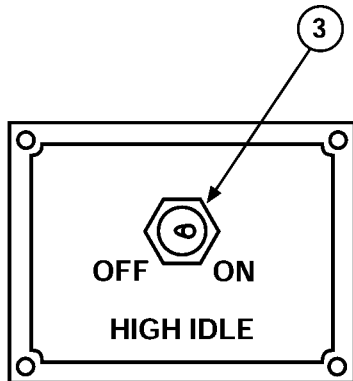
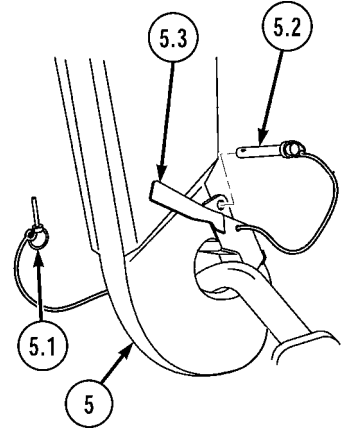
- **When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.**
- **PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.**

- d. Turn LHS MODE SELECT switch (1) to AUTO SEQUENCE, and position PTO ENGAGE switch (2) to ON.



**2-19. UNLOADING NATO FLATRACK TO THE GROUND (continued).**

- e. Turn HIGH IDLE switch (3) to ON.
- f. Move joystick (4) to UNLOAD and hold while LHS hook arm rises and moves NATO flatrack to the rear.
- g. Immediately release service brake when back edge of NATO flatrack touches the ground.
- h. Continue unloading while allowing Transporter to roll forward. Release joystick (4) when front end of NATO flatrack is about 1 foot (0.3 m) off the ground.
- i. Turn HIGH IDLE switch (3) to OFF.
- j. Move joystick (4) to UNLOAD and continue unloading until NATO flatrack rests on the ground and weight of load is off LHS hook (5).
- j.1 Apply service brake.
- j.2 Remove lock pin (5.1), pin (5.2), and bar bar lock (5.3) from LHS hook (5).
- j.3 Move joystick (4) to UNLOAD.
- j.4 Release joystick (4) when LHS hook tip is slightly below NATO flatrack hook bar.
- k. Release service brake.
- l. Drive forward slowly about 6 inches (15 cm), making sure LHS hook clears flatrack hook bar. Stop Transporter, apply parking brake, and place transmission in neutral.





**2-19. UNLOADING NATO FLATRACK TO THE GROUND (continued).**

- m. Position HIGH IDLE switch to ON.
- n. Move joystick (4) to LOAD position.

**WARNING**

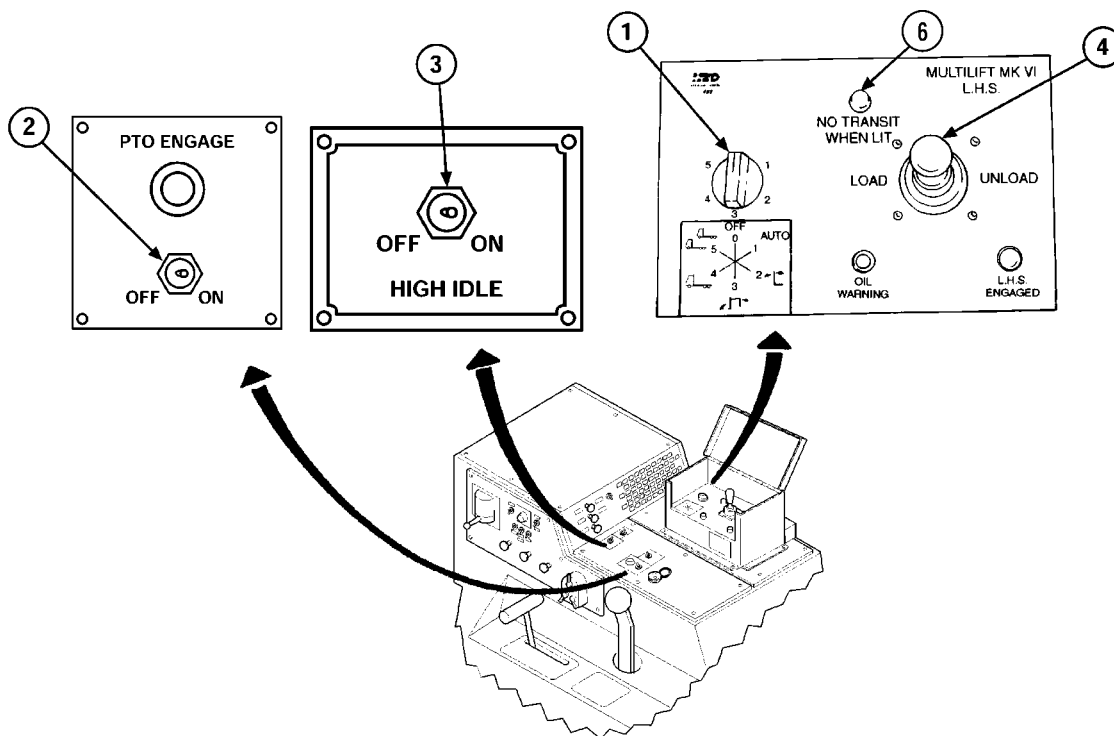
When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.

- o. Release joystick (4) when main frame and LHS hook arm are fully stowed and NO TRANSIT WHEN LIT indicator (6) light has gone out.
- p. Position HIGH IDLE switch (3) to OFF.

**CAUTION**

While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame hand hook arm cylinders.

- q. Position PTO ENGAGE switch (2) to OFF, and turn LHS MODE SELECT switch (1) to OFF/TRANSPORT.



**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER.**

**WARNING**

- **Prior to and during any load or unload cycle, all personnel should stay clear of the LHS and the BAP or serious injury or death to personnel could result.**
- **Trailer wheels must be chocked during transfer operations or serious injury or death to personnel could result.**

**CAUTION**

- **To avoid damage to equipment during transfer operations, make sure trailer drawbar extension is retracted and on the ground, centered forward of the trailer. Make sure drawbar and drawbar extension are properly positioned (refer to TM 9-2330-385-14).**
- **Make sure air lines and cables are properly stowed, to prevent damage to equipment (refer to TM 9-2330-385-14).**
- **Both trailer bumper points must be under truck bump plate, and at least one trailer bumper point must contact bump plate. Trailer bumper point not contacting Transporter bumper stop cannot exceed 0.5 inch (12.7 mm) or the BAP will miss main rail guides and damage to equipment may result.**

**NOTE**

During all Transporter operations, the operator will drive and be responsible for the operation of the LHS cab control box. The assistant acts as a ground guide and will be responsible for directing the operator using hand signals, operating the remote control unit and winch, and assisting the operator as needed.

- a.* Check transfer site for 22 feet (6.7 m) overhead clearance, ground firmness, and level ground.
- b.* If the BAP is loaded, make sure load is properly secured.

**WARNING**

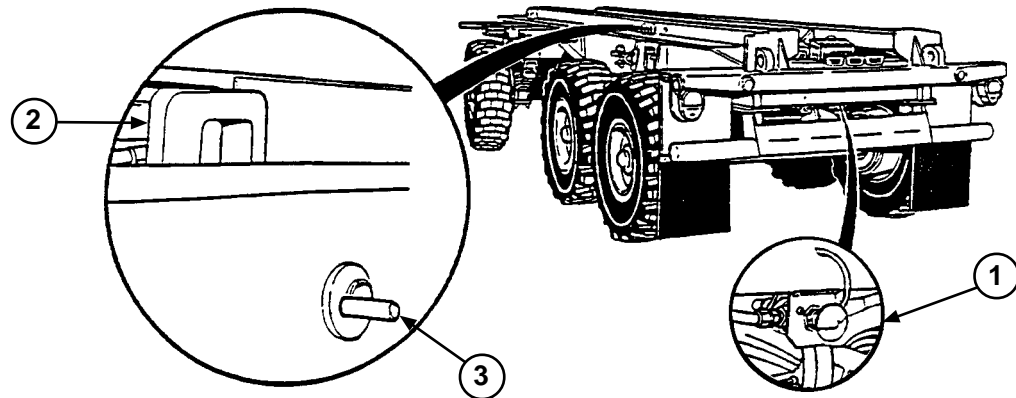
- **When operating Transporter with palletized load system (PLS) trailer, the heaviest loaded BAP must always be placed on the Transporter; otherwise, adverse handling and/or braking may result, causing injury or death to personnel.**
- **Make sure trailer air system is charged before beginning transfer, or trailer locks may not engage properly. Serious injury or death to personnel could result.**

**CAUTION**

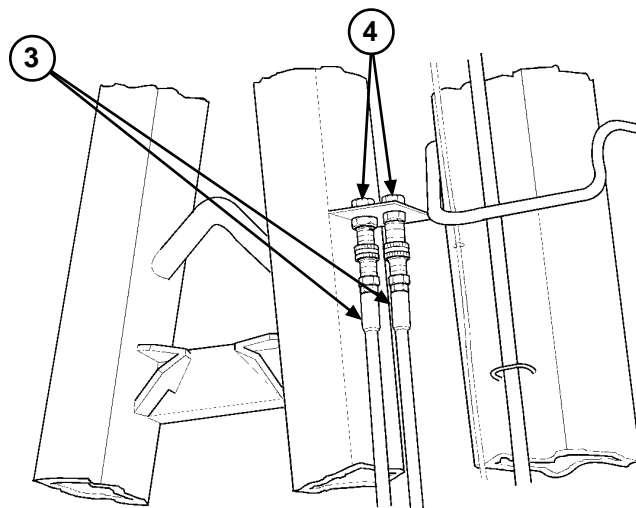
- **Air pressure in trailer air system must be sufficient to retract trailer locks or damage to trailer locks may occur while attempting to load the BAP on trailer. If air pressure is not sufficient, use truck to charge trailer air system using trailer air-charging hose. If air system cannot retract trailer locks, use manual trailer lock retract procedure (refer to TM 9-2330-385-14).**
- **Make sure both trailer locks are fully retracted or damage to equipment may result.**

**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

- c. Push in on knob (1) and retract left trailer lock (2) and right trailer lock (2). Make sure lock indicator pin (3) is fully retracted.



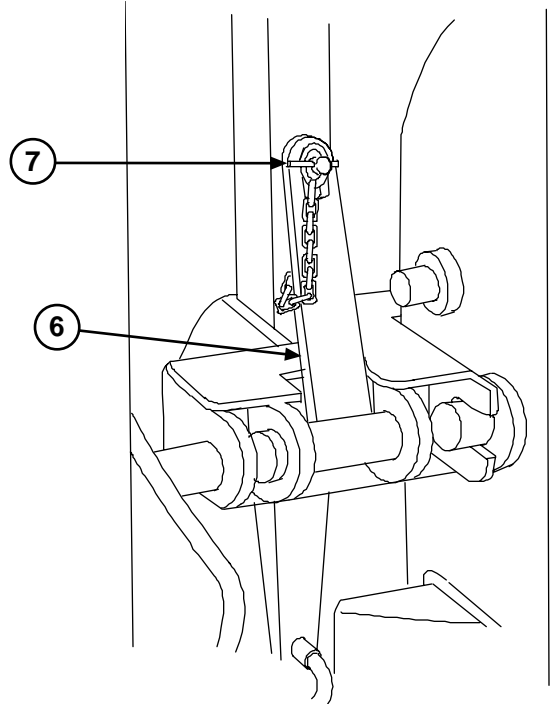
- d. Make sure two hydraulic hoses (4) are in the stowed location connections (5).



**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

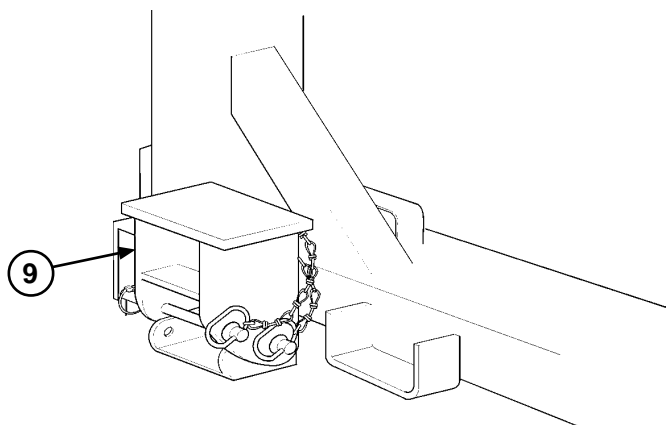
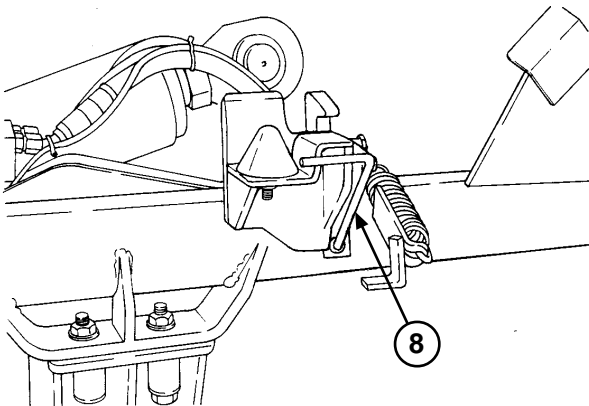
e. Secure winch frame to the BAP. Make sure two winch frame locking levers (6) are in the up position. If locking levers (6) are not up:

- (1) Remove lockpin (7) from each locking lever (6).
- (2) Swing locking lever (6) to the up position.
- (3) Insert lockpin (7) into locking lever (6).



f. Make sure curb-side and road-side BAP hold-down lock handles (8) are in the auto engage position (handle pushed in).

g. Make sure both PLS feet (9) are in the stowed position (up).



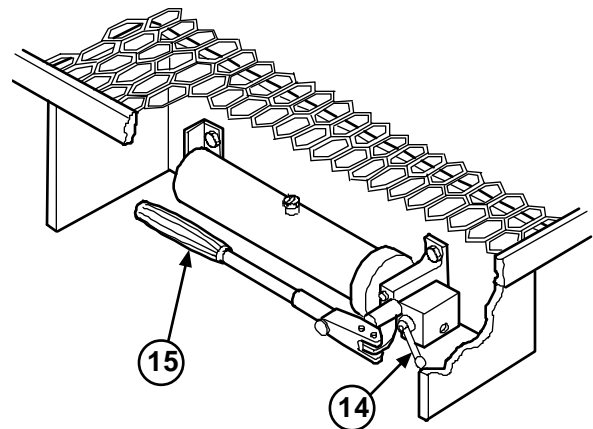
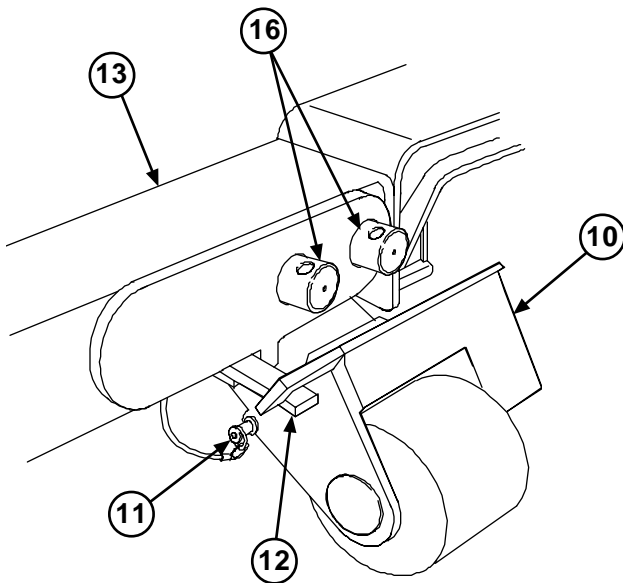
## 2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).

*h.* Deploy both BAP transload rollers (10).

### NOTE

Operation of each (road-side and curb-side) transload roller is the same.

- (1) Remove lockpin (11) from transload roller (10), and swing transload roller (10) up. Stow retainer bar (12) under BAP frame (13). Install lockpin (11) in stowed position on transload roller (10).



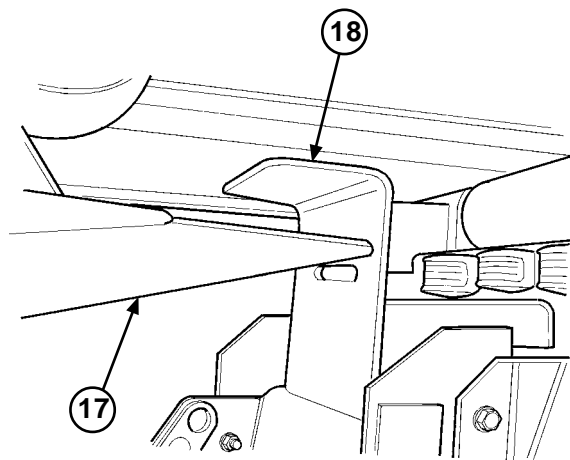
- (2) Turn hand pump selector valve lever (14) to transload position (down). Pump handle (15) until both curb-side and road-side extension cylinders (16) are fully extended.

**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

**CAUTION**

- **Make sure trailer drawbar is down against the ground during transfer operations or damage to equipment may result.**
- **To prevent damage to equipment, make sure air lines and cables are properly stowed (TM 9-2330-385-14).**
- **Both trailer bumper points must be under truck bump plate, and at least one trailer bumper point must contact bump plate. Trailer bumper point not contacting Transporter bumper stop cannot exceed 0.5 inch (12.7 mm) or the BAP will miss main rail guides and damage to equipment may result.**

- i.* Back up Transporter so trailer bumper points (17) are under flange and contact bump plate (18).



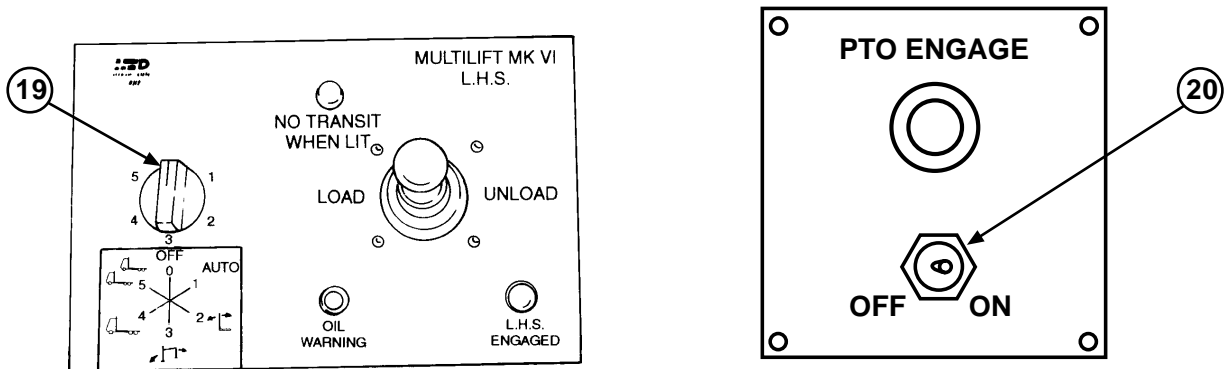
- j.* Set parking brake, and put transmission in neutral.

**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

k. Turn LHS MODE SELECT switch (19) to AUTO, and position PTO ENGAGE switch (20) to ON.



**WARNING**

**Trailer wheels must be chocked during transfer operations or serious injury or death to personnel could result.**

**NOTE**

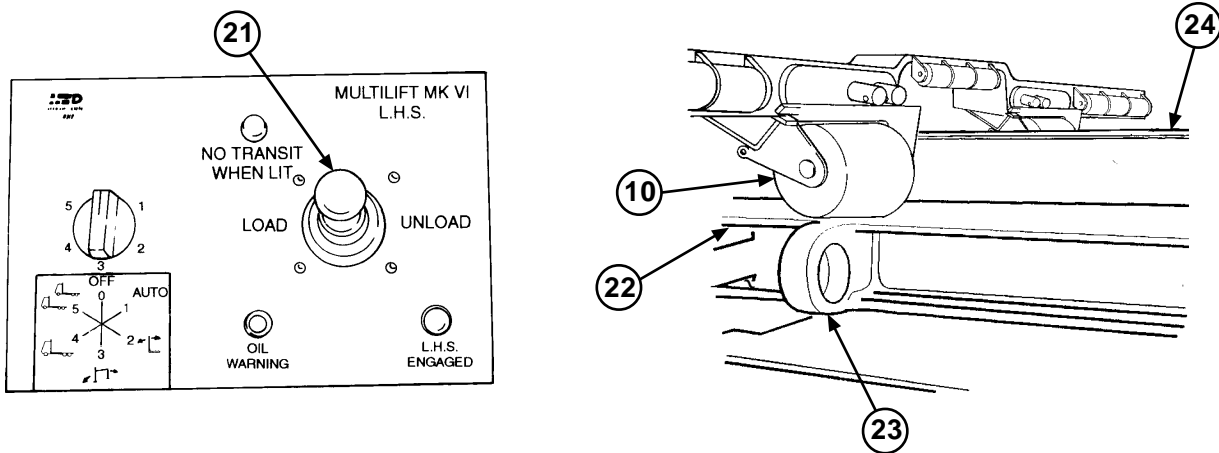
The amount of time it takes to load and unload is controlled by engine speed. To reduce loading and unloading times, engine speed can be increased to approximately 1200 rpm by engaging HIGH IDLE switch.

**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

**CAUTION**

**If transload rollers roll over lifting eyes, damage to the BAP could occur.**

- l.* Move joystick (21) to UNLOAD until both transload rollers (10) contact trailer (22). Make sure transload rollers (10) clear the top of trailer lifting eyes (23).

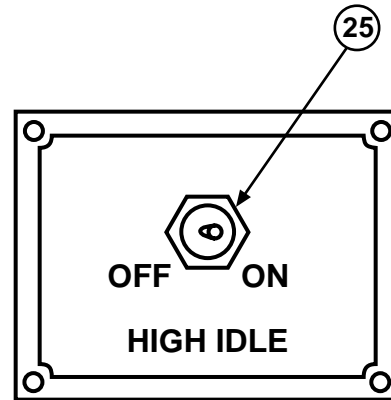


- m.* Release joystick (21).
- n.* Make sure trailer guides (24) are between transload rollers (10).

**NOTE**

If trailer guides are not between transload rollers, perform Step o. If trailer guides are aligned, go to Step p.

- o.* If trailer guides (24) are not between transload rollers (10):
  - (1) Move joystick (21) to LOAD.
  - (2) When the BAP is fully reloaded, release joystick (21). Reposition Transporter to line up with trailer.
  - (3) Repeat Steps i through n.



- p.* Turn HIGH IDLE switch (25) to ON.
- q.* Move joystick (21) to UNLOAD until BAP front end contacts trailer (22).
- r.* Release joystick (21).
- s.* Turn HIGH IDLE switch (25) to OFF.

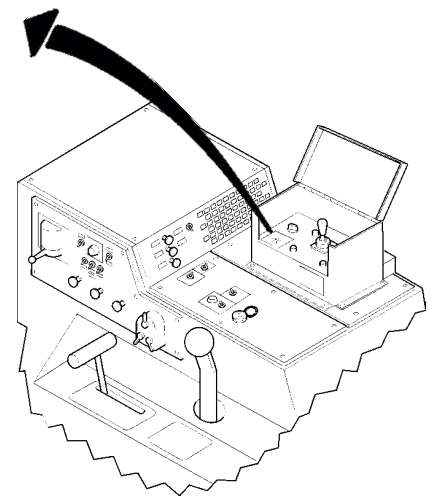
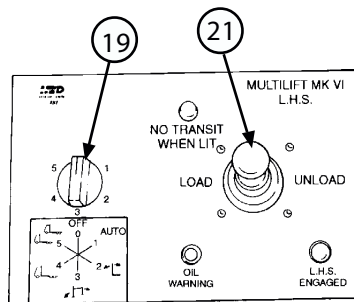


2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).

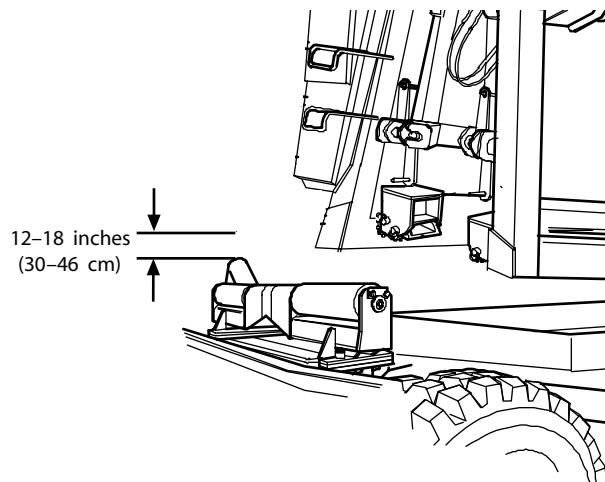
CAUTION

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

t. Turn LHS MODE SELECT switch (19) to HOOK ARM only (position 2).



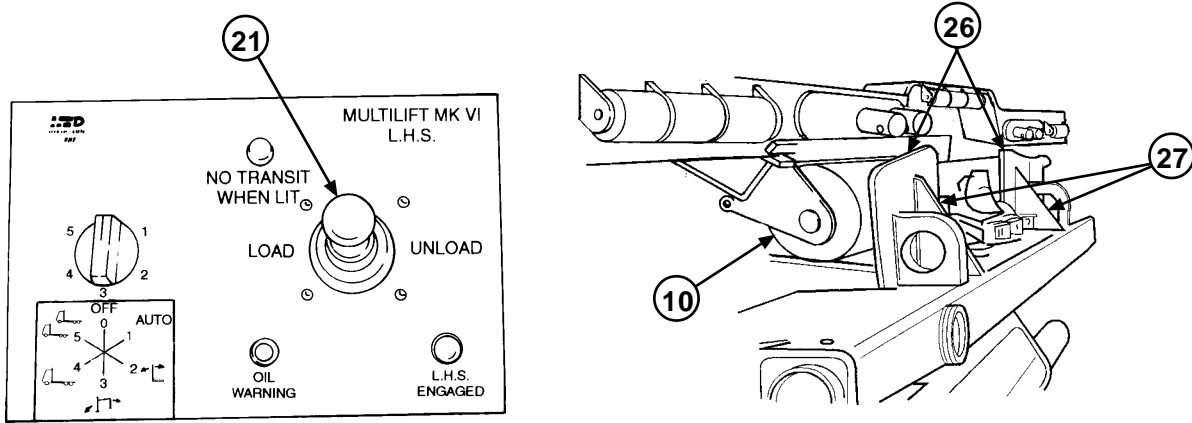
u. Move joystick (21) to LOAD until front of the BAP is raised approximately 12 to 18 inches (30 to 46 cm) above trailer deck height.



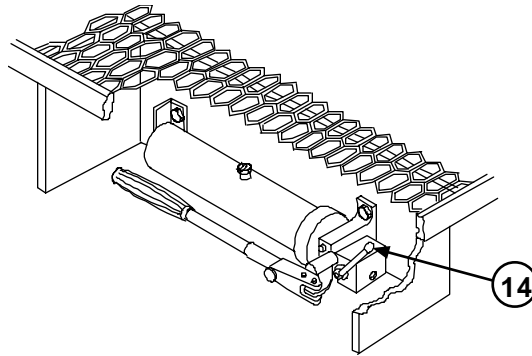
v. Turn LHS MODE SELECT switch (19) to MAIN FRAME ONL Y (position 3).

**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

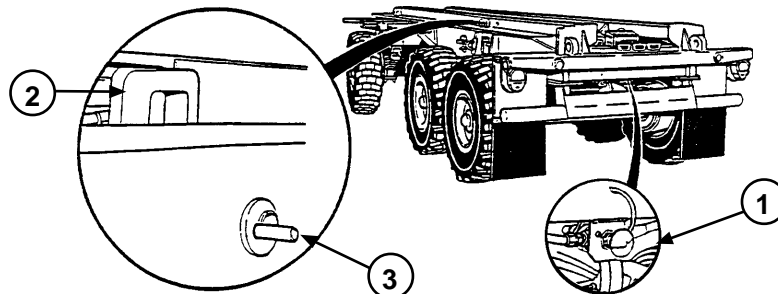
- w. Move joystick (21) to UNLOAD until both transload rollers (10) contact rear trailer stops (26) and front of BAP main rails (27) are seated on trailer.



- x. Release joystick (21).
- y. Make sure both transload rollers (10) have contacted rear trailer stops (26).
- z. Move hand pump selector valve lever (14) to transload roller UP position, allowing the BAP to lower onto trailer. When lowered, move hand pump selector valve lever (14) to OFF position.

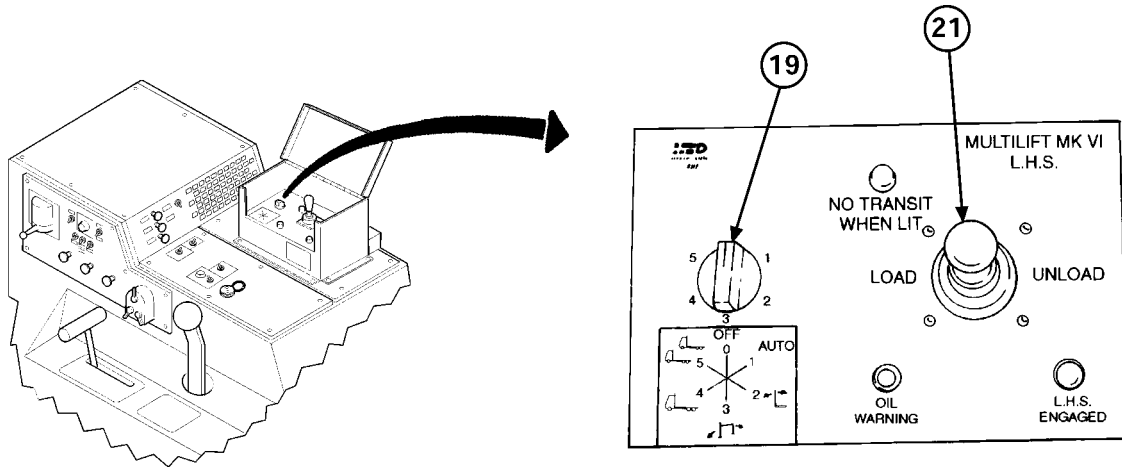


- aa. Pull knob (1) and engage curb-side and road-side trailer locks (2).
- ab. Make sure trailer locks (2) are engaged. Make sure lock indicator pin (3) is extended approximately 2 inches (5 cm).



**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

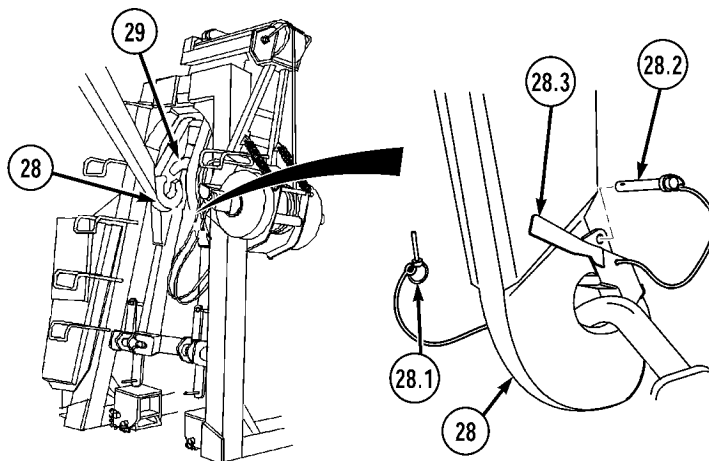
- ab.1 Remove lock pin (28.1), pin (28.2), and bail bar lock (28.3) from LHS hook (28).
- ac. Turn LHS MODE SELECTION switch (19) to HOOK ARM only (position 2).



**NOTE**

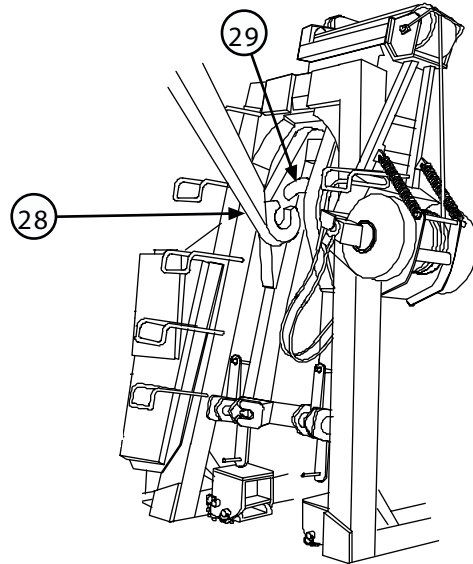
It may be necessary to repeat Steps ad and ae several times in order to clear hook arm from hook bar.

- ad. Move joystick (21) to UNLOAD to allow top of LHS hook (28) to clear BAP hook bar (29).



2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).

- ae. Put Transporter in drive and move forward slowly, making sure LHS lift hook (28) clears BAP hook bar (29).



- af. Move Transporter forward approximately 5 feet (1.5 m).  
ag. Set parking brake and put transmission in neutral.

WARNING

When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.

CAUTION

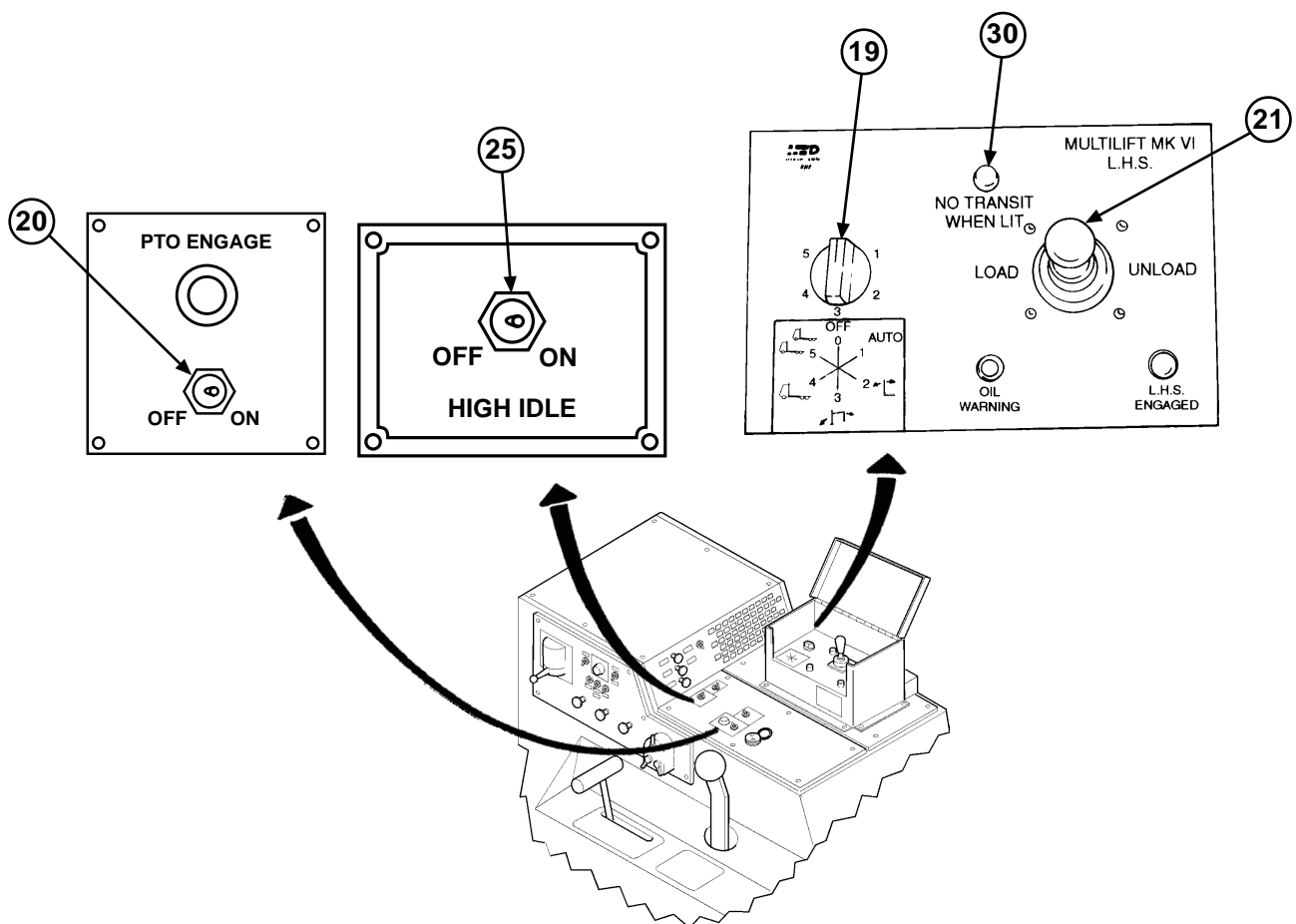
While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.

**2-20. NORMAL TRANSFER OF THE BAP TO TRAILER (continued).**

**NOTE**

LHS hook arm does not need to be fully stowed if more transfer operations are going to be done.

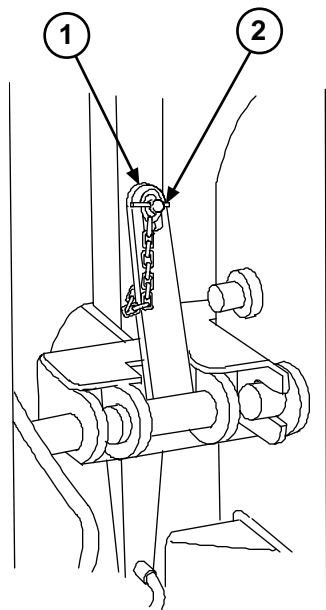
- ah.* Turn LHS MODE SELECT switch (19) to AUTO.
- ai.* Position HIGH IDLE switch (25) to ON.
- aj.* Move joystick (21) to LOAD and hold in position until NO TRANSIT WHEN LIT indicator (30) light goes out.
- ak.* Position HIGH IDLE switch (25) to OFF.
- al.* Position PTO ENGAGE switch (20) to OFF, and turn LHS MODE SELECT switch (19) to OFF/TRANSPORT.



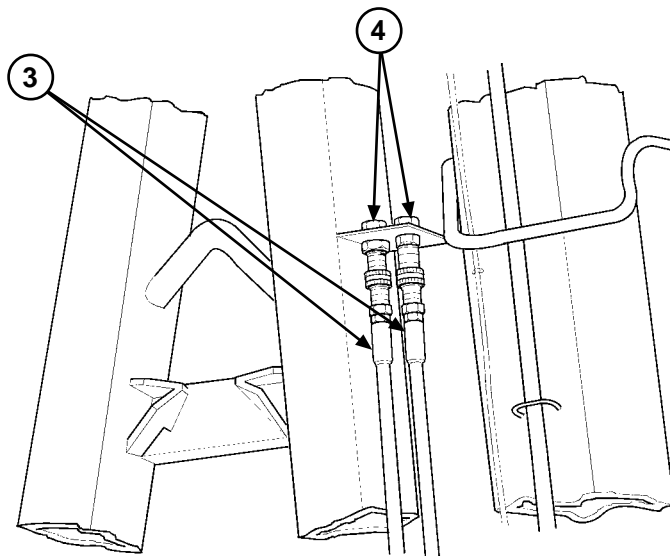
**2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER.**

- a. Check transfer site for 22 feet (6.7 m) overhead clearance, ground firmness, and level within one percent slope in all directions.
- b. Align Transporter with the BAP, and back up Transporter. Stop approximately 5 feet (1.5 m) from the BAP.
- c. Apply service brake or parking brake and place transmission in neutral.
- d. If the BAP is loaded, make sure load is properly secured.
- e. Make sure winch frame is secured to the BAP. Make sure two winch frame locking levers (1) are in the up position. If locking levers (1) are not up:

- (1) Remove lockpin (2) from each locking lever (1).
- (2) Swing locking lever (1) to the up position.
- (3) Insert lockpin (2) into locking lever (1).



- f. Make sure two hydraulic hoses (3) are secured to the stowed location connections (4).

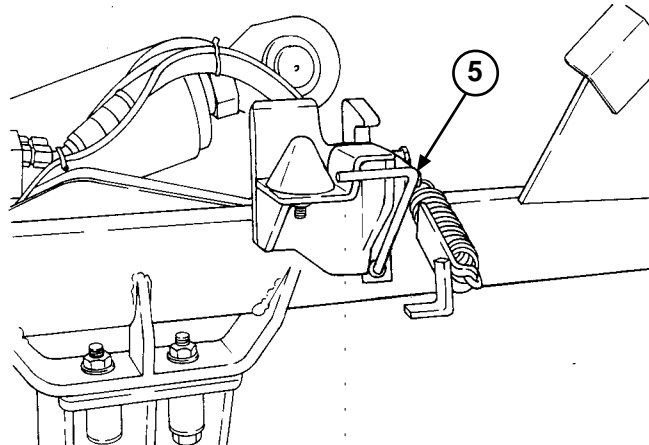


## 2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER (continued).

### CAUTION

Failure to engage BAP hold-down lock in the in position will result in damage to equipment.

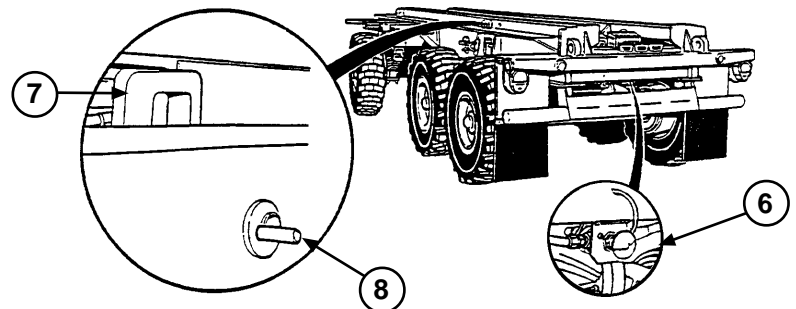
- g. Position each of two BAP hold-down locks (5) at the in position and push handle in.



### CAUTION

- Air pressure must be sufficient in trailer air system to retract trailer locks or damage to trailer locks can occur while attempting to remove the BAP from trailer. If air pressure is not sufficient, use Transporter to charge trailer air system using trailer air-charging hose. If air system cannot retract trailerlocks, use manual trailer lock retract procedure (refer to TM 9-2330-385-14).
- To prevent damage to equipment, make sure air lines and cables are properly stowed (refer to TM 9-2330-385-14).
- To avoid damage to equipment during transfer operations, make sure trailer drawbar extension is retracted and drawbar is in the down position against the ground and centered forward of the trailer. Make sure drawbar and drawbar extension are properly positioned (refer to TM 9-2330-385-14).

- h. Push knob (6) on trailer to retract both trailer locks (7). Make sure curb-side and road-side lock indicator pins (8) are fully retracted.



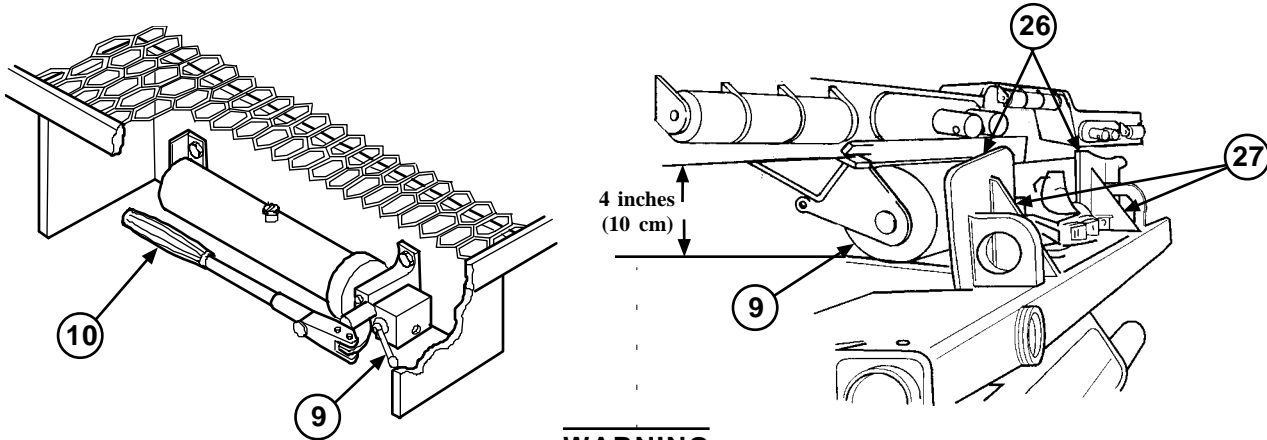
### CAUTION

Make sure both trailer locks are fully retracted or damage to equipment may result.

- i. Make sure both trailer locks (7) are fully retracted.

**2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER (continued).**

- j. Move hand pump selector valve lever (9) to transload roller DOWN position.
- k. Operate hand pump (10) until all four extension cylinders are fully extended. Rear of the BAP should be raised about 4 inches (10 cm).



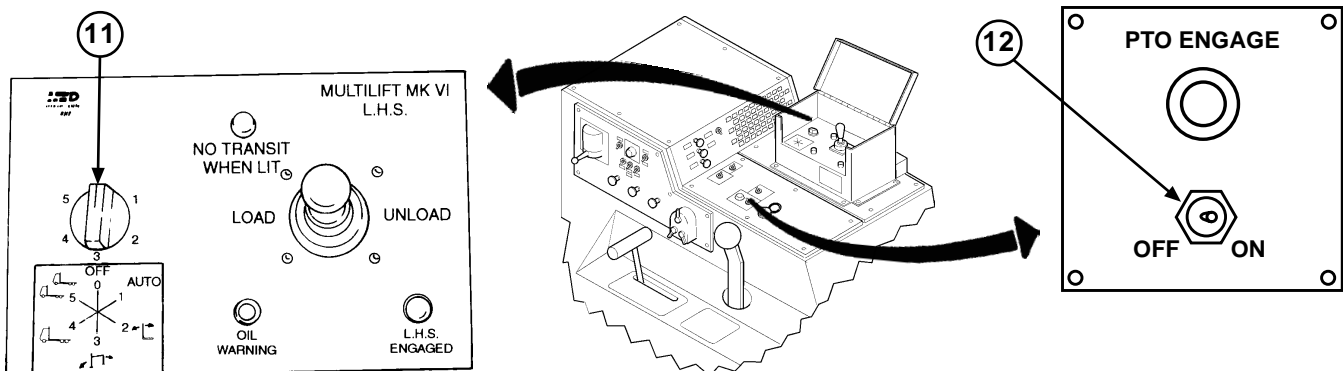
**WARNING**

- Prior to and during any load or unload cycle, all personnel should stay clear of the LHS and the BAP or serious injury or death to personnel could result.
- Trailer wheels must be chocked during transfer operations or serious injury or death to personnel could result.

**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to LHS resulting in equipment damage.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

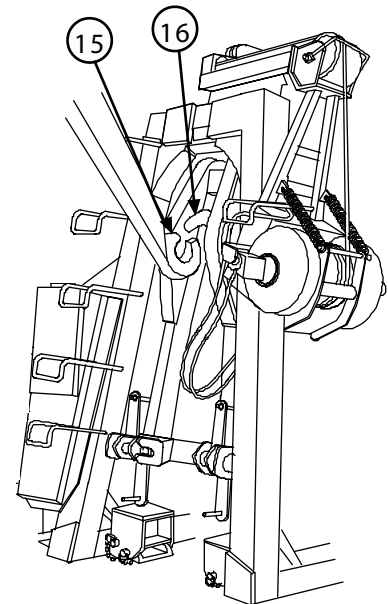
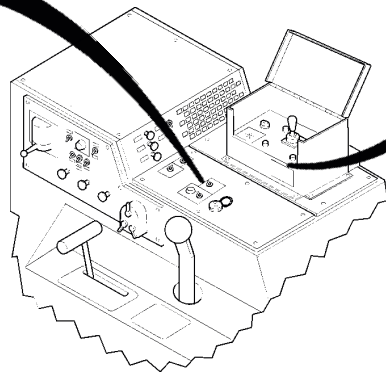
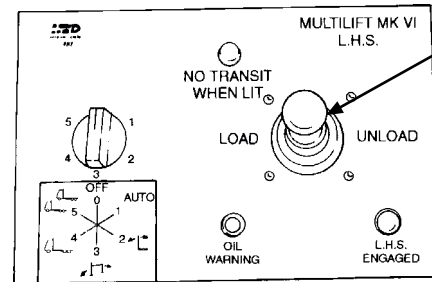
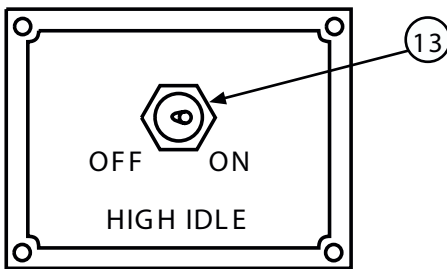
- l. Turn LHS MODE SELECT switch (11) to AUTO, and position PTO ENGAGE switch (12) to ON.





2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER (continued).

- m. Turn cab HIGH IDLE switch (13) to ON.
- n. Move joystick (14) to UNLOAD until bottom tip of LHS lift hook (15) is just below level of BAP hook bar (16).
- o. Turn cab HIGH IDLE switch (13) to OFF.

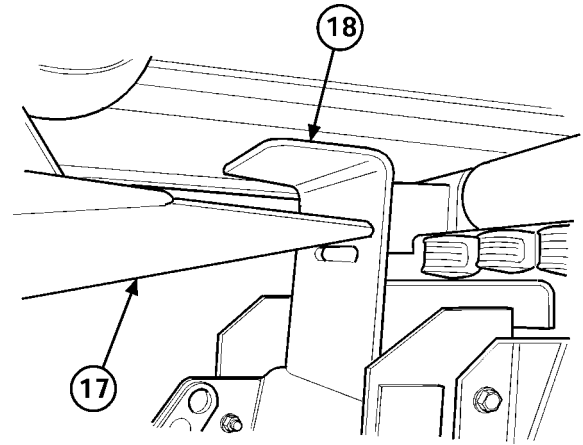


- p. Release service brake or parking brake.
- q. Place transmission in reverse and back up T ransporter until LHS lift hook (15) engages BAP hook bar (16).
- r. Place transmission in neutral and apply service brake or parking brake.

**2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER (continued).**

**CAUTION**

- Both trailer bumper points must be under truck bump plate, and at least one trailer bumper point must contact bump plate. Trailer bumper point not contacting Transporter bumper stop cannot exceed 0.5 inch (12.7 mm) of the BAP will miss main rail guides and damage to equipment may result.
  - Do not shift transmission to reverse to back up Transporter while LHS hook arm is attached to the BAP or damage to the LHS will occur.
- s. Make sure trailer bumper point (17) is under flange of truck bump plate (18).



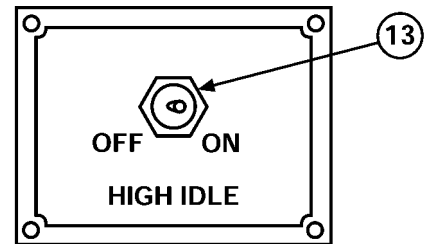
**CAUTION**

**Make sure trailer air system is pressurized before beginning removal, or BAP locks may not disengage properly. Damage to equipment may result.**

**NOTE**

The time it takes for loading and unloading is controlled by engine speed. To reduce loading and unloading times, engine speed can be increased to approximately 1200 rpm by engaging HIGH IDLE switch.

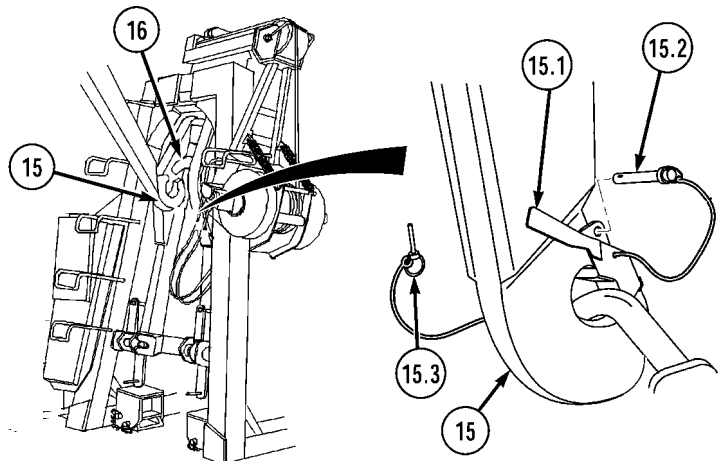
- s.1 Move joystick (14) to load until LHS hook (15) engages BAP hook bar (16).
- s.2 Install bail bar lock (15.1) on LHS hook (15) with pin (15.2) and lock pin (15.3).
- t. Move joystick (14) to LOAD, stop when hook (15) raises the BAP.
- u. Turn cab HIGH IDLE switch (13) to ON.



**WARNING**

**When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.**

- v. Move joystick (14) to load and stop when NO TRANSIT WHEN LIT (19) indicator light goes out.
- w. Turn cab HIGH IDLE switch (13) to OFF.



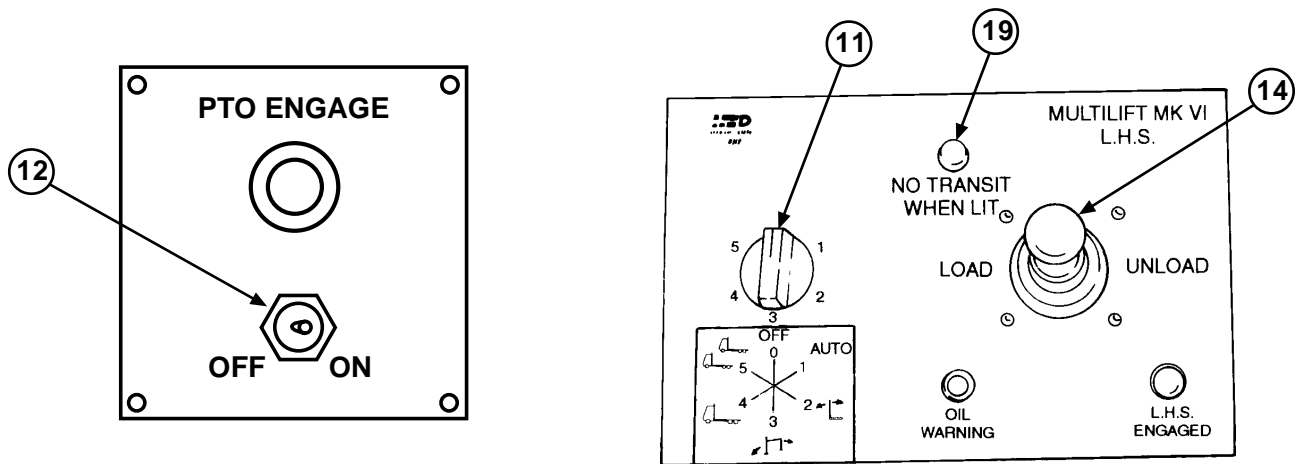
**2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER (continued).**

- x. Place transmission in forward mode and move Transporter 10 feet (3 m) from trailer.
- y. Apply parking brake and place transmission in neutral.

**NOTE**

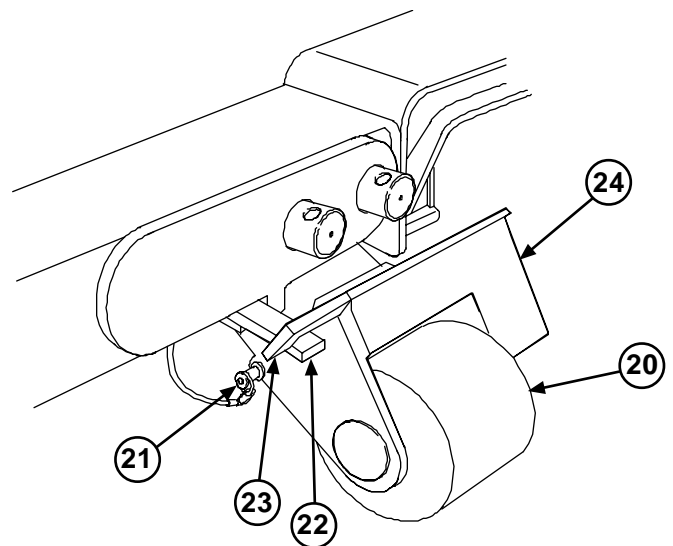
If BAP hold-down locks do not engage, raise the BAP slightly and lower again. The BAP should seat completely and engage BAP hold-down locks.

- z. Position PTO ENGAGE switch (12) to OFF, and turn LHS MODE SELECT switch (11) to OFF.



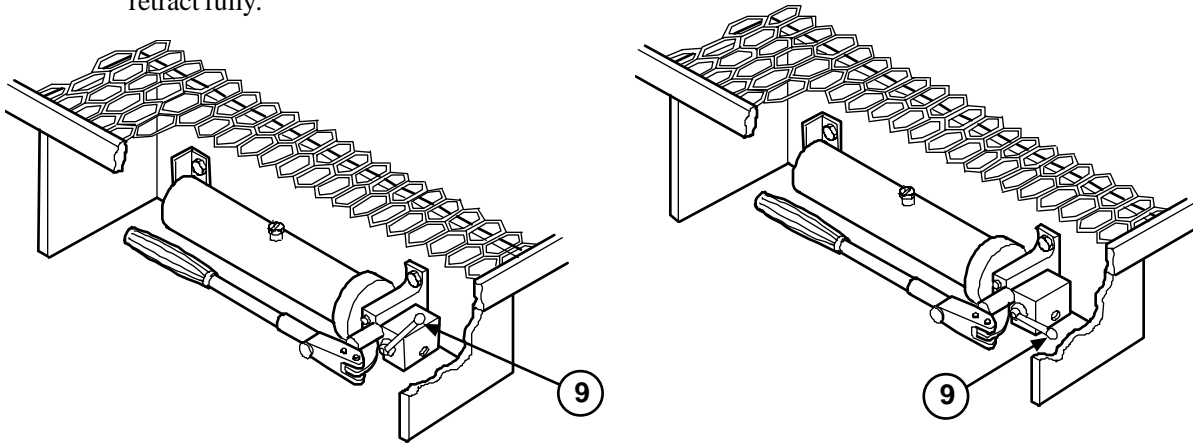
- aa. Stow curb-side and road-side transload rollers (20):

- (1) Remove lockpin (21) from stowed position on transload rollers (20).
- (2) While holding transload roller (20), swing retainer bar (22) free of notch (23) on transload rollers (20).
- (3) Swing transload roller (20) into stowed position and install lockpin (21) in transload rollers (20).
- (4) Swing transload bracket (24) up against lockpin (21).



## 2-21. NORMAL REMOVAL OF THE BAP FROM TRAILER (continued).

- (5) Move hand pump selector valve lever (9) to center roller UP position, to allow extension cylinders to retract fully.



- (6) When extension cylinders are retracted, return selector valve (9) to center position (off).

## 2-22. DECALS AND INSTRUCTION PLATES.

See TM 9-2320-279-10 in regard to labels—decals, data plates, and instruction plates—on the HEMTT family of vehicles. For the CBT, operational instruction plates are located on each lock and roller assembly. In addition, the following are located in the areas indicated:

- a. **“Hot Surface Warning.”** This decal is located on the exhaust extension heat shield.
- b. **“Heavy Lift Warning.”** This decal, located in the curb-side BAP toolbox, warns of “Heavy Lift” in reference to the winch frame extension assembly and snatch block stowed in the stowage box.
- c. **Hearing Protection Warning.** There are two of these decals, one on the battery box cover and one on the air cleaner, warning of “High Intensity Noise — Hearing Protection Required.”
- d. **“LHS Function Warning.”** This decal, located on the driver’s side of the cab control box, warns of not using the LHS for any function other than lifting palletized loads and bridge equipment.
- e. **“Stowage Location.”** This decal, located in the curb-side BAP toolbox, identifies the locations and the items that are stowed in the toolbox.
- f. **“Control Valve Layout.”** This placard, located inside the hydraulic manifold enclosure, provides the locations and operations of each hydraulic solenoid and valve.
- g. **“BAP Transport by PLS Truck.”** This data plate, located on the front side of the BAP toolbox, provides instruction on the use of PLS feet.
- h. **“Bridge Adapter Pallet.”** This data plate, located on the road side of the BAP A-frame, provides descriptive data pertaining to the BAP.

## 2-22. DECALS AND INSTRUCTION PLATES (continued).

- i. **“CBT Shipping Data.”** This data plate, located on the front of the toolbox, provides information on BAP weight and dimensions.
- j. **“Coupling Connection CAUTION.”** This data plate, located on the road side of the winch frame, cautions you to make sure couplings are fully connected.
- k. **“Hand Pump Valve.”** This data plate, located next to the hand pump, illustrates proper positioning of the hand pump valve.
- l. **“LHS MODE SELECT Switch Position.”** This decal, located inside the cab on the control box cover, identifies the functions of the numbered positions of the LHS MODE SELECT switch.
- m. **“Pull Master Winch Corporation.”** This manufacturer’s data plate, located on the winch assembly, provides descriptive data pertaining to the winch.
- n. **“Winch Frame Locks.”** There are two winch frame locks data plates, located on the front side of the BAP winch frame, providing information on the locking positions.
- o. **“BAP Hold-down Locks.”** Located on Transporter frame, provides information on lock operation.

## 2-23. OPERATING AUXILIARY EQUIPMENT.

- a. For operation of the bridge bays, refer to TM 5-5420-209-12.
- b. For operation of the bridge erection boat, refer to TM 5-2090-202-12&P and TM 5-1940-277-10.

## 2-24. PREPARATION FOR MOVEMENT.

- a. The M1977 CBT is the prime mover for the CBT System. The chassis is 112 inches (284 cm) high and 101 inches (256.5 cm) wide and is reducible to 101 inches (256.5 cm) high and 96 inches (243.8 cm) wide. Reduction in width is accomplished by removing the mirrors and storing them in the cab. Reduction in height is accomplished by removing and palletizing the following items: the spare tire, the CBT workstation assembly and operator’s handrail, and the exhaust extension.
- b. When the LHS is mounted on the chassis, the height of the Transporter is raised above 112 inches (284 cm). However, by removing the hook arm lockpin and lowering the hook arm onto the hook arm assembly, the height of the Transporter is reducible to 101 inches (256.5 cm) high and 96 inches (243.8 cm) wide.
- c. The CBT with the BAP mounted is 157.4 inches (400.8 cm) high; width is 121.0 inches (307.3 cm) without guide pads and 131.2 inches (333.2 cm) with guide pads. With either bridge bay loaded, the height increases to 161.1 inches (409 cm). When the bridge erection boat with cradle is loaded, the width remains the same but the height increases to 163.8 inches (416 cm).

**2-24. PREPARATION FOR MOVEMENT (continued).**

*d. Air Movement.*

The CBT and CBT components in all configurations are certified by the Air Force for transport on C-5 and C-17 aircraft. The following configurations are certified for air transport by the Air Force:

CBT: C-141 and C-130 in reduced configuration, 102 inches.  
 IBC and Bridge Erection Boat: C-130 and C-141 as palletized loads.

*e. Rail Movement.*

- (1) *U.S. Rail.* Transportation of the CBT by rail, in the United States, is based on the use of the “worst case” 50-inch (127 cm) flatcar. The deck height of this flatcar is 50 inches (127 cm) above the top of the rails. Based on the American Association of Railroads Outline Diagram, the M1977 CBT can be transported by rail, providing the height and width reduction procedures are completed. The M1977 CBT with the M15 BAP cannot be reduced in dimensions and therefore exceeds the height and width requirements of rail transportation.
- (2) *Foreign Rail.* Transportation of the CBT by rail is based on the use of the RES-type or REMMS-type flatcar. The deck height of these flatcars is 48.7 inches (123.7 cm) and 49.6 inches (126 cm), respectively. Based on the Gabarit International de Chargement (GIC) equipment gage, the M1977 CBT can be transported by rail, providing the height and width reduction procedures are completed and the air cleaner is removed. The M1977 chassis with the LHS and the BAP cannot be reduced in dimensions and therefore is not cleared for unrestricted rail transport. However, it may be possible to transport in this configuration based on the planned rail route. The planned rail routes need to be checked for clearances for this configuration.

*f. Road Movement.*

These are the dimensions for unrestricted highway movement in the U.S. and NATO:

	<b>U.S.</b>	<b>NATO</b>
Height:	162.0 inches (411 cm)	157.5 inches (400 cm)
Length:		
Single Vehicle	420.0 inches (1066 cm)	472.8 inches (1200 cm)
Vehicle and Trailer	660.0 inches (1676 cm)	590.0 inches (1498 cm)
Width:	96.0 inches (243 cm)	96.0 inches (243 cm)

**2-24. PREPARATION FOR MOVEMENT (continued).****WARNING**

Removal of spare tire requires two people, one to operate the davit and one to guide the tire. Wheel and tire assembly is heavy and can cause death or injury to personnel if dropped or improperly handled.

- g. Removal of Spare Tire.* See TM 9-2320-279-10.
- h. Removal of Spare Tire Davit.* See TM 9-2320-279-10.
- i. Removal of Exhaust Extension.* See Unit maintenance.
- j. Removal of Workstation.* See Unit maintenance.
- k. Removal of Air Cleaner Assembly.* See TM 9-2320-279-10.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 2-25. GENERAL.

This section addresses operating procedures under unusual conditions.

### 2-26. UNUSUAL ENVIRONMENT/WEATHER.

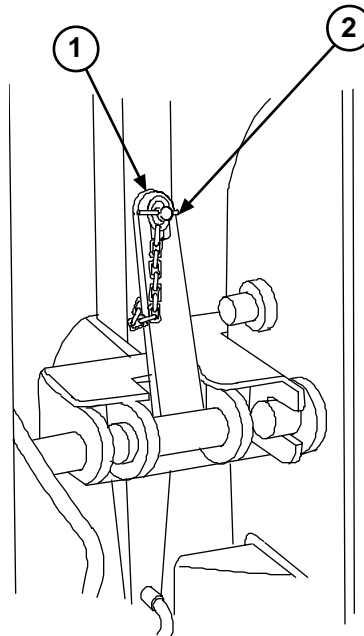
For operation of the Heavy Expanded Mobility Tactical Truck (HEMTT) in unusual environment/weather conditions, see TM 9-2320-279-10; for the bridge erection boat, see TM 5-1940-277-10.

### 2-27. MANUALLY LOADING THE BAP FROM THE GROUND.

#### NOTE

The following manual mode operations using the cab control box are to be performed only when the normal AUTO mode electric circuit is malfunctioning.

- a.* Secure winch frame to the BAP. Make sure two winch frame locking levers (1) are in the up position. If locking levers (1) are not up:
  - (1) Remove lockpin (2) from each locking lever (1).
  - (2) Swing locking lever (1) to the up position.
  - (3) Insert lockpin (2) into locking lever (1).



- b.* If the BAP is loaded, inspect load and make sure it is secure.

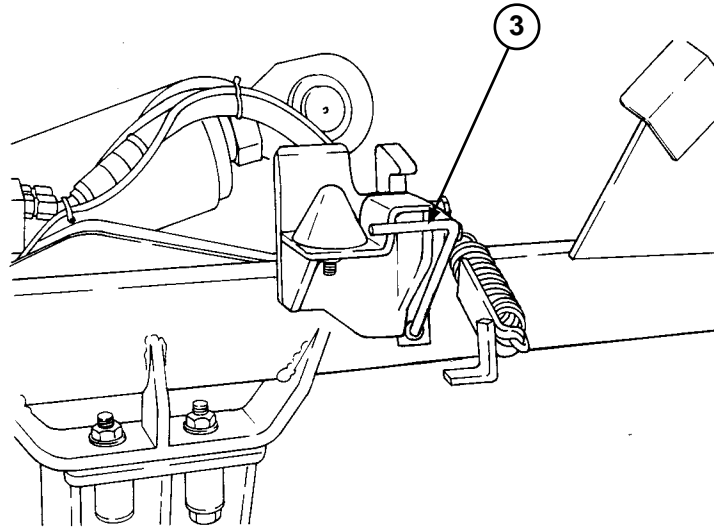


## 2-27. MANUALLY LOADING THE BAP FROM THE GROUND (continued).

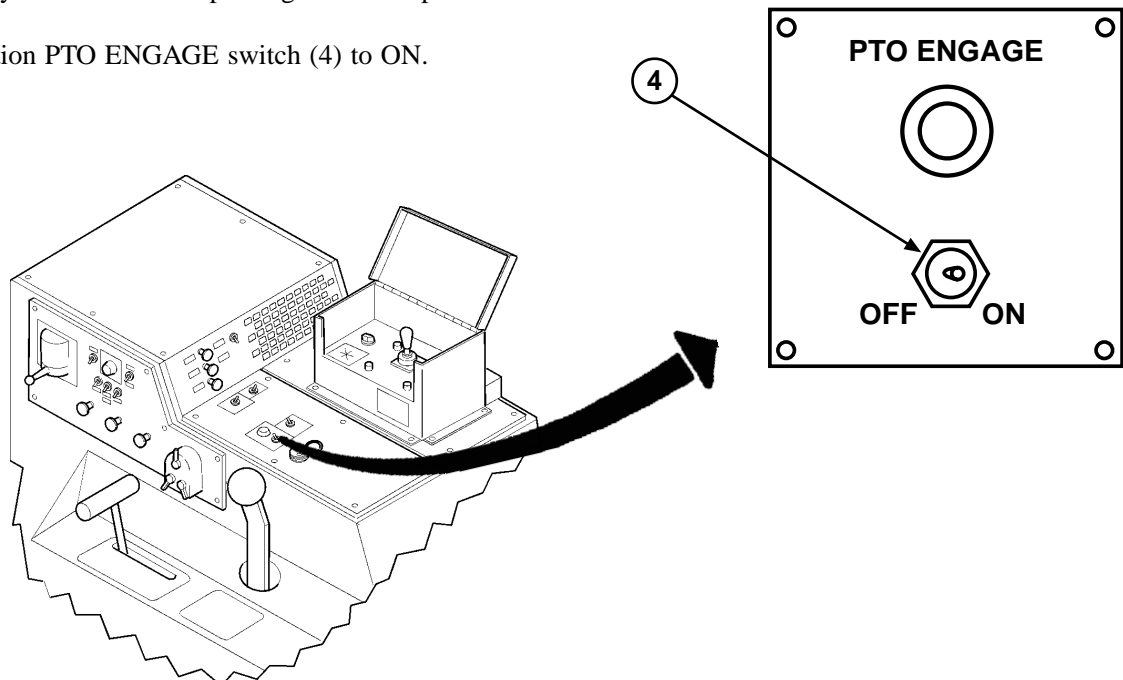
### CAUTION

**The BAP hold-down locks must be unlocked before loading the BAP. Loading the BAP with the hold-down locks engaged could result in damage to equipment.**

- c. Make sure BAP hold-down locks (3) are in the auto engage position (handle pushed in).



- d. Back up Transporter so that at least 5 feet (1.5 m) of clearance is available behind Transporter for loading the BAP.
- e. Apply service brake or parking brake and place transmission in neutral.
- f. Position PTO ENGAGE switch (4) to ON.

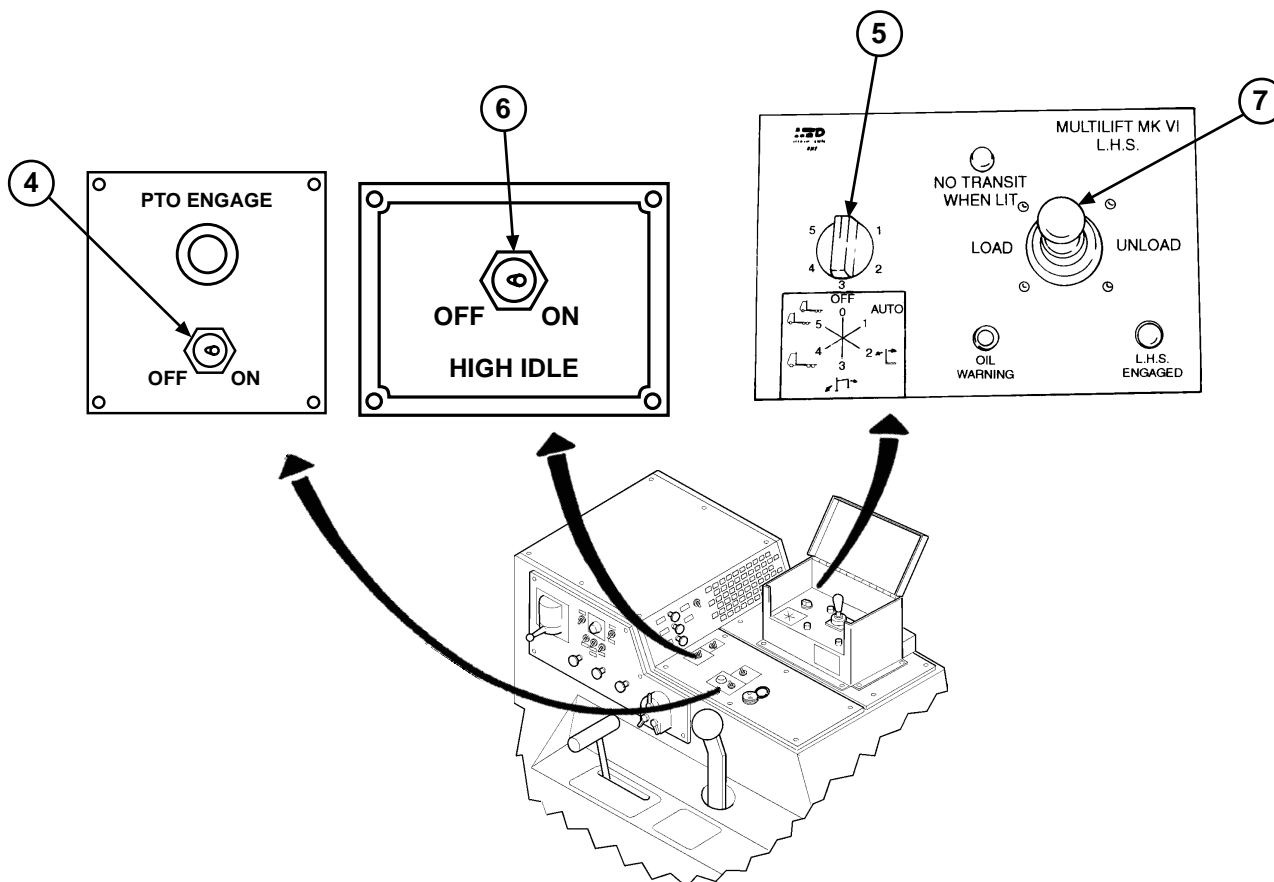


**2-27. MANUALLY LOADING THE BAP FROM THE GROUND (continued).**

**CAUTION**

- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

- g.* Turn LHS MODE SELECT switch (5) to HOOK ARM ONLY (position 2).
- h.* Position HIGH IDLE switch (6) to ON.
- i.* To raise and move hook arm toward the BAP, move joystick (7) to UNLOAD and hold.
- j.* Release joystick (7) when hook arm completes full movement rearward.
- k.* Turn HIGH IDLE switch (6) to OFF.



**2-27. MANUALLY LOADING THE BAP FROM THE GROUND (continued).**

- l. Turn LHS MODE SELECT switch (5) to MAIN FRAME ONLY (position 3).
- m. Turn HIGH IDLE switch (6) to ON.

**NOTE**

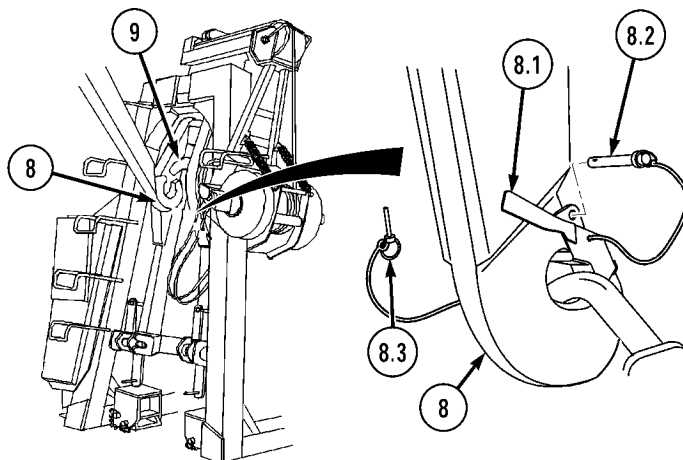
When LHS hook moves below level of BAP hook bar, release joystick.

- n. To raise and move main frame toward the BAP, move joystick (7) to UNLOAD and hold.
- o. Position HIGH IDLE switch (6) to OFF.
- p. Release Transporter service brake or parking brake.

**NOTE**

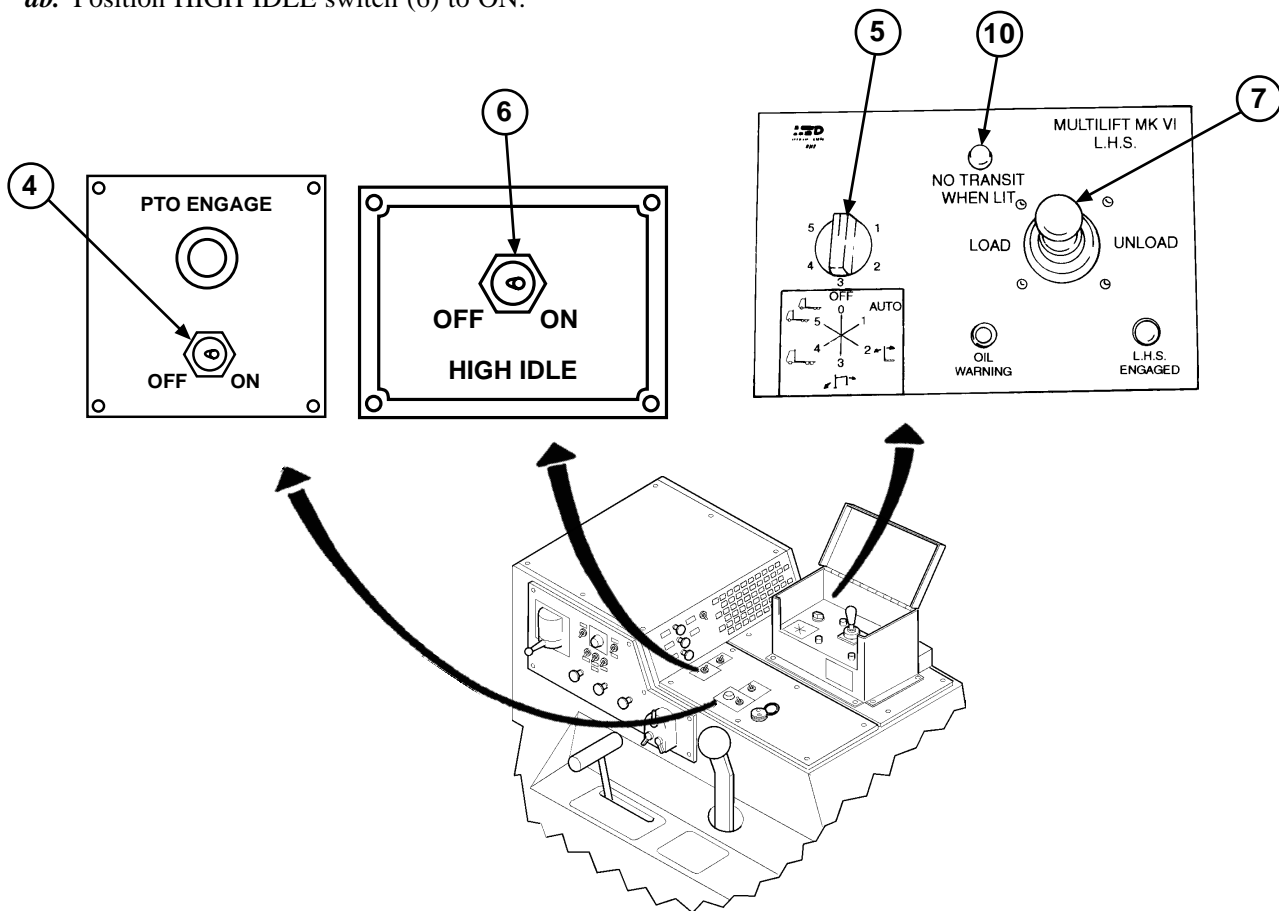
Have an assistant function as a ground guide.

- q. Back up Transporter until Transporter and the BAP are aligned.
- r. Make sure LHS hook tip (8) is slightly below and in line with the middle of the BAP hook bar (9).
- s. Apply service brake and place transmission in neutral.
- s.1 Move joystick (7) to LOAD, until LHS hook (8) engages BAP hook bar (9).
- t. If LHS hook and BAP hook bar are not properly aligned, perform the following steps:
  - (1) Deleted.
  - (2) Release Transporter service brake.
  - (3) Move Transporter away from the BAP.
  - (4) Repeat Steps d through s.1.
- t.1 Install bail bar lock (8.1) on LHS hook (8) with pin (8.2) and lock pin (8.3).
- u. Turn HIGH IDLE switch (6) to ON.
- v. Move joystick (7) to LOAD.



**2-27. MANUALLY LOADING THE BAP FROM THE GROUND (continued).**

- w. Steer Transporter under the BAP as the BAP rises to make sure BAP runners engage LHS rear rollers.
- x. Apply service brake when BAP runners contact LHS rear rollers.
- y. Move joystick (7) to LOAD and release when main frame is fully stopped.
- z. Position HIGH IDLE switch (6) to OFF.
- aa. Turn LHS MODE SELECT switch (5) to HOOK ARM ONLY (position 2).
- ab. Position HIGH IDLE switch (6) to ON.



**NOTE**

Hold joystick in LOAD position until the BAP is loaded.

- ac. To move and lower hook arm to stowed position, move joystick (7) to LOAD and hold.

## 2-27. MANUALLY LOADING THE BAP FROM THE GROUND (continued).

### WARNING

When **NO TRANSIT WHEN LIT** indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when **NO TRANSIT WHEN LIT** indicator is illuminated could result in death or injury to personnel or damage to equipment.

- ad.* Release joystick (7) when hook arm is fully stowed and the **NO TRANSIT WHEN LIT** indicator (10) light is off.
- ae.* Position **HIGH IDLE** switch (6) to **OFF**.
- af.* Set Transporter parking brake.

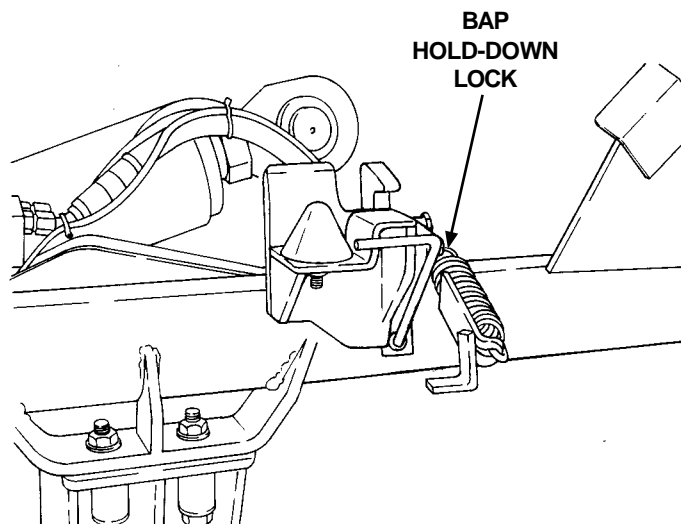
### CAUTION

While maneuvering Transporter in the immediate vicinity of the loading or unloading site, **LHS MODE SELECT** switch may be in any setting. However, **LHS MODE SELECT** switch must be set to **OFF/TRANSPORT** prior to road travel, to prevent damage to main frame and hook arm cylinders.

- ag.* Turn **LHS MODE SELECT** switch (5) to **OFF/TRANSPORT**.
- ah.* Position **PTO ENGAGE** switch (4) to **OFF**.

### NOTE

Make sure both **BAP hold-down locks** are in to the auto engage position (handles are pushed in).



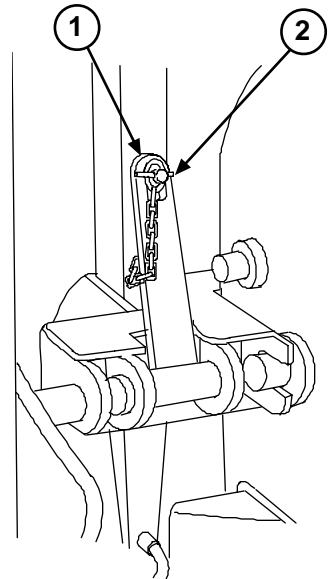
**2-28. MANUALLY UNLOADING THE BAP TO THE GROUND.**

**NOTE**

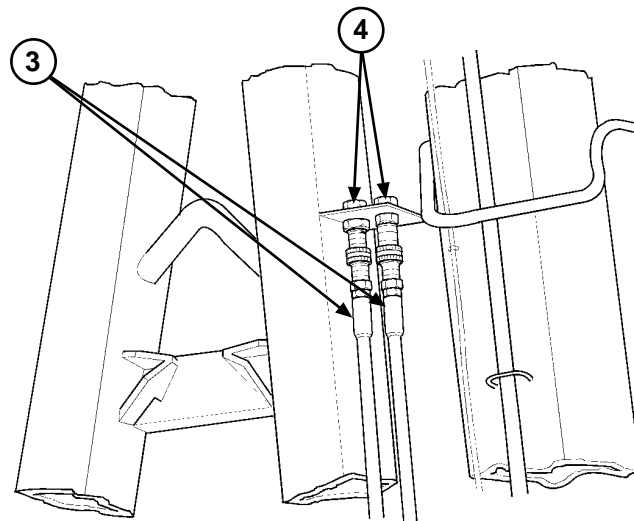
The following manual mode operations using the cab control box are to be performed only when the normal AUTO SEQUENCE mode electric circuit is malfunctioning.

- a.* Secure winch frame to the BAP. Make sure two winch frame locking levers (1) are in the up position. If locking levers (1) are not up:

- (1) Remove lockpin (2) from each locking lever (1).
- (2) Swing locking lever (1) to the up position.
- (3) Insert lockpin (2) into locking lever (1).



- b.* Connect two hydraulic hoses (3) to the stowed location connections (4).



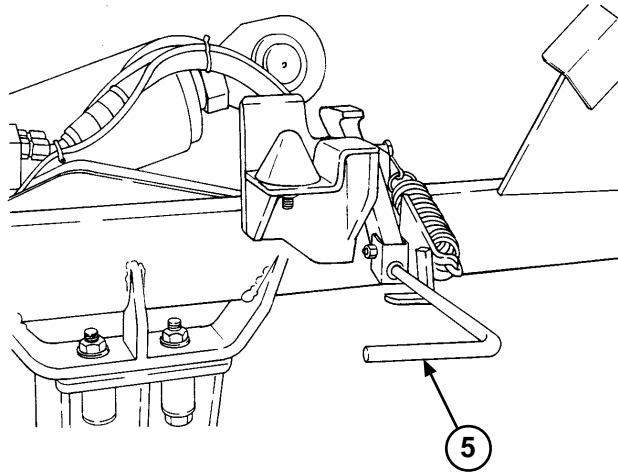
- c.* If the BAP is loaded, inspect load and make sure it is secure.
- d.* Drive Transporter to unloading area, apply service brake, and place transmission in neutral.

**2-28. MANUALLY UNLOADING THE BAP TO THE GROUND (continued).**

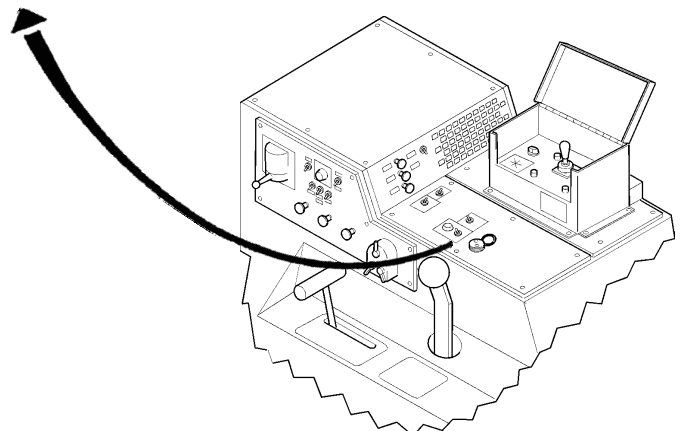
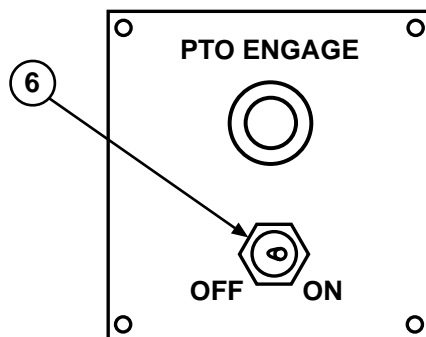
**CAUTION**

The BAP hold-down locks must be unlocked from the LHS prior to starting BAP unloading operations. Failure to release the hold-down locks could result in damage to equipment.

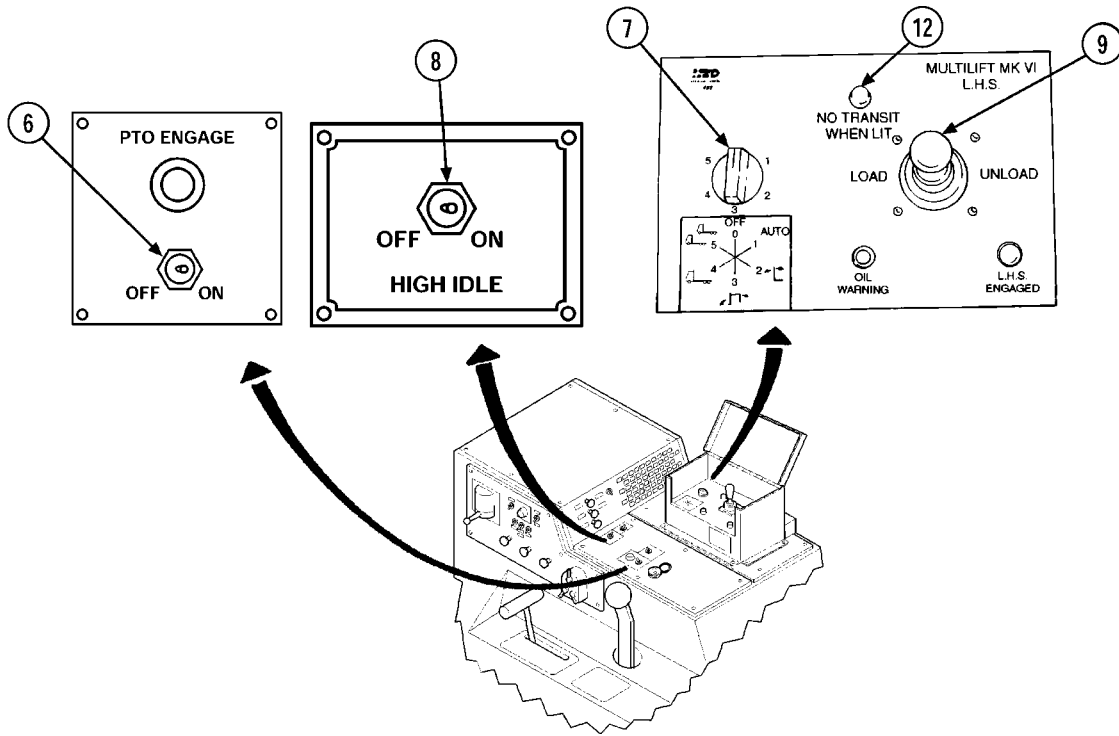
- e. Make sure BAP hold-down locks (5) are disengaged (handle pulled out).



- f. Position PTO ENGAGE switch (6) to ON.



**2-28. MANUALLY UNLOADING THE BAP TO THE GROUND (continued).**



**CAUTION**

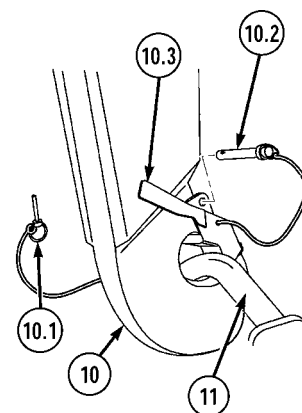
- When selecting PTO ENGAGE switch, engine must be at low idle speed. Selection of PTO ENGAGE switch with HIGH IDLE switch on may result in sudden application of hydraulic pressure to the LHS, resulting in damage to equipment.
- PTO ENGAGE switch must be turned off before road transport or severe equipment damage could result.

- g. Turn LHS MODE SELECT switch (7) to HOOK ARM ONLY (position 2).
- h. Position HIGH IDLE switch (8) to ON.
- i. Move joystick (9) to UNLOAD and hold while hook arm rises and moves the BAP to the rear. Release joystick (9) when hook arm completes its full movement rearward.
- j. Position HIGH IDLE switch (8) to OFF.
- k. Turn LHS MODE SELECT switch (7) to MAIN FRAME ONLY (position 3).
- l. Turn HIGH IDLE switch (8) to ON.
- m. Move joystick (9) to UNLOAD and hold until back edge of the BAP touches the ground.



**2-28. MANUALLY UNLOADING THE BAP TO THE GROUND (continued).**

- n. Immediately release service brake.
- o. Move joystick (9) to UNLOAD and continue unloading while allowing Transporter to roll forward. Release when front end of the BAP is about 1 foot (25.4 cm) off the ground.
- p. Position HIGH IDLE switch (8) to OFF.
- q. Move joystick (9) to UNLOAD and continue unloading until the BAP rests on the ground and weight of load is off LHS hook (10). Apply parking or service brake.
- q.1 Remove lock pin (10.1), pin (10.2), and bail bar lock (10.3) from LHS hook (10).
- q.2 Move joystick (9) to UNLOAD.
- q.3 Release joystick (9) when LHS hook (10) is slightly below BAP hook bar (11).
- r. Drive forward slowly about 6 inches (12.8 cm), stop Transporter, apply parking brake, and place transmission in neutral.
- s. Turn HIGH IDLE switch (8) to ON.
- t. Position joystick (9) to LOAD and release when main frame has stopped moving.
- u. Position HIGH IDLE switch (8) to OFF.
- v. Turn LHS MODE SELECT switch (7) to HOOK ARM ONLY (position 2).
- w. Position HIGH IDLE switch (8) to ON.
- x. Move joystick (9) to LOAD.

**WARNING**

**When NO TRANSIT WHEN LIT indicator is illuminated, Transporter may be maneuvered in the immediate vicinity of the loading/unloading site. However, Transporter is unsafe for road travel. Open-road driving when NO TRANSIT WHEN LIT indicator is illuminated could result in death or injury to personnel or damage to equipment.**

- y. Release joystick (9) when hook arm is fully stowed and the NO TRANSIT WHEN LIT indicator (12) light is off.
- z. Turn HIGH IDLE switch (8) to OFF.

**CAUTION**

**While maneuvering Transporter in the immediate vicinity of the loading or unloading site, LHS MODE SELECT switch may be in any setting. However, LHS MODE SELECT switch must be set to OFF/TRANSPORT prior to road travel, to prevent damage to main frame and hook arm cylinders.**

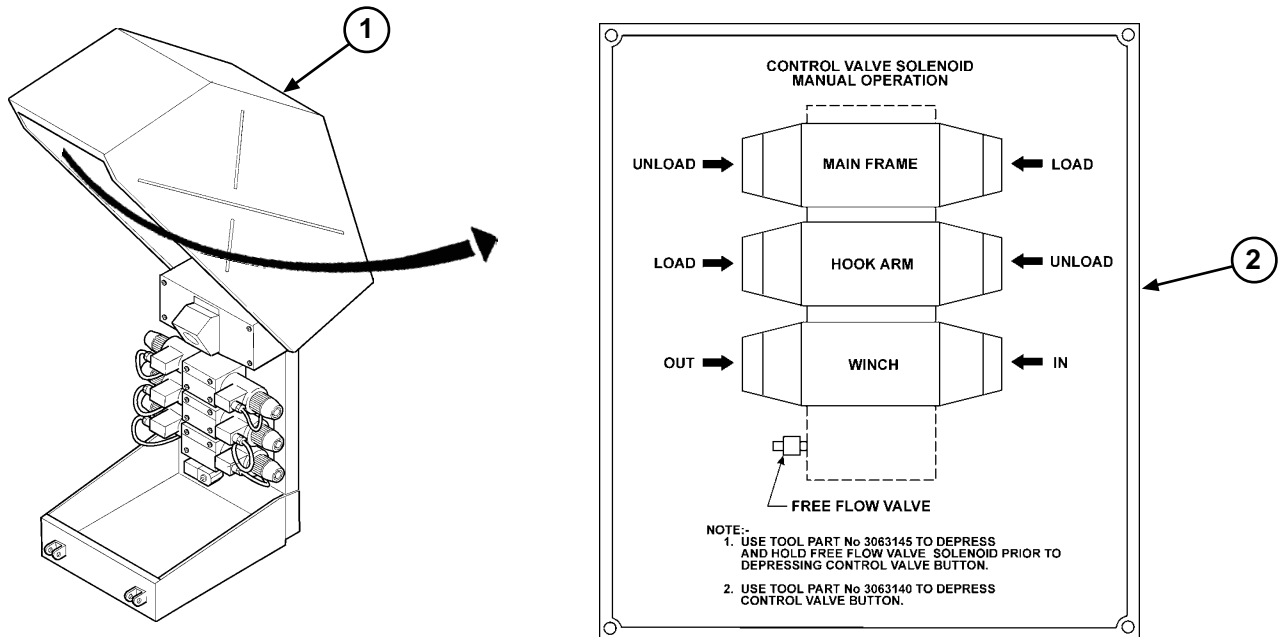
- aa. Turn LHS MODE SELECT switch (7) to OFF/TRANSPORT.
- ab. Position PTO ENGAGE switch (6) to OFF.

**2-29. MANUALLY BYPASSING SOLENOID DURING ELECTRIC POWER LOSS.**

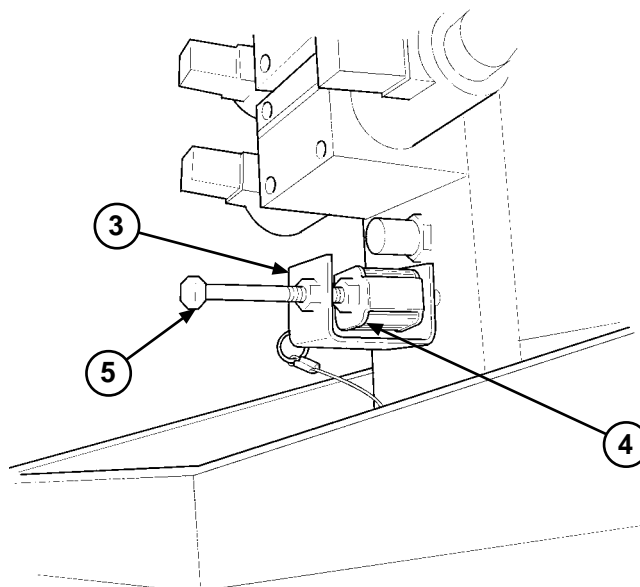
**NOTE**

- Manual mode operations using the cab control box are to be performed only when the normal AUTO mode electric circuit is malfunctioning.
- When determined necessary, the solenoid bypass procedure may be used to perform Transporter operations.

*a.* Open hydraulic manifold assembly cover (1). Placard (2) is on inside of cover (1).

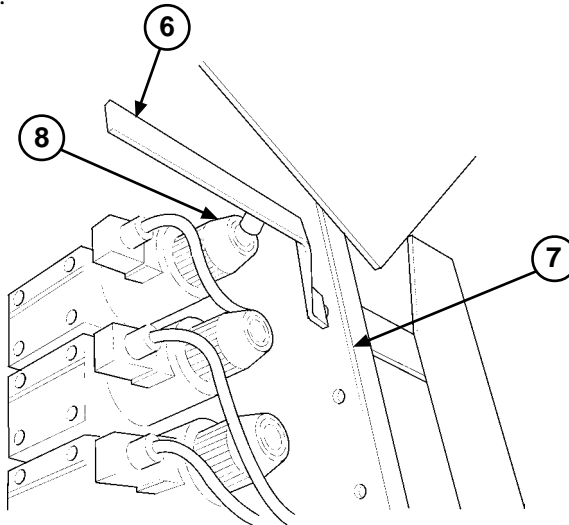


*b.* Install free-flow-valve tool (3) on free-flow valve (4) and tighten thumbscrew (5).



## 2-29. MANUALLY BYPASSING SOLENOID DURING ELECTRIC POWER LOSS (continued).

- c. Refer to and perform the appropriate operational procedures with the following exceptions: When the procedure directs the operation of the remote control unit or the cab controls, use the manual valve plunger tool (6), follow the placard (2), and perform the operation within the control valve layout of the hydraulic manifold assembly. Fit plunger tool (6) in appropriate hole in hydraulic manifold assembly (7) and press plunger tool (6) into solenoid button (8).



## 2-30. PREPARATION FOR EMERGENCY MANUAL REMOVAL OF THE BAP.

### WARNING

**Do not lift a load greater than the rated load capacity of the crane or material-handling equipment. Failure to heed this warning could result in death or injury to personnel or damage to equipment.**

### CAUTION

**The main frame of the LHS must be in fully stowed position. Attempting to lift the BAP with main frame not stowed could result in damage to equipment.**

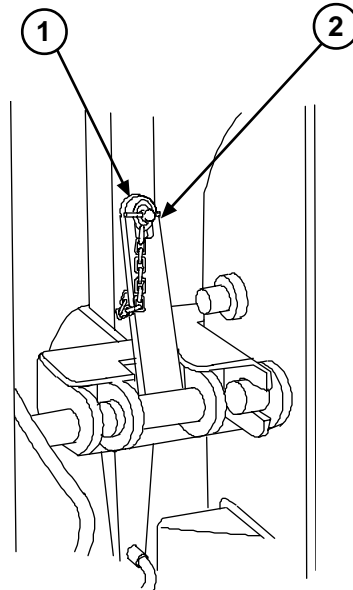
### NOTE

- Manual mode operations using the cab control box are to be performed only when the normal AUTO mode electric circuit is malfunctioning.
  - This procedure is performed when a loaded BAP must be removed using a crane or other handling system and must be done with the help of a higher maintenance level.
  - The BAP weighs 5,810 pounds (2,637 kg). The BAP with bridge bay weighs 24,148 pounds (10,963 kg).
- a. Make sure main frame is fully stowed.
- b. Make sure that, if necessary, main frame is lowered using loading button of the solenoid bypass procedure as necessary (para 2-29).

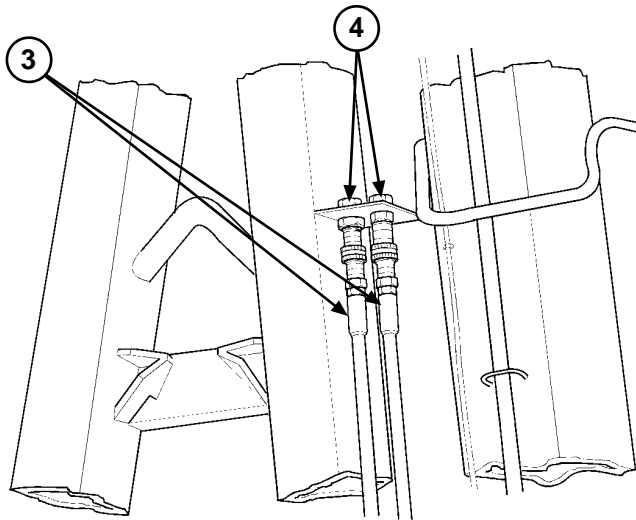
**2-30. PREPARATION FOR EMERGENCY MANUAL REMOVAL OF THE BAP  
(continued).**

c. Secure winch frame to the BAP. Make sure two winch frame locking levers (1) are in the up position. If locking levers (1) are not up:

- (1) Remove lockpin (2) from each locking lever (1).
- (2) Swing locking lever (1) to the up position.
- (3) Insert lockpin (2) into locking lever (1).



d. Connect two hydraulic hoses (3) to the stowed location connections (4).

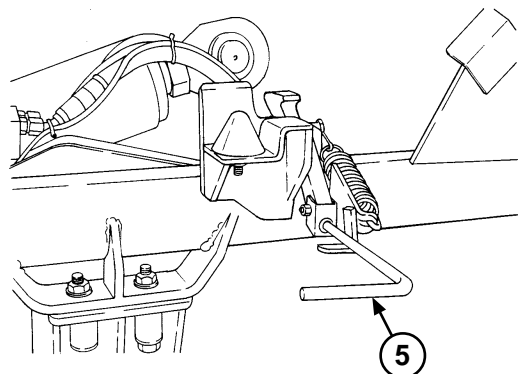


e. If the BAP is loaded, inspect load and make sure it is secure.

**CAUTION**

**The BAP hold-down locks must be unlocked from the LHS prior to starting BAP unloading operations. Failure to release hold-down locks could result in damage to equipment.**

f. Release BAP hold-down locks by pulling out handle (5).

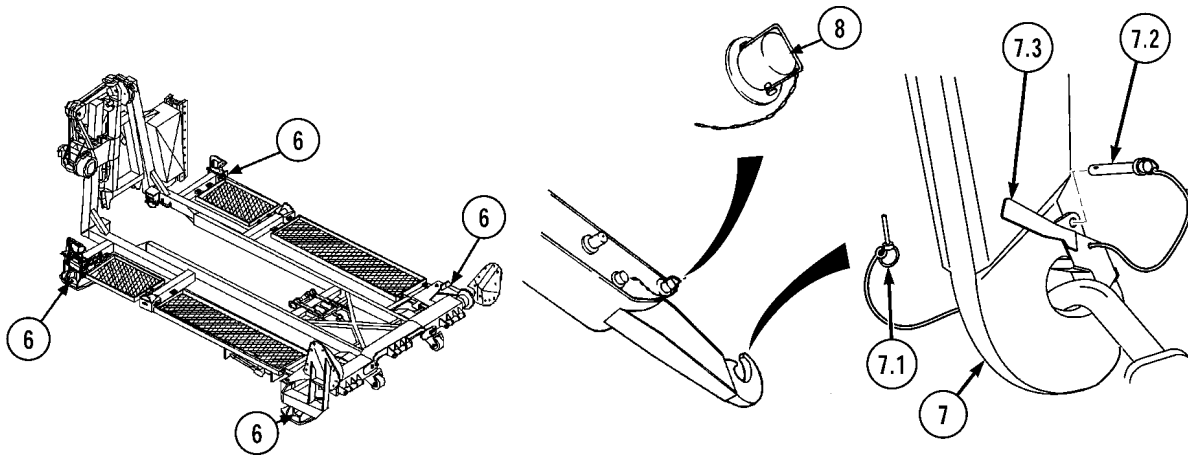


**2-30. PREPARATION FOR EMERGENCY MANUAL REMOVAL OF THE BAP (continued).**

**CAUTION**

The BAP is front-heavy. Arrange cable length accordingly or damage to equipment may occur.

- g. Assist crane operator in securing four-legged sling to BAP lifting eyes (6) and to crane or other materiel-handling-system hook.
- g.1 Remove locking pin (7.1), pin (7.2), and bail bar lock (7.3) from LHS hook (7).
- h. Remove hook arm locking pin (8).



**WARNING**

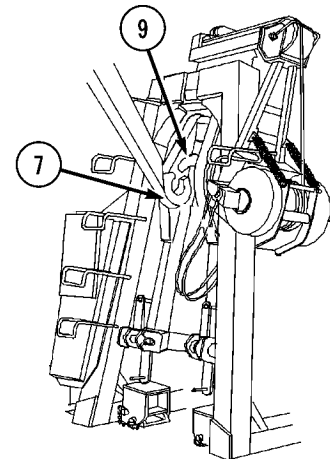
A loaded BAP will not rise due to LHS hook being engaged to the BAP. To avoid injury to personnel, personnel should stand clear of loaded BAP.

- i. Have crane operator perform steps 1 through 8.
  - (1) Using a crane, raise sling until tension is on sling and weight of the BAP is removed from Transporter.

**WARNING**

LHS hook arm is heavy and will fall free when the BAP is moved rearward. Stay clear of hook when moving the BAP; otherwise death or injury to personnel or damage to equipment could occur.

- (2) Move the BAP rearward until LHS hook (7) drops free of BAP hook bar (9).
- (3) Raise loaded BAP until it clears the LHS.
- (4) Move loaded BAP away from Transporter.
- (5) Set loaded BAP on the ground.
- (6) Remove sling lifting eye from hook on crane.
- (7) Remove four legs of sling from BAP lifting eye (6).
- (8) Stow sling.



**2-31. MANUALLY REMOVING LOAD DURING HYDRAULIC POWER LOSS.**

**NOTE**

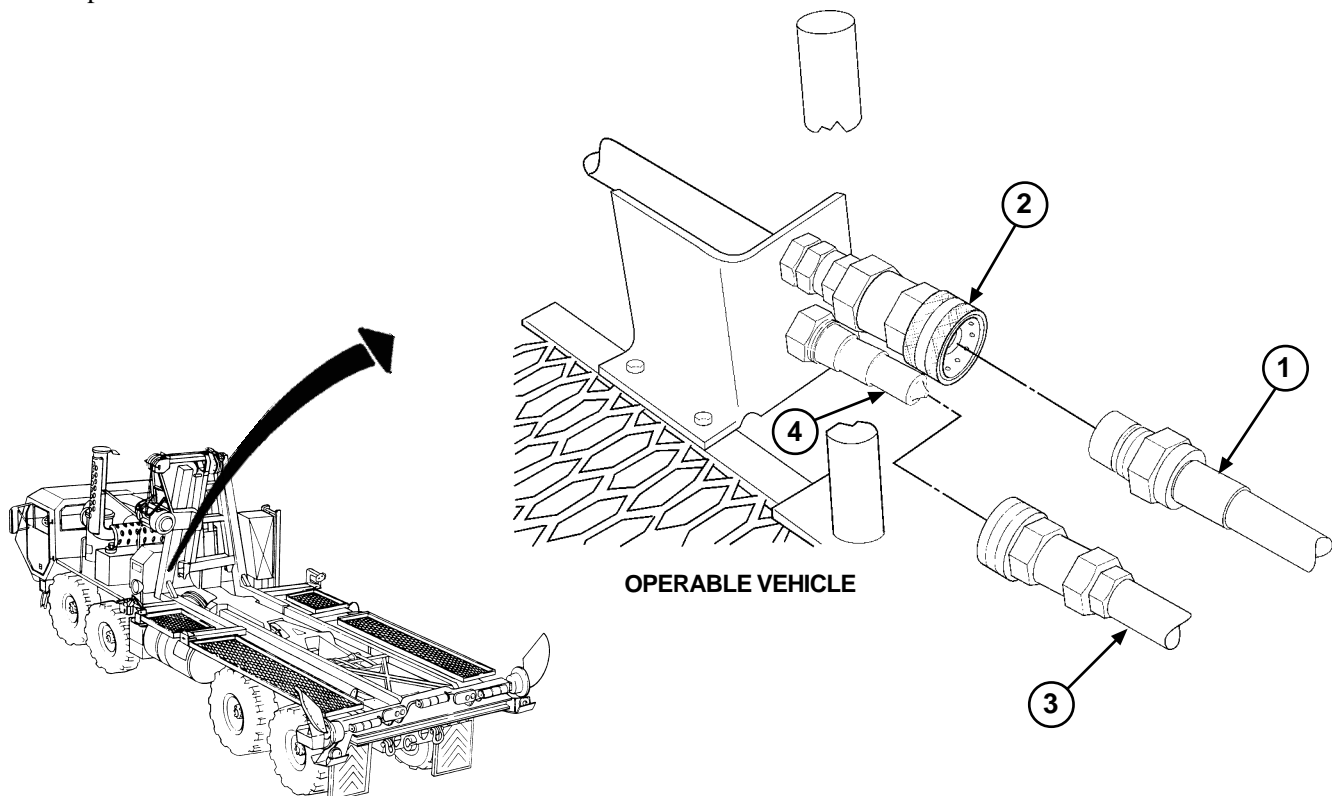
- Manual mode operations using the cab control box are to be performed only when the normal AUTO SEQUENCE mode electric circuit is not operating.
- This procedure is used to remove the load from a Transporter with a failed hydraulic system or other failure that prevents operation of the hydraulic system.
- Each Transporter is equipped with one hose. Two hoses (one from each vehicle) are required.

- a.* Move vehicles into position so LHS control boxes on both vehicles are side by side.
- b.* Shut off engines on both vehicles.
- c.* Disconnect hydraulic lines on both vehicles at quick disconnect located just forward of workstation behind engine.

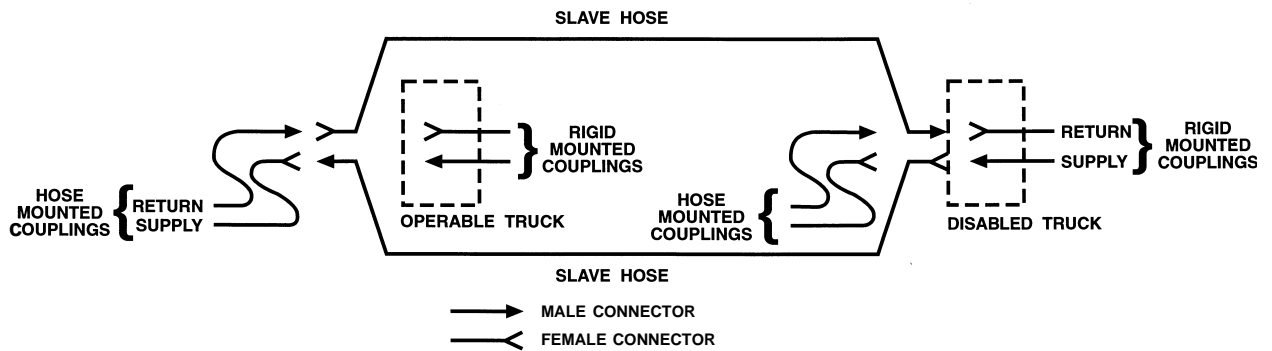
**NOTE**

Make sure to connect disabled vehicle's female end of slave hose to rigid mounted male end of supply hose on disabled vehicle and to connect male end of disabled vehicle's slave hose to rigid mounted female end of return hose on disabled vehicle.

- d.* Connect disabled vehicle's male end of slave hose (1) to hose-mounted female end of supply hose (2) on operable vehicle.



**2-31. MANUALLY REMOVING LOAD DURING HYDRAULIC POWER LOSS (continued).**



- e.* Connect female end of disabled vehicle's slave hose (3) to hose-mounted male end of return hose (4) on operable vehicle.
- f.* Start engines of both vehicles.
- g.* Turn light control switch of both vehicles to STOP LIGHT position.
- h.* Engage PTO ENGAGE switch on operable vehicle to ON.

**CAUTION**

**Make sure slave hoses are not stretched or run over during operations.**

- i.* Continue the load/unload operations using operable vehicles' controls.
- j.* After completion of load cycle, disconnect and store hydraulic hoses.

<p><b>2-32. NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES.</b></p>
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The CBT is capable of being operated by personnel wearing nuclear, biological, or chemical (NBC) protective clothing without special tools or supporting equipment. Refer to FM 3-5 for information on decontamination procedures. Specific procedures for the CBT are as follows:

- a.* Rubber sleeves and other rubber items, rope, and gaskets will absorb and retain chemical agents. Replacement of these items is the recommended method of decontamination.
- b.* Lubricants or fluids may be present on the external surfaces of the CBT or its components due to leaks or normal operation. These fluids will absorb NBC agents. The preferred method of decontamination is removal of these fluids using conventional decontamination methods in accordance with FM 3-5.
- c.* Continued decontamination of the external CBT surfaces with supertropical bleach (STB)/decontamination solution number 2 (DS2) will degrade clear plastic (e.g., hydraulic fluid reservoir sight glass) to the point where looking through it will become impossible. This problem will become more evident for soldiers wearing protective masks. Therefore, the use of STB or DS2 decontamination in the area of clear plastic should be minimized. Clear plastic should be decontaminated with warm, soapy water.
- d.* External surfaces of the CBT and the remote control unit that are marked with painted or stamped lettering will not withstand repeated decontamination with STB or DS2 without degradation of this lettering. Therefore, the recommended method of decontamination for these areas is warm, soapy water.
- e.* Areas that will entrap contaminants, making efficient decontamination extremely difficult, include the following:
  - (1) Exposed heads of screws.
  - (2) Areas adjacent to and behind exposed hydraulic lines.
  - (3) Hinged areas or access doors on the stowage boxes.
  - (4) Retaining chains for lynch pins and lockpins.
  - (5) Areas around the tiedowns, lifting rings, crevices around access doors, external valves and drains, and exposed hydraulic connectors.
  - (6) Areas behind knobs, levers, externally mounted equipment, specification and advisory data plates, and roller and locking mechanisms.
  - (7) Winch cable and winch hook assembly.

Replacement of these items, if items are available, is the preferred method of decontamination. Conventional methods of decontamination should be used on these areas, while stressing the importance of thoroughness and the probability of some degree of continuing contact and vapor hazard.

- f.* To reduce the effects of contamination in an NBC-contaminated environment, the CBT should be operated with all windows, doors, and stowage boxes closed.
- g.* For additional NBC information, refer to FM 3-3 and FM 3-4.



# CHAPTER 3

## OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Para	Contents	Page
Section I. Lubrication Instructions		
3-1	Lubrication Instructions .....	3-1
Section II. Operator/Crew Troubleshooting Procedures		
3-2	Troubleshooting Introduction .....	3-2
3-3	Troubleshooting Symptoms .....	3-2
	Malfunction Index .....	3-3
	Table 3-1. Operator/Crew Troubleshooting .....	3-4
Section III. Operator/Crew Maintenance Procedures		
3-4	General .....	3-12
3-5	BAP Ladder Stowage ....(Deleted).....	3-12 ■
3-6	BAP PLS Foot Stowage .....	3-14
3-7	HEMTT Ladder Stowage (Model A Only) .....	3-14.2
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### Section I. LUBRICATION INSTRUCTIONS

#### **3-1. LUBRICATION INSTRUCTIONS.**

Lubrication instructions are in Appendix G of this technical manual. All lubrication instructions are mandatory. For lubrication instructions for the M977 Heavy Expanded Mobility Tactical Truck (HEMTT), refer to LO 9-2320-279-12.

## Section II. OPERATOR/CREW TROUBLESHOOTING PROCEDURES

### **3-2. TROUBLESHOOTING INTRODUCTION.**

Table 3-1 (p. 3-4) lists common malfunctions that you may find with your equipment. Perform the tests, inspections, and corrective actions in the order they appear in the table. This table cannot list all malfunctions that may occur, all tests or inspections needed to find the fault, or all corrective actions needed to correct the fault. If a malfunction is not listed or the actions listed do not correct the fault, notify your supervisor.

### **3-3. TROUBLESHOOTING SYMPTOMS.**

To quickly find a troubleshooting procedure, use the Malfunction Index (p. 3-3). Table 3-1 contains the Operator/Crew Troubleshooting steps.

# MALFUNCTION INDEX

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TROUBLESHOOTING PROCEDURE	PAGE
1. BAP Center Roller and/or Transload Rollers Will Not Operate .....	3-4
2. BAP Front Pin Lock Air Release Will Not Operate During Launch of Bridge Bay .....	3-6
3. BAP Winch Assembly Will Not Wind Out .....	3-7
4. BAP Winch Assembly Will Not Wind In .....	3-8
5. BAP Winch Assembly Will Not Lift Load or Operates Slowly .....	3-9
6. BAP Front Pin Lock Will Not Align with Bridge Bay Pin .....	3-11

**Table 3-1. Operator/Crew Troubleshooting**

Malfunction	Test or Inspection	Corrective Action
<p><b>1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE.</b></p>		
Step 1.	Check position of hand pump selector lever (1):	<ul style="list-style-type: none"> <li>• To operate center roller assembly (2), lever (1) must be in up position.</li> <li>• To operate transload roller extension cylinders (3), lever (1) must be in down position.</li> <li>• If lever (1) is in center position (OFF), neither will work.</li> </ul>
Step 2.	Place lever (1) in the proper position to operate the center or transload roller positions, as required.	

Table 3-1. Operator/Crew Troubleshooting (continued)

Malfunction	Test or Inspection	Corrective Action
<b>1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).</b>		
Step 3.	Operate hand pump handle and watch to see if center roller assembly (2) rises.	<ul style="list-style-type: none"> <li>• With lever (1) in the up position, center roller assembly (2) should rise.</li> <li>• With lever (1) in the down position, transload roller extension cylinders (3) should extend out.</li> <li>• If desired action(s) is not observed or if leaks are noted, notify Unit maintenance.</li> </ul>
Step 4.	Check for leaks in hydraulic lines, fittings, and components.	<ul style="list-style-type: none"> <li>• If leaks are noted, notify Unit maintenance.</li> </ul>
Step 5.	Check hydraulic fluid level in hand pump.	<ul style="list-style-type: none"> <li>• If fluid is low, notify Unit maintenance.</li> </ul>
Step 6.	If problem is not resolved, notify Unit maintenance.	

Table 3-1. Operator/Crew Troubleshooting (continued)

Malfunction	Test or Inspection	Corrective Action
<p><b>2. BAP FRONT PIN LOCK AIR RELEASE WILL NOT OPERATE DURING LAUNCH OF BRIDGE BAY.</b></p>		
<p>The diagram illustrates a vehicle with a bridge bay. A circular inset provides a detailed view of the air line quick-disconnect connector (1) and the CBT air system quick-disconnect connectors (2). The inset shows the connector (1) being inserted into the CBT air system quick-disconnect connectors (2).</p>		
<p>STEP 1. Make sure BAP air line quick-disconnect connector (1) is properly connected to CBT air system quick-disconnect connectors (2).</p> <ul style="list-style-type: none"> <li>• Disconnect and reconnect quick-disconnect connector (1).</li> <li>• If locks do not work or if an air leak is heard, notify Unit maintenance.</li> <li>• If front pin locks do not work during air-release procedure, manually release front locks to deploy bridge bay (para 2-12). Notify Unit maintenance upon completion of mission.</li> </ul>		

**Table 3-1. Operator/Crew Troubleshooting (continued)**

Malfunction	Test or Inspection	Corrective Action
<b>3. BAP WINCH ASSEMBLY WILL NOT WIND OUT.</b>		
Step 1.	Make sure BAP winch assembly switch (1) on remote control unit (2) is set to OUT.	
Step 2.	Check for leaks in BAP winch hydraulic lines and fittings.	
		<ul style="list-style-type: none"> <li>• If leaks are noted, notify Unit maintenance.</li> <li>• If no leaks are noted, go to Step 3.</li> </ul>
Step 3.	Make sure BAP winch hydraulic lines quick-disconnect connectors (3) are properly connected to CBT hydraulic system quick-disconnect connectors (4).	
		<ul style="list-style-type: none"> <li>• Disconnect and reconnect quick-disconnect connectors (3).</li> <li>• If winch still does not work, go to Step 4.</li> </ul>
Step 4.	Check remote control at receptacle (5) on opposite side of Transporter.	
		<ul style="list-style-type: none"> <li>• If winch still does not work, notify Unit maintenance.</li> </ul>

Table 3-1. Operator/Crew Troubleshooting (continued)

Malfunction	Test or Inspection	Corrective Action
<b>4. BAP WINCH ASSEMBLY WILL NOT WIND IN.</b>		
Step 1.	Make sure BAP winch assembly switch (1) on remote control unit (2) is set to IN.	
Step 2.	Check for leaks in BAP winch hydraulic lines and fittings.	
	<ul style="list-style-type: none"> <li>• If leaks are noted, notify Unit maintenance.</li> <li>• If no leaks are noted, go to Step 3.</li> </ul>	
Step 3.	Make sure BAP winch hydraulic lines quick-disconnect connectors (3) are properly connected to CBT hydraulic system quick-disconnect connectors (4).	
	<ul style="list-style-type: none"> <li>• Disconnect and reconnect quick-disconnect connectors (3).</li> <li>• If winch still does not work, go to Step 4.</li> </ul>	
Step 4.	Check remote control at receptacle (5) on opposite side of Transporter.	
	<ul style="list-style-type: none"> <li>• If winch still does not work, notify Unit maintenance.</li> </ul>	



**Table 3-1. Operator/Crew Troubleshooting (continued)**

Malfunction	Test or Inspection	Corrective Action
<b>5. BAP WINCH ASSEMBLY WILL NOT LIFT LOAD OR OPERATES SLOWLY.</b>		
<b>NOTE</b>		
<p>Perform the following check by operating the CBT/winch with a load in place.</p>		
Step 1.	<p>With load attached to hook (1) on winch cable (2), set BAP winch switch (3) on remote control unit (4) to IN.</p>	<ul style="list-style-type: none"> <li>• If cable will not lift the load or operates slowly, go to Step 2.</li> </ul>
Step 2.	<p>Check for any binding of or obstructions to winch cable (2) and/or loose or missing winch mounting hardware (5, 6, and 7).</p>	
Step 3.	<p>Check fluid level in BAP winch (Appendix G). Notify Unit maintenance if fluid level is low.</p>	
Step 4.	<p>Check for leaks in the BAP or for other obvious damage to winch hydraulic lines and fittings.</p>	<ul style="list-style-type: none"> <li>• If leaks or damage are noted, notify Unit maintenance.</li> <li>• If no leaks or damage are noted, go to Step 5.</li> </ul>

Table 3-1. Operator/Crew Troubleshooting (continued)

Malfunction	Test or Inspection	Corrective Action
<p><b>5. BAP WINCH ASSEMBLY WILL NOT LIFT LOAD OR OPERATES SLOWLY (continued).</b></p>		
Step 5.	<p>Make sure BAP winch hydraulic lines quick-disconnect connectors (8) are properly connected to CBT hydraulic system quick-disconnect connectors (9).</p>	<ul style="list-style-type: none"> <li>• Disconnect and reconnect quick-disconnect connectors (8).</li> <li>• If winch still does not work properly, go to Step 6.</li> </ul>
Step 6.	<p>Check remote control at receptacle (10) on opposite side of Transporter.</p>	<ul style="list-style-type: none"> <li>• If winch works, complete the mission and notify Unit maintenance about remote station that does not work.</li> <li>• If winch still does not lift load, notify Unit maintenance.</li> </ul>

Table 3-1. Operator/Crew Troubleshooting (continued)

Malfunction	Test or Inspection	Corrective Action
<b>6. BAP FRONT PIN LOCK WILL NOT ALIGN WITH BRIDGE BAY PIN.</b>		
<p>Step 1. Make sure bridge bay (1) is sitting on all four roller assemblies (2).</p>		
<ul style="list-style-type: none"> <li>• If bridge bay (1) is not sitting on all four roller assemblies (2), unload bridge bay from the BAP and reload, ensuring that bridge bay is sitting on all four roller assemblies.</li> <li>• If BAP front pin lock (3) still will not align with bridge bay pin (4), notify Unit maintenance to adjust BAP front pin lock bracket (para 4-35).</li> </ul>		

Section III. OPERATOR/CREW MAINTENANCE PROCEDURES

3-4. GENERAL.

This section contains stowage procedures for the Bridge Adapter Pallet (BAP) ladder, the Palletized Load System (PLS) foot, and the Heavy Expanded Mobility Tactical Truck (HEMTT) ladder.

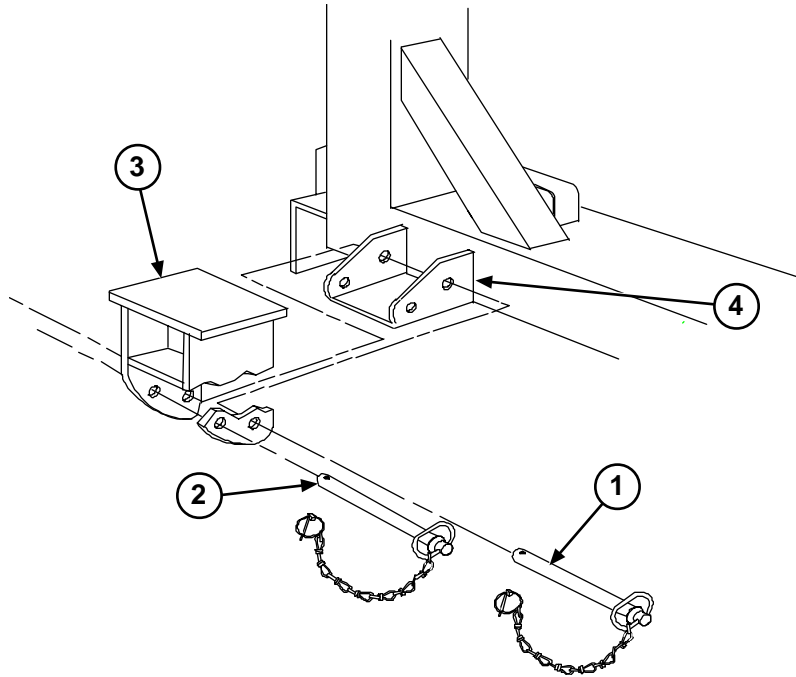
3-5. BAP LADDER STOWAGE. **(Deleted)**



**3-6. BAP PLS FOOT STOWAGE (continued).**

**b. Stowage.**

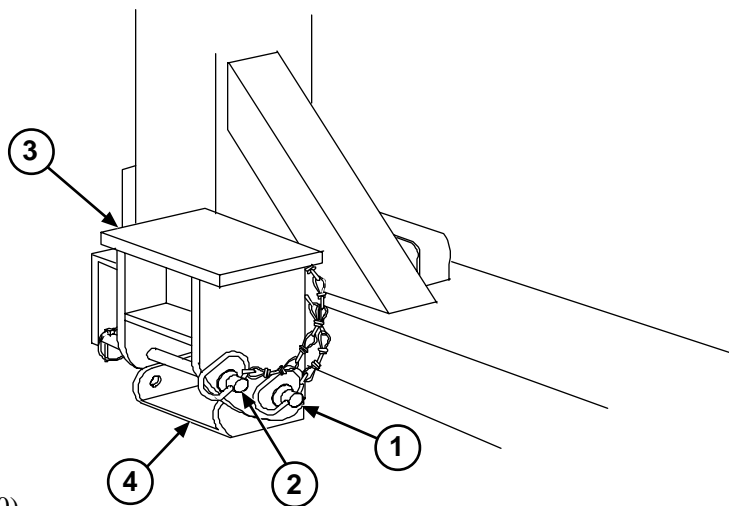
(1) Align PLS foot (3) with rear hole in frame bracket (4).



**NOTE**

Make sure hitch pin chains are stored between PLS foot and BAP frame.

(2) Install hitch pin (1) in rear hole of PLS foot (3) and frame bracket (4). Install hitch pin (2) in front hole of PLS foot (3) so that hitch pin (2) rests on frame bracket (4).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



### 3-7. HEMTT LADDER STOWAGE (MODEL A ONLY).

This task covers:

- a. Removal                                  b. Stowage                                  c. Follow-on Maintenance

#### INITIAL SETUP

##### *Equipment Condition*

Engine turned off (TM 9-2320-279-10)

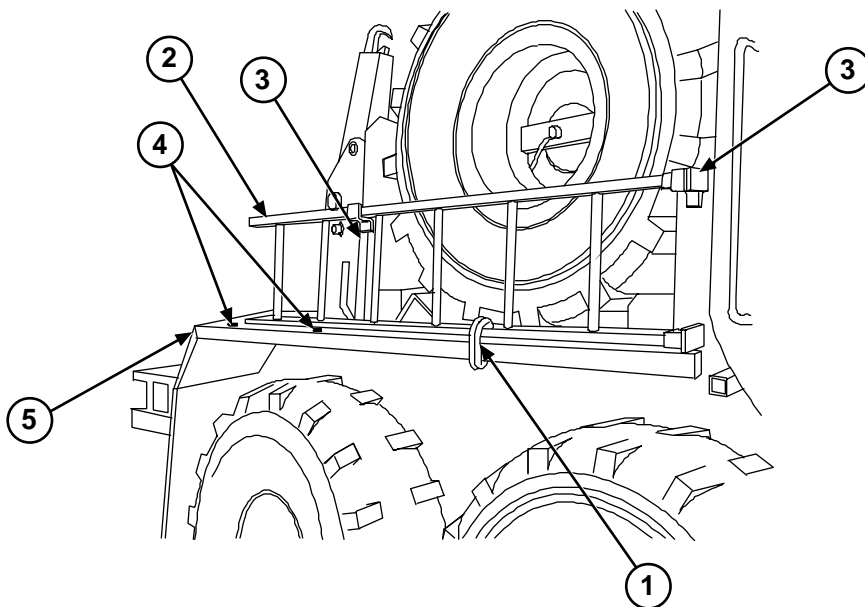
Wheels chocked (TM 9-2320-279-10)

#### **a. Removal.**

- (1) Unhook tiedown (1) from ladder (2).
- (2) Remove ladder (2) from two ladder brackets (3) and install in two holes (4) on fender (5).

#### **b. Stowage.**

- (1) Remove ladder (2) from two holes (4) on fender (5) and install on two ladder brackets (3), with feet of ladder (2) facing front of vehicle.
- (2) Wrap tiedown (1) around ladder (2), and hook tiedown (1) to fender (5).



#### **c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

#### END OF TASK



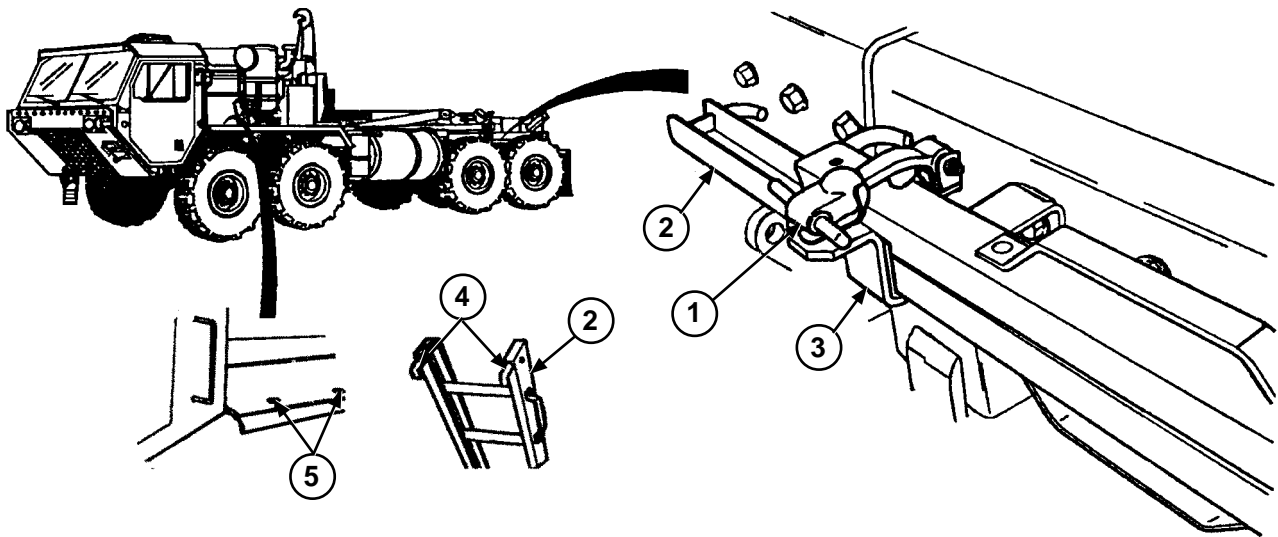
**3-7.1 USE ACCESS LADDER (MODEL B ONLY).**

This task covers:

- a. Removal                                      b. Stowage                                      c. Follow-on Maintenance

**INITIAL SETUP***Equipment Condition*

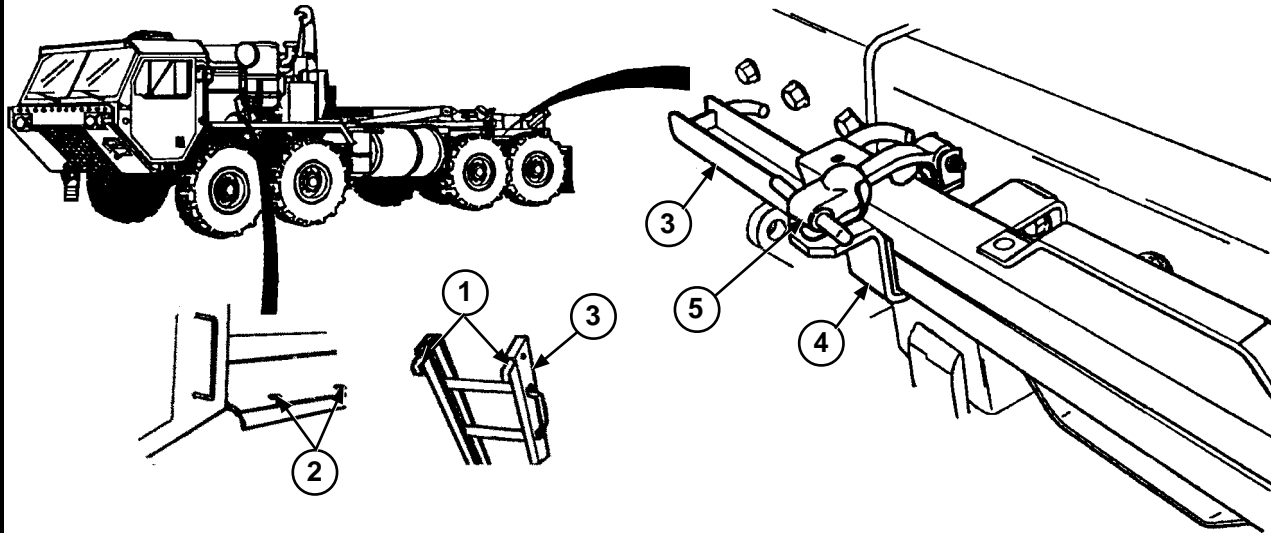
- Engine turned off (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)

**a. Removal.**

- (1) Pull rubber hooks (1) out and up.
- (2) Remove ladder (2) from ladder brackets (3).
- (3) Open ladder (2).
- (4) Install access ladder hooks (4) in left front fender holes (5).

**3-7.1 USE ACCESS LADDER (MODEL B ONLY) (continued).**

***b. Stowage.***



- (1) Remove access ladder hooks (1) from left front fender holes (2).
- (2) Close ladder (3).
- (3) Install ladder (3) in ladder brackets (4).
- (4) Connect rubber hooks (5).

***c. Follow-on Maintenance:***

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**3-8. STENCILS.**

This task covers:

- a. Stencil Application
- b. Follow-on Maintenance

**INITIAL SETUP**

**Equipment Condition**

Engine turned off (TM 9-2320-279-10)

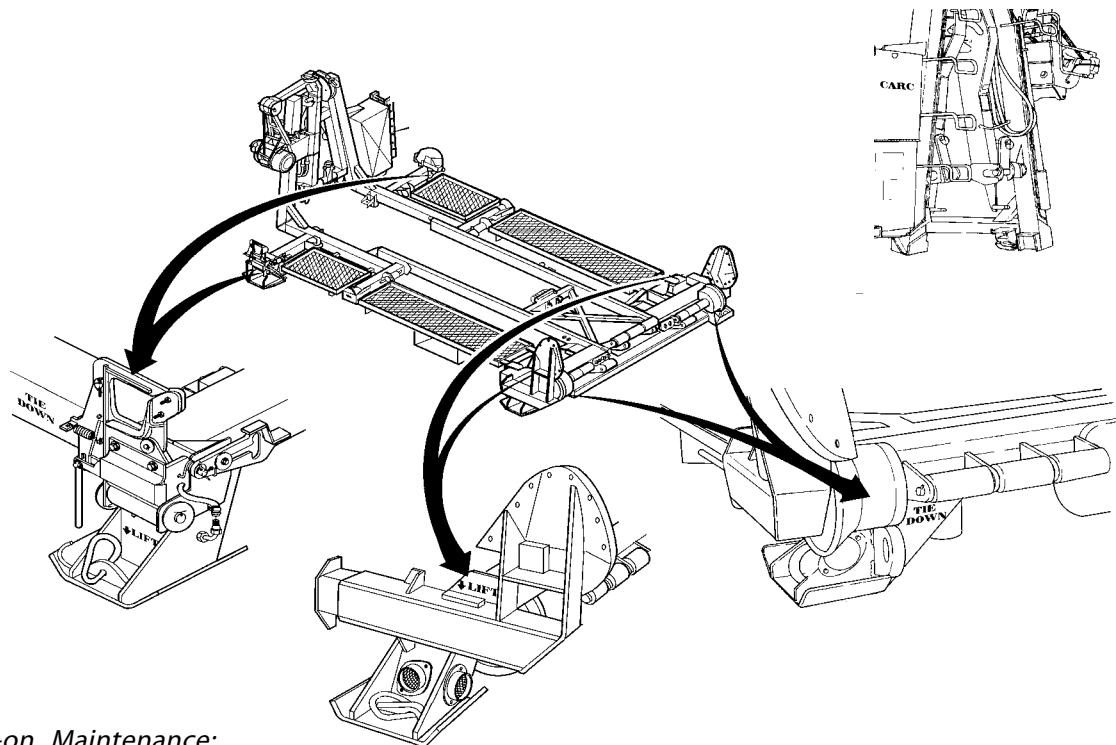
Wheels chocked (TM 9-2320-279-10)

*a. Stencil Application.*

**NOTE**

- Stencil locations (four each for TIE DOWN and LIFT , one for CARC) are shown below .
- Apply stencils to clean, painted surfaces only using CARC black paint.

Paint in accordance with MIL-T-704. For LIFT and CARC stencils, use 1-inch-high characters; for TIE DOWN stencils, use 3/4-inch-high characters.



*b. Follow-on Maintenance:*

- Remove wheel chocks (TM 9-2320-279-10).

END OF TASK



## CHAPTER 4

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**Section I. REPAIR PARTS; TOOLS; SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT**

**4-1. GENERAL.**

This section addresses repair parts, common and special tools, TMDE, and support equipment needed to perform Unit maintenance for the Common Bridge Transporter (CBT), Bridge Adapter Pallet (BAP), and Load Handling System (LHS).

**4-2. COMMON TOOLS AND EQUIPMENT.**

Common tools and equipment are issued to Unit maintenance personnel for maintaining the CBT System. The General Mechanic's Tool Kit (SC 5180-90-N26, national stock number 5180-00-177-7033) is required for all maintenance tasks. Common tools and equipment should not be used for purposes other than those prescribed and should be properly stored when not in use. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment, CTA 50-970 or CTA 8-100, as applicable to your unit.

**4-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.**

For a listing of special tools, TMDE, and support equipment, refer to Appendix B, "Maintenance Allocation Chart," and to Appendix F, "Repair Parts and Special Tools List."

**4-4. REPAIR PARTS.**

All repair parts are listed and illustrated in Appendix F. Mandatory replacement parts are also listed in the "Initial Setup" boxes of each task, with references to Appendix K, "Mandatory Replacement Parts."



**Section II. SERVICE UPON RECEIPT****4-5. GENERAL.**

This section provides or refers to the procedures required for Unit maintenance to ensure that the CBT System is adequately inspected and serviced and is operationally tested before being subjected to normal usage. When a new, used, or reconditioned CBT or BAP is received, determine whether it has been properly prepared for service and is capable of performing its mission by following the instructions in this section.

**4-6. SERVICE UPON RECEIPT OF MATERIEL.**

Upon receipt of a new CBT or BAP, the receiving unit must see if it has been properly prepared for service and is in good condition. Inspect all assemblies, subassemblies, and accessories to be sure they are in proper working order (Chapter 1). Secure, clean, and correctly adjust and/or lubricate as needed (Chapters 3 and 4 and Appendix G). Check all tools and equipment to make sure every item is accounted for and is in good condition, clean, and properly mounted or stowed.

**4-7. CABLE DIAGRAMS.**

Electric and hydraulic system schematics for the CBT can be found as foldout pages in Appendix J of this manual.

## Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**4-8. PMCS INTRODUCTION.**

- a.* General. Table 4-1, PMCS, has been provided so you can keep your equipment in good operating condition and ready for its primary mission. This PMCS table contains instructions for the BAP and the LHS only and does not cover the Heavy Expanded Mobility Tactical Truck (HEMTT) chassis. Refer to TM 9-2320-279-20-1 for HEMTT chassis PMCS instructions. The operator/crew PMCS in Chapter 2 must be performed before doing Unit-level PMCS. Lubricate the system in accordance with the instructions in Appendix G while performing checks and services.
- b.* Explanation of Columns:
1. **Item No.** Numbers in this column shall be used as a source of item numbers for the “TM Number” column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet), in recording the results of PMCS.
  2. **Interval.** This column tells you when to do a certain check or service. Semiannual PMCS must be performed every 6 months, and annual PMCS must be performed every 12 months.
  3. **Item To Check/Service.** This column tells you the item to be checked or serviced.
  4. **Procedure.** This column provides specific instructions for performing the checks or services.
  5. **Not Fully Mission Capable If:** This column tells you what faults will keep the CBT from being capable of performing its primary mission. If you perform a check or service that shows faults listed in this column, do not operate the CBT. Follow standard operating procedures for repairing the CBT or reporting equipment failure.
- c.* General Maintenance Procedures.

**WARNING**

- **Drycleaning solvent is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and DO NOT breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.**
- **If personnel become dizzy while using drycleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush them with water and get immediate medical attention.**
- **When drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.**
- **Do not use drycleaning solvent on winch rope (cable). Solvent will soak into rope strands and rust, causing rope to deteriorate. This may result in the rope breaking under normal loads and could cause death or injury to personnel.**

<b>4-8. PMCS INTRODUCTION (continued).</b>
--

1. **Cleanliness.** Dirt, grease, oil, and debris may get in the way and cover up a serious problem. Use drycleaning solvent on all metal surfaces and soapy water on rubber components, as necessary.
  2. **Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness and for missing, bent, or broken conditions. Look for chipped paint, bare metal, or rust around bolt heads. If any part seems loose, tighten it. If any part is broken or missing, replace it.
  3. **Welds.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If a bad weld is found, notify your supervisor.
  4. **Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure wires are in good condition. Repair/replace any bad wires or connectors.
  5. **Hydraulic Lines and Fittings.** Look for wear, damage, and leaks; make sure clamps and fittings are tight. Wet spots are an indication of leaks. Stains around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, repair it or replace it.
  6. **Damage.** Damage is defined as any condition that affects safety or would make the CBT unserviceable for mission requirements.
- d.** Fluid Leakage.
1. Leakage definitions:
 

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not enough to cause the drops to fall from the item being checked/inspected.
Class III	Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

**CAUTION**

- **Equipment operation is allowable with minor leaks (Class I or II). Of course, you must consider the fluid capacity of the item/system being checked/inspected. When in doubt, notify your supervisor.**
- **When operating with a Class I or II leak, frequently check the fluid level of the system.**
- **All leaks should be reported to your supervisor and repaired.**

#### **4-9. MANDATORY REPLACEMENT PARTS.**

No CBT Transporter or BAP items need to be replaced during PMCS.

#### **4-10. INITIAL SETUP.**

##### *Tools and Special Tools*

Shop Equipment, Automotive Maintenance and Repair: Common No. 1 (SC 4910-95-CL-A74)  
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

##### *Materials/Parts*

Drycleaning Solvent (Item 13, Appendix E)  
Grease, Automotive and Artillery (Item 17, Appendix E)

Lubricating Oil (Item 20, Appendix E)  
Rag, Wiping (Item 21, Appendix E)

##### *Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
Parking brake applied (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)

**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS)**

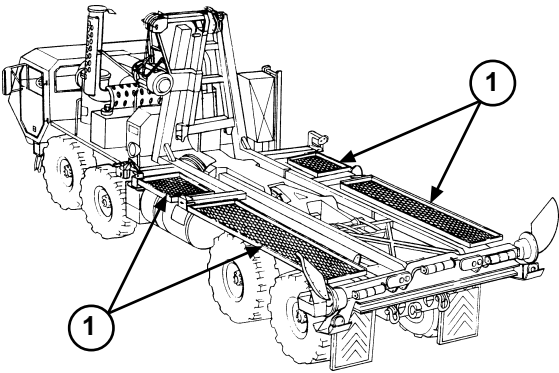
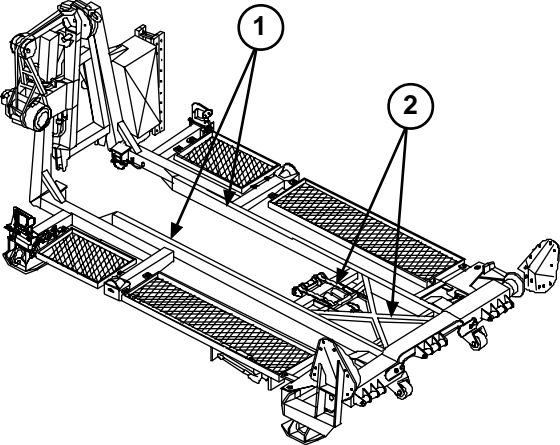
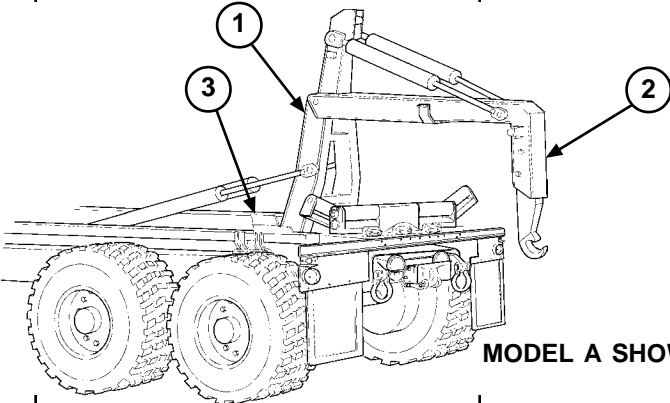
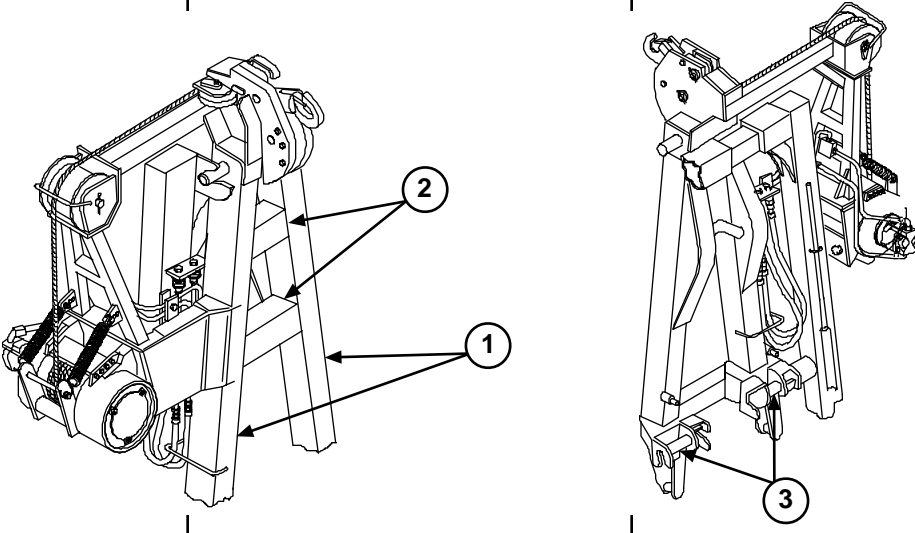
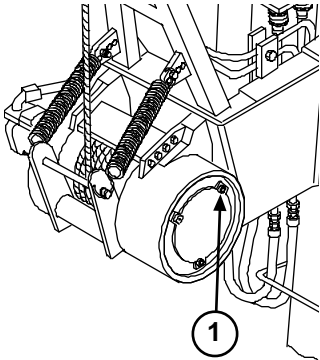
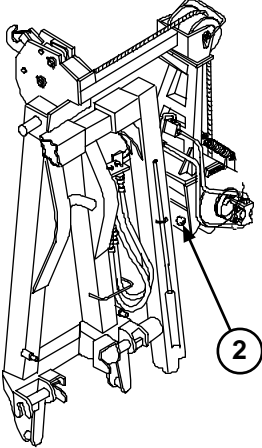
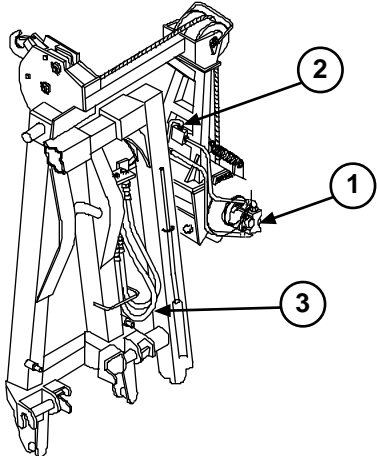
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
1	Semi-annual	Catwalk	<p>Inspect catwalk sections (1) for damaged or missing hardware.</p>  <p style="text-align: center;"><b>MODEL A SHOWN</b></p>	
2	Semi-annual	BAP Frame Assembly	<p>Check for damaged side rails (1) or crossmembers (2), or broken welds.</p> 	Side rails or crossmembers are damaged or welds are broken.

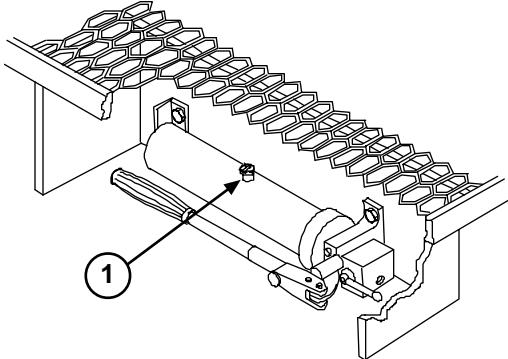
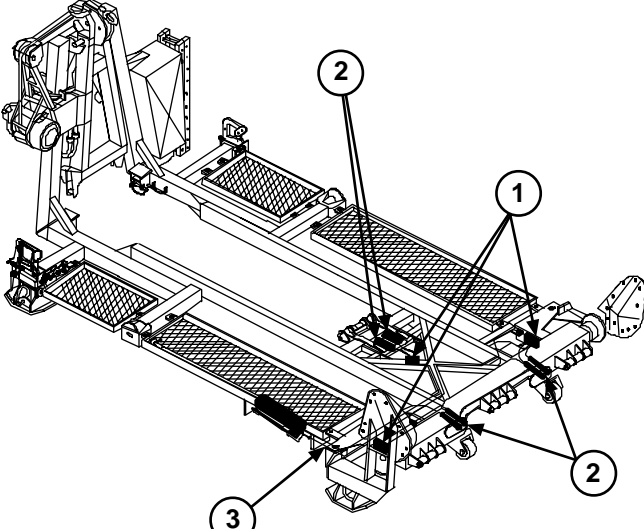
Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
3	Semi-annual	LHS Main Frame, Hook Arm, and Compression Frame	<p style="text-align: center;"><b>NOTE</b></p> <p>Fully extend the LHS prior to performing this procedure.</p> <p>Check for loose, broken, or missing fasteners on main frame (1), hook arm (2), and compression frame (3).</p>	Fasteners are missing or broken.
 <p><b>MODEL A SHOWN</b></p>				
4	Semi-annual	BAP Winch Frame and Components	<p><i>a.</i> Check for damaged frame rails (1) or crossmembers (2), or broken welds.</p> <p><i>b.</i> Check winch frame locking levers (3) for cracks, broken weldments, or damage and for freedom of movement.</p>	<p><i>a.</i> Frame rails or crossmembers are damaged or welds are broken.</p> <p><i>b.</i> Winch frame locking levers are cracked, have broken weldments, are damaged, or have no freedom of movement.</p>
				

**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

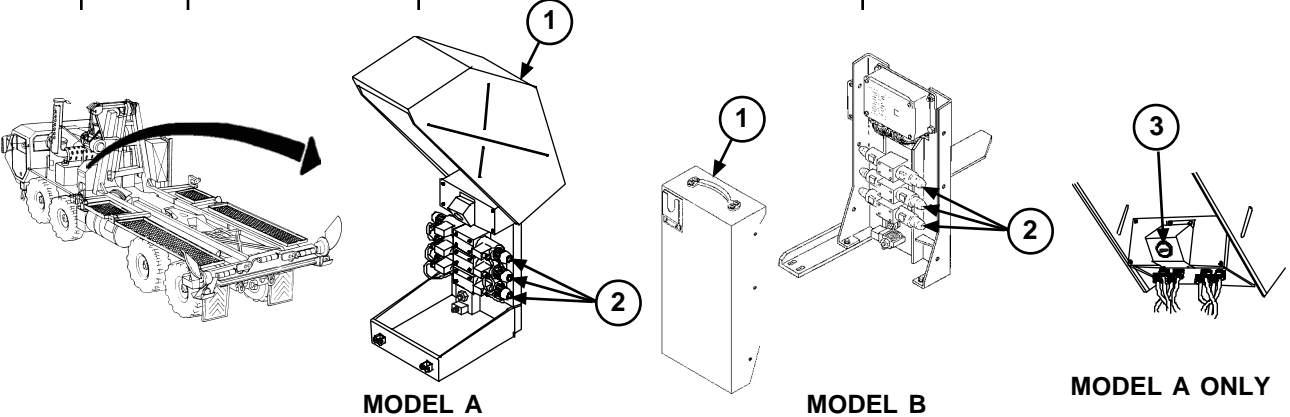
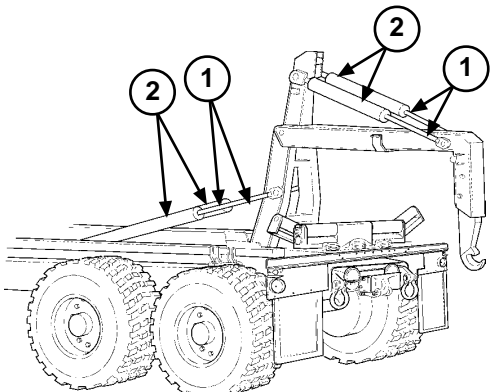
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
5	Semi-annual	BAP Winch Assembly	<p><i>a.</i> Check fluid level from winch filler port (1) semiannually. Fill with OE/HDO (see Appendix G, Note 8).</p> <p><i>b.</i> Check mounting screws (2). Replace mounting screws (2) if broken or missing (see para 4-39).</p> 	<p><i>a.</i> Any Class III leaks are found.</p> <p><i>b.</i> Mounting screws are broken or missing.</p> 
6	Semi-annual	BAP Winch Hydraulic System	<p><i>a.</i> Inspect input ports to winch hydraulic motor (1) for leaks.</p> <p><i>b.</i> Inspect valve block (2) and holding valve connections for leaks.</p> <p><i>c.</i> Inspect hydraulic tubing and hoses (3) for damage, kinks, and/or leaking.</p> <p><i>d.</i> Check for leaks on winch.</p> <p><i>e.</i> Check to make sure hydraulic hoses are not rubbing or chafing on sharp edges.</p>	<p><i>c.</i> Any Class III leaks are found.</p> <p><i>d.</i> Any Class III leaks are found.</p> 

**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
7	Semi-annual	Hydraulic Hand Pump	<p>Check fluid level in hand pump (1) semiannually. Fill with OE/HDO as required (see Appendix G, Note 8).</p> 	Any Class III leaks are found.
8	Semi-annual	Hand Pump Hydraulic System	<p><i>a.</i> Check valve manifolds (1) and fittings for leaks.</p> <p><i>b.</i> Check hydraulic cylinders (2) for leaks.</p> <p><i>c.</i> Check hydraulic tubing (3) and hoses for damage, kinks, and/or leaking.</p> 	<i>c.</i> Any Class III leaks are found.
9	Semi-annual	Hydraulic Cabinet Assembly	<p><b>NOTE</b></p> <p>Refer to paragraph 2-29 for specific instructions on operating the LHS using manual controls.</p>	



**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

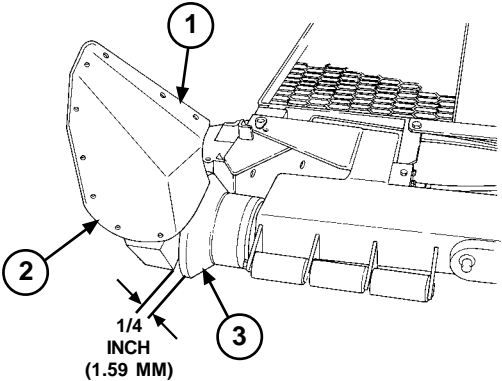
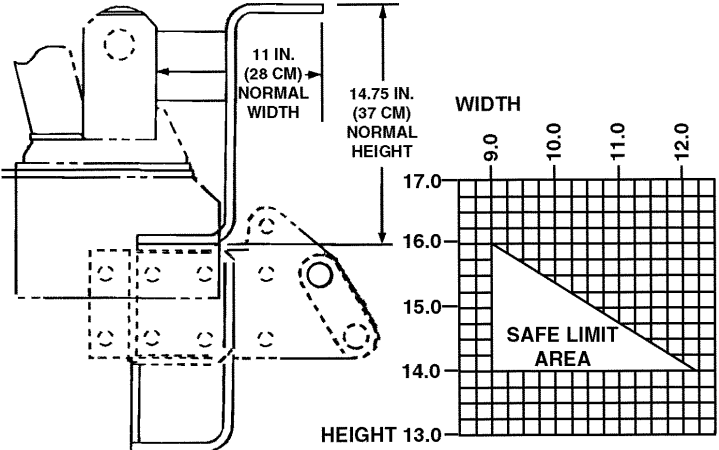
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
9	Semi-annual	Hydraulic Cabinet Assembly (continued)	<p><i>a.</i> Open hydraulic cabinet assembly (1). Fully operate the LHS using the manual override controls. Check to make sure the LHS operates properly in override mode. Check for leaking, sticking, or malfunctioning directional control valves (2). For Model A only, operate the LHS long enough to verify that the hourmeter (3) is functioning.</p> <p><i>b.</i> Check for leaks on main block and fittings.</p>	<p><i>a.</i> The LHS does not operate properly in override mode.</p> <p><i>b.</i> Any Class III leaks are found.</p>
				
10	Semi-annual	LHS Hydraulic Cylinders	<p style="text-align: center;"><b>NOTE</b></p> <p>Fully extend the LHS prior to performing this procedure.</p> <p>Check hydraulic cylinder piston rods (1) for scoring, scratches, bends, or signs of leaking. Check cylinders (2) for splits,</p>	<p>Any Class III leaks are found, or there are splits, cracks, gouges, bends, or damage that will impair operation.</p>
				

**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
11	Semi-annual	LHS Wire and Wire Harnesses	<p>gouges, cracks, leaks, or signs of wear.</p> <p><b>NOTE</b></p> <p>Fully extend hook arm and main frame prior to performing the following procedure.</p> <p>Check to make sure wires and wire harnesses (1) are not rubbing or chafing on sharp edges.</p>	Wires are broken, frayed, or damaged.

**MODEL A SHOWN**

**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
12	Semi-annual	Rear Guide Assembly	<p><i>a.</i> Check rear guide pad (1) for excessive wear, damage, or missing hardware. Replace wear pad (1) if it is worn to within 1/16 inch (1.59 mm) of screw heads or if it is worn through, exposing metal backing plate (para 4-28).</p> <p><i>b.</i> Check clearance between BAP rear guide assembly (2) and rear roller assembly (3). Clearance should be adjusted to 1/4 inch (para 4-28).</p>	<p><i>a.</i> Wear pad is worn to within 1/16 (1.59 mm) of screw heads or is worn through.</p>
<div style="display: flex; justify-content: space-around; align-items: center;">   </div>				
12.1	Semi-annual	Bumper Stop Bracket	<p>Check bumper stop bracket for cracks and/or broken parts. Gouges and scrapes are acceptable as long as they do not wear through the face plate. Measure height and width of bumper stop bracket. If both measurements are within safe limit area on graph, the bumper stop bracket is good. If both measurements are not within safe limit area on graph, refer to Para 4-55.</p>	<p>Either the height or width measurement is outside the safe limit area on graph.</p>

**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

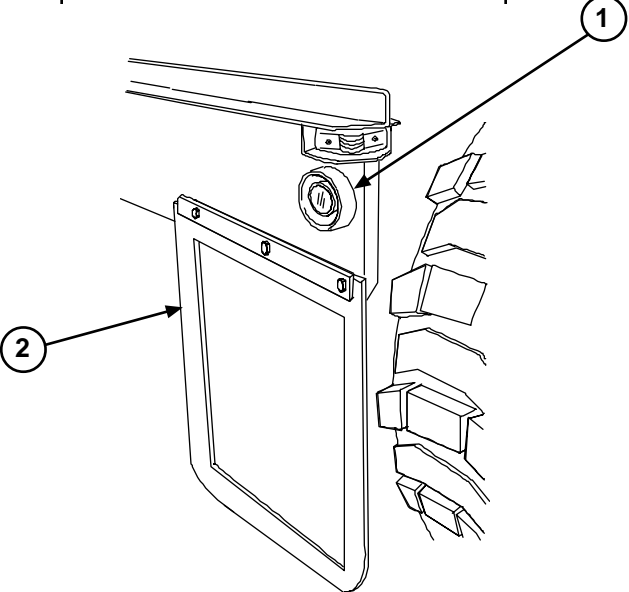
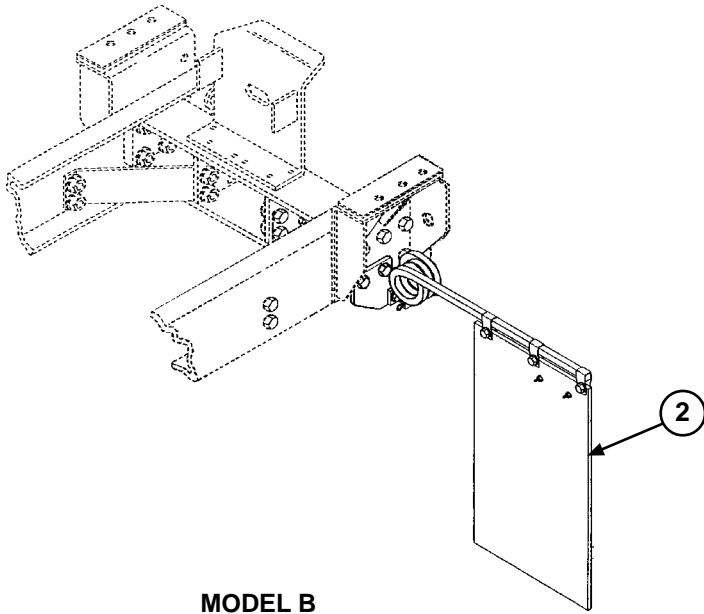
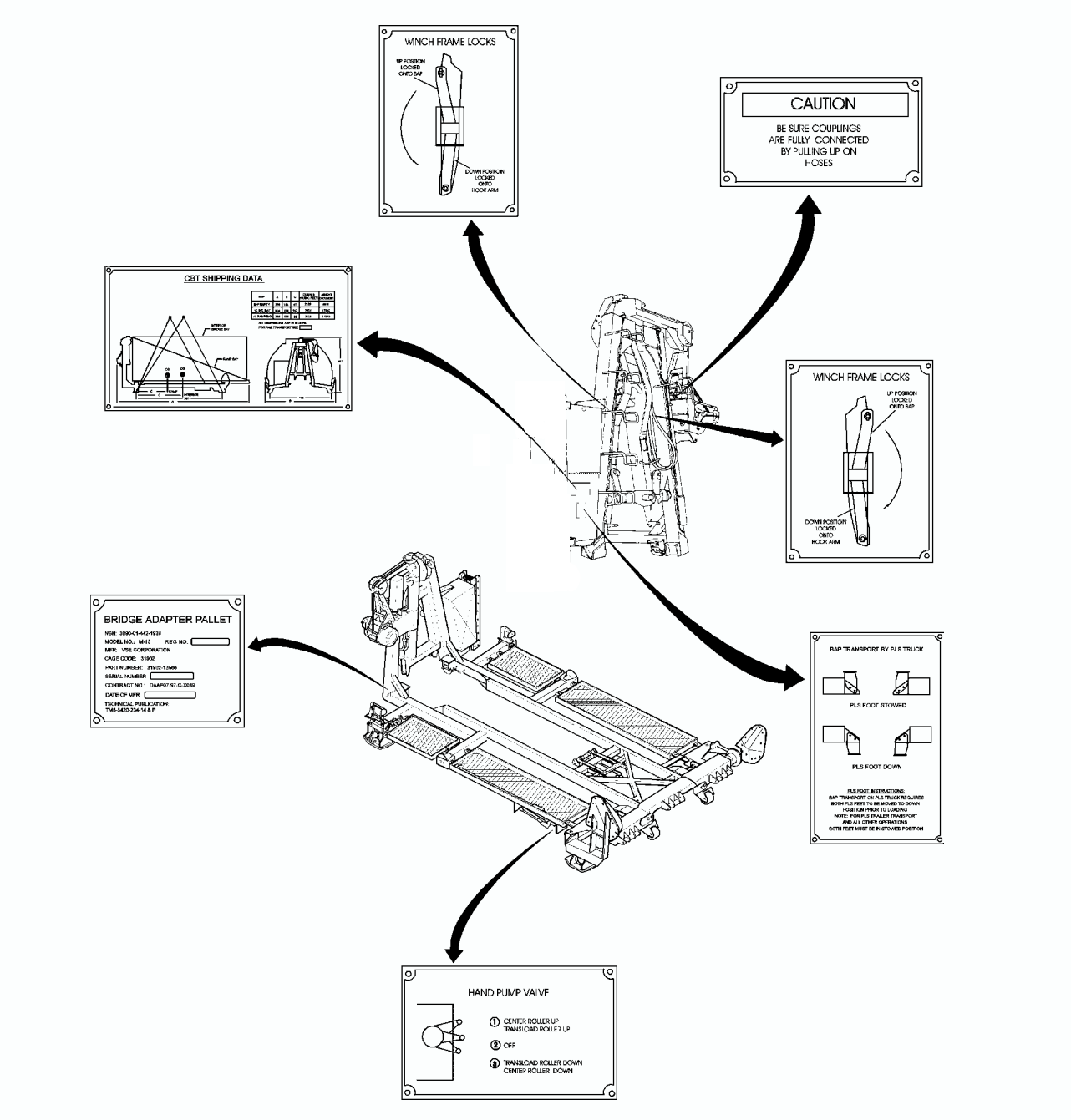
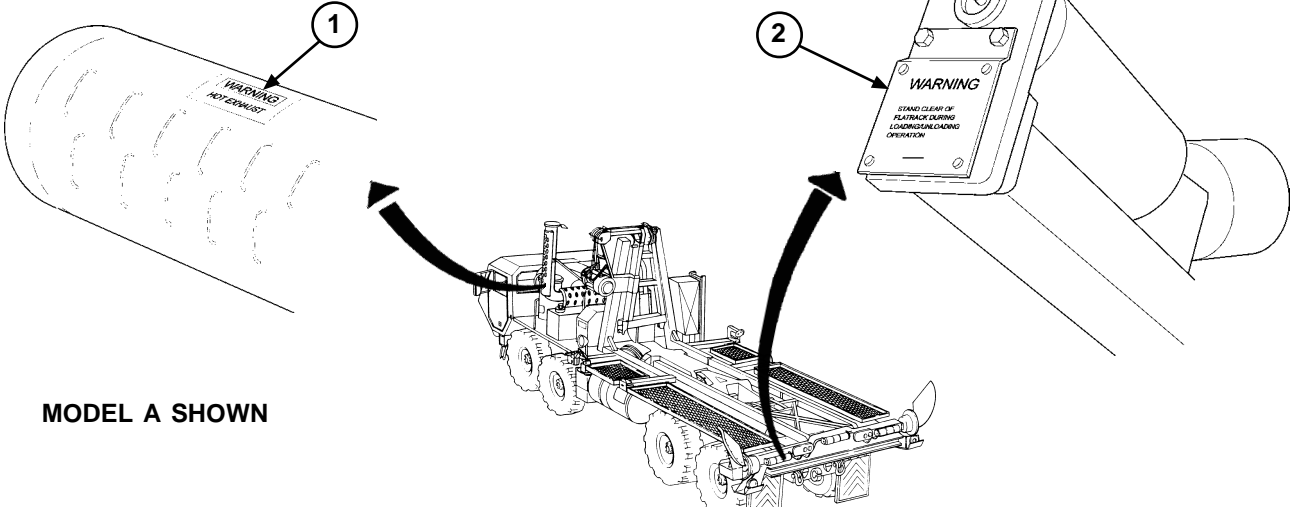
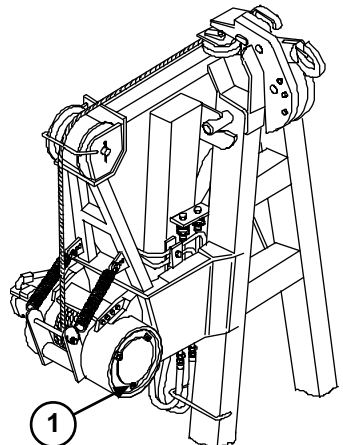
Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
13	Semi-annual	Mudflap Assembly	<p>Inspect reflectors (1) for missing hardware.                      Inspect mudflaps (2) for missing parts, torn rubber, or bent mountings.</p>  <p>The diagram for Model A shows a side view of a mudflap assembly. A circular reflector (1) is mounted on a bracket above the mudflap. The mudflap itself is a rectangular panel (2) with a rubber seal around its perimeter. The assembly is shown attached to a vehicle's fender.</p> <p style="text-align: center;"><b>MODEL A</b></p>  <p>The diagram for Model B shows an exploded view of the mudflap assembly. It includes a metal bracket, a rubber seal, and a rectangular mudflap panel (2). The components are shown in their relative positions as they would be assembled.</p> <p style="text-align: center;"><b>MODEL B</b></p>	

Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
14	Semi-annual	BAP Labels	Check all labels to ensure legibility. Replace labels if damaged or missing (para 4-34).	



**Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) (continued).**

Item No.	Interval	Item To Check/ Service	Procedure	Not Fully Mission Capable If:
15	Semi-annual	LHS Labels	<p>Check to make sure all decals (1) and data plates (2) are present and legible. Replace labels (para 4-56.1) if damaged or missing.</p>	
 <p>The diagram shows a side view of a vehicle with a crane. Callout 1 points to a decal on the crane's drum with the text 'WARNING! HOT SURFACE!'. Callout 2 points to a data plate on the crane's boom with the text 'WARNING! STAND CLEAR OF PLATFORM DURING LOADING/UNLOADING OPERATION!'.</p>				
<p><b>MODEL A SHOWN</b></p>				
16	Semi-Annual	LHS Hydraulic System	<p>Inspect all hoses, lines, and fittings for leaks. Check to see that hoses are not rubbing or chafing on sharp edges by securing hoses. If hoses are worn or braiding, Direct Support maintenance replace them.</p>	<p>Any Class III leaks are found. Any loose fittings cracks, or leaks are found.</p>
17	Annual	BAP Winch Assembly	<p>Drain fluid from winch assembly drain plug (1) annually. Fill with OE/HDO as required (Appendix G, Note 8).</p>	<p>Any Class III leaks are found.</p>
 <p>The diagram shows a detailed view of a winch assembly. Callout 1 points to a drain plug on the bottom of the winch housing.</p>				

## Section IV. TROUBLESHOOTING PROCEDURES

## 4-11. INTRODUCTION TO LOGIC-TREE TROUBLESHOOTING.

This section contains step-by-step procedures for identifying, locating, isolating, and repairing equipment malfunctions by Unit maintenance personnel. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the corrective actions listed, notify your supervisor.

- a. Troubleshooting Format.** All troubleshooting procedures are separated into left-hand and right-hand pages. The main diagnostic logic is on the left-hand pages. Related and helpful information is on right-hand pages. Just answer the questions on the left-hand pages. If you are not sure about a question or procedure, look on the right-hand page for notes, instructions, and help. Follow the YES or NO path as directed to the next step.
- (1) **Left-Hand Pages.** All critical information for decision making is found on left-hand pages. Related and helpful information, if needed, can be found on the accompanying right-hand page. Each left-hand page contains the following information:
- (a) **INITIAL SETUP** — This box is located only before the first step in a given troubleshooting fault. INITIAL SETUP lists tools, materials, references, personnel, and equipment needed to troubleshoot the fault.
  - (b) **QUESTION** — Each question, located in the middle column, refers to POSSIBLE PROBLEMS. Just answer the question YES or NO and follow the appropriate path to the next step. Everything else on both pages is information to support the question.
  - (c) **KNOWN INFO** — This box contains known information about the vehicle or subsystem. As you follow a test chain, parts will be listed here after they have been found to be OK. Sometimes this box will indicate a fault known to exist, such as “No Transit Light on All the Time.” **DO NOT USE THIS BOX TO PICK A “JUMP IN” POINT.** Always run a complete chain when instructed to do so.
  - (d) **POSSIBLE PROBLEMS** — This box is the opposite of KNOWN INFO. Whatever might be causing the problem is listed here until it is tested and shown to be OK.
  - (e) **TEST OPTIONS** — This box lists at least one way of getting to the answer to the question. When there is more than one way to get to the answer, all the different options will be given. The easiest or best option is listed first.
  - (f) **REASON FOR QUESTION** — If you know why the question is being asked, it should be easier to understand the diagnostic logic and easier to answer the question. Many times, an explanation of how the system or circuit works is included here. Knowing why the question is being asked should help you decide if the answer should be YES or NO.
- (2) **Right-Hand Pages.** Right-hand pages contain additional information. Each right-hand page contains the following information:
- (a) **WARNINGS AND CAUTIONS** — Warning and caution statements are placed on the right-hand page.

#### 4-11. INTRODUCTION TO LOGIC-TREE TROUBLESHOOTING (continued).

- (b) **Test Procedures (e.g., VISUAL INSPECTION)** — These are specific instructions about how to make the measurements required to answer the question. The procedures presume a basic working knowledge of the test equipment to be used.
- (c) **Illustrations** — The illustrations are designed to make it easier for you to find what you are looking for, such as a specific connector or wire.
- (d) **NOTES** — Helpful notes are provided as supporting information only; you do not usually need this information to answer the question.

#### **b. How To Begin Troubleshooting.**

- (1) Determine the symptom or condition that most closely resembles your problem or failure. The troubleshooting is divided into symptoms peculiar to a system or component.
- (2) Refer to the Malfunction Index (p. 4-21). Go to the referenced page to begin troubleshooting.
- (3) Open the manual flat so both the left-hand and right-hand pages are displayed before you.
- (4) Carefully observe all WARNINGS and CAUTIONS.
- (5) Model B only- Remove hydraulic cabinet cover and observe digital control box LED display for error codes.



**Table 4-1. Error Codes for LHS Digital Controller**

<b>Ec01</b>	<b>Data line is open</b> <b>Loss of power or ground</b>
<b>Ec02</b>	Short or open detected to <b>Main Unload Valve Solenoid</b>
<b>Ec03</b>	Short or open detected to <b>Main Load Valve Solenoid</b>
<b>Ec04</b>	Short or open detected to <b>Hook Arm Unload Valve Solenoid</b>
<b>Ec05</b>	Short or open detected to <b>Hook Arm Load Valve Solenoid</b>
<b>Ec06</b>	Short or open detected to <b>Winch Out Valve Solenoid</b>
<b>Ec07</b>	Short or open detected to <b>Winch in Valve Solenoid</b>
<b>Ec08</b>	Short or open detected to <b>Free Flow Valve Solenoid</b>
<b>Ec09</b>	Short or open detected to <b>High Idle Solenoid</b>
<b>Ec11</b>	Short or open detected to <b>Hand-held Spotlight Circuit</b>
<b>Ec12</b>	Short or open detected to <b>Main Frame Work Light Circuit</b>
<b>Ec17</b>	Short or open detected to <b>Remote Controller Circuit</b>
<b>Ec19</b>	Short or open detected to <b>Transit Valve Circuit</b>
<b>Ec25</b>	Short or open detected to <b>Remote Controller Light Circuit</b>
<b>Ec26</b>	Short or open detected to <b>PS1 circuit</b> (PS1 out of range, high/low volts)
<b>Ec27</b>	Short or open detected to <b>PS2 circuit</b> (PS2 out of range, high/low volts)

**NOTE**

- For each error code, an open or short in the ground circuit will generate the same code.
- The PS1 and PS2 sensors operate within a voltage range and if either too high or too low a voltage is detected, an out of range code will show.
- The proximity switches are not part of the built in test circuits, and will not trigger an error code.
- With an Ec01 error code, check continuity of the wire harness between the cab digital control box and the LHS digital controller. If all wires check good, replace the cab digital control box.
- All other codes require all of the wires, switches, solenoids and other components from the digital controller to be checked for continuity or shorts to ground.
- The LHS digital controller or the cab digital control box are not repairable.

**Table 4-2. Malfunction Index**

<b>TROUBLESHOOTING PROCEDURE</b>	<b>PAGE</b>
1. BAP Center Roller and/or Transload Rollers Will Not Operate .....	4-22
2. BAP Front Pin Lock Will Not Operate .....	4-32
3. Engine High Idle Does Not Operate (Model A Only).....	4-46
3.1 Engine High Idle Does Not Operate (Model B Only).....	4-75.1
4. Main Frame Worklight Does Not Operate .....	4-76
5. Hand-Held Spotlight Does Not Operate .....	4-96
6. Indicator/Panel Lights Do Not Operate (Model A Only).....	4-114
7. Hourmeter Does Not Operate (Model A Only) .....	4-120
8. Oil Temperature Light Does Not Operate Properly (Model A Only).....	4-132
9. LHS Engaged Indicator Light Does Not Operate (Model A Only) .....	4-152
10. No Transit Light Does Not Operate Properly (Model A Only) .....	4-166
11. Hook Arm Does Not Load in Manual Mode .....	4-194
12. Hook Arm Does Not Unload in Manual Mode .....	4-216
13. Main Frame Does Not Load in Manual Mode .....	4-238
14. Main Frame Does Not Unload in Manual Mode .....	4-268
15. LHS Does Not Operate Properly in Auto Mode (Cab Only) .....	4-300
15.1 LHS Does Not Operate Properly in Auto Mode (Cab Only) (Model B Only) .....	4-349.1
16. Main Frame, Hook Arm, and Winch Do Not Operate .....	4-350
16.1 Main Frame, Hook Arm, and Winch Do Not Operate (Model B Only) .....	4-387.11
17. BAP Winch Does Not Operate .....	4-388
18. BAP Winch Does Not Wind Out.....	4-392
19. BAP Winch Does Not Wind In .....	4-404
20. Transit Valves Inoperative, Error Code 19 (Model B Only) .....	4-415.1
21. Remote Control Light Inoperative, Error Code 25, (Model B Only) .....	4-415.17
22. Pressure Sensors, PS1/PS2, Inoperative, Error Code 26 and 27, (Model B Only) .....	4-415.25
23. Backup Alarm Does Not Operate (Model B Only) .....	4-415.33

**NOTE**

- MODEL B, faults 6, 8, 9, and 10 are not repairable. The cab digital control box is solid state circuitry and can only be replaced as an assembly.
- MODEL B, fault 7, the hourmeter is not installed on this model.



4-12. UNIT TROUBLESHOOTING.

1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE.

INITIAL SETUP

*Tools and Special Tools*

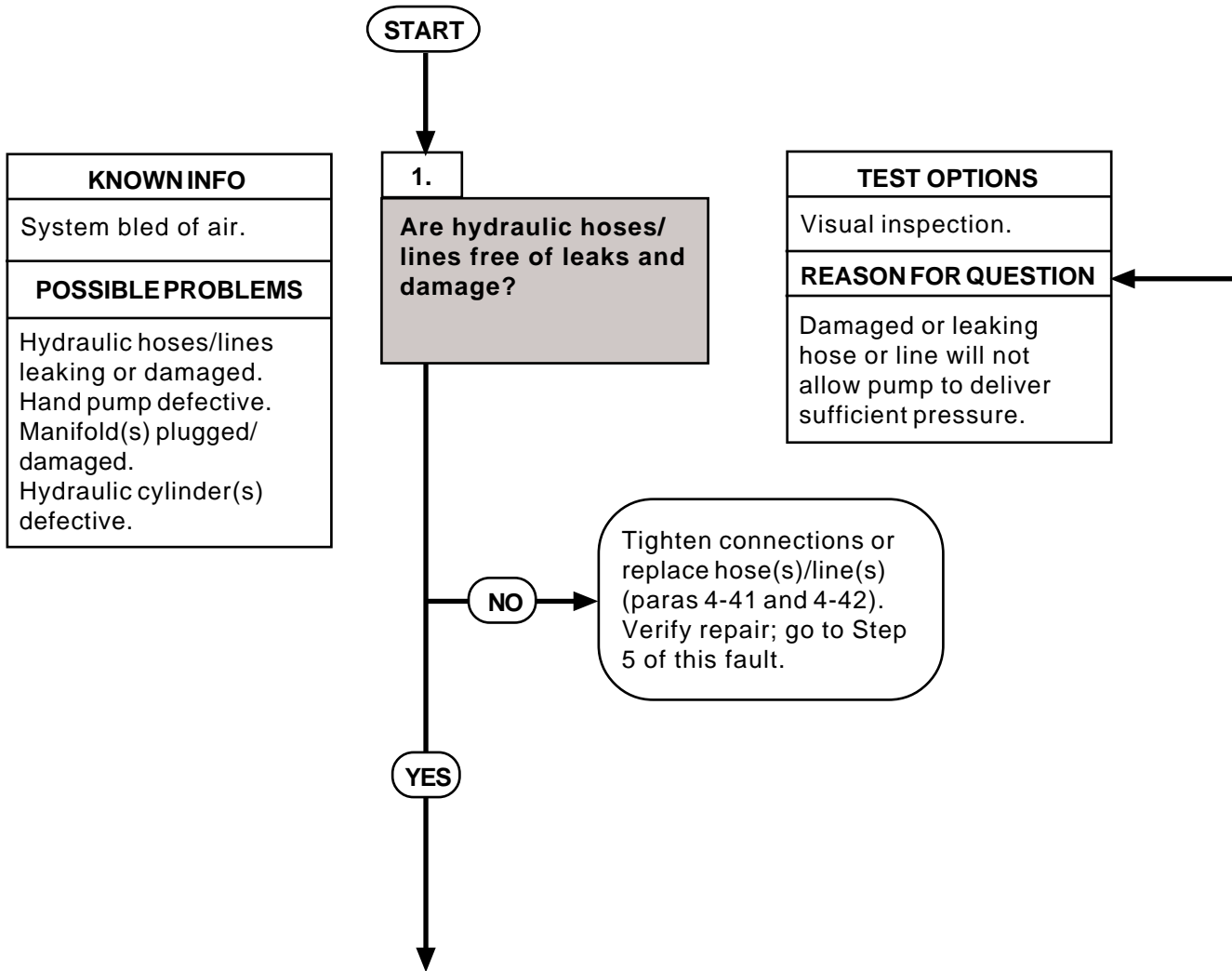
Pan, Drain, 4-Gallon (MIL-P-45819)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*References*

TM 9-2320-279-10

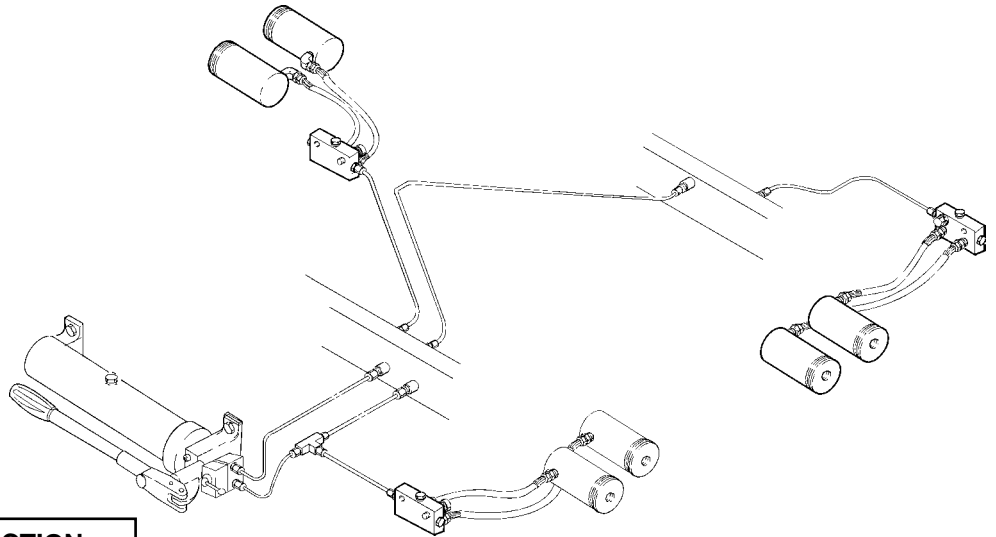
*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)  
 System bled of air (para 4-43)  
 Load removed from the BAP (para 2-12)



**4-12. UNIT TROUBLESHOOTING (continued).**

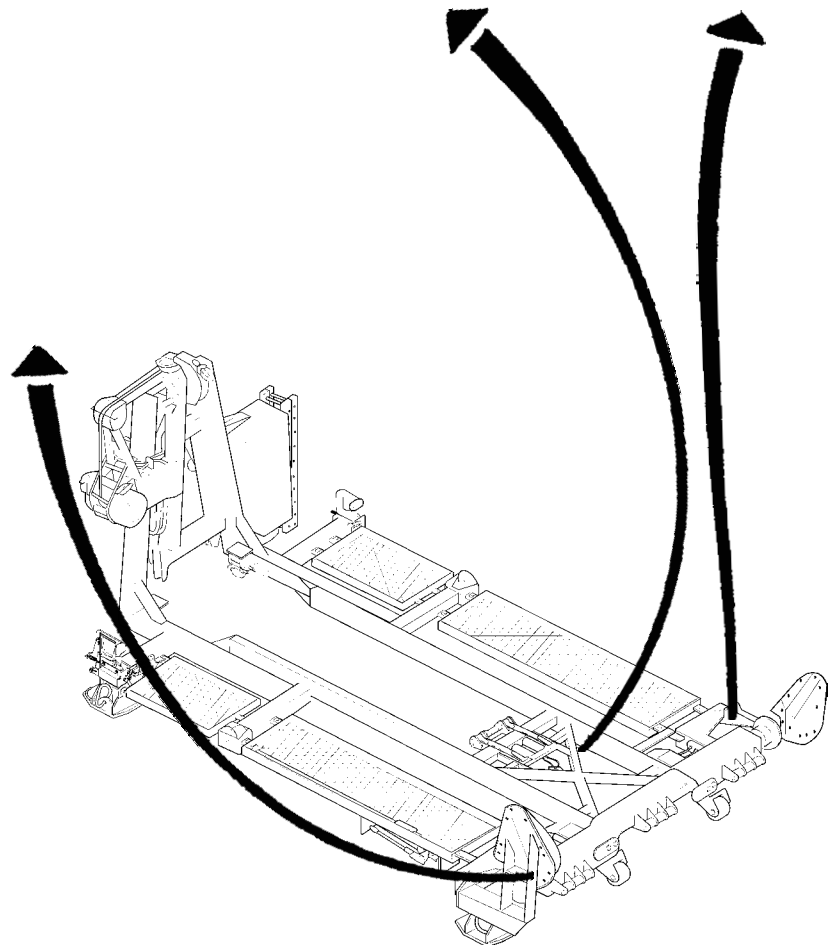
**1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).**



**VISUAL INSPECTION**

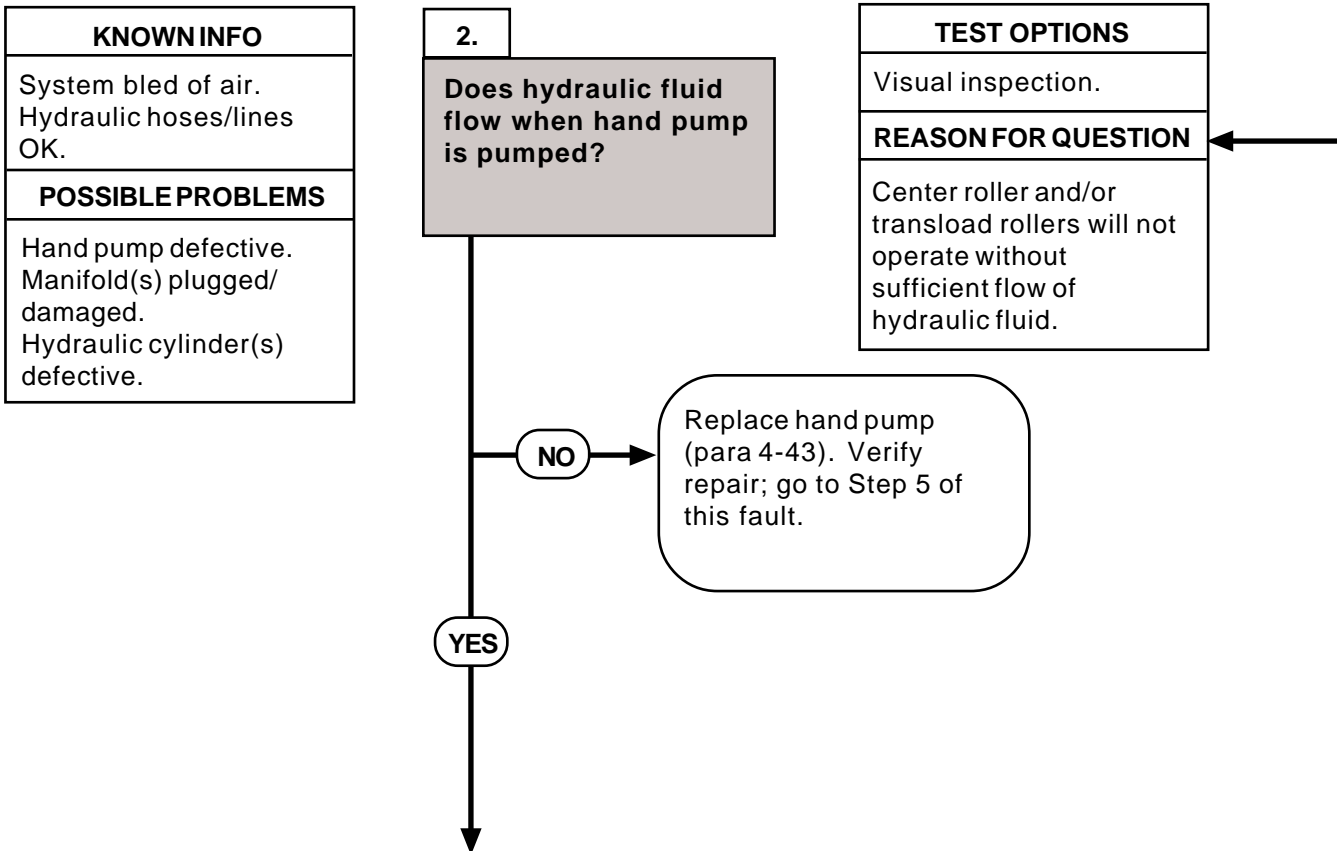
Check hoses and lines for leaks and/or damage.

- (1) If hoses and/or lines are leaking or damaged, tighten connections or replace hose(s)/line(s) (paras 4-41 and 4-42).
- (2) If hoses and/or lines are free from leaks or damage, go to Step 2 of this fault.



4-12. UNIT TROUBLESHOOTING (continued).

1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).

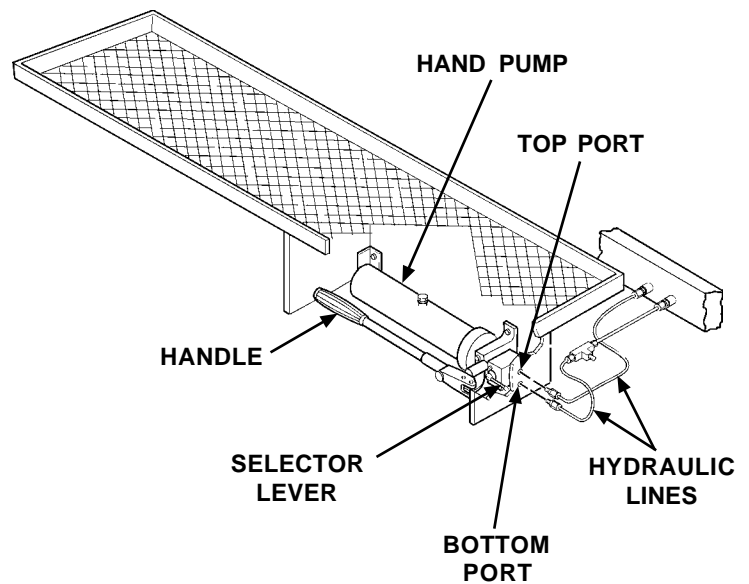


## 4-12. UNIT TROUBLESHOOTING (continued).

### 1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).

#### VISUAL INSPECTION

- (1) Place suitable container under hand pump.
- (2) Remove two hydraulic lines from hand pump.
- (3) Move hand pump selector lever to up position.
- (4) Pump hand pump handle and observe top port on hand pump to ensure hand pump is flowing hydraulic fluid.
- (5) Move hand pump selector lever to down position.
- (6) Pump hand pump handle and observe bottom port on hand pump to ensure hand pump is flowing hydraulic fluid.
  - (a) If hand pump fails to flow hydraulic fluid in Step 4 or 6 above, replace hand pump (para 4-43).
  - (b) If hand pump does flow hydraulic fluid in Steps 4 and 6 above, go to Step 3 of this fault.
- (7) Install two hydraulic lines on hand pump.
- (8) Bleed system to remove trapped air (para 4-43).



**4-12. UNIT TROUBLESHOOTING (continued).**

**1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).**

**NOTE**

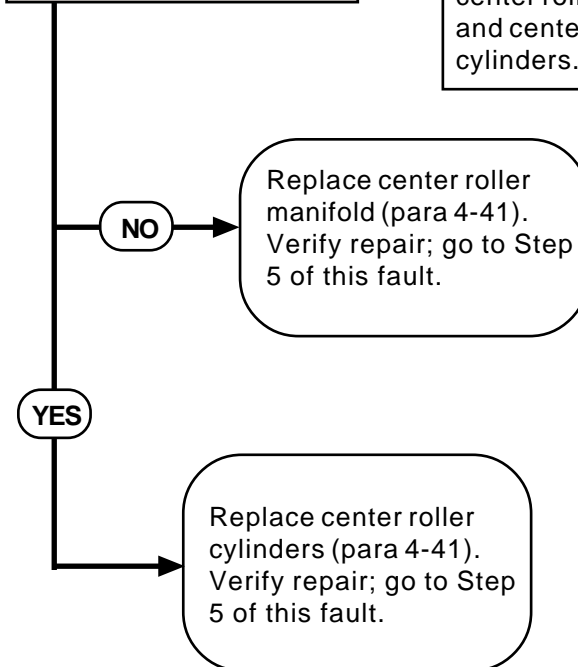
If center roller does not operate, go to Step 3. If transload rollers do not operate, go to Step 4. If center and transload rollers do not operate, perform Steps 3 and 4.

KNOWN INFO
System bled of air. Hydraulic hoses/lines OK. Hand pump OK.
POSSIBLE PROBLEMS
Manifold(s) plugged/damaged. Hydraulic cylinder(s) defective.

**3.**

**Does hydraulic fluid flow to both center roller cylinders?**

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
Fault isolated between center roller manifold and center roller cylinders.



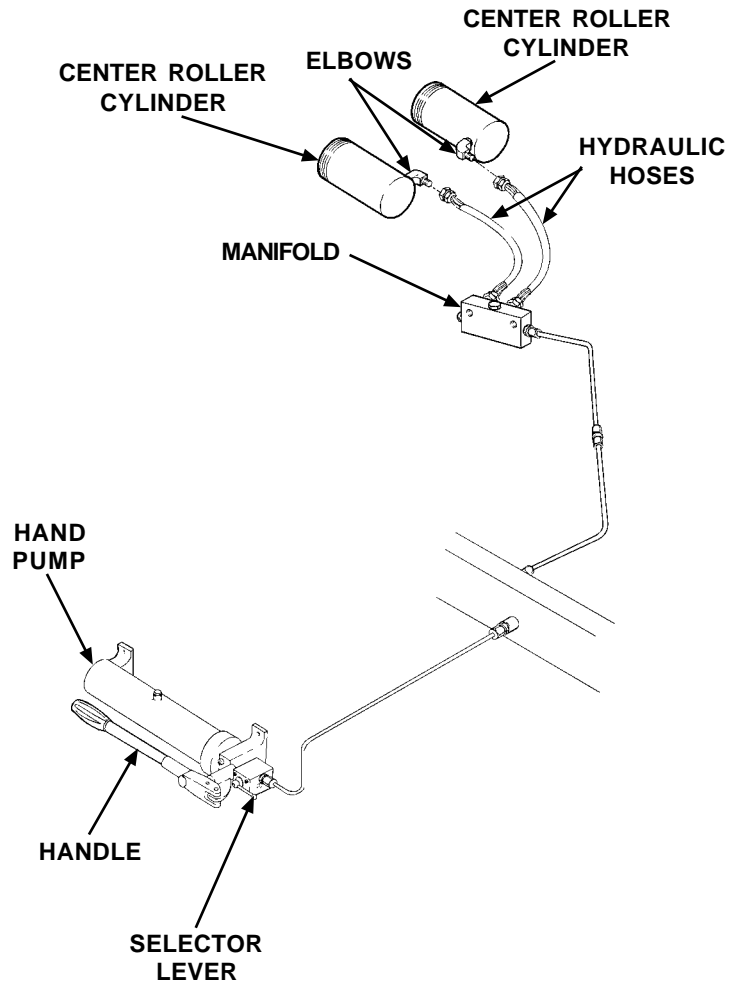


**4-12. UNIT TROUBLESHOOTING (continued).**

**1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).**

**VISUAL INSPECTION**

- (1) Place suitable container under center roller cylinders.
- (2) Remove two hydraulic hoses from elbows on center roller cylinders.
- (3) Move hand pump selector lever to up position.
- (4) Pump hand pump handle and observe open ends of two hydraulic hoses.
  - (a) If hydraulic fluid is not flowing, replace center roller manifold (para 4-41).
  - (b) If hydraulic fluid is flowing, replace center roller cylinders (para 4-41).
- (5) Install two hydraulic hoses on elbows on center roller cylinders.
- (8) Bleed system to remove trapped air (para 4-43).

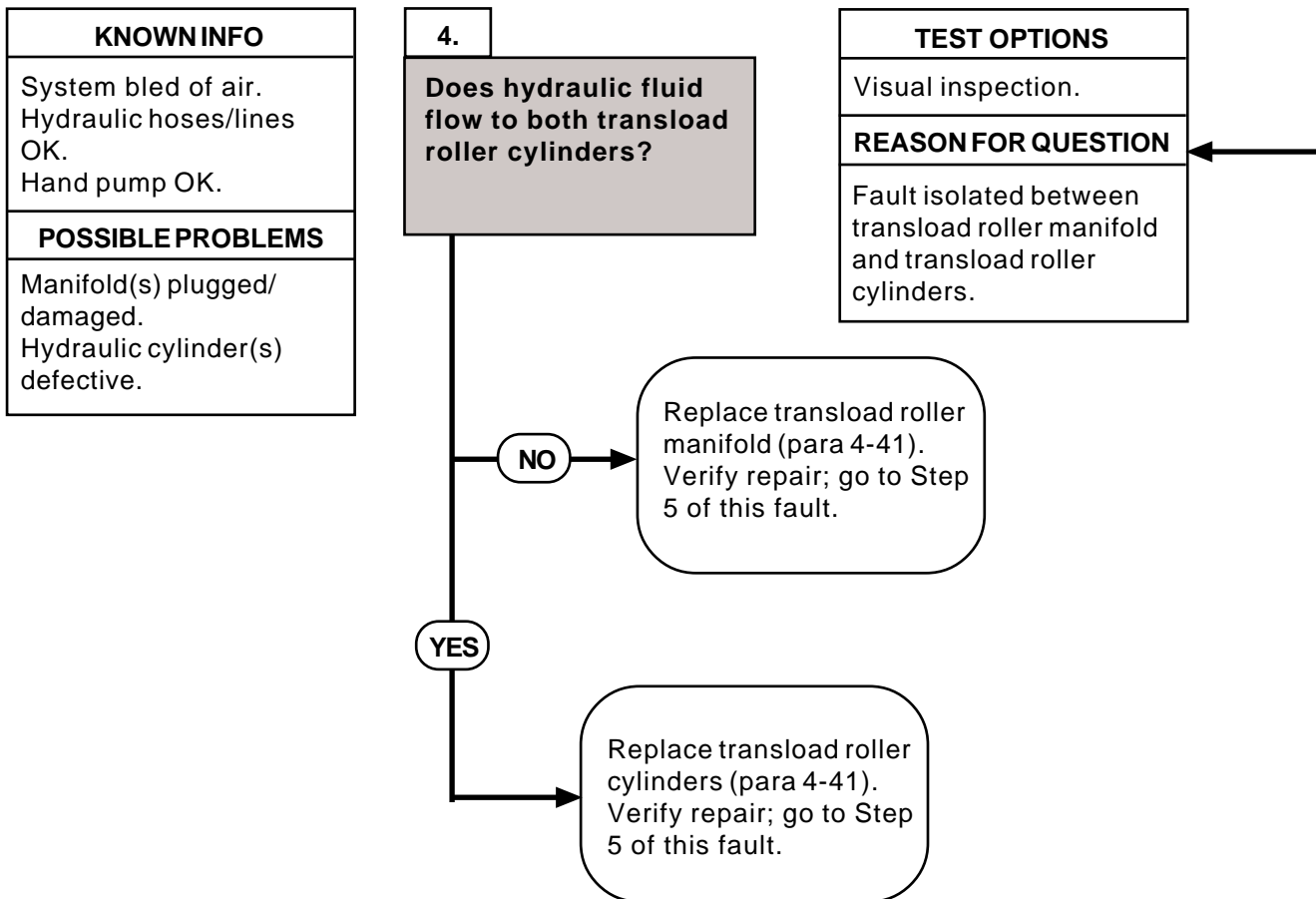


**4-12. UNIT TROUBLESHOOTING (continued).**

**1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).**

**NOTE**

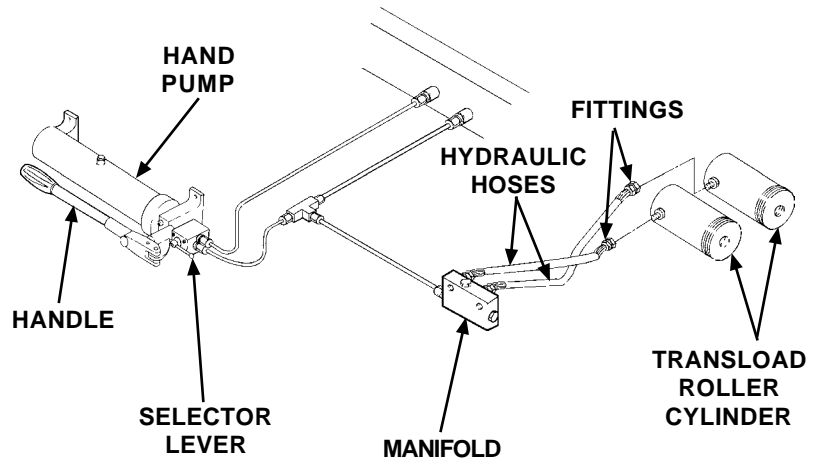
The following step is common for road-side and curb-side transload rollers. Road side is shown; repeat the procedure for the curb side, as required.



**4-12. UNIT TROUBLESHOOTING (continued).**

**1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).**

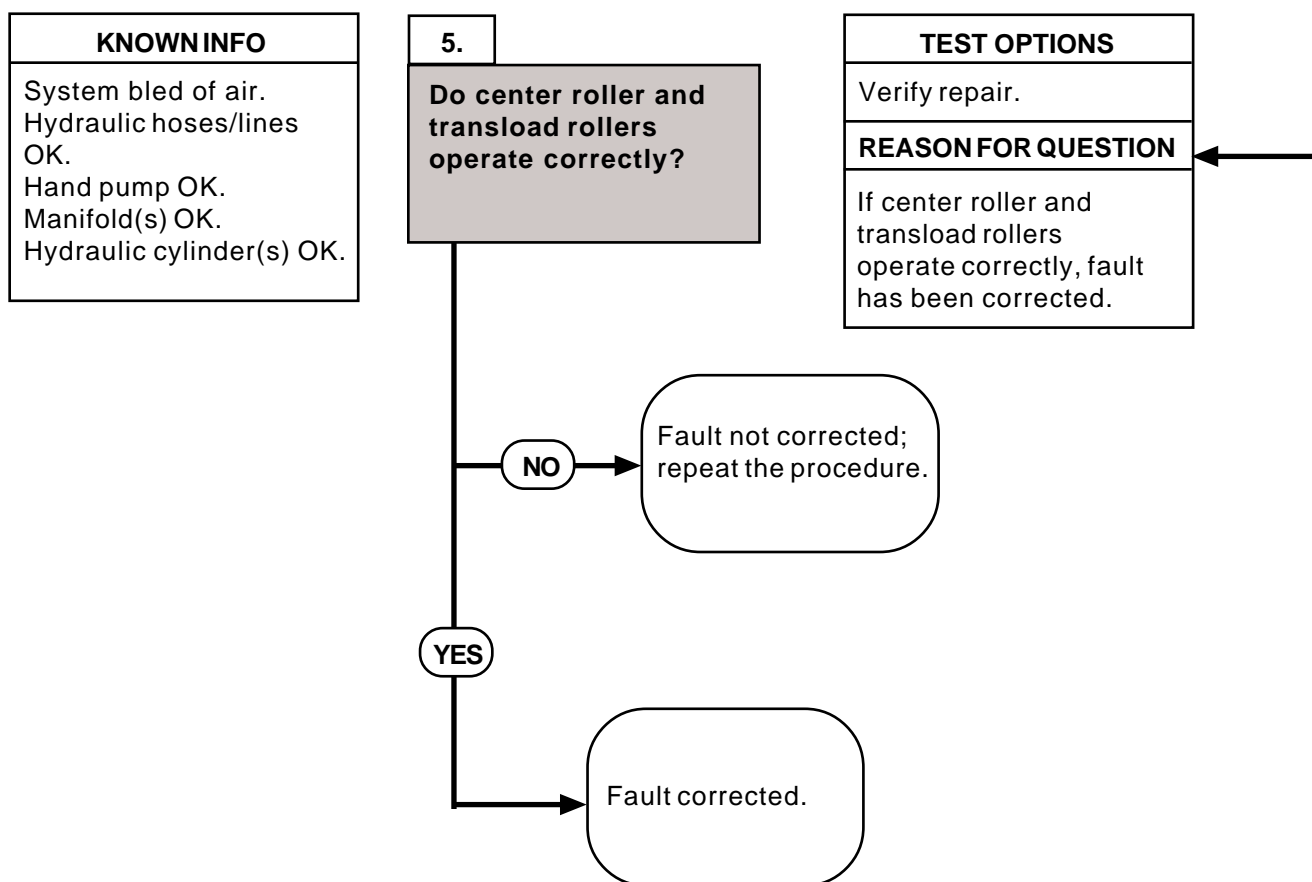
<b>VISUAL INSPECTION</b>
(1) Place suitable container under transload roller cylinders.
(2) Remove two hydraulic hoses from fittings on transload roller cylinders.
(3) Move hand pump selector lever to down position.
(4) Pump hand pump handle and observe open ends of two hydraulic hoses. <ul style="list-style-type: none"> <li>(a) If hydraulic fluid is not flowing, replace transload roller manifold (para 4-41).</li> <li>(b) If hydraulic fluid is flowing, replace transload roller cylinders (para 4-41).</li> </ul>
(5) Install two hydraulic hoses on fittings on transload roller cylinders.
(6) Bleed system to remove trapped air (para 4-43).



**ROAD SIDE SHOWN**

4-12. UNIT TROUBLESHOOTING (continued).

1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).

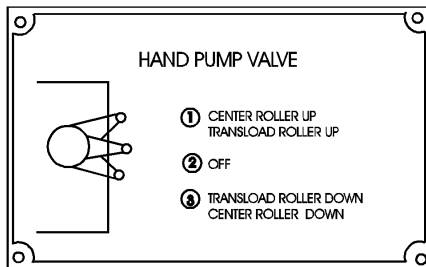
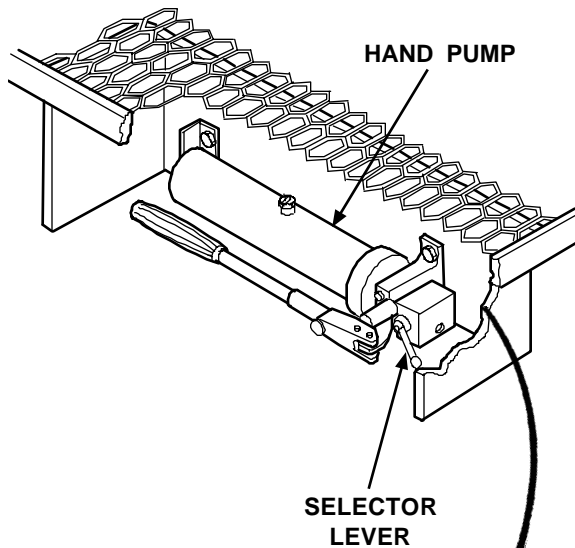
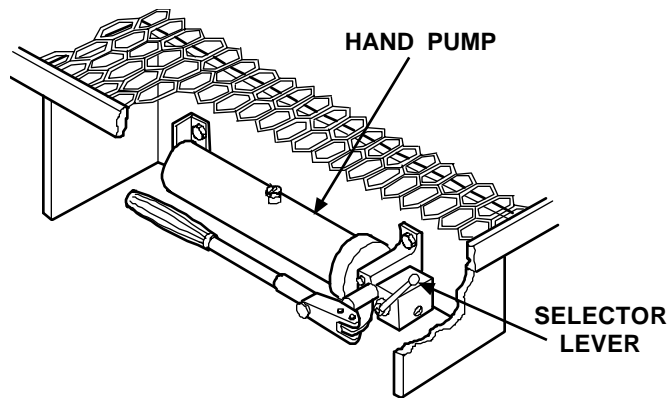


**4-12. UNIT TROUBLESHOOTING (continued).**

**1. BAP CENTER ROLLER AND/OR TRANSLOAD ROLLERS WILL NOT OPERATE (continued).**

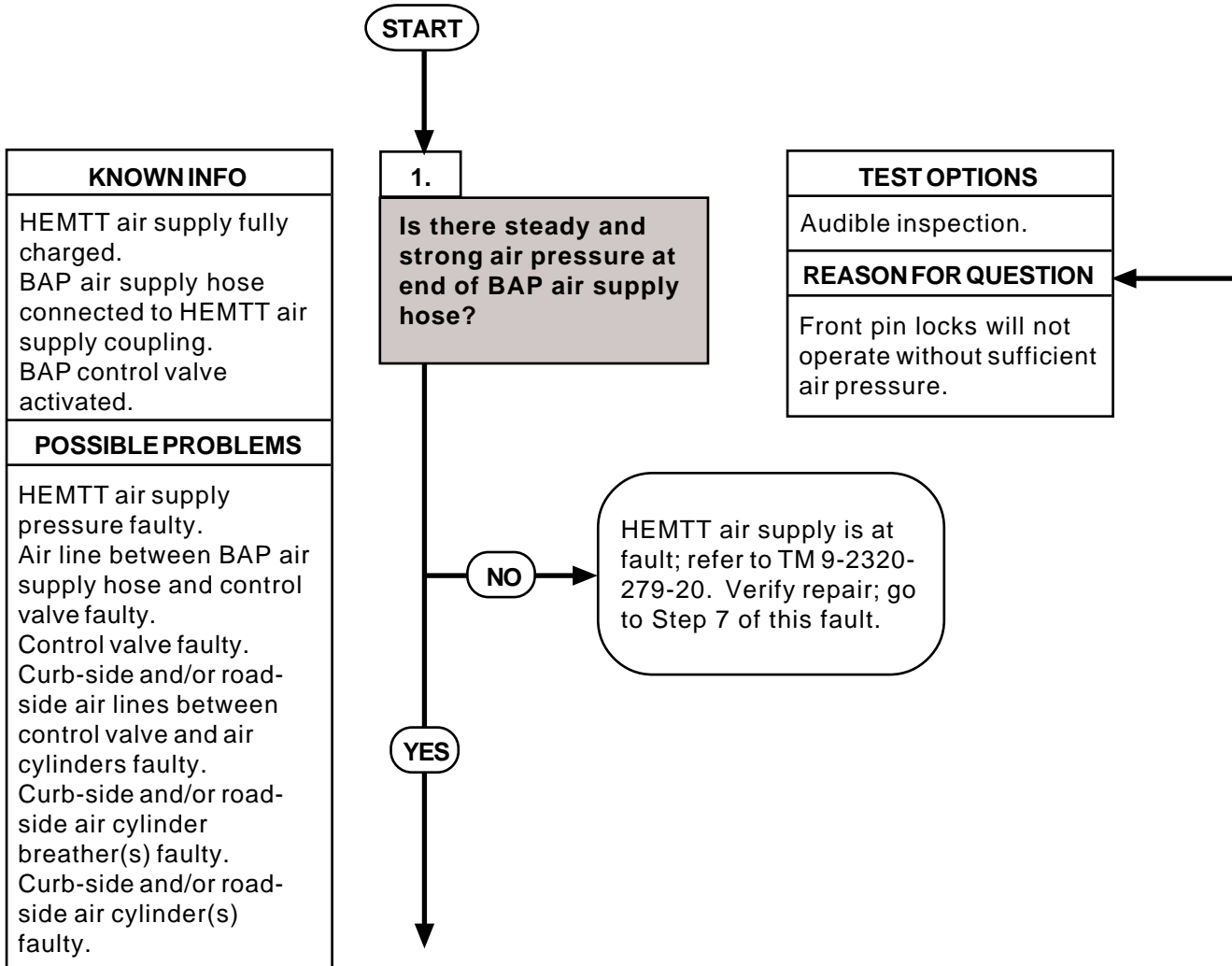
**VERIFY REPAIR**

- (1) Move hand pump selector lever to up position.
- (2) Pump hand pump handle and observe center roller for correct operation.
- (3) Move hand pump selector lever to down position.
- (4) Pump hand pump handle and observe both transload rollers for correct operation.
  - (a) If center roller or transload rollers do not operate correctly, fault was not corrected. Repeat the procedure.
  - (b) If center roller and transload rollers operate correctly, fault has been corrected.



4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE.	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Engine turned off (TM 9-2320-279-10)
	Parking brake applied (TM 9-2320-279-10)
	Wheels chocked (TM 9-2320-279-10)
<i>Materials/Parts</i>	Load removed from the BAP (para 2-12)
Lockwasher (6) (Item 29, Appendix K)	HEMTT air supply fully charged (TM 9-2320-279-10)
Lockwasher (2) (Item 31, Appendix K)	BAP air supply hose connected to HEMTT supply air coupling (para 2-15)



4-12. UNIT TROUBLESHOOTING (continued).

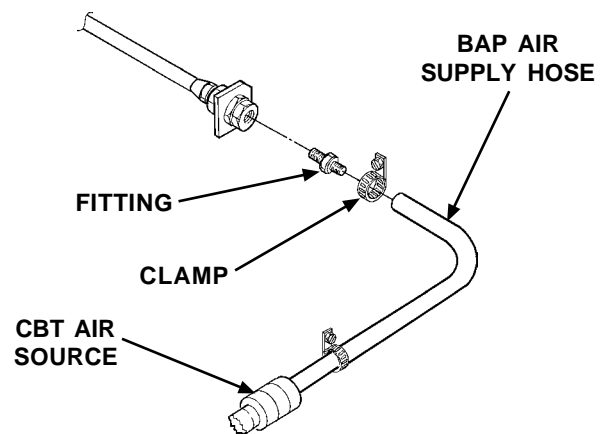
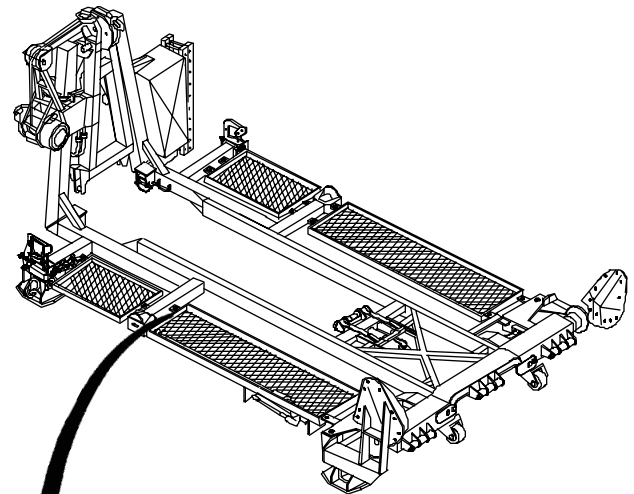
2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).

**AUDIBLE INSPECTION**

**WARNING**

**Air system is under pressure. Never point air flow toward personnel or injury could result.**

- (1) Loosen hose clamp and remove BAP air supply hose from fitting. Check for air pressure at end of air supply hose.
  - (a) Very little or no air pressure indicates HEMTT air supply is at fault; refer to TM 9-2320-279-20.
  - (b) Steady and strong air pressure indicates HEMTT air supply is good.
- (2) Install BAP air supply hose on fitting and tighten hose clamp.

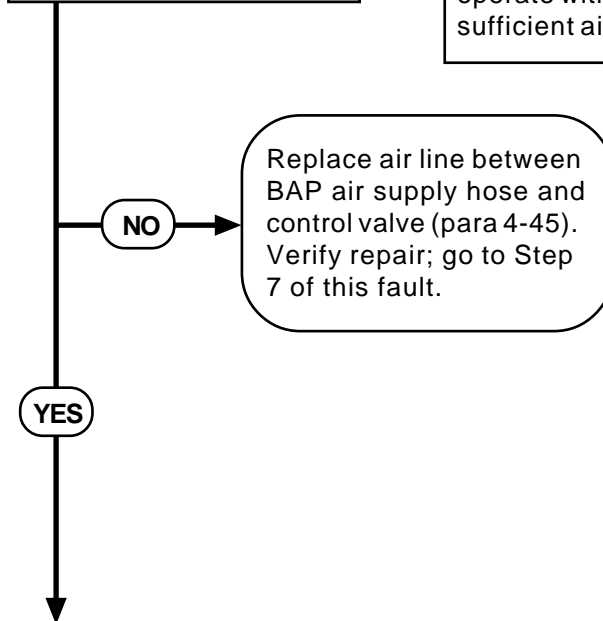


4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).

KNOWN INFO
HEMTT air supply fully charged. BAP air supply hose connected to HEMTT air supply coupling. BAP control valve activated. HEMTT air supply pressure OK.
POSSIBLE PROBLEMS
Air line between BAP air supply hose and control valve faulty. Control valve faulty. Curb-side and/or road-side air lines between control valve and air cylinders faulty. Curb-side and/or road-side air cylinder breather(s) faulty. Curb-side and/or road-side air cylinder(s) faulty.

2.  
**Is there steady and strong air pressure at inlet port of control valve?**



TEST OPTIONS
Audible inspection.
REASON FOR QUESTION
Control valve will not operate without sufficient air pressure.

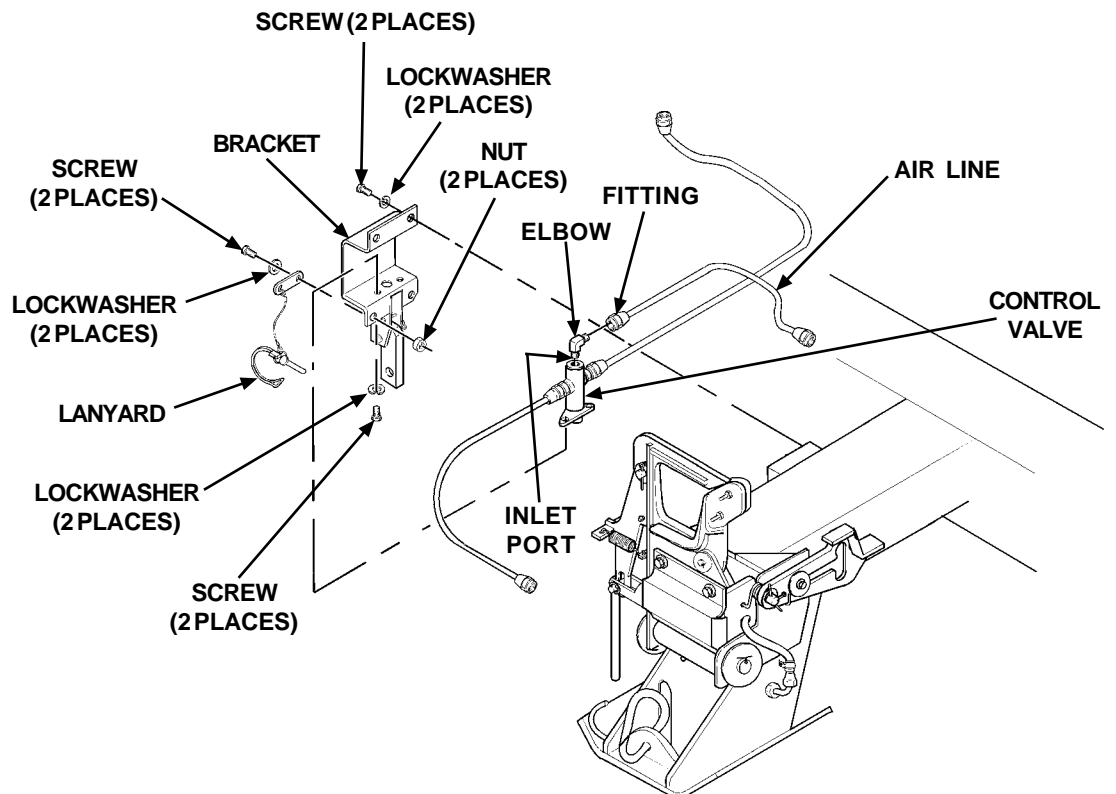




**4-12. UNIT TROUBLESHOOTING (continued).**

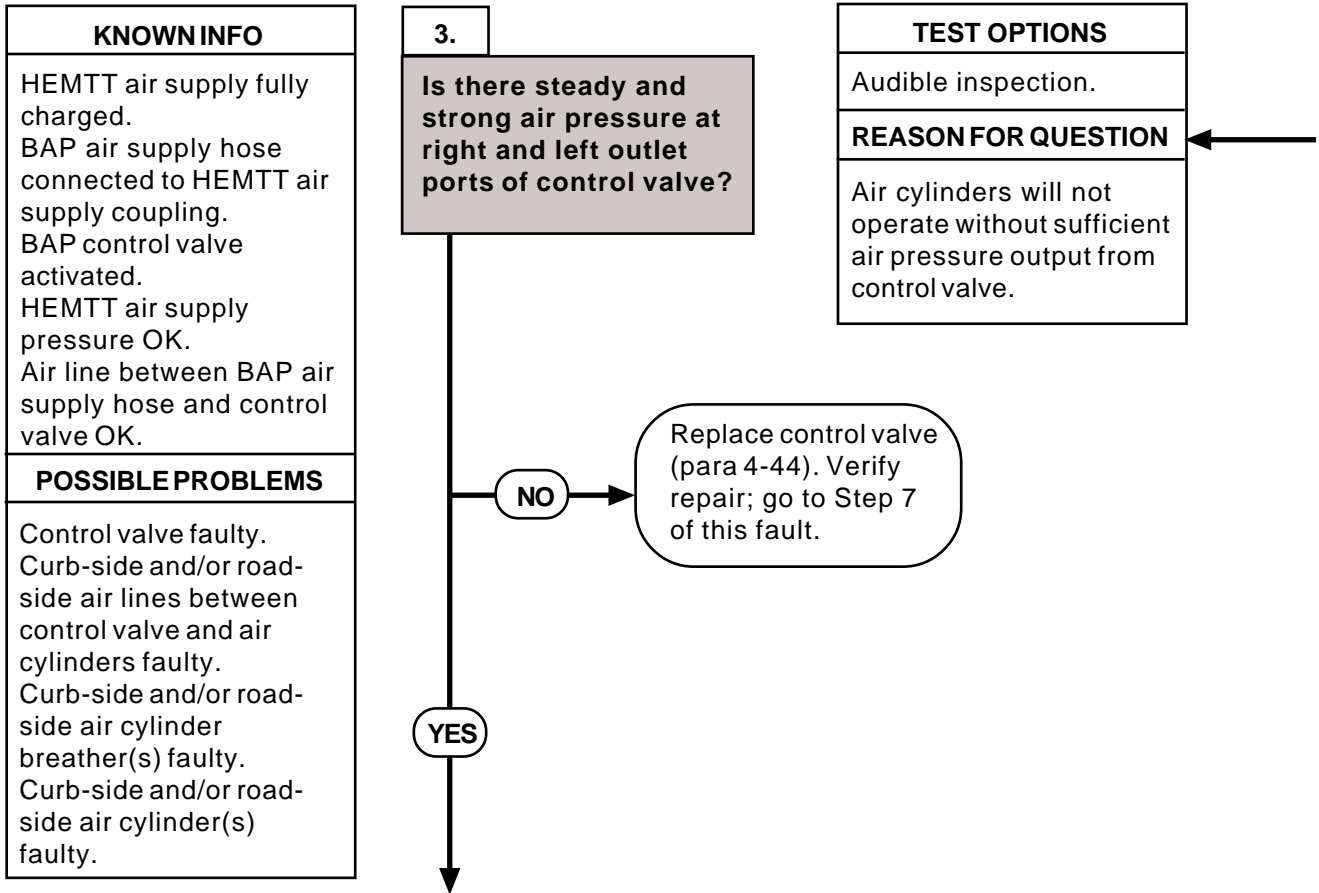
**2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).**

AUDIBLE INSPECTION	
(1)	Remove two screws and lockwashers from bracket and control valve. Discard lockwashers.
(2)	Remove two screws and lockwashers from bracket. Discard lockwashers.
(3)	Remove two screws, lockwashers, and nuts, lanyard, and bracket from frame.
(4)	Remove air line fitting from elbow on inlet port of control valve. Check for air pressure at end of air line. <ul style="list-style-type: none"> <li>(a) Very little or no air pressure indicates air line between BAP air supply hose and control valve is damaged. Replace air line (para 4-45).</li> <li>(b) Steady air pressure indicates air line is good.</li> </ul>
(5)	Install fitting on elbow on inlet port of control valve.



4-12. UNIT TROUBLESHOOTING (continued).

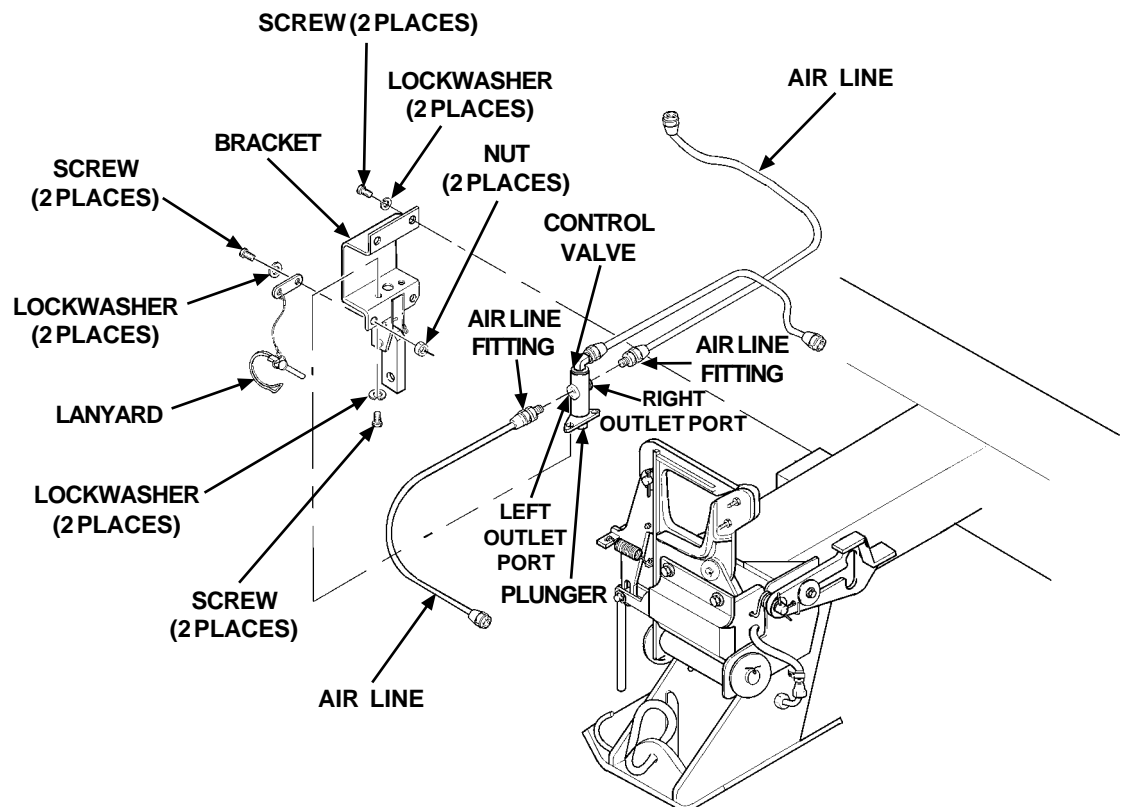
2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

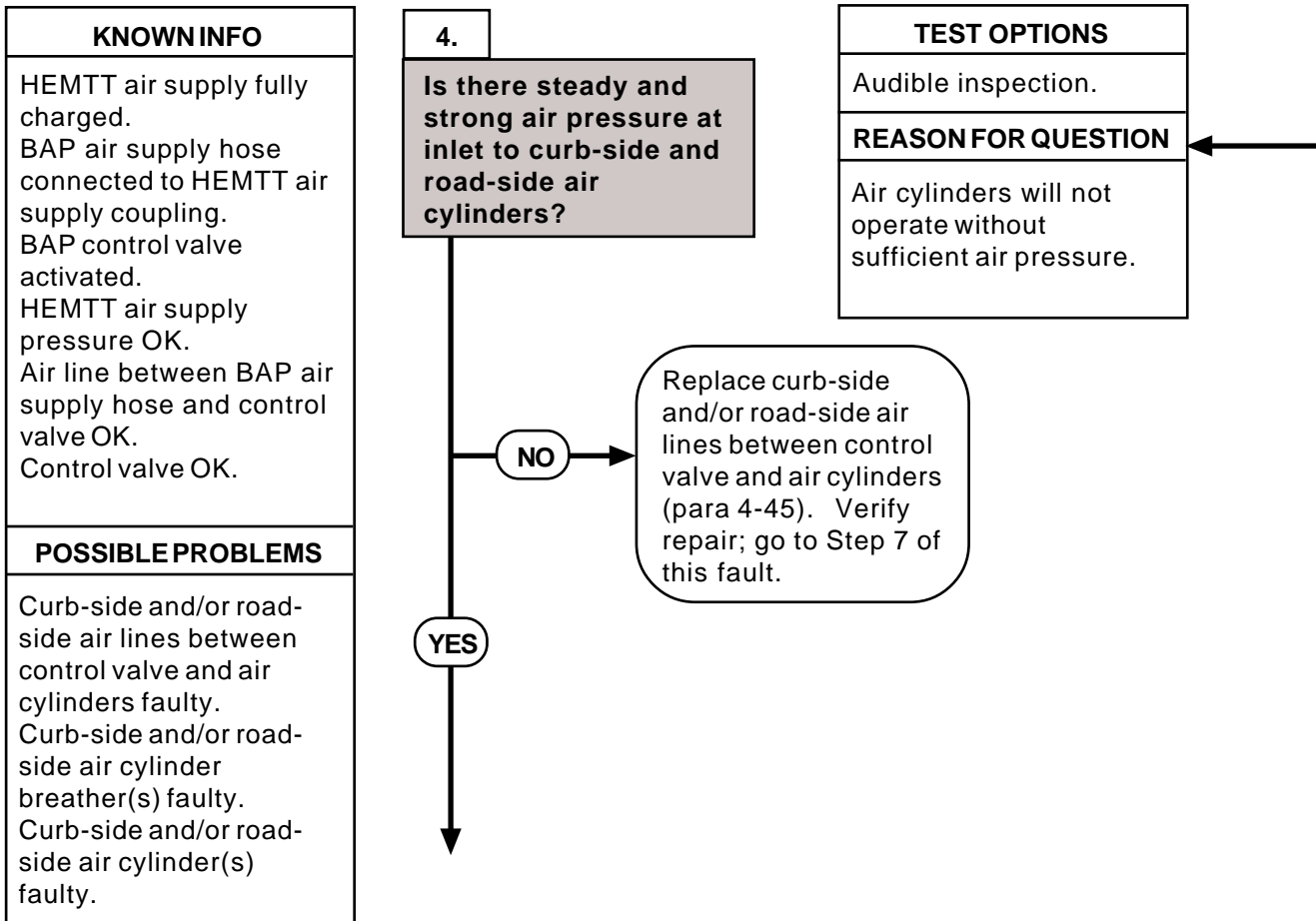
**2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).**

AUDIBLE INSPECTION
<p>(1) Remove air line fittings from right and left outlet ports of control valve. Check for air pressure at both outlet ports by pressing plunger on bottom of control valve.</p> <p>(a) Very little or no air pressure at one and/or both outlet ports indicates control valve is defective. Replace control valve (para 4-44).</p> <p>(b) Steady air pressure from both outlet ports indicates control valve is good.</p> <p>(2) Install fittings on left and right outlet ports of control valve.</p> <p>(3) Install bracket on control valve with two screws and new lockwashers.</p> <p>(4) Install two screws and new lockwashers on bracket and control valve.</p> <p>(5) Install lanyard and two screws, new lockwashers, and nuts on bracket.</p>



4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).

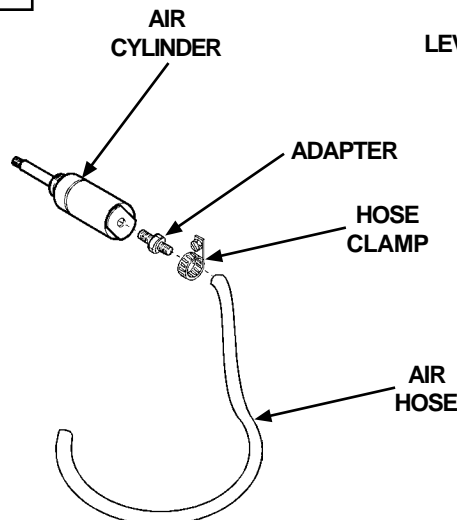
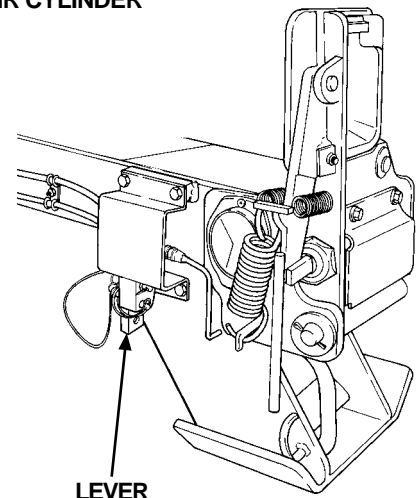
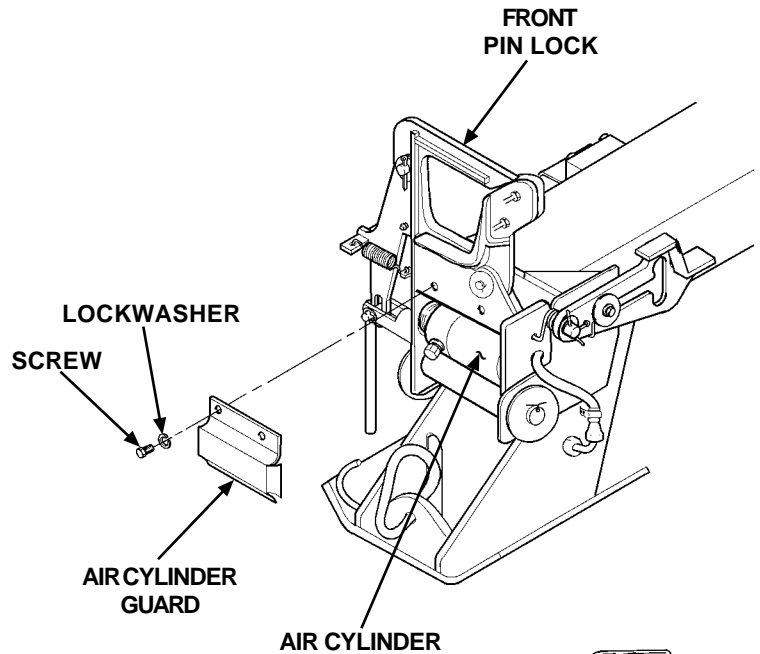


4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).

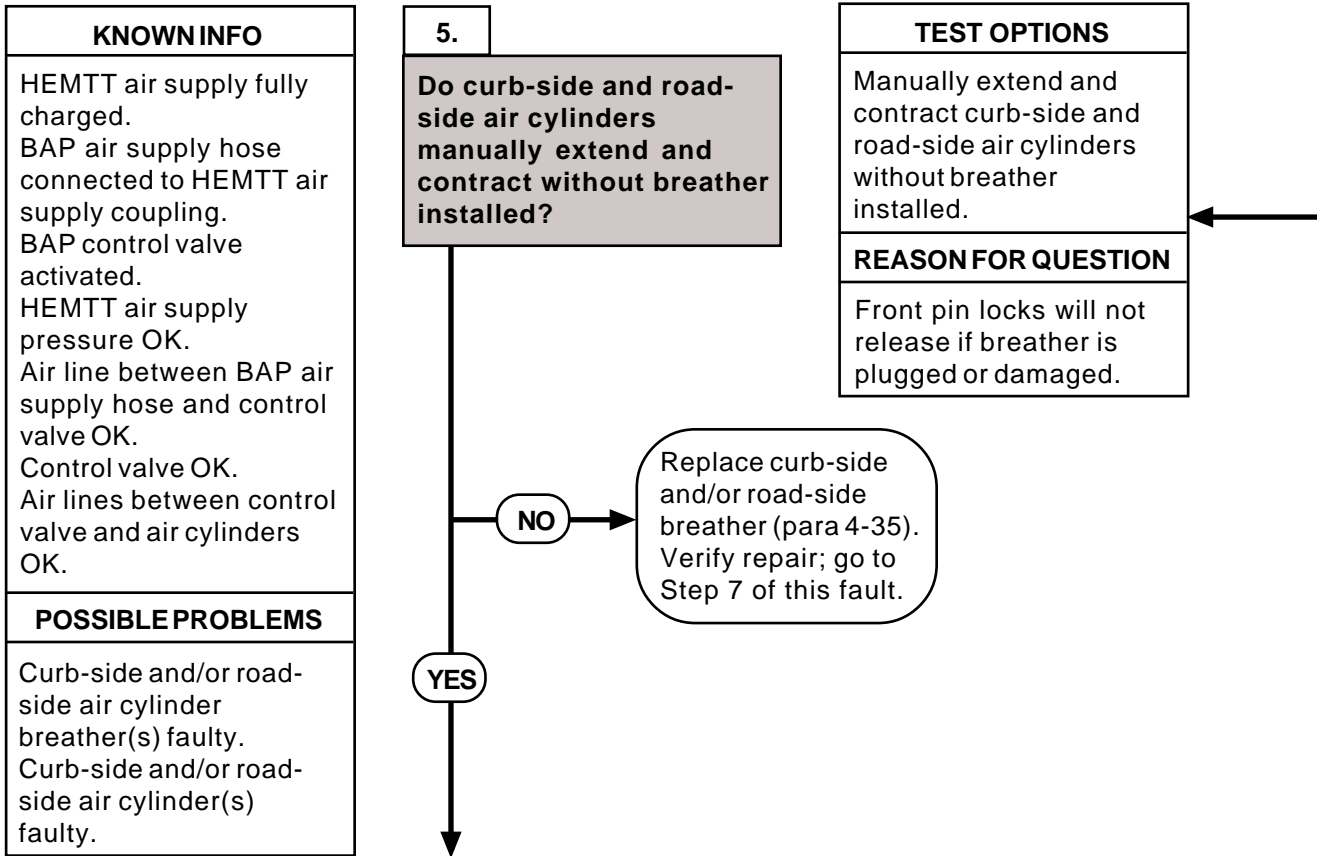
**AUDIBLE INSPECTION**

- (1) Remove two screws and lockwashers and air cylinder guard from curb-side and road-side front pin locks. Discard lockwashers.
- (2) Loosen hose clamp and remove air hose and adapter from each curb-side and road-side air cylinders. Check for air pressure at ends of air hoses.
  - (a) Activate control valve by pulling lever forward.
  - (b) Very little or no air pressure indicates hose between control valve and air cylinder is damaged. Replace hose (para 4-45).
  - (c) Steady air pressure indicates hose is good. Go to Step (3).
- (3) Install air hose and adapter on curb-side and road-side air cylinders with hose clamp.



4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).

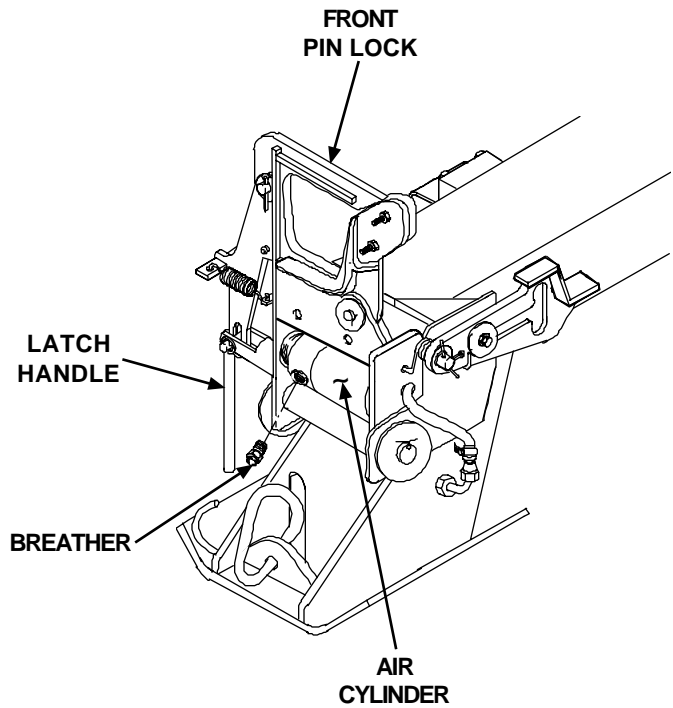


**4-12. UNIT TROUBLESHOOTING (continued).**

**2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).**

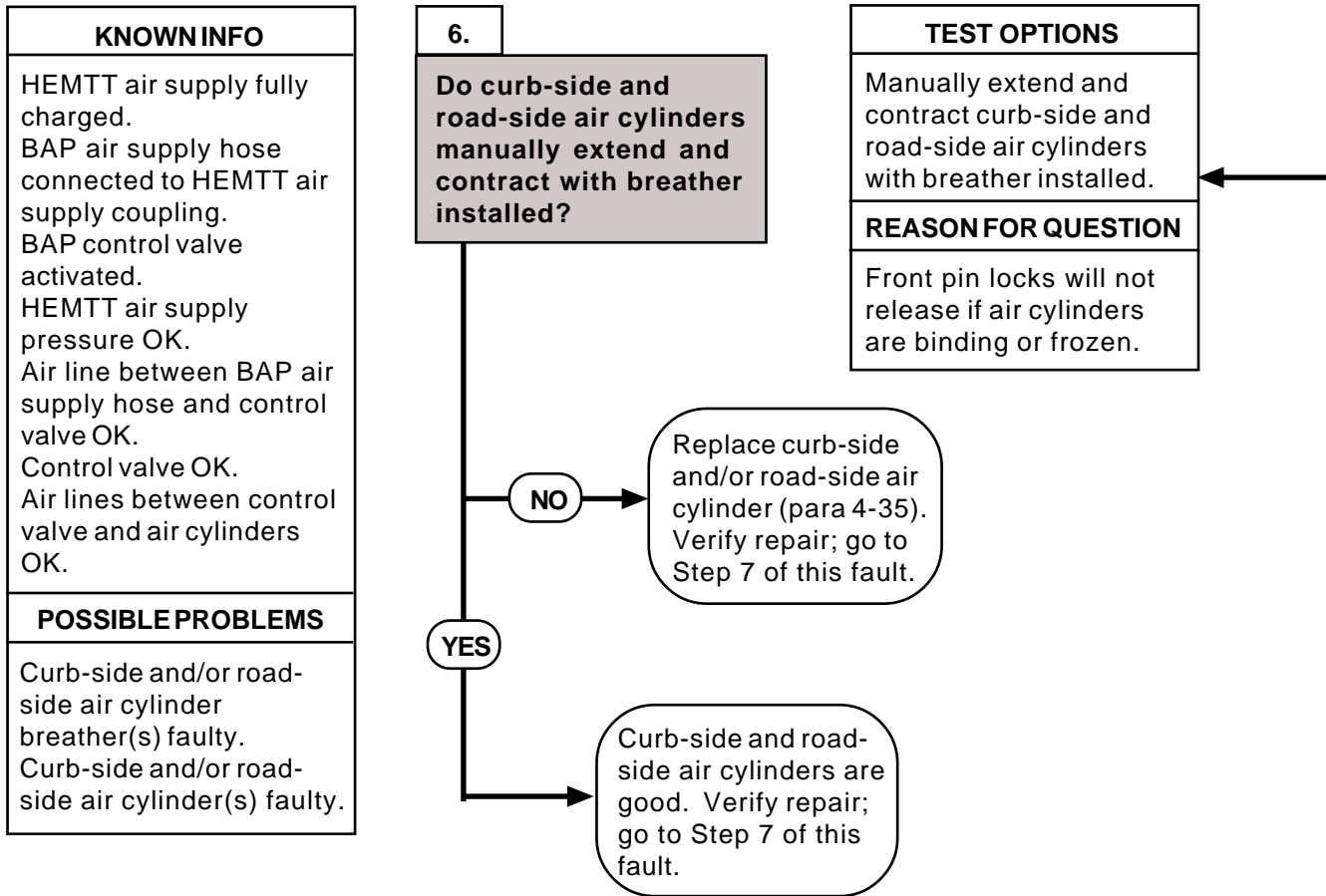
**MANUALLY EXTEND AND CONTRACT TWO AIR CYLINDERS WITHOUT BREATHER INSTALLED.**

- (1) Remove breather from curb-side and road-side air cylinders.
- (2) Pull and release curb-side and road-side latch handles to extend and contract air cylinders.
  - (a) If air cylinders do extend and contract smoothly, replace breather (para 4-35).
  - (b) If air cylinders do not extend and contract or move slowly and bind, go to Step 6.



4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).



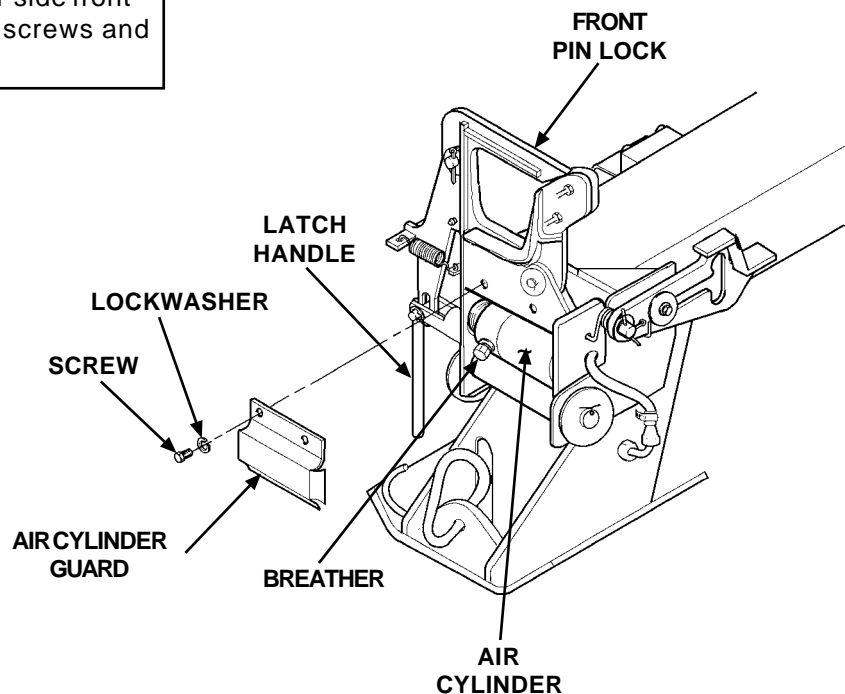


## 4-12. UNIT TROUBLESHOOTING (continued).

## 2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).

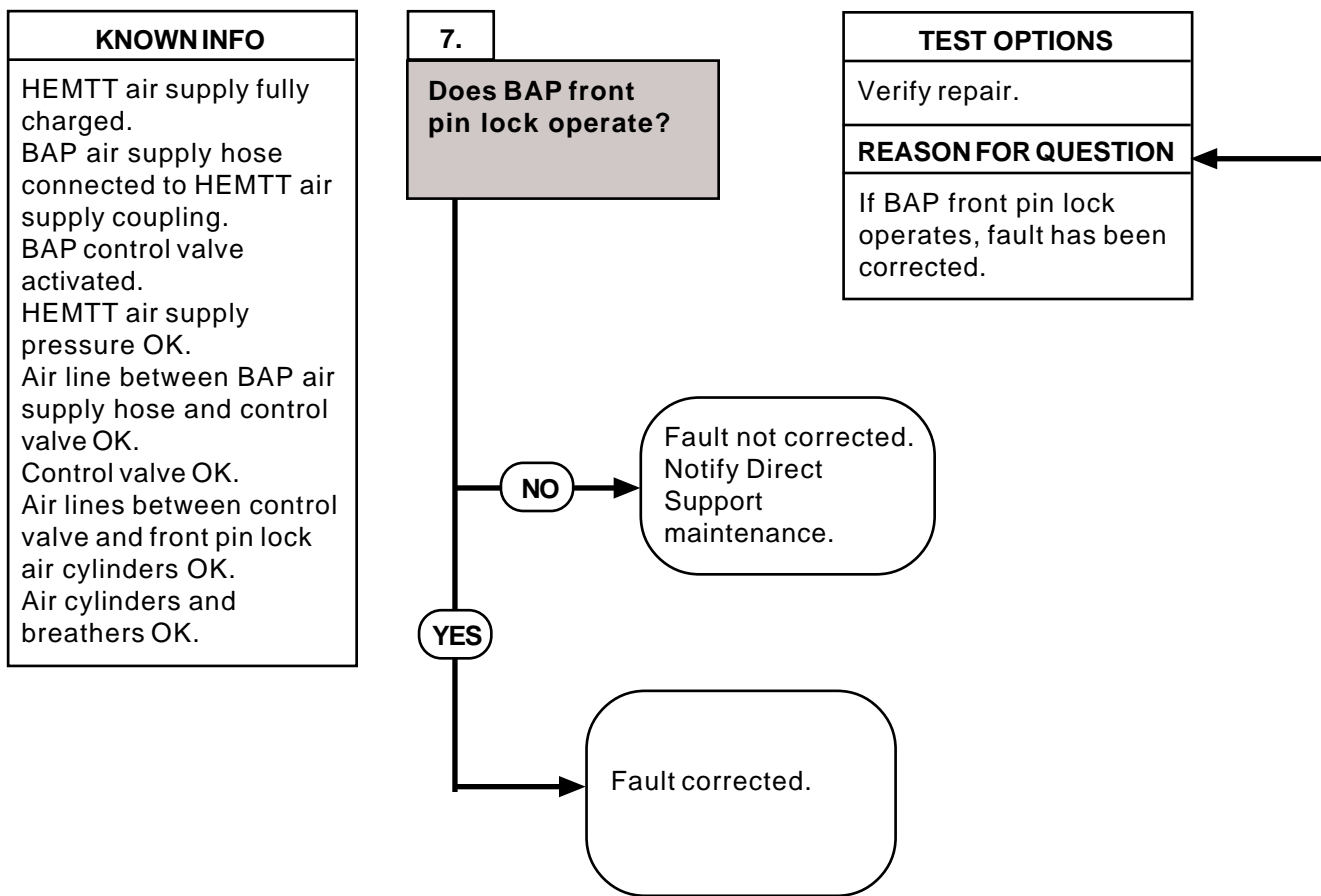
**MANUALLY EXTEND AND CONTRACT TWO AIR CYLINDERS WITH BREATHER INSTALLED.**

- (1) Pull and release curb-side and road-side latch handles to extend and contract air cylinders.
  - (a) If air cylinders do not extend and contract or move slowly and bind, air cylinders are damaged. Replace damaged air cylinders (para 4-35). Go to Step 6 of this fault.
  - (b) If air cylinders do extend and contract smoothly, go to Step (2). Verify repair.
- (2) Install air cylinder guard on curb-side and road-side front pin locks with two screws and new lockwashers.



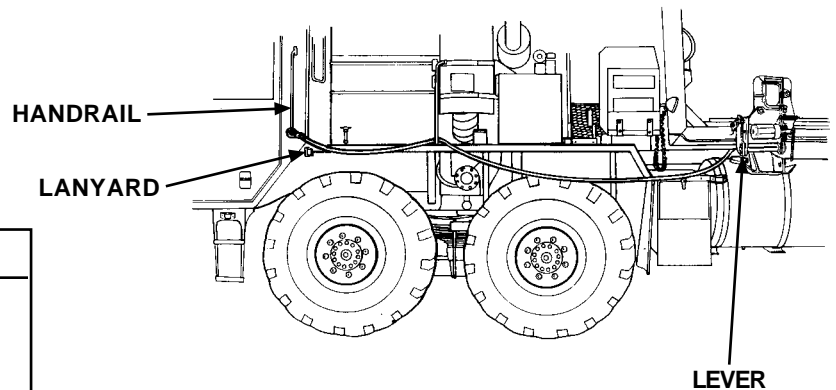
4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).



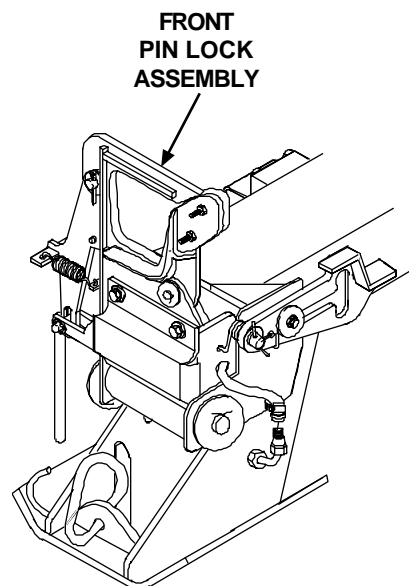
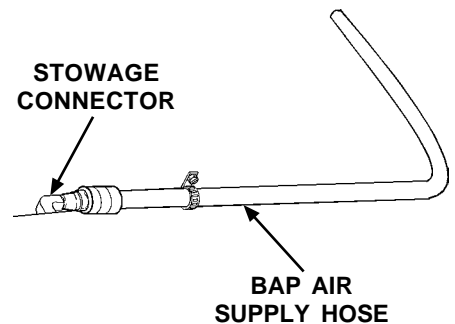
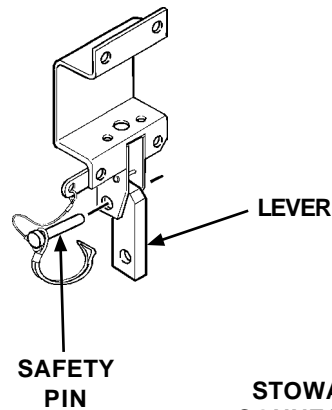
4-12. UNIT TROUBLESHOOTING (continued).

2. BAP FRONT PIN LOCK WILL NOT OPERATE (continued).



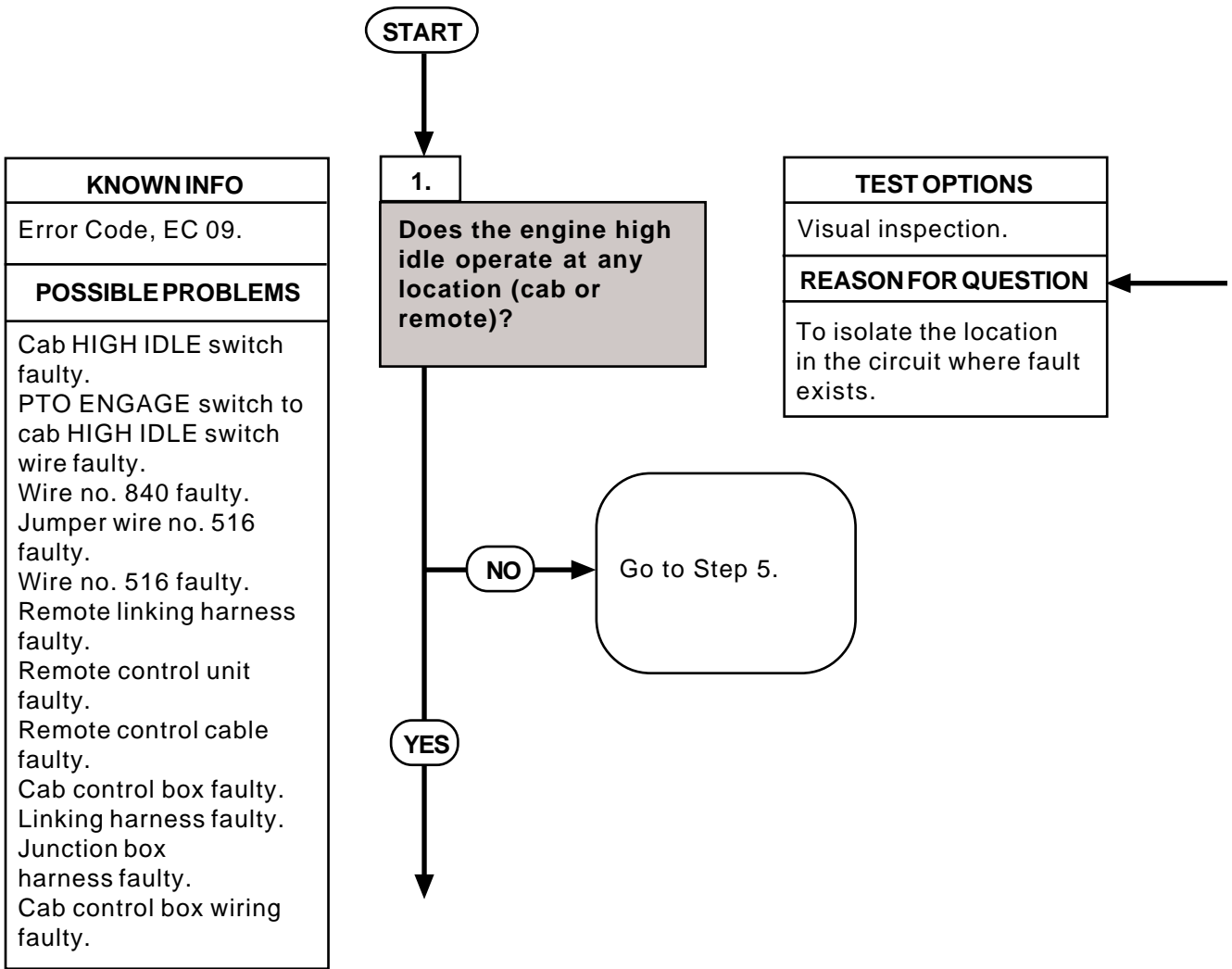
**VERIFY REPAIR**

- (1) Make sure safety pin is engaged through lever.
- (2) Run lanyard from toolbox forward and attach to Transporter handrail.
- (3) Attach lanyard to front bridge lock lever.
- (4) Remove safety pin from lever.
- (5) Pull lanyard to release front pin locks.
  - (a) If front pin locks do not release, fault was not corrected. Notify Direct Support maintenance.
  - (b) If front pin locks do release, fault has been corrected.
- (6) Remove and stow lanyard.
- (7) Insert safety pin in lever.
- (8) Disconnect BAP air supply hose from HEMTT air supply coupling and connect to stowage connector on BAP.
- (9) Close both front pin lock assemblies.



4-12. UNIT TROUBLESHOOTING (continued).

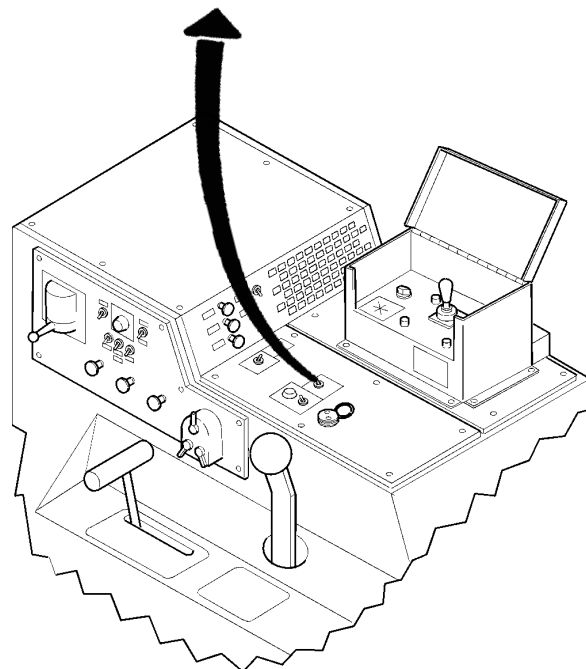
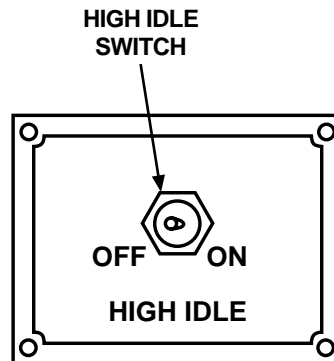
<b>3. ENGINE HIGH IDLE DOES NOT OPERATE.</b>	
<b>INITIAL SETUP</b>	
<p><i>Tools and Special Tools</i></p> <p>Multimeter (ANURM105C)                  Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)</p> <p><i>Personnel Required</i></p> <p>Two</p>	<p><i>Equipment Condition</i></p> <p>Engine turned off (TM 9-2320-279-10)                  Parking brake applied (TM 9-2320-279-10)                  Wheels chocked (TM 9-2320-279-10)</p>



**4-12. UNIT TROUBLESHOOTING (continued).**

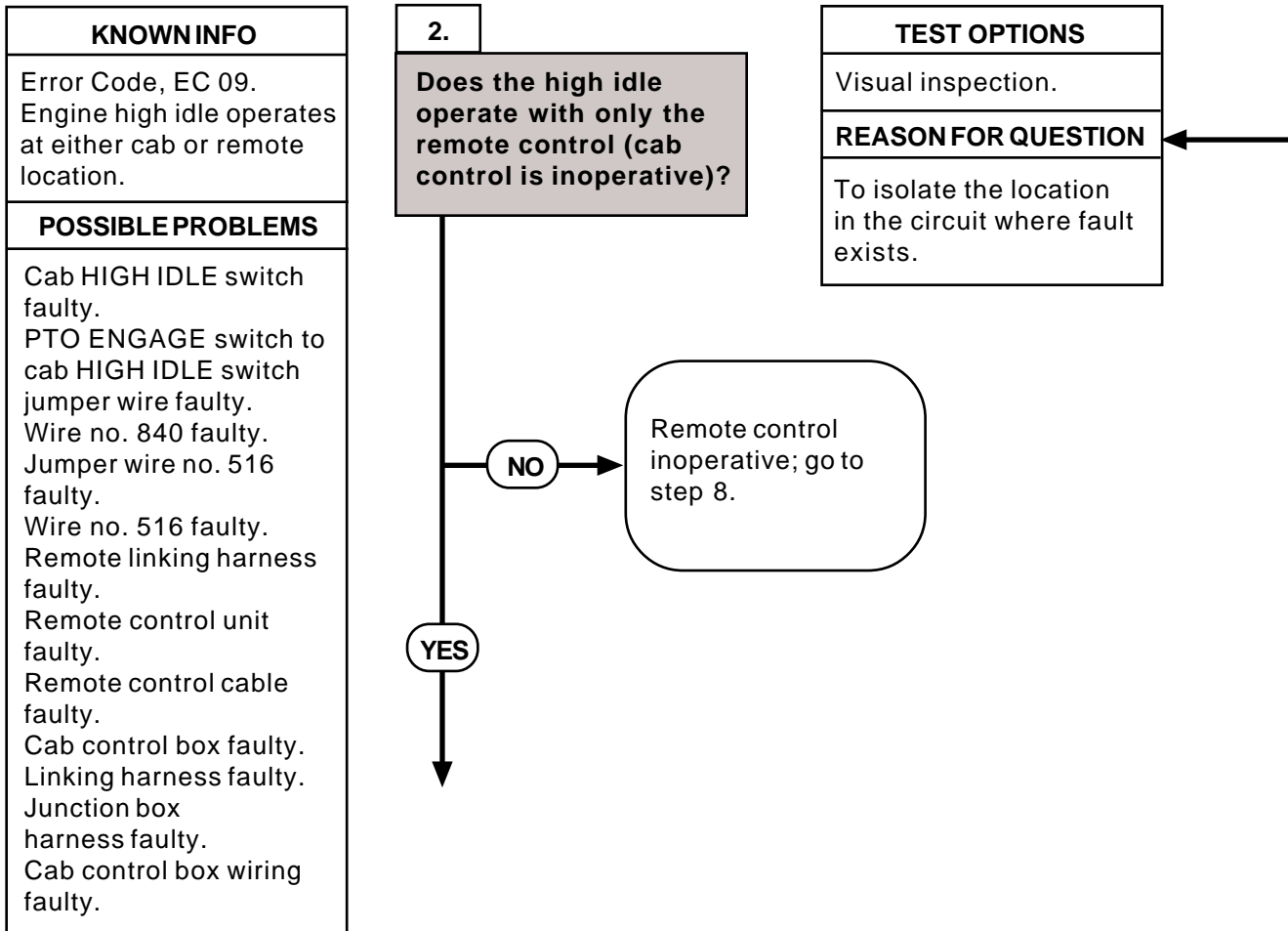
**3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).**

- | <b>VISUAL INSPECTION</b> |   |
|--------------------------|---|
| (1)                      | Start engine.   |
| (2)                      | Move cab HIGH IDLE switch to ON position and observe engine speed.            |
| (3)                      | Move cab HIGH IDLE switch to OFF position.                                    |
| (4)                      | Move remote control HIGH IDLE switch to ON position and observe engine speed. |
| (5)                      | Move remote control HIGH IDLE switch to OFF position.                         |
| (6)                      | Move remote control cable to other side of truck and repeat Steps 4 and 5.    |
| (7)                      | Shut off engine.  |



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

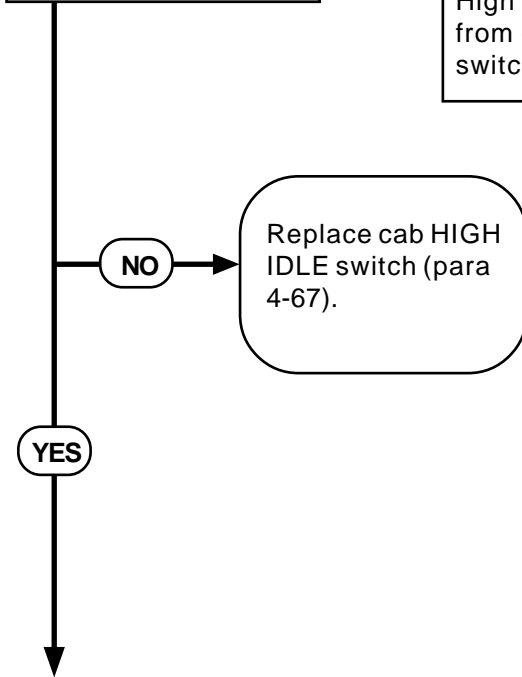
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

<b>KNOWN INFO</b>
Error Code, EC 09. Engine high idle operates at remote locations.
<b>POSSIBLE PROBLEMS</b>
Cab HIGH IDLE switch faulty. PTO ENGAGE switch to cab HIGH IDLE switch jumper wire faulty.

3.  
**Is there continuity between terminals 2 and 3 on the cab HIGH IDLE switch?**

<b>TEST OPTIONS</b>
Cab High Idle Switch Test.
<b>REASON FOR QUESTION</b>
High idle will not work from cab location if cab switch is defective.





4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

**CAB HIGH IDLE SWITCH TEST**

**CAUTION**

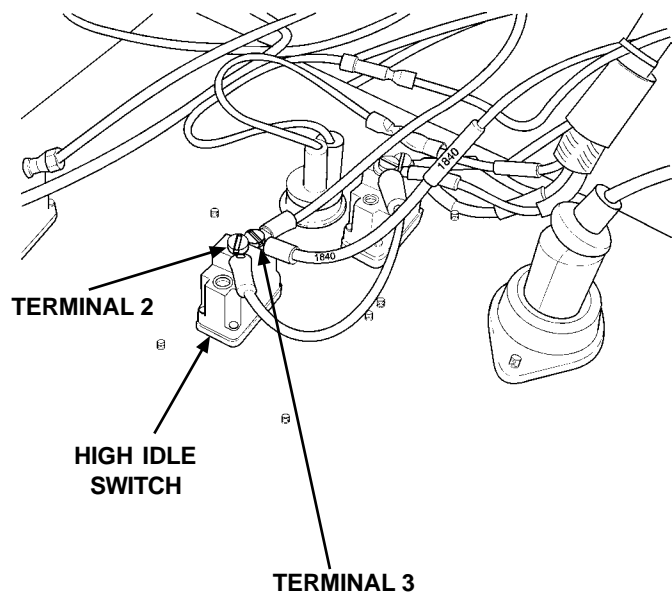
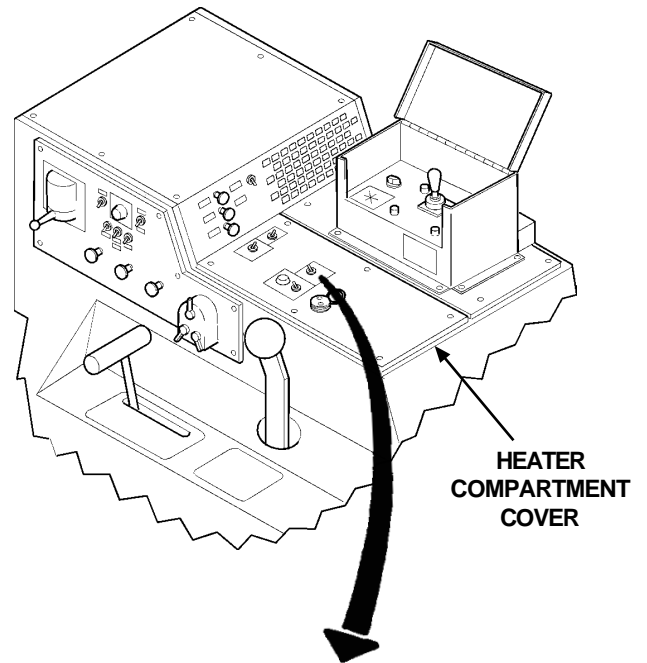
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Turn off engine start switch.
- (2) Remove six screws and lift heater compartment cover for access to switch terminals.
- (3) Move HIGH IDLE switch to ON position.
- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to switch terminals, and check multimeter for continuity.



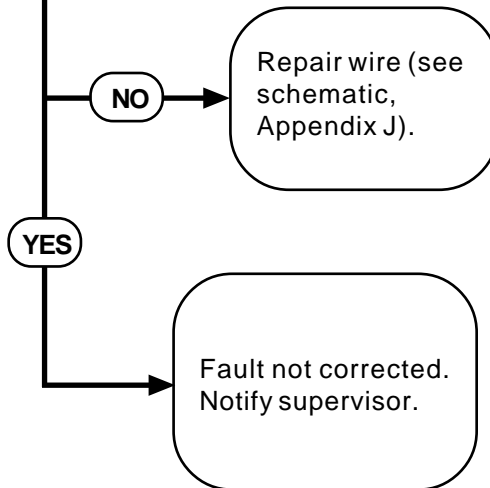
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

KNOWN INFO
Error Code, EC 09. Engine high idle operates at remote locations. Cab HIGH IDLE switch OK.
POSSIBLE PROBLEMS
PTO ENGAGE switch to cab HIGH IDLE switch jumper wire faulty.

4.  
Is there continuity on jumper wire between PTO ENGAGE switch and the cab HIGH IDLE switch (terminal 2)?

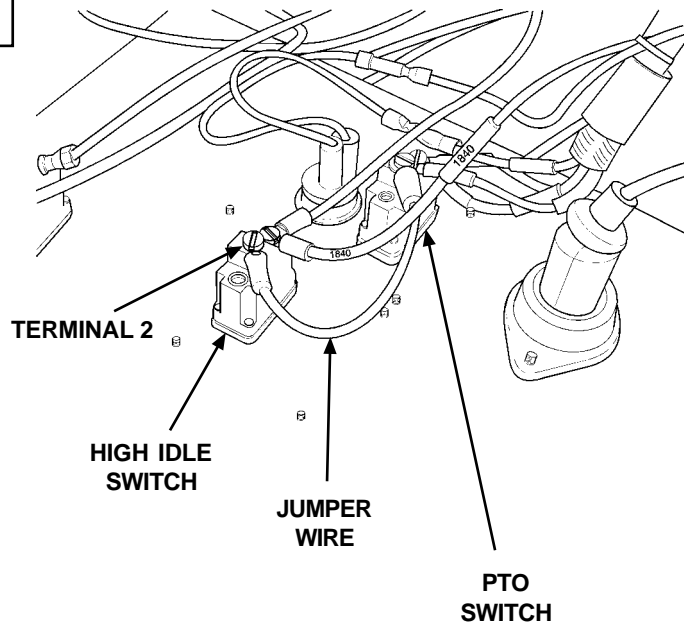
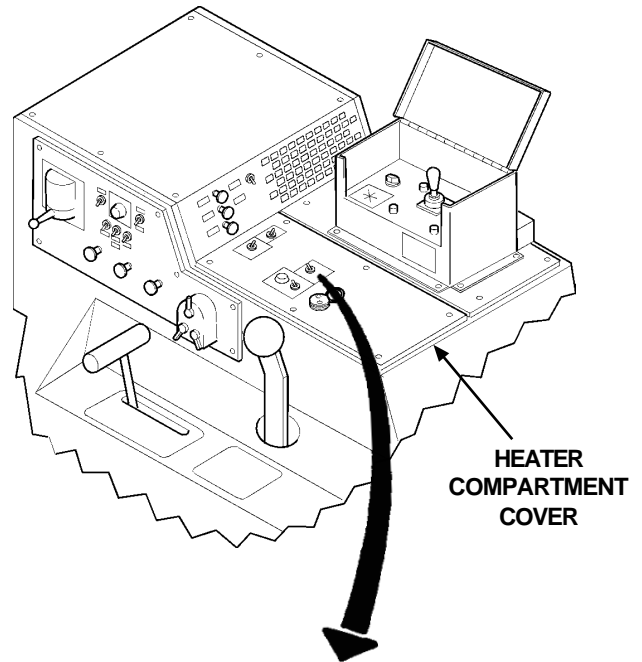
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Cab HIGH IDLE switch gets its power supply from PTO ENGAGE switch. If the wire is damaged, the engine high idle will not operate from cab location.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

<p><b>CONTINUITY TEST</b></p>
<p><b><u>CAUTION</u></b></p>
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(1) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p>
<p>A reading of infinity indicates an open circuit.</p>
<p>(2) Connect multimeter leads to each end of wire, and check multimeter for continuity.</p>



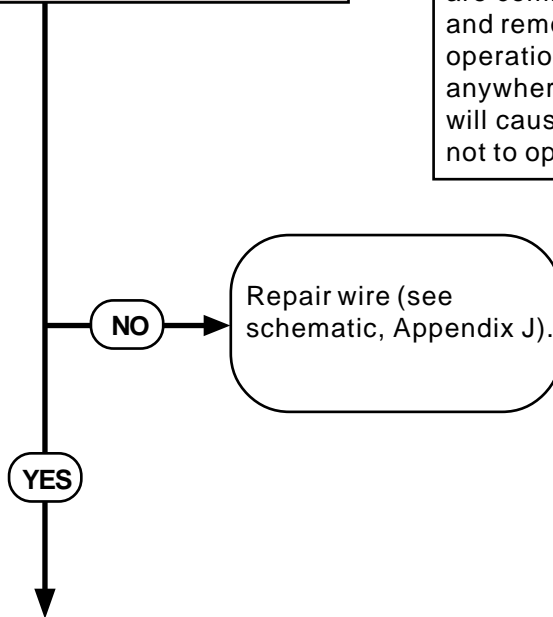
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

KNOWN INFO
Error Code, EC 09. Engine high idle does not operate from cab or remote.
POSSIBLE PROBLEMS
Wire no. 840 faulty. Jumper wire no. 516 faulty. Wire no. 516 faulty.

5.  
Is there continuity on wire no. 840 between cab HIGH IDLE switch and the 2-pin connector?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Wire nos. 840 and 516 are common to both cab and remote high idle operation. An open anywhere in this circuit will cause the high idle not to operate.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect jumper wire no. 516.
- (2) Set multimeter to ohms position.

**NOTE**

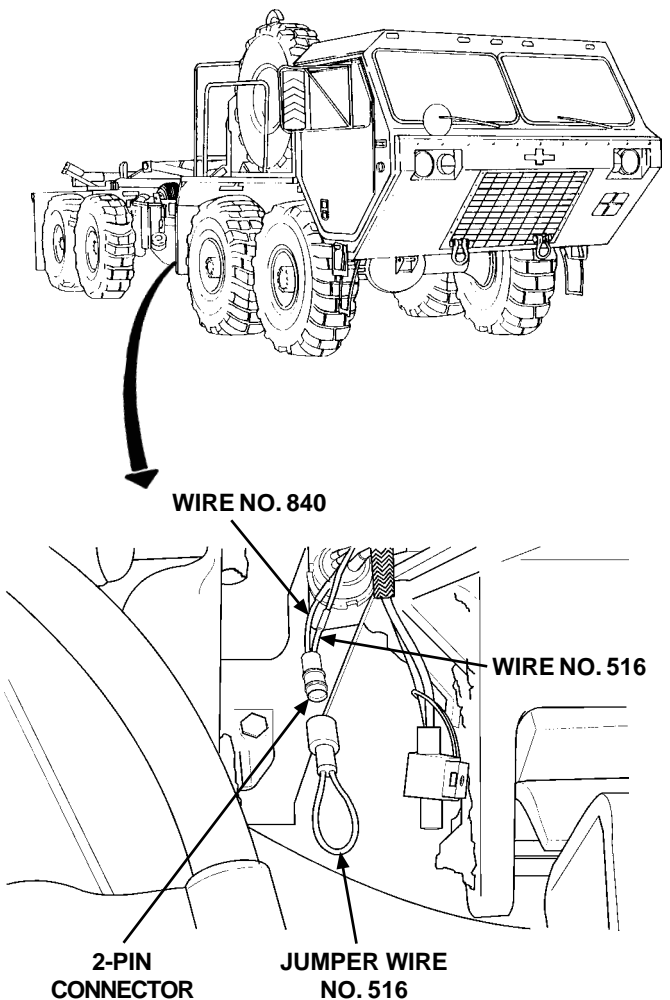
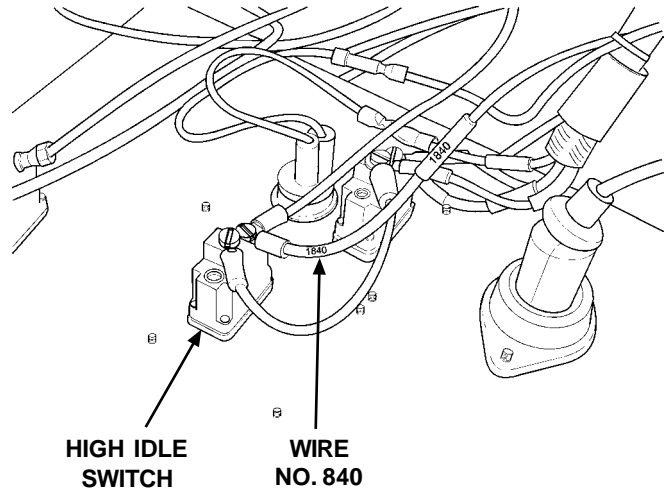
A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to wire no. 840 at HIGH IDLE switch and at 2-pin connector. Check multimeter for continuity.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



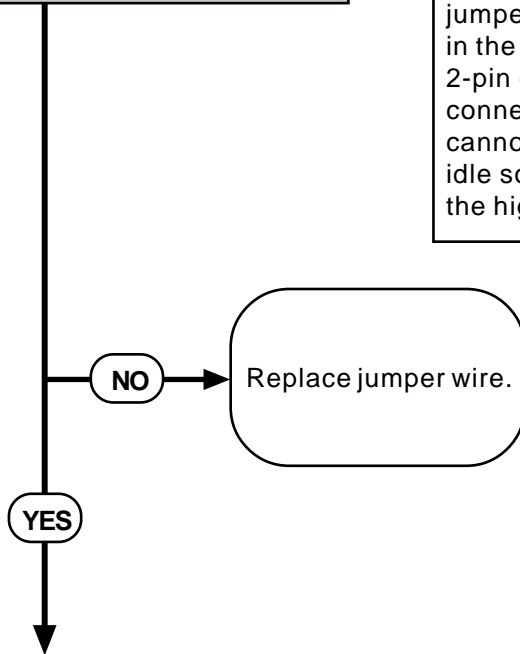
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

<b>KNOWN INFO</b>
Error Code, EC 09. Engine high idle does not operate from cab or remote. Wire no. 840 OK.
<b>POSSIBLE PROBLEMS</b>
Jumper wire no. 516 faulty. Wire no. 516 faulty.

6.  
Is there continuity on jumper wire no. 516?  
Is the connection OK?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
For CBT applications, a jumper wire is installed in the existing HEMTT 2-pin connector. If this connection is bad, power cannot reach the high idle solenoid to actuate the high idle.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

**CONTINUITY TEST**

**CAUTION**

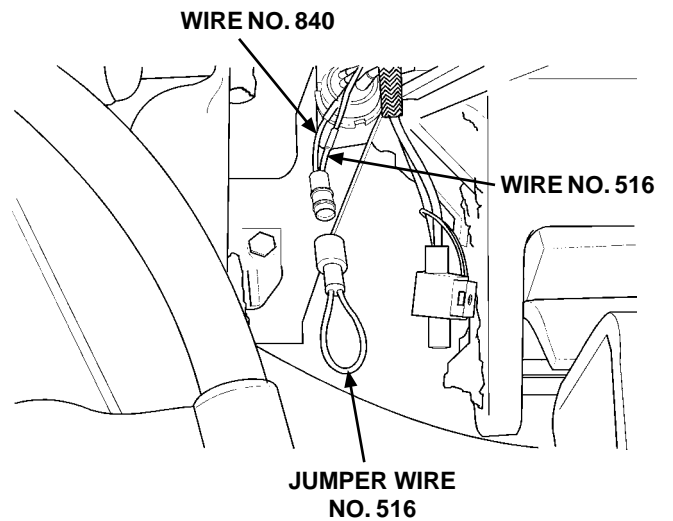
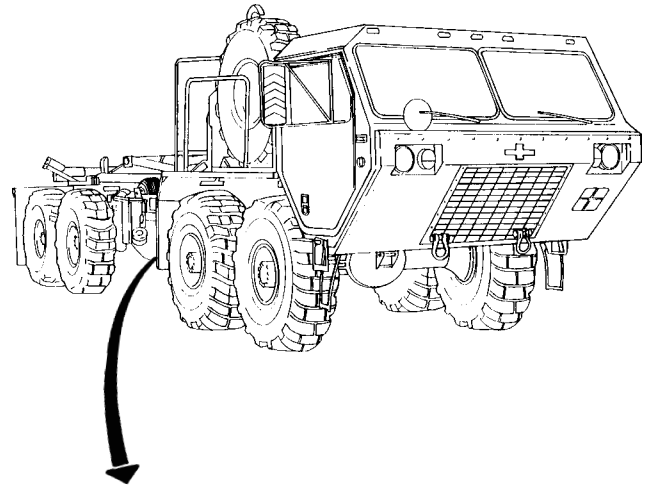
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (2) Connect multimeter leads to each end of jumper wire, and check multimeter for continuity.



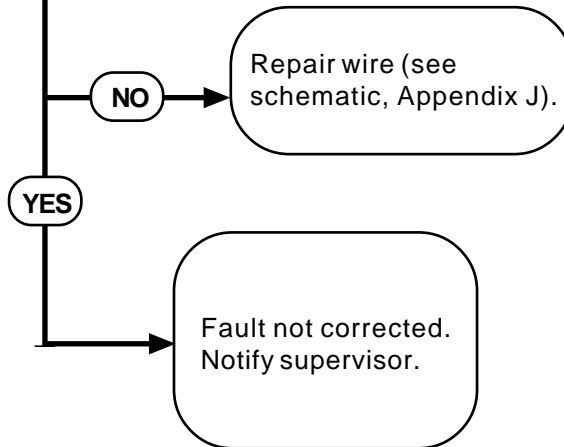
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

KNOWN INFO
Error Code, EC 09. Engine high idle does not operate from cab or remote. Wire no. 840 OK. Jumper wire no. 516 OK.
POSSIBLE PROBLEMS
Wire no. 516 faulty.

7.  
Is there continuity on wire no. 516 from the 2-pin connector to the high idle solenoid?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Wire no. 516 is the voltage supply directly to the high idle solenoid. An open circuit in this wire will prevent high idle operation from both the cab and the remote.





4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect connector from high idle solenoid.
- (2) Set multimeter to ohms position.

**NOTE**

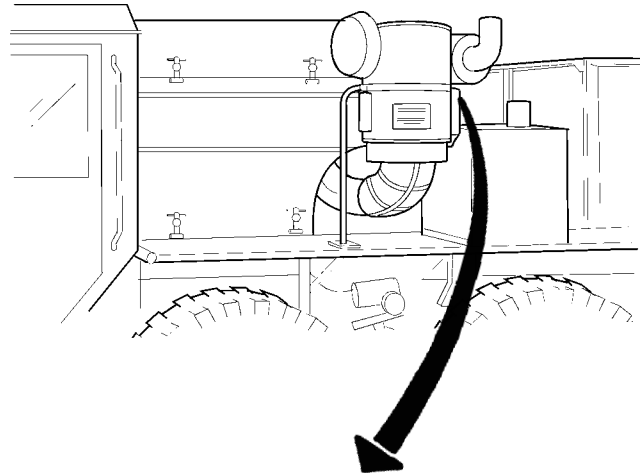
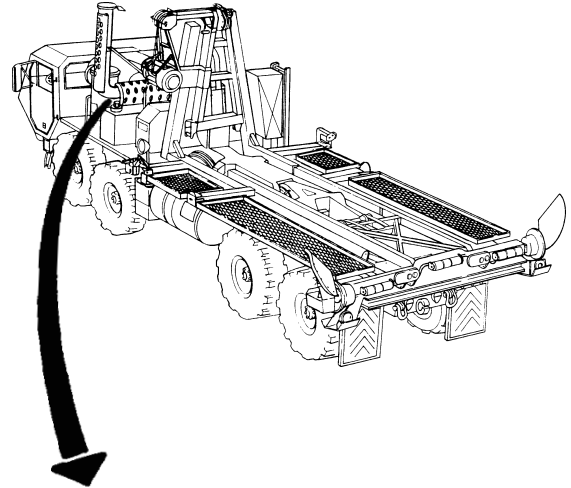
A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity.

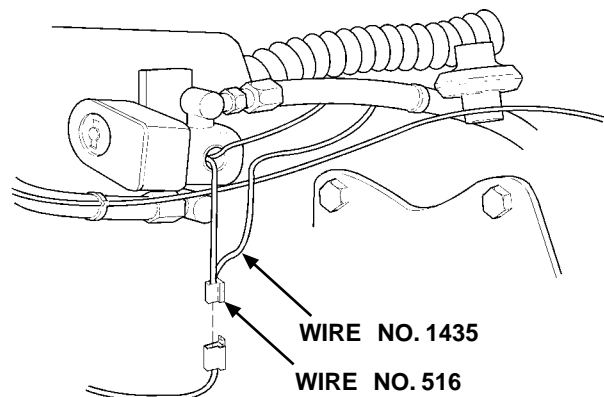
**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



**THROTTLE CONTROL SOLENOID LOCATED FORWARD OF MUFFLER**



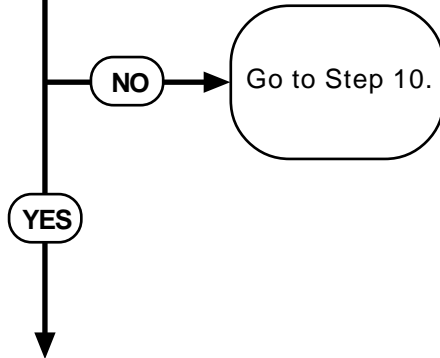
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

KNOWN INFO
Error Code, EC 09. Engine high idle operates from cab switch.
POSSIBLE PROBLEMS
Remote linking harness faulty. Remote control unit faulty. Remote control cable faulty. Cab control box faulty. Linking harness faulty. Junction box harness faulty. Cab control box wiring faulty.

8. Does the high idle operate at either the right-hand or left-hand remote locations?

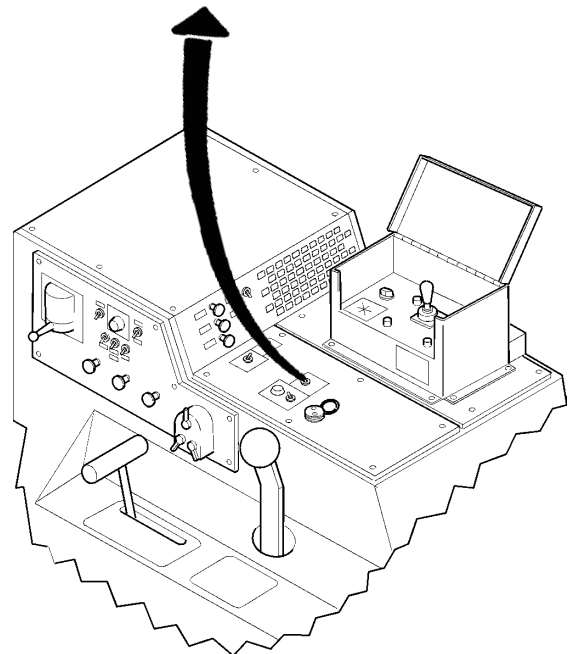
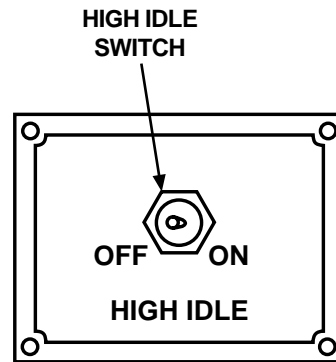
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If remote HIGH IDLE switch operates on one side but not the other, the problem is in the RH/ LH wiring or remote connector. If remote HIGH IDLE switch does not operate on either side, the problem is with remote control unit or chassis wiring common to both sides of the CBT.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

Answer this question based on the results obtained in Step 1.



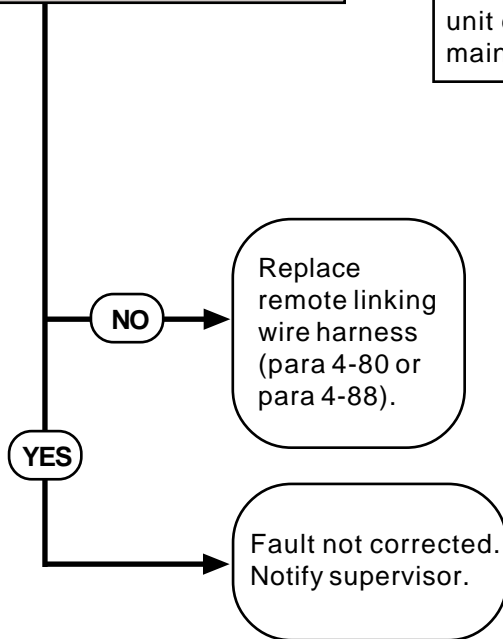
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

<b>KNOWN INFO</b>
Error Code, EC 09. Engine high idle operates from cab switch. Engine high idle operates from RH or LH remote location.
<b>POSSIBLE PROBLEMS</b>
Remote linking harness faulty.

9.  
Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?

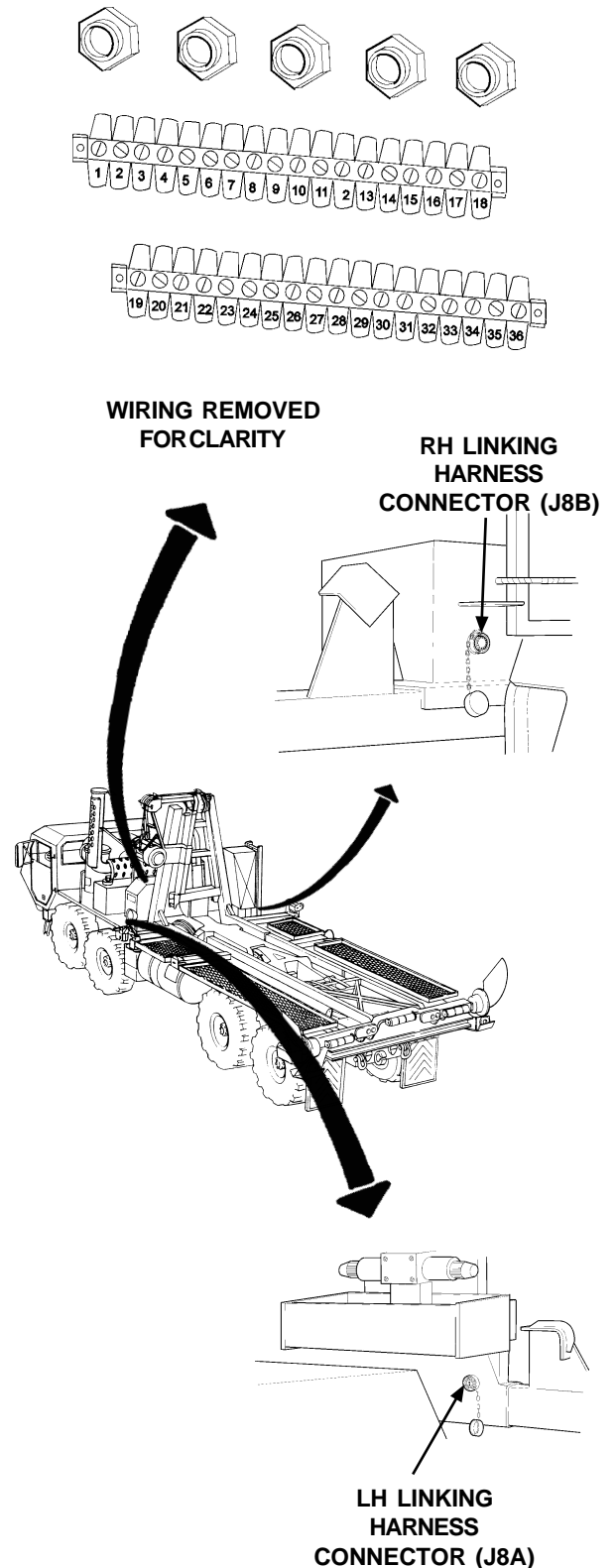
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
If there is no continuity on the remote linking harness, the function selected by the operator on the remote control unit does not reach the main control box.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

CONTINUITY TEST
<p>(1) Open hydraulic cabinet cover.                      (2) Loosen four screws on main junction box cover and open cover.                      (3) If necessary, remove remote control cable from linking harness connector.</p>
<p><b>CAUTION</b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(4) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between terminal "A" on connector and position "8" in junction box. Check again between terminal "B" on connector and position "4" in junction box.</p>
<p><b>NOTE</b></p> <p>Any reading besides infinity indicates a grounded wire.</p>
<p>(6) Remove multimeter lead from one end of wire and connect to chassis ground.</p>



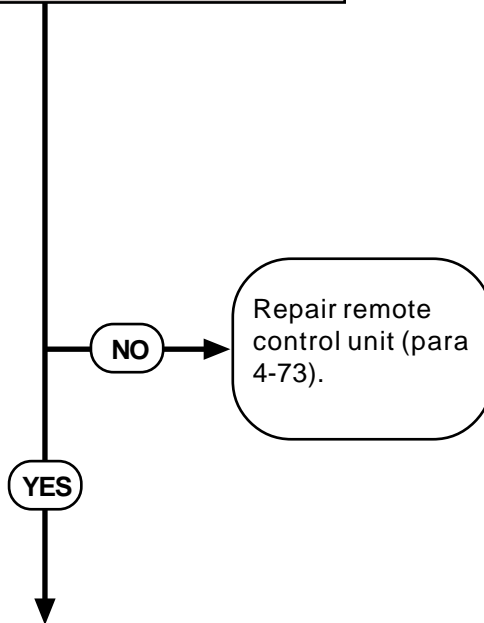
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

KNOWN INFO
Error Code, EC 09. Engine high idle operates from cab switch. Engine high idle does not operate from either RH or LH remote locations.
POSSIBLE PROBLEMS
Remote control unit faulty. Remote control cable faulty. Cab control box faulty. Linking harness faulty. Junction box harness faulty. Cab control box wiring faulty.

10.  
Is there continuity measured on the remote control connector (J9) between positions G and L with HIGH IDLE switch in the ON position?

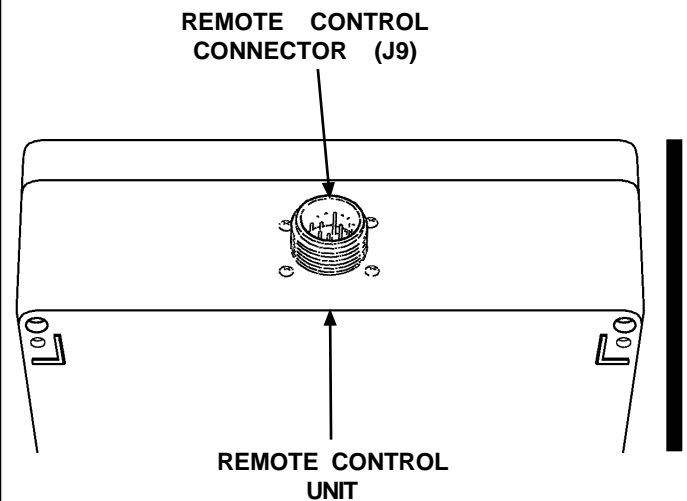
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
High idle will not operate if remote control HIGH IDLE switch is defective.



**4-12. UNIT TROUBLESHOOTING (continued).**

**3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).**

<b>CONTINUITY TEST</b>	
<p>(1) Disconnect remote control cable from remote control unit.</p> <p>(2) Set multimeter to ohms position.</p> <p>(3) Position remote control EMERGENCY STOP switch in the ON position.</p> <p>(4) Position HIGH IDLE switch in the ON position.</p>	
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>	
<p>(5) Connect multimeter leads to positions "G" and "L" on remote control unit, and check multimeter for continuity.</p>	



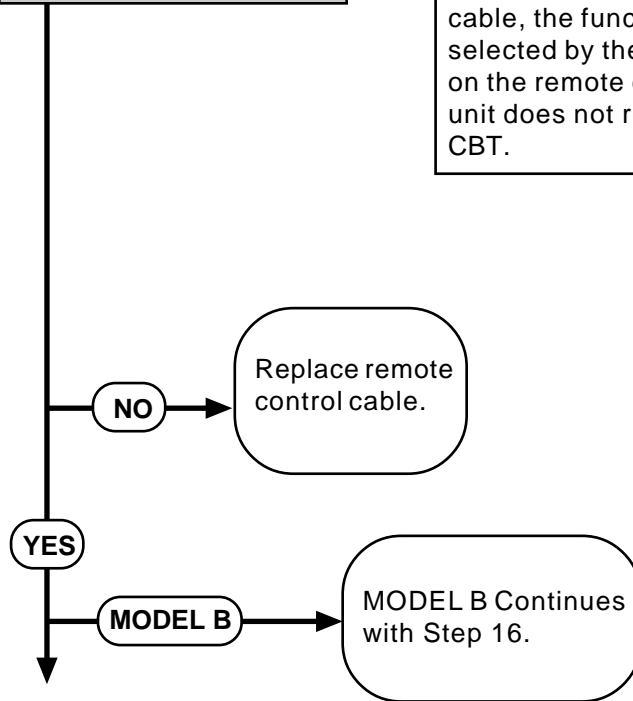
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).

KNOWN INFO
Error Code, EC 09. Engine high idle operates from cab switch. Engine high idle does not operate from either RH or LH remote locations. Remote control unit OK.
POSSIBLE PROBLEMS
Remote control cable faulty. Cab control box faulty. Linking harness faulty. Junction box harness faulty. Cab control box wiring faulty.

11.  
Is there continuity measured on the remote control cable, between connectors P8 and P9?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is no continuity on the remote control cable, the function selected by the operator on the remote control unit does not reach the CBT.





**4-12. UNIT TROUBLESHOOTING (continued).****3. ENGINE HIGH IDLE DOES NOT OPERATE (continued).****CONTINUITY TEST****CAUTION**

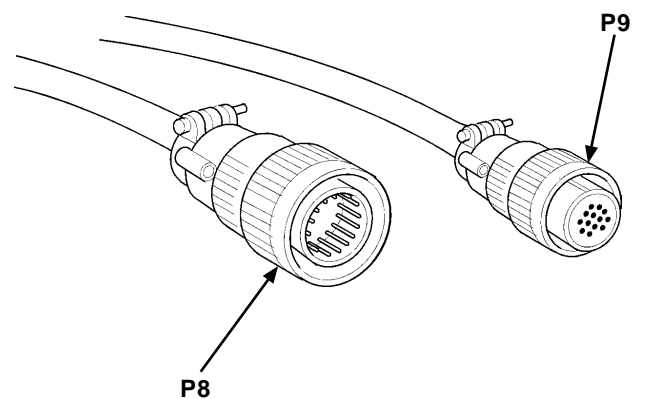
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter to leads at each end of wire, and check multimeter for continuity. Check for continuity between position "A" on chassis end and position "M" on remote control end. Also check for continuity between position "B" on chassis end and position "B" on remote end.

**REMOTE CONTROL CABLE**

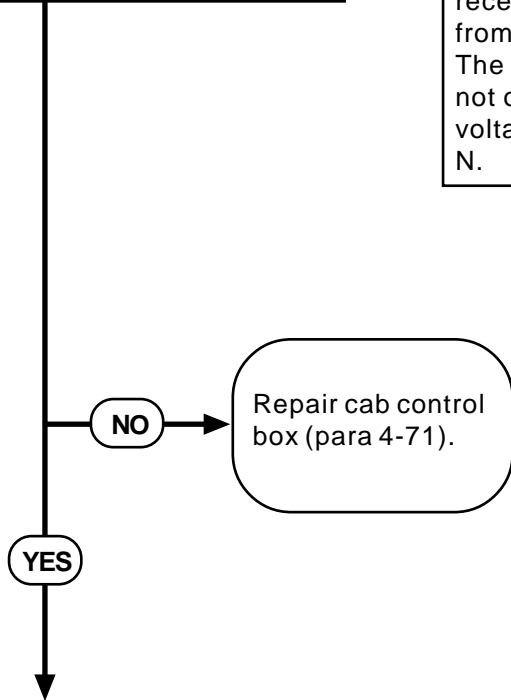
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Engine high idle operates from cab switch. Engine high idle does not operate from either RH or LH remote locations. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Cab control box faulty. Linking harness faulty. Junction box harness faulty. Cab control box wiring faulty.

12.  
 Are 22–28 volts measured at cab control box connector (J2), position N?

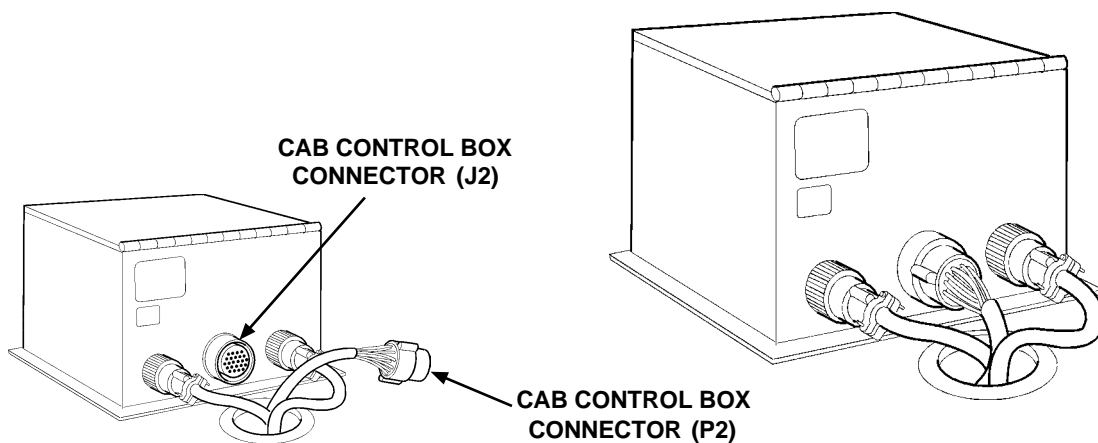
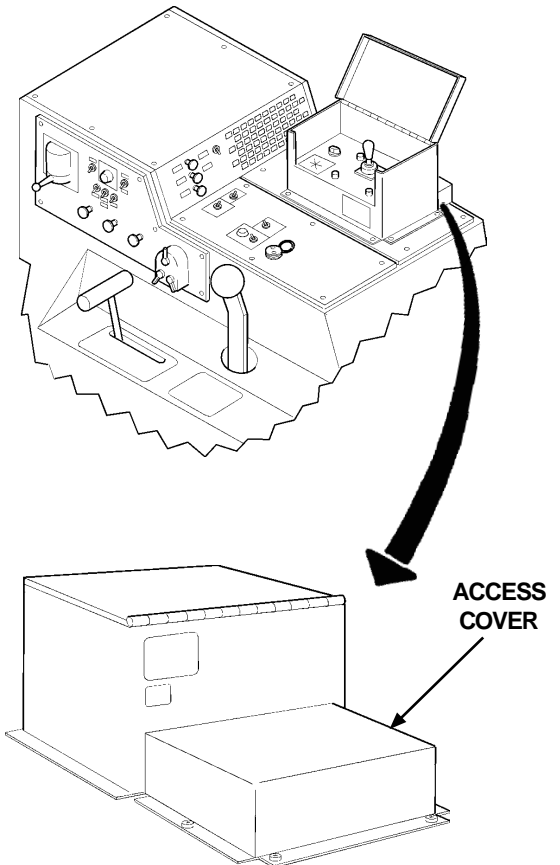
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The remote control unit receives its power source from the cab control box. The remote control will not operate if there is no voltage supply at position N.



**4-12. UNIT TROUBLESHOOTING (continued).**

**3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).**

- | <b>VOLTAGE TEST</b> |  |
|---------------------|--|
|                     | (1) Remove four screws and lockwashers and access cover from heater compartment.                           |
|                     | (2) Remove cab control box connector (P2) from cab control box.  |
|                     | (3) Turn engine start switch to ON position.   |
|                     | (4) Turn light control switch to STOP LIGHT position.  |
|                     | (5) Set multimeter to voltage position.  |
|                     | (6) Place positive (+) probe of multimeter on position "N" of cab control box connector (J2).              |
|                     | (7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading. |
|                     | (8) Turn engine start switch and light control switches to OFF position.                                   |



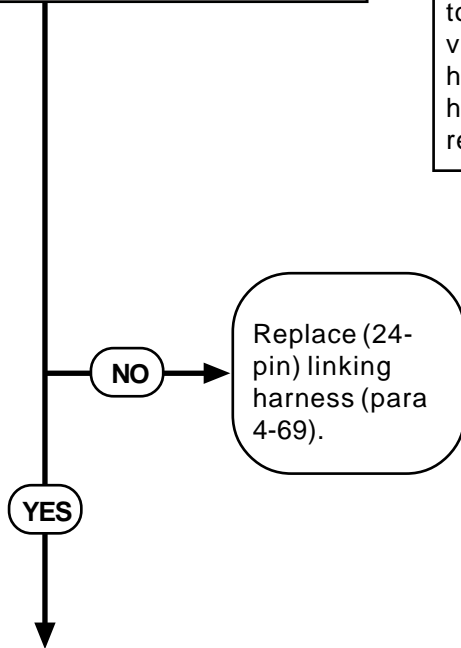
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Engine high idle operates from cab switch. Engine high idle does not operate from either RH or LH remote locations. Remote control unit OK. Remote control cable OK. Supply voltage from cab control box OK.
POSSIBLE PROBLEMS
Linking harness faulty. Junction box harness faulty. Cab control box wiring faulty.

13.  
**Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?**

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power source and ground circuit are transferred from the cab control box to the main junction box via the (24-pin) linking harness. Faults in this harness will prevent remote control operation.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect wire harness from components.
- (2) Set multimeter to ohms position.

**NOTE**

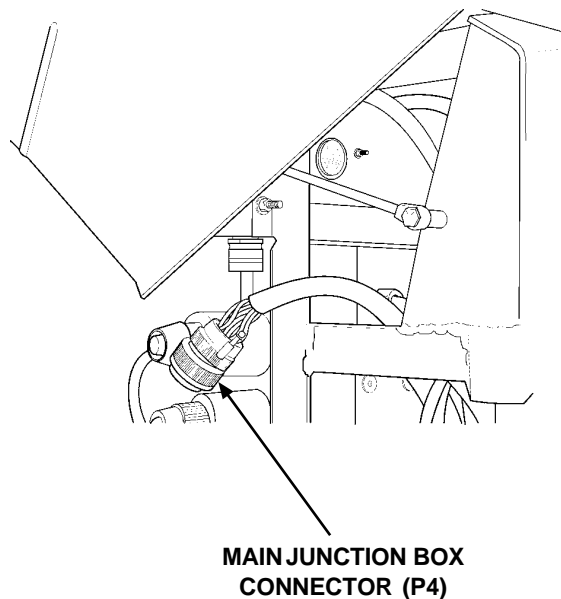
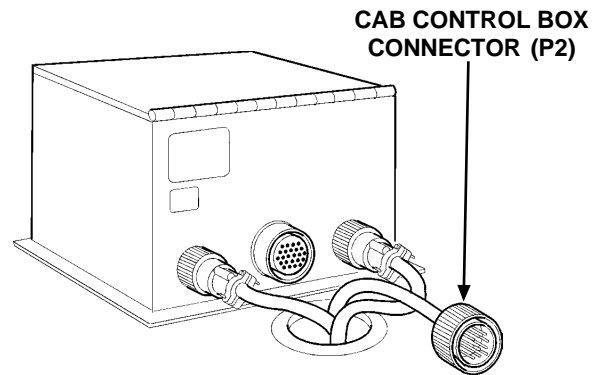
A reading of infinity indicates an open circuit.

- (3) Connect multimeter to leads at each end of wiring harness, and check multimeter for continuity. Check (24-pin) linking harness positions "N" and "R."

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



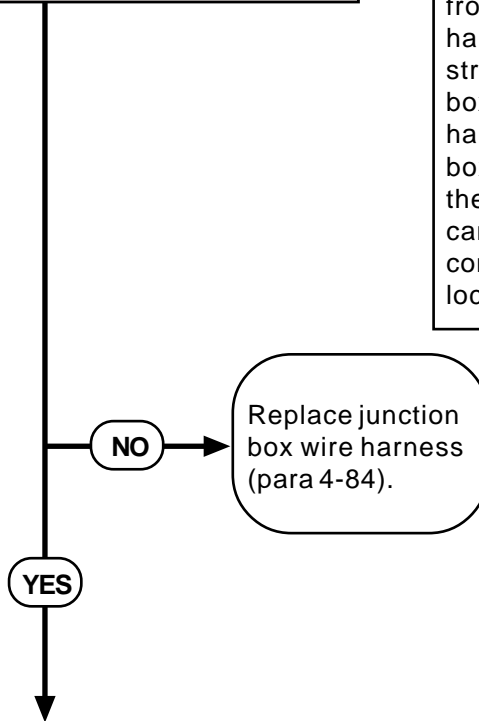
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Engine high idle operates from cab switch. Engine high idle does not operate from either RH or LH remote locations. Remote control unit OK. Remote control cable OK. Supply voltage from cab control box OK. Main linking harness OK.
POSSIBLE PROBLEMS
Junction box harness faulty. Cab control box wiring faulty.

14.  
**Is there continuity between the main junction box connector (J4) and the junction box terminal strip?**

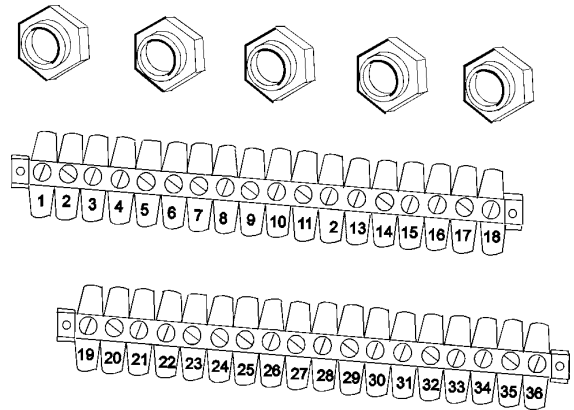
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power source and ground circuit are transferred from the (24-pin) linking harness to the terminal strip in the main junction box by this wiring harness. If the junction box harness is defective, the power and ground cannot reach the remote control connector locations.



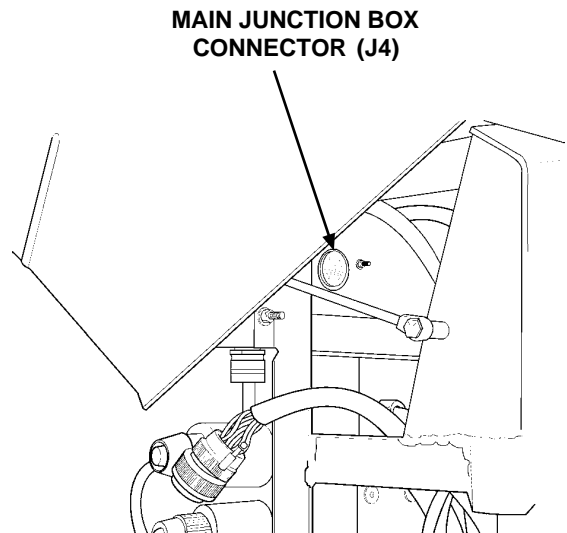
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Open hydraulic cabinet cover.                      (2) Loosen four screws on main junction box cover and open cover.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter to terminals at each end on wire, and check multimeter for continuity. Check between main junction box connector (J4), position "N," and terminal strip position "7." Also check between main junction box connector, position "R," and terminal strip position "27."</p>	



WIRING REMOVED FOR CLARITY



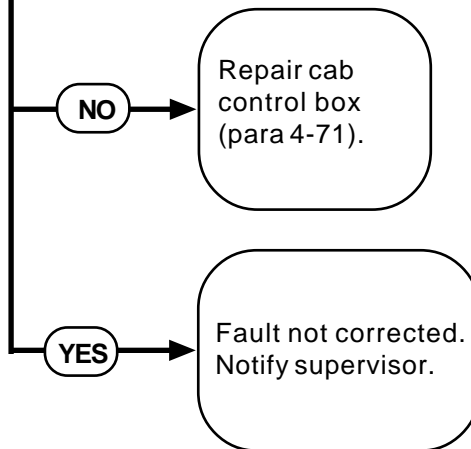
4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Engine high idle operates from cab switch. Engine high idle does not operate from either RH or LH remote locations. Remote control unit OK. Remote control cable OK. Supply voltage from cab control box OK. Junction box harness OK.
POSSIBLE PROBLEMS
Cab control box wiring faulty.

15. Is there continuity between the cab control box connector (J2), position "R," and the supply harness connector (J1), position "F"?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the (24-pin) linking harness to the cab portion of the high idle circuit through the cab control box. An open circuit in the control box will prevent high idle operation from the remote control unit.





## 4-12. UNIT TROUBLESHOOTING (continued).

## 3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL A ONLY) (continued).

## CONTINUITY TEST

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect supply harness and cab control box connectors from cab control box.
- (2) Set multimeter to ohms position.

**NOTE**

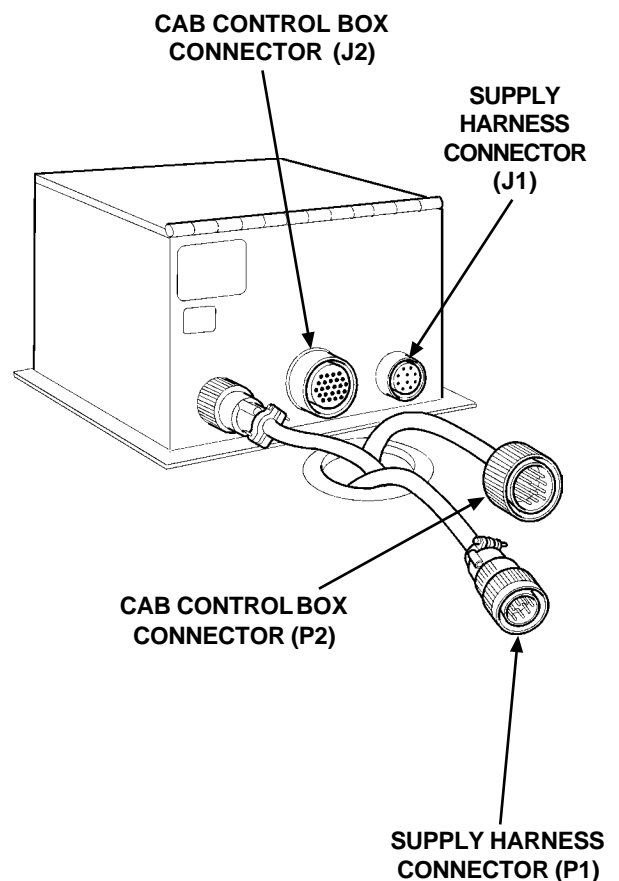
A reading of infinity indicates an open circuit.

- (3) Connect multimeter between cab control box connector (J2), position "R," and supply harness connector (J1), position "F." Check multimeter for continuity.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one terminal and connect to chassis ground.

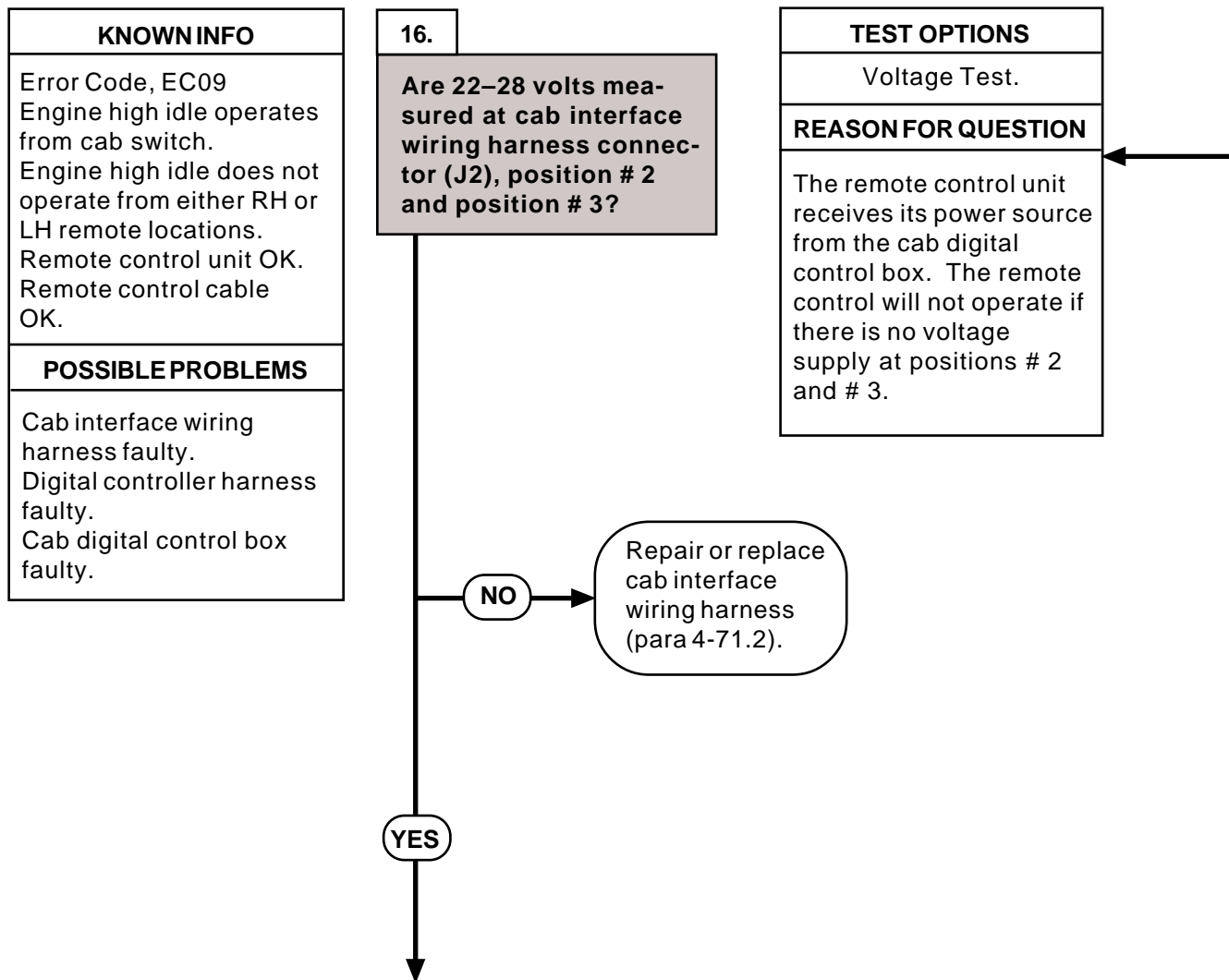


4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

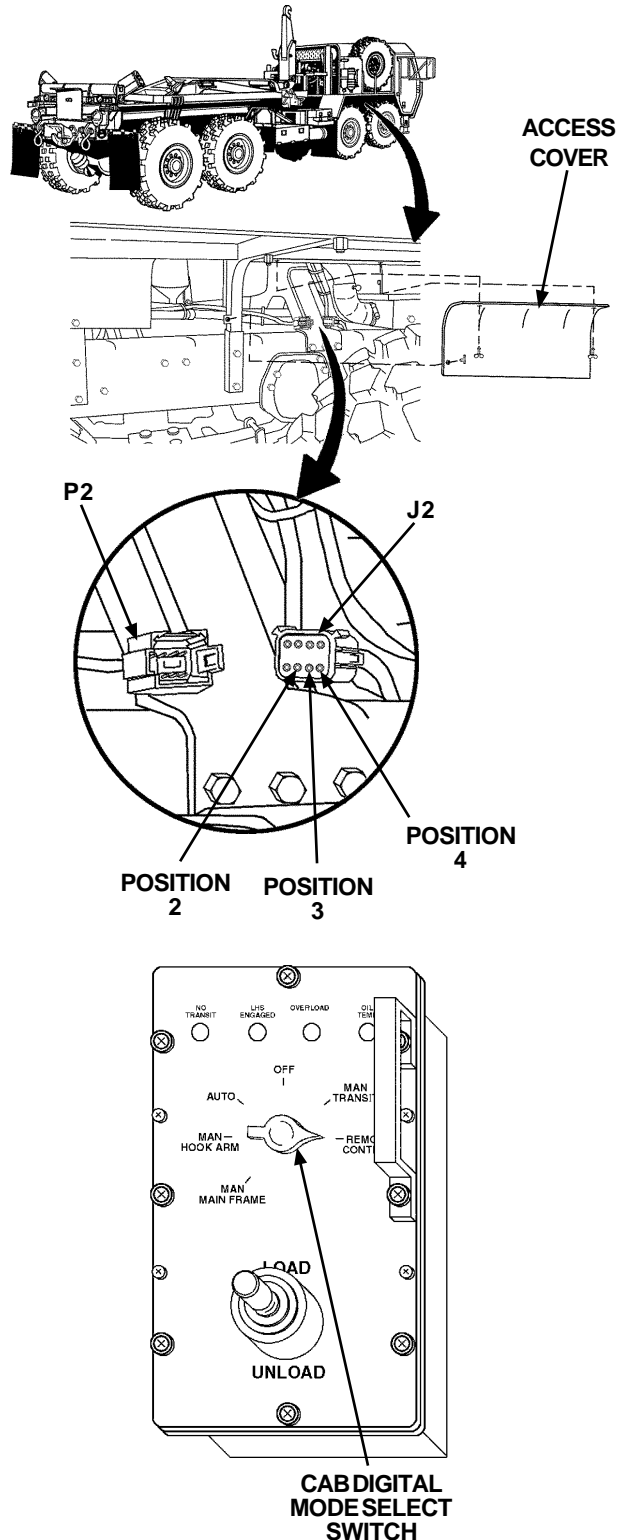
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the main digital controller and the digital cab controller.



**4-12. UNIT TROUBLESHOOTING (continued).**

**3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL B ONLY) (continued).**

<b>VOLTAGE TEST</b>	
<ol style="list-style-type: none"> <li>(1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.</li> <li>(2) Cut and remove wire ties as necessary to loosen harness and disconnect male from female end.</li> <li>(3) Set multimeter to voltage position.</li> <li>(4) Turn engine start switch to ON position.</li> <li>(5) Place negative (-) probe of multimeter on known good ground.</li> <li>(6) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), and check multimeter for voltage reading, note reading.</li> <li>(7) Place cab digital mode select switch in "REMOTE CONTROL" position.</li> <li>(8) Place positive (+) probe of multimeter on position "3", circuit 1474, of cab control box connector (J2), note reading.</li> </ol>	<p style="text-align: center;"><b>NOTE</b></p> <p>Position # 4, circuit 1490, should have a reading of 1 - 5 volts, not 22 - 28 volts. If 1 - 5 volts are not measured at position # 4, replace cab digital control box.</p> <ol style="list-style-type: none"> <li>(9) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab control box connector (J2), note reading.</li> <li>(10) Turn engine start switch to OFF position.</li> </ol>

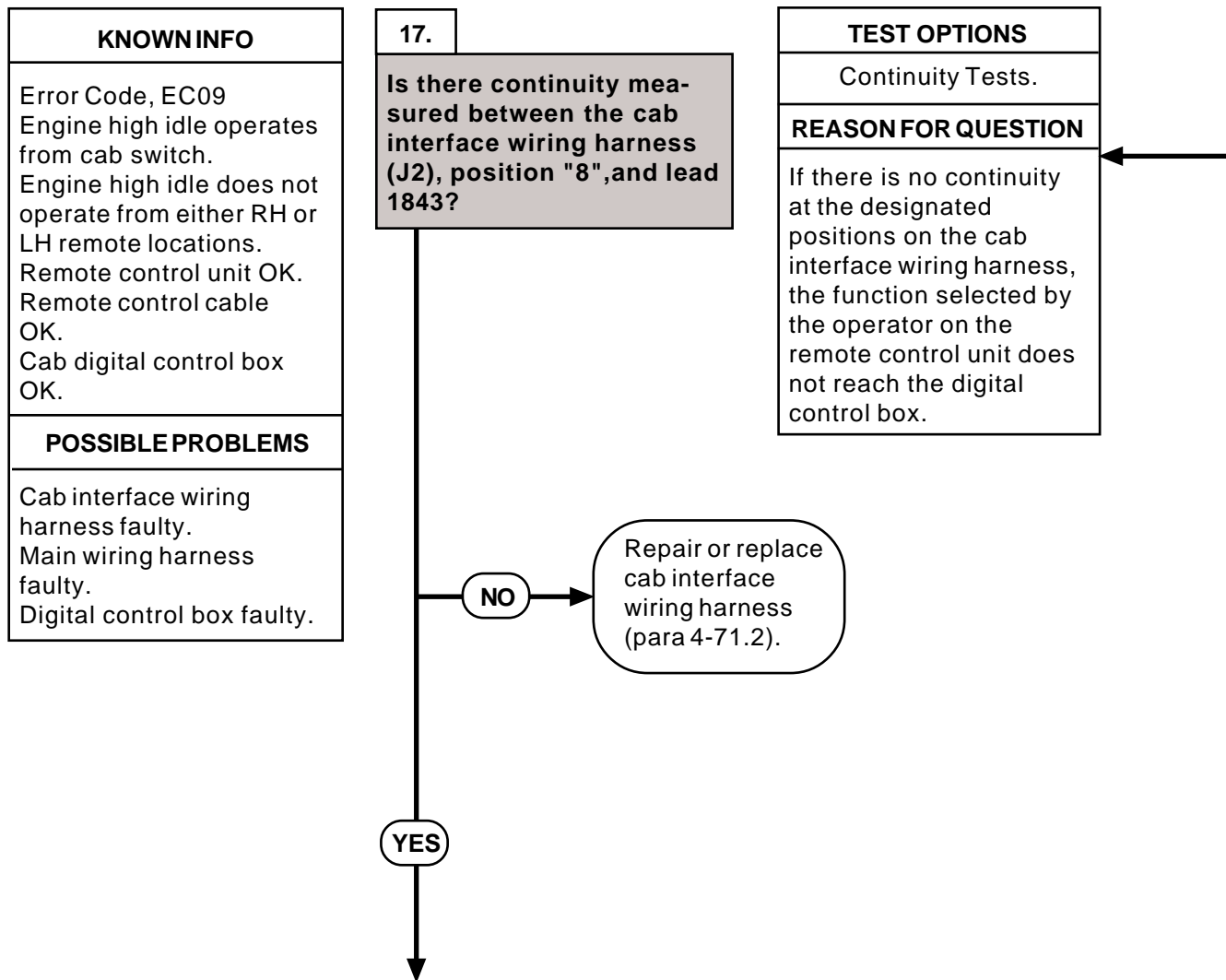


4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the main digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

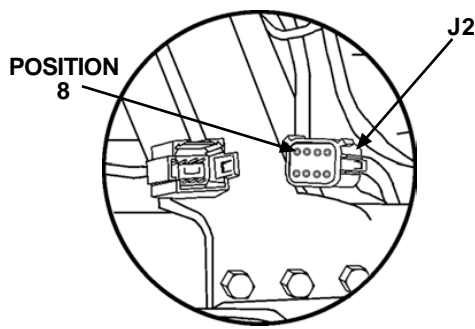
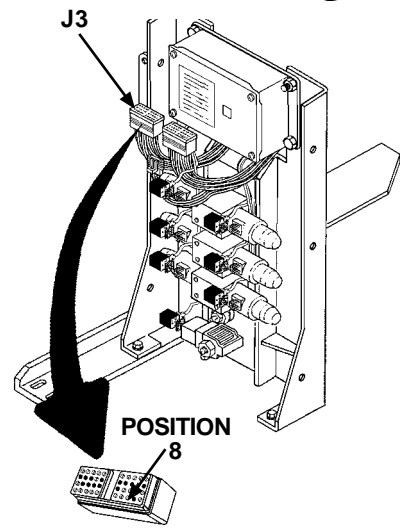
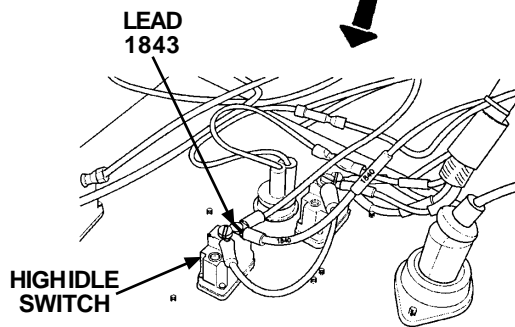
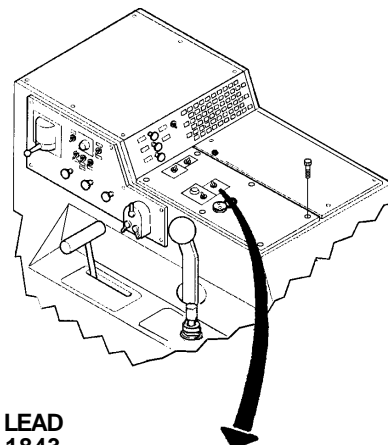
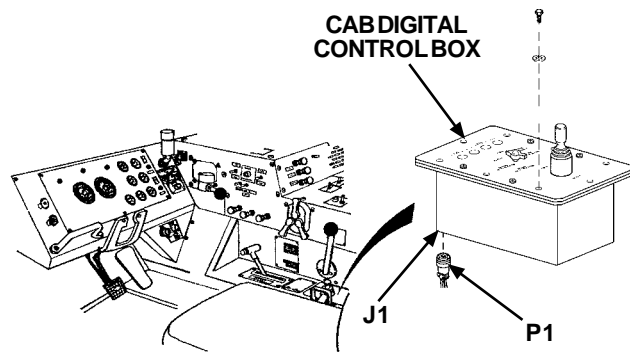
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove eight screws and flatwashers from cab digital control box and remove cab interface wiring harness connector (P1) from cab digital control box (J1).
- (2) Remove six screws from console cover and loosen cover to gain access to the back of high idle switch.
- (3) Disconnect cab interface wiring harness from back of high idle switch.
- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter between cab interface wiring harness (J2), position "8" and lead 1843 from high idle switch. Check multimeter for continuity.
- (6) Connect multimeter between (P2), position "8" and (J3), position "8". Check multimeter for continuity.

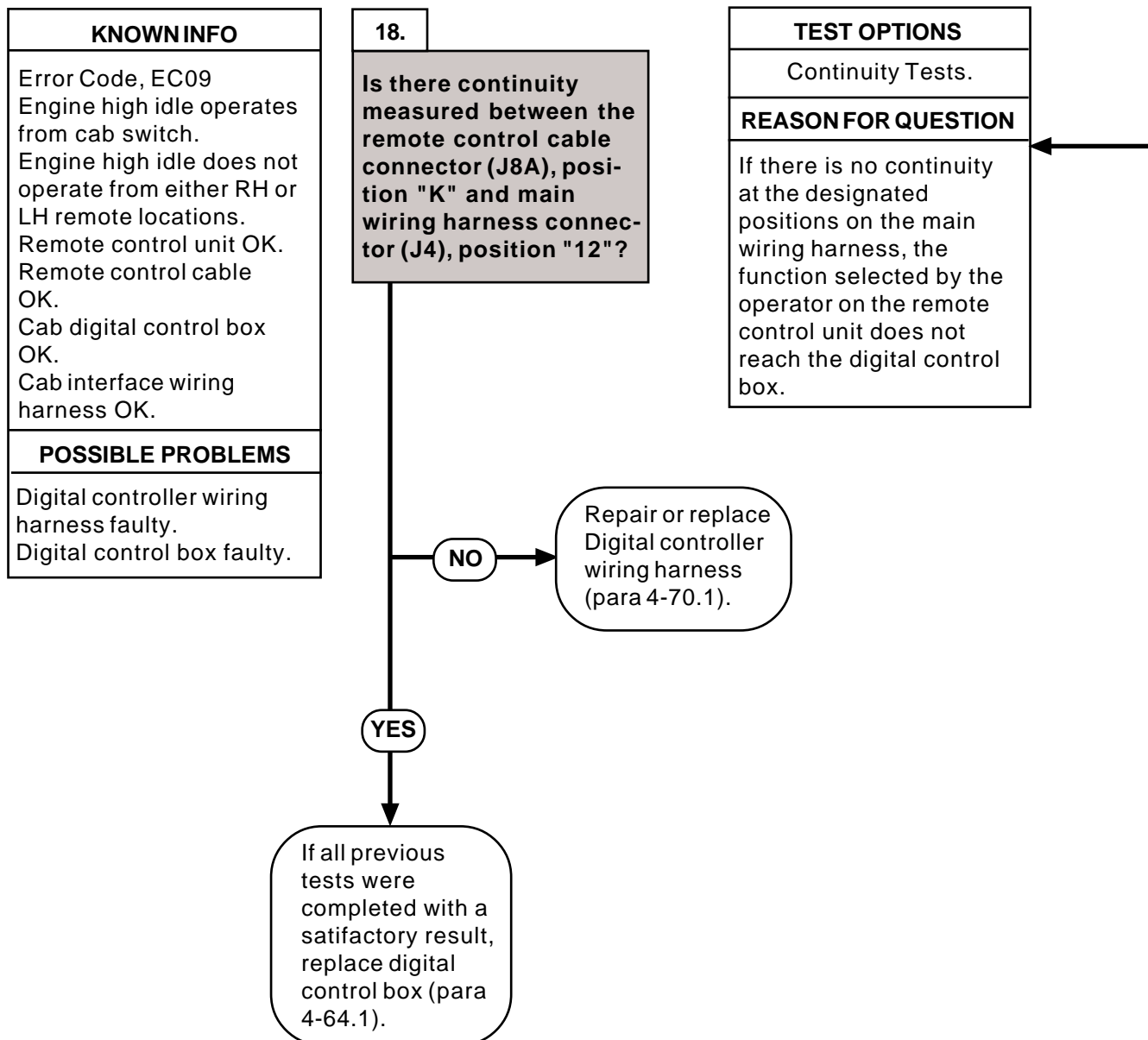


4-12. UNIT TROUBLESHOOTING (continued).

3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

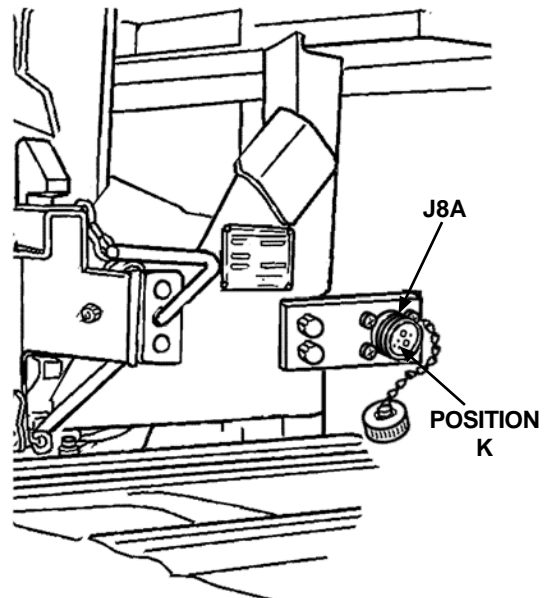
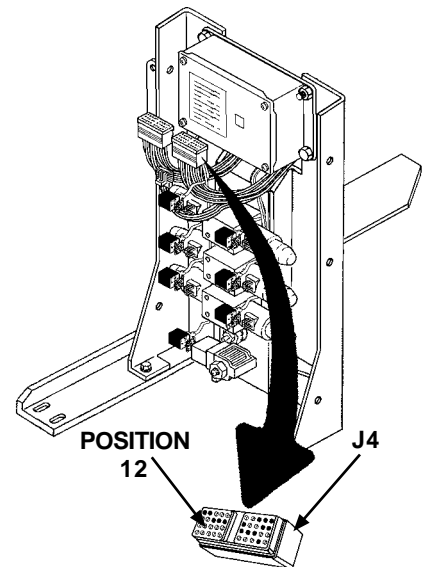
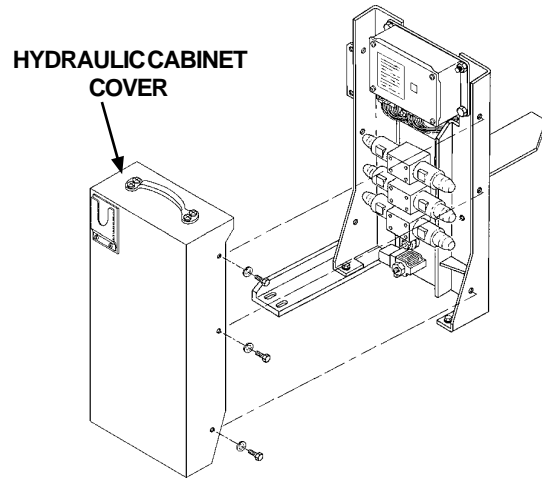
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

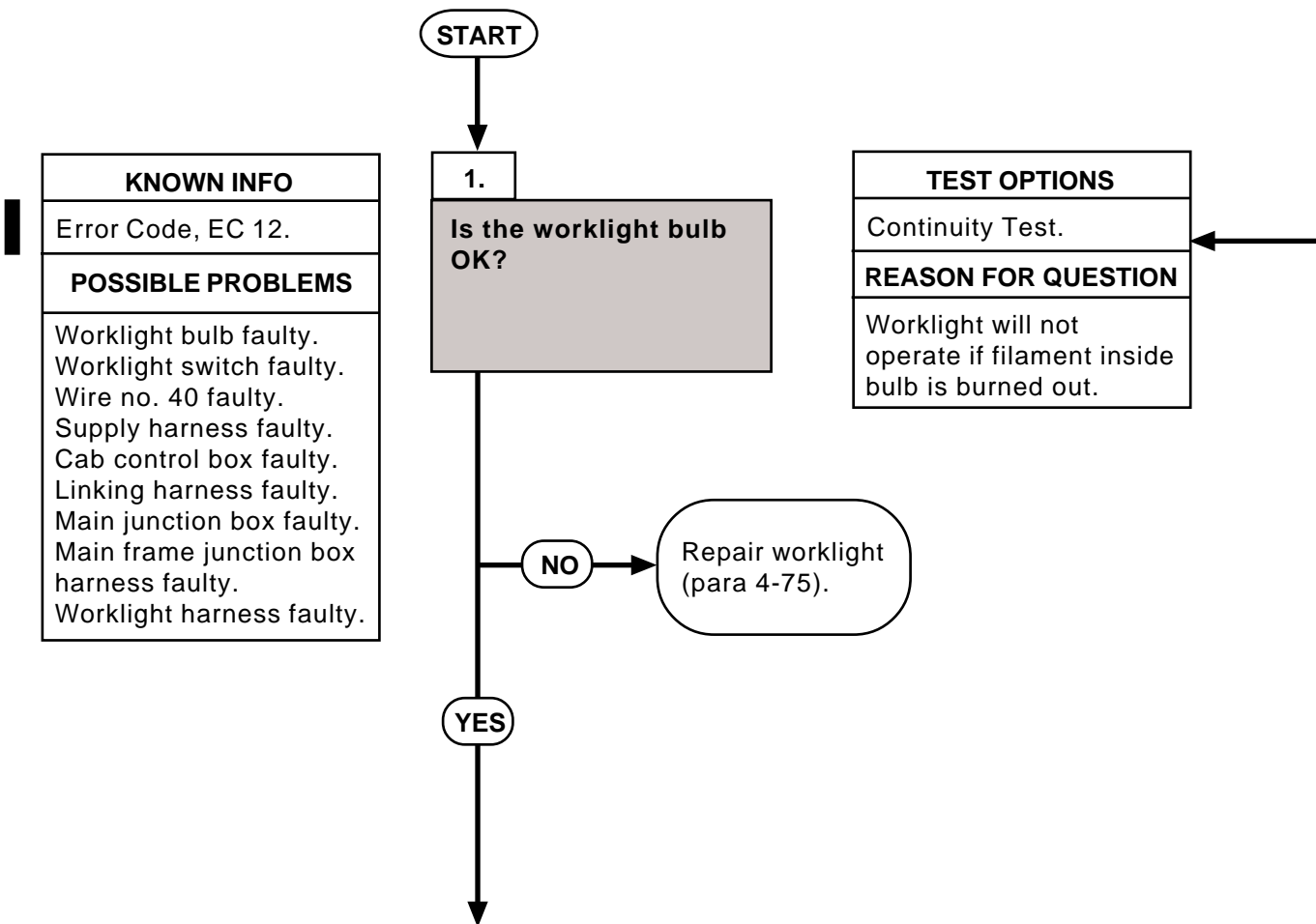
3. ENGINE HIGH IDLE DOES NOT OPERATE (MODEL B ONLY) (continued).

CONTINUITY TEST
<p><b>CAUTION</b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(1) Remove five screws and flatwashers from hydraulic cabinet cover and remove cover.</p> <p>(2) Remove left hand (J4), 40-pin connectors from digital controller.</p> <p>(3) Remove cap from right hand (J8A), remote control cable connector.</p> <p>(4) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(5) Connect multimeter between (J4), position "12," and (J8A), position "K". Check multimeter for continuity.</p>



4-12. UNIT TROUBLESHOOTING (continued).

<b>4. MAIN FRAME WORKLIGHT DOES NOT OPERATE.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Multimeter (ANURM105C)	Engine turned off (TM 9-2320-279-10)
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Parking brake applied (TM 9-2320-279-10)
	Wheels chocked (TM 9-2320-279-10)





**4-12. UNIT TROUBLESHOOTING (continued).**

**4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).**

**MODEL A, CONTINUITY TEST**

- (1) Disconnect worklight connectors.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates a burned-out bulb.

- (3) Connect multimeter to leads at each end of worklight wiring, and check multimeter for continuity.

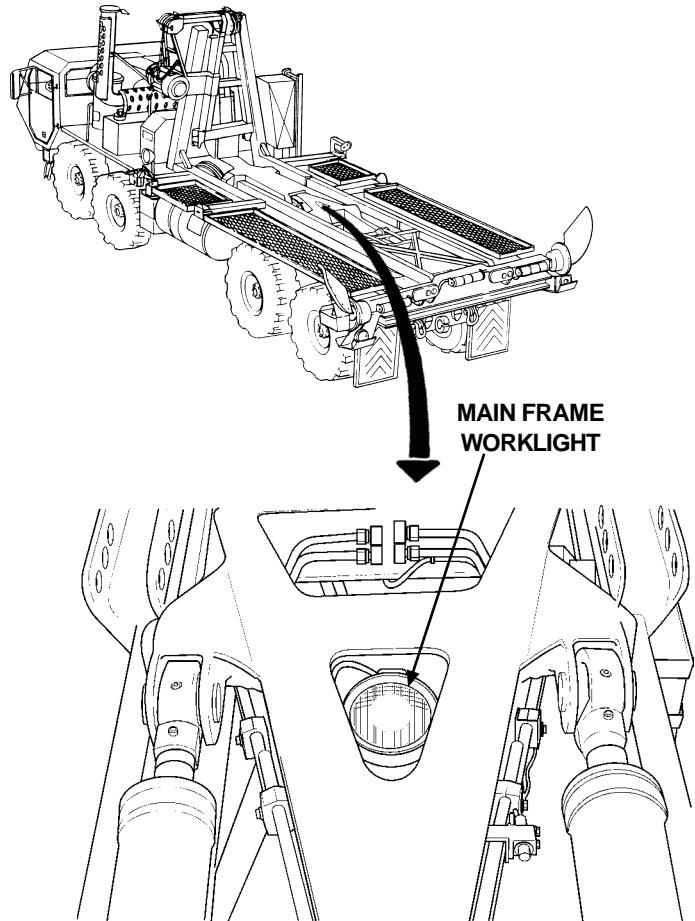
**MODEL B, CONTINUITY TEST**

- (1) Remove main frame worklight from main frame.
- (2) Remove worklight bulb from main frame worklight assembly.
- (3) Set multimeter to ohms position.

**NOTE**

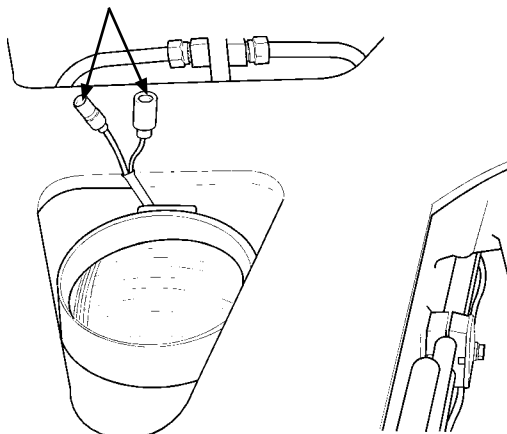
A reading of infinity indicates a burned-out bulb.

- (3) Connect multimeter to leads at each side of light bulb connectors, and check multimeter for continuity.

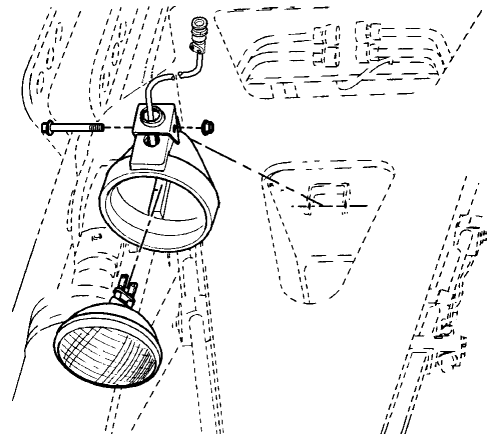


**MODEL A**

**WORKLIGHT CONNECTORS**

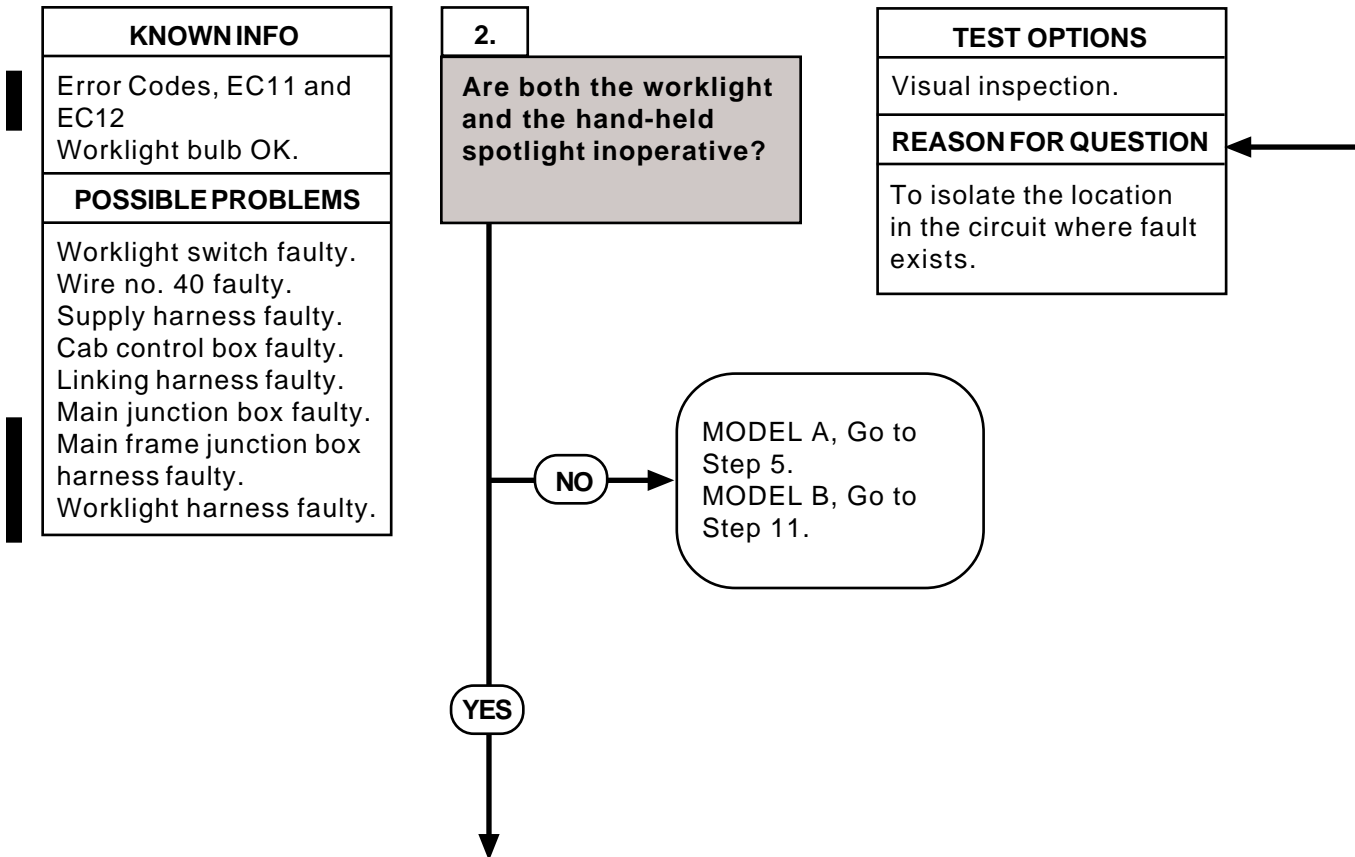


**MODEL B**




4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).**



Operate the worklight and hand-held spotlight (para 2-2). Observe whether one, both, or neither of the lights operate.

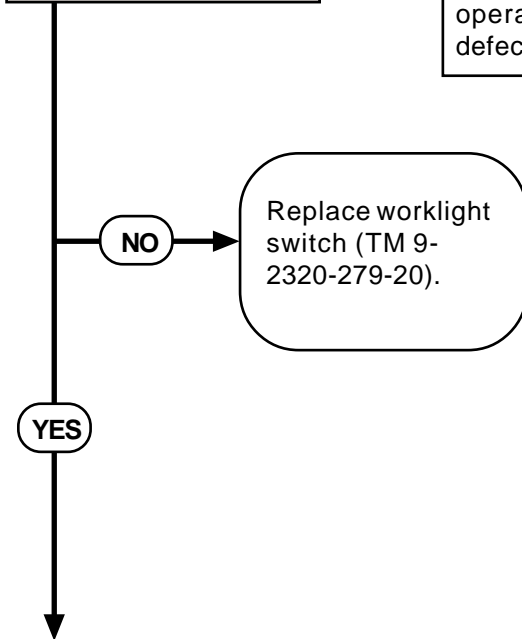
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).

<b>KNOWN INFO</b>
Error Codes, EC11 and EC12 Worklight bulb OK. Both worklight and spotlight are inoperative.
<b>POSSIBLE PROBLEMS</b>
Worklight switch faulty. Wire no. 40 faulty.

3.  
Is there continuity between the two terminals on the worklight switch?

<b>TEST OPTIONS</b>
Worklight Switch Test.
<b>REASON FOR QUESTION</b>
Worklight will not operate if cab switch is defective.



4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).

**WORKLIGHT SWITCH TEST**

- (1) Remove eight screws and side panel from heater compartment.
- (2) Move cab worklight switch to the ON position.

**CAUTION**

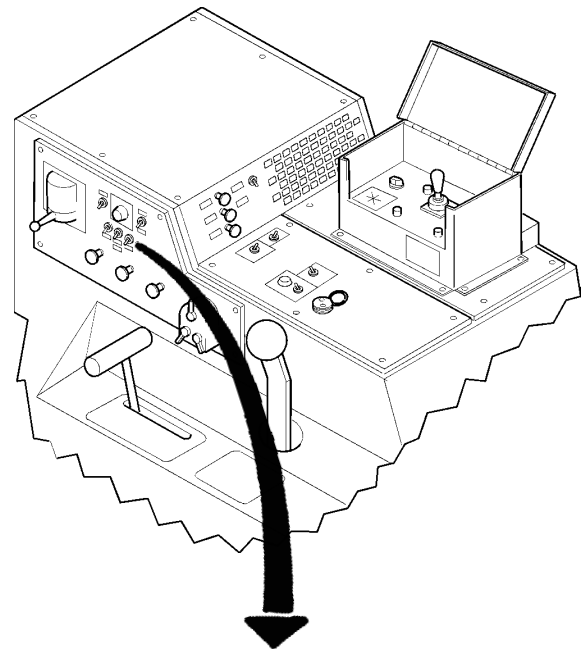
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Set multimeter to ohms position.

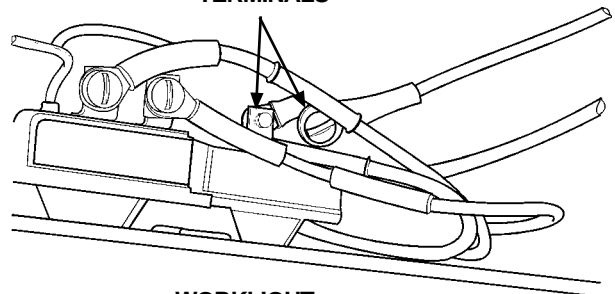
**NOTE**

A reading of infinity indicates a faulty switch.

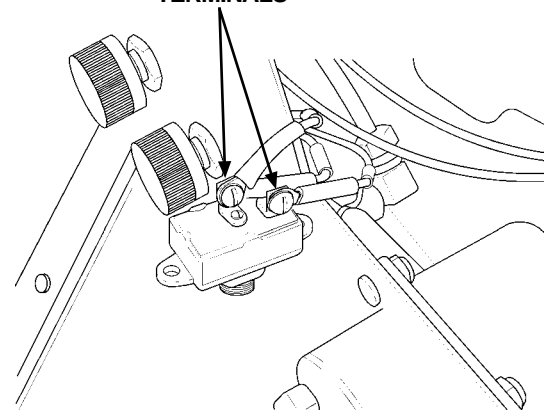
- (4) Connect multimeter leads to worklight switch terminals, and check multimeter for continuity.



**WORKLIGHT SWITCH TERMINALS**



**WORKLIGHT SWITCH TERMINALS**



**(SWITCH REMOVED FROM PANEL FOR CLARITY)**

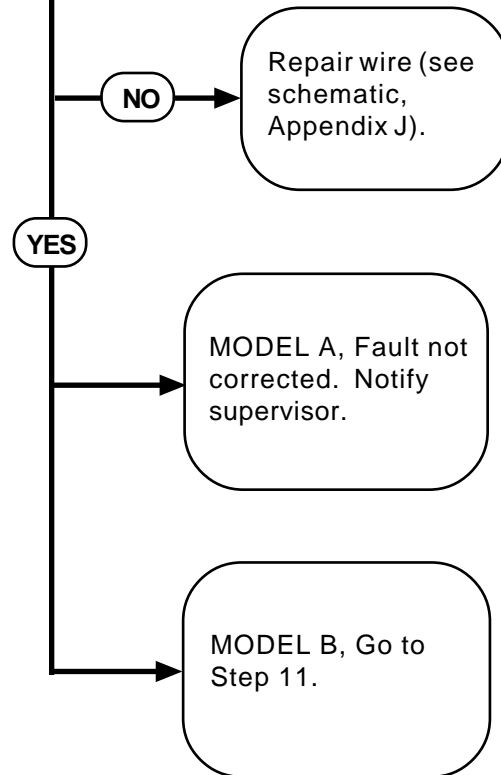
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).

KNOWN INFO
Error Codes, EC11 and EC12 Worklight bulb OK. Both worklight and spotlight are inoperative. Worklight switch OK.
POSSIBLE PROBLEMS
Wire no. 40 faulty.

**4.**  
Are there 22-28 volts measured on wire no. 40 at worklight switch?

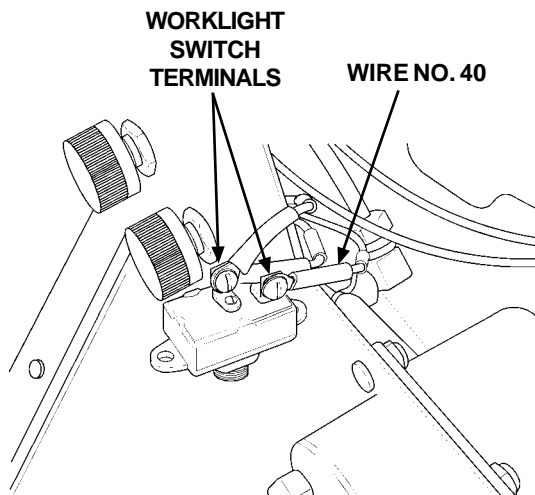
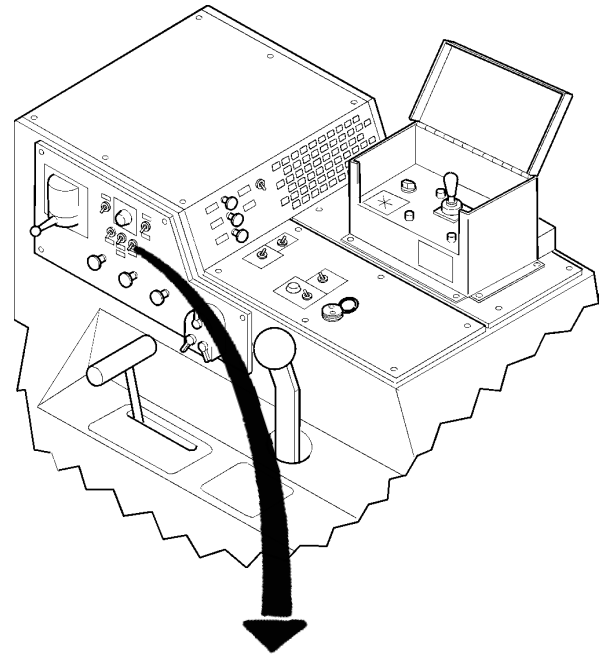
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The voltage source for the CBT worklight switch is wire no. 40 in the HEMTT cab wire harness. Worklight will not operate if this wire is defective.



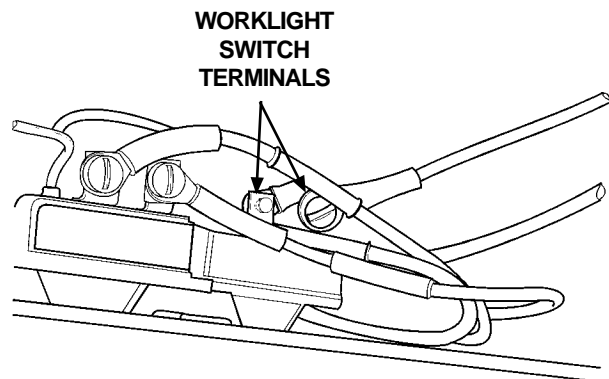
**4-12. UNIT TROUBLESHOOTING (continued).**

**4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (continued).**

<b>VOLTAGE TEST</b>	
	(1) Turn engine start switch to ON position.
	(2) Turn light control switch to STOP LIGHT position.
	(3) Set multimeter to voltage position.
	(4) Place positive (+) probe of multimeter on wire no. 40 at worklight switch.
	(5) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
	(6) Turn engine start switch and light control switch to OFF position.



**(SWITCH REMOVED FROM PANEL FOR CLARITY)**



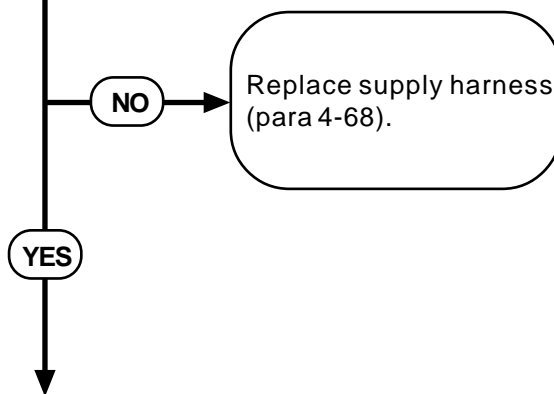
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Spotlight OK. Worklight bulb OK.
POSSIBLE PROBLEMS
Supply harness faulty. Cab control box faulty. Linking harness faulty. Main junction box faulty. Main frame junction box harness faulty. Worklight harness faulty.

5.  
Is there continuity measured between the worklight switch (terminal with two wires) and the supply harness connector (P1), position H?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the worklight switch to the cab control box via the supply harness.





4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Remove eight screws and side panel from heater compartment.
- (2) Remove four screws and lockwashers and access panel from heater compartment.

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Disconnect supply harness connector from cab control box.
- (4) Set multimeter to ohms position.

**NOTE**

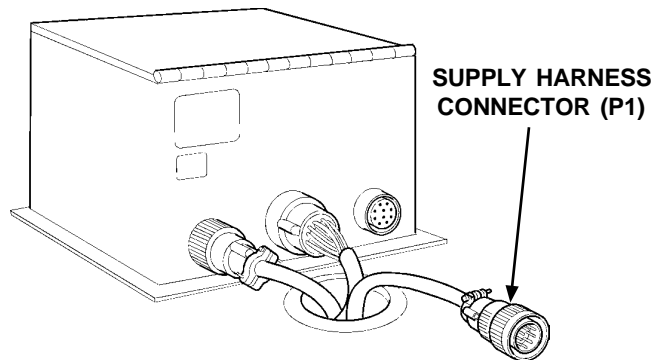
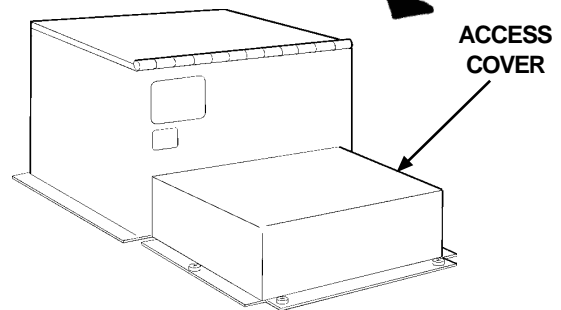
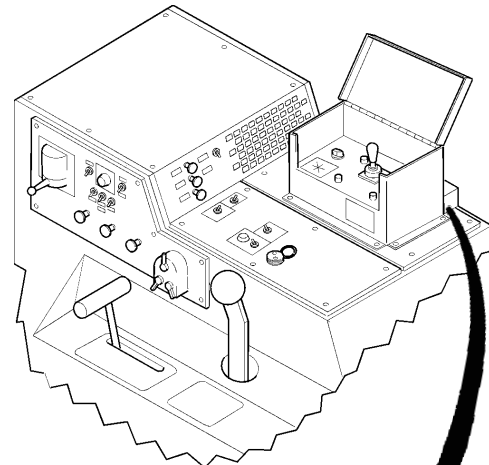
A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check between cab worklight switch (terminal with two wires) and the supply harness connector, position H.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (6) Remove multimeter lead from one end of wire and connect to chassis ground.



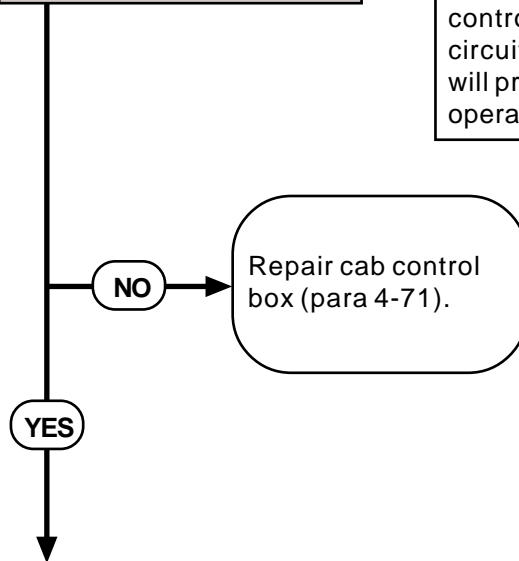
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Worklight bulb OK. Spotlight OK. Supply harness OK.
POSSIBLE PROBLEMS
Cab control box faulty. Linking harness faulty. Main junction box faulty. Main frame junction box harness faulty. Worklight harness faulty.

6.  
Is there continuity between the cab control box (9-pin) linking harness connector (J5), position G, and the supply harness connector (J1), position H?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the supply harness to the (9-pin) linking harness through the cab control box. An open circuit in the control box will prevent worklight operation.



## 4-12. UNIT TROUBLESHOOTING (continued).

## 4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST****CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

**NOTE**

Tag and mark connector before removing.

- (1) Disconnect (9-pin) linking harness connector from cab control box.
- (2) Set multimeter to ohms position.

**NOTE**

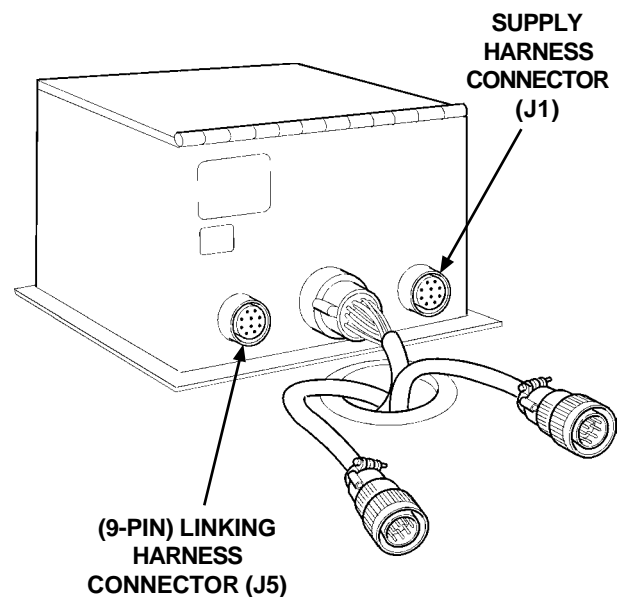
A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check between (9-pin) linking harness connector, position G, and supply harness connector, position H.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



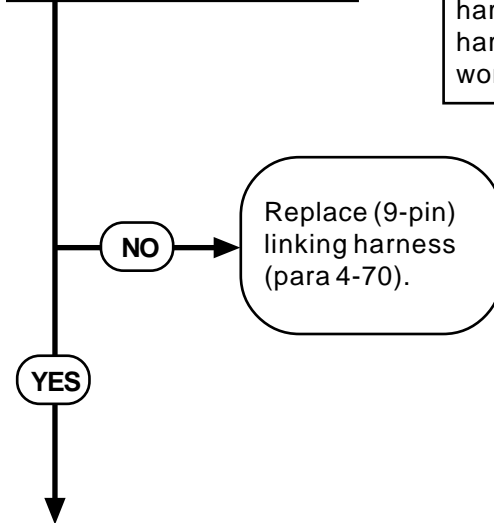
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Worklight bulb OK. Spotlight OK. Supply harness OK. Cab control box OK.
POSSIBLE PROBLEMS
Linking harness faulty. Main junction box faulty. Main frame junction box harness faulty. Worklight harness faulty.

7.  
Is there continuity measured on the (9-pin) main linking harness between (9-pin) linking harness connector (P5) and (9-pin) linking harness connector (P3)?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The worklight power source is transferred from the cab control box to the main junction box via the (9-pin) linking harness. Faults in this harness will prevent worklight operation.



4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove (9-pin) linking harness connector from main junction box.
- (2) Set multimeter to ohms position.

**NOTE**

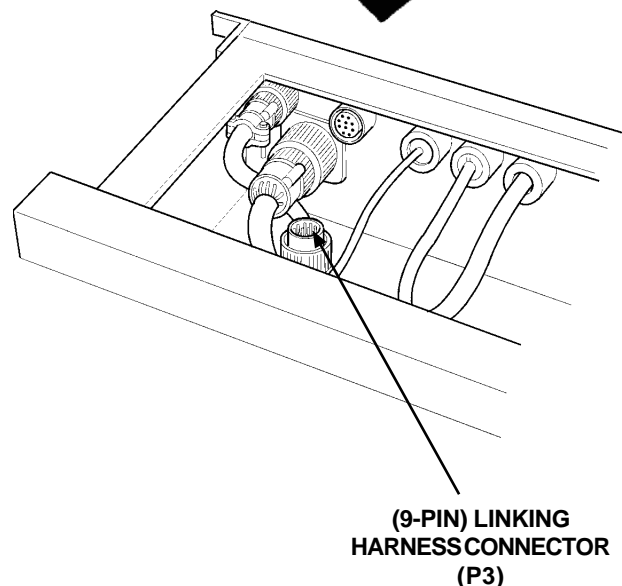
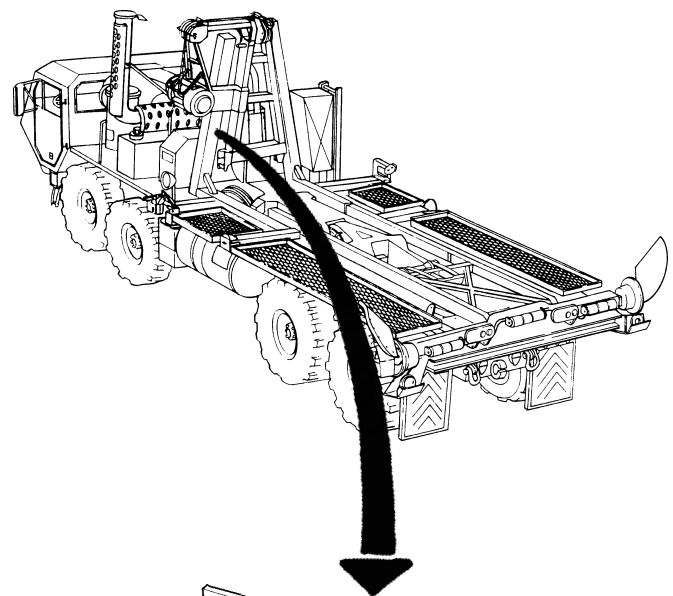
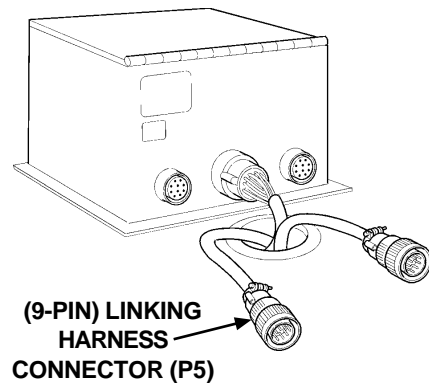
A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check between (9-pin) linking harness connector (P5), position G, and connector (P3), position G.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



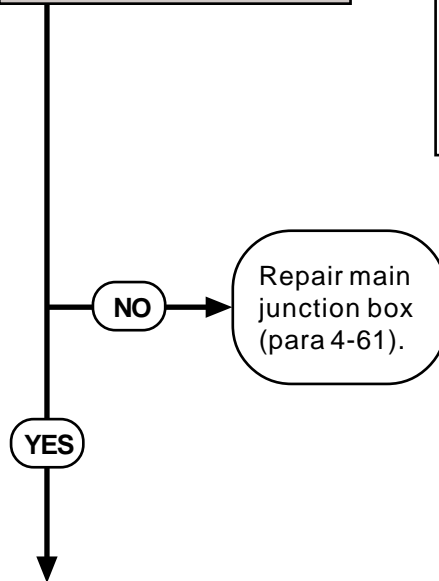
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Worklight bulb OK. Spotlight OK. Supply harness OK. Cab control box OK. Linking harness OK.
POSSIBLE PROBLEMS
Main junction box faulty. Main frame junction box harness faulty. Worklight harness faulty.

8.  
Is there continuity in the main junction box, between (9-pin) linking harness connector (J3), position G, and main frame junction box harness connector (J6), position H?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The worklight power source is transferred from the (9-pin) linking harness to the main frame junction box harness via the main junction box. If there is an open circuit within the junction box, the worklight will not operate.



## 4-12. UNIT TROUBLESHOOTING (continued).

## 4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Remove hydraulic cabinet cover (para 4-60).

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (2) Disconnect main frame junction box connector (P6) from main junction box.  
 (3) Set multimeter to ohms position.

**NOTE**

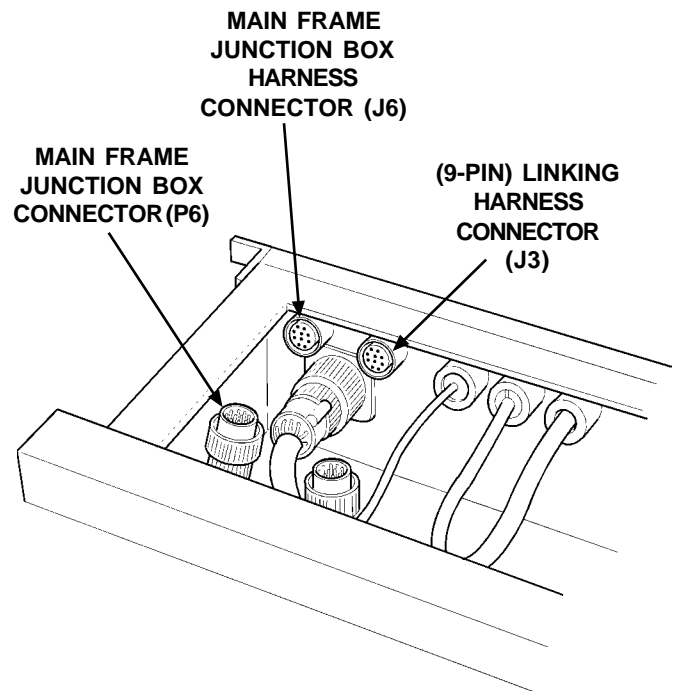
A reading of infinity indicates an open circuit.

- (4) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between the small linking harness connector, position G, and the main frame junction box harness connector, position H.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (5) Remove multimeter lead from one end of wire and connect to chassis ground.



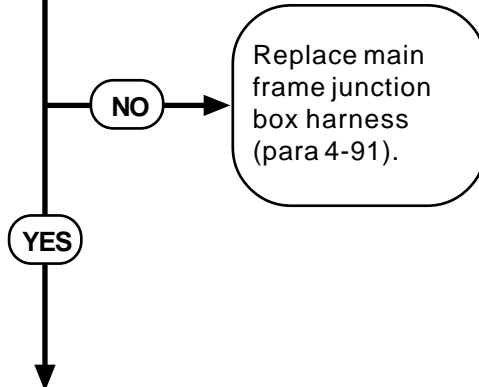
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Worklight bulb OK. Spotlight OK. Supply harness OK. Cab control box OK. Linking harness OK. Main junction box OK.
POSSIBLE PROBLEMS
Main frame junction box harness faulty. Worklight harness faulty.

9.  
Is there continuity measured between the main frame junction box connector (P6) and the main frame junction box terminal strip?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the main junction box to the main frame junction box via the main frame junction box harness and connector. If there is no voltage measured at the terminal strip, either the wire harness or its connector is faulty.

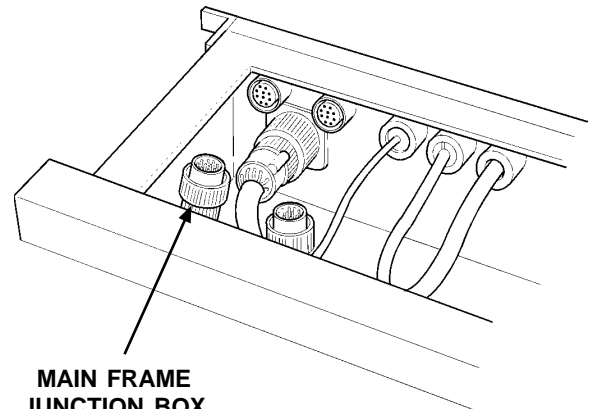




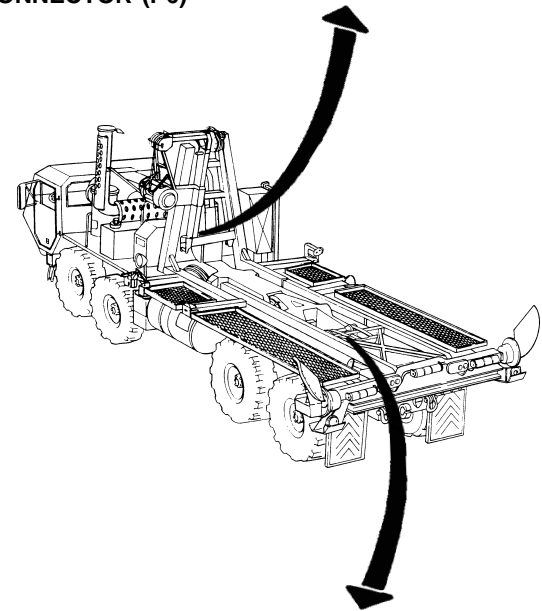
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

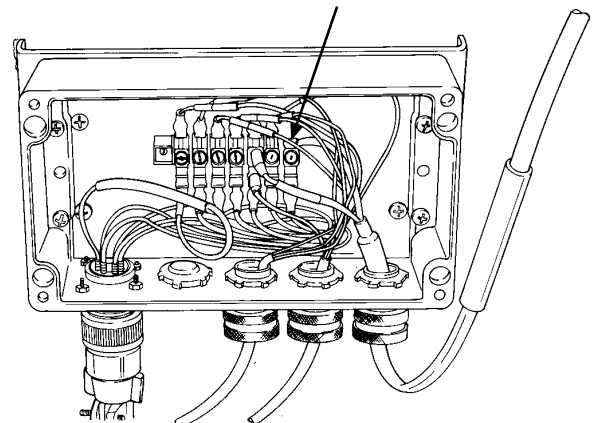
<b>CONTINUITY TEST</b>	
(1) Loosen four screws and remove cover from main frame junction box.	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
(2) Set multimeter to ohms position.	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
(3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check between the main frame junction box harness connector, position H, and the main frame junction box terminal strip, position 7.	
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
(4) Remove multimeter lead from one end of wire and connect to chassis ground.	



**MAIN FRAME  
JUNCTION BOX  
CONNECTOR (P6)**



**MAIN FRAME  
JUNCTION BOX  
TERMINAL STRIP,  
POSITION 7**



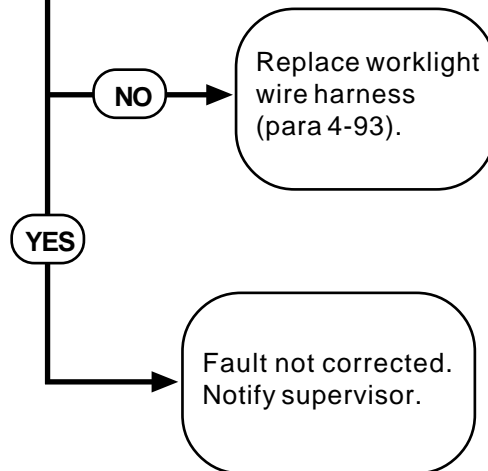
4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Worklight bulb OK. Spotlight OK. Supply harness OK. Cab control box OK. Linking harness OK. Main junction box OK. Main frame junction box harness OK.
POSSIBLE PROBLEMS
Worklight harness faulty.

10.  
Is there continuity measured in the worklight harness?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the main frame junction box to the worklight via this wire harness.



4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

(1) Set multimeter to ohms position.

**NOTE**

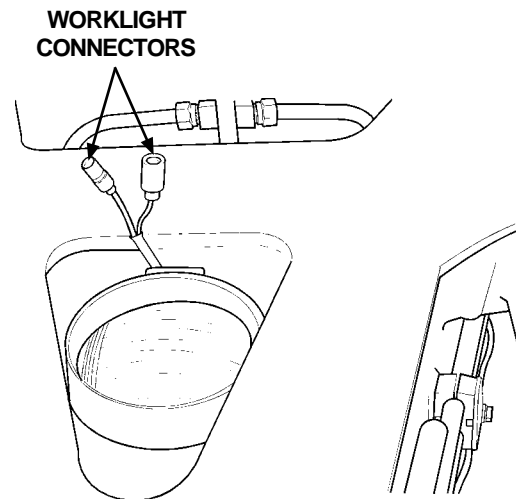
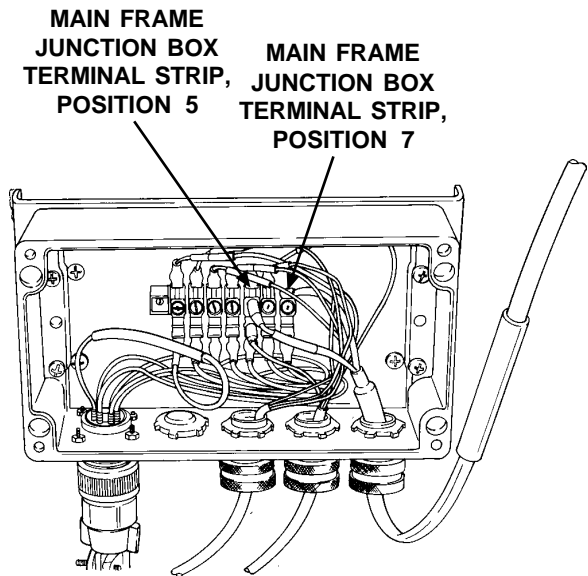
A reading of infinity indicates an open circuit.

(2) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between terminal strip position 7 and the end of one wire, and between terminal strip position 5 and the end of the other wire.

**NOTE**

Any reading besides infinity indicates a grounded wire.

(3) Remove multimeter lead from one end of wire and connect to chassis ground.



4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

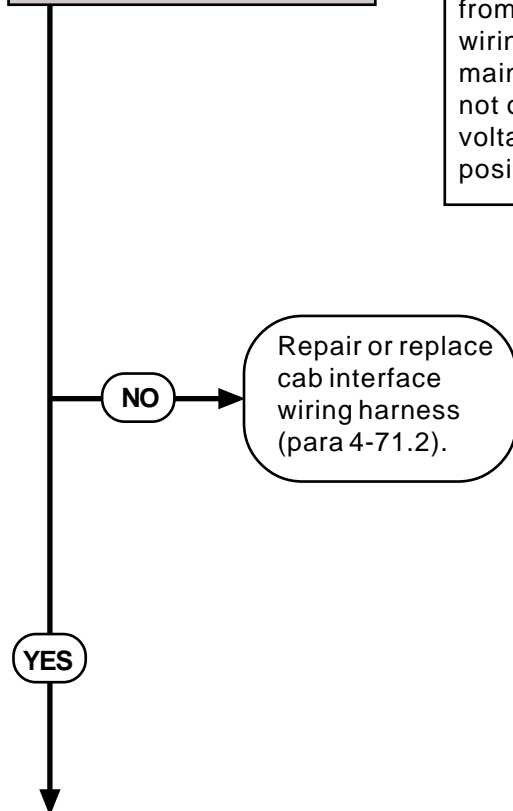
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Codes, EC11 and EC12 Worklight bulb OK. Both worklight and spotlight are inoperative. Worklight switch OK. Wire no. 40 OK.
POSSIBLE PROBLEMS
Cab interface wiring harness faulty. Digital controller wiring harness faulty. Digital control box faulty. Worklight harness faulty.

11.  
Are 22–28 volts measured at cab interface wiring harness connector (J2), position # 2 and position # 6?

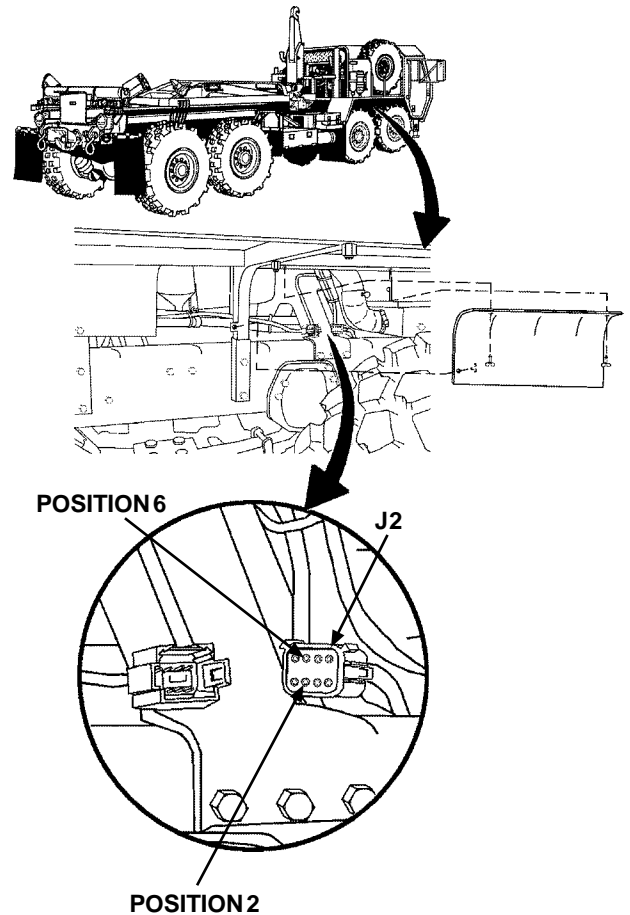
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The main frame worklight receives its power source from the cab interface wiring harness. The main frame worklight will not operate if there is no voltage supply at positions # 2 and # 6.



**4-12. UNIT TROUBLESHOOTING (continued).**

**4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).**

<b>VOLTAGE TEST</b>
(1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
(2) Cut and remove wire ties as necessary to loosen harness and disconnect male from female end.
(3) Turn engine start switch to ON position.
(4) Set multimeter to voltage position.
(5) Place negative (-) probe of multimeter on known good ground.
(6) Place cab worklight switch in "ON" position.
(7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), note reading.
(8) Place positive (+) probe of multimeter on position "6", circuit 1040, of cab control box connector (J2), note reading.
(9) Turn worklight switch and engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

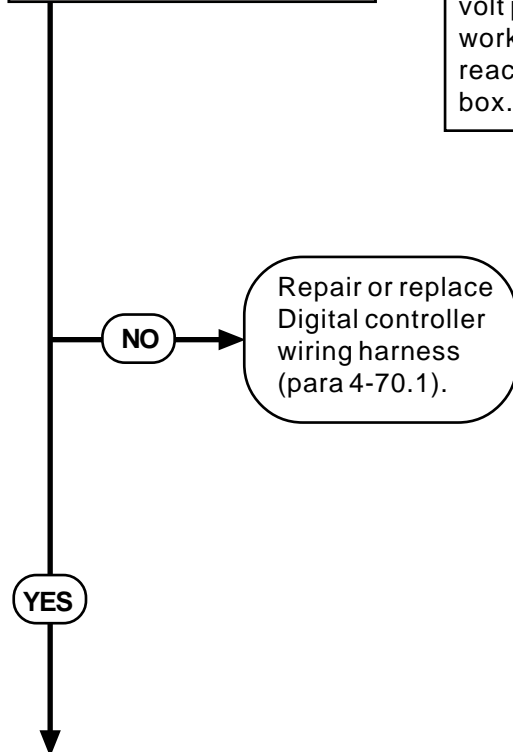
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Codes, EC11 and EC12 Worklight bulb OK. Both worklight and spotlight are inoperative. Worklight switch OK. Wire no. 40 OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Digital control box faulty. Worklight harness faulty.

12.  
Is there continuity measured between the digital control wiring harness (J3) , (J4) and the main frame worklight harness (J11)?

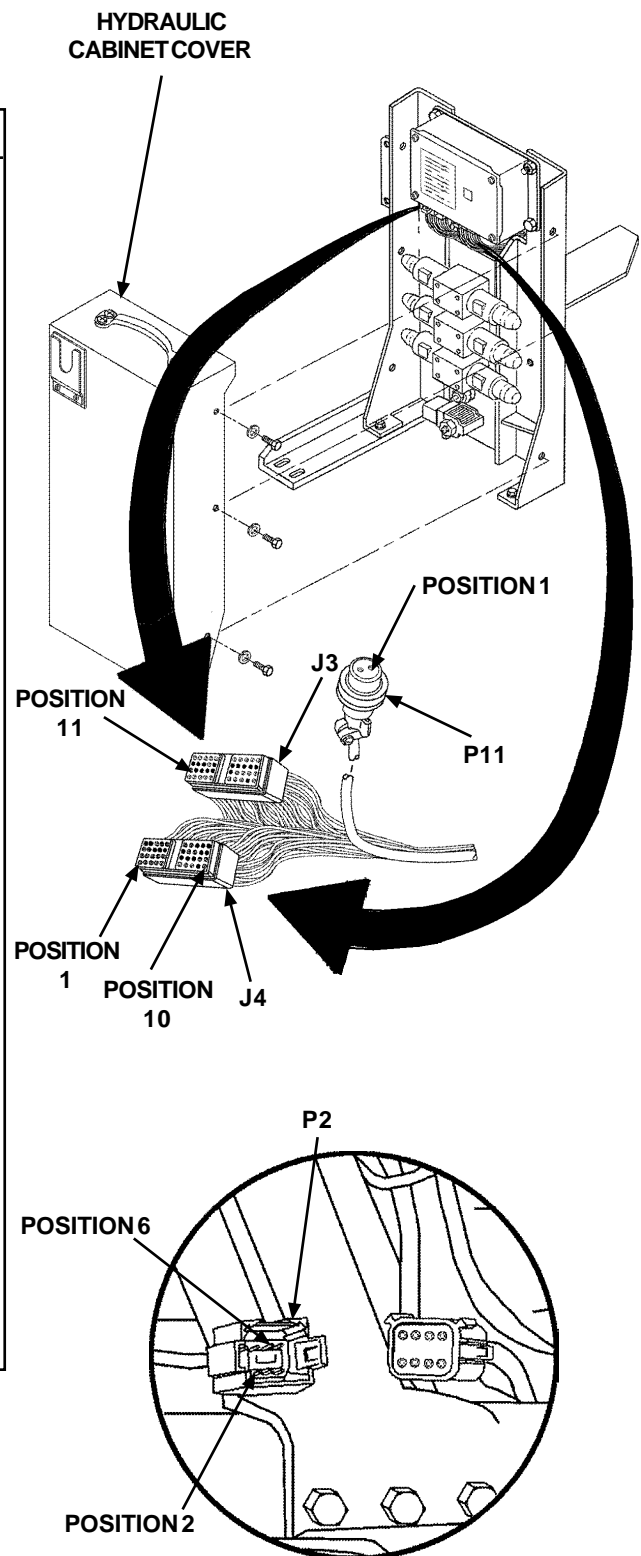
TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the main wiring harness, the 24 volt power from the worklight switch does not reach the digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove five screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Disconnect main frame worklight wiring harness connector (J11) from Digital controller wiring harness connector (P11), near bulkhead connector.</li> <li>(4) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter between (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "6", and (J4), position "10". Check multimeter for continuity.</li> <li>(7) Connect</li> </ol>	

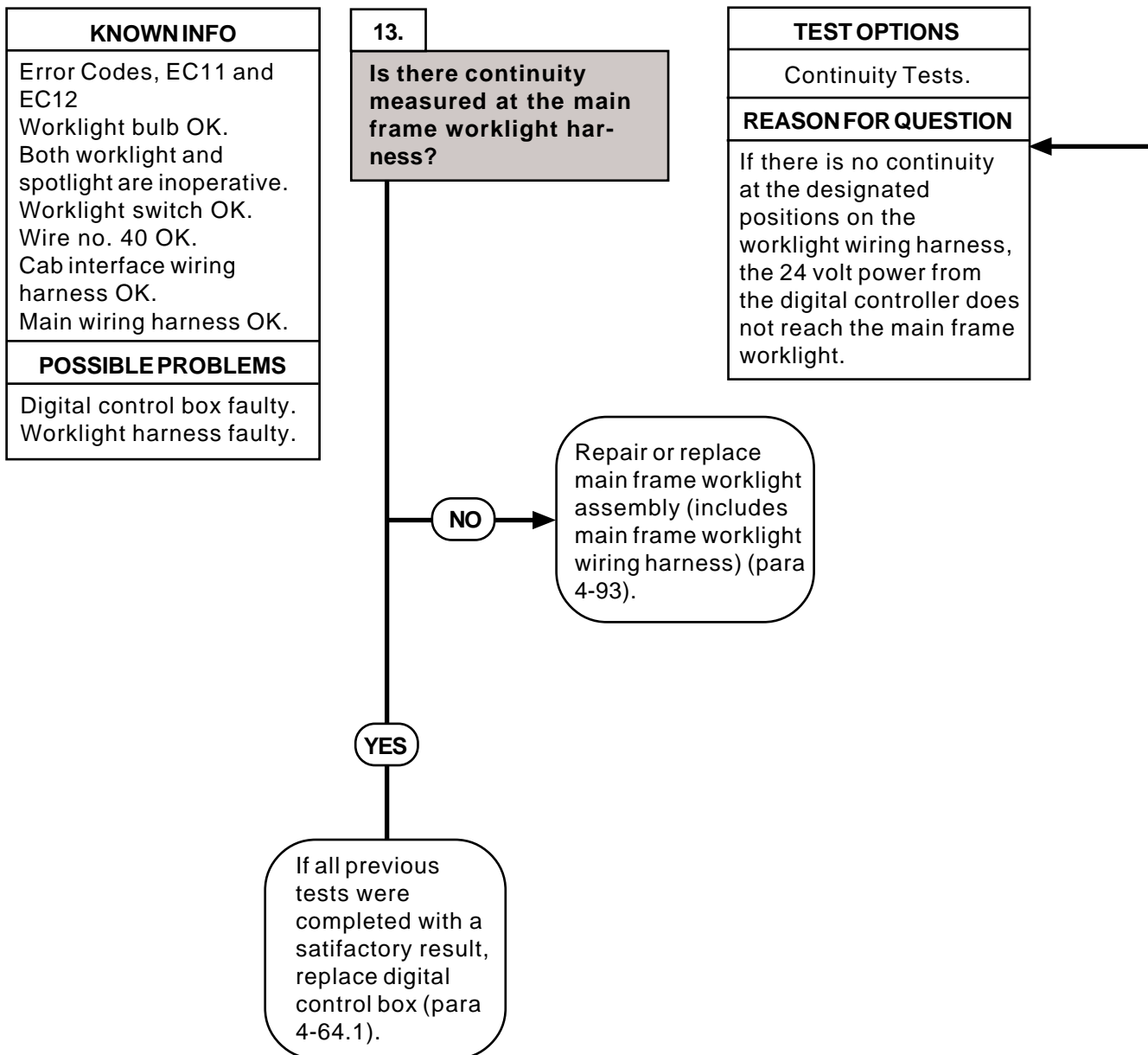


4-12. UNIT TROUBLESHOOTING (continued).

4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.





## 4-12. UNIT TROUBLESHOOTING (continued).

## 4. MAIN FRAME WORKLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

**CONTINUITY TEST****CAUTION**

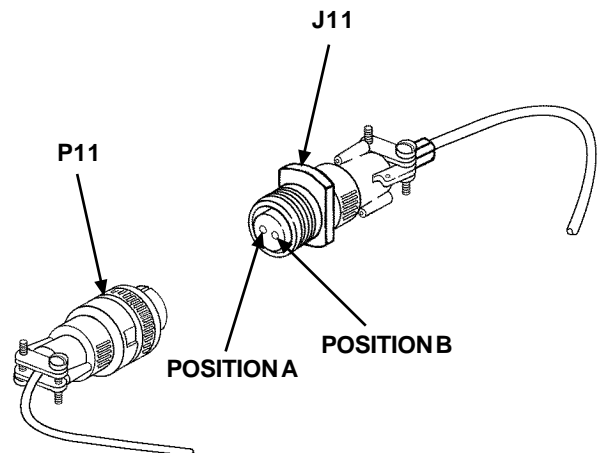
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

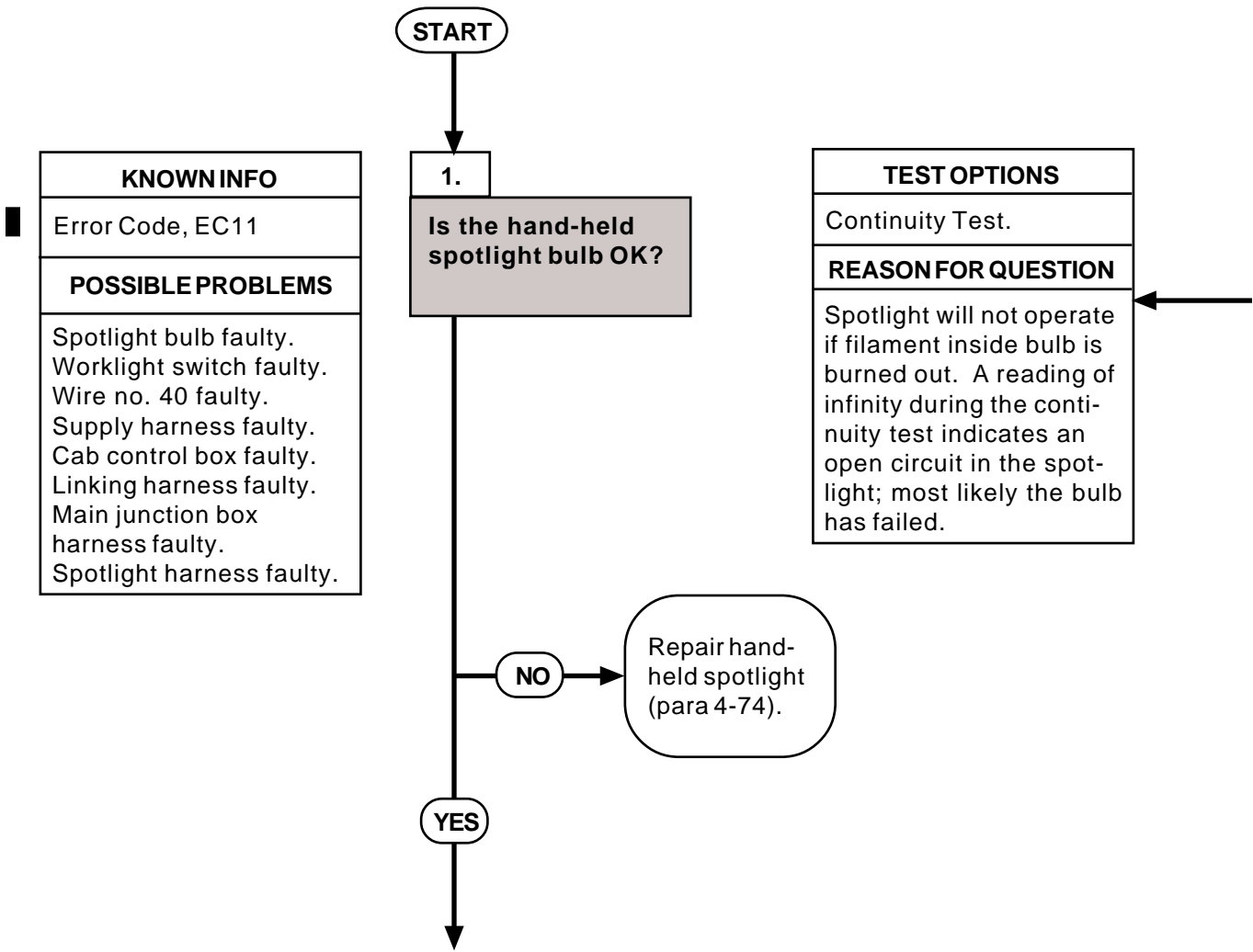
A reading of infinity indicates an open circuit.

- (2) Connect multimeter at connector (J11), between positions "A", and "B". Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

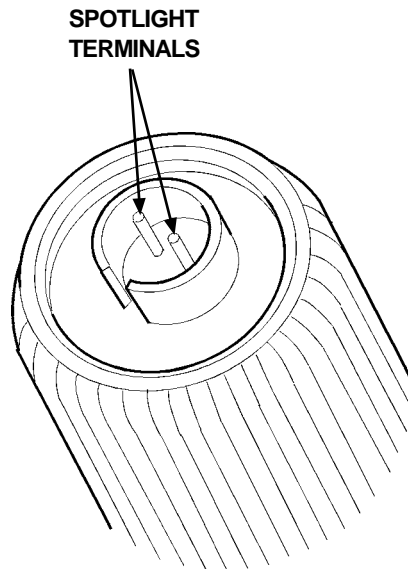
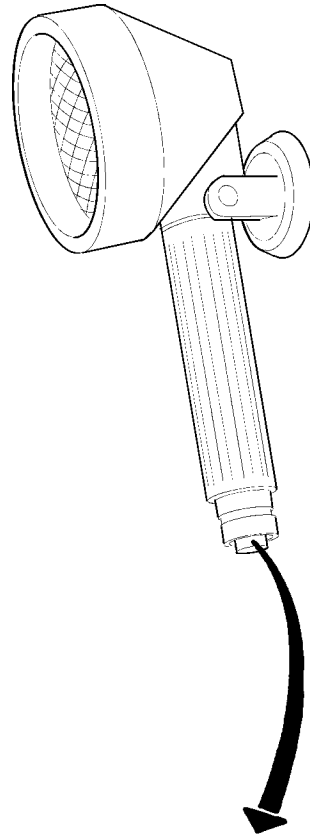
<b>5. HAND-HELD SPOTLIGHT DOES NOT OPERATE.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Multimeter (ANURM105C)	Engine turned off (TM 9-2320-279-10)
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Parking brake applied (TM 9-2320-279-10)
	Wheels chocked (TM 9-2320-279-10)



**4-12. UNIT TROUBLESHOOTING (continued).**

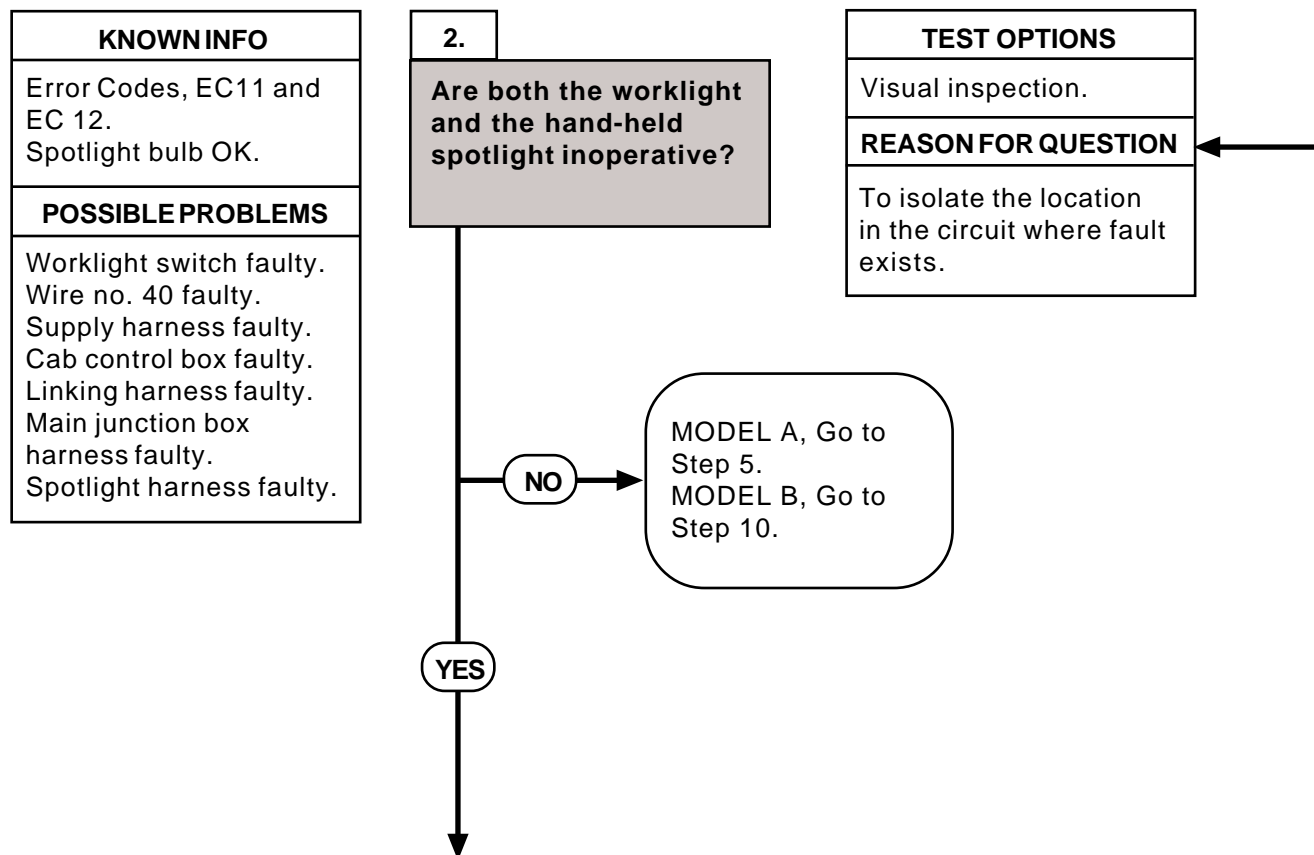
**5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).**

<b>CONTINUITY TEST</b>	
(1)	Disconnect power cable from spotlight.
(2)	Set multimeter to ohms position.
(3)	Position spotlight switch to ON position.
<b>NOTE</b>	
A reading of infinity indicates an open circuit.	
(4)	Connect multimeter leads to terminals on spotlight, and check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).



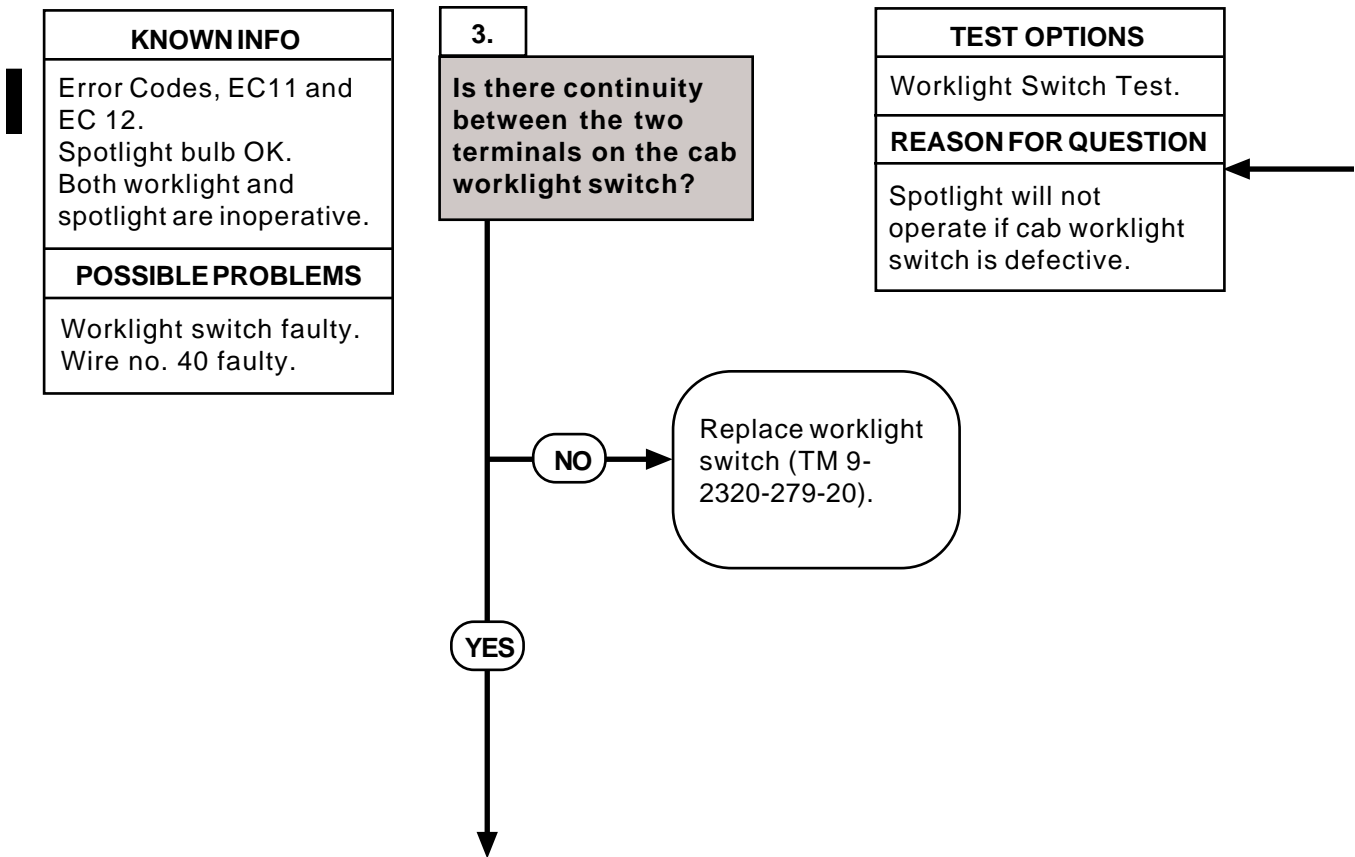
**4-12. UNIT TROUBLESHOOTING (continued).**

**5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).**

Operate the worklight and hand-held spotlight (para 2-2). Observe whether one, both, or neither of the lights operate.

4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).

**WORKLIGHT SWITCH TEST**

- (1) Remove eight screws and side panel from heater compartment.
- (2) Move cab worklight switch to the ON position.

**CAUTION**

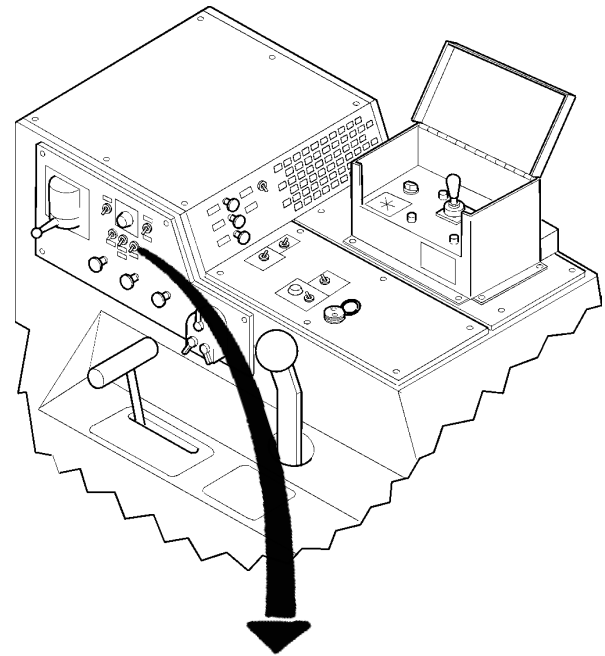
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Set multimeter to ohms position.

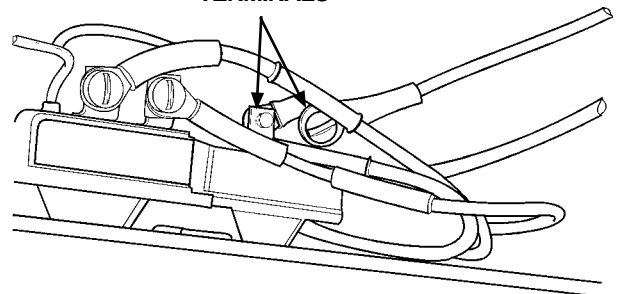
**NOTE**

A reading of infinity indicates a faulty switch.

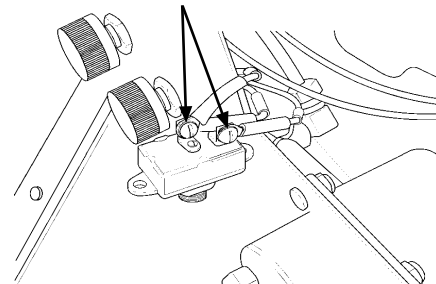
- (4) Connect multimeter leads to worklight switch terminals, and check multimeter for continuity.



**WORKLIGHT SWITCH TERMINALS**



**WORKLIGHT SWITCH TERMINALS**



**(SWITCH REMOVED FROM PANEL FOR CLARITY)**

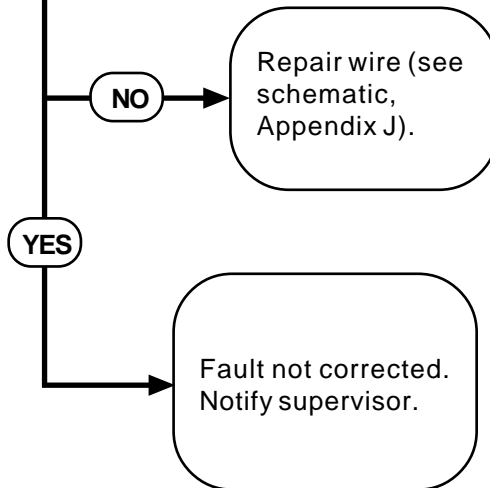
4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).

KNOWN INFO
Error codes, EC 11 and EC 12. Spotlight bulb OK. Both worklight and spotlight are inoperative. Worklight switch OK.
POSSIBLE PROBLEMS
Wire no. 40 faulty.

4.  
Are 22–28 volts measured on wire no. 40 at worklight switch?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The voltage source for the CBT worklight switch is wire no. 40 in the HEMTT cab wiring harness. Spotlight will not operate if this wire is defective.



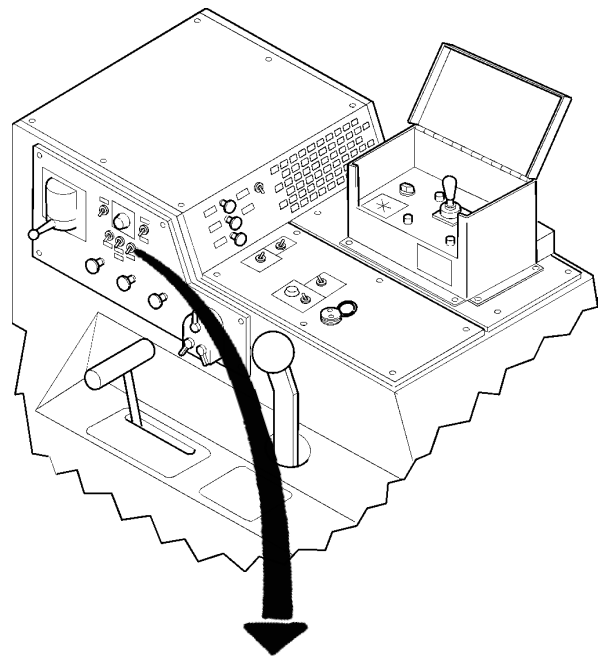


**4-12. UNIT TROUBLESHOOTING (continued).**

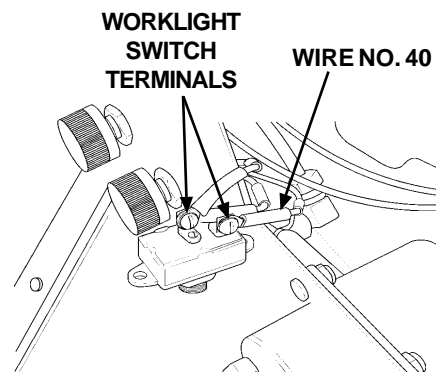
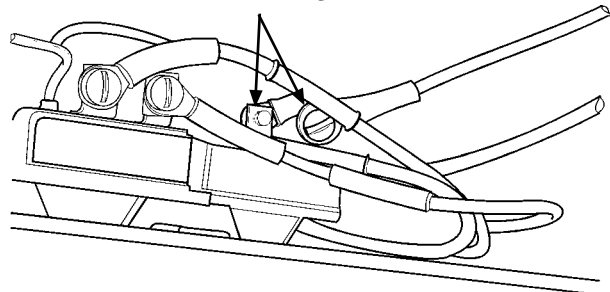
**5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (continued).**

**VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Set multimeter to voltage position.
- (4) Place positive (+) probe of multimeter on wire no. 40 at worklight switch.
- (5) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (6) Turn engine start switch and light control switch to OFF position.



**WORKLIGHT  
SWITCH  
TERMINALS**



**(SWITCH REMOVED FROM PANEL FOR CLARITY)**

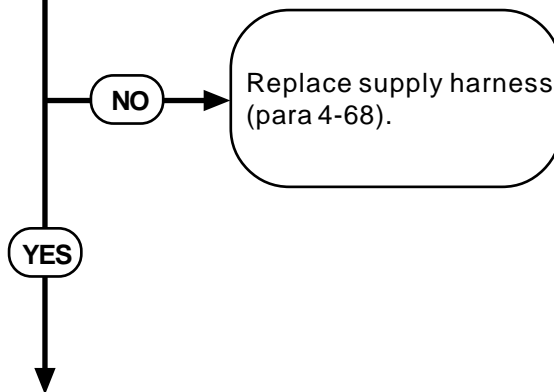
4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Worklight OK. Spotlight bulb OK.
<b>POSSIBLE PROBLEMS</b>
Supply harness faulty. Cab control box faulty. Linking harness faulty. Main junction box harness faulty. Spotlight harness faulty.

5.  
Is there continuity measured between the worklight switch (terminal with two wires) and the supply harness connector (P1), position G?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Power is transferred from the cab worklight switch to the cab control box via the supply harness.



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Remove eight screws and side panel from heater compartment.
- (2) Remove four screws and lockwashers and access panel from heater compartment.

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Disconnect supply harness connector from cab control box.
- (4) Set multimeter to ohms position.

**NOTE**

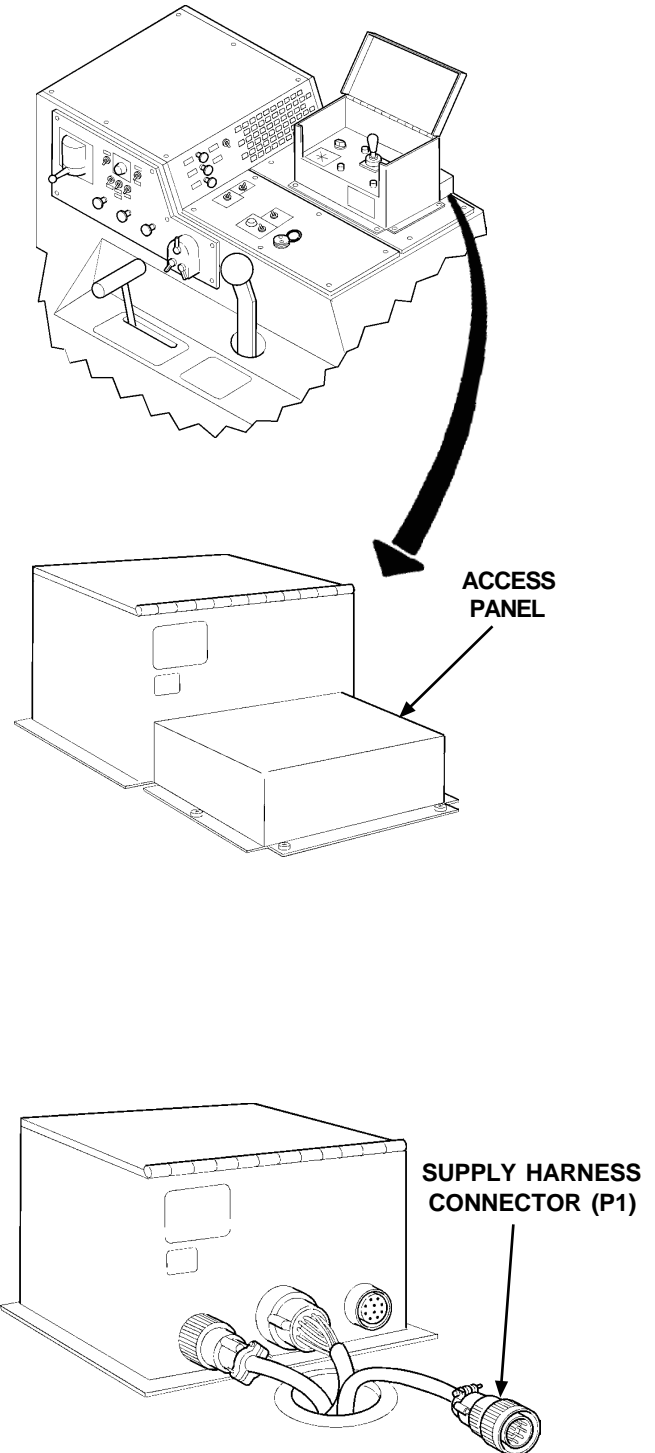
A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check between cab worklight switch (terminal with two wires) and the supply harness connector, position G.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (6) Remove multimeter lead from one end of wire and connect to chassis ground.



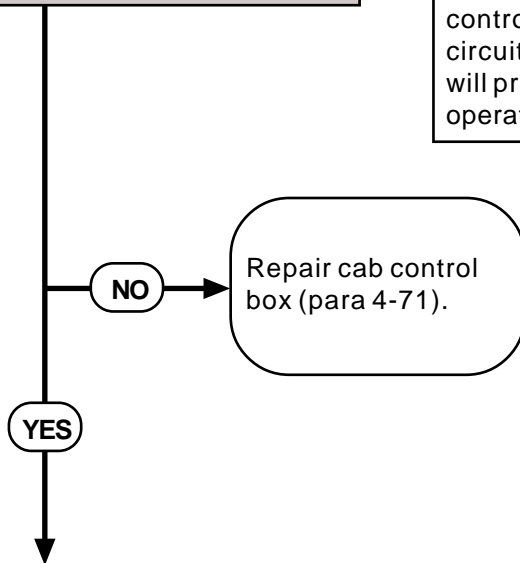
4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Worklight OK. Spotlight bulb OK. Supply harness OK.
POSSIBLE PROBLEMS
Cab control box faulty. Linking harness faulty. Main junction box harness faulty. Worklight harness faulty.

6.  
Is there continuity between the cab control box (24-pin) linking harness connector (J2), position E, and the supply harness connector (J1), position G?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the supply harness to the (24-pin) linking harness through the cab control box. An open circuit in the control box will prevent spotlight operation.



## 4-12. UNIT TROUBLESHOOTING (continued).

## 5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

## CONTINUITY TEST

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect cab control box connector (P2) from cab control box.
- (2) Set multimeter to ohms position.

**NOTE**

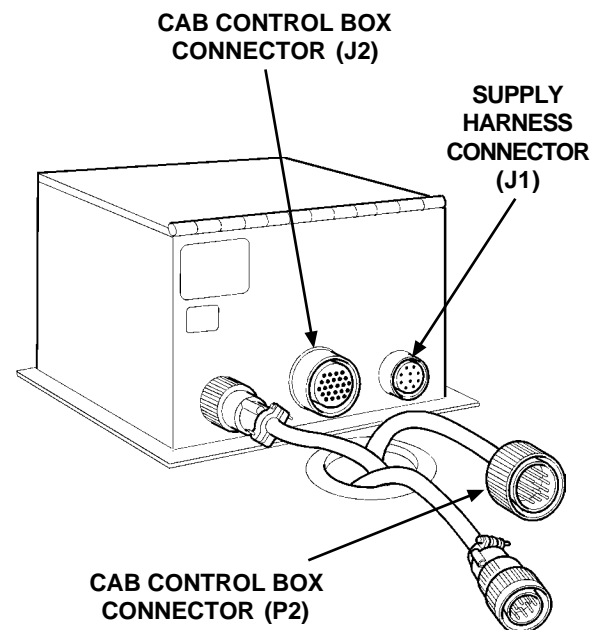
A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check between cab control box connector (J2), position E, and supply harness connector (J1), position G.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



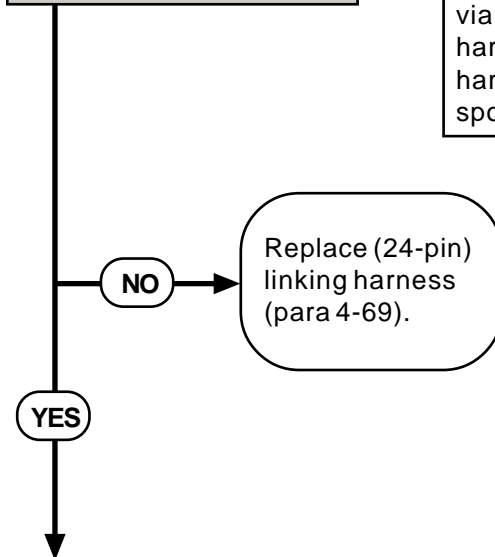
4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Spotlight bulb OK. Worklight OK. Supply harness OK. Cab control box OK.
POSSIBLE PROBLEMS
Linking harness faulty. Main junction box harness faulty. Spotlight harness faulty.

7.  
Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and junction box connector (P4)?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The spotlight power source is transferred from the cab control box to the main junction box via the (24-pin) linking harness. Faults in this harness will prevent spotlight operation.



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Open hydraulic cabinet cover.

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (2) Disconnect main junction box connector (P4) from main junction box.
- (3) Set multimeter to ohms position.

**NOTE**

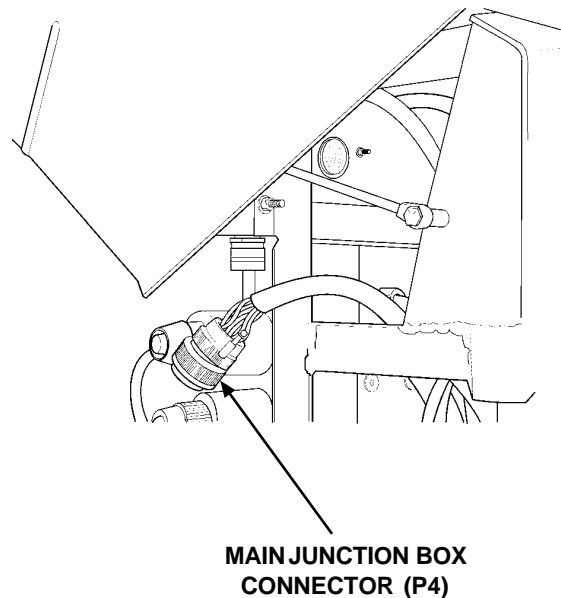
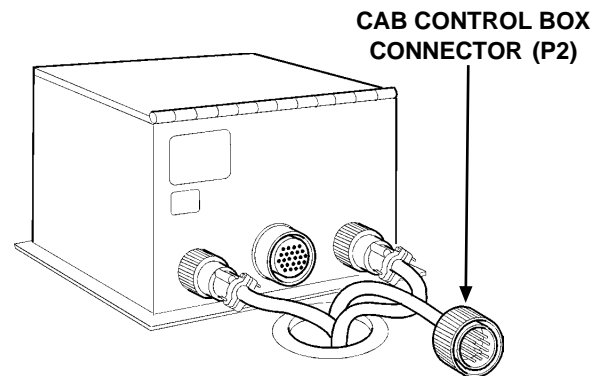
A reading of infinity indicates an open circuit.

- (4) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity on (24-pin) linking harness, position E.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (5) Remove multimeter lead from one end of wire and connect to chassis ground.



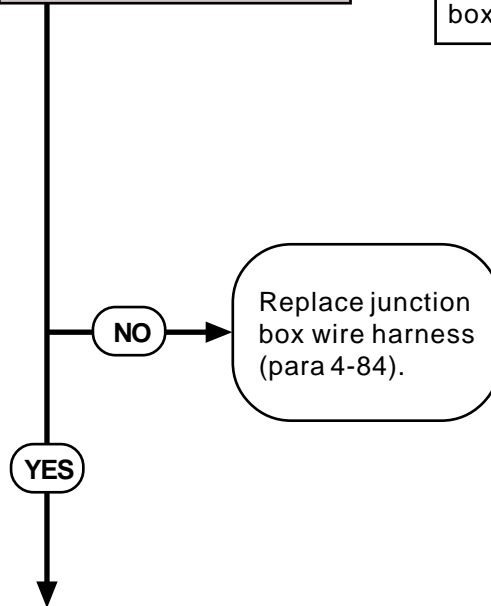
4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Spotlight bulb OK. Worklight OK. Supply harness OK. Cab control box OK. Linking harness OK.
POSSIBLE PROBLEMS
Main junction box harness faulty. Spotlight harness faulty.

8.  
Is there continuity between the main junction box connector (J4), position E, and the junction box terminal strip, position 5?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The power source for the spotlight is transferred from the main linking harness to the terminal strip in the main junction box by this wire harness.





4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

(1) Loosen four screws on main junction box cover and open cover.

**CAUTION**

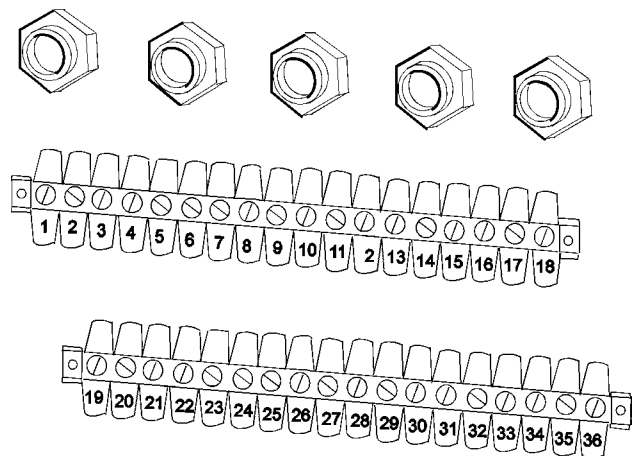
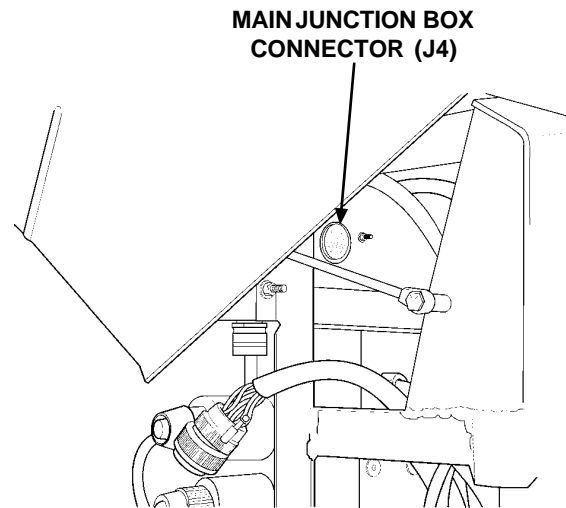
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this may result in damage to test equipment or electrical system.**

(2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

(3) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between position E on connector (J4) and position 5 in junction box.



WIRING REMOVED FOR CLARITY

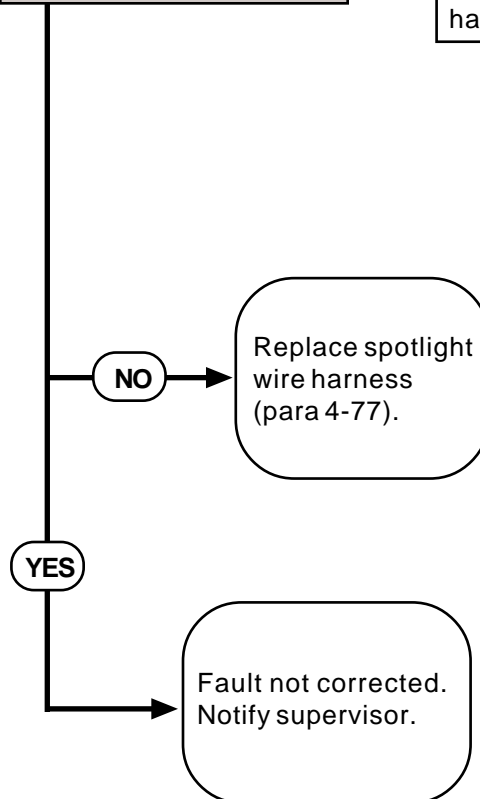
4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
Spotlight bulb OK. Worklight OK. Supply harness OK. Cab control box OK. Linking harness OK. Main junction box harness OK.
POSSIBLE PROBLEMS
Spotlight harness faulty.

9.  
Is there continuity measured between the spotlight harness connector and the main junction box terminal strip?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the main junction box to the spotlight via this wire harness.



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

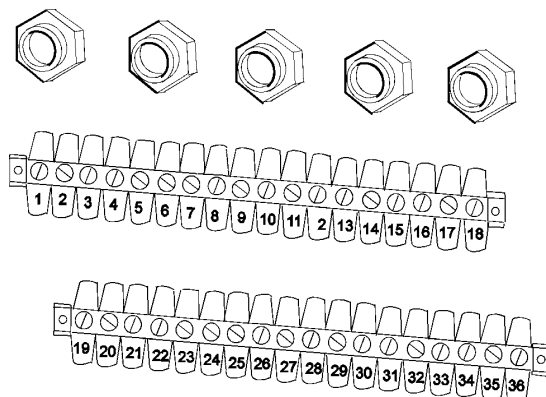
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

(1) Set multimeter to ohms position.

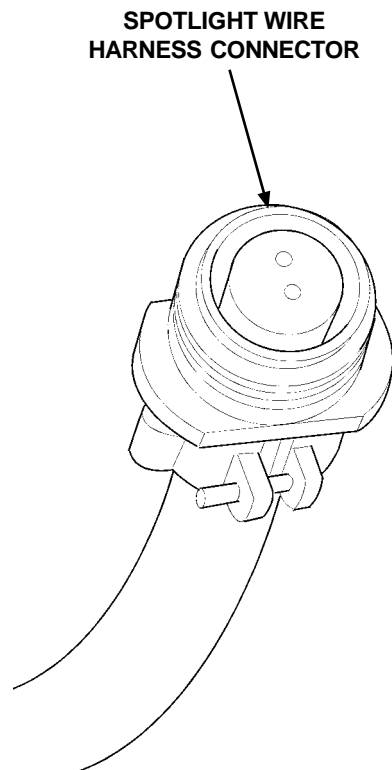
**NOTE**

A reading of infinity indicates an open circuit.

(2) Connect multimeter terminals to each end of wire, and check multimeter for continuity. Check between spotlight harness connector position A and terminal strip position 5. Also check between spotlight harness connector position B and terminal strip position 16.



WIRING REMOVED FOR CLARITY

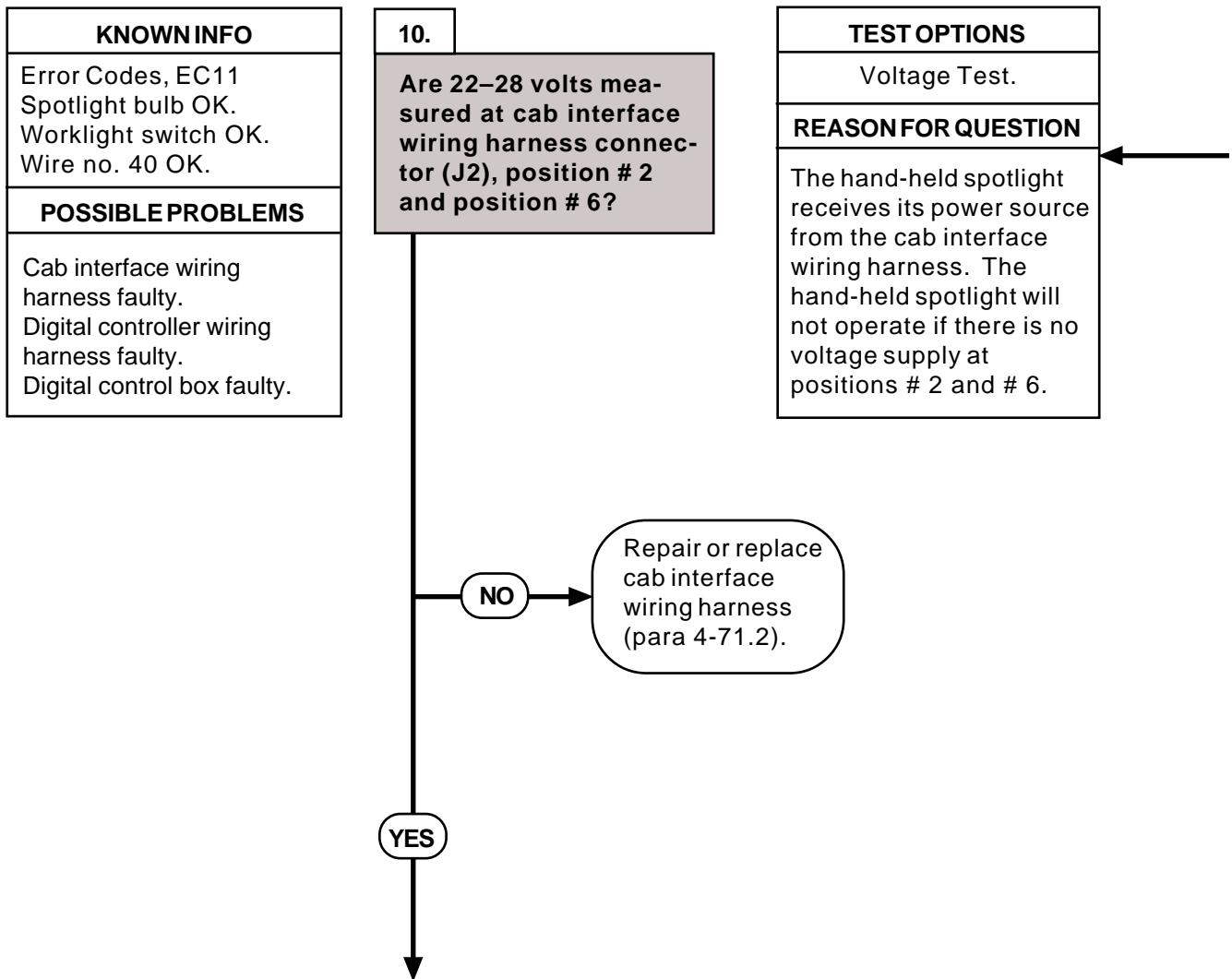


4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

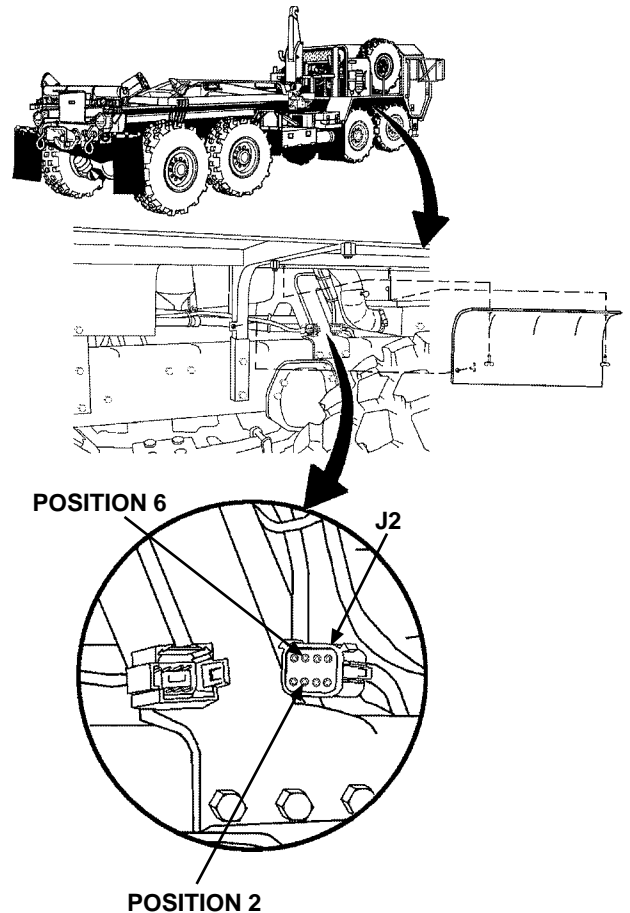
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



**4-12. UNIT TROUBLESHOOTING (continued).**

**5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).**

<b>VOLTAGE TEST</b>
(1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
(2) Cut and remove wire ties as necessary to loosen harness and disconnect male from female end.
(3) Turn engine start switch to ON position.
(4) Set multimeter to voltage position.
(5) Place negative (-) probe of multimeter on known good ground.
(6) Place cab worklight switch in "ON" position.
(7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
(8) Place positive (+) probe of multimeter on position "6", circuit 1040, of cab control box connector (J2), note reading.
(9) Turn worklight switch and engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

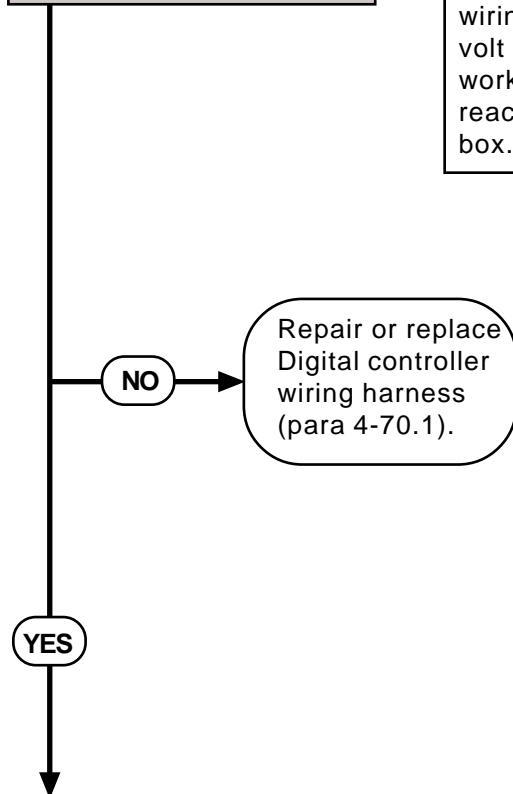
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

<b>KNOWN INFO</b>
Error Codes, EC11 Spotlight bulb OK. Worklight switch OK. Wire no. 40 OK.. Cab interface wiring harness OK.
<b>POSSIBLE PROBLEMS</b>
Digital controller wiring harness faulty. Digital control box faulty.

11.  
Is there continuity measured between the main wiring harness (J3) , (J4) and the hand-held spotlight harness (P12)?

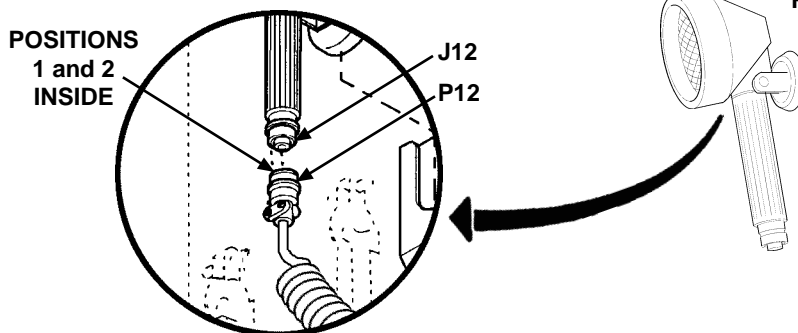
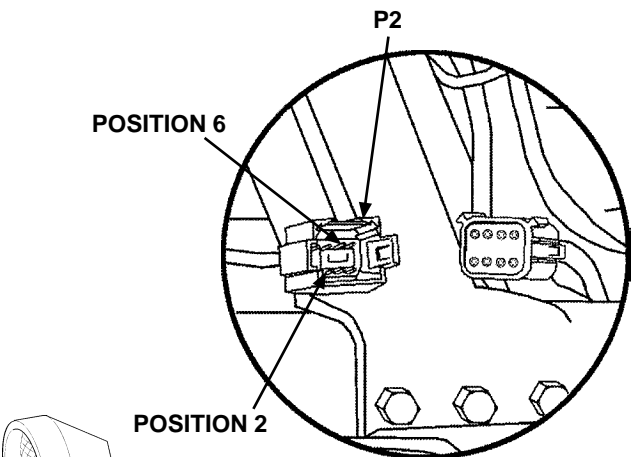
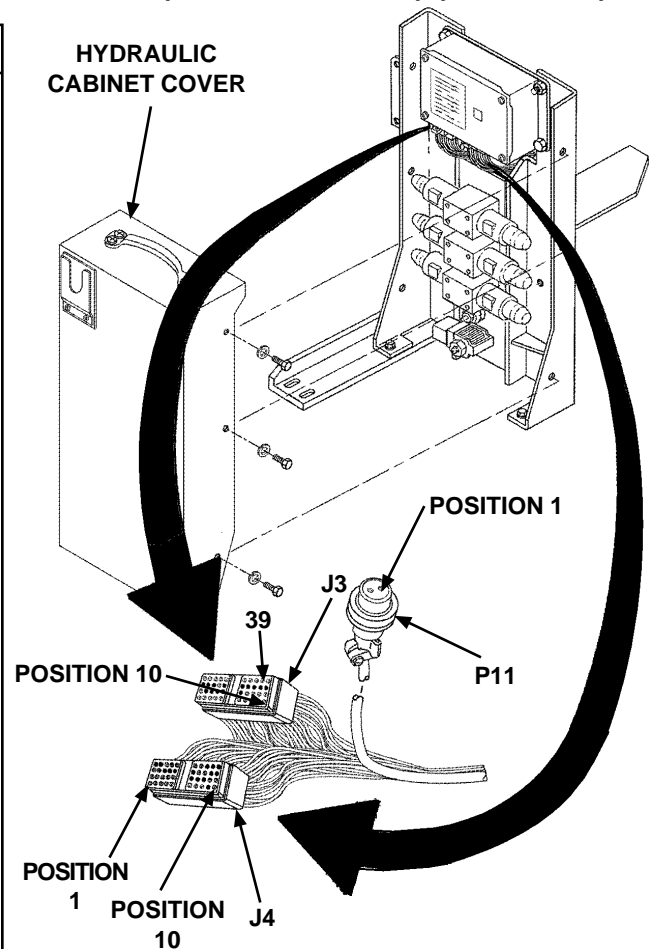
<b>TEST OPTIONS</b>
Continuity Tests.
<b>REASON FOR QUESTION</b>
If there is no continuity at the designated positions on the main wiring harness, the 24 volt power from the worklight switch does not reach the digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove five screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Disconnect hand-held spotlight wiring harness connector (J12) from Digital controller wiring harness connector (P12), at the base of hand-held spotlight.</li> <li>(4) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter between (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "6", and (J4), position "10". Check multimeter for continuity.</li> <li>(7) Connect multimeter between (P3), position 10, and (P12), position "1". Check multimeter for continuity.</li> <li>(8) Connect multimeter between (P3), position 39, and (P12), position "2". Check multimeter for continuity.</li> </ol>	

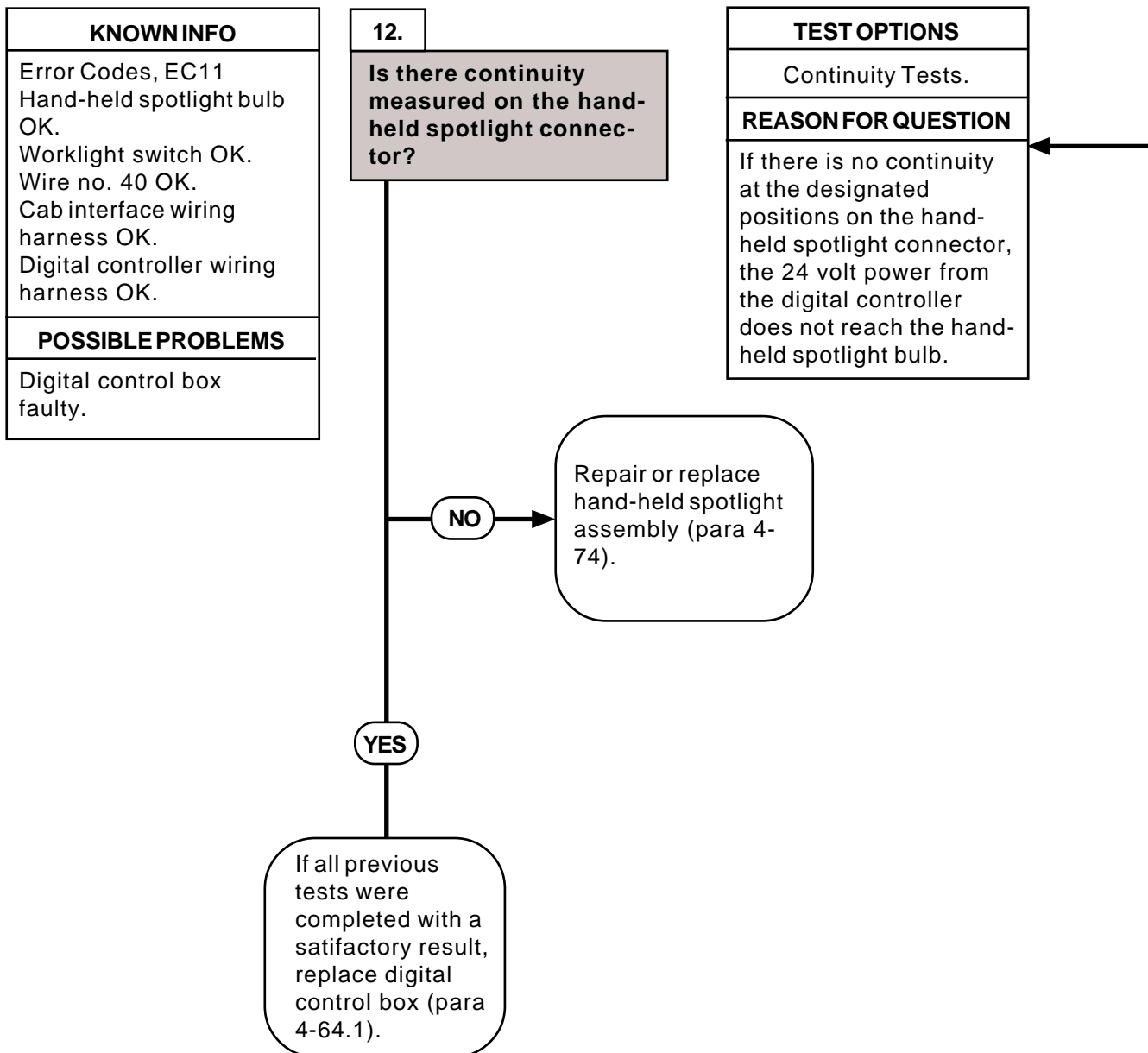


4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

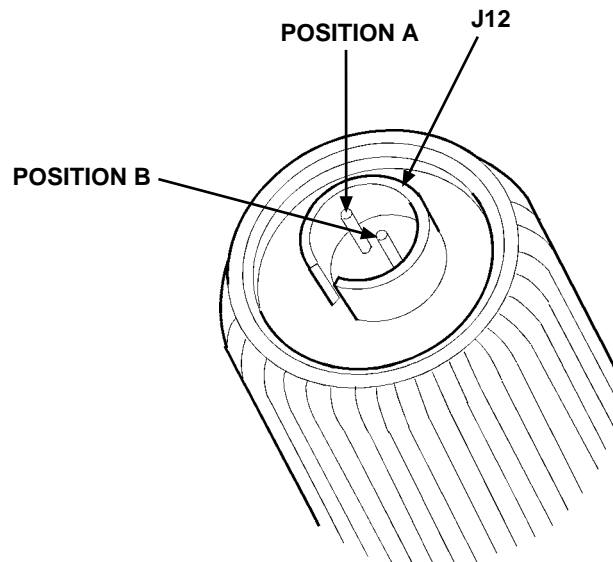
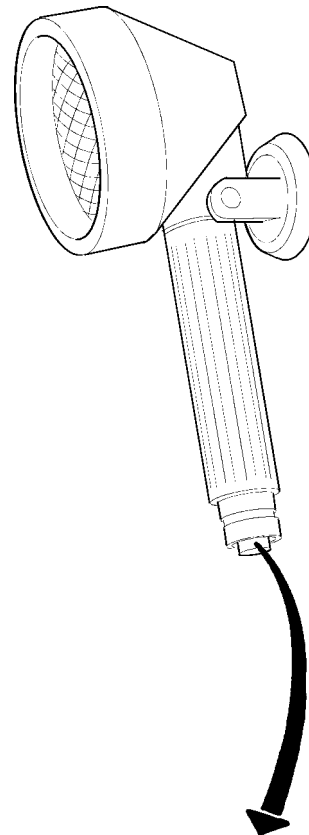




4-12. UNIT TROUBLESHOOTING (continued).

5. HAND-HELD SPOTLIGHT DOES NOT OPERATE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(2) Connect multimeter at connector (J12), between positions "A", and "B". Check multimeter for continuity.</p>	



4-12. UNIT TROUBLESHOOTING (continued).

6. INDICATOR/PANEL LIGHTS DO NOT OPERATE (MODEL A ONLY).

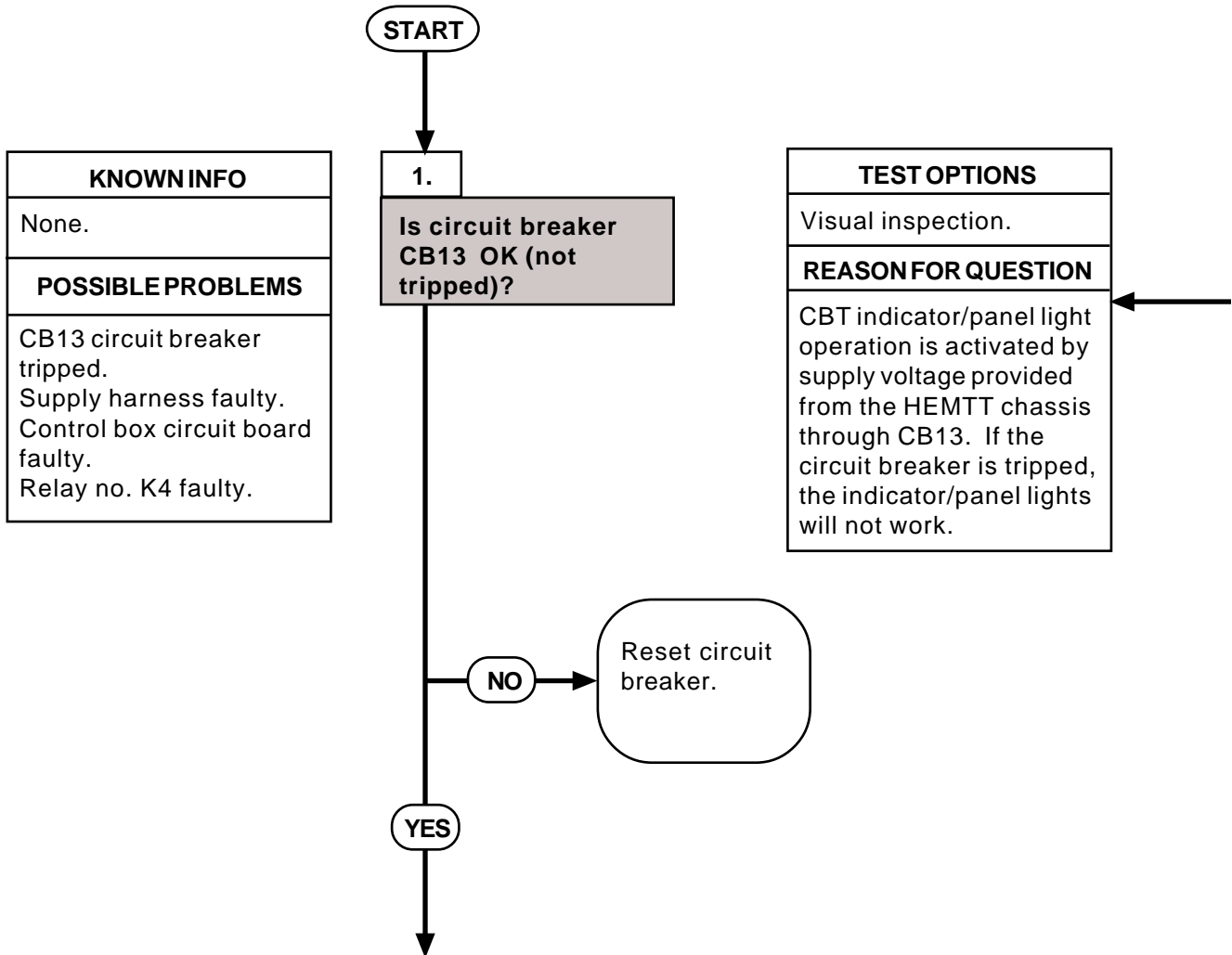
INITIAL SETUP

*Tools and Special Tools*

Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Equipment Condition*

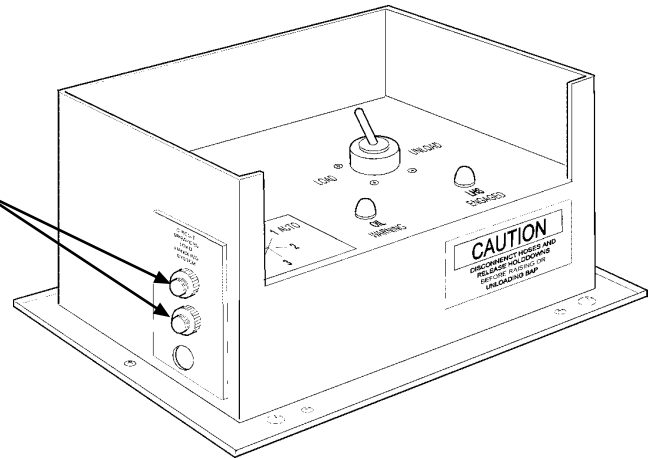
Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)



4-12. UNIT TROUBLESHOOTING (continued).

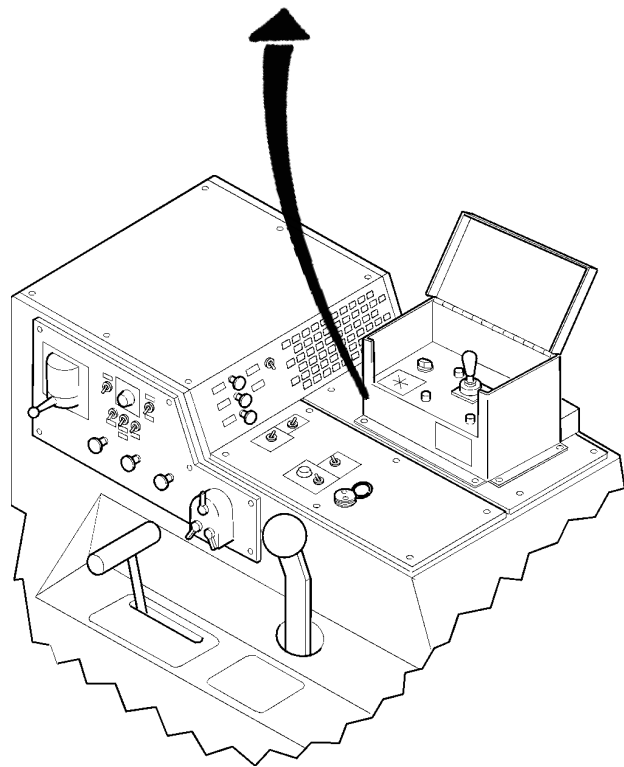
6. INDICATOR/PANEL LIGHTS DO NOT OPERATE (MODEL A ONLY) (continued).

CBT CIRCUIT  
BREAKERS



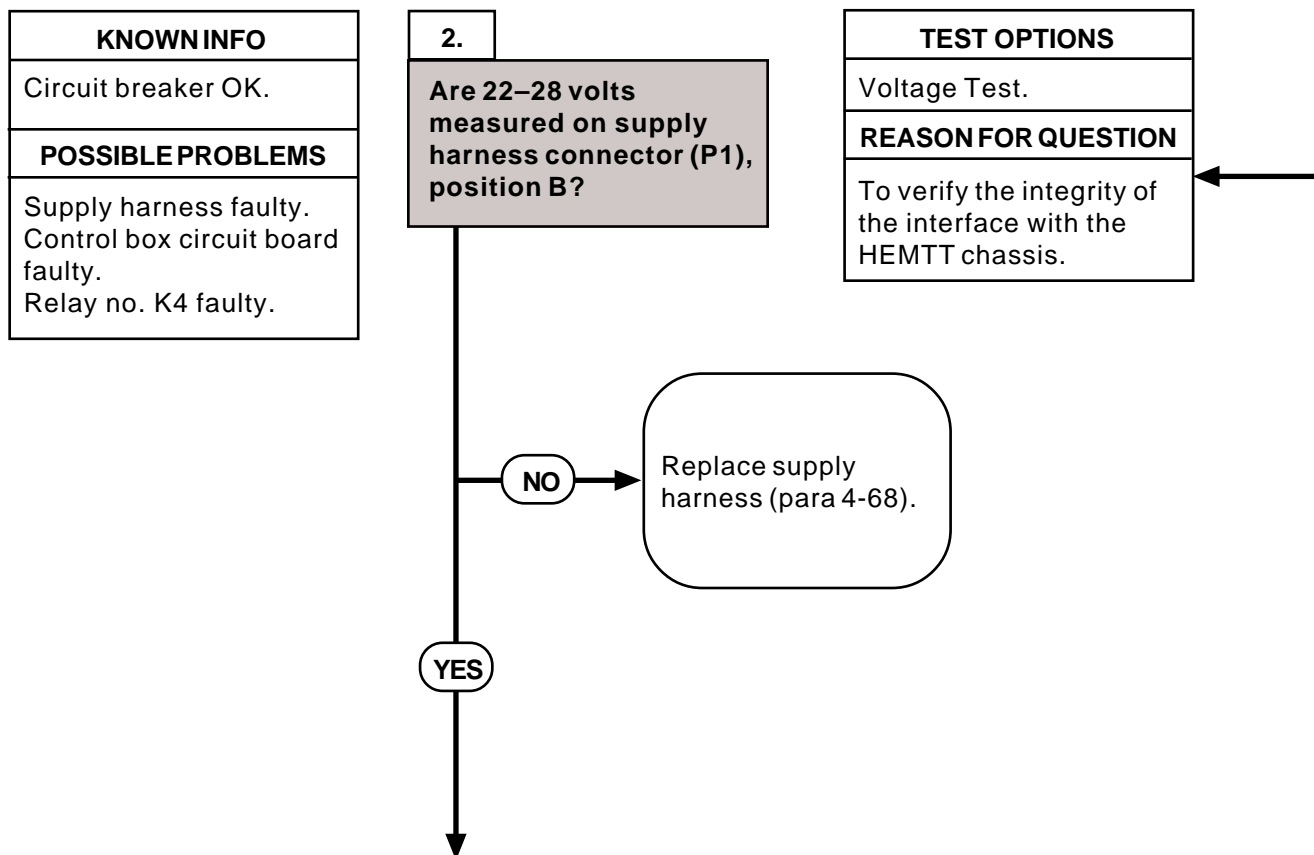
**VISUAL INSPECTION**

Inspect circuit breaker for being tripped. If tripped, depress button to reset.



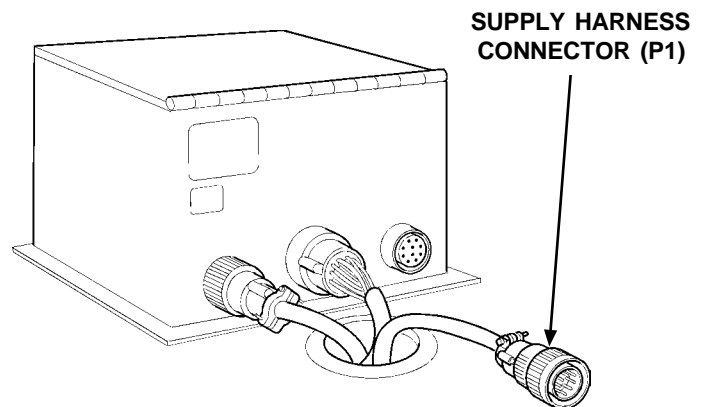
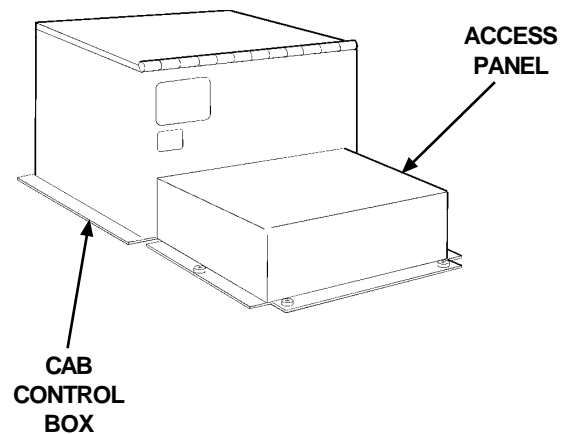
4-12. UNIT TROUBLESHOOTING (continued).

6. INDICATOR/PANEL LIGHTS DO NOT OPERATE (MODEL A ONLY) (continued).



**4-12. UNIT TROUBLESHOOTING (continued).****6. INDICATOR/PANEL LIGHTS DO NOT OPERATE (MODEL A ONLY) (continued).****VOLTAGE TEST**

- (1) Remove four screws and lockwashers and access panel from heater compartment.
- (2) Remove supply harness connector (P1) from supply harness connector (J1).
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position.
- (5) Set multimeter to voltage position.
- (6) Place positive (+) probe of multimeter on supply harness connector (P1), position B.
- (7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (8) Turn engine start switch and light control switch to OFF position.



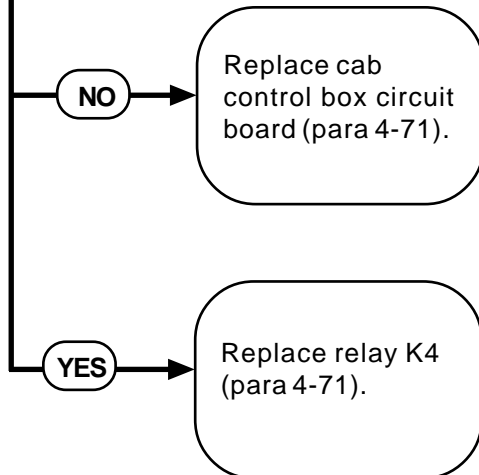
4-12. UNIT TROUBLESHOOTING (continued).

6. INDICATOR/PANEL LIGHTS DO NOT OPERATE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Circuit breaker OK. Supply harness OK.
<b>POSSIBLE PROBLEMS</b>
Control box circuit board faulty. Relay no. K4 faulty.

3.  
Is LED D7 on the cab control box circuit board illuminated?

<b>TEST OPTIONS</b>
Relay K4 Test.
<b>REASON FOR QUESTION</b>
If LED D7 is lit, power is reaching the relay and the relay is defective. If LED D7 is not lit, the cab control box circuit board is faulty.

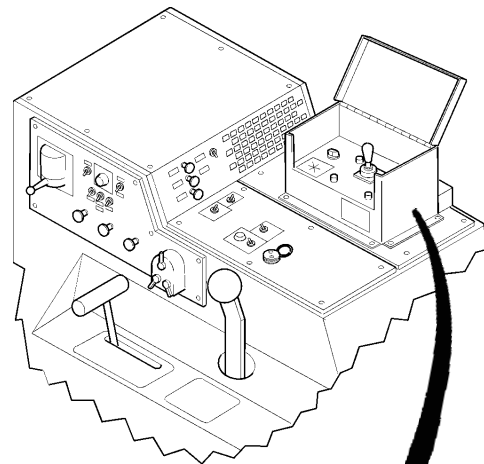


**4-12. UNIT TROUBLESHOOTING (continued).**

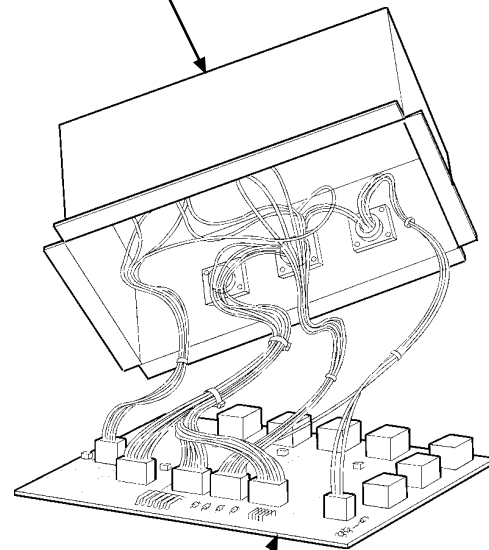
**6. INDICATOR/PANEL LIGHTS DO NOT OPERATE (MODEL A ONLY) (continued).**

**RELAY K4 TEST**

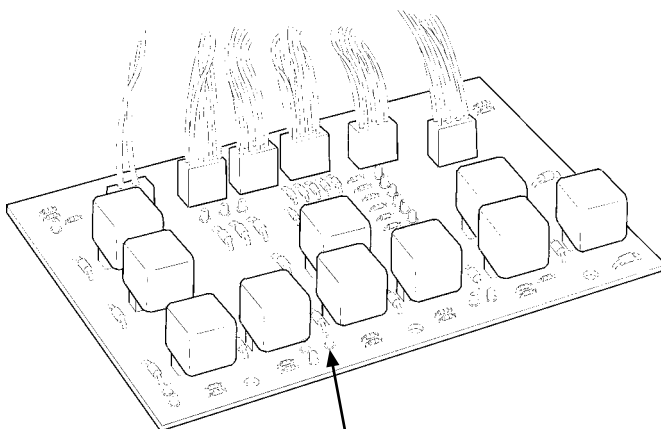
- (1) Remove four screws and lockwashers from cab control box.
- (2) Remove six screws from cab control box, and separate upper body from base.
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position.
- (5) Inspect whether LED D7 is on or off.
- (6) Turn engine start switch and light control switch to OFF position.



UPPER  
BODY



BASE



LED D7

4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY).

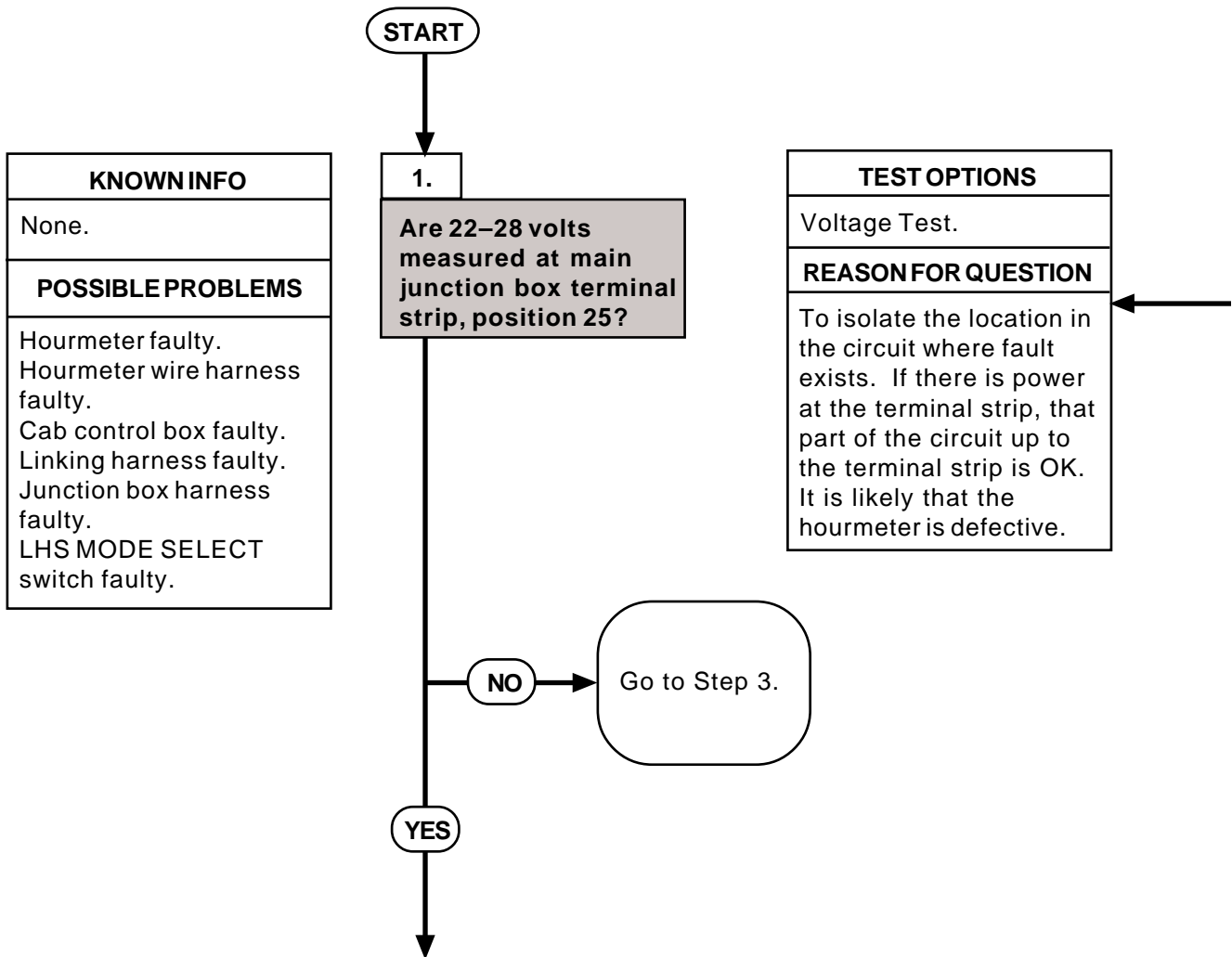
INITIAL SETUP

*Tools and Special Tools*

Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)



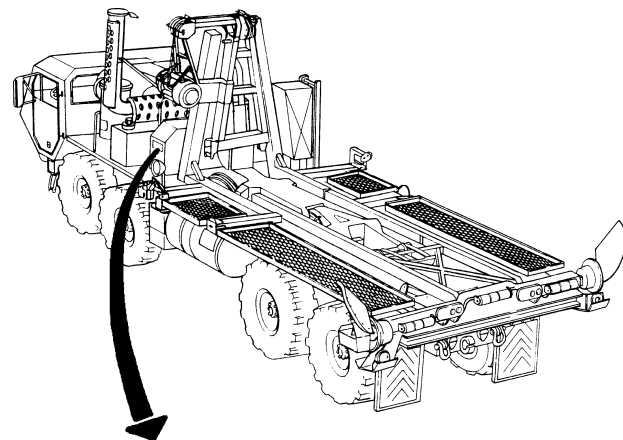


**4-12. UNIT TROUBLESHOOTING (continued).**

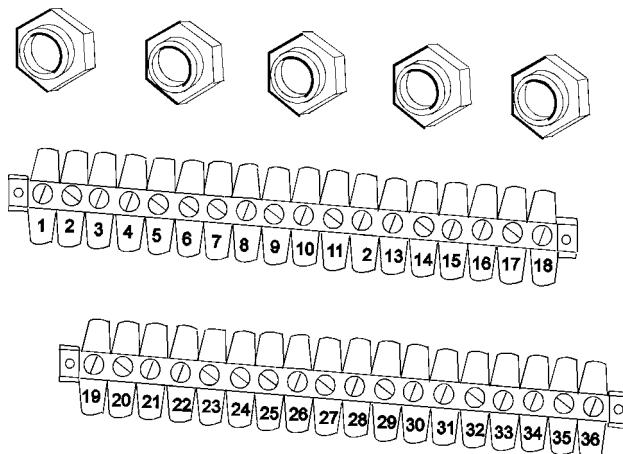
**7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).**

**NOTE**

The hourmeter operates only when the engine start switch is in the ON position and the cab control selector valve is in the AUTO or MANUAL position.



<b>VOLTAGE TEST</b>	
	(1) Open hydraulic cabinet cover.
	(2) Loosen four screws on main junction box cover and open cover.
	(3) Turn engine start switch to ON position.
	(4) Turn LHS MODE SELECT switch to the AUTO or MANUAL positions.
	(5) Set multimeter to voltage position.
	(6) Place positive (+) probe of multimeter on terminal strip position 25.
	(7) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
	(8) Turn engine start switch to OFF position.



**WIRING REMOVED FOR CLARITY**

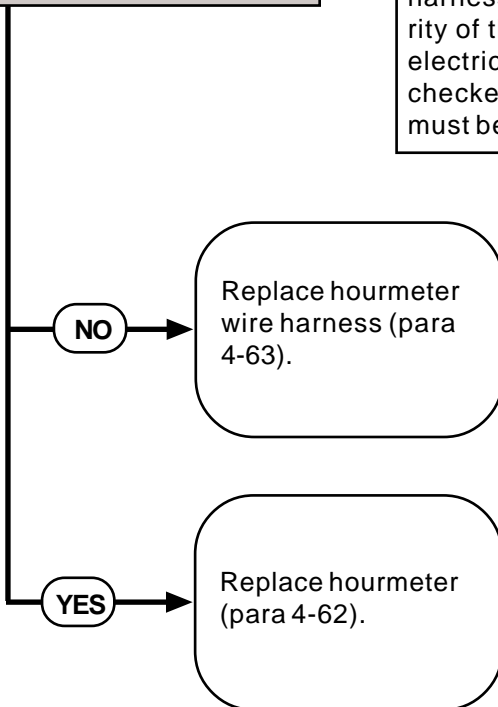
4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Voltage OK at junction box terminal strip.
<b>POSSIBLE PROBLEMS</b>
Hourmeter faulty. Hourmeter wire harness faulty.

2.  
Is there continuity measured in the hourmeter wire harness?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
If the hourmeter wire harness is OK, the integrity of the complete electrical circuit has been checked. The hourmeter must be defective.



4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

(1) Remove four screws, lockwashers, two locknuts, and hourmeter housing from main junction box.

**NOTE**

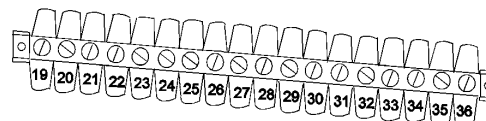
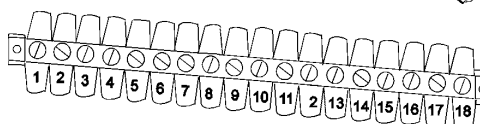
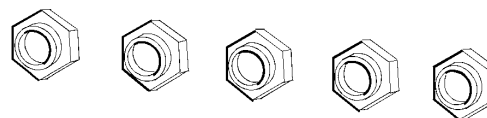
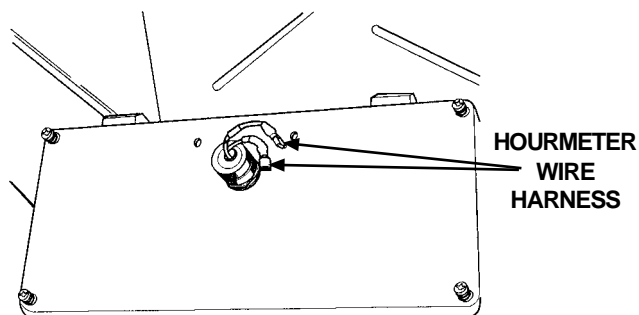
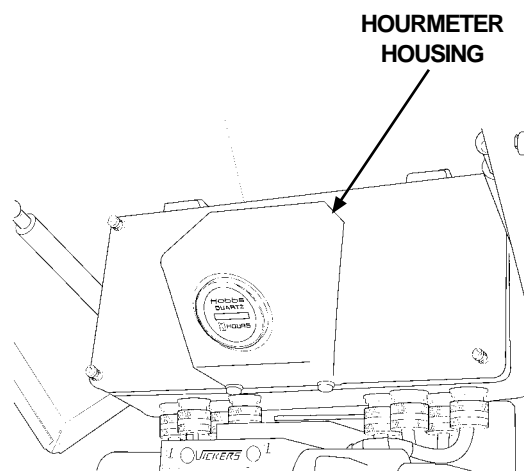
Tag and mark wires before removal.

(2) Disconnect wires from hourmeter.  
 (3) Set multimeter to ohms position.

**NOTE**

- A reading of infinity indicates an open circuit.
- Terminal 25 is connected to one end of the harness; terminal 26 is connected to the other end of the harness.

(4) Check for continuity between connectors on hourmeter harness and positions 25 and 26 on terminal strip.



WIRING REMOVED FOR CLARITY

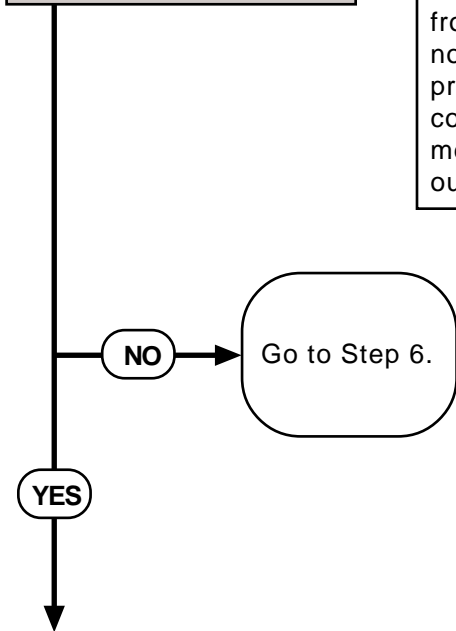
4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
No voltage at junction box terminal strip.
POSSIBLE PROBLEMS
Cab control box faulty. Linking harness faulty. Junction box harness faulty. LHS MODE SELECT switch faulty.

3.  
Are 22–28 volts measured at the cab control box connector (J2), position D?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power supply for the hourmeter circuit comes from the cab control box. If no voltage is measured, the problem is internal to cab control box. If voltage is measured, the problem is outside the cab control box.

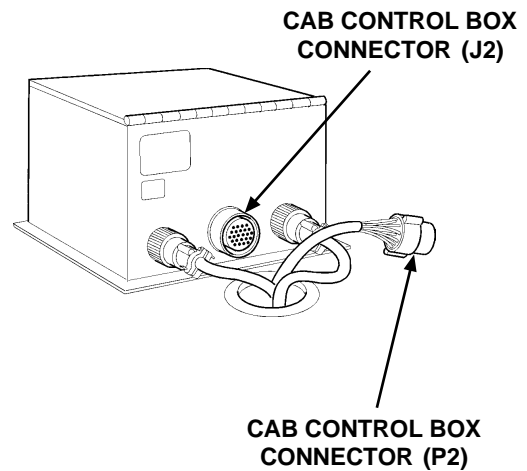
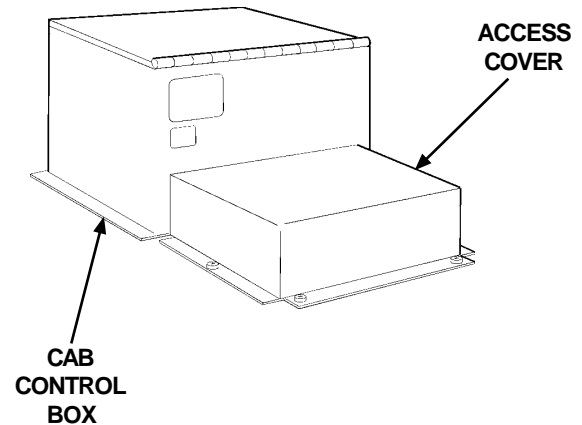


**4-12. UNIT TROUBLESHOOTING (continued).**

**7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).**

**VOLTAGE TEST**

- (1) Remove four screws and lockwashers and access cover from heater compartment.
- (2) Remove cab control box connector (P2) from cab control box.
- (3) Turn engine start switch to ON position.
- (4) Set multimeter to voltage position.
- (5) Place positive (+) probe of multimeter on position D of cab control box connector (J2).
- (6) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (7) Turn engine start switch to OFF position.



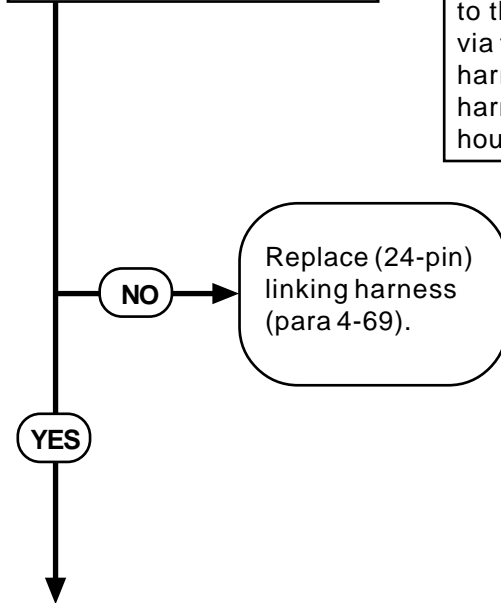
4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
No voltage at junction box terminal strip. Cab control box OK.
<b>POSSIBLE PROBLEMS</b>
Linking harness faulty. Junction box harness faulty.

4.  
Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?

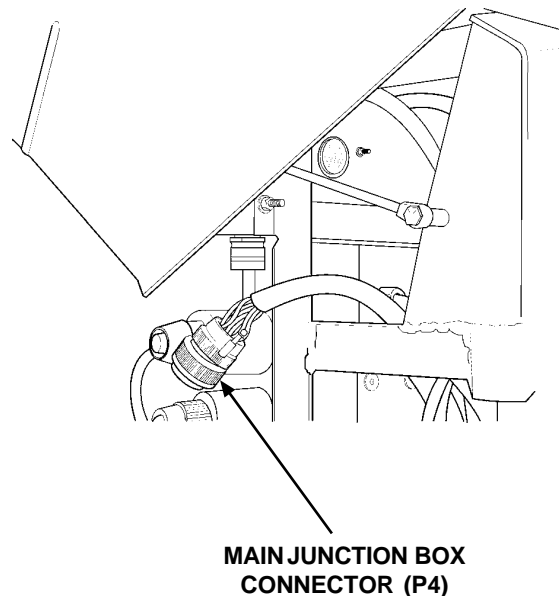
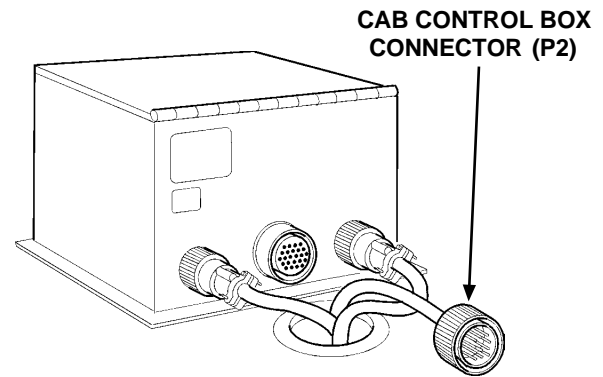
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The hourmeter power source is transferred from the cab control box to the main junction box via the (24-pin) linking harness. Faults in this harness will prevent hourmeter operation.



4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

VOLTAGE TEST	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Disconnect main junction box connector (P4) from main junction box.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter to leads at each end of (24-pin) linking harness, position D. Check multimeter for continuity.</p>	
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
<p>(4) Remove multimeter lead from one end of wire and connect to chassis ground.</p>	



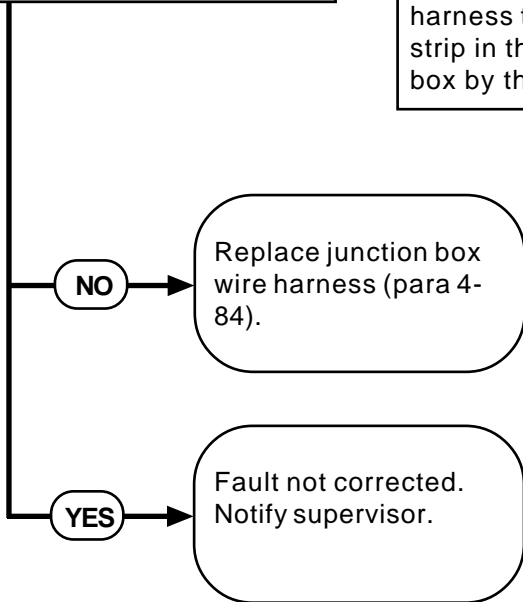
4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
No voltage at junction box terminal strip. Cab control box OK. Linking harness OK.
POSSIBLE PROBLEMS
Junction box harness faulty.

**5.**  
Is there continuity between the main junction box connector (J4) and the junction box terminal strip, position 25?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The power source for the hourmeter is transferred from the (24-pin) linking harness to the terminal strip in the main junction box by this wire harness.

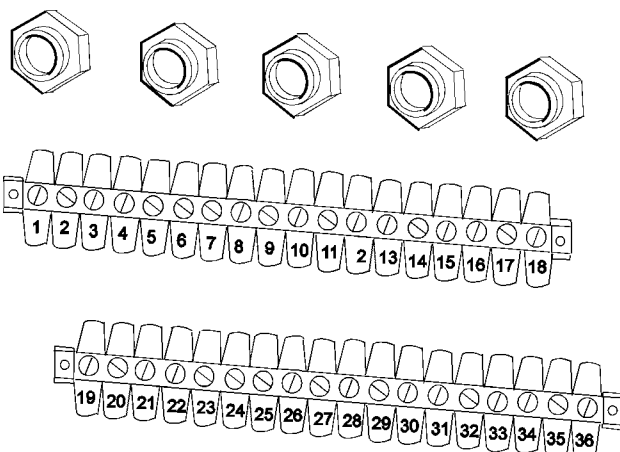
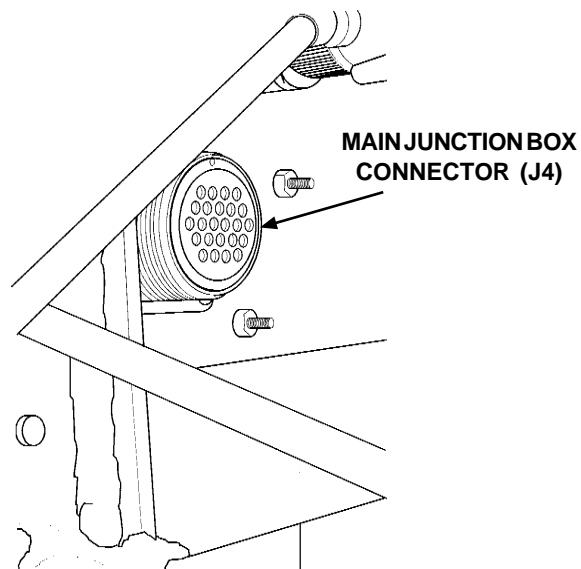




4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>
<b><u>CAUTION</u></b>
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(1) Set multimeter to ohms position.</p>
<b>NOTE</b>
<p>A reading of infinity indicates an open circuit.</p>
<p>(2) Check for continuity between main junction box connector (J4), position D, and terminal strip, position 25.</p>



WIRING REMOVED FOR CLARITY

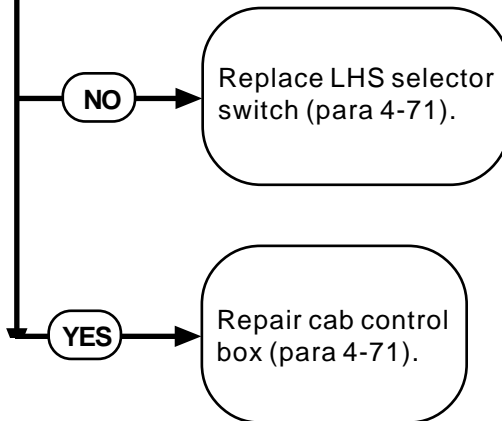
4-12. UNIT TROUBLESHOOTING (continued).

7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
No voltage at junction box terminal strip. No voltage at cab control box, position D.
POSSIBLE PROBLEMS
Cab control box faulty. LHS MODE SELECT switch faulty.

6.  
Is LED D59 in the cab control box illuminated?

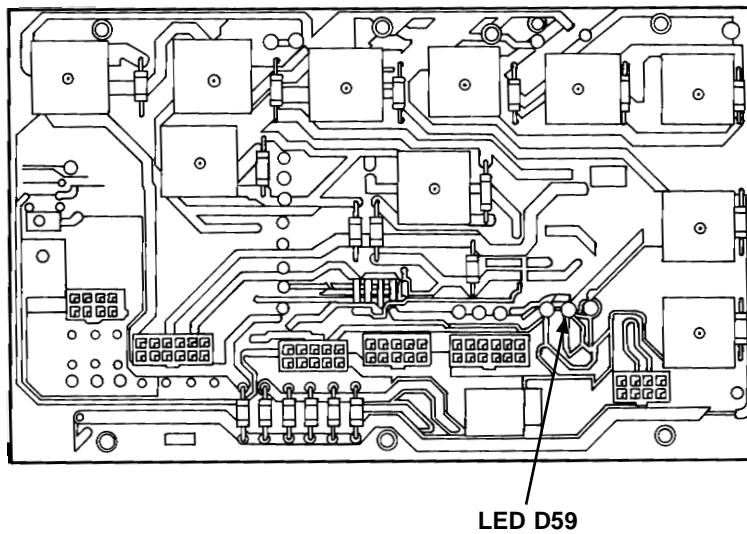
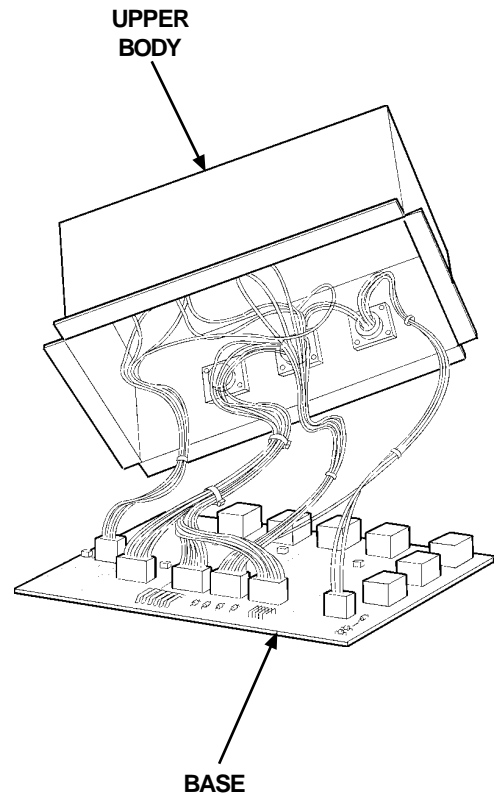
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If the LED is out, it indicates there is no power from the LHS MODE SELECT switch. If the LED is on, there is an open circuit in the hourmeter portion of the cab control box.



**4-12. UNIT TROUBLESHOOTING (continued).**

**7. HOURMETER DOES NOT OPERATE (MODEL A ONLY) (continued).**

- | <b>CONTINUITY TEST</b> |  |
|------------------------|--|
| (1)                    | Remove four screws and lockwashers from cab control box.                   |
| (2)                    | Remove six screws from cab control box, and separate upper body from base. |
| (3)                    | Turn engine start switch to ON position.                                   |
| (4)                    | Turn LHS MODE SELECT SWITCH to AUTO or one of the manual positions.        |
| (5)                    | Inspect whether LED D59 is on or off.                                      |



4-12. UNIT TROUBLESHOOTING (continued).

**8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY).**

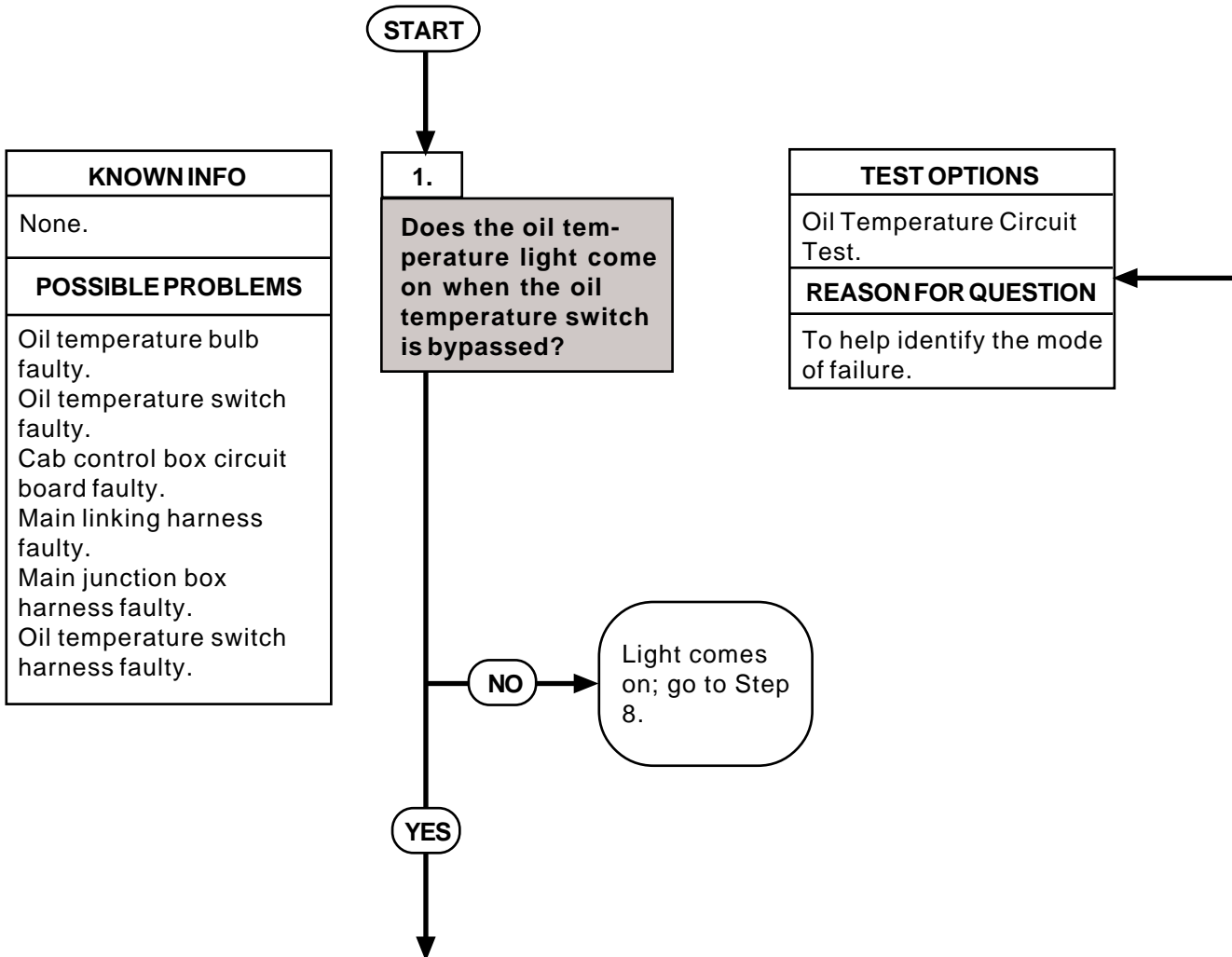
**INITIAL SETUP**

*Tools and Special Tools*

Heater, Gun-Type (500A)  
 Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

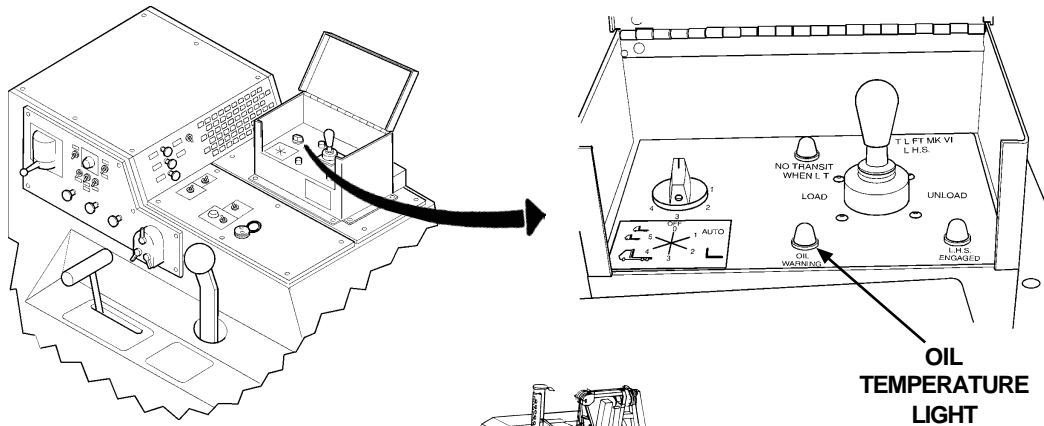
*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)

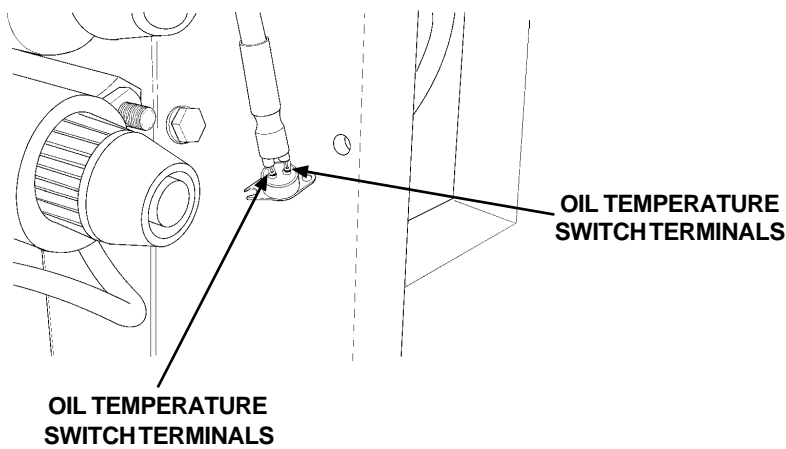
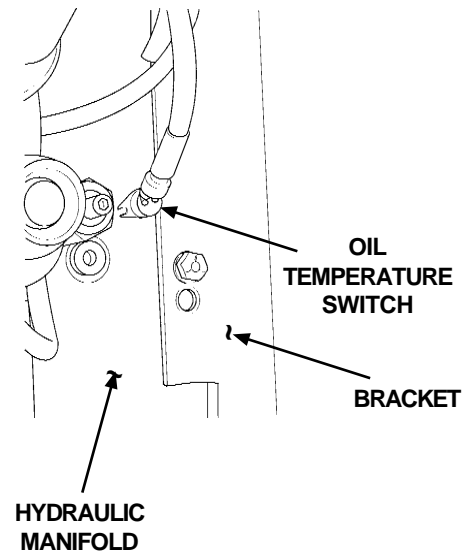
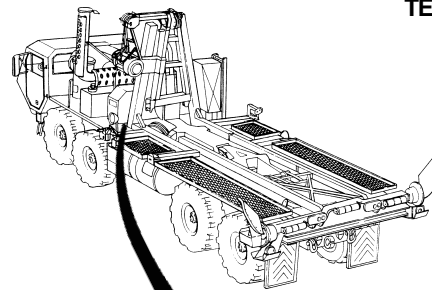


**4-12. UNIT TROUBLESHOOTING (continued).**

**8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).**

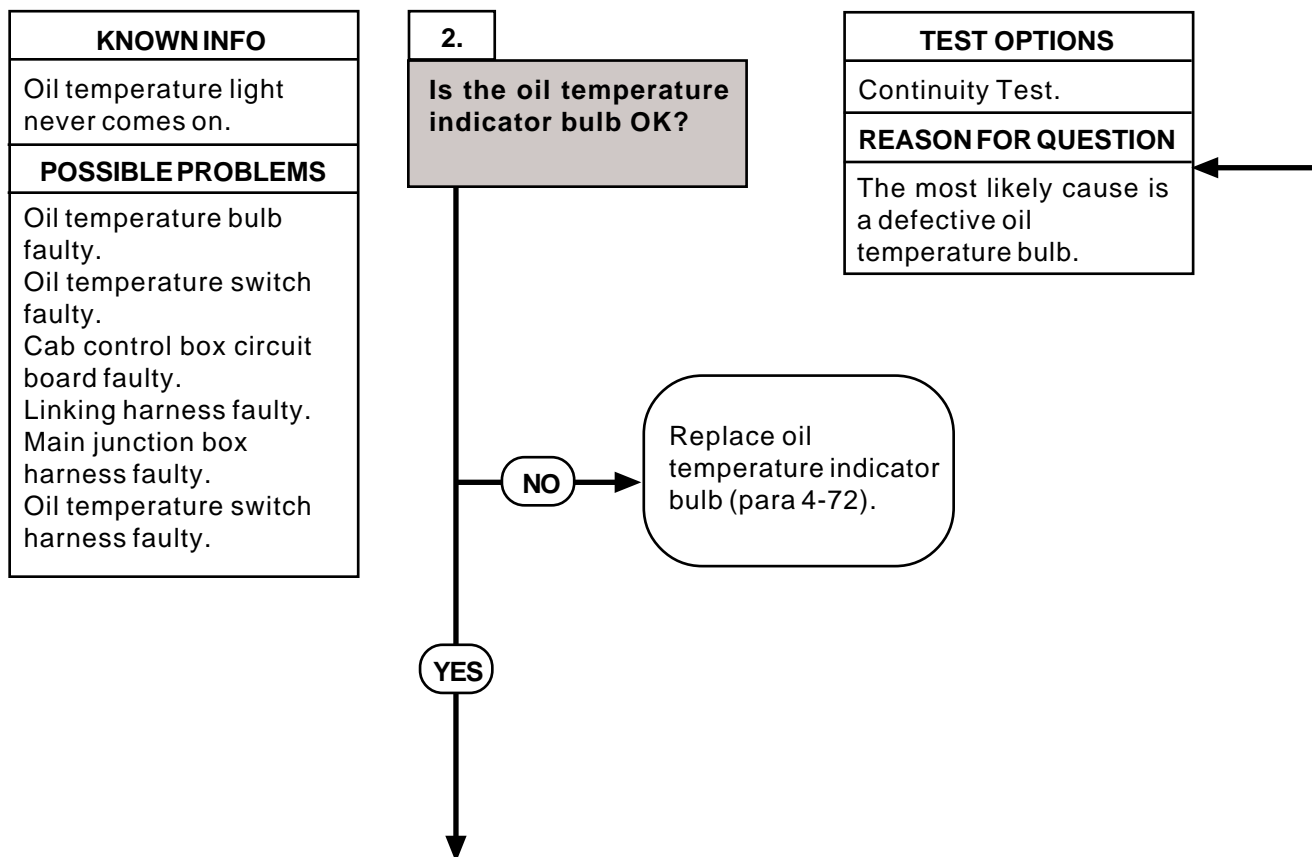


- OIL TEMPERATURE CIRCUIT TEST**
- (1) Install jumper between terminals on oil temperature switch.
  - (2) Turn engine start switch to ON position.
  - (3) Turn light control switch to STOP LIGHT position.
  - (4) Observe status of oil temperature light.
  - (5) Turn engine start switch and light control switch to OFF position.
  - (6) Remove jumper from oil temperature switch.



4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).



4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

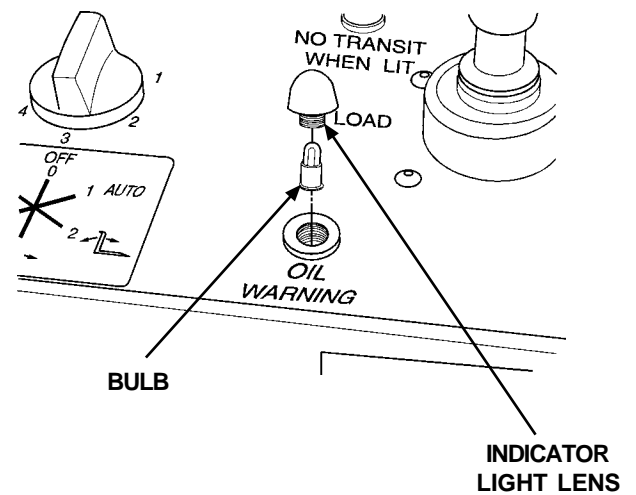
**CONTINUITY TEST**

- (1) Unscrew indicator light lens from socket.
- (2) Remove indicator light bulb from inside lens or socket.
- (3) Set multimeter to ohms position.

**NOTE**

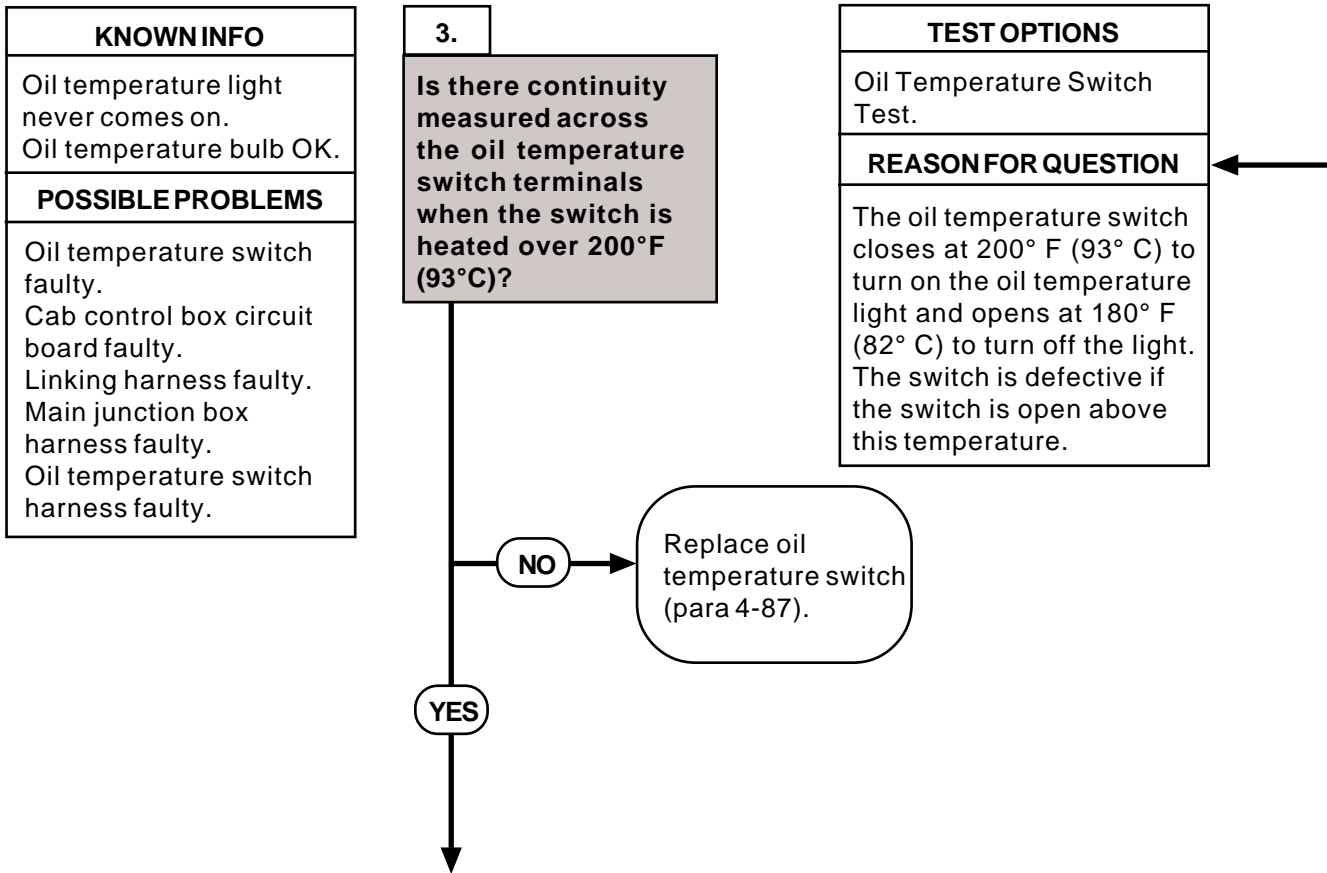
A reading of infinity indicates a burned-out bulb.

- (4) Connect multimeter leads to base and center terminal of bulb. Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).





4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

**OIL TEMPERATURE SWITCH TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws and open main junction box cover.

**NOTE**

Screws in bracket may need to be loosened to remove switch.

- (3) Slide oil temperature switch out from between mounting bracket and hydraulic manifold.

**CAUTION**

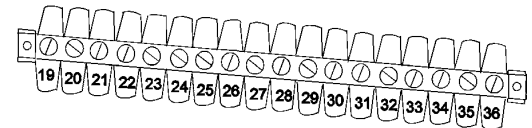
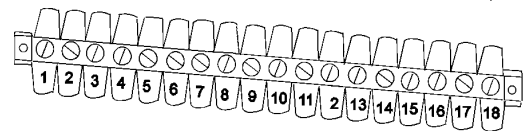
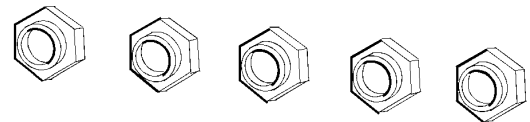
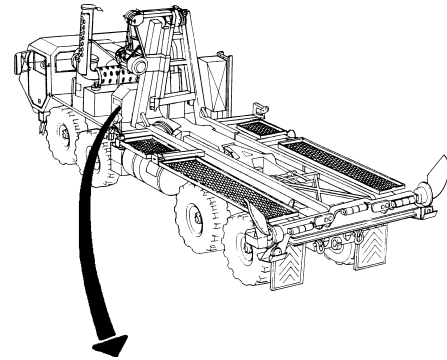
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (4) Set multimeter to ohms position.

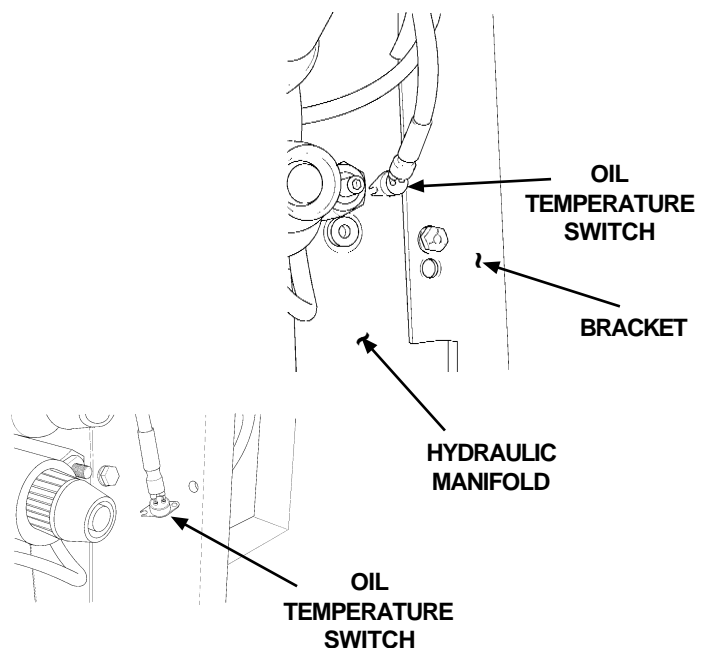
**NOTE**

A reading of infinity indicates the switch is open; zero or very low resistance indicates that the switch is closed.

- (5) Connect multimeter leads to main junction box terminal strip, positions 1 and 2.
- (6) Apply heat to the face of the oil temperature switch. Observe readings on multimeter to determine if switch is opening and closing.



WIRING REMOVED FOR CLARITY



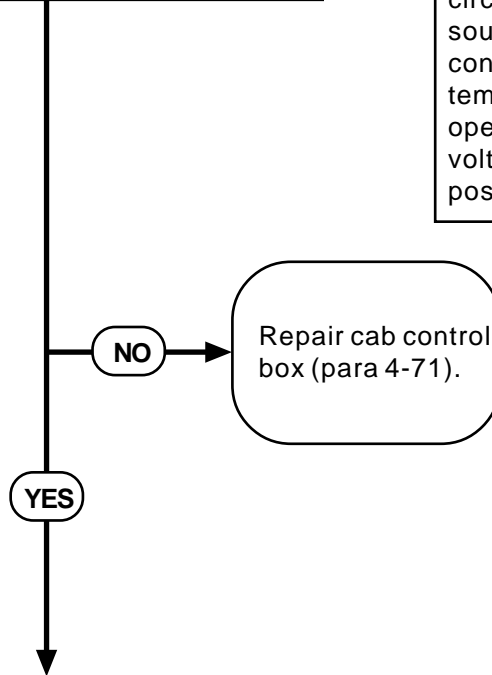
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
Oil temperature light never comes on. Oil temperature bulb OK. Oil temperature switch OK.
POSSIBLE PROBLEMS
Cab control box circuit board faulty. Linking harness faulty. Main junction box harness faulty. Oil temperature switch harness faulty.

4.  
Are 22–28 volts measured at cab control box connector (J2), position N?

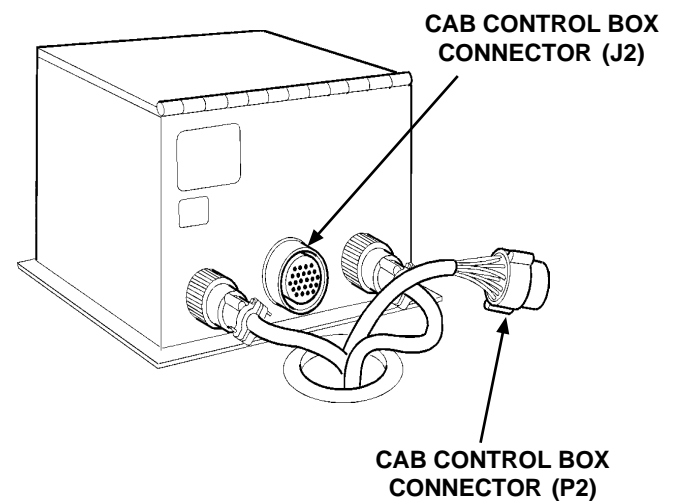
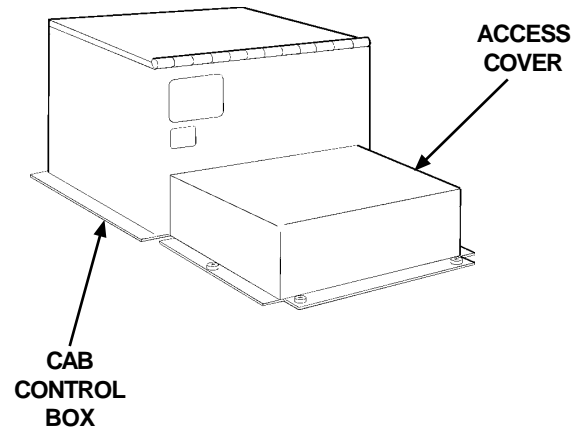
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The oil pressure switch circuit receives its power source from the cab control box. The oil temperature light will not operate if there is no voltage supply at position N.



## 4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).**VOLTAGE TEST**

- (1) Remove four screws and lockwashers and access cover from heater compartment.
- (2) Remove cab control box connector (P2) from cab control box.
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position.
- (5) Set multimeter to voltage position.
- (6) Place positive (+) probe of multimeter on position N of cab control box connector (J2).
- (7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (8) Turn engine start switch and light control switches to OFF position.



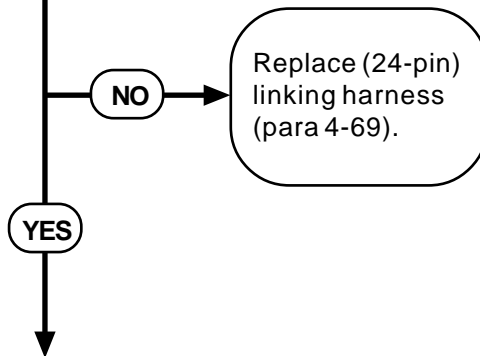
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
Oil temperature light never comes on. Oil temperature bulb OK. Oil temperature switch OK. Cab control box circuit board OK.
POSSIBLE PROBLEMS
Linking harness faulty. Main junction box harness faulty. Oil temperature switch harness faulty.

5.  
Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?

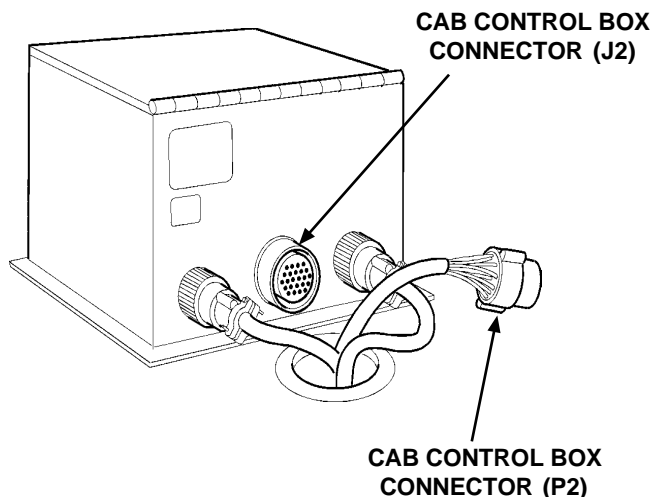
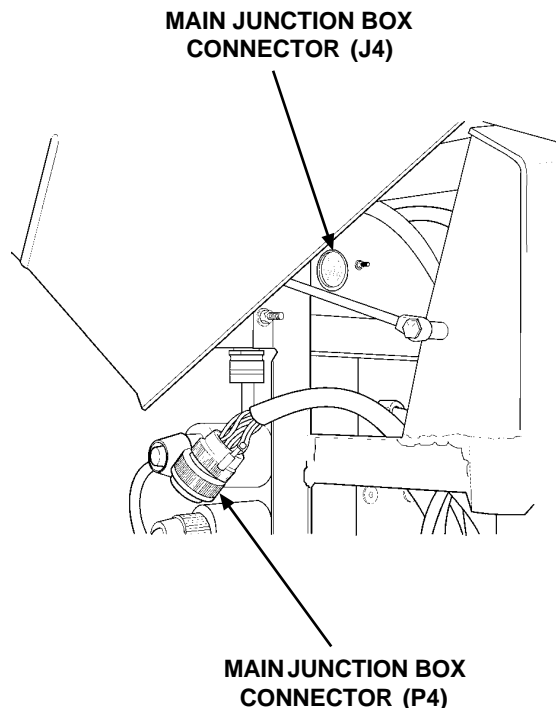
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power source and ground circuit are transferred from the cab control box to the main junction box via the (24-pin) linking harness. Faults in this harness will prevent oil temperature light operation.



4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p> <p>(1) Disconnect main junction box connector (P4) from junction box.</p> <p>(2) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p> <p>(3) Connect multimeter to leads at each end of harness, and check multimeter for continuity. Check (24-pin) linking harness, positions N and P.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Any reading besides infinity indicates a grounded wire.</p> <p>(4) Remove multimeter lead from one end of wire and connect to chassis ground.</p>
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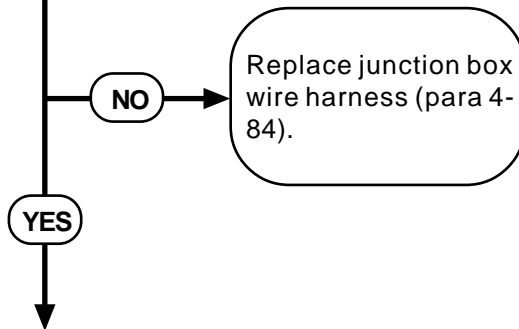
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
Oil temp light never comes on. Oil temperature bulb OK. Oil temperature switch OK. Circuit board OK. Linking harness OK.
POSSIBLE PROBLEMS
Main junction box harness faulty. Oil temperature switch harness faulty.

6.  
Is there continuity between the main junction box connector (J4) and the junction box terminal strip?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power source and ground circuit are transferred from the (24-pin) linking harness to the terminal strip in the main junction box by this wire harness. If this harness is defective, the power and ground cannot reach the oil temperature switch.



4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

(1) Set multimeter to ohms position.

**NOTE**

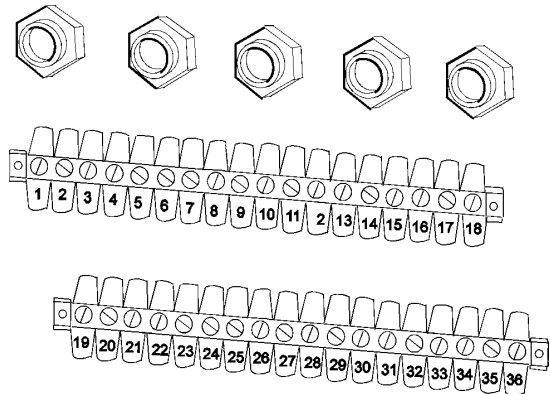
A reading of infinity indicates an open circuit.

(2) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position N, and terminal strip, position 2. Also check between main junction box connector (J4), position P, and terminal strip, position 1.

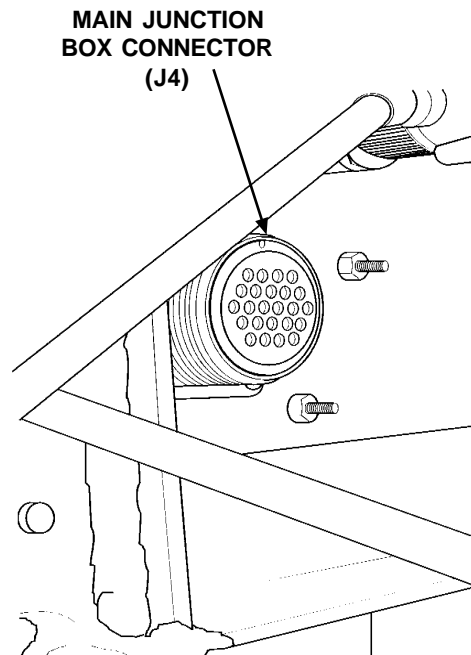
**NOTE**

Any reading besides infinity indicates a grounded wire.

(3) Remove multimeter lead from one end of wire and connect to chassis ground.



WIRING REMOVED FOR CLARITY



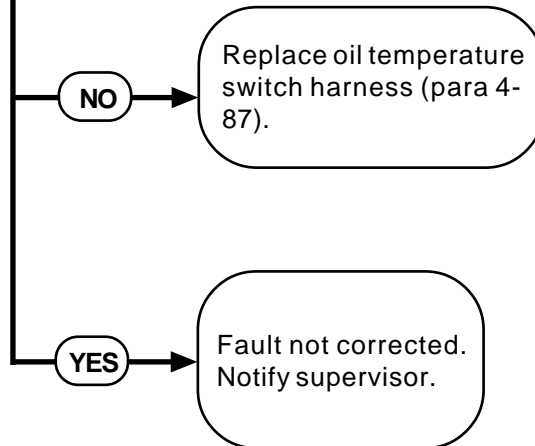
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
Oil temperature light never comes on. Oil temperature bulb OK. Oil temperature sensor OK. Circuit board OK. Linking harness OK. Main junction box harness OK.
POSSIBLE PROBLEMS
Oil temperature sensor harness faulty.

7.  
Is there continuity measured in the oil temperature switch wire harness?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power is transferred from the main frame junction box to the oil temperature switch via this wire harness.

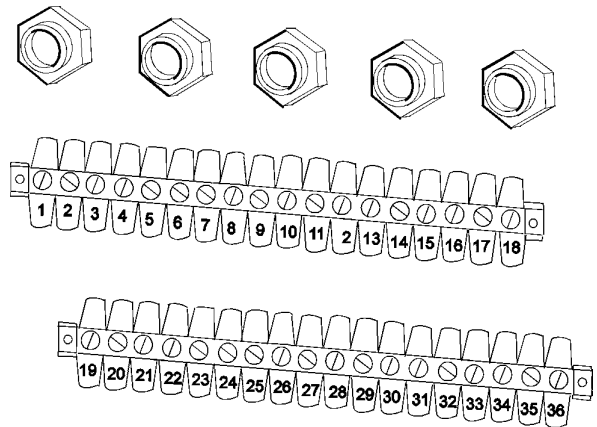




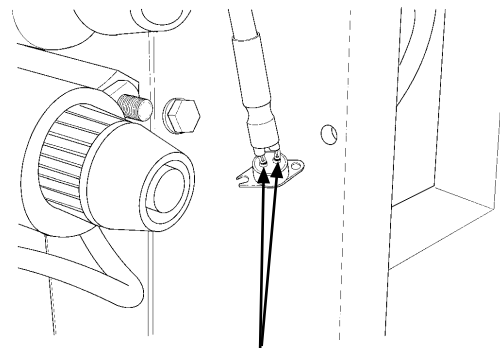
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• Junction box terminal 1 is connected to one side of the oil temperature switch; terminal 2 is connected to the other side.</li> </ul>	
<p>(2) Check for continuity between terminals on oil temperature switch and positions 1 and 2 on terminal strip.</p>	



WIRING REMOVED FOR CLARITY



OIL TEMPERATURE SWITCH TERMINALS

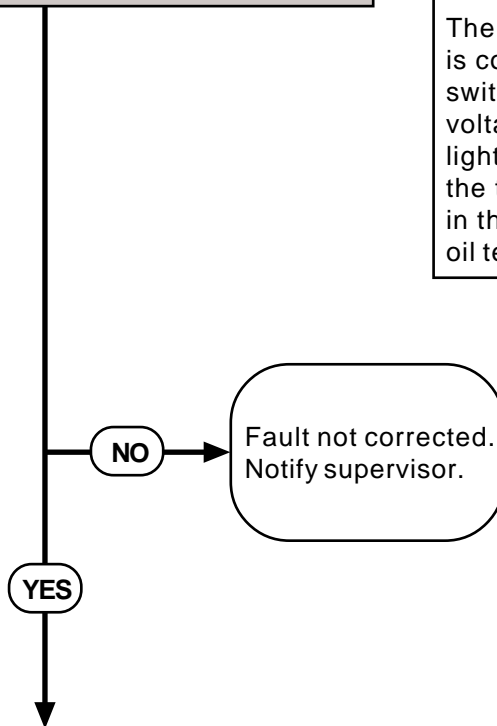
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Oil temperature bulb OK.
<b>POSSIBLE PROBLEMS</b>
Oil temperature switch faulty. Linking harness faulty. Main junction box wire harness faulty.

8.  
Does the oil temperature light stay on with the jumper wire removed?

<b>TEST OPTIONS</b>
Oil Temperature Circuit Test.
<b>REASON FOR QUESTION</b>
The oil temperature light is controlled by the switch controlling the voltage supply to the light. If the light is on all the time, there is a short in the supply side of the oil temperature circuit.

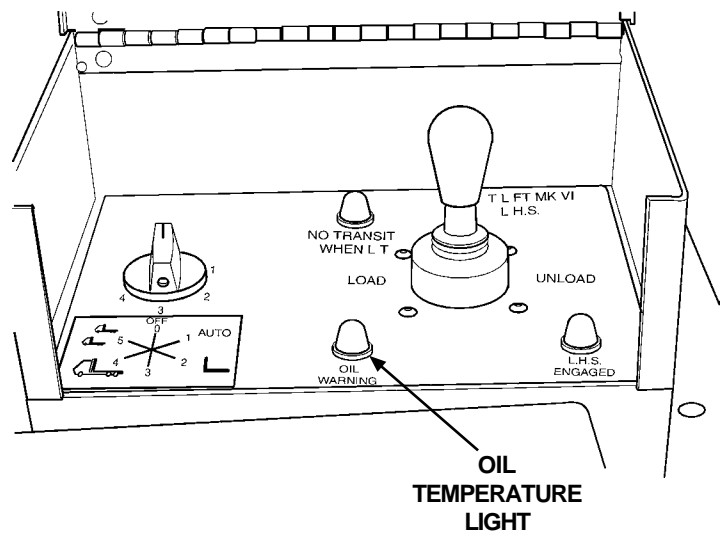
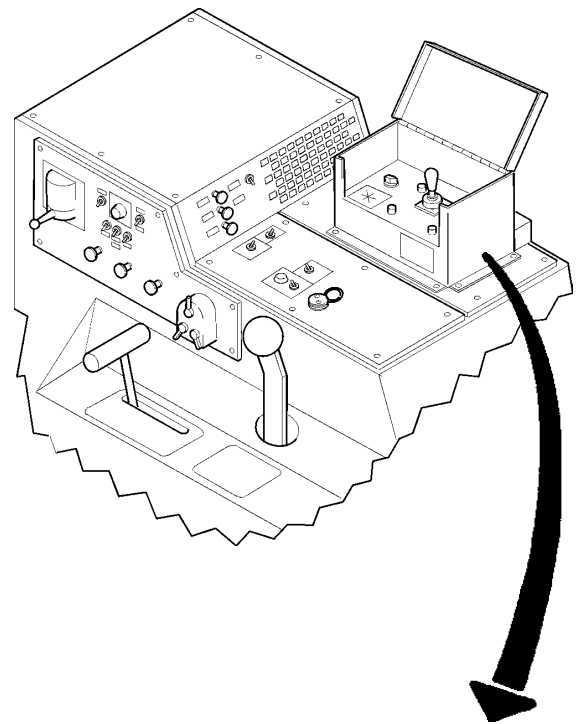


4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

**OIL TEMPERATURE CIRCUIT TEST**

- (1) Turn engine switch to ON position.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Observe status of oil temperature light.
- (4) Turn engine start switch and light control switch to OFF position.



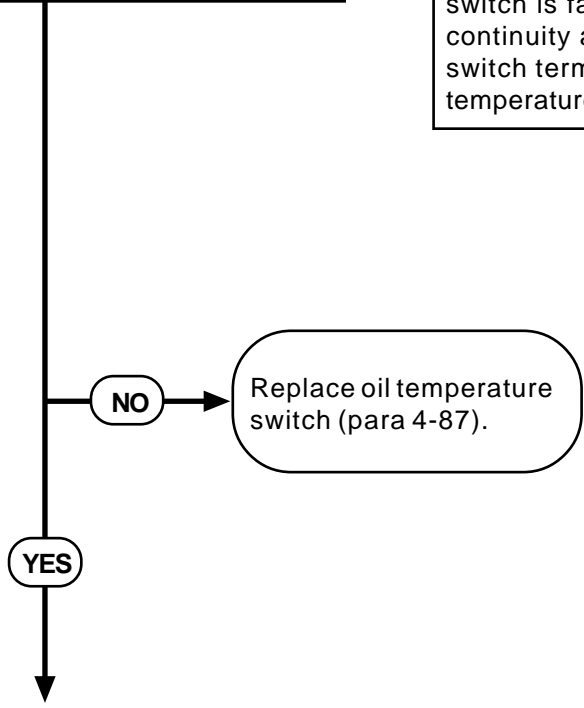
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
Oil temperature bulb OK. Oil temperature light is on all the time.
POSSIBLE PROBLEMS
Oil temperature switch faulty. Linking harness faulty. Main junction box wire harness faulty.

9.  
Is there an open circuit across the terminals of the oil temperature switch?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The oil temperature switch is faulty if there is continuity across the switch terminals at room temperature.



**4-12. UNIT TROUBLESHOOTING (continued).****8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).****CONTINUITY TEST****CAUTION**

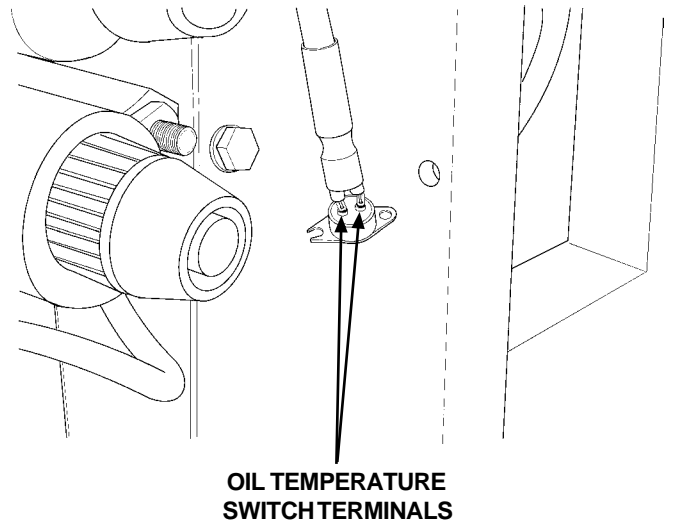
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (2) Connect multimeter to terminals at each side of oil temperature switch, and check multimeter for continuity.



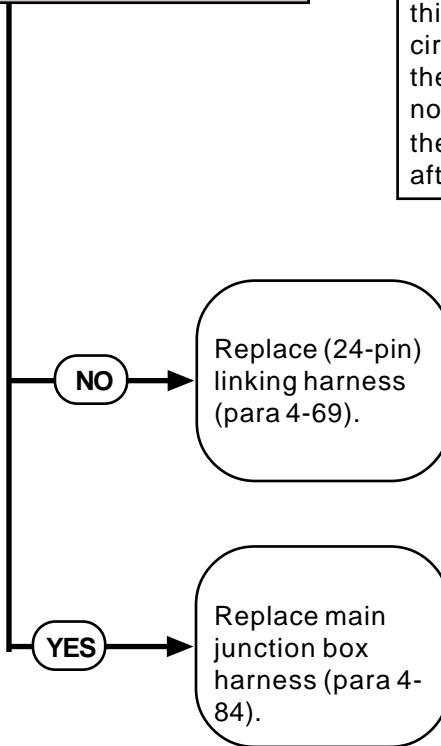
4-12. UNIT TROUBLESHOOTING (continued).

8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Oil temperature bulb OK. Oil temperature light is on all the time. Oil temperature switch OK.
<b>POSSIBLE PROBLEMS</b>
Linking harness faulty. Main junction box harness faulty.

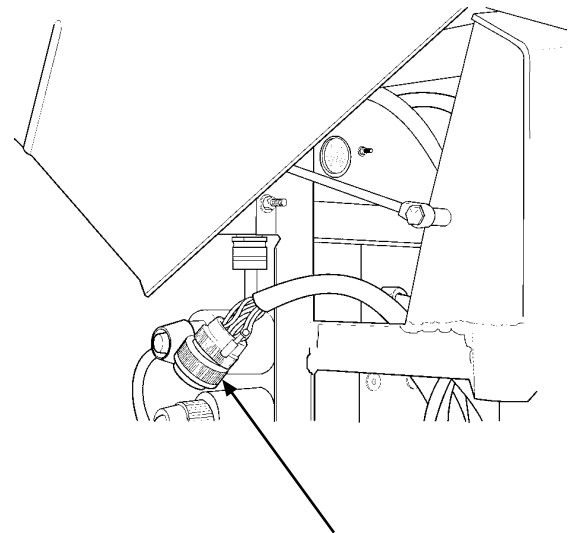
10. Are there 22–28 volts measured at main junction box connector (J4), position P, at main junction box?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
If voltage is measured at the main junction box, this indicates that the circuit is shorted inside the main junction box. If no voltage is measured, the circuit is shorted after the junction box.



**4-12. UNIT TROUBLESHOOTING (continued).****8. OIL TEMPERATURE LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).****VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position
- (3) Set multimeter to voltage position.
- (4) Place positive (+) probe of multimeter on main junction box connector (J4), position P.
- (5) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (6) Turn engine start switch and light control switch to OFF position.

**MAIN JUNCTION BOX  
CONNECTOR (P4)**

4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY).

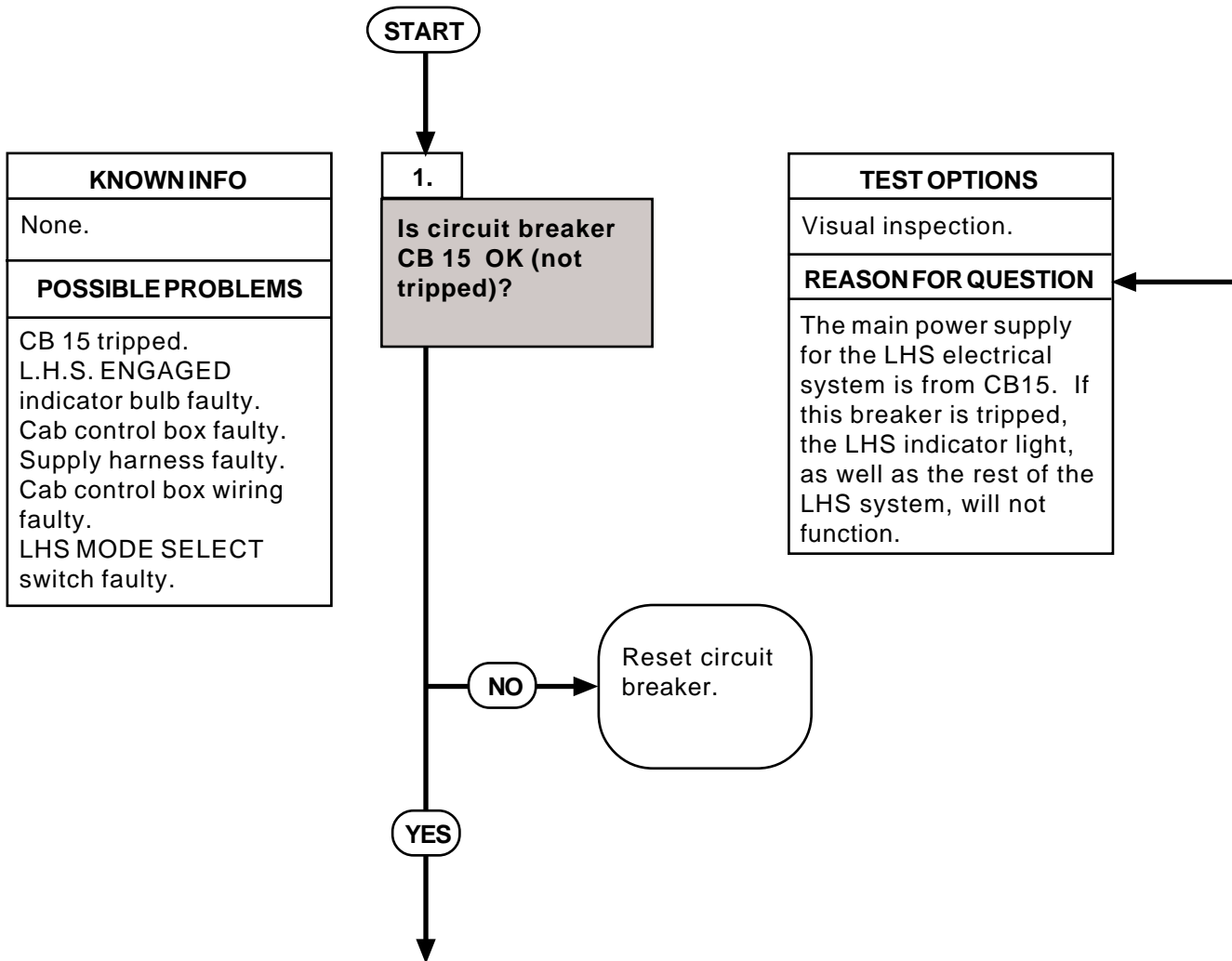
INITIAL SETUP

*Tools and Special Tools*

Heater, Gun-Type (500A)  
 Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)

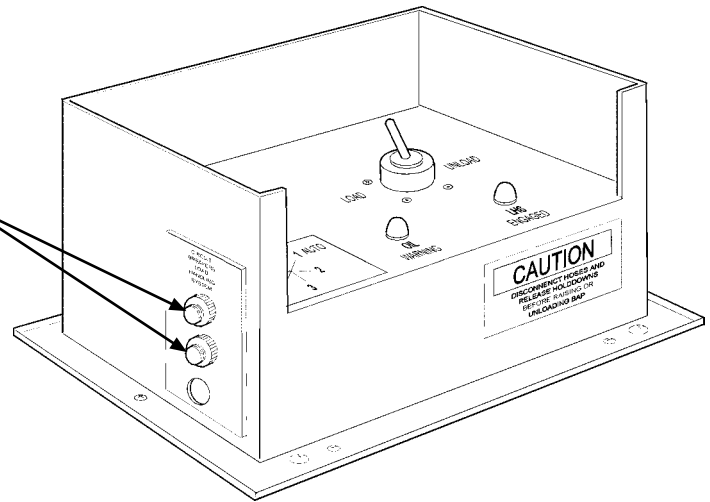




4-12. UNIT TROUBLESHOOTING (continued).

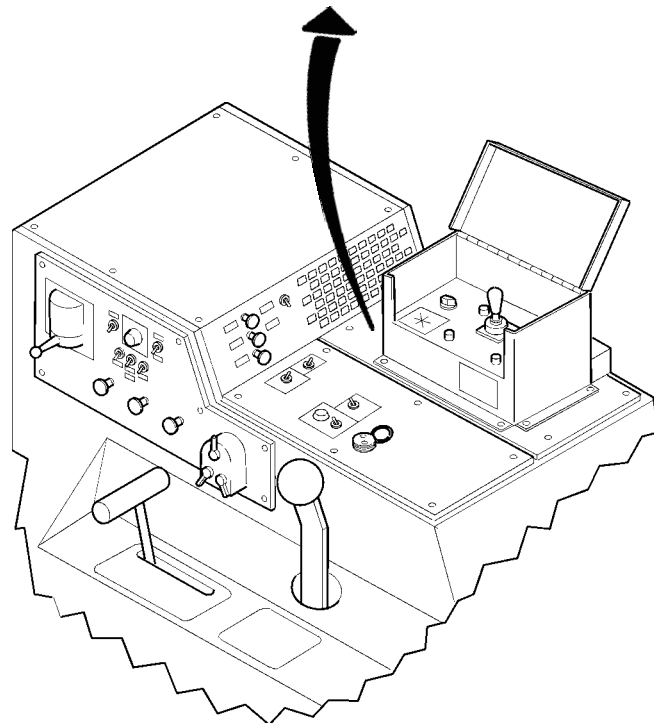
9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

CBT CIRCUIT BREAKERS



**VISUAL INSPECTION**

Inspect circuit breaker for being tripped. If tripped, depress button to reset.



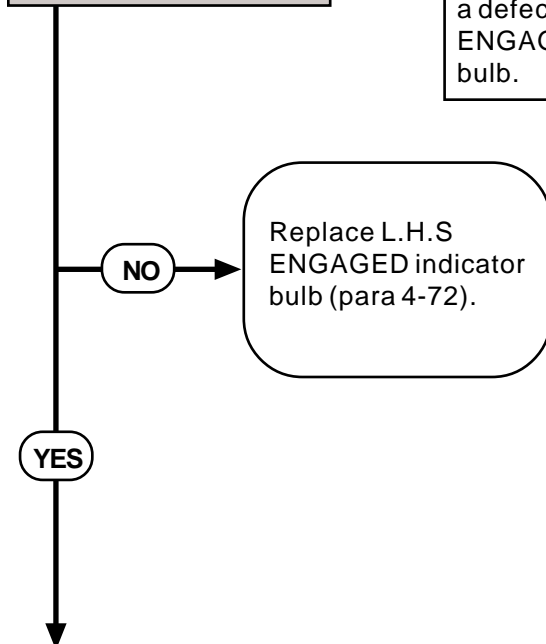
4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
CB 15 OK.
<b>POSSIBLE PROBLEMS</b>
L.H.S. ENGAGED indicator bulb faulty. Cab control box faulty. Supply harness faulty. Cab control box wiring faulty. LHS MODE SELECT switch faulty.

2.  
Is the L.H.S engaged indicator bulb OK?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The most likely cause is a defective L.H.S ENGAGED indicator bulb.



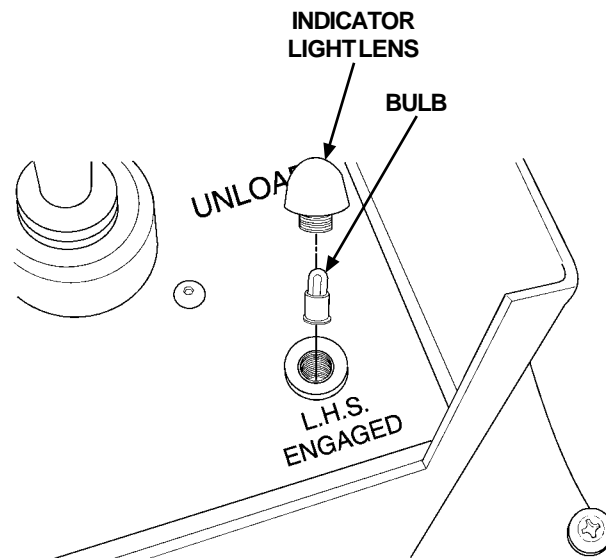
**4-12. UNIT TROUBLESHOOTING (continued).****9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY)  
(continued).****CONTINUITY TEST**

- (1) Unscrew indicator light lens from socket.
- (2) Remove indicator light bulb from inside lens or socket.
- (3) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates a burned-out bulb.

- (4) Connect multimeter leads to base and center terminal of bulb. Check multimeter for continuity.



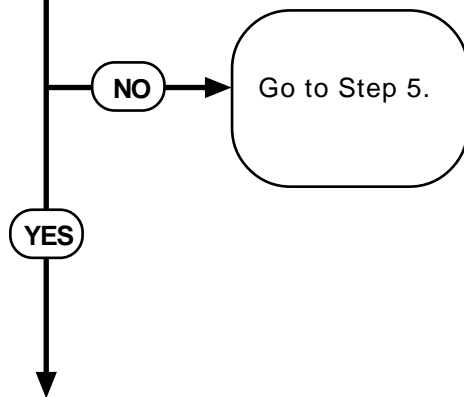
4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
CB 15 OK. L.H.S. ENGAGED indicator bulb OK.
POSSIBLE PROBLEMS
Cab control box faulty. Supply harness faulty. Cab control box wiring faulty. LHS MODE SELECT switch faulty.

3.  
Are there 22–28 volts supplied to LHS indicator bulb?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
To isolate the failure to the power or ground portion of the indicator light circuit.



## 4-12. UNIT TROUBLESHOOTING (continued).

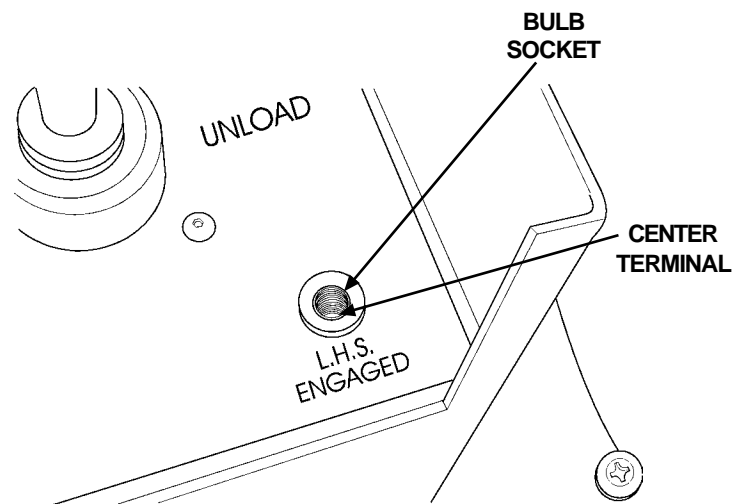
9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY)  
(continued).**VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position and LHS MODE SELECT switch to position 1 (AUTO).
- (3) Set multimeter to voltage position.

**CAUTION**

Do not allow the test probe to contact the side of the bulb socket, as this would complete the circuit. Failure to comply with this caution will result in damage to the socket or test equipment.

- (4) Place positive (+) probe of multimeter on terminal in center of indicator bulb socket.
- (5) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (6) Turn engine start switch and light control switch to OFF position.



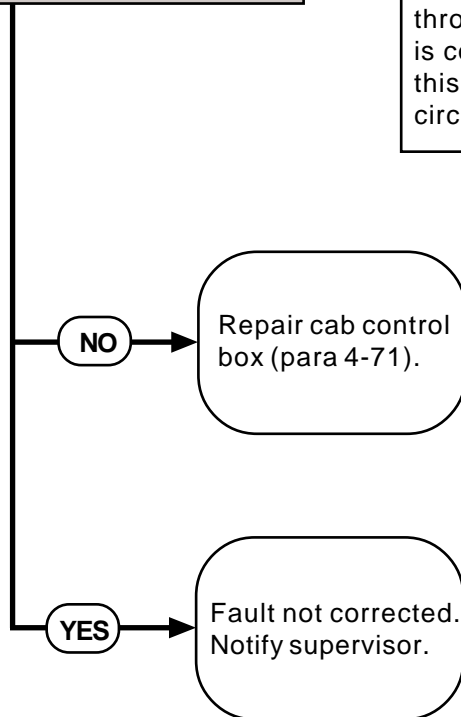
4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
CB 15 OK. L.H.S. ENGAGED indicator bulb OK. Voltage to L.H.S. indicator bulb.
POSSIBLE PROBLEMS
Cab control box faulty.

4.  
Is there continuity between the LHS indicator light socket and relay K4, position 30?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The ground for the LHS indicator bulb is provided through relay K4. If there is continuity measured in this test, the ground circuit to relay K4 is OK.



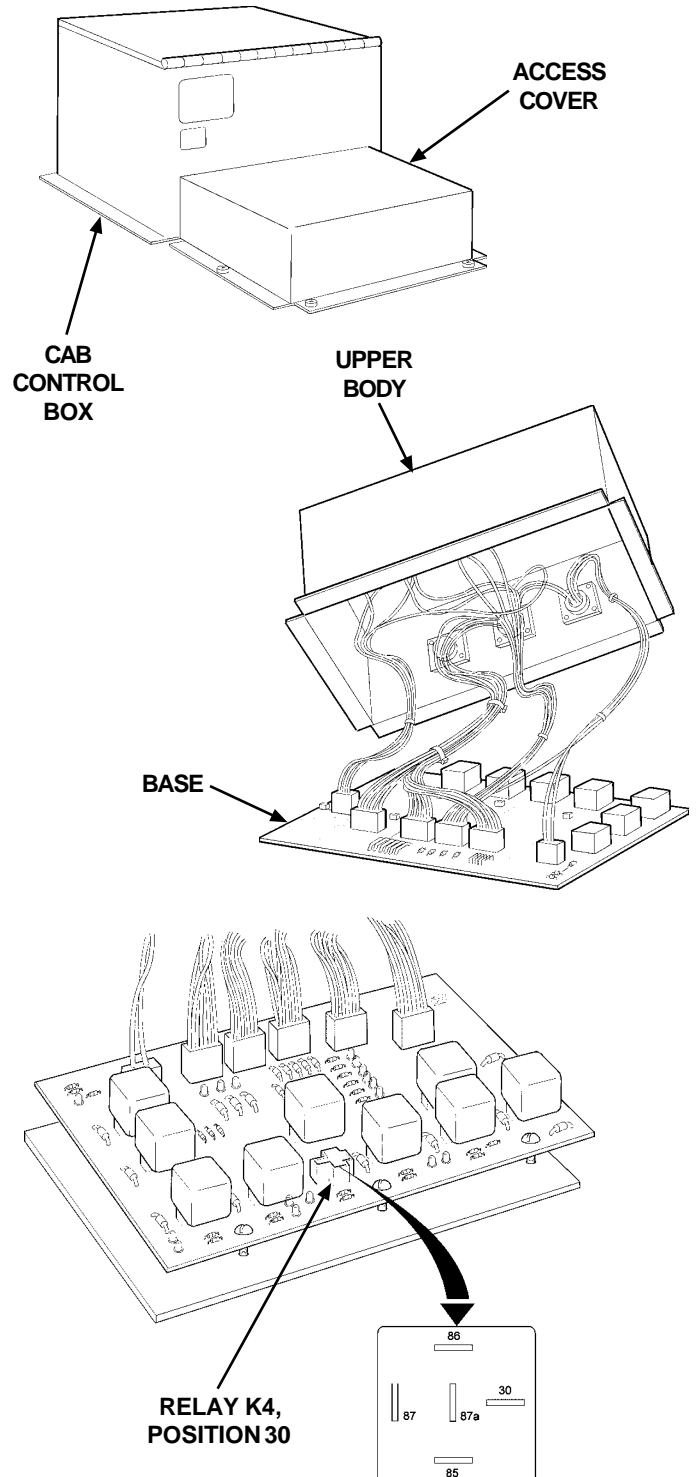
**4-12. UNIT TROUBLESHOOTING (continued).**

**9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).**

**NOTE**

If relay K4 is defective, none of the indicator lights will work. See fault 6 - Indicator/Panel Lights Do Not Operate.

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p>	
<p>(1) Remove four screws and lockwashers and access cover from heater compartment.</p> <p>(2) Remove four screws and lockwashers from cab control box.</p> <p>(3) Remove six screws from cab control box, and separate upper body from base.</p>	
<b><u>CAUTION</u></b>	
<p><b>Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.</b></p>	
<p>(4) Remove relay K4 from cab control box circuit board.</p> <p>(5) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(6) Connect one multimeter lead to side of indicator bulb socket and the other to relay K4 socket, position 30. Check multimeter for continuity.</p>	



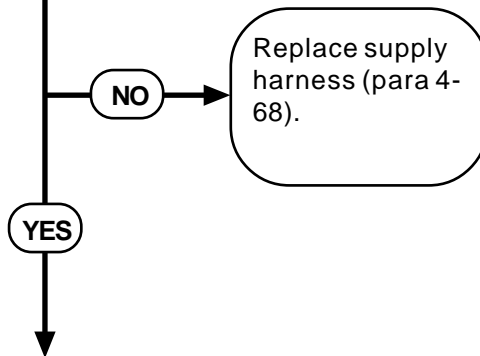
4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
CB 15 OK. L.H.S. ENGAGED indicator bulb OK. No voltage to L.H.S. indicator bulb.
POSSIBLE PROBLEMS
Supply harness faulty. Cab control box wiring faulty. LHS MODE SELECT switch faulty.

5.  
Are there 22–28 volts measured at the supply harness connector (P1), position A?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
To isolate the problem in either the supply harness or in the cab control box. If voltage is measured, there is an open circuit in the cab control box.

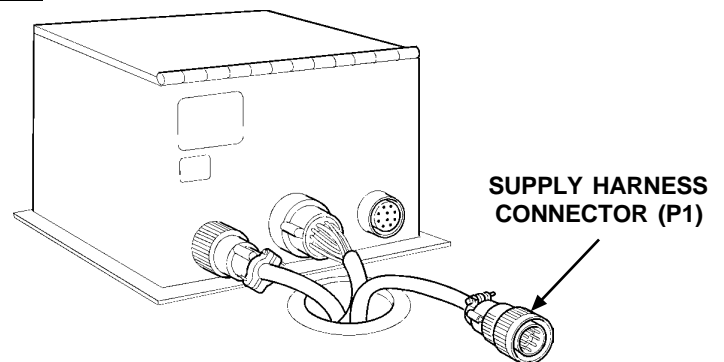
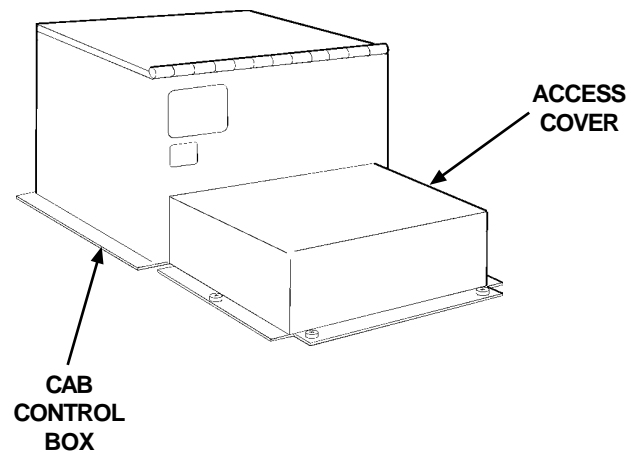




4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>	
	(1) Remove four screws and lockwashers, and access cover from heater compartment.
	(2) Remove supply harness connector (P1) from cab control box.
	(3) Turn engine start switch to ON position.
	(4) Turn light control switch to STOP LIGHT position.
	(5) Set multimeter to voltage position.
	(6) Place positive (+) probe of multimeter on supply harness connector (P1), position A.
	(7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
	(8) Turn engine start switch and light control switch to OFF position.



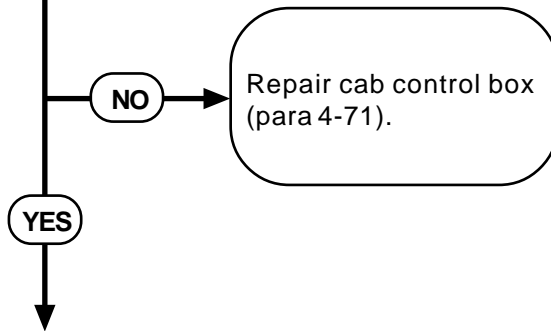
4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
CB 15 OK. L.H.S. ENGAGED indicator bulb OK. No voltage to L.H.S. indicator bulb. Supply harness OK.
POSSIBLE PROBLEMS
Cab control box wiring faulty. LHS MODE SELECT switch faulty.

6.  
**Are there 22–28 volts supplied to LHS MODE SELECT switch?**

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
If there is no power reaching the LHS MODE SELECT switch, there is an open circuit in the control box wiring between connector J1 and the LHS MODE SELECT switch.



4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

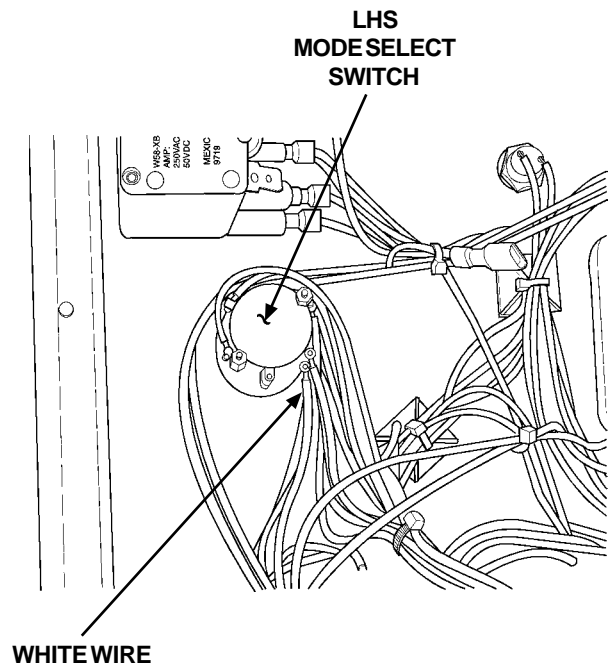
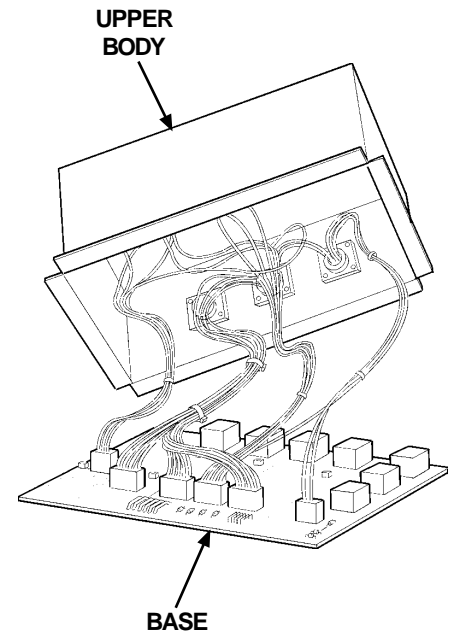
**CONTINUITY TEST**

- (1) Remove four screws and lockwashers from cab control box.
- (2) Remove six screws from cab control box, and separate upper body from base.
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position.

**CAUTION**

**When checking voltage, use caution not to short or ground the terminal being checked. Failure to comply with this caution may result in damage to vehicle or test equipment.**

- (5) Set multimeter to voltage position.
- (6) Place positive (+) probe of multimeter on the LHS MODE SELECT switch terminal with the white wire.
- (7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (8) Turn engine start switch and light control switch to OFF position.



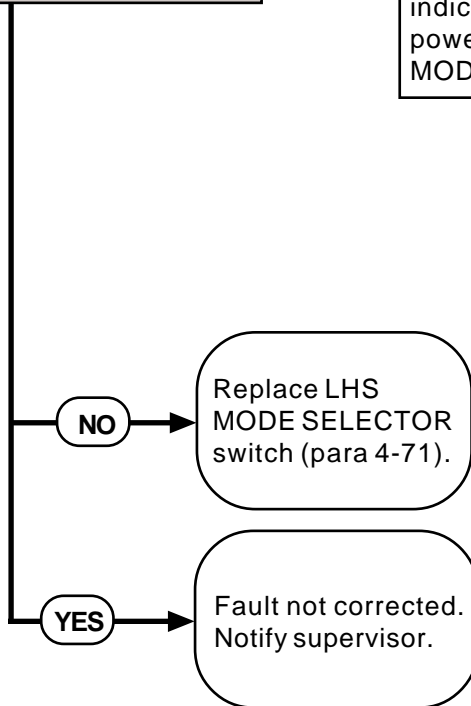
4-12. UNIT TROUBLESHOOTING (continued).

9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY) (continued).

KNOWN INFO
CB 15 OK. L.H.S. ENGAGED indicator bulb OK. No voltage to L.H.S indicator bulb. Supply harness OK. Cab control box wiring OK.
POSSIBLE PROBLEMS
LHS MODE SELECT switch faulty.

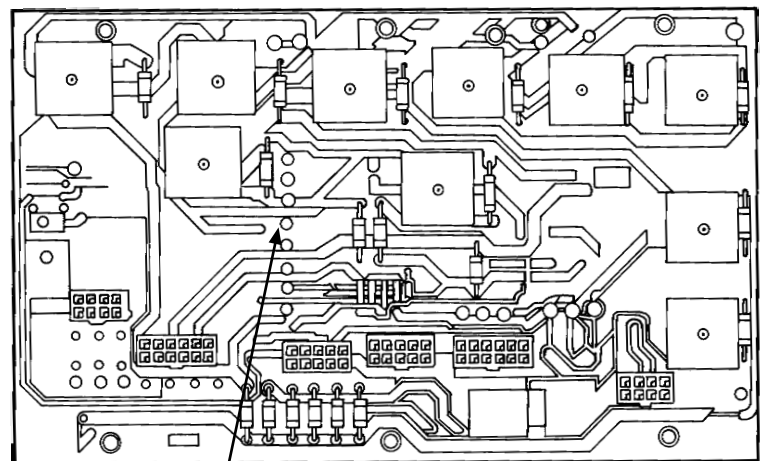
7.  
**Is LED D32 in the cab control box illuminated?**

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
If the LED is out, it indicates there is no power from the LHS MODE SELECT switch.



**4-12. UNIT TROUBLESHOOTING (continued).****9. LHS ENGAGED INDICATOR LIGHT DOES NOT OPERATE (MODEL A ONLY)  
(continued).****VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Turn LHS MODE SELECT switch to AUTO or one of the manual positions.
- (4) Determine whether LED D32 is on or off.
- (5) Turn engine switch and light control switch to OFF position.



LED D32

4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY).

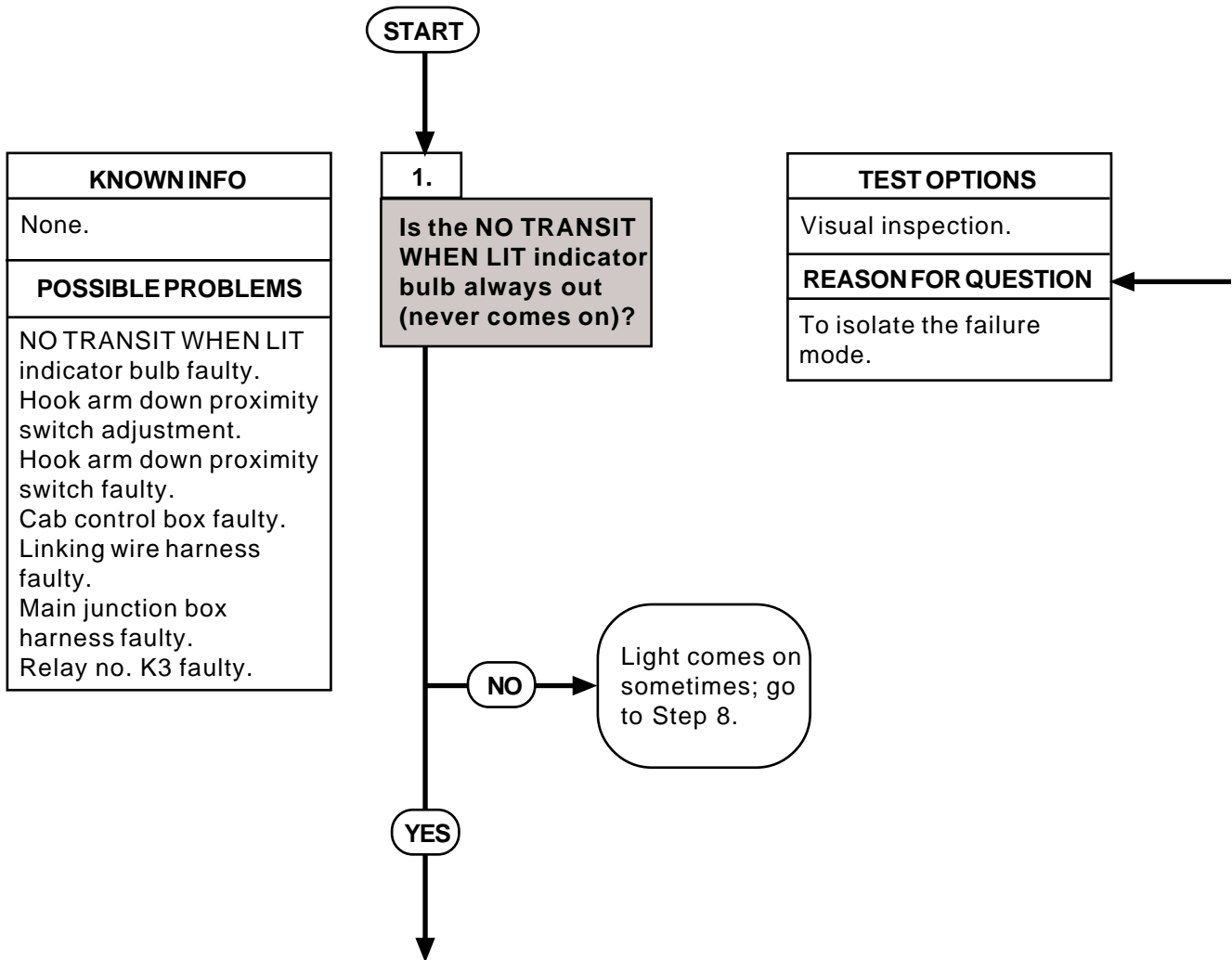
INITIAL SETUP

*Tools and Special Tools*

Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)



4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

**VISUAL INSPECTION**

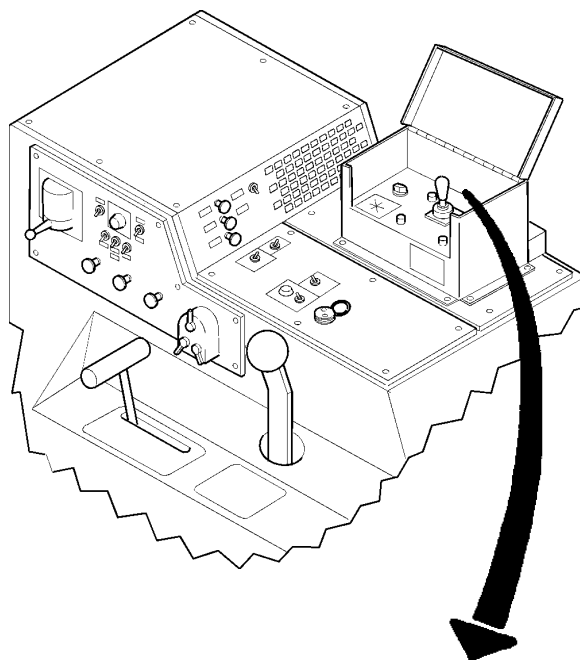
(1) Start engine.

**NOTE**

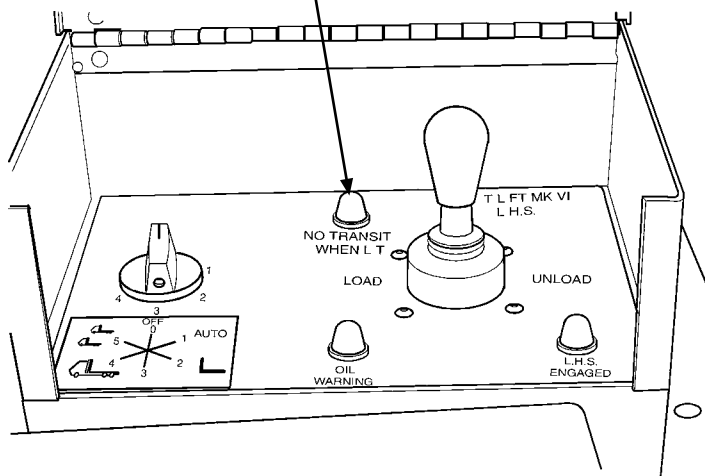
NOTRANSITWHENLIT indicator should be on when the hook arm is raised, off when the hook arm is stowed.

(2) Raise and lower hook arm using manual controls. Observe status of the NO TRANSIT WHEN LIT indicator light during LHS operation.

(3) Shut off engine.



**NO TRANSIT  
WHEN LIT  
INDICATOR**

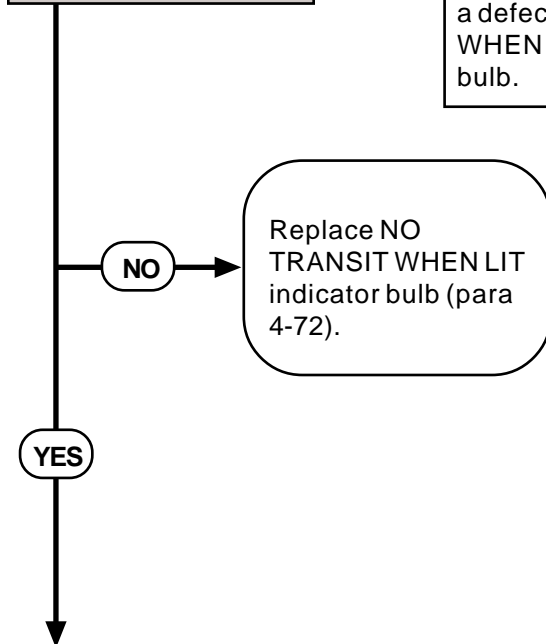


4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
NO TRANSIT WHEN LIT indicator light never comes on.
<b>POSSIBLE PROBLEMS</b>
NO TRANSIT WHEN LIT indicator bulb faulty. Hook arm down proximity switch adjustment. Hook arm down proximity switch faulty. Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty. Relay no. K3 faulty.

2.  
Is the NO TRANSIT WHEN LIT indicator bulb OK?



<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The most likely cause is a defective NO TRANSIT WHEN LIT indicator bulb.





4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

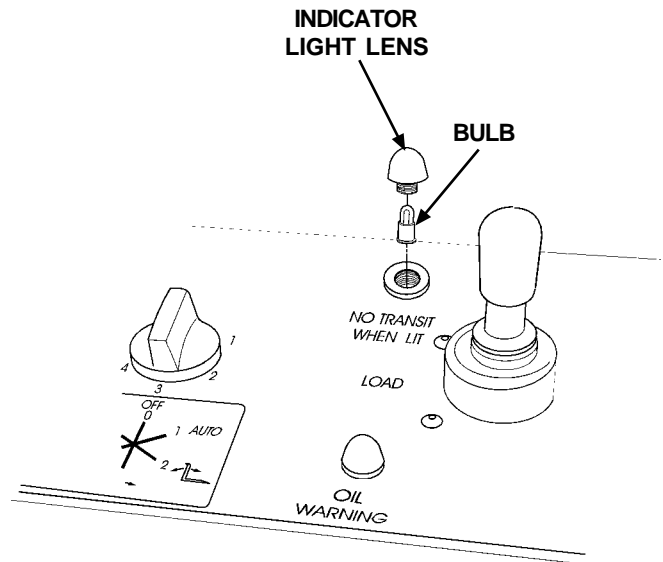
**CONTINUITY TEST**

- (1) Unscrew indicator light lens from socket.
- (2) Remove indicator light bulb from inside lens or socket.
- (3) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates a burned out bulb.

- (4) Connect multimeter leads to base and center terminal of bulb. Check multimeter for continuity.



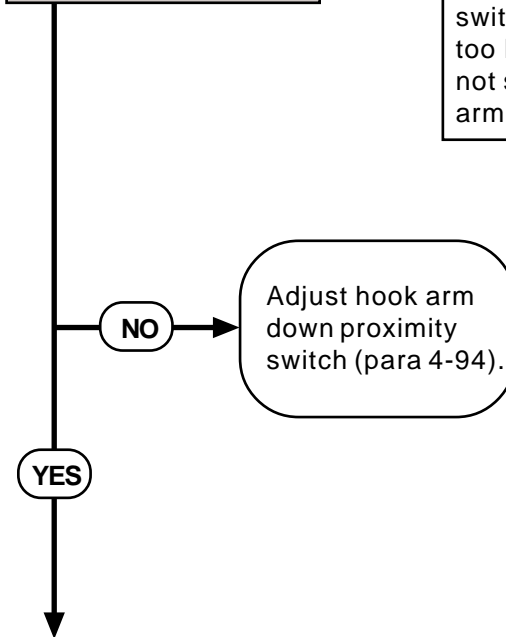
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb light never comes on. NO TRANSIT WHEN LIT indicator bulb OK.
POSSIBLE PROBLEMS
Hook arm down proximity switch adjustment. Hook arm down proximity switch faulty. Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty. Relay no. K3 faulty.

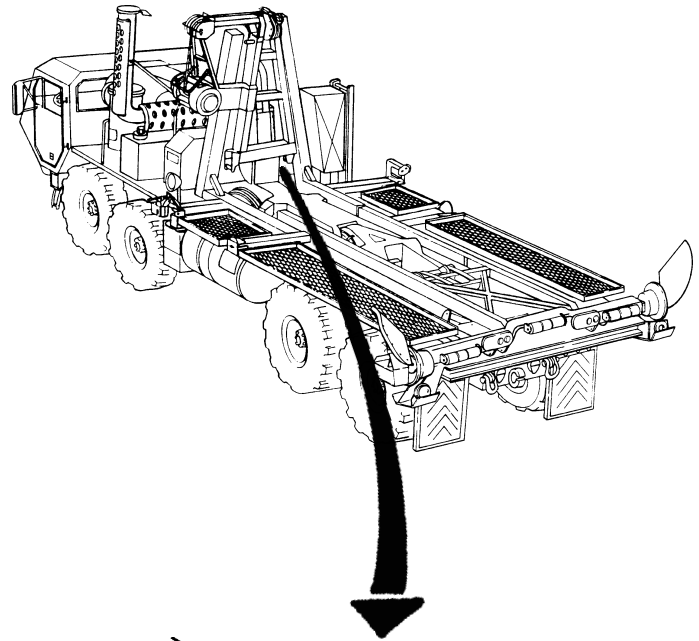
3.  
Is the hook arm down proximity switch adjusted properly?

TEST OPTIONS
Refer to para 4-94.
REASON FOR QUESTION
If the gap between the hook arm down proximity switch and the hook arm is too large, the switch will not sense when the hook arm is stowed.

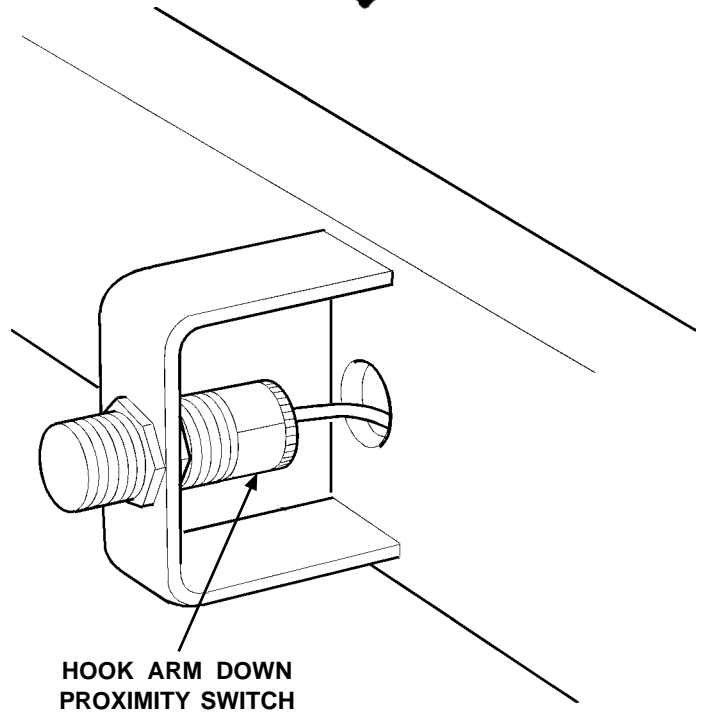


**4-12. UNIT TROUBLESHOOTING (continued).**

**10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).**



Refer to para 4-94 for specific proximity switch adjustment procedures.



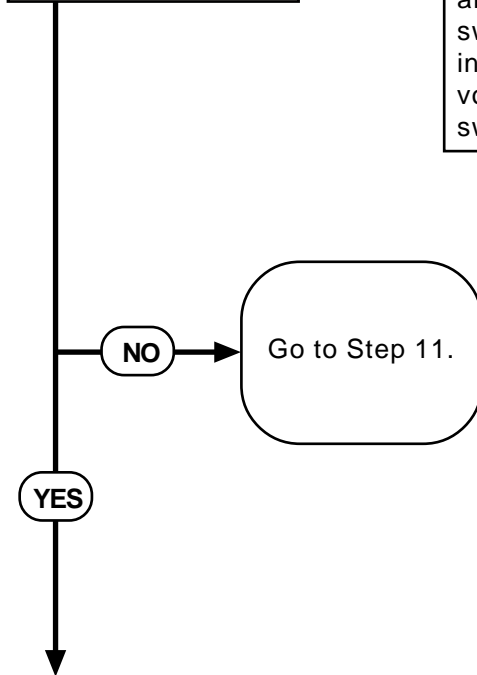
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb never comes on. NO TRANSIT indicator bulb OK. Hook arm down proximity switch adjustment OK.
POSSIBLE PROBLEMS
Hook arm down proximity switch faulty. Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty. Relay no. K3 faulty.

4.  
Is the LED on the hook arm down proximity switch illuminated?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If the LED on the hook arm down proximity switch is ON, this indicates that supply voltage is reaching the switch.



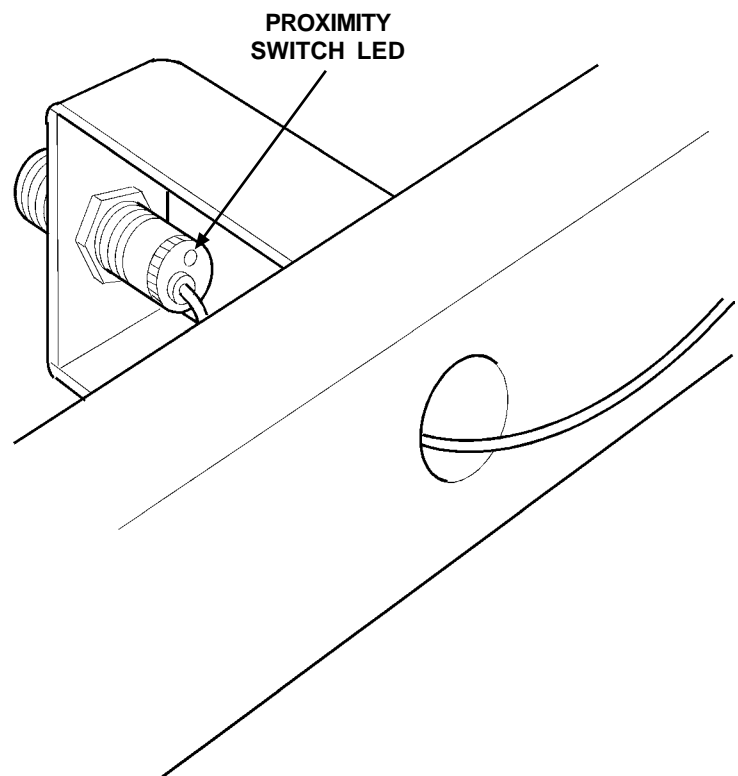
**4-12. UNIT TROUBLESHOOTING (continued).****10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).****VISUAL TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position.

**NOTE**

LED should be on when hook arm is stowed, off when hook arm is raised.

- (3) Observe status of LED.
- (4) Turn engine start switch and light control switch to OFF position.



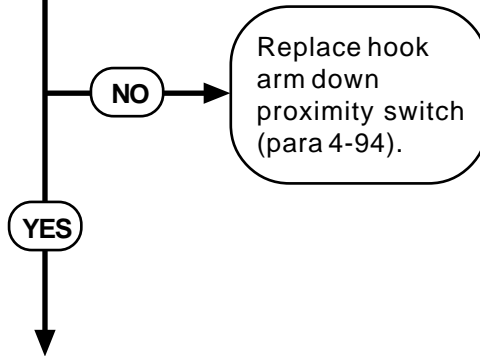
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator light never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch adjustment OK. Hook arm down proximity switch LED on.
POSSIBLE PROBLEMS
Hook arm down proximity switch faulty. Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty. Relay no. K3 faulty.

5.  
Are 22–28 volts measured at main junction box terminal strip, position 11?

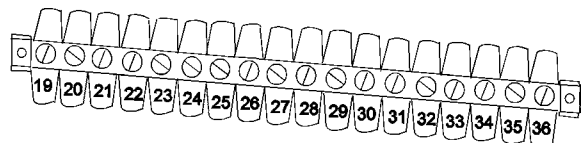
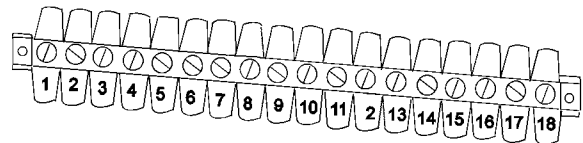
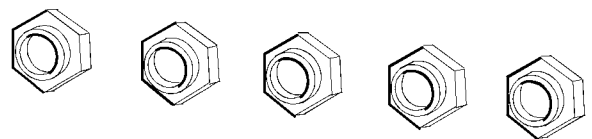
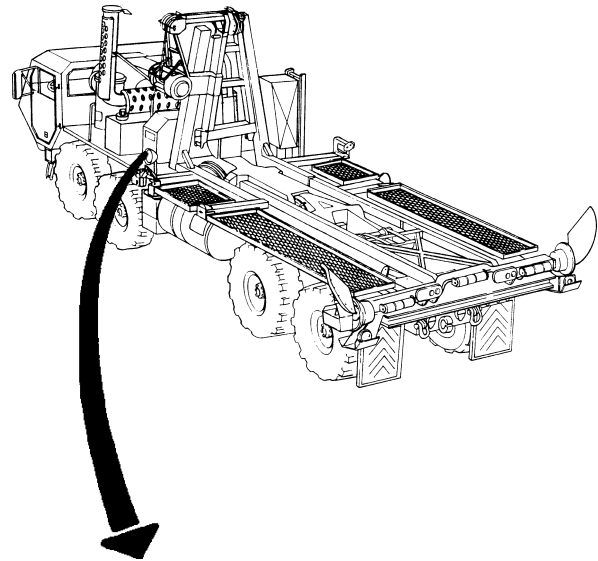
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power measured at the terminal strip indicates that the hook arm down proximity switch is functioning and sending signal voltage to the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).

<b>VOLTAGE TEST</b>	
	(1) Open hydraulic cabinet cover.
	(2) Loosen four screws on main junction box cover and open cover.
	(3) Turn engine start switch to ON position.
	(4) Turn light control switch to STOP LIGHT position.
	(5) Set multimeter to voltage position.
	(6) Place positive (+) probe of multimeter on terminal strip, position 11.
	(7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
	(8) Turn engine start switch and light control switch to OFF position.



WIRING REMOVED FOR CLARITY

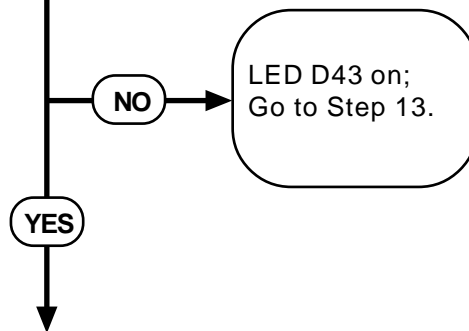
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator light never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch OK.
POSSIBLE PROBLEMS
Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty. Relay no. K3 faulty.

6.  
Is LED D43 in the cab control box off?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
This step is a quick check to determine if the proximity switch signal is reaching the cab control box from the main junction box. If the circuit is operating correctly, LED D43 should be off.

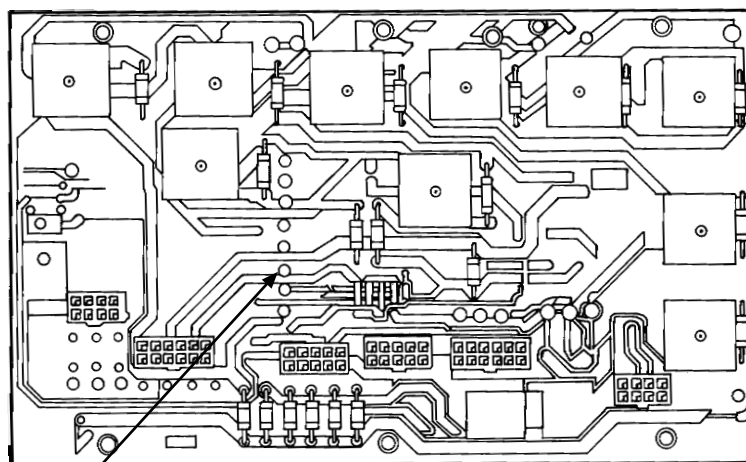
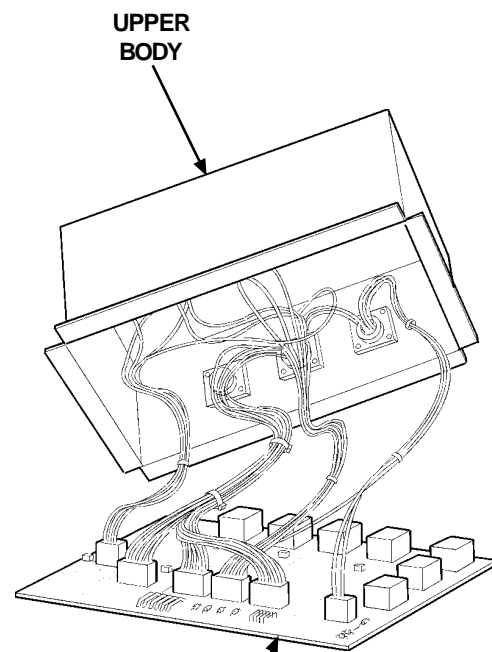
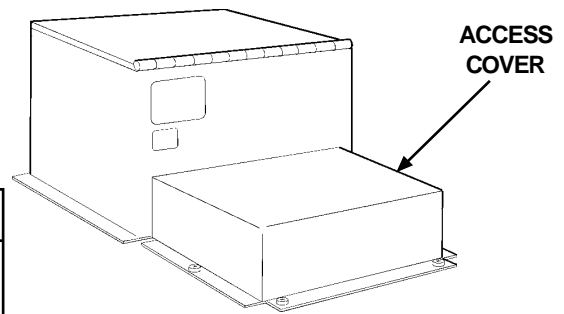




**4-12. UNIT TROUBLESHOOTING (continued).**

**10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).**

<b>VISUAL INSPECTION</b>	
	(1) Remove four screws and lockwashers and access cover from heater compartment.
	(2) Remove four screws and lockwashers from cab control box.
	(3) Remove six screws from cab control box, and separate upper body from base.
	(4) Turn engine start switch to ON position.
	(5) Turn light control switch to STOP LIGHT position.
	(6) Inspect whether LED D43 is on or off.
	(7) Turn engine start switch and light control switch to off position.



LED D43

BASE

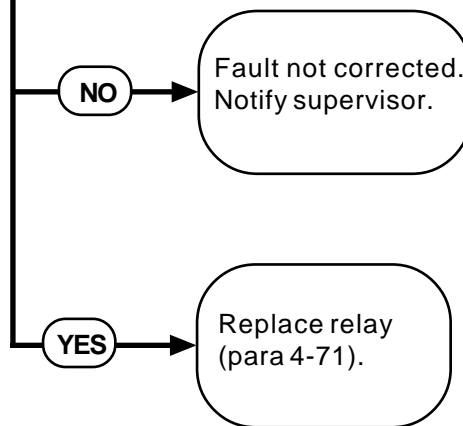
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch OK. Hook arm down proximity switch circuit OK.
POSSIBLE PROBLEMS
Relay No. K3 faulty.

7.  
Are 22–28 volts measured at relay K3, position 86?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Relay K3 activates the NO TRANSIT WHEN LIT indicator bulb. When the relay is closed, the light is OFF. When the relay is open, the light is ON.

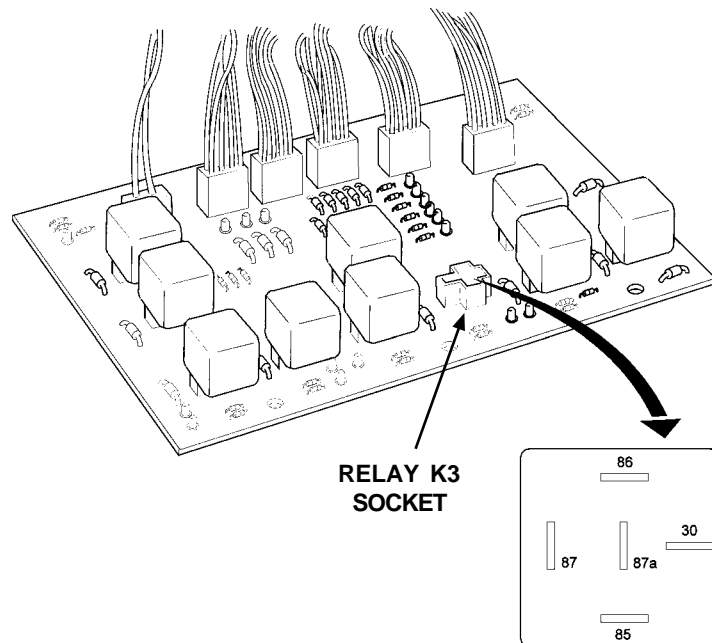


## 4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).**VOLTAGE TEST****CAUTION**

Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to the circuit board.

- (1) Remove relay K3 from cab control box circuit board.
- (2) Turn engine start switch to ON position.
- (3) Turn light control switch to STOP LIGHT position.
- (4) Set multimeter to voltage position.
- (5) Place positive (+) probe of multimeter on relay K3 socket, position 86.
- (6) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (7) Turn engine start switch and light control switch to OFF position.



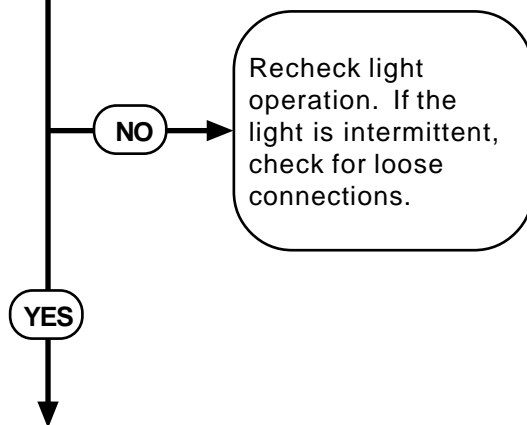
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
NO TRANSIT WHEN LIT indicator bulb on sometimes.
<b>POSSIBLE PROBLEMS</b>
Hook arm down proximity switch faulty. Linking harness faulty.

8.  
Is the NO TRANSIT WHEN LIT indicator bulb on all the time?

<b>TEST OPTIONS</b>
Visual inspection.
<b>REASON FOR QUESTION</b>
If the NO TRANSIT WHEN LIT bulb is on all the time, there is a short in the circuit.



**4-12. UNIT TROUBLESHOOTING (continued).**

**10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).**

—

Answer this question based on the results obtained in Step 1.
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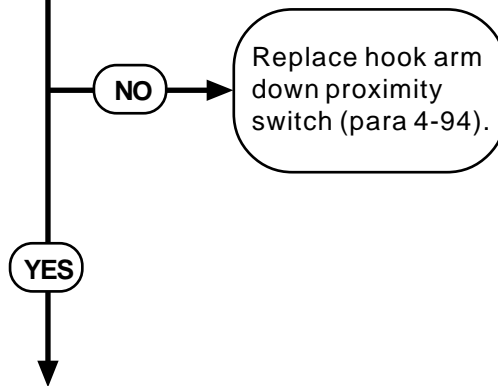
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
NO TRANSIT WHEN LIT indicator bulb on all the time.
<b>POSSIBLE PROBLEMS</b>
Hook arm down proximity switch faulty. Linking harness faulty.

9. Does the NO TRANSIT WHEN LIT indicator bulb stay on with the hook arm down proximity switch disconnected?

<b>TEST OPTIONS</b>
Hook Arm Down Proximity Switch Test.
<b>REASON FOR QUESTION</b>
If the NO TRANSIT WHEN LIT indicator bulb stays on with the hook arm down proximity switch disconnected, there is a short indicated somewhere in the circuit.

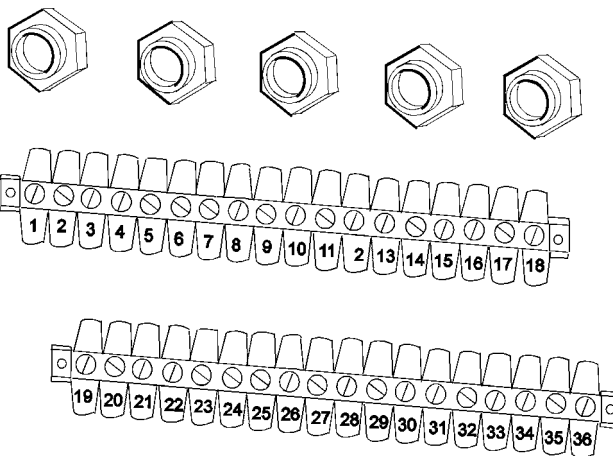
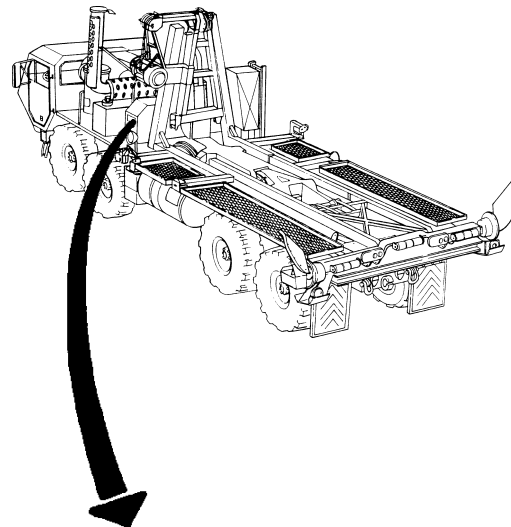


**4-12. UNIT TROUBLESHOOTING (continued).**

**10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).**

**HOOK ARM DOWN PROXIMITY SWITCH TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.
- (3) Remove hook arm down proximity switch connectors from main junction box terminals 10, 11, and 12.
- (4) Turn engine switch to ON position.
- (5) Turn light control switch to STOP LIGHT position.
- (6) Observe status of NO TRANSIT WHEN LIT light.
- (7) Turn light control switch and engine start switch to OFF position.



**WIRING REMOVED FOR CLARITY**

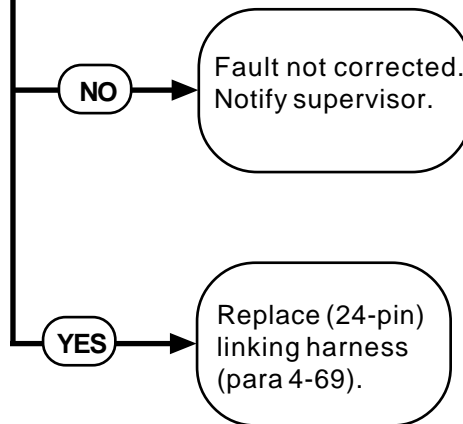
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb on with hook arm down switch disconnected.
POSSIBLE PROBLEMS
Linking harness faulty.

10.  
**Is position K on the (24-pin) linking harness shorted to one of the other positions on the linking harness?**

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The NO TRANSIT WHEN LIT indicator bulb will illuminate if the (24-pin) linking harness is shorted at position K.

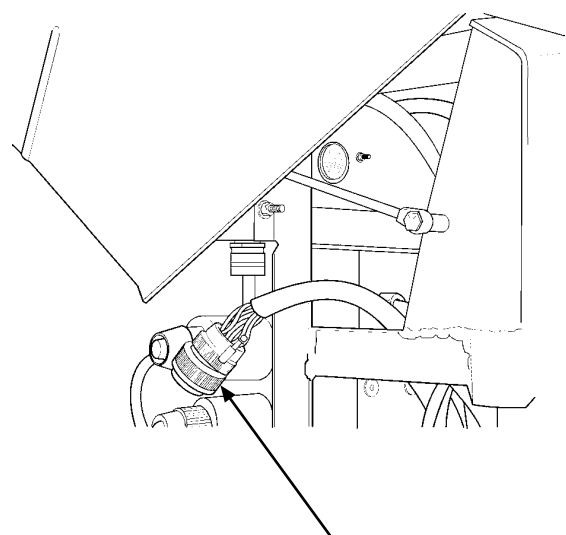
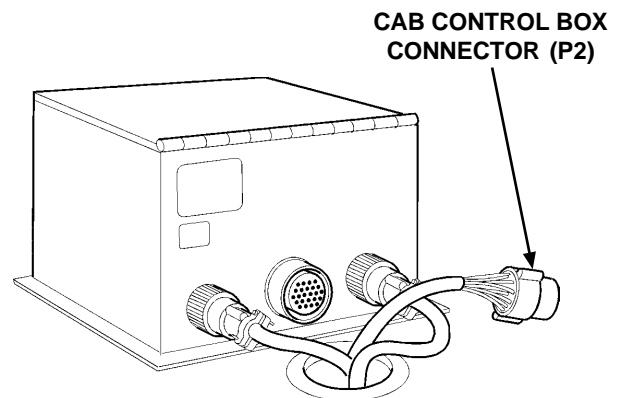
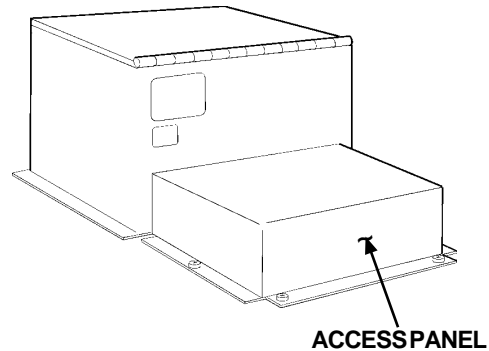




4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove four screws and lockwashers and access panel from heater compartment.</li> <li>(2) Remove cab control box connector (P2) from cab control box.</li> <li>(3) Remove main junction box connector (P4) from main junction box.</li> <li>(4) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(5) Connect one multimeter lead to connector (P2), position K. Connect other multimeter lead to connector (P4), position A, and check multimeter for continuity. Repeat Step 5 for all other positions on connector (P4), except position K.</li> <li>(6) Connect one multimeter lead to connector (P4), position K. Connect other multimeter lead to connector (P2), position A, and check multimeter for continuity.</li> <li>(7) Repeat Step 6 for all other positions on connector (P2), except position K.</li> </ol>	



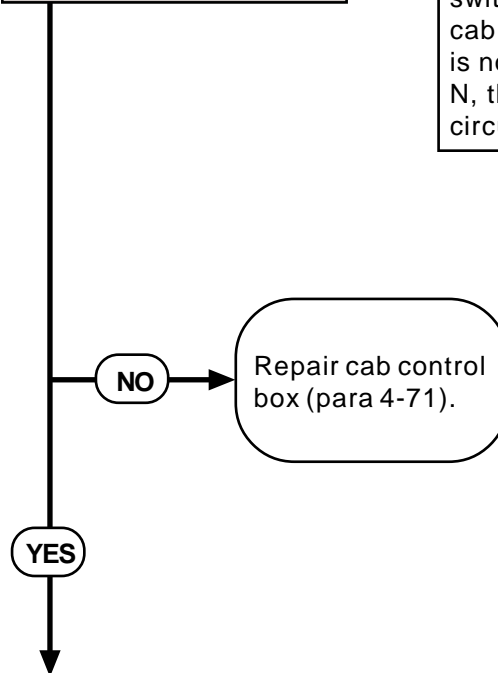
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch OK. No hook arm down signal at cab control box.
POSSIBLE PROBLEMS
Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty.

11. Are there 22–28 volts measured at the cab control box connector (J2), position N?

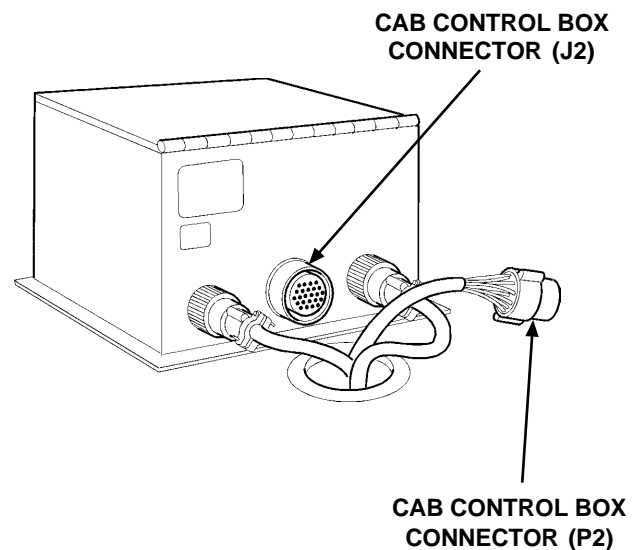
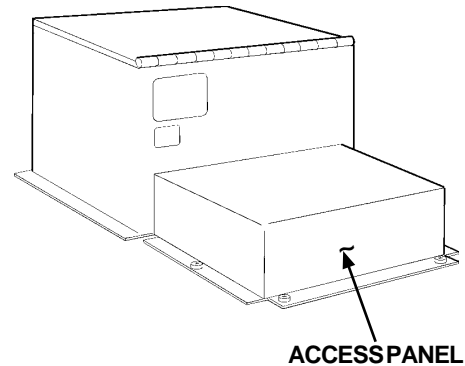
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The voltage supply for the hook arm down proximity switch originates from the cab control box. If there is no voltage at position N, the proximity switch circuit will not operate.



**4-12. UNIT TROUBLESHOOTING (continued).**

**10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).**

<b>VOLTAGE TEST</b>
(1) Remove four screws and lockwashers and access cover from heater compartment.
(2) Remove cab control box connector (P2) from cab control box.
(3) Turn engine start switch to ON position.
(4) Turn light control switch to STOP LIGHT position.
(5) Set multimeter to voltage position.
(6) Place positive (+) probe of multimeter on position N of cab control box connector (J2).
(7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
(8) Turn engine start switch and light control switch to OFF position.



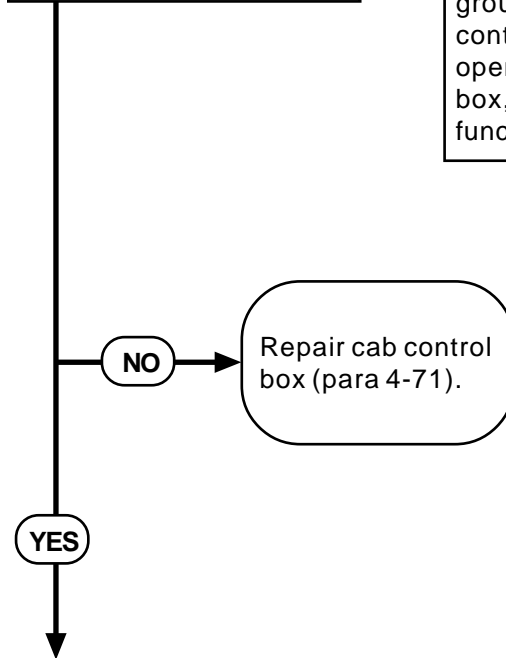
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch OK. No hook arm down signal at cab control box. Cab control box power output OK.
POSSIBLE PROBLEMS
Cab control box faulty. Linking wire harness faulty. Main junction box harness faulty.

12. Is there continuity measured at the cab control box connector (J2), position Q, and a known good ground?

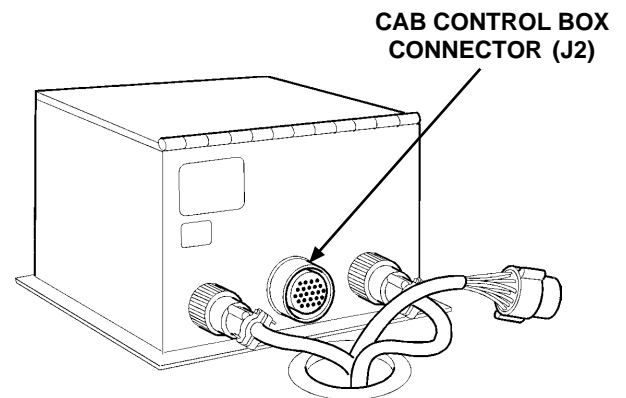
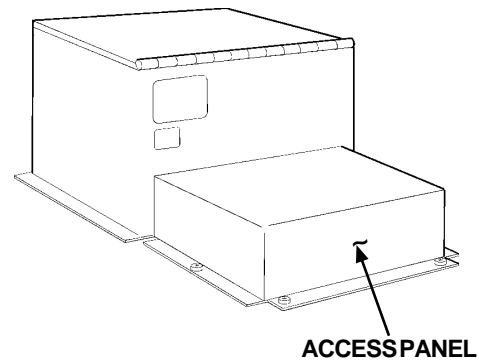
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The hook arm down proximity switch is grounded through the cab control box. If there is an open circuit inside the box, the switch will not function.



4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(2) Connect one multimeter lead to cab control box connector (J2), position Q.</p>	
<p>(3) Connect the other multimeter lead to a known good ground, and check multimeter for continuity.</p>	



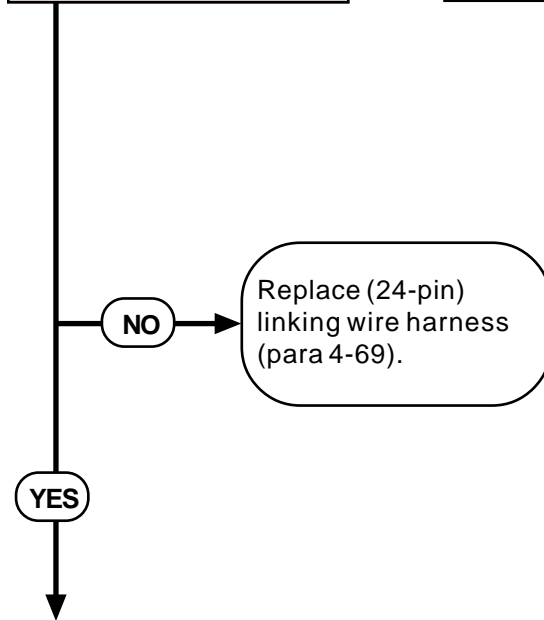
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY) (continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch OK. No hook arm down signal at cab control box. Cab control box power output OK. Cab control box ground circuit OK.
POSSIBLE PROBLEMS
Linking wire harness faulty. Main junction box harness faulty.

13.  
**Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?**

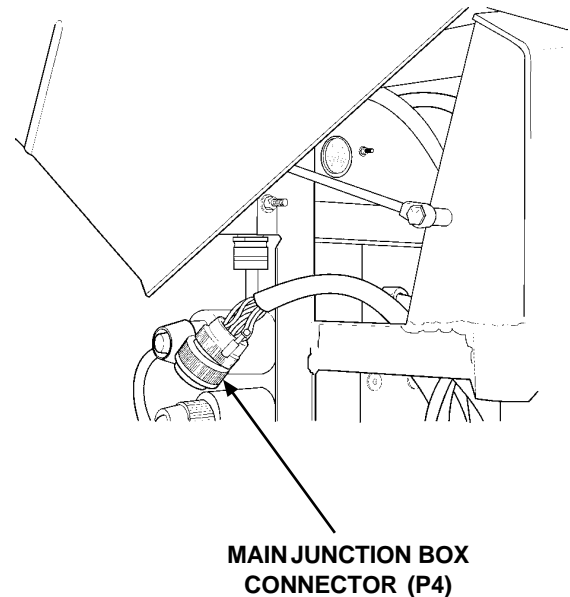
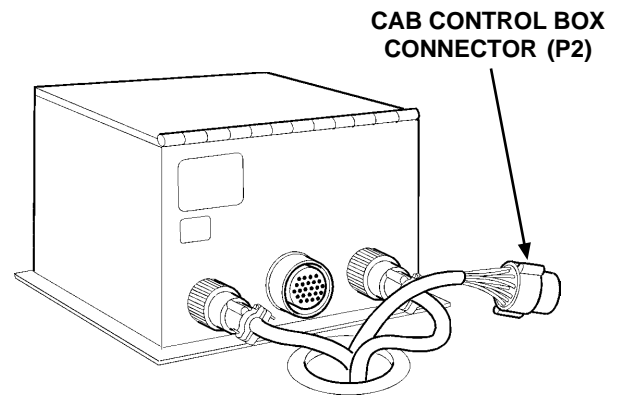
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If the (24-pin) linking harness is faulty, the hook arm down proximity switch will not function.



4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).

CONTINUITY TEST	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
(1)	Disconnect main junction box connector (P4) from junction box.
(2)	Set multimeter to ohms position.
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
(3)	Connect multimeter to leads at each end of (24-pin) linking harness, and check multimeter for continuity. Pay special attention to harness positions N, K and Q.
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
(4)	Remove multimeter lead from one end of wire and connect to chassis ground.

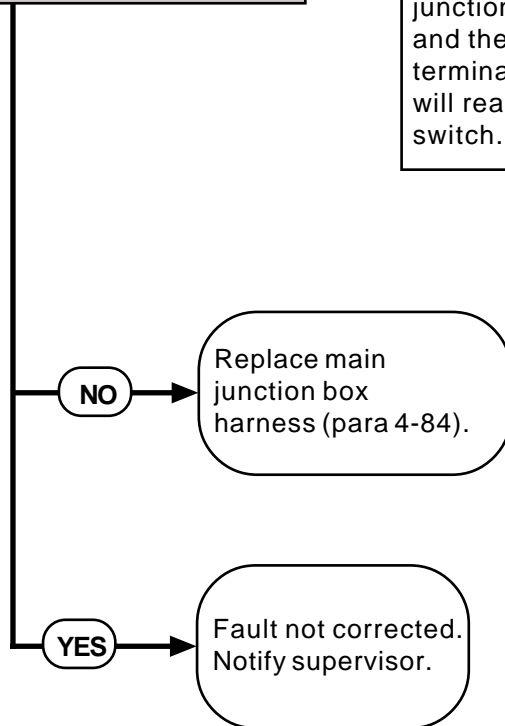


4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY continued).

KNOWN INFO
NO TRANSIT WHEN LIT indicator bulb never comes on. NO TRANSIT WHEN LIT indicator bulb OK. Hook arm down proximity switch OK. No hook arm down signal at cab control box. Cab control box power output OK. Cab control box ground circuit OK. Linking wire harness OK.
POSSIBLE PROBLEMS
Main junction box harness faulty.

14. Is there continuity between the main junction box connector (J4) and the junction box terminal strip?



TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is an open circuit between the main junction box connector and the junction box terminal strip, no power will reach the proximity switch.

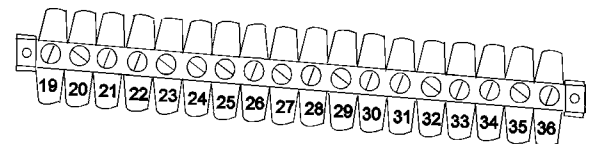
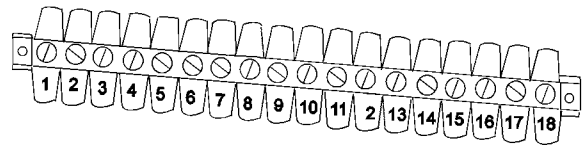
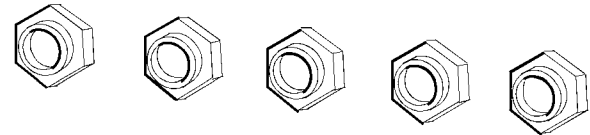




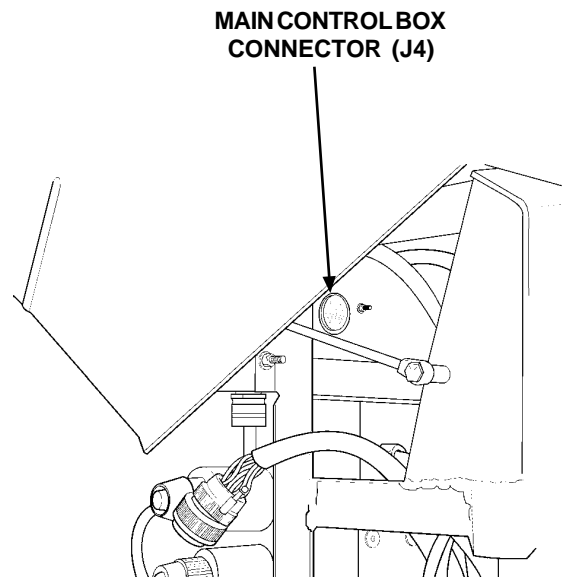
4-12. UNIT TROUBLESHOOTING (continued).

10. NO TRANSIT LIGHT DOES NOT OPERATE PROPERLY (MODEL A ONLY)  
(continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(2) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (P4), position N and terminal strip, position 10. Next, check between main junction box connector (P4), position L, and terminal strip position, 12. Last, check between main junction box connector (P4), position K, and terminal strip, position 11.</p>	

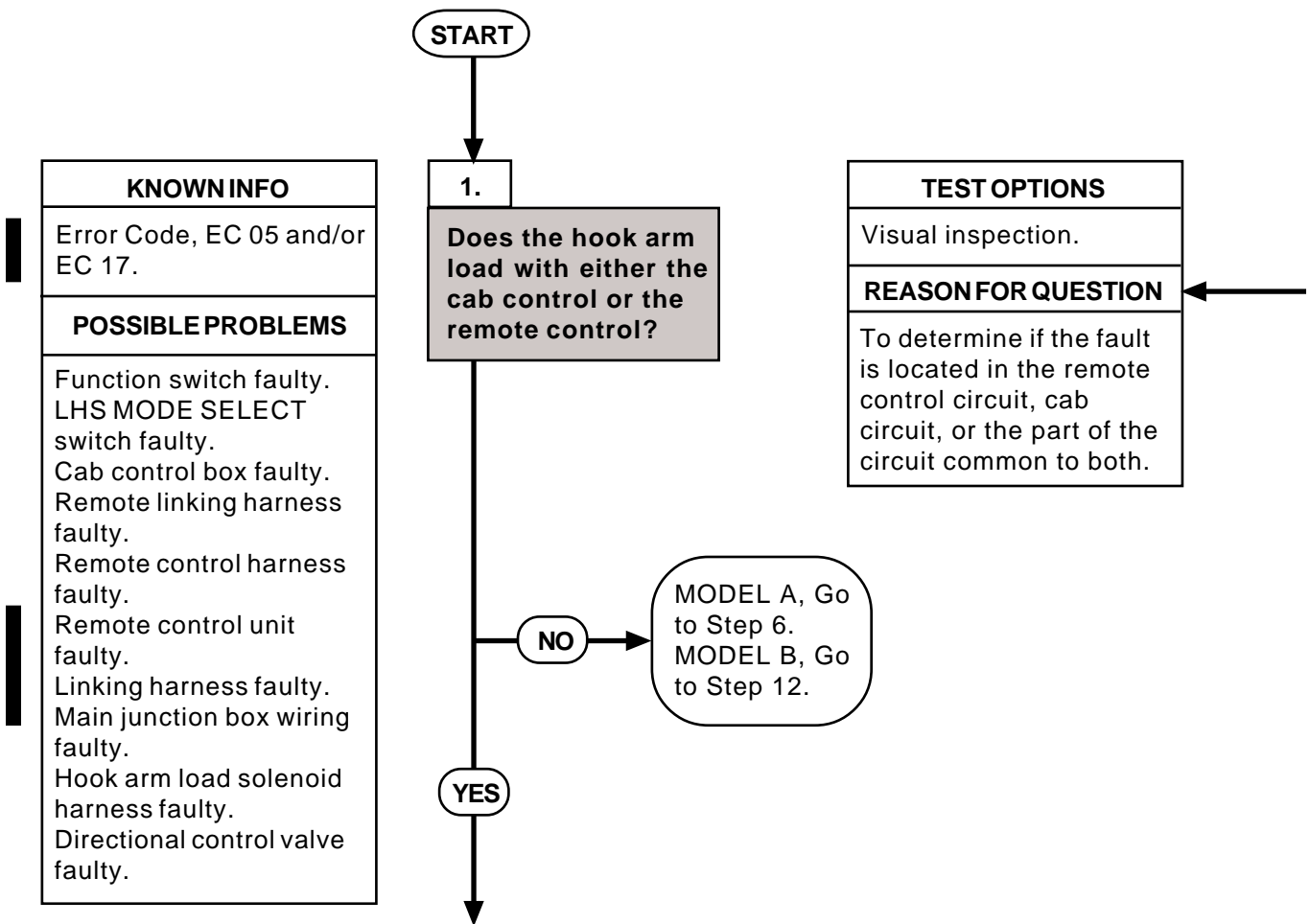


WIRING REMOVED FOR CLARITY



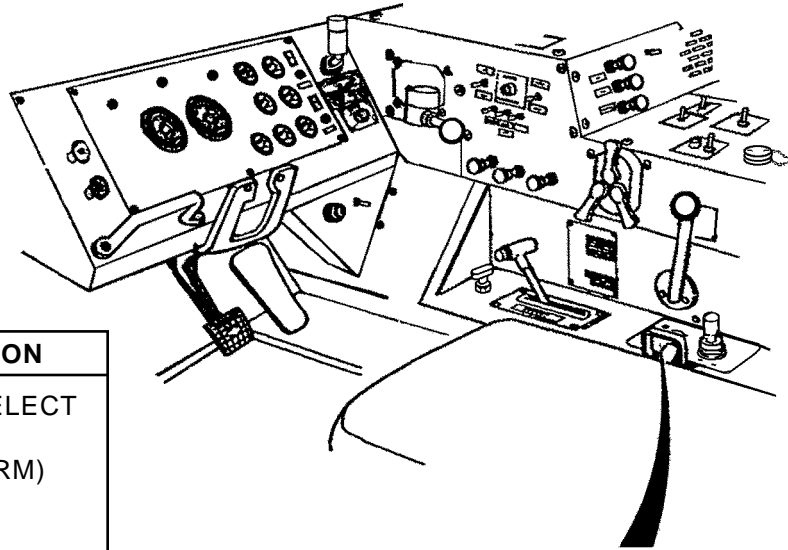
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE.	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Multimeter (ANURM105C)	Engine turned off (TM 9-2320-279-10)
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Parking brake applied (TM 9-2320-279-10)
	Wheels chocked (TM 9-2320-279-10)
<i>Personnel Required</i>	
Two	



4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).



**VISUAL INSPECTION**

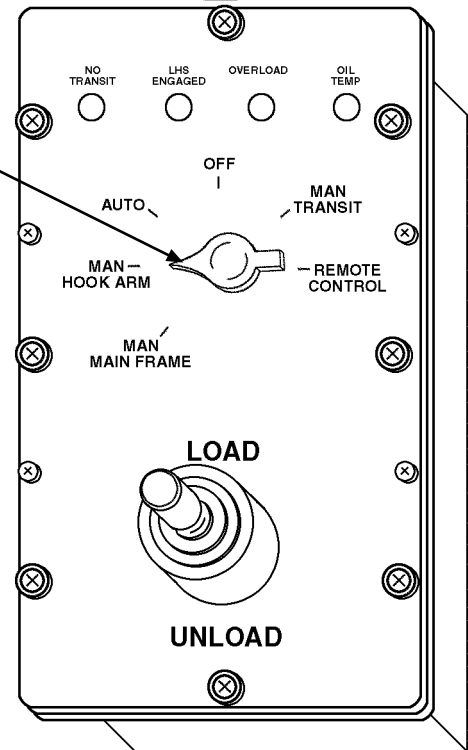
- (1) Turn LHS MODE SELECT switch to position 2 (MANUAL HOOK ARM) position.

**NOTE**

Refer to Chapter 2 for specific LHS operating instructions.

- (2) Attempt to actuate LHS using both the cab controls and the remote control. Note the results of the test.

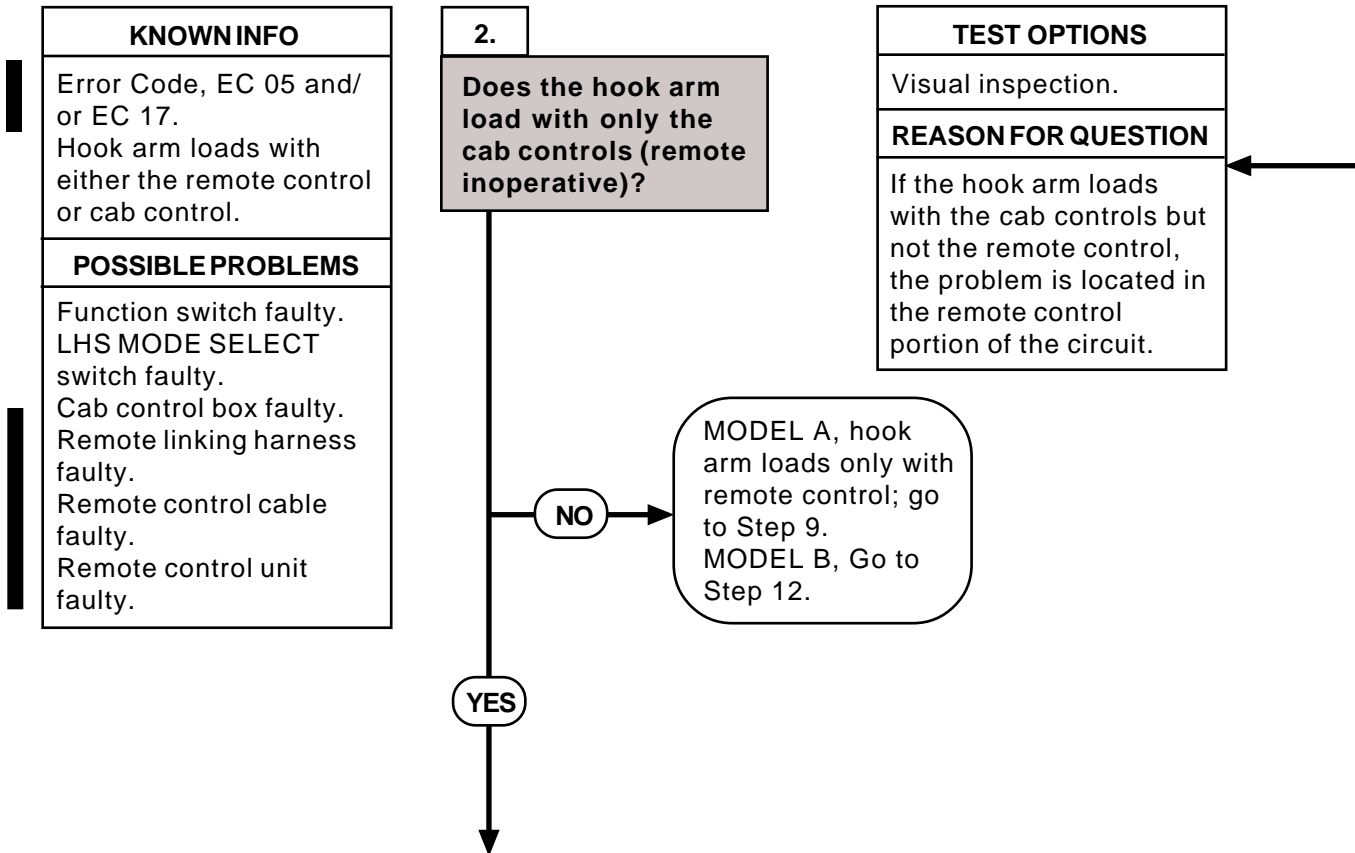
CAB DIGITAL MODE SELECT SWITCH



MODEL B SHOWN

4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

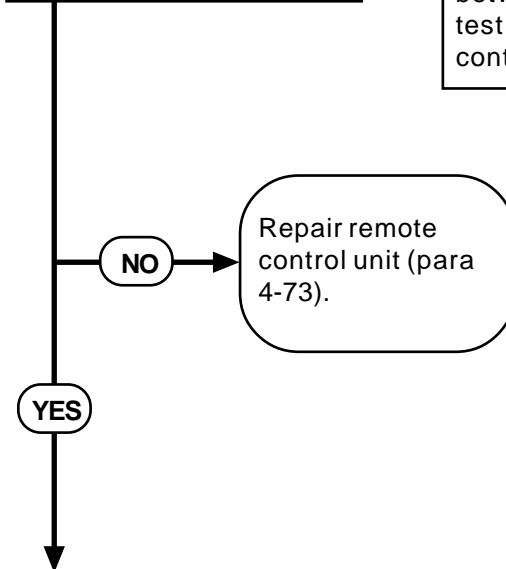
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).

<b>KNOWN INFO</b>
Error Code, EC 05 and/ or EC 17. Cab controls OK.
<b>POSSIBLE PROBLEMS</b>
Remote control unit faulty. Remote control cable faulty. Remote linking harness faulty.

**3.**  
Is continuity measured on the remote control connector (J9), between positions L and E and between L and K, with the hook arm switch in the load position?

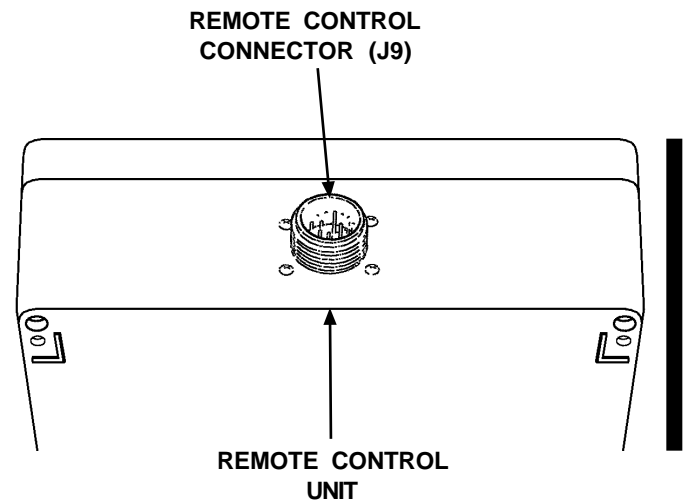
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
To verify the function of the remote control unit. If there is an open circuit between either of the two test points, the remote control unit is faulty.



**4-12. UNIT TROUBLESHOOTING (continued).**

**11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).**

<b>CONTINUITY TEST</b>	
<ol style="list-style-type: none"> <li>(1) Disconnect remote control cable from remote control unit.</li> <li>(2) Set multimeter to ohms position.</li> <li>(3) Position EMERGENCY STOP switch in the ON position.</li> <li>(4) Have assistant hold the HOOK ARM switch in the LOAD position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to positions E and L on remote control unit, and check multimeter for continuity.</li> <li>(6) Repeat step 3, but this time check for continuity between positions L and K.</li> </ol>	



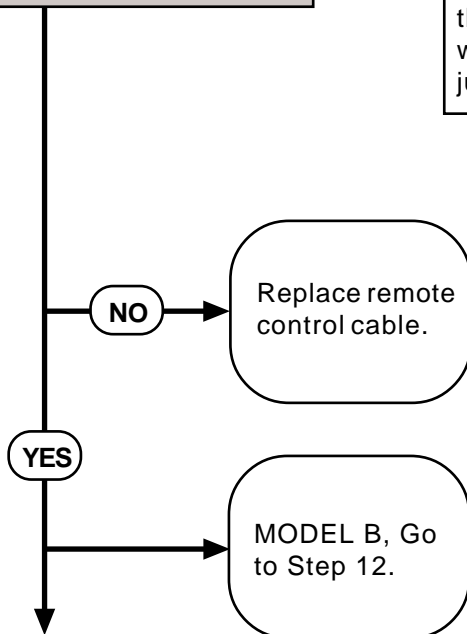
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).

KNOWN INFO
Error Code, EC 05 and/ or EC 17. Cab controls OK. Remote control unit OK.
POSSIBLE PROBLEMS
Remote control cable faulty. Remote linking harness faulty.

4.  
Is there continuity measured between the remote control cable, between connectors P8 and P9?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is an open circuit in the remote control cable, the signal from the remote control unit will not reach the junction box.

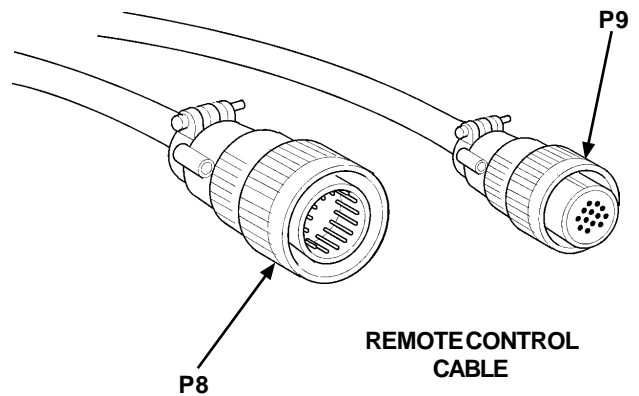




4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (continued).

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Disconnect remote control cable from components.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between position G on chassis end and position J on remote control end. Also check for continuity between position J on chassis end and position E on remote end.</p>	



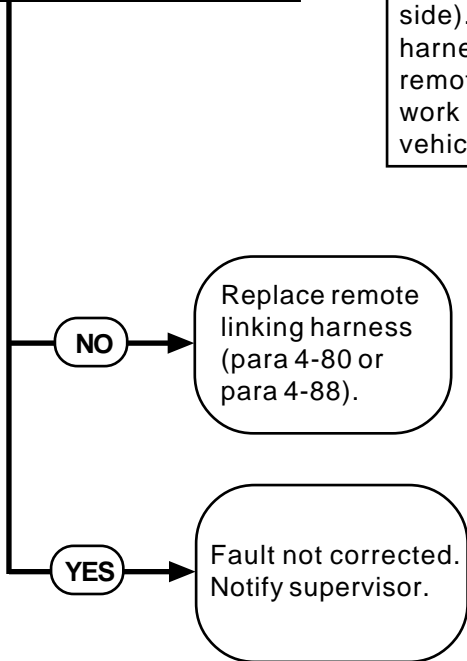
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls OK. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Remote linking harness faulty.

**5.**  
Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Signal power is transferred from the remote control cable to the main junction box via the remote linking harnesses (one for each side). If this linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.



4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.
- (3) If necessary, remove remote control cable from linking harness connector.

**NOTE**

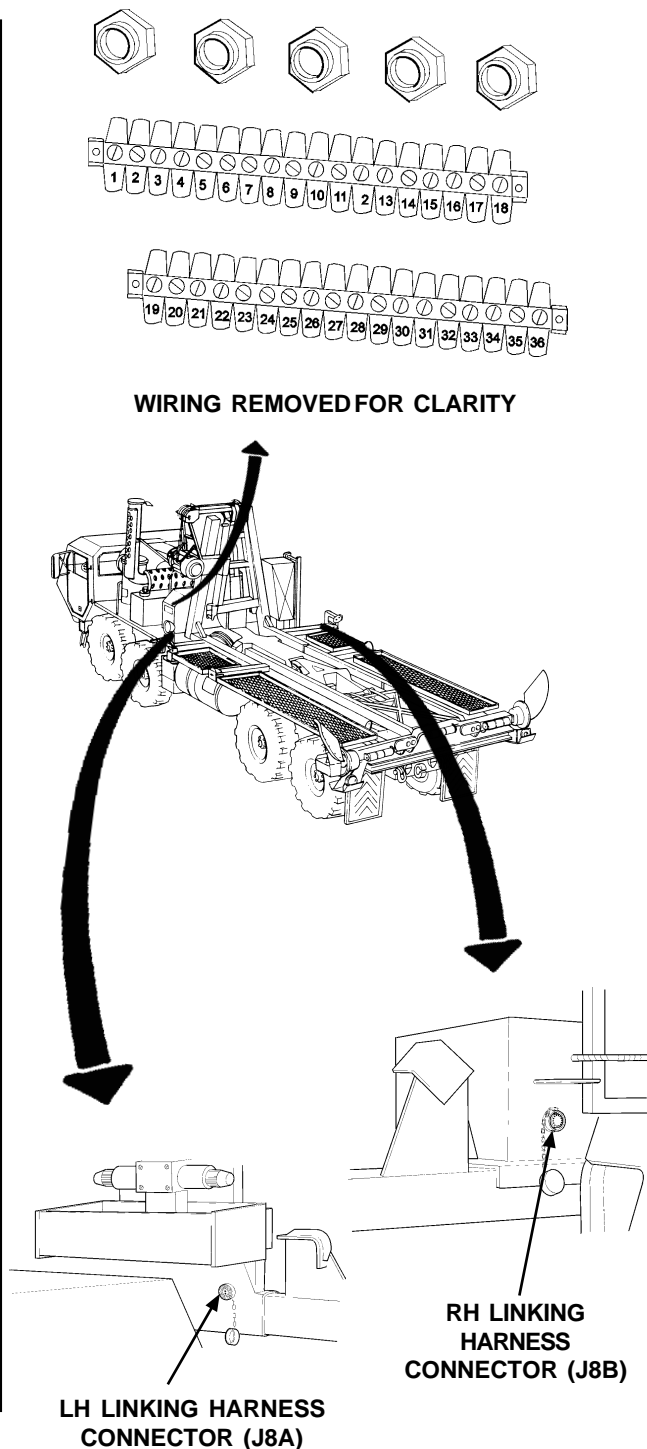
A reading of infinity indicates an open circuit.

- (4) Set multimeter to ohms position.
- (5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between terminal C on connector and position 7 in junction box. Next, check between terminal J on connector and position 23 in junction box. Finally, check between terminal F on connector and position 17 in junction box.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (6) Check for grounded wiring by connecting one multimeter lead to each terminal wire and the other lead to chassis ground.



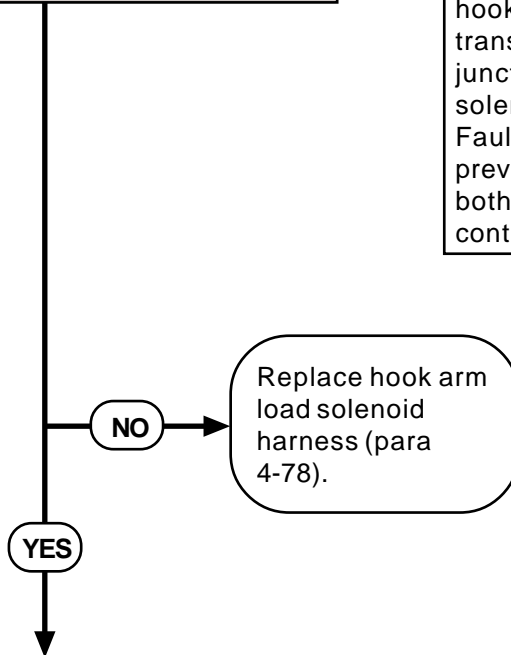
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Does not operate with remote control or cab controls.
<b>POSSIBLE PROBLEMS</b>
Hook arm load solenoid harness faulty. Main junction box wiring faulty. Linking harness faulty. Directional control valve faulty.

6.  
Is continuity measured on the hook arm load solenoid harness?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Power to activate the hook arm load solenoid is transferred from the main junction box to the solenoid via this harness. Faults in this harness will prevent operation from both the cab and remote controls.



4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.

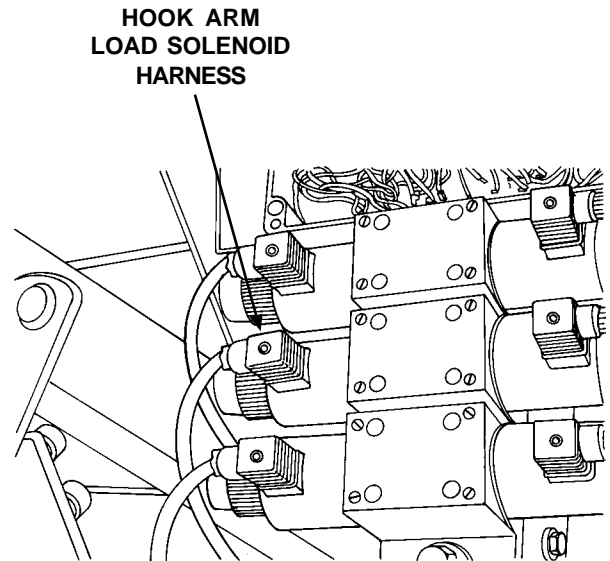
**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

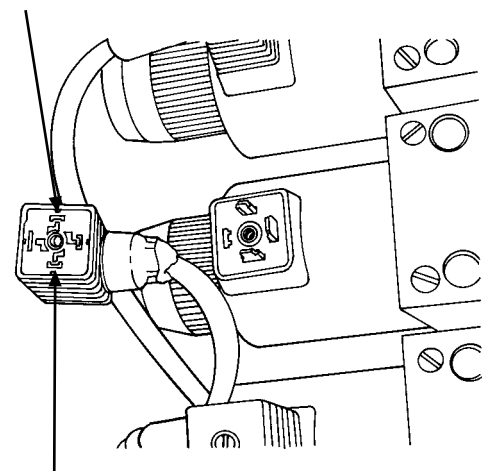
- (3) Remove connector from the hook arm load solenoid.
- (4) Set multimeter to ohms position.

**NOTE**

- A reading of infinity indicates an open circuit.
  - Junction box terminal 17 is connected to one side of the solenoid; terminal 18 is connected to the other side.
- (5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between the solenoid connector, position 1, and terminal strip, position 17.
  - (6) Repeat Step 5 to check for continuity between position 2 in the connector and terminal strip, position 18.



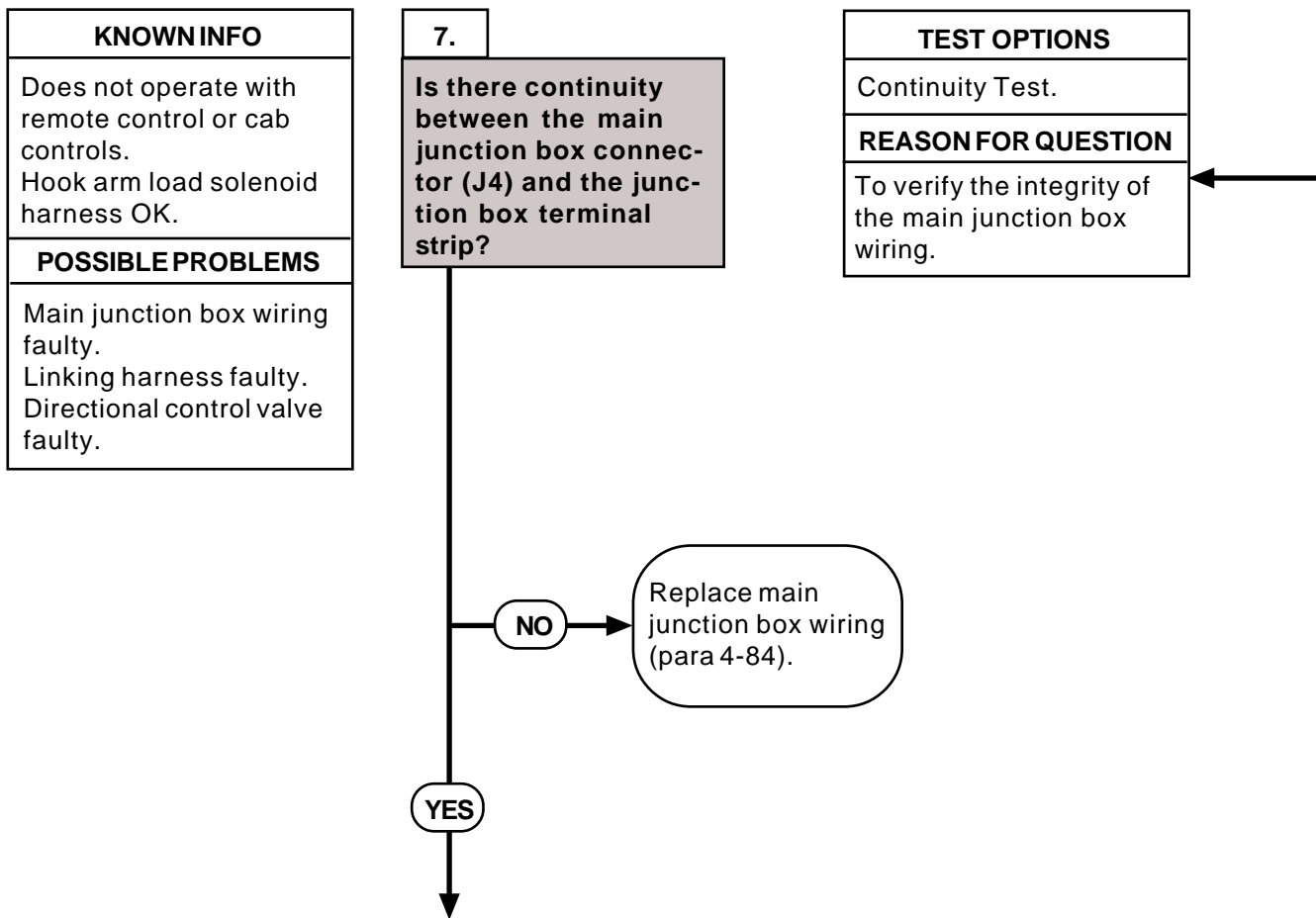
**SOLENOID CONNECTOR POSITION 1**



**SOLENOID CONNECTOR POSITION 2**

4-12. UNIT TROUBLESHOOTING (continued).

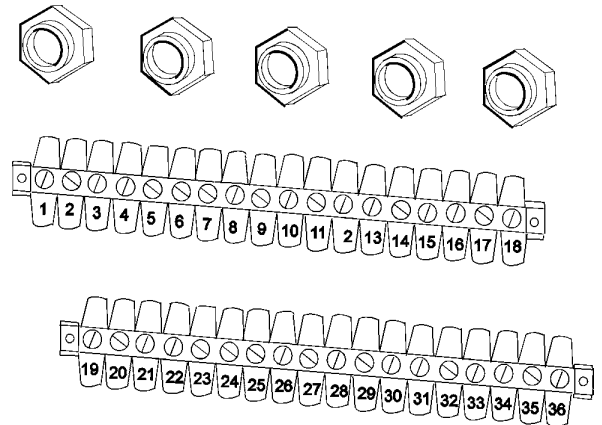
11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).



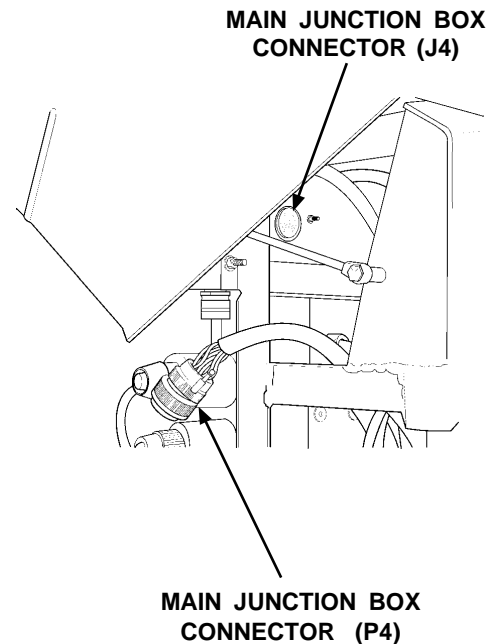
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p>	
<p>(1) Remove main junction box connector (P4) from main junction box.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position J, and terminal strip, position 17. Also check between main junction box connector (J4), position Q, and terminal strip, position 18.</p>	



WIRING REMOVED FOR CLARITY



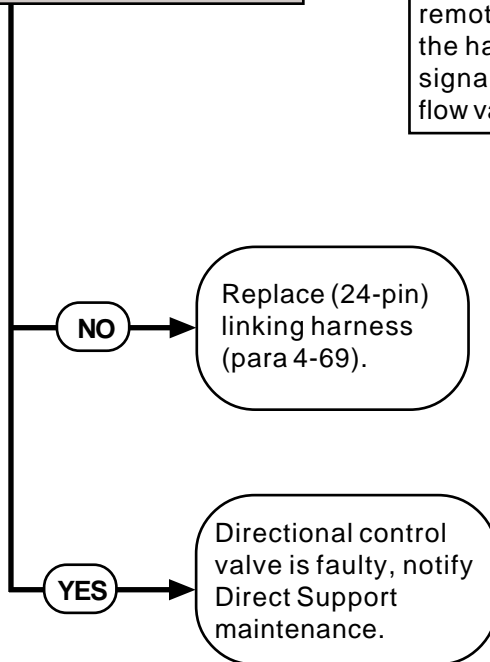
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODELA ONLY) (continued).

KNOWN INFO
Does not operate with remote control or cab controls. Hook arm load solenoid harness OK. Main junction box wiring OK.
POSSIBLE PROBLEMS
Linking harness faulty. Directional control valve faulty.

**8.**  
Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
During cab control operation, this harness provides power to the hook arm load solenoid. During remote control operation, the harness provides a signal to activate the free flow valve.

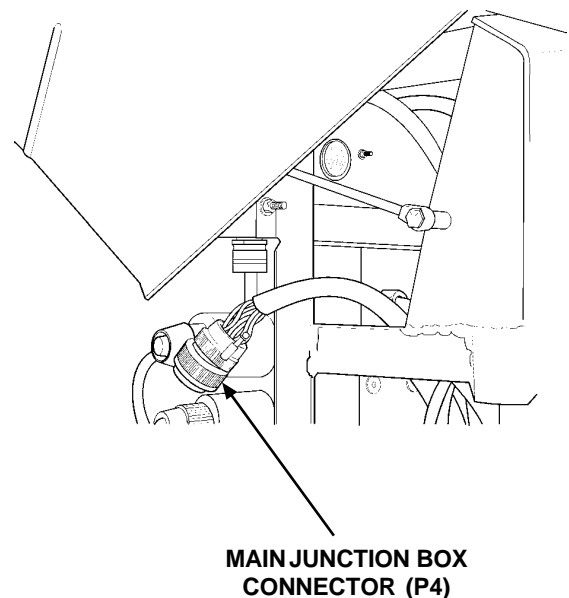
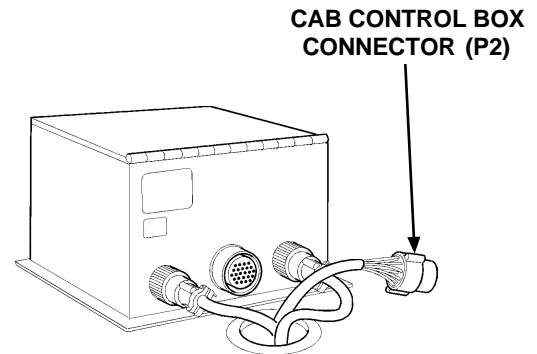




**4-12. UNIT TROUBLESHOOTING (continued).**

**11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).**

<b>CONTINUITY TEST</b>	
<p>(1) Remove four screws and lockwashers and access cover from heater compartment.</p> <p>(2) Remove cab control box connector (P2) from cab control box.</p>	
<p><b><u>CAUTION</u></b></p> <p><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p>	
<p>(3) Remove main junction box connector (J4) from junction box.</p> <p>(4) Set multimeter to ohms position.</p>	
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>	
<p>(5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check (24-pin) linking harness, position J.</p>	
<p><b>NOTE</b></p> <p>Any reading besides infinity indicates a grounded wire.</p>	
<p>(6) Remove multimeter lead from one end of wire and connect to chassis ground.</p>	



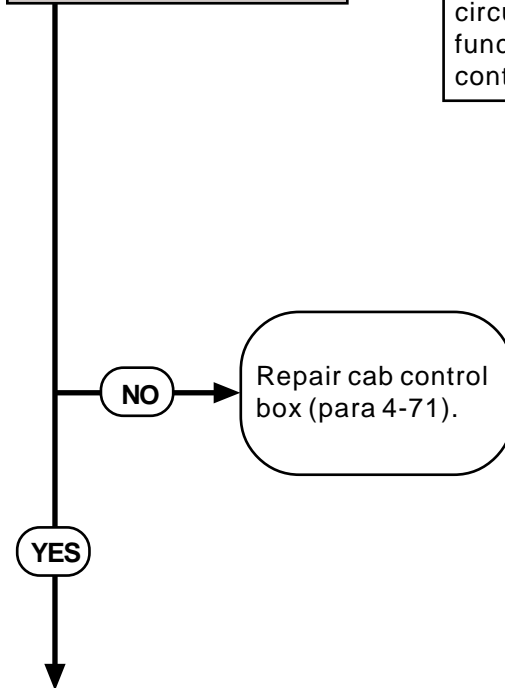
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Operates only with remote control.
<b>POSSIBLE PROBLEMS</b>
Function switch faulty. LHS MODE SELECT switch faulty. Cab control box faulty.

9.  
Is continuity measured on the cab control box function switch, with the switch in the load position?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The source of the power in the hook arm load circuit originates with the function switch in the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

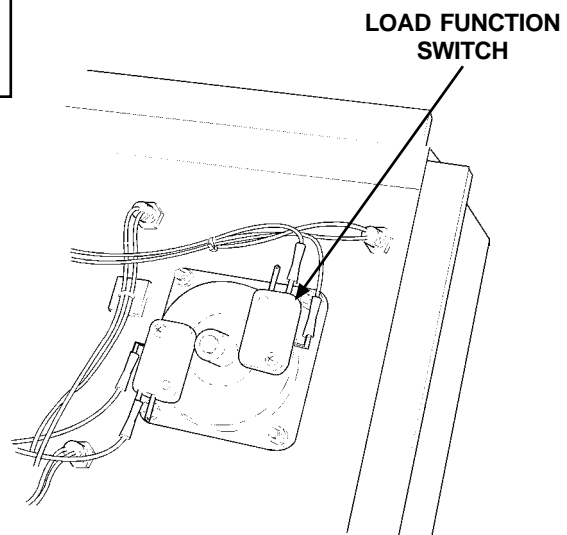
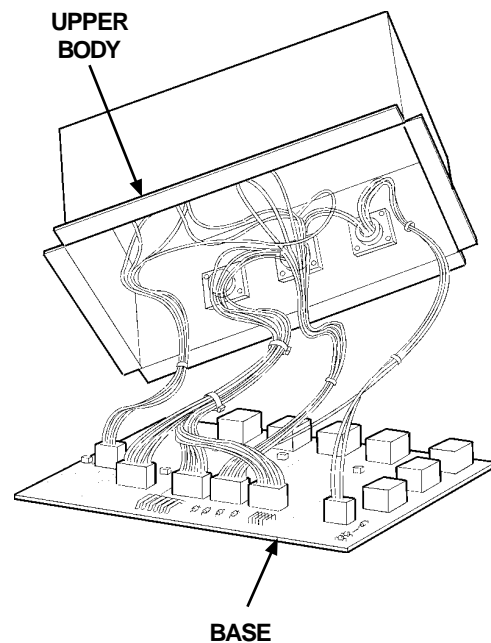
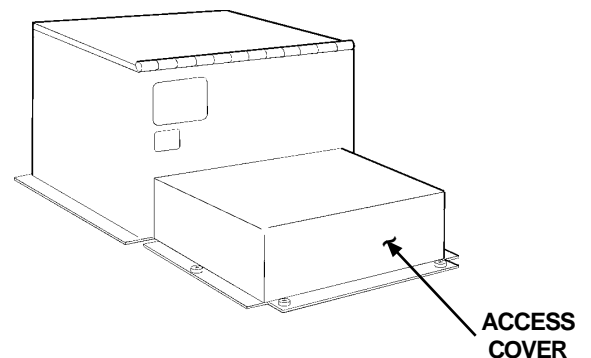
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove four screws and lockwashers and access cover from heater compartment.
- (2) Remove four screws and lockwashers from cab control box.
- (3) Remove six screws from cab control box, and separate upper body from base.
- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to switch terminals. Hold the joystick in the LOAD position, and check multimeter for continuity.



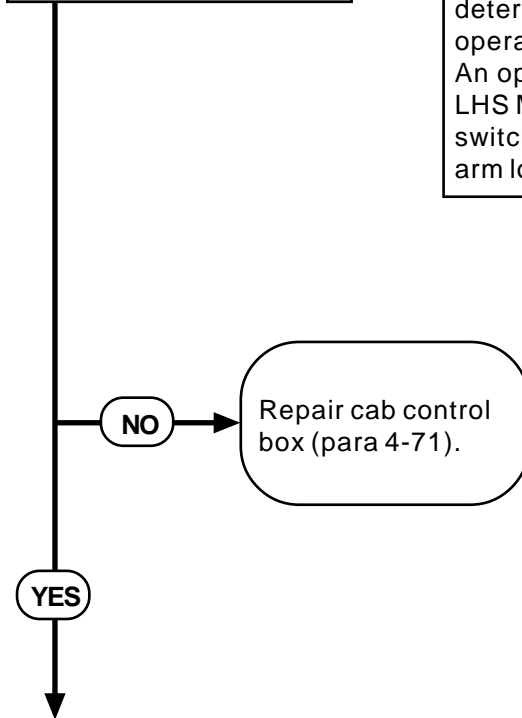
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Operates only with remote control. Function switch OK.
<b>POSSIBLE PROBLEMS</b>
LHS MODE SELECT switch faulty. Cab control box faulty.

10.  
Are 22–28 volts measured at the selector switch (orange wire)?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
The selector switch determines the mode of operation for the LHS. An open circuit within the LHS MODE SELECT switch will prevent hook arm load operation.



## 4-12. UNIT TROUBLESHOOTING (continued).

## 11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Rotate LHS MODE SELECT switch to position 2 (hook arm in manual mode) position.
- (4) Set multimeter to voltage position.

**CAUTION**

When checking voltage, use caution not to short or ground the terminal being checked. Failure to comply with this caution may result in damage to vehicle or test equipment.

**NOTE**

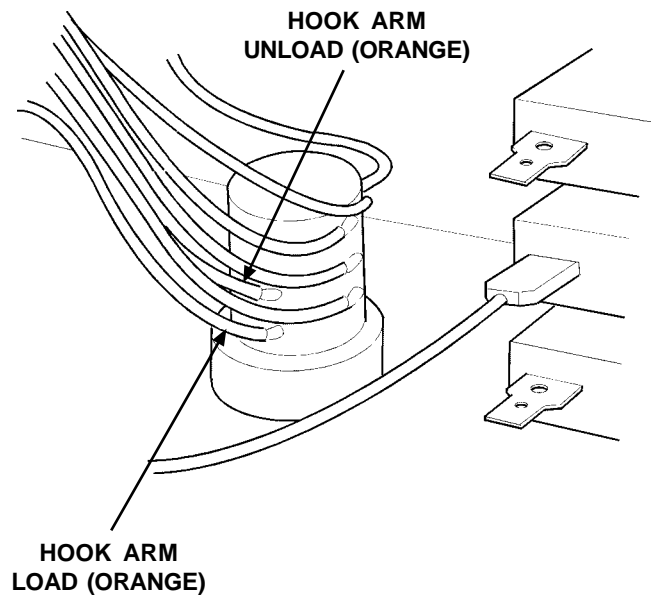
Refer to illustration for correct wire.

- (5) Place positive (+) probe of multimeter on orange (LOAD) wire on selector switch.
- (6) Place negative (-) probe of multimeter on known good ground.

**NOTE**

This test can also be accomplished by observing the status of LED D15 while performing Step 7.

- (7) Hold joystick in LOAD position, and check multimeter for voltage reading.
- (8) Turn engine start switch and light control switch to OFF position.



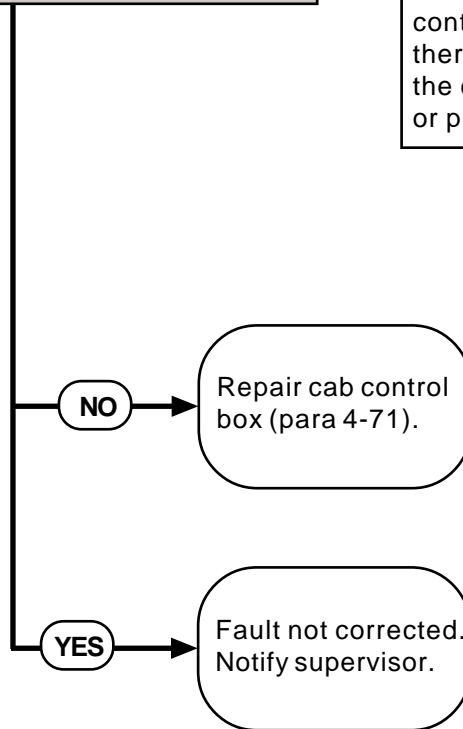
4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Operates only with remote control. Function switch OK. LHS MODE SELECT switch OK.
POSSIBLE PROBLEMS
Cab control box faulty.

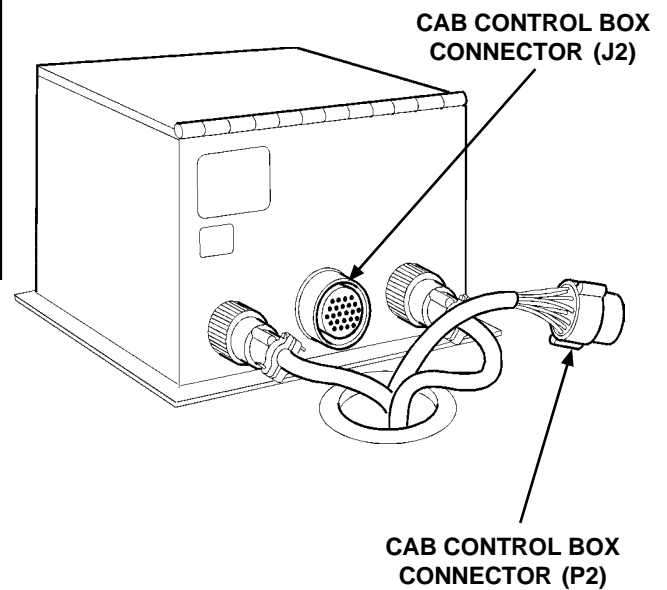
11.  
Are 22–28 volts measured at the cab control box connector (J2), position J?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
If there is no voltage measured on the cab control box connector, there is an open circuit in the cab control box wiring or printed circuit.



**4-12. UNIT TROUBLESHOOTING (continued).****11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).****VOLTAGE TEST**

- (1) Remove cab control box connector (P2) from cab control box.
- (2) Turn engine start switch to ON position.
- (3) Turn light control switch to STOP LIGHT position.
- (4) Set multimeter to voltage position.
- (5) Place positive (+) probe of multimeter on cab control box connector (J2), position J.
- (6) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (7) Turn engine start switch and light control switch to OFF position.



4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY).

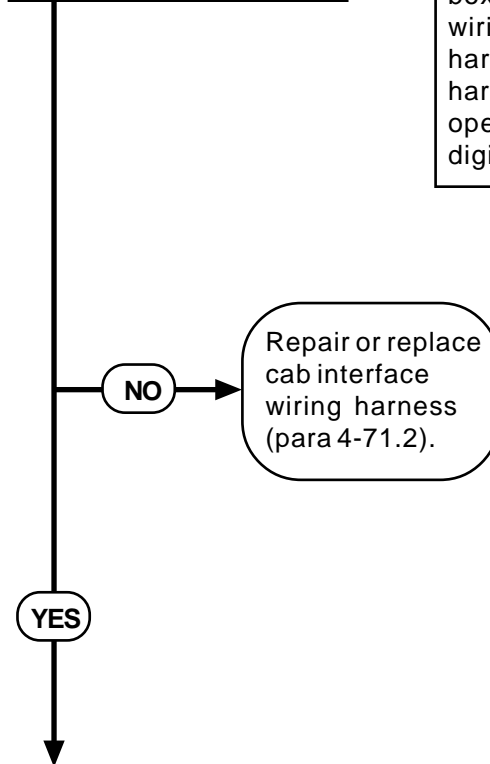
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 05 and/or EC 17. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Digital control box faulty.

12.
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position #2 and position #3?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the hook arm solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.





**4-12. UNIT TROUBLESHOOTING (continued).**

**11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).**

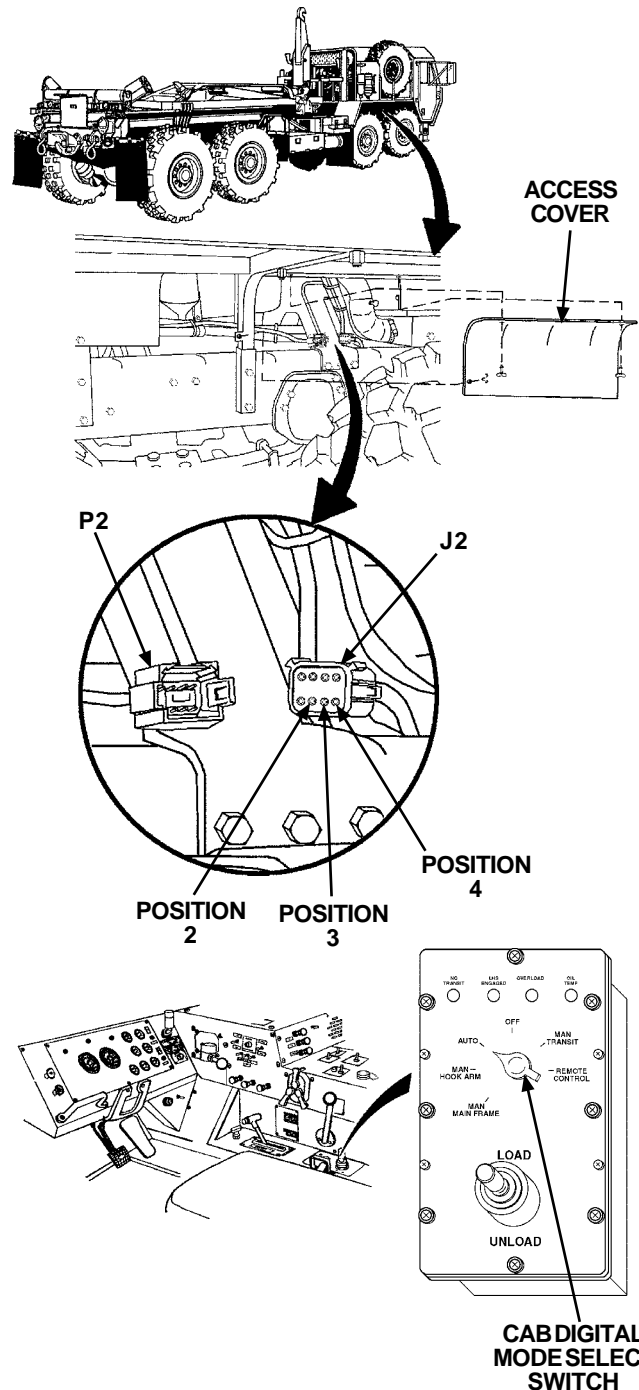
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position # 4, circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position #4, replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position # 4, circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.

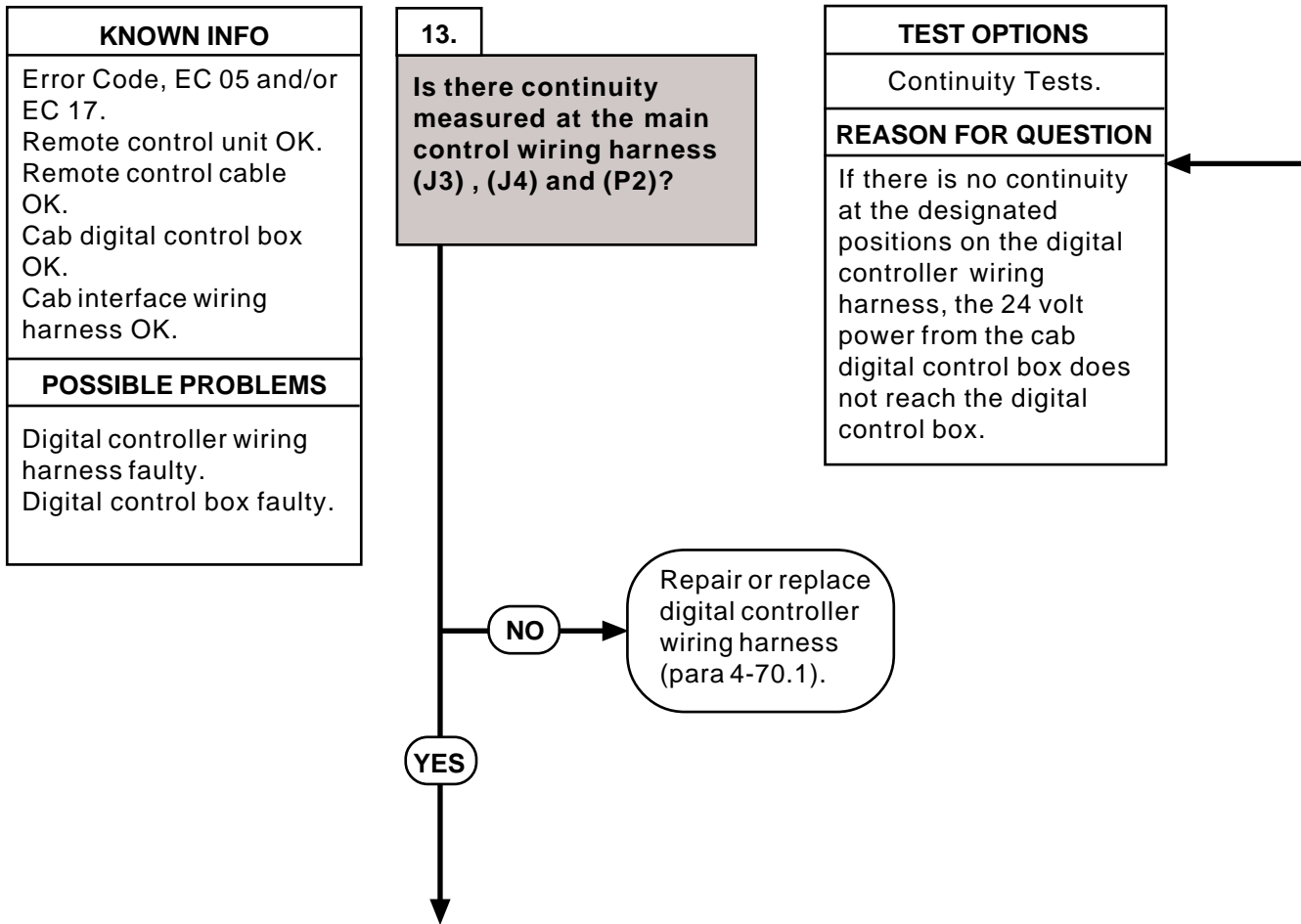


4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove five screws and flatwashers from hydraulic cabinet cover and remove cover.
- (2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.
- (3) Set multimeter to ohms position.

**NOTE**

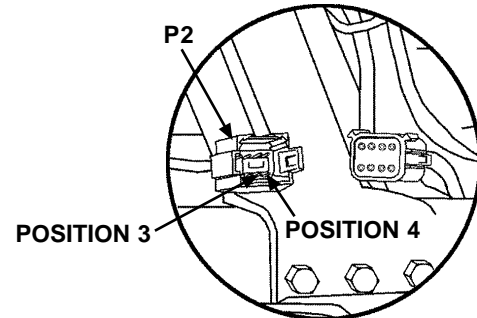
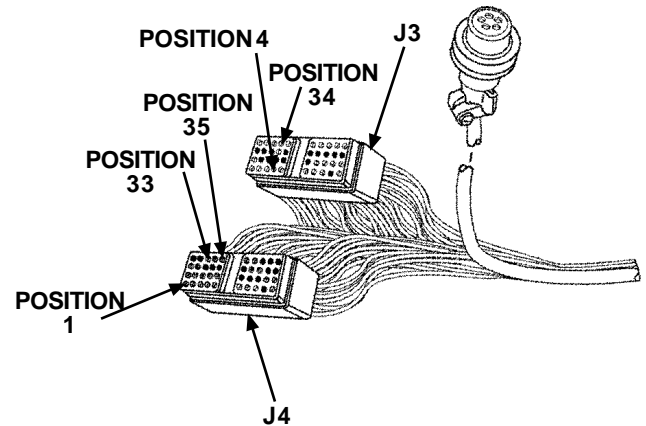
A reading of infinity indicates an open circuit.

- (4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.
- (5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.
- (6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.
- (7) Connect multimeter between (J3), position "4", and hook arm load solenoid connector, position "1". Check multimeter for continuity.
- (8) Connect multimeter between (J3), position "34", and hook arm load solenoid connector, position "2". Check multimeter for continuity.

HYDRAULIC CABINET COVER

HOOK ARM LOAD SOLENOID CONNECTOR

POSITION 1  
POSITION 2

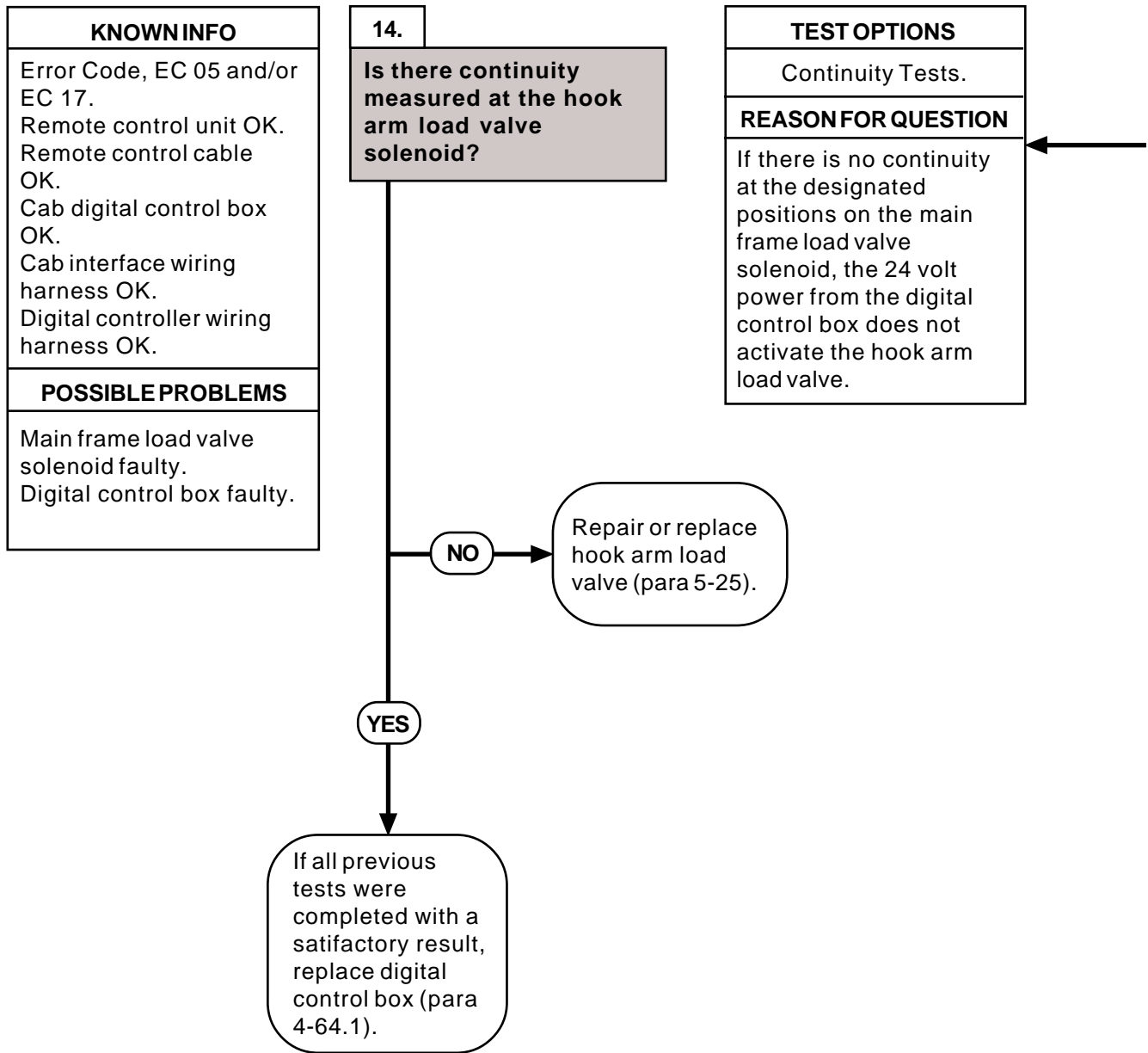


4-12. UNIT TROUBLESHOOTING (continued).

11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



## 4-12. UNIT TROUBLESHOOTING (continued).

## 11. HOOK ARM DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

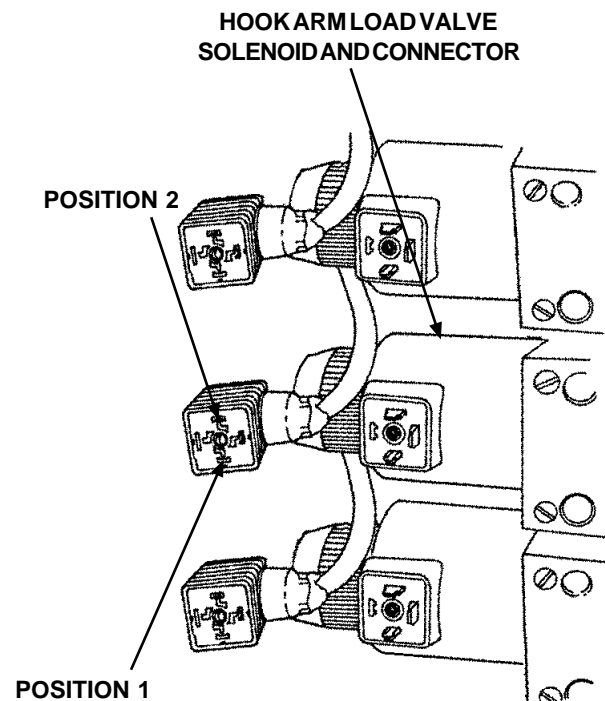
**CONTINUITY TEST****CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

**NOTE**

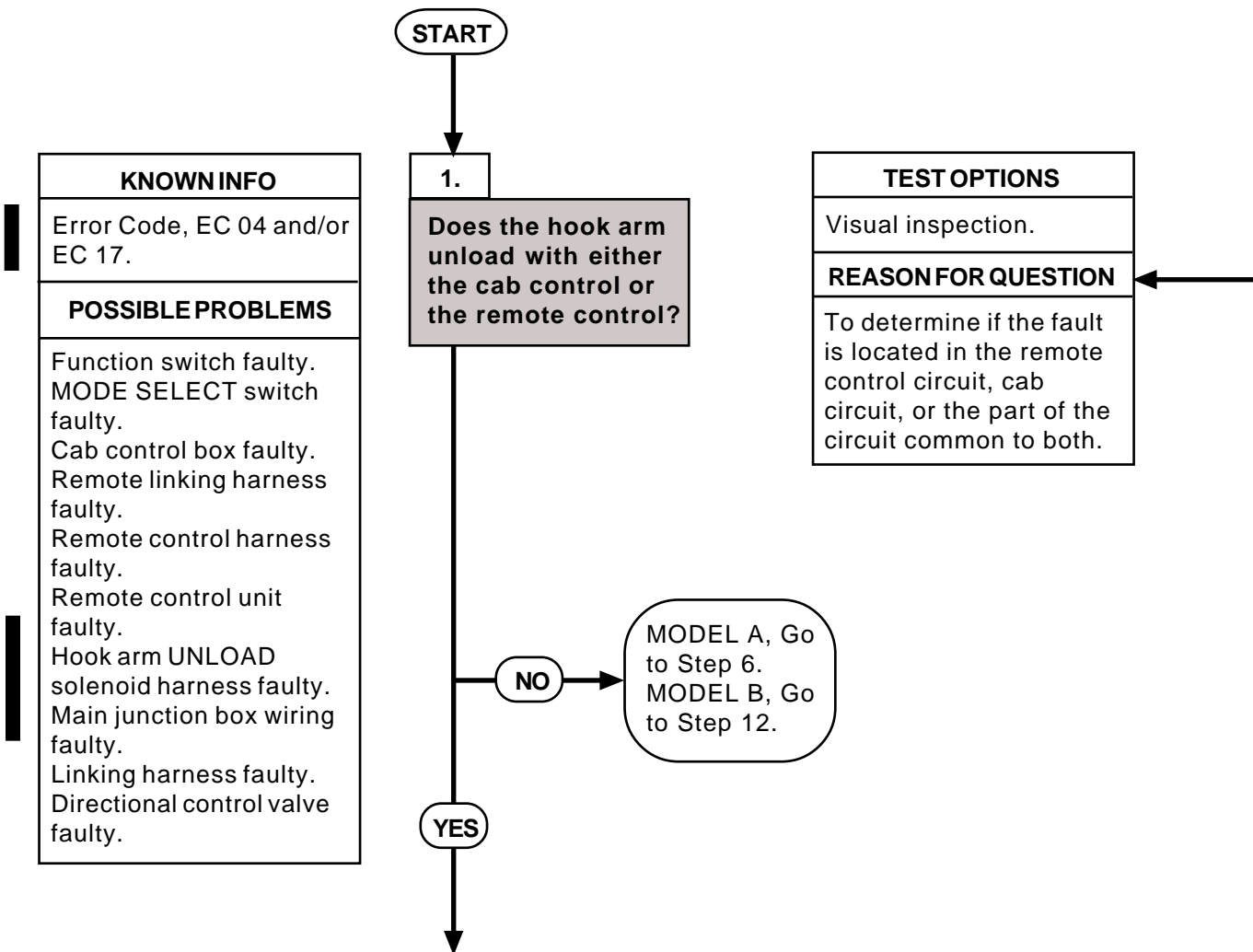
A reading of infinity indicates an open circuit.

- (1) Set multimeter to ohms position.
- (2) Connect multimeter between position "1" and position "2" on hook arm load valve solenoid. Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

<b>12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i> Multimeter (ANURM105C) Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	<i>Equipment Condition</i> Engine turned off (TM 9-2320-279-10) Parking brake applied (TM 9-2320-279-10) Wheels chocked (TM 9-2320-279-10)
<i>Personnel Required</i> Two	



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).

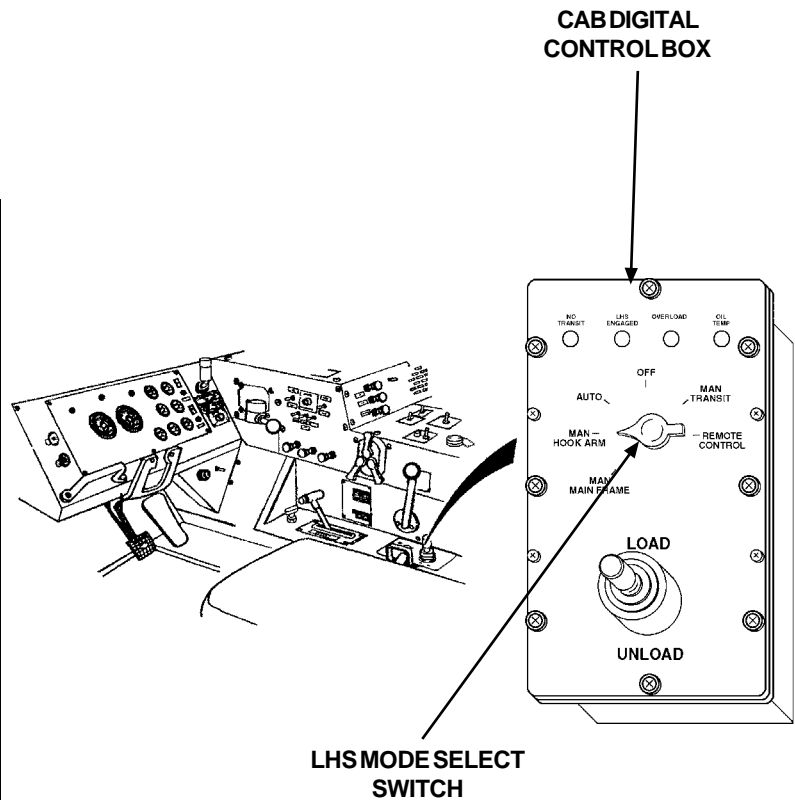
**VISUAL INSPECTION**

- (1) Turn LHS MODE SELECT switch to position 2 (hook arm in manual mode).

**NOTE**

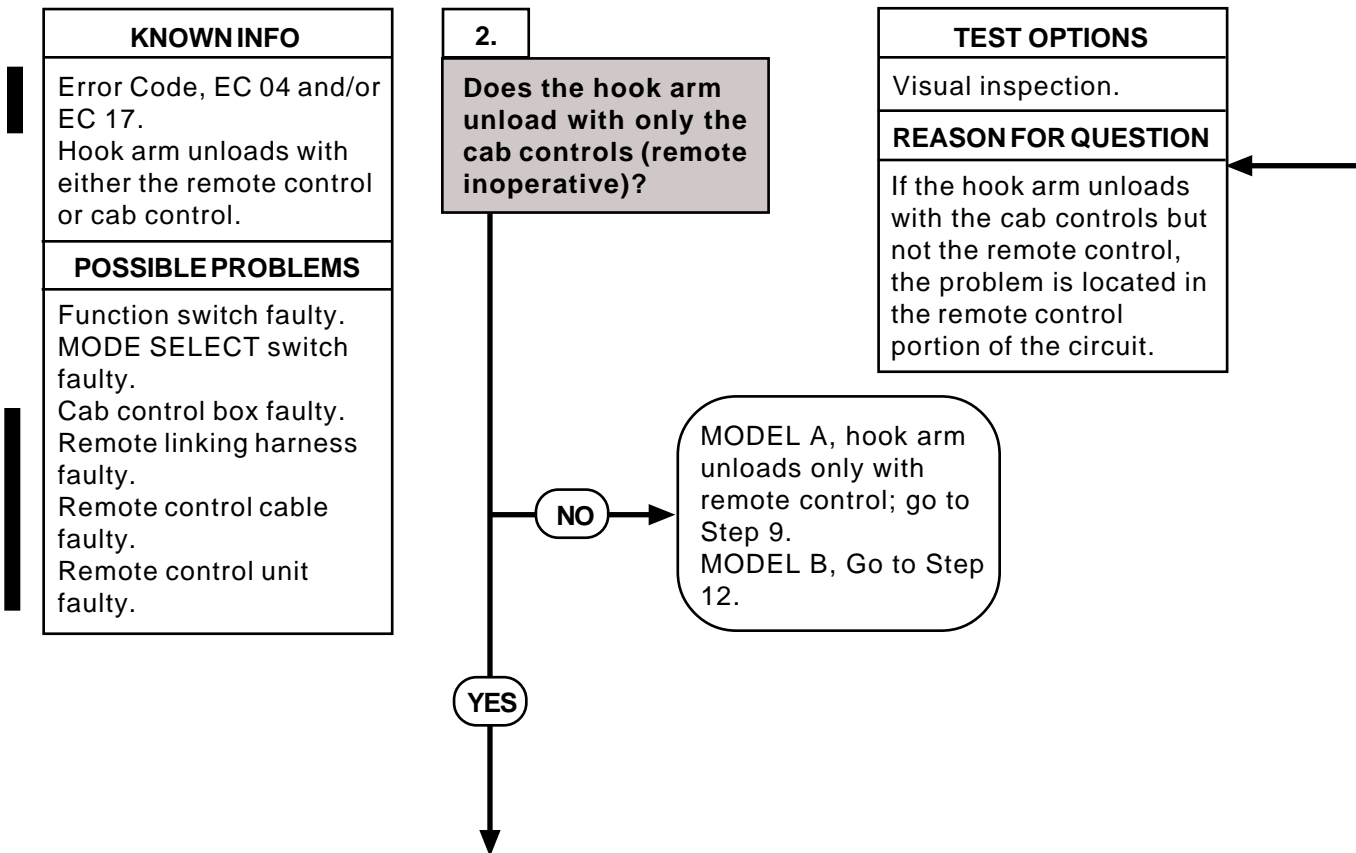
Refer to Chapter 2 for specific LHS operating instructions.

- (2) Attempt to actuate LHS using both the cab controls and the remote control unit. Note the results of the test.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).





**4-12. UNIT TROUBLESHOOTING (continued).**

**12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

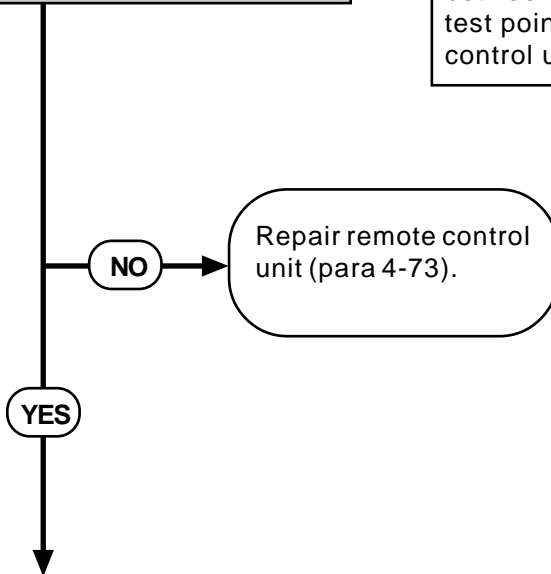
4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).

<b>KNOWN INFO</b>
Error Code, EC 04 and/or EC 17. Cab controls OK.
<b>POSSIBLE PROBLEMS</b>
Remote control unit faulty. Remote control cable faulty. Remote linking harness faulty.

**3.**  
Is continuity measured on the remote control connector (J9), between positions "L" and "E" and "L" and "J", with the hook arm switch in the UNLOAD position?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
To verify the function of the remote control unit. If there is an open circuit between either of the two test points, the remote control unit is faulty.



**4-12. UNIT TROUBLESHOOTING (continued).**

**12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).**

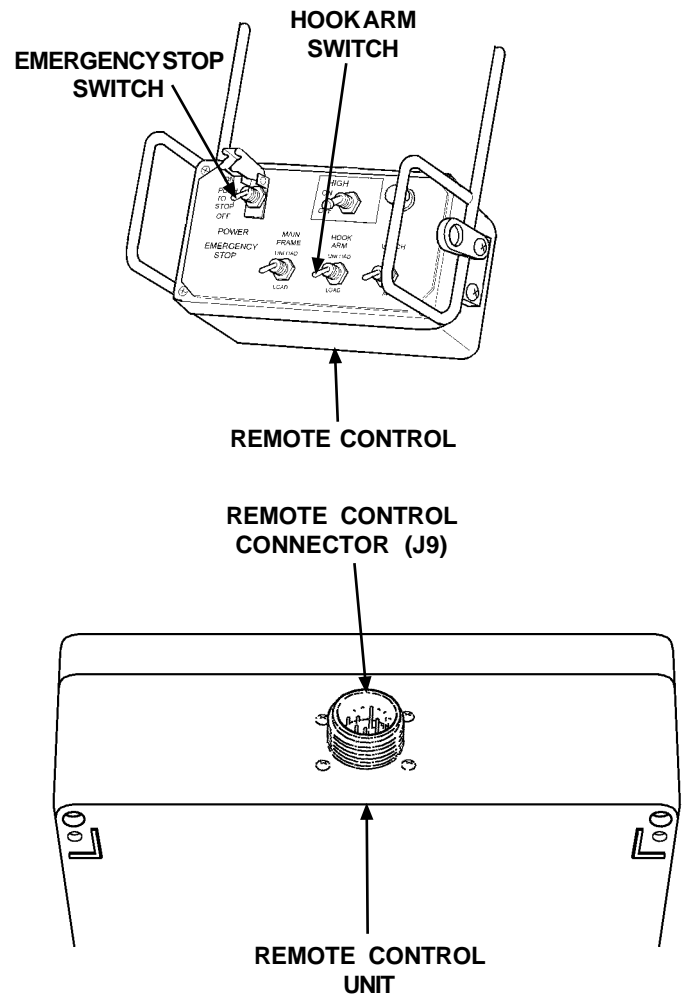
**CONTINUITY TEST**

- (1) Disconnect remote control cable from remote control unit.
- (2) Set multimeter to ohms position.
- (3) Position EMERGENCY STOP switch in the ON position.
- (4) Have assistant hold the HOOK ARM switch in the UNLOAD position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to remote control connector (J9), positions "E" and "L" on remote control unit, and check multimeter for continuity.
- (6) Repeat Step 5, but this time check for continuity between positions "L" and "K".



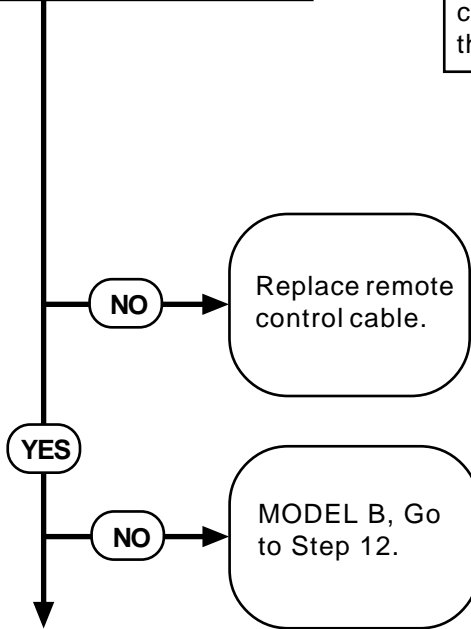
4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).

KNOWN INFO
Error Code, EC 04 and/or EC 17. Cab controls OK. Remote control unit OK.
POSSIBLE PROBLEMS
Remote control cable faulty. Remote linking harness faulty.

4.  
Is there continuity measured on the remote control cable connectors, between connectors P8 and P9?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is an open in the remote control cable, the signal from the remote control unit will not reach the junction box.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (continued).

**CONTINUITY TEST**

**CAUTION**

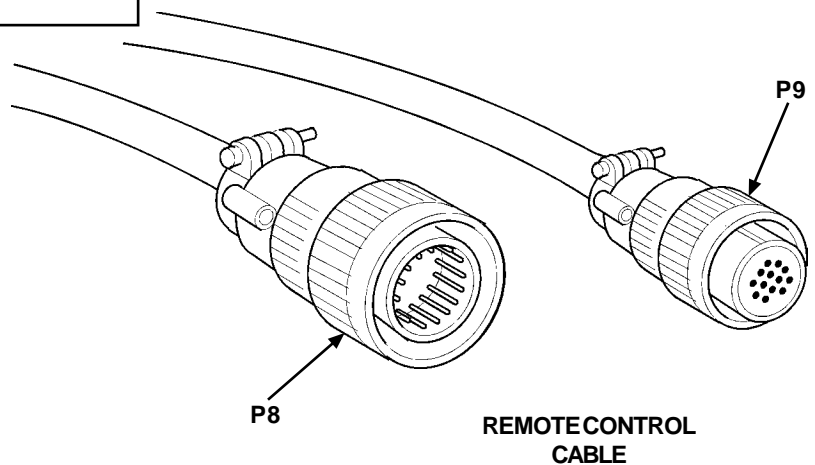
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between position F on chassis end and position K on remote control end. Also check for continuity between position J on chassis end and position E on remote end.



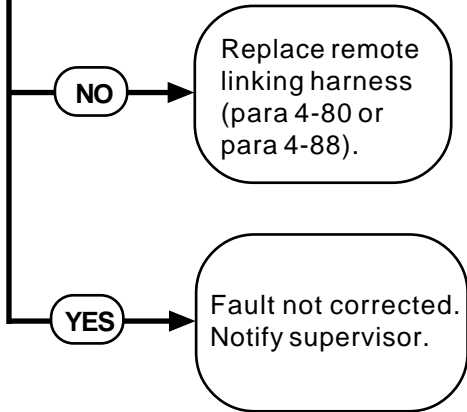
4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls OK. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Remote linking harness faulty.

5. Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Signal power is transferred from the remote control cable to the main junction box via the remote linking harnesses (one for each side). If this linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.
- (3) If necessary, remove remote control cable from linking harness connector.
- (4) Set multimeter to ohms position.

**NOTE**

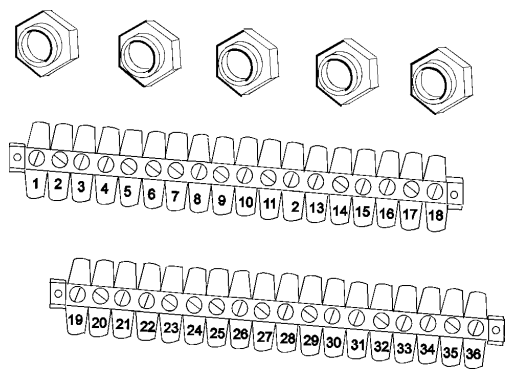
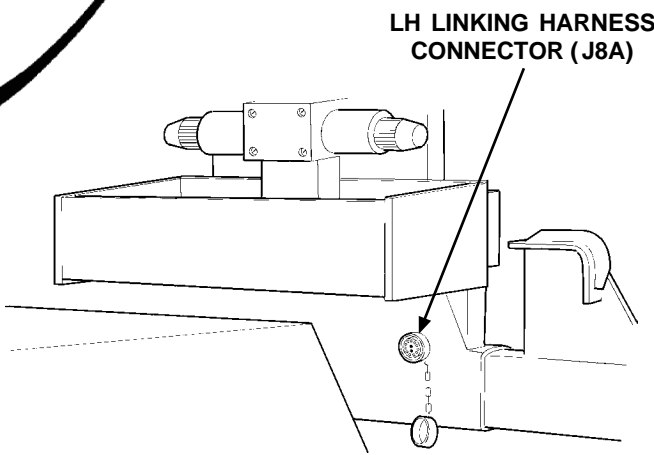
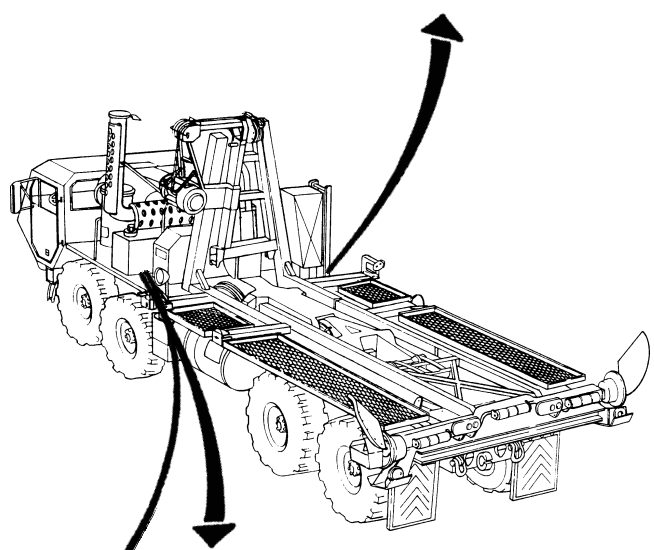
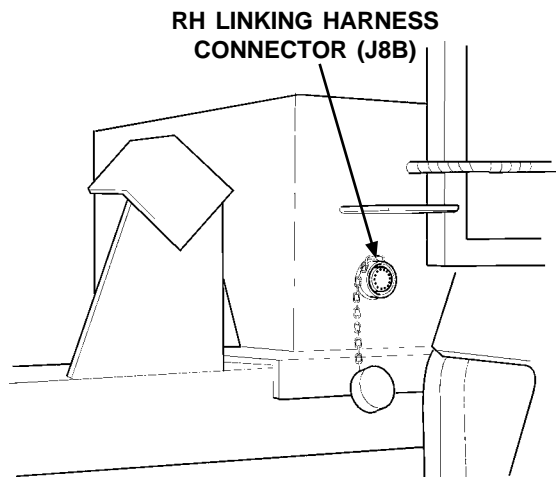
A reading of infinity indicates an open circuit.

- (5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between terminal C on connector and position 7 in junction box. Next, check between terminal J on connector and position 23 in junction box. Finally, check between terminal G on connector and position 13 in junction box.

**NOTE**

Any reading besides infinity indicates a grounded wire.

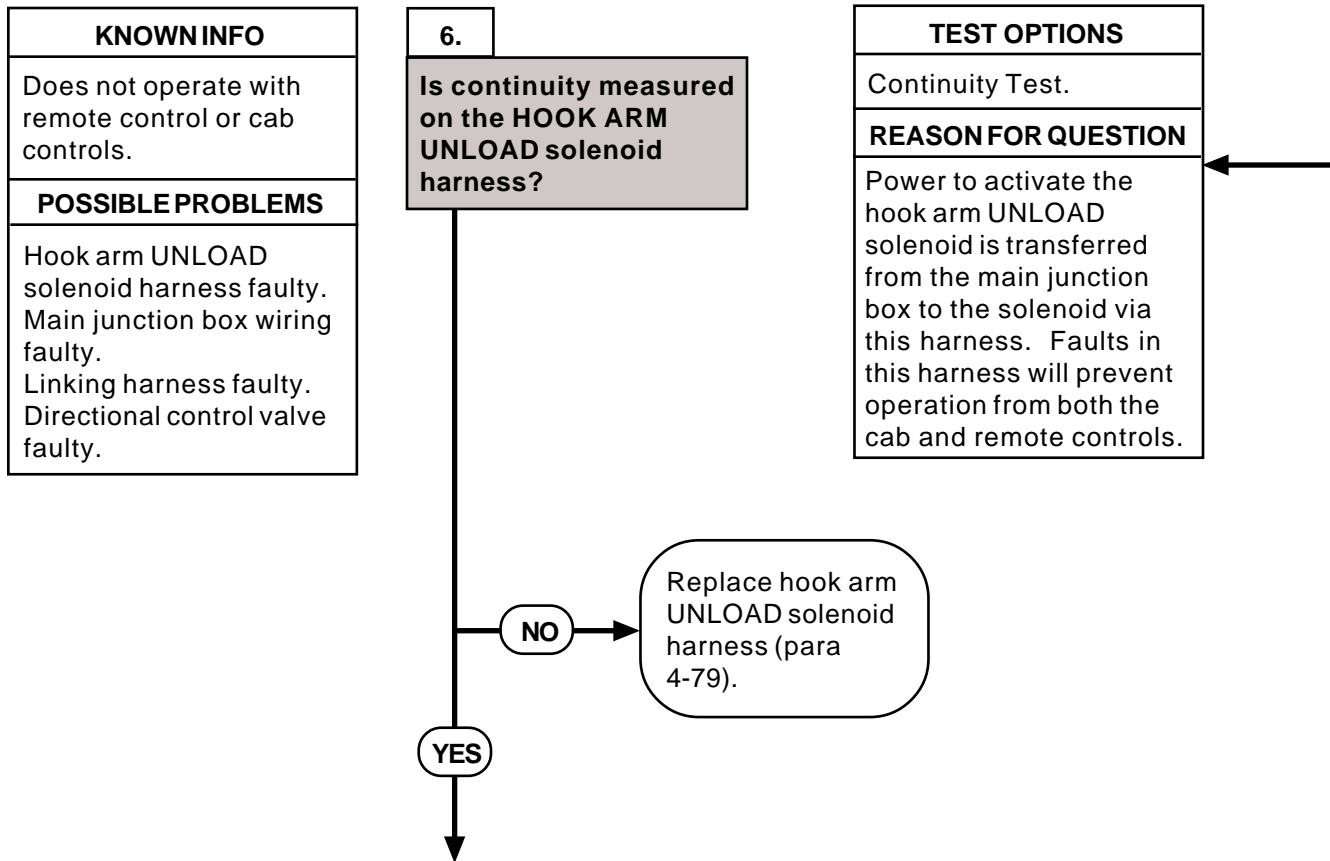
- (6) Check for grounded wiring by connecting one multimeter lead to each terminal wire and the other lead to chassis ground.



WIRING REMOVED FOR CLARITY

4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).





4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.

**CAUTION**

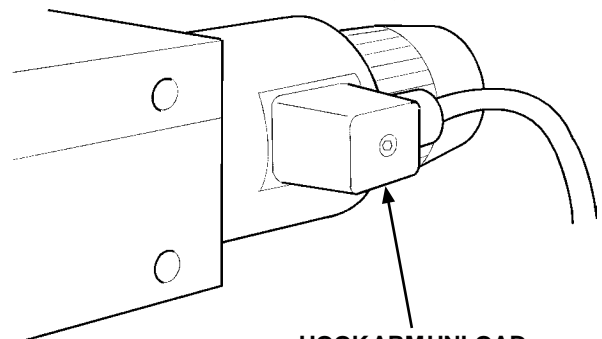
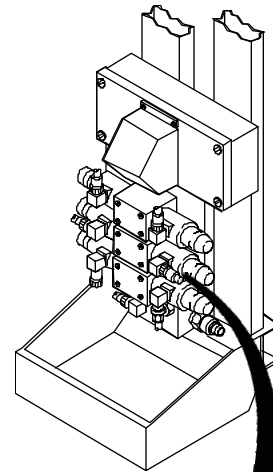
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Remove connector from the hook arm UNLOAD solenoid.
- (4) Set multimeter to ohms position.

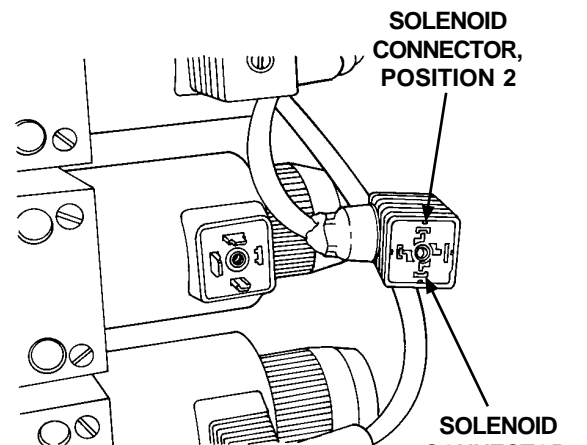
**NOTE**

- A reading of infinity indicates an open circuit.
- Junction box terminal 13 is connected to one side of the solenoid; terminal 14 is connected to the other side.

- (5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between the solenoid connector, position 1, and terminal strip, position 13.
- (6) Repeat Step 5 to check for continuity between position 2 in the connector and terminal strip, position 14.



**HOOK ARM UNLOAD SOLENOID HARNESS**



**SOLENOID CONNECTOR, POSITION 2**

**SOLENOID CONNECTOR, POSITION 1**

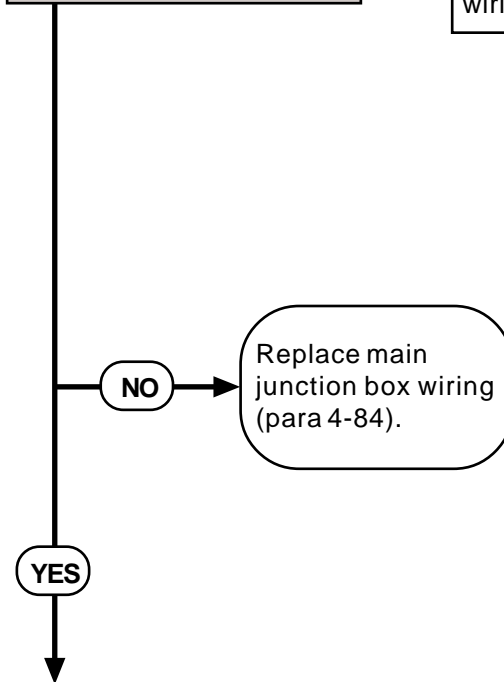
4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Does not operate with remote control or cab controls. Hook arm UNLOAD solenoid harness OK.
<b>POSSIBLE PROBLEMS</b>
Main junction box wiring faulty. Linking harness faulty. Directional control valve faulty.

7.  
Is continuity measured between the main junction box connector (J4) and the junction box terminal strip?

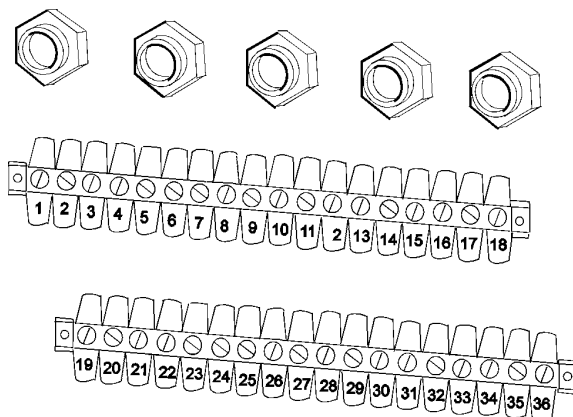
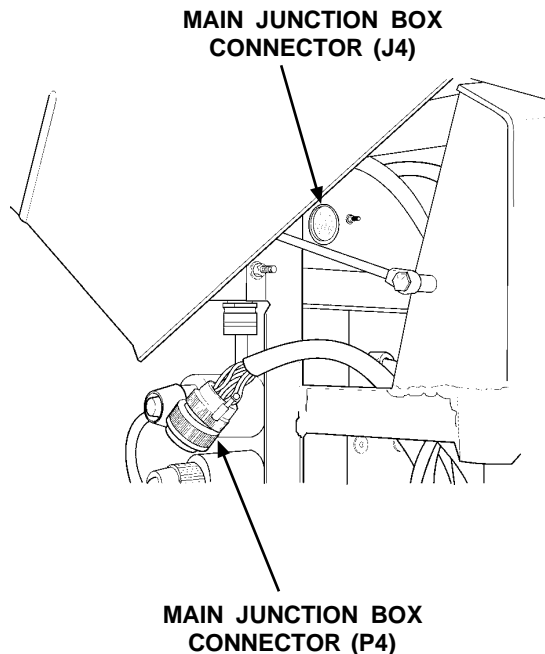
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
To verify the integrity of the main junction box wiring.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

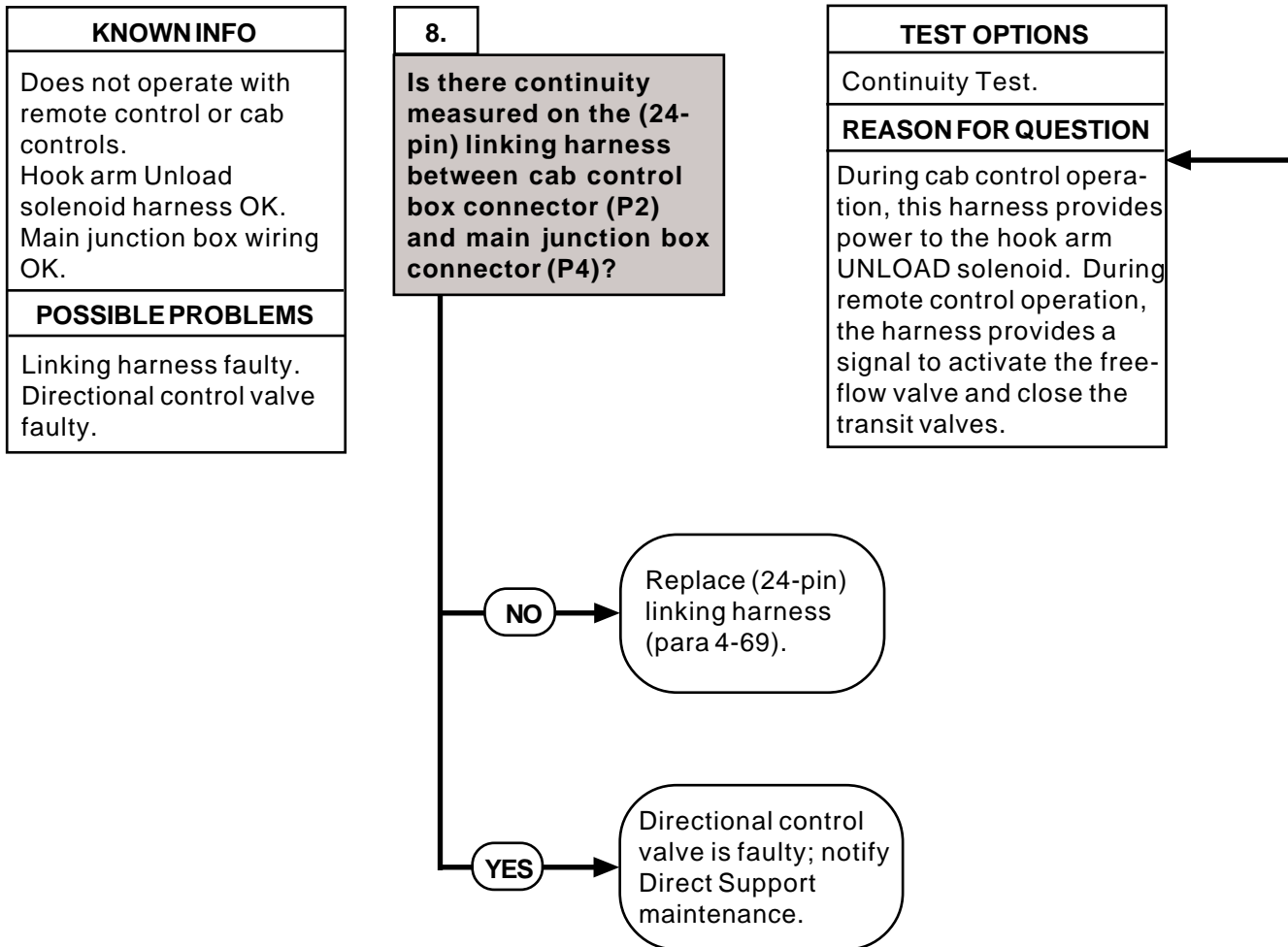
<b>CONTINUITY TEST</b>
<b><u>CAUTION</u></b>
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(1) Remove main junction box connector (P4) from main junction box.                  (2) Set multimeter to ohms position.</p>
<b>NOTE</b>
<p>A reading of infinity indicates an open circuit.</p>
<p>(3) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position G, and terminal strip position 13. Also check between main junction box connector (J4), position Q, and terminal strip, position 14.</p>



WIRING REMOVED FOR CLARITY

4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).**

**CONTINUITY TEST**

- (1) Remove four screws and lockwashers and access cover from heater compartment.
- (2) Remove cab control box connector (P2) from cab control box.

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Remove main junction box connector (J4) from junction box.
- (4) Set multimeter to ohms position.

**NOTE**

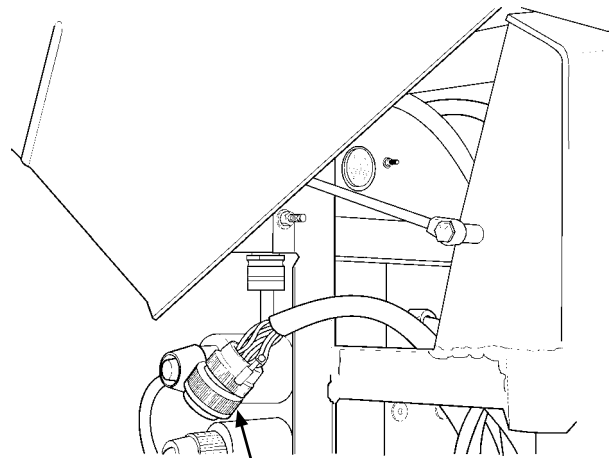
A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check (24-pin) linking harness, position G.

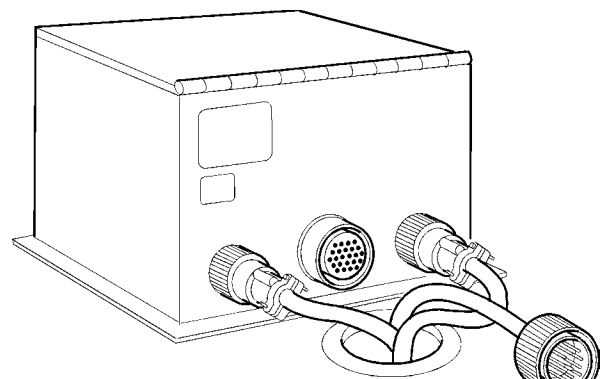
**NOTE**

Any reading besides infinity indicates a grounded wire.

- (6) Remove multimeter lead from one end of wire and connect to chassis ground.



**MAIN JUNCTION BOX CONNECTOR (P4)**



**CAB CONTROL BOX CONNECTOR (P2)**

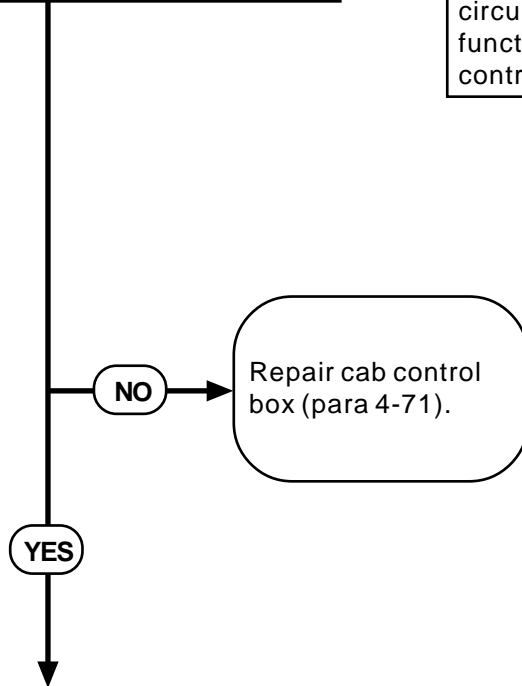
4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Operates only with remote control.
<b>POSSIBLE PROBLEMS</b>
Function switch faulty. LHS MODE SELECT switch faulty. Cab control box faulty.

9.  
Is continuity measured on the cab control box function switch, with the switch in the UNLOAD position?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The source of the power in the hook arm UNLOAD circuit originates with the function switch in the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

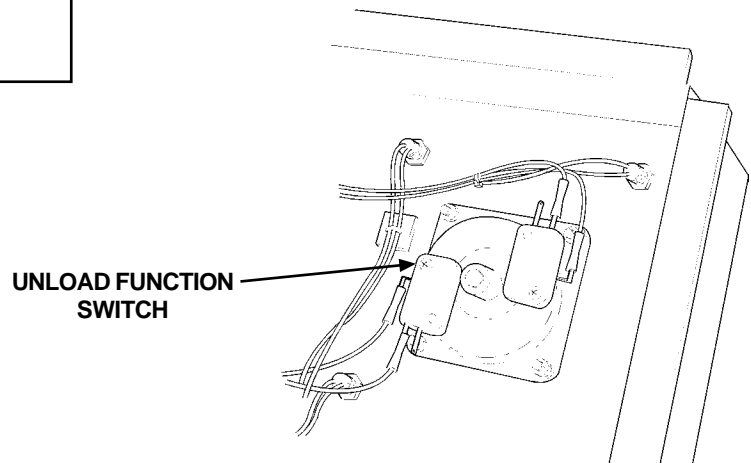
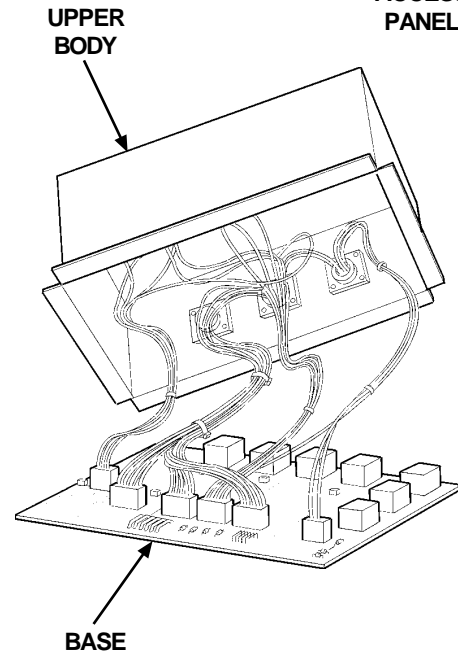
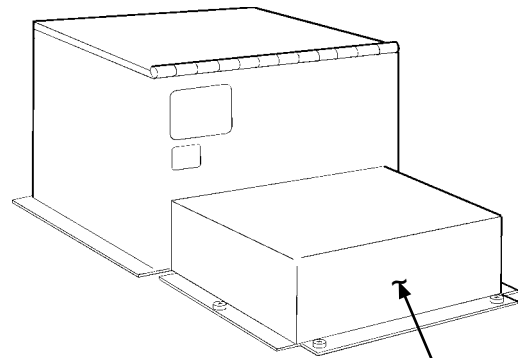
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove four screws and lockwashers and access cover from heater compartment.
- (2) Remove four screws and lockwashers from cab control box.
- (3) Remove six screws from cab control box, and separate upper body from base.
- (4) Set multimeter to ohms position.

**NOTE**

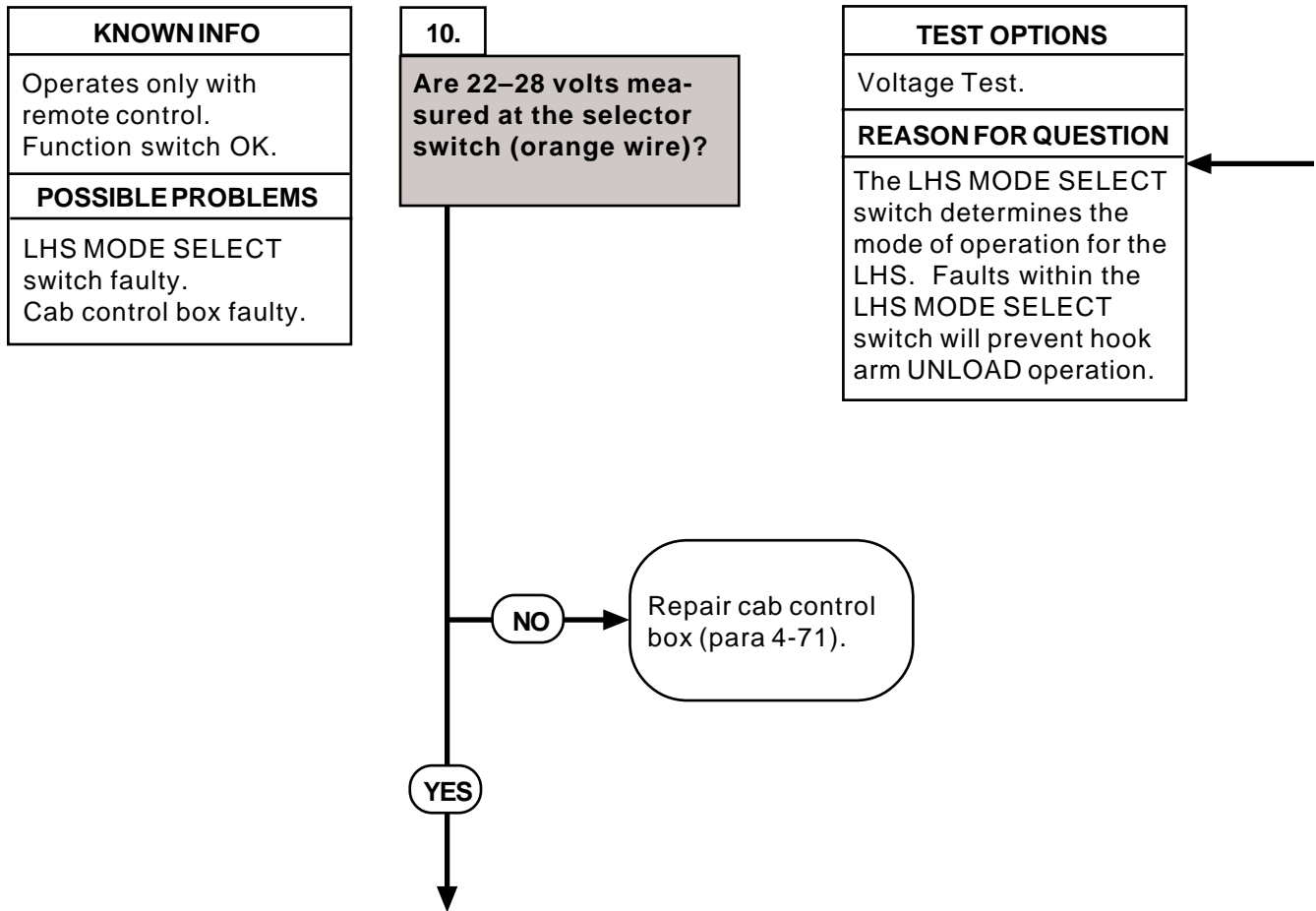
A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to switch terminals. Hold the joystick in the UNLOAD position and check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).





**4-12. UNIT TROUBLESHOOTING (continued).****12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).****VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Rotate LHS MODE SELECT switch to position 2 (hook arm in manual mode).
- (4) Set multimeter to voltage position.

**CAUTION**

**When checking voltage, use caution not to short or ground the terminal being checked. Failure to comply with this caution may result in damage to vehicle or test equipment.**

**NOTE**

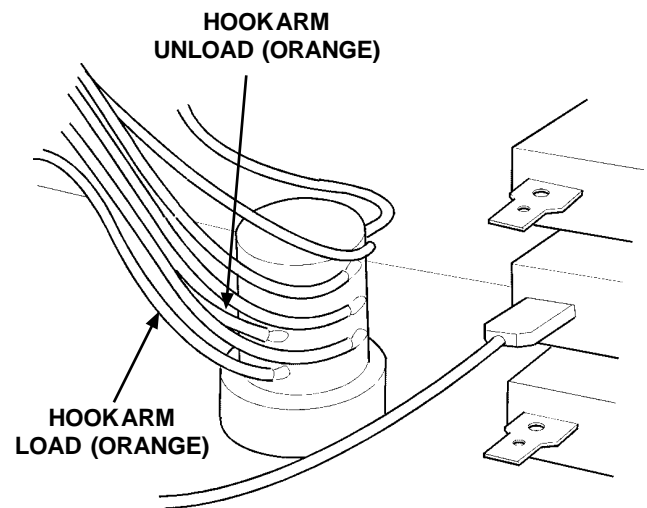
Refer to illustration for correct wire.

- (5) Place positive (+) probe of multimeter on orange (UNLOAD) wire on LHS mode select switch.
- (6) Place negative (-) probe of multimeter on known good ground.

**NOTE**

This test can also be accomplished by observing the status of LEDD15 while performing Step 7.

- (7) Hold joystick in UNLOAD position, and check multimeter for voltage reading.
- (8) Turn engine start switch and light control switch to OFF position.



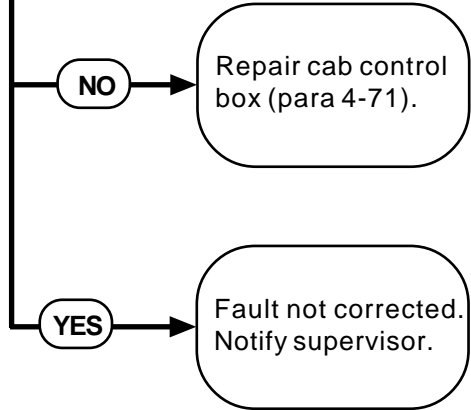
4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Operates only with remote control. Function switch OK. LHS MODE SELECT switch OK.
<b>POSSIBLE PROBLEMS</b>
Cab control box faulty.

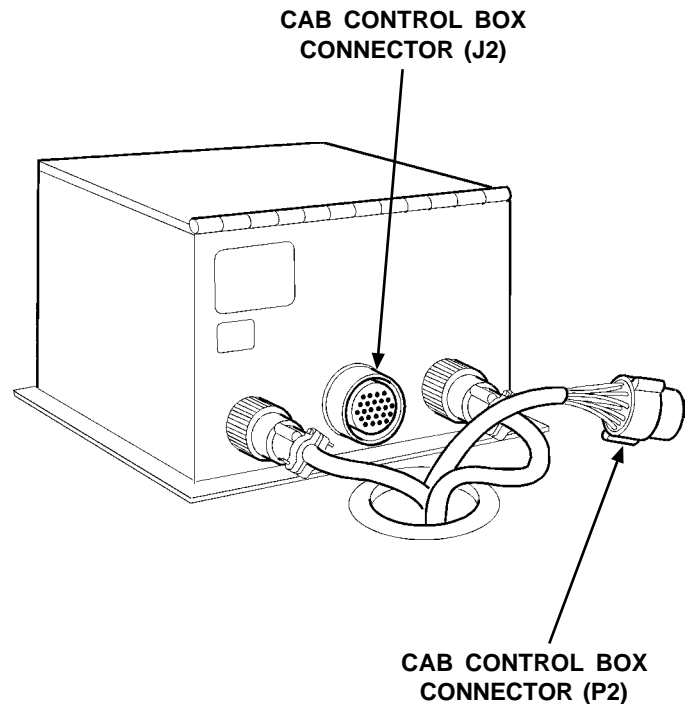
11.  
Are 22–28 volts measured at the cab control box connector (J2), position G?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
If there is no voltage measured on the cab control box connector, there is an open circuit in the cab control box wiring or printed circuit.



**4-12. UNIT TROUBLESHOOTING (continued).****12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).****VOLTAGE TEST**

- (1) Remove cab control box connector (P2) from cab control box.
- (2) Turn engine start switch to ON position.
- (3) Turn light control switch to STOP LIGHT position.
- (4) Set multimeter to voltage position.
- (5) Place positive (+) probe of multimeter on cab control box connector (J2), position G.
- (6) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
- (7) Turn engine start switch and light control switch to OFF position.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY).

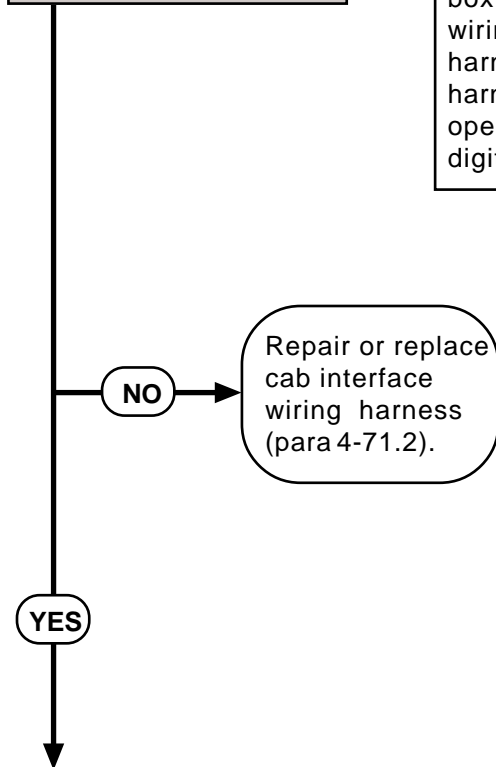
NOTE

The LHS digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 04. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Unload valve solenoid faulty. Digital control box faulty.

12.  
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the hook arm solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

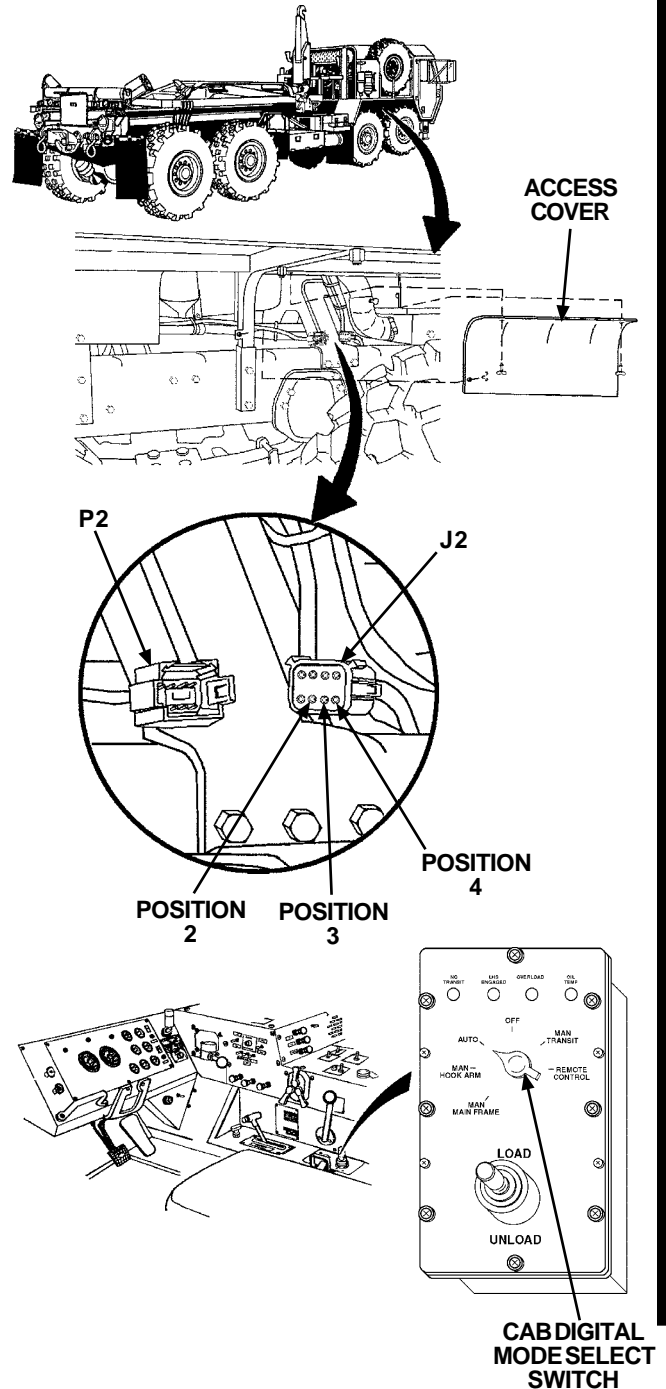
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

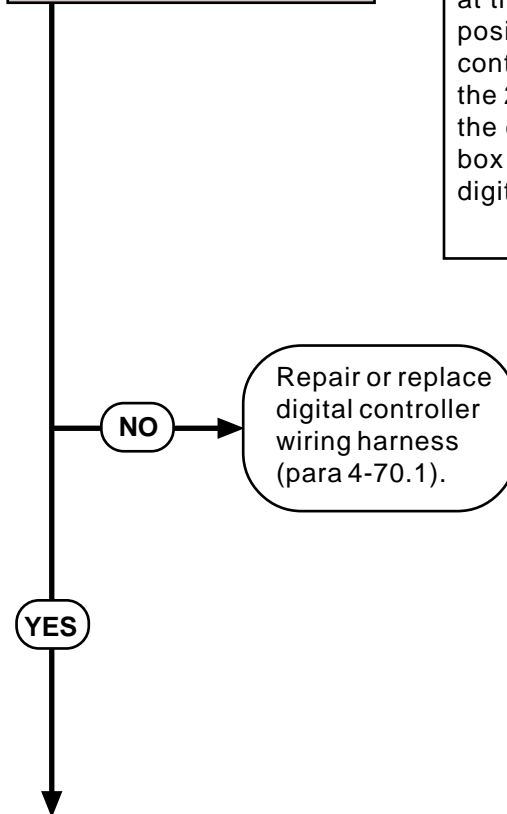
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 04. Remote control unit OK. Remote control cable OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Unload valve solenoid faulty. Digital control box faulty.

13. **Is there continuity measured at the Digital controller wiring harness (J3), (J4) and (P2)?**

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the digital controller wiring harness, the 24 volt power from the cab digital control box does not reach the digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

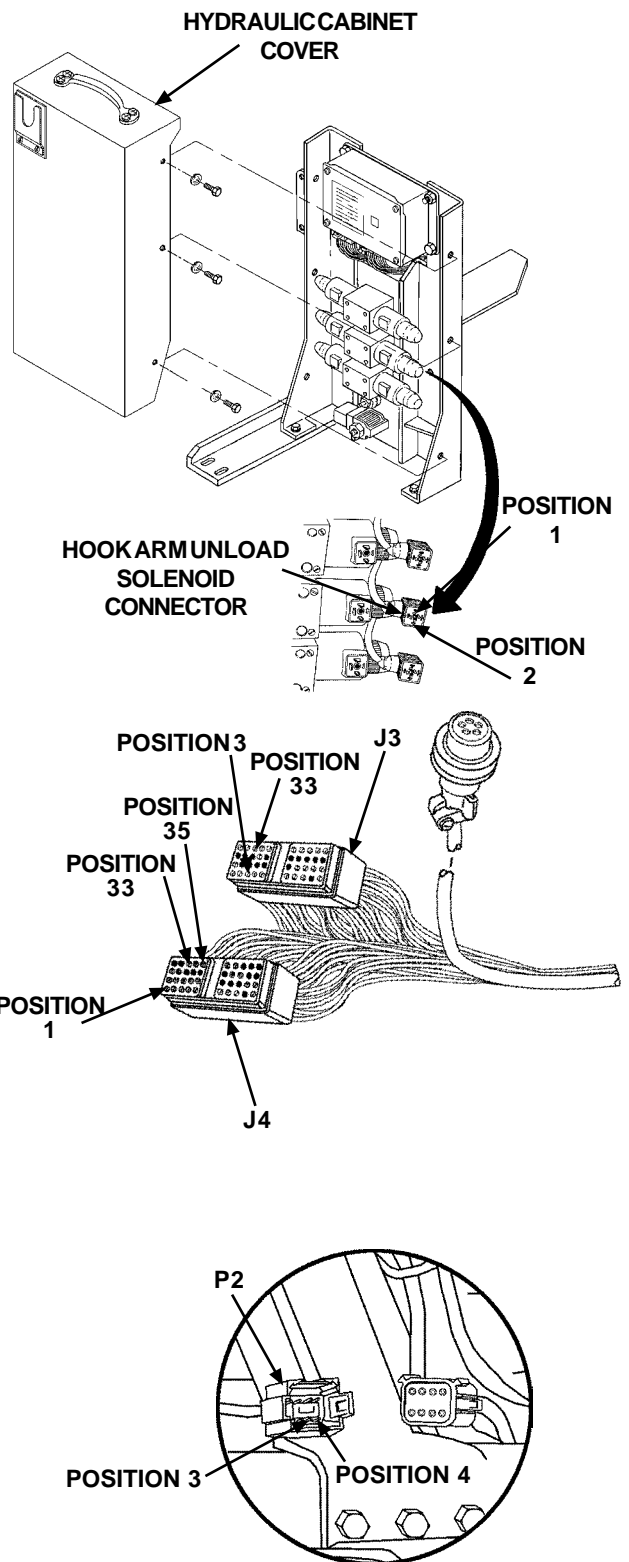
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove five screws and flatwashers from hydraulic cabinet cover and remove cover.
- (2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.
- (3) Remove unload solenoid connector from unload solenoid valve.
- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.
- (6) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.
- (7) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.
- (8) Connect multimeter between (J3), position "3", and hook arm unload solenoid connector, position "1". Check multimeter for continuity.
- (9) Connect multimeter between (J3), position "33", and hook arm unload solenoid connector, position "2". Check multimeter for continuity.

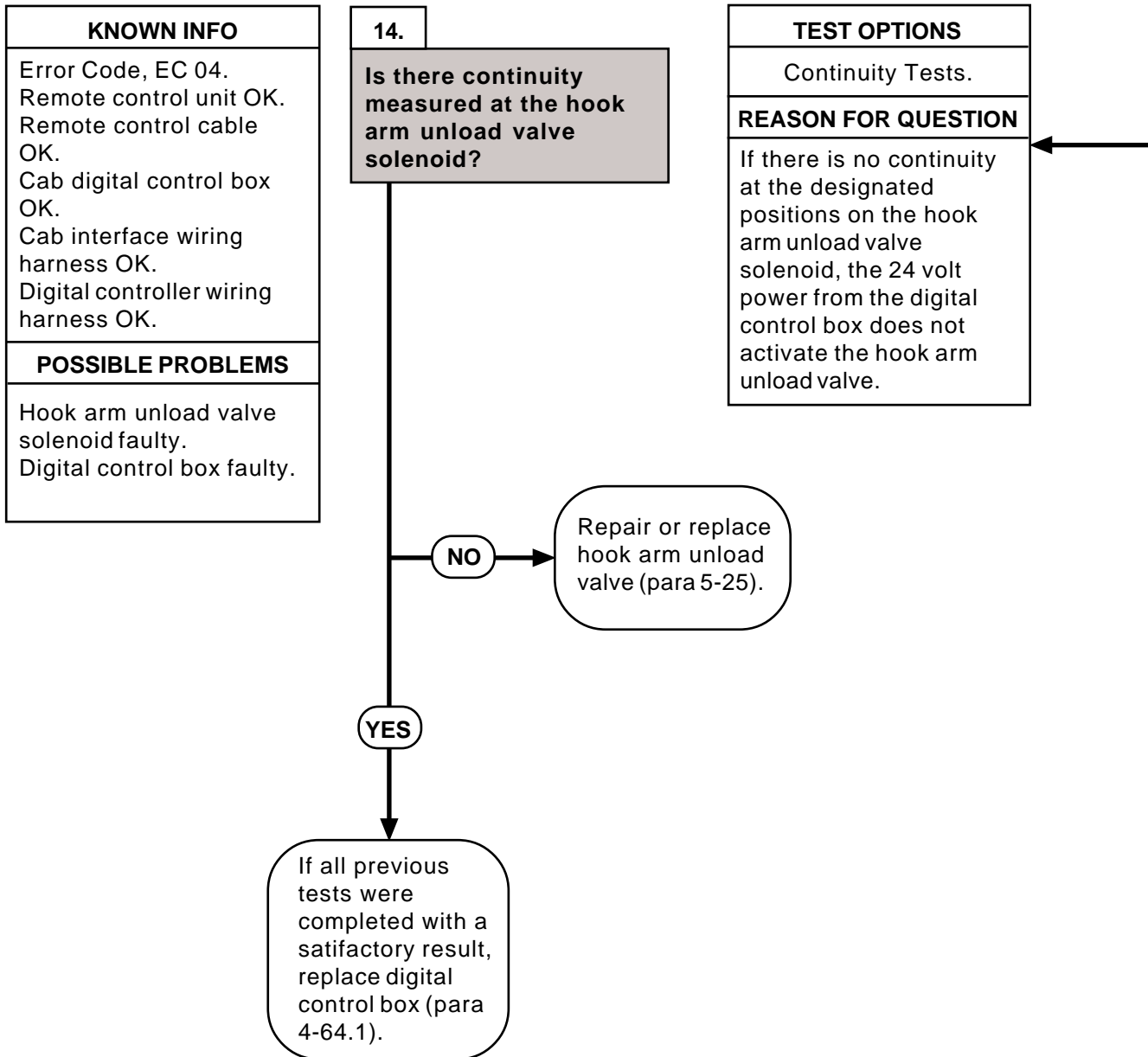


4-12. UNIT TROUBLESHOOTING (continued).

12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

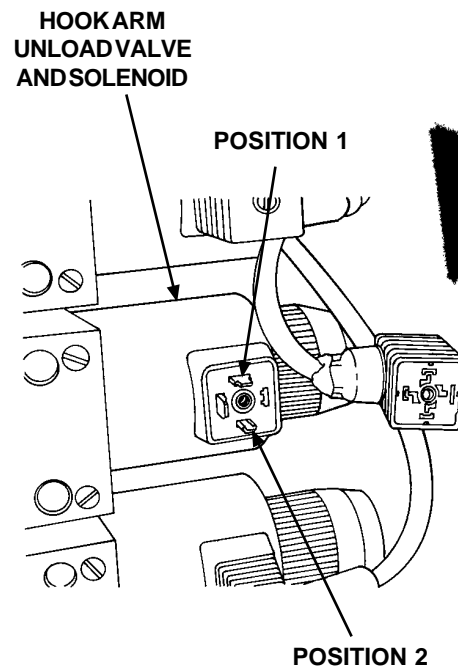
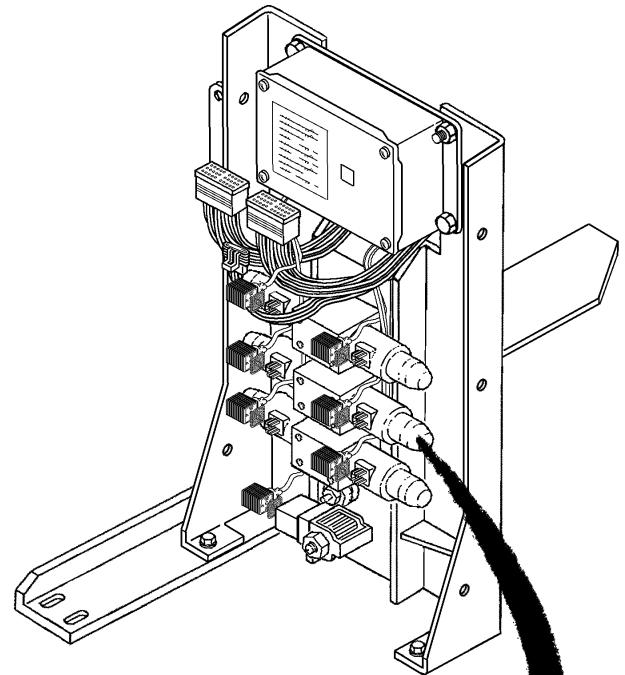




4-12. UNIT TROUBLESHOOTING (continued).

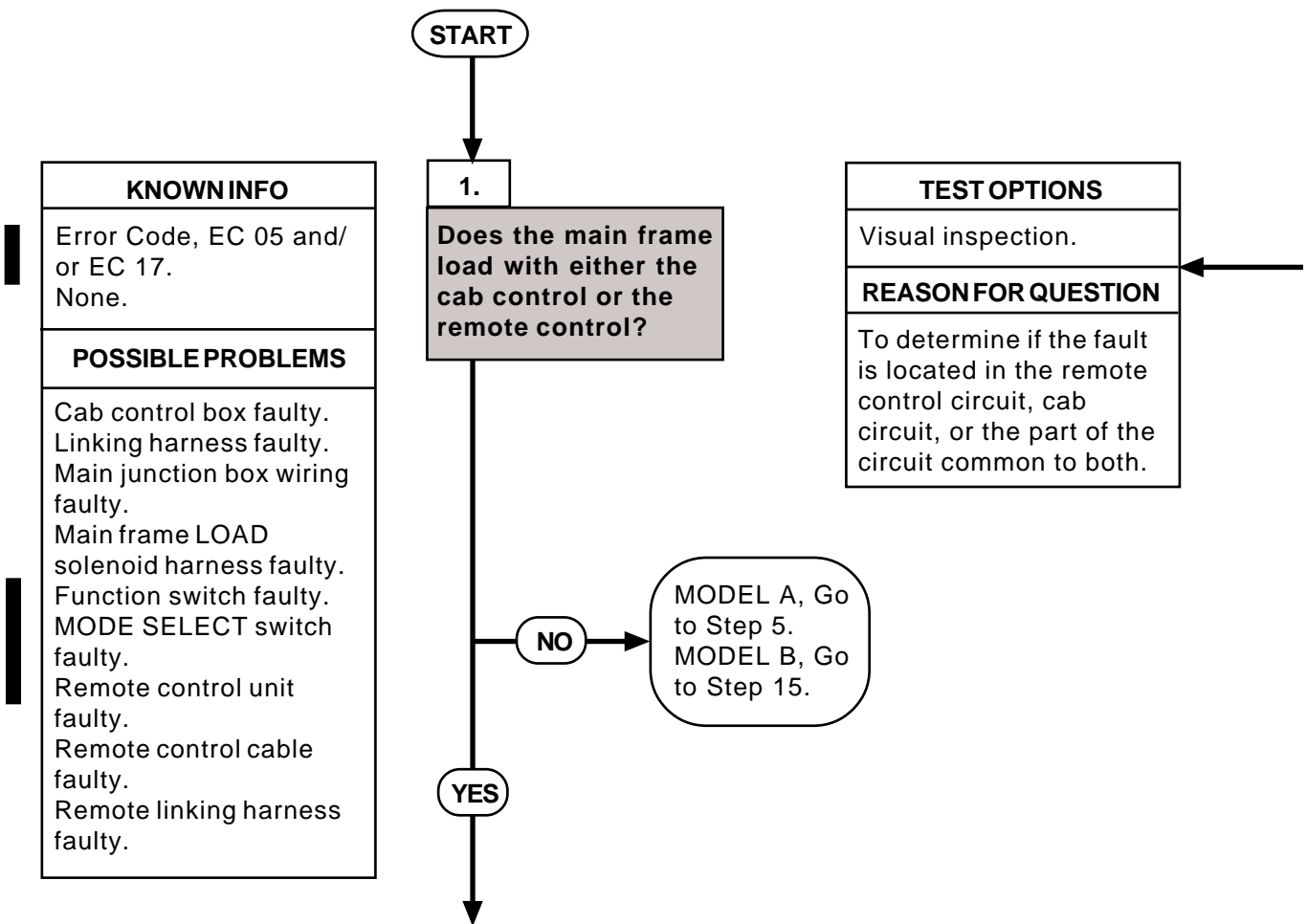
12. HOOK ARM DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p> <p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p> <p>(1) Set multimeter to ohms position.                  (2) Connect multimeter between position "1" and position "2" on hook arm unload valve solenoid. Check multimeter for continuity.</p>
--



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE.	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Multimeter (ANURM105C)	Engine turned off (TM 9-2320-279-10)
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Parking brake applied (TM 9-2320-279-10)
	Wheels chocked (TM 9-2320-279-10)
<i>Personnel Required</i>	
Two	



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).

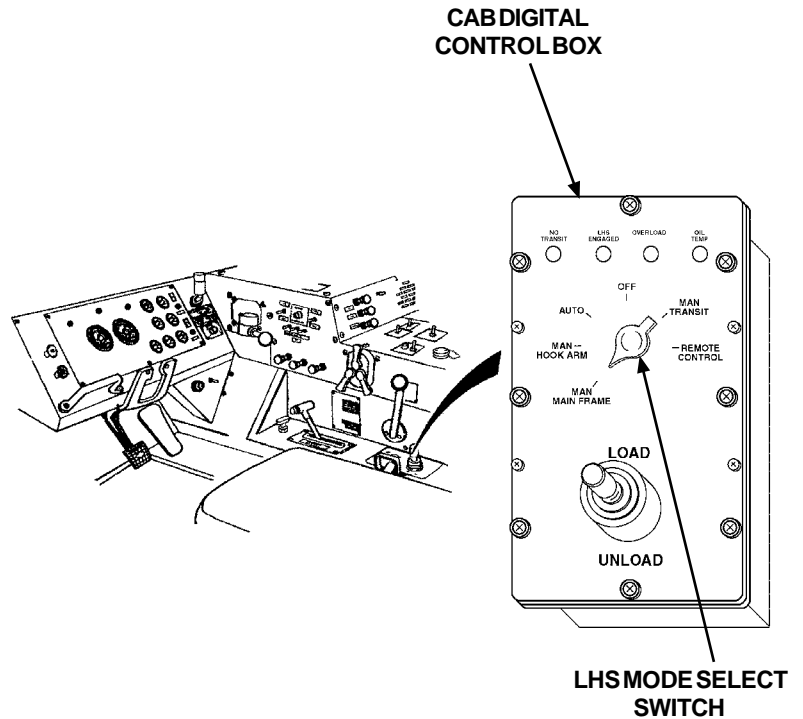
**VISUAL INSPECTION**

- (1) Turn MODE SELECT switch to position 3 (main frame in manual mode).

**NOTE**

Refer to Chapter 2 for specific LHS operating instructions.

- (2) Attempt to actuate LHS using both the cab controls and the remote control. Note the results of the test.

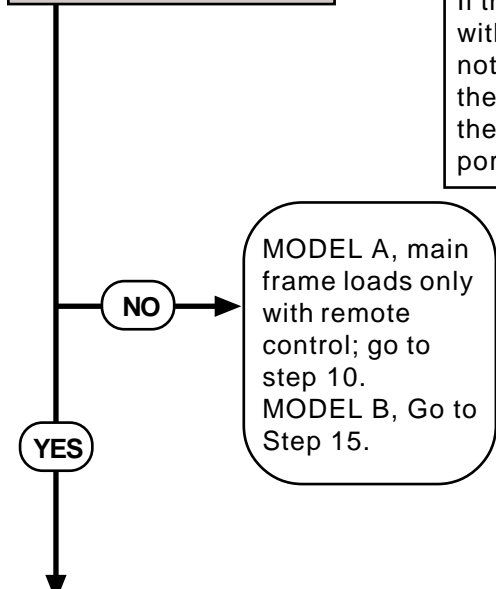


4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).

KNOWN INFO
Error Code, EC 03 and/or EC 17. Operates with either cab controls or remote control.
POSSIBLE PROBLEMS
Cab control box faulty. Linking harness faulty. Main junction box wiring faulty. Main frame LOAD solenoid harness faulty. Function switch faulty. MODE SELECT switch faulty. Remote control unit faulty. Remote control cable faulty. Remote linking harness faulty.

2.  
Does the main frame load with only the cab controls (remote inoperative)?



TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
If the main frame loads with the cab controls but not the remote control, the problem is located in the remote control portion of the circuit.



**4-12. UNIT TROUBLESHOOTING (continued).**

**13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

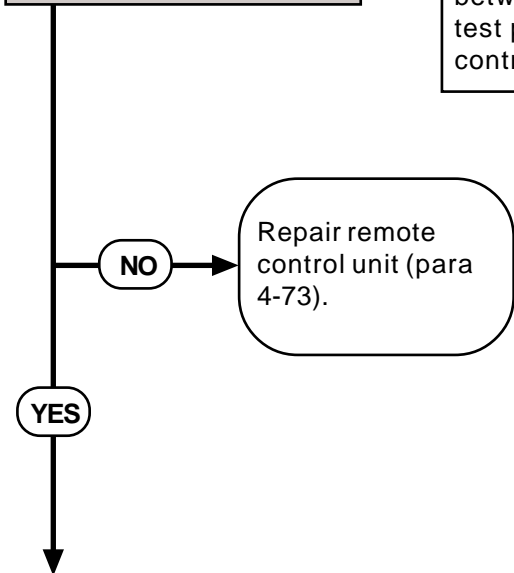
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).

KNOWN INFO
Error Code, EC 05 and/or EC 17. Cab controls OK.
POSSIBLE PROBLEMS
Remote control unit faulty. Remote control cable faulty. Remote linking harness faulty.

3.  
Is continuity measured on the remote control connector (J9), between positions L and E and between L and A, with the hook arm switch in the load position?

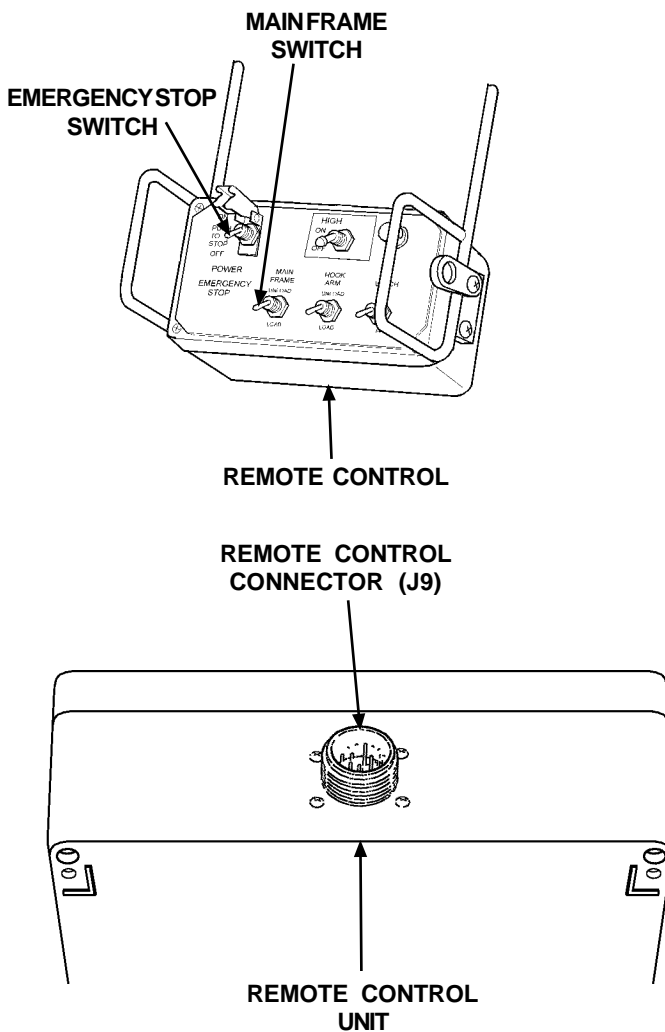
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
To verify the function of the remote control unit. If there is an open circuit between either of the two test points, the remote control unit is faulty.



**4-12. UNIT TROUBLESHOOTING (continued).**

**13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).**

<b>CONTINUITY TEST</b>
<p>(1) Disconnect remote control cable from remote control unit.</p> <p>(2) Set multimeter to ohms position.</p> <p>(3) Position EMERGENCY STOP switch in the ON position.</p> <p>(4) Have assistant hold the HOOK ARM switch in the LOAD position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(5) Connect multimeter leads to remote control connector (J9), positions "E" and "L" on remote control unit, and check multimeter for continuity.</p> <p>(6) Repeat step 3, but this time check for continuity between positions "L" and "K".</p>



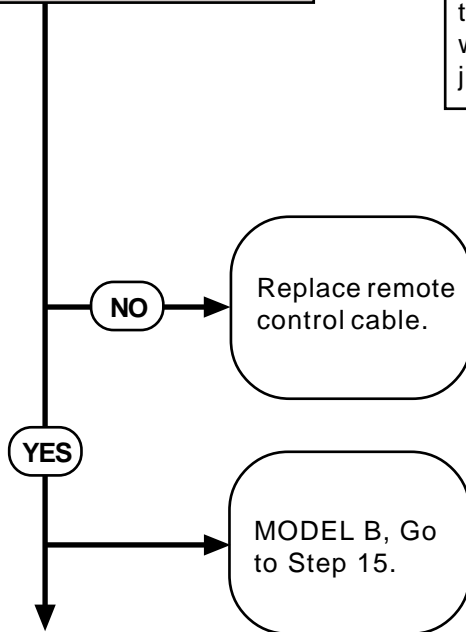
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).

KNOWN INFO
Error Code, EC 05 and/or EC 17. Cab controls OK. Remote control unit OK.
POSSIBLE PROBLEMS
Remote control cable faulty. Remote linking harness faulty.

4.  
Is there continuity measured between the remote control cable, between connectors P8 and P9?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is an open circuit in the remote control cable, the signal from the remote control unit will not reach the junction box.





4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (continued).

**CONTINUITY TEST**

**CAUTION**

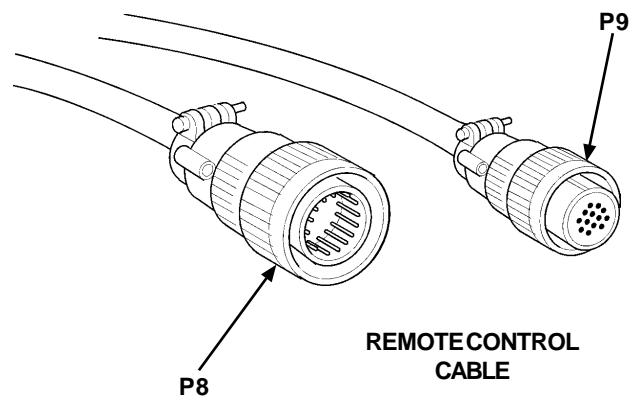
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between position G on chassis end and position J on remote control end. Also check for continuity between position J on chassis end and position E on remote end.



**REMOTE CONTROL CABLE**

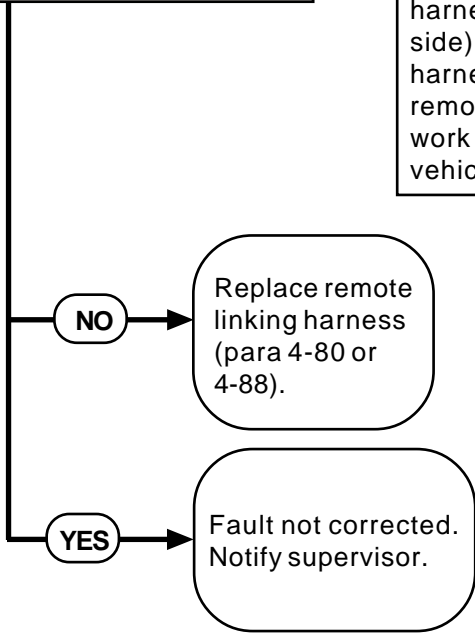
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Cab controls OK. Remote control unit works only on one side of vehicle.
<b>POSSIBLE PROBLEMS</b>
Remote linking harness faulty.

5. Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?

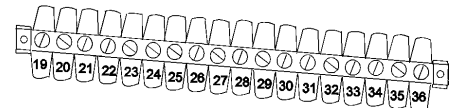
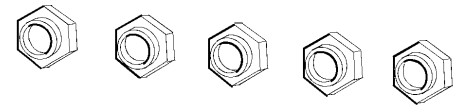
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Signal power is transferred from the remote control cable to the main junction box via the remote linking harnesses (one for each side). If this linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.



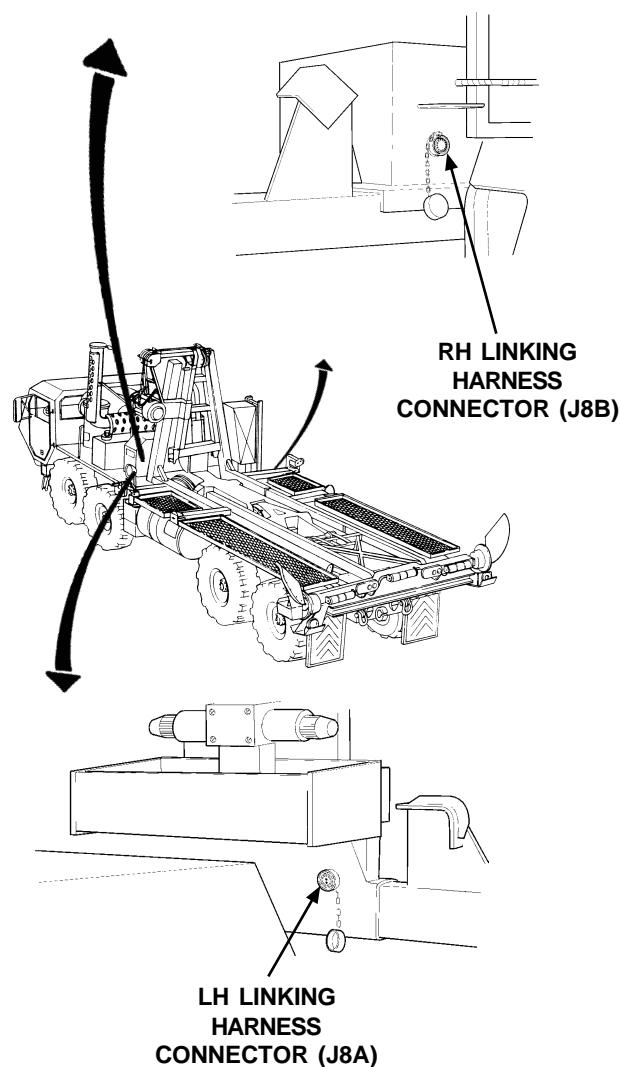
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST
<p>(1) Open hydraulic cabinet cover.</p> <p>(2) Loosen four screws on main junction box cover and open cover.</p> <p>(3) If necessary, remove remote control cable from linking harness connector.</p>
<p><b>CAUTION</b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(4) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between terminal C on connector and position 7 in junction box. Next, check between terminal J on connector and position 23 in junction box. Finally, check between terminal I on connector and position 31 in junction box.</p>
<p><b>NOTE</b></p> <p>Any reading besides infinity indicates a grounded wire.</p>
<p>(6) Check for grounded wiring by connecting one multimeter lead to each terminal and the other lead to chassis ground.</p>



WIRING REMOVED FOR CLARITY



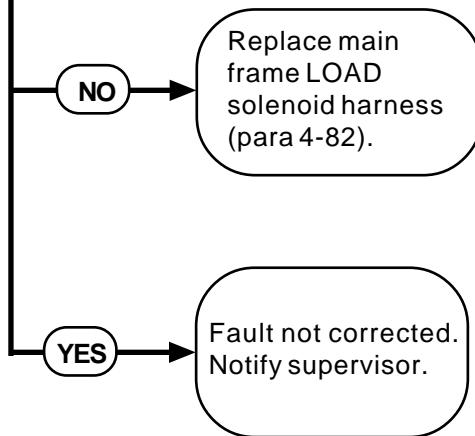
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls and remote control inoperative. Cab control box OK. Linking harness OK. Main junction box wiring OK.
POSSIBLE PROBLEMS
Main frame LOAD solenoid harness faulty.

6.  
Is continuity measured on the main frame LOAD solenoid harness?

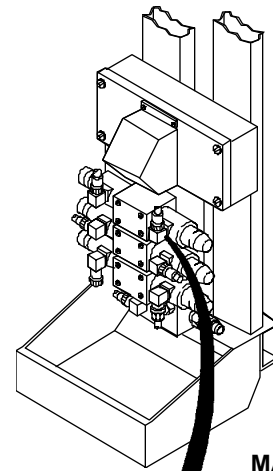
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power to activate the main frame LOAD solenoid is transferred from the main junction box to the solenoid via this harness. Faults in this harness will prevent operation from both the cab and remote controls.



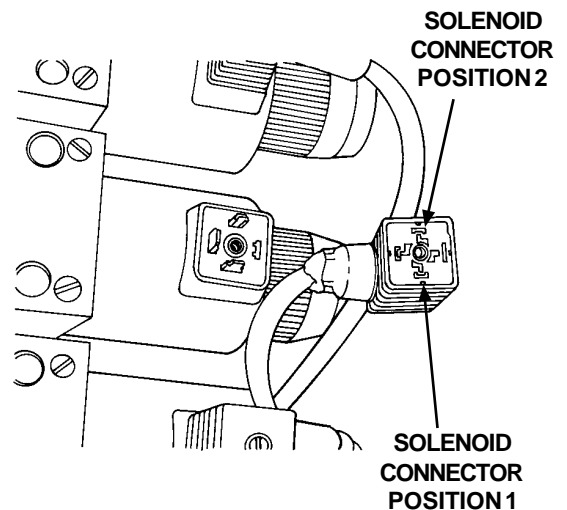
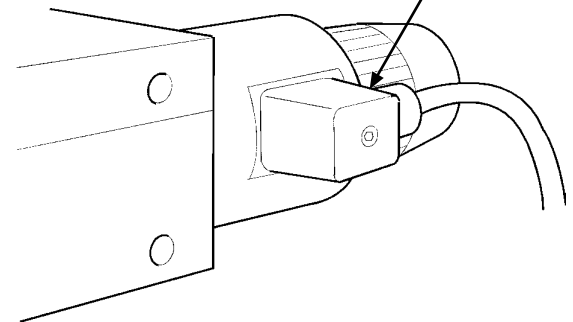
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove connector from the hook arm load solenoid.</li> <li>(2) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• Junction box terminal 15 is connected to one side of the solenoid; terminal 16 is connected to the other side.</li> </ul>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between the solenoid connector, position 1, and terminal strip, position 15.</li> <li>(6) Repeat Step 5 to check for continuity between position 2 in the connector and terminal strip, position 16.</li> </ol>	



MAIN FRAME  
LOAD SOLENOID  
HARNESS



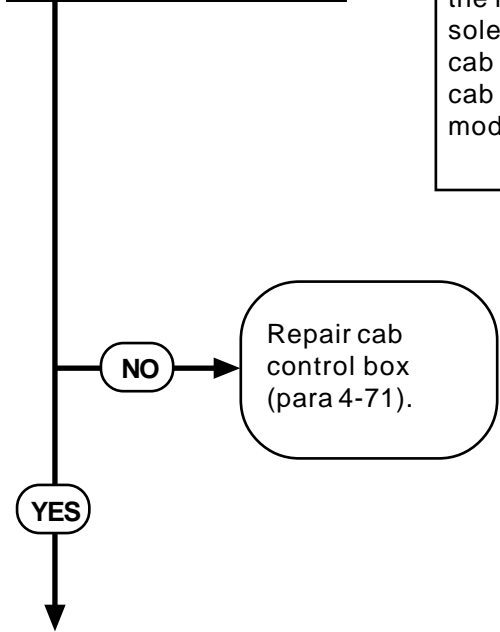
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Cab controls and remote control inoperative.
<b>POSSIBLE PROBLEMS</b>
Cab control box faulty. Linking harness faulty. Main junction box wiring faulty. Main frame LOAD solenoid harness faulty.

7.  
Are 22–28 volts measured at the cab control box connector (J2), position H?

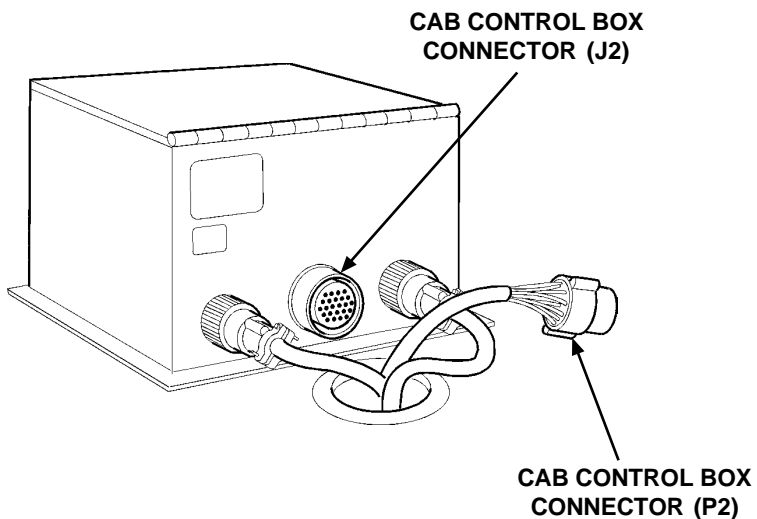
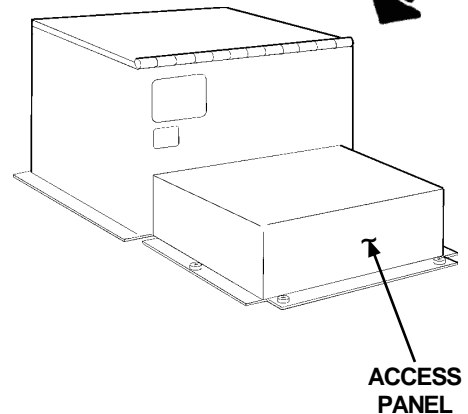
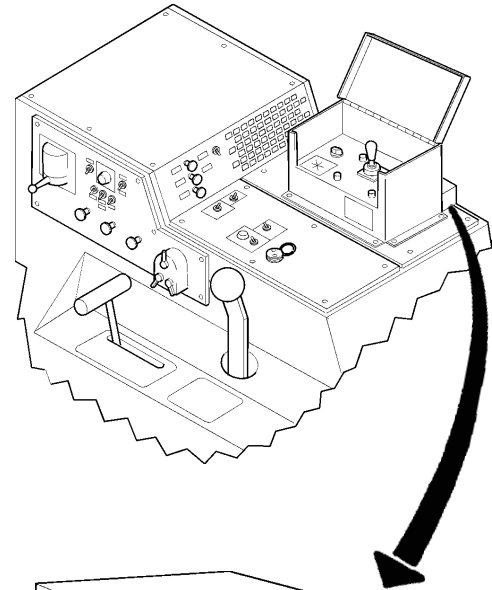
<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
Output voltage to activate the main frame LOAD solenoid comes from the cab control box during both cab and remote control modes of operation.



**4-12. UNIT TROUBLESHOOTING (continued).**

**13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).**

<b>VOLTAGE TEST</b>	
	(1) Remove four screws and lockwashers and access cover from heater compartment.
	(2) Remove cab control box connector (P2) from cab control box.
	(3) Turn engine start switch to ON position.
	(4) Turn light control switch to STOP LIGHT position.
	(5) Set multimeter to voltage position.
	(6) Place positive (+) probe of multimeter on cab control box connector (J2), position H.
	(7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
	(8) Turn engine start switch and light control switch to OFF position.



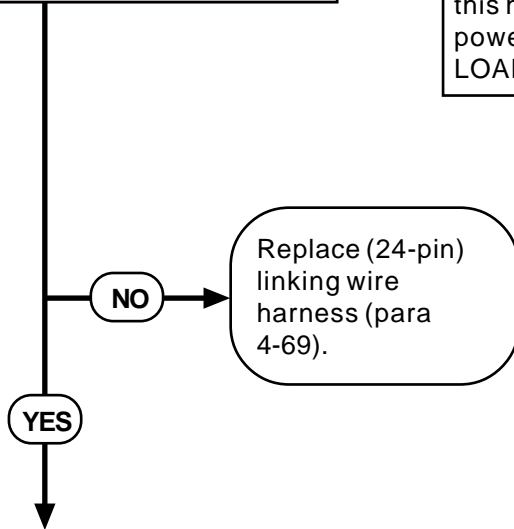
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Cab controls and remote control inoperative. Cab control box OK.
<b>POSSIBLE PROBLEMS</b>
Linking harness faulty. Main junction box wiring faulty. Main frame LOAD solenoid harness faulty.

8.  
Is continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
During both cab and remote control operation, this harness provides power to the main frame LOAD solenoid.

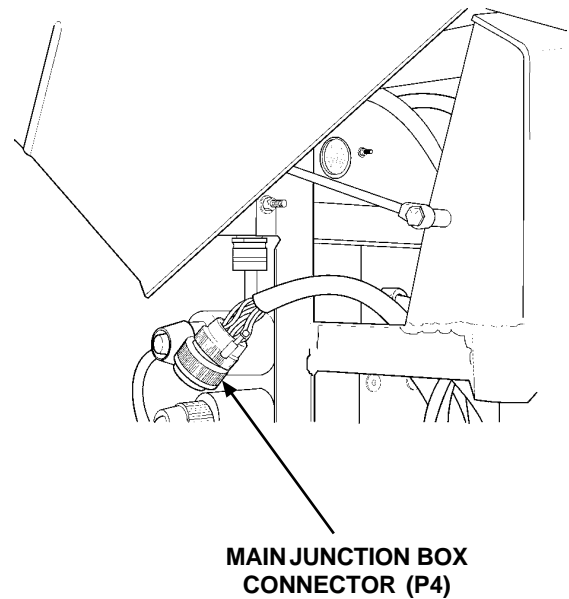
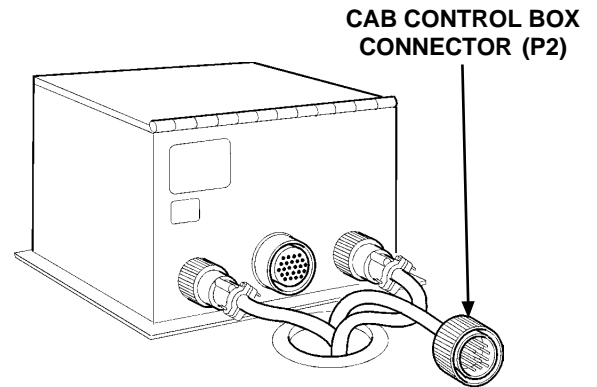




**4-12. UNIT TROUBLESHOOTING (continued).**

**13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).**

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Disconnect main junction box connector (P4) from junction box.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter to leads at each end of wire, and check multimeter for continuity. Check (24-pin) linking harness, position H.</p>	
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
<p>(4) Remove multimeter lead from one end of wire and connect to chassis ground.</p>	



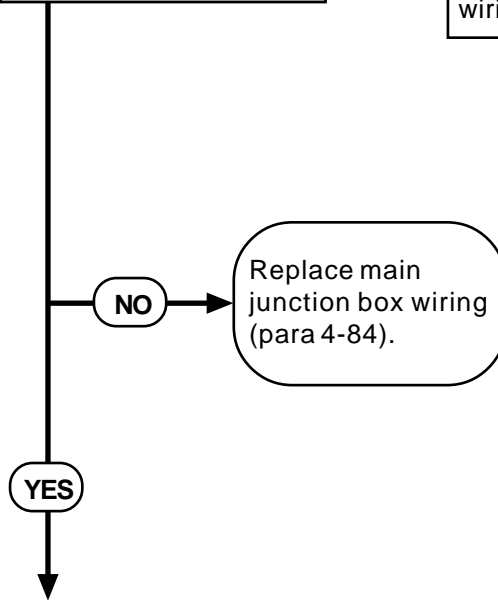
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls and remote control inoperative. Cab control box OK. Linking harness OK.
POSSIBLE PROBLEMS
Main junction box wiring faulty. Main frame LOAD solenoid harness faulty.

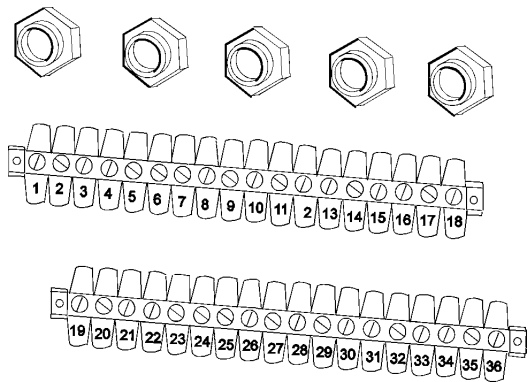
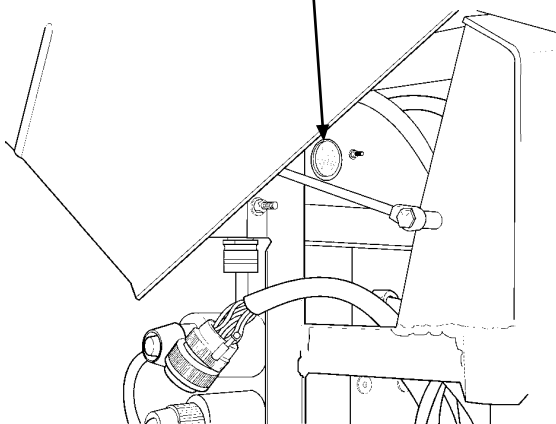
9.  
Is there continuity between the main junction box connector (J4) and the junction box terminal strip?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
To verify the integrity of the main junction box wiring.



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<p>(1) Open hydraulic cabinet cover.</p> <p>(2) Loosen four screws on main junction box cover and open cover.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p> <p>(3) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">A reading of infinity indicates an open circuit.</p> <p>(4) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position H, and terminal strip, position 15. Also check between main junction box connector (J4), position Q, and terminal strip, position 16.</p>	 <p style="text-align: center;"><b>WIRING REMOVED FOR CLARITY</b></p> <p style="text-align: center;"><b>MAIN JUNCTION BOX CONNECTOR (J4)</b></p> 

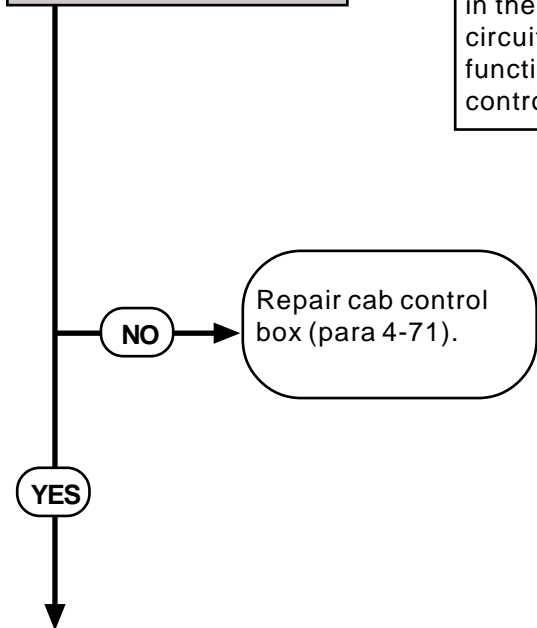
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Remote controls OK.
<b>POSSIBLE PROBLEMS</b>
Function switch faulty. MODE SELECT switch faulty.

10.  
Is continuity measured on the cab control box function switch, with the switch in the LOAD position?

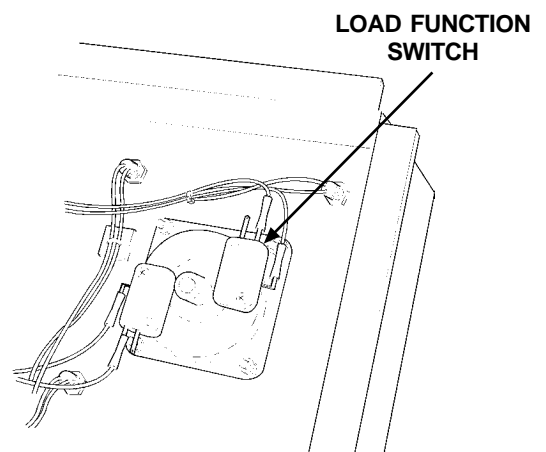
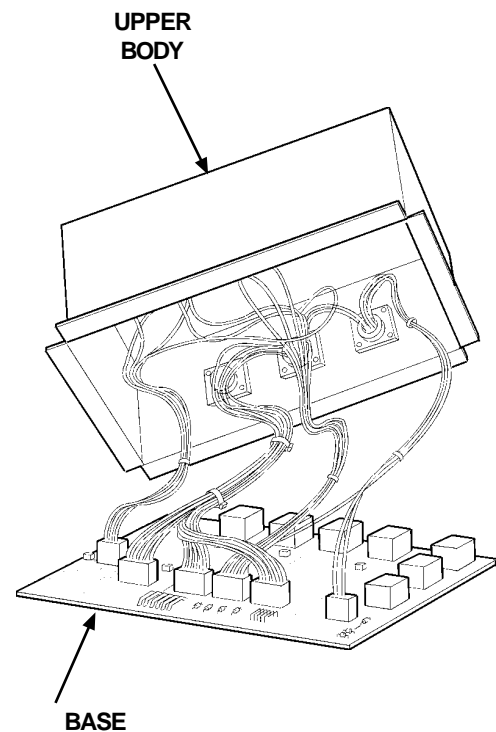
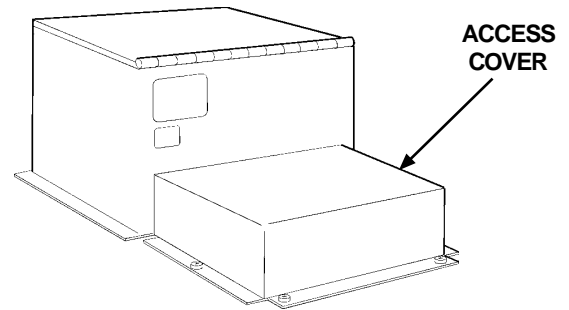
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The source of the power in the main frame LOAD circuit originates with the function switch in the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove four screws and lockwashers and access cover from heater compartment.</li> <li>(2) Remove four screws and lockwashers from cab control box.</li> <li>(3) Remove six screws from cab control box, and separate upper body from base.</li> <li>(4) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to switch terminals. Hold the joystick in the LOAD position, and check multimeter for continuity.</li> </ol>	



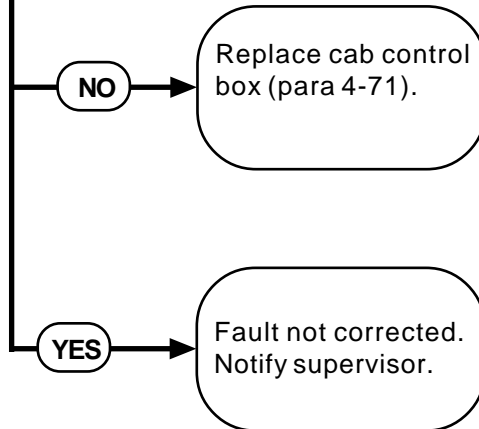
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Remote controls OK. Function switch OK.
<b>POSSIBLE PROBLEMS</b>
MODE SELECT switch faulty.

11.  
Are 22–28 volts measured at the LHS MODE SELECT switch (yellow wire)?

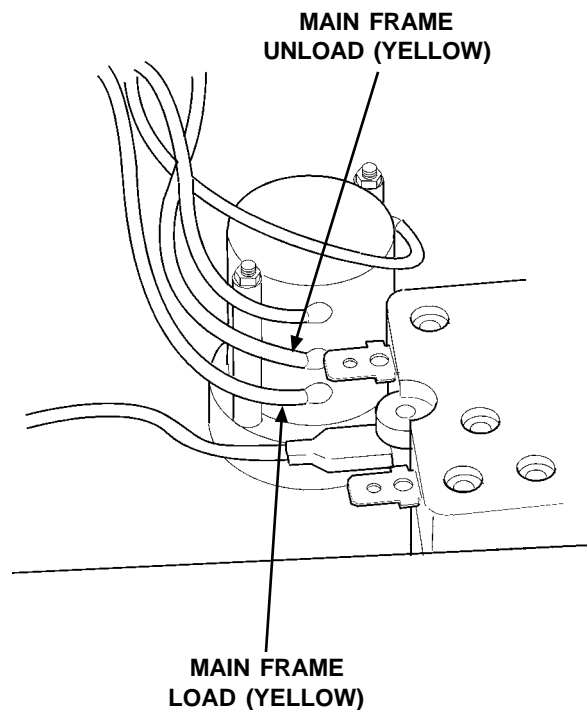
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The MODE SELECT switch determines the mode of operation for the LHS. An open circuit within the MODE SELECT switch will prevent main frame load operation.



**4-12. UNIT TROUBLESHOOTING (continued).**

**13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).**

<b>VOLTAGE TEST</b>
<p>(1) Turn engine start switch to ON position.</p> <p>(2) Turn light control switch to STOP LIGHT position.</p> <p>(3) Rotate MODE SELECT switch to position 3 (main frame in manual mode).</p> <p>(4) Set multimeter to voltage position.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p><b>When checking voltage, use caution not to short or ground the terminal being checked. Failure to comply with this caution may result in damage to vehicle or test equipment.</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p>Refer to illustration for correct wire.</p> <p>(5) Place positive (+) probe of multimeter on yellow (LOAD) wire on MODE SELECT switch.</p> <p>(6) Place negative (-) probe of multimeter on known good ground.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>This test can also be accomplished by observing the status of LEDD31 while performing Step 7.</p> <p>(7) Hold joystick in LOAD position and check multimeter for voltage reading.</p> <p>(8) Turn engine start switch and light control switch to OFF position.</p>



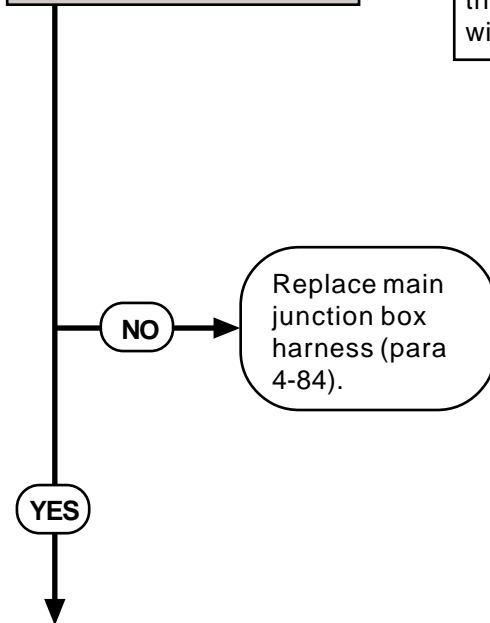
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Remote control does not work at either side. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Main junction box wiring faulty. Linking harness faulty. Cab control box faulty.

12. Is there continuity between the main junction box connector (J4) and the junction box terminal strip?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
To verify the integrity of the main junction box wiring.





4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.

**CAUTION**

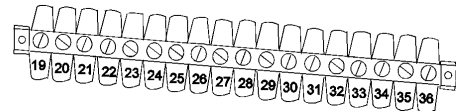
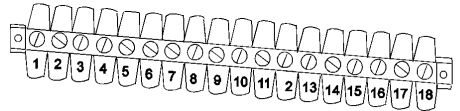
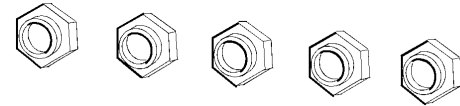
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (3) Remove main junction box connector (P4) from main junction box.
- (4) Set multimeter to ohms position.

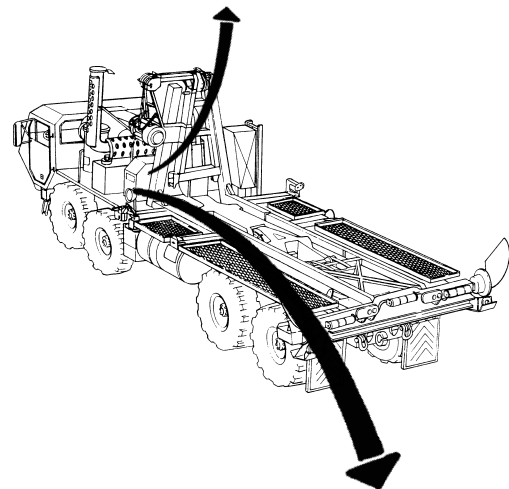
**NOTE**

A reading of infinity indicates an open circuit.

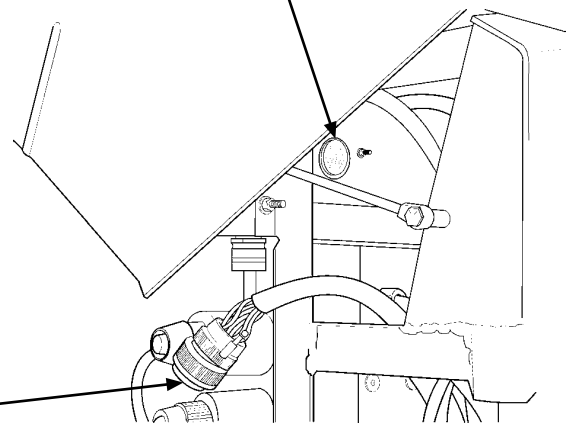
- (5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position H, and terminal strip, position 15. Also check between main junction box connector (J4), position Q, and terminal strip, position 16.



WIRING REMOVED FOR CLARITY



MAIN JUNCTION BOX CONNECTOR (J4)



MAIN JUNCTION BOX CONNECTOR (P4)

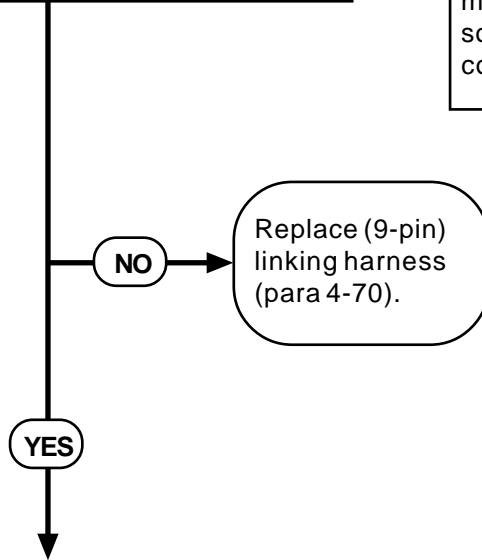
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Remote control does not work at either side. Remote control unit OK. Remote control cable OK. Main junction box wiring OK.
POSSIBLE PROBLEMS
Linking harness faulty. Cab control box faulty.

13.  
Is continuity measured on the (9-pin) linking harness between the 9-pin linking harness connector (P5) and the 9-pin linking harness box connector (P3)?

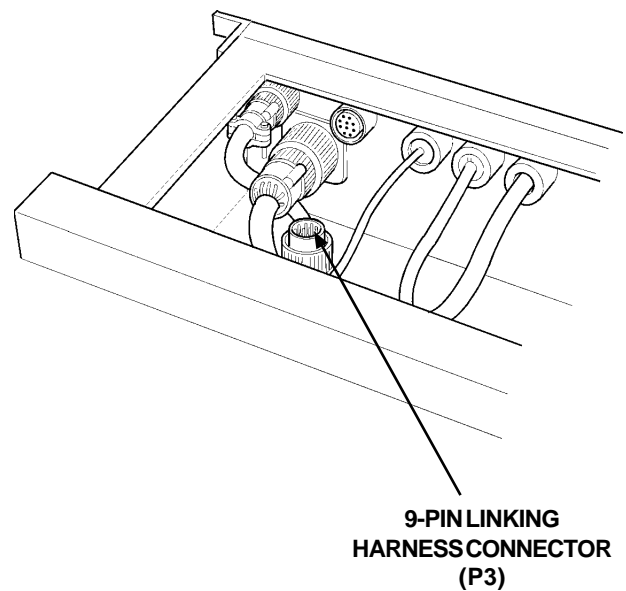
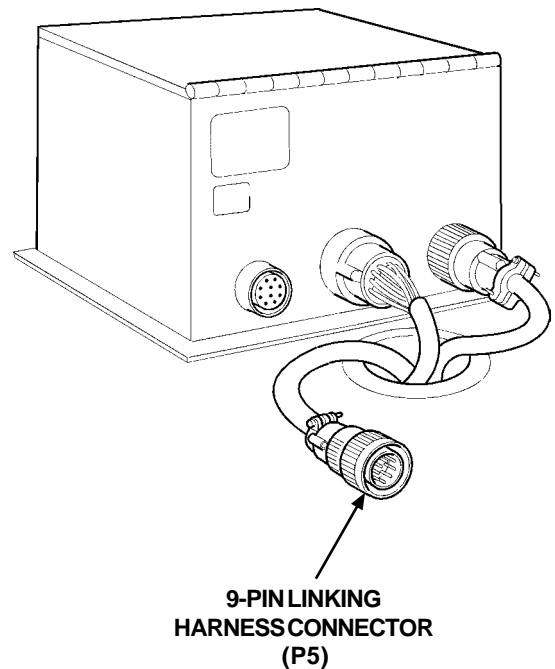
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
During remote control operation, this harness provides power to the main frame LOAD solenoid via the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<p><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p>	
<p>(1) Remove four screws and lockwashers and access cover from heater compartment.</p> <p>(2) Remove hydraulic cabinet cover (para 4-60).</p> <p>(3) Disconnect (9-pin) linking harness connectors.</p> <p>(4) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check (9-pin) linking harness, position F.</p>	
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
<p>(6) Remove multimeter lead from one end of wire and connect to chassis ground.</p>	



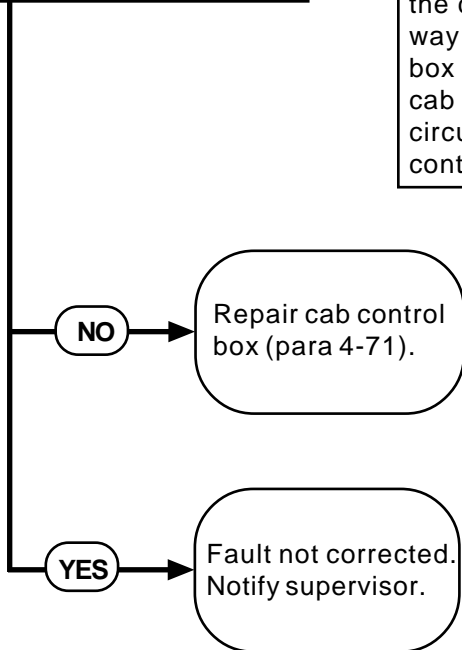
4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Remote control does not work at either side. Remote control unit OK. Remote control cable OK. Main junction box wiring OK. Linking harness OK.
POSSIBLE PROBLEMS
Cab control box faulty.

14.  
Is there continuity at the cab control box between the (9-pin) linking harness connector (J5), position F, and the cab control box connector (J2), position H?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
In the remote control mode, the power to activate the main frame LOAD solenoid passes through the cab control box on the way to the main junction box and solenoid. If the cab control box internal circuit is open, the remote control will not function.



## 4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL A ONLY)  
(continued).**CONTINUITY TEST****CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect cab control box connector (P2) from cab control box.
- (2) Set multimeter to ohms position.

**NOTE**

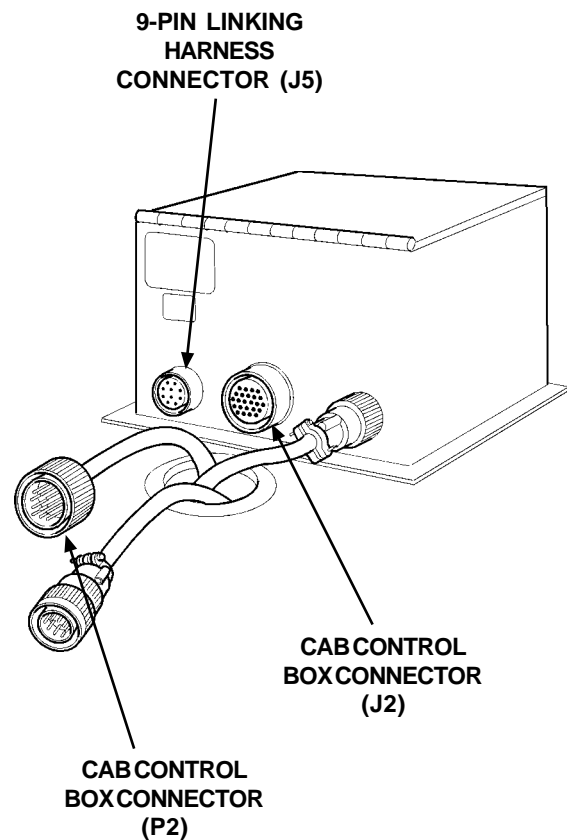
A reading of infinity indicates an open circuit.

- (3) Connect multimeter between (9-pin) linking harness connector (J5), position F, and cab control box connector (J2), position H. Check multimeter for continuity.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY).

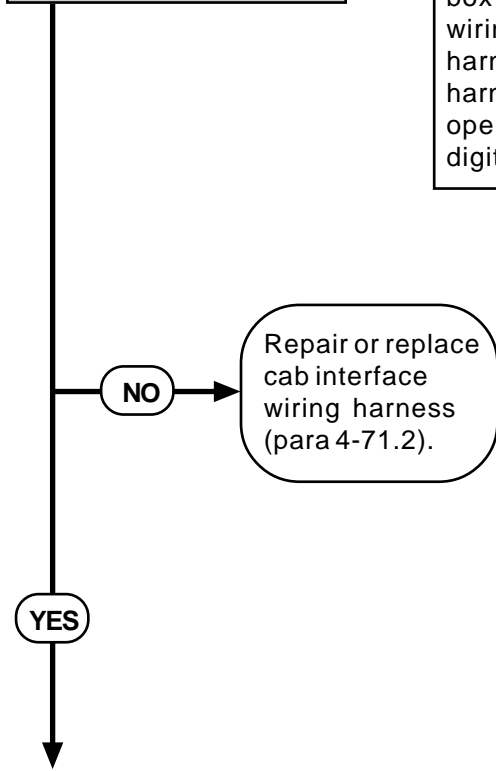
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 03. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. digital control box faulty.

15. Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the hook arm solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



**4-12. UNIT TROUBLESHOOTING (continued).**

**13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).**

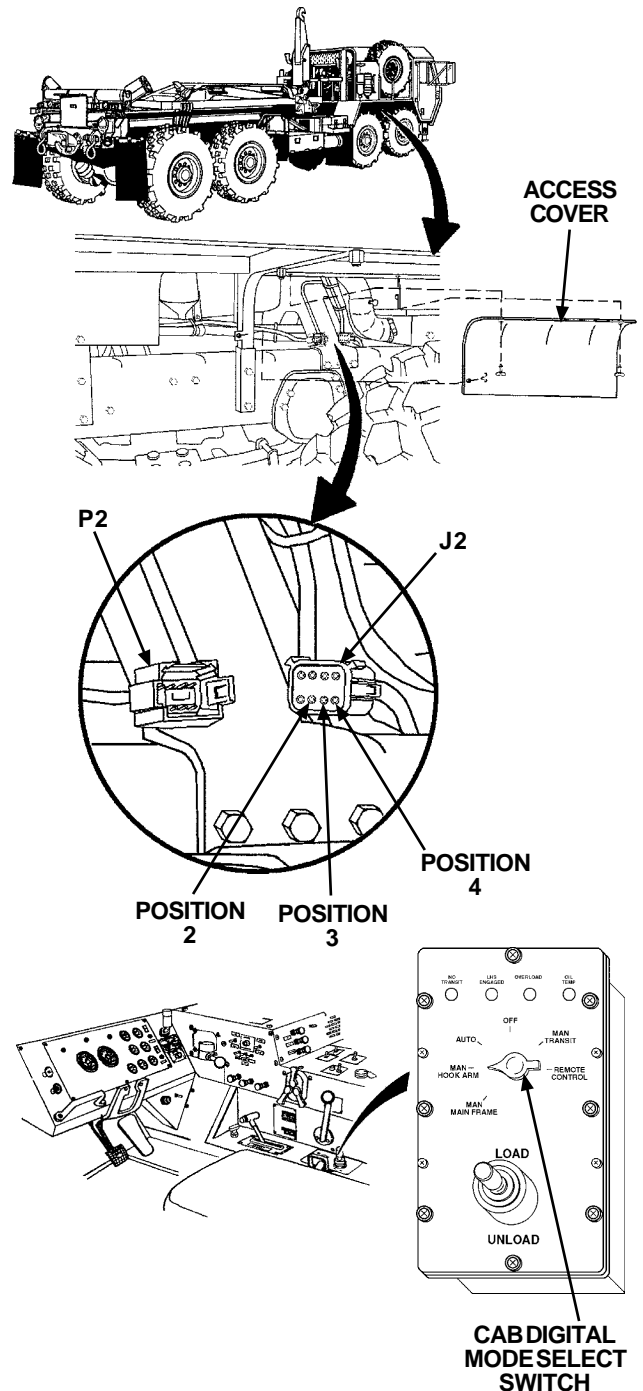
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

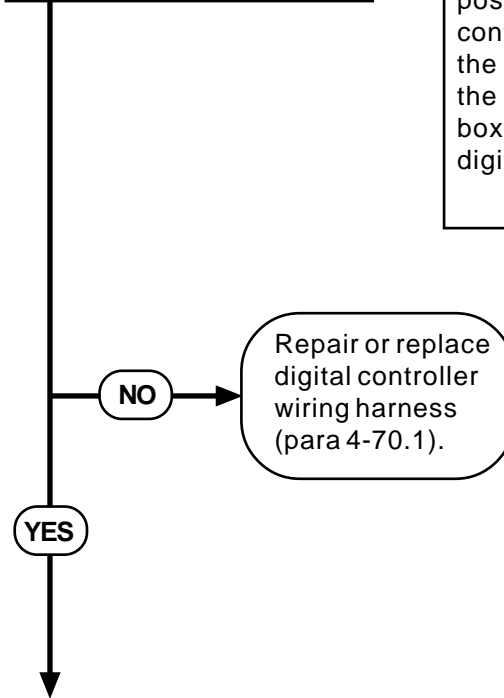
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 03. Remote control unit OK. Remote control cable OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Digital control box faulty.

16. **Is there continuity measured at the digital controller wiring harness (J3) , (J4) and (P2)?**

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the digital controller wiring harness, the 24 volt power from the cab digital control box does not reach the digital control box.

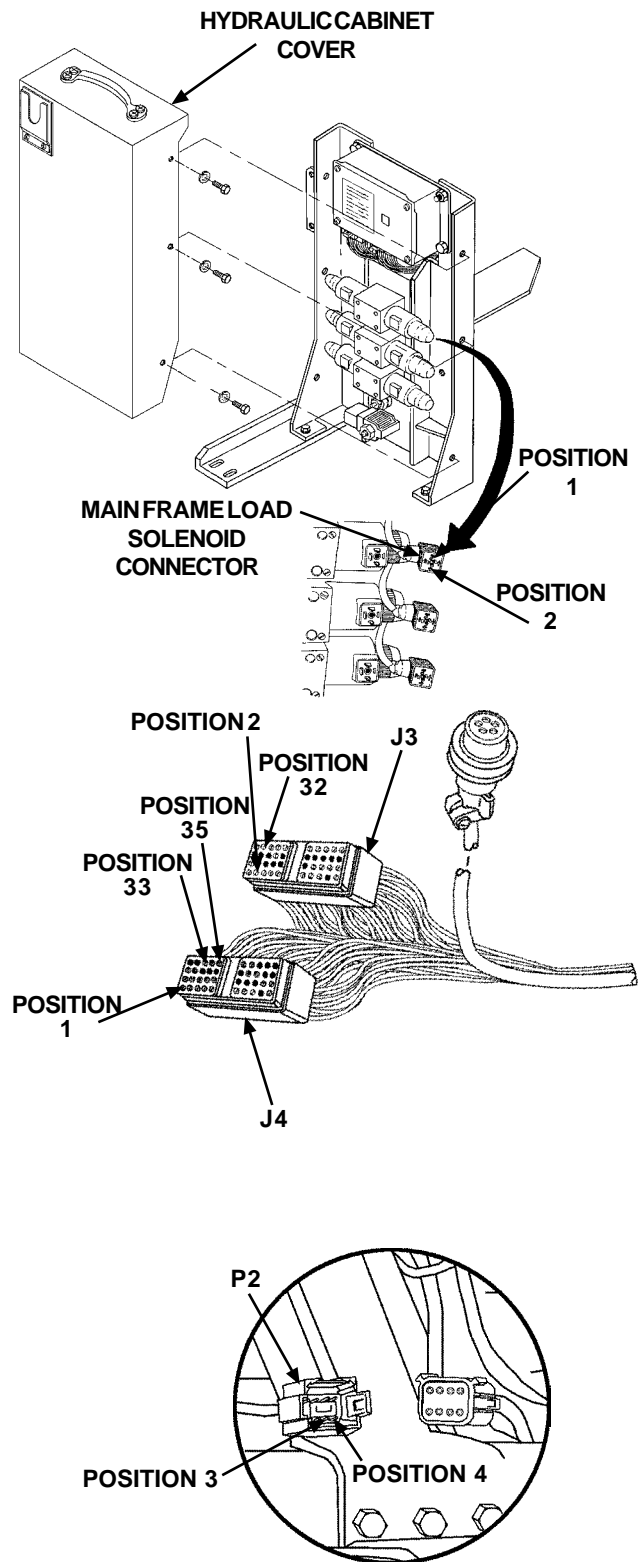




4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</li> <li>(7) Connect multimeter between (J3), position "2", and main frame load solenoid connector, position "1". Check multimeter for continuity.</li> <li>(8) Connect multimeter between (J3), position "2", and main frame load solenoid connector, position "32". Check multimeter for continuity.</li> </ol>	



4-12. UNIT TROUBLESHOOTING (continued).

13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

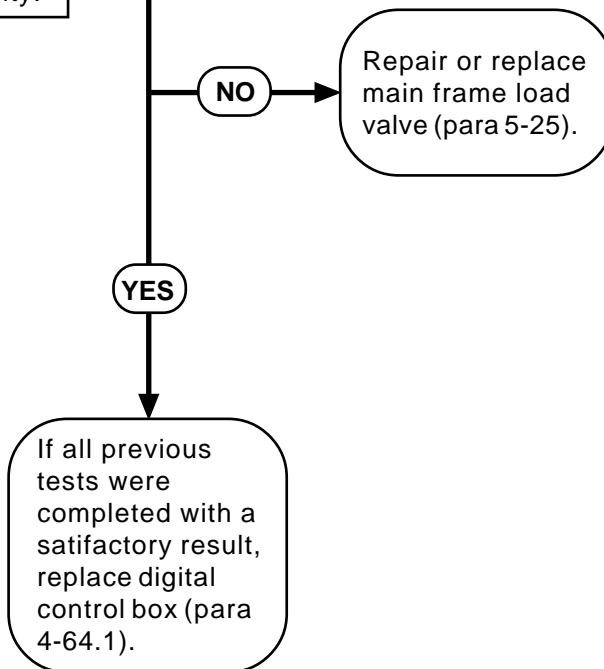
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 03. Remote control unit OK. Remote control cable OK. Cab digital control box OK. Cab interface wiring harness OK. Digital controller wiring harness OK.
POSSIBLE PROBLEMS
Main frame load valve solenoid faulty. Digital control box faulty.

17.  
Is there continuity measured at the main frame load valve solenoid?

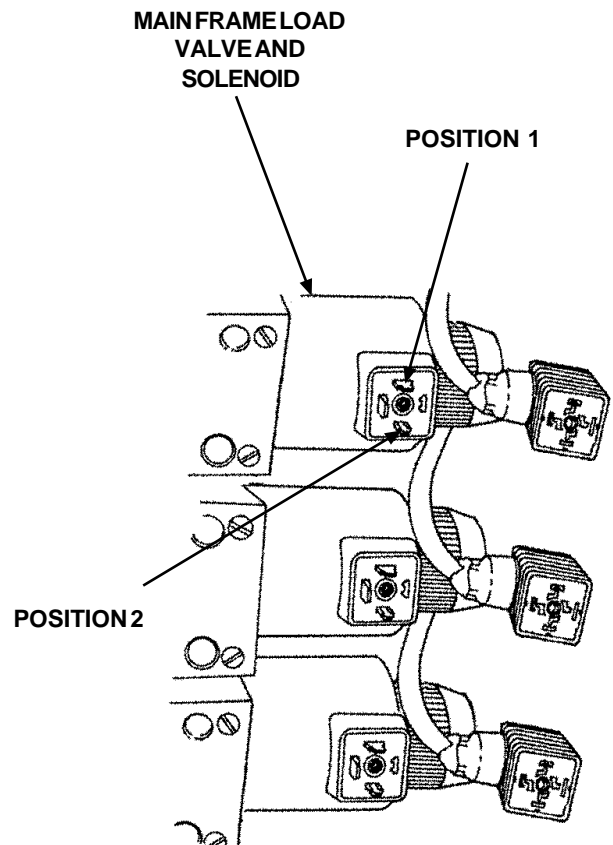
TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the main frame load valve solenoid, the 24 volt power from the digital control box does not activate the main frame load valve.



4-12. UNIT TROUBLESHOOTING (continued).

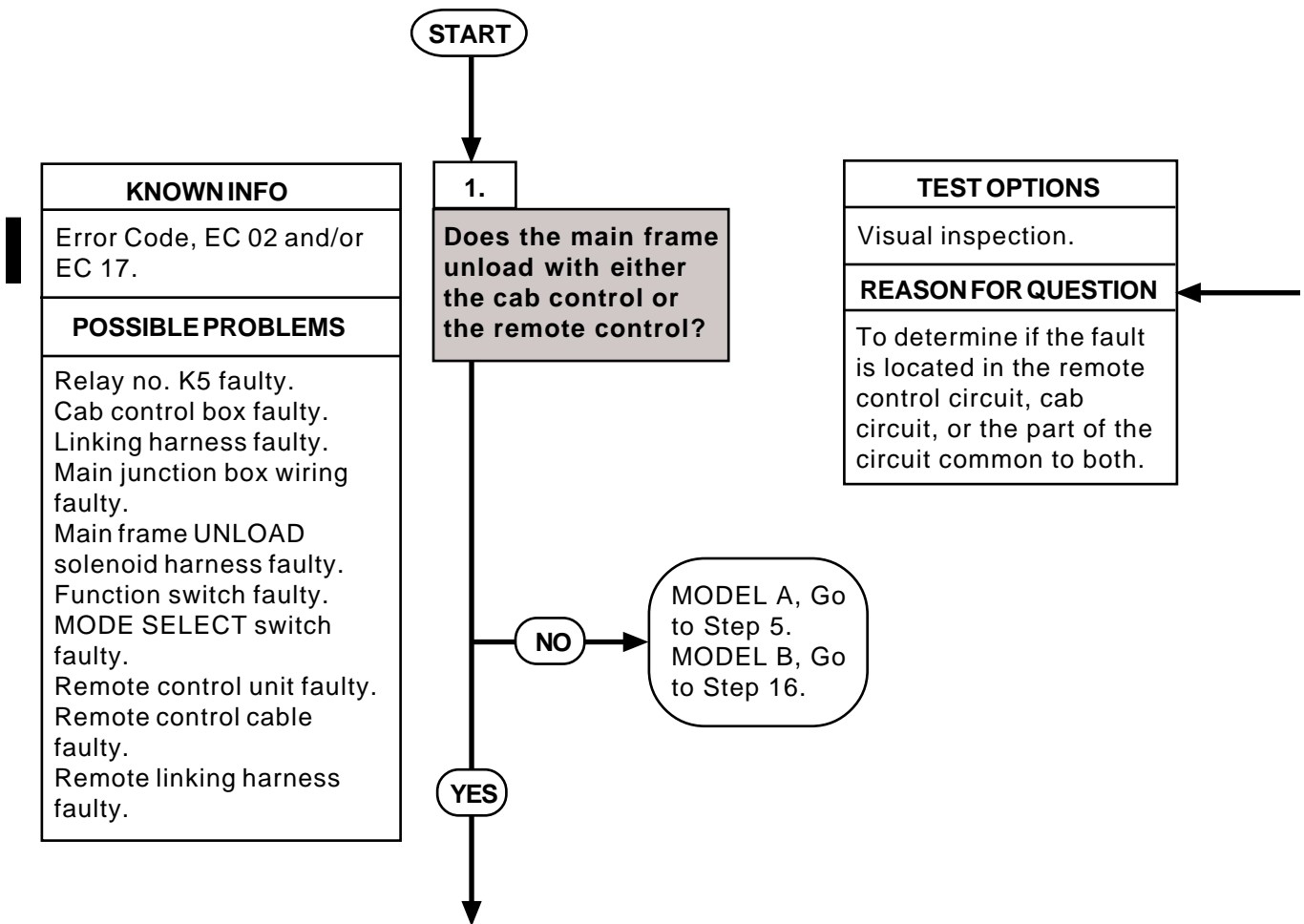
13. MAIN FRAME DOES NOT LOAD IN MANUAL MODE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
(1)	Set multimeter to ohms position.
(2)	Connect multimeter between position "1" and position "2" on main frame load valve solenoid. Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

<b>14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i> Multimeter (ANURM105C) Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	<i>Equipment Condition</i> Engine turned off (TM 9-2320-279-10) Parking brake applied (TM 9-2320-279-10) Wheels chocked (TM 9-2320-279-10)
<i>Personnel Required</i> Two	



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).

**VISUAL INSPECTION**

**NOTE**

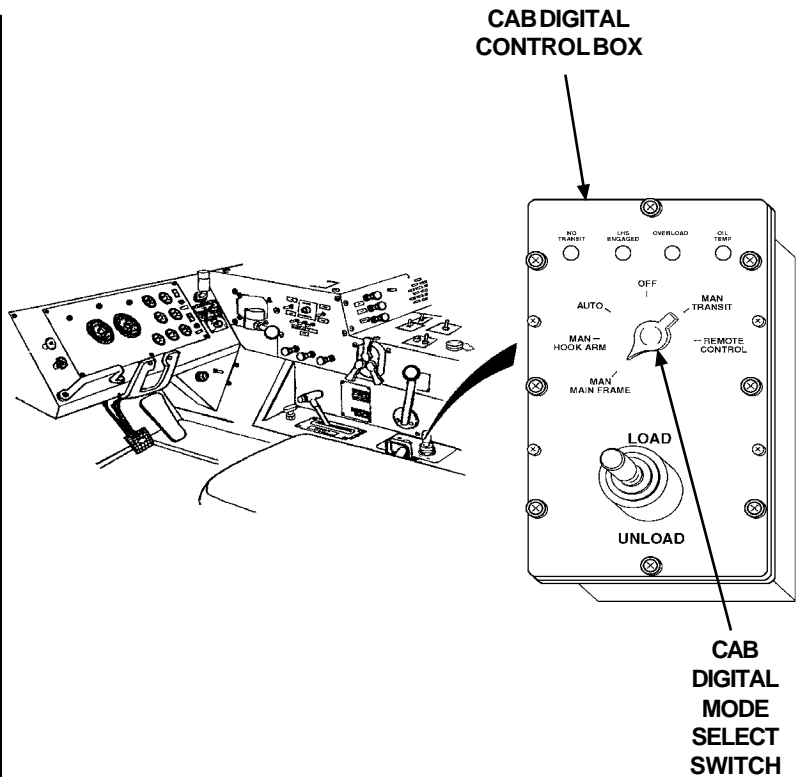
The CBT is designed to prevent the operation of the main frame UNLOAD function if the hook arm is fully retracted.

- (1) Turn LHS MODE SELECT switch to position 3 (main frame in manual mode).

**NOTE**

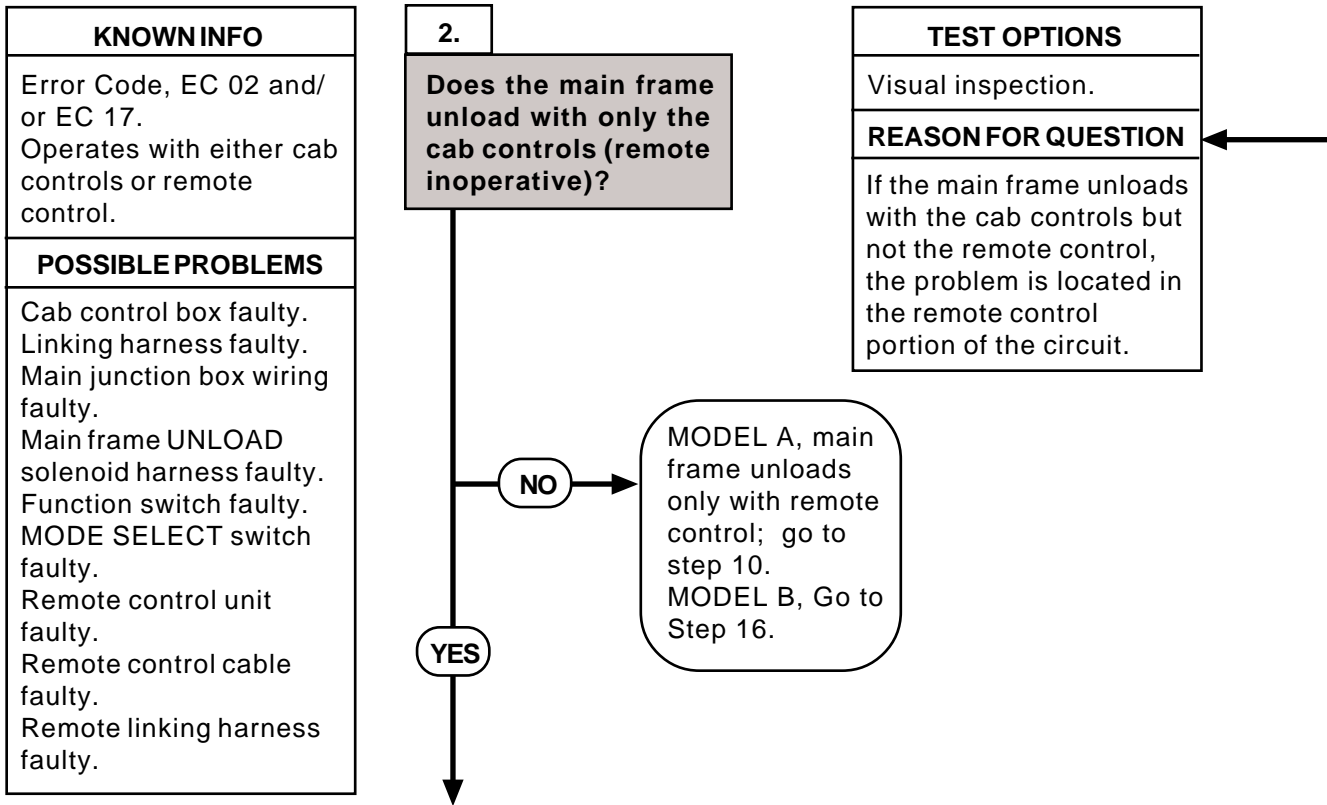
Refer to Chapter 2 for specific LHS operating instructions.

- (2) Attempt to actuate LHS using both the cab controls and the remote control. Note the results of the test.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).



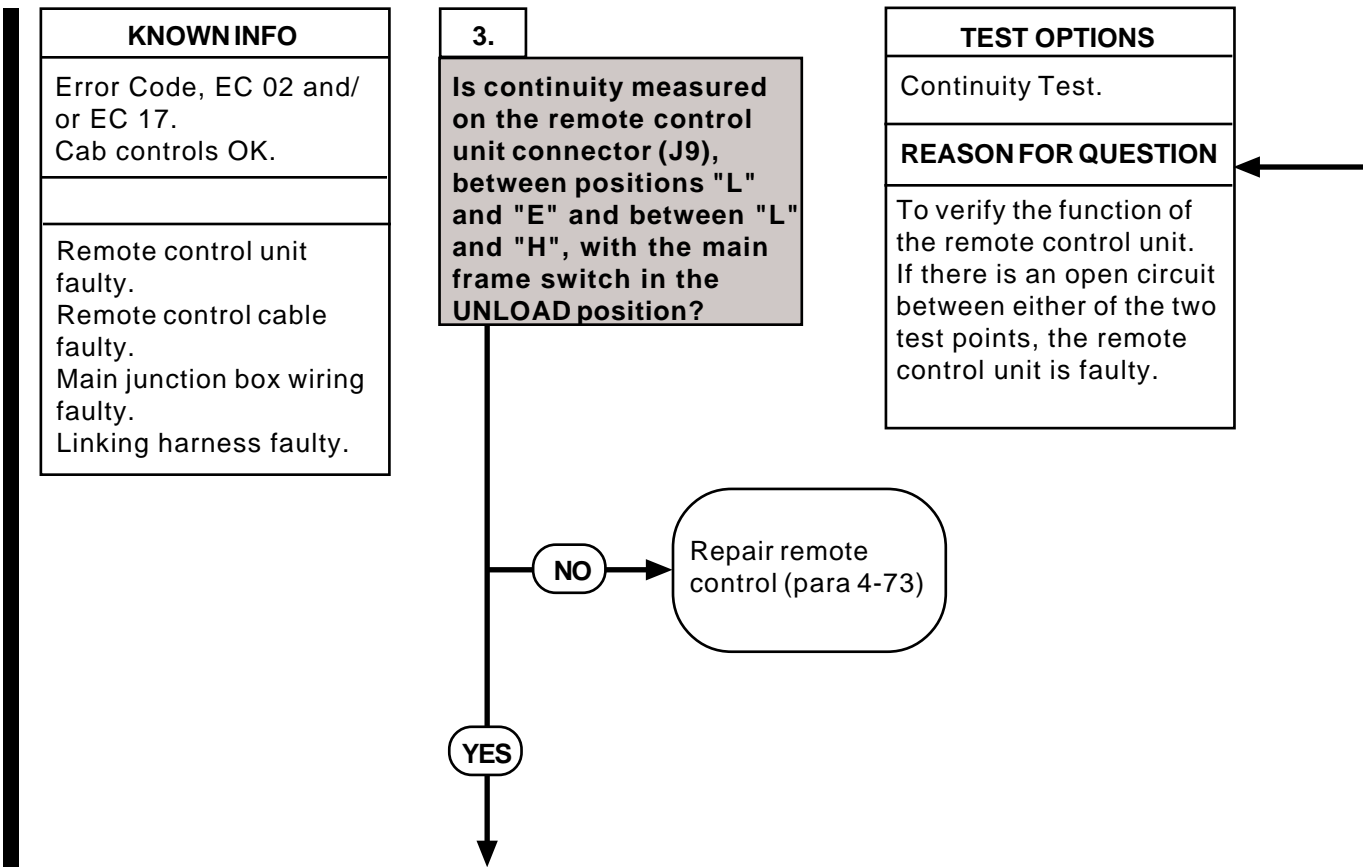
**4-12. UNIT TROUBLESHOOTING (continued).**

**14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).

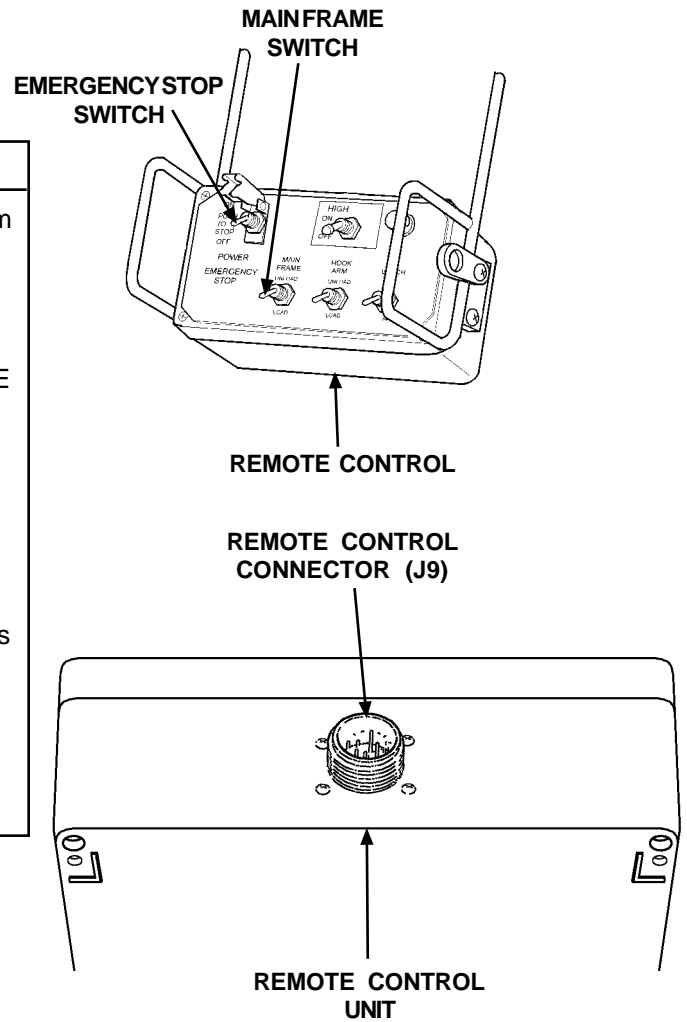




**4-12. UNIT TROUBLESHOOTING (continued).**

**14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).**

<b>CONTINUITY TEST</b>	
<ol style="list-style-type: none"> <li>(1) Disconnect remote control cable from remote control unit.</li> <li>(2) Set multimeter to ohms position.</li> <li>(3) Position EMERGENCY STOP switch in the ON position.</li> <li>(4) Have assistant hold the MAIN FRAME switch in the UNLOAD position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to positions "E" and "L" on remote control unit, and check multimeter for continuity.</li> <li>(6) Repeat Step 5, but this time check for continuity between positions "L" and "H".</li> </ol>	



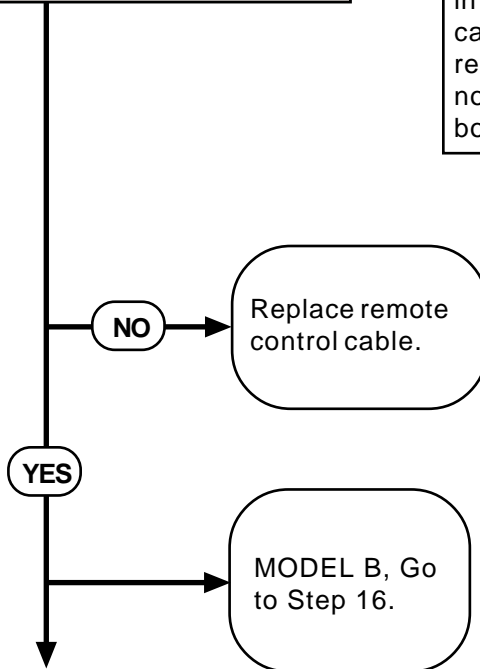
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).

KNOWN INFO
Error Code, EC 02 and/ or EC 17. Cab controls OK. Remote control does not work at either side. Remote control unit OK.
POSSIBLE PROBLEMS
Remote control cable faulty. Main junction box wiring faulty. Linking harness faulty. Cab control box faulty.

4.  
Is there continuity measured on the remote control cable connectors, between connectors P8 and P9?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is an open circuit in the remote control cable, the signal from the remote control unit will not reach the junction box.



## 4-12. UNIT TROUBLESHOOTING (continued).

## 14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (continued).

**CONTINUITY TEST****CAUTION**

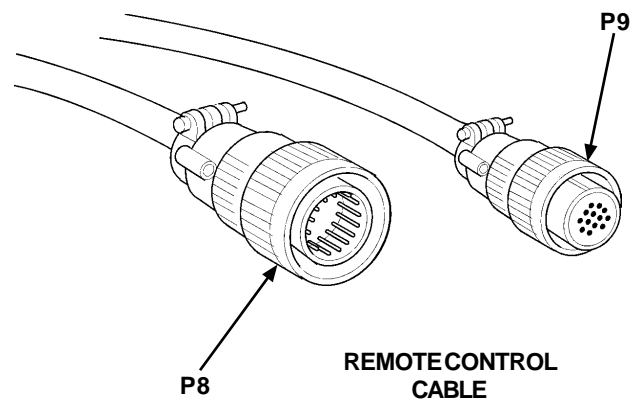
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between position H on chassis end and position H on remote control end. Also check for continuity between position J on chassis end and position E on remote end.



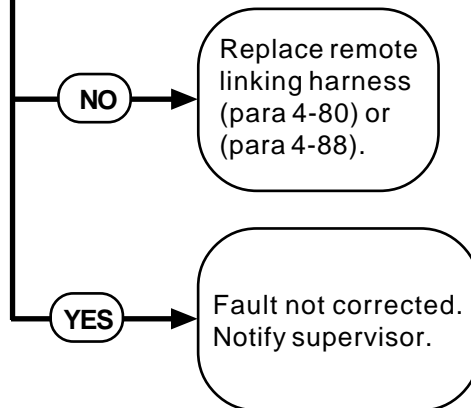
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls OK. Remote control unit works only on one side of vehicle.
POSSIBLE PROBLEMS
Remote linking harness faulty.

5. Is there continuity measured between the remote linking harness connector (JA8 or J8B) and the main control box terminal strip, on the side that does not operate?

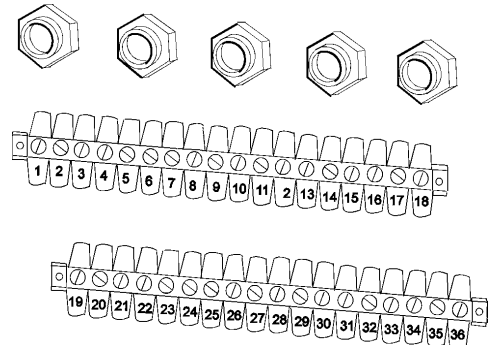
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Signal power is transferred from the remote control cable to the main junction box via the remote linking harnesses (one for each side). If this linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.



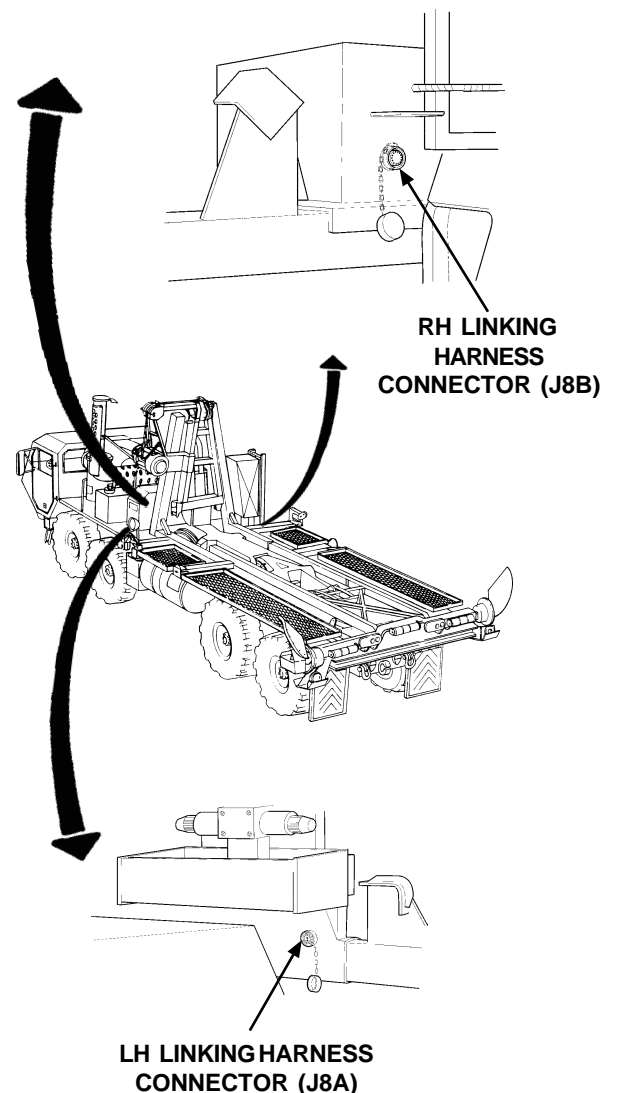
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST
<p>(1) Open hydraulic cabinet cover.                      (2) Loosen four screws on main junction box cover and open cover.                      (3) If necessary, remove remote control cable from linking harness connector.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p> <p>(4) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">A reading of infinity indicates an open circuit.</p> <p>(5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between terminal C on connector and position 7 in junction box. Next, check between terminal J on connector and position 23 in junction box. Finally, check between terminal H on connector and position 30 in junction box.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">Any reading besides infinity indicates a grounded wire.</p> <p>(6) Check for grounded wiring by connecting one multimeter lead to each terminal and the other lead to chassis ground.</p>



WIRING REMOVED FOR CLARITY



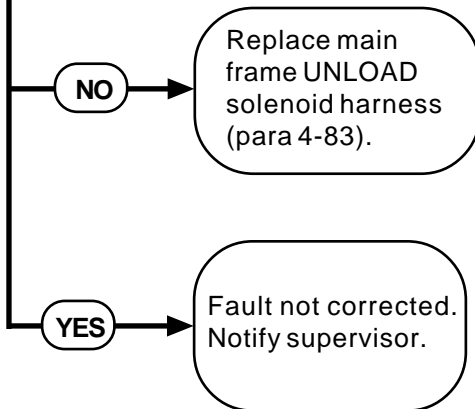
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls and remote control inoperative. Cab control box OK. Main linking harness OK. Main junction box wiring OK.
POSSIBLE PROBLEMS
Main frame UNLOAD solenoid harness faulty.

6.  
Is continuity measured on the main frame UNLOAD solenoid harness?

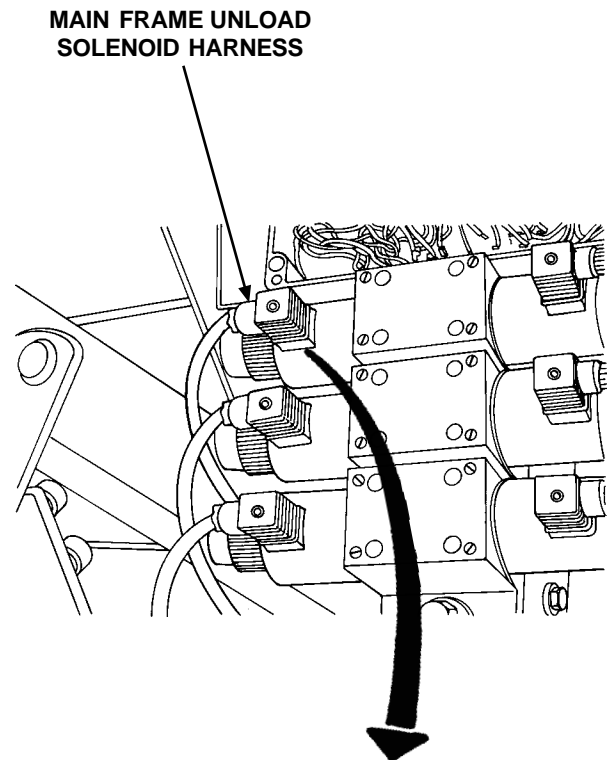
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power to activate the main frame UNLOAD solenoid is transferred from the main junction box to the solenoid via this harness. Faults in this harness will prevent operation from both the cab and remote controls.



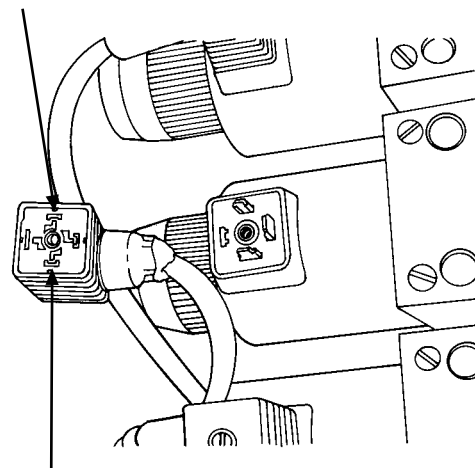
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove connector from the hook arm UNLOAD solenoid.</li> <li>(2) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• Junction box terminal 19 is connected to one side of the solenoid; terminal 20 is connected to the other side.</li> </ul>	
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check for continuity between the solenoid connector, position 1, and terminal strip, position 19.</li> <li>(6) Repeat Step 5 to check for continuity between position 2 in the connector and terminal strip, position 20.</li> </ol>	



SOLENOID CONNECTOR, POSITION 1



SOLENOID CONNECTOR, POSITION 2

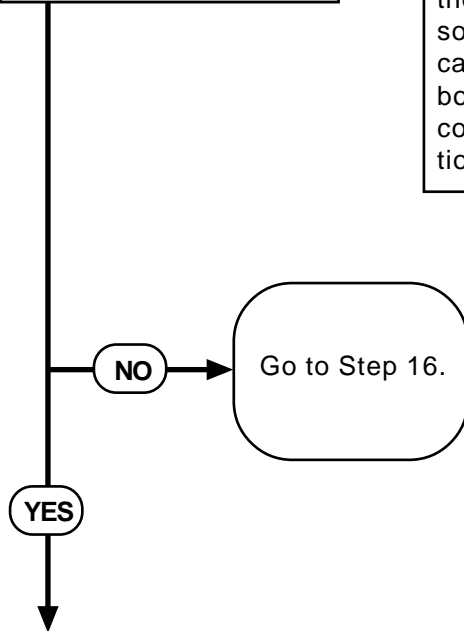
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Cab controls and remote control inoperative.
<b>POSSIBLE PROBLEMS</b>
Relay no. K5 faulty. Cab control box faulty. Linking harness faulty. Main junction box wiring faulty. Main frame UNLOAD solenoid harness faulty.

7.  
Are 22–28 volts measured at the cab control box connector (J2), position F?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
Output voltage to activate the main frame UNLOAD solenoid comes from the cab control box during both cab and remote control modes of operation.

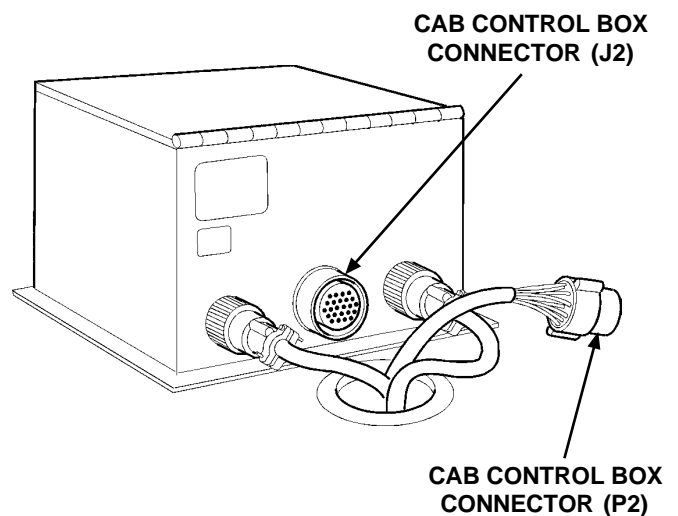
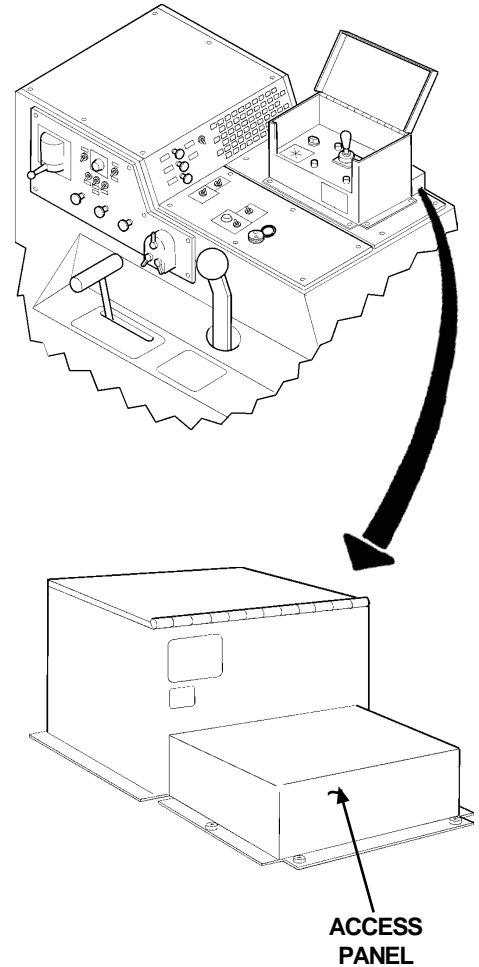




4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>VOLTAGE TEST</b>	
	(1) Remove four screws and lockwashers, and access cover from heater compartment.
	(2) Remove cab control box connector (P2) from cab control box.
	(3) Turn engine start switch to ON position.
	(4) Turn light control switch to STOP LIGHT position.
	(5) Set multimeter to voltage position.
	(6) Place positive (+) probe of multimeter on cab control box connector (J2), position F.
	(7) Place negative (-) probe of multimeter on known good ground, and check multimeter for voltage reading.
	(8) Turn engine start switch and light control switch to OFF position.



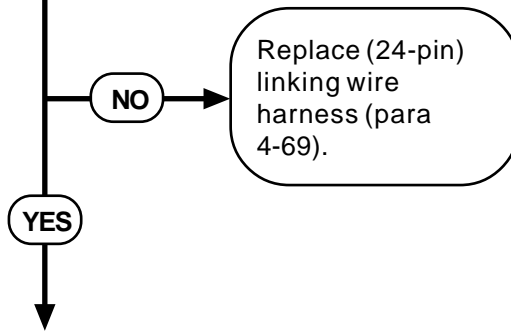
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Cab controls and remote control inoperative. Cab control box OK.
POSSIBLE PROBLEMS
Linking harness faulty. Main junction box wiring faulty. Main frame UNLOAD solenoid harness faulty.

8.  
Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?

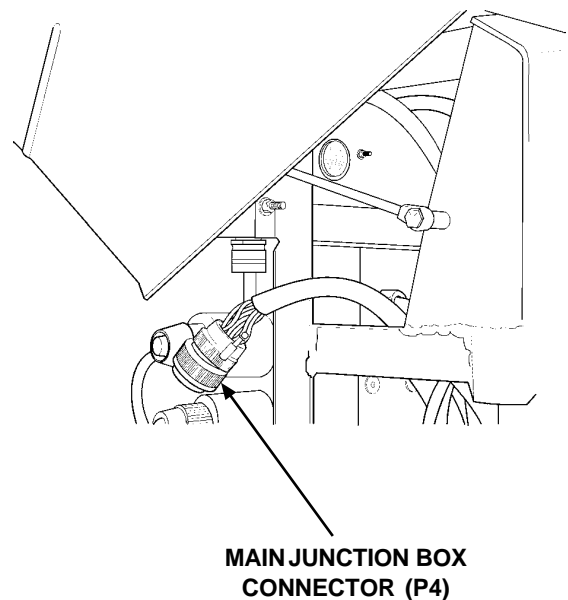
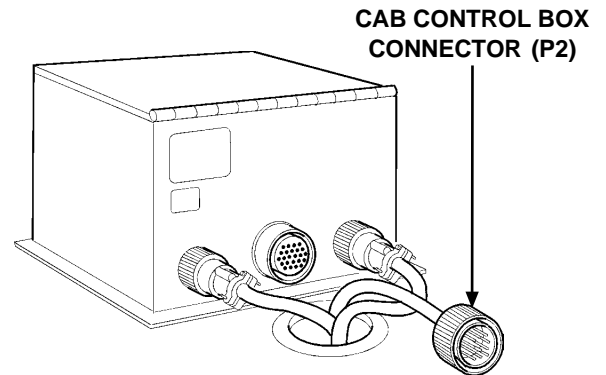
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
During both cab and remote control operation, this harness provides power to the main frame UNLOAD solenoid.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Disconnect main junction box connector (P4) from junction box.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter to leads at each end of wire, and check multimeter for continuity. Check (24-pin) linking harness, position F.</p>	
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
<p>(4) Remove multimeter lead from one end of wire and connect to chassis ground.</p>	



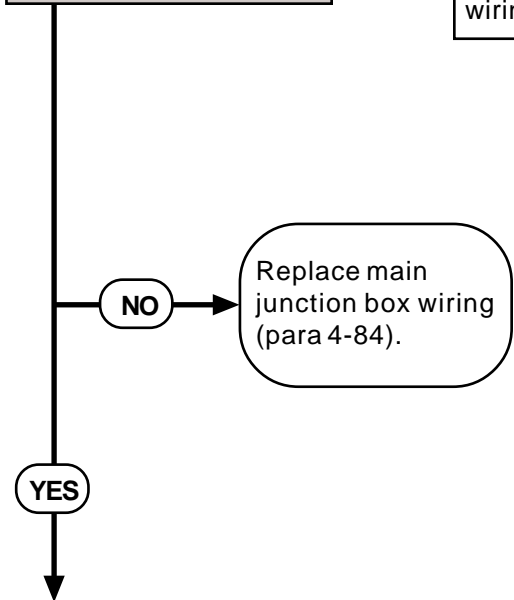
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Cab controls and remote control inoperative. Cab control box OK. Linking harness OK.
<b>POSSIBLE PROBLEMS</b>
Main junction box wiring faulty. Main frame UNLOAD solenoid harness faulty.

9. Is there continuity between the main junction box connector (J4) and the junction box terminal strip?

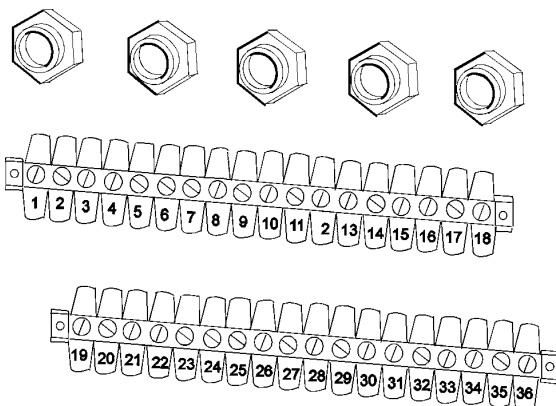
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
To verify the integrity of the main junction box wiring.



4-12. UNIT TROUBLESHOOTING (continued).

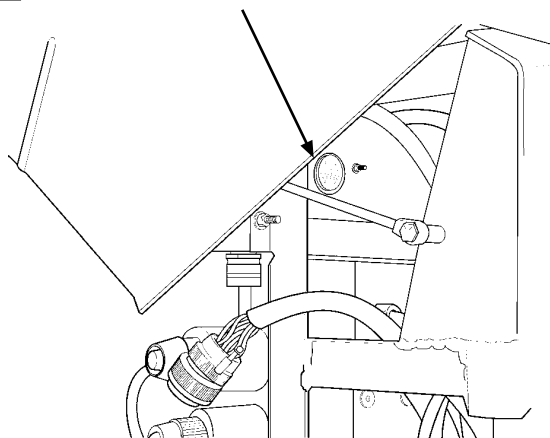
14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>	
<p>(1) Open hydraulic cabinet cover.                      (2) Loosen four screws on main junction box cover and open cover.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p style="text-align: center;"><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p> <p>(3) Set multimeter to ohms position.</p> <p style="text-align: center;"><b><u>NOTE</u></b></p> <p style="text-align: center;">A reading of infinity indicates an open circuit.</p> <p>(4) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position F, and terminal strip, position 19. Also check between main junction box connector (J4), position Q, and terminal strip, position 20.</p>	



WIRING REMOVED FOR CLARITY

MAIN JUNCTION BOX CONNECTOR (J4)



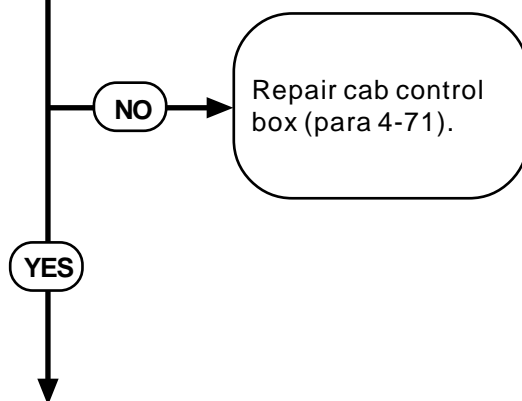
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Remote controls OK.
<b>POSSIBLE PROBLEMS</b>
Function switch faulty. LHS MODE SELECT switch faulty.

10.  
Is continuity measured on the cab control box function switch, with the switch in the UNLOAD position?

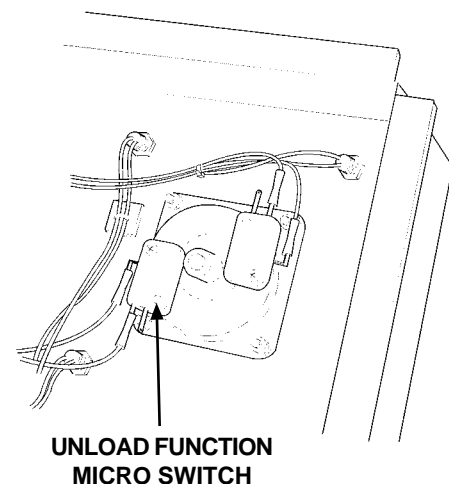
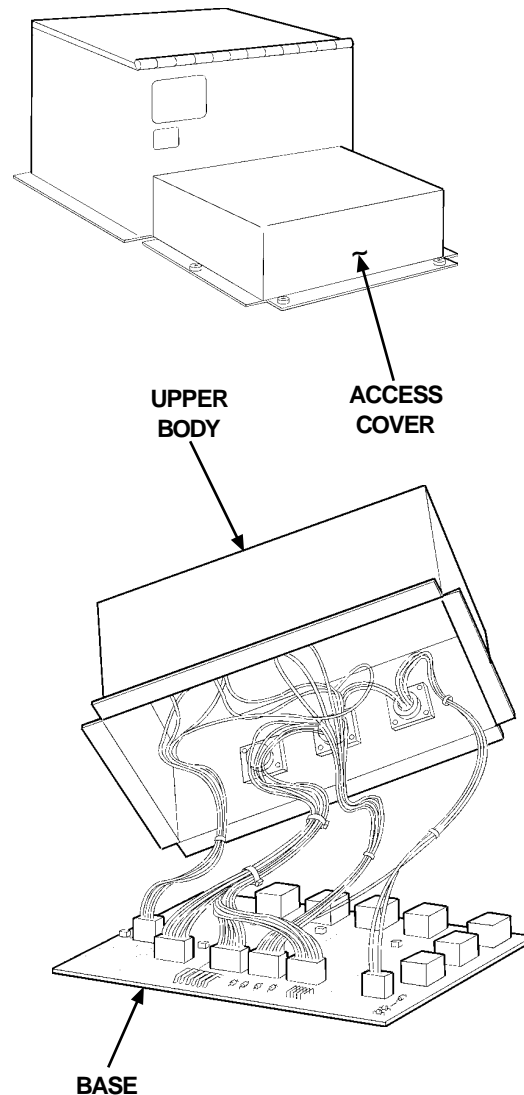
<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The source of the power in the main frame UNLOAD circuit originates with the function switch in the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<p><b>CONTINUITY TEST</b></p>
<p><b><u>CAUTION</u></b></p>
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<ol style="list-style-type: none"> <li>(1) Remove four screws, lockwashers and access cover from heater compartment.</li> <li>(2) Remove four screws and lockwashers from cab control box.</li> <li>(3) Remove six screws from cab control box, and separate upper body from base.</li> <li>(4) Set multimeter to ohms position.</li> </ol>
<p><b>NOTE</b></p>
<p>A reading of infinity indicates an open circuit.</p>
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to switch terminals. Hold the joystick in the UNLOAD position, and check multimeter for continuity.</li> </ol>



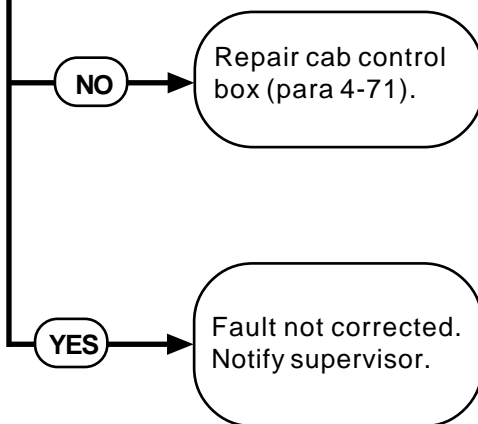
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Remote controls OK. Function switch OK.
<b>POSSIBLE PROBLEMS</b>
LHS MODE SELECT switch faulty.

11.  
Are 22–28 volts measured at the selector switch (yellow wire)?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
The LHS MODE SELECT switch determines the mode of operation for the LHS. Faults within the LHS MODE SELECT switch will prevent main frame unload operation.

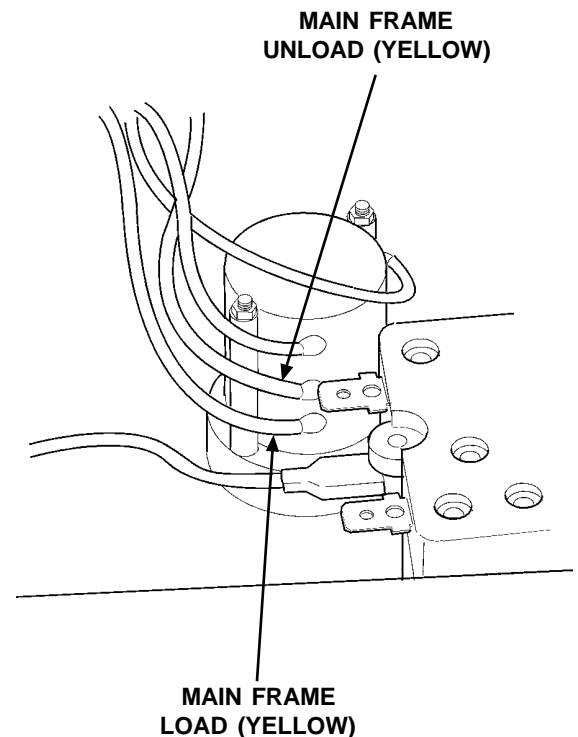




4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

VOLTAGE TEST
<p>(1) Turn engine start switch to ON position.</p> <p>(2) Turn light control switch to STOP LIGHT position.</p> <p>(3) Rotate LHS MODE SELECT switch to position 3 (main frame in manual mode).</p> <p>(4) Set multimeter to voltage position.</p>
<p><b>CAUTION</b></p> <p>When checking voltage, use caution not to short or ground the terminal being checked. Failure to comply with this caution may result in damage to vehicle or test equipment.</p>
<p><b>NOTE</b></p> <p>Refer to illustration for correct wire.</p>
<p>(5) Place positive (+) probe of multimeter on yellow (UNLOAD) wire on LHS MODE SELECT switch.</p> <p>(6) Place negative (-) probe of multimeter on known good ground.</p>
<p><b>NOTE</b></p> <p>This test can also be accomplished by observing the status of LED D8 while performing Step 7.</p>
<p>(7) Hold joystick in UNLOAD position and check multimeter for voltage reading.</p> <p>(8) Turn engine start switch and light control switch to OFF position.</p>



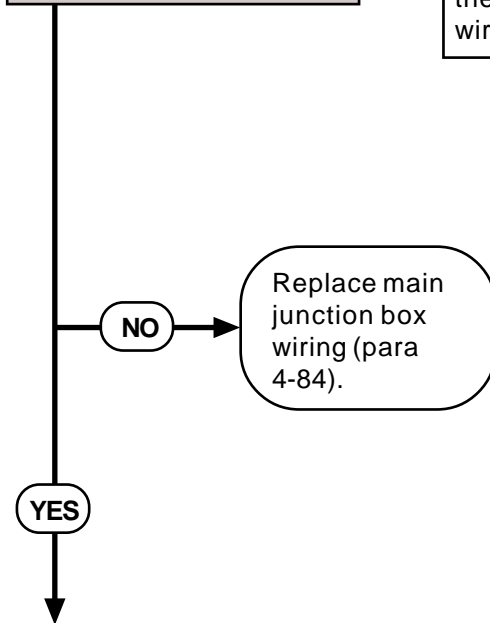
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Remote control does not work at either side. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Main junction box wiring faulty. Linking harness faulty. Cab control box faulty.

12. Is there continuity between the main junction box connector (J4) and the junction box terminal strip?

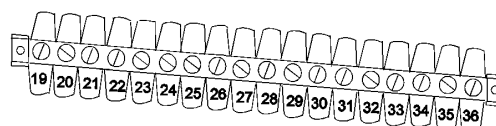
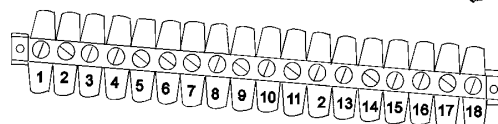
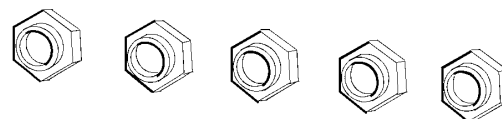
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
To verify the integrity of the main junction box wiring.



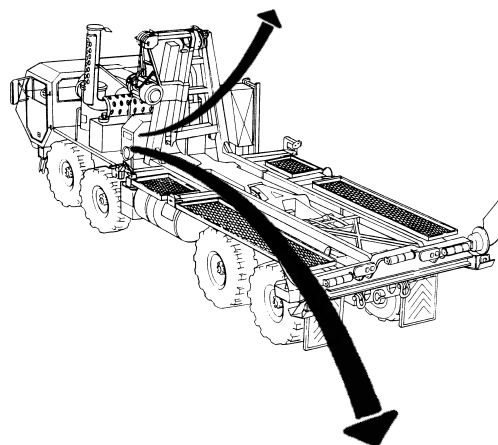
**4-12. UNIT TROUBLESHOOTING (continued).**

**14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).**

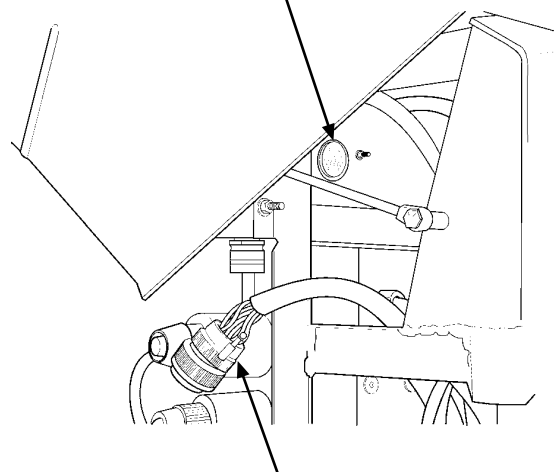
<b>CONTINUITY TEST</b>
<p>(1) Open hydraulic cabinet cover.</p> <p>(2) Loosen four screws on main junction box cover and open cover.</p> <p>(3) Remove main junction box connector (P4) from main junction box.</p>
<p><b>CAUTION</b></p> <p><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p>
<p>(4) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(5) Connect multimeter to terminals at each end of wire, and check multimeter for continuity. Check between main junction box connector (J4), position F, and terminal strip, position 19. Also check between main junction box connector (J4), position Q, and terminal strip, position 20.</p>



**WIRING REMOVED FOR CLARITY**



**MAIN JUNCTION BOX CONNECTOR (J4)**



**MAIN JUNCTION BOX CONNECTOR (P4)**

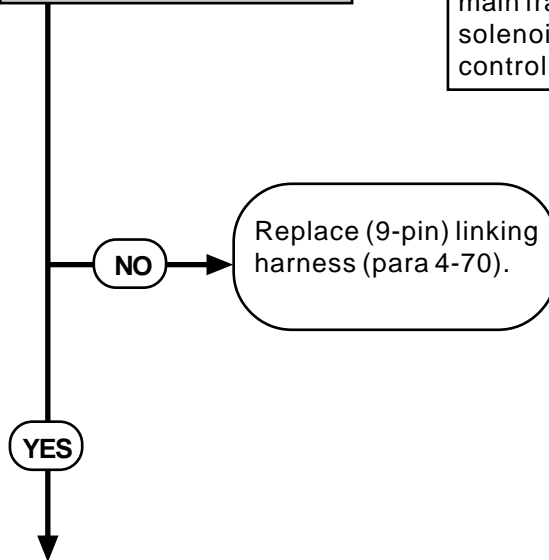
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Remote control does not work at either side. Remote control unit OK. Remote control cable OK. Main junction box wiring OK.
POSSIBLE PROBLEMS
Linking harness faulty. Cab control box faulty.

13. Is continuity measured on the (9-pin) linking harness between the 9-pin linking harness connector (P5) and the 9-pin linking harness connector (P3)?

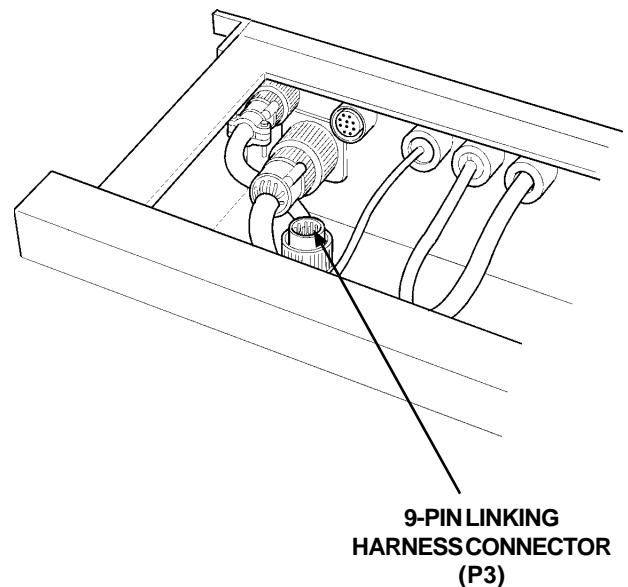
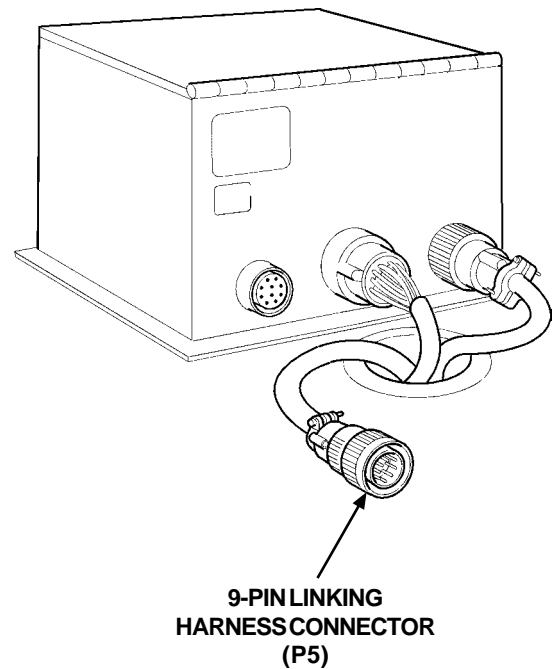
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
During remote control operation, this harness provides power to the main frame UNLOAD solenoid via the cab control box.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>CONTINUITY TEST</b>	
<b><u>CAUTION</u></b>	
<b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b>	
<ol style="list-style-type: none"> <li>(1) Remove four screws and lockwashers and access cover from heater compartment.</li> <li>(2) Remove hydraulic cabinet cover (para 4-60).</li> <li>(3) Disconnect (9-pin) linking harness connectors (P5 and P3).</li> <li>(4) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
A reading of infinity indicates an open circuit.	
<ol style="list-style-type: none"> <li>(5) Connect multimeter leads to each end of wire, and check multimeter for continuity. Check (9-pin) linking harness, position A.</li> </ol>	
<b>NOTE</b>	
Any reading besides infinity indicates a grounded wire.	
<ol style="list-style-type: none"> <li>(6) Remove multimeter lead from one end of wire and connect to chassis ground.</li> </ol>	



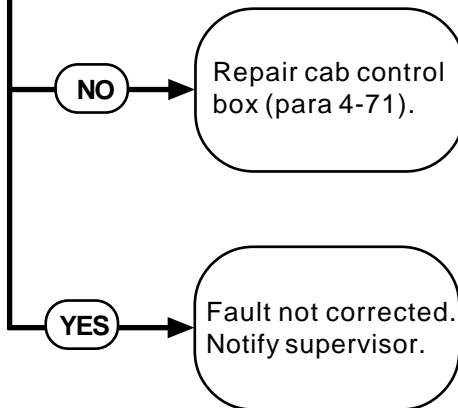
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

KNOWN INFO
Remote control does not work at either side. Remote control unit OK. Remote control cable OK. Main junction box wiring OK. Linking harness OK.
POSSIBLE PROBLEMS
Cab control box faulty.

14.  
Is there continuity at the cab control box between the (9-pin) linking harness connector (J5), position A, and the cab control box connector (J2), position F?

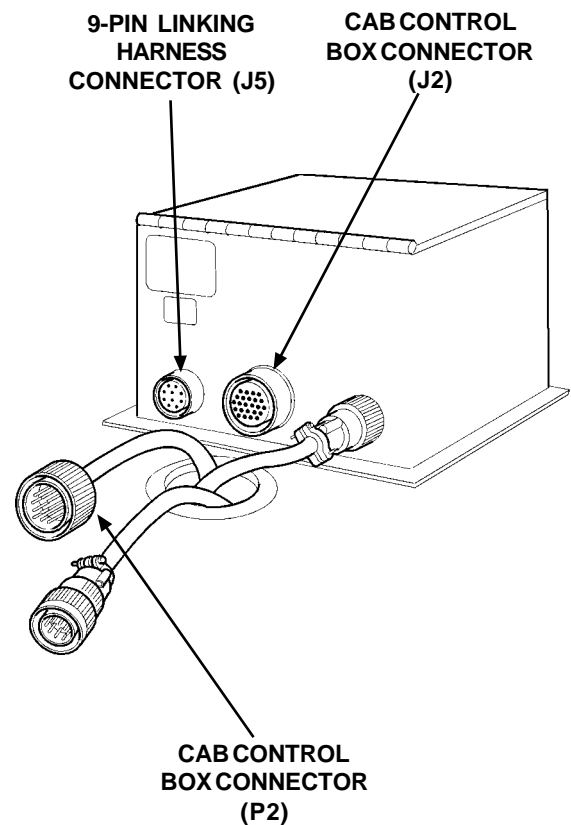
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
In the remote control mode, the power to activate the main frame UNLOAD solenoid passes through the cab control box on the way to the main junction box and solenoid. If the cab control box internal circuit is open, the remote control will not function.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Disconnect cab control box connector (P2) from cab control box.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter between (9-pin) linking harness connector (J5), position A, and cab control box connector (J2), position F. Check multimeter for continuity.</p>	
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
<p>(4) Remove multimeter lead from one end of wire and connect to chassis ground.</p>	



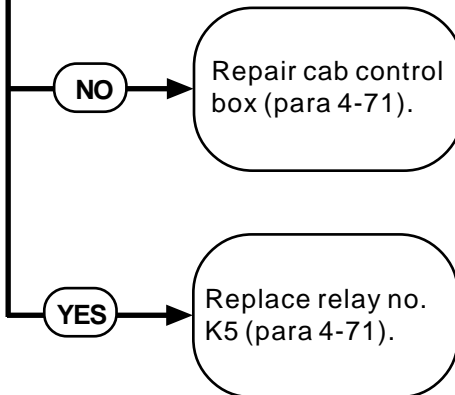
4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
No power from cab control box.
<b>POSSIBLE PROBLEMS</b>
Relay no. K5 faulty. Cab control box faulty.

15. Is continuity measured between the cab control box connector (J2), position F, and relay K5, position 87A?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
If there is continuity between the cab control box connector and the relay socket, the cab control box is OK and the relay is faulty. If there is no continuity, there is an open circuit in the cab control box.





4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove four screws and lockwashers from cab control box.
- (2) Remove six screws from cab control box, and separate upper body from base.

**CAUTION**

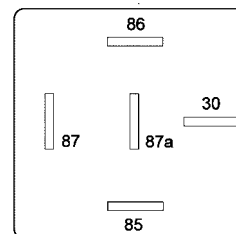
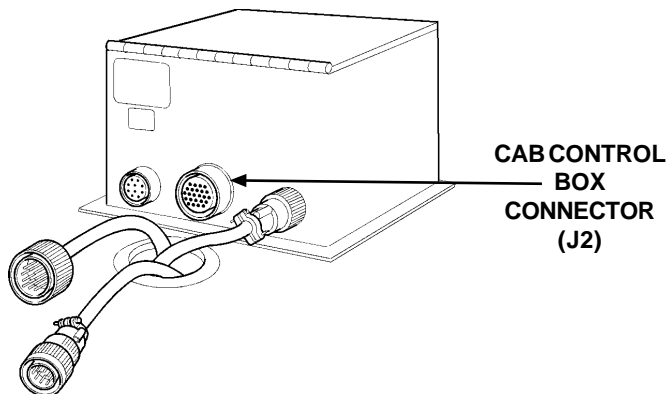
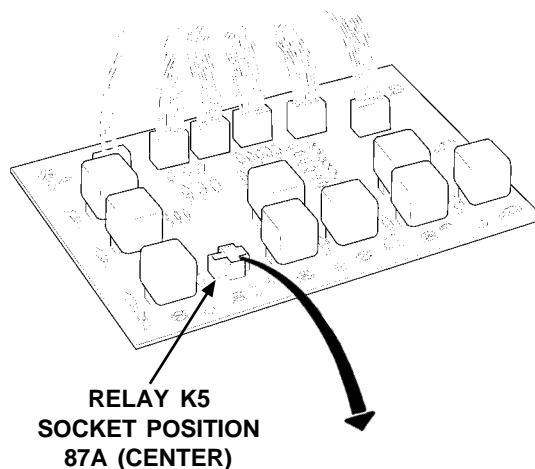
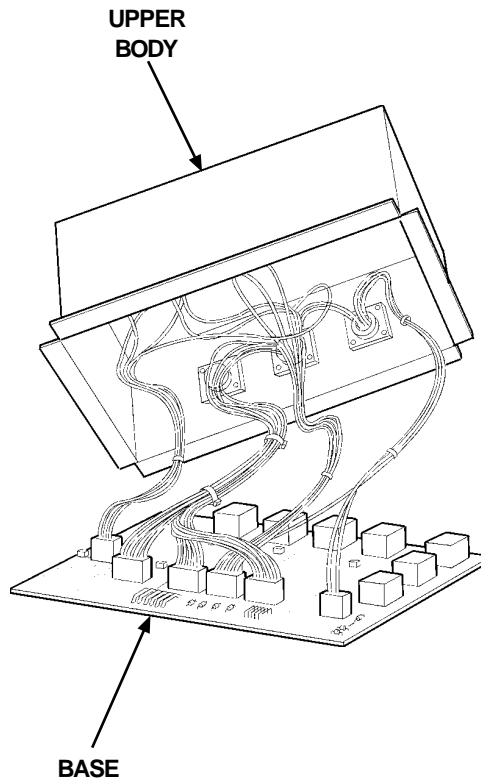
Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.

- (3) Remove relay no. K5 from cab control box circuit board.
- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (6) Connect one multimeter lead to center terminal, 87A, of relay K5 socket and the other multimeter lead to the cab control box connector, position F. Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY).

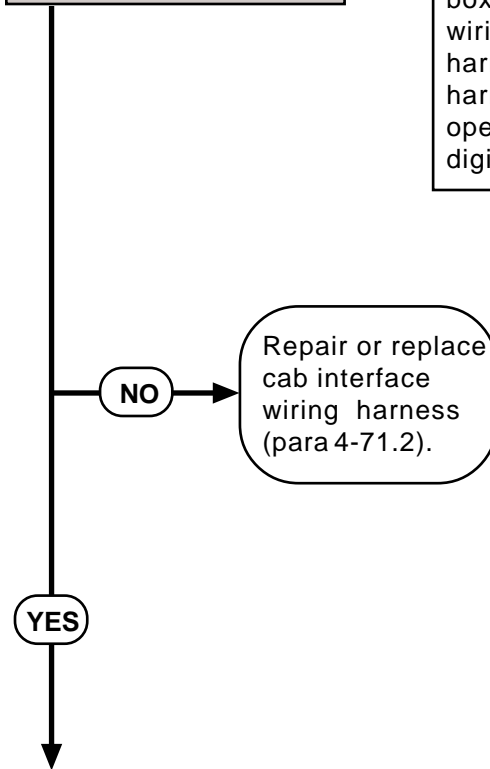
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 02. Remote control unit OK. Remote control cable OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Digital control box faulty.

16. Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

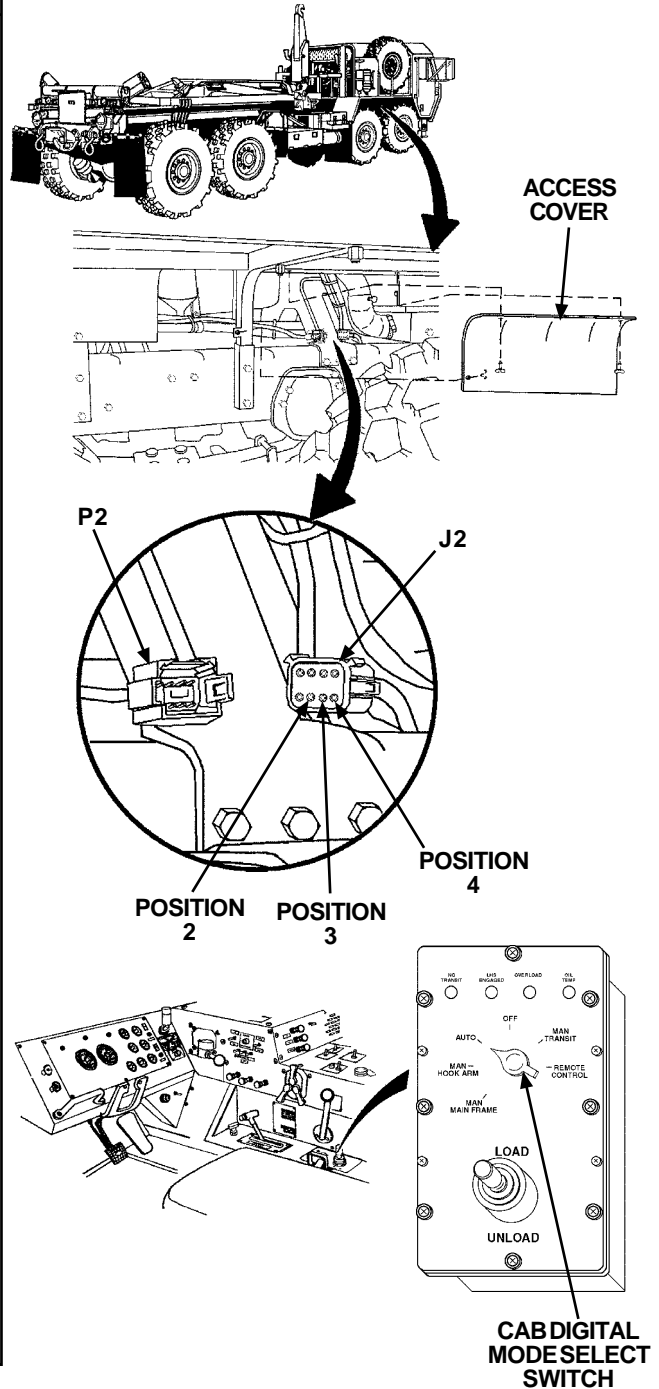
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the hook arm solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



**4-12. UNIT TROUBLESHOOTING (continued).**

**14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).**

VOLTAGE TEST
<p>(1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.</p> <p>(2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.</p> <p>(3) Set multimeter to voltage position.</p> <p>(4) Turn engine start switch to ON position.</p> <p>(5) Place negative (-) probe of multimeter on known good ground.</p> <p>(6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).</p> <p>(7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.</p> <p>(8) Place cab digital mode select switch in "AUTO" position.</p> <p>(9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.</p> <p>(10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.</p> <p>(11) Turn engine start switch to "OFF" position.</p>

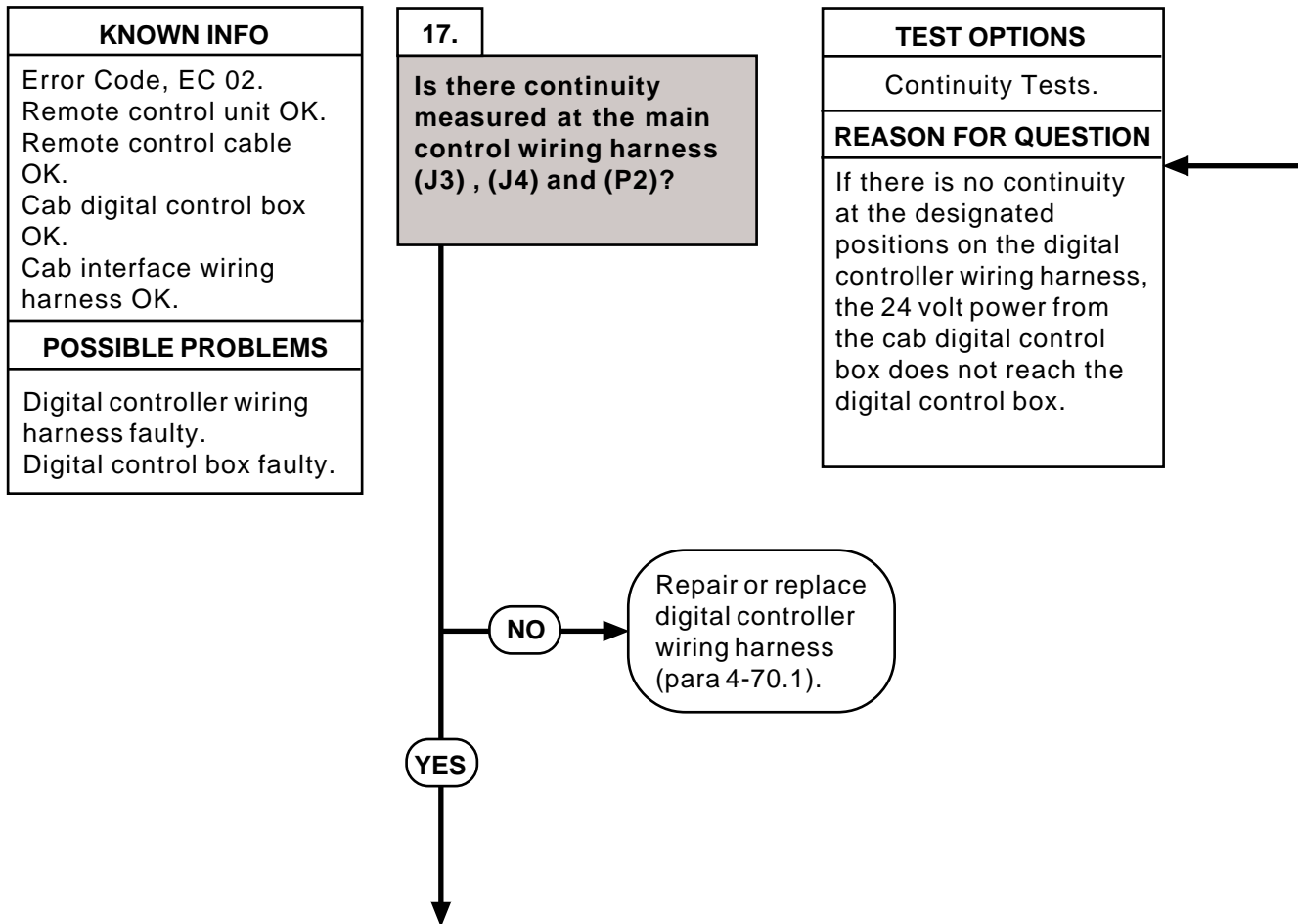


4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

NOTE

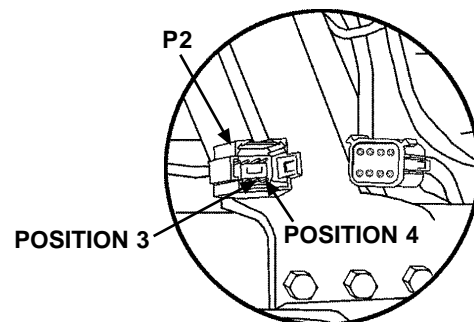
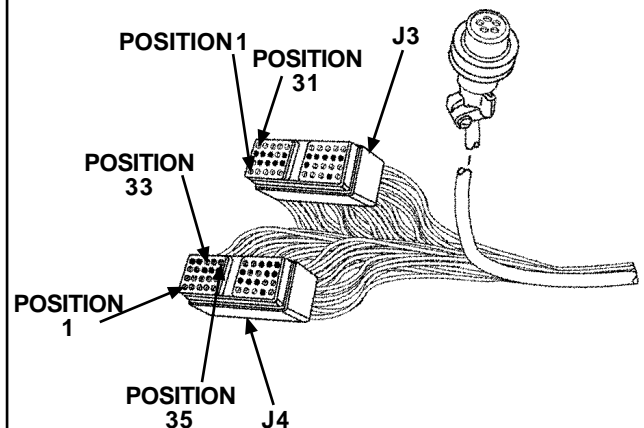
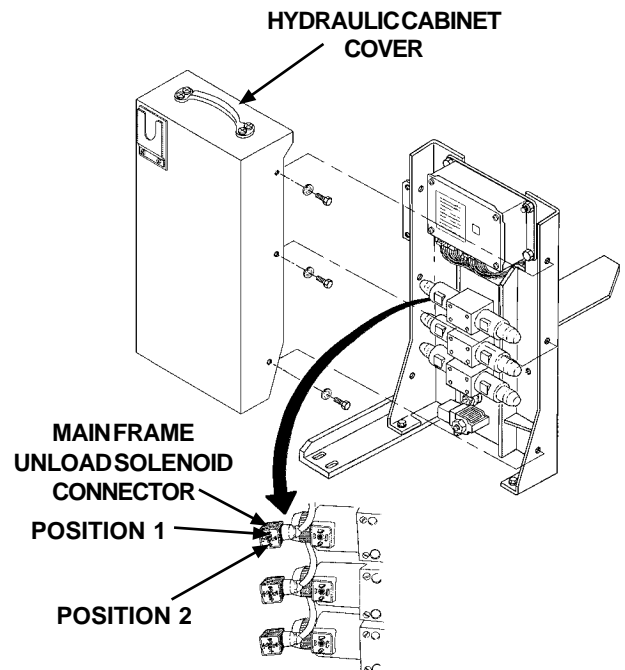
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</li> <li>(7) Connect multimeter between (J3), position "1", and main frame unload solenoid connector, position "1". Check multimeter for continuity.</li> <li>(8) Connect multimeter between (J3), position "31", and main frame unload solenoid connector, position "2". Check multimeter for continuity.</li> </ol>	

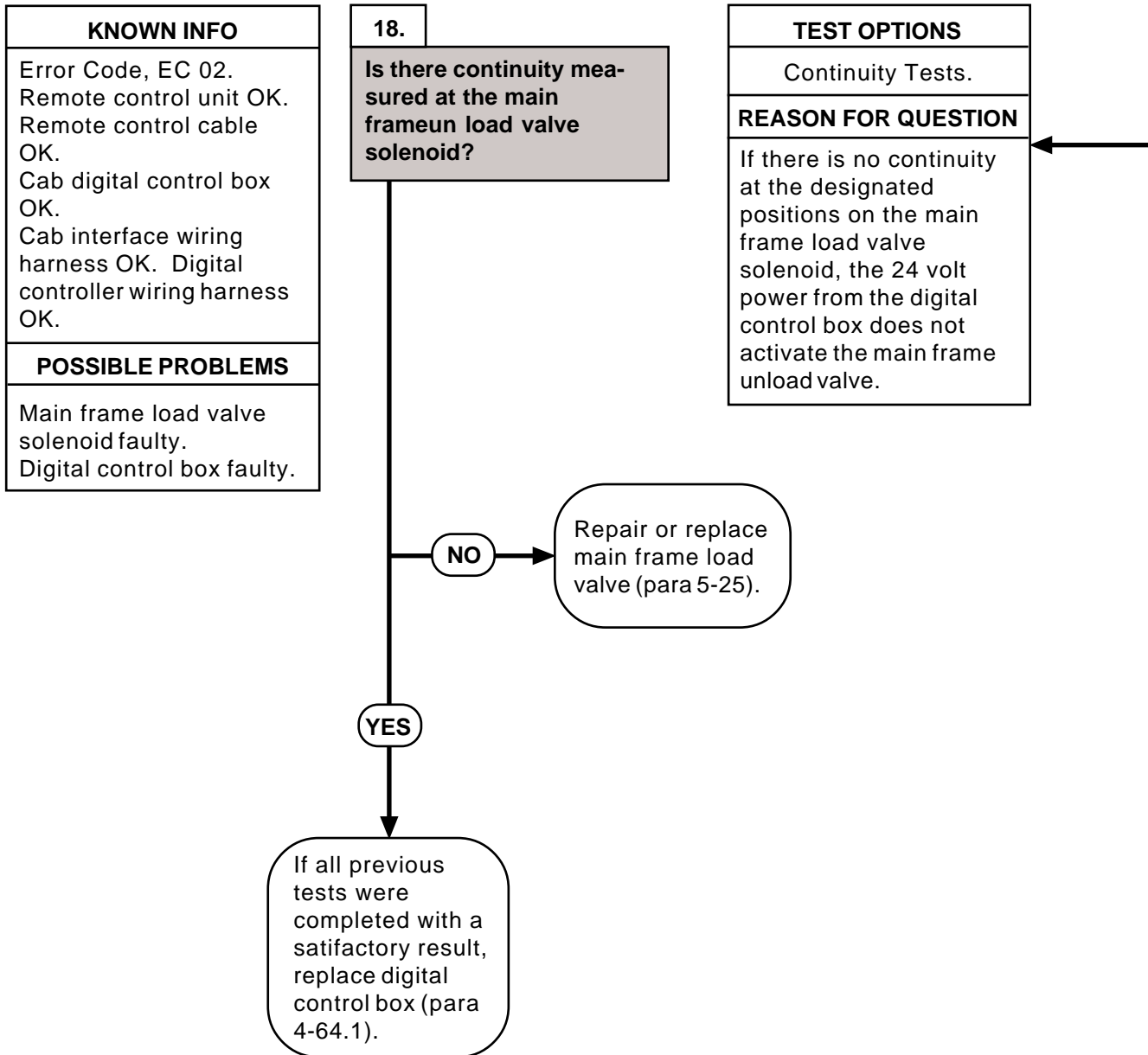


4-12. UNIT TROUBLESHOOTING (continued).

14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

NOTE

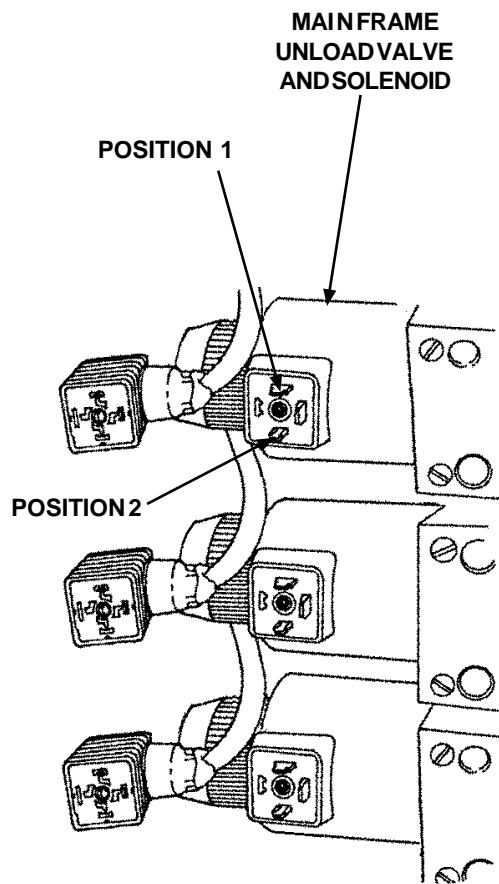
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

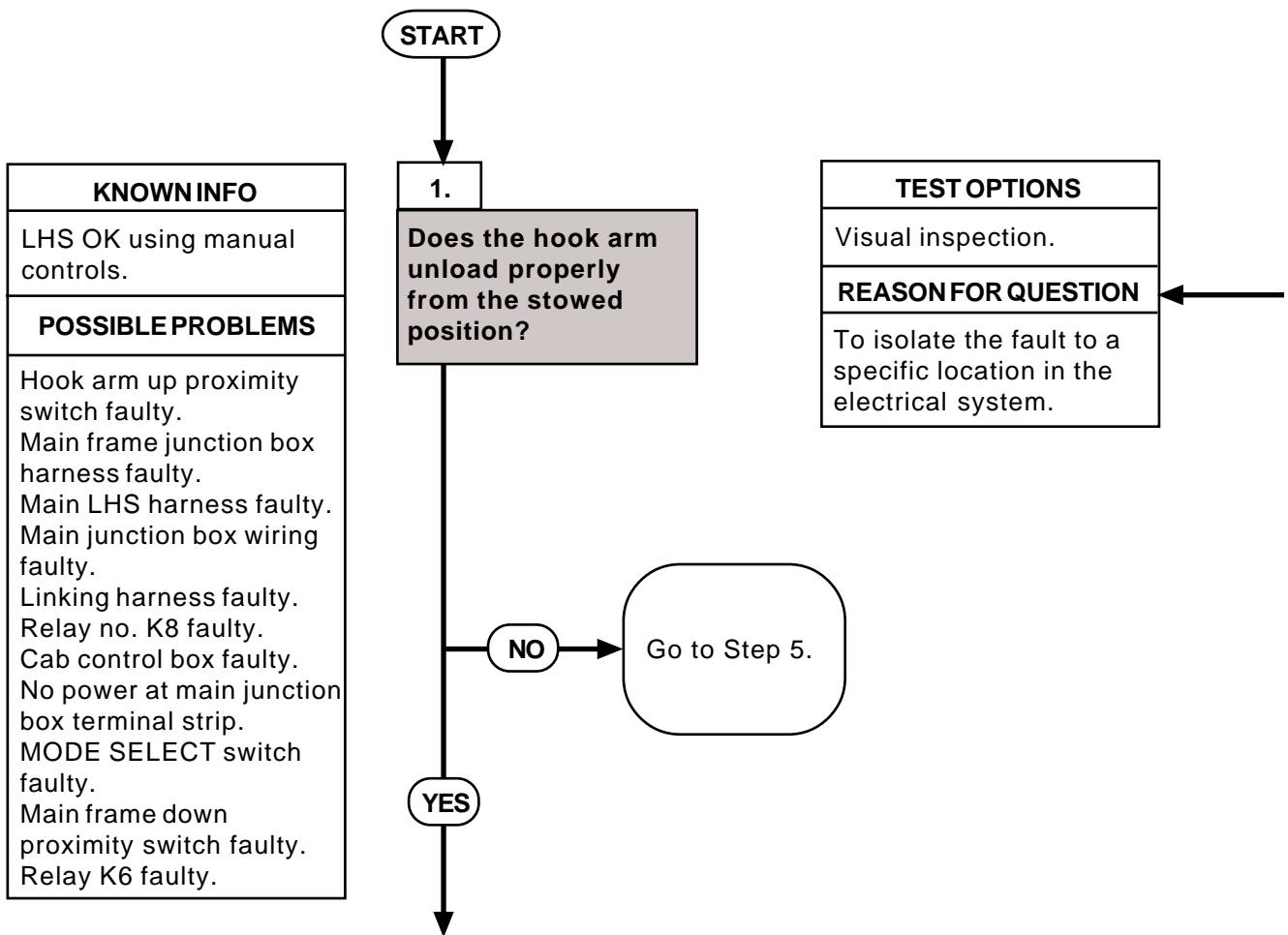
14. MAIN FRAME DOES NOT UNLOAD IN MANUAL MODE (MODEL B ONLY) (continued).

<b>CONTINUITY TEST</b>
<b><u>CAUTION</u></b>
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<b>NOTE</b>
<p>A reading of infinity indicates an open circuit.</p> <p>(1) Set multimeter to ohms position.                  (2) Connect multimeter between position "1" and position "2" on main frame unload valve solenoid. Check multimeter for continuity.</p>



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY).	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Multimeter (ANURM105C)	Engine turned off (TM 9-2320-279-10)
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Parking brake applied (TM 9-2320-279-10)
	Wheels chocked (TM 9-2320-279-10)
<i>Personnel Required:</i>	
Two	





**4-12. UNIT TROUBLESHOOTING (continued).****15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).****VISUAL INSPECTION****NOTE**

MODE SELECT switch must remain in position 1 (AUTO) for all tests within this fault.

- (1) Turn LHS MODE SELECT switch to position 1 (AUTO).

**NOTE**

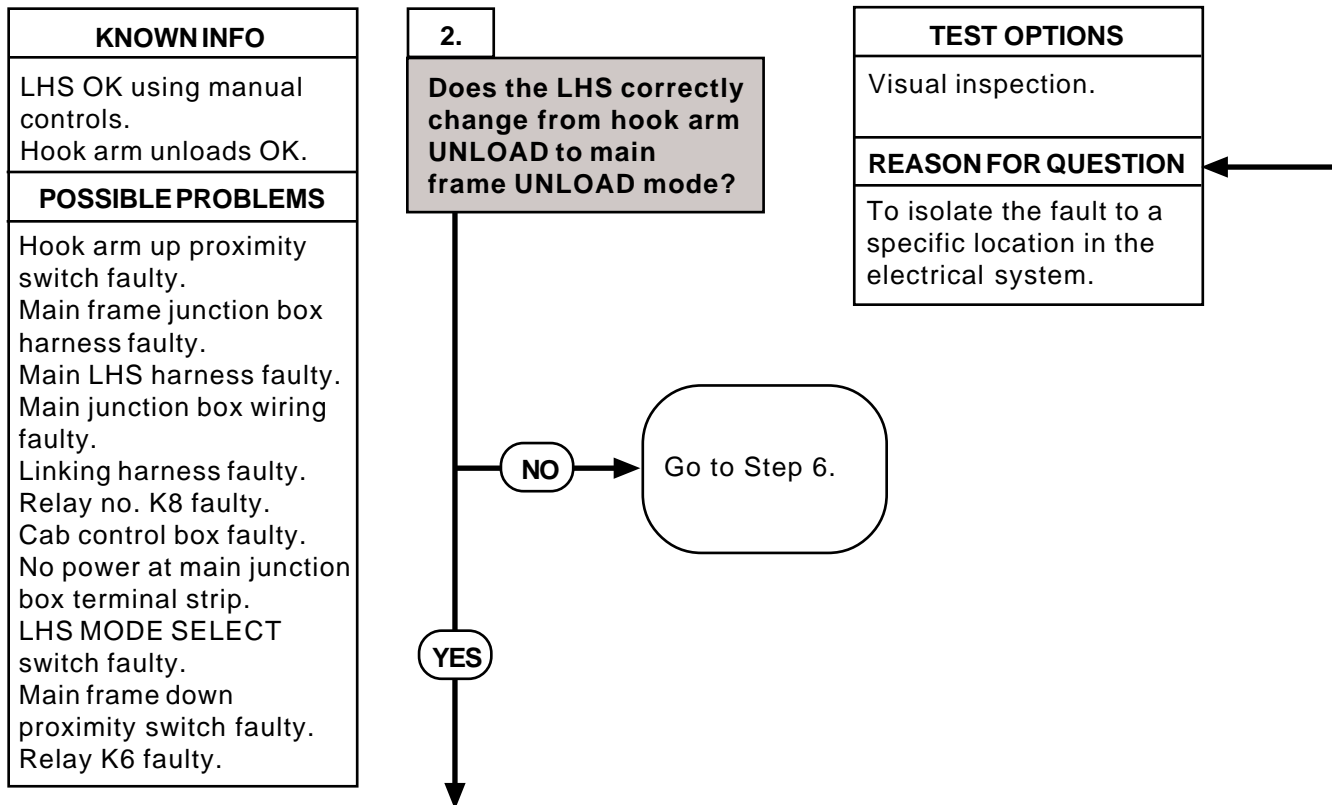
Refer to Chapter 2 for specific LHS operating instructions.

- (2) Attempt to actuate LHS through a complete UNLOAD/LOAD cycle using the cab controls. Note which phase of the cycle the problem occurs:

- Hook arm UNLOAD
- Main frame UNLOAD
- Main frame LOAD
- Hook arm LOAD

4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).



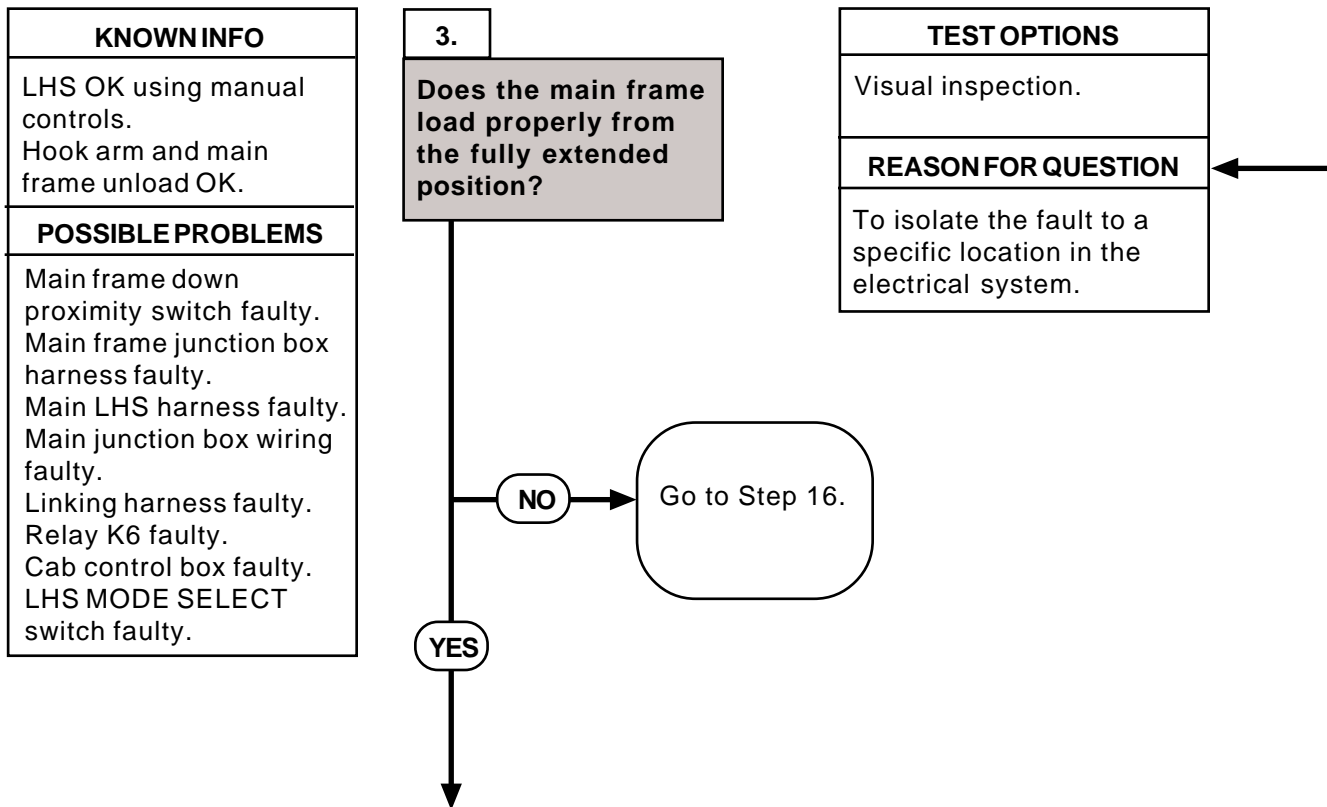
**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**

— Answer this question based on  
the results obtained in Step 1.

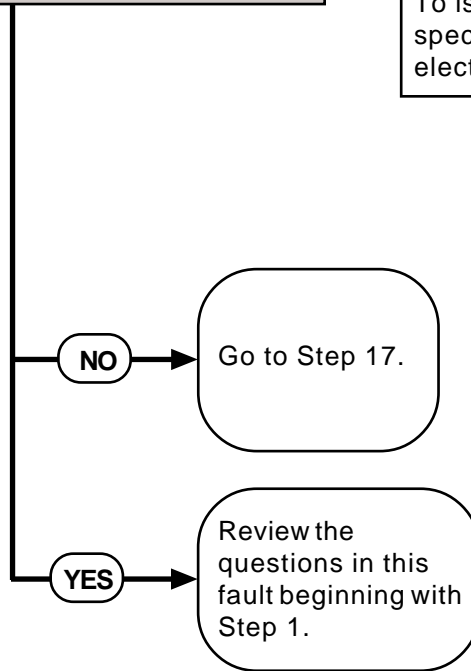
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm and main frame unload OK. Main frame loads OK.
POSSIBLE PROBLEMS
Main frame down proximity switch faulty. Main frame junction box harness faulty. Main LHS harness faulty. Main junction box wiring faulty. Linking harness faulty. Relay K6 faulty. Cab control box faulty. LHS MODE SELECT switch faulty.

4.  
Does the LHS correctly change from main frame LOAD to hook arm LOAD mode?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
To isolate the fault to a specific location in the electrical system.



**4-12. UNIT TROUBLESHOOTING (continued).**

- 15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**

— | Answer this question based on  
the results obtained in Step 1.

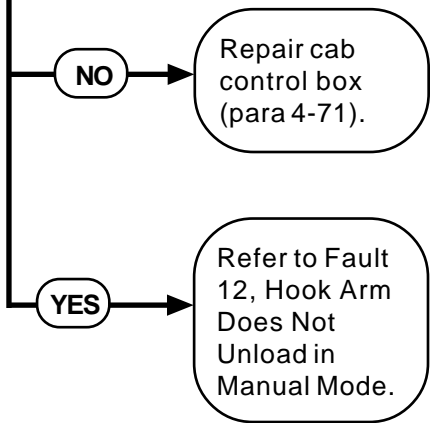
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

<b>KNOWN INFO</b>
LHS OK using manual controls. Hook arm fails to unload.
<b>POSSIBLE PROBLEMS</b>
LHS MODE SELECT switch faulty.

5.  
Are 22–28 volts measured on the socket for relay K8, position 30?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
When unloading In the AUTO mode, power is supplied from the function switch through the selector valve on to the rest of the hook arm unload circuit. If there is voltage measured at the socket for relay K8, the LHS MODE SELECT switch is functioning properly.

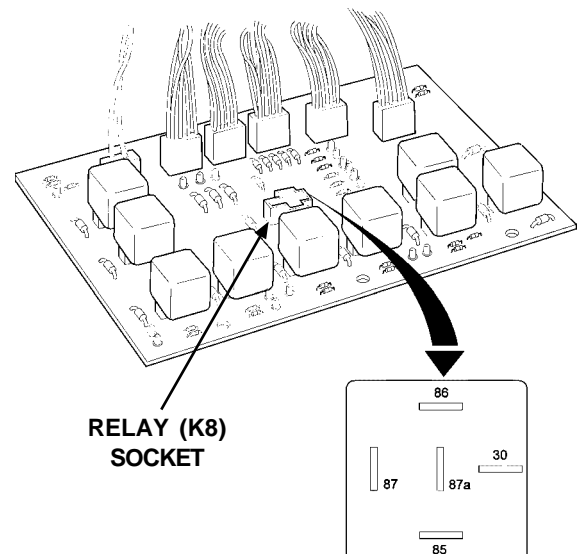
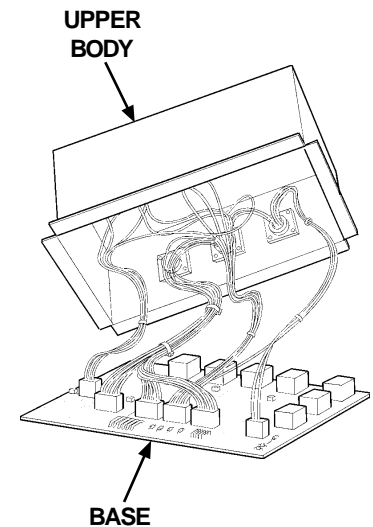
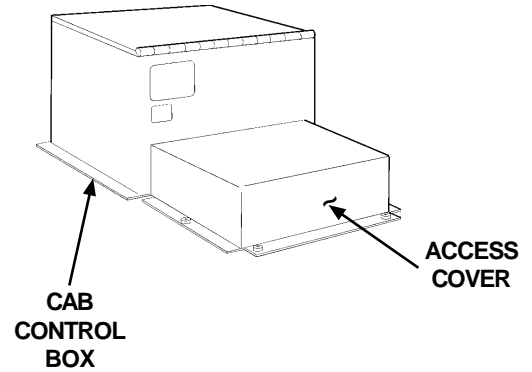




**4-12. UNIT TROUBLESHOOTING (continued).**

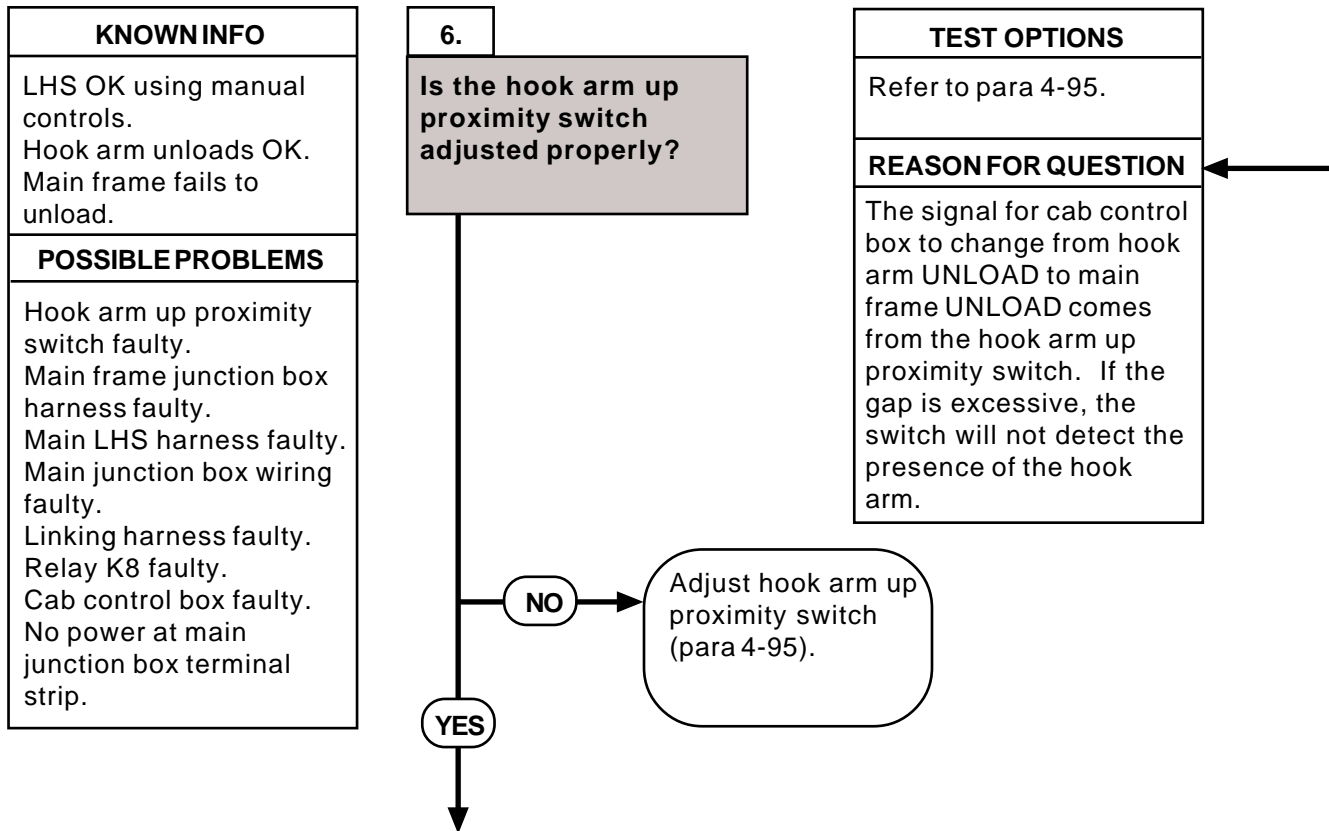
**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).**

VOLTAGE TEST
<p>(1) Remove four screws and lockwashers and access panel from heater compartment.</p> <p>(2) Remove four screws and lockwashers from cab control box.</p> <p>(3) Remove six screws from cab control box and separate upper body from base.</p>
<p><b>CAUTION</b></p> <p><b>Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.</b></p>
<p>(4) Remove relay K8 from cab control box circuit board.</p> <p>(5) Turn engine start switch to ON position.</p> <p>(6) Turn light control switch to STOP LIGHT position.</p> <p>(7) Set multimeter to voltage position.</p>
<p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• This test can also be accomplished by observing the status of LEDD56.</li> </ul>
<p>(8) Connect one multimeter lead to terminal 30 of relay K8 socket and the other multimeter lead to a known good ground, while assistant holds the joystick in the UNLOAD position. Check multimeter for voltage.</p>



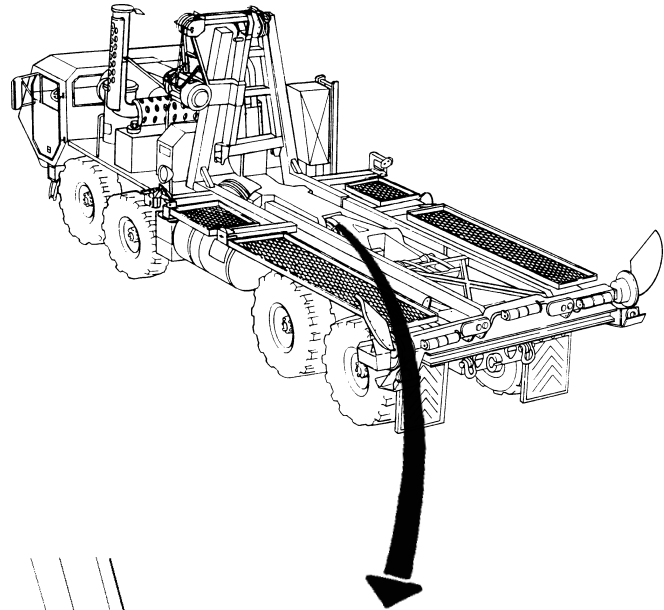
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

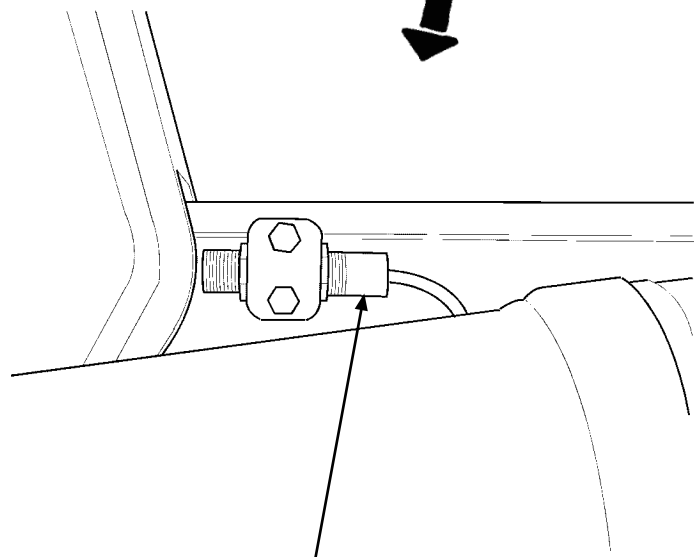


**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**



Refer to para 4-95 for specific proximity switch adjustment procedures.



**HOOK ARM UP  
PROXIMITY SWITCH**

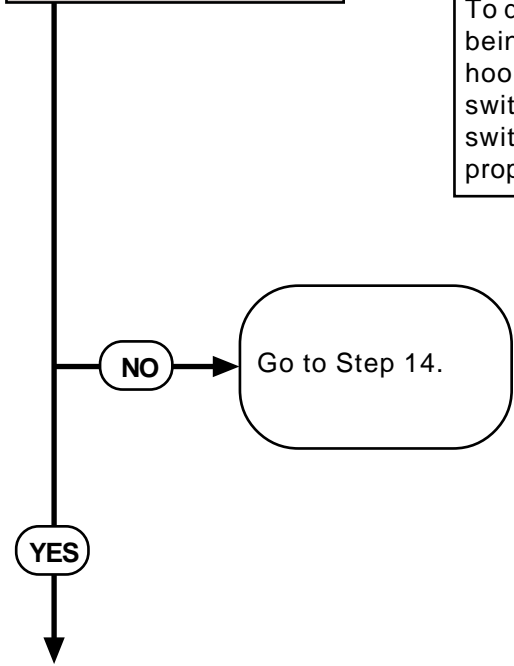
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm unloads OK. Main frame fails to unload. Hook arm up proximity switch OK.
POSSIBLE PROBLEMS
Hook arm up proximity switch faulty. Main frame junction box harness faulty. Main LHS harness faulty. Main junction box wiring faulty. Linking harness faulty. Relay K8 faulty. Cab control box faulty. No power at main junction box terminal strip.

7.  
Is the LED on the hook arm up proximity switch illuminated?

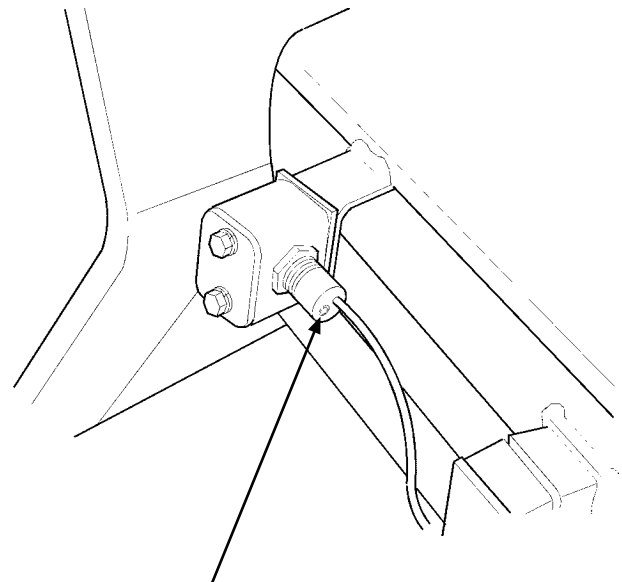
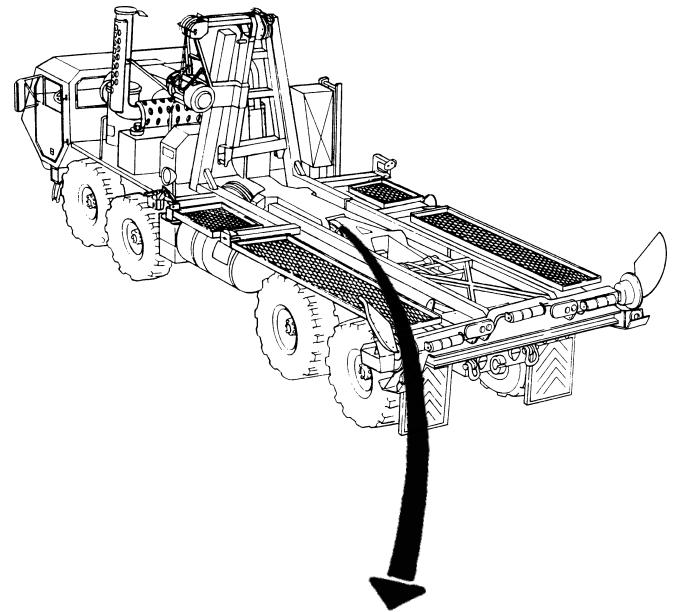
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
To determine if voltage is being supplied to the hook arm up proximity switch and to verify if the switch is functioning properly.



**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).**

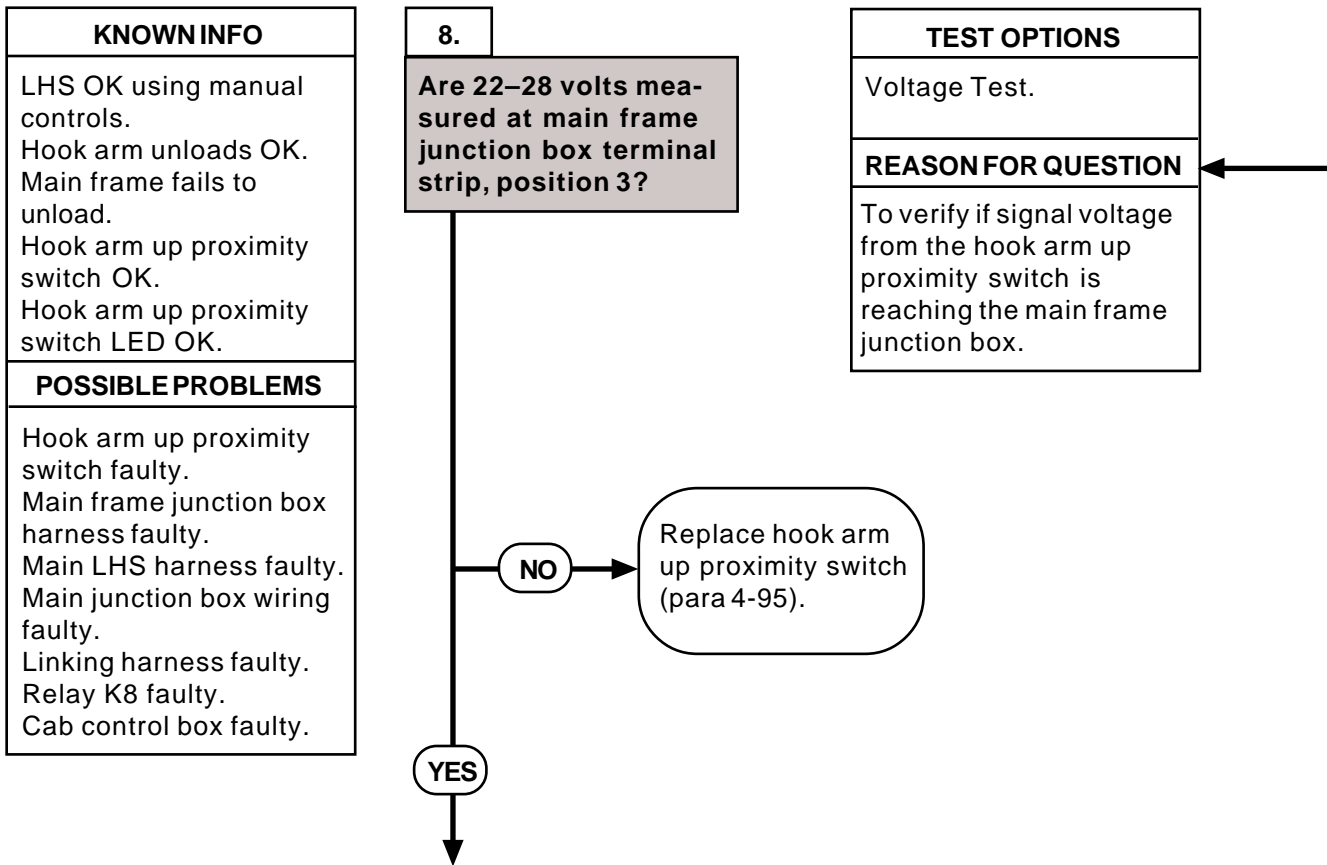
<b>VISUAL INSPECTION</b>	
<ol style="list-style-type: none"> <li>(1) Start engine.</li> <li>(2) Turn light control switch to SPOT LIGHT position.</li> </ol>	<p><b>NOTE</b></p> <p>LED should be on when hook arm is fully extended, off when hook arm is stowed.</p>
<ol style="list-style-type: none"> <li>(3) Fully extend hook arm and shut off engine.</li> <li>(4) Turn engine start switch to ON position and observe status of LED.</li> <li>(5) Turn engine start switch and light control switch to OFF position.</li> </ol>	



**HOOK ARM UP  
PROXIMITY  
SWITCH LED**

4-12. UNIT TROUBLESHOOTING (continued).

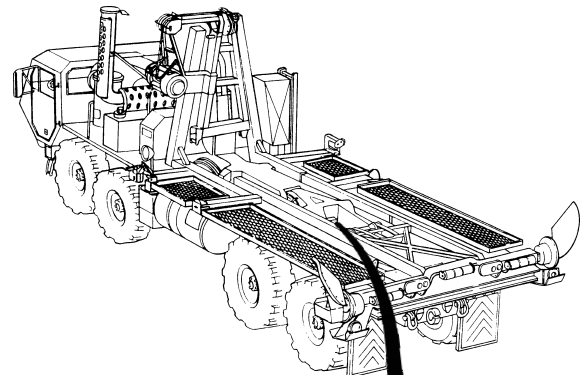
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



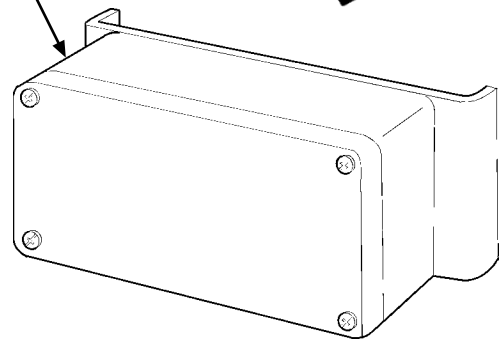
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

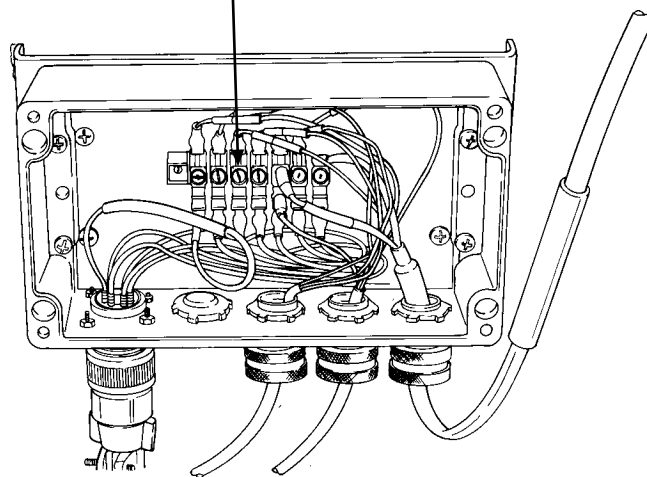
VOLTAGE TEST
(1) Loosen four screws and remove cover from main frame junction box.
<b>NOTE</b>
Leave hook arm in the UP position until advised otherwise.
(2) Turn engine start switch to ON position.
(3) Turn light control switch to SPOT LIGHT position.
(4) Set multimeter to voltage position.
(5) Place positive (+) probe of multimeter on main frame junction box terminal strip, position 3.
(6) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
(7) Turn engine start switch and light control switch to OFF position.



MAIN FRAME JUNCTION BOX

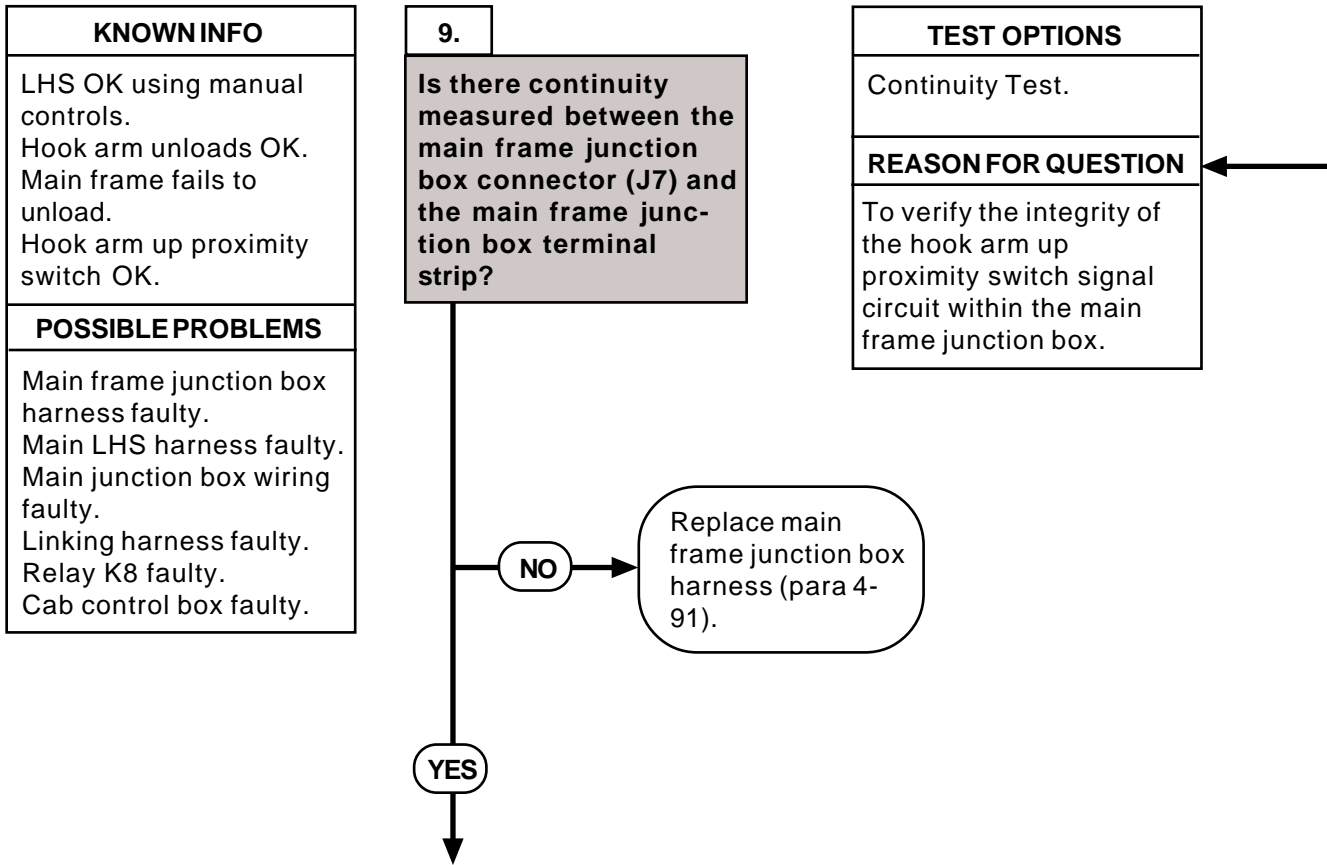


TERMINAL STRIP, POSITION 3



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

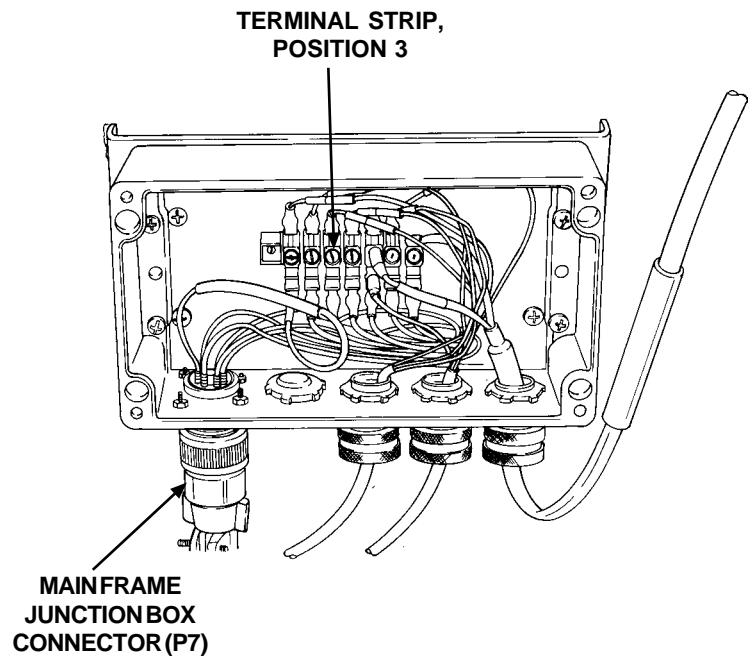




4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Remove main frame junction box connector (P7) from main frame junction box.</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between main frame junction box connector (J7), position C, and terminal strip, position 3.</p>	



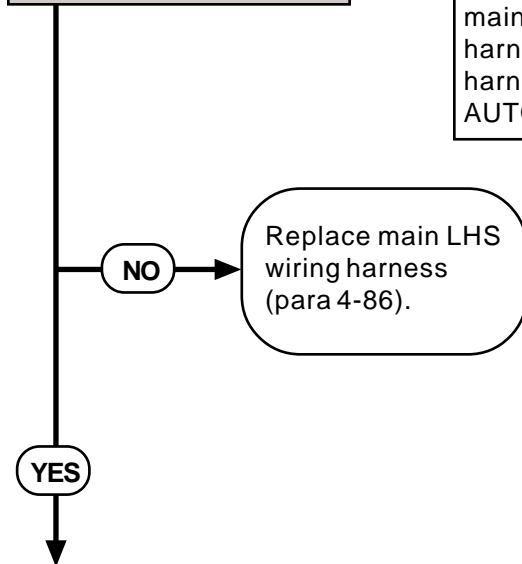
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm unloads OK. Main frame fails to unload. Hook arm up proximity switch OK. Main frame junction box harness OK.
POSSIBLE PROBLEMS
Main LHS harness faulty. Main junction box wiring faulty. Linking harness faulty. Relay K8 faulty. Cab control box faulty.

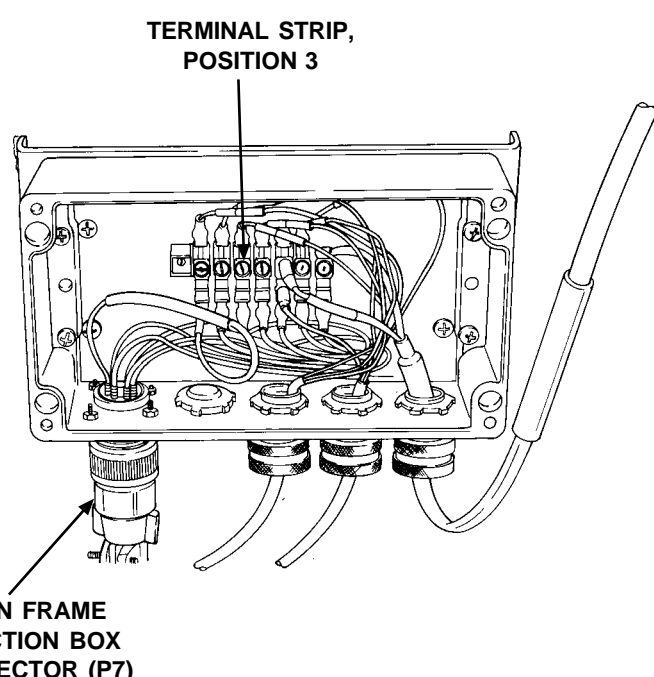
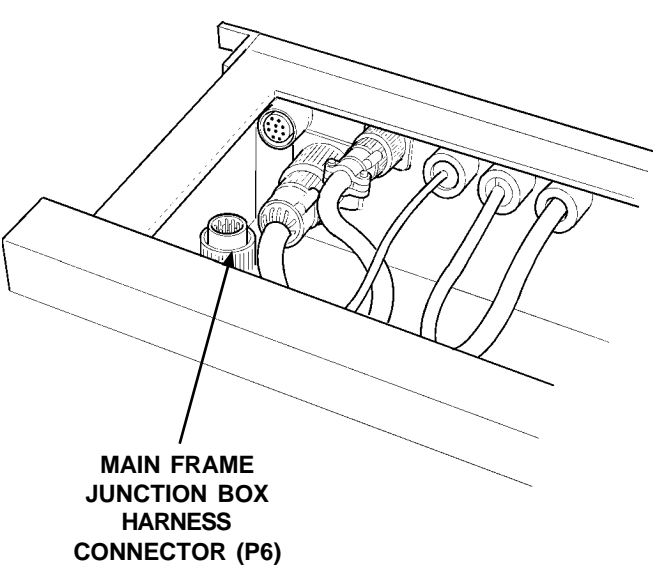
10. Is there continuity measured on the main LHS wire harness, between the main frame junction box harness connector (P6) and connector (P7)?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
The hook arm up proximity switch signal is transferred from the main frame junction box to the main junction box via this harness. Faults in this harness will prevent AUTO operation.



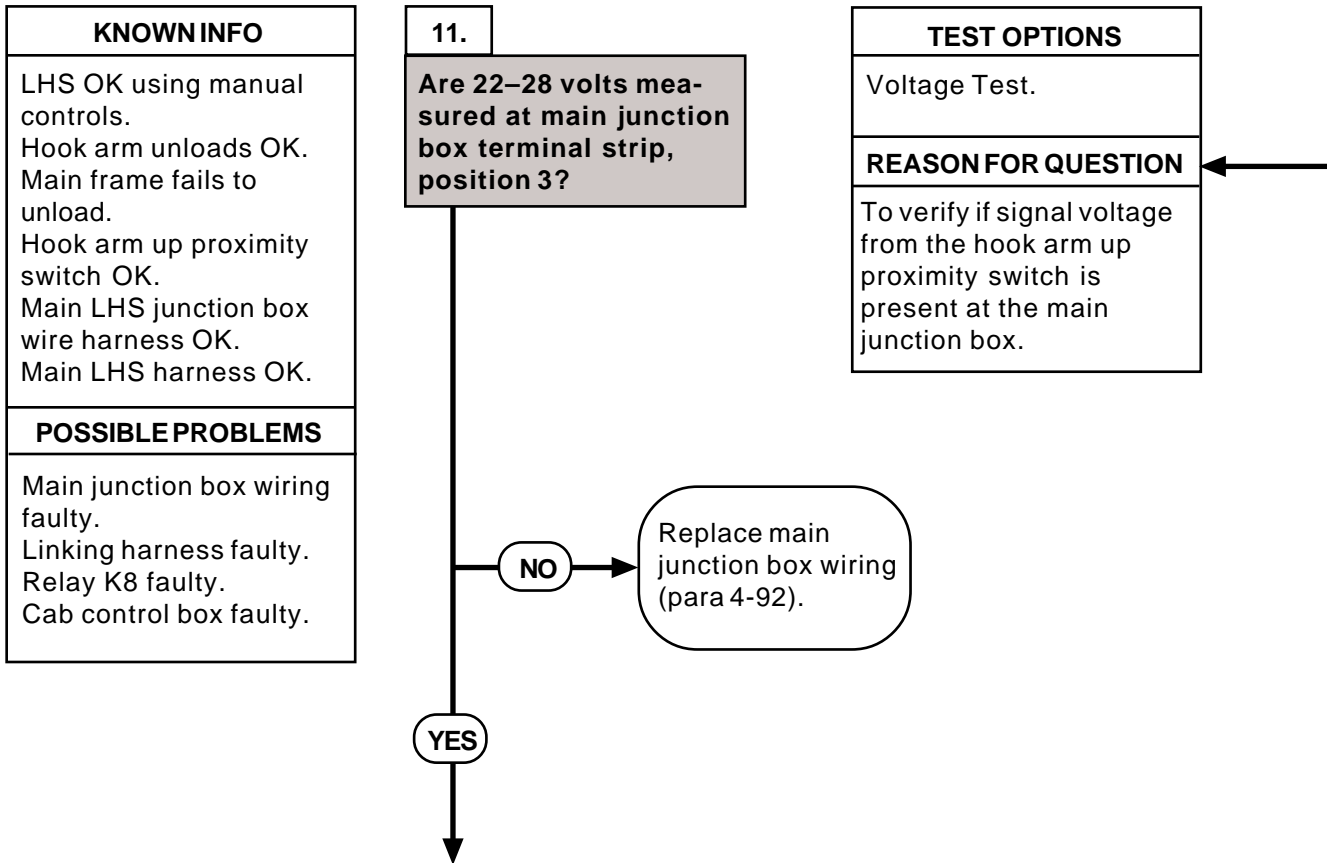
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

<b>CONTINUITY TEST</b>	
<p>(1) Remove hydraulic cabinet cover (para 4-60).</p> <p>(2) Disconnect main frame junction box connector (P6) from main junction box.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p> <p>(3) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">A reading of infinity indicates an open circuit.</p> <p>(4) Connect multimeter to terminals at each end of wire and check multimeter for continuity. Check main LHS wire harness, position C.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">Any reading besides infinity indicates a grounded wire.</p> <p>(5) Remove multimeter lead from one end of wire and connect to chassis ground.</p> <p>(6) Reinstall main LHS wire harness connectors (P6) and (P7) on main frame junction box and main junction box.</p>	 <p style="text-align: center;"><b>TERMINAL STRIP, POSITION 3</b></p> <p style="text-align: center;"><b>MAIN FRAME JUNCTION BOX CONNECTOR (P7)</b></p>  <p style="text-align: center;"><b>MAIN FRAME JUNCTION BOX HARNESS CONNECTOR (P6)</b></p>

4-12. UNIT TROUBLESHOOTING (continued).

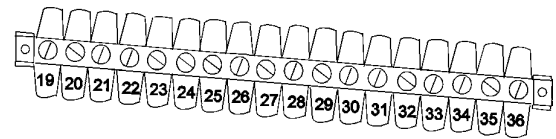
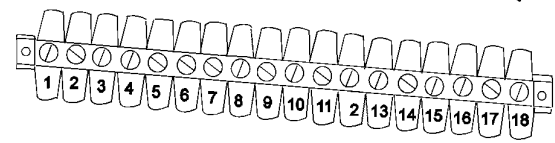
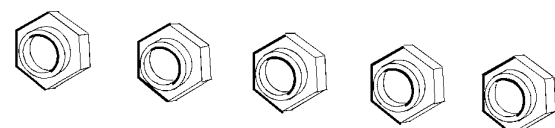
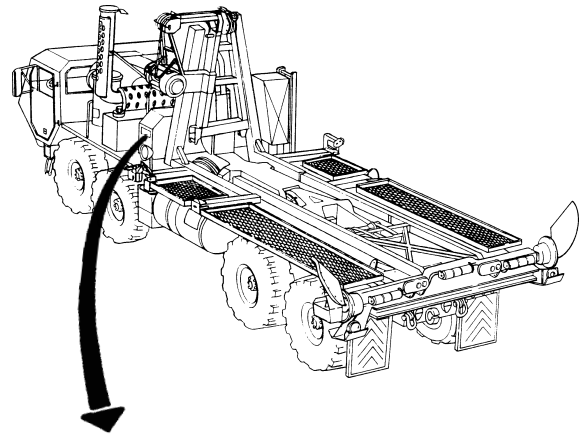
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

VOLTAGE TEST
(1) Open hydraulic cabinet cover.
(2) Loosen four screws on main junction box cover and open cover.
(3) Turn engine start switch to ON position.
(4) Turn light control switch to STOP LIGHT position.
(5) Set multimeter to voltage position.
(6) Place positive (+) probe of multimeter on terminal strip, position 3.
(7) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
(8) Turn engine start switch and light control switch to OFF position.



WIRING REMOVED FOR CLARITY

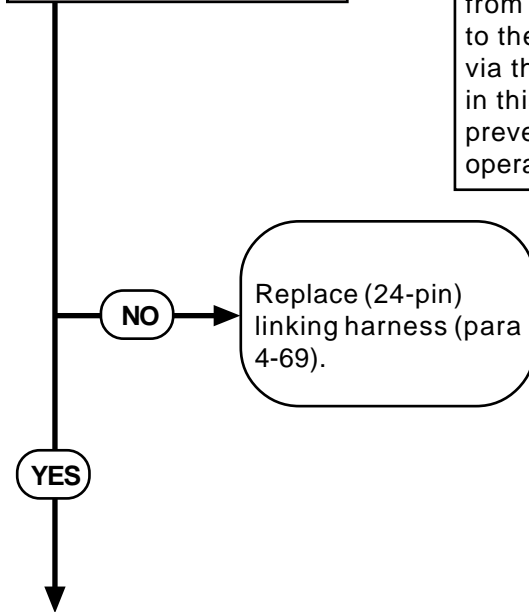
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm unloads OK. Main frame fails to unload. Hook arm up proximity switch OK. Main frame junction box wire harness OK. Main LHS harness OK. Main frame junction box wire harness OK.
POSSIBLE PROBLEMS
Linking harness faulty. Relay K8 faulty. Cab control box faulty.

12.  
Is there continuity measured on the (24-pin) linking harness between cab control box connector (P2) and main junction box connector (P4)?

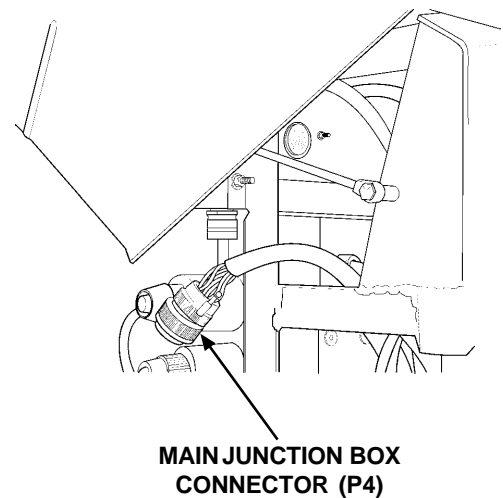
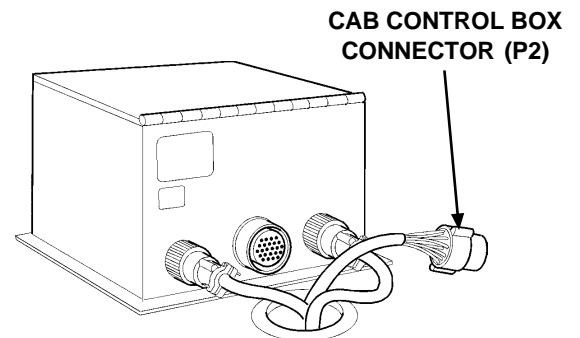
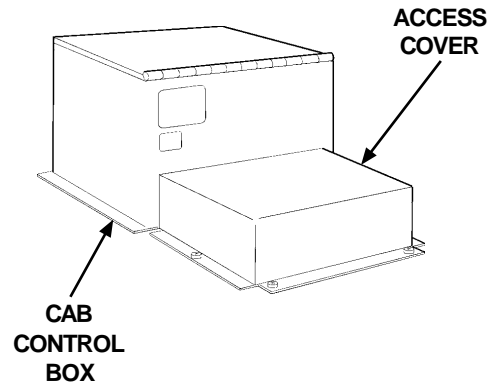
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Supply voltage, signal voltage, and ground circuit are transferred from the cab control box to the main junction box via this harness. Faults in this harness will prevent proper LHS operation.



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p> <p>(1) Remove four screws and lockwashers and access cover from heater compartment.</p> <p>(2) Disconnect wiring from components.</p> <p>(3) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p> <p>(4) Connect multimeter to leads at each end of wire and check multimeter for continuity. Check (24-pin) linking harness, positions C and F.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Any reading besides infinity indicates a grounded wire.</p> <p>(5) Remove multimeter lead from one end of wire and connect to chassis ground.</p>
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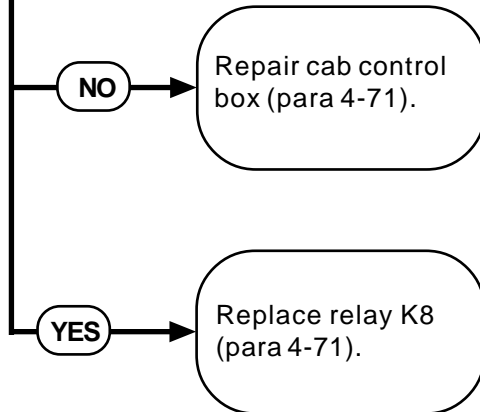
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm unloads OK. Main frame fails to unload. Hook arm up proximity switch OK. Main frame junction box harness OK. Main LHS harness OK. Main junction box wiring OK. Linking harness OK.
POSSIBLE PROBLEMS
Relay K8 faulty. Cab control box faulty.

13.  
Are 22–28 volts measured on the socket for relay K8, position 86?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
The main frame unload function is triggered by the closing of relay K8, which is controlled by a proximity switch. If voltage is measured at relay K8 socket, it indicates that the signal voltage from the proximity switch is reaching the relay.

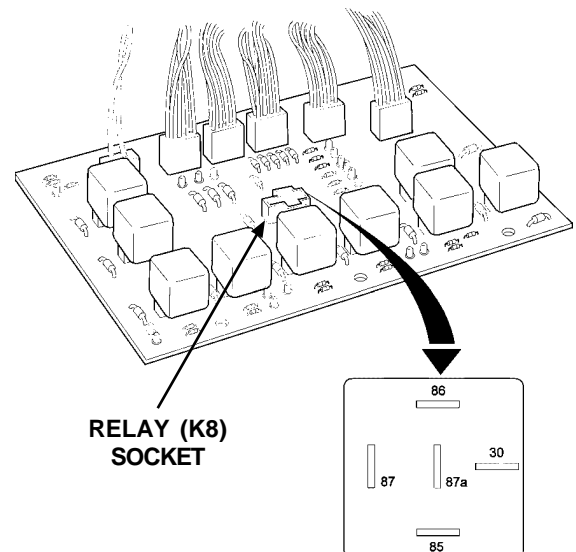
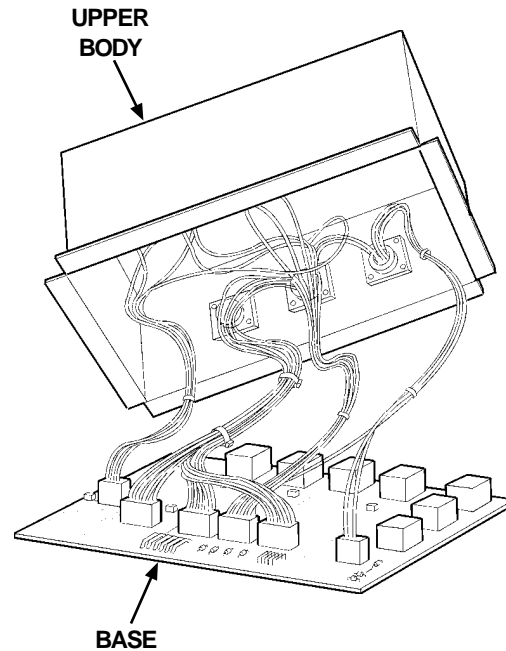




4-12. UNIT TROUBLESHOOTING (continued).

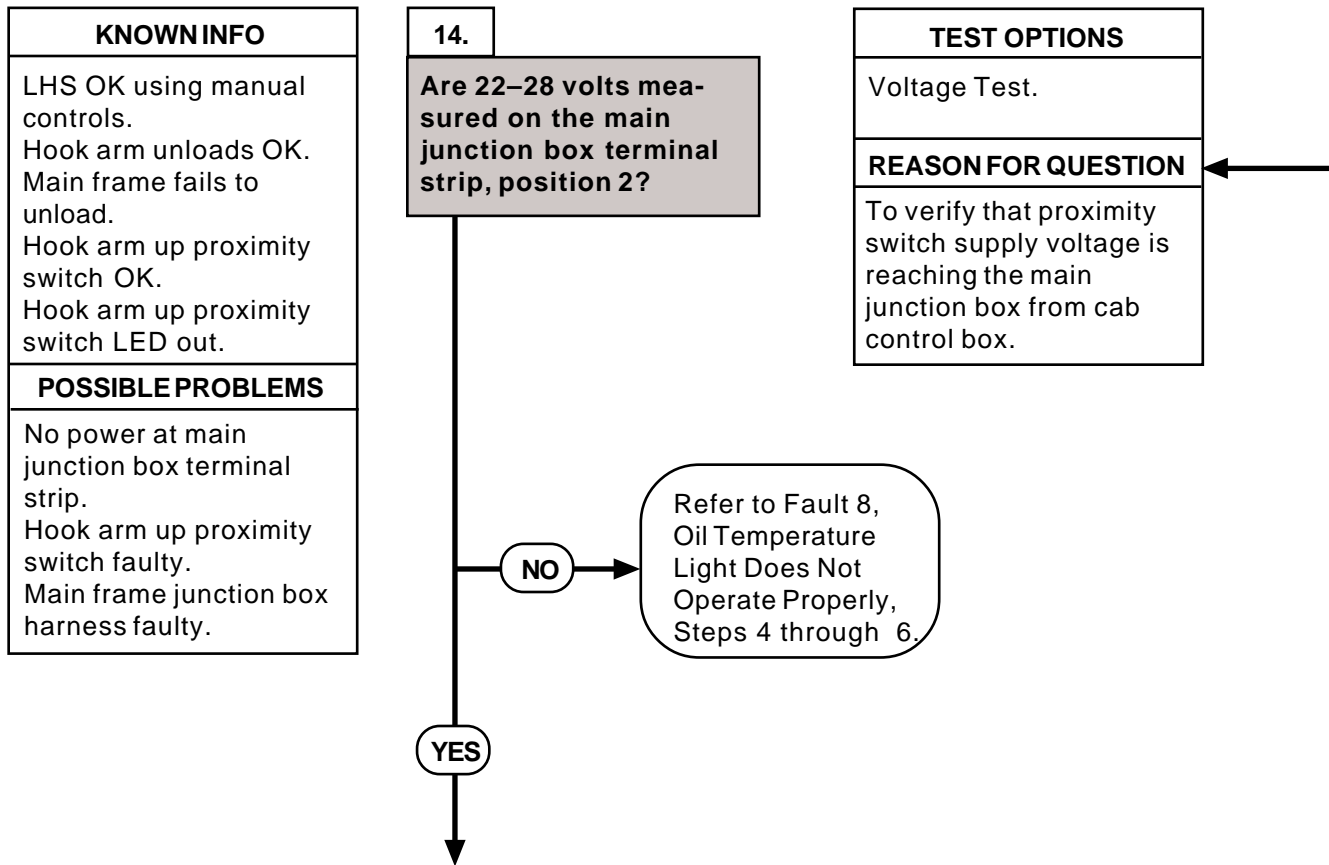
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

VOLTAGE TEST
<p>(1) Remove four screws and lockwashers from cab control box.</p> <p>(2) Remove six screws from cab control box and separate upper body from base.</p>
<p><b>CAUTION</b></p> <p>Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.</p>
<p>(3) Remove relay K8 from cab control box circuit board.</p> <p>(4) Turn engine start switch to ON position.</p> <p>(5) Turn light control switch to STOP LIGHT position.</p> <p>(6) Set multimeter to voltage position.</p>
<p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• This test can also be accomplished by observing the status of LED D28.</li> </ul>
<p>(7) Connect one multimeter lead to terminal 86 of relay K8 socket and the other multimeter lead to a known good ground. Check multimeter for voltage.</p>



4-12. UNIT TROUBLESHOOTING (continued).

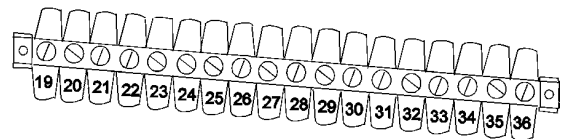
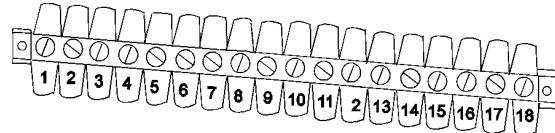
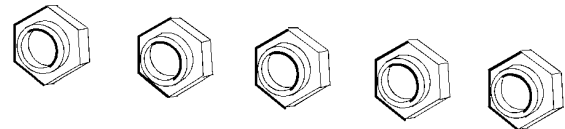
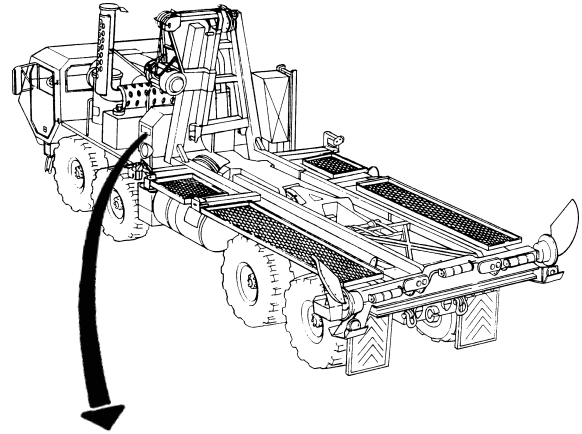
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).**

- | <b>VOLTAGE TEST</b> |   |
|---------------------|---|
|                     | (1) Open hydraulic cabinet cover.   |
|                     | (2) Loosen four screws on main junction box cover and open cover.   |
|                     | (3) Turn engine start switch to ON position.  |
|                     | (4) Turn light control switch to STOP LIGHT position.   |
|                     | (5) Set multimeter to voltage position.   |
|                     | (6) Place positive (+) probe of multimeter on terminal strip, position 2.                                 |
|                     | (7) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading. |
|                     | (8) Turn engine start switch and light control switch to OFF position.                                    |



**WIRING REMOVED FOR CLARITY**

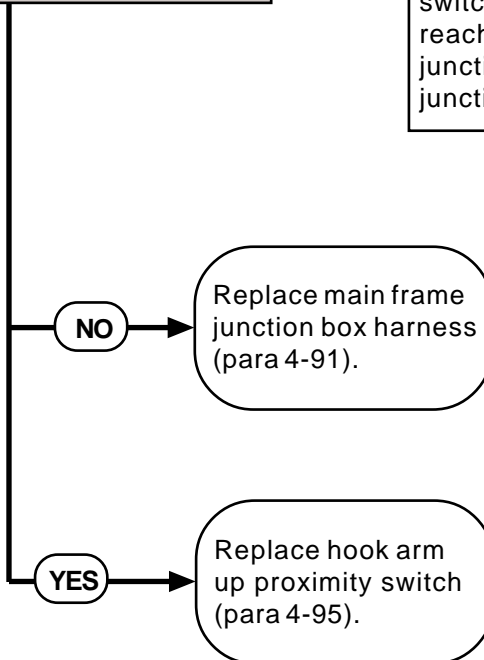
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm unloads OK. Main frame fails to unload. Hook arm up proximity switch OK. Hook arm up proximity switch LED out. Power at main junction box terminal strip.
POSSIBLE PROBLEMS
Hook arm up proximity switch faulty. Main frame junction box harness faulty.

15.  
Are 22–28 volts measured on the main frame junction box terminal strip, position 4?

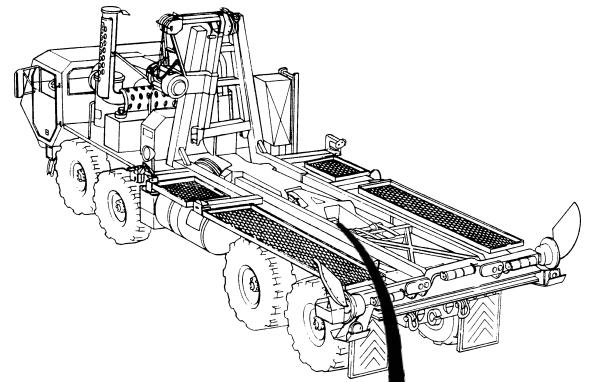
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
To verify that proximity switch supply voltage is reaching the main frame junction box from main junction box.



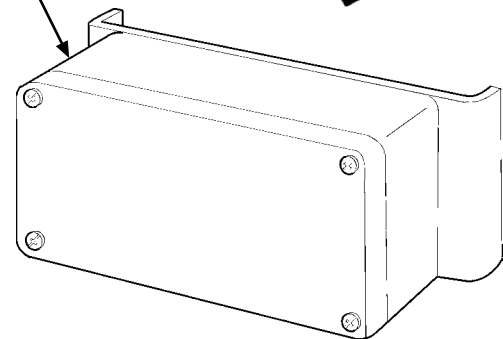
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

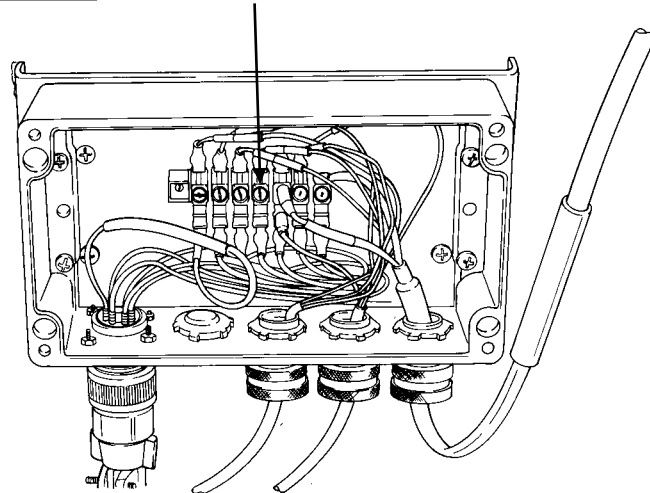
<b>VOLTAGE TEST</b>	
(1)	Loosen four screws and remove cover from main frame junction box.
<b>NOTE</b>	
Leave hook arm in the up position until advised otherwise.	
(2)	Turn engine start switch to ON position.
(3)	Turn light control switch to STOP LIGHT position.
(4)	Set multimeter to voltage position.
(5)	Place positive (+) probe of multimeter on main frame junction box terminal strip, position 4.
(6)	Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
(7)	Turn engine start switch and light control switch to OFF position.



**MAIN FRAME JUNCTION BOX**



**TERMINAL STRIP, POSITION 4**



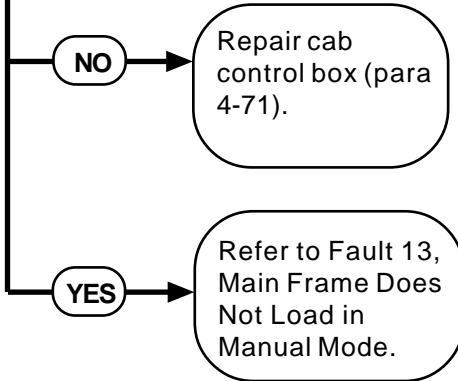
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

KNOWN INFO
LHS OK using manual controls. Hook arm and main frame unload OK. Main frame fails to load.
POSSIBLE PROBLEMS
LHS MODE SELECT switch faulty.

16. Are 22–28 volts measured on the socket for relay K6, position 30?

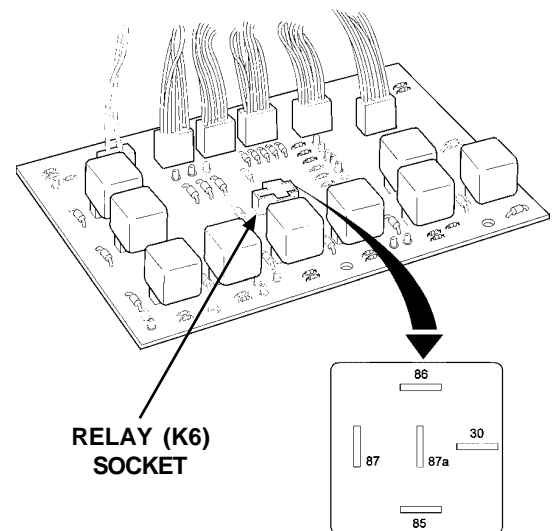
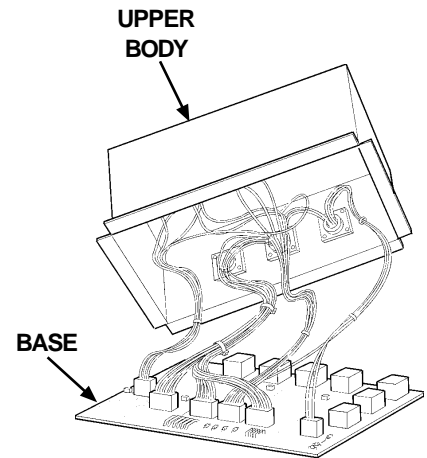
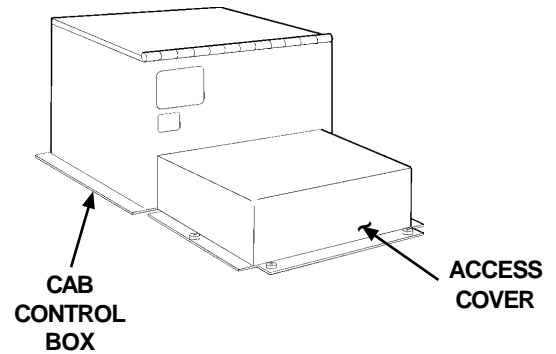
TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
When loading in the AUTO mode, power is supplied from the function switch through the LHS MODE SELECT switch on to the rest of the main frame load circuit. If voltage is present at the socket for relay K6, the LHS MODE SELECT switch is functioning properly.



**4-12. UNIT TROUBLESHOOTING (continued).**

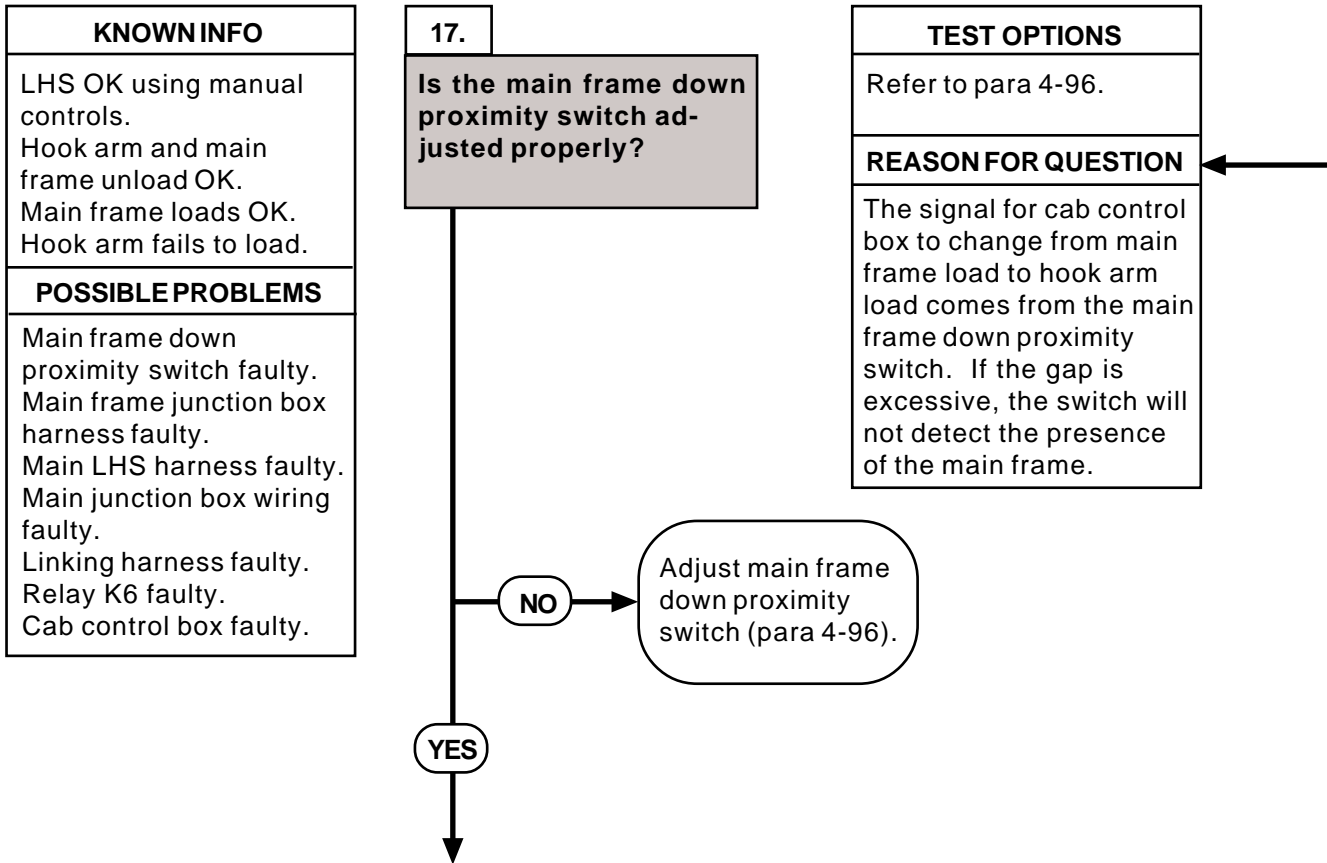
**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).**

VOLTAGE TEST
<p>(1) Remove four screws and lockwashers and access panel from heater compartment.</p> <p>(2) Remove four screws and lockwashers from cab control box.</p> <p>(3) Remove six screws from cab control box and separate upper body from base.</p>
<p><b>CAUTION</b></p> <p><b>Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.</b></p>
<p>(4) Remove relay K6 from cab control box circuit board.</p> <p>(5) Turn engine start switch to ON position.</p> <p>(6) Turn light control switch to STOP LIGHT position.</p> <p>(7) Set multimeter to voltage position.</p>
<p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• This test can also be accomplished by observing the status of LED D55.</li> </ul>
<p>(8) Connect one multimeter lead to terminal 30, of relay K6 socket and the other multimeter lead to a known good ground, while assistant holds the joystick in the LOAD position. Check multimeter for voltage.</p>



4-12. UNIT TROUBLESHOOTING (continued).

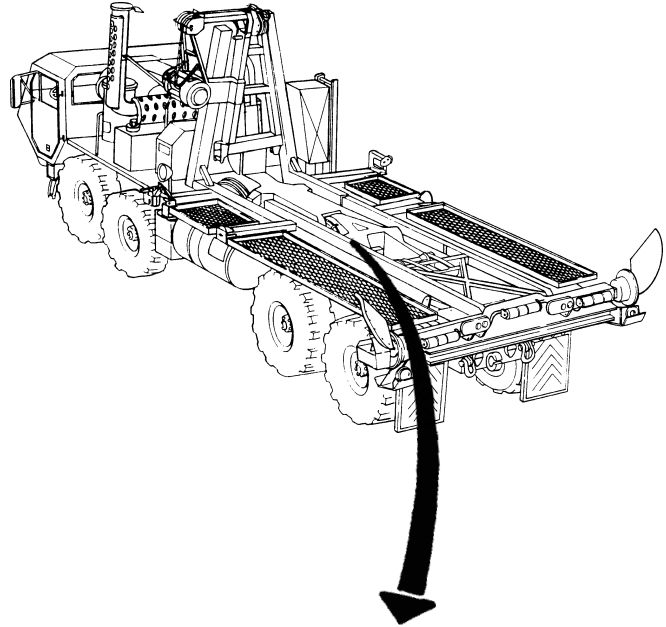
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).





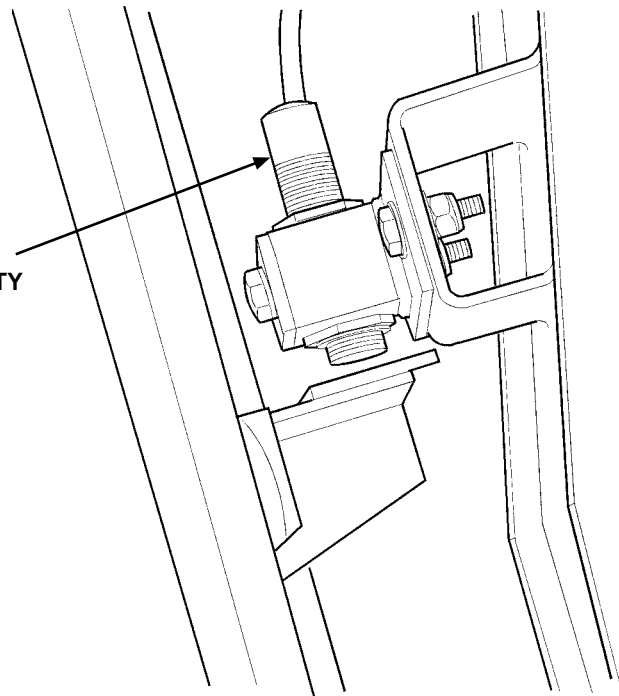
**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**



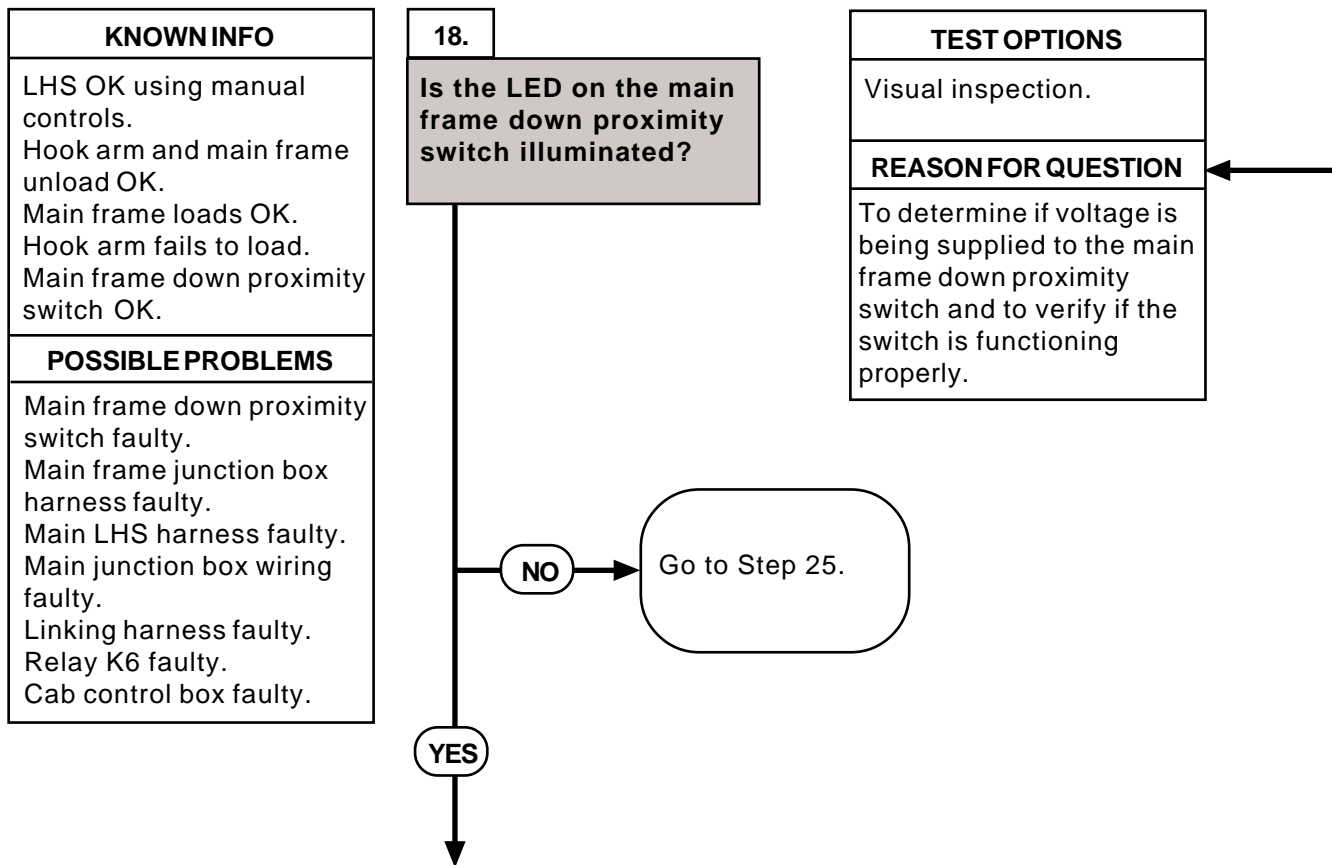
Refer to para 4-96 for specific proximity switch adjustment procedures.

**MAIN FRAME  
DOWN PROXIMITY  
SWITCH**



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**

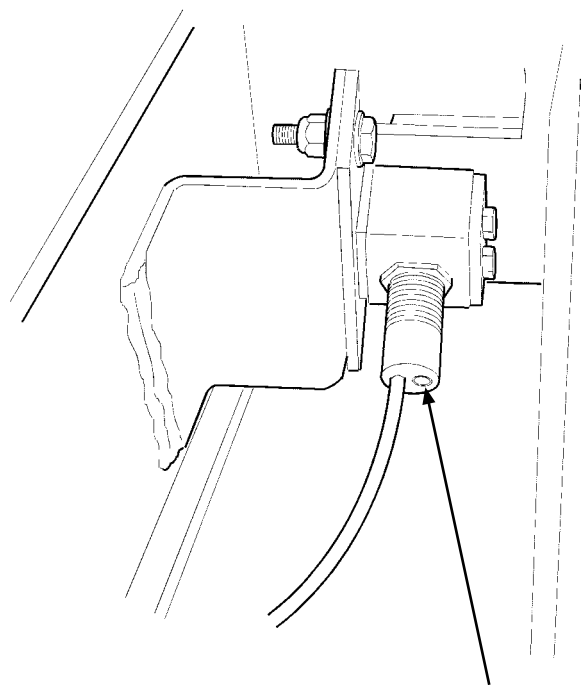
**CONTINUITY TEST**

- (1) Start engine.
- (2) Turn light control switch to STOP LIGHT position.

**NOTE**

LED should be on when main frame is fully retracted, off when main frame is extended.

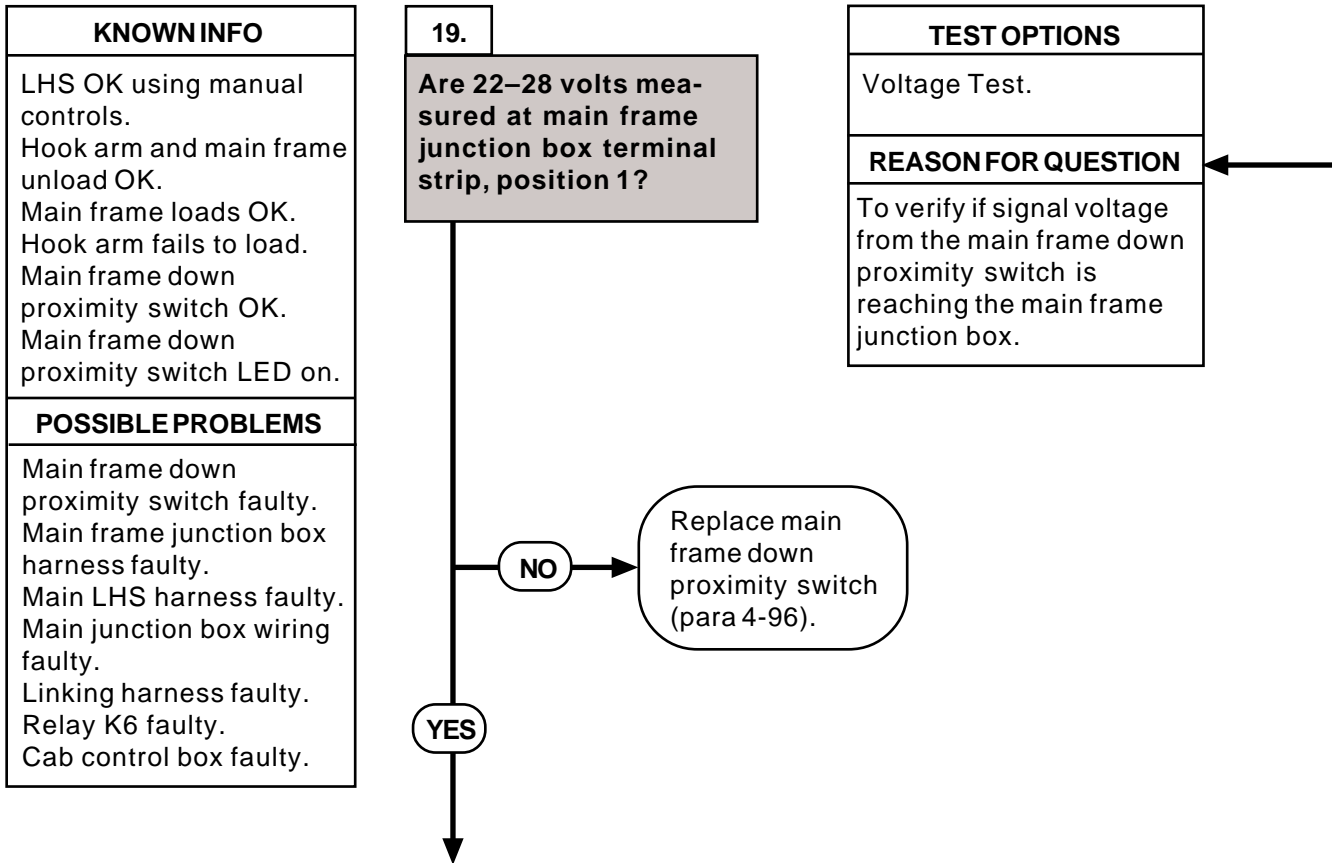
- (3) Fully retract main frame and shut off engine.
- (4) Turn engine start switch to ON position and observe status of LED.
- (5) Turn engine start switch and light control switch to OFF position.



**MAINFRAME  
DOWN PROXIMITY  
SWITCH LED**

4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).**

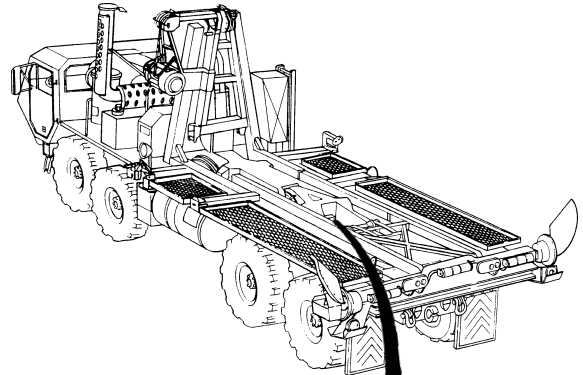
**VOLTAGE TEST**

- (1) Loosen four screws and remove cover from main frame junction box.

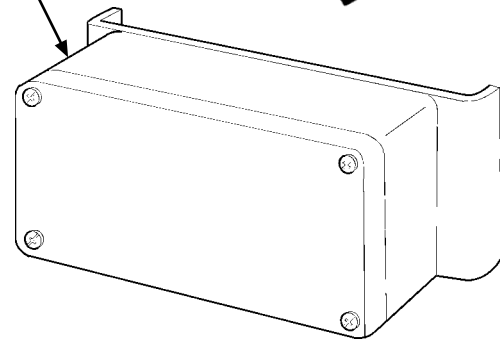
**NOTE**

Leave main frame in the down position until advised otherwise.

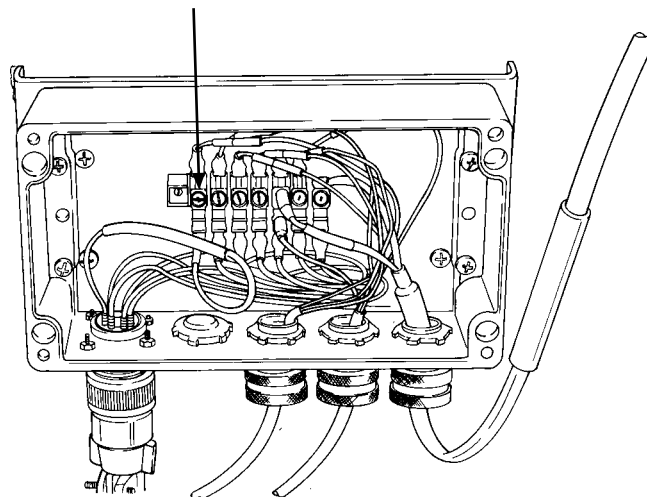
- (2) Turn engine start switch to ON position.
- (3) Turn light control switch to STOP LIGHT position.
- (4) Set multimeter to voltage position.
- (5) Place positive (+) probe of multimeter on main frame junction box terminal strip, position 1.
- (6) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
- (7) Turn engine start switch and light control switch to OFF position.



**MAIN FRAME JUNCTION BOX**

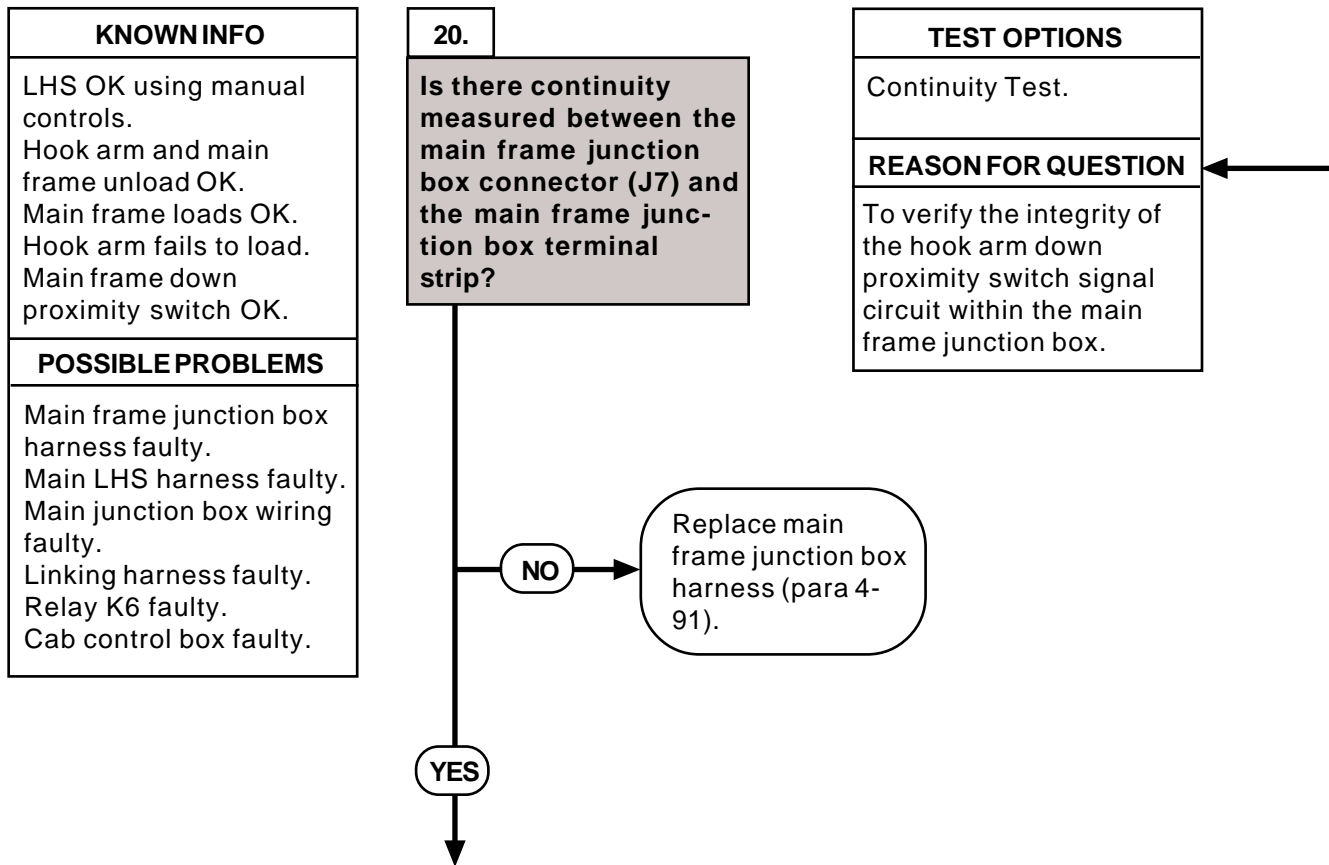


**TERMINAL STRIP, POSITION 1**



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

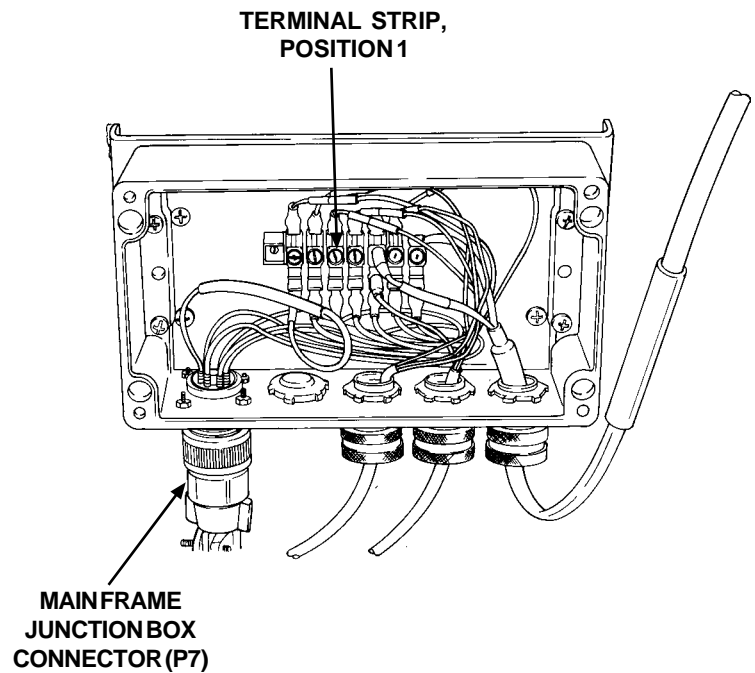
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove main frame junction box connector (P7) from main frame junction box.
- (2) Set multimeter to ohms position.

**NOTE**

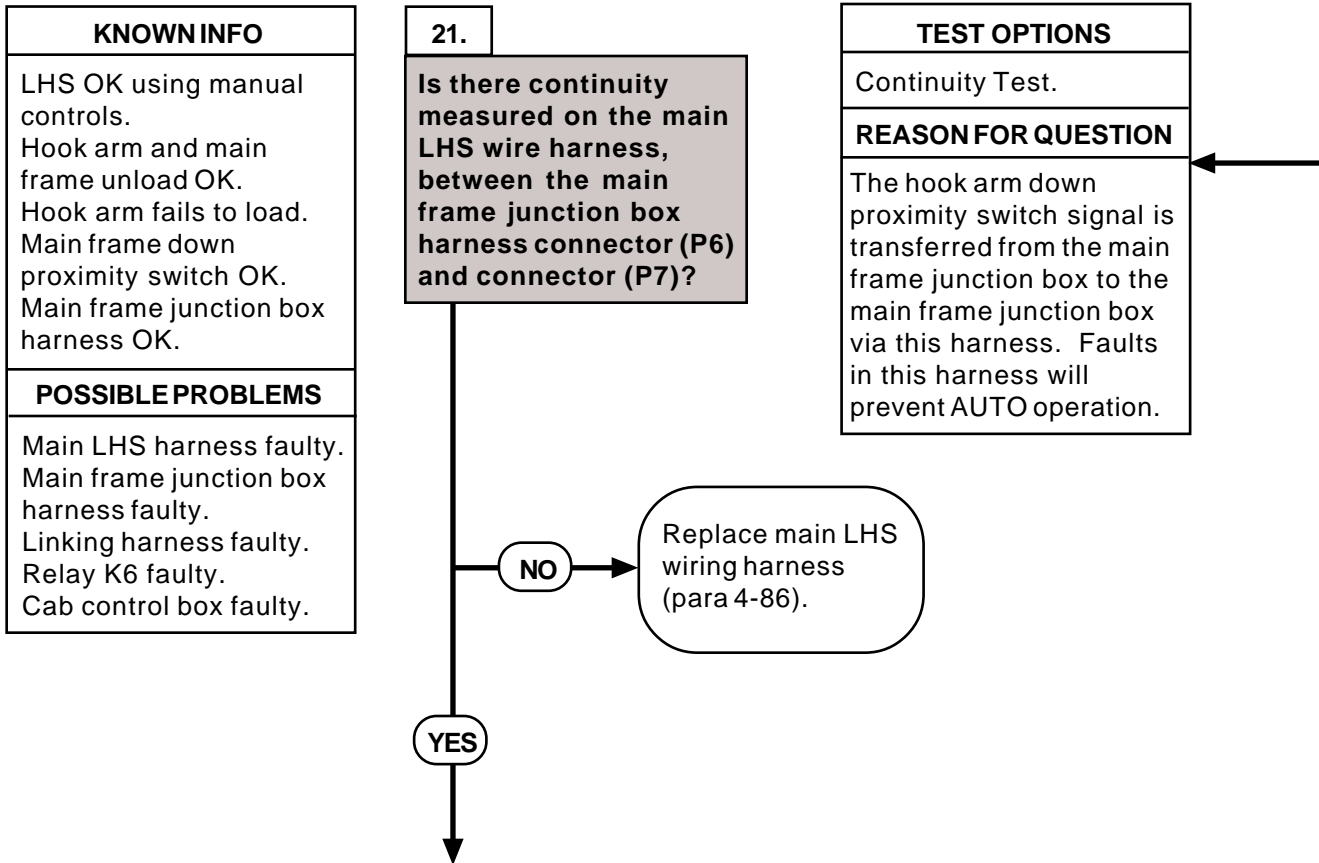
A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between main frame junction box connector (J7), position A, and terminal strip, position 1.



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).





4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

**CONTINUITY TEST**

- (1) Remove hydraulic cabinet cover (para 4-60).
- (2) Disconnect main frame junction box connector (P6) from main junction box.

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (3) Set multimeter to ohms position.

**NOTE**

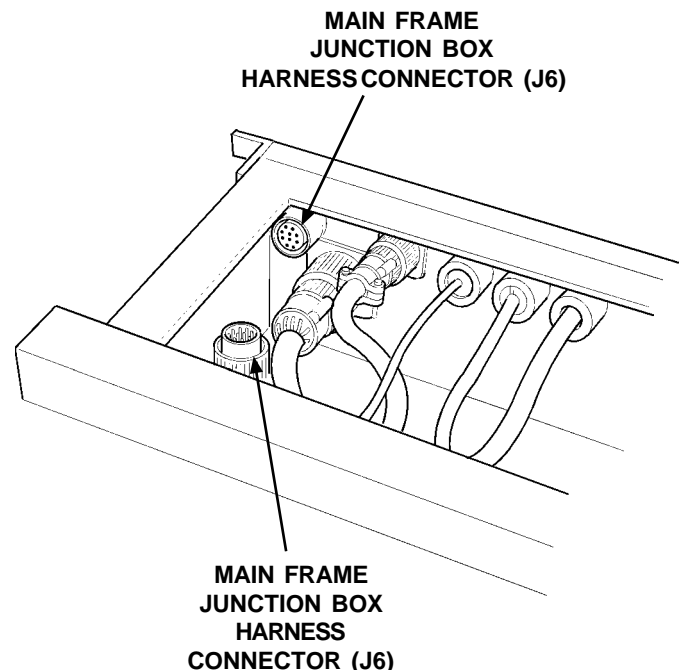
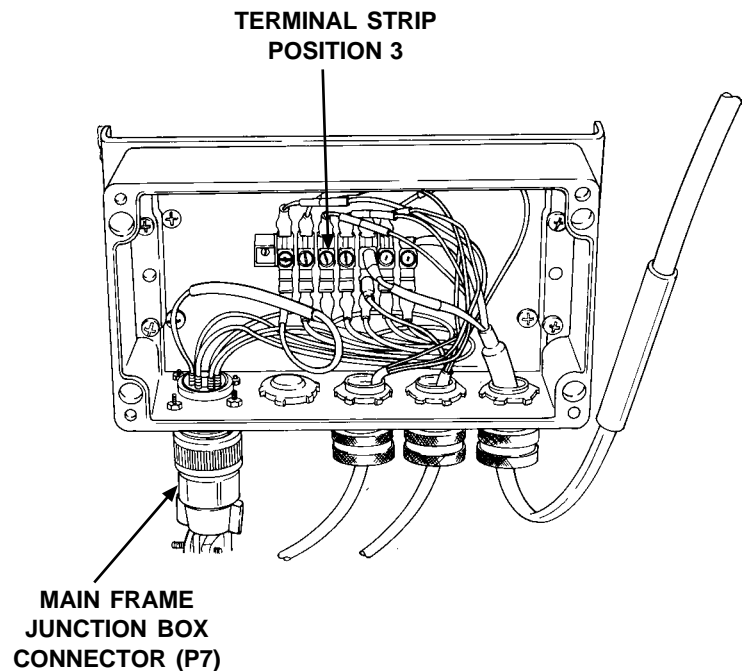
A reading of infinity indicates an open circuit.

- (4) Connect multimeter to terminals at each end of wire and check multimeter for continuity. Check main LHS wire harness, position A.

**NOTE**

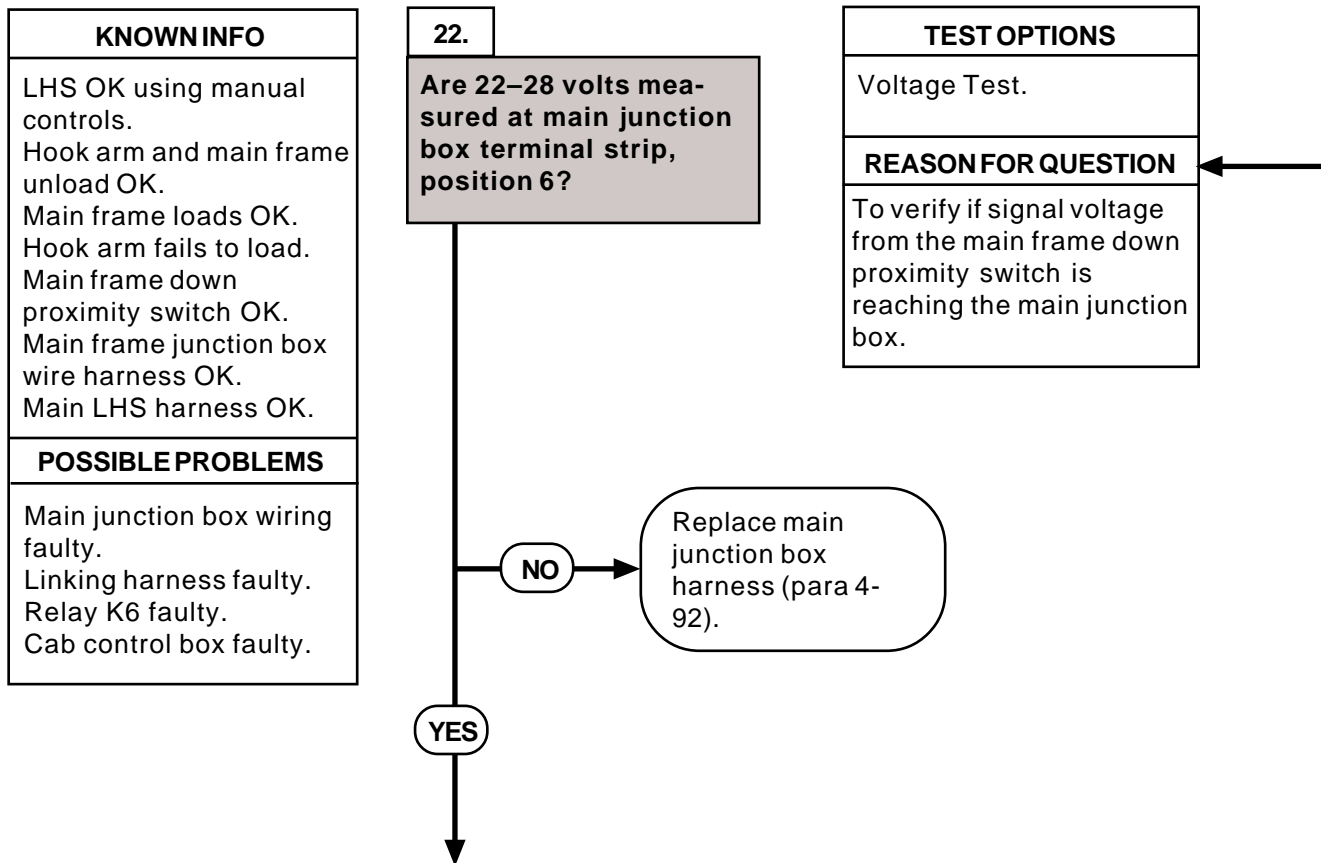
Any reading besides infinity indicates a grounded wire.

- (5) Remove multimeter lead from one end of wire and connect to chassis ground.
- (6) Reinstall main LHS wire harness connectors (P6) and (P7) on main frame junction box and main junction box.



4-12. UNIT TROUBLESHOOTING (continued).

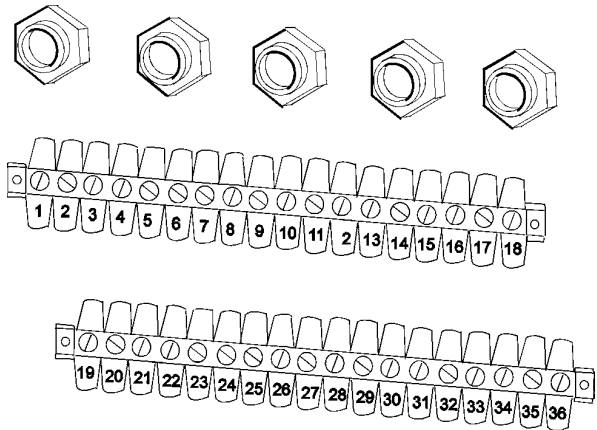
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).**

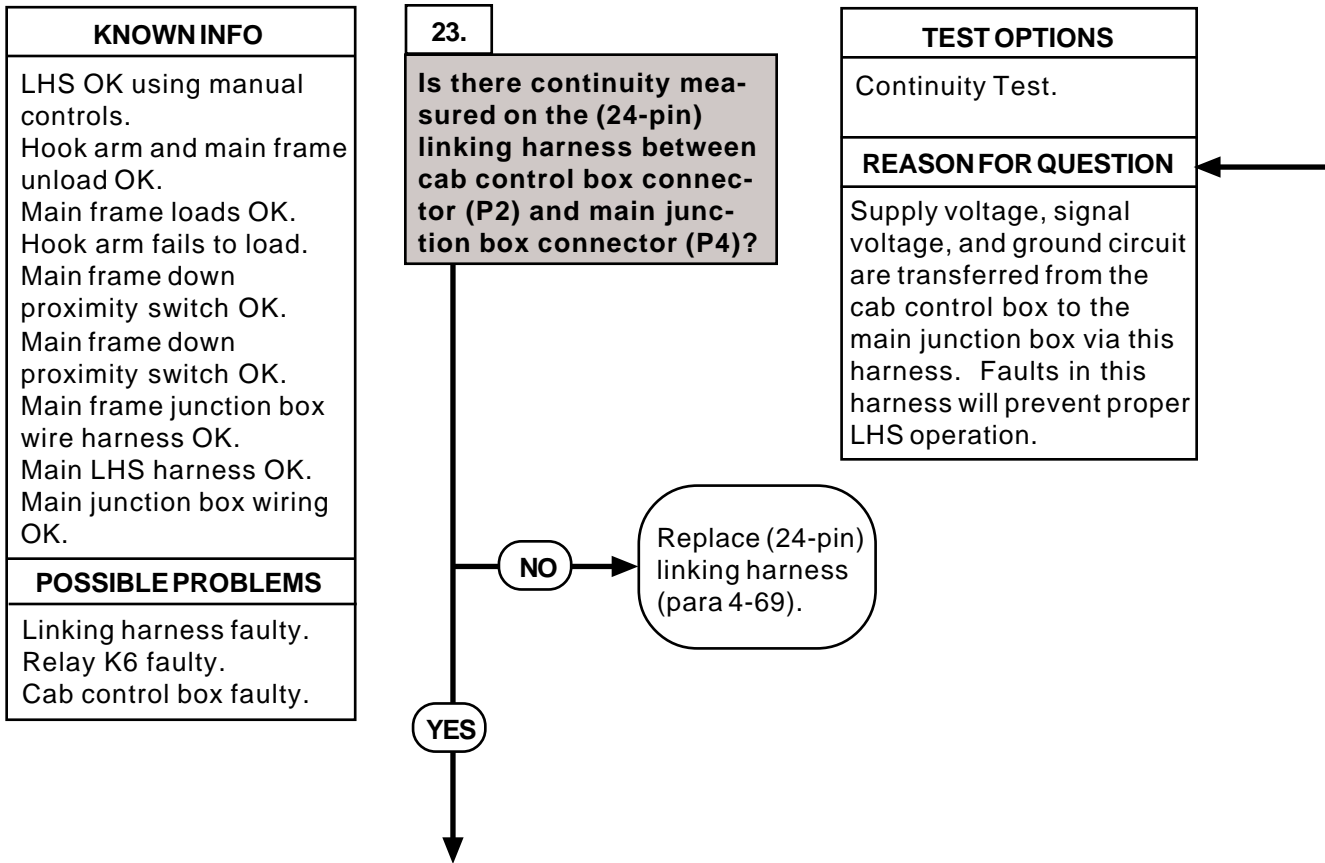
<b>VOLTAGE TEST</b>	
	(1) Open hydraulic cabinet cover.
	(2) Loosen four screws on main junction box cover and open cover.
	(3) Turn engine start switch to ON position.
	(4) Turn light control switch to STOP LIGHT position.
	(5) Set multimeter to voltage position.
	(6) Place positive (+) probe of multimeter on terminal strip, position 6.
	(7) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
	(8) Turn engine start switch and light control switch to OFF position.



**WIRING REMOVED FOR CLARITY**

4-12. UNIT TROUBLESHOOTING (continued).

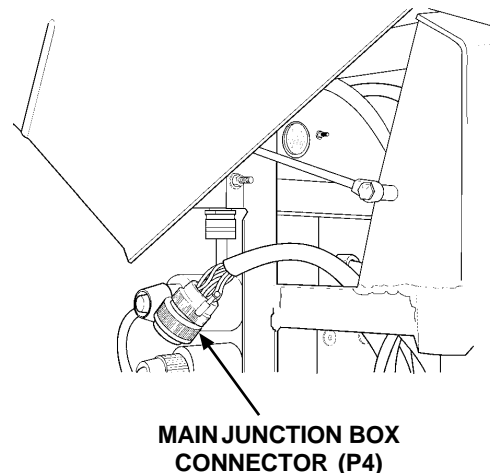
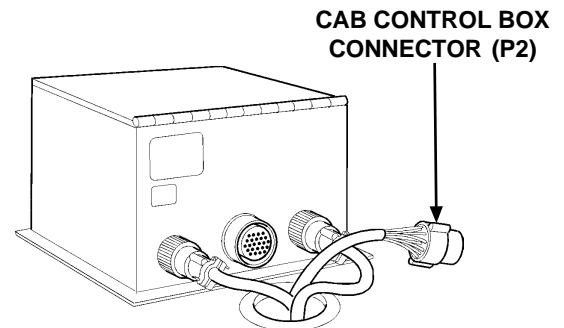
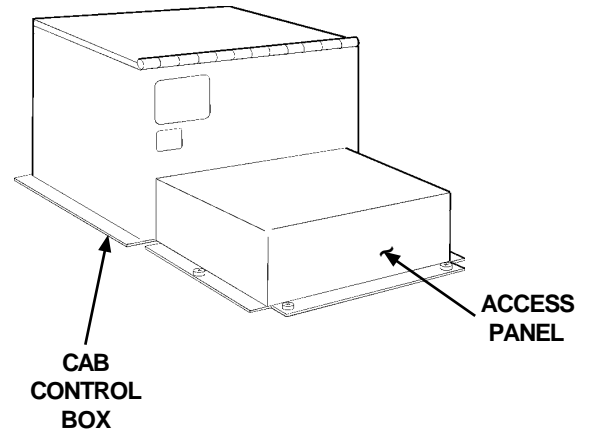
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



4-12. UNIT TROUBLESHOOTING (continued).

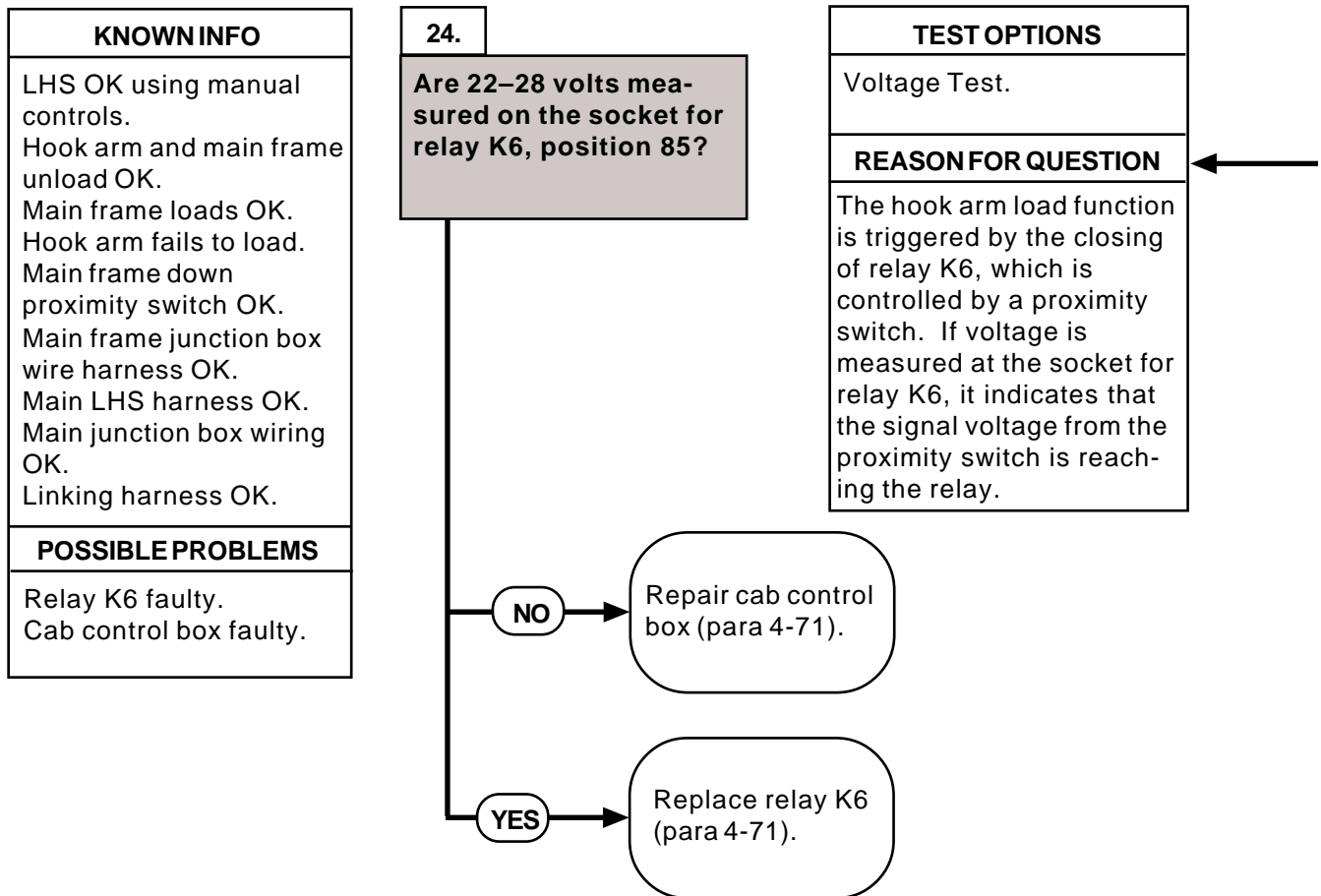
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

CONTINUITY TEST	
<b><u>CAUTION</u></b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
(1)	Remove four screws and lockwashers and access cover from heater compartment.
(2)	Disconnect wiring from components.
(3)	Set multimeter to ohms position.
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
(4)	Connect multimeter to leads at each end of wire and check multimeter for continuity. Check (24-pin) linking harness, positions B and J.
<b>NOTE</b>	
<p>Any reading besides infinity indicates a grounded wire.</p>	
(5)	Remove multimeter lead from one end of wire and connect to chassis ground.



4-12. UNIT TROUBLESHOOTING (continued).

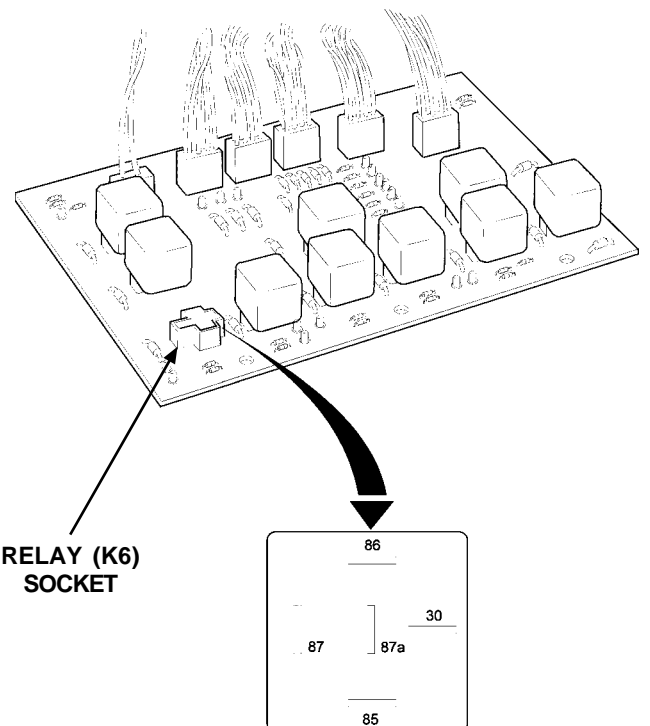
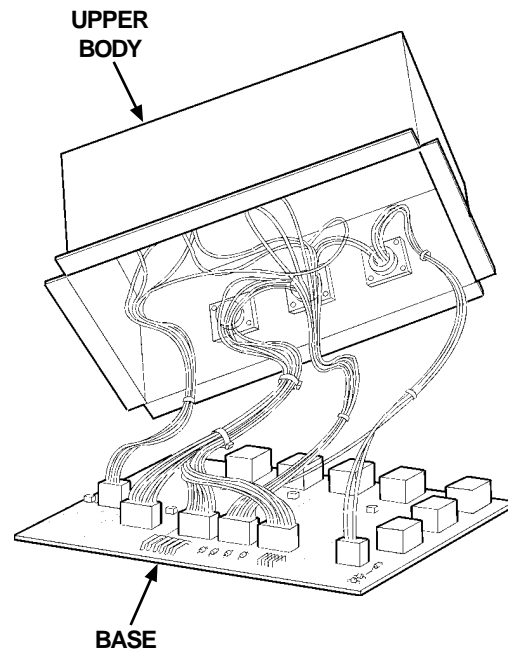
15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).



4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

VOLTAGE TEST
<p>(1) Remove four screws and lockwashers from cab control box.</p> <p>(2) Remove six screws from cab control box and separate upper body from base.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.</b></p> <p>(3) Remove relay K6 from cab control box circuit board.</p> <p>(4) Turn engine start switch to ON position.</p> <p>(5) Turn light control switch to STOP LIGHT position.</p> <p>(6) Set multimeter to voltage position.</p> <p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• A reading of infinity indicates an open circuit.</li> <li>• This test can also be accomplished by observing the status of LED D9.</li> </ul> <p>(7) Connect one multimeter lead to terminal 85 of relay K6 socket and the other multimeter lead to a known good ground. Check multimeter for voltage.</p>



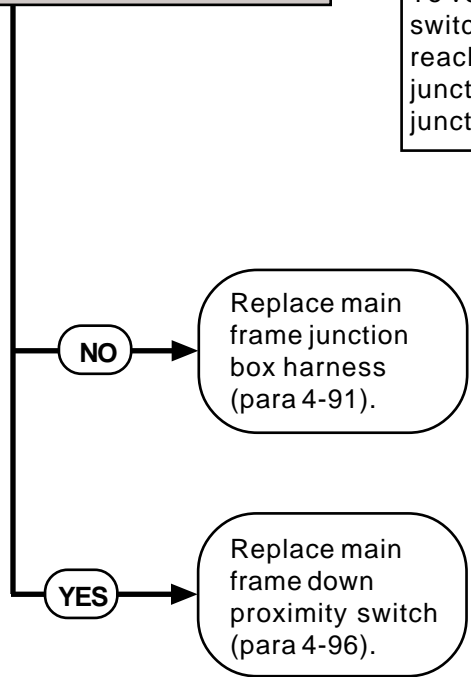
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY)  
(continued).

KNOWN INFO
LHS OK using manual controls. Hook arm and main frame unload OK. Main frame loads OK. Hook arm fails to load. Main frame down proximity switch LED out.
POSSIBLE PROBLEMS
Main frame down proximity switch faulty. Main frame junction box harness faulty.

25. Are 22–28 volts measured on the main frame junction box terminal strip, position 1?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
To verify that proximity switch supply voltage is reaching the main frame junction box from the main junction box.

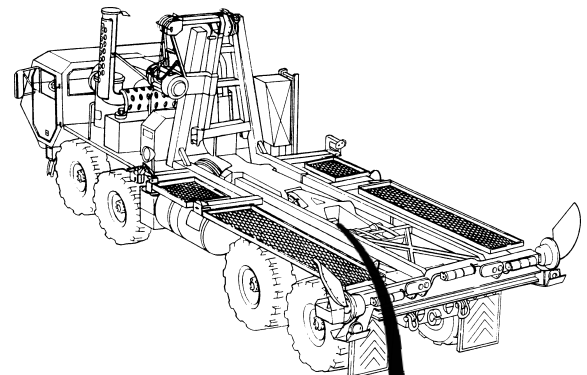




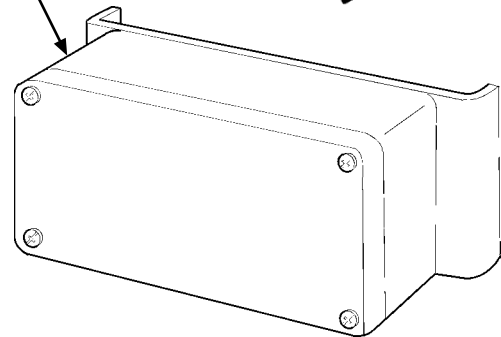
4-12. UNIT TROUBLESHOOTING (continued).

15. LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (continued).

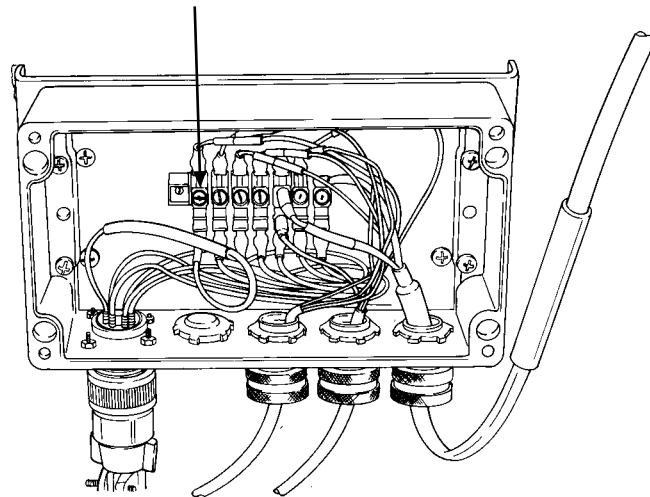
<b>VOLTAGE TEST</b>
(1) Loosen four screws and remove cover from main frame junction box.
<b>NOTE</b>
Leave main frame in the down position until advised otherwise.
(2) Turn engine start switch to ON position.
(3) Turn light control switch to STOP LIGHT position.
(4) Set multimeter to voltage position.
(5) Place positive (+) probe of multimeter on main frame junction box terminal strip, position 1.
(6) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
(7) Turn engine start switch and light control switch to OFF position.



**MAIN FRAME JUNCTION BOX**



**TERMINAL STRIP, POSITION 1**



4-12. UNIT TROUBLESHOOTING (continued).

**15.1 LHS DOES NOT OPERATE PROPERLY IN AUTO MODE (CAB ONLY) (MODEL B ONLY.)**

**INITIAL SETUP**

*Tools and Special Tools*

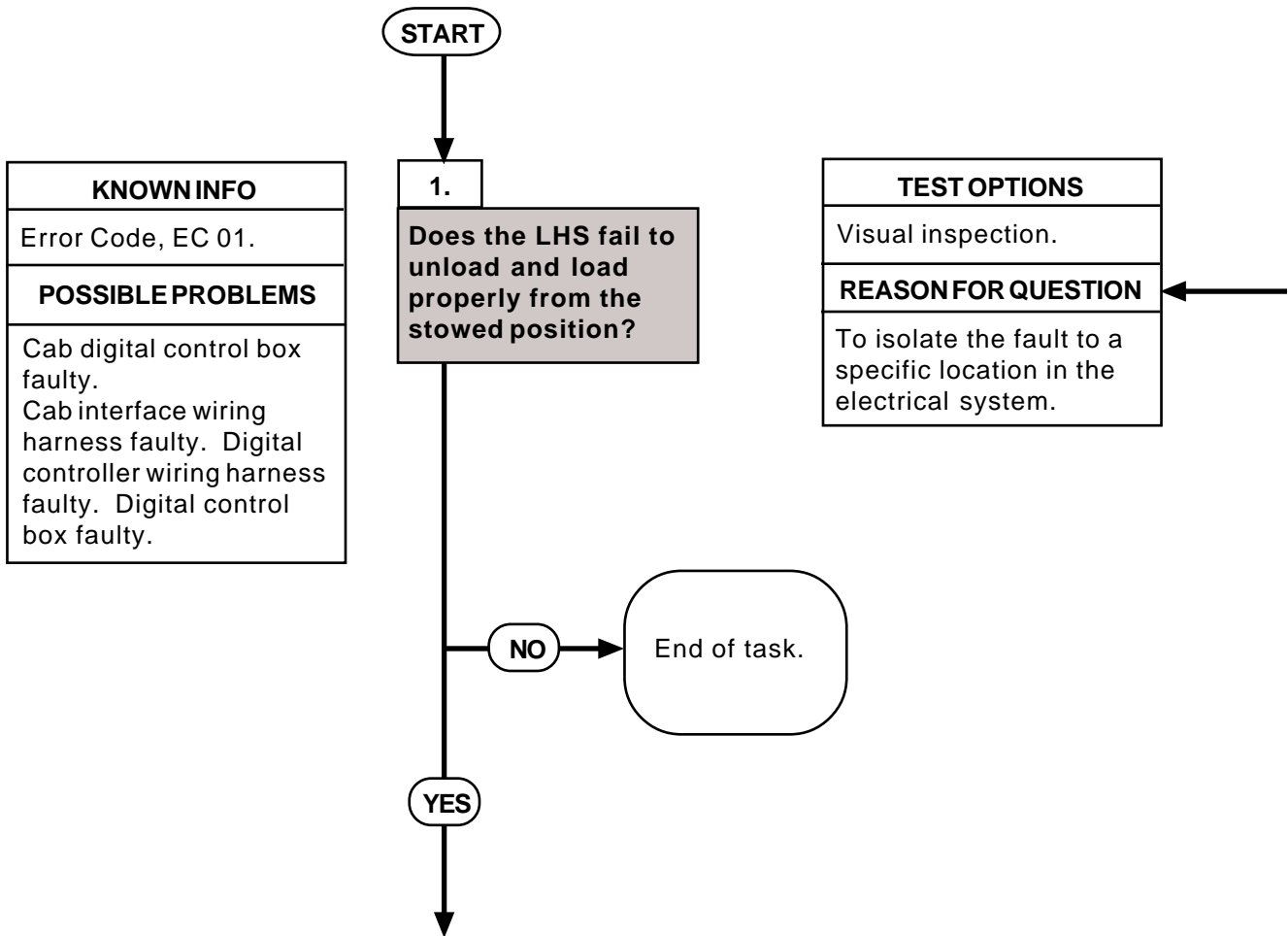
Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)

*Personnel Required:*

Two



4-12. UNIT TROUBLESHOOTING (continued).

15.1 LHS DOES NOT OPERATE PROPERLY IN AUTO (CAB ONLY) (MODEL B ONLY) (continued).

**VISUAL INSPECTION**

**NOTE**

LHS MODE SELECT switch must remain in position 1 (AUTO) for all tests within this fault.

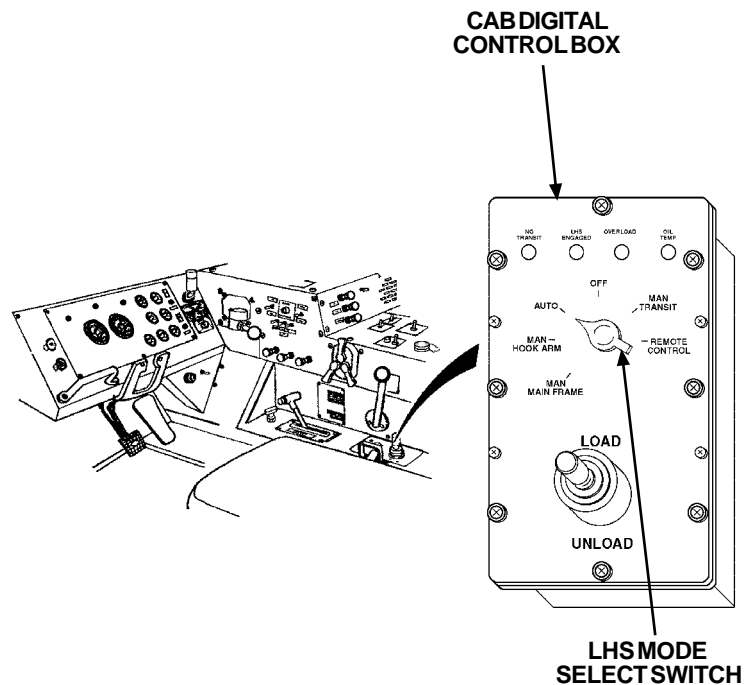
- (1) Turn LHS MODE SELECT switch to (AUTO) position.

**NOTE**

Refer to Chapter 2 for specific LHS operating instructions.

- (2) Attempt to actuate LHS through a complete UNLOAD/LOAD cycle using the cab controls. Note which phase of the cycle the problem occurs and go to appropriate troubleshooting procedure:

- Hook arm UNLOAD
- Main frame UNLOAD
- Main frame LOAD
- Hook arm LOAD



4-12. UNIT TROUBLESHOOTING (continued).

15.1 LHS DOES NOT OPERATE PROPERLY IN AUTO (CAB ONLY) (MODEL B ONLY) (continued).

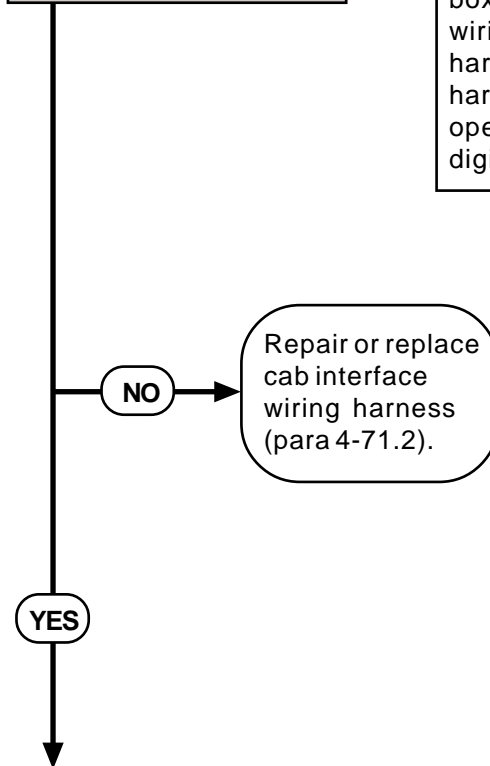
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

<b>KNOWN INFO</b>
Error Code, EC 01.
<b>POSSIBLE PROBLEMS</b>
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Digital control box faulty.

<b>2.</b>
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
Power to activate the hook arm solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

15.1 LHS DOES NOT OPERATE PROPERLY IN AUTO (CAB ONLY) (MODEL B ONLY) (continued).

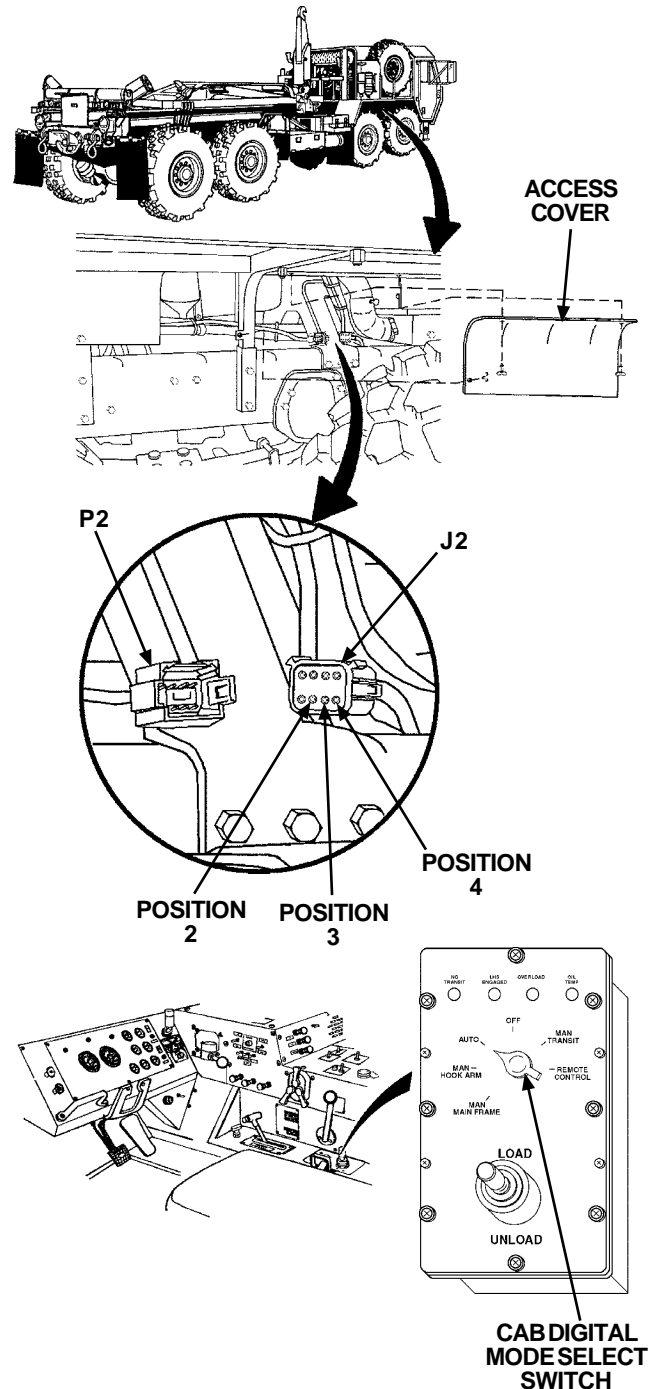
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.

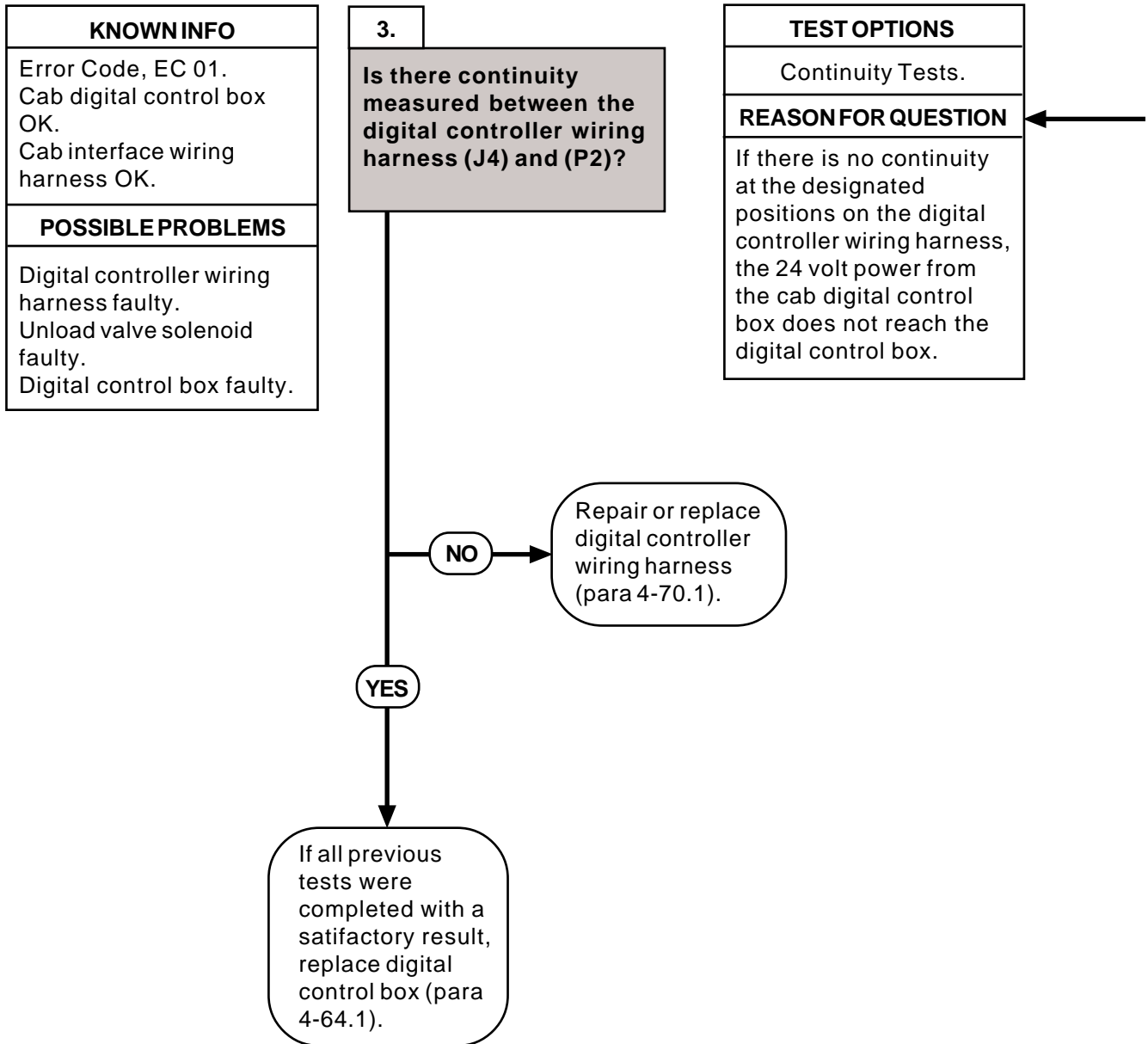


4-12. UNIT TROUBLESHOOTING (continued).

15.1 LHS DOES NOT OPERATE PROPERLY IN AUTO (CAB ONLY) (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

15.1 LHS DOES NOT OPERATE PROPERLY IN AUTO (CAB ONLY) (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

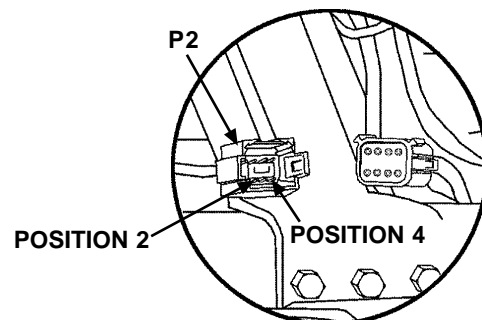
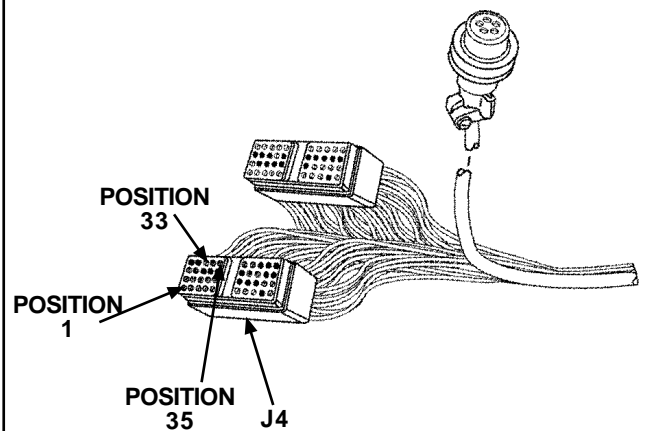
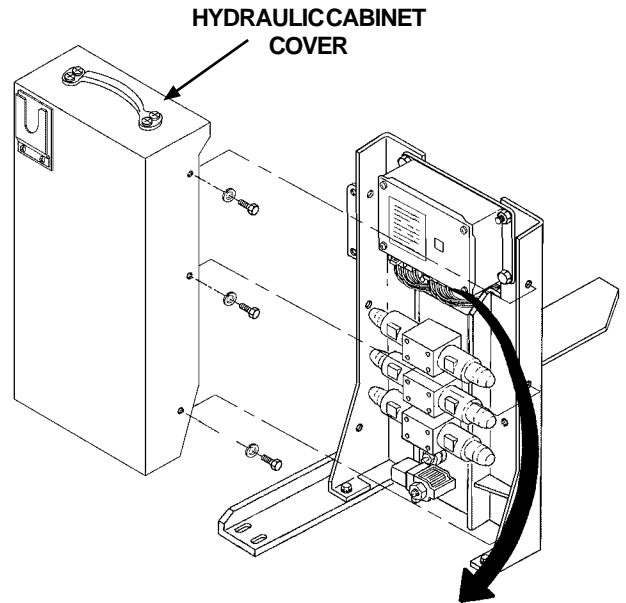
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.
- (2) Remove left hand (J4), 40-pin connector from digital controller.
- (3) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.
- (5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.
- (6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE.

INITIAL SETUP

Tools and Special Tools

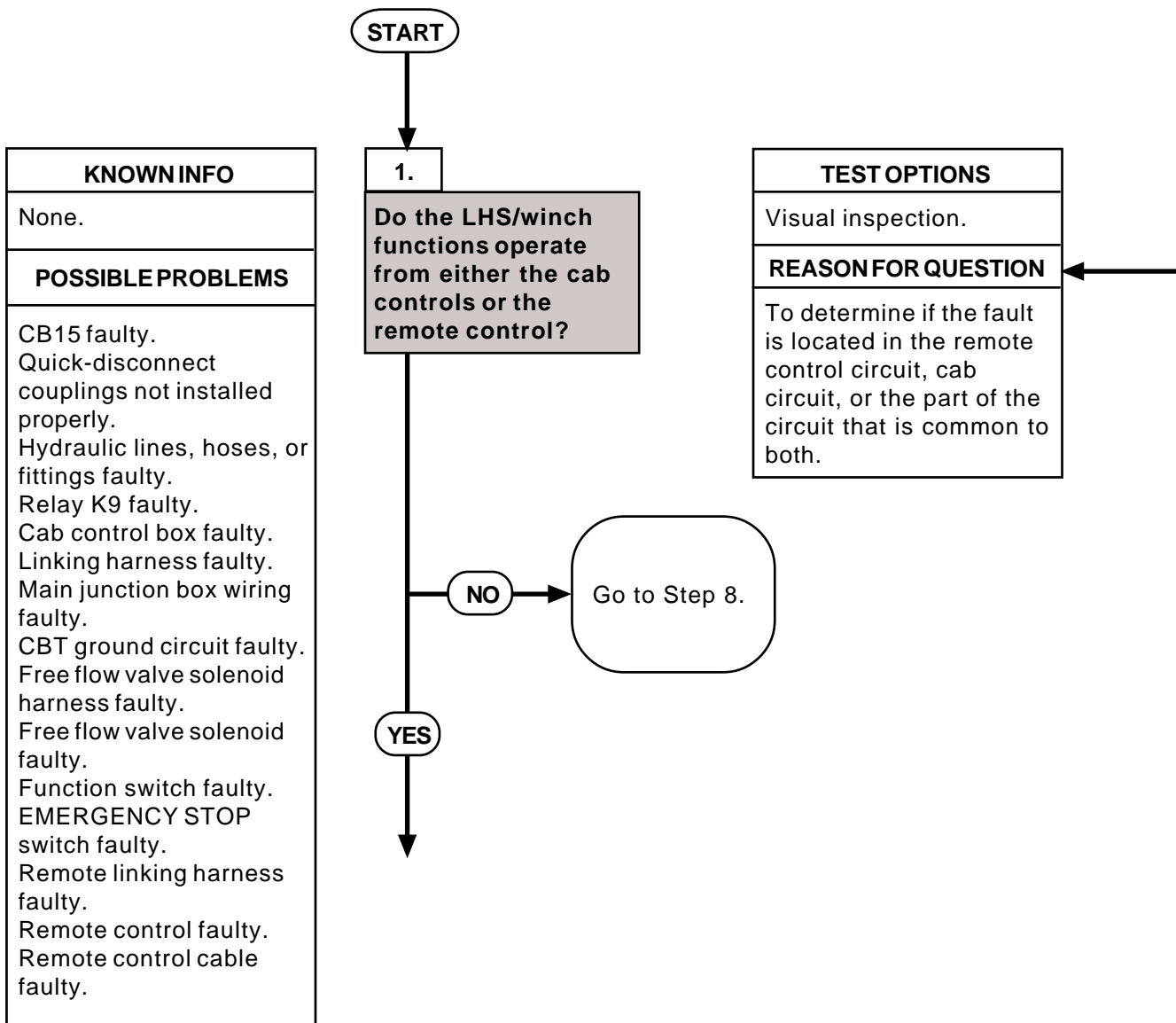
Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

Personnel Required

Two

Equipment Condition

BAP loaded on the CBT Transporter  
 Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)





**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

**VISUAL INSPECTION**

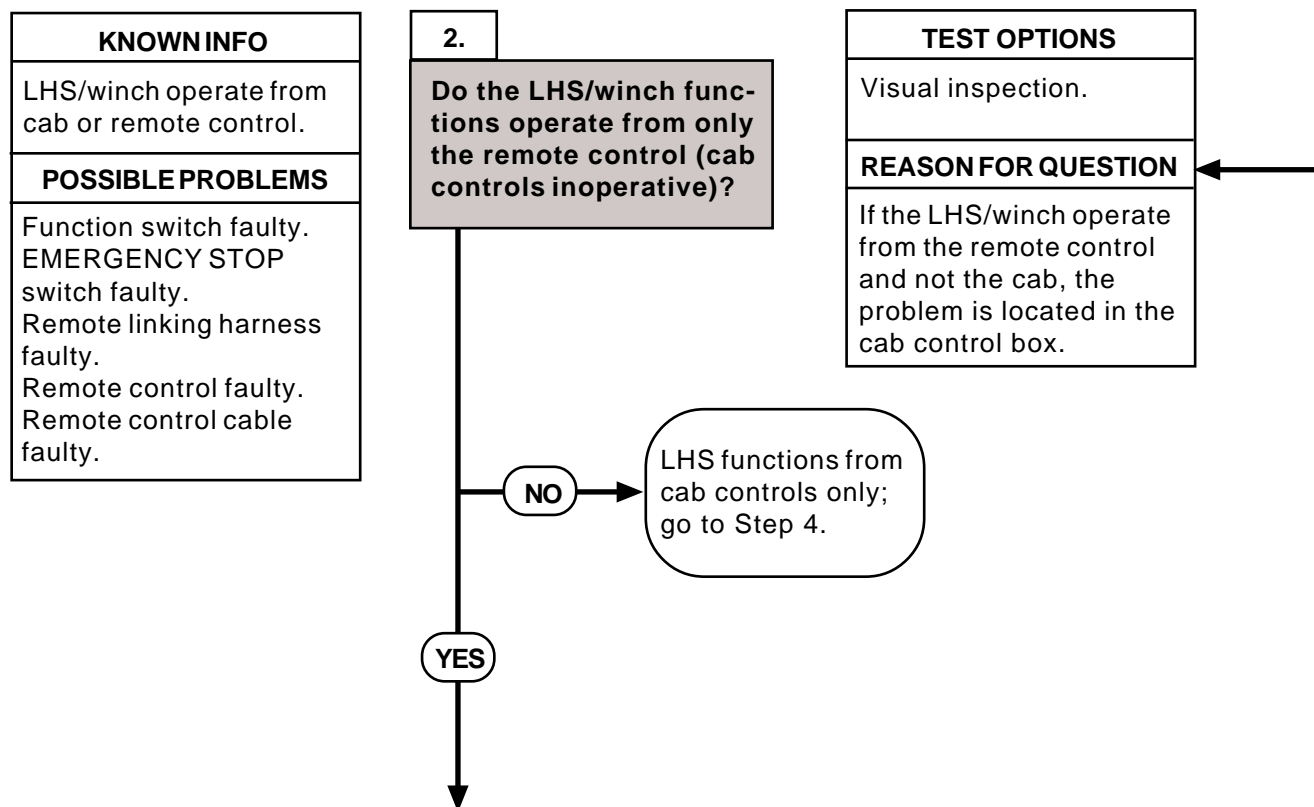
**NOTE**

Refer to Chapter 2 for specific LHS and winch operating instructions.

Attempt to operate the LHS and winch using both the cab controls and the remote control. Note the results of the test.

4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



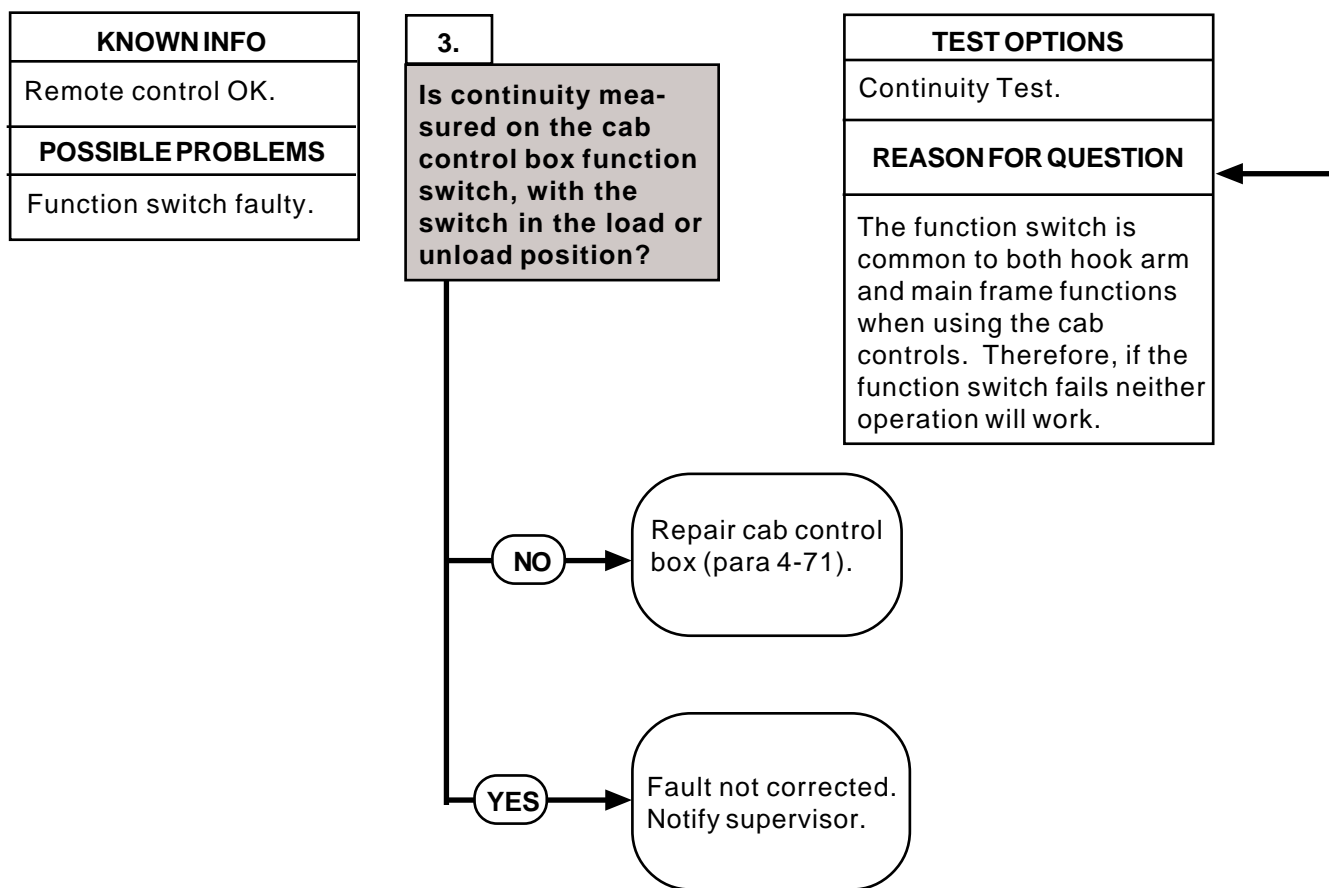
**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

— | Answer this question based  
on the results obtained in  
Step 1.

4-12. UNIT TROUBLESHOOTING (continued).

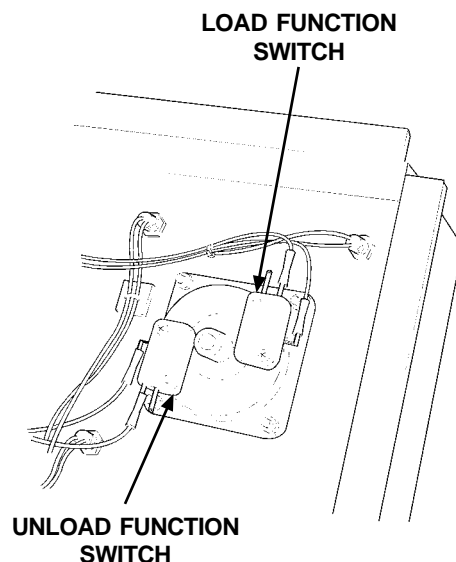
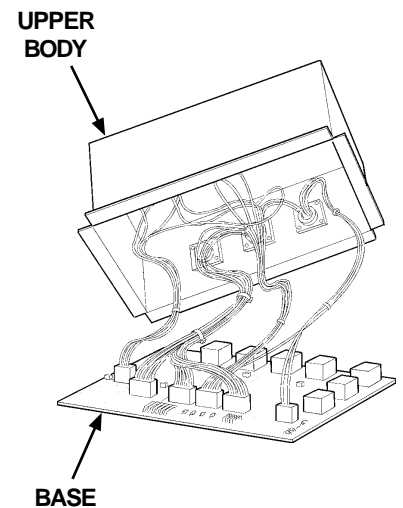
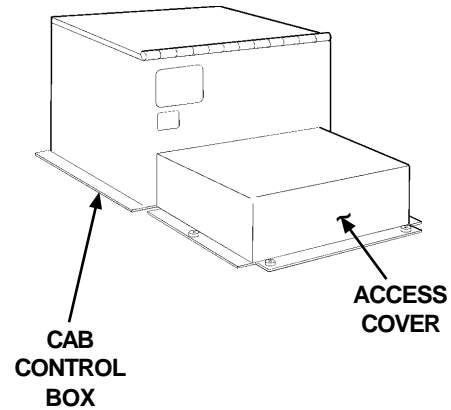
16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

CONTINUITY TEST
<p>(1) Remove four screws and lockwashers and access panel from heater compartment.</p> <p>(2) Remove four screws and lockwashers from cab control box.</p> <p>(3) Remove six screws from cab control box and separate upper body from base.</p>
<p><b>CAUTION</b></p> <p><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p>
<p>(4) Disconnect wiring from components.</p> <p>(5) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(6) Connect multimeter leads to UNLOAD switch terminals, positions "NC" and "COM," and hold joystick in UNLOAD position. Check multimeter for continuity.</p> <p>(7) Connect multimeter leads to LOAD switch terminals, positions "NC" and "COM," and hold joystick in LOAD position. Check multimeter for continuity.</p>



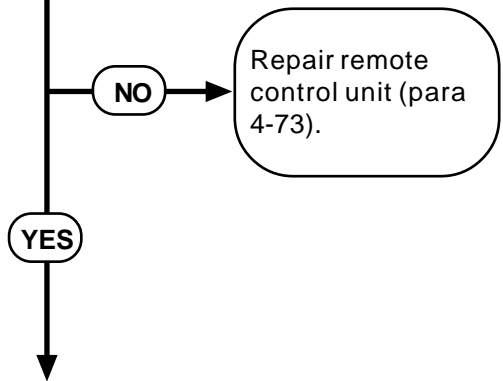
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

<b>KNOWN INFO</b>
Cab controls OK.
<b>POSSIBLE PROBLEMS</b>
EMERGENCY STOP switch faulty. Remote linking harness faulty. Remote control faulty. Remote control cable faulty.

4.  
Does the engine high idle operate with the remote control?

<b>TEST OPTIONS</b>
Emergency Stop Switch Test.
<b>REASON FOR QUESTION</b>
The remote control LHS/winch circuit, as well as the engine high idle circuit, receive power from the emergency stop switch. If the high idle (as well as the LHS/winch) does not operate from the remote control, the EMERGENCY STOP switch is faulty.



**4-12. UNIT TROUBLESHOOTING (continued).****16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).****EMERGENCY STOP SWITCH TEST**

- (1) Start engine.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Move remote control HIGH IDLE switch to ON position and observe engine speed.
- (4) Move remote control HIGH IDLE switch to OFF position.
- (5) Turn light control switch to OFF position.
- (6) Shut off engine.

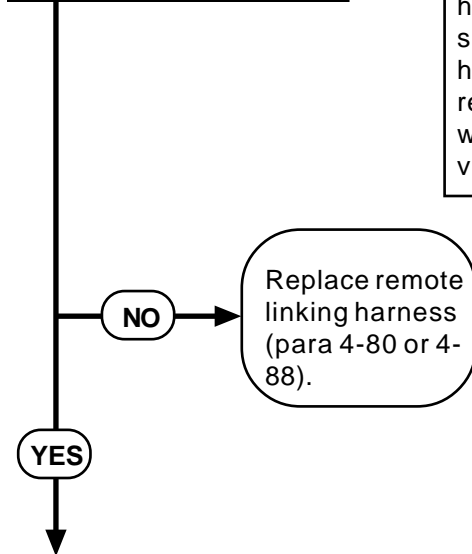
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

KNOWN INFO
Cab controls OK.
POSSIBLE PROBLEMS
Remote linking harness faulty. Remote control faulty. Remote control cable faulty.

5.  
Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Signal power is transferred from the remote control cable to the main junction box via the remote linking harness (one for each side). If this linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.

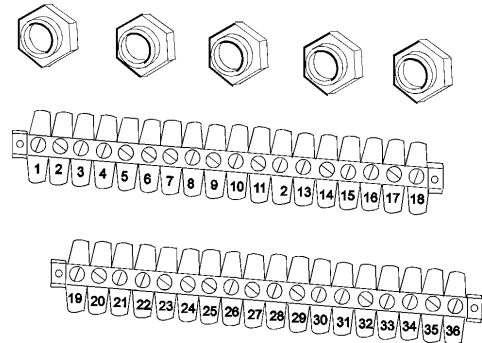




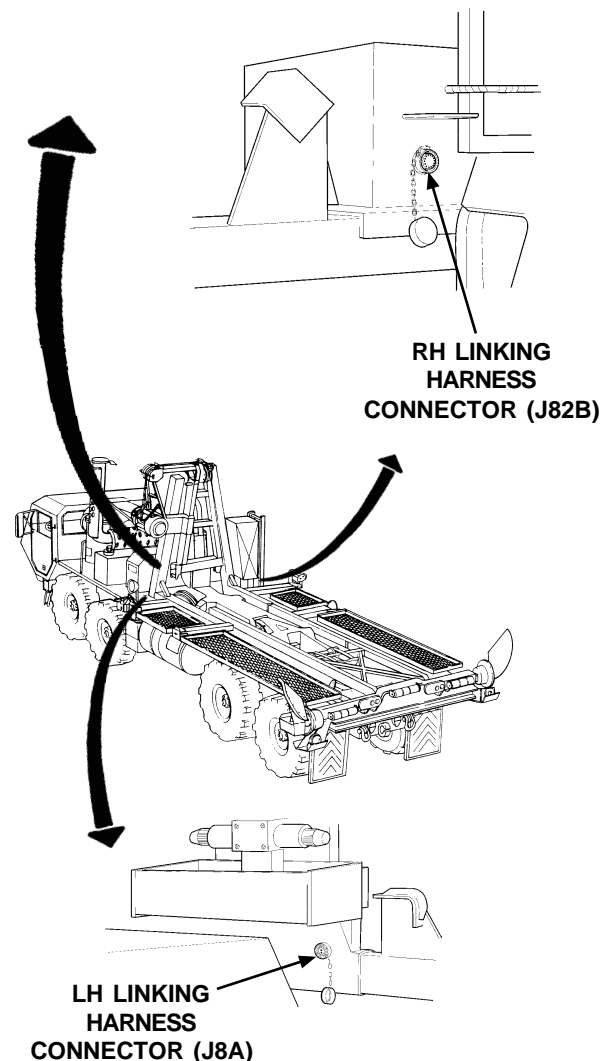
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

CONTINUITY TEST
<p>(1) Open hydraulic cabinet cover.                      (2) Loosen four screws on main junction box cover and open cover.                      (3) If necessary, remove remote control cable from linking harness connector.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p> <p>(4) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">A reading of infinity indicates an open circuit.</p> <p>(5) Connect multimeter to terminals at each end of wire and check multimeter for continuity. Check between terminal C on connector and position 7 in junction box. Next, check between terminal J on connector and position 23 in junction box.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">Any reading besides infinity indicates a grounded wire.</p> <p>(6) Check for grounded wiring by connecting one multimeter lead to each terminal and the other lead to chassis ground.</p>



WIRING REMOVED FOR CLARITY



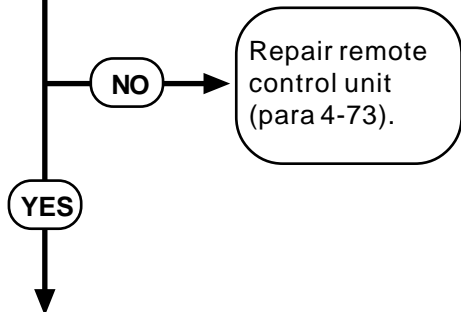
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

KNOWN INFO
Cab controls OK. EMERGENCY STOP switch OK. Remote linking harness OK.
POSSIBLE PROBLEMS
Remote control faulty. Remote control cable faulty.

6.  
Is continuity measured on the remote control connector (J9), between positions L and E, when each function is activated?

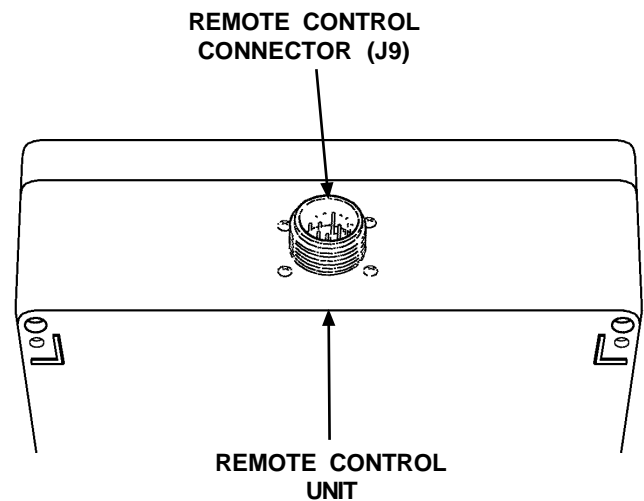
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
On all remote control functions, power is supplied to the free flow valve solenoid via position E on the remote control connector. If no continuity (open circuit) is measured between E and L during any remote function, that LHS or winch function will not operate.



**4-12. UNIT TROUBLESHOOTING (continued).**

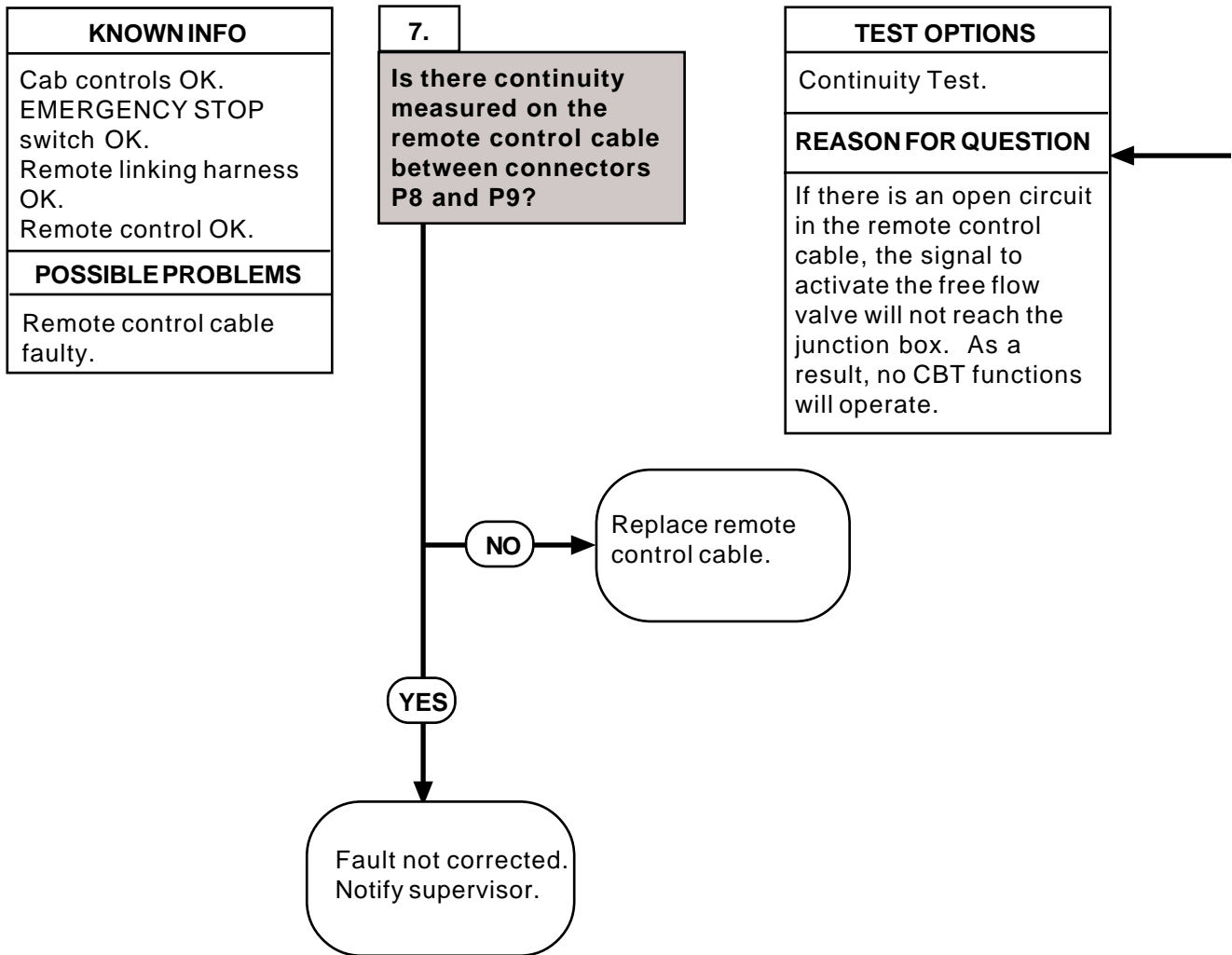
**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

<b>CONTINUITY TEST</b>	
<ol style="list-style-type: none"> <li>(1) Disconnect remote control cable from remote control unit.</li> <li>(2) Set multimeter to ohms position.</li> <li>(3) Position EMERGENCY STOP switch in the ON position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity during the activation of any function indicates an open circuit in the remote control.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter leads to positions E and L on remote control unit and have an assistant activate the MAIN FRAME (LOAD and UNLOAD), HOOK ARM (LOAD and UNLOAD) and WINCH (IN and OUT) controls one at a time. Check multimeter for continuity during the activation of each individual function.</li> </ol>	



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

**CONTINUITY TEST**

**CAUTION**

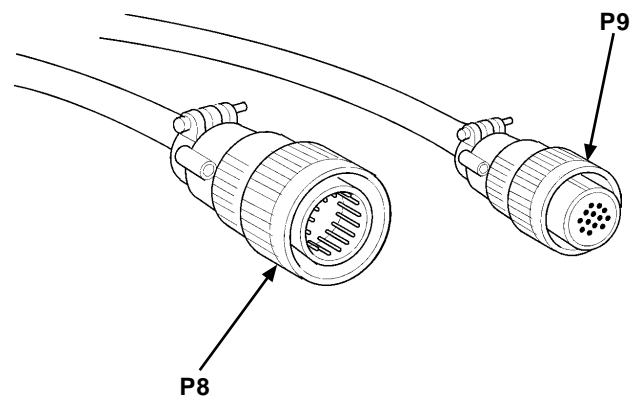
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

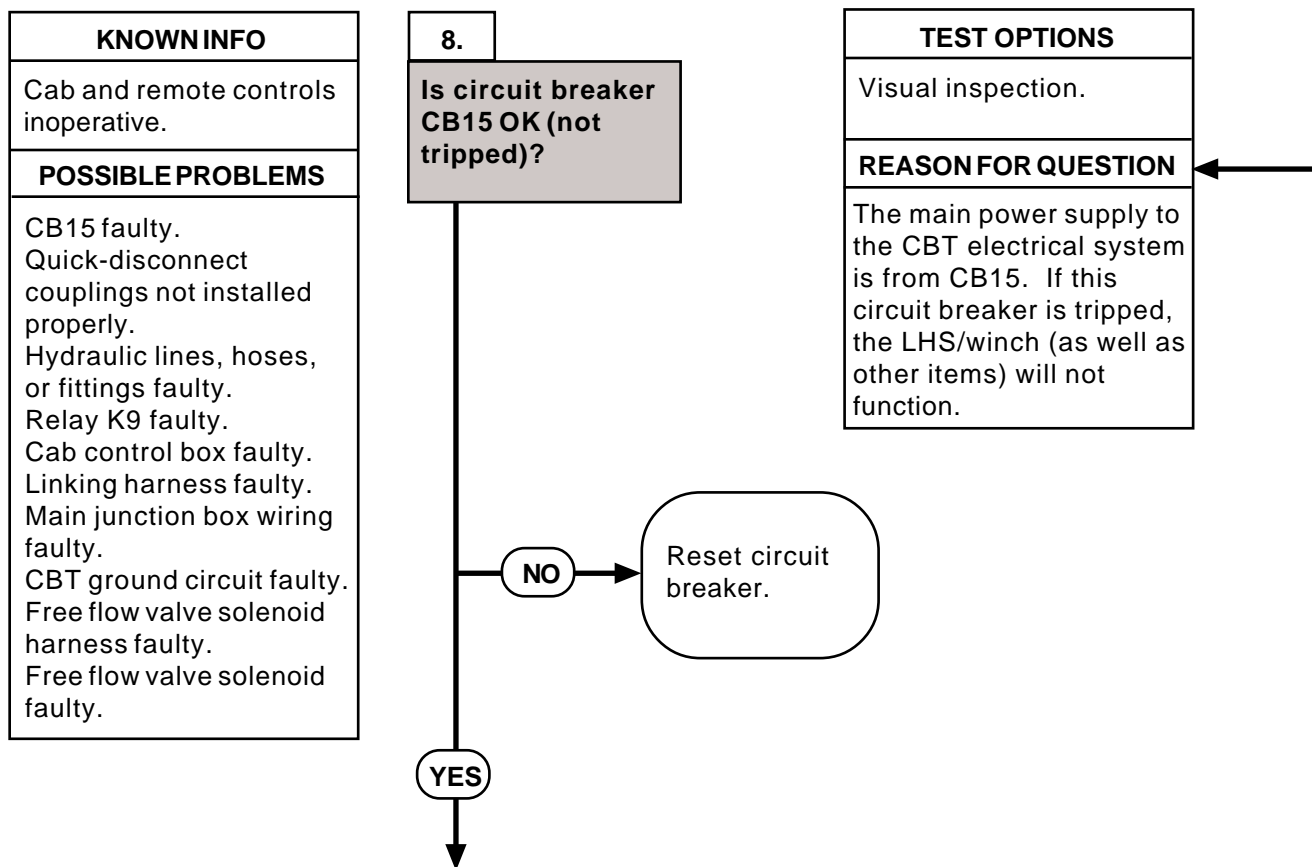
- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between position C on chassis end and position L on remote control end. Also check for continuity between position J on chassis end and position E on remote end.



**REMOTE CONTROL CABLE**

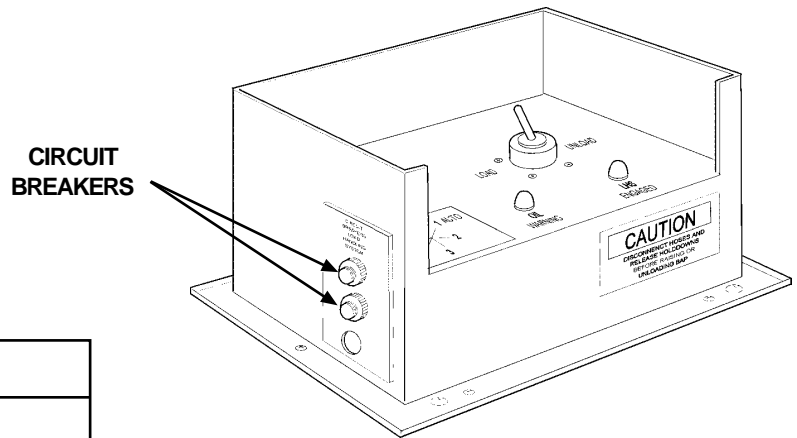
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

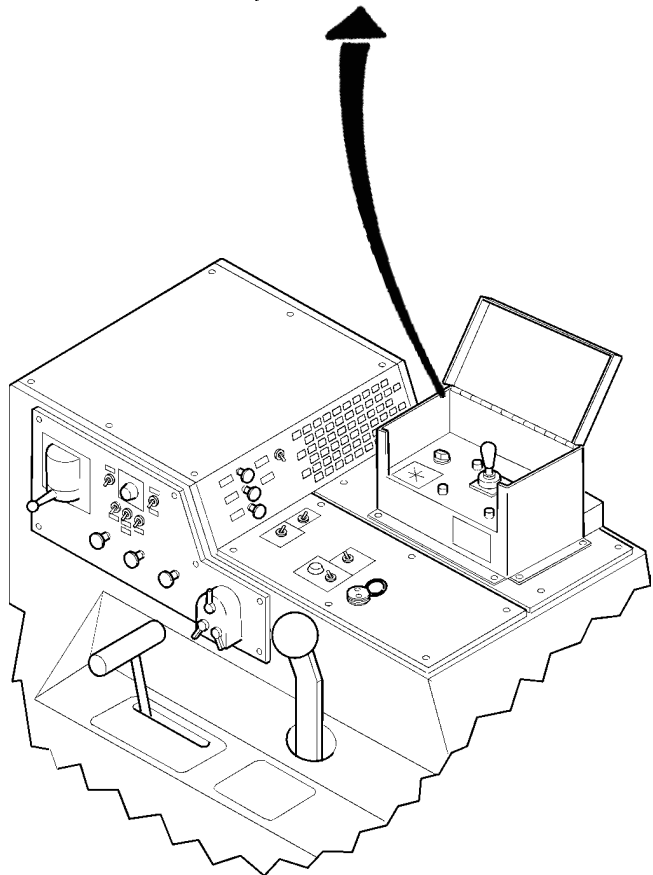


4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



<b>VISUAL INSPECTION</b>
<b>NOTE</b>
<p>Early production units have three circuit breakers, one of which (bottom circuit breaker) is not connected.</p> <p>Inspect circuit breaker for being tripped. If tripped, depress button to reset.</p>



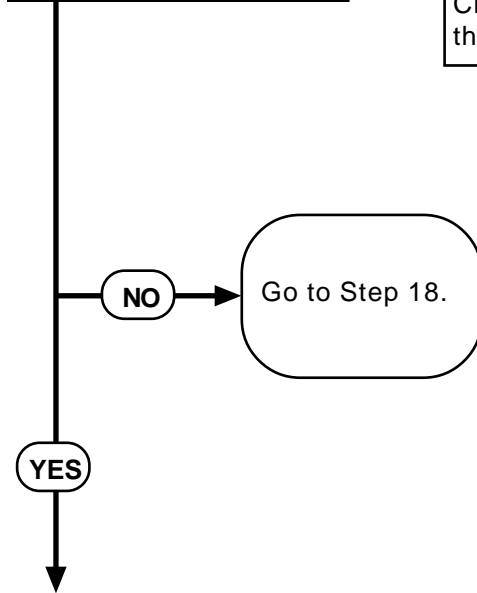
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

KNOWN INFO
Cab and remote controls inoperative. CB15 OK.
POSSIBLE PROBLEMS
Quick-disconnect couplings not installed properly. Hydraulic lines, hoses, or fittings faulty. Relay K9 faulty. Cab control box faulty. Linking harness faulty. Main junction box wiring faulty. CBT ground circuit faulty. Free flow valve solenoid harness faulty. Free flow valve solenoid faulty.

9. Do the LHS/winch functions work when the hydraulic control solenoids are manually bypassed (para 2-29)?

TEST OPTIONS
Para 2-29.
REASON FOR QUESTION
To determine whether the fault is isolated to the CBT electrical system or the hydraulic system.





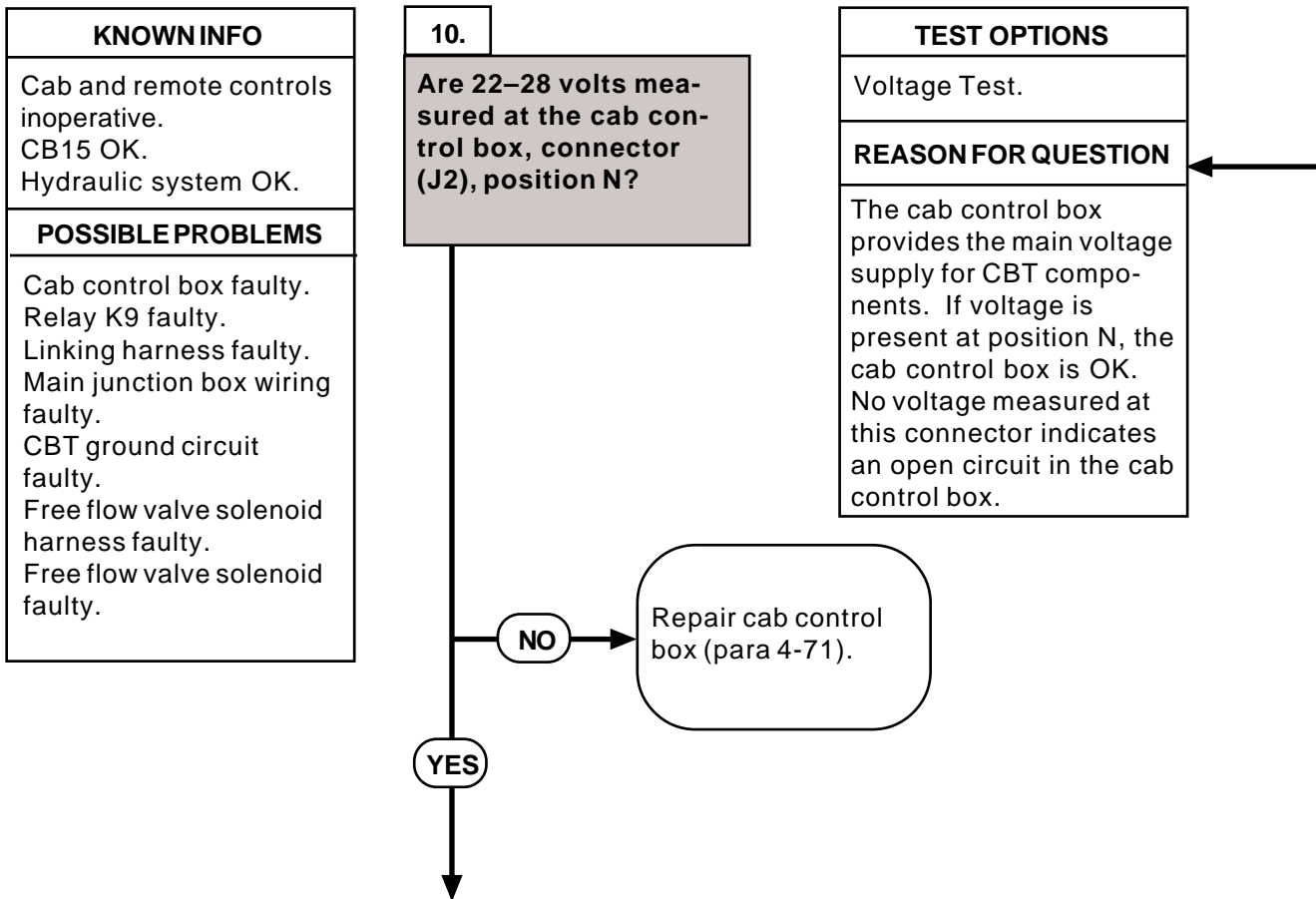
**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

Attempt to operate the LHS and winch by manually bypassing the hydraulic control solenoids. Refer to para 2-29 for specific instructions for this procedure. Note which, if any, functions operate.

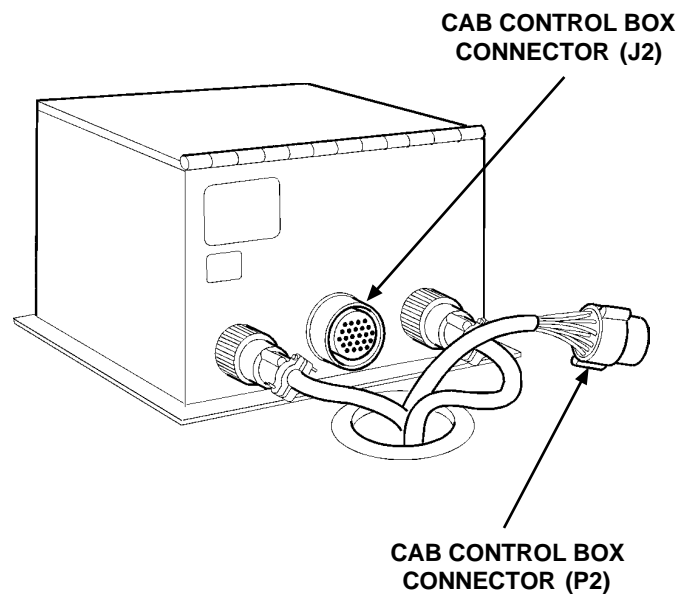
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).****16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).****VOLTAGE TEST**

- (1) Remove four screws and lockwashers and access cover from heater compartment.
- (2) Remove cab control box connector (P2) from cab control box.
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position
- (5) Set multimeter to voltage position.
- (6) Place positive (+) probe of multimeter on position N of cab control box connector (J2).
- (7) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
- (8) Turn engine start switch and light control switch to OFF position.



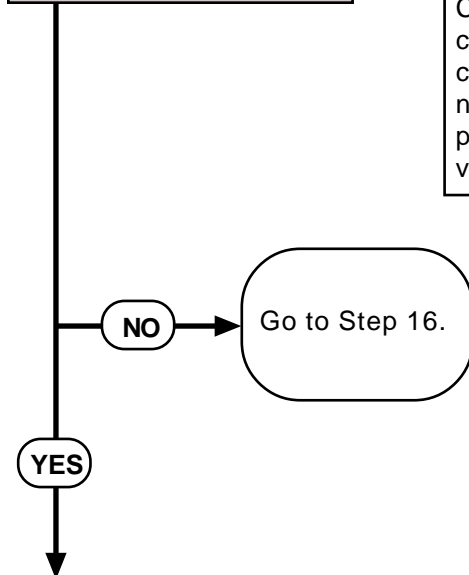
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

KNOWN INFO
Cab control box main power supply OK. Cab and remote controls inoperative. CB15 OK. Hydraulic system OK.
POSSIBLE PROBLEMS
Cab control box faulty. Relay K9 faulty. Main linking harness faulty. Main junction box wiring faulty. CBT ground circuit faulty. Free flow valve solenoid harness faulty. Free flow valve solenoid faulty.

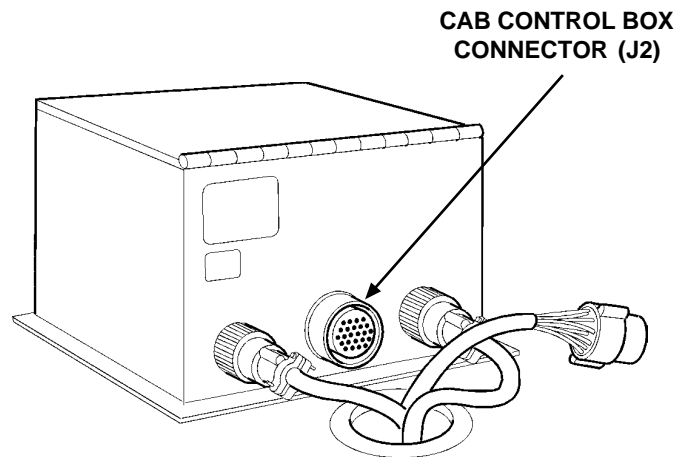
11.  
**Are 22–28 volts measured at the cab control box, connector (J2), position A, with the joystick in the load or unload position?**

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Whenever a LHS/winch function is activated a free flow valve closes to provide hydraulic pressure to the CBT. This function is controlled by a relay in the cab control box. If there is no voltage measured at position A, the free flow valve will not function.



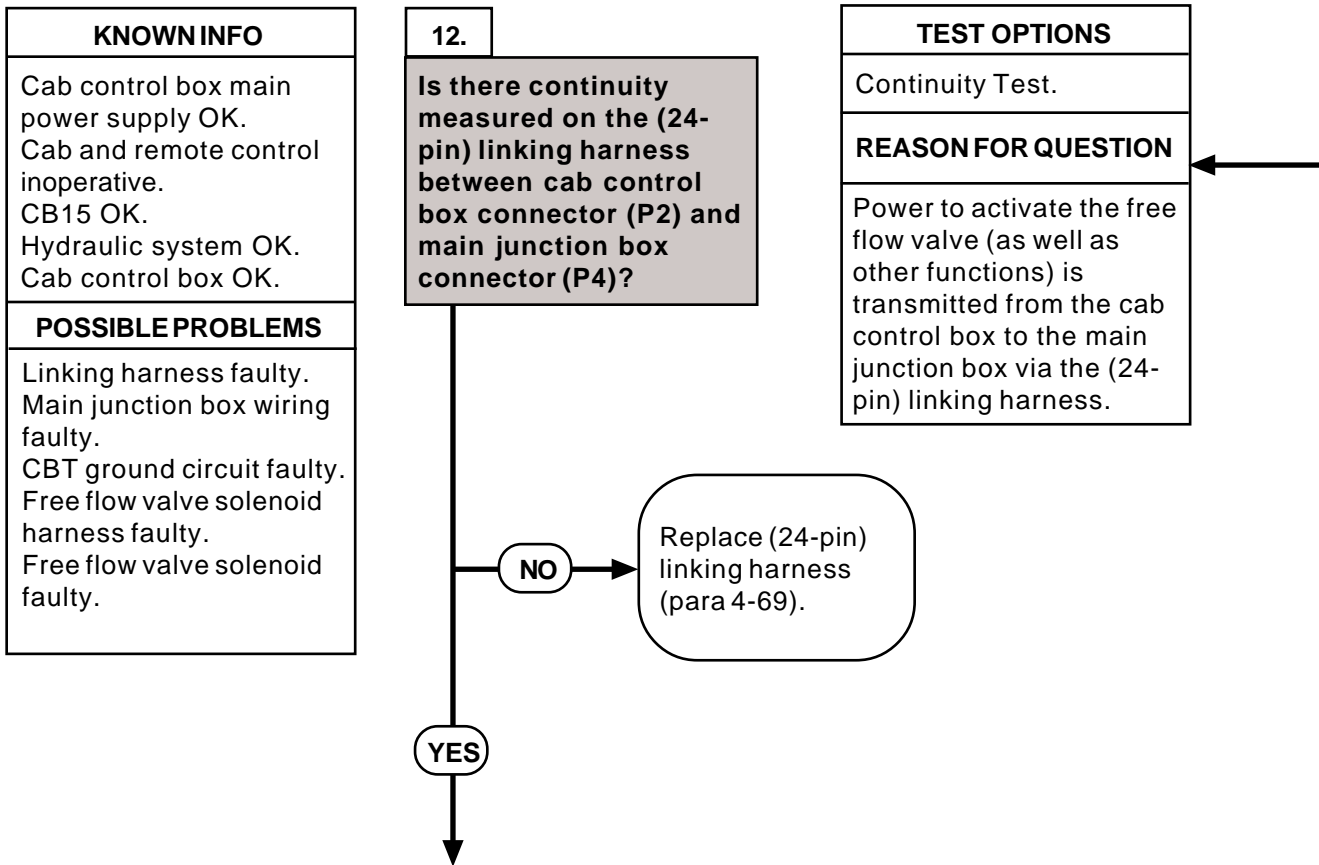
**4-12. UNIT TROUBLESHOOTING (continued).****16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).****VOLTAGE TEST**

- (1) Turn engine start switch to ON position.
- (2) Turn light control switch to STOP LIGHT position
- (3) Set multimeter to voltage position.
- (4) Hold joystick in the UNLOAD position.
- (5) Place positive (+) probe of multimeter on position A of cab control box connector (J2).
- (6) Place negative (-) probe of multimeter on known good ground and check multimeter for voltage reading.
- (7) Repeat Steps 5 through 7 with joystick in the LOAD position.
- (8) Turn engine start switch and light control switch to OFF position.



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

**CONTINUITY TEST**

**CAUTION**

**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.**

- (1) Disconnect main junction box connector (P4) from junction box.
- (2) Set multimeter to ohms position.

**NOTE**

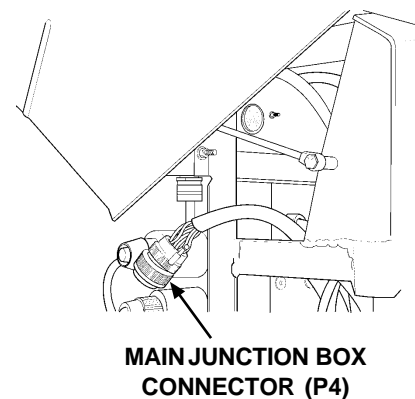
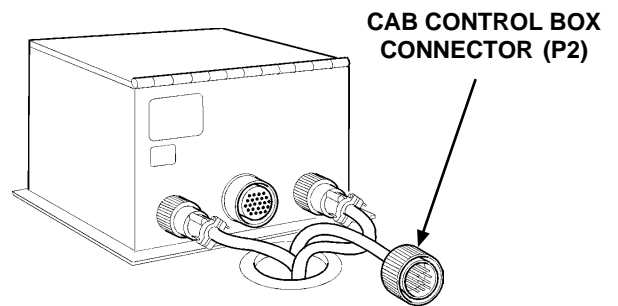
A reading of infinity indicates an open circuit.

- (3) Connect multimeter to leads at each end of wire and check multimeter for continuity. Check (24-pin) linking harness, positions A and N.

**NOTE**

Any reading besides infinity indicates a grounded wire.

- (4) Remove multimeter lead from one end of wire and connect to chassis ground.



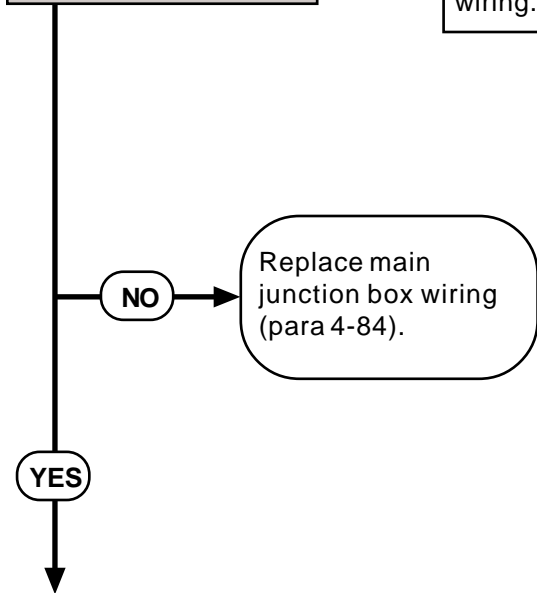
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

KNOWN INFO
Cab control box main power supply OK. Cab and remote control inoperative. CB15 OK. Hydraulic system OK. Cab control box OK. Linking harness OK.
POSSIBLE PROBLEMS
Main junction box wiring faulty. CBT ground circuit faulty. Free flow valve solenoid harness faulty. Free flow valve solenoid faulty.

13. Is there continuity between the main junction box connector (J4) and the junction box terminal strip?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
To verify the integrity of the main junction box wiring.

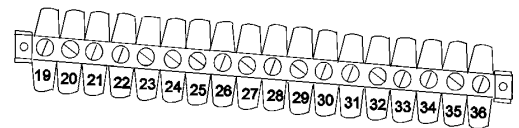
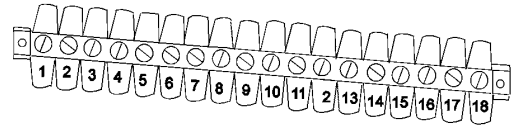
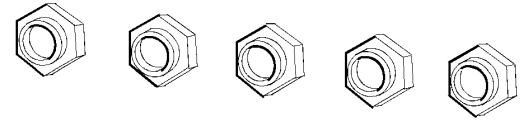




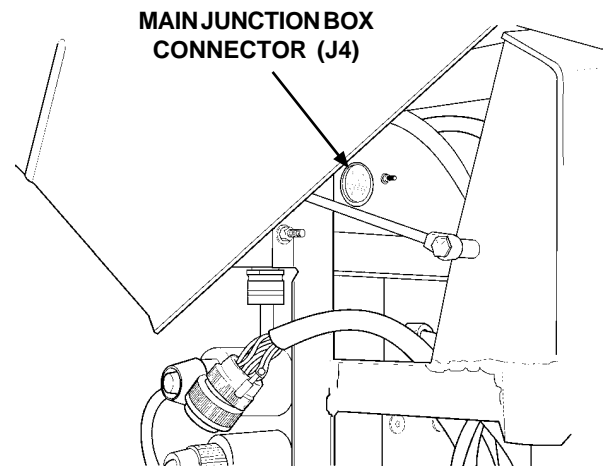
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

CONTINUITY TEST
<p>(1) Open hydraulic cabinet cover.</p> <p>(2) Loosen four screws on main junction box cover and open cover.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</b></p> <p>(3) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">A reading of infinity indicates an open circuit.</p> <p>(4) Connect multimeter to terminals at each end of wire and check multimeter for continuity. Check between main junction box connector (J4), position A, and terminal strip, position 23. Also check between main junction box connector (J4), position N, and terminal strip, position 7.</p>

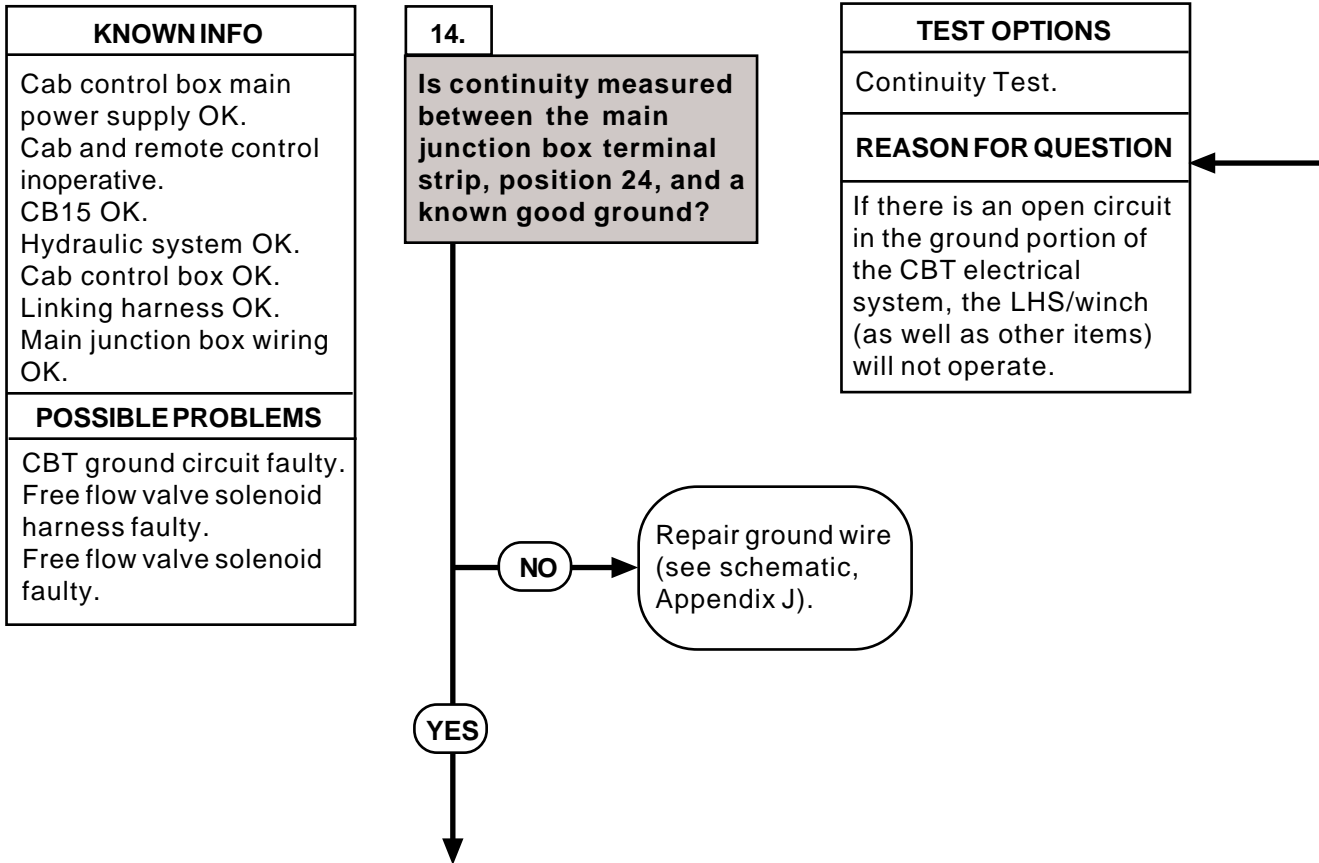


WIRING REMOVED FOR CLARITY



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

**CONTINUITY TEST**

**CAUTION**

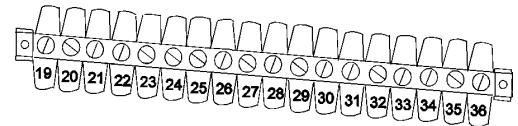
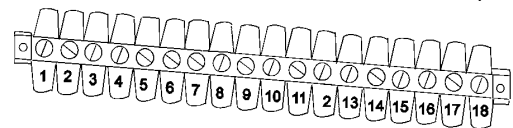
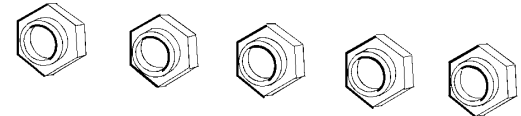
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

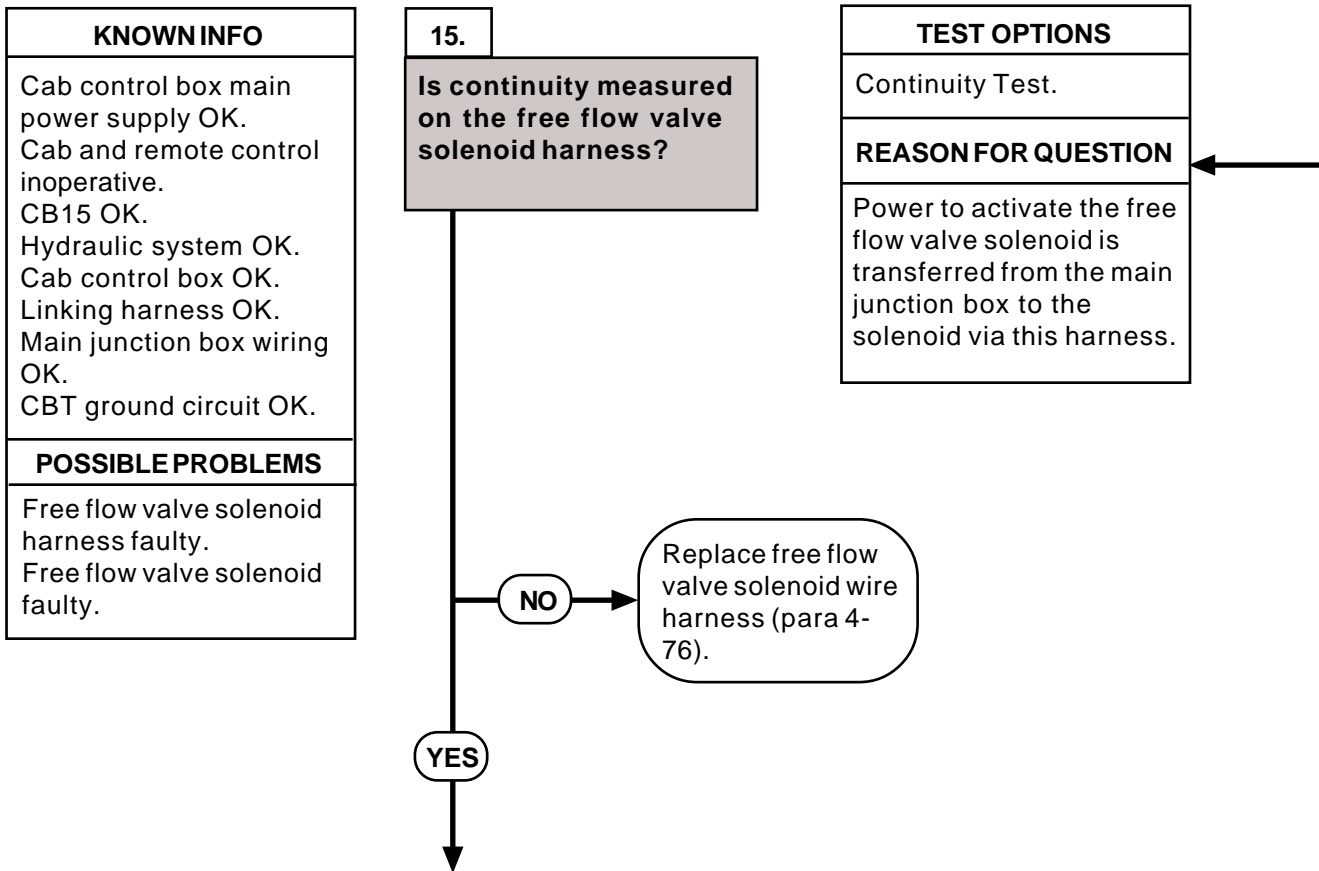
- (2) Place one multimeter lead on terminal strip, position 24, and the other multimeter lead on a known good ground. Check multimeter for continuity.



**WIRING REMOVED FOR CLARITY**

4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

**CONTINUITY TEST**

**CAUTION**

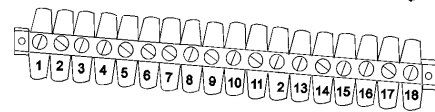
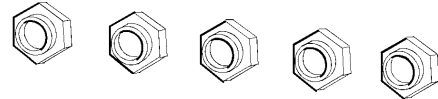
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Loosen connector screw and remove connector from the free flow valve solenoid.
- (2) Set multimeter to ohms position.

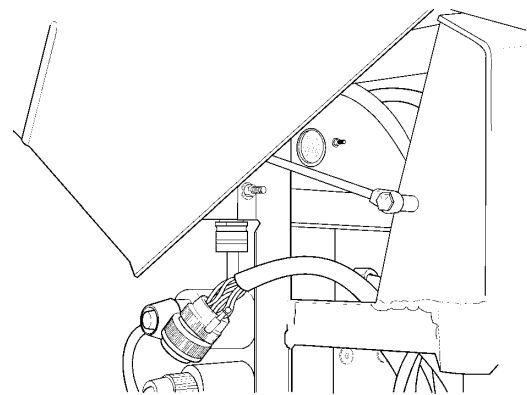
**NOTE**

- A reading of infinity indicates an open circuit.
- Junction box terminal 23 is connected to one side of the solenoid; terminal 24 is connected to the other side.

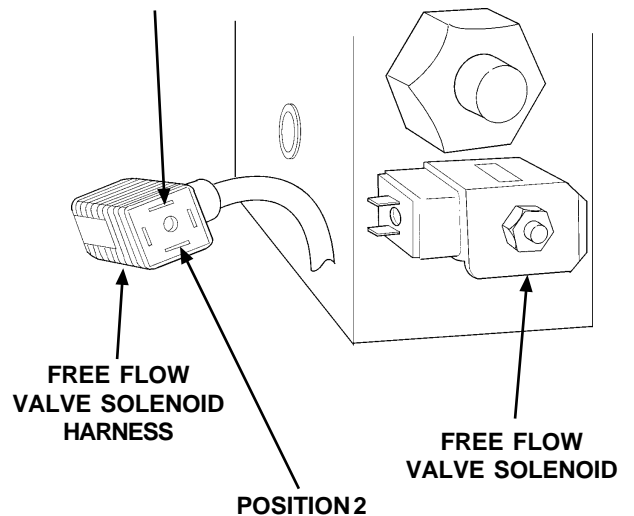
- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between solenoid connector, position 1, and terminal strip, position 23.
- (4) Repeat Step 3 to check for continuity between position 2 in the connector and terminal strip, position 24.



**WIRING REMOVED FOR CLARITY**



**POSITION 1**



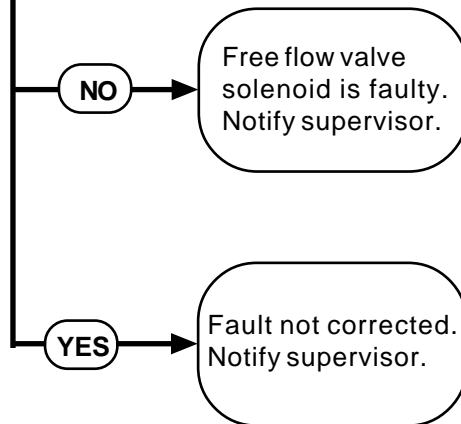
4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

KNOWN INFO
Cab control box main power supply OK. Cab and remote control inoperative. CB15 OK. Hydraulic system OK. Cab control box OK. Linking harness OK. Main junction box wiring OK. CBT ground circuit OK. Free flow valve solenoid harness OK.
POSSIBLE PROBLEMS
Free flow valve solenoid faulty.

16. **Is the resistance of the free flow valve solenoid 39–47 ohms?**

TEST OPTIONS
Free Flow Valve Solenoid Test.
REASON FOR QUESTION
Resistance less than or greater than the specification indicates a faulty solenoid.

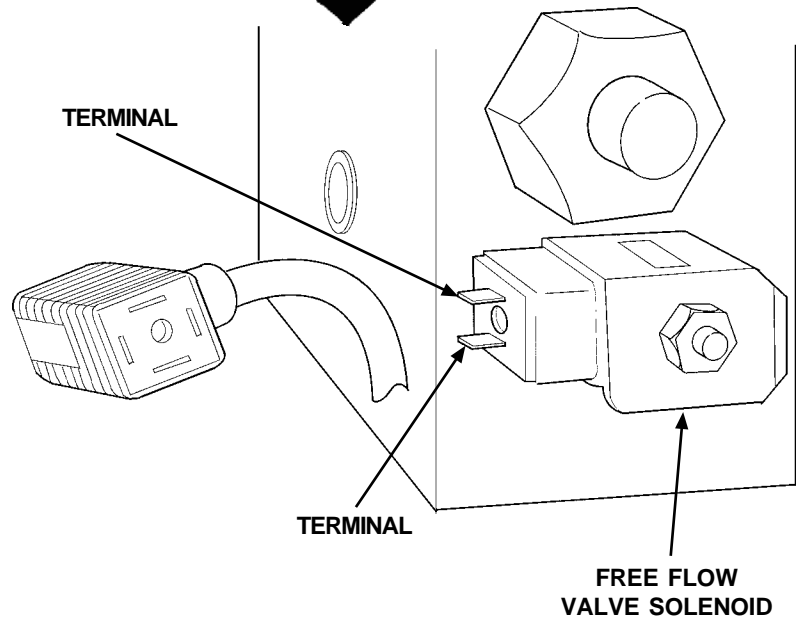
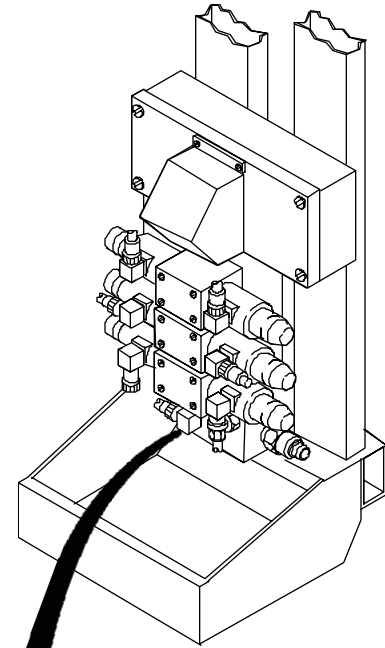


**4-12. UNIT TROUBLESHOOTING (continued).**

**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

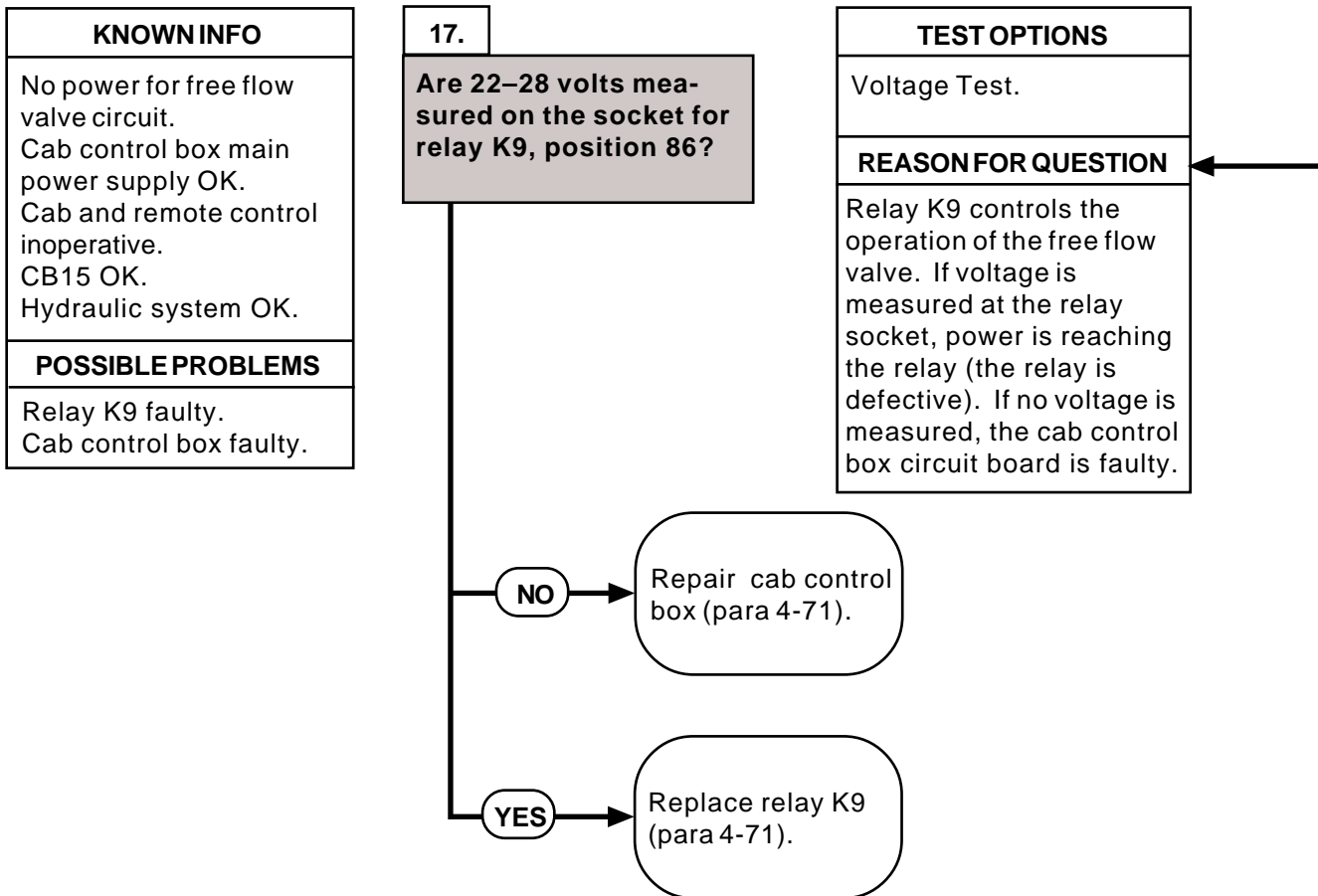
**FREE FLOW VALVE SOLENOID TEST**

- (1) Set multimeter to ohms position.
- (2) Connect multimeter leads to each terminal on the free flow valve solenoid and check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

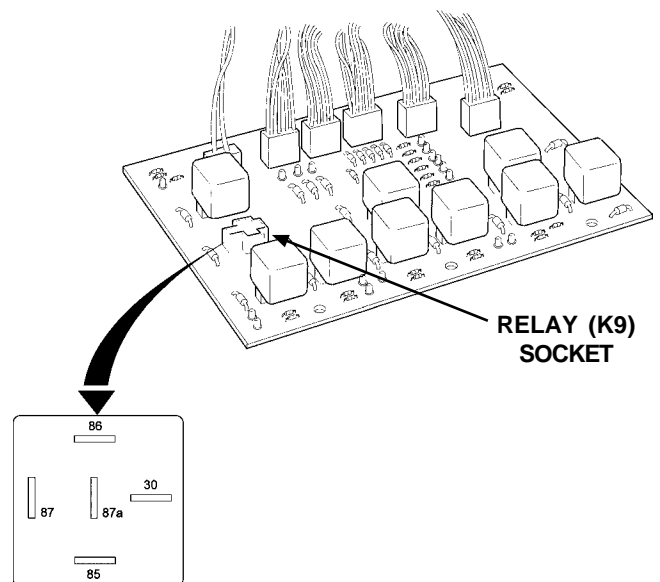
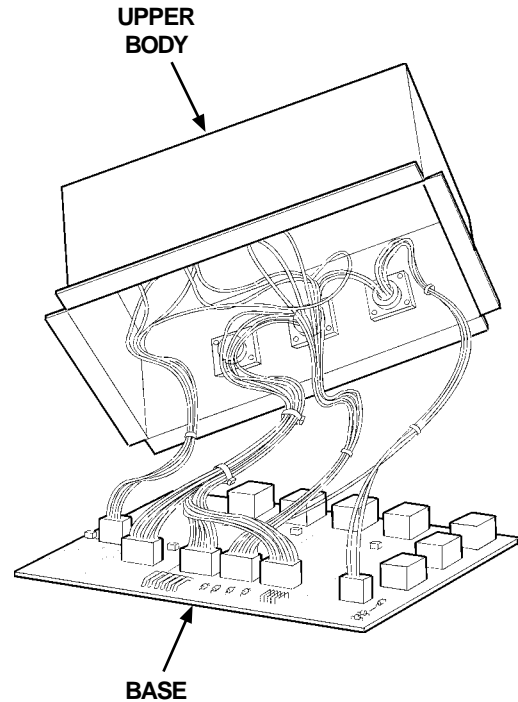




**4-12. UNIT TROUBLESHOOTING (continued).**

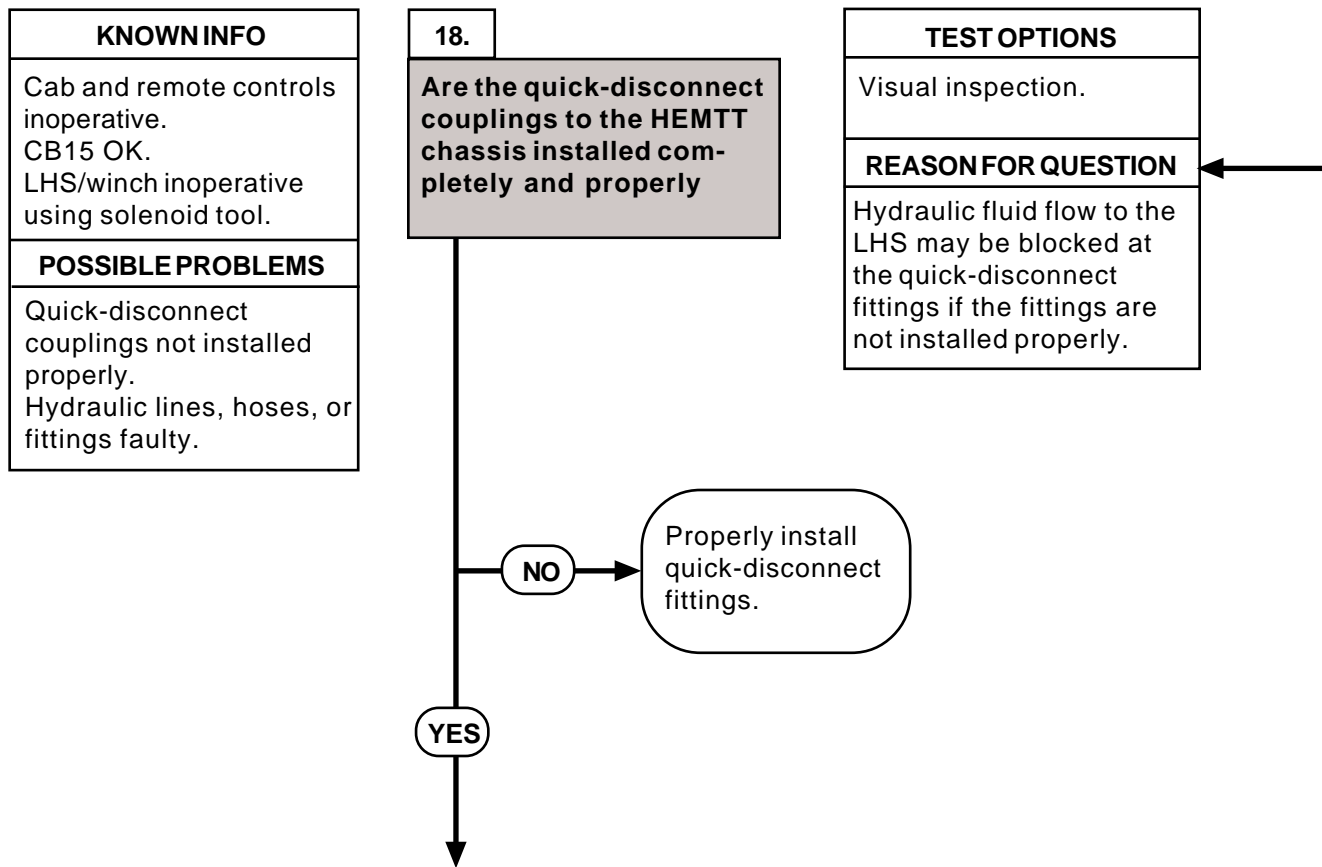
**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

<b>VOLTAGE TEST</b>
<p>(1) Remove four screws and lockwashers from cab control box.</p> <p>(2) Remove six screws from cab control box and separate upper body from base.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;"><b>Use care when removing relay from circuit board. Failure to comply with this caution may result in damage to circuit board.</b></p> <p>(3) Remove relay K9 from cab control box circuit board.</p> <p>(4) Turn engine start switch to ON position.</p> <p>(5) Turn light control switch to STOP LIGHT position.</p> <p>(6) Set multimeter to voltage position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">This test can also be accomplished by observing the status of LED D60.</p> <p>(7) Connect one multimeter lead to terminal "86" of relay K9 socket and the other multimeter lead to a known good ground, while assistant holds the function switch in the UNLOAD or LOAD positions. Check multimeter for voltage.</p>



4-12. UNIT TROUBLESHOOTING (continued).

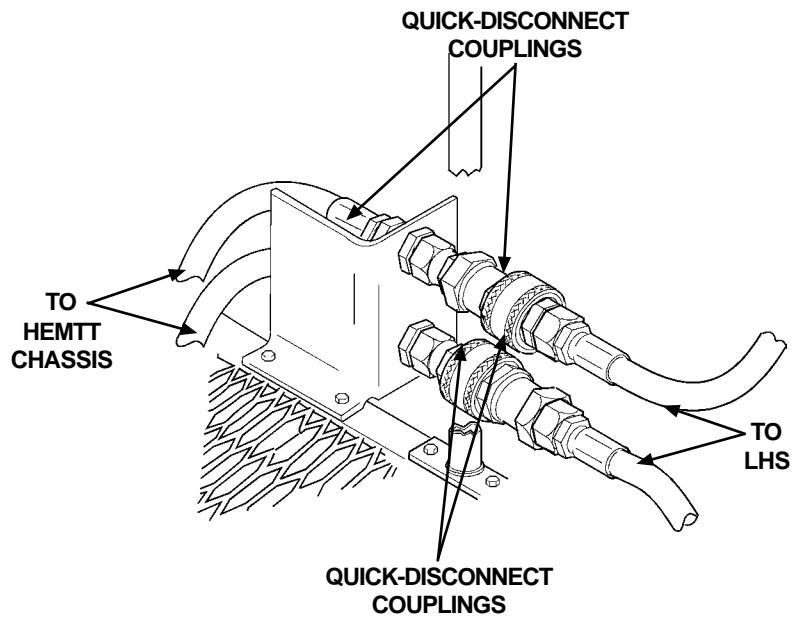
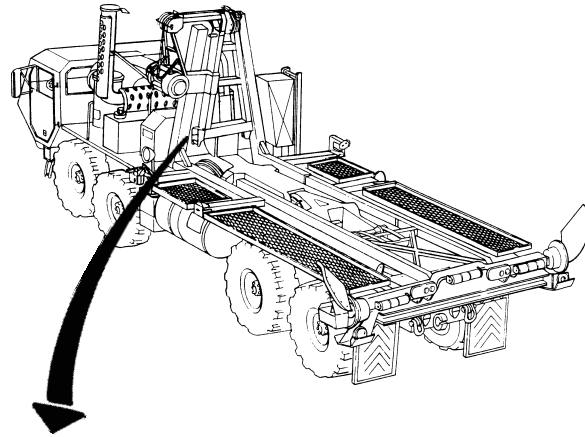
16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).



**4-12. UNIT TROUBLESHOOTING (continued).**

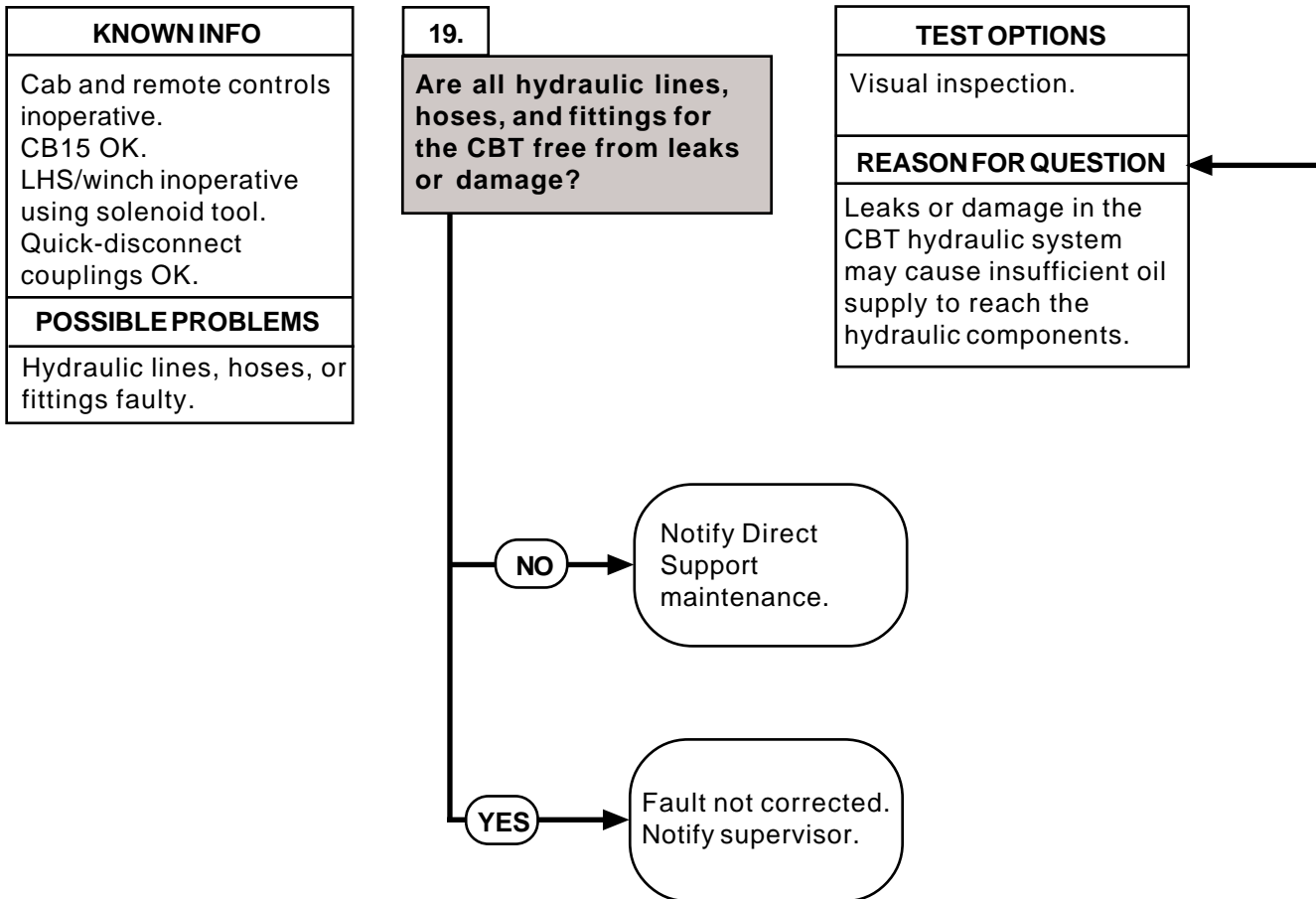
**16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).**

Make sure that the male portions of the quick-disconnect couplings are fully seated in the female portions of the fittings and secured completely by the locking mechanism.



4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

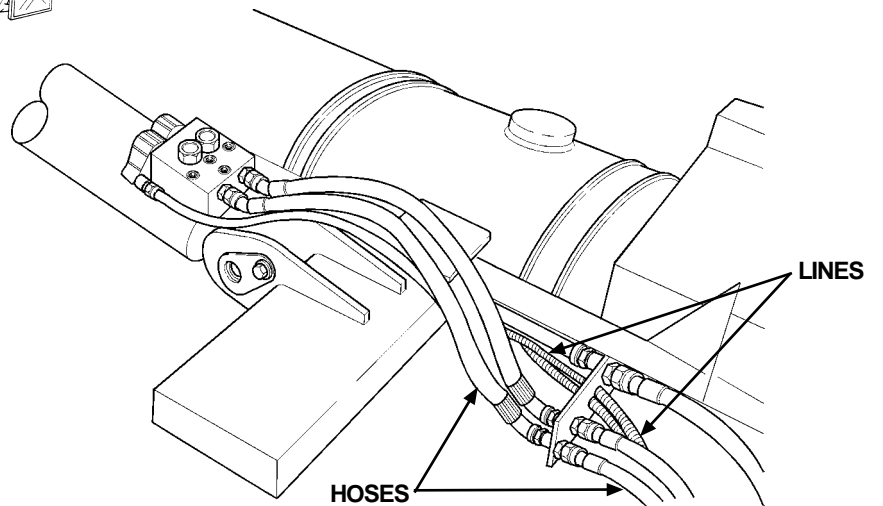
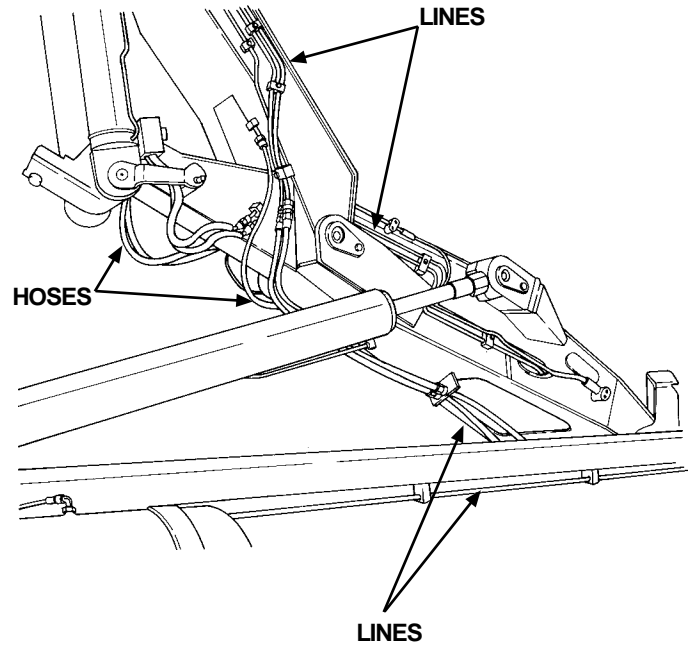
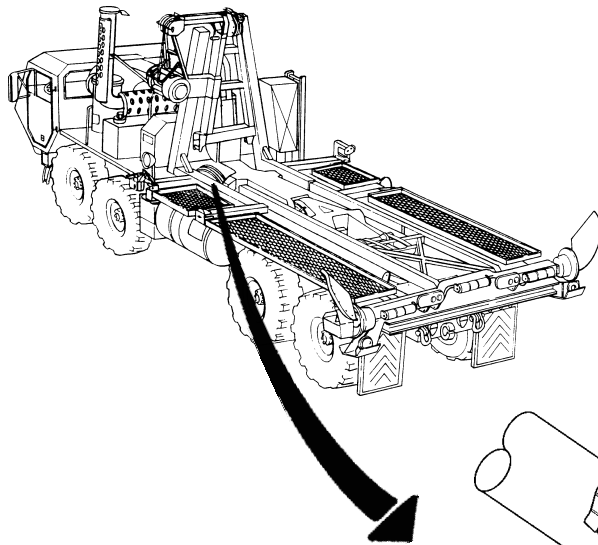


4-12. UNIT TROUBLESHOOTING (continued).

16. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (continued).

TYPICAL CBT HYDRAULIC HOSES AND LINES

Check LHS/winch hydraulic lines, hoses, and fittings for leaks or damage.



TYPICAL CBT HYDRAULIC HOSES

4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY).

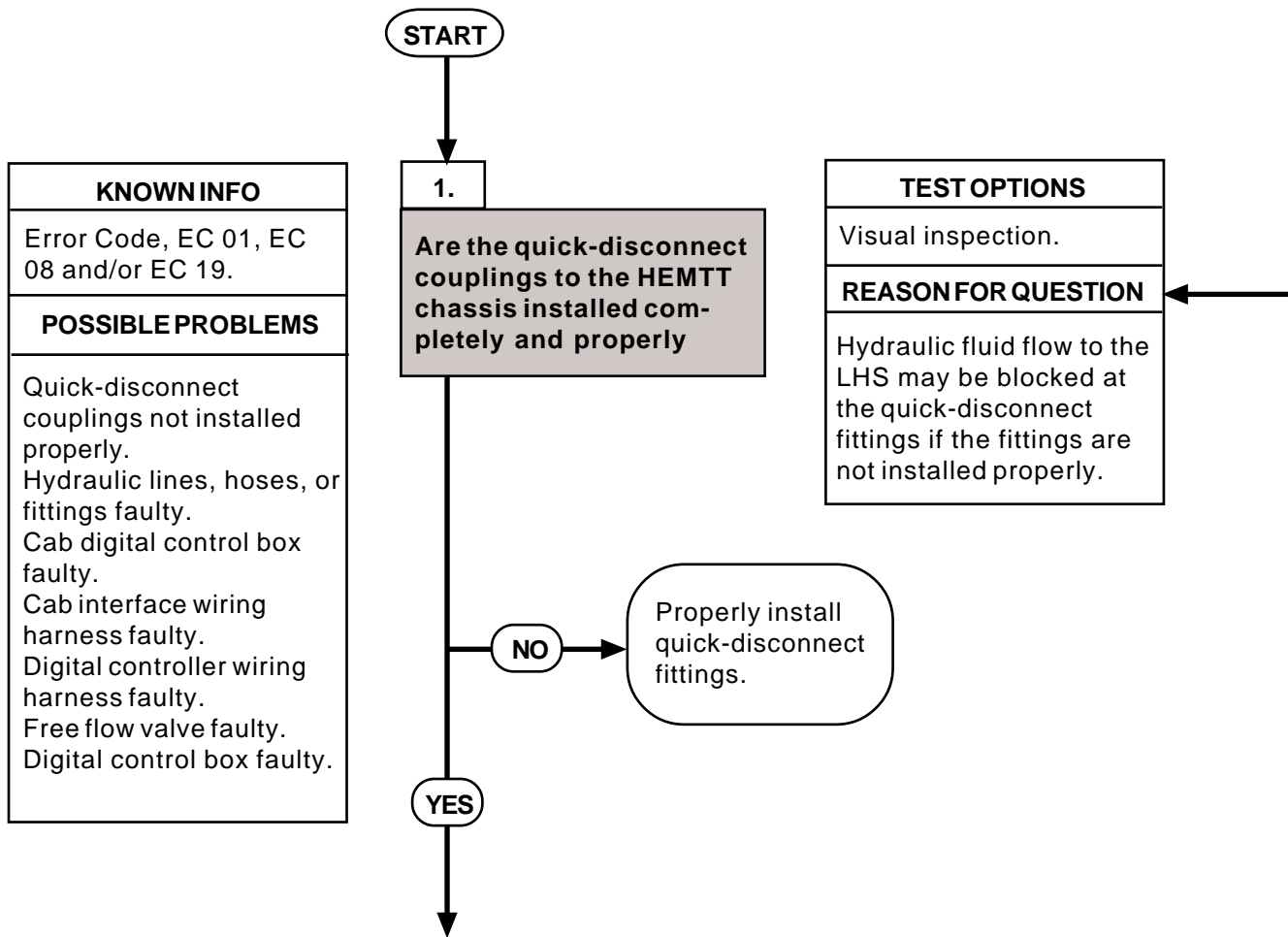
INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

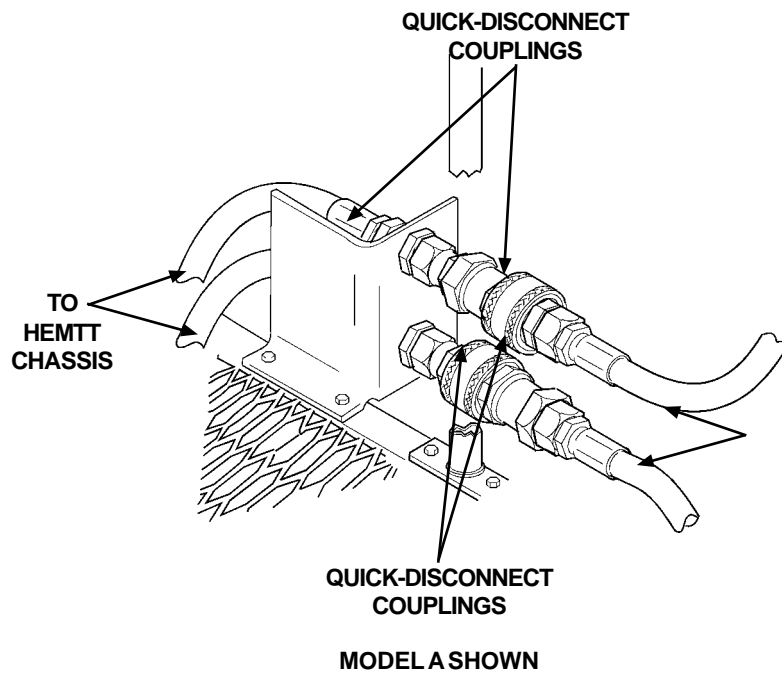
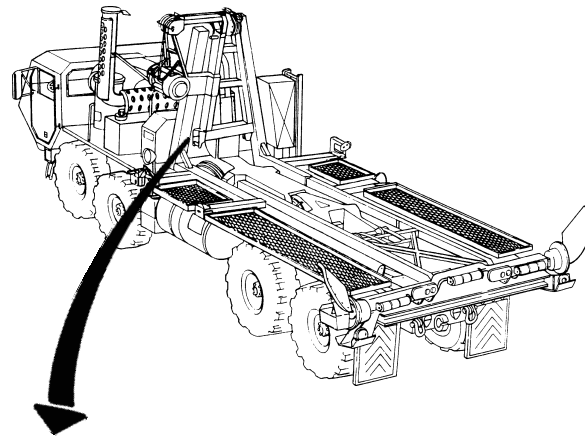
BAP loaded on the CBT  
Engine turned off (TM 9-2320-279-10)  
Parking brake applied (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)



**4-12. UNIT TROUBLESHOOTING (continued).**

**16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY)  
(continued).**

Make sure that the male portions of the quick-disconnect couplings are fully seated in the female portions of the fittings and secured completely by the locking mechanism.



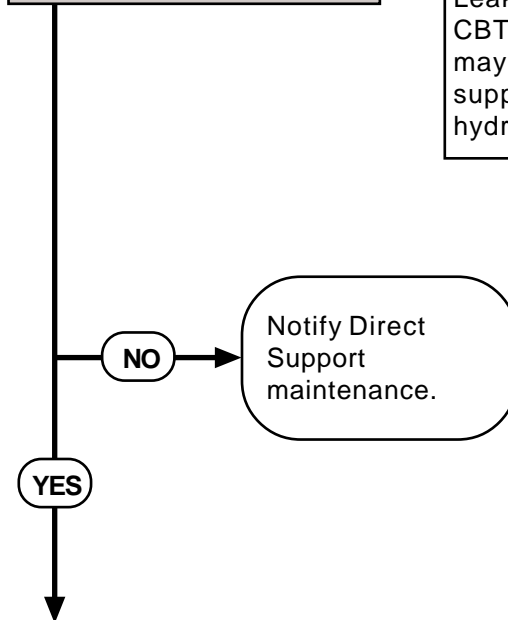
4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).

KNOWN INFO
Error Code, EC 01, EC 08 and/or EC 19. Quick-disconnect couplings installed properly.
POSSIBLE PROBLEMS
Hydraulic lines, hoses, or fittings faulty. Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Free flow valve faulty. digital control box faulty.

2.  
**Are all hydraulic lines, hoses, and fittings for the CBT free from leaks or damage?**

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
Leaks or damage in the CBT hydraulic system may cause insufficient oil supply to reach the hydraulic components.

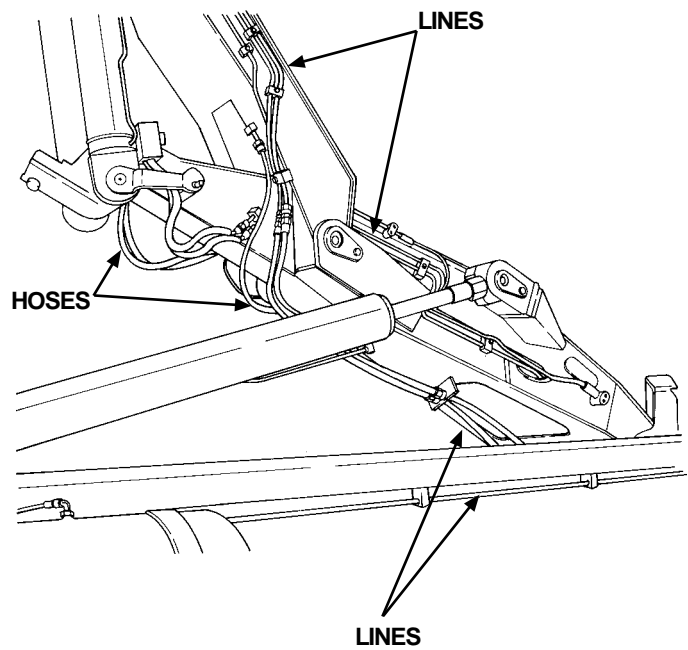




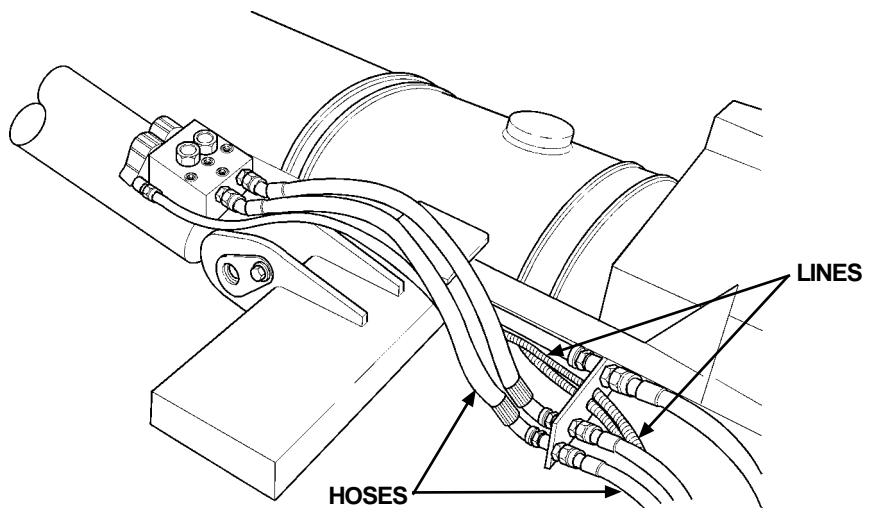
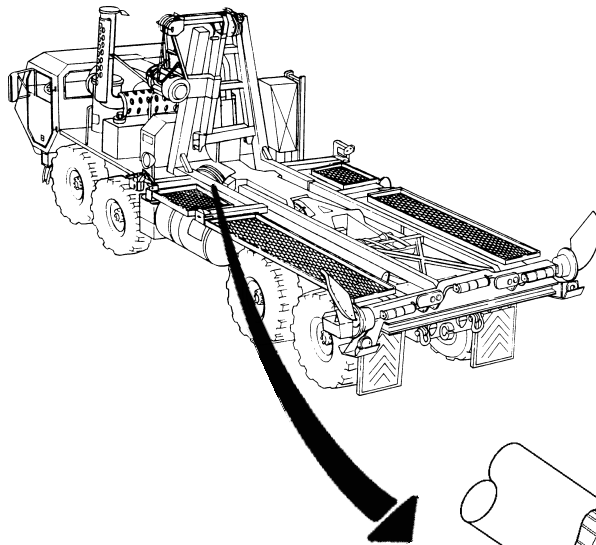
4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY)  
(continued).

TYPICAL CBT HYDRAULIC HOSES AND LINES



Check LHS/winch hydraulic lines, hoses, and fittings for leaks or damage.



TYPICAL CBT HYDRAULIC HOSES

4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).

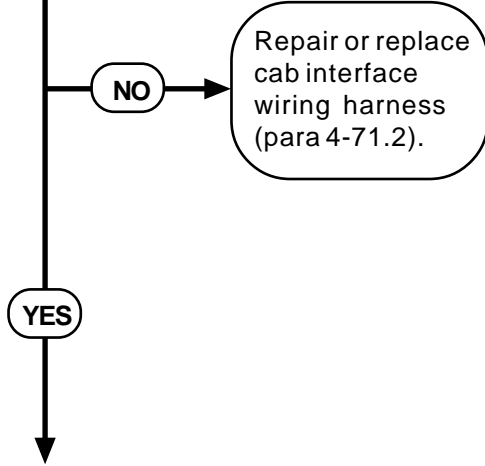
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 01, EC 08 and/or EC 19. Quick-disconnect couplings installed properly. Hydraulic lines, hoses, or fittings OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Free flow valve faulty. Digital control box faulty.

3.  
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the hook arm solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



**4-12. UNIT TROUBLESHOOTING (continued).**

**16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).**

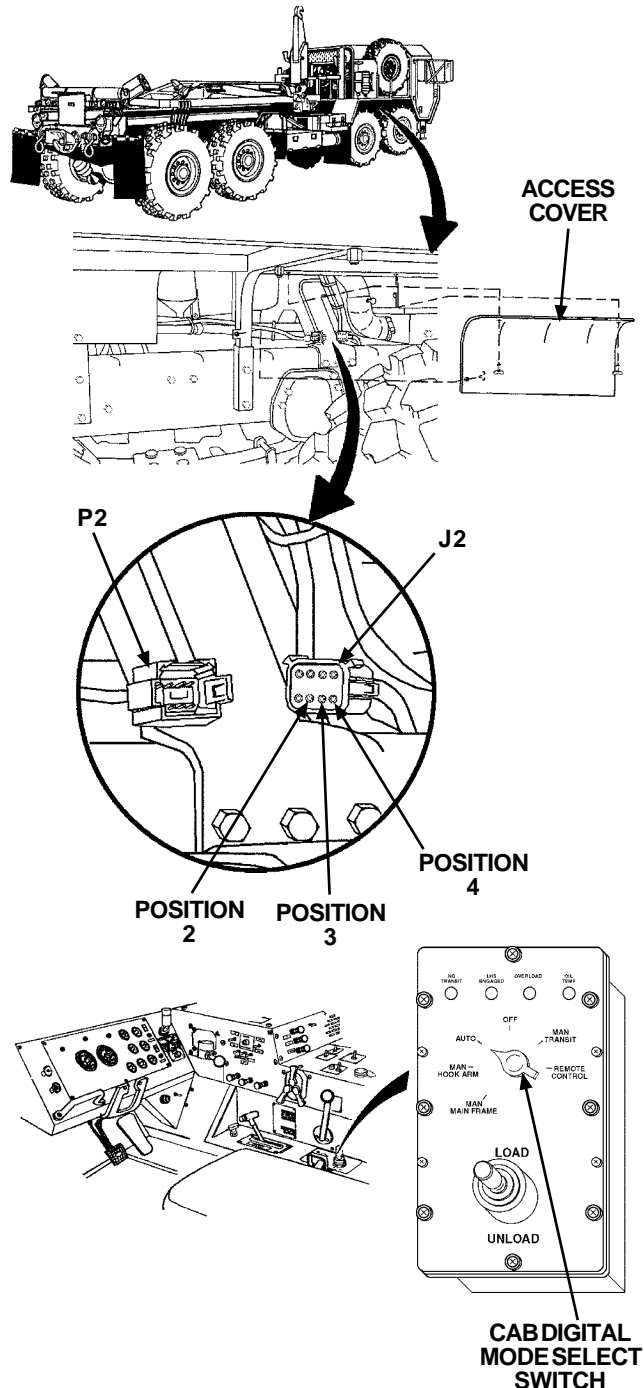
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).

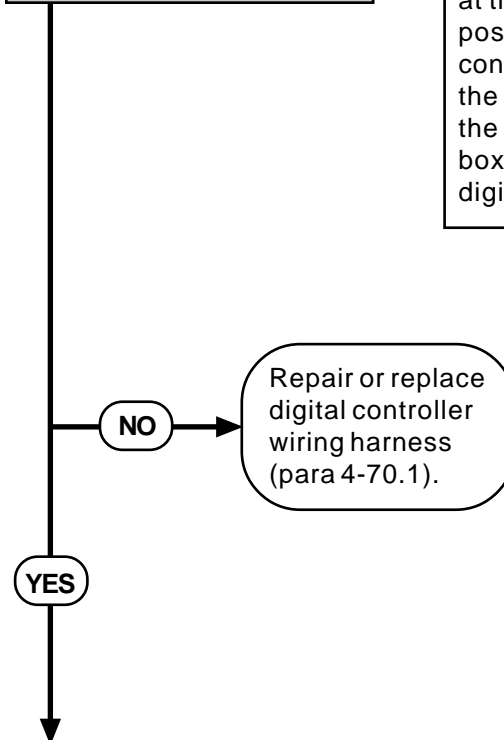
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 01, EC 08 and/or EC 19. Quick-disconnect couplings installed properly. Hydraulic lines, hoses, or fittings OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Free flow valve faulty. Digital control box faulty.

4.  
Is there continuity measured between the digital controller wiring harness (J4) and (P2)?

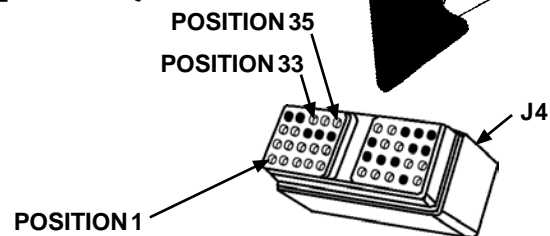
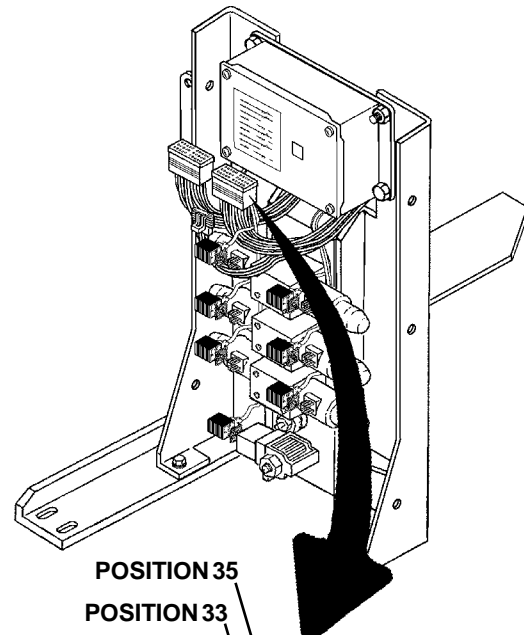
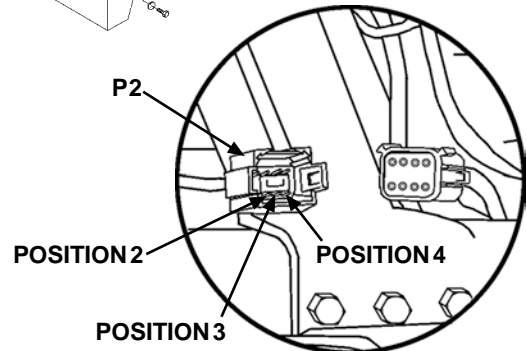
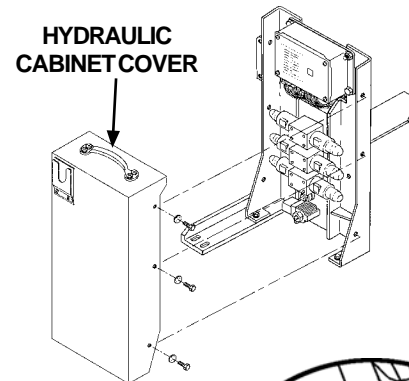
TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the digital controller wiring harness, the 24 volt power from the cab digital control box does not reach the digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p> <p>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</p> <p>(2) Remove left hand (J4), 40-pin connector from digital controller.</p> <p>(3) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p> <p>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</p> <p>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</p> <p>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</p>
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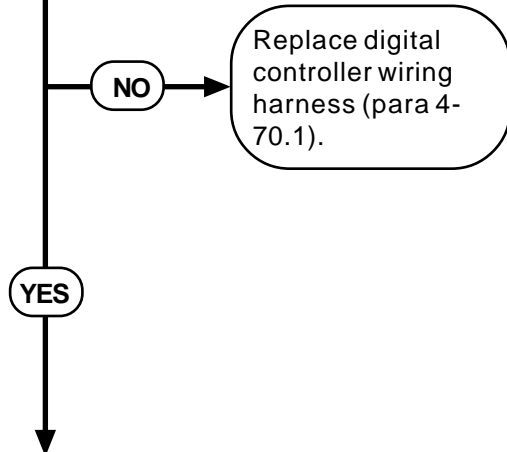
4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).

KNOWN INFO
Error Code, EC 01, EC 08 and/or EC 19. Quick-disconnect couplings installed properly. Hydraulic lines, hoses, or fittings OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Free flow valve faulty. Digital control box faulty.

5.  
Is continuity measured on the free flow valve solenoid harness?

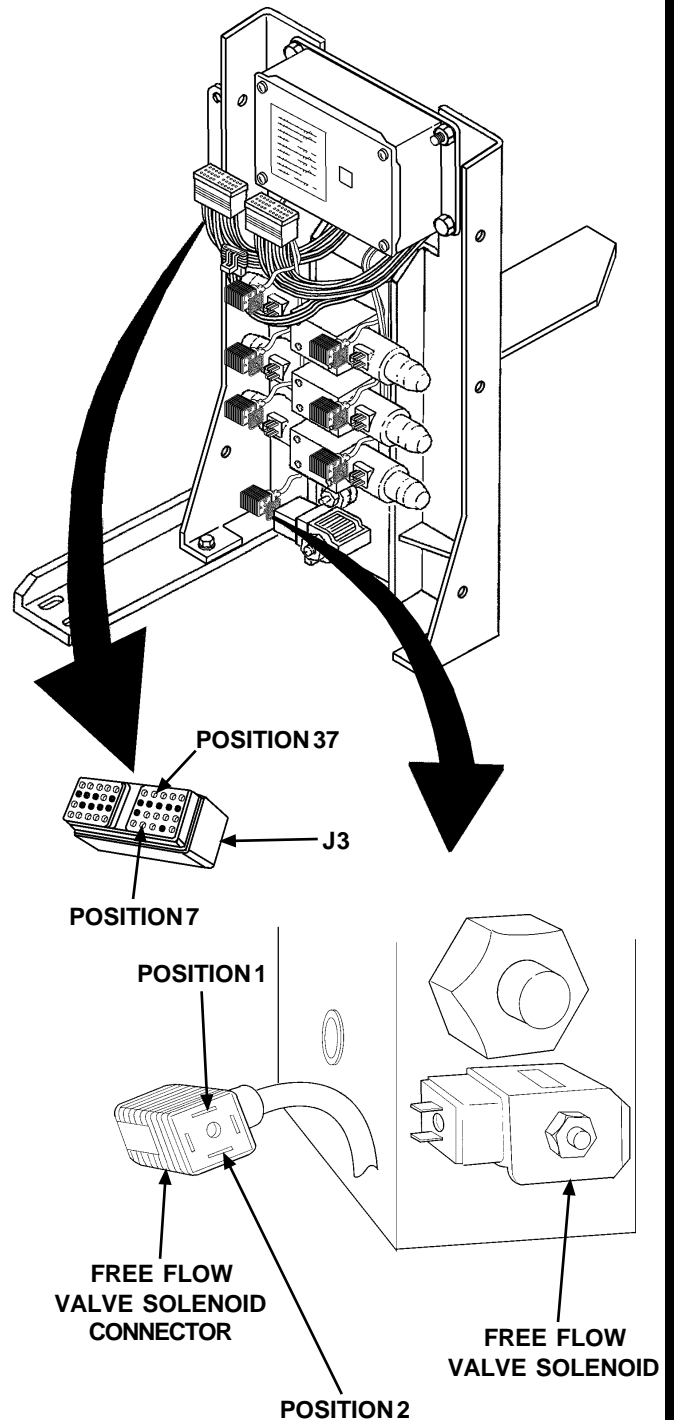
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power to activate the free flow valve solenoid is transferred from the digital control box to the free flow valve solenoid via this harness.



4-12. UNIT TROUBLESHOOTING (continued).

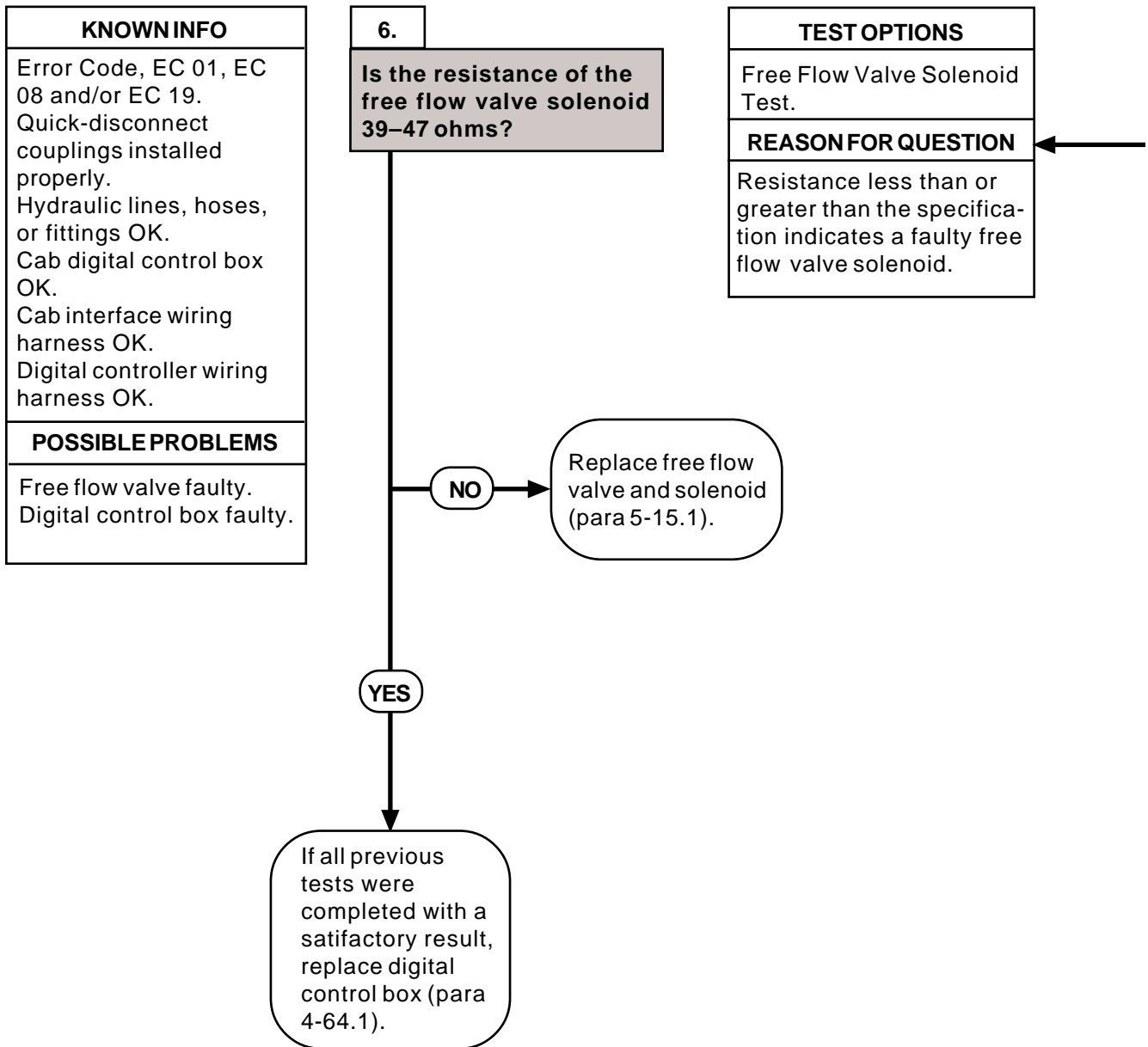
16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p> <p>(1) Loosen connector screw and remove connector from the free flow valve solenoid.</p> <p>(2) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p> <p>(3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between digital controller wiring harness (J3), position "7", and free flow solenoid connector, position "1".</p> <p>(4) Repeat Step 3 to check for continuity between (J3), position "37", and position "2" on the free flow solenoid connector.</p>
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4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY) (continued).



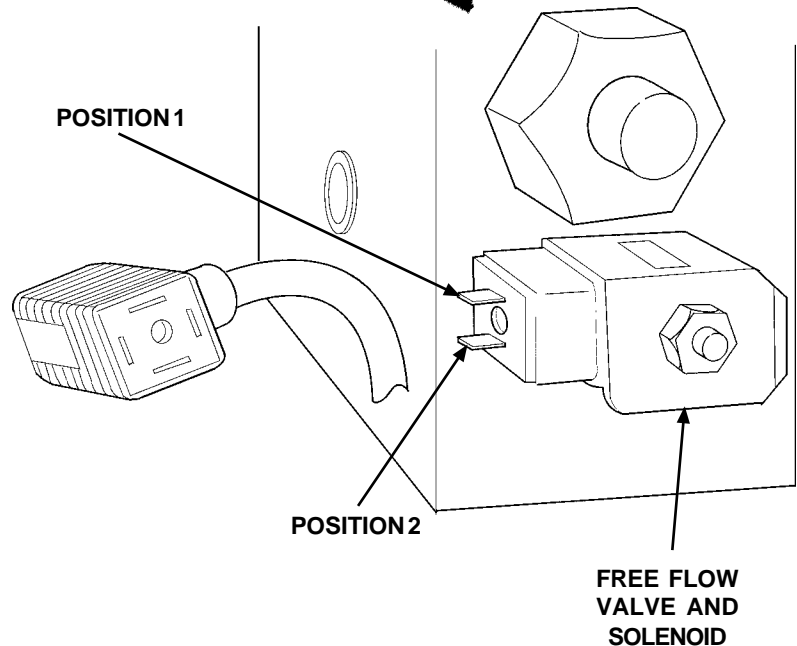
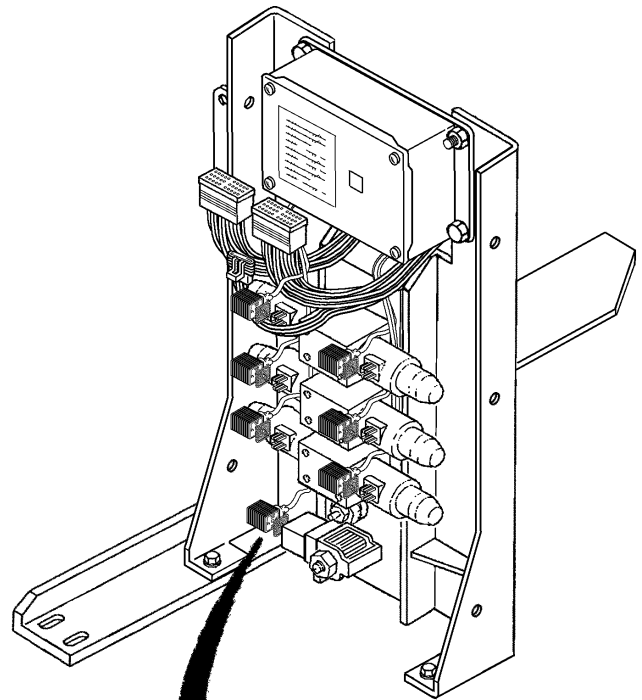


4-12. UNIT TROUBLESHOOTING (continued).

16.1 MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE (MODEL B ONLY)  
(continued).

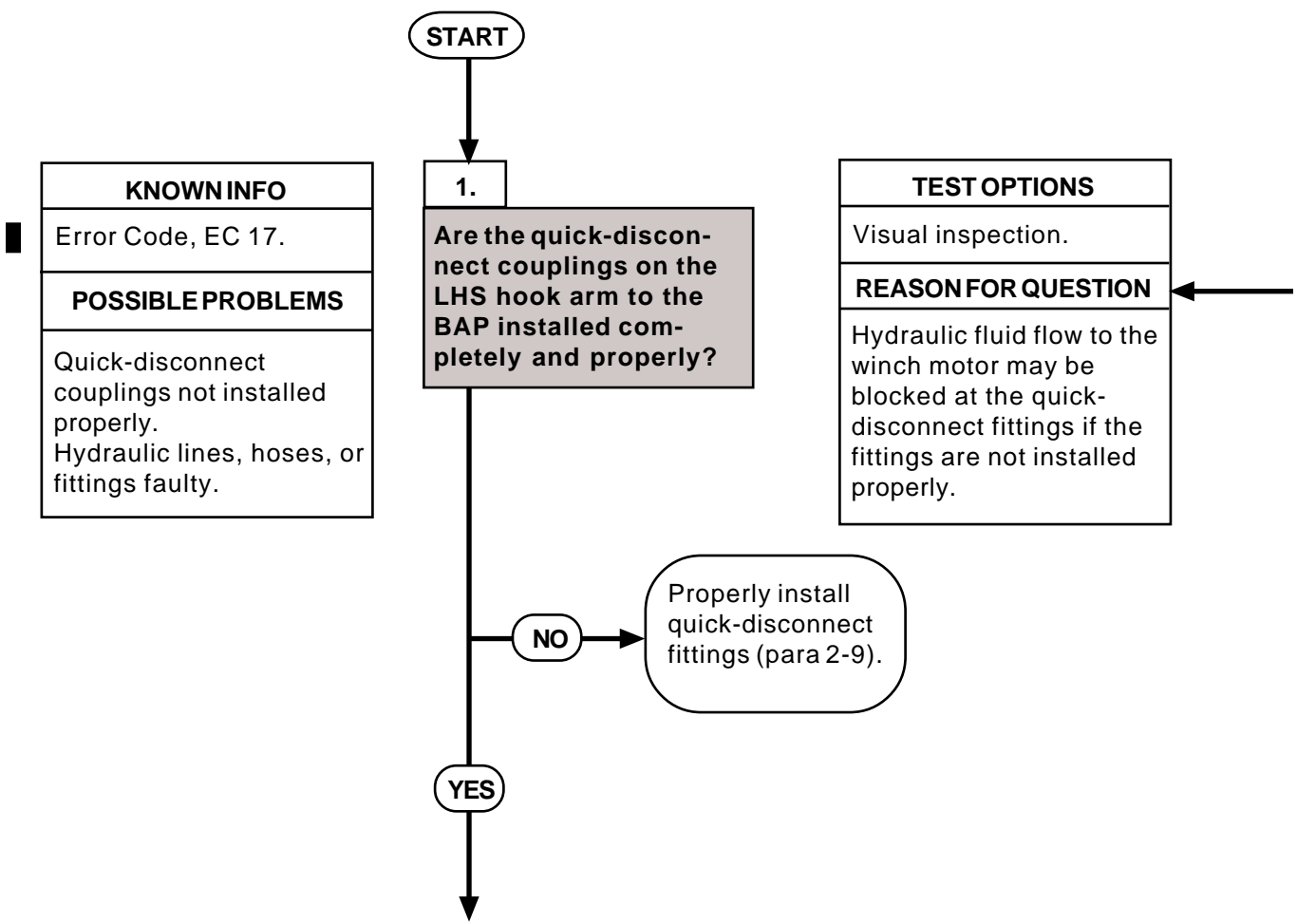
**FREE FLOW VALVE SOLENOID TEST**

- (1) Set multimeter to ohms position.
- (2) Connect multimeter leads to position "1" and position "2" on the free flow valve solenoid and check multimeter for 39-47 ohms.



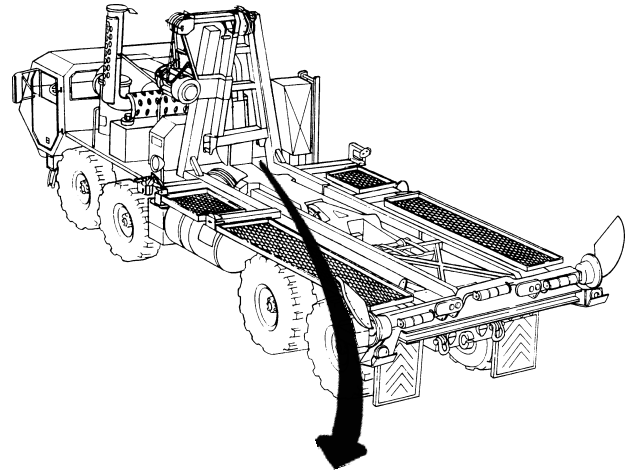
4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE.	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	BAP loaded on the CBT Engine turned off (TM 9-2320-279-10) Parking brake applied (TM 9-2320-279-10) Wheels chocked (TM 9-2320-279-10)



**4-12. UNIT TROUBLESHOOTING (continued).**

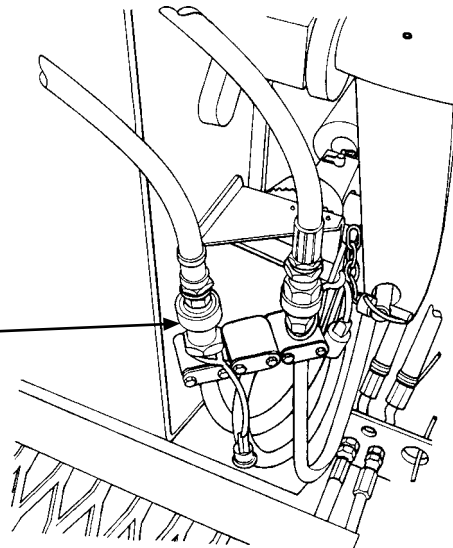
**17. BAP WINCH DOES NOT OPERATE (continued).**



**VISUAL INSPECTION**

Make sure that the male portion of the quick-disconnect couplings are fully seated in the female portions of the fittings and are completely secured by the locking mechanism.

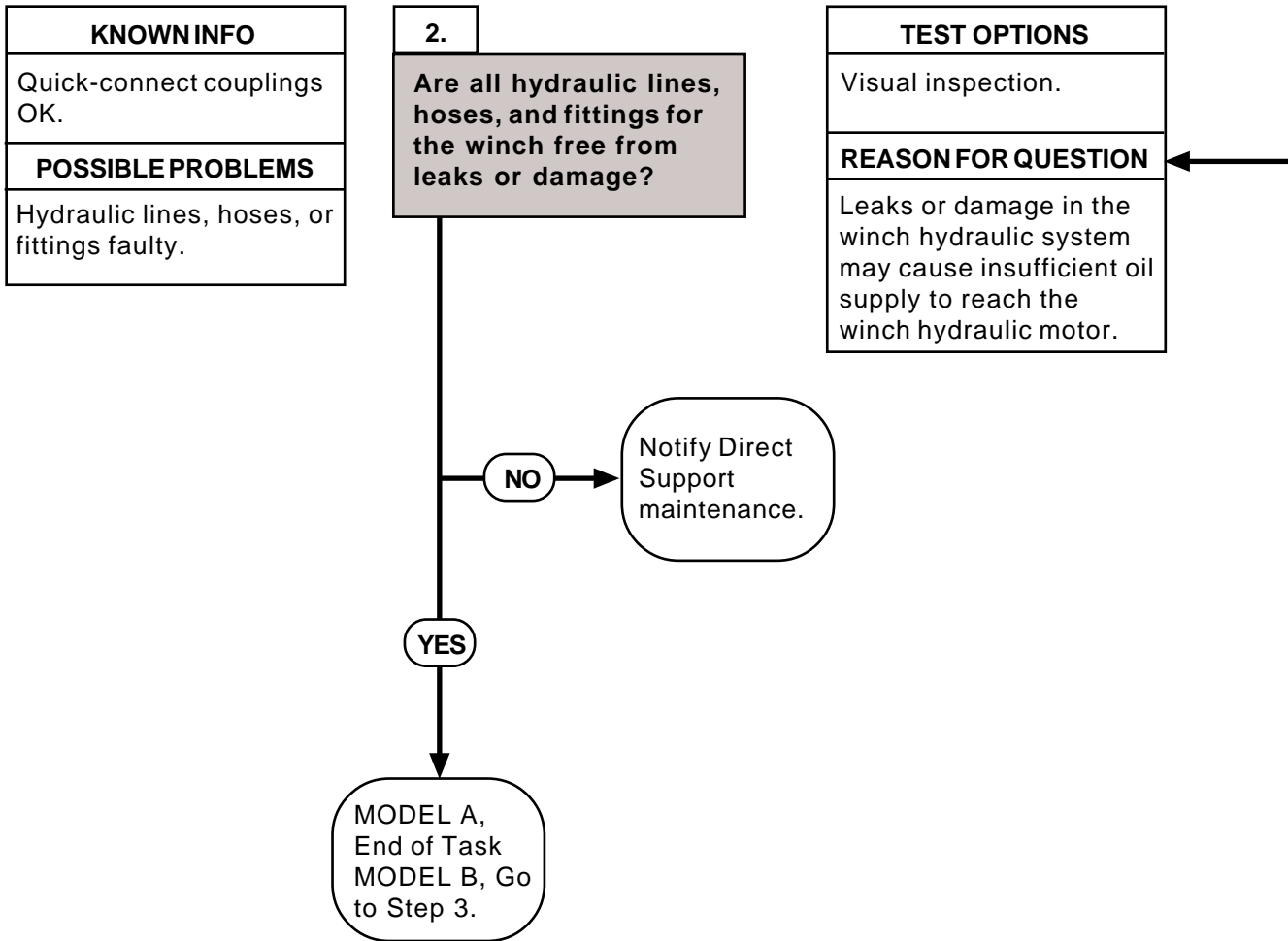
**WINCH QUICK-DISCONNECT COUPLINGS**



**MODEL A SHOWN**

4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (continued).

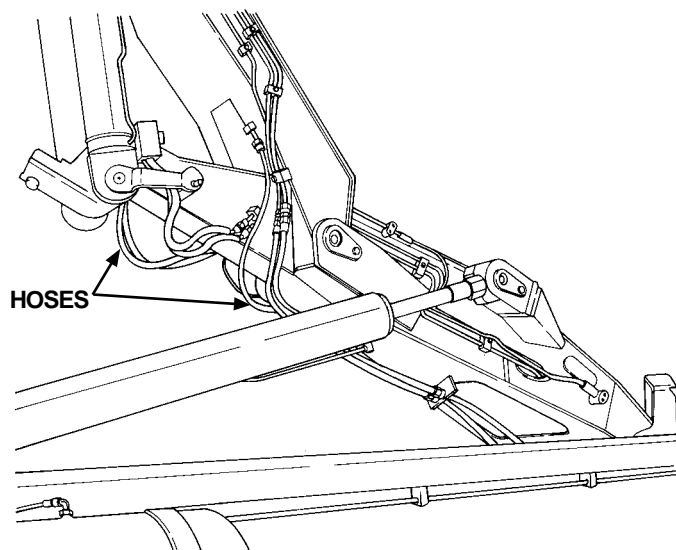
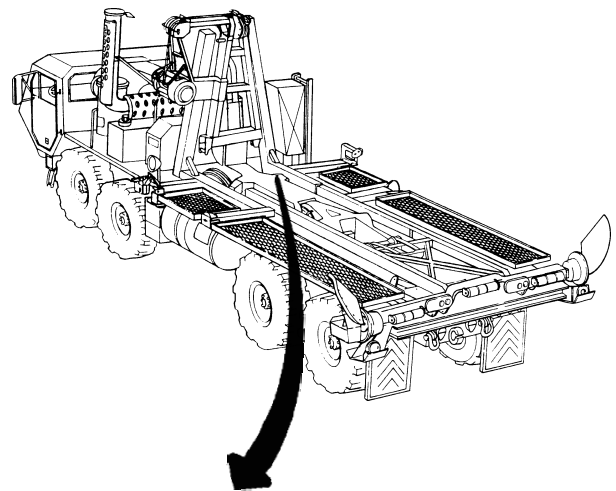


4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (continued).

**VISUAL INSPECTION**

Check winch hydraulic lines, hoses, and fittings for leaks or damage.



4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY).

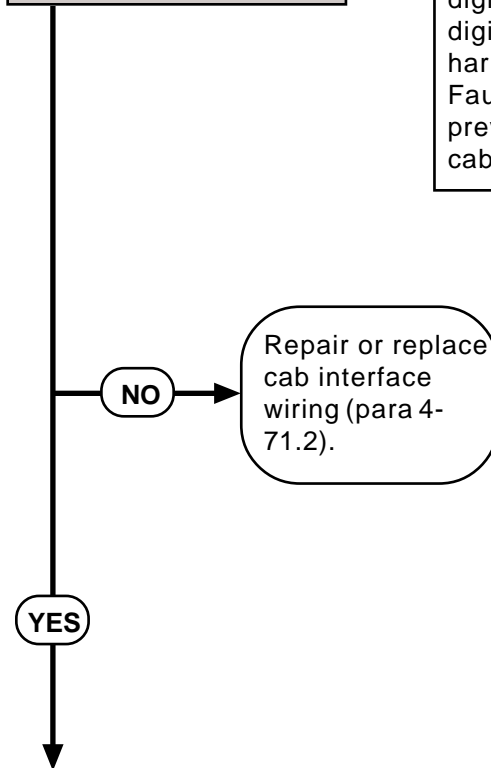
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 17. Quick-connect couplings OK. Hydraulic lines, hoses, or fittings OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Winch in valve faulty. Winch out valve faulty. Digital control box faulty.

3.  
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the BAP winch solenoids is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



**4-12. UNIT TROUBLESHOOTING (continued).**

**17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY) (continued).**

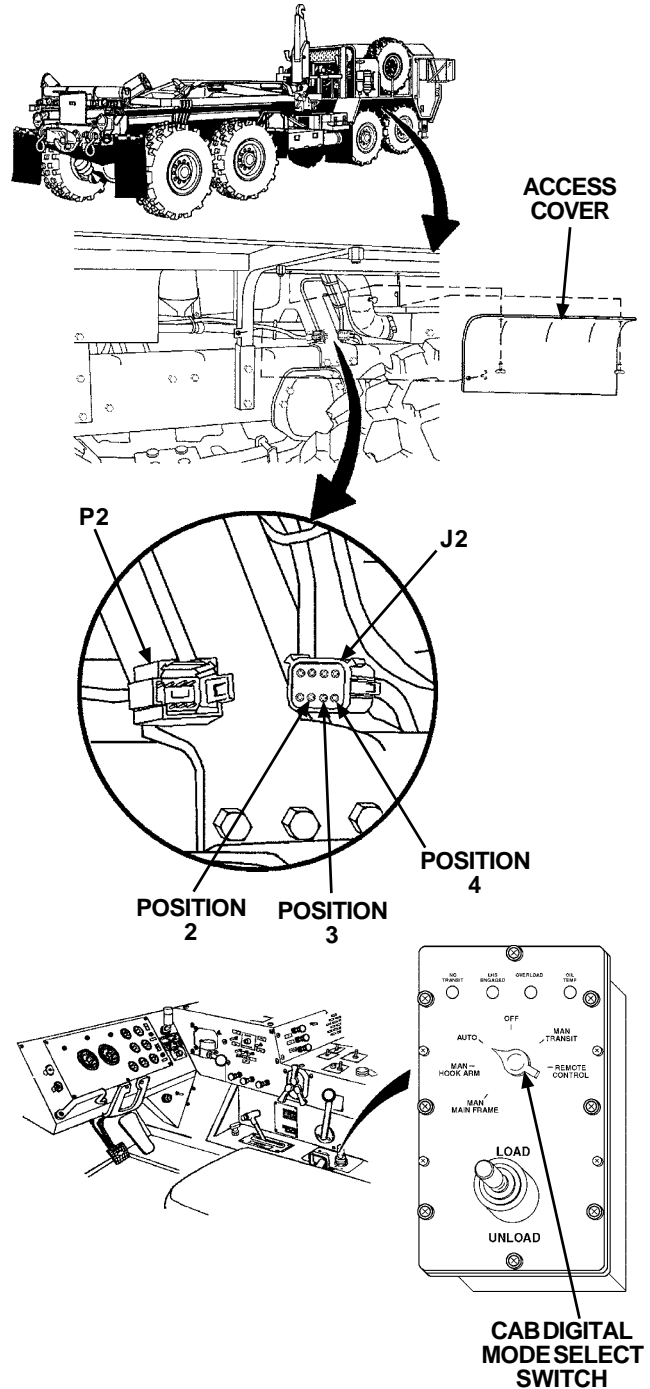
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.

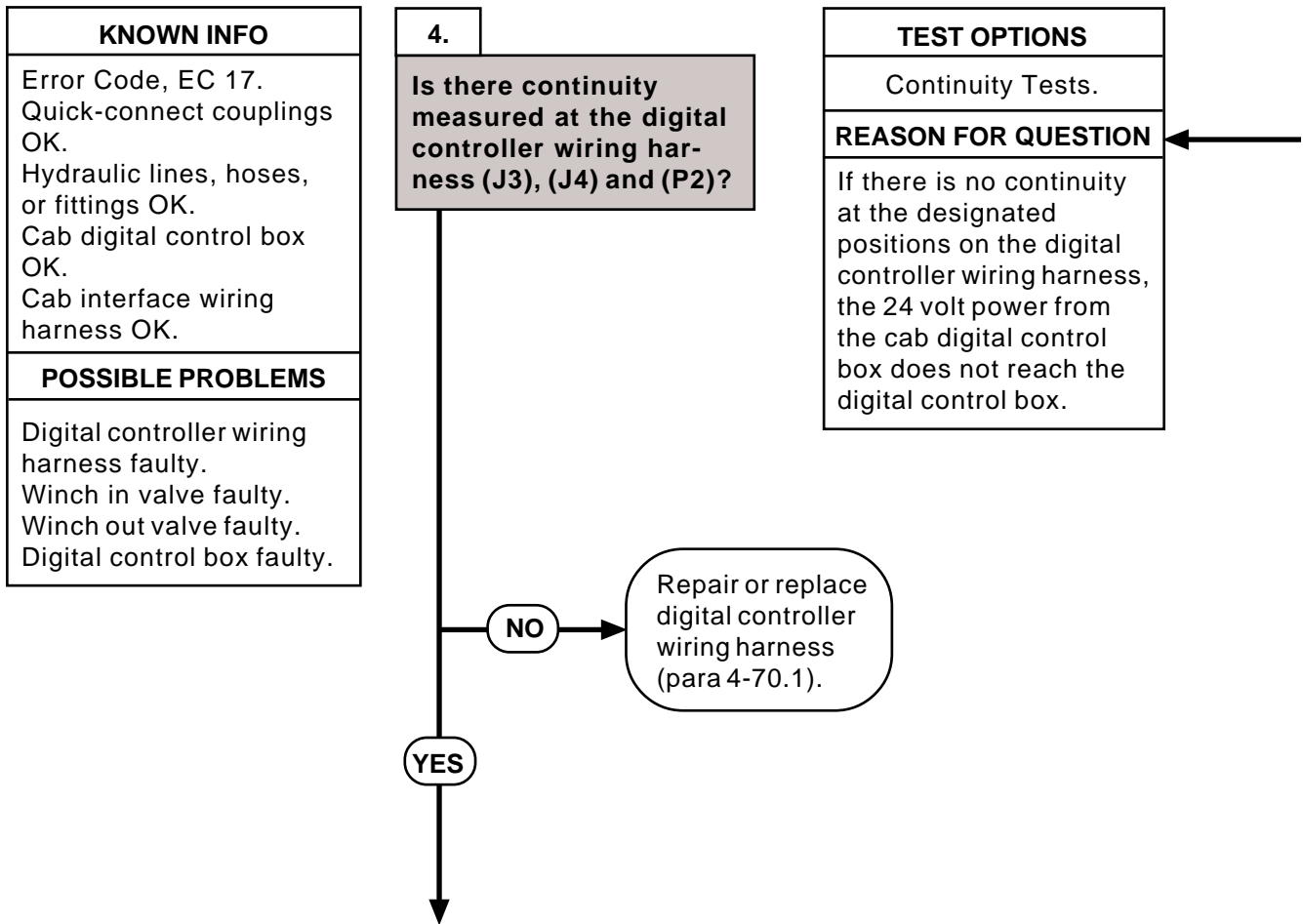


4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

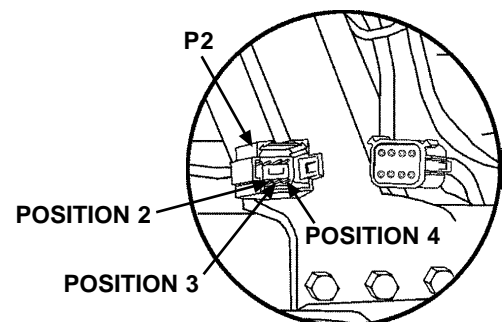
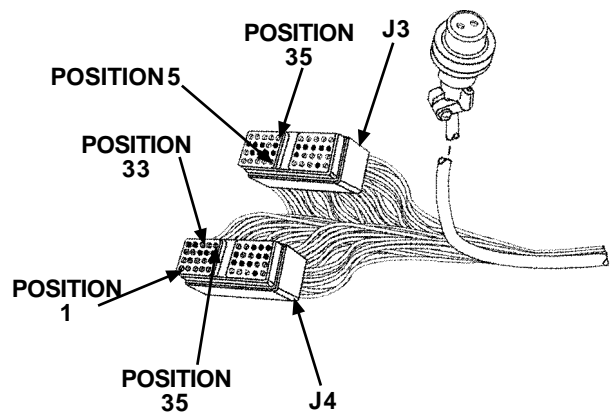
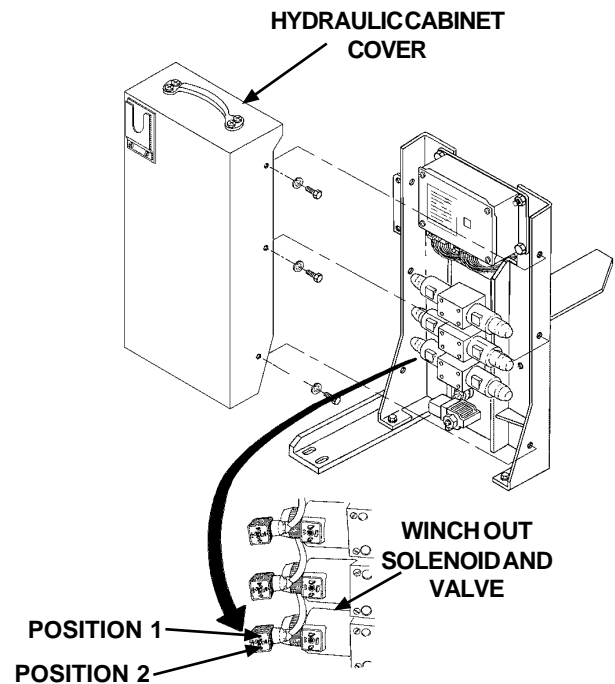




4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</li> <li>(7) Connect multimeter between (J3), position "5", and winch out solenoid connector, position "1". Check multimeter for continuity.</li> <li>(8) Connect multimeter between (J3), position "35", and winch out solenoid connector, position "2". Check multimeter for continuity.</li> </ol>	

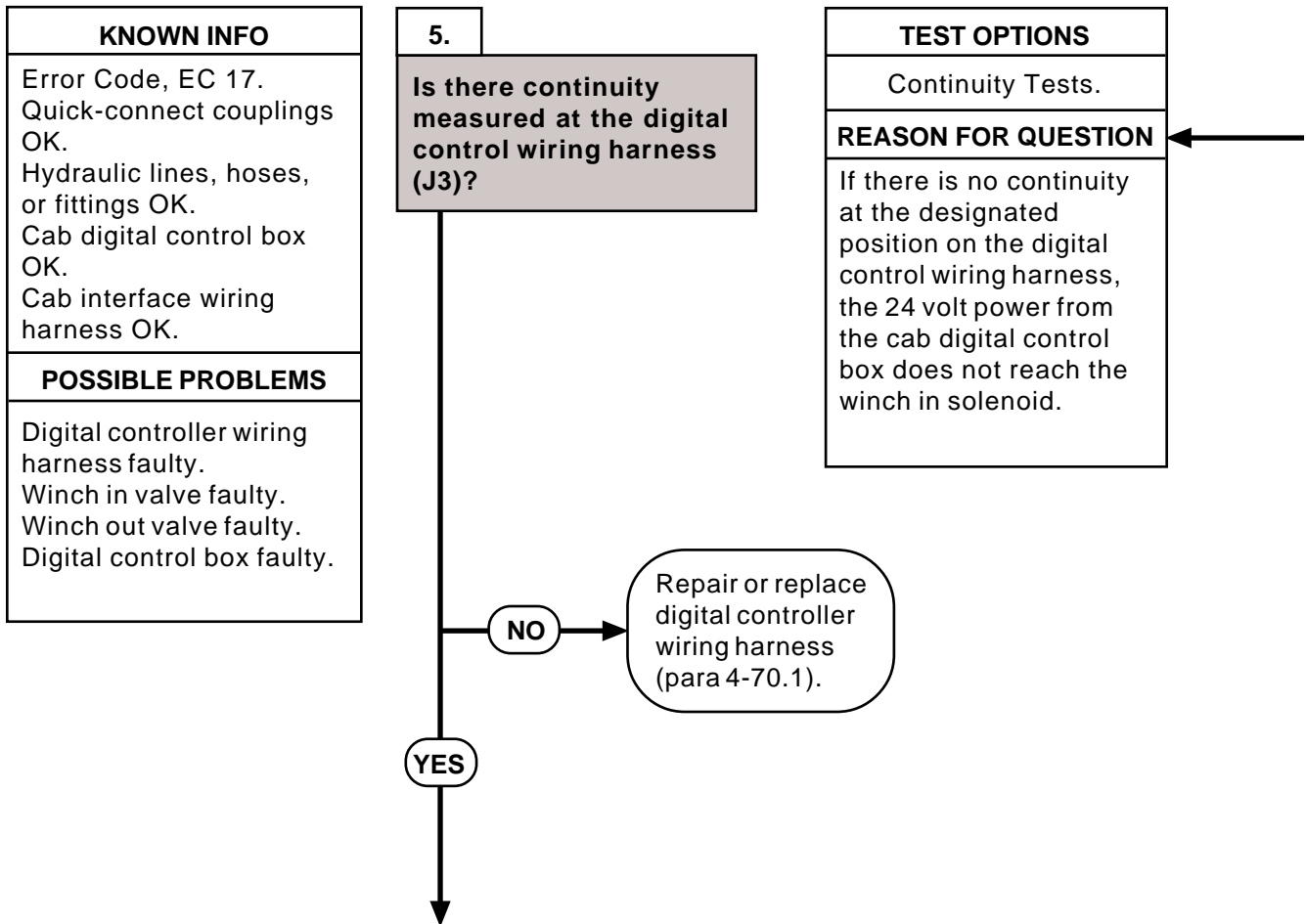


4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE( MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

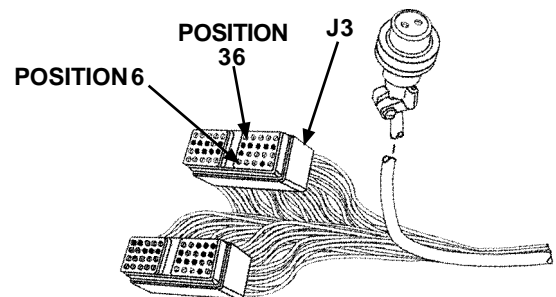
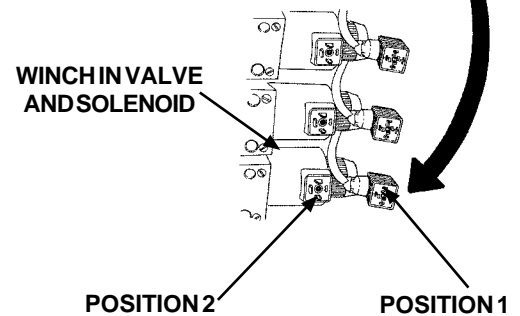
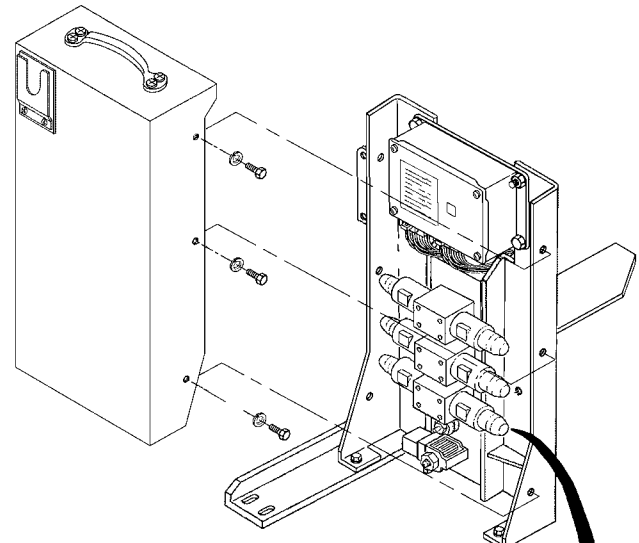
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (2) Connect multimeter between (J3), position "6", and winch in solenoid connector, position "1". Check multimeter for continuity.
- (3) Connect multimeter between (J3), position "36", and winch in solenoid connector, position "2". Check multimeter for continuity.

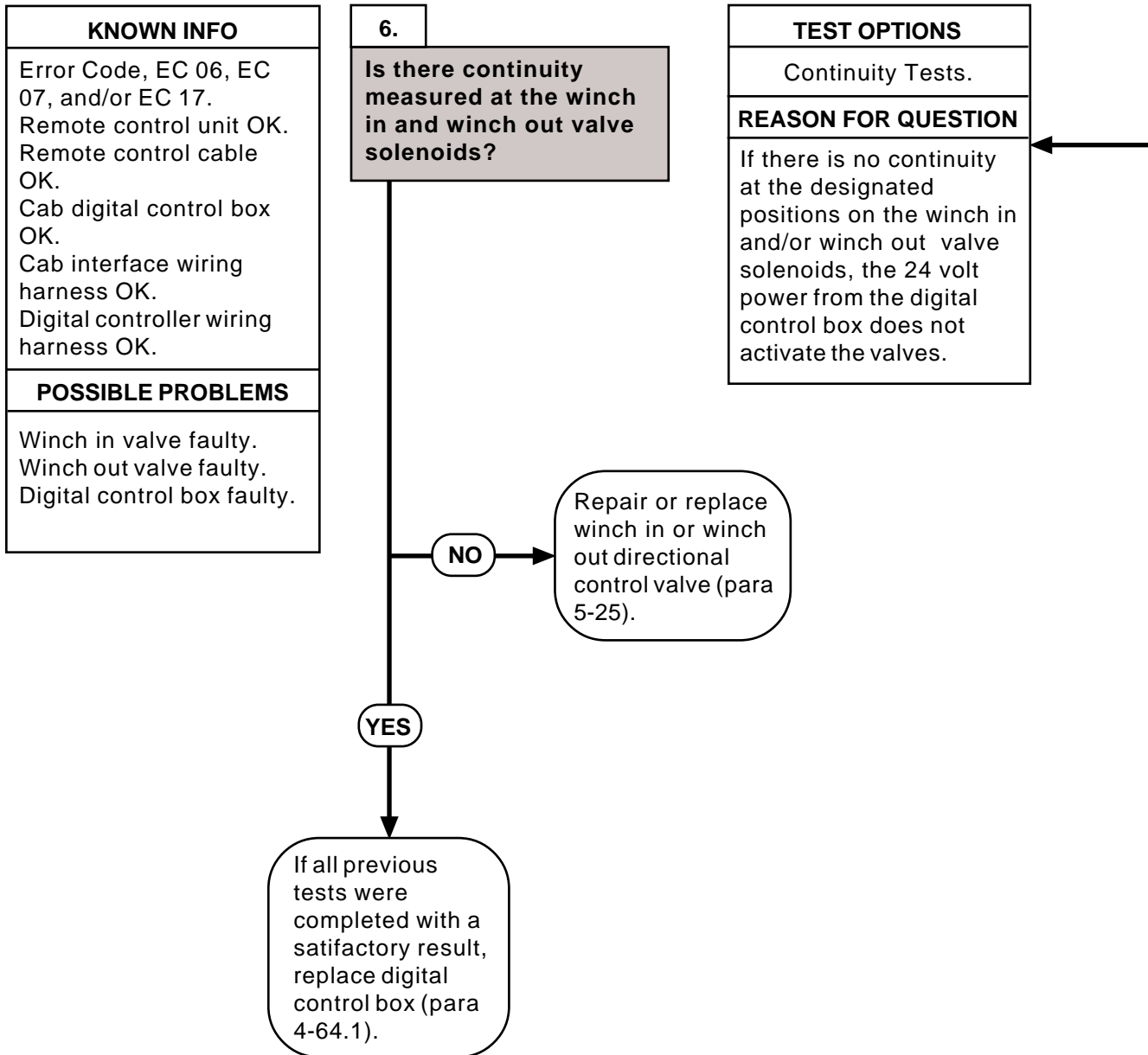


4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

17. BAP WINCH DOES NOT OPERATE (MODEL B ONLY) (continued).

**CONTINUITY TEST**

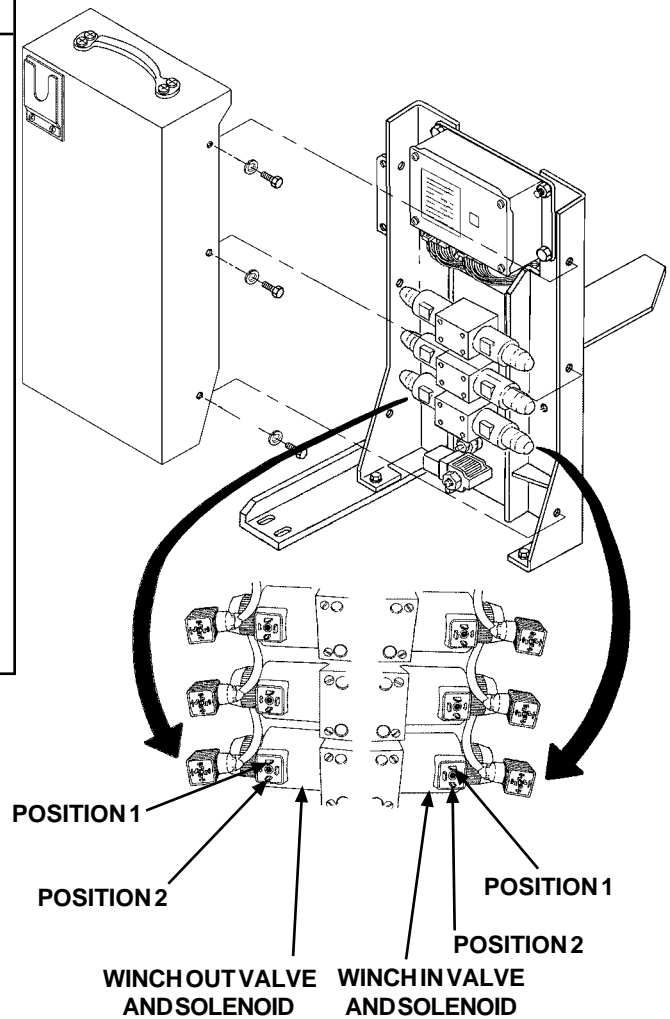
**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

**NOTE**

A reading of infinity indicates an open circuit.

- (1) Set multimeter to ohms position.
- (2) Connect multimeter between position "1" and position "2" on winch in and winch out valve solenoid. Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

**18. BAP WINCH DOES NOT WIND OUT.**

**INITIAL SETUP**

*Tools and Special Tools*

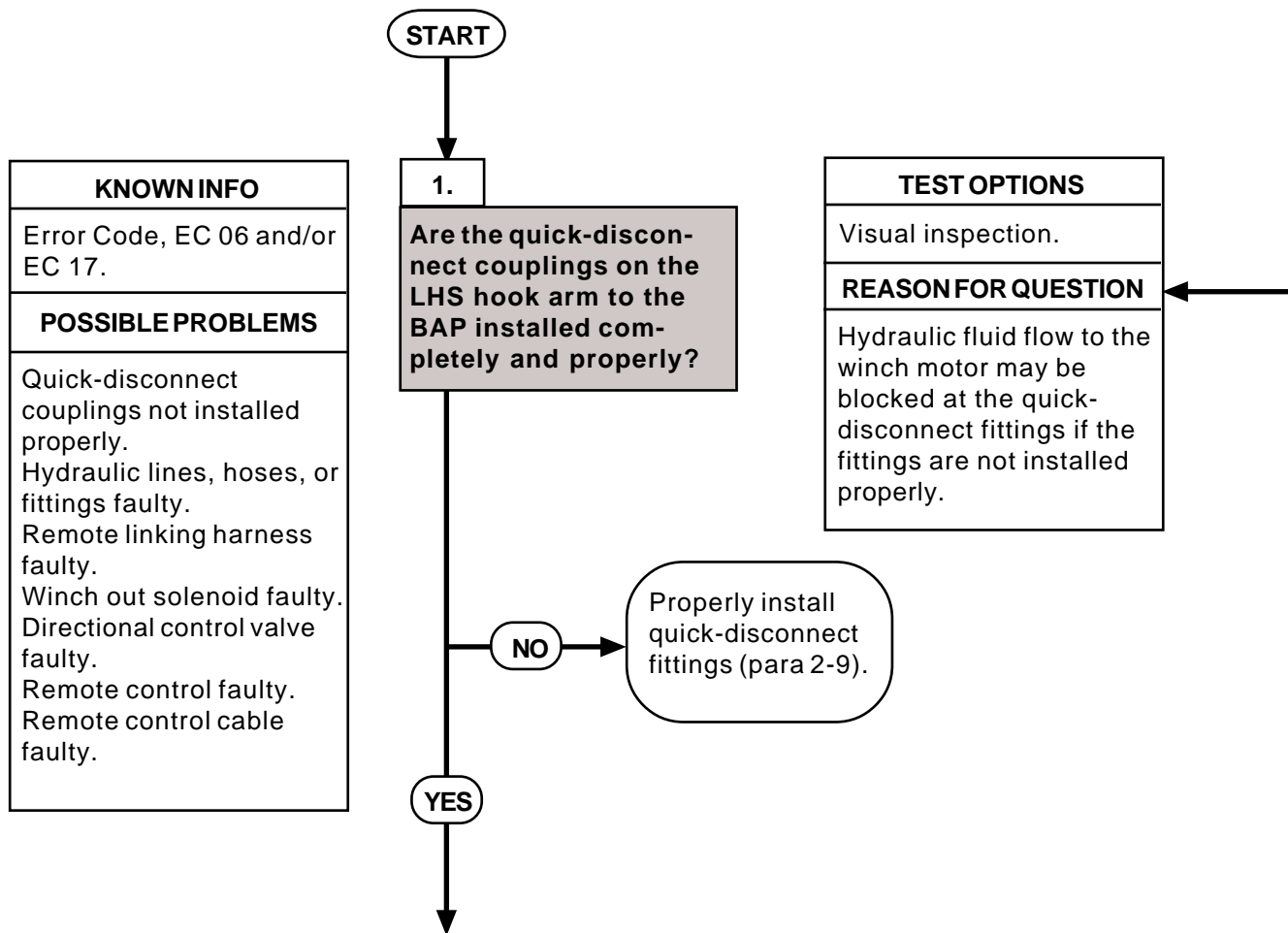
Multimeter (ANURM105C)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Personnel Required:*

Two

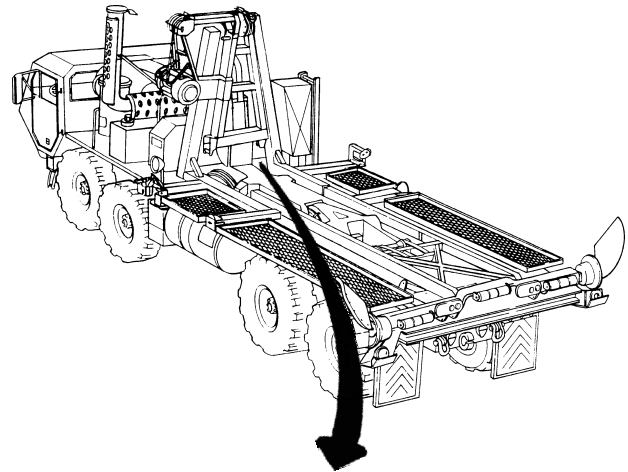
*Equipment Condition*

BAP loaded on the CBT (para 2-9)  
 Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)



4-12. UNIT TROUBLESHOOTING (continued).

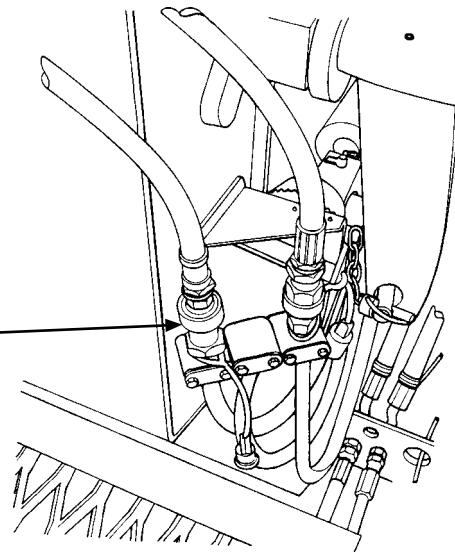
18. BAP WINCH DOES NOT WIND OUT (continued).



**VISUAL INSPECTION**

Make sure that the male portion of the quick-disconnect couplings are fully seated in the female portions of the fittings and are completely secured by the locking mechanism.

WINCH QUICK-DISCONNECT COUPLINGS



MODEL SHOWN

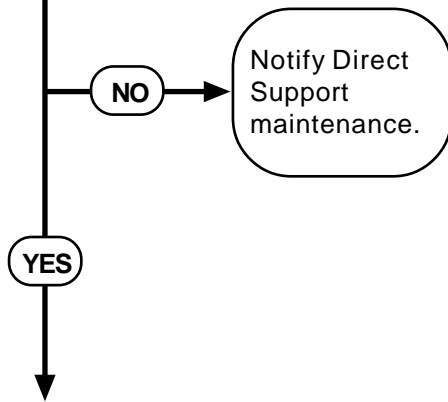
4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (continued).

KNOWN INFO
Error Code, EC 06 and/or EC 17. Quick-connect couplings OK.
POSSIBLE PROBLEMS
Hydraulic lines, hoses, or fittings faulty. Remote linking harness faulty. Winch out solenoid faulty. Directional control valve faulty. Remote control faulty. Remote control cable faulty.

2.  
Are all hydraulic lines, hoses, and fittings for the winch free from leaks or damage?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
Leaks or damage in the winch hydraulic system may cause insufficient oil supply to reach the winch hydraulic motor.



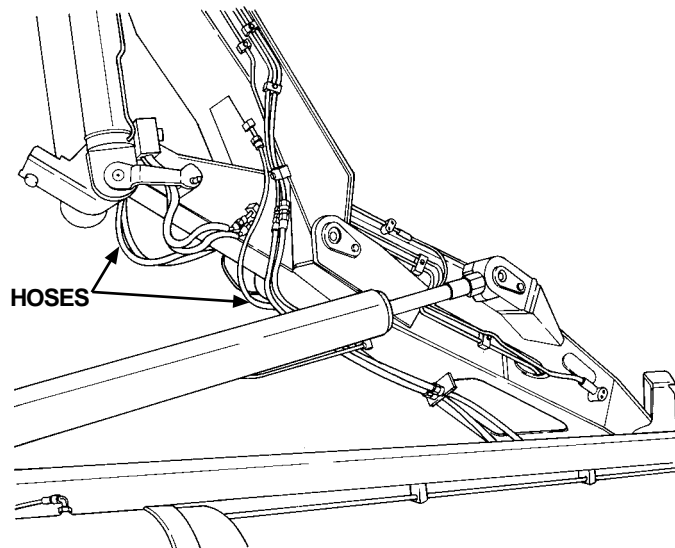
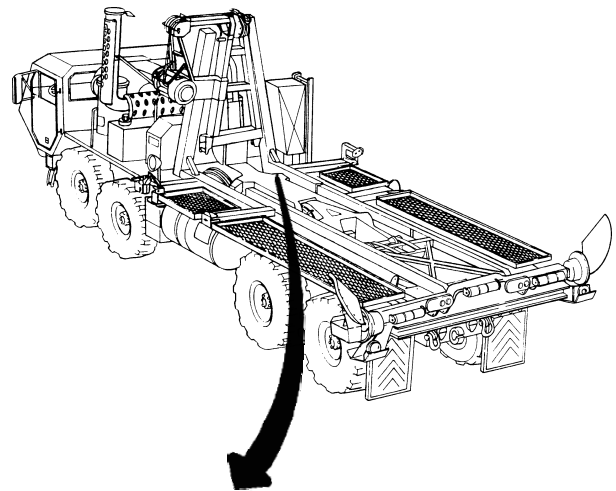


4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (continued).

**VISUAL INSPECTION**

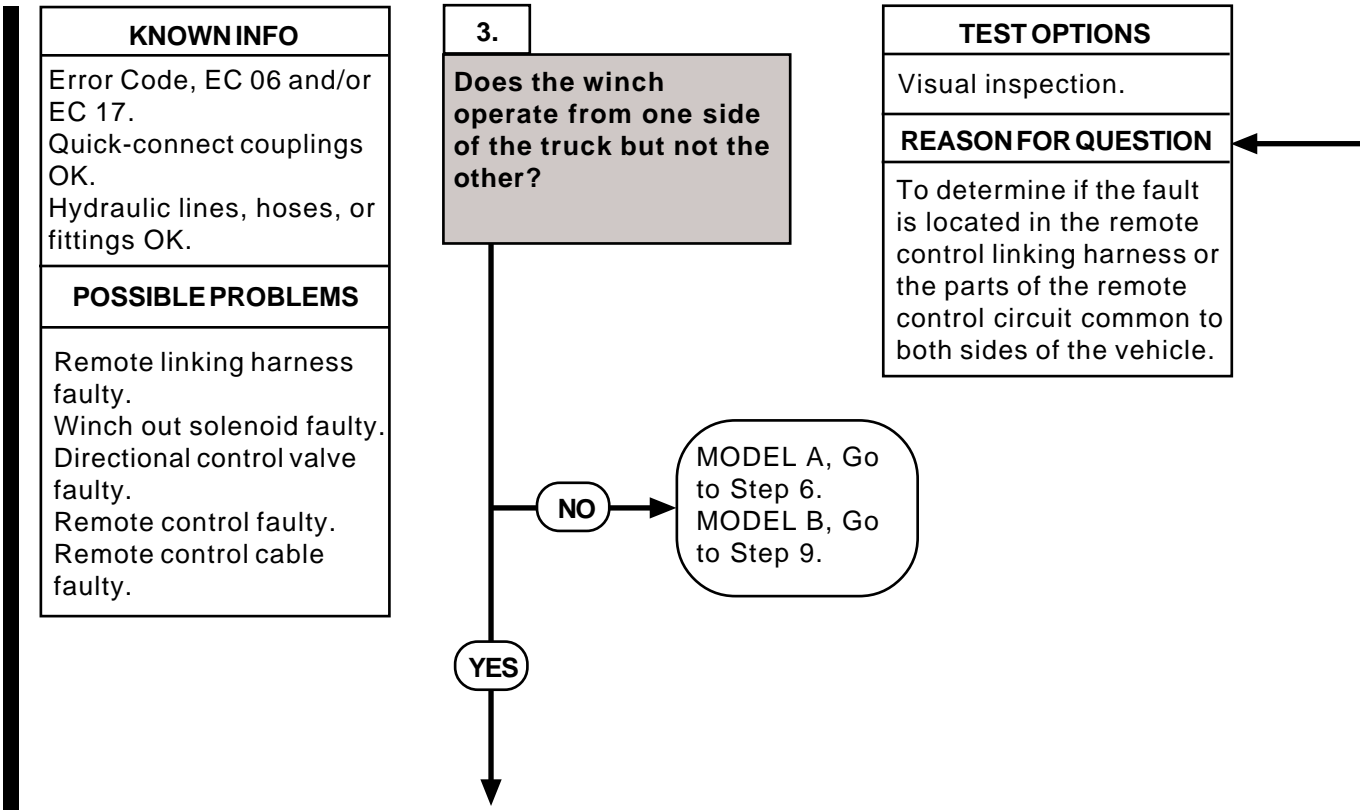
Check winch hydraulic lines, hoses, and fittings for leaks or damage.



MODEL A SHOWN

4-12. UNIT TROUBLESHOOTING (continued).

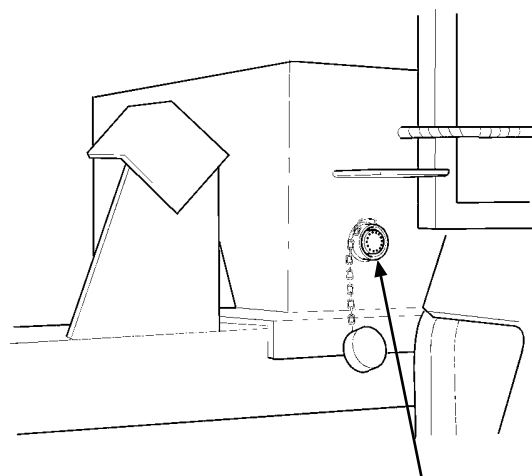
18. BAP WINCH DOES NOT WIND OUT (continued).



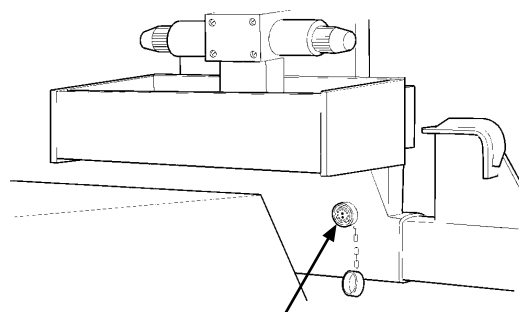
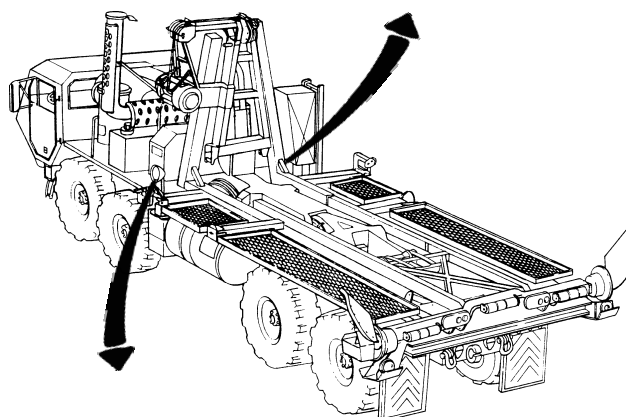
4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (continued).

<b>VISUAL INSPECTION</b>
<b>NOTE</b>
<p>Refer to Chapter 2 for specific winch operating procedures.</p> <p>Attempt to operate the winch with the remote control unit at both the left and right remote locations. Note the results of this test.</p>



**RH LINKING  
HARNESS  
CONNECTOR**

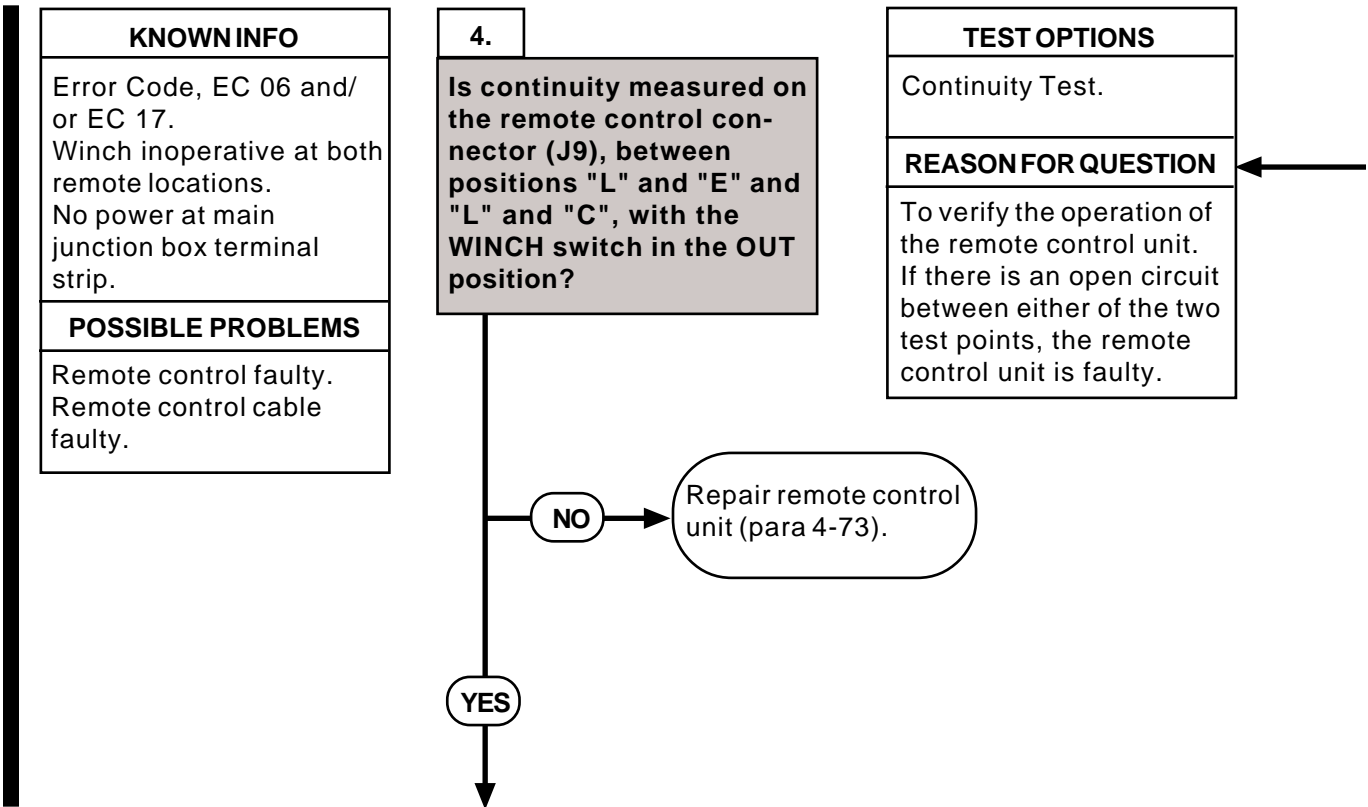


**LH LINKING  
HARNESS  
CONNECTOR (J8A)**

**MODEL A SHOWN**

4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (continued).



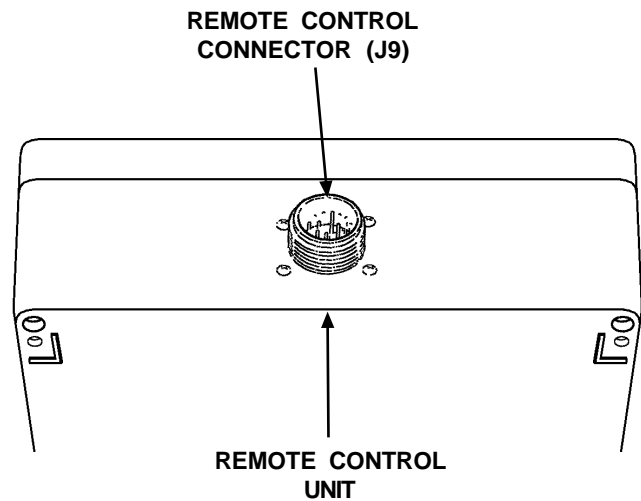
**4-12. UNIT TROUBLESHOOTING (continued).****18. BAP WINCH DOES NOT WIND OUT (continued).****CONTINUITY TEST**

- (1) Disconnect remote control cable from remote control unit.
- (2) Set multimeter to ohms position.
- (3) Position EMERGENCY STOP switch in the ON position.
- (4) Have assistant hold the WINCH switch in the OUT position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to positions "E" and "L" on remote control unit and check multimeter for continuity.
- (6) Repeat Step 5, but this time check for continuity between positions "L" and "C".



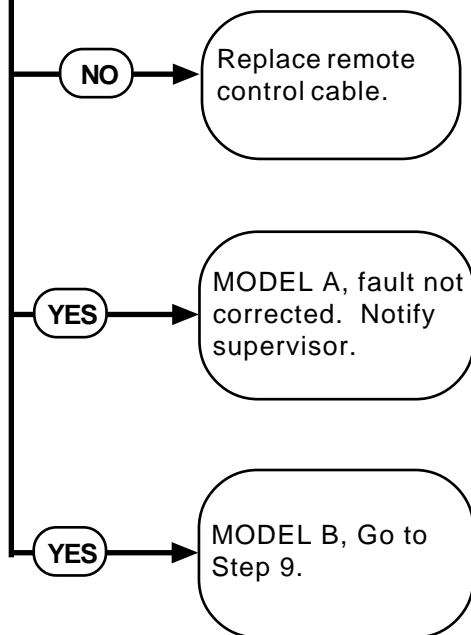
4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (continued).

<b>KNOWN INFO</b>
Winch inoperative at both remote locations. No power at main junction box terminal strip. Remote control OK.
<b>POSSIBLE PROBLEMS</b>
Remote control cable faulty.

5.  
Is there continuity measured between the remote control harness, between connectors P8 and P9?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
If there is an open circuit in the remote control cable, the signal from the remote control unit will not reach the linking harness or the main junction box.



**4-12. UNIT TROUBLESHOOTING (continued).****18. BAP WINCH DOES NOT WIND OUT (continued).****CONTINUITY TEST****CAUTION**

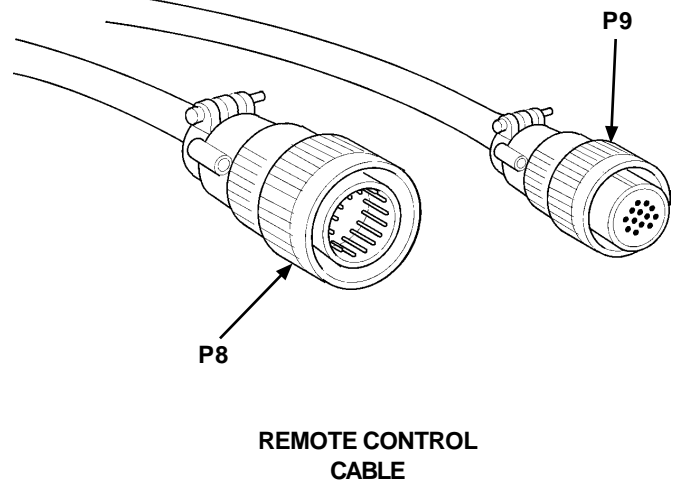
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between position D on chassis end and position C on remote control end. Also check for continuity between position J on chassis end and position E on remote end.



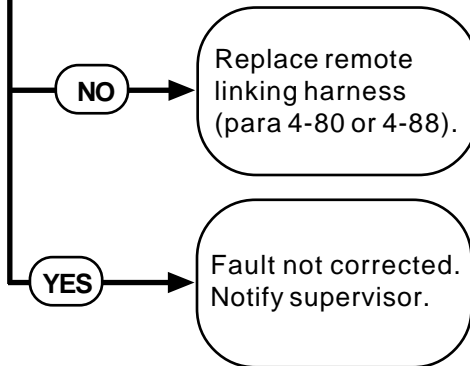
4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Winch operates from only one remote location.
<b>POSSIBLE PROBLEMS</b>
Remote linking harness faulty.

6.  
**Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?**

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Signal power is transferred from the remote control cable to the main junction box via the remote linking harnesses (one for each side). If the linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.





4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL A ONLY) (continued).

**CONTINUITY TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.
- (3) If necessary, remove remote control cable from linking harness connector.

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

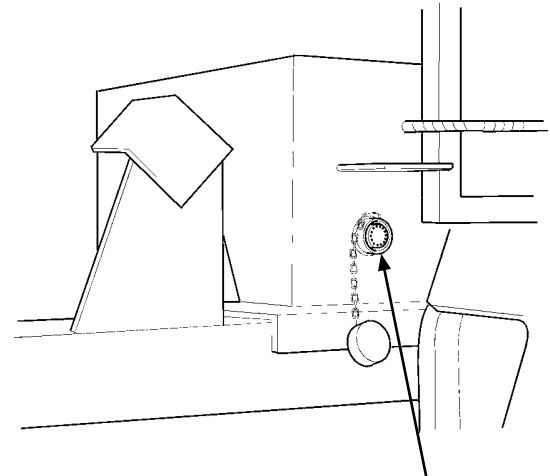
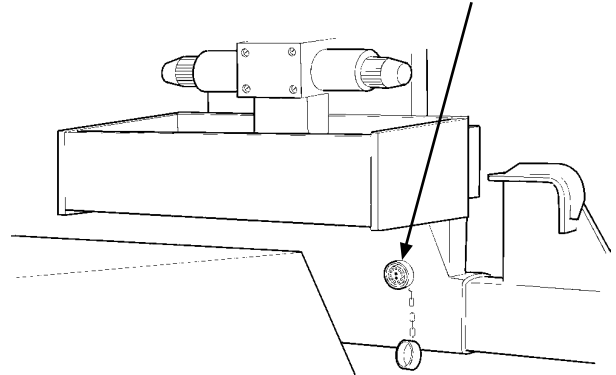
- (5) Connect multimeter to terminals at each end of wire and check multimeter for continuity. Check between terminal C on connector and position 7 in junction box. Next, check between terminal J on connector and position 23 in junction box. Finally, check between terminal D on connector and position 33 in junction box.

**NOTE**

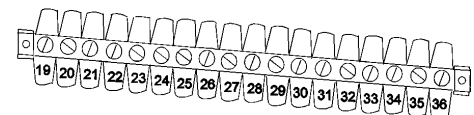
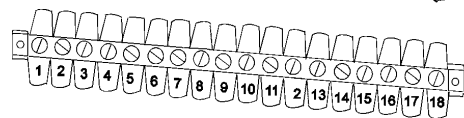
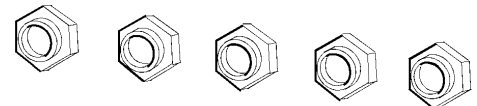
Any reading besides infinity indicates a grounded wire.

- (6) Check for grounded wiring by connecting one multimeter lead to each terminal and the other lead to chassis ground.

LH LINKING HARNESS CONNECTOR J8A



RH LINKING HARNESS CONNECTOR



WIRING REMOVED FOR CLARITY

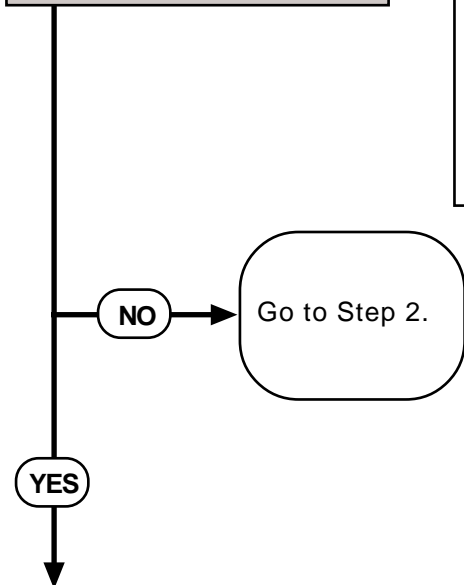
4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Winch inoperative at both remote locations.
<b>POSSIBLE PROBLEMS</b>
Winch out solenoid faulty. Directional control valve faulty. Remote control faulty. Remote control cable faulty.

7.  
Are 22–28 volts measured at the main junction box terminal strip, position 33?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
If no voltage is measured, the remote control or the remote control cable is faulty. If there is power at the terminal strip, the remote control components are OK.

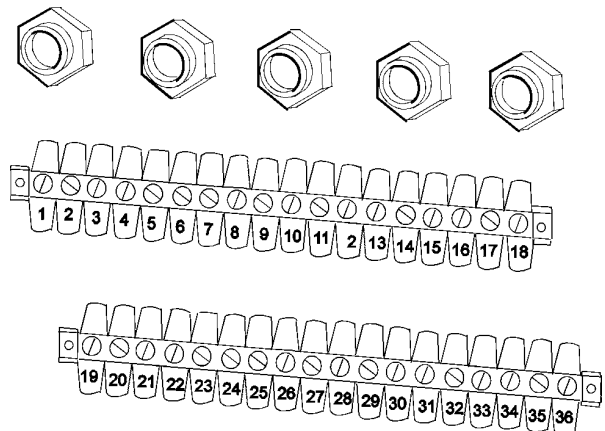


**4-12. UNIT TROUBLESHOOTING (continued).**

**18. BAP WINCH DOES NOT WIND OUT (MODEL A ONLY) (continued).**

**VOLTAGE TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws and remove cover from main frame junction box.
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position.
- (5) Set multimeter to voltage position.
- (6) Place positive (+) probe of multimeter on main frame junction box terminal strip, position 33.
- (7) Place negative (-) probe of multimeter on known good ground. Check multimeter for voltage reading while an assistant holds the WINCH switch in the OUT position.
- (8) Instruct assistant to release the WINCH switch.
- (9) Turn engine start switch and light control switch to OFF position.



**WIRING REMOVED FOR CLARITY**

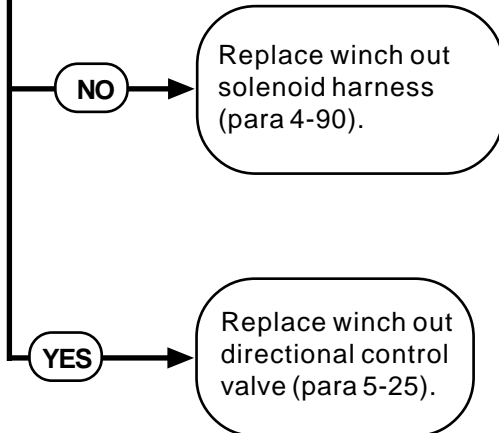
4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Winch inoperative at both remote locations. Power at main junction box terminal strip.
<b>POSSIBLE PROBLEMS</b>
Winch out solenoid faulty. Directional control valve faulty.

8. **Is continuity measured on the winch out solenoid harness?**

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Power to activate the winch out solenoid is transferred from the main junction box to the solenoid via this harness.



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

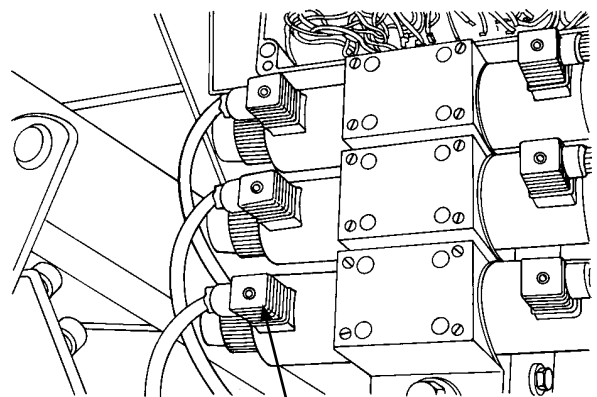
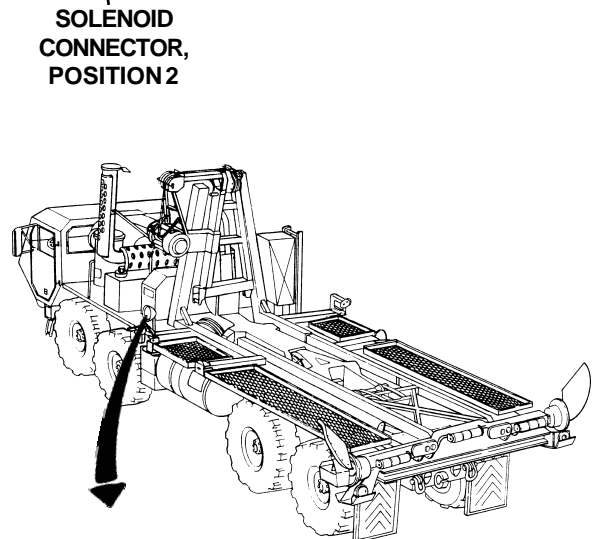
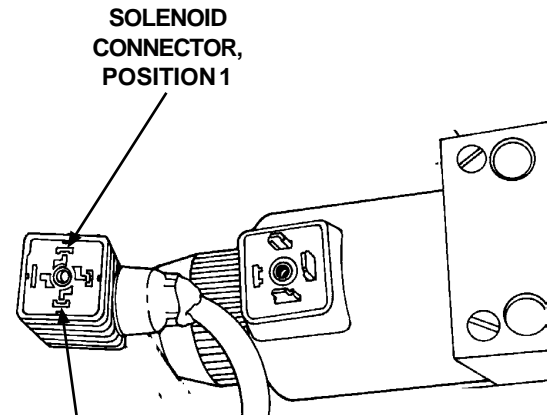
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove connector from the winch out solenoid.
- (2) Set multimeter to ohms position.

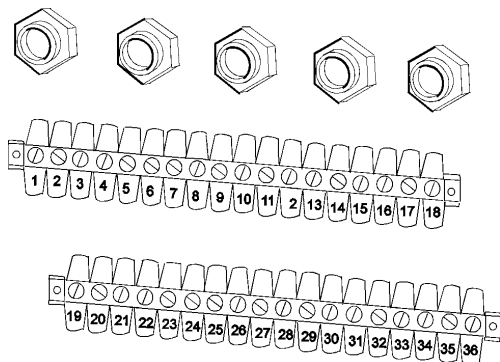
**NOTE**

- A reading of infinity indicates an open circuit.
- Junction box terminal 33 is connected to one side of the solenoid; terminal 34 is connected to the other side.

- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between the solenoid connector, position 1, and terminal strip position, 33.
- (4) Repeat Step 3 to check for continuity between position 2 in the connector and terminal strip, position 34.



WINCH OUT SOLENOID HARNESS



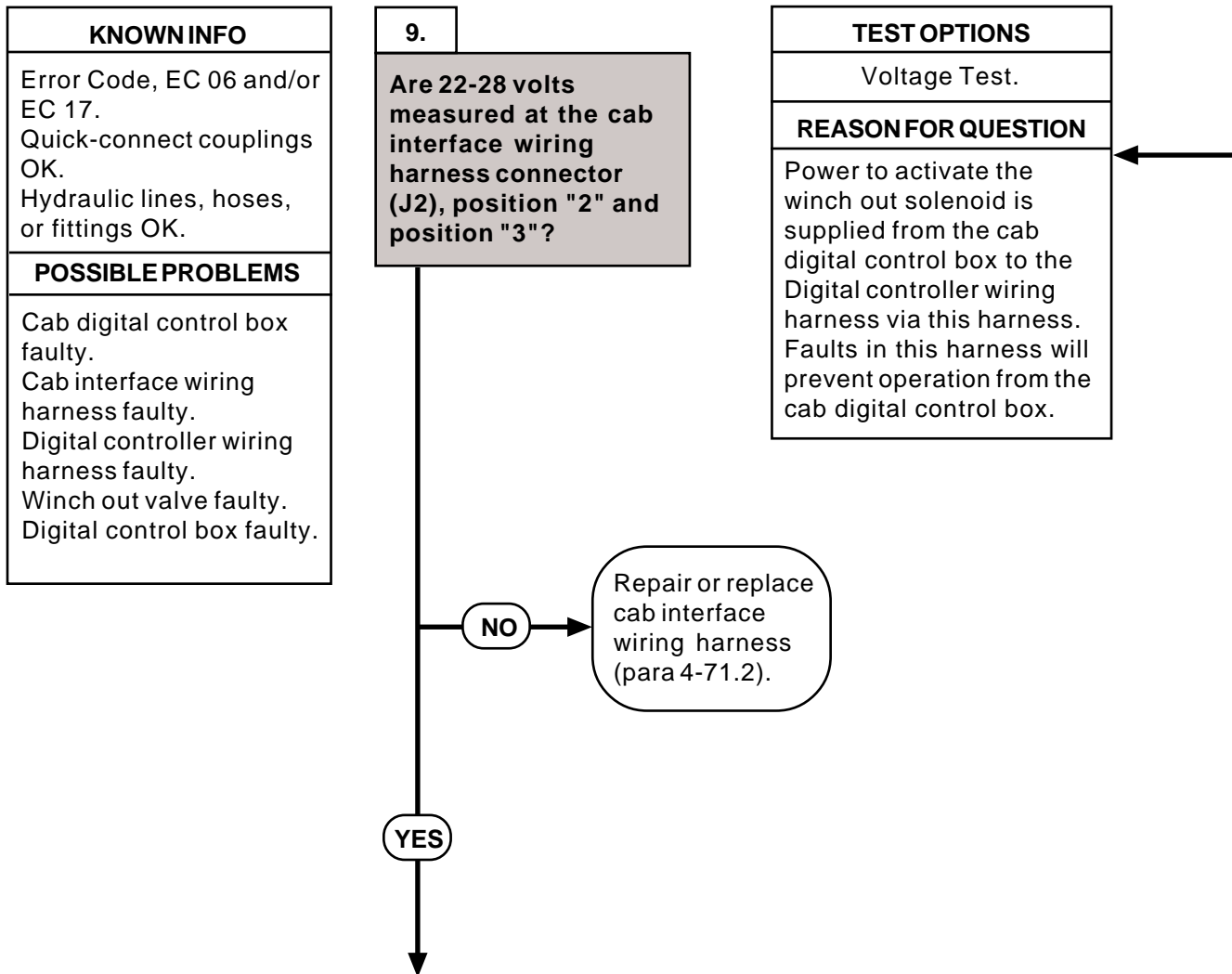
WIRING REMOVED FOR CLARITY

4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY).

NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

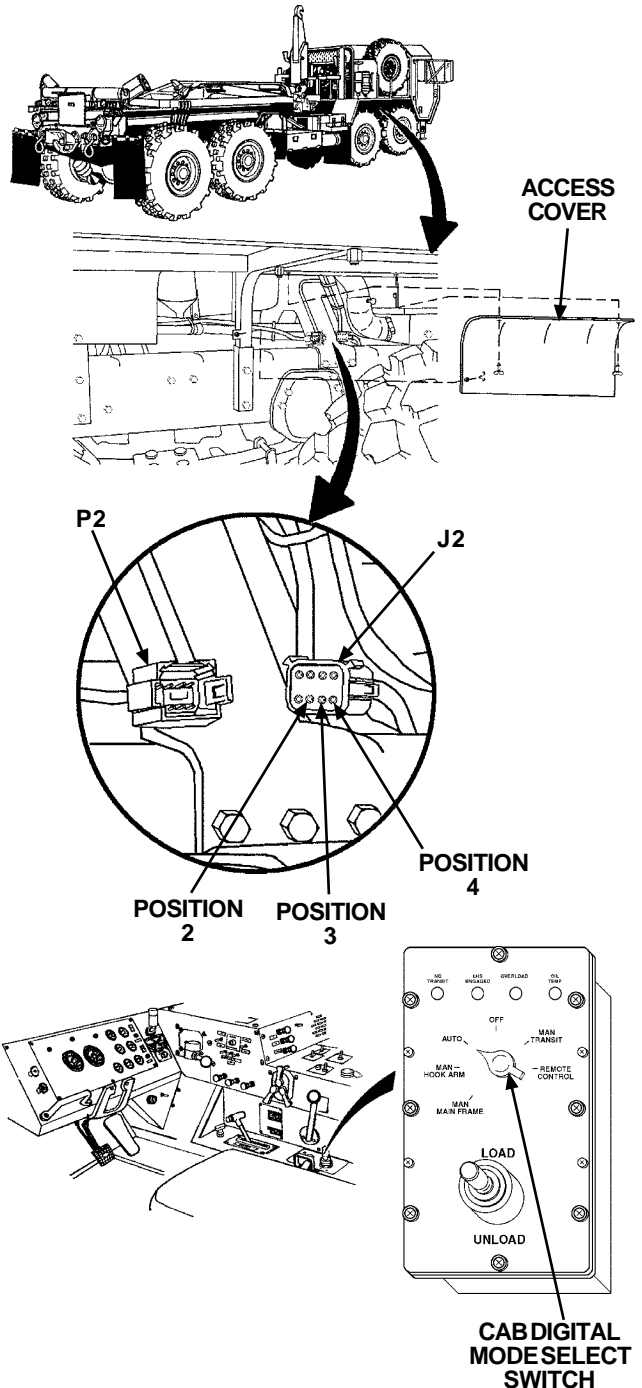
VOLTAGE TEST

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

NOTE

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

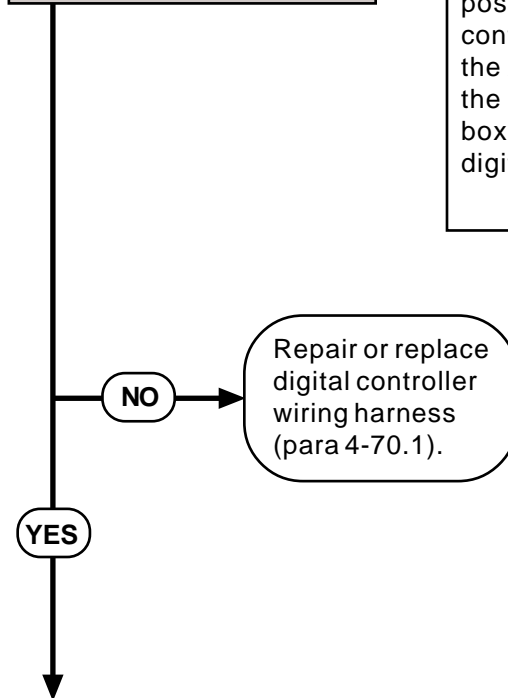
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 06 and/or EC 17. Quick-connect couplings OK. Hydraulic lines, hoses, or fittings OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Winch out valve faulty. Digital control box faulty.

10.
Is there continuity measured at the digital control wiring harness (J3), (J4) and (P2)?

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the digital controller wiring harness, the 24 volt power from the cab digital control box does not reach the digital control box.

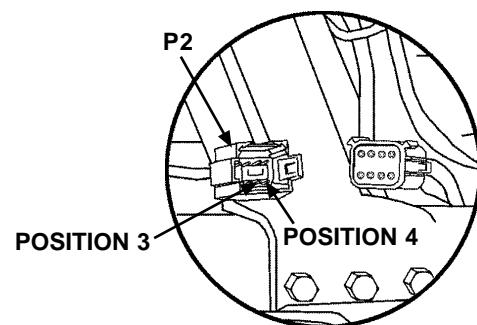
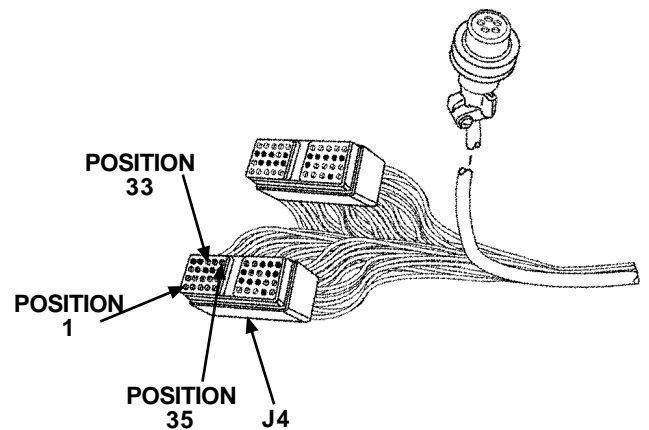
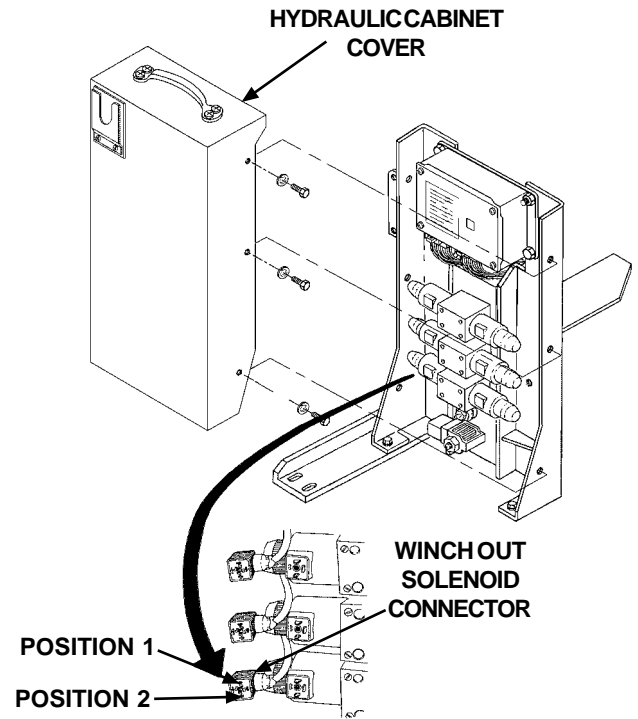




4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</li> </ol>	



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

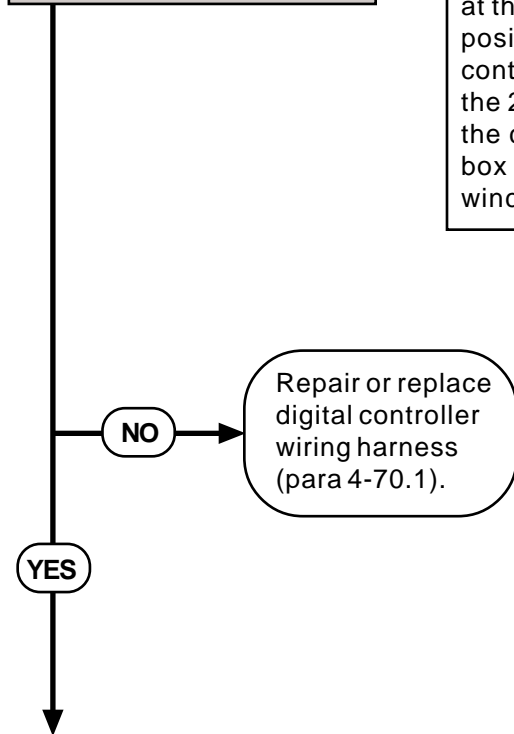
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 06 and/or EC 17. Quick-connect couplings OK. Hydraulic lines, hoses, or fittings OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Winch out valve faulty. Digital control box faulty.

11.  
Is there continuity measured at the digital controller wiring harness (J3)?

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated position on the digital control wiring harness, the 24 volt power from the cab digital control box does not reach the winch out solenoid.



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

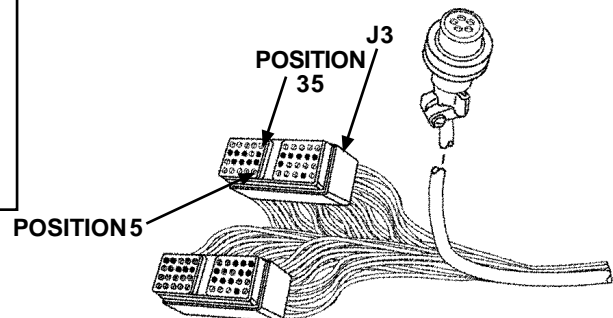
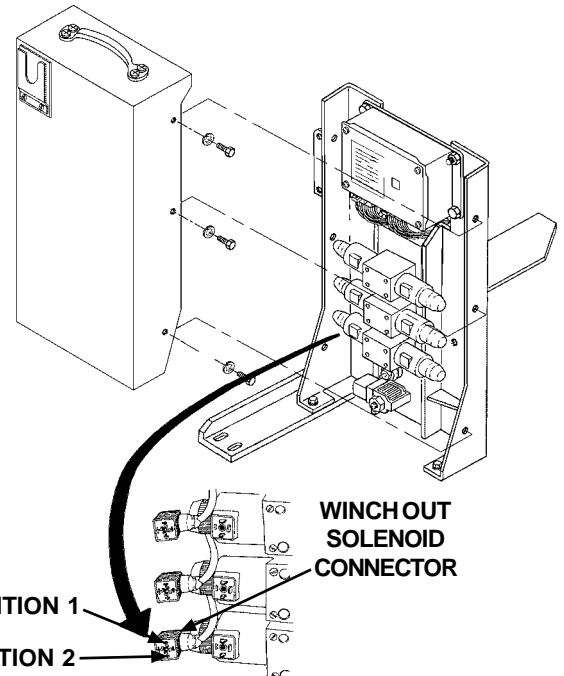
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (2) Connect multimeter between (J3), position "5", and winch out solenoid connector, position "1". Check multimeter for continuity.
- (3) Connect multimeter between (J3), position "35", and winch out solenoid connector, position "2". Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

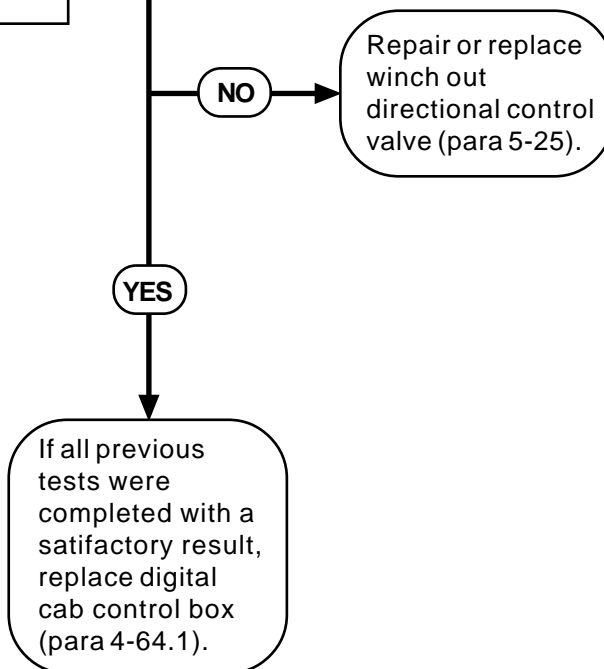
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 06. Remote control unit OK. Remote control cable OK. Cab digital control box OK. Cab interface wiring harness OK. Digital controller wiring harness OK.
POSSIBLE PROBLEMS
Winch out valve faulty. Digital control box faulty.

12.  
**Is there continuity measured at the winch out valve solenoid?**

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the winch out valve solenoid, the 24 volt power from the digital control box does not activate the valves.



4-12. UNIT TROUBLESHOOTING (continued).

18. BAP WINCH DOES NOT WIND OUT (MODEL B ONLY) (continued).

**CONTINUITY TEST**

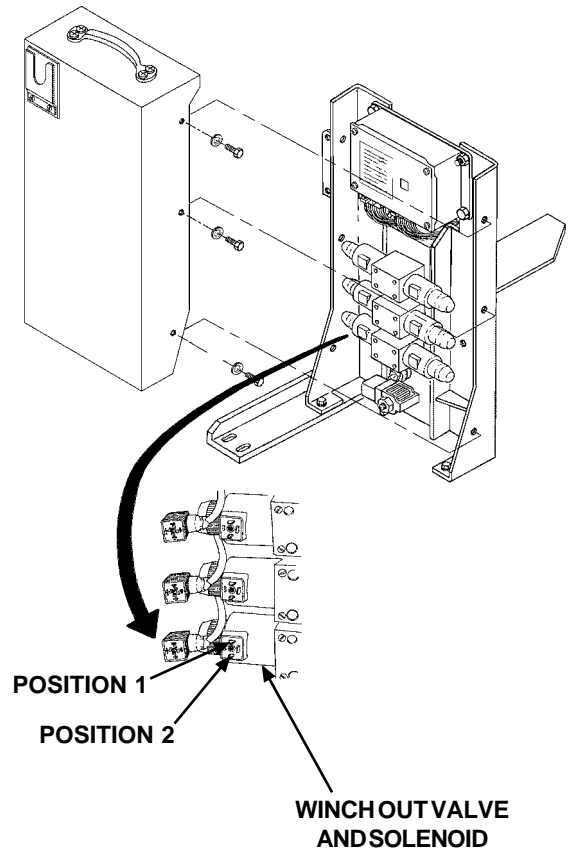
**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

**NOTE**

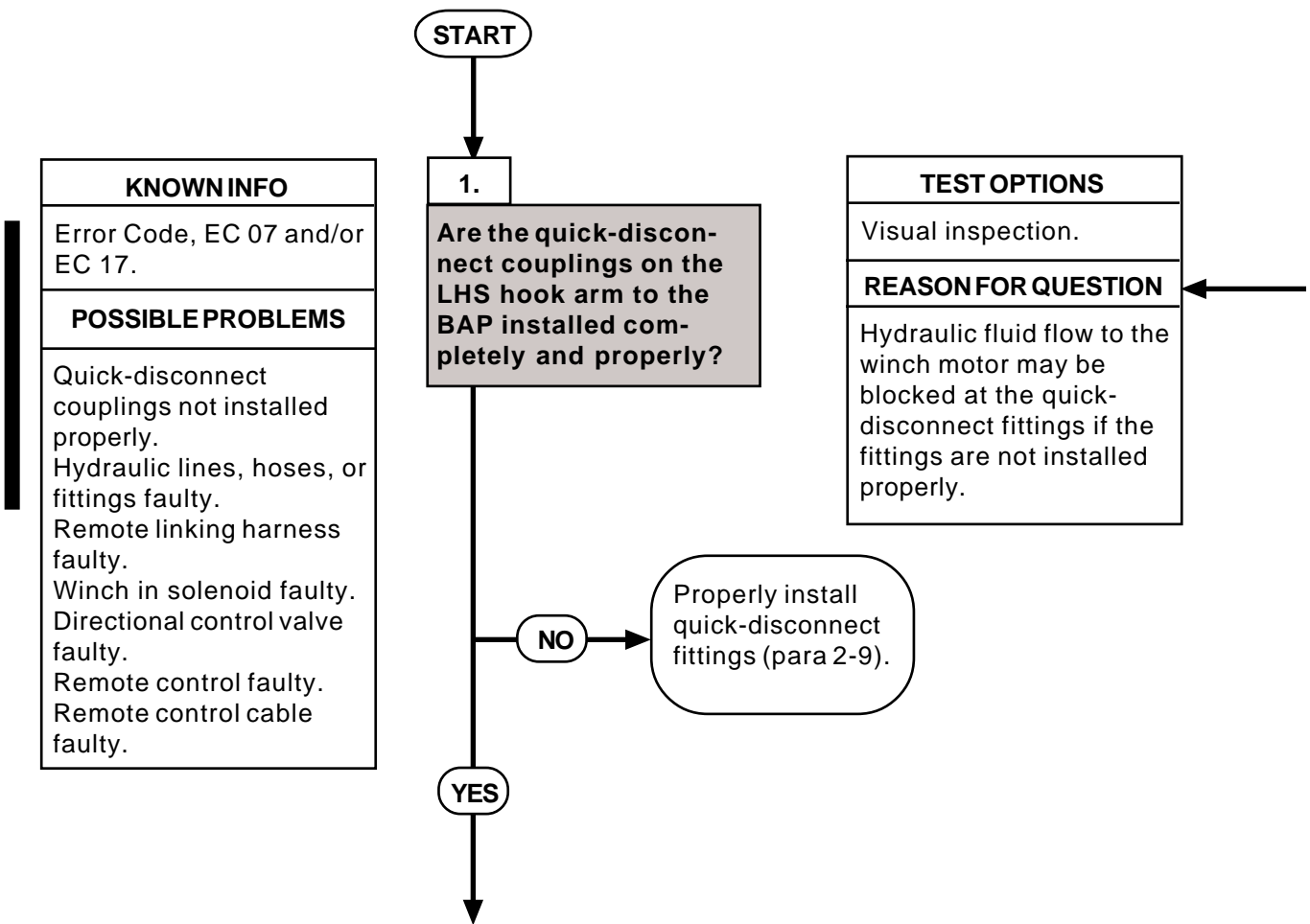
A reading of infinity indicates an open circuit.

- (1) Set multimeter to ohms position.
- (2) Connect multimeter between position "1" and position "2" on winch out valve solenoid. Check multimeter for continuity.



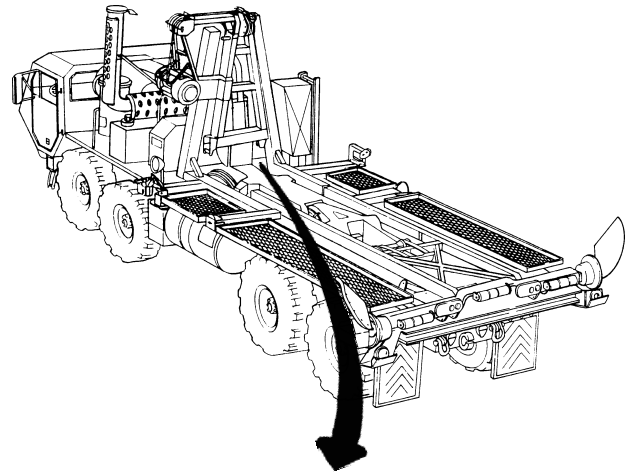
4-12. UNIT TROUBLESHOOTING (continued).

<b>19. BAP WINCH DOES NOT WIND IN.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i> Multimeter (ANURM105C) Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	<i>Equipment Condition</i> Engine turned off (TM 9-2320-279-10) Parking brake applied (TM 9-2320-279-10) Wheels chocked (TM 9-2320-279-10) BAP loaded on the CBT (para 2-9)
<i>Personnel Required</i> Two	



**4-12. UNIT TROUBLESHOOTING (continued).**

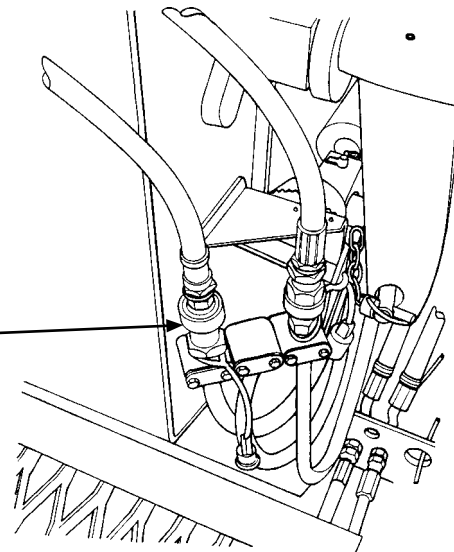
**19. BAP WINCH DOES NOT WIND IN (continued).**



**VISUAL INSPECTION**

Make sure that the male portion of the quick-disconnect couplings are fully seated in the female portions of the fittings and are completely secured by the locking mechanism.

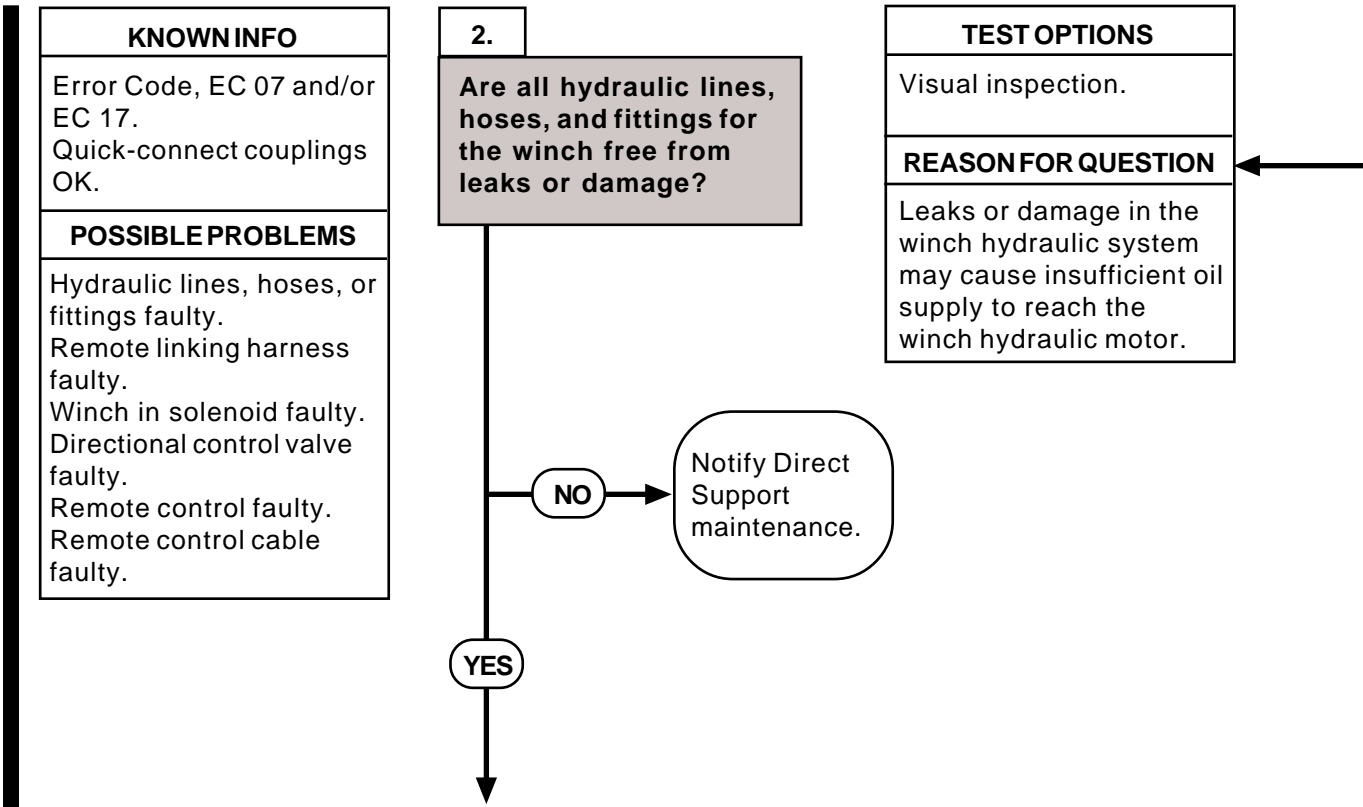
WINCH QUICK-DISCONNECT COUPLINGS



MODEL A SHOWN

4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (continued).



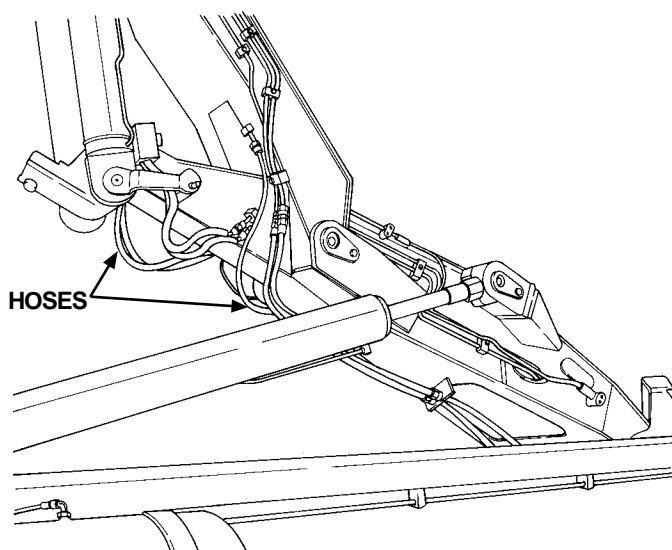
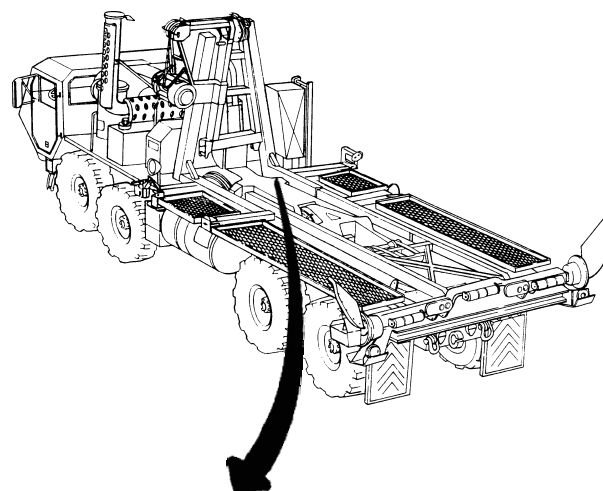


4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (continued).

**VISUAL INSPECTION**

Check winch hydraulic lines, hoses, and fittings for leaks or damage.



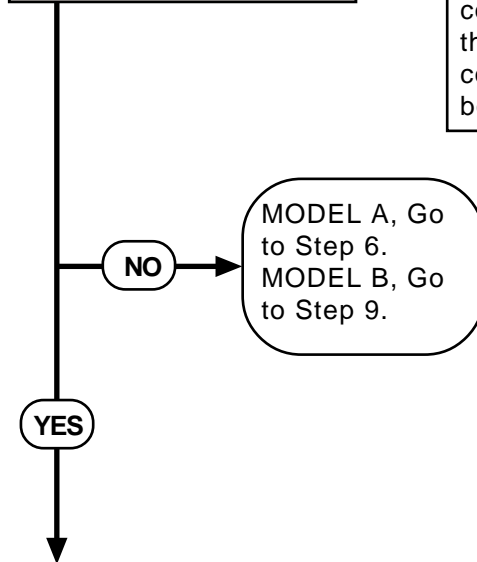
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (continued).

KNOWN INFO
Error Code, EC 07 and/ or EC 17. Quick-disconnect couplings installed properly. Hydraulic lines, hoses, or fittings OK. LHS operations OK.
POSSIBLE PROBLEMS
Remote linking harness faulty. Winch in solenoid faulty. Directional control valve faulty. Remote control faulty. Remote control cable faulty.

3.  
Does the winch operate from one side of the truck but not the other?

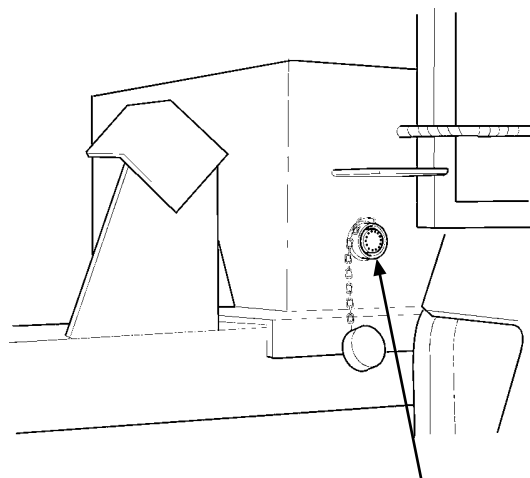
TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
To determine if the fault is located in the remote control linking harness or the parts of the remote control circuit common to both sides of the vehicle.



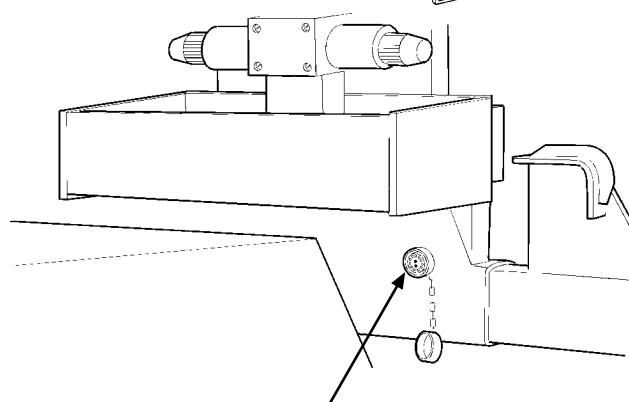
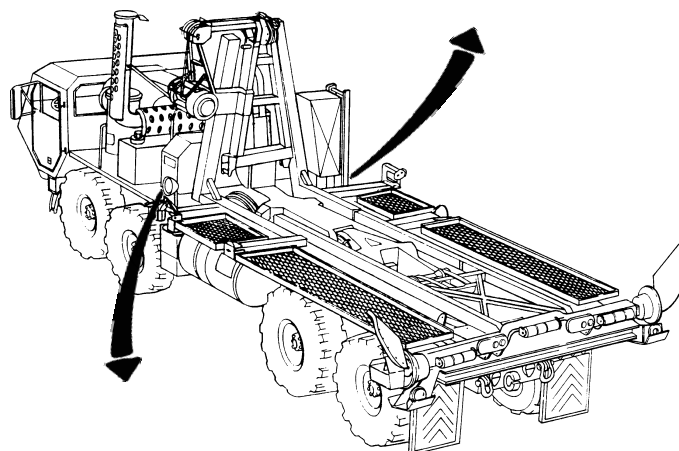
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (continued).

<b>VISUAL INSPECTION</b>
<b>NOTE</b>
Refer to Chapter 2 for specific winch operating procedures.
Attempt to operate the winch with the remote control unit at both the left and right remote locations. Note the results of this test.



**RH LINKING HARNESS CONNECTOR J2B**



**LH LINKING HARNESS CONNECTOR (J8A)**

**MODEL A SHOWN**

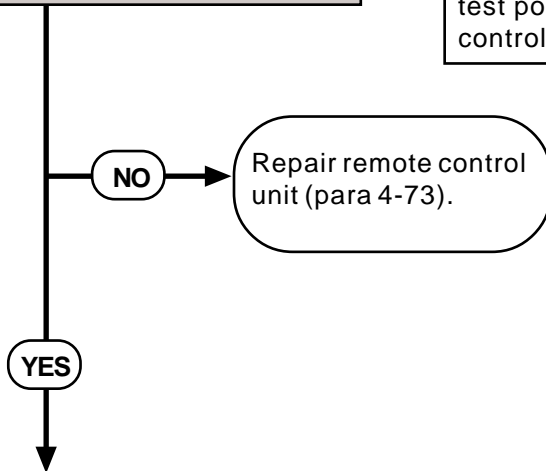
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (continued).

<b>KNOWN INFO</b>
Winch inoperative at both remote locations. No power at main junction box terminal strip.
<b>POSSIBLE PROBLEMS</b>
Remote control faulty. Remote control cable faulty.

4.  
Is continuity measured on the remote control connector (J9), between positions "L" and "E" and between "L" and "F", with the WINCH switch in the IN position?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
To verify the operation of the remote control unit. If there is an open circuit between either of the two test points, the remote control unit is faulty.



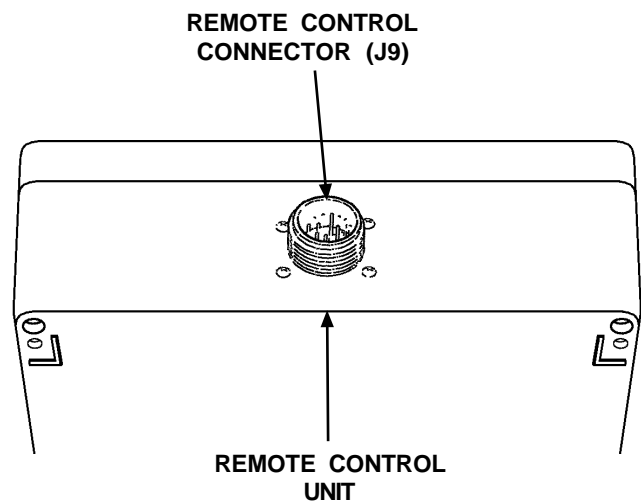
**4-12. UNIT TROUBLESHOOTING (continued).****19. BAP WINCH DOES NOT WIND IN (continued).****CONTINUITY TEST**

- (1) Disconnect remote control cable from remote control unit.
- (2) Set multimeter to ohms position.
- (3) Position EMERGENCY STOP switch to the ON position.
- (4) Have assistant hold the WINCH switch in the IN position.

**NOTE**

A reading of infinity indicates an open circuit.

- (5) Connect multimeter leads to positions "E" and "L" on remote control unit and check multimeter for continuity.
- (6) Repeat Step 5, but this time check for continuity between positions "L" and "F".



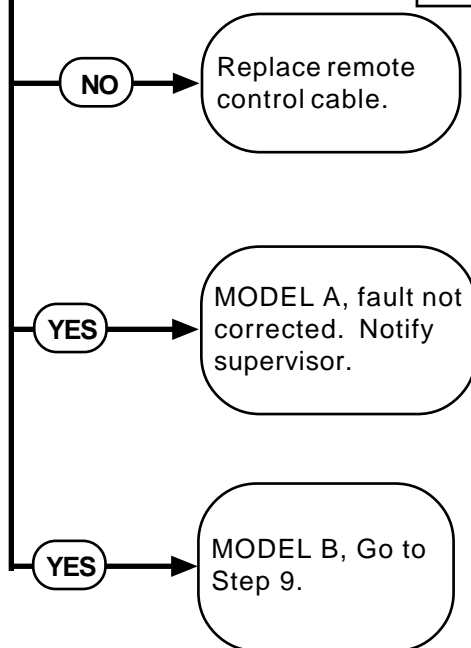
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (continued).

KNOWN INFO
Winch inoperative at both remote locations. No power at main junction box terminal strip. Remote control OK.
POSSIBLE PROBLEMS
Remote control cable faulty.

5.  
Is there continuity measured between the remote control harness, between connectors P8 and P9?

TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
If there is an open circuit in the remote control cable, the signal from the remote control unit will not reach the linking harness or the main junction box.



**4-12. UNIT TROUBLESHOOTING (continued).****19. BAP WINCH DOES NOT WIND IN (continued).****CONTINUITY TEST****CAUTION**

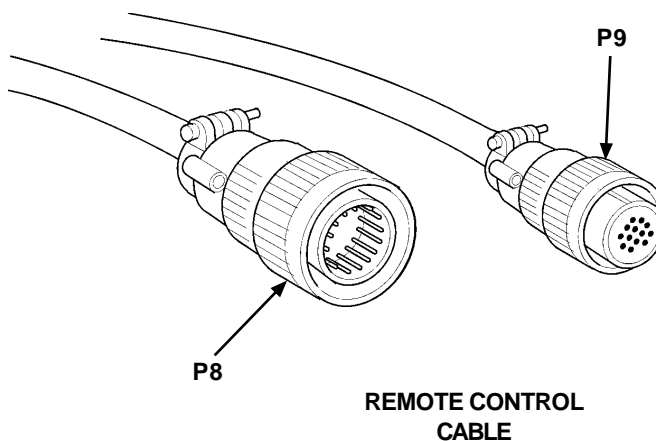
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Disconnect remote control cable from components.
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between position "E" on chassis end and position "F" on remote control end. Also check for continuity between position "J" on chassis end and position "E" on remote end.



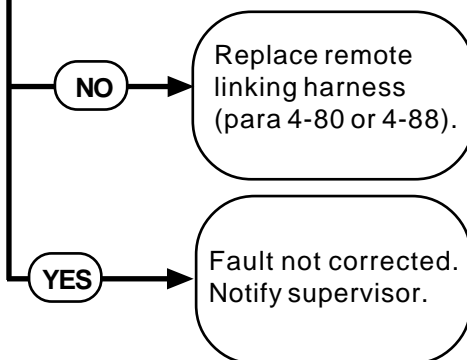
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Winch operates from only one remote location.
<b>POSSIBLE PROBLEMS</b>
Remote linking harness faulty.

6.  
**Is there continuity measured between the remote linking harness connector (J8A or J8B) and the main control box terminal strip, on the side that does not operate?**

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Signal power is transferred from the remote control cable to the main junction box via the remote linking harnesses (one for each side). If the linking harness is defective, the remote control unit will work on one side of the vehicle but not the other.





4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL A ONLY) (continued).

CONTINUITY TEST

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws on main junction box cover and open cover.
- (3) If necessary, remove remote control cable from linking harness connector.

**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (4) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

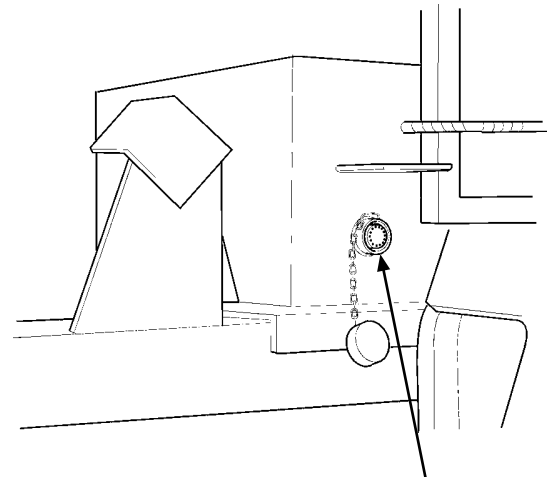
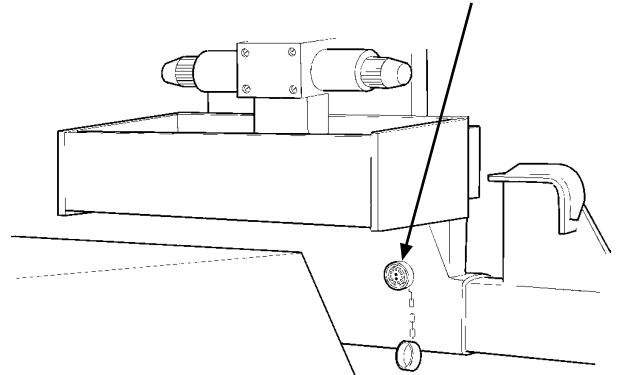
- (5) Connect multimeter to terminals at each end of wire and check multimeter for continuity. Check between terminal C on connector and position "7" in junction box. Next, check between terminal "J" on connector and position "23" in junction box. Finally, check between terminal E on connector and position "35" in junction box.

**NOTE**

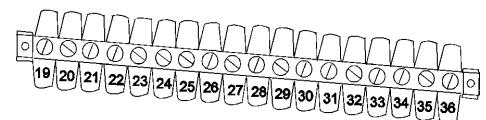
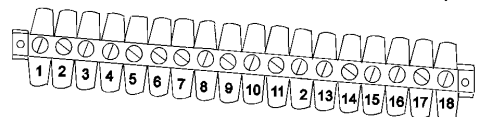
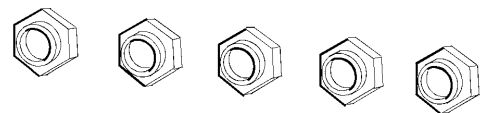
Any reading besides infinity indicates a grounded wire.

- (6) Check for grounded wiring by connecting one multimeter lead to each terminal and the other lead to chassis ground.

LH LINKING HARNESS CONNECTOR J8A



RH LINKING HARNESS CONNECTOR J2B



WIRING REMOVED FOR CLARITY

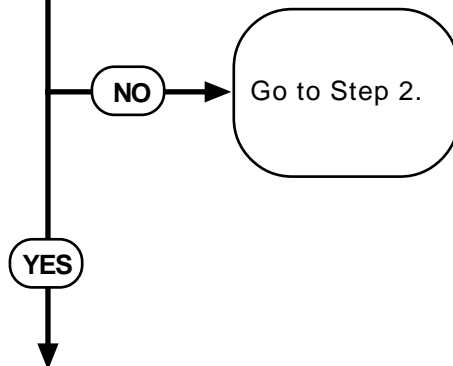
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Winch inoperative at both remote locations.
<b>POSSIBLE PROBLEMS</b>
Winch in directional control valve faulty. Directional control valve faulty. Remote control faulty. Remote control cable faulty.

7.  
Are 22–28 volts measured at the main junction box terminal strip, position 35?

<b>TEST OPTIONS</b>
Voltage Test.
<b>REASON FOR QUESTION</b>
If no voltage is measured, the remote control or the remote control cable is faulty. If there is power at the terminal strip, the remote control components are OK.

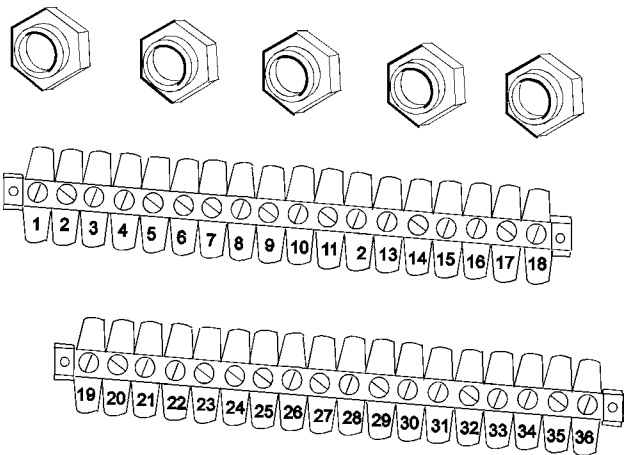


**4-12. UNIT TROUBLESHOOTING (continued).**

**19. BAP WINCH DOES NOT WIND IN (MODEL A ONLY) (continued).**

**VOLTAGE TEST**

- (1) Open hydraulic cabinet cover.
- (2) Loosen four screws and remove cover from main frame junction box.
- (3) Turn engine start switch to ON position.
- (4) Turn light control switch to STOP LIGHT position.
- (5) Set multimeter to voltage position.
- (6) Place positive (+) probe of multimeter on main frame junction box terminal strip, position "33".
- (7) Place negative (-) probe of multimeter on known good ground. Check multimeter for voltage reading while an assistant holds the WINCH switch in the "IN" position.
- (8) Instruct assistant to release the WINCH switch.
- (9) Turn engine start switch and light control switch to "OFF" position.



**WIRING REMOVED FOR CLARITY**

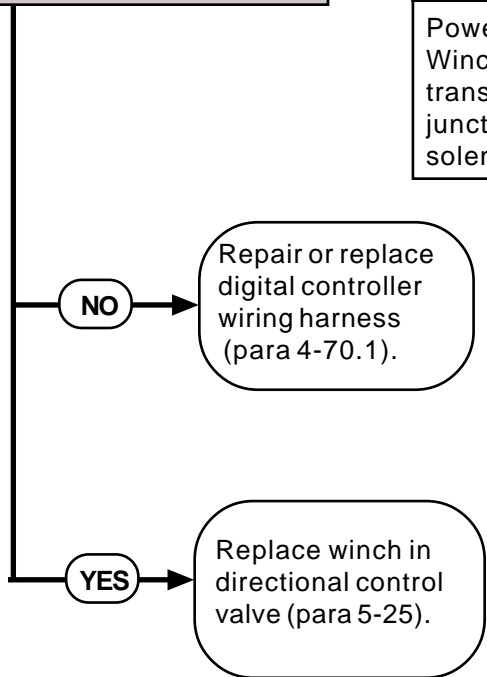
4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL A ONLY) (continued).

<b>KNOWN INFO</b>
Winch inoperative at both remote locations. Power at main junction box terminal strip.
<b>POSSIBLE PROBLEMS</b>
Winch indirectional control valve faulty. Directional control valve faulty.

8. Is continuity measured on the WINCH IN solenoid harness?

<b>TEST OPTIONS</b>
Continuity Test.
<b>REASON FOR QUESTION</b>
Power to activate the Winch in solenoid is transferred from the main junction box to the solenoid via this harness.



4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL A ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

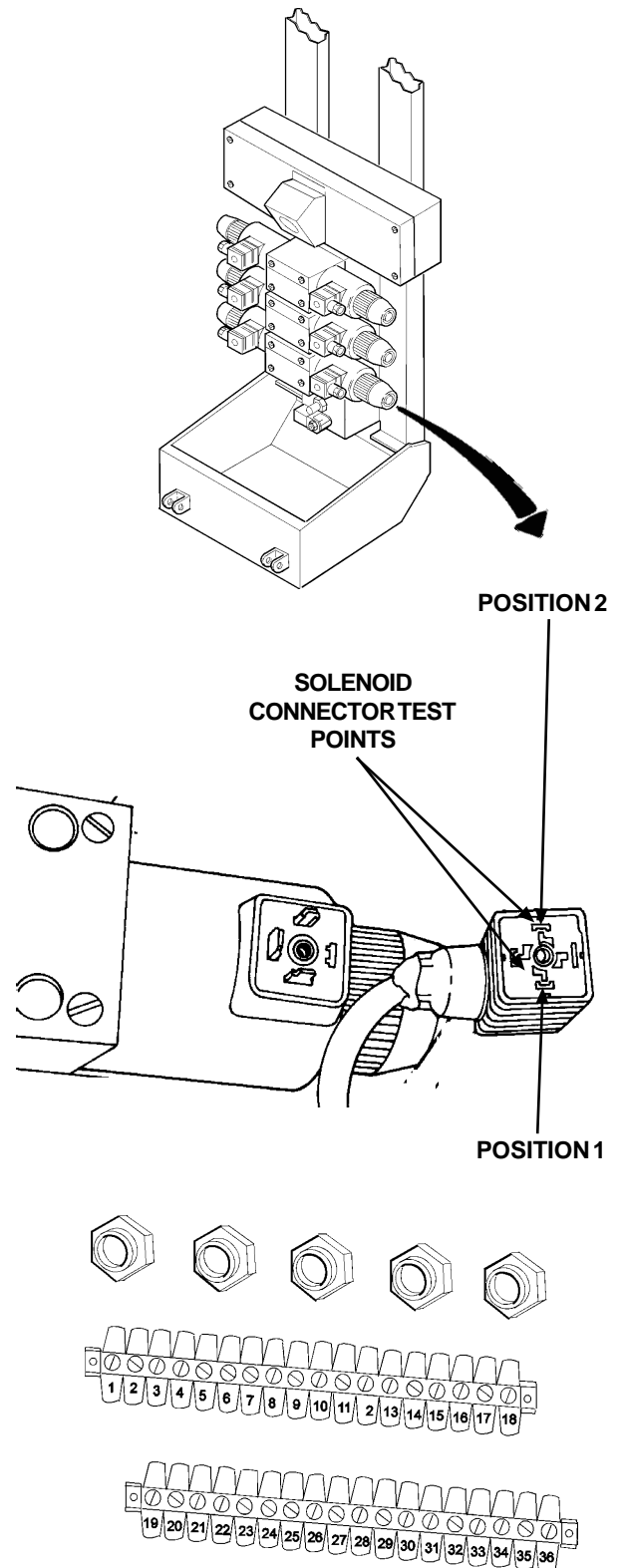
**Electrical power must be shut off from circuit before continuity can be checked. Failure to comply may result in damage to test equipment or electrical system.**

- (1) Remove connector from the WINCH IN solenoid.
- (2) Set multimeter to ohms position.

**NOTE**

- A reading of infinity indicates an open circuit.
- Junction box terminal "35" is connected to one side of the solenoid; terminal "36" is connected to the other side.

- (3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between the solenoid connector, position "1", and terminal strip, position "35".
- (4) Repeat Step 3 to check for continuity between position "2" in the connector and terminal strip position "36".



WIRING REMOVED FOR CLARITY

4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY).

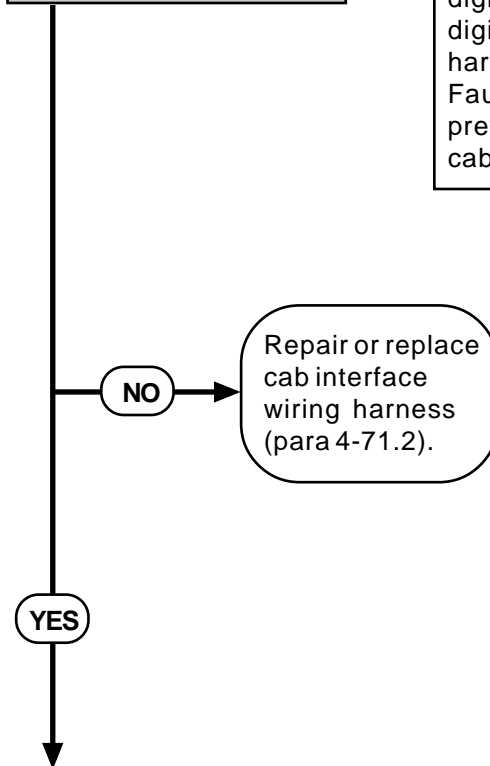
NOTE

The digital controller and the cab digital control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 07 and/or EC 17. Quick-connect couplings OK. Hydraulic lines, hoses, or fittings OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Winch in directional control valve faulty. Digital control box faulty.

9.  
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Test.
REASON FOR QUESTION
Power to activate the winch in solenoid is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.



**4-12. UNIT TROUBLESHOOTING (continued).**

**19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).**

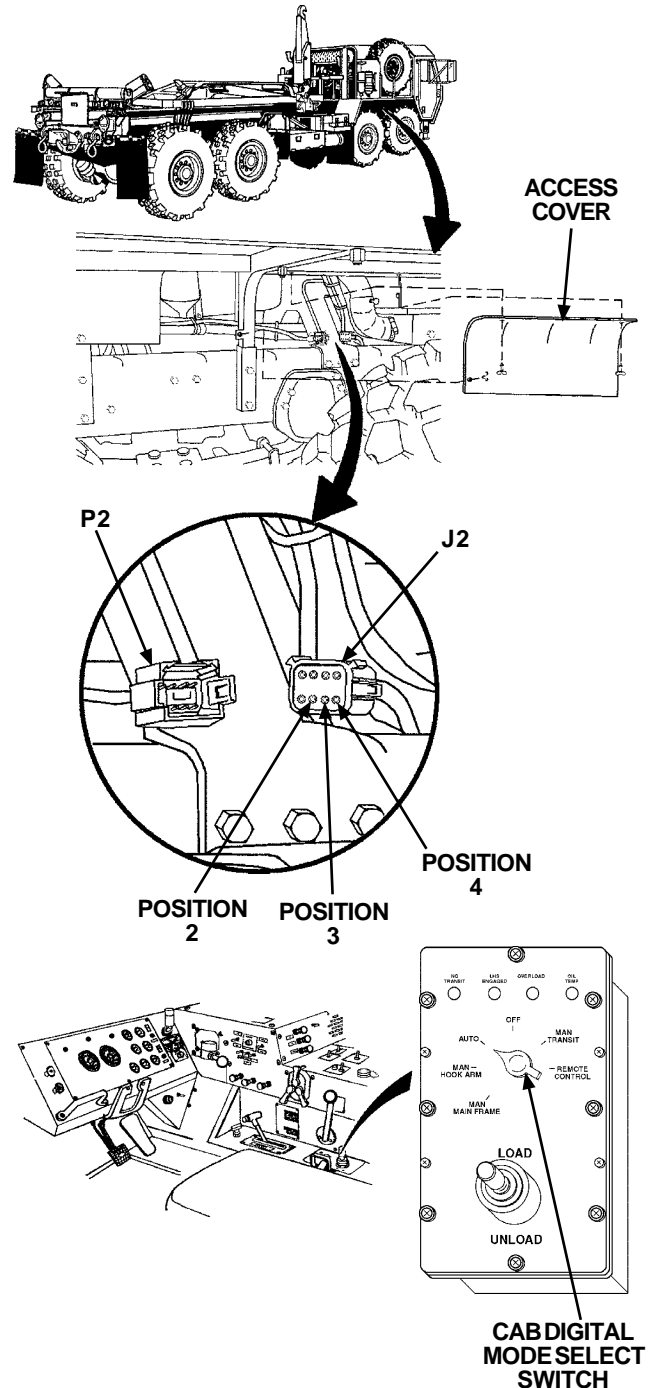
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.

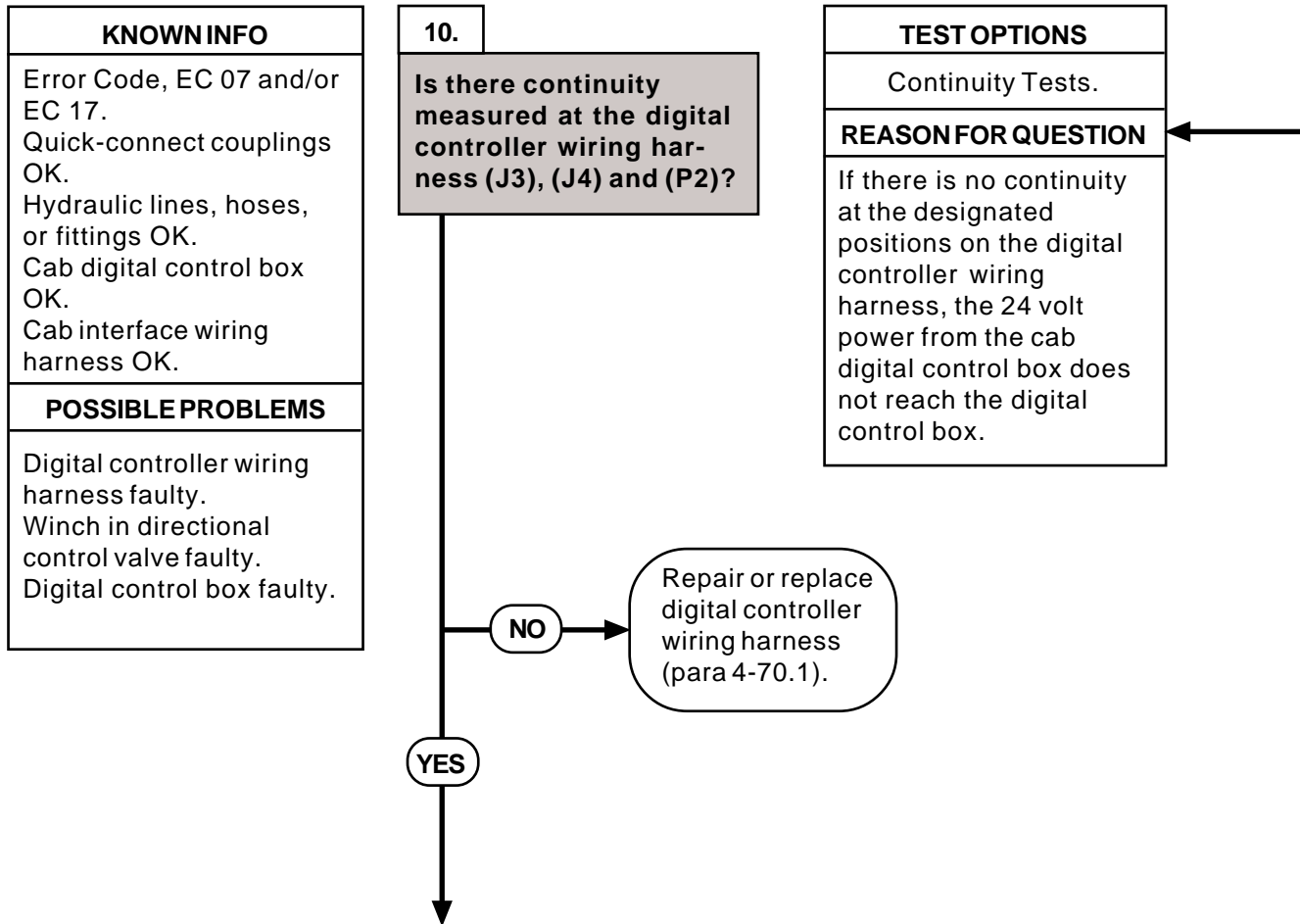


4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

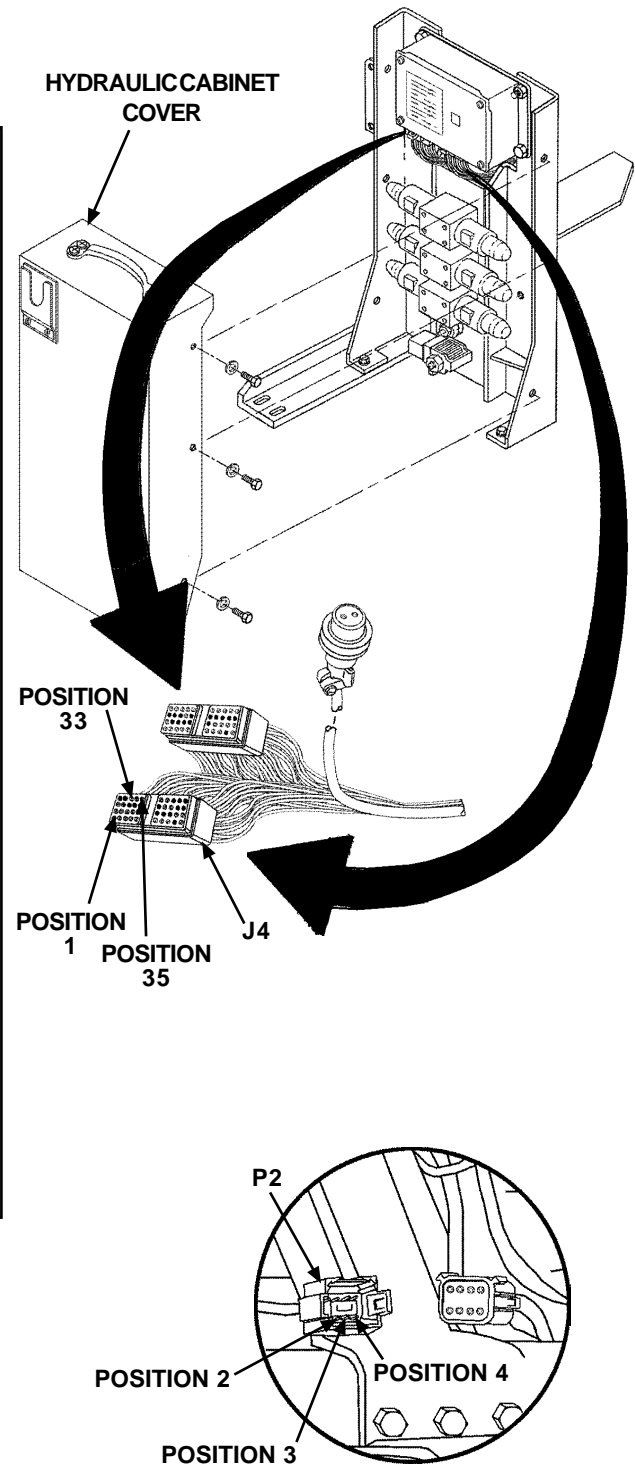




4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove right hand (J3) and left hand (J4), 40-pin connectors from digital controller.</li> <li>(3) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</li> </ol>	

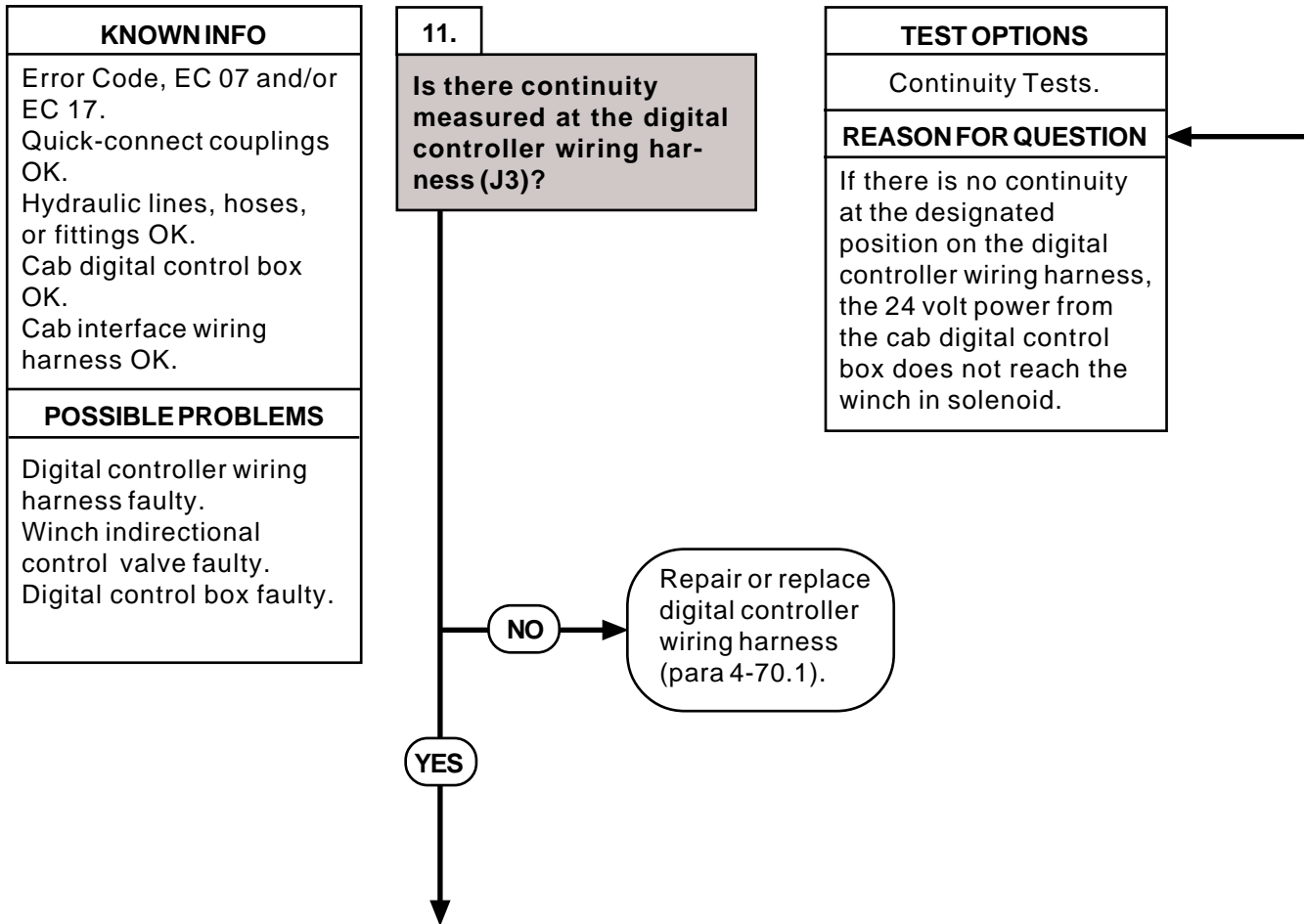


4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).

NOTE

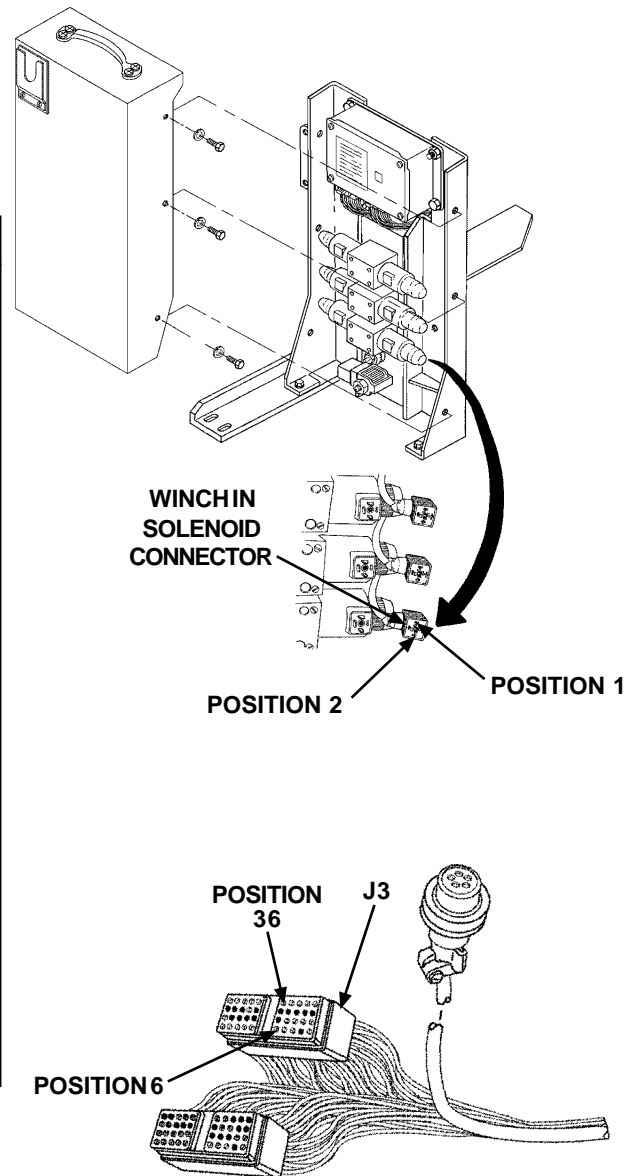
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(1) Set multimeter to ohms position.</p>
<p><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p>
<p>(2) Connect multimeter between digital controller wiring harness connector, (J3), position "6", and winch in solenoid connector, position "1". Check multimeter for continuity.</p> <p>(3) Connect multimeter between (J3), position "36" and winch in solenoid connector, position "2". Check multimeter for continuity.</p>

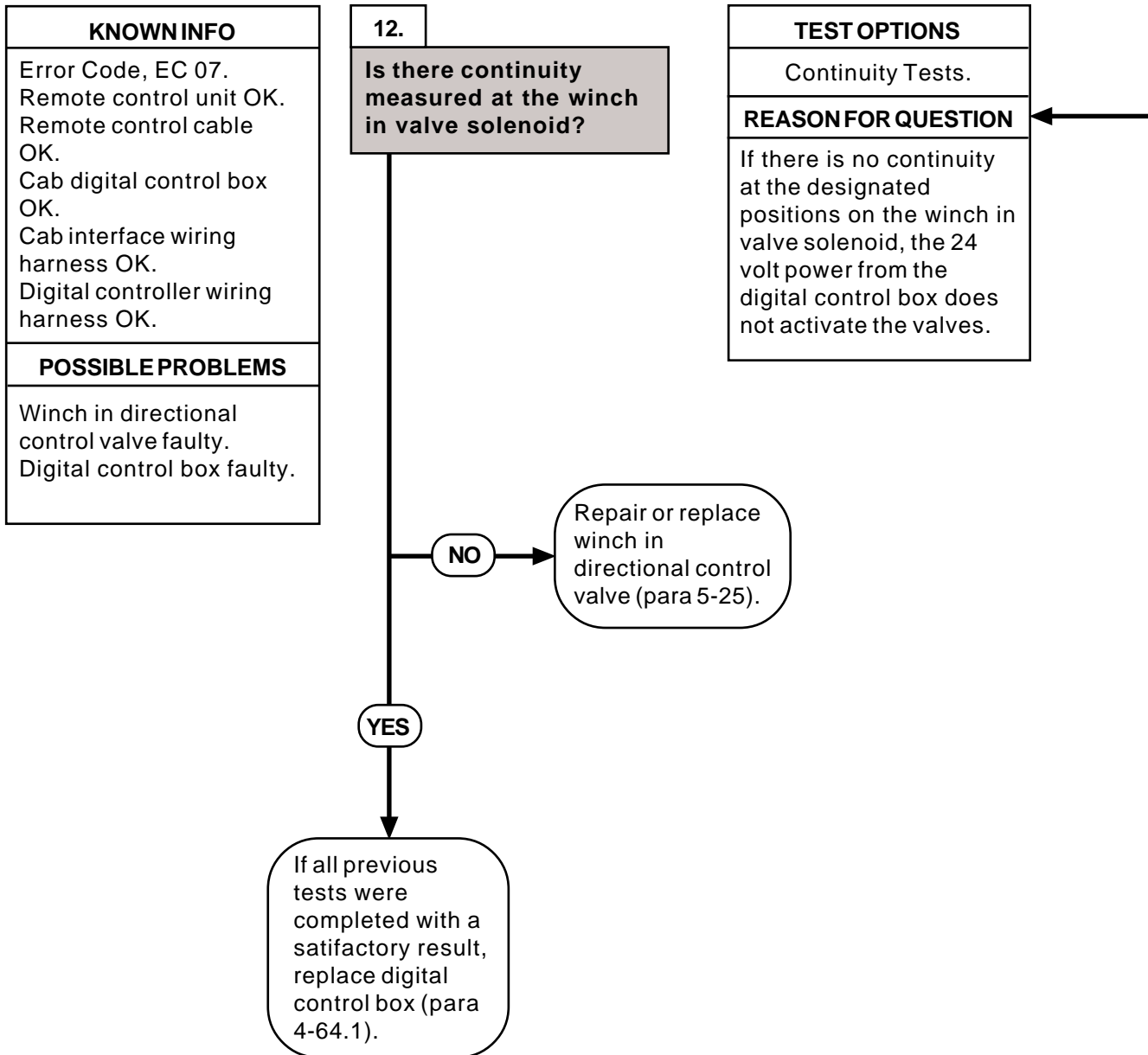


4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

19. BAP WINCH DOES NOT WIND IN (MODEL B ONLY) (continued).

**CONTINUITY TEST**

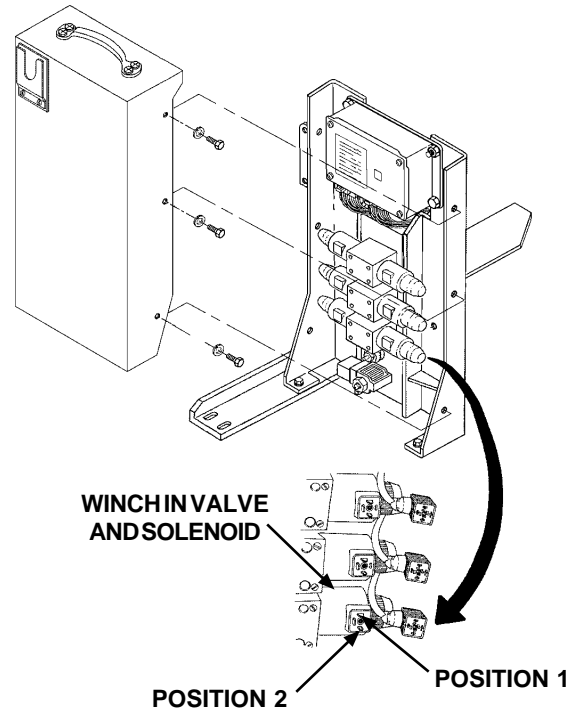
**CAUTION**

Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

**NOTE**

A reading of infinity indicates an open circuit.

- (1) Set multimeter to ohms position.
- (2) Connect multimeter between position "1" and position "2" on winch in valve solenoid. Check multimeter for continuity.



4-12. UNIT TROUBLESHOOTING (continued).

**20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY).**

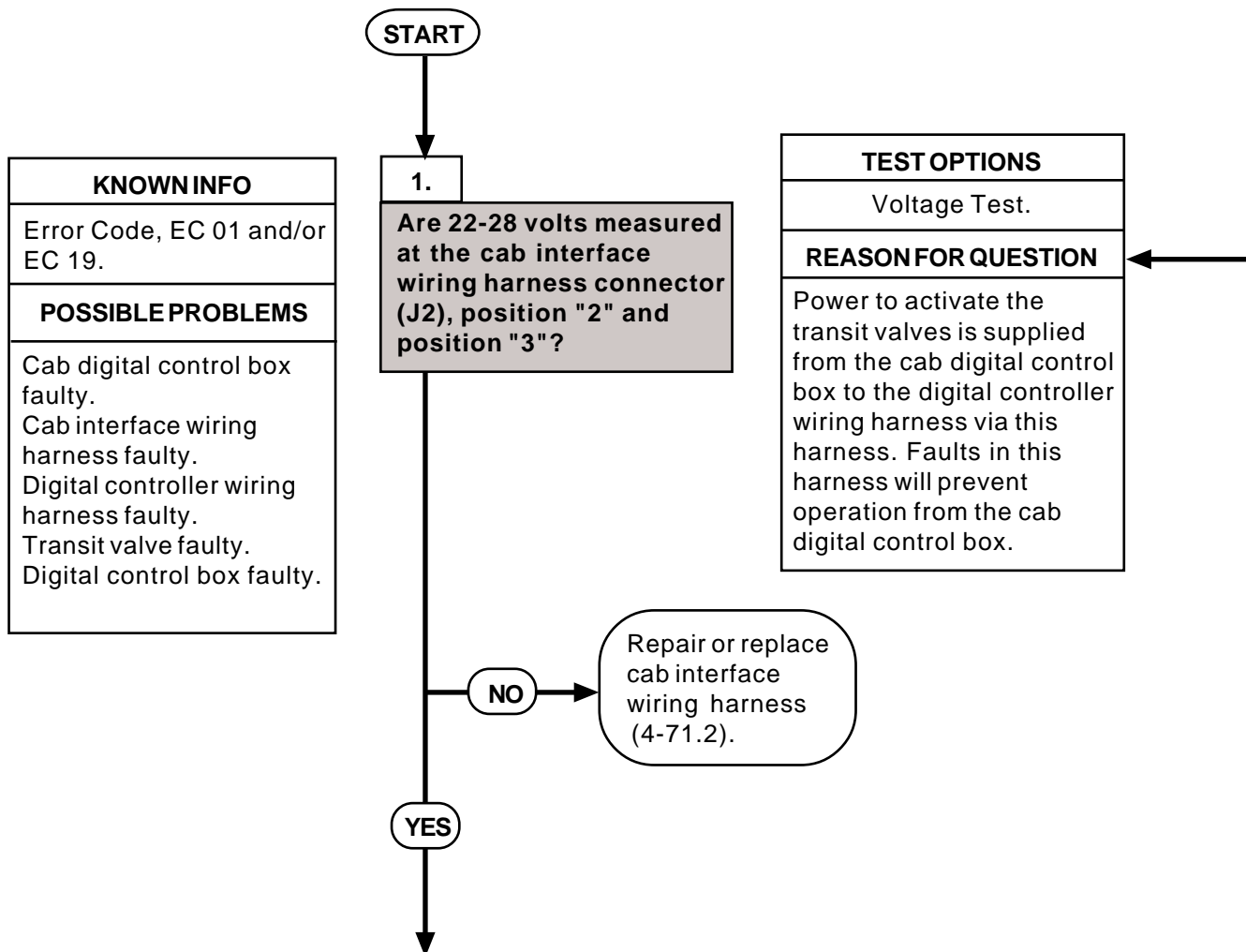
**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

BAP loaded on the CBT  
Engine turned off (TM 9-2320-279-10)  
Parking brake applied (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)



4-12. UNIT TROUBLESHOOTING (continued).

20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY) (continued).

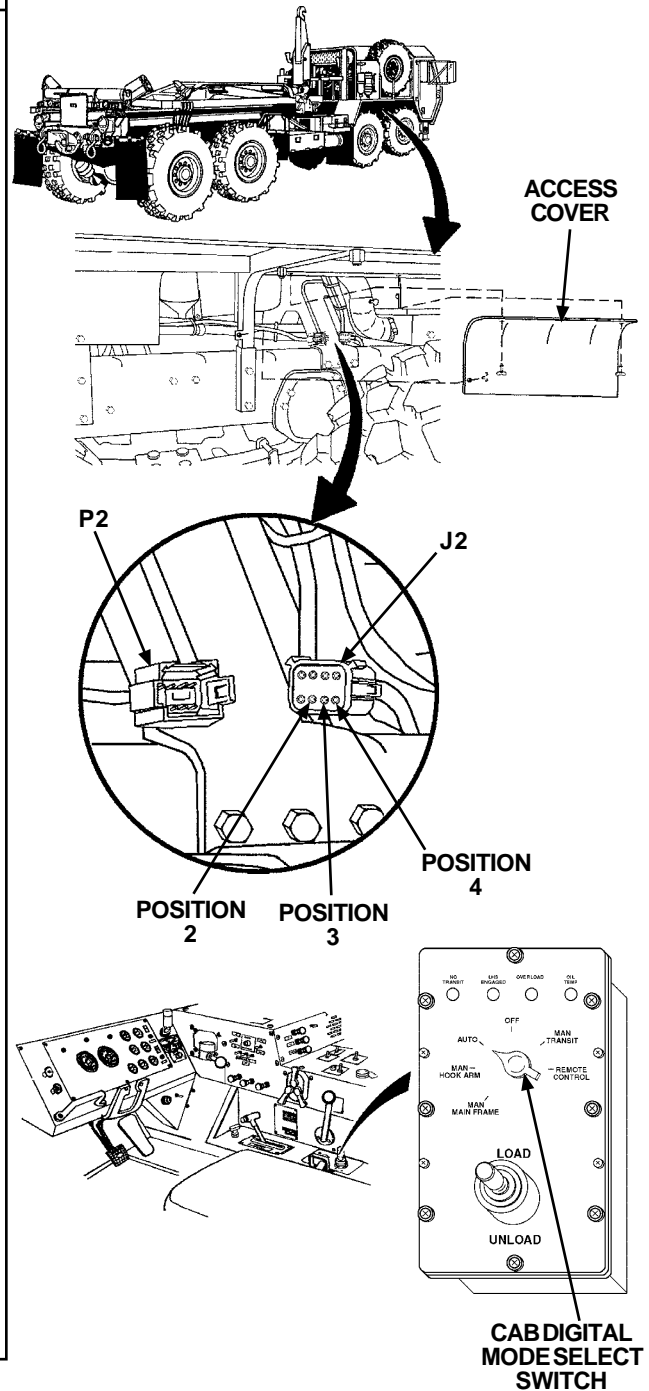
**VOLTAGE TEST**

- (1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.
- (2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.
- (3) Set multimeter to voltage position.
- (4) Turn engine start switch to ON position.
- (5) Place negative (-) probe of multimeter on known good ground.
- (6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).
- (7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.
- (8) Place cab digital mode select switch in "AUTO" position.
- (9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.

**NOTE**

Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.

- (10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.
- (11) Turn engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY) (continued).

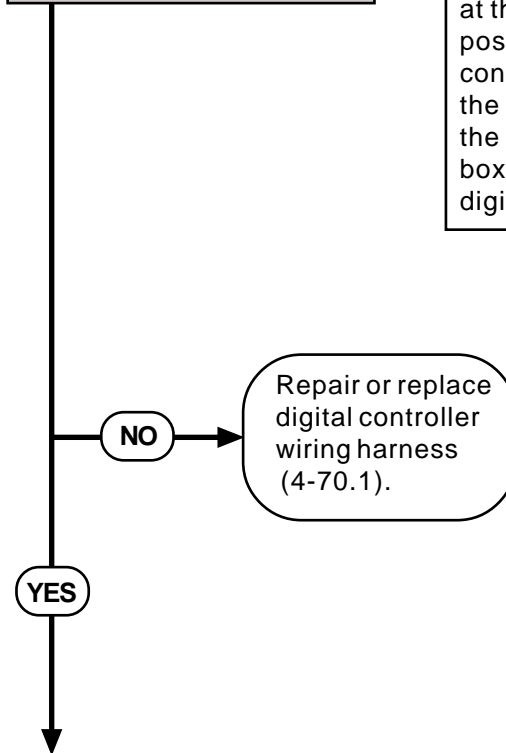
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 01 and/or EC 19. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Transit valve faulty. Digital control box faulty.

2.  
Is there continuity measured between the digital controller wiring harness (J4) and (P2)?

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the digital controller wiring harness, the 24 volt power from the cab digital control box does not reach the digital control box.

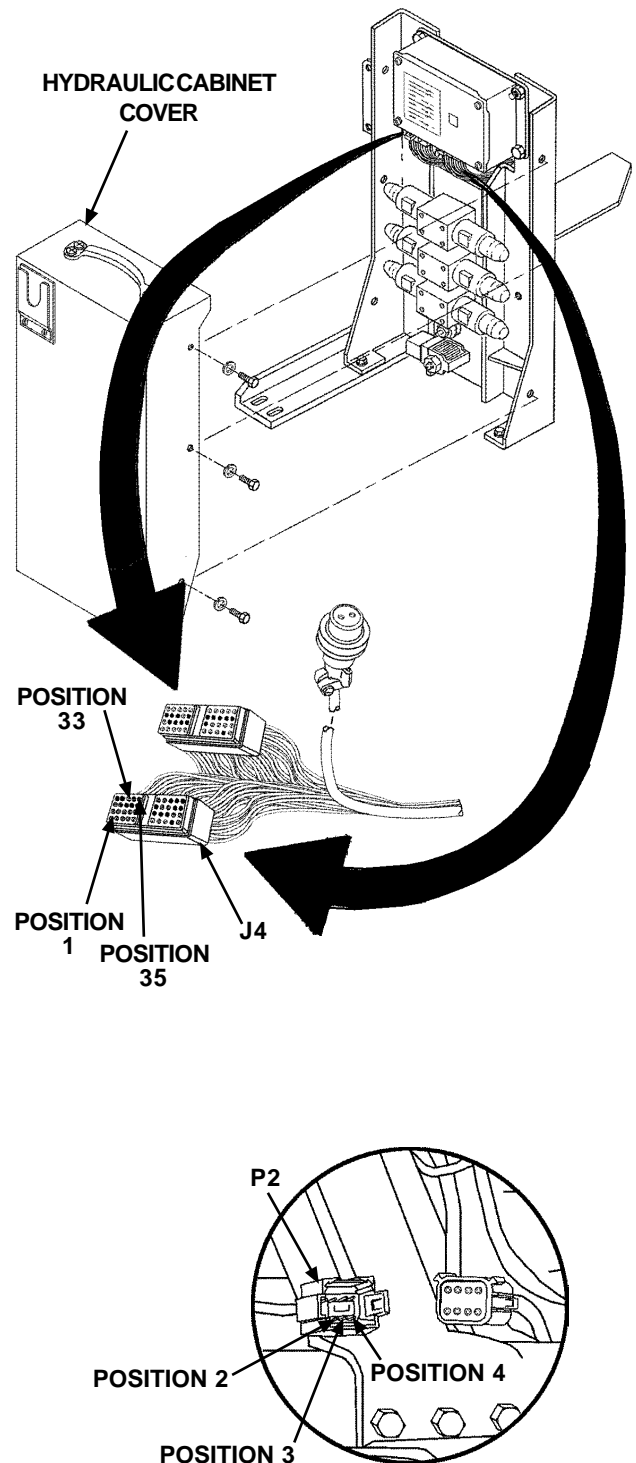




4-12. UNIT TROUBLESHOOTING (continued).

20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.</li> <li>(2) Remove left hand (J4), 40-pin connector from digital controller.</li> <li>(3) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.</li> <li>(5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.</li> <li>(6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.</li> </ol>	



4-12. UNIT TROUBLESHOOTING (continued).

20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY) (continued).

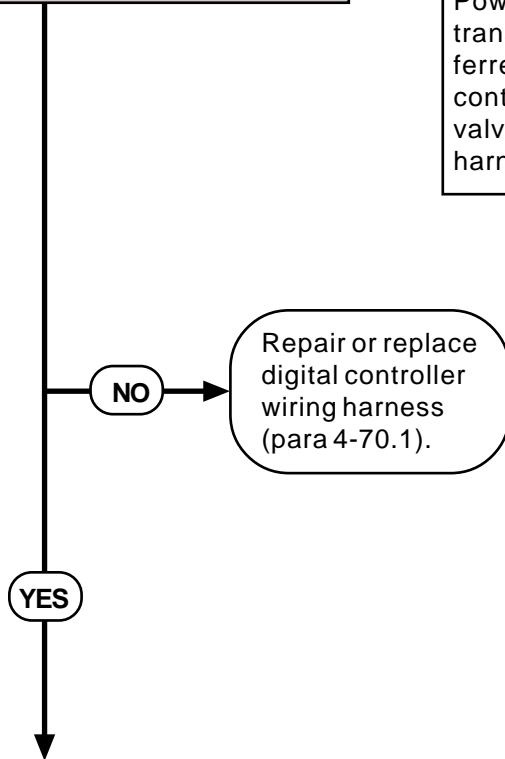
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 01 and/or EC 19. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Transit valve faulty. Digital control box faulty.

3.  
Is continuity measured on the digital controller wiring harness, transit valve solenoid circuits?

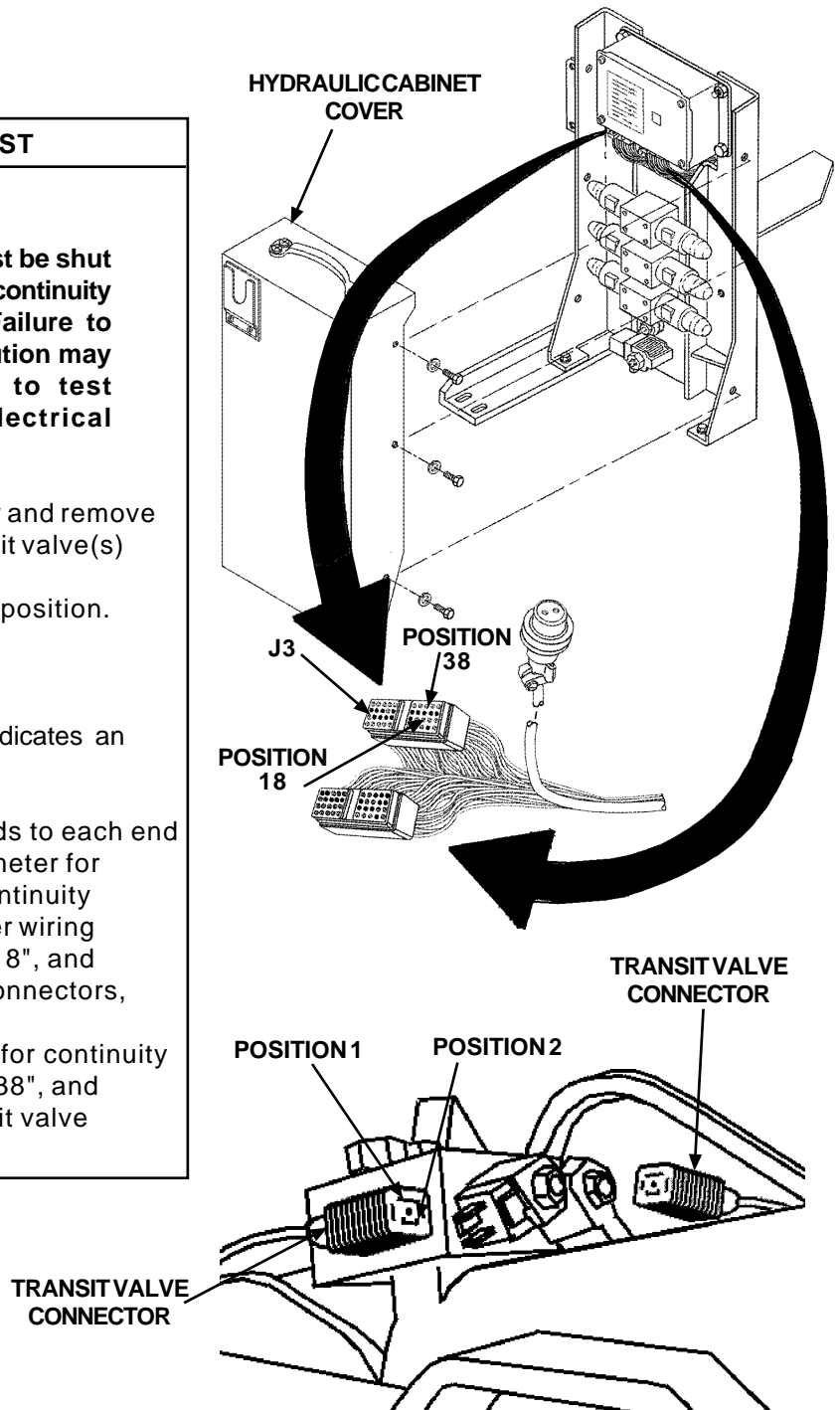
TEST OPTIONS
Continuity Test.
REASON FOR QUESTION
Power to activate the transit valves is transferred from the digital control box to the transit valve solenoids via this harness.



4-12. UNIT TROUBLESHOOTING (continued).

20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY) (continued).

<b>CONTINUITY TEST</b>
<b><u>CAUTION</u></b>
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>
<p>(1) Loosen connector screw and remove connector from the transit valve(s) solenoid.</p> <p>(2) Set multimeter to ohms position.</p>
<b>NOTE</b>
<p>A reading of infinity indicates an open circuit.</p>
<p>(3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between digital controller wiring harness (J3), position "18", and transit valve solenoid connectors, position "1".</p> <p>(4) Repeat Step 3 to check for continuity between (J3), position "38", and position "2" on the transit valve solenoid connectors.</p>

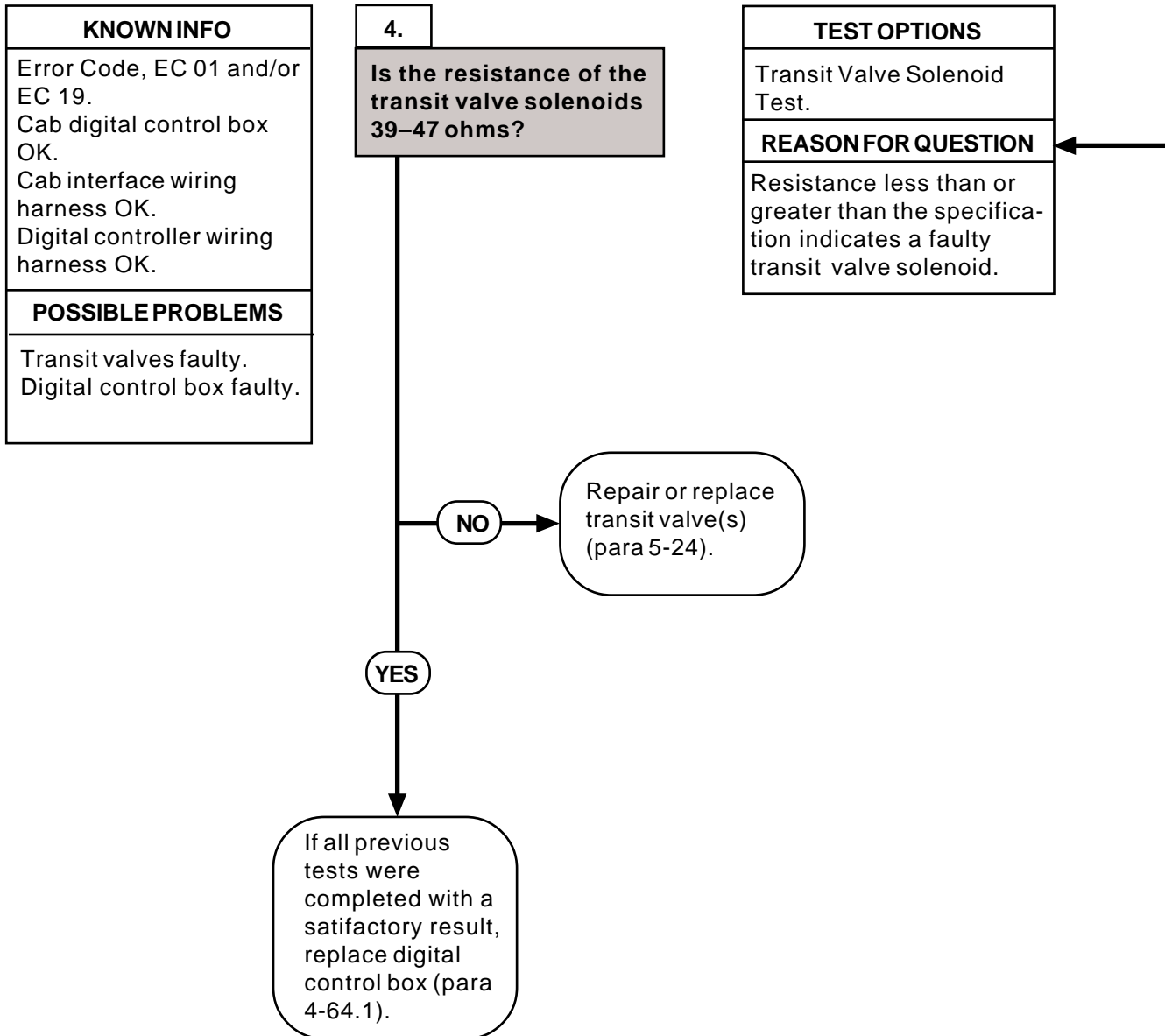


4-12. UNIT TROUBLESHOOTING (continued).

20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



**4-12. UNIT TROUBLESHOOTING (continued).****20. TRANSIT VALVES INOPERATIVE, ERROR CODE 19, (MODEL B ONLY)  
(continued).****RESISTANCE TEST****CAUTION**

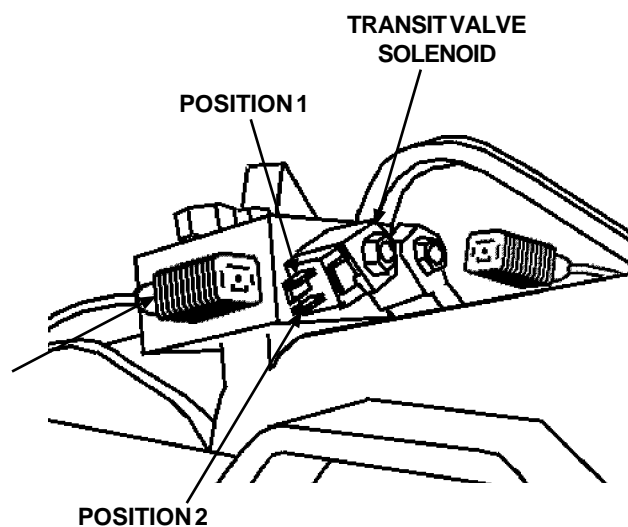
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (2) Connect multimeter leads to position "1" and position "2" on the transit valve solenoid(s) and check multimeter for 39-47 ohms of resistance.



4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY).

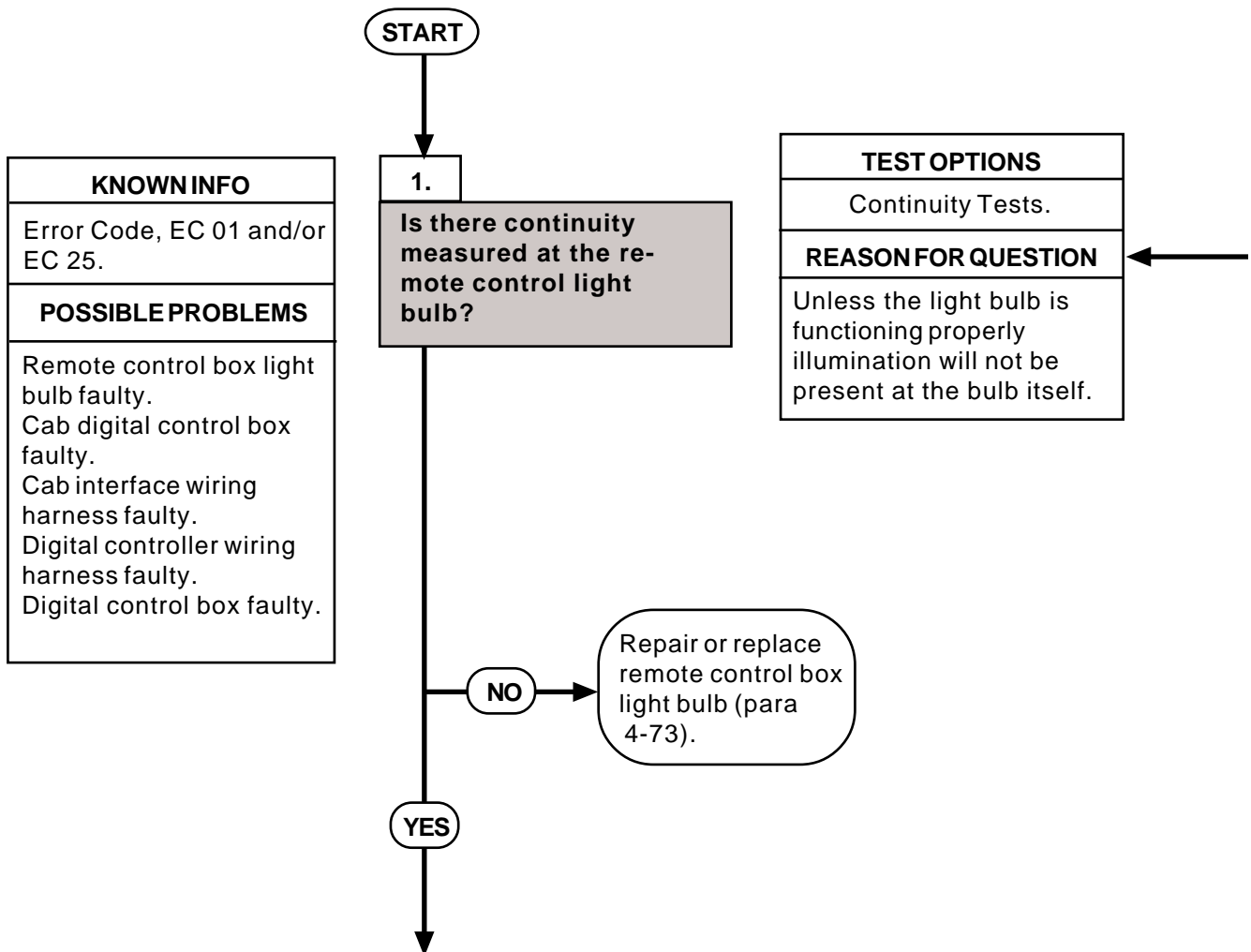
INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

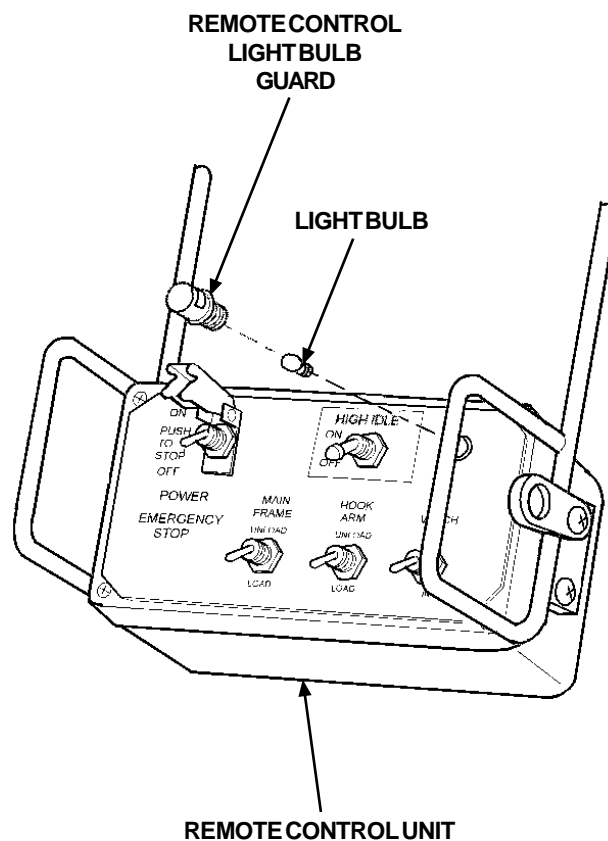
BAP loaded on the CBT  
Engine turned off (TM 9-2320-279-10)  
Parking brake applied (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)



4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<ol style="list-style-type: none"> <li>(1) Remove control box light bulb guard and remove from remote control unit.</li> <li>(2) Set multimeter to ohms position.</li> </ol>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<ol style="list-style-type: none"> <li>(3) Connect multimeter between center of bulb at the base and outside of bulb base. Check multimeter for continuity.</li> </ol>	



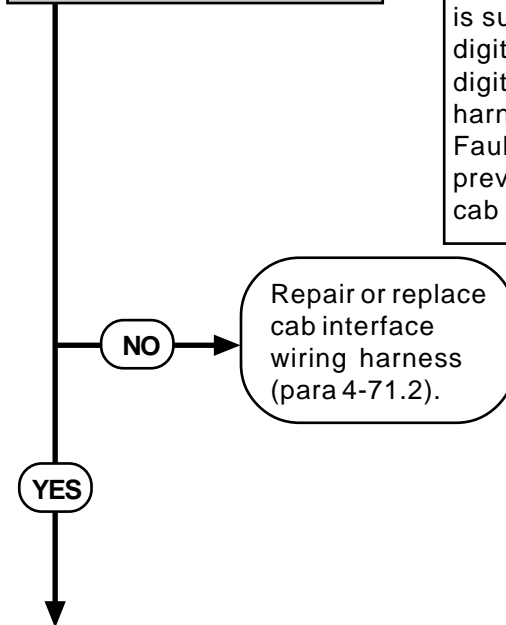
4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

KNOWN INFO
Error Code, EC 01 and/or EC 25. Remote control box light bulb OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Digital control box faulty.

2.  
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Tests.
REASON FOR QUESTION
Power to activate the remote control light circuit is supplied from the cab digital control box to the digital controller wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.

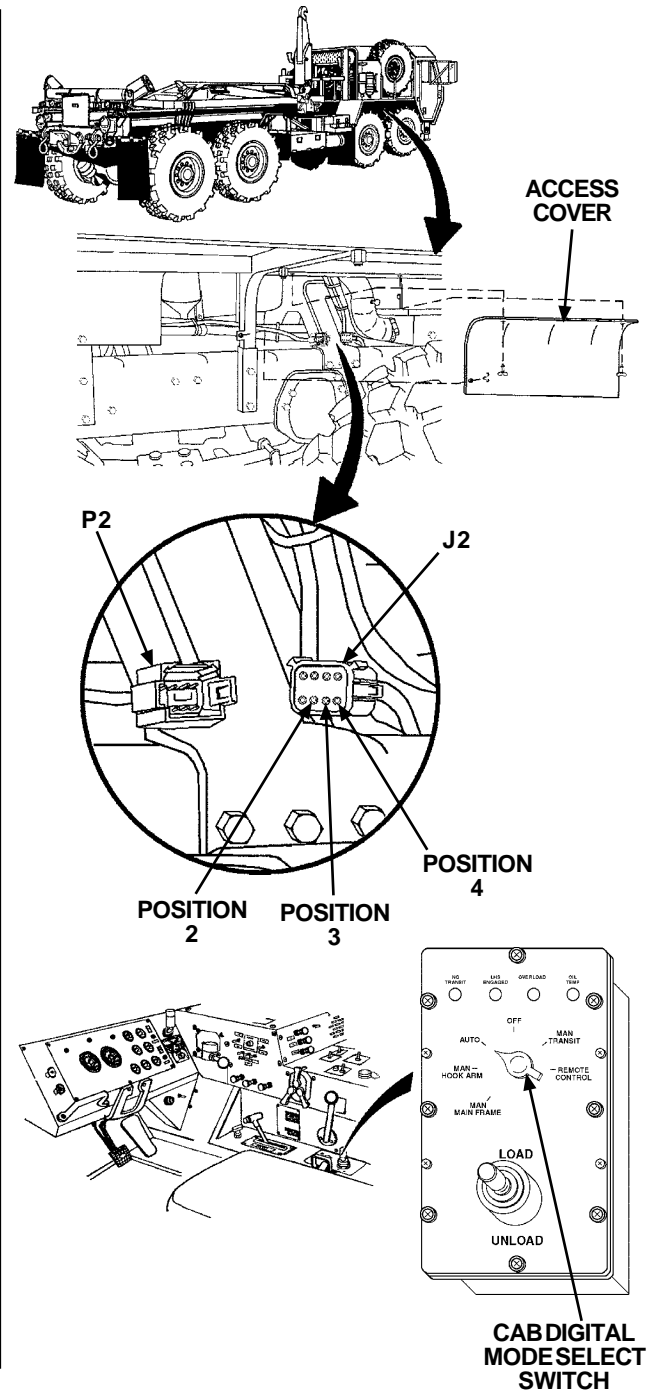




4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

VOLTAGE TEST
<p>(1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.</p> <p>(2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.</p> <p>(3) Set multimeter to voltage position.</p> <p>(4) Turn engine start switch to ON position.</p> <p>(5) Place negative (-) probe of multimeter on known good ground.</p> <p>(6) Disconnect cab interface wiring harness connector, (J2) from digital controller wiring harness connector, (P2).</p> <p>(7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.</p> <p>(8) Place cab digital mode select switch in "AUTO" position.</p> <p>(9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.</p> <p style="text-align: center;">NOTE</p> <p>Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.</p> <p>(10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.</p> <p>(11) Turn engine start switch to "OFF" position.</p>



4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

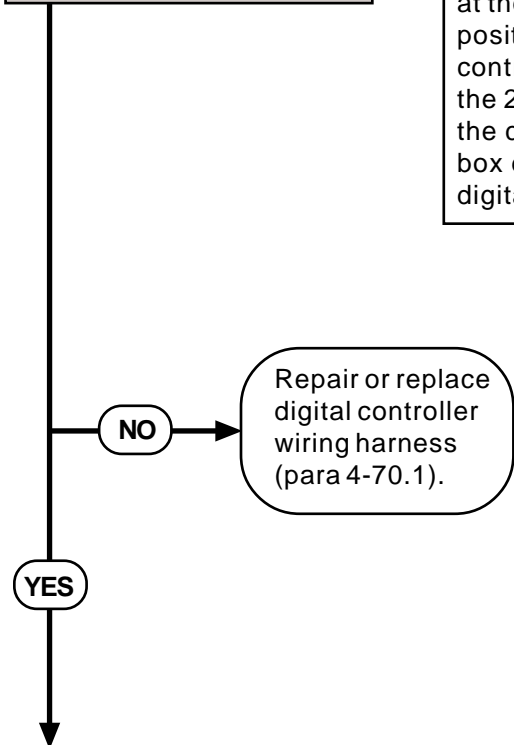
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code, EC 01 and/or EC 25. Remote control box light bulb OK. Cab digital control box OK. Cab interface wiring harness OK.
POSSIBLE PROBLEMS
Digital controller wiring harness faulty. Digital control box faulty.

3.  
Is there continuity measured between the digital controller wiring harness (J4) and (P2)?

TEST OPTIONS
Continuity Tests.
REASON FOR QUESTION
If there is no continuity at the designated positions on the digital controller wiring harness, the 24 volt power from the cab digital control box does not reach the digital control box.



4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

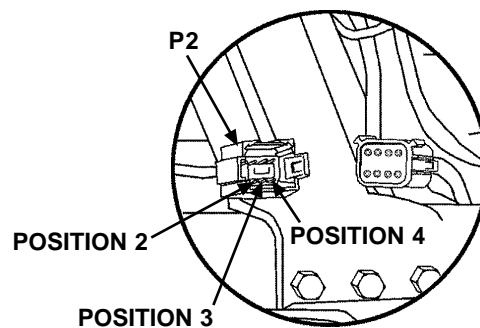
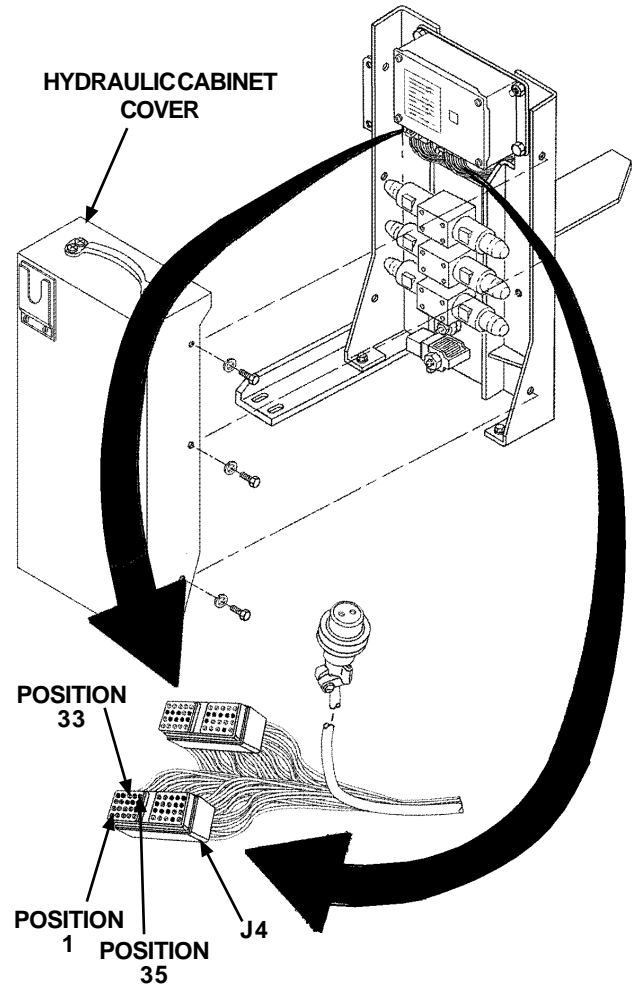
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.
- (2) Remove left hand (J4), 40-pin connector from digital controller.
- (3) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.
- (5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.
- (6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.

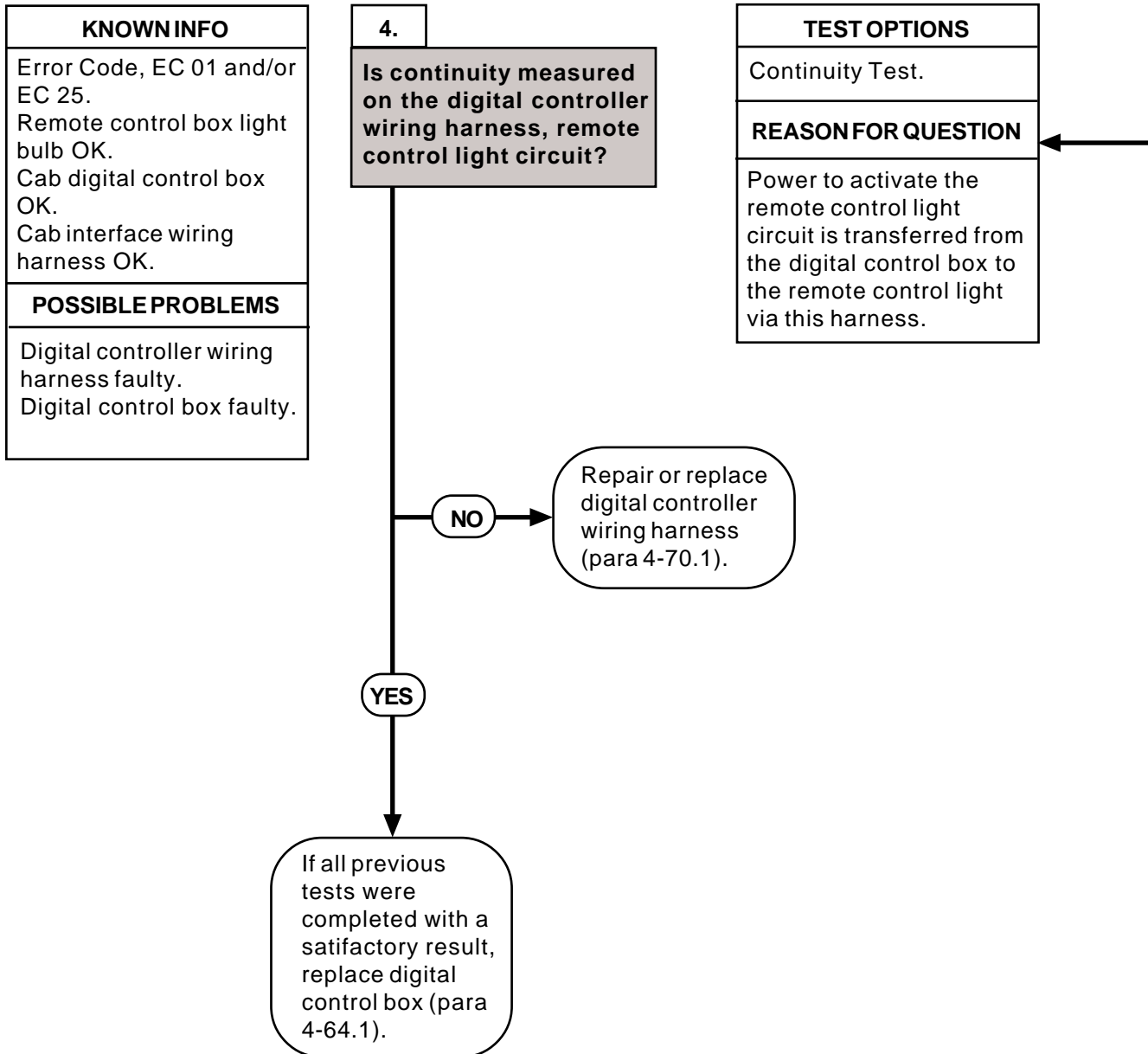


4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

NOTE

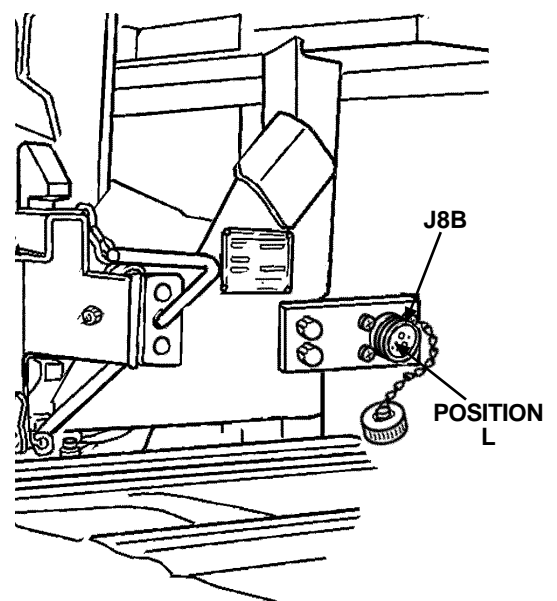
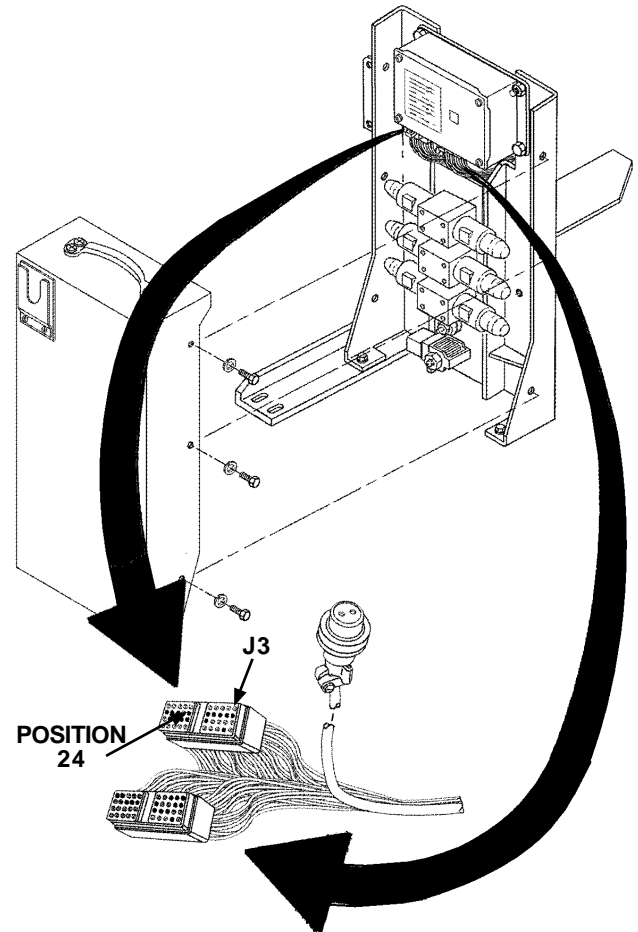
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

21. REMOTE CONTROL LIGHT INOPERATIVE, ERROR CODE 25, (MODEL B ONLY) (continued).

<p><b>CONTINUITY TEST</b></p> <p><b><u>CAUTION</u></b></p> <p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p> <p>(1) Remove cap from connector (J8B), remote control cable connection point.</p> <p>(2) Set multimeter to ohms position.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>A reading of infinity indicates an open circuit.</p> <p>(3) Connect multimeter leads to each end of wire and check multimeter for continuity. Check for continuity between digital controller wiring harness (J3), position "24", and remote control connector (J8B), position "L".</p>
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4-12. UNIT TROUBLESHOOTING (continued).

**22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODES 26 AND 27, (MODEL B ONLY).**

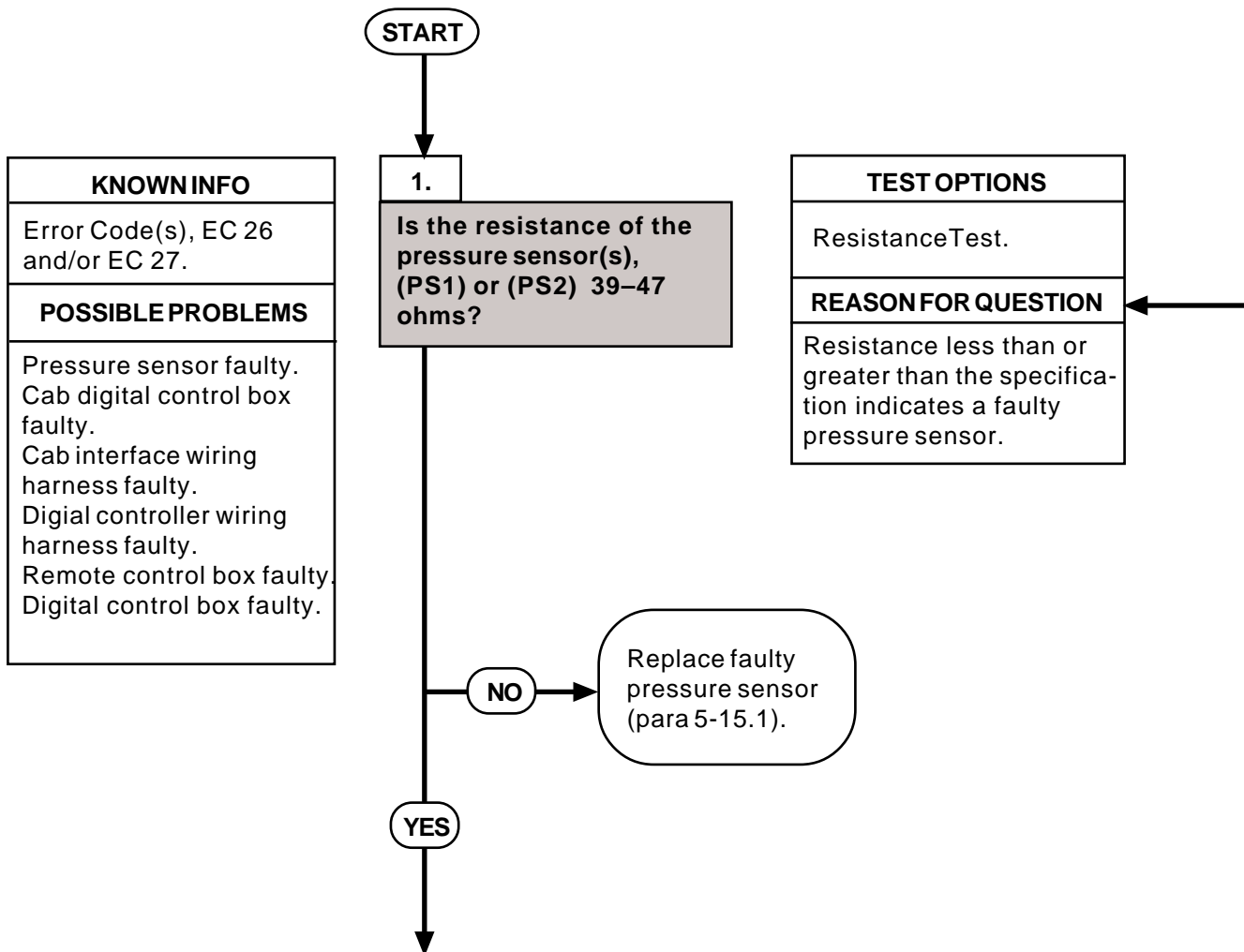
**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

BAP loaded on the CBT  
Engine turned off (TM 9-2320-279-10)  
Parking brake applied (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)



## 4-12. UNIT TROUBLESHOOTING (continued).

## 22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE 26 AND 27, (MODEL B ONLY) (continued).

**RESISTANCE TEST****CAUTION**

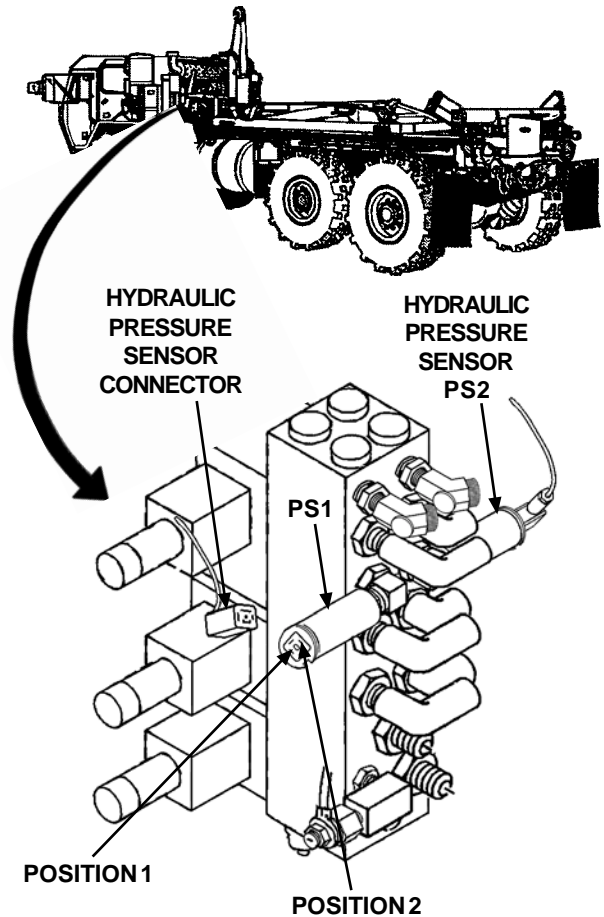
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Loosen connector screw and remove hydraulic pressure sensor connector from the pressure sensor (PS1) and/or (PS2).
- (2) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (3) Connect multimeter leads to position "1" and position "2" on the pressure sensor(s) (PS1) or (PS2) and check multimeter for 39-47 ohms resistance.



4-12. UNIT TROUBLESHOOTING (continued).

22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE(S) 26 AND 27, (MODEL B ONLY) (continued).

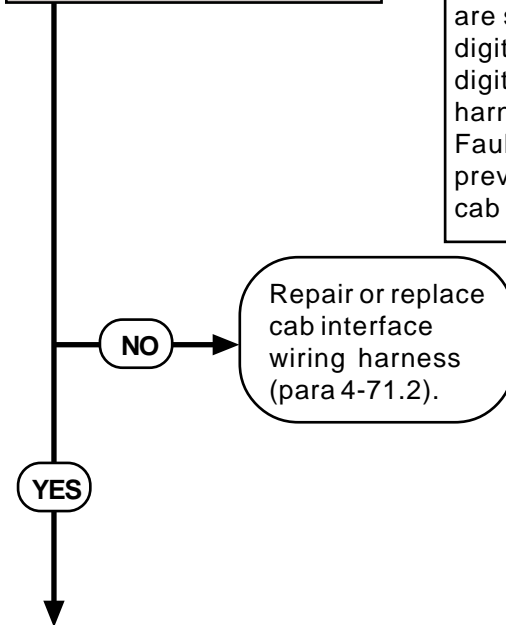
NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.

KNOWN INFO
Error Code(s), EC 26 and/or EC 27. Pressure sensor(s) OK.
POSSIBLE PROBLEMS
Cab digital control box faulty. Cab interface wiring harness faulty. Digital controller wiring harness faulty. Digital control box faulty.

2.  
Are 22-28 volts measured at the cab interface wiring harness connector (J2), position "2" and position "3"?

TEST OPTIONS
Voltage Tests.
REASON FOR QUESTION
Power to activate the pressure sensor circuits are supplied from the cab digital control box to the digital control wiring harness via this harness. Faults in this harness will prevent operation from the cab digital control box.

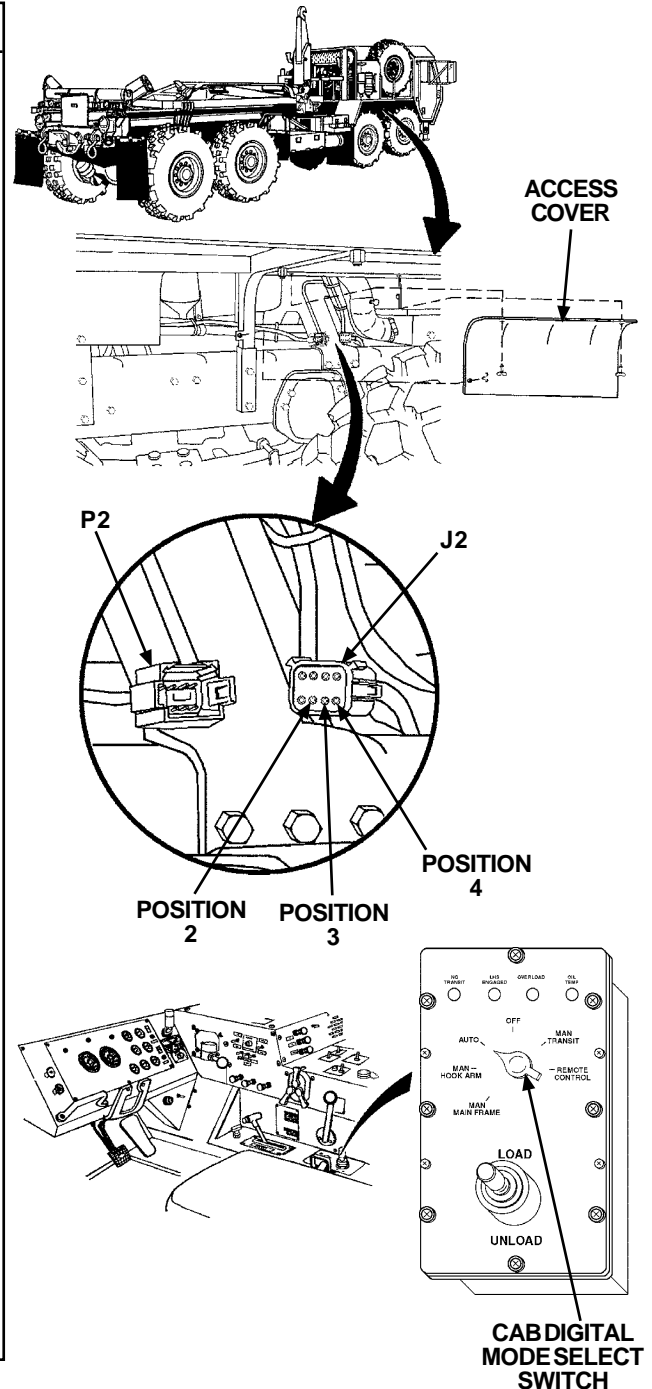




4-12. UNIT TROUBLESHOOTING (continued).

22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE(S) 26 AND 27, (MODEL B ONLY) (continued).

VOLTAGE TEST
<p>(1) Remove three thumb screws and access cover on right side of vehicle under front fender to gain access to cab interface wiring harness connector.</p> <p>(2) Cut and remove wire ties as necessary to loosen cab interface wiring harness.</p> <p>(3) Set multimeter to voltage position.</p> <p>(4) Turn engine start switch to ON position.</p> <p>(5) Place negative (-) probe of multimeter on known good ground.</p> <p>(6) Disconnect cab interface wiring harness connector, (J2) from main control wiring harness connector, (P2).</p> <p>(7) Place positive (+) probe of multimeter on position "2", circuit 1473, of cab control box connector (J2), Check multimeter for voltage reading, note reading.</p> <p>(8) Place cab digital mode select switch in "AUTO" position.</p> <p>(9) Place positive (+) probe of multimeter on position "3", circuit 1471, of cab control box connector (J2), note reading.</p> <p style="text-align: center;">NOTE</p> <p>Position "4", circuit 1490, should have a reading of 1-5 volts, not 22-28 volts. If 1-5 volts are not measured at position "4", replace the cab digital control box.</p> <p>(10) Place positive (+) probe of multimeter on position "4", circuit 1490, of cab digital control box connector (J2), note reading.</p> <p>(11) Turn engine start switch to "OFF" position.</p>

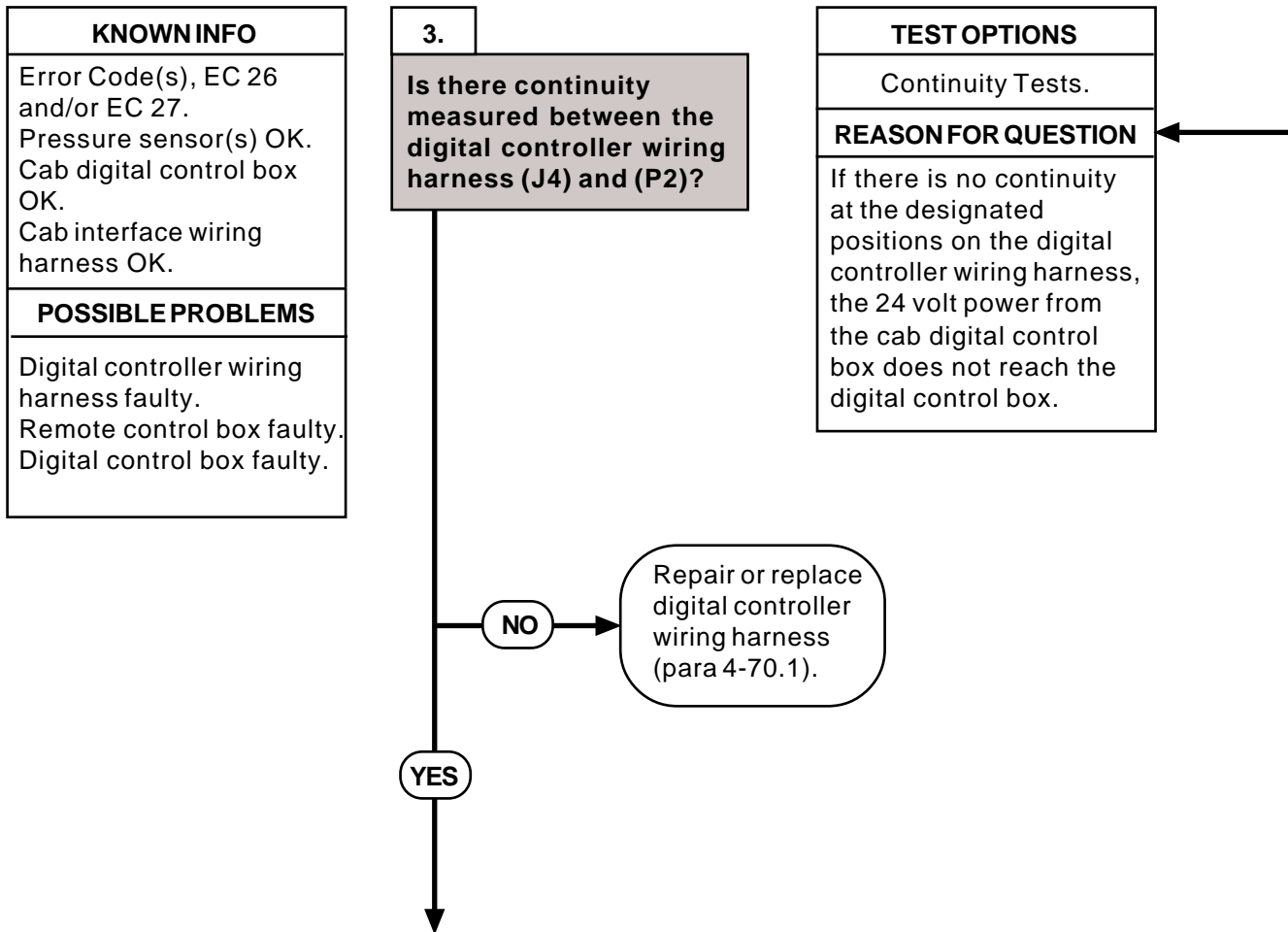


4-12. UNIT TROUBLESHOOTING (continued).

22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE 26 AND 27, (MODEL B ONLY) (continued).

NOTE

The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE 26 AND 27, (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

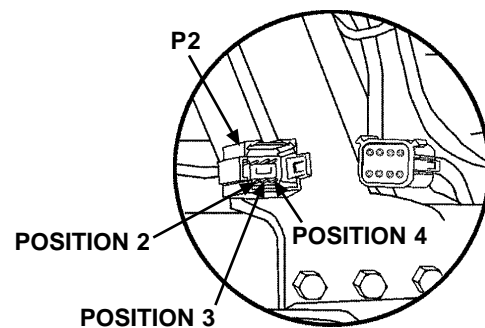
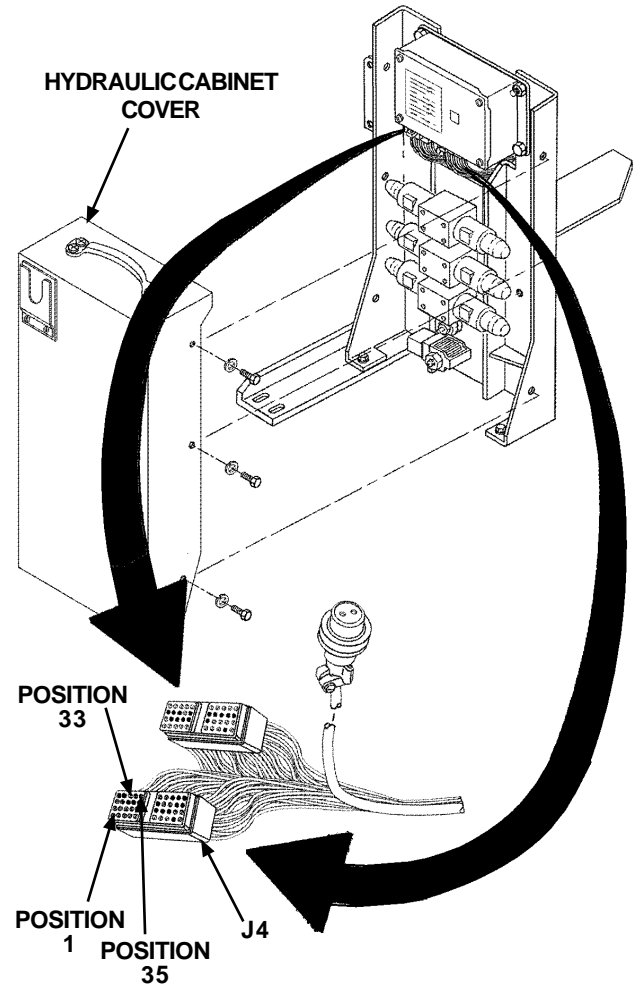
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Remove six screws and flatwashers from hydraulic cabinet cover and remove cover.
- (2) Remove left hand (J4), 40-pin connector from digital controller.
- (3) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (4) Connect multimeter between digital controller wiring harness connector, (P2), position "2", and (J4), position "1". Check multimeter for continuity.
- (5) Connect multimeter between (P2), position "3", and (J4), position "35". Check multimeter for continuity.
- (6) Connect multimeter between (P2), position "4", and (J4), position "33". Check multimeter for continuity.

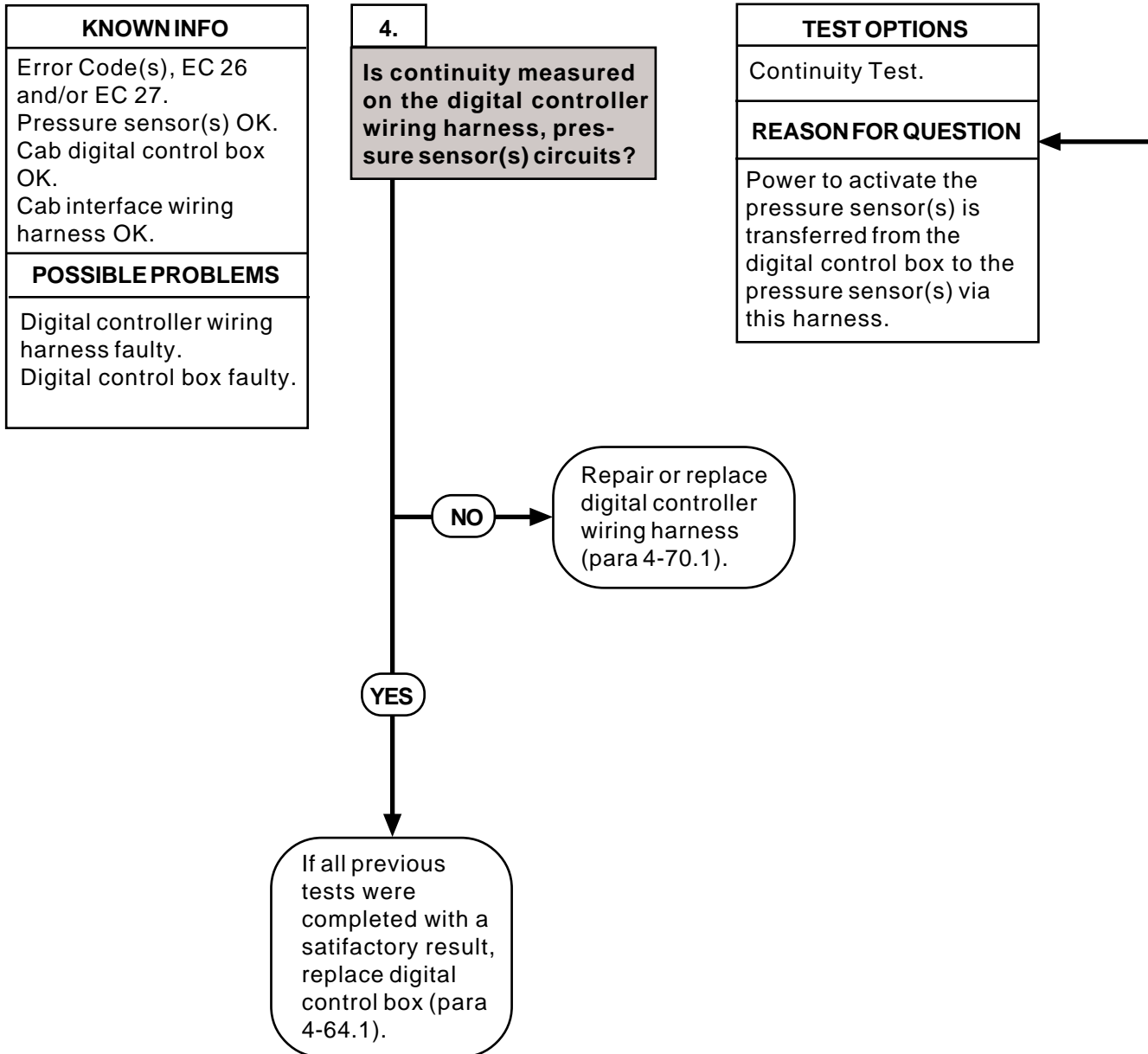


4-12. UNIT TROUBLESHOOTING (continued).

22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE 26 AND 27, (MODEL B ONLY) (continued).

NOTE

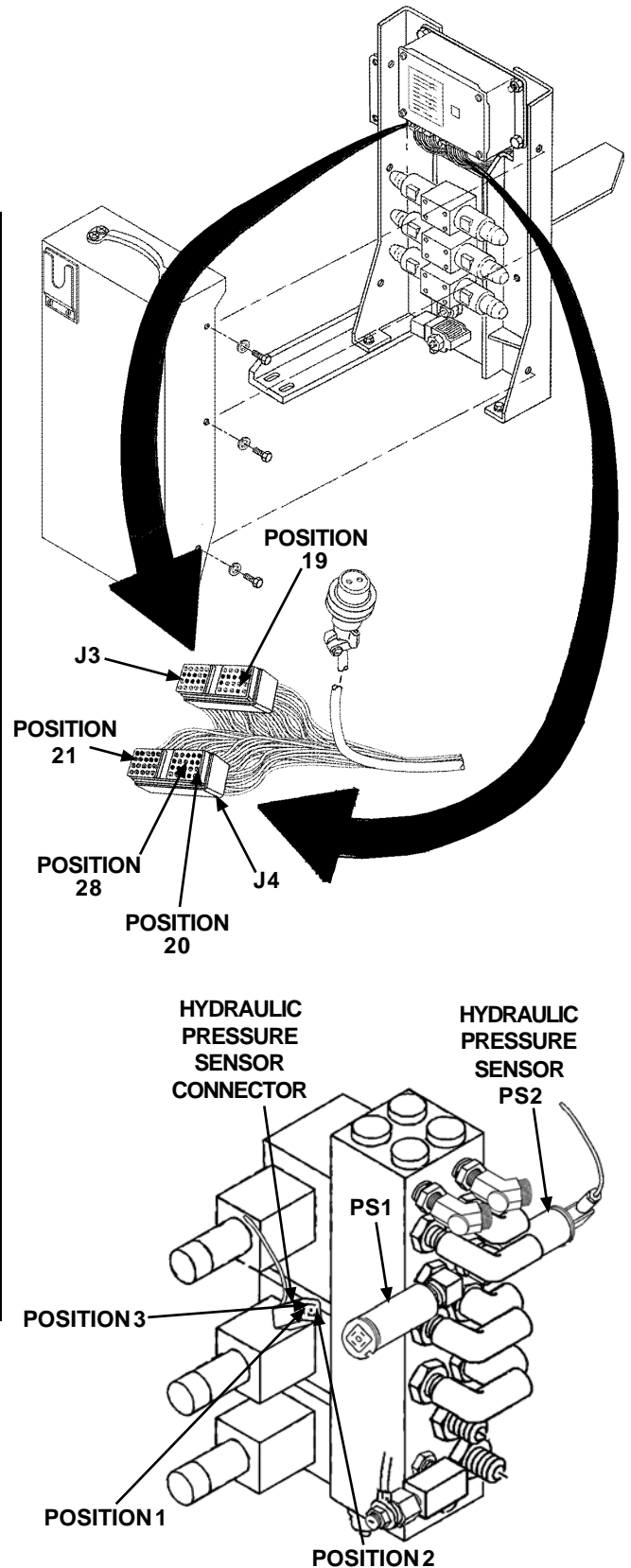
The digital controller and the cab control box are not repairable, therefore, it is necessary to test the digital controller and cab interface wiring harnesses, switches, solenoids, and other components to identify possible faults other than the digital controller and the digital cab controller.



4-12. UNIT TROUBLESHOOTING (continued).

22. PRESSURE SENSORS, PS1 / PS2, INOPERATIVE, ERROR CODE 26 AND 27, (MODEL B ONLY) (continued).

CONTINUITY TEST	
<b>CAUTION</b>	
<p>Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.</p>	
<p>(1) Loosen connector screw and remove connector from the pressure sensor(s) (PS1) or (PS2).</p> <p>(2) Set multimeter to ohms position.</p>	
<b>NOTE</b>	
<p>A reading of infinity indicates an open circuit.</p>	
<p>(3) Connect multimeter leads to each end of wire and check multimeter for continuity. For (PS1) check for continuity between (J3), position "19" and sensor connector, position "1", (J4), position "28", and sensor connector, position "2", and (J4), position "20" and sensor connector, position "3".</p> <p>(4) Do the same test as above for pressure sensor (PS2) except use (J4), position "21" and sensor connector, position "3". Check multimeter for continuity.</p>	



4-12. UNIT TROUBLESHOOTING (continued).

**23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY)**

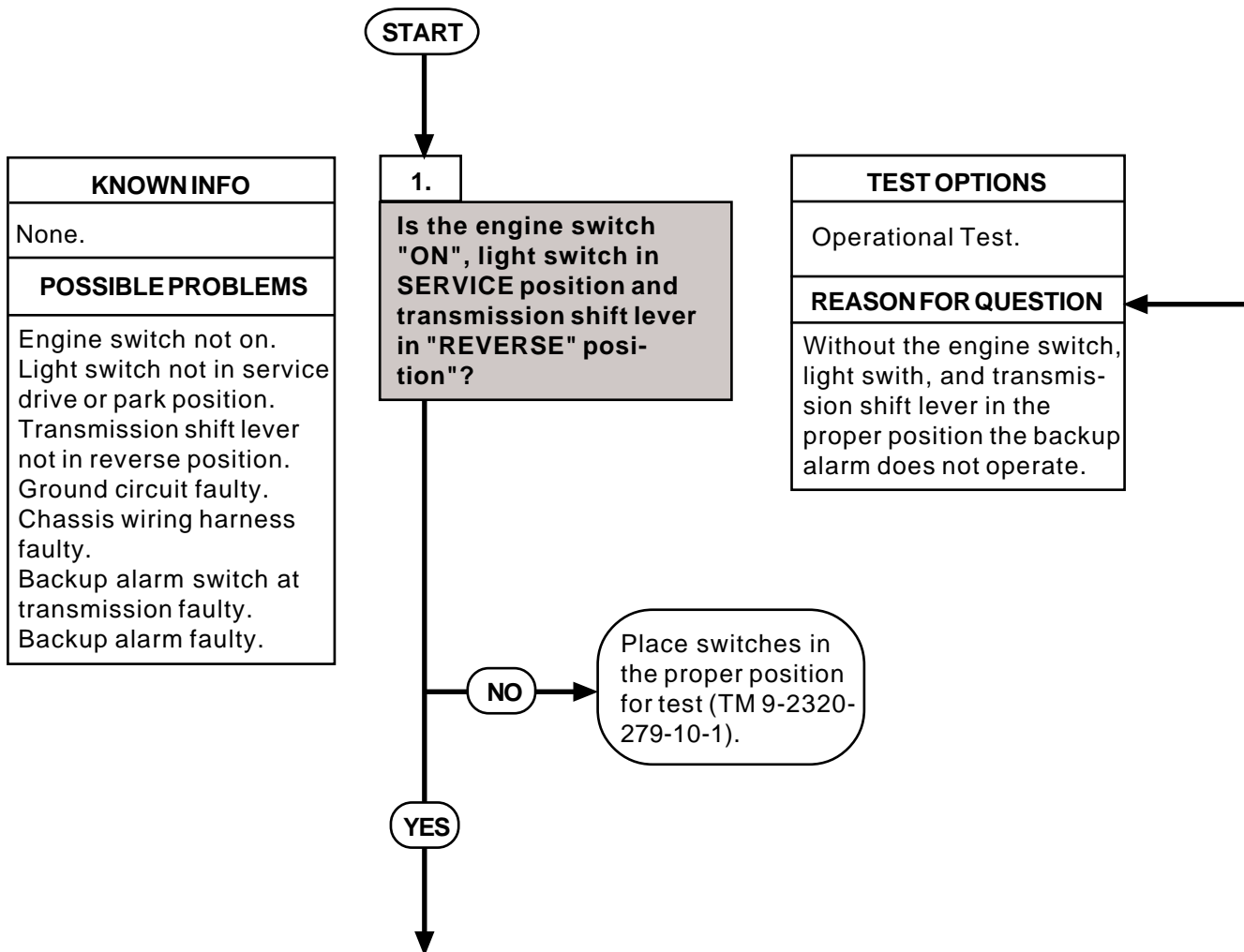
**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
Parking brake applied (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)



**4-12. UNIT TROUBLESHOOTING (continued).****23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).****OPERATIONAL TEST**

- (1) Turn engine switch to "ON" position.
- (2) Turn light switch to "SERVICE" or "PARK" light position.
- (3) Place transmission shift lever in "REVERSE" position.
- (4) Listen for backup alarm audible warning tone.

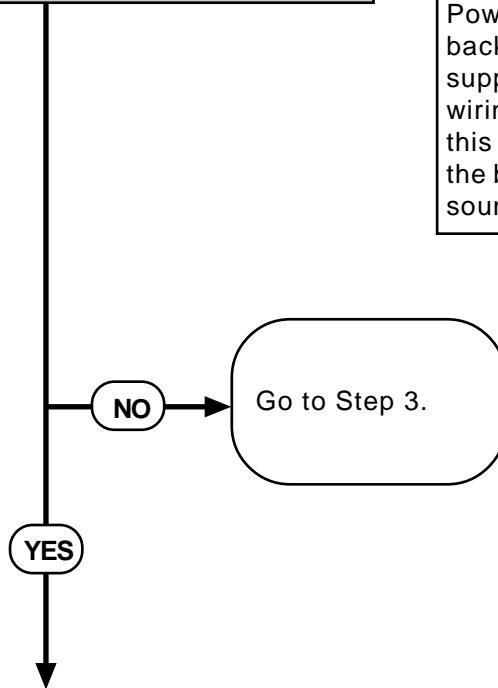
4-12. UNIT TROUBLESHOOTING (continued).

23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).

KNOWN INFO
Engine switch not on. Light switch in service drive or park position. Transmission shift lever in reverse position. Ground circuit OK.
POSSIBLE PROBLEMS
Chassis wiring harness faulty. Backup alarm switch at transmission faulty. Backup alarm faulty.

2.  
Are 22-28 volts measured at the backup alarm, position "1"?

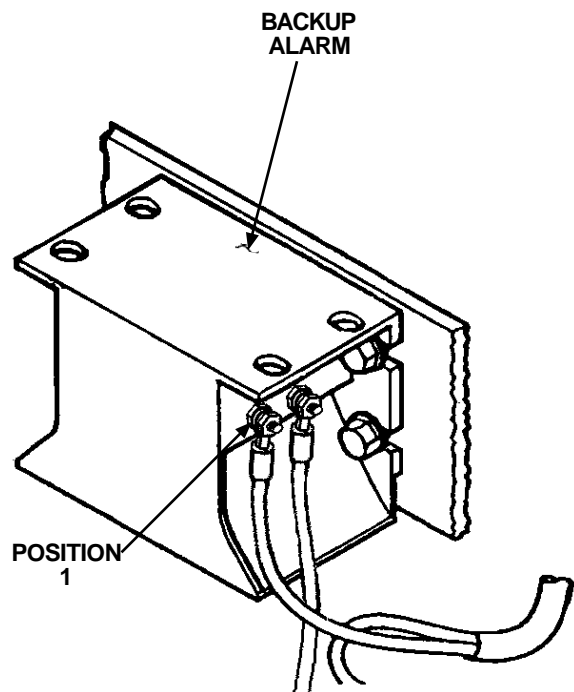
TEST OPTIONS
Voltage Tests.
REASON FOR QUESTION
Power to activate the backup alarm circuit is supplied from the chassis wiring harness. Faults in this harness will prevent the backup alarm from sounding audible tone.





**4-12. UNIT TROUBLESHOOTING (continued).****23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).****VOLTAGE TEST**

- (1) Set multimeter to voltage position.
- (2) Place negative (-) probe of multimeter on known good ground.
- (3) Place positive (+) probe of multimeter on position "1", circuit 1665A, of backup alarm, Check multimeter for voltage reading, note reading.



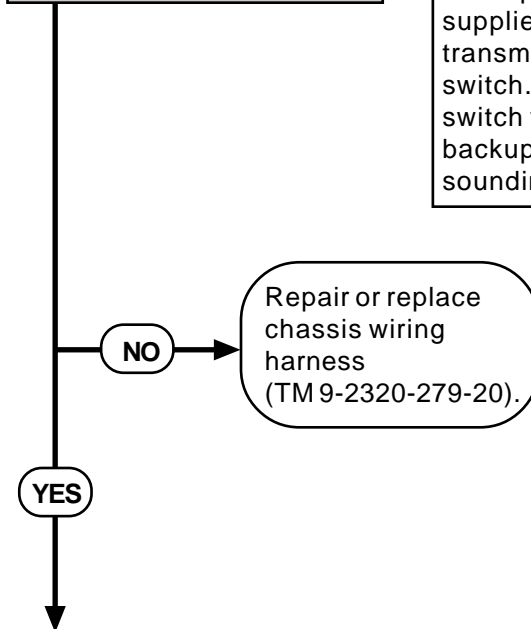
4-12. UNIT TROUBLESHOOTING (continued).

23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).

KNOWN INFO
Engine switch not on. Light switch in service drive or park position. Transmission shift lever in reverse position. Ground circuit OK.
POSSIBLE PROBLEMS
Chassis wiring harness faulty. Backup alarm switch at transmission faulty. Backup alarm faulty.

3.  
Are 22-28 volts measured at the transmission backup alarm switch connector, positions "1" and position "2"?

TEST OPTIONS
Voltage Tests.
REASON FOR QUESTION
Power to activate the backup alarm circuit is supplied from the transmission backup alarm switch. Faults in this switch will prevent the backup alarm from sounding audible tone.

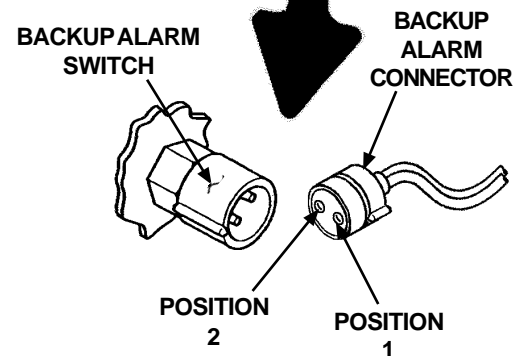
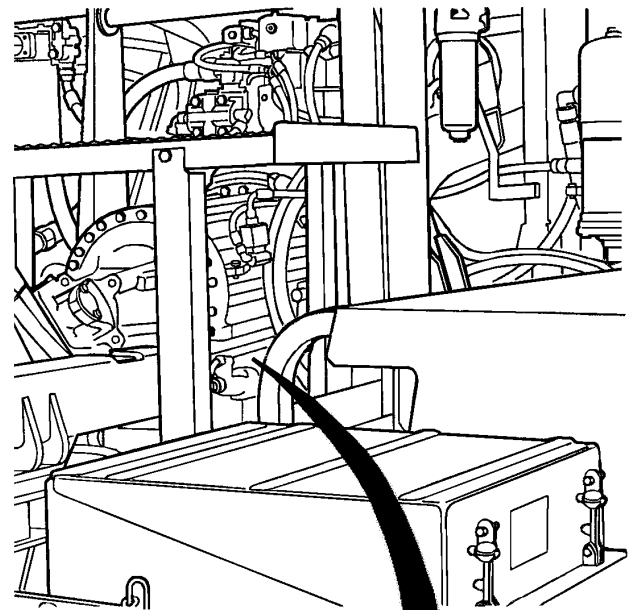


**4-12. UNIT TROUBLESHOOTING (continued).**

**23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).**

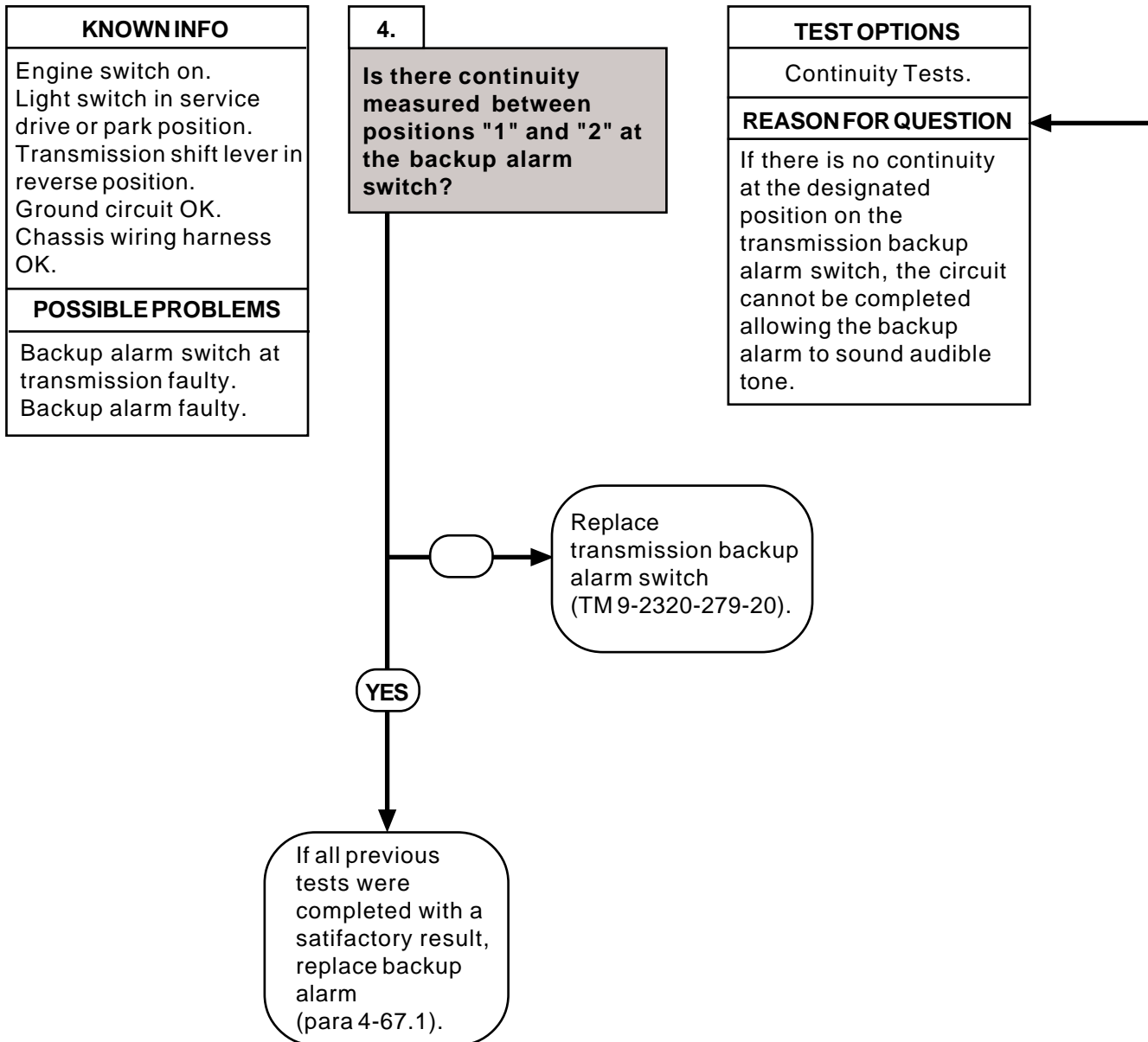
**VOLTAGE TEST**

- (1) Remove transmission backup switch connector from backup switch.
- (1) Set multimeter to voltage position.
- (2) Place negative (-) probe of multimeter on position "1".
- (3) Place positive (+) probe of multimeter on position "2", circuit 1665A, of backup alarm, Check multimeter for voltage reading, note reading.
- (4) Shift transmission into "PARK" position.
- (5) Place light switch in "OFF" position.
- (6) Turn engine start switch to "OFF" position.



4-12. UNIT TROUBLESHOOTING (continued).

23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).



4-12. UNIT TROUBLESHOOTING (continued).

23. BACKUP ALARM DOES NOT OPERATE (MODEL B ONLY) (continued).

**CONTINUITY TEST**

**CAUTION**

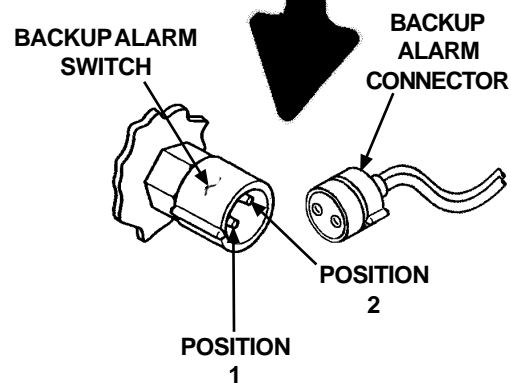
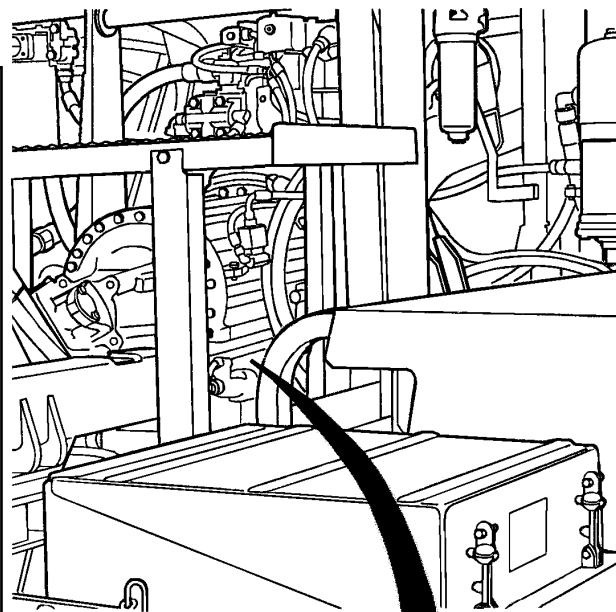
Electrical power must be shut off from circuit before continuity can be checked. Failure to comply with this caution may result in damage to test equipment or electrical system.

- (1) Set multimeter to ohms position.

**NOTE**

A reading of infinity indicates an open circuit.

- (2) Connect multimeter between backup alarm, position "1", and position "2". Check multimeter for continuity.



**4-13. INTRODUCTION.**

This section describes general procedures that apply to all parts of the Common Bridge Transporter (CBT) System. To avoid repetition, these procedures are not described in specific maintenance paragraphs.

**4-14. GENERAL REMOVAL INSTRUCTIONS.**

- a.* **Work Required.** Remove only those parts needing repair or replacement. Do not disassemble a component any further than needed.
- b.* **Preparation.** Before removing any parts of the electrical or hydraulic systems, make sure the system is not energized or pressurized. Disconnect the batteries before doing any work to the electrical system. Make sure the parking brake is applied, wheels are blocked, and all controls are in the OFF position before starting any removal procedure.
- c.* **Removal.** Make sure there is enough clearance to remove a part. Disassemble adjacent parts as needed to provide working clearance.
- d.* **Lifting.** Always use a chain hoist, jack, or other aid when lifting heavy parts. Make sure the load limit of lifting devices is not exceeded by the weight being lifted. Position and rig lifting devices before disconnecting any part for removal.
- e.* **Identification.** Tag or mark all similar parts, such as electrical leads, before disconnecting and removing the part. This will make proper assembly easier. Be sure to identify mating ends of electric, hydraulic, and air lines as they are disconnected.
- f.* **Position of Valves.** Before removing valve handles, mark or diagram their positions when opened and closed. This will help during assembly.
- g.* **Electrical Wires and Connectors.** Electrical wires and connectors are identified on the electrical schematic. Wherever possible, these wire and connector numbers are also provided in the troubleshooting and maintenance tasks.

**4-15. GENERAL DISASSEMBLY INSTRUCTIONS.**

- a.* **Cleanliness.** The work area must be kept as clean as possible. This will prevent contamination of internal parts. This is especially true for valves, cylinders, and other hydraulic or air system parts.
- b.* **Expendable Parts.** All gaskets, preformed packings, and seals removed during repair shall be discarded and replaced with new parts. These items are usually damaged during removal. All lockwires, lockwashers, locknuts, cotter pins, and like items must be replaced at the time of assembly.
- c.* **Seal Removal.** When removing gaskets, preformed packings, or seals do not use any metal tool that will scratch the surfaces next to those items.
- d.* **Disassembly.** Before disassembly of any item, study the illustrations carefully. Note the relationship of internal parts. Knowing the details of a component will speed up disassembly and assembly and will help avoid mistakes.

#### 4-15. GENERAL DISASSEMBLY INSTRUCTIONS (continued).

- e.* **Parts Protection.** To prevent moisture and dirt from entering open housings, lines, and other openings, apply protective caps and plugs as soon as possible after disassembly. Wrap all parts removed in clean cloth or dip them in preservative oil.

#### 4-16. GENERAL CLEANING INSTRUCTIONS.

##### WARNING

- **Cleaning solvents may be toxic to skin, eyes, and respiratory tract. Skin and eye protection is required. Avoid repeated or prolonged contact. Good general ventilation is normally adequate.**
- **Never use gasoline to clean parts. Gasoline is highly flammable. Serious injury or death could result if fuel ignites during cleaning.**

##### CAUTION

- Petroleum solvents may damage parts that are in contact with hydraulic fluids.
  - Do not clean tires, lubricants, seals, rubber hoses, or electrical components with a solvent mixture.
- a.* **Cleaning Solvents.** Use only approved cleaning solvents to clean parts. Drycleaning solvent is commonly used. Work in a well-ventilated area.

##### WARNING

**Compressed air used for cleaning and drying purposes shall not exceed 30 psi (207 kPa). Use only with chip-guarding and personal protective equipment (goggles/shield, gloves, etc.).**

- b.* **Deposit Removal.** After soaking parts in solvent, wash away deposits by flushing or spraying. Where necessary, brush with a soft bristle brush moistened in solvent. Use compressed air to dry all parts, except bearings. Bearings must be allowed to air-dry.
- c.* **Tools.** Do not use scrapers, wire brushes, abrasive wheels, or compounds in cleaning parts, unless called for in detailed instructions.
- d.* **Ball and Roller Bearings.** When cleaning ball or roller bearings, place them in a basket and suspend the basket in a container of drycleaning solvent. If needed, use a brush to remove caked-on grease, chips, and so on. Avoid rotating a bearing before solid particles are removed, to prevent damaging races and balls. When bearings have been cleaned, coat them lightly with lubricating oil to remove solvent.
- e.* **Rubber Parts.** Do not clean O-rings or other rubber parts in drycleaning solvent. These parts should be wiped clean with a clean, dry, lint-free cloth.

#### 4-16. GENERAL CLEANING INSTRUCTIONS (continued).

##### WARNING

**Steam cleaning creates hazardous noise levels and severe burn potential. Eye, skin, and ear protection is required. Failure to comply with this warning may result in injury to personnel.**

- f.* **Exterior Parts.** Steam-clean all exterior parts thoroughly before removing. This will make inspection and disassembly easier.
- g.* **Degreasing Machine.** Use a degreasing machine to remove heavy grease and oil accumulations from metal parts.
- h.* **Passages.** After removing parts from degreasing machine and before coating with rust preventive, check all oil passages and cavities for dirt or blockage. A thin, flexible wire should be run through oil passages to make certain they are not clogged. Individual passages that are dirty may be cleared using a spray gun and drycleaning solvent.

##### CAUTION

To prevent corrosion, parts should be dipped in rust-preventive compound within two hours after degreasing.

- i.* **Electrical Parts.** Electrical parts, such as switches, that use insulating materials, should not be soaked or sprayed with cleaning solutions. Clean these parts with a clean, lint-free cloth moistened with drycleaning solvent.
- j.* **Hydraulic System.** When cleaning hydraulic system parts, use a drycleaning solvent. Clean and dry parts thoroughly to make sure no residue remains. If a coating of preservative is required before assembly, apply a light film of preservative oil. If petroleum-free solvents are not available, use the same hydraulic fluid as used in the truck system.

#### 4-17. GENERAL INSPECTION INSTRUCTIONS.

- a.* **Sealing Surfaces.** Inspect all surfaces in contact with gaskets, packing, or seals. Make sure there are no nicks, burrs, or scratches. If any defect is found, remove or repair as outlined under "General Repair Instructions" (para 4-18).
- b.* **Bearings.** Check bearings for rusted or pitted balls, races, or separators. Check balls and races for brinelling, abrasion, and serious discoloration. Criteria for bearing rejection are as follows:
  - (1) Cuts or grooves parallel to ball or roller rotation.
  - (2) Fatigue pits (not minor machine marks or scratches).
  - (3) Cracks.



#### 4-17. GENERAL INSPECTION INSTRUCTIONS (continued).

- c.* **Inspection.** Inspection consists of checking for defects, such as distortion, wear, cracks, leakage, and pitting. Parts under heavy load or pressure must be inspected more thoroughly. Clean all parts before inspection.
- d.* **Drain Plugs.** When removing drain plugs from system components, inspect for sediment adhering to the plug. A buildup of grit and/or fine metal particles may indicate part failure. A few fine particles are normal. This inspection is effective in determining defective parts prior to internal inspection of parts.
- e.* **Tubing and Hosing.** Check all hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or rubbing against other parts of the truck. Inspect fitting threads for damage. Replace any part found to be defective. Following assembly and during operation of the Load Handling System, check for leaks.
- f.* **Electrical Parts.** Inspect wiring harnesses for chafed or burned insulation. Inspect all terminal connectors for loose connections and broken parts. Inspect connectors for corrosion.
- g.* **Metal Parts.** Visually inspect all castings and weldments for cracks. Parts that carry a great load should receive magnetic particle inspection. Critical nonferrous parts may be inspected with fluorescent penetrant.

#### 4-18. GENERAL REPAIR INSTRUCTIONS.

##### WARNING

**Drilling and grinding operations are hazardous to the eyes. Eye protection is required. Failure to heed this warning can result in injury to personnel.**

- a.* **Exterior Parts.** Chassis and exterior painted parts may be resurfaced where paint is damaged, or where parts have been repaired, by using an abrasive disc driven by a flexible shaft.
- b.* **Bearings.** Remove residue and oil stain from bearing races with crocus cloth.

##### **NOTE**

The protective parts procedure is used with polished or machined steel parts not protected by cadmium, tin, copper, or other plating or surface treatment. Bare metal surfaces must be free of moisture when protective coating is applied.

- c.* **Protective Parts.** During repair operations, protect bare steel surfaces from rusting when not actually undergoing repair work. Dip parts in, or spray them with, corrosion preventive compound. The same protective coating may be applied to other metal to prevent rust. Aluminum parts may require protection in regions having a high salt-air content. Steel parts must always be protected.
- d.* **Electrical Parts.** Replace all broken, worn, or burned electrical wiring. Wires with several broken strands shall be replaced. Broken strands increase the resistance of the wire and impair the efficiency of the system.
- e.* **Hoses.** Replace all broken, frayed, crimped, or soft flexible lines or hoses. Replace stripped or damaged fittings. Replace entire flexible hose if fittings are damaged. Make sure hose clamps do not crimp hoses.

#### 4-18. GENERAL REPAIR INSTRUCTIONS (continued).

- f.* **Fasteners.** Replace any bolt, screw, nut, or fitting with damaged threads. Inspect tapped holes for thread damage. If cross-threading or galling is evident, retap the holes for next oversize screw or stud. When retapping will weaken the part or when the cost of a part makes retapping impractical, replace the damaged part. Chasing threads with the proper size tap or die may often be enough.
- g.* **Sheet Metal Repair.** Repair minor skin cracks by installing patches.

#### 4-19. GENERAL ASSEMBLY INSTRUCTIONS.

- a.* **Preparation.** Remove grease from parts before installation.
- b.* **Packing Installation.** Lubricate all packing with a thin coating of lubricating oil before installation. Slightly stretch packing and place into position. Rotate component on flat surface or uniformly press the packing into position.
- c.* **Gaskets.** To provide added sealing for gaskets, coat both sides with sealant. Remove all traces of previous gasket and sealant before installing new gasket.
- d.* **Seal Rings.** Coat seal rings with oil and carefully inset into their bores. If a seal ring must be installed over threaded parts, temporarily wrap the threads with tape to protect the seal ring. Then remove the tape.
- e.* **Bearings and Shafts.** During assembly of shafts and bearings in housings, first mount the bearing on the shaft. Then install the assembly by applying force to the shaft. When mounting bearings on shafts, always apply force to the inner races of the bearings.
- f.* **Bearing Lubrication.** Lubricate bearings before reassembly with the type of lubricant normally used in the related housing or container. This will provide lubrication during the first run-in until lubrication from the system can reach the bearings.

**4-20. BAP GENERAL AIR TUBING ASSEMBLY INSTRUCTIONS.**

This task covers:

- a. Inspection                                      b. Installation                                      c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

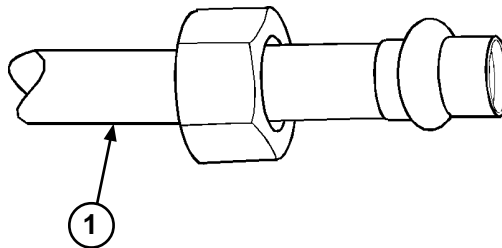
Load removed from the BAP (para 2-12)  
BAP unloaded from the CBT (para 2-10)

**NOTE**

- Do not remove tube nuts and flared tube sleeves from air tubing unless there is leakage or other damage to tubes, tube nuts, or flared tube sleeves that make them unserviceable.
- If flared tube sleeve is removed, inspect end of tube connected by tube nut for distortion or other damage that would make it unserviceable. Do not reuse flared tube sleeves.
- All tube nuts and flared tube sleeves are replaced in the same manner. Use the following procedure to replace all tube nuts and flared tube sleeves.

**a. Inspection.**

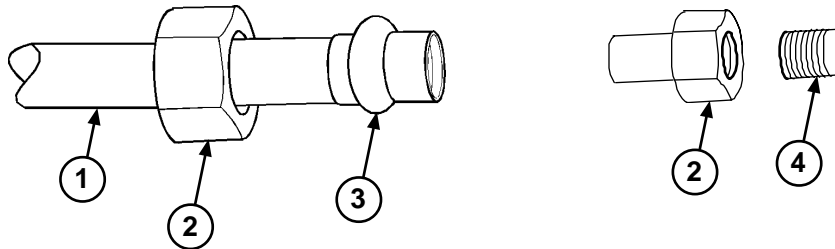
Inspect end of tube (1) for distortion or other damage. If distortion or damage is noted, replace tube (1).



#### 4-20. BAP GENERAL AIR TUBING ASSEMBLY INSTRUCTIONS (continued).

##### **b. Installation.**

Install tube nut (2) and new flared tube sleeve (3) on end of tube (1), and install tube nut (2) on fitting (4). To finish installing flared tube sleeve (3), tighten tube nut (2) by compressing flared tube sleeve (3).



##### **c. Follow-on Maintenance:**

- Load the BAP on the CBT (para 2-9).
- Check air system for leaks.

**END OF TASK**

#### 4-21. GENERAL INSTALLATION INSTRUCTIONS.

- Preparation.** When unpacking items, remove all packing material, barrier paper, tape, plastic bags, protective caps, and protective grease coatings. Handle and store removed components carefully.
- Adhesive Sealants and Sealing Compounds.** Use sealants and sealing compounds as required in each maintenance task.
- Torquing.** Screws and nuts must be tightened according to the values given in Appendix I, or to specific values given in the maintenance tasks.
- Identification Tags.** Put hoses, tubes, lines, and electrical wiring in place by matching identification tags and markings on equipment.
- Hoses, Air Lines, and Wiring.** After installing hoses, air lines, and wiring, make sure they do not contact moving parts or component edges. Secure in place, out of the way, with cable ties and cushion clips.

**Section VI. BRIDGE ADAPTER PALLET MAINTENANCE PROCEDURES**

**4-22. GENERAL.**

Sections VI and VII of this chapter contain instructions for replacement and repair of Common Bridge Transporter (CBT) System components authorized by the Maintenance Allocation Chart at the Unit maintenance level. Maintenance procedures for the Bridge Adapter Pallet (BAP) are in this section, and maintenance procedures for the Transporter are in Section VII. In some cases, components must be removed before performing the task. In these cases, references are provided to other chapters or paragraphs within this manual.

**4-23. BAP CATWALK REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

- Pan, Drain, 4-Gallon (MIL-P-45819)
- Lifting Device, Minimum Capacity 160 lb (72.6 kg)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Materials/Parts*

- Lockwasher (3) (Item 29, Appendix K)
- Self-Locking Nut (5) (Item 38, Appendix K)

*Personnel Required*

Two

*Equipment Condition*

- Hydraulic hand pump removed (rear road-side section of catwalk only) (para 4-43)
- Plunger removed (rear road-side section of catwalk only) (para 4-24)

**a. Removal.**

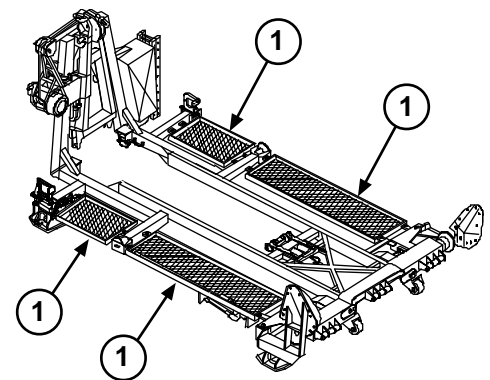
**WARNING**

**A suitable lifting device is required for removing the catwalk because each large catwalk section weighs approximately 160 pounds (72.6 kg) and each small catwalk section weighs approximately 68 pounds (30.8 kg). Failure to use a lifting device could result in injury to personnel.**

**NOTE**

This task is used for front and rear, road-side and curb-side, catwalks. Each section of catwalk is removed in a similar manner, except as noted.

- (1) With the aid of an assistant, secure lifting device to section of catwalk (1) being removed.



**4-23. BAP CATWALK REPLACEMENT (continued).**

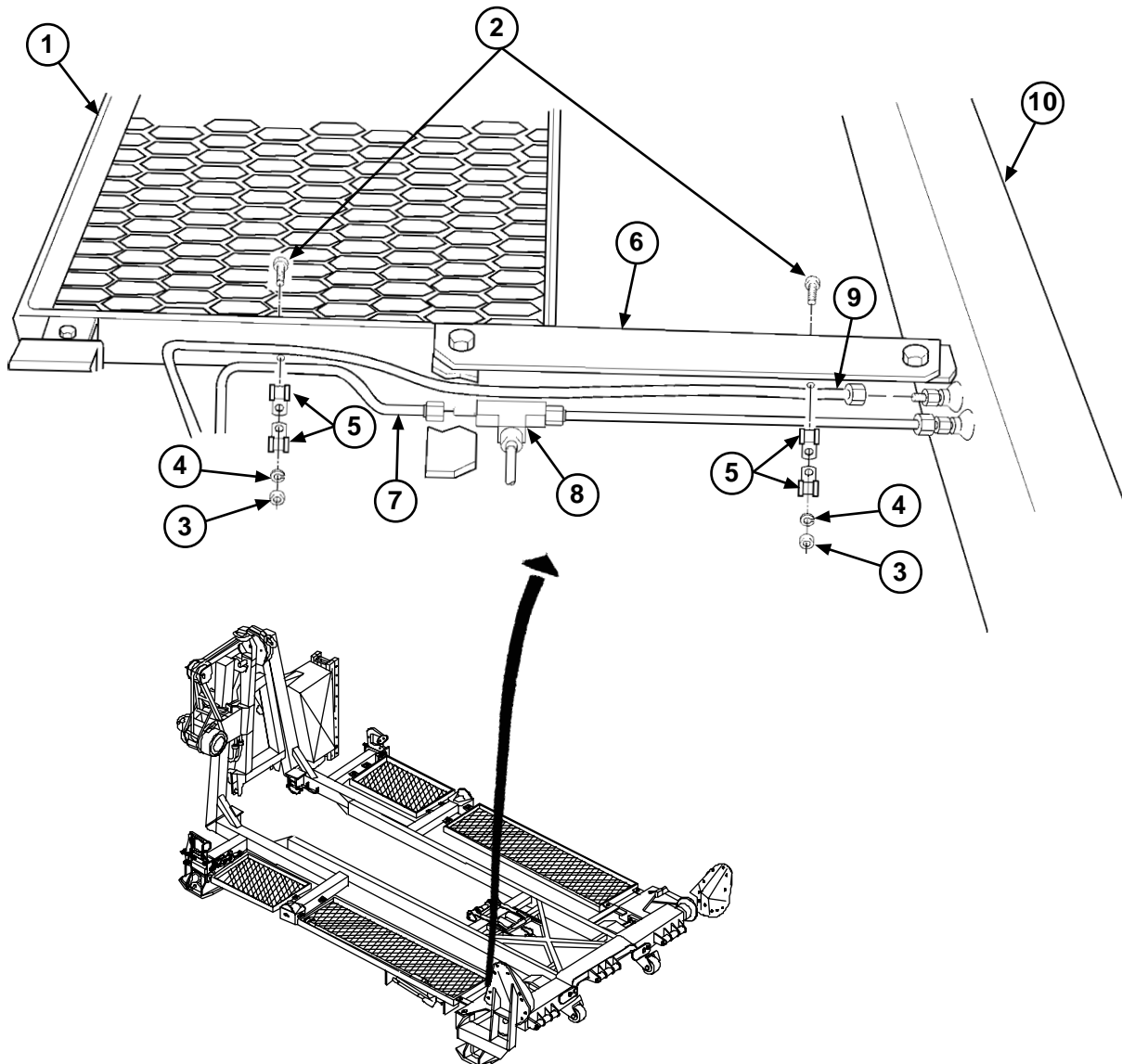
**NOTE**

- Do Steps 2 through 5 and Step 7 only when removing rear road-side section of catwalk.
- Use a drain pan to catch any draining fluid from tubes.

(2) Remove two screws (2), nuts (3), and lockwashers (4) and four clamps (5) from catwalk (1) and tube support (6). Discard lockwashers.

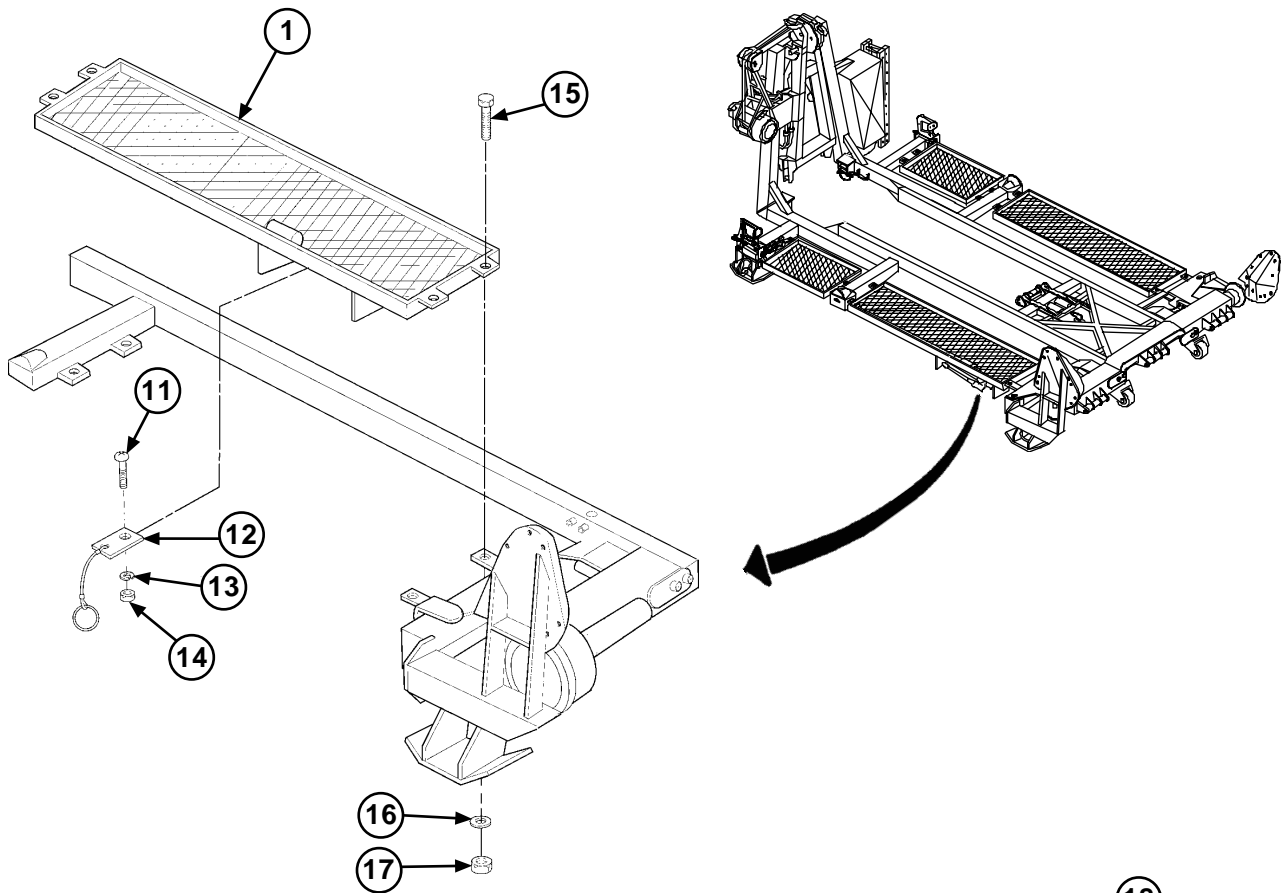
(3) Remove hydraulic tube (7) from tee (8).

(4) Remove hydraulic tube (9) from BAP frame (10).



**4-23. BAP CATWALK REPLACEMENT (continued).**

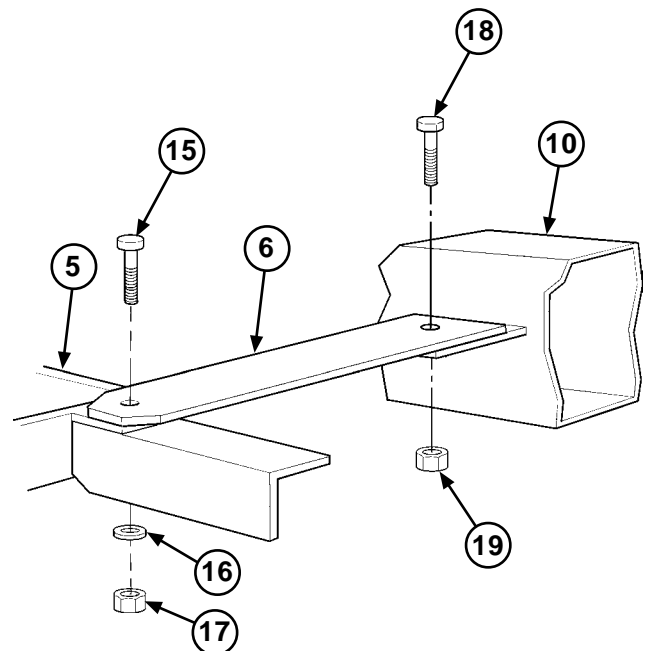
- (5) Remove screw (11), retaining clip (12), lockwasher (13), and nut (14) from left rear section of catwalk (1). Discard lockwasher.



**NOTE**

Tube support is found only on rear sections of catwalk.

- (6) Remove four screws (15), washers (16), and self-locking nuts (17) from catwalk (1) and tube support (6). Discard self-locking nuts.
- (7) Remove screw (18) and self-locking nut (19) from tube support (6). Remove tube support (6) from catwalk (1) and frame (10). Discard self-locking nut.



**4-23. BAP CATWALK REPLACEMENT (continued).**

(8) With the aid of an assistant, remove section of catwalk (1) from the BAP.

**b. Installation.**

**WARNING**

**A suitable lifting device is required for removing the catwalk because each large catwalk section weighs approximately 160 pounds (72.6 kg) and each small catwalk section weighs approximately 68 pounds (30.8 kg). Failure to use a lifting device could result in injury to personnel.**

(1) With the aid of an assistant, install section of catwalk (1) on the BAP.

**NOTE**

If installing front section of catwalk, do Step 3 only. Do Steps 2 through 8 when installing a rear section of catwalk.

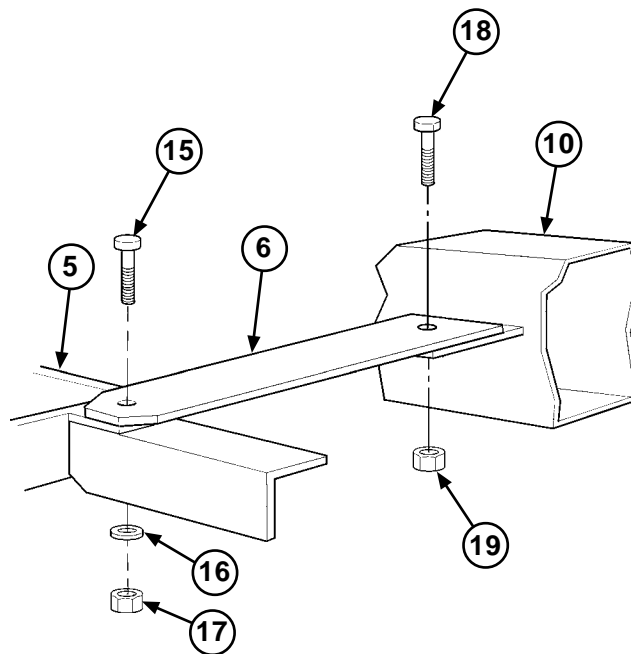
(2) Align holes in ends of tube support (6) and mounting holes in catwalk (1).

**NOTE**

Tube support is found only on rear sections of catwalk.

(3) Install four screws (15), washers (16), and new self-locking nuts (17) on catwalk (1) and tube support (6).

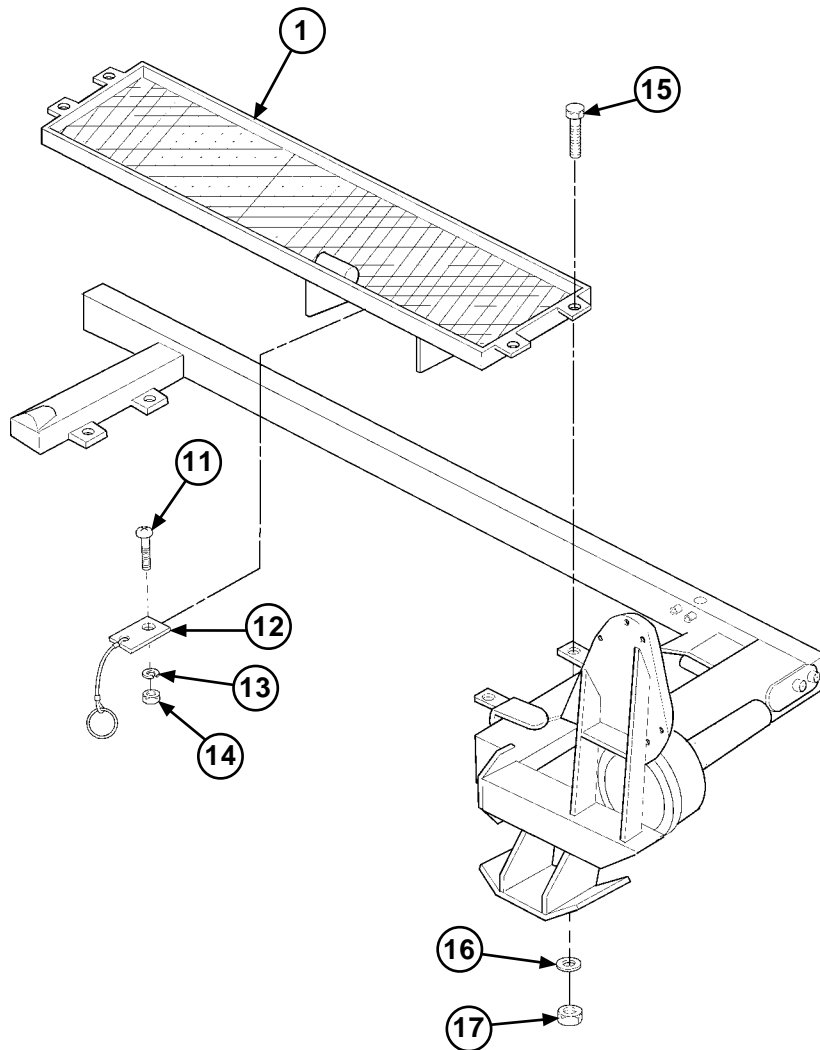
(4) Install screw (18), new self-locking nut (19), and tube support (6) on catwalk (1) and frame (10).





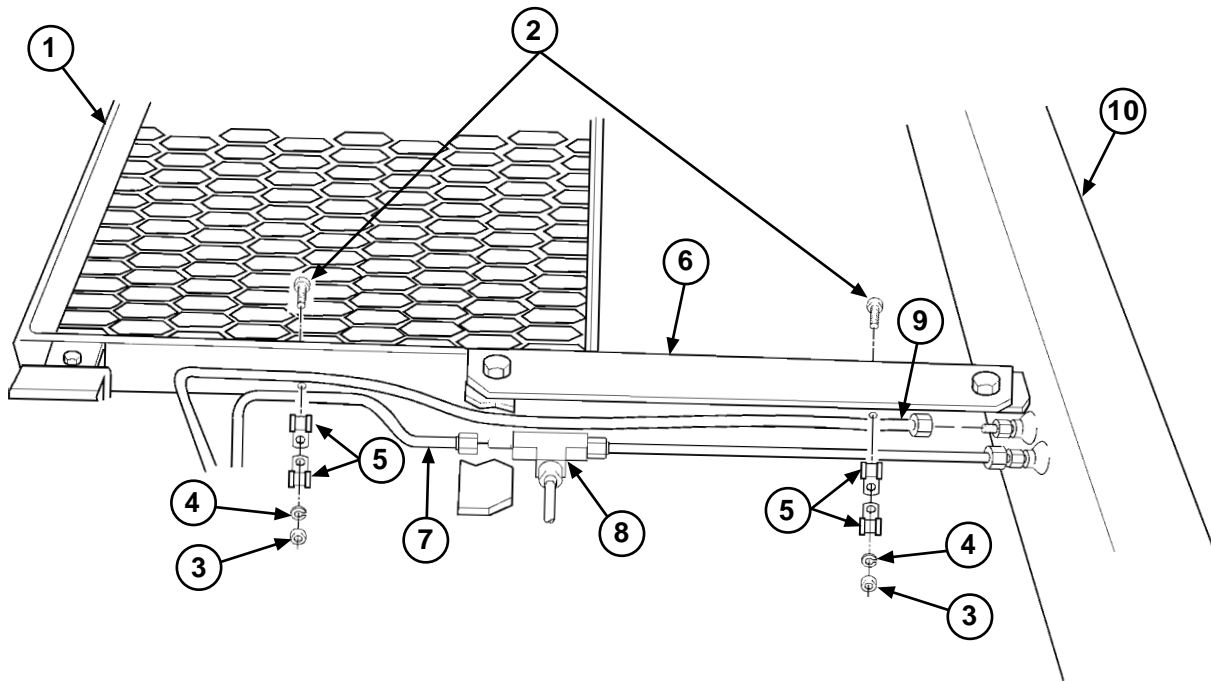
**4-23. BAP CATWALK REPLACEMENT (continued).**

- (5) Install screw (11), retaining clip (12), new lockwasher (13), and nut (14) on rear road-side section of catwalk (1).



**4-23. BAP CATWALK REPLACEMENT (continued).**

- (6) Install hydraulic tube (9) on frame (10).
- (7) Install hydraulic tube (7) on tee (8).
- (8) Install four clamps (5) and two screws (2), nuts (3), and new lockwashers (4) on catwalk (1) and tube support (6).



**c. Follow-on Maintenance:**

- Install hydraulic hand pump (para 4-43).
- Install plunger (para 4-24).

**END OF TASK**

## 4-24. BAP PLUNGER REPLACEMENT.

This task covers:

- a. Removal                                      b. Installation                                      c. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

#### *Equipment Condition*

Load removed from the BAP (para 2-12)  
BAP unloaded from the CBT (para 2-10)

#### *Materials/Parts*

Spring Pin (Item 5, Appendix K)

#### **a. Removal.**

- (1) Remove boat hook (1) from plunger housing (2).
- (2) Remove spring pin (3) from plunger (4). Discard spring pin.
- (3) Slide plunger (4) out of plunger housing (2).
- (4) Remove compression spring (5) from plunger (4).

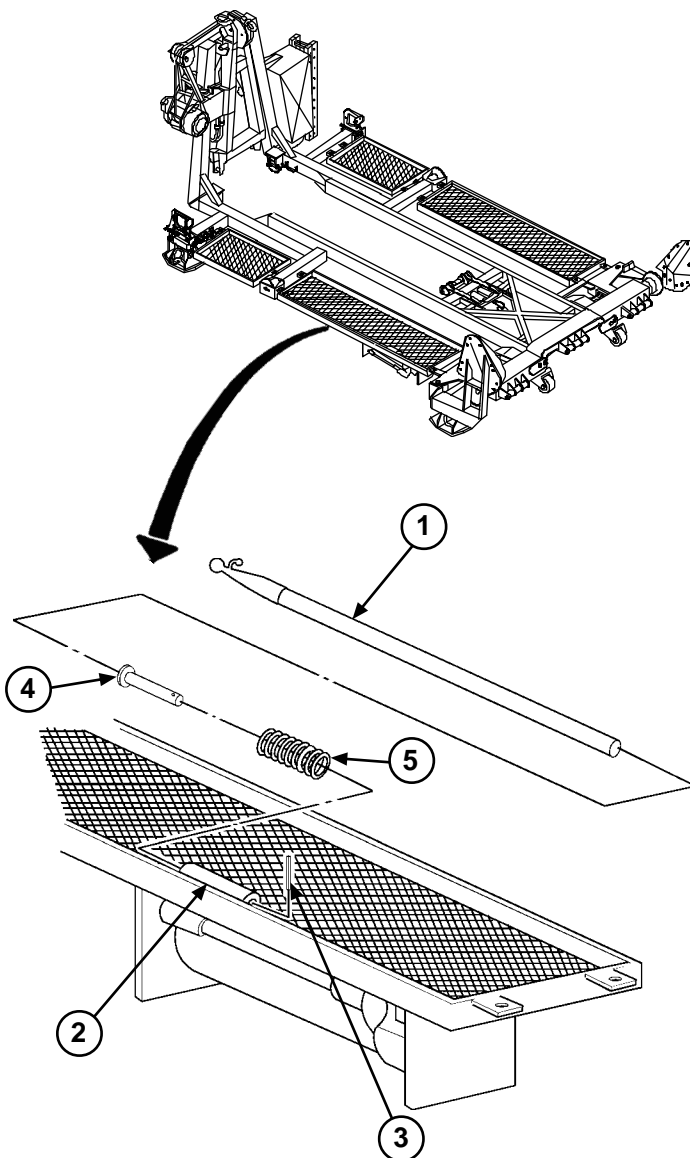
#### **b. Installation.**

- (1) Install compression spring (5) on plunger (4).
- (2) Slide plunger (4) and compression spring (5) into plunger housing (2).
- (3) Install new spring pin (3) on plunger (4).
- (4) Install boat hook (1) in plunger housing (2).

#### **c. Follow-on Maintenance:**

None.

**END OF TASK**



4-25. BAP LADDER REPAIR. **(Deleted)**

4-25. BAP LADDER REPAIR (**Deleted**).



4-25. BAP LADDER REPAIR (**Deleted**).

4-25. BAP LADDER REPAIR (**Deleted**).



4-25. BAP LADDER REPAIR (**Deleted**).

END OF TASK



4-26. BAP TOOLBOX ASSEMBLY REPAIR.

This task covers:

- |                |                 |                          |
|----------------|-----------------|--------------------------|
| a. Removal     | c. Assembly     | e. Follow-on Maintenance |
| b. Disassembly | d. Installation |                          |

INITIAL SETUP

Tools and Special Tools  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

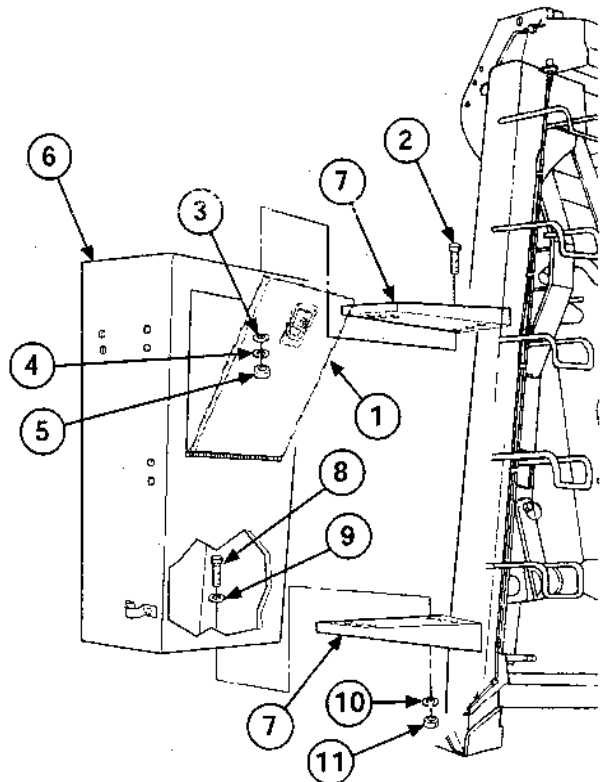
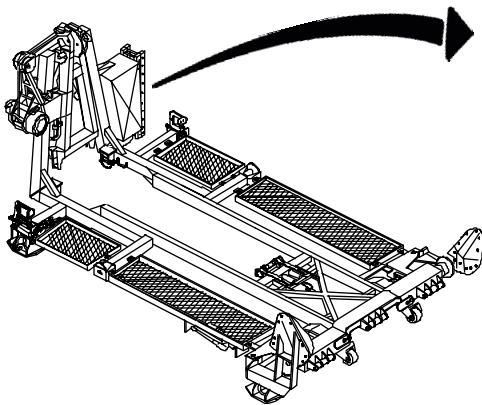
Lockwasher (12) (Item 32, Appendix K)  
 Self-Locking Nut (4) (Item 9, Appendix K)

Materials/Parts  
 Lockwasher (8) (Item 31, Appendix K)

Equipment Condition  
 BAP ladder removed (para 4-25)

**a. Removal.**

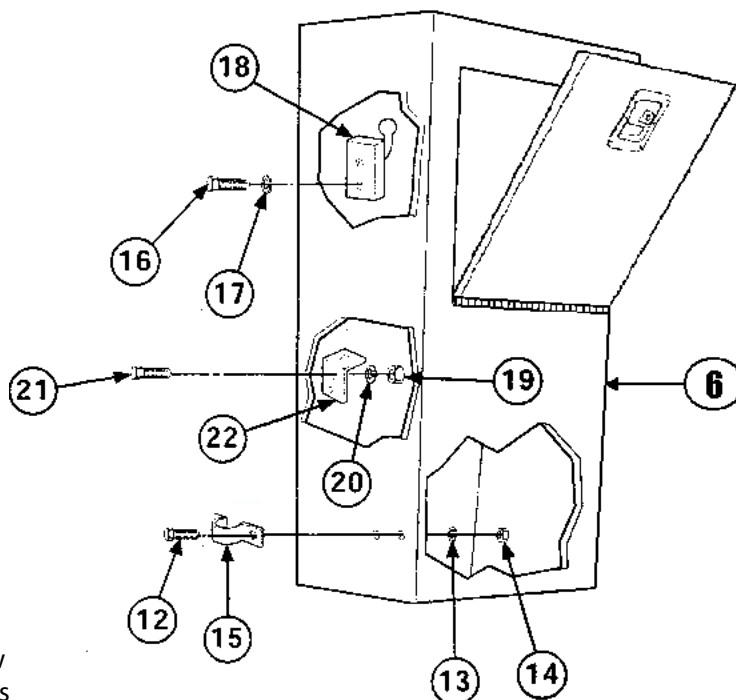
- (1) Open toolbox door (1).
- (2) Remove six bolts (2), washers (3), lockwashers (4), and nuts (5) from toolbox (6) and BAP frame (7). Discard lockwashers.
- (3) Remove six bolts (8), washers (9), lockwashers (10), and nuts (11) from toolbox (6) and frame (7). Discard lockwashers.
- (4) Remove toolbox (6) from frame (7).



4-26. BAP TOOLBOX ASSEMBLY REPAIR (continued).

**b. Disassembly.**

- (1) Remove two bolts (12), lockwashers (13), and self-locking nuts (14) and T-wrench bracket (15) from toolbox (6). Discard lockwashers and self-locking nuts.
- (2) Remove four bolts (16) and lockwashers (17) and two hooks (18) from toolbox (6). Discard lockwashers.
- (3) Remove two self-locking nuts (19), lockwashers (20), and bolts (21) and bracket (22) from toolbox (6). Discard self-locking nuts and lockwashers.

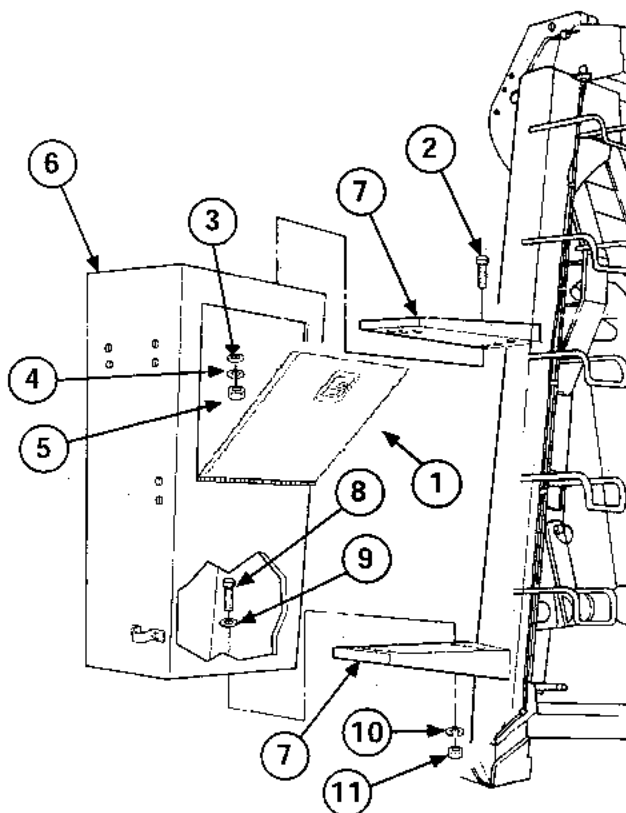


**c. Assembly.**

- (1) Install bracket (22) and two bolts (21), new self-locking nuts (19), and new lockwashers (20) on toolbox (6).
- (2) Install two hooks (18) and four bolts (16) and new lockwashers (17) on toolbox (6).
- (3) Install T-wrench bracket (15) and two bolts (12), new lockwashers (13), and new self-locking nuts (14) on toolbox (6).

**d. Installation.**

- (1) Install toolbox (6) on frame (7), aligning toolbox and frame mounting holes.
- (2) Install six bolts (8), washers (9), new lockwashers (10), and nuts (11) on toolbox (6) and frame (7).
- (3) Install six bolts (2), washers (3), new lockwashers (4), and nuts (5) and toolbox (6) on frame (7).
- (4) Close toolbox door (1).



**e. Follow-on Maintenance:**

- Install BAP ladder (para 4-25).

**END OF TASK**

**4-27. BAP CENTER ROLLER REPAIR.**

*This task covers:*

- |                            |                          |
|----------------------------|--------------------------|
| a. Removal                 | c. Installation          |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Lockwasher (Item 32, Appendix K)

Spring Pin (4) (Item 6, Appendix K)

*Materials/Parts*

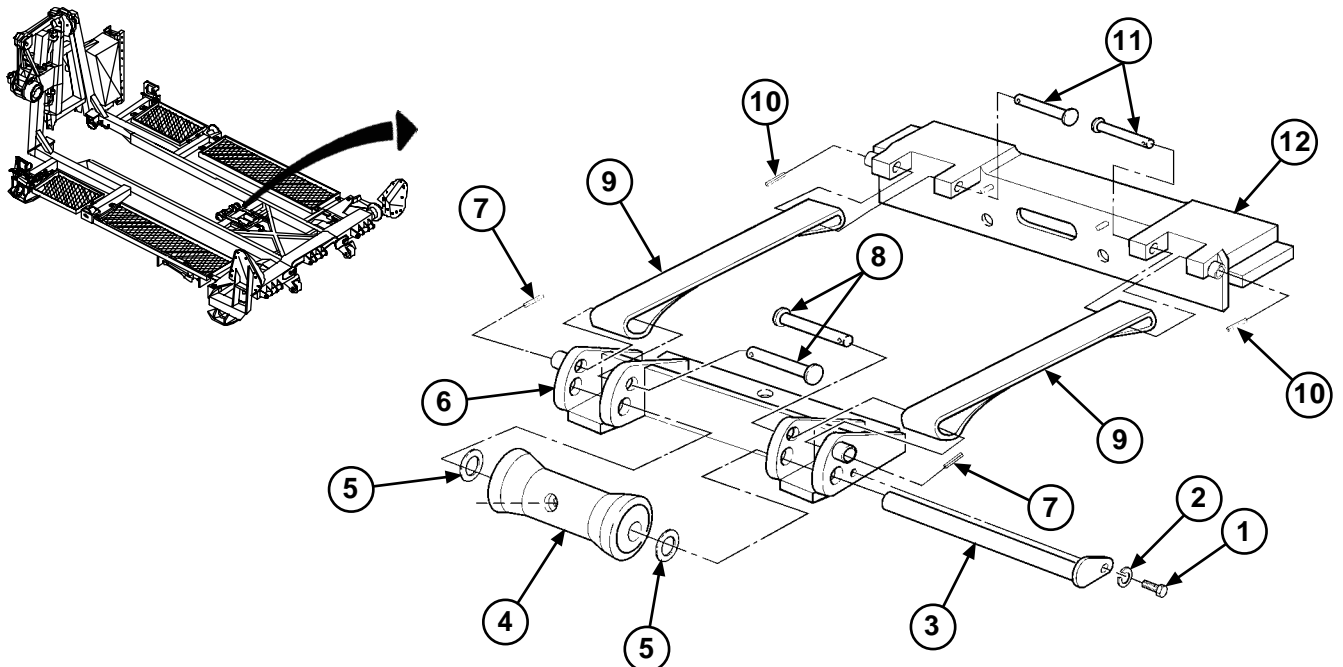
Drycleaning Solvent (Item 13, Appendix E)  
Rag (Item 19, Appendix E)

*Equipment Condition*

Center roller hydraulic cylinders and hoses  
removed (para 4-41)

**a. Removal.**

- (1) Remove screw (1), lockwasher (2), straight-headed pin (3), center roller assembly (4), and two thrust washers (5) from center roller carriage (6). Discard lockwasher.
- (2) Remove two spring pins (7) from two front strap pins (8). Remove two strap pins (8) and pull straps (9) from center roller carriage (6). Remove center roller carriage (6) from the BAP. Discard spring pins.
- (3) Remove two spring pins (10) from two rear strap pins (11). Remove two strap pins (11) and pull straps (9) from rear cylinder carriage (12). Remove rear cylinder carriage (12) from the BAP. Discard spring pins.



**4-27. BAP CENTER ROLLER REPAIR (continued).**

**b. Cleaning and Inspection.**

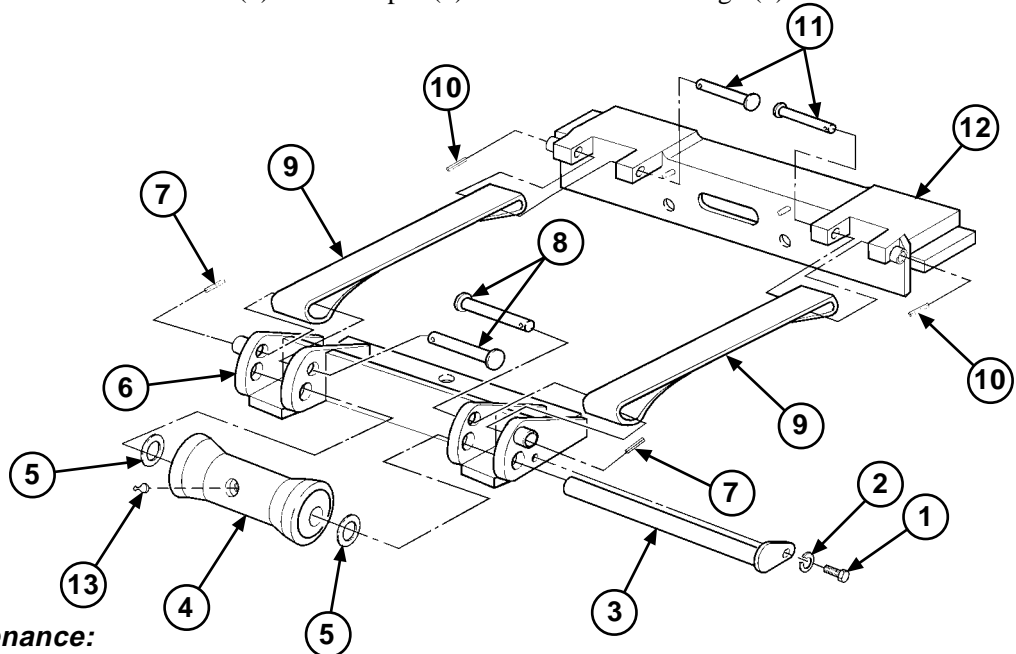
**WARNING**

Drycleaning solvent is **TOXIC and flammable**. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.

- (1) Clean all parts with drycleaning solvent and rag.
- (2) Remove lubrication fitting (13) from center roller assembly (4).
- (3) Inspect all parts for damage. Replace damaged parts as necessary.
- (4) Lubricate in accordance with Appendix G.

**c. Installation.**

- (1) Place rear cylinder carriage (12) on the BAP. Install two rear strap pins (11), new spring pins (10), and pull straps (9) on rear cylinder carriage (12).
- (2) Place center roller carriage (6) on the BAP. Install two front strap pins (8) on pull straps (9) on center roller carriage (6). Install two new spring pins (7) on front strap pins (8).
- (3) Install pin (3), two thrust washers (5), and center roller assembly (4) on center roller carriage (6).
- (4) Install screw (1) and new lockwasher (2) to secure pin (3) on center roller carriage (6).



**d. Follow-on Maintenance:**

- Install center roller hydraulic cylinders and hoses (para 4-41).

**END OF TASK**

**4-28. BAP REAR GUIDE REPAIR.**

This task covers:

- |                            |                 |                          |
|----------------------------|-----------------|--------------------------|
| a. Removal                 | c. Installation | e. Follow-on Maintenance |
| b. Cleaning and Inspection | d. Adjustment   |                          |

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's Automotive (SC 5180-90-N26)

Lockwasher (5) (Item 32, Appendix K)

Self-Locking Nut (Item 38, Appendix K)

Self-Locking Nut (11) (Item 39, Appendix K)

Spring Pin (Item 7, Appendix K)

*Materials/Parts*

Drycleaning Solvent (Item 13, Appendix E)

Rag (Item 21, Appendix E)

Cotter Pin (Item 22, Appendix K)

*Equipment Condition*

Load removed from the BAP (para 2-12)

BAP removed from the CBT (para 2-10)

**a. Removal.**

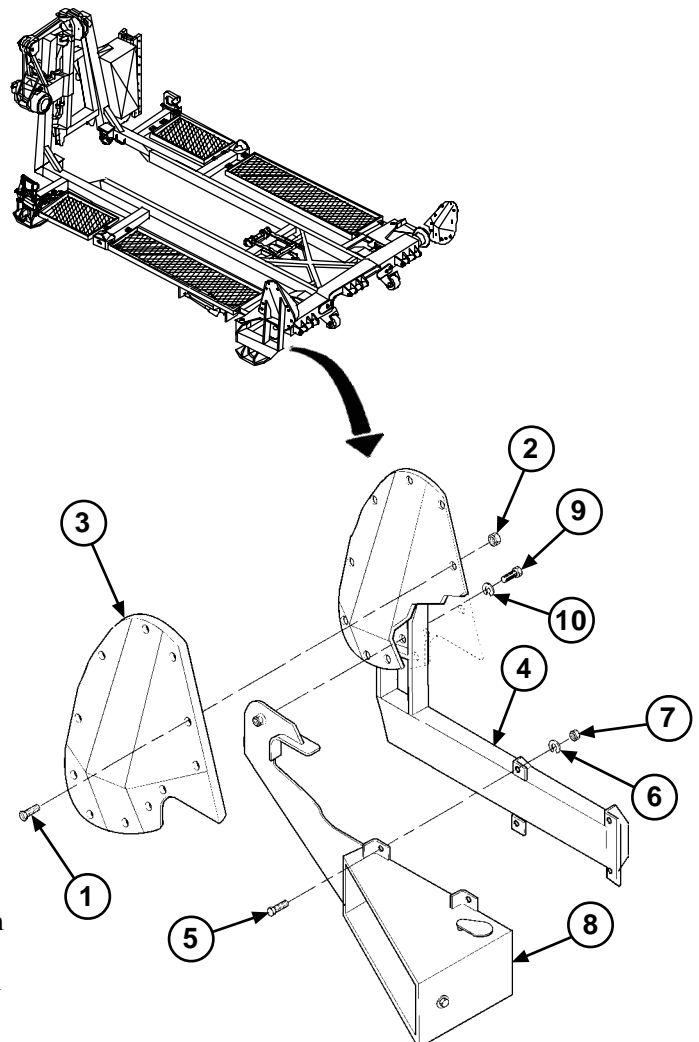
**WARNING**

**Support BAP rear guide in place when removing pivot pin. Without support, BAP rear guide could fall and cause injury to personnel or damage to equipment.**

**NOTE**

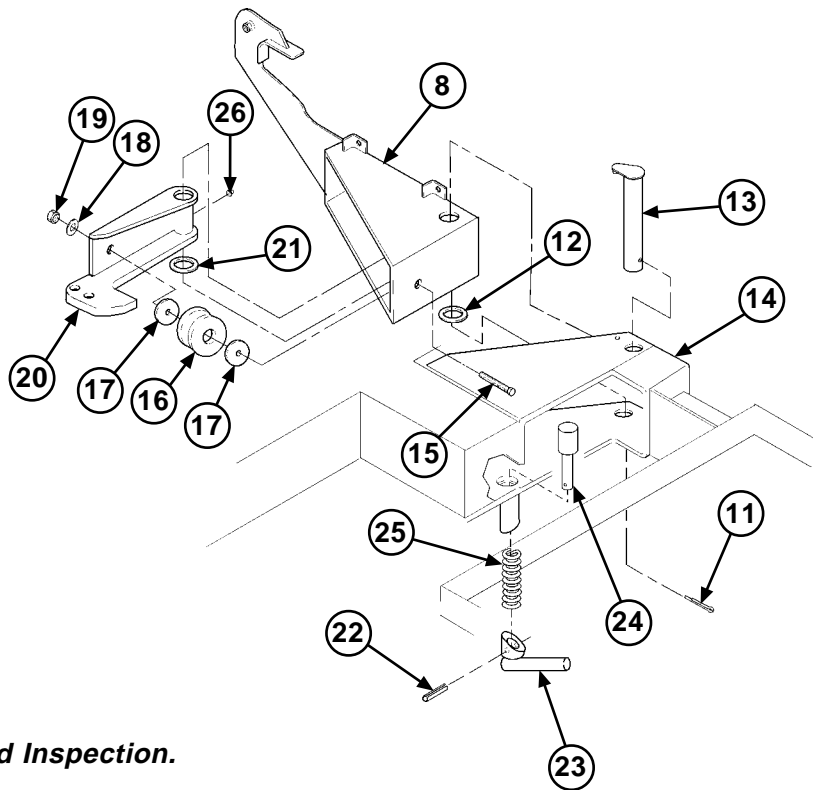
- Rear guide latch handle must be in locked position and rear guide in full open position before performing task.
- This task can be used for either curb-side or road-side rear guide. Road side is shown.

- (1) Remove 11 screws (1) and self-locking nuts (2) from rear guide pad (3) and rear guide (4). Discard self-locking nuts.
- (2) Remove rear guide pad (3) from rear guide (4).
- (3) Remove four screws (5), lockwashers (6), and nuts (7) from lock bracket (8) and rear guide (4). Discard lockwashers.
- (4) Remove screw (9) and lockwasher (10) from rear guide (4) and lock bracket (8). Remove rear guide (4) from lock bracket (8). Discard lockwasher.



**4-28. BAP REAR GUIDE REPAIR (continued).**

- (5) Remove cotter pin (11) and washer (12) from pivot pin (13). Tap pivot pin (13) out of BAP frame (14). Discard cotter pin.
- (6) Remove screw (15), rubber bumper (16), two spacers (17), washer (18), and self-locking nut (19) from reaction bracket (20) and lock bracket (8). Discard self-locking nut.
- (7) Remove reaction bracket (20) and washer (21) from lock bracket (8).
- (8) Remove spring pin (22) from latch handle (23). Remove latch handle (23) from latch pin (24). Discard spring pin.
- (9) Remove latch pin (24) from frame (14).
- (10) Remove spring (25) from latch pin (24).



**b. Cleaning and Inspection.**

**WARNING**

**Drycleaning solvent is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and DO NOT breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.**

- (1) Clean all parts with drycleaning solvent and rag.
- (2) Inspect all parts for damage. Replace damaged parts as necessary.

**4-28. BAP REAR GUIDE REPAIR (continued).**

- (3) Lubricate pivot pin (13) and latch pin (24) in accordance with Appendix G.
- (4) Replace grease fitting (26) on reaction bracket (20) only if damaged.

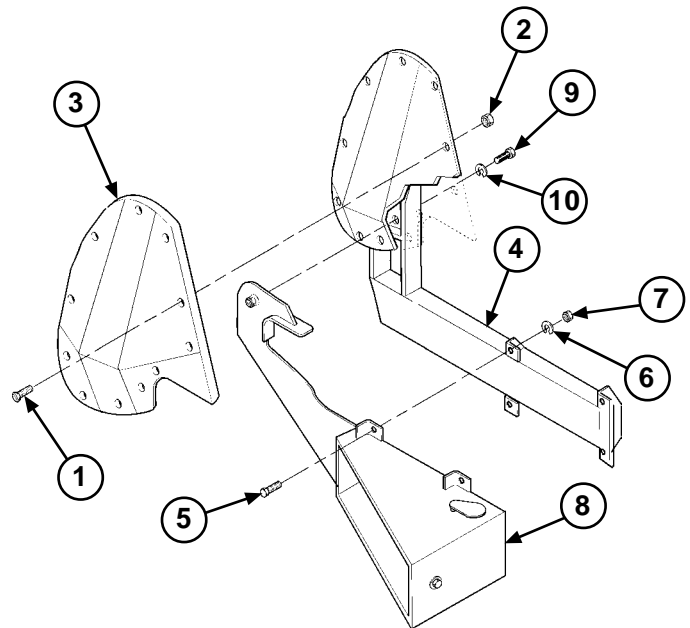
**NOTE**

Rear guide pad prevents metal-to-metal contact between the BAP and bridge bay sections during launch/recovery operations.

- (5) Inspect rear guide pad (3) for damage and/or wear. Replace rear guide pad (3) if worn within 1/16 inch (1.6 mm) from head of screws (1) or exposes metal on rear guide (4).

**c. Installation.**

- (1) Install spring (25) on latch pin (24).
- (2) Install latch pin (24) in frame (14).
- (3) Install latch handle (23) on latch pin (24), and install new spring pin (22) in latch handle (23).
- (4) Install reaction bracket (20) and washer (21) on lock bracket (8).
- (5) Install screw (15), rubber bumper (16), two spacers (17), washer (18), and new self-locking nut (19) on reaction bracket (20) and lock bracket (8).
- (6) Install lock bracket (8), washer (12), screw (9), and new lockwasher (10) in rear guide (4).
- (7) Tap pivot pin (13) into frame (14).
- (8) Install new cotter pin (11) on pivot pin (13).
- (9) Install four screws (5), new lockwashers (6), and nuts (7) and lock bracket (8) on rear guide (4).
- (10) Install rear guide pad (3) and 11 screws (1) and new self-locking nuts (2) on rear guide (4).



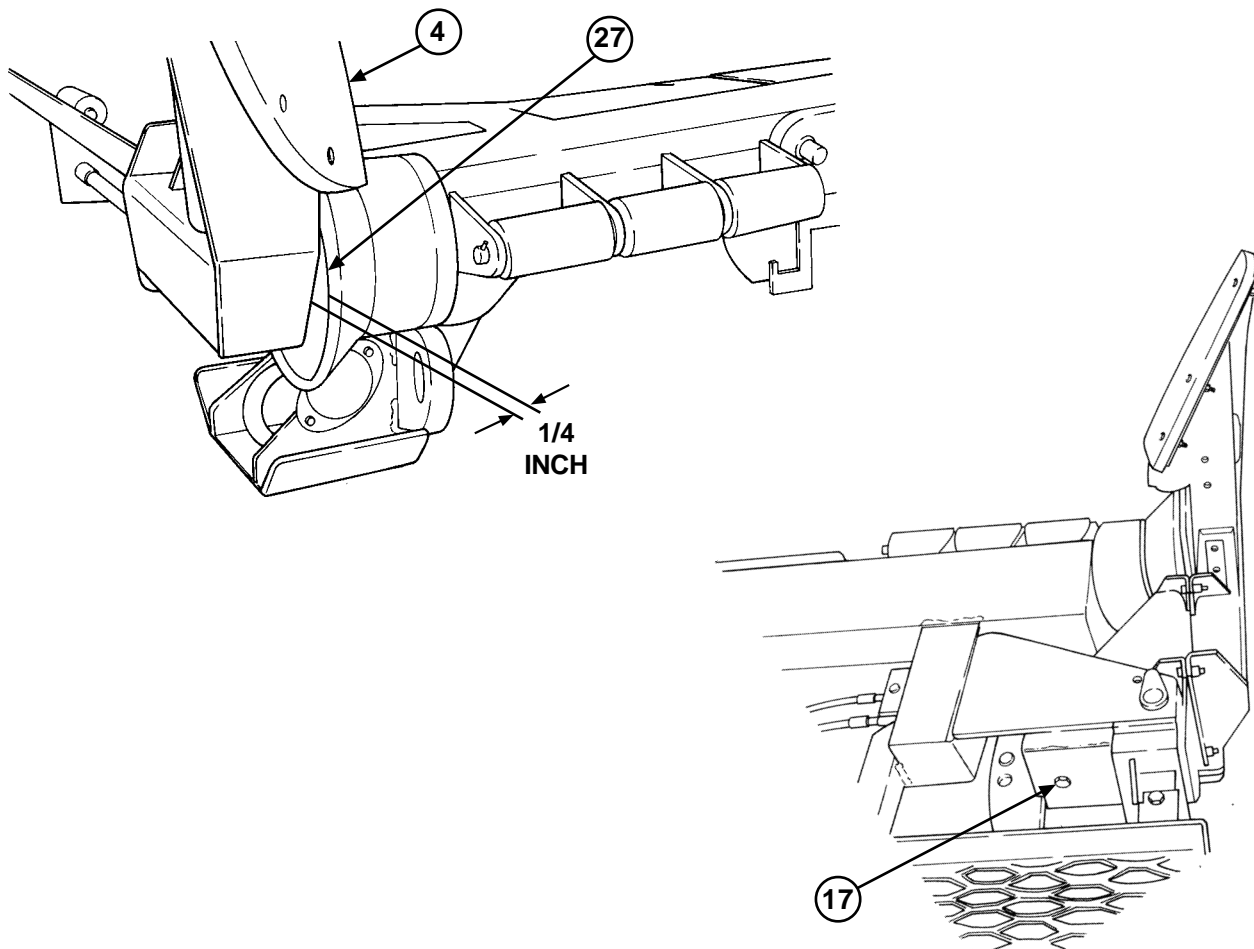
**4-28. BAP REAR GUIDE REPAIR (continued).**

**d. Adjustment.**

**NOTE**

With rear guide in fully closed position, gap between rear guide and rear roller should be 1/4 inch (6.3 mm).

- (1) With rear guide (4) in fully closed position, measure the gap between rear guide (4) and rear roller (27).



- (2) If gap is more than 1/4 inch (6.3 mm), turn screw (17) clockwise to decrease gap. If gap is less than 1/4 inch (6.3 mm), turn screw (17) counterclockwise to increase gap.

**e. Follow-on Maintenance:**

None.

**END OF TASK**



**4-29. BAP FRONT ROLLER ASSEMBLY REPLACEMENT.**

*This task covers:*

- a. Removal
- b. Cleaning and Inspection
- c. Installation
- d. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC-5180-90-N26)

Rag (Item 21, Appendix E)

Lockwasher (2) (Item 30, Appendix K)

*Equipment Condition*

Load removed from the BAP (para 2-12)

BAP unloaded from the CBT (para 2-10)

*Materials/Parts*

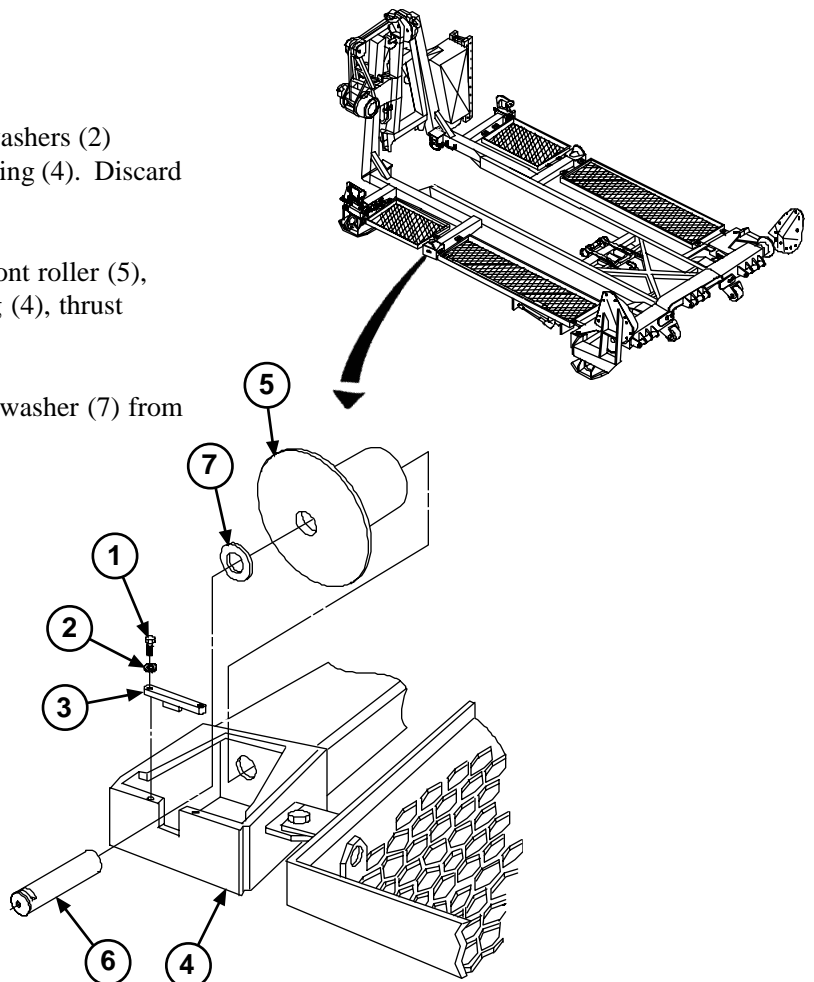
Drycleaning Solvent (Item 13, Appendix E)

**NOTE**

BAP front roller assembly replacement is the same for curb-side and road-side rollers. The road-side roller is shown.

**a. Removal.**

- (1) Remove two screws (1) and lockwashers (2) securing shaft cap (3) to roller housing (4). Discard lockwashers.
- (2) Using one hand to support BAP front roller (5), slide shaft (6) out of roller housing (4), thrust washer (7), and roller (5).
- (3) Remove front roller (5) and thrust washer (7) from roller housing (4).



**4-29. BAP FRONT ROLLER ASSEMBLY REPLACEMENT (continued).**

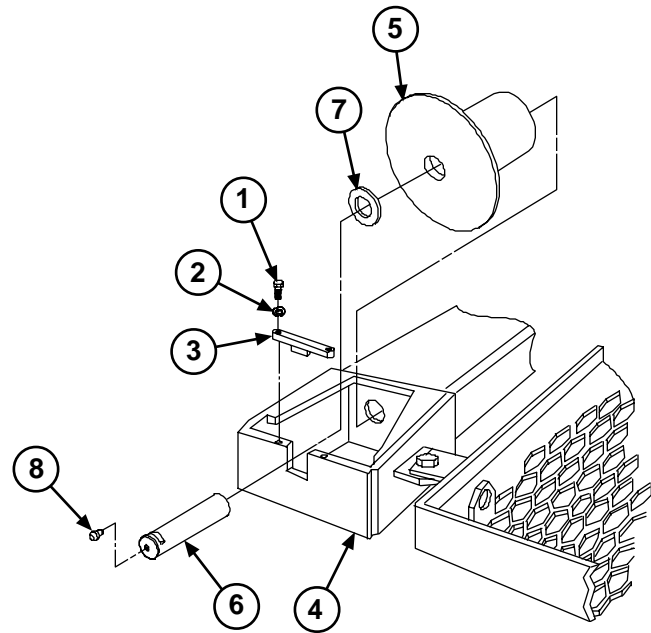
**b. Cleaning and Inspection.**

- (1) If damaged, replace roller and/or shaft.
- (2) Remove grease fitting (8) from shaft (6) and replace if damaged.

**WARNING**

Drycleaning solvent is **TOXIC and flammable**. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.

- (3) Clean all components with drycleaning solvent and a rag.



**c. Installation.**

- (1) Install front roller (5) in roller housing (4).
- (2) Insert shaft (6) partway into hole in roller housing (4), and slide thrust washer (7) onto shaft (6).
- (3) Using one hand to hold roller (5) in alignment with shaft (6), slide shaft (6) through roller (5). Make sure grease fitting (8) and slot in shaft cap (3) are facing out.
- (4) Align slot in shaft (6) with edge of roller housing (4).
- (5) Insert shaft cap (3) in slot and align with holes in roller housing (4).
- (6) Insert two screws (1) through two new lockwashers (2) and into roller housing (4).
- (7) Lubricate roller assembly (Appendix G).

**d. Follow-on Maintenance:**

None.

**END OF TASK**

**4-30. BAP REAR ROLLER ASSEMBLY REPLACEMENT.**

This task covers:

- a. Removal
- b. Cleaning and Inspection
- c. Installation
- d. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*  
 Tool Kit, General Mechanic's:  
 Automotive (SC 5180-90-N26)

Rag (Item 21, Appendix E)  
 Lockwasher (2) (Item 34, Appendix K)

*Materials/Parts*  
 Drycleaning Solvent (Item 13, Appendix E)

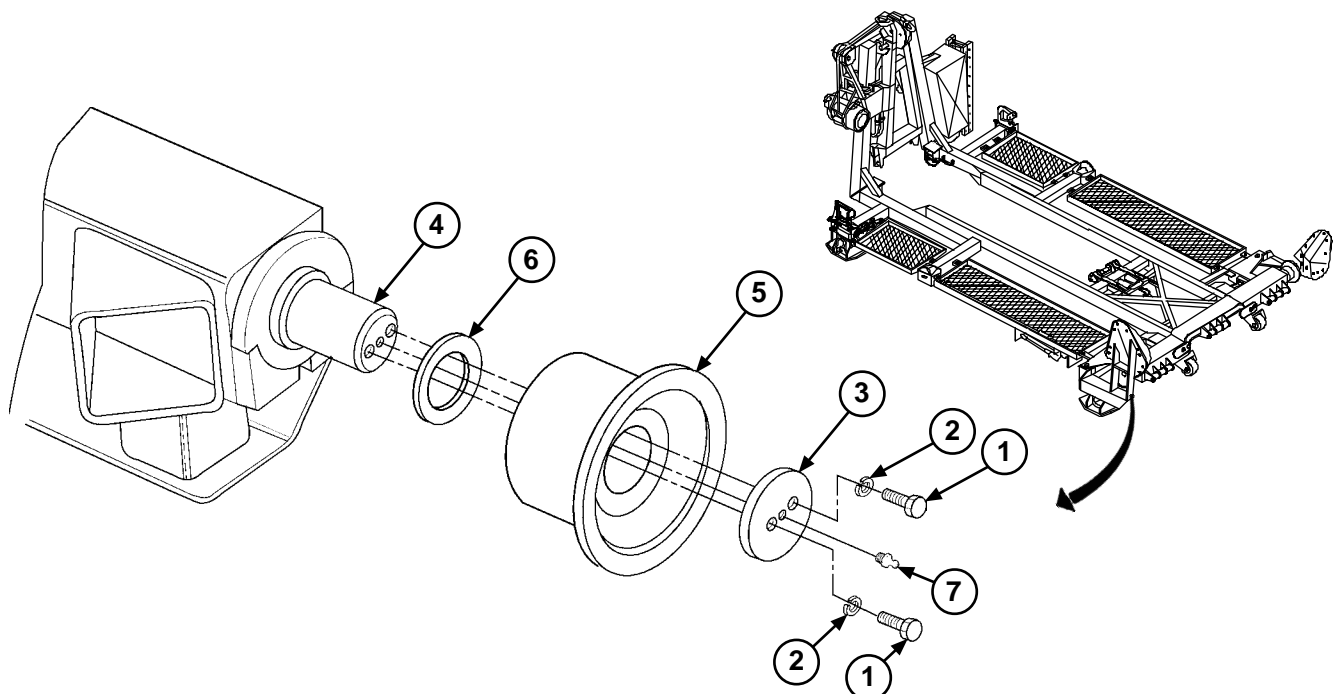
*Equipment Condition*  
 Load removed from the BAP (para 2-12)  
 BAP unloaded from the CBT (para 2-10)  
 Rear guide in full open position (para 2-12)

**a. Removal.**

- (1) Remove two bolts (1) and lockwashers (2) and plate clamp (3) from axle (4). Discard lockwashers.
- (2) Remove BAP rear roller assembly (5) and shim (6) from axle (4).

**b. Cleaning and Inspection.**

- (1) Remove grease fitting (7) from end of axle (4).
- (2) Inspect all parts for damage. Replace damaged parts as necessary.



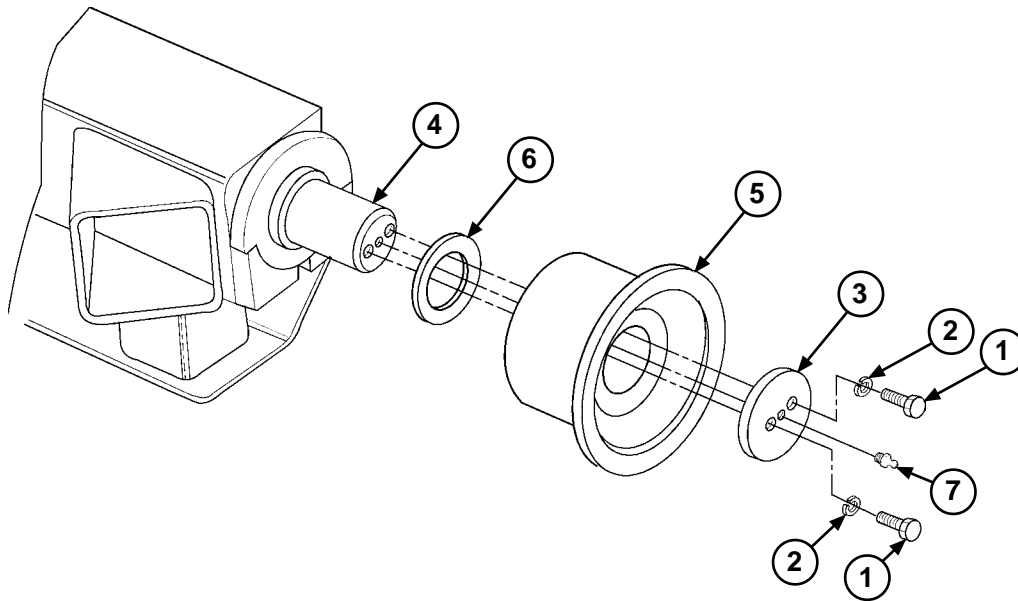
**4-30. BAP REAR ROLLER ASSEMBLY REPLACEMENT (continued).**

**WARNING**

Drycleaning solvent is **TOXIC** and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.

- (3) Clean and dry axle (4) bearing surface and components with drycleaning solvent and rag.
- (4) Install grease fitting (7) on end of axle (4).

**c. Installation.**



- (1) Install shim (6) and rear roller assembly (5) on axle (4).
- (2) Install plate clamp (3) on end of axle (4), and align holes in plate clamp (3) with holes in axle (4).
- (3) Insert two bolts (1) and new lockwashers (2) in plate clamp (3).
- (4) Lubricate rear roller assembly (Appendix G).

**d. Follow-on Maintenance:**

- Put rear guide in stowed position (para 2-9).

**END OF TASK**

**4-31. BAP REAR BUMPER ASSEMBLY REPLACEMENT.**

*This task covers:*

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

*Equipment Condition*

Load removed from the BAP (para 2-12)  
BAP unloaded from the CBT (para 2-10)

*Materials/Parts*

Cotter Pin (Item 20, Appendix K)

**NOTE**

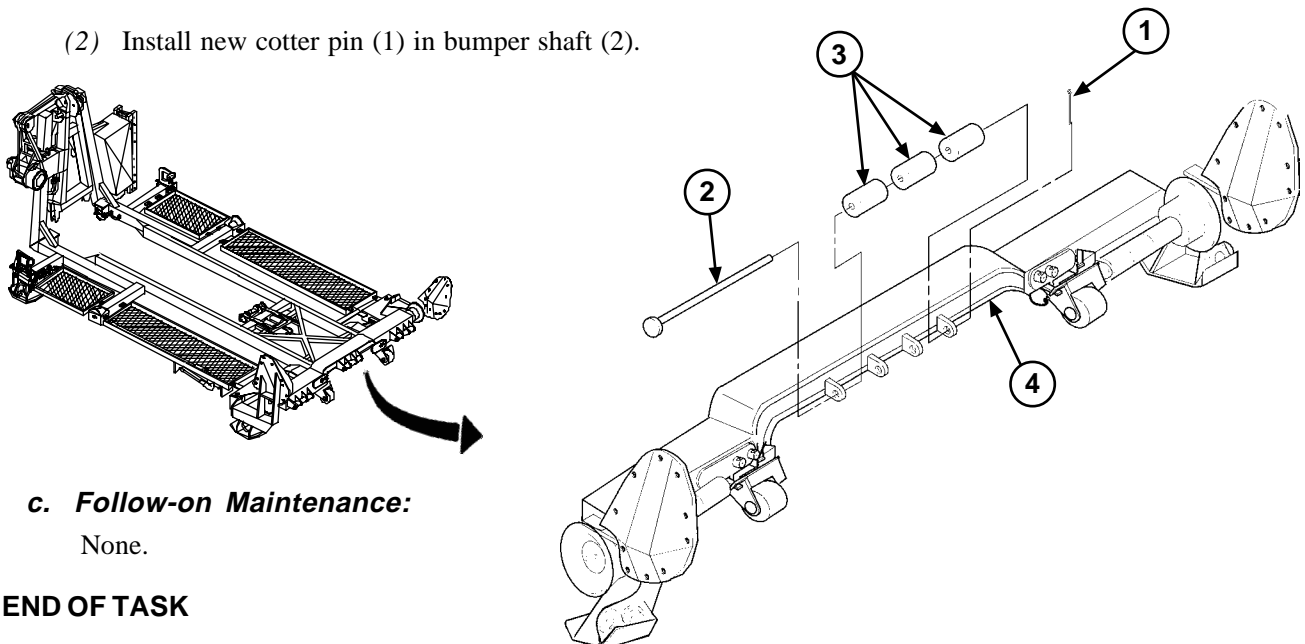
This task can be used for the road-side, curb-side, or middle roller bumpers. The middle roller bumpers are shown.

**a. Removal.**

- (1) Remove cotter pin (1) from bumper shaft (2). Discard cotter pin.
- (2) Remove bumper shaft (2) and three roller bumpers (3) from BAP frame (4).
- (3) Lubricate bumper shaft (2) and bumpers (3) in accordance with Appendix G.

**b. Installation.**

- (1) Install three roller bumpers (3) and bumper shaft (2) on BAP frame (4).
- (2) Install new cotter pin (1) in bumper shaft (2).



**c. Follow-on Maintenance:**

None.

**END OF TASK**

**4-32. BAP TRANSLOAD ROLLER REPLACEMENT.**

*This task covers:*

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Personnel Required*

Two

*Materials/Parts*

Cotter Pin (Item 21, Appendix K)  
Lockwasher (Item 32, Appendix K)  
Spring Pin (Item 40, Appendix K)

*Equipment Condition*

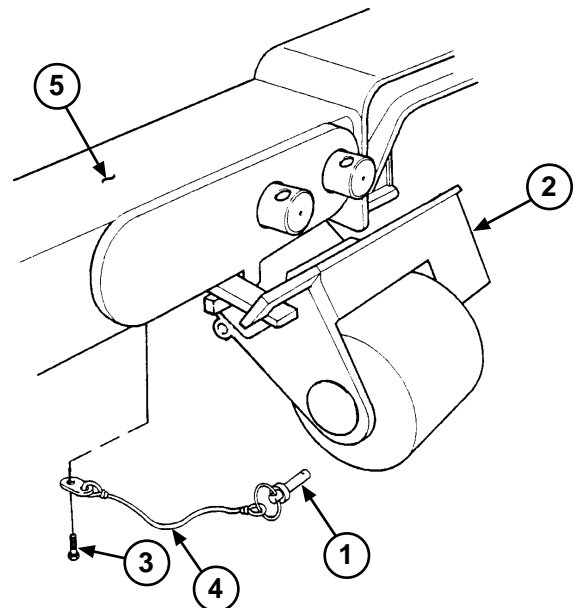
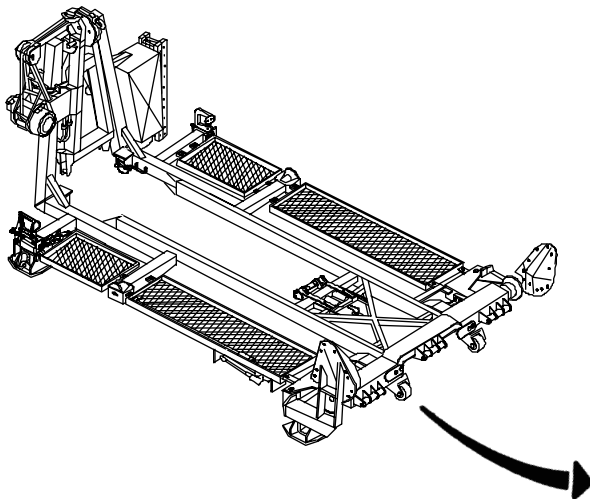
Load removed from the BAP (para 2-12)  
BAP unloaded from the CBT (para 2-10)

**NOTE**

This procedure is for either curb-side or road-side transload roller replacement.  
Road side is shown.

**a. Removal.**

- (1) Remove-quick release pin (1) from transloader bracket (2). Remove screw (3) and lanyard (4) from BAP frame (5).



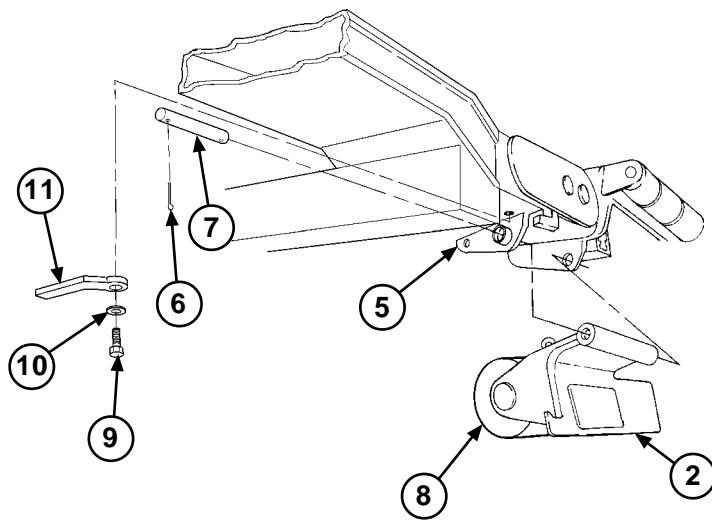
**4-32. BAP TRANSLOAD ROLLER REPLACEMENT (continued).**

- (2) Remove cotter pin (6) from straight pin (7). Discard cotter pin.

**NOTE**

The straight pin is removed by pulling it toward the outside of the BAP.

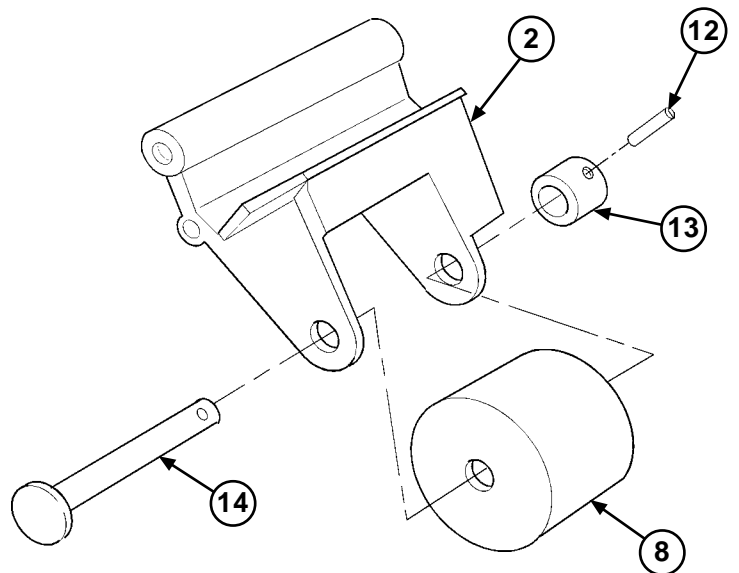
- (3) While an assistant supports transload roller (8) and transloader bracket (2), remove straight pin (7) from welded bracket on frame (5) by pulling it toward the outside of the BAP.
- (4) Remove screw (9), lockwasher (10), and retaining bar (11) from welded bracket on frame (5). Discard lockwasher.



- (5) Remove spring pin (12) and transloader collar (13) from headed pin (14). Discard spring pin.
- (6) Remove headed pin (14) and roller (8) from transloader bracket (2).
- (7) Lubricate straight pin (7) and headed pin (14) in accordance with Appendix G.

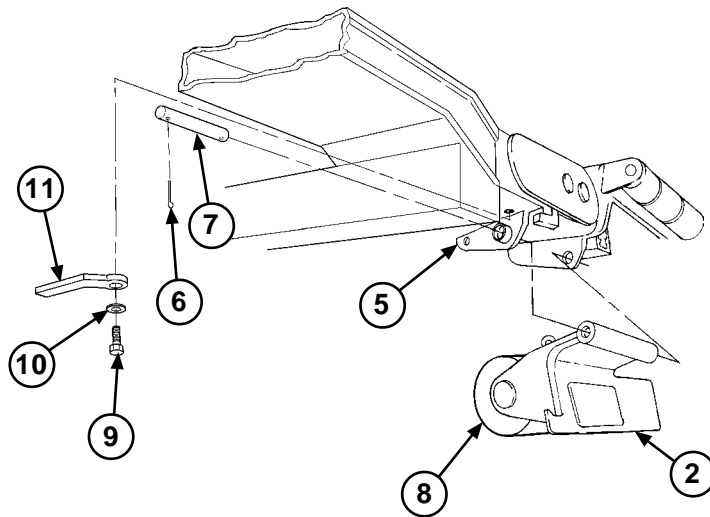
**b. Installation.**

- (1) Install headed pin (14) in bracket (2), roller (8), and transloader collar (13), making sure holes in transloader collar (13) and headed pin (14) align.
- (2) Install new spring pin (12) in holes in transloader collar (13) and headed pin (14).

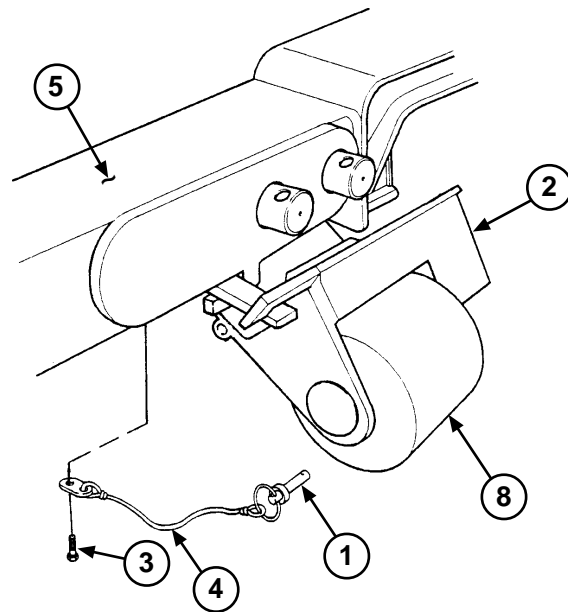


**4-32. BAP TRANSLOAD ROLLER REPLACEMENT (continued).**

- (3) Install retaining bar (11), screw (9), and new lockwasher (10) on welded bracket on frame (5).
- (4) Install straight pin (7) through transloader bracket (2) and welded bracket on frame (5).
- (5) Install new cotter pin (6) on straight pin (7).



- (6) Install lanyard (4) and screw (3) on frame (5).
- (7) Put roller (8) and transloader bracket (2) in stowed position, and insert quick-release pin (1) in frame (5).



**c. Follow-on Maintenance:**

None.

**END OF TASK**



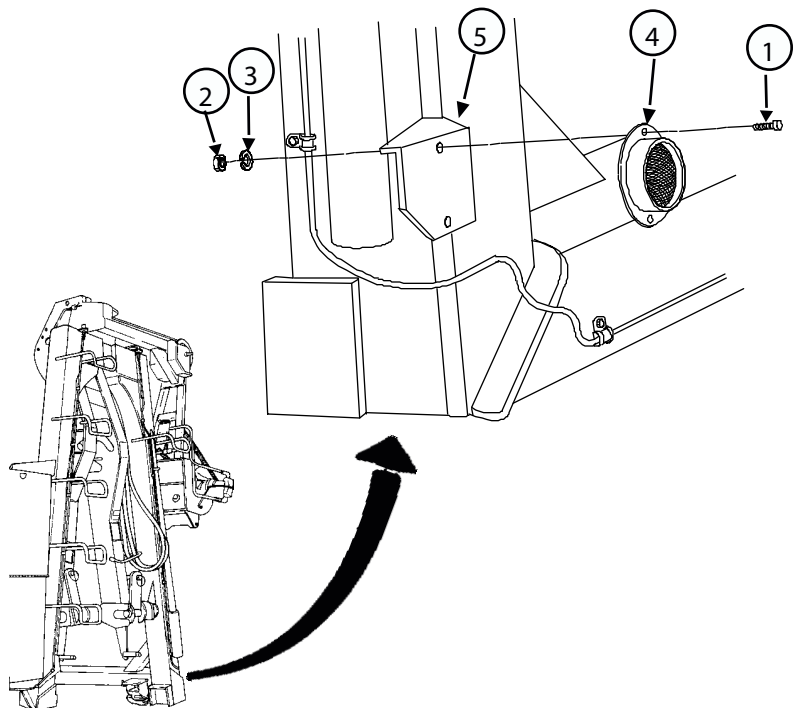
<b>4-33. BAP REFLECTOR REPLACEMENT.</b>	
This task covers:	
a. Removal	b. Installation
c. Follow-on Maintenance	
<b>INITIAL SETUP</b>	
<b>Tools and Special Tools</b> Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	<b>Equipment Condition</b> Load removed from the BAP (para 2-12) BAP unloaded from the CBT (para 2-10)
<b>Materials/Parts</b> Lockwasher (2) (Item 29, Appendix K)	

**NOTE**

There are eight reflectors on the BAP: Four amber reflectors are located on the A-frame and front pin locks, and four red reflectors are located on the rear guides.

*a. Removal.*

- (1) Remove two screws (1), nuts (2), and lockwashers (3) and amber reflector (4) from A-frame (5). Discard lockwashers.

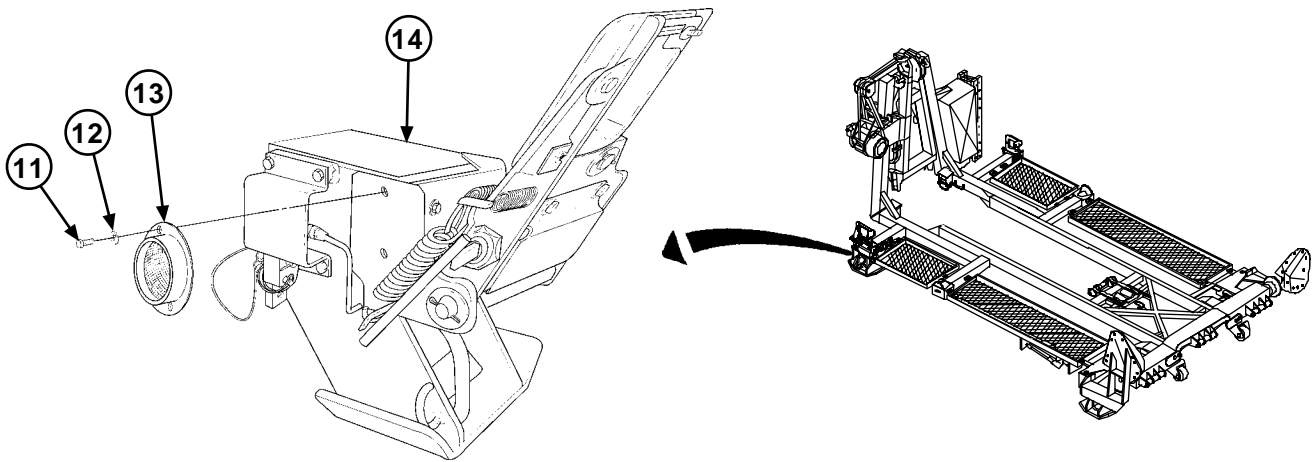


**4-33. BAP REFLECTOR REPLACEMENT (continued).**

**NOTE**

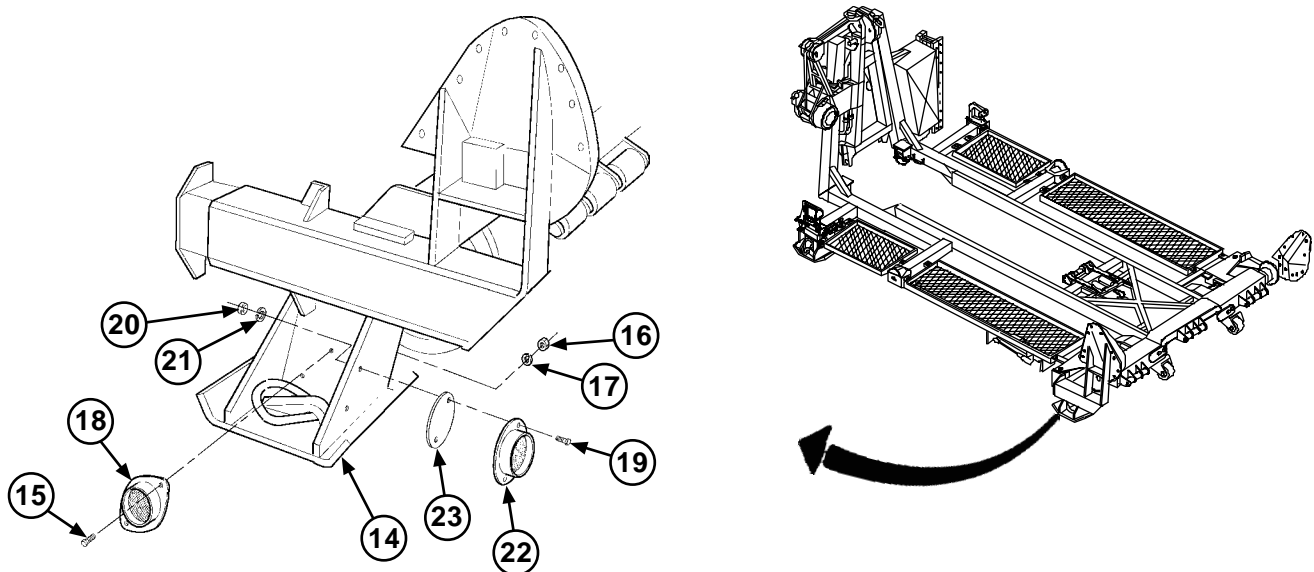
- Steps 3 through 5 are the same for removal of road-side and curb-side reflectors.
- Engage pin lock assembly in manual position before removing or installing reflector.

(3) Remove two screws (11) and lockwashers (12) and amber reflector (13) from BAP frame (14). Discard lockwashers.



(4) Remove two screws (15), nuts (16), and lockwashers (17) and red reflector (18) from frame (14). Discard lockwashers.

(5) Remove two screws (19), nuts (20), and lockwashers (21), red reflector (22), and mounting plate (23) from frame (14). Discard lockwashers.



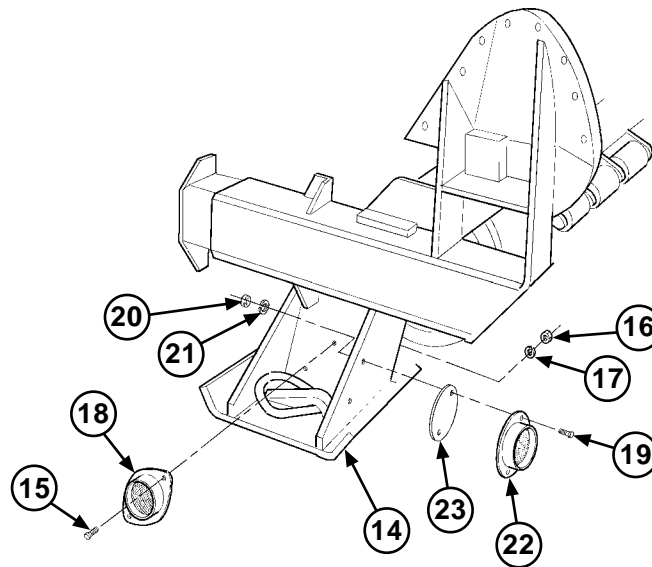
### 4-33. BAP REFLECTOR REPLACEMENT (continued).

#### *b. Installation.*

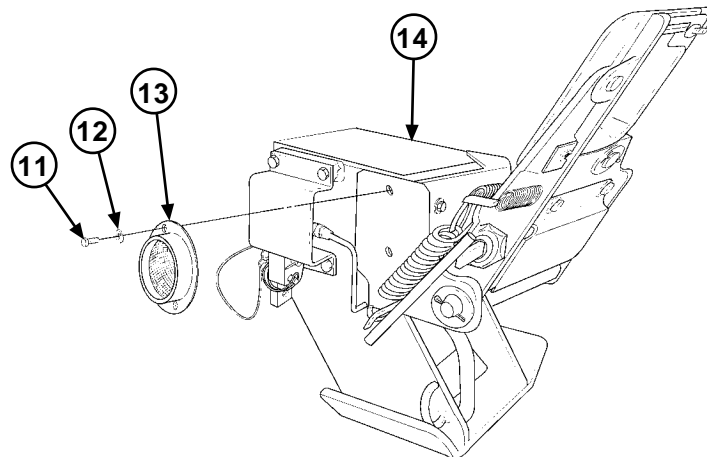
#### NOTE

Steps 1 through 3 are the same for installation of road-side and curb-side reflectors.

- (1) Install mounting plate (23), red reflector (22), and two screws (19), nuts (20), and new lockwashers (21) on frame (14).
- (2) Install red reflector (18) and two screws (15), nuts (16), and new lockwashers (17) on frame (14).



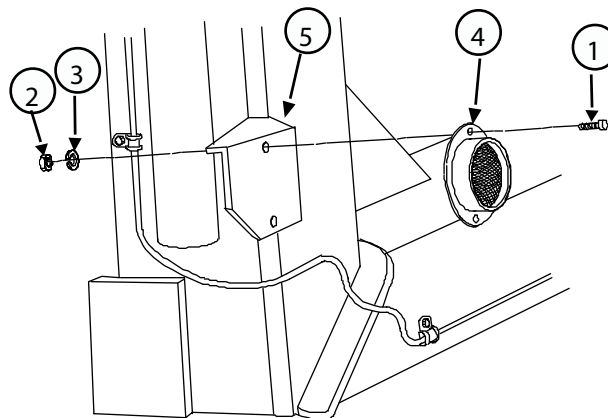
- (3) Install amber reflector (13) and two screws (11) and new lockwashers (12) on frame (14).



4-33. BAP REFLECTOR REPLACEMENT (continued).

(4) Deleted.

(5) Install amber reflector (4) and two screws (1), nuts (2), and new lockwashers (3) on A-frame (5).



c. *Follow-on Maintenance:*  
None.

END OF TASK

4-34. BAP LABEL REPLACEMENT.

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

INITIAL SETUP

Tools and Special Tools

- Drill, Electric, Portable (W-D-661)
- Drill Set, Twist (800434)
- Tool Kit, Blind Rivet (D-100-MIL-1)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

Materials/Parts

- Drive Screw (4) (Item 14, Appendix K)
- Rivet (4) (Item 13, Appendix K)

Equipment Condition

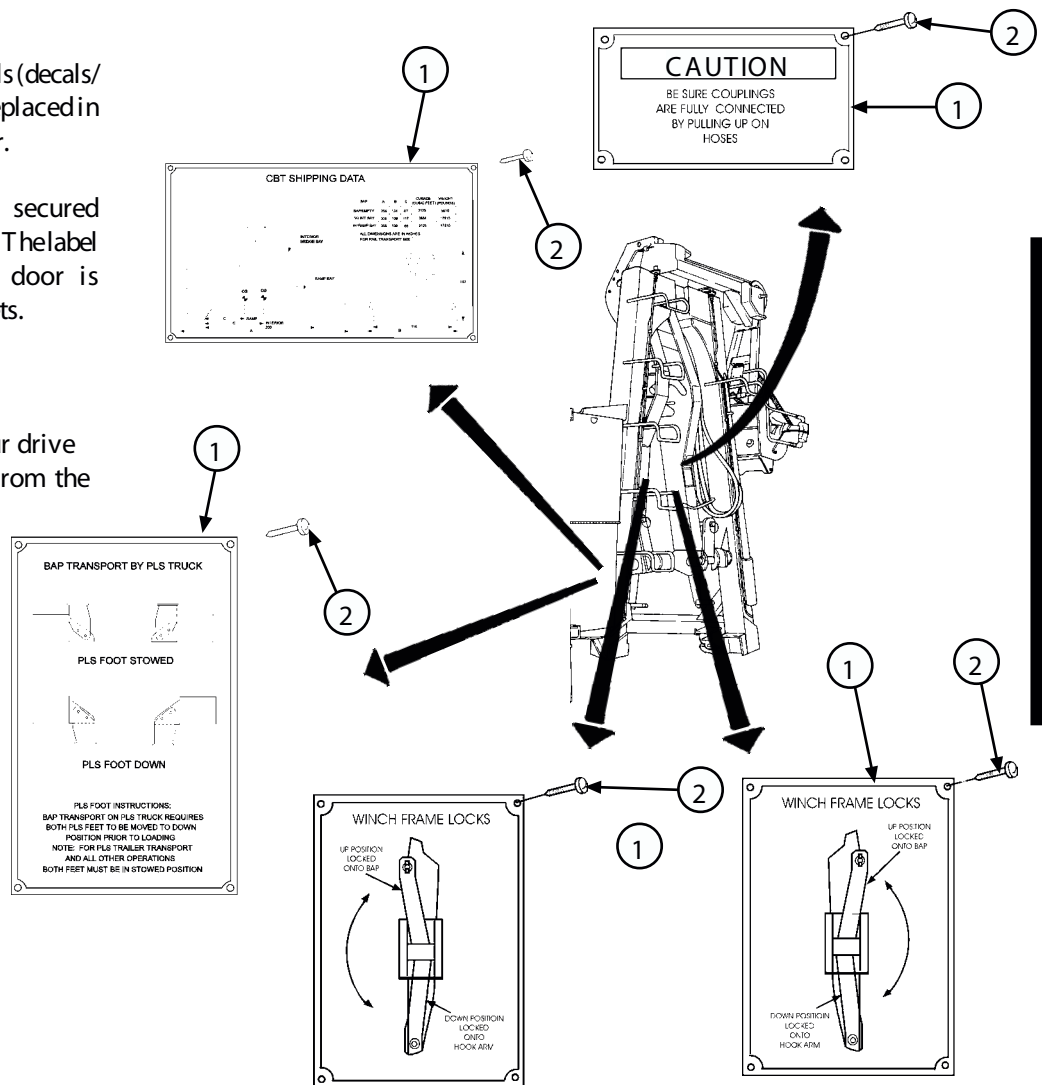
- Load removed from the BAP (para 2-10)
- BAP unloaded from the CBT (para 2-12)

NOTE

- All nine BAP labels (decals/data plates) are replaced in the same manner.
- Eight labels are secured with drivescrews. The label on the toolbox door is secured with rivets.

a. Removal.

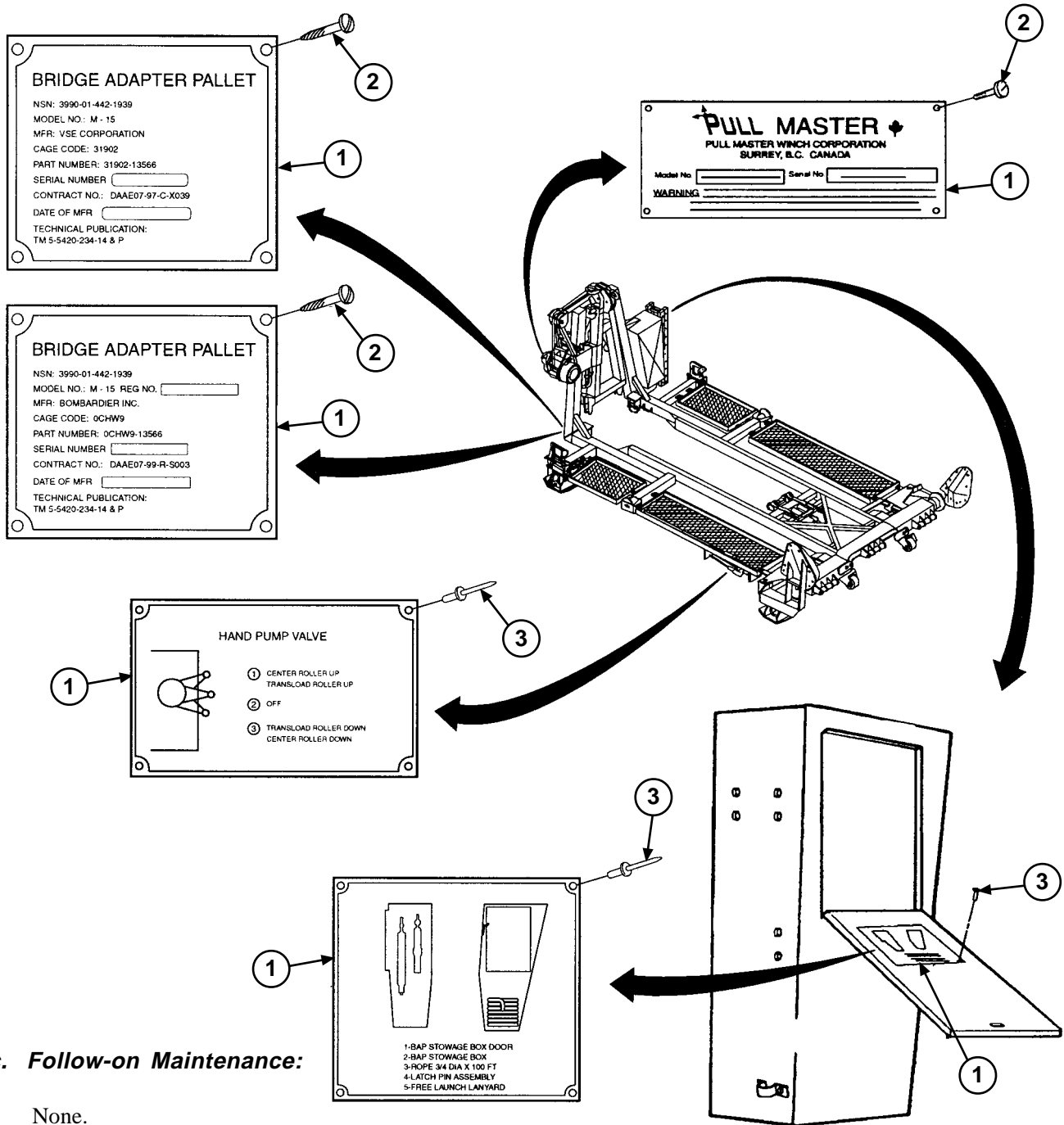
Remove label (1) and four drive screws (2) or rivets (3) from the BAP.



**4-34. BAP LABEL REPLACEMENT (continued).**

**b. Installation.**

Install new label (1) on the BAP with four new drive screws (2) or rivets (3).



**c. Follow-on Maintenance:**

None.

**END OF TASK**

**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR.**

This task covers:

- |                |                            |                          |
|----------------|----------------------------|--------------------------|
| a. Removal     | c. Cleaning and Inspection | e. Installation          |
| b. Disassembly | d. Assembly                | f. Follow-on Maintenance |

**INITIAL SETUP**

*Tools and Special Tools*

- Pliers, Retaining Ring (SG 2086PC32)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wrench, Adjustable (2117080)
- Wrench, Torque, 50-250 ft-lb (STW-3RCF)

- Cotter Pin (2) (Item 19, Appendix K)
- Cotter Pin (2) (Item 43, Appendix K)
- Lockwasher (Item 30, Appendix K)
- Lockwasher (2) (Item 31, Appendix K)
- Self-Locking Nut (2) (Item 39, Appendix K)

*Materials/Parts*

- Drycleaning Solvent (Item 13, Appendix E)
- Goggles, Safety (Item 16, Appendix E)
- Rag (Item 21, Appendix E)
- Cotter Pin (Item 17, Appendix K)

*Personnel Required*

Two

*Equipment Condition*

Front pin lock reflector removed (para 4-33)

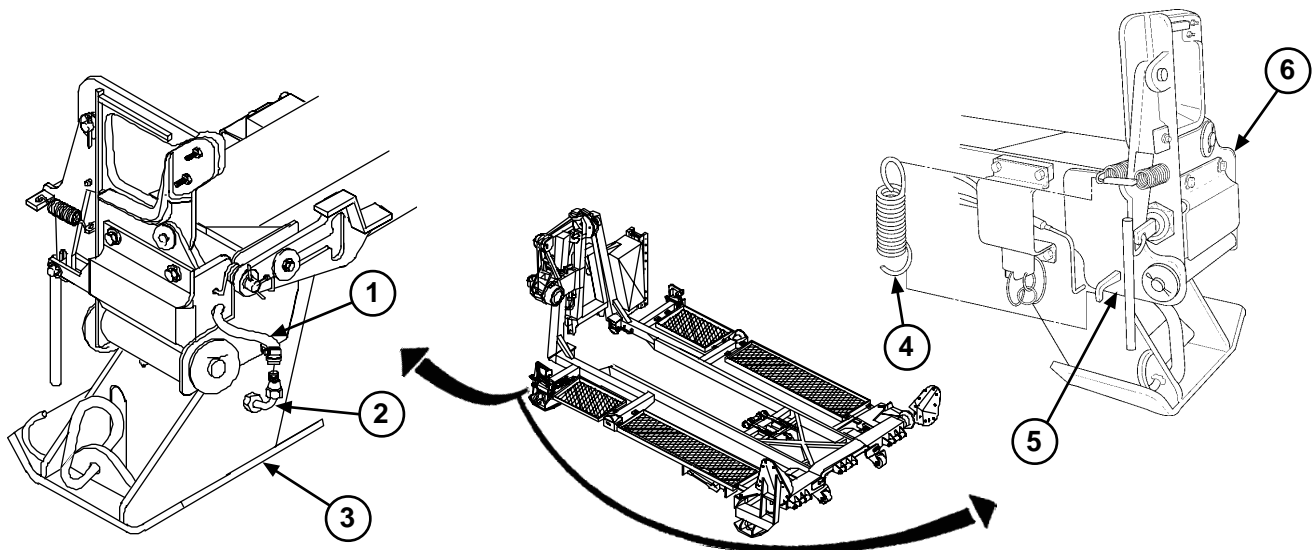
**a. Removal.**

**NOTE**

- BAP front pin lock should be in stowed position for Steps 1 through 3.
- Repair of curb-side and road-side pin locks is the same. Road-side pin lock is shown.

(1) Remove air hose (1) from elbow (2) on BAP frame (3).

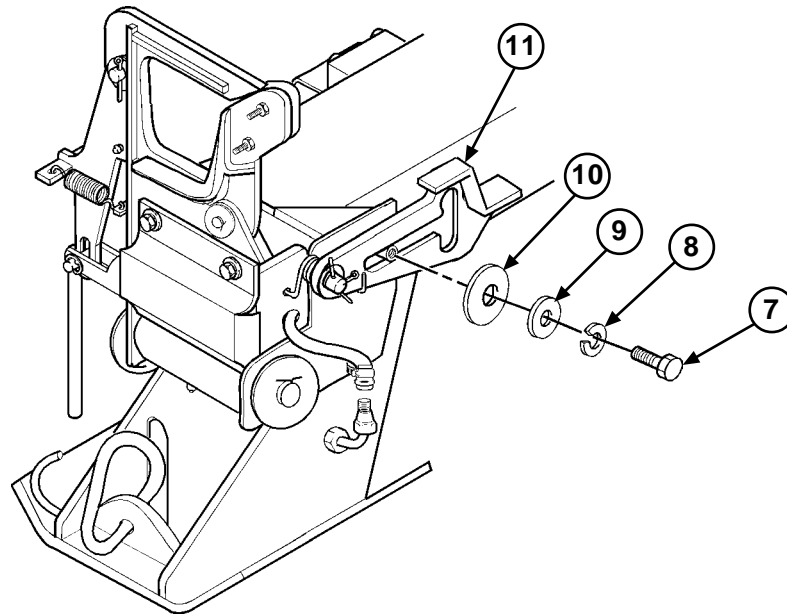
(2) Disengage extension spring (4) from pin lock bracket (5) and front pin lock guide (6).



**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).**

(3) Remove bolt (7), lockwasher (8), and two washers (9 and 10) from pivot latch (11). Discard lockwasher.

**b. Disassembly.**



- (1) Remove two bolts (12) and lockwashers (13) and air cylinder guard (14) from pin lock guide (6). Discard lockwashers.
- (2) Loosen clamp (15) on air hose (1) and remove air hose (1) from air cylinder (16).
- (3) Remove two springs (17) from release latch (18) and pin lock guide (6). Remove cotter pin (19), washer (20), and headed straight pin (21) from pin lock guide (6). Discard cotter pin.

**WARNING**

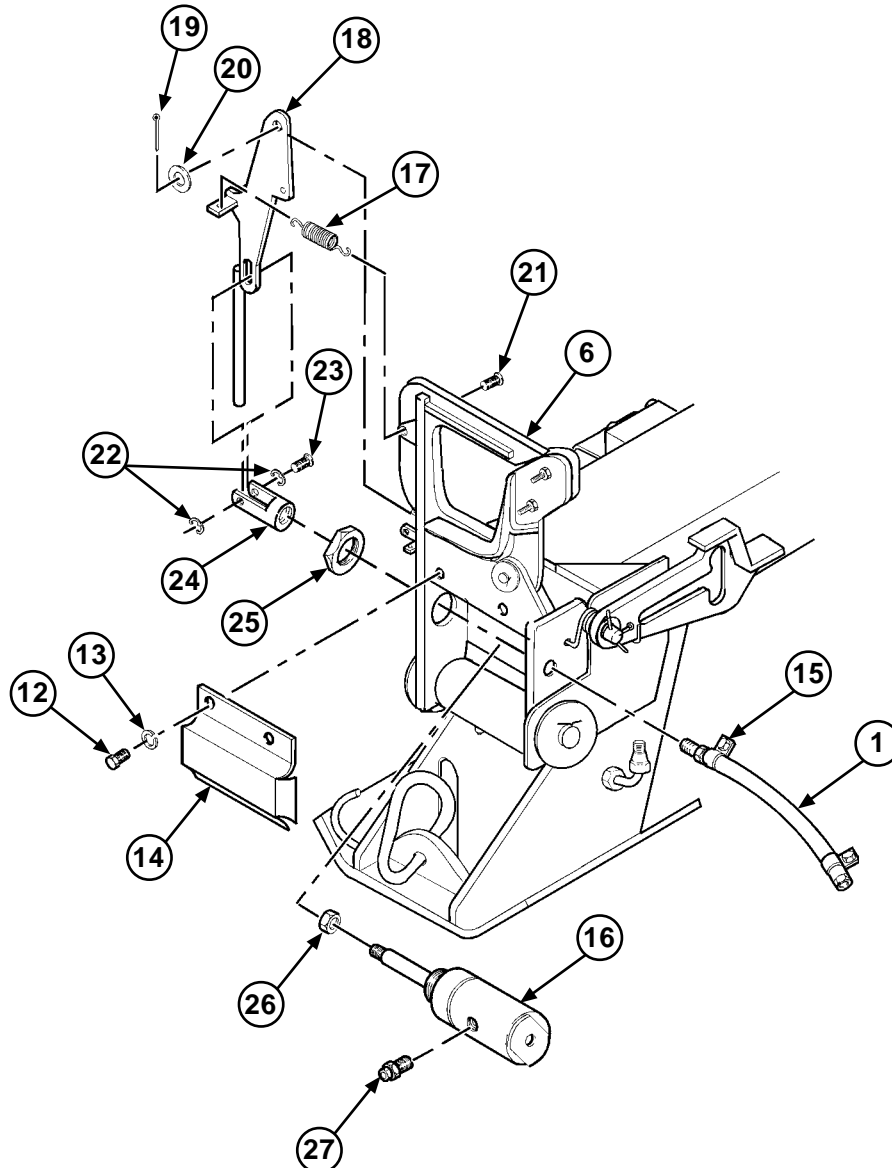
**Wear safety goggles and use care when removing or installing snaprings. They are under tension and can act as projectiles when released. Failure to heed this warning can result in serious injury to personnel.**

- (4) Remove two snaprings (22) and straight pin (23) from clevis (24). Remove clevis (24) from release latch (18).
- (5) Remove release latch (18) from pin lock guide (6).
- (6) Loosen nut (25) and remove air cylinder (16) from pin lock guide (6).



**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).**

- (7) Remove nut (25) from air cylinder (16). Remove clevis (24) and adjusting nut (26) from air cylinder (16).
- (8) Remove breather (27) from air cylinder (16).

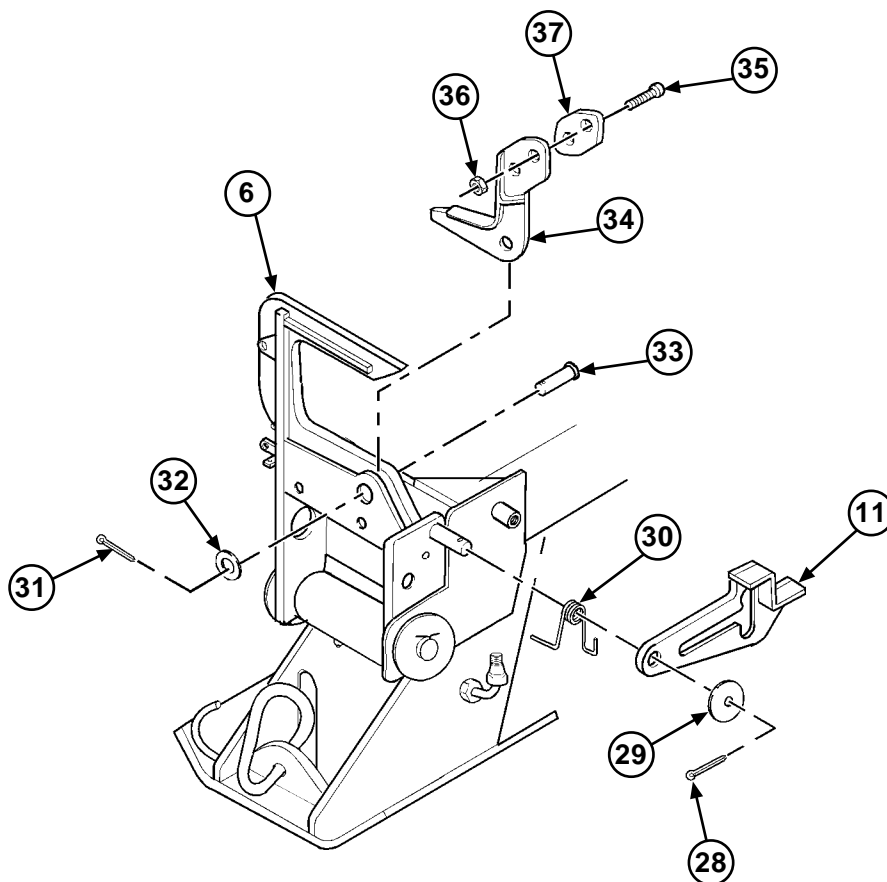


**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).**

- (9) Remove cotter pin (28), washer (29), pivot latch (11), and torsion spring (30) from pin lock guide (6). Discard cotter pin.
- (10) Remove cotter pin (31), washer (32), and headed straight pin (33) from pin lock jaw (34). Discard cotter pin.
- (11) Remove pin lock jaw (34) from pin lock guide (6).
- (12) Remove two screws (35) and self-locking nuts (36) and wear pad (37) from pin lock jaw (34). Discard self-locking nuts.

**NOTE**

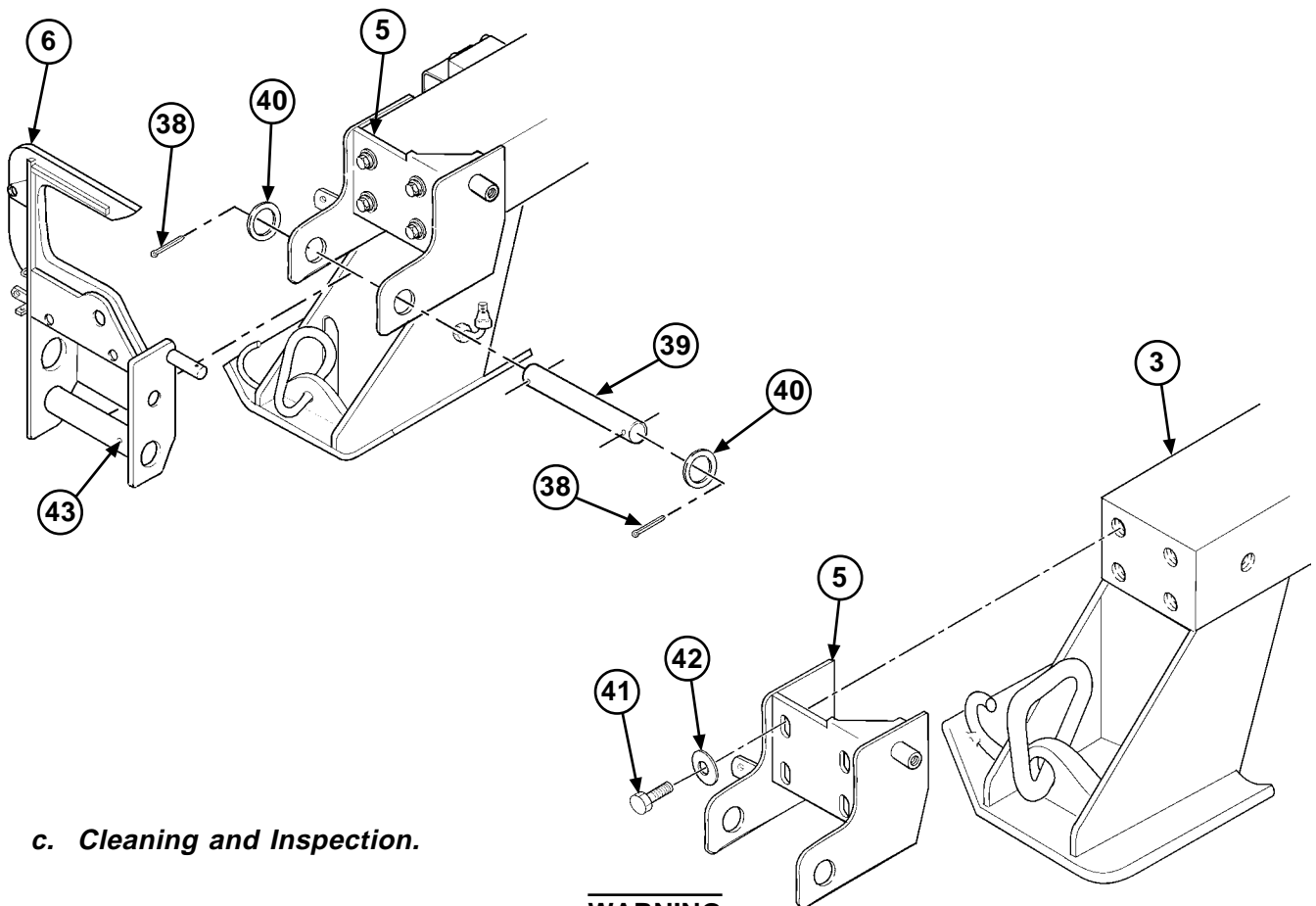
Measure the distance from the top of triangle-shaped weldment on top of pin lock bracket to top of frame. Make a note of distance measured for later use during assembly.



- (13) Remove two cotter pins (38) from pin lock pin (39). With the aid of an assistant, remove two washers (40) and pin lock pin (39) from pin lock guide (6). Discard cotter pins.

#### 4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).

- (14) Remove pin lock guide (6) from pin lock bracket (5).
- (15) Remove four screws (41) and washers (42) from pin lock bracket (5).
- (16) Remove pin lock bracket (5) from frame (3).



#### c. *Cleaning and Inspection.*

#### **WARNING**

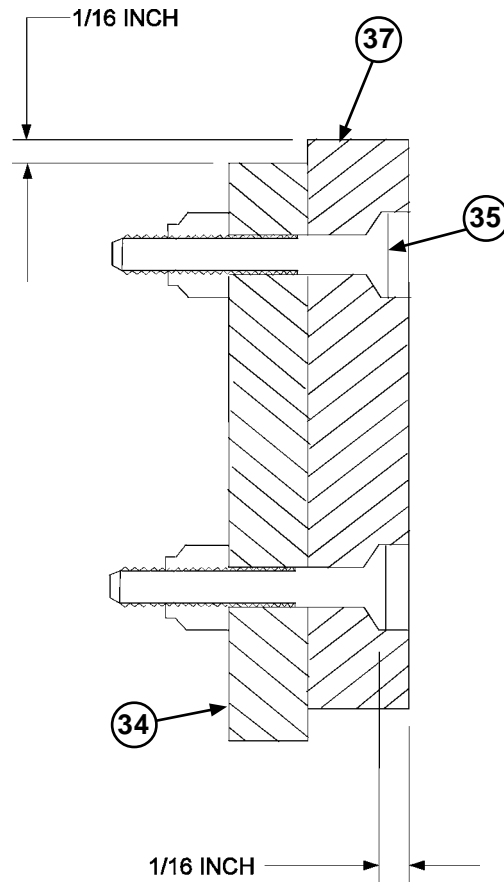
**Drycleaning solvent is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and DO NOT breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.**

- (1) Clean components with drycleaning solvent and rag.
- (2) Inspect all parts for damage and replace as necessary.
- (3) Remove grease fitting (43) from pin lock guide (6) if damaged.

**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).**

- (4) Measure wear pad (37). If wear pad (37) is worn to within 1/16 inch (1.6 mm) of screw (35) or pin lock jaw (34), wear pad (37) can be rotated 180 degrees and reused. If bottom and top edges of wear pad (37) show excessive wear, replace wear pad (37).
- (5) Lubricate all pins in accordance with Appendix G.

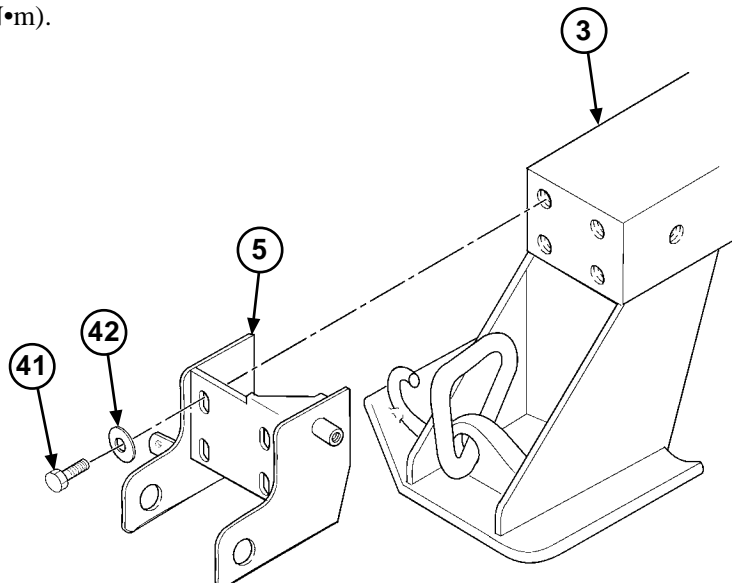
**d. Assembly.**



**NOTE**

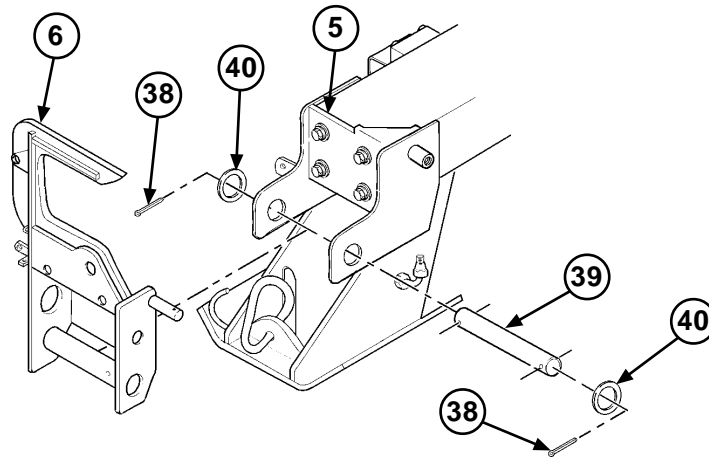
Mount pin lock bracket at same height as noted during disassembly.

- (1) Install pin lock bracket (5) and four screws (41) and washers (42) on frame (3). Torque screws between 75 and 80 ft-lb (101.7 and 108.5 N•m).



**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).**

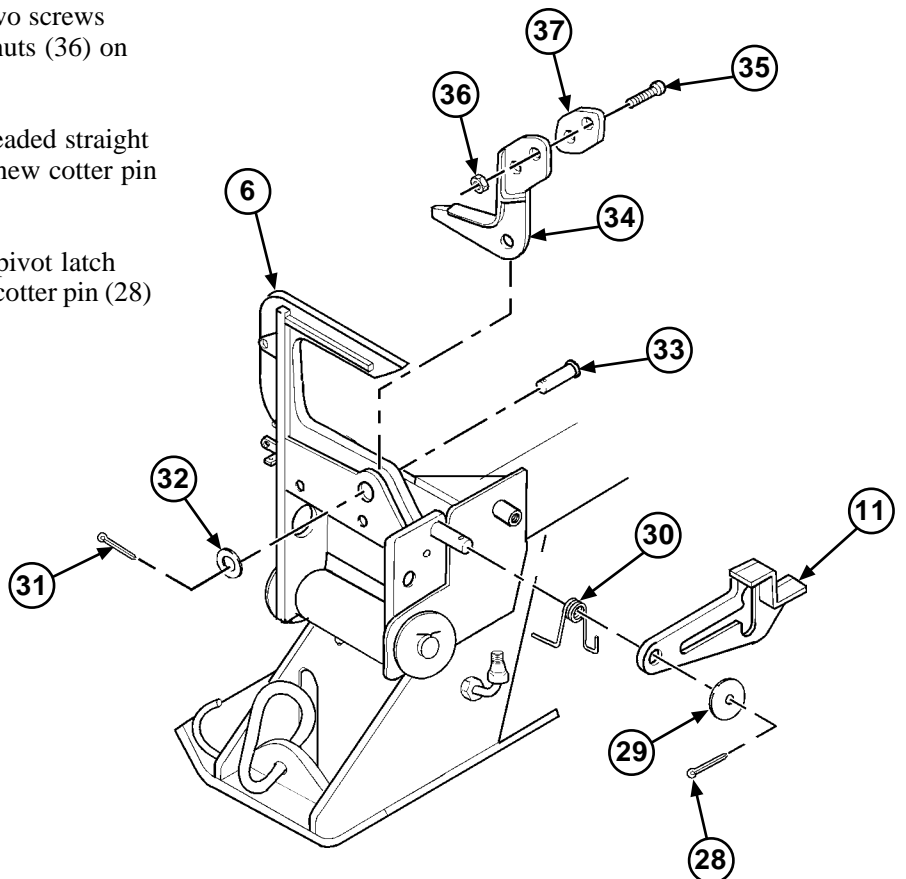
- (2) With the aid of an assistant, install pin lock guide (6), pin lock pin (39), and two washers (40) and new cotter pins (38) on pin lock bracket (5).



- (3) Install wear pad (37) and two screws (35) and new self-locking nuts (36) on pin lock jaw (34).

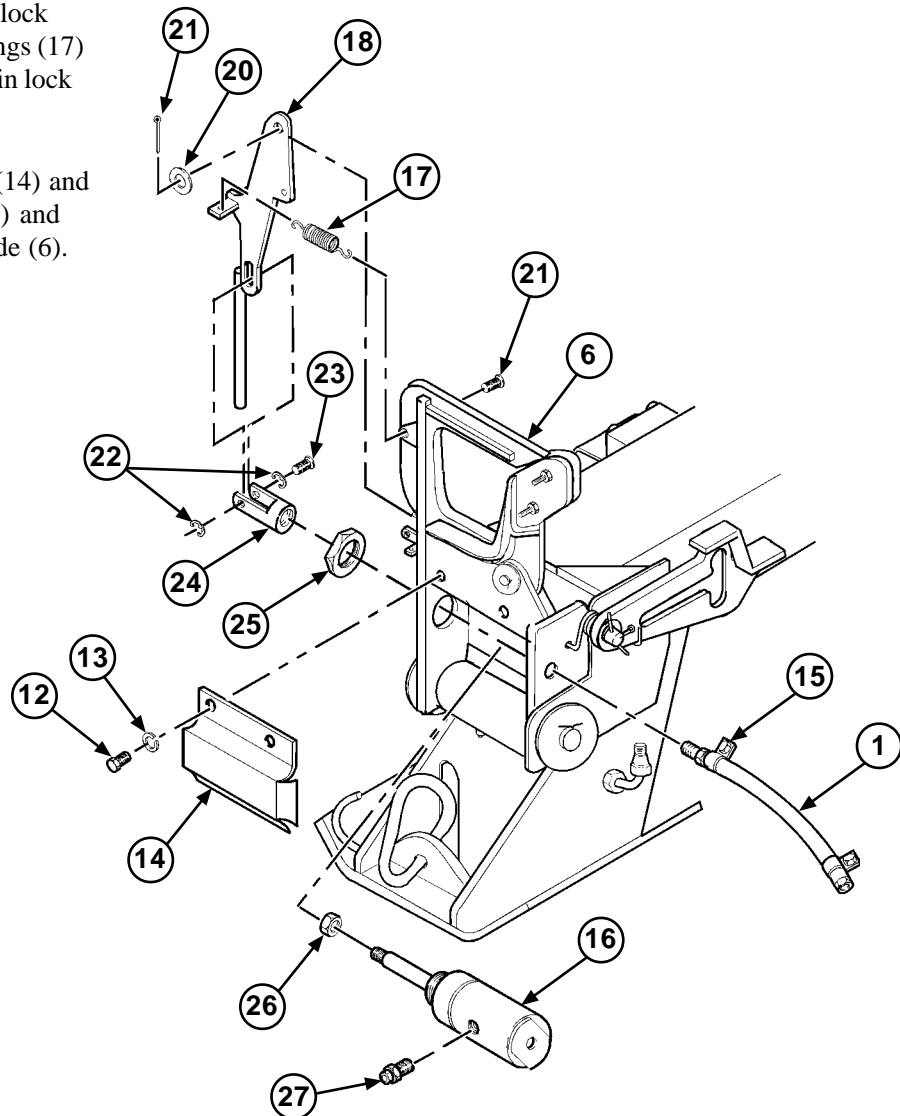
- (4) Install pin lock jaw (34), headed straight pin (33), washer (32), and new cotter pin (31) on pin lock guide (6).

- (5) Install torsion spring (30), pivot latch (11), washer (29), and new cotter pin (28) on pin lock guide (6).



**4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).**

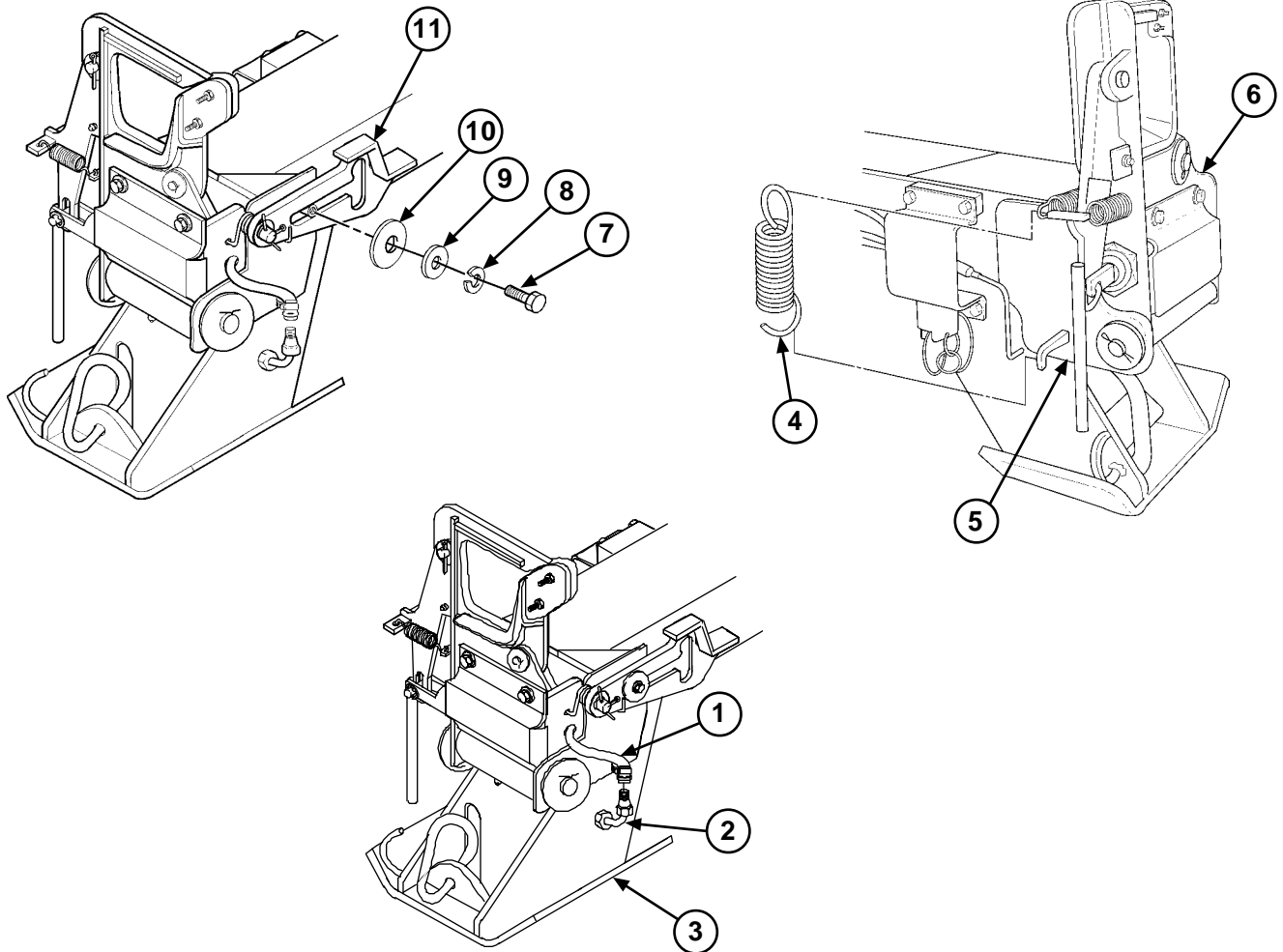
- (6) Install breather (27) on air cylinder (16).
- (7) Install adjusting nut (26) and clevis (24) on air cylinder (16).
- (8) Install air cylinder (16) in pin lock guide (6), making sure pin lock jaw (34) is in the up position and breather (27) is facing bottom of pin lock guide (6).
- (9) Install nut (25) on air cylinder (16). Install air hose (1) on air cylinder (16). Tighten clamp (15).
- (10) Install release latch (18) on clevis (24).
- (11) Install straight pin (23) and two snaprings (22) in clevis (24) and release latch (18).
- (12) Install release latch (18), headed straight pin (21), washer (20), and new cotter pin (19) on pin lock guide (6). Install two springs (17) on release latch (18) and pin lock guide (6).
- (13) Install air cylinder guard (14) and two new lockwashers (13) and bolts (12) on pin lock guide (6).



## 4-35. BAP FRONT PIN LOCK ASSEMBLY ADJUSTMENT AND REPAIR (continued).

### e. Installation.

- (1) Install pivot latch (11), bolt (7), two washers (9 and 10), and new lockwasher (8) on pin lock bracket (5).
- (2) Install extension spring (4) on pin lock guide (6) and pin lock bracket (5). Install air hose (1) on elbow (2) on frame (3).



### f. Follow-on Maintenance:

- Install front pin lock reflector (para 4-33).

**END OF TASK**

### 4-36. BAP SHEAVE ASSEMBLY REPAIR.

This task covers:

- |                            |                          |
|----------------------------|--------------------------|
| a. Removal                 | c. Installation          |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Cotter Pin (4) (Item 22, Appendix K)  
Lockwasher (8) (Item 33, Appendix K)

*Materials/Parts*

Drycleaning Solvent (Item 13, Appendix E)  
Rag (Item 21, Appendix E)

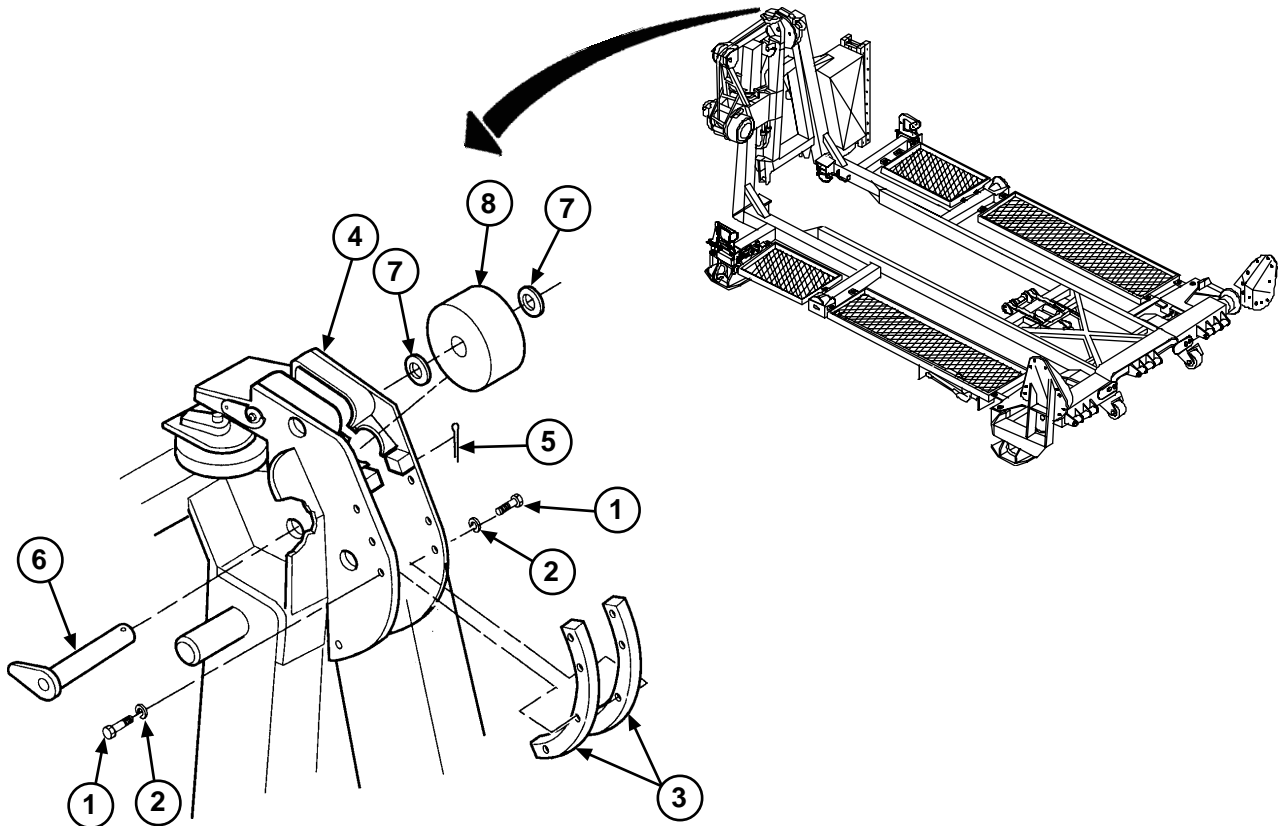
*Personnel Required*  
Two

*Equipment Condition*

BAP winch cable extended six feet (para 2-11)

#### a. Removal.

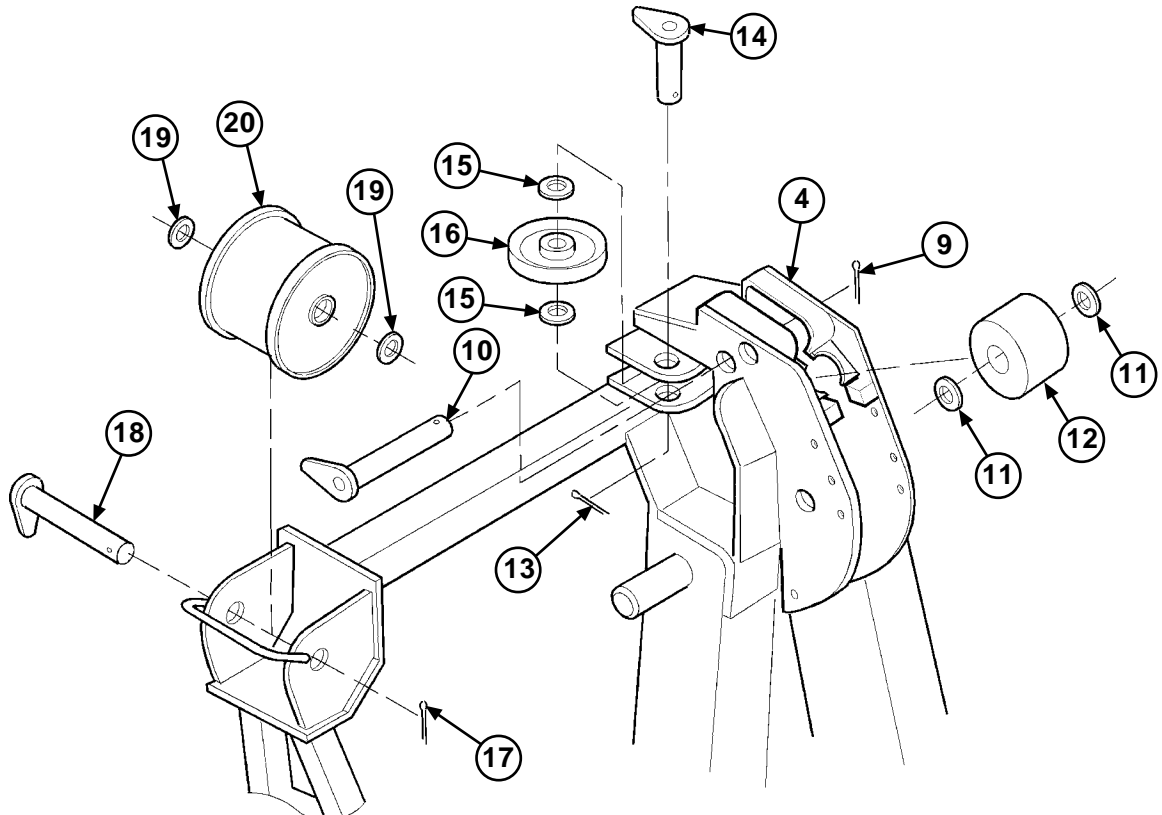
- (1) Remove eight bolts (1) and lockwashers (2) and two guides (3) from winch frame (4). Discard lockwashers.
- (2) Remove cotter pin (5) from roller pin (6). Remove roller pin (6), two spacers (7), and roller assembly (8) from winch frame (4). Discard cotter pin.





#### 4-36. BAP SHEAVE ASSEMBLY REPAIR (continued).

- (3) Remove cotter pin (9) from roller pin (10). Remove roller pin (10), two spacers (11), and roller assembly (12) from winch frame (4). Discard cotter pin.
- (4) Remove cotter pin (13) from pulley pin (14). Remove pulley pin (14), two spacers (15), and pulley (16) from winch frame (4). Discard cotter pin.
- (5) With the aid of an assistant, remove cotter pin (17) from roller pin (18). Remove roller pin (18), two spacers (19), and roller assembly (20) from winch frame (4). Discard cotter pin.



#### b. Cleaning and Inspection.

#### **WARNING**

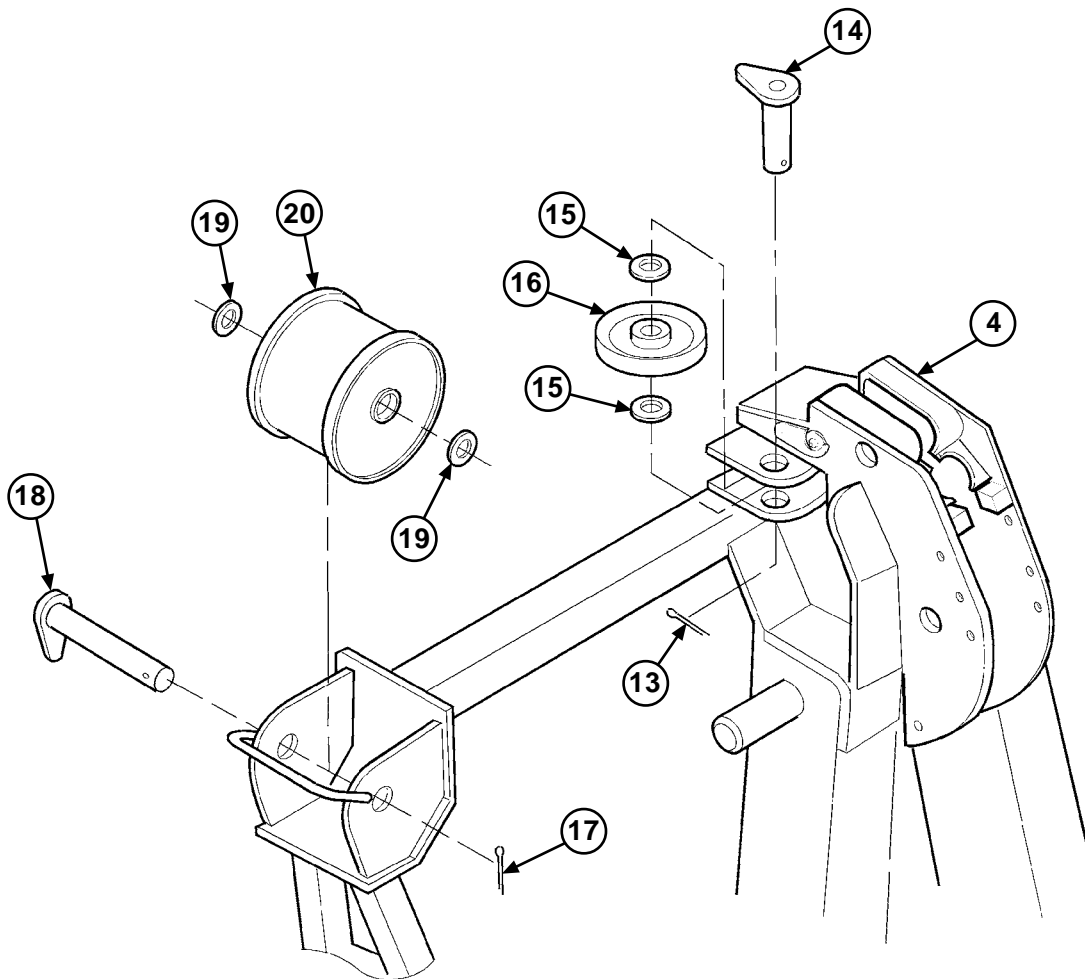
Drycleaning solvent is **TOXIC** and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.

- (1) Clean parts with drycleaning solvent and a rag.
- (2) Inspect all parts for damage that would make the parts unserviceable. Replace damaged parts.
- (3) Lubricate parts in accordance with Appendix G.

**4-36. BAP SHEAVE ASSEMBLY REPAIR (continued).**

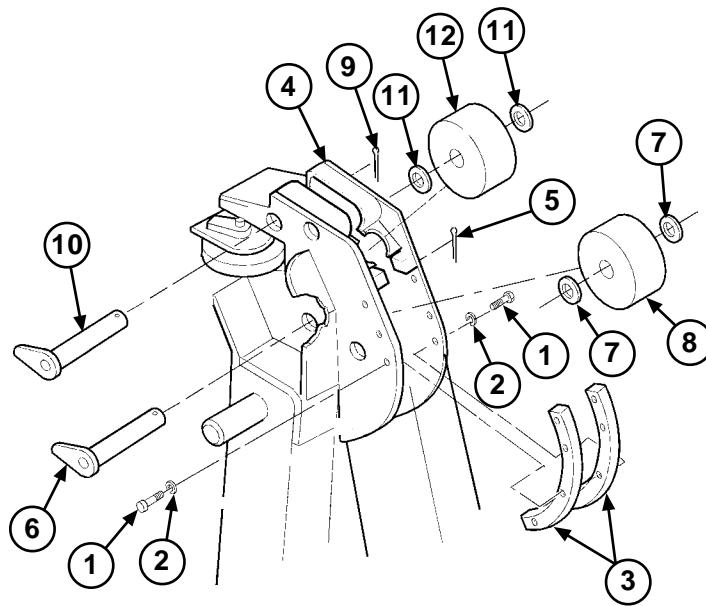
**c. Installation.**

- (1) With the aid of an assistant, install roller pin (18), two spacers (19), and roller assembly (20) on winch frame (4). Install new cotter pin (17) on roller pin (18).
- (2) Install pulley pin (14), two spacers (15), and pulley (16) on winch frame (4). Install new cotter pin (13) on pulley pin (14).



### 4-36. BAP SHEAVE ASSEMBLY REPAIR (continued).

- (3) Install roller pin (10), two spacers (11), and roller assembly (12) on winch frame (4). Install new cotter pin (9) on roller pin (10).
- (4) Install roller pin (6), two spacers (7), and roller assembly (8) on winch frame (4). Install new cotter pin (5) on roller pin (6).
- (5) Install eight bolts (1) and new lockwashers (2) and two guides (3) on winch frame (4).



#### **d. Follow-on Maintenance:**

- Wind in winch cable (para 2-11).

**END OF TASK**

### 4-36.1 BAP WINCH FRAME LOCKING LEVER OUTBOARD RETAINER BLOCKS FIELD REPLACEMENT

*This task covers:*

- a. Removal
- b. Installation

#### INITIAL SETUP

*Tools and Special Tools*

Welder, Portable  
Hand Grinder, Portable  
Clamps

*Materials/Parts*

Block, Retainer (part no. A4809211)

Rod, Welding, 336 or 340 for stick welding, MG600  
1/16 in. for TIG welder  
Shim Stock, 0.040 in.

*Equipment Condition*

Load removed from the BAP  
BAP unloaded from the CBT

#### NOTE

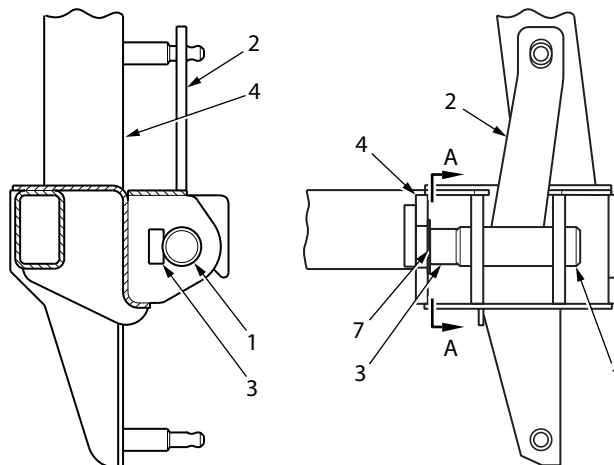
- Use MG600 1/16 in. filler rod if using a TIG welder.
- Use 336 or 340 welding rod if stick welding.

#### a. Removal.

- (1) Grind off any remaining weld or broken retainer block from locking pin (1).

#### b. Installation.

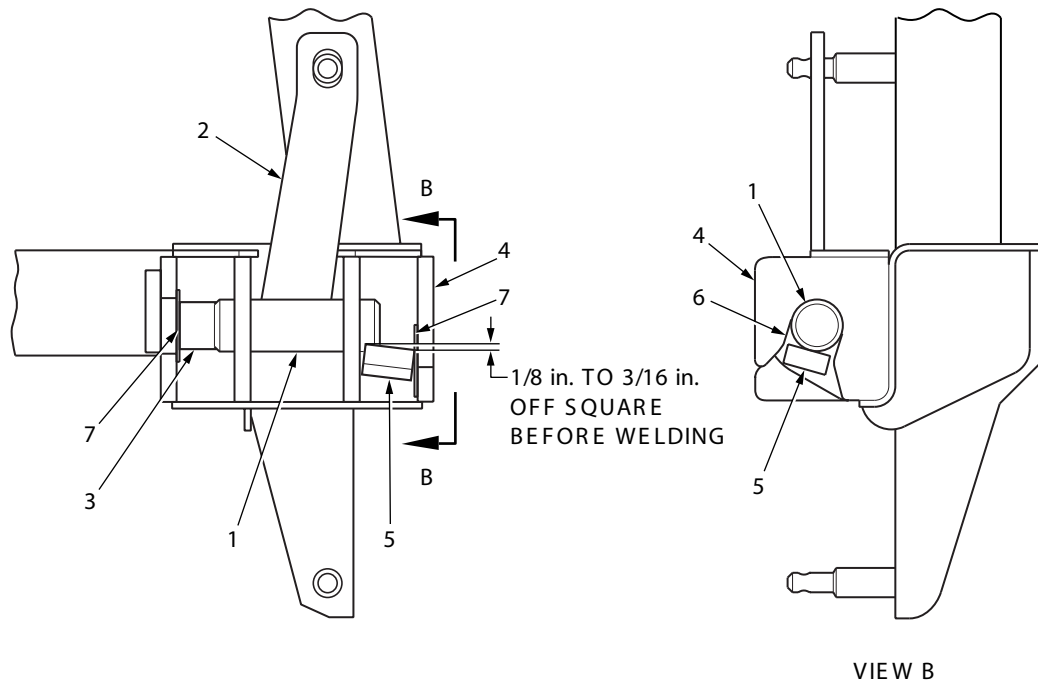
- (1) Rotate locking lever (2) to the up position. Inboard retainer block (3) should be to the back of locking pin (1) and parallel with the winch frame (4).
- (2) Place a 0.040 in. thick shim (7) between end of inboard retainer block (3) and winch frame (4) and clamp in place.



VIEW A

### 4-36.1 BAP WINCH FRAME LOCKING LEVER OUTBOARD RETAINER BLOCKS FIELD REPLACEMENT (continued).

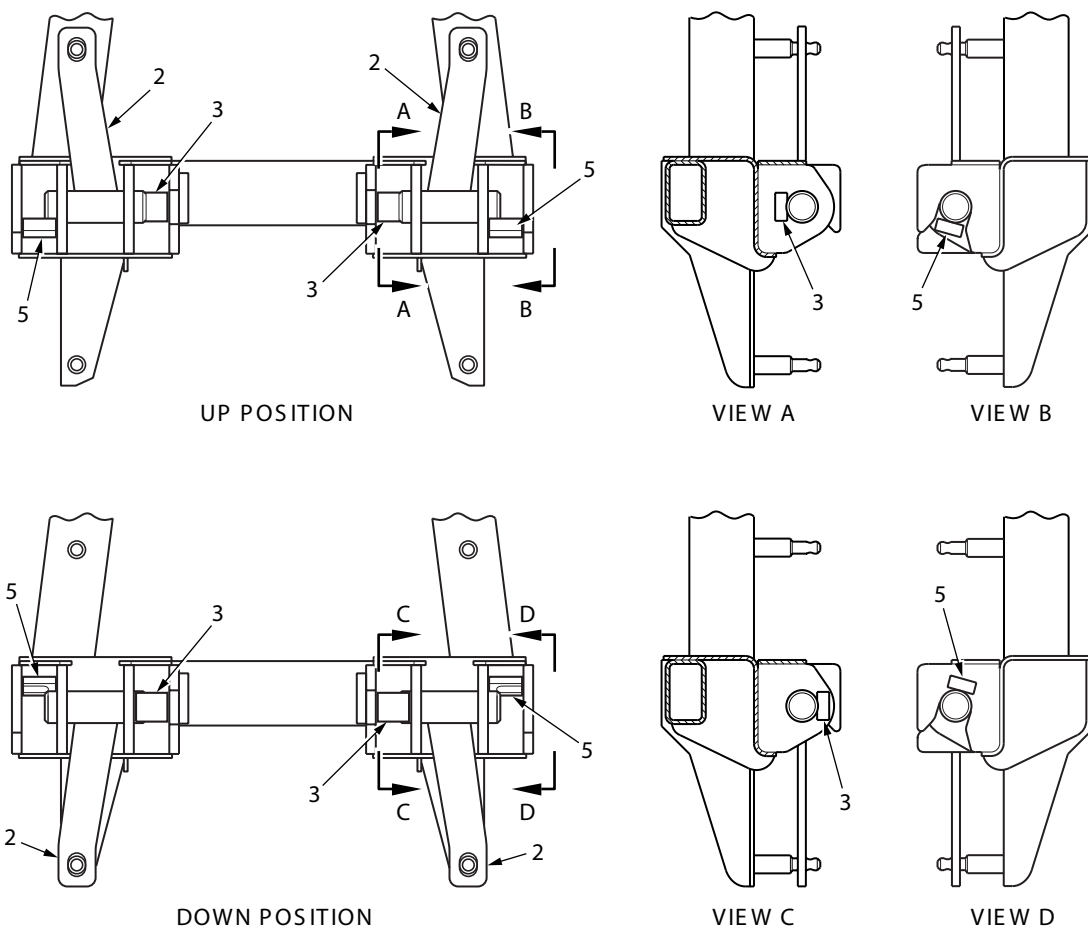
- (3) Position new outboard retainer block (5) on the locking pin (1) so that it is centered in the outboard lock beam opening (6). Pre-stress outboard retainer block 1/8 in. to 3/16 in. out of square off the end of locking pin (1) to counter pull of the weld.
- (4) Place a 0.040 in thick shim (7) between end of outboard retainer block (3) and winch frame (4) and clamp in place.



- (5) Pre-heat locking pin (1) to 475° F.
- (6) Tack weld outboard retainer block (5) on back corners.
- (7) Weld root pass from on sides of retainer block from back to front.
- (8) Build up weld from side to side until just over flush. All weld passes should be made from back to front.
- (9) Build up weld across front of retainer block until just under flush.

**4-36.1 BAP WINCH FRAME LOCKING LEVER OUTBOARD RETAINER BLOCKS  
FIELD REPLACEMENT (continued).**

- (10) Check that locking levers (2) move freely to upper and lower lock positions. Check that inboard retainer blocks (3) and outboard retainer blocks (5) are in the correct positions.



- c. Follow-on Maintenance.  
None.

**END OF TASK**



### 4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT.

This task covers:

- |                            |                          |
|----------------------------|--------------------------|
| a. Removal                 | c. Installation          |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

#### INITIAL SETUP

##### *Tools and Special Tools*

Pan, Drain, 4-Gallon (MIL-P-45819)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

##### *Materials/Parts*

Drycleaning Solvent (Item 13, Appendix E)  
 Grease (Item 17, Appendix E)  
 Rag (Item 21, Appendix E)  
 Backup Ring (Item 70, Appendix K)

Lockwasher (2) (Item 31, Appendix K)  
 Lockwasher (2) (Item 35, Appendix K)  
 O-ring (2) (Item 48, Appendix K)  
 O-ring (Item 81, Appendix K)  
 O-ring (2) (Item 82, Appendix K)  
 O-ring (2) (Item 83, Appendix K)  
 Preformed Packing (Item 71, Appendix K)

##### *Equipment Condition*

Load removed from the BAP (para 2-12)  
 BAP removed from the CBT (para 2-10)

#### NOTE

Use a drain pan to catch fluid draining from hoses and fittings. Wipe up any spillage with a rag.

#### a. Removal.

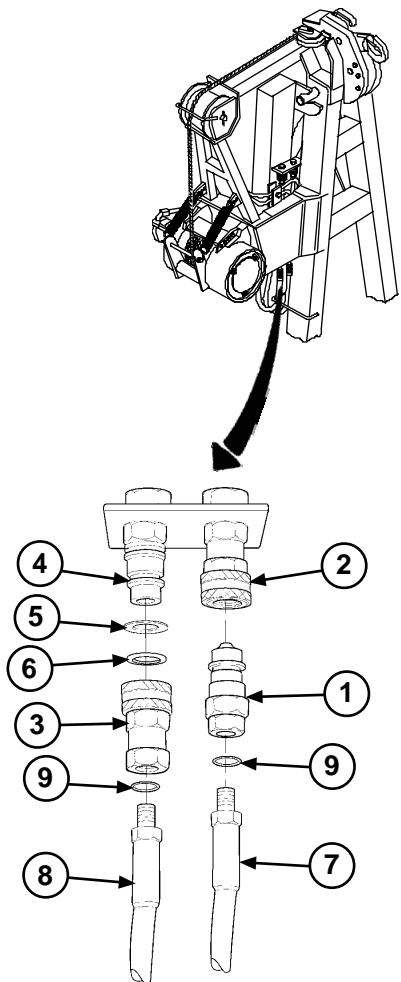
#### CAUTION

**Do not remove tube nuts and flared tube sleeves from hydraulic tubes unless there is leakage or other damage to tubes, tube nuts, or flared tube sleeves that make them unserviceable.**

#### NOTE

Tag all hoses and tubes before disconnecting. Note if each hose or tube has a male or female connector.

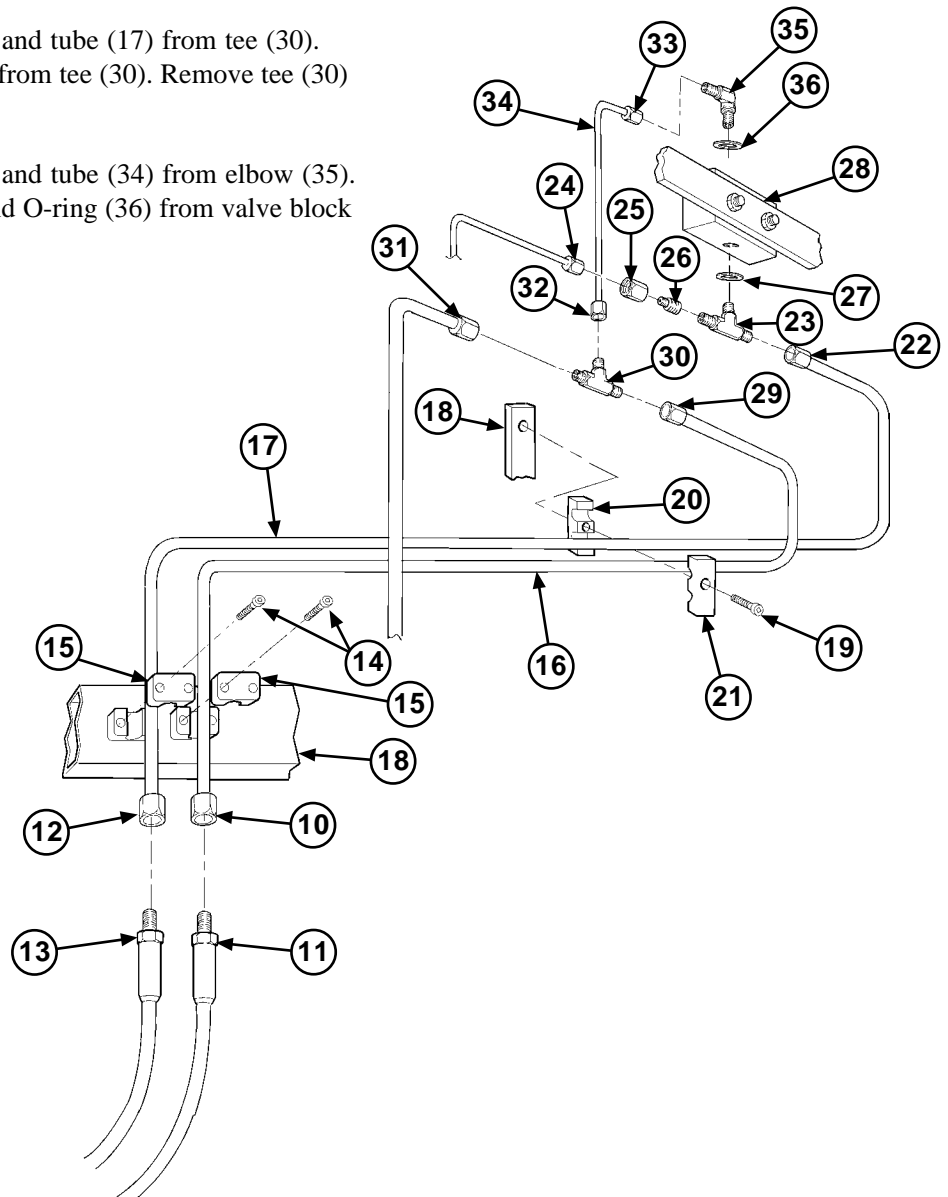
- (1) Remove male quick-disconnect coupling half (1) from dummy female quick-disconnect coupling half (2).
- (2) Remove female quick-disconnect coupling half (3) from dummy male quick-disconnect coupling half (4).
- (3) Remove backup ring (5) and preformed packing (6) from female quick-disconnect coupling half (3). Discard backup ring and preformed packing.
- (4) Remove male quick-disconnect coupling half (1) from hose (7).
- (5) Remove female quick-disconnect coupling half (3) from hose (8). Remove two O-rings (9) from male quick-disconnect coupling half (1) and female quick-disconnect coupling half (3). Discard O-rings.





**4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).**

- (6) Remove tube nut (10) from hose connector (11). Remove tube nut (12) from hose connector (13).
- (7) Remove four screws (14) and two double brackets (15) from two tubes (16 and 17) and winch frame (18).
- (8) Remove screw (19), clamp block (20), and arched cover plate (21) from two tubes (16 and 17) and winch frame (18). Remove tube nut (22) and tube (16) from tee (23).
- (9) Remove tube nut (24) from tube nut (25). Remove tube nut (25) from tee (23). Remove reducer (26) from tube nut (25).
- (10) Remove tee (23) and O-ring (27) from valve block (28). Discard O-ring.
- (11) Remove tube nut (29) and tube (17) from tee (30). Remove tube nut (31) from tee (30). Remove tee (30) from tube nut (32).
- (12) Remove tube nut (33) and tube (34) from elbow (35). Remove elbow (35) and O-ring (36) from valve block (28). Discard O-ring.



**4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).**

- (13) Remove tube nut (37) from straight adapter (38). Remove straight adapter (38) and O-ring (39) from valve block (28). Discard O-ring.
- (14) Remove two bolts (40), washers (41), lockwashers (42), and nuts (43) and valve block (28) from winch frame (18). Discard lockwashers.

**NOTE**

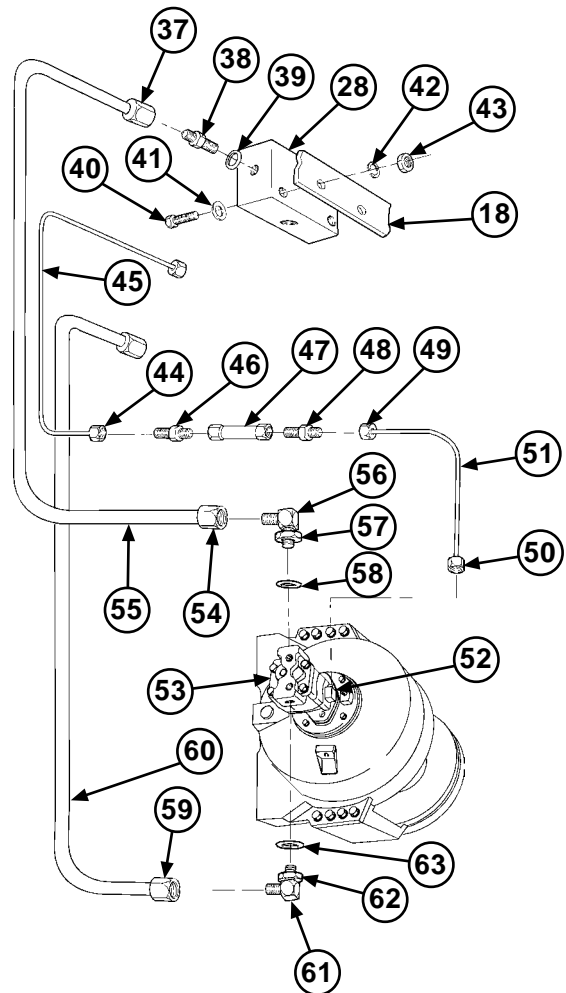
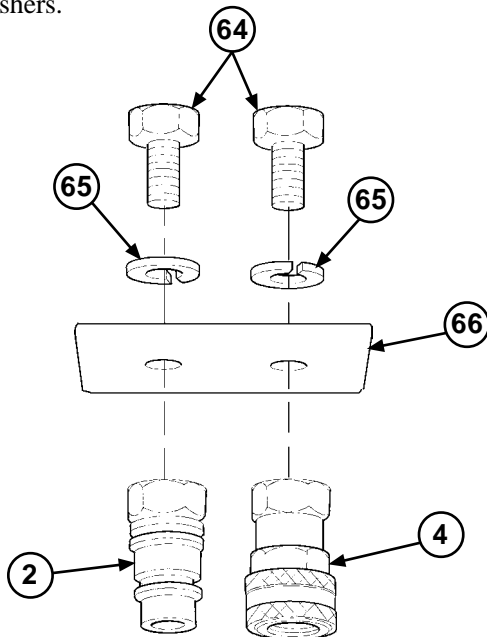
Before removal, mark one end of the check valve, straight adapter, and tube nut. The check valve must be installed the same way it is removed.

- (15) Remove tube nut (44) and tube (45) from straight adapter (46). Remove straight adapter (46) from check valve (47). Remove check valve (47) from straight adapter (48). Remove tube nut (49) from straight adapter (48).
- (16) Remove tube nut (50) and tube (51) from elbow (52) on side of winch motor (53).
- (17) Remove tube nut (54) and tube (55) from elbow (56) on top of winch motor (53). Loosen captive nut (57) and remove elbow (56) and O-ring (58) from winch motor (53). Discard O-ring.
- (18) Remove tube nut (59) and tube (60) from elbow (61) on bottom of winch motor (53). Loosen captive nut (62) and remove elbow (61) and O-ring (63) from winch motor (53). Discard O-ring.

**NOTE**

Note where dummy coupling halves were removed.

- (19) Remove two screws (64), lockwashers (65), and dummy quick-disconnect coupling halves (2 and 4) from mounting bracket (66). Discard lockwashers.



## 4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).

### b. Cleaning and Inspection.

#### WARNING

Drycleaning solvent is **TOXIC and flammable**. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.

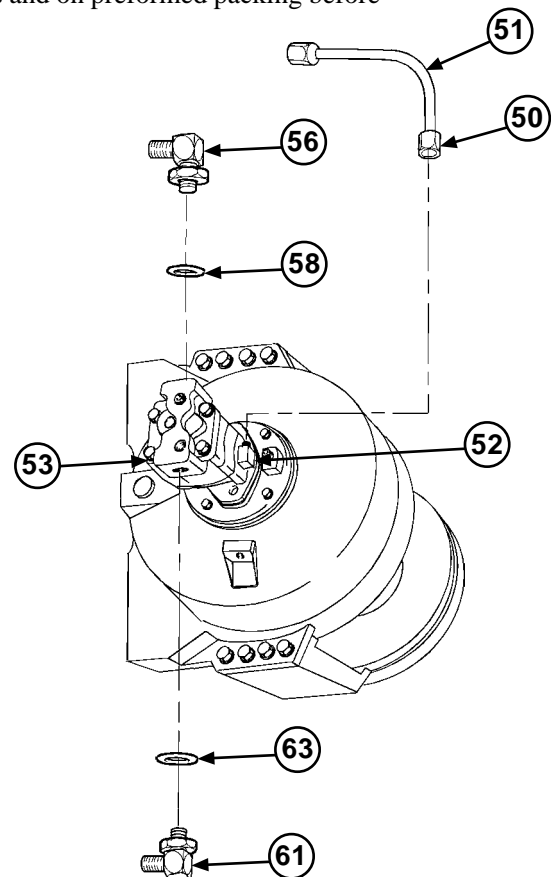
- (1) Clean parts with drycleaning solvent and rag.
- (2) Inspect all parts for damage that would make them unserviceable. Replace damaged parts.

### c. Installation.

#### **NOTE**

- Do not tighten captive nuts until all tubes are installed.
- Apply a light film of grease on all O-rings and on preformed packing before installation.

- (1) Install two screws (64), new lockwashers (65), and dummy quick-disconnect coupling halves (2 and 4) on mounting bracket (66).
- (2) Install elbow (61) and new O-ring (63) on bottom of winch motor (53).
- (3) Install elbow (56) and new O-ring (58) on top of winch motor (53).
- (4) Install tube nut (50) and tube (51) on elbow (52) on side of winch motor (53).



**4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).**

**NOTE**

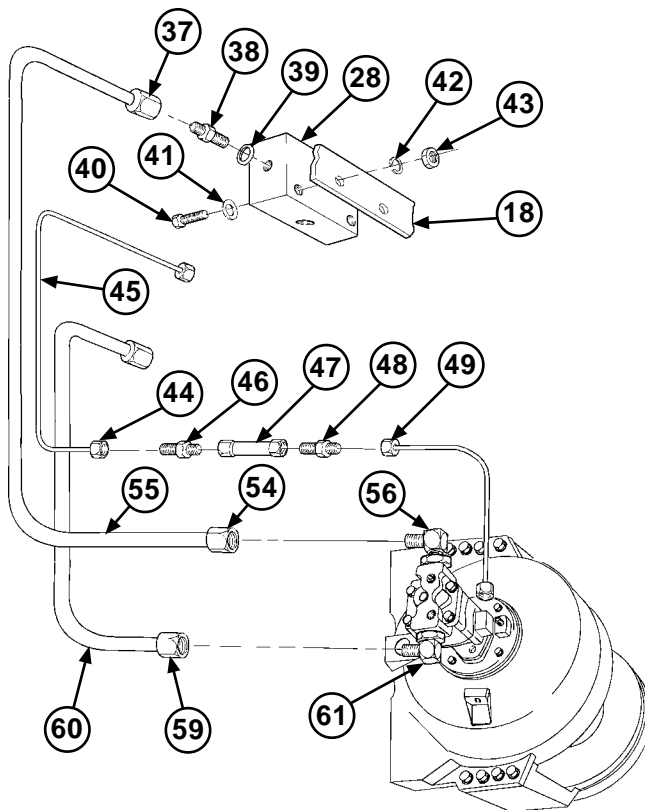
Make sure breather valve is facing rear of the BAP when installing valve block.

- (5) Install two bolts (40), washers (41), new lockwashers (42), and nuts (43) and valve block (28) on winch frame (18).
- (6) Install straight adapter (38) and new O-ring (39) on side of valve block (28).

**NOTE**

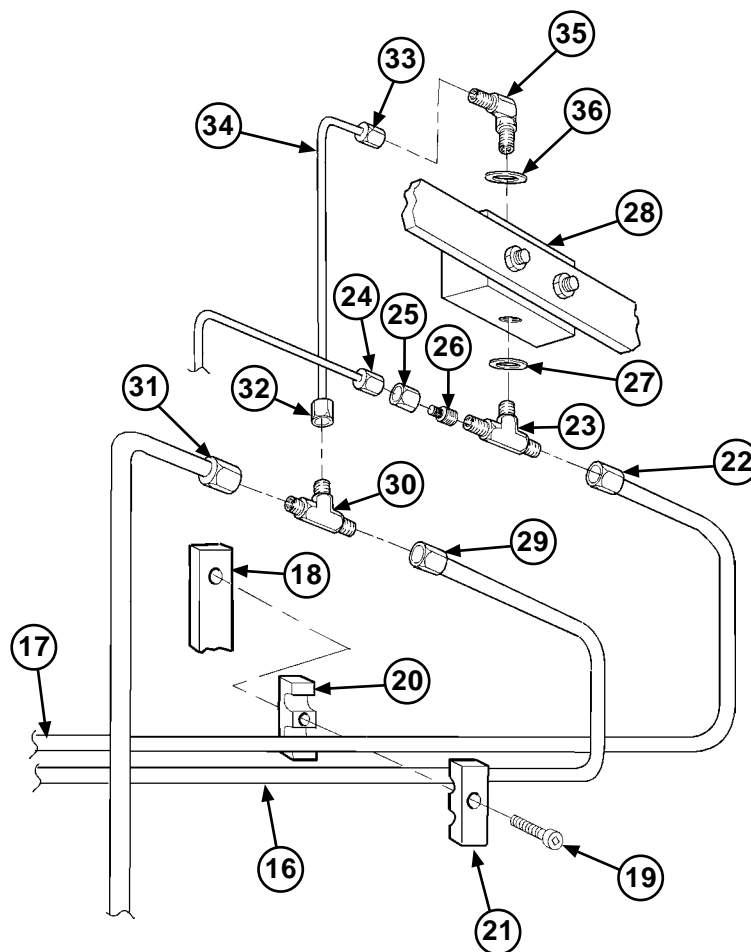
To install check valve correctly, use the marks made on check valve, straight adapter, and tube nut during removal.

- (7) Install tube nut (49) on straight adapter (48). Install check valve (47) on straight adapter (48). Install straight adapter (46) on check valve (47). Install tube nut (44) and tube (45) on straight adapter (46).
- (8) Install tube nut (54) and tube (55) on elbow (56). Install tube nut (37) on other end of tube (55) on straight adapter (38).
- (9) Install tube nut (59) and tube (60) on elbow (61).



**4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).**

- (10) Install tee (23) and new O-ring (27) on bottom of valve block (28). Install elbow (35) and new O-ring (36) on top of valve block (28).
- (11) Install tube nut (33) and tube (34) on elbow (35). Install tee (30) on tube nut (32) and tube (34). Install tube nut (31) on tee (30).
- (12) Install reducer (26) and tube nut (25) on tee (23).
- (13) Install tube nut (24) on tube nut (25). Install tube nut (22) and tube (16) on tee (30). Install tube nut (22) and tube (16) on tee (23).
- (14) Install screw (19), clamp block (20), and arched cover plate (21) on two tubes (16 and 17) and winch frame (18).



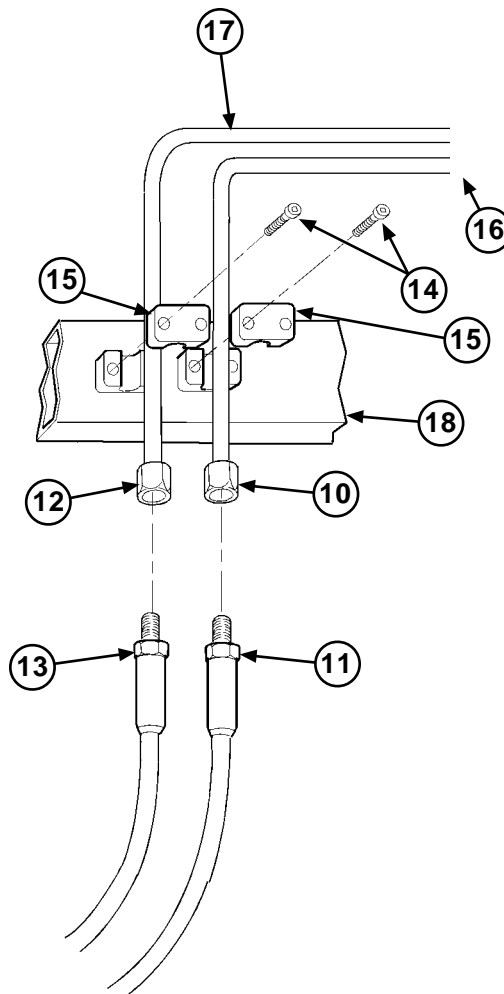
**4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).**

(15) Install four screws (14) and two double brackets (15) on two tubes (16 and 17) and winch frame (18).

**CAUTION**

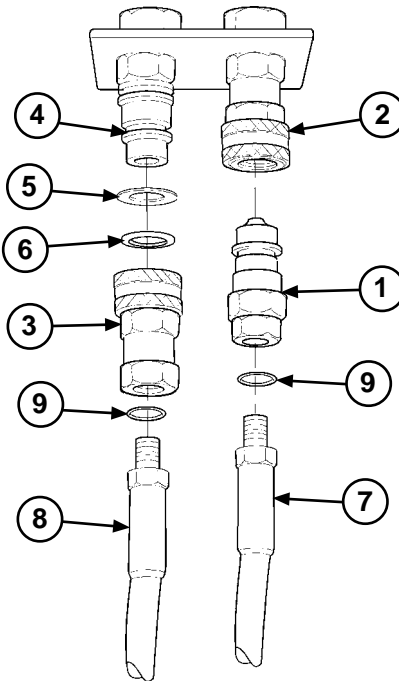
**BAP hydraulic hoses must be installed through restraining bracket welded onto winch frame. Failure to properly install hydraulic hoses could result in damage to hoses during BAP operation.**

(16) Install tube nut (10) on hose connector (11). Install tube nut (12) on hose connector (13).



#### 4-37. BAP WINCH HYDRAULIC SYSTEM REPLACEMENT (continued).

- (17) Install two new O-rings (9) on male quick-disconnect coupling half (1) and female quick-disconnect coupling half (3).
- (18) Install female quick-disconnect coupling half (3) on hose (8).
- (19) Install male quick-disconnect coupling half (1) on hose (7).
- (20) Install new backup ring (5) and new preformed packing (6) in female quick-disconnect coupling half (3).
- (21) Install female quick-disconnect coupling half (3) on dummy male quick-disconnect coupling half (4).
- (22) Install male quick-disconnect coupling half (1) on dummy female quick-disconnect coupling half (2).



#### d. Follow-on Maintenance:

- Load the BAP on the CBT (para 2-9).
- Briefly operate BAP winch and check for leaks.
- Add hydraulic oil to Transporter as needed (LO 9-2320-279-12).

**END OF TASK**

### 4-38. BAP CABLE ASSEMBLY REPLACEMENT.

This task covers:

- |                |                 |                          |
|----------------|-----------------|--------------------------|
| a. Removal     | c. Assembly     | e. Follow-on Maintenance |
| b. Disassembly | d. Installation |                          |

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Materials/Parts*

Gloves, Protective (Item 15, Appendix E)  
Hook Latch Kit (Item 2, Appendix K)

*Personnel Required*

Two

*Equipment Condition*

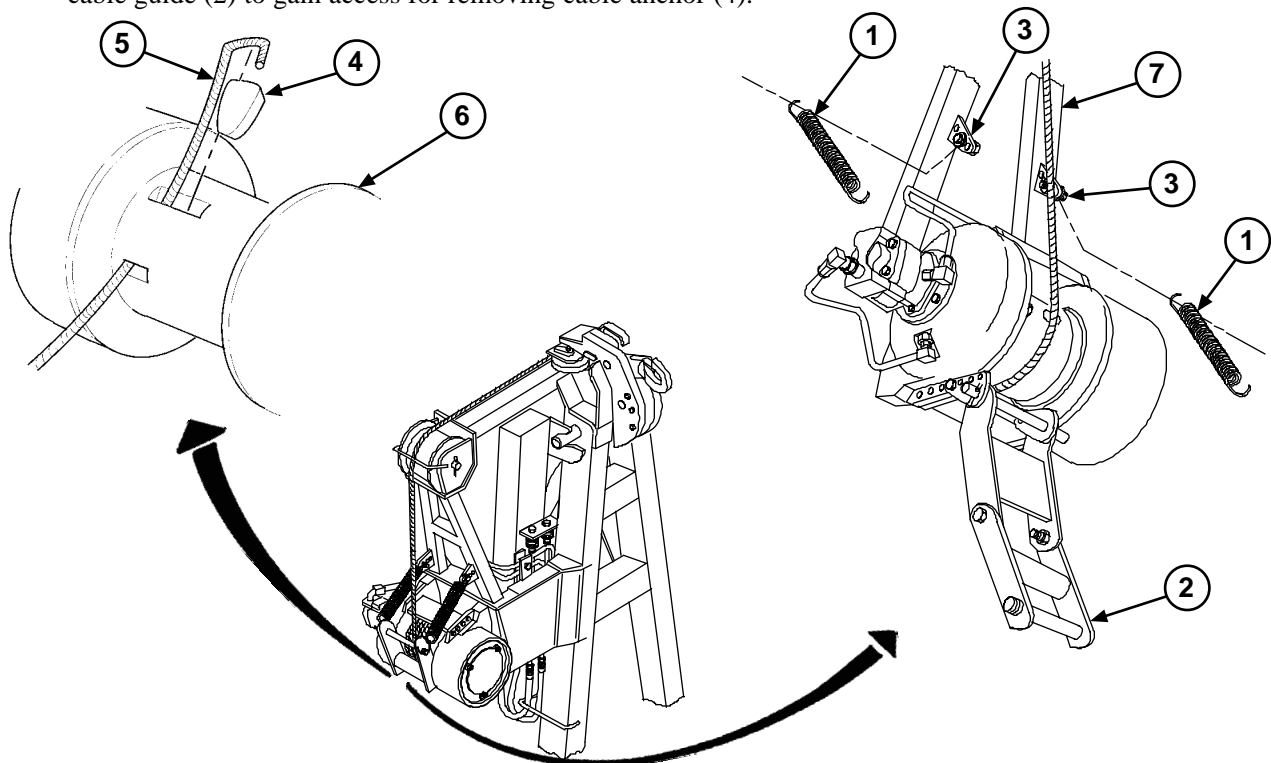
Load removed from the BAP (para 2-12)  
Wheels chocked (TM 9-2320-279-10)  
Winch cable fully extended (para 2-12)  
Engine turned off (TM 9-2320-279-10)

**WARNING**

**Always wear leather gloves when handling cable. Handling cable with bare hands could result in injury to personnel.**

**a. Removal.**

- (1) Unhook ends of two cable guide springs (1) from cable guide (2) and two mounting brackets (3). Lower cable guide (2) to gain access for removing cable anchor (4).



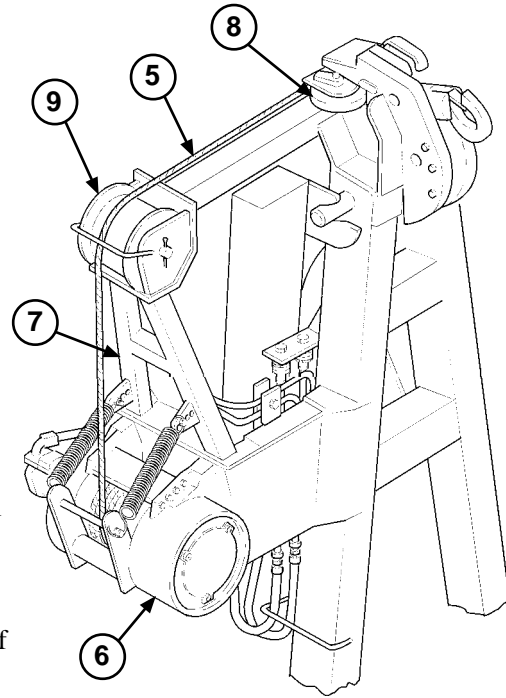


**4-38. BAP CABLE ASSEMBLY REPLACEMENT (continued).**

**NOTE**

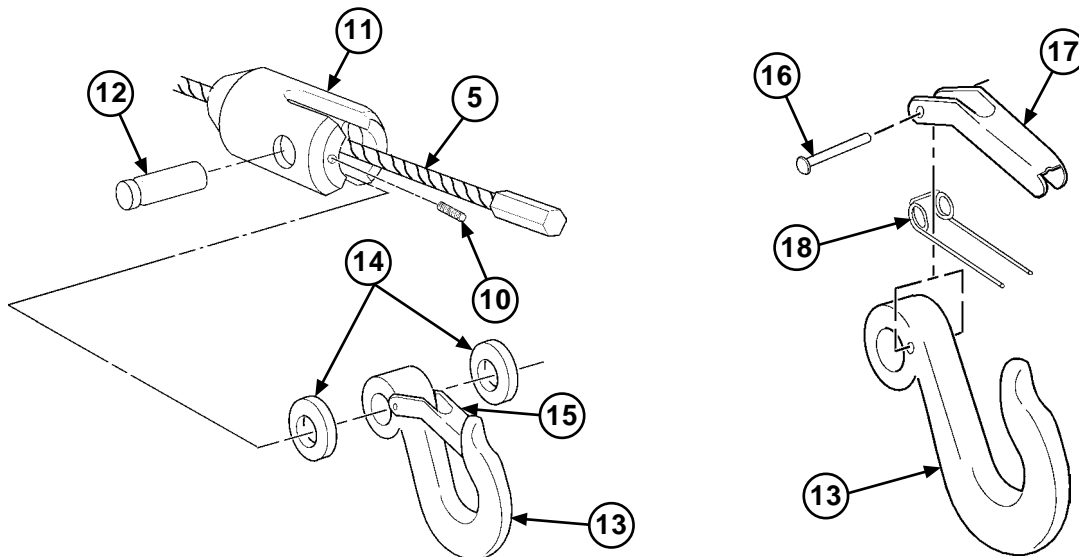
Cable drum can be set up for clockwise or counterclockwise installation of winch cable. To aid in installation, make note of cable anchor slot used to secure cable on winch drum.

- (2) Push out cable anchor (4) and winch cable (5). Remove cable (5) from around cable anchor (4), and pull cable (5) from winch (6).
- (3) Remove cable (5) from winch (6) and off of winch frame (7) by pulling through pulley (8) and rollers (9).



**b. Disassembly.**

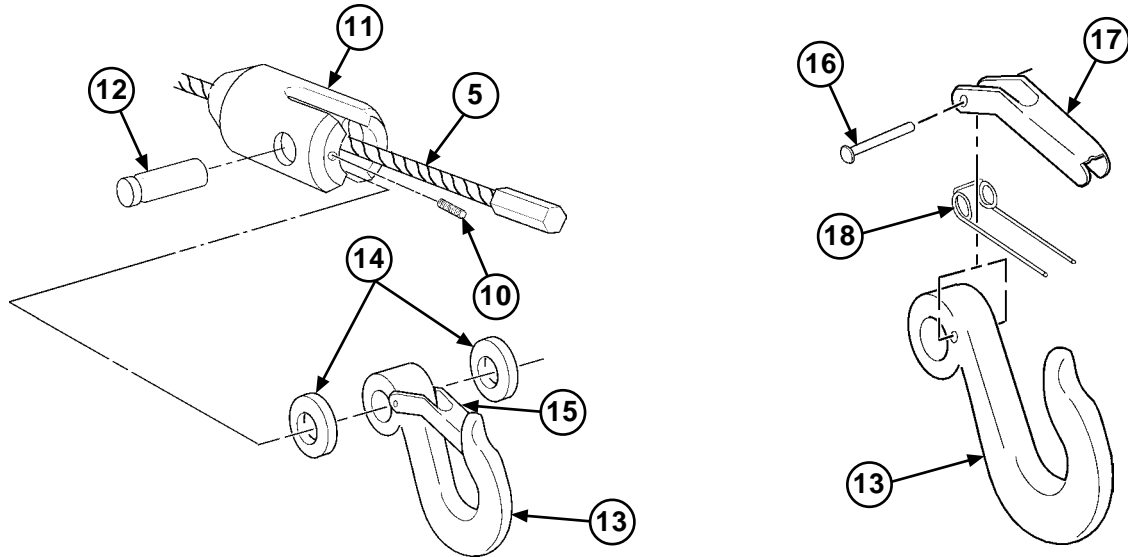
- (1) Loosen setscrew (10) from hook holder (11) until pin (12) can be removed from hook holder (11).
- (2) Remove hook (13) and two spacers (14) from hook holder (11), and slide hook holder (11) off of cable (5).
- (3) Remove hook latch kit (15) by driving out rivet (16) and removing latch (17) and spring (18) from hook (13). Discard hook latch kit.



**4-38. BAP CABLE ASSEMBLY REPLACEMENT (continued).**

**c. Assembly.**

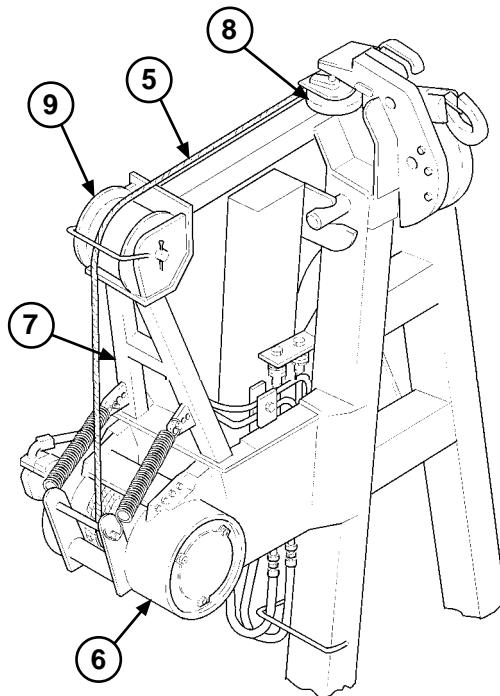
- (1) Install new latch (17), spring (18), and rivet (16) on hook (13).
- (2) Slide hook holder (11) over cable (5) until cable (5) is fully seated in hook holder (11).



- (3) Install two spacers (14), hook (13), and pin (12) in hook holder (11). Make sure pin (12) is installed with groove under setscrew (10).
- (4) Install setscrew (10) in hook holder (11).
- (5) Lubricate cable (Appendix G).

**d. Installation.**

- (1) Install cable (5) through pulley (8) and rollers (9) and on winch (6).

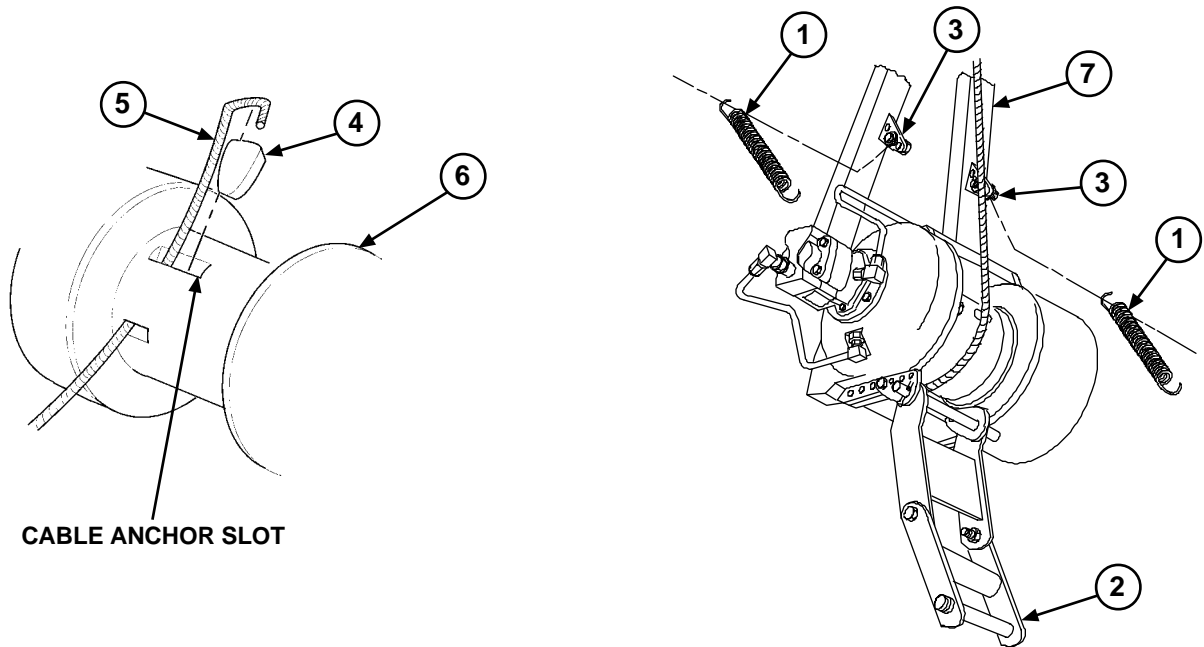


<b>4-38. BAP CABLE ASSEMBLY REPLACEMENT (continued).</b>
--

**NOTE**

Make sure cable is fully wrapped around wide end of cable anchor and lies along groove of cable anchor. Small end of cable anchor goes into cable anchor slot first.

- (2) Install cable (5) through cable anchor slot and around cable anchor (4). Firmly seat cable anchor (4) in cable anchor (4) slot of winch (6).
- (3) Install two cable guide springs (1) on cable guide (2) and two mounting brackets (3).

**c. Follow-on Maintenance:**

- Reel in winch cable (para 2-12).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-39. BAP WINCH ASSEMBLY REPLACEMENT.**

This task covers:

- |                            |                          |
|----------------------------|--------------------------|
| a. Removal                 | c. Installation          |
| b. Cleaning and Inspection | d. Follow-on Maintenance |

**INITIAL SETUP**

*Tools and Special Tools*

- Pan, Drain, 4-Gallon (MIL-P-45819)
- Lifting Device, Minimum Capacity 350 lb (158.9 kg)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

- Cotter Pin (4) (Item 18, Appendix K)
- Lockwasher (8) (Item 33, Appendix K)
- Lockwasher (4) (Item 35, Appendix K)
- O-ring (2) (Item 83, Appendix K)

*Materials/Parts*

- Cap and Plug Set (Item 9, Appendix E)
- Gloves, Protective (Item 15, Appendix E)
- Goggles, Safety (Item 16, Appendix E)
- Lubricating Oil (Item 20, Appendix E)
- Rag (Item 21, Appendix E)

*Personnel Required*

Two

*Equipment Condition*

- Load removed from the BAP (para 2-12)
- BAP unloaded from the CBT (para 2-10)

**a. Removal.**

**WARNING**

**If winch cable has to be cut to remove winch assembly, wrap cut end of cable in tape and secure loose end of cable to prevent it from swinging free during winch assembly removal. Failure to follow this warning could result in injury to personnel.**

**CAUTION**

**To prevent contamination of hydraulic system, cap and/or plug hydraulic lines and ports after disconnecting lines.**

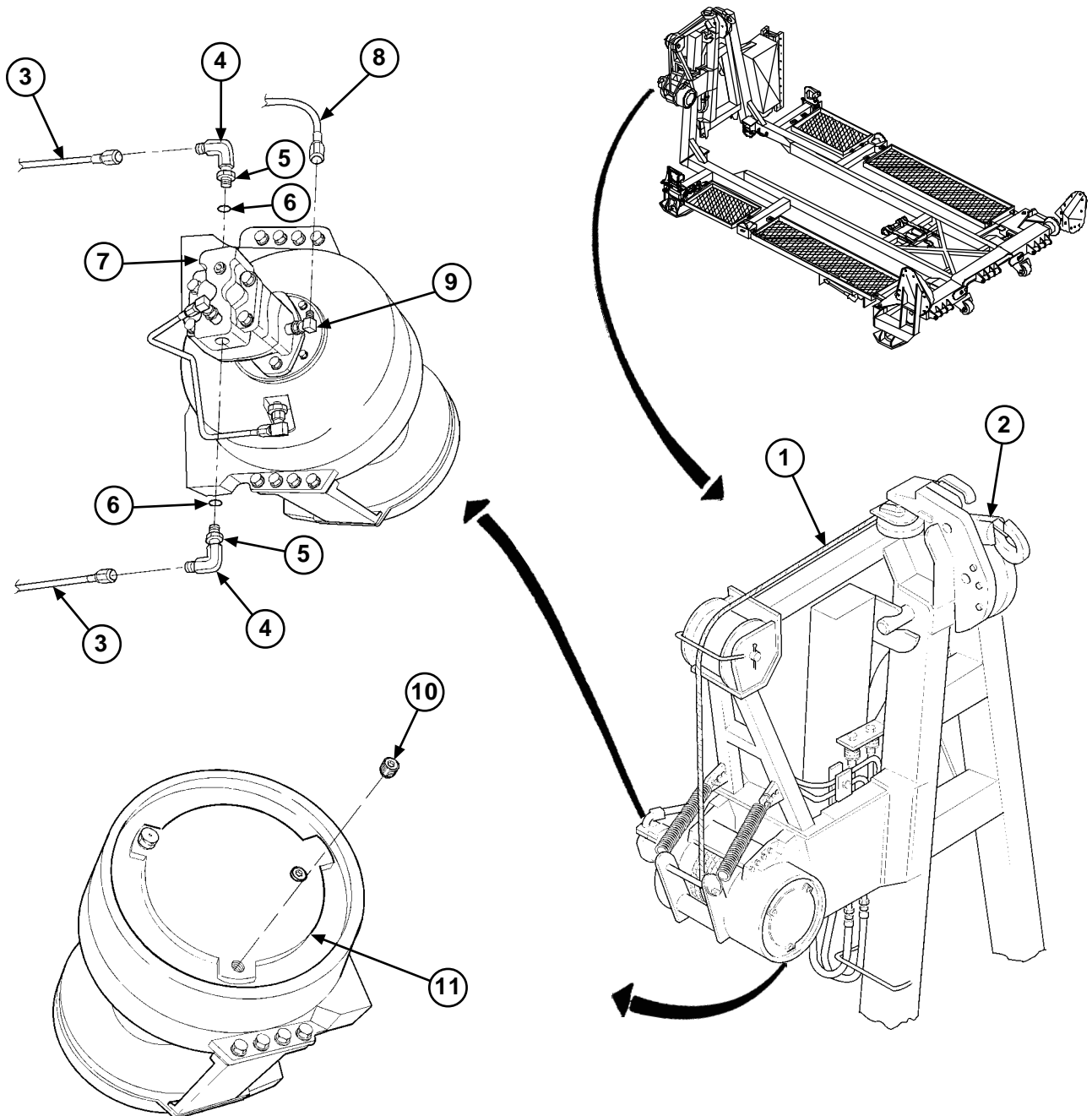
**NOTE**

- If winch is inoperative, it can be removed only by cutting the cable.
- Use a suitable container to catch fluid draining from hoses and fittings. Wipe up any spillage with a rag.

(1) If winch can be operated to play out winch cable (1), remove winch cable (1) (para 4-38). If winch cannot be operated to play out winch cable, cut cable (1) close to hook holder (2).

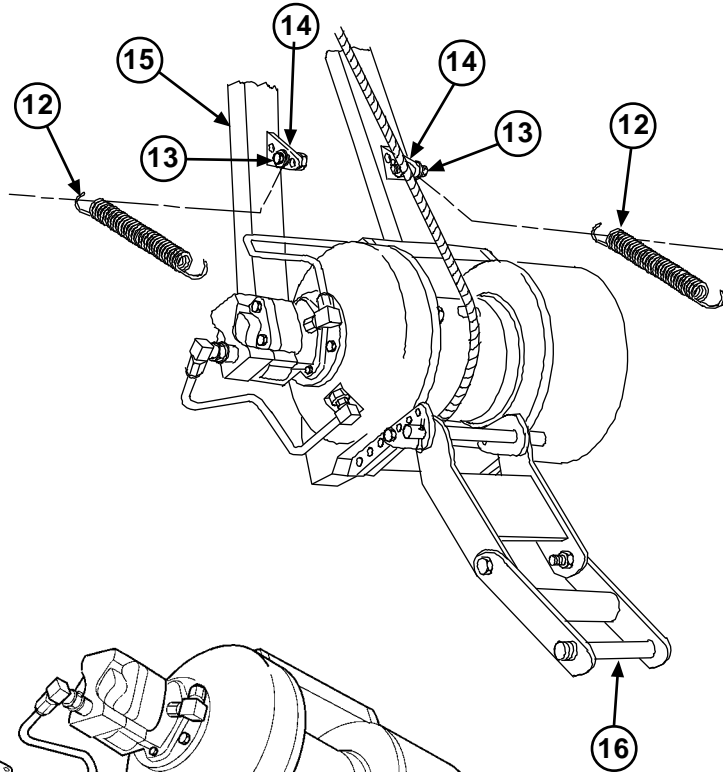
**4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).**

- (2) Remove two hydraulic tubes (3) from two elbows (4). Loosen two captive nuts (5), then remove two elbows (4) and O-rings (6) from winch motor (7). Remove tube (8) from elbow (9). Discard O-rings.
- (3) Remove pipe plug (10) from end cover (11), and drain oil into a suitable container. Install pipe plug (10) in end cover (11).

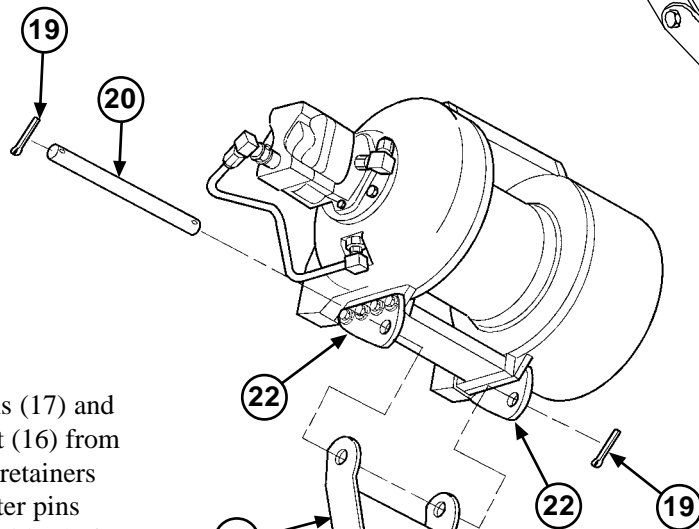


**4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).**

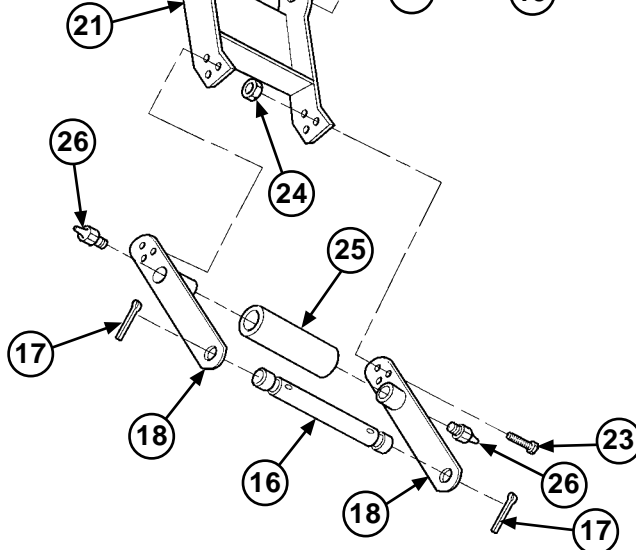
- (4) Remove two cable guide springs (12) from two bolts (13) and brackets (14) on winch frame (15) and upper cable guide shaft (16).



- (5) Remove two cotter pins (17) and upper cable guide shaft (16) from two upper cable guide retainers (18). Remove two cotter pins (19) and lower cable guide shaft (20) from carriage (21) and two pivot plates (22). Discard cotter pins.



- (6) Remove six screws (23) and nuts (24), two upper cable guide retainers (18), and roller assembly (25) from carriage (21). Remove two grease fittings (26) from roller assembly (25).



## 4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).

### NOTE

- When replacing an old winch assembly with a new winch assembly, remove eight bolts from new winch assembly and exchange with those on winch being turned in for repair. Bolts used to mount pivot plates are longer than those shipped with new winch assembly. Be sure to ship old winch to Direct Support maintenance with all shorter bolts.
  - Replace the two pivot plates one at a time.
- (7) Remove four bolts (27) and lockwashers (28) from each of two pivot plates (22). Remove two pivot plates (22) from winch assembly (29). Discard lockwashers. Temporarily reinstall four bolts (27) in winch assembly (29).

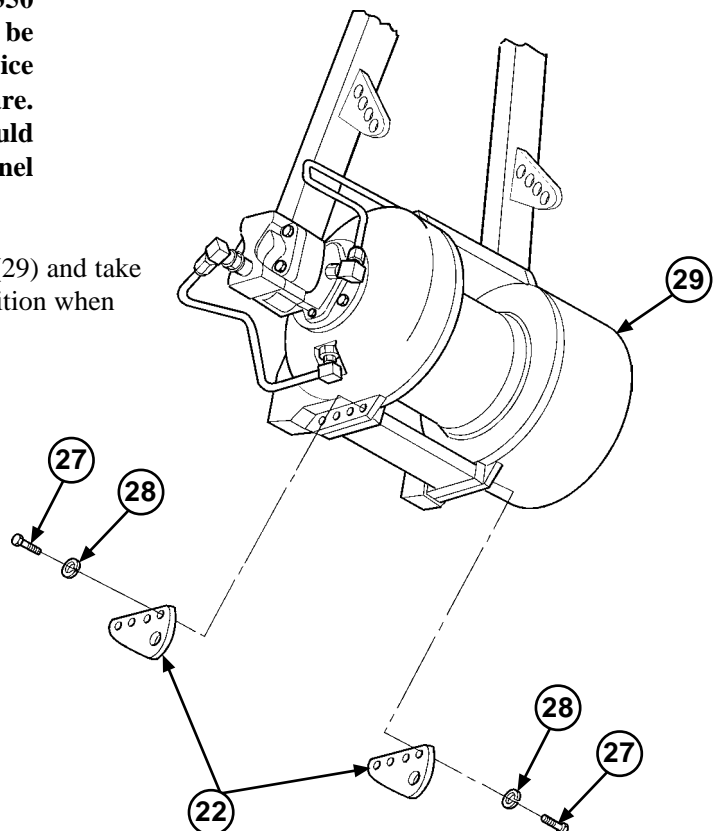
### NOTE

If winch cable had to be cut to remove winch assembly in Step 1, manually unwind winch cable from winch drum, then remove winch cable from winch drum (para 4-38).

### WARNING

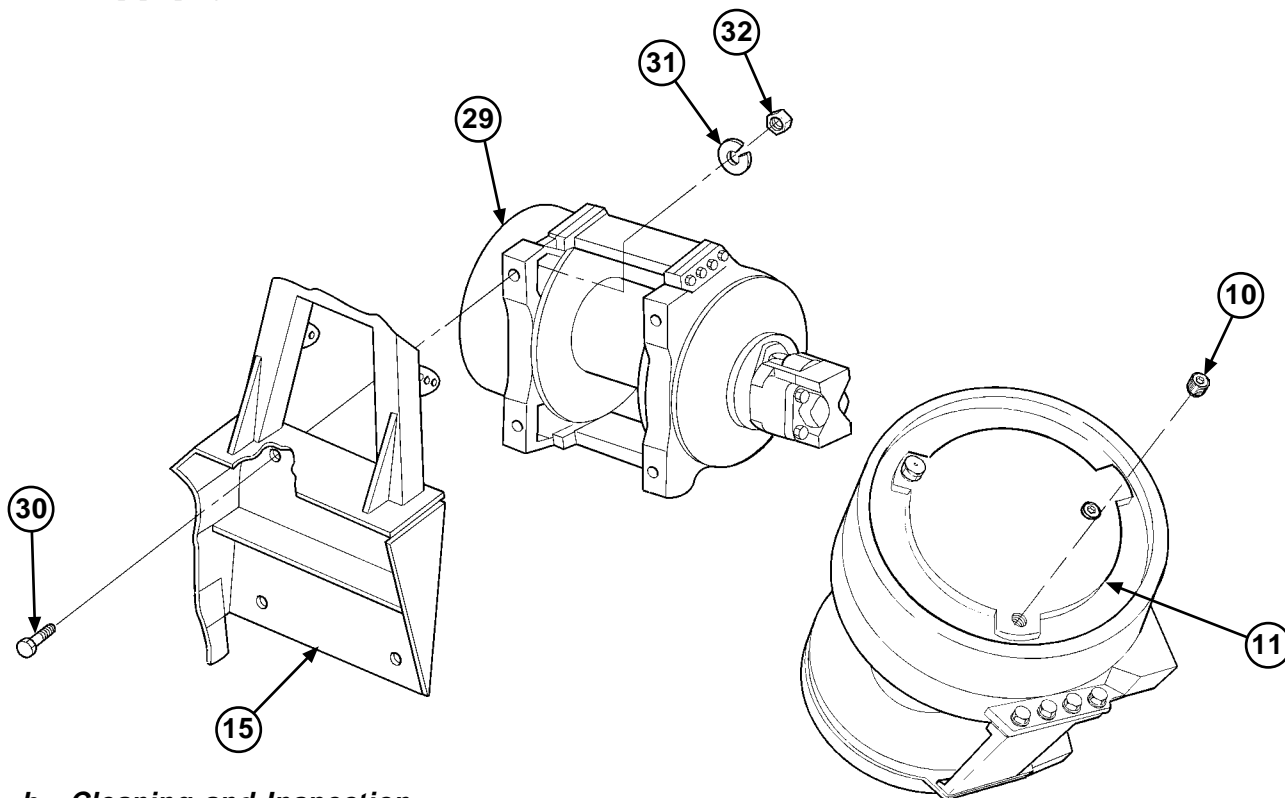
The winch assembly without cable installed weighs approximately 350 pounds (158.9 kg). Winch must be secured by a suitable lifting device before removing mounting hardware. Failure to follow this warning could result in death or injury to personnel and damage to equipment.

- (8) Attach lifting device to winch assembly (29) and take up slack so winch will not fall out of position when mounting hardware is removed.



**4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).**

- (9) Remove four bolts (30), lockwashers (31), and nuts (32) from base of winch assembly (29). Discard lockwashers. Remove winch assembly (29) from winch frame (15).
- (10) Remove pipe plug (10) from end cover (11), and drain remaining oil into a suitable container. Install pipe plug (10) in end cover (11).



**b. Cleaning and Inspection.**

**WARNING**

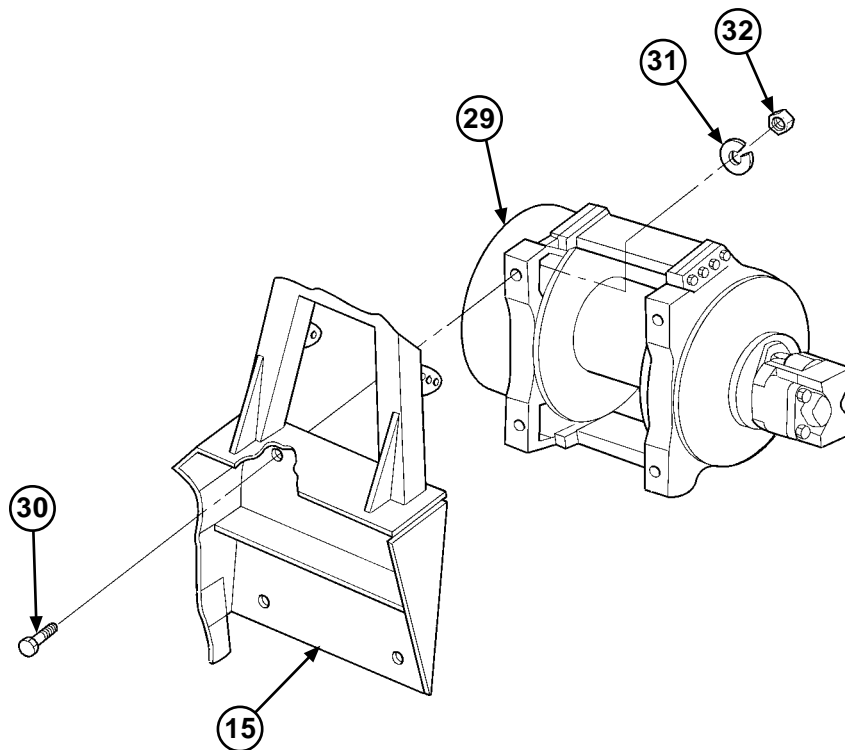
- Drycleaning solvent is **TOXIC** and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.
  - Do not use drycleaning solvent on winch cable. Solvent will soak into strands of cable and result in rust forming inside cable, which will cause cable to deteriorate and weaken much faster than usual. This could result in cable breaking under normal loads and could cause death or injury to personnel.
- (1) Clean all parts except winch cable using drycleaning solvent and rag.
  - (2) Inspect all hardware and parts for wear or damage that would make them unserviceable. Replace any damaged, unserviceable, or missing hardware and parts.



**4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).****c. Installation.****WARNING**

The winch assembly without cable weighs approximately 350 pounds (158.9 kg). Winch must be secured by a suitable lifting device before installing it on BAP winch frame. Failure to follow this warning could result in death or injury to personnel and equipment damage.

- (1) With the aid of an assistant, use lifting device to lift winch assembly (29) into position on winch frame (15), and make sure all four mounting pads (33) of winch assembly (29) are flush with winch frame (15) mounting surface.
- (2) Install four bolts (30), new lockwashers (31), and nuts (32) on winch frame (15) and winch assembly (29). Remove lifting device.

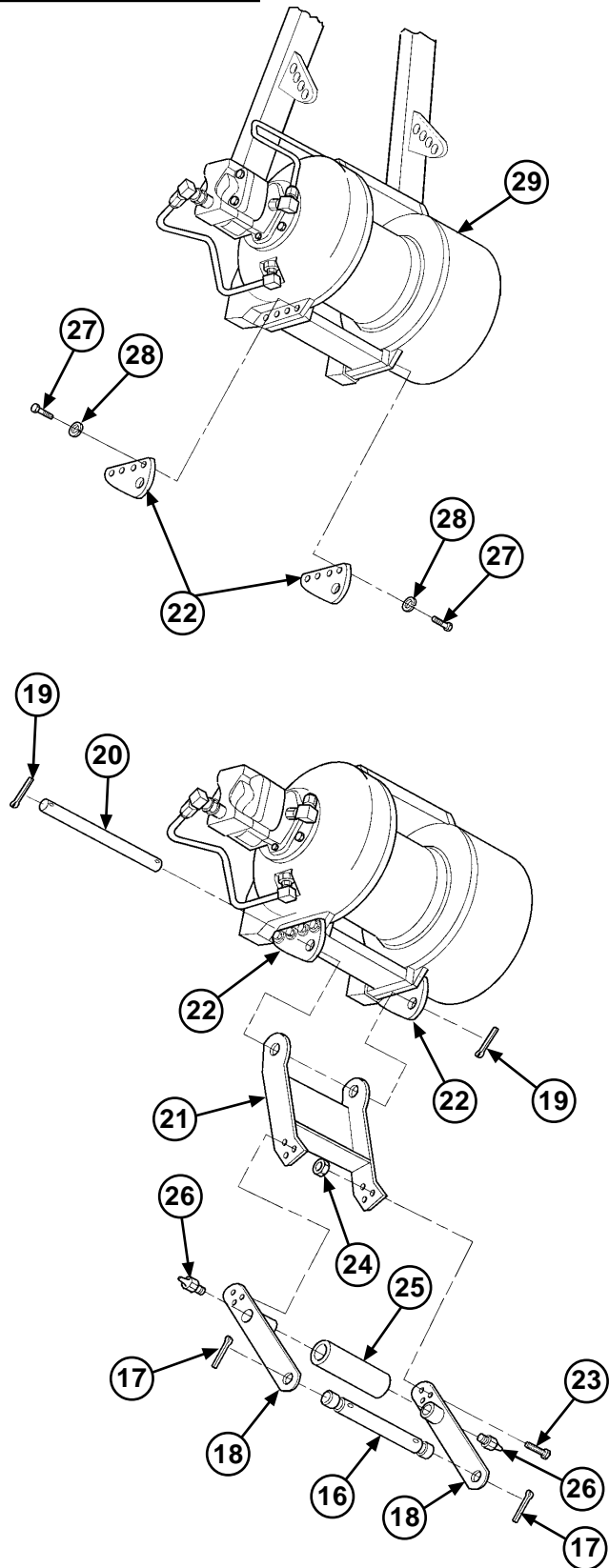
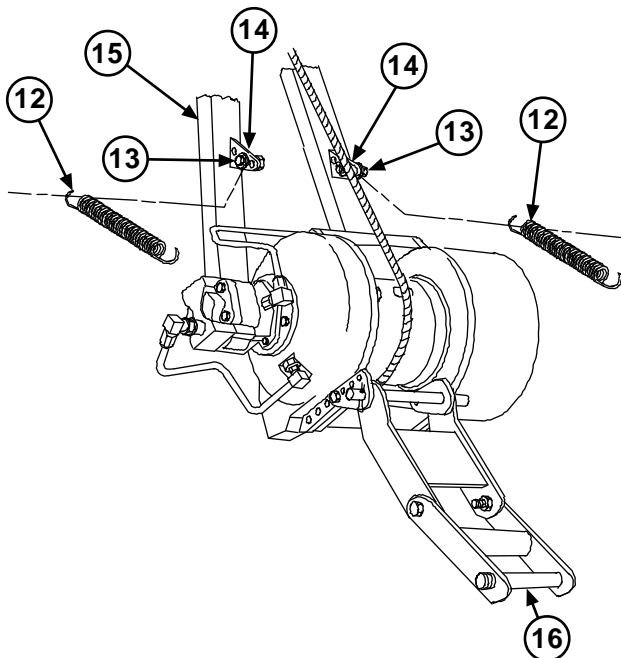


**4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).**

**NOTE**

Reuse the 8 long bolts that supported pivot plates from old winch assembly during installation.

- (3) Remove four bolts (27) temporarily reinstalled in winch assembly (29) during removal. Install four bolts (27) and new lockwashers (28) and pivot plate (22) on winch assembly (29). Install other pivot plate (22) in the same manner.
- (4) Install six screws (23) and nuts (24), two upper cable guide retainers (18), and roller assembly (25) on carriage (21). Install two grease fittings (26) on ends of roller assembly (25).
- (5) Install two new cotter pins (19), and lower cable guide shaft (20) onto carriage (21) and two pivot plates (22). Install two new cotter pins (17) and upper cable guide shaft (16) on two upper cable guide retainers (18).

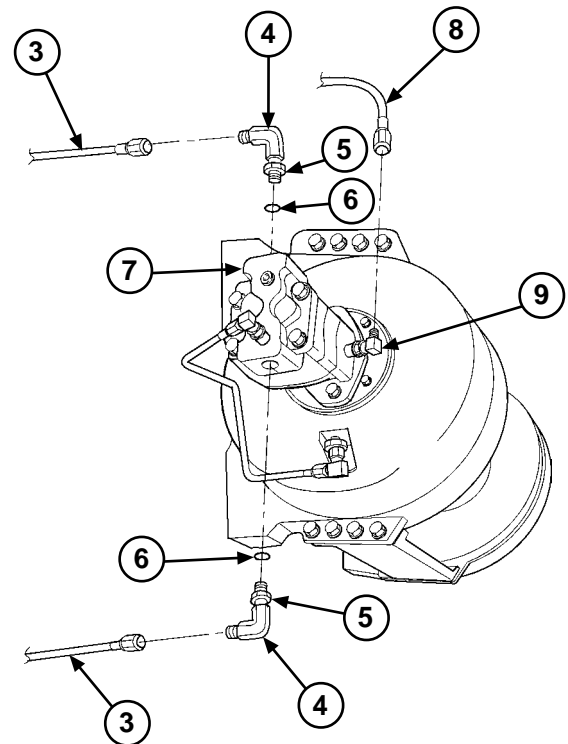
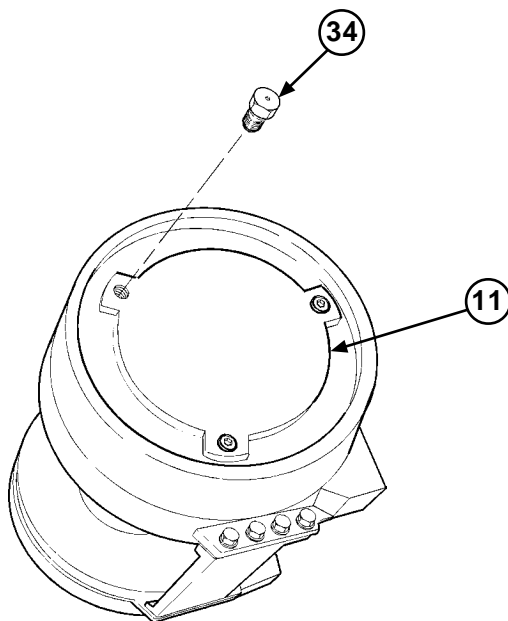


## 4-39. BAP WINCH ASSEMBLY REPLACEMENT (continued).

### NOTE

If there is no tension of cable against roller assemblies, install spring on higher hole until tension exists.

- (6) Install one end of each of two cable guide springs (12) on upper cable guide shaft (16). Install other end of each of two springs (12) on two bolts (13) that are on brackets (14).
- (7) Remove filler plug (34) from end cover (11), and fill winch with oil (Appendix G). Install filler plug (34) in end cover (11).



- (8) Install tube (8) on elbow (9). Install two elbows (4) and new O-rings (6) on winch motor (7), and tighten two captive nuts (5). Install two hydraulic tubes (3) on elbows (4).

### d. Follow-on Maintenance:

- Install winch cable (para 4-38).

**END OF TASK**

### 4-40. BAP WINCH MOTOR ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

- Pan, Drain, 4-Gallon (MIL-P-45819)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

- O-ring (Item 75, Appendix K)
- O-ring (Item 78, Appendix K)
- O-ring (Item 79, Appendix K)
- O-ring (2) (Item 83, Appendix K)

*Materials/Parts*

- Grease (Item 17, Appendix E)
- Rag (Item 21, Appendix E)
- Lockwasher (2) (Item 36, Appendix K)

*Equipment Condition*

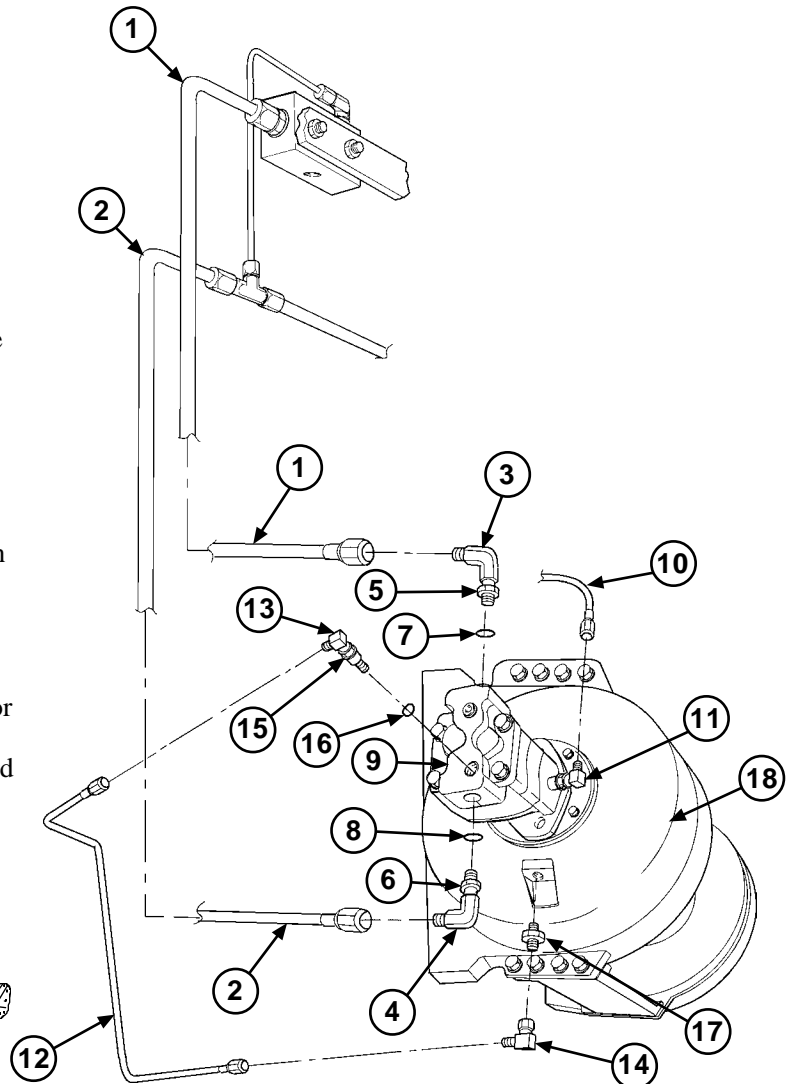
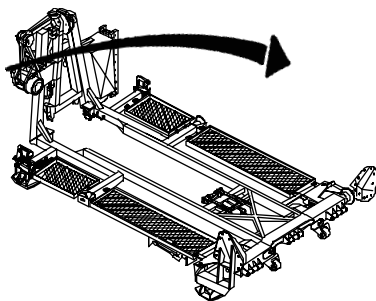
- Load removed from the BAP (para 2-12)
- BAP unloaded from the CBT (para 2-10)

#### NOTE

Use a drain pan to catch fluid draining from hoses and fittings. Wipe up any spillage with a rag.

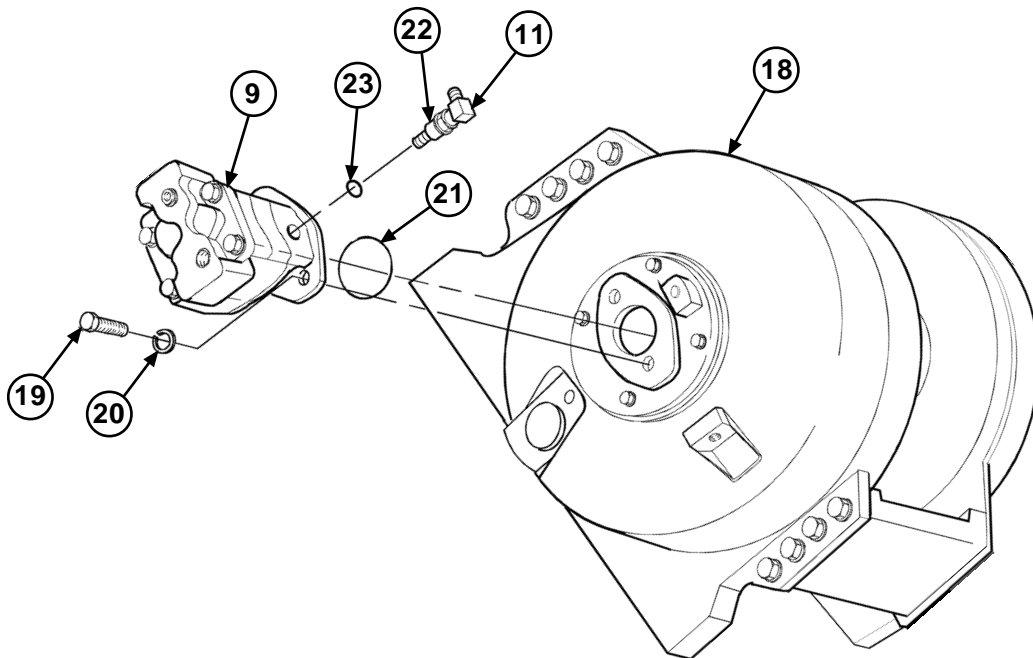
#### a. Removal.

- (1) Loosen both ends of two tubes (1 and 2) on two elbows (3 and 4). Loosen two captive nuts (5 and 6) and remove elbows (3 and 4) and two O-rings (7 and 8) from BAP winch hydraulic motor (9). Discard O-rings.
- (2) Remove tube (10) from elbow (11).
- (3) Remove tube (12) from elbow (13) on motor (9). Remove other end of tube (12) from elbow (14).
- (4) Loosen captive nut (15) and remove elbow (13) and O-ring (16) from motor (9). Remove elbow (14) and adapter (17) from winch housing (18). Discard O-ring.



#### 4-40. BAP WINCH MOTOR ASSEMBLY REPLACEMENT (continued).

- (5) Remove two bolts (19) and lockwashers (20) and motor (9) from winch housing (18). Remove O-ring (21) from base of motor (9). Discard lockwashers and O-ring.
- (6) Loosen captive nut (22) and remove elbow (11) and O-ring (23) from motor (9). Discard O-ring.



#### **b. Installation.**

- (1) Coat new O-ring (21) with grease and install on base of motor (9). Install elbow (11) and new O-ring (23) to align with the end of tube (10) when motor (9) is installed on winch housing (18).

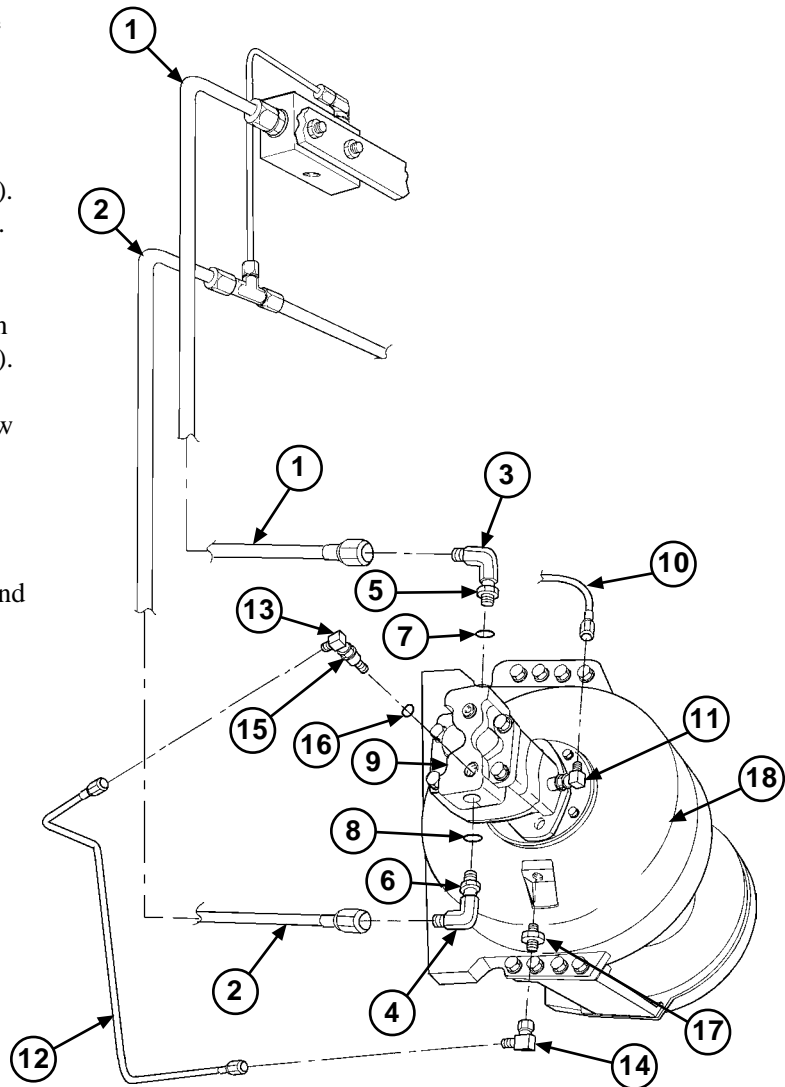
#### **CAUTION**

**Be careful not to damage new O-ring by pinching it between the winch motor base and the winch housing when installing winch motor.**

- (2) Carefully position motor (9) on winch housing (18), and install two bolts (19) and new lockwashers (20) on winch housing (18).

**4-40. BAP WINCH MOTOR ASSEMBLY REPLACEMENT (continued).**

- (3) Install adapter (17) on winch housing (18). Install elbow (14) on adapter (17), but do not tighten. Install tube (2) on elbow (14).
- (4) Install elbow (13) and new O-ring (16) on motor (9) to align with tube (12). Install tube (12) on elbow (13). Install captive nut (15) on motor (9). Install elbow (14) on adapter (17).
- (5) Install tube (10) on elbow (11), then tighten captive nut (22) on motor (9).
- (6) Install two elbows (3 and 4) and new O-rings (7 and 8) on motor (9), then install two captive nuts (5 and 6) on motor (9).
- (7) Tighten both ends of two tubes (1 and 2) on two elbows (3 and 4).



**c. Follow-on Maintenance:**

- Load the BAP on the CBT (para 2-9).
- Operate BAP winch and check for leaks (para 2-11).
- Turn off engine (TM 9-2320-279-10).
- Add hydraulic fluid to winch (Appendix G).
- Add hydraulic fluid to Transporter, as needed (LO 9-2320-279-12).

**END OF TASK**

**4-41. BAP CENTER ROLLER HYDRAULIC SYSTEM REPAIR.**

This task covers:

- a. Removal
- b. Cleaning and Inspection
- c. Installation
- d. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Pan, Drain, 4-Gallon (MIL-P-45819)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

Lockwasher (2) (Item 31, Appendix K)  
 Lockwasher (2) (Item 32, Appendix K)  
 O-ring (Item 42, Appendix K)

*Materials/Parts*

Rag (Item 21, Appendix E)  
 Lockwasher (2) (Item 29, Appendix K)  
 Lockwasher (Item 30, Appendix K)

*Equipment Condition*

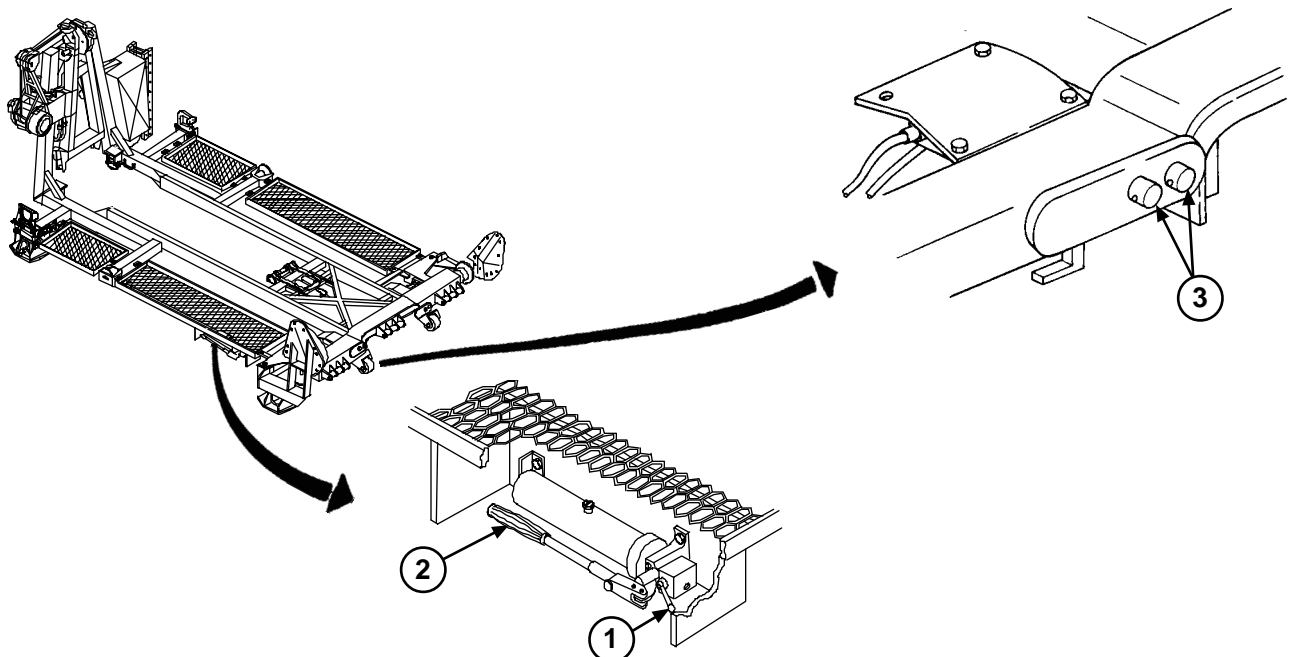
Load removed from the BAP (para 2-12)  
 BAP unloaded from the CBT (para 2-10)

**NOTE**

Use a drain pan to catch fluid draining from hoses and fittings. Wipe up any spillage with a rag.

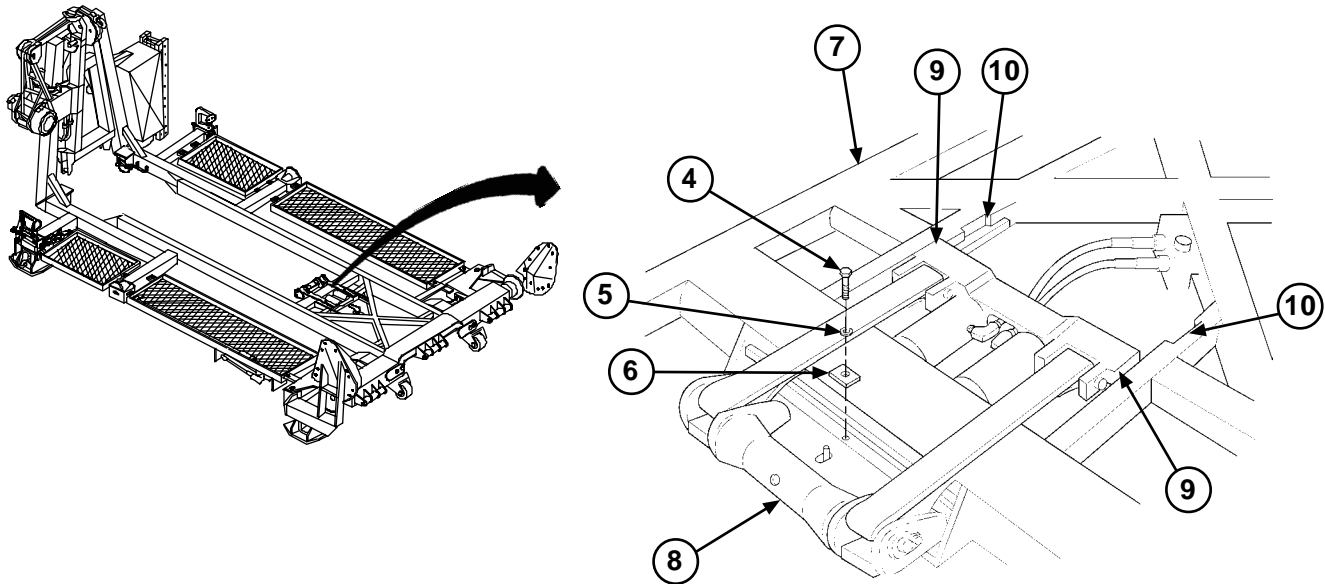
**a. Removal.**

- (1) To relieve pressure from center roller hydraulic system, move hydraulic hand pump selector lever (1) down, in TRANSLOAD position, and pump hand pump lever (2) until two transload cylinders (3) are fully extended.

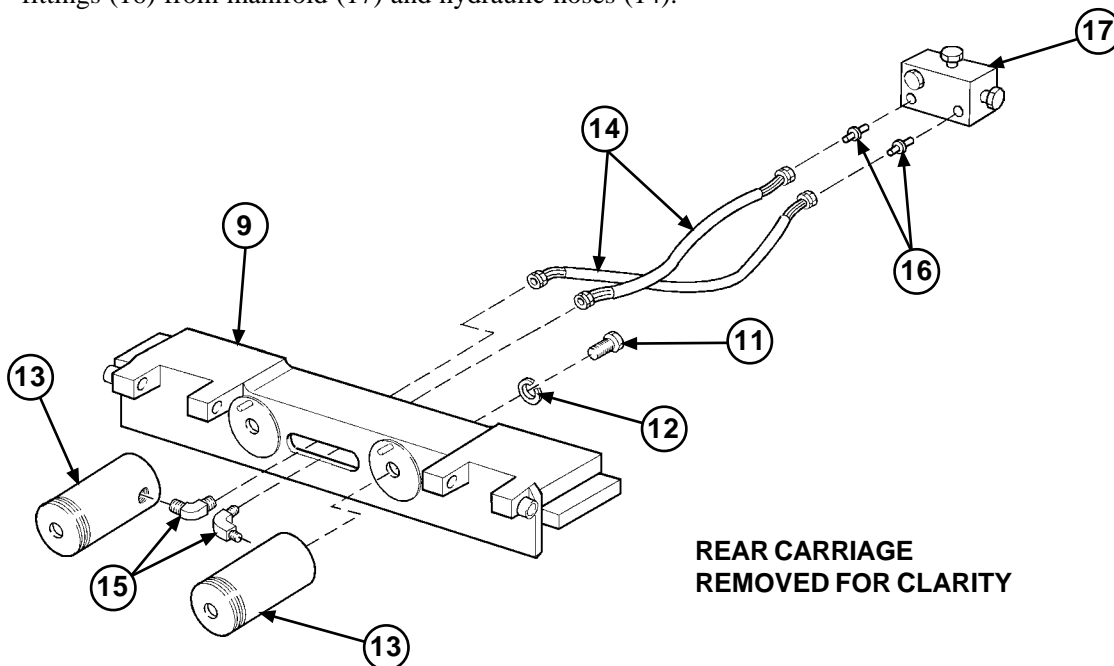


**4-41. BAP CENTER ROLLER HYDRAULIC SYSTEM REPAIR (continued).**

- (2) Remove screw (4), lockwasher (5), and retainer (6) from BAP frame (7). Discard lockwasher.
- (3) Lift and move center roller assembly (8) toward rear of the BAP until tabs on rear carriage (9) align with two notches in track (10) of frame (7), then lift center roller assembly (8) clear of frame (7).



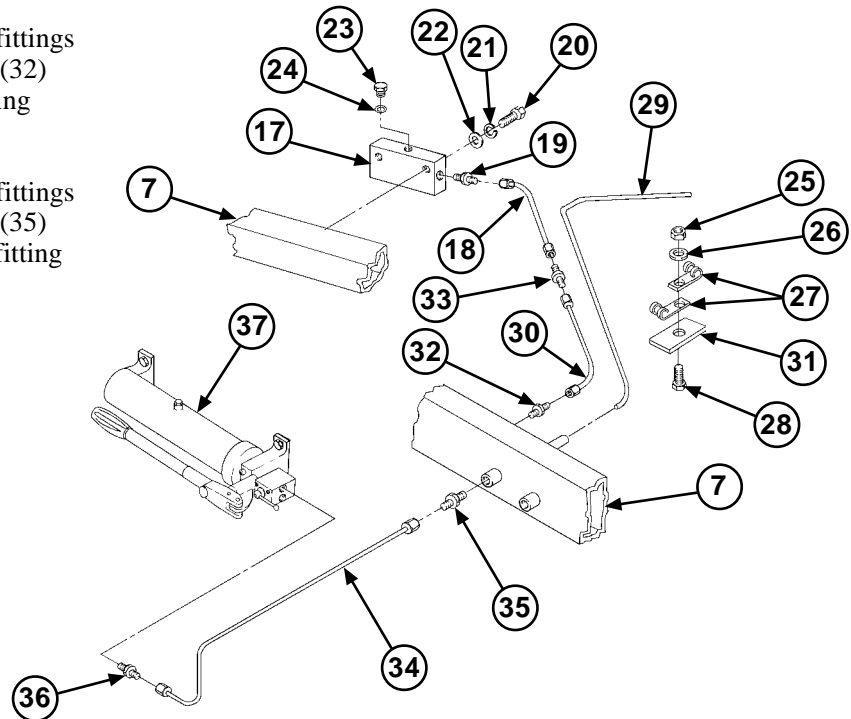
- (4) Remove two screws (11) and lockwashers (12) from rear carriage (9) and two BAP center roller hydraulic cylinders (13). Discard lockwashers. Remove hydraulic cylinders (13) from rear carriage (9).
- (5) Remove two hydraulic hoses (14) and elbows (15) from two hydraulic cylinders (13). Remove two fittings (16) from manifold (17) and hydraulic hoses (14).





#### 4-41. BAP CENTER ROLLER HYDRAULIC SYSTEM REPAIR (continued).

- (6) Remove tube (18) from fitting (19). Remove fitting (19) from manifold (17).
- (7) Remove two bolts (20), lockwashers (21), and washers (22) from manifold (17), and remove manifold (17) from frame (7). Remove plug (23) and O-ring (24) from manifold (17). Discard lockwashers and O-ring.
- (8) Remove two nuts (25) and lockwashers (26), four cushion clamps (27), and two bolts (28) from tubes (29 and 30) and welded bracket (31) on frame (7). Discard lockwashers.
- (9) Remove tube (30) from two fittings (32 and 33). Remove fitting (32) from frame (7). Remove fitting (33) from tube (18).
- (10) Remove tube (34) from two fittings (35 and 36). Remove fitting (35) from frame (7), and remove fitting (36) from hand pump (37).



#### b. Cleaning and Inspection.

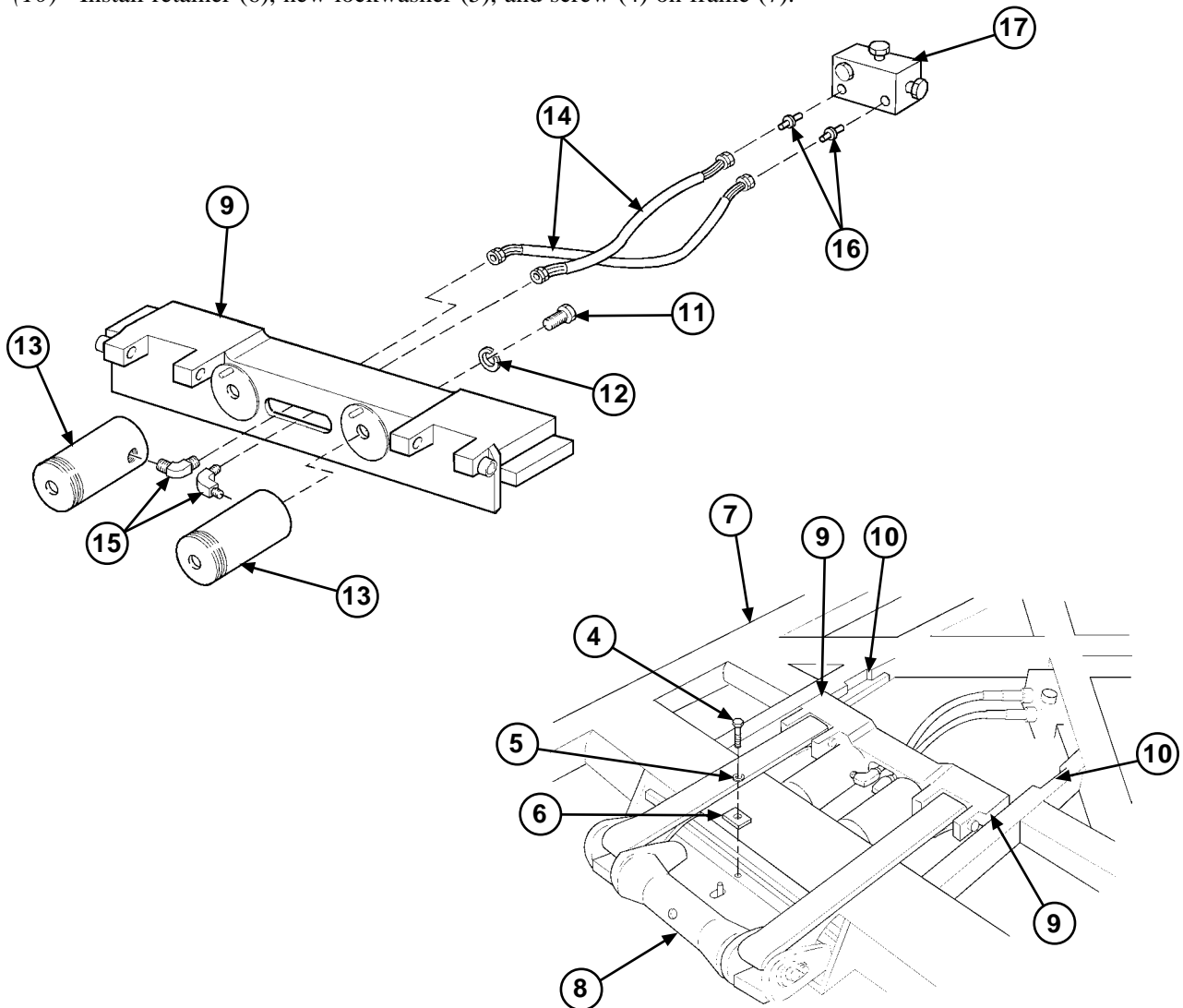
Inspect hoses, tubes, fittings, and hydraulic cylinders for leaks or damage (such as damaged threads) that would make them unserviceable. Replace any unserviceable parts.

#### c. Installation.

- (1) Install fitting (35) on frame (7), and install fitting (36) on hand pump (37). Install tube (34) on two fittings (35 and 36).
- (2) Install fitting (32) on frame (7). Install tube (30) on fitting (32). Install fitting (33) on tube (30).
- (3) Install two nuts (25) and new lockwashers (26), four cushion clamps (27), and two bolts (28) on tubes (29 and 30) and welded bracket (31) on frame (7).
- (4) Install plug (23) and new O-ring (24) on manifold (17). Install manifold (17) on frame (7) using two bolts (20), new lockwashers (21), and washers (22).
- (5) Install fitting (19) on manifold (17). Install tube (18) on fitting (19).
- (6) Install tube (18) on tube (30).

**4-41. BAP CENTER ROLLER HYDRAULIC SYSTEM REPAIR (continued).**

- (7) Install two screws (11), new lockwashers (12), and hydraulic cylinders (13) on rear carriage (9).
- (8) Install two fittings (16) on manifold (17). Install two hydraulic hoses (14) and elbows (15) on two hydraulic cylinders (13).
- (9) Align track (10) in frame (7) with tabs on rear carriage (9), and install center roller assembly (8) on frame (7).
- (10) Install retainer (6), new lockwasher (5), and screw (4) on frame (7).



**d. Follow-on Maintenance:**

- Fill and bleed center roller hydraulic system (para 4-43).

**END OF TASK**

**4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR.**

This task covers:

- a. Removal
- b. Cleaning and Inspection
- c. Installation
- d. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Pan, Drain, 4-Gallon (MIL-P-45819)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

Lockwasher (3) (Item 29, Appendix K)  
 Lockwasher (Item 30, Appendix K)  
 Lockwasher (4) (Item 31, Appendix K)  
 Lockwasher (6) (Item 32, Appendix K)  
 O-ring (2) (Item 42, Appendix K)  
 Star Washer (2) (Item 25, Appendix K)

*Materials/Parts*

Drycleaning Solvent (Item 13, Appendix E)  
 Grease (Item 17, Appendix E)  
 Lubricating Oil (Item 20, Appendix E)  
 Rag (Item 21, Appendix E)  
 Tape, Antiseizing (Item 24, Appendix E)

*Equipment Condition*

Load removed from the BAP (para 2-12)  
 BAP unloaded from the CBT (para 2-10)

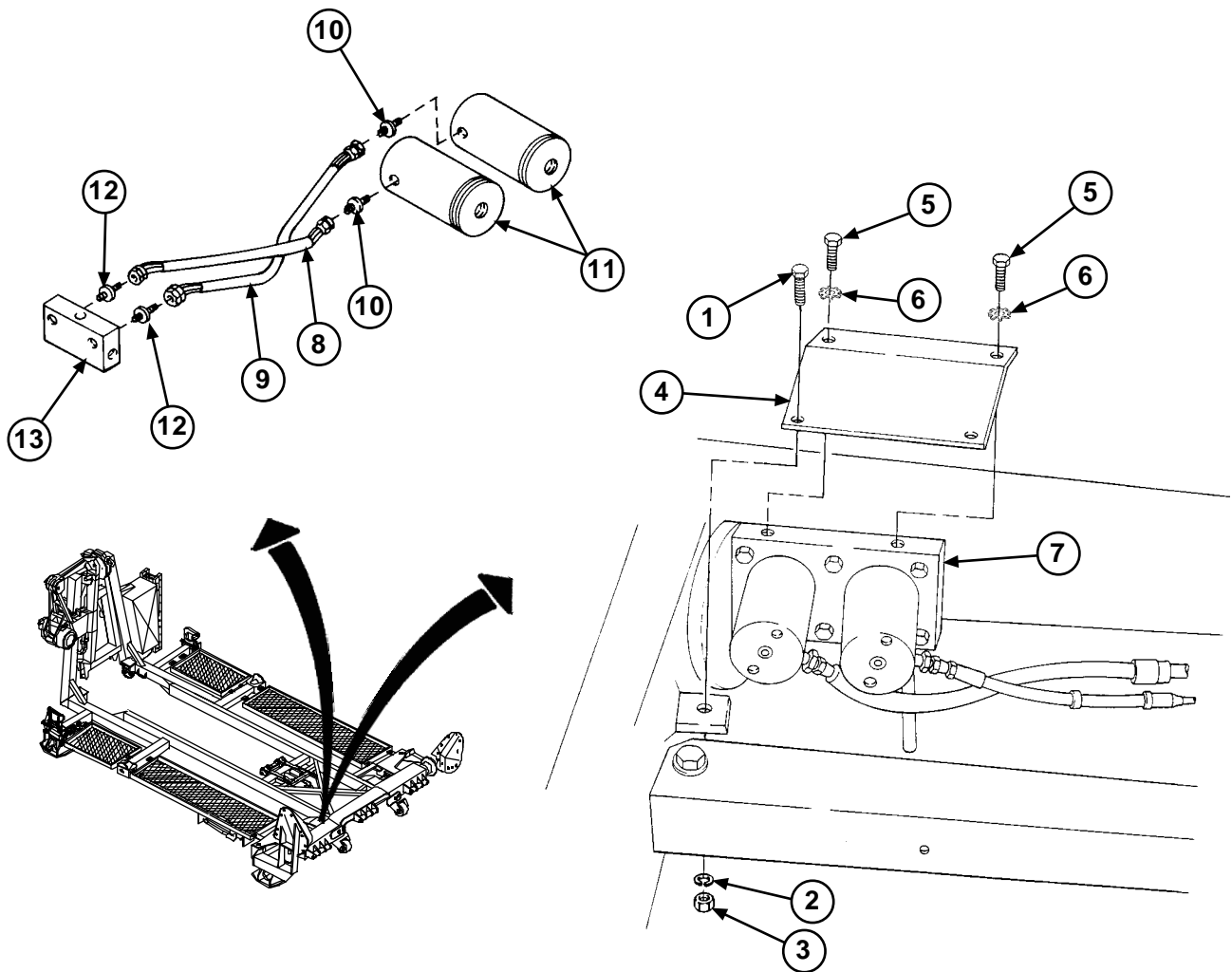
**a. Removal.**

**NOTE**

- Use a drain pan to catch fluid draining from hoses and fittings. Wipe up any spillage with a rag.
- Procedures for the curb-side and road-side transload roller guard plates and hydraulic cylinders, hoses, and fittings are the same, except as otherwise noted.

**4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR (continued).**

- (1) Remove screw (1), lockwasher (2), and nut (3) from guard plate (4). Remove two screws (5) and star washers (6) from guard plate (4) and mounting plate (7). Discard lockwasher and star washers.
- (2) Remove two hoses (8 and 9) from two fittings (10). Remove two fittings (10) from two hydraulic cylinders (11).
- (3) Remove other end of each hose (8 and 9) from two fittings (12). Remove fittings (12) from manifold (13).

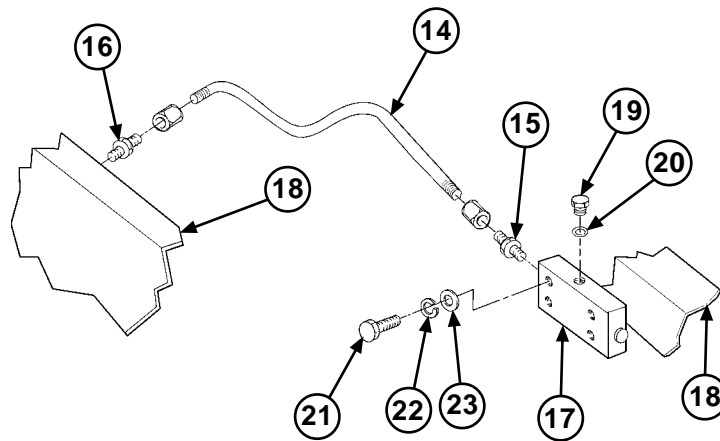


**4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR (continued).**

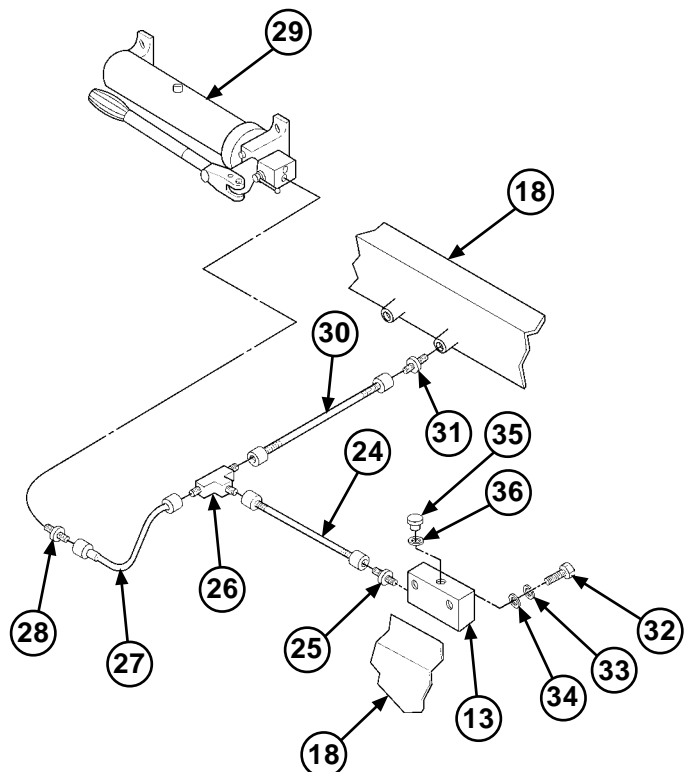
**NOTE**

For removal of hoses and fittings from curb side only, do Step 4 and then go to Step 8. For road side only, skip Steps 4 and 5 and go to Step 6.

- (4) Remove hose (14) from two fittings (15 and 16). Remove fitting (15) from manifold (17). Remove fitting (16) from frame (18).
- (5) Remove plug (19) and O-ring (20) from manifold (17). Remove two screws (21), lockwashers (22), and washers (23) and manifold (17) from frame (18). Discard lockwashers and O-ring.

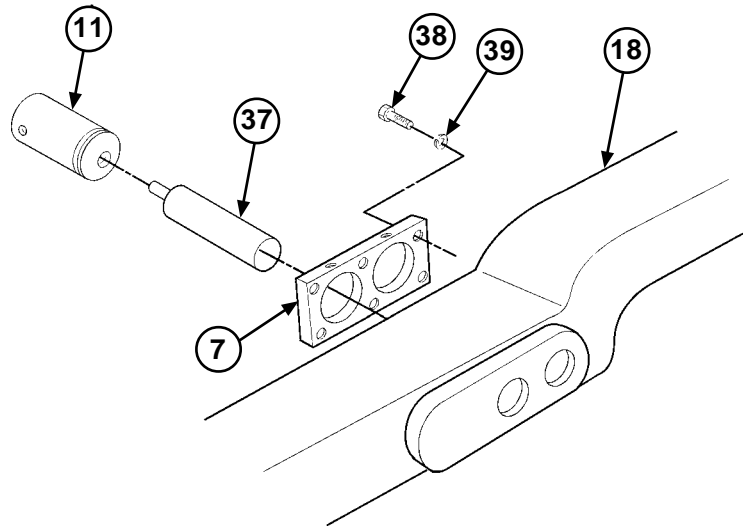


- (6) Remove tube (24) from fitting (25) and tee (26). Remove fitting (25) from manifold (13).
- (7) Remove tube (27) from tee (26) and fitting (28). Remove fitting (28) from hand pump (29).
- (8) Remove tube (30) from tee (26) and fitting (31). Remove fitting (31) from frame (18).
- (9) Remove two screws (32), lockwashers (33), and washers (34) and manifold (13) from frame (18). Remove plug (35) and O-ring (36) from manifold (13). Discard lockwashers and O-ring.



**4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR (continued).**

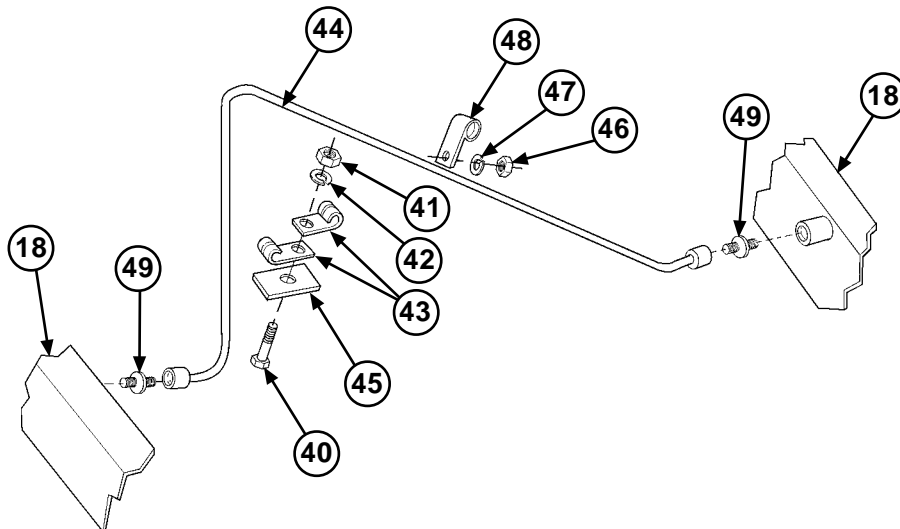
- (10) Unscrew and remove two hydraulic cylinders (11) and extensions (37) from mounting plate (7). Remove extension cylinders (37) from hydraulic cylinders (11).
- (11) Remove six screws (38) and lockwashers (39) and mounting plate (7) from frame (18). Discard lockwashers.



**NOTE**

Steps 12 through 14 are for curb-side hydraulics only.

- (12) Remove two screws (40), nuts (41), and lockwashers (42) and four cushion clamps (43) from tube (44) and frame bracket (45). Discard lockwashers.
- (13) Remove nut (46), lockwasher (47), and clamp (48) from tube (44) and frame (18). Discard lockwasher.
- (14) Remove tube (44) from two fittings (49). Remove fittings (49) from frame (18).



**b. Cleaning and Inspection.**

- (1) Inspect hoses, tubes, fittings, and hydraulic cylinders for leakage or damage (such as damaged threads) that would make them unserviceable. Replace any unserviceable parts.
- (2) Apply Antiseizing tape to all fittings that fit into cylinders or manifolds.

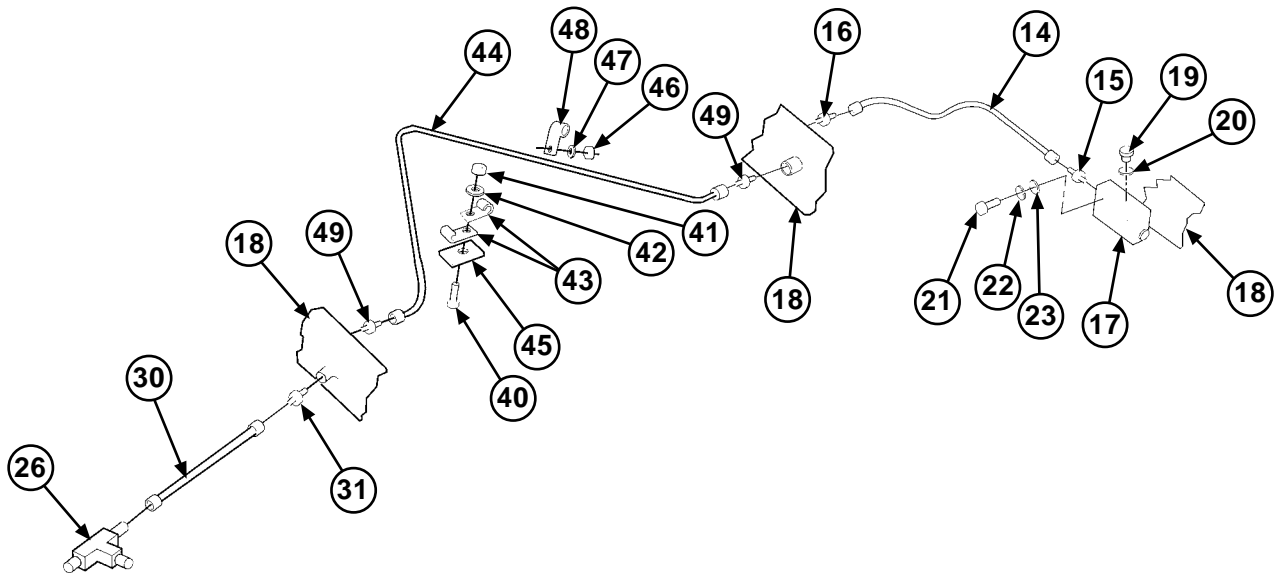
## 4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR (continued).

### c. Installation.

#### NOTE

Steps 1 through 6 are for curb side only. Go to Step 7 for road-side hydraulics.

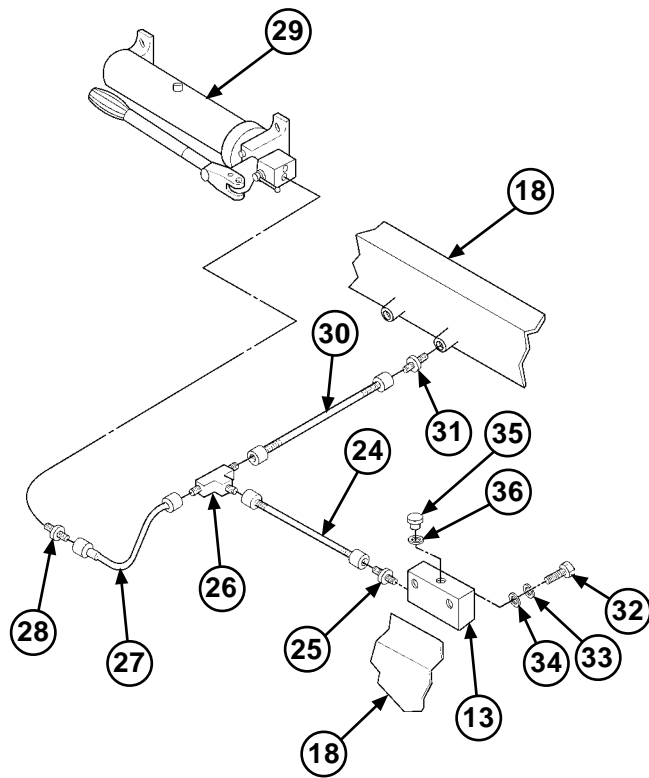
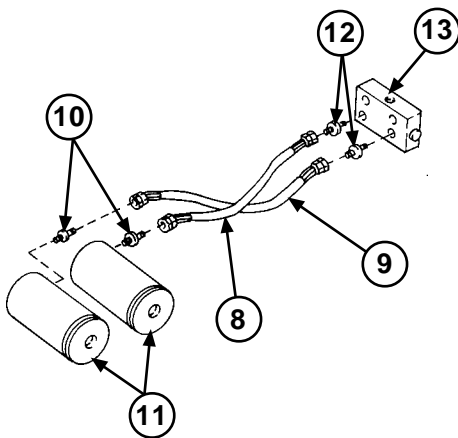
- (1) Install two fittings (49) on frame (18).
- (2) Install tube (44) on two fittings (49).



- (3) Install nut (46), new lockwasher (47), and clamp (48) on tube (44) and frame (18).
- (4) Install two screws (40), nuts (41), and new lockwashers (42) and four cushion clamps (43) on tube (44) and frame bracket (45).
- (5) Install two screws (21), new lockwashers (22), and washers (23) and manifold (17) on frame (18). Install plug (19) and new O-ring (20) on manifold (17).
- (6) Install fitting (16) on frame (18). Install fitting (15) on manifold (17). Install hose (14) on two fittings (15 and 16).
- (7) Install six screws (38) and new lockwashers (39) and mounting plate (7) on frame (18). Make sure mounting plate (7) is installed with two small holes on top.
- (8) Install two extensions (37) on two hydraulic cylinders (11).
- (9) Install two hydraulic cylinders (11) on mounting plate (7).

**4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR (continued).**

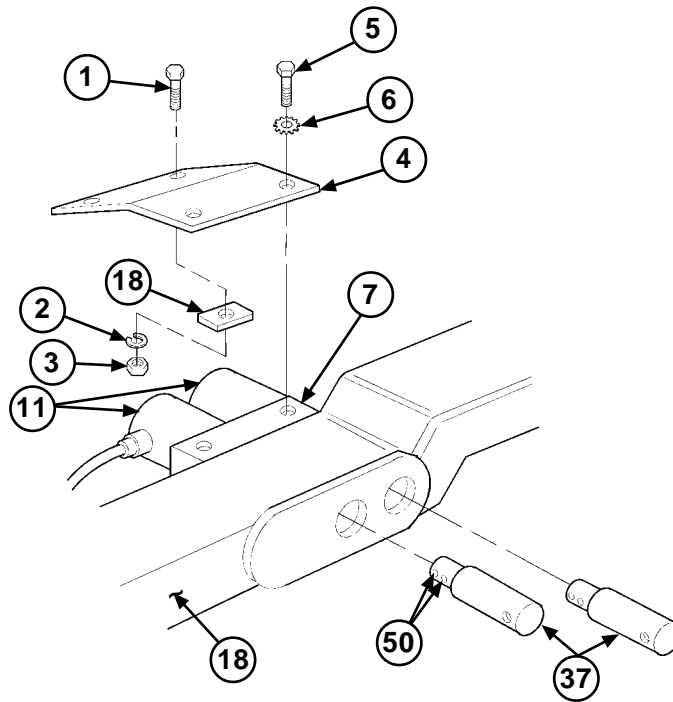
- (10) Install two screws (32), new lockwashers (33), and washers (34) and manifold (13) on frame (18). Install plug (35) and new O-ring (36) on manifold (13).
- (11) Install fitting (31) on frame (18). Install tube (30) on tee (26) and fitting (31).
- (12) Install fitting (28) on hand pump (29). Install tube (27) on tee (26) and fitting (28).
- (13) Install fitting (25) on manifold (13). Install tube (24) on fitting (25) and tee (26).
- (14) Install two fittings (12) on manifold (13). Install two hoses (8 and 9) on fittings (12).
- (15) Install two fittings (10) on two hydraulic cylinders (11).
- (16) Install other end of each hose (8 and 9) on two fittings (10).





#### 4-42. BAP TRANSLOAD ROLLER HYDRAULIC SYSTEM REPAIR (continued).

- (17) Install two screws (5) and new star washers (6) and guard plate (4) on mounting plate (7) and frame (18). Install screw (1), new lockwasher (2), and nut (3) on mounting plate (7).
- (18) Lubricate two spring-loaded ball bearings (50) on two extension cylinders (37) (Appendix G).
- (19) Push two extension cylinders (37) into frame (18) until two spring-loaded ball bearings (50) lock into two hydraulic cylinders (11).



#### d. Follow-on Maintenance:

- Fill and bleed transload hydraulic system with hydraulic fluid (para 4-43).

**END OF TASK**

**4-43. BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 12959.**

*This task covers:*

- a. Removal
- b. Installation
- c. Bleeding
- d. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

- Pan, Drain, 4-Gallon (MIL-P-45819)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Materials/Parts*

- Lubricating Oil (Item 20, Appendix E)

Rag (Item 21, Appendix E)

Lockwasher (4) (Item 31, Appendix K)

*Equipment Condition*

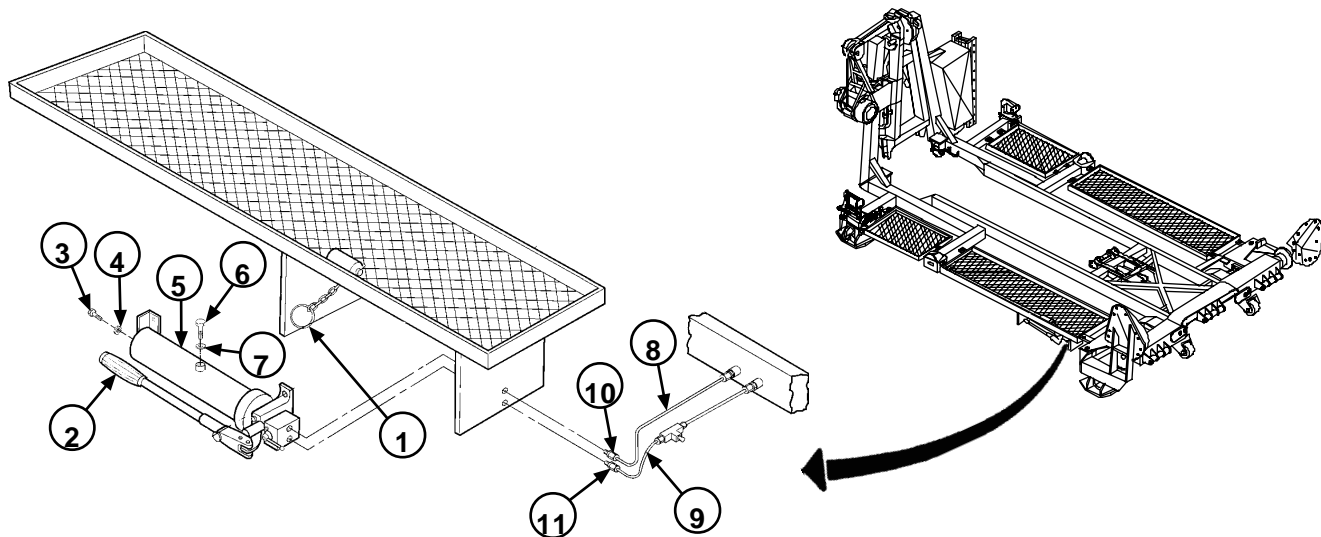
- Load removed from the BAP (para 2-12)
- BAP unloaded from the CBT (para 2-10)

**NOTE**

Use a drain pan to catch fluid draining from hoses and fittings. Wipe up all spills with a rag.

**a. Removal.**

- (1) Remove key holder (1) from handle (2).
- (2) Remove plug (3) and gasket (4) from BAP hydraulic hand pump (5).
- (3) Remove dipstick (6) and gasket (7) from hand pump (5).
- (4) Disconnect two hydraulic tubes (8 and 9) and fittings (10 and 11) from hand pump (5).

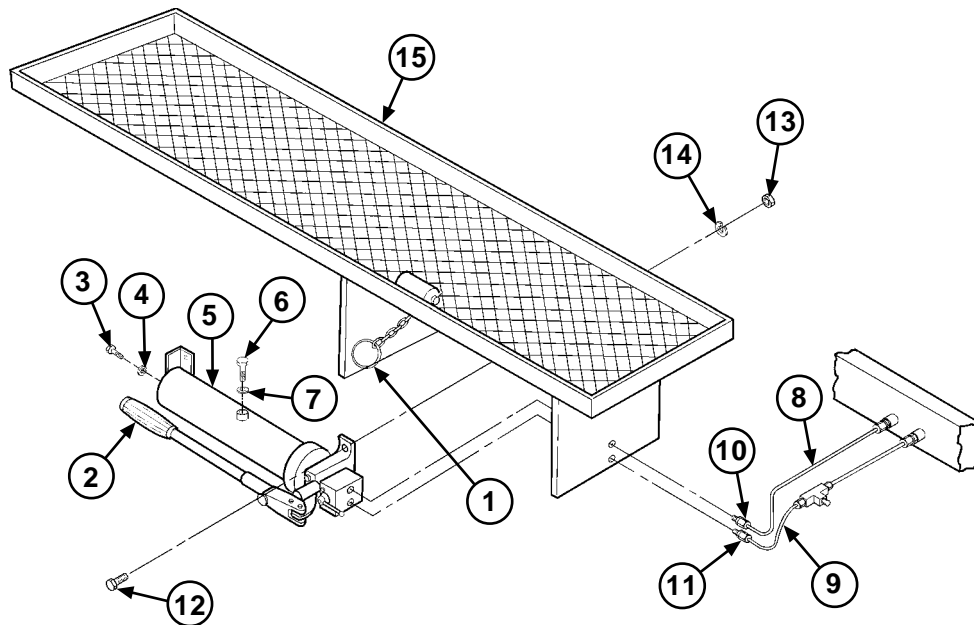


**4-43. BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 12959 (cont.)** ■

- (5) Remove four screws (12), nuts (13), and lockwashers (14) from hand pump (5). Discard lockwashers.
- (6) Remove hand pump (5) from catwalk (15).

**b. Installation.**

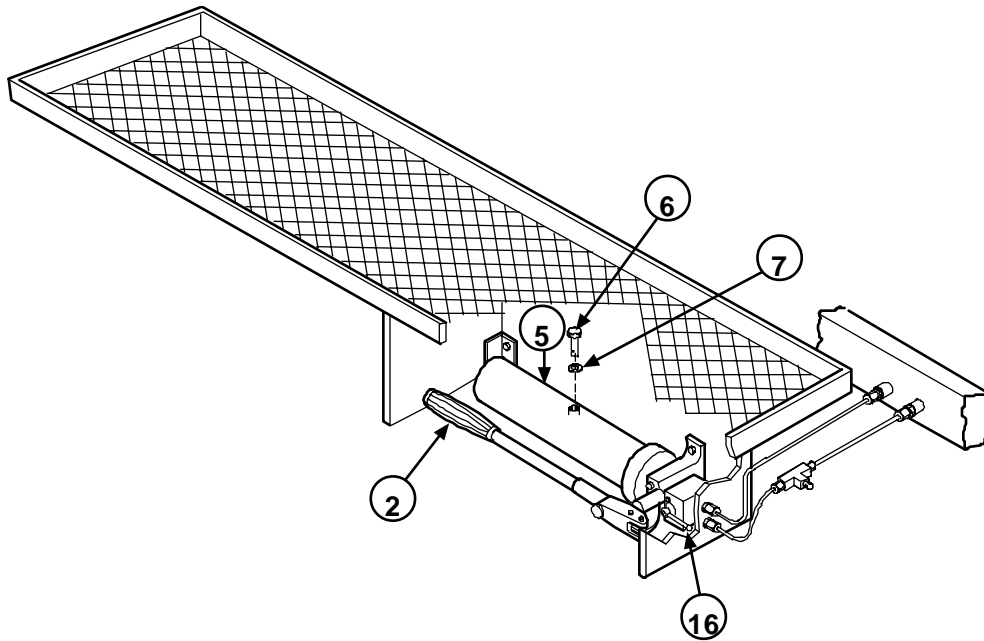
- (1) Install hand pump (5) and four screws (12), nuts (13), and new lockwashers (14) on catwalk (15).
- (2) Connect two hydraulic tubes (8 and 9) and fittings (10 and 11) to hand pump (5).
- (3) Install dipstick (6) and gasket (7) on hand pump (5).
- (4) Install plug (3) and gasket (4) on hand pump (5).
- (5) Install key holder (1) on handle (2).



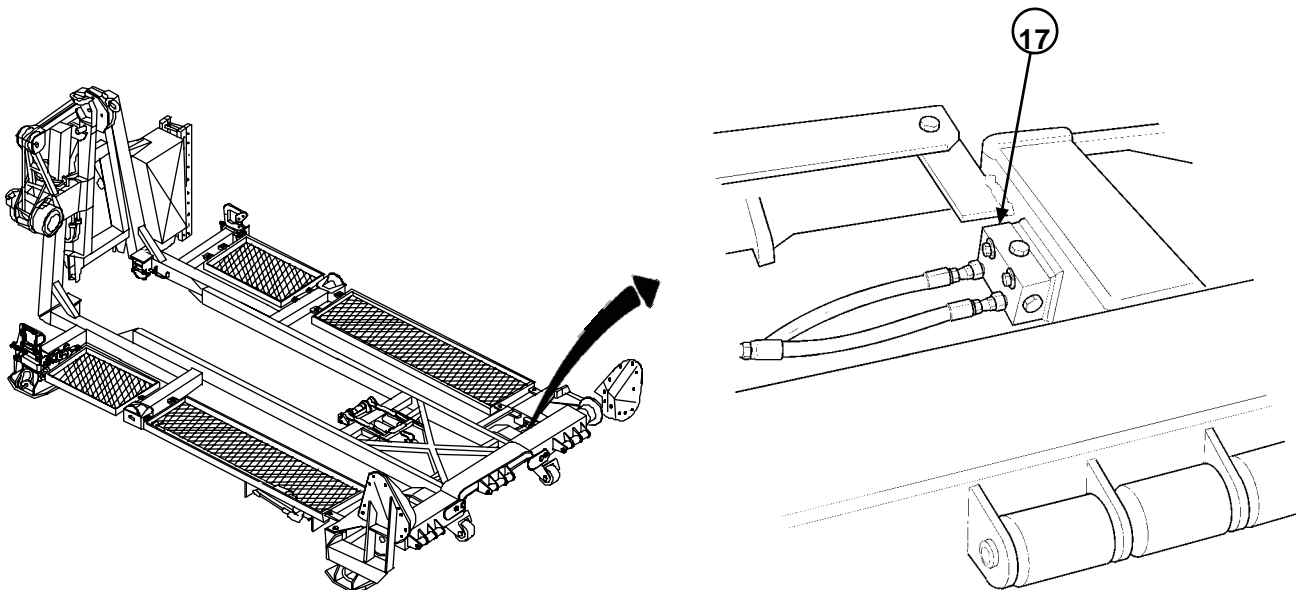
■ 4-43. BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 12959 (cont.)

*c. Bleeding.*

- (1) Remove dipstick (6) and gasket (7) from hand pump (5).
- (2) Push hand pump selector (16) to down position.

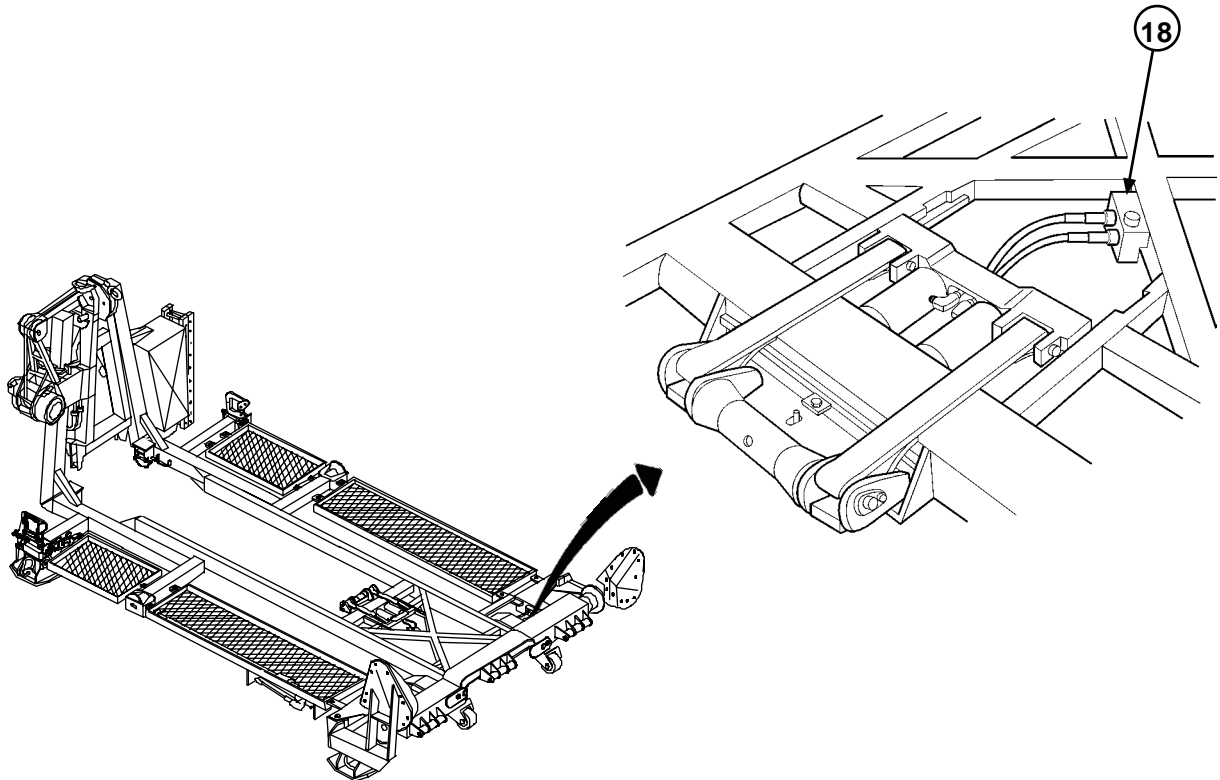


- (3) Slowly pump handle (2) as fluid level spreads to hydraulic system until no air comes out of plug at manifold (17). Fill hand pump (5) with fluid until dipstick (6) shows fluid level.



**4-43. BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 12959 (cont.) ■**

- (4) Fill hand pump (5) with hydraulic fluid until fluid level reaches dipstick (6) hole.
- (5) Push hand pump selector (16) to up position.
- (6) Slowly pump handle (2) as fluid level spreads to hydraulic system until no air comes out of plug at center roller manifold (18). Fill hand pump (5) with fluid until dipstick (6) shows fluid level.



- (7) Fill hand pump (5) with hydraulic fluid until fluid level reaches dipstick hole.
- (8) Install dipstick (6) and gasket (7) in hand pump (5).
- (9) Move hand pump selector (16) to center position.

**d. Follow-on Maintenance:**

None.

**END OF TASK**

## 4-43.1 BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 13566.

*This task covers:*

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Bleeding              |
| b. Installation | d. Follow-on Maintenance |

### INITIAL SETUP

*Tools and Special Tools*

Pan, Drain, 4-Gallon (MIL-P-45819)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Materials/Parts*

Lubricating Oil (Item 20, Appendix E)

Rag (Item 21, Appendix E)

Lockwasher (4) (Item 31, Appendix K)

*Equipment Condition*

Load removed from the BAP (para 2-12)

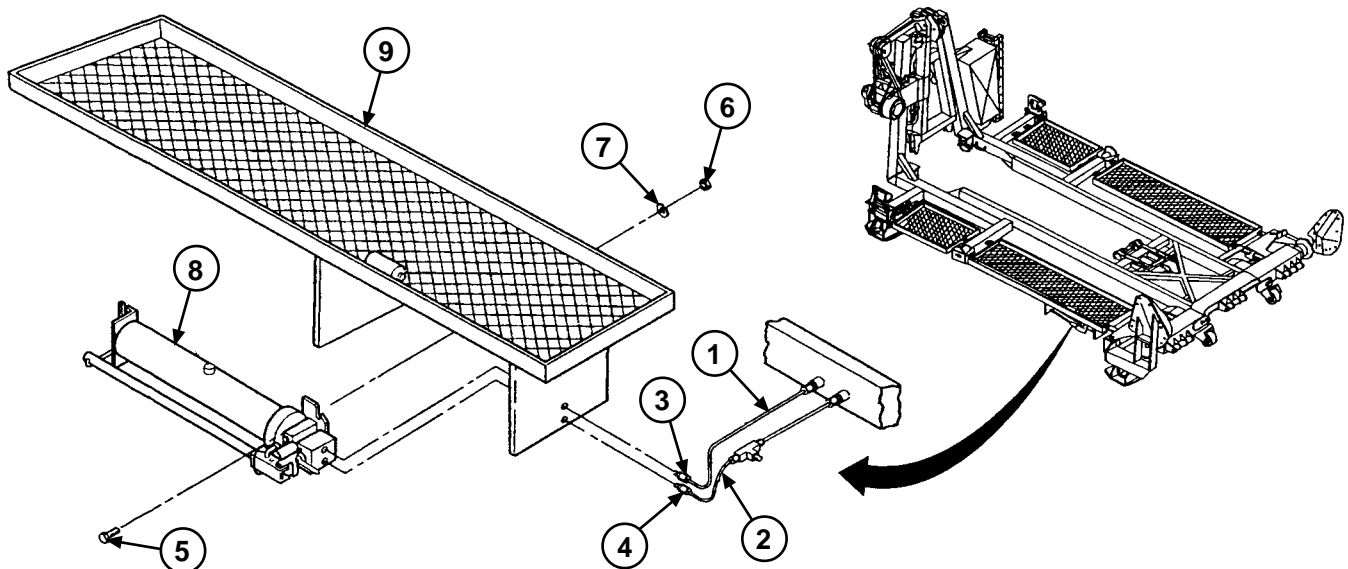
BAP unloaded from the CBT (para 2-10)

### NOTE

- BAP serial numbers BBD0001 and subsequent only.
- Use a drain pan to catch fluid draining from hoses and fittings. Wipe up all spills with a rag.

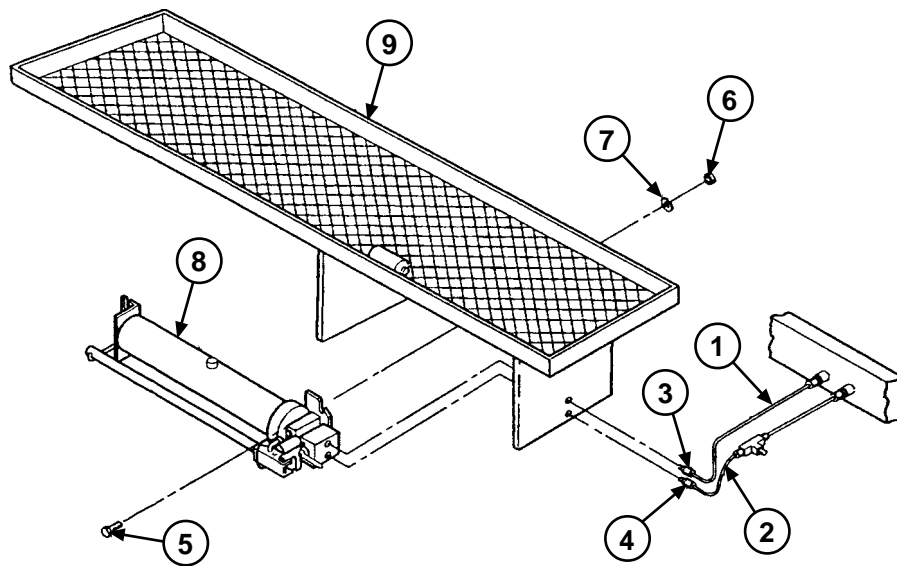
#### a. Removal.

- (1) Disconnect two hydraulic tubes (1 and 2) and fittings (3 and 4) from hand pump (8).
- (2) Remove four screws (5), nuts (6), and lockwashers (7) from hand pump (8). Discard lockwashers.
- (3) Remove hand pump (8) from catwalk (9).



**4-43.1 BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 13566 (cont.)** ■**b. Installation.**

- (1) Install hand pump (8) and four screws (5), nuts (6), and new lockwashers (7) on catwalk (9).
- (2) Connect two hydraulic tubes (1 and 2) and fittings (3 and 4) to hand pump (8).



#### 4-43.1 BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 13566 (continued)

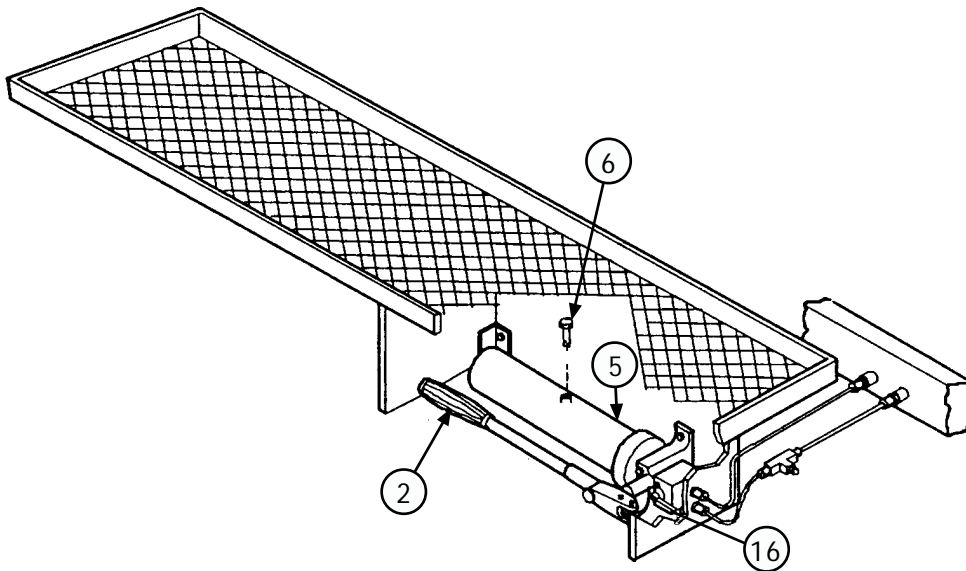
*c. Bleeding.*

- (1) Remove dipstick (6) from hand pump (5).

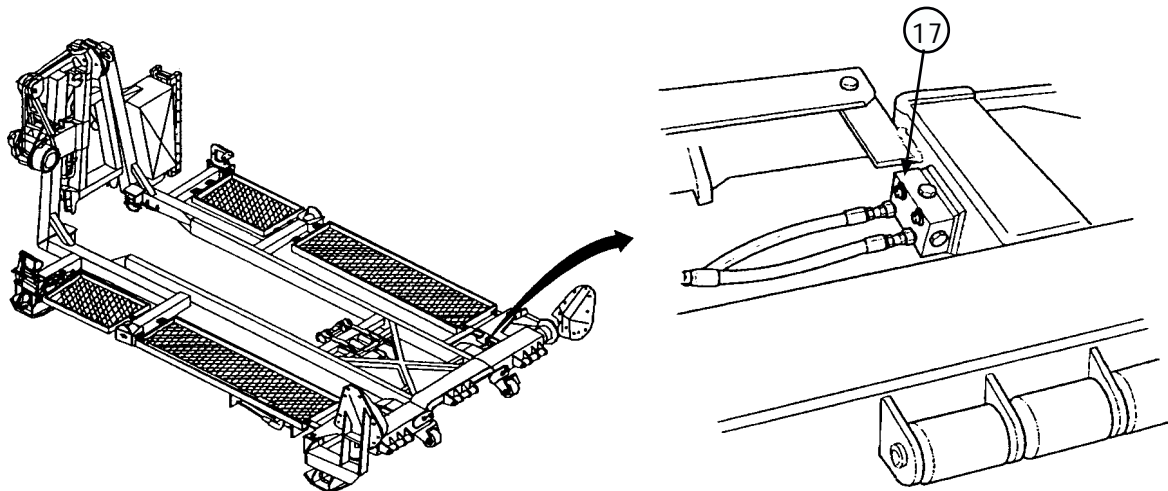
**NOTE**

A gasket is not required for BAP Part Number 13566.

- (2) Push hand pump selector (16) to down position.



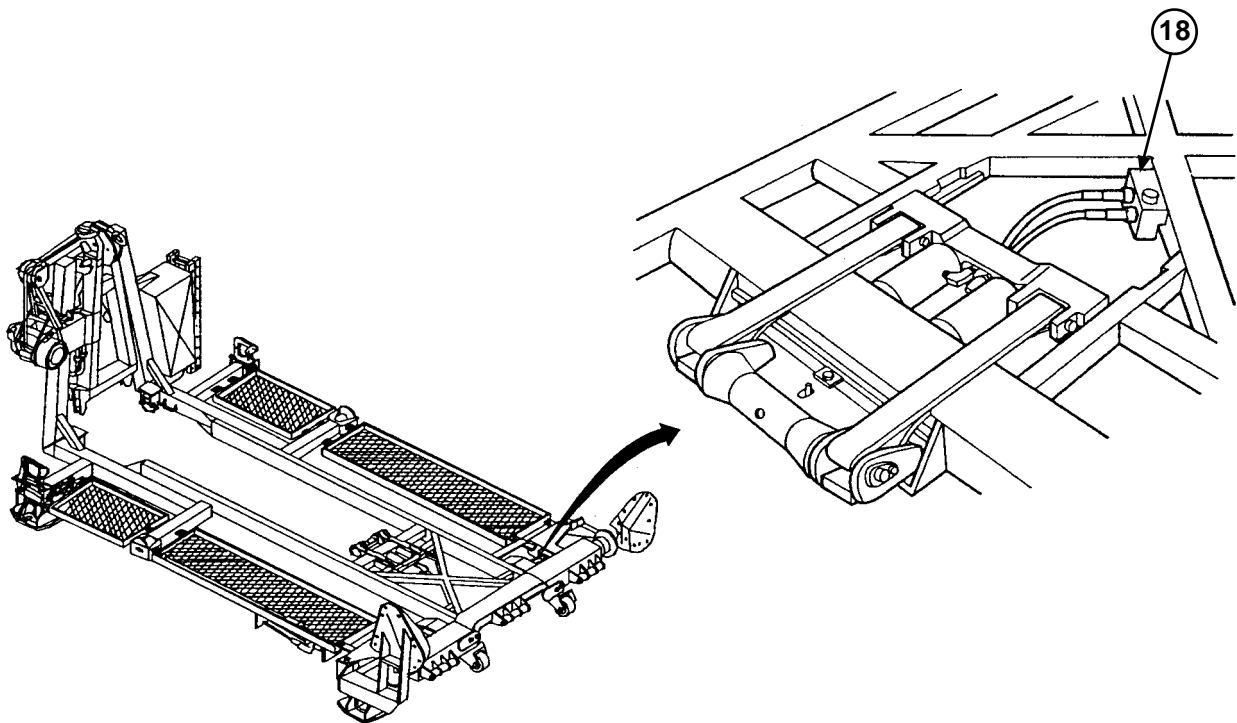
- (3) Slowly pump handle (2) as fluid level spreads to hydraulic system until no air comes out of plug or test fitting at manifold (17). Fill hand pump (5) with fluid until dipstick (6) shows fluid level.





## 4-43.1 BAP HYDRAULIC HAND PUMP REPLACEMENT - Part Number 13566 (cont.) ■

- (4) Fill hand pump (5) with hydraulic fluid until fluid level reaches dipstick (6) hole.
- (5) Push hand pump selector (16) to up position.
- (6) Slowly pump handle (2) as fluid level spreads to hydraulic system until no air comes out of plug or test fitting at center roller manifold (18). Fill hand pump (5) with fluid until dipstick (6) shows fluid level.



- (7) Fill hand pump (5) with hydraulic fluid until fluid level reaches dipstick hole.

### NOTE

A gasket is not required for BAP Part Number 13566.

- (8) Install dipstick (6) in hand pump (5).
- (9) Move hand pump selector (16) to center position.

### c. *Follow-on Maintenance:*

None,

**END OF TASK**

#### 4-44. BAP CONTROL VALVE REPLACEMENT.

This task covers:

- |            |                 |                          |
|------------|-----------------|--------------------------|
| a. Removal | b. Installation | c. Follow-on Maintenance |
|------------|-----------------|--------------------------|

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Lockwasher (2) (Item 29, Appendix K)

Lockwasher (4) (Item 31, Appendix K)

*Materials/Parts*

Cotter Pin (Item 17, Appendix K)

*Equipment Condition:*

Load removed from the BAP (para 2-12)

BAP unloaded from the CBT (para 2-10)

#### **a. Removal.**

- (1) Release safety snap (1) from valve bracket (2) and lever (3).
- (2) Remove cotter pin (4), straight pin (5), and lever (3) from valve bracket (2). Discard cotter pin.
- (3) Remove two screws (6) and lockwashers (7) from valve bracket (2). Discard lockwashers.
- (4) Remove two bolts (8) and lockwashers (9) from valve bracket (2). Discard lockwashers.
- (5) Remove two bolts (10) and lockwashers (11), lanyard (12), valve bracket (2), and two nuts (13) from control valve (14) and BAP frame (15). Discard lockwashers.
- (6) Remove elbow (16) from tubing (17).
- (7) Remove two adapters (18) from two tubings (19).
- (8) Remove elbow (16) and two adapters (18) from control valve (14).

#### **b. Installation.**

- (1) Install elbow (16) and two adapters (18) on control valve (14).
- (2) Install two adapters (18) on two tubings (19).
- (3) Install elbow (16) on tubing (17).
- (4) Install two nuts (13), valve bracket (2), lanyard (12), and two bolts (10) and new lockwashers (11) on control valve (14) and frame (15).
- (5) Install two bolts (8) and new lockwashers (9) on valve bracket (2).

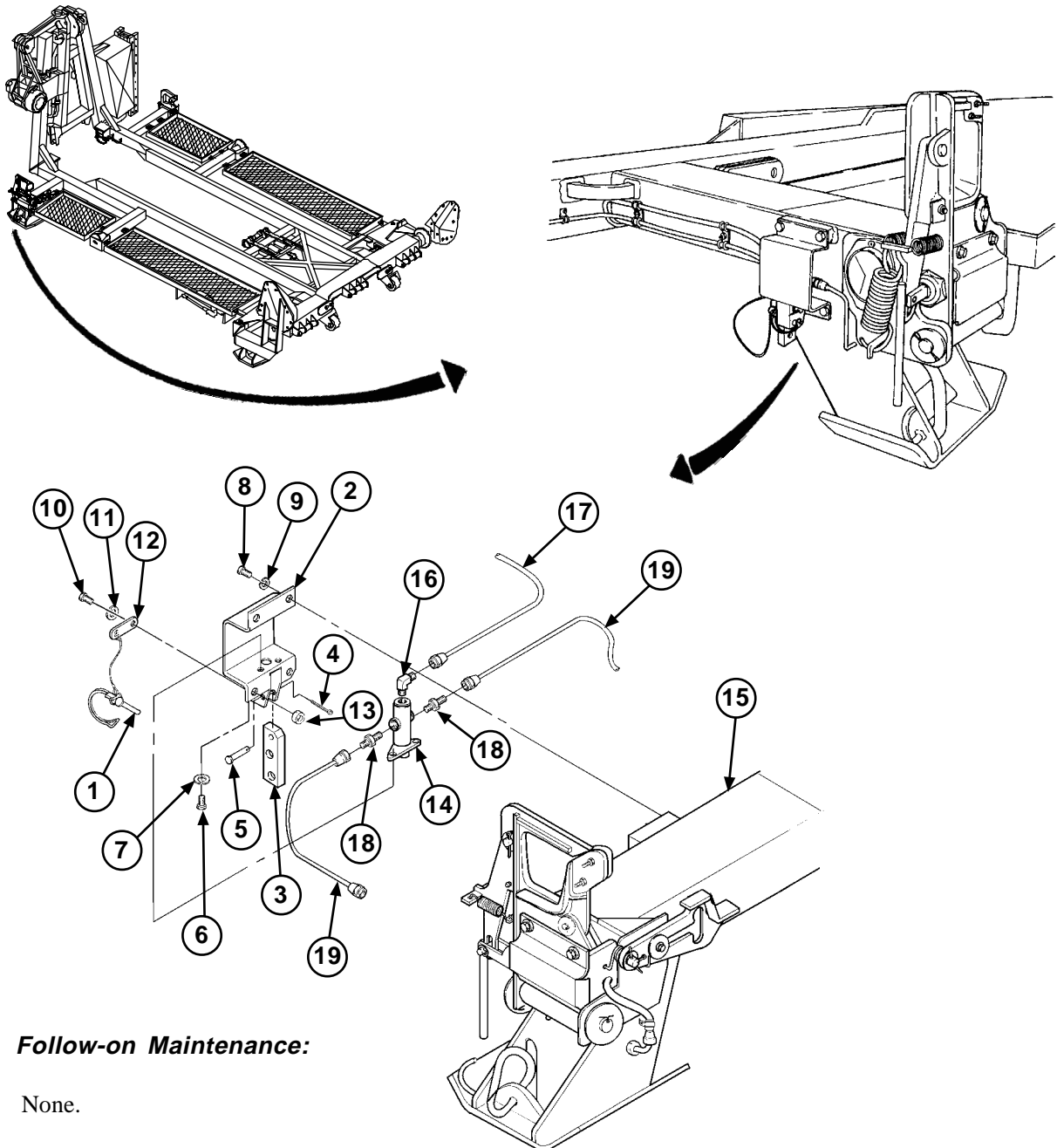
**4-44. BAP CONTROL VALVE REPLACEMENT (continued).**

- (6) Install two screws (6) and new lockwashers (7) on valve bracket (2).

**NOTE**

Small top hole in lever faces BAP frame.

- (7) Install straight pin (5) in middle hole of lever (3) and in valve bracket (2). Install new cotter pin (4) on valve bracket (2). Engage safety snap (1) through valve bracket (2) and lever (3).



**c. Follow-on Maintenance:**

None.

**END OF TASK**

**4-45. BAP AIR LINES AND FITTINGS REPLACEMENT.**

*This task covers:*

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

*Equipment Condition*

BAP control valve removed (para 4-44)  
BAP front pin lock guard plate removed (para 4-35)

*Materials/Parts*

Lockwasher (25) (Item 29, Appendix K)

**WARNING**

**Air system is under pressure. Take care not to direct air flow toward personnel or injury to personnel could occur.**

**a. Removal.**

- (1) Remove nut (1), lockwasher (2), and loop clamp (3) from tubing (4). Remove tubing (4) from BAP frame. Discard lockwasher.
- (2) Loosen tube nuts (5 and 6) on each end of tubing (4), and disconnect tubing (4) from two elbows (7 and 8).

**NOTE**

Steps 3 through 11 apply to curb-side air lines. Go to Step 12 for road-side air lines.

- (3) Remove elbow (7) from pipe coupling (9).
- (4) Loosen tube nut (10) on each end of tubing (11), and disconnect tubing (11) from adapter (12) and tube nipple (13). Remove adapter (12) from pipe coupling (9).
- (5) Remove six nuts (14), lockwashers (15), and loop clamps (16) from tubing (11). Remove tubing (11) from BAP frame. Discard lockwashers.
- (6) Remove adapter (12) and pipe coupling (9) from BAP frame.
- (7) Loosen tube nut (17) on each end of tubing (18), and disconnect tubing (18) from tube nipple (13) and adapter (19).
- (8) Remove six nuts (20), lockwashers (21), and loop clamps (22) from tubing (18). Remove tubing (18) from BAP frame. Discard lockwashers.

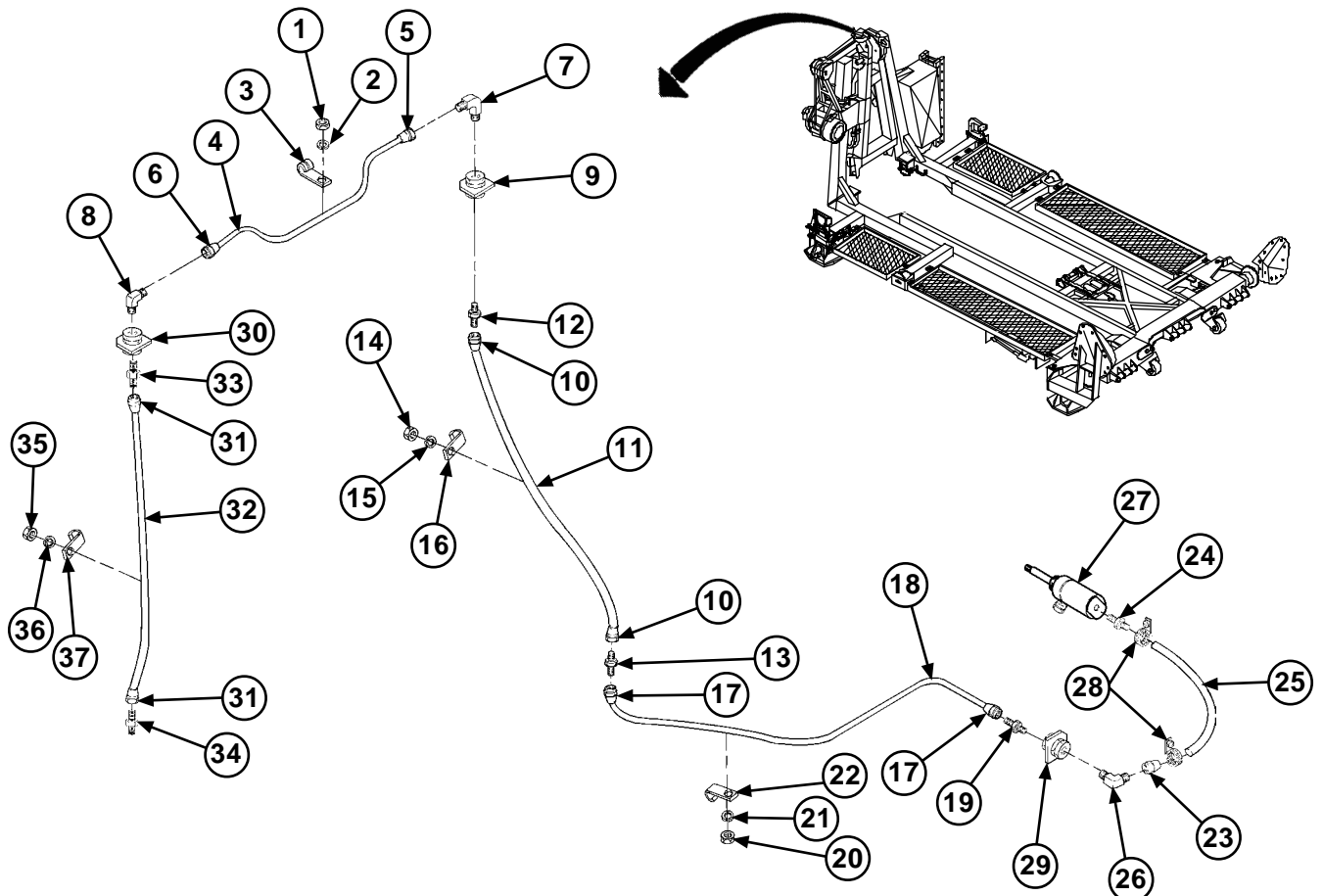
**4-45. BAP AIR LINES AND FITTINGS REPLACEMENT (continued).**

- (9) Loosen two tube nuts (23 and 24) on ends of air hose (25) and disconnect air hose (25), from elbow (26) and air cylinder (27).
- (10) Remove two hose clamps (28) and tube nuts (23 and 24) from air hose (25).
- (11) Remove adapter (19), elbow (26), and coupling (29) from BAP frame.

**NOTE**

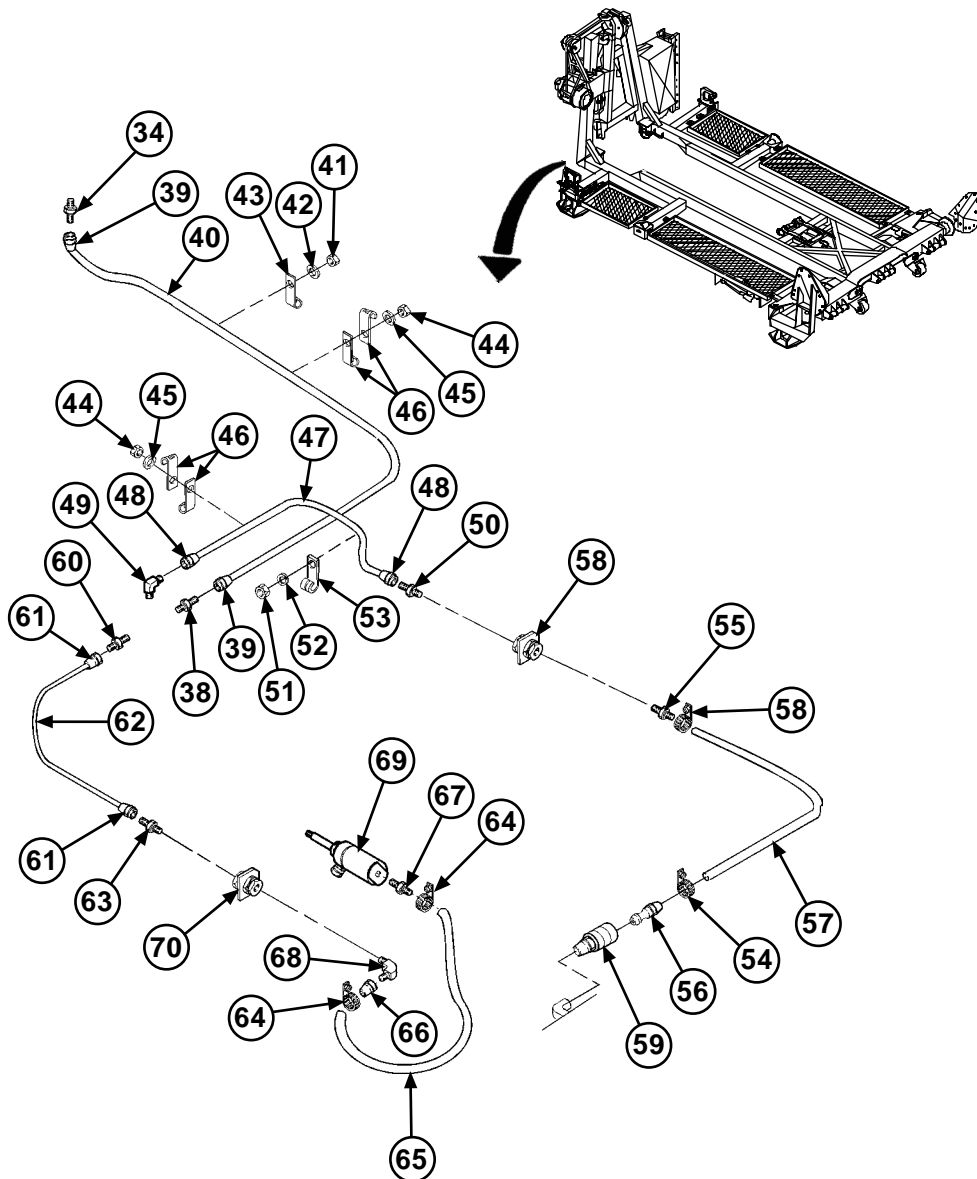
Steps 12 through 28 apply only to road-side air lines.

- (12) Remove elbow (8) from coupling (30).
- (13) Loosen tube nut (31) on each end of tubing (32), and disconnect tubing (32) from adapter (33) and tube nipple (34).
- (14) Remove six nuts (35), lockwashers (36), and loop clamps (37) from tubing (32). Remove tubing (32) from BAP frame. Discard lockwashers.
- (15) Remove adapter (33) and coupling (30) from BAP frame.



**4-45. BAP AIR LINES AND FITTINGS REPLACEMENT (continued).**

- (16) Remove tube nipple (34) and adapter (38) from tube nut (39) on each end of tubing (40).
- (17) Remove three nuts (41), lockwashers (42), and loop clamps (43) from tubing (40). Discard lockwashers.
- (18) Remove two nuts (44) and lockwashers (45) and four loop clamps (46) from two tubings (40 and 47). Remove tubing (40) from BAP frame. Discard lockwashers.
- (19) Remove tube nut (48) from elbow (49) on one end of tubing (47). Loosen tube nut (48) on other end of tubing (47), and disconnect tubing (47) from adapter (50).
- (20) Remove nut (51), lockwasher (52), and loop clamp (53) from tubing (47) under BAP frame. Remove tubing (47) from BAP frame. Discard lockwasher.



<b>4-45. BAP AIR LINES AND FITTINGS REPLACEMENT (continued).</b>
--

- (21) Remove two hose clamps (54), straight adapter (55), and coupling half (56) from air hose (57).
- (22) Remove adapter (50), straight adapter (55), and coupling (58) from BAP frame.
- (23) Release coupling half (56) from coupling half (59), and remove coupling half (59) from BAP frame.
- (24) Remove adapter (60) from tube nut (61) on one end of tubing (62). Loosen tube nut (61) on other end of tubing (62), and disconnect tubing (62) from adapter (63). Remove tubing (62) from BAP frame.
- (25) Loosen two hose clamps (64) from air hose (65).
- (26) Loosen two adapters (66 and 67) on ends of air hose (65), and disconnect air hose (65) from elbow (68), two hose clamps (64), and air cylinder (69).
- (27) Remove adapters (66 and 67) from air hose (65).
- (28) Remove adapter (63), elbow (68), and coupling (70) from BAP frame.

**b. Installation.**

**NOTE**

- For general air tubing repair instructions, go to para 4-20.
- Steps 1 through 17 apply only to road-side air lines. Go to Step 18 for curb-side air lines.

- (1) Install two hose clamps (64) on air hose (65).
- (2) Using two adapters (66 and 67), connect air hose (65) to elbow (68) and air cylinder (69). Tighten hose clamps (64).
- (3) Tighten two adapters (66 and 67) on air hose (65).
- (4) Install coupling (70), elbow (68), and adapter (63) on BAP frame.
- (5) Using two tube nuts (61), connect tubing (62) to two adapters (60 and 63).
- (6) Install coupling half (56) and straight adapter (55) on air hose (57) with two hose clamps (54).
- (7) Install coupling half (59) on BAP frame, and insert coupling half (56) in coupling half (59).
- (8) Install coupling (58), straight adapter (55), and adapter (50) on BAP frame.
- (9) Install tubing (47) on BAP frame with loop clamp (53), new lockwasher (52), and nut (51).
- (10) Using two tube nuts (48), connect tubing (47) to adapter (50) and elbow (49).
- (11) Install tubing (40) on BAP frame and further secure tubing (47) to BAP frame using four loop clamps (46) and two new lockwashers (45) and nuts (44).
- (12) Further secure tubing (40) to BAP frame with three loop clamps (43), new lockwashers (42), and nuts (41).
- (13) Using two tube nuts (39), connect tubing (40) to adapter (38) and tube nipple (34).

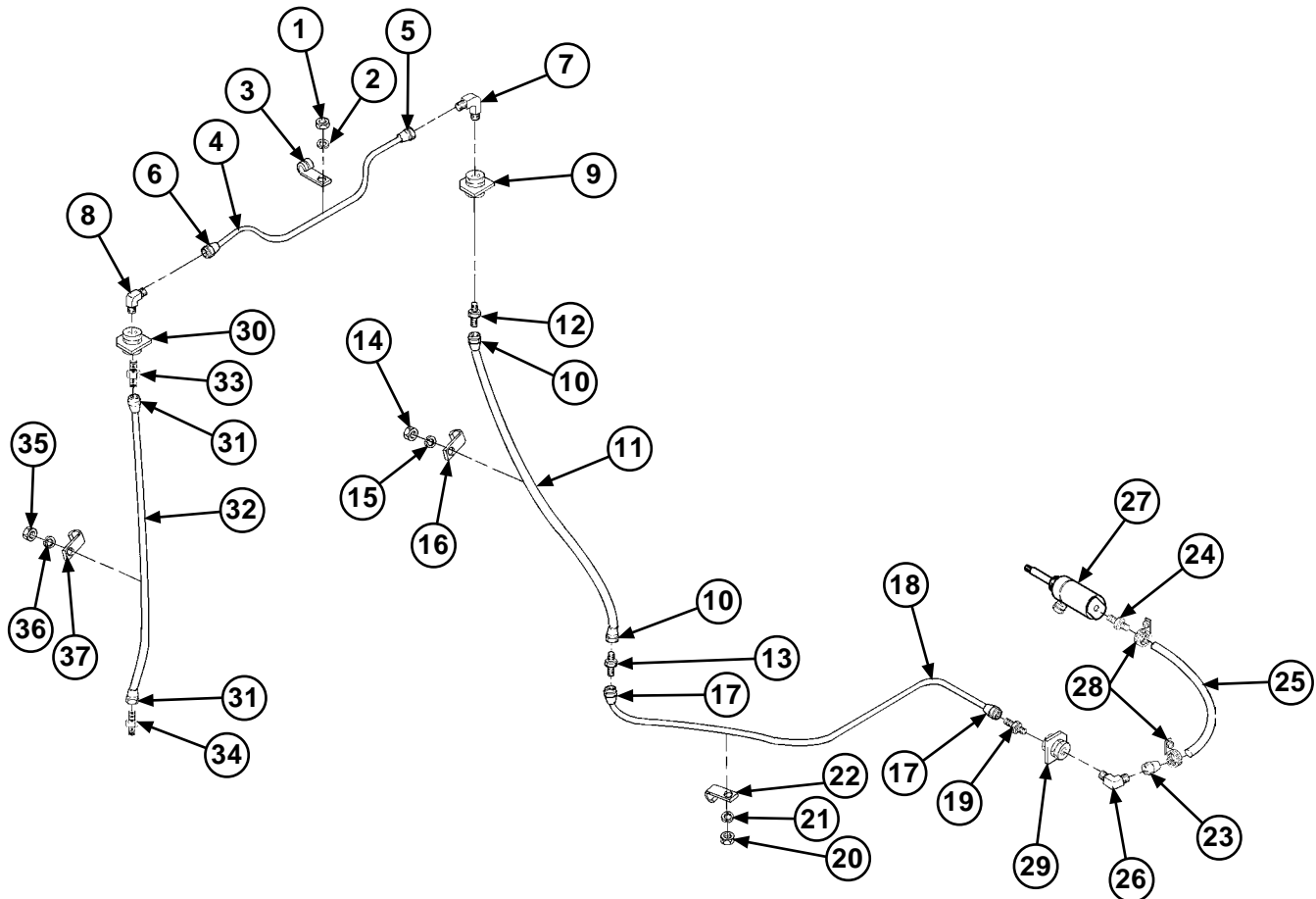
**4-45. BAP AIR LINES AND FITTINGS REPLACEMENT (continued).**

- (14) Install coupling (30) and adapter (33) on BAP frame.
- (15) Install tubing (32) on BAP frame with six loop clamps (37), new lockwashers (36), and nuts (35).
- (16) Using two tube nuts (31), connect tubing (32) to tube nipple (34) and adapter (33).
- (17) Install elbow (8) on coupling (30).

**NOTE**

Steps 18 through 28 apply only to curb-side air lines.

- (18) Install coupling (29), elbow (26), and adapter (19) on the BAP.
- (19) Install two tube nuts (23 and 24) on air hose (25) with two hose clamps (28).
- (20) Using two tube nuts (23 and 24), connect air hose (25) to elbow (26) and air cylinder (27).
- (21) Install tubing (18) on BAP frame with six loop clamps (22), new lockwashers (21), and nuts (20).





**4-45. BAP AIR LINES AND FITTINGS REPLACEMENT (continued).**

- (22) Using two tube nuts (17), connect tubing (18) to adapter (19) and tube nipple (13).
- (23) Install pipe coupling (9) and adapter (12) on BAP frame.
- (24) Install tubing (11) on BAP frame with six loop clamps (16), new lockwashers (15), and nuts (14).
- (25) Using two tube nuts (10), connect tubing (11) to tube nipple (13) and adapter (12).
- (26) Install elbow (7) on pipe coupling (9).
- (27) Install tubing (4) on BAP frame with loop clamp (3), new lockwasher (2), and nut (1).
- (28) Using two tube nuts (5 and 6), connect tubing (4) to two elbows (7 and 8).

***c. Follow-on Maintenance:***

- Install BAP front pin lock guard plate (para 4-35).
- Install BAP control valve (para 4-44).
- Load BAP onto Transporter and connect air system (para 2-9).
- Check air system for leaks.

**END OF TASK**

**Section VII. TRANSPORTER MAINTENANCE PROCEDURES**

**4-46. GENERAL.**

Sections VI and VII of this chapter contain instructions for replacement and repair of Common Bridge Transporter (CBT) System components authorized by the Maintenance Allocation Chart at the Unit maintenance level. Maintenance procedures for the Transporter are in this section, and maintenance procedures for the Bridge Adapter Pallet (BAP) are in Section VI. In some cases, components must be removed before performing the task. In these cases, references are provided to other chapters or paragraphs within this manual.

**4-47. LADDER BRACKETS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition:*

Ladder removed (para 3-7)  
Engine turned off (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)

*Materials/Parts:*

Adhesive, Gasket (Item 2, Appendix E)  
Locknut (4) (Item 59, Appendix K)

**a. Removal.**

**NOTE**

There are two ladder brackets. Both brackets are removed the same way.

- (1) Remove two locknuts (1), screws (2), and ladder bracket (3) from vehicle (4). Discard locknuts.

**NOTE**

Perform Step 2 only if rubber pads are damaged.

- (2) Remove and discard two rubber pads (5) from vehicle (4).

## 4-47. LADDER BRACKETS REPLACEMENT (MODEL A ONLY) (continued).

### b. Installation.

#### WARNING

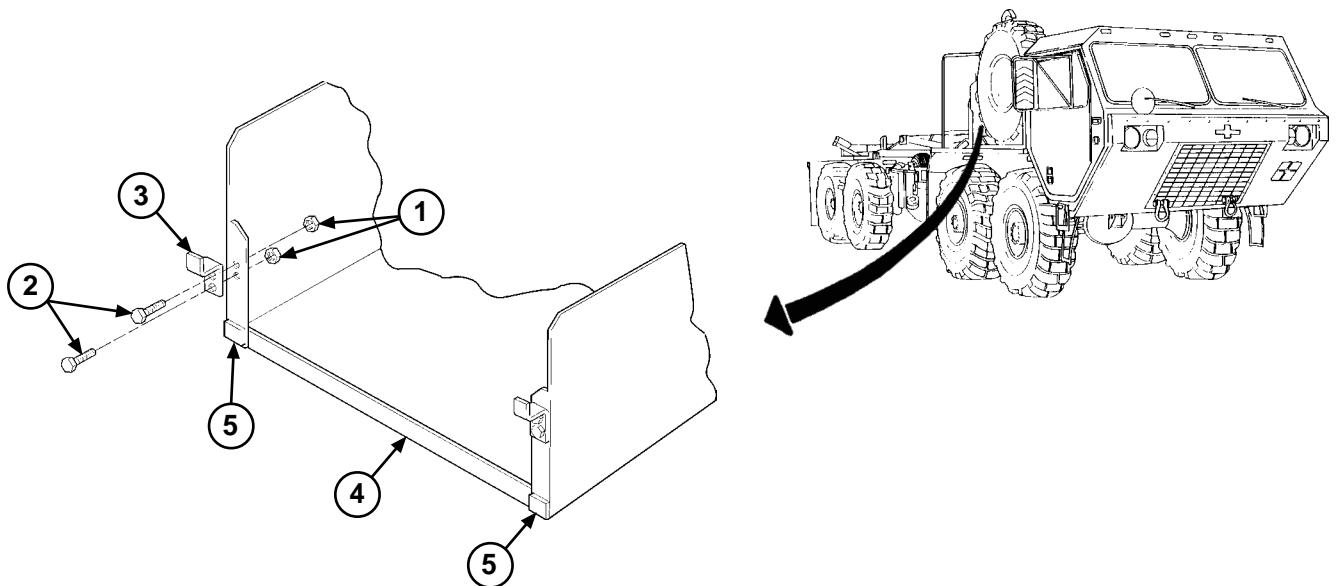
Adhesive causes immediate bonding on contact with eyes, skin, or clothing and also gives off harmful vapors. Wear protective goggles and use in a well-ventilated area. If adhesive gets in your eyes, try to keep them open; flush them with water for 15 minutes and get immediate medical attention.

#### NOTE

- There are two ladder brackets. Both brackets are installed the same way.
- Perform Step 1 only if rubber pads were removed.

(1) Apply adhesive to two rubber pads (5) and install on vehicle (4).

(2) Install ladder bracket (3) on vehicle (4) with two screws (2) and new locknuts (1).



SPARE TIRE REMOVED FOR CLARITY

### c. Follow-on Maintenance:

- Install ladder (para 3-7).
- Remove wheel chocks (TM 9-2320-279-10).

END OF TASK

### 4-47.1 LADDER SUPPORTS REPLACEMENT (MODEL B ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools:*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

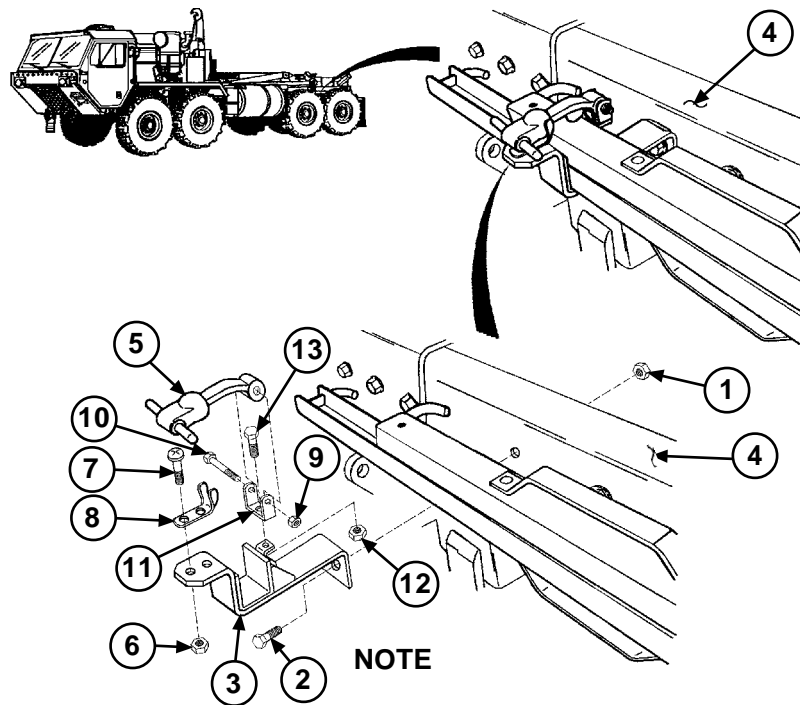
*Equipment Condition:*

Ladder removed (para 3-7.1)  
Engine turned off (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)

*Materials/Parts:*

- Locknut (2) (Item 59, Appendix K)
- Locknut (4) (Item 1, Appendix K)
- Locknut (2) (Item 48.1, Appendix K)
- Locknut (2) (Item 40.1, Appendix K)

**a. Removal.**



There are two ladder supports. Both supports are removed the same way.

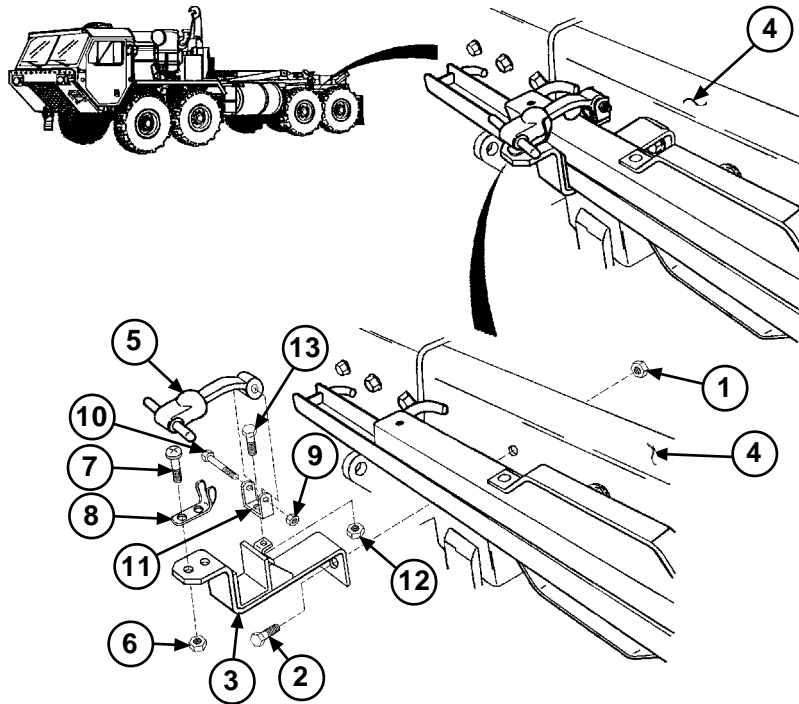
- (1) Remove locknut (1), bolt (2), and ladder support (3) from vehicle (4). Discard locknut.
- (2) Pull hood latch (5) out and up.
- (3) Remove locknut (6), screw (7), and support hook (8) from ladder support (3). Discard locknut.
- (4) Remove locknut (9), screw (10), and hood latch (5) from retaining strap (11). Discard locknut.
- (5) Remove locknut (12), screw (13), and retaining strap (11) from ladder support (3). Discard locknut.

## 4-47.1 LADDER SUPPORTS REPLACEMENT (MODEL B ONLY) (continued).

### b. Installation.

#### NOTE

There are two ladder supports. Both supports are installed the same way.



- (1) Install retaining strap (11) on ladder support (3) using screw (13) and new locknut (12).
- (2) Install hood latch (5) on retaining strap (11) using screw (10) and new locknut (9).
- (3) Install support hook (8) on ladder support (3) using screw (7) and new locknut (6).
- (4) Connect hood latch (5).
- (5) Install ladder support (3) on vehicle (4) using bolt (2) and new locknut (1).

### c. Follow-on Maintenance:

- Stow ladder (Para 3-7.1).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

#### 4-48. WORKSTATION ASSEMBLY REPLACEMENT.

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

Lifting Device, Minimum Capacity 150 lb (68 kg)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Personnel Required*

Two

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)

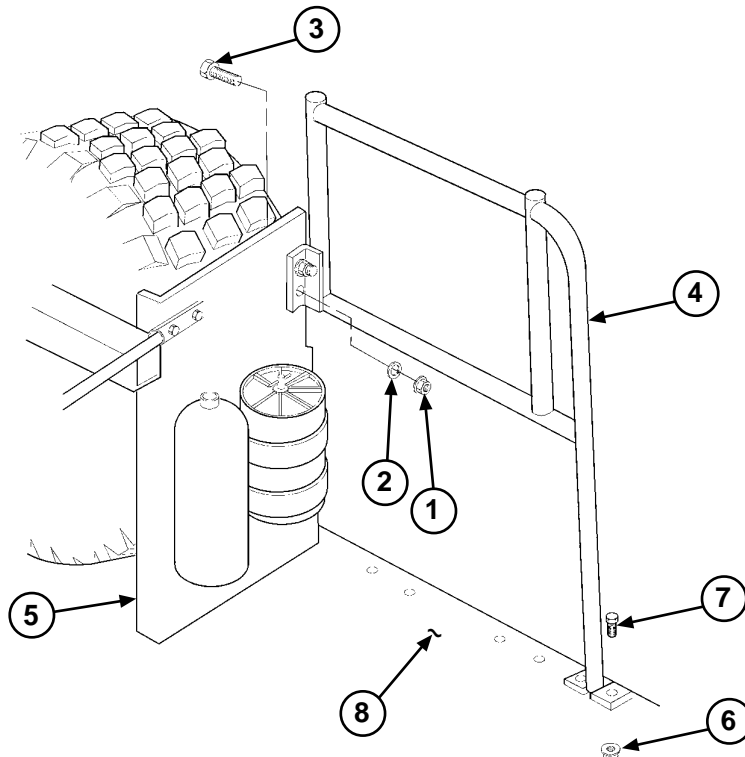
Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

Locknut (4) (Item 53, Appendix K)  
 Locknut (2) (Item 56, Appendix K)  
 Locknut (10) (Item 49, Appendix K)

#### a. Removal.

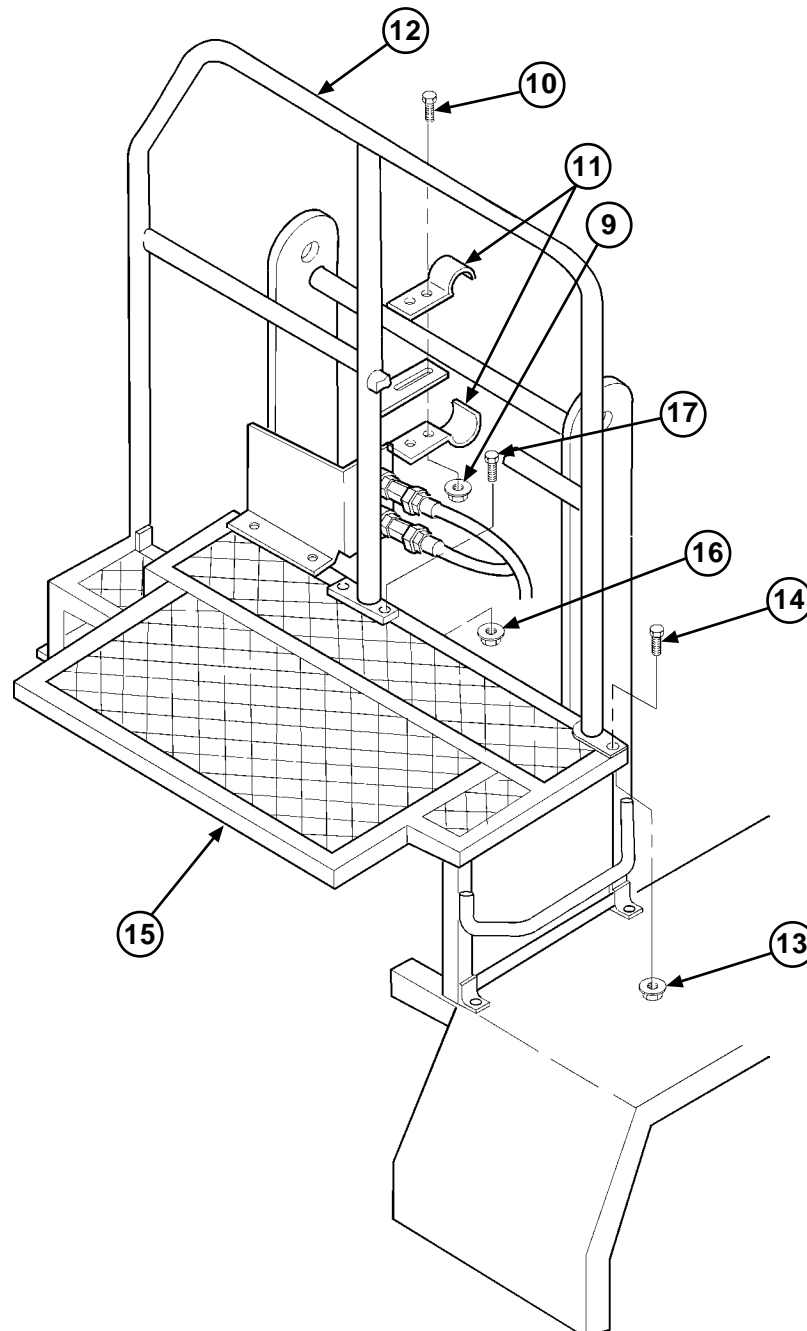
- (1) Remove two locknuts (1), washers (2), and screws (3) from workstation rail (4) and tire davit panel (5). Discard locknuts.
- (2) Remove two locknuts (6) and screws (7) from workstation rail (4) and fender (8). Discard locknuts.
- (3) With the help of an assistant, remove workstation guard (1) from fender (8).



**4-48. WORKSTATION ASSEMBLY REPLACEMENT (continued).****NOTE**

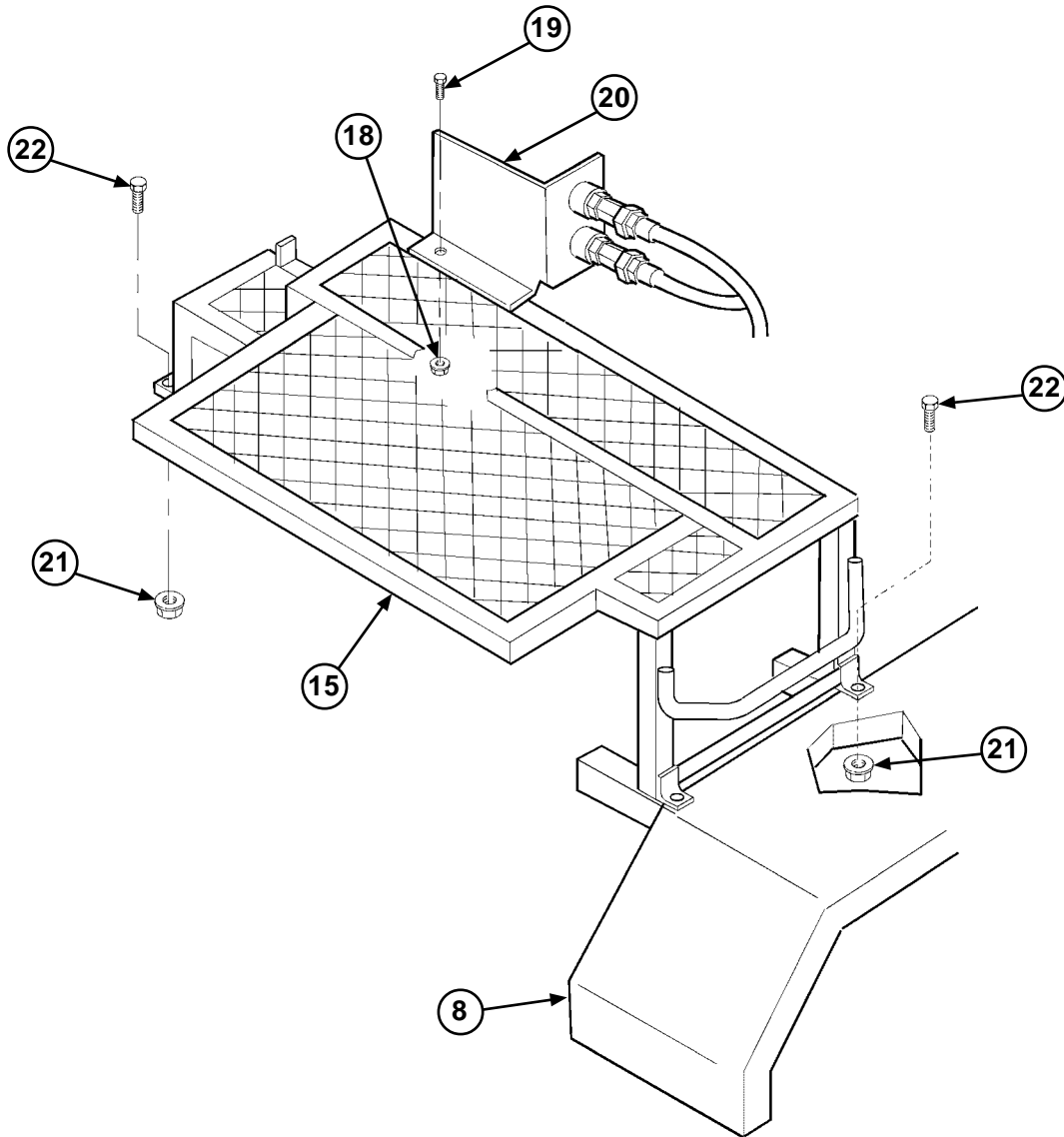
The platform assembly for Model B is removed according to para 4-48.1

- (4) Remove two locknuts (9), screws (10), and piece clamps (11) from handrail (12). Discard locknuts.
- (5) With the help of an assistant, remove locknut (13) and screw (14) from each end of handrail (12) and catwalk (15). Discard locknut.
- (6) Remove two locknuts (16) and screws (17) and handrail (12) from catwalk (15). Discard locknuts.



**4-48. WORKSTATION ASSEMBLY REPLACEMENT (continued).**

- (7) Remove two locknuts (18) and screws (19) and slave bracket (20) from catwalk (15). Discard locknuts.
- (8) With the help of an assistant, remove two locknuts (21) and screws (22) and catwalk (15) from each fender (8). Discard locknuts.





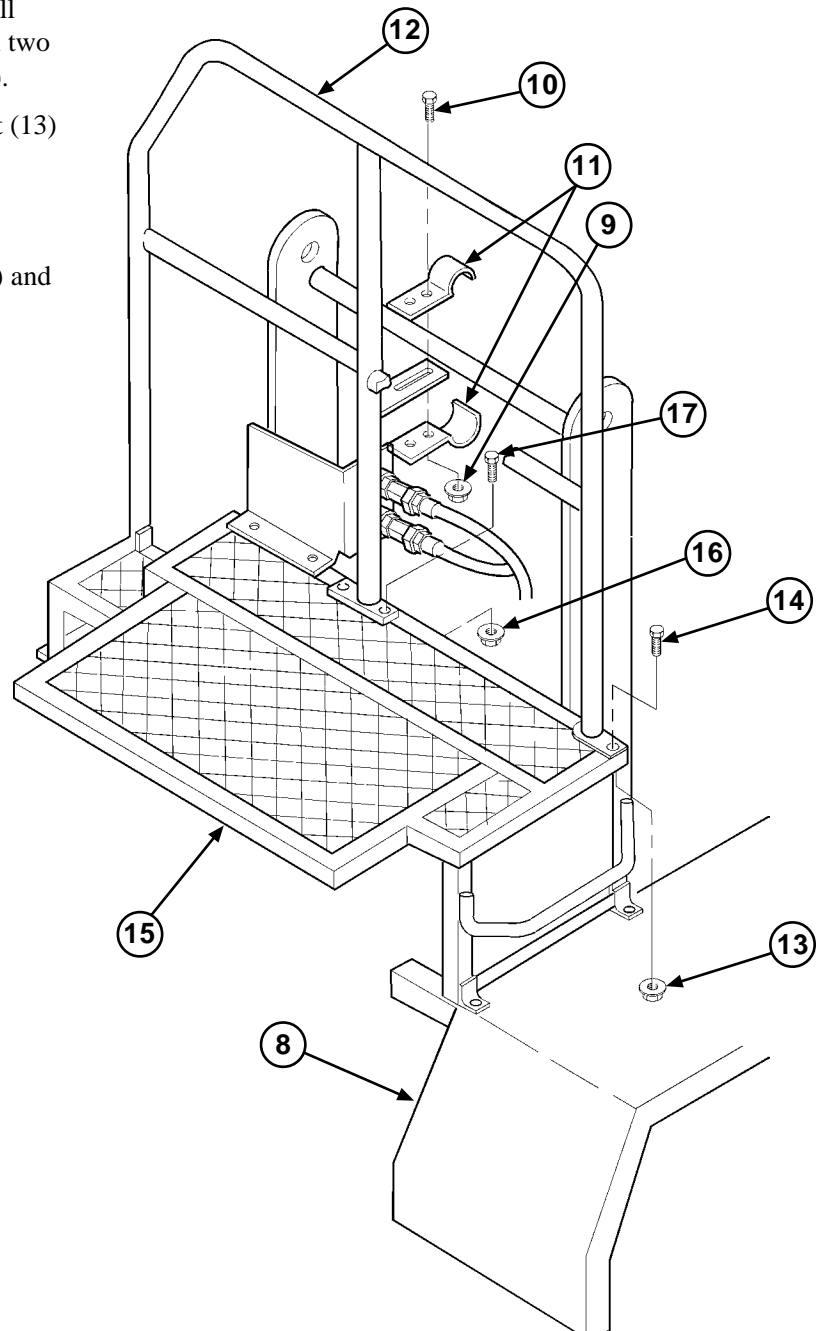
## 4-48. WORKSTATION ASSEMBLY REPLACEMENT (continued).

### NOTE

The platform assembly for Model B is installed according to para 4-48.1.

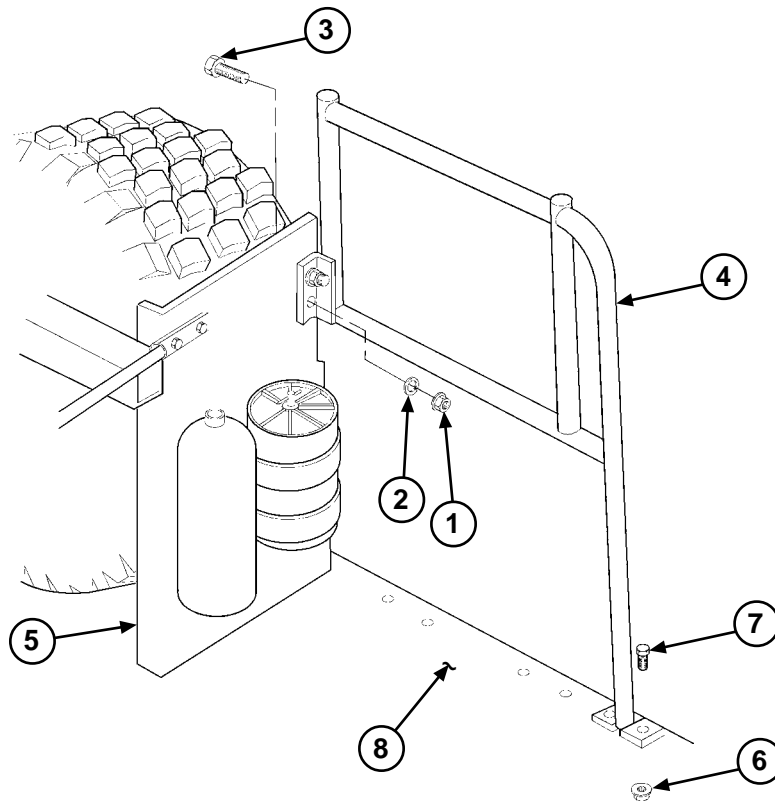
#### b. Installation.

- (1) With the help of an assistant, install catwalk (15) on each fender (8) with four screws (22) and new locknuts (21).
- (2) Install slave bracket (20) on catwalk (15) with two screws (19) and new locknuts (18).
- (3) With the help of an assistant, install handrail (12) on catwalk (15) with two screws (17) and new locknuts (16).
- (4) Install screw (14) and new locknut (13) in each end of handrail (12) and catwalk (15).
- (5) Install two piece clamps (11) on handrail (12) with two screws (10) and new locknuts (9).



**4-48. WORKSTATION ASSEMBLY REPLACEMENT (continued).**

- (6) With the help of an assistant, position workstation rail (4) on fender (8).
- (7) Install two screws (7) and new locknuts (6) in workstation rail (4) and fender (8).
- (8) Install two screws (3), washers (2), and new locknuts (1) in workstation rail (4) and tire davit panel (5).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-48.1 PLATFORM ASSEMBLY REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal                                      b. Installation                                      c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

Lifting Device, Minimum Capacity 150 lb (68 kg)

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Materials/Parts*

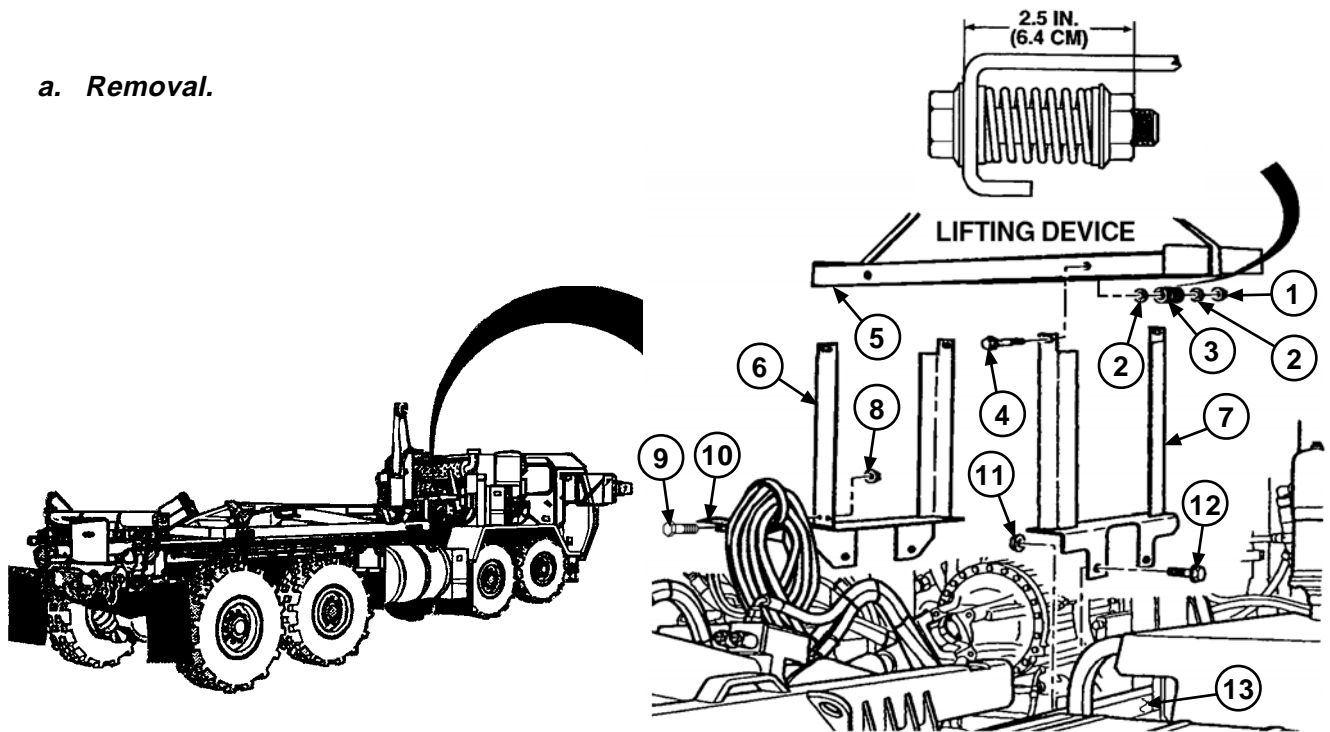
Locknuts (4) (Item 53, Appendix K)

Locknuts (4) (Item 54, Appendix K)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)

Engine turned off (TM 9-2320-279-10)

**a. Removal.****WARNING**

After removing deck, caution must be used not to get impaled on brackets.

- (1) Remove four locknuts (1), eight washers (2), four springs (3), four screws (4), and deck (5) from brackets (6 and 7). Discard locknuts.
- (2) Remove two locknuts (8), screws (9), and bracket (10) from bracket (6). Discard locknuts.
- (3) Remove four locknuts (11) and screws (12) from brackets (6 and 7). Discard locknuts.

**NOTE**

Left hand bracket must be rotated towards the front of the truck to remove.

- (4) Remove brackets (6 and 7) from frame rail (13).

**4-48.1 PLATFORM ASSEMBLY REPLACEMENT (MODEL B ONLY) (continued).**

**b. Installation.**

**NOTE**

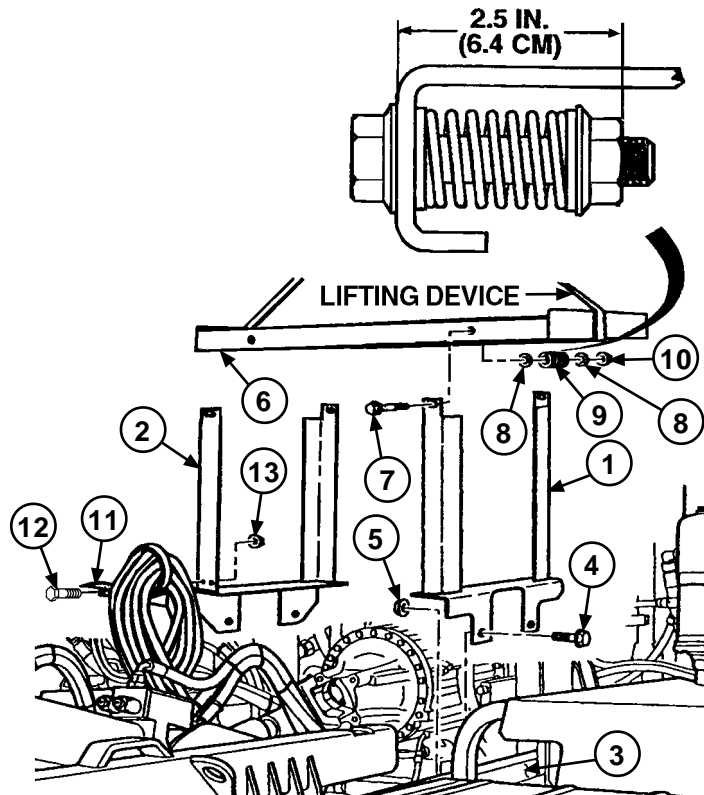
Left hand bracket must be rotated under hydraulic hoses to install.

- (1) Install brackets (1 and 2) on frame rail (3) with screw (4) and locknut (5).
- (2) Instal deck (6) on brackets ( and 2) with four screws (7), four springs (8), eight washers (9), and four locknuts (10).
- (3) Install bracket (11) on bracket (2) with two screws (13) and locknuts (14).

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



**4-49. EXHAUST EXTENSION REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal                                      b. Installation                                      c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

Lockwasher (10) (Item 88, Appendix K)

*General Safety Instructions*

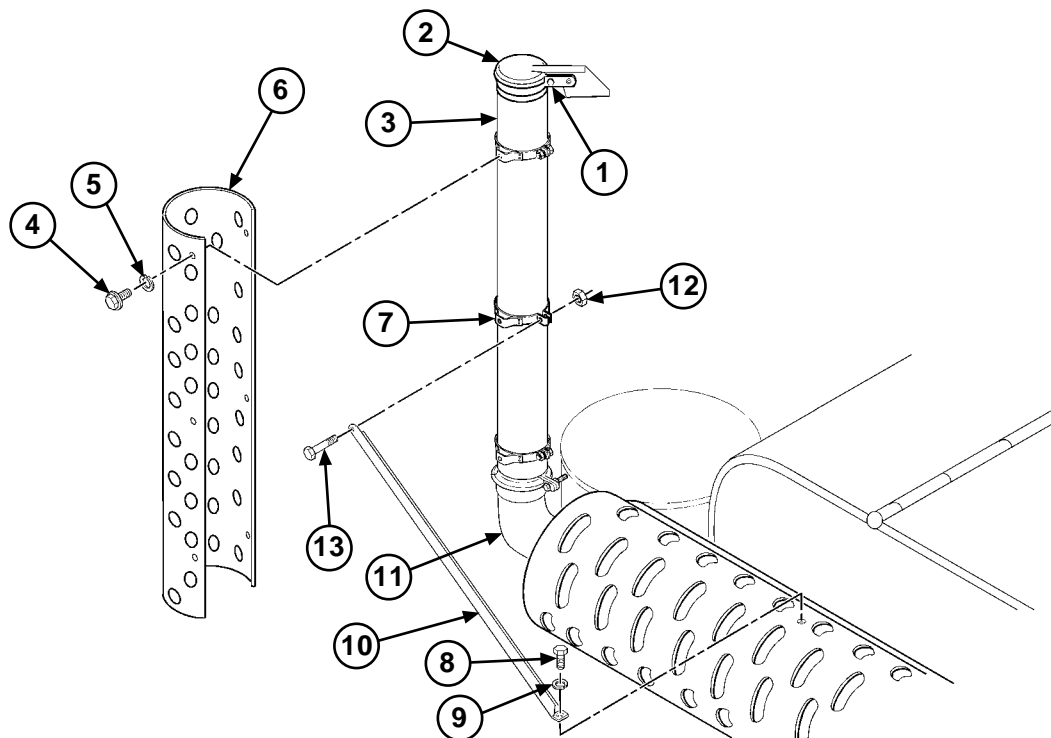
Ensure exhaust stack is cool prior to performing this task. Failure to comply could result in injury to personnel.

*Personnel Required*

Two

**a. Removal.**

- (1) Loosen nut (1) and remove rain cap (2) from tube (3).
- (2) Remove nine screws (4), lockwashers (5) and shield (6) from three clamps (7). Discard lockwashers.
- (3) Remove screw (8) and lockwasher (9) from angle strap (10) and muffler (11). Discard lockwasher.
- (4) Remove nut (12), screw (13), and angle strap (10) from center clamp (7).

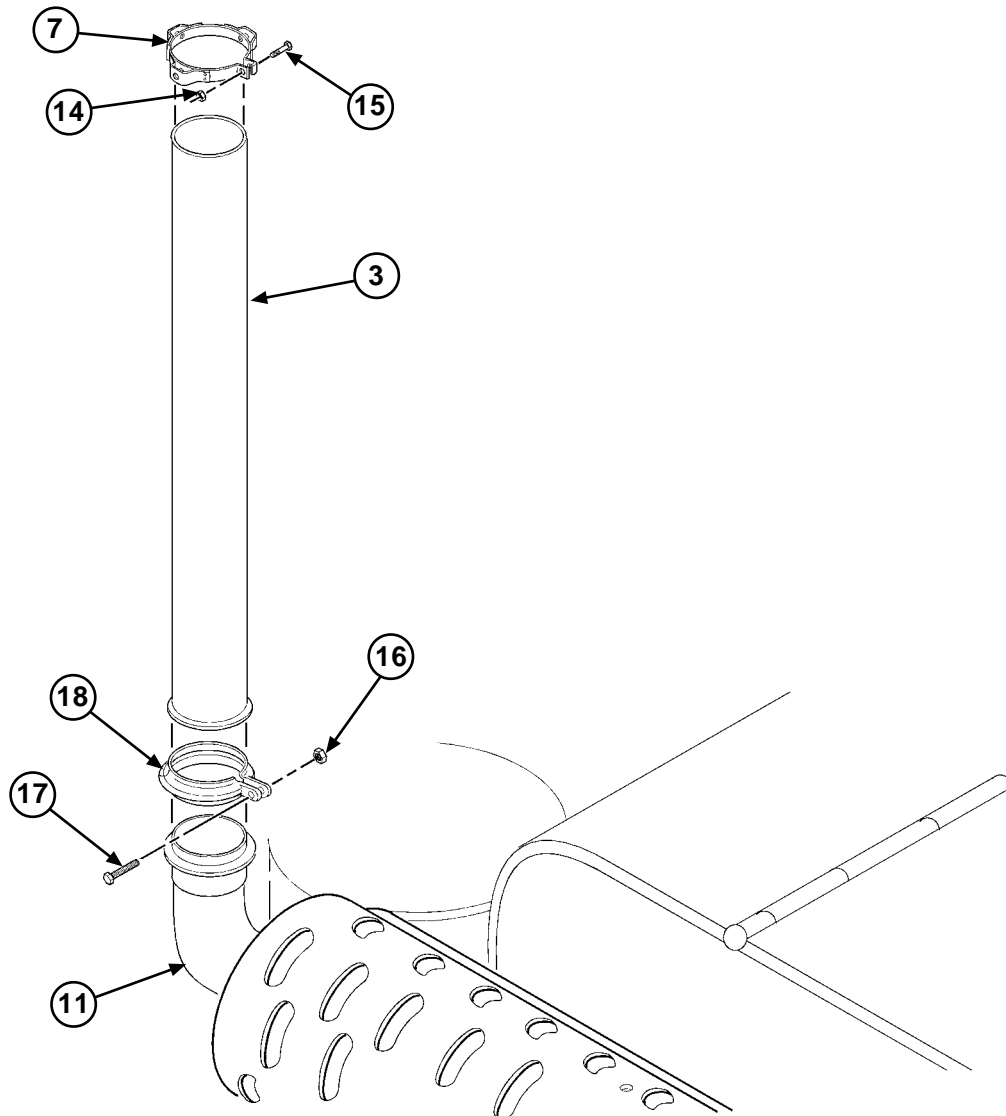


**4-49. EXHAUST EXTENSION REPLACEMENT (MODEL A ONLY) (continued).**

**NOTE**

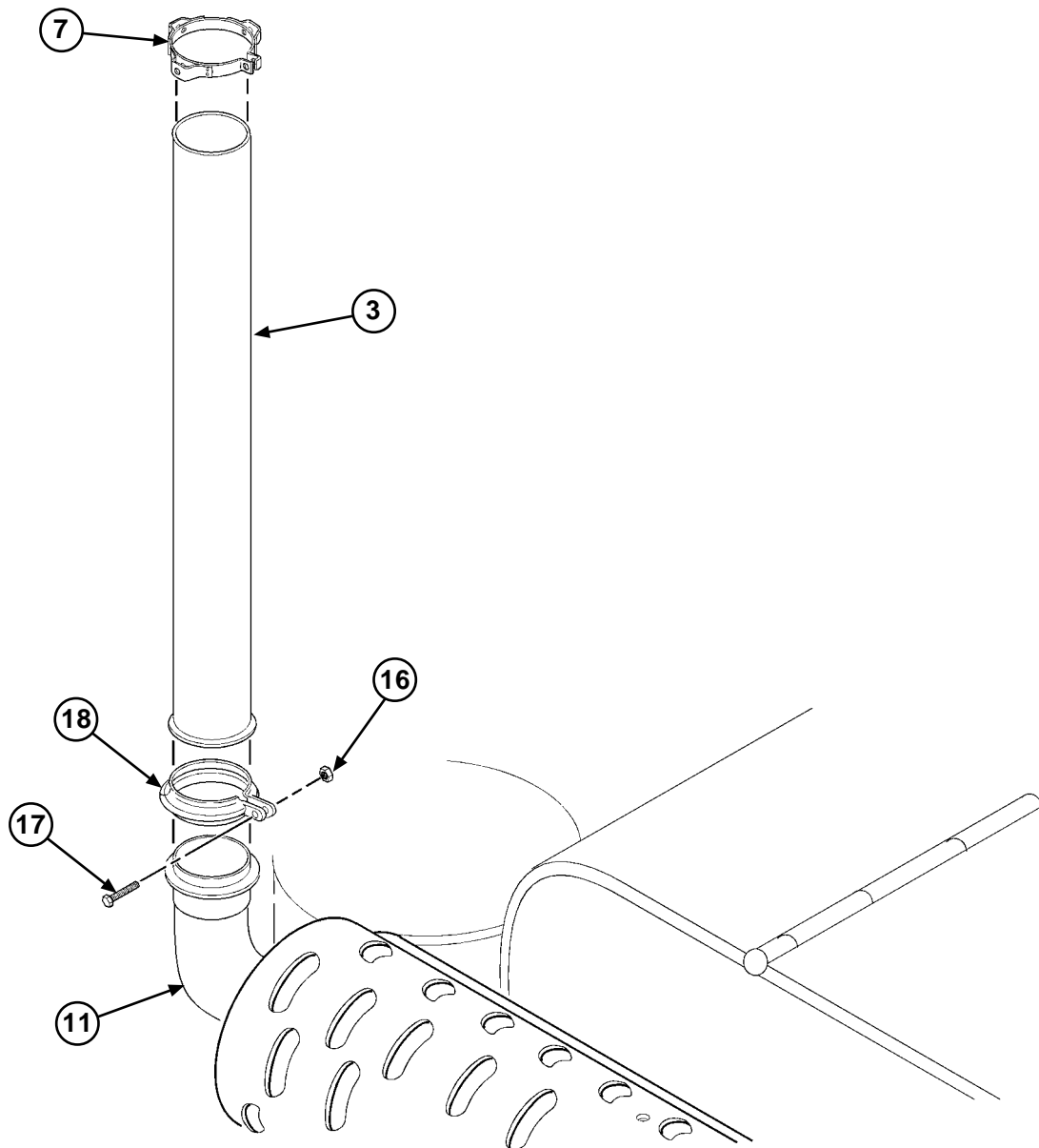
Note distance from top of tube to top clamp prior to removal to ensure proper installation.

- (5) Remove nut (14) and screw (15) from top and bottom clamps (7).
- (6) Remove three clamps (7) from tube (3).
- (7) Remove nut (16) and screw (17) from clamp (18).
- (8) Slide clamp (18) down onto muffler (11) and remove tube (3) from muffler (11).
- (9) Remove clamp (18) from muffler (11).



**4-49. EXHAUST EXTENSION REPLACEMENT (MODEL A ONLY) (continued).****b. Installation.**

- (1) Position clamp (18) on muffler (11).
- (2) Install tube (3) on muffler (11) and secure with clamp (18), screw (17) and nut (16).
- (3) Position three clamps (7) on tube (3).

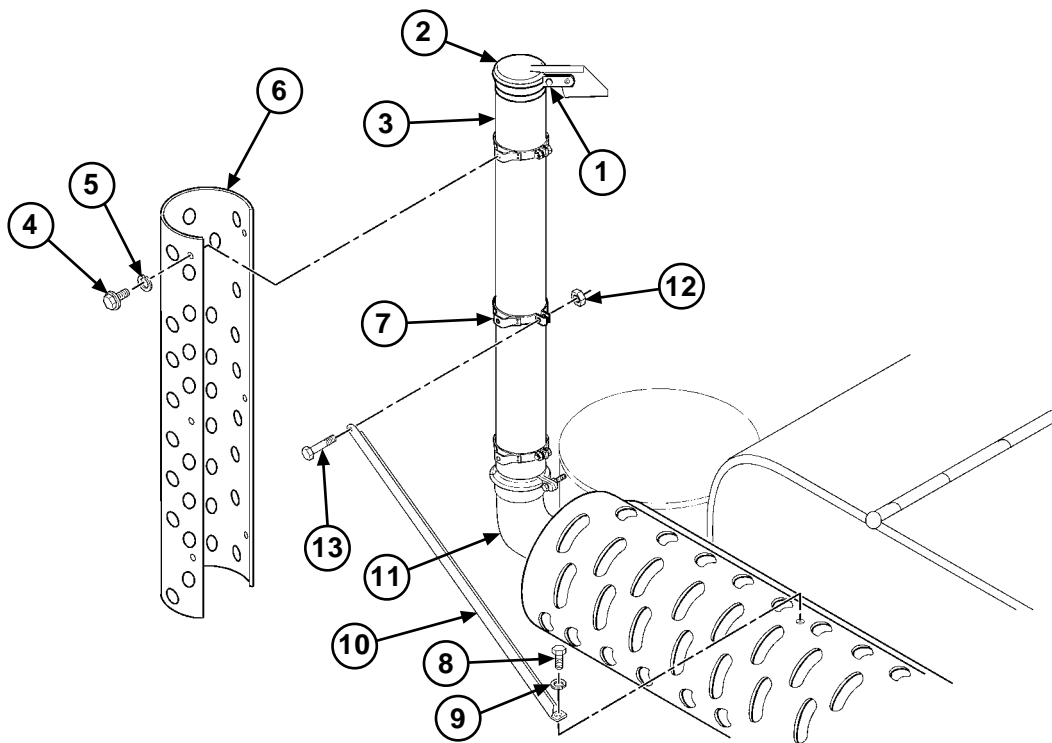


**4-49. EXHAUST EXTENSION REPLACEMENT (MODEL A ONLY) (continued).**

**NOTE**

Ensure top clamp is installed as noted prior to removal.

- (4) With the help of an assistant, install shield (6) on three clamps (7) with nine new lockwashers (5) and screws (4).
- (5) Install angle strap (10) on center clamp (7) with screw (13) and nut (12).
- (6) Install angle strap (10) on muffler (11) with new lockwasher (9) and screw (8).
- (7) Secure top and bottom clamp (7) with screw (15) and nut (14).
- (8) Install rain cap (2) in tube (3) and secure with nut (1).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



**4-50. REMOTE CONTROL STOWAGE BOX REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

Lockwasher (3) (Item 87, Appendix K)  
Lockwasher (5) (Item 89, Appendix K)

*Materials/Parts*

Locknut (Item 56, Appendix K)  
Locknut (2) (Item 59, Appendix K)  
Locknut (6) (Item 63, Appendix K)  
Locknut (Item 67, Appendix K)

*Personnel Required*

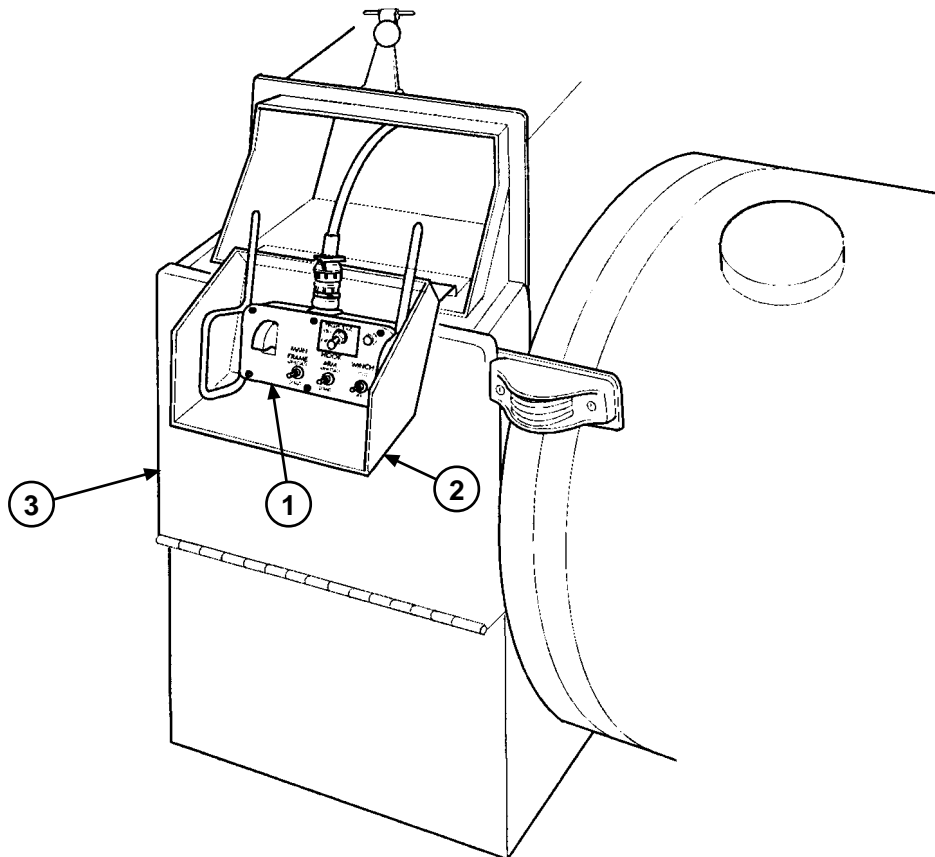
Two

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine OFF (TM 9-2320-279-10)

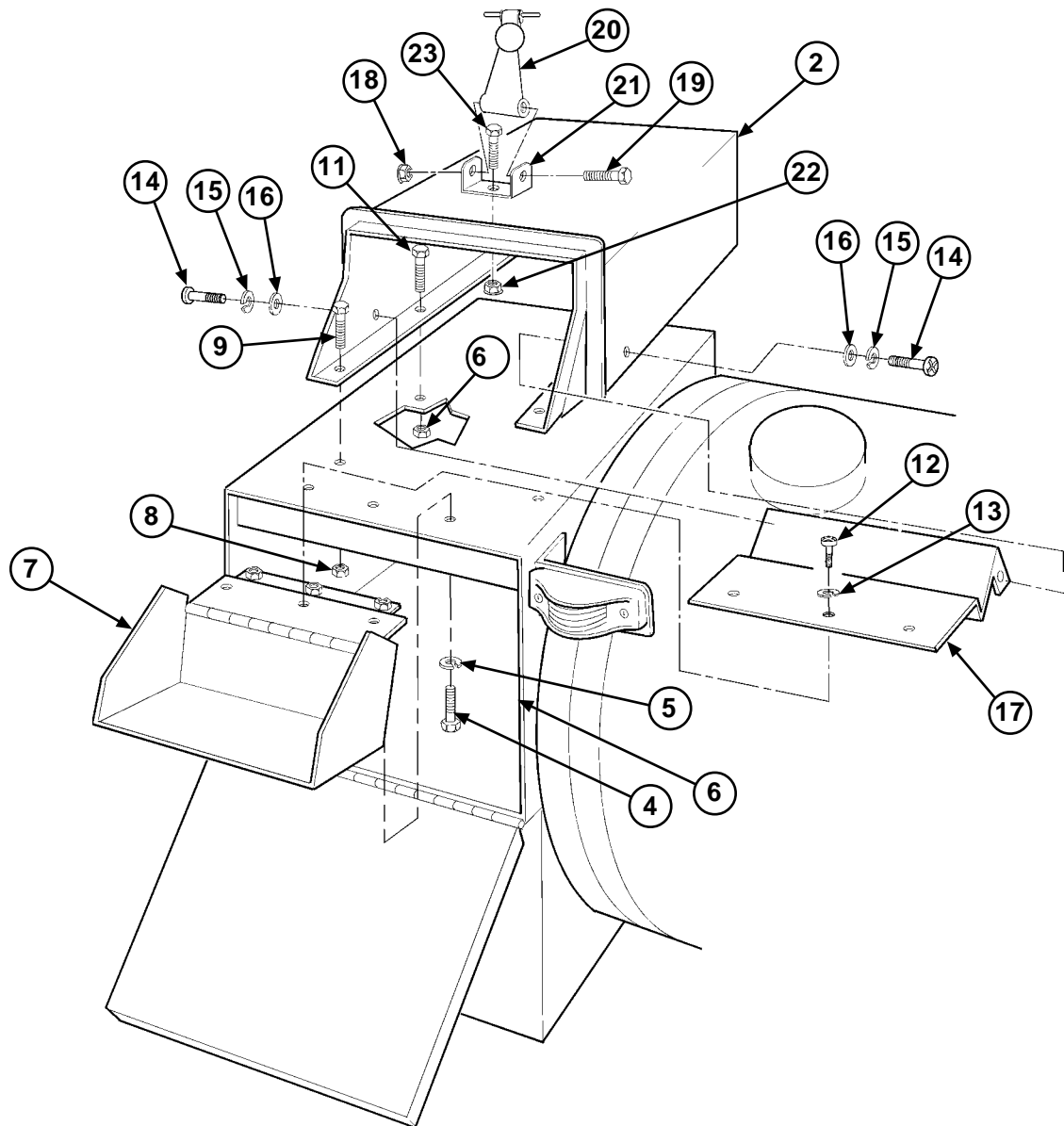
**a. Removal.**

- (1) Remove remote control unit (1) from remote control stowage box (2).
- (2) Open tool storage box door (3).



**4-50. REMOTE CONTROL STORAGE BOX REPLACEMENT (continued).**

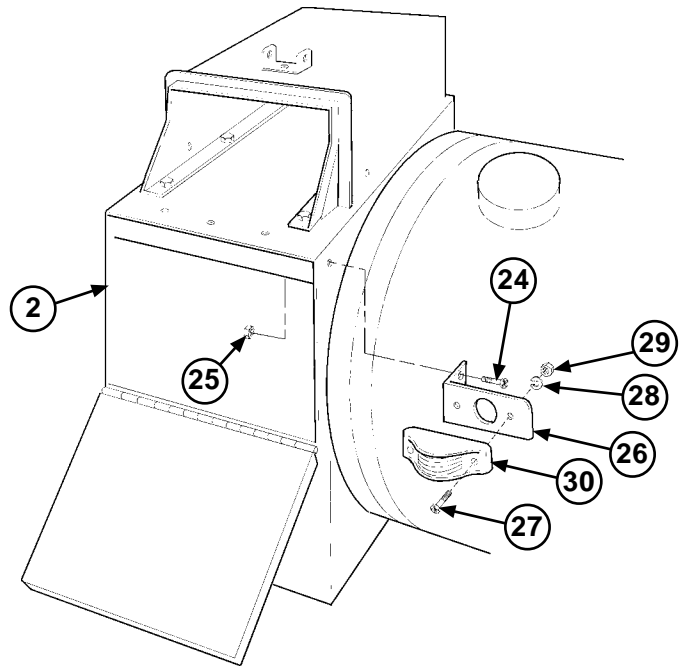
- (3) Remove three screws (4) and lockwashers (5) from inside of tool storage box (6). Discard lockwashers.
- (4) Lift remote control storage box door (7) and remove two locknuts (8) and screws (9) from remote control storage box (2) and inside of tool storage box (6). Discard locknuts.
- (5) Lower remote control storage box door (7).



- (6) With the help of an assistant, remove four locknuts (10) and screws (11) from remote control storage box (2). Discard locknuts.
- (7) Remove remote control storage box (2) from tool storage box (6) and position on clean work surface.
- (8) Remove three screws (12), lockwashers (13), and remote control storage box door (7) from remote control storage box (2). Discard lockwashers.

#### 4-50. REMOTE CONTROL STOWAGE BOX REPLACEMENT (continued).

- (9) Remove two screws (14), lockwashers (15), washers (16), and plate (17) from remote control stowage box (2). Discard lockwashers.
- (10) Remove locknut (18), screw (19), and latch (20) from latch bracket (21). Discard locknut.
- (11) Remove locknut (22), screw (23), and latch bracket (21) from remote control stowage box (2). Discard locknut.
- (12) Remove screw (24), locknut (25), and bracket (26) from remote control stowage box (2). Discard locknut.
- (13) Remove screw (27), c washer (28), locknut (29), and marker light (30) from bracket (26). Discard locknut.



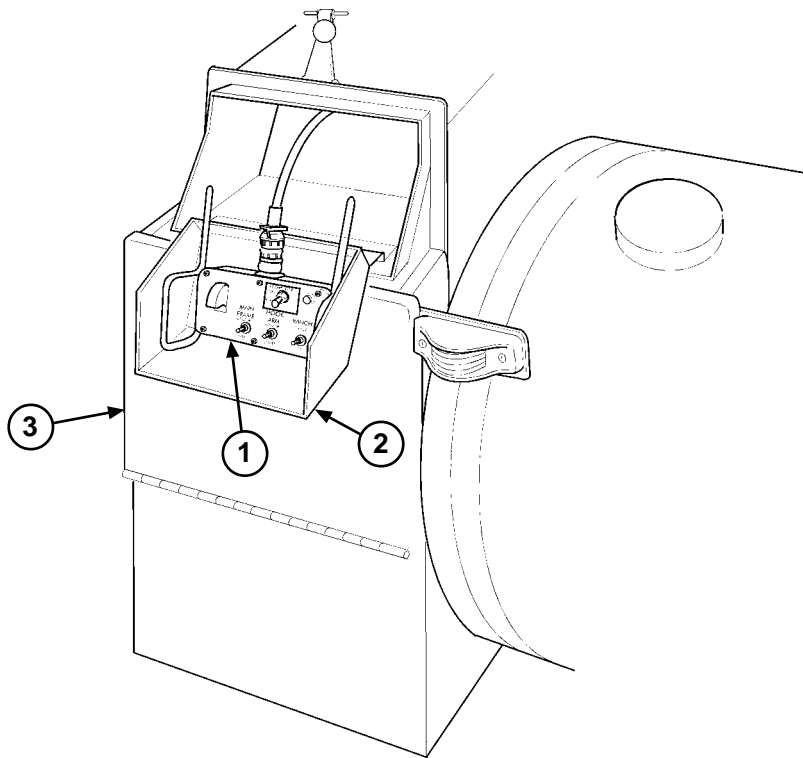
#### b. Installation.

- (1) Install marker light (30), screw (27), c washer (28), and new locknut (29) on bracket (26).
- (2) Install bracket (26), screw (24), and new locknut (25) on remote control stowage box (2).
- (3) Install latch bracket (21) on remote control stowage box (2) with screw (23) and new locknut (22).
- (4) Install latch (20) in latch bracket (21) with screw (19) and new locknut (18).
- (5) Install plate (17) in remote control stowage box (2) with two washers (16), new lockwashers (15), and screws (14).
- (6) Install remote control stowage box door (7) on remote control stowage box (2) with three screws (12) and new lockwashers (13). Do not tighten.
- (7) With the help of an assistant, install remote control stowage box (2) on tool storage box (6) with four screws (11) and new locknuts (10). Do not tighten.
- (8) Lift remote control stowage box door (7) and install two screws (9) and new locknuts (8) in remote control stowage box (2) and inside of tool storage box (6). Do not tighten.
- (9) Lower remote control stowage box door (7).
- (10) Install three new lockwashers (5) and screws (4) thru tool storage box (6) and into remote control stowage box door (7).
- (11) Tighten four screws (11), three screws (12), and two screws (9).

**4-50. REMOTE CONTROL STOWAGE BOX REPLACEMENT (continued).**

(12) Close tool stowage box door (3).

(13) Position remote control unit (1) inside remote control stowage box (2) and close door.



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-50.1 WHEEL CHOCK STORAGE BOX REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
 Engine OFF (TM 9-2320-279-10)

*Materials/Parts*

Locknut (2) (Item 55, Appendix K)

**a. Removal.**

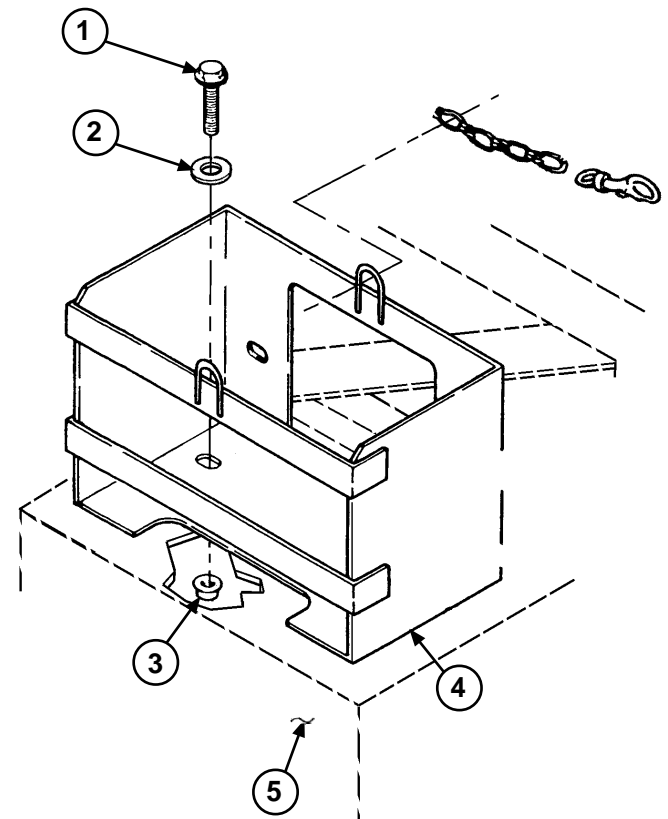
- (1) Remove two screws (1), washers (2), and self-locking nuts (3) from wheel chock storage box (4). Discard locknuts.
- (2) Remove wheel chock storage box (4) from RH HEMTT storage box (5).

**b. Installation.**

- (1) Position wheel chock storage box (4) on RH HEMTT storage box (5).
- (2) Install two screws (1), washers (2), and self-locking nuts (3) to secure wheel chock storage box (4) to RH HEMTT storage box (5).

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).



**END OF TASK**



**4-51. LHS REAR ROLLER ASSEMBLY REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Lifting Device, Minimum Capacity 375 lb (170 kg)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Personnel Required*

Two

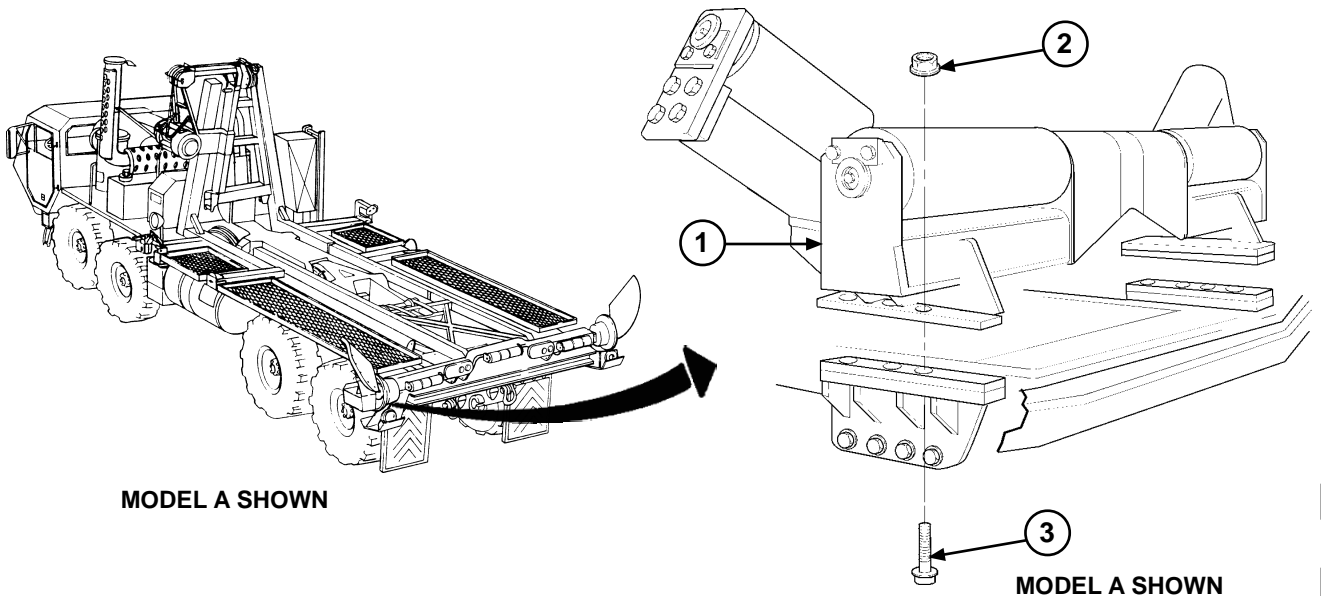
*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
 Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

Locknut (6) (Item 55, Appendix K)

**a. Removal.**



**WARNING**

**Rear roller assembly weighs 375 lb (170 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel**

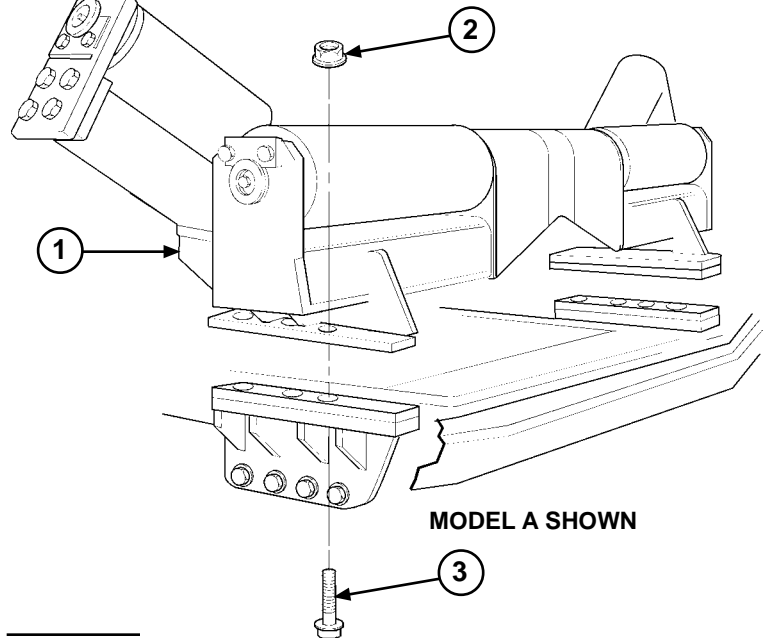
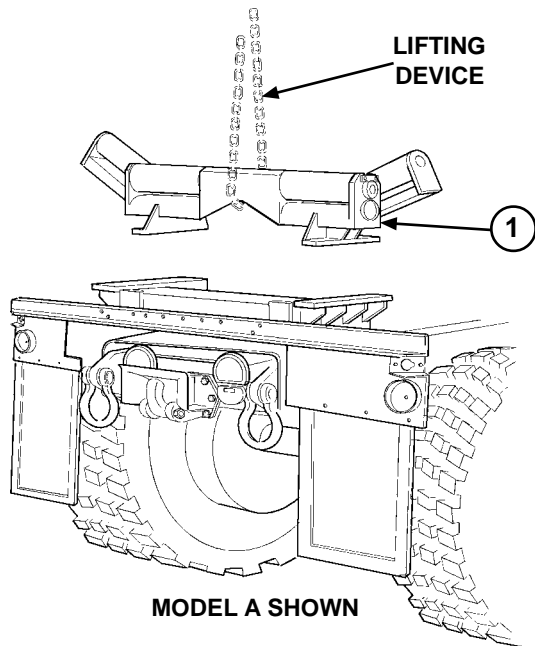
- (1) Attach lifting device to rear roller assembly (1).
- (2) Remove six locknuts (2) and screws (3) from rear roller assembly (1). Discard locknuts.

**4-51. LHS REAR ROLLER ASSEMBLY REPLACEMENT (continued).**

**NOTE**

Model B trucks are equipped with two spacer plates between rear roller assembly and mounting bracket.

- (3) With the aid of an assistant, guide rear roller assembly (1) up and off of truck.
- (4) Remove lifting device from rear roller assembly (1).



**b. Installation.**

**WARNING**

**Rear roller assembly weighs 375 lb (170 kg). Attach suitable lifting device prior to removal or installation to prevent possible injury to personnel.**

- (1) Attach lifting device to rear roller assembly (1).

**NOTE**

Model B trucks are equipped with two spacer plates on each side. Position and align prior to lowering rear roller assembly onto truck.

- (2) With the aid of an assistant, lower rear roller assembly (1) onto truck.
- (3) Install six screws (3) and locknuts (2) in rear roller assembly (1).
- (4) Remove lifting device from rear roller assembly (1).

**c. Follow-on Maintenance:**

- Lubricate rollers (Appendix G).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



**4-52. LHS HORIZONTAL ROLLER REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)  
 Lifting Device, Minimum Capacity 375 lb (170 kg)

*Equipment Condition*

Angled rollers removed (para 4-53)  
 Rear roller assembly removed (para 4-51)

*Materials/Parts*

Locknut (Item 10, Appendix K)  
 Lockwasher (Item 12, Appendix K)  
 Lockwasher (2) (Item 50, Appendix K)

**a. Removal.**

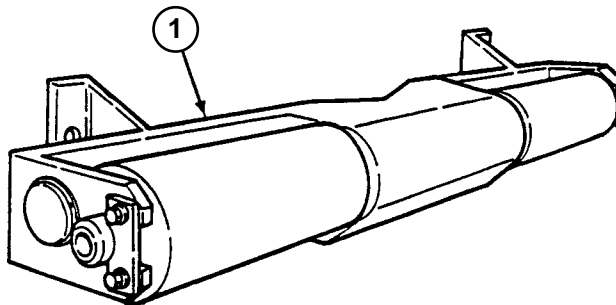
**WARNING**

**Rear roller assembly weighs 375 lb (170 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

**NOTE**

Both right and left hand horizontal rollers are removed the same way. Right horizontal roller is shown.

- (1) Using lifting device, position rear roller assembly (1) on clean work surface, angled roller side down.

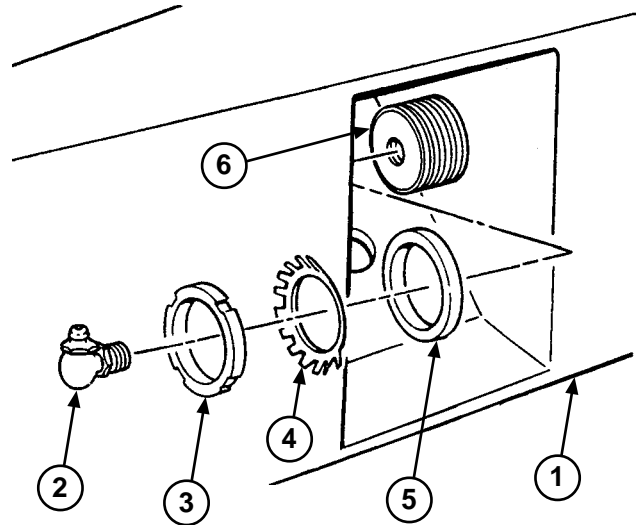


**4-52. LHS HORIZONTAL ROLLER REPLACEMENT (continued).**

- (2) Remove lube fitting (2), bend lockwasher tab out of locknut slot and remove locknut (3), lockwasher (4) and thrust washer (5) from roller (6) at underside of roller assembly (1). Discard lockwasher and locknut.
- (3) Remove two screws (7), lockwashers (8), lockplate (9) and lube fitting (10) from roller assembly (1). Discard lockwashers.
- (4) Attach lifting device to horizontal roller (6).

**NOTE**

Horizontal roller weighs 75 lb (34 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.



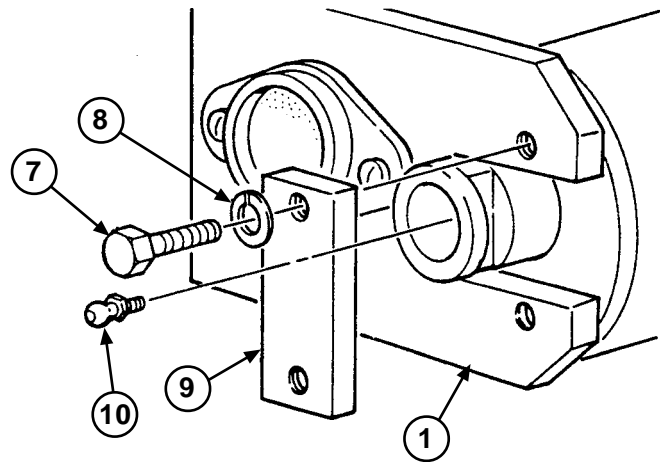
- (5) Using lifting device, remove horizontal roller (6) from roller assembly (1).
- (6) Remove lifting device from horizontal roller (6).

**b. Installation.**

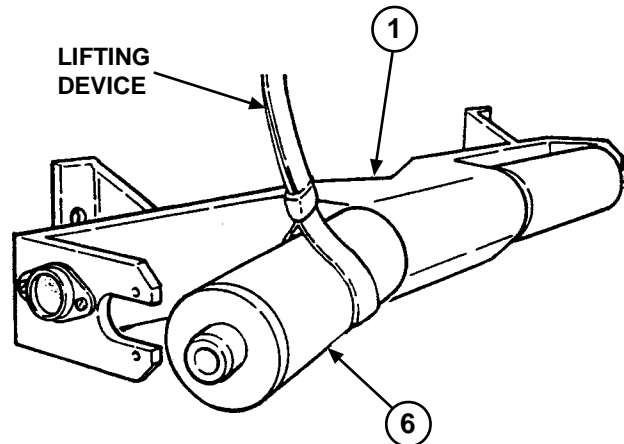
- (1) Attach lifting device to horizontal roller (6).

**NOTE**

Horizontal roller weighs 75 lb (34 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.



- (2) Using lifting device, position horizontal roller (6) in roller assembly (1).
- (3) Install lockplate (9), two new lockwashers (8), screws (7) and lube fitting (10) in roller assembly (1).

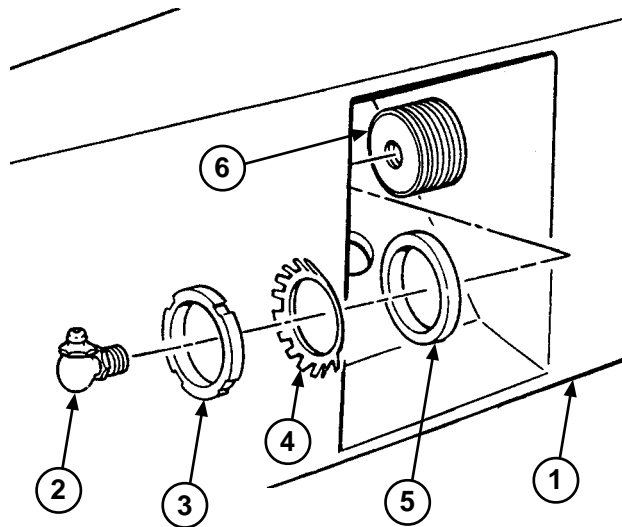


<b>4-52. LHS HORIZONTAL ROLLER REPLACEMENT (continued).</b>
---

**NOTE**

Locknut is installed properly when locknut is tightened and roller does not bind.

- (4) Install thrust washer (5), new lockwasher (4), new locknut (3) and lube fitting (2) on roller (6). Tighten locknut.
- (5) Bend tab of lockwasher (4) into slot of locknut (3).



- (6) Remove lifting device from horizontal roller (6).

**c. Follow-on Maintenance:**

- Lubricate roller assembly (Appendix G).
- Install angled rollers (para 4-53).
- Install roller assembly (para 4-51).

**END OF TASK**

## 4-53. LHS ANGLED ROLLER REPLACEMENT.

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)  
Hammer, Soft-Faced (3-HD)

#### *Materials/Parts*

Locknut (Item 10, Appendix K)  
Lockwasher (Item 50, Appendix K)

Lockwasher (4) (Item 89, Appendix K)

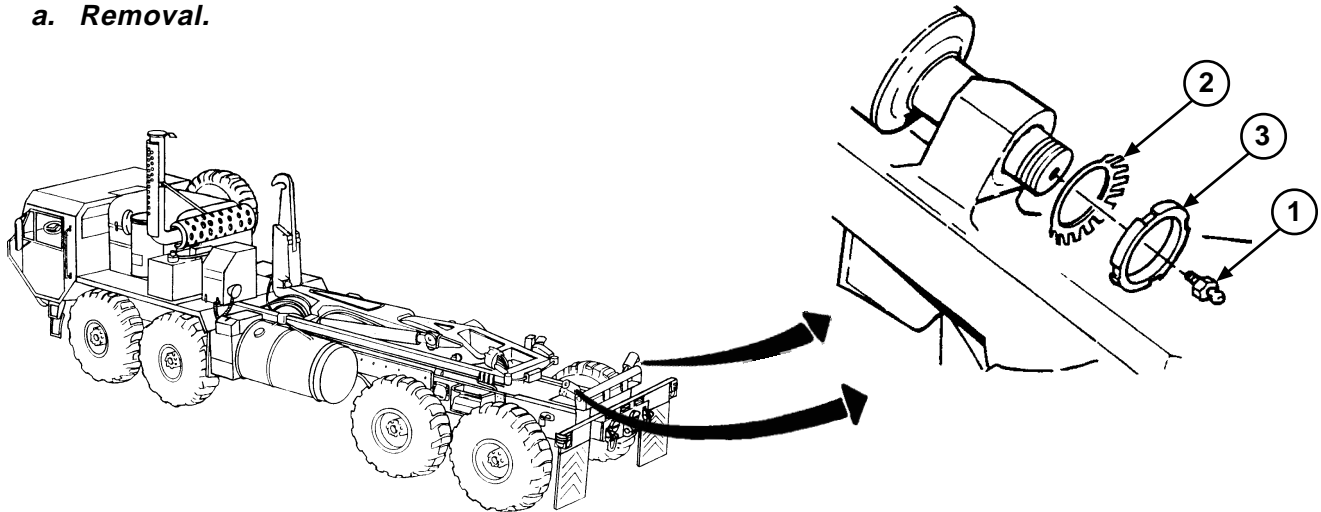
Lockwasher (2) (Item 51, Appendix K)

#### *Equipment Condition*

Engine turned off (TM 9-2320-279-10)

Wheels chocked (TM 9-2320-279-10)

### ***a. Removal.***



- (1) Remove lube fitting (1).

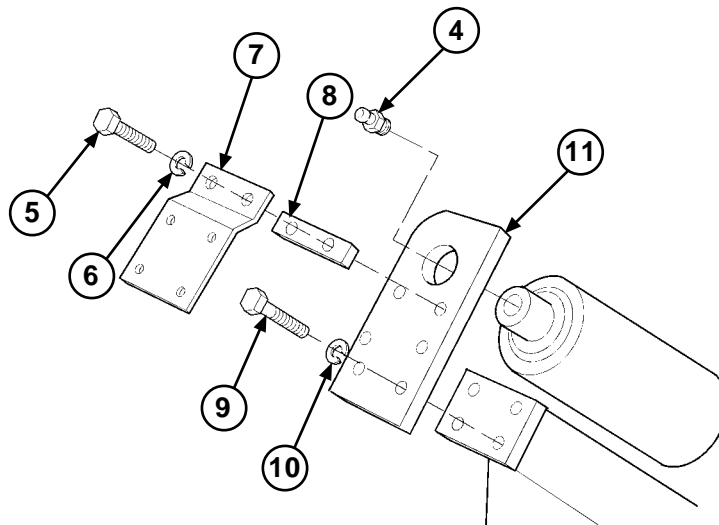
### **NOTE**

Both left- and right-hand angled rollers are removed the same way. Left-hand roller is shown.

- (2) Bend tab of lockwasher (2) out of locknut (3) slot.
- (3) Remove locknut (3) and lockwasher (2). Discard locknut and lockwasher.

#### 4-53. LHS ANGLED ROLLER REPLACEMENT (continued).

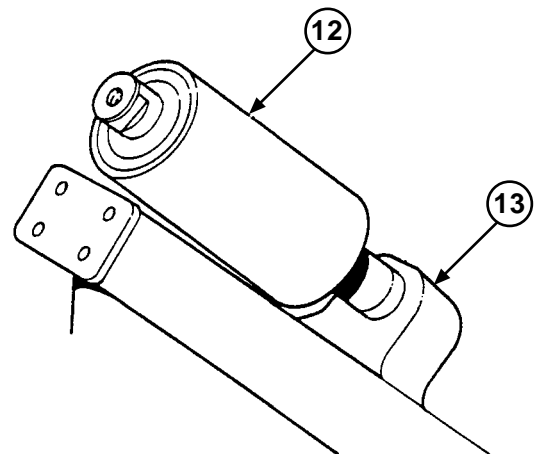
- (4) Remove lube fitting (4), two screws (5), lockwashers (6), data plate bracket (7), lockplate (8), four screws (9), lockwashers (10) and endplate (11). Discard lockwashers.



- (5) Using a soft faced hammer, remove roller (12) from roller assembly (13).

#### **b. Installation.**

- (1) Position roller (12) in roller assembly (13).
- (2) Install endplate (11), four new lockwashers (10) and screws (9).
- (3) Install lockplate (8), bracket (7), two new lockwashers (6) and screws (5).
- (4) Install lube fitting (4) in roller assembly (13).
- (5) Install new lockwasher (2), new locknut (3) and grease fitting (1). Tighten locknut.
- (6) Bend tab of lockwasher (2) into slot of locknut (3).



#### **c. Follow-on Maintenance:**

- Lubricate rear rollers (Appendix G).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-54. REAR BUMPER REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Personnel Required*

Two

*Materials/Parts*

- Locknut (4) (Item 53, Appendix K)
- Locknut (6) (Item 56, Appendix K)
- Locknut (2) (Item 57, Appendix K)
- Locknut (9) (Item 59, Appendix K)

*Equipment Condition*

- Stop plate removed (para 4-55)
- Rear marker light and mounting bracket removed (para 4-65)
- Rear side marker lights removed (TM 9-2320-279-20)
- Rear red reflectors removed (TM 9-2320-279-20)

**a. Removal.**

- (1) Remove six locknuts (1), screws (2), two retaining plates (3), and mudflaps (4) from rear bumper (5). Discard locknuts.

**NOTE**

There are three clips and one plug located on each end of rear bumper.

- (2) Remove six locknuts (6), screws (7), and clips (8) from rear bumper (5). Discard locknuts.
- (3) Remove two locknuts (9), screws (10) and angle brackets (11) from rear bumper (5). Discard locknuts.
- (4) With the help of an assistant, remove four locknuts (12), screws (13) and rear bumper (5) from vehicle (14). Discard locknuts.

**NOTE**

Step 5 is required only if vehicle does not have a self-recovery winch.

- (5) Remove three locknuts (15), screws (16), and winch opening panel (17) from rear bumper (5). Discard locknuts.

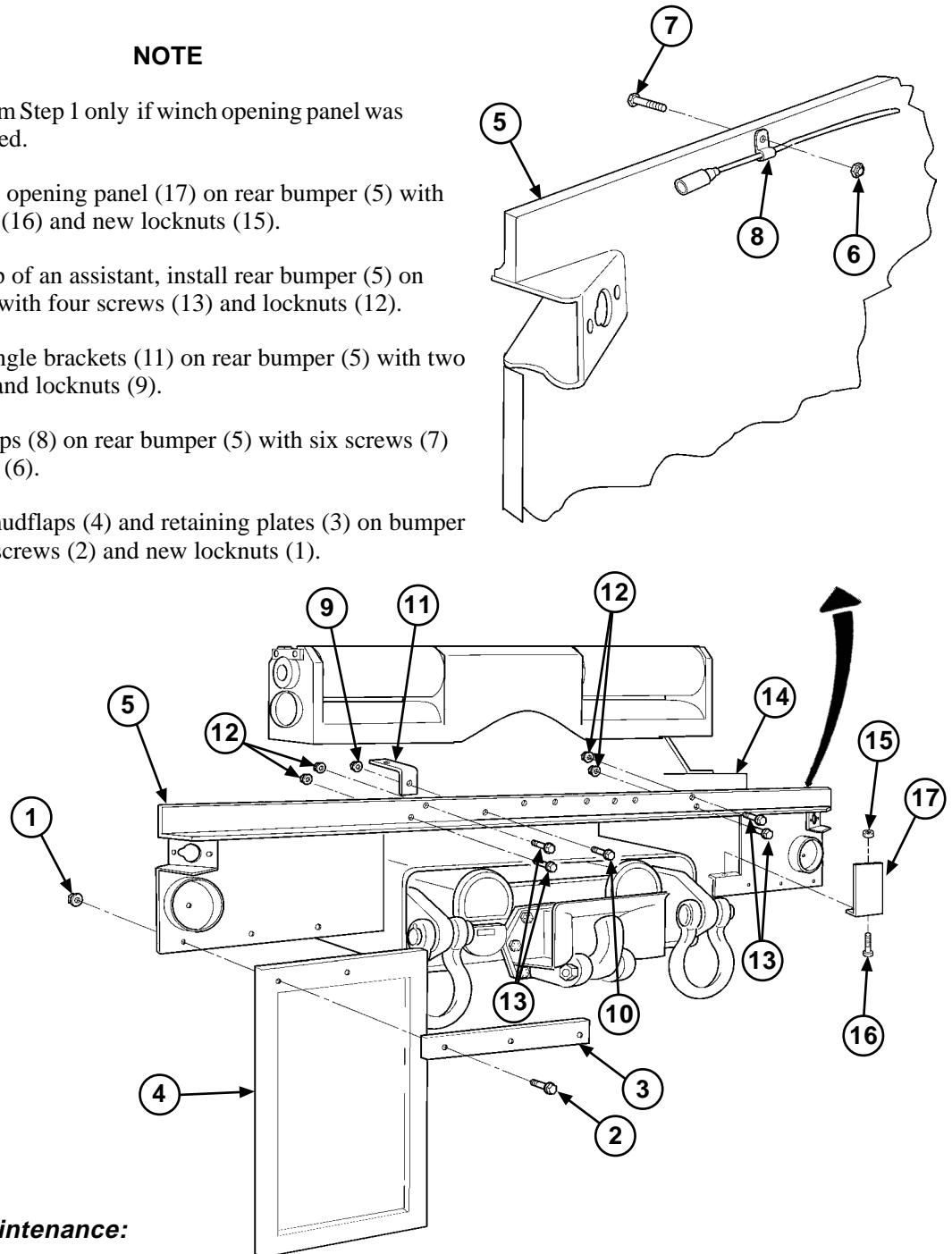
## 4-54. REAR BUMPER REPLACEMENT (MODEL A ONLY) (continued).

### b. Installation.

#### NOTE

Perform Step 1 only if winch opening panel was removed.

- (1) Install winch opening panel (17) on rear bumper (5) with three screws (16) and new locknuts (15).
- (2) With the help of an assistant, install rear bumper (5) on vehicle (14) with four screws (13) and locknuts (12).
- (3) Install two angle brackets (11) on rear bumper (5) with two screws (10) and locknuts (9).
- (4) Install six clips (8) on rear bumper (5) with six screws (7) and locknuts (6).
- (5) Install two mudflaps (4) and retaining plates (3) on bumper (5) with six screws (2) and new locknuts (1).



### c. Follow-on Maintenance:

- Install rear red reflectors (TM 9-2320-279-20).
- Install rear side marker lights (TM 9-2320-279-20).
- Install rear marker light and mounting bracket (para 4-65).
- Install stop plate (para 4-55).

END OF TASK

### 4-55. STOP PLATE REPLACEMENT.

This task covers:

- a. Removal    b. Installation    c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

Locknut (4) (Item 53, Appendix K) (Model A only)  
Locknut (6) (Item 53, Appendix K) (Model B only)

#### a. Removal.

**NOTE**

Perform step (1) for Model A only.

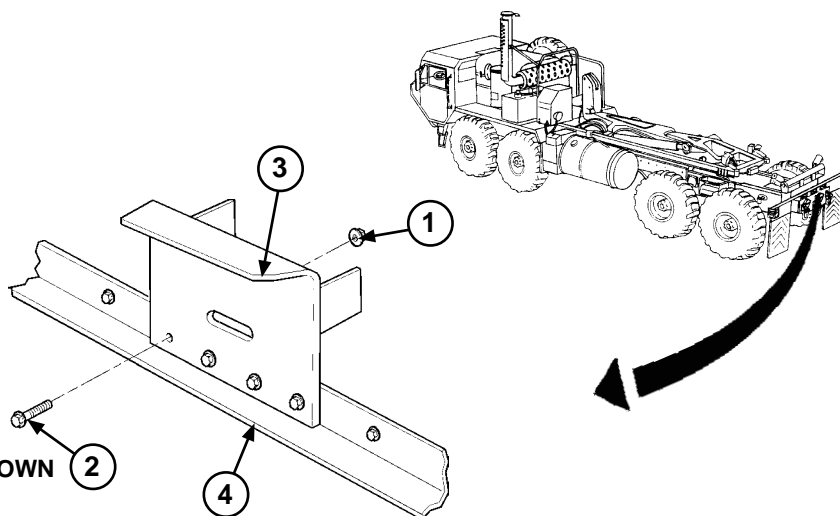
- (1) Remove four locknuts (1), screws (2), and stop plate (3) from vehicle (4). Discard locknuts.  
(2) Remove six locknuts (1), screws (2), and stop plate (3) from vehicle (4). Discard locknuts.

#### b. Installation.

**NOTE**

Perform step (1) for Model A only.

- (1) Install stop plate (3) on vehicle (4) with four screws (2) and new locknuts (1).  
(2) Install stop plate (3) on vehicle (4) with six screws (2) and new locknuts (1).



#### c. Follow-on Maintenance:

- Remove wheel chocks (TM 9-2320-279-10).

END OF TASK



**4-55.1. REAR FENDER REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal    b. Installation    c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

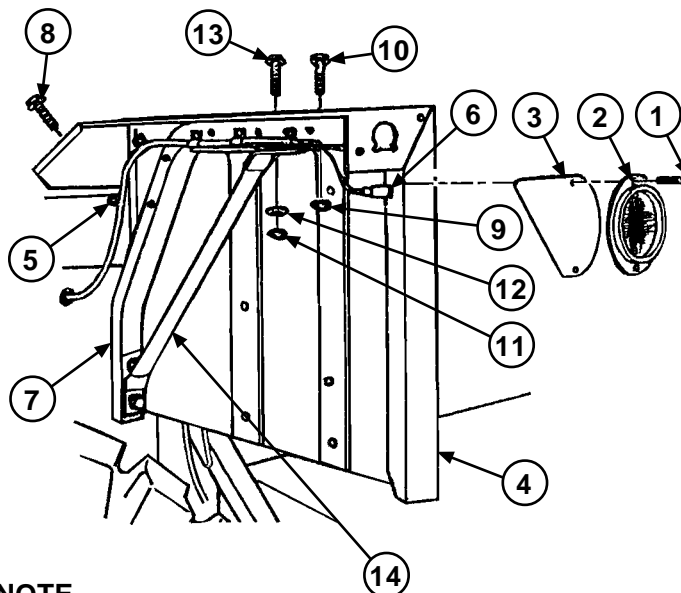
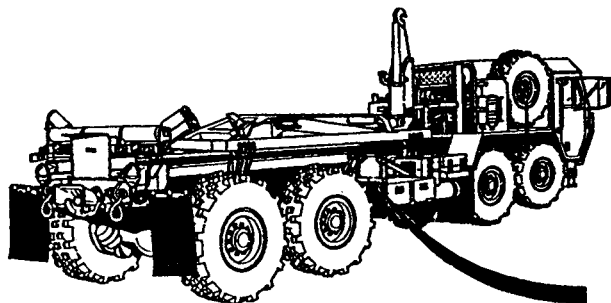
Wheels chocked (TM 9-2320-279-10)  
 Engine OFF (TM 9-2320-279-10)  
 Disconnect batteries (TM 9-2320-279-10)  
 LED marker/clearance  
 light removed (Para 4-65.1)  
 Center mud flap removed (Para 4-55.5)

*Materials/Parts*

Locknut (4) (Item 63, Appendix K)  
 Locknut (3) (Item 48.1, Appendix K)  
 Screw, Tapping (Item 58.1, Appendix K)

**4-55.1. REAR FENDER REPLACEMENT (MODEL B ONLY) (continued).**

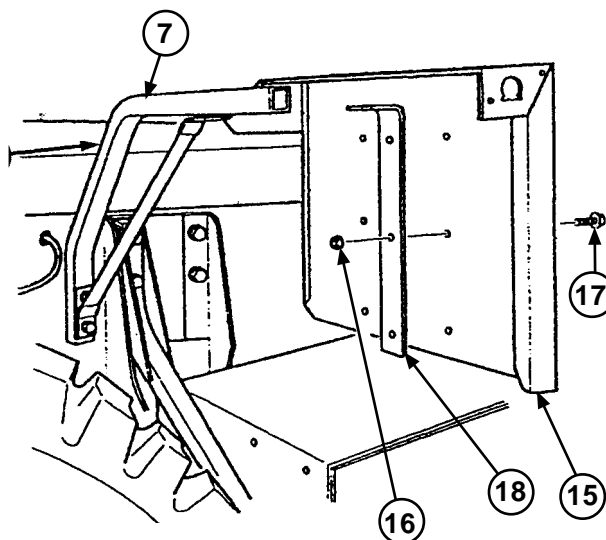
**a. Removal.**



**NOTE**

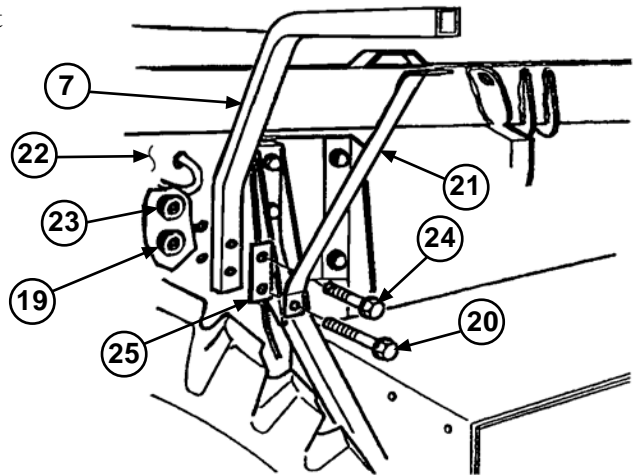
- Both rear fenders are removed the same way. The right fender is shown.
- Mark all wires before disconnecting.

- (1) Remove two screws (1), reflector (2), and reflector bracket (3) from fender (4).
- (2) Remove six push clips (5) and marker lamp wiring harness (6) from fender support arm (7).
- (3) Remove self-tapping screw (8) from fender support arm (7). Discard self-tapping screw.
- (4) Remove two locknuts (9) and screws (10) from fender support arm (7). Discard locknuts.
- (5) Remove locknut (11), washer (12), and screw (13) from fender support arm (7) and fender brace (14). Discard locknut.
- (6) Remove rear fender (15) from fender support arm (7).
- (7) Remove four locknuts (16), screws (17), and two braces (18) from rear fender (15). Discard locknuts.



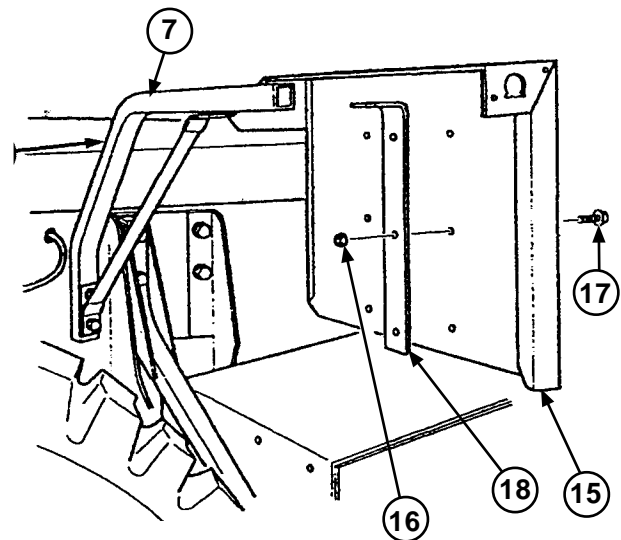
### 4-55.1. REAR FENDER REPLACEMENT (MODEL B ONLY) (continued).

- (8) With the aid of an assistant, remove locknut (19), screw (20), and brace (21) from truck frame (22). Discard locknut.
- (9) With the aid of an assistant, remove locknut (23), screw (24), spacer (25), and fender support arm (7) from truck frame (22). Discard locknut.



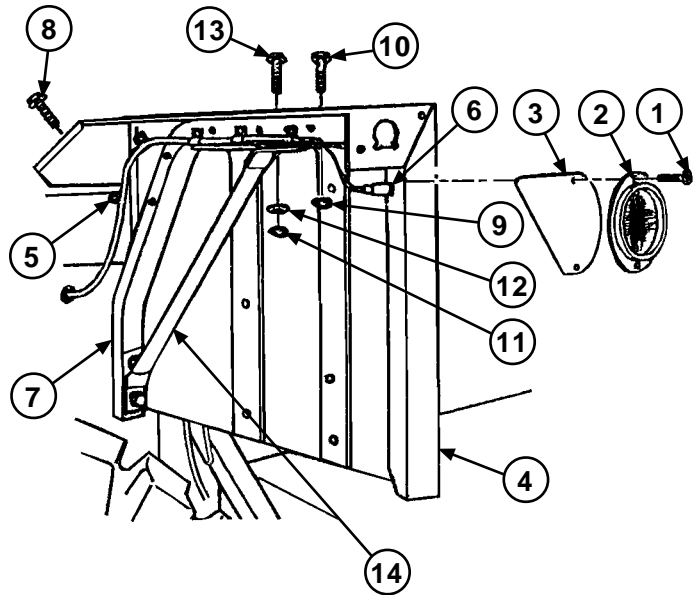
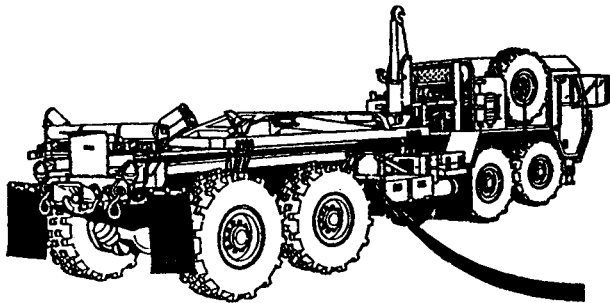
#### b. Installation.

- (1) With the aid of an assistant, position fender support arm (7), spacer (25), screw (24), and new locknut (23) on truck frame (22).
- (2) With the aid of an assistant, install brace (21), screw (20), and new locknut (19) in truck frame (22).



- (3) Install two braces (18) on rear fender (15) using four screws (17) and new locknuts (16).
- (4) Position rear fender (15) on fender support arm (7).

**4-55.1. REAR FENDER REPLACEMENT (MODEL B ONLY) (continued).**



- (5) Position screw (13), washer (12), and new locknut (11) in fender support arm (7) and fender brace (14).
- (6) Install two screws (10) and new locknuts (9) in fender support arm (7).
- (7) Install new self-tapping screw (8) in fender support arm (7).

**NOTE**

Push clips are properly installed when lock button is pushed in after installation.

- (8) Install marker lamp wiring harness (6) and six push clips (5) on fender support arm (7).
- (9) Install reflector bracket (3), reflector (2), and two screws (1).

**c. Follow-on Maintenance:**

- Install LED marker clearance light (Para 4-65.1).
- Install center mud flap (Para 55.5).
- Connect batteries (TM 9-2320-279-10).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

### 4-55.2. REAR MUD FLAP REPLACEMENT (MODEL B ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine OFF (TM 9-2320-279-10)

*Materials/Parts*

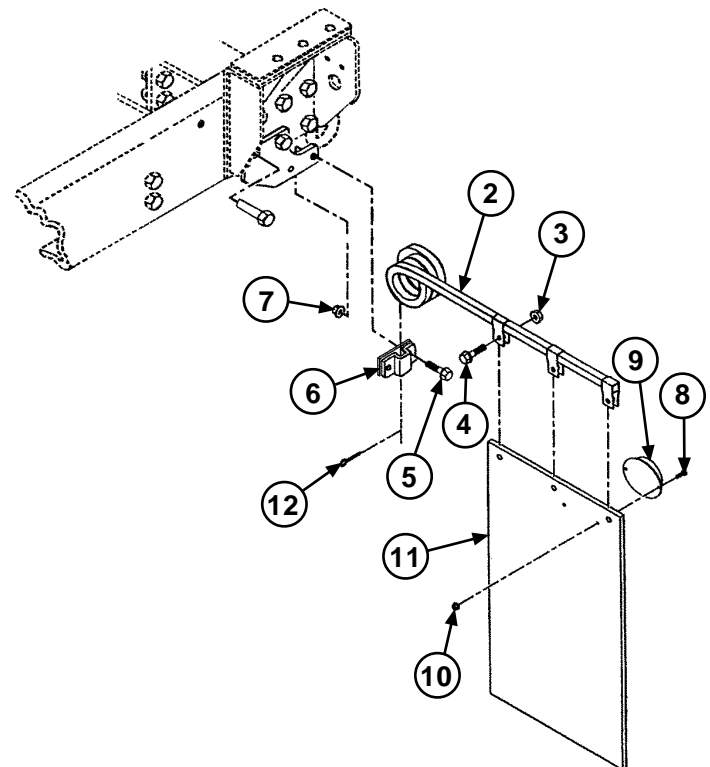
- Locknut (4) (Item 71, Appendix K)
- Cotter Pin (Item 22.1, Appendix K)
- Locknut (6) (Item 5.2, Appendix K)
- Locknut (4) (Item 5.3, appendix K)

#### NOTE

Procedures are identical for both sides of truck. Left side shown.

#### a. Removal.

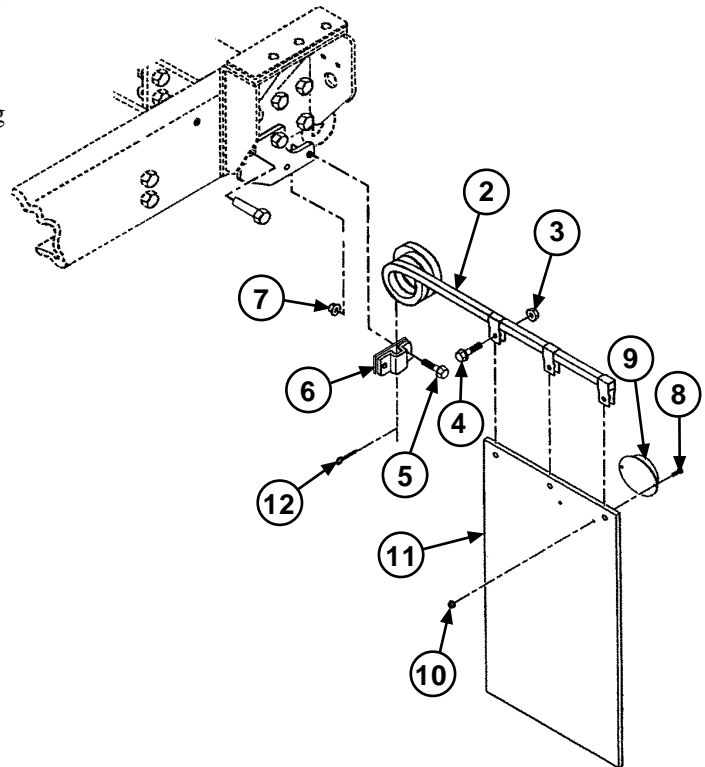
- (1) Remove two screws (5) and self-locking nuts (7) from socket bracket (6). Pull socket bracket (6) and mud flap assembly away from frame.
- (2) Remove cotter pin (12) from bracket (2) and remove bracket (2) from socket bracket (6). Discard cotter pin.
- (3) Remove three bolts (4) and self-locking nuts (3) from mud flap (11) and bracket (2). Remove mud flap (11) from bracket (2). Discard self-locking nuts.
- (4) Remove two screws (8), self-locking nuts (10), and reflector (9) from mud flap (11). Discard self-locking nuts.



**4-55.2. REAR MUD FLAP REPLACEMENT (MODEL B ONLY) (Continued).**

**b. Installation.**

- (1) Position reflector (9) onto mud flap (11) and secure with two screws (8) and new self-locking nuts (10).
- (2) Position mud flap (11) onto bracket (2) and align holes. Secure with three bolts (4) and new self-locking nuts (3).
- (3) Position bracket (2) onto socket bracket (6) and secure with new cotter pin (12).
- (4) Position socket bracket (6) onto frame and secure with two screws (5) and self-locking nuts (7).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

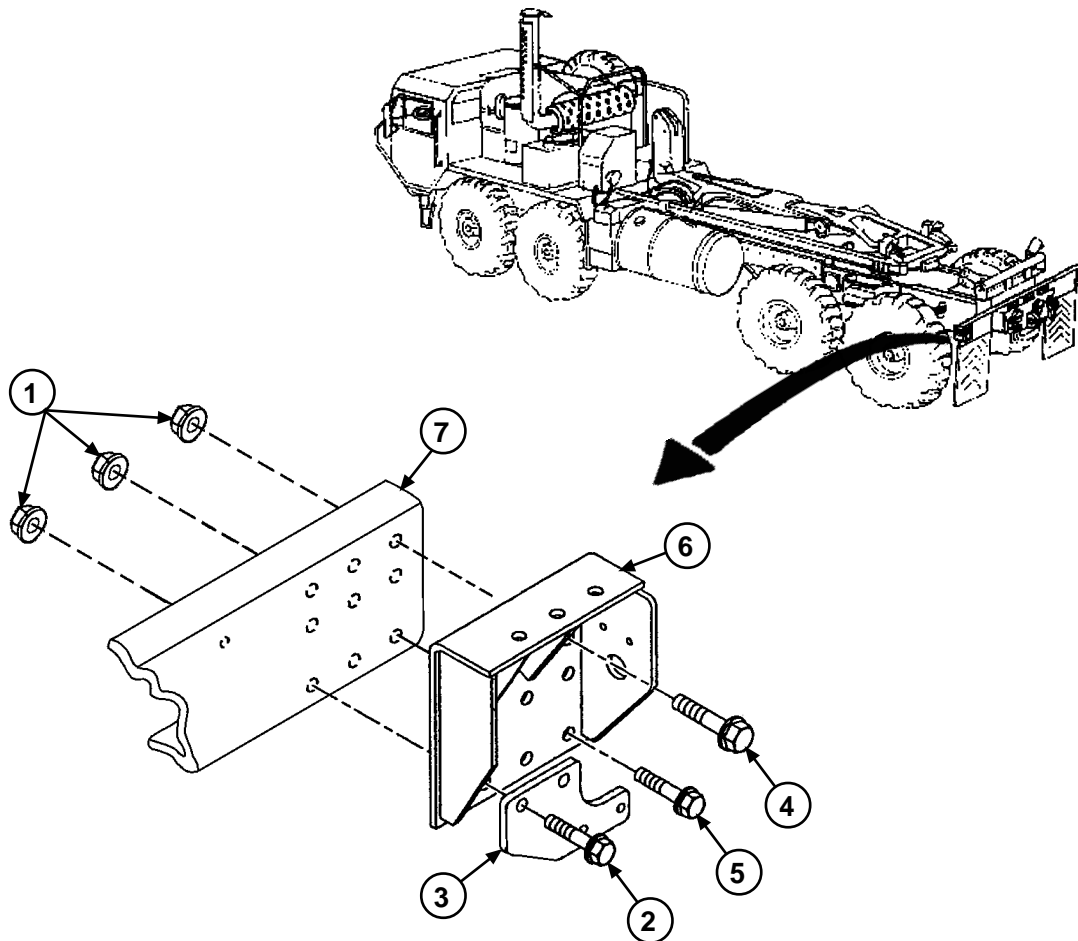
**END OF TASK**







**4-55.4. REAR ROLLER MOUNTING BRACKET REPLACEMENT (MODEL B ONLY)  
(continued).**



**c. Follow-on Maintenance:**

- Install rear composite light assembly (TM 9-2320-279-20).
- Install rear cable guide (if equipped with self-recovery winch) (TM 9-2320-279-20).
- Install rear roller assembly (para 4-51).

**END OF TASK**



## 4-56. DATA PLATE REPLACEMENT.

This task covers:

- |                                   |                                   |                          |
|-----------------------------------|-----------------------------------|--------------------------|
| a. Type 1 Data Plate Removal      | c. Type 2 Data Plate Removal      | e. Follow-on Maintenance |
| b. Type 1 Data Plate Installation | d. Type 2 Data Plate Installation |                          |

### INITIAL SETUP

#### *Tools and Special Tools:*

Drill, Electric, Portable (W-D-661)  
 Drill Set, Twist (800434)  
 Tool Kit, Blind Rivet (D-100-MIL-1)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

#### *Equipment Condition:*

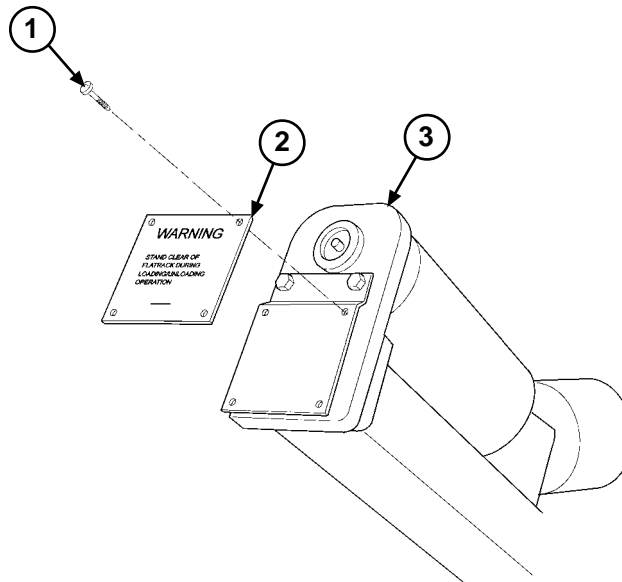
Engine turned off (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)

### NOTE

There are two types of data plates used, type 1 and type 2. Type 1 is shown in subparagraph a, and type 2 is shown in subparagraph c.

#### **a. Type 1 Data Plate Removal.**

Drill out four rivets (1) and remove data plate (2) from frame (3). Discard rivets.



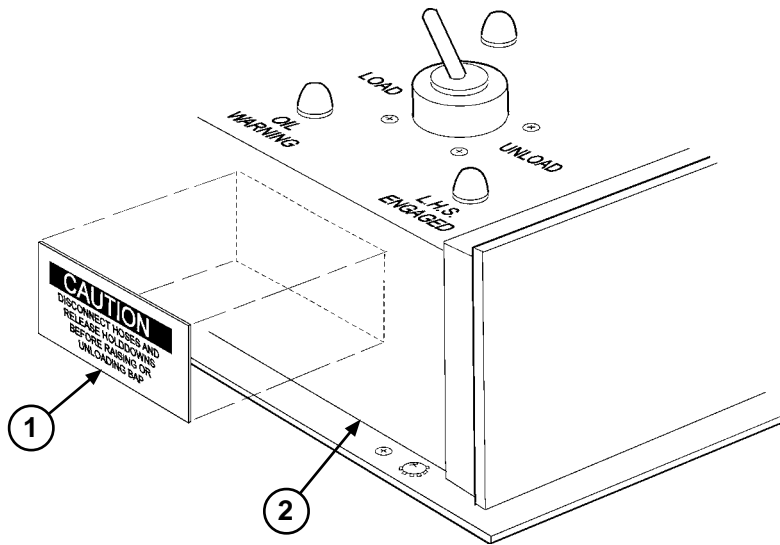
#### **b. Type 1 Data Plate Installation.**

Install data plate (2) on frame (3) with four rivets (1).

**4-56. DATA PLATE REPLACEMENT (continued).**

**c. Type 2 Data Plate Removal.**

Pry data plate (1) away from surface (2).



**NOTE**

Ensure surface is clean prior to installation to allow proper installation of data plate.

**d. Type 2 Data Plate Installation.**

Peel paper off data plate (1) and place on surface (2).

**e. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10)

**END OF TASK**

**4-56.1 LHS DATA PLATE REPLACEMENT (MODEL B ONLY).**

This task covers:

- |                                  |                                  |
|----------------------------------|----------------------------------|
| a. Type 1 Data Plate Replacement | c. Type 3 Data Plate Replacement |
| b. Type 2 Data Plate Replacement | d. Follow-on Maintenance         |

**INITIAL SETUP***Tools and Special Tools:*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)  
Shop Equipment, Automotive Maintenance  
and Repair: Organizational Maintenance  
and Repair: Common No. 1 (SC 4910-95-CL-A74)

*Equipment Condition:*

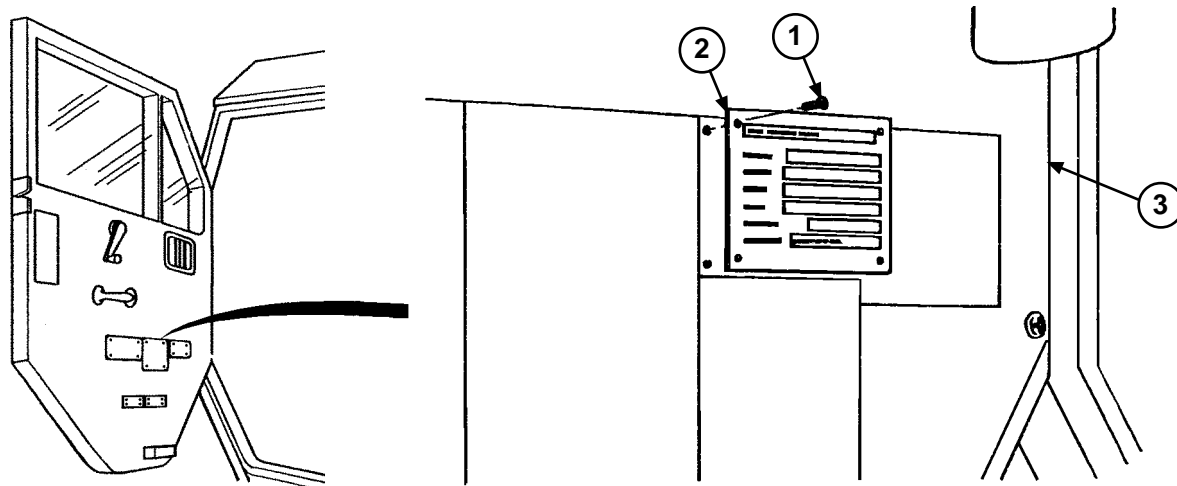
Engine OFF (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)

*Supplies:*

Drycleaning Solvent (Item 14, Appendix E)  
Cloth, Cleaning (Item 10, Appendix E)  
Rivet, Blind (Item 2.1, Appendix K)

**4-56.1 LHS DATA PLATE REPLACEMENT (MODEL B ONLY) (continued).**

**a. Type 1 Data Plate Replacement.**



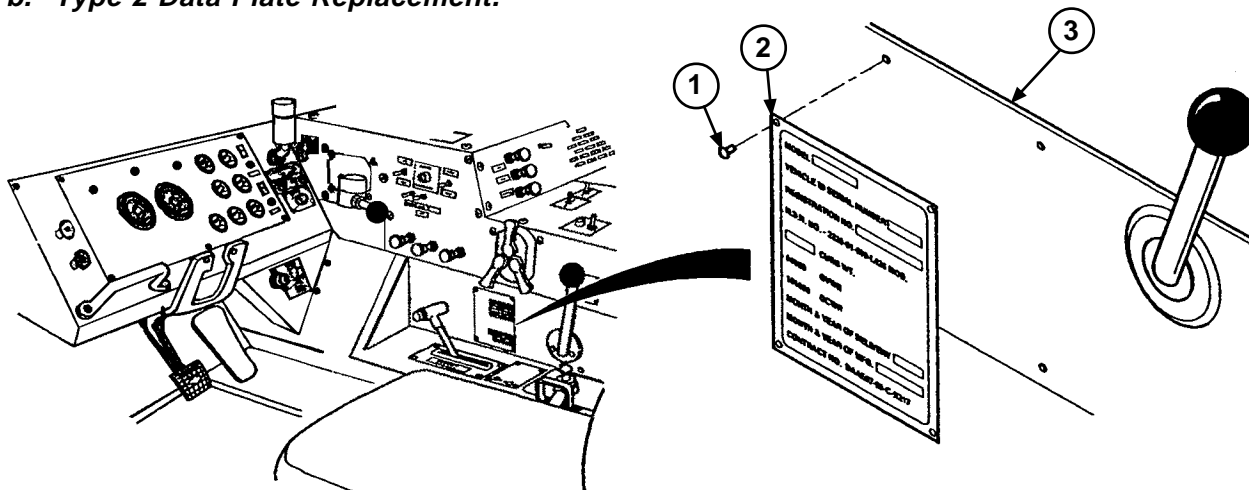
**NOTE**

- Subparagraphs a. through c. show all typical data plates used on the truck.
- Refer to Appendix L and TM 9-2320-279-10 for location of all data plates.

(1) *Removal.* Remove four screws (1) and data plate (2) from frame (3).

(2) *Installation.* Install data plate (2) on frame (3) with four screws (1).

**b. Type 2 Data Plate Replacement.**

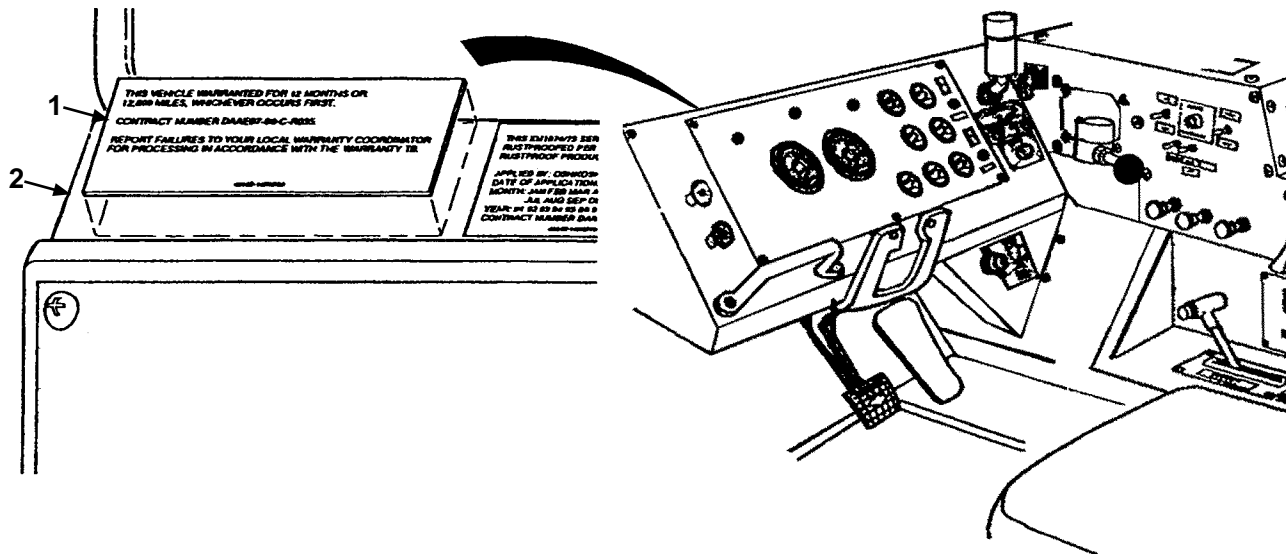


(1) *Removal.* Using a 1/8 in. drill bit, remove four rivets (1) and data plate (2) from frame (3). Discard rivets.

(2) *Installation.* Install data plate (2) on frame (3) with four new rivets (1).

## 4-56.1 LHS DATA PLATE REPLACEMENT (MODEL B ONLY) (continued).

### c. Type 3 Data Plate Replacement.



(1) *Removal.* Pry data plate (1) away from frame (2).

(2) *Cleaning/Inspection.*

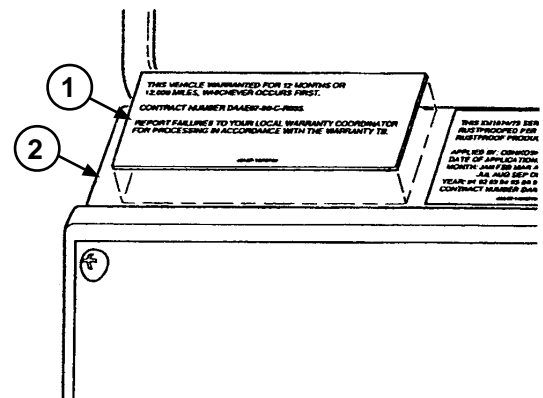
### WARNING

- Drycleaning solvent (P-D-680) is **TOXIC** and flammable. Wear protective goggles, face shield, and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent. The flashpoint for Type III Drycleaning Solvent is 200° F (93° C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.
  - (a) Ensure surface is free of any dirt or debris.
  - (b) Clean with lint-free cloth and drycleaning solvent.
- (3) *Installation.* Peel paper off data plate (1) and place on frame (2).

### d. Follow-on Maintenance:

- Remove wheel chocks (TM 9-2320-279-10).

END OF TASK







**4-57. FRONT BAP LOCK REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Personnel Required*

Two

*Materials/Parts*

Cotter pin (2) (Item 16, Appendix K)  
Cotter pin (Item 90, Appendix K)  
Locknut (Item 1, Appendix K)  
Locknut (Item 67, Appendix K)

*Equipment Condition*

BAP unloaded to ground (para 2-10)  
Wheels chocked (TM 9-2320-279-10)  
Engine turned off (TM 9-2320-279-10)

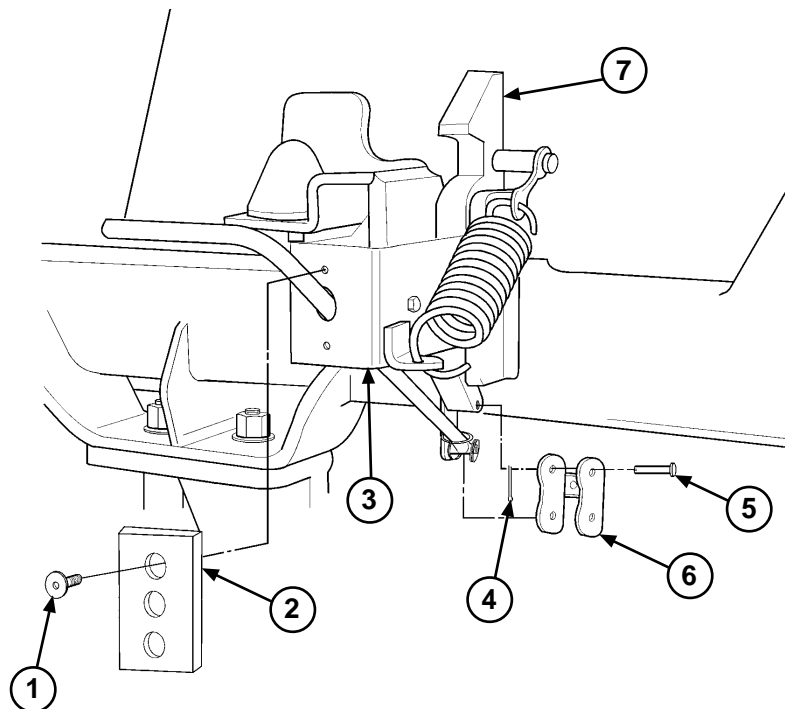
**a. Removal.**

**NOTE**

- Front bap locks are located on right and left sides of vehicle. Both bap locks are replaced the same way. Right side shown.
- Model B trucks are equipped with shims between bap lock and frame

(1) Remove two screws (1) and plate (2) from bracket (3).

(2) Remove cotter pin (4), pin (5) and bracket (6) from lock (7). Discard cotter pin.

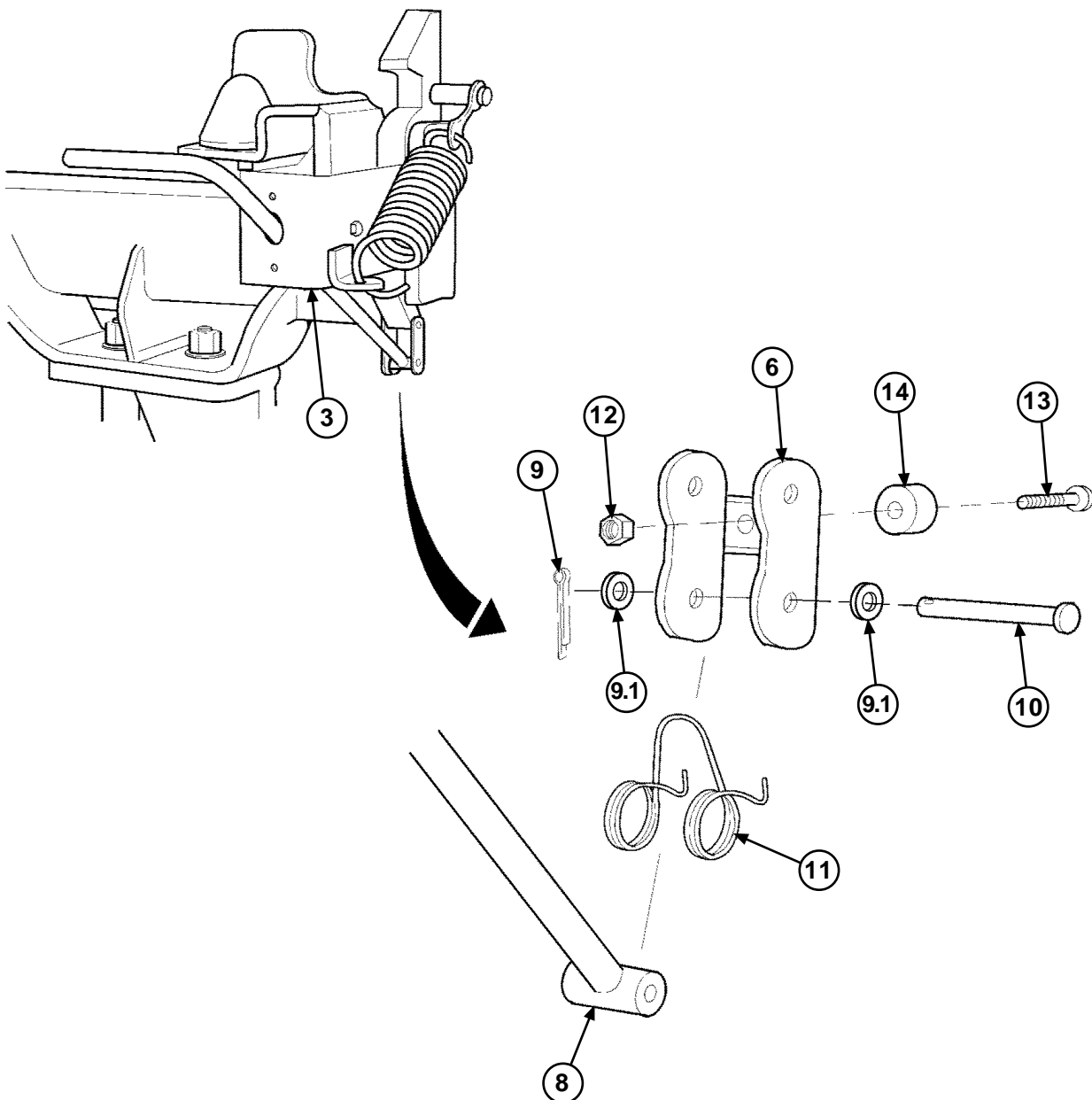


**4-57. FRONT BAP LOCK REPLACEMENT (continued).**

**NOTE**

Note position of spring prior to removal to ensure proper installation.

- (3) Remove handle (8) from bracket (3).
- (4) Remove two cotter pins (9), four washers (9.1), two pins (10), spring (11) and handle (8) from bracket (6). Discard cotter pins.
- (5) Remove locknut (12), screw (13) and bumper (14) from bracket (6). Discard locknut.



## 4-57. FRONT BAP LOCK REPLACEMENT (continued).

### WARNING

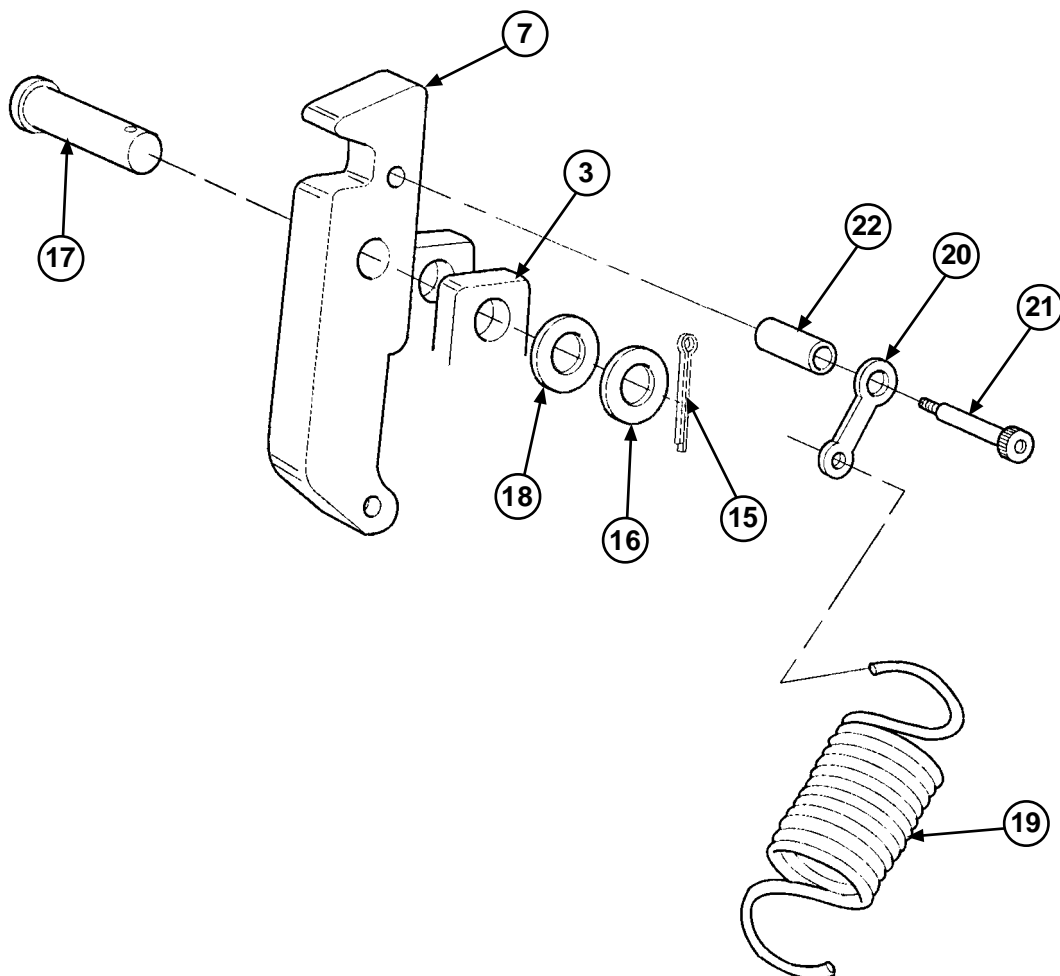
Lock is under spring tension. Use extreme care when removing pin. Ensure all personnel wear safety glasses and keep hands and fingers clear of lock when pin is being removed in Step 7. Failure to comply could result in injury to personnel.

- (6) Remove cotter pin (15) and washer (16) from pin (17). Discard cotter pin.

### NOTE

Spacer washer is used only if needed. Some units may not have one.

- (7) Remove pin (17) and spacer washer (18) from bracket (3) and lock (7).  
 (8) Remove spring (19) from bracket (3) and spring extension (20).  
 (9) Remove shoulder bolt (21), spacer tube (22), and spring extension (20) from lock (7).



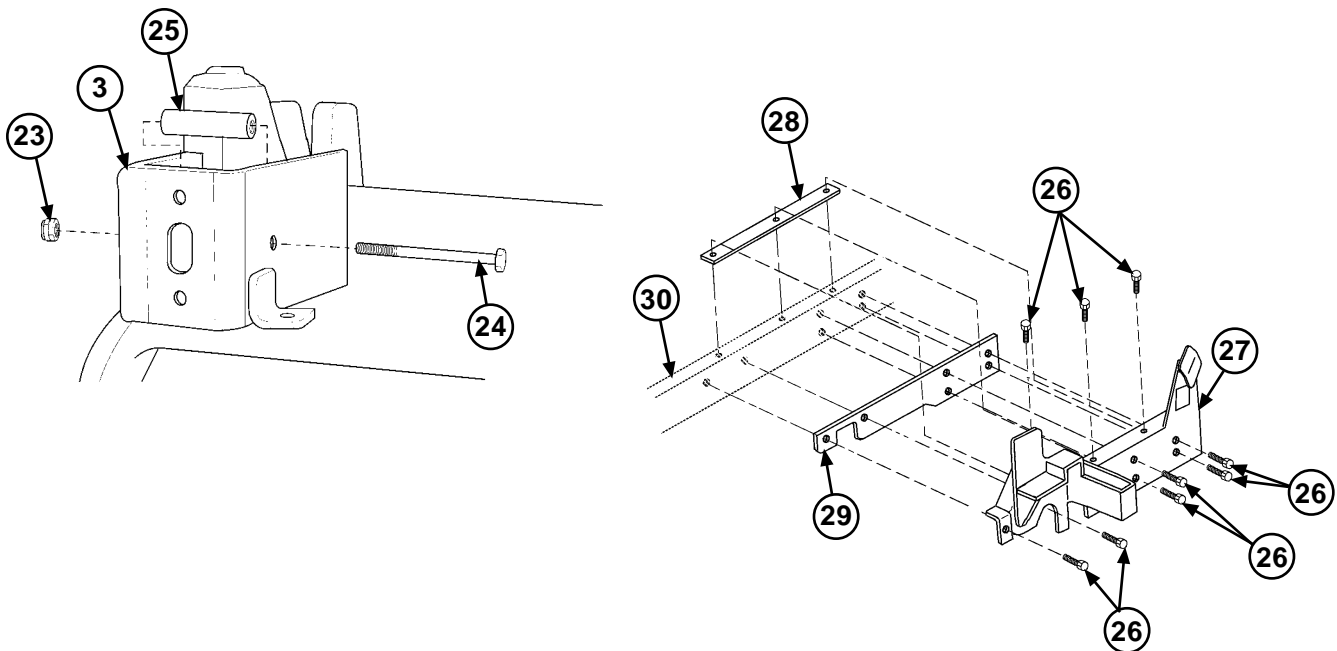
**4-57. FRONT BAP LOCK REPLACEMENT (continued).**

- (10) Remove locknut (23), screw (24), and rubber stop (25) from bracket (3). Discard locknut.
- (11) Remove nine screws (26) from bracket (27). Remove bracket (27) and two shims (28 and 29) from frame (30).

**b. Installation.**

**NOTE**

Position two shims (28 and 29) on frame (30). Install bracket (27) on frame (30) and secure with nine screws (26).



- (1) Install rubber stop (25) in bracket (3) with screw (24) and locknut (23).
- (2) Install spacer tube (22) and spring extension (20) on lock (7) with shoulder bolt (21).
- (3) Install spring (19) on bracket (3) and spring extension (20).
- (4) Position lock (7) in bracket (3).

**WARNING**

**Lock is under spring tension. Use extreme caution when installing pin. Ensure all personnel wear safety glasses and keep hands and fingers clear of lock when pin is being installed in Step 5. Failure to comply could result in injury to personnel.**

**NOTE**

- Assistant must pry lock up into position while mechanic installs pin.
- Use one or more spacer washers as needed to fill gap between bracket and lock without binding lock. Some installations may not need spacer washer.

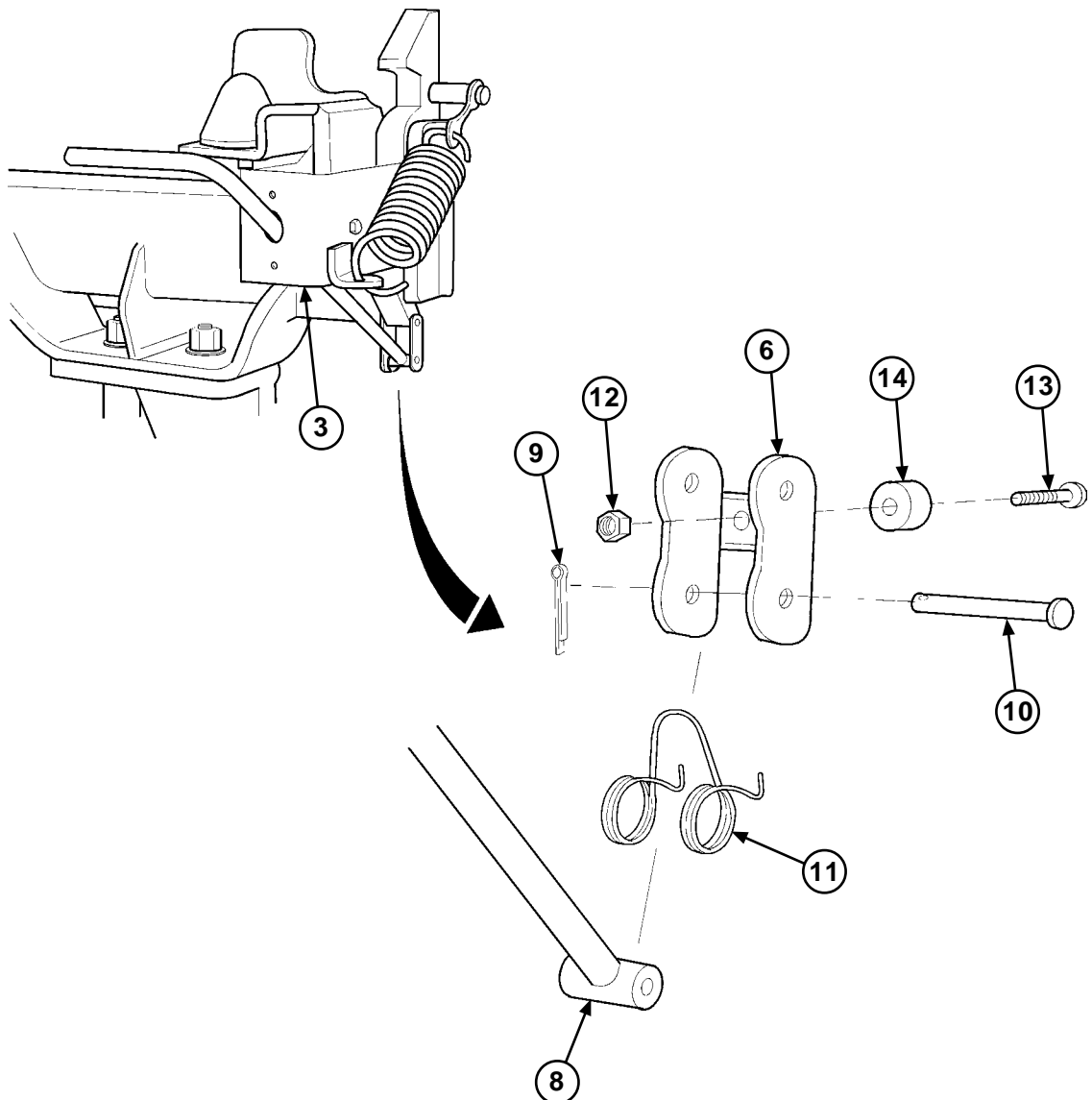
## 4-57. FRONT BAP LOCK REPLACEMENT (continued).

- (5) With the help of an assistant, install lock (7) in bracket (3) with flat washer (16) and pin (17).
- (6) Install washer (16), spacer washer (18), and new cotter pin (15) in pin (17).
- (7) Install bumper (14) on bracket (6) with screw (13) and new locknut (12).

### NOTE

- Handle faces rear of Transporter.
- Ensure spring is installed in same position as noted during removal.

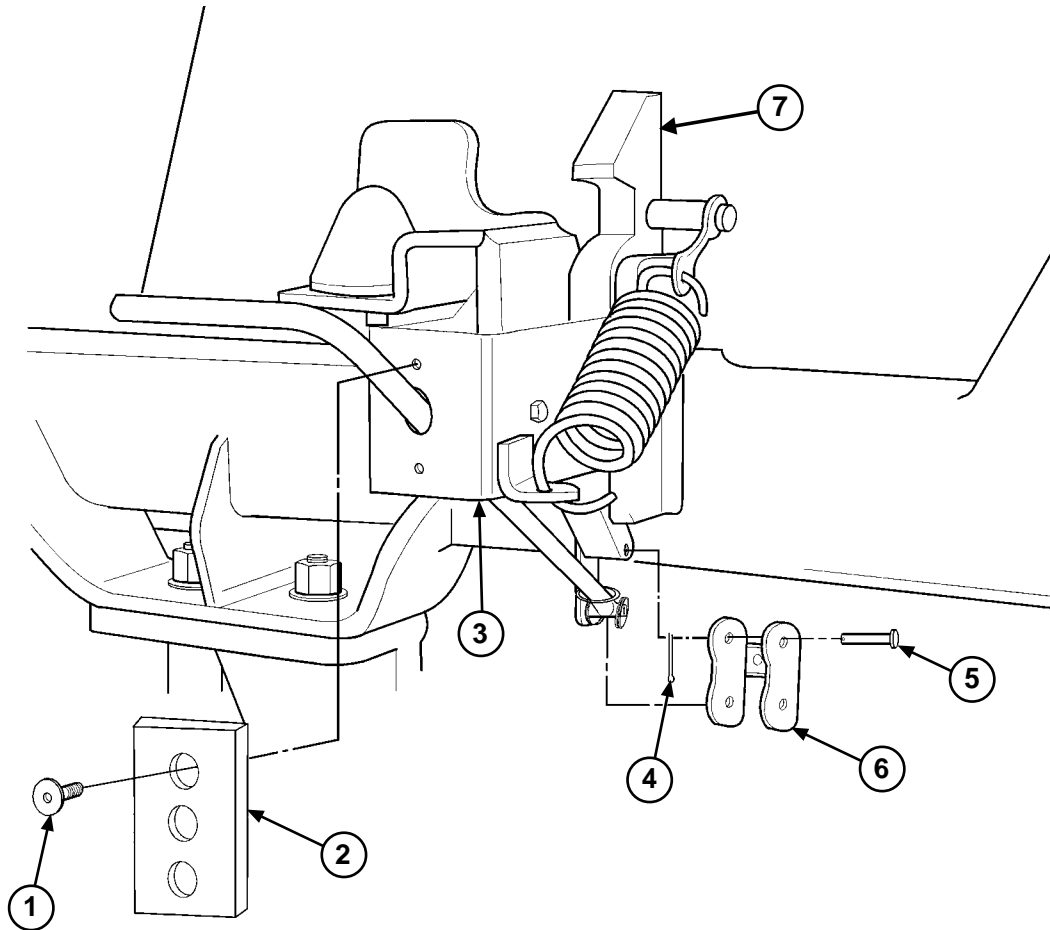
- (8) Install handle (8) and spring (11) in bracket (6) with pin (10) and new cotter pin (9).
- (9) Install handle (8) in bracket (3).



**4-57. FRONT BAP LOCK REPLACEMENT (continued).**

(10) Install bracket (6) on lock (7) with pin (5) and new cotter pin (4).

(11) Install plate (2) on bracket (3) with two screws (1).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-58. RUBBER BUMPER REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Locknut (as required) (Item 58, Appendix K)

Lockwasher (as required) (Item 89, Appendix K)

*Materials/Parts*

Adhesive, Loctite 242 (Item 3,  
Appendix E)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)

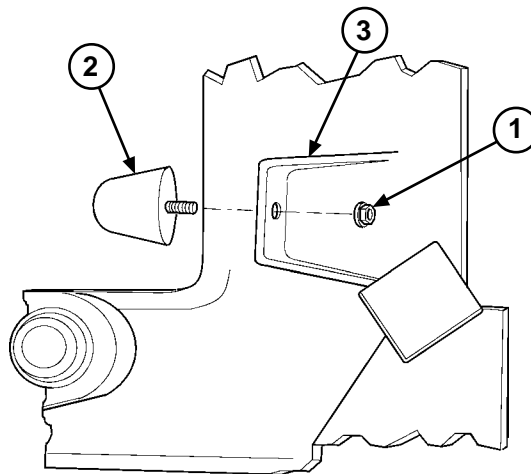
Engine turned off (TM 9-2320-279-10)

**a. Removal.**

**NOTE**

- There are two different sized rubber bumpers on the vehicle. There are five larger bumpers which are mounted with a flanged locknut. There are two smaller bumpers mounted with a lockwasher and nut.
- If removing larger bumper, perform Step 1. If removing smaller bumper, perform Step 2.

(1) Remove locknut (1) and rubber bumper (2) from vehicle (3). Discard locknut.



**4-58. RUBBER BUMPER REPLACEMENT (continued).**

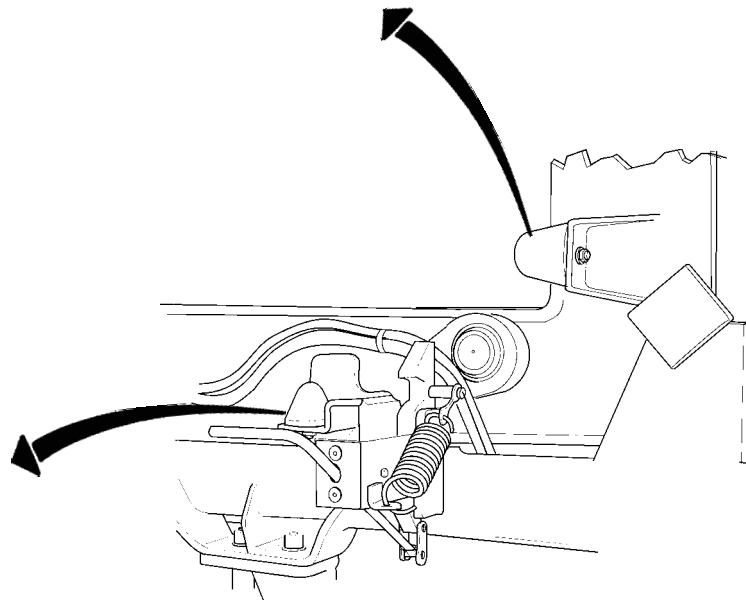
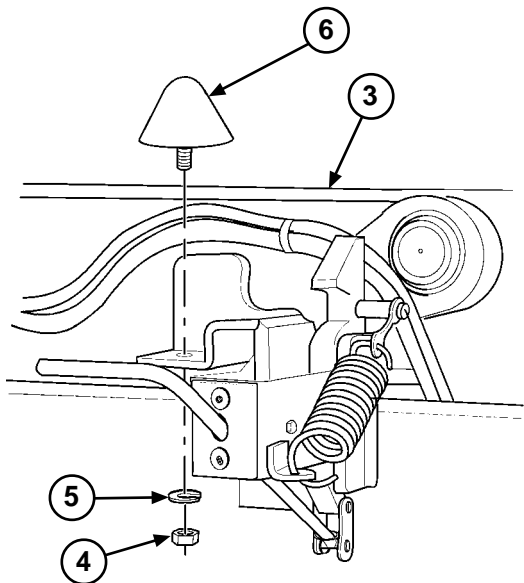
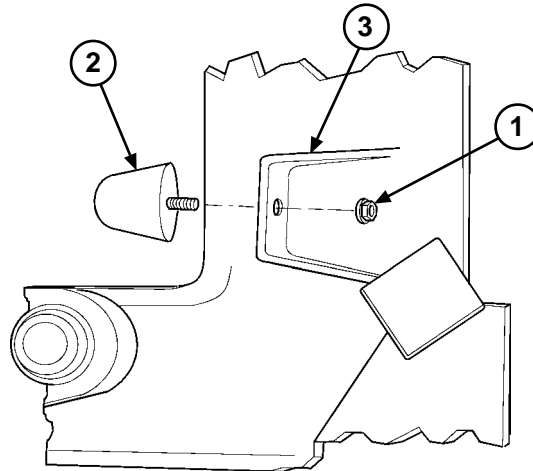
(2) Remove nut (4), lockwasher (5) and rubber bumper (6) from vehicle (3). Discard lockwasher.

**b. Installation.**

**NOTE**

If installing smaller bumper, perform Step 1. If installing larger bumper, perform Steps 2 and 3.

- (1) Install rubber bumper (6) on vehicle (3) with lockwasher (5) and nut (4).
- (2) Coat threads of rubber bumper (2) with adhesive.
- (3) Install rubber bumper (2) on vehicle (3) with locknut (1).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



**4-59. TOOL STORAGE BRACKET REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal                                      b. Installation                                      c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

Locknut (2) (Item 59, Appendix K)

**a. Removal.**

- (1) Open hydraulic cabinet cover (1).
- (2) Remove tools (2 and 3) from tool storage bracket (4).
- (3) Remove two locknuts (5) and screws (6) and tool storage bracket (4) from hydraulic cabinet assembly (7). Discard locknuts.

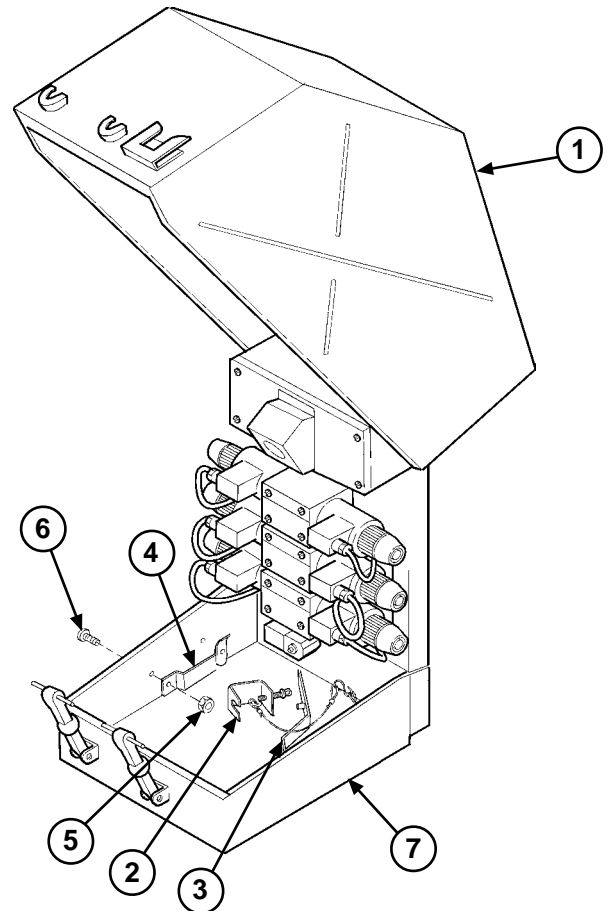
**b. Installation.**

- (1) Install tool storage bracket (4) in hydraulic cabinet assembly (7) with two screws (6) and new locknuts (5).
- (2) Position tools (2 and 3) in tool storage bracket (4).
- (3) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



#### 4-60. HYDRAULIC CABINET COVER REPAIR (MODEL A ONLY).

This task covers:

- a. Removal    b. Installation    c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

- Drill, Electric, Portable (W-D-661)
- Drill Set, Twist (800434)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

Locknut (2) (Item 59, Appendix K)

*Personnel Required*

Two

*Equipment Condition*

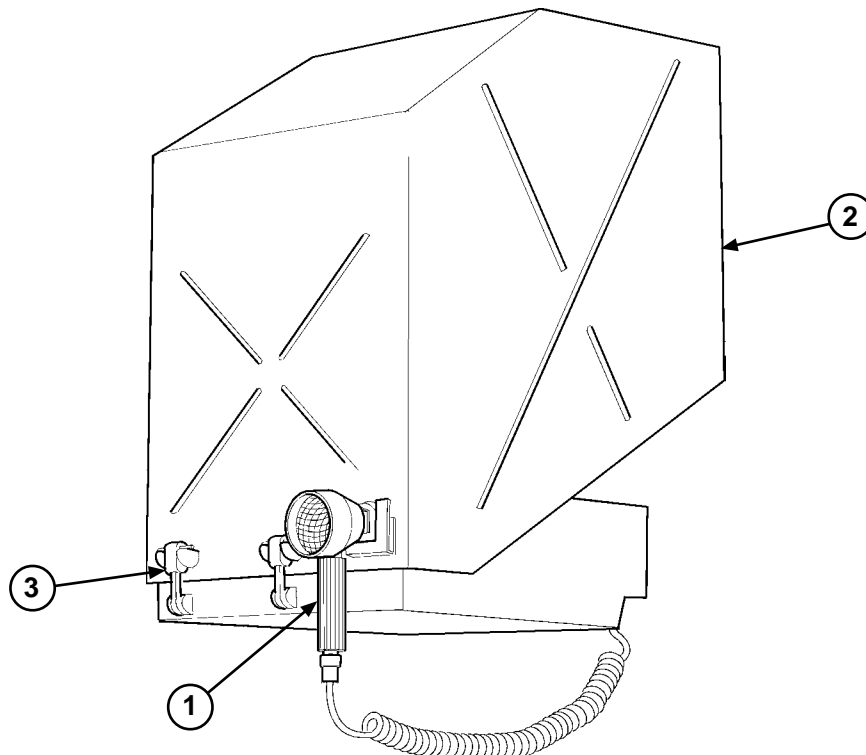
- Wheels chocked (TM 9-2320-279-10)
- Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

- Locknut (4) (Item 1, Appendix K)
- Locknut (2) (Item 52, Appendix K)

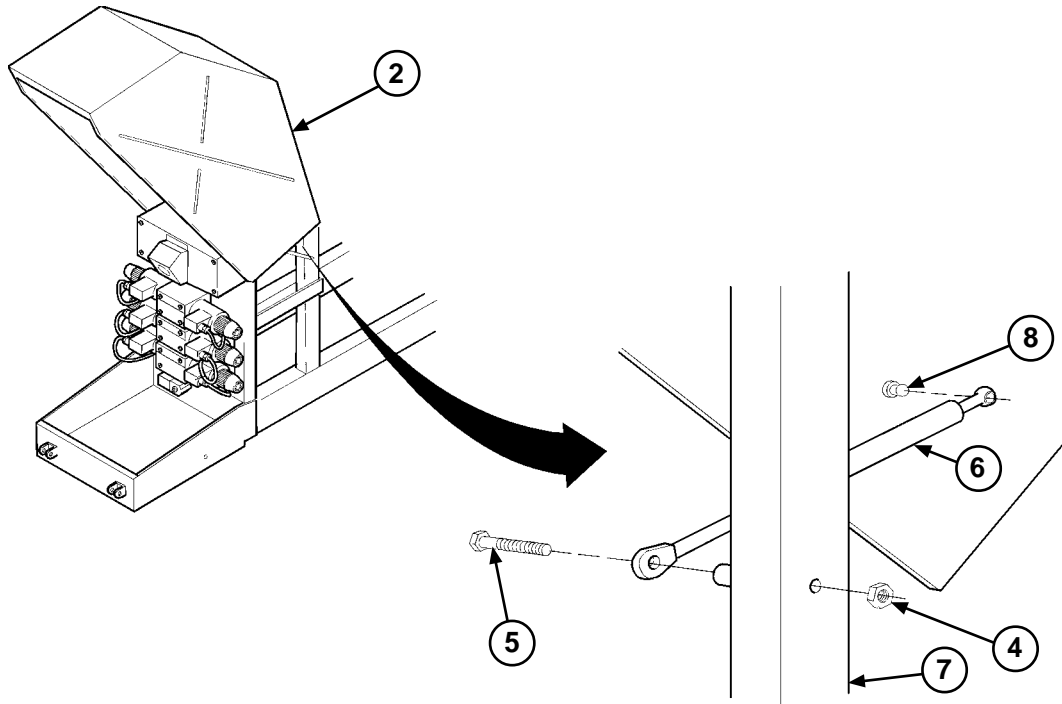
#### **a. Removal.**

- (1) Remove hand-held spotlight (1) from hydraulic cabinet cover (2).
- (2) Open two latches (3) and open hydraulic cabinet cover (2).

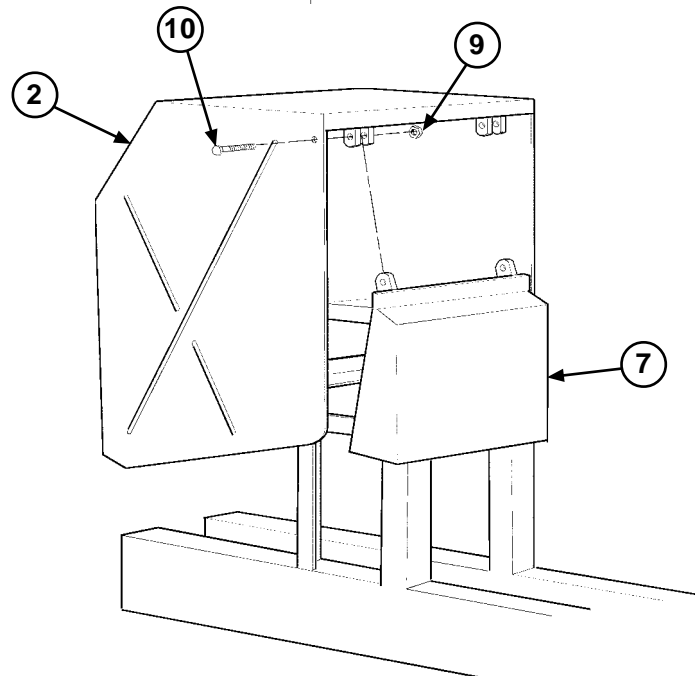


**4-60. HYDRAULIC CABINET COVER REPAIR (MODEL A ONLY) (continued).**

- (3) With assistant supporting hydraulic cabinet cover (2), remove two nuts (4), screws (5) and air cylinders (6) from bracket (7).
- (4) Remove two air cylinders (6) from ball studs (8).
- (5) Lower hydraulic cabinet cover (2).



- (6) Remove two locknuts (9) and screws (10) from hydraulic cabinet cover (2). Discard locknuts.
- (7) With help from an assistant, remove hydraulic cabinet cover (2) from bracket (7).



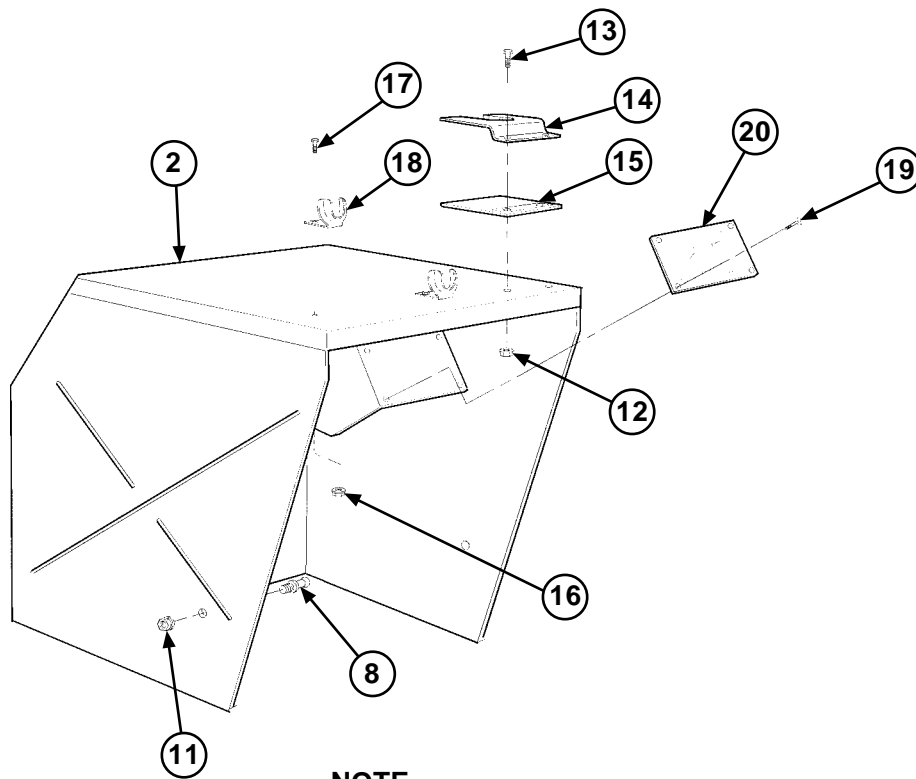
**4-60. HYDRAULIC CABINET COVER REPAIR (MODEL A ONLY) (continued).**

- (8) Remove two nuts (11) and ball studs (8) from hydraulic cabinet cover (2).
- (9) Remove two locknuts (12), screws (13), bracket (14) and spacer (15) from hydraulic cabinet cover (2). Discard locknuts.
- (10) Remove four locknuts (16), screws (17) and two brackets (18) from hydraulic cabinet cover (2). Discard locknuts.

**NOTE**

Perform Step 11 only if damaged.

- (11) Remove and discard four rivets (19) and data plate (20) from hydraulic cabinet cover (2).



**b. Installation.**

**NOTE**

Perform Step 1 only if data plate was removed during removal.

- (1) Install data plate (20) on hydraulic cabinet cover (2) with four new rivets (19).
- (2) Install two brackets (18) on hydraulic cabinet cover (2) with four screws (17) and new locknuts (16).
- (3) Install spacer (15) and bracket (14) on hydraulic cabinet cover (2) with two screws (13) and new locknuts (12).
- (4) Install two ball studs (8) in hydraulic cabinet cover (2) with two nuts (11).
- (5) With help from an assistant, install hydraulic cabinet cover (2) on bracket (7) with two screws (10) and new locknuts (9).

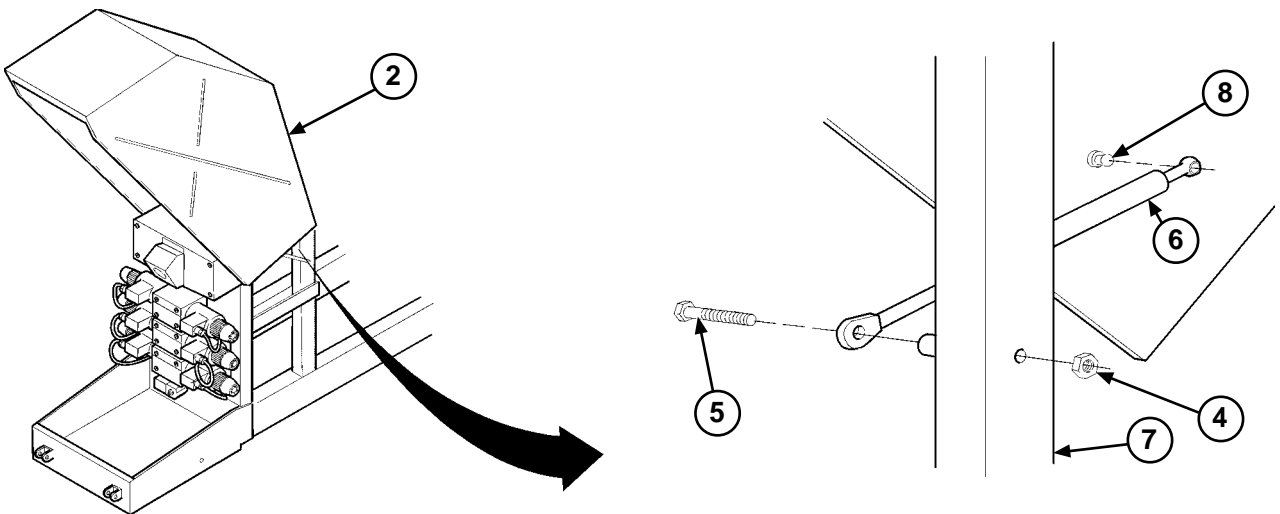
## 4-60. HYDRAULIC CABINET COVER REPAIR (MODEL A ONLY) (continued).

- (6) Open hydraulic cabinet cover (2).
- (7) With assistant supporting hydraulic cabinet cover (2), install two air cylinders (6) on ball studs (8).

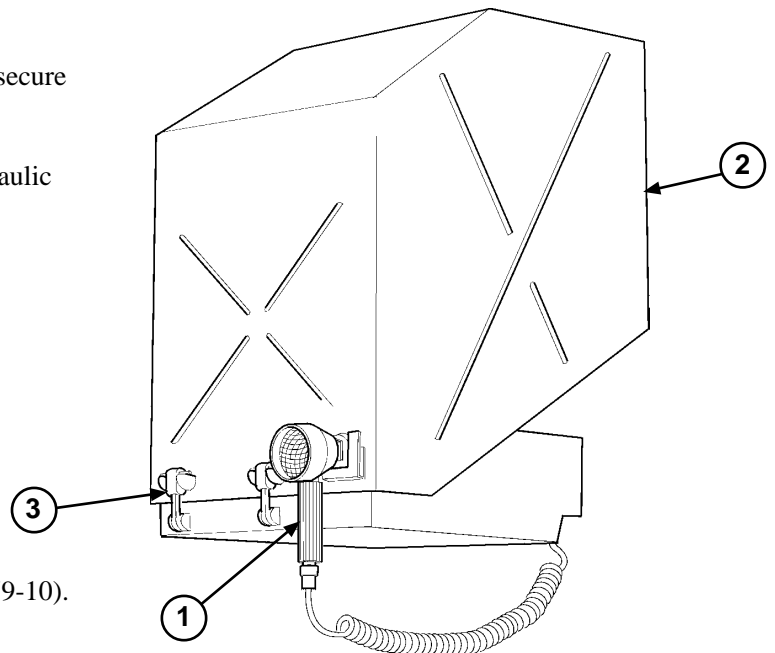
### CAUTION

**Do not tighten locknuts and screws completely. Air cylinder must be allowed to pivot on screws. Overtightening will cause damage to air cylinder.**

- (8) With assistant supporting hydraulic cabinet cover (2), install two air cylinders (6) on bracket (7) with two screws (5) and nuts (4).



- (9) Close hydraulic cabinet cover (2) and secure with two latches (3).
- (10) Install hand-held spotlight (1) on hydraulic cabinet cover (2).



### **c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

## 4-61. MAIN JUNCTION BOX REPAIR (MODEL A ONLY).

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Disassembly         | c. Assembly              |
| b. Cleaning/Inspection | d. Follow-on Maintenance |

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

#### *Materials/Parts*

Adhesive-Sealant, Silicone, RTV  
(Item 6, Appendix E)  
Tags, Identification (Item 23, Appendix E)  
Locknut (4) (Item 57, Appendix K)

#### *Equipment Condition*

Hourmeter harness removed (para 4-63)  
Free flow valve harness removed from  
junction box (para 4-76)  
Hand-held spotlight harness removed from  
junction box (para 4-77)  
Hook arm valve (load) harness removed from  
junction box (para 4-78)  
Hook arm valve (unload) harness removed from  
junction box (para 4-79)  
Left hand linking harness removed from junction  
box (para 4-80)

Main cylinder harness removed from junction  
box (para 4-81)  
Main frame valve (load) harness removed from  
junction box (para 4-82)  
Main frame valve (unload) harness removed from  
junction box (para 4-83)  
Main junction box harness (24 pin) removed from  
junction box (para 4-84)  
Main junction box harness (front) removed from  
junction box (para 4-85)  
Main junction box harness (rear) removed from  
junction box (para 4-92)  
Oil temperature sensor and harness removed from  
junction box (para 4-87)  
Right hand linking harness removed from  
junction box (para 4-88)  
Winch (in) harness removed from junction  
box (para 4-89)  
Winch (out) harness removed from junction  
box (para 4-90)  
Hook arm down proximity switch wiring removed  
from junction box (para 4-94)

#### **a. Disassembly.**

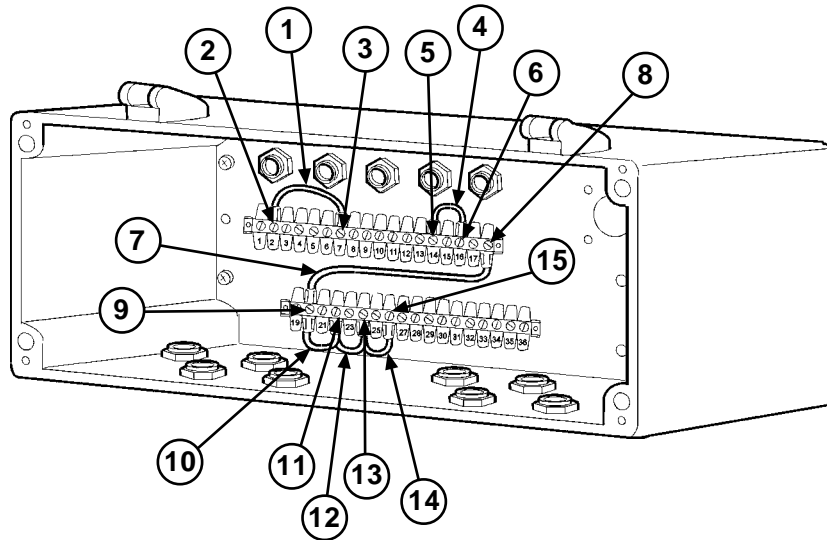
### NOTE

Tag and mark all wires prior to removal to ensure proper installation.

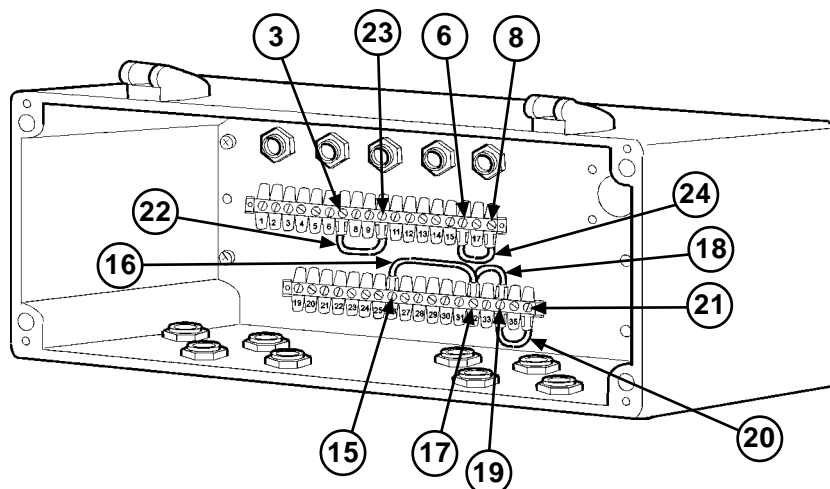
- (1) Remove jumper wire (1) from terminal no. 2 (2) and terminal no. 7 (3).
- (2) Remove jumper wire (4) from terminal no. 14 (5) and terminal no. 16 (6).
- (3) Remove jumper wire (7) from terminal no. 18 (8) and terminal no. 20 (9).
- (4) Remove jumper wire (10) from terminal no. 20 (9) and terminal no. 22 (11).
- (5) Remove jumper wire (12) from terminal no. 22 (11) and terminal no. 24 (13).

**4-61. MAIN JUNCTION BOX REPAIR (MODEL A ONLY) (continued).**

- (6) Remove jumper wire (14) from terminal no. 24 (13) and terminal no. 26 (15).



- (7) Remove jumper wire (16) from terminal no. 26 (15) and terminal no. 32 (17).  
 (8) Remove jumper wire (18) from terminal no. 32 (17) and terminal no. 34 (19).  
 (9) Remove jumper wire (20) from terminal no. 34 (19) and terminal no. 36 (21).  
 (10) Remove jumper wire (22) from terminal no. 7 (3) and terminal no. 10 (23).  
 (11) Remove jumper wire (24) from terminal no. 16 (6) and terminal no. 18 (8).



**4-61. MAIN JUNCTION BOX REPAIR (MODEL A ONLY) (continued).**

**NOTE**

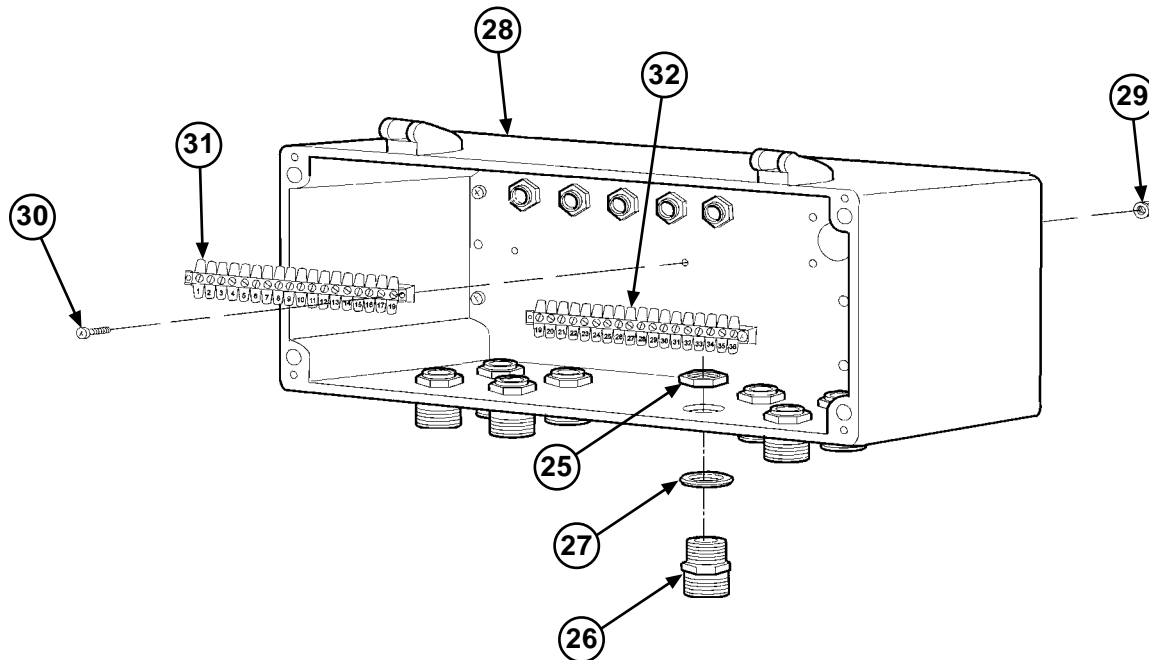
All connectors are removed the same way. Only one is shown.

- (12) Remove 14 nuts (25), connectors (26) and sealing washers (27) from junction box (28).

**NOTE**

Note location of terminal strips prior to removal to ensure proper installation.

- (13) Remove four locknuts (29), screws (30) and two terminal strips (31) and (32) from junction box (28). Discard locknuts.



**b. Cleaning/Inspection.**

- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.



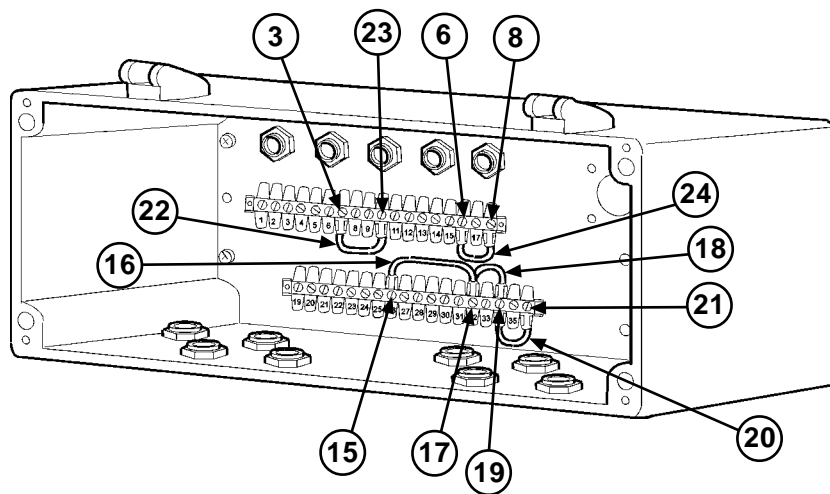
## 4-61. MAIN JUNCTION BOX REPAIR (MODEL A ONLY) (continued).

### c. Assembly.

#### WARNING

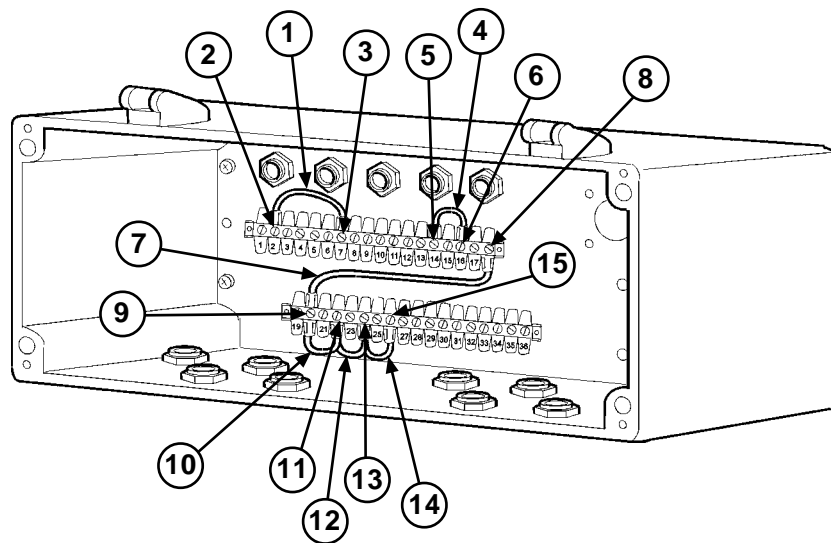
Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply silicone adhesive-sealant around holes for screws (30).
- (2) Install two terminal strips (31) in junction box (28) with four screws (30) and new locknuts (29).
- (3) Install 14 sealing washers (27) and connectors (26) in junction box (28) with nuts (25).
- (4) Install jumper wire (24) on terminal no. 16 (6) and terminal no. 18 (8).
- (5) Install jumper wire (22) on terminal no. 7 (3) and terminal no. 10 (23).
- (6) Install jumper wire (20) on terminal no. 34 (19) and terminal no. 36 (21).
- (7) Install jumper wire (18) on terminal no. 32 (17) and terminal no. 34 (19).
- (8) Install jumper wire (16) on terminal no. 26 (15) and terminal no. 32 (17).



**4-61. MAIN JUNCTION BOX REPAIR (MODEL A ONLY) (continued).**

- (9) Install jumper wire (14) on terminal no. 24 (13) and terminal no. 26 (15).
- (10) Install jumper wire (12) on terminal no. 22 (11) and terminal no. 24 (13).
- (11) Install jumper wire (10) on terminal no. 20 (9) and terminal no. 22 (11).
- (12) Install jumper wire (7) on terminal no. 18 (8) and terminal no. 20 (9).
- (13) Install jumper wire (4) on terminal no. 14 (5) and terminal no. 16 (6).
- (14) Install jumper wire (1) on terminal no. 2 (2) and terminal no. 7 (3).



**d. Follow-on Maintenance:**

- Install hook arm down proximity switch harness in junction box (para 4-94).
- Install winch (out) harness in junction box (para 4-90).
- Install winch (in) harness in junction box (para 4-89).
- Install right hand linking harness in junction box (para 4-88).
- Install oil temperature sensor and harness in junction box (para 4-87).
- Install main junction box harness (rear) in junction box (para 4-92).
- Install main junction box harness (front) in junction box (para 4-85).
- Install main junction box harness (24 pin) in junction box (para 4-84).
- Install main frame valve (unload) harness in junction box (para 4-83).
- Install main frame valve (load) harness in box (para 4-82).
- Install main cylinder harness in box (para 4-81).
- Install left hand linking harness in junction box (para 4-80).
- Install hook arm valve (unload) harness in junction box (para 4-79).
- Install hook arm valve (load) harness in junction box (para 4-78).
- Install hand-held spotlight harness in junction box (para 4-77).
- Install free flow valve harness in junction box (para 4-76).
- Install hourmeter harness (para 4-63).

**END OF TASK**

**4-62. HOURMETER REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

Locknut (2) (Item 67, Appendix K)

Lockwasher (4) (Item 87, Appendix K)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

Tag, Identification (as required) (Item 23, Appendix E)

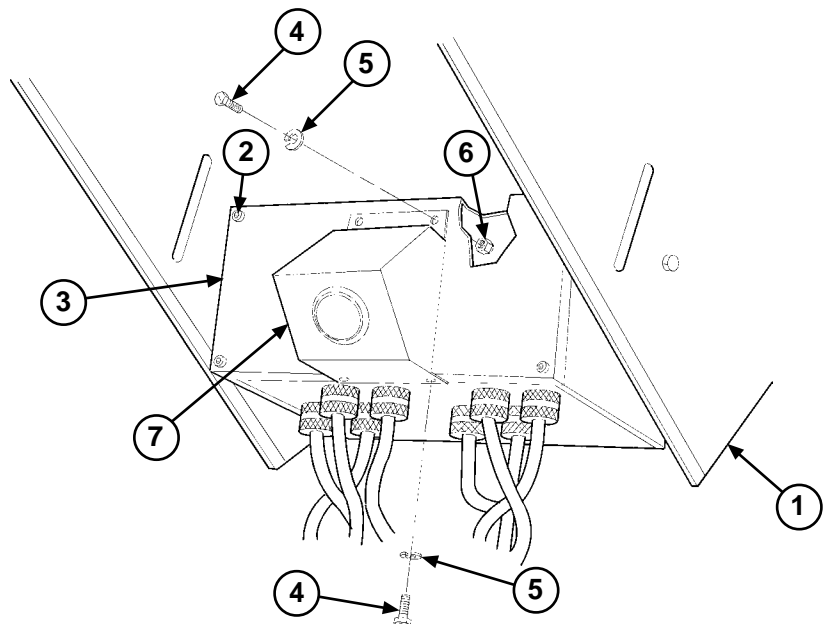
**a. Removal.**

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).
- (3) Remove two screws (4) and lockwashers (5) from junction box cover (3). Discard lockwashers.

**CAUTION**

**The hourmeter assembly is still attached by two wires upon completion of Step 4. Do not pull on the hourmeter assembly or damage to equipment may result.**

- (4) Remove two locknuts (6), screws (4), lockwashers (5), and hourmeter assembly (7) from junction box cover (3). Discard locknuts.

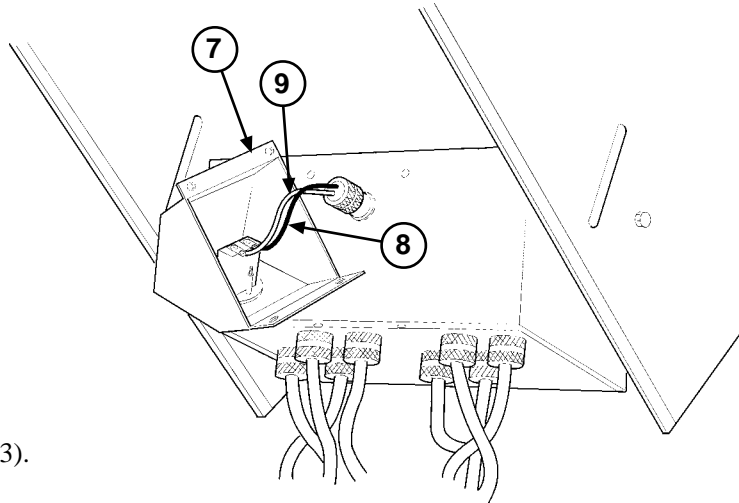


**4-62. HOURMETER REPLACEMENT (MODEL A ONLY) (continued).**

**NOTE**

Tag and mark wires prior to removal.

- (5) Remove white wire no. 25 (8) and black wire no. 24 (9) from hourmeter assembly (7).
- (6) Position hourmeter assembly (7) on work bench.



**NOTE**

Note position of hourmeter prior to removing to ensure proper installation.

- (7) Remove two locknuts (10), rear retainer (11), and hourmeter (12) from bracket (13). Discard locknuts.

**b. Installation.**

**NOTE**

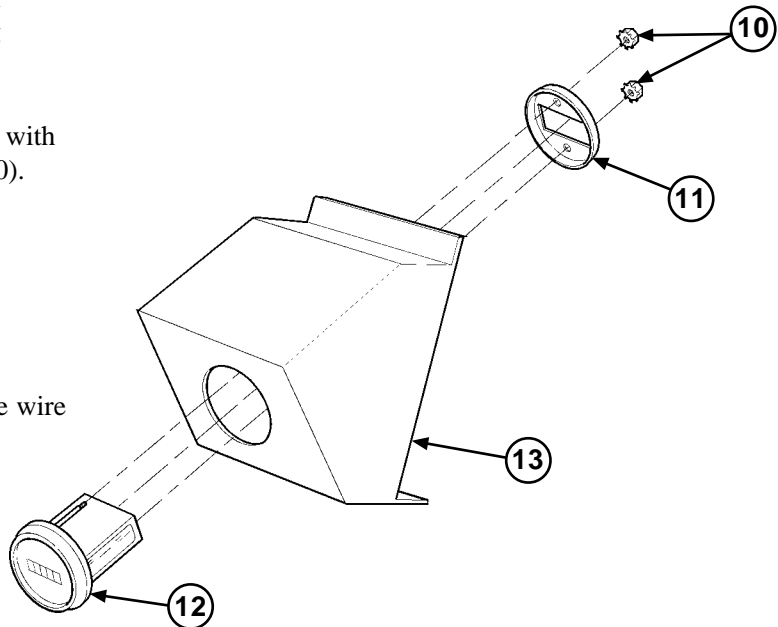
Ensure hourmeter is installed in same position as noted during removal.

- (1) Install hourmeter (12) in bracket (13) with retainer (11) and two new locknuts (10).

**NOTE**

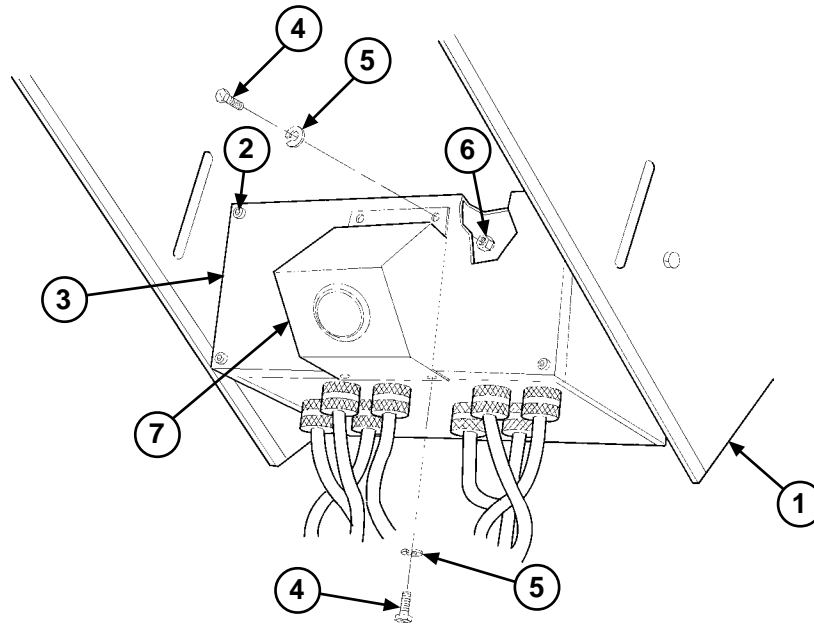
White wire no. 25 is installed on positive terminal.

- (2) Install black wire no. 26 (9) and white wire no. 25 (8) on hourmeter assembly (7).



#### 4-62. HOURMETER REPLACEMENT (MODEL A ONLY) (continued).

- (3) Install hourmeter assembly (7) on junction box cover (3) with four screws (4), new locknuts (6), and four new lockwashers (5).
- (4) Close junction box cover (3) and tighten four screws (2).



- (5) Close hydraulic cabinet cover (1).

#### c. Follow-on Maintenance:

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

## 4-63. HOURMETER HARNESS REPLACEMENT (MODEL A ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Locknut (2) (Item 67, Appendix K)

Lockwasher (4) (Item 87, Appendix K)

#### *Materials/Parts*

Tag, Identification (as required) (Item 23,  
Appendix E)

#### *Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

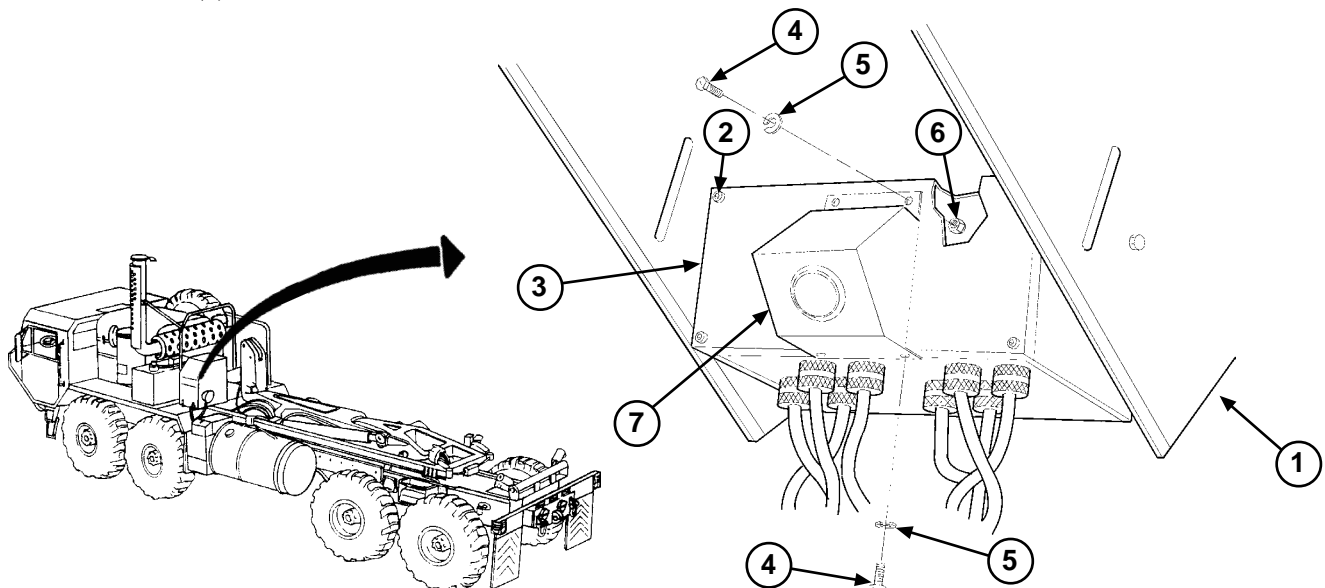
### a. Removal.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).
- (3) Remove two screws (4) and lockwashers (5) from junction box cover (3). Discard lockwashers.

### CAUTION

**The hourmeter assembly is still attached by two wires upon completion of Step 4. Do not pull on the hourmeter assembly or damage to equipment may result.**

- (4) Remove two locknuts (6), screws (4), lockwashers (5), and hourmeter assembly (7) from junction box cover (3). Discard locknuts.



**4-63. HOURMETER HARNESS REPLACEMENT (MODEL A ONLY) (continued).****NOTE**

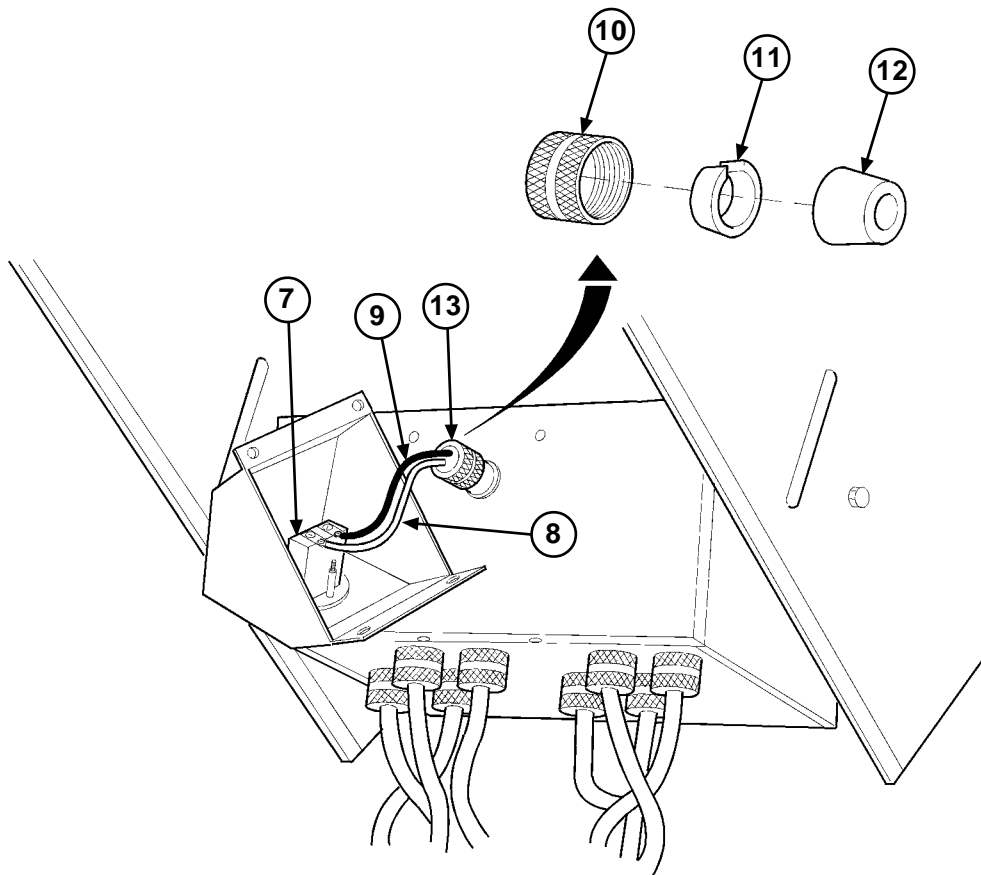
Tag and mark wires prior to removal to ensure proper installation.

- (5) Remove white wire no. 25 (8) and black wire no. 26 (9) from hourmeter assembly (7).

**NOTE**

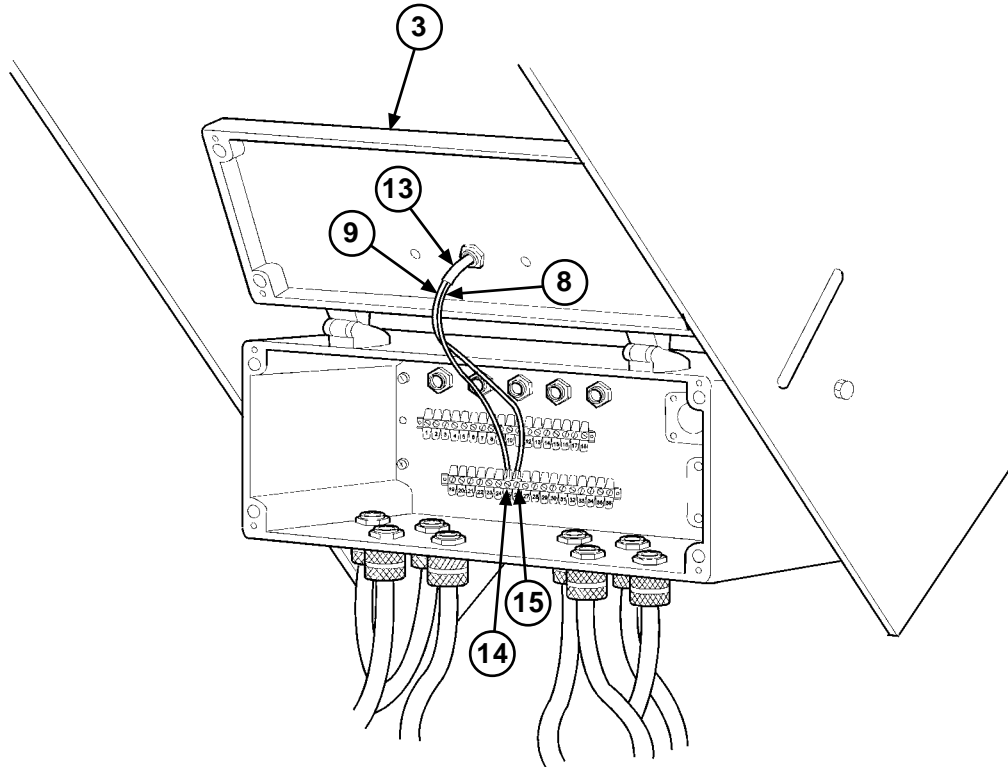
Note position of rubber grommet prior to removal.

- (6) Remove nut (10), plastic insert (11) and rubber grommet (12) from hourmeter harness (13).



**4-63. HOURMETER HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (7) Remove white wire no. 25 (8) from terminal no. 25 (14) and black wire no. 26 (9) from terminal no. 26 (15).
- (8) Remove hourmeter harness (13) from junction box cover (3).



**OTHER WIRE HARNESSES REMOVED FOR CLARITY**

**b. Installation.**

- (1) Position hourmeter harness (13) in junction box cover (3).
- (2) Install black wire no. 26 (9) on terminal no. 26 (15) and white wire no. 25 (8) on terminal no. 25 (14).

**NOTE**

Ensure rubber grommet is installed in same position as noted during removal.

- (3) Position rubber grommet (12) over hourmeter harness (13) and install plastic insert (11) and nut (10).

**NOTE**

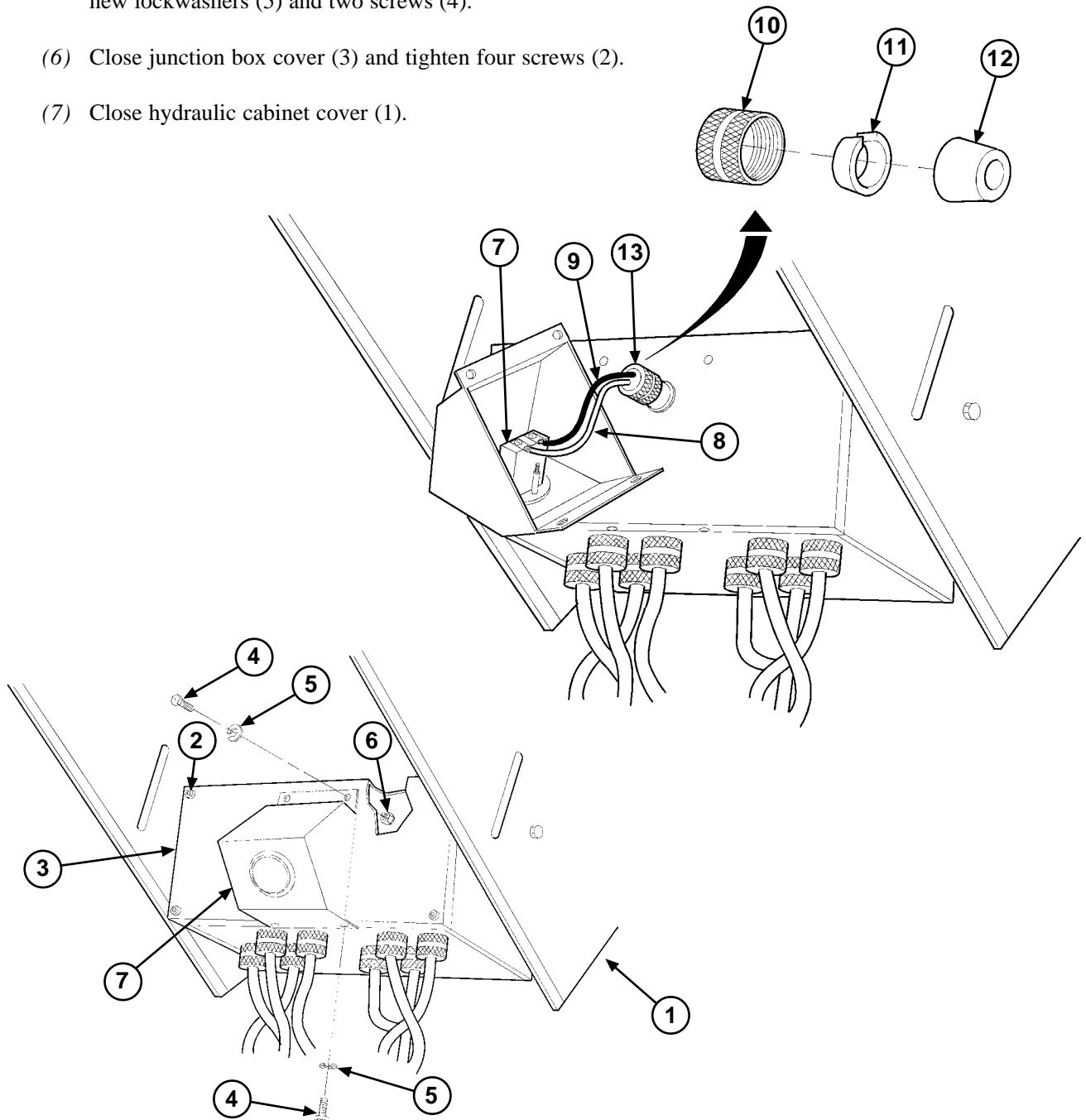
White wire no. 25 is installed on positive terminal.

- (4) Install black wire no. 26 (9) and white wire no. 25 (8) on hourmeter assembly (7).



### 4-63. HOURMETER HARNESS REPLACEMENT (MODEL A ONLY) (continued).

- (5) Install hourmeter assembly (7) on junction box cover (3) with four screws (4), new locknuts (6), four new lockwashers (5) and two screws (4).
- (6) Close junction box cover (3) and tighten four screws (2).
- (7) Close hydraulic cabinet cover (1).



#### c. Follow-on Maintenance:

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

## 4-64. MAIN FRAME JUNCTION BOX REPAIR.

This task covers:

- |                |                        |                          |
|----------------|------------------------|--------------------------|
| a. Removal     | c. Cleaning/Inspection | e. Installation          |
| b. Disassembly | d. Assembly            | f. Follow-on Maintenance |

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

#### *Materials/Parts*

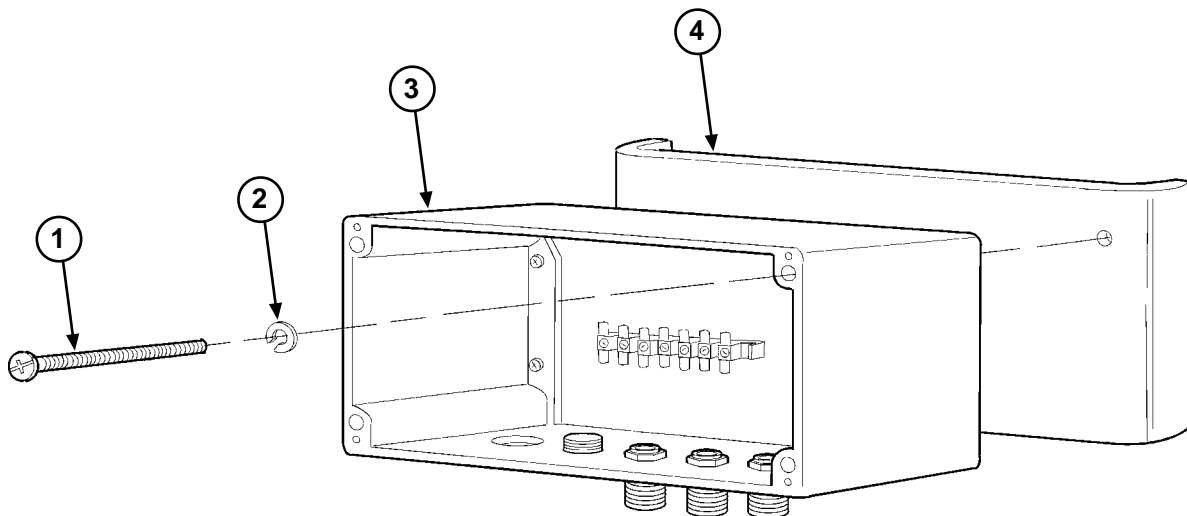
Adhesive-Sealant, Silicone, RTV  
(Item 6, Appendix E)  
Locknut (2) (Item 57, Appendix K)  
Lockwasher (4) (Item 74, Appendix K)

#### *Equipment Condition*

Main frame junction box harness removed  
(para 4-91)  
Worklight harness removed from main frame  
junction box (para 4-93)  
Main frame down proximity switch removed  
from main frame junction box (para 4-96)  
Hook arm up proximity switch removed from  
main frame junction box (para 4-95)

#### **a. Removal.**

- (1) Remove four screws (1), lockwashers (2) and main frame junction box (3) from vehicle (4). Discard lockwashers.
- (2) Position main frame junction box (3) on clean work surface.



## 4-64. MAIN FRAME JUNCTION BOX REPAIR (continued).

### b. Disassembly.

#### NOTE

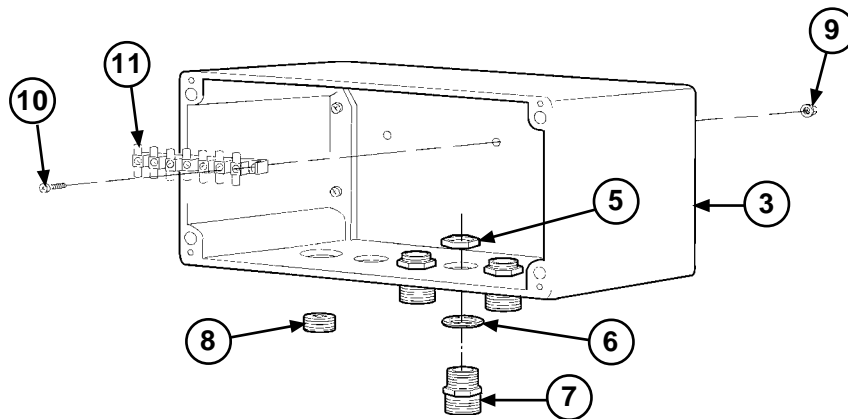
Model B trucks are equipped with four nuts, washers, and connectors.

- (1) Remove three nuts (5), sealing washers (6) and connectors (7) from main frame junction box (3).

#### NOTE

Perform step (2) for Model A trucks only.

- (2) Remove plug (8) from main frame junction box (3).
- (3) Remove two locknuts (9), screws (10) and terminal strip (11) from main frame junction box (3). Discard locknuts.



### c. Cleaning/Inspection.

- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.

### d. Assembly.

#### WARNING

**Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (1) Apply silicone adhesive-sealant around holes for screws (10).
- (2) Install terminal strip (11) in main frame junction box (3) with two screws (10) and new locknuts (9).

#### NOTE

Perform step (3) for Model A trucks only.

- (3) Apply silicone adhesive-sealant to threads of plug (8) and install plug (8) in main frame junction box (3).

#### NOTE

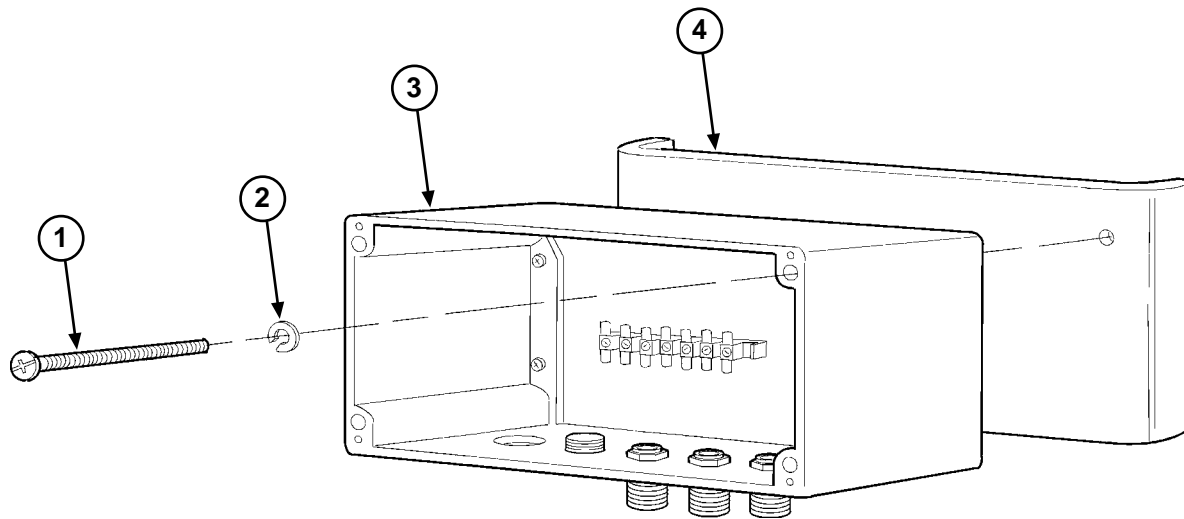
Model B trucks are equipped with four nuts, washers, and connectors.

- (4) Install three sealing washers (6) and connectors (7) in main frame junction box (3) with nuts (5).

**4-64. MAIN FRAME JUNCTION BOX REPAIR (continued).**

**e. Installation.**

(1) Install main frame junction box (3) on vehicle (4) with four new lockwashers (2) and screws (1).



**f. Follow-on Maintenance:**

- Install hook arm up proximity switch on main frame junction box (para 4-95).
- Install main frame down proximity switch on main frame junction box (para 4-96).
- Install worklight harness on main frame junction box (para 4-93).
- Install main frame junction box harness (para 4-91).

**END OF TASK**

## 4-64.1 DIGITAL CONTROL BOX AND RESISTOR ASSEMBLY REPLACEMENT (MODEL B ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

#### Tools and Special Tools

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

#### Materials/Parts

Locknut (4) (Item 71, Appendix K)  
Lockwasher (4) (Item 91, Appendix K)

#### Equipment Condition

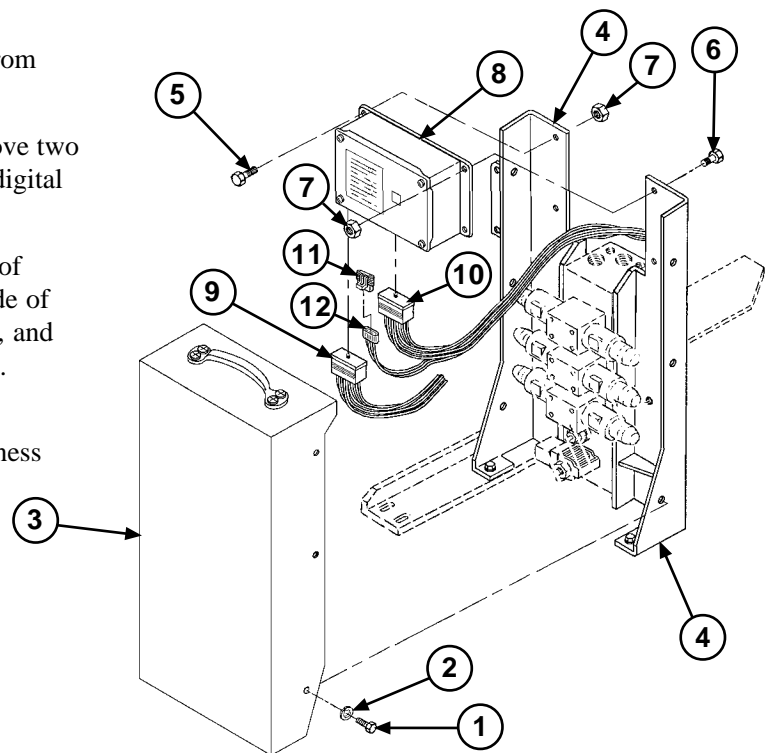
Wheels chocked (TM 9-2320-279-10)  
Engine OFF (TM 9-2320-279-10)  
Batteries disconnected (TM 9-2320-279-20)

### a. Removal.

#### NOTE

For resistor assembly replacement only, go to step (5).

- (1) Remove four screws (1) and lockwashers (2) from hydraulic cabinet cover (3).
- (2) Discard lockwashers.
- (3) Remove hydraulic cabinet cover (3) from main junction box brackets (4).
- (4) Loosen two allen screws (9) and remove two wiring harness connectors (10) from digital controller (8).
- (5) Remove three screws (5) from inside of bracket (4), one screw (6) from outside of bracket (4), four self-locking nuts (7), and digital controller (8) from bracket (4).
- (6) Discard self-locking nuts.
- (7) Remove resistor (11) from wiring harness (12).



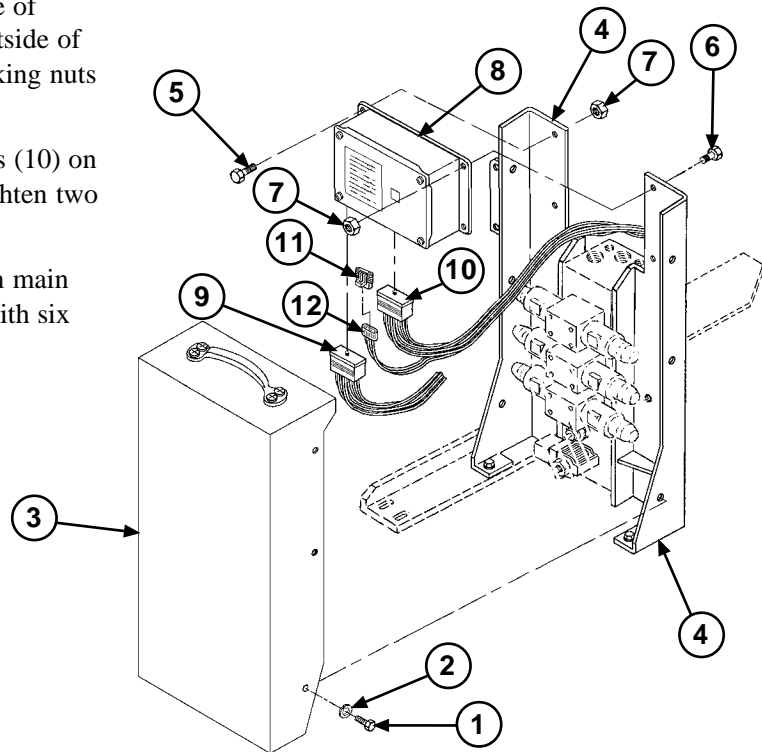
**4-64.1 DIGITAL CONTROL BOX AND RESISTOR ASSEMBLY REPLACEMENT  
(MODEL B ONLY) (continued).**

**b. Installation.**

**NOTE**

For resistor assembly replacement only, go to step (1).

- (1) Replace resistor (11) onto wiring harness (12).
- (2) Position digital controller (8) on brackets (4) and install three screws (5) from inside of bracket (4) and one screw (6) from outside of bracket (4). Secure with four self-locking nuts (7).
- (3) Position two wiring harness connectors (10) on bottom of digital controller (8) and tighten two allen screws (9).
- (4) Position hydraulic cabinet cover (3) on main junction box brackets (4) and secure with six screws (1) and lockwashers (2).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).
- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

## 4-65. REAR MARKER LIGHT AND MOUNTING BRACKET REPLACEMENT (MODEL A ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

Lockwasher (2) (Item 32, Appendix K)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)

Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)

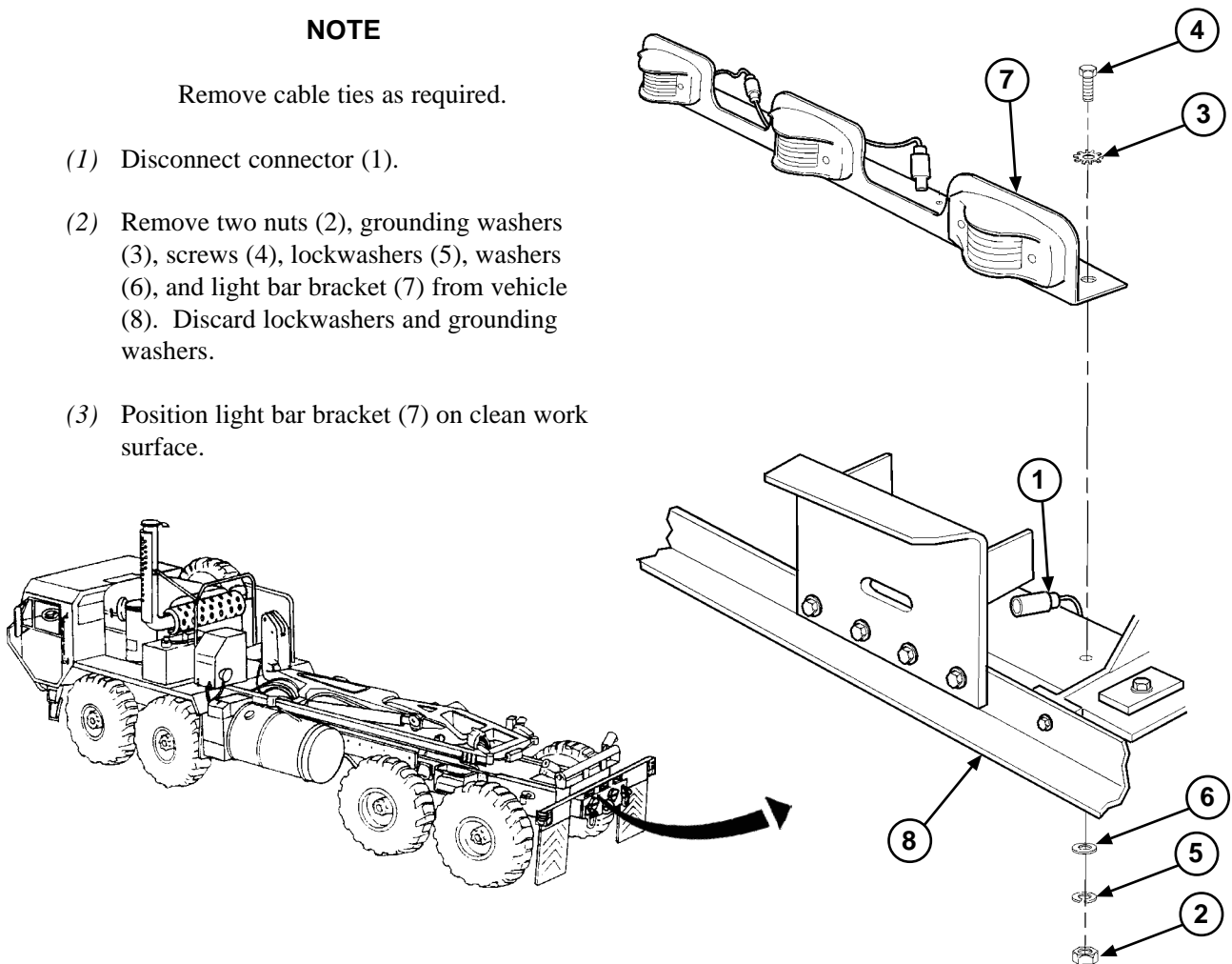
Grounding Washer (2) (Item 37, Appendix K)

### a. Removal.

**NOTE**

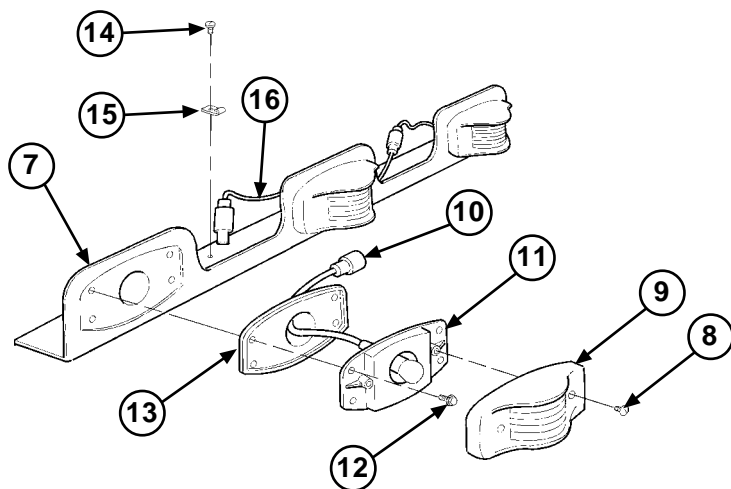
Remove cable ties as required.

- (1) Disconnect connector (1).
- (2) Remove two nuts (2), grounding washers (3), screws (4), lockwashers (5), washers (6), and light bar bracket (7) from vehicle (8). Discard lockwashers and grounding washers.
- (3) Position light bar bracket (7) on clean work surface.



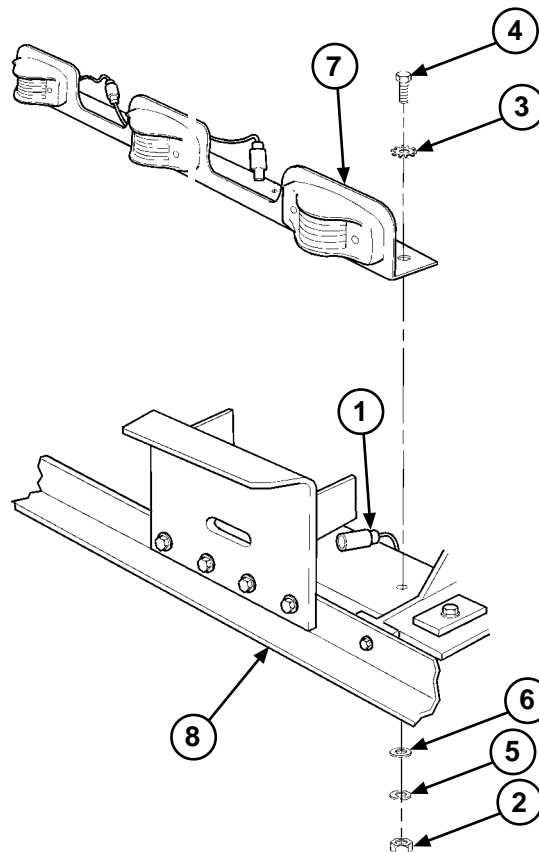
**4-65. REAR MARKER LIGHT AND MOUNTING BRACKET REPLACEMENT (MODEL A ONLY) (continued).**

- (4) Remove six screws (8) and three lenses (9) from three light assemblies (11).
- (5) Disconnect three connectors (10) from harness (16).
- (6) Remove six screws (12), three light assemblies (11) and three gaskets (13) from light bar bracket (7).
- (7) Remove two screws (14), clips (15) and harness (16) from light bar bracket (7).



**b. Installation.**

- (1) Install harness (16) on light bar bracket (7) with two clips (15) and screws (14).
- (2) Install three gaskets (13) and light assemblies (11) on light bar bracket (7) with six screws (12).
- (3) Connect three connectors (10) to harness (16).
- (4) Install three lenses (9) on three light assemblies (11) with six screws (8).
- (5) Install light bar bracket (7) on vehicle (8) with two washers (6), new lockwashers (5), screws (4), grounding washers (3) and nuts (2).
- (6) Connect connector (1).



**c. Follow-on Maintenance**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



**4-65.1 REAR CLEARANCE LIGHT REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal    b. Installation    c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

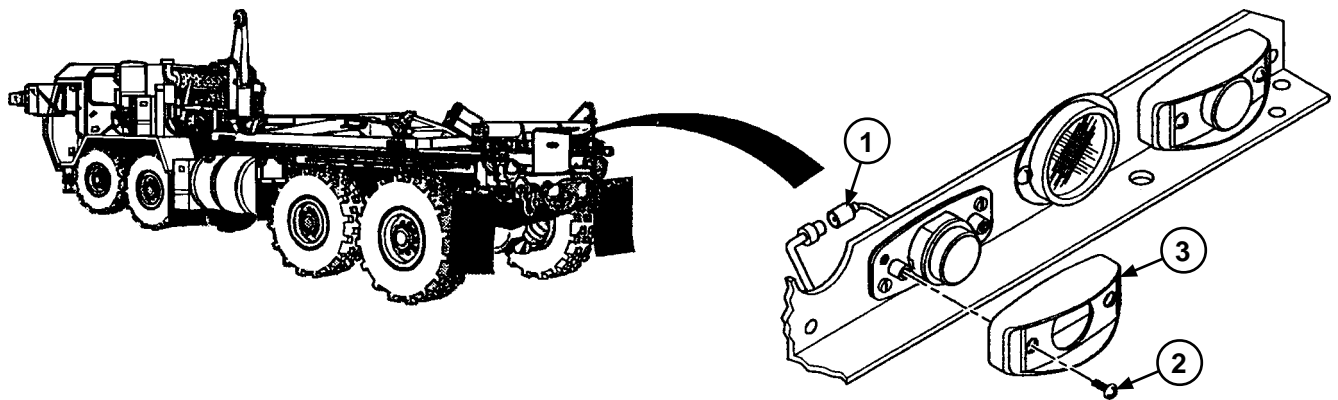
Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine OFF (TM 9-2320-279-10)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)  
Tags, Identification (as required) (Item 23, Appendix E)

**a. Removal.****NOTE**

- The marker lights and clearance lights are removed and installed the same way. The marker light is shown.
- Tag and mark all wires before disconnecting.
- Remove cable ties as needed.

(1) Tag and disconnect wire (1).

(2) Remove two screws (2) and outer bracket (3).

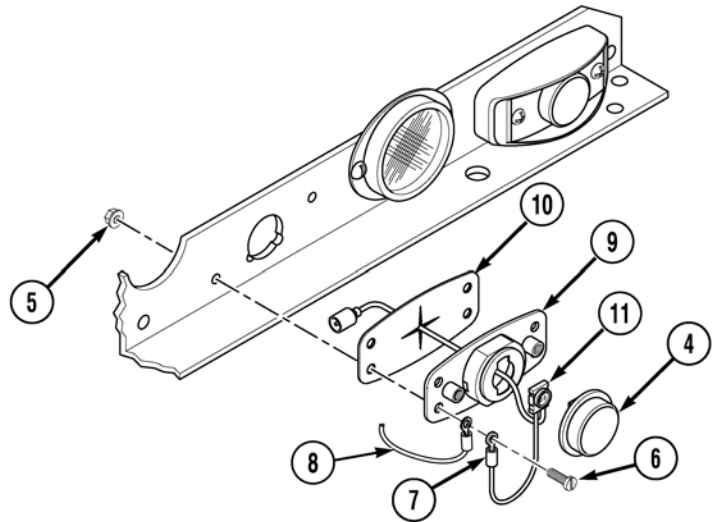
**4-65.1 REAR CLEARANCE LIGHT REPLACEMENT (MODEL B ONLY) (continued).**

- (3) Remove light emitting diode (4).

**NOTE**

Side marker lights will have two ground wires.

- (4) Remove two nuts (5), screws (6), ground wires (7 and 8), mounting base (9), mounting gasket (10), and pigtail (11).

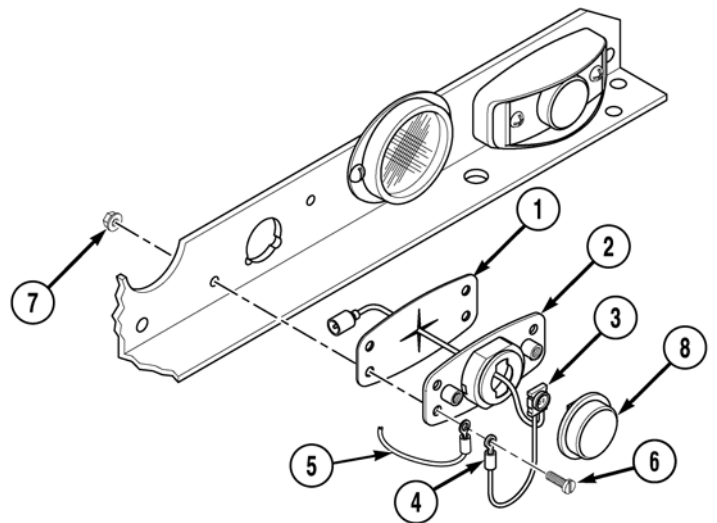


**b. Installation.**

**NOTE**

Side marker lights will have two ground wires.

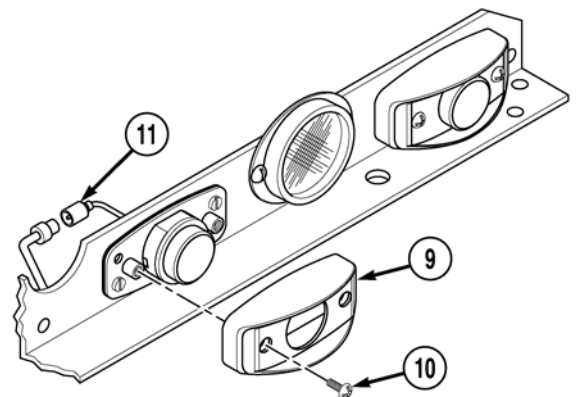
- (1) Install mounting gasket (1), mounting base (2), pigtail (3), two ground wires (4 and 5), screws (6), and nuts (7). Tighten nuts.
- (2) Install light emitting diode (8).



- (3) Install outer bracket (9) and two screws (10).
- (4) Connect wire (11).

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).



**END OF TASK**



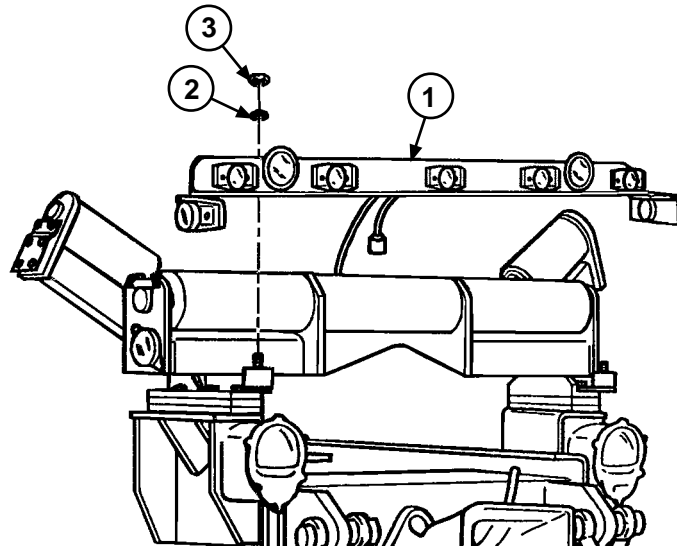
**4-65.2 REAR LIGHT BAR ASSEMBLY REPLACEMENT (MODEL B ONLY) (continued).**

**b. Installation.**

- (1) Install rear light bar (1), two lockwashers (2), and nuts (3).
- (2) Connect wires to rear light bar (1).

**c. Follow-on Maintenance:**

- Install stop plate (Para 4-55).
- Remove wheel chocks (TM 9-2320-279-10).



**END OF TASK**

**4-66. CLEARANCE LIGHT HARNESS REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

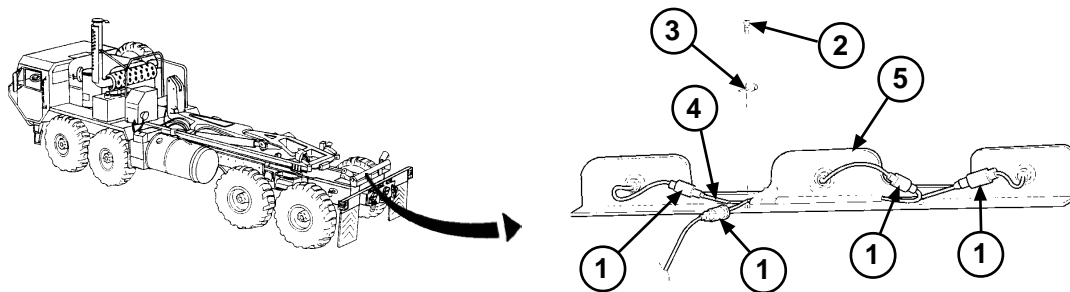
Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

**a. Removal.**

**NOTE**

- Cut cable ties as required.
- Tag and mark wires before removal.
- Model B is equipped with an additional four connectors for side clearance lights.

- (1) Disconnect four connectors (1).
- (2) Remove two screws (2), clips (3) and clearance light harness (4) from light bar (5).



**NOTE**

- Replace cable ties as required.
- Model B is equipped with an additional four connectors for side clearance lights.

**b. Installation.**

- (1) Install clearance light harness (4) on light bar (5) with two clips (3) and screws (2).
- (2) Connect four connectors (1).

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-66.1 REMOTE CONTROL CONNECTOR REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine OFF (TM 9-2320-279-10)

*Materials/Parts*

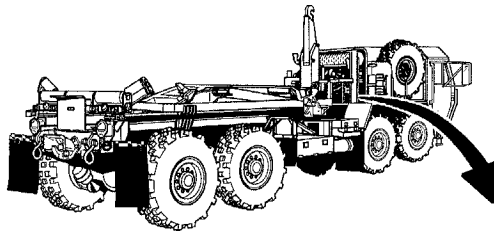
Locknut (4) (Item 59, Appendix K)  
Lockwasher (8) (Item 28.1, Appendix K)

**a. Removal.**

**NOTE**

Left and right side remote control connectors are removed the same way.  
Right side shown.

- (1) Remove four screws (1), lockwashers (2), and hex nuts (3) from bulk head plate (4). Discard lockwashers.
- (2) Remove two bolts (5) and locknuts (6) from bulk head plate (4). Discard locknuts.
- (3) Remove protective cap (7) from harness (8) and remove bulk head plate (4) from vehicle.

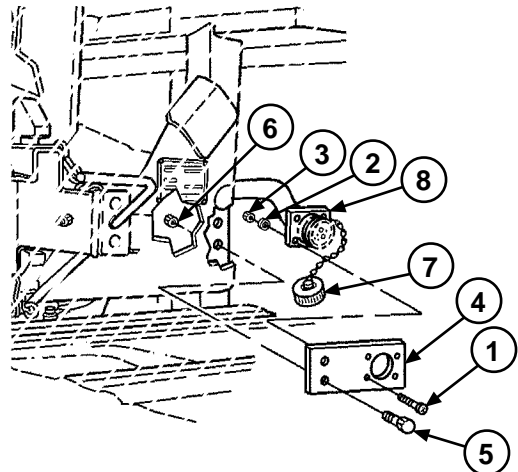


**b. Installation**

**NOTE**

One screw should pass through chain on protective cap.

- (1) Install harness (8) through bulk head plate (4) and secure with four screws (1), new lockwashers (2), and hex nuts (3).
- (2) Position bulk head plate (4) on frame and secure with two bolts (5) and new locknuts (6).
- (3) Install protective cap (7) on harness (8) and hand tighten.



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



**4-67. HIGH IDLE SWITCH REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

Tag, Identification (as required) (Item 23, Appendix E)

**a. Removal.**

- (1) Remove six screws (1) and heater compartment cover (2) from cab (3).

**NOTE**

Tag and mark wires prior to removal to ensure proper installation

- (2) Turn heater compartment cover (2) over and remove screw (4) and wire (5) from terminal no. 2 (6).
- (3) Remove screw (7), wire no. 1840 (8), and wire no. 06 (9) from terminal no. 3 (10).

**NOTE**

Note position of high idle switch prior to removal to ensure proper installation.

- (4) Turn panel (2) over and remove nut (11), lockwasher (12) and high idle switch (13) from heater compartment cover (2).

**b. Installation.**

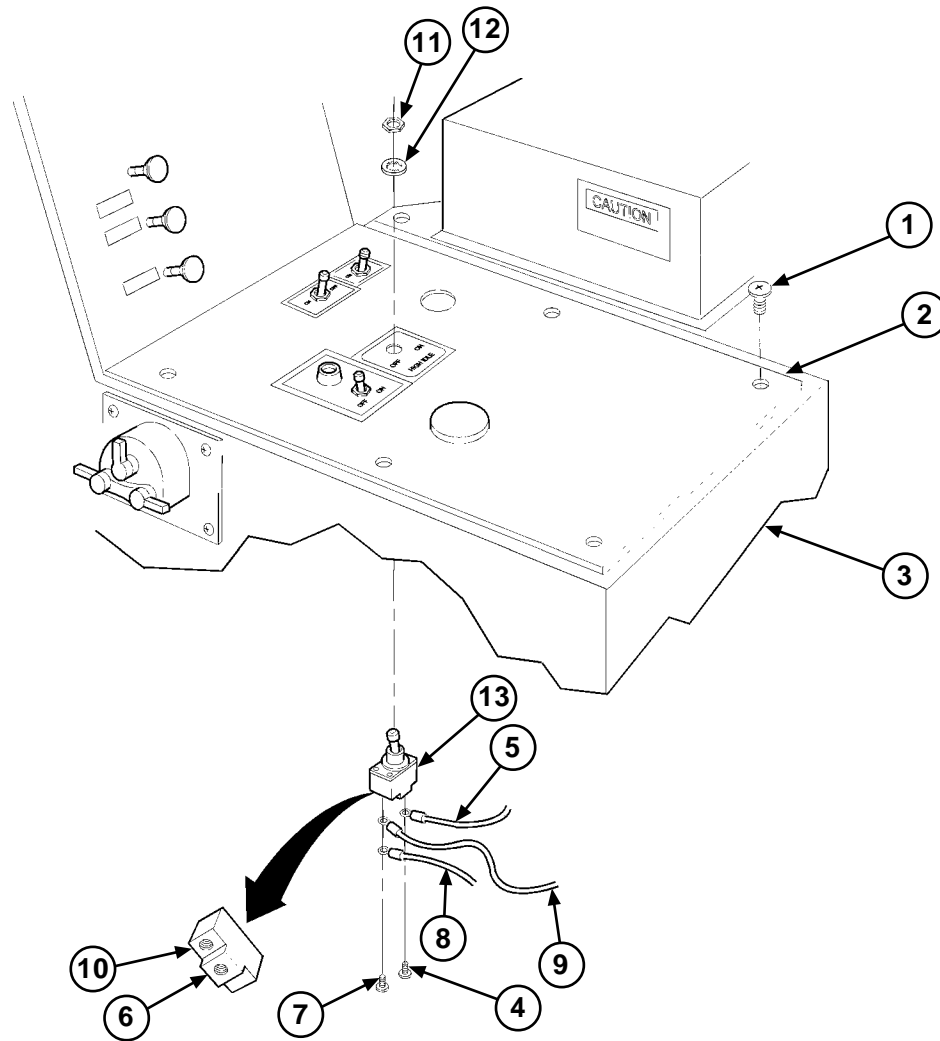
**NOTE**

Ensure high idle switch is installed as noted during removal.

- (1) Install high idle switch (13) in heater compartment cover (2) with lockwasher (12) and nut (11).



**4-67. HIGH IDLE SWITCH REPLACEMENT (continued).**



**NOTE**

Ensure wires are installed as noted during removal.

- (2) Turn heater compartment cover (2) over and install wire no. 1840 (8) and wire no. 06 (9) on terminal no. 3 (10) with screw (7).
- (3) Install wire (5) on terminal no. 2 (6) with screw (4).
- (4) Turn heater compartment cover (2) over and install on cab (3) with six screws (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-67.1. BACKUP ALARM AND HARNESS REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

*Equipment Conditions*

Engine OFF (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-20)

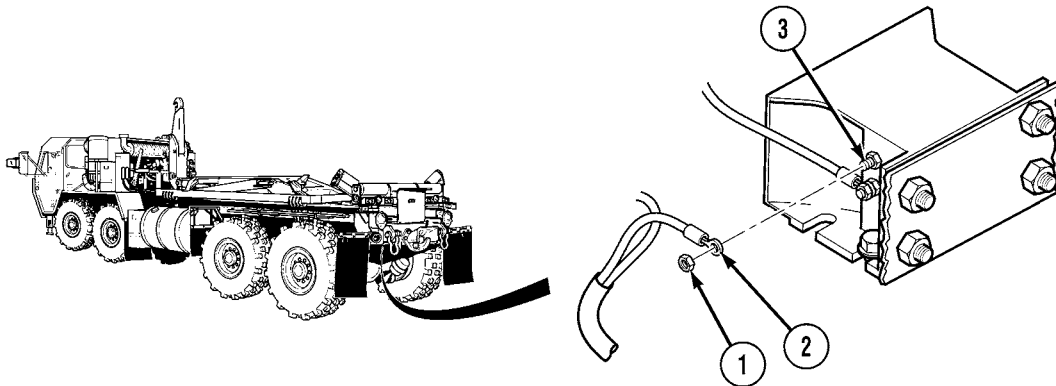
*Materials/Parts*

Cable Ties (Item 8, Appendix E)

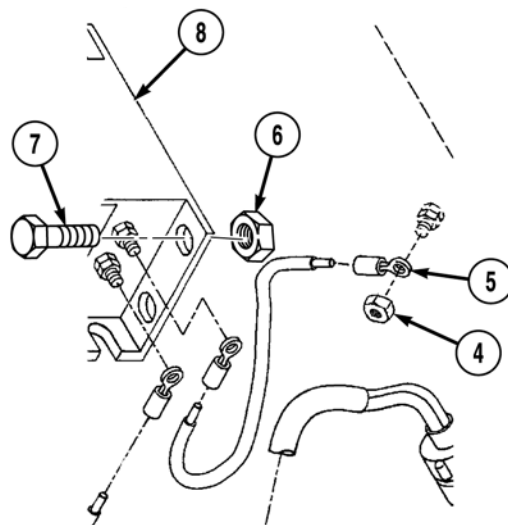
**NOTE**

- Remove cable ties as needed.
- Remove cable clamps as needed.

**a. Removal.**



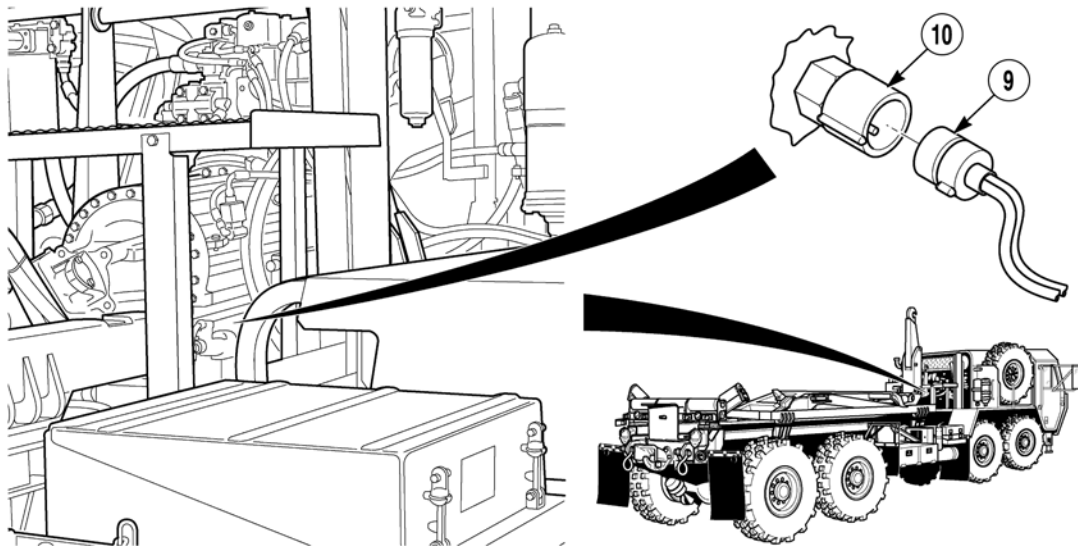
(1) Remove two locknuts (1) and wires (2) from reverse alarm terminals (3).



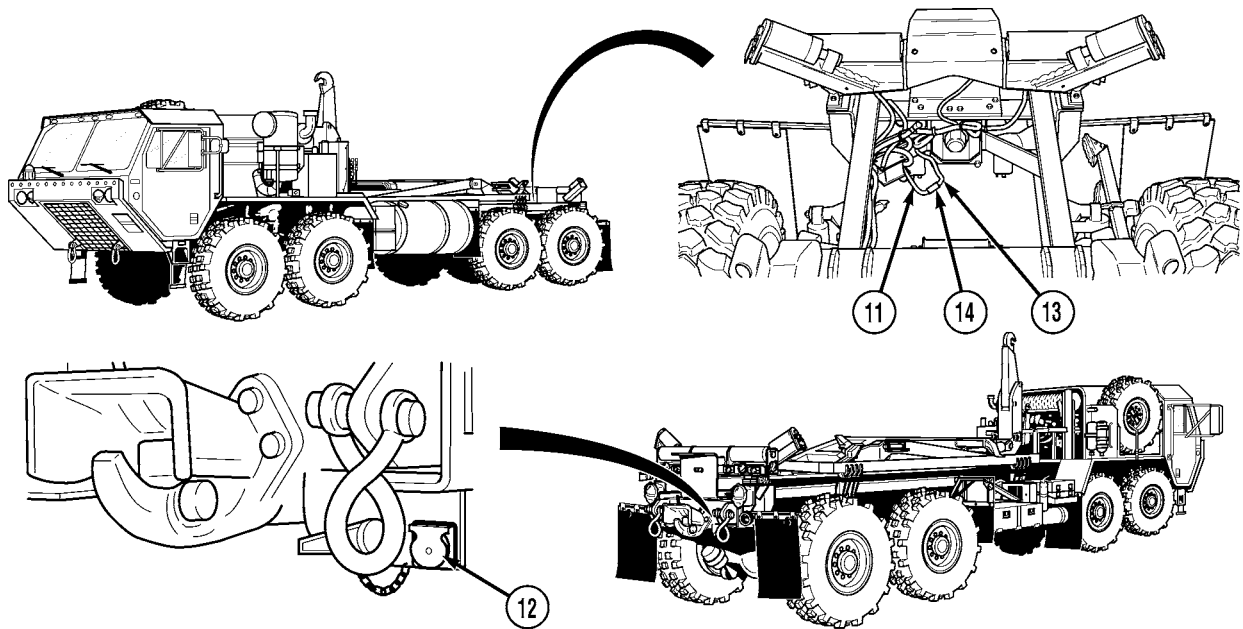
(2) Remove locknut (4) and wire (5) from ground.

(2.1) Remove four locknuts (6), screws (7), and reverse alarm (8) from vehicle.

**4-67.1. BACKUP ALARM AND HARNESS REPLACEMENT (MODEL B ONLY) (continued).**



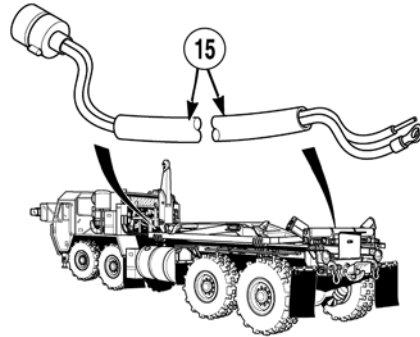
(3) Disconnect reverse alarm switch connector (9) from reverse alarm switch (10).



(4) Remove insulating tape from harness (11) to inter vehicle connector (12). Cut wire (13) after butt connector (14).

**4-67.1. BACKUP ALARM AND HARNESS REPLACEMENT (MODEL B ONLY) (continued).**

- (5) Remove reverse alarm wiring harness (15).

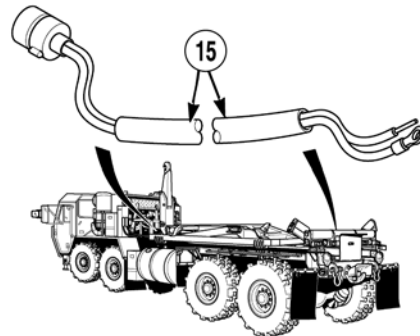


**b. Installation.**

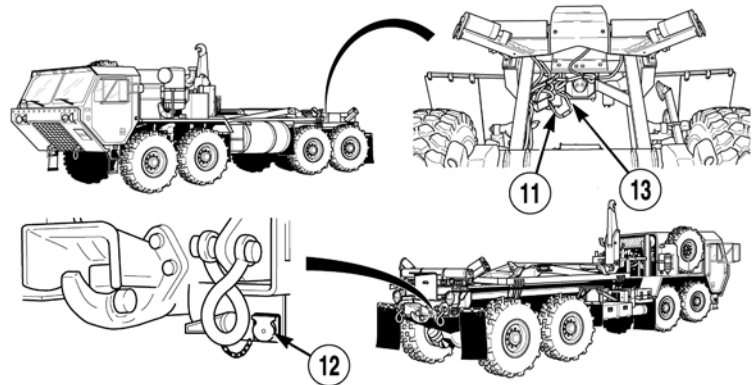
**NOTE**

- Install cable clamps as needed.
- Install cable ties as needed.

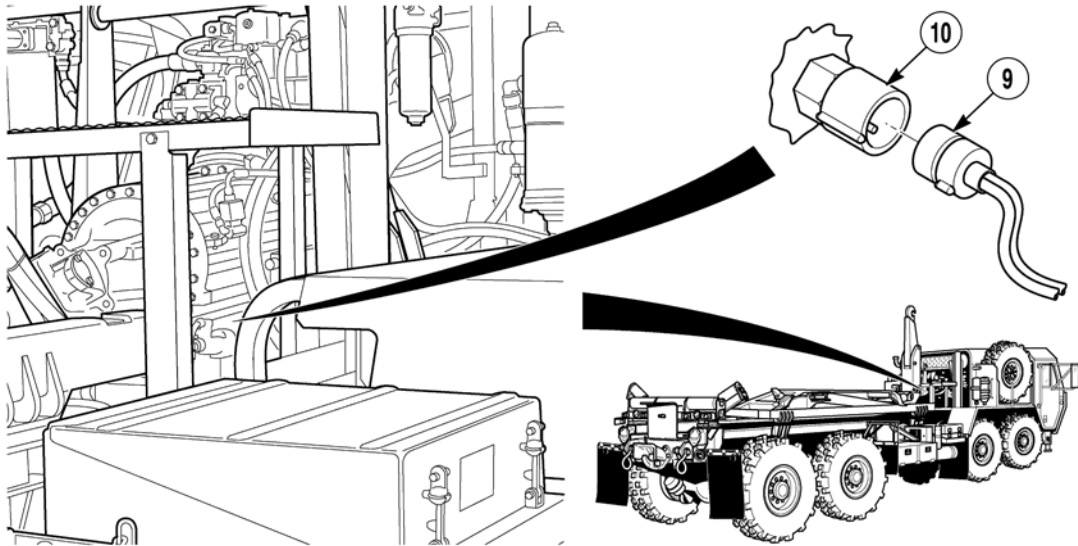
- (1) Install reverse alarm wiring harness (15).



- (2) Remove one half inch of insulation, exposing bare wire and splice wire (13) from inter vehicle connector (12) to harness (11).



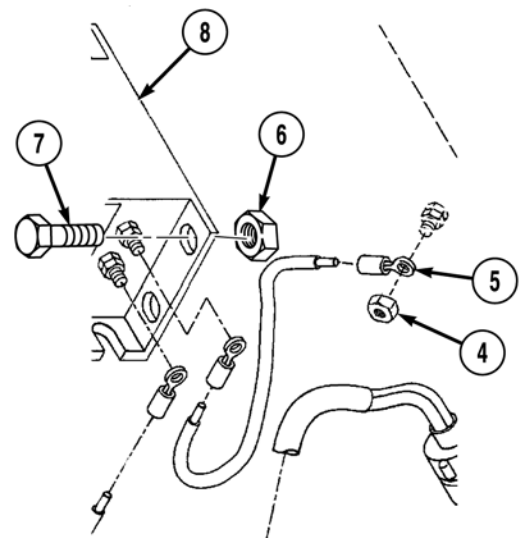
**4-67.1. BACKUP ALARM AND HARNESS REPLACEMENT (MODEL B ONLY) (continued).**



(3) Install reverse alarm switch connector (9) to reverse alarm switch (10).

(3.1) Install reverse alarm (8) on vehicle with four screws (7) and locknuts (6).

(4) Install wire (5) on ground and secure with locknut (4).

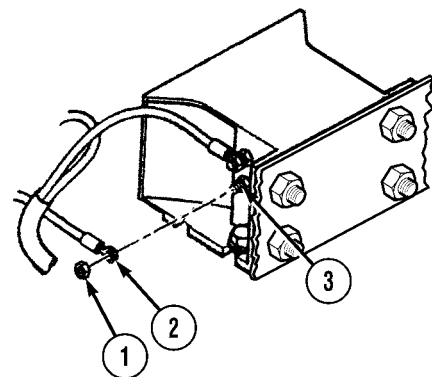


(5) Install two wires (2) and two locknuts (1) on reverse alarm terminals (3).

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



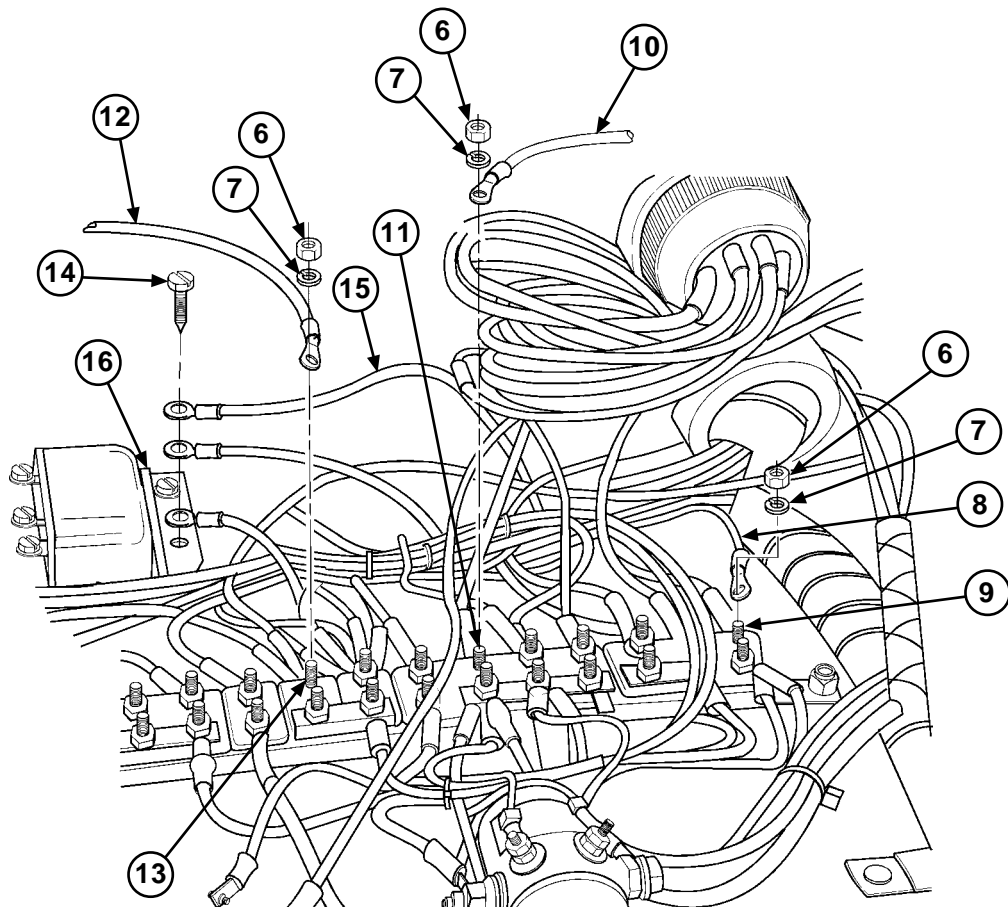


## 4-68. SUPPLY HARNESS REPLACEMENT (MODEL A ONLY) (continued).

### CAUTION

**Remove only the wires for the supply harness. All other wires must remain in position. Failure to comply may cause damage to equipment.**

- (3) Remove three nuts (6), lockwashers (7) and wire no. 2 (8) from CB no. 1 (9), wire no. 4 (10) from CB no. 6 (11) and wire no. 1 (12) from CB no. 9 (13). Discard lockwashers.
- (4) Reinstall three nuts (6) on CB no. 1 (9), no. 6 (11) and no. 9 (13).
- (5) Remove screw (14) and wire no. 3 (15) from relay mounting bracket (16).
- (6) Reinstall screw (14) in relay mounting bracket (16).

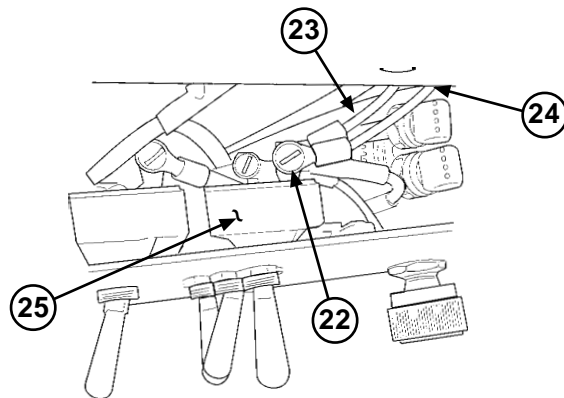
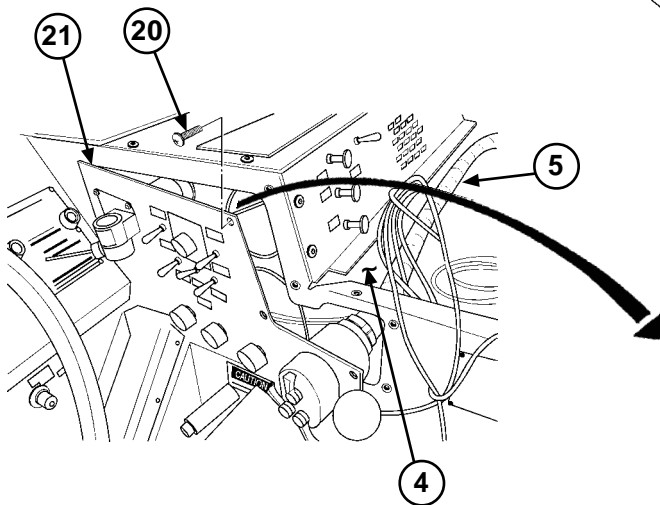
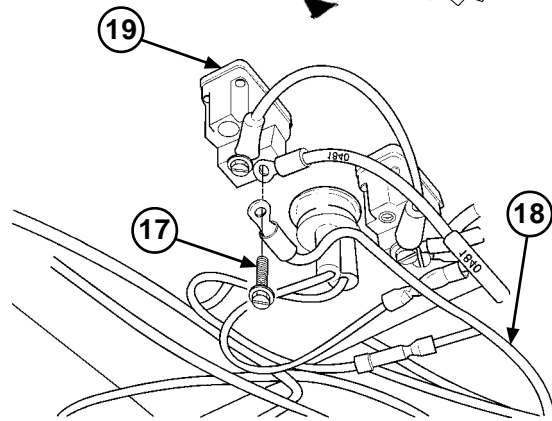
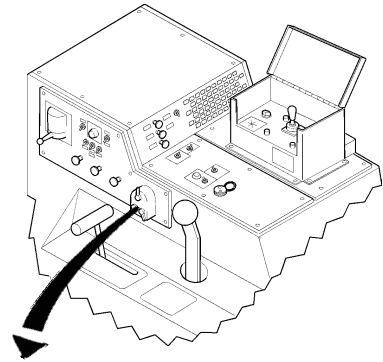


**4-68. SUPPLY HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

**CAUTION**

**Move side panel outward only enough to gain access to wires. Failure to comply may result in damage to equipment.**

- (7) Remove screw (17) and wire no. 6 (18) from high idle switch (19).
- (8) Reinstall screw (17) in high idle switch (19).
- (9) Remove eight screws (20) and pull side panel (21) outward.
- (10) Remove screw (22), wire no. 7 (23) and wire no. 8 (24) from work light switch (25).
- (11) Reinstall screw (22) on work light switch (25).
- (12) Remove supply harness (5) from cab (4).



**b. Installation.**

**NOTE**

Install cable ties in same positions as noted during removal.

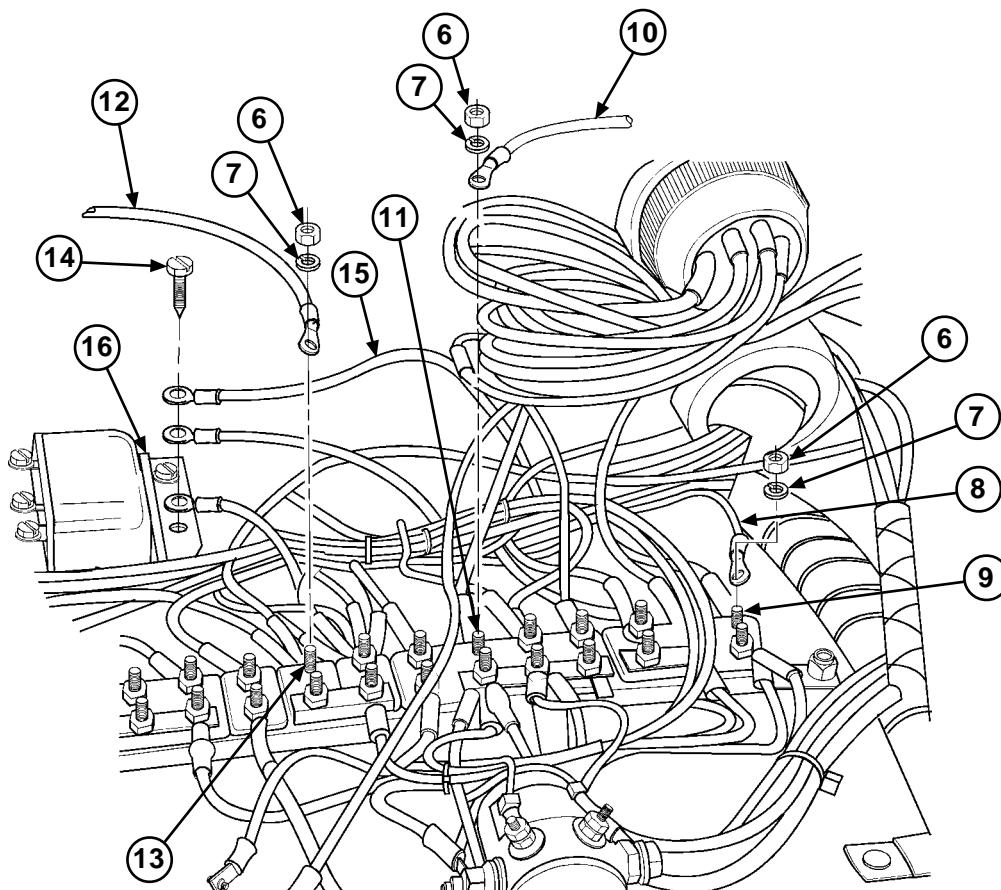
- (1) Position supply harness (5) in cab (4).



**4-68. SUPPLY HARNESS REPLACEMENT (MODEL A ONLY) (continued).**
**CAUTION**

**Use caution when removing hardware. Ensure existing HEMTT wires are reinstalled on proper terminals. Failure to comply may result in damage to equipment.**

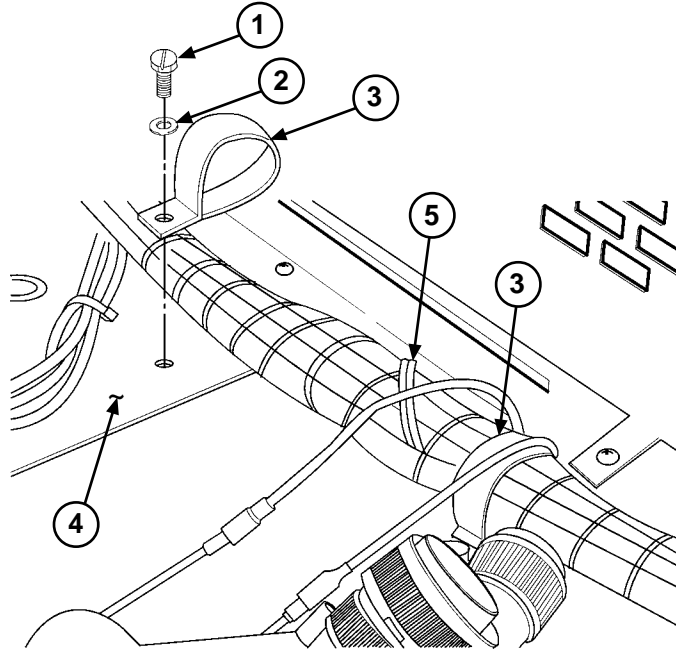
- (2) Remove screw (22) from work light switch (25).
- (3) Install wire no. 8 (24) and wire no. 7 (23) on work light switch (25) with screw (22).
- (4) Push side panel (21) back into position and install eight screws (20).
- (5) Remove screw (17) from high idle switch (19).
- (6) Install wire no. 6 (18) on high idle switch (19) with screw (17).
- (7) Remove screw (14) from relay mounting bracket (16).
- (8) Install wire no. 3 (15) on relay mounting bracket (16) with screw (14).
- (9) Remove three nuts (6) from CB no. 1 (9), no. 6 (11) and no. 9 (13).
- (10) Install wire no. 1 (12) on CB no. 9 (13), wire no. 4 (10) on CB no. 6 (11) and wire no. 2 (8) on CB no. 1 (9) with three new lockwashers (7) and nuts (6).



**4-68. SUPPLY HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

(11) Position supply harness (5) in two cushion clips (3).

(12) Install two cushion clips (3) in cab (4) with two washers (2) and screws (1).



**c. Follow-on Maintenance:**

- Install engine stop switch (TM 9-2320-279-20).
- Install heater compartment cover (TM 9-2320-279-20).
- Install cab control box (para 4-71).

**END OF TASK**

**4-69. CAB TO JUNCTION BOX LINKING HARNESS (24-PIN) REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal    b. Installation    c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Cab control box removed (para 4-71)  
Heater compartment covers removed  
(TM 9-2320-279-20)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

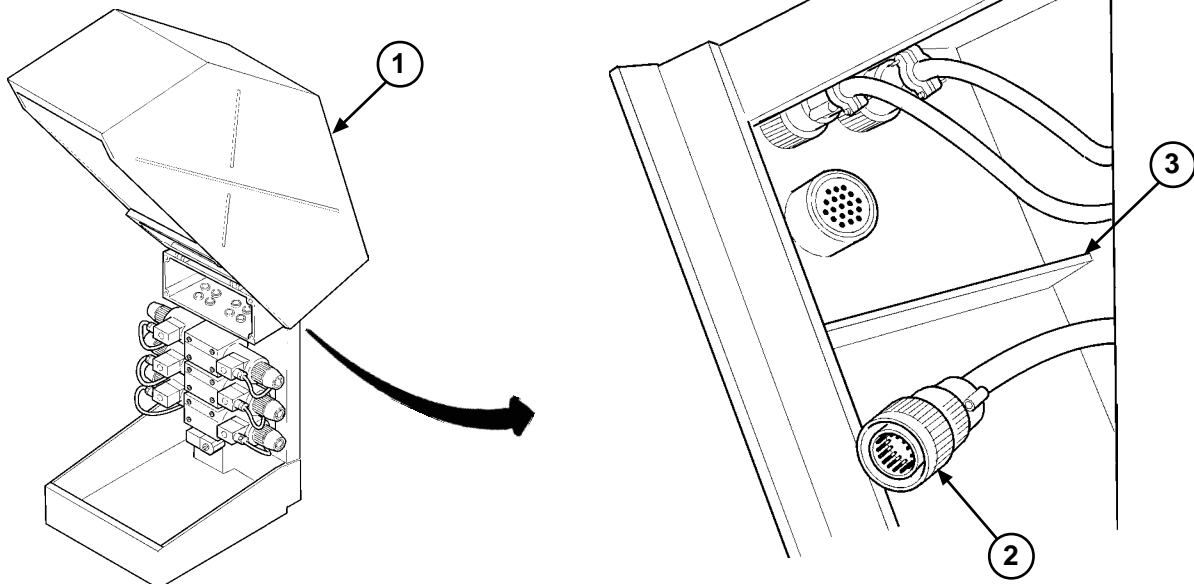
**a. Removal.**

**NOTE**

- Tag and mark all connectors, wires and connection points prior to removal to ensure proper installation.
- Cut cable ties as required.
- Note location of cable ties prior to removal to ensure proper installation.

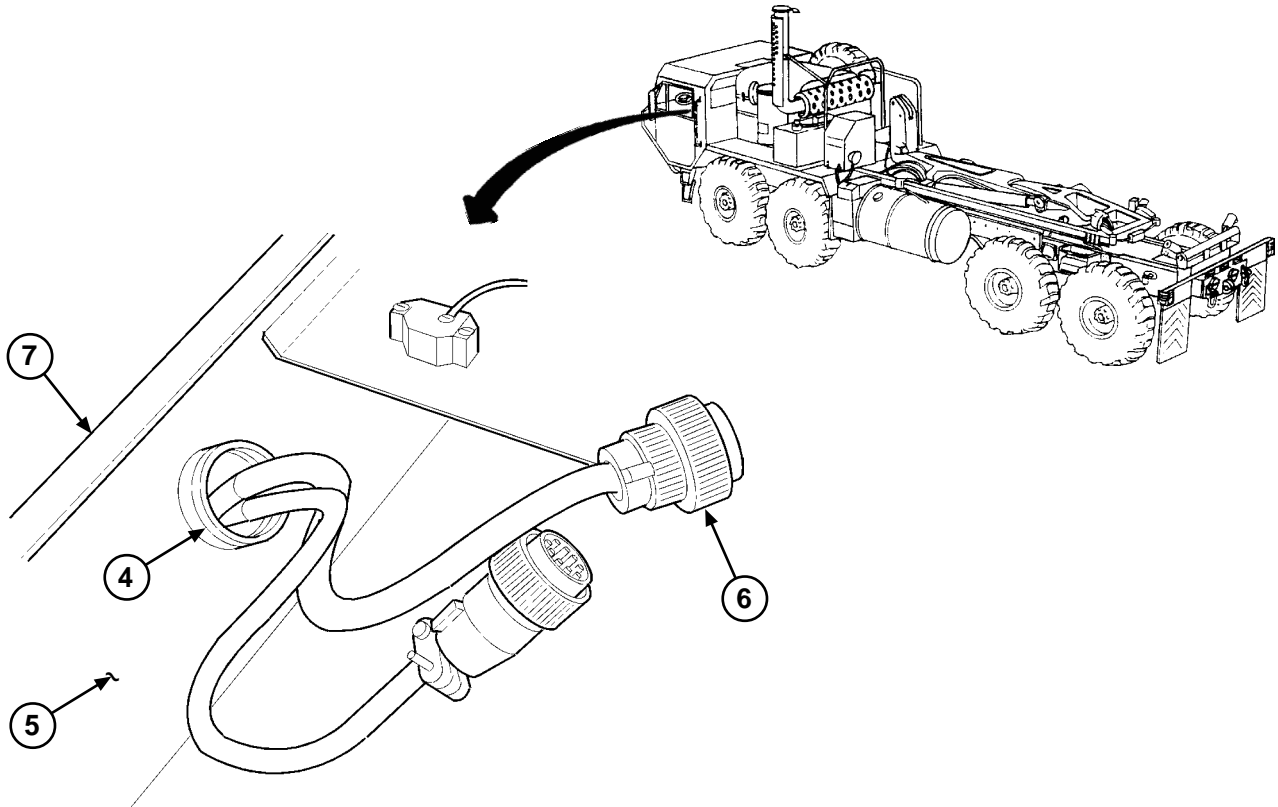
(1) Open hydraulic cabinet cover (1).

(2) Disconnect connector P4 (2) from junction box (3).



**4-69. CAB TO JUNCTION BOX LINKING HARNESS (24-PIN) REPLACEMENT (MODEL A ONLY) (continued).**

- (3) Remove grommet (4) from cab (5).
- (4) Follow 24-pin cab to junction box harness (6) down through cab (5) and remove cable ties as required.
- (5) Remove 24-pin cab to junction box harness (6) from vehicle (7).



**b. Installation.**

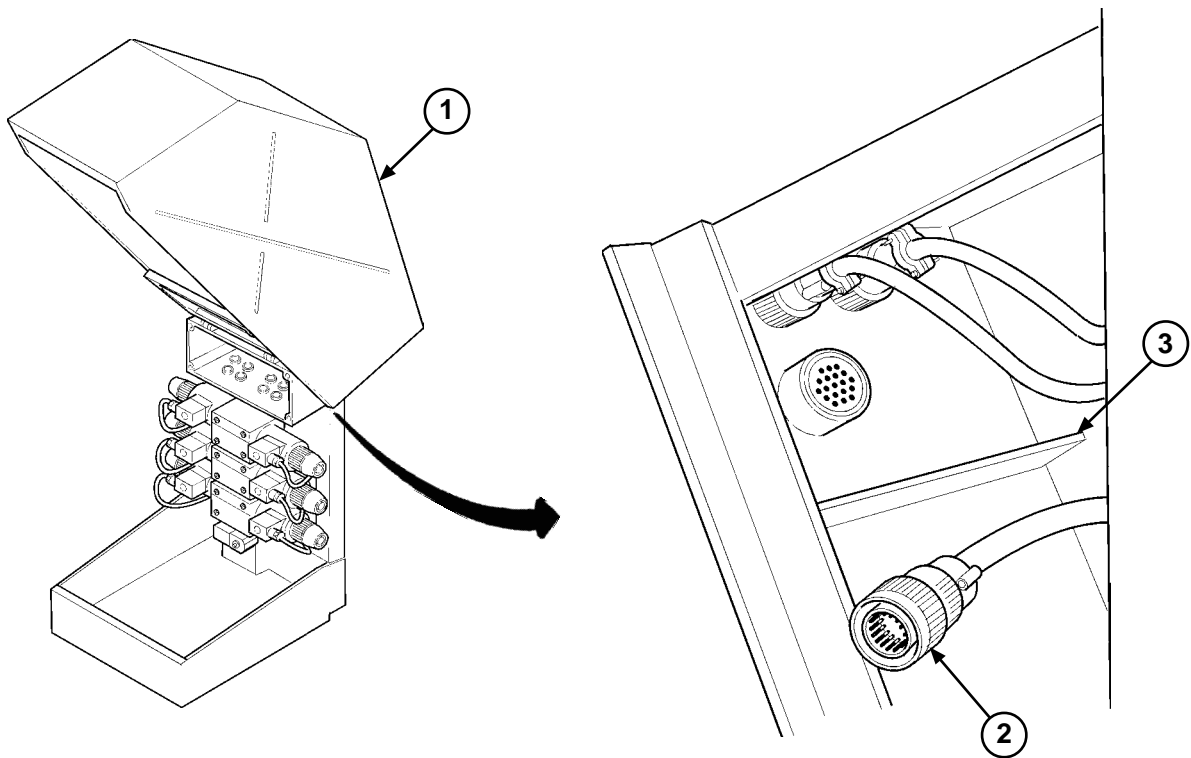
**NOTE**

- 24-pin linking harness is routed the same as the 9-pin linking harness.
- Install cable ties in same locations as noted during removal.

- (1) Route 24-pin cab to junction harness (6) up through vehicle (7) and cab (5).
- (2) Install grommet (4) in cab (5).

**4-69. CAB TO JUNCTION BOX LINKING HARNESS (24-PIN) REPLACEMENT  
(MODEL A ONLY) (continued).**

- (3) Connect connector P4 (2) to junction box (3).
- (4) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

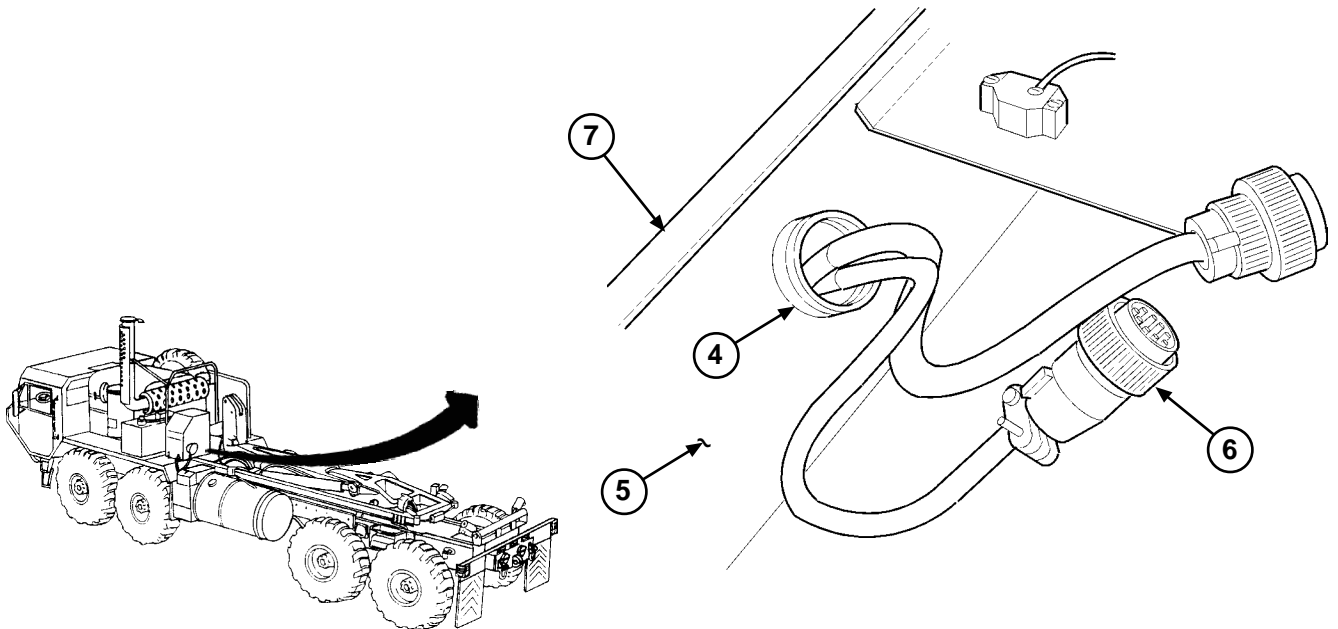
- Install heater compartment covers (TM 9-2320-360-20).
- Install cab control box (para 4-71).

**END OF TASK**



## 4-70. CAB TO JUNCTION BOX LINKING HARNESS (9-PIN) REPLACEMENT (MODEL A ONLY) (continued).

- (3) Remove grommet (4) from cab (5).
- (4) Follow 9-pin cab to junction box harness (6) down through cab (5) and remove cable ties as required.
- (5) Remove 9-pin cab to junction box harness (6) from vehicle (7).



### b. Installation.

#### NOTE

- The 9-pin linking harness is routed the same as the 24-pin linking harness.
- Install cable ties in same locations as noted during removal.

- (1) Route 9-pin cab to junction box harness (6) up through vehicle (7) and cab (5).
- (2) Install grommet (4) in cab (5).
- (3) Connect connector P3 (2) to junction box (3).
- (4) Close hydraulic cabinet cover (1).

### c. Follow-on Maintenance:

- Install heater compartment covers (TM 9-2320-279-20).
- Install cab control box (para 4-71).

**END OF TASK**

**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)  
 Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No.1 (SC 4910-95-CL-A74)  
 Tool Kit, Electrical (7550526)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
 Engine OFF (TM 9-2320-279-10)  
 Disconnect batteries (TM 9-2320-279-10)  
 Digital control box cover removed (para 4-64.1)  
 LHS fully extended (para 2-10)

*Materials/Parts*

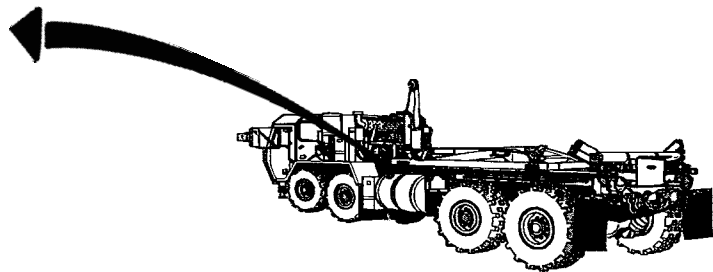
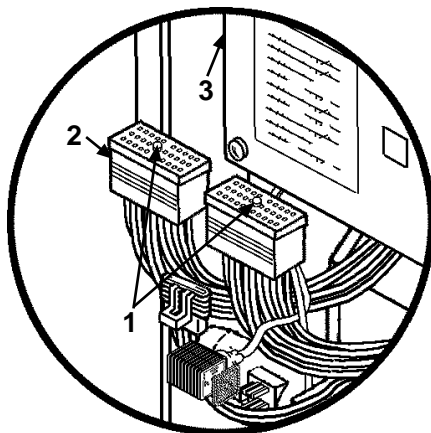
Cable Ties (Item 8, Appendix E)  
 Tag, Identification (as required) (Item 23, Appendix E)  
 Gasket (11) (Item 109), Appendix K)

**a. Removal**

**NOTE**

- Tag and mark all connectors, wires and connection points prior to removal to ensure proper installation.
- Cut cable ties as required
- Note location of cable ties prior to removal to ensure proper installation
- Refer to (para 4-18) for general repair instructions.
- Both 40-pin connectors are removed the same way.

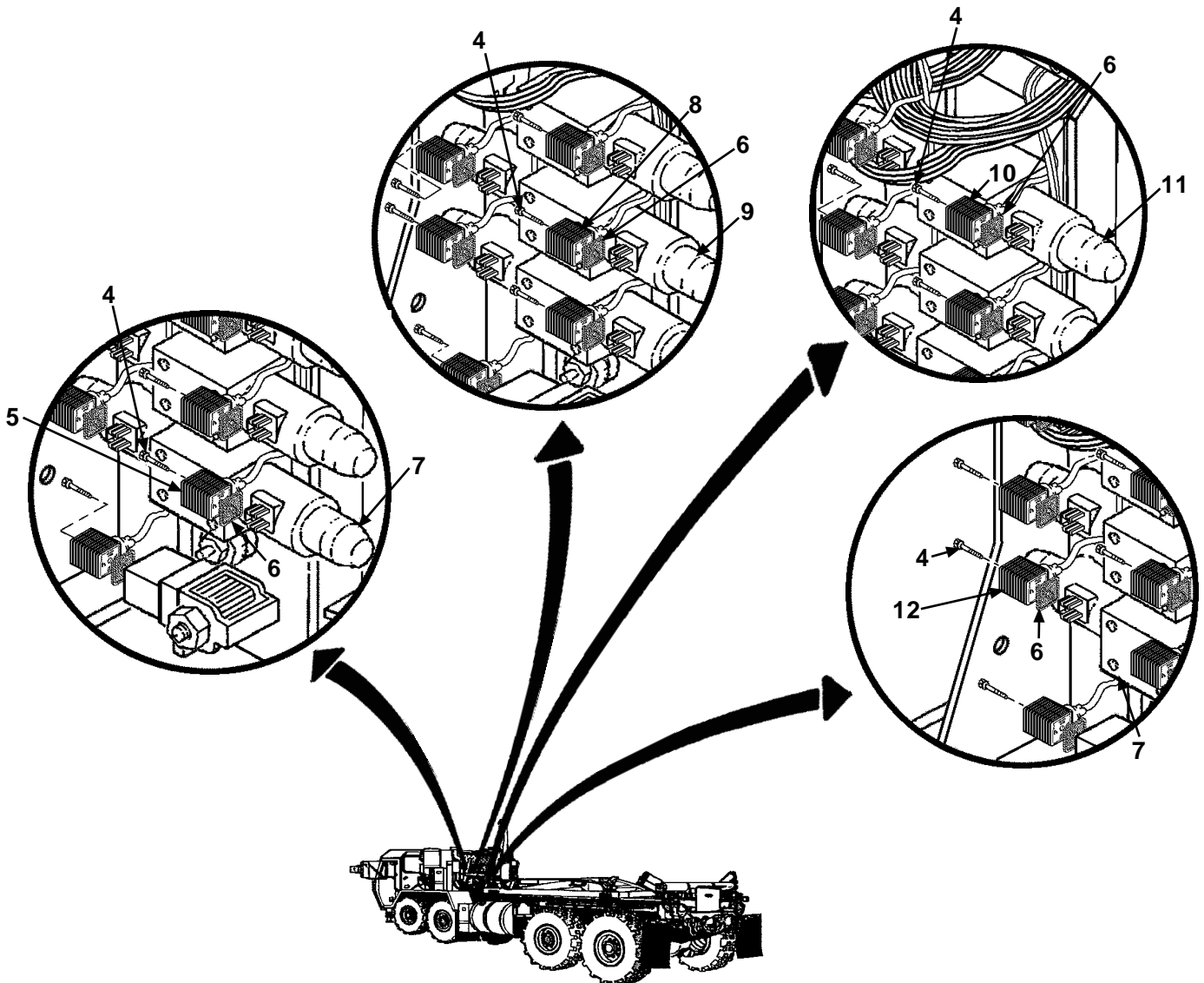
- (1) Loosen allen head screw (1) and remove 40-pin connector (2) from digital control box (3).
- (2) Repeat step (1) for remaining 40-pin connector.





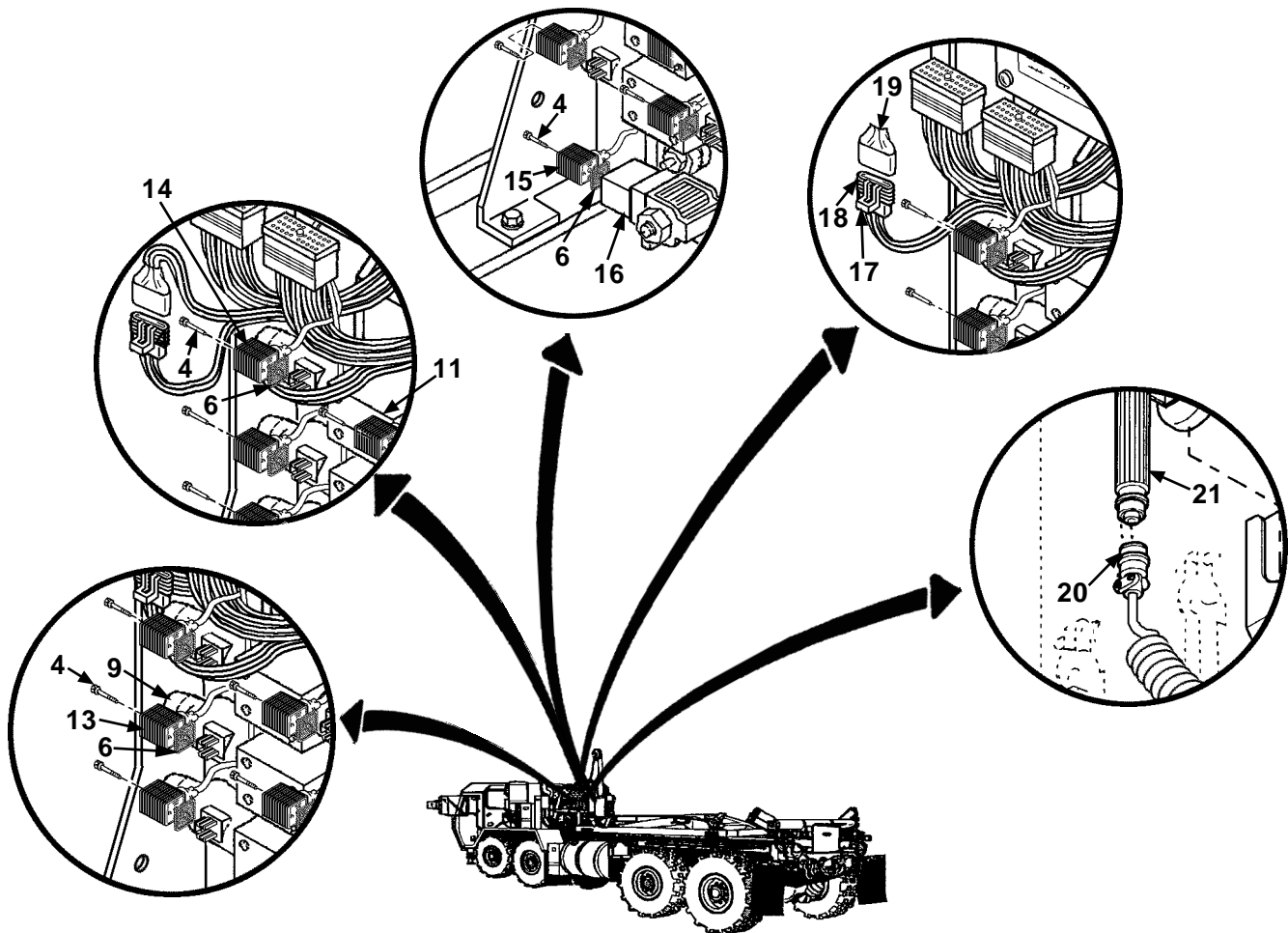
**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

- (3) Remove screw (4), winch in plug (5), and gasket (6) from winch solenoid (7). Discard gasket
- (4) Remove screw (4), hook arm unload plug (8), and gasket (6) from hook arm solenoid (9). Discard gasket.
- (5) Remove screw (4), main frame load plug (10), and gasket (6) from main frame solenoid (11). Discard gasket.
- (6) Remove screw (4), winch out plug (12), and gasket (6) from winch solenoid (7). Discard gasket.



**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

- (7) Remove screw (4), hook arm load plug (13), and gasket (6) from hook arm solenoid (9). Discard gasket.
- (8) Remove screw (4), main frame unload plug (14), and gasket (6) from main frame solenoid (11). Discard gasket.
- (9) Remove screw (4), free flow valve plug (15), and gasket (6) from free flow valve (16). Discard gasket.
- (10) Release thumb clip (17) on resistor connector (18) and remove resistor (19). Set resistor aside for future use.
- (11) Remove hand-held worklight harness (20) from hand-held worklight (21).



## 4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY) (continued).

### NOTE

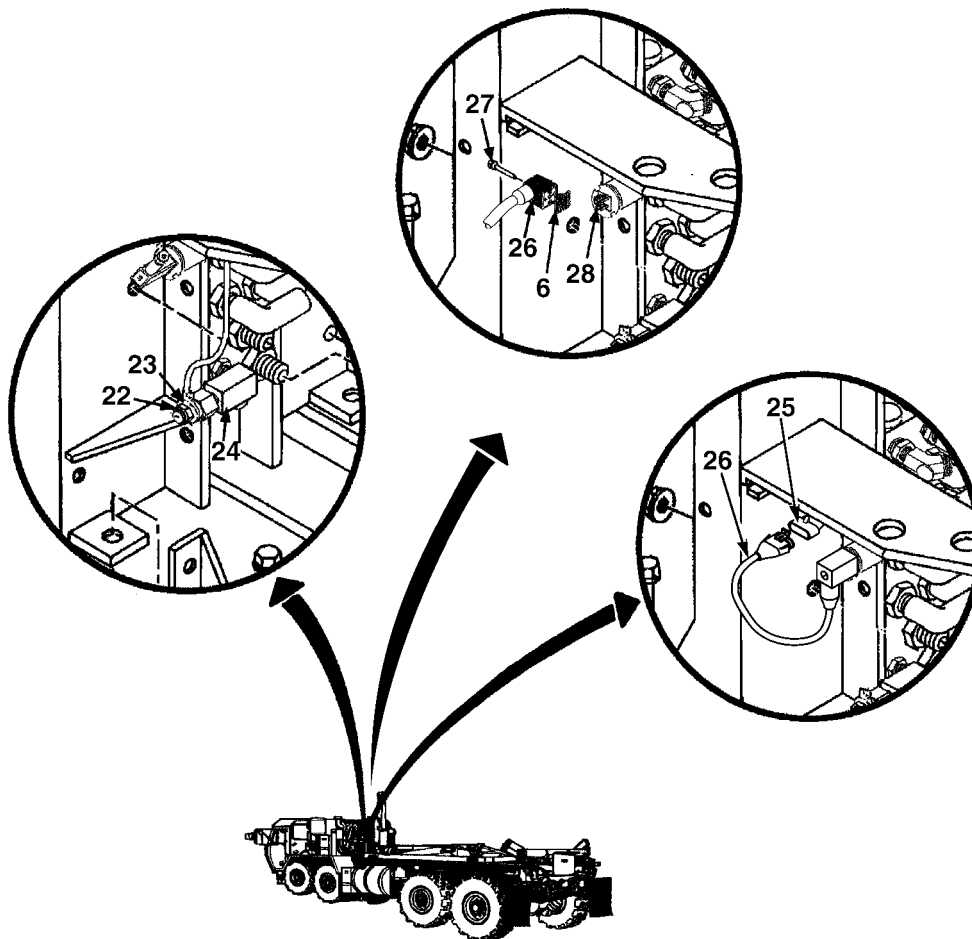
Both hydraulic temperature sensor terminals are removed the same way.

- (12) Remove screw (22) and hydraulic temperature sensor terminal (23) from hydraulic temperature sensor (24).

### NOTE

Both LHS harness plugs are disconnected the same way.

- (13) Disconnect LHS harness plug (25) from transducer harness plug (26).



### NOTE

Both transducer harness plugs are disconnected the same way.

- (14) If necessary, remove screw (27), transducer harness plug (26), and gasket (6) from hydraulic pressure transducer (28).

**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

**NOTE**

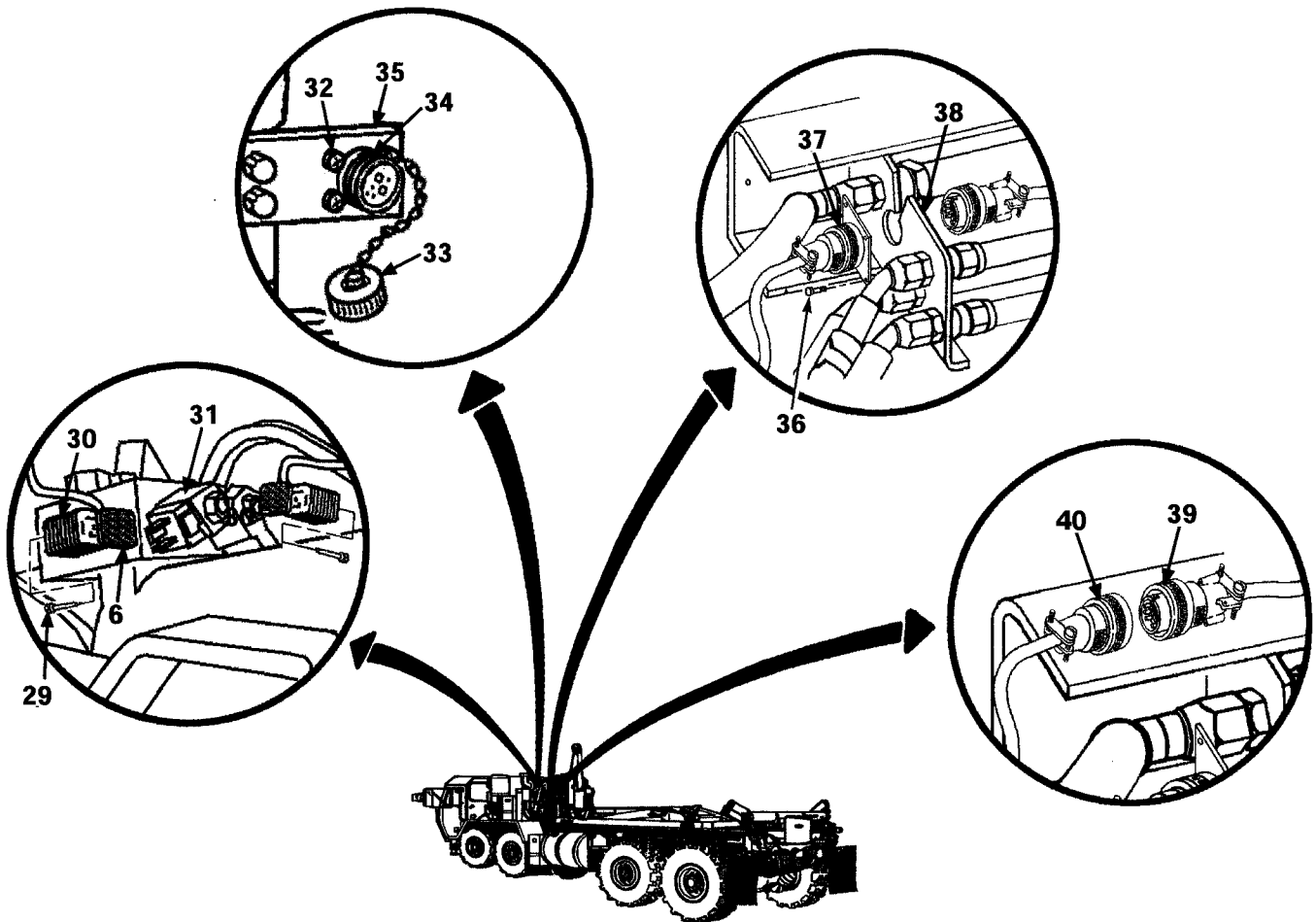
Left and right side transit valve plugs are removed the same way. Left side shown.

- (15) Remove screw (29), transit valve plug (30), and gasket (6) from left side transit valve (31). Discard gasket.
- (16) Repeat step (15) for right side transit valve.

**NOTE**

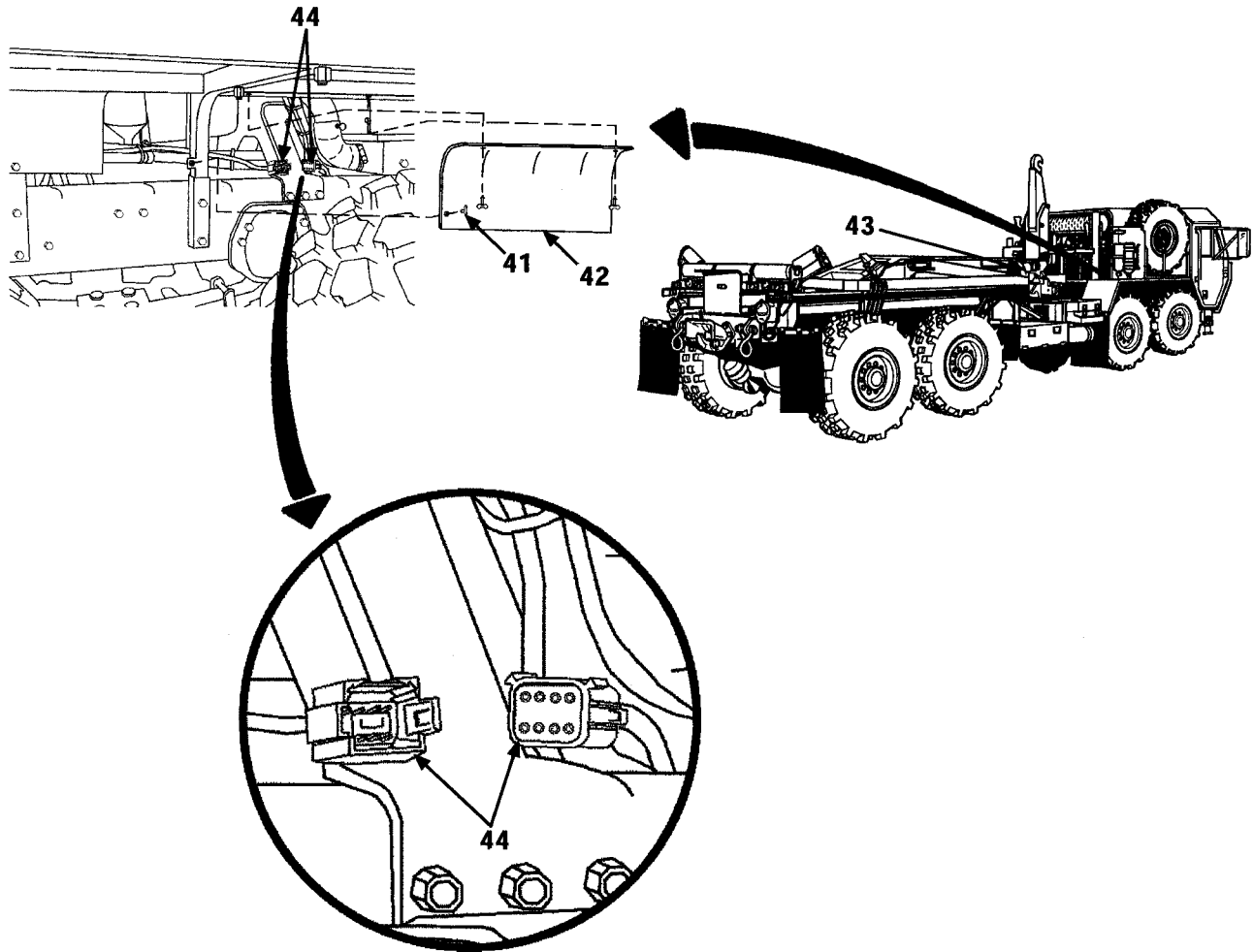
Left and right side remote control connectors are removed the same way. Left side shown.

- (17) Remove four screws (32), protective cap (33), and left side remote control connector (34) from bracket (35).
- (18) Repeat step (17) for right side remote control connector.
- (19) Remove four screws (36) and LHS bulkhead connector (37) from bulkhead plate (38).
- (20) Remove worklight connector (39) from stationary worklight harness (40).



**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

(21) Loosen three thumb screws (41) and remove access panel (42) from vehicle (43). Disconnect cab interface plug ends (44).



(22) Remove digital controller wiring harness from vehicle (43).

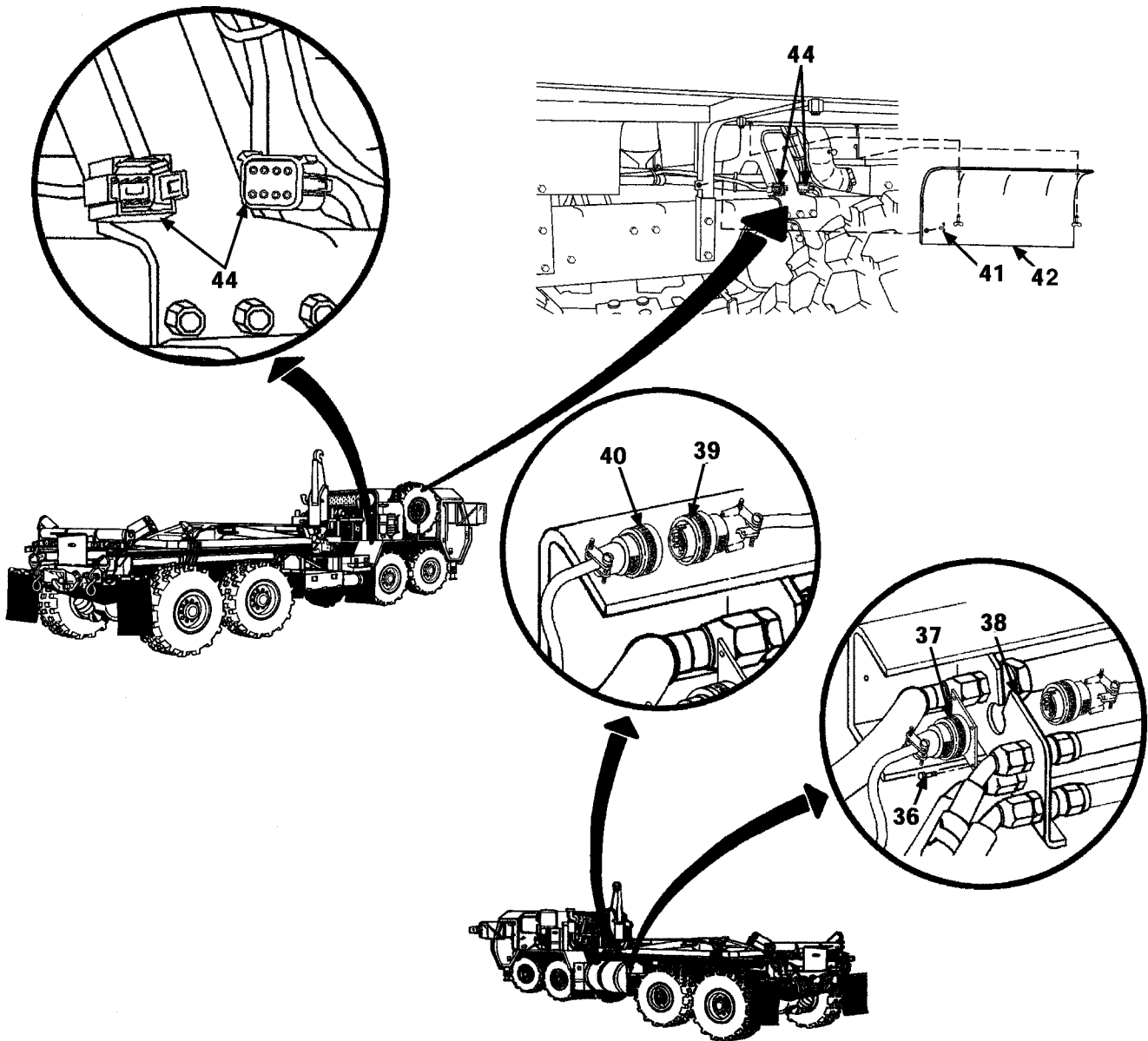
**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

**b. Installation.**

**NOTE**

Install cable ties as needed.

- (1) Connect cab interface plug ends (44). Position access panel (42) onto vehicle (43) and secure with three thumb screws (41).
- (2) Connect worklight connector (39) to stationary worklight harness (40).
- (3) Position LHS bulkhead connector (37) onto bulkhead plate (38) and secure with four screws (36).



**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).****NOTE**

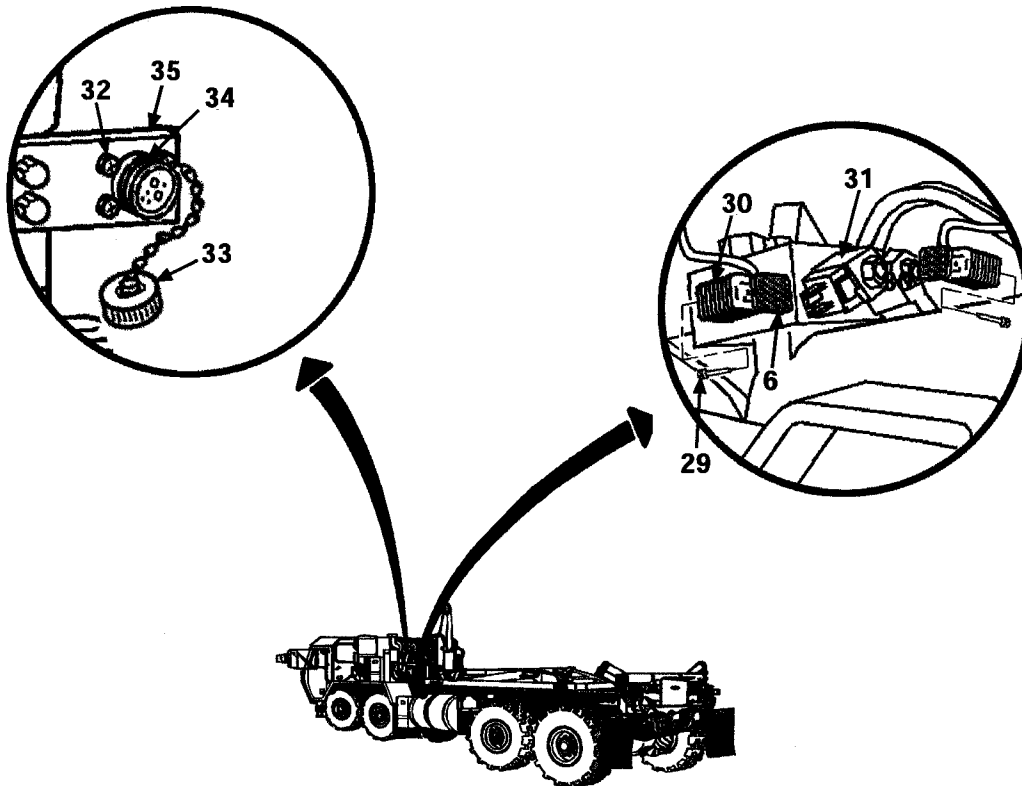
Left and right side remote control connectors are installed the same way. Left side shown.

- (4) Position left side remote control connector (34) onto bracket (35). Replace protective cap (33) and secure with four screws (32).
- (5) Repeat step (4) for right side remote control connector.

**NOTE**

Left and right side transit valve plugs are installed the same way. Left side shown.

- (6) Install transit valve plug (30) and new gasket (6) onto left side transit valve (31). Secure with screw (29).
- (7) Repeat step (6) for right side transit valve.



**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

**NOTE**

Both transducer harness plugs are connected the same way.

- (7.1) If removed, install gasket (6), transducer harness plug (26), and screw (27) to hydraulic pressure transducer (28).

**NOTE**

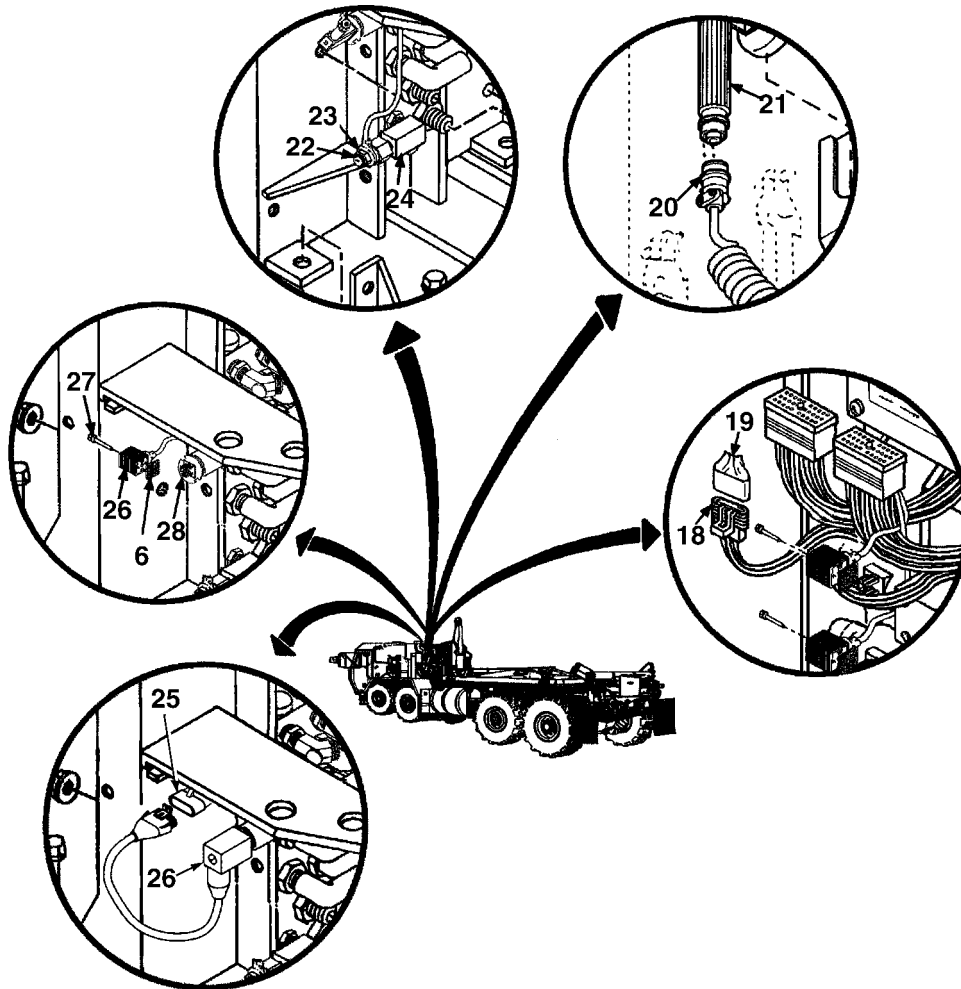
Both LHS harness plugs are connected the same way.

- (8) Connect LHS harness plug (25) to transducer harness plug (26).

**NOTE**

Both hydraulic temperature sensor terminals are installed the same way.

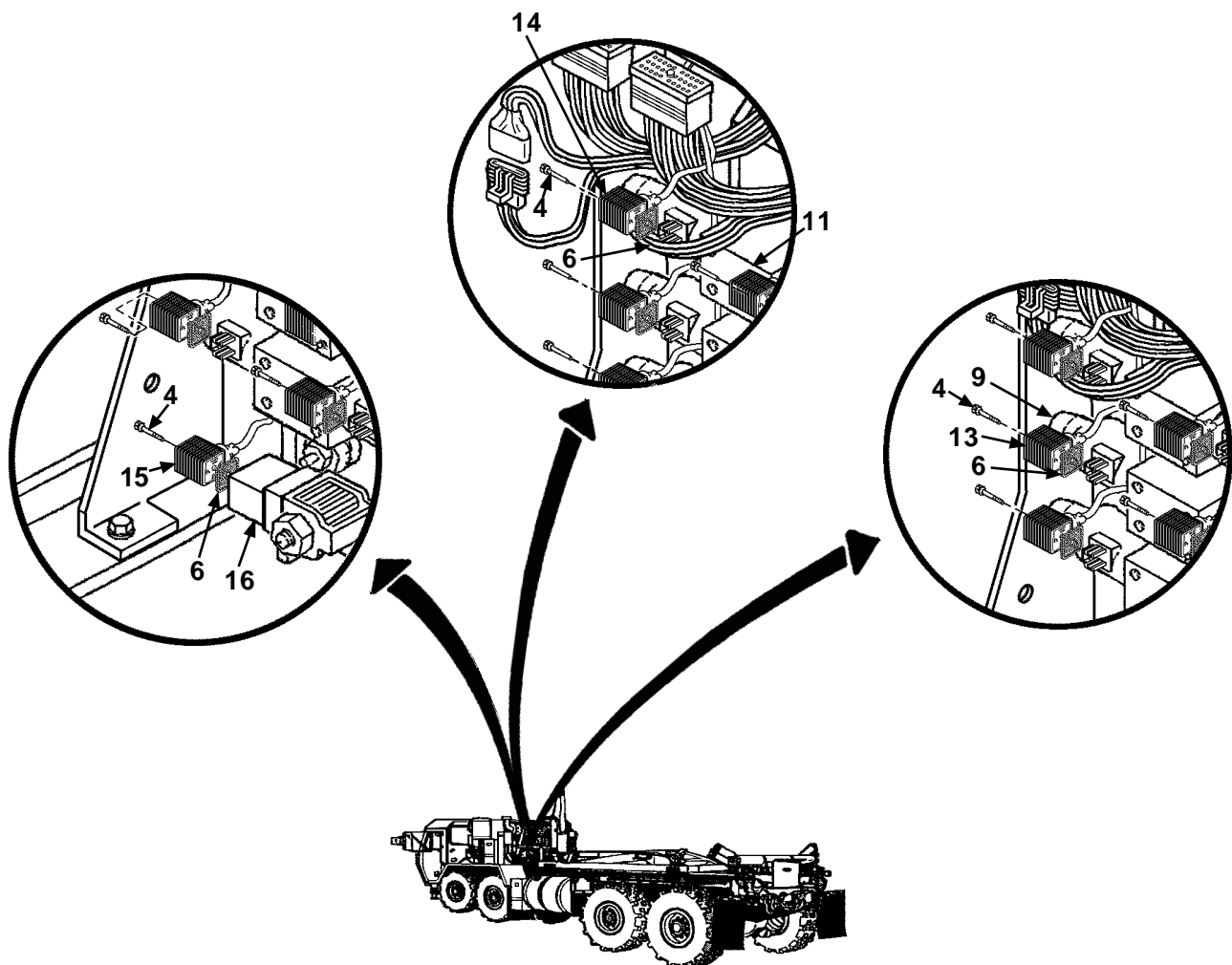
- (9) Install hydraulic temperature sensor terminal (23) onto hydraulic temperature sensor (24) and secure with screw (22).
- (10) Install hand held worklight harness (20) onto hand-held worklight (21).
- (11) Install resistor (19) onto resistor connector (18).





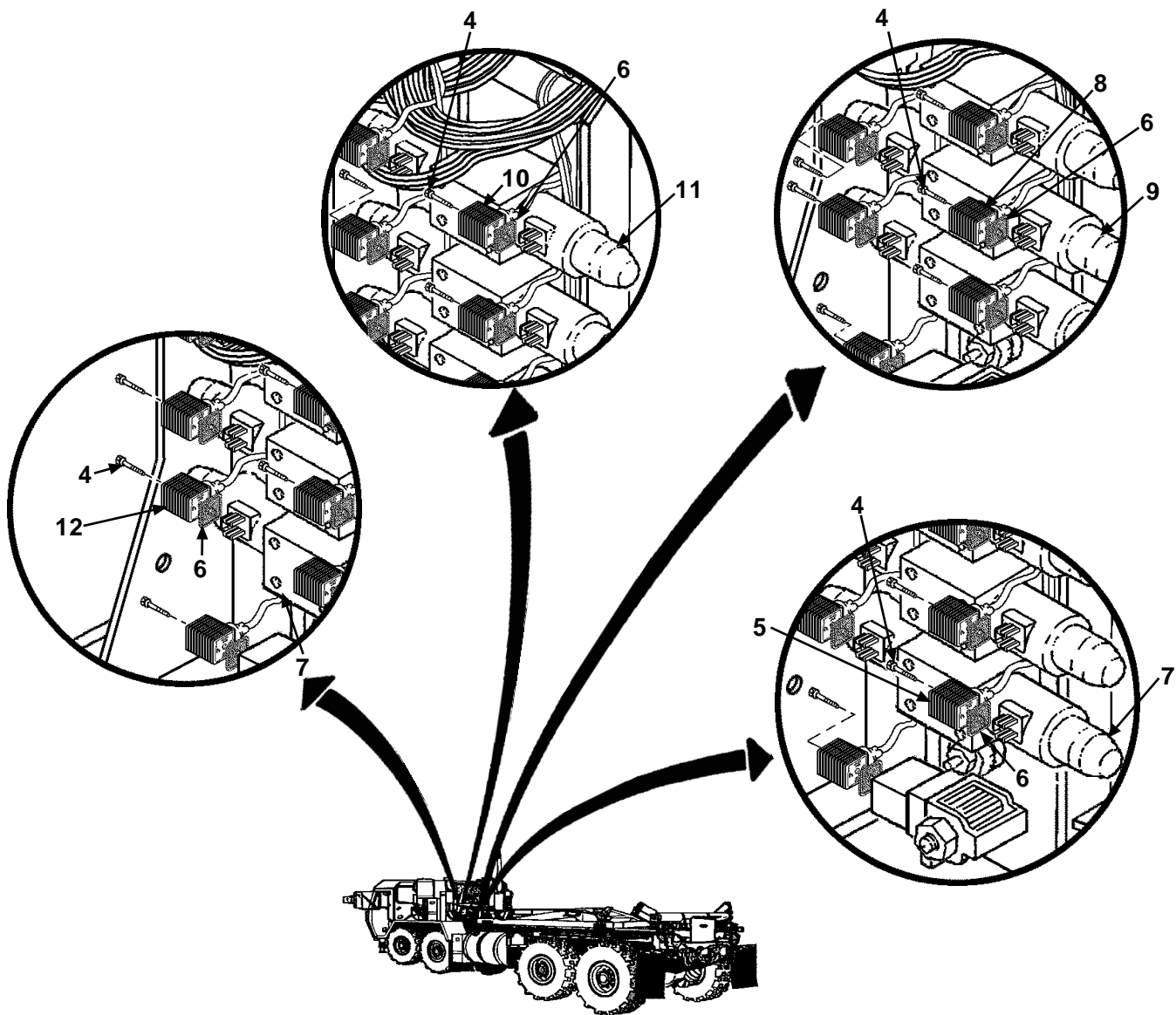
**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

- (12) Install free flow valve plug (15) and new gasket (6) onto free flow valve (16). Secure with screw (4).
- (13) Install main frame unload plug (14) and new gasket (6) onto main frame solenoid (11). Secure with screw (4).
- (14) Install hook arm load plug (13) and new gasket (6) onto hook arm solenoid (9). Secure with screw (4).



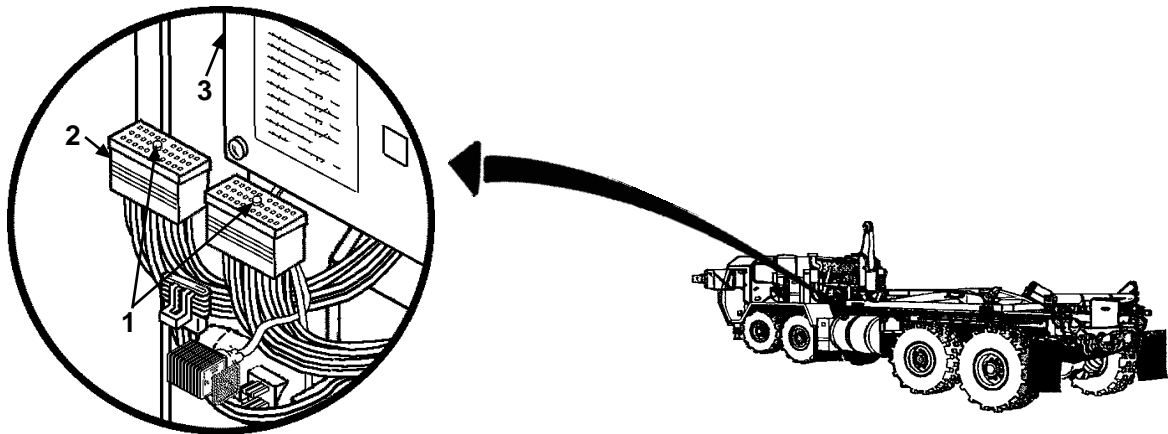
**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

- (15) Install winch out plug (12) and new gasket (6) onto winch solenoid (7). Secure with screw (4).
- (16) Install main frame load plug (10) and new gasket (6) onto main frame solenoid (11). Secure with screw (4).
- (17) Install hook arm unload plug (8) and new gasket (6) onto hook arm solenoid (9). Secure with screw (4).
- (18) Install winch in plug (5) and new gasket (6) onto winch soleoid (7). Secure with scew (4).



**4-70.1 DIGITAL CONTROLLER WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

- (19) Install 40-pin connector (2) onto digital control box (3) and secure with allen head screw (1).
- (20) Repeat step 19 for remaining 40-pin connector.

**c. Follow-on Maintenance:**

- Fully retract LHS (para 2-10).
- Digital control box cover replaced (para 4-64.1).
- Connect batteries (TM 9-2320-279-10).
- Remove wheel chocks (TM 9-2320-279-10).

## 4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY).

This task covers:

- |                |                 |                          |
|----------------|-----------------|--------------------------|
| a. Removal     | c. Assembly     | e. Follow-on Maintenance |
| b. Disassembly | d. Installation |                          |

### INITIAL SETUP

#### *Tools and Special Tools*

Soldering Gun (D550-3)  
 Tool Kit, Electrical (7550526)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

Gasket (Item 60, Appendix K)  
 Gasket (2) (Item 61, Appendix K)  
 Locknut (4) (Item 106, Appendix K)  
 Lockwasher (8) (Item 27, Appendix K)  
 Lockwasher (4) (Item 28, Appendix K)  
 Lockwasher (8) (Item 30, Appendix K)

#### *Materials/Parts*

Adhesive, Gasket (Item 2, Appendix E)  
 Cable Ties (Item 8, Appendix E)  
 Tag, Identification (as required) (Item 23, Appendix E)

#### *Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

### a. Removal.

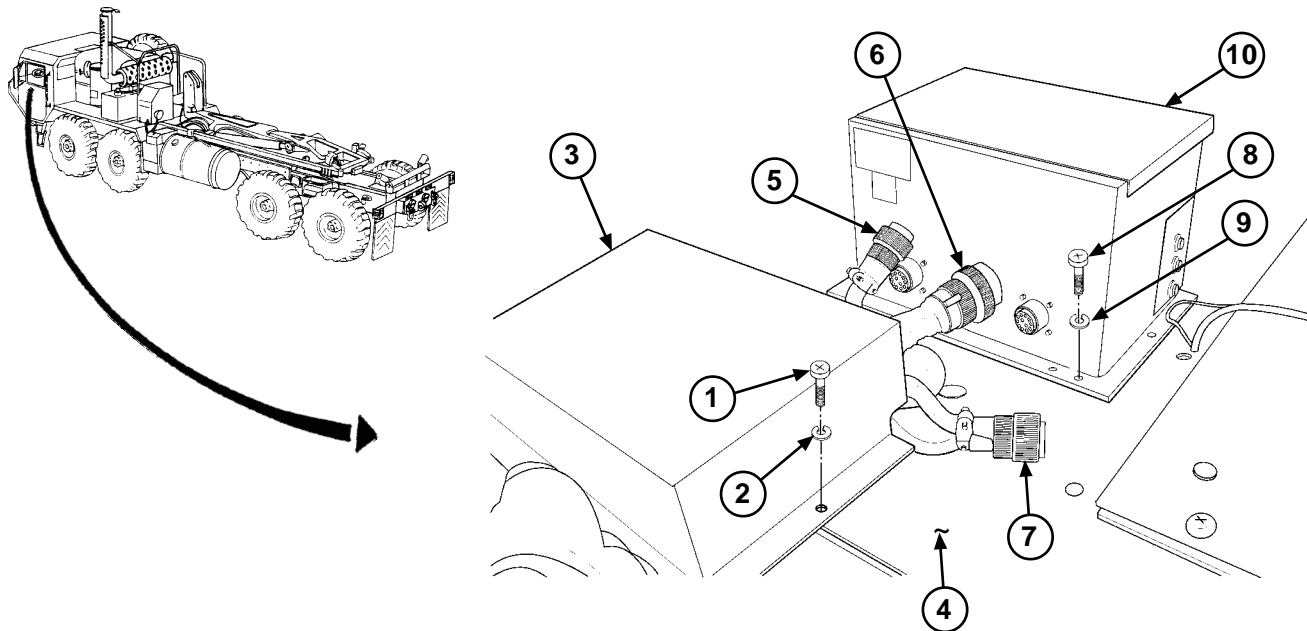
- (1) Remove four screws (1), lockwashers (2) and cover (3) from vehicle (4). Discard lockwashers.

#### NOTE

Tag and mark connectors prior to removal.

- (2) Disconnect three connectors (5, 6, and 7).

- (3) Remove four screws (8), lockwashers (9) and cab control box (10) from vehicle (4). Discard lockwashers.



## 4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).

### b. Disassembly.

#### CAUTION

Use care when removing cab control box from plate. Cab control box is connected to plate with wires. Failure to comply may result in damage to equipment.

- (1) Remove six screws (11) and cab control box (10) from plate (12).

#### NOTE

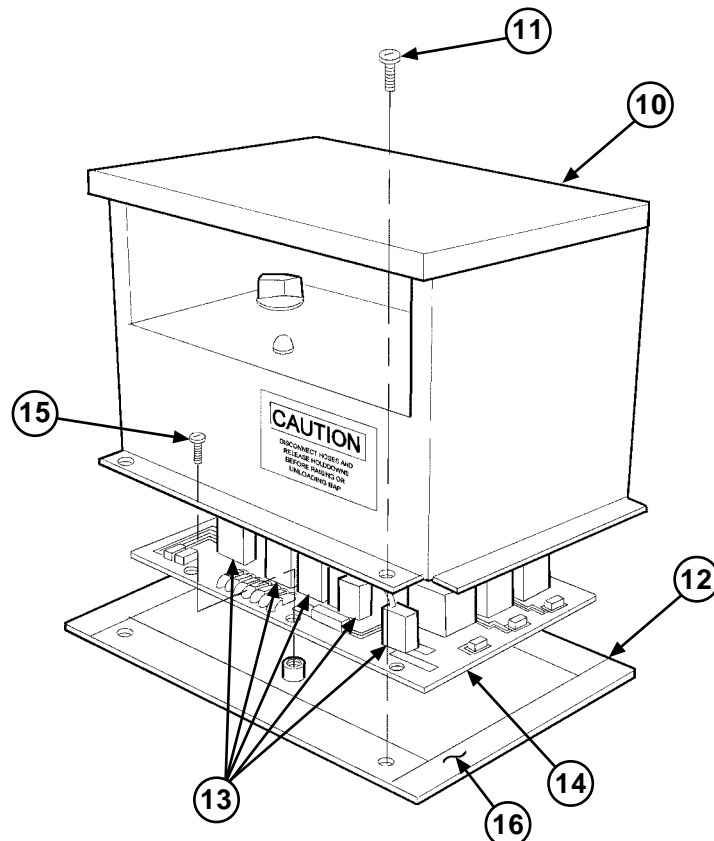
Tag and mark all wires, connectors, terminals, circuit breakers and switches prior to removal.

- (2) Disconnect six connectors (13) from circuit board (14).
- (3) Remove six screws (15) and circuit board (14) from plate (12).

#### NOTE

Perform Step 4 only if damaged.

- (4) Remove gasket (16) from plate (12).



**4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).**

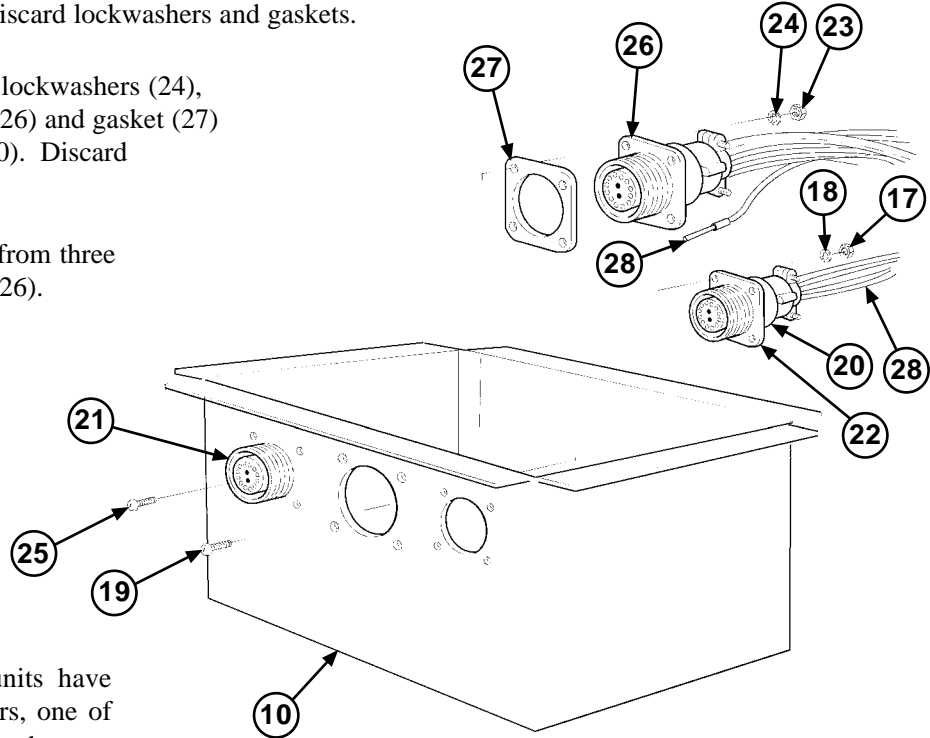
**NOTE**

Cut cable ties as required.

- (5) Remove eight nuts (17), lockwashers (18), screws (19), two connectors (20 and 21) and gaskets (22) from cab control box (10). Discard lockwashers and gaskets.

- (6) Remove four nuts (23), lockwashers (24), screws (25), connector (26) and gasket (27) from cab control box (10). Discard lockwashers and gasket.

- (7) Remove terminals (28) from three connectors (20, 21, and 26).

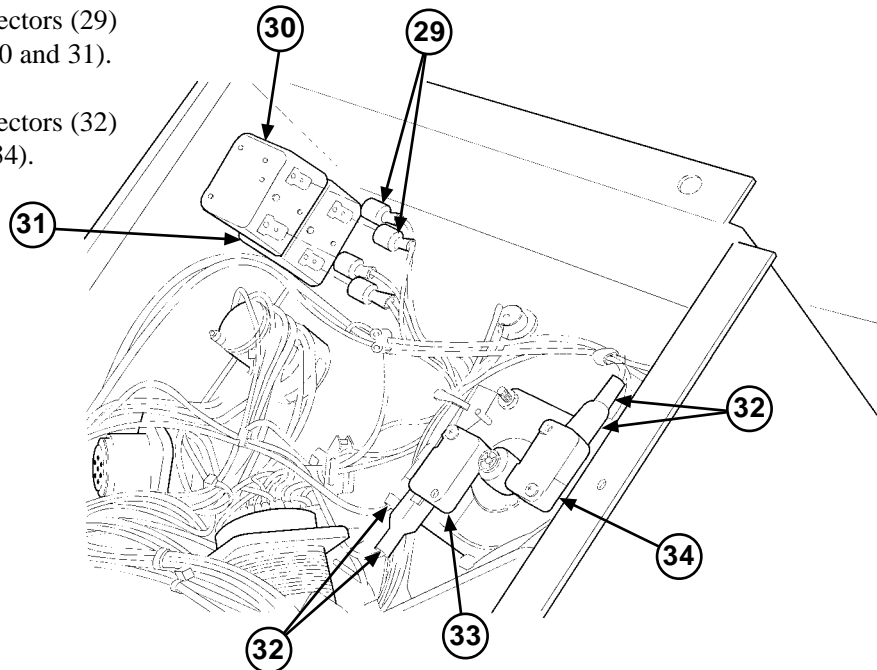


**NOTE**

Early production units have three circuit breakers, one of which is not connected.

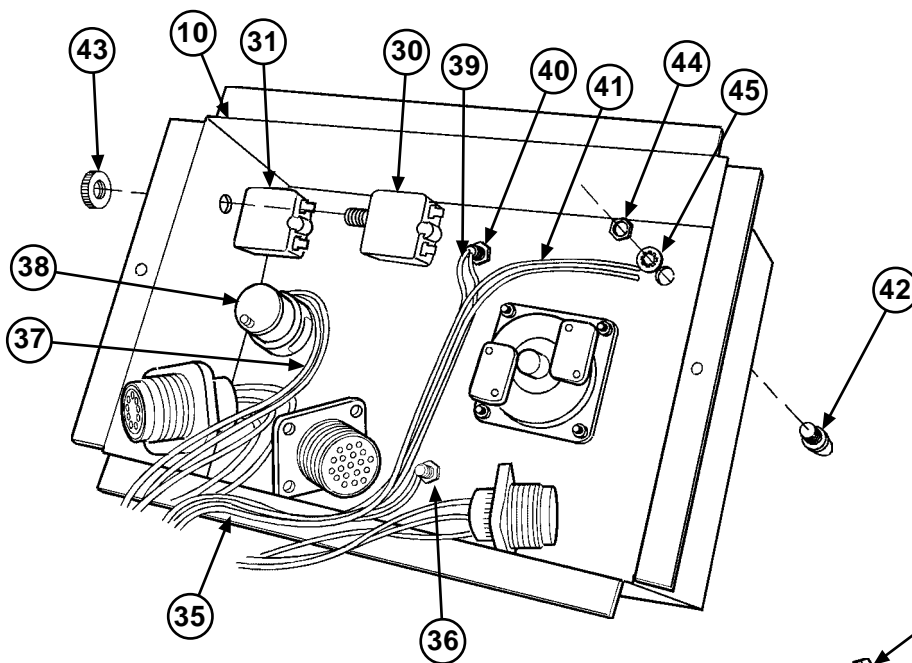
- (8) Disconnect four spade connectors (29) from two circuit breakers (30 and 31).

- (9) Disconnect four spade connectors (32) from two switches (33 and 34).



**4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).**

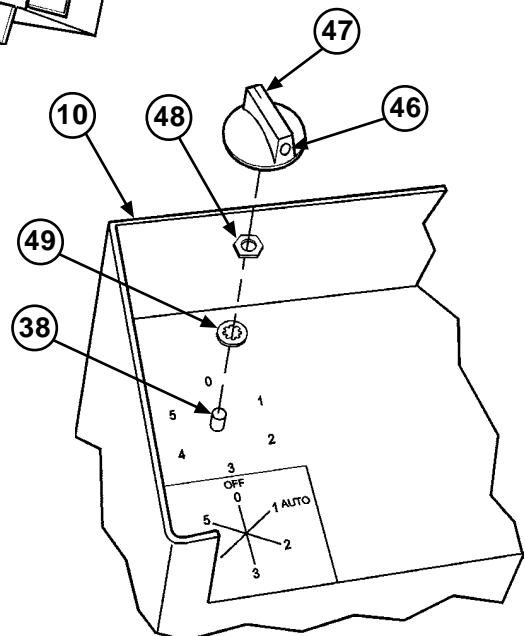
- (10) Unsolder wires (35) from indicator light (36).
- (11) Unsolder wires (37) from rotary switch (38).
- (12) Unsolder wires (39) from indicator light (40).
- (13) Unsolder wires (41) from indicator light (42).
- (14) Remove two nuts (43) and circuit breakers (30 and 31) from cab control box (10).
- (15) Remove three nuts (44), lockwashers (45) and indicator lights (36, 40, and 42) from cab control box (10).



**NOTE**

Rotary switch must be match marked to ensure proper orientation during assembly. Failure to comply will result in incorrect LHS functions for switch position.

- (16) Matchmark rotary switch (38) to cab control box (10).
- (17) Loosen screw (46) and remove knob (47) from rotary switch (38).
- (18) Remove nut (48), lockwasher (49) and rotary switch (38) from cab control box (10).



**4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).**

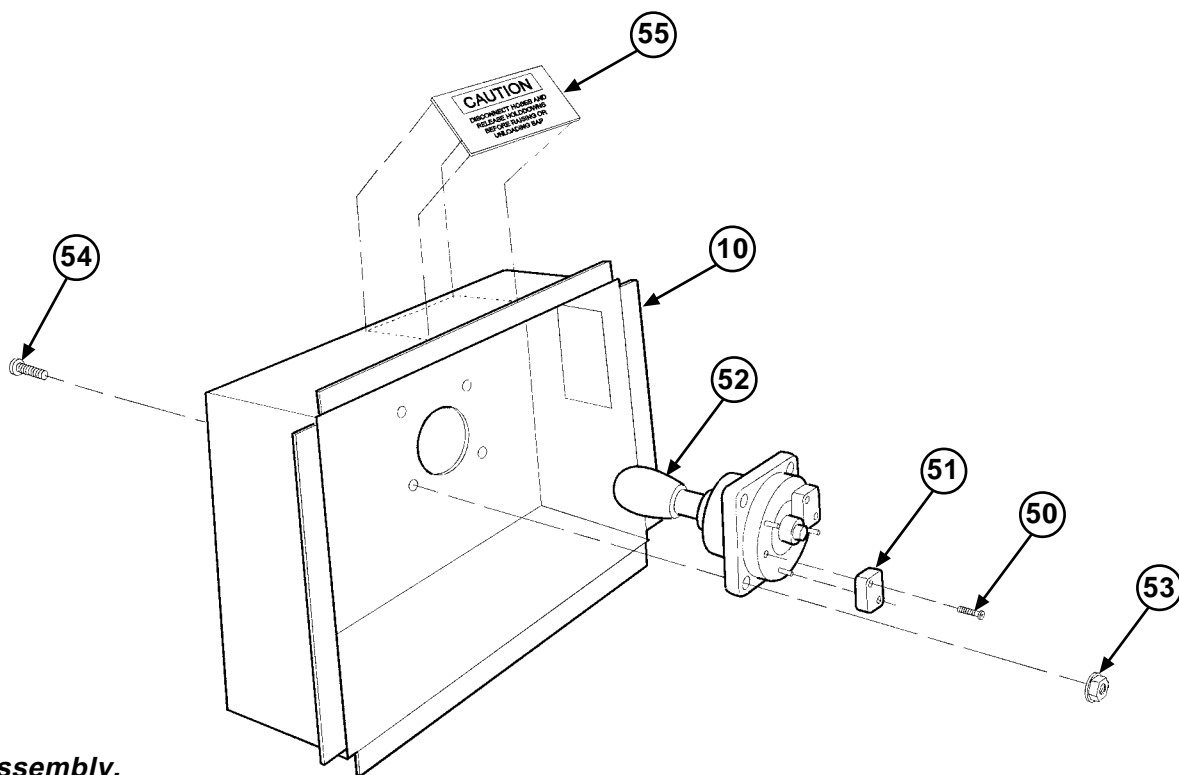
(19) Remove two screws (50) and switches (51) from joystick (52).

(20) Remove four locknuts (53), screws (54) and joystick (52) from cab control box (10). Discard locknuts.

**NOTE**

Perform Step 21 only if damaged.

(21) Remove and discard four decals (55) from cab control box (10).



**c. Assembly.**

**NOTE**

Perform Step 1 only if decals were removed during removal.

(1) Install four decals (55) on cab control box (10).

**NOTE**

When properly installed, joystick should move side to side.

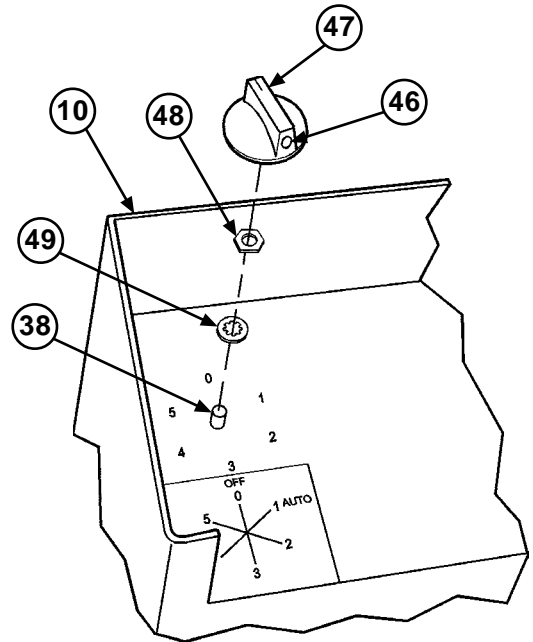
(2) Install joystick (52) in cab control box (10) with four screws (54) and new locknuts (53).

(3) Install two switches (51) on joystick (52) with two screws (50).

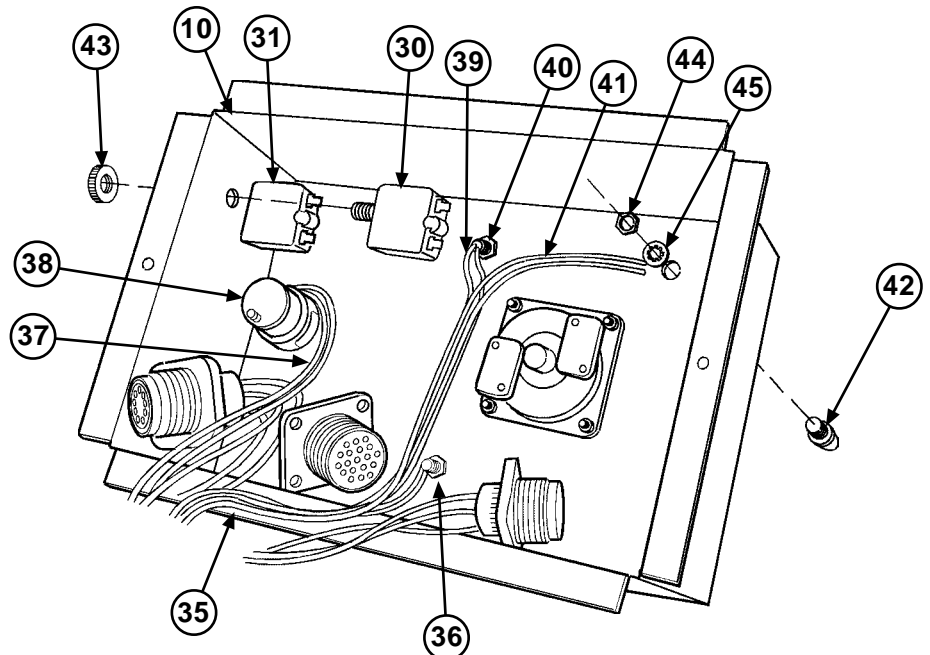


**4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).**

- (4) Align matchmarks on rotary switch (38) and install in cab control box (10) with lockwasher (49) and nut (48).
- (5) Install knob (47) on rotary switch (38) and tighten screw (46).



- (6) Install three indicator lights (36, 40, and 42) in cab control box (10) with three lockwashers (45) and nuts (44).
- (7) Install two circuit breakers (30 and 31) in cab control box (10) with three nuts (43).
- (8) Solder wires (41) on indicator light (42).
- (9) Solder wires (39) on indicator light (40).
- (10) Solder wires (37) on rotary switch (38).
- (11) Solder wires (35) on indicator light (36).

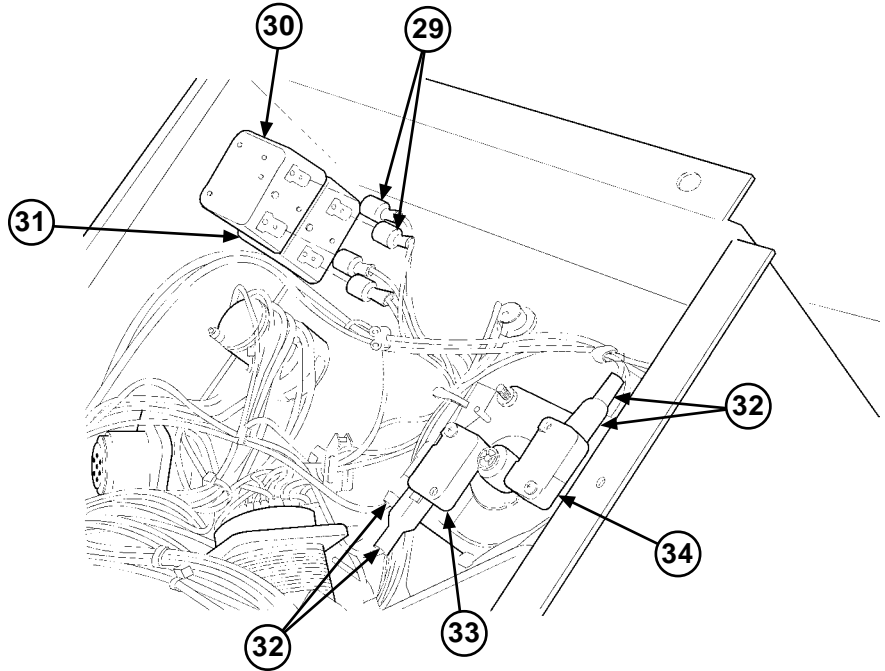


**4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).**

**NOTE**

The "NC" switch terminals are not used.

- (12) Connect four spade connectors (32) to two switches (33 and 34).
- (13) Connect four spade connectors (29) to two circuit breakers (30 and 31).



- (14) Install terminals (28) in three connectors (20, 21, and 26).

**NOTE**

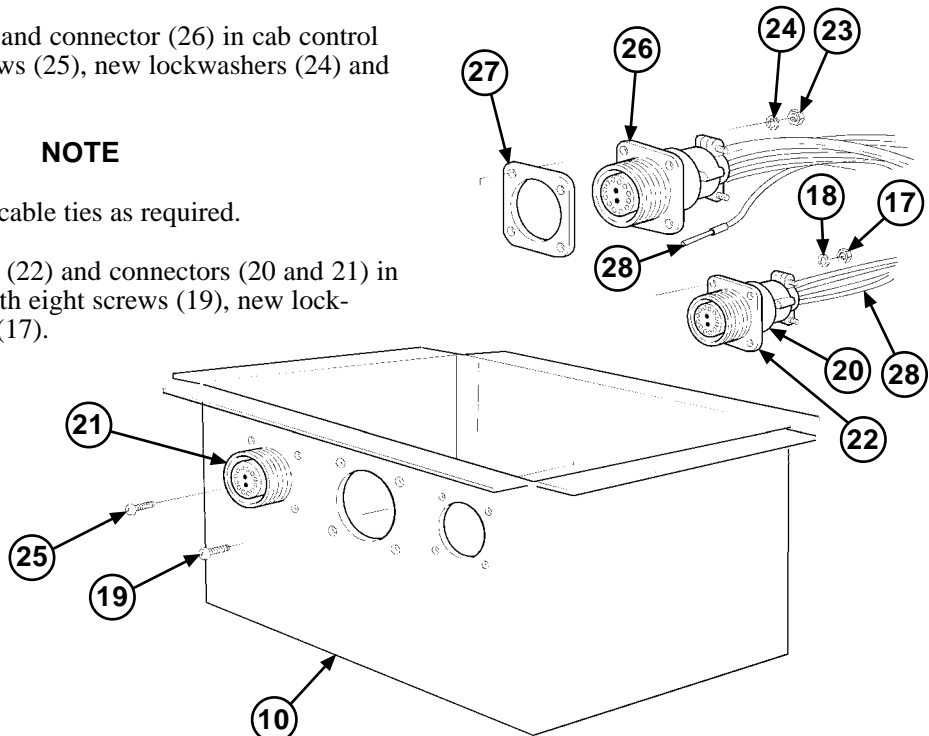
Connectors should be installed with notch facing top of control box.

- (15) Install new gasket (27) and connector (26) in cab control box (10) with four screws (25), new lockwashers (24) and nuts (23).

**NOTE**

Install cable ties as required.

- (16) Install two new gaskets (22) and connectors (20 and 21) in cab control box (10) with eight screws (19), new lockwashers (18), and nuts (17).

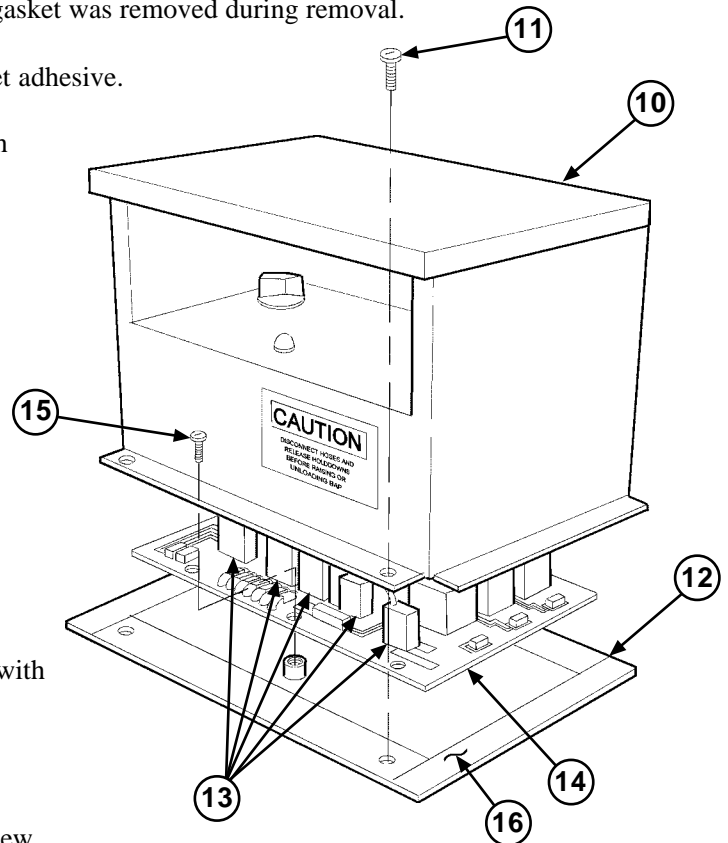


**4-71. CAB CONTROL BOX ASSEMBLY REPAIR (MODEL A ONLY) (continued).**

**NOTE**

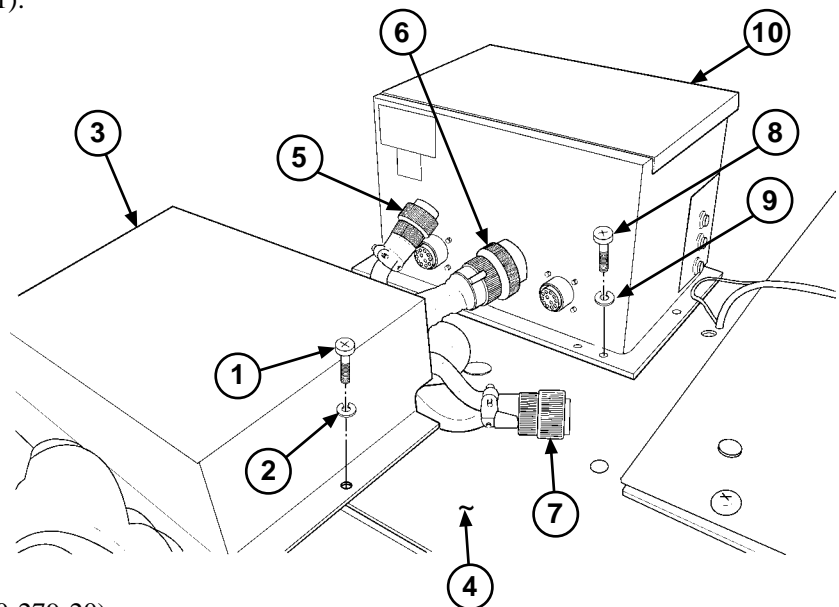
Perform Step 17 only if gasket was removed during removal.

- (17) Install gasket (16) on plate (12) with gasket adhesive.
- (18) Install circuit board (14) on plate (12) with six screws (15).
- (19) Connect six connectors (13) on circuit board (14).
- (20) Install cab control box (10) on plate (12) with six screws (11).



**d. Installation.**

- (1) Install cab control box (10) in vehicle (4) with four new lockwashers (9) and screws (8).
- (2) Connect three connectors (5), (6) and (7).
- (3) Install cover (3) on vehicle (4) with four new lockwashers (2) and screws (1).



**e. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

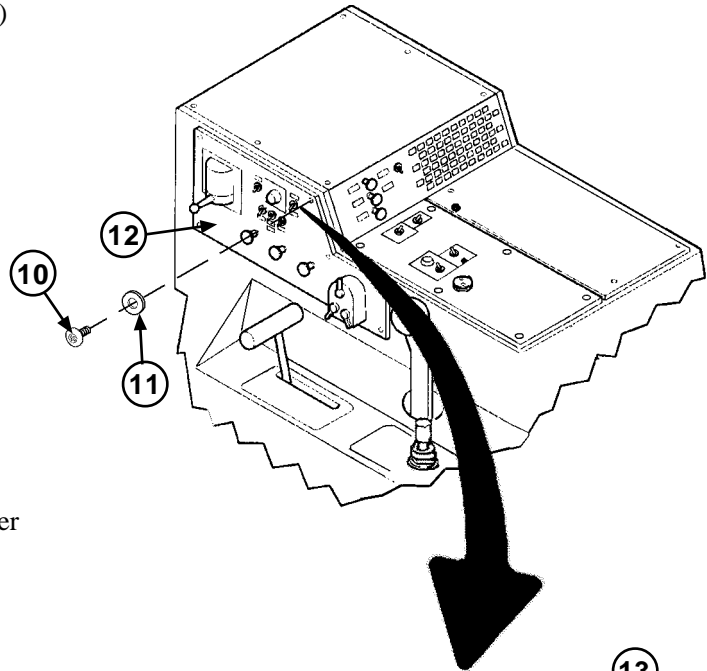
**END OF TASK**



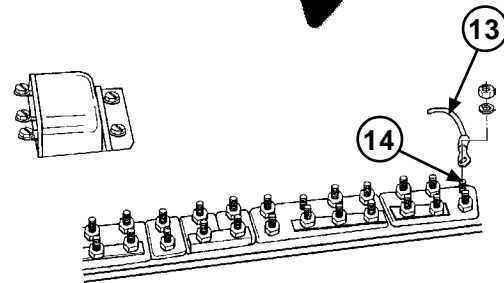


**4-71.2 CAB INTERFACE WIRING HARNESS REPLACEMENT (MODEL B ONLY)  
(continued).**

- (5) Remove eight screws (10) and washers (11) from heater compartment side panel (12).

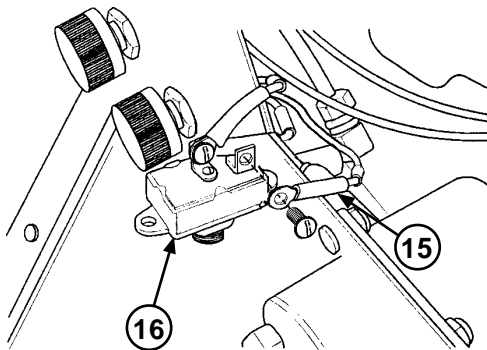


- (6) Remove wire 1680 (13) from circuit breaker one (14).
- (7) Remove wire 1040 (15) from work light switch (16).
- (8) Remove cab interface wiring harness from vehicle.



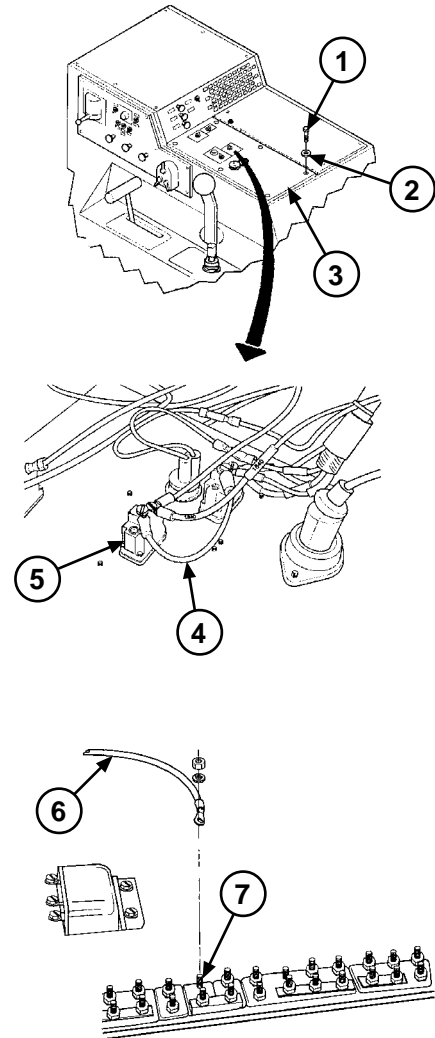
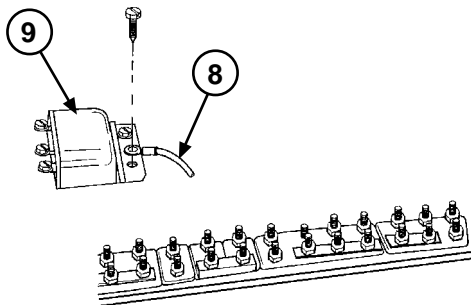
**b. Installation.**

- (1) Install wire 1040 (15) onto worklight switch (16).



## 4-71.2 CAB INTERFACE WIRING HARNESS REPLACEMENT (MODEL B ONLY) (continued).

- (2) Install wire 1680 (13) onto circuit breaker one (14).
- (3) Position heater compartment side panel (12) and secure with eight screws (10) and washers (11).
- (4) Install ground wire 1435 (8) onto relay switch ground (9).
- (5) Install wire 1473 (6) onto circuit breaker nine (7).
- (6) Install wire 1843 (4) onto high idle switch (5).
- (7) Position heater compartment top panel (3) and secure with six screws (1) and washers (2).



### c. Follow-on Maintenance:

- Connect cab interface harness to main LHS wiring harness (para 4-70.1).
- Install cab control box (para 4-71.1).
- Connect batteries (TM 9-2320-279-20).

**4-72. INDICATOR LIGHT REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

**a. Removal.**

**NOTE**

- There are three indicator lights in the cab control box. All three lights are removed the same way.
- Bulb may or may not be removed with cover.

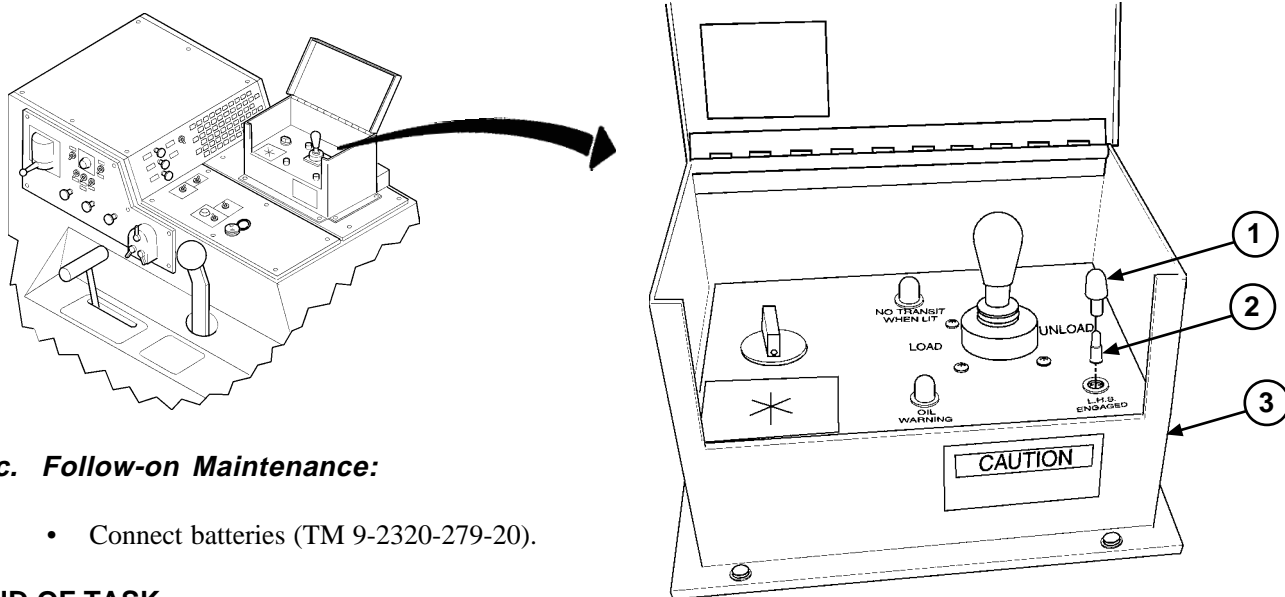
Remove cover (1) and bulb (2) from cab control box (3).

**b. Installation.**

**NOTE**

All three indicator lights are installed the same way.

Position bulb (2) in cover (1) and install cover (1) in cab control box (3).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**



**4-73. REMOTE CONTROL UNIT REPAIR.**

This task covers:

- a. Disassembly
- b. Cleaning and Inspection
- c. Assembly
- d. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

- Soldering Gun (D550-3)
- Tool Kit, Electrical (7550526)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Materials/Parts*

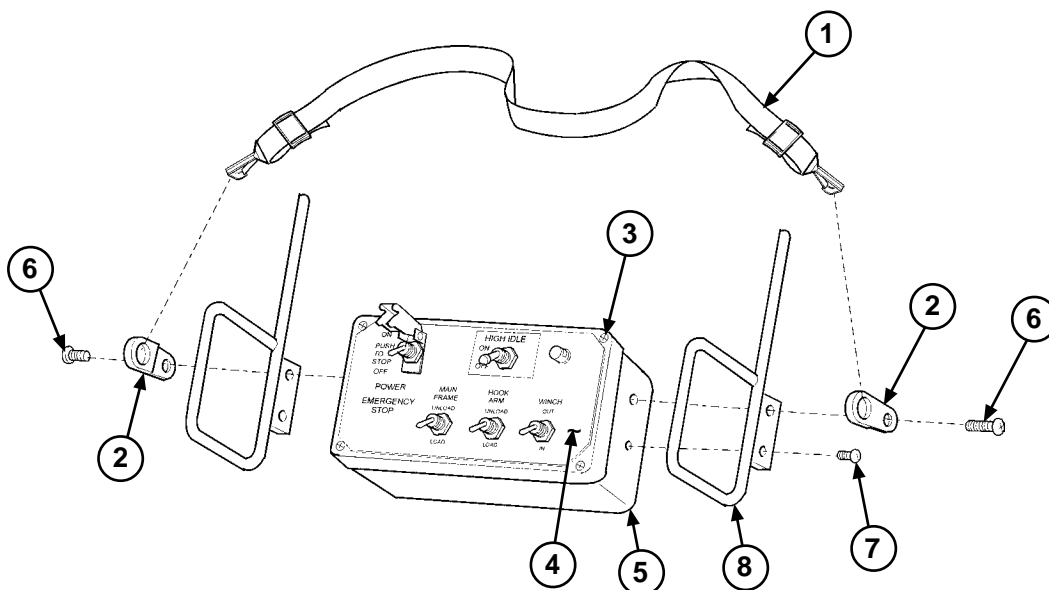
- Gasket (Item 60, Appendix K)
- Lockwasher (4) (Item 27, Appendix K)

**a. Disassembly.**

**NOTE**

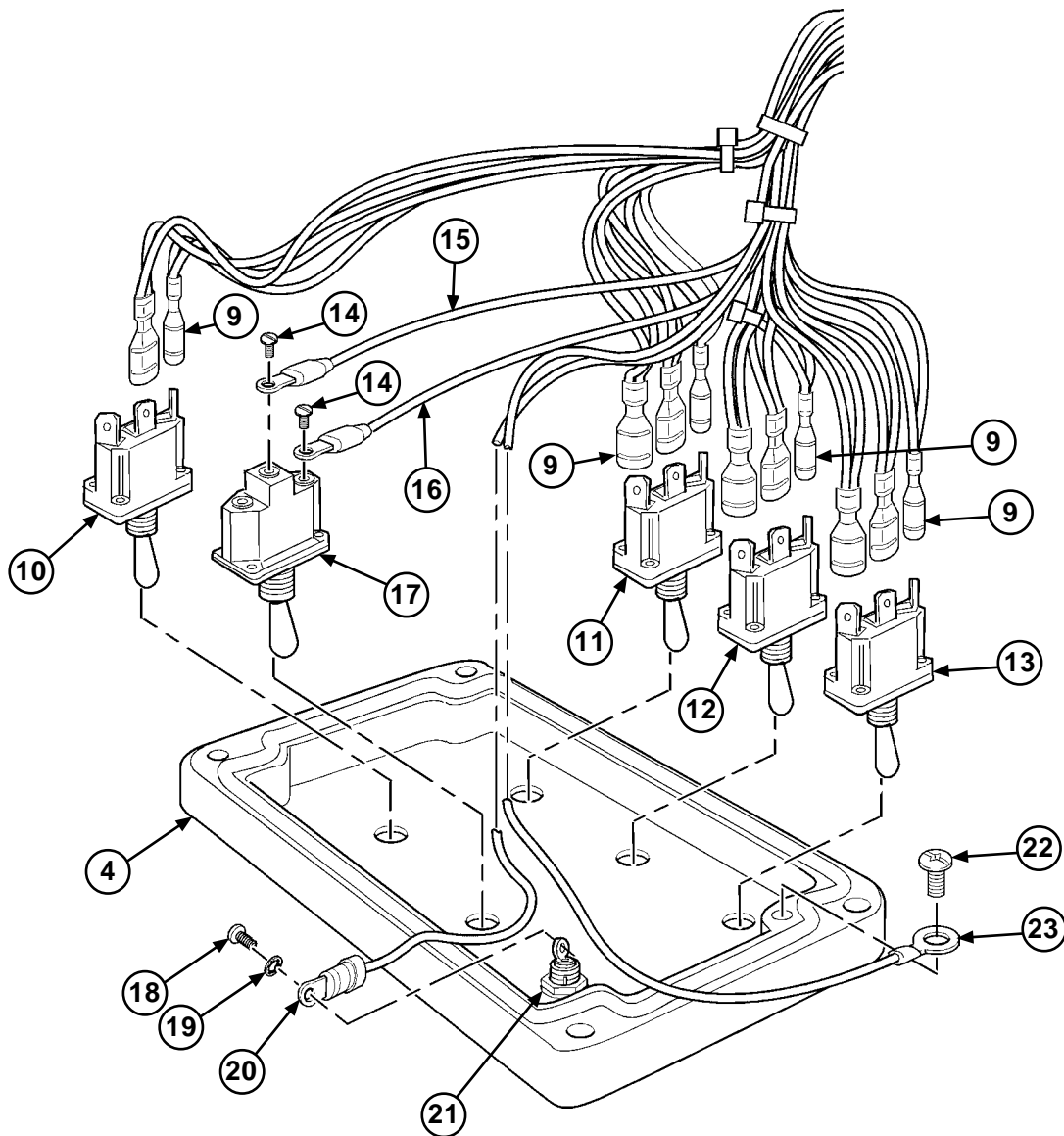
- Tag and mark all wires prior to removal to ensure proper installation.
- Cut cable ties as required.

- (1) Remove neck strap (1) from two neck strap brackets (2).
- (2) Loosen four screws (3) and remove cover (4) from base (5).
- (3) Remove two screws (6) and neck strap brackets (2) from cover (4).
- (4) Remove two screws (7) and guard bar (8) from cover (4).



**4-73. REMOTE CONTROL UNIT REPAIR (continued).**

- (5) Remove 11 spade connectors (9) from four switches (10, 11, 12, and 13).
- (6) Remove two screws (14), wire (15), and wire (16) from HIGH IDLE switch (17).
- (7) Remove screw (18), lockwasher (19), and red wire (20) from light (21).
- (8) Remove screw (22) and brown wire (23) from cover (4).

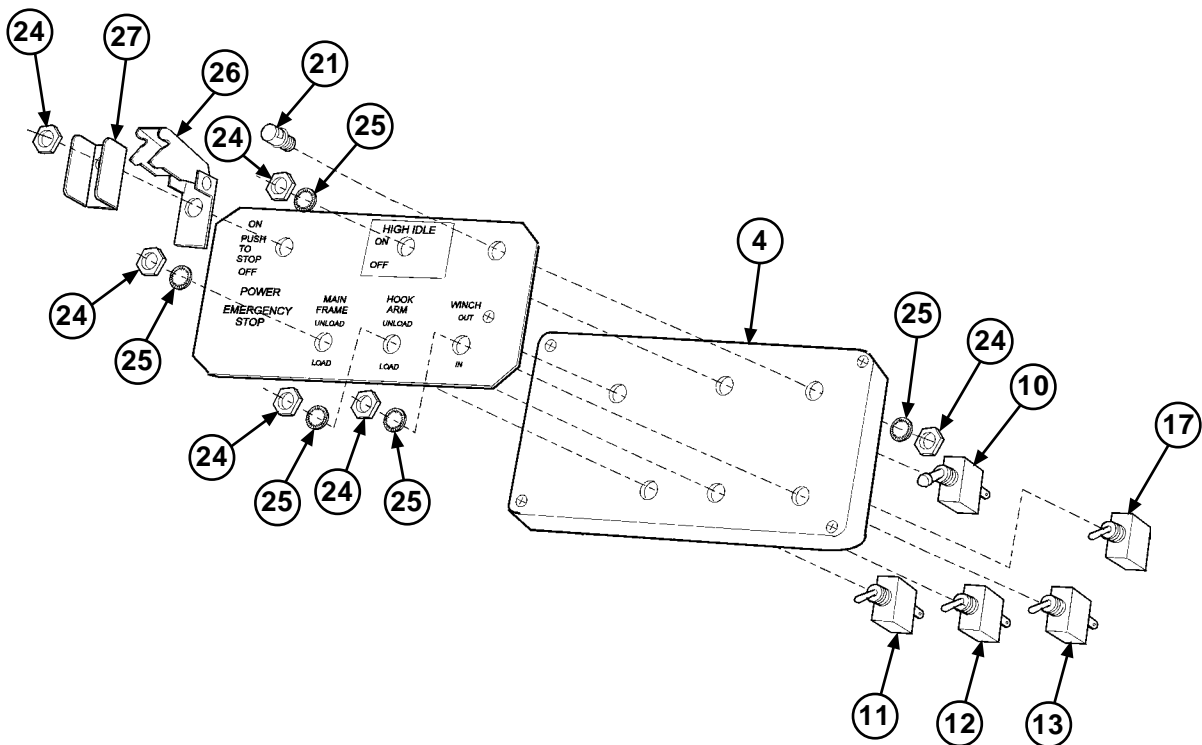


**4-73. REMOTE CONTROL UNIT REPAIR (continued).**

**NOTE**

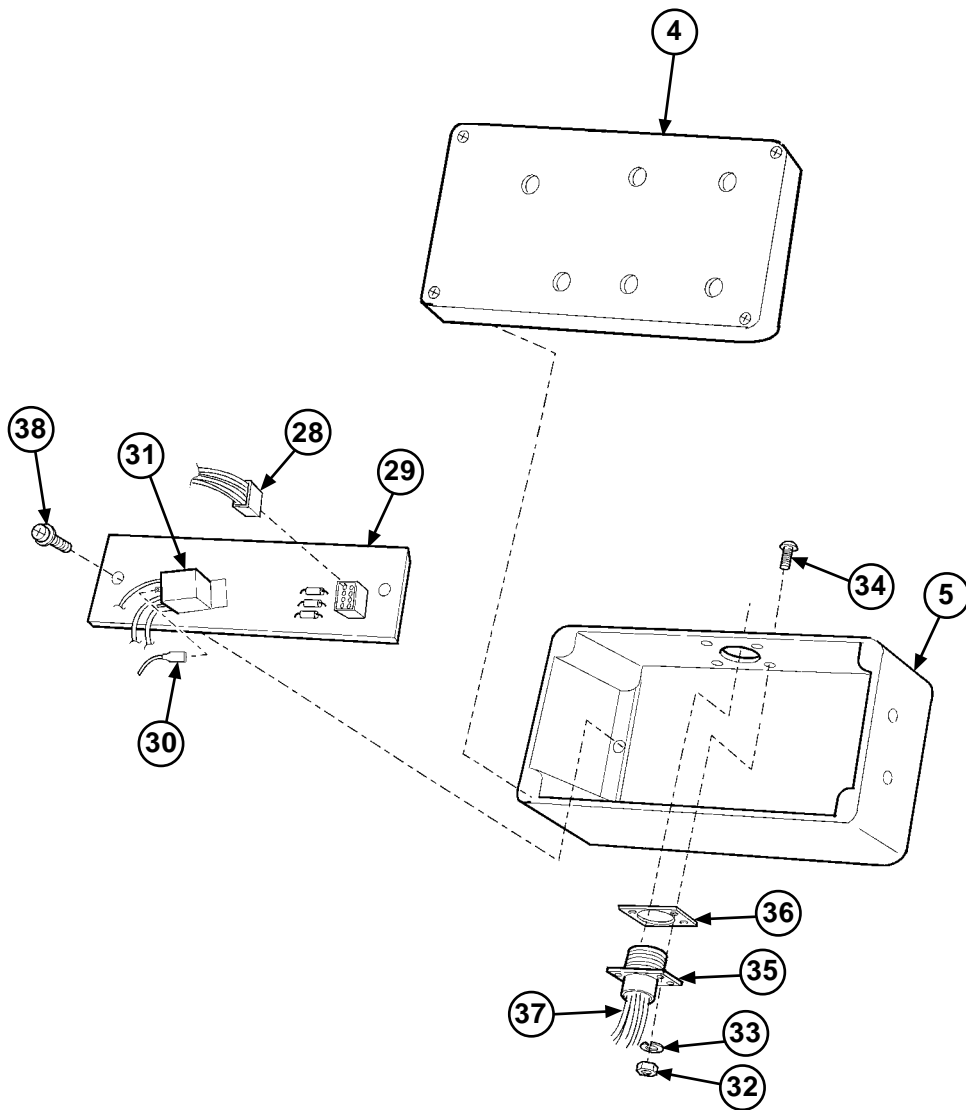
Match-mark switches to cover prior to removal, to ensure proper installation.

- (9) Remove nut (24), lockwasher (25), and MAIN FRAME load/unload switch (11) from cover (4).
- (10) Remove nut (24), lockwasher (25), and HOOK ARM switch (12) from cover (4).
- (11) Remove nut (24), lockwasher (25), and WINCH switch (13) from cover (4).
- (12) Remove nut (24), lockwasher (25), and HIGH IDLE switch (17) from cover (4).
- (13) Remove nut (24), snap cover (26), switch guard (27), and on/off switch (10) from cover (4).
- (14) Remove nut (24), lockwasher (25), and light (21) from cover (4). Discard lockwasher.



**4-73. REMOTE CONTROL UNIT REPAIR (continued).**

- (15) Remove connector (28) from circuit board (29).
- (16) Remove four spade connectors (30) from relay (31).
- (17) Remove four nuts (32), lockwashers (33), and screws (34), connector (35), and gasket (36) from base (5). Discard lockwashers and gasket.
- (18) Unsolder wires (37) from connector (35).



**4-73. REMOTE CONTROL UNIT REPAIR (continued).****NOTE**

Note position of circuit board prior to removal to ensure proper installation.

- (19) Remove two screws (38) and circuit board (29) from base (5).

**b. Cleaning and Inspection.**

- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.

**c. Assembly.****NOTE**

- Install cable ties as required.
- Make sure circuit board is installed in same position as noted during disassembly.

- (1) Install circuit board (29) in base (5) with two screws (38).
- (2) Solder wires (37) on connector (35).

**NOTE**

Connector should be installed in base with notch facing up.

- (3) Install new gasket (36) and connector (35) in base (5) with four screws (34), new lockwashers (33), and nuts (32).
- (4) Install four spade connectors (30) on relay (31).
- (5) Install connector (28) on circuit board (29).

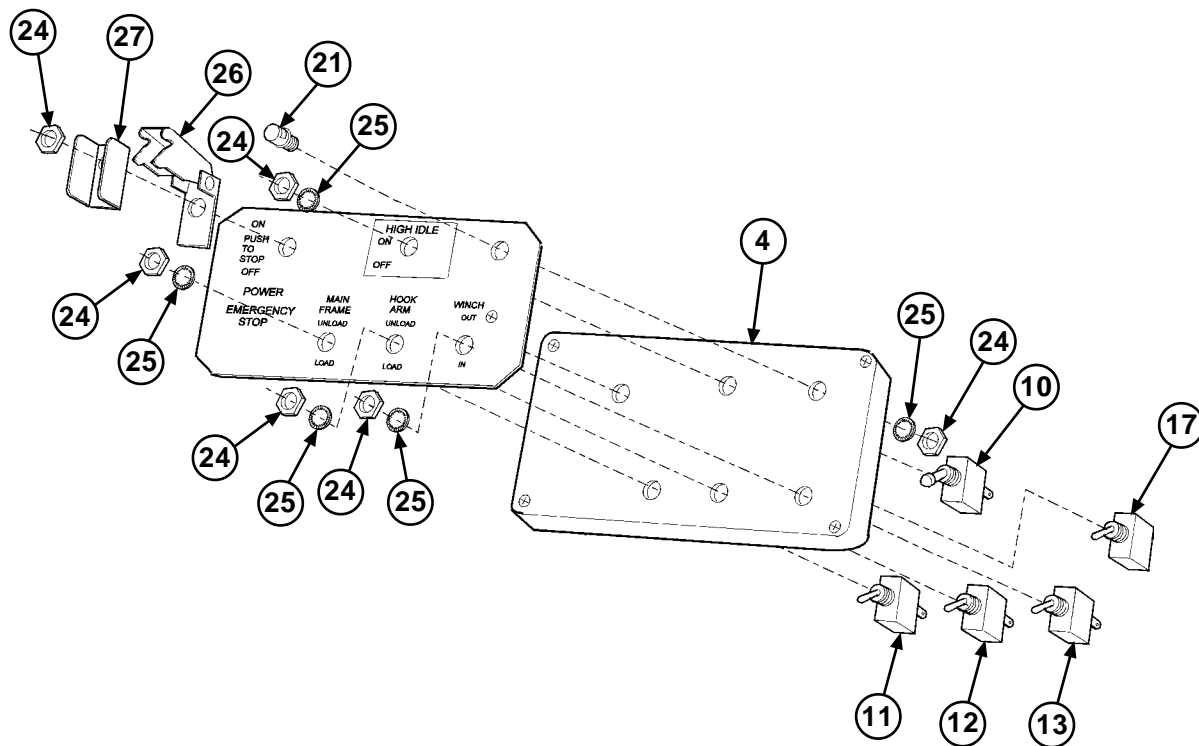
**4-73. REMOTE CONTROL UNIT REPAIR (continued).**

- (6) Install light (21) in cover (4) with lockwasher (25) and nut (24).

**NOTE**

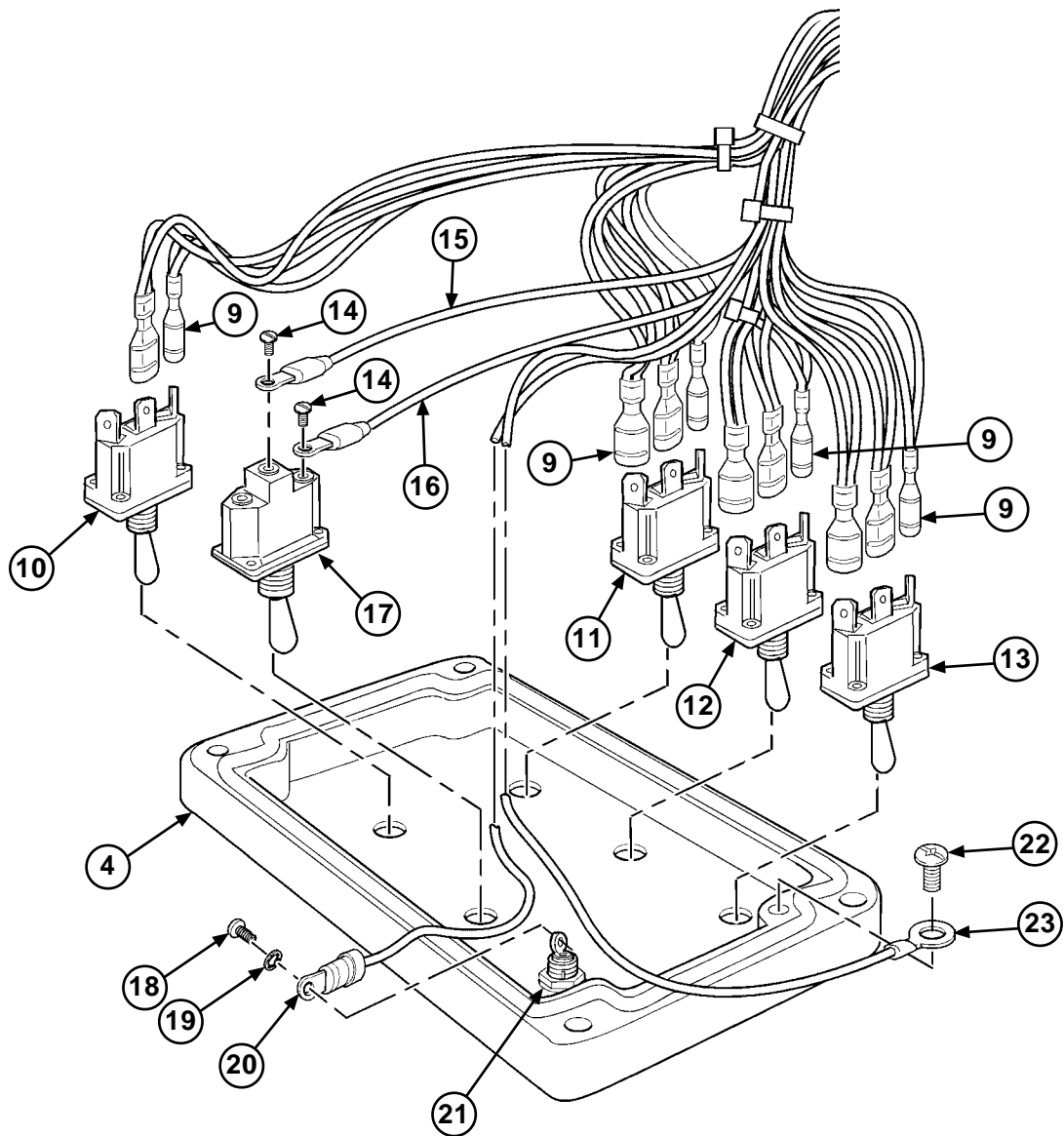
Make sure switches are installed in same position as noted during disassembly.

- (7) Install on/off switch (10), switch guard (27), and snap cover (26) on cover (4) with lockwasher (25) and nut (24).
- (8) Install HIGH IDLE switch (17) in cover (4) with lockwasher (25) and nut (24).
- (9) Install WINCH switch (13) in cover (4) with lockwasher (25) and nut (24).
- (10) Install HOOK ARM switch (12) in cover (4) with lockwasher (25) and nut (24).
- (11) Install MAIN FRAME switch (11) in cover (4) with lockwasher (25) and nut (24).



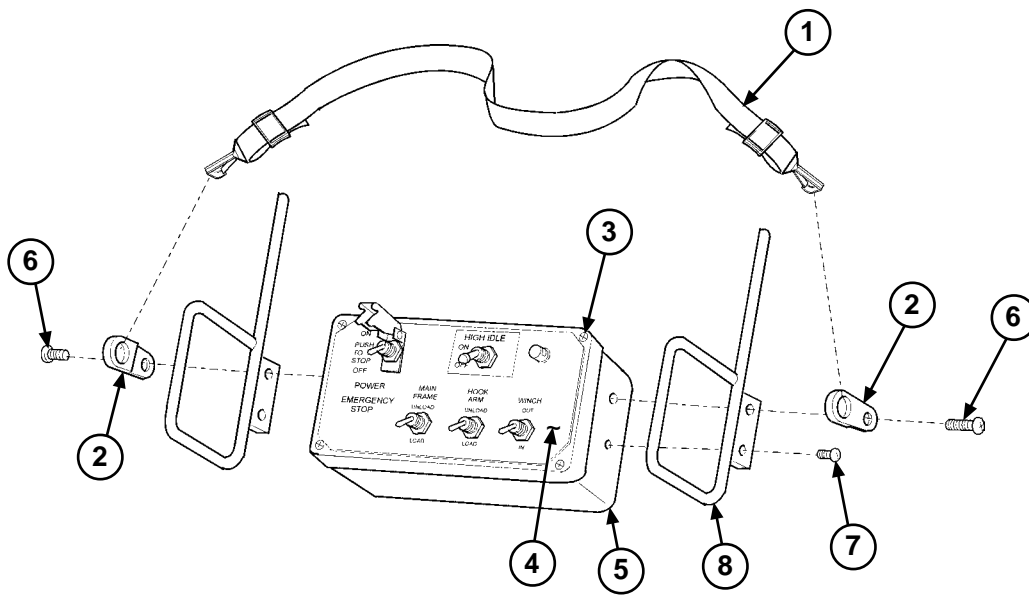
**4-73. REMOTE CONTROL UNIT REPAIR (continued).**

- (12) Install brown wire (23) on cover (4) with screw (22).
- (13) Install red wire (20) on light (21) with lockwasher (19) and screw (18).
- (14) Install wire (16) and wire (15) on HIGH IDLE switch (17) with two screws (14).
- (15) Install 11 spade connectors (9) on four switches (13, 12, 11 and 10).



**4-73. REMOTE CONTROL UNIT REPAIR (continued).**

- (16) Install guard bar (8) on cover (4) with two screws (7).
- (17) Install two neck strap brackets (2) on cover (4) with two screws (6).
- (18) Install cover (4) on base (5) and tighten four screws (3).
- (19) Install neck strap (1) on two neck strap brackets (2).



**c. Follow-on Maintenance:**

None.

**END OF TASK**



**4-74. HAND-HELD SPOTLIGHT REPAIR.**

This task covers:

- |                |                 |                          |
|----------------|-----------------|--------------------------|
| a. Removal     | c. Assembly     | e. Follow-on Maintenance |
| b. Disassembly | d. Installation |                          |

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

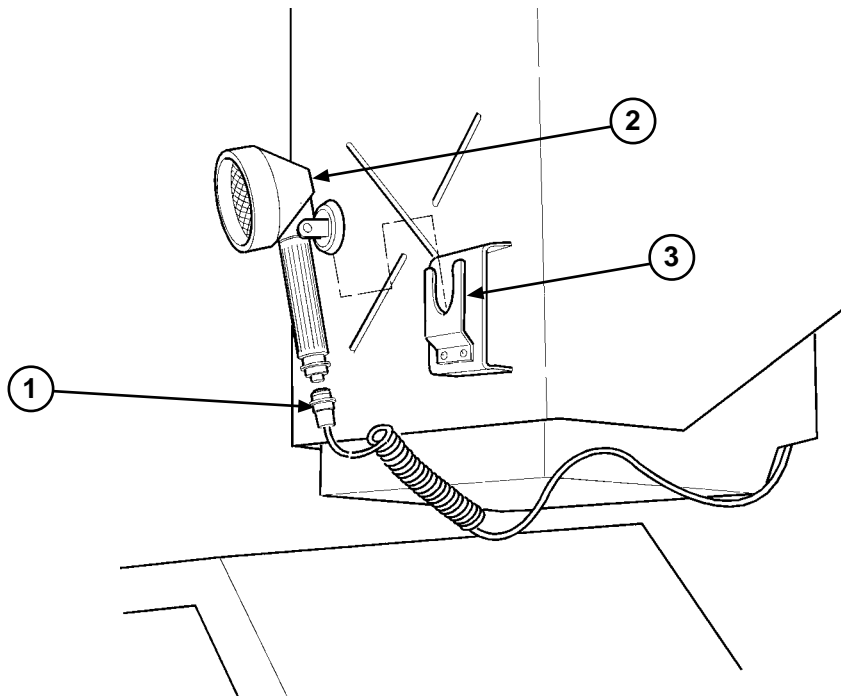
Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

Soap, Laundry (Item 22, Appendix E)

**a. Removal.**

- (1) Remove connector (1) from bottom of hand-held spotlight (2).
- (2) Remove hand-held spotlight (2) from mounting bracket (3).



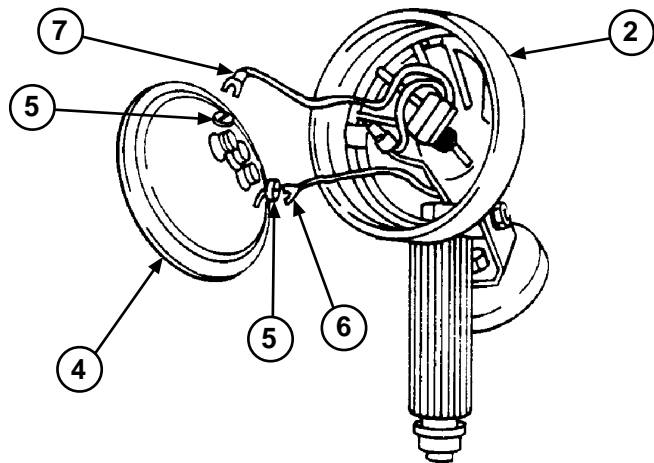
**4-74. HAND-HELD SPOTLIGHT REPAIR (continued).**

**b. Disassembly.**

- (1) Apply soap solution to edge of sealed beam (4).
- (2) Pry off edge of hand-held spotlight (2) from sealed beam (4).
- (3) Loosen two screws (5) and remove wire (6) and wire (7) from rear of sealed beam (4).

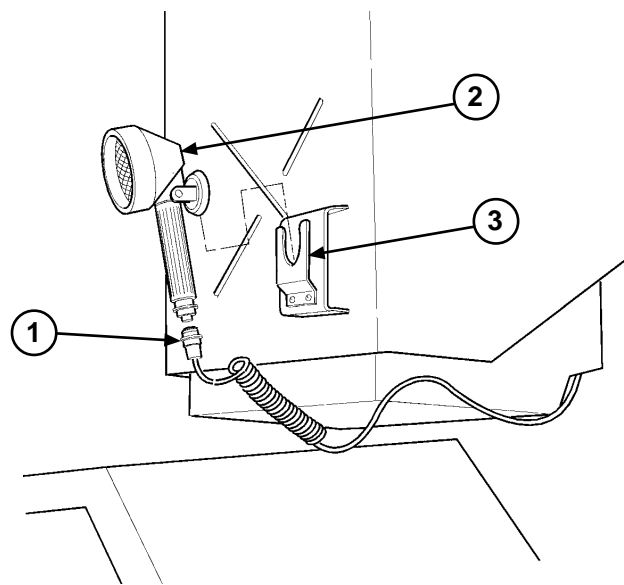
**c. Assembly.**

- (1) Install wires (6 and 7) with screws (5) on rear of sealed beam (4).
- (2) Install sealed beam (4) in hand-held spotlight (2).



**d. Installation.**

- (1) Install hand-held spotlight (2) in mounting bracket (3).
- (2) Install connector (1) on hand-held spotlight (2).



**e. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).
- Check operation of hand-held spotlight.
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-75. WORKLIGHT ASSEMBLY REPAIR.**

This task covers:

- a. Removal
- b. Disassembly
- c. Assembly
- d. Installation
- e. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Wheels chocked (TM 9-2320-279-10)  
Engine turned off (TM 9-2320-279-10)

*Materials/Parts*

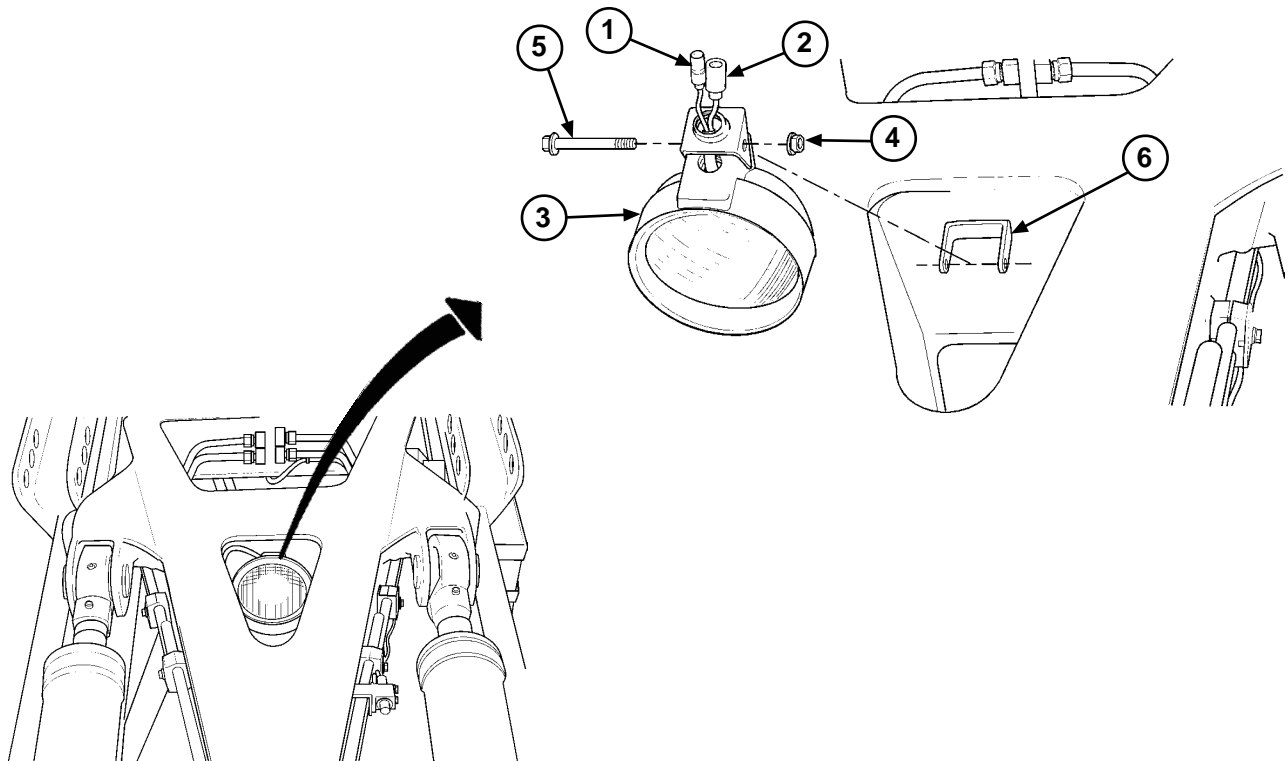
Soap, Laundry (Item 22, Appendix E)  
Locknut (Item 67, Appendix K)

**a. Removal.**

**NOTE**

Model B is equipped with a single connector.

- (1) Disconnect two connectors (1 and 2).
- (2) Push down worklight assembly (3) to access locknut (4) and screw (5).
- (3) Remove locknut (4), screw (5), and worklight assembly (3) from bracket (6). Discard locknut.



**4-75. WORKLIGHT ASSEMBLY REPAIR (continued).**

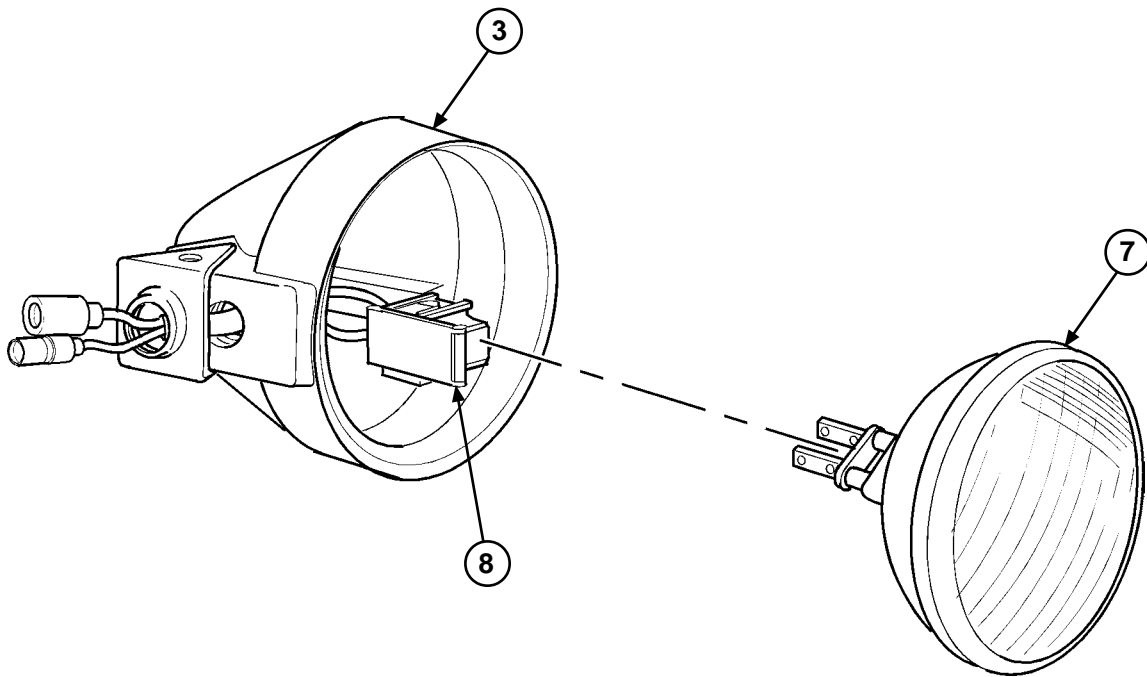
**b. Disassembly.**

- (1) Apply laundry soap solution to edge of sealed beam (7) and pry off from worklight assembly (3).

**NOTE**

Socket is removed from sealed beam by depressing locking tabs.

- (2) Disconnect socket (8) from sealed beam (7).



**c. Assembly.**

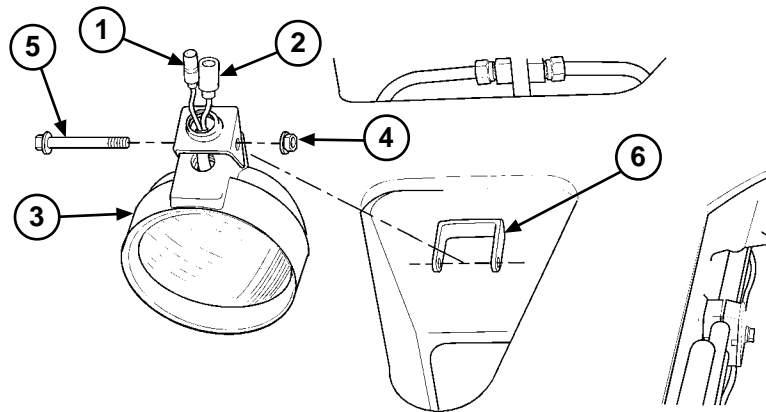
- (1) Connect socket (8) to sealed beam (7).
- (2) Install sealed beam (7) in worklight assembly (3).

**4-75. WORKLIGHT ASSEMBLY REPAIR (continued).****d. Installation.**

- (1) Install worklight assembly (3) on bracket (6) with screw (5) and new locknut (4).
- (2) Pull up worklight assembly (3) into original position.

**NOTE**

Model B is equipped with a single connector.



- (3) Connect two connectors (2 and 1).

**e. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-76. FREE FLOW VALVE HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Gasket (Item 109, Appendix K)

Locknut (4) (Item 110, Appendix K)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

**a. Removal.**

**NOTE**

Cut cable ties as required.

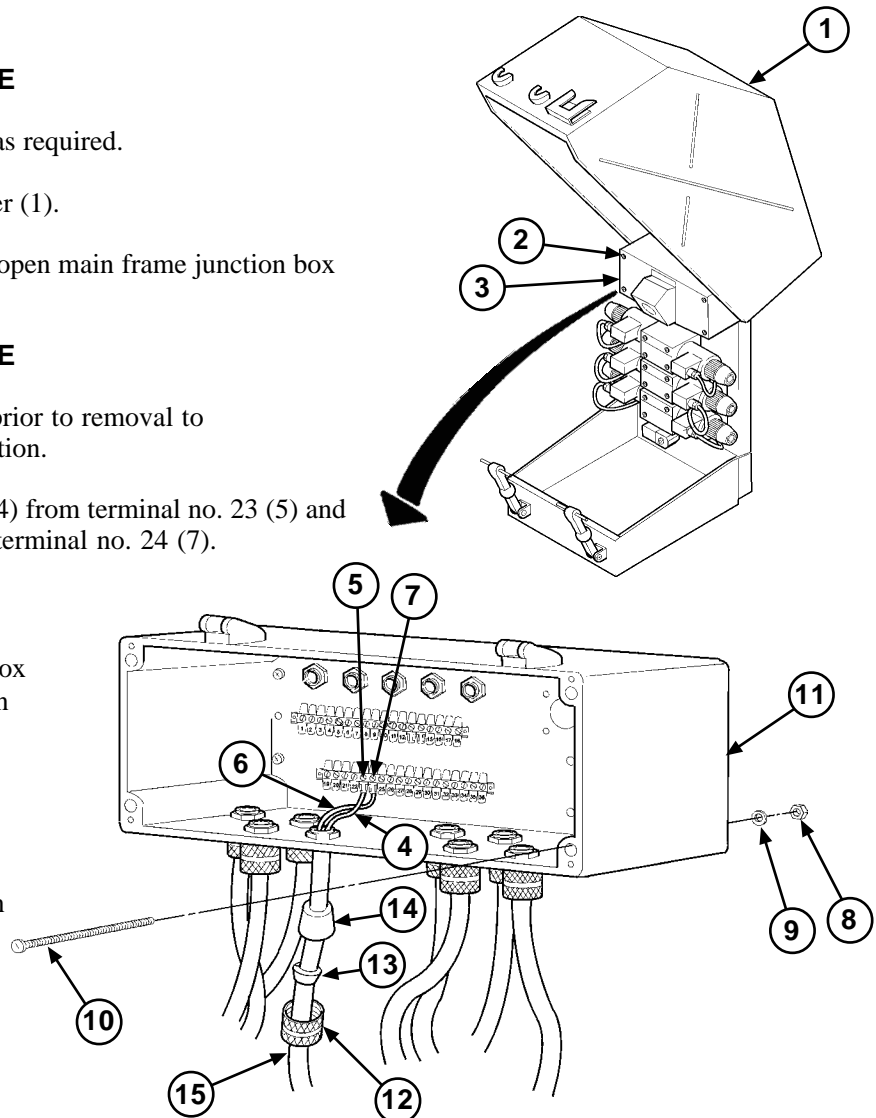
- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open main frame junction box cover (3).

**NOTE**

Tag and mark wires prior to removal to ensure proper installation.

- (3) Remove white wire no. 23 (4) from terminal no. 23 (5) and black wire no. 24 (6) from terminal no. 24 (7).
- (4) Remove four locknuts (8), washers (9) and screws (10) from main frame junction box (11) and gently pull junction box forward to access nut (12). Discard locknuts.

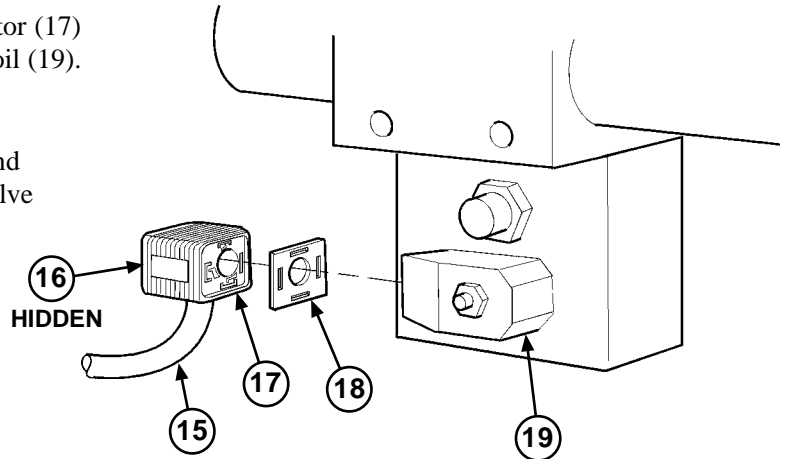
- (5) Remove nut (12), plastic insert (13) and rubber grommet (14) from junction box (11).
- (6) Remove free flow valve harness (15) from junction box (11).



**OTHER WIRE HARNESSES REMOVED FOR CLARITY**

**4-76. FREE FLOW VALVE HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (7) Loosen screw (16) and remove connector (17) and gasket (18) from free flow valve coil (19). Discard gasket.
- (8) Remove nut (12), plastic insert (13), and rubber grommet (14) from free flow valve harness (15).

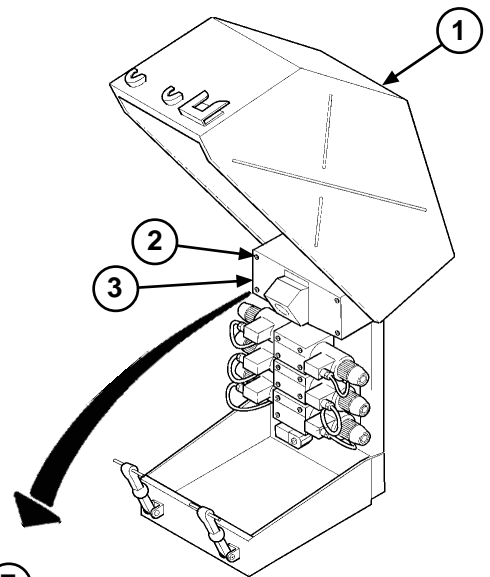


**b. Installation.**

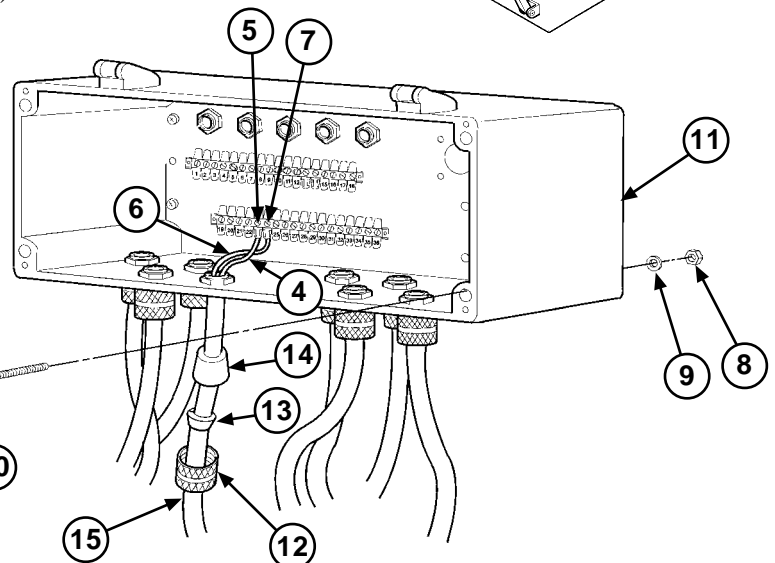
**NOTE**

- Ensure rubber grommet is installed in same position as noted during removal.
- Install cable ties as required.

- (1) Install rubber grommet (14), plastic insert (13), and nut (12) on free flow valve harness (15).
- (2) Install new gasket (18) and connector (17) to free flow valve coil (19) and tighten screw (16).
- (3) Position free flow valve harness (15) in junction box (11).
- (4) Position rubber grommet (14) over free flow valve harness (15) and install plastic insert (13) and nut (12).
- (5) Install junction box (11) on vehicle (19) with four screws (10), washers (9) and new locknuts (8).



- (6) Install black wire no. 24 (6) on terminal no. 24 (7) and white wire no. 23 (4) on terminal no. 23 (5).
- (7) Close junction box cover (3) and tighten four screws (2).
- (8) Close hydraulic cabinet cover (1).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**OTHER WIRE HARNESSES REMOVED FOR CLARITY**

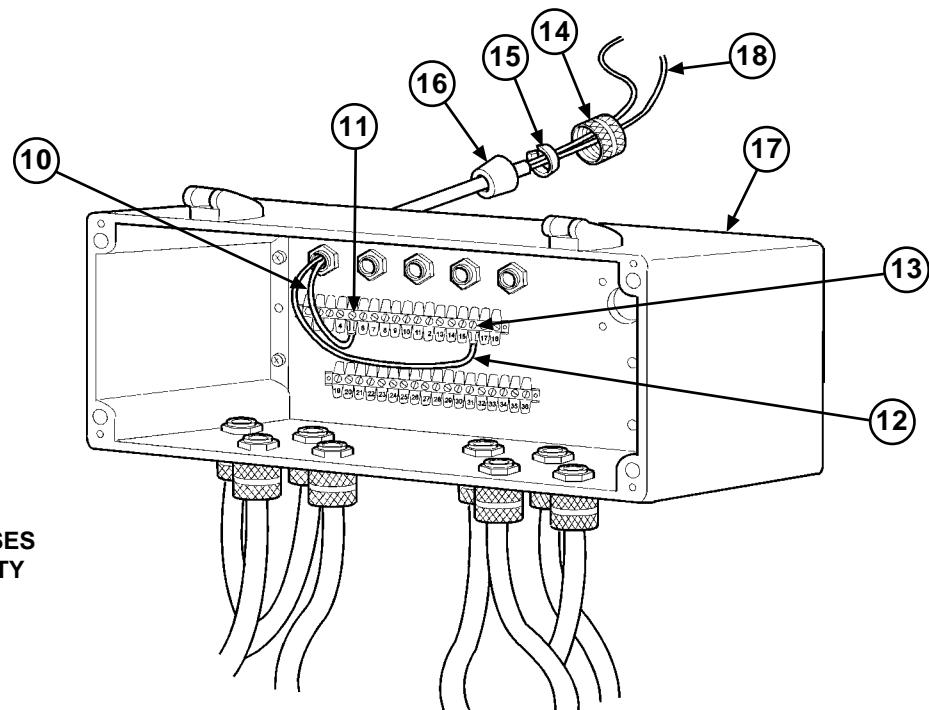




## 4-77. HAND-HELD SPOTLIGHT HARNESS REPLACEMENT (MODEL A ONLY) (continued).

### NOTE

- Tag and mark wires prior to removal.
  - Note position of rubber grommet prior to removal.
- (5) Remove white wire no. 5 (10) from terminal no. 5 (11) and black wire no. 16 (12) from terminal no. 16 (13).
  - (6) Remove nut (14), plastic insert (15) and rubber grommet (16) from back of junction box (17).
  - (7) Remove hand-held spotlight harness (18) from junction box (17).



OTHER WIRE HARNESSSES  
REMOVED FOR CLARITY

- (8) Remove nut (14), plastic insert (15), and rubber grommet (16) from hand-held spotlight harness (18).
- b. Installation.**

- (1) Install rubber grommet (16), plastic insert (15), and nut (14) on hand-held spotlight harness (18).
- (2) Position hand-held spotlight harness (18) in junction box (17).

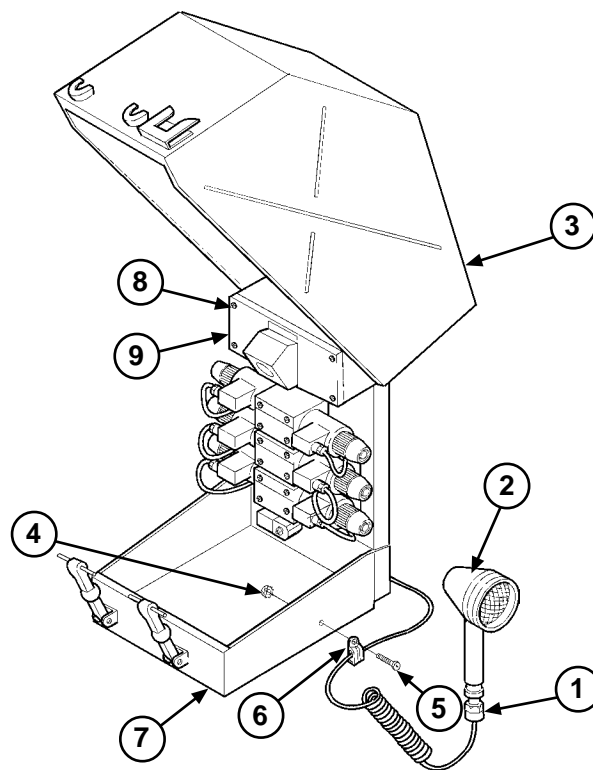
### NOTE

Ensure rubber grommet is installed as noted during removal.

- (3) Install rubber grommet (16), plastic insert (15) and nut (14) in back of junction box (17).
- (4) Install black wire no. 16 (12) on terminal no. 16 (13) and white wire no. 5 (10) on terminal no. 5 (11).

**4-77. HAND-HELD SPOTLIGHT HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

- (5) Close junction box cover (9) and tighten four screws (8).
- (6) Install clip (6) on hydraulic cabinet (7) with screw (5) and new locknut (4).
- (7) Close hydraulic cabinet cover (3).



- (8) Connect connector (1) to hand-held spotlight (2).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-78. HOOK ARM VALVE (LOAD) HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal                                      b. Installation                                      c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic’s: Automotive (SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Gasket (Item 109, Appendix K)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)

*Equipment Condition*

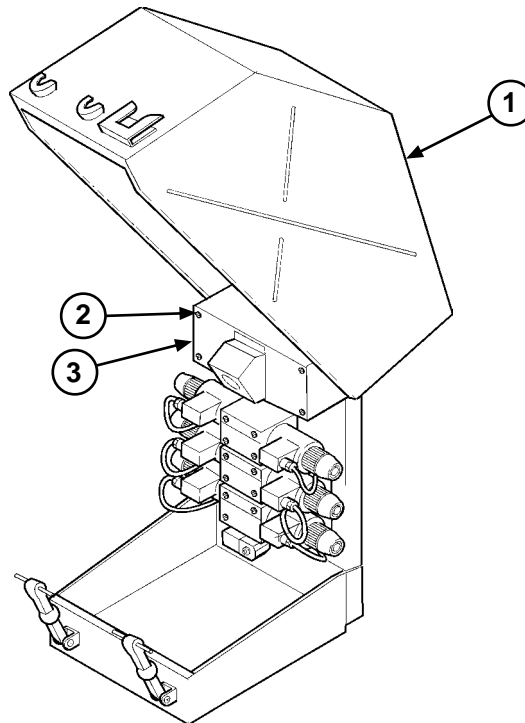
Batteries disconnected (TM 9-2320-279-20)

**a. Removal.**

**NOTE**

Cut cable ties as required.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).

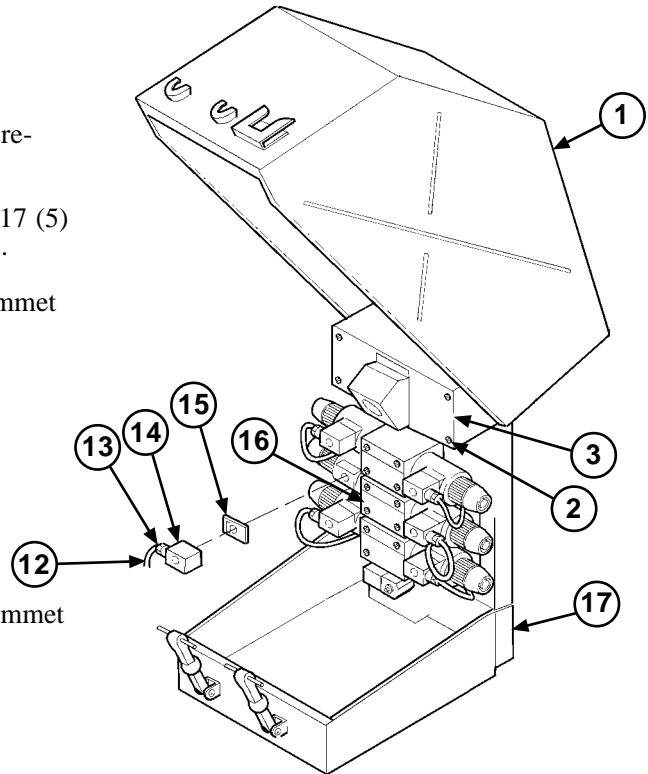


**4-78. HOOK ARM VALVE (LOAD) HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

**NOTE**

- Tag and mark wires prior to removal.
- Note position of rubber grommet prior to removal.

- (3) Remove white wire no. 17 (4) from terminal no. 17 (5) and black wire no. 18 (6) from terminal no. 18 (7).
- (4) Remove nut (8), plastic insert (9) and rubber grommet (10) from junction box (11).
- (5) Remove hook arm valve load harness (12) from junction box (11).
- (6) Loosen screw (13) and remove connector (14) and gasket (15) from directional control valve (16). Discard gasket.
- (7) Remove nut (8), plastic insert (9), and rubber grommet (10) from hook arm valve load harness (12).

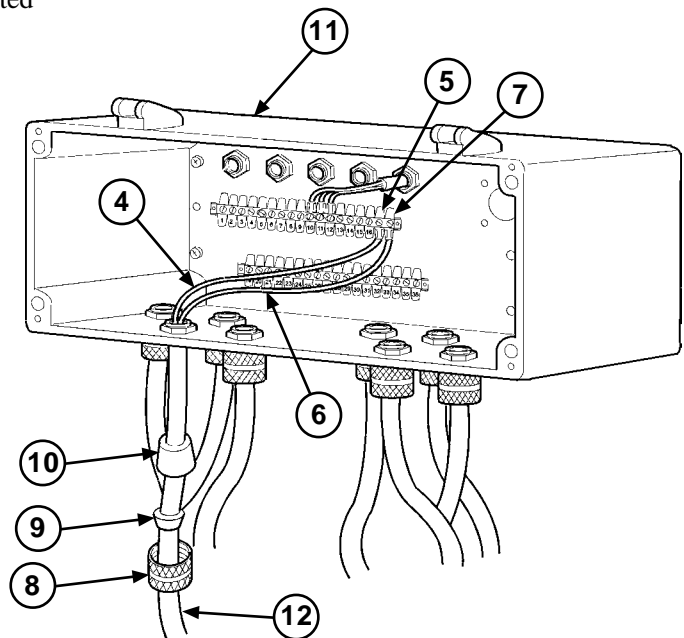


**b. Installation.**

**NOTE**

- Ensure rubber grommet is installed as noted during removal.
- Install cable ties as required.

- (1) Install rubber grommet (10), plastic insert (9), and nut (8) on hook arm valve load harness (12).
- (2) Install new gasket (15) and connector (14) on directional control valve (16).
- (3) Position hook arm load harness (11) in junction box (12).
- (4) Install rubber grommet (10), plastic insert (9), and nut (8) on junction box (11).
- (5) Install black wire no. 18 (6) on terminal no. 18 (7) and white wire no. 17 (4) on terminal no. 17 (5).
- (6) Close junction box cover (3) and tighten four screws (2).
- (7) Close hydraulic cabinet cover (1).



**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-79. HOOK ARM VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)

Gasket (Item 109, Appendix K)

Locknut (4) (Item 110, Appendix K)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)

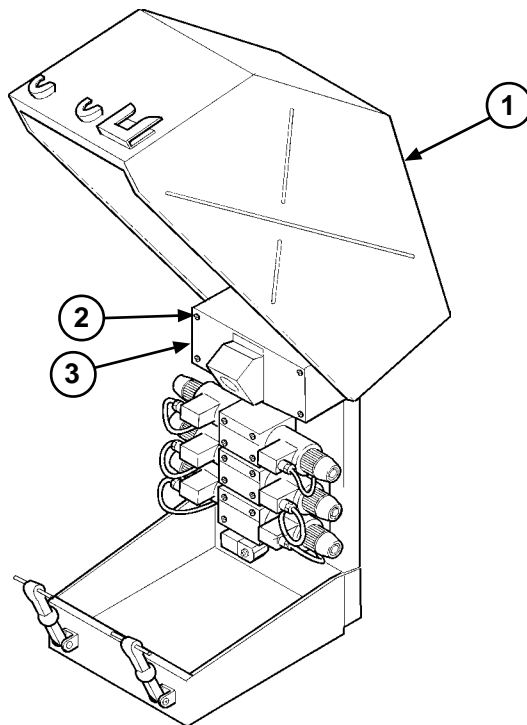
*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

**a. Removal.****NOTE**

Cut cable ties as required.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).



**4-79. HOOK ARM VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

**NOTE**

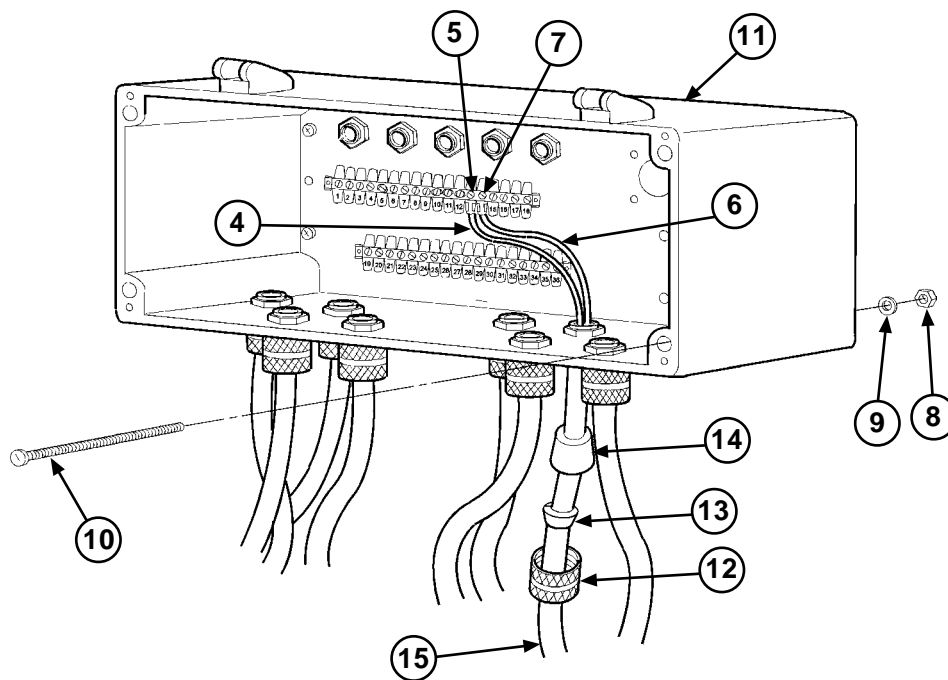
Tag and mark wires prior to removal.

- (3) Remove white wire no. 13 (4) from terminal no. 13 (5) and black wire no. 14 (6) from terminal no. 14 (7).
- (4) Remove four locknuts (8), washers (9) and screws (10) from junction box (11) and gently pull junction box forward to access nut (12). Discard locknuts.

**NOTE**

Note position of rubber grommet prior to removal.

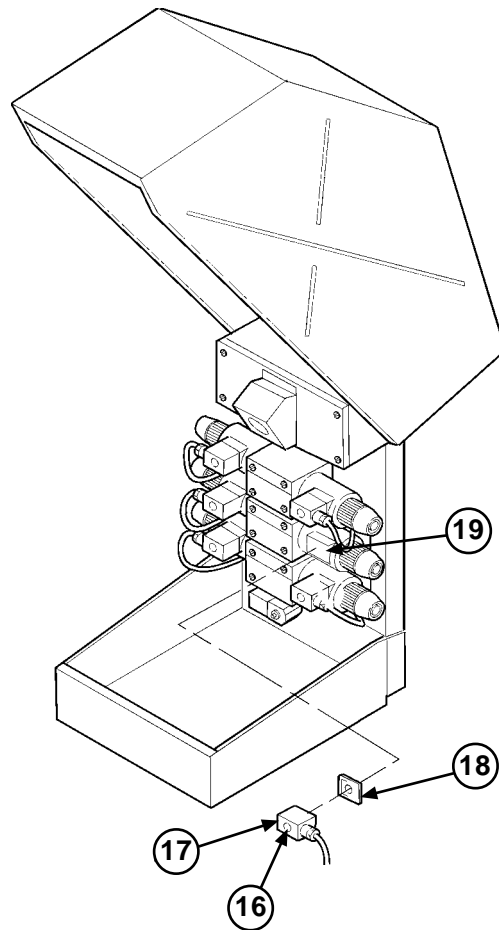
- (5) Remove nut (12), plastic insert (13) and rubber grommet (14) from junction box (11).
- (6) Remove hook arm valve (unload) harness (15) from junction box (11).



**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

## 4-79. HOOK ARM VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY) (continued).

- (7) Loosen screw (16) and remove connector (17) and gasket (18) from directional control valve (19). Discard gasket.



- (8) Remove nut (12), plastic insert (13), and rubber grommet (14) from hook arm valve (unload) harness (15).

### **b. Installation.**

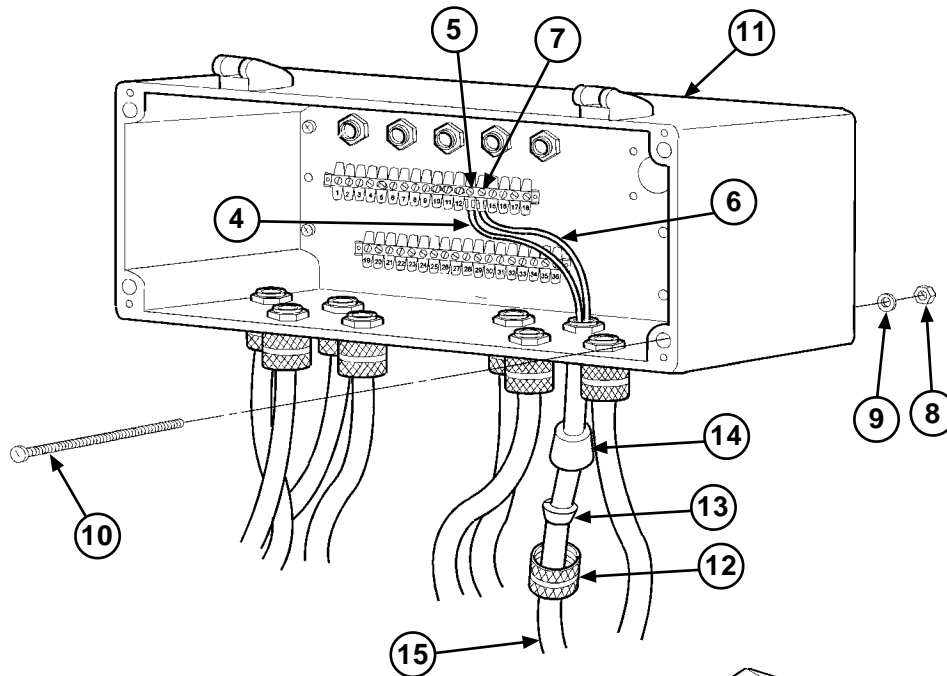
#### **NOTE**

- Install cable ties as required.
- Ensure rubber grommet is installed in same position as noted during removal.

- (1) Install rubber grommet (14), plastic insert (13), and nut (12) on hook arm valve (unload) harness (15).
- (2) Install new gasket (18) and connector (17) to directional control valve (19) and tighten screw (16).
- (3) Position hook arm valve (unload) harness (15) in junction box (11).

**4-79. HOOK ARM VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

- (4) Install rubber grommet (14), plastic insert (13), and nut (12) on junction box (11).
- (5) Install junction box (11) on vehicle (19) with four screws (10), washers (9) and new locknuts (8).
- (6) Install black wire no. 14 (6) on terminal no. 14 (7) and white wire no. 13 (4) on terminal no. 13 (5).

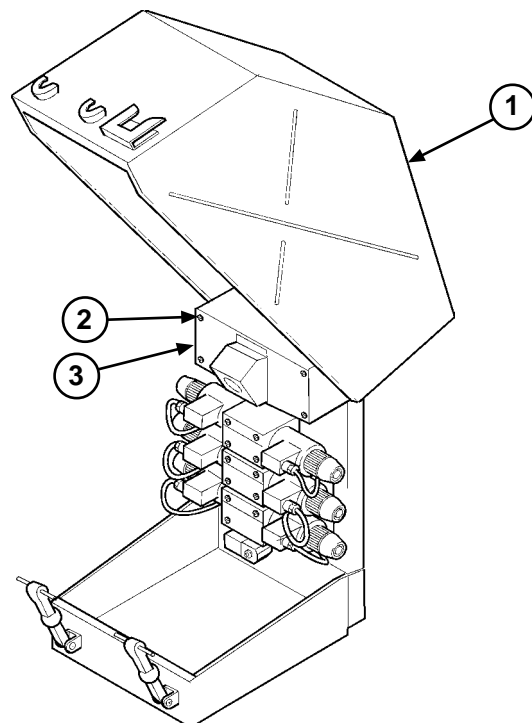


- (7) Close junction box cover (3) and tighten four screws (2).
- (8) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**





**4-80. LEFT- HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal    b. Installation    c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Lockwasher (4) (Item 104, Appendix K)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

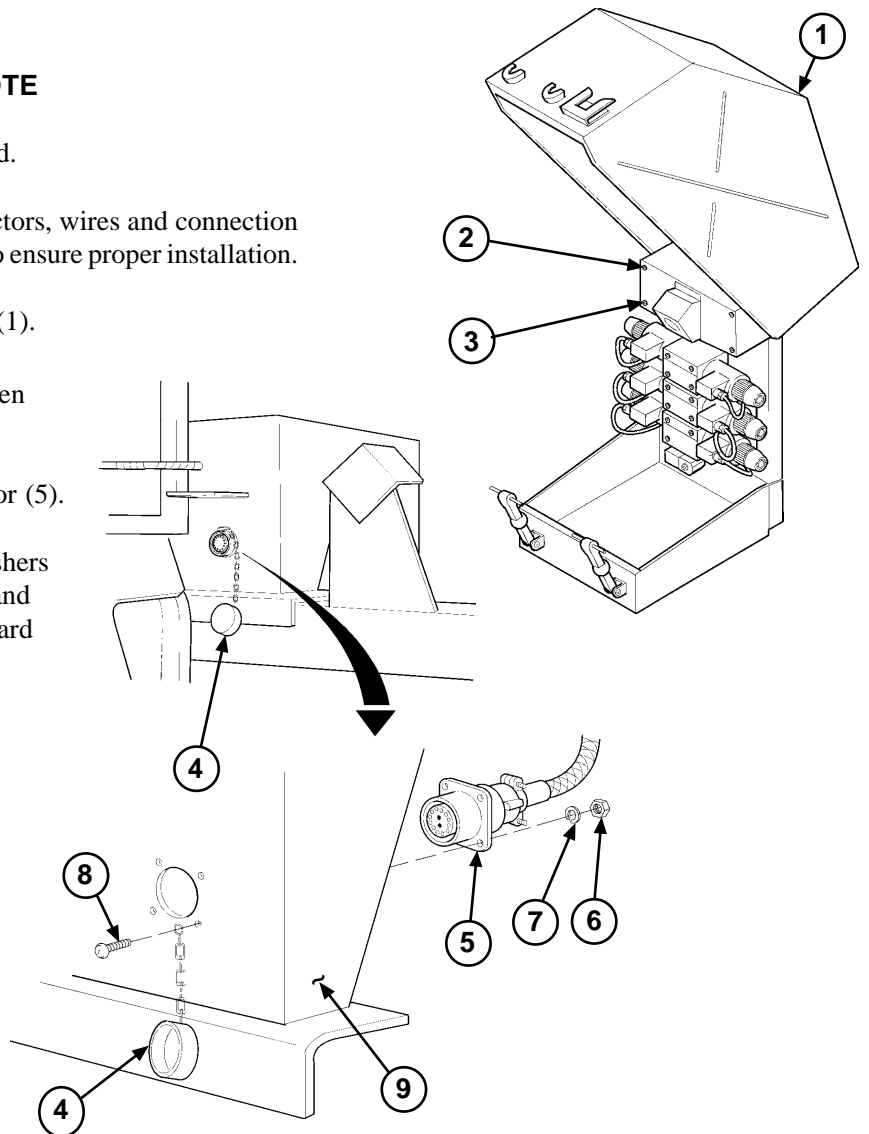
Cable Ties (Item 8, Appendix E)

**a. Removal.**

**NOTE**

- Cut cable ties as required.
- Tag and mark all connectors, wires and connection points prior to removal to ensure proper installation.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).
- (3) Remove cap (4) from connector (5).
- (4) Remove four nuts (6), lockwashers (7), screws (8), connector (5) and cap (4) from bracket (9). Discard lockwashers.



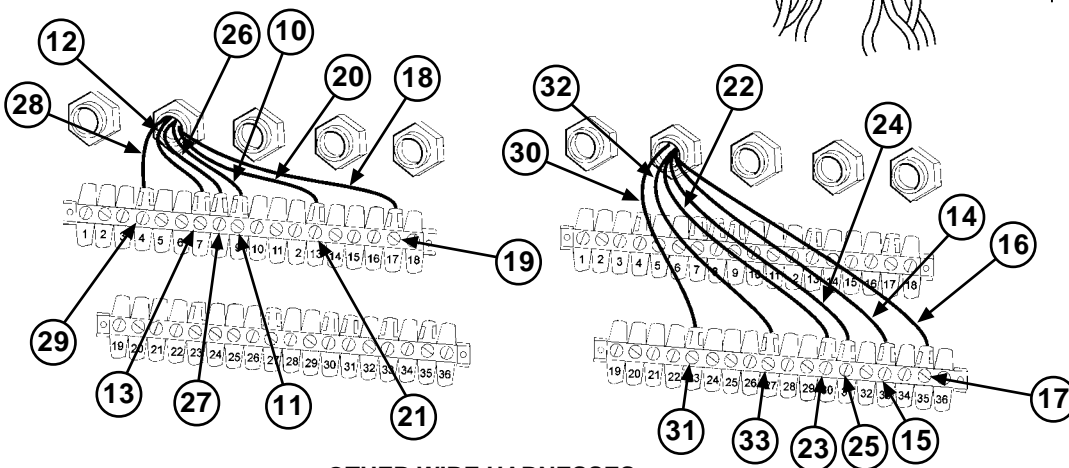
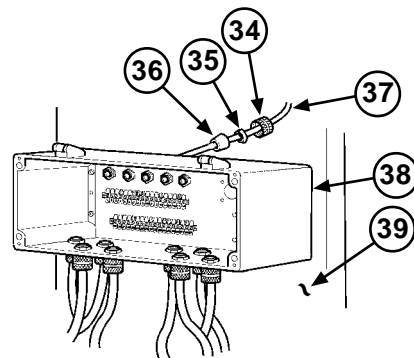
**4-80. LEFT-HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (5) Remove brown/black wire no. 9L (10) from terminal no. 9 (11) and blue wire no. 7C (12) from terminal no. 7 (13).
- (6) Remove orange wire no. 33D (14) from terminal no. 33 (15) and yellow wire no. 35E (16) from terminal no. 35 (17).
- (7) Remove brown wire no. 17F (18) from terminal no. 17 (19) and red/black wire no. 13G (20) from terminal no. 13 (21).
- (8) Remove blue/black wire no. 30H (22) from terminal no. 30 (23) and orange/black wire no. 31I (24) from terminal no. 31 (25).
- (9) Remove black wire no. 8A (26) from terminal no. 8 (27) and red wire no. 4B (28) from terminal no. 4 (29).
- (10) Remove yellow/black wire no. 23J (30) from terminal no. 23 (31) and brown/black wire no. 27K (32) from terminal no. 27 (33).

**NOTE**

Note position of rubber grommet prior to removal.

- (11) Remove nut (34), plastic insert (35), rubber grommet (36) and left-hand linking harness (37) from junction box (38).
- (12) Remove left-hand linking harness (37) from vehicle (39).
- (13) Remove rubber grommet (36), plastic insert (35), and nut (34) from left-hand linking harness (37).



**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

**4-80. LEFT-HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

**b. Installation.**

- (1) Install nut (34), plastic insert (35), and rubber grommet (36) on left-hand linking harness (37).

**NOTE**

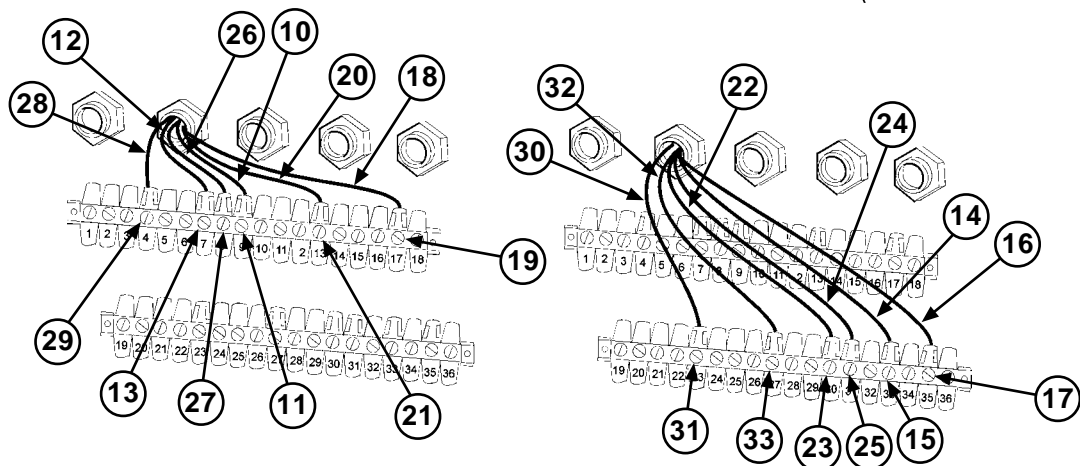
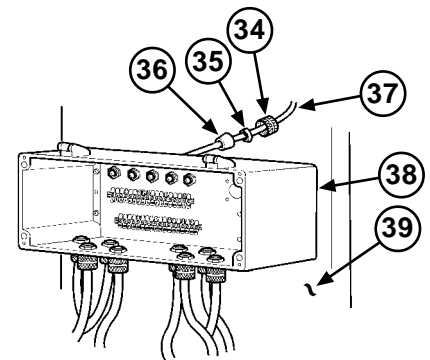
Install cable ties as required.

- (2) Position left-hand linking harness (37) on vehicle (39) and route up to junction box (38).

**NOTE**

Ensure rubber grommet is installed in same position as noted during removal.

- (3) Install left-hand linking harness (37) in junction box (38) with rubber grommet (36), plastic insert (35), and nut (34).
- (4) Install brown/black wire no. 27K (32) on terminal no. 27 (33) and yellow/black wire no. 23J (30) on terminal no. 23 (31).
- (5) Install red wire no. 4B (28) on terminal no. 4 (29) and black wire no. 8A (26) on terminal no. 8 (27).
- (6) Install orange/black wire no. 31I (24) on terminal no. 31 (25) and blue/black wire no. 30H (22) on terminal no. 30 (23).
- (7) Install red/black wire no. 13G (20) on terminal no. 13 (21) and brown wire no. 17F (18) on terminal no. 17 (19).
- (8) Install yellow wire no. 35E (16) on terminal no. 35 (17) and orange wire no. 33D (14) on terminal no. 33 (15).
- (9) Install blue wire no. 7C (12) on terminal no. 7 (13) and brown/black wire no. 9L (10) on terminal no. 9 (11).



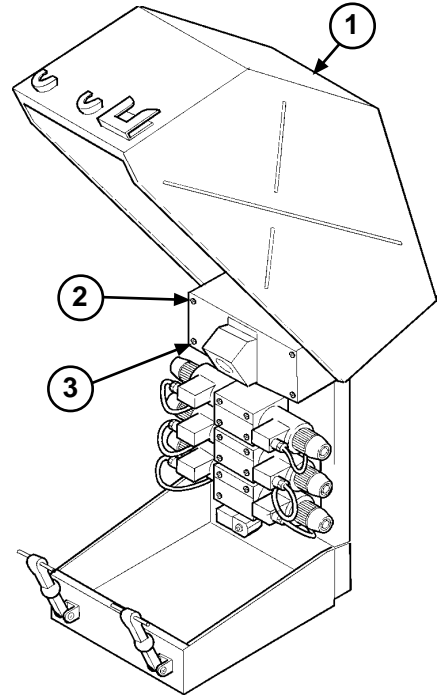
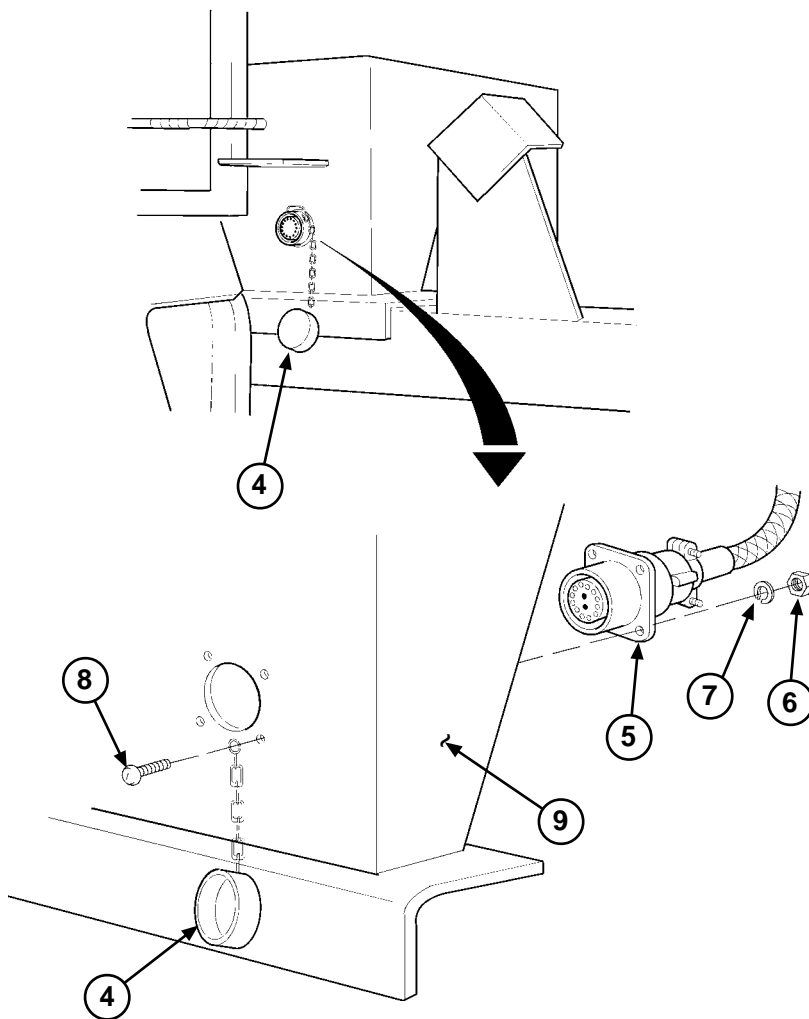
**OTHER WIRE HARNESSSES  
REMOVED FOR CLARITY**

**4-80. LEFT- HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

**NOTE**

Connector should be installed with notch facing up.

- (10) Install connector (5) and cap (4) on bracket (9) with four screws (8), new lockwashers (7) and nuts (6).
- (11) Install cap (4) on connector (5).
- (12) Close junction box cover (3) and tighten four screws (2).
- (13) Close hydraulic cabinet cover (1).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-81. MAIN CYLINDER HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Gasket (4) (Item 109, Appendix K)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)

*Equipment Condition*

Hook arm raised (para 2-9)  
Batteries disconnected (TM 9-2320-279-20)

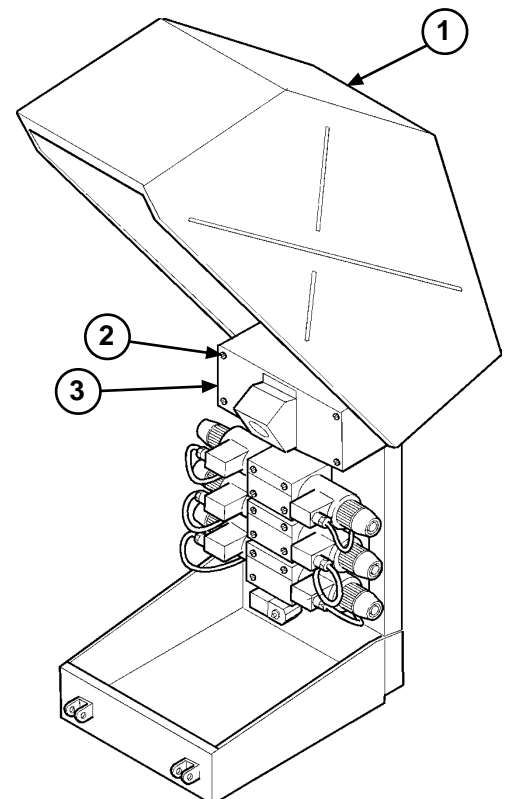
**a. Removal.**

**NOTE**

- Cut cable ties as required.
- Note location of cable ties prior to removal.
- Tag and mark all connectors, wires and connection points prior to removal.

(1) Open hydraulic cabinet cover (1).

(2) Loosen four screws (2) and open junction box cover (3).

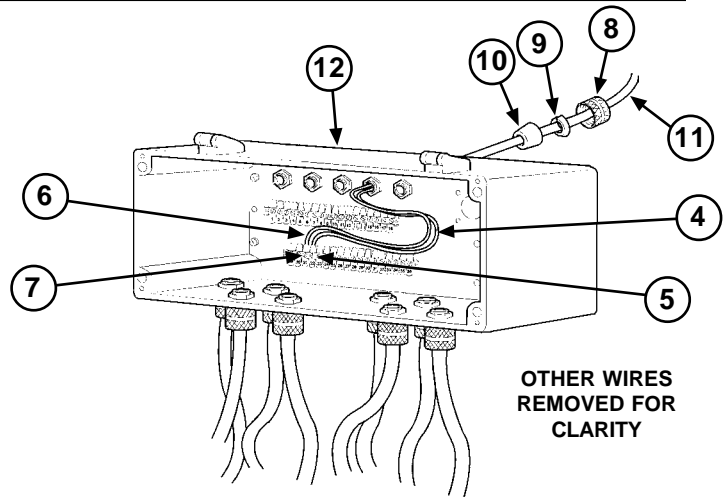


**4-81. MAIN CYLINDER HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

(3) Remove black wire no. 22 (4) from terminal no. 22 (5) and white wire no. 21 (6) from terminal no. 21 (7).

(4) Remove nut (8), plastic insert (9), grommet (10) and main cylinder harness (11) from junction box (12).

(5) Remove nut (8), plastic insert (9), and grommet (10) from main cylinder harness (11).

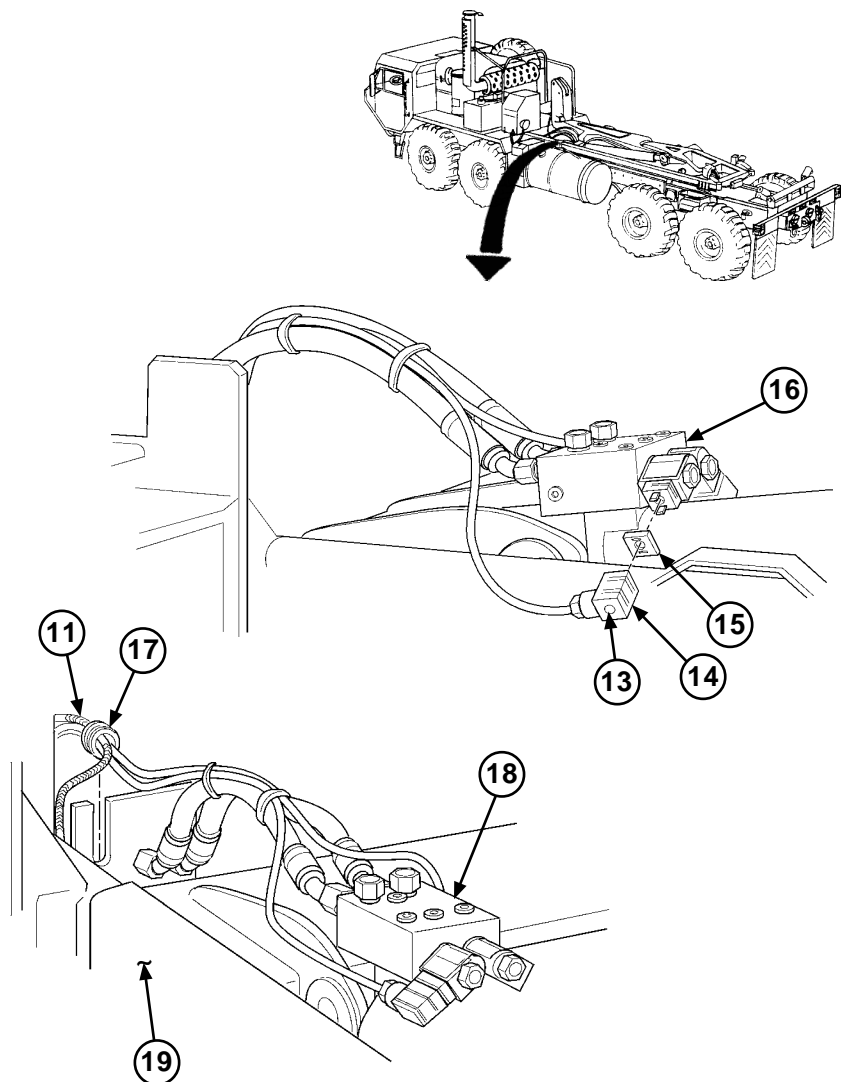


(6) Loosen two screws (13) and remove connectors (14) and gaskets (15) from main frame manifold (16). Discard gaskets.

(7) Turn grommet (17) and remove main cylinder harness (11) from grommet (17).

(8) Repeat Steps 5 and 6 to remove main cylinder harness (11) from other main frame manifold (18).

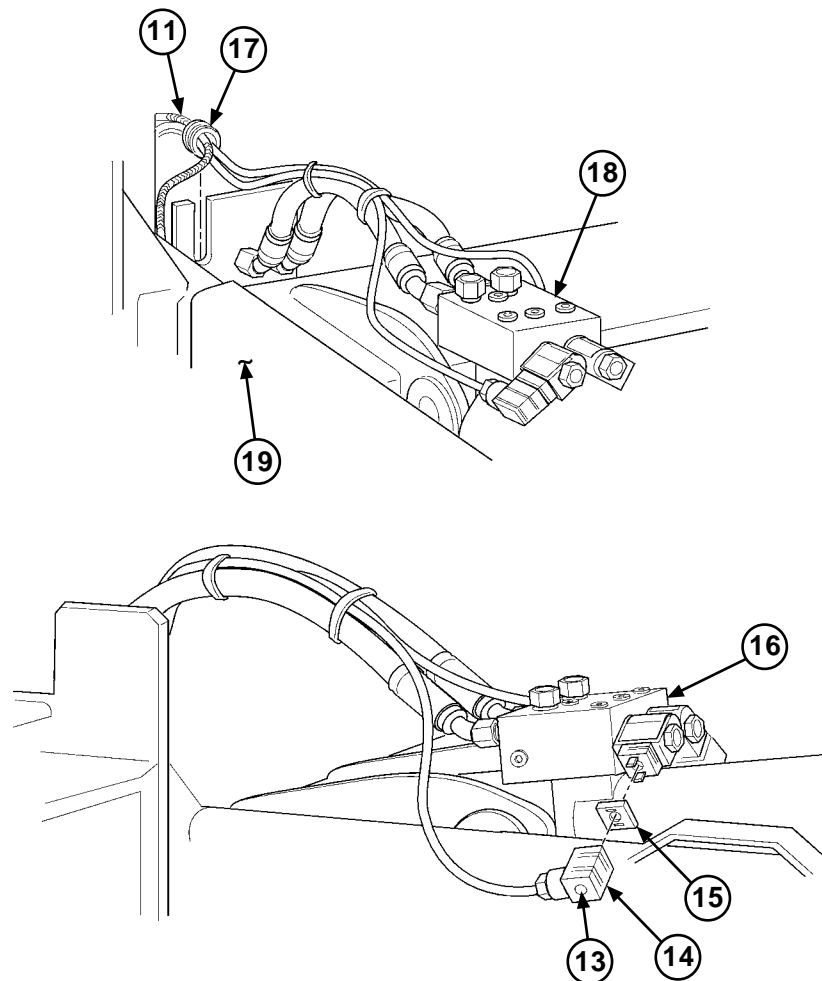
(9) Remove main cylinder harness (11) from vehicle (19).



**4-81. MAIN CYLINDER HARNESS REPLACEMENT (MODEL A ONLY) (continued).****b. Installation.****NOTE**

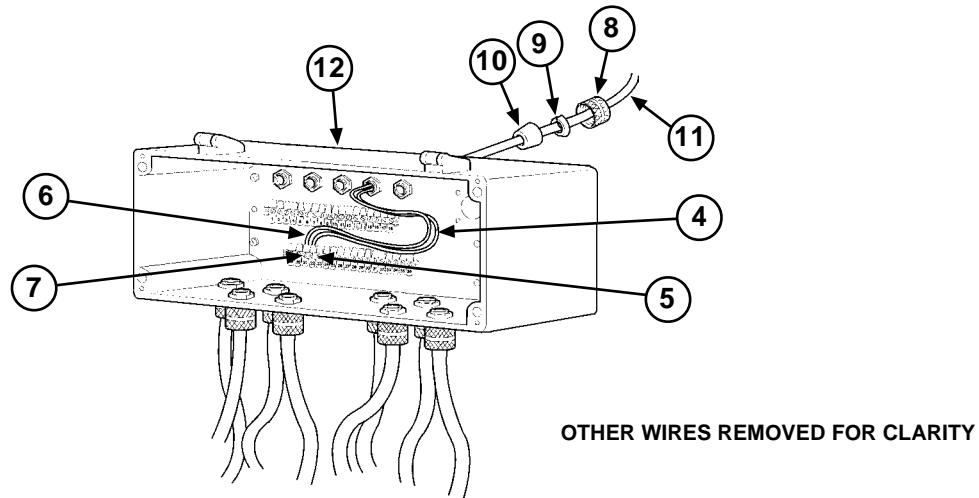
Install cable ties in same locations as noted during removal.

- (1) Route main cylinder harness (11) on vehicle (19).
- (2) Install main cylinder harness (11) through grommet (17).
- (3) Install two new gaskets (15) and connectors (14) on main frame manifold (16) and tighten two screws (13).
- (4) Repeat Steps 2 and 3 to install main cylinder harness (11) on other main frame manifold (18).

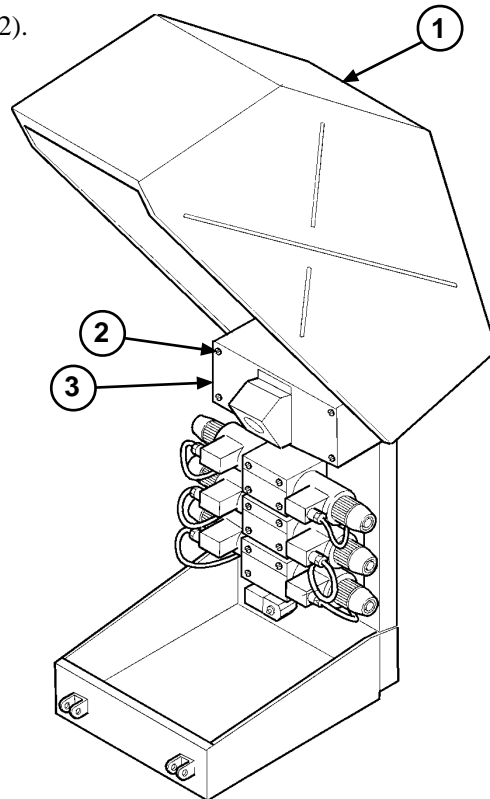


**4-81. MAIN CYLINDER HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (5) Install grommet (10), plastic insert (9), and nut (8) on main cylinder harness (11).
- (6) Install main cylinder harness (11) in junction box (12) with grommet (10), plastic insert (9) and nut (8).
- (7) Install white wire no. 21 (6) on terminal no. 21 (7) and black wire no. 22 (4) on terminal no. 22 (5).



- (8) Close junction box cover (3) and tighten four screws (2).
- (9) Close hydraulic cabinet cover (1).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).
- Lower hook arm (para 2-9).

**END OF TASK**



**4-82. MAIN FRAME VALVE (LOAD) HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)

Gasket (Item 109, Appendix K)

Locknut (4) (Item 110, Appendix K)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)

*Equipment Condition*

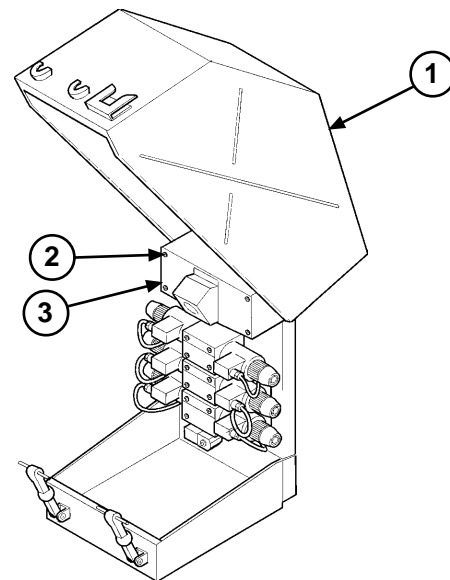
Batteries disconnected (TM 9-2320-279-20)

**a. Removal.**

**NOTE**

Cut cable ties as required.

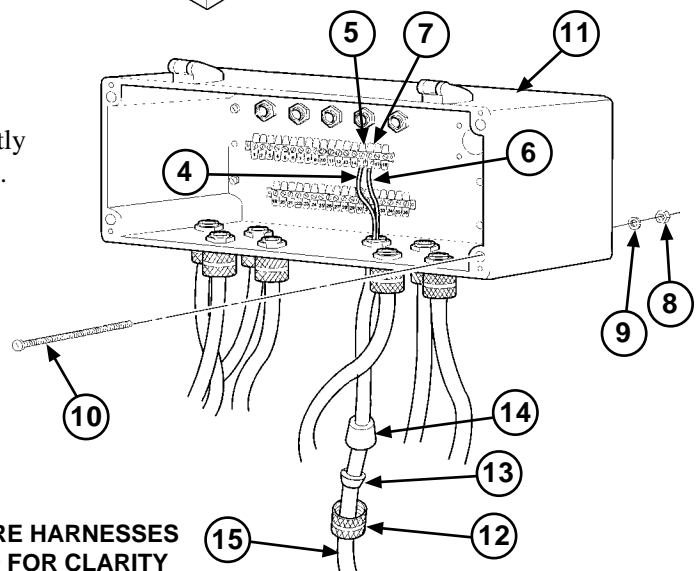
- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).



**NOTE**

Tag and mark wires prior to removal.

- (3) Remove white wire no. 15 (4) from terminal no. 15 (5) and black wire no. 16 (6) from terminal no. 16 (7).
- (4) Remove four locknuts (8), washers (9) and screws (10) from junction box (11) and gently pull junction box forward to access nut (12). Discard locknuts.



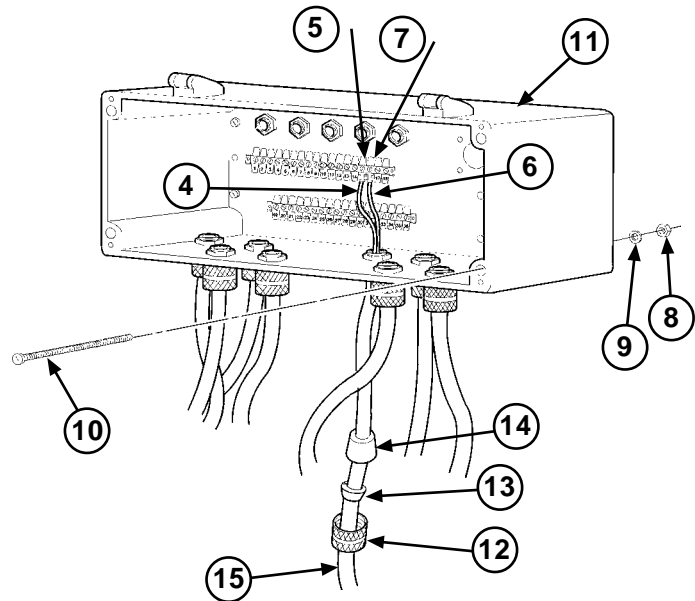
**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

**4-82. MAIN FRAME VALVE (LOAD) HARNESS REPLACEMENT (MODEL A ONLY)  
(continued)**

**NOTE**

Note position of rubber grommet prior to removal.

- (5) Remove nut (12), plastic insert (13) and rubber grommet (14) from junction box (11)
- (6) Remove main frame valve (load) harness (15) from junction box (11).
- (7) Loosen screw (16) and remove connector (17) and gasket (18) from directional control valve (19). Discard gasket.
- (8) Remove nut (12), plastic insert (13), and rubber grommet (14) from main frame valve (load) harness (15).



**b. Installation.**

**NOTE**

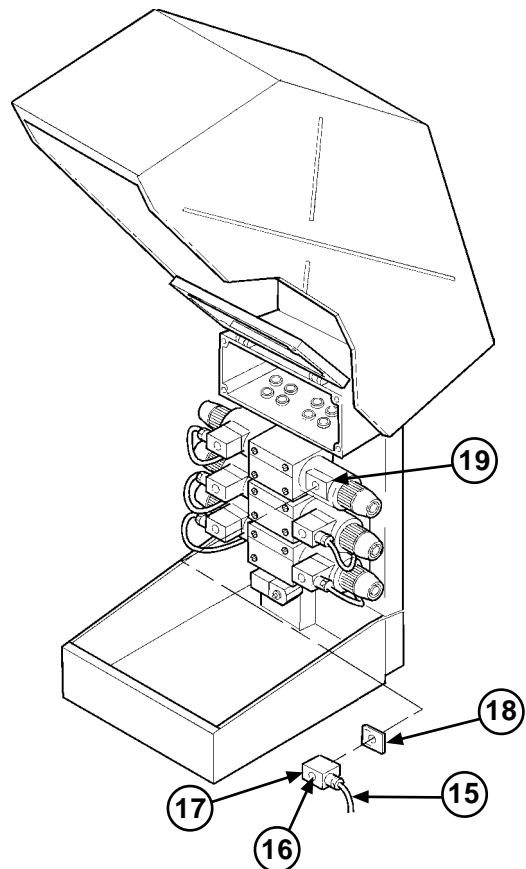
OTHER WIRE HARNESES REMOVED FOR CLARITY

- Install cable ties as required.
- Ensure rubber grommet is installed in same position as noted during removal.

- (1) Install rubber grommet (14), plastic insert (13), and nut (12) on main frame valve (load) harness (15).
- (2) Install new gasket (18) and connector (17) to directional control valve (19) and tighten screw (16).
- (3) Position main frame valve (load) harness (15) in junction box (11).
- (4) Install rubber grommet (14), plastic insert (13), and nut (12) on junction box (11).
- (5) Install junction box (11) on vehicle (19) with four screws (10), washers (9) and new locknuts (8).
- (6) Install black wire no. 16 (6) on terminal no. 16 (7) and white wire no. 15 (4) on terminal no. 15 (5).
- (7) Close junction box cover (3) and tighten four screws (2).
- (8) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).



**END OF TASK**

**4-83. MAIN FRAME VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal                                  b. Installation                                  c. Follow-on Maintenance

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanics: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Gasket (Item 109, Appendix K)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

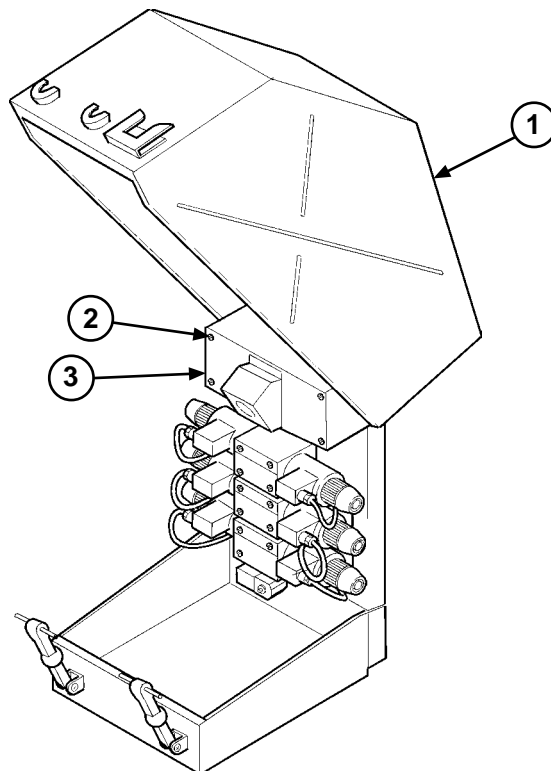
*Materials/Parts*

Cables Ties (Item 8, Appendix E)

**a. Removal.****NOTE**

Cut cable ties as required.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).



**4-83. MAIN FRAME VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

**NOTE**

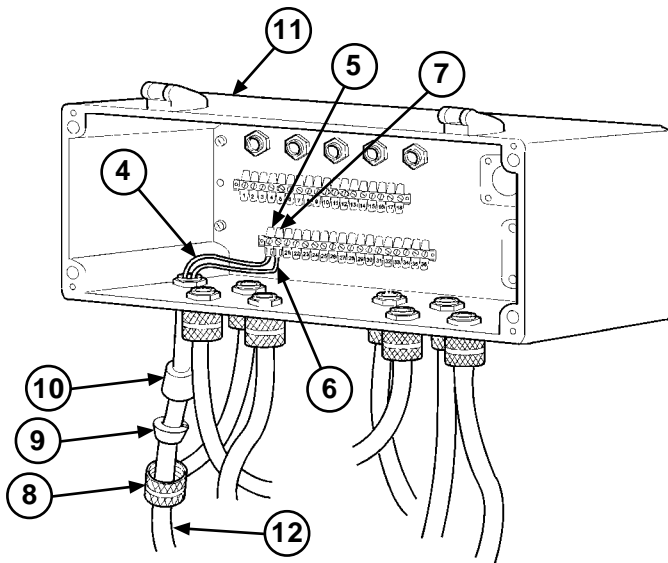
Tag and mark wires prior to removal.

- (3) Remove white wire no. 19 (4) from terminal no. 19 (5) and black wire no. 20 (6) from terminal no. 20 (7).

**NOTE**

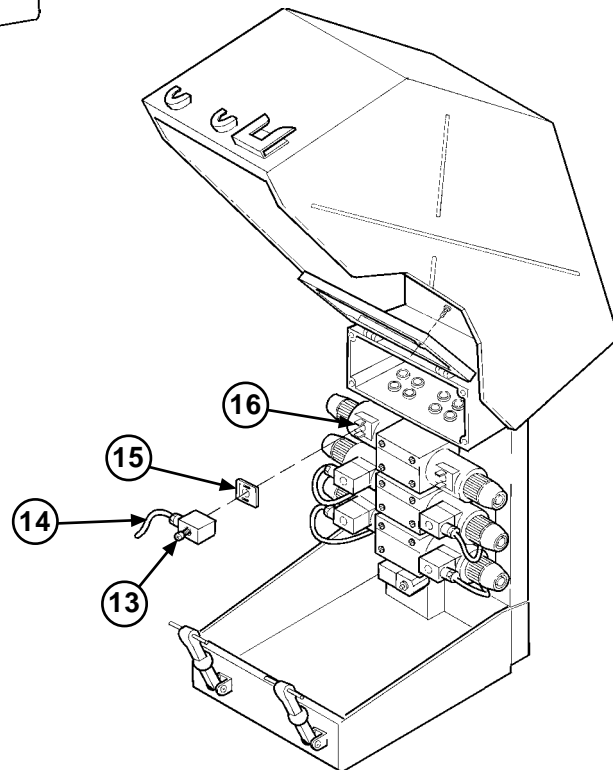
Note position of rubber grommet prior to removal.

- (4) Remove nut (8), plastic insert (9) and rubber grommet (10) from junction box (11).



**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

- (5) Remove main frame valve (unload) harness (12) from junction box (11).
- (6) Loosen screw (13) and remove connector (14) and gasket (15) from directional control valve (16). Discard gasket.
- (7) Remove nut (8), plastic insert (9), and rubber grommet (10) from main frame valve (unload) harness (12).



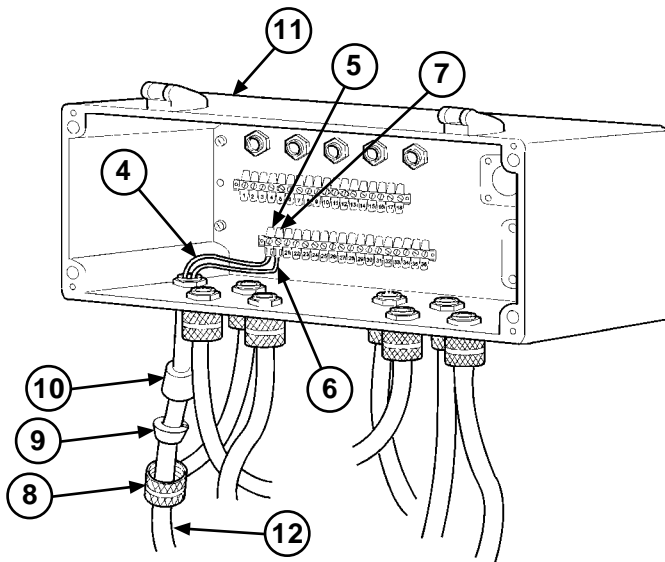
## 4-83. MAIN FRAME VALVE (UNLOAD) HARNESS REPLACEMENT(MODEL A ONLY) (continued).

### b. Installation.

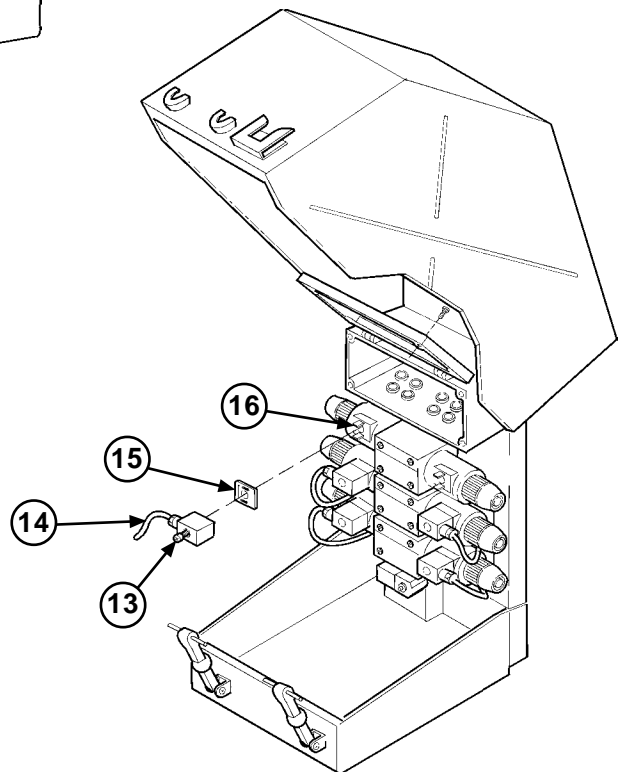
#### NOTE

- Install cable ties as required.
- Ensure rubber grommet is installed as noted during removal.

- (1) Install rubber grommet (10), plastic insert (9), and nut (8) on main frame valve (unload) harness (12).
- (2) Install new gasket (15) and connector (14) on directional control valve (16) and tighten screw (13).

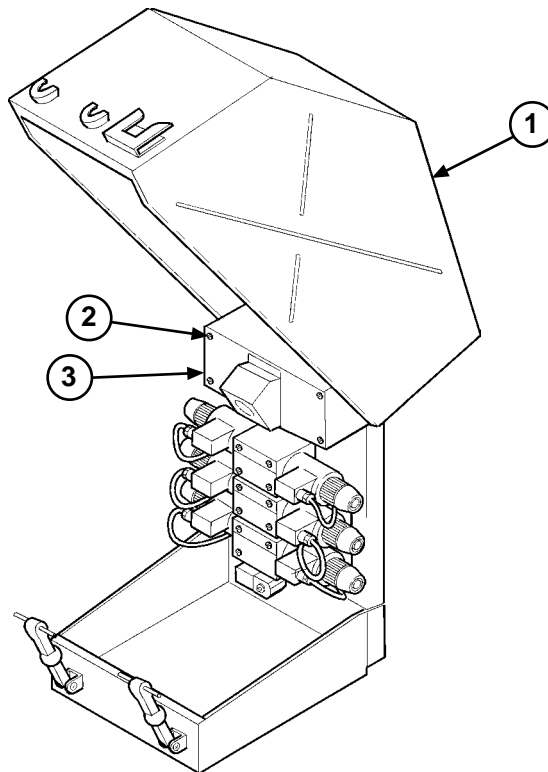


- (3) Position main frame (unload) harness (12) in junction box (11).
- (4) Install rubber grommet (10), plastic insert (9), and nut (8) on junction box (11).
- (5) Install black wire no. 20 (6) on terminal no. 20 (7) and white wire no. 19 on terminal no. 19 (5).



**4-83. MAIN FRAME VALVE (UNLOAD) HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

(6) Close junction box cover (3) and tighten four screws (2).



(7) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-84. MAIN JUNCTION BOX HARNESS (24-PIN) REPLACEMENT(MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)

Locknut (4) (Item 61, Appendix K)

*Equipment Condition*

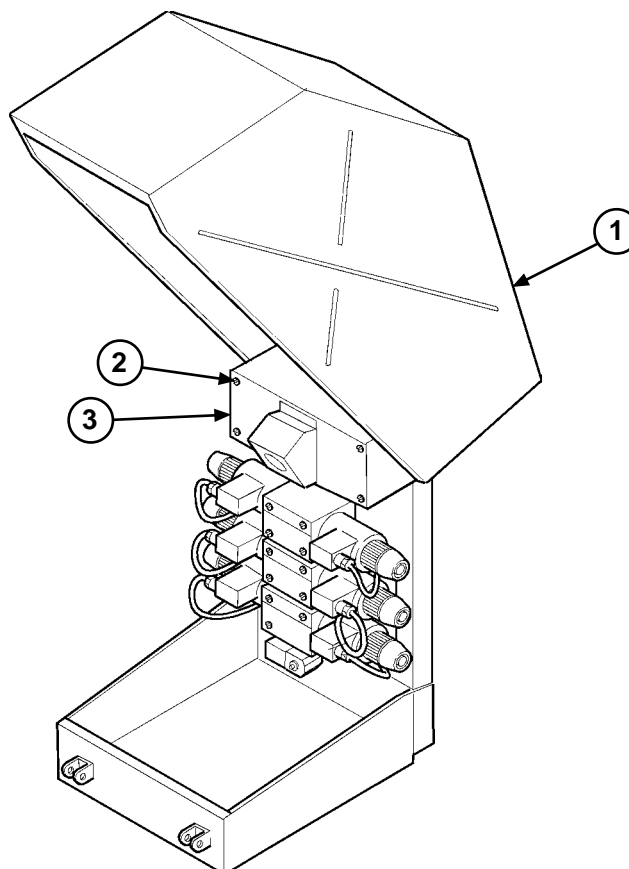
Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

Adhesive, RTV Sealant (Item 5, Appendix E)

**a. Removal.**

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).

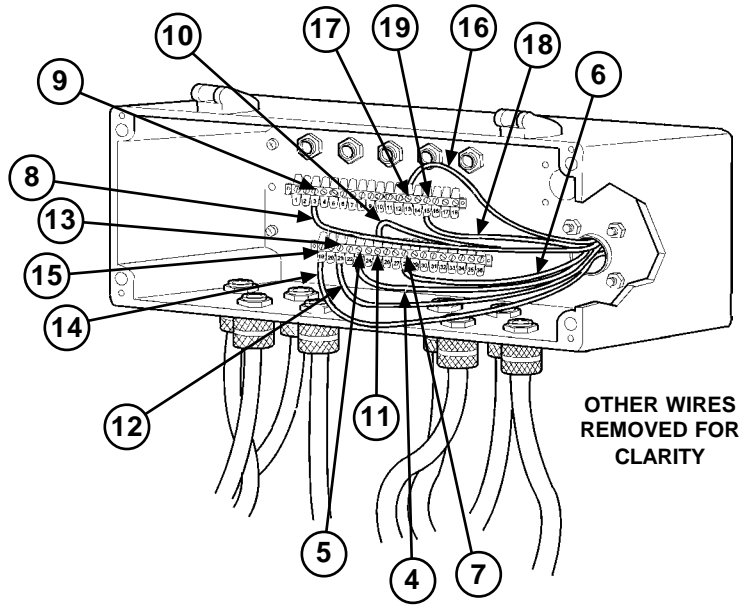


**4-84. MAIN JUNCTION BOX HARNESS (24-PIN) REPLACEMENT (MODEL A ONLY)  
(continued).**

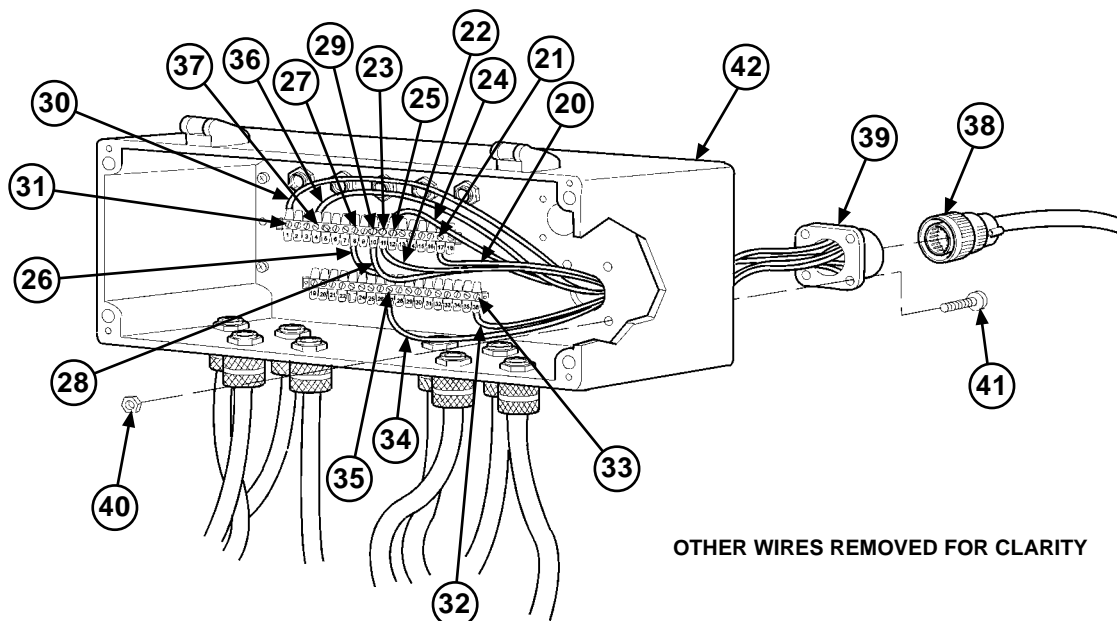
**NOTE**

Tag and mark wires prior to removal.

- (3) Remove wire no. 23 (4) from terminal no. 23 (5), wire no. 28 (6) from terminal no. 28 (7), wire no. 3 (8) from terminal no. 3 (9) and wire no. 25 (10) from terminal no. 25 (11).
- (4) Remove wire no. 21 (12) from terminal no. 21 (13), wire no. 19 (14) from terminal no. 19 (15), wire no. 13 (16) from terminal no. 13 (17) and wire no. 15 (18) from terminal no. 15 (19).



- (5) Remove wire no. 17 (20) from terminal no. 17 (21), wire no. 11 (22) from terminal no. 11 (23), wire no. 12 (24) from terminal no. 12 (25) and wire no. 8 (26) from terminal no. 8 (27).
- (6) Remove wire no. 10 (28) from terminal no. 10 (29), wire no. 1 (30) from terminal no. 1 (31), wire no. 36 (32) from terminal no. 36 (33), wire no. 27 (34) from terminal no. 27 (35) and wire no. 4 (36) from terminal no. 4 (37).





## 4-84. MAIN JUNCTION BOX HARNESS (24-PIN) REPLACEMENT (MODEL A ONLY) (continued).

- (7) Remove connector P4 (38) from main junction box harness (39).
- (8) Remove four locknuts (40), and screws (41), and main junction box harness (39) from main junction box (42). Discard locknuts.

### b. Installation.

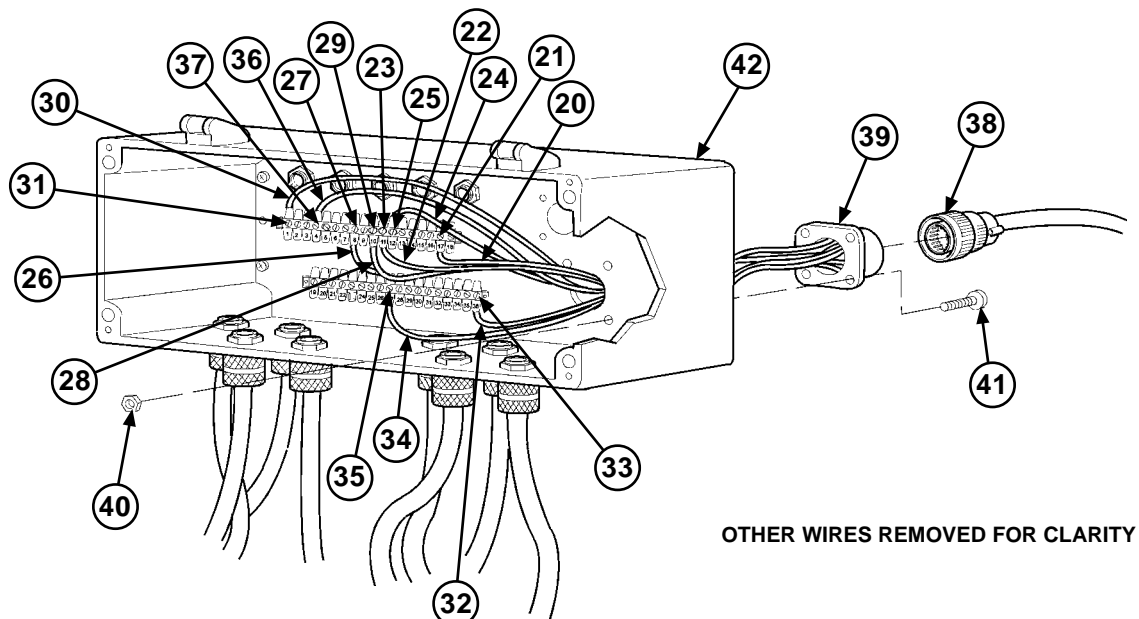
#### WARNING

Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.

#### NOTE

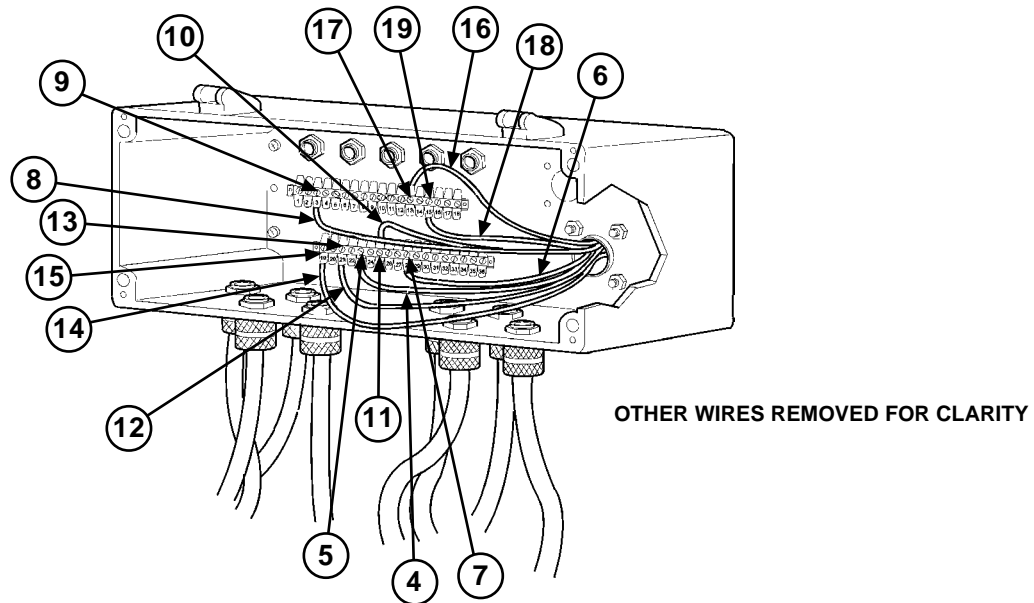
Connector should be installed in junction box with notch facing up.

- (1) Apply RTV sealant adhesive to flange of main junction box harness (39) and install in junction box (42) with four screws (41) and new locknuts (40).
- (2) Install connector P4 (38) on main junction box harness (39).
- (3) Install wire no. 4 (36) on terminal no. 4 (37), wire no. 27 (34) on terminal no. 27 (35), wire no. 36 (32) on terminal no. 36 (33), wire no. 1 (30) on terminal no. 1 (31) and wire no. 10 (28) on terminal no. 10 (29).
- (4) Install wire no. 8 (26) on terminal no. 8 (27), wire no. 12 (24) on terminal no. 12 (25), wire no. 11 (22) on terminal no. 11 (23) and wire no. 17 (20) on terminal no. 17 (21).

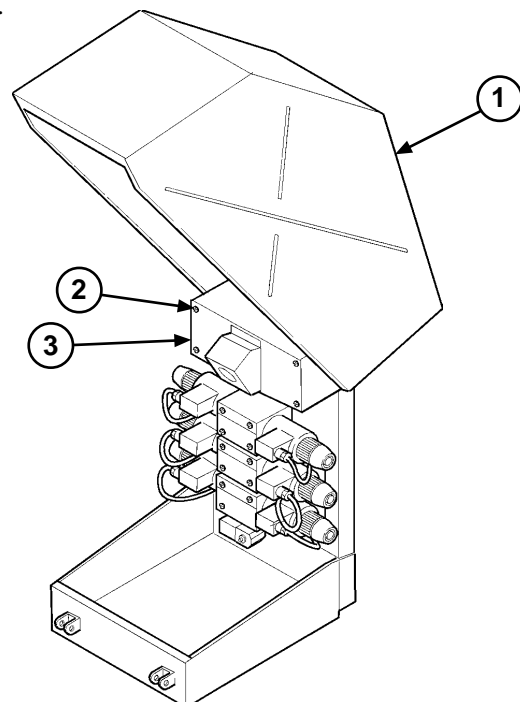


**4-84. MAIN JUNCTION BOX HARNESS (24-PIN) REPLACEMENT (MODEL A ONLY)  
(continued).**

- (5) Install wire no. 15 (18) on terminal no. 15 (19), wire no. 13 (16) on terminal no. 13 (17), wire no. 19 (14) on terminal no. 19 (15) and wire no. 21 (12) on terminal no. 21 (13).
- (6) Install wire no. 25 (10) on terminal no. 25 (11), wire no. 3 (8) on terminal no. 3 (9), wire no. 28 (6) on terminal no. 28 (7) and wire no. 23 (4) on terminal no. 23 (5).



- (7) Close junction box cover (3) and tighten four screws (2).
- (8) Close hydraulic cabinet cover (1).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-85. MAIN JUNCTION BOX HARNESS (FRONT) REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

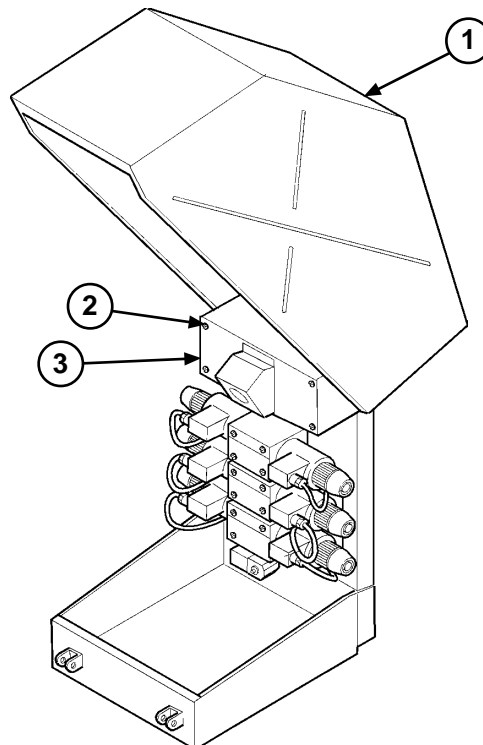
Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

Adhesive, RTV Sealant, (Item 5, Appendix E)  
 Tag, Identification (as required) (Item 23, Appendix E)  
 Locknut (4) (Item 61, Appendix K)

**a. Removal.**

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).

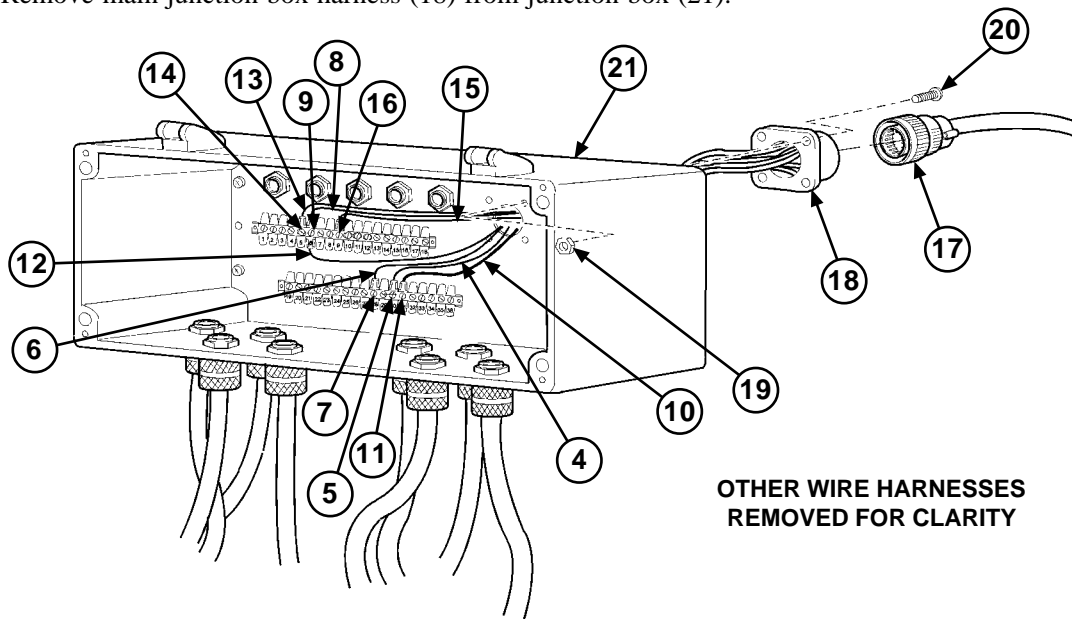


**4-85. MAIN JUNCTION BOX HARNESS (FRONT) REPLACEMENT (MODEL A ONLY)  
(continued).**

**NOTE**

Tag and mark wires prior to removal.

- (3) Remove wire no. 30 (4) from terminal no. 30 (5), wire no. 29 (6) from terminal no. 29 (7), wire no. 6 (8) from terminal no. 6 (9) and wire no. 31 (10) from terminal no. 31 (11).
- (4) Remove wire no. 6 (12) from terminal no. 6 (9), wire no. 5 (13) from terminal no. 5 (14) and wire no. 9 (15) from terminal no. 9 (16).
- (5) Disconnect connector P3 (17) from main junction box harness (18).
- (6) Remove four locknuts (19) and screws (20) from main junction box harness (18). Discard locknuts.
- (7) Remove main junction box harness (18) from junction box (21).



**b. Installation.**

**WARNING**

**Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.**

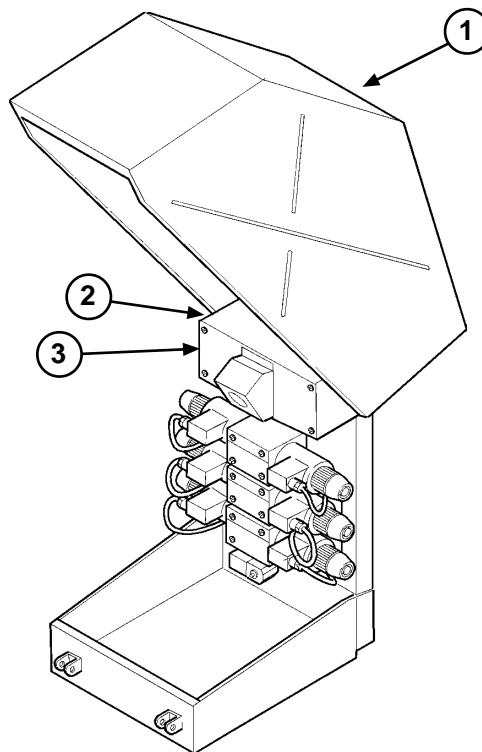
**NOTE**

Connector should be installed with notch facing up.

- (1) Apply RTV sealant adhesive to flange of main junction box harness (18) and install in junction box (21) with four screws (20) and new locknuts (19).

## 4-85. MAIN JUNCTION BOX HARNESS (FRONT) REPLACEMENT (MODEL A ONLY) (continued).

- (2) Connect connector P3 (17) to main junction box harness (18).
- (3) Install wire no. 9 (15) on terminal no. 9 (16), wire no. 5 (13) on terminal no. 5 (14) and wire no. 6 (12) on terminal no. 6 (9).
- (4) Install wire no. 31 (10) on terminal no. 31 (11), wire no. 6 (8) on terminal no. 6 (9), wire no. 29 (6) on terminal no. 29 (7) and wire no. 30 (4) on terminal no. 30 (5).
- (5) Close junction box cover (3) and tighten four screws (2).



- (6) Close hydraulic cabinet cover (1).

### c. Follow-on Maintenance:

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

## 4-86. MAIN LHS HARNESS REPLACEMENT (MODEL A ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

#### *Equipment Condition*

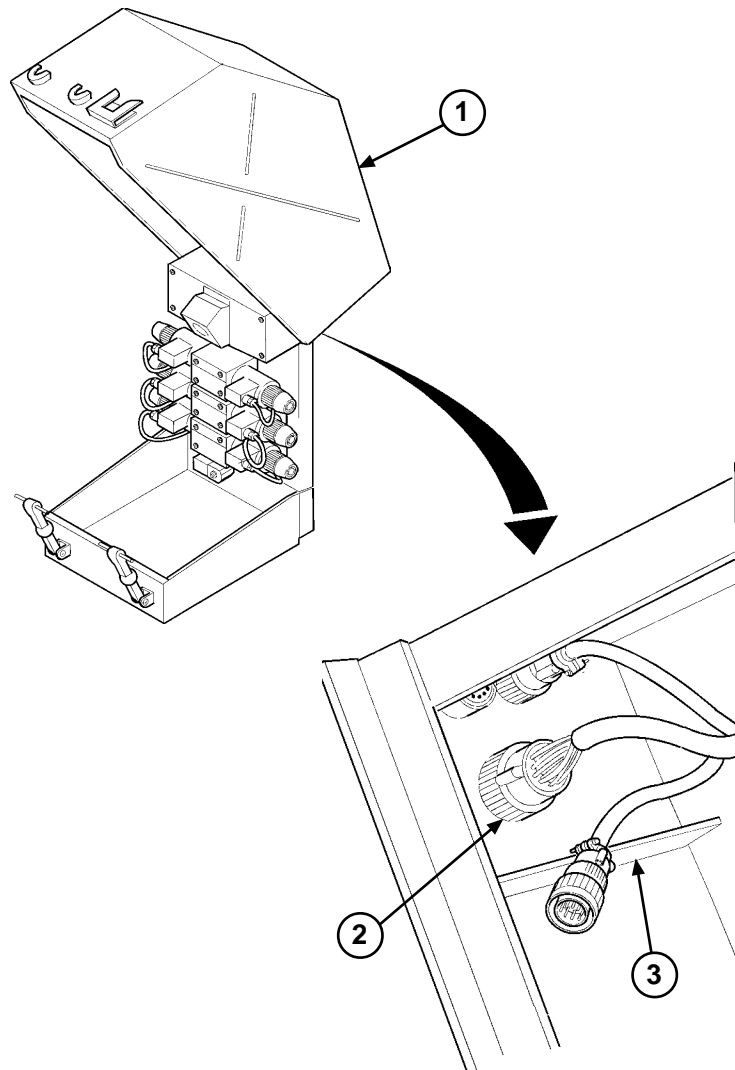
Hook arm raised (para 2-9)  
Batteries disconnected (TM 9-2320-279-20)

#### *Materials/Parts*

Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

### **a. Removal.**

- (1) Open hydraulic cabinet cover (1).
- (2) Disconnect connector P6 (2) from junction box (3).



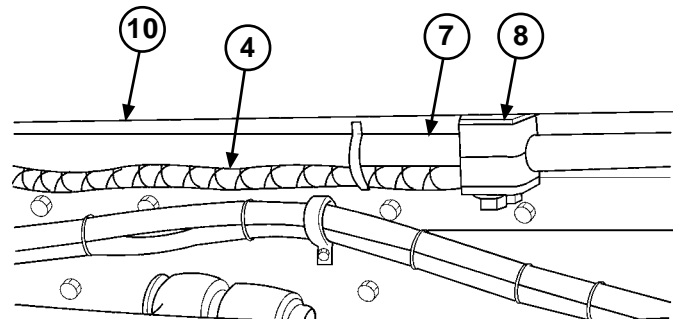
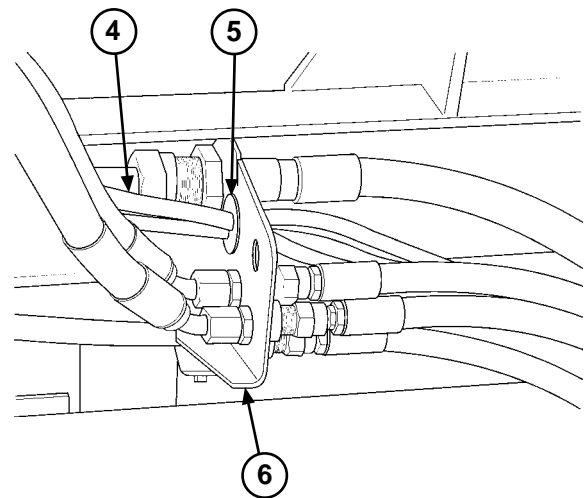
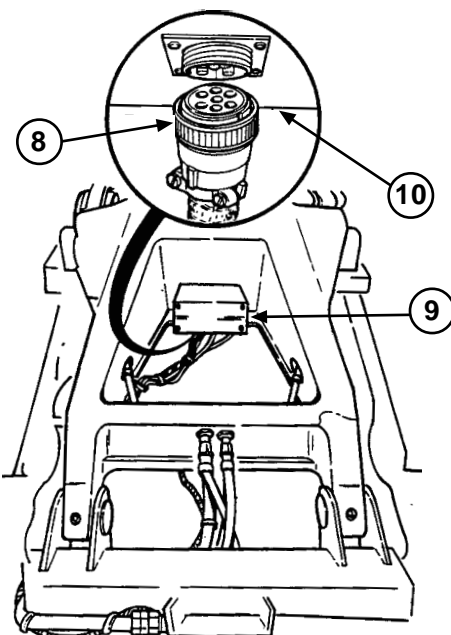
**4-86. MAIN LHS HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (3) Remove main LHS harness (4) from grommet (5) on compression frame bracket (6).

**NOTE**

Note location of cable ties prior to removal to ensure proper installation.

- (4) Cut and remove cable ties securing main LHS harness (4) to hydraulic tube (7).



- (5) Disconnect connector P7 (8) from main frame junction box (9).
- (6) Remove main LHS harness (4) from vehicle (10).

**b. Installation.**

- (1) Route main LHS harness (4) on vehicle (10).
- (2) Connect connector P7 (8) to main frame junction box (9).

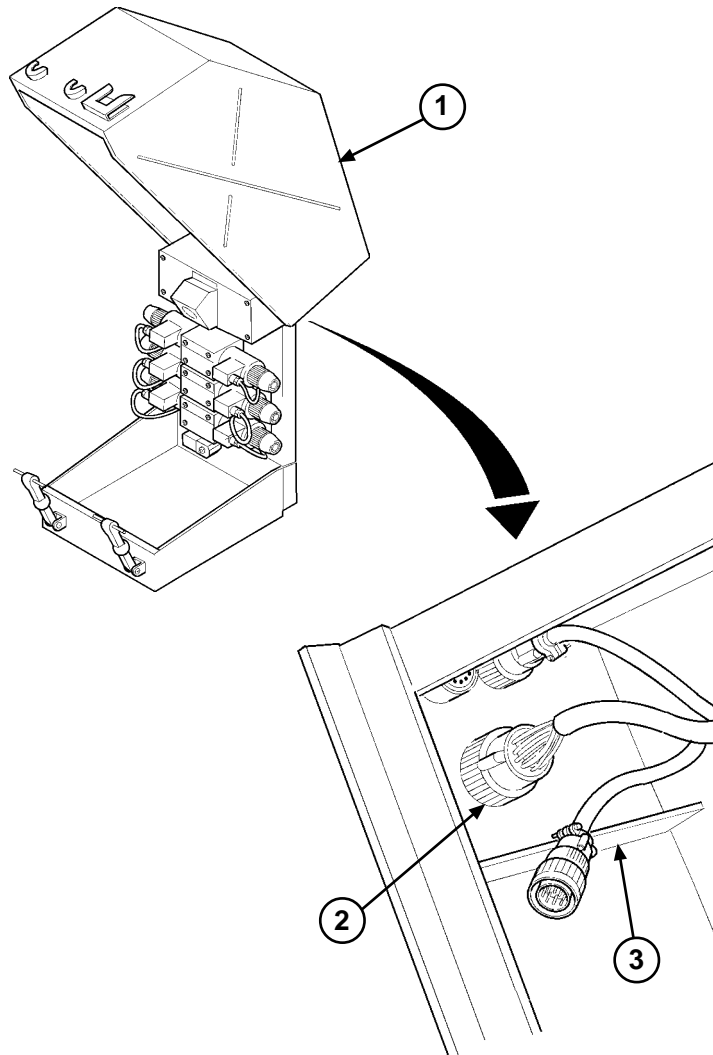
**NOTE**

Install cable ties in same locations as noted during removal.

- (3) Secure main LHS harness (4) to hydraulic tube (7) with plastic cable ties.
- (4) Install main LHS harness (4) in grommet (5) on compression frame bracket (6).

**4-86. MAIN LHS HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (5) Connect connector P6 (2) to junction box (3).
- (6) Close hydraulic cabinet cover (1).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).
- Lower hook arm (para 2-9).

**END OF TASK**



**4-87. OIL TEMPERATURE SENSOR AND HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Gasket (Item 109, Appendix K)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

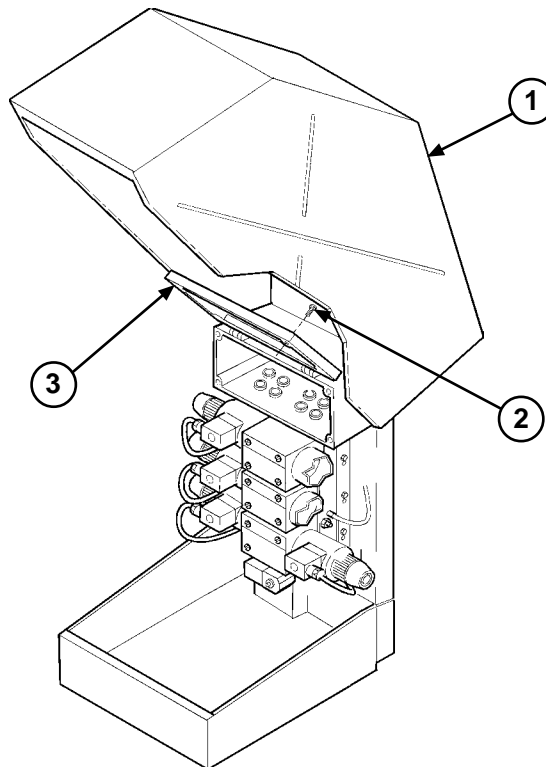
Cables Ties (Item 8, Appendix E)

**a. Removal.**

**NOTE**

Cut cable ties as required.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).



**4-87. OIL TEMPERATURE SENSOR AND HARNESS REPLACEMENT (MODEL A ONLY)  
(continued).**

**NOTE**

Tag and mark wires prior to removal.

- (3) Remove white wire no. 1 (4) from terminal no. 1 (5) and black wire no. 2 (6) from terminal no. 2 (7).

**NOTE**

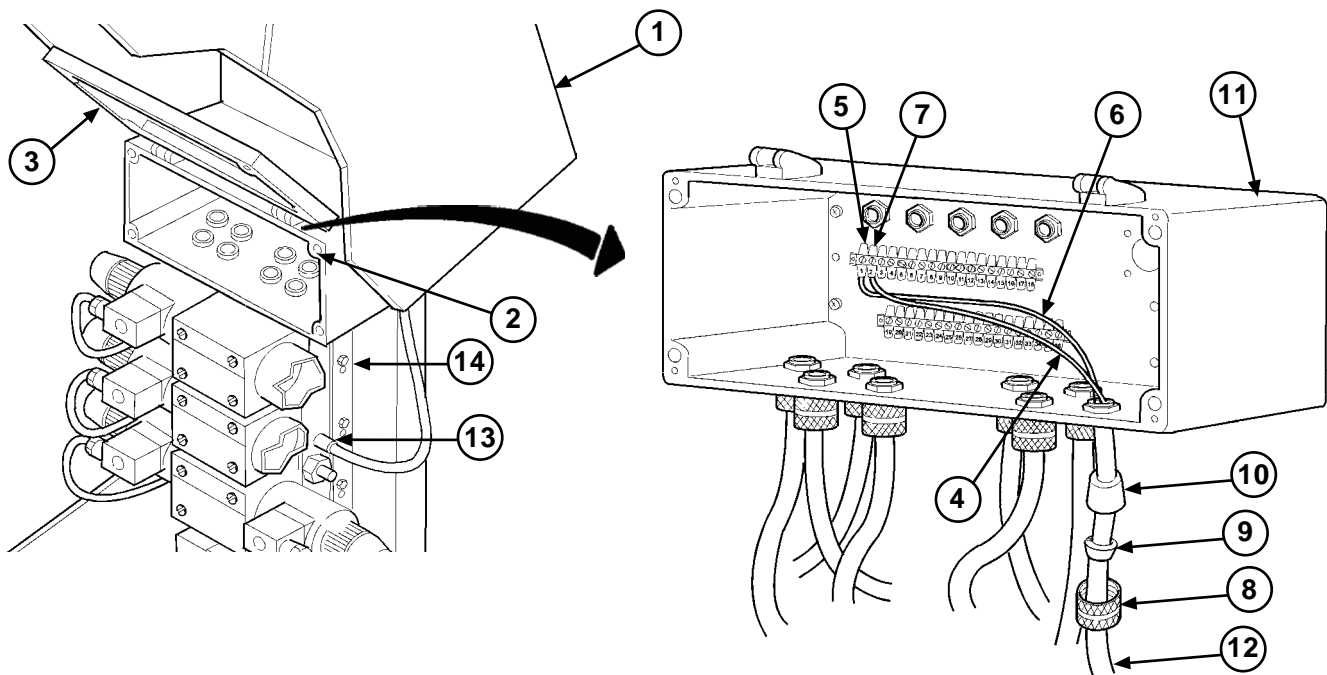
Note position of rubber grommet prior to removal.

- (4) Remove nut (8), plastic insert (9) and rubber grommet (10) from junction box (11).
- (5) Remove oil temperature harness (12) from junction box (11).

**NOTE**

Screws in bracket may need to be loosened if oil temperature unit does not remove easily in Step 6.

- (6) Remove oil temperature sensor (13) from bracket (14).
- (7) Remove nut (8), plastic insert (9), and rubber grommet (10) from oil temperature harness (11).



**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

## 4-87. OIL TEMPERATURE SENSOR AND HARNESS REPLACEMENT (MODEL A ONLY) (continued).

### *b. Installation.*

#### NOTE

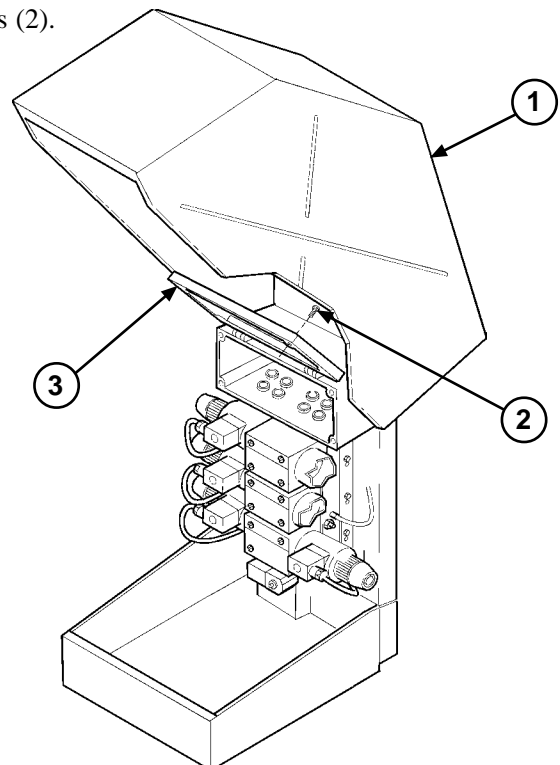
Ensure rubber grommet is installed as noted during removal.

- (1) Install rubber grommet (10), plastic insert (9), and nut (8) on oil temperature harness (11).

#### NOTE

- Install cable ties as required.
- If screws in bracket were loosened during removal, tighten screws upon completion of Step 2.

- (2) Install oil temperature sensor (13) in bracket (14).
- (3) Position oil temperature harness (12) in junction box (11).
- (4) Install rubber grommet (10), plastic insert (9), and nut (8) on junction box (11).
- (5) Install black wire no. 2 (6) on terminal no. 2 (7) and white wire no. 1 (4) on terminal no. 1 (5).
- (6) Close junction box cover (3) and tighten four screws (2).
- (7) Close hydraulic cabinet cover (1).



### *c. Follow-on Maintenance:*

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

### 4-88. RIGHT-HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Lockwasher (4) (Item 104, Appendix K)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

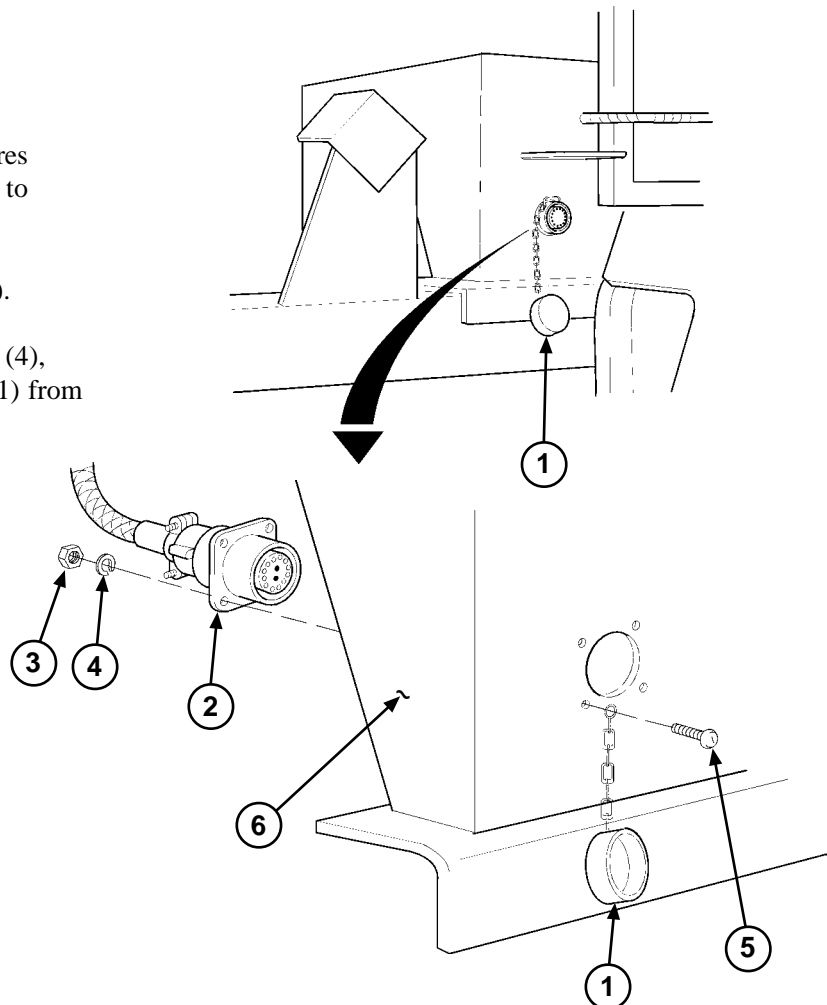
Tag, Identification (as required) (Item 23, Appendix E)  
Cable Ties (Item 8, Appendix E)

#### a. Removal.

#### NOTE

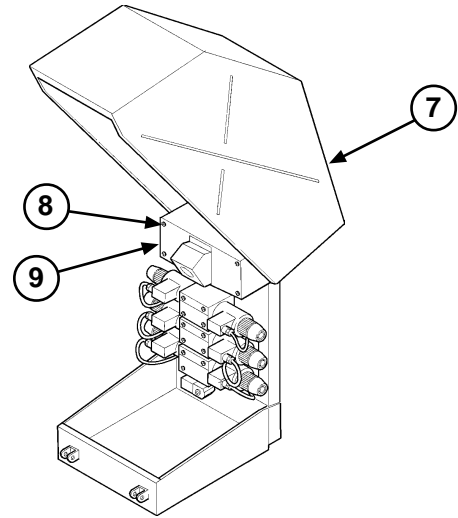
- Cut cable ties as required.
- Tag and mark all connectors, wires and connection points prior to removal.

- (1) Remove cap (1) from connector (2).
- (2) Remove four nuts (3), lockwashers (4), screws (5), connector (2) and cap (1) from bracket (6). Discard lockwashers.



**4-88. RIGHT-HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

- (3) Open hydraulic cabinet cover (7).
- (4) Loosen four screws (8) and open junction box cover (9).
- (5) Remove black/brown wire no. 9L (10) from terminal no. 9 (11) and blue wire no. 7C (12) from terminal no. 7 (13).
- (6) Remove orange wire no. 33D (14) from terminal no. 33 (15) and yellow wire no. 35E (16) from terminal no. 35 (17).
- (7) Remove brown wire no. 17F (18) from terminal no. 17 (19) and red/black wire no. 13G (20) from terminal nn. 13 (21).

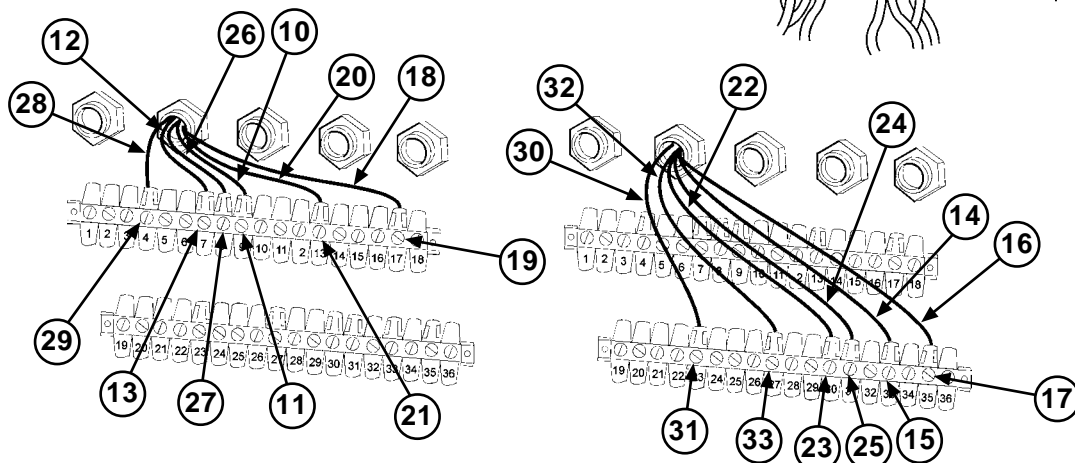
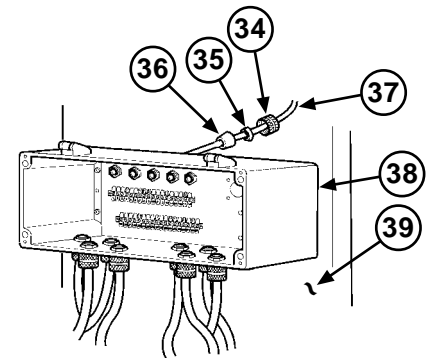


- (8) Remove blue/black wire no. 30H (22) from terminal no. 30 (23) and orange/black wire no. 31I (24) from terminal no. 31 (25).
- (9) Remove black wire no. 8A (26) from terminal no. 8 (27) and red wire no. 4B (28) from terminal no. 4 (29).
- (10) Remove yellow/black wire no. 23J (30) from terminal no. 23 (31) and brown/black wire no. 27K (32) from terminal no. 27 (33).

**NOTE**

Note position of rubber grommet prior to removal.

- (11) Remove nut (34), plastic insert (35), rubber grommet (36), and right-hand linking harness (37) from junction box (38).
- (12) Remove right-hand linking harness (37) from vehicle (39).
- (13) Remove rubber grommet (36), plastic insert (35), and nut (34) from right-hand linking harness (37).



**OTHER HARNESSES  
REMOVED FOR CLARITY**

**4-88. RIGHT HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

**b. Installation.**

- (1) Install nut (34), plastic insert (35), and rubber grommet (36) on right-hand linking harness (37).

**NOTE**

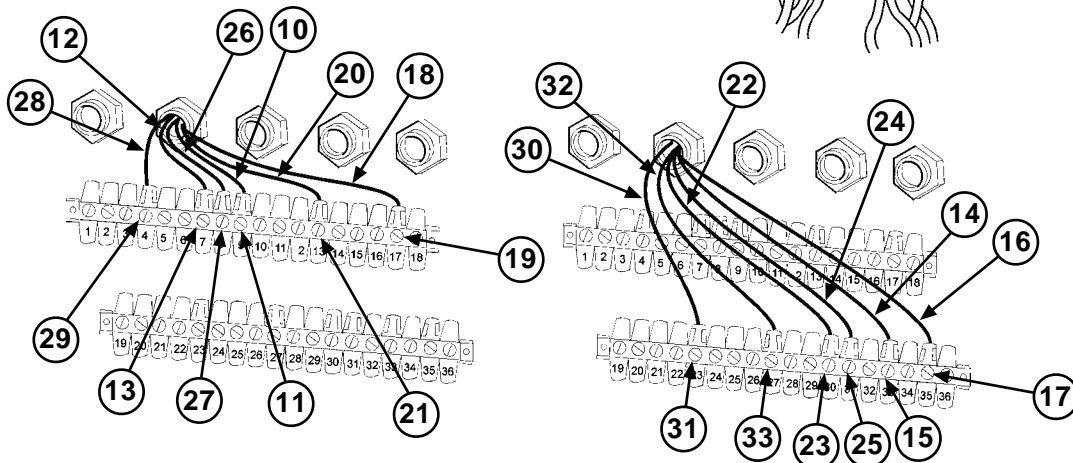
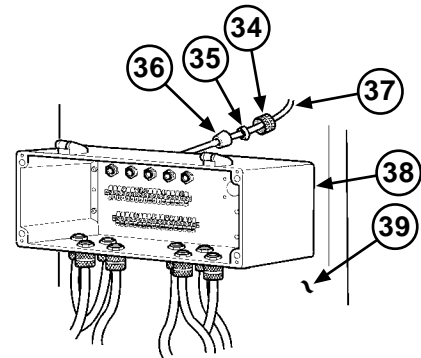
Install cable ties as required.

- (2) Position right-hand linking harness (37) on vehicle (39) and route up to junction box (38).

**NOTE**

Ensure rubber grommet is installed in same position as noted during removal.

- (3) Install right hand linking harness (37) in junction box (38) with rubber grommet (36), plastic insert (35), and nut (34).
- (4) Install brown/black wire no. 27K (32) on terminal no. 27 (33) and yellow/black wire no. 23J (30) on terminal no. 23 (31).
- (5) Install red wire no. 4B (28) on terminal no. 4 (29) and black wire no. 8A (26) on terminal no. 8 (27).
- (6) Install orange/black wire no. 31I (24) on terminal no. 31 (25) and blue/black wire no. 30H (22) on terminal no. 30 (23).
- (7) Install red/black wire no. 13G (20) on terminal no. 13 (21) and brown wire no. 17F (18) on terminal no. 17 (19).
- (8) Install yellow wire no. 35E (16) on terminal no. 35 (17) and orange wire no. 33D (14) on terminal no. 33 (15).
- (9) Install blue wire no. 7C (12) on terminal no. 7 (13) and black/brown wire no. 9L (10) on terminal no. 9 (11).

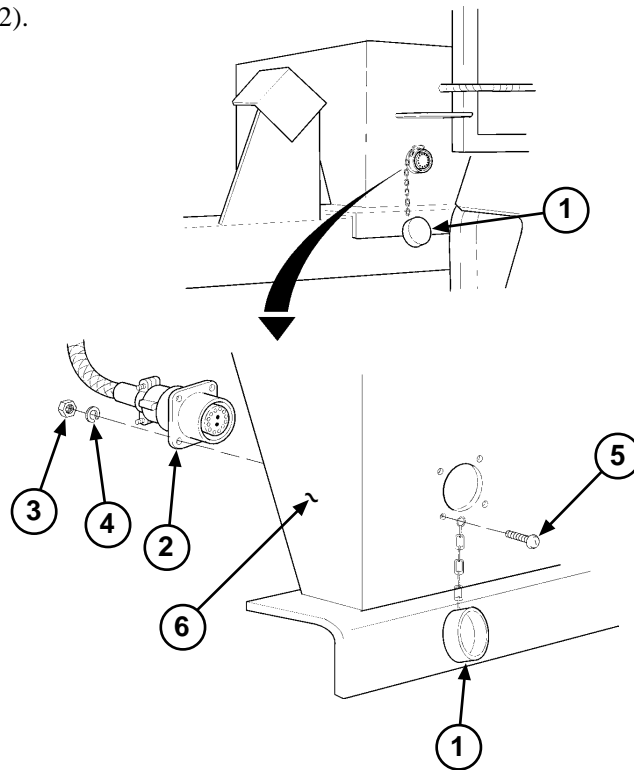


**OTHER HARNESSSES  
REMOVED FOR CLARITY**

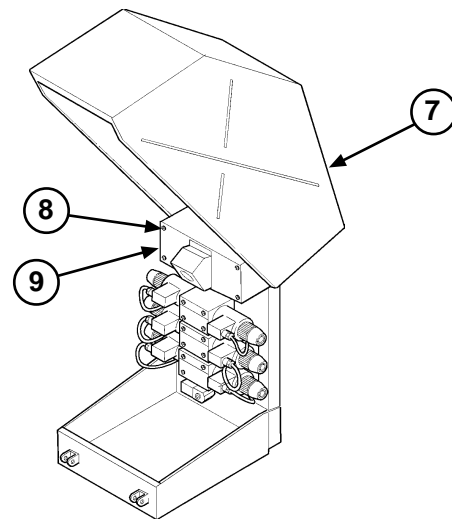
**4-88. RIGHT HAND LINKING HARNESS REPLACEMENT (MODEL A ONLY) (continued).****NOTE**

Connector should be installed with notch facing up.

- (10) Install connector (2) and cap (1) on bracket (6) with four screws (5), new lockwashers (4) and nuts (3).
- (11) Install cap (1) on connector (2).



- (12) Close junction box cover (9) and tighten four screws (8).
- (13) Close hydraulic cabinet cover (7).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**4-89. WINCH (IN) HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Gasket (Item 109, Appendix K)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)

**a. Removal.**

**NOTE**

Cut cable ties as required.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).

**NOTE**

Tag and mark wires prior to removal.

- (3) Remove white wire no. 35 (4) from terminal no. 35 (5) and black wire no. 36 (6) from terminal no. 36 (7).

**NOTE**

Note position of rubber grommet prior to removal.

- (4) Remove nut (8), plastic insert (9) and rubber grommet (10) from junction box (11).
- (5) Remove winch (in) harness (12) from junction box (11).
- (6) Loosen screw (13) and remove connector (14) and gasket (15) from directional control valve (16).  
Discard gasket.
- (7) Remove nut (8), plastic insert (9), and rubber grommet (10) from winch (in) harness (12).

**b. Installation.**

**NOTE**

Ensure rubber grommet is installed as noted during removal.

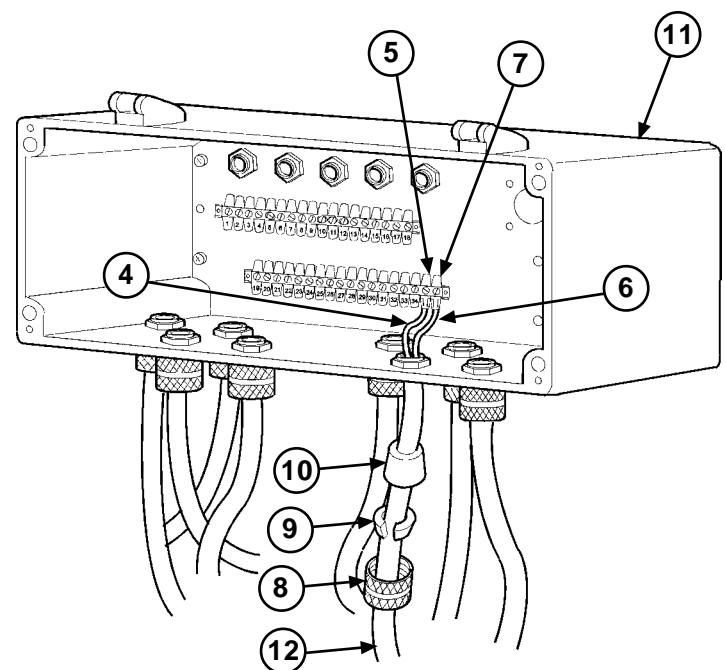
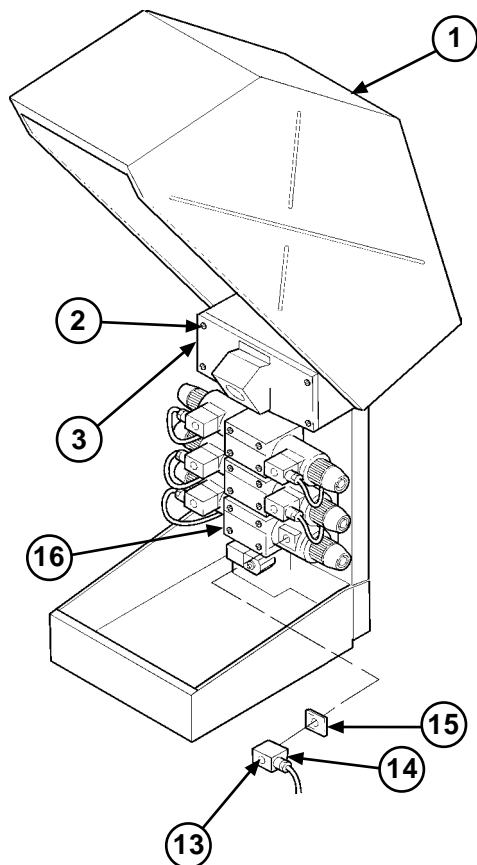
- (1) Install rubber grommet (10), plastic insert (9), and nut (8) on winch (in) harness (12).



**4-89. WINCH (IN) HARNESS REPLACEMENT (MODEL A ONLY) (continued).****NOTE**

Install cable ties as required.

- (2) Install new gasket (15) and connector (14) on directional control valve (16) and tighten screw (13).
- (3) Position winch (in) harness (12) in junction box (11).
- (4) Install rubber grommet (10), plastic insert (9), and nut (8) on junction box (11).
- (5) Install black wire no. 36 (6) on terminal no. 36 (7) and white wire no. 35 (4) on terminal no. 35 (5).
- (6) Close junction box cover (3) and tighten four screws (2).
- (7) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY**

**4-90. WINCH (OUT) HARNESS REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Gasket (Item 109, Appendix K)

Locknut (4) (Item 110, Appendix K)

*Materials/Parts*

Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

**a. Removal.**

**NOTE**

Cut cable ties as required.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).

**NOTE**

Tag and mark wires prior to removal to ensure proper installation.

- (3) Remove white wire no. 33 (4) from terminal no. 33 (5) and black wire no. 34 (6) from terminal no. 34 (7).
- (4) Remove four locknuts (8), washers (9) and screws (10) from junction box (11) and gently pull junction box forward to access nut (12). Discard locknuts.

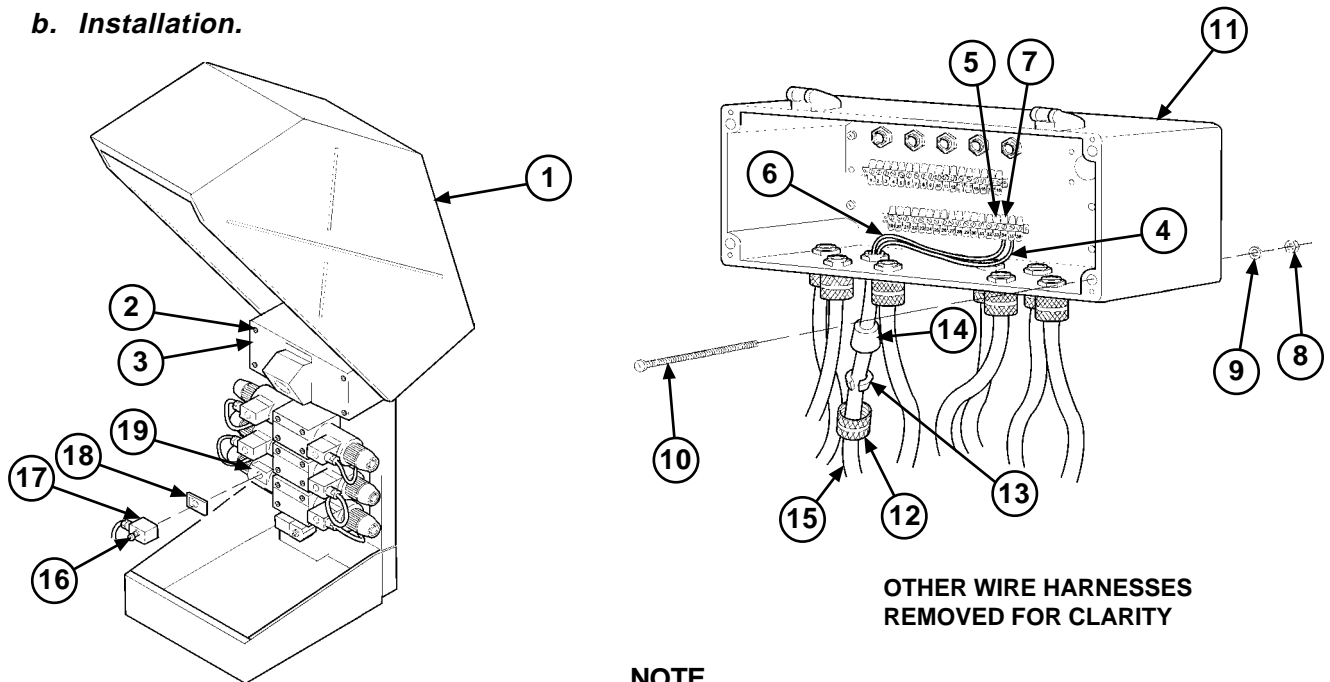
**NOTE**

Note position of rubber grommet prior to removal.

- (5) Remove nut (12), plastic insert (13) and rubber grommet (14) from junction box (11).
- (6) Remove winch (out) harness (15) from junction box (11).
- (7) Loosen screw (16) and remove connector (17) and gasket (18) from directional control valve (19). Discard gasket.
- (8) Remove nut (12), plastic insert (13), and rubber grommet (14) from winch (out) harness (15).

## 4-90. WINCH (OUT) HARNESS REPLACEMENT (MODEL A ONLY) (continued).

### b. Installation.



#### NOTE

Ensure rubber grommet is installed in same position as noted during removal.

- (1) Install rubber grommet (14), plastic insert (13), and nut (12) on winch (out) harness (15).

#### NOTE

Install cable ties as required.

- (2) Install new gasket (18) and connector (17) to directional control valve (19) and tighten screw (16).
- (3) Position winch (out) harness (15) in junction box (11).
- (4) Install rubber grommet (14), plastic insert (13), and nut (12) on junction box (11).
- (5) Install junction box (11) on vehicle (19) with four screws (10), washers (9) and new locknuts (8).
- (6) Install black wire no. 34 (6) on terminal no. 34 (7) and white wire no. 33 (4) on terminal no. 33 (5).
- (7) Close junction box cover (3) and tighten four screws (2).
- (8) Close hydraulic cabinet cover (1).

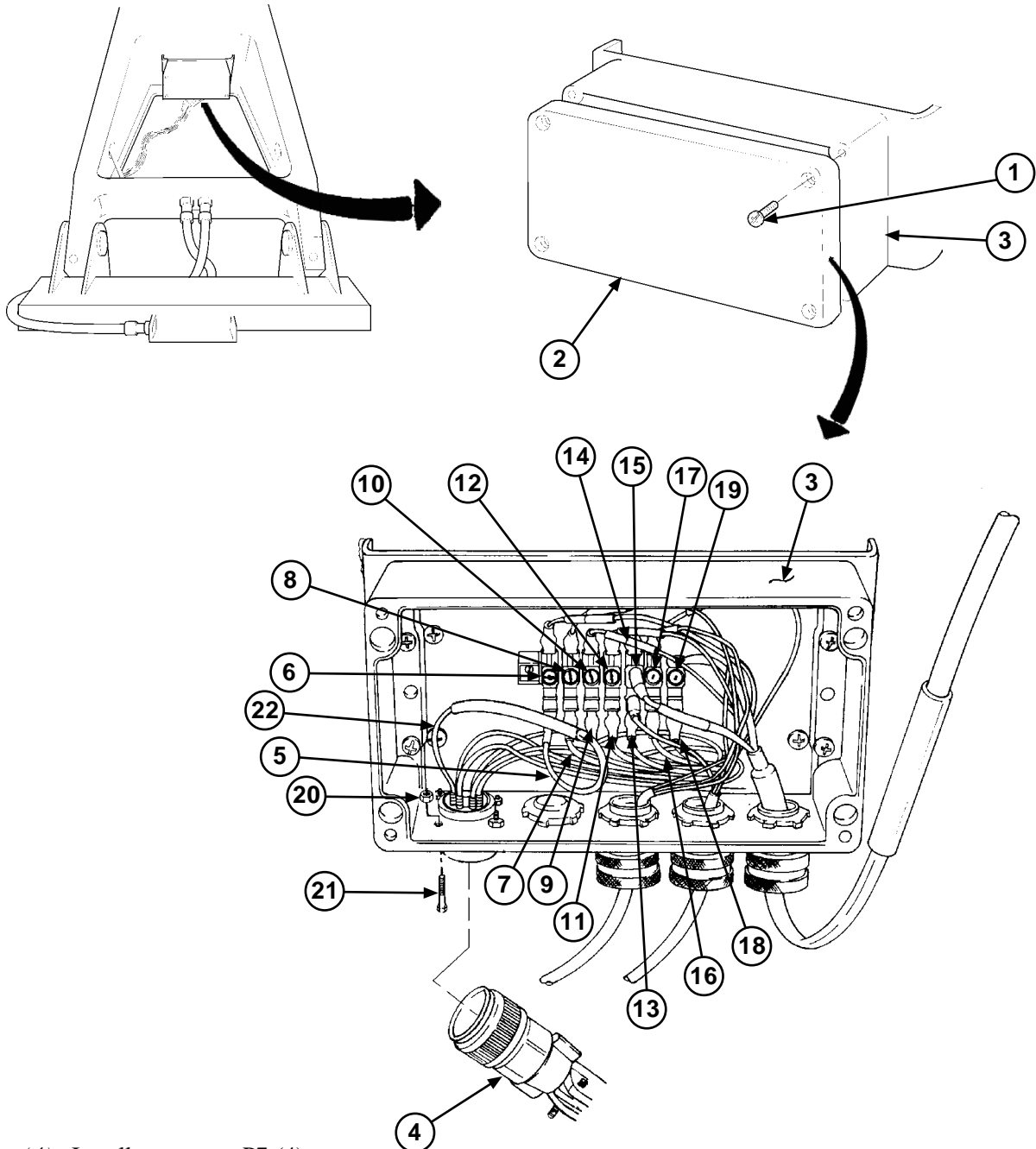
### c. Follow-on Maintenance:

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**



**4-91. MAIN FRAME JUNCTION BOX HARNESS REPLACEMENT (MODEL A ONLY) (continued).**



(4) Install connector P7 (4).

(5) Install main frame junction box cover (2) on junction box (3) and tighten four captive screws (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

## 4-91.1 MAIN FRAME JUNCTION BOX HARNESS REPLACEMENT (MODEL B ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

Cable Ties (Item 8, Appendix E)

Tag, Identification (as required) (Item 23, Appendix E)

Locknut (4) (Item 101, Appendix K)

*Materials/Parts*

Adhesive-Sealant, Silicone, RTV  
(Item 6, Appendix E)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

#### a. Removal.

- (1) Loosen four captive screws (1) and remove main frame junction box cover (2) from junction box (3).
- (2) Remove connector P7 (4).

**NOTE**

Tag and mark wires prior to removal.

- (3) Remove wire no. 1475 (5) from terminal no. 1 (6), wire no. 1470 (7) from terminal no. 2 (8), and wire no. 1466 (9) from terminal no. 3 (10).
- (4) Remove wire no. 1469 (11) from terminal no. 4 (12), wires no. 1435 (13) from terminal no. 5 (14) and no. 6 (15), and wire no. 1461 (16) from terminal no. 7 (17).
- (5) Remove four locknuts (18), screws (19) and main frame junction box harness (20) from junction box (3). Discard locknuts.

#### b. Installation.

**WARNING**

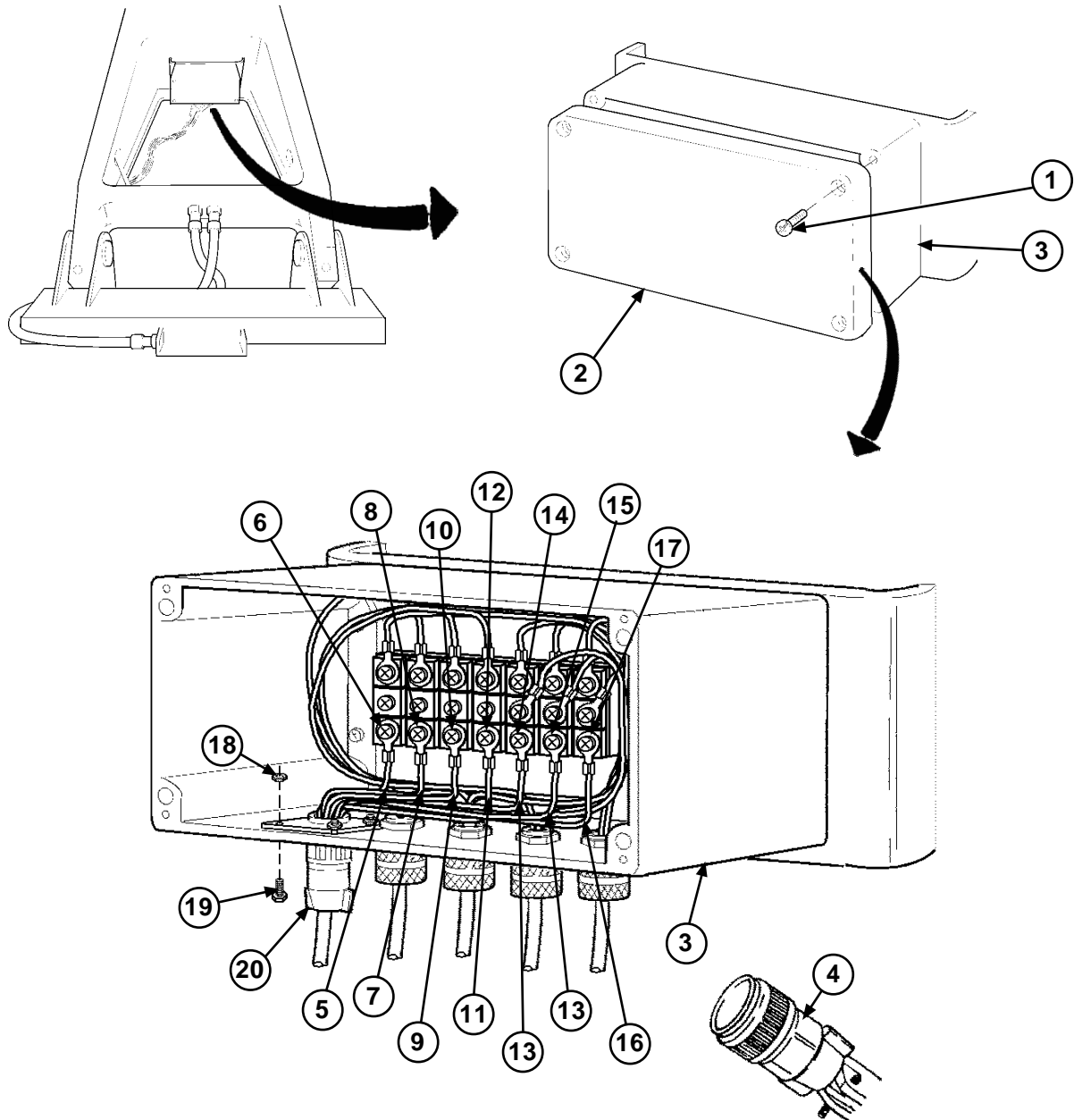
**Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvents or sealing compound gets on skin or clothing, wash immediately with soap and water.**

**NOTE**

Connector should be installed with notch facing rear of vehicle.

- (1) Apply silicone adhesive-sealant to flange of main frame junction box harness (20) and install in junction box (3) with four screws (19) and new locknuts (18).
- (2) Install wire no. 1461 (16) on terminal no. 7 (17), wires no. 1435 (13) on terminals no. 5 (14) and no. 6 (15), and wire no. 1469 (11) on terminal no. 4 (12).
- (3) Install wire no. 1466 (9) on terminal no. 3 (10), wire no. 1470 (7) on terminal no. 2 (8), and wire no. 1475 (5) on terminal no. 1 (6).
- (4) Install connector P7 (4).
- (5) Install main frame junction box cover (2) on junction box (3) and tighten four captive screws (1).

**4-91.1 MAIN FRAME JUNCTION BOX HARNESS REPLACEMENT (MODEL B ONLY) (continued).**



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

## 4-92. MAIN JUNCTION BOX HARNESS (REAR) REPLACEMENT (MODEL A ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)  
Locknut (4) (Item 61, Appendix K)

#### *Materials/Parts*

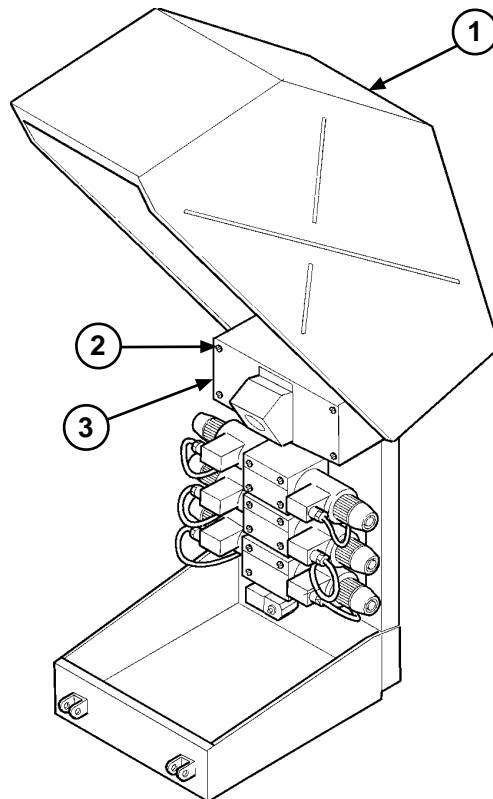
Adhesive, RTV Sealant (Item 5, Appendix E)

#### *Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

### **a. Removal.**

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen four screws (2) and open junction box cover (3).





## 4-92. MAIN JUNCTION BOX HARNESS (REAR) REPLACEMENT (MODEL A ONLY) (continued).

### NOTE

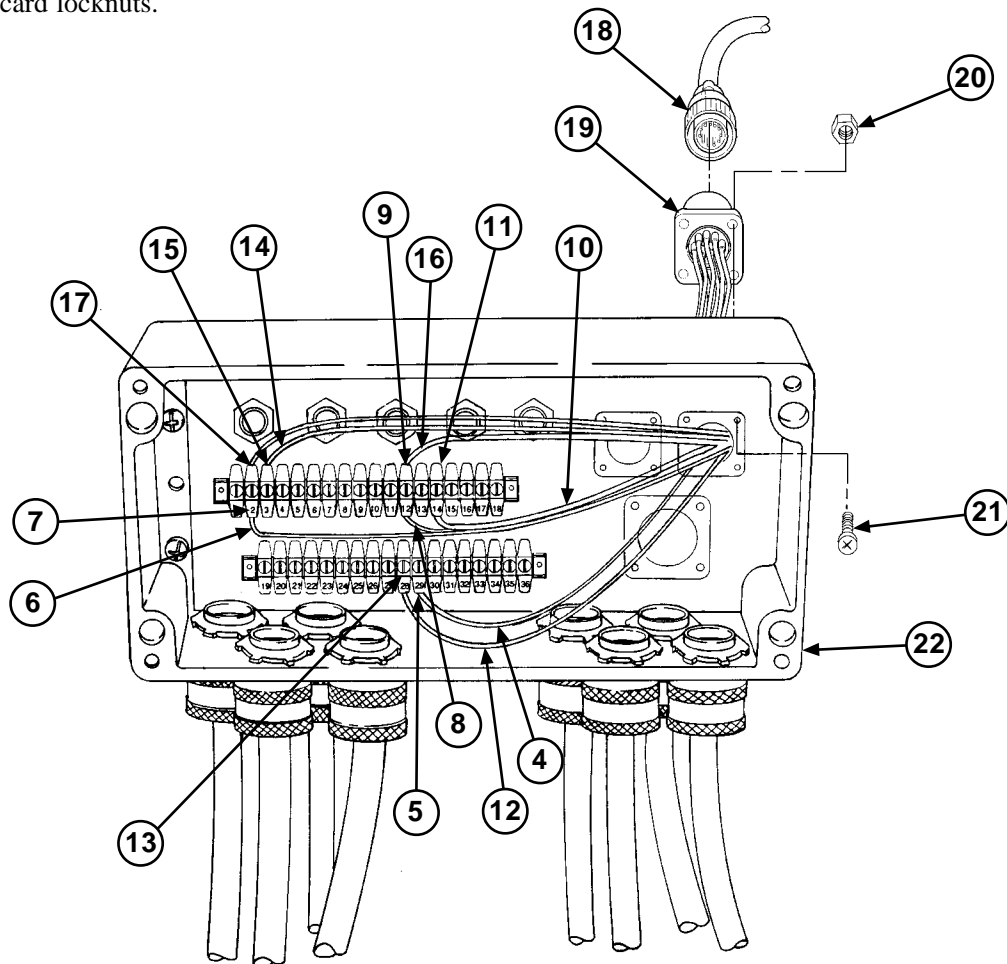
Tag and mark wires prior to removal.

- (3) Remove wire no. 29 (4) from terminal no. 29 (5), wire no. 2 (6) from terminal no. 2 (7), wire no. 12 (8) from terminal no. 12 (9) and wire no. 14 (10) from terminal no. 14 (11).
- (4) Remove wire no. 28 (12) from terminal no. 28 (13), wire no. 3 (14) from terminal no. 3 (15), wire no. 12 (16) from terminal no. 12 (9) and wire no. 2 (17) from terminal no. 2 (7).

### NOTE

If additional access is required, 24-pin connector can be removed from main junction box.

- (5) Remove connector P6 (18) from main junction box harness (19).
- (6) Remove four locknuts (20), screws (21), and main junction box harness (19) from junction box (22). Discard locknuts.



**4-92. MAIN JUNCTION BOX HARNESS (REAR) REPLACEMENT (MODEL A ONLY)  
(continued).**

**b. Installation.**

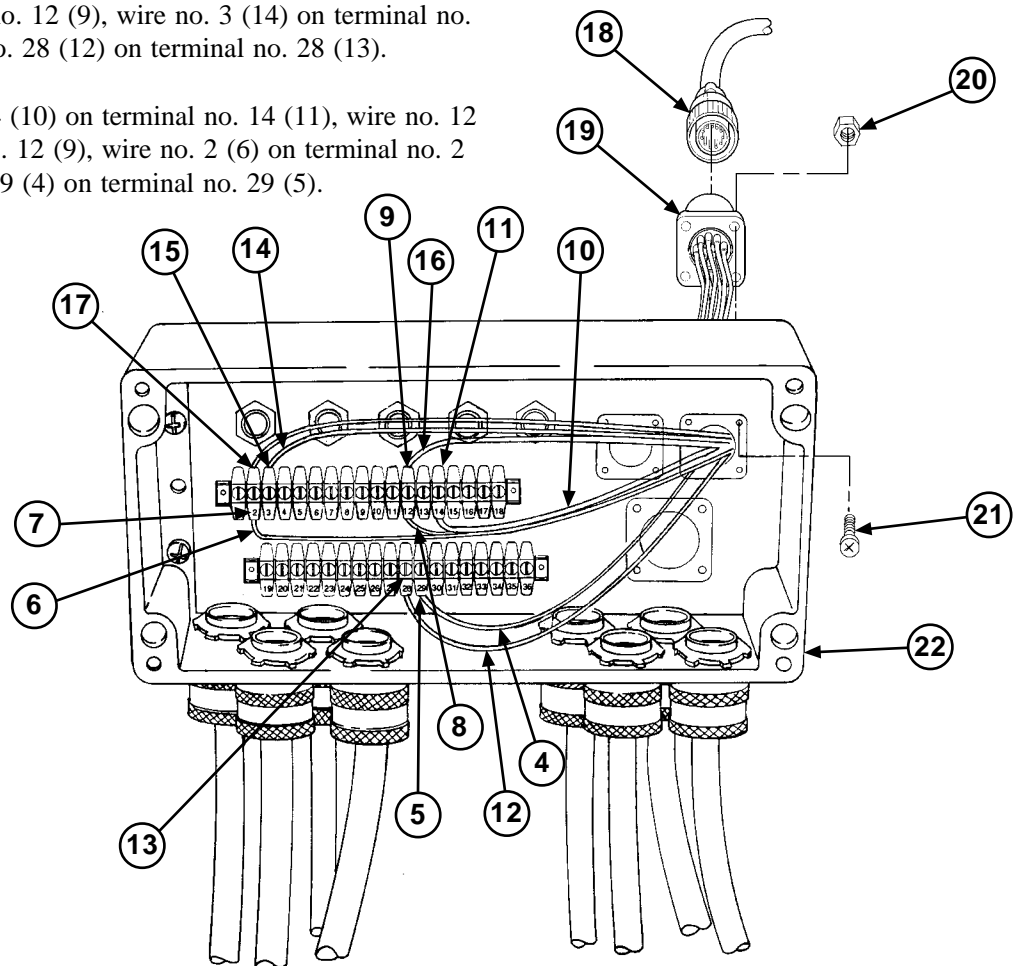
**WARNING**

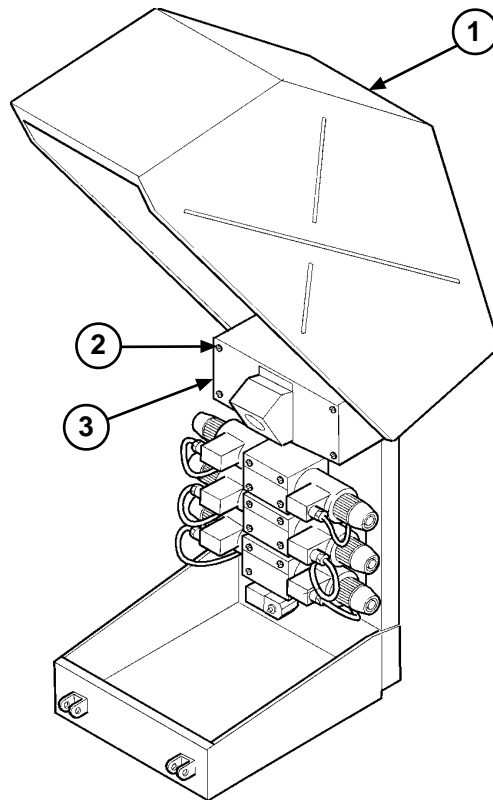
Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.

**NOTE**

Connector should be installed in junction box with notch facing up.

- (1) Apply silicone RTV sealant adhesive to flange of main junction box harness (19) and install in junction box (22) with four screws (21) and new locknuts (20).
- (2) Install connector P6 (18) on main junction box harness (19).
- (3) Install wire no. 2 (19) on terminal no. 2 (7), wire no. 12 (16) on terminal no. 12 (9), wire no. 3 (14) on terminal no. 3 (15) and wire no. 28 (12) on terminal no. 28 (13).
- (4) Install wire no. 14 (10) on terminal no. 14 (11), wire no. 12 (8) on terminal no. 12 (9), wire no. 2 (6) on terminal no. 2 (7) and wire no. 29 (4) on terminal no. 29 (5).



**4-92. MAIN JUNCTION BOX HARNESS (REAR) REPLACEMENT (MODEL A ONLY)  
(continued).**

(5) Close junction box cover (3) and tighten four screws (2).

(6) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

### 4-93. WORKLIGHT HARNESS REPLACEMENT (MODEL A ONLY).

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

#### INITIAL SETUP

*Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

*Equipment Condition*

Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

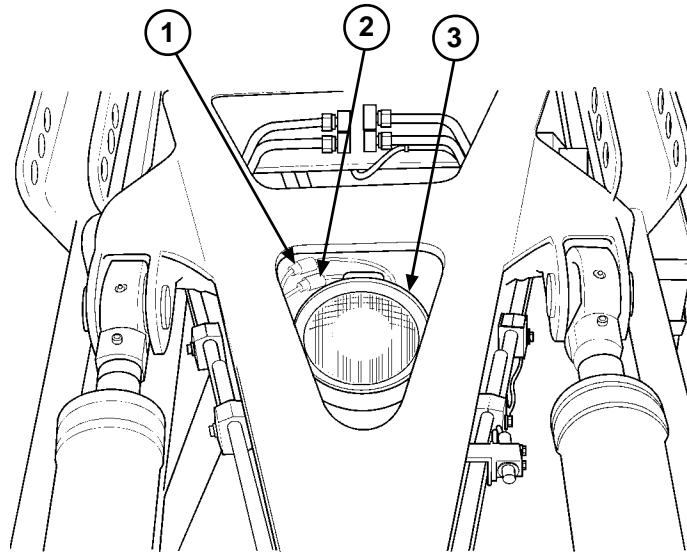
Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

#### a. Removal.

#### NOTE

Cut cable ties as required.

- (1) Disconnect two connectors (1) and (2) from worklight (3).



- (2) Loosen four screws (4) and remove cover (5) from main frame junction box (6).

#### NOTE

Tag and mark wires prior to removal.

- (3) Remove wire no. 7 (7) from terminal no. 7 (8) and wire no. 5 (9) from terminal no. 5 (10).

**4-93. WORKLIGHT HARNESS REPLACEMENT (MODEL A ONLY) (continued).**

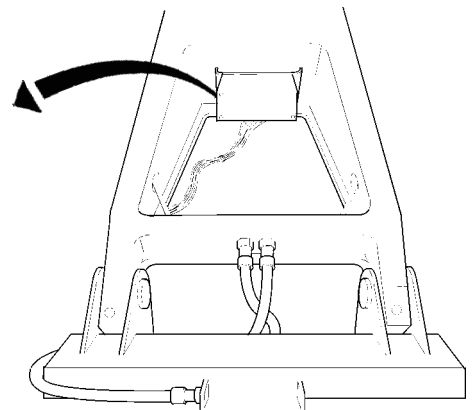
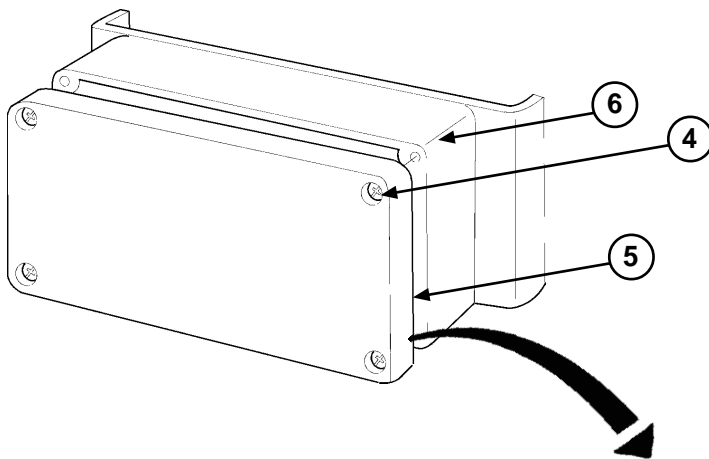
- (4) Remove nut (11), plastic insert (12), rubber grommet (13) and worklight harness (14) from main frame junction box (6).
- (5) Remove nut (11), plastic insert (12) and rubber grommet (13) from worklight harness (14).

**b. Installation.**

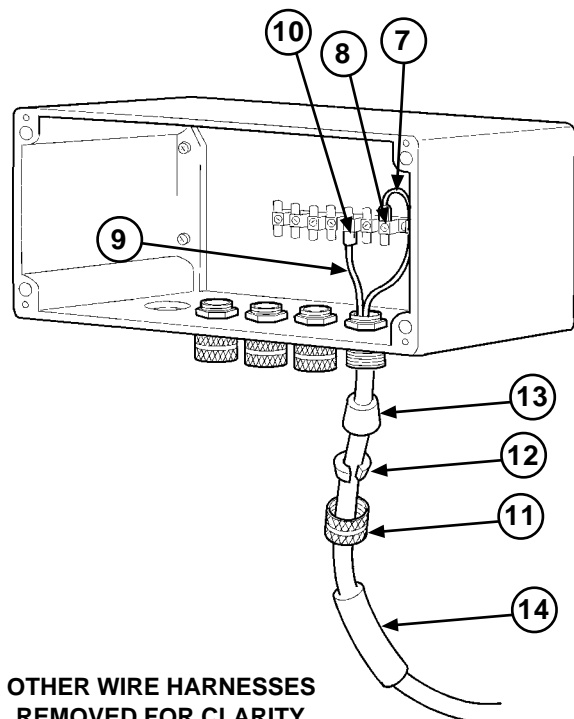
- (1) Install nut (11), plastic insert (12) and rubber grommet (13) on worklight harness (14).

**NOTE**

Install cable ties as required.



- (2) Install worklight harness (14) in main frame junction box (6) with rubber grommet (13), plastic insert (12) and nut (11).
- (3) Install wire no. 5 (9) on terminal no. 5 (10) and wire no. 7 (7) on terminal no. 7 (8).
- (4) Install cover (5) on main frame junction box (6) and tighten four screws (4).
- (5) Connect two connectors (2) and (1) to worklight (3).



**c. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).

**END OF TASK**

**OTHER WIRE HARNESSSES  
REMOVED FOR CLARITY**

#### 4-94. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM DOWN).

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Adjustment.           |
| b. Installation | d. Follow-on Maintenance |

#### INITIAL SETUP

##### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)  
Wrench, Open-End, 1 7/16 in. (B107.6)

Tag, Identification (as required) (Item 23, Appendix E)

##### *Equipment Condition*

LHS in transit position (para 2-9)  
Batteries disconnected (TM 9-2320-279-20)

##### *Materials/Parts*

Cable Ties (Item 8, Appendix E)

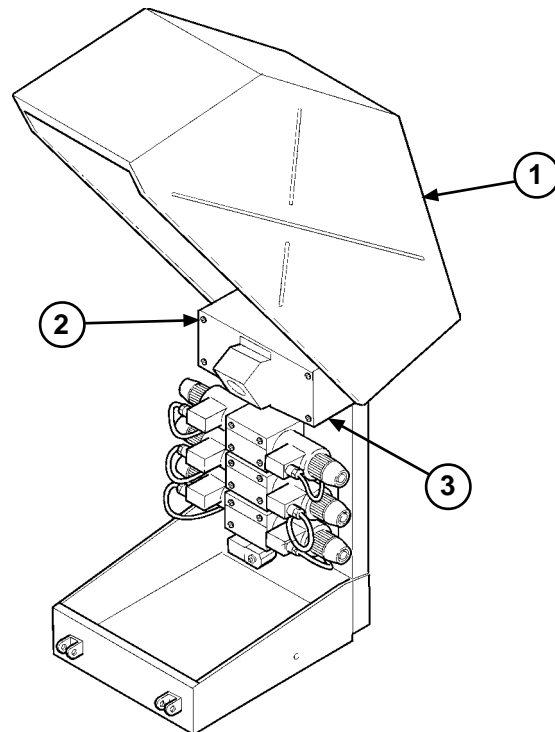
#### a. Removal.

#### NOTE

- Note location of cable ties prior to removal.
- Remove cable ties as required.
- Tag and mark wires upon removal to ensure proper installation.
- Perform steps (1) through (9) for Model A only.

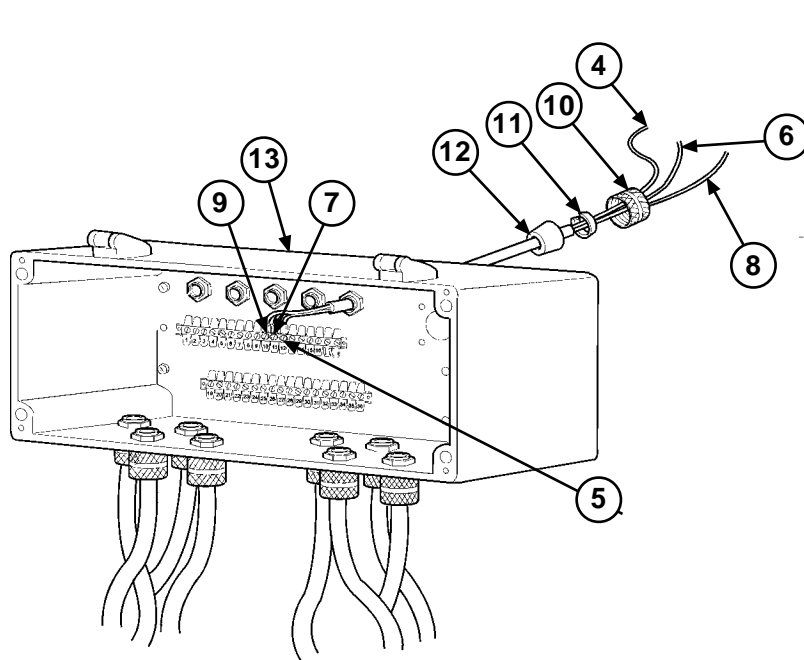
(1) Open hydraulic cabinet cover (1).

(2) Loosen four screws (2) and open junction box cover (3).

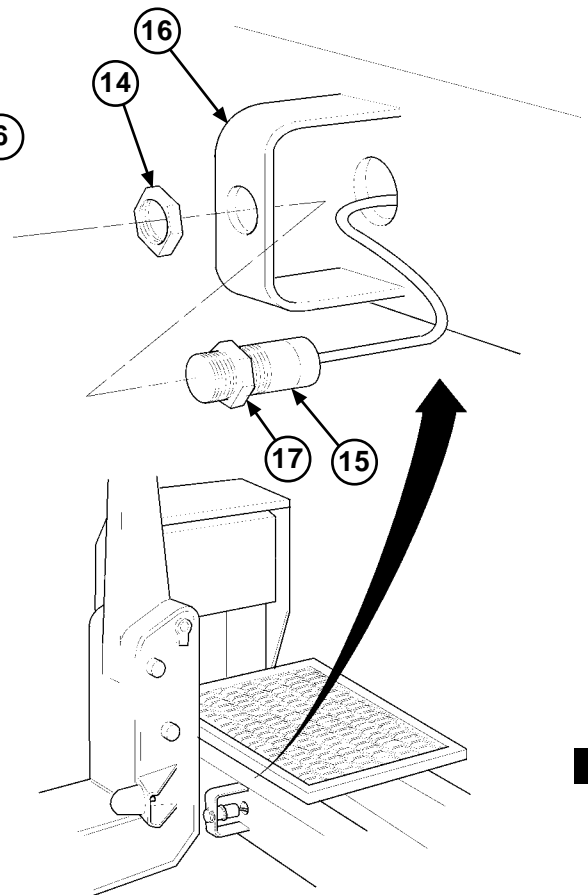


**4-94. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM DOWN)  
(continued).**

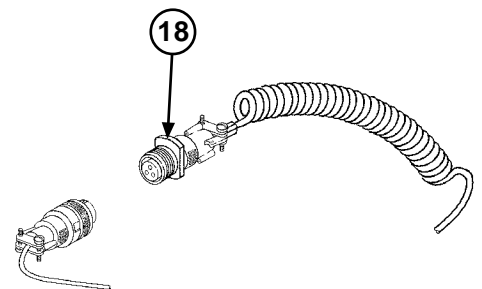
- (3) Remove blue (4) from terminal (5).
- (4) Remove black (6) from terminal (7).
- (5) Remove brown wire (8) from terminal (9).
- (6) Remove nut (10), plastic insert (11), rubber grommet (12) and three wires (4), (6) and (8) from back of junction box (13).



**OTHER WIRE HARNESSES  
REMOVED FOR CLARITY  
MODEL A**



- (7) Remove nut (14 ) and proximity switch (15) from frame (16).
- (8) Remove nut (17) from proximity switch (15).
- (9) Remove nut (10), plastic insert (11), and rubber grommet (12) from proximity switch (15).
- (10) Disconnect connector MC88 (18).



**MODEL B**

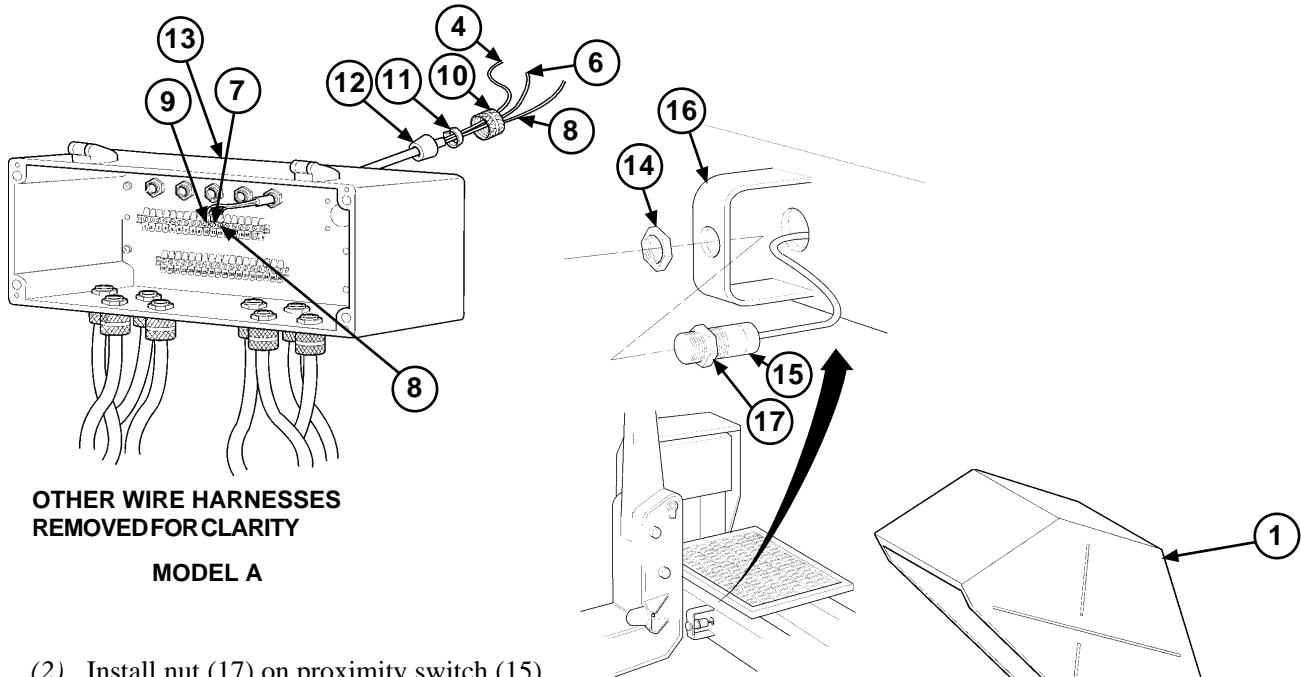
**4-94. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM DOWN)  
(continued).**

**b. Installation.**

(1) Install rubber grommet (12), plastic insert (11) and nut (10) on proximity switch (15).

**NOTE**

- Install cable ties as required.
- Serrated side of nuts face bracket.



OTHER WIRE HARNESSSES  
REMOVED FOR CLARITY

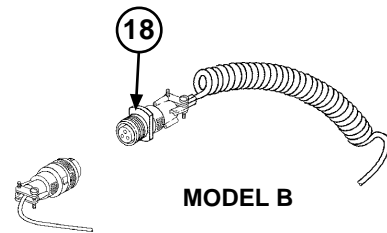
MODEL A

- (2) Install nut (17) on proximity switch (15).
- (3) Install proximity switch (15) on frame (17) with nut (14)
- (4) Route three wires (4, 6, and 8) up to junction box (13).
- (5) Install three wires (4, 6, and 8), rubber grommet (12), plastic insert (11) and nut (10) in junction box (13).
- (6) Install brown wire no. 10 (8) on terminal no. 10 (9).
- (7) Install black wire no. 11 (6) on terminal no. 11 (7).
- (8) Install blue wire no. 12 (4) on terminal no. 12 (5).
- (9) Close junction box cover (3) and tighten four screws (2).
- (10) Close hydraulic cabinet cover (1).

**NOTE**

Perform step (11) for Model B only.

- (11) Connect connector MC88 (18).



MODEL B

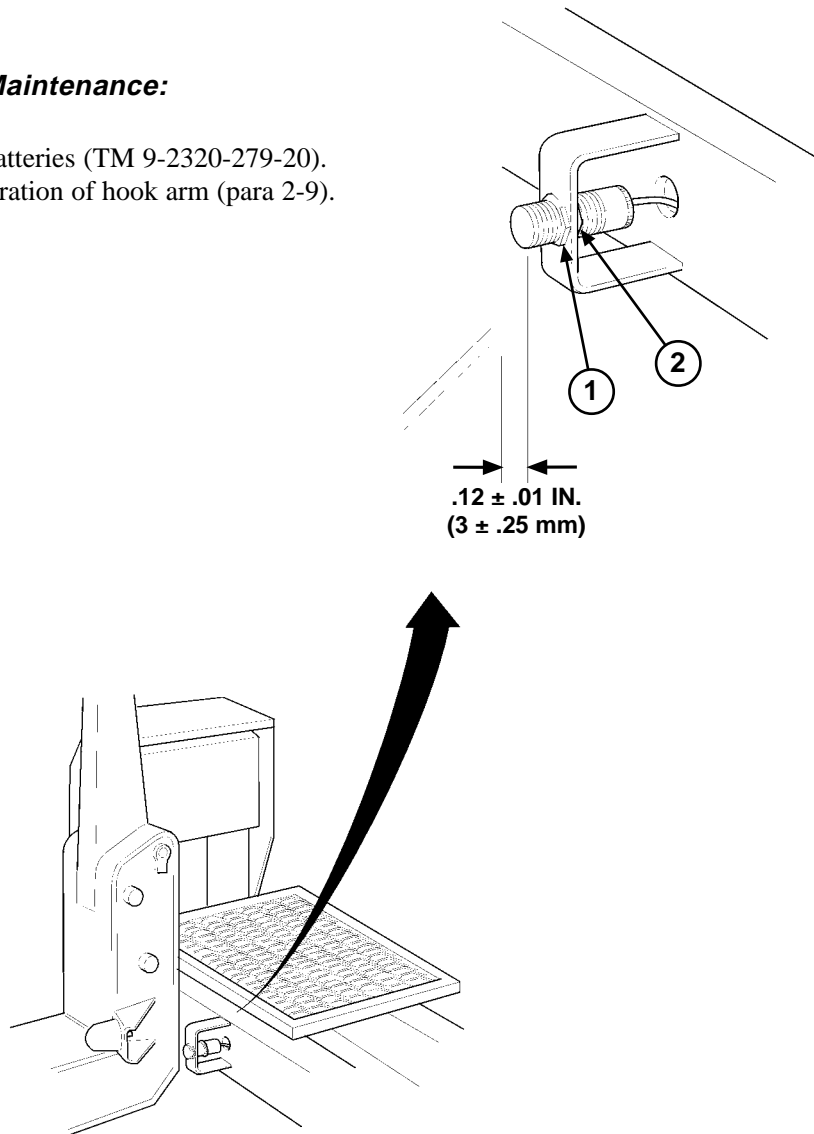


**4-94. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM DOWN)  
(continued).****c. Adjustment.**

Adjust clearance between proximity switch and hook arm to  $0.12 \pm 0.01$  in. ( $3 \pm 0.25$  mm.) and tighten nuts (1) and (2).

**d. Follow-on Maintenance:**

- Connect batteries (TM 9-2320-279-20).
- Check operation of hook arm (para 2-9).

**END OF TASK**

## 4-95. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM UP).

This task covers:

- a. Removal
- b. Installation
- c. Adjustment
- d. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Tag, Identification (as required) (Item 23, Appendix E)

Lockwasher (2) (Item 30, Appendix K)

#### *Materials/Parts*

Adhesive, Loctite 242 (Item 3, Appendix E)  
Cable Ties (Item 8, Appendix E)

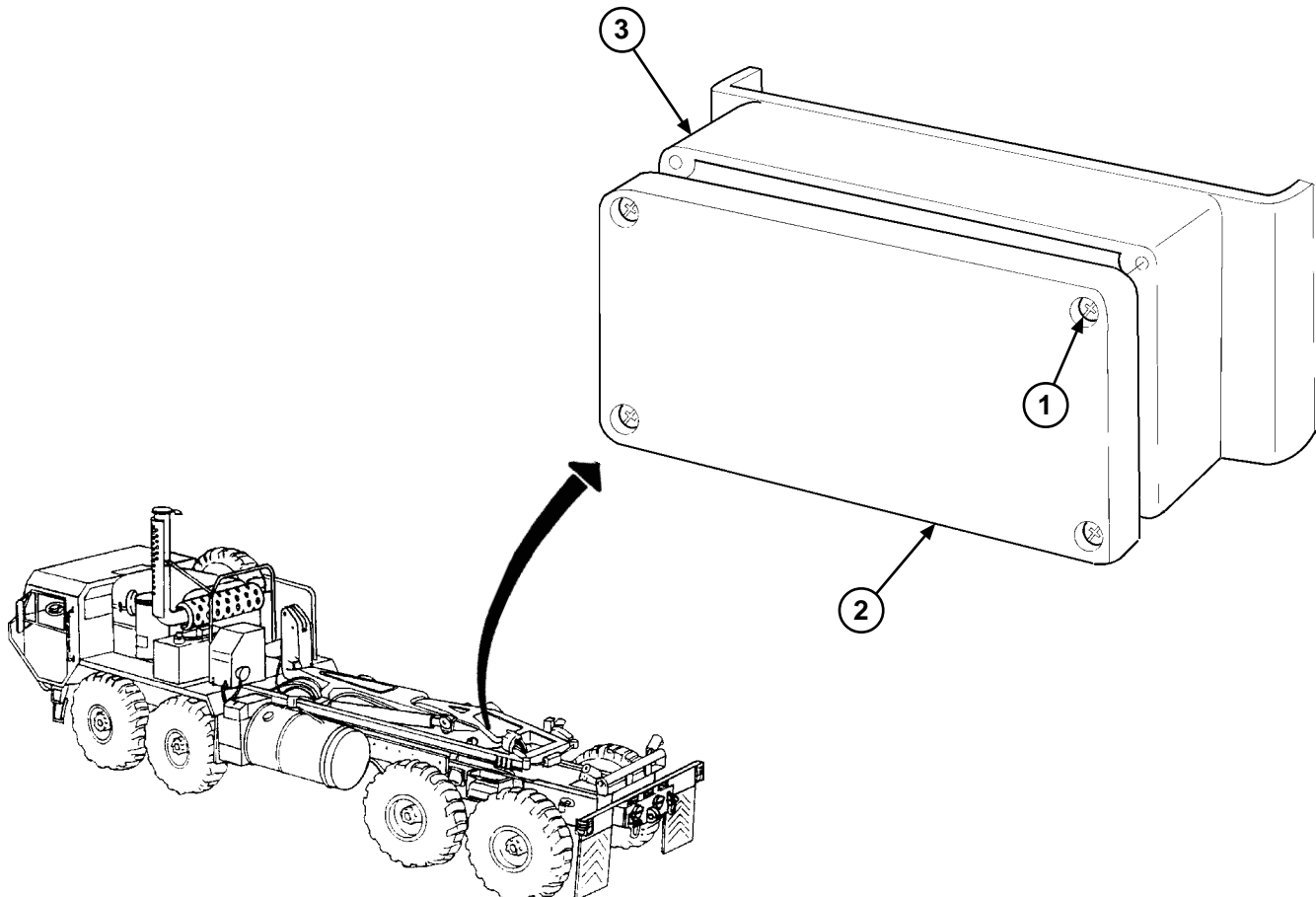
#### *Equipment Condition*

LHS in transit position (Chapter 2)

Batteries disconnected (TM 9-2320-279-20)

### **a. Removal.**

- (1) Loosen four captive screws (1) and remove main frame junction box cover (2) from main frame junction box (3).

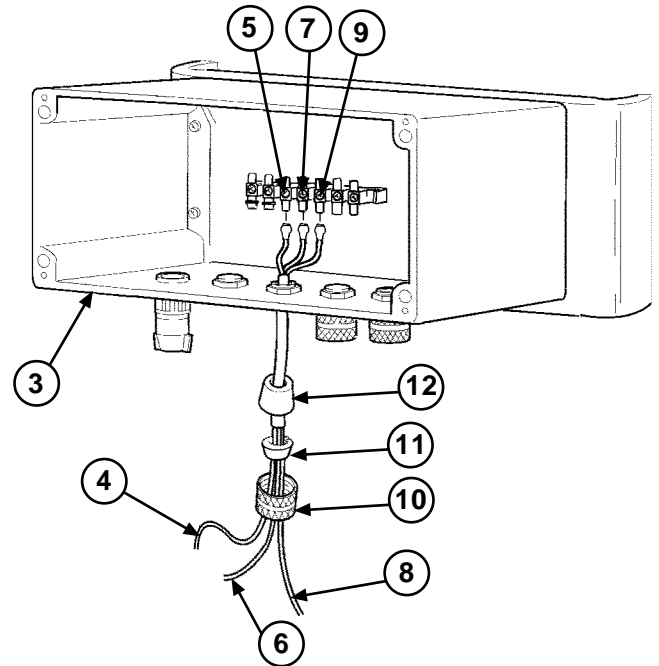


**4-95. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM UP)  
(continued).**

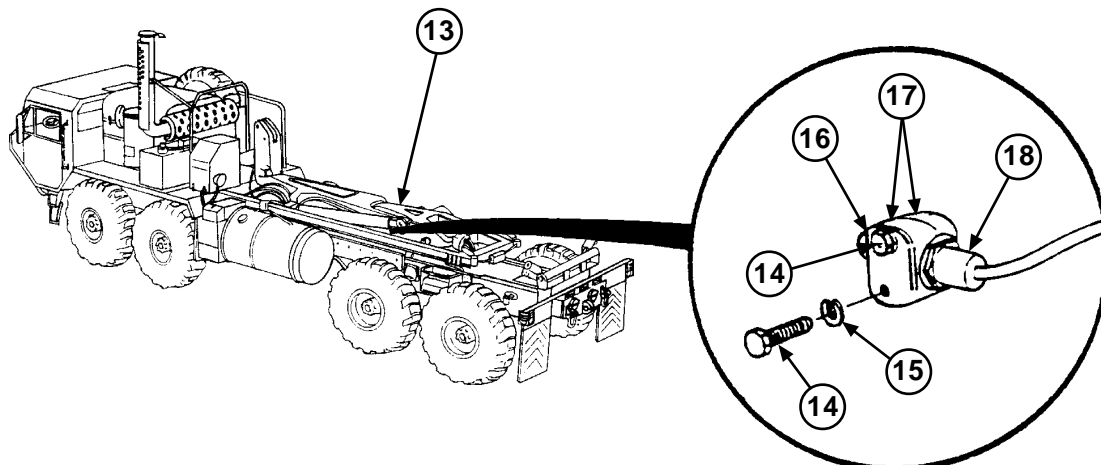
**NOTE**

- Tag and mark wires prior to removal.
- For Model B trucks, the black wire connects to terminal no. 5, the brown wire connects to terminal no. 1, and the blue wire connects to terminal no. 2.

- (2) Remove black wire no. 3 (4) from terminal no. 3 (5).
- (3) Remove brown wire no. 4 (6) from terminal no. 4 (7).
- (4) Remove blue wire no. 5 (8) from terminal no. 5 (9).
- (5) Remove nut (10), plastic insert (11), rubber grommet (12) and three wires (4), (6) and (8) from main frame junction box (3).
- (6) Remove nut (10), plastic insert (11), and rubber grommet (12) from three wires (4, 6, and 8).
- (7) Follow three wires (4, 6, and 8) through main frame (13), and cut cable ties as required.
- (8) Remove two screws (14), lockwashers (15) and plate (16) from two clamp halves (17).
- (9) Remove two clamp halves (17) with proximity switch (18), as an assembly, from main frame (13).

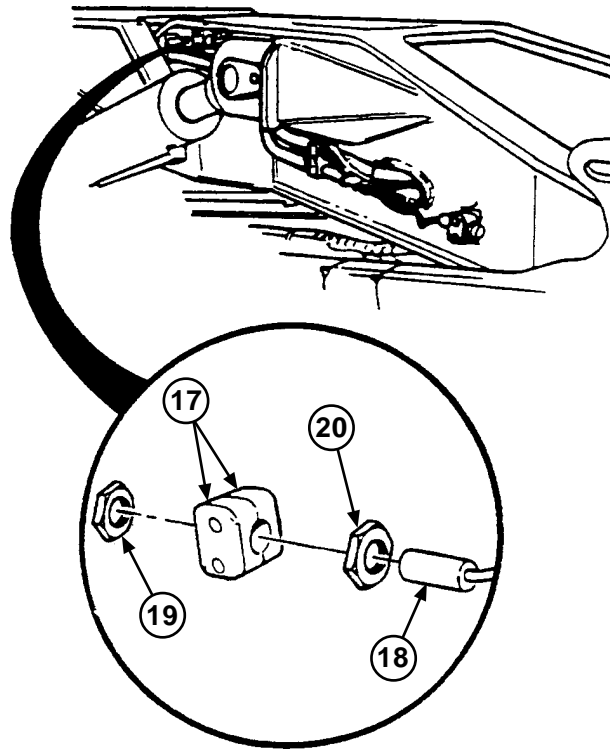


OTHER WIRE HARNESSES REMOVED FOR CLARITY



**4-95. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM UP)  
(continued).**

(10) Remove nut (19), two clamp halves (17) and nut (20) from proximity switch (18).



***b. Installation.***

**CAUTION**

**Install outer nut flush with end of proximity switch. Installing the nut farther could cause the switch to contact hook arm before final adjustment is made.**

**NOTE**

Serrated side of nuts face clamp halves.

(1) Install nut (20), two clamp halves (17) and nut (19) on proximity switch (18).

**4-95. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM UP)  
(continued).**

**WARNING**

**Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or compound gets on skin or clothing, wash immediately with soap and water.**

- (2) Apply adhesive sealant to threads of two screws (14).
- (3) Position proximity switch (18), with two clamp halves (17) as an assembly, on main frame (13) with plate (16), two lockwashers (15) and screws (14).

**NOTE**

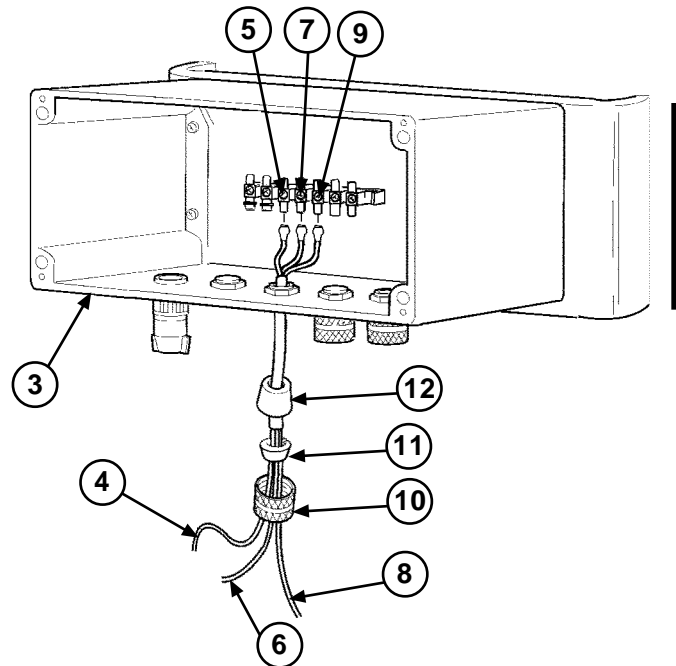
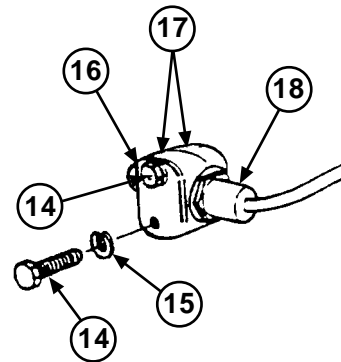
Install cable ties as required.

- (4) Route three wires (4, 6, and 8) through main frame (13) to main frame junction box (3).
- (5) Install rubber grommet (12), plastic insert (11), and nut (10) on three wires (4, 6, and 8).
- (6) Install three wires (4), (6) and (8) in main frame junction box (3) with rubber grommet (12), plastic insert (11) and nut (10).

**NOTE**

For Model B trucks, the black wire connects to terminal no. 5, the brown wire connects to terminal no. 1, and the blue wire connects to terminal no. 2

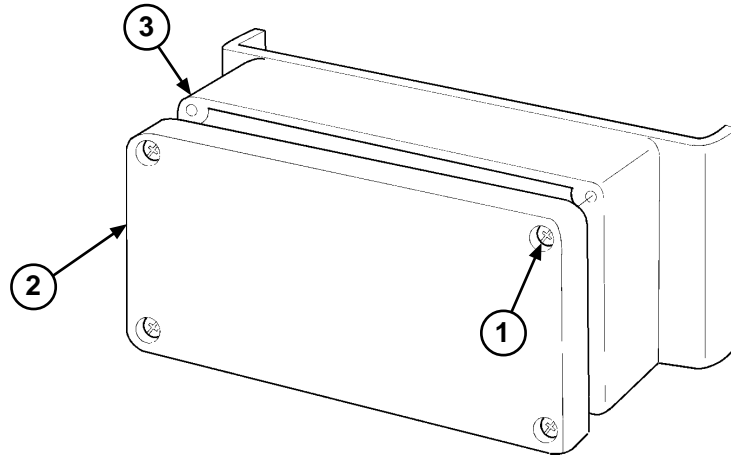
- (7) Install blue wire no. 5 (8) on terminal no. 5 (9).
- (8) Install brown wire no. 4 (6) on terminal no. 4 (7).
- (9) Install black wire no. 3 (4) on terminal no. 3 (5).



**OTHER WIRE HARNESSES REMOVED FOR CLARITY**

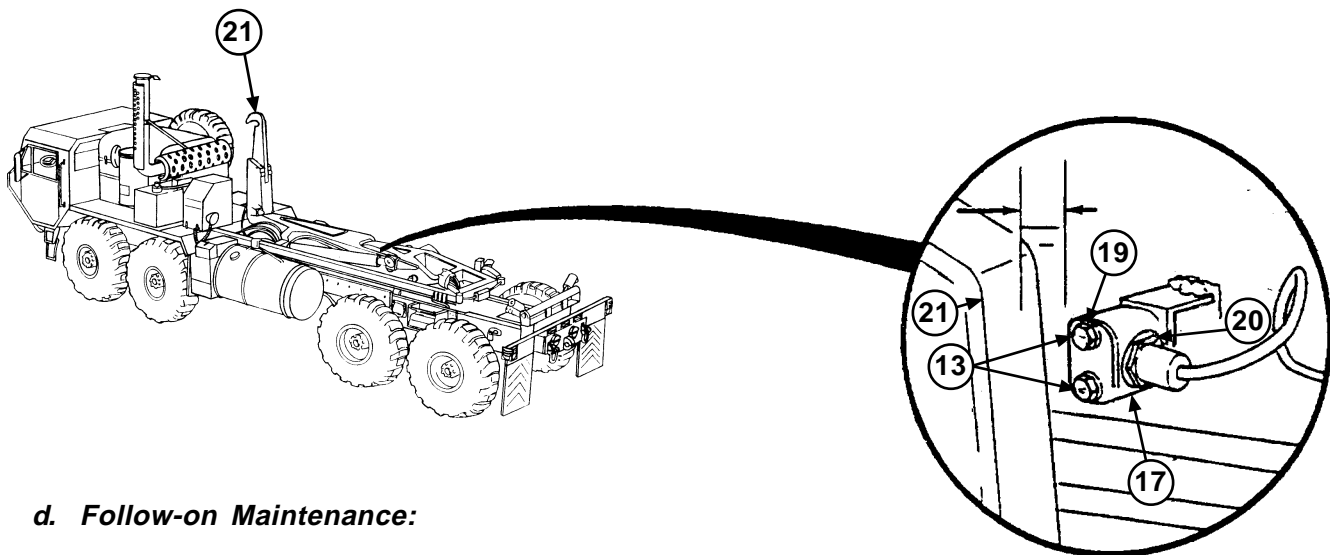
**4-95. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (HOOK ARM UP)  
(continued).**

- (10) Install main frame junction box cover (2) on main frame junction box (3) and tighten four captive screws (1).



**c. Adjustment.**

- (1) Connect batteries (para TM 9-2320-279-20).
- (2) Fully extend hook arm (21) using manual mode only.
- (3) Adjust clearance between proximity switch (17) and hook arm (21) to 0.12 in.  $\pm$  0.01 in. (3 mm  $\pm$  0.25 mm). Loosen two screws (13) and thread proximity switch (17) in or out of two nuts (19) and (20) to adjust clearance.
- (4) Tighten two screws (13) and nuts (19) and (20) on proximity switch (17).



**d. Follow-on Maintenance:**

- Return LHS to transit position (Chapter 2).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN).**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Adjustment            |
| b. Installation | d. Follow-on Maintenance |

**INITIAL SETUP***Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)

Locknut (2) (Item 71, Appendix K)  
Lockwasher (2) (Item 30, Appendix K)  
Lockwasher (2) (Item 91, Appendix K)

*Materials/Parts*

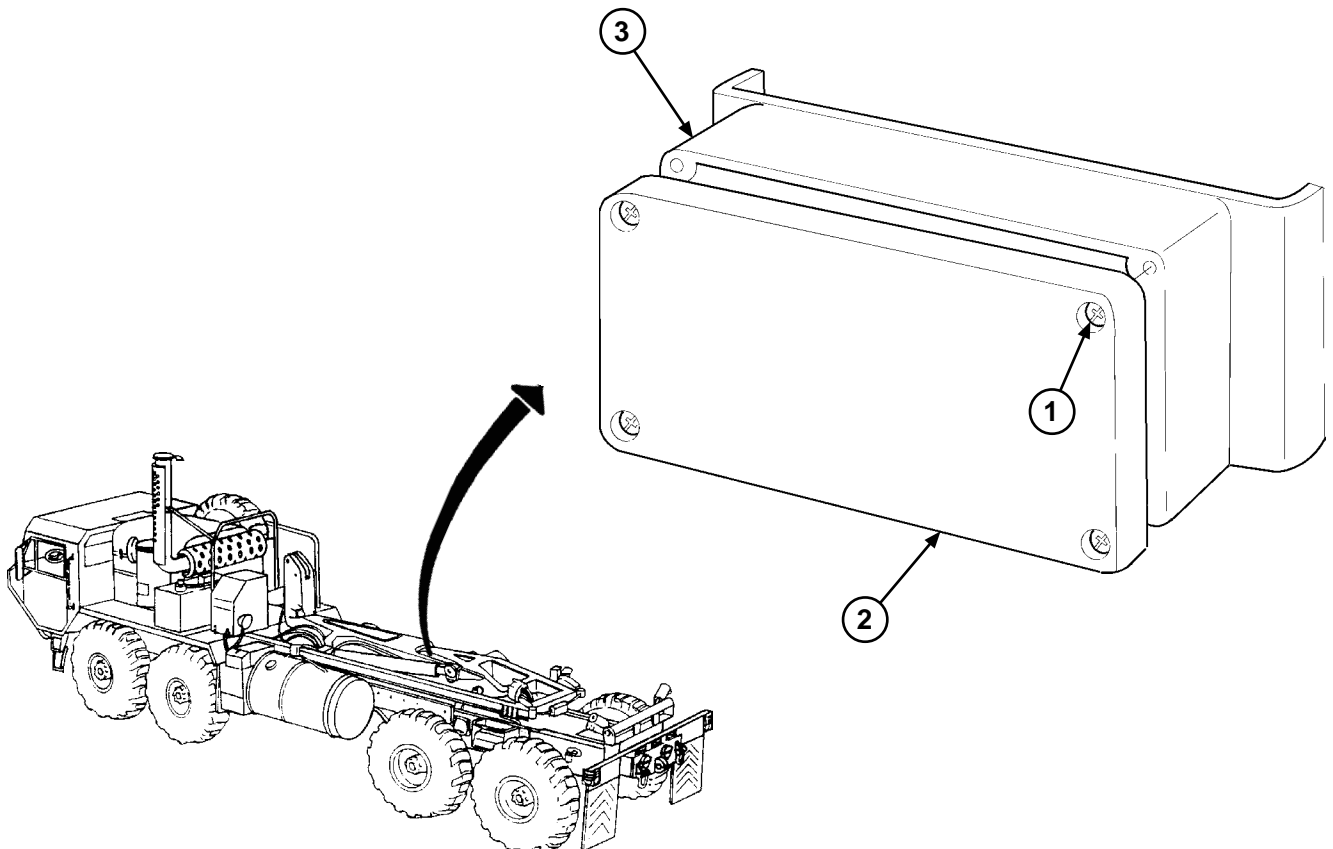
Adhesive, Loctite 242 (Item 3, Appendix E)  
Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

*Equipment Condition*

LHS in transit position (para 2-9)  
Batteries disconnected (TM 9-2320-279-20)

**a. Removal.**

- (1) Loosen four screws (1) and remove main junction box cover (2) from main frame junction box (3).

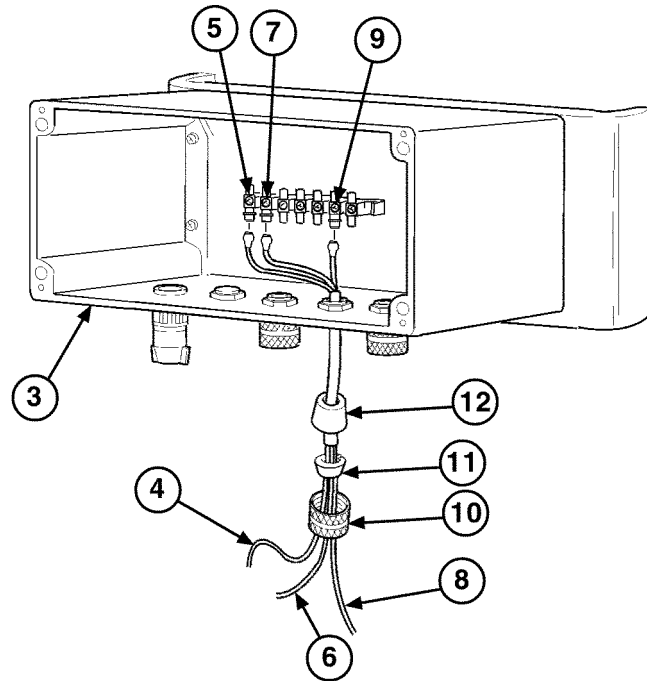


**4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN)  
(continued).**

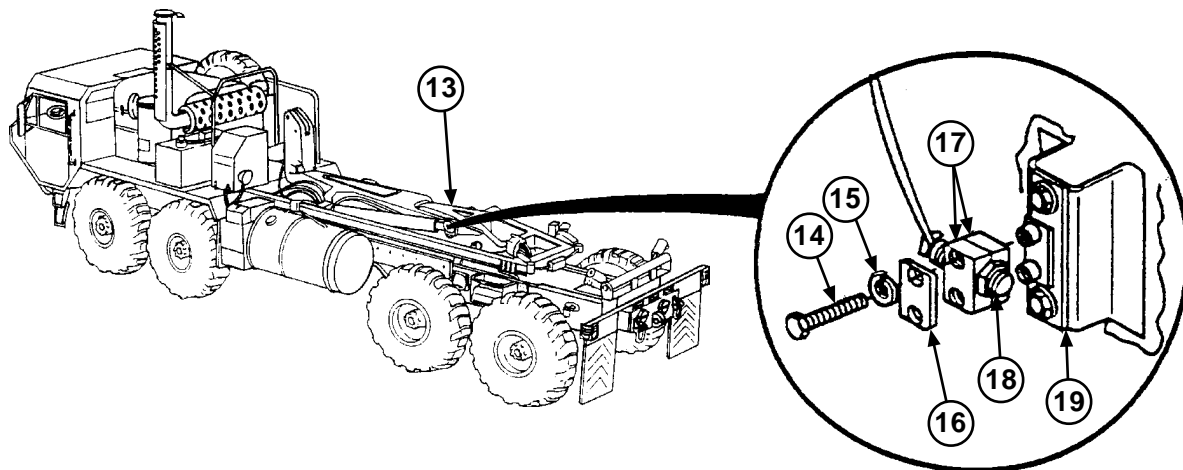
**NOTE**

- Tag and mark wires prior to removal.
- For Model B trucks, the black wire connects to terminal no. 4, the brown wire connects to terminal no. 1, and the blue wire connects to terminal no. 3.

- (2) Remove brown wire no. 1 (4) from terminal no. 1 (5).
- (3) Remove blue wire no. 2 (6) from terminal no. 2 (7).
- (4) Remove black wire no. 6 (8) from terminal no. 6 (9).
- (5) Remove nut (10), plastic insert (11), rubber grommet (12) and three wires (4), (6), and (8) from main frame junction box (3).
- (6) Remove nut (10), plastic insert (11), and rubber grommet (12) from three wires (4, 6, and 8).
- (7) Follow three wires (4, 6, and 8) through main frame (13) and cut cable ties as required.
- (8) Remove two screws (14), lockwashers (15) and plate (16) from two clamp halves (17).
- (9) Remove two clamp halves (17) with proximity switch (18) as an assembly from proximity switch mounting plate (19).



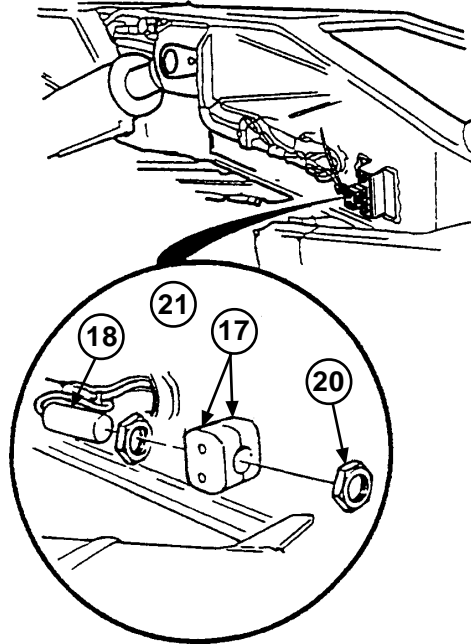
**OTHER WIRE HARNESES  
REMOVED FOR CLARITY**





## 4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN) (continued).

- (10) Remove nut (20), two clamp halves (17) and nut (21) from proximity switch (18).



- (11) Remove two locknuts (22), screws (23), four washers (24) and proximity switch mounting plate (19) from main frame (13).

### b. Installation.

#### **WARNING**

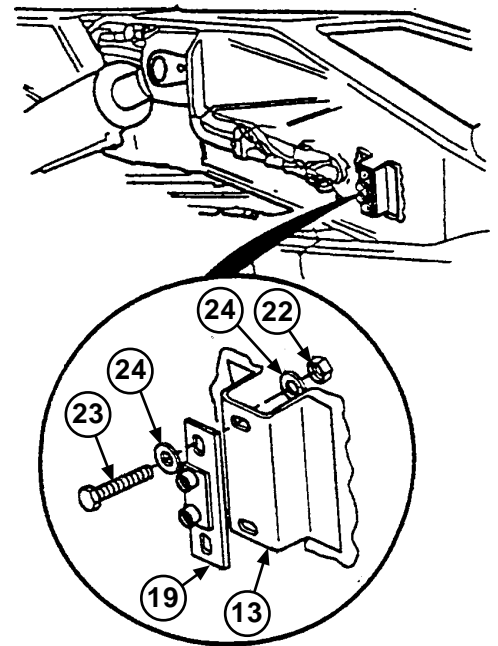
Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply adhesive to threads of two screws (23).

#### **NOTE**

Install cable ties as required.

- (2) Position proximity switch mounting plate (19), four washers (24), two screws (23) and locknuts (22) on main frame (13).

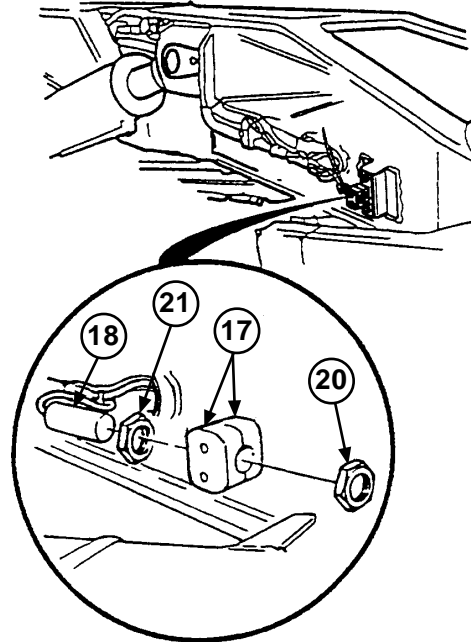


**4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN)  
(continued).**

**NOTE**

Serrated side of nuts face clamp.

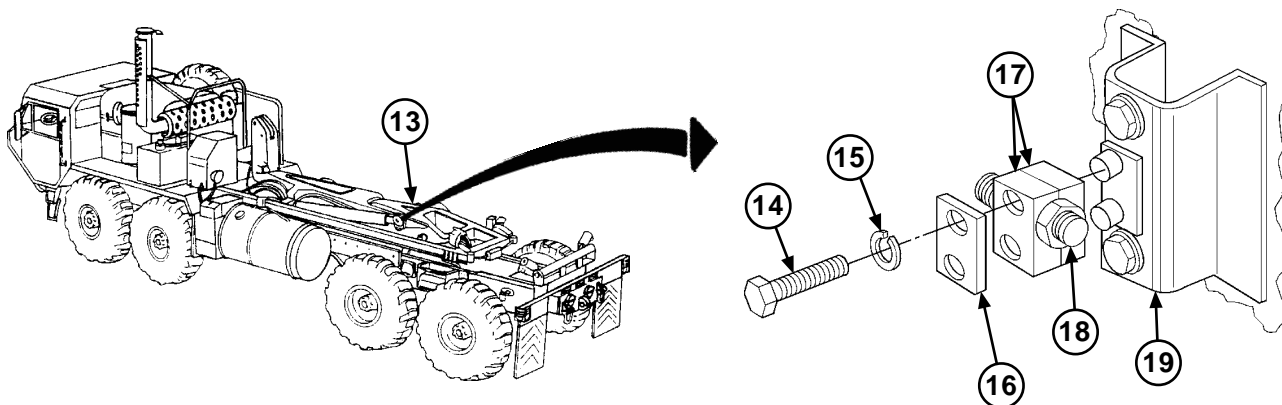
- (3) Position nut (21), two clamp halves (17) and nut (20) on proximity switch (18).



**WARNING**

**Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (4) Apply adhesive sealant to threads of two screws (14).
- (5) Position proximity switch (18), with two clamp halves (17) as an assembly, on proximity switch mounting plate (19) with plate (16), two lockwashers (15) and screws (14).

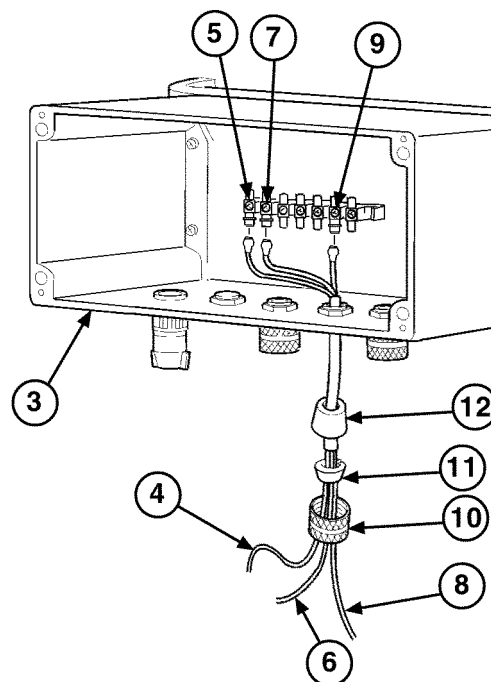


## 4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN) (continued).

### NOTE

- Install cable ties as required.
- For Model B trucks, the black wire connects to terminal no. 4, the brown wire connects to terminal no. 1, and the blue wire connects to terminal no. 3.

- (6) Route three wires (4, 6, and 8) through main frame (13) to main frame junction box (3).
- (7) Install rubber grommet (12), plastic insert (11), and nut (10) on three wires (4, 6, and 8).
- (8) Install three wires (4, 6, and 8) in main frame junction box (3) with rubber grommet (12), plastic insert (11) and nut (10).
- (9) Install black wire no. 6 (8) on terminal no. 6 (9).
- (10) Install blue wire no. 2 (6) on terminal no. 2 (7).
- (11) Install brown wire no. 1 (4) on terminal no. 1 (5).

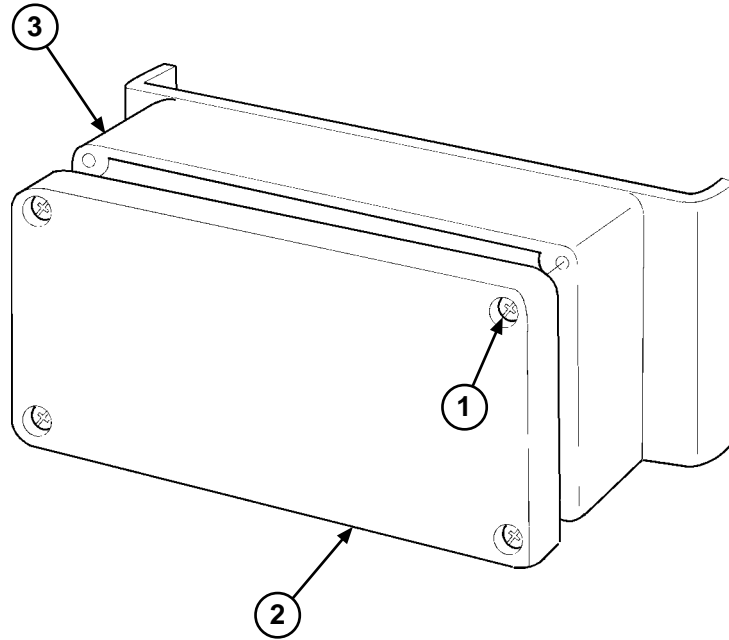


OTHER WIRE HARNESSSES  
REMOVED FOR CLARITY

**4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN)  
(continued).**

(12) Position mainframe junction box cover (2) on junction box (3) and tighten four screws (1).

**c. Adjustment.**



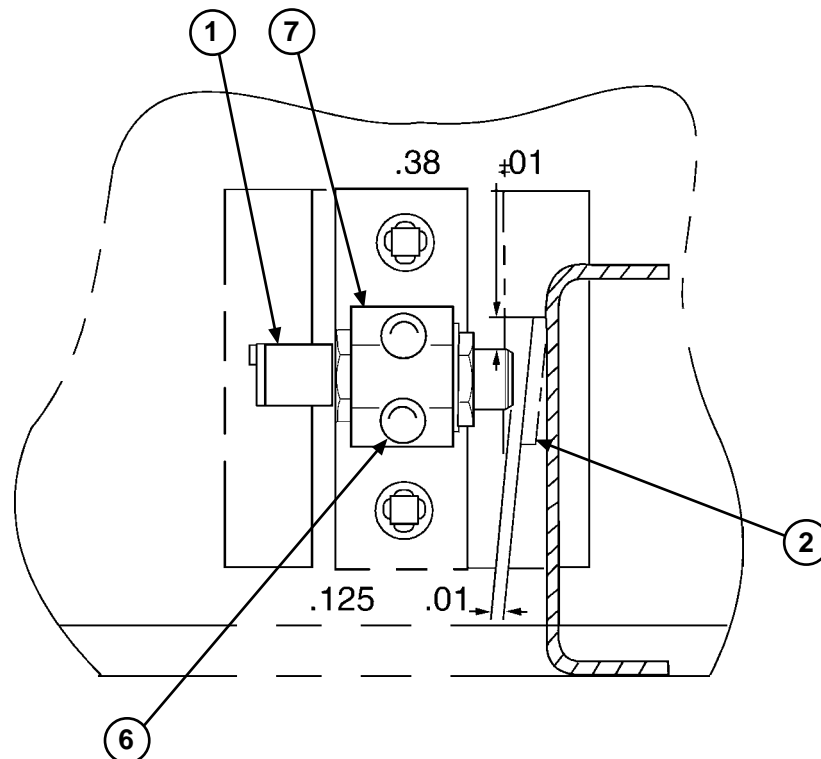
**NOTE**

Proximity switch mounting plate and middle frame have slotted holes to aid in adjustment.

- (1) Adjust height between top of proximity switch (1) and top of target plate (2). Height should be .38 in.  $\pm$  .01 in. (9.65 mm  $\pm$  .25 mm).
- (2) Tighten proximity switch mounting plate (3) with two screws (4) and locknuts (5).

#### 4-96. PROXIMITY SWITCH REPLACEMENT/ADJUSTMENT (MAIN FRAME DOWN) (continued).

- (3) Adjust clearance between proximity switch (1) and target plate (2). Height should be  $.12 \text{ in.} \pm .01 \text{ in.}$  ( $3 \text{ mm} \pm .25 \text{ mm}$ ).
- (4) Tighten two screws (6) on clamp halves (7).



#### d. Follow-on Maintenance:

- Connect batteries (TM 9-2320-279-20).
- Check LHS operation (para 2-9).

**END OF TASK**

**Section VIII. PREPARATION FOR STORAGE OR SHIPMENT**

<b>Para</b>	<b>Contents</b>	<b>Page</b>
4-97	General .....	4-678
4-98	Definition of Administrative Storage .....	4-678
4-99	Preparation of Equipment for Administrative Storage .....	4-679
4-100	Care of Equipment in Administrative Storage .....	4-680
4-101	Storage Maintenance Procedures .....	4-681
4-102	Removal of Equipment from Administrative Storage .....	4-683
4-103	Preparation of Equipment for Shipment .....	4-684

**4-97. GENERAL.**

- a. This section contains requirements and procedures for the administrative storage of equipment that is issued to and in use by Army activities worldwide.
- b. The requirements specified herein are necessary to maintain equipment in administrative storage in such a way as to achieve maximum readiness condition.
- c. Equipment that is placed in administrative storage should be capable of being readied to perform its mission with a 24-hour period, or as otherwise prescribed by the approving authority. Before equipment is placed in administrative storage, current preventive maintenance checks and services (PMCS) procedures should be completed and deficiencies corrected.
- d. Report equipment in administrative storage as prescribed for all reportable equipment (refer to AR 200-1).
- e. Perform inspections, maintenance services, and lubrication as specified herein.
- f. Records and reports to be maintained for equipment in administrative storage are those prescribed by DA Pam 738-750 for equipment in use.
- g. A 10 percent variance is acceptable on time, running hours, or mileage used to determine the required maintenance actions.
- h. Accomplishment of applicable PMCS, as mentioned throughout this section, will be on a semiannual basis.

**NOTE**

Refer to TM 9-2320-279-20 for specific storage and shipment instructions related to the HEMTT chassis.

**4-98. DEFINITION OF ADMINISTRATIVE STORAGE.**

The placement of equipment in administrative storage can be for short periods of time when a shortage of maintenance effort exists. Items should be ready for use within the time factors determined by the directing authority. During the storage period, appropriate maintenance records will be kept.

**4-99. PREPARATION OF EQUIPMENT FOR ADMINISTRATIVE STORAGE.*****a. Storage Site***

- (1) Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously mark the area "Administrative Storage."
- (2) Covered space is preferred.
- (3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well drained, and free of excessive vegetation

***b. Storage Plan***

- (1) Store equipment so as to provide maximum protection from the elements and access for inspection, maintenance and exercising. Anticipate removal or deployment problems and take suitable precautions.
- (2) Take into consideration environmental conditions, such as extreme heat or cold, high humidity, soft ground, mud, heavy snow, blowing sand, dust or loose debris, or any combination thereof, and take adequate precautions.
- (3) Establish a fire plan and provide for adequate fire-fighting equipment and personnel.

***c. Maintenance Services and Inspection***

- (1) Prior to storage, perform the next scheduled Unit PMCS.
- (2) Inspect and approve the equipment prior to storage. Do not place in storage equipment that is not mission capable.

***d. Auxiliary Equipment and Basic Issue Items***

- (1) Process auxiliary equipment and basic issue items (BII) simultaneously with the major item to which they are assigned.
- (2) If possible, store auxiliary equipment and BII with the major item.
- (3) If stored apart from the major item, mark auxiliary equipment and BII with tags indicating the major item and its registration or serial number and location, and store in protective-type enclosures. In addition, place a tag or list indicating the location of the removed items in a conspicuous place on the major item.

***e. Correction of Shortcomings and Deficiencies***

Correct all shortcomings and deficiencies prior to storage or obtain a deferment from the approving authority.

***f. Lubrication***

Lubricate equipment in accordance with the instructions in Appendix G.

**4-99. PREPARATION OF EQUIPMENT FOR ADMINISTRATIVE STORAGE (continued).**

*g. General Cleaning, Painting, and Preservation*

**CAUTION**

**Do not direct water or steam under pressure against unsealed electrical systems or any exterior opening. Failure to follow this caution may result in damage to the equipment.**

- (1) Clean dirt, grease, and other contaminants from the equipment, but do not use vapor degreasing. Wash any oil, grease, or mud from tires.
- (2) Remove rust and damaged paint by scraping, wire brushing, sanding, or buffing. Sand to a smooth finish and spot-paint as necessary (refer to TB 43-0209).
- (3) After cleaning and drying, immediately coat unpainted metal surfaces with oil or grease, as appropriate (Appendix G).

**CAUTION**

**To prevent corrosion, place a piece of barrier material between dessicant bags and metal surfaces.**

**NOTE**

Air circulation under draped covers reduces deterioration from moisture and heat.

- (4) Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Install all covers (including vehicle protective closures) authorized for the equipment. Close and secure all openings except those required for venting and draining. Seal openings to prevent the entry of rain, snow, or dust. Insert dessicant when complete seal is required. Place equipment and provide blocking or framing to allow for ventilation and water drainage. Support cover away from item surfaces that may rust, rot, or mildew.
- (5) Park vehicle so tires are not resting on greasy or oily surfaces.

**4-100. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE.**

*a. Maintenance Services*

After equipment has been placed in administrative storage, inspect, service, and exercise as required.



**4-100. CARE OF EQUIPMENT IN ADMINISTRATIVE STORAGE (continued).*****b. Inspection***

Inspection must consist of at least a walk-around examination of all equipment to detect any deficiencies. Inspect equipment in open storage weekly, and inspect equipment in covered storage monthly. Inspect all equipment immediately after any severe storm or environmental change. The following are examples of things to look for during a visual inspection:

- (1) Low or flat tires.
- (2) Condition of preservatives, seals, and wraps.
- (3) Torn, frayed, or split canvas covers and tops.
- (4) Corrosion or other deterioration.
- (5) Missing or damaged parts.
- (6) Water in compartments.
- (7) Fluid leaks.
- (8) Oil can points.
- (9) Any other readily recognizable shortcomings or deficiencies.

***c. Repair During Administrative Storage***

Keep equipment in an optimum state of readiness. Accomplish the required services and repairs as expeditiously as possible. Whenever possible, perform all maintenance on-site.

**4-101. STORAGE MAINTENANCE PROCEDURES.**

***a.*** Before placing a Bridge Adapter Pallet (BAP) in storage, perform the following inspection, repair, or replacement tasks:

- (1) ***Rollers.*** Inspect rollers for excess wear, scuffing, torn or cracked rubber, excess play, and free spinning ability. Lubricate rollers if necessary and verify that they spin freely. Replace any damaged or missing rollers in accordance with the applicable maintenance procedure in this manual.
- (2) ***Seals.*** Inspect seals for leaks. Leaks may develop during storage or shortly thereafter. If leaking seals are present, replace seals in accordance with the applicable maintenance procedure in this manual.
- (3) ***Hoses.*** Inspect hoses for cracks, splits, frayed or rotted material, poor connections, and leaks. Replace any hoses that show signs of corrosion, deterioration, or other defects.

**4-101. STORAGE MAINTENANCE PROCEDURES (continued).**

- (4) **Winch Mechanism.** Inspect winch casing for signs of obvious damage or hydraulic reservoir leaks. Repair or replace in accordance with the applicable maintenance procedure in this manual.
  - (5) **Road-Side and Curb-Side Front Pin Locks.** Inspect front pin locks for signs of damage and missing or broken springs. Replace any missing or broken springs in accordance with the applicable maintenance procedure in this manual.
  - (6) **Road-Side and Curb-Side Rear Guides.** Inspect rear guides for signs of damage and loose and/or missing nuts and bolts. Replace and/or tighten any missing or loose nuts and bolts. Push down on the locking pins and make sure each rear guide swivels freely on its arc throughout its entire range of motion.
  - (7) **Winch Cable.** Make sure entire length of winch cable has been coated with grease (Appendix G).
- b. Before placing a BAP in storage, perform the following disassembly procedure:
- (1) Loosen and remove four nuts, bolts, and washers from road-side and curb-side rear guides (para 4-28).
  - (2) Remove the rear guide from its position on the rear of the BAP.
  - (3) Mount the rear guide to the welded bolts on the underside of the BAP so that the rear guide is perpendicular to the centerline of the BAP.
  - (4) Secure the rear guide to the BAP bolts using the washers and nuts removed in Step (1). Stow the bolts removed in Step (1) in the BAP stowage box.
- c. Forty-five *working* days after the BAP is placed in storage, perform the following inspection:
- (1) Inspect the BAP in accordance with paragraph 4-108a(1) through (6).
  - (2) Note the items checked and any maintenance problems encountered on a Preventive Maintenance Record.
  - (3) Note the corrective action completed for any maintenance problems.
  - (4) If any loss, damage, or destruction is found, note it on a Preventive Maintenance Record and notify the Government Property Administrator for action.
- d. Ninety *working* days after the BAP is placed in storage, perform the following inspection and exercises:
- (1) Inspect the BAP in accordance with paragraph 4-108a(1) through (6).
  - (2) Using a portable hydraulic power unit, exercise the winch cable by extending it a minimum of 30 feet.
  - (3) Examine winch cable for preservative application. If reapplication of preservatives is required, extend the cable full length and clean and reapply preservatives as necessary (Appendix G).
  - (4) Rewind the winch cable using enough tension to prevent kinking and to ensure a proper cable wind.

**4-101. STORAGE MAINTENANCE PROCEDURES (continued).**

- (5) Exercise the hand pump pneumatic system by raising and lowering the center rollers.
  - (6) Exercise the pneumatic system by opening and closing the front bay locks three times.
  - (7) Note the items checked and any maintenance problems encountered on a Preventive Maintenance Record.
  - (8) Note the corrective action completed for any maintenance problems and record the badge number and date of performance.
  - (9) If any loss, damage, or destruction is found, note it on the Preventive Maintenance Record and notify the Government Property Administrator for action.
- e. While vehicle is in storage, exercise the LHS on a quarterly basis.
- f. While the vehicle is in storage, perform the following tasks annually:
- (1) Clean the exterior and undercarriage. Wash any oil, grease, or mud from tires.
  - (2) Completely lubricate chassis and all ancillary equipment in accordance with Appendix G.

**4-102. REMOVAL OF EQUIPMENT FROM ADMINISTRATIVE STORAGE.***a. Activation*

Restore the BAP and Transporter to normal operating condition as follows:

- (1) Loosen and remove four nuts and washers and road-side rear guide from its stored position underneath the BAP.
- (2) Remove eight bolts from the BAP stowage box.
- (3) Replace the road-side rear guide in its position at the rear of the BAP. Secure the rear guide with four bolts, washers, and nuts.
- (4) Repeat Steps 1 through 3 for the curb-side rear guide.
- (5) Conduct a visual inspection of the vehicle. Check lubricant level and tire pressures. Correct any discrepancies.
- (6) Completely lubricate chassis, all ancillary equipment, and oil can points in accordance with Appendix G.

*b. Servicing*

Resume the maintenance service schedule in effect at the commencement of administrative storage.

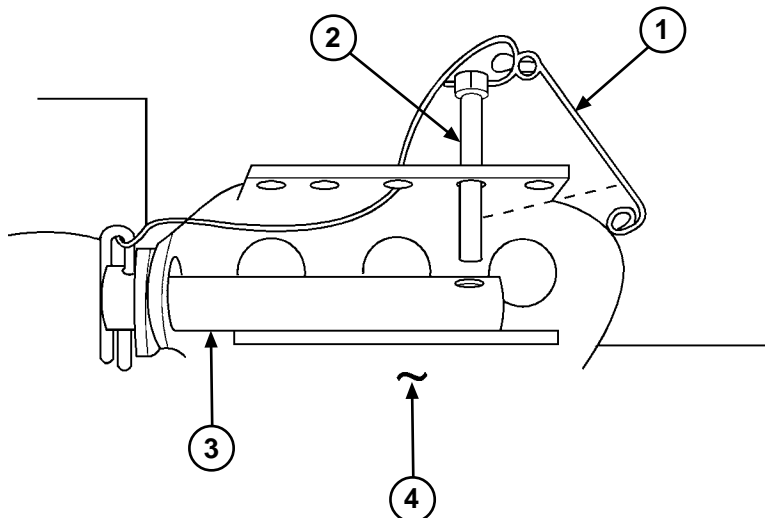
**4-103. PREPARATION OF EQUIPMENT FOR SHIPMENT.**

- a. DA Form 4895, *Equipment Preservation Data Sheets*, documents in detail preparation for shipment and storage. Along with MIL-U-62038, the data sheets provide specific equipment processing instructions. The data sheets can be obtained from AMSTA-TR/E-HTV, U.S. Army Tank-automotive and Armaments Command, Warren, Michigan 48397-5000; commercial telephone number (810) 574-8317. Refer to FM 55-21, TM 55-2200-001-12, and TM 743-200-1 for additional instructions on processing, storage, and shipment of material.
- b. Vehicles shipped on flatcars require wheel blocking in accordance with the Association of American Railroads' rules governing the loading of commodities on open-top cars.
- c. Vehicles that have been removed from storage for shipment do not have to be reprocessed if they will reach their destination within the administrative storage period. Reprocess only if inspection reveals any corrosion or if in-transit weather conditions make it necessary.
- d. When a vehicle is received and has already been processed for domestic shipment, as indicated on DD Form 1397, the vehicle does not have to be reprocessed for storage unless corrosion and deterioration are found during the inspection upon receipt. List, on an SF Form 364, all discrepancies found because of poor preservation, packaging, packing, marking, handling, loading, storage, or excessive preservation. Repairs that cannot be handled by the receiving unit must have tags attached listing needed repairs. A report of these conditions will be submitted by the Unit Commander for action by an ordnance maintenance unit.
- e. *Install hitch pins.*

**NOTE**

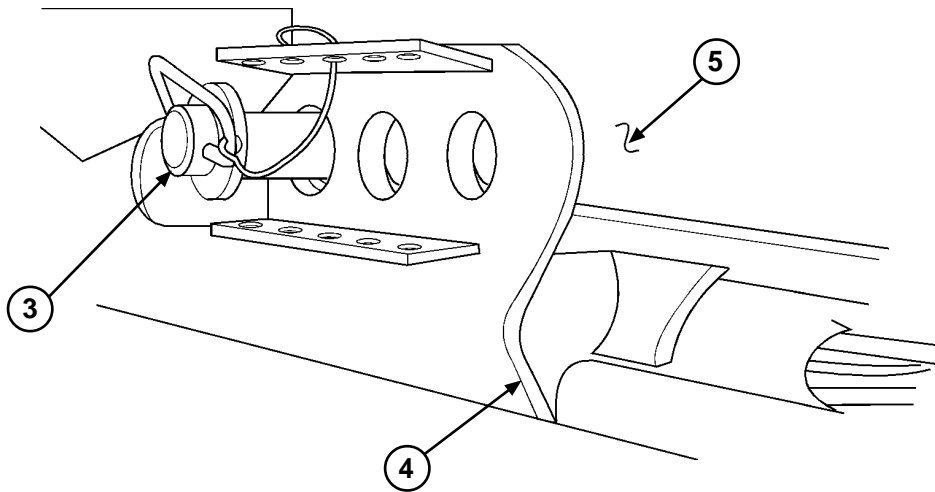
Both hitch pins are installed the same way. Road side is shown.

- (1) Remove safety pin (1) from lock pin (2).
- (2) Remove lock pin (2) from hitch pin (3).
- (3) Remove hitch pin (3) from bracket (4).

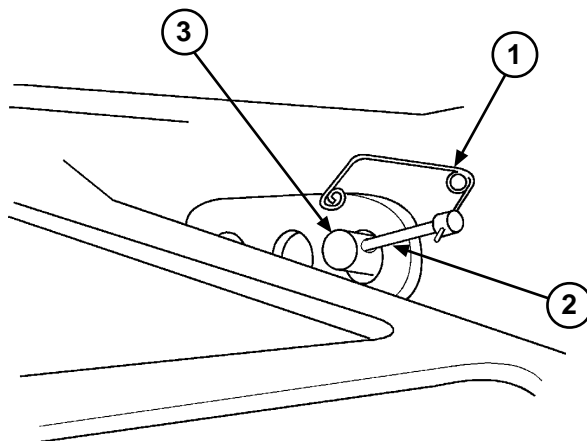


**4-103. PREPARATION OF EQUIPMENT FOR SHIPMENT (continued).**

- (4) Install hitch pin (3) through bracket (4) and flatrack main rail (5).



- (5) Install lock pin (2) in hitch pin (3).  
 (6) Install safety pin (1) in lock pin (2).  
 (7) Repeat Steps 1 through 6 for curb side.





## CHAPTER 5

### DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

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## Section I. TROUBLESHOOTING PROCEDURES

**5-1. INTRODUCTION TO LOGIC-TREE TROUBLESHOOTING.**

This section contains step-by-step procedures for identifying, locating, isolating, and repairing equipment malfunctions by Unit maintenance personnel. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the corrective actions listed, notify your supervisor.

- a. Troubleshooting Format.** All troubleshooting procedures are separated into left-hand and right-hand pages. The main diagnostic logic is on the left-hand pages. Related and helpful information is on right-hand pages. Just answer the questions on the left-hand pages. If you are not sure about a question or procedure, look on the right-hand page for notes, instructions, and help. Follow the YES or NO path as directed to the next step.
- (1) **Left-Hand Pages.** All critical information for decision making is found on left-hand pages. Related and helpful information, if needed, can be found on the accompanying right-hand page. Each left-hand page contains the following information:
- (a) **INITIAL SETUP** — This box is located only before the first step in a given troubleshooting fault. INITIAL SETUP lists tools, materials, references, personnel, and equipment needed to troubleshoot the fault.
  - (b) **QUESTION** — Each question, located in the middle column, refers to POSSIBLE PROBLEMS. Just answer the question YES or NO and follow the appropriate path to the next step. Everything else on both pages is information to support the question.
  - (c) **KNOWN INFO** — This box contains known information about the vehicle or subsystem. As you follow a test chain, parts will be listed here after they have been found to be OK. Sometimes this box will indicate a fault known to exist, such as “No Transit Light on All the Time.” **DO NOT USE THIS BOX TO PICK A “JUMP IN” POINT.** Always run a complete chain when instructed to do so.
  - (d) **POSSIBLE PROBLEMS** — This box is the opposite of KNOWN INFO. Whatever might be causing the problem is listed here until it is tested and shown to be OK.
  - (e) **TEST OPTIONS** — This box lists at least one way of getting to the answer to the question. When there is more than one way to get to the answer, all the different options will be given. The easiest or best option is listed first.
  - (f) **REASON FOR QUESTION** — If you know why the question is being asked, it should be easier to understand the diagnostic logic and easier to answer the question. Many times, an explanation of how the system or circuit works is included here. Knowing why the question is being asked should help you decide if the answer should be YES or NO.
- (2) **Right-Hand Pages.** Right-hand pages contain additional information. Each right-hand page contains the following information:
- (a) **WARNINGS AND CAUTIONS** — Warning and caution statements are placed on the right-hand page.



**5-1. INTRODUCTION TO LOGIC-TREE TROUBLESHOOTING (continued).**

- (b) **Test Procedures (e.g., VISUAL INSPECTION)** — These are specific instructions about how to make the measurements required to answer the question. The procedures presume a basic working knowledge of the test equipment to be used.
- (c) **Illustrations** — The illustrations are designed to make it easier for you to find what you are looking for, such as a specific connector or wire.
- (d) **NOTES** — Helpful notes are provided as supporting information only; you do not usually need this information to answer the question.

**b. How To Begin Troubleshooting.**

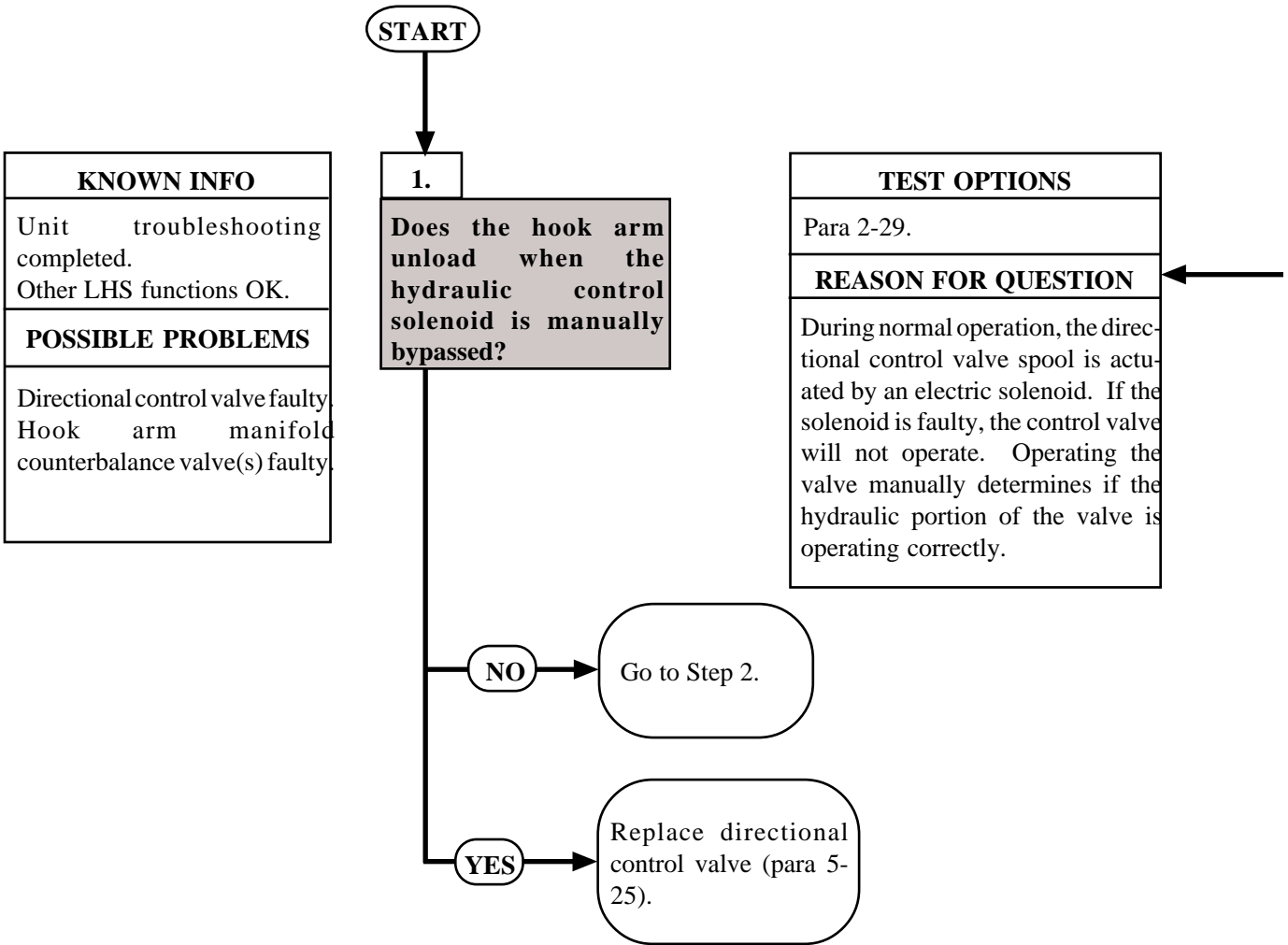
- (1) Determine the symptom or condition that most closely resembles your problem or failure. The troubleshooting is divided into symptoms peculiar to a system or component.
- (2) Refer to the Malfunction Index. Go to the referenced page to begin troubleshooting.
- (3) Open the manual flat so both the left-hand and right-hand pages are displayed before you.
- (4) Carefully observe all WARNINGS and CAUTIONS.

**Table 5-1. Malfunction Index**

TROUBLESHOOTING PROCEDURE	PAGE
1. Hook Arm Does Not Unload .....	5-4
2. Hook Arm Does Not Load .....	5-10
3. Main Frame Does Not Unload .....	5-16
4. Main Frame Does Not Load.....	5-22
5. LHS Creeps Under Load.....	5-28
6. Main Frame, Hook Arm, and Winch Do Not Operate or Operate Slowly.....	5-38
7. BAP Winch Does Not Operate .....	5-44
8. BAP Winch Will Not Lift Load or Operates Slowly .....	5-50

5-2. DIRECT SUPPORT TROUBLESHOOTING.

<b>1. HOOK ARM DOES NOT UNLOAD.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i> Adapter, Straight, Pipe to Tube (TCM20-1/2JIC-V) Gage, Pressure, Dial Indicating (151469) Hose Assembly, Nonmetallic (HFF20-060) Pan, Drain, 4-gallon (MIL-P-45819) Tee, Tube (203102-8-8S) Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	Union, Pipe to Tube (GAH20-1/4 NPT-V) Wrench, Combination, 1-1/4 in. (GGG-W-636)  <i>Equipment Condition</i> BAP unloaded to ground (para 2-10) Engine turned off (TM 9-2320-279-10) Parking brake applied (TM 9-2320-279-10) Wheels chocked (TM 9-2320-279-10)



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**1. HOOK ARM DOES NOT UNLOAD (continued).**

Attempt to unload the hook arm by manually bypassing the hook arm hydraulic control solenoid. Refer to paragraph 2-29 for specific instructions for this procedure.

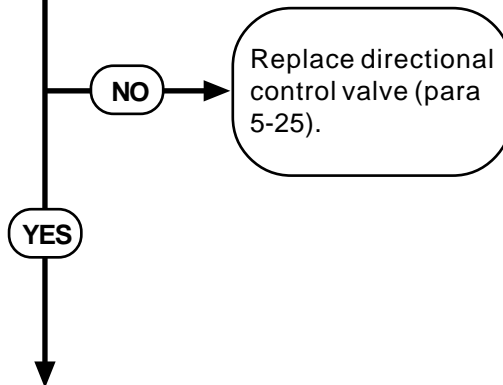
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

1. HOOK ARM DOES NOT UNLOAD (continued).

KNOWN INFO
Unit troubleshooting completed. Other LHS functions OK.
POSSIBLE PROBLEMS
Directional control valve faulty. Hook arm manifold counterbalance valve(s) faulty.

2.  
Are 3,100–3,300 psi present at the hook arm manifolds during unloading?

TEST OPTIONS
Hook Arm Unload Pressure Test.
REASON FOR QUESTION
If the correct hydraulic pressure is measured at the hook arm hydraulic cylinders, the control portion of the hydraulic circuit is OK.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**1. HOOK ARM DOES NOT UNLOAD (continued).**

**HOOK ARM UNLOAD PRESSURE TEST**

**WARNING**

The LHS hydraulic system operates at oil pressures up to 3,625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply with this warning may result in serious injury or death to personnel.

- (1) Remove hose no. 2892 from fitting at rear of main frame.
- (2) Install tee fitting, hose adapter, hose, and pressure gage between fitting and hose no. 2892.
- (3) Start engine and engage the PTO.
- (4) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the manual HOOK ARM ONLY (manual mode) position.
- (5) Attempt to unload the hook arm using the remote control or cab controls.

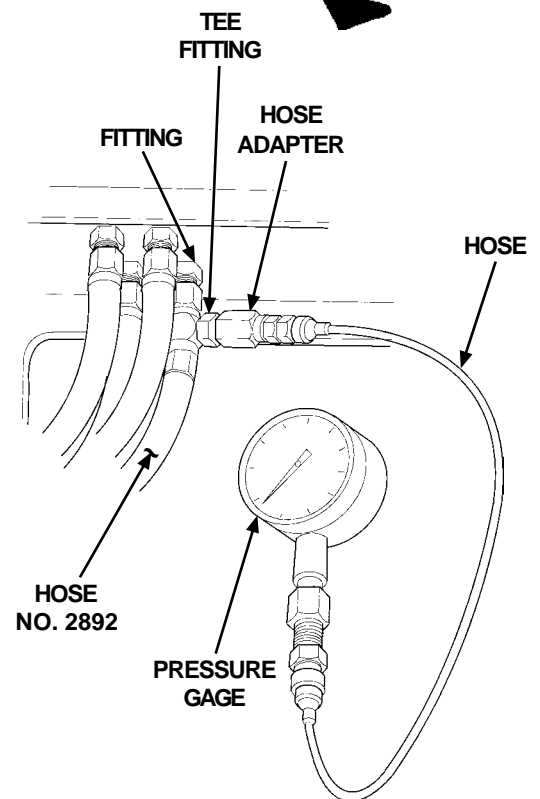
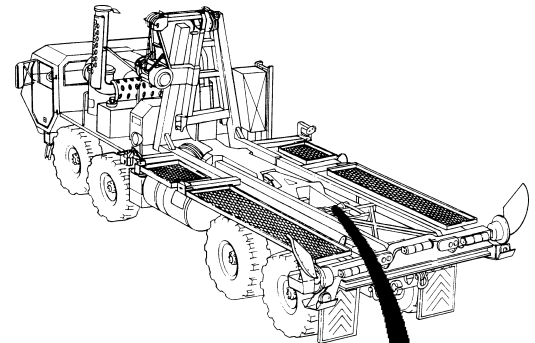
**CAUTION**

Fully extending or retracting hydraulic cylinders will put the hydraulic system into relief. This should be limited to 10 seconds. Failure to comply with this caution may result in damage to equipment.

**NOTE**

During an empty unload cycle, the hydraulic pressure will read approximately 1,000 psi until the hook arm hydraulic cylinders are fully extended. Full relief pressure of 3,100 to 3,300 psi will be reached at full extension of the hydraulic cylinder.

- (6) Observe the readings on the pressure gage during unloading.
- (7) Shut off engine and turn off light control switch.
- (8) Remove tee fitting, hose adapter, hose, and pressure gage from between fitting and hose no. 2892.
- (9) Install hose no. 2892 on fitting at rear of main frame.



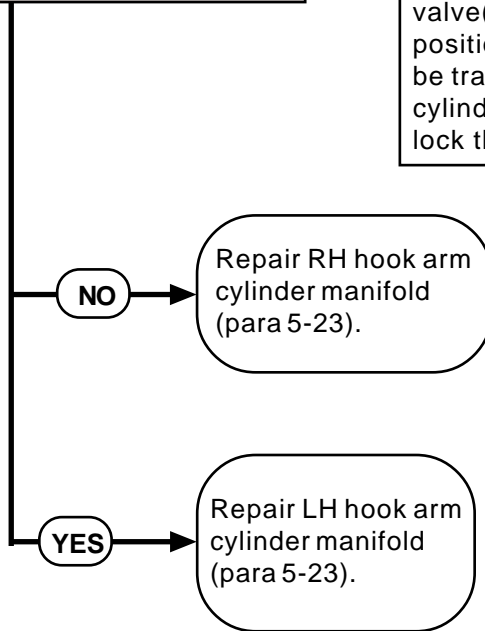
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

1. HOOK ARM DOES NOT UNLOAD (continued).

KNOWN INFO
Unit troubleshooting completed. Other LHS functions OK. Directional control valve OK.
POSSIBLE PROBLEMS
Hook arm manifold counterbalance valve(s) faulty.

3. Does the hook arm unload after the counterbalance valves are reversed on the left hook arm cylinder manifold?

TEST OPTIONS
Counterbalance Valve Test.
REASON FOR QUESTION
If the hook arm cylinder manifold counterbalance valve(s) stick in the closed position, hydraulic fluid will be trapped in the hydraulic cylinder, which will hydro-lock the cylinder.

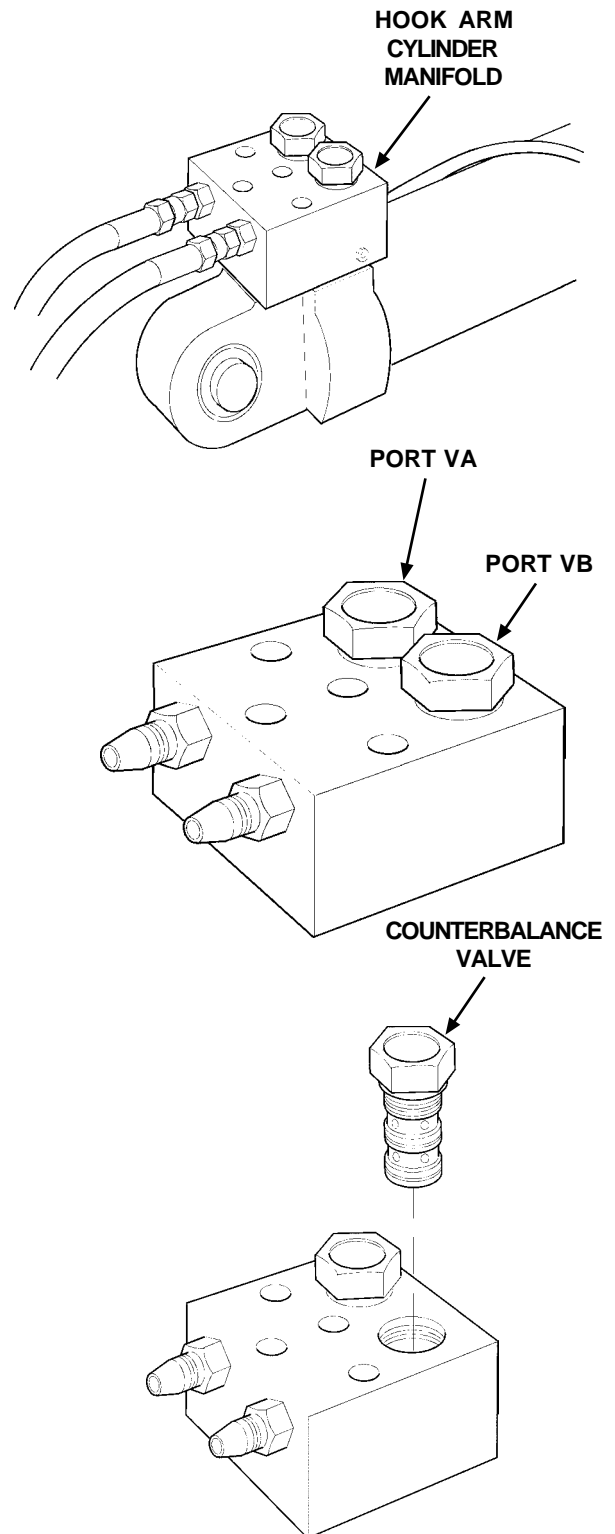


**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**1. HOOK ARM DOES NOT UNLOAD (continued).**

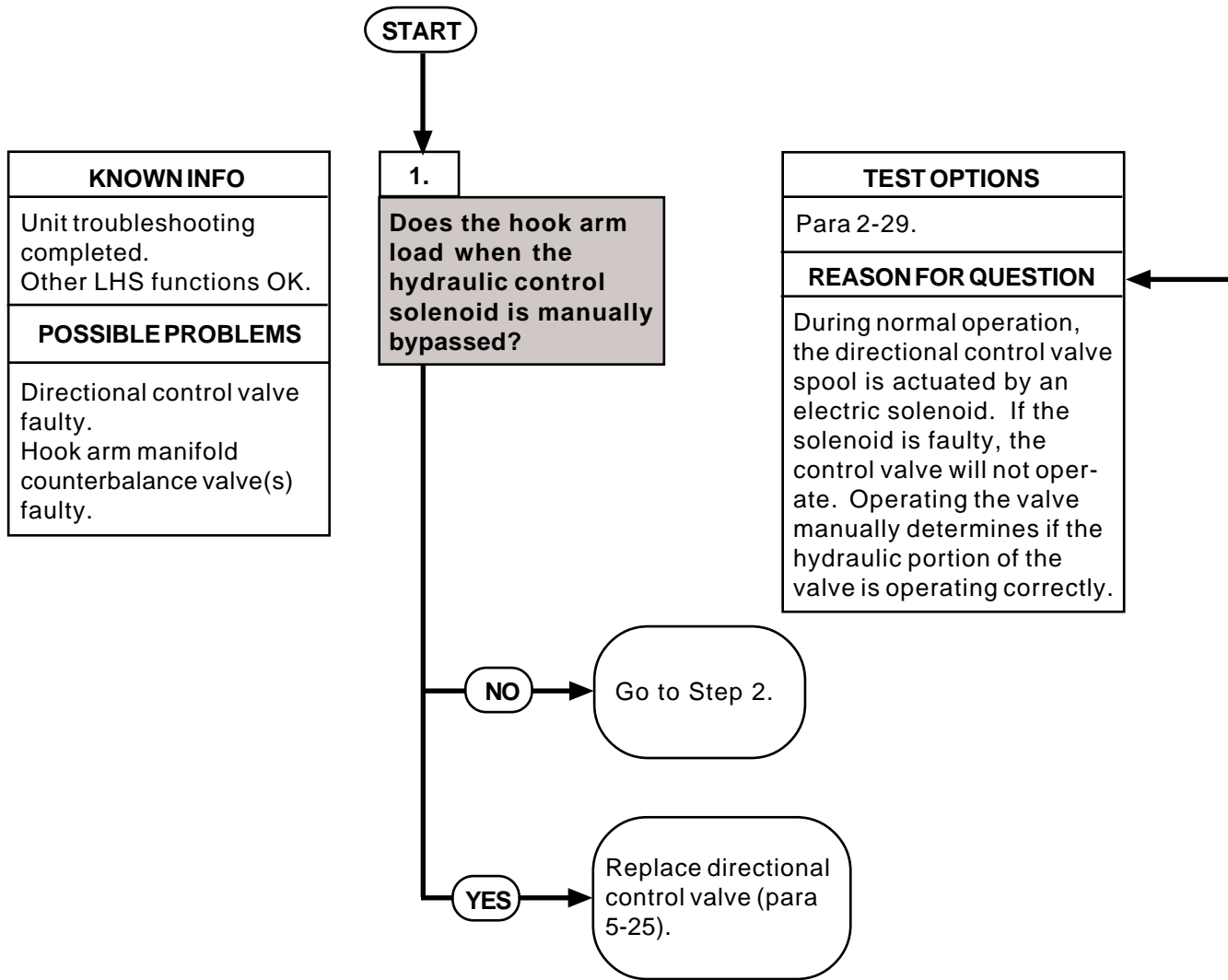
**COUNTERBALANCE VALVE TEST**

- (1) Remove left hook arm cylinder manifold from cylinder (para 5-23).
- (2) Remove counterbalance valve from manifold port VA.
- (3) Remove counterbalance valve from manifold port VB and install in port VA.
- (4) Install remaining counterbalance valve in manifold port VB.
- (5) Install left hook arm cylinder manifold on cylinder (para 5-23).
- (6) Start engine and engage the PTO.
- (7) Turn the light control switch to the ON position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
- (8) Attempt to unload the hook arm using the remote control or cab controls. Note the operation of the hook arm.
- (9) Shut off engine and turn light control switch to OFF position.
- (10) If the hook arm now unloads properly, the counterbalance valve installed in the left manifold port VB is faulty. If the hook arm still does not unload, the counterbalance valve in the right manifold port VA is faulty.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

<b>2. HOOK ARM DOES NOT LOAD.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i>	<i>Equipment Condition</i>
Adapter, Straight, Pipe to Tube (TCM20-1/2JIC-V)	Union, Pipe to Tube (GAH20-1/4 NPT-V)
Gage, Pressure, Dial Indicating (151469)	Wrench, Combination, 1-1/4 in. (GGG-W-636)
Hose Assembly, Nonmetallic (HFF20-060)	
Pan, Drain, 4-gallon (MIL-P-45819)	
Tee, Tube (203102-8-8S)	
Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	





**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**2. HOOK ARM DOES NOT LOAD (continued).**

Attempt to load the hook arm by manually bypassing the hook arm hydraulic control solenoid. Refer to paragraph 2-29 for specific instructions for this procedure.

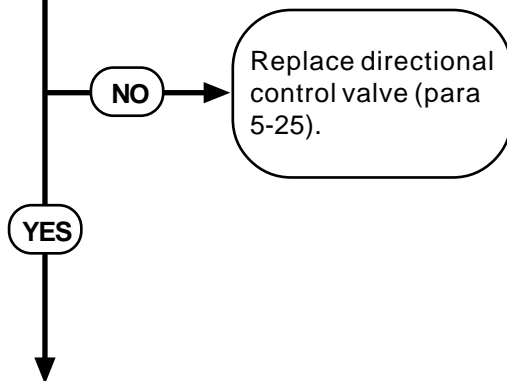
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

2. HOOK ARM DOES NOT LOAD (continued).

<b>KNOWN INFO</b>
Unit troubleshooting completed. Other LHS functions OK.
<b>POSSIBLE PROBLEMS</b>
Directional control valve faulty. Hook arm manifold counterbalance valve(s) faulty.

2.  
Are 3,100–3,300 psi present at the hook arm manifolds during loading?

<b>TEST OPTIONS</b>
Hook Arm Load Pressure Test.
<b>REASON FOR QUESTION</b>
If the correct hydraulic pressure is measured at the hook arm hydraulic cylinders, the control portion of the hydraulic circuit is OK.



## 5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

### 2. HOOK ARM DOES NOT LOAD (continued).

#### HOOK ARM LOAD PRESSURE TEST

##### WARNING

The LHS hydraulic system operates at oil pressures up to 3,625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply with this warning may result in serious injury or death to personnel.

- (1) Remove hose no. 2882 from fitting at rear of main frame.
- (2) Install tee fitting, hose adapter, hose, and pressure gage between fitting and hose.
- (3) Start engine and engage the PTO.
- (4) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
- (5) Attempt to load the hook arm using the remote control or cab controls.

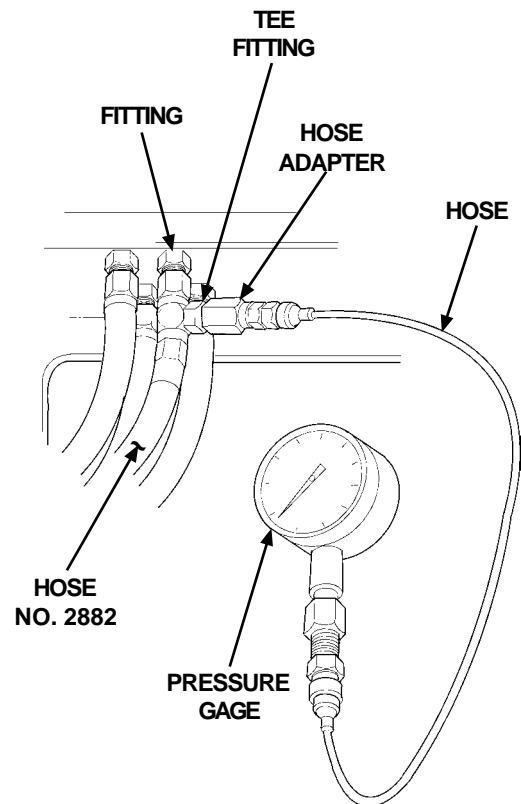
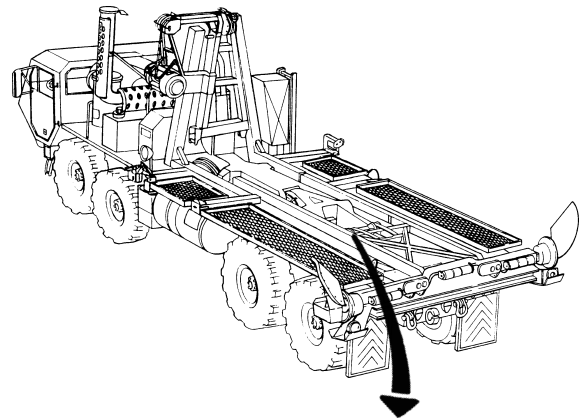
##### CAUTION

Fully extending or retracting hydraulic cylinders will put the hydraulic system into relief. This should be limited to 10 seconds. Failure to comply with this caution may result in damage to equipment.

##### NOTE

During an empty load cycle, the hydraulic pressure will read approximately 1,000 psi until the hook arm hydraulic cylinders are fully extended. Full relief pressure of 3,100 to 3,300 psi will be reached at full extension of the hydraulic cylinder.

- (6) Observe the readings on the pressure gage during loading.
- (7) Shut off engine and turn off light control switch.
- (8) Remove tee fitting, hose adapter, hose, and pressure gage from between fitting and hose no. 2882.
- (9) Install hose no. 2882 on fitting at rear of main frame.



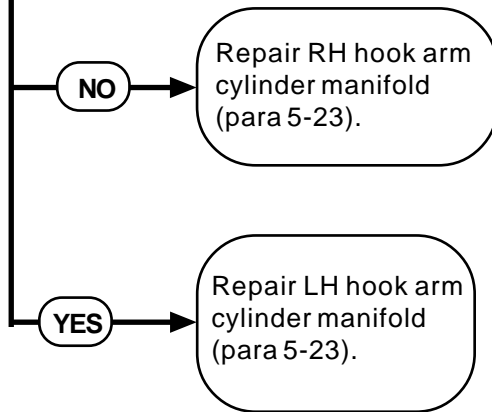
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

2. HOOK ARM DOES NOT LOAD (continued).

KNOWNINFO
Unit troubleshooting completed. Other LHS functions OK. Directional control valve OK.
POSSIBLE PROBLEMS
Hook arm manifold counterbalance valve(s) faulty.

3. Does the hook arm load after the counterbalance valves are reversed on the left hook arm cylinder manifold?

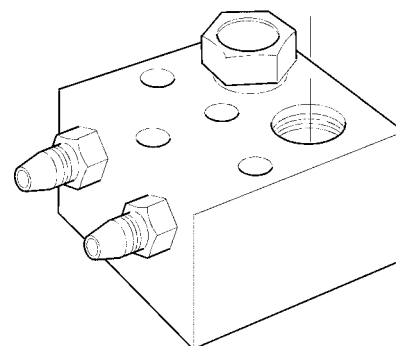
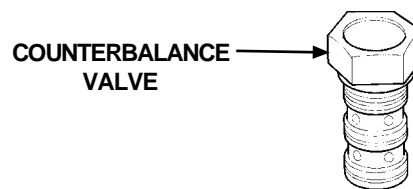
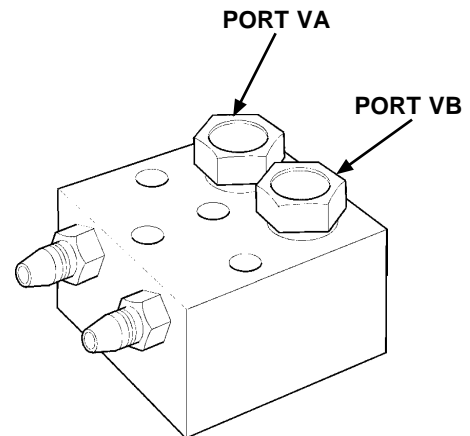
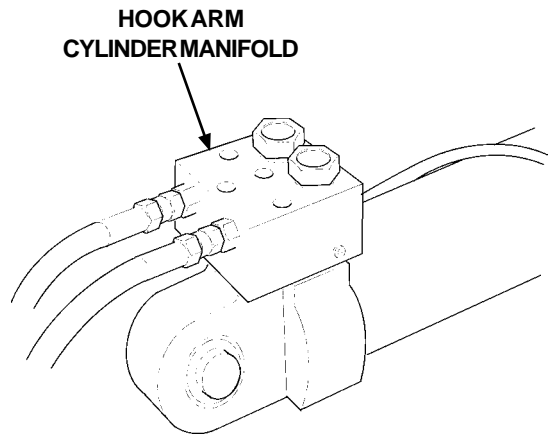
TEST OPTIONS
Counterbalance Valve Test.
REASON FOR QUESTION
If the hook arm cylinder manifold counterbalance valve(s) stick in the closed position, hydraulic fluid will be trapped in the hydraulic cylinder, which will hydro-lock the cylinder.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

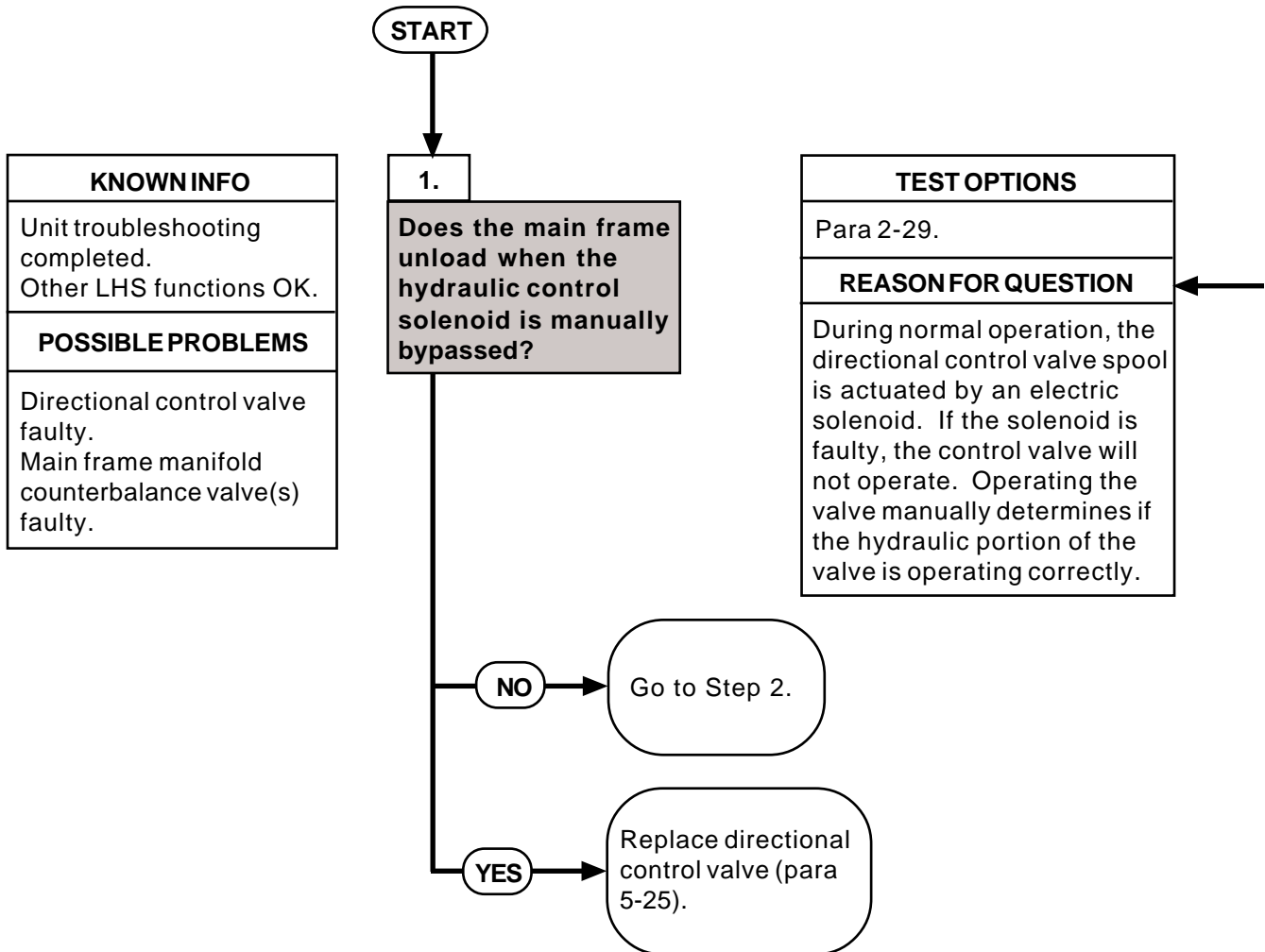
**2. HOOK ARM DOES NOT LOAD (continued).**

<b>COUNTERBALANCE VALVE TEST</b>	
(1)	Remove left hook arm cylinder manifold from cylinder (para 5-22).
(2)	Remove counterbalance valve from manifold port VA.
(3)	Remove counterbalance valve from manifold port VB and install in port VA.
(4)	Install remaining counterbalance valve in manifold port VB.
(5)	Install left hook arm cylinder manifold on cylinder (para 5-23).
(6)	Start engine and engage the PTO.
(7)	Turn the light control switch to the ON position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
(8)	Attempt to load the hook arm using the remote control or cab controls. Note the operation of the hook arm.
(9)	Shut off engine and turn light control switch to OFF position.
(10)	If the hook arm now loads properly, the counterbalance valve installed in the left manifold port VA is faulty. If the hook arm still does not load, the counterbalance valve in the right manifold port VB is faulty.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

<b>3. MAIN FRAME DOES NOT UNLOAD.</b>	
<b>INITIAL SETUP</b>	
<p><i>Tools and Special Tools</i></p> <ul style="list-style-type: none"> <li>Adapter, Straight, Pipe to Tube (TCM20-1/2JIC-V)</li> <li>Gage, Pressure, Dial Indicating (151469)</li> <li>Hose Assembly, Nonmetallic (HFF20-060)</li> <li>Pan, Drain, 4-gallon (MIL-P-45819)</li> <li>Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)</li> <li>Union, Pipe to Tube (GAH 20-1/4 NPT-V)</li> <li>Wrench, Combination, 1-1/4 in. (GGG-W-636)</li> </ul>	<p><i>Equipment Condition</i></p> <ul style="list-style-type: none"> <li>BAP unloaded to ground (para 2-10)</li> <li>Engine turned off (TM 9-2320-279-10)</li> <li>Parking brake applied (TM 9-2320-279-10)</li> <li>Wheels chocked (TM 9-2320-279-10)</li> </ul>



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**3. MAIN FRAME DOES NOT UNLOAD (continued).**

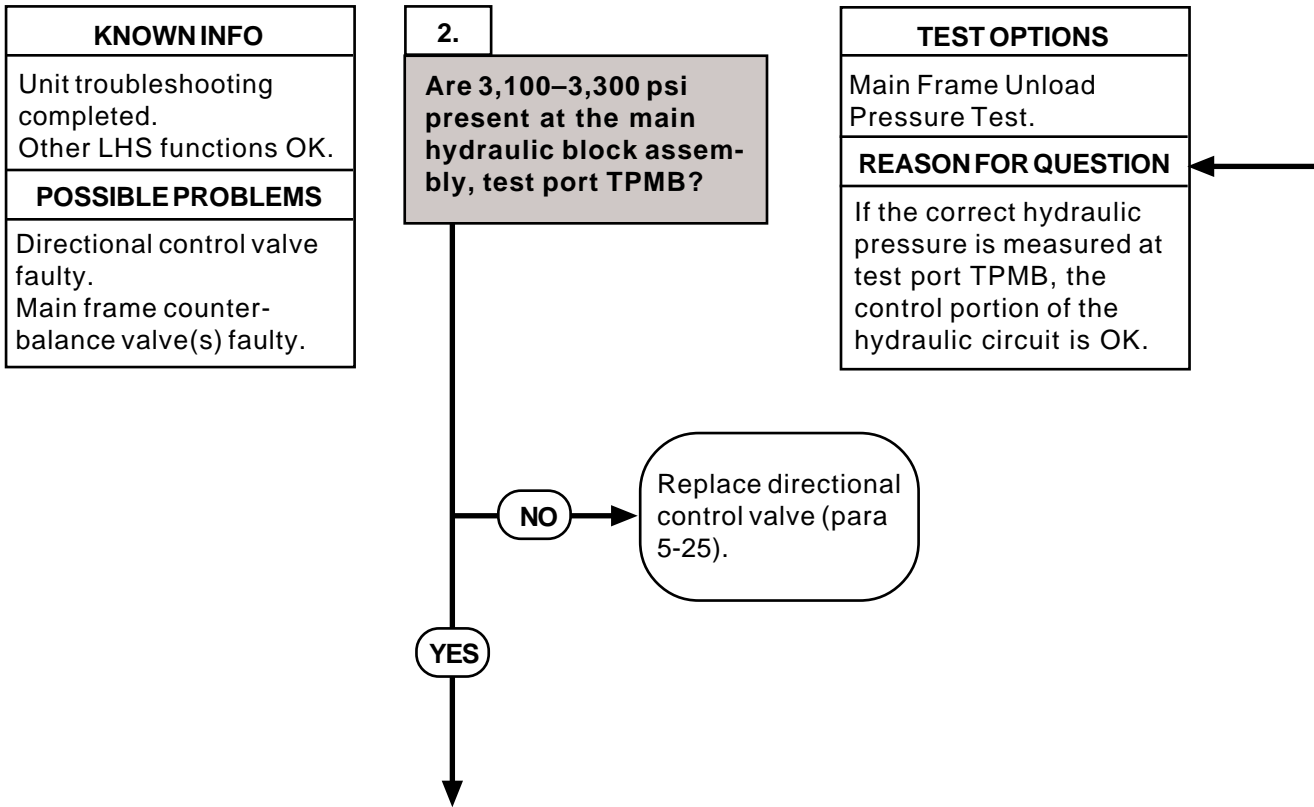
**NOTE**

The CBT is designed to prevent the operation of the main frame unload function when the hook arm is fully retracted.

Attempt to unload the main frame by manually bypassing the main frame hydraulic control solenoid. Refer to paragraph 2-29 for specific instructions regarding this procedure.

5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

3. MAIN FRAME DOES NOT UNLOAD (continued).

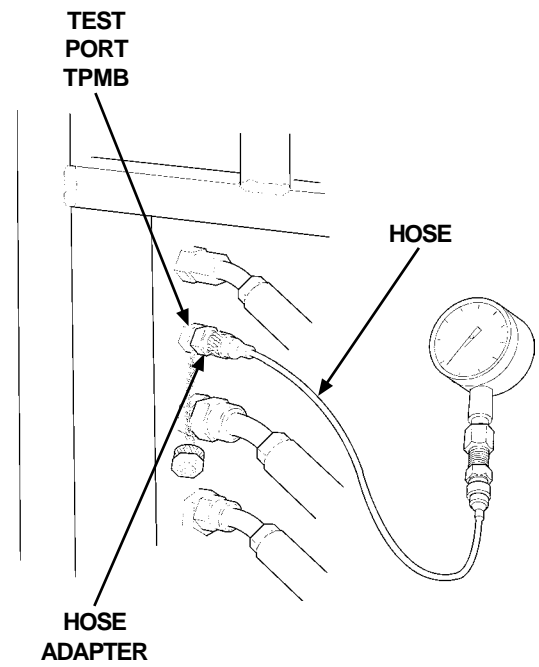
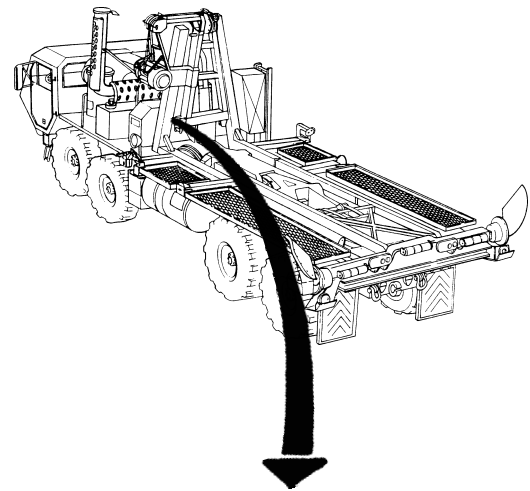




**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**3. MAIN FRAME DOES NOT UNLOAD (continued).**

<b>MAIN FRAME UNLOAD PRESSURE TEST</b>	
<b><u>WARNING</u></b>	
<p>The LHS hydraulic system operates at oil pressures up to 3,625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply with this warning may result in serious injury or death to personnel.</p>	
<ol style="list-style-type: none"> <li>(1) Remove plug and O-ring from port TPMB on main hydraulic block assembly.</li> <li>(2) Install hose adapter, hose, and pressure gage on main hydraulic block assembly.</li> <li>(3) Start engine and engage the PTO.</li> <li>(4) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.</li> <li>(5) Attempt to unload the main frame using the remote control or cab controls.</li> </ol>	
<b><u>CAUTION</u></b>	
<p>Fully extending or retracting hydraulic cylinders will put the hydraulic system into relief. This should be limited to 10 seconds. Failure to comply with this caution may result in damage to equipment.</p>	
<b>NOTE</b>	
<p>During an empty unload cycle, the hydraulic pressure will read approximately 1,000 psi until the main frame hydraulic cylinders are fully extended. Full relief pressure of 3,100 to 3,300 psi will be reached at full extension of the hydraulic cylinder.</p>	
<ol style="list-style-type: none"> <li>(6) Observe the readings on the pressure gage during unloading.</li> <li>(7) Shut off engine and turn off light control switch.</li> <li>(8) Remove hose adapter, hose, and pressure gage from main hydraulic block assembly.</li> <li>(9) Install plug and O-ring in port TPMB on main hydraulic block assembly.</li> </ol>	



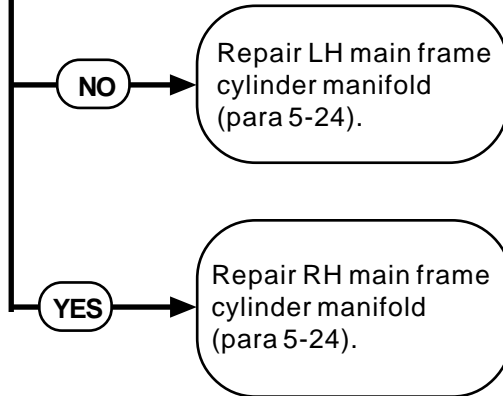
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

3. MAIN FRAME DOES NOT UNLOAD (continued).

KNOWN INFO
Unit troubleshooting completed. Other LHS functions OK. Directional control valve OK.
POSSIBLE PROBLEMS
Main frame manifold counterbalance valve(s) faulty.

3.  
Does the main frame unload after the counterbalance valves are reversed on the right main frame cylinder manifold?

TEST OPTIONS
Counterbalance Valve Test.
REASON FOR QUESTION
If the main frame cylinder manifold counterbalance valve(s) stick in the closed position, hydraulic fluid will be trapped in the hydraulic cylinder, which will hydro-lock the cylinder.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**3. MAIN FRAME DOES NOT UNLOAD (continued).**

**COUNTERBALANCE VALVE TEST**

**WARNING**

The main frame cylinders may be under hydraulic pressure. Steps 1 through 3 must be performed to relieve hydraulic pressure before removing counterbalance valves from main frame manifold. Failure to comply with this warning may result in damage to equipment and injury to personnel.

**NOTE**

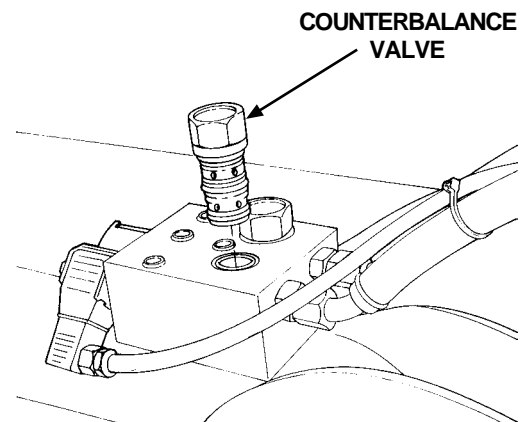
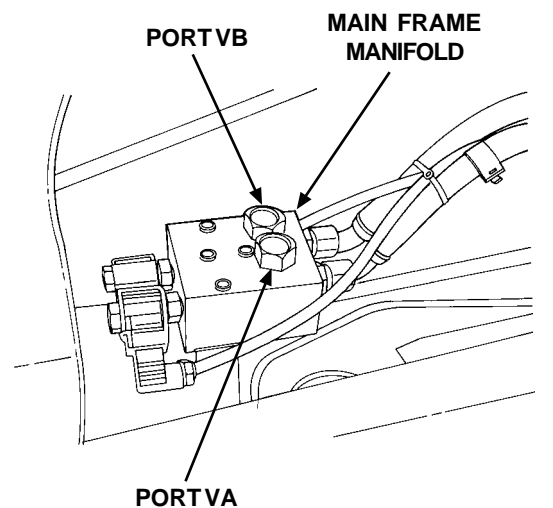
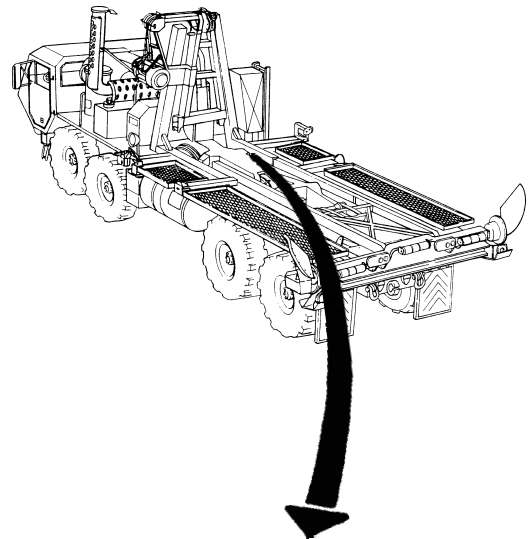
Hook arm and main frame must be in the stowed position.

- (1) Turn engine switch to ON and light control switch to STOP LIGHT position.
- (2) Turn LHS MODE SELECT switch to AUTO position.
- (3) Turn off engine and light control switches after a minimum of three minutes.

**NOTE**

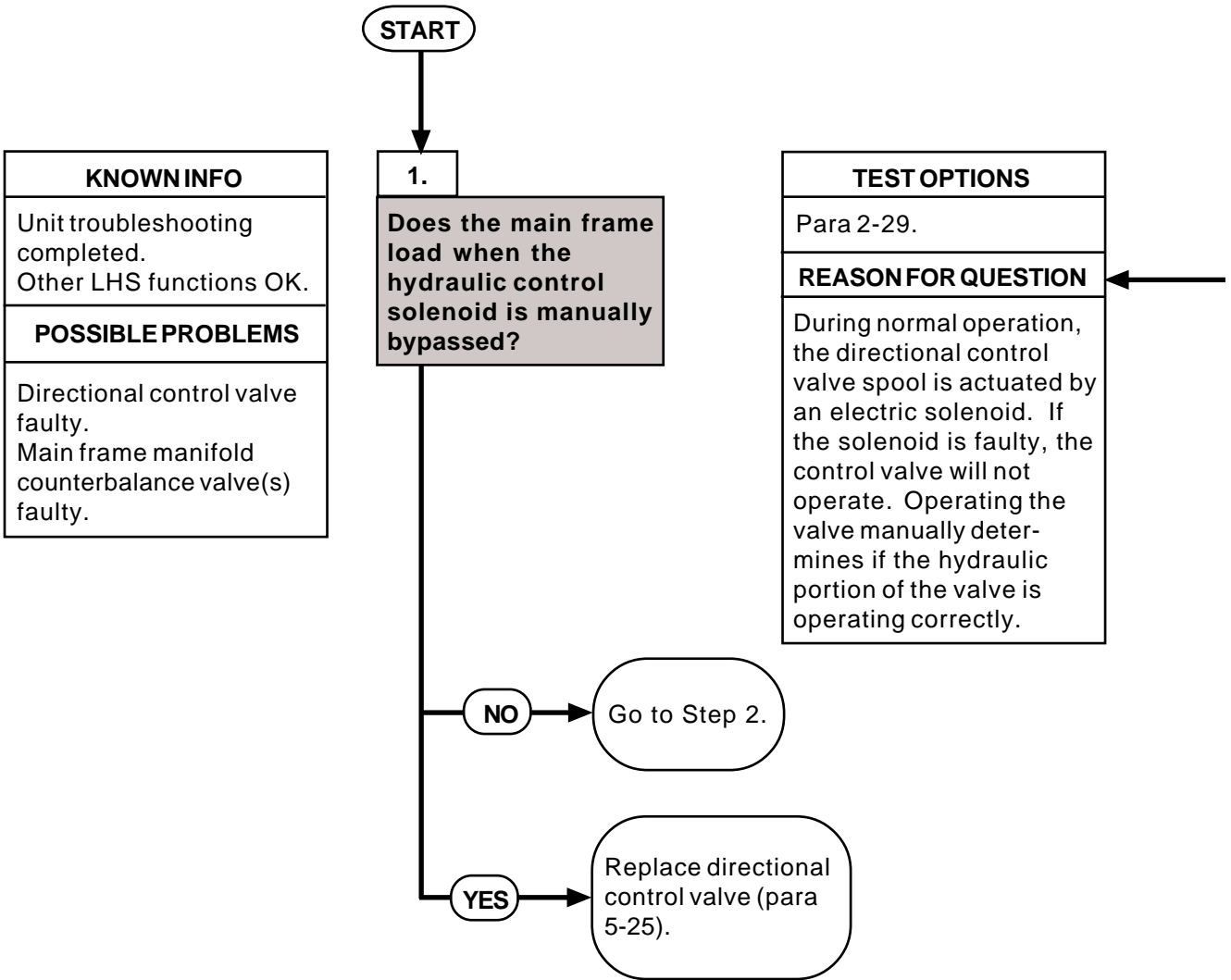
Oil will drip from main frame manifold when counterbalance valve is removed.

- (4) Remove counterbalance valve from right main frame manifold port VA.
- (5) Remove counterbalance valve from right main frame manifold port VB and install in port VA.
- (6) Install remaining counterbalance valve in right main frame manifold port VB.
- (7) Start engine and engage the PTO.
- (8) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
- (9) Attempt to unload the main frame using the remote control or cab controls. Note the operation of the main frame.
- (10) Shut off engine and turn light control switch to OFF position.
- (11) If the main frame now unloads properly, the counterbalance valve installed in the right manifold port VB is faulty. If the main frame still does not unload, the counterbalance valve in the left manifold port VA is faulty.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

<b>4. MAIN FRAME DOES NOT LOAD.</b>	
<b>INITIAL SETUP</b>	
<p><i>Tools and Special Tools</i></p> <ul style="list-style-type: none"> <li>Adapter, Straight, Pipe to Tube (TCM20-1/2JIC-V)</li> <li>Gage, Pressure, Dial Indicating (151469)</li> <li>Hose Assembly, Nonmetallic (HFF20-060)</li> <li>Pan, Drain, 4-gallon (MIL-P-45819)</li> <li>Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)</li> <li>Union, Pipe to Tube (GAH20-1/4 NPT-V)</li> <li>Wrench, Combination, 1-1/4 in. (GGG-W-636)</li> </ul>	<p><i>Equipment Condition</i></p> <ul style="list-style-type: none"> <li>BAP unloaded to ground (para 2-10)</li> <li>Engine turned off (TM 9-2320-279-10)</li> <li>Parking brake applied (TM 9-2320-279-10)</li> <li>Wheels chocked (TM 9-2320-279-10)</li> </ul>



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**4. MAIN FRAME DOES NOT LOAD (continued).**

Attempt to load the main frame by manually bypassing the main frame hydraulic control solenoid. Refer to paragraph 2-29 for specific instructions regarding this procedure.

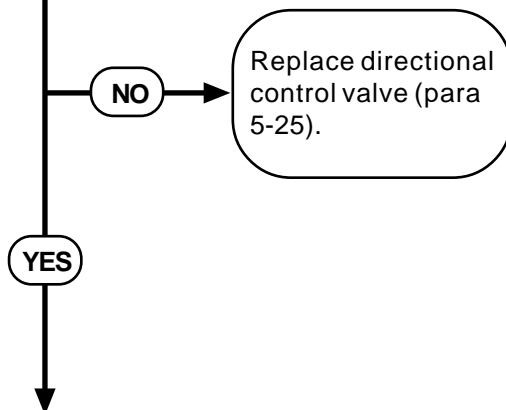
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

4. MAIN FRAME DOES NOT LOAD (continued).

KNOWN INFO
Unit troubleshooting completed. Other LHS functions OK.
POSSIBLE PROBLEMS
Directional control valve faulty. Main frame counter-balance valve(s) faulty.

2.  
Are 3,100–3,300 psi present at the main hydraulic block assembly, test port TPMA?

TEST OPTIONS
Main Frame Load Pressure Test.
REASON FOR QUESTION
If the correct hydraulic pressure is measured at test port TPMA, the control portion of the hydraulic circuit is OK.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**4. MAIN FRAME DOES NOT LOAD (continued).**

**MAIN FRAME LOAD PRESSURE TEST**

**WARNING**

The LHS hydraulic system operates at oil pressures up to 3,625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply with this warning may result in serious injury or death to personnel.

- (1) Remove plug and O-ring from port TPMA on main hydraulic block assembly.
- (2) Install hose adapter, hose, and pressure gage on main hydraulic block assembly.
- (3) Start engine and engage the PTO.
- (4) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
- (5) Attempt to load the main frame using the remote control or cab controls.

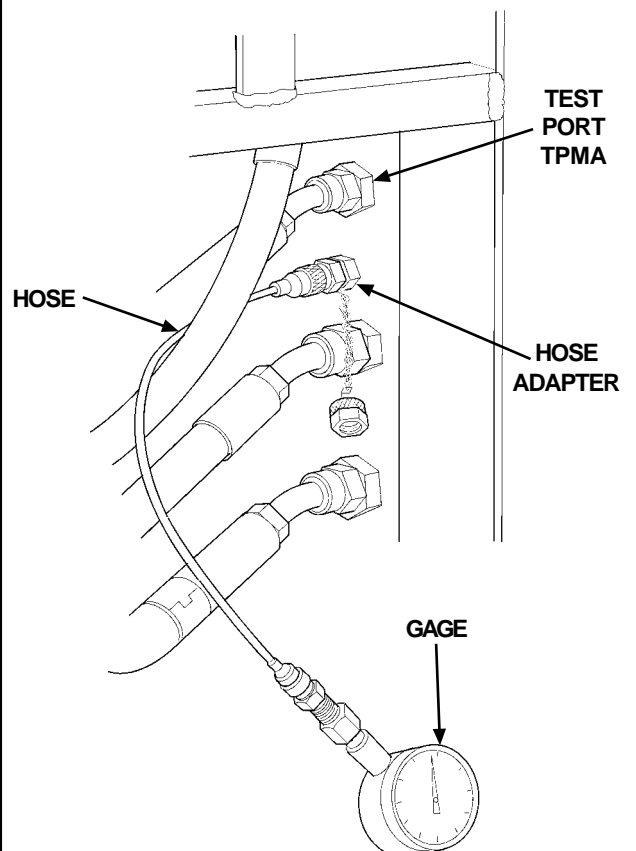
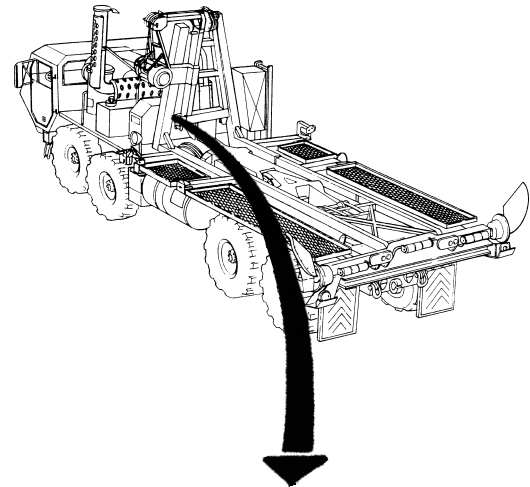
**CAUTION**

Fully extending or retracting hydraulic cylinders will put the hydraulic system into relief. This should be limited to 10 seconds. Failure to comply this caution may result in damage to equipment.

**NOTE**

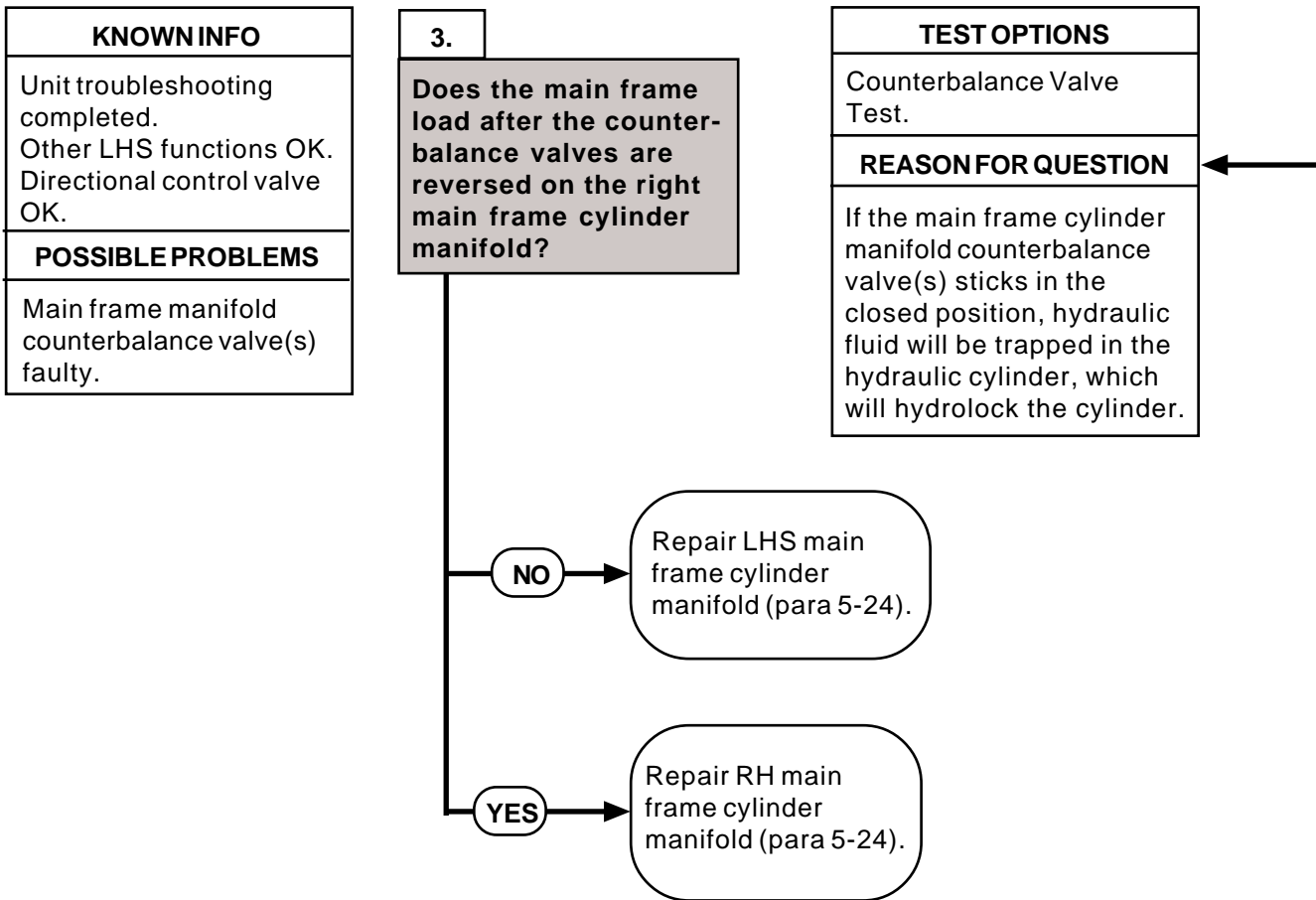
During an empty load cycle, the hydraulic pressure will read approximately 1,000 psi until the main frame hydraulic cylinders are fully retracted. Full relief pressure of 3,100 to 3,300 psi will be reached at full retraction of the hydraulic cylinder.

- (6) Observe the readings on the pressure gage during loading.
- (7) Shut off engine and turn off light control switch.
- (8) Remove hose adapter, hose, and pressure gage from main hydraulic block assembly.
- (9) Install plug and O-ring in port TPMA on main hydraulic block assembly.



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

4. MAIN FRAME DOES NOT LOAD (continued).





## 5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

### 4. MAIN FRAME DOES NOT LOAD (continued).

#### COUNTERBALANCE VALVE TEST

##### **WARNING**

The main frame cylinders may be under hydraulic pressure. Steps 1 thru 4 must be performed to relieve hydraulic pressure, before removing counterbalance valves from main frame manifold. Failure to comply with this warning may result in damage to equipment and injury to personnel.

- (1) Turn engine switch to ON and light control switch to STOP LIGHT position.
- (2) Turn LHS MODE SELECT switch to AUTO position.

##### **NOTE**

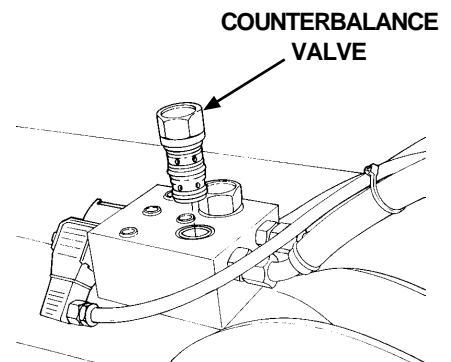
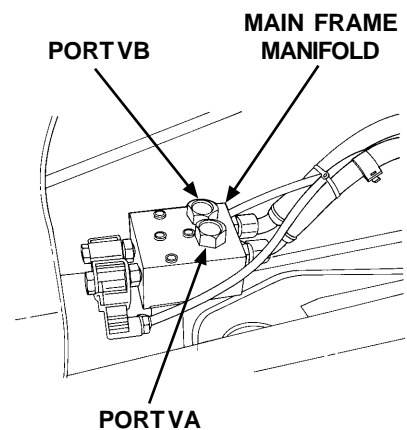
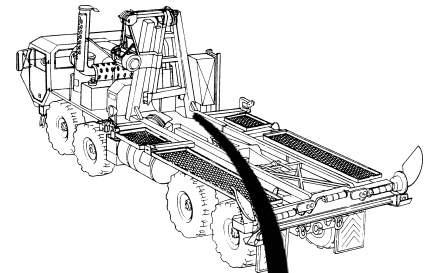
Perform Step 3 only if main frame and hook arm are not in the stowed position.

- (3) Hold a piece of metal over the main frame down and hook arm down proximity switches until main frame reaches fully retracted or fully extended position.
- (4) Turn off engine and light control switches after a minimum of three minutes.

##### **NOTE**

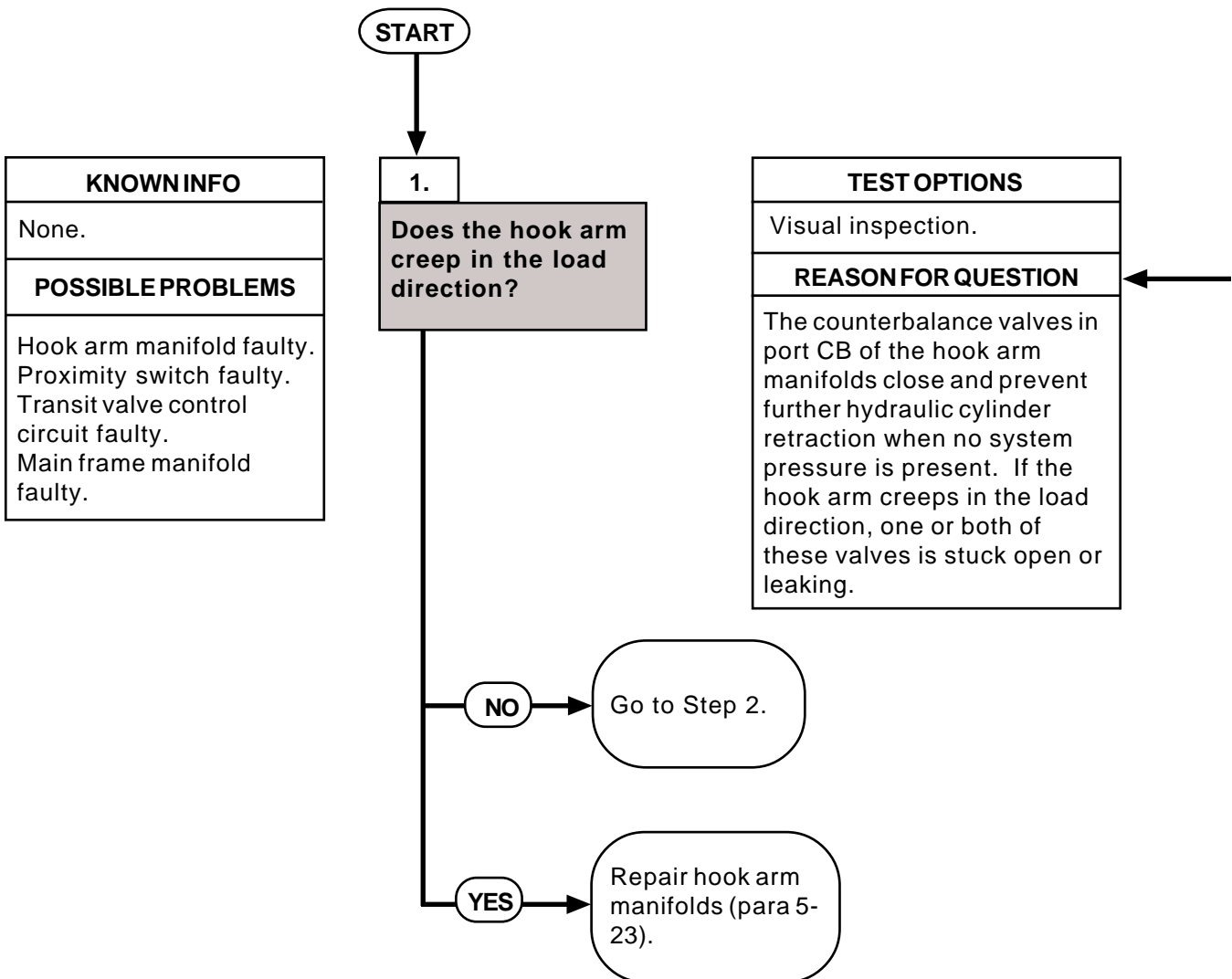
Oil will drip from main frame manifold when counterbalance valve is removed.

- (5) Remove counterbalance valve from right main frame manifold port VA.
- (6) Remove counterbalance valve from right main frame manifold port VB and install in port VA.
- (7) Install remaining counterbalance valve in right main frame manifold port VB.
- (8) Start engine and engage the PTO.
- (9) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
- (10) Attempt to load the main frame using the remote control or cab controls. Note the operation of the main frame.
- (11) Shut off engine and turn light control switch to OFF position.
- (12) If the main frame now loads properly, the counterbalance valve installed in the right manifold port VA is faulty. If the main frame still does not load, the counterbalance valve in the left manifold port VB is faulty.



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

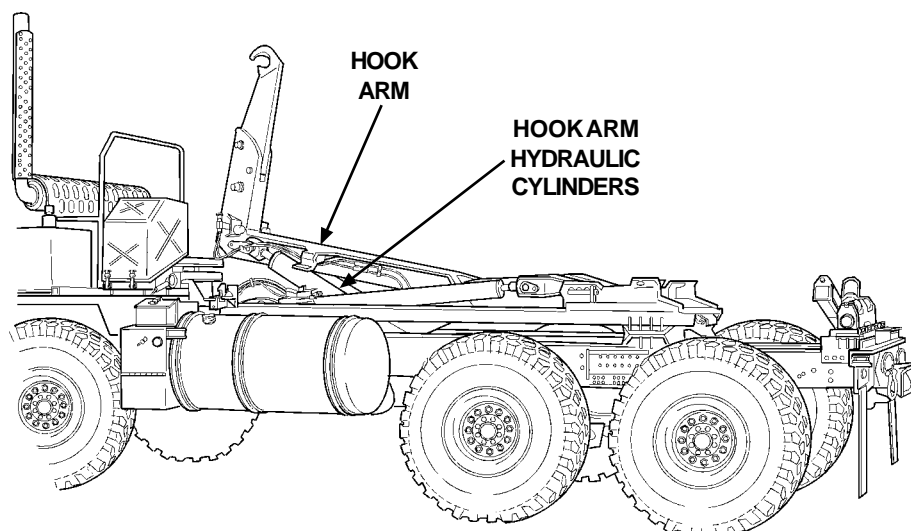
<b>5. LHS CREEPS UNDER LOAD.</b>	
<b>INITIAL SETUP</b>	
<i>Tools and Special Tools</i> Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)	<i>Equipment Condition</i> Engine turned off (TM 9-2320-279-10) Parking brake applied (TM 9-2320-279-10) Wheels chocked (TM 9-2320-279-10)



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).****5. LHS CREEPS UNDER LOAD (continued).****LHS LOAD TEST****NOTE**

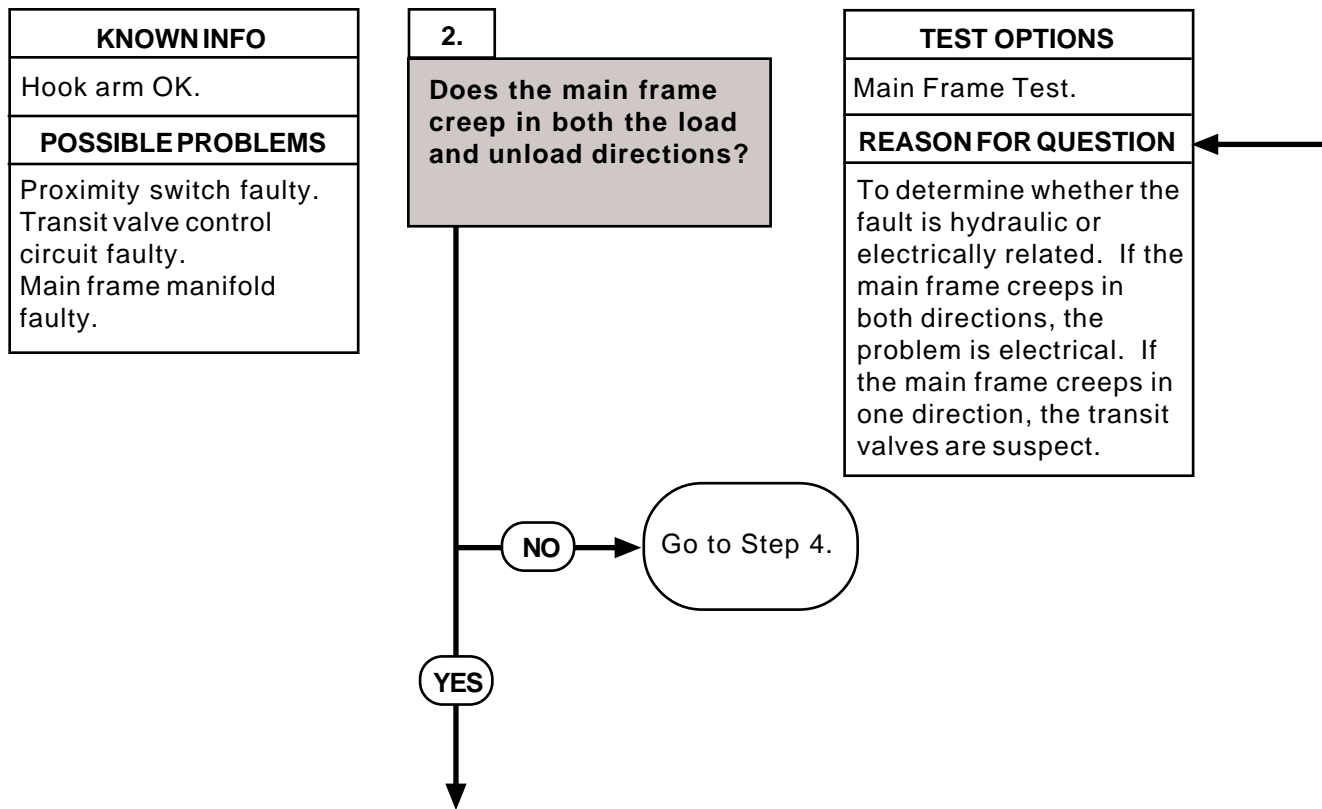
- The LHS will creep in the direction that gravity is pushing the LHS components and payload. Depending on the position of the LHS components, the weight will try to push the LHS into the loaded (retracted) or unloaded (extended) positions.
- Additional weight on the LHS will magnify a creeping problem. Therefore, this fault will be easier to diagnose using a payload rather than an empty LHS.
- Refer to Chapter 2 for specific LHS operating instructions.

- (1) Turn LHS MODE SELECT switch to AUTO position.
- (2) Unload LHS until hook arm hydraulic cylinders are extended approximately one foot.
- (3) Turn LHS MODE SELECT switch to OFF position.
- (4) Watch hook arm and hook arm hydraulic cylinders for movement.



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

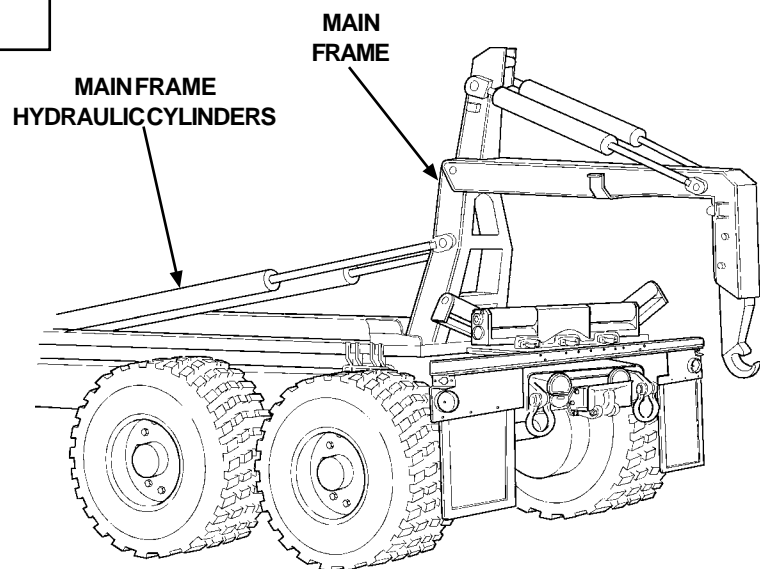
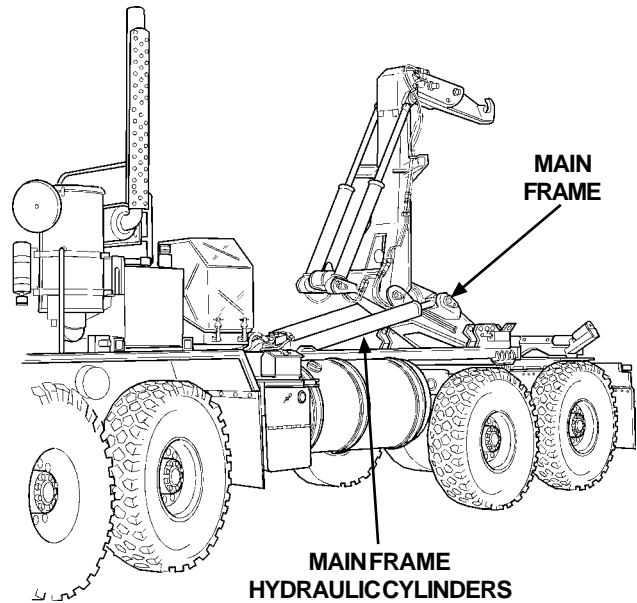
5. LHS CREEPS UNDER LOAD (continued).



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**5. LHS CREEPS UNDER LOAD (continued).**

<b>MAIN FRAME TEST</b>	
(1)	Return LHS MODE SELECT switch to AUTO position and continue unloading LHS until main frame hydraulic cylinders are extended approximately one foot.
(2)	Turn LHS MODE SELECT switch to OFF position.
(3)	Watch main frame for movement.
(4)	Return LHS MODE SELECT switch to AUTO position and continue unloading LHS until front of payload (or hook) is approximately 18 inches above the ground.
(5)	Watch main frame for movement.
(6)	Return LHS MODE SELECT switch to AUTO position and return LHS to transport position.



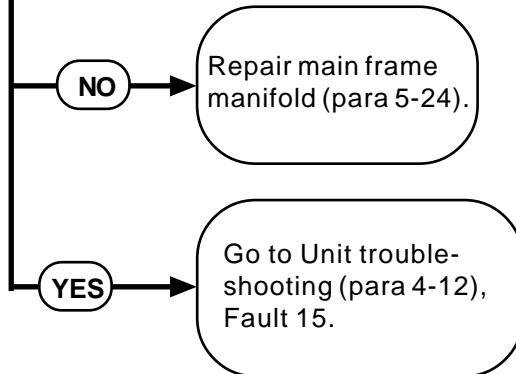
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

5. LHS CREEPS UNDER LOAD (continued).

KNOWN INFO
Hook arm OK. Main frame creeps in both directions.
POSSIBLE PROBLEMS
Transit valve control circuit faulty.

3.  
Are the transit valves magnetically charged when the main frame and hook arm are partially raised?

TEST OPTIONS
Transit Valve Test.
REASON FOR QUESTION
The transit valves should not be energized (open) with the main frame and hook arm raised. If they are energized, the circuit controlling them has failed. The same controls that control the AUTO LHS operation from the cab control box also control the transit valves.

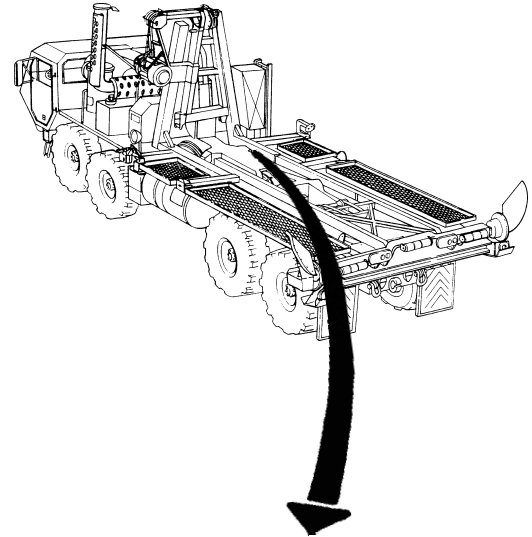


**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

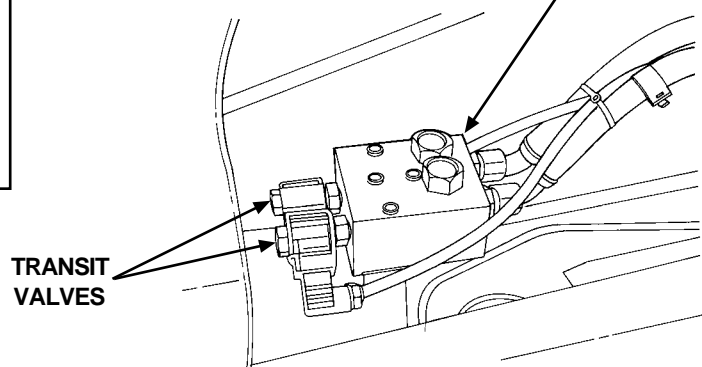
**5. LHS CREEPS UNDER LOAD (continued).**

**TRANSIT VALVE TEST**

- (1) Start engine.
- (2) Turn light control switch to STOP LIGHT position.
- (3) Turn LHS MODE SELECT switch to AUTO position.
- (4) Unload LHS until hook arm hydraulic cylinders are extended approximately one foot.
- (5) Shut off engine. Return engine start switch to ON position.
- (6) Using a metal object, check each transit valve for magnetic charge.
- (7) Start engine and return LHS to transit position.
- (8) Shut off engine.
- (9) Turn light control switch to OFF position.



**MAIN FRAME  
MANIFOLD**



**TRANSIT  
VALVES**

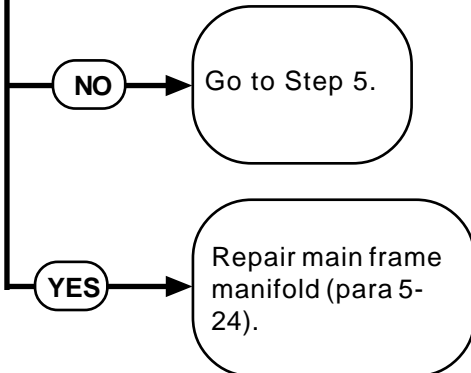
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

5. LHS CREEPS UNDER LOAD (continued).

KNOWN INFO
Hook arm OK. Main frame creeps in only one direction.
POSSIBLE PROBLEMS
Main frame manifold faulty.

4.  
Does the main frame creep in the unload direction?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
The transit valves in port CA of the main frame manifolds relieve hydraulic pressure on the back side of the hydraulic cylinder piston in the transit mode. The counterbalance valves in port CA of the manifolds close and prevent further hydraulic cylinder extension when no system pressure is present. If the main frame creeps in the unload direction, one or both of these valves is stuck open or leaking.





**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**5. LHS CREEPS UNDER LOAD (continued).**

— | Answer this question based  
on the results of Step 2.

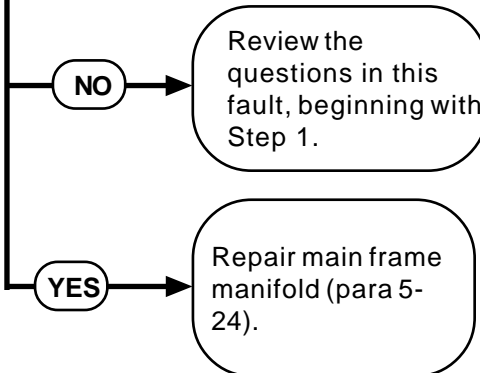
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

5. LHS CREEPS UNDER LOAD (continued).

KNOWN INFO
Hook arm OK. Main frame OK in unload direction.
POSSIBLE PROBLEMS
Main frame manifold faulty.

5.  
Does the main frame creep in the load direction?

TEST OPTIONS
Visual inspection.
REASON FOR QUESTION
The transit valves in port CB of the main frame manifolds relieve hydraulic pressure on the front side of the hydraulic cylinder piston in the transit mode. The counterbalance valves in port CB of the manifolds close and prevent further hydraulic cylinder retraction when no system pressure is present. If the main frame creeps in the load direction, one or both of these valves is stuck open.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**5. LHS CREEPS UNDER LOAD (continued).**

— | Answer this question based  
on the results of Step 2.

5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

6. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE OR OPERATE SLOWLY.

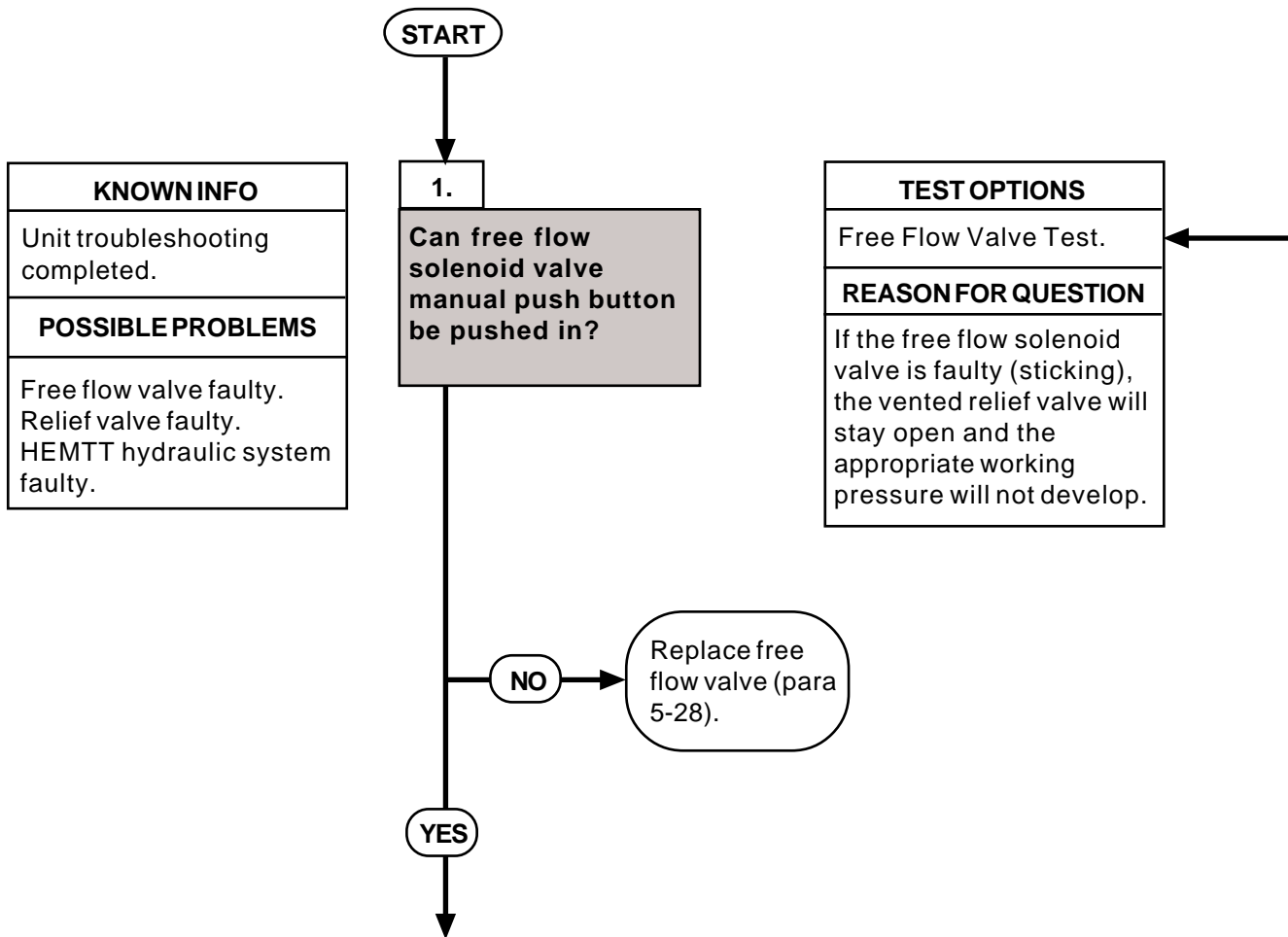
INITIAL SETUP

*Tools and Special Tools*

- Adapter, Straight, Pipe to Boss (TCM)
- Adapter, Straight, Pipe to Tube (TCM20-1/2JIC-V)
- Gage, Pressure, Dial Indicating (151469)
- Hose Assembly, Nonmetallic (HFF20-060)
- Tee, Tube (203102-8-8S)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Union, Pipe to Tube (GAH20-1/4 NPT-V)

*Equipment Condition*

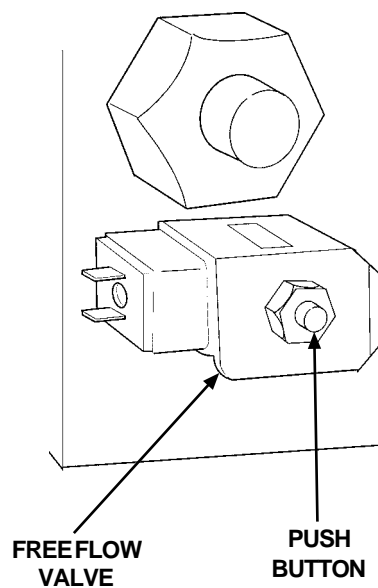
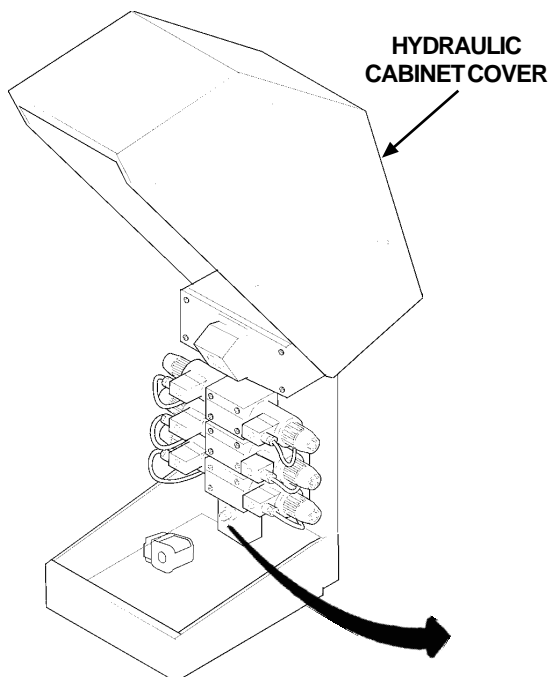
- Engine turned off (TM 9-2320-279-10)
- Parking brake applied (TM 9-2320-279-10)
- Wheels chocked (TM 9-2320-279-10)



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

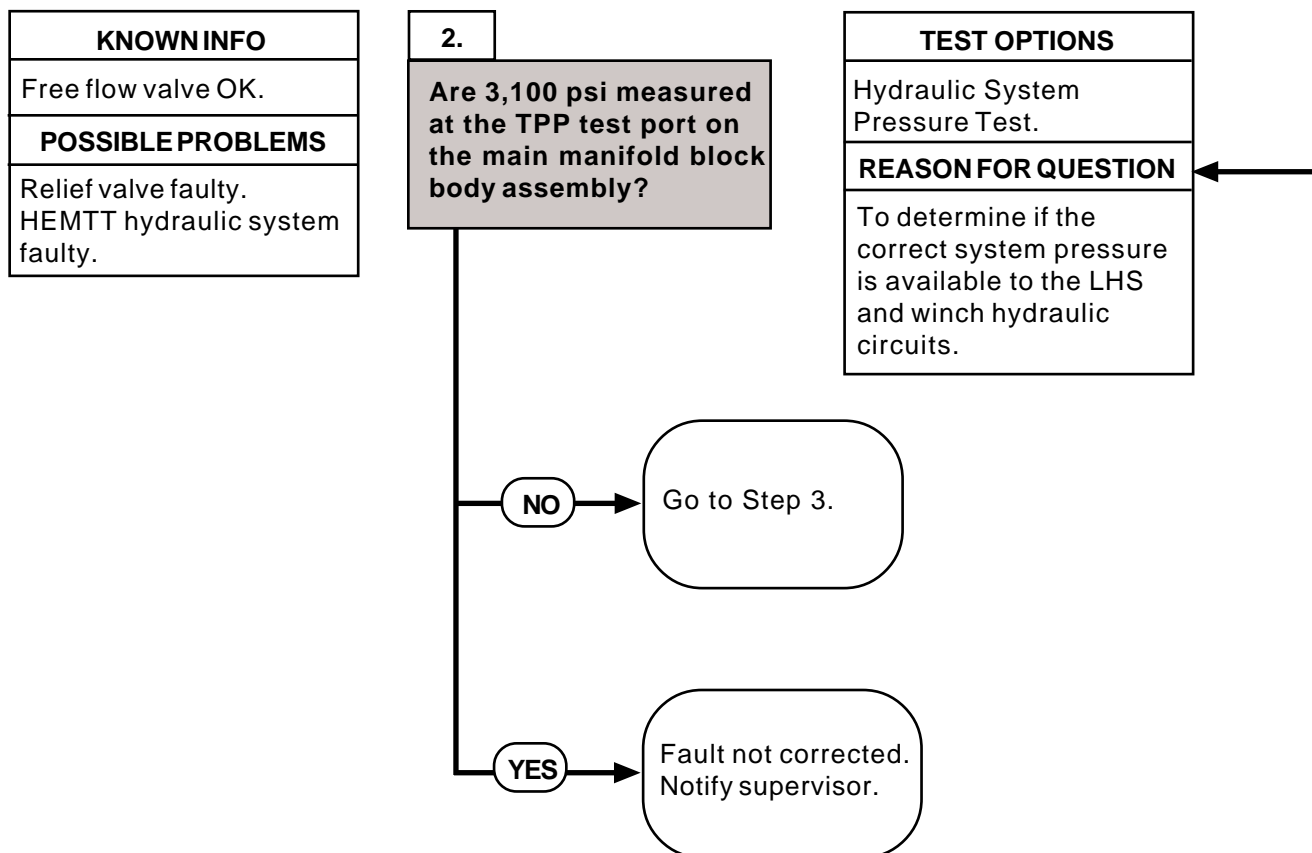
**6. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE OR OPERATE SLOWLY (continued).**

<b>FREE FLOW VALVE TEST</b>	
(1) Open hydraulic cabinet cover.	
<b>NOTE</b>	
Free flow tool can also be used to activate push button.	
(2) Attempt to push in free flow valve manual push button. If button cannot be pushed in, the free flow valve is faulty.	



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

6. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE OR OPERATE SLOWLY (continued).



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).****6. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE OR OPERATE SLOWLY (continued).****HYDRAULIC SYSTEM PRESSURE TEST****WARNING**

The LHS hydraulic system operates at oil pressures up to 3,625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply with this warning may result in serious injury or death to personnel.

- (1) Remove plug and O-ring from port TPP on main hydraulic block assembly.
- (2) Install hose adapter, hose, and pressure gage on main hydraulic block assembly.
- (3) Start engine and engage the PTO.
- (4) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.
- (5) Attempt to operate the LHS and/or winch using the remote control or cab controls.

**CAUTION**

Fully extending or retracting hydraulic cylinders will put the hydraulic system into relief. This should be limited to 10 seconds. Failure to comply with this caution may result in damage to equipment.

**NOTE**

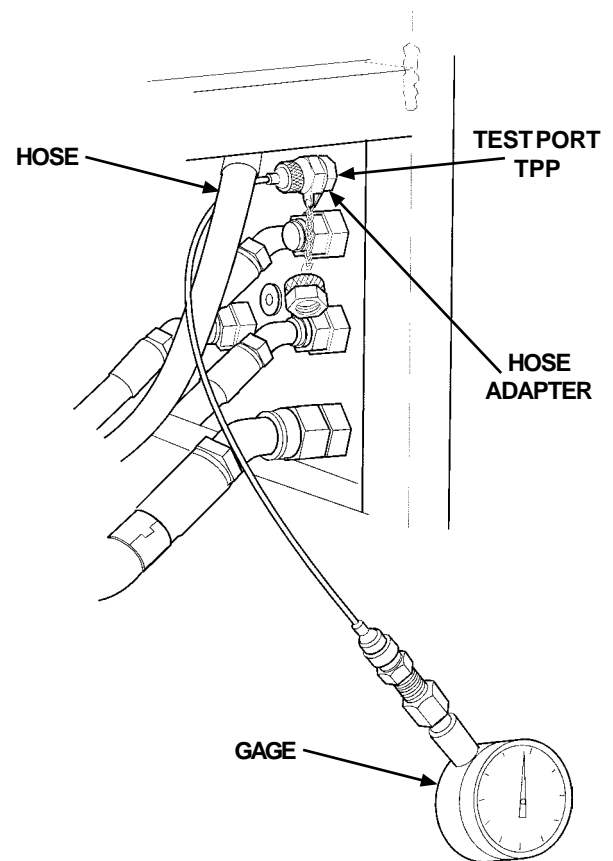
Full relief pressure of 3,100 to 3,300 psi will be reached during the full extension of the hydraulic cylinder.

- (6) Observe the readings on the pressure gage during loading.
- (7) Shut off engine and turn the light control switch to the OFF position.

**NOTE**

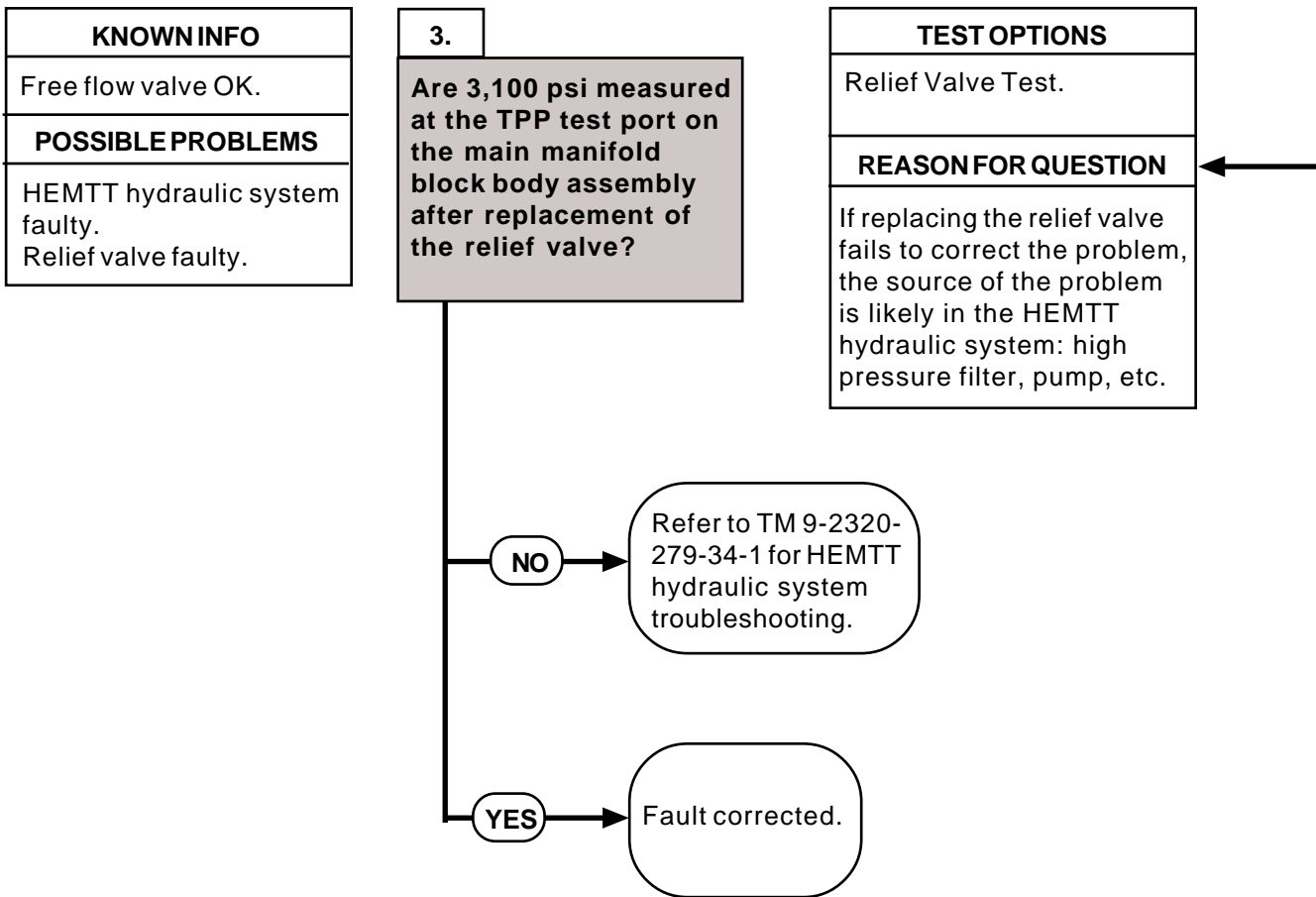
If 3,100 to 3,300 psi were not obtained, skip the remaining steps in this test and go to Step 3.

- (8) Remove hose adapter, hose, and pressure gage from main hydraulic block assembly.
- (9) Install plug and O-ring in port TPP on main hydraulic block assembly.



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

6. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE OR OPERATE SLOWLY (continued).

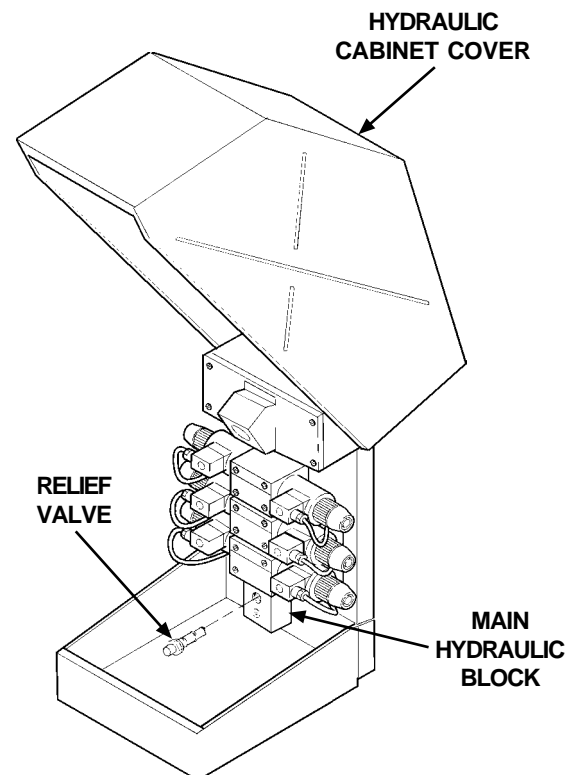
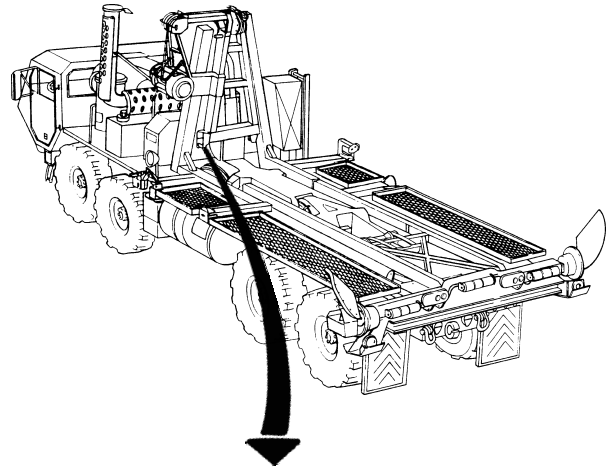




**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**6. MAIN FRAME, HOOK ARM, AND WINCH DO NOT OPERATE OR OPERATE SLOWLY (continued).**

RELIEF VALVE TEST
<p>(1) Replace relief valve (para 5-26).</p> <p>(2) Start engine and engage the PTO.</p> <p>(3) Turn the light control switch to the STOP LIGHT position. Place LHS MODE SELECT switch in the HOOK ARM ONLY (manual mode) position.</p> <p>(4) Attempt to operate the LHS and/or winch using the remote control or cab controls.</p>
<p><b>CAUTION</b></p> <p>Fully extending or retracting hydraulic cylinders will put the hydraulic system into relief. This should be limited to 10 seconds. Failure to comply with this warning may result in damage to equipment.</p>
<p><b>NOTE</b></p> <p>Full relief pressure of 3,100 to 3,300 psi will be reached during the full extension of the hydraulic cylinder.</p>
<p>(5) Observe the readings on the pressure gage during loading.</p> <p>(6) Shut off engine and turn the light control switch to the OFF position.</p> <p>(7) Remove hose adapter, hose, and pressure gage from main hydraulic block assembly</p> <p>(8) Install plug and O-ring in port TPP on main hydraulic block assembly.</p>



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

7. BAP WINCH DOES NOT OPERATE.

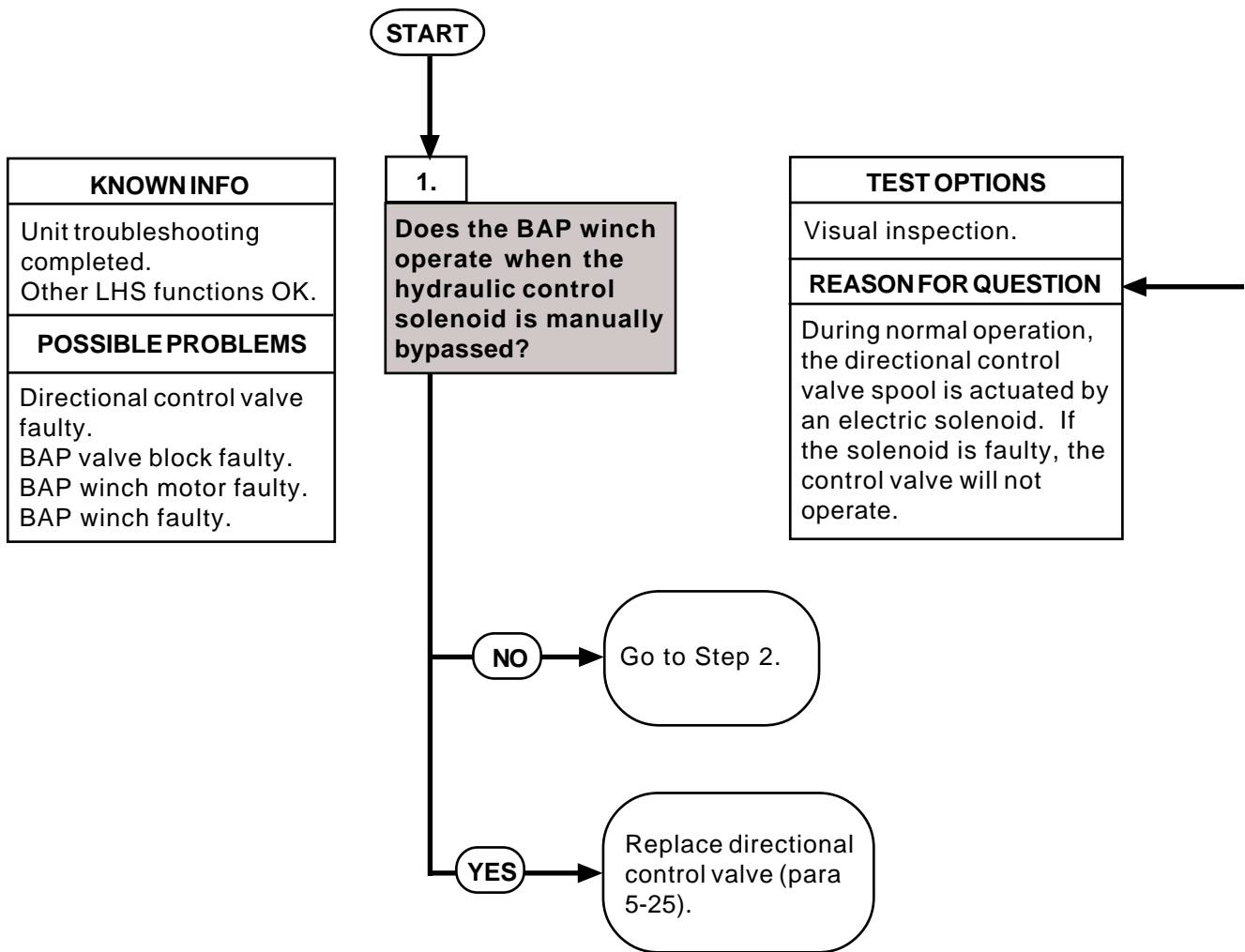
INITIAL SETUP

*Tools and Special Tools*

Pan, Drain, 4-gallon (MIL-P-45819)  
 Tool Kit, General Mechanic's: Automotive  
 (SC 5180-90-N26)

*Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
 Parking brake applied (TM 9-2320-279-10)  
 Wheels chocked (TM 9-2320-279-10)  
 BAP loaded on CBT (para 2-9)



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**7. BAP WINCH DOES NOT OPERATE (continued).**

Attempt to operate the winch by manually bypassing the winch hydraulic control solenoid. Refer to paragraph 2-29 for specific instructions for this procedure.

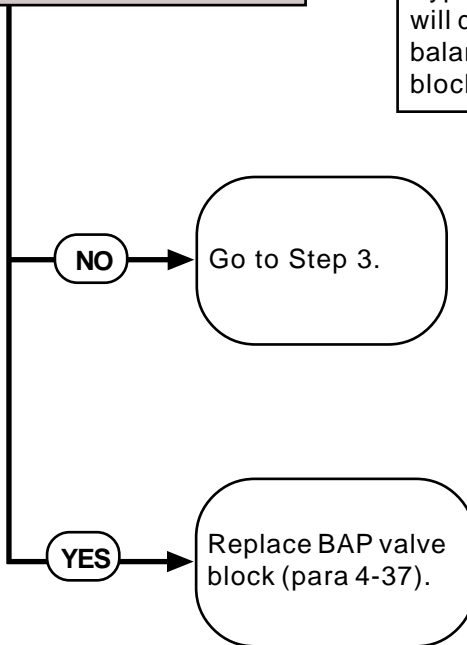
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

7. BAP WINCH DOES NOT OPERATE (continued).

<b>KNOWN INFO</b>
Directional control valve OK.
<b>POSSIBLE PROBLEMS</b>
BAP valve block faulty. BAP winch motor faulty. BAP winch faulty.

**2.**  
Does bypassing BAP valve block correct the fault?

<b>TEST OPTIONS</b>
Valve Block Bypass.
<b>REASON FOR QUESTION</b>
Bypassing valve block will determine if counter-balance valve in valve block is defective.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**7. BAP WINCH DOES NOT OPERATE (continued).**

**VALVE BLOCK BYPASS**

**WARNING**

The LHS hydraulic system operates at oil pressures up to 3625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply with this warning may result in serious injury or death to personnel.

- (1) Loosen tube nut (1) at winch motor elbow (2).
- (2) Remove inlet tube (3) from valve block (4).

**NOTE**

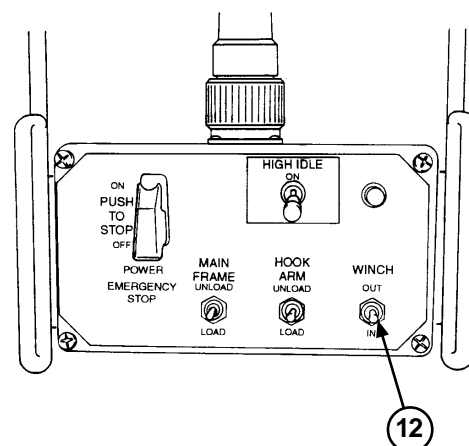
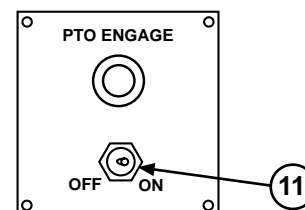
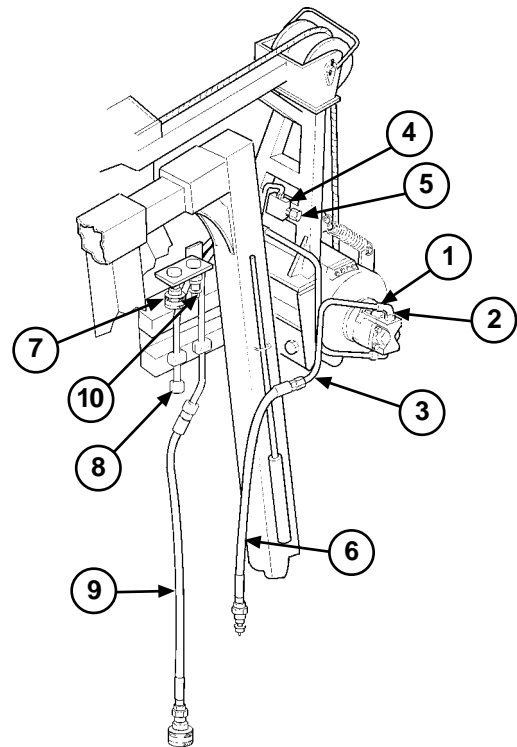
It may be necessary to loosen elbow on winch motor in order to fully rotate tube downward.

- (3) Rotate inlet tube (3) downward.
- (4) Tighten tube nut (1) on winch motor elbow (2).
- (5) Install plug (5) on valve block (4).
- (6) Remove male quick-disconnect hose (6) from dummy coupling (7). Remove opposite end of hose (6) from tube nut (8).
- (7) Install male quick-disconnect hose (6) on inlet tube (3).
- (8) Remove female quick-disconnect hose (9) from dummy coupling (10).
- (9) Attach two quick-disconnect hoses (6 and 9) to Transporter.
- (10) Start engine.
- (11) Turn PTO ENGAGE switch (11) to ON.

**NOTE**

Oil will leak from hydraulic tubing when the WINCH switch is in the neutral position. Place drain pan under tubing to collect oil.

- (12) Move WINCH switch (12) to the OUT position, then to the IN position while observing winch operation.
- (13) Turn PTO ENGAGE switch (11) to OFF position.
- (14) Shut off engine.
- (15) Install female quick-disconnect hose (9) on dummy coupling (10).
- (16) Remove male quick-disconnect hose (6) from inlet tube (3).
- (17) Install male quick-disconnect hose (6) on tube nut (8).
- (18) Install male quick-disconnect hose (6) on dummy coupling (7).
- (19) Remove plug (5) from valve block (4).
- (20) Loosen tube nut (1) on winch motor elbow (2).
- (21) Rotate inlet tube (3) upward.
- (22) Install inlet tube (3) on valve block (4).
- (23) Tighten tube nut (1) on winch motor elbow (2).



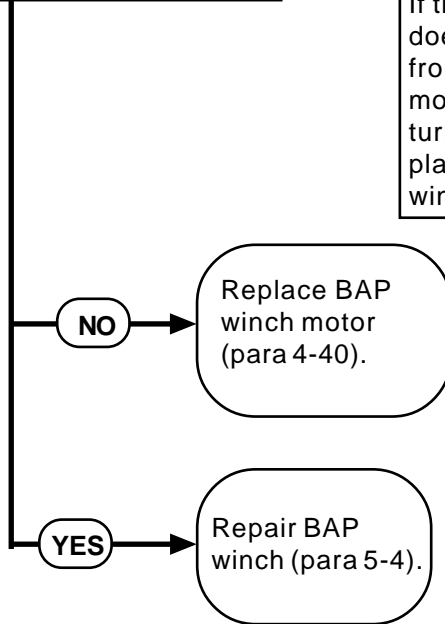
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

7. BAP WINCH DOES NOT OPERATE (continued).

KNOWN INFO
Directional control valve OK. BAP valve block OK.
POSSIBLE PROBLEMS
BAP winch motor faulty. BAP winch faulty.

3.  
Does the winch motor operate when removed from winch housing?

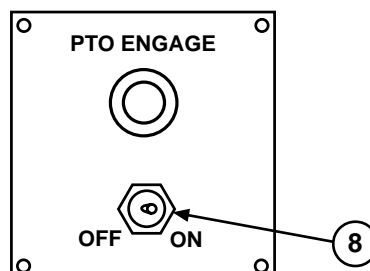
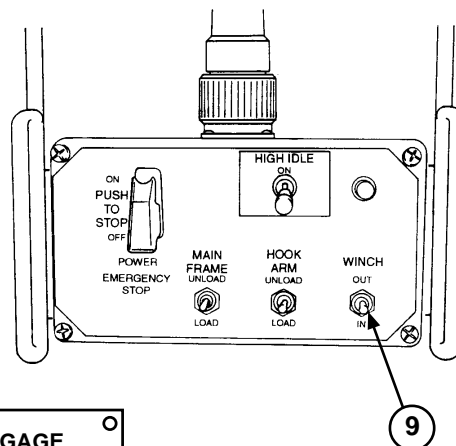
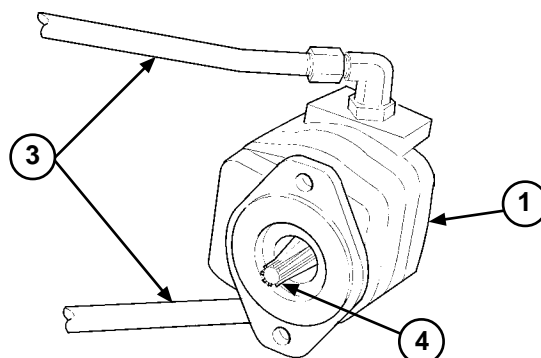
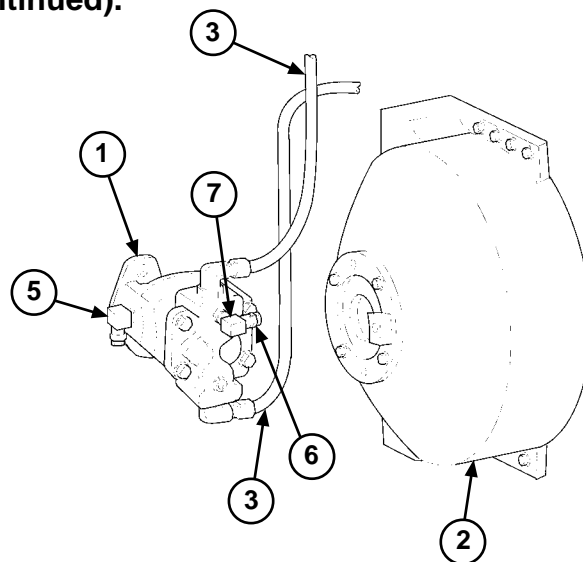
TEST OPTIONS
BAP Winch Motor Test.
REASON FOR QUESTION
If the winch motor shaft does not turn when removed from housing, the winch motor is faulty. If the shaft turns, the winch brake or planetary gearing inside the winch has failed.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**7. BAP WINCH DOES NOT OPERATE (continued).**

<b>BAP WINCH MOTOR TEST</b>	
(1)	Remove winch motor (1) from housing (2) (para 4-40).
(2)	Reinstall winch motor (1) on two tubes (3) with shaft (4) pointing out and fitting (5) pointing down.
(3)	Install cap (6) on fitting (7).
(4)	If necessary, attach two quick-disconnect hoses to Transporter.
(5)	Start engine.
(6)	Turn PTO ENGAGE switch (8) to ON position.
<b>NOTE</b>	
	Oil will leak from hydraulic tubing when the WINCH switch is in the neutral position. Place drain pan under tubing to collect oil.
(7)	Move WINCH switch (9) to the OUT position, then to the IN position while observing the winch shaft (4).
(8)	Turn PTO ENGAGE switch to OFF position.
(9)	Shut off engine.
(10)	Remove cap (6) from fitting (7).
(11)	Remove winch motor (1) from two tubes (2).
<b>NOTE</b>	
	If winch motor shaft failed to rotate, skip Step 12.
(12)	Install winch motor (1) on housing (2) (para 4-40).



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

**8. BAP WINCH WILL NOT LIFT LOAD OR OPERATES SLOWLY.**

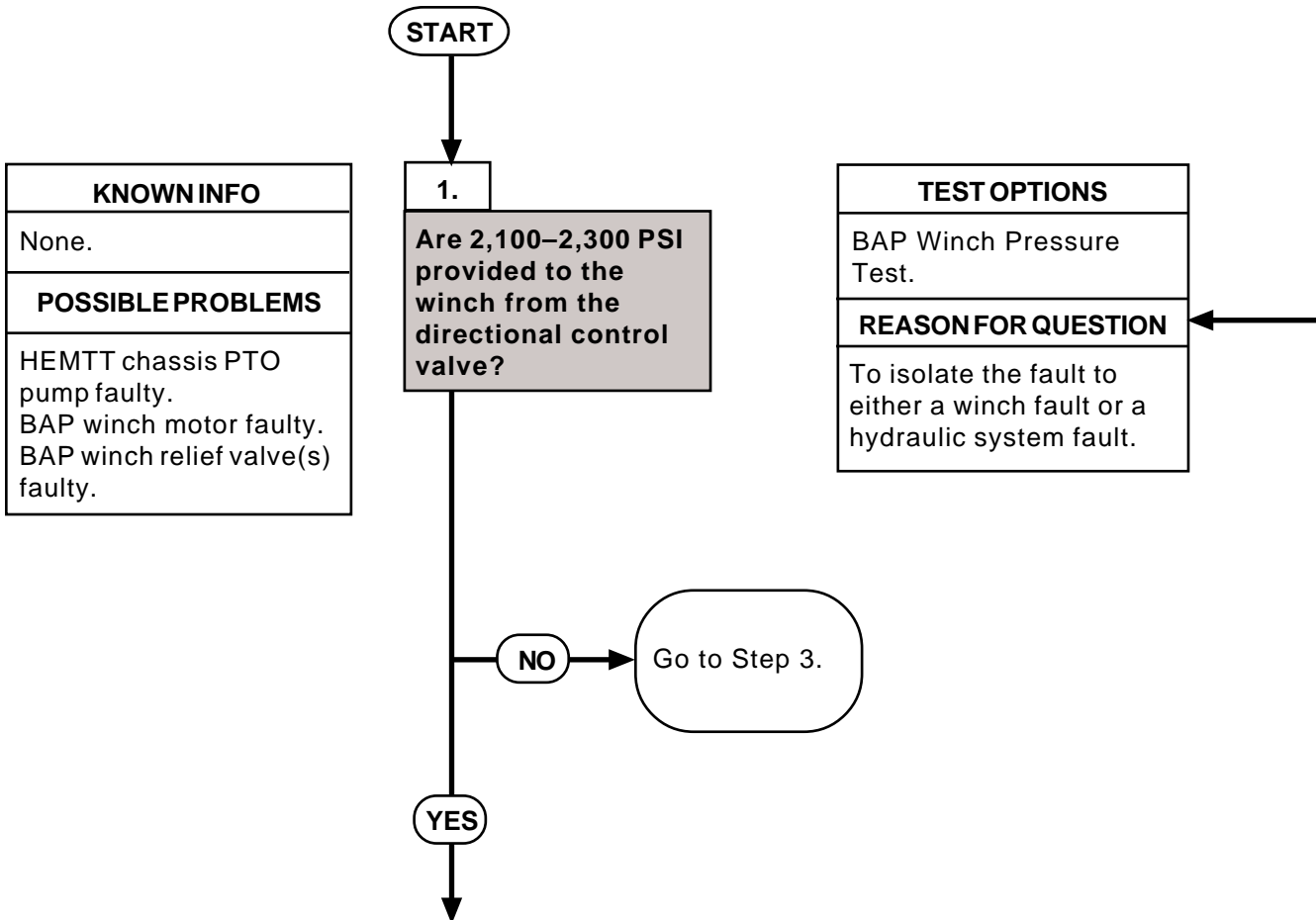
**INITIAL SETUP**

*Tools and Special Tools*

- Adapter, Straight, Pipe to Tube (TCM 20-5/8 JIC-V)
- Gage, Pressure, Dial Indicating (151469)
- Hose Assembly, Nonmetallic (HGG20-060)
- Pan, Drain, 4-gallon (MIL-P-45819)
- Tee, Tube (TCM 20-5/8 JIC-V)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-CL-N26)
- Wrench, Combination, 26 mm (B107.9)
- Union, Pipe to Tube (GAH20-1/4NT-V)

*Equipment Condition*

- Engine turned off (TM 9-2320-279-10)
- Parking brake applied (TM 9-2320-279-10)
- Wheels chocked (TM 9-2320-279-10)
- BAP loaded on CBT (para 2-9)





**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**8. BAP WINCH WILL NOT LIFT LOAD OR OPERATES SLOWLY (continued).**

**BAP WINCH PRESSURE TEST**

- (1) Remove upper winch hose from hydraulic tube fitting.
- (2) Install tee fitting, hose adapter, hose, and pressure gage between fitting and hose.
- (3) Start engine and engage the PTO.
- (4) Turn the light control switch to the STOP LIGHT position.
- (5) Remove remote control from stowage box.

**CAUTION**

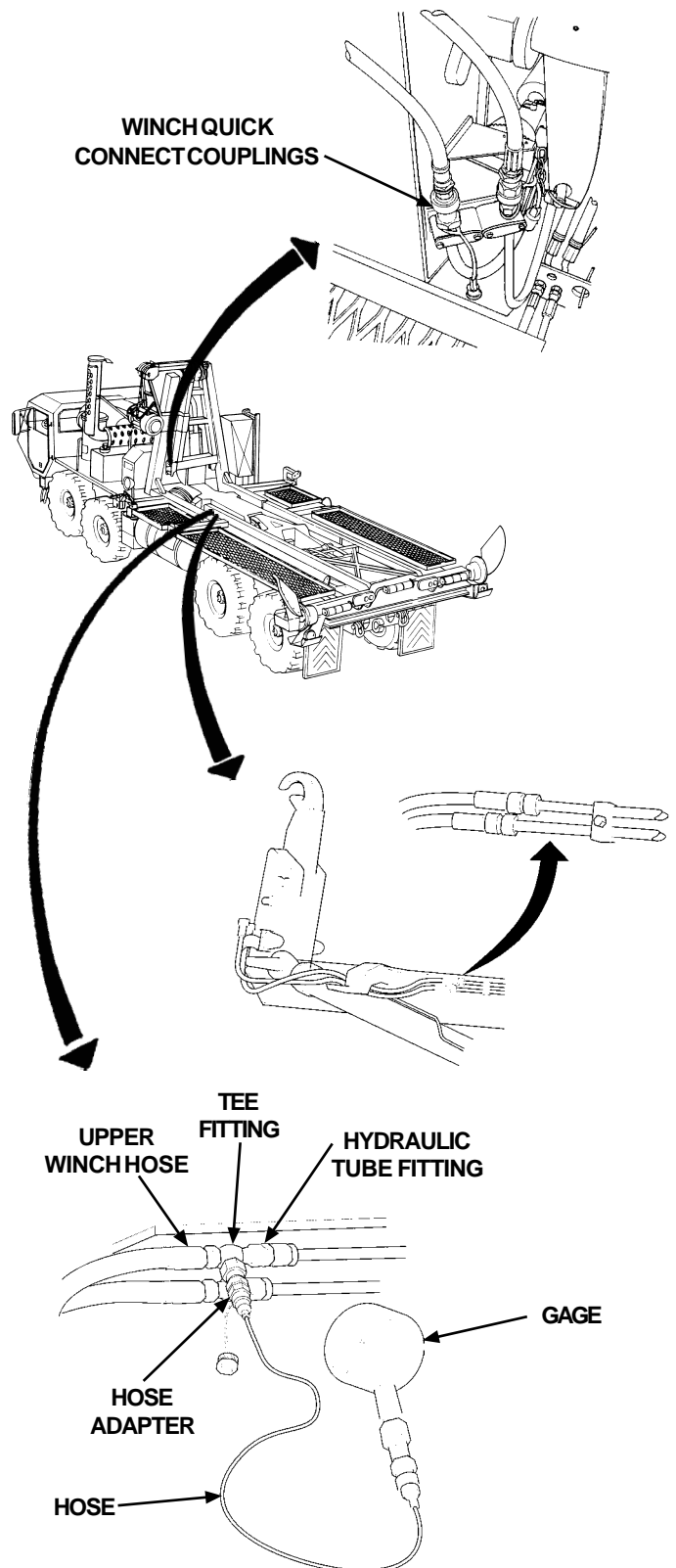
**Operating the winch controls with the winch hoses disconnected will put the winch hydraulic circuit into relief. This should be limited to 10 seconds. Failure to comply with this caution may result in damage to equipment.**

- (6) Activate WINCH IN switch on remote control and note reading on gage.
- (7) Shut off engine and turn light control switch to OFF position.

**NOTE**

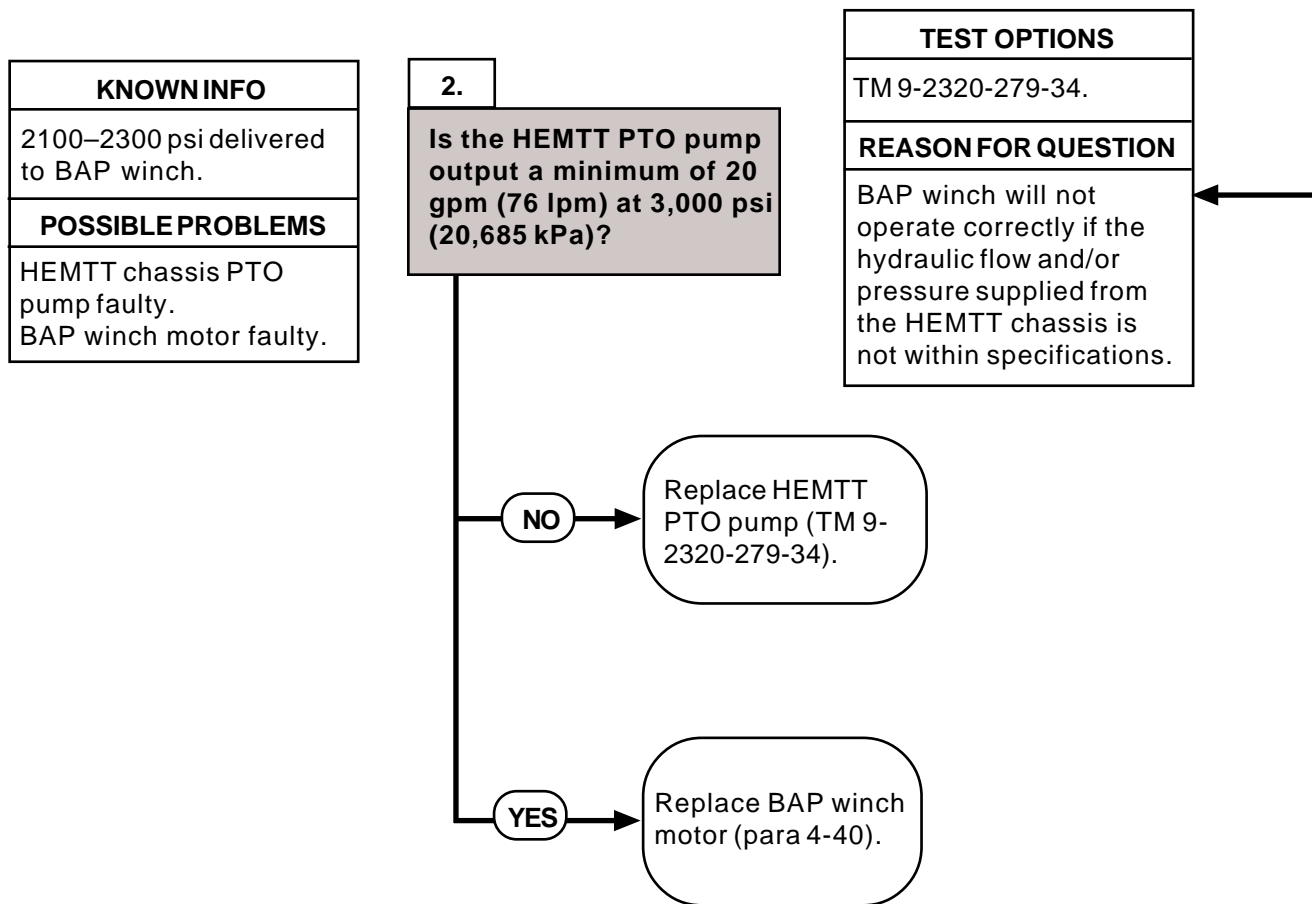
If 2,100 to 2,300 psi were not obtained, skip the remaining steps of this test and go directly to Step 3.

- (8) Remove tee fitting, hose adapter, hose, and pressure gage from between line fitting and hose.
- (9) Install winch hose on hydraulic tube fitting.
- (10) Connect winch quick-connect fittings.



5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

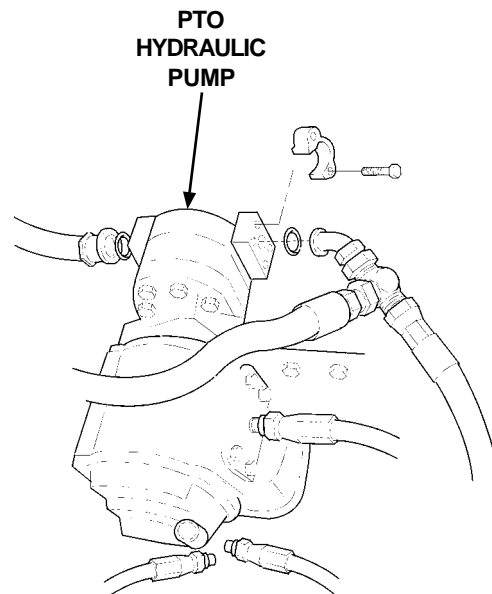
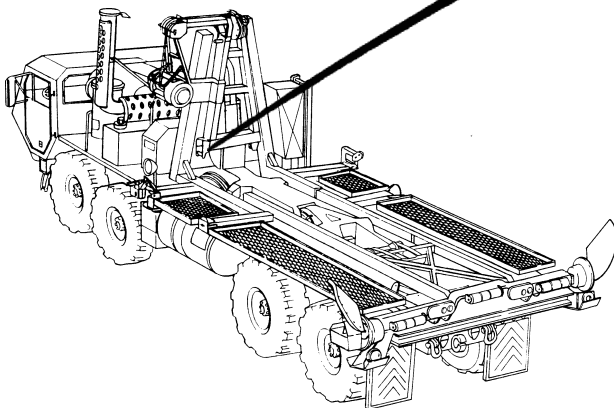
8. BAP WINCH WILL NOT LIFT LOAD OR OPERATES SLOWLY (continued).



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**8. BAP WINCH WILL NOT LIFT LOAD OR OPERATES SLOWLY (continued).**

Refer to the HEMTT hydraulic system troubleshooting (TM 9-2320-279-34-1) for instructions and test equipment required to perform this test procedure.



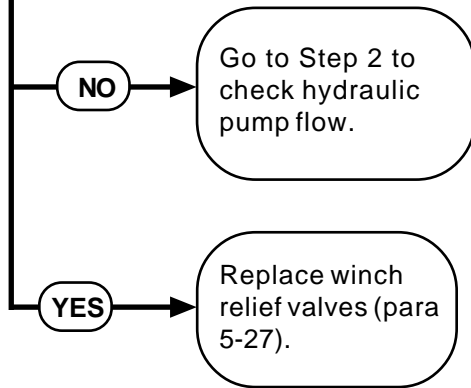
5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

8. BAP WINCH WILL NOT LIFT LOAD OR OPERATES SLOWLY (continued).

<b>KNOWN INFO</b>
Less than 2100 psi delivered to BAP winch.
<b>POSSIBLE PROBLEMS</b>
Winch relief valve faulty.

3.  
**Does the winch operate properly if the winch relief valves are reversed?**

<b>TEST OPTIONS</b>
Winch Relief Valve Test.
<b>REASON FOR QUESTION</b>
The hydraulic pressure for the winch circuit is less than that for the LHS system. Two winch relief valves drop the winch system operating pressure down to 2100–2300 psi. If one of the valves is weak or faulty, the winch may not have sufficient pressure to lift the payload.



**5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).**

**8. BAP WINCH WILL NOT LIFT LOAD OR OPERATES SLOWLY (continued).**

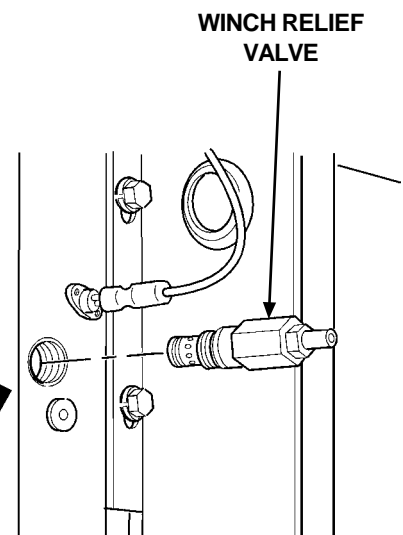
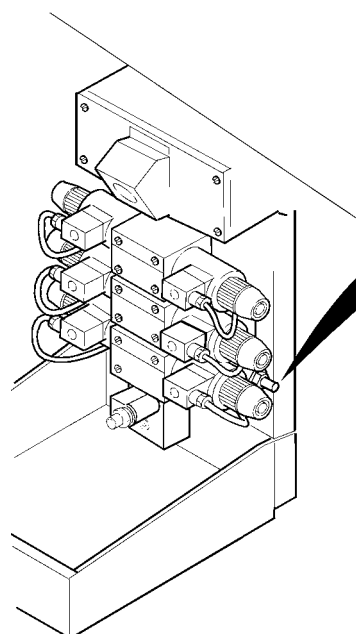
**WINCH RELIEF VALVE TEST**

- (1) Remove winch relief valve from right side of main hydraulic block assembly (para 5-27).
- (2) Remove winch relief valve from left side of main hydraulic block assembly and install in right side.
- (3) Install remaining winch relief valve in left side of main hydraulic block assembly.
- (4) Start engine.
- (5) Turn the light control switch to the ON position.

**CAUTION**

**Operating the winch controls with the winch hoses disconnected will put the winch hydraulic circuit into relief. This should be limited to 10 seconds. Failure to comply with this caution may result in damage to equipment.**

- (6) Activate WINCH IN switch on remote control and note reading on gage.
- (7) Shut off engine and turn light control switch to OFF position.
- (8) Remove tee fitting, hose adapter, hose, and pressure gage from between line fitting and hose.
- (9) Install winch hose on hydraulic tube fitting.
- (10) Connect winch quick-connect fittings.



## 5-2. DIRECT SUPPORT TROUBLESHOOTING (continued).

### Section II. BRIDGE ADAPTER PALLET MAINTENANCE PROCEDURES

#### 5-3. GENERAL.

Sections II and III contain instructions for replacement and repair of Common Bridge Transporter (CBT) components authorized at the Direct Support level by the Maintenance Allocation Chart. In some cases, components must be removed before performing the task. In these cases, references are provided to the applicable chapters or paragraphs. This section contains the Bridge Adapter Pallet (BAP) winch repair task. The task encompasses removal, disassembly, assembly, and installation procedures for the brake hub assembly, final drive assembly, brake housing, and cable drum assembly, as well as cleaning and inspection procedures. Section III contains maintenance procedures for the Transporter.

#### 5-4. BAP WINCH REPAIR.

This task covers:

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| a. Brake Hub Assembly Removal        | g. Cable Drum Assembly Installation  |
| b. Brake Hub Subassembly Disassembly | h. Brake Housing Installation        |
| c. Final Drive Assembly Removal      | i. Final Drive Assembly Installation |
| d. Brake Housing Removal             | j. Brake Hub Subassembly Assembly    |
| e. Cable Drum Assembly Removal       | k. Brake Hub Assembly Installation   |
| f. Cleaning and Inspection           | l. Follow-on Maintenance             |

#### INITIAL SETUP

##### *Tools and Special Tools*

Arbor Press (11671961)  
 Pliers, Retaining Ring, 6 1/2 in. (7083704)  
 Pliers, Retaining Ring, 1 1/2 in. (T161-2)  
 Shop Equipment, Automotive (SC 4910-95-A31)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)  
 Wrench Set, Socket (51200017510)  
 Wrench, Torque, 15-75 ft-lb (GGG-W-00686)

Rag (Item 21, Appendix E)  
 Tape, Antiseizing (Item 24, Appendix E)  
 Lockwasher (4) (Item 37, Appendix K)  
 Lockwasher (16) (Item 85, Appendix K)  
 Seal Kit (Item 82, Appendix K)  
 Spacer (2) (Item 70, Appendix K)

*Personnel Required*  
 Two

##### *Materials/Parts*

Crocus Cloth (Item 12, Appendix E)  
 Drycleaning Solvent (Item 13, Appendix E)  
 Goggles, Safety (Item 16, Appendix E)  
 Grease (Item 17, Appendix E)

*Equipment Condition*  
 Winch on work table

## 5-4. BAP WINCH REPAIR (continued).

### a. Brake Hub Assembly Removal.

- (1) Remove pipe plug (1) from motor adapter (2).

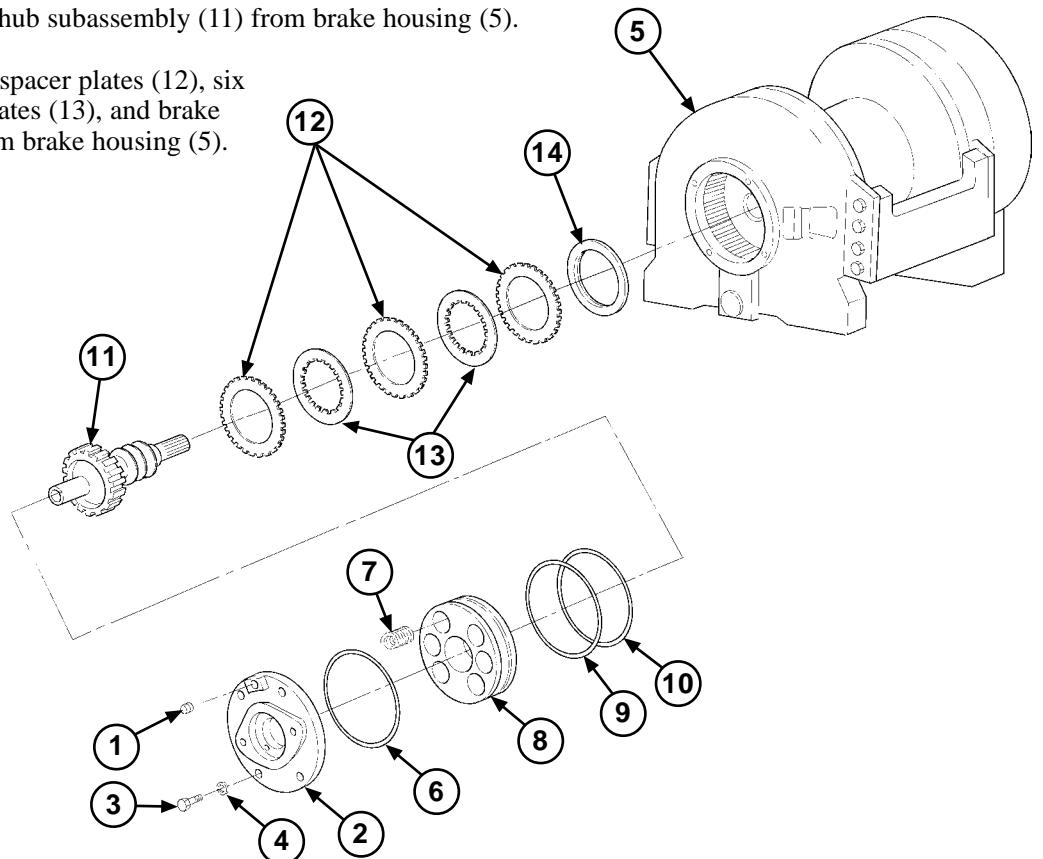
#### **CAUTION**

**Brake springs are under pressure inside motor housing. Remove motor adapter screws one turn at a time, until spring pressure has been released.**

#### **NOTE**

Match-mark motor adapter and its location on the winch so motor adapter can be installed at the same angle as when removed.

- (2) Remove four screws (3) and lockwashers (4) and motor adapter (2) from brake housing (5). Discard lockwashers.
- (3) Remove O-ring (6) from motor adapter (2). Discard O-ring.
- (4) Remove six springs (7) from piston (8).
- (5) Remove piston (8) from brake housing (5).
- (6) Remove two O-rings (9 and 10) from piston (8). Discard O-rings.
- (7) Remove brake hub subassembly (11) from brake housing (5).
- (8) Remove seven spacer plates (12), six brake spacer plates (13), and brake spacer (14) from brake housing (5).



**5-4. BAP WINCH REPAIR (continued).**

***b. Brake Hub Subassembly Disassembly.***

**WARNING**

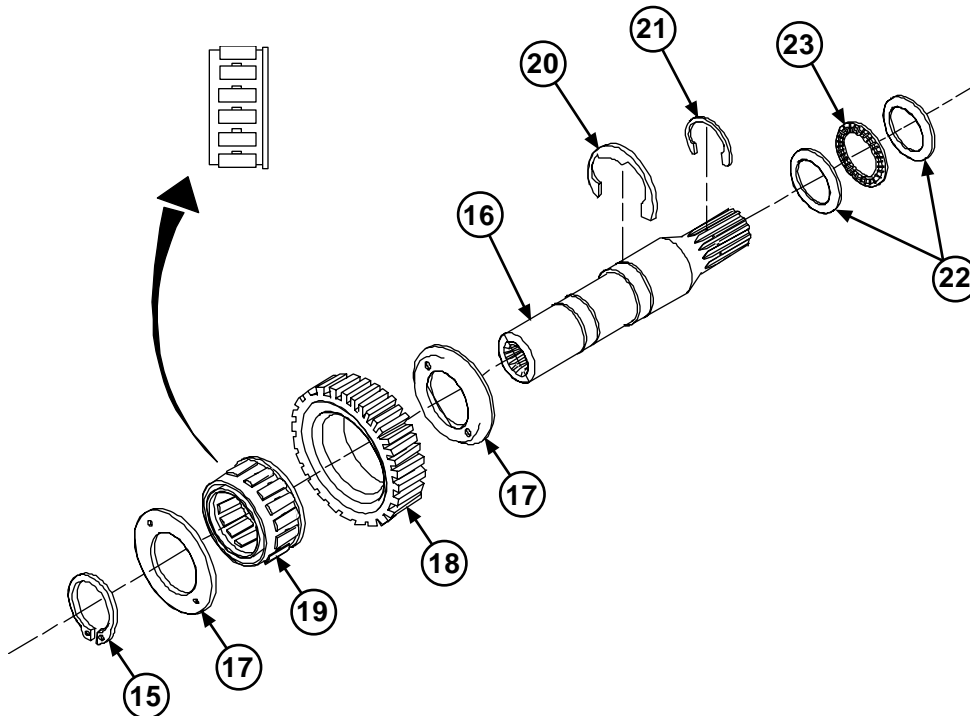
**Wear safety goggles and use care when removing snapping. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (1) Remove snapping (15) from motor drive shaft (16).
- (2) Remove two clutch liners (17) and brake hub (18) from motor drive shaft (16).
- (3) Remove bearing (19) from brake hub (18).

**WARNING**

**Wear safety goggles and use care when removing retaining ring. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (4) Remove retaining ring (20) and C-clip (21) from motor drive shaft (16).
- (5) Remove two bearing seats (22) and bearing (23) from motor drive shaft (16).





## 5-4. BAP WINCH REPAIR (continued).

### c. Final Drive Assembly Removal.

#### **WARNING**

**Wear safety goggles and use care when removing cover retainer. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (1) Remove cover retainer (24) from end cover (25).

#### **NOTE**

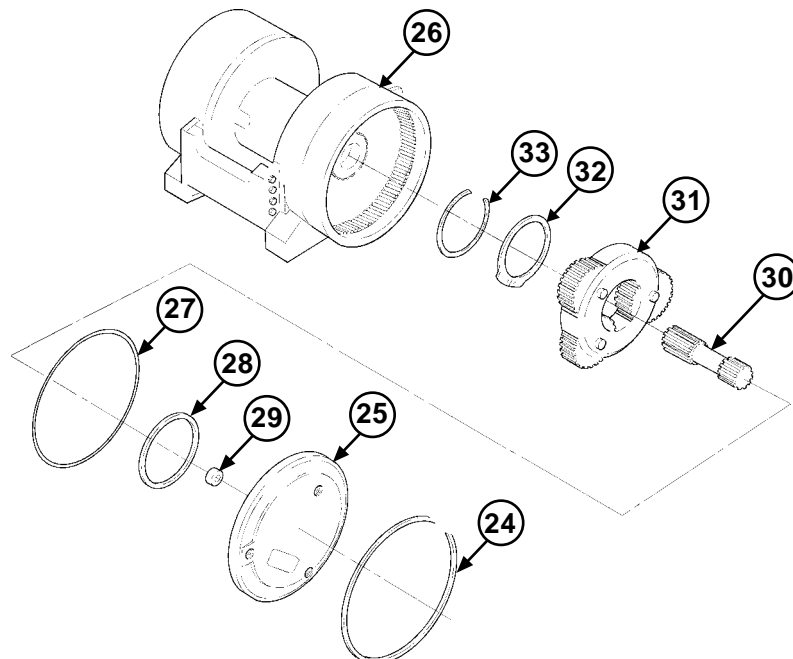
Match-mark end cover and its location on the winch so end cover can be installed at the same angle as when removed.

- (2) Remove end cover (25) from final housing (26).
- (3) Remove O-ring (27), stopper (28), and sungear stopper (29) from end cover (25). Discard O-ring.
- (4) Remove final sungear shaft (30) and final drive planetary gear (31) from final housing (26).

#### **WARNING**

**Wear safety goggles and use care when removing snapping. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (5) Remove snapping (32) and bearing retainer (33) from final housing (26).



**5-4. BAP WINCH REPAIR (continued).**

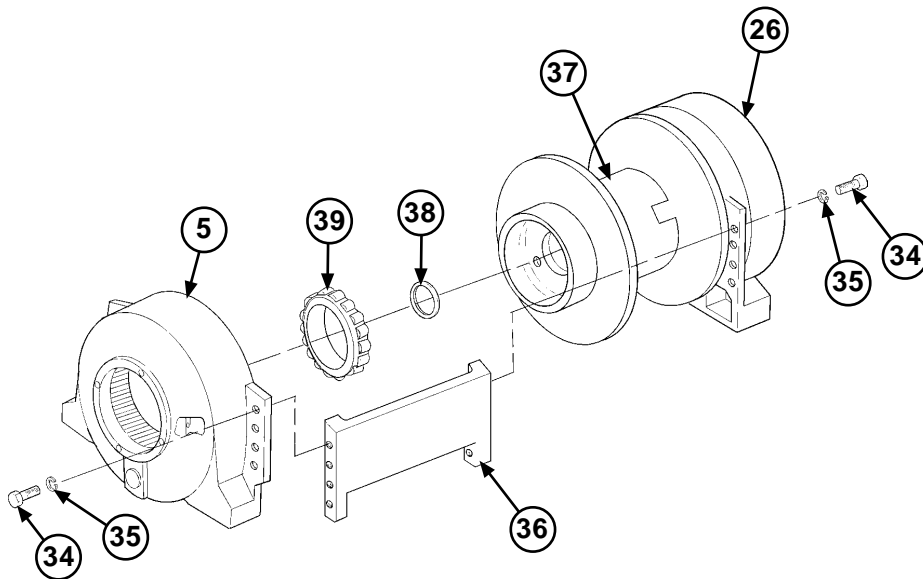
**d. Brake Housing Removal.**

- (1) Remove 16 screws (34) and lockwashers (35) and two tie bars (36) from brake housing (5) and final housing (26). Discard lockwashers.
- (2) With the aid of an assistant, remove brake housing (5) from cable drum (37).

**NOTE**

Cylindrical roller bearing comes apart with the brake housing, and the cylindrical roller race remains in the cable drum. Remove cylindrical roller bearing from brake housing only if damaged.

- (3) Remove spacer (38) and cylindrical roller bearing (39), if damaged, from brake housing (5). Discard spacer.



**e. Cable Drum Assembly Removal.**

- (1) Remove oil seal (40) from cable drum (37). Discard oil seal.

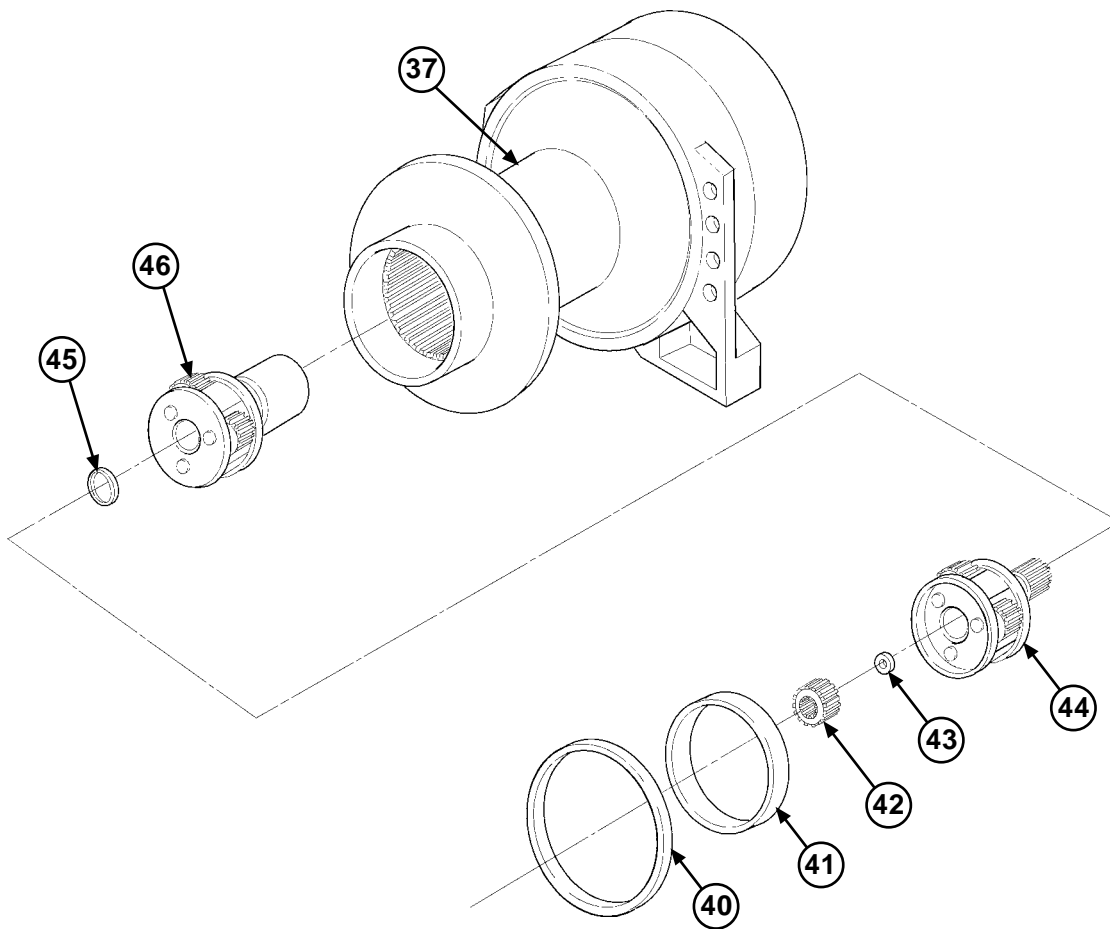
**NOTE**

Remove cylindrical roller race only if damaged.

- (2) If damaged, remove cylindrical roller race (41) from cable drum (37).
- (3) Remove primary sun gear (42) and shim (43) from primary drive planetary gear (44).

**5-4. BAP WINCH REPAIR (continued).**

- (4) Remove primary drive planetary gear (44) from cable drum (37).
- (5) Remove spacer (45) from primary drive planetary gear (44). Discard spacer.
- (6) Remove secondary drive planetary gear (46) from cable drum (37).

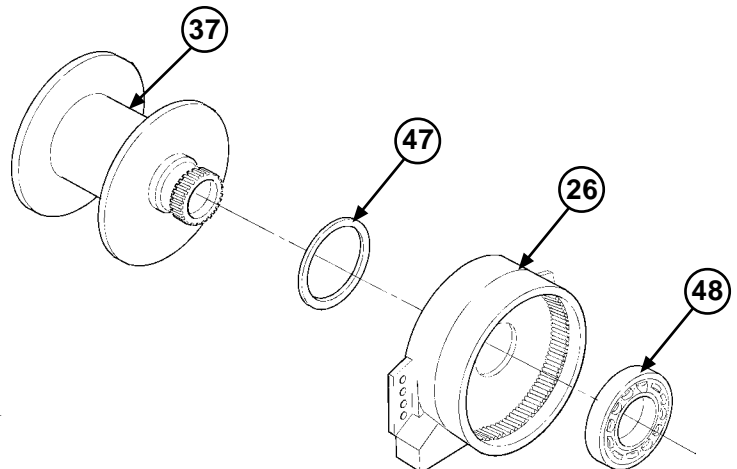


- (7) With the aid of an assistant, separate final housing (26) from cable drum (37).
- (8) Remove oil seal (47) from final housing (26). Discard oil seal.

**NOTE**

Remove bearing only if damaged.

- (9) If damaged, remove bearing (48) from final housing (26).



**5-4. BAP WINCH REPAIR (continued).**

*f. Cleaning and Inspection.*

**WARNING**

**Drycleaning solvent P-D-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat.**

- (1) Clean all metal parts with drycleaning solvent and rags. Lubricate all O-rings and oil seals with grease.
- (2) Inspect all metal parts for cracks, bends, or breaks. Replace any damaged parts.
- (3) Check the outside diameters of the piston and the inside diameters of the brake housing for surface scratches due to contaminated hydraulic fluid. If there is any evidence of damage, polish piston and brake housing with fine emery cloth.

**NOTE**

Discard any springs that have pitted or fractured coils, or measure less than 1.2 inches (30.5 mm) in length.

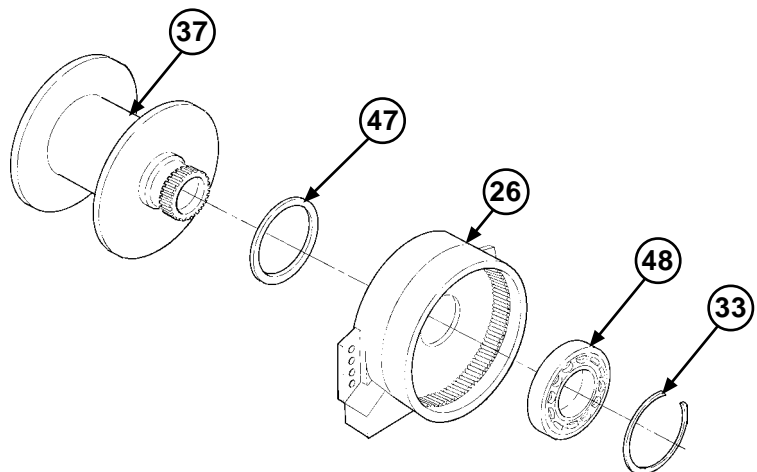
*g. Cable Drum Assembly Installation.*

- (1) Install new oil seal (47) on final housing (26) so it is flush with final housing (26) rim.
- (2) If removed, install new bearing (48) in final housing (26).

**WARNING**

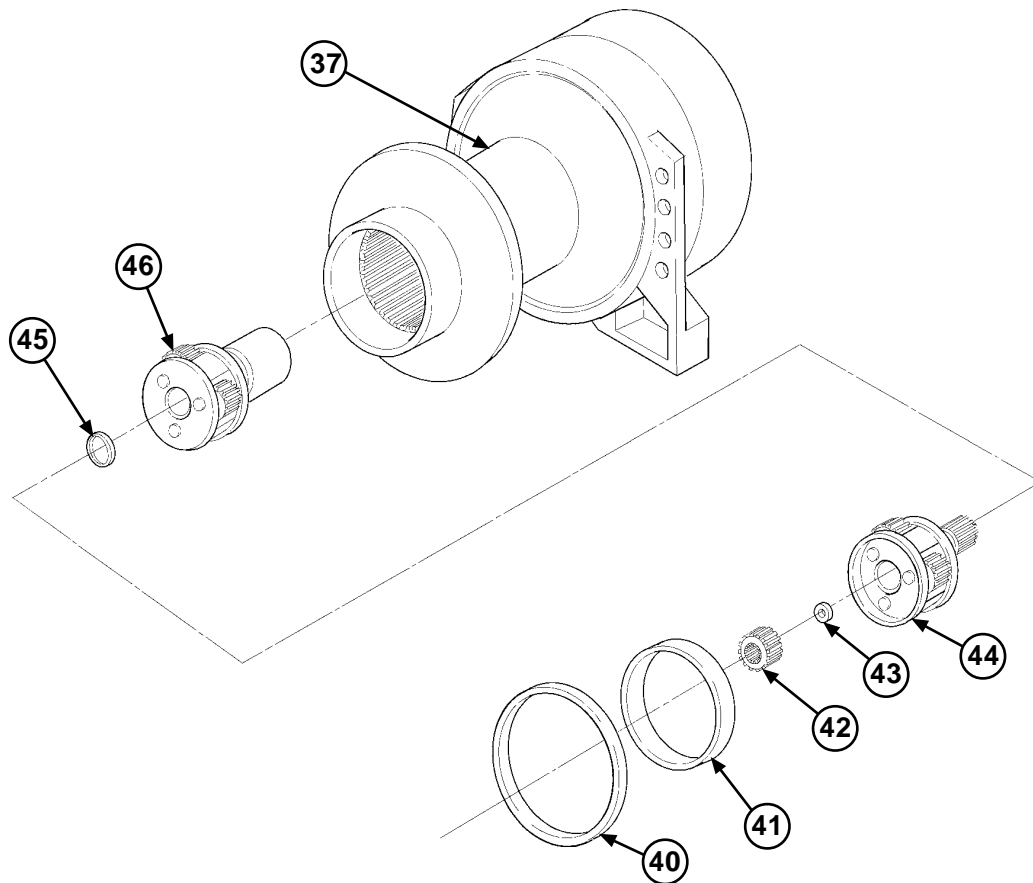
**Wear safety goggles and use care when installing bearing retainer. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (3) Install bearing retainer (33) in final housing (26).
- (4) With the aid of an assistant, install final housing (26) in cable drum (37).
- (5) Install secondary drive planetary gear (46) on cable drum (37).



#### 5-4. BAP WINCH REPAIR (continued).

- (6) Install shim (43) in primary sungear (42).
- (7) Install new spacer (45) on primary drive planetary gear (44).
- (8) Install primary drive planetary gear (44) in cable drum (37).
- (9) Install primary sungear (42) in primary drive planetary gear (44).



- (10) If removed, install new cylindrical roller race (41) in cable drum (37) using an arbor press.
- (11) Install new oil seal (40) in cable drum (37). Make sure oil seal (40) is flush with cable drum (37) rim.

**5-4. BAP WINCH REPAIR (continued).**

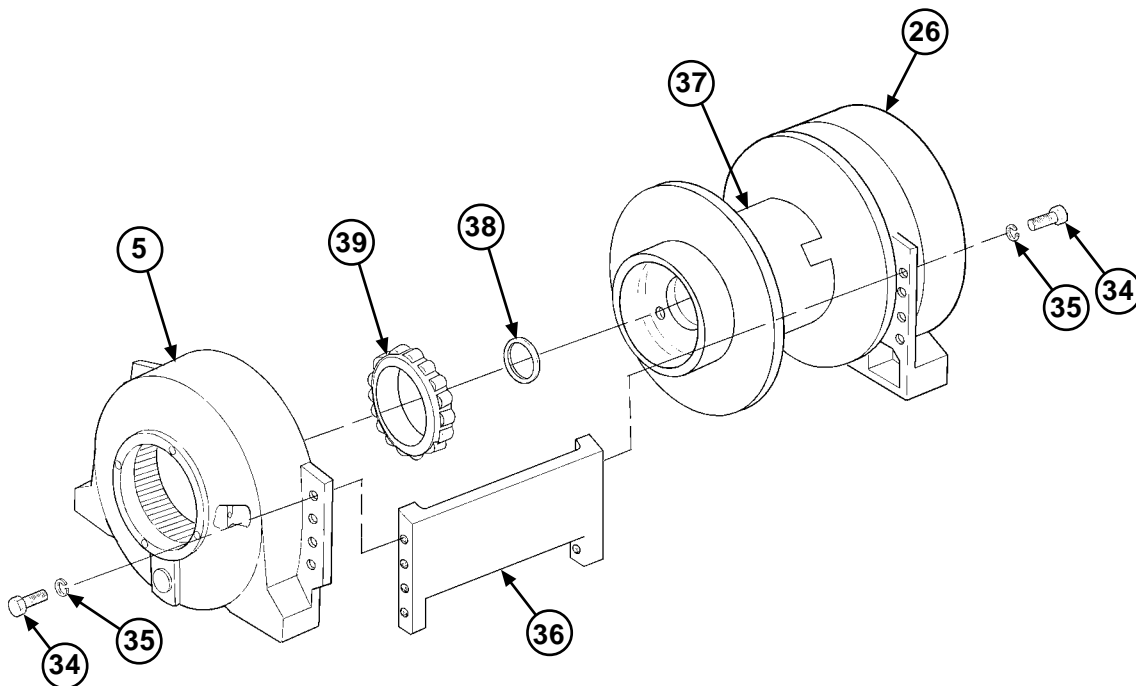
***h. Brake Housing Installation.***

- (1) Install new spacer (38) on brake housing (5).

**NOTE**

Remove cylindrical roller race from new cylindrical roller bearing before installing cylindrical roller bearing.

- (2) If removed, install new cylindrical roller bearing (39) on brake housing (5) using an arbor press.
- (3) With the aid of an assistant, install brake housing (5) on cable drum (37), making sure the two tie bars (36) align from brake housing (5) to final housing (26).
- (4) Install two tie bars (36) and 16 screws (34) and new lockwashers (35) on brake housing (5) and cable drum (37). Torque screws to 50 lb-ft (68 N•m).



## 5-4. BAP WINCH REPAIR (continued).

### i. Final Drive Assembly Installation.

#### WARNING

**Wear safety goggles and use care when installing snapping. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (1) Install snapping (32) in final housing (26).
- (2) Install final drive planetary gear (31) in final housing (26).
- (3) Install final sungear shaft (30) in final drive planetary gear (31), with longer splined end first, making sure final sungear shaft (30) engages with final drive planetary gear (31).
- (4) Install sungear stopper (29), stopper (28), and new O-ring (27) on end cover (25).

#### **NOTE**

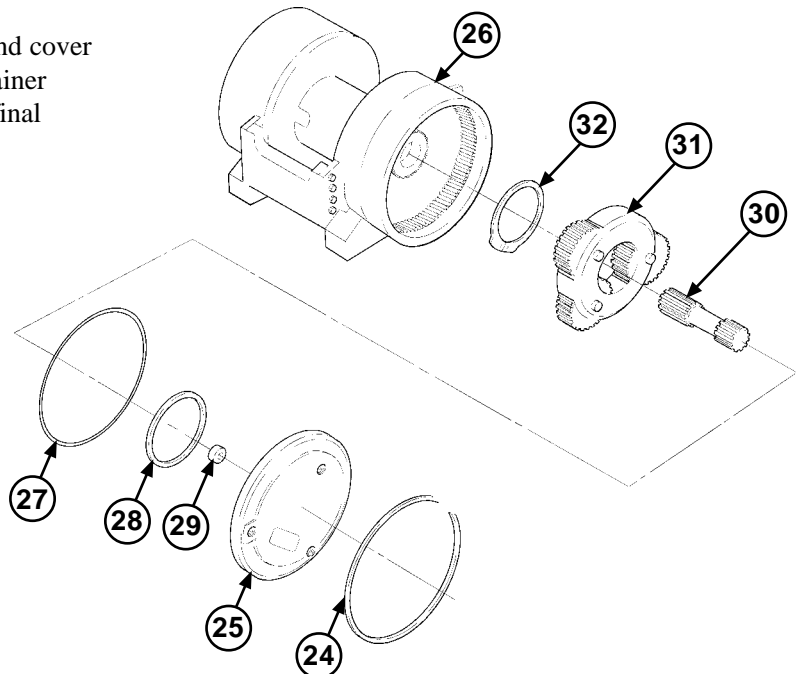
When installing end cover, be sure to align marks previously made during removal.

- (5) Install end cover (25) on final housing (26).

#### WARNING

**Wear safety goggles and use care when installing cover retainer. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (6) Install cover retainer (24) on end cover (25). Make sure lip end of retainer aligns with nail hole at top of final housing (26).



**5-4. BAP WINCH REPAIR (continued).**

***j. Brake Hub Subassembly Assembly.***

- (1) Install bearing (19) in brake hub (18), making sure bearing (19) lip end goes into recessed side of brake hub (18).
- (2) Install two clutch liners (17) on brake hub (18), with recessed sides inward.
- (3) Install raised side of brake hub (18) on nonsplined end of motor drive shaft (16), turning motor drive shaft (16) counterclockwise until brake hub (18) fits securely on motor drive shaft (16).

**WARNING**

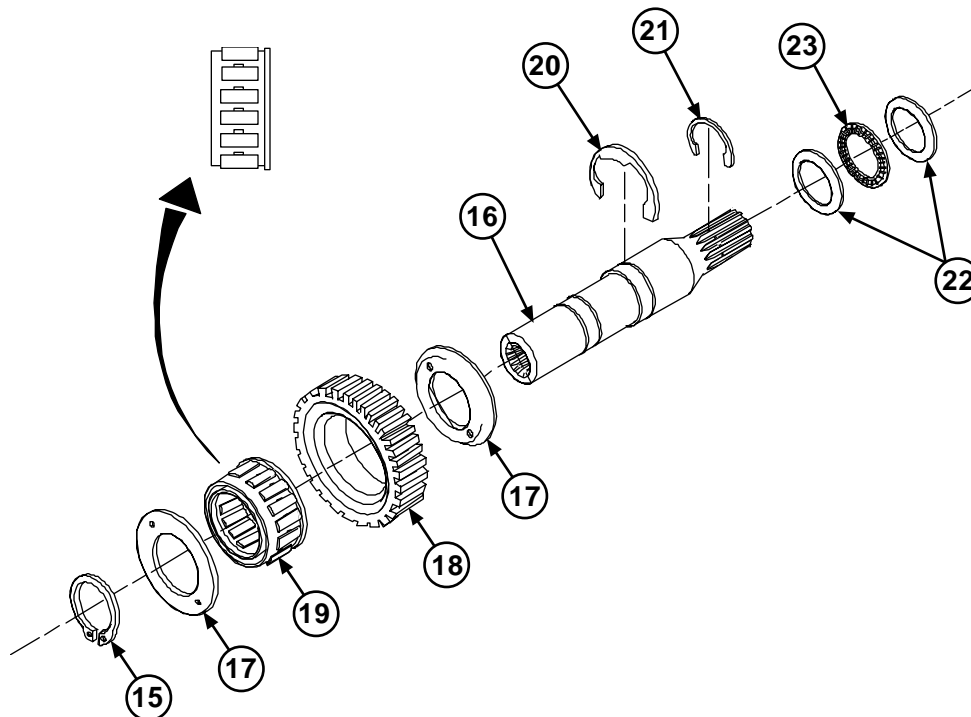
**Wear safety goggles and use care when installing snapping. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (4) Install snapping (15) on machine-cut groove in nonsplined end of motor drive shaft (16).
- (5) Install two bearing seats (22) and bearing (23) on motor drive shaft (16).

**WARNING**

**Wear safety goggles and use care when installing retaining ring. It is under spring tension and can act as a projectile when released. Failure to heed this warning can result in serious injury to personnel.**

- (6) Install retaining ring (20) and C-clip (21) on machine-cut grooves in splined end of motor drive shaft (16).





## 5-4. BAP WINCH REPAIR (continued).

### k. Brake Hub Assembly Installation.

- (1) Install brake hub subassembly (11) in brake housing (5), making sure splined end is in brake housing (5) first. Rotate brake hub subassembly (11) until it engages with primary gear.
- (2) Install brake spacer (14) in brake housing (5), with recessed end down.

#### NOTE

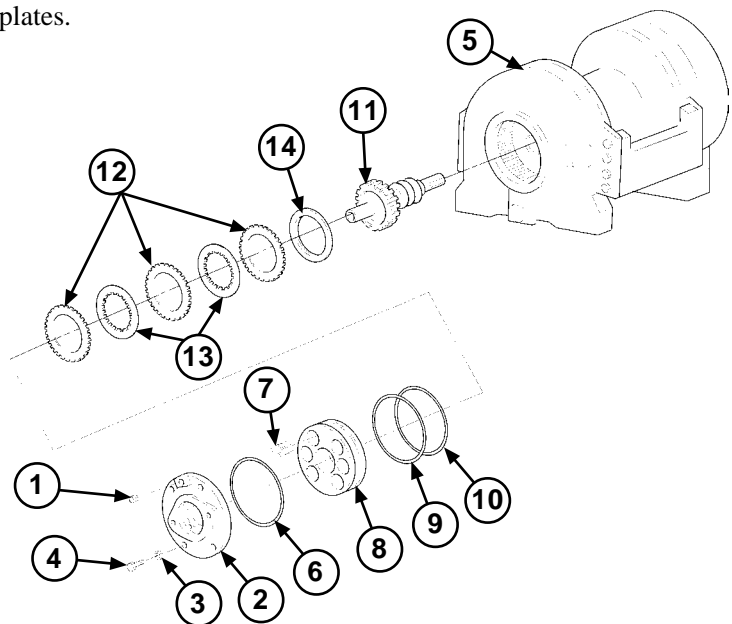
Install spacer plates alternately, making sure to end with seventh spacer plate.

- (3) Install seven spacer plates (12) and six brake spacer plates (13) in brake housing (5).

#### NOTE

If installed spacer plates and brake spacer plates measure more than 1.7 inches (4.3 cm) from brake housing rim, or if they are discolored or glazed, replace with new spacer plates and brake spacer plates.

- (4) Install two new O-rings (9 and 10) on piston (8).
- (5) Install piston (8) in brake housing (5).
- (6) Install six springs (7) in piston (8).
- (7) Install new O-ring (6) on motor adapter (2).



#### NOTE

When installing motor adapter, be sure to align marks previously made during removal.

- (8) Install motor adapter (2) and four new lockwashers (4) and screws (3) on brake housing (5). Tighten screws (3) evenly, one turn at a time, against the pressure exerted by the six springs (7). Torque screws to 32 lb-ft (43 N•m).
- (9) Apply antiseizing tape to pipe plug (1), and install pipe plug (1) on motor adapter (2).

### l. Follow-on Maintenance:

- Refill winch oil (Appendix G).

**END OF TASK**

**5-5. BAP GENERAL WELDING MAINTENANCE.**

**NOTE**

- When weldment cracks are discovered, it is recommended that they be repaired at the next service interval to prevent the length of the crack from increasing and to minimize repair. The following inspection procedures are to be considered as guidelines only. Any cracks discovered during inspections, considered more significant—especially from a safety standpoint—should be referred to the supervisor for weld repair decisions. This would include cracks identified in any BAP main frame or winch frame structures and cracks that have opened and could lengthen rapidly during BAP handling of bridge bays or transport of loaded BAP.
- Refer to the *Operator’s Circular for Welding Theory and Application (TC 9-237)* for further information about welding procedures.

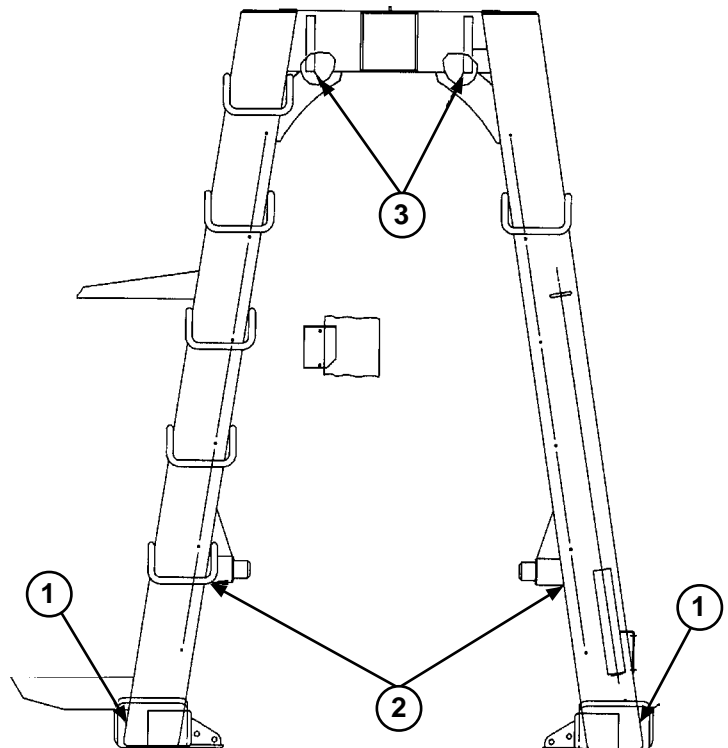
**a. Weldment Points.** Thoroughly inspect all weldments for cracks, chips, or other damage. BAP areas include the main frame structure, winch frame structure, front pin lock assemblies, rear guides, center roller assembly, and catwalks. Not all of these are specifically addressed in subparagraph b.

**b. BAP Main Frame Structure.**

(1) *A-Frame to Main Rails.* These welds are those joining A-frame tubes and main rail tubes to angled plate between the two tubes. Sound welds in these joints are necessary to ensure safe loading and unloading of the loaded BAP. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at either of the A-frame leg joints should not exceed 2.0 inches (50.8 mm).

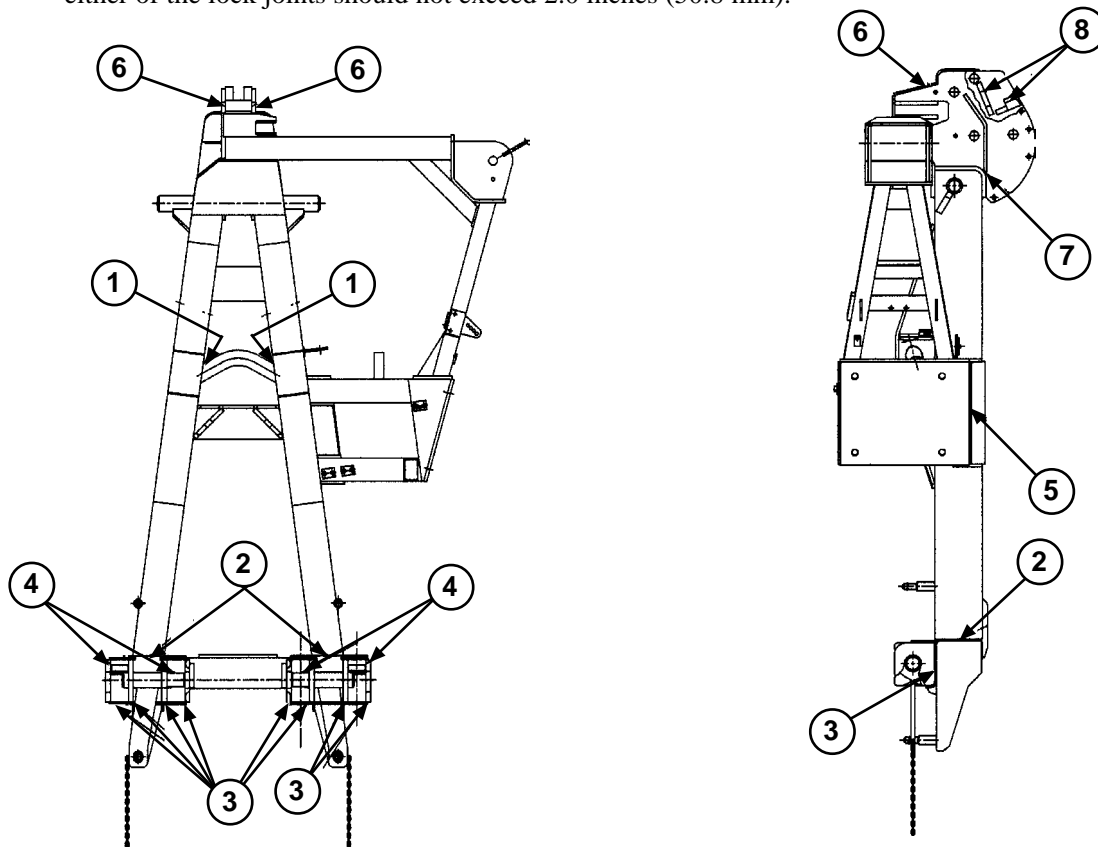
(2) *Winch Frame Lower Lock Pin to A-Frame.* These welds join winch frame lower lock pin outer circumference to A-frame tubes. Sound welds in these joints are necessary to ensure safe loading and unloading of the loaded BAP. A crack should be repaired before it reaches 0.75 inch (19.0 mm) in length. The combined length of multiple cracks at either of the pin joints should not exceed 1.50 inches (38.1 mm).

(3) *Winch Frame Upper Pin Saddle Plate to A-Frame.* These welds join winch frame upper pin saddle plate to top beam of A-frame. Sound welds in these joints are necessary for safe unloading of the loaded BAP. A crack should be repaired before it reaches 1.5 inches (38.1 mm) in length. The combined length of multiple cracks at either plate joint should not exceed 3.0 inches (76.2 mm).



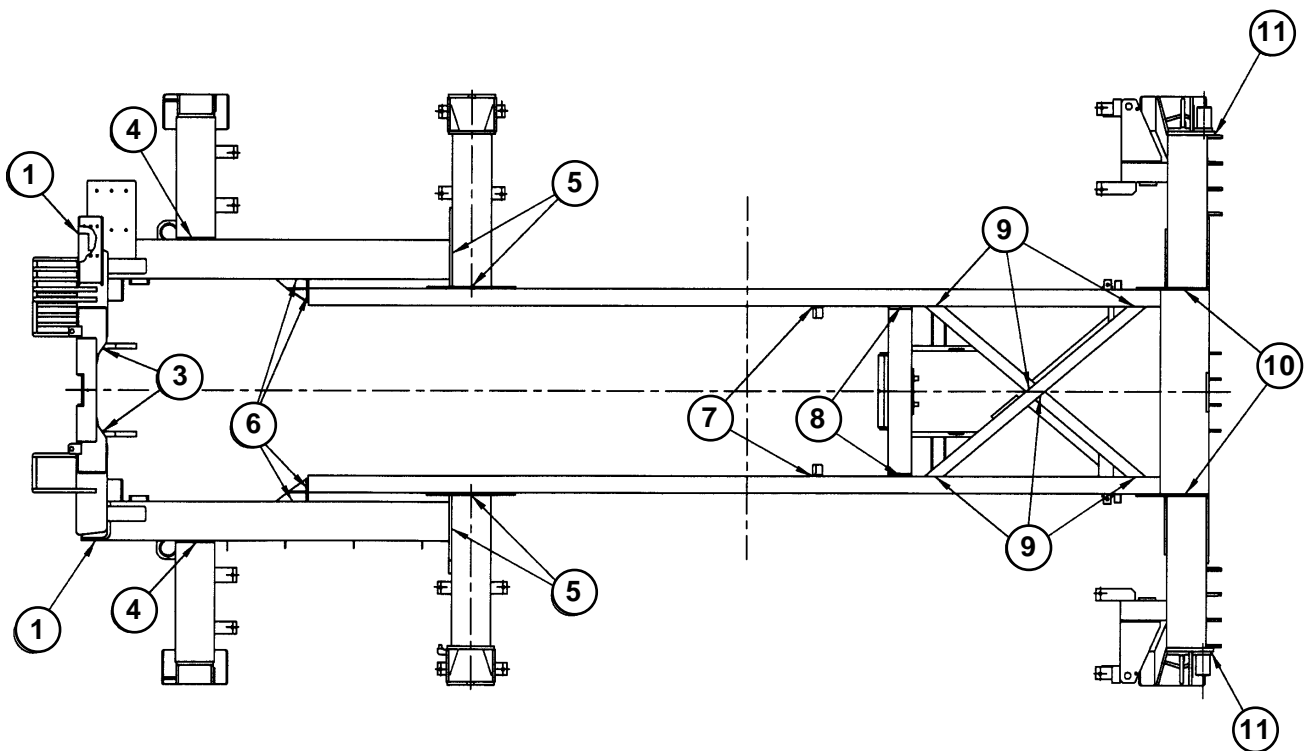
**5-5. BAP GENERAL WELDING MAINTENANCE (continued).**

- (4) *Front Lock Outrigger Tubes to Main Rails.* These welds join front lock outrigger tubes to main rails. Sound welds in these joints are necessary to ensure safe support of the loaded BAP when resting on front feet. A crack should be repaired before it reaches 1.5 inches (38.1 mm) in length. The combined length of multiple cracks at either front outrigger tube joint to main rail should not exceed 2.0 inches (50.8 mm).
- (5) *Front Roller Outrigger Tubes to Both Main Rails.* These welds join front roller outrigger tubes to both front and rear main rail segments. Sound welds in these joints are necessary to ensure safe support of bridge bays during handling and transport. A crack should be repaired before it reaches 1.5 inches (38.1 mm) in length. The combined length of multiple cracks at any one of the four tube joints (two for each outrigger) to main rails should not exceed 2.0 inches (50.8 mm).
- (6) *Front Main Rails to Rear Main Rails.* These welds join front end of rear main rails and front main rails via gusset plates. Sound welds in these joints are necessary to ensure safe support of the loaded BAP during handling and transport. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at any of the rail joints should not exceed 2.0 inches (50.8 mm).
- (7) *Rear Holding Locks (DIN Locks).* These locks secure the BAP to the Transporter, preventing it from moving forward or up. These welds join the locks to the main rails. Sound welds in these joints are necessary to ensure safe transport of the loaded BAP on the CBT or on a PLS trailer. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at either of the lock joints should not exceed 2.0 inches (50.8 mm).



**5-5. BAP GENERAL WELDING MAINTENANCE (continued).**

- (8) *Center Roller Crossmember to Main Rails.* These welds join the center roller crossmember tube to the main rails. Sound welds in these joints are necessary to ensure support of the loaded BAP during handling and transport. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at either of the rail joints should not exceed 1.5 inches (38.1 mm).
- (9) *X-Bracket to X-Brace and to Main Rails.* These welds join x-brace members and join x-braces to main rails. Sound welds in these joints are necessary to ensure that the frame, with load, will remain square during handling and transport. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at any one of the x-brace joints should not exceed 2.0 inches (50.8 mm).
- (10) *Rear Beam Outrigger Tubes to Main Rails.* These welds join rear beam outrigger tubes to gusset plates, which join to main rails and to beam center segment. Sound welds in these joints are necessary to ensure safe support of bridge bays during handling and transport as well as supporting loaded BAP when resting on BAP rear feet. A crack should be repaired before it reaches 1.5 inches (38.1 mm) in length. The combined length of multiple cracks at any one joint should not exceed 2.0 inches (50.8 mm).
- (11) *Rear Roller Axles to Beam End Plates.* These welds join rear roller axles to beam end plates. Sound welds in these joints are necessary to ensure safe support of bridge bays during handling and transport. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at either of the axle joints should not exceed 1.5 inches (38.1 mm).



**5-5. BAP GENERAL WELDING MAINTENANCE (continued).***c. BAP Winch Frame Structure.*

- (1) *Hook Bar to Plates.* These welds join hook bar to plates. Sound welds in these bar joints are necessary to ensure safe handling of bridge bays and loaded BAP. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at one of the joints should not exceed 1.5 inches (38.1 mm).
- (2) *Bottom Lock Beam to Side Tubes.* These welds join the bottom lock beam assembly to side tubes. Sound welds in these joints are necessary to ensure safe handling of bridge bays and loaded BAP. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at one of the joints should not exceed 2.0 inches (50.8 mm).
- (3) *Bottom Lock Support and Guide Plates to Beam.* These welds join the eight bottom lock support and guide plates to the beam. Sound welds in these joints are necessary to ensure safe handling of bridge bays and loaded BAP. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks at any one plate joint should not exceed 2.0 inches (50.8 mm).
- (4) *Bottom Locking Tabs to Pins.* These welds join locking tabs to bottom lockpins. Sound welds are necessary to ensure safe handling of bridge bays and loaded BAP. A crack should be repaired before it reaches 0.25 inch (6.4 mm) in length. The combined length of multiple cracks at any one tab joint should not exceed 0.5 inch (12.7 mm).
- (5) *Winch Mounting Plate to Support Plate.* These welds join the winch mounting plate to support plate coming from winch frame side tubes. Sound welds in these joints are necessary to ensure safe handling of bridge bays. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks in this joint should not exceed 2.0 inches (50.8 mm).
- (6) *Sheave Housing Side Plates to Cap Plate.* These welds join sheave housing side plates to top cap plate. Sound welds in cap plate joints are necessary to ensure safe handling of bridge bays. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks in cap plate joints should not exceed 2.0 inches (50.8 mm).
- (7) *Sheave Housing Outside Gusset Plates to Base Plate.* These welds join outside gusset plates to sheave housing base plate. Sound welds in these joints are necessary to ensure safe handling of bridge bays. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks in any one gusset plate joint should not exceed 2.0 inches (50.8 mm).
- (8) *Sheave Housing Hook Housing Saddle Plates and Supports.* These welds join winch rope hook housing saddle stop plates and support bars to sheave housing side plates. Sound welds in these joints are necessary to ensure safe handling of bridge bays. A crack should be repaired before it reaches 1.0 inch (25.4 mm) in length. The combined length of multiple cracks should not exceed 1.5 inches (38.1 mm).

**5-5. BAP GENERAL WELDING MAINTENANCE (continued).**

**WARNING**

- **Unusable CARC mixtures are considered hazardous waste and will require disposal in accordance with Federal, state, Department of Defense, Department of the Army, and local installation hazardous waste regulations. Consult the installation environmental office for proper disposal guidance. Mixed CARC is extremely flammable. Use only in a well-ventilated areas. Keep away from open flames, sparks, and other ignition sources.**
- **CARC paint contains isocyanate (HDI), which is highly irritating to skin and respiratory system. High concentrations of HDI can produce symptoms of itching and reddening of skin, a burning sensation in throat and nose, and watering of the eyes. In extreme concentrations, HDI can cause cough, shortness of breath, pain during respiration, increased sputum production, and chest tightness. The following precautions must be taken whenever using CARC paint:**
  - **ALWAYS use air-line respirators when using CARC paint unless air sampling shows exposure to be below standards. Use chemical cartridge respirator if air sampling is below standards.**
  - **DO NOT use CARC paint without adequate ventilation.**
  - **NEVER weld or cut CARC-coated materials.**
  - **DO NOT grind or sand paint equipment without high-efficiency, air-purifying respirators in use.**
  - **BE AWARE of CARC paint exposure symptoms; symptoms can occur a few days after initial exposure. Seek medical help immediately if symptoms are detected.**

**CAUTION**

**Do not weld the BAP while on truck or trailer or while loaded with bridge bay or damage to equipment may result.**

- d. BAP Welding.* Welding on the BAP must be performed when the BAP has been removed from the CBT or PLS trailer and the bridge bay load has been removed. Different areas of the BAP require different weld electrodes. Use the guidelines given in Table 5-2 to determine the correct weld.

**5-5. BAP GENERAL WELDING MAINTENANCE (continued).**

**Table 5-2. BAP Weld Joint Materials**

Weld Joint	Joint Materials
<i>BAP Main Frame Structure</i>	
1. A-Frame to Main Rails	ASTM A500, GR B to ASTM A572, GR 50 to ASTM A656, GR 80, TY7
2. Winch Frame Lower Lock Pin to A-Frame	ASTM A331, GR 41L40 to ASTM A500, GR B
3. Winch Frame Upper Pin Saddle Plate to A-Frame	ASTM A572, GR 5 to ASTM A500, GR B
4. Front Lock Outrigger Tubes to Main Rails	ASTM A500, GR B to ASTM A656, GR 80, TY7
5. Front Roller Outrigger Tubes to Both Main Rails	ASTM A500, GR B to ASTM A656, GR 80, TY7
6. Front Main Rails to Rear Main Rails	ASTM A656, GR 80, TY7 to ASTM A588, GR A or to ASTM A656, GR 80, TY7
7. Rear Holding Locks	ASTM A352, GR LCB to ASTM A656, GR 80, TY7
8. Center Roller Crossmember to Main Rails	ASTM A656, GR 80, TY7 to ASTM A588, GR A or to ASTM A656, GR 80, TY7
9. X-Brace to X-Brace and to Main Rails	ASTM A500, GR B to ASTM A500, GR B, or to ASTM A588, GR A or to ASTM A656, GR 80, TY7
10. Rear Beam Outrigger Tubes to Main Rails	ASTM A500, GR B to ASTM A656, GR 80, TY7
11. Rear Roller Axle to Beam End Plate	ASTM A322, GR 8620 to ASTM A572, GR 50
<i>BAP Winch Frame Structure</i>	
1. Hook Bar to Plates	ASTM A322, GR 8620 to ASTM A656, GR 80, TY7
2. Bottom Lock Beam to Side Tubes	ASTM A656, GR 80, TY7 to ASTM A500, GR B
3. Bottom Lock Support and Guide Plates to Beam	ASTM A572, GR 50 to ASTM A656, GR 80, TY7
4. Bottom Locking Tabs to Pins	ASTM A572, GR 50, to ASTM A193, GR B7
5. Winch Mounting Plate to Support Plate	ASTM A656, GR 80, TY7 to ASTM A572, GR 50
6. Sheave Housing Side Plates to Cap Plate	ASTM A572, GR 50 to ASTM A572, GR 50
7. Sheave Housing Outside Gusset Plates to Base Plate	ASTM A572, GR 50 to ASTM A572, GR 50

**Section III. TRANSPORTER MAINTENANCE PROCEDURES**

**5-6. GENERAL.**

Sections II and III contain instructions for replacement and repair of Common Bridge Transporter (CBT) components authorized at the Direct Support level by the Maintenance Allocation Chart. In some cases, components must be removed before performing the task. In these cases, references are provided to the applicable chapters or paragraphs. This section contains maintenance procedures for the Transporter. Section II contains a maintenance procedure for the Bridge Adapter Pallet (BAP).

**5-7. MAIN FRAME NOSE SUPPORT BRACKET REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

*Equipment Condition*

LHS fully extended (para 2-10)

*Materials/Parts*

Locknut (16) (Item 54, Appendix K)

**a. Removal.**

- (1) Remove eight locknuts (1), screws (2) and nose support bracket (3) from crossmembers (4). Discard locknuts.
- (2) Remove eight locknuts (5), screws (6), two plates (7), and plates (8) from left and right gusset (9 and 10). Discard locknuts.

**NOTE**

If removal of front intermediate crossmember is required, refer to TM 9-2320-279-34-2 HEMTT manual.

**b. Installation.**

- (1) Install two plates (7) and plates (8) on gussets (9) and (10) with eight screws (6) and new locknuts (5).

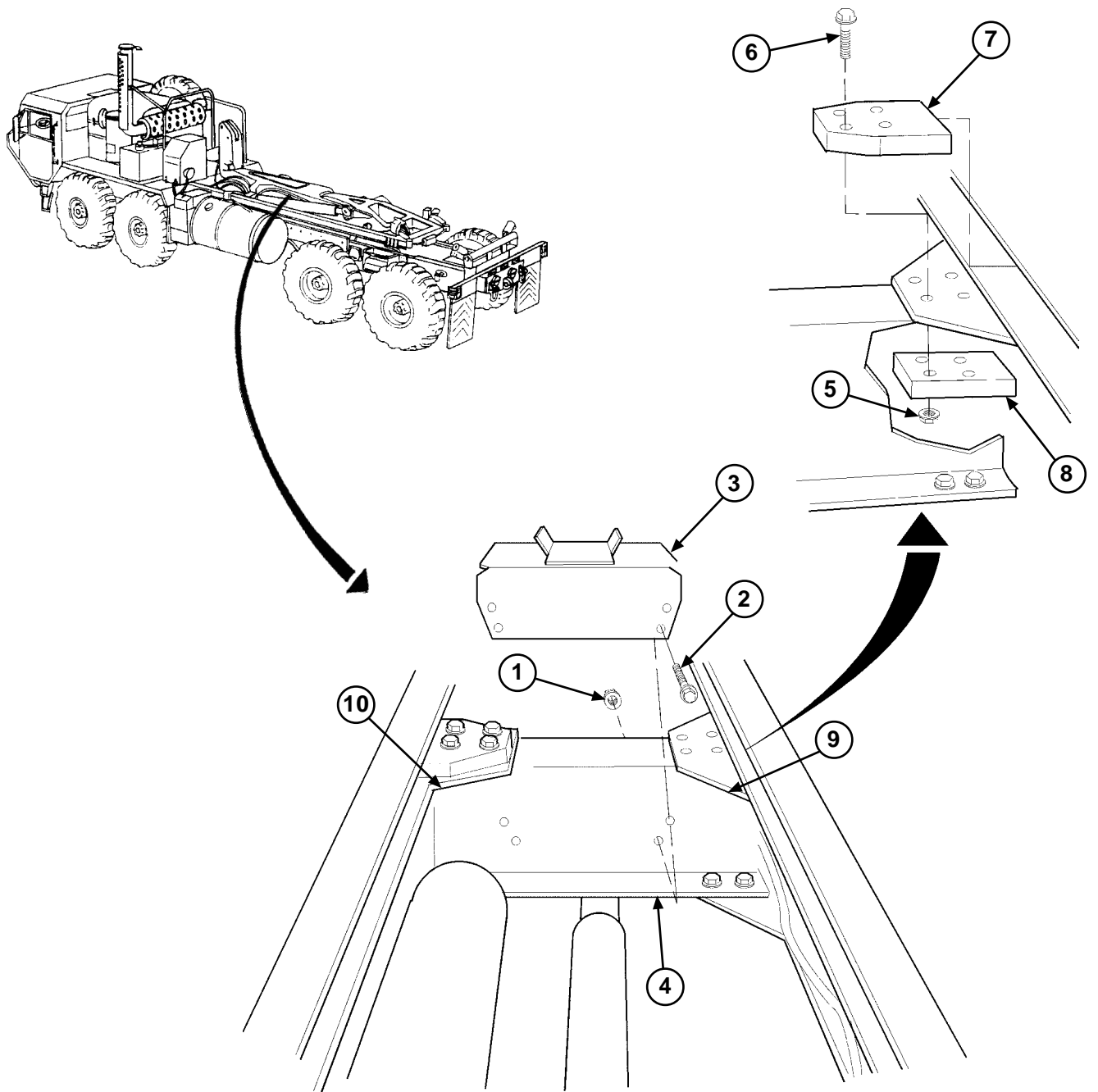
**NOTE**

Nose support bracket must be installed so ears on bracket are positioned toward front of vehicle.

- (2) Install nose support bracket (3) on crossmember (4) with eight screws (2) and new locknuts (1).



**5-7. MAIN FRAME NOSE SUPPORT BRACKET REPLACEMENT (continued).**



**c. Follow-on Maintenance:**

- Stow the LHS (para 2-10).

**END OF TASK**

**5-8. FRONT COMPRESSION FRAME MOUNTING BRACKET REPLACEMENT.**

This Task Covers:

- |   |  |                          |
|---|--|--------------------------|
| a. Left Front Compression Frame Mounting Bracket Removal      | c. Right Front Compression Frame Mounting Bracket Removal      | e. Follow-on Maintenance |
| b. Left Front Compression Frame Mounting Bracket Installation | d. Right Front Compression Frame Mounting Bracket Installation |                          |

**INITIAL SETUP**

*Tools and Special Tools*

Tool kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

*Equipment Conditions*

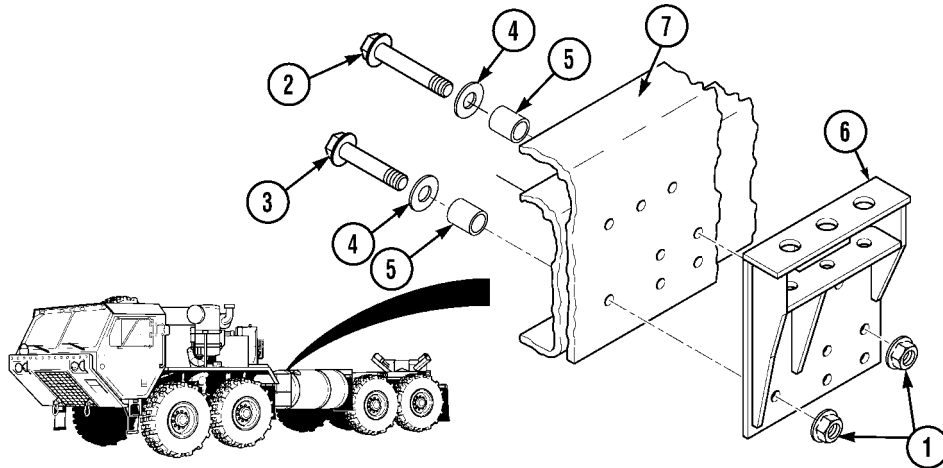
Compression frame removed (para 5-14)  
Left fuel tank removed (for left side bracket only)  
(TM 9-2320-279-20-1)

*Materials/Parts*

Locknut (11) (Item 54, Appendix K)  
Locknut (3) (Item 56, Appendix K)

**a. Left Front Compression Frame Bracket Removal.**

Remove eight locknuts (1), four 4.00 in. (102 mm) screws (2), 3.75 in. (95 mm) screws (3), eight washers (4), spacers (5), and left front compression frame mounting bracket (6) from frame (7). Discard locknuts.



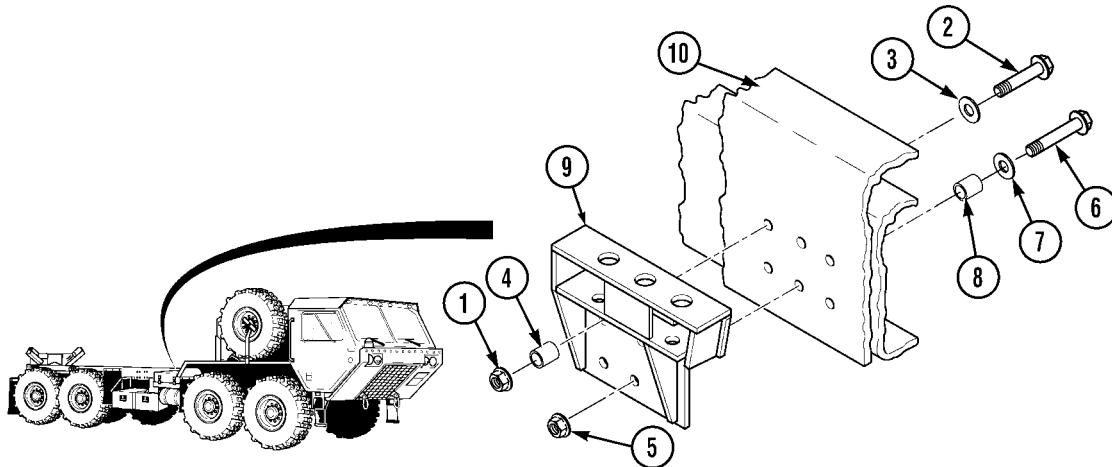
**b. Left Front Compression Frame Bracket Installation.**

- (1) Install left front compression frame bracket (6) on frame (7) with four 4.00 in. (102 mm) screws (2), 3.75 in. (95 mm) screws (3), eight washers (4), spacers (5), and new locknuts (1).
- (2) Tighten locknuts to 210 lb-ft (285 N•m).

## 5-8. FRONT COMPRESSION FRAME MOUNTING BRACKET REPLACEMENT (continued).

### c. Right Front Compression Frame Mounting Bracket Removal.

- (1) Remove three locknuts (1), 4.00 in. (102 mm) screws (2), washers (3), and spacers (4). Discard locknuts.
- (2) Remove three locknuts (5), 3.75 in. (95 mm) screws (6), washers (7), spacers (8), and right front compression frame bracket (9) from frame (10). Discard locknuts.



### d. Right Front Compression Frame Mounting Bracket Installation.

- (1) Install right front compression frame mounting bracket (9) to frame (10) with three 4.00 in. (102 mm) screws (2), washers (3), spacers (4), and new locknuts (1).
- (2) Install three 3.75 in. (95 mm) screws (6), washers (7), spacers (8), and new locknuts (5).
- (3) Tighten locknuts (1) to 410 lb-ft (556 N•m).
- (4) Tighten locknuts (5) to 210 lb-ft (285 N•m).

### e. Follow-on Maintenance:

- Install left fuel tank (for left side bracket only) (TM 9-2320-279-20-1).
- Install compression frame (para 5-14).

**END OF TASK**



## 5-9. REAR COMPRESSION FRAME MOUNTING BRACKET REPLACEMENT.

This Task Covers:

a. Removal

b. Installation

c. Follow-on Maintenance

### INITIAL SETUP

#### Tools and Special Tools

Tool Kit, General Mechanic's:  
Automotive (SC 5180-90-N26)

#### Materials/Parts

Locknut (14) (Item 54, Appendix K)

#### Personnel Required

Two

#### Equipment Conditions

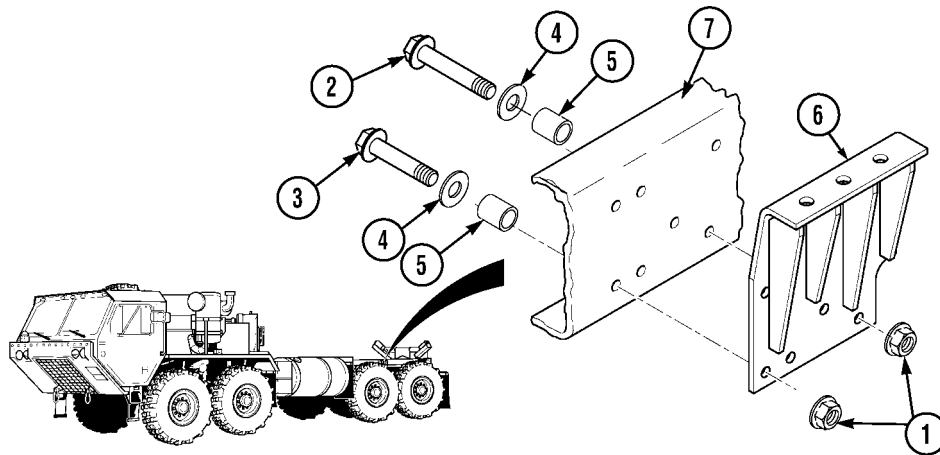
Compression frame removed (para 5-14)  
Wheel chock stowage box removed  
(for left rear bracket only) (TM 9-2320-279-20-2)

### a. Removal.

#### NOTE

Left and right compression frame mounting brackets are removed the same way.

With the help of an assistant, remove seven locknuts (1), four 4.00 in. (102 mm) screws (2), three 3.75 in. (95 mm) screws (3), seven washers (4), spacers (5), and rear compression frame mounting bracket (6) from frame (7). Discard locknuts.



### b. Installation.

#### NOTE

Left and right compression frame mounting brackets are installed the same way.

(1) With the help of an assistant, install rear compression frame mounting bracket (6) on frame (7) with four 4.00 in. (102 mm) screws (2), three 3.75 in. (95 mm) screws (3), seven washers (4), spacers (5), and new locknuts (1).

(2) Tighten locknuts to 210 lb-ft (285 N•m).

### c. Follow-on Maintenance:

- Install wheel chock stowage box (for left rear bracket only) (TM 9-2320-279-20-2).
- Install compression frame (para 5-14).

**END OF TASK**

**5-10. REAR ROLLER MOUNTING BRACKET REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

Lifting Device, Minimum Capacity 375 lb (170 kg)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Materials/Parts:*

Locknut (13) (Item 60, Appendix K)

*Personnel Required*

Two

*Equipment Condition:*

Rear roller assembly removed (para 4-51)  
 Rear bumper removed (para 4-54)  
 Rear cable guide removed (if equipped with self-recovery winch) (TM 9-2320-279-20)

**a. Removal.**

**NOTE**

If vehicle is equipped with a self-recovery winch, only seven fasteners will be removed. The other four are removed with cable guide.

**WARNING**

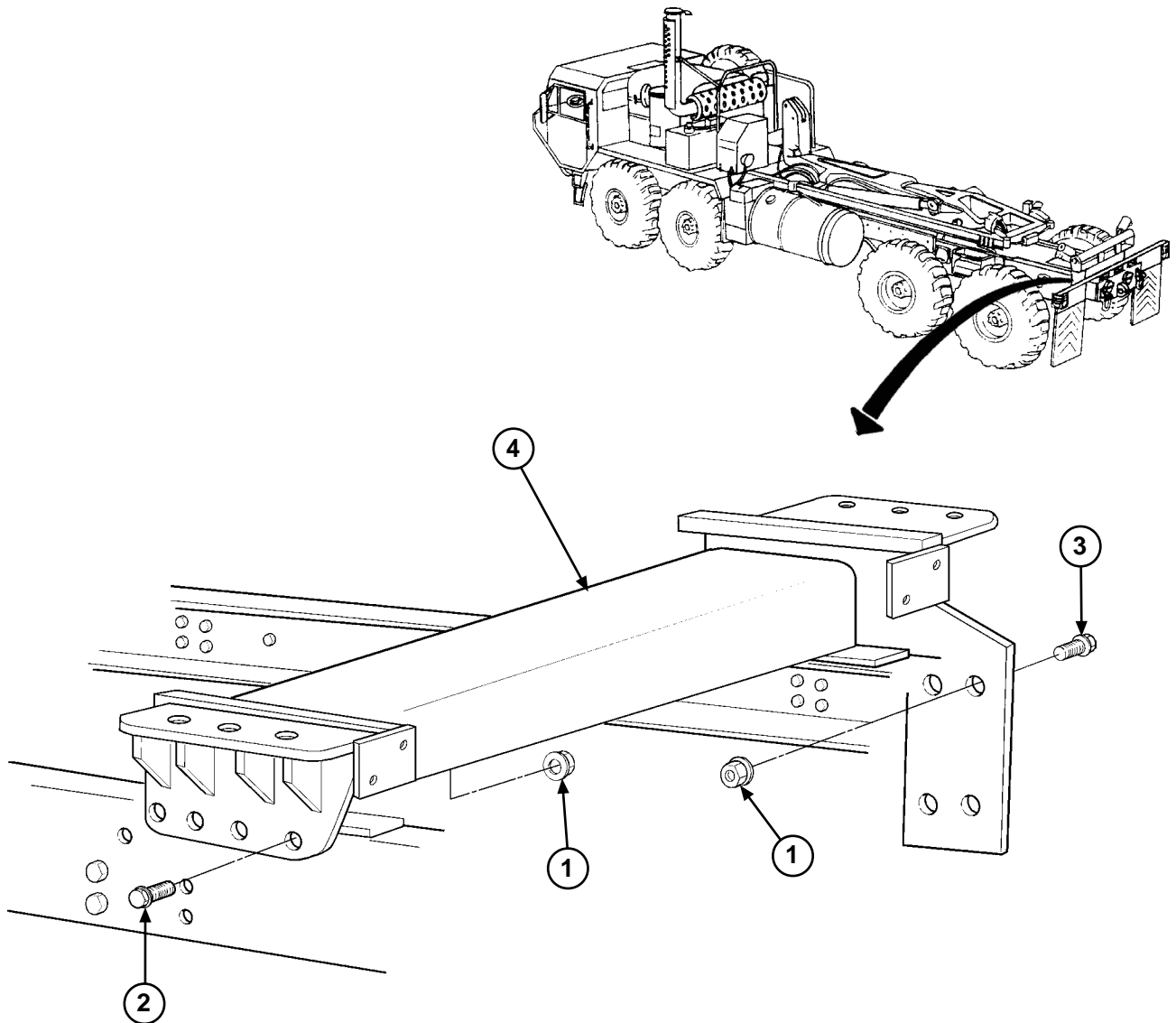
**Rear roller mounting bracket weighs 92 lb (41.76 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

Remove 11 locknuts (1), seven screws (2), four screws (3), and rear roller mounting bracket (4) from left side and right side of vehicle (5). Discard locknuts.

**b. Installation.**

Install rear roller mounting bracket (4) on left side with four screws (3) and new locknuts (1). Install right side of mounting bracket (4) with seven screws (2) and new locknuts (1).

**5-10. REAR ROLLER MOUNTING BRACKET REPLACEMENT (MODEL A ONLY)  
(continued).**



**c. Follow-on Maintenance:**

- Install rear cable guide (if equipped with self-recovery winch) (TM 9-2320-279-20).
- Install rear bumper (para 4-54).
- Install rear roller assembly (para 4-51).

**END OF TASK**

## 5-11. MAIN FRAME REPAIR.

This task covers:

- |                |                        |                          |
|----------------|------------------------|--------------------------|
| a. Removal     | c. Cleaning/Inspection | e. Installation          |
| b. Disassembly | d. Assembly            | f. Follow-on Maintenance |

### INITIAL SETUP

#### *Tools and Special Tools*

LHS Bushing Remover (2215090)  
 LHS Bushing Remover/Installer (Large) (2215070)  
 LHS Bushing Remover/Installer (Small) (2215060)  
 LHS Lead Screw (2215080)  
 LHS Washer (45232AX)  
 Lifting Device, Minimum Capacity 925 lb (419.95 kg)  
 Pliers Set, Retaining (GGGP00480)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

#### *Materials/Parts*

Adhesive, Loctite 242 (Item 3, Appendix E)  
 Grease, Lubriplate (Item 18, Appendix E)  
 Bushing (2) (Item 4, Appendix K)  
 Locknut (2) (Item 60, Appendix K)  
 Ring, Retaining (2) (Item 11, Appendix K)

Seal (4) (Item 111, Appendix K)

#### *Personnel Required*

Two

#### *Equipment Condition*

Hook arm removed (para 5-12)  
 Hook arm up proximity switch removed (para 4-95)  
 Main frame down proximity switch removed (para 4-96)  
 Worklight assembly removed (para 4-75)  
 Main frame junction box removed (para 4-64)  
 Main frame hydraulic hoses removed (para 5-17)  
 Hook arm (on main frame) hydraulic tubes removed (para 5-20)  
 Main frame cylinders removed (para 5-31)

#### *General Safety Instructions*

Component exceeds handling weight for one person.  
 Two people are required for disassembly/assembly.

### **a. Removal.**

- (1) Remove two locknuts (1), screws (2) and ground strap (3) from main frame (4) and compression frame (5). Discard locknuts.

### **WARNING**

**Main frame weighs 925 lb (419.95 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

- (2) Attach lifting device to main frame (4).

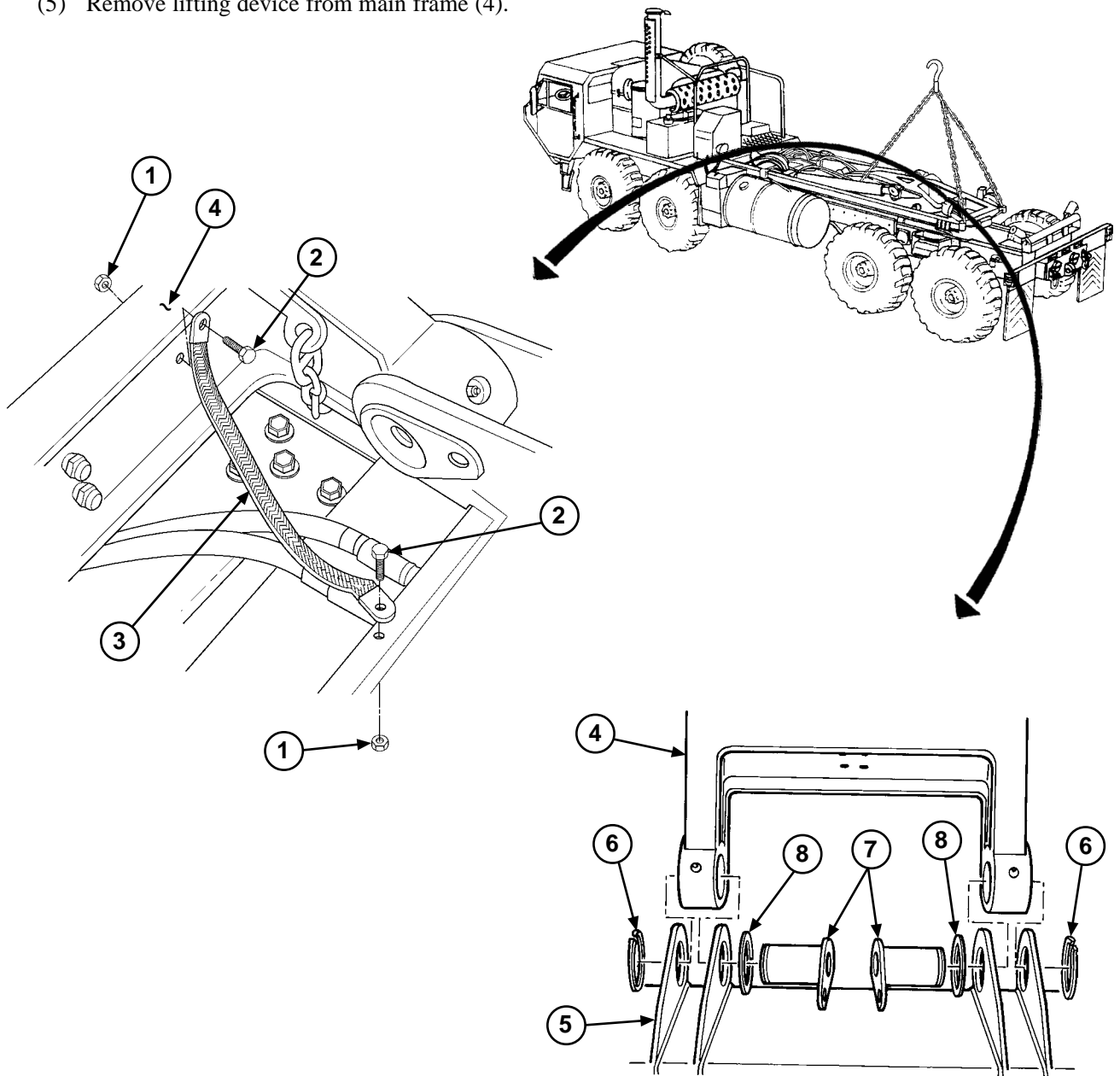


**5-11. MAIN FRAME REPAIR (continued).**

**WARNING**

**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.**

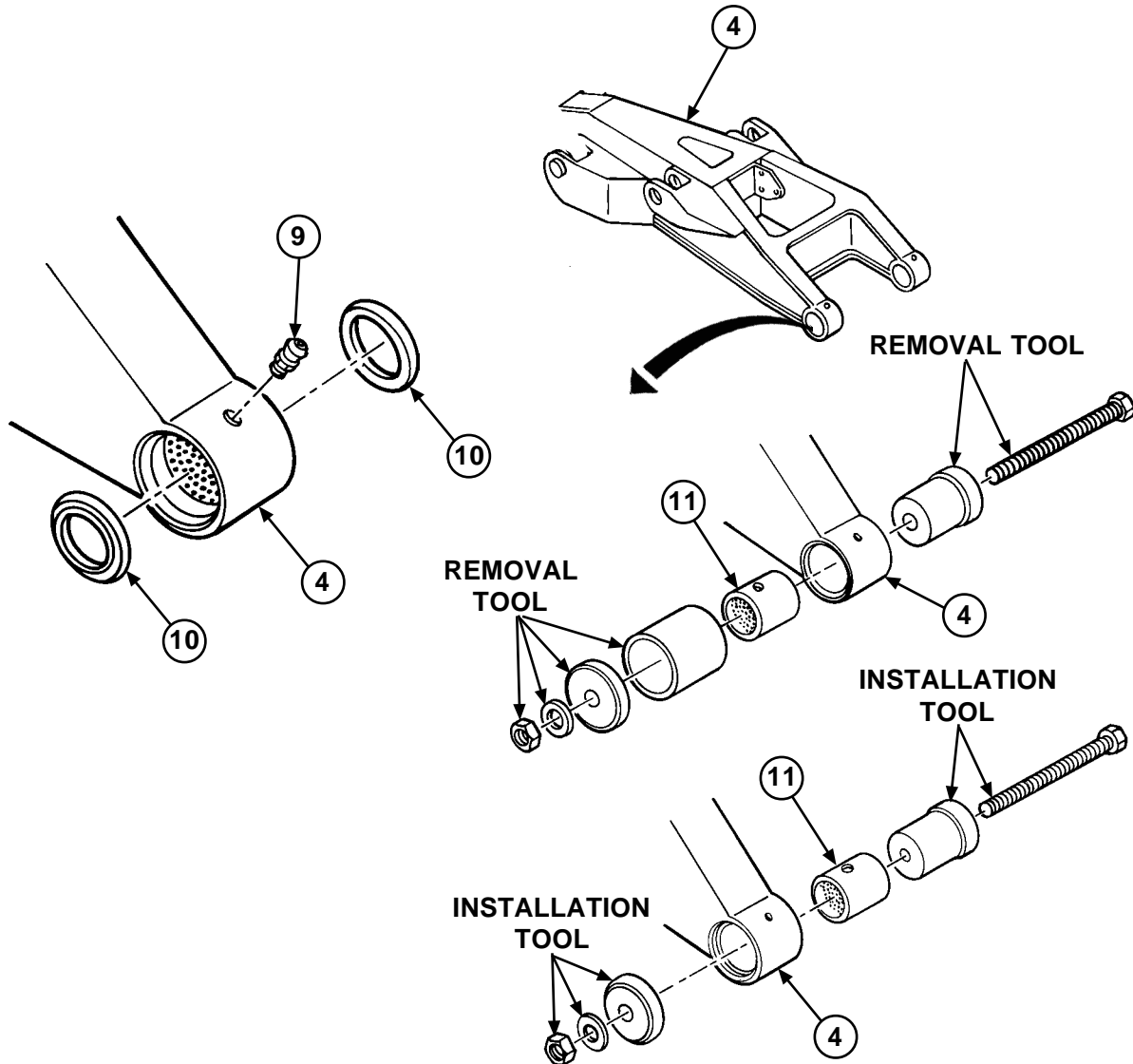
- (3) With a lifting device supporting the main frame (4), remove two retaining rings (6), pins (7) and spacers (8) from main frame (4) and compression frame (5). Discard retaining rings.
- (4) Remove main frame (4) from compression frame (5) and lower to ground using a lifting device.
- (5) Remove lifting device from main frame (4).



**5-11. MAIN FRAME REPAIR (continued).**

**b. Disassembly.**

- (1) Remove two grease fittings (9) from main frame (4).



**NOTE**

Seals are removed by prying out.

- (2) Remove four seals (10) from main frame (4). Discard seals.
- (3) Using removal/installation tool, remove two bushings (11) from main frame (4).

**5-11. MAIN FRAME REPAIR (continued).****c. Cleaning/Inspection.**

- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.

**d. Assembly.****WARNING**

**Adhesive, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (1) Apply adhesive-sealant to outside surface of two bushings (11).

**NOTE**

- Apply light coat of grease to threads of removal/installation tool before using.
  - Make sure hole in bushings are aligned with hole for grease fitting in main frame before installing.
- (2) Using removal/installation tool, install two bushings (11) in main frame (4).

**NOTE**

Apply light coat of grease to outer edges of seals before installing.

- (3) Install four seals (10) in main frame (4).
- (4) Install two grease fittings (9) in main frame (4).

**5-11. MAIN FRAME REPAIR (continued).**

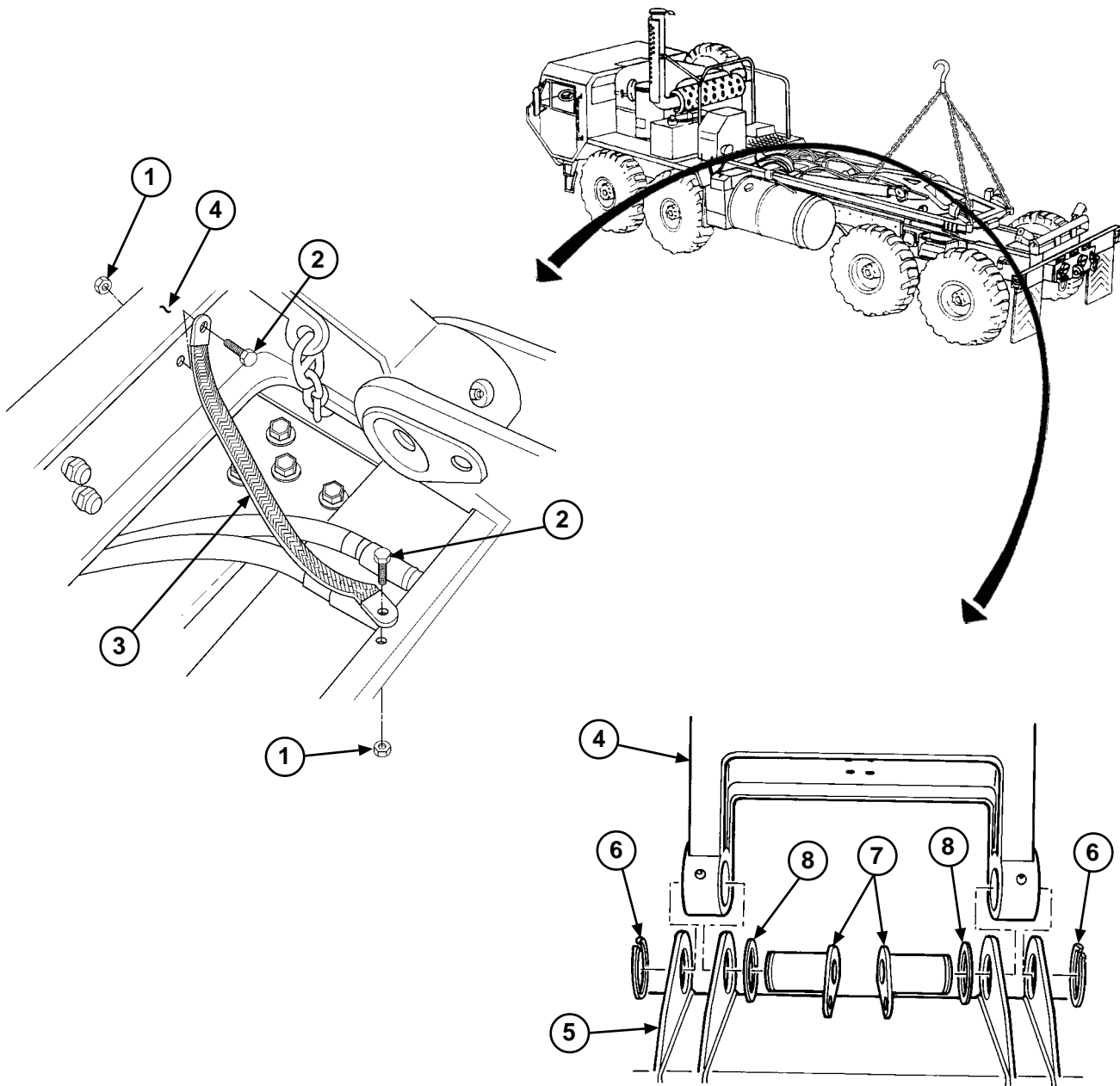
**e. Installation.**

- (1) Attach lifting device to main frame (4).

**WARNING**

**Main frame weighs 925 lb (419.95 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (2) Position main frame (4) in compression frame (5) using a lifting device.



**5-11. MAIN FRAME REPAIR (continued).****WARNING**

**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.**

- (3) With lifting device supporting main frame (4), install two spacers (8) and pins (7) in compression frame (5) and main frame (4) and secure with two new retaining rings (6).
- (4) Remove lifting device from main frame (4).
- (5) Install two ground straps (3) on main frame (4) and compression frame (5) with screws (2) and new locknuts (1).

***f. Follow-on Maintenance:***

- Install main frame cylinders (para 5-31).
- Install hook arm (on main frame) hydraulic tubes (para 5-20).
- Install main frame hydraulic hoses (para 5-17).
- Install main frame junction box (para 4-64).
- Install worklight assembly (para 4-75).
- Install main frame down proximity switch (para 4-96).
- Install hook arm up proximity switch (para 4-95).
- Install hook arm (para 5-12).

**END OF TASK**

## 5-12. HOOK ARM REPAIR.

This task covers:

- |                |                        |                          |
|----------------|------------------------|--------------------------|
| a. Removal     | c. Cleaning/Inspection | e. Installation          |
| b. Disassembly | d. Assembly            | f. Follow-on Maintenance |

### INITIAL SETUP

#### *Tools and Special Tools*

LHS Bushing Remover (2215090)  
 LHS Bushing Remover/Installer (Small) (2215060)  
 LHS Bushing Remover/Installer (Large) (2215070)  
 LHS Lead Screw (2215080)  
 LHS Washer (AE30574)  
 Lifting Device, Minimum Capacity 1950 lb (885.3 kg)  
 Pliers Set, Retaining (GGGP00480)  
 Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)  
 Wooden Block (Item H-6, Appendix H)

Ring, Retaining (2) (Item 42, Appendix K)  
 Seal (4) (Item 111, Appendix K)

#### *Personnel Required*

Two

#### *Equipment Condition*

Main frame manifolds removed (para 5-24)  
 Main frame cylinders removed (para 5-31)  
 Hook removed (para 5-13)  
 Hook arm cylinders removed (para 5-30)  
 Hook arm tubes removed (para 5-20)  
 Main frame to hook arm winch hoses removed (para 5-18)  
 Hook arm rubber bumpers removed (para 4-58)

#### *Materials/Parts*

Adhesive, Loctite 242 (Item 3, Appendix E)  
 Grease, Lubriplate (Item 18, Appendix E)  
 Bushing (2) (Item 4, Appendix K)

#### *General Safety Instructions*

Component exceeds handling weight for one person.  
 Two people are required for disassembly/assembly.

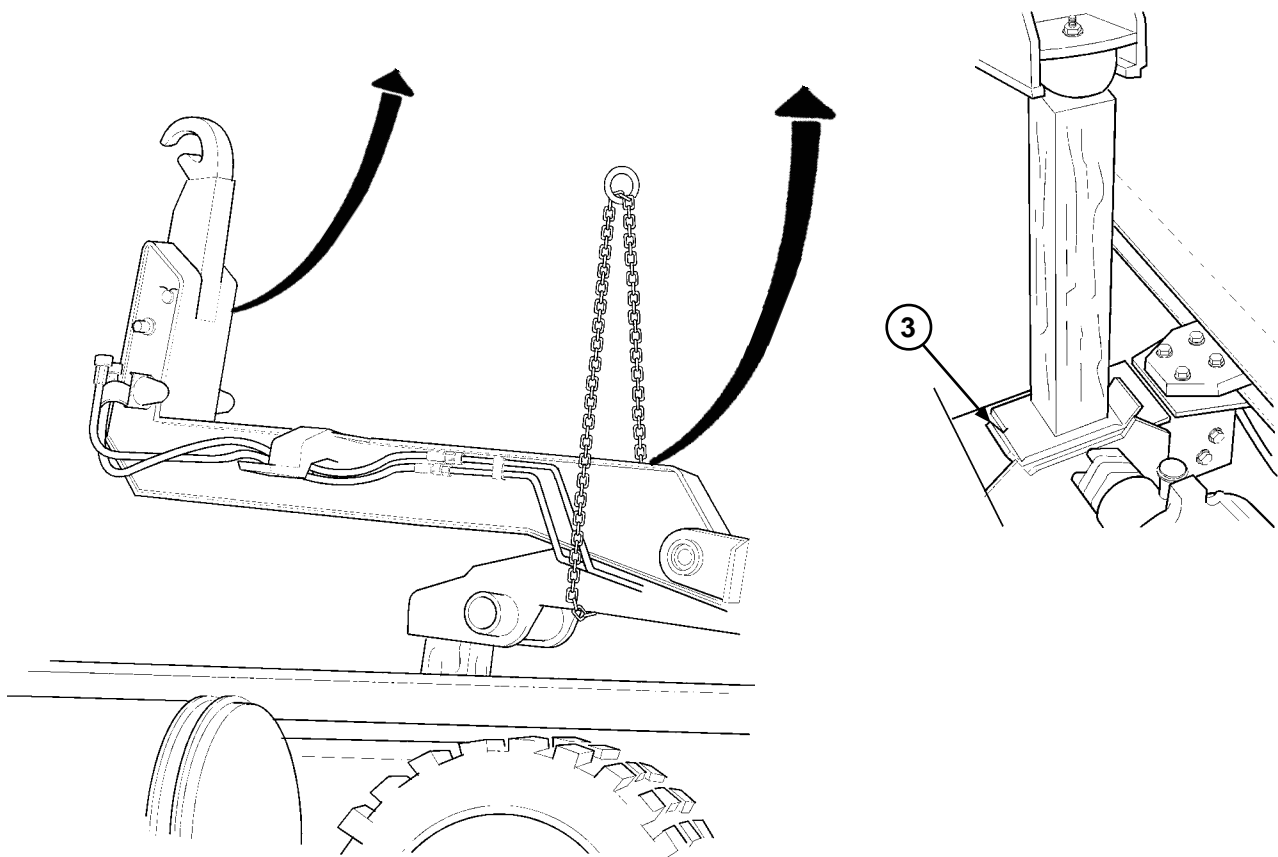
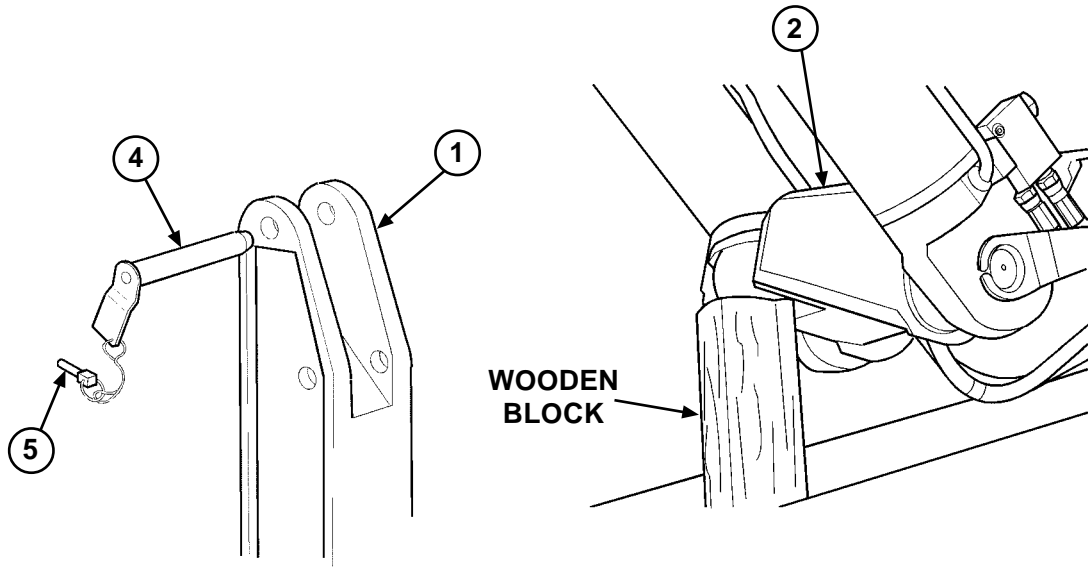
### **a. Removal.**

### **WARNING**

**Hook arm and main frame weigh 1950 lb (885.3 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

- (1) Attach lifting device to hook arm (1) and main frame (2).
- (2) Raise main frame (2) and hook arm (1). Remove wooden block and lower hook arm (1) and main frame (2) to compression frame (3) using a lifting device.
- (3) Remove lifting device from hook arm (1) and main frame (2).
- (4) Install pin (4) in upper hole of hook arm (1) and secure with lynch pin (5).

5-12. HOOK ARM REPAIR (continued).



**5-12. HOOK ARM REPAIR (continued).**

**WARNING**

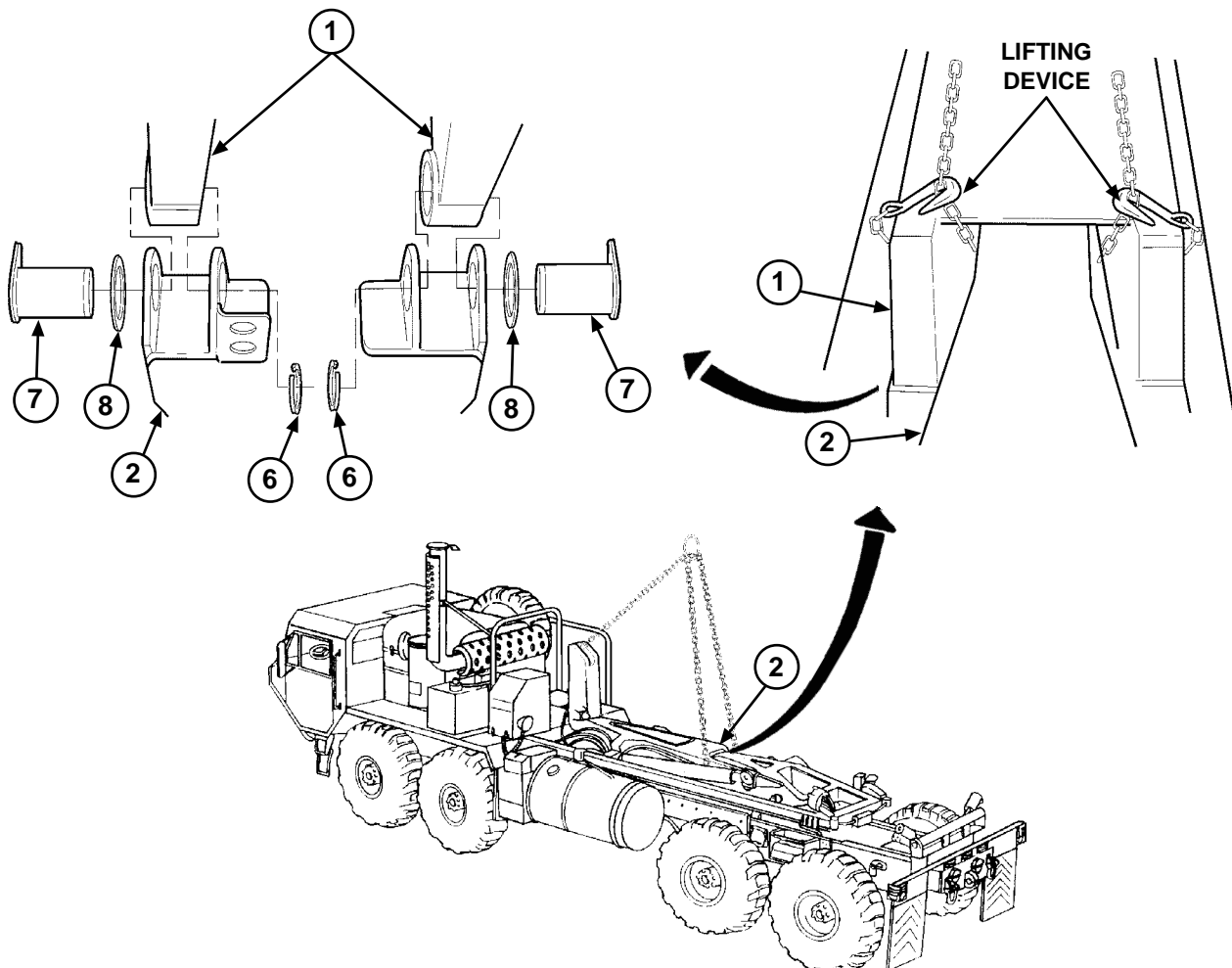
**Hook arm weighs 1025 lb (465.35 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

- (5) Attach lifting device to hook arm (1) as shown.

**WARNING**

**Retaining rings are under tension and can act as projectiles. Use care when removing rings to prevent injury to personnel.**

- (6) Remove two retaining rings (6), two pins (7), and two shims (8) from main frame (2) and hook arm (1). Discard retaining rings.
- (7) Remove hook arm (1) from main frame (2) using a lifting device and lower to ground.
- (8) Remove lifting device from hook arm (1).





## 5-12. HOOK ARM REPAIR (continued).

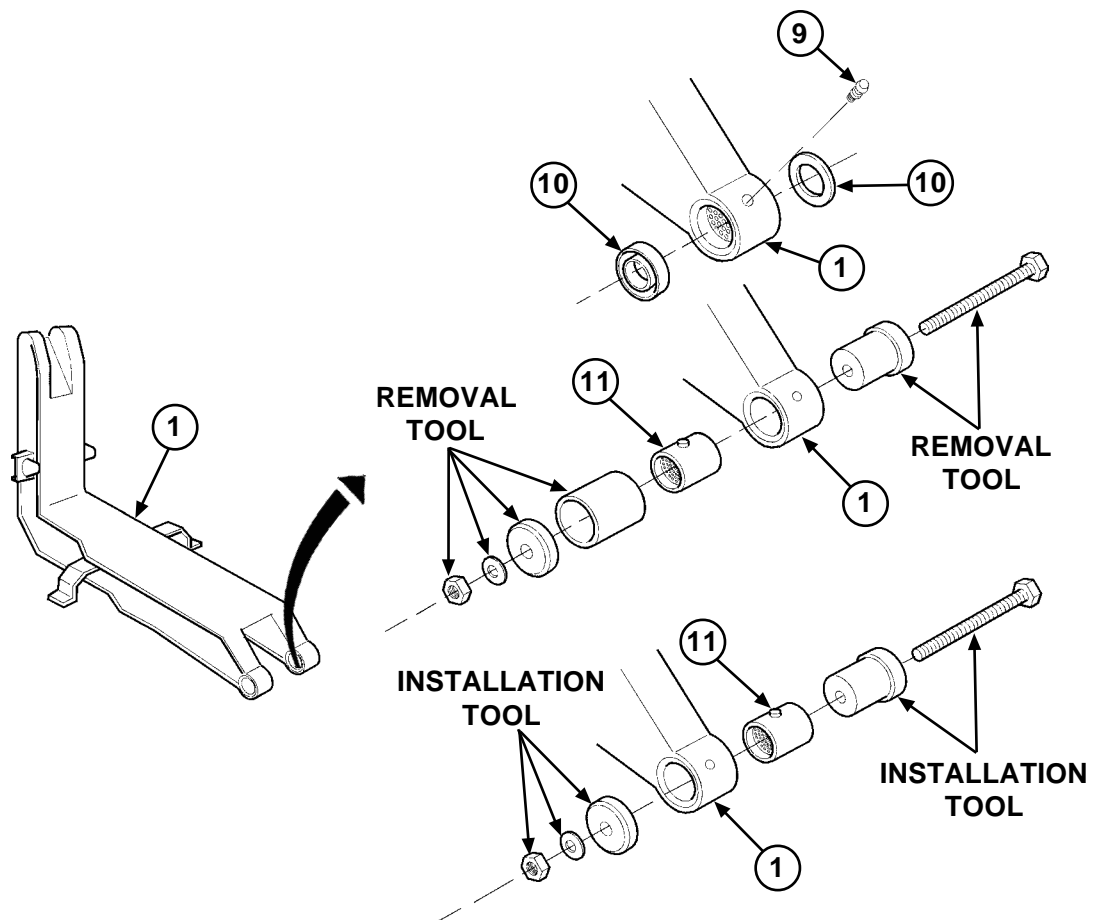
### b. Disassembly.

- (1) Remove two grease fittings (9) from hook arm (1).

#### NOTE

Seals are removed by prying out.

- (2) Remove four seals (10) from hook arm (1). Discard seals.
- (3) Using removal/installation tool, remove two bushings (11) from hook arm (1).



### c. Cleaning/Inspection.

- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.

**5-12. HOOK ARM REPAIR (continued).**

**d. Assembly.**

**WARNING**

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (1) Apply adhesive-sealant to outside surface of two bushings (11).

**NOTE**

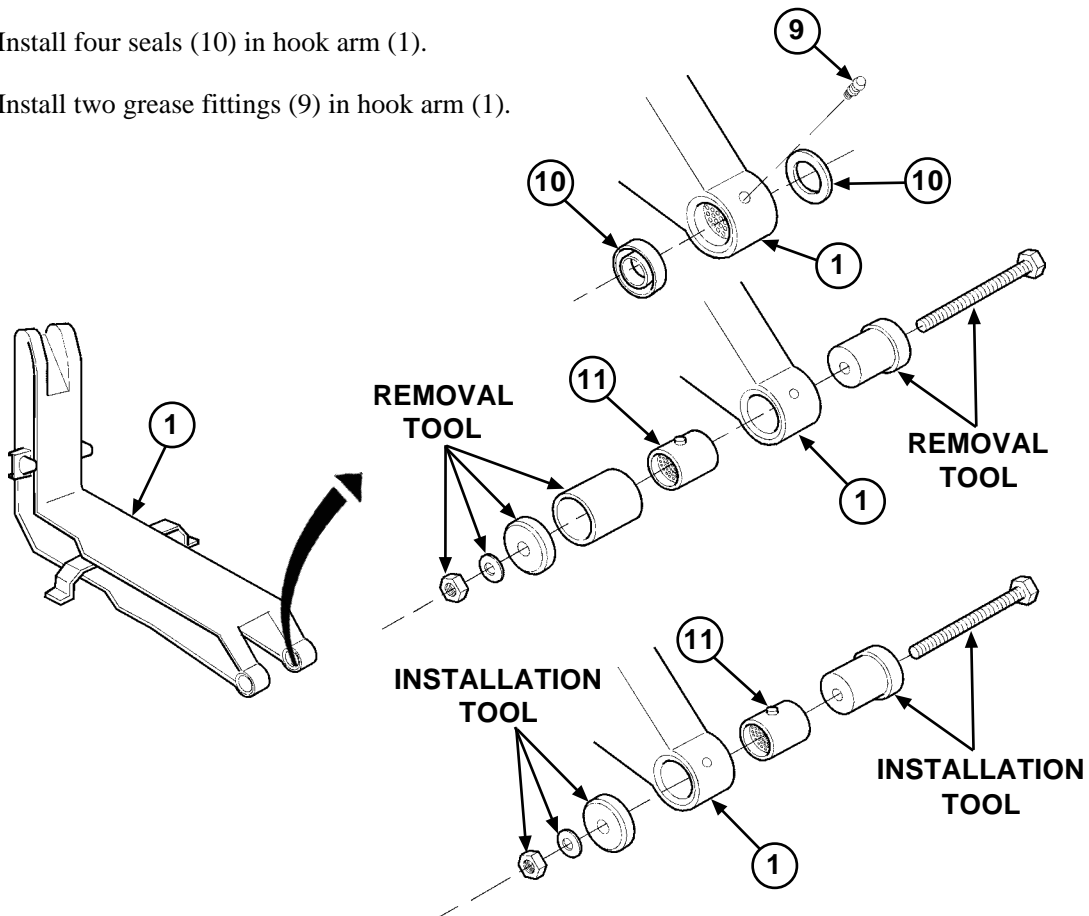
- Apply light coat of grease to threads of removal/installation tool before using.
- Make sure hole in bushings are aligned with hole for grease fitting in hook arm before installing.

- (2) Using removal/installation tool, install two bushings (11) in hook arm (1).

**NOTE**

Apply light coat of grease to outer edges of seals before installing.

- (3) Install four seals (10) in hook arm (1).
- (4) Install two grease fittings (9) in hook arm (1).



## 5-12. HOOK ARM REPAIR (continued).

### e. Installation.

#### WARNING

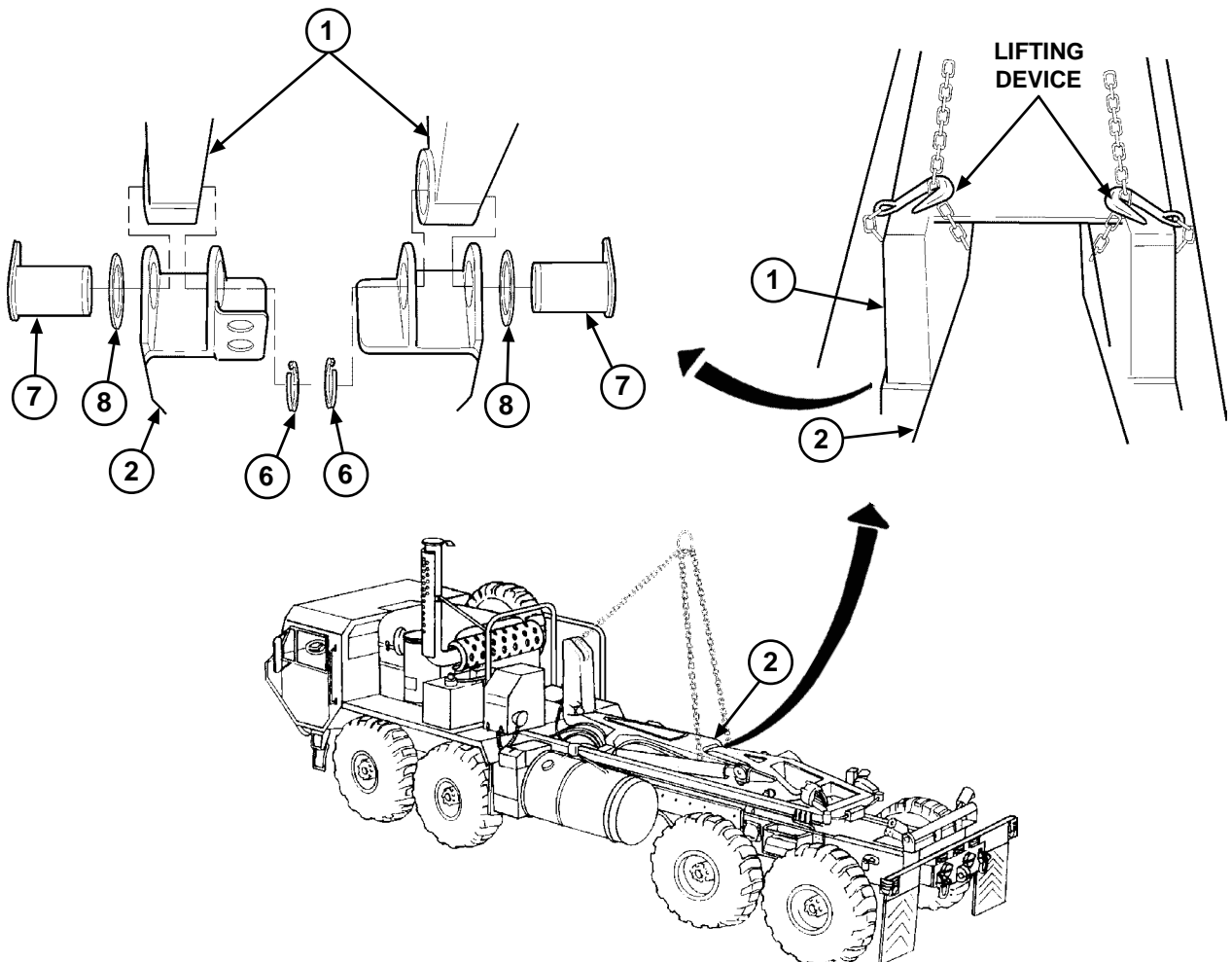
Hook arm weighs 1025 lb (465.35 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.

- (1) Attach lifting device to hook arm (1) as shown.
- (2) Position hook arm (1) on main frame (2) using a lifting device.

#### WARNING

Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.

- (3) Install two shims (8) and pins (7) in main frame (2) and hook arm (1) and secure with two new retaining rings (6).

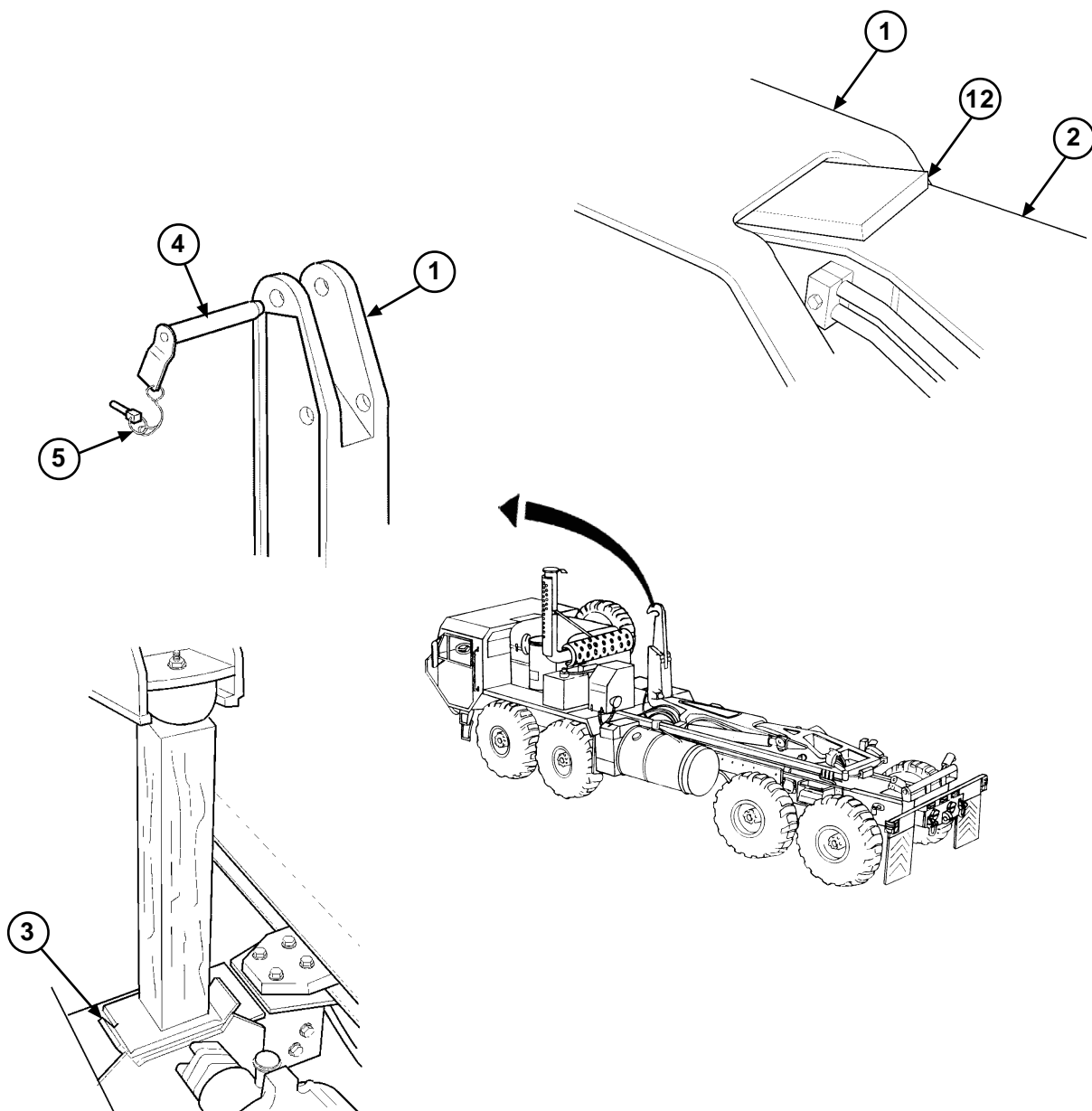


**5-12. HOOK ARM REPAIR (continued).**

**NOTE**

Spacer plate must be installed between hook arm and main frame to install hook arm hydraulic cylinders.

- (4) Raise hook arm (1) and install spacer plate (12) between hook arm (1) and main frame (2).
- (5) Remove lifting device from hook arm (1).
- (6) Remove lynch pin (5) and pin (4) from upper hole of hook arm (1).



**5-12. HOOK ARM REPAIR (continued).****WARNING**

**Hook arm and main frame weigh 1950 lb (885.30 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (7) Attach lifting device to hook arm (1) and main frame (2).
- (8) Raise hook arm (1) and main frame (2) using a lifting device, and install wooden block between main frame (2) and compression frame (3).
- (9) Remove lifting device from hook arm (1) and main frame (2).

***f. Follow-on Maintenance:***

- Install hook arm rubber bumpers (para 4-58).
- Install hook arm hoses (para 5-18).
- Install hook arm tubes (para 5-20).
- Install hook arm cylinders (para 5-30).
- Install hook (para 5-13).
- Install main frame cylinders (para 5-31).
- Install main frame manifolds (para 5-24).

**END OF TASK**

**5-13. HOOK REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

- Lifting Device, Minimum Capacity 200 lb (91 kg)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)

*Equipment Condition:*

- Wheels chocked (TM 9-2320-279-10)
- Engine turned off (TM 9-2320-279-10)

*Materials/Parts:*

- Compound, Antiseize (Item 10, Appendix E)
- Cotter Pin (Item 24, Appendix K)

**NOTE**

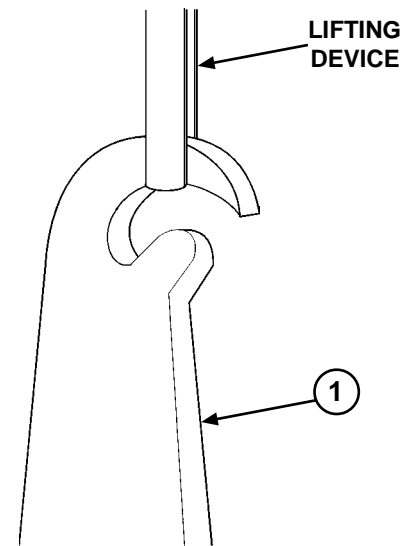
PLS and CBT LHS hooks are not interchangeable.

**a. Removal.**

**WARNING**

**Hook weighs 200 lb (91 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

- (1) Attach lifting device to support hook (1).
- (2) Remove snapper pin (2), washer (3) and retaining pin (4).
- (3) Remove cotter pin (5), two washers (6), pivot pin (7) and hook (1) from hook arm (8). Discard cotter pin.
- (4) Remove lifting device from hook (1).



**b. Installation.**

**WARNING**

**Hook weighs 200 lb (91 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

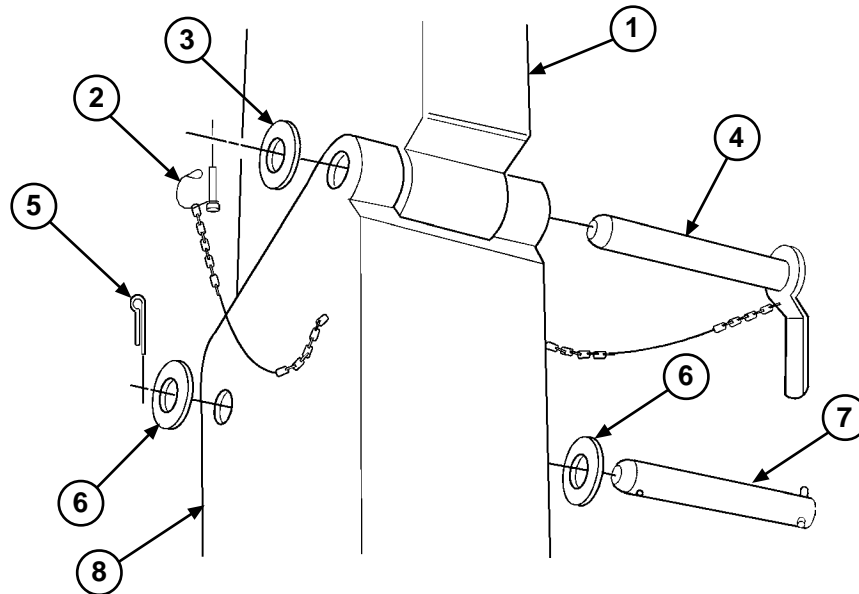
- (1) Attach lifting device to hook (1).

### 5-13. HOOK REPLACEMENT (continued).

#### WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (2) Apply antiseize compound to pivot pin (7).
- (3) Using lifting device, install hook (1) on hook arm (8) with pivot pin (7), two washers (6) and cotter pin (5).
- (4) Apply antiseize compound to retaining pin (4).
- (5) Install retaining pin (4), washer (3) and snapper pin (2) on hook (1).
- (6) Remove lifting device from hook (1).



#### **c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**5-14. COMPRESSION FRAME REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

- Lifting Device, Minimum Capacity 835 lb (379 kg)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wrench, Torque, 50-250 ft-lb (STW-3RCF)

*Personnel Required*

Two

*Equipment Condition*

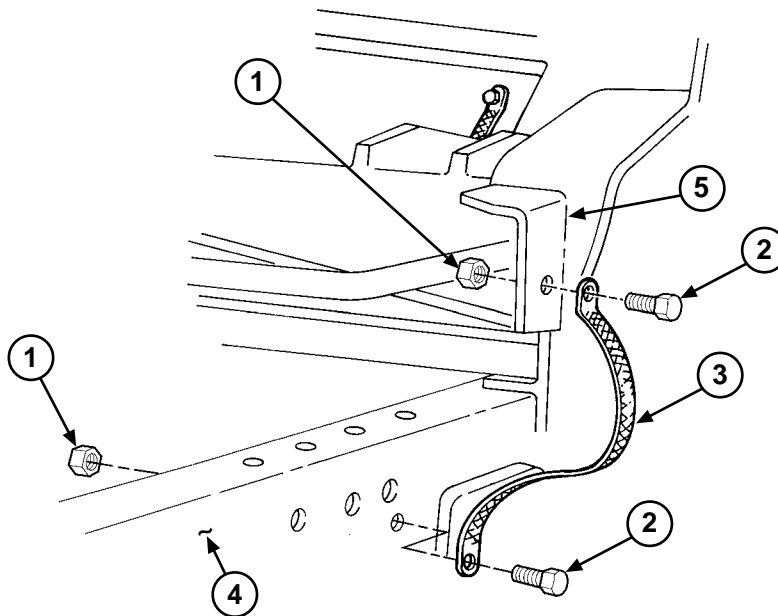
- Front BAP locks removed (para 4-57)
- Main LHLS harness removed (para 4-86)
- Compression frame hydraulic hoses removed (para 5-17)
- Winch (compression frame) hydraulic tubes removed (para 5-19)
- Rubber bumpers removed (para 4-58)
- Main frame removed (para 5-11)
- Main frame manifold removed (para 5-24)
- Main manifold support frame removed (para 5-15)

*Materials/Parts:*

- Adhesive, Loctite 271 (Item 4, Appendix E)
- Lubricating Oil (Item 20, Appendix E)
- Locknut (4) (Item 51, Appendix K)
- Locknut (6) (Item 56, Appendix K)
- Locknut (2) (Item 60, Appendix K)
- Lockwasher (4) (Item 26, Appendix K)
- Lockwasher (2) (Item 36, Appendix K)
- Lockwasher (2) (Item 74, Appendix K)
- Spring Washer (16) (Item 64, Appendix K)

**a. Removal.**

- (1) Remove two locknuts (1), screws (2), and ground strap (3) from frame (4) and compression frame (5). Discard locknuts.



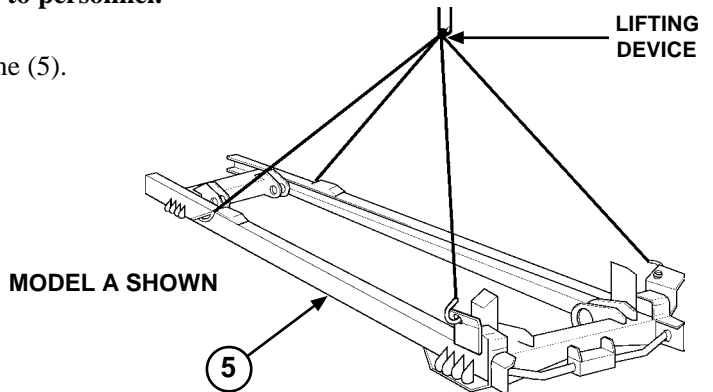


**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

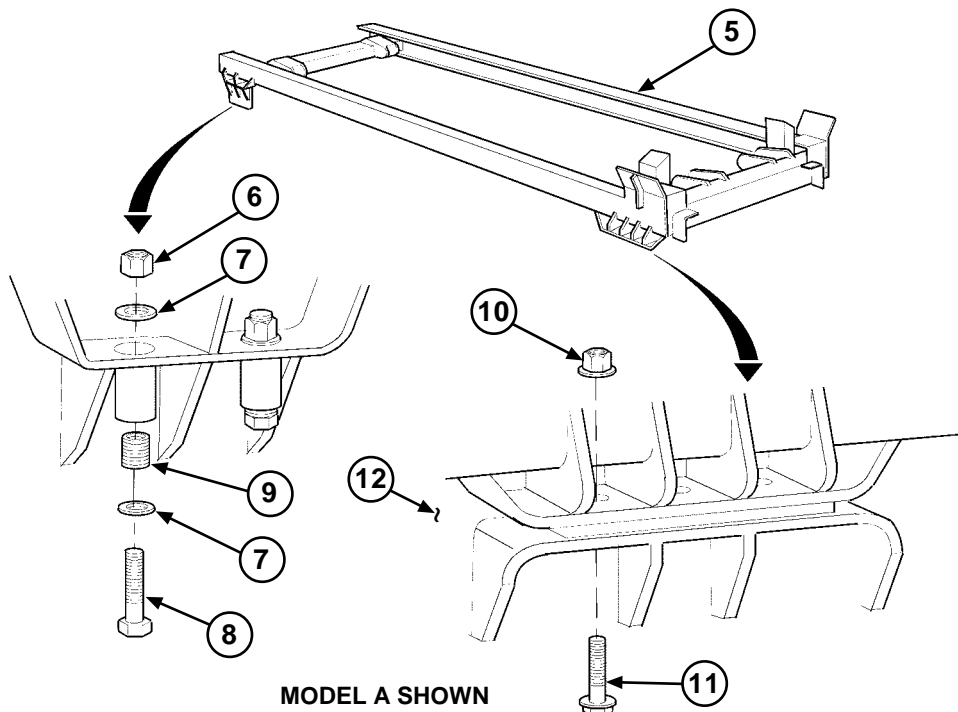
**WARNING**

**Compression frame weighs 835 lb (379 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

- (2) Attach lifting device to compression frame (5).

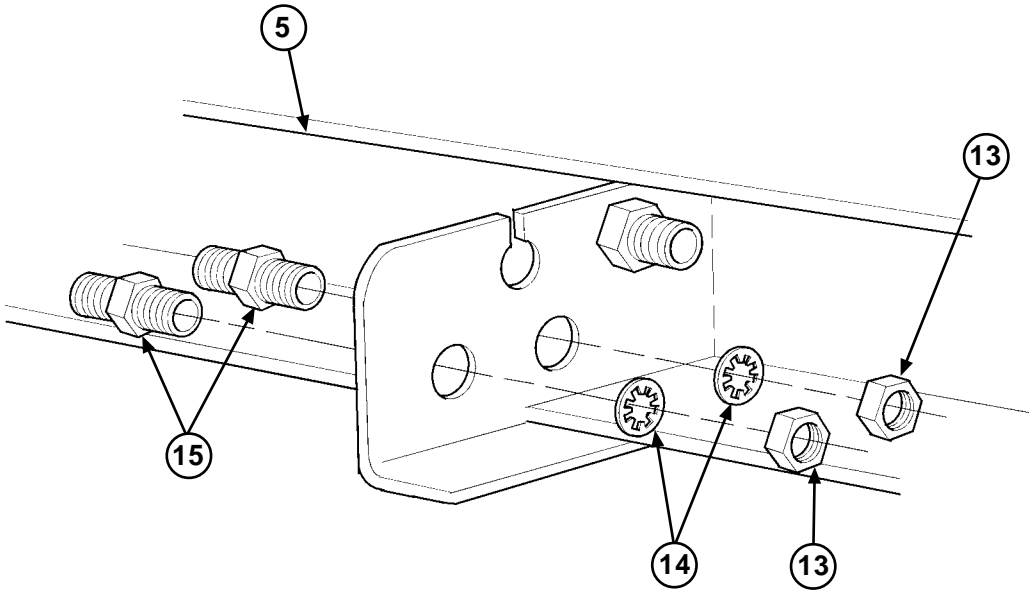


- (3) With the aid of an assistant, remove two locknuts (6), four washers (7), two screws (8), and eight spring washers (9) from compression frame (5). Discard locknuts.
- (4) With the aid of an assistant, remove three locknuts (10) and rear screws (11) from compression frame (5). Discard locknuts.
- (5) Repeat Steps 2 and 3 for right side of vehicle (12).
- (6) With aid of an assistant and using lifting device, remove compression frame (5) from vehicle (12).
- (7) Remove lifting device from compression frame (5).

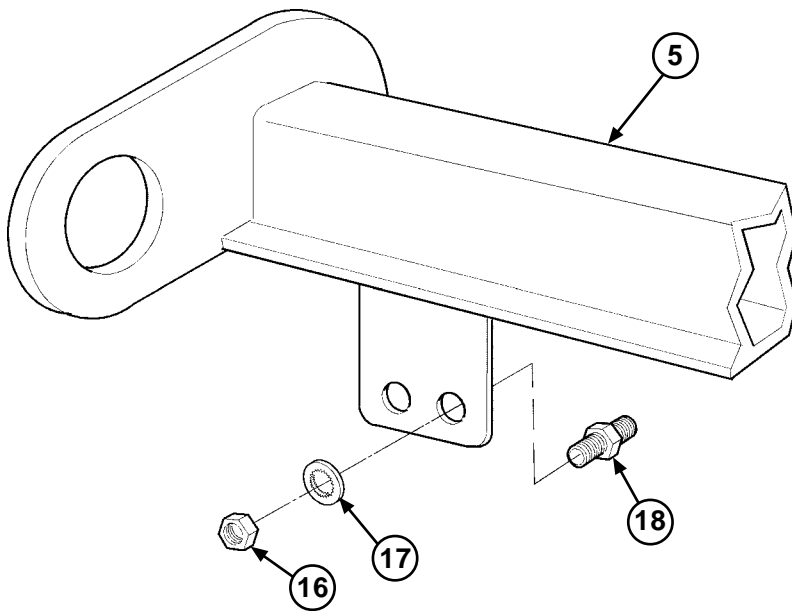


**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

- (8) Remove two nuts (13), lockwashers (14) and adapters (15) from front right of compression frame (5). Discard lockwashers.
- (9) Repeat Steps 7 and 8 for front left side of compression frame (5).



- (10) Remove two nuts (16), lockwashers (17), and adapters (18) from rear of compression frame (5). Discard lockwashers.

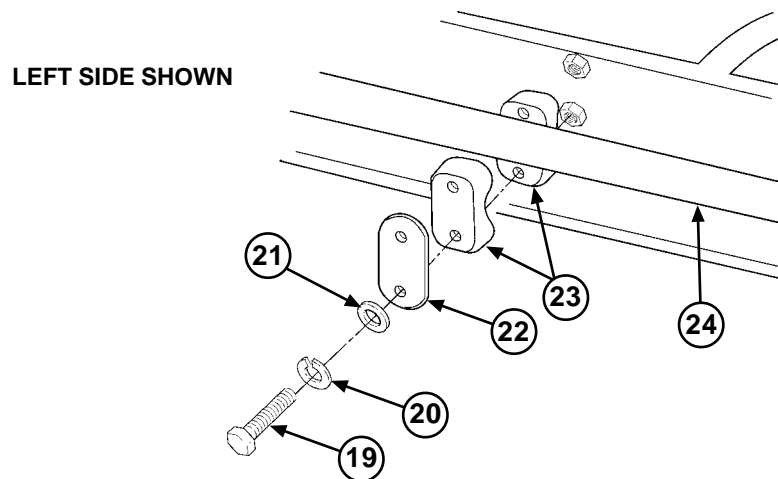


## 5-14. COMPRESSION FRAME REPLACEMENT (continued).

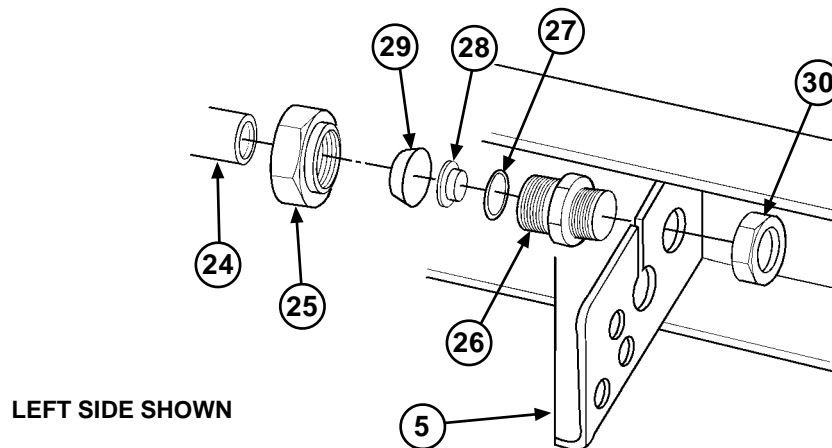
### NOTE

Left-side and right-side clamps are removed the same way. Left side is shown.

- (11) Remove eight screws (19) and lockwashers (20), washers (21), four cover plates (22) and eight tube clamp halves (23) from left-side compression frame tube (24). Discard lockwashers.



- (12) Remove left-side compression frame nut (25) and left-side compression frame tube (24) from adapter (26).
- (13) Remove preformed packing (27), spacer (28), compression ring (29) and nut (25) from left-side compression frame tube (24). Discard preformed packing.
- (14) Remove nut (30) and adapter (26) from compression frame (5).
- (15) Repeat Steps 11 through 14 for right side.

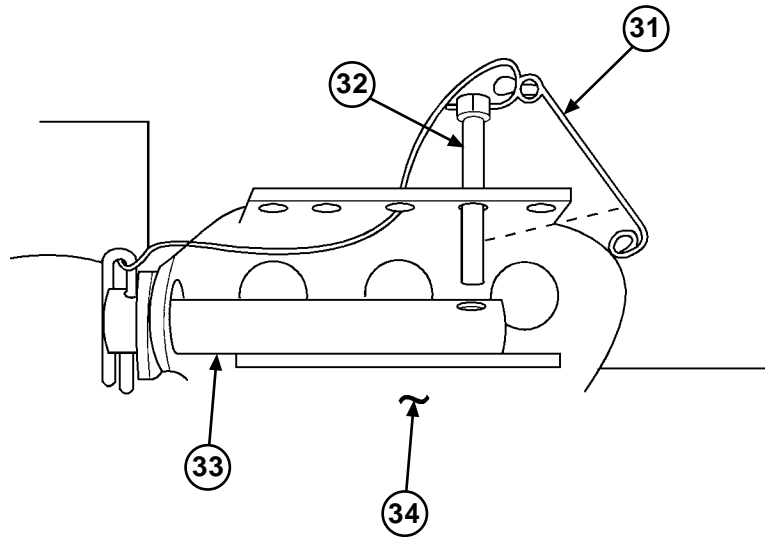


**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

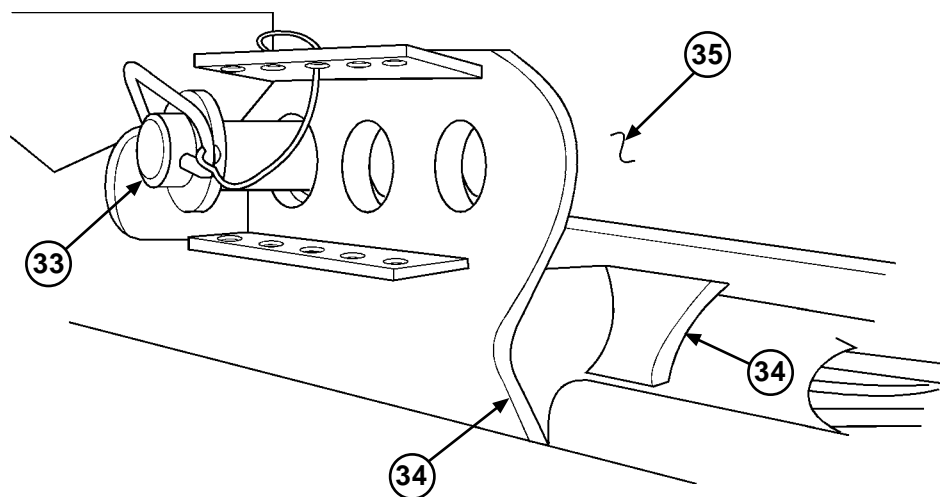
**NOTE**

Both hitch pins are installed the same way. Right side is shown.

- (16) Remove safety pin (31) from lockpin (32).
- (17) Remove lockpin (32) from hitch pin (33).
- (18) Remove hitch pin (33) from bracket (34).

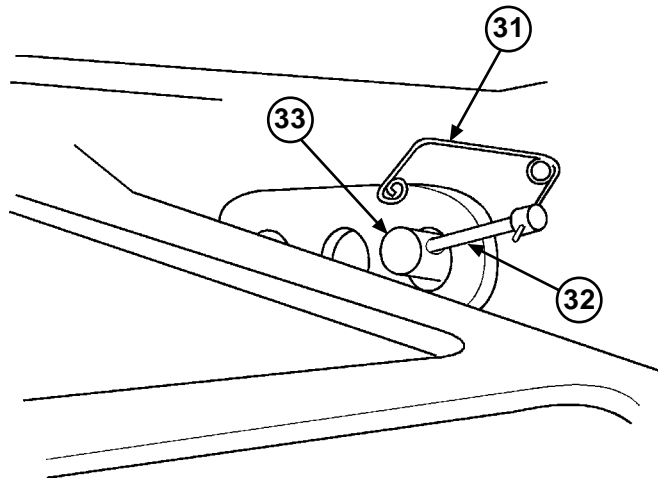


- (19) Install hitch pin (33) through bracket (34) and flatrack main rail (35).



**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

- (20) Install lockpin (32) in hitch pin (33).
- (21) Install safety pin (31) in lockpin (32).
- (22) Repeat Steps 16 through 21 for left side.



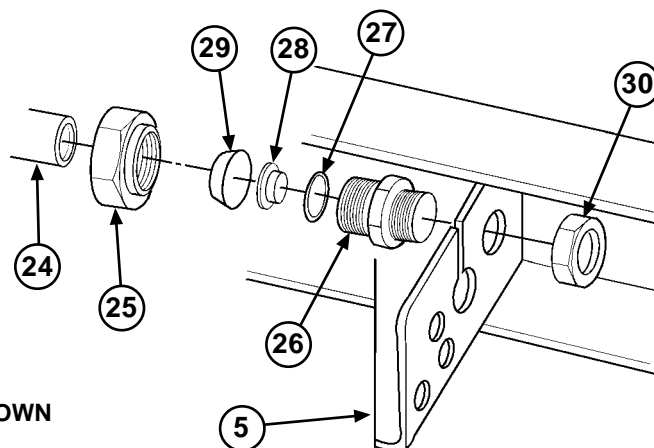
**b. Installation.**

- (1) Install adapter (26) with nut (30) in compression frame (5).

**CAUTION**

**Ensure correct preformed packing is installed on fitting or damage to packing will result.**

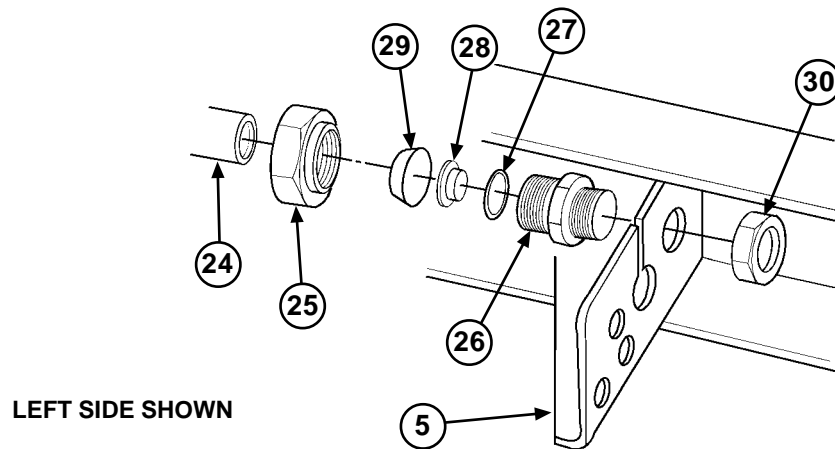
- (2) Apply lubricating oil to preformed packing (27).
- (3) Install nut (25), compression ring (29), spacer (28) and preformed packing (27) on left-side compression frame tube (24).



**LEFT SIDE SHOWN**

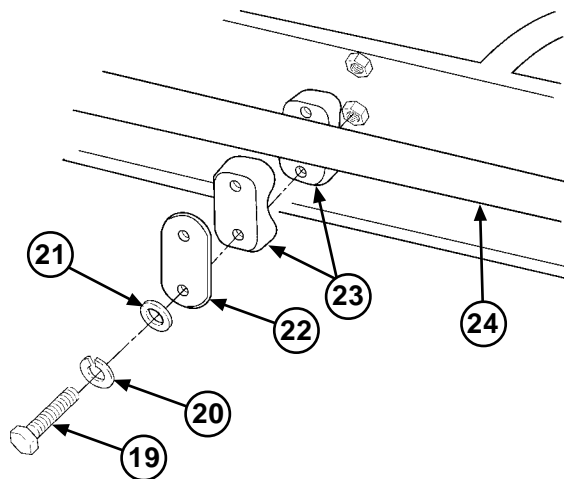
**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

- (4) Install left-side compression frame tube (24) in adapter (26) and slide preformed packing (27) with spacer (28) and compression ring (29) into adapter (26).
- (5) Install nut (25) on adapter (26).



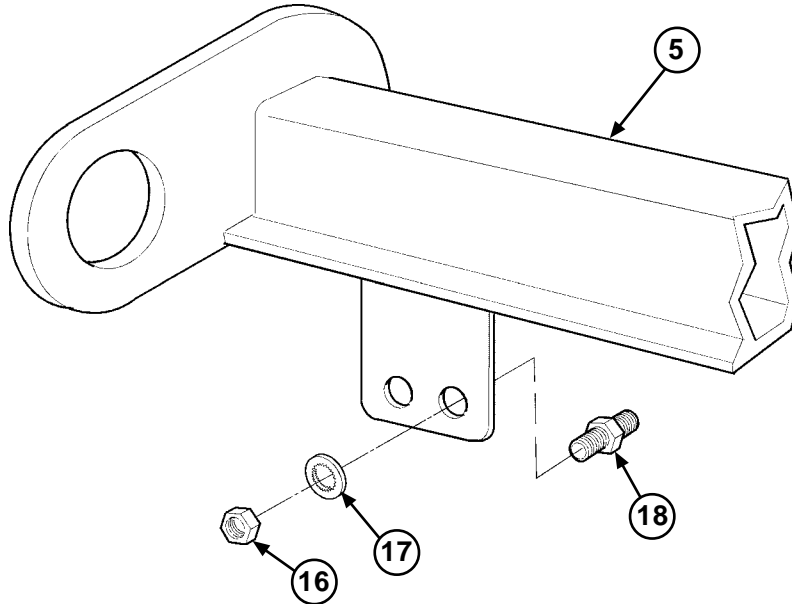
- (6) Install eight tube clamp halves (23) and four cover plates (22) on left-side compression frame tube (24) with eight washers (21), lockwashers (20) and screws (19).

LEFT SIDE SHOWN



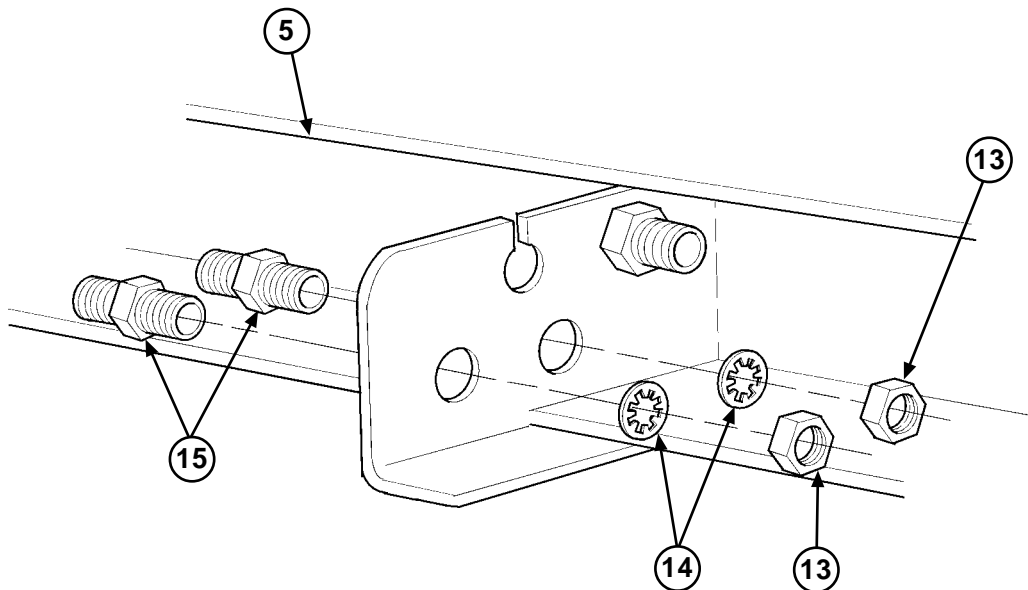
**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

- (7) Install two adapters (18) on compression frame (5) with two nuts (16) and new lockwashers (17).



- (8) Install two adapters (15) on front right of compression frame (5) with new lockwashers (14) and nuts (13).

- (9) Repeat Steps 2 and 3 for front left side of compression frame (5).

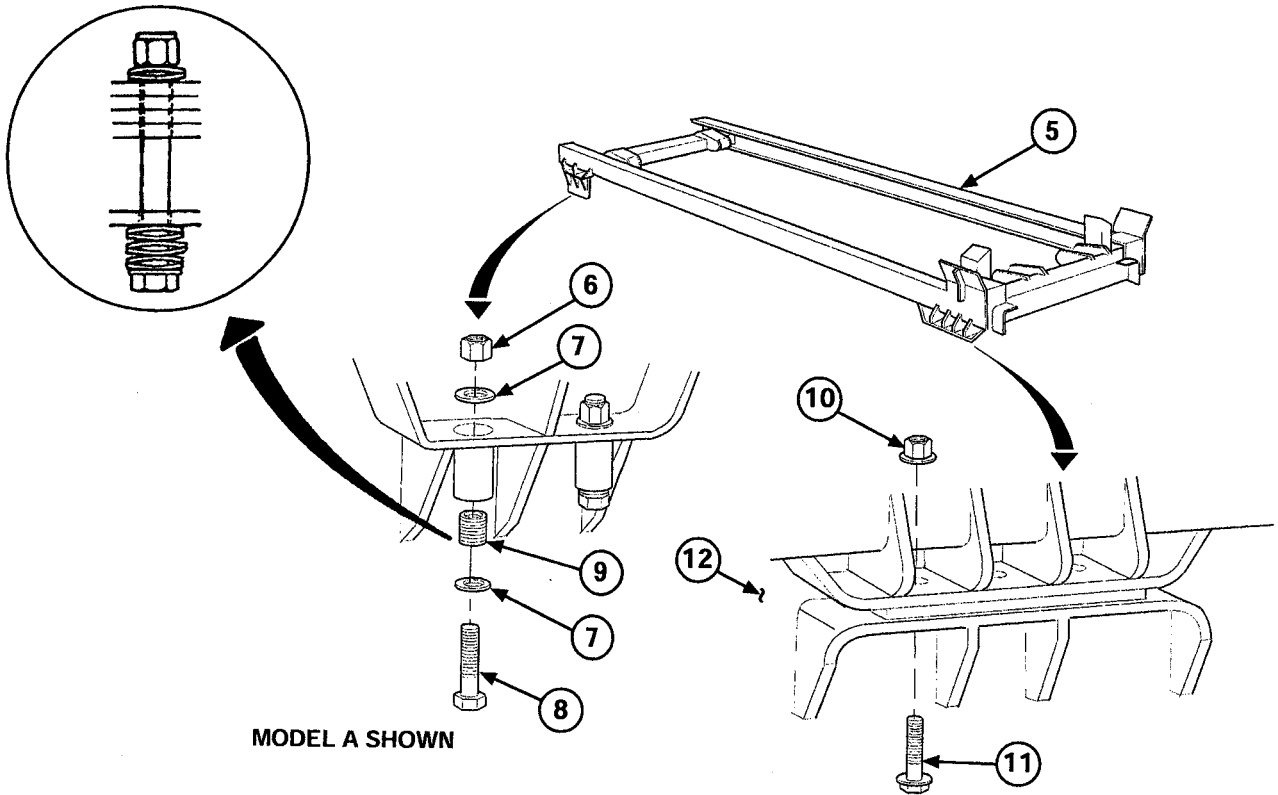
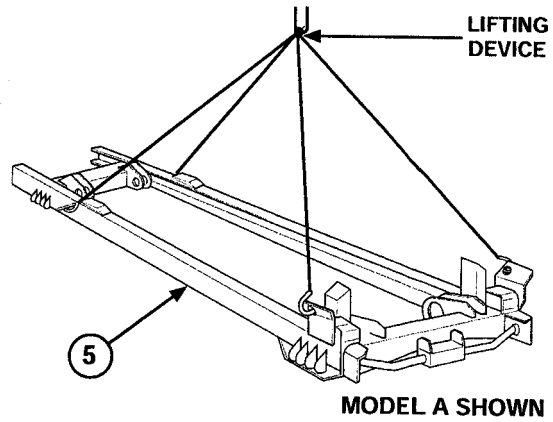


**5-14. COMPRESSION FRAME REPLACEMENT (continued).**

**WARNING**

**Compression frame weighs 835 lb (379 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (10) Attach lifting device to compression frame (5).
- (11) With the aid of an assistant and using lifting device, install compression frame (5) on vehicle (12).
- (12) With the aid of an assistant, install three rear screws (11) in compression frame (5) with new locknuts (10). Tighten locknuts to 410 lb-ft (556 N•m).





## 5-14. COMPRESSION FRAME REPLACEMENT (continued).

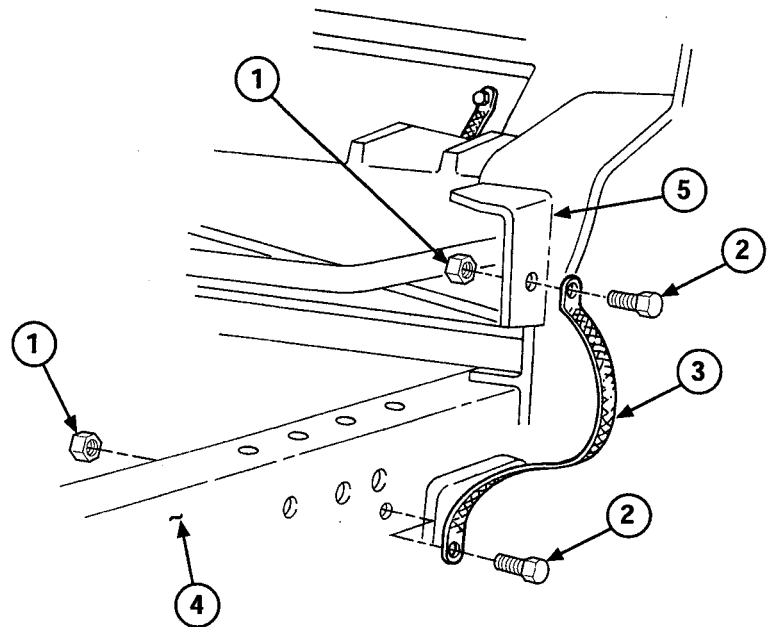
### **WARNING**

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

### **NOTE**

Install spring washers in pairs with no two pairs in the same direction.

- (12.1) Apply thread lock sealing compound to threads of two screws (8).
- (13) With the aid of an assistant, install eight spring washers (9), two front screws (8), four washers (7), and new locknuts (6) in compression frame (5). Tighten locknuts to 75 lb-ft (102 N•m).
- (14) Repeat Steps 12 through 13 for right side of vehicle (12).
- (15) Remove lifting device from compression frame (5).
- (16) Install ground strap (3) on frame (4) and compression frame (5) with two screws (2) and new locknuts (1).



### **c. Follow-on Maintenance:**

- Install main manifold support frame (para 5-15).
- Install diverter manifold (para 5-24).
- Install main frame (para 5-11).
- Install rubber bumpers (para 4-58).
- Install winch (compression frame) hydraulic tubes (para 5-19).
- Install compression frame hydraulic hoses (para 5-17).
- Install main LHS harness (para 4-86).
- Install front BAP locks (para 4-57).

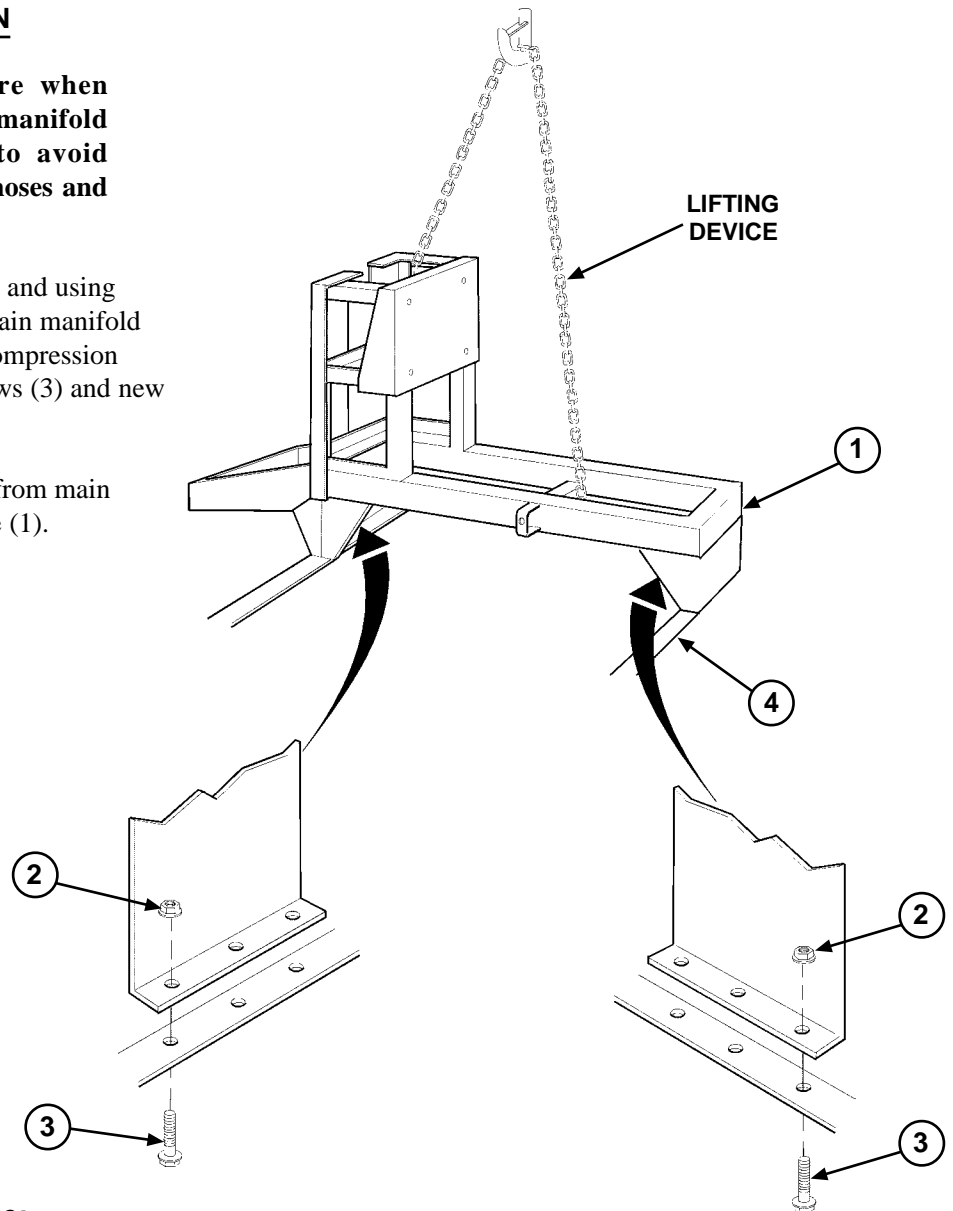


## 5-15. MAIN MANIFOLD SUPPORT FRAME REPLACEMENT (continued).

### CAUTION

Use extreme care when installing main manifold support frame to avoid damage to loose hoses and wire harnesses.

- (2) With aid of an assistant and using lifting device, install main manifold support frame (1) on compression frame (4) with six screws (3) and new locknuts (2).
- (3) Remove lifting device from main manifold support frame (1).



### **c. Follow-on Maintenance:**

- Install tool storage bracket (para 4-59).
- Install main manifold block (para 5-29).
- Install workstation assembly (para 4-48).
- Install main junction box (para 4-61).
- Install hydraulic cabinet cover (para 4-60).
- Install right-hand linking harness (para 4-88).
- Install left-hand linking harness (para 4-80).
- Install hand-held spotlight harness (para 4-77).
- Install hook arm down proximity switch (para 4-94).

**END OF TASK**

**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools*

- Tool Kit, General Mechanics (SC 5180-90-N26)
- Cap and Plug Set (Item 5, Appendix B)
- Torch, Propane (Item 29, Appendix B)
- Wrench, Torque (0-60 N•m (Item 30, Appendix B)
- Lifting Device, Minimum Capacity 150 lbs. (68 kg)
- Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance Common No. 1 (SC 4910-95-CL-A74)

*Materials/Parts - (Cont.)*

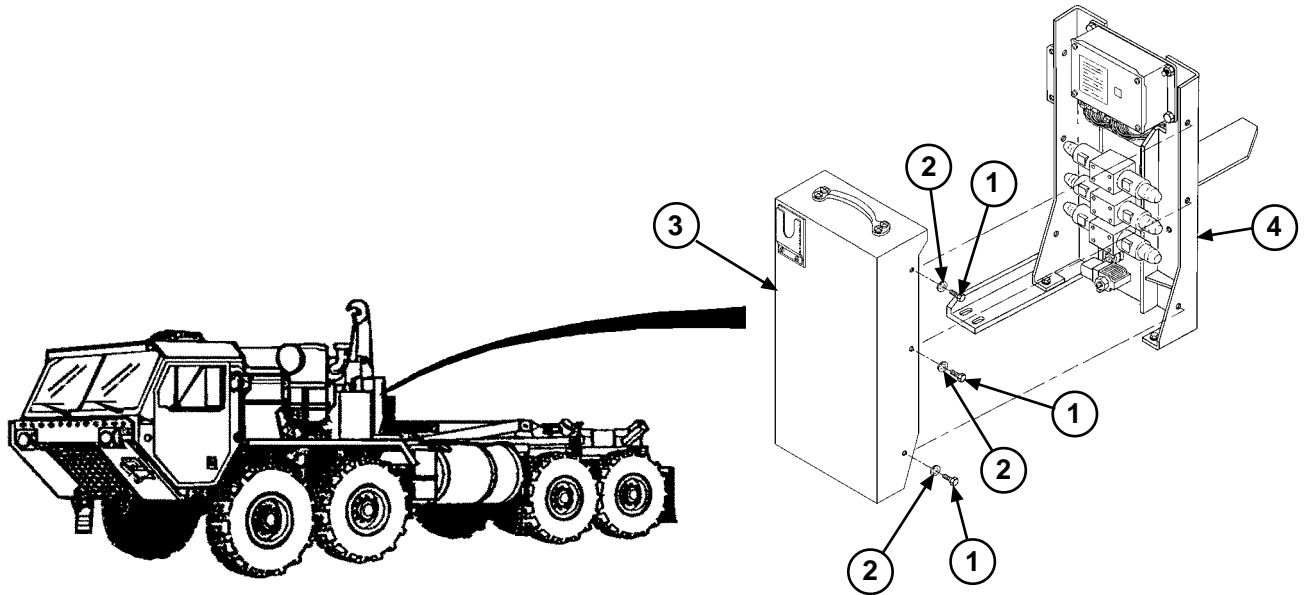
- Packing, Preformed (6) (Item 81, Appendix K)
- Parts Kit, Seal (Item 44.1, Appendix K)
- Preformed Packing Kit (Item 112, Appendix K)

*Equipment Condition*

- Engine OFF (TM 9-2320-279-10)
- Wheels chocked (TM 9-2320-279-10)
- Batteries disconnected (TM 9-2320-279-20)

*Materials/Parts*

- Oil, Hydraulic (Item 21, Appendix E)
- Sealing Compound (Item 26, Appendix E)
- Tags, Identification (Item 24, Appendix E)
- Locknut (4), (Item 60, Appendix K)
- Locknut (Item 63, Appendix K)
- Locknut (6) (Item 48.1, Appendix K)
- Lockwasher (8) (Item 48.2, Appendix K)
- Lockwasher (8) (Item 114, Appendix K)
- Packing, Preformed (4), (Item 78, Appendix K)
- Packing, Preformed (2) (Item 79, Appendix K)

**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BACKET REPLACEMENT  
(MODEL B ONLY) (continued).****a. Removal.****NOTE**

Only remove center screw on engine side of LHS main junction box cover.

(1) Remove four screws (1), lockwashers (2), and cover (3) from bracket (4). Discard lockwashers.

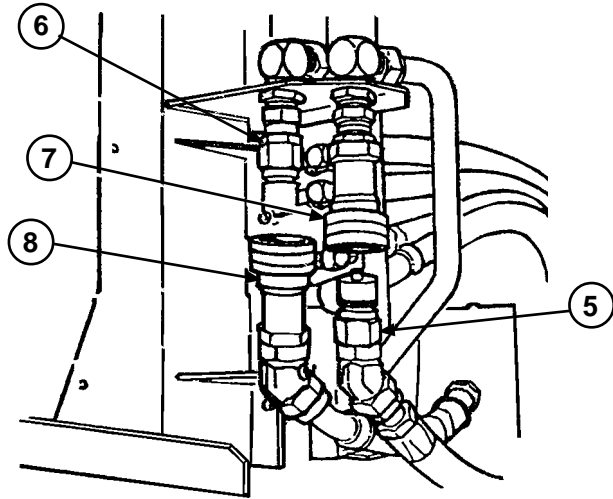
**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

**WARNING**

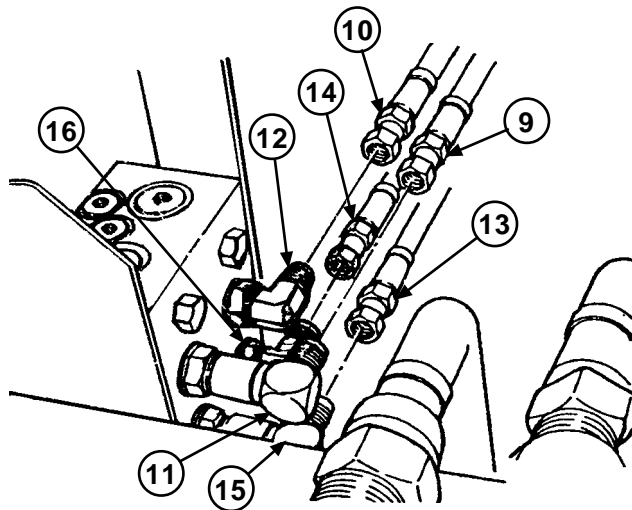
The LHS hydraulic system operates at oil pressures up to 1,725 psi (11 895 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury or death to personnel.

**NOTE**

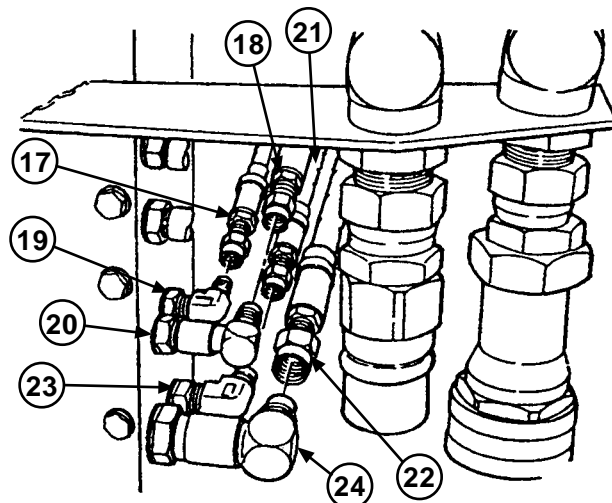
- Tag and mark wires prior to removal.
- Position drain pan under bracket.
- Cap and plug all hoses, tubes, and fittings after removal.



- (2) Remove couplings (5 and 6) from fittings (7 and 8).
- (3) Remove hose (9) and hose (10) from elbows (11 and 12).
- (4) Remove hose (13) and hose (14) from elbows (15 and 16).

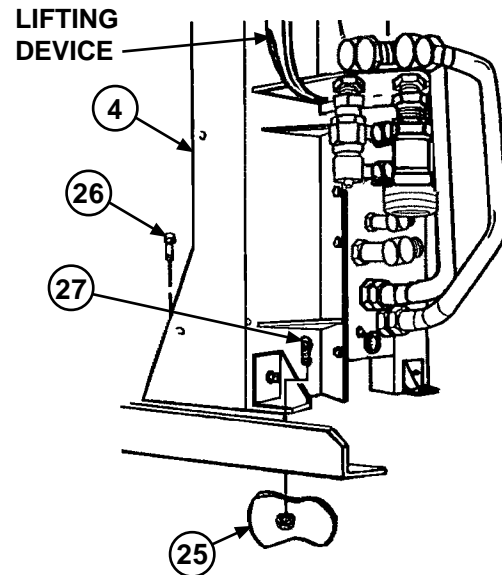


- (5) Remove hose (17) and hose (18) from elbows (19 and 20).
- (6) Remove hose (21) and hose (22) from elbows (23 and 24).



## 5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).

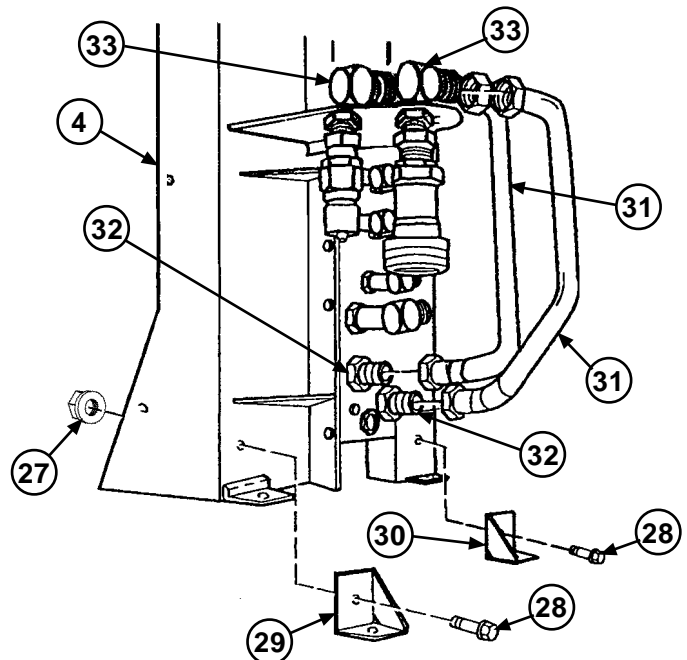
- (7) Remove four locknuts (25) and two screws (26 and 27) from bracket assembly (4). Discard locknuts.



### **WARNING**

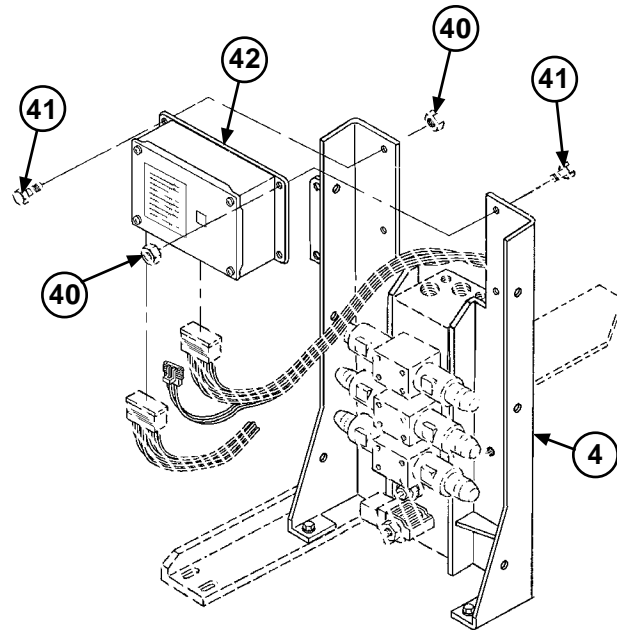
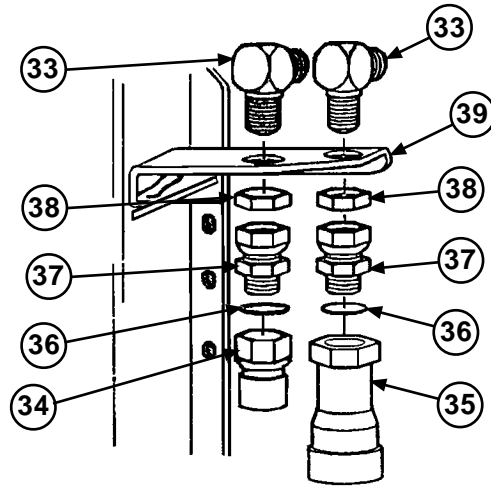
**Bracket weighs 120 lbs. (54 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

- (8) Remove bracket (4) from vehicle.
- (9) Position bracket (4) on clean work surface.
- (10) Remove two locknuts (27), screws (28), and brackets (29 and 30). Discard locknuts.
- (11) Remove oil tubes (31) from fittings (32) and elbows (33).



**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

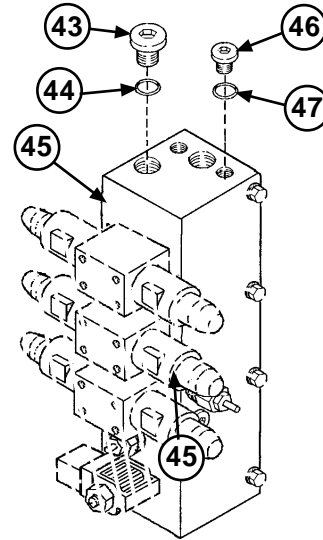
- (12) Remove couplings (34 and 35) and two preformed packings (36) from fittings (37). Discard preformed packings.
- (13) Remove two nuts (38) and elbows (33) from bracket (39).
- (14) Remove four locknuts (40), screws (41), and digital junction box (42) from LHS manifold assembly (4). Discard locknuts.



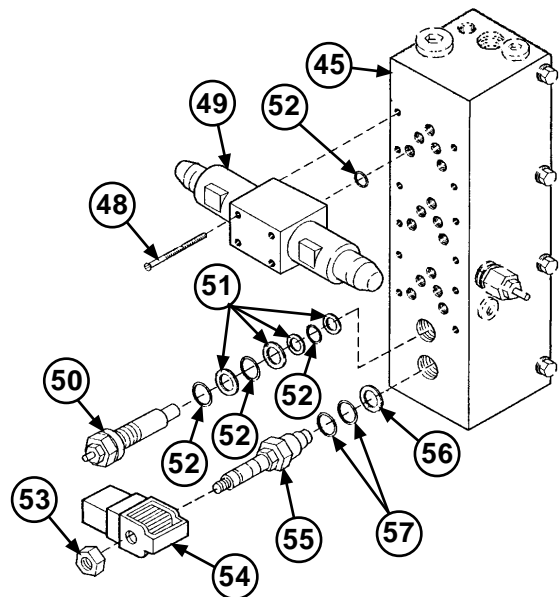


**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BACKET REPLACEMENT (MODEL B ONLY) (continued).**

- (15) Remove plug (43) and preformed packing (44) from hydraulic manifold (45). Discard preformed packings.
- (16) Remove plug (46) and preformed packing (47) from hydraulic manifold (45). Discard preformed packings.



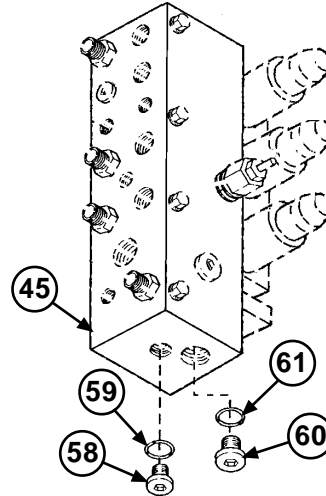
- (17) Remove four screws (48), solenoid valve (49), and four preformed packings (52) from hydraulic manifold (45). Discard preformed packings.
- (18) Repeat step (17) for remaining two solenoid valves.
- (19) Remove safety relief valve (50), four back-up rings (51), and three preformed packings (52). Discard back-up rings and preformed packings.
- (20) Remove locknut (53), electrical coil (54), solenoid valve (55), back-up ring (56), and two preformed packings (57). Discard preformed packings.



**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

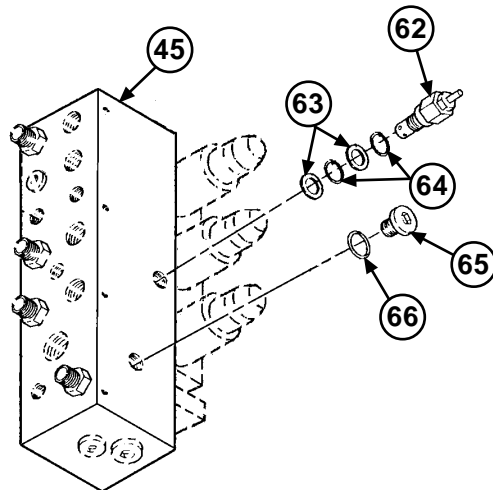
(21) Remove plug (58) and preformed packing (59) from hydraulic manifold (45).  
Discard preformed packing.

(22) Remove plug (60) and preformed packing (61) from hydraulic manifold (45).  
Discard preformed packing.



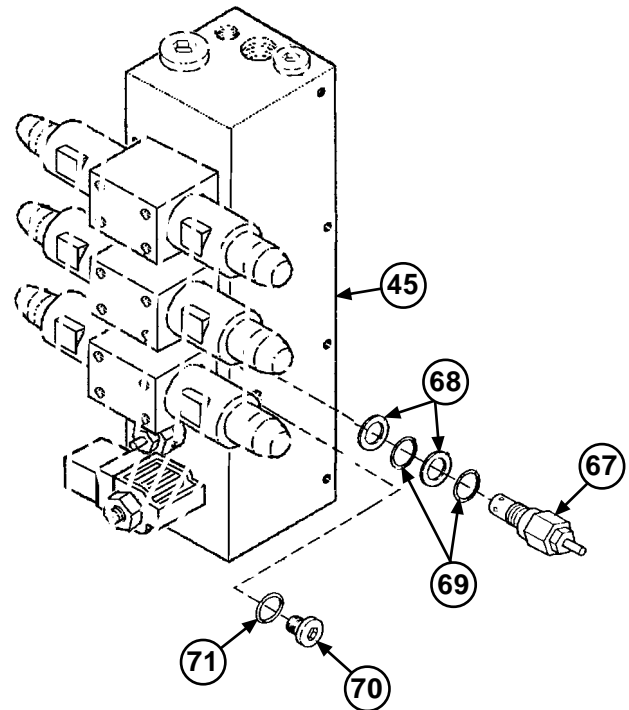
(23) Remove safety relief valve (62), two back-up rings (63), and two preformed packings (64) from hydraulic manifold (45).  
Discard preformed packings and back-up rings.

(24) Remove plug (65) and preformed packing (66) from hydraulic manifold (45).  
Discard preformed packing.



**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT  
(MODEL B ONLY) (continued).**

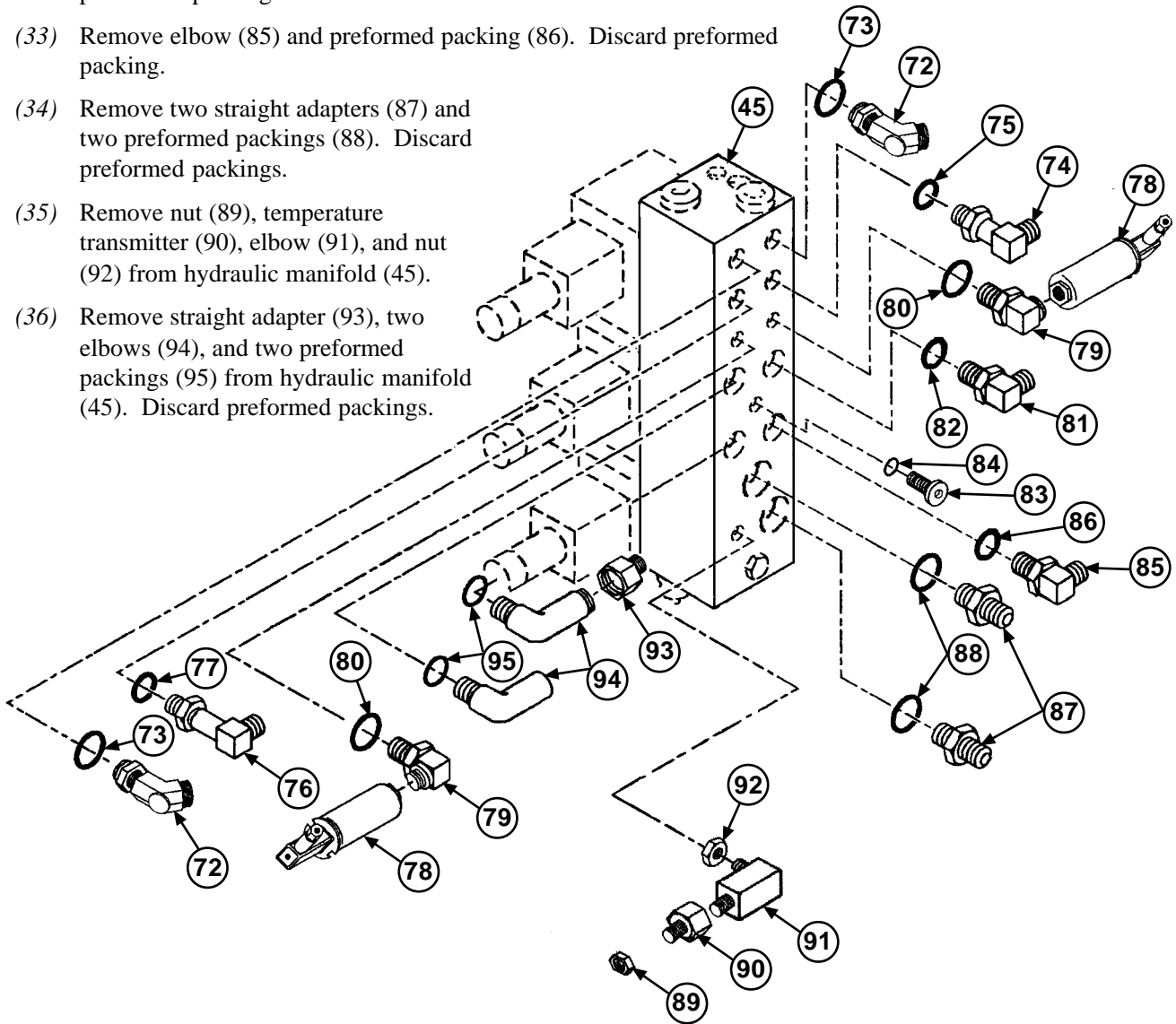
- (25) Remove safety relief valve (67), two back-up rings (68), and two preformed packings (69) from hydraulic manifold (45). Discard back-up rings and preformed packings.



- (26) Remove plug (70) and preformed packing (71) from hydraulic manifold (45). Discard preformed packing.

**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

- (27) Remove two 45-degree elbows (72) and two preformed packings (73) from hydraulic manifold (45). Discard preformed packings.
- (28) Remove elbow (74) and preformed packing (75) from hydraulic manifold (45). Discard preformed packing.
- (29) Remove elbow (76) and preformed packing (77) from hydraulic manifold (45). Discard preformed packing.
- (30) Remove two pressure transducers (78), two elbows (79), and two preformed packings (80) from hydraulic manifold (45). Discard preformed packings.
- (31) Remove elbow (81) and preformed packing (82) from hydraulic manifold (45). Discard preformed packing.
- (32) Remove hydraulic plug (83) and preformed packing (84) from hydraulic manifold (45). Discard preformed packing.
- (33) Remove elbow (85) and preformed packing (86). Discard preformed packing.
- (34) Remove two straight adapters (87) and two preformed packings (88). Discard preformed packings.
- (35) Remove nut (89), temperature transmitter (90), elbow (91), and nut (92) from hydraulic manifold (45).
- (36) Remove straight adapter (93), two elbows (94), and two preformed packings (95) from hydraulic manifold (45). Discard preformed packings.



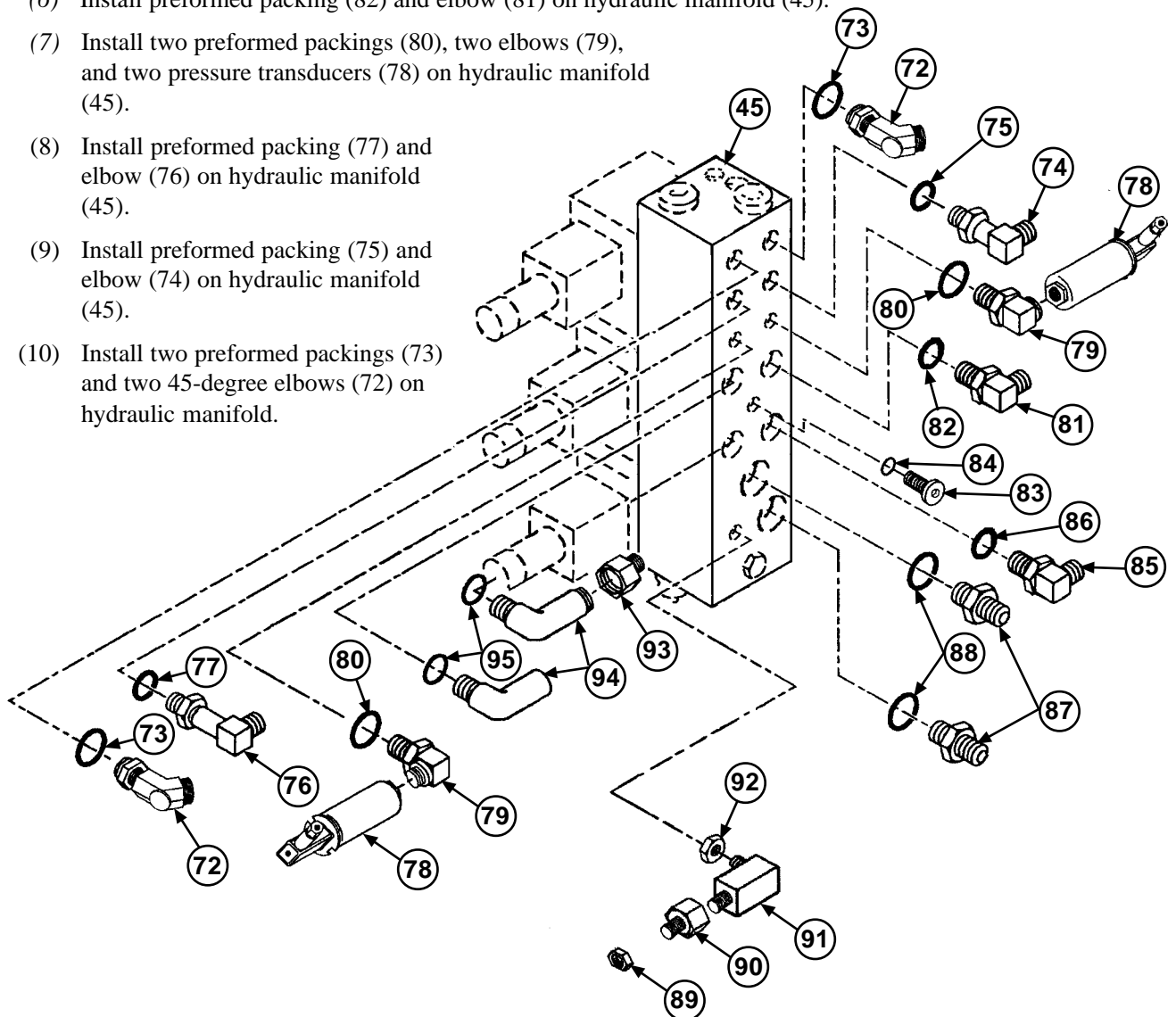
**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

**b. Installation.**

**NOTE**

Apply hydraulic oil to all preformed packings prior to installation.

- (1) Install two preformed packings (95), two elbows (94), and straight adapter (93) on hydraulic manifold (45).
- (2) Install nut (92), temperature transmitter (90), elbow (91), and nut (89) on hydraulic manifold (45). Tighen nuts.
- (3) Install two preformed packings (88) and two straight adapter (87) on hydraulic manifold (45).
- (4) Install preformed packing (86) and elbow (85) on hydraulic manifold (45).
- (5) Install preformed packing (84) and hydraulic plug (83) on hydraulic manifold (45).
- (6) Install preformed packing (82) and elbow (81) on hydraulic manifold (45).
- (7) Install two preformed packings (80), two elbows (79), and two pressure transducers (78) on hydraulic manifold (45).
- (8) Install preformed packing (77) and elbow (76) on hydraulic manifold (45).
- (9) Install preformed packing (75) and elbow (74) on hydraulic manifold (45).
- (10) Install two preformed packings (73) and two 45-degree elbows (72) on hydraulic manifold.



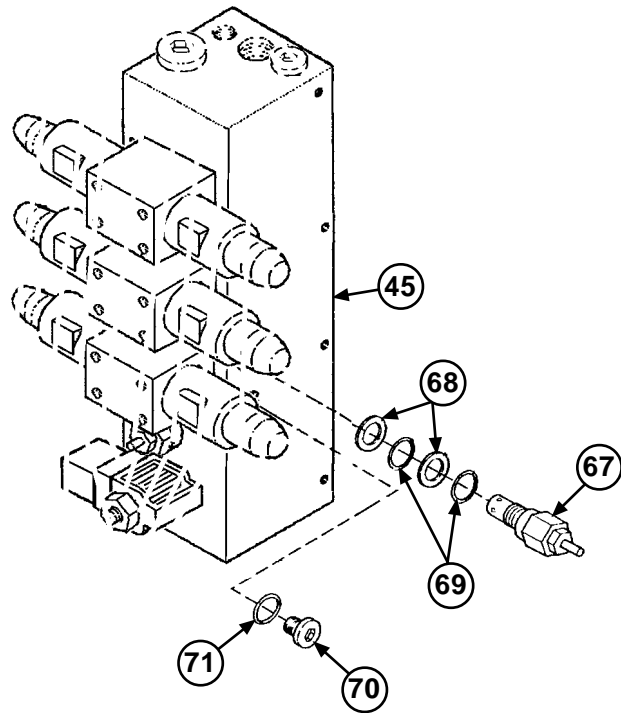
**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT  
(MODEL B ONLY) (continued).**

**NOTE**

Apply hydraulic oil to all preformed packings prior to installation.

- (11) Install preformed packing (71) and plug (70) on hydraulic manifold (45).

- (12) Install two preformed packings (69), two back-up rings (68), and safety relief valve (67) on hydraulic manifold (45).

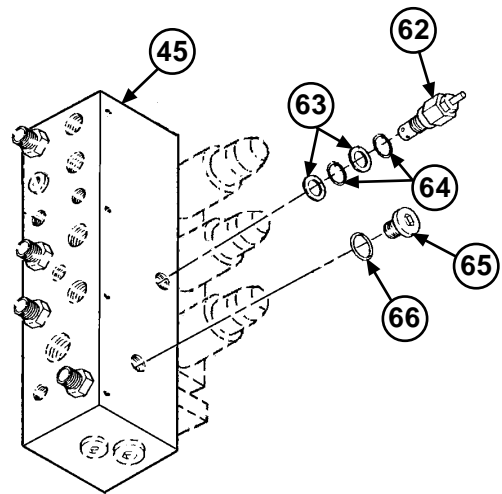


**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

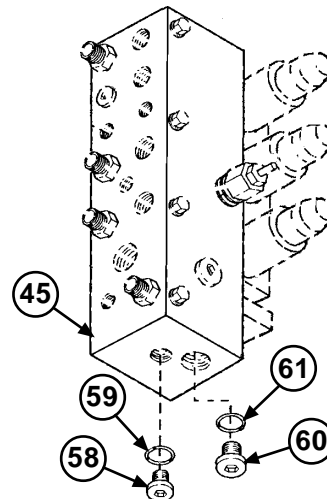
**NOTE**

Apply hydraulic oil to all preformed packings prior to installation.

- (13) Install preformed packing (66) and plug (65) on hydraulic manifold (45).
- (14) Install two preformed packings (64), two back-up rings (63), and safety relief valve (62) on hydraulic manifold (45).

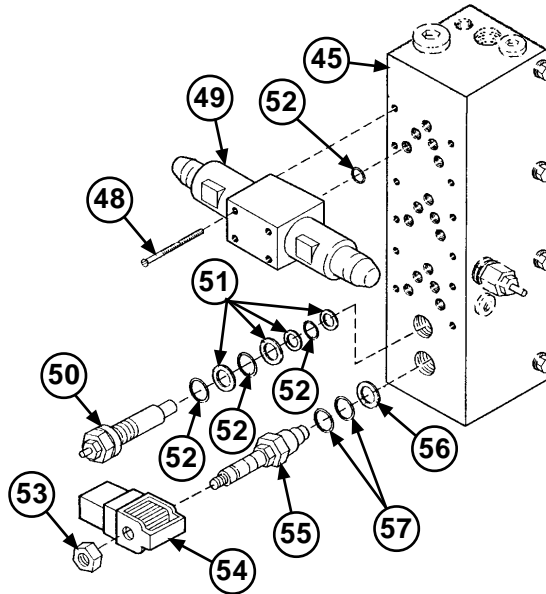


- (15) Install preformed packing (61) and plug (60) on hydraulic manifold (45).
- (16) Install preformed packing (59) and plug (58) on hydraulic manifold (45).

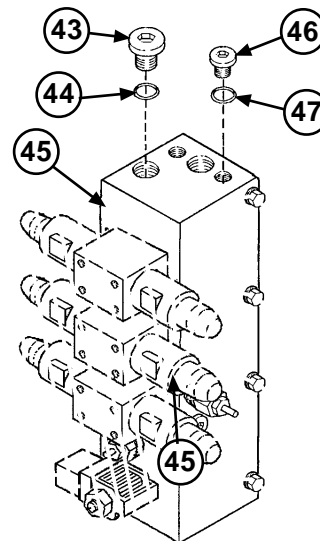


**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

- (17) Install two preformed packings (57), back-up ring (56), solenoid valve (55), electrical coil (54), and locknut (53) on hydraulic manifold (45).
- (18) Install three preformed packings (52), four back-up rings (51), and safety relief valve (50) on hydraulic manifold (45).
- (19) Install four preformed packings (52), solenoid valve (49), and four screws (48) on hydraulic manifold (45).
- (20) Repeat step (19) for remaining two solenoid valves.



- (21) Install preformed packing (47) and plug (46) on hydraulic manifold (45).
- (22) Install preformed packing (44) and plug (43) on hydraulic manifold (45).





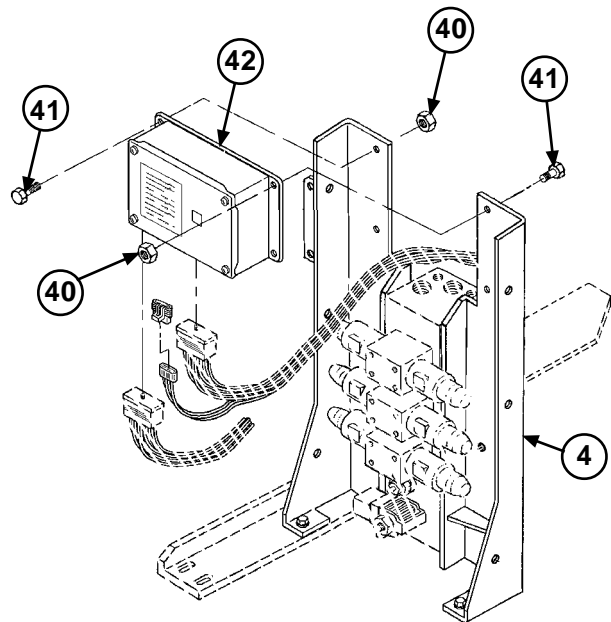
**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT  
(MODEL B ONLY) (continued).**

- (23) Install hydraulic manifold (45) on left and right LHS main manifold bracket assembly (4).

**WARNING**

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

- (24) Install digital junction box (42) on bracket (4) with four locknuts (40) and screws (41).

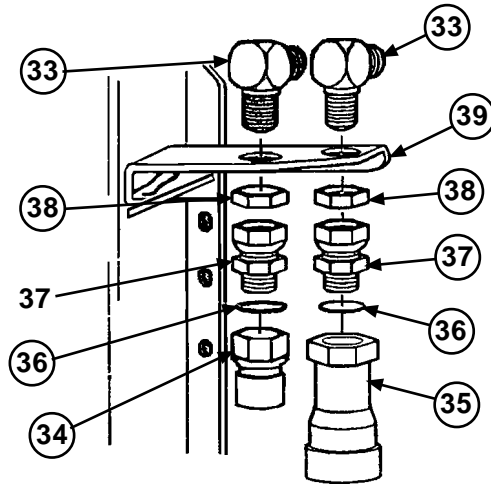


**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

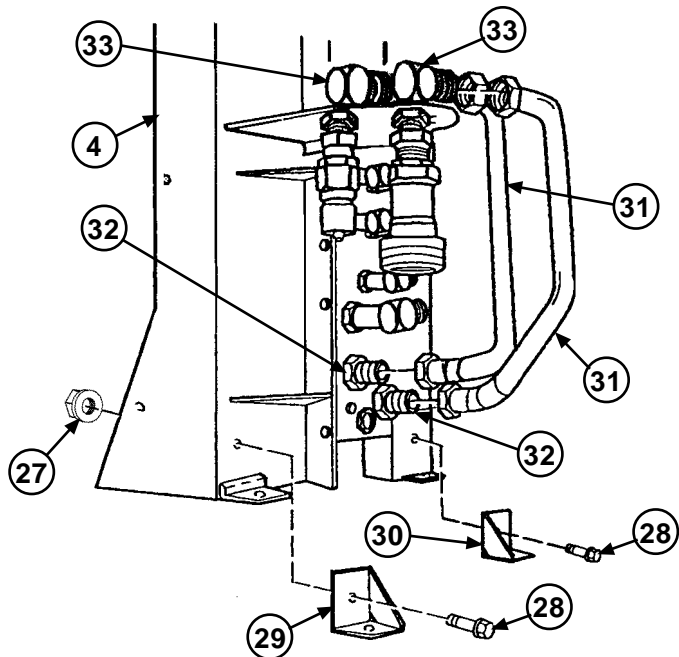
**NOTE**

Apply hydraulic oil to all preformed packings prior to installation.

- (25) Install elbows (33) on bracket (39) with nuts (38).
- (26) Install two preformed packings (36), fittings (37), and couplings (34 and 35) on elbows (33).



- (27) Install oil tube (31) on fitting (32) and elbow (33).
- (28) Install oil tube (31) on fitting (32) and elbow (33).
- (29) Install brackets (29 and 30) with screws (28) and two locknuts (27). Tighten to 23 lb-ft. (31 N•m).

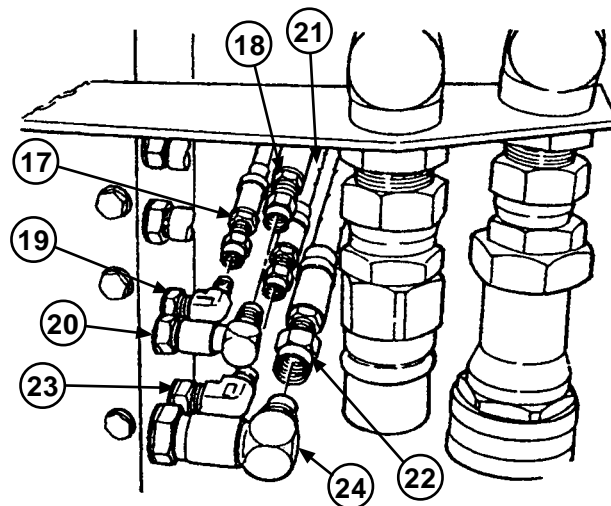
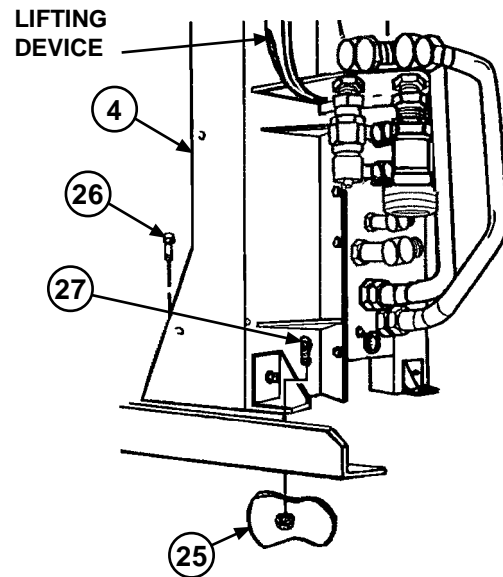


## 5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).

### WARNING

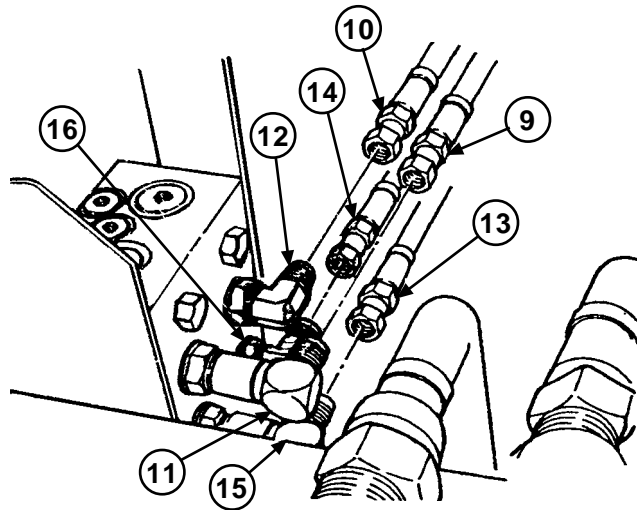
**Bracket weights 120 lbs. (54 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (30) Attach lifting device to LHS main manifold bracket (4).
- (31) Position LHS main manifold bracket assembly (4) on vehicle.
- (32) Install two screws (26), screws (27), and four locknuts (25) on bracket (4) and vehicle. Tighten to 23 lb-ft. (31 N•m).
- (33) Remove lifting device from bracket (4).
- (34) Install hose (21) and hose (22) on elbows (23 and 24).
- (35) Install hose (17) and hose (18) on elbows (19 and 20).

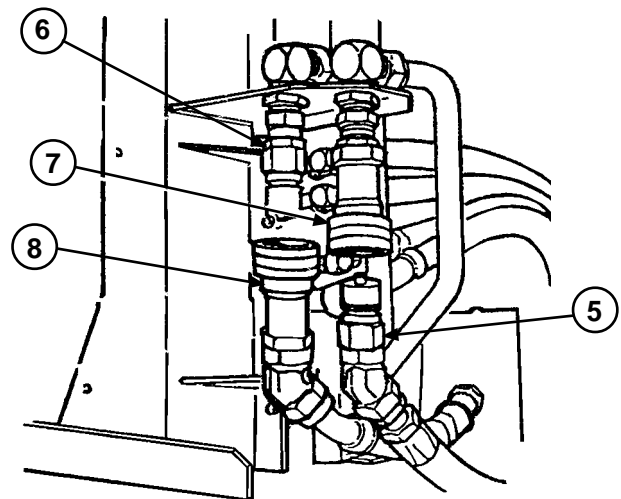


**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT  
(MODEL B ONLY) (continued).**

- (36) Install hose (13) and hose (14) on elbows (15 and 16).
- (37) Install hose (9) and hose (10) on elbows (11 and 12).

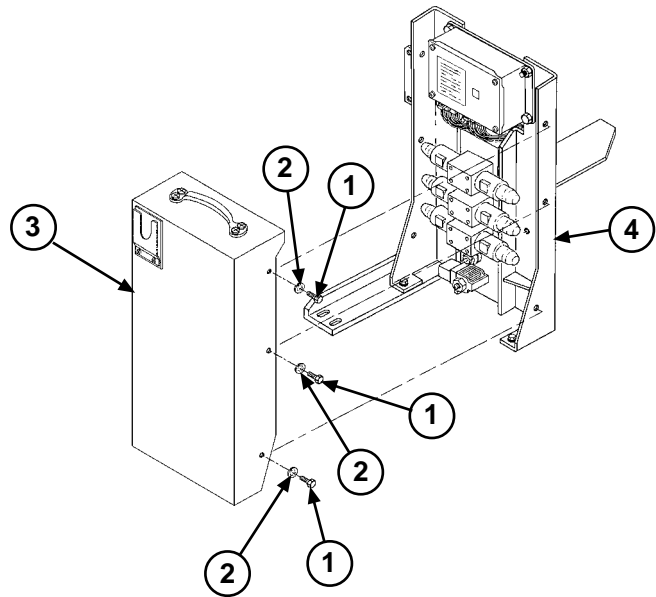


- (38) Install couplings (5 and 6) on fittings (7 and 8).



**5-15.1 LOAD HANDLING SYSTEM (LHS) MAIN MANIFOLD/BRACKET REPLACEMENT (MODEL B ONLY) (continued).**

- (39) Install digital control box cover (3) on LHS main manifold bracket assembly (4), and secure with five screws (1) and lockwashers (2).

**c. Follow-on Maintenance.**

- Connect batteries (TM 9-2320-279-20).
- Start engine (TM 9-2320-279-10).
- Check for oil leaks (TM 9-2320-279-10).
- Shut off engine (TM 9-2320-279-10).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**5-14. SLAVE QUICK CONNECT COUPLING AND BRACKET REPLACEMENT (MODEL A ONLY).**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Pan, Drain, 4 gallon (MIL-P-45819)
- Wrench, Combination, 1/12 in (A-A-1358)
- Wrench, Combination, 2-in. (GGG-W-636)
- Wrench, Open End, 1-5/8 in. (A-A-1356)

*Materials/Parts*

- Tag, Identification (as required) (Item 23, Appendix E)
- Locknut (2) (Item 60, Appendix K)
- O-ring (4) (Item 55, Appendix K)

*Equipment Condition*

- Wheels chocked (TM 9-2320-279-10)
- Engine turned off (TM 9-2320-279-10)

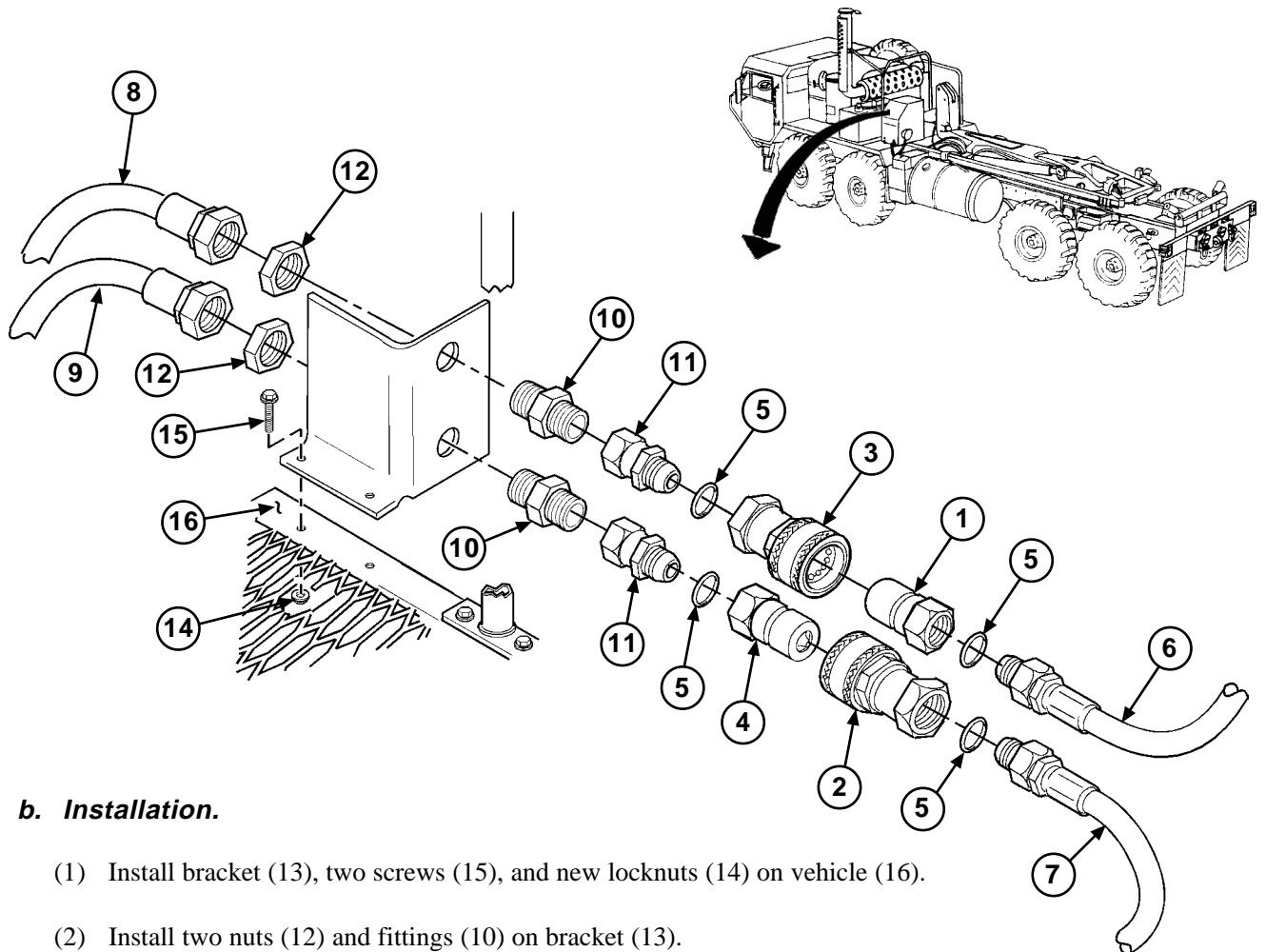
**a. Removal.**

**NOTE**

- Cap and plug all hoses upon removal.
- Position drain pan under hoses to catch excess oil
- Tag and mark hoses upon removal to ensure proper installation.

- (1) Disconnect two quick connect couplings (1 and 2) from quick connect couplings (3 and 4).
- (2) Remove two quick connect couplings (1 and 2) and O-rings (5) from hoses (6 and 7). Discard O-rings.
- (3) Remove two hoses (8 and 9) from fittings (10).
- (4) Remove two quick connect couplings (3 and 4) and O-rings (5) from adapters (11). Discard O-rings.
- (5) Remove two adapters (11) from fittings (10).
- (6) Remove two nuts (12) and fittings (10) from bracket (13).
- (7) Remove two locknuts (14), screws (15), and bracket (13) from vehicle (16). Discard locknuts.

## 5-16. SLAVE QUICK CONNECT COUPLING AND BRACKET REPLACEMENT (MODEL A ONLY) (continued).



### b. Installation.

- (1) Install bracket (13), two screws (15), and new locknuts (14) on vehicle (16).
- (2) Install two nuts (12) and fittings (10) on bracket (13).
- (3) Install two adapters (11) on fittings (10).
- (4) Install two quick connect couplings (3 and 4) and new O-rings (5) on adapters (11).
- (5) Install two hoses (8 and 9) on fittings (10).
- (6) Install two quick connect couplings (1 and 2) and new O-rings (5) on hoses (6 and 7).
- (7) Install two quick connect couplings (1 and 2) on quick connect couplings (3 and 4).

### c. Follow-on Maintenance:

- Briefly operate the LHS and check for leaks, then shut off engine (TM 9-2320-279-10).
- Check hydraulic reservoir and add hydraulic oil as needed (LO 9-2320-279-12).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

## 5-17. HYDRAULIC HOSE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

#### *Tools and Special Tools*

Tool Kit, General Mechanic's: Automotive  
(SC 5180-90-N26)  
Pan, Drain (MIL-P-45819)

#### *Equipment Condition*

Engine turned off (TM 9-2320-279-10)  
Wheels chocked (TM 9-2320-279-10)

#### *Materials/Parts*

Cable Ties (Item 8, Appendix E)  
Tag, Identification (as required) (Item 23, Appendix E)

### ***a. Removal.***

### **WARNING**

**Never disconnect any hydraulic hose or part while the engine is running. Allow several minutes to elapse after shutting of engine, to allow pressure to relieve itself, before attempting to remove hoses. Failure to comply may result in injury to personnel.**

### **CAUTION**

**The hydraulic system can be contaminated with foreign matter anytime the hoses are disconnected. Cap/plug all hoses and fittings to prevent contamination. Failure to comply may result in damage to equipment.**

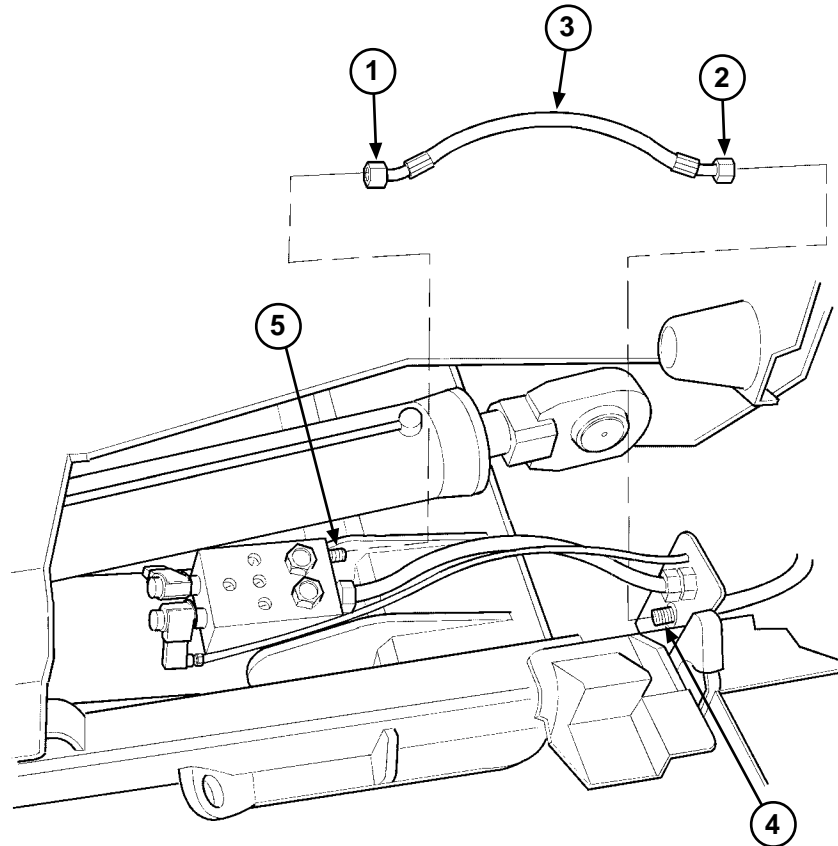
### **NOTE**

- Cut cable ties as required.
- Remove clamps and support brackets as required.
- Hoses should be tagged before removal.
- Note hose routing before removal.
- Hydraulic oil will leak from fittings when hoses are removed. Cap/plug all hoses and fittings to prevent leakage.
- All hoses are replaced the same way.



### 5-17. HYDRAULIC HOSE REPLACEMENT (continued).

- (1) Clean both hose fittings (1 and 2) on hose (3) being removed.
- (2) Disconnect both hose fittings (1 and 2) from fitting (4) and adapter (5).



#### **b. Installation.**

#### **CAUTION**

**Only use replacement hydraulic hoses with the same inside diameters, pressure ratings, length, and fittings as original equipment. Failure to comply may result in damage to equipment.**

- (1) Position hose (3) by connecting hose fittings (1 and 2) loosely on adapter (5) and fitting (4).
- (2) Tighten hose fittings (1 and 2).

#### **c. Follow-on Maintenance:**

- Start engine and operate system (Chapter 2).
- Inspect hoses for leaks, interference, twisting, or binding.
- Check hydraulic fluid level (LO 9-2320-279-12).
- Remove wheel chocks.

**END OF TASK**

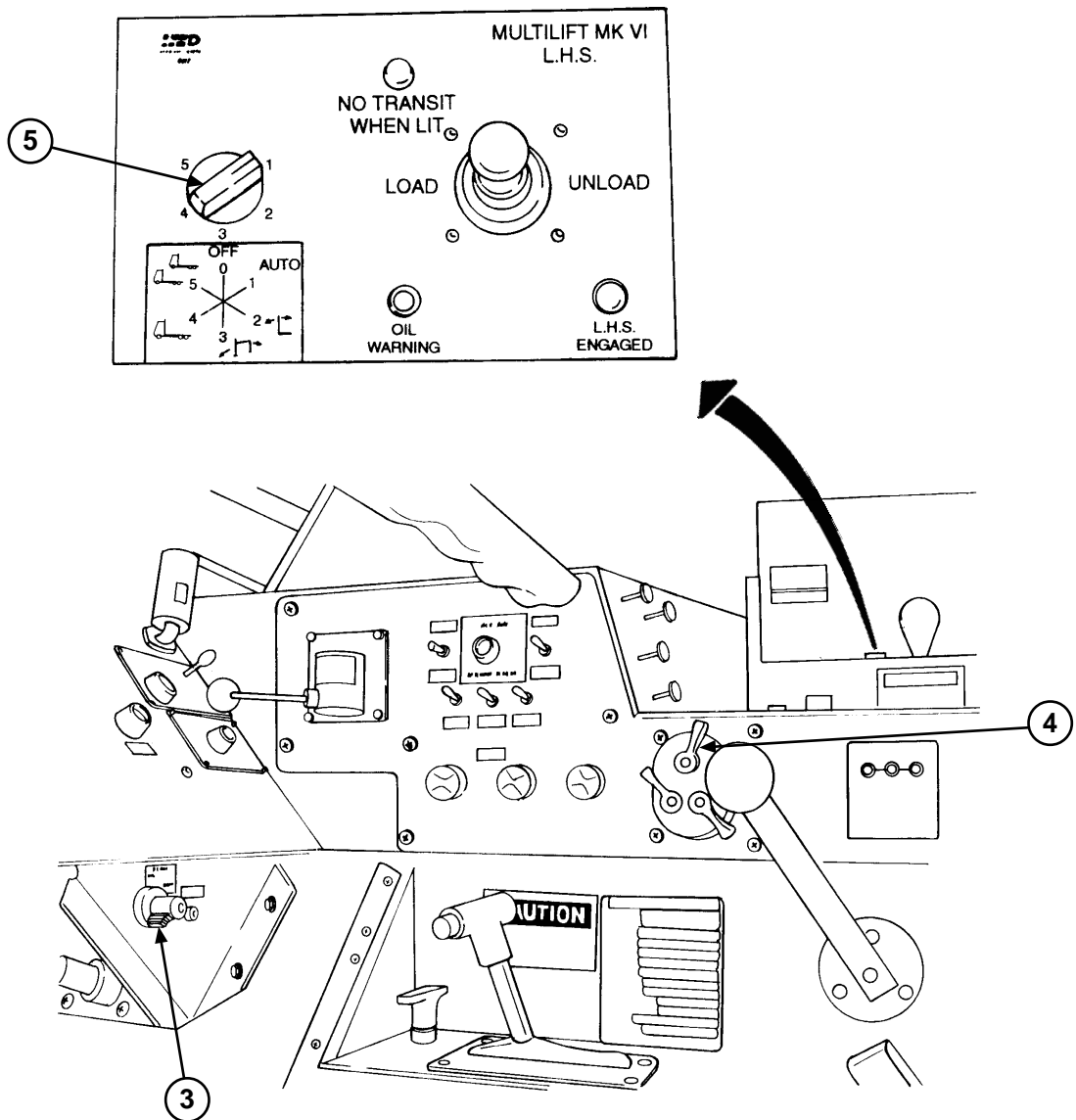


**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

**NOTE**

- Steps 2 through 4 are to relieve main frame cylinder pressure. Main frame cylinder should move freely when pressure is relieved.
- It may take two to three minutes before pressure is relieved.

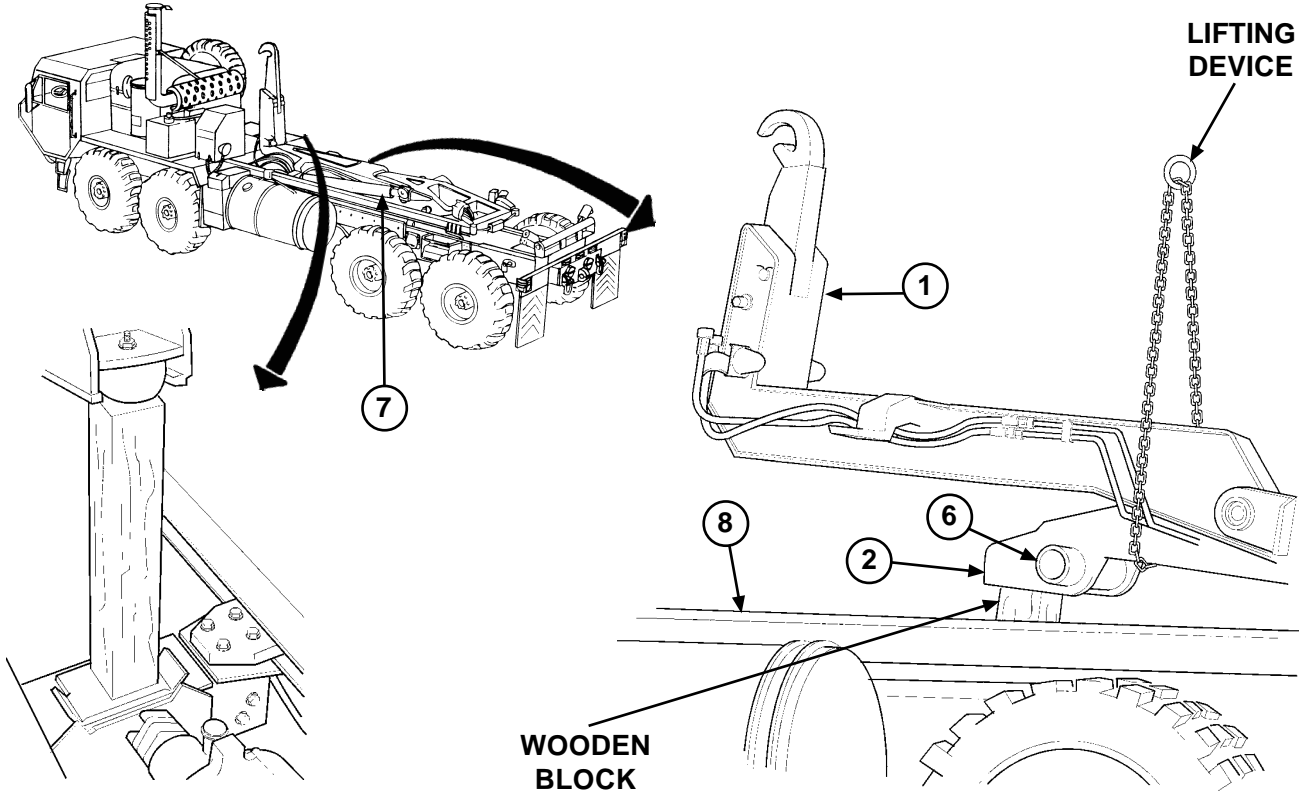
- (2) Turn engine switch (3) to ON position.
- (3) Turn light control switch (4) to STOP LIGHT position.
- (4) Turn LHS selector switch (5) to no. 1 position.



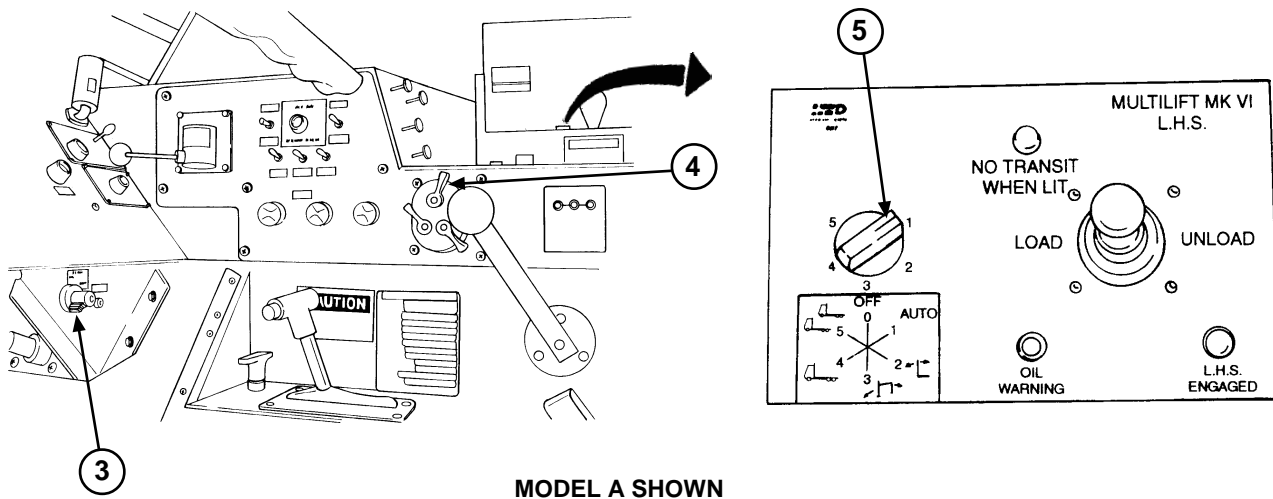
MODEL A SHOWN

**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

- (5) Raise hook arm (1) and main frame (2) using a lifting device, until hook arm pivot pin (6) is above main cylinder (7). Install wooden block between main frame (2) and compression frame (8).



- (6) Turn LHS selector switch (5) light control switch (4) and engine switch (3) to OFF position.



MODEL A SHOWN

## 5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).

- (7) Remove lifting device from main frame (2) and hook arm (1).

### **WARNING**

**Main cylinder weighs 325 lb (148 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.**

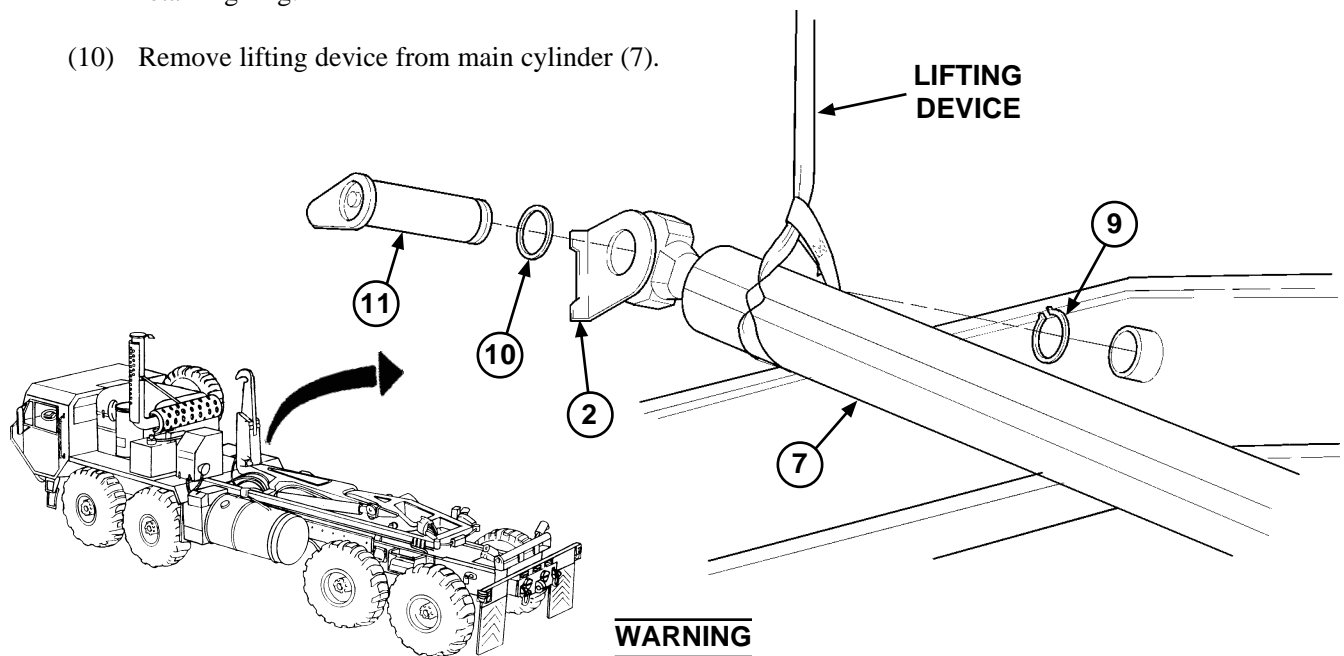
- (8) Attach lifting device to main cylinder (7).

### **WARNING**

**Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.**

- (9) With the aid of an assistant, support main frame cylinder (7) using lifting device and remove retaining ring (9), shim (10) and main cylinder pivot pin (11). Lower main cylinder out of main frame (2) and discard retaining ring.

- (10) Remove lifting device from main cylinder (7).



**The LHS hydraulic system operates at oil pressure up to 3625 psi (24,994 kPa). Never disconnect any hydraulic line or fitting without first dropping pressure to zero. Failure to comply may result in serious injury to personnel.**

### **NOTE**

- Tag and mark all hoses and tubes prior to removal.
- Cap and plug hydraulic hoses and tubes after removal.
- Remove cable ties as required.

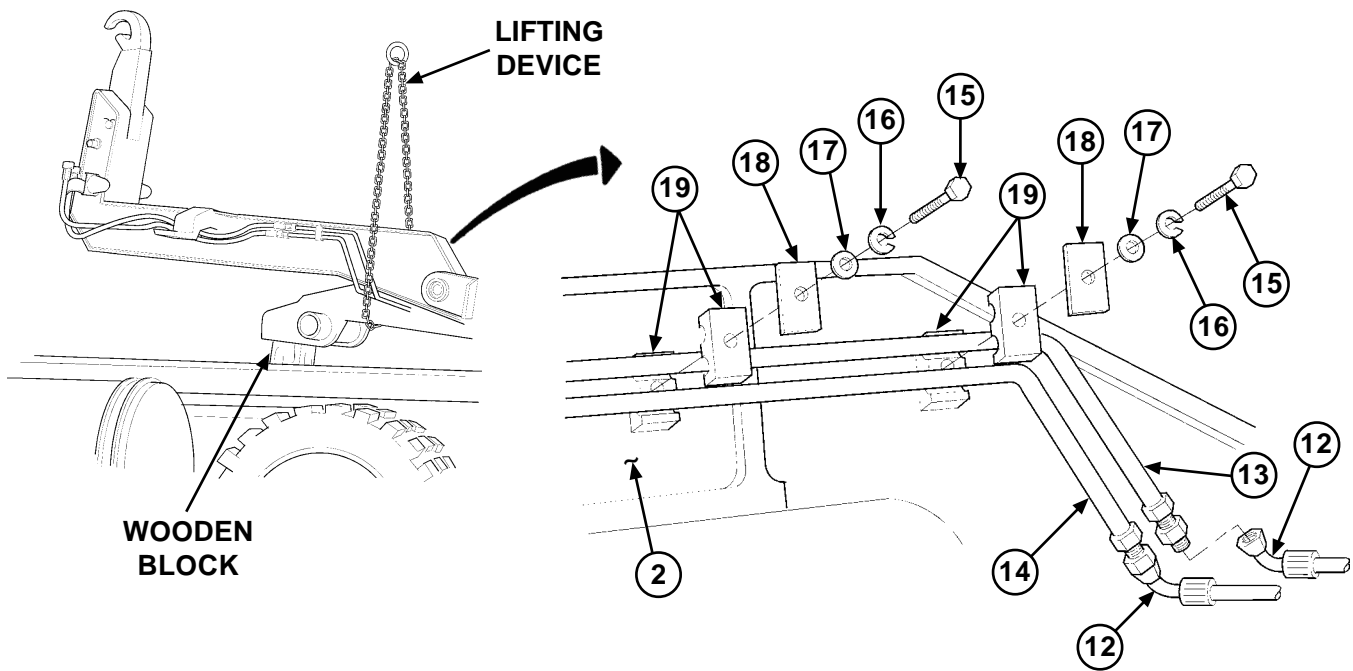
**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

- (11) Remove two hoses (12) from tubes (13 and 14).

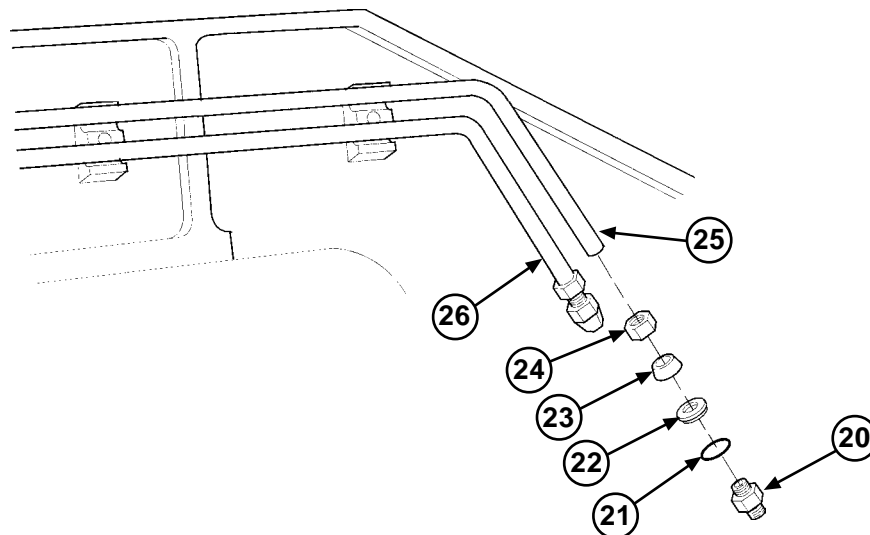
**NOTE**

Front clamp does not have a flat washer.

- (12) Remove three screws (15), lockwashers (16), two washers (17), three cover plates (18) and two-piece clamps (19) from main frame (2). Discard lockwashers.



- (13) Remove two adapters (20), o-rings (21), spacers (22), compression rings (23) and nuts (24) from tubes (25 and 26). Discard o-rings.

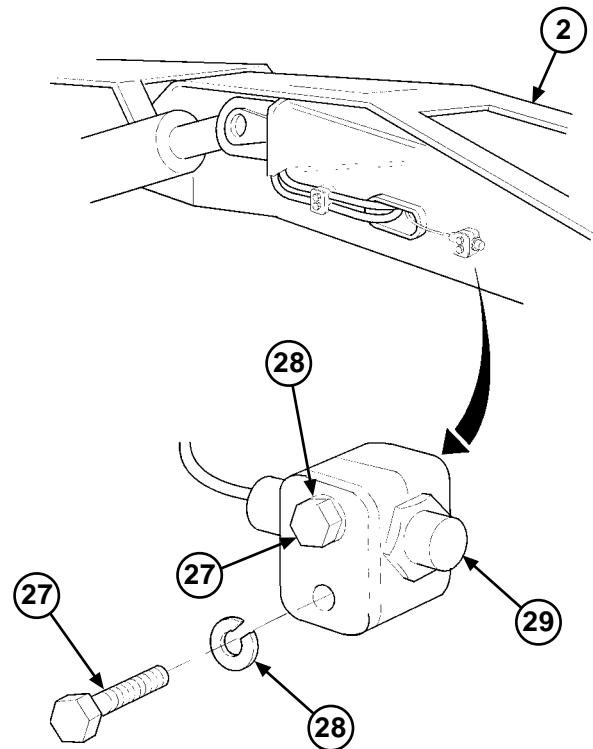


## 5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).

### NOTE

Step 15 applies to tubes on left side only.

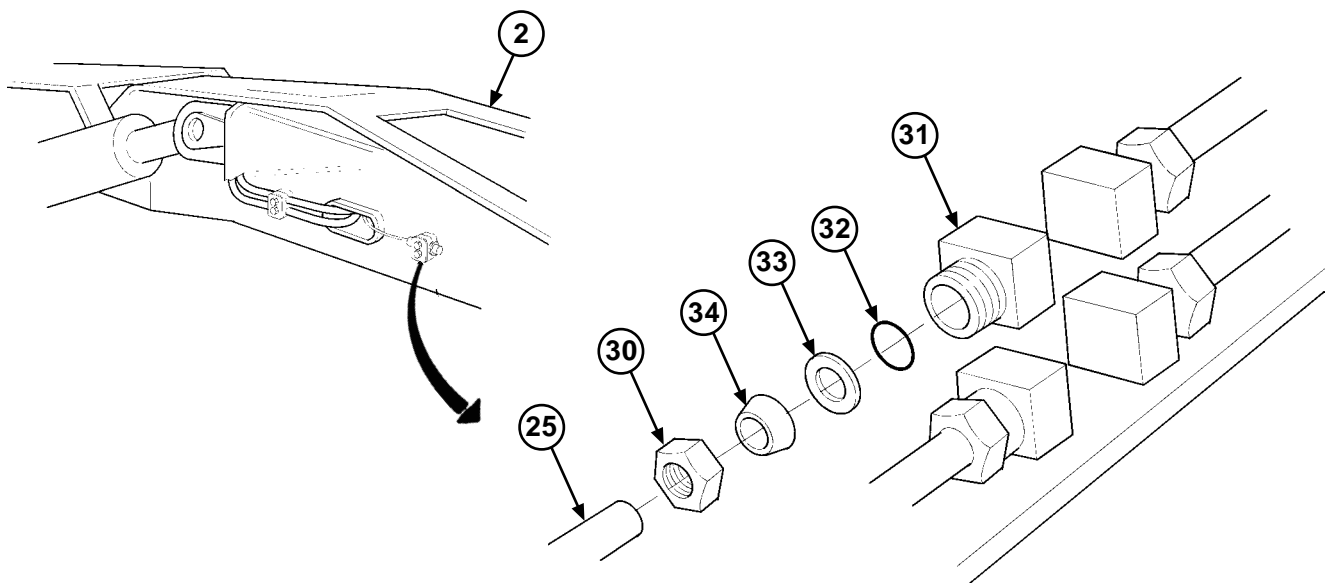
- (14) Remove two screws (27), lockwashers (28), proximity switch and clamp (29). Do not separate clamp halves.



- (15) Remove two tube nuts (30) from bulkheads (31) at inside rear of main frame (2).

- (16) Pull tubes (25 and 26) from bulkheads (31) and remove o-rings (32), spacers (33), compression rings (34), and nuts (30) from tubes.

- (17) Remove tubes (25 and 26) from main frame (2). Discard o-rings.



**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

**b. Installation.**

**NOTE**

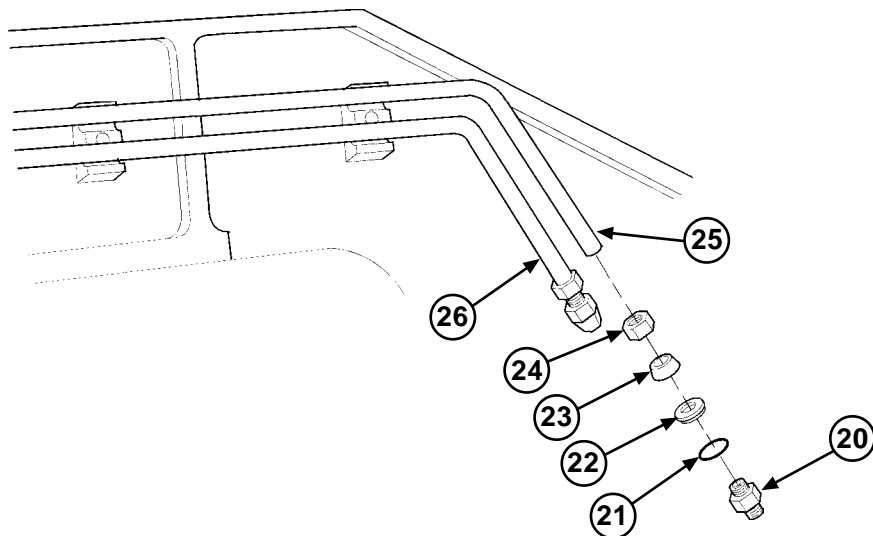
Install cable ties as required.

- (1) Apply lubricating oil to new o-ring (32).
- (2) Position tube (25) and tube (26) through main frame (2) and install nut (30), compression ring (34), spacer (33) and new o-ring (32) on tube (25) and tube (26).
- (3) Insert tube (25) into bulkhead (31) and install nut (30) on bulkhead.

**NOTE**

Step 4 applies to tubes on left side only.

- (4) Install proximity switch with clamp (29) using two screws (27) and new lockwashers (28).
- (5) Apply hydraulic oil to new o-ring (21).
- (6) Install tube nut (24), compression ring (23), spacer (22), new o-ring (21) and adapter (20) on tubes (25 and 26).

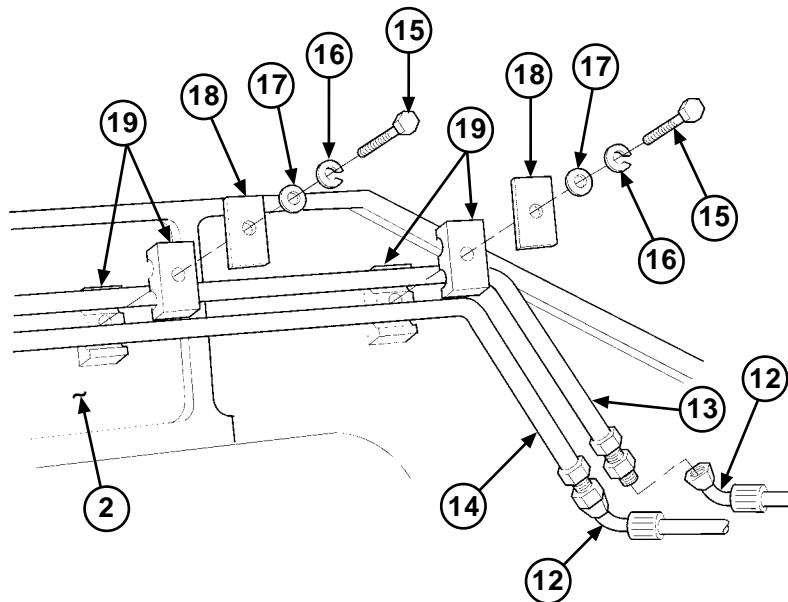




**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).****NOTE**

Front clamp does not have a washer.

- (7) Install tubes (25 and 26) on main frame (2) with three two-piece clamps (19), cover plates (18), two washers (17), three new lockwashers (16), and screws (15).

**WARNING**

**Main cylinder weighs 325 lb (148 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (8) Attach lifting device to main cylinder (7).

**WARNING**

**Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released causing injury to personnel.**

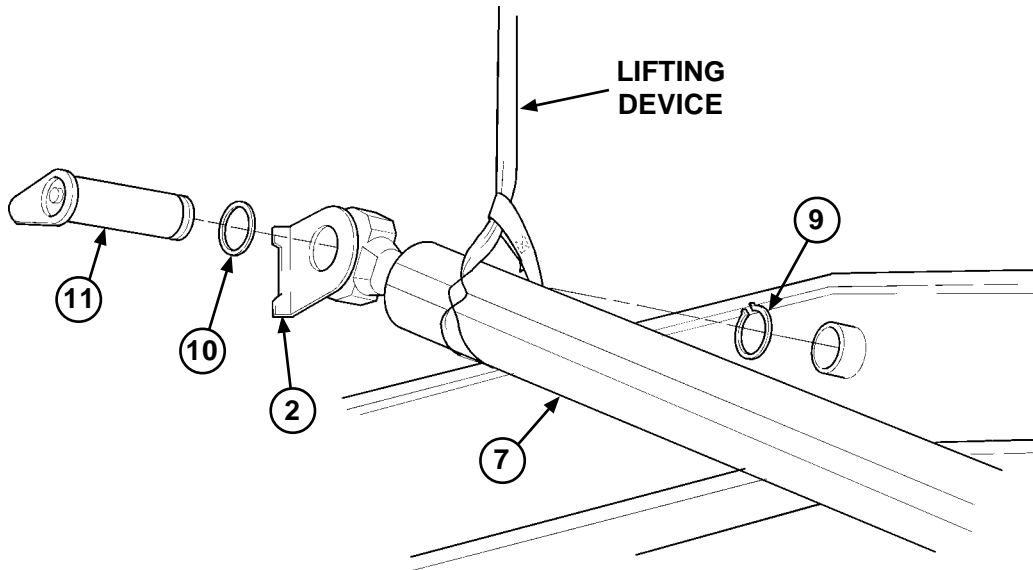
**NOTE**

It may be necessary to use soft faced hammer to align cylinder rod end with clevis on main frame.

- (9) With the aid of an assistant and using lifting device, lift main cylinder (7) into main frame (2) and install pivot pin (11), shim (10) and new retaining ring (9).

**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

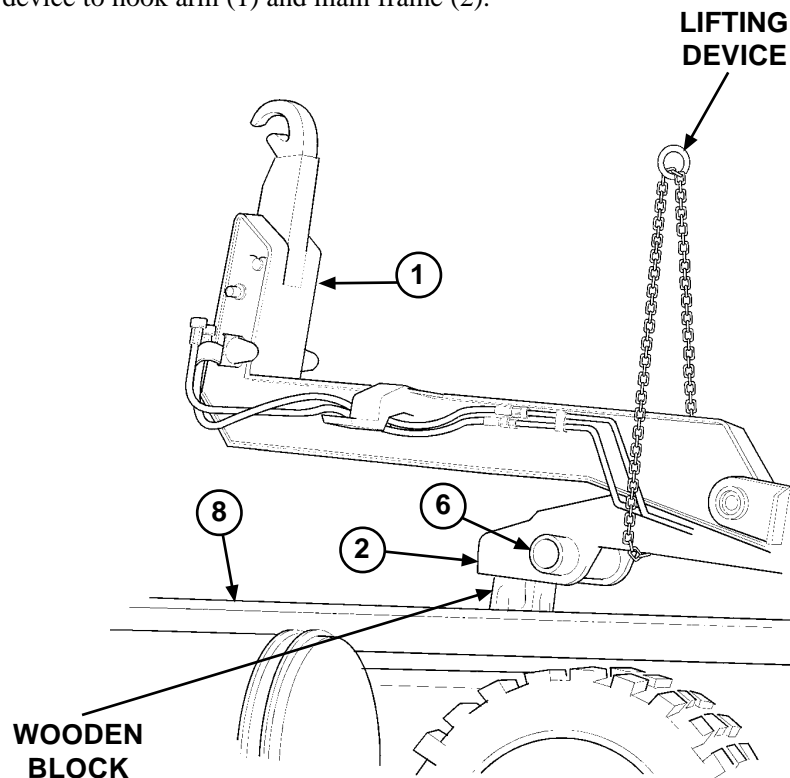
- (10) Remove lifting device from main cylinder (7).



**WARNING**

**Main frame and hook arm weigh 1950 lb (885 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (11) Attach lifting device to hook arm (1) and main frame (2).

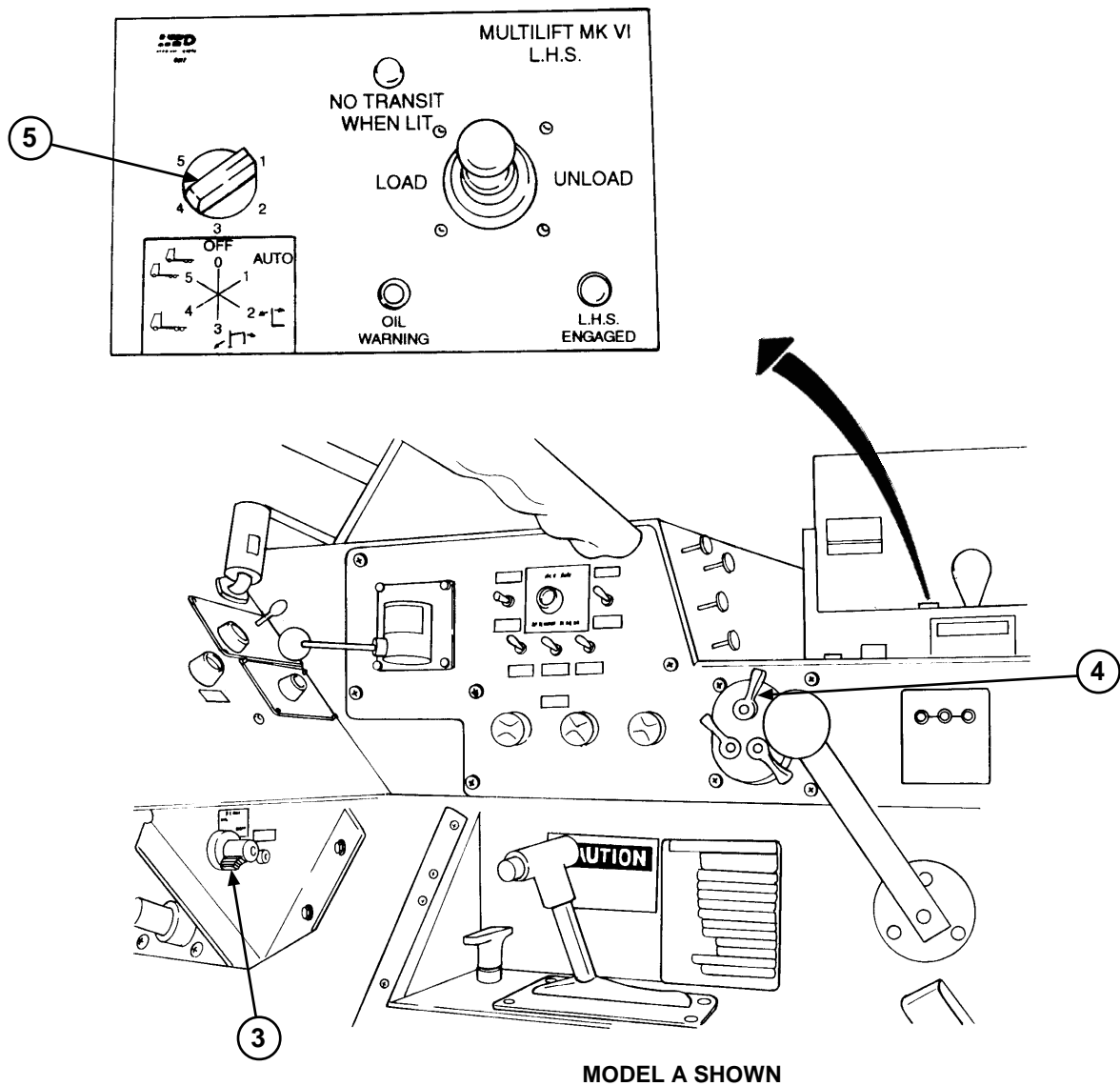


**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

**NOTE**

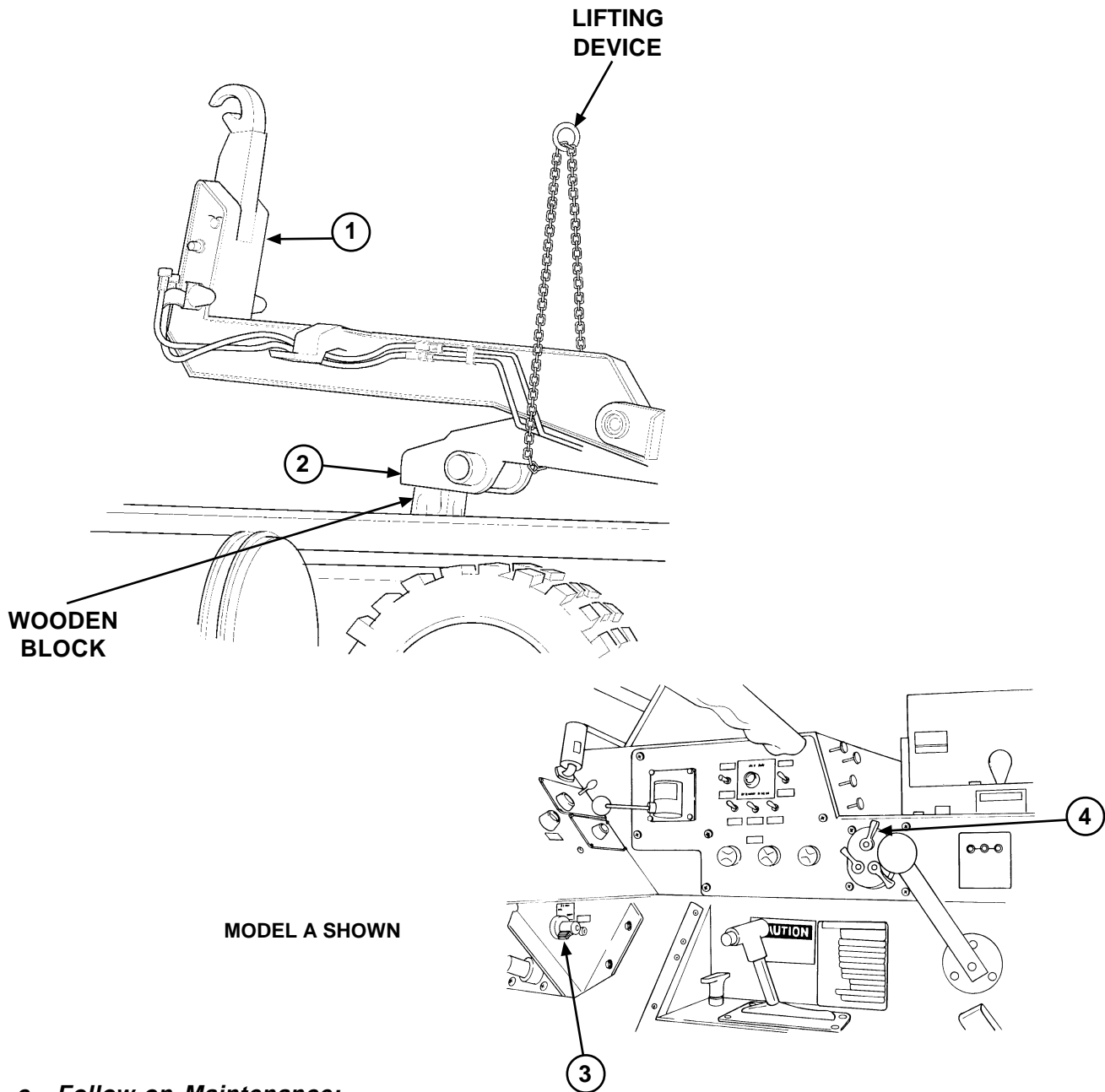
If LHS was operational, Steps 12 through 17 can be omitted.

- (12) Turn engine switch (3) to ON.
- (13) Turn light control switch (4) to STOP LIGHT position.
- (14) Turn LHS selector switch (5) to no. 2 position while using lifting device to raise main frame (2).



**5-18. HOOK ARM HYDRAULIC TUBE (MAIN FRAME) REPLACEMENT (continued).**

- (15) Remove wooden blocks and then lower hook arm (1) and main frame (2).
- (16) Turn engine switch (3) and light control switch (4) to OFF position.
- (17) Remove lifting device from hook arm (1) and main frame (2).



**c. Follow-on Maintenance:**

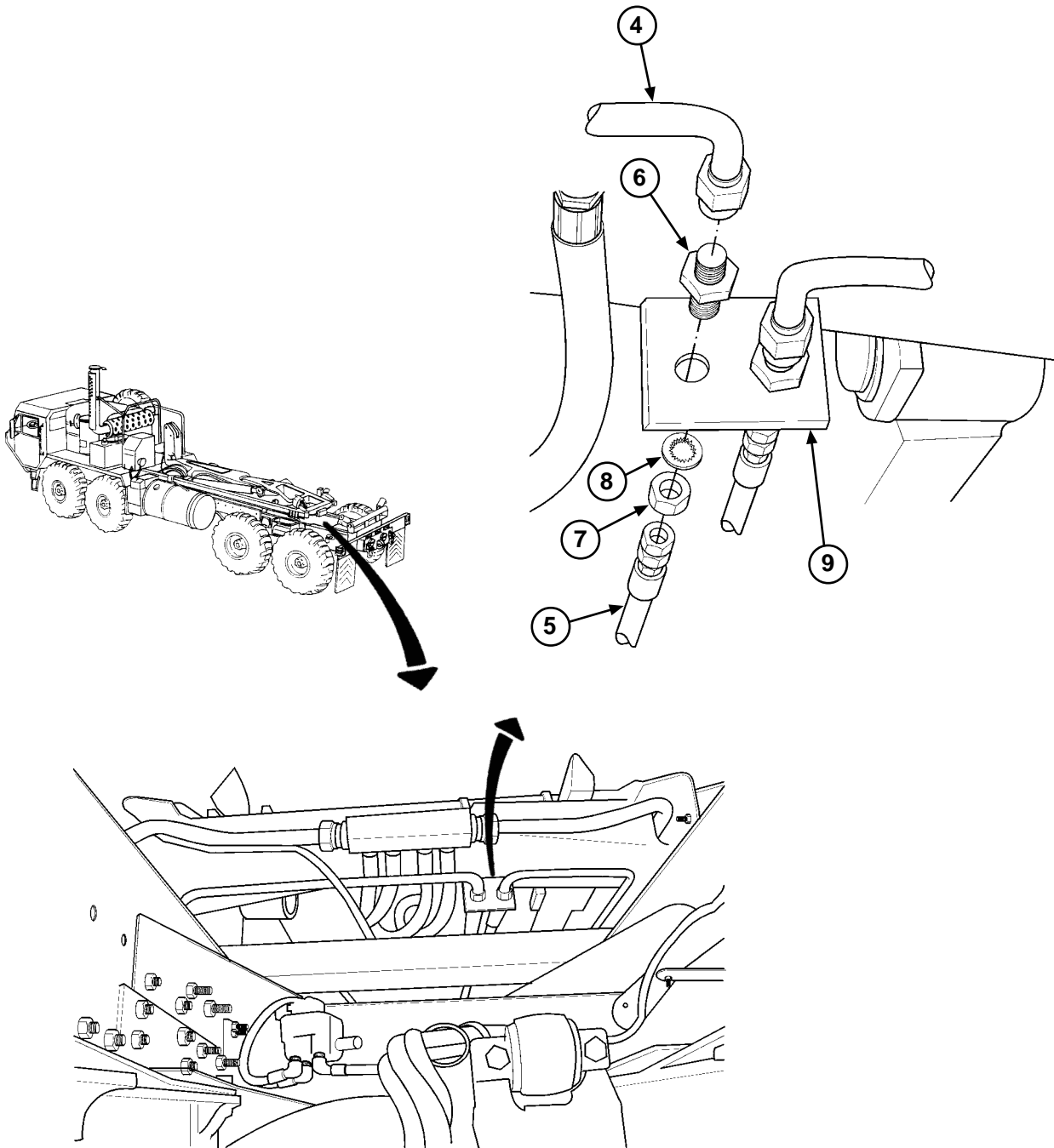
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



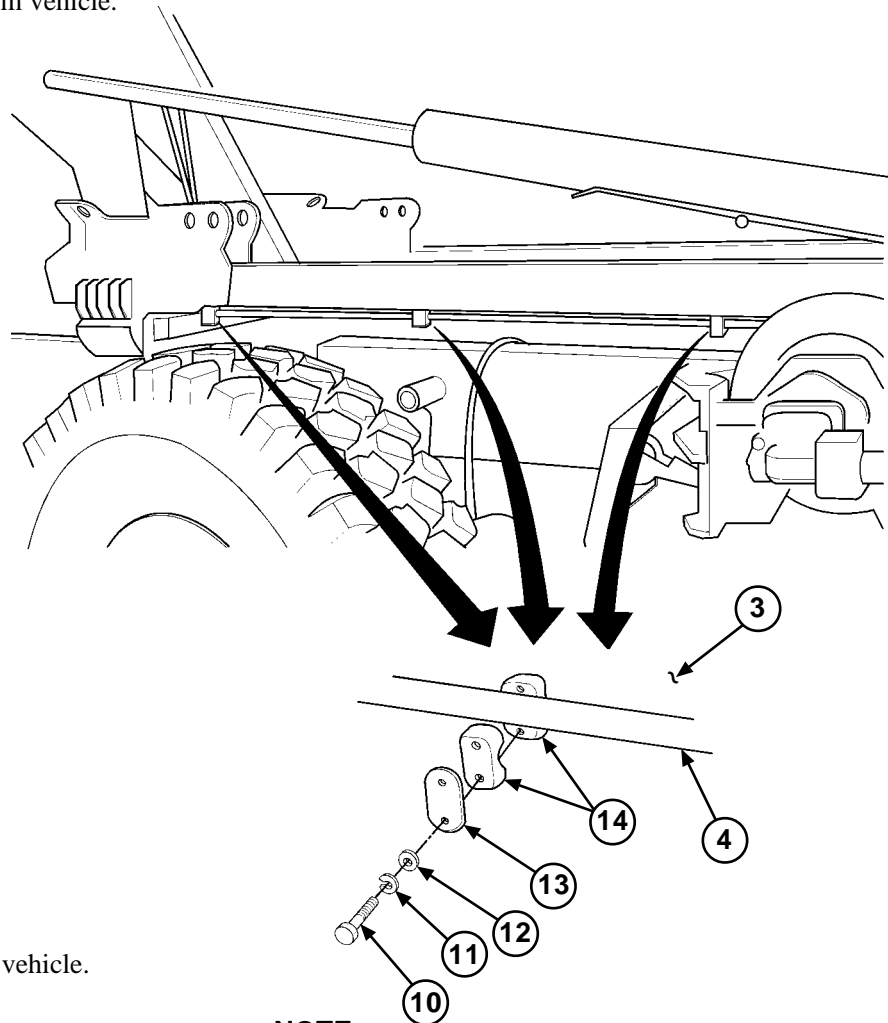
**5-19. WINCH HYDRAULIC TUBE (COMPRESSION FRAME) REPLACEMENT (continued).**

- (3) Remove hose (5) from bulkhead fitting (6).
- (4) Remove tube (4) from bulkhead fitting (6).
- (5) Remove bulkhead locknut (7) and lockwasher (8) from hose side of compression frame bracket (9) and remove bulkhead fittings (6).



### 5-19. WINCH HYDRAULIC TUBE (COMPRESSION FRAME) REPLACEMENT (continued).

- (6) Remove ten screws (10), lockwashers (11), washers (12), five cover plates (13), five 2-piece clamps (14) from compression frame (3). Discard lockwashers.
- (7) Remove tube (4) from vehicle.



#### b. Installation.

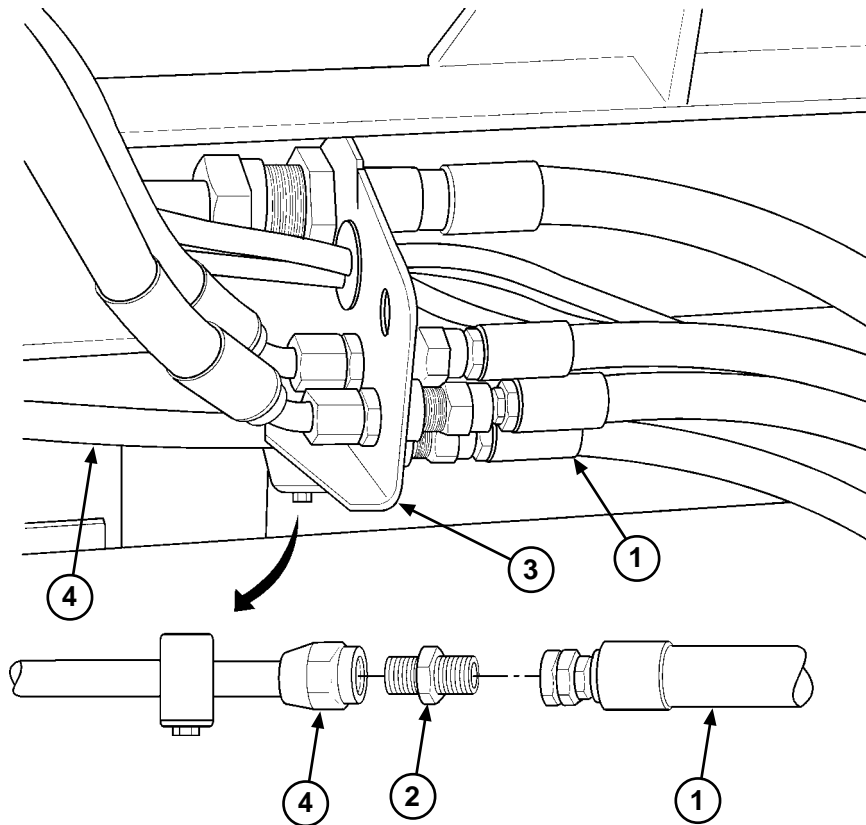
- (1) Position tube (4) on vehicle.

#### NOTE

- Do not tighten twin clamps until all clamps are installed.
  - Install cable ties as required.
- (2) Install tube (4) on compression frame (3) with five 2-piece clamps (14), five cover plates (13), washers (12), ten new lockwashers (11) and screws (10).
  - (3) Install bulkhead fitting (6) on rear compression frame bracket (9) with bulkhead locknut (7) and lockwashers (8).
  - (4) Install tube (4) on bulkhead fitting (6).
  - (5) Install hose (5) on bulkhead fitting (6).

**5-19. WINCH HYDRAULIC TUBE (COMPRESSION FRAME) REPLACEMENT (continued).**

- (6) Install union (2) on tube (4) at front of compression frame (3).
- (7) Install hose (1) to union (2).



**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

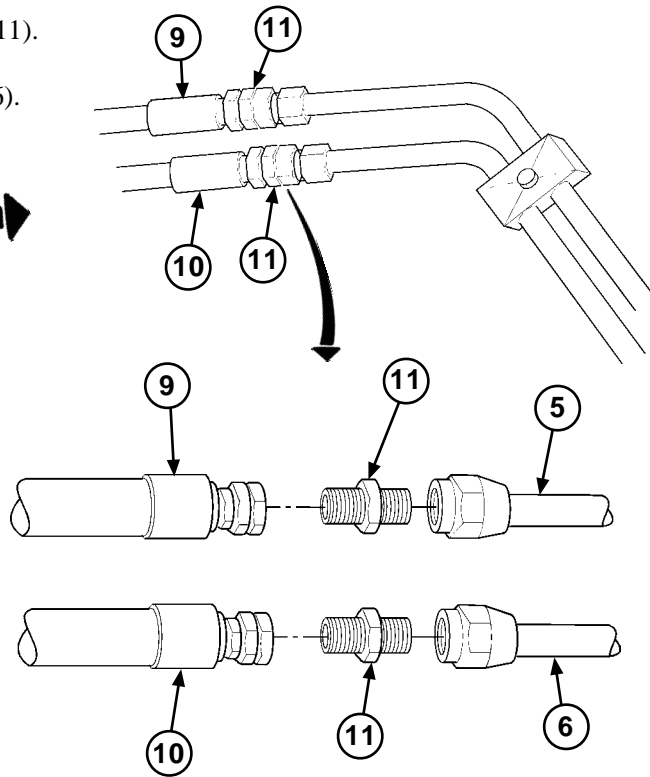
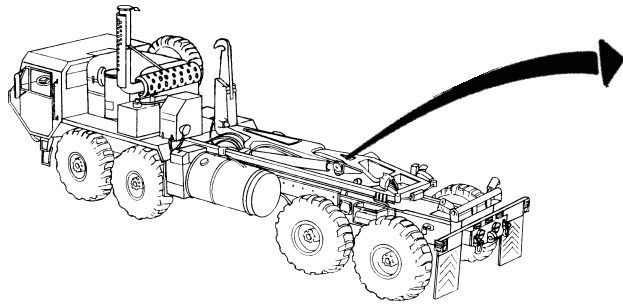




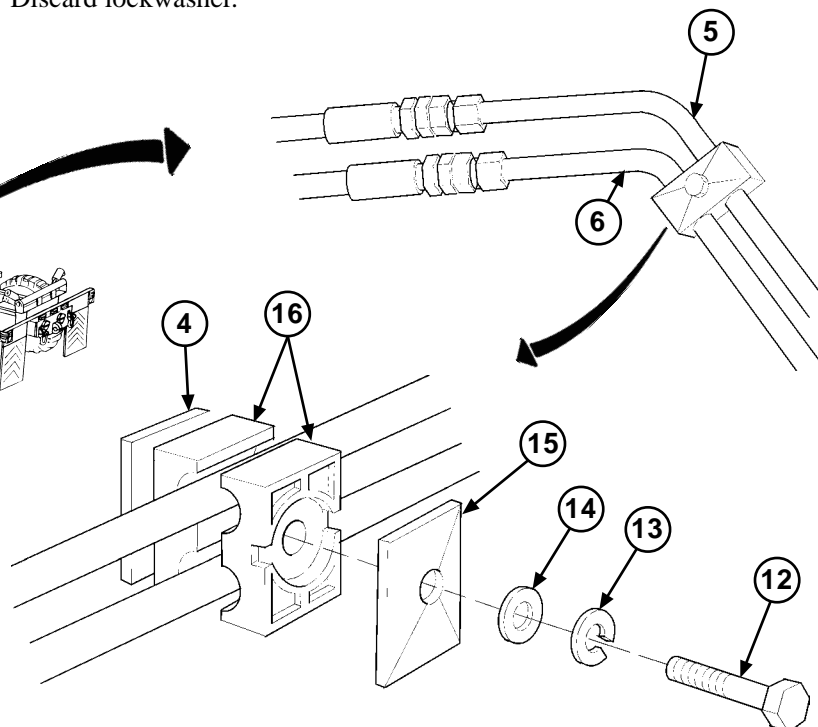
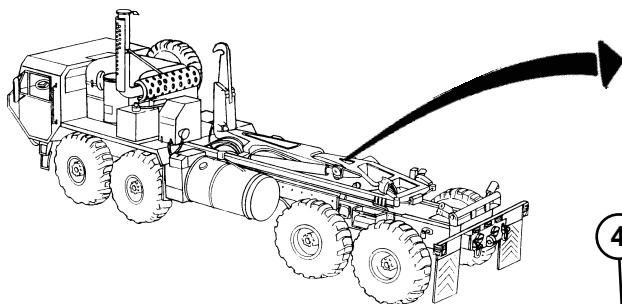
**5-20. WINCH HYDRAULIC TUBE (HOOK ARM AND MAIN FRAME) REPLACEMENT (continued).**

(5) Remove two hoses (9 and 10) from unions (11).

(6) Remove two unions (11) from tubes (5 and 6).

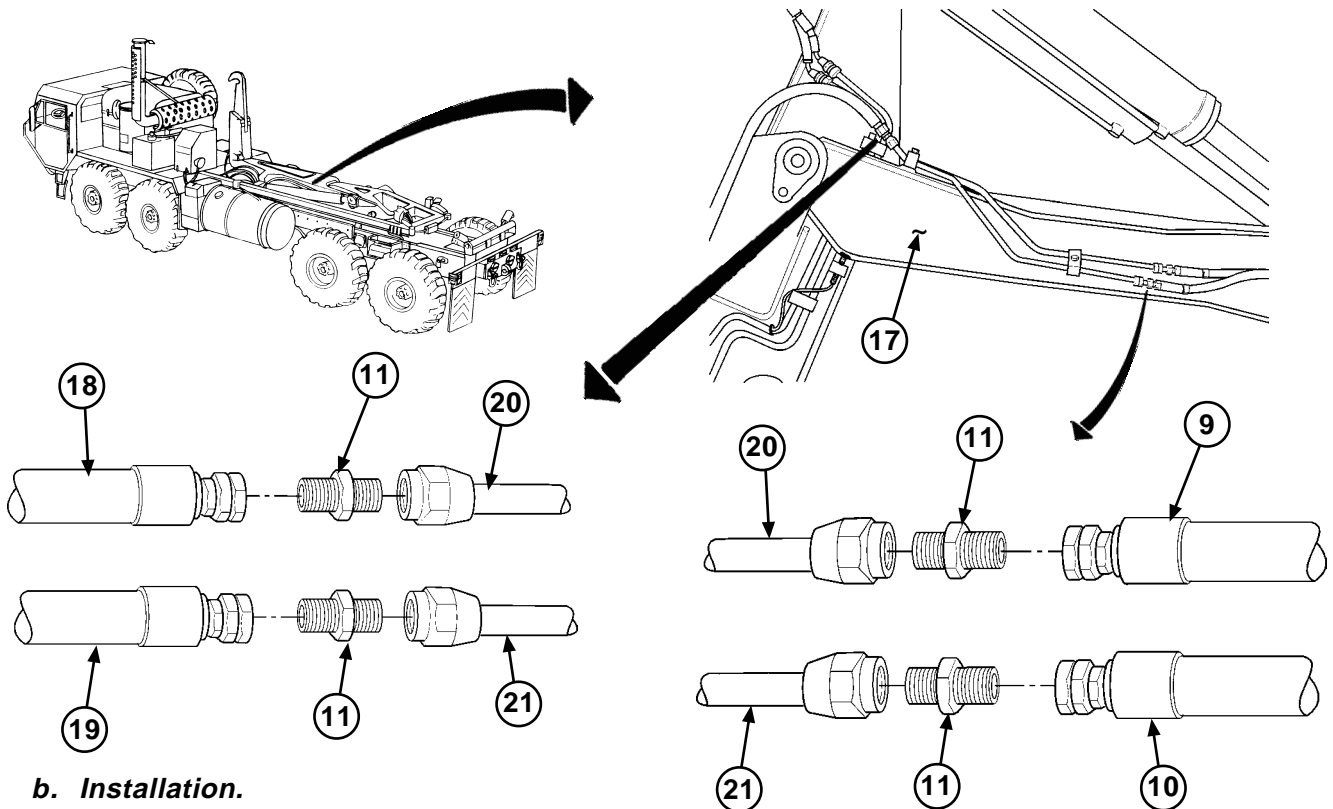


(7) Remove screw (12), lockwasher (13), washer (14), cover plate (15), two-piece clamp (16) and two tubes (5 and 6) from main frame (4). Discard lockwasher.



**5-20. WINCH HYDRAULIC TUBE (HOOK ARM AND MAIN FRAME) REPLACEMENT (continued).**

- (8) Remove four hoses (9, 10, 18 and 19) from unions (11).
- (9) Remove four unions (11) from tubes (20 and 21).
- (10) Remove two screws (12), lockwashers (13), washers (14), cover plates (15), two-piece clamps (16) and two tubes (20 and 21) from hook arm (17). Discard lockwashers.



**b. Installation.**

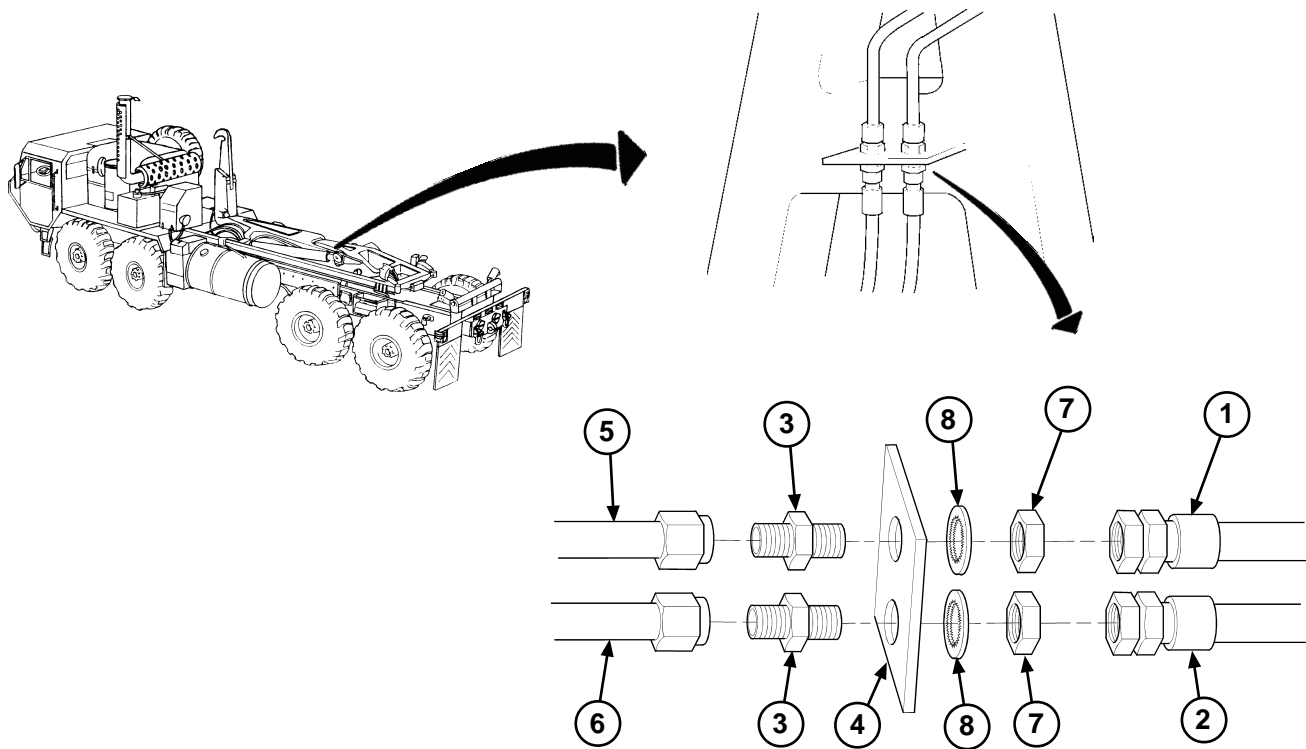
**NOTE**

Do not tighten two-piece clamps until after all clamps are installed.

- (1) Install two tubes (20 and 21) on hook arm (17) with two two-piece clamps (16), cover plates (15), washers (14), new lockwashers (13) and screws (12).
- (2) Install four unions (11) on tubes (20 and 21).
- (3) Install four hoses (9, 10, 18, and 19) on unions (11).
- (4) Install two tubes (5 and 6) on main frame (4) with two-piece clamp (16), cover plate (15), washer (14), new lockwasher (13) and screw (12).
- (5) Install unions (11) on tubes (5 and 6).
- (6) Install hoses (9 and 10) on unions (11).

**5-20. WINCH HYDRAULIC TUBE (HOOK ARM AND MAIN FRAME) REPLACEMENT (continued).**

- (7) Install two bulkhead fittings (3) on main frame (4) with two nuts (7) and new lockwashers (8).
- (8) Install two tubes (5) and (6) on bulkhead fittings (3).
- (9) Install two hoses (1) and (2) on bulkhead fittings (3).



**c. Follow-on Maintenance:**

- Fully retract hook arm (para 2-10).
- Check hydraulic fluid level (LO 9-2320-279-12).
- Remove wheel chocks.

**END OF TASK**



**5-21. WINCH QUICK DISCONNECT COUPLING REPLACEMENT (continued).**

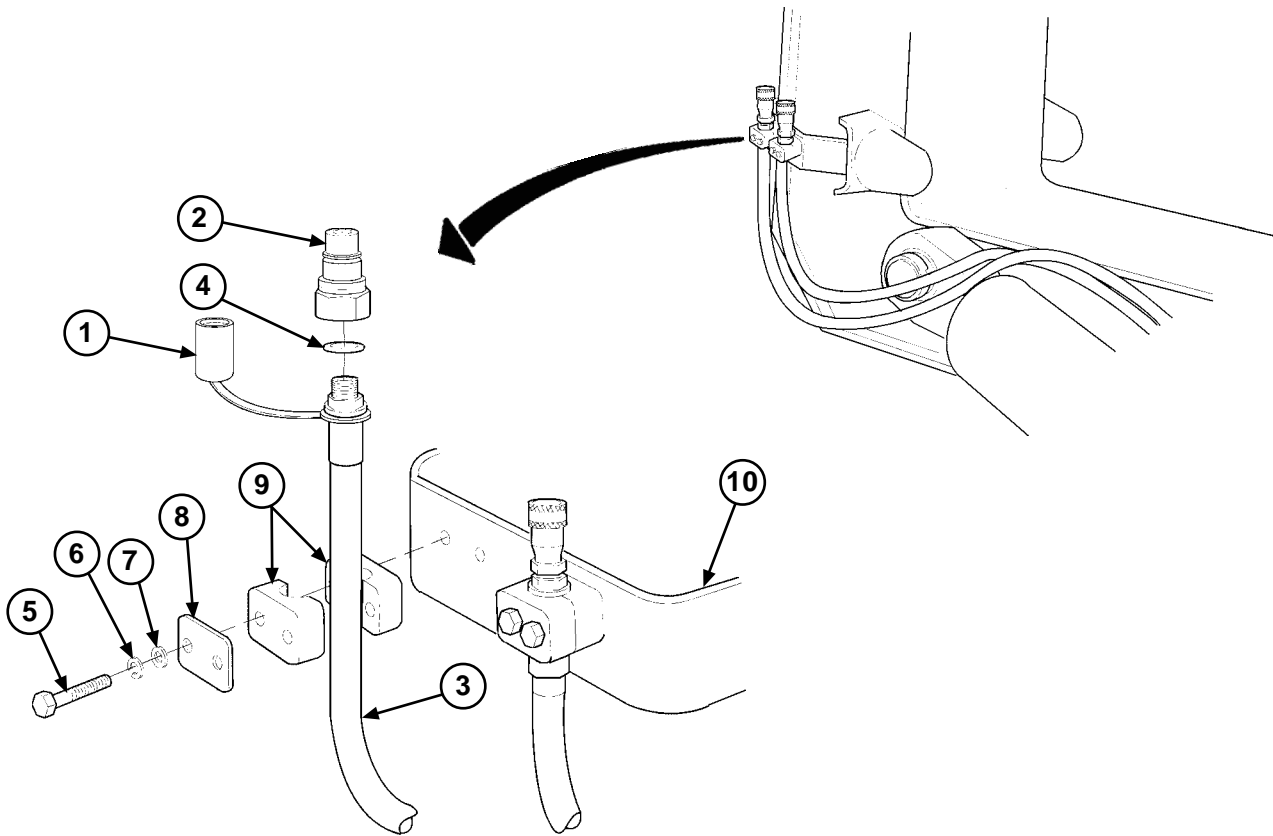
***b. Installation.***

- (1) Position hose (3) in two piece clamp (9) and install two piece clamp (9) on bracket (10) with plate (8), two washers (7), new lockwashers (6), and screws (5).

**NOTE**

Coat O-rings with clean hydraulic oil prior to installation.

- (2) Install new O-ring (4) on hose (3).
- (3) Install coupling (2) on hose (3).
- (4) Install dust cap (1) on coupling (2).



***c. Follow-on Maintenance:***

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**5-22. DIVERTER MANIFOLD REPAIR.**

This task covers:

- |                |                        |                          |
|----------------|------------------------|--------------------------|
| a. Removal     | c. Cleaning/Inspection | e. Installation          |
| b. Disassembly | d. Assembly            | f. Follow-on Maintenance |

**INITIAL SETUP**

*Tools and Special Tools*

- Pan, Drain, 4 Gallon (MIL-P-45189)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wrench, Combination, 1 3/4 in. (1256)
- Wrench, Open-end, 1 5/8 & 1 13/16 in. (ANSI B107.6)

- Tag, Identification (as required) (Item 23, Appendix E)
- Lockwasher (3) (Item 118, Appendix K)
- O-ring (2) (Item 72, Appendix K)
- O-ring (2) (Item 99, Appendix K)
- O-ring (4) (Item 81, Appendix K)

*Materials/Parts*

- Cable Ties (Item 8, Appendix E)
- Lubricating Oil (Item 20, Appendix E)

*Equipment Condition*

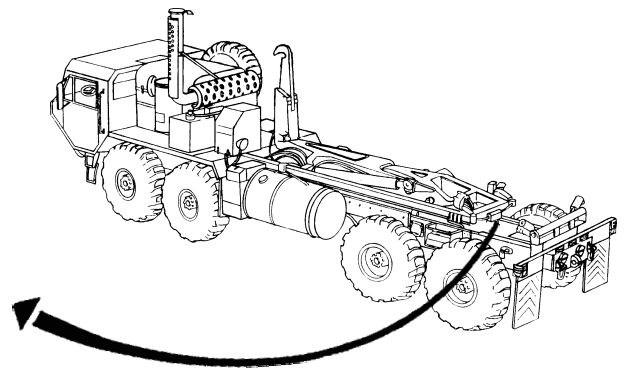
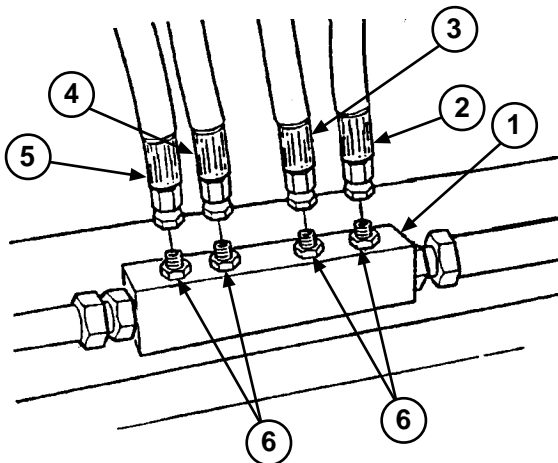
- Wheels chocked (TM 9-2320-279-10)

**a. Removal.**

**NOTE**

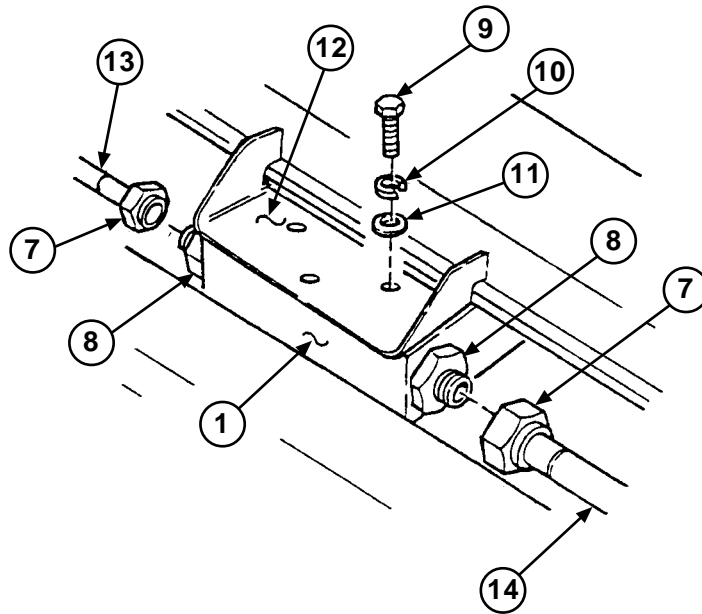
- Cut cable ties as required.
- Tag and mark hoses prior to removal.
- Cap and plug hoses after removal.

- (1) Position drain pan under diverter manifold (1).
- (2) Remove four hoses (2, 3, 4, and 5) from four adapters (6).

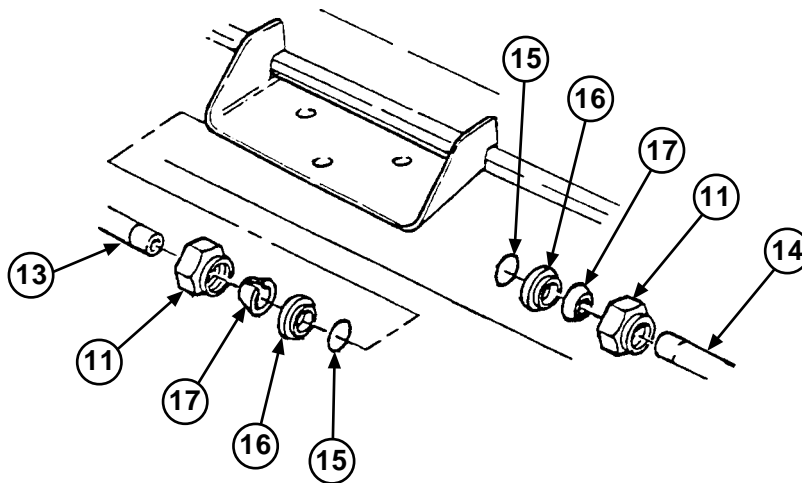


**5-22. DIVERTER MANIFOLD REPAIR (continued).**

- (3) Remove two coupling nuts (7) from adapters (8).
- (4) Remove three screws (9), lockwashers (10) and washers (11) from bracket (12) and diverter manifold (1). Discard lockwashers.
- (5) Remove diverter manifold (1) from tubes (13) and (14).



- (6) Remove two o-rings (15), bushings (16), sleeves (17) and coupling nuts (11) from tubes (13 and 14). Discard o-rings.

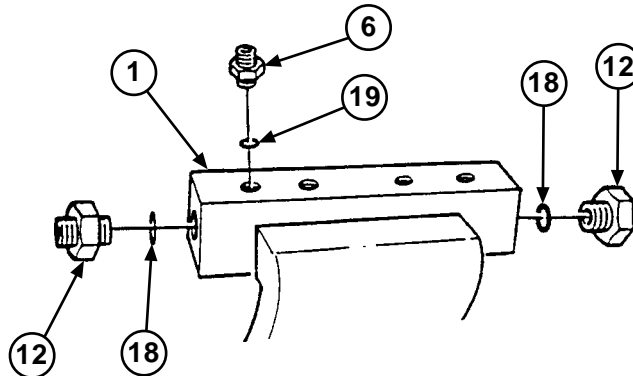




## 5-22. DIVERTER MANIFOLD REPAIR (continued).

### b. Disassembly.

- (1) Position diverter manifold (1) in soft-jawed vise.
- (2) Remove two adapters (12) and o-rings (18) from diverter manifold (1). Discard o-rings.
- (3) Remove four adapters (6) and o-rings (19) from diverter manifold (1). Discard o-rings.



### c. Cleaning/Inspection.

#### WARNING

- Drycleaning solvent is **TOXIC** and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.
- If personnel become dizzy while using drycleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush them with water and get immediate medical attention.
- When drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.
- Do not use drycleaning solvent on winch rope (cable). Solvent will soak into rope strands and rust, causing rope to deteriorate. This may result in the rope breaking under normal loads and could cause death or injury to personnel.

- (1) Clean manifold and components using drycleaning solvent.
- (2) Dry all parts with compressed air.
- (3) Inspect for any foreign material in ports and remove as necessary.

**5-22. DIVERTER MANIFOLD REPAIR (continued).**

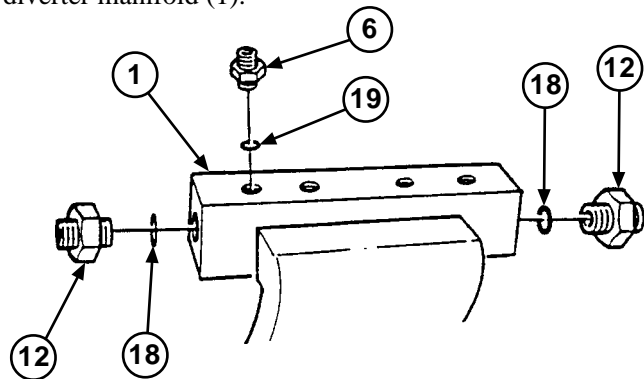
- (4) Inspect for cracks, dents, gouges or stripped threads.
- (5) Replace all damaged parts.

**d. Assembly.**

**NOTE**

Coat O-rings with clean lubricating oil prior to installation.

- (1) Position diverter manifold (1) in soft-jawed vise.
- (2) Install four new o-rings (19) and adapters (6) in diverter manifold (1).
- (3) Install two new o-rings (18) and adapters (12) in diverter manifold (1).
- (4) Remove diverter manifold (1) from vise.

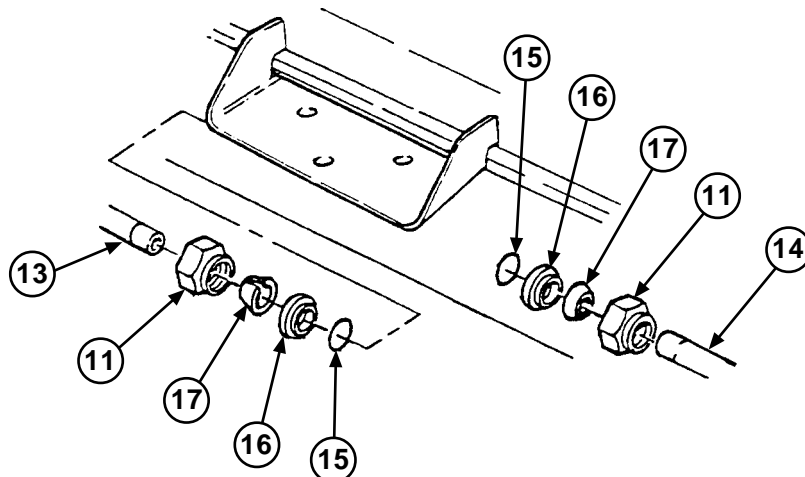


**e. Installation.**

**NOTE**

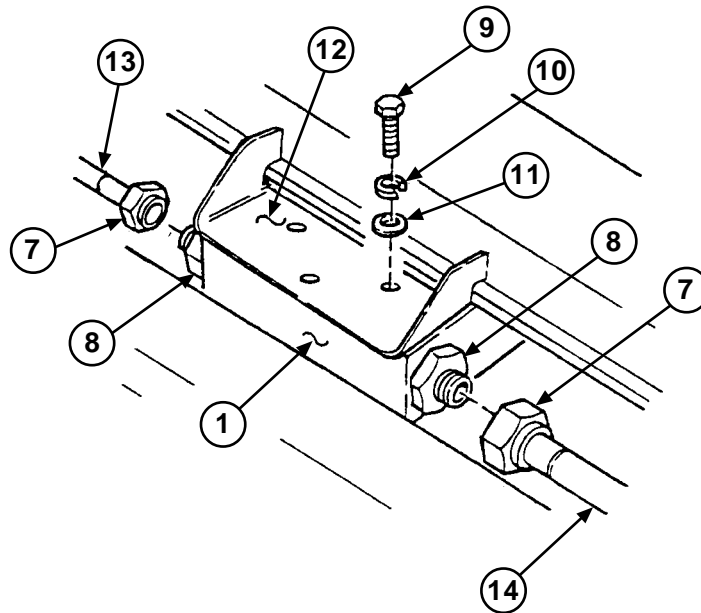
- Install cable ties as required.
- Coat O-rings with clean lubricating oil prior to installation.

- (1) Position two coupling nuts (11), sleeves (17), bushings (16) and new o-rings (15) on tubes (13 and 14).

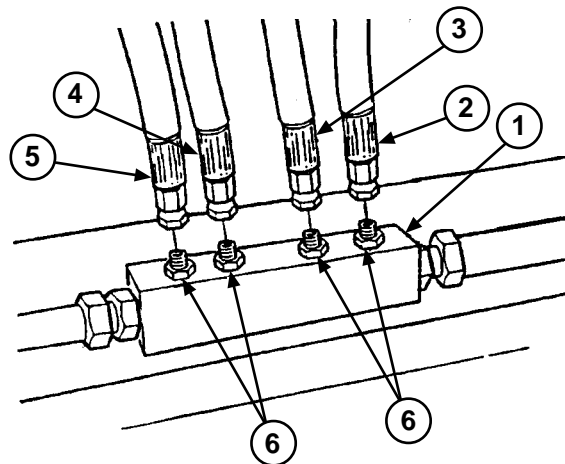


## 5-22. DIVERTER MANIFOLD REPAIR (continued).

- (2) Position diverter manifold (1) on tubes (13 and 14).
- (3) Loosely install two coupling nuts (11) on adapters (12). Do not tighten.
- (4) Install diverter manifold (1) on bracket (10) using three washers (9), new lockwashers (8) and screws (7).
- (5) Tighten two coupling nuts (11).



- (6) Install four hoses (5, 4, 3, and 2) on four adapters (6).



### f. Follow-on Maintenance:

- Fill hydraulic reservoir (LO 9-2320-279-12).
- Start engine and run for 3 minutes (TM 9-2320-279-10).
- Turn engine off (TM 9-2320-279-10).
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**5-23. HOOK ARM MANIFOLD REPAIR (MODEL A ONLY).**

This task covers:

- |                |                        |                          |
|----------------|------------------------|--------------------------|
| a. Removal     | c. Cleaning/Inspection | e. Installation          |
| b. Disassembly | d. Assembly            | f. Follow-on Maintenance |

**INITIAL SETUP**

*Tools and Special Tools:*

- Pan, Drain, 4-Gallon (MIL-P-45189)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wooden Block (Item H-6, Appendix H)
- Wrench, Combination, 1 1/4 in. (GGG-W-636)

- O-ring (2) (Item 78, Appendix K)
- Seal Kit (2) (Item 50, Appendix K)

*Equipment Condition*

- Wheels chocked (TM 9-2320-279-10)
- Engine turned off (TM 9-2320-279-10)

*Materials/Parts:*

- Adhesive-Sealant, Silicone, RTV (Item 6, Appendix E)
- Lubricating Oil (Item 20, Appendix E)
- Tag, Identification (as required) (Item 23, Appendix E)
- Lockwasher (4) (Item 67, Appendix K)
- O-ring (2) (Item 58, Appendix K)

*Special Environmental Conditions*

Cleanliness is extremely important when working on hydraulic equipment. Clean all parts before disassembly and work in a clean area.

**a. Removal.**

- (1) Raise main frame (1) and support with wooden block.

**NOTE**

- Place drain pan under manifold to catch excess oil.
- Tag and mark all hoses prior to removal.
- Cap and plug all hoses upon removal.
- Hook arm manifold is non-functional on Model B trucks.

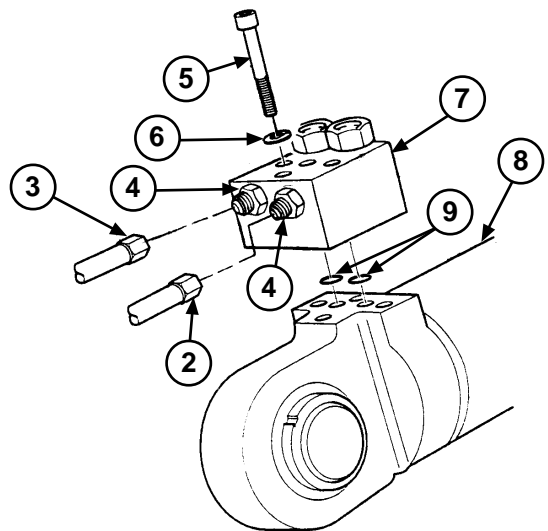
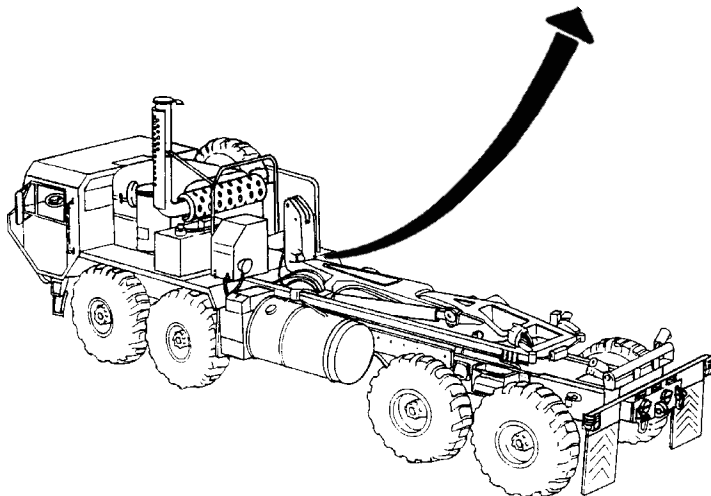
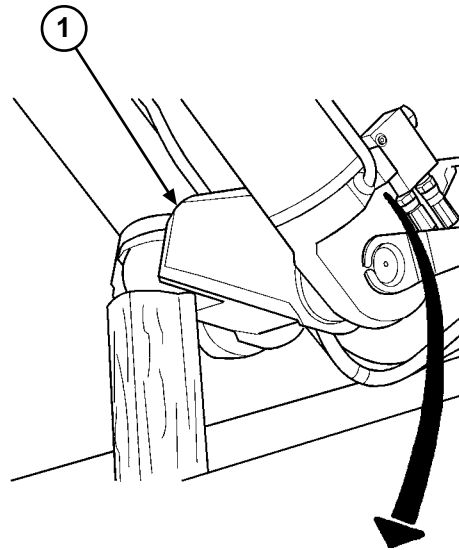
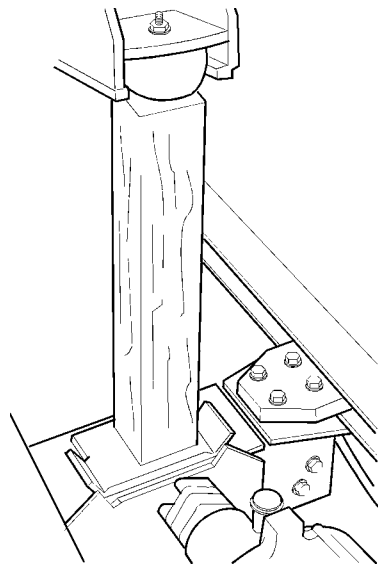
- (2) Remove two hoses (2) and (3) from adapters (4).

**WARNING**

**Hook arm manifold will have hydraulic pressure behind it. Loosen screws equally and cover manifold with clean rag to prevent personal injury from oil spray.**

- (3) Remove four screws (5), lockwashers (6) and hook arm manifold (7) from hook arm cylinder (8). Discard lockwashers.
- (4) Remove and discard two o-rings (9) from hook arm manifold (7).

**5-23. HOOK ARM MANIFOLD REPAIR (MODEL A ONLY) (continued).**



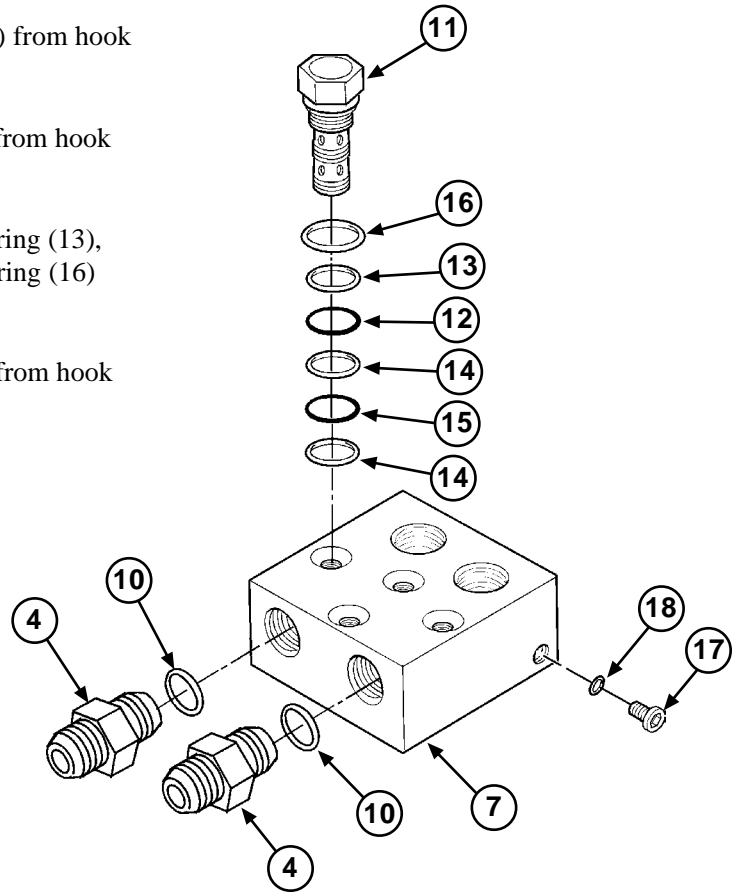
**5-23. HOOK ARM MANIFOLD REPAIR (MODEL A ONLY) (continued).**

**b. Disassembly.**

**NOTE**

- Position manifold in soft-jawed vise to disassemble.
- Note location of all components before removing.

- (1) Remove two adapters (4) and o-rings (10) from hook arm manifold (7). Discard o-rings.
- (2) Remove two counterbalance valves (11) from hook arm manifold (7).
- (3) Remove and discard o-ring (12), backup ring (13), two backup rings (14), o-ring (15) and o-ring (16) from each counterbalance valve (11).
- (4) Remove two plugs (17) and o-rings (18) from hook arm manifold (7). Discard o-rings.



**c. Cleaning/Inspection.**

- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.

**d. Assembly.**

**NOTE**

- Lubricate O-rings and backup rings with clean lubricating oil prior to installation.
- Cup side of backup ring should face O-ring.

- (1) Install two o-rings (18) on plugs (17) and install in hook arm manifold (7).
- (2) Install new o-ring (16), o-ring (15), two backup rings (14), backup ring (13) and o-ring (12) on each counterbalance valve (11).
- (3) Install two counterbalance valves (11) in hook arm manifold (7).
- (4) Install two new o-rings (10) on adapters (4) and install hook arm manifold (7).

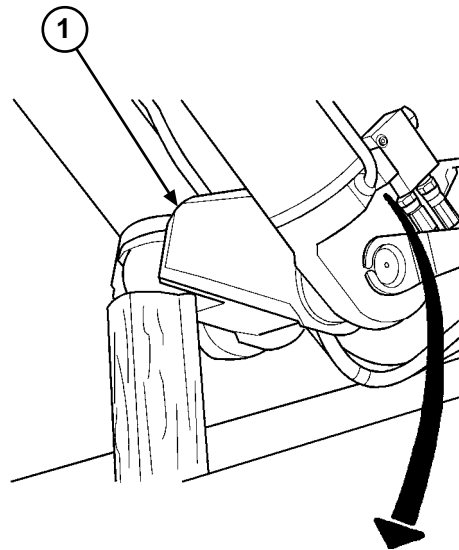
**5-23. HOOK ARM MANIFOLD REPAIR (MODEL A ONLY) (continued).****e. Installation.****NOTE**

- Lubricate O-rings with clean lubricating oil prior to installation.
- Install hoses in same location as noted during removal.

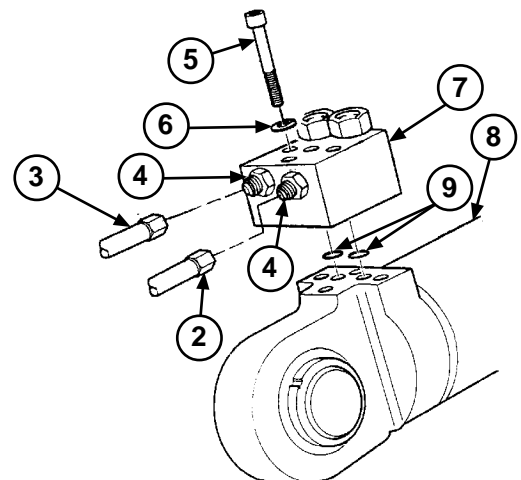
- (1) Install two new o-rings (9) in hook arm manifold (7).

**WARNING**

**Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.**



- (2) Apply silicone sealant to bottom of screw heads on four screws (5).
- (3) Install hook arm manifold (7) on hook arm cylinder (8) with four new lockwashers (6) and screws (5).
- (4) Fill recessed area of four screws (5) with silicone sealant.
- (5) Install two hoses (2) and (3) on adapter (4).
- (6) Raise main frame (1) and remove wooden block.

**f. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**5-24. MAIN FRAME MANIFOLD REPAIR.**

This task covers:

- |                |                        |                          |
|----------------|------------------------|--------------------------|
| a. Removal     | c. Cleaning/Inspection | e. Installation          |
| b. Disassembly | d. Assembly            | f. Follow-on Maintenance |

**INITIAL SETUP**

*Tools and Special Tools*

- Pan, Drain, 4-Gallon (MIL-P-45189)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wrench, Combination, 1 1/4 in. (GGG-W-636)

- O-ring (2) (Item 58, Appendix K)
- O-ring (2) (Item 78, Appendix K)
- Seal Kit (2) (Item 45, Appendix K)
- Seal Kit (2) (Item 50, Appendix K)

*Materials/Parts*

- Adhesive-Sealant, Silicone, RTV (Item 6, Appendix E)
- Cable Ties (Item 8, Appendix E)
- Lubricating Oil (Item 20, Appendix E)
- Tag, Identification (as required) (Item 23, Appendix E)
- Gasket (2) (Item 109, Appendix K)
- Lockwasher (4) (Item 67, Appendix K)

*Equipment Condition*

- Wheels chocked (TM 9-2320-279-10)
- Engine turned off (TM 9-2320-279-10)

*Special Environmental Conditions*

Cleanliness is extremely important when working on hydraulic equipment. Clean all parts before disassembly and work in a clean work area.

**a. Removal.**

**NOTE**

- Steps 1 through 3 are to relieve main frame cylinder pressure. Main frame cylinder should rotate freely when pressure is relieved.
- It may take two to three minutes before pressure is relieved.

- (1) Turn engine switch (1) to ON position.
- (2) Turn light control switch (2) to STOP LIGHT position.
- (3) Turn LHS MODE SELECT switch (3) to no. 1 (AUTO) position.

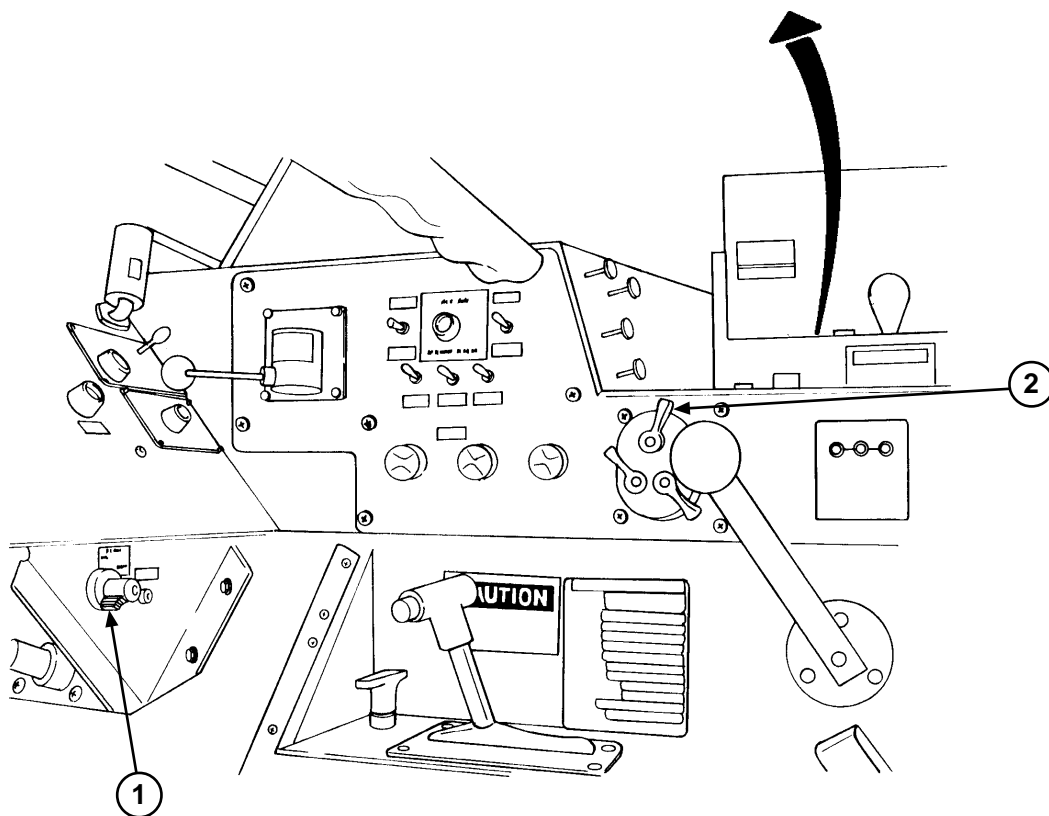
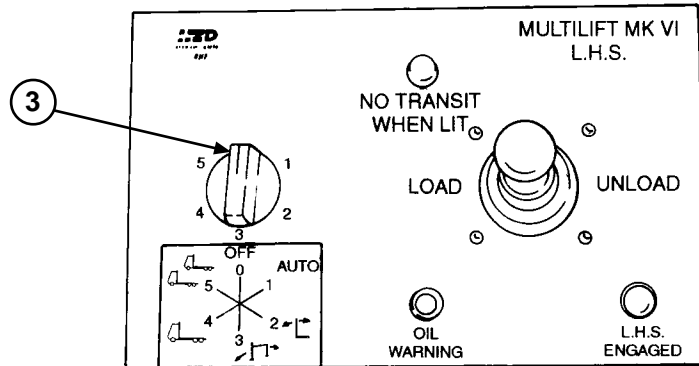
**NOTE**

If hook arm and/or main frame are above proximity switch(es), it will be necessary to hold a metal object in front of switch(es) to relieve pressure.

- (4) After pressure is relieved, turn LHS MODE SELECT switch (3), light control switch (2) and engine switch (1) to OFF position.



**5-24. MAIN FRAME MANIFOLD REPAIR (continued).**



MODEL A SHOWN

**5-24. MAIN FRAME MANIFOLD REPAIR (continued).**

**NOTE**

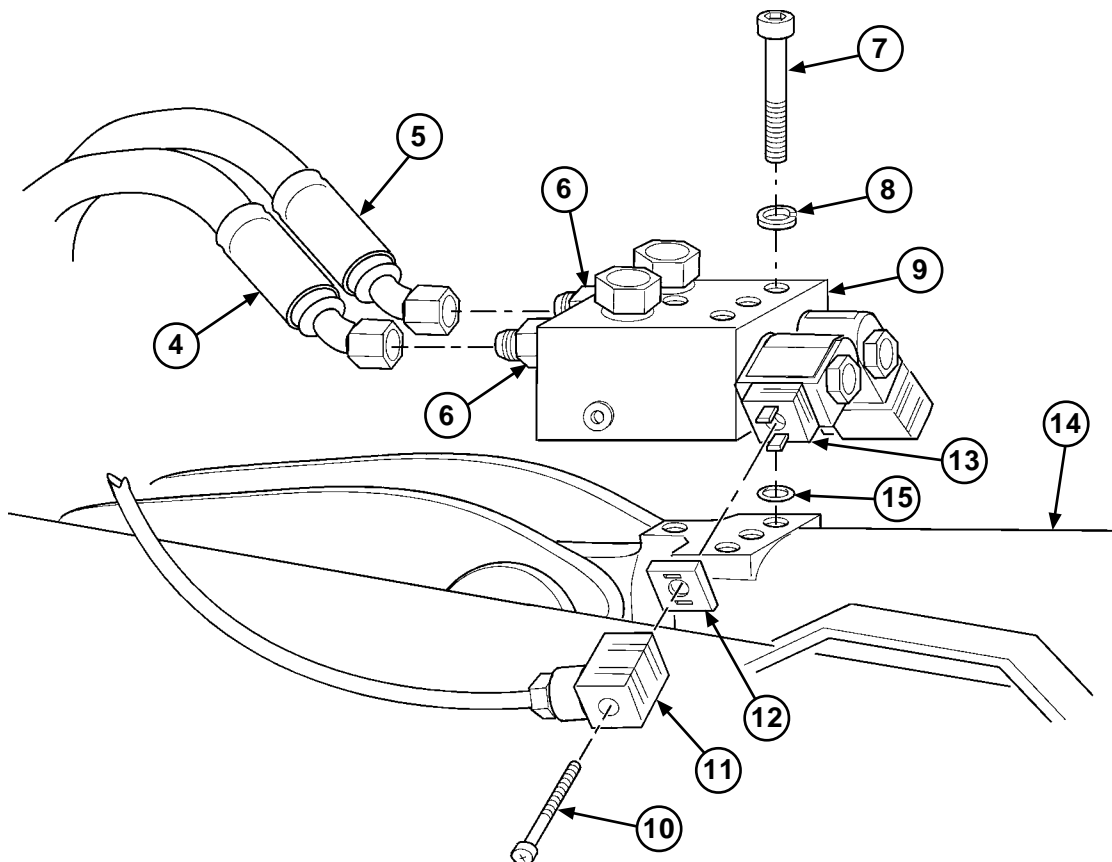
- Cut cable ties as required.
- Place drain pan under manifold to catch excess oil.
- Tag and mark hoses prior to removal to ensure proper installation.
- Cap and plug hoses upon removal.

(5) Remove two hoses (4) and (5) from adapters (6).

**WARNING**

**Main frame manifold may have hydraulic pressure behind it. Loosen screws equally and cover manifold with clean rag to prevent personal injury from oil spray.**

- (6) Remove four screws (7) and lockwashers (8) from main frame manifold (9). Discard lockwashers.
- (7) Loosen two screws (10) and remove connectors (11) and gaskets (12) from coils (13). Discard gaskets.
- (8) Remove main frame manifold (9) from main frame cylinder (14).
- (9) Remove and discard two o-rings (15) from main frame manifold (9).

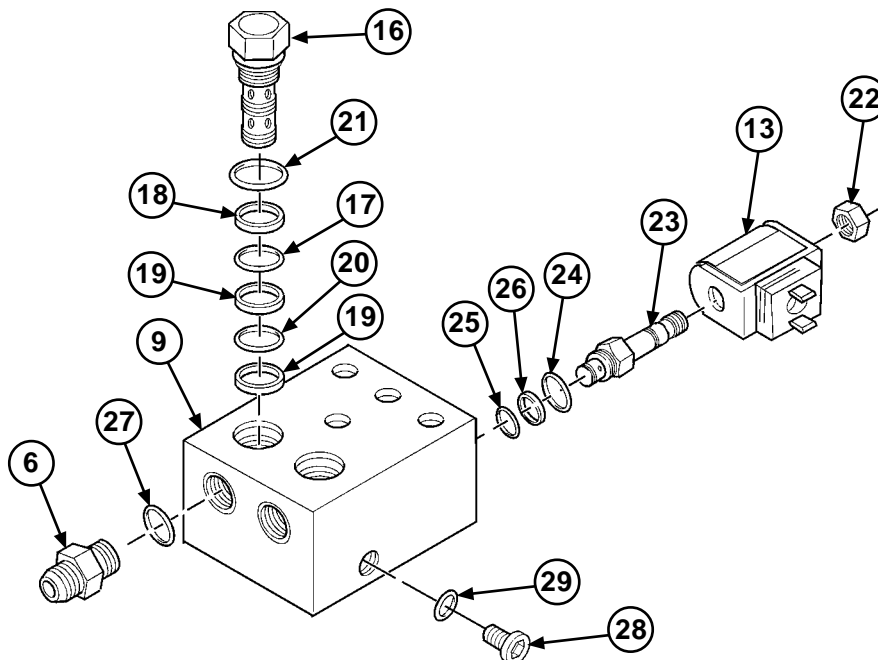


## 5-24. MAIN FRAME MANIFOLD REPAIR (continued).

### b. Disassembly.

#### NOTE

- Position manifold in soft-jawed vise to disassemble.
  - Note location of all components before removing.
- (1) Remove two counterbalance valves (16) from main frame manifold (9).
  - (2) Remove and discard o-ring (17), backup ring (18), two backup rings (19), o-ring (20) and o-ring (21) from each counterbalance valve (16).
  - (3) Remove two nuts (22) and coils (13) from cartridges (23).
  - (4) Remove two cartridges (23) from main frame manifold (9).
  - (5) Remove and discard o-ring (24), o-ring (25) and backup ring (26) from each cartridge (23).
  - (6) Remove two adapters (6) from main frame manifold (9).
  - (7) Remove and discard two o-rings (27) from adapters (6).
  - (8) Remove two plugs (28) from main frame manifold (9).
  - (9) Remove and discard two o-rings (29) from plugs (28).



**5-24. MAIN FRAME MANIFOLD REPAIR (continued).**

**c. Cleaning/Inspection.**

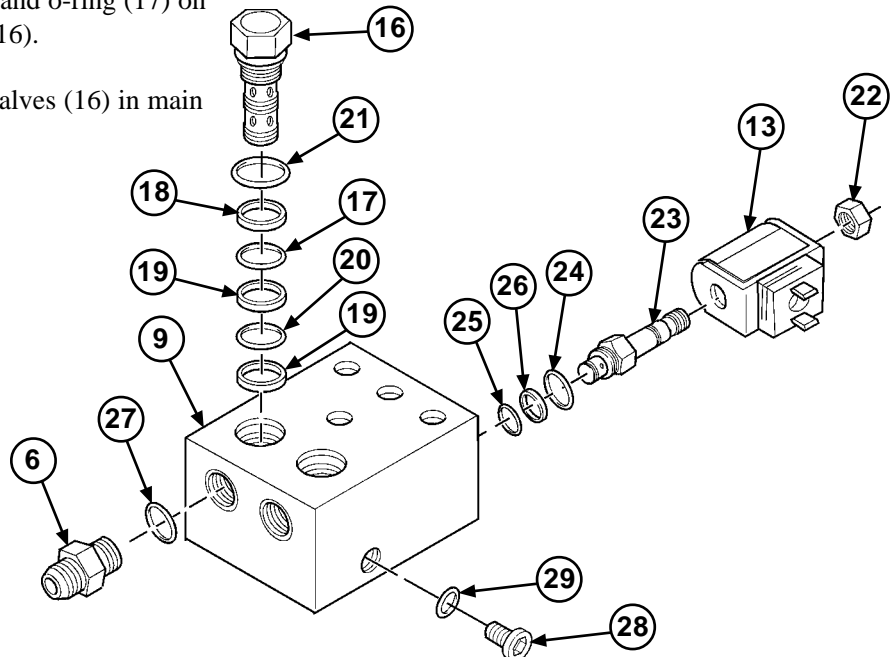
- (1) Clean all parts. Refer to para 4-16.
- (2) Inspect all parts. Refer to para 4-17.
- (3) Replace all parts failing inspection.

**d. Assembly.**

**NOTE**

- Lubricate O-rings and backup rings with clean lubricating oil prior to installation.
- Cup side of backup ring should face O-ring.

- (1) Install two o-rings (29) on plugs (28) and install plugs in main frame manifold (9).
- (2) Install two new o-rings (27) on adapters (6) and install adapters in main frame manifold (9).
- (3) Install new backup ring (26), o-ring (25) and o-ring (24) on two cartridges (23) and install cartridges in main frame manifold (9).
- (4) Install two coils (13) on cartridges (23) with nuts (22).
- (5) Install new o-ring (21), o-ring (20) two backup rings (19), backup ring (18) and o-ring (17) on each counterbalance valve (16).
- (6) Install two counterbalance valves (16) in main frame manifold (9).



## 5-24. MAIN FRAME MANIFOLD REPAIR (continued).

### e. Installation.

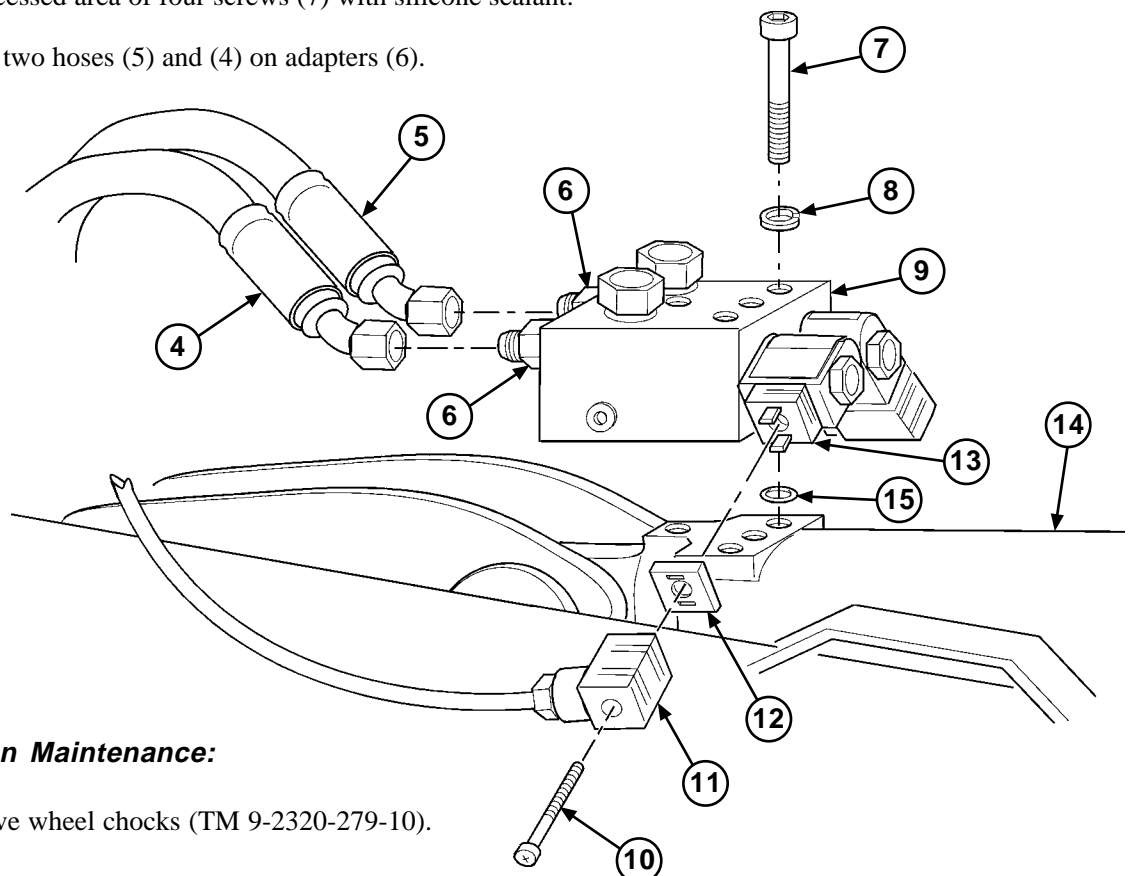
#### NOTE

- Lubricate O-rings with clean lubricating oil prior to installation.
  - Install hoses and connectors in same location as noted during removal.
- (1) Install two new gaskets (12) and connectors (11) on coils (13) and tighten two screws (10).
  - (2) Install two new o-rings (15) in main frame manifold (9).

#### WARNING

**Adhesives, solvents and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesives, solvent or sealing compound gets on skin or clothing, wash immediately with soap and water.**

- (3) Apply silicone sealant to bottom of screw heads on four screws (7).
- (4) Install main frame manifold (9) on main frame cylinder (14) with four new lockwashers (8) and screws (7).
- (5) Fill recessed area of four screws (7) with silicone sealant.
- (6) Install two hoses (5) and (4) on adapters (6).



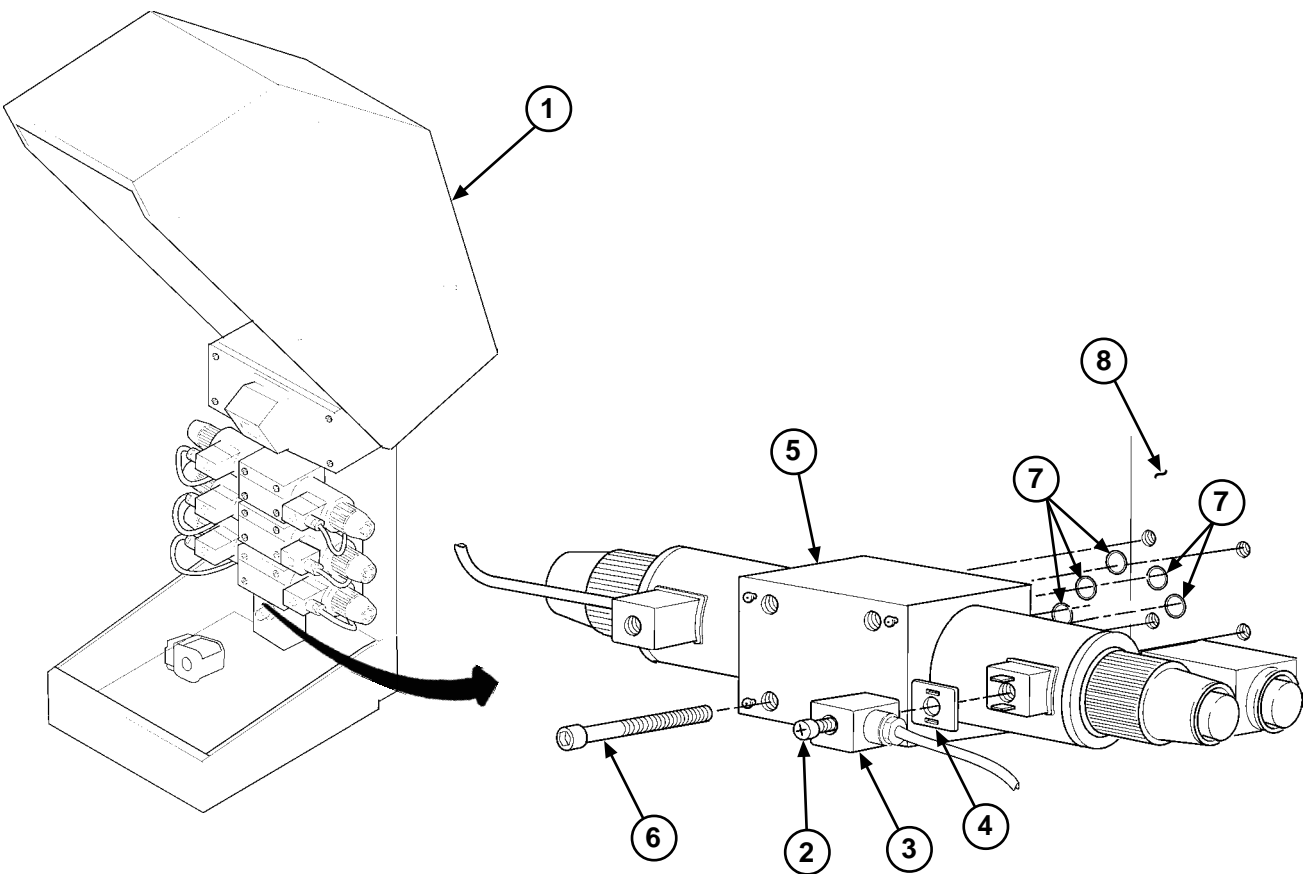
### f. Follow-on Maintenance:

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**



## 5-25. DIRECTIONAL CONTROL VALVE REPLACEMENT (continued).



MODEL A SHOWN

### b. Installation.

#### NOTE

Coat O-rings with lubricating oil prior to installation.

- (1) Install five new o-rings (7) and directional control valve (5) on main manifold block (8) with four screws (6).
- (2) Install two new gaskets (4) and connectors (3) on directional control valve (5) and tighten two screws (2).
- (3) Close hydraulic cabinet cover (1).

### c. Follow-on Maintenance:

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

## 5-26. RELIEF VALVE REPLACEMENT.

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

### INITIAL SETUP

*Tools and Special Tools:*

- Pan, Drain, 4-Gallon (MIL-P-45819)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wrench, Combination, 1 3/8 in. (1244)
- Wrench Set, Socket, 3/4-In. Drive (FEDSTD353)
- Wrench, Torque, 50-250 ft-lb (STW-3RCF)

*Materials/Parts:*

- Lubricating Oil (Item 20, Appendix E)
- Seal Kit (Item 46, Appendix K)

*Equipment Condition:*

- Free flow valve and coil removed (para 5-28)
- Lower directional control valve removed (para 5-25)

#### **a. Removal.**

- (1) Open hydraulic cabinet cover (1).

#### **NOTE**

Place drain pan under relief valve to catch excess oil.

- (2) Remove relief valve (2) from main manifold block (3).
- (3) Remove and discard two backup rings (4) and o-ring (5) from relief valve (2).
- (4) Remove and discard two backup rings (6) and o-ring (7) from relief valve (2).
- (5) Remove and discard o-ring (8) from relief valve (2).

#### **b. Installation.**

#### **NOTE**

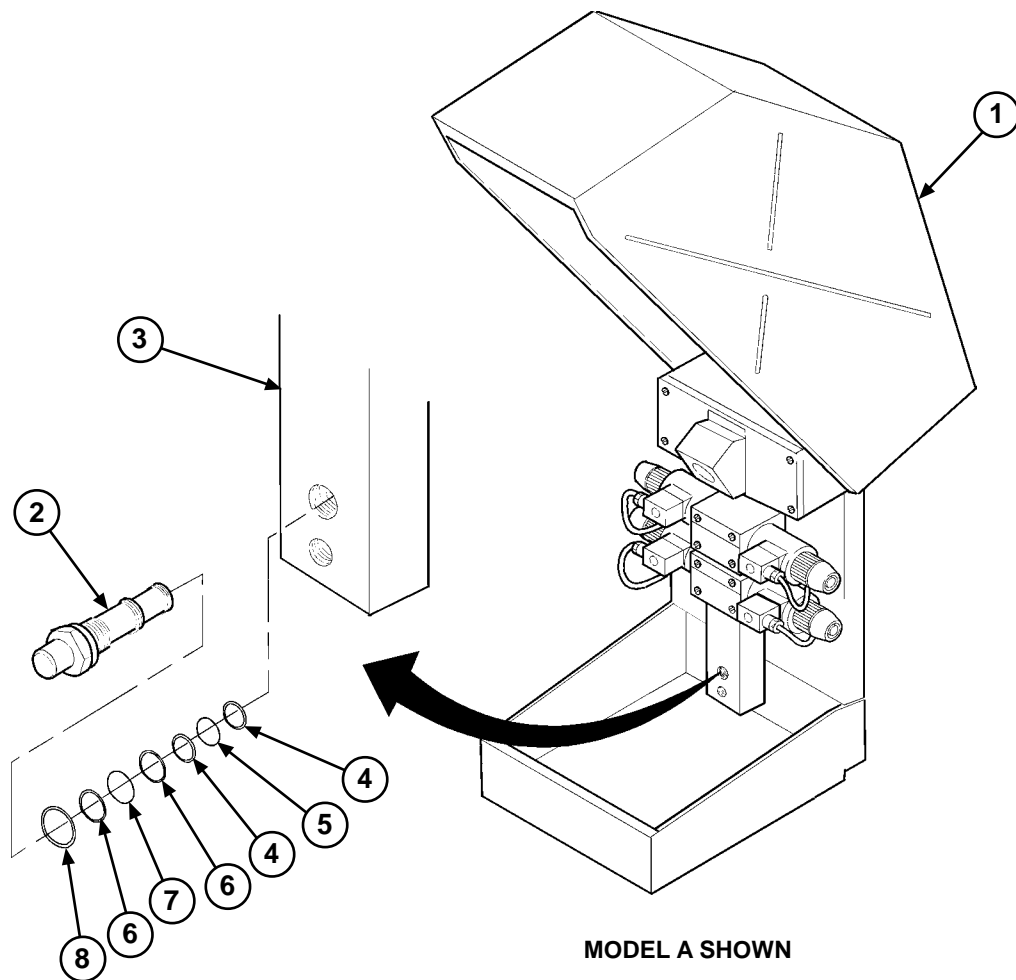
Coat new O-rings and backup rings with lubricating oil prior to installation.

- (1) Install new o-ring (8) on relief valve (2).
- (2) Install new o-ring (7) and two backup rings (6) on relief valve (2).



**5-26. RELIEF VALVE REPLACEMENT (continued).**

- (3) Install new o-ring (7) and two backup rings (6) on relief valve (2).
- (4) Install relief valve (2) in main manifold block (3). Torque to 65 lb-ft (88 N•m).
- (5) Close hydraulic cabinet cover (1).

**c. Follow-on Maintenance:**

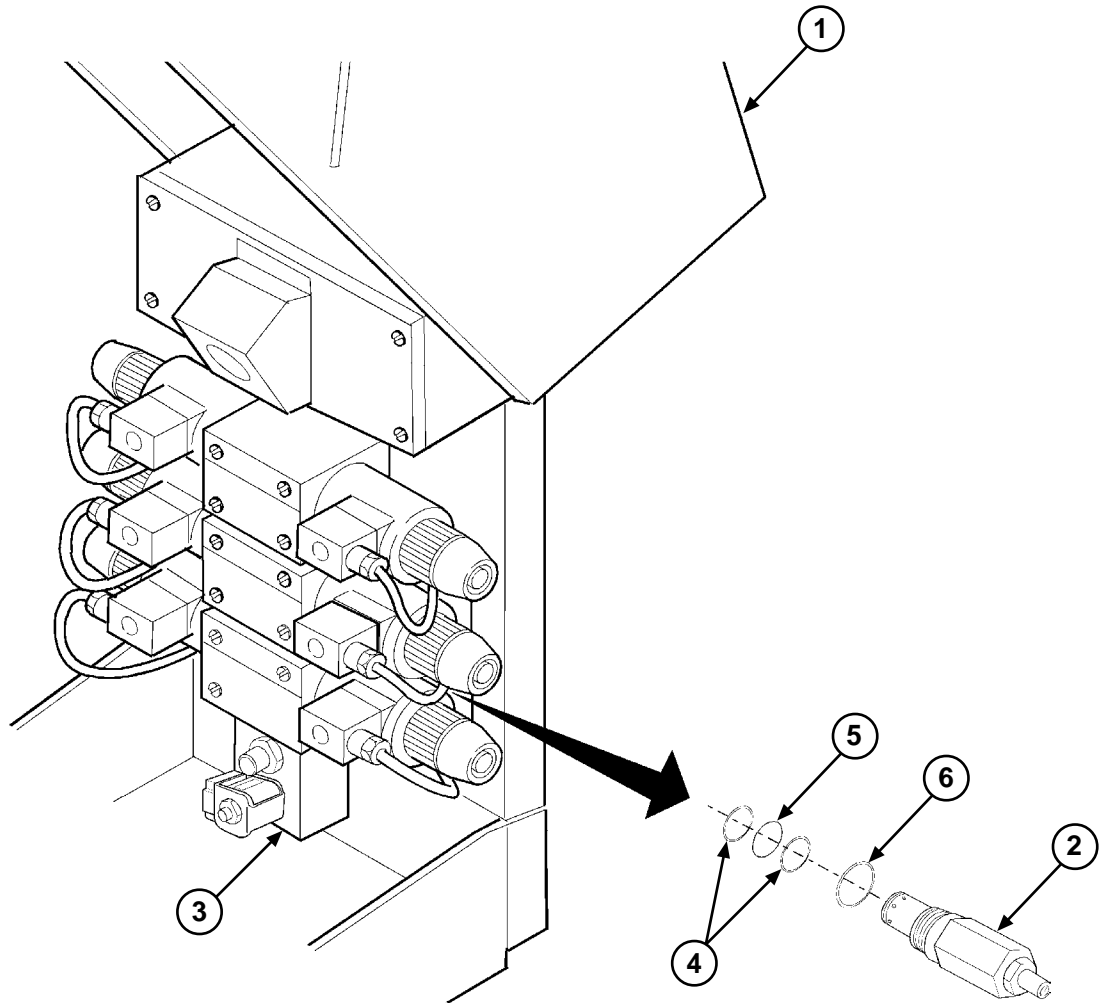
- Install free flow valve and coil (para 5-25).
- Install directional control valve (para 5-28).

**END OF TASK**



**5-27. WINCH RELIEF VALVE REPLACEMENT CONTINUED.**

- (2) Install winch relief valve (2) in main manifold block (3). Torque to 46 lb-ft (62.37 N•m).
- (3) Close hydraulic cabinet cover (1).



MODEL A SHOWN

**c. Follow-on Maintenance:**

- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

**5-28. FREE FLOW VALVE AND COIL REPLACEMENT.**

This task covers:

- a. Removal
- b. Installation
- c. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

- Pan, Drain, 4-Gallon (MIL-P-45189)
- Socket Set, 1/2-in. deep (GGG-W-641)
- Tool Kit, General Mechanic's: Automotive (SC 5180-95-CL-N26)
- Wrench Set, Socket (51200017510)
- Wrench, Torque, 15-75 ft-lb (GGG-W-00686)
- Wrench, Torque, 0-300 in-lb (2163993)

*Materials/Parts:*

- Lubricating Oil (Item 20, Appendix E)
- Gasket (Item 109, Appendix K)
- Seal Kit (Item 45, Appendix K)

*Equipment Condition:*

- Wheels chocked (TM 9-2320-279-10)
- Engine turned off (TM 9-2320-279-10)

**a. Removal.**

**NOTE**

Place drain pan under free flow valve to catch excess oil.

- (1) Open hydraulic cabinet cover (1).
- (2) Loosen screw (2) and remove connector (3) and gasket (4) from coil (5). Discard gasket.

**NOTE**

Note position of coil prior to removal to ensure proper installation.

- (3) Remove nut (6) and coil (5) from free flow valve (7).
- (4) Remove free flow valve (7) from main manifold block (8).
- (5) Remove and discard two backup rings (9), O-ring (10) and o-ring (11) from free flow valve (7).

**b. Installation.**

**NOTE**

Coat O-rings with lubricating oil prior to installation

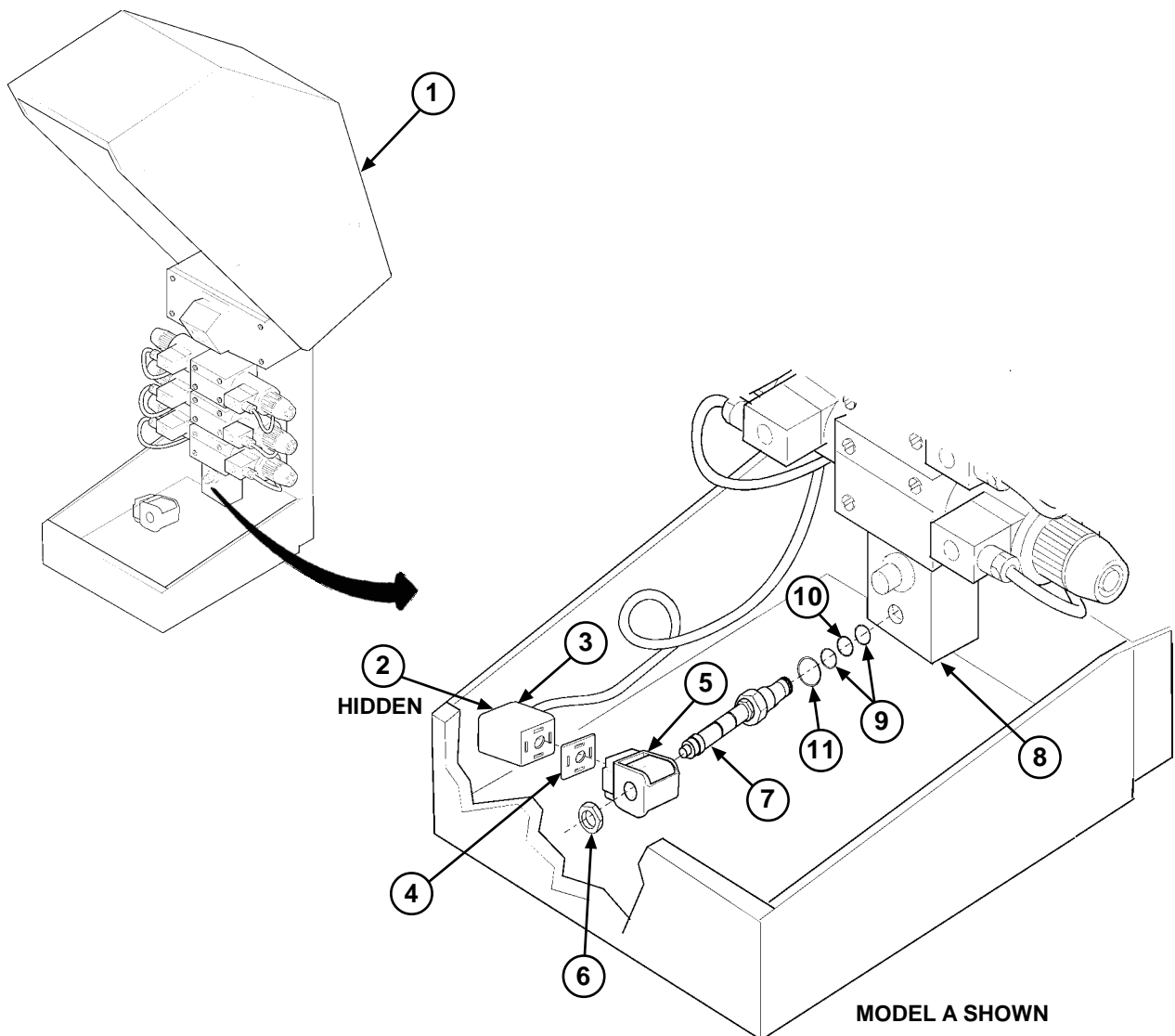
- (1) Install new o-ring (11), O-ring (10) and two backup rings (9) on free flow valve (7).
- (2) Install free flow valve (7) in manifold (8). Torque to 22 lb-ft (N•m).

## 5-28. FREE FLOW VALVE AND COIL REPLACEMENT (continued).

### NOTE

Ensure coil is installed in same position as noted during removal.

- (3) Install coil (5) on free flow valve (7) with nut (6). Tighten nut to 36 in-lb (4 N•m).
- (4) Install new gasket (4) and connector (3) on coil (5) and tighten screw (2).
- (5) Close hydraulic cabinet cover (1).



### c. Follow-on Maintenance:

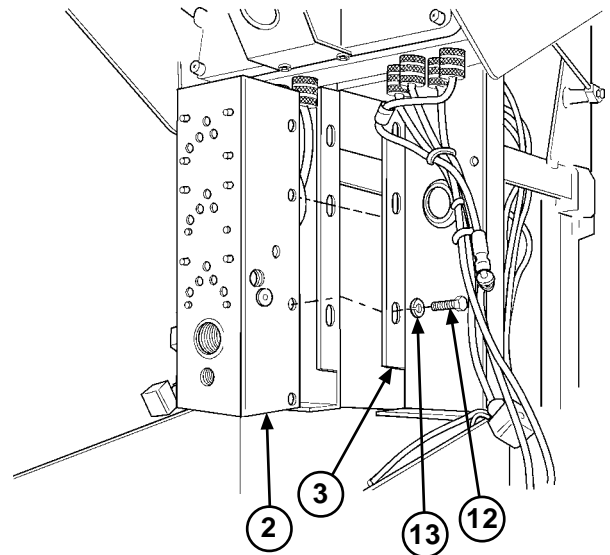
- Remove wheel chocks (TM 9-2320-279-10).

**END OF TASK**

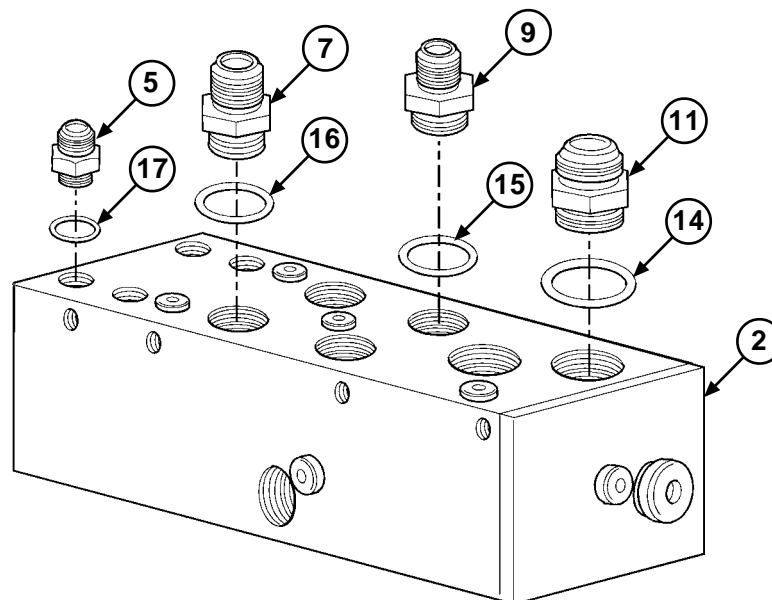


**5-29. MAIN MANIFOLD BLOCK REPLACEMENT (MODEL A ONLY) (continued).**

- (2) Remove four hoses (4) from adapters (5).
- (3) Remove two hoses (6) from adapters (7).
- (4) Remove two hoses (8) from adapters (9).
- (5) Remove two hoses (10) from adapters (11).
- (6) Remove six screws (12), lockwashers (13) and main manifold block (2) from bracket (3). Discard lockwashers.
- (7) Position main manifold block (2) in soft jawed vise.

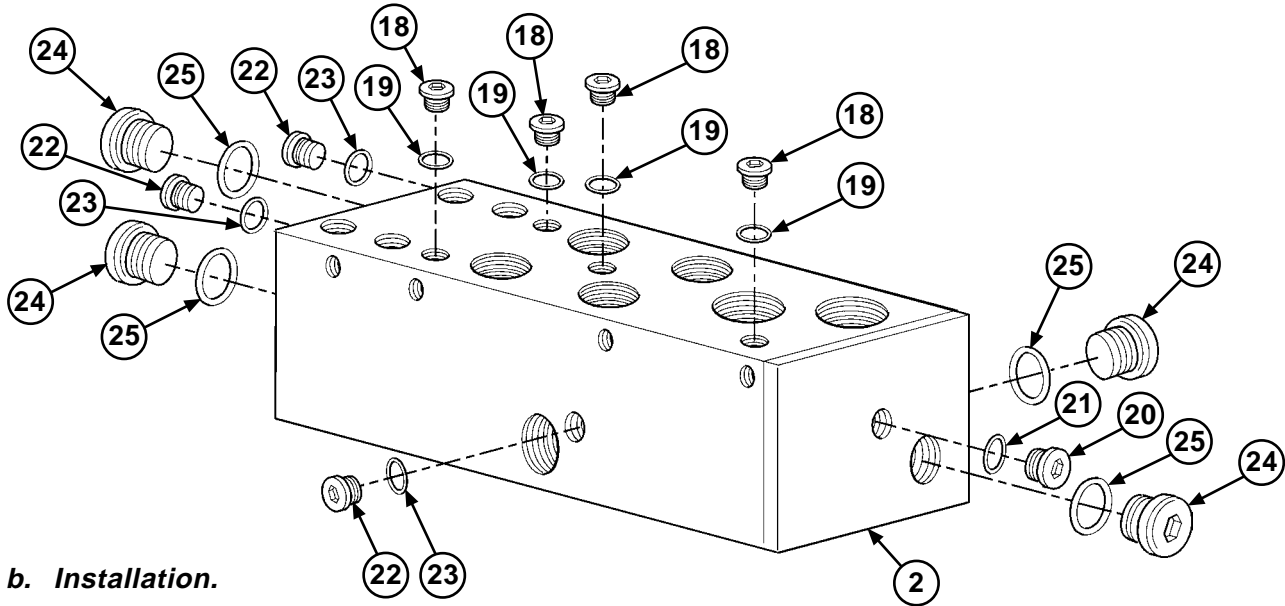


- (8) Remove two adapters (11) and o-rings (14) from main manifold block (2). Discard o-rings.
- (9) Remove two adapters (9) and o-rings (15) from main manifold block (2). Discard o-rings.
- (10) Remove two adapters (7) and o-rings (16) from main manifold block (2). Discard o-rings.
- (11) Remove four adapters (5) and o-rings (17) from main manifold block (2). Discard o-rings.



**5-29. MAIN MANIFOLD BLOCK REPLACEMENT (MODEL A ONLY) (continued).**

- (12) Remove four plugs (18) and o-rings (19) from main manifold block (2). Discard o-rings.
- (13) Remove plug (20) and o-ring (21) from main manifold block (2). Discard o-ring.
- (14) Remove three plugs (22) and o-rings (23) from main manifold block (2). Discard o-rings.
- (15) Remove four plugs (24) and o-rings (25) from main manifold block (2). Discard o-rings.

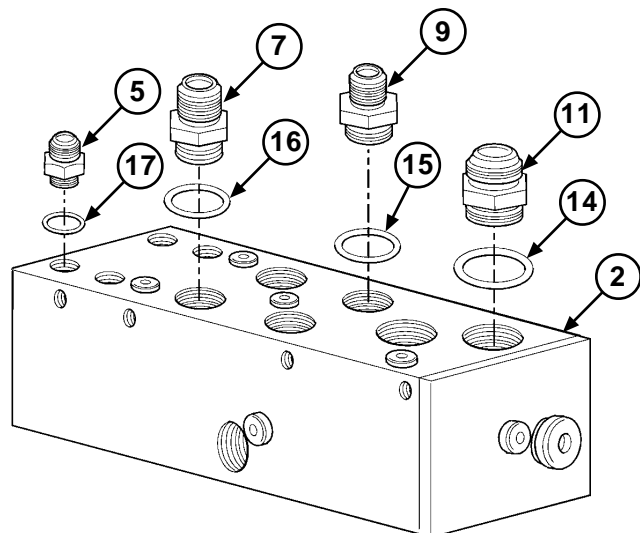


**b. Installation.**

**NOTE**

Apply lubricating oil to all O-rings prior to installation.

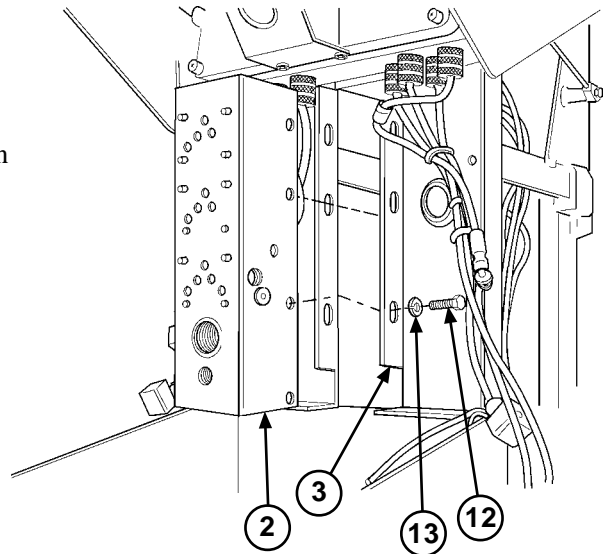
- (1) Install four new o-rings (25) and plugs (24) in main manifold block (2).
- (2) Install three new o-rings (23) and plugs (22) in main manifold block (2).
- (3) Install new o-ring (21) and plug (20) in main manifold block (2).
- (4) Install four new o-rings (19) and plugs (18) in main manifold block (2).
- (5) Install four new o-rings (17) and adapters (5) in main manifold block (2).
- (6) Install two new o-rings (16) and adapters (7) in main manifold block (2).
- (7) Install two new o-rings (15) and adapters (9) in main manifold block (2).
- (8) Install two new o-rings (14) and adapters (11) in main manifold block (2).





**5-29. MAIN MANIFOLD BLOCK REPLACEMENT (MODEL A ONLY) (continued).**

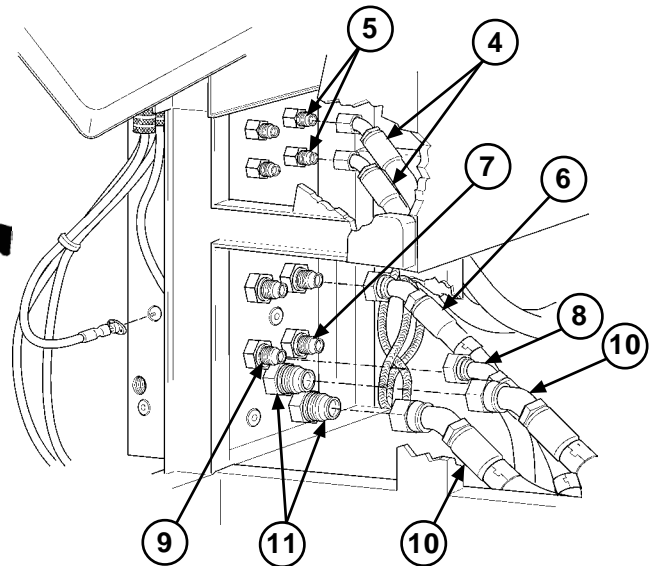
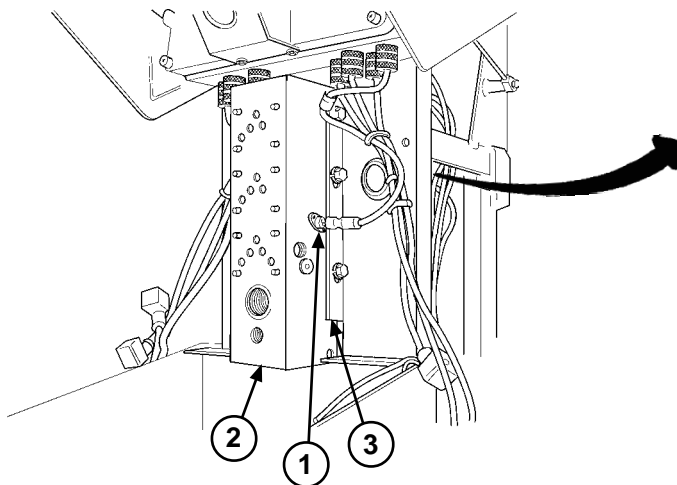
- (9) Install main manifold block (2) in bracket (3) with six new lockwashers (13) and screws (12). Do not tighten.
- (10) Install oil temperature sending unit (1) between main manifold block (2) and bracket (3).
- (11) Tighten six screws (12).
- (12) Install two hoses (10) on adapters (11).



**CAUTION**

**Hoses to right side of vehicle must be routed over bracket in main manifold support frame. Failure to comply will result in damage to hoses.**

- (13) Install two hoses (8) on adapters (9).
- (14) Install two hoses (6) on adapters (7).
- (15) Install four hoses (4) on adapters (5).



***c. Follow-on Maintenance:***

- Install free flow valve and coil (para 5-28).
- Install directional control valves (para 5-25).
- Install winch relief valve (para 5-27).
- Install relief valve (para 5-26).

**END OF TASK**

**5-30. HOOK ARM CYLINDER REPLACEMENT.**

This task covers:

- a. Right Cylinder Removal
- b. Left Cylinder Removal
- c. Left Cylinder Installation
- d. Right Cylinder Installation
- e. Follow-on Maintenance

**INITIAL SETUP**

*Tools and Special Tools:*

- Lifting Device, Minimum Capacity 210 lb (95 kg)
- Spacer Plate (Item H-5, Appendix H)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Wooden Block (Item H-6, Appendix H)
- Wrench Set, Adjustable Hook Spanner (304AHSK)

- Locknut (2) (Item 59, Appendix K)
- Lockwasher (2) (Item 50, Appendix K)
- Lockwasher (2) (Item 89, Appendix K)
- Lockwasher (2) (Item 90, Appendix K)

*Personnel Required*

Two

*Equipment Condition*

Hook arm manifolds removed (para 5-23)

*Materials/Parts:*

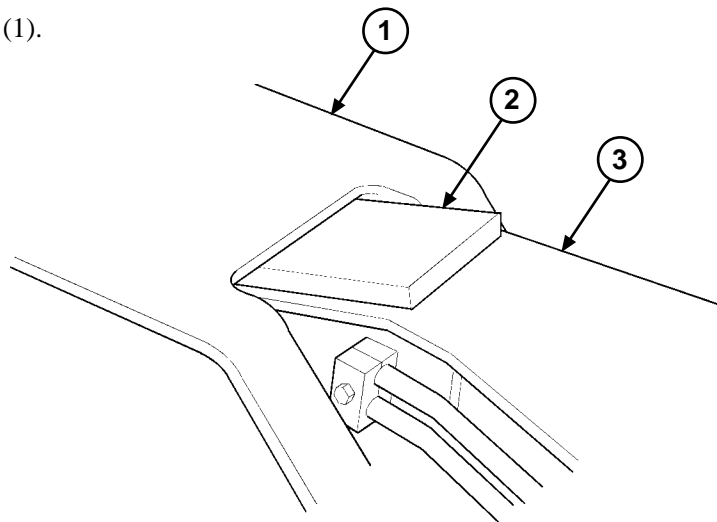
- Tag, Identification (as required) (Item 23, Appendix E)
- Locknut (2) (Item 13, Appendix K)

**a. Right Cylinder Removal.**

**NOTE**

Spacer plate must be installed between hook arm and main frame to relieve pressure on hydraulic cylinders.

- (1) Attach lifting device to hook arm (1).
- (2) Raise hook arm (1) and install spacer plate (2) between hook arm (1) and main frame (3).
- (3) Remove lifting device from hook arm (1).



## 5-30. HOOK ARM CYLINDER REPLACEMENT (continued).

### WARNING

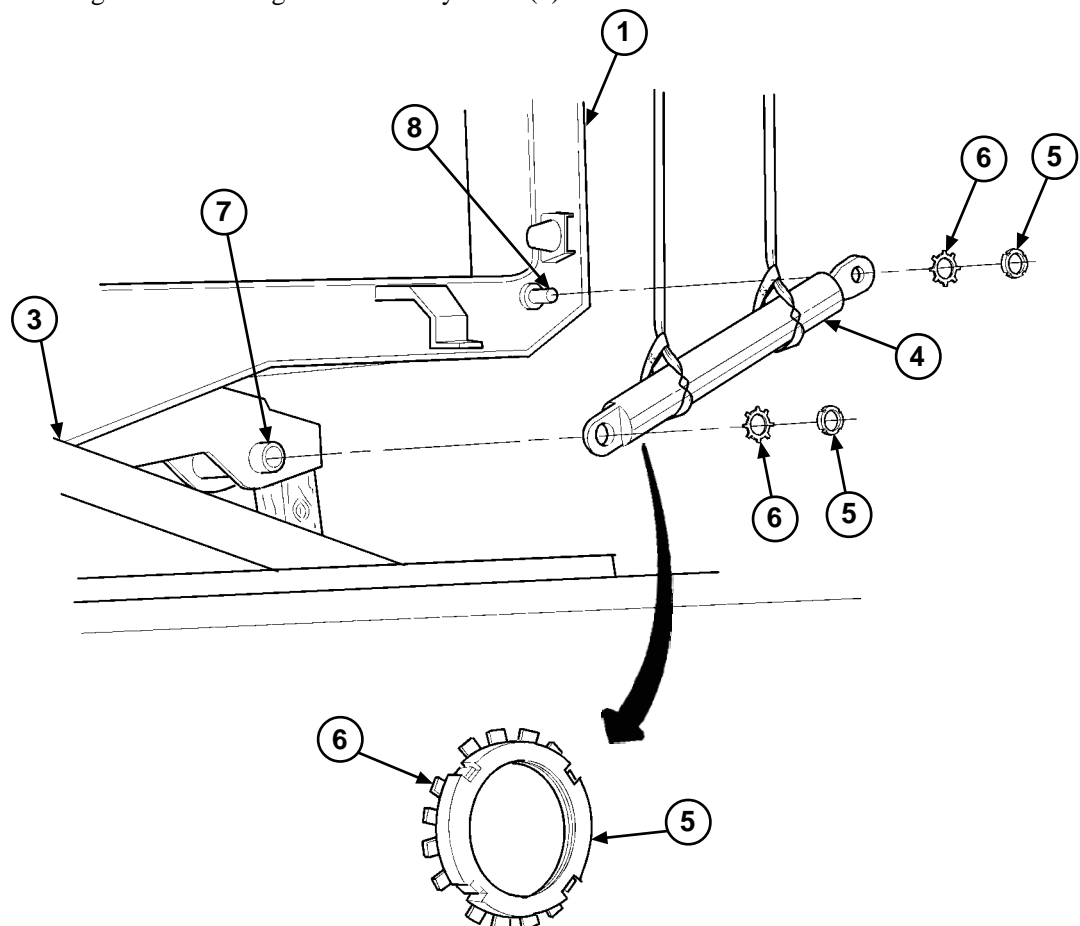
- Hook arm cylinders weigh 210 lb (95 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.
- Ensure main frame is supported with wooden block prior to removal to prevent possible injury to personnel.

- (4) Attach lifting device to right hook arm cylinder (4). Remove slack from lifting device.

### NOTE

Bend lockwasher tabs out to remove locknuts.

- (5) Remove two locknuts (5) and lockwashers (6) from two pins (7 and 8). Discard locknuts and lockwashers.
- (6) Remove right hook arm cylinder (4) from two pins (7 and 8), hook arm (1) and main frame (3) with the aid of an assistant and lifting device.
- (7) Remove lifting device from right hook arm cylinder (4).



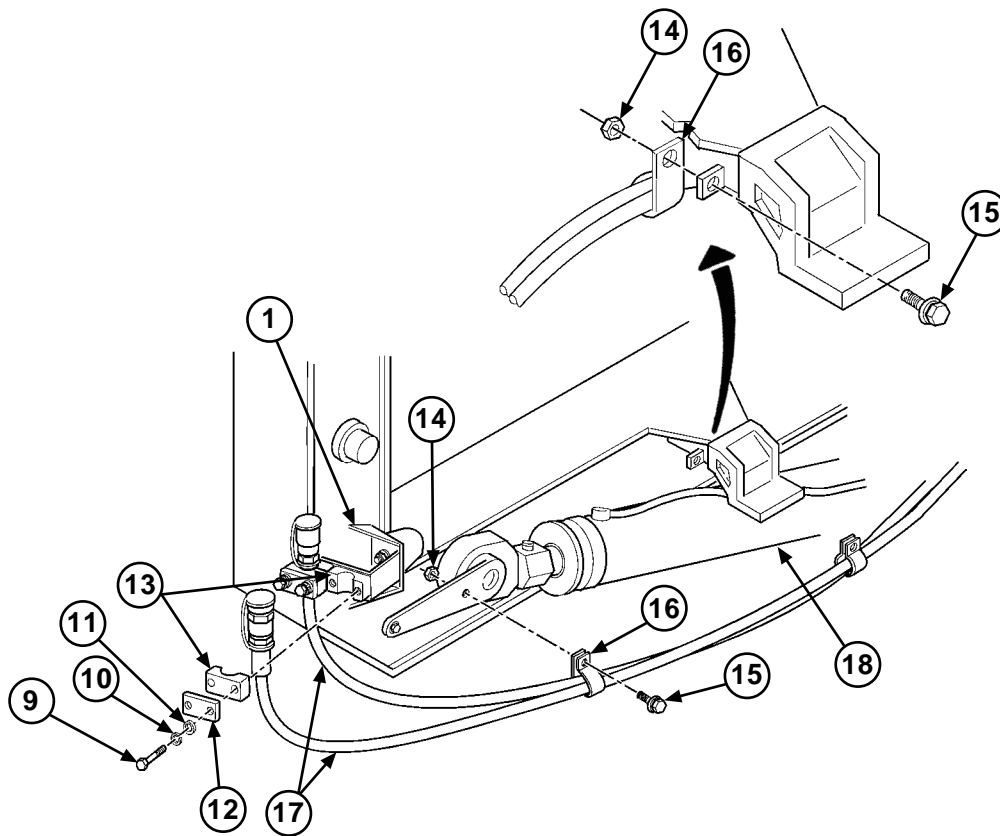
**5-30. HOOK ARM CYLINDER REPLACEMENT (continued).**

***b. Left Cylinder Removal.***

**NOTE**

Tag and mark hose locations before removing clamps.

- (1) Remove four screws (9), lockwashers (10), washers (11), two plates (12), and two piece clamps (13) from hook arm (1). Discard lockwashers.
- (2) Remove two locknuts (14), screws (15), and clips (16) from hook arm (1) and position hoses (17) away from left hook arm cylinder (18). Discard locknuts.

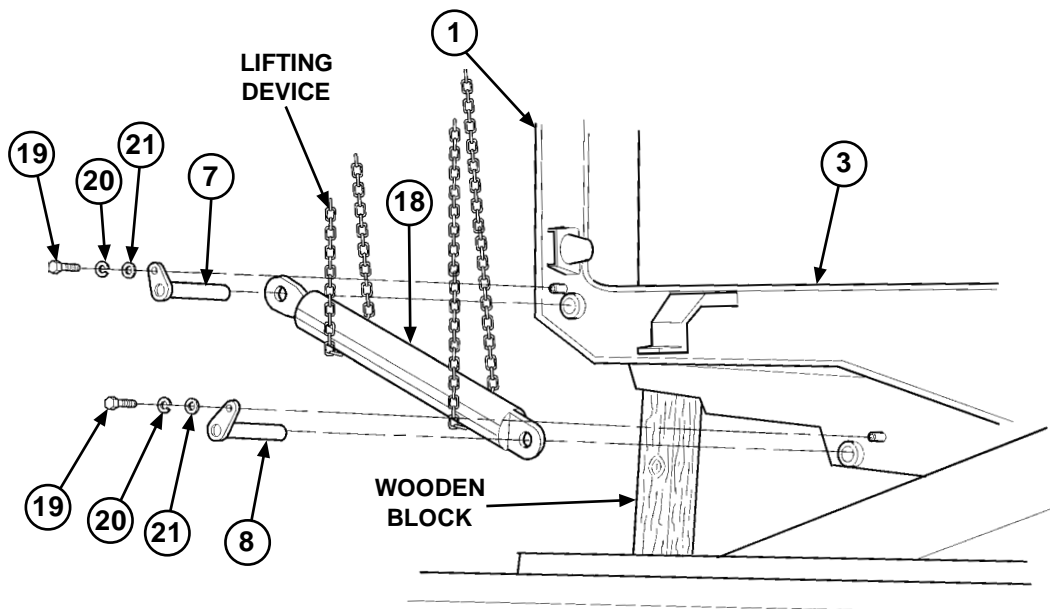


### 5-30. HOOK ARM CYLINDER REPLACEMENT (continued).

#### NOTE

Right cylinder must be removed prior to left cylinder removal.

- (3) Attach lifting device to right hook arm cylinder (18).
- (4) Remove two screws (19), lockwashers (20), washers (21) from two pins (7 and 8), hook arm (1) and main frame (3). Discard lockwashers.
- (5) Remove two pins (7 and 8) and left hook arm cylinder (18) from hook arm (1) and main frame (3) with the aid of an assistant and lifting device.
- (6) Remove lifting device from left hook arm cylinder (18).



#### c. Left Cylinder Installation.

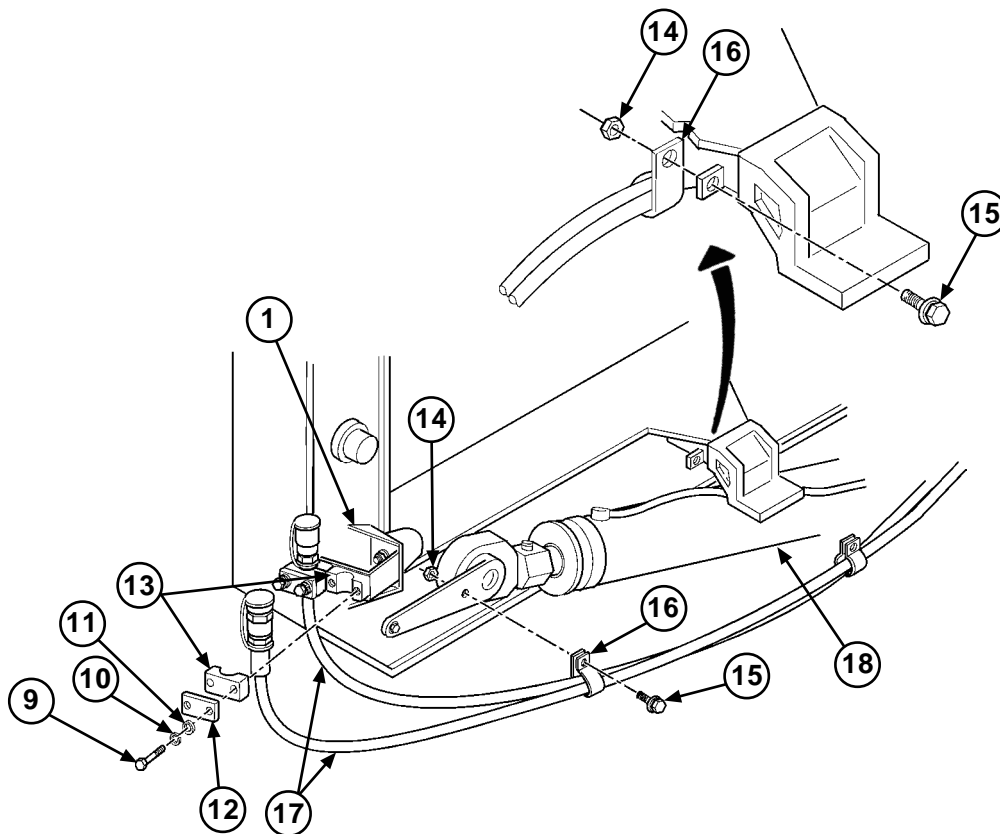
#### **WARNING**

**Hook arm cylinder weighs 210 lb (95 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**

- (1) Position left hook arm cylinder (18) on main frame (3) and hook arm (1) with two pins (8 and 7) with the aid of an assistant and lifting device.
- (2) Install pins (8 and 7) in main frame (3) and hook arm (1) with two washers (21), new lockwashers (20) and screws (19).
- (3) Remove lifting device from left hook arm cylinder (18).

**5-30. HOOK ARM CYLINDER REPLACEMENT (continued).**

- (4) Install hoses (17) on hook arm (1) with two clips (16), screws (15), and new locknuts (14).
- (5) Install hoses (17) on hook arm (1) with two piece clamp (13), plate (12), two washers (11), new lockwashers (10), and screws (9).



**d. Right Cylinder Installation.**

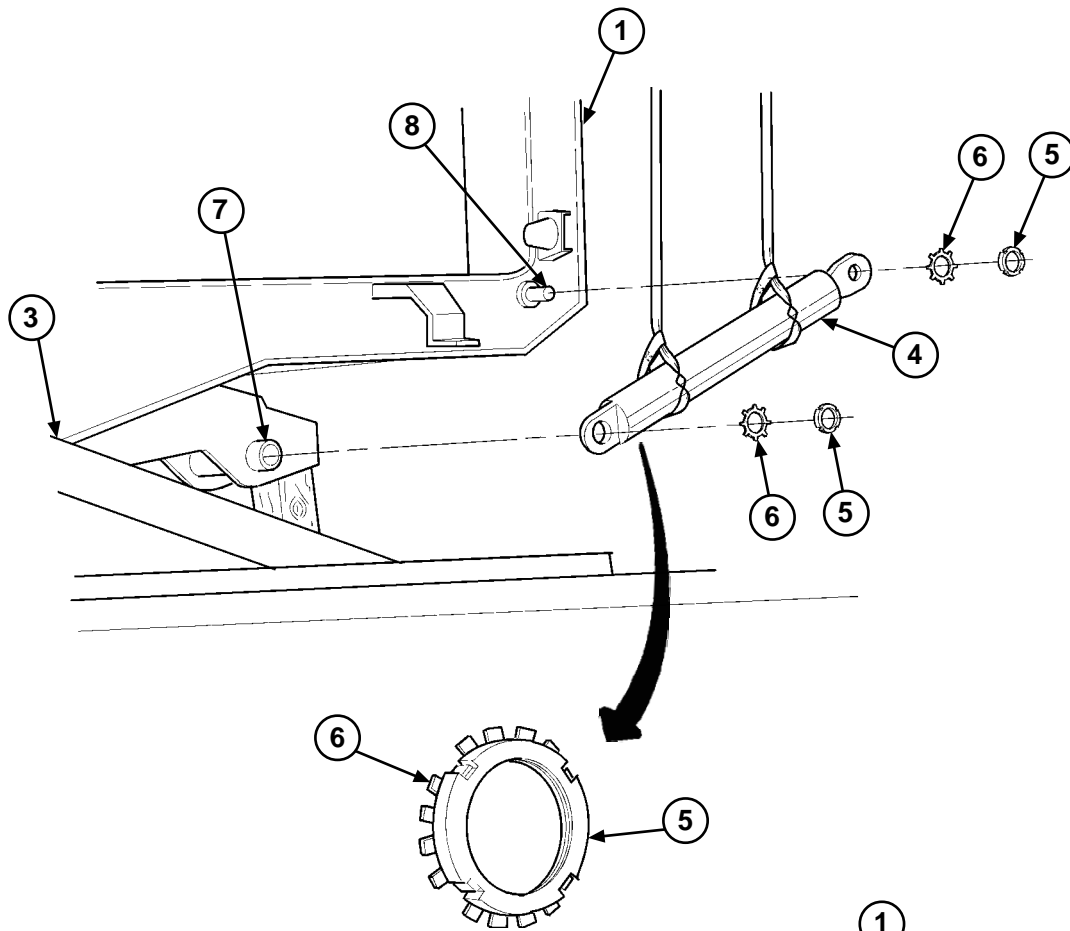
**NOTE**

Left cylinder must be installed prior to right cylinder installation.

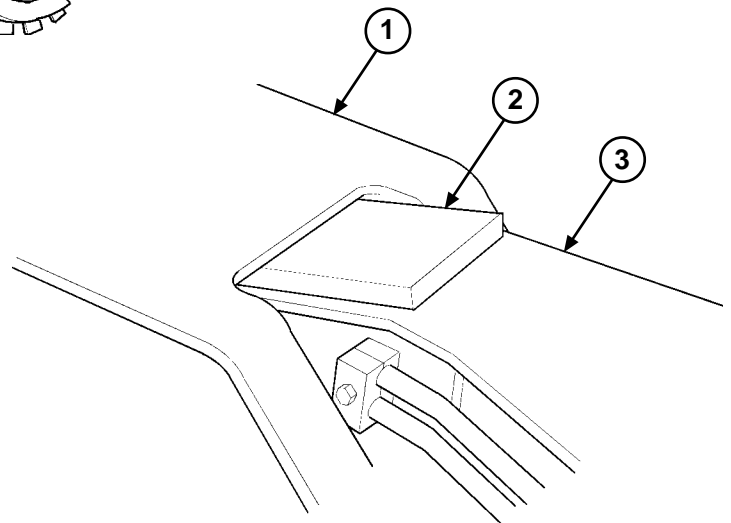
- (1) Attach lifting device to right hook arm cylinder (4).
- (2) Position right hook arm cylinder (4) on two pins (8 and 7) with the aid of an assistant and lifting device.
- (3) Install new locknut (5) and new lockwasher (6) on pin (8).

**5-30. HOOK ARM CYLINDER REPLACEMENT (continued).**

- (4) Install new locknut (5) and new lockwasher (6) on pin (7).
- (5) Bend tabs of two lockwashers (6) into slots on two locknuts (5).
- (6) Remove lifting device from right hook arm cylinder (4).



- (7) Attach lifting device to hook arm (1).
- (8) Raise hook arm (1) and remove spacer plate (2) from between hook arm (1) and main frame (3).
- (9) Remove lifting device from hook arm (1).



**e. Follow-on Maintenance:**

- Install hook arm manifolds (para 5-23).

**END OF TASK**



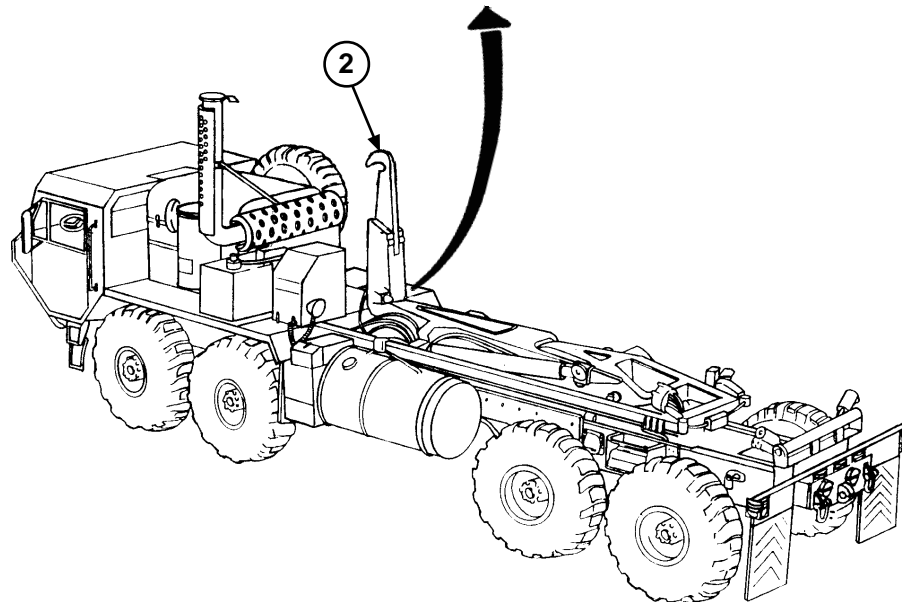
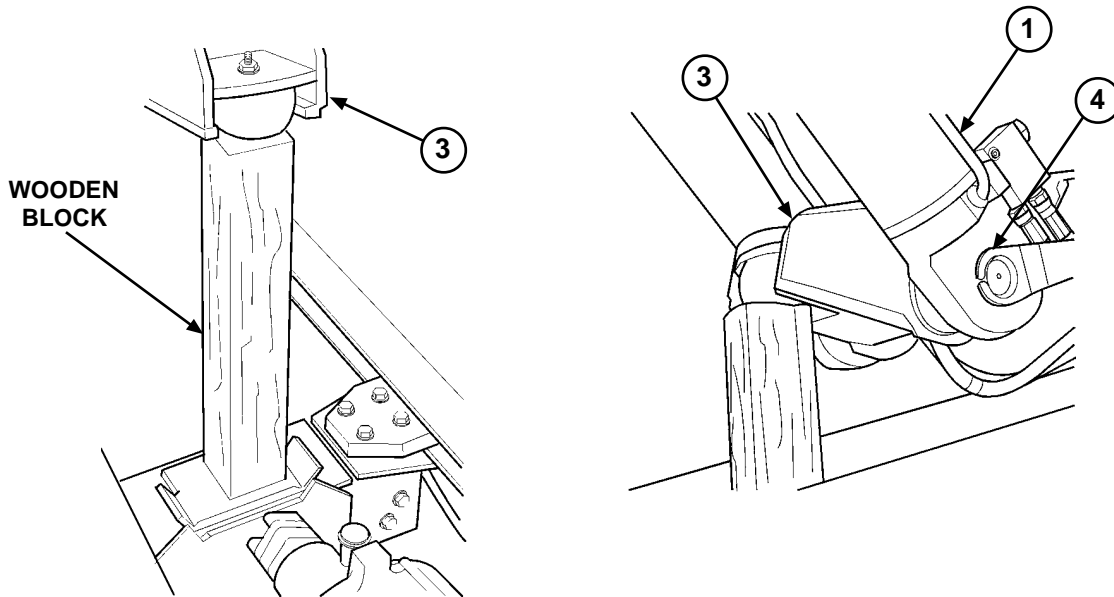


**5-31. MAIN FRAME CYLINDER REPLACEMENT (continued).**

**CAUTION**

**Wooden block supporting main frame can fall when main frame is supported by a lifting device. Have an assistant prevent wooden block from falling or damage to equipment may result.**

- (4) Block up main frame (3) with wooden block with aid of assistant.
- (5) Remove lifting device from hook arm (2).



## 5-31. MAIN FRAME CYLINDER REPLACEMENT (continued).

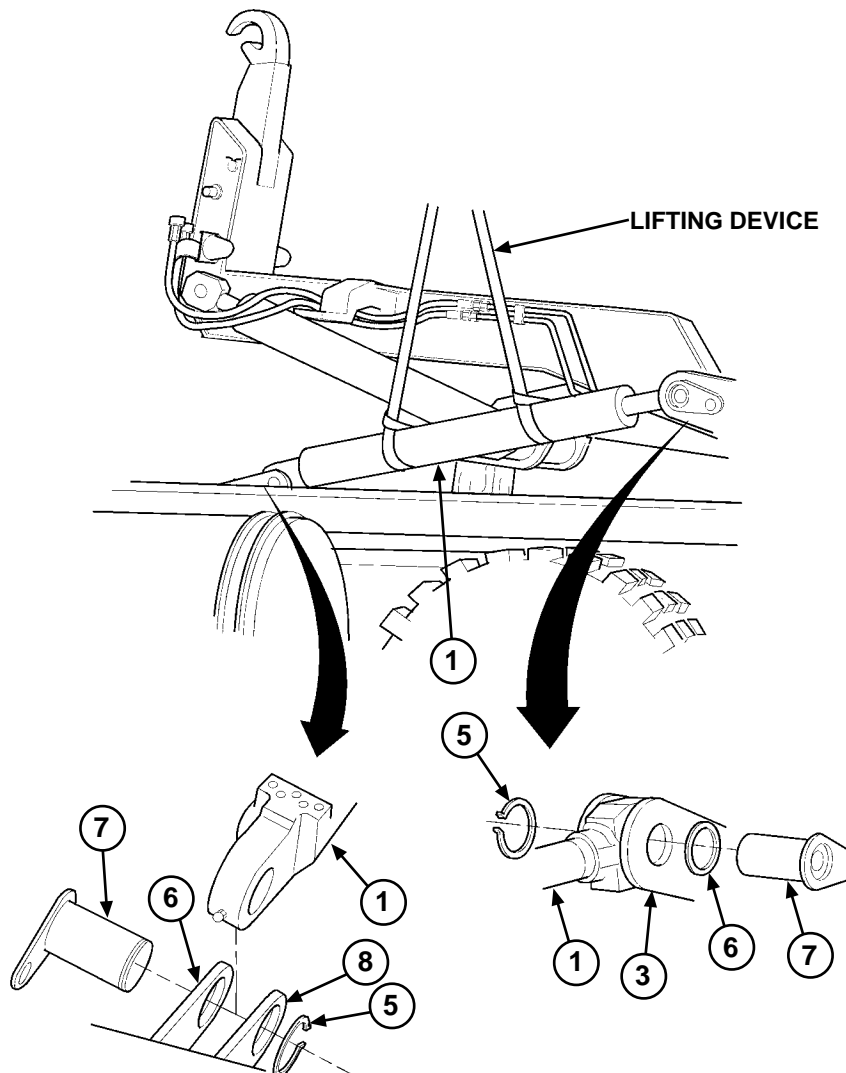
### WARNING

- Main frame cylinder weighs 325 lb (148 kg). Attach suitable lifting device prior to removal to prevent possible injury to personnel.
- Use care when removing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause severe eye injury.

### NOTE

Both main frame cylinders are replaced the same way. Left side is shown.

- (6) Attach lifting device to main frame cylinder (1).
- (7) Support main frame cylinder (1) and remove retaining ring (5), shim (6) and pin (7) from main frame (3) and rear of main frame cylinder (1) with aid of assistant and lifting device. Discard retaining ring.



## **5-31. MAIN FRAME CYLINDER REPLACEMENT (continued).**

- (8) Remove retaining ring (5), shim (6) and pin (7) from compression frame (8) and front of main frame cylinder (1). Discard retaining ring.
- (9) Remove main frame cylinder (1) from compression frame (8) and main frame (3) and lower to ground with aid of assistant and lifting device.
- (10) Remove lifting device from main frame cylinder (1).

### ***b. Installation.***

- (1) Attach lifting device to main frame cylinder (1).

### **WARNING**

- **Main frame cylinder weighs 325 lb (148 kg). Attach suitable lifting device prior to installation to prevent possible injury to personnel.**
  - **Use care when installing retaining rings. Retaining rings are under tension and can act as projectiles when released and could cause severe injury.**
- (2) Position main frame cylinder (1) on compression frame (8) and main frame (3) with the aid of an assistant and a lifting device.
  - (3) Install shim (6) and pin (7) in compression frame (8) and front of main frame cylinder (1) with new retaining ring (5).

### **NOTE**

Pull out or push in cylinder rod to align holes for pin installation.

- (4) Install shim (6) and pin (7) in main frame (3) and rear of main frame cylinder (1) with new retaining ring (5).
- (5) Remove lifting device from main frame cylinder (1).

### ***c. Follow-on Maintenance:***

- Install main frame manifolds (para 5-24).
- If hook arm cylinders are installed, raise main frame to remove wooden block.

**END OF TASK**



## CHAPTER 6

### GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Para	Contents	Page
6-1	General .....	6-1
6-2	Hook Arm/Main Frame Cylinder Repair .....	6-1

**6-1. GENERAL.**

This chapter contains instructions for repair of the Common Bridge Transporter (CBT) hook arm/main frame cylinder at the General Support maintenance level, as authorized by the Maintenance Allocation Chart.

**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR.**

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Disassembly         | c. Assembly              |
| b. Cleaning/Inspection | d. Follow-on Maintenance |

**INITIAL SETUP**

*Tools and Special Tools:*

- Drill, Electric, Portable, 1/4-inch (W-D-661)
- Drill Set, Twist (GGG-D-751)
- Goggles, Industrial (GGG-G-513)
- Lifting Device, Minimum Capacity 325 lb (145 kg)
- Pan, Drain, 4-gallon (MILP 45819)
- Tool Kit, General Mechanic's: Automotive (SC 5180-90-N26)
- Vise, Pipe, Chain (CV12)
- Wrench Set, Socket, 3/4-inch drive (FEDSTD353)
- Wrench Set, Socket (51200017510)
- Wrench, Spanner (GGG-W-665)
- Wrench, Torque, 15-75 ft-lb (GGG-W-00686)

*Materials/Parts:*

- Lubricating Oil (Item 20, Appendix E)
- Piston Seal Assembly (Item 100, Appendix K)
- Plug, Nylon (Item 108, Appendix K)
- Screw (Item 107, Appendix K)

*Personnel Required*

Two

*Equipment Condition*

Cylinder on work table.

**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).**

*a. Disassembly.*

**WARNING**

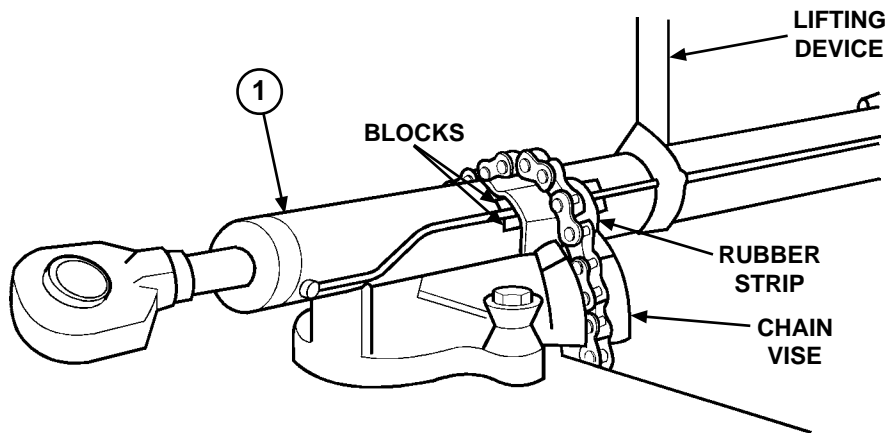
**Hook arm cylinder weighs 210 lb (95 kg). Main frame cylinder weighs 325 lb (148 kg). Attach suitable lifting device prior to lifting to prevent possible injury to personnel.**

- (1) Attach lifting device to cylinder (1).

**CAUTION**

**Transfer tube is mounted along axis of cylinder. Use blocks to protect transfer tube when clamping cylinder in a chain vise or damage to equipment may result.**

- (2) Using lifting device, place cylinder (1) in chain vise.



## 6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).

### WARNING

Oil will spray from cylinder manifold ports when rod is moved in or out. Cover ports with two cleaning cloths to prevent oil from spraying. Failure to comply may result in injury to personnel.

### CAUTION

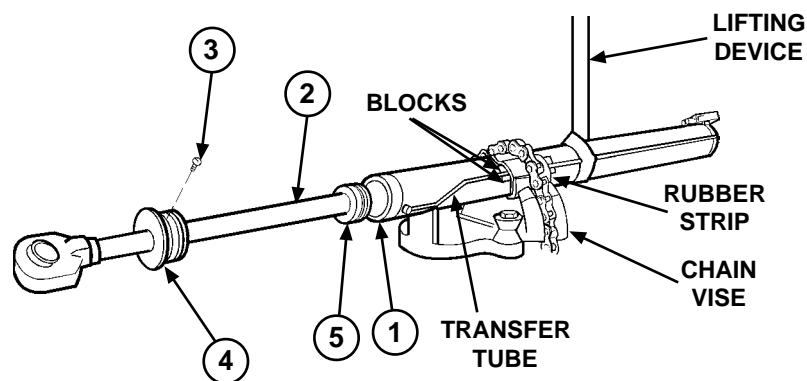
Do not allow threaded or machined surfaces to come in contact with other metal surfaces. Clearances between cylinder components are very small, any minor damage done during disassembly could require component replacement or make assembly difficult.

- (3) Position drain pan under cylinder (1).
- (4) Fully extend cylinder rod (2) to drain oil from cylinder (1) with aid of assistant. Push in cylinder rod (2) until it extends approximately 24 in. (61 mm) and properly support cylinder rod (2).

### NOTE

Cylinder may need to be heated to aid in loosening of rod bearing.

- (5) Remove screw (3) and unscrew rod bearing (4) from cylinder (1). Discard screw.
- (6) With the aid of an assistant, remove rod (2) and piston (5) from cylinder (1).

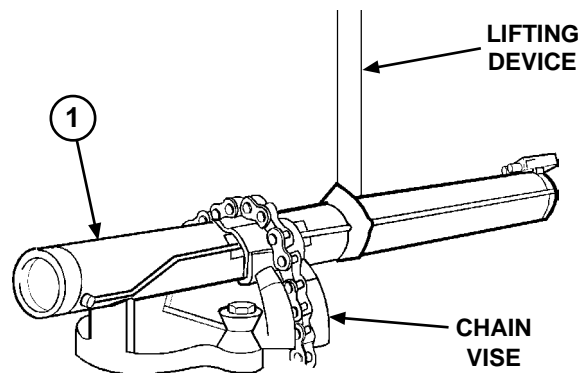


**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).**

**WARNING**

**Cylinder weight exceeds the handling weight for one person. Two people are required to lift and handle the cylinder. Failure to comply may result in injury to personnel.**

- (7) Remove cylinder (1) from chain vise.
- (8) Remove lifting device from cylinder (1).

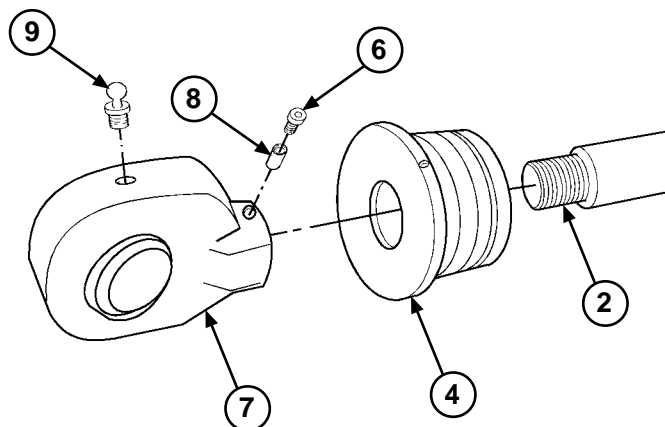


- (9) With the aid of an assistant, remove screw (6), rod lug (7), and rod bearing (4) from rod (2).

**CAUTION**

**Ensure all pieces of nylon plug are completely removed in Step 10. Failure to comply may result in damage to equipment during installation.**

- (10) Remove nylon plug (8) from bottom of screw hole in rod lug (7). Discard nylon plug.
- (11) Remove lube fitting (9) from rod lug (7).



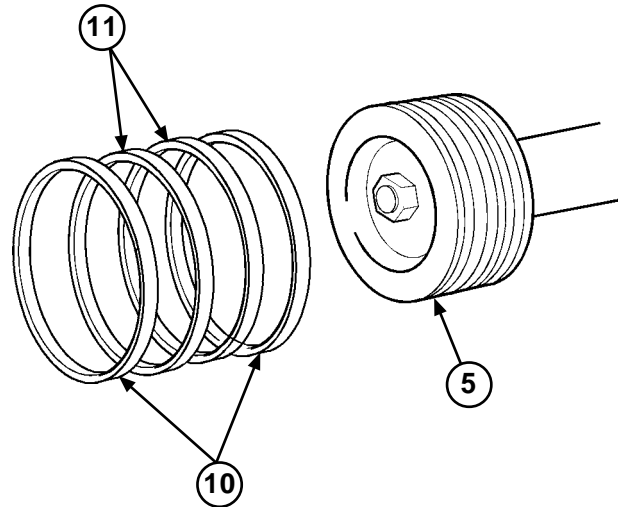


**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).**

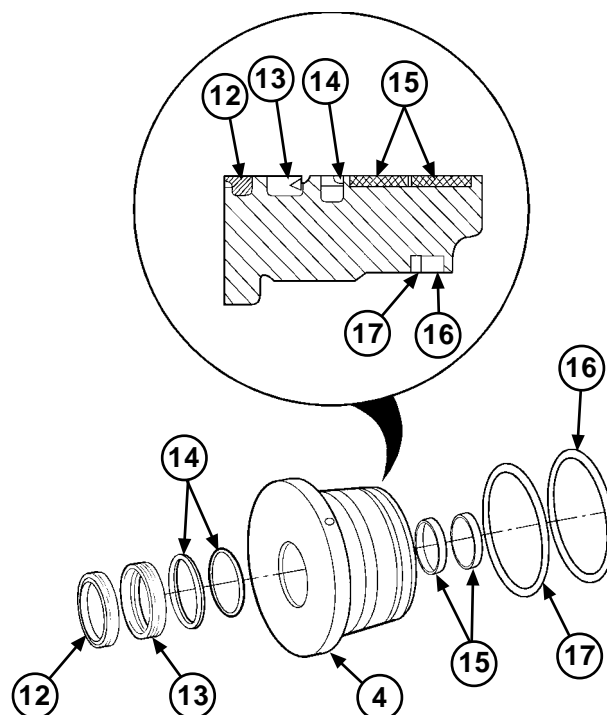
**NOTE**

In Steps 12 and 13, note location and position of rings, seals, and packings prior to removal.

- (12) Remove two wear rings (10) and piston seal assembly (11) from piston (5). Discard wear rings and seal assembly.

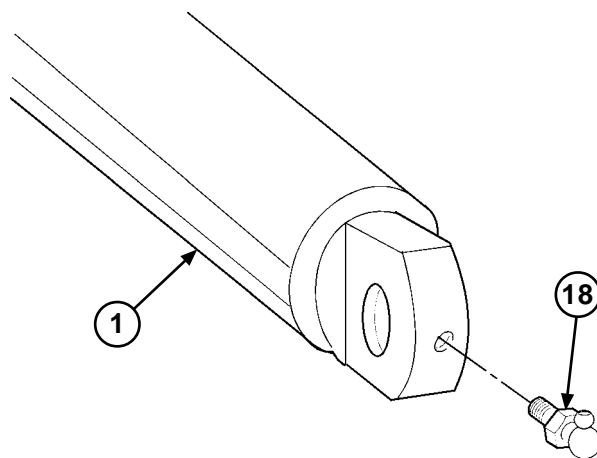


- (13) Remove and discard wiper (12), rod seal (13), step seal assembly (14), two wear rings (15), preformed packing (16) and backup ring (17) from rod bearing (4).



**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).**

(14) Remove lube fitting (18) from cylinder (1).



**b. Cleaning/Inspection.**

**WARNING**

- Drycleaning solvent is **TOXIC** and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and **DO NOT** breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in death or injury to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush them with water and get immediate medical attention.
- When drycleaning solvent is used, notify the local medical authority (preventive medicine) and environmental coordinator concerning medical surveillance, respiratory protection, and disposal requirements.
- Do not use drycleaning solvent on winch rope (cable). Solvent will soak into rope strands and rust, causing rope to deteriorate. This may result in the rope breaking under normal loads and could cause death or injury to personnel.

- (1) Clean all components and flush cylinder barrel using drycleaning solvent (P-D-680) only. Do not use cleaning cloth as any foreign material would contaminate hydraulic system.
- (2) Inspect barrel bore for any scratches or corrosion. Replace barrel if rusted. Replace barrel and piston if either component is scratched.
- (3) Inspect rod for bending. Replace if necessary.
- (4) Inspect for scratches or pitting. Remove minor scratches and pitting by using stone and lubrication oil. Stone imperfection just enough to smooth raised part.
- (5) Inspect component threads for burrs and stripped threads. Replace or repair as necessary.

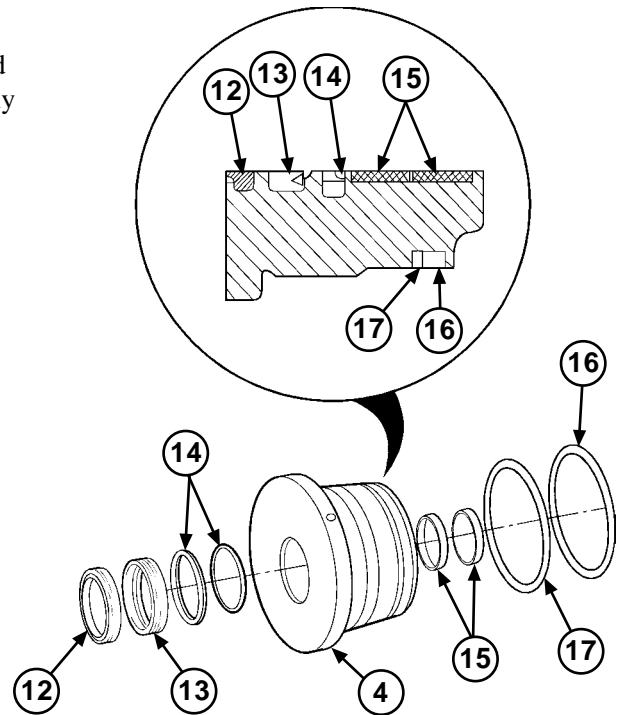
**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).**

**c. Assembly.**

**NOTE**

- Lubricate O-rings, backup rings, wear rings, seals, and wipers before installing.
- Cup side of backup ring should face O-ring.
- Position O-rings, backup rings, wear rings, seals, and wipers in same location as removed.

- (1) Apply lubricating oil to backup ring (17), preformed packing (16), two wear rings (15), step seal assembly (14), rod seal (13), and wiper (12).

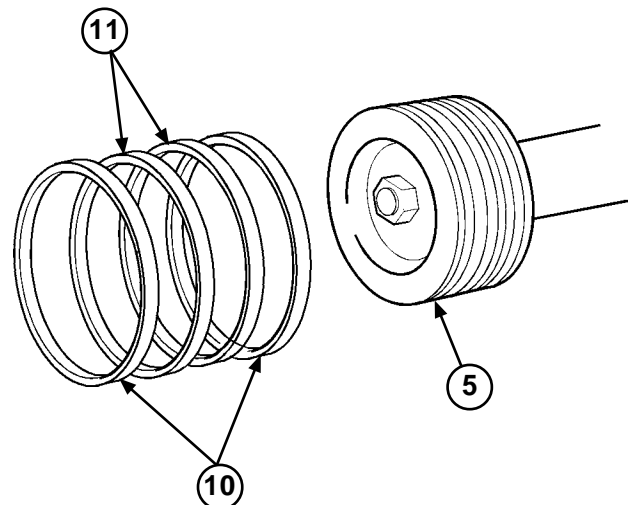


- (2) Install backup ring (17), preformed packing (16), two wear rings (15), step seal assembly (preformed packing first, then step seal) (14), rod seal (13), and wiper (12) on rod bearing (4).

- (3) Install lube fitting (18) on cylinder (1).

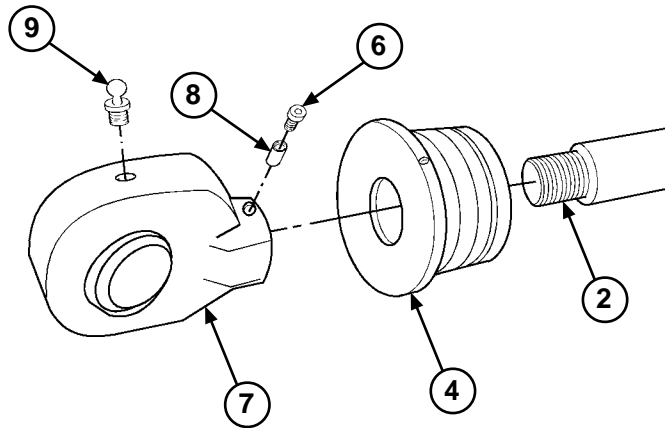
- (4) Apply lubricating oil to piston seal assembly (11) and two wear rings (10).

- (5) Install piston seal assembly (11) and two wear rings (10) on piston (5).



**6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).**

- (6) Apply lubricating oil to inside diameter of rod bearing (4).
- (7) Install rod bearing (4) on rod (2).
- (8) Install rod lug (7) on rod (2).
- (9) Position nylon plug (8) and screw (6) in rod lug (7).
- (10) Tighten to 41 lb-ft (56 N•m).
- (11) Install lube fitting (9) on rod lug (7).



**WARNING**

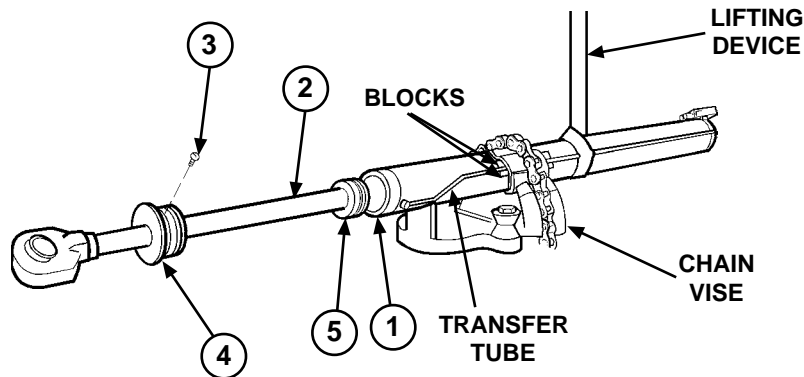
**Cylinder weight exceeds the handling weight for one person. Two people are required to lift and handle cylinder. Failure to comply may result in injury to personnel.**

**CAUTION**

**Transfer tube is mounted along axis of cylinder. Use blocks to protect transfer tube when clamping cylinder in a chain vise, or damage to equipment may result.**

- (12) Using lifting device, place cylinder (1) in chain vise.

<b>6-2. HOOK ARM/MAIN FRAME CYLINDER REPAIR (continued).</b>
--

**CAUTION**

Use care when installing piston in cylinder. Failure to comply will result in damage to seals.

**NOTE**

Screw hole halves in the rod bearing and cylinder should be aligned when installed properly.

- (13) With the aid of an assistant, install piston (5) with rod (2) and rod bearing (4) in cylinder (1).
- (14) Install rod bearing (4) in barrel (1) and align bearing to barrel screw hole halves. If rod bearing was replaced, drill new screw hole 0.440 inch (11.2 mm) deep using 0.147 inch (3.73 mm) drill.
- (15) Install screw (3) in rod bearing (4).

**WARNING**

**Hook arm cylinder weighs 210 lb (95 kg). Main frame cylinder weighs 325 lb (148 kg). Attach suitable lifting device prior to lifting to prevent possible injury to personnel.**

- (16) Using lifting device, remove cylinder (1) from chain vise.

***d. Follow-on Maintenance:***

None.

**END OF TASK**



## APPENDIX A

### REFERENCES

#### A-1. GENERAL.

This appendix lists all forms, manuals, pamphlets, bulletins, and other publications that are referenced in this technical manual and/or apply to the operation or maintenance of the CBT System. DA Pam 25-30 should be consulted frequently for the latest changes or revisions to publications and for new publications relevant to the material covered in this technical manual.

#### A-2. FORMS.

Refer to DA Pam 738-750, *The Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

Recommended Changes to Publications and Blank Forms .....	DA Form 2028
Recommended Changes to Equipment Technical Publications .....	DA Form 2028-2
Equipment Inspection and Maintenance Worksheet .....	DA Form 2404
Maintenance Request .....	DA Form 2407
Equipment Log Assembly (Records).....	DA Form 2408
Equipment Control Record .....	DA Form 2408-9
Processing and Deprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines .....	DD Form 1397
Material Safety Data Sheet .....	DD Form 1813
Report of Discrepancy (ROD) .....	SF Form 364
Product Quality Deficiency Report .....	SF Form 368

#### A-3. FIELD MANUALS AND REGULATIONS.

Environmental Protection and Enhancement .....	AR 200-1
Army Logistics Readiness and Sustainability .....	AR 700-138
Product Quality Deficiency Report Program .....	AR 702-7
Modification of Materiel and Issuing Safety-of-Use Messages and Commercial Vehicle Safety Recall Campaign Directive .....	AR 750-10
Army Medical Department Expendable/Durable Items .....	CTA 8-100
Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items) .....	CTA 50-970
Chemical and Biological Contamination Avoidance .....	FM 3-3
NBC Protection .....	FM 3-4
NBC Decontamination .....	FM 3-5
Field Behavior of NBC Agents (Including Smoke and Incendiaries) .....	FM 3-6
NBC Field Handbook .....	FM 3-7





**A-4. TECHNICAL MANUALS (continued).**

Transportability Guidance for Application of Blocking, Bracing and Tiedown Materials  
for Rail Transport ..... TM 55-2200-001-12

Storage and Materials Handling ..... TM 743-200-1

Procedures for Destruction of Equipment to Prevent Enemy Use  
(Mobility Equipment Command) ..... TM 750-244-3

**A-5. PAMPHLETS AND BULLETINS.**

Consolidated Index of Army Publications and Blank Forms ..... DA Pam 25-30

The Army Maintenance Management System (TAMMS) ..... DA Pam 738-750

Warranty Program for the Common Bridge Transporter (CBT) ..... TB 5-5420-234-15

Color, Marking and Camouflage Painting of Military Vehicles, Construction  
Equipment, and Materials Handling Equipment ..... TB 43-0209



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**APPENDIX B**  
**MAINTENANCE ALLOCATION CHART**

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**Section I. INTRODUCTION****THE ARMY MAINTENANCE SYSTEM (AMS)**

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

The MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column 4 as:

Field - includes two subcolumns, Unit C (operator/crew) and O (unit/organizational maintenance) and Direct Support (F) maintenance

Sustainment - includes two subcolumns, general support (H) and depot (D).

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

**MAINTENANCE FUNCTIONS**

Maintenance functions are limited to and defined as follows:

1. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
3. Service. Operations required periodically to keep an item in proper operating condition: e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.
4. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

## MAINTENANCE FUNCTIONS - Continued

6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
7. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

### NOTE

The following definitions are applicable to the "repair" maintenance function:

Services. Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning: the act of isolating a fault within a system or Unit Under Test (UUT).

Disassembly/assembly. The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

9. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
10. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
11. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

### EXPLANATION OF COLUMNS IN THE MAC

**Column 1, Group Number.** Column 1 lists FGC numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

**Column 2, Component/Assembly.** Column 2 contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

**Column 3, Maintenance Function.** Column 3 lists the functions to be performed on the item listed in Column 2. (For a detailed explanation of these functions, refer to "Maintenance Functions" outlined above.)

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**EXPLANATION OF COLUMNS IN THE MAC - Continued**

**Column 4, Maintenance Level.** Column 4 specifies each level of maintenance authorized to perform each function listed in Column 3, by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

**Field:**

C Operator or crew maintenance  
O Unit maintenance  
F Direct support maintenance

**Sustainment:**

H General support maintenance  
D Depot maintenance

**NOTE**

The "L" maintenance level is not included in Column 4 of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column of Column 4, and an associated reference code is used in the REMARKS Column 6. This code is keyed to the remarks and the SRA complete repair application is explained there.

**Column 5, Tools and Equipment Reference Code.** Column 5 specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

**Column 6, Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

## EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS

**Column 1, Tool or Test Equipment Reference Code.** The tool or test equipment reference code correlates with a code used in Column 5 of the MAC.

**Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

**Column 3, Nomenclature.** Name or identification of the tool or test equipment.

**Column 4, National Stock Number (NSN).** The NSN of the tool or test equipment.

**Column 5, Tool Number.** The manufacturer's part number, model number, or type number.

### Explanation of Columns in the Remarks

**Column 1, Remarks Code.** The code recorded in Column 6 of the MAC.

**Column 2, Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field			Sustainment			
			Unit		DS	GS	Depot		
			C	O	F	H	D		
1000	BAP Assembly	Inspect Service Test Repair	0.5 1.0	0.25 * 1.0	*			1,2  A	
1110	Front Pin Lock Assembly, Right Side	Inspect Adjust Repair		0.1 * 1.0				1,2	
	Front Pin Lock Assembly, Left Side	Inspect Adjust Repair		0.1 * 1.0				1,2	
1200	Winch Frame Assembly	Inspect Repair	0.1	1.0				1	
1210	Cable Assembly	Inspect Service Replace Repair	0.3 0.5	1.0 1.0				1	
1220	BAP Winch Assembly	Inspect Replace Repair Overhaul	0.5	1.0 0.5	1.7	2.0		1,4,5	
1300	Hydraulic Installation	Inspect Repair	0.1	1.0				1,2	
1310	Hydraulic Hand Pump	Replace Repair		0.5 1.5				1,2	
1400	Air System Installation	Inspect Repair		0.1 1.0				1	
2000	Transporter, CBT	Inspect Service Test	0.5	1.0	*			1	
	Workstation Assembly	Replace		2.3				1	
	Platform Assembly (Model B Only)	Replace		0.4				1	
	Main Frame Nose Support Bracket	Replace			1.0			1	
	Remote Control Stowage Box Assembly	Inspect Replace Repair	0.1	1.0 0.5				1 1	

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks	
			Field		Sustainment					
			Unit		DS	GS	Depot			
			C	O	F	H	D			
2100	Rear Bumper Assembly	Inspect Replace Repair	0.1	1.3 1.0				1 1		
	Rear Roller Assembly	Inspect Lubricate Replace Repair	0.1 0.1	0.6 1.0				1 1,2		
	Rear Roller Mounting Bracket (Model A Only)	Replace			0.8			1		
	Rear Roller Mounting Bracket (Model B Only)	Replace		0.6				1		
	Stop Plate	Replace		0.3				1		
	Stop Plate (Model B Only)	Replace		0.4				1		
	Rear Fender (Model B Only)	Replace		0.7				1		
	Rear Mud Flap (Model B Only)	Replace		0.2				1		
	Center Mud Flap (Model B Only)	Replace		0.2				1		
	Rear Roller Mounting Bracket	Replace		0.7				1		
	Rear Roller Mounting Bracket (Model B Only)	Replace		0.5				1		
	Data Plate	Replace		0.1				1		
	LHS Assembly	Inspect Service Test Repair	*	*	*	2.5			1, 16, 17, 18, 19, 20, 21, 22, 23, 24	D
	Main Frame	Repair				2.8			1, 4, 11, 12, 13, 14, 15	
	Hook Arm	Repair				1.4			1, 4, 11, 12, 13, 14, 15	
Compression Frame	Replace				4.0			1, 2, 3		



Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	Depot		
			C	O	F	H	D		
2110	Compression Frame Mounting Brackets	Replace			0.6			1	
	Main Manifold Support Frame	Replace			2.1			1	
	LHS Main Manifold/ Bracket	Replace			2.1				
2200	Hydraulic Cover Assembly	Inspect	0.1						
		Replace		1.0				1	
		Repair		0.5				1, 3	
2210	LHS Electrical								
2210	Chassis Electrical								
2220	Rear Marker/Clearance Lights	Replace		0.5				1	
	Rear Light Bar Assembly (Model B Only)	Replace		0.2				1	
	Harness, Clearance Light	Replace		1.0				1	
		Repair		*				1	B, C
	High Idle Switch	Replace		0.4				1	
	Reversal Alarm Wiring Harness	Replace		0.7				1	
	Electrical Controls								
	Cab Control Box	Replace		0.5				1, 3	
		Repair		2.4				9	B
	Cab Interface Wiring Harness	Replace		1.0				1	
Remote Control Unit	Replace		0.1				1, 2		
	Repair		*				1, 3, 9	B	
2230	LHS Lights								
2240	Worklight	Replace		0.2				1	
	Spotlight	Replace		0.2				1	
	LHS Wiring Harnesses								
2240	Harness, Supply	Replace		1.0				1	
		Repair		*				3	B, C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Field		Sustainment				
			Unit		DS	GS	Depot		
			C	O	F	H	D		
	Harness, Cab, 24-Pin	Replace Repair		0.8 *				1 3	B, C
	Harness, Cab, 9-Pin	Replace Repair		1.0 *				1 3	B, C
	Digital Controller Wiring Harness (Model B Only)	Replace Repair		2.0 *				1 1, 2, 9	B, C
	Cable, Remote Control Unit	Replace Repair	0.5	*				1 3	B, C
	Harness, LHS Junction Box	Replace Repair		1.0 *				1 3	B, C
	Harness, Worklight	Replace Repair		0.5 *				1 3	B, C
	Proximity Switch, Hook Up	Replace Test Adjust		0.5 0.5 0.2				1 3, 16 1	
	Proximity Switch, Hook Down	Replace Test Adjust		0.5 0.5 0.2				1, 2 3 1	
	Proximity Switch, Main Frame Down	Replace Test Adjust		0.5 0.5 0.2				1, 2 3 1	B, C
	Harness, Cab to Junction Box	Replace		1.0				1	
	Harness, Main Junction Box, 24-Pin	Replace Repair		1.0 *				1 3	B, C
	Harness, Main Frame Junction Box	Replace Repair		1.0 0.2				1 3	B, C
	Hydraulic Cabinet Assembly Harnesses	Replace Repair		1.0 *				1 3	B, C
	Harness, Main Junction Box (Rear)	Replace Repair		0.6 0.4				1 3	B, C
	Harness, Oil Pressure	Replace Repair		1.0 *				1 3	B, C
	Harness, Hourmeter	Replace Repair		1.0 *				1 3	B, C

Section II. MAINTENANCE ALLOCATION CHART (continued)

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks	
			Field		Sustainment					
			Unit		DS	GS	Depot			
			C	O	F	H	D			
2300	Harness, Main Cylinder	Replace Repair		1.0 *				1 3	B, C	
	Harness, RH Linking	Replace Repair		1.0 *				1 3	B, C	
	Harness, LH Linking	Replace Repair		1.0 *				1 3	B, C	
	Harness, Worklight	Replace Repair		1.0 *				1 3	B, C	
	Digital Control Box (Model B Only)	Replace		0.2				1		
	LHS Hydraulics	Replace Repair			0.5 0.5			1 1, 4, 6, 7, 10, 25		
	Diverter Manifold	Repair			0.7			1, 4, 6, 26		
	2310	Manifold, Hook Arm and Load Control Valve	Replace			1.6			1	
			Repair			1.1			1, 4, 31	
	2320	Manifold, Main Cylinder and Load Control Valve	Replace			1.0			1	
Repair					1.0			1, 4, 31		
2350	Manifold, Hydraulic Main	Repair			3.1			1, 4, 31		
2360	Cylinder, Main Frame	Replace			1.0			1, 4		
		Repair					2.5	1, 4, 8		
	Cylinder, Hook Arm	Replace Repair			2.0		2.5	1, 4 1, 4, 8		

## Section III. TOOLS AND TEST EQUIPMENT FOR THE COMMON BRIDGE TRANSPORTER

Tools or Test Equipment Reference Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
1	O, F, H	Tool Kit, General Mechanic's Automotive	5180-00-177-7033	SC 5180-90-N26
2	O, F, H	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1	4910-00-754-0654	SC 4910-95-CL-A74
3	O, F	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2, Less Power	4940-00-754-0650	SC 4910-95-CL-A72
4	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic	4910-00-754-0705	SC 4910-95-A31
5	O	Cap and Plug Set	5340-00-450-5718	10935405
6	O	Wrench, Combination, 1 5/8 in.	5120-01-016-7144	1180
7	O	Wrench, Combination, 1 7/8 in.	5120-00-020-8632	1260
8	H	Wrench, Spanner	5120-01-375-4502	J41108
9	O	Tool Kit, Electrical		7550526
10	O	Wrench, Combination 1 3/4 in	5120-00-020-8658	1256
11	F	Bushing Remover		2215090
12	F	Bushing Remover, Installer (Small)		2215060
13	F	Bushing Remover, Installer (Large)		2215070
14	F	Lead Screw		2215080
15	F	Washer, Flat		AE30574
16	O	Multimeter	6625-00-999-6282	ANURM105C
17	O	Gage		151469
18	O	Tee		203102-8-85
19	O	Tee		202102-10-105
20	O	Hose		HFF20-060

## Section III. TOOLS AND TEST EQUIPMENT FOR THE COMMON BRIDGE TRANSPORTER (continued)

Tools or Test Equipment Reference Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
21	O	Adapter		TCM20-1/2UNF-V
22	O	Adapter		TCM20-1/2 JIC-V
23	O	Coupling		TCM20-5/8JIC-V
24	O	Union		GAH20-1/4NPTV
25	F	Crows Feet		GAN8508-29A
26	F	Wrench, Combination		ANSI B 1007.6
27	O	Gloves, Chemical Oil Protective	8415-00-641-4601	22-G-381
28	O	Goggles, Industrial	4140-00-269-7912	GGG-G-13
29	O	Torch, Propane	3433-01-161-4998	737-I-0000
30	O	Wrench, Torque	5120-01-112-9531	TESI60

**Section IV. REMARKS**

Reference Code	Remarks
A	No specific times established. Times required for inspection, service, or test will depend on extent of testing required
B	No specific times established. Times required for inspection, service, or test will depend on extent of work required
C	In the "O" category, repair is limited to splicing wires, taping of the harness wires, and the replacement of wire ends
D	Repair consists of replacing individual items.

## APPENDIX C

### COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

#### Section I. INTRODUCTION

##### C-1. SCOPE.

This appendix lists components of end item (COEI) and basic issue items (BII) for the Common Bridge Transporter (CBT) to help you inventory the items for safe and efficient operation of the equipment.

##### C-2. GENERAL.

The COEI and BII lists are divided into the following sections:

- a. **Section II, Components of End Item.** This listing is for information purposes only, and is not authority to requisition replacements. These items are part of the CBT. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.
- b. **Section III, Basic Issue Items.** These essential items are required in order to place the CBT in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the CBT during operation and whenever it is transferred between property accounts. This list is your authority to request/requisition BII for replacement based on authorization of the end item by the Table of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE). Illustrations are furnished to help you find and identify the items.

##### C-3. EXPLANATION OF COLUMNS.

The following is an explanation of the columns in Section III.

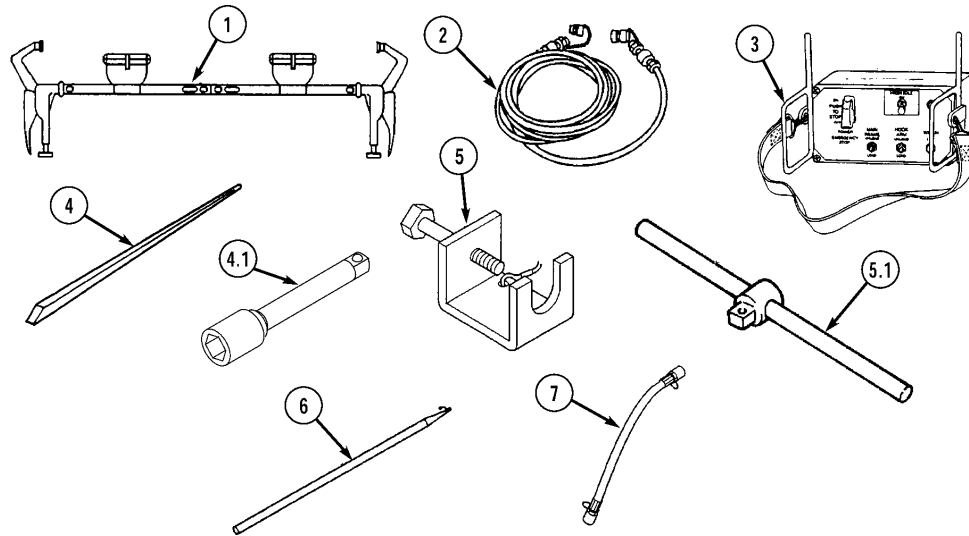
- a. **Column (1)—Illus. [Illustration] Number:** gives you the number of the item illustrated.
- b. **Column (2)—National Stock Number:** identifies the national stock number of the item; this number will be used for requisitioning purposes.
- c. **Column (3)—Description, CAGEC and Part Number:** identifies the Federal item name (in capital letters) followed by a minimum description when needed. The line below the description is the Commercial and Government Entity Code (CAGEC) (in parentheses) and the part number.
- d. **Column (4)—U/I [Unit of Issue]:** indicates how the item is issued for the national stock number shown in the second column. This measure is expressed by a two-character alphabetical abbreviation: EA for “each.”
- e. **Column (5)—Qty. Rqr.:** indicates the quantity required for use with or on the equipment.

**Section II. COMPONENTS OF END ITEM**

There are no components of end item for the CBT System.

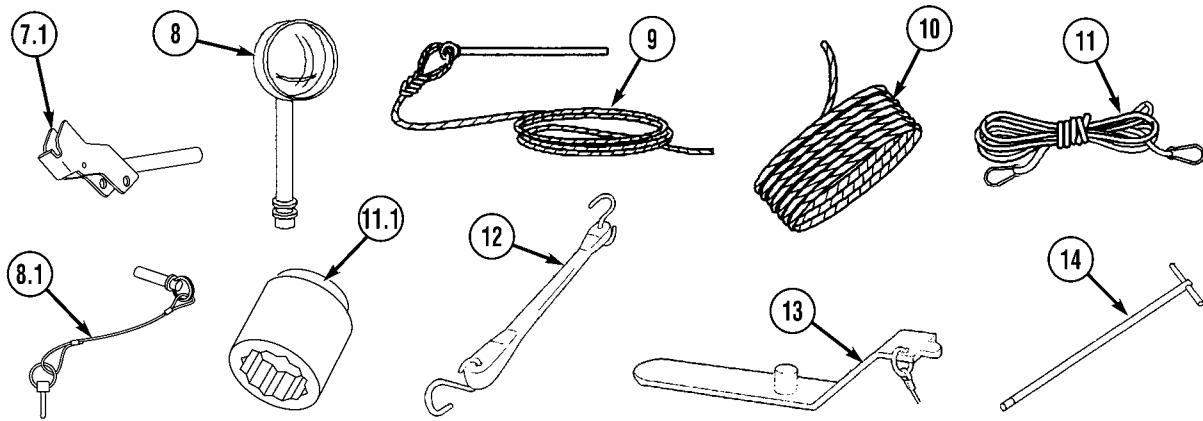


Section III. BASIC ISSUE ITEMS (MODEL A)



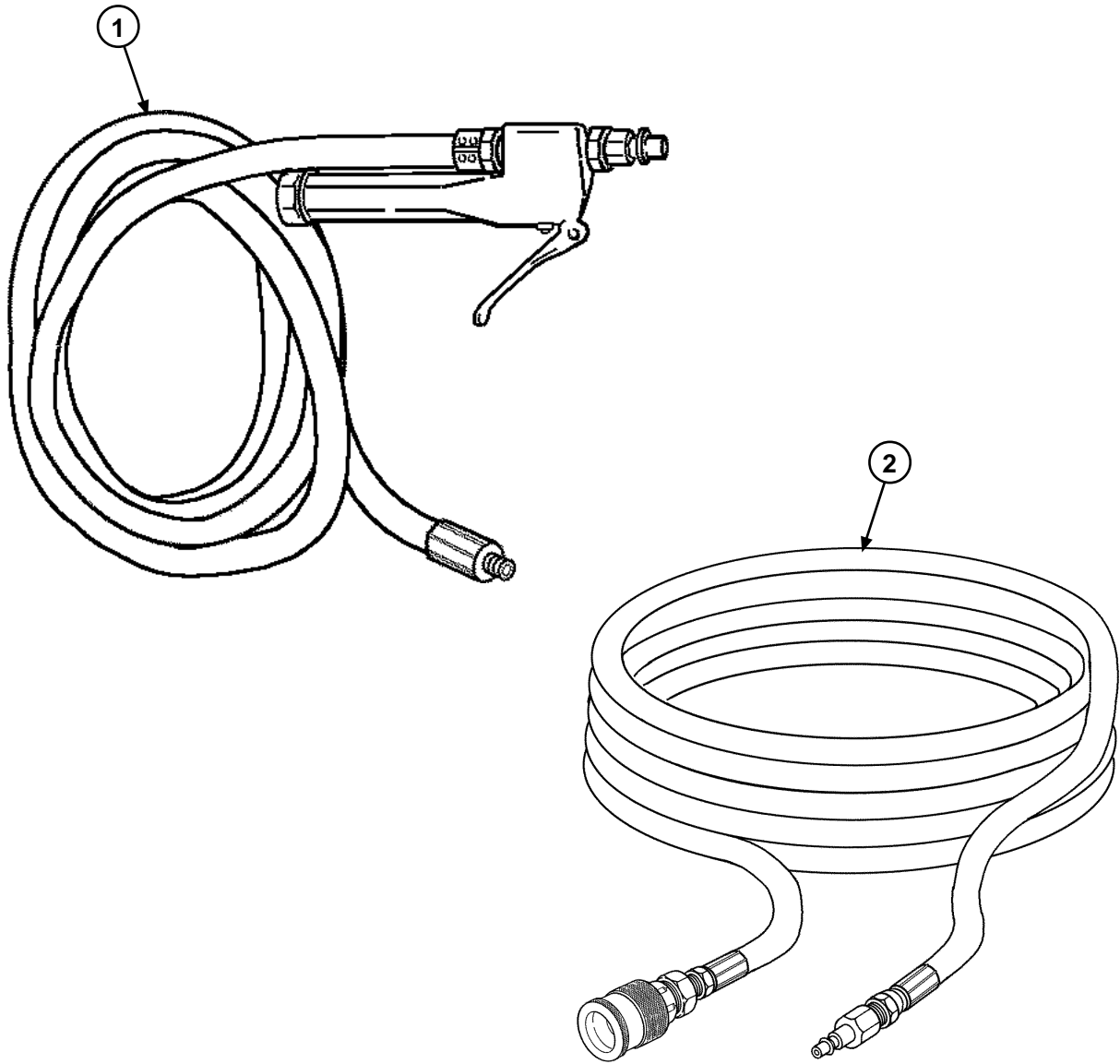
(1) Illus. Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/I	(5) Qty. Rqr.
1	6220-01-456-2746	AUXILIARY LIGHT BAR KIT (in LH HEMTT stowage box) (33287) J-43173	EA	1
2		CABLE ASSEMBLY, RCU (in remote control stowage box in transporter) (45152) 3055065	EA	1
3		CONTROL UNIT, REMOTE (in remote control stowage box in transporter) (OENJ2) DA-OOE-900	EA	1
4	5120-00-224-1390	CROWBAR (on winch frame) (80069) 1833244	EA	1
4.1	5130-01-400-0129	EXTENSION, WRENCH (07569) 2020970	EA	1
5		FREE FLOW TOOL ASSEMBLY (in hydraulic cabinet assembly) (45152) 3063145	EA	1
5.1	5120-00-709-4072	HANDLE, SLIDING (SP 13-938) 1505380	EA	1
6	2040-00-007-1136	HOOK, BOAT (on LH catwalk of BAP) (97403) 13216E9929	EA	1
7	4720-01-341-4913	HOSE ASSEMBLY, NONMETALLIC SLAVE (in LH stowage box in transporter) (45152) 1789130	EA	1

Section III. BASIC ISSUE ITEMS (MODEL A) (continued)



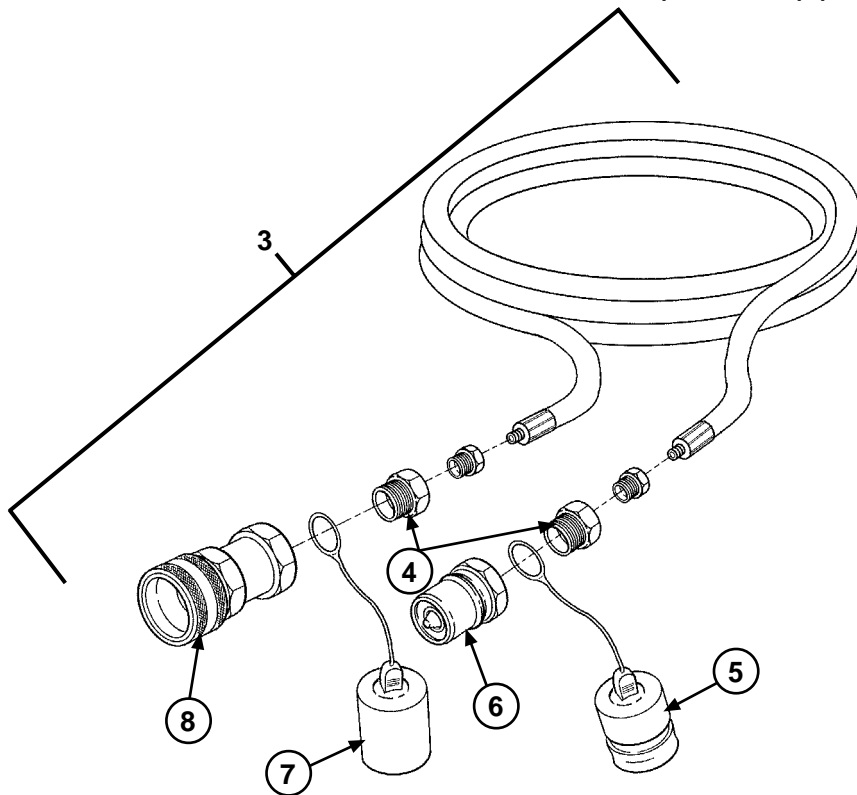
(1) Illus. Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/I	(5) Qty. Rqr.
7.1	5340-01-462-1757	LOCK, BAIL BAR (in hook) (45152) 3191030	EA	1
8	6230-01-364-8663	SPOTLIGHT (on hydraulic manifold cover) (45152) 1779170	EA	1
8.1	5315-01-431-0602	PIN, BAIL LOCK (in hook) (45152) 2207830	EA	1
9	5420-01-045-1770	PIN LATCH ASSEMBLY (in BAP toolbox) (97403) 13218E4360	EA	1
10	4020-00-018-2186	ROPE, FIBROUS, 3/4 in. dia., manila, approximately 100 ft. long (in BAP toolbox) (81349) T-R-605	EA	1
11	4020-01-453-6292	ROPE LANYARD ASSEMBLY (in BAP toolbox) (31902) A4810490	EA	1
11.1	5130-00-541-7839	SOCKET, 1-1/2 in. (DP 482TW) 1759370	EA	1
12	5340-00-340-0980	STRAP, ELASTIC 10 in. (on HEMTT ladder) (13435) 13013	EA	1
13		SOLENOID TOOL (in hydraulic cabinet assembly) (45152) 3063140	EA	1
14	5420-01-030-5815	WRENCH, BAY DRIVE (on BAP toolbox) (97403) 13218E4347	EA	1

Section IV. BASIC ISSUE ITEMS (MODEL B)



(1) Illus. Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/I	(5) Qty. Rqr.
1		HOSE ASSY, TIRE INFLATION (in LH HEMTT stowage box) (45152) 2155210U	EA	1
2		HOSE ASSY (in LH HEMTT stowage box) (45152) 1793550	EA	1

Section IV. BASIC ISSUE ITEMS (MODEL B) (continued)



(1) Illus. Number	(2) National Stock Number	(3) Description CAGEC and Part Number	(4) U/I	(5) Qty. Rqr.
3		HOSE ASSY, SLAVE (in RH HEMTT stowage box) (45152) 3294652	EA	1
4	4730-01-338-2123	ADAPTER, STRAIGHT, TUBE TO BOSS (in RH HEMTT stowage box) (01276) FF1852T-0816S	EA	2
5	5340-01-260-6009	PLUG, PROTECTIVE, DUST AND MOISTURE (in RH HEMTT stowage box) (01276) FD45-1041-16	EA	1
6	4730-01-220-8297	COUPLING, HALF, QUICK DISCONNECT (in RH HEMTT stowage box) (01276) FD45-1168-16-16	EA	1
7		DUST CAP-16 (in RH HEMTT stowage box) (45152) 1458070	EA	1
8	4730-01-221-2080	COUPLING HALF, QUICK DISCONNECT (in RH HEMTT stowage box) (01276) FD45-1169-16-16	EA	1

## APPENDIX D

### ADDITIONAL AUTHORIZATION LIST

#### Section I. INTRODUCTION

##### **D-1. SCOPE.**

This appendix lists additional items you are authorized for the support of the Bridge Adapter Pallet.

##### **D-2. GENERAL.**

The list in Section II identifies items that do not have to accompany the CBT and do not have to be turned in with it. These items are all authorized to you by CTA 50-970.

##### **D-3. EXPLANATION OF LISTING.**

The national stock number, description, CAGEC (Commercial and Government Entity Code) (in parentheses), part number, unit of measure (U/M), and quantity recommended (Qty. Recm.) are provided for each item to help you identify and request the additional items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description CAGEC and Part Number	(3) U/M	(4) Qty Recm
5420-00-071-5273	EXTENSION ASSEMBLY (31902) A4810810  BRIDGE SUPPLEMENTARY SET (19207) SC 5420-98-E51	EA  EA	1  1

## APPENDIX E

### EXPENDABLE AND DURABLE ITEMS LIST

#### Section I. INTRODUCTION

##### E-1. SCOPE.

This appendix lists expendable and durable items that you will need to maintain the Common Bridge Transporter and the Bridge Adapter Pallet. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970.

##### E-2. EXPLANATION OF COLUMNS.

- a. Column (1) - Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item (e.g., “Drycleaning Solvent, Item 13, Appendix E”).
- b. Column (2) - Level.* This column identifies the lowest level of maintenance that requires the listed item:
 

C - Operator/Crew	F - Direct Support Maintenance
O - Unit Maintenance	H - General Support Maintenance
- c. Column (3) - National Stock Number.* This is the national stock number assigned to the item; use it to requisition the item.
- d. Column (4) - Item Name, Description, (CAGEC) Part Number.* Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the CAGEC (Commercial and Government Entity Code) in parentheses, followed by the part number.
- e. Column (5) - UM [Unit of Measure]/UI [Unit of Issue].* This measure is expressed by a two-character alphabetical abbreviation: BE (bale), BX (box), CA (cartridge), CN (can), DR (drum), EA (each), GL (gallon), HD (hundred), KT (kit), PG (package), PR (pair), QT (quart), TU (tube). If the unit of measure differs from the unit of issue as shown in the Army Master Data File (AMDF), requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE AND DURABLE ITEMS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description (CAGEC) Part Number	(5) UM/UI
1	O	8040-01-321-1254	Adhesive 20-gram tube (05972) 40945	TU
2	O	8040-01-235-5435	Adhesive, Gasket 5-oz tube (04963) 1711	TU
3	O	8040-01-250-3969	Adhesive, Loctite 242 (05972) 242	EA
4	O	8030-00-148-9833	Adhesive, Loctite 271 (05972) 271-21	BX
5	O	8040-00-118-2695	Adhesive, RTV Sealant 2.8-oz tube (72799) RTV162	KT
6	O, F	8040-00-843-0802	Adhesive-Sealant, Silicone, RTV 2.8-oz cartridge MIL-A-46106A (01139) RTV108-2.8 oz	KT
7	O	5975-00-074-2072	Cable Ties 6-inch length (96906) MS3367-1	HD
8	O	5975-01-273-8133	Cable Ties 12-inch length (96906) MS3367-3	HD
9	O	5340-00-450-5718	Cap and Plug Set (19207) 10935405	EA
9.1	O	7920-00-165-7195 7920-00-044-9281	Cloth, Cleaning Type I - 10 lb box Type II - 10 lb box (81349) MIL-C-85043	BX
10	F	8030-00-616-7694	Compound, Antiseize, High Temperature 2-1/2 lb can (81349) MIL-A-907D	CN
11	C	8030-00-231-2345	Compound, Corrosion Prevention 1-gal. can (80244) MIL-C-16173, CL1GR1	GL
12	F	5350-00-221-0872	Crocus Cloth 50-sheet package (80204) ANSI B74.18	PG



## Section II. EXPENDABLE AND DURABLE ITEMS LIST (continued)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description (CAGEC) Part Number	(5) UM/UI
13	O	6850-01-378-0679 6850-01-378-0666	Drycleaning Solvent 5-gal. can 55-gal. drum (OK209) Breakthrough	CN DR
14	O	6850-01-277-0595 6850-01-244-3207	Drycleaning Solvent 5-gal. can 55-gal. drum (59557) 134 Hi-solv	CN DR
15	C, O	8415-00-268-7859	Gloves, Protective (58536) A-A-50022	PR
16	O, F	4240-00-269-7912	Goggles, Safety (30760) 5023A	PR
17	C	9150-01-197-7688 9150-00-935-1017 9150-01-197-7690 9150-01-197-7689 9150-01-197-7692	Grease, Automotive, Artillery 2-1/4 oz tube 14-oz cartridge 1-3/4 lb can 6-1/2 lb can 35-lb can (81349) MIL-G-10924	TU CA CN CN CN
18	F	9150-00-076-1587	Grease, Lubriplate 8-oz tube (73219) LUBRIPLATE 110	TU
19	O	9150-00-402-2372 9150-00-491-7197	Lubricating Oil, Engine, OEA 5-gal. can 55-gal. drum (81349) MIL-L-46167	CN DR
20	C, O, F	9150-00-189-6727 9150-00-186-6668 9150-00-191-2772 9150-00-183-7807	Lubricating Oil, Engine, OE/HDO 10 1-qt can 5-gal. can 55-gal. drum bulk (81349) MIL-L-2104	QT CN DR GL
21	C	7920-00-205-1711	Rag, Wiping 50-lb bale (58536) A-A-531	BE
22	O	7930-00-634-3935	Soap, Laundry (81346) ASTM D 496	DR

**Section II. EXPENDABLE AND DURABLE ITEMS LIST (continued)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description (CAGEC) Part Number	(5) UM/UI
23	O	9905-00-720-5377	Tag, Identification (16956) 12-105	EA
24	O	8030-00-889-3534	Tape, Antiseizing (Pipe Thread) (81349) MIL-T-27730	EA
24.1	O	8030-01-158-6060	Sealing Compound (05972) MIL-S-46163 Type I Grade K 10 milliter bottle	BT

# APPENDIX F UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

## Section I. INTRODUCTION

Para	Contents	Page
F-1	Scope .....	F-1
F-2	General .....	F-1
F-3	Explanation of Columns (Sections II and III) .....	F-2
F-4	Explanation of Columns (Section IV) .....	F-6
F-5	Special Information .....	F-6
F-6	How To Locate Repair Parts .....	F-7
F-7	Abbreviations .....	F-7

**F-1. SCOPE.**

This repair parts and special tools list (RPSTL) lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special Common Bridge Transporter support equipment required for the performance of Unit and Direct Support maintenance of the Common Bridge Transporter. This RPSTL authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

**F-2. GENERAL.**

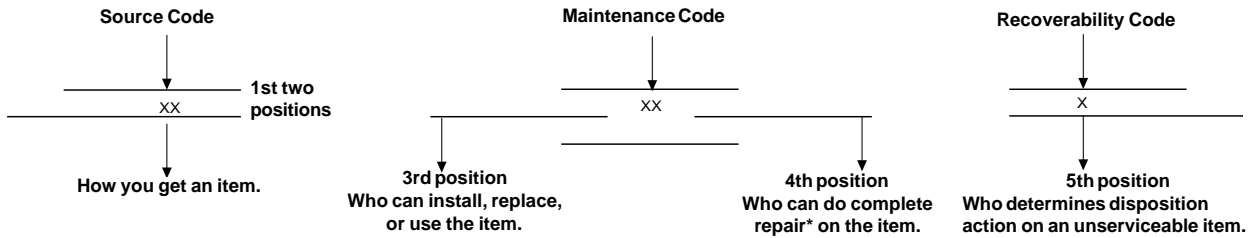
In addition to Section I, Introduction, this RPSTL is divided into the following sections:

- a. Section II. Repair Parts List.* A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts that must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustrations/figures.
- b. Section III. Special Tools List.* A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL for the performance of maintenance.
- c. Section IV. Cross-Reference Indexes.* There are two indexes. The first is a list, in national item identification number (NIIN) sequence, of all national stock numbered items appearing in the listing; this is followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers (NSNs) and part numbers are cross-referenced to each illustration/figure and item-number appearance.

**F-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).**

a. **ITEM NO. [Column (1)].** Indicates the number used to identify items called out in the illustration.

b. **SMR CODE [Column (2)].** The SMR code is a five-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



\* *Complete Repair:* Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) **Source Code.** The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

<u>Code</u>	<u>Application/Explanation</u>
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the third position of the SMR code.

*\*Items coded PC are subject to deterioration.*

KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit that is authorized to the maintenance category indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.
----------------	---

MO - Made at UNIT/AVUM Level MF - Made at DS/AVUM Level MH - Made at GS Level ML - Made at Specialized Repair Activity (SRA) MD - Made at Depot	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material that is identified by the part number in the DESCRIPTION AND USABLE-ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the third-position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
---	--

AO - Assembled by UNIT/AVUM Level AF - Assembled by DS/AVUM Level AH - Assembled by GS Level AL - Assembled by SRA AD - Assembled at Depot	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third-position code of the SMR code authorizes you to replace the item, but the source code indicates that the item is assembled at a higher level, order the item from the higher level of maintenance.
--	--

<b>F-3. EXPLANATION OF COLUMNS (SECTIONS II AND III) (continued).</b>
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- XA - DO NOT requisition an "XA"-coded item. Order its next higher assembly.
- XB - If an "XB" item is not available from salvage, order it using the Commercial and Government Entity Code (CAGEC) and part number given.
- XC - Installation drawing, diagram, instruction sheet, or field service drawing that is identified by manufacturer's part number.
- XD - Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGEC and part number given if no NSN is available.

**NOTE**

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the preceding source codes, except for those source coded "XA."

- (2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:
- (a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance:

<u>Code</u>	<u>Application/Explanation</u>
<i>C</i>	Crew or Operator maintenance done within Unit maintenance or Aviation Unit maintenance.
<i>O</i>	Unit or Aviation Unit level can remove, replace, and use the item.
<i>F</i>	Direct Support or Aviation Intermediate level can remove, replace, and use the item.
<i>H</i>	General Support level can remove, replace, and use the item.
<i>L</i>	Specialized repair activity (SRA) can remove, replace, and use the item.
<i>D</i>	Depot level can remove, replace, and use the item.

**NOTE**

If authorized by the maintenance allocation chart (MAC) and SMR codes, some limited repair may be done on an item at a lower level of maintenance.

- (b) The maintenance code entered in the fourth position tells whether the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized "Repair" functions). This position will contain one of the following maintenance codes:

**F-3. EXPLANATION OF COLUMNS (SECTIONS II AND III) (continued).**

<u>Code</u>	<u>Application/Explanation</u>
<i>O</i>	Unit or Aviation Unit is the lowest level that can do complete repair of the item.
<i>F</i>	Direct Support or Aviation Intermediate is the lowest level that can do complete repair of the item.
<i>H</i>	General Support is the lowest level that can do complete repair of the item.
<i>L</i>	SRA is the lowest level that can do complete repair of the item.
<i>D</i>	Depot is the lowest level that can do complete repair of the item.
<i>Z</i>	Nonrepairable. No repair is authorized.
<i>B</i>	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B"-coded item.) However, the item may be reconditioned by adjusting, lubricating, and so on, at the user level.

- (3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR code as follows:

<u>Code</u>	<u>Application/Explanation</u>
<i>Z</i>	Nonrepairable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
<i>O</i>	Repairable item. When uneconomically repairable, condemn and dispose of the item at the Unit or Aviation Unit level.
<i>F</i>	Repairable item. When uneconomically repairable, condemn and dispose of the item at the Direct Support or Aviation Intermediate level.
<i>H</i>	Repairable item. When uneconomically repairable, condemn and dispose of the item at the General Support level.
<i>D</i>	Repairable item. When beyond lower-level repair capability, return to Depot. Condemnation and disposal of the item is not authorized below Depot level.
<i>L</i>	Repairable item. Condemnation and disposal of the item is not authorized below SRA.
<i>A</i>	Item requires special handling or condemnation procedures for specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

<b>F-3. EXPLANATION OF COLUMNS (SECTIONS II AND III) (continued).</b>
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*c. NSN [Column (3)].* The NSN is a five-digit numeric code used to identify the manufacturer, distributor, Government agency, or other entity that supplies the item.

*d. CAGEC [Column (4)].* The CAGEC (commercial and government entity code) is a five-digit alphanumeric code used to identify the manufacturer, distributor, Government agency, or other entity that supplies the item.

#### NOTE

When you use an NSN to requisition an item, the item you receive may have a part number different from the part ordered.

*e. PART NUMBER [COLUMN (5)].* Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

*f. DESCRIPTION AND USABLE-ON CODE (UOC) [Column (6)].* This column includes the following information:

- (1) The Federal item name and, when required, a minimum description to identify the item.
- (2) Physical security classification. Not applicable.
- (3) Items that are included in kits and sets are listed below the name of the kit or set on Figure KIT.
- (4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
- (5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.
- (6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before the UOC).
- (7) The UOC, when applicable (see para F-5, Special Information).
- (8) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

*g. QTY [Column (7)].* The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and may vary from application to application.

**F-4. EXPLANATION OF COLUMNS (SECTION IV).**

*a. National Stock Number (NSN) Index.*

(1) STOCK NUMBER Column. This column lists the NSN by NIIN (National Item Identification Number) sequence. The NIIN consists of the last nine digits of the NSN (i.e.:

$$\frac{\text{NSN}}{5305-01-674-1467}.$$

NIIN

When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) FIG. Column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section III.

(3) ITEM Column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

*b. Part Number Index.* Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination that places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) CAGEC Column. The CAGEC is a five-digit alphanumeric code used to identify the manufacturer, distributor, Government agency, or other entity, that supplies the item.

(2) PART NUMBER Column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

(3) STOCK NUMBER Column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) FIG. Column. This column lists the number of the figure where the item is identified/located in Section II and Section III.

(5) ITEM Column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

**F-5. SPECIAL INFORMATION.**

*a. Usable-On Code.* The usable-on code appears in the lower left corner of the Description column heading. A usable-on code is shown as "UOC: . . . . ." in the Description column (justified left) on the first line after the applicable item description/nomenclature. Uncoded items are applicable to all models.

*b. Fabrication Instructions.* Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL. Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source-coded to be manufactured or fabricated are found in Appendix H of this manual.



## F-5. SPECIAL INFORMATION (continued).

*c. Assembly Instructions.* Detailed assembly instructions for items source-coded to be assembled from component spare/repair parts are found in Appendix H. Items that make up the assembly are listed immediately following the assembly item entry, or reference is made to an applicable figure.

*d. Kits.* Line item entries for repair parts kits appear in a group in Section II (see Table of Contents).

*e. Index Numbers.* Items that have the word BULK in the figure-number column will have an index number shown in the item-number column. This index number is furnished for use as a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

*f. Associated Publications.* The publications listed below pertain to the Common Bridge Transporter and its components:

<u>Publication</u>	<u>Short Title</u>
TM 9-2320-279-Series	Heavy Expanded Mobility Tactical Trucks Manuals
TM 9-2320-364-Series	Palletized Load System (PLS) Manuals

## F-6. HOW TO LOCATE REPAIR PARTS.

*a. When NSN or Part Number Is Not Known:*

(1) First. Using the Table of Contents, determine the assembly group or subassembly group to which the item belongs. This is necessary because figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number of the item.

(4) Fourth. Refer to the Repair Parts List for the figure to find the line-item entry for the item number noted on the figure.

*b. When NSN or Part Number Is Known:*

(1) First. Using the National Stock Number Index or the Part Number Index, find the pertinent NSN or part number. The NSN index is in NIIN (see para F-4a) sequence. The part numbers in the Part Number Index are listed in ascending alphanumeric sequence. Both indexes cross-reference you to the illustration/figure and item number of the item you are looking for.

(2) Second. After finding the figure and item numbers, verify that the item is the one you are looking for; then locate the item number in the Repair Parts List for the figure.

## F-7. ABBREVIATIONS.

For standard abbreviations see MIL-STD-12, Military Standard Abbreviations for Use on Drawings, Specifications, Standards, and in Technical Documents.

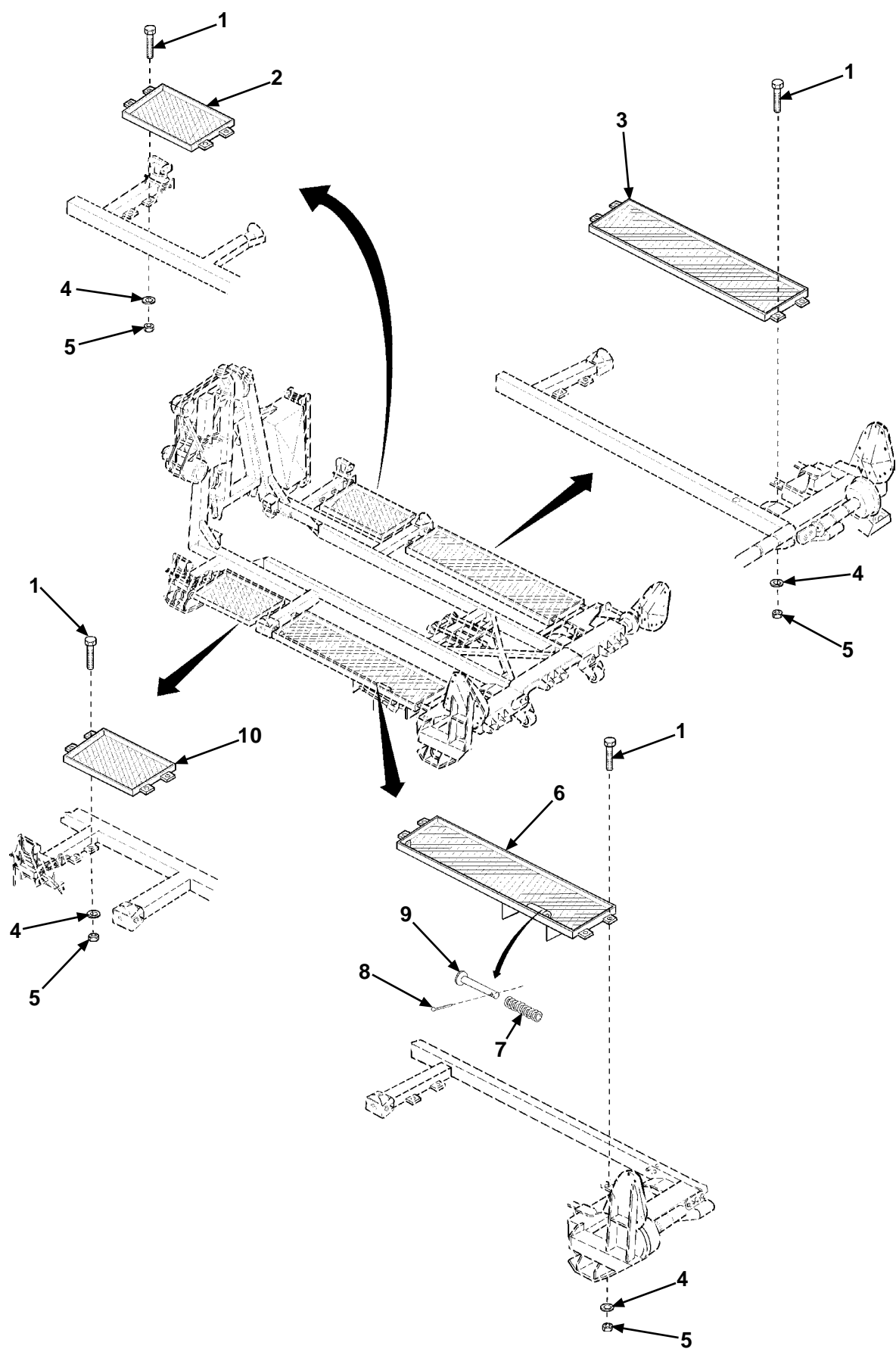


Figure 1. Catwalks

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY	
GROUP 1000 BAP ASSEMBLY							
FIG.1 CATWALKS							
1	PAOZZ	5305013258388	96906	MS90725-113	SCREW,CAP,HEXAGON H 0.500-13 UNC X 1.500 LG.....	16	
*	2	PFOZZ	5340014610414	31902	13551-2	CATWALK,RH RIGHT SIDE.....	1
*	3	PFOZZ	3990014610423	31902	13553	CATWALK,RH RIGHT SIDE.....	1
	4	PAOZZ	5310008095997	96906	MS27183-17	WASHER,FLAT 0.50 NOM SIZE.....	16
	5	PAOZZ	5310002256993	96906	MS51922-33	NUT,SELF-LOCKING,HE 0.50-13 UNC....	16
*	6	PFOZZ	3990014610440	31902	13554	CATWALK,LH LEFT SIDE.....	1
*	7	PAOZZ	5360014537577	92830	C1225-085-5000S	SPRING,HELICAL,COMP.....	1
	8	PAOZZ	5315000589756	96906	MS16562-227	PIN,SPRING 0.125 X 1.25 LG.....	1
*	9	PAOZZ	5315014545755	31902	A4810440	PIN,STRAIGHT,HEADED.....	1
*	10	PFOZZ	3990014610443	31902	13551-1	CATWALK,LH LEFT SIDE.....	1

END OF FIGURE

Figure 2. Ladder (Deleted)



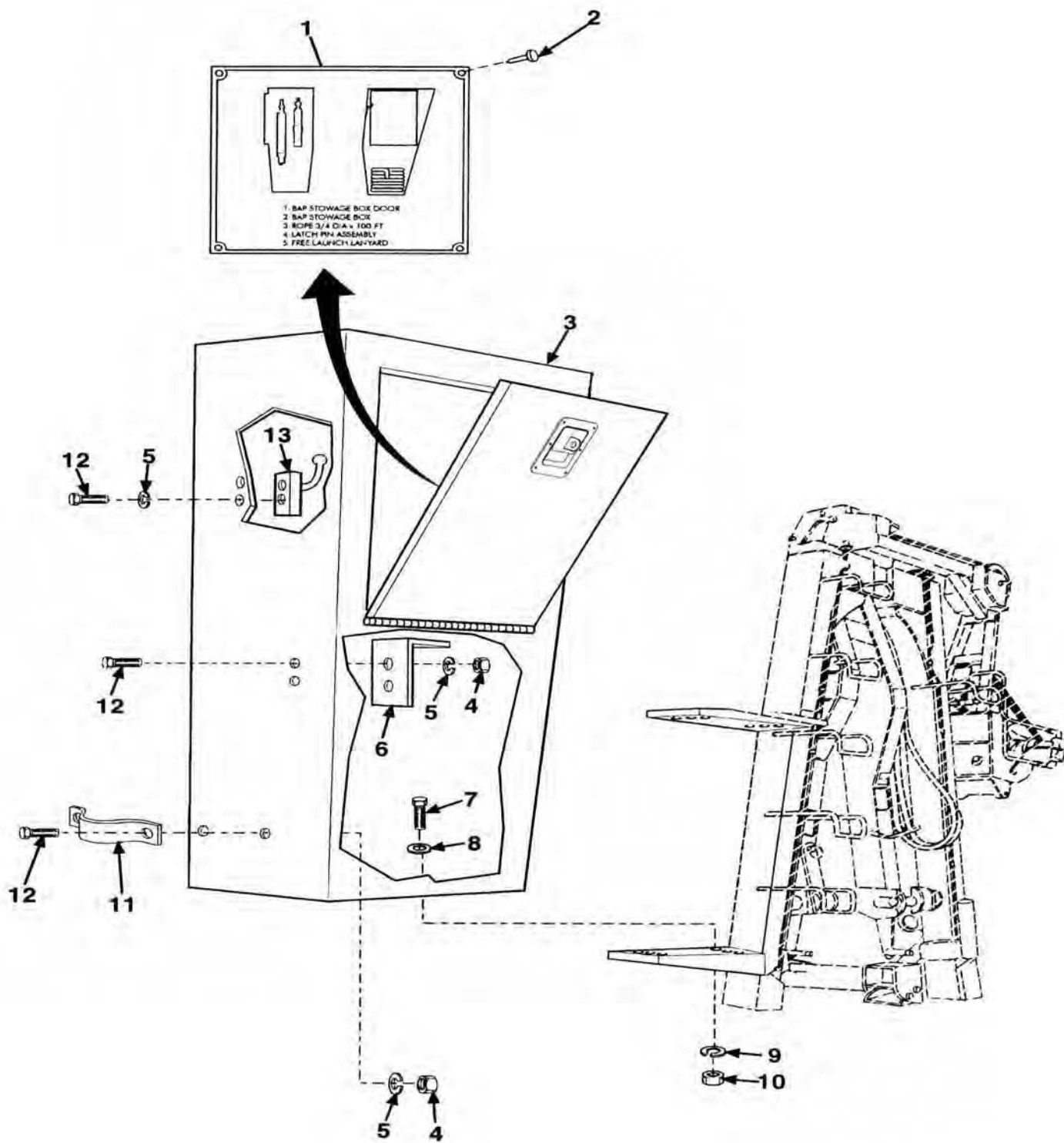


Figure 3. Tool Box Assembly

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.3 TOOL BOX ASSEMBLY						
* 1	PFOZZ	7690014565113	31902	12790	LABEL BAP STOWAGE BOX.....	1
2	PAOZZ	5320005849078	96906	MS20470A4-4	RIVET,SOLID 0.125 X 0.250.....	4
* 3	PFOZZ	2540014538763	31902	A4810260	BOX,ACCESSORIES STOWAGE.....	1
4	PAOZZ	5310009843806	96906	MS51922-9	NUT SELF-LOCKING,HE 0.312-18 UNC...	4
* 5	PAOZZ	5310004079566	96906	MS35338-45	WASHER,LOCK 0.312 NOM.....	8
* 6	PAOZZ	5340014547284	31902	A4810263	BRACKET,MOUNTING.....	1
7	PAOZZ	5305000680510	80204	B1821BH038C100N	SCREW,CAP,HEXAGON H 0.38-16 UNC X 1.00 IN LG.....	12
8	PAOZZ	5310000806004	96906	MS27183-14	WASHER,FLAT 0.375 NOM.....	12
* 9	PAOZZ	5310006379541	80045	23MS35338-46	WASHER,LOCK 0.375 NOM.....	12
10	PAOZZ	5310007320558	96906	MS51967-8	NUT,PLAIN,HEXAGON 0.38-16 UNC.....	12
* 11	PAOZZ	5340014547287	31902	A4810151	BRACKET,MOUNTING T WRENCH.....	1
12	PAOZZ	5306002264825	80204	B1821BH031C075N	BOLT,MACHINE 0.312-16 UNC X 0.75 IN LG.....	8
* 13	PAOZZ	5340014547285	31902	A4810480	H00K,SUPPORT.....	2

END OF FIGURE

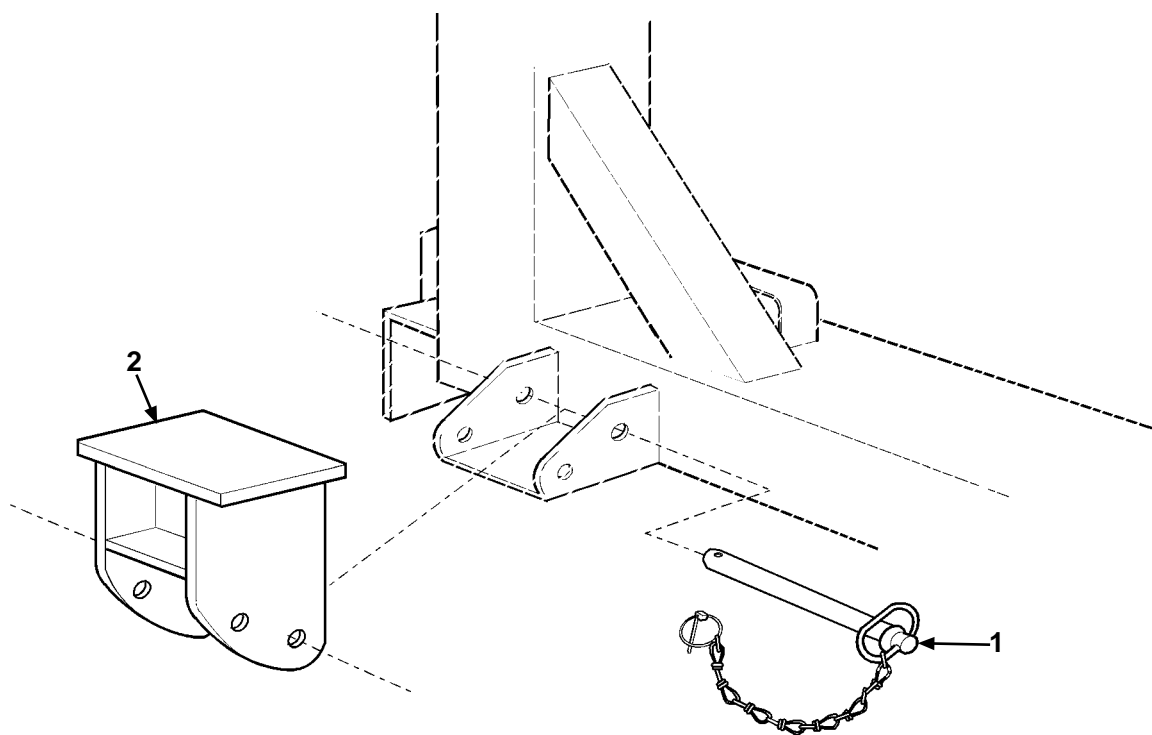


Figure 4. PLS Foot



SECTION II

C01

TM 5-5420-234-14&P

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM	SMR			PART		
NO	CODE	NSN	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
					GROUP 1000 BAP ASSEMBLY	
					FIG.4 PLS FOOT	
* 1	PAOZZ	5315014572385	39428	98497A661	PIN,QUICK RELEASE 0.500 X 5.75.....	4
* 2	PFOZZ	8145014571170	31902	14047	SUPPORT,SHIPPING AN.....	2
					END OF FIGURE	

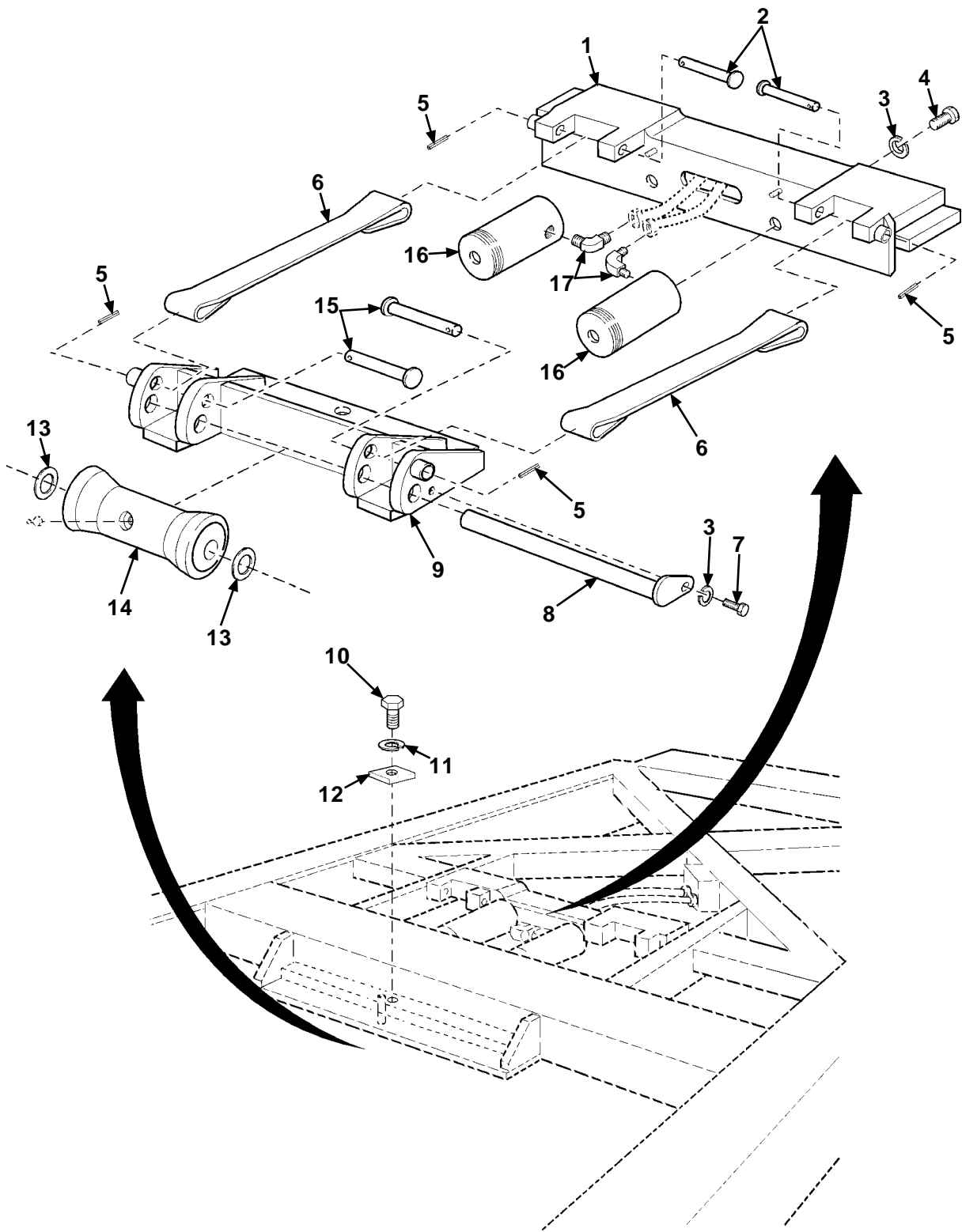


Figure 5. Center Rollers

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.5 CENTER ROLLERS						
* 1	PBOZZ	3040014538773	31902	13800	SUPPORT,CYLINDER.....	1
* 2	PAOZZ	5315014548256	31902	13795-2	PIN, STRAIGHT,HEADLE FRONT.....	2
* 3	PAOZZ	5310006379541	80045	23MS35338-46	WASHER,LOCK 0.375 NOM.....	3
4	PAOZZ	5305000680510	80204	B1821BH038C100N	SCREW,CAP,HEXAGON H 0.38-16 UNC X 1.00 IN LG.....	2
5	PAOZZ	5315000589782	96906	MS16562-236	PIN,SPRING 0.188 X .750 IN LG.....	4
* 6	PAOZZ	5340014591294	31902	13799	STRAP,RETAINING.....	2
7	PAOZZ	5305011409118	80204	B1821BH038C088N	SCREW,CAP,HEXAGON H 0.375-16 UNC X 0.875 IN LG.....	1
* 8	PAOZZ	5315014542268	31902	13798	PIN,STRAIGHT,HEADED.....	1
* 9	PBOZZ	3040014538771	31902	13790	SUPPORT,CYLINDER.....	1
10	PAOZZ	5305000680508	80204	B1821BH025C075N	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	1
11	PAOZZ	5310005825965	96906	MS35338-44	WASHER LOCK 0.250 NOM.....	1
* 12	PAOZZ	5340014576136	31902	14085	RETAINER,NUT AND BO.....	1
* 13	PAOZZ	5310014543840	31902	13789	WASHER,FLAT.....	2
* 14	PAOZZ	5340014577628	31902	13788	WHEEL,SOLID,METALLI.....	1
* 15	PAOZZ	5315014548224	31902	13795-1	PIN,STRAIGHT,HEADLE REAR.....	2
* 16	PAOZZ	2590014537423	1W385	C152C	CYLINDER,HYDRAULIC 2.00 BORE X 2.12 STROKE.....	2
17	PAOZZ	4730008127999	96906	MS51504A6	ELBOW,PIPE TO TUBE 90 DEGREE, 0.375 NPT X 0.250 TUBE, 37 DEG.....	2

END OF FIGURE

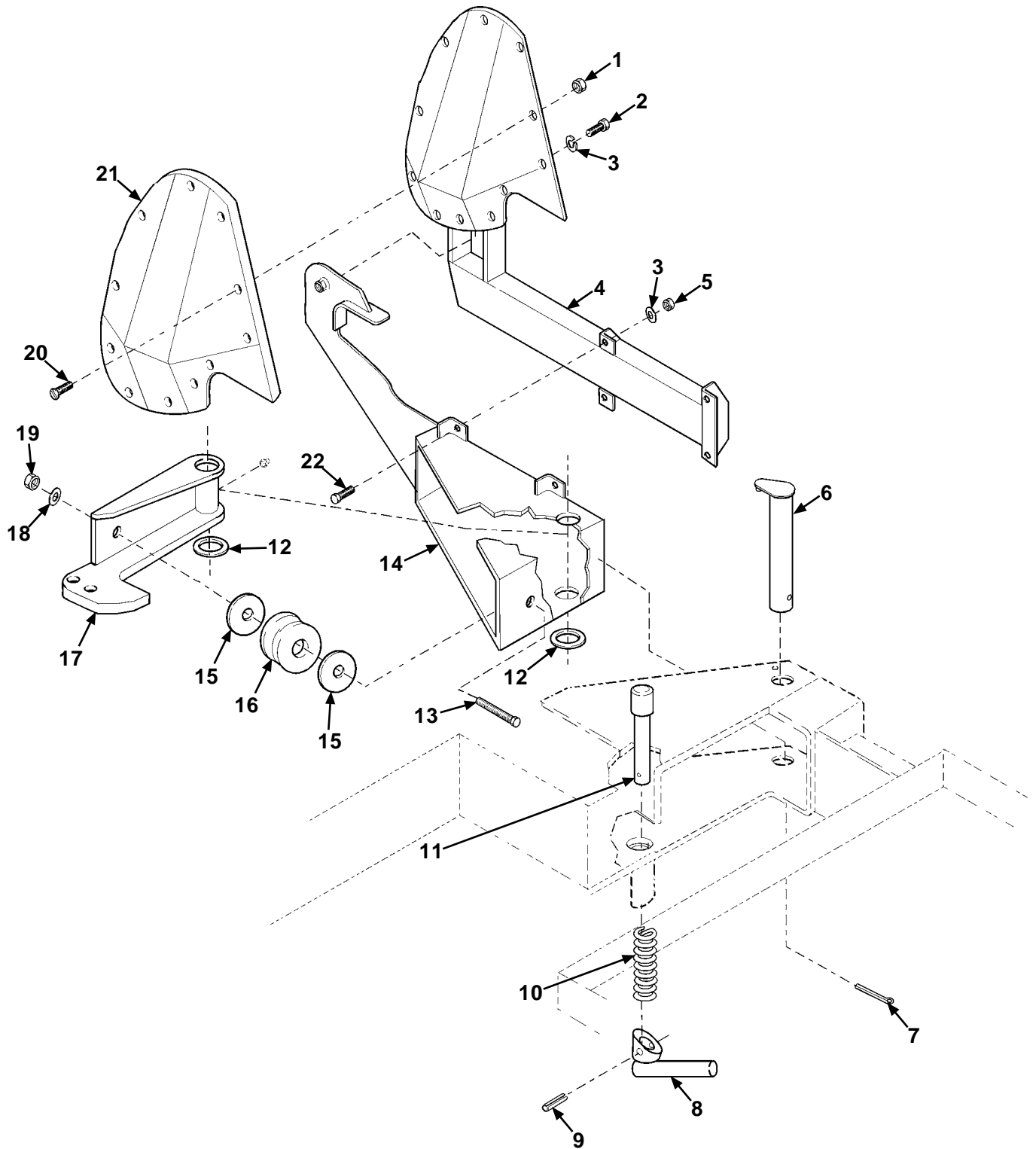


Figure 6. Rear Guide

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.6 REAR GUIDE						
* 1	PAOZZ	5310009843806	96906	MS51922-9	NUT,SELF-LOCKING,HE 0.312-18 UNC...	22
2	PAOZZ	5305013258387	96906	MS90725-64	SCREW,CAP,HEXAGON H 0.38-16 UNC X 1.50 IN LG.....	2
* 3	PAOZZ	5310006379541	80045	23MS35338-46	WASHER,LOCK 0.375 NOM.....	10
* 4	PAOZZ	5340014532532	31902	13525-1	PLATE,MOUNTING RIGHT SIDE, REAR GUIDE.....	1
* 4	PAOZZ	5340014551836	31902	13525-2	PLATE MOUNTING LEFT SIDE, REAR GUIDE.....	1
5	PAOZZ	5310007320558	96906	MS51967-8	NUT,PLAIN,HEXAGON 0.375-16 UNC.....	8
* 6	PAOZZ	5315014554898	31902	13532	PIN,SHOULDER,HEADED REAR GUIDE PIVOT.....	2
7	PAOZZ	5315002097273	96906	MS24665-625	PIN,COTTER 0.225 X 2.00 IN LG.....	2
* 8	PAOZZ	5315014546752	31902	13516	PIN,STRAIGHT,HEADLE REAR GUIDE, HANDLE LATCH.....	2
9	PAOZZ	5315002003183	96906	MS16562-240	PIN,SPRING 0.19 X 1.50 IN LG.....	2
* 10	PAOZZ	5360014557581	92830	C0975-105-2500M	SPRING,HELICAL,COMP 0.975 X 2.50 IN LG X 0.105 WIRE.....	2
* 11	PAOZZ	5315014546761	31902	13514	PIN,STRAIGHT,HEADED REAR GUIDE LATCH.....	2
* 12	PAOZZ	5310014543837	31902	13533	WASHER,FLAT REAR GUIDE.....	2
13	PAOZZ	5305000712084	80204	B1821BH050C550N	SCREW,CAP,HEXAGON H 0.50-13 UNC X 5.50 IN LG.....	2
* 14	PAOZZ	5340014552093	31902	13519-1	BRACKET,MOUNTING LEFT SIDE, REAR GUIDE.....	1
* 14	PAOZZ	5340014552095	31902	13519-2	BRACKET,MOUNTING RIGHT SIDE, REAR GUIDE.....	1
* 15	PAOZZ	5310014614474	31902	14079	WASHER,FLAT RUBBER SPRING, SPACER..	4
* 16	PAOZZ	5340014547279	0S7U8	810046	BUMPER,NONMETALLIC DIA 75MM X 90MM LG.....	2
* 17	PAOZZ	5340014552090	31902	13512-1	BRACKET,MOUNTING LEFT SIDE, REAR GUIDE, REACTION.....	1
* 17	PAOZZ	5340014552092	31902	13512-2	BRACKET,MOUNTING RIGHT SIDE, REAR GUIDE, REACTION.....	1
18	PAOZZ	5310008095997	96906	MS27183-17	WASHER,FLAT 0.50 NOM SIZE.....	4
19	PAOZZ	5310002256993	96906	MS51922-33	NUT,SELF-LOCKING,HE 0.50-13 UNC....	2
* 20	PAOZZ	5305014555055	39428	92196A585	SCREW,CAP,SOCKET HE 0.31-UNC X 1.25 IN LG.....	22
* 21	PAOZZ	2590014539122	31902	13882-1	PAD,CUSHIONING RIGHT SIDE, REAR GUIDE.....	1
* 21	PAOZZ	2590014539248	31902	13882-2	PAD,CUSHIONING LEFT SIDE, REAR GUIDE	1
22	PAOZZ	5305005432419	80204	B1821BH038C113N	SCREW,CAP,HEXAGON H 0.375-16 UNC X 1.25 IN LG.....	8

END OF FIGURE

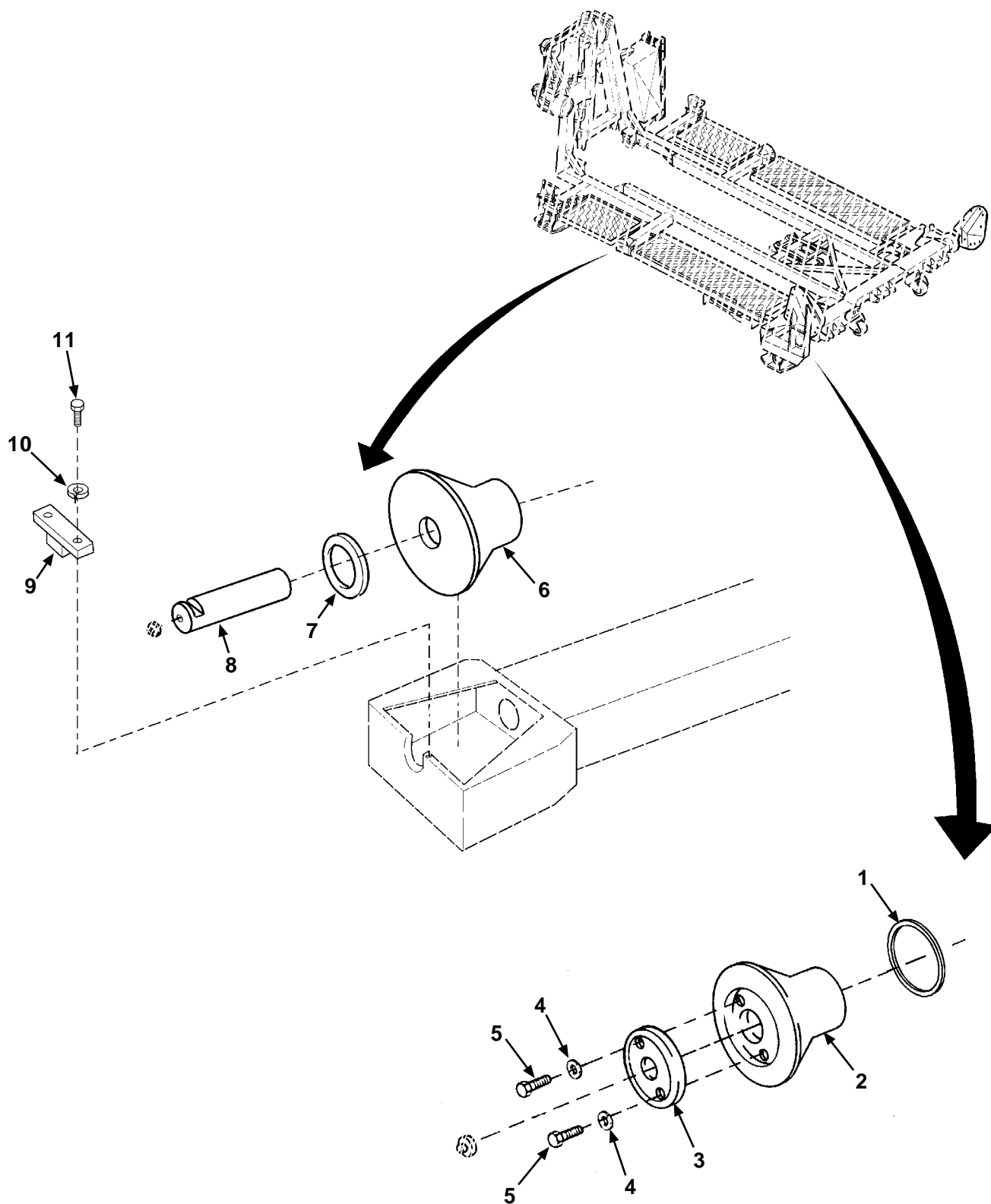


Figure 7. Front and Rear Roller Assemblies

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.7 FRONT AND REAR ROLLER ASSEMBLIES						
* 1	PAOZZ	5365014549552	31902	A4810075	SHIM.....	2
* 2	PAOZZ	3990014539712	31902	A4810110	ROLLER,MATERIAL HAN REAR.....	2
* 3	PAOZZ	3040014538714	31902	A4810074	PLATE,RETAINING,SHA.....	2
* 4	PAOZZ	5310008206653	96906	MS35338-50	WASHER,LOCK 0.62-UNC.....	4
5	PAOZZ	5306000873762	96906	MS16208-137	BOLT,MACHINE 0.62-UNC X 1.25 IN LG.	4
* 6	PAOZZ	3910014603891	31902	A4810080	ROLLER ASSEMBLY FRONT BAY/ BOAT....	2
* 7	PAOZZ	5365014549554	31902	A4810056	SHIM.....	2
* 8	PAOZZ	3040014538753	31902	A4810055	SHAFT,STRAIGHT.....	2
* 9	PAOZZ	3110014543228	31902	13493	CAP,SHAFT FRONT BAY ROLLER.....	2
* 10	PAOZZ	5310005825965	96906	MS35338-44	WASHER,LOCK 0.250 NOM.....	4
11	PAOZZ	5305000680508	80204	B1821BH025C075N	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	4

END OF FIGURE

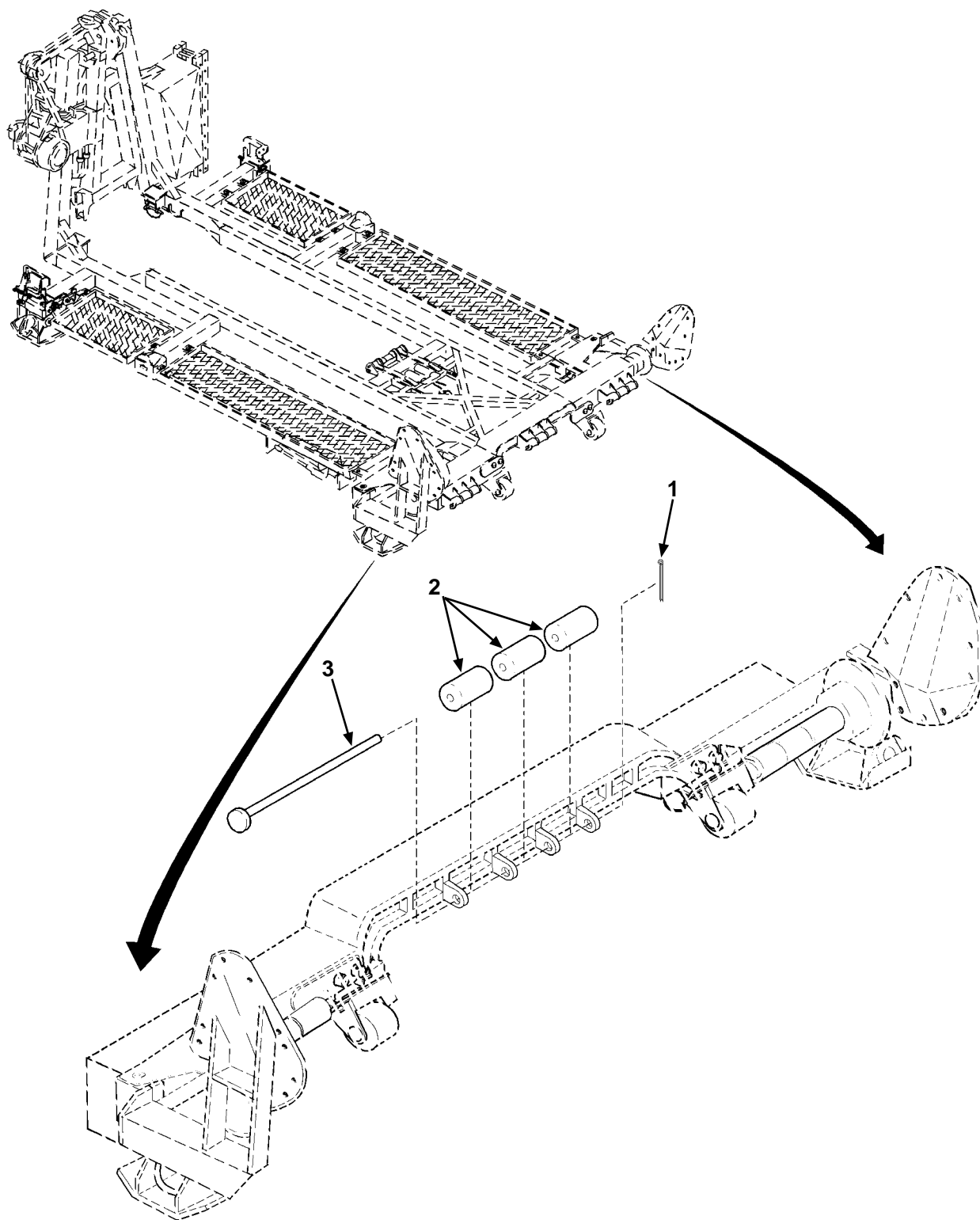


Figure 8. Rear Bumper Assembly



## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
					GROUP 1000 BAP ASSEMBLY FIG.8 REAR BUMPER ASSEMBLY	
1	PAOZZ	5315005760421	96906	MS24665-511	PIN,COTTER 0.188 X 1.25 IN LG.....	3
* 2	PAOZZ	5340014578615	39428	2292T52	WHEEL,SOLID,NONMETA HIGH BANK ROLLER.....	9
* 3	PAOZZ	5315014546758	31902	13479	PIN,STRAIGHT,HEADED REAR BUMPER.....	3
					END OF FIGURE	

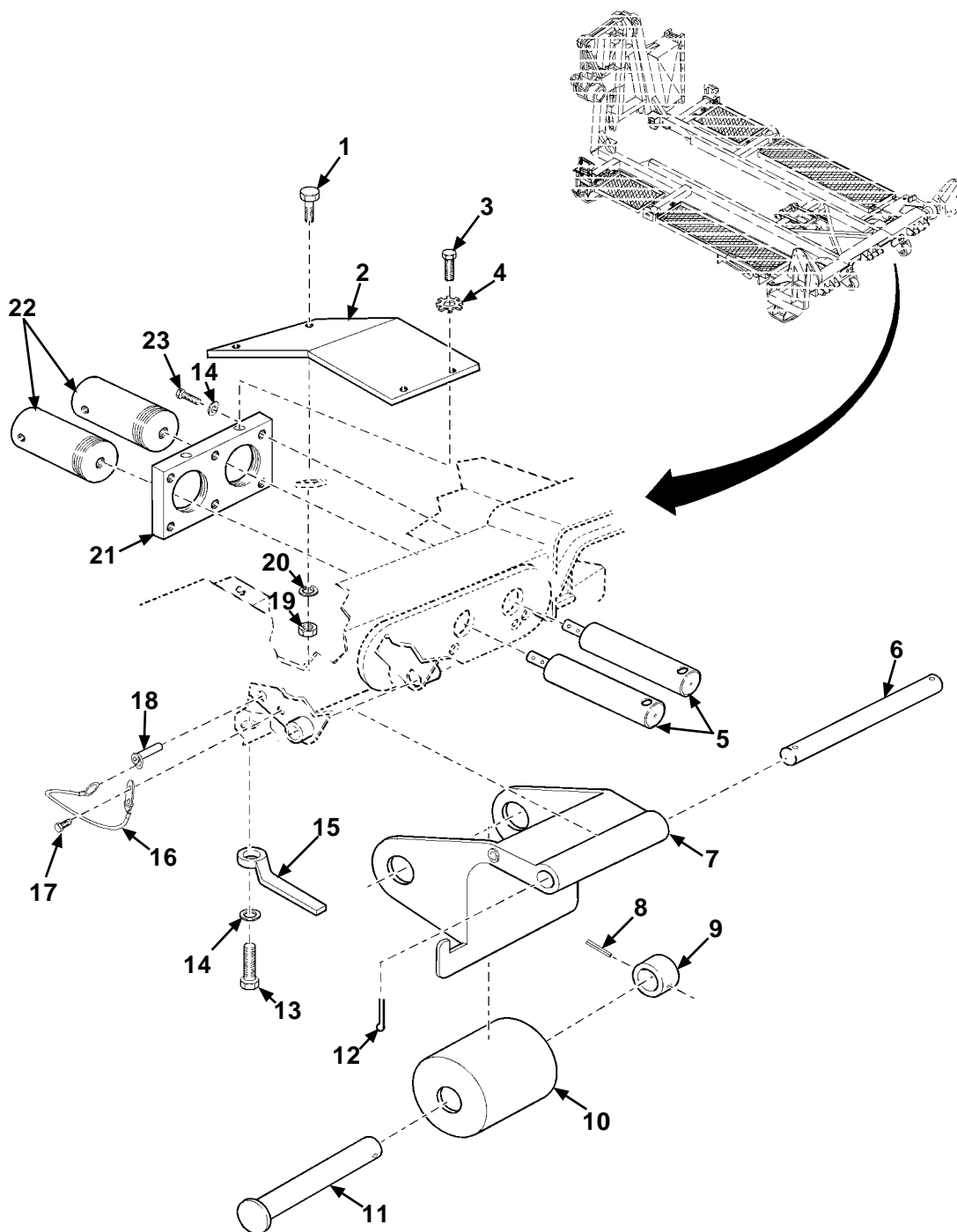


Figure 9. Guard Plate and Transload Roller

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.9 GUARD PLATE AND TRANSLOAD ROLLER						
1	PAOZZ	5305009901347	96906	MS35190-292	SCREW,MACHINE 0.250-20 UNC X 1.25 IN LG X 82 DEGREES.....	2
* 2	PAOZZ	5340014532520	31902	13481	PLATE,MENDING GUARD RAMP.....	2
3	PAOZZ	5305002063689	96906	MS35198-70	SCREW,MACHINE 0.250-20 UNC X 0.62 IN LG X 82 DEGREES CSK.....	4
* 4	PAOZZ	5310002617163	96906	MS35336-29	WASHER,LOCK EXT TOOTH, 0.25 SIZE X 82 DEGREES.....	4
* 5	PAOZZ	3040014538796	31902	13786	EXTENSION SHAFT CYLINDER.....	4
* 6	PAOZZ	5315014542514	31902	13537	PIN,STRAIGHT HEADLE.....	2
* 7	PBOZZ	5340014532544	31902	13531-1	BRACKET,MOUNTING LEFT SIDE, TRANSLOADER.....	1
* 7	PBOZZ	5340014532533	31902	13531-2	BRACKET,MOUNTING RIGHT SIDE, TRANSLOADER.....	1
8	PAOZZ	5315011404870	96906	MS51987-422	PIN,SPRING DIA 0.19 X 2.00 IN LG...	2
* 9	PAOZZ	3040014538635	31902	13581	COLLAR,RETAINING TRANSLOADER.....	2
* 10	PAOZZ	5340998941046	U8623	PK16906	WHEEL,SOLID,NONMETA ROLLER.....	2
11	PAOZZ	5315014221705	31902	14127	PIN,STRAIGHT,HEADED.....	2
* 12	PAOZZ	5315002398032	96906	MS24665-513	PIN,COTTER 0.175 ID X 1.50 NOM.....	2
13	PAOZZ	5305000680510	80204	B1821BH038C100N	SCREW,CAP,HEXAGON H 0.38-16 UNC X 1.00 IN LG.....	2
* 14	PAOZZ	5310006379541	80045	23MS35338-46	WASHER,LOCK 0.375 NOM.....	14
* 15	PFOZZ	5340014532554	31902	13538	LEVER,LOCK-RELEASE.....	2
16	MOOZZ		39428	90312A310-6	LANYARD MAKE FROM LANYARD KIT, P/N 97840A66, 6.00 IN LG.....	2
17	PAOZZ	5305000145454	28839	535213	SCREW,TAPPING 10-24 UNC X 0.38 IN LG.....	2
18	PAOZZ	5315009041673	96906	MS17984C415	PIN,QUICK RELEASE 0.31 X 1.50 GRIP.	2
19	PAOZZ	5310007616882	96906	MS51967-2	NUT,PLAIN,HEXAGON 0.250-20 UNC.....	2
* 20	PAOZZ	5310005825965	96906	MS35338-44	WASHER,LOCK 0.250 NOM.....	2
* 21	PFOZZ	5340014532542	31902	13517	BRACKET,MOUNTING.....	2
* 22	PAOZZ	2590014537423	1W385	C152C	CYLINDER,HYDRAULIC 2.00 BORE X 2.12 STROKE.....	4
23	PAOZZ	5305013258387	96906	MS90725-64	SCREW,CAP,HEXAGON H 0.38-16 UNC X 1.50 IN LG.....	12

END OF FIGURE

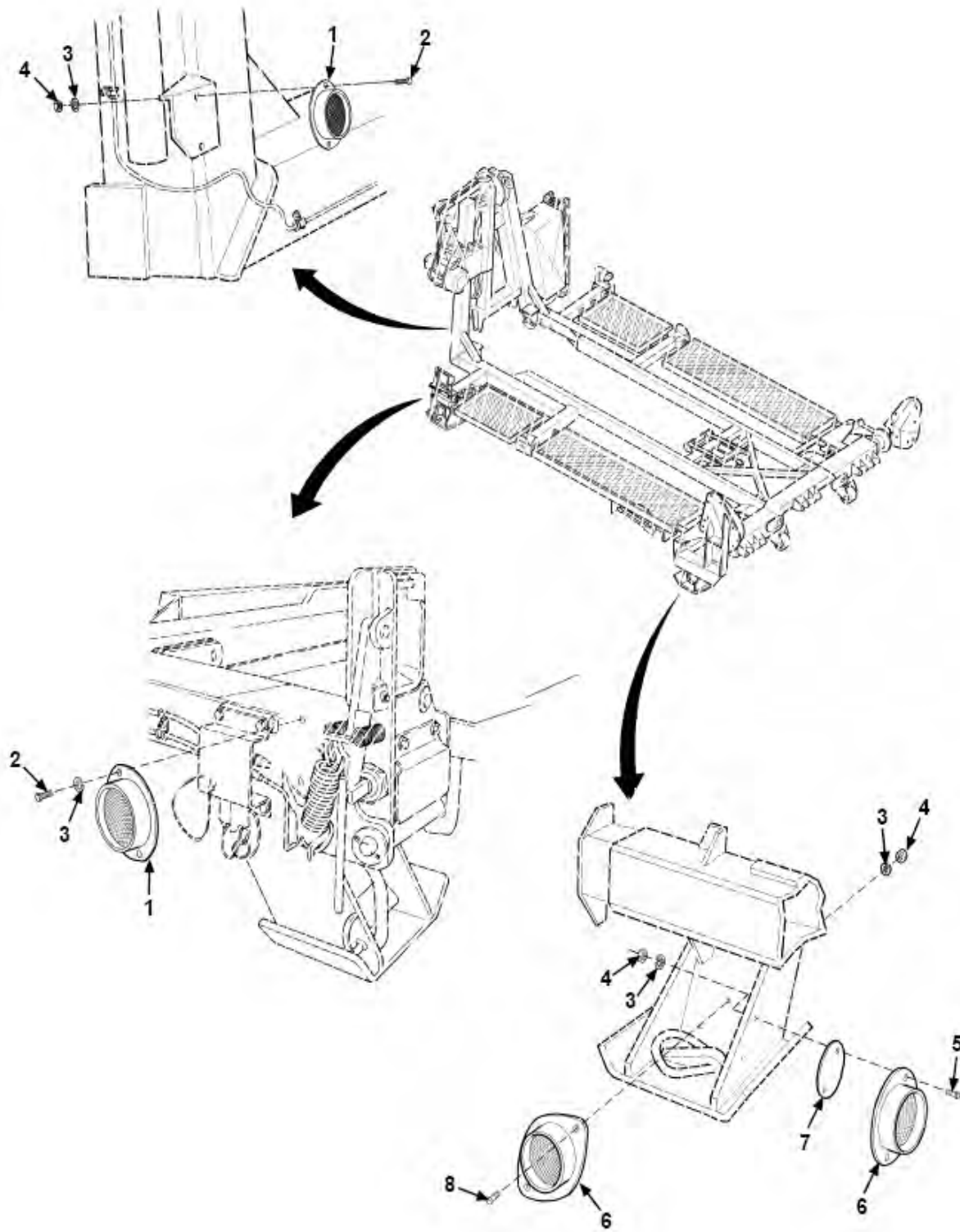


Figure 10. Reflectors

SECTION II

C03

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.10 REFLECTORS						
* 1	PAOZZ	9905009177167	81834	40153-3	REFLECTOR,INDICATIN AMBER.....	3
* 2	PAOZZ	5305009846210	96906	MS35206-263	SCREW,MACHINE 10-24 UNC X 0.50 IN LG.....	6
* 3	PAOZZ	5310000453296	96906	MS35338-43	WASHER,LOCK NO. 10 SIZE.....	14
* 4	PAOZZ	5310009349764	96906	MS35649-205	NUT,PLAIN,HEXAGON NO. 10-24 UNC....	10
5	PAOZZ	5305009846214	96906	MS35206-267	SCREW,MACHINE 0.192-24 UNC X 1.00 IN LG.....	4
6	PAOZZ	9905009177168	81834	40152-3	RFLECTOR,INDICATIN RED.....	4
7	PAOZZ	5340014761306	31902	13591	PLATE,MOUNTING.....	2
8	PAOZZ	5305009846212	96906	MS35206-265	SCREW,MACHINE NO. 10-24 UNC X 0.75 IN LG.....	4
END OF FIGURE						

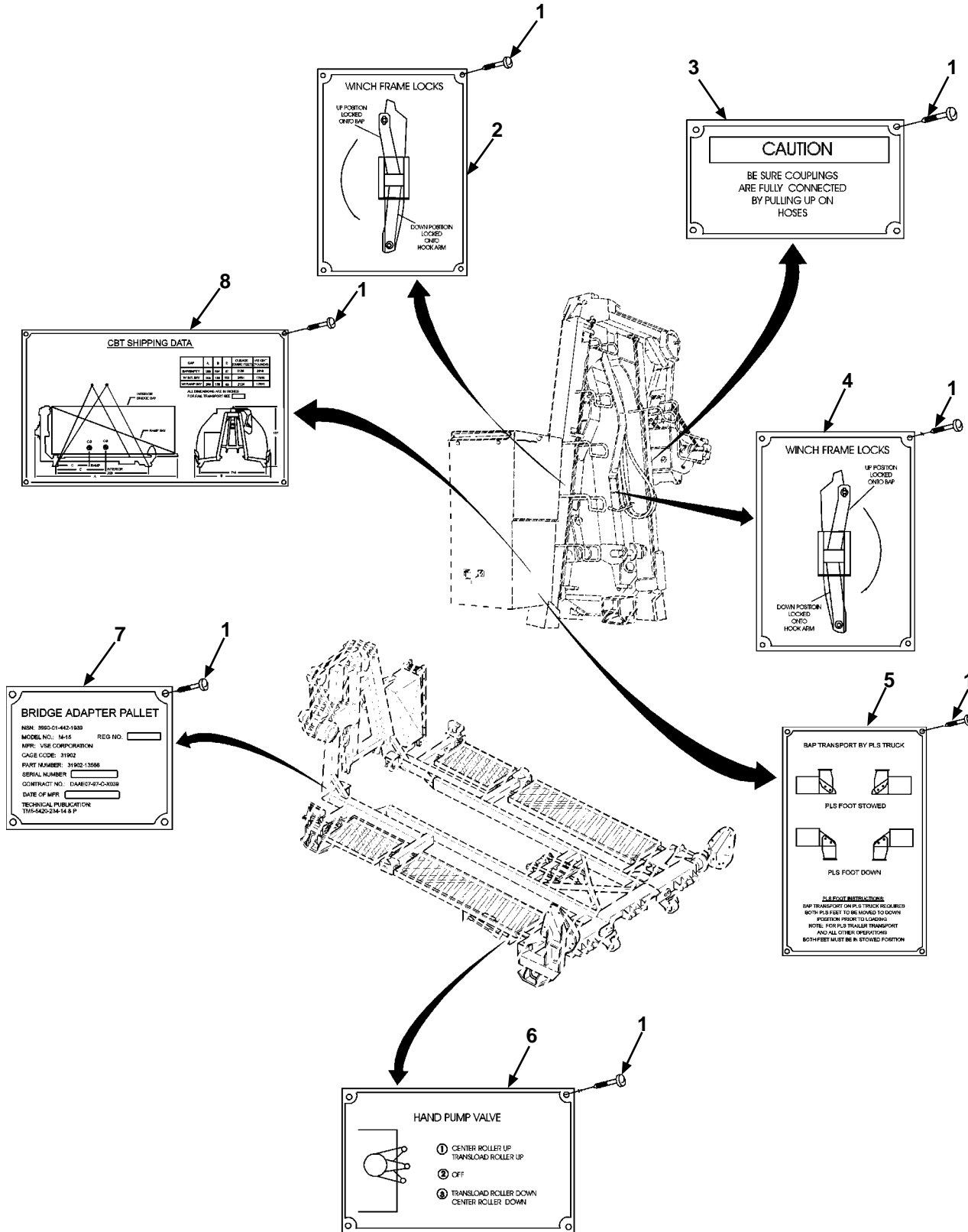


Figure 11. BAP Labels

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1000 BAP ASSEMBLY						
FIG.11 BAP LABELS						
* 1	PAOZZ	5305002535614	80205	MS21318-20	SCREW,DRIVE 0.144 X 2.00 NOM.....	28
* 2	PFOZZ	9905014565361	31902	13590-4	PLATE,INSTRUCTION WINCH FRAME LOCKS	1
* 3	PFOZZ	9905014564287	31902	12208-15	PLATE,INSTRUCTION CAUTION.....	1
* 4	PFOZZ	9905014563829	31902	13590-5	PLATE,INSTRUCTION WINCH FRAME LOCKS.....	1
* 5	PFOZZ	9905014578348	31902	14084	PLATE,INSTRUCTION PLS FOOT USE.....	1
* 6	PFOZZ	9905014564282	31902	13590-8	PLATE,INSTRUCTION HAND PUMP VALVE..	1
* 7	PFOZZ	9905014578347	31902	14028	PLATE,IDENTIFICATIO BAP.....	1
* 8	PFOZZ	9905014578351	31902	14029	PLATE,INSTRUCTION SHIPPING DATA....	1
END OF FIGURE						

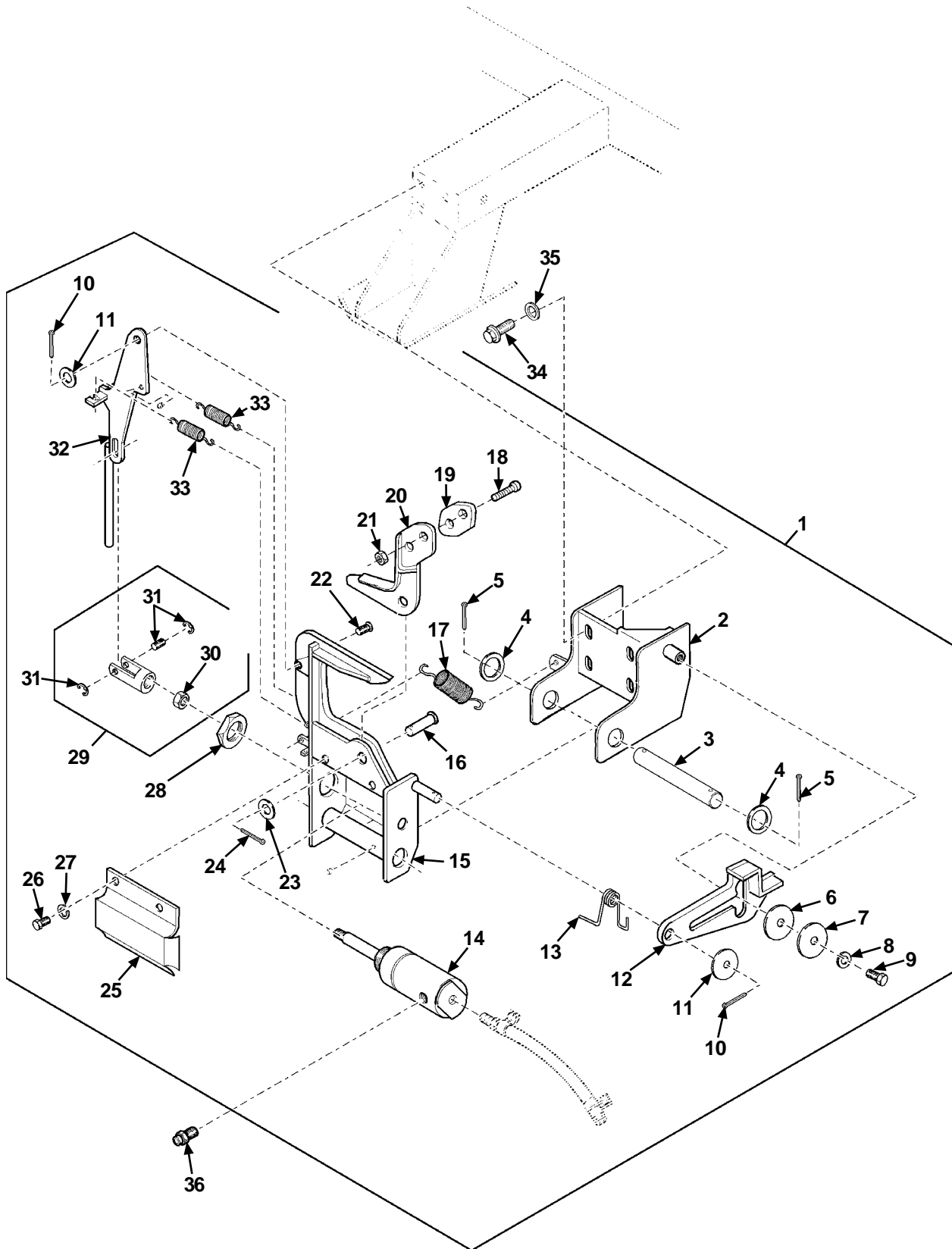


Figure 12. Front Pin Lock



## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1100 FRONT PIN LOCK ASSEMBLY FIG.12 FRONT PIN LOCK						
* 1	PBOO	2510014540929	31902	13480-1	LOCK ASSEMBLY,PNEUM LEFT HAND.....	1
* 1	PBOO	1440014547251	31902	13480-2	LOCK ASSEMBLY,PNEUM RIGHT HAND.....	1
* 2	XAOZZ		31902	13472-1	.BRACKET,FRONT,PIN LEFT HAND.....	1
* 2	XAOZZ		31902	13472-2	.BRACKET,FRONT,PIN RIGHT HAND.....	1
* 3	PAOZZ	5315014544326	31902	13478	.PIN,STRAIGHT,HEADLE.....	1
4	PAOZZ	5310008098541	96906	MS27183-27	.WASHER,FLAT 1.00 NOM SIZE.....	2
5	PAOZZ	5315002417332	76005	RS40-7	.PIN,COTTER 0.125 X 1.50 IN LG.....	2
* 6	PAOZZ	5310006194848	63910	99-51505-017	.WASHER,FLAT 0.25 NOM. X 1.00 O.D..	1
* 7	PAOZZ	5310013644211	39428	98026A033	.WASHER,FLAT 0.562 ID X 1.00.....	1
* 8	PAOZZ	5310005825965	96906	MS35338-44	.WASHER,LOCK 0.250 NOM.....	1
9	PAOZZ	5305000680500	96906	MS90725-3	.SCREW,CAP,HEXAGON H 0250-20 UNC X 0.50 IN LG.....	1
10	PAOZZ	5315000590206	96906	MS24665-491	.PIN,COTTER 0.19 X 1.00 IN LG.....	2
11	PAOZZ	5310008095997	96906	MS27183-17	.WASHER,FLAT 0.50 NOM SIZE.....	2
12	XAOZZ		31902	13475-1	.LATCH,PIVOT LEFT SIDE, FRONT.....	1
12	XAOZZ		31902	13475-2	.LATCH,PIVOT RIGHT SIDE, FRONT.....	1
* 13	PAOZZ	5360014540425	31902	13477-1	.SPRING,HELICAL,TORS LEFT SIDE, FRONT.....	1
* 13	PAOZZ	5360014540427	31902	13477-2	.SPRING,HELICAL,TORS RIGHT SIDE, FRONT.....	1
* 14	XDOZZ	2990011086147	19541	502-D	.CYLINDER,AIR 2.50 BORE X 2.00 STROKE.....	1
* 15	PBOZZ	5340014539094	31902	13473-1	.PLATE,MOUNTING LEFT SIDE, GUIDE...	1
* 15	PBOZZ	5340014565631	31902	13473-2	.PLATE,MOUNTING RIGHT SIDE, GUIDE..	1
* 16	PAOZZ	5315014542368	31902	13497-2	.PIN,STRAIGHT,HEADED 0.50 NOM.....	1
* 17	PAOZZ	5360014537574	56048	E1750-207-5500M	.SPRING,HELICAL EXTE 1.75 X 5.50 IN LG.....	2
18	PAOZZ	5305000527485	96906	MS35198-87	.SCREW,MACHINE 0.312-18 UNC X 1.25 IN LG X 82 DEGREES.....	2
* 19	PAOZZ	2590014565819	31902	14058	.PAD,CUSHIONING.....	1
20	XAOZZ		31902	13474-1	.JAW,FRONT PIN LOCK LEFT HAND.....	1
20	XAOZZ		31902	13474-2	.JAW,FRONT,PIN LOCK RIGHT SIDE.....	1
21	PAOZZ	5310009843806	96906	MS51922-9	.NUT SELF-LOCKING,HE 0.312-18 UNC..	2
* 22	PAOZZ	5315014546001	31902	13497-1	.PIN,STRAIGHT,HEADED 0.75 NOM SIZE.	1
23	PAOZZ	5310008098533	96906	MS27183-23	.WASHER FLAT 0.812 NOM.....	1
24	PAOZZ	5315008457787	96906	MS24665-289	.PIN,COTTER 0.09 X 1.50 IN LG.....	1
* 25	PAOZZ	5340014532469	31902	13815	.GUARD,VALVE ACTUATO.....	1
26	PAOZZ	5306002264822	80204	B1821BH031C050N	.BOLT,MACHINE 0.312-18 UNC X 0.50 IN LG.....	2
* 27	PAOZZ	5310004079566	96906	MS35338-45	.WASHER,LOCK 0.312 NOM SIZE.....	2
* 28	PAOZZ	5310014611608	19541	D-2540	.NUT,PLAIN,HEXAGON 1.375-12 UNF-2B.	1
29	PAOZZ	5340011338831	19541	D231-3	.CLEVIS,ROD END.....	1
* 30	PAOZZ	5310014585052	39428	94895A825	.NUT,PLAIN,HEXAGON 0.50-20 UNC PART OF P/N D231-3.....	1
* 31	PAOZZ	5315014579220	39428	92735A430	.PIN,STRAIGHT,HEADED WITH E-CLIP, PART OF P/N D-231-3.....	1
* 32	PAOZZ	2510014537303	40909	13476-1	.LATCH RELEASE LEFT SIDE, FRONT....	1

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(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
* 32	PAOZZ	2510014540909	31902	13476-2	.LATCH,RELEASE RIGHT SIDE, FRONT...	1
* 33	PAOZZ	5360014538119	56048	E0850-085-2750M	.SPRING,HELICAL,EXTE 0.85 X 2.75... IN LG.....	2
* 34	PAOZZ	5305014569393	39428	92316A716	SCREW,CAP,HEXAGON H 0.50 X 1.50 IN LG.....	8
* 35	PAOZZ	5310008095997	96906	MS27183-17	WASHER,FLAT 0.50 NOM SIZE.....	8
* 36	PAOZZ	2805012440125	39428	9833K22	BREATHER.....	2

END OF FIGURE



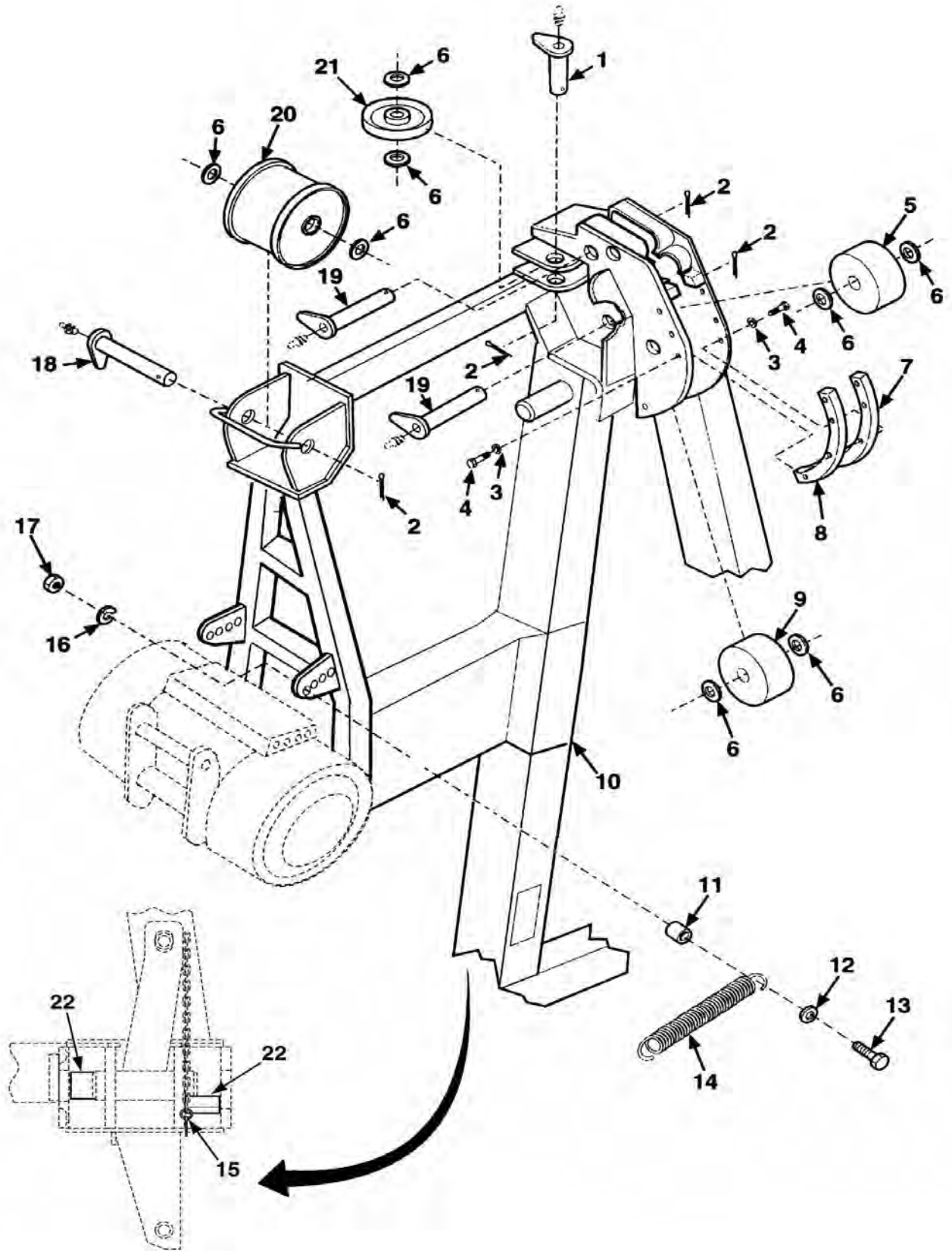


Figure 13. Sheave Assembly

## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1200 WINCH FRAME ASSEMBLY FIG.13 SHEAVE ASSEMBLY						
1	PAOZZ	5315014540517	31902	A4809270	PIN,STRAIGHT,HEADED.....	1
2	PAOZZ	5315002097273	96906	MS24665-625	PIN,COTTER 0.25 X 2.00 IN LG.....	4
3	PAOZZ	5310002090965	96906	MS35338-47	WASHER,LOCK 0.452 NOM.....	8
4	PAOZZ	5305007098539	96906	MS90727-89	SCREW,CAP,HEXAGON H 0.438-20 UNF X 1.50 IN LG.....	8
5	PAOZZ	3020014540321	31902	A4809300	PULLEY,FLAT ROLLER ASSEMBLY.....	1
6	PAOZZ	5365014536479	31902	A4809165	SPACER,SPECIAL SHAP.....	8
7	PAOZZ	3950014535422	31902	A4809088	WEAR PLATE,CRANE LEFT HAND.....	1
8	PAOZZ	3950014535524	31902	A4809089	WEAR PLATE,CRANE RIGHT HAND.....	1
9	PAOZZ	3020014540316	31902	A4809280	PULLEY,FLAT ROLLER ASSEMBLY.....	1
10	XAOZZ		31902	A6208060	WINCH FRAME W.A.....	1
11	PAOZZ	3120014532303	31902	A4809164	BUSHING,SLEEVE.....	2
12	PAOZZ	5310000806004	96906	MS27183-14	WASHER,FLAT 0.375 NOM.....	2
13	PAOZZ	5305005432419	80204	B1821BH038C113N	SCREW,CAP,HEXAGON H 0.382-16 UNC X 1.25 IN LG.....	2
14	PAOZZ	5360014535457	92830	E2000-177-8000M	SPRING,HELICAL,EXTE.....	2
15	PAOZZ	5315001987653	96906	MS17984-516	PIN,QUICK RELEASE 0.312 X 1.56 IN LG.....	2
16	PAOZZ	5310006379541	80045	23MS35338-46	WASHER LOCK 0.375 NOM.....	2
17	PAOZZ	5310007320558	96906	MS51967-8	NUT,PLAIN,HEXAGON 0.375-16 UNC.....	2
18	PAOZZ	5315014538667	31902	A4809260	PIN,STRAIGHT,HEADED ROLLER.....	1
19	PAOZZ	5315014545458	31902	A4809290	PIN,STRAIGHT,HEADED ROLLER.....	2
20	PAOZZ		31902	A4809250	ROLLER ASSEMBLY.....	1
21	PAOZZ	3020014538749	31902	A4809195	PULLEY,GROOVE.....	1
* 22	XDFZZ		0CHW9	A4809211	BLOCK, LOCKING RETAINER .....	2

END OF FIGURE

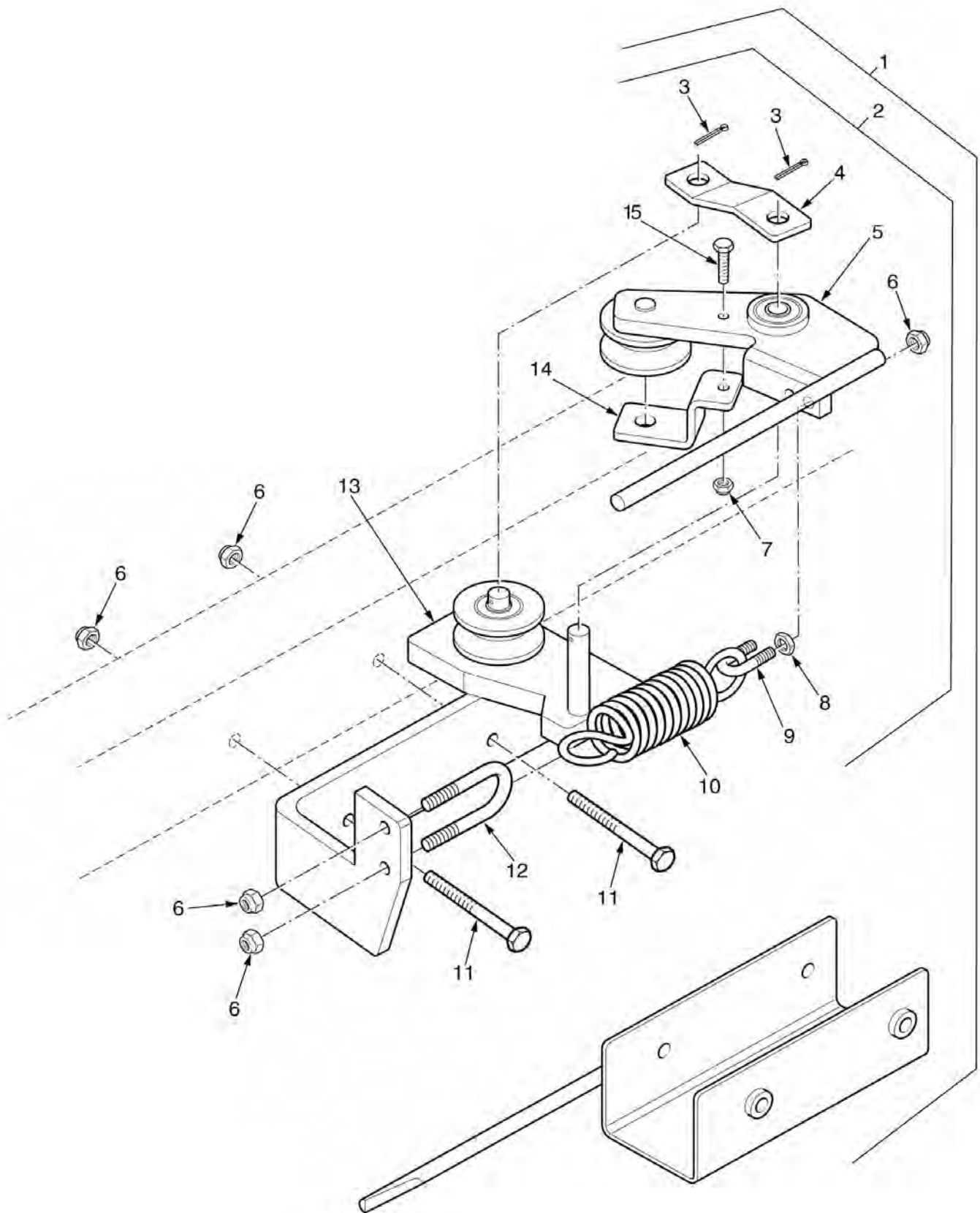


Figure 13A. Cable Tensioner

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1200 WINCH FRAME ASSEMBLY FIG.13A CABLE TENSIONER						
* 1	XDOOO		0CHW9	BBD22001IK	KIT, TENSIONER INSTALLATION INCLUDES CABLE TENSIONER ASSEMBLY, DRILL JIG AND INSTALLATION INSTRUCTIONS	1
* 2	XDOOO		0CHW9	BBD20000AM	.TENSIONER ASSEMBLY, CABLE . . . . .	1
* 3	XDOZZ		0CHW9	165-143	..PIN, COTTER 0.125 X 1.25 IN LG. . . . .	2
* 4	XDOZZ		0CHW9	BBD20003AM	..BAR, RETAINER . . . . .	1
* 5	XDOZZ		0CHW9	BBD20014AM	..HANDLE ASSEMBLY. . . . .	1
* 6	XDOZZ		0CHW9	111-018	..NUT, NYLOCK 0.375-16 UNC. . . . .	6
* 7	XDOZZ		0CHW9	108-016	..NUT, NYLOCK 0.3125-18 UNC . . . . .	1
* 8	XDOZZ		0CHW9	341057	..NUT, HEX JAM 0.375-16 UNC . . . . .	2
* 9	XDOZZ		0CHW9	APEX50-ZP- $\frac{1}{2}$ - 601612	..U-BOLT . . . . .	1
* 10	XDOZZ		0CHW9	BBD01468	..SPRING . . . . .	1
* 11	XDOZZ		0CHW9	075-504	..BOLT, HEX HEAD 0.375-16 X 4 IN LG . . . . .	2
* 12	XDOZZ		0CHW9	29010024	..U-BOLT . . . . .	1
* 13	XDOZZ		0CHW9	BBD20013AM	..BASE ASSEMBLY. . . . .	1
* 14	XDOZZ		0CHW9	BBD20006AM	..PLATE, TORSION LOCK . . . . .	1
* 15	XDOZZ		0CHW9	075-444	..BOLT, HEX HEAD 0.3125-18 X 1 IN LG. . . . .	1

END OF FIGURE

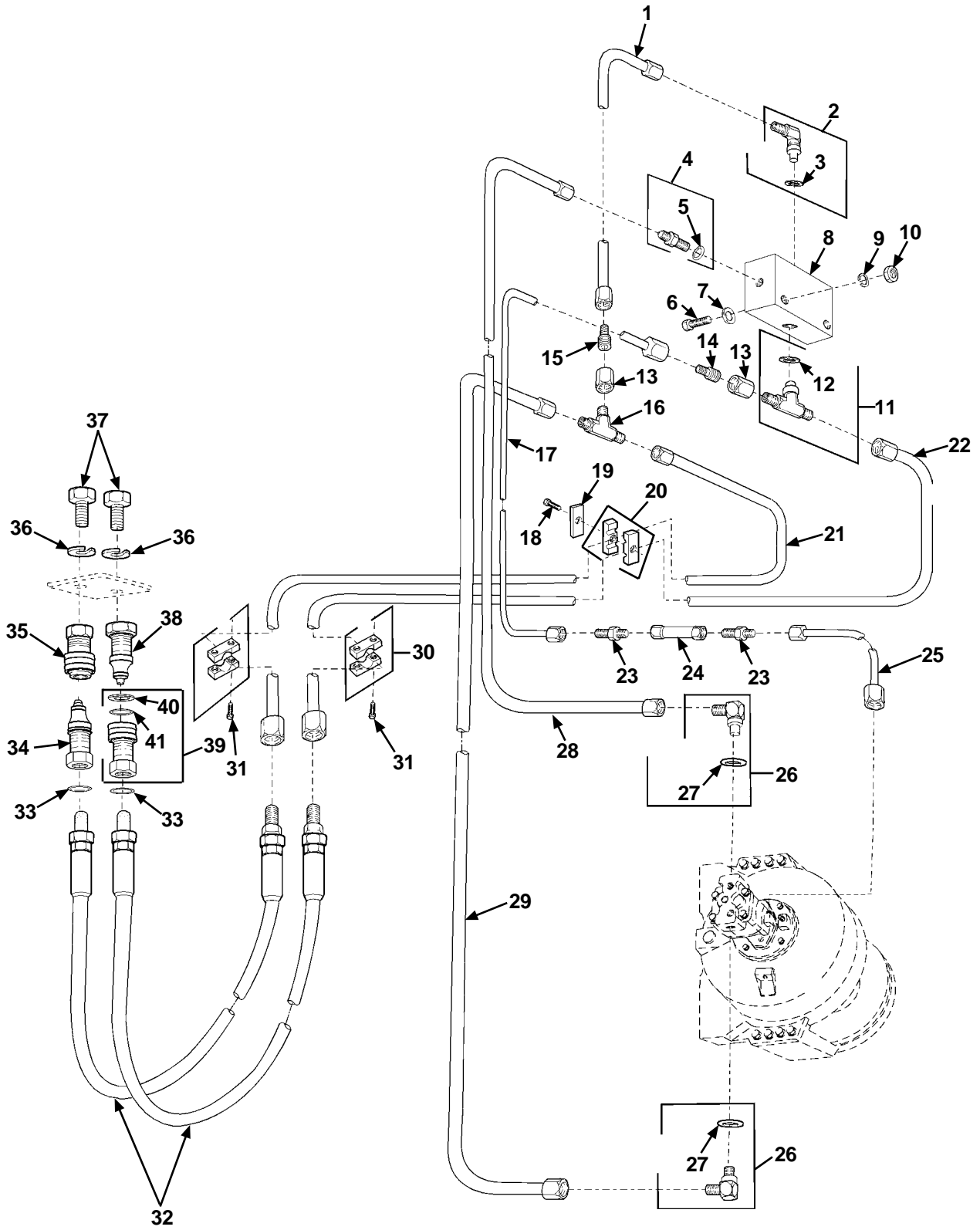


Figure 14. Winch Hydraulic Lines



## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1200 WINCH FRAME ASSEMBLY FIG.14 WINCH HYDRAULIC LINES						
* 1	PAOZZ	4710014570954	31902	14097	TUBE, BENT, METALLIC.....	1
* 2	PAOZZ	4730001433941	96906	MS51527A6	ELBOW, TUBE TO BOSS 0.375 TUBE.....	1
* 3	PAOZZ	5330014604706	30780	3-906V0894	PACKING, PREFORMED PART OF P/N MS51527A6.....	1
* 4	PAOZZ	4730009060721	30780	10F50XS	ADAPTER, STRAIGHT, TU 0.625 TUBE.....	1
* 5	PAOZZ	5330004853586	02697	3-910	PACKING, PREFORMED PART OF P/N 10F50XS.....	1
6	PAOZZ	5306002264834	96906	MS90725-41	BOLT, MACHINE 0.312-18 UNC X 2.25 IN LG.....	2
7	PAOZZ	5310000814219	96906	MS27183-12	WASHER, FLAT 0.312 NOM.....	2
* 8	PBOZZ	4820014536133	54035	CBEA-LAN-BCK	VALVE, REGULATING, FL BLOCK.....	1
* 9	PAOZZ	5310004079566	96906	MS35338-45	WASHER, LOCK 0.312 NOM.....	2
10	PAOZZ	5310008807744	96906	MS51967-5	NUT, PLAIN, HEXAGON 0.312-18 UNC.....	2
* 11	PAOZZ	4730004211363	96906	MS51529A10	TEE, TUBE TO BOSS 0.625 TUBE.....	1
* 12	PAOZZ	5330004853586	02697	3-910	PACKING, PREFORMED PART OF P/N MS51529A10.....	1
* 13	PAOZZ	4730008972043	30780	10BTX-S	NUT, TUBE COUPLING 0.625.....	2
14	PAOZZ	4730011161658	30780	0603-10-4	REDUCER BODY, TUBE 0.625 TO 0.250...	1
* 15	PAOZZ	4730009999830	30780	10-6TRTX-S	REDUCER, TUBE 0.625 TO 0.375.....	1
16	PAOZZ	4730007842633	96906	MS51510-A10	TEE, TUBE 0.625 TUBE.....	1
* 17	PAOZZ	4710014571284	31902	14099	TUBE ASSEMBLY, METAL.....	1
* 18	PAOZZ	5306014535940	53790	AS-2-D	BOLT, MACHINE 0.312-18 UNC X 1.375 IN LG.....	1
* 19	PAOZZ	5340014532747	53970	SP3	PLATE, MOUNTING COVER.....	1
* 20	PAOZZ	5340013756141	53790	2160/160 PP	CLAMP, BLOCK.....	1
21	PAOZZ		31902	14104	TUBE, ASSEMBLY, METAL.....	1
* 22	PAOZZ	4710014571080	31902	14103	TUBE, BENT, METALLIC.....	1
23	PAOZZ	4730008377073	96906	MS51500A4-4S	ADAPTER, STRAIGHT, PI 0.250 TUBE TO 0.250 NPT.....	2
24	PAOZZ	4820010382313	09990	VCL4P05A	VALVE, CHECK 0.250 NPT.....	1
* 25	PAOZZ	4710014571297	31902	14101	TUBE ASSEMBLY, METAL.....	1
* 26	PAOZZ	4730010774889	30780	10-12 C50XS	ELBOW, TUBE TO BOSS 0.6250 TUBE TO 0.750 O-RING.....	2
* 27	PAOZZ		30780	3-912	SEAL, PLAIN PART OF P/N 10-12 C50XS.	1
* 28	PAOZZ	4710014570952	31902	14098	TUBE, BENT, METALLIC.....	1
* 29	PAOZZ	4710014570931	31902	14102	TUBE, BENT, METALLIC.....	1
30	PAOZZ	5340012161165	53790	2160PP	BRACKET, PIPE 0.625 TUBE.....	2
* 31	PAOZZ	5305012807901	80204	B182113H025C100N	SCREW, CAP, HEXAGON H 0.25-20 UNC X 1.00 IN LG.....	4
* 32	PAOZZ	4720014535137	31902	A4806096	HOSE ASSEMBLY, NONME.....	2
* 33	XDOZZ		99517	S1E10164 ITEM 17	O-RING 0.375 PORT.....	2
34	PAOZZ	4730010241347	01276	5610-10-10S	COUPLING HALF, QUICK 0.875-14.....	1
* 35	PAOZZ	4730014535390	01276	5691-8-10S	COUPLING, HALF, QUICK 0.750 NOM.....	1
36	PAOZZ	5310005847888	96906	MS35338-51	WASHER, LOCK 0.750 NOM.....	2
37	PAOZZ	5305012961863	80204	B1821BH075F100N	SCREW, CAP, HEXAGON 0.750-16 UNC X 1.00 IN LG.....	2
* 38	PAOZZ	4730013275244	01276	5606-8-10S	COUPLING ASSEMBLY, Q MALE 3/4-16....	1

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(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
39	PAOZZ	4730010254918	01276	5608-10-10S	COUPLING HALF,QUICK FEMALE.....	1
40	PAOZZ	5340007898409	01276	22021-10	RING,BACKUP PART OF P/N 5608-10-10S.....	1
41	PAOZZ	5330000179253	01276	22550-211	PACKING,PREFORMED PART OF P/N 5608-10-10S.....	1

END OF FIGURE



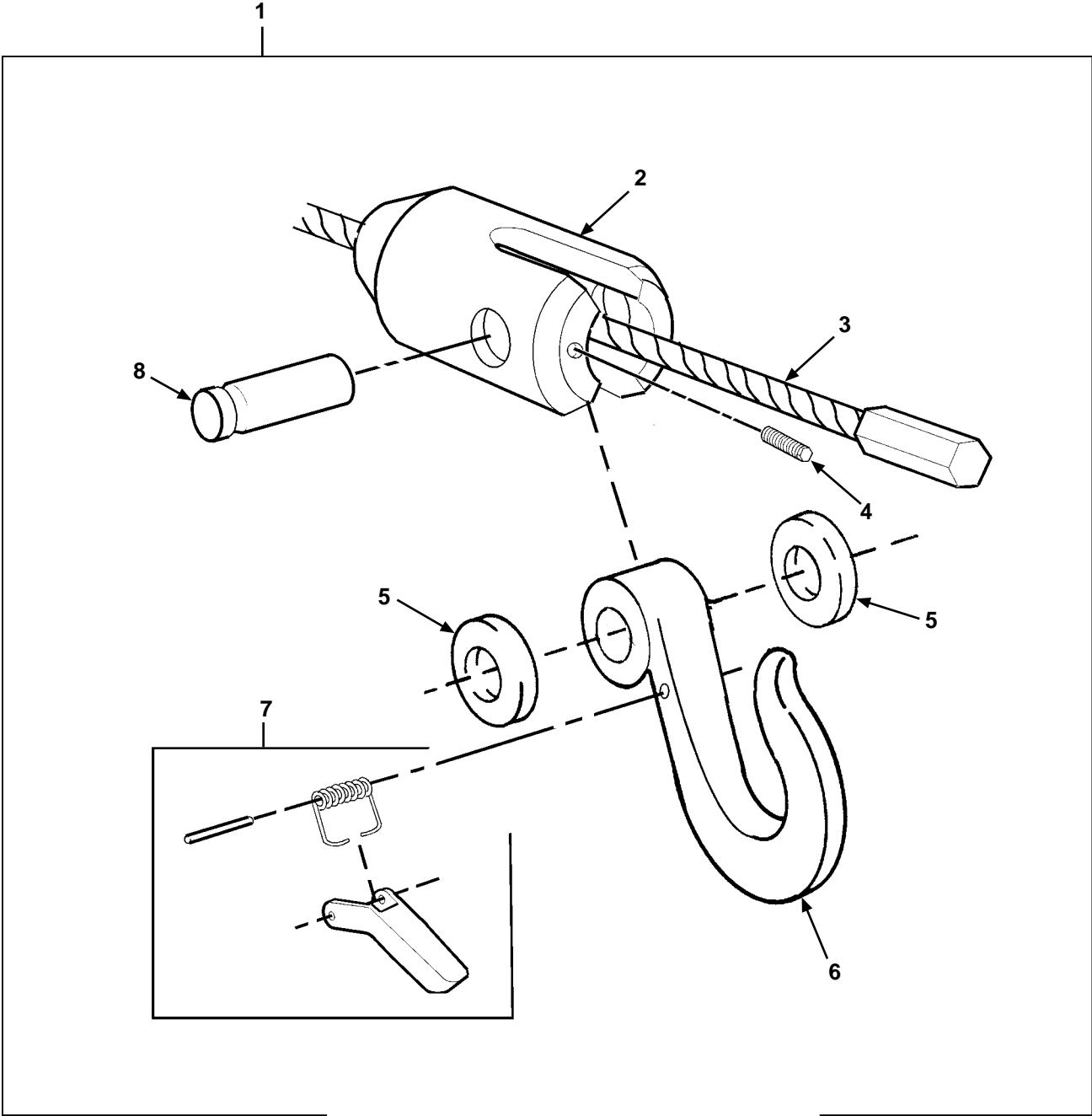


Figure 15. Winch Cable Assembly

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1210 WINCH CABLE ASSEMBLY						
FIG.15 WINCH CABLE ASSEMBLY						
1	A0000		31902	A4809240	CABLE ASSEMBLY.....	1
2	PAOZZ	4030014548215	31902	A4809131	.COUPLING,WIRE ROPE.....	1
* 3	PAOZZ	4010015281747	0CHW9	BBD30075	.WIRE ROPE ASSEMBLY 75 FT .....	1
* 3	PAOZZ	4010014548213	31902	A4809185	.WIRE ROPE ASSEMBLY 107 FT	1
USE UNTIL EXHAUSTED.....						
4	PAOZZ	5305007245834	96906	MS51963-87	.SETSCREW 0.312-18 UNC X 0.750 IN LG.....	1
5	PAOZZ	5365014537218	31902	A4809163	.SPACER,SPECIAL SHAP.....	2
6	PAOZZ	4030014580680	31902	A4809183	.HOOK,HOIST.....	1
7	PAOZZ	4030014548219	31902	A4809184	.LATCH,SAFETY,HOOK.....	1
8	PAOZZ	5315014542338	31902	12785	.PIN,GROOVED,HEADED.....	1

END OF FIGURE

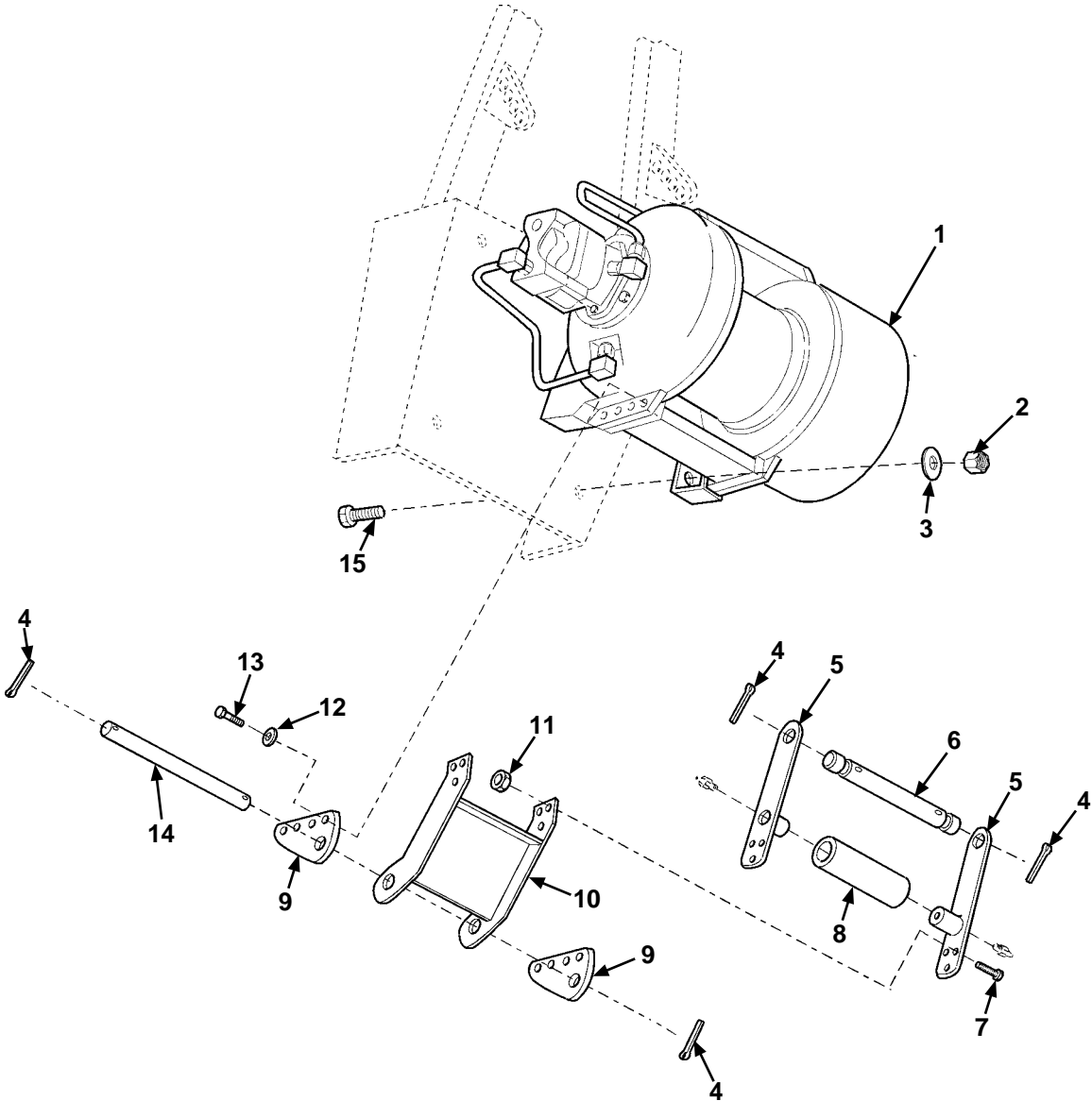


Figure 16. Winch Assembly

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1220 BAP WINCH ASSEMBLY FIG.16 WINCH ASSEMBLY						
* 1	PAOFF	3950014505478	31902	A4809173	WINCH,DRUM,POWER OP ASSEMBLY BY PULLMASTER MODEL #38335-R7-15- 135-1-437.....	1
2	PAOZZ	5310007638921	96906	MS51967-23	NUT,PLAIN,HEXAGON 0.750-10 UNC.....	4
3	PAOZZ	5310005847888	96906	MS35338-51	WASHER,LOCK 0.755 NOM.....	4
4	PAOZZ	5315002981499	96906	MS24665-360	PIN,COTTER 0.125 X 2.0 IN LG.....	4
* 5	PFOZZ	5340014547280	31902	A4809370	BRACKET,MOUNTING.....	2
* 6	PFOZZ	3040014538731	31902	A4809152	SHAFT,STRAIGHT.....	1
* 7	PAOZZ	5305013588402	80205	NAS1352C5-12	SCREW CSK HD 0.312-18 UNC X .750 IN LG.....	6
* 8	PAOZZ	3040014538550	31902	A4809400	SHAFT,STRAIGHT ROLLER.....	1
* 9	PFOZZ	5340014547281	31902	A4809151	PLATE,MOUNTING PIVOT.....	2
* 10	PFOZZ	5340014547283	31902	A4809380	BRACKET,MOUNTING CARRIAGE.....	1
* 11	PAOZZ	5310009843806	96906	MS51922-9	NUT,SELF-LOCKING,HE 0.312-18 UNC...	6
12	PAOZZ	5310002090965	96906	MS35338-47	WASHER,LOCK 0.452 NOM.....	8
13	PAOZZ	5305000712055	80204	B1821BH044C150N	SCREW,CAP,HEXAGON H 0.438-14 UNC X 1.50 IN LG.....	8
* 14	PFOZZ	3040014538706	31902	A4809149	SHAFT,STRAIGHT.....	1
* 15	PAOZZ	5305009227994	80204	B1821BH075C250N	SCREW,CAP,HEXAGON H 0.750-10 UNC X 2.50 IN LG.....	4

END OF FIGURE

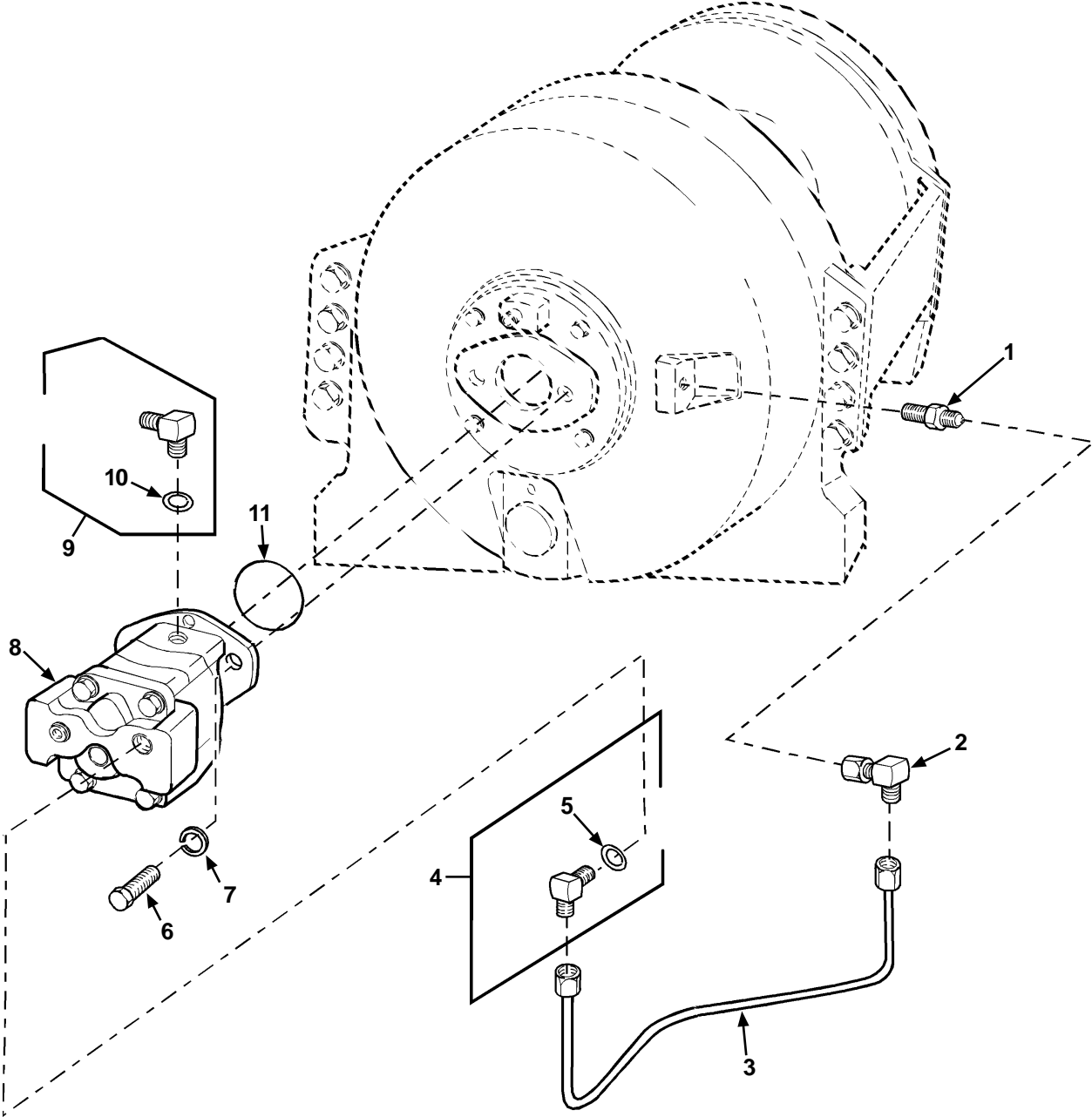


Figure 17. Winch Motor Assembly



(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1220 BAP WINCH ASSEMBLY FIG.17 WINCH MOTOR ASSEMBLY						
* 1	PAFZZ		38335	25895	ADAPTER 45 0.125 NPT 1.25 FPT.....	1
* 2	PAOZZ		38335	26120	ELBOW,TUBE TO BOSS.....	1
* 3	PAOZZ	4710219145839	38335	23071	TUBE ASSEMBLY 0.250 INCH OD .125...	1
* 4	PAOZZ		38335	26125	ELBOW,TUBE TO BOSS 90 DEGREE.....	1
* 5	PAOZZ		38335	25716	SEAL,PLAIN PART OF P/N 26125.....	1
6	PAFZZ	5305012172126	38335	25264	SCREW,CAP,HEXAGON H 0.375-16 UNC X 1.00 IN LG GR5.....	2
7	PAFZZ	5310000115093	96906	MS35338-65	WASHER,LOCK 0.390 NOM .....	2
* 8	PAOZZ		38335	26384	MOTOR-PUMP,HYDRAU 0.375 NOM.....	1
9	PAOZZ	4730013889668	98441	4C50X-S	ELBOW,TUBE TO BOSS 0.250 TUBE TO 0.250.....	1
* 10	PAFZZ	5331014589296	35338	26194	O-RING PART OF P/N 4C50X-S.....	1
* 11	KFFZZ		38335	25016	O-RING PART OF KIT P/N 23157, 3.250 INCHES ID X .062 INCHES CS....	1

END OF FIGURE

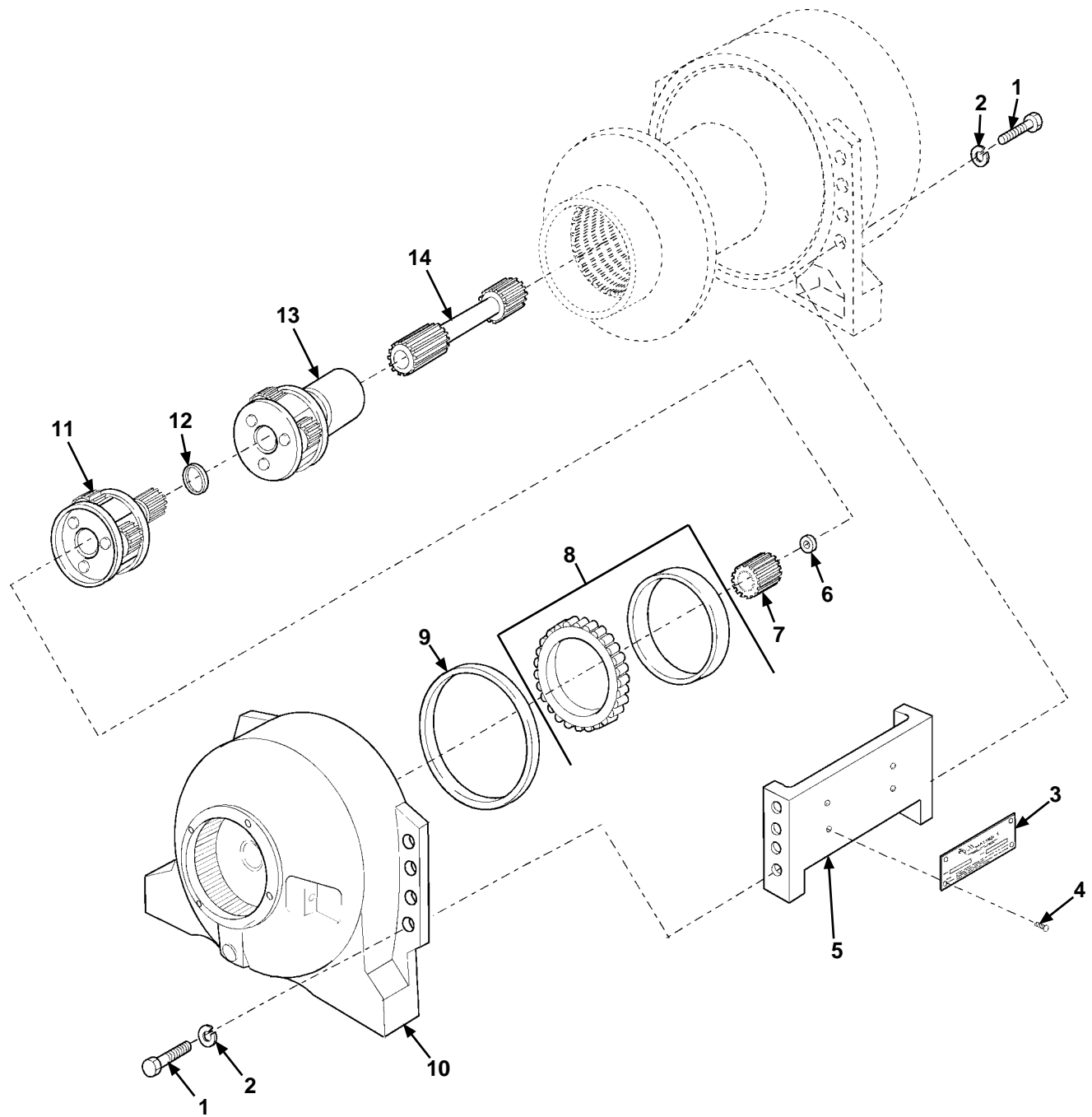


Figure 18. Winch Primary and Secondary Drives

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1220 BAP WINCH ASSEMBLY						
FIG.18 WINCH PRIMARY AND SECONDARY						
DRIVES						
* 1	PAFZZ	5305012713276	38335	25265	SCREW,CAP,HEXAGON H 0.437-14 UNC X 1.25 IN LG GR5.....	16
* 2	PAFZZ	5310012122299	38335	25328	WASHER,LOCK 0.437 NOM.....	16
3	PFOZZ		38335	26324	PLATE,IDENTIFICATIO SERIAL NUMBER..	1
4	PAOZZ		38335	26091	SCREW,DRIVE.....	4
* 5	PFOZZ		38335	22374	BRACKET,MOUNTING R7.....	2
6	PAFZZ	5365012786157	38335	20450	SHIM PRIMARY.....	1
* 7	PFFZZ		38335	20670	GEAR CLUSTER S-15 PRIMARY.....	1
* 8	PAFZZ	3110218933048	38335	25480	BEARING ROLLER,CYLI.....	1
9	KFFZZ		38335	25148	OIL SEAL PART OF KIT P/N 23157.....	1
10	XAFZZ		38335	22834	BRAKE HOUSING R7-13 SPEC-437.....	1
* 11	PFFZZ		38335	22272	GEAR SET,HELICAL,MA PRIMARY DRIVE..	1
* 12	PFFZZ	5365012177125	38335	20372	SPACER.....	2
* 13	PFFZZ		38335	22402	GEAR SET,HELICAL,MA SECONDARY DRIVE	1
* 14	PFFZZ	3040219149942	38335	22400	GEAR SHAFT,SPUR R7 FINAL.....	1

END OF FIGURE

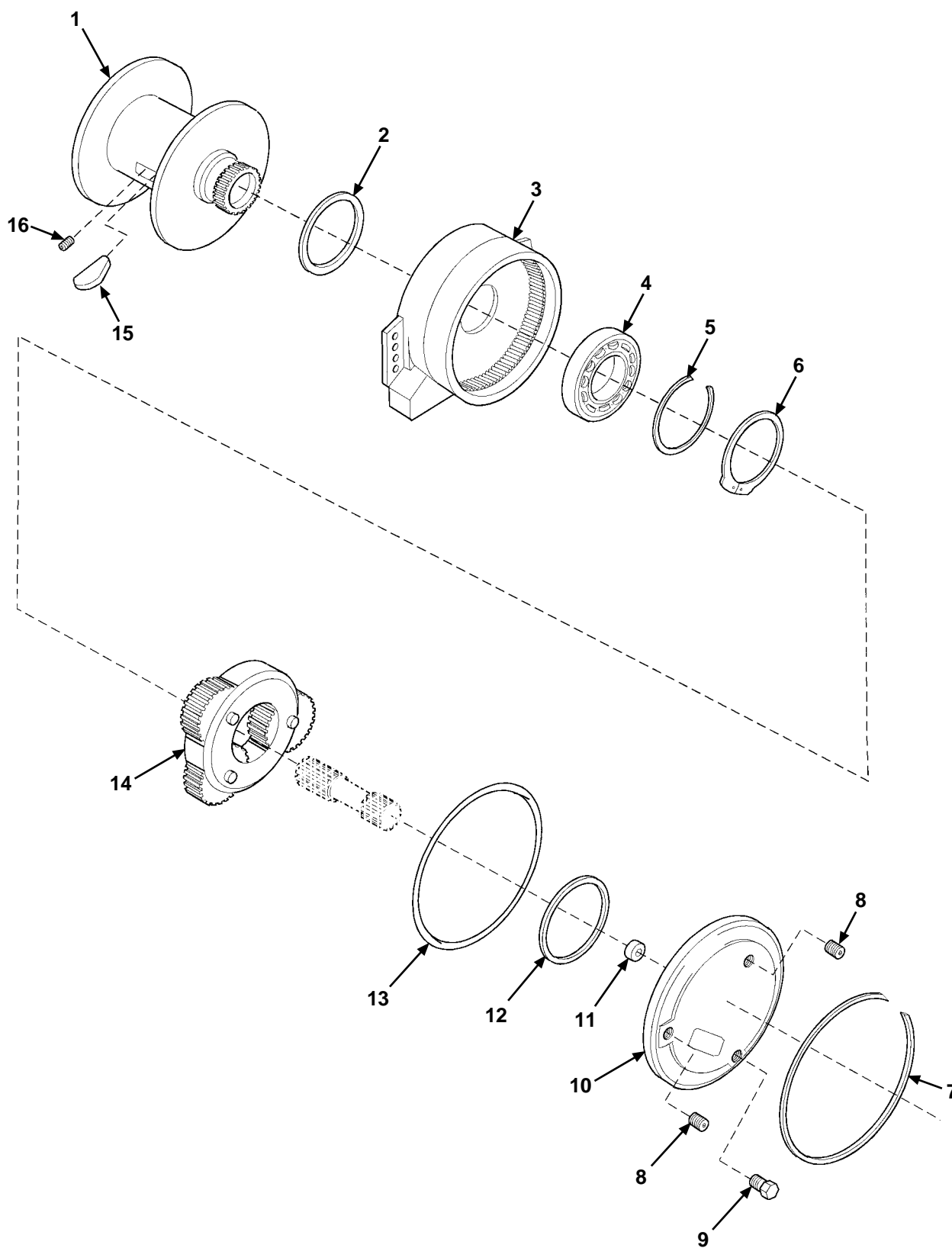


Figure 19. Winch Final Drive Assembly

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1220 BAP WINCH ASSEMBLY FIG.19 WINCH FINAL DRIVE ASSEMBLY						
* 1	PFFZZ		38335	22361	REEL CABLE 6.4 X 12.6 X 8.0, R7-01.	1
* 2	PAFZZ		38335	26049	SEAL, NONMETALLIC RO PART OF KIT P/N 23157.....	1
3	XAFZZ		38335	22360	FINAL HOUSING R7.....	1
* 4	PFFZZ		38335	25150	BEARING, ROLLER, CYLI 110 X 170 X 28.	1
* 5	PAFZZ		38335	20664	COLLAR, RETAINING.....	1
* 6	PAFZZ		38335	25489	RING, RETAINING 0.500.....	1
* 7	PAFZZ	5325219149925	38335	20663	RING, RETAINING 0.250 IN X 0.156 IN.	1
8	PAOZZ	4730012115222	38335	25032	PLUG, PIPE NPT SOC HD.....	2
* 9	PAOZZ		38335	20458	BREATHER 0.500 NPT 7.5 PSI.....	1
* 10	PFFZZ		38335	22399	COVER, HYDRAULIC, PUM R7.....	1
* 11	PAFZZ		38335	20063	BUSHING, NONMETALLIC.....	1
* 12	PAFZZ		38335	20662	BUSHING, NONMETALLIC PLANET HUB STOPPER.....	1
* 13	KFFZZ		38335	25484	O-RING PART OF KIT P/N 23157.....	1
* 14	PFFZZ		38335	22273	PLANETARY GEAR FINAL DRIVE.....	1
* 15	PAFZZ	4030219106656	38335	20171	CABLE ANCHOR 12` S .375 TO .625 WIRE.....	1
* 16	PFFZZ	4730012045145	38335	25085	PLUG, PIPE 0.375 NPT SOC HD.....	1

END OF FIGURE

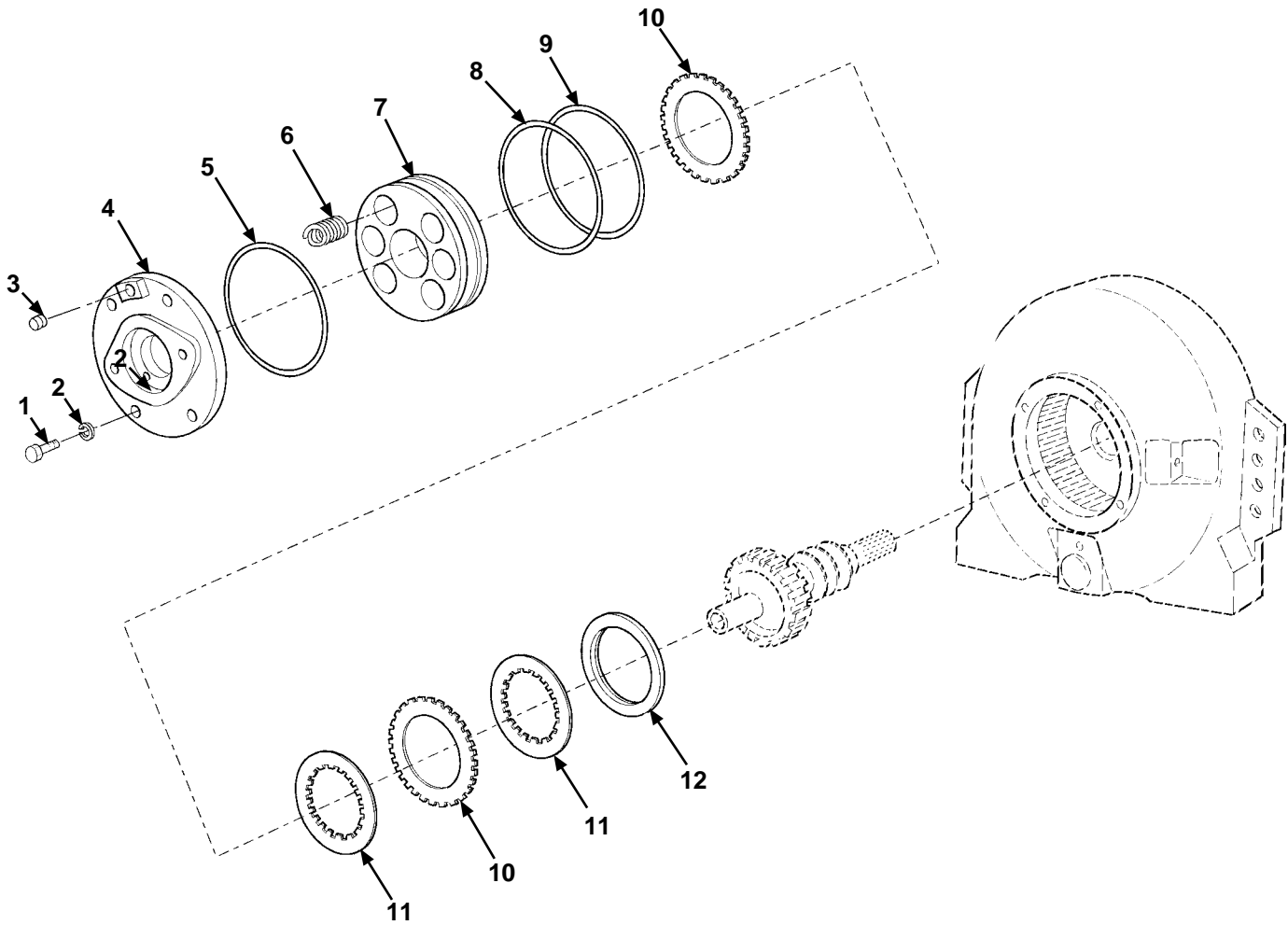


Figure 20. Winch Brake Hub Assembly

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1220 BAP WINCH ASSEMBLY FIG.20 WINCH BRAKE HUB ASSEMBLY						
* 1	PAFZZ	5305012172126	38335	25264	SCREW,CAP,HEXAGON H.....	4
* 2	PAFZZ	5310000115093	96906	MS35338-65	WASHER,LOCK 0.390 NOM.....	4
3	PAFZZ	4730000428988	38335	25031	PLUG,PIPE 0.350 1/4 NPT SOC HD.....	1
4	XAFZZ		38335	21079	MOTOR ADAPTOR.....	1
* 5	KFFZZ	5330012193994	38335	25275	PACKING,PREFORMED PART OF KIT P/N 23157.....	1
6	PAFZZ	5360011996157	38335	20340	SPRING,HELICAL,COMP NO. 11G 4C 1.245 X 0.845.....	6
* 7	PFFZZ		38335	23088	PISTON,LINEAR ACTUA R7 W/O INT BR, PL 2/4.....	1
* 8	KFFZZ		38335	25869	O-RING PART OF KIT P/N 23157.....	1
* 9	KFFZZ		38335	25870	O-RING PART OF KIT P/N 23157.....	1
10	PAFZZ	5365011981650	38335	25024	SPACER,PLATE.....	7
11	PAFZZ	5365011983321	38335	20034	SPACER PLATE PL2, PL4 M5, R7.....	6
* 12	PAFZZ		38335	22836	SPACER,SLEEVE R7 SPEC 437.....	1

END OF FIGURE

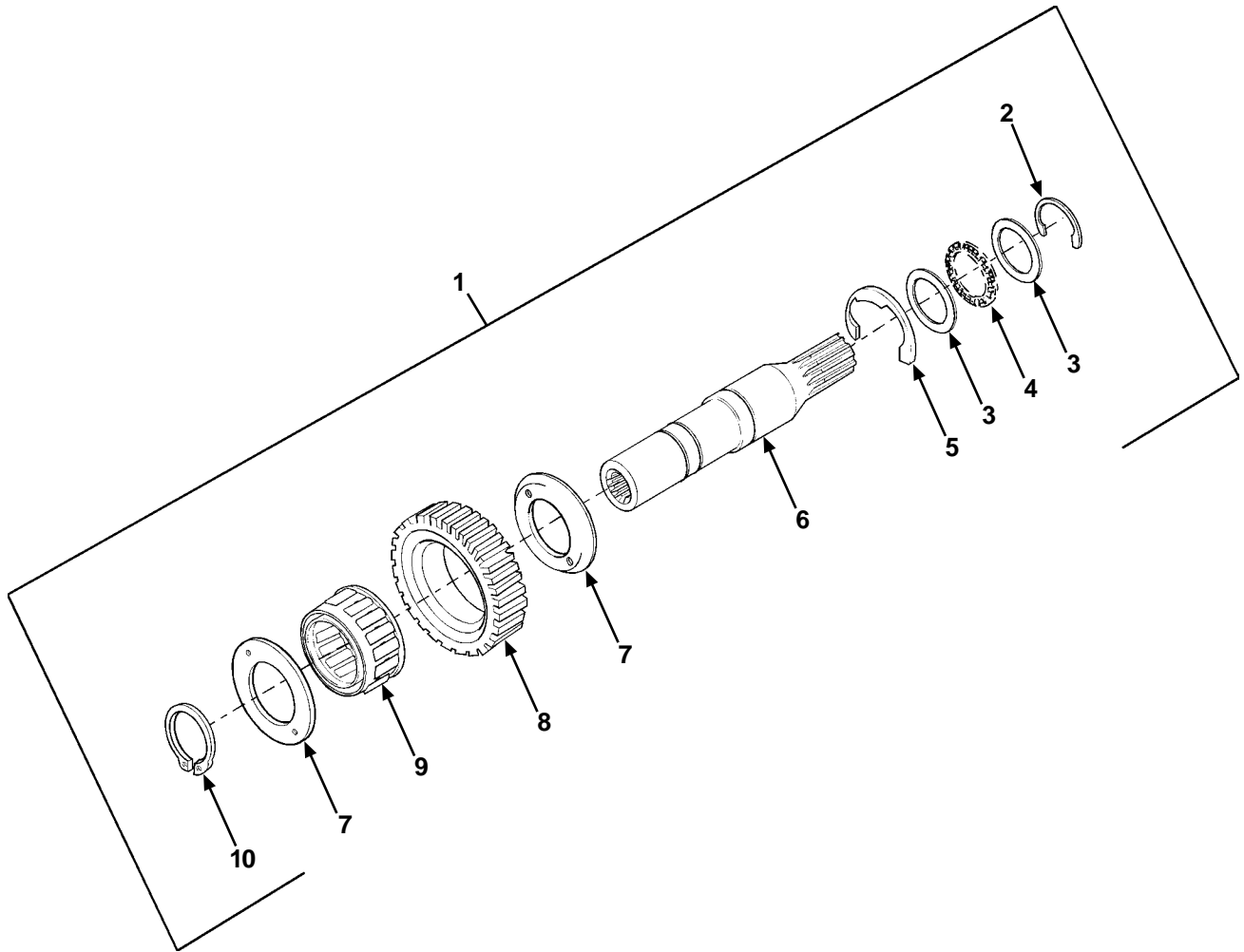


Figure 21. Winch Brake Hub Subassembly



## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1230 BRAKE HUB SUBASSEMBLY						
FIG.21 WINCH BRAKE HUB SUBASSEMBLY						
* 1	A0000		38335	22277	SUB-ASSY,BRAKE HUB R7 135-CW.....	1
* 2	PAFZZ		38335	25500	.RING,RETAINING.....	1
3	PAFZZ	3110011215318	27737	AS3047	.SEAT,BEARING.....	2
4	PFFZZ	3110004550374	27737	AXK3047	.RETAINER AND ROLLER.....	1
5	PAFZZ	5365012407163	38335	25539	.RING,RETAINING.....	1
6	ADFZZ		38335	22214	.MOTOR DRIVE SHAFT R7-X-135.....	1
7	PFFZZ	2590012178142	38335	20183	.LINER,CLUTCH PL2/4.....	2
8	ADFZZ		38335	20640	.BRAKE HUB R7.....	1
* 9	PAFZZ		38335	25187	.BEARING,ROLLER,CYLI.....	1
* 10	PAFZZ		38335	25492	.RING,RETAINING.....	1

END OF FIGURE

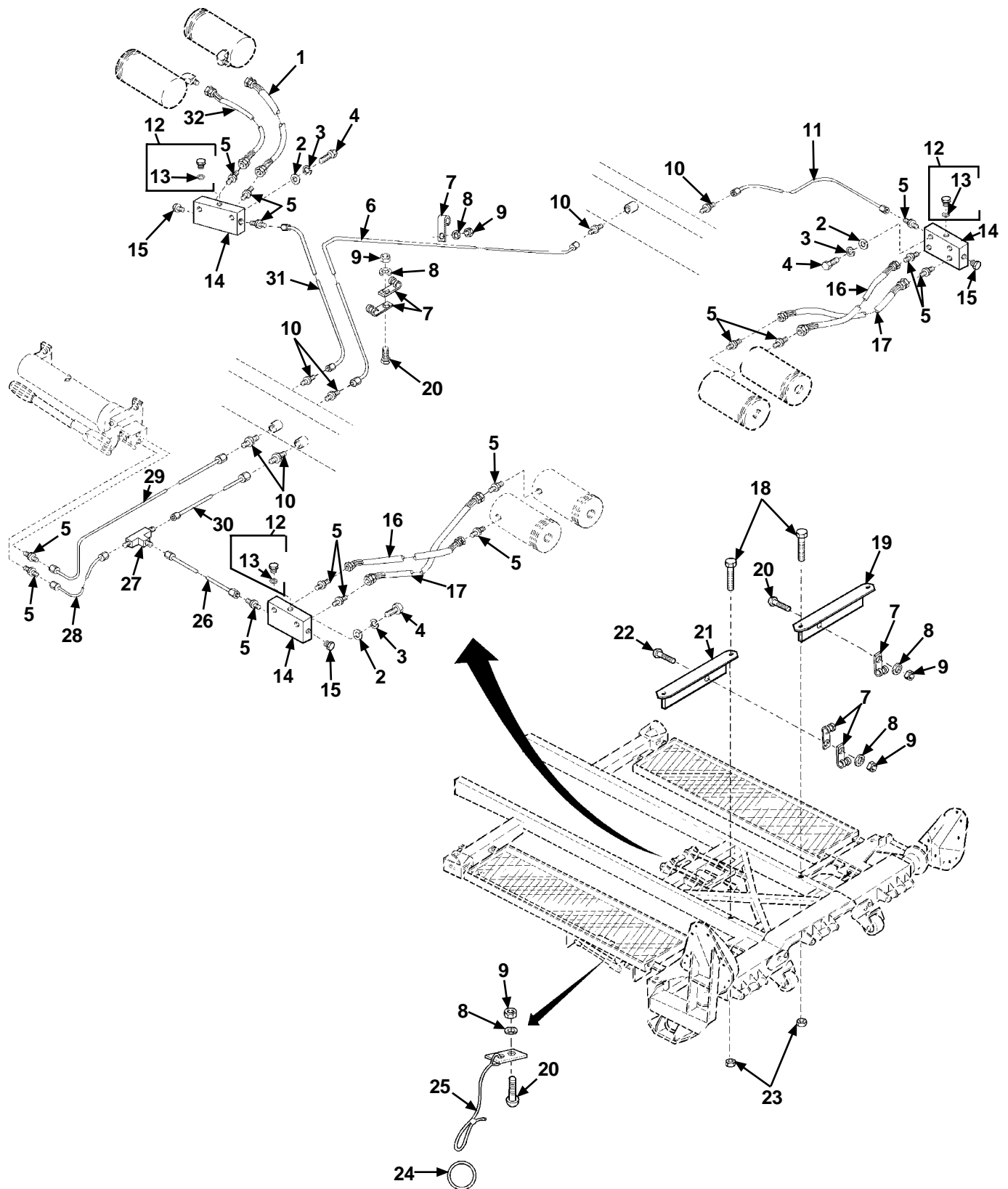


Figure 22. BAP Hydraulic Installation

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1300 BAP HYDRAULIC INSTALLATION FIG.22 BAP HYDRAULIC INSTALLATION						
* 1	PAOZZ	4720014535448	31902	13586-4	HOSE,ASSEMBLY,NONME 16.25 LG.....	1
* 2	PAOZZ	5310000814219	96906	MS27183-12	WASHER,FLAT 0.312 NOM.....	6
3	PAOZZ	5310004079566	96906	MS35338-45	WASHER LOCK 0.312 NOM.....	10
4	PAOZZ	5306002264832	80204	B1821BH031C175N	BOLT,MACHINE 0.312-18 UNC X 1.75 IN LG.....	6
* 5	PAOZZ	4730009429147	81343	4-6 070102C	ADAPTER,STRAIGHT,PI 0.38 NPT X 0.25 TUBE 37 FLARE.....	15
* 6	PAOZZ	4710014571599	31902	14110	TUBE ASSEMBLY,METAL.....	1
* 7	PAOZZ	4730009083195	75160	AR21837	CLAMP,HOSE 0.25 TUBE X 0.19 STUD...	12
8	PAOZZ	5310000453296	96906	MS35338-43	WASHER,LOCK NO. 10 SIZE.....	10
* 9	PAOZZ	5310009349764	96906	MS35649-205	NUT,PLAIN,HEXAGON NO. 10-24 UNC....	10
10	PAOZZ	4730010579597	10988	218-444	ADAPTER,STRAIGHT,PI 0.125 NPT X 0.25 TUBE, 37 FLARE.....	6
* 11	PAOZZ	4710014568765	31902	14096	TUBE,ASSEMBLY,METAL.....	1
12	PAOZZ	5365010718261	30780	5P50N-S	PLUG,MACHINE THREAD 0.50-20 UNC....	3
13	PAOZZ	5330001675166	81349	M83248/1-905	O-RING PART OF P/N 5P50N-S.....	1
* 14	PBOZZ	4730014535411	31902	13005	MANIFOLD ASSEMBLY,H.....	3
15	PAOZZ	4730009588599	93061	3/8-HP-S	PLUG,PIPE 0.375 NPT.....	3
* 16	PAOZZ	4720014535517	31902	13586-1	HOSE ASSEMBLY,NONME HYDRAULIC 11.00 IN LG.....	2
* 17	PAOZZ	4720014535169	31902	13586-2	HOSE ASSEMBLY,NONME HYDRAULIC 16.00 IN LG.....	2
18	PAOZZ	5305000444153	96906	MS90725-109	SCREW,CAP,HEXAGON H 0.500-13 UNC X 1.00 IN LG.....	2
* 19	PFOZZ	5340014551839	31902	13585-1	BRACKET,MOUNTING LEFT SIDE.....	1
20	PAOZZ	5305009846210	96906	MS35206-263	SCREW,MACHINE 0.190-24 UNC X 0.50 IN LG.....	2
* 21	PFOZZ	5340014551838	31902	13585-2	BRACKET,MOUNTING RIGHT SIDE.....	1
22	PAOZZ	5305009846212	96906	MS35206-265	SCREW,MACHINE 10-24 UNC X 0.75 IN LG.....	2
23	PAOZZ	5310002256993	96906	MS51922-33	NUT,SELF-LOCKING,HE 0.500-13 UNC...	2
24	PAOZZ	5340013435833	39428	90177A224	HOLDER KEY 1.40 ID, 1.64 OD.....	1
25	MOOZZ		39428	90312A610-10	LANYARD MAKE FROM LANYARD KIT, P/N 97840A66, 10.00 IN LG.....	1
* 26	PAOZZ	4710014569295	31902	14108	TUBE,BENT,METALLIC.....	1
27	PAOZZ	4730005221910	79470	C35705X4	TEE,TUBE 0.25 TUBE,37 DEGREES.....	1
* 28	PAOZZ	4710014580122	31902	14106	TUBE ASSEMBLY,METAL.....	1
* 29	PAOZZ	4710014569299	31902	14107	TUBE BENT,METALLIC.....	1
* 30	PAOZZ	4710014571375	31902	14109	TUBE ASSEMBLY,METAL.....	1
* 31	PAOZZ	4710014571303	31902	14105	TUBE ASSEMBLY,METAL.....	1
* 32	PAOZZ	4720014535420	31902	13586-3	HOSE ASSEMBLY,NONME HYDRAULIC 14.50 IN LG.....	1

END OF FIGURE

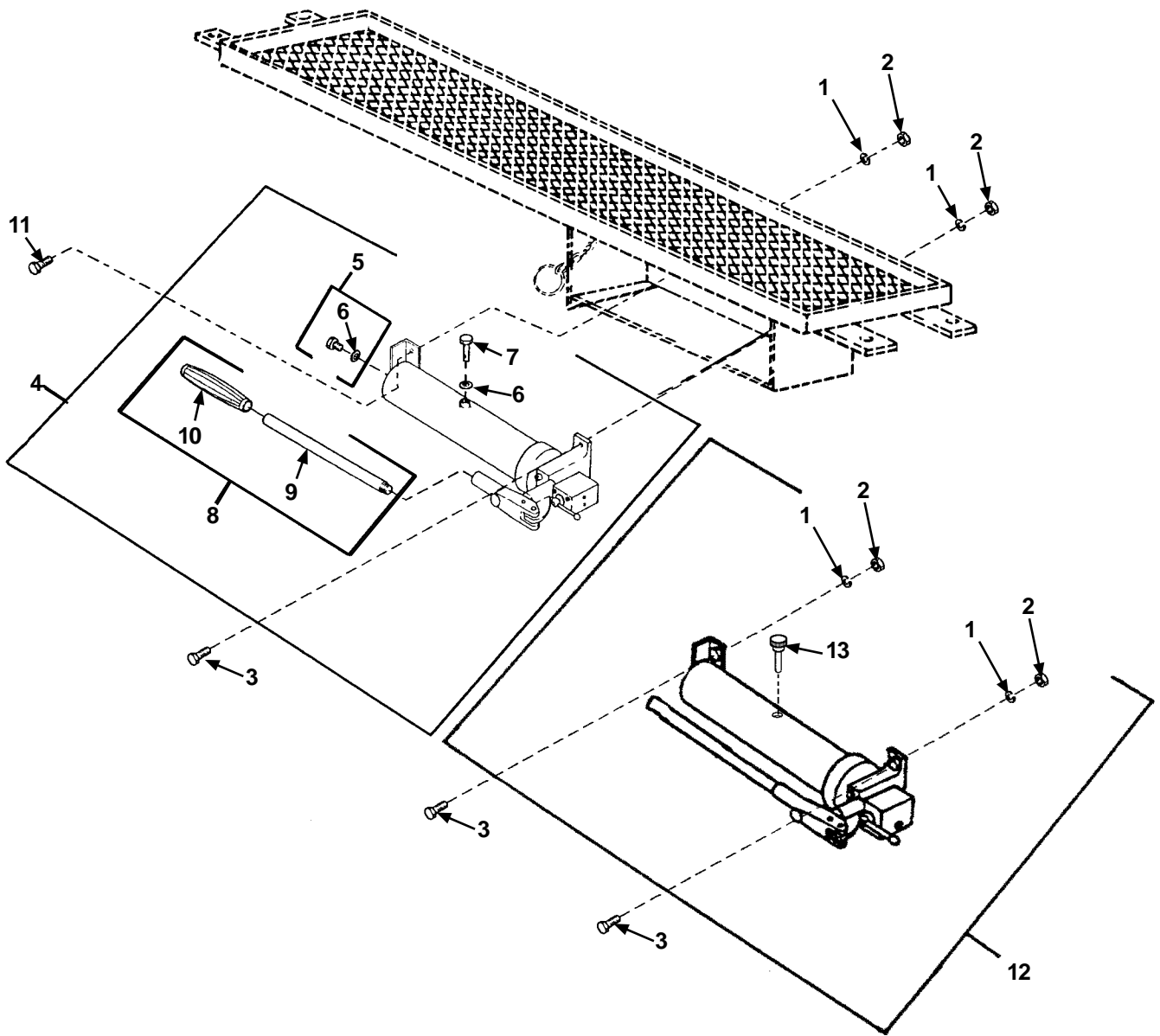


Figure 23. Hydraulic Hand Pump

## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1310 HYDRAULIC HAND PUMP						
FIG.23 HYDRAULIC HAND PUMP						
1	PAOZZ	5310004079566	96906	MS35338-45	WASHER, LOCK 0.312 NOM.....	4
2	PAOZZ	5310008807744	96906	MS51967-5	NUT, PLAIN, HEXAGON 0.318-18 UNC.....	4
3	PAOZZ	5305002264831	80204	B1821BH031C150N	SCREW, CAP, HEXAGON 0.312-18 UNC X 1.50 IN LG, BAP SERIAL NUMBERS BBD0001 & SUBSEQUENT ONLY.....	4
3	PAOZZ	5305002264831	80204	B1821BH031C150N	SCREW, CAP, HEXAGON H 0.312-18 UNC X 1.50 IN LG.....	2
4	PAOOO	4320014536465	31902	12959	PUMPING UNIT, HYDRAU.....	1
5	PAOZZ	5365014549557	31902	12959-2	.BUSHING, MACHINE THR.....	1
6	PAOZZ	5330007954269	07505	B159167	.GASKET, VALVE PLUG COPPER, PART OF P/N 12959-2.....	2
* 7	MOOZZ	6680014621797	31902	12959-5	.GAGE ROD-CAP, LIQUID SEE APPENDIX "H" FOR FABRICATION INSTRUCTIONS....	1
8	XDOOO		26952	C7900SR	.HANDLE, MANUAL CONTR.....	1
9	MOOZZ		39428	89955K27-18	..BAR, HANDLE MAKE FROM TUBING, STEEL P/N 89955K27, 18 IN LG.....	1
10	PAOZZ	5340014551671	39428	9729K74	..GRIP, HANDLE.....	1
11	PAOZZ	5306010758519	96906	MS90725-36	BOLT, MACHINE 0.312-18 UNC X 1.188 IN LG.....	2
* 12	XDOZZ		0CHW9	13566	PUMPING UNIT, HYDRAUL BAP SERIAL NUMBERS BBD0001 & SUBSEQUENT ONLY...	4
* 13	XDOZZ		0CHW9	BBD-42898	.GAGE ROD-CAP, LIQUID PART OF P/N BBD-P140DF, BAP SERIAL NUMBERS BBD0001 & SUBSEQUENT ONLY.....	1

END OF FIGURE

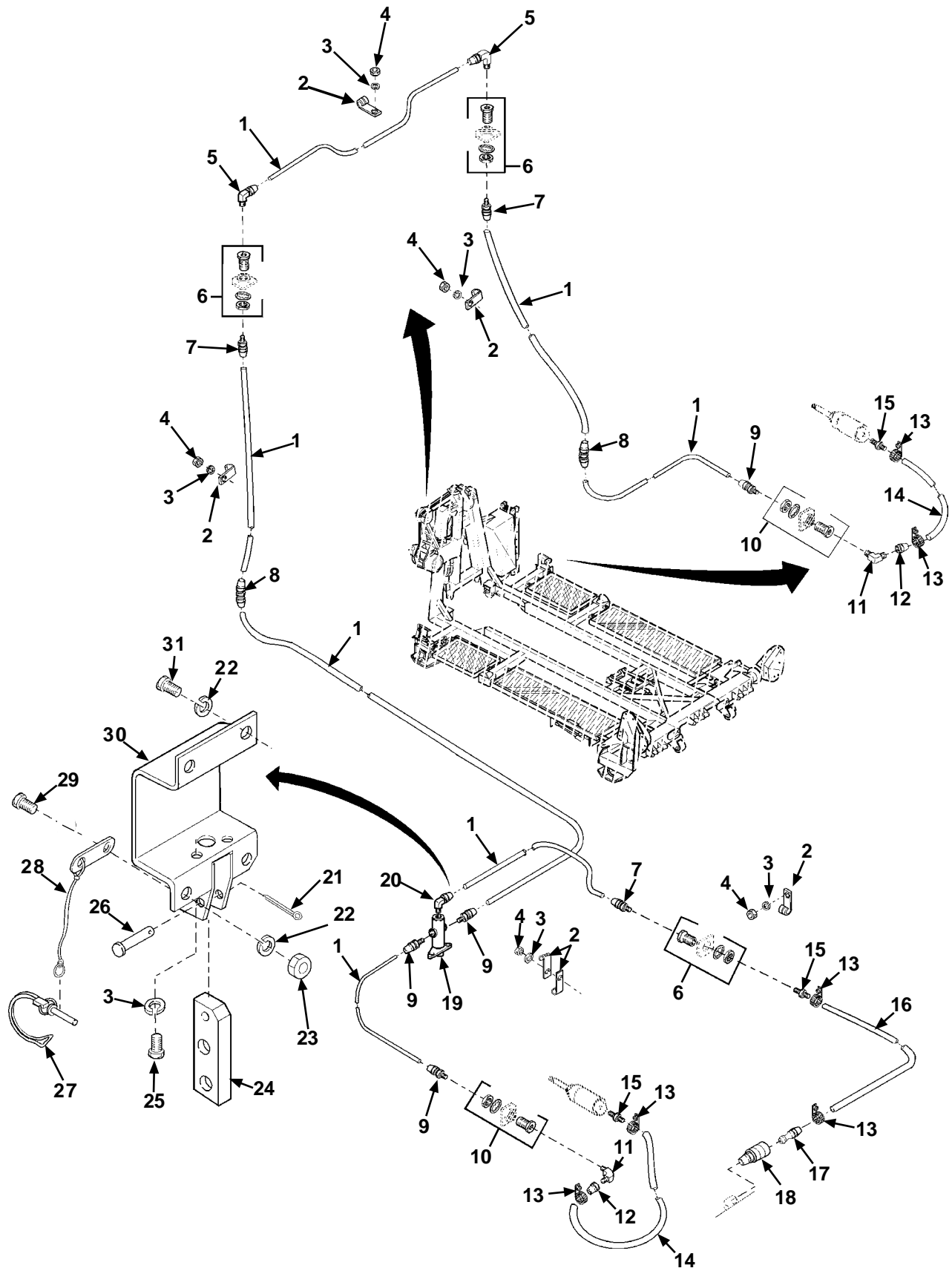


Figure 24. BAP Air Lines Installation

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 1400 BAP AIR LINES INSTALLATION FIG.24 BAP AIR LINES INSTALLATION						
* 1	MOOZZ	4710014538578	39428	5175K51-AR	TUBE,METALLIC MAKE FROM METALLIC TUBING, P/N 5175K51 LENGTH AS REQUIRED.....	7
2	PAOZZ	5340000572890	96906	MS21333-3	CLAMP LOOP 0.25 TUBE 0.190 STUD....	27
3	PAOZZ	5310000453296	96906	MS35338-43	WASHER,LOCK NO. 10 NOM SIZE.....	27
4	PAOZZ	5310009349764	96906	MS35649-205	NUT PLAIN,HEXAGON NO. 10-24 UNC....	25
5	PAOZZ	4730001185177	81343	4-4 120202BA	ELBOW,PIPE TO TUBE 0.25 TUBE X 250-27 NPT.....	2
6	PAOZZ	4730011643365	93061	207ACBH-4	COUPLING,PIPE 1/4-18 NPT.....	3
7	PAOZZ	4730002704580	81343	4-4 120102BA	ADAPTER STRAIGHT,PI 0.250 TUBE TO 250-18 NPT.....	3
8	PAOZZ	4730002779672	81343	4-4 120101BA	NIPPLE,TUBE 0.250 TUBE.....	2
9	PAOZZ	4730002778750	81343	4-2 120102BA	ADAPTER,STRAIGHT,PI 0.25 TUBE X 125-27 NPT.....	4
10	PAOZZ	4730005748807	93061	207ACBH-2	COUPLING,PIPE.....	2
11	PAOZZ	4730002546211	54214	MS39162-3	ELBOW,PIPE TO TUBE 0.250 TUBE X 0.125-27 NPT.....	2
* 12	PAOZZ	4730005551152	98441	30682-4-4B	ADAPTER STRAIGHT,TU 0.25 HOSE X .25 45 FLARE.....	2
13	PAOZZ	4730009083195	81343	SAE J1508-06	CLAMP,HOSE.....	6
14	MOOZZ		02697	836-4-9.5	HOSE,NONMETALLIC MAKE FROM HOSE, NONMETALLIC, P/N M24135/10-05, 9.5 LG.....	2
* 15	PAOZZ	4730000287021	01276	4738-4-4B	ADAPTER,STRAIGHT,PI 0.250-18 NPT TO HOSE BARB.....	3
16	MOOZZ		02697	836-4-62	HOSE,NONMETALLIC MAKE FROM HOSE,NONMETALLIC,P/N M24135/10-05, 62.0 LG.....	1
* 17	PAOZZ	4730013836756	97111	B20-3-BP	COUPLING HALF,QUICK 0.250, MALE....	1
18	PAOZZ	4730011553163	01276	FD40-1000-04-04	COUPLING HALF,QUICK.....	1
* 19	PAOZZ	4820014540733	01604	229612	VALVE,LINEAR,DIRECT.....	1
* 20	PAOZZ	4730009213240	81343	4-2 120202BA	ELBOW,PIPE TO TUBE 0.250 X .125 24 NPT.....	1
21	PAOZZ	5315000179252	96906	MS24665-136	PIN,COTTER 0.062 X 1.00 IN LG.....	1
* 22	PAOZZ	5310004079566	96906	MS35338-45	WASHER,LOCK 0.312 NOM SIZE.....	4
23	PAOZZ	5310008807744	96906	MS51967-5	NUT,PLAIN,HEXAGON 0.312-18 UNC....	2
* 24	PAOZZ	5340014547282	31902	A4814071	LEVER,MANUAL CONTRO.....	1
25	PAOZZ	5305009846210	96906	MS35206-263	SCREW,MACHINE 0.190-24 UNC X 0.50 IN LG.....	2
26	PAOZZ	5315000817015	96906	MS20392-3C31	PIN,STRAIGHT,HEADED 0.250 X .9 GRIP.....	1
* 27	PAOZZ	5315014539031	39428	98416A011	PIN,STRAIGHT,HEADED 0.250 X 1.38 GRIP.....	1
28	MOOZZ		39428	90312A310-6	LANYARD MAKE FROM LANYARD KIT, P/N 97840A66, 6.00 IN LG.....	1
29	PAOZZ	5306002264829	80204	B1821BH031C125N	BOLT,MACHINE 0.312-18 UNC X 1.25 IN LG.....	2

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
* 30	PAOZZ	5340014532528	31902	12825	BRACKET,MULTIPLE AN.....	1
31	PAOZZ	5306002258496	96906	MS90725-31	BOLT,MACHINE 0.312-18 UNC X .625 IN LG.....	2

END OF FIGURE





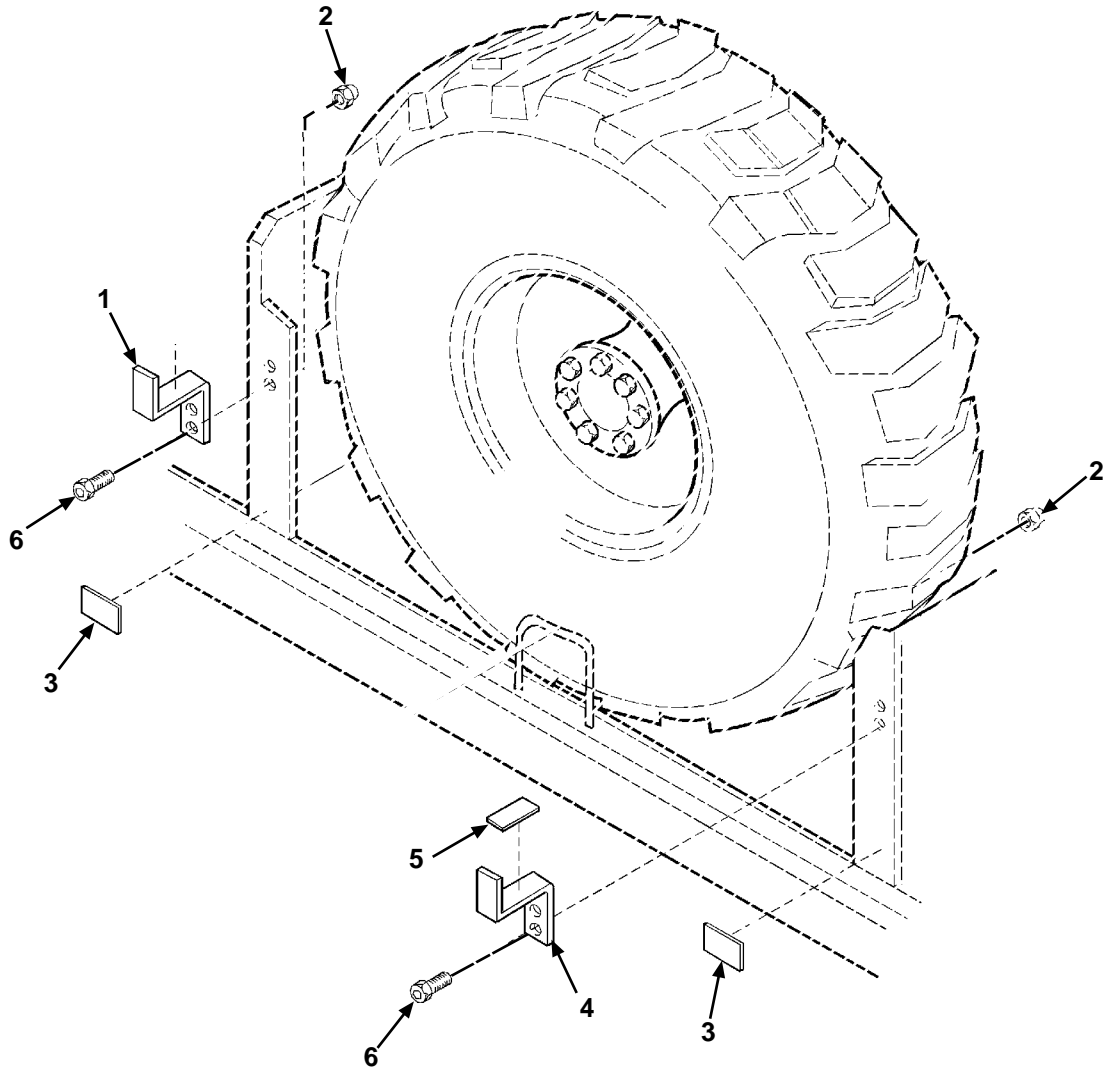


Figure 25. Ladder Mounting Brackets (Model A Only)

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG.25 LADDER MOUNTING BRACKETS						
(MODEL A ONLY)						
* 1	PAOZZ	5340014568536	45152	3064073	BRACKET,DOUBLE ANGL.....	1
* 2	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC...	4
* 3	MOOZZ		45152	3064081	PAD,CUSHIONING MAKE FROM RUBBER	2
					PAD, P/N 115820-26 3.00 x 1.750 IN..	
* 4	PAOZZ	5340014568532	45152	3064074	BRACKET,MOUNTING WITH PAD.....	1
* 5	MOOZZ		45152	3070941	PAD,CUSHIONING MAKE FROM RUBBER	1
					PAD, P/N 115820-26, 1.50 x 1.750 IN.	
6	PAOZZ	5305013448899	45152	1606140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	4

END OF FIGURE

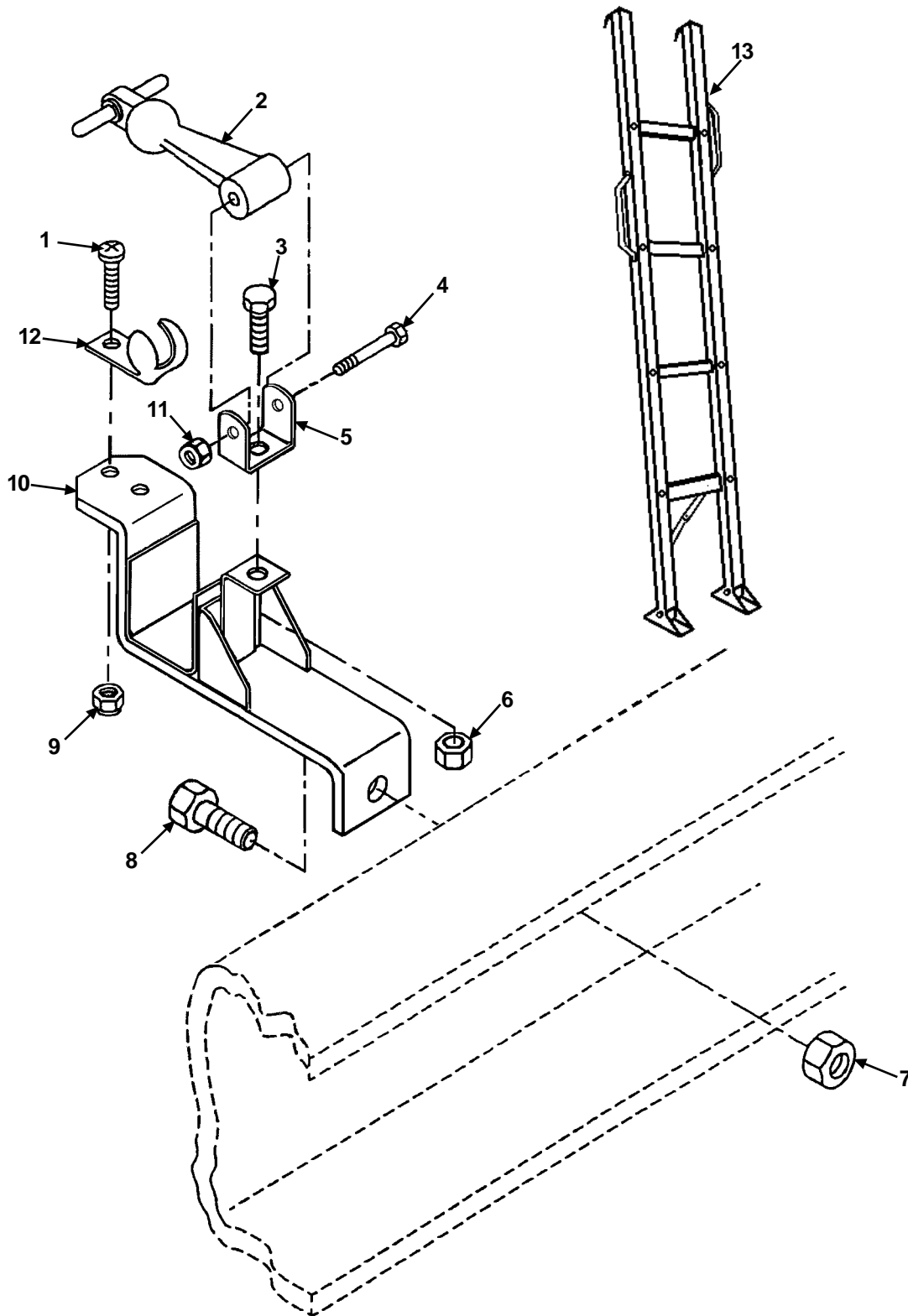


Figure 25A. Ladder Supports (Model B Only)

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG.25A LADDER SUPPORTS (MODEL B ONLY)						
* 1	PAOZZ	5305012498564	45152	59031AX	SCREW,MACHINE 0.190-24 UNC X 0.750 IN LG.....	4
* 2	PAOZZ	2540011527764	64386	67D794	LATCH,HOOD,VEHICULA.....	2
* 3	PAOZZ	5305010621017	45152	1367HX1	SCREW,CAP,HEXAGON H 0.31-18 UNC X.. 0.750 IN LG.....	2
* 4	PAOZZ	5305000712510	80204	B1821BH025C175N	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.750 IN LG.....	2
* 5	PAOZZ	5340011566776	64386	277-A-80-1	STRAP,RETAINING.....	2
* 6	PAOZZ	5310013405671	45152	1333510	NUT,SELF-LOCKING,EX.....	2
* 7	PAOZZ	5310012881116	82458	T893R	NUT,SELF-LOCKING,EX 0.382-16 UNC...	2
* 8	PAOZZ	5306012875715	52167	WC0414PB	BOLT,MACHINE REAR SUPPORT, 0.382- 16 UNC X 1.25 IN LG G5.....	2
* 8	PAOZZ	5306011479723	52167	WE0822TB	SCREW,CAP,HEXAGON H FRONT SUPPORT, PAN HEAD, 0.25-20 UNC X 0.62 IN LG..	2
* 9	PAOZZ	5310002081918	88044	AN365-1024A	NUT,SELF-LOCKING,HE.....	4
* 10	PFOZZ		45152	3300699	BRACKET,MOUNTING.....	2
* 11	PAOZZ	5310000614650	96906	MS51943-31	NUT,SELF-LOCKING,HE.....	2
* 12	PAOZZ	5340010921637	74687	028-561	HOOK,SUPPORT.....	2
* 13	PAOZZ	5440013420700	45152	2019940	LADDER,STRAIGHT.....	1

END OF FIGURE

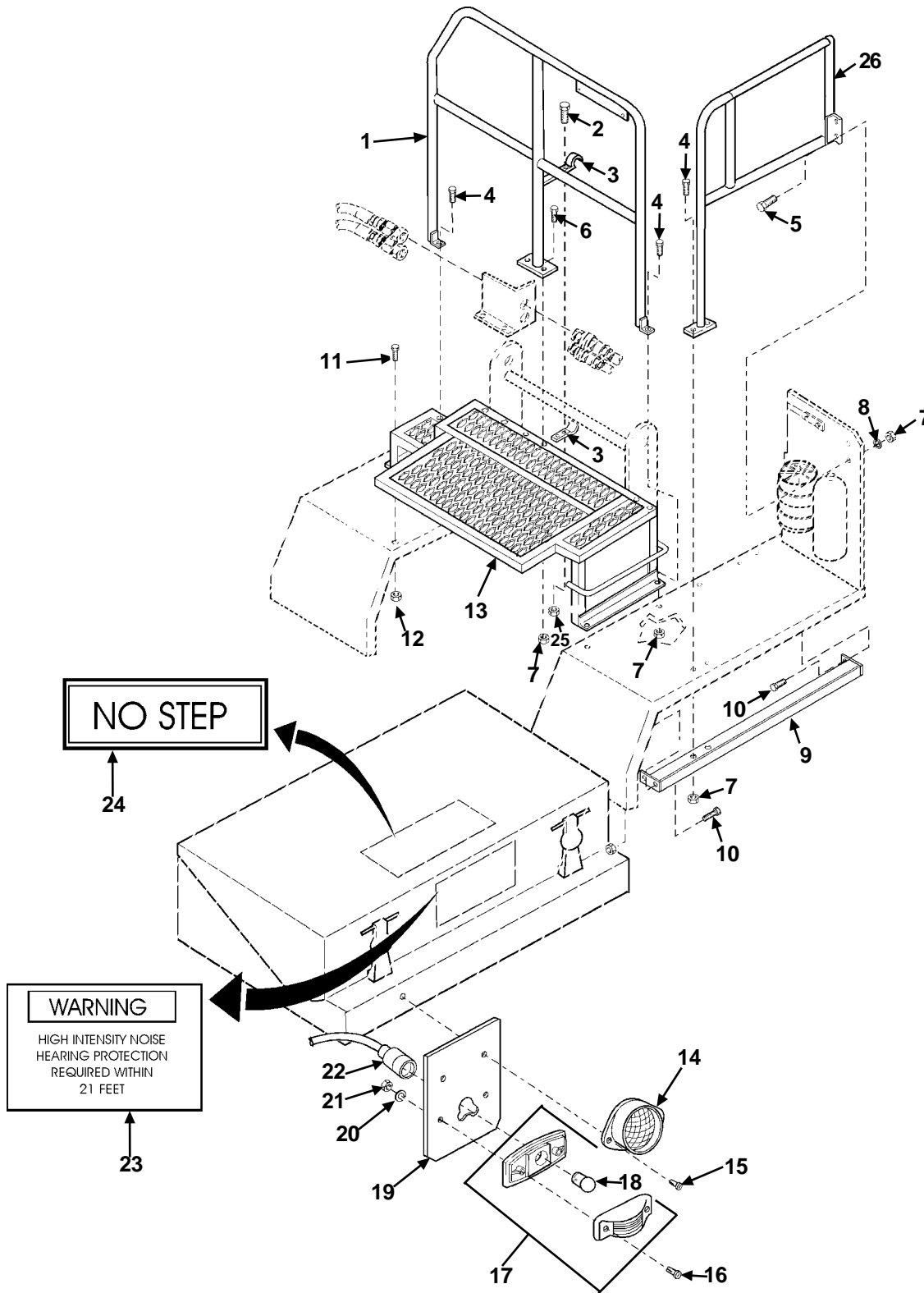


Figure 26. Workstation, Crosswalk, Handrails, and Related Parts

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG.26 WORKSTATION CROSSWALK, HANDRAILS AND RELATED PARTS						
* 1	PFOZZ	2510014575316	45152	3150300	CROSS RAIL,VEHICULA (MODEL A AND B).	1
2	PAOZZ	5305013538267	45152	1754220	SCREW,CAP,HEXAGON H 0.312-18 X 0.750 IN LG G5.....	2
* 3	PAOZZ	5340014568530	45152	3150238	STRAP,RETAINING.....	2
4	PAOZZ	5306012875714	52167	WC0412PB	BOLT,MACHINE 0.382-16 X 1.00 IN LG G5 (MODEL A AND B).....	4
5	PAOZZ	5306012875715	52167	WC0414PB	BOLT,MACHINE 0.382-16 X 1.25 IN LG G5 (MODEL A AND B).....	8
6	PAOZZ	5305013574682	45152	1754310	SCREW,CAP,HEXAGON H 0.382-16 X 3.00 IN LG (MODEL A AND B).....	4
* 7	PAOZZ	5310012881116	82458	T893R	NUT,SELF-LOCKING,EX 0.382-16 G5 (MODEL A AND B).....	14
8	PAOZZ	5310008800626	19207	10892331	WASHER,FLAT 3/8 NOM.....	2
* 9	PFOZZ	5340014550143	45152	3115350	BRACKET,MOUNTING,WOR WORKSTATION (MODEL A ONLY).....	1
* 10	PAOZZ	5305011565099	45152	118941A	SCREW,TAPPING 0.382-16 X 1.00 IN LG (MODEL A ONLY).....	4
* 11	PAOZZ	5305013574683	52167	WH0612TB	SCREW,CAP,HEXAGON H 0.50-13 X 1.00 IN LG G8 (MODEL A ONLY).....	4
* 12	PAOZZ	5310011598178	45152	110310A	NUT,SELF-LOCKING,EX 0.50-13 GR8 (MODEL A ONLY).....	4
* 13	PFOZZ		45152	3057009	GRATING,METAL CATWALK (MODEL A ONLY).....	1
* 14	PAOZZ	9905002023639	96906	MS35387-2	REFLECTOR,INDICATIN AMBER (MODEL A ONLY).....	1
* 15	PAOZZ	5305012498564	45152	59031AX	SCREW,MACHINE 0.190-24 UNC X 0.750 IN LG (MODEL A ONLY).....	2
* 16	PAOZZ	5305011664410	088A2	45A115-P29	SCREW,MACHINE 0.190-24 UNC X 1.00 IN LG (MODEL A ONLY).....	2
* 17	PAOOO	6220005773434	96906	MS35423-1	LIGHT MARKER,CLEARA AMBER (MODEL A ONLY).....	1
* 18	PAOZZ	6240001558717	81348	W-L-00111/60	.LAMP,INCANDESCENT (MODEL A ONLY)..	1
* 19	PAOZZ	5340014568527	45152	3115375	BRACKET,MOUNTING SIDE MARKER,RH (MODEL A ONLY).....	1
* 20	PAOZZ	5310008338567	45152	68404AX	WASHER,SLOTTED (MODEL A ONLY).....	2
* 21	PAOZZ	5310002081918	88044	AN365-1024A	NUT,SELF-LOCKING,HE 0.190-24 UNC (MODEL A ONLY).....	6
* 22	PAOZZ	5975012304370	5A910	8338566	CABLE NIPPLE,ELECTR (MODEL A ONLY).....	2
* 23	PFOZZ	7690014567955	45152	3064076	LABEL HIGH INTENSITY NOISE.....	2
* 24	PFOZZ	7690014567957	45152	3064077	LABEL NO STEP.....	1
* 25	PAOZZ	5310013405671	45152	1333510	NUT,SELF-LOCKING,EX 0.312-18 UNC G5 (MODEL A ONLY).....	2
* 26	PFOZZ		45152	3276335	CROSS,RAIL,VEHICULA (MODEL A AND B).....	1

END OF FIGURE

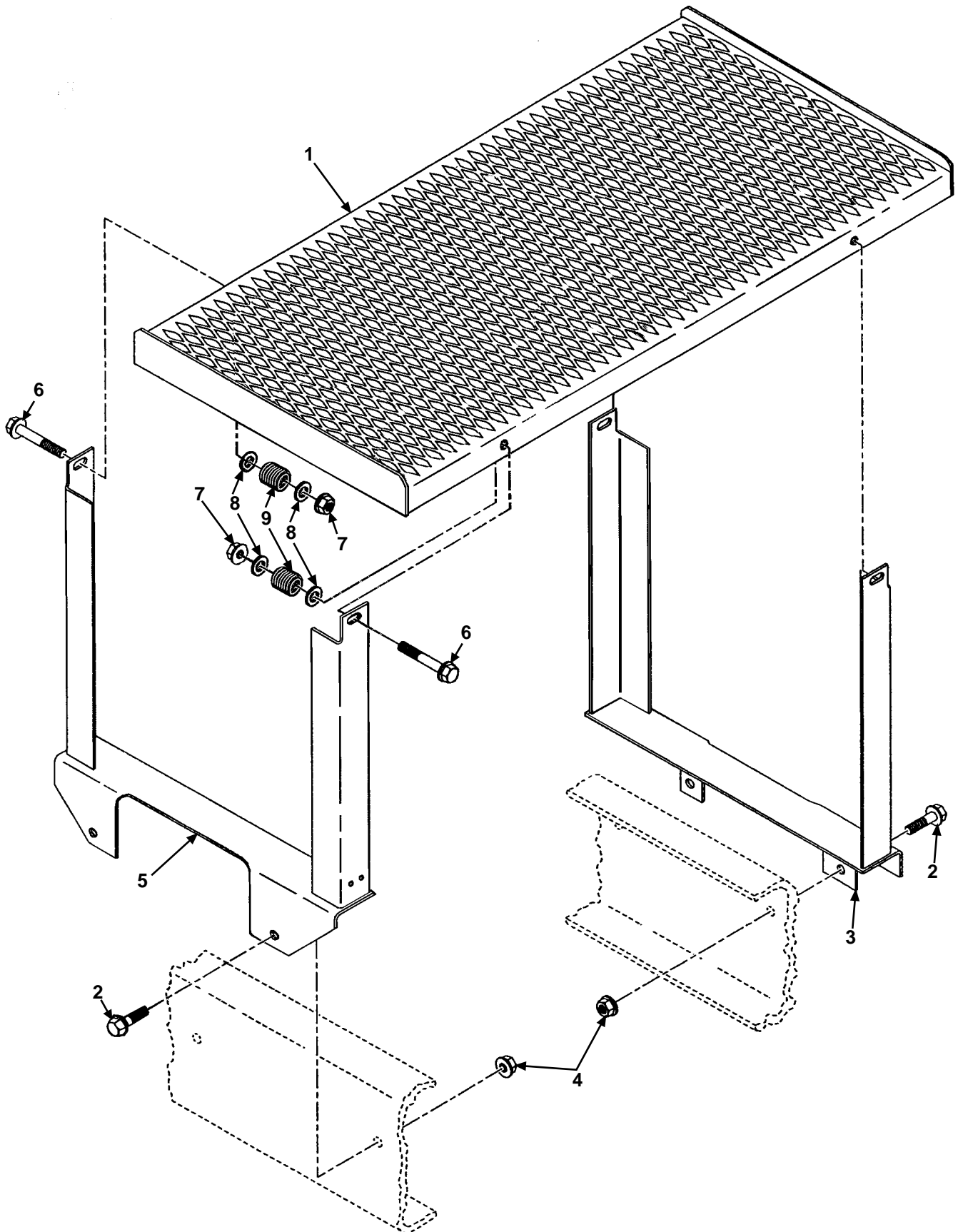


Figure 26A. Deck Assembly (Model B Only)



## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG. 26A DECK ASSEMBLY (MODEL B ONLY)						
* 1	PAOZZ	5670014088386	45152	1971460 W	GRATING,METAL.....	1
* 2	PAOZZ	5306011067496	52167	WE0818TB	BOLT,MACHINE 0.625-11 UNC X 1.75 IN LG.....	4
* 3	PAOZZ		45152	3054537	BRACKET,MOUNTING RH.....	1
* 4	PAOZZ	5310011110645	45152	110311A	NUT,SELF-LOCKING,EX 0.625-11 UNC...	4
* 5	PAOZZ		45152	3054536	BRACKET,MOUNTING LH.....	1
* 6	PAOZZ	5305013413090	52167	WE0628TB	SCREW,CAP,HEXAGON H 0.50-13 UNC X 3.0 IN LG.....	4
* 7	PAOZZ	5310011598178	45152	110310A	NUT,SELF-LOCKING,EX 0.50-13 UNC....	4
* 8	PAOZZ	5310014578573	45152	720HX	WASHER,FLAT.....	8
* 9	PAOZZ	5360012362072	45152	1307840	SPRING,HELICAL,COMP.....	4

END OF FIGURE

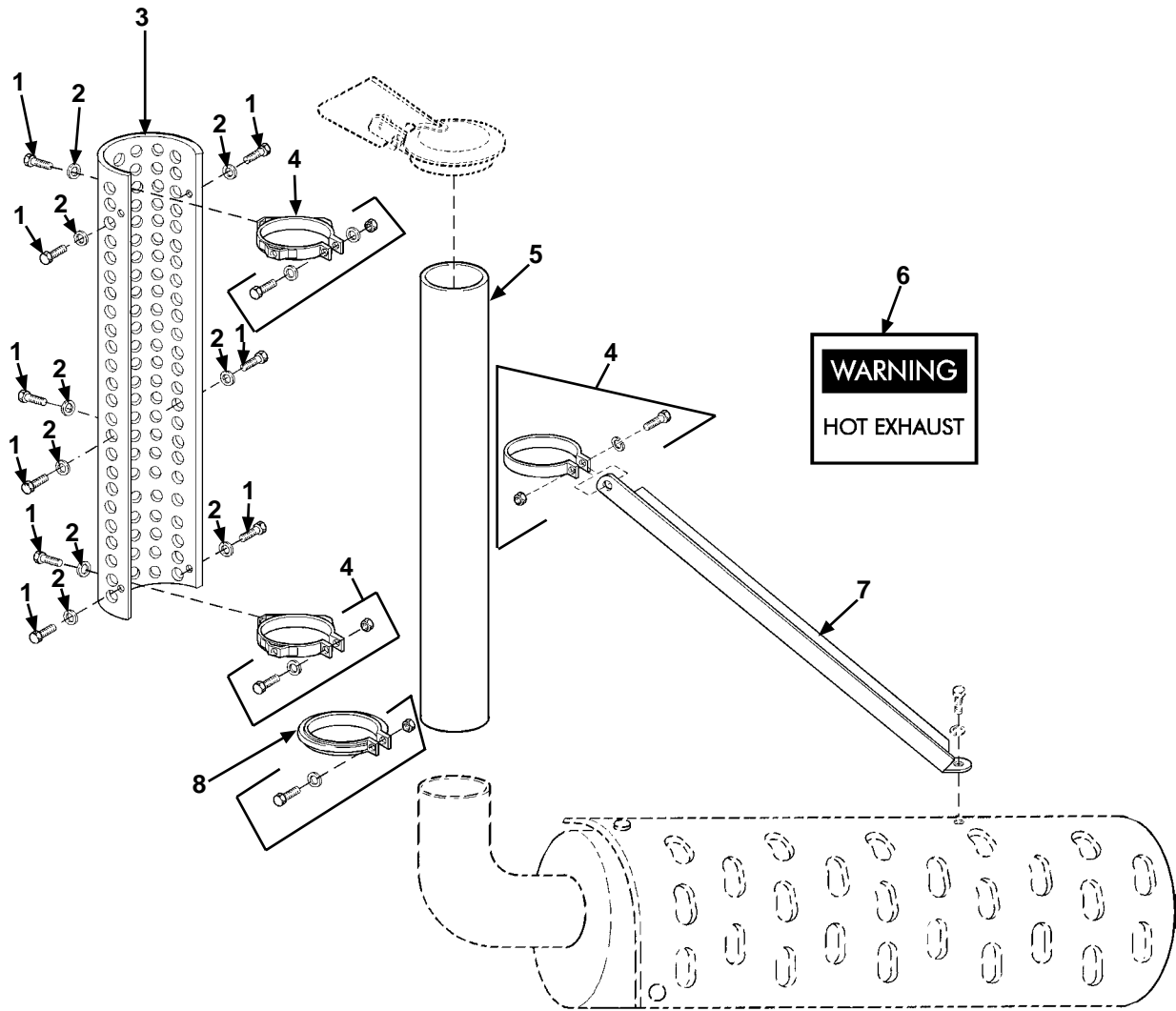


Figure 27. Exhaust Extension (Model A Only)

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG.27 EXHAUST EXTENSION (MODEL A ONLY)						
1	PAOZZ	5305010621017	45152	1367HX1	SCREW,CAP,HEXAGON H 0.312-18 UNC X 0.750 IN LG.....	9
2	PAOZZ	5310010688446	45152	354AX	WASHER LOCK 0.312 NOM SIZE.....	9
* 3	PFOZZ	2990014538306	45152	3062269	GUARD,MUFFLER-EXHAU.....	1
* 4	PAOZZ	5340014547250	45152	3062267	CLAMP,LOOP EXHAUST SHIELD.....	3
* 5	PAOZZ	2990014539105	45152	3062266	PIPE,EXHAUST 48 IN LG.....	1
* 6	PFOZZ	7690014567954	45152	3064075	LABEL HOT EXHAUST.....	2
* 7	PFOZZ	5340014547268	45152	3063147	BRACKET,MOUNTING.....	1
* 8	PAOZZ	5342014547088	55996	78-500-1	COUPLING,CLAMP,GROO.....	1

END OF FIGURE

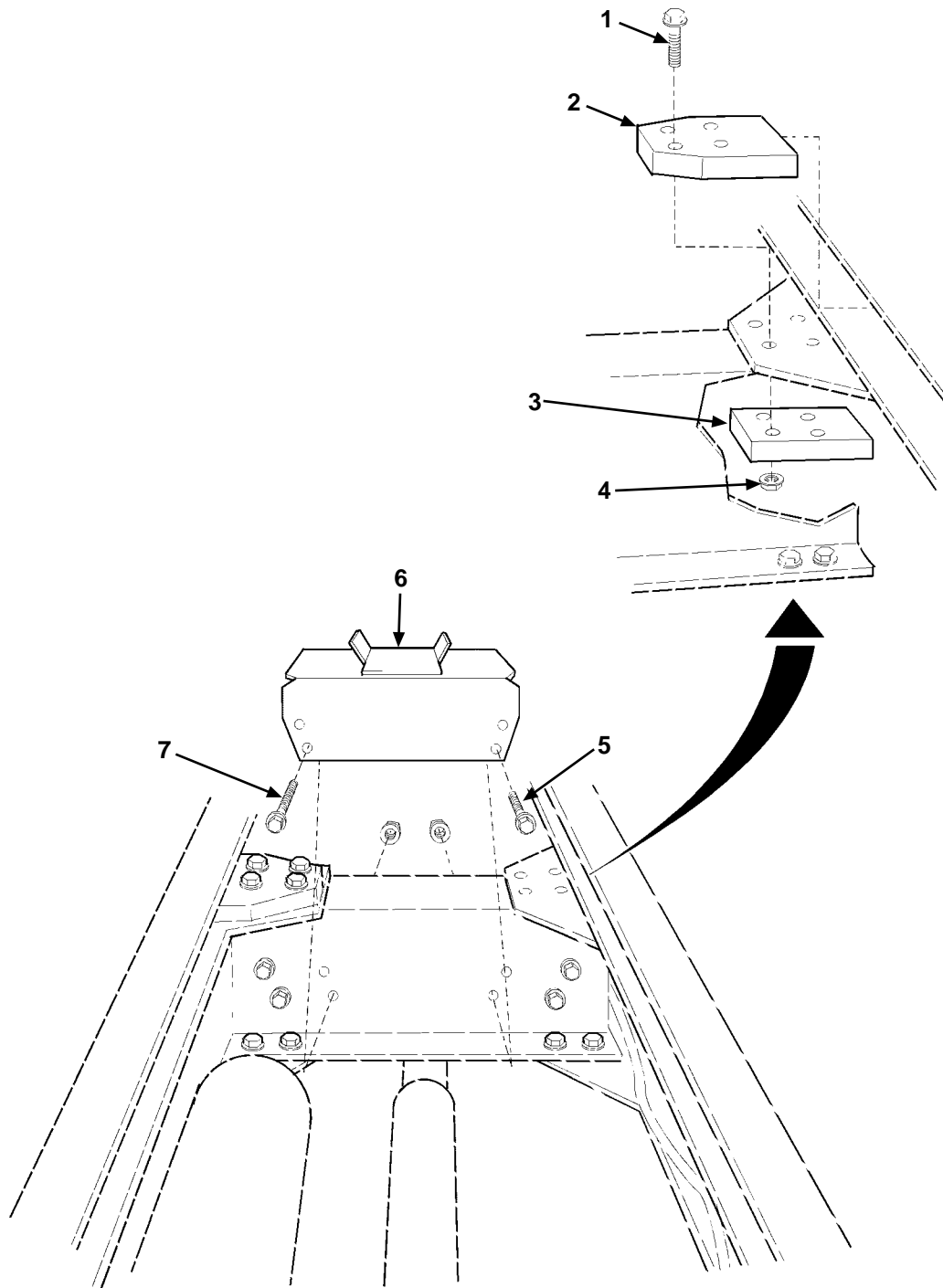


Figure 28. Main Frame Nose Support

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG.28 MAIN FRAME NOSE SUPPORT						
1	PAFZZ	5306011715897	45152	123341A	BOLT,MACHINE 0.625-11 UNC X 4.00 IN LG.....	8
* 2	PBFZZ	5340014568537	45152	3056874	PLATE,MOUNTING.....	2
* 3	PBFZZ	5340014580154	45152	3056873	BRACKET,MOUNTING.....	2
* 4	PAFZZ	5310011110645	45152	110311A	NUT,SELF-LOCKING,EX 0.625-11 UNC...	8
5	PAFZZ	5306011067496	52167	WH0818TB	BOLT,MACHINE 0.625-11 UNC X 1.75 IN LG.....	8
* 6	PBFZZ	2510014575270	45152	3056872	FRAME SECTION,STRUC.....	1
* 7	PAFZZ	5306011565429	52167	WE0820TB	BOLT,MACHINE 0.625-11 UNC x 2.00 IN LG.....	8
END OF FIGURE						

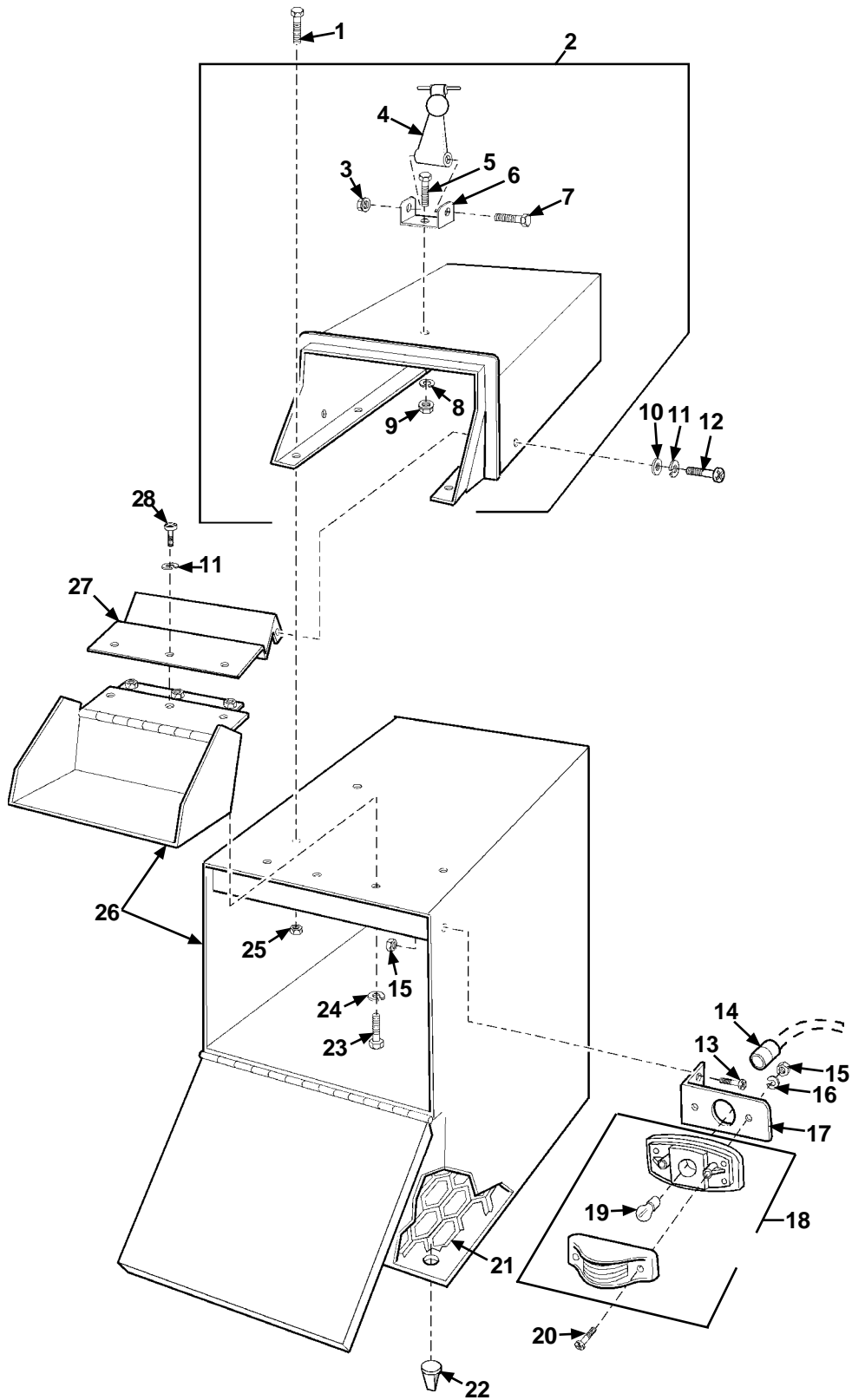


Figure 29. Remote Control Stowage Box

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG.29 REMOTE CONTROL STOWAGE BOX						
* 1	PAOZZ	5305014569449	45152	1955110	SCREW,CAP,HEXAGON H 0.31-18 X 0.75 IN LG.....	6
* 2	PFOZZ	5342014549188	45152	3063943	DOOR,ACCESS.....	1
3	PAOZZ	5310010666759	72962	21NE-040	NUT,SELF-LOCKING,HE 0.250-20 UNC, PART OF P/N 3063943.....	1
* 4	PAOZZ	2540011527764	64386	67D794	LATCH,HOOD,VEHICULA PART OF P/N 3063943.....	1
5	PAOZZ	5305012038360	45152	1337630	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.75 PART OF P/N 3063943.....	1
* 6	PAOZZ	5340011566776	64386	277-A-80-1	STRAP,RETAINING PART OF P/N 3063943.....	1
* 7	PAOZZ	5305010621017	45152	1367HX1	SCREW,CAP,HEXAGON H 0.31-18 UNC X 0.750 IN LG, PART OF P/N 3063943....	1
* 8	PAOZZ	5310010688446	45152	354AX	WASHER,LOCK 0.312 NOM, PART OF P/N 3063943.....	1
* 9	PAOZZ	5310011057229	06853	244095	NUT,PLAIN,HEXAGON 0.312-18 UNC, PART OF P/N 3063943.....	1
* 10	PAOZZ	5310013618388	45152	1379HX	WASHER,FLAT NO.10 NOM.....	2
* 11	PAOZZ	5310007755139	35510	2434	WASHER,LOCK 0.198 NOM.....	5
12	PAOZZ	5305009846211	96906	MS35206-264	SCREW,MACHINE 0.190-24 X 0.625 IN LG.....	2
13	PAOZZ	5305013379120	45152	1754140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.00 IN LG G5.....	2
14	PAOZZ	5975012304370	5A910	8338566	CABLE NIPPLE,ELECTR.....	2
* 15	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC-2B.....	8
* 16	PAOZZ	5310008338567	45152	68404AX	WASHER,SLOTTED.....	2
* 17	PFOZZ	5340014568529	45152	3115374	BRACKET,ANGLE SIDE MARKER, LH.....	1
* 18	PAOZZ	6220005773434	96906	MS35423-1	LIGHT,MARKER,CLEARA AMBER.....	1
* 19	PAOZZ	6240001558717	81348	W-L-00111/60	LAMP,INCANDESCENT PART OF P/N MS35423-1.....	1
* 20	PAOZZ	5305011664410	088A2	45A115-P29	SCREW,MACHINE 0.194-24 UNC X 1.00 IN LG.....	6
* 21	XDOZZ		45152	3070943	GRATE,STOWAGE BOX.....	1
22	PAOZZ	4820011971880	18265	P14-9099	VALVE,VACUUM BREAKI.....	4
23	PAOZZ	5305000680508	80204	B1821BH025C075N	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	3
* 24	PAOZZ	5310005825965	96906	MS35338-44	WASHER,LOCK 0.250 NOM.....	4
* 25	PAOZZ	5310013405671	45152	1333510	NUT,SELF-LOCKING,EX 0.312-18 UNC G5.....	6
* 26	PFOZZ	5342014538566	45152	3063942	DOOR,ACCESS.....	1
* 27	PFOZZ	5975014581901	45152	3063944	TRAY,MOUNTING,ELECT.....	1
* 28	PAOZZ	5305009846210	96906	MS35206-263	SCREW,MACHINE 0.190-24 UNC X 0.50 IN LG.....	3

END OF FIGURE

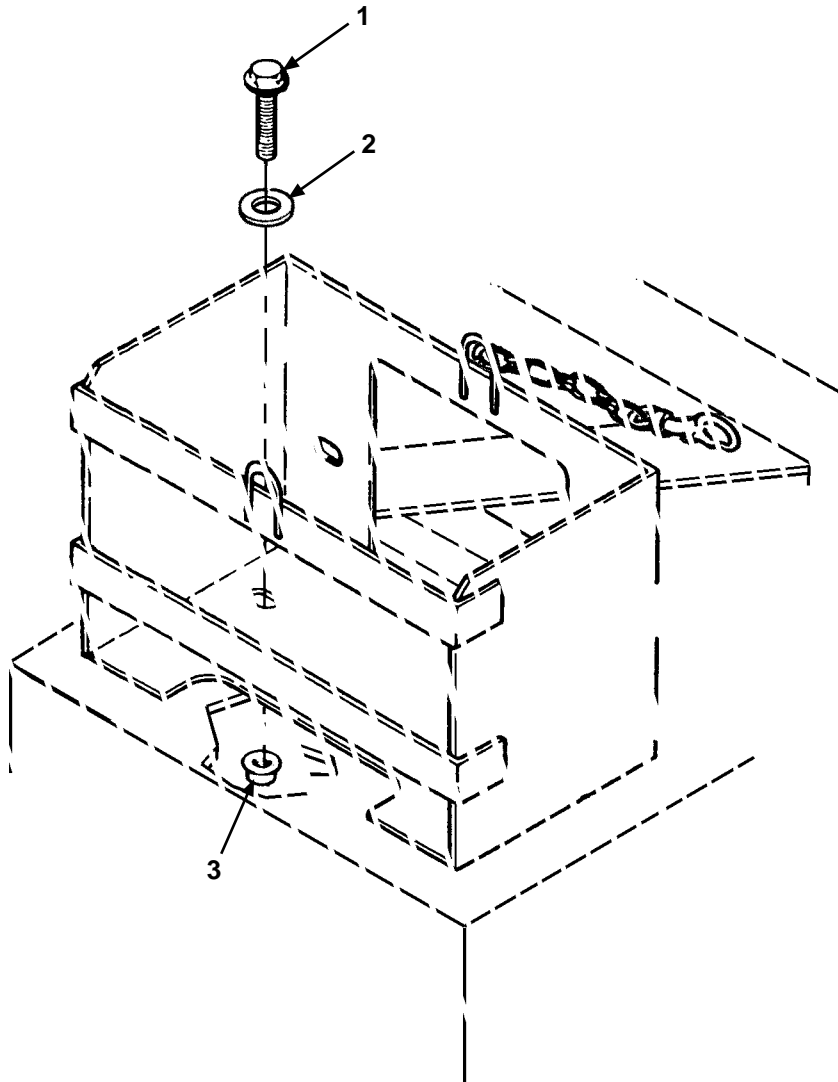


Figure 29A. Wheel Chock Storage Box (Model B Only)



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG. 29A WHEEL CHOCK STOWAGE BOX						
(MODEL B ONLY)						
* 1	PAOZZ	5305010621017	45152	1367HX1	SCREW,CAP,HEXAGON H 0.31-18 X 0.750 IN LG.....	2
* 2	PAOZZ	5310010617452	45152	1804HX	WASHER,FLAT 0.344 NOM.....	2
* 3	PAOZZ	5310013405671	45152	1333510	NUT,SELF-LOCKING, EX 0.312-18 UNC G5.....	2
END OF FIGURE						

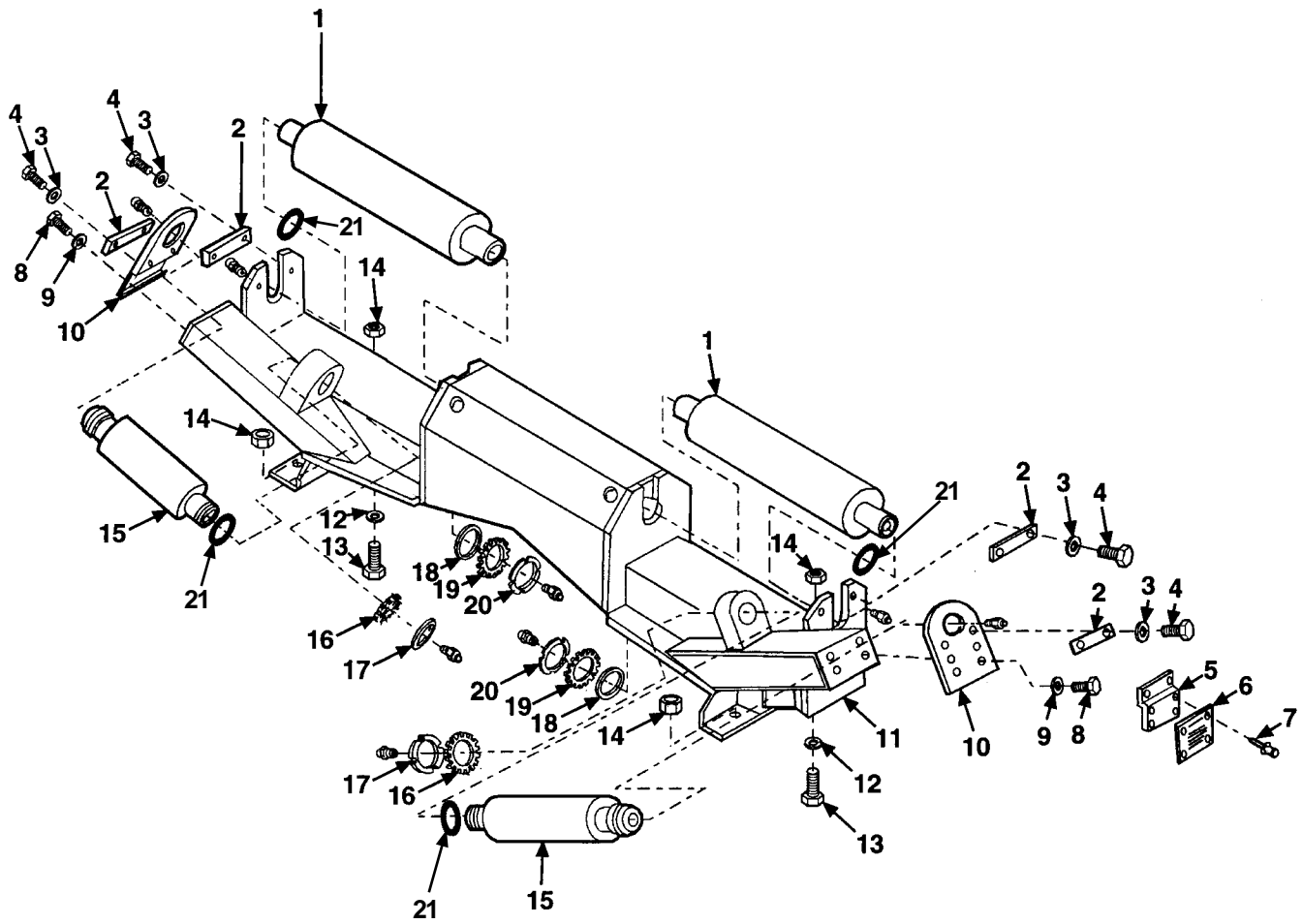


Figure 30. Rear Roller Assembly

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG. 30 REAR ROLLER ASSEMBLY						
1	PAOZZ	3990013581146	45152	3SK804	ROLLER UNIT,RAIL TY.....	2
2	PFOZZ	5340013553794	45152	1862350	PLATE,MOUNTING.....	4
* 3	PAOZZ	5310010688446	45152	354AX	WASHER LOCK 0.312 NOM SIZE.....	8
4	PAOZZ	5305010820049	11939	93544216	SCREW,CAP,HEXAGON H 0.312-18 X 1.00 IN LG.....	8
5	PFOZZ	5340013636139	45152	1953740	BRACKET,DOUBLE ANGL.....	2
* 6	PFOZZ	9905013618611	45152	1783190	PLATE,INSTRUCTION WARNING, LOADING/ UNLOADING.....	2
* 7	PAOZZ	5320013515621	3Z048	BTT43	RIVET,BLIND 0.125 X 0.294.....	8
8	PAOZZ	5305013284384	45152	738HX4	SCREW,CAP,HEXAGON H 0.500-13 X 1.250 IN LG.....	8
9	PAOZZ	5310011332130	45152	355AX	WASHER,LOCK 0.500 NOM.....	8
10	PAOZZ	5340013555248	45152	1862360	PLATE,RETAINING,SEA.....	2
11	PBOZZ	3910013975277	45152	1862230W	ROLLER,CONVEYOR.....	1
12	PAOZZ	5310012144946	45152	2083HX	WASHER,FLAT 0.81 NOM (MODEL A ONLY)	6
13	PAOZZ	5305011491935	45152	111454A	SCREW,CAP,HEXAGON H 0.750-10 X 2.250 IN LG.....	4
* 14	PAOZZ	5310011505918	45152	110312A	NUT,SELF-LOCKING,EX 0.750-10 UNC...	4
15	PAOZZ	3990013571944	45152	3SK805	ROLLER UNIT,RAIL TY.....	2
* 16	PAOZZ	5310013558794	2K272	W 08	WASHER,KEY.....	2
* 17	PAOZZ	5310001856389	08162	N08	NUT,PLAIN ROUND.....	2
18	PAOZZ	3120013558843	45152	1862340	BEARING,WASHER,THRU.....	2
* 19	PAOZZ	5310014596126	2K272	W 09	WASHER,KEY.....	4
* 20	PAOZZ	5310001856461	96906	MS19068-091	NUT,PLAIN,ROUND NO. 9.....	4
* 21	PFOZZ		48482	S-19693-SS	SEAL,OIL.....	4

END OF FIGURE

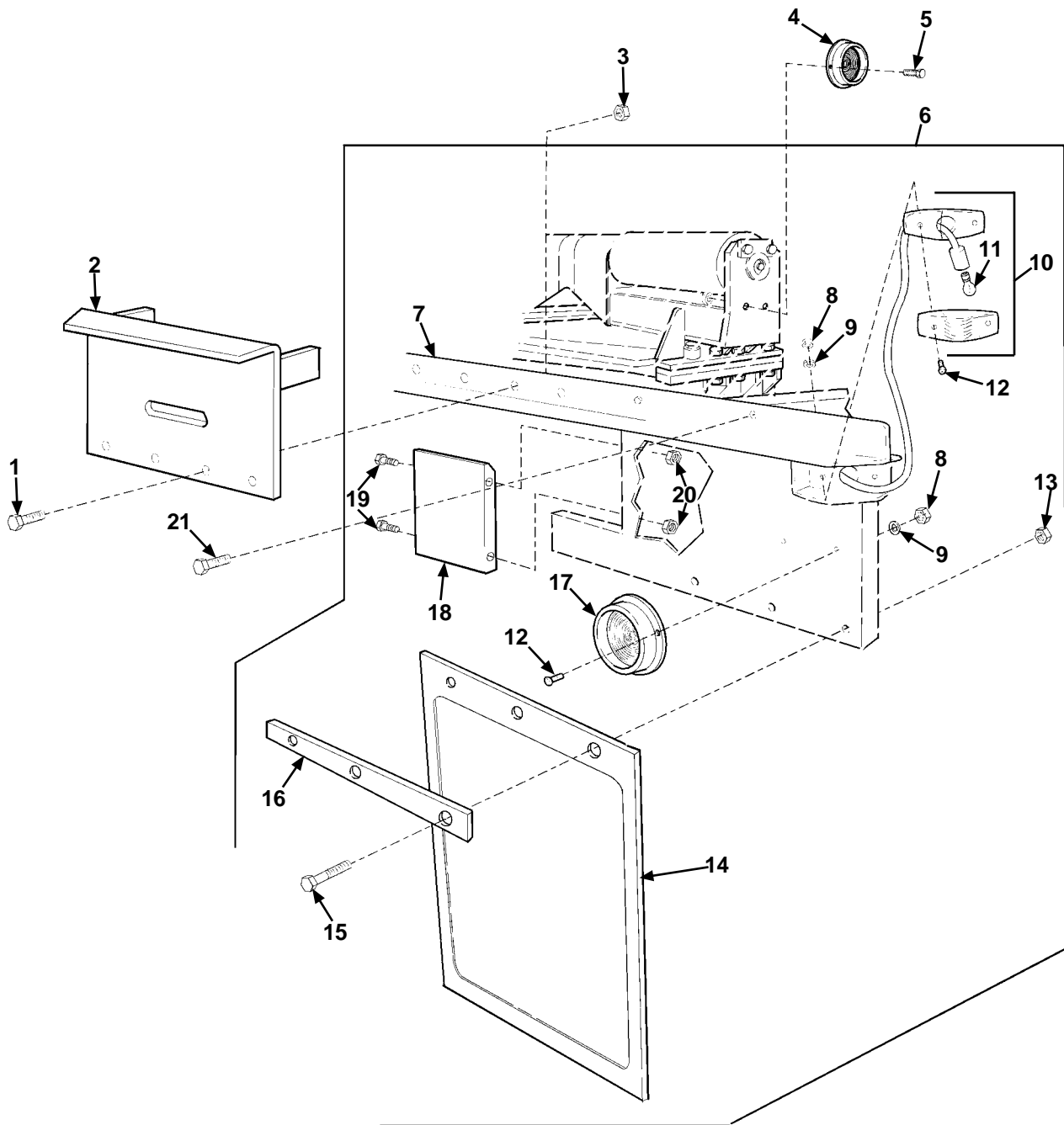


Figure 31. Rear Bumper and Stop Plate (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG. 31 REAR BUMPER AND STOP PLATE (MODEL A ONLY)						
1	PAOZZ	5305011503996	45152	115309A	SCREW,CAP,HEXAGON 0.500-13 X 2.75 IN LG GR8.....	4
* 2	PFOZZ	5340014547270	45152	3127533	BRACKET,MOUNTING STOP.....	1
* 3	PAOZZ	5310011598178	45152	110310A	NUT,SELF-LOCKING,EX 0.50-13 G8.....	8
* 4	PAOZZ	9905002052795	96906	MS35387-1	REFLECTOR,INDICATIN RED.....	2
5	PAOZZ	5305011598544	45152	1345280	SCREW,TAPPING 0.25-20 X 0.50 IN LG.	4
6	AOOOO		45152	3107597	ASSEMBLY,REAR BUMPE W WINCH.....	1
* 7	PAOZZ	5340014568538	45152	3107576	.PLATE,MOUNTING STOP.....	1
* 8	PAOZZ	5310012885096	45152	1571850	.NUT,SELF-LOCKING,AS 10-24 UNC.....	8
* 9	PAOZZ	5310007755139	35510	2434	.WASHER,LOCK 10 NOM SIZE.....	8
* 10	PAOZZ	6220007261916	96906	MS35423-2	.LIGHT,MARKER,CLEARE RED.....	8
* 11	PAOZZ	6240001558717	81348	W-L-00111/60	.LAMP,INCANDESCENT PART OF P/N MS35423-2.....	1
12	PAOZZ	5305012498564	45152	59031AX	.SCREW,MACHINE 0.190-24 UNC X .750 IN LG.....	8
* 13	PAOZZ	5310013405671	45152	1333510	.NUT,SELF-LOCKING,EX 0.312-18 UNC G5.....	6
* 14	PAOZZ	2540011343714	45152	1312410	.GUARD,SPLASH,VEHICU.....	2
* 15	PAOZZ	5306013410712	45152	1756870	.BOLT,MACHINE 0.31-18 X 1.25 IN LG G5.....	6
* 16	PAOZZ	5340011530313	45152	1330560	.PLATE,CLAMPING.....	2
* 17	PAOZZ	9905002052795	96906	MS35387-1	.REFLECTOR,INDICATIN RED.....	4
* 18	PFOZZ	5340014568533	45152	3107592	.BRACKET,MOUNTING.....	1
19	PAOZZ	5305013448899	45152	1606140	.SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	3
* 20	PAOZZ	5310013469445	45152	1600460	.NUT,SELF-LOCKING,CL 0.250-20 UNC..	3
21	PAOZZ	5305011507736	45152	115293A	SCREW,CAP,HEXAGON H 0.50-13 X 1.50 IN LG.....	4

END OF FIGURE

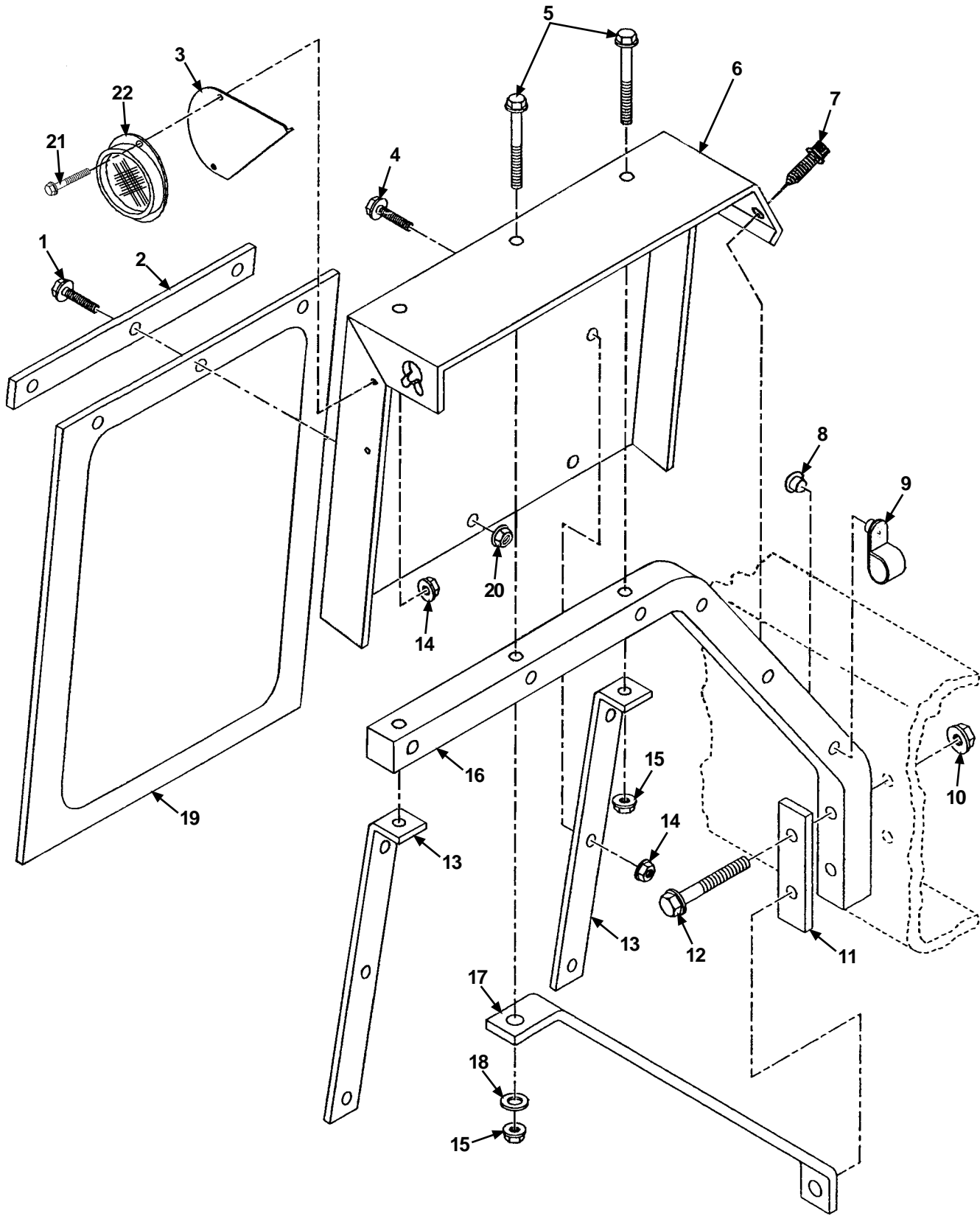


Figure 31A. Rear Fender Assembly (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG. 31A REAR FENDER ASSEMBLY (MODEL B ONLY)						
* 1	PAOZZ	5305013538267	45152	1754220	SCREW,CAP,HEXAGON 0.312-18 X 1.50 IN LG G5.....	6
* 2	PAOZZ	5340011530313	45152	1330560	PLATE,CLAMPING.....	2
* 3	PAOZZ	5340013644343	45152	1976560	BRACKET,ANGLE RH REFLECTOR.....	1
* 3	PAOZZ	5340013641959	45152	1976570	BRACKET,ANGLE LH REFLECTOR.....	1
* 4	PAOZZ	5305013448899	45152	1606140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	8
* 5	PAOZZ	5305013538268	45152	1754300	SCREW,CAP,HEXAGON H 0.375-16 UNC 2A RH X 2.50 IN LG.....	6
* 6	PAOZZ	2510013578795	45152	1783090	FENDER,VEHICULAR RH SIDE.....	1
* 6	PAOZZ	2510013578796	45152	1783100	FENDER,VEHICULAR LH SIDE.....	1
* 7	PAOZZ	5305011575624	45152	1324510	SCREW,TAPPING 0.312-HEX X 0.75 IN LG.....	2
* 8	PAOZZ	5340010811718	28520	DP-312	BUTTON,PLUG 0.310 BLACK NYLON.....	4
* 9	PAOZZ	5340011518391	83014	H360-5-2	CLAMP,LOOP.....	12
* 10	PAOZZ	5310011598178	45152	110310A	NUT,SELF-LOCKING,EX.....	4
* 11	PAOZZ	5340013568487	45152	1937190	PLATE,MOUNTING.....	2
* 12	PAOZZ	5305011565445	52167	WE0630TB	SCREW,CAP,HEXAGON H 0.50-13 UNC 2A RH X 3.25 IN LG.....	4
* 13	PAOZZ	2510013572507	45152	1783110	BRACE,FENDER.....	4
* 14	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC...	16
* 15	PAOZZ	5310012881116	82458	T893R	NUT,SELF-LOCKING,EX 0.382-16 UNC G5.....	6
* 16	PAOZZ	2510013575691	45152	1921380	BRACE,FENDER.....	2
* 17	PAOZZ	2510013644489	45152	2068380	BRACE,FENDER.....	2
* 18	PAOZZ	5310008800626	19207	10892331	WASHER,FLAT.....	2
* 19	PAOZZ	2540011316242	45152	1321600	GUARD,SPLASH,VEHICU.....	2
* 20	PAOZZ	5310013405671	45152	1333510	NUT,SELF-LOCKING,EX.....	6
* 21	PAOZZ	5305009881724	96906	MS35206-280	SCREW,MACHINE, PAN HEAD, 0.250-20 X 0.62 IN LG.....	4
* 22	PAOZZ	9905002023639	96906	MS35387-2	REFLECTOR,INDICATIN AMBER.....	2

END OF FIGURE

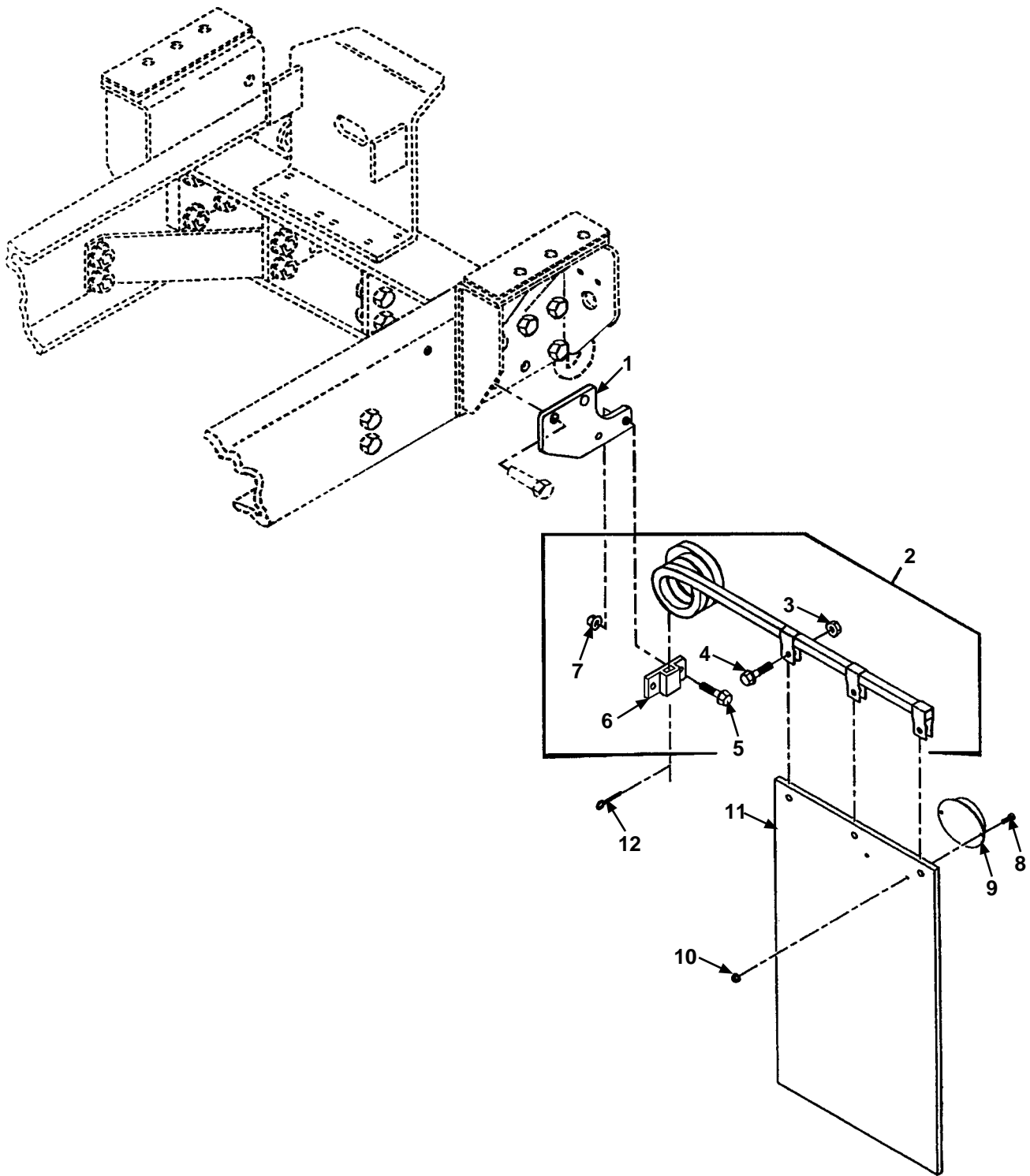


Figure 31B. Rear Mud Flap Installation (Model B Only)



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG. 31B REAR MUD FLAP INSTALLATION (MODEL B ONLY)						
* 1	PFOZZ		45152	3263040	BRACKET,MOUNTING.....	2
* 2	PAOZZ	2540012229653	3D374	031-00724	BRACKET SET,SPLASH CONTAINS TWO BRACKET SETS.....	1
* 3	PAOZZ	5310009843806	81349	M45913/1-5CG5C	NUT,SELF-LOCKING,HE PART OF P/N 031-00724.....	6
* 4	PAOZZ	5306002264827	80204	B1821BHC31C100N	BOLT,MACHINE PART OF P/N 031-00724.	6
* 5	PAOZZ	5305000712056	80204	B1821BH044C175N	SCREW,CAP,HEXAGON H PART OF P/N 031-00724.....	4
* 6	XAOZZ		45152	1500280-1	BRACKET,SOCKET MUD FLAP, PART OF P/N 031-00724.....	2
* 7	PAOZZ	5310005755329	81349	M45913/1-7CG5C	NUT,SELF-LOCKING,HE PART OF P/N 031-00724.....	4
* 8	PAOZZ	5305009881725	96906	MS35206-281	SCREW,MACHINE 0.25-20 UNC X 0.750.. IN LG.....	4
* 9	PAOZZ	9905002052795	96906	MS35387-1	REFLECTOR,INDICATIN RED.....	2
* 10	PAOZZ	5310010666759	72962	21NE-040	NUT,SELF-LOCKING,CL 0.250-20 UNC...	4
* 11	PAOZZ	2540011343714	45152	1312410	GUARD,SPLASH,VEHICU.....	2
* 12	PAOZZ	5315000590217	80205	MS24665-624	PIN,COTTER.....	2
END OF FIGURE						

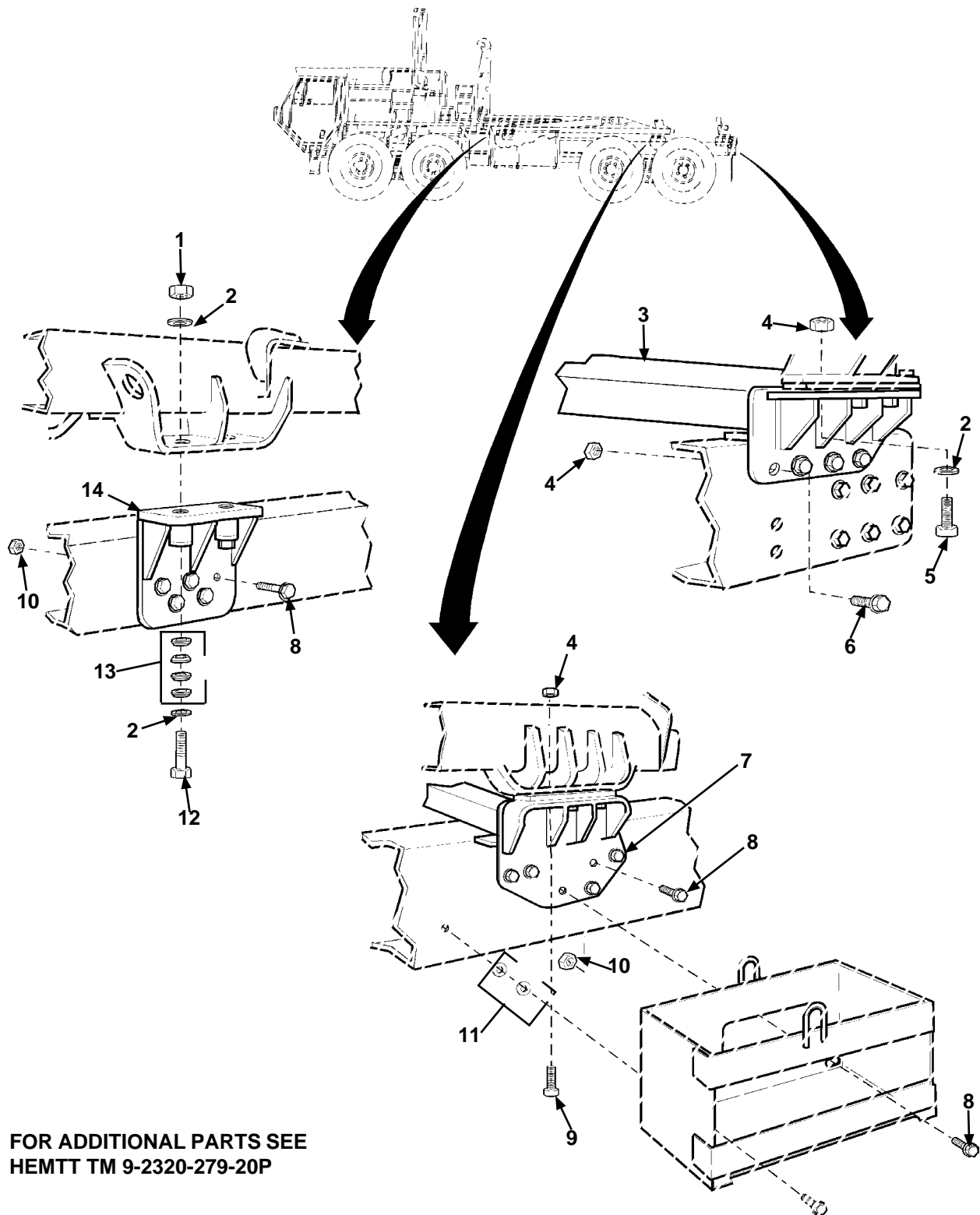


Figure 32. Front & Rear Compression Frame & Rear Roller Mounting Brackets (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG. 32 FRONT AND REAR COMPRESSION FRAME AND REAR ROLLER MOUNTING BRACKETS (MODEL A ONLY)						
* 1	PAFZZ	5310013435712	10001	2533408-26	NUT SELF-LOCKING 0.750-10 UNC.....	4
* 2	PAFZZ	5310012144946	45152	2083HX	WASHER,FLAT 0.75 HDN.....	8
* 3	PBFZZ	5340014568539	45152	3056868	BRACKET,MOUNTING.....	1
* 4	PAFZZ	5310011505918	45152	110312A	NUT,SELF-LOCKING,EX 0.750-10 UNC...	6
5	PAFZZ	5305011491935	45152	111454A	SCREW,CAP,HEXAGON H 0.750-10 UNC X 2.250 IN LG.....	6
6	PAFZZ	5305011491934	45152	111320A	SCREW,CAP,HEXAGON H 0.750-10 X 2.00 IN LG LEFT SIDE.....	7
6	PAFZZ	5305011544323	45152	1317120	SCREW,CAP,HEXAGON H 0.750-10 UNC X 3.00 IN LG G8 RIGHT SIDE.....	4
* 7	PBFZZ	5340014567145	45152	3056869	BRACKET,MOUNTING REAR.....	1
8	PAFZZ	5306011507726	45152	120622A	BOLT,MACHINE.....	5
9	PAFZZ	5305011553478	45152	1324980	SCREW,CAP,HEXAGON 0.75-10 UNC X 2.75 IN LG G8.....	6
* 10	PAFZZ	53100111110645	45152	110311A	NUT,SELF-LOCKING,EX.....	8
* 11	PAFZZ	5365014578369	45152	3115349	SPACER,PLATE.....	2
12	PAFZZ	5305009474362	80204	B1821BH075C500N	SCREW,CAP,HEXAGON 0.750-10 UNC 5.00 IN LG.....	4
13	PAFZZ	5310010382294	81349	M12133/1-12P	WASHER,SPRING TENSI 0.750 NOM.....	16
* 14	PAFZZ	5340014568540	45152	3056871	BRACKET,MOUNTING FRONT.....	2

END OF FIGURE

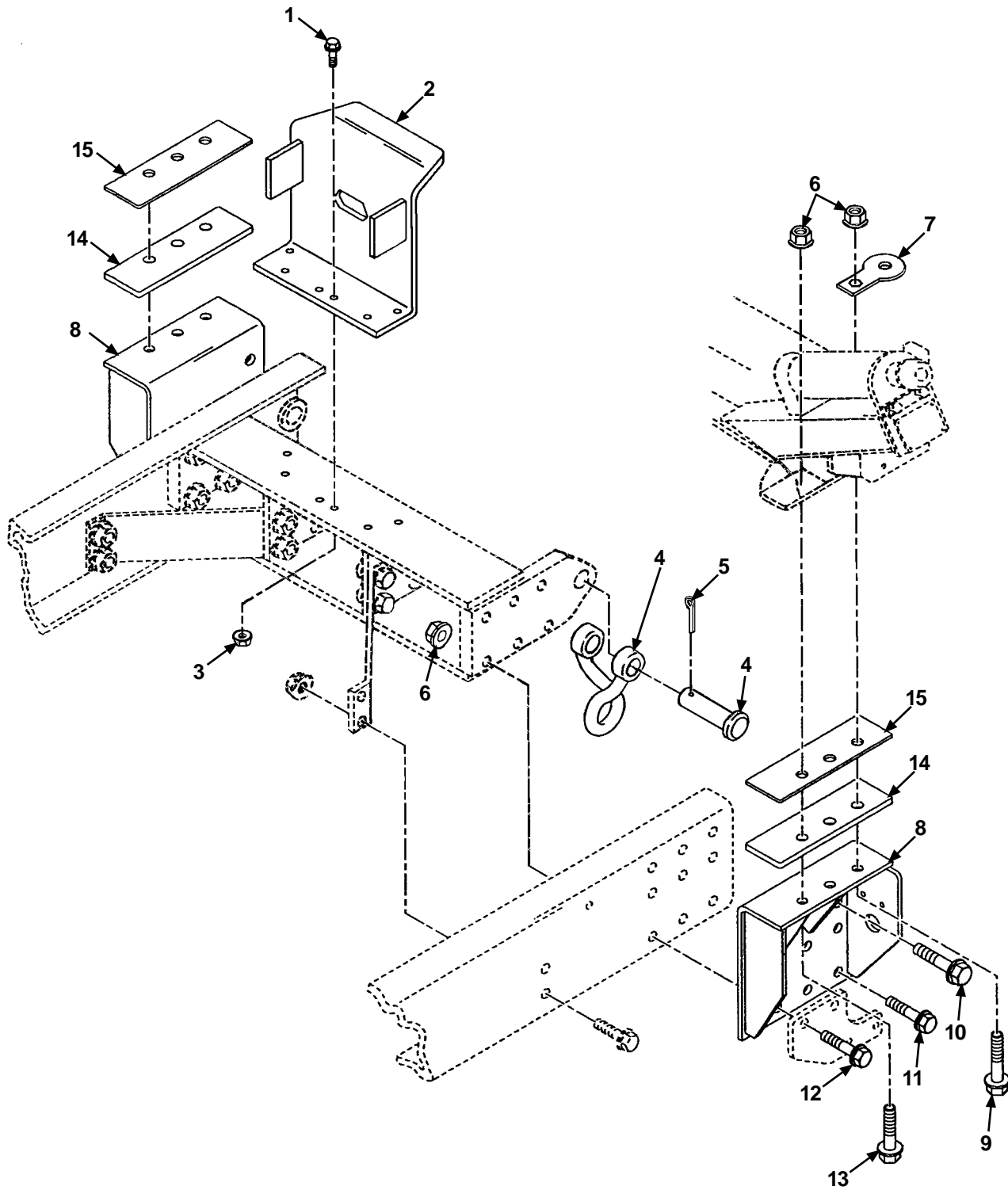


Figure 32A. Rear Roller Mounting Brackets and Stop Plate (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER FIG. 32A REAR ROLLER MOUNTING BRACKETS AND STOP PLATE (MODEL B ONLY)						
* 1	PAOZZ	55305011679408	52167	WE0620TB	SCREW,CAP,HEXAGON H 0.50-13 UNC X 2.00 IN LG.....	6
* 2	PAOZZ		45152	3053453	BRACKET,DOUBLE ANGL.....	1
* 3	PAOZZ	5310011598178	45152	110310A	NUT,SELF-LOCKING,EX.....	6
* 4	PAOZZ	4030002780715	90202	M885AG	SHACKLE.....	2
* 5	PAOZZ	5315001879420	80205	MS24665-717	PIN,COTTER.....	2
* 6	PAOZZ	5310011505918	45152	110312A	NUT,SELF-LOCKING,EX 0.750-10 UNC...	32
* 7	PFOZZ		45152	3055925	BRACKET,MOUNTING.....	2
* 8	PAOZZ		45152	3051990	BRACKET,MULTIPLE AN RH.....	1
* 8	PAOZZ		45152	3051989	BRACKET,MULTIPLE AN LH.....	1
* 9	PAOZZ	5305011858668	45152	126536A	SCREW,CAP,HEXAGON H 0.750-10 X 3.00 IN LG.....	2
* 10	PAOZZ	5305011491934	45152	111320A	SCREW,CAP,HEXAGON H 0.750-10 X 2.00 IN LG.....	8
* 11	PAOZZ	5305011968088	45152	111319A	SCREW,CAP,HEXAGON H 0.750-10 X 3.25 IN LG.....	4
* 12	PAOZZ	5305011544323	45152	1317120	SCREW,CAP,HEXAGON H 0.750-10 UNC X 3.00 IN LG G8.....	8
* 13	PAOZZ	5305011553478	45152	1324980	SCREW,CAP,HEXAGON H 0.750-10 UNC X 2.75 IN LG G8.....	4
* 14	PAOZZ		45152	3053912	SPACER,PLATE.....	2
* 15	PAOZZ		45152	3055128	SPACER,PLATE.....	2

END OF FIGURE

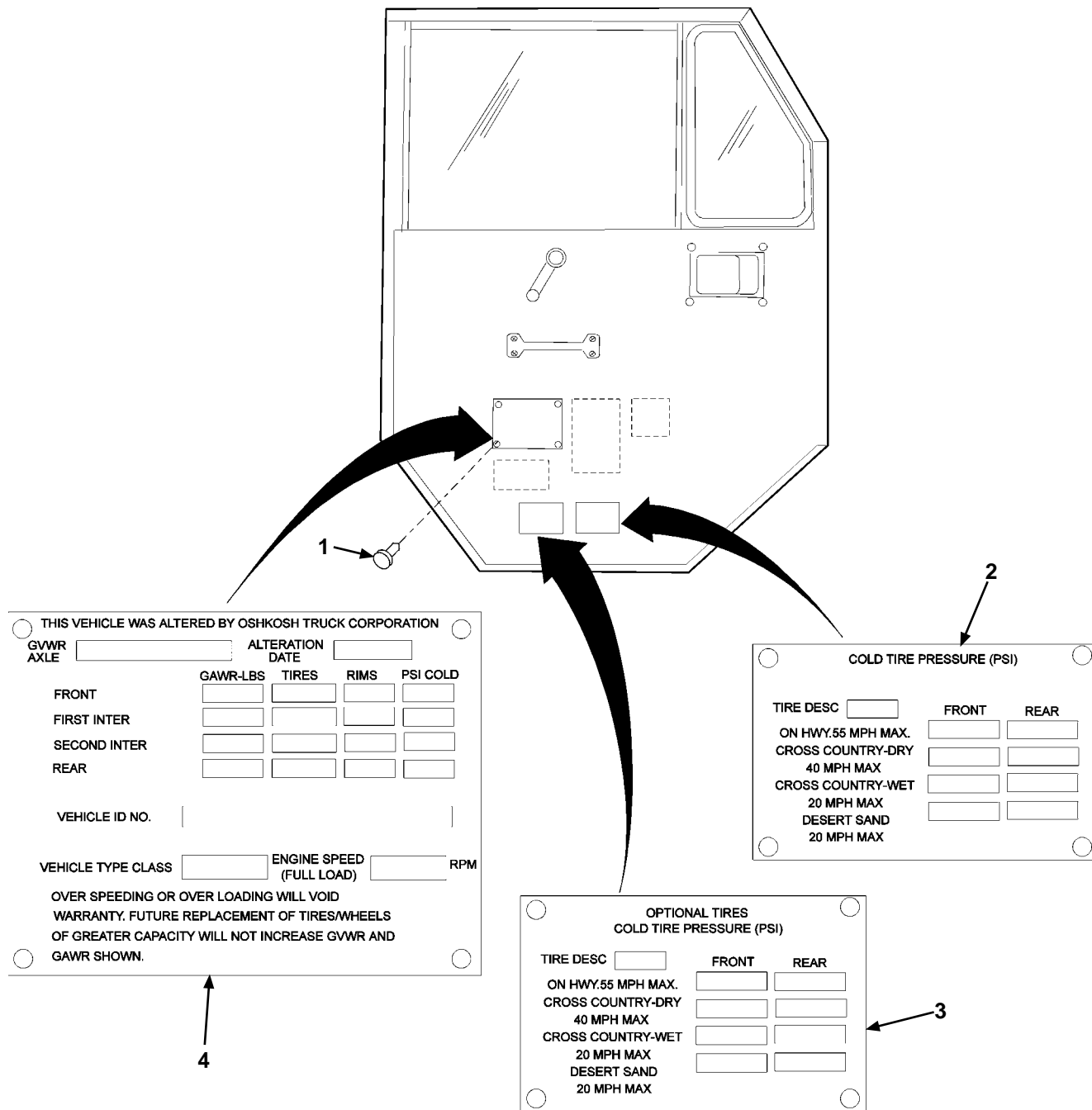


Figure 33. Data Plates (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG. 33 DATA PLATES						
(MODEL A ONLY)						
* 1	PAOZZ	5320013515621	3Z048	BTT43	RIVET,BLIND 0.125 X 0.294.....	20
* 2	PFOZZ	9905014578345	45152	2008730	PLATE,IDENTIFICATIO TIRE PRESSURE (MODEL A ONLY).....	1
3	PFOZZ	9905011571026	45152	1320590	PLATE,INSTRUCTIO TIRE INFLATION....	1
* 4	PFOZZ	9905014578346	45152	3126523	PLATE,IDENTIFICATIO CERTIFICATION, ALTERED VEHICLE.....	1
END OF FIGURE						

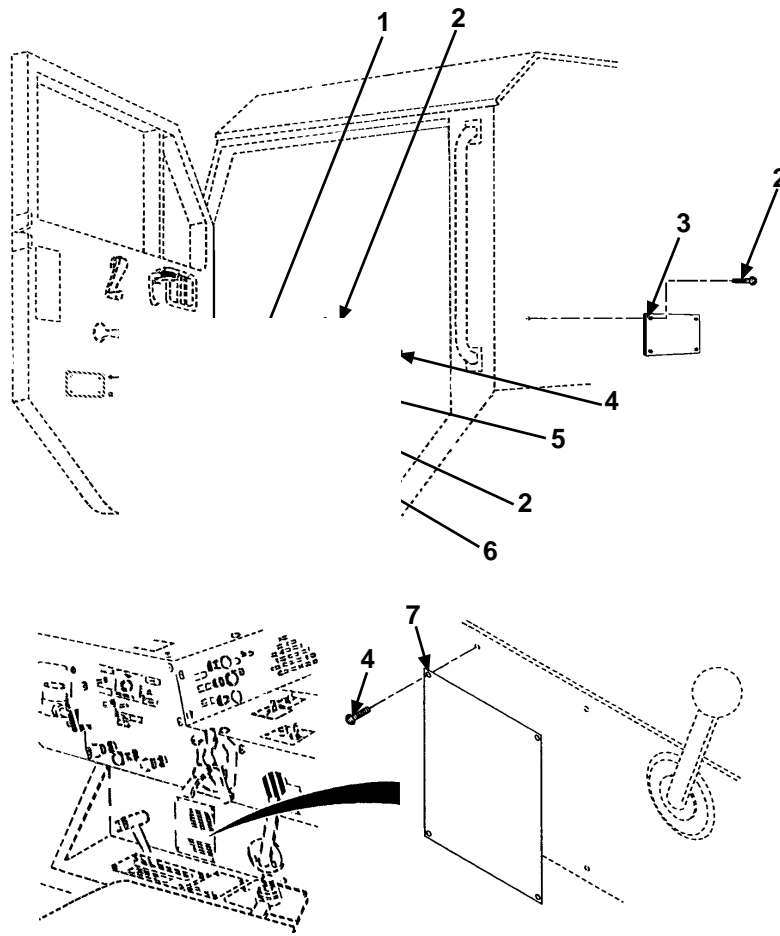


Figure 33A. Data Plates (Model B Only)

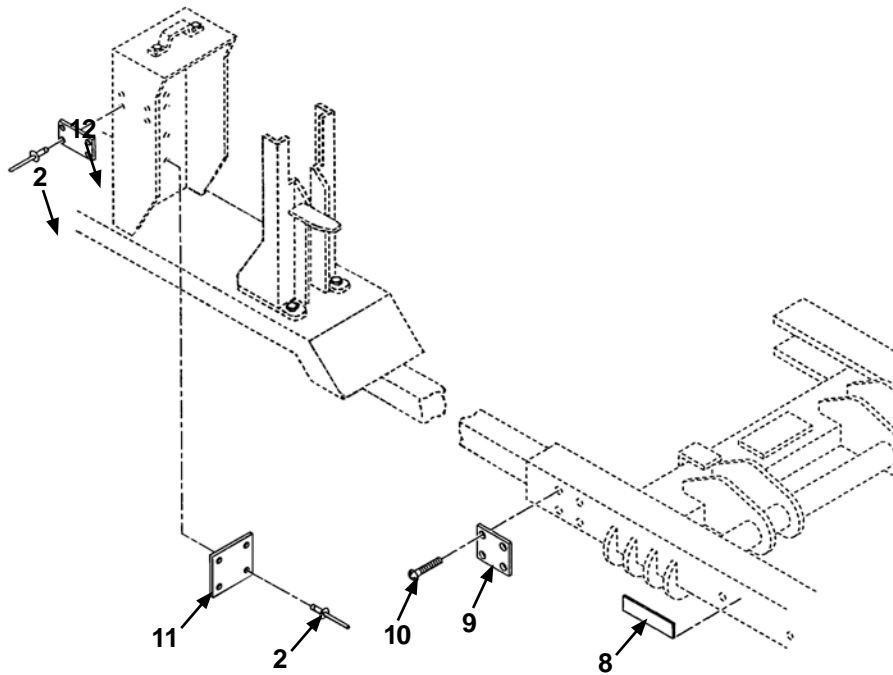


Figure 33A. Data Plates (Model B Only)



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2000 CBT TRANSPORTER						
FIG. 33A DATA PLATES (MODEL B ONLY)						
* 1	PAOZZ	9905014578346	45152	2185360	PLATE,IDENTIFICATIO CERTIFICATION, S/N.....	1
* 2	PAOZZ	5320013515621	3Z048	BTT43	RIVET,BLIND 0.125 X 0.294.....	20
* 3	PFOZZ		45152	3181920	PLATE,IDENTIFICATIO SHIPPING.....	1
* 4	PAOZZ	5305011342052	45152	1381HX1	SCREW.....	8
* 5	PFOZZ		45152	3064067	PLATE,IDENTIFICATIO VEHICLE NAME...	1
* 6	PAOZZ	9905011571026	45152	1320590	PLATE,INSTRUCTION TIRE INFLATION...	1
* 7	PFOZZ		45152	3064068	PLATE,IDENTIFICATIO VEHICLE DATA...	1
* 8	XDOZZ		45152	1987130	LABEL,MULTILIFT.....	2
* 9	PAOZZ	9905014571710	45152	3153187	PLATE,INSTRUCTION LOCK.....	2
* 10	PAOZZ	5305002535614	80205	MS21318-20	SCREW,DRIVE 0.114 X 2.00 NOM.....	12
* 11	PFOZZ		1DK67	3280639	PLATE,INSTRUCTION LHS MANUAL OVERRIDE.....	1
* 12	PAOZZ	9905013586746	45152	1785220	PLATE,INSTRUCTION HYDRAULIC SLAVE..	1

END OF FIGURE

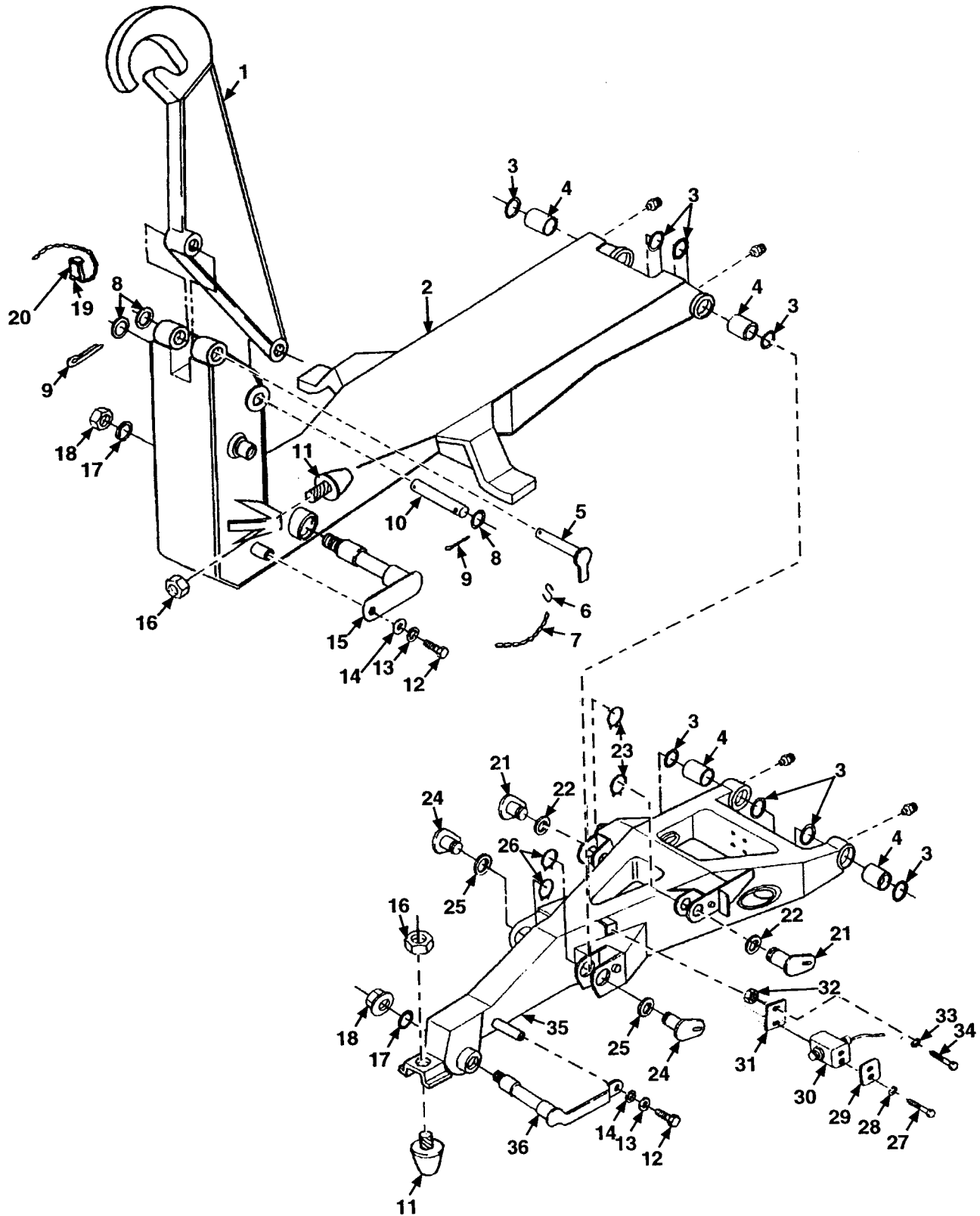


Figure 34. Main Frame, Hook Arm, and Related Parts (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2100 LOAD HANDLING SYSTEM FIG. 34 MAIN FRAME, HOOK ARM, AND RELATED PARTS (MODEL A ONLY)						
* 1	PAFFZZ	4030014541349	45152	3059948	HOOK, ARM UPPER.....	1
* 2	PAFFZZ	3040014542704	45152	3059934	LEVER, MANUAL CONTRO HOOK ARM.....	1
3	PAFZZ	5330013559269	01212	80X100X10	SEAL, PLAIN.....	8
4	PAFZZ	5365013559529	2K272	GLY.PG 808560 A	BUSHING, NONMETALLIC.....	4
5	PAOZZ	5315013612721	45152	1862720 W	PIN, STRAIGHT, HEADED.....	1
* 6	PAFZZ	4030014561150	35111	811	HOOK, CHAIN, S.....	1
7	MOOZZ		45152	1394510-17.6	CHAIN WELDED MAKE FROM WELDED CHAIN, P/N 031-0424, 17.60 IN LG....	1
* 8	PAOZZ	5310012162799	72447	330734	WASHER, FLAT 1.781 NOM.....	3
9	PAFZZ	5315008995931	96906	MS24665-768	PIN, COTTER.....	2
10	PAFZZ	5340013568373	45152	1862770	ROD, STRAIGHT, HEADLE.....	1
11	PAOZZ	5340013559368	45152	1897980	BUMPER, NONMETALLIC.....	3
12	PAFZZ	5305010617910	45152	2013HX1	SCREW 0.38-16 UNC X 0.50 IN LG....	2
* 13	PAFZZ	5310011290450	45152	351AX	WASHER, LOCK 0.382 NOM.....	2
* 14	PAFZZ	5310008800626	19207	10892331	WASHER, FLAT 0.406 NOM.....	2
* 15	PAFZZ	3040013564589	45152	1863010W	SHAFT, SHOULDERED.....	1
* 16	PAOZZ	5310013428595	45152	1598030	NUT, SELF-LOCKING, EX 0.500-13 UNC...	3
* 17	PAFZZ	5310014580248	2K272	W 12 LOCKWASHER	WASHER, KEY 2.412 ID NOM.....	2
* 18	PAFZZ	5310001856345	96906	MS19068-121	NUT, PLAIN, ROUND 2.360-18 UNC.....	2
19	MOOZZ		45152	1394510-12	CHAIN, WELDED MAKE FROM WELDED CHAIN, P/N 031-0424, 12.00 IN LG....	1
20	PAOZZ	5315013553744	96652	28-04	PIN, STRAIGHT, HEADED.....	1
21	PAFZZ	2530013564614	45152	1860250 W	ARM ASSEMBLY, PIVOT,.....	2
22	PAFZZ	5365013557358	45152	1862830	SPACER, RING 2.50 ID X 0.137 THK....	2
23	PAFZZ	5325008062357	96906	MS16624-1250	RING, RETAINING.....	2
24	PAFZZ	2530013564613	45152	1860310 W	ARM ASSEMBLY, PIVOT.....	4
25	PAFZZ	5365013557357	45152	1862820	SPACER, RING.....	4
26	PAFZZ	5325002006684	96906	MS16624-1315	RING, RETAINING.....	4
* 27	PAOZZ	5305010645470	45152	45092AX	SCREW, CAP, HEXAGON H 0250-20 UNC X 1.50 IN LG.....	2
* 28	PAOZZ	5310010614480	96906	MS35338-44	WASHER, LOCK 0.250 NOM.....	2
29	PAOZZ	5340013556821	53790	DP-2	COVER, ACCESS.....	1
30	PAOZZ	5340013558246	53790	2180PA	CLAMP, BLOCK.....	1
31	PAOZZ	5935013761003	45152	1997520 W	PLATE, RETAINING, ELE.....	1
32	PAOZZ	5310010666759	72962	21NE-040	NUT, SELF-LOCKING, HE 0.250-20 UNC...	2
* 33	PAOZZ	5310008094058	96906	MS27183-10	WASHER, FLAT 0.281 NOM.....	4
34	PAOZZ	5305012807901	80204	B1821BH025C100N	SCREW, CAP, HEXAGON H 0.250-20 UNC X 1.00 IN LG.....	2
* 35	PAFFZZ	2510014538548	45152	3051121	FRAME SECTION, STRUC MIDDLE.....	1
* 36	PAFZZ	3040013566837	45152	1862690W	SHAFT, SHOULDERED CYLINDER.....	1

END OF FIGURE



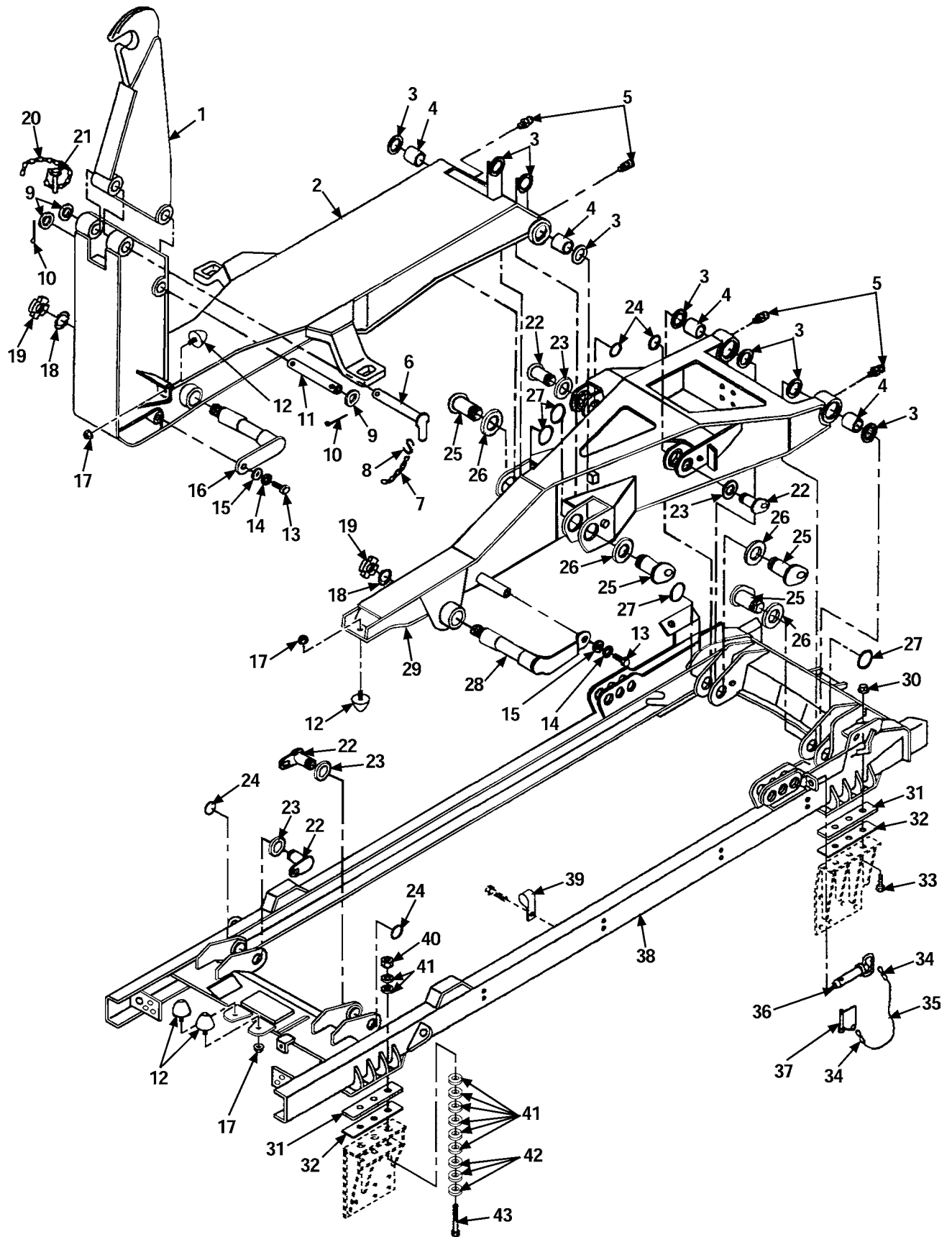


Figure 34A. Load Handling System (Model B Only) (Sheet 1 of 2)

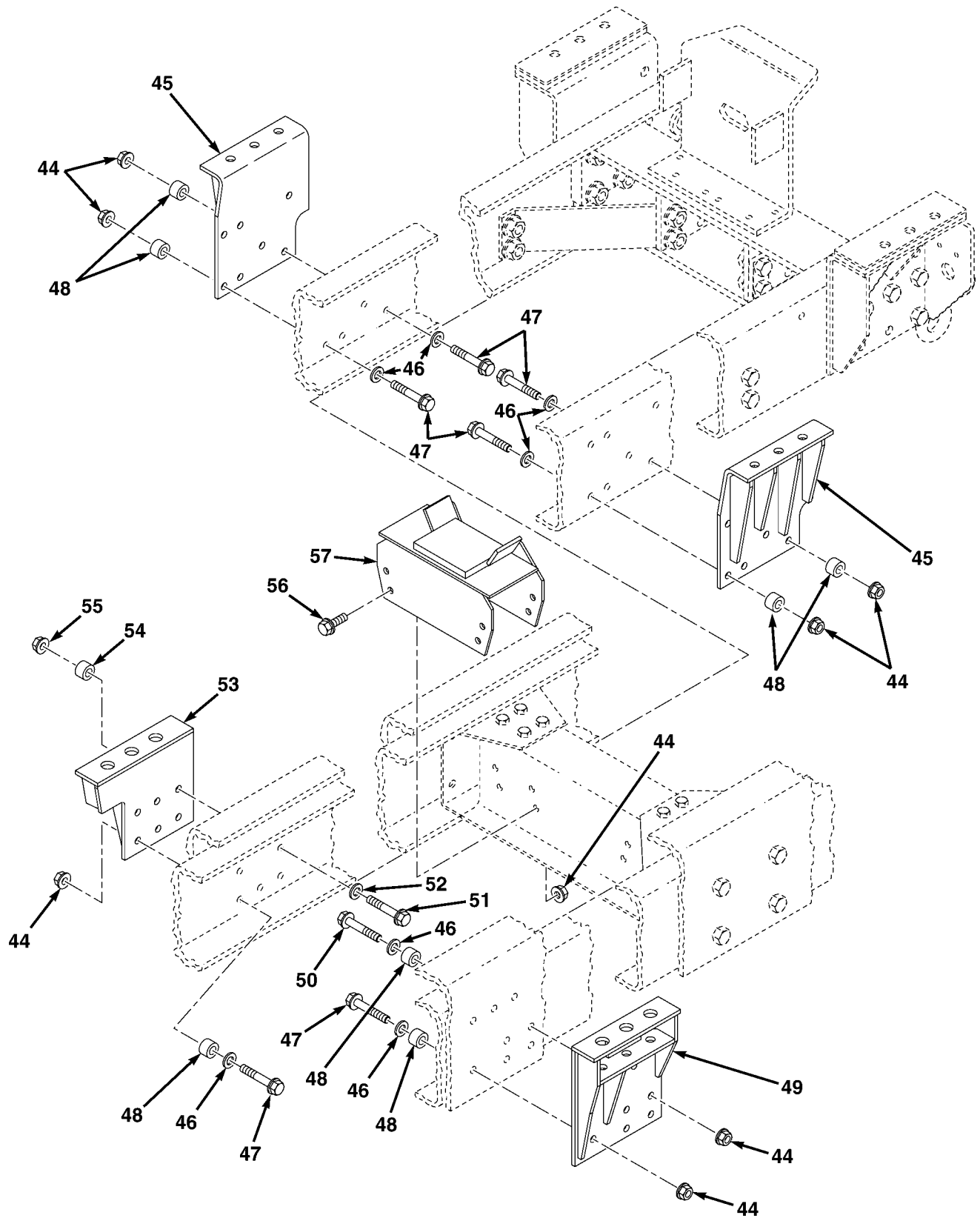


Figure 34A. Load Handling System (Model B Only) (Sheet 2 of 2)

## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC) GROUP 2100 LOAD HANDLING SYSTEM FIG. 34A LOAD HANDLING SYSTEM (MODEL B ONLY)	(7) QTY
1	PBFZZ	4030014541349	45152	3059948	HOOK,PINTLE HOOK ARM.....	1
2	PBFZZ	3040014542704	45152	3059934	LEVER,MANUAL CONTROL.....	1
3	PAFZZ	5330013559269	01212	80X100X10	SEAL,PLAIN.....	8
4	PAFZZ	5365013559529	2K272	GLY.PG 808560 A	BUSHING,NONMETALLIC.....	4
5	PAOZZ	4730012171115	45152	615FX	FITTING,LUBRICATION.....	4
6	PAFZZ	5315013612721	45152	1862720 W	PIN,STRAIGHT,HEADED HOOK ARM RETAINING.....	1
7	MOOZZ		45152	1394510-12	CHAIN WELDED MAKE FROM WELDED CHAIN, P/N 031-0424, 12.00 IN LG....	1
8	PAFZZ	4030014561150	35111	811	HOOK,CHAIN,S.....	1
9	PAFZZ	5310012162799	72447	330734	WASHER,FLAT 1.781 NOM.....	3
10	PAFZZ	5315009176226	96906	MS24665-15	PIN,COTTER.....	2
11	PAOZZ	5340013568373	45152	1862770	ROD,STRAIGHT,HEADLE PIVOT, HOOK ARM.....	1
12	PAFZZ	5340013559368	45152	1897980	BUMPER,NONMETALLIC.....	5
* 13	PAFZZ	5305010565448	52304	X-8S-601	SCREW 0.38-16 UNC X 0.50 IN LG....	2
14	PAFZZ	5310011290450	45152	351AX	WASHER,LOCK 0.382 NOM.....	2
15	PAFZZ	5310008800626	19207	10892331	WASHER,FLAT 0.406 NOM.....	2
16	PAFZZ	3040013564589	45152	1863010W	SHAFT,SHOULDERED.....	1
17	PAOZZ	5310013428595	45152	1598030	NUT,SELF-LOCKING,EX 0.500-13 UNC...	5
18	PAFZZ	5310014580248	2K272	W 12 LOCKWASHER	WASHER,KEY 2.412 ID NOM.....	2
19	PAFZZ	5310001856345	96906	MS19068-121	NUT,PLAIN,ROUND 2.360-18 UNC.....	2
20	MFFZZ		45152	1394510-018	CHAIN,WELDED MAKE FROM WELDED CHAIN, P/N 031-0424, 18 IN LG.....	1
21	PAOZZ	5315013553744	96652	28-04	PIN,STRAIGHT,HEADED.....	1
22	PAFZZ	2530013564614	45152	1860250 W	ARM ASSEMBLY,PIVOT, MAIN CYLINDER..	4
23	PAFZZ	5365013557358	45152	1862830	SPACER,RING 2.50 ID X 0.137 THK....	4
24	PAFZZ	5325008062357	96906	MS16624-1250	RING,RETAINING.....	4
25	PAFZZ	2530013564613	45152	1860310 W	ARM ASSEMBLY,PIVOT.....	4
26	PAFZZ	5365013557357	45152	1862820	SPACER,RING.....	4
27	PAFZZ	5325002006684	96906	MS16624-1315	RING,RETAINING.....	4
28	PAFZZ	3040013566837	45152	1862690W	SHAFT,SHOULDERED CYLINDER.....	1
29	PAFZZ	2510014538548	45152	3051121	FRAME SECTION,STRUC.....	1
30	PAFZZ	5310011505918	45152	110312A	NUT,SELF-LOCKING,EX 0.750-10 UNC...	6
31	PAFZZ		45152	3053913	SPACER,PLATE.....	4
32	PAFZZ		45152	3055129	SPACER,PLATE.....	4
33	PAFZZ	5305011553478	45152	1324980	SCREW,CAP,HEXAGON H 0.75-10 X 2.75 IN LG G8.....	6
34	PAOZZ	4030012580467	96906	MS51844-43	SWAGING SLEEVE,WIRE, PART OF P/N 1965220.....	2
35	MOOZZ		45152	1533100-22	ROPE,WIRE MAKE FROM WIRE ROPE, P/N 97840A66, 22 IN LG, PART OF P/N 1965220.....	2
36	PAFZZ		45152	3423024	PIN,STRAIGHT,HEADED.....	2
37	PAFZZ	5315013637062	45152	1965220	PIN,GROOVED,HEADED.....	2
38	PAFZZ		45152	3055132	FRAME,COMPRESSION.....	1
39	PAOZZ	5340012044888	84971	TA720-S8	CLAMP,LOOP.....	4
40	PAFZZ	5310013435712	10001	2533408-26	NUT,SELF-LOCKING,HE 0.750-10 UNC...	6
41	PAFZZ	5310010382294	81349	M12133/1-12P	WASHER,SPRING TENSI.....	48

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
* 42	PAFZZ	5310012144946	45152	2083HX	WASHER,FLAT 0.81 NOM.....	18
43	PAFZZ	5306010862368	45152	EE-103647	BOLT,MACHINE 0.750-10 UNC X 6.50 IN LG.....	6
44	PAFZZ	5310011110645	45152	110311A	NUT, SELF-LOCKING,EXB 0.625-11 UNC..	35
45	PAFZZ	5340014783050	45152	3053774	BRACKET,MULTIPLE AN REAR LH.....	1
45	PAFZZ	5340014783044	45152	3053775	BRACKET,MULTIPLE AN REAR RH.....	1
46	PAFZZ	5310010615301	45152	8865GX	WASHER, FLAT.....	28
47	PAFZZ	5305007247248	80204	B1821BH063C375N	BOLT, MACHINE.....	14
48	PAFZZ	5340014783063	45152	3301831	SPACER.....	35
49	PAFZZ		45152	3053776	BRACKET,MULTIPLE AN FRONT LH.....	1
50	PAFZZ	5305012741097	45152	55521AX	BOLT, MACHINE.....	4
51	PAFZZ	5305011167363	45152	62788AX	BOLT, MACHINE.....	4
52	PAFZZ	5310008098533	96906	MS27183-23	WASHER.....	4
53	PAFZZ		45152	3456089	BRACKET, LHS MTG, RH, FT.....	1
54	PAFZZ		45152	1455460	SPACER.....	4
55	PAFZZ	5310011505918	45152	110312A	NUT, SELF-LOCKING.....	4
56	PAFZZ	5306011505884	45152	115289A	BOLT,MACHINE 0.625-11 UNC X 1.50 IN LG.....	8
57	PAFZZ	2510014575270	45152	3056872	SUPPORT, MIDDLE FRAME NOSE.....	1

END OF FIGURE





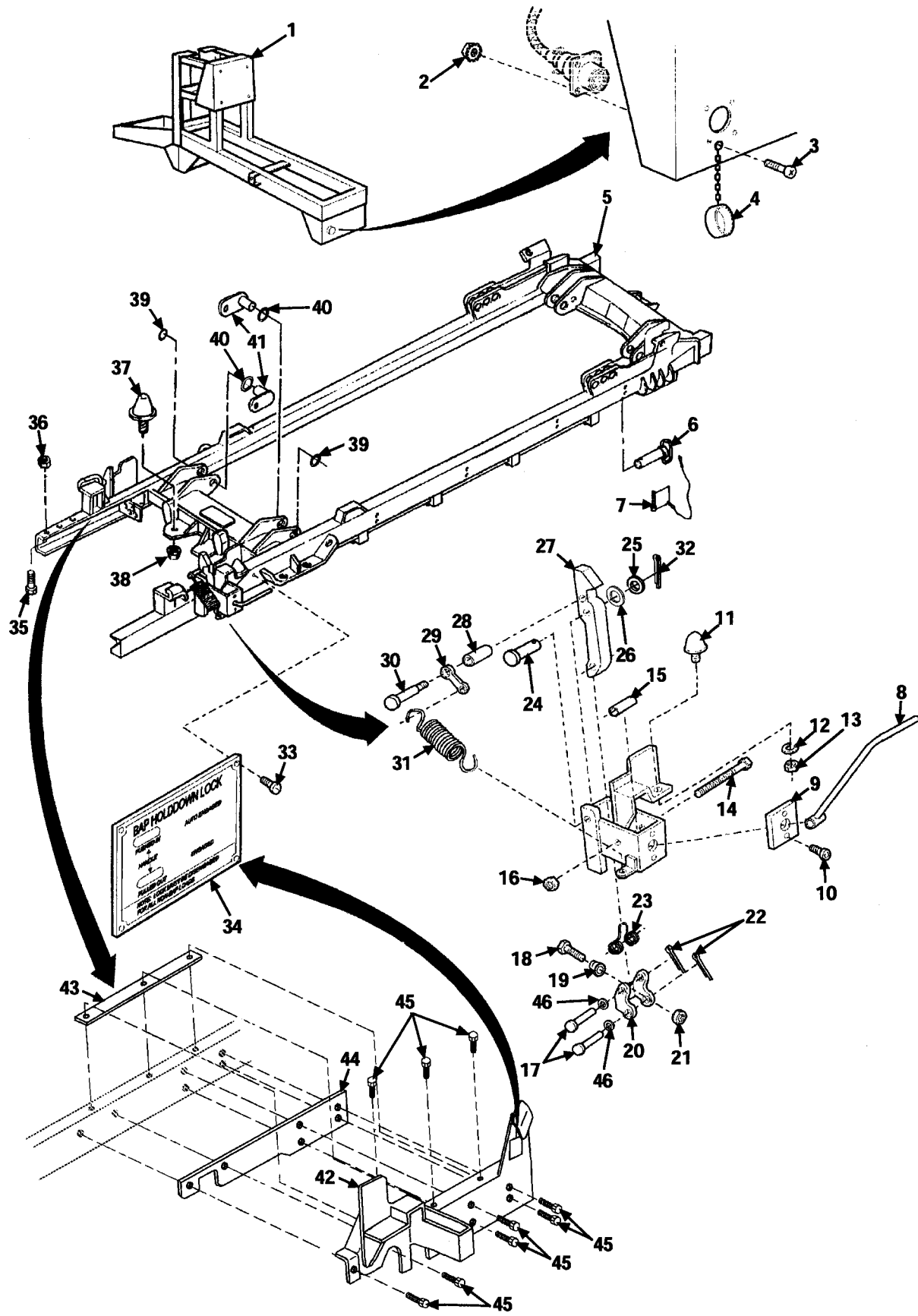


Figure 35. Compression Frame, Main Manifold Support Frame and Related Parts

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2100 LOAD HANDLING SYSTEM FIG. 35 COMPRESSION FRAME, MAIN MANIFOLD SUPPORT FRAME, AND RELATED PARTS						
1	PAOZZ	2510014575009	45152	3057007	FRAME, STRUCTURAL, VE.....	1
2	PAOZZ	5310005420087	78189	511-041810-01	NUT, PLAIN, ASSEMBLED 0.112-40 UNC...	8
3	PAOZZ	5305009836730	96906	MS35206-218	SCREW, MACHINE 0112-40 UNC X 0.625 IN LG.....	8
4	PAOZZ	5340013679122	71468	CA121003-9	CAP-PLUG, PROTECTIVE.....	2
5	PFFZZ	2510014538556	45152	3051376	FRAME SECTION, STRUC.....	1
* 6	PAOZZ		45152	3423024	PIN, STRAIGHT, HEADED TRANSPORT PINS.	2
7	PAOZZ	5315013637062	45152	1965220	PIN, GROOVED, HEADED.....	2
8	PAOZZ	5340014566964	45152	3138396	HANDLE, MANUAL CONTR.....	2
9	PAOZZ	5340014566969	45152	3145757	STRIKE, CATCH.....	2
10	PAOZZ	5305014566925	45152	51047AX	SCREW, SHOULDER 0.31-18 UNC X 0.38 NOM.....	4
11	PAOZZ	5340014587192	30966	3131197	BUMPER, NONMETALLIC.....	2
12	PAOZZ	5310011332130	45152	355AX	WASHER, LOCK 0.50 NOM.....	2
13	PAOZZ	5310010570822	45152	1768HX1	NUT, PLAIN, HEXAGON 0.500-13 UNC.....	2
14	PAOZZ	5305012275660	45152	36850AX	SCREW, CAP, HEXAGON H 0.250-20 UNC X 3.00 IN LG.....	2
15	MOOZZ		97403	13221E4806-1-2.1 25	HOSE, NONMETALLIC MAKE FROM HOSE, NONMETALLIC, P/N 13221E4806-1, 2.125 IN LG.....	4
16	PAOZZ	5310010666759	72962	21NE-040	NUT, SELF-LOCKING, HE 0.250-20 UNC...	2
17	PAOZZ	5315014582064	96652	11-043	PIN, STRAIGHT HEADLE 0.25 X 1.50 IN LG.....	4
18	PAOZZ	5305012498564	45152	59031AX	SCREW, MACHINE 0.190-24 UNC X 0.750 IN LG.....	2
19	PAOZZ	5340014558403	7B735	CCN-91001	BUMPER, NONMETALLIC.....	2
20	PAOZZ	2590014589395	45152	3138348	LINK ASSEMBLY, COUPL.....	2
21	PAOZZ	5310002081918	88044	AN365-1024A	NUT, SELF-LOCKING, HE 0.190-24 UNC...	2
22	PAOZZ	5315008423044	96906	MS24665-283	PIN, COTTER 0.750 X 0.090 NOM.....	4
23	PAOZZ	5360014565633	45152	3149272	SPRING, HELICAL, TORS.....	2
24	PAOZZ	5315012886747	96652	11-289	PIN, STRAIGHT, HEADED 0.74 OD X 3.0 IN LG.....	2
25	PAOZZ	5310012144946	45152	2083HX	WASHER, FLAT 0.750 NOM.....	2
26	PAOZZ		45152	3234843	WASHER, SPACER.....	2
27	PAOZZ	5340014578923	45152	3130933	LEVER, LOCK-RELEASE.....	2
28	PAOZZ		45152	3234830	TUBE, SPACER.....	2
29	PAOZZ	2590014589401	45152	3130939	LINK ASSEMBLY, COUPL.....	2
30	PAOZZ		45152	3234829	SCREW, SHOULDER 0.31-18 UNC X 2.00 IN LG.....	2
31	PAOZZ	5360014566943	45152	3129059	SPRING, HELICAL, EXTE.....	2
32	PAOZZ	5315013771554	45152	356AX	PIN, COTTER 0.12 X 1.25.....	2
33	PAOZZ	5305012107413	8A932	1146173	SCREW, DRIVE 0.116 X 0.190.....	8
34	PFOZZ	9905014571710	45152	3153187	PLATE, INSTRUCTION BAP HOLDDOWN LOCK.....	2
35	PAFZZ	5305011507736	45152	115293A	SCREW, CAP, HEXAGON H 0.50-13 X 1.50 IN LG.....	6

C03

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
36	PAFZZ	5310011598178	45152	110310A	NUT, SELF-LOCKING, EX 0.50-13 UNC....	6
* 37	PAOZZ	5340013559368	45152	1897980	BUMPER, NONMETALLIC.....	2
* 38	PAOZZ	5310013428595	45152	1598030	NUT, SELF-LOCKING, EX 0.500-13 UNC...	2
* 39	PAFZZ	5325008062357	96906	MS16624-1250	RING, RETAINING.....	2
* 40	PAFZZ	5365013557358	45152	1862830	SPACER, RING.....	2
* 41	PAFZZ	2530013564614	45152	1860250 W	ARM ASSEMBLY, PIVOT.....	2
* 42	PFOZZ		45152	3274525	BRACKET RH (MODEL B ONLY).....	1
* 42	PFOZZ		45152	3274524	BRACKET LH (MODEL B ONLY).....	1
* 43	PFOZZ		45152	3274653	SHIM (MODEL B ONLY).....	2
* 44	PFOZZ		45152	3276180	SHIM (MODEL B ONLY).....	2
* 45	PAOZZ	5305013574683	52167	WHO612TB	SCREW, CAP, HEXAGON H 0.50-13 X 1.00 IN LG G8 (MODEL B ONLY).....	18
* 46	PAOZZ	5310008094058	96906	MS27183-10	WASHER FLAT 0.281 NOM.....	8

END OF FIGURE



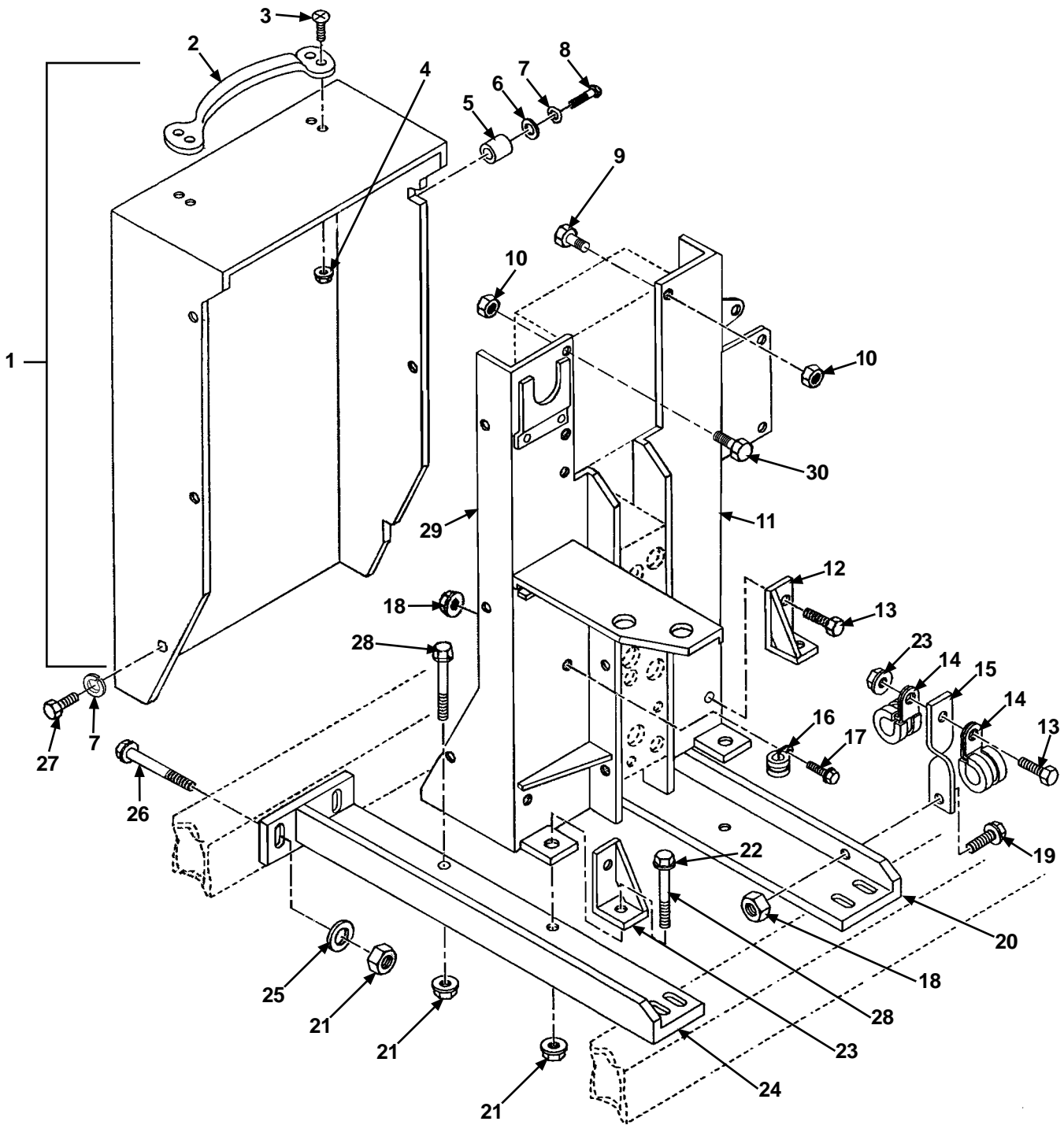


Figure 35A. LHS Main Manifold & Junction Box Mounting (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2100 LOAD HANDLING SYSTEM FIG. 35A MAIN MANIFOLD AND JUNCTION BOX MOUNTING (MODEL B ONLY)						
* 1	PFOZZ		45152	1883460U	COVER,ACCESS.....	1
* 2	PAOZZ	5340011687285	57733	752023	HANDLE,BOW PART OF P/N 1883460U....	1
* 3	PAOZZ	5305009585246	80205	MS35190-289	SCREW,MACHINE 0.250-20 UNC X .719 IN LG, PART OF P/N 1883460U.....	4
* 4	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC PART OF P/N 1883460U.....	4
* 5	PAFZZ	5365013943553	45152	2063940	SPACER,SLEEVE.....	2
* 6	PAFZZ	5310001670767	80205	AN970-5	WASHER,FLAT 0.318 I.D. X 1.365 O.D.	2
* 7	PAOZZ	5310010688446	45152	354AX	WASHER,LOCK.....	6
* 8	PAFZZ	5305010621017	45152	1367HX1	SCREW,CAP,HEXAGON H.....	2
* 9	PAFZZ	5305004703321	96906	MS51849-74	SCREW,CAP,HEXAGON H 0.190-24 X 0.50 IN LG (MODEL A ONLY).....	4
* 9	PAFZZ	3505013448899	52167	WC0210PB	SCREW,MACHINE 0.250-20 UNC X 0.750 IN LG (MODEL B ONLY).....	3
* 10	PAFZZ	5310010666759	72962	21NE-040	NUT,SELF-LOCKING HE 0.250-20 UNC....	4
* 11	PFFZZ	5340013555268	45152	1862530 W	BRACKET,MOUNTING.....	1
* 12	PAFZZ	5340013942420	45152	2048840W	BRACKET,ANGLE RH.....	1
* 13	PAFZZ	5306012875714	52167	WC0412PB	BOLT,MACHINE 0.382-16 UNC X 1.00 IN LG, G5.....	3
* 14	PAOZZ	5340004044100	75272	COV2113	CLAMP,LOOP 1.250 NOM.....	2
* 15	PAOZZ	5342011750316	45152	3737FX3	CLIP,BRACKET,HEATER.....	1
* 16	PAFZZ	5340013175450	53606	CJV-0809	CLIP,SPRING TENSION.....	1
* 17	PAFZZ	5305013448899	45152	1606140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	1
* 18	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC....	9
* 19	PAOZZ	5305013379120	45152	1754140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.00 IN LG, G5.....	1
* 20	PFFZZ		45152	3053657	BRACKET,DOUBLE ANGL.....	1
* 21	PAOZZ	5310012881116	82458	T893R	NUT,SELF-LOCKING,EX 0.382-16 UNC....	19
* 22	PAFZZ	5305013405061	45152	1754280	SCREW,CAP,HEXAGON H 0.375-16 UNC X 1.50 IN LG.....	4
* 23	PFFZZ	5340013942421	45152	2048850W	BRACKET,ANGLE LH.....	1
* 24	PFFZZ		45152	3053658	BRACKET,DOUBLE ANGL.....	1
* 25	PAOZZ	5310010623379	45152	362-AX	WASHER,FLAT 0.406 I.D. X 0.812 O.D.	8
* 26	PAOZZ	5305011188860	96906	MS51105-367	SCREW,CAP,HEXAGON H 0.375-16 UNC X 2.75 IN LG.....	8
* 27	PAOZZ	5305013551428	45152	50619AX	SCREW,CAP,HEXAGON H.....	4
* 28	PAOZZ	5306012875715	52167	WC0414PB	BOLT,MACHINE 0.38-16 X 1.25 IN LG, G5.....	4
* 29	PFFZZ	5340013555259	45152	1862510 W	BRACKET,MOUNTING.....	1
* 30	PAFZZ	5305014289165	45152	1507220	SCREW,MACHINE 0.250-20 UNC X 1.00.. IN LG.....	1

END OF FIGURE

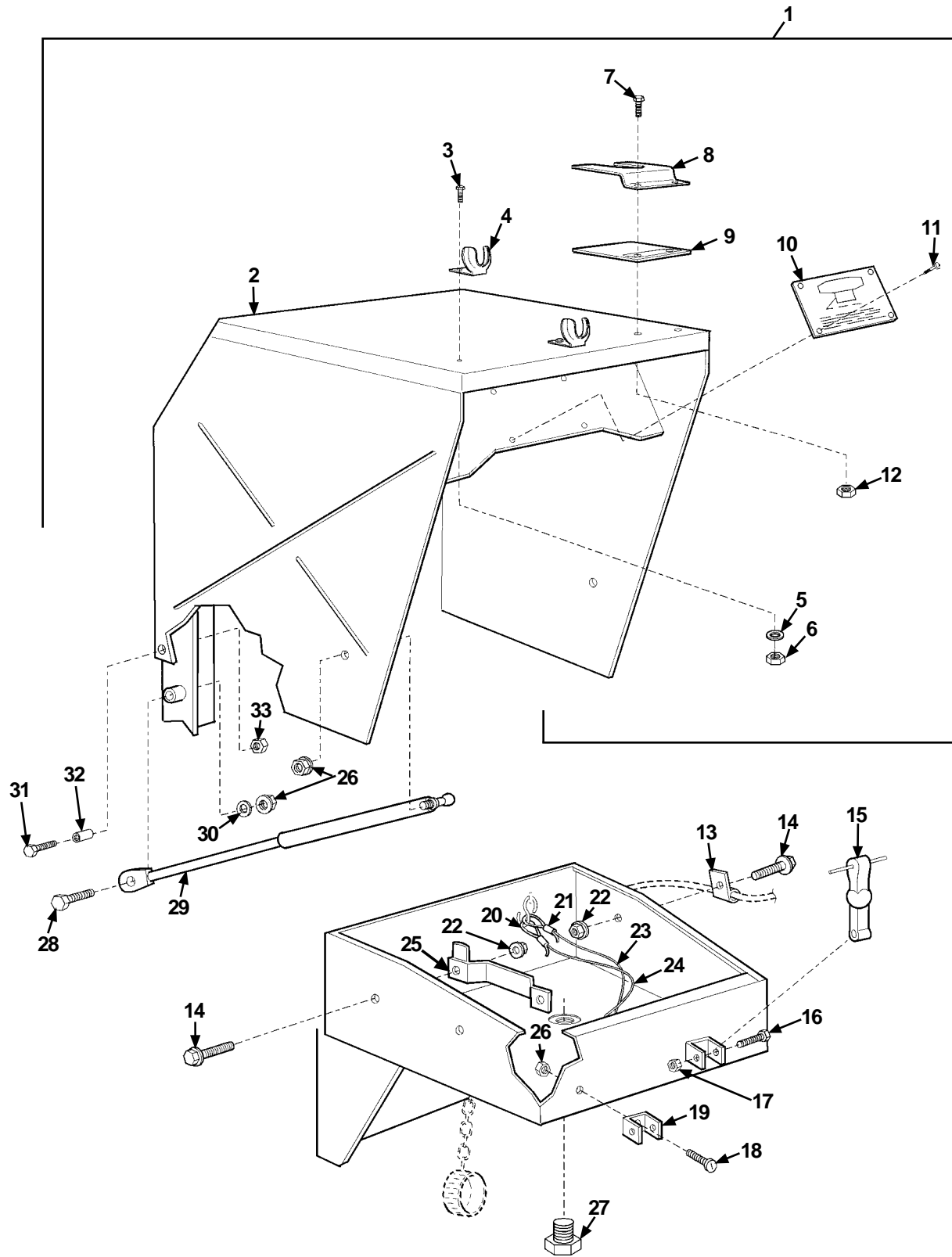


Figure 36. Hydraulic Cover Assembly and Related Parts (Model A Only)



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2110 COVER ASSEMBLY FIG. 36 HYDRAULIC COVER ASSEMBLY AND RELATED PARTS (MODEL A ONLY)						
* 1	PBOZZ	5342014538560	45152	3065633	DOOR,ACCESS.....	1
* 2	PAOZZ		45152	3060630	DOOR,ACCESS PART OF P/N 3065633....	1
* 3	PAOZZ	5305009846210	96906	MS35206-263	SCREW,MACHINE 0.190-24 UNC X 0.500 IN LG, PART OF P/N 3065633....	4
* 4	PAOZZ	5340010921637	74687	028-561	HOOK,SUPPORT PART OF P/N 3065633...	2
* 5	PAOZZ	5310013618388	45152	1379HX	WASHER,FLAT 0.190, PART OF P/N 3065633.....	4
* 6	PAOZZ	5310002081918	88044	AN365-1024A	NUT,SELF-LOCKING,HE 0.190-24 UNC, PART OF P/N 3065633.....	4
* 7	PAOZZ	5305013448899	45152	1606140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG, PART OF P/N 3065633..	5
* 8	PAOZZ	5340013637320	45152	1779140	BRACKET,DOUBLE ANGL PART OF P/N 3065633.....	1
* 9	PAOZZ	5340014587187	45152	3128740	BRACKET,MOUNTING PART OF P/N 3065633.....	1
* 10	PFOZZ	7690014556357	45152	3074871	LABEL MANUAL OVERRIDE, PART OF P/N 3065633.....	1
* 11	PAOZZ	5320013515621	3Z048	BTT43	RIVET,BLIND 0.125 X 0.294, PART OF P/N 3065633.....	4
* 12	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC, PART OF P/N 3065633.....	2
13	PAOZZ	5340008338476	96906	MS21333-122	CLAMP,LOOP.....	1
14	PAOZZ	5305013448899	45152	1606140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	3
15	PAOZZ	2540011527764	64386	67D794	LATCH,HOOD,VEHICULA.....	2
* 16	PAOZZ	5305012038360	45152	1337630	SCREW,CAP,HEXAGON H 0.250-20 UNC 1.750 IN LG.....	2
17	PAOZZ	5310010666759	72962	21NE-040	NUT,SELF-LOCKING,HE 0.250-20 UNC...	2
18	PAOZZ	5305010621017	45152	1367HX1	SCREW,CAP,HEXAGON H 0.31-18 X 0.750 IN LG.....	2
19	PAOZZ	5340011566776	64386	277-A-80-1	STRAP,RETAINING.....	2
* 20	PAOZZ	5340013032997	39428	90177A216	HOLDER,KEY 0.750.....	2
21	PAOZZ	4030012580467	96906	MS51844-43	SWAGING SLEEVE,WIRE.....	4
* 22	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC...	3
23	MOOZZ		45152	1533100-12	ROPE,WIRE MAKE FROM WIRE ROPE, P/N 97840A66, 12 IN LG.....	1
24	MOOZZ		45152	1533100-18	ROPE,WIRE MAKE FROM WIRE ROPE, P/N 97840A66, 18 IN LG.....	1
* 25	PFFZZ	5340014578921	45152	3065636	BRACKET,MOUNTING BRACKET.....	1
* 26	PAOZZ	5310010815351	11939	93604342	NUT 0.31-18 UNC.....	6
27	PAOZZ	5365012174133	01276	900598-8S	PLUG,MACHINE THREAD 0.75-16 UNC....	1
28	PAOZZ	5306011653256	45152	1911HX1	BOLT,MACHINE 0.312-18 UNC X 2.250 IN LG.....	2
29	PAOZZ	2540014214686	19220	EAA-8600U	CYLINDER ASSEMBLY,R.....	2

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
* 30	PAOZZ	5310010617452	45152	1804HX	WASHER,FLAT 0.344 NOM.....	2
31	PAOZZ	5305007813928	80204	B1821BH038C400N	SCREW,CAP,HEXAGON H 0.38-16 X 4.00 IN LG.....	2
* 32	PAOZZ		2K272	GLY.PGZ 0606A	BUSHING BLANK.....	2
* 33	PAOZZ	5310011774625	45152	108708A	NUT,SELF-LOCKING,HE 0.375-16 UNC...	2

END OF FIGURE





## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2200 LHS ELECTRICAL						
FIG. 37 MAIN JUNCTION BOX						
(MODEL A ONLY)						
1	PFOZZ		0EUT9	MCL 0116360900	TERMINAL BOX.....	1
2	PAOZZ	5975001521075	56501	141	LOCKNUT,ELECTRICAL 0.50-14 NPT.....	13
3	PAOZZ	5330005880892	56501	5262	O-RING.....	13
4	PAOZZ	5975005199060	49367	DB-9	BOX CONNECTOR,ELECT 0.500 NPT.....	3
5	PAOZZ	5975012070230	81992	SHC-1022	BOX CONNECTOR,ELECT 0.500 NPT X 0.25 CORD.....	10
6	PAOZZ	5310013527732	45152	1571870	NUT,SELF-LOCKING,AS NO.6-32 UNC....	4
7	PAOZZ	5310008094058	96906	MS27183-10	WASHER,FLAT 0.281 NOM.....	4
8	PAOZZ	5310010583183	45152	767HX1	NUT,PLAIN,HEXAGON 0.250-20 UNC.....	4
9	PAOZZ	5305009889265	96906	MS35206-286	SCREW,MACHINE 0.250-20 UNC X 1.750 IN LG.....	4
10	PAOZZ	5305008893001	96906	MS35206-231	SCREW,MACHINE 0.138-32 UNC X 0.625 IN LG.....	4
11	PAOZZ	5940014581013	45152	3065846	TERMINAL JUNCTION B.....	2
* 12	MOOZZ		45152	1927FX-AR	WIRE ASSEMBLY MAKE FROM WIRE, P/N 1927FX, LENGTH AS REQUIRED.....	11
* 13	PAOZZ	5940001434780	96906	MS25036-108	TERMINAL, RING.....	22

END OF FIGURE

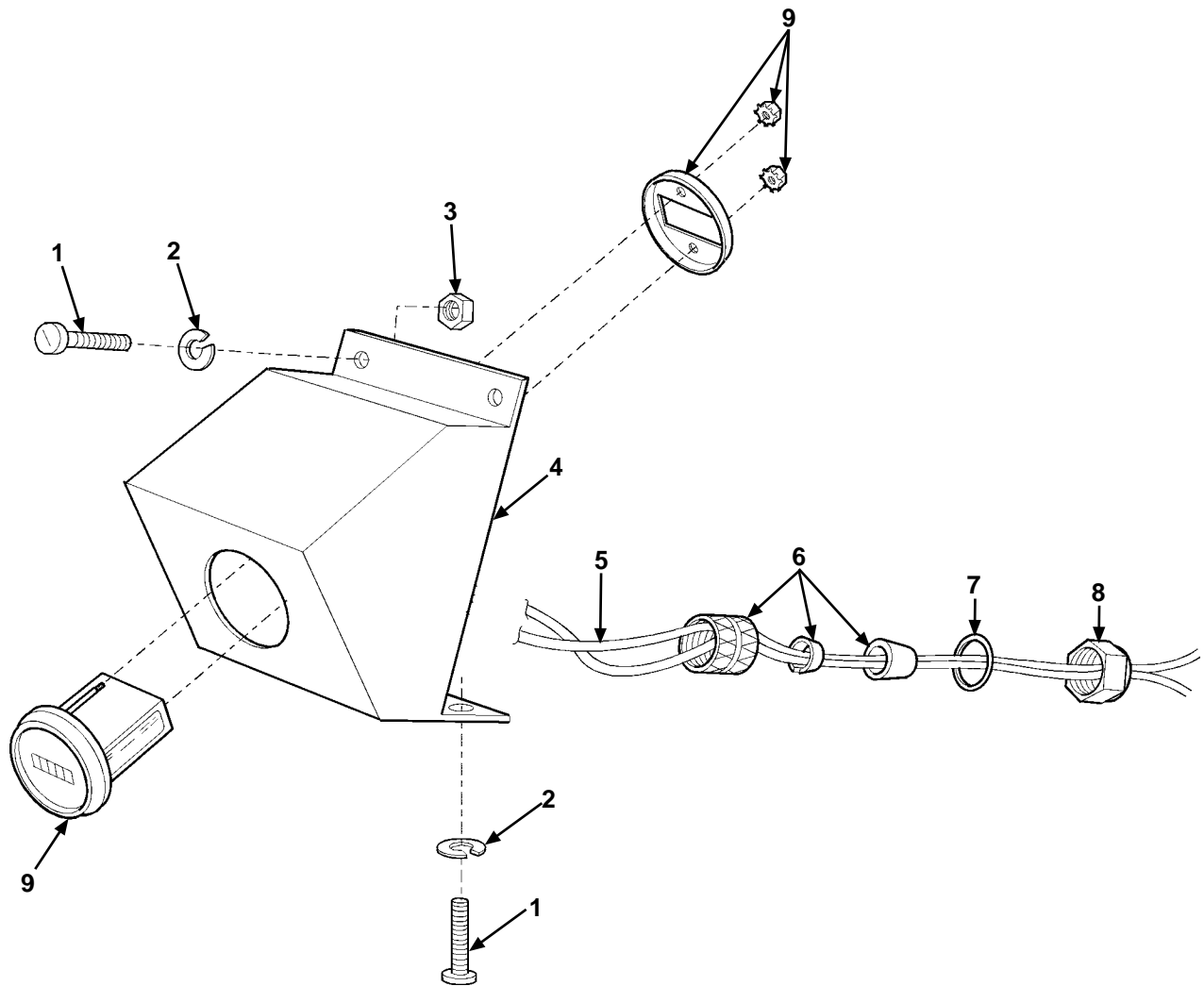


Figure 38. Hourmeter and Related Parts (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2200 LHS ELECTRICAL FIG. 38 HOURMETER AND RELATED PARTS (MODEL A ONLY)						
1	PAOZZ	5306011456949	11757	378429-8	BOLT, SELF-LOCKING 0.250-20 X 0.750 IN LG.....	4
* 2	PAOZZ	5310010614480	96906	MS35338-44	WASHER, LOCK 0.250 NOM.....	4
3	PAOZZ	5310010666759	72962	21NE-040	NUT, SELF-LOCKING, HE 0.250-20 UNC...	2
* 4	PFOZZ	6680014576644	45152	3071910	HOUSING, GAGE HOURMETER.....	1
* 5	PAOZZ	6150014584842	45152	3071958	WIRING HARNESS, BRAN HOURMETER.....	1
6	PAOZZ	5975012070230	81992	SHC-1022	BOX CONNECTOR, ELECT.....	1
7	PAOZZ	5330005880892	56501	5262	O-RING.....	1
8	PAOZZ	5975001521075	56501	141	LOCKNUT, ELECTRICAL 0.50 X 14 NPT...	1
* 9	PAOZZ	6645014173524	74400	85006	METER, TIME TOTALIZI.....	1

END OF FIGURE

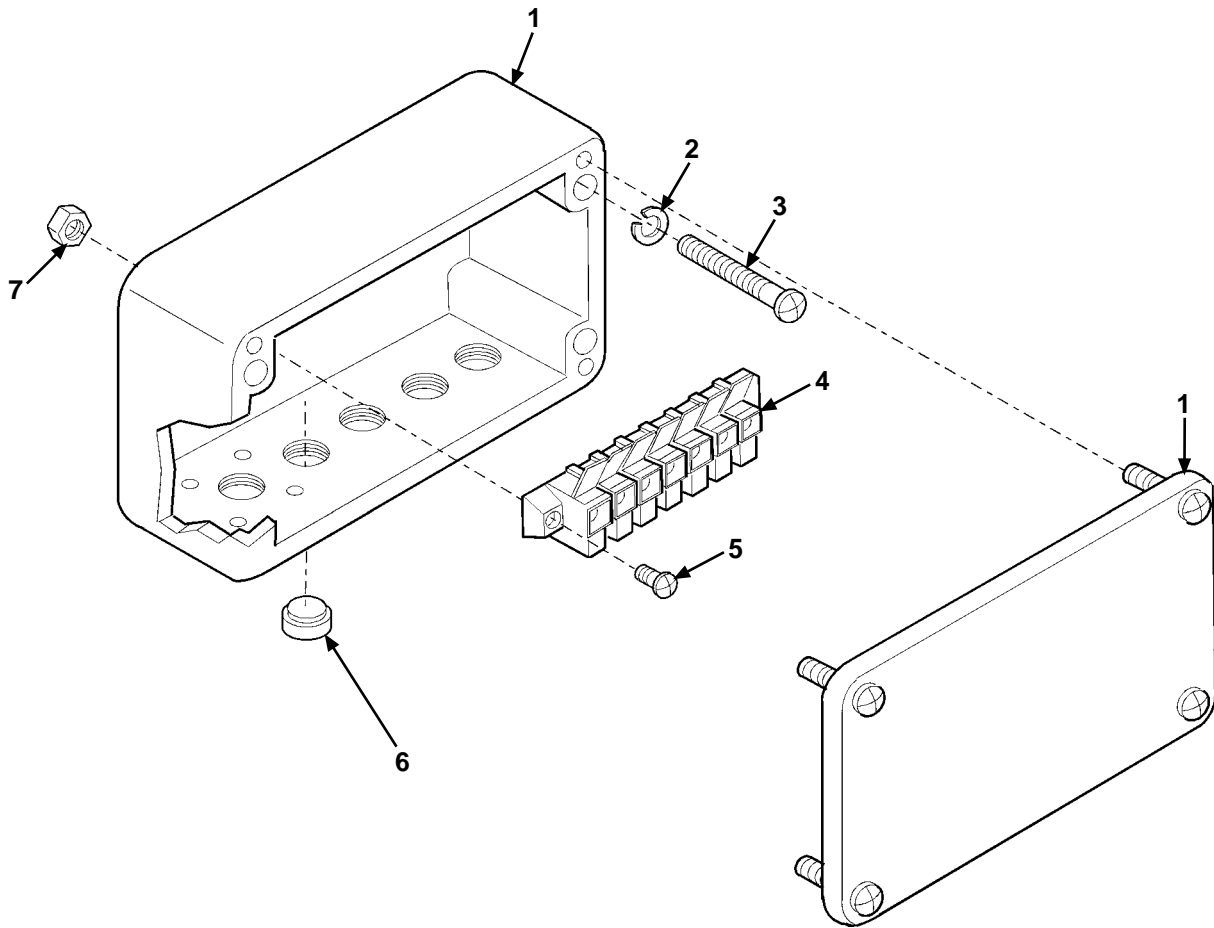


Figure 39. Main Frame Junction Box



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2200 LHS ELECTRICAL						
FIG. 39 MAIN FRAME JUNCTION BOX						
1	PBOZZ	5940013581127	45152	1891540	TERMINAL BOX.....	1
* 2	PAOZZ	5310007755139	35510	2434	WASHER, LOCK 0.198 NOM.....	4
3	PAOZZ	5305009846216	96906	MS35206-269	SCREW, MACHINE 0.190-24 UNC X 1.50 IN LG.....	4
4	PAOZZ	5940013579199	71400	A 203107-NL	TERMINAL STRIP, GROU.....	1
5	PAOZZ	5305008893001	96906	MS35206-231	SCREW, MACHINE 0.138-32 UNC X 0.625 IN LG.....	2
* 6	PAOZZ	4730010712875	03743	PLG-50RA	PLUG, PIPE (MODEL A ONLY).....	1
7	PAOZZ	5310013527732	45152	1571870	NUT, SELF-LOCKING, AS 0.138-32 UNC...	2
END OF FIGURE						

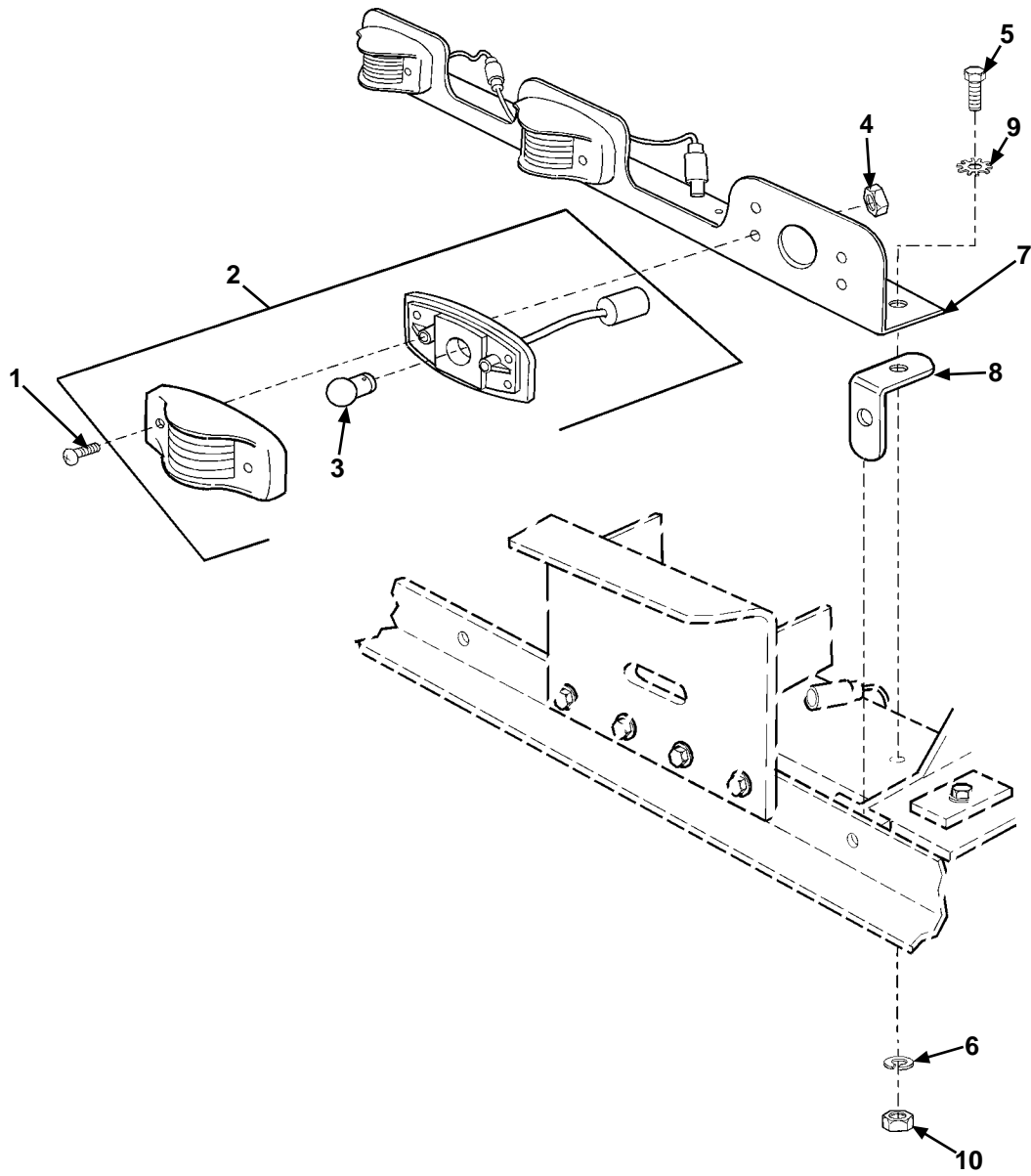


Figure 40. Rear Marker Lights (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2210 CHASSIS ELECTRICAL						
FIG. 40 REAR MARKER LIGHTS						
(MODEL A ONLY)						
1	PAOZZ	5305012498564	45152	59031AX	SCREW,MACHINE 0.190-24 UNC X 0.75 IN LG.....	2
* 2	PAOZZ	6220007261916	96906	MS35423-2	LIGHT,MARKER,CLEARE.....	3
* 3	PAOZZ	6240001558717	81348	W-L-00111/60	LAMP,INCANDESCENT PART OF P/N MS35423-2.....	1
* 4	PAOZZ	5310012885096	45152	1571850	NUT,SELF-LOCKING,AS 10-24 UNC.....	6
5	PAOZZ	5306012875715	52167	WC0414PB	BOLT,MACHINE 0.382-16 UNC X 1.25 IN LG, G5.....	3
6	PAOZZ	5310000611258	96906	MS45904-76	WASHER,LOCK 0.391 NOM.....	3
* 7	PAOZZ	5305012498564	45152	3133645	PLATE,MOUNTING COMPOSITE LIGHT.....	2
* 8	PAOZZ	5340014571221	45152	3127559	BRACKET,ANGLE.....	3
9	PAOZZ	5310006379541	96906	MS35338-46	WASHER,LOCK 0.375 NOM.....	3
* 10	PAOZZ	5310012881116	82458	T893R	NUT,SELF-LOCKING,EX 0.382-16 UNC, G5.....	14

END OF FIGURE

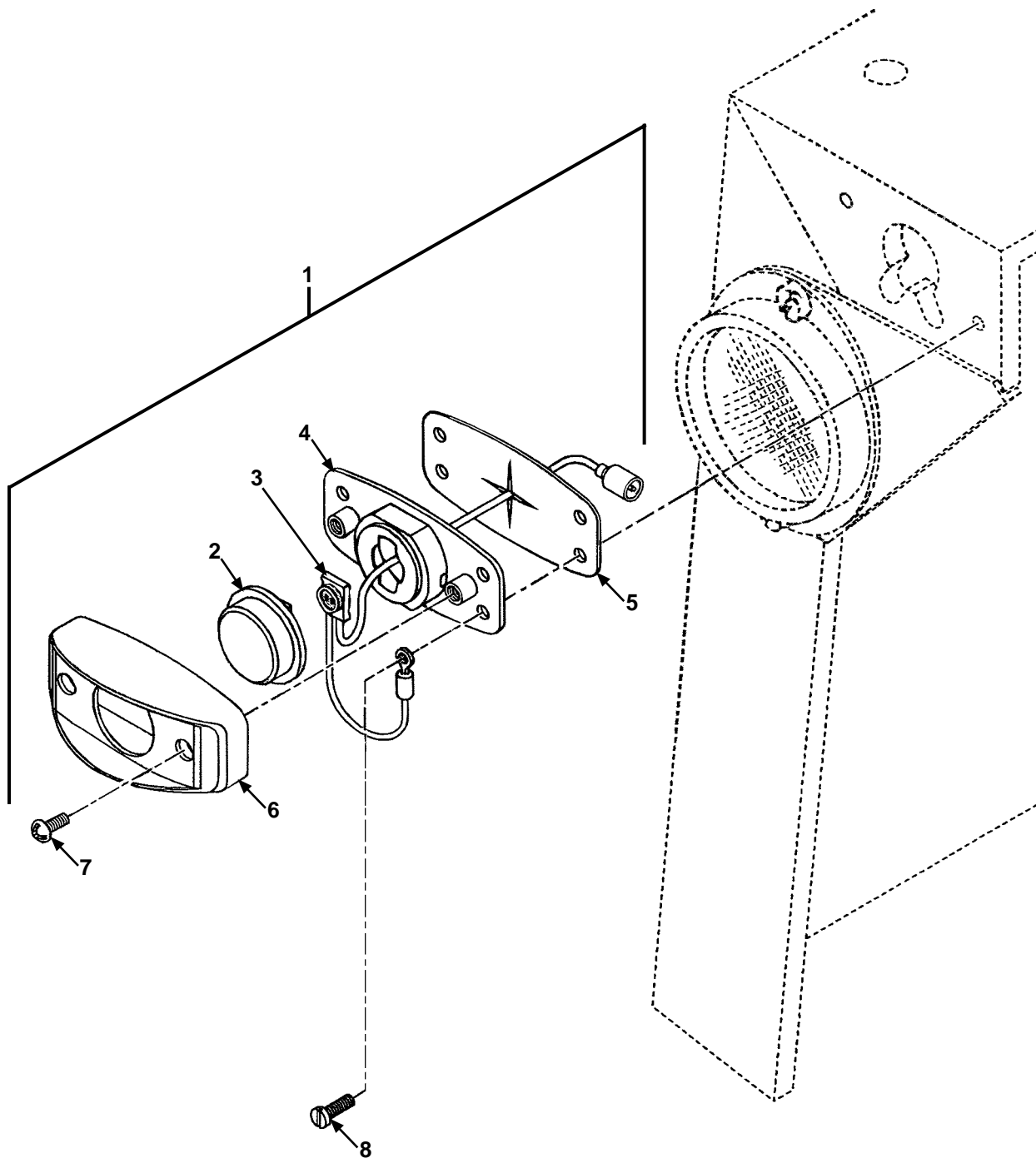


Figure 40A. Rear Clearance Lights (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2210 CHASSIS ELECTRICAL FIG. 40A REAR CLEARANCE LIGHTS (MODEL B ONLY)						
* 1	PAOOO		13548	07196	LIGHT, MARKER, CLEAR LED, AMBER.....	2
* 2	PAOZZ	5980014592073	13548	30250Y	.LIGHT EMITTING, DIOD LED, AMBER....	1
* 3	PAOZZ	6150014591811	13548	94626	.LEAD ASSEMBLY, ELECT.....	1
* 4	PAOZZ		13548	07197	.BASE, MOUNTING.....	1
* 5	PAOZZ		13548	5370	.GASKET, MOUNTING.....	1
* 6	XAOZZ		13548	07198	.BRACKET, OUTER.....	1
* 7	PAOZZ	5305000593660	96906	MS51958-64	.SCREW, MACHINE 3/8 DIA X 32 UNF, 2A RH, 5/8 IN LG.....	2
* 8	PAOZZ	5305013522066	93907	B71-10015-002	SCREW, TAPPING.....	4
END OF FIGURE						

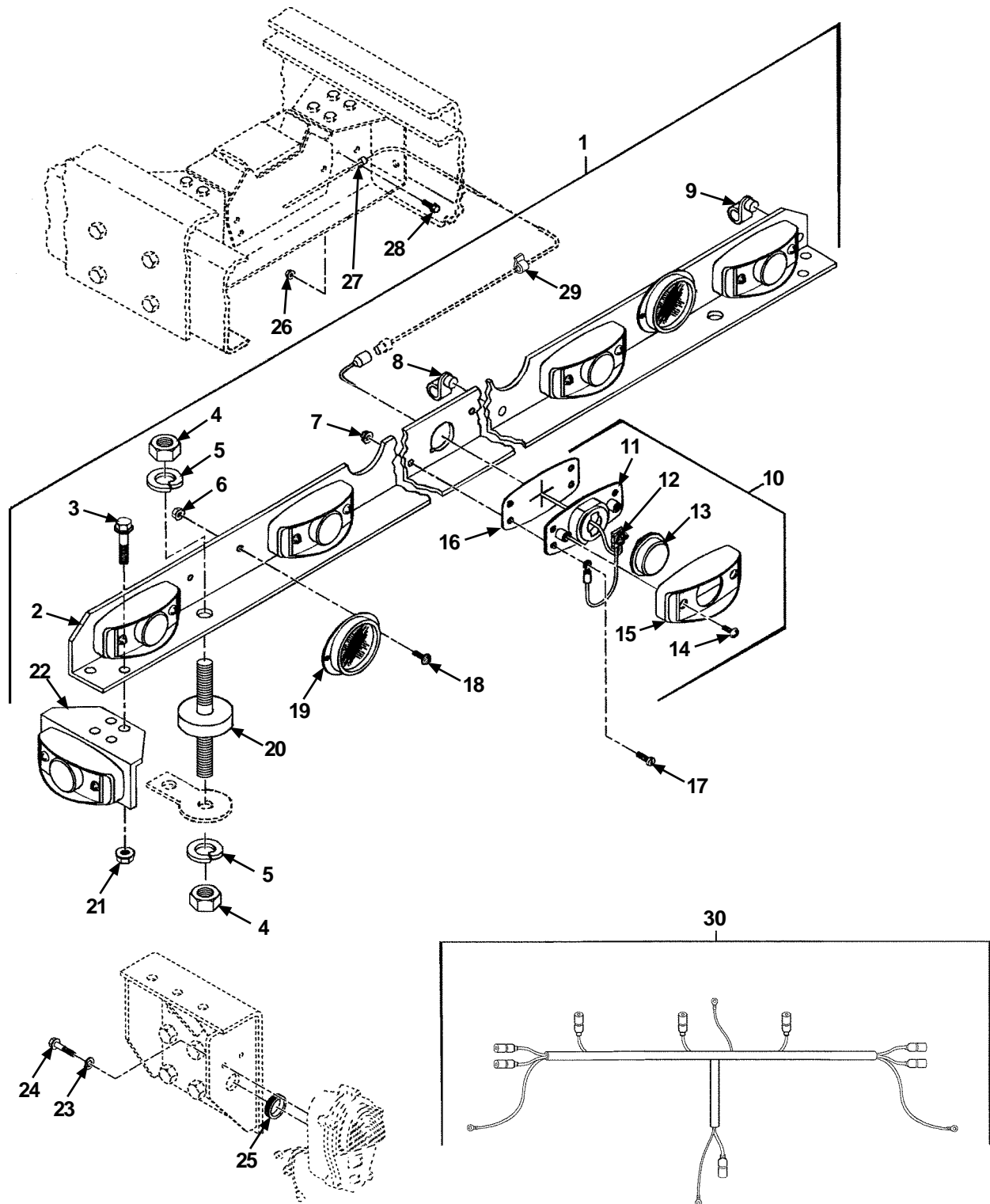


Figure 40B. Rear Light Bar Assembly (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2210 CHASSIS ELECTRICAL FIG. 40B REAR LIGHT BAR ASSEMBLY (MODEL B ONLY)						
* 1	PAOOO		45152	3153166	LIGHT BAR ASSEMBLY REAR.....	1
* 2	PFOZZ		45152	3154864	.BAR,REAR LIGHT.....	1
* 3	PAOZZ	5305013448899	45152	1606140	.SCREW,CAP,HEXAGON H 0.250-20 UNC X 0.750 IN LG.....	4
* 4	PAOZZ	5310010638970	45152	434-A	.NUT,PLAIN,HEXAGON 3/8 HOLE DIA, 16 UNC, 2B RH.....	4
* 5	PAOZZ	5310011290450	45152	351AX	.WASHER,LOCK 0.382 NOM.....	4
* 6	PAOZZ	5310010666759	72962	21NE-040	.NUT,SELF-LOCKING,HE 0.250-20 UNC..	4
* 7	PAOZZ	5310012885096	78519	1571850	.NUT,SELF-LOCKING,AS 3/8 DIA HOLE, 24 UNC, 2B RH W/ASSEMBLED WASHER....	14
* 8	PAOZZ	5340014191315	83014	H360K2598	.CLAMP,LOOP.....	4
* 9	PAOZZ	5340012248368	83014	H360-6-2	.CLAMP,LOOP.....	2
* 10	PAOOO		13548	07195	.LIGHT,MARKER,CLEARA LED, RED.....	7
* 11	XAOZZ		13548	07197	..BASE,MOUNTING.....	1
* 12	PAOZZ	6150014591811	13548	94626	..LEAD ASSEMBLY,ELECT.....	1
* 13	PAOZZ	5980014591848	13548	30250R	..LIGHT EMITTING DIOD LED, RED.....	1
* 14	PAOZZ	5305000593660	96906	MS51958-64	..SCREW,MACHINE 3/8 DIA X 32 UNF, 2A RH, 5/8 IN LG.....	2
* 15	XAOZZ		13548	07198	..BRACKET,OUTER.....	1
* 16	PAOZZ		13548	5370	..GASKET,MOUNTING.....	1
* 17	PAOZZ	5305012498564	45152	59031AX	.SCREW,MACHINE 0.190-24 UNC X 0.750 IN LG.....	14
* 18	PAOZZ	5305011555237	45152	1434HX	.SCREW,MACHINE 1/4 X 20 UNC, 2A RH, 1/2 IN LG.....	4
* 19	PAOZZ	9905002052795	96906	MS35387-1	.RELFECTOR,INDICATIN RED.....	2
* 20	PAOZZ	5342013849511	42366	16282B-35005	.MOUNT,RESILIENT.....	2
* 21	PAOZZ	5310013469445	45152	1600460	.NUT,SELF-LOCKING,CL 0.250-20 UNC..	4
* 22	PAOZZ	5340013586695	45152	1867670	.BRACKET,ANGLE.....	2
* 23	PAOZZ	5310000611258	96906	MS45904-76	WASHER,LOCK.....	4
* 24	PAOZZ	5306010845390	78500	S-268-1	BOLT,MACHINE 3/8 DIA, 16 UNC, 2A RH, 1 IN LG.....	4
* 25	PAOZZ	5325009259838	70485	559	GROMMET,NONMETALLIC.....	2
* 26	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL .25-20 UNC.....	1
* 27	PAOZZ	5340009265334	96906	MS21333-21	CLAMP,LOOP.....	1
* 28	PAOZZ	5305013379120	45152	1754140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.00 IN LG G5.....	1
* 29	PAOZZ	5975013864837	96906	MS3368-1-9E	CLAMP,LOOP.....	10
* 30	PFOZZ		45152	3276347	HARNESS,WIRING,ELEC REAR LIGHT BAR ASSEMBLY.....	1

END OF FIGURE

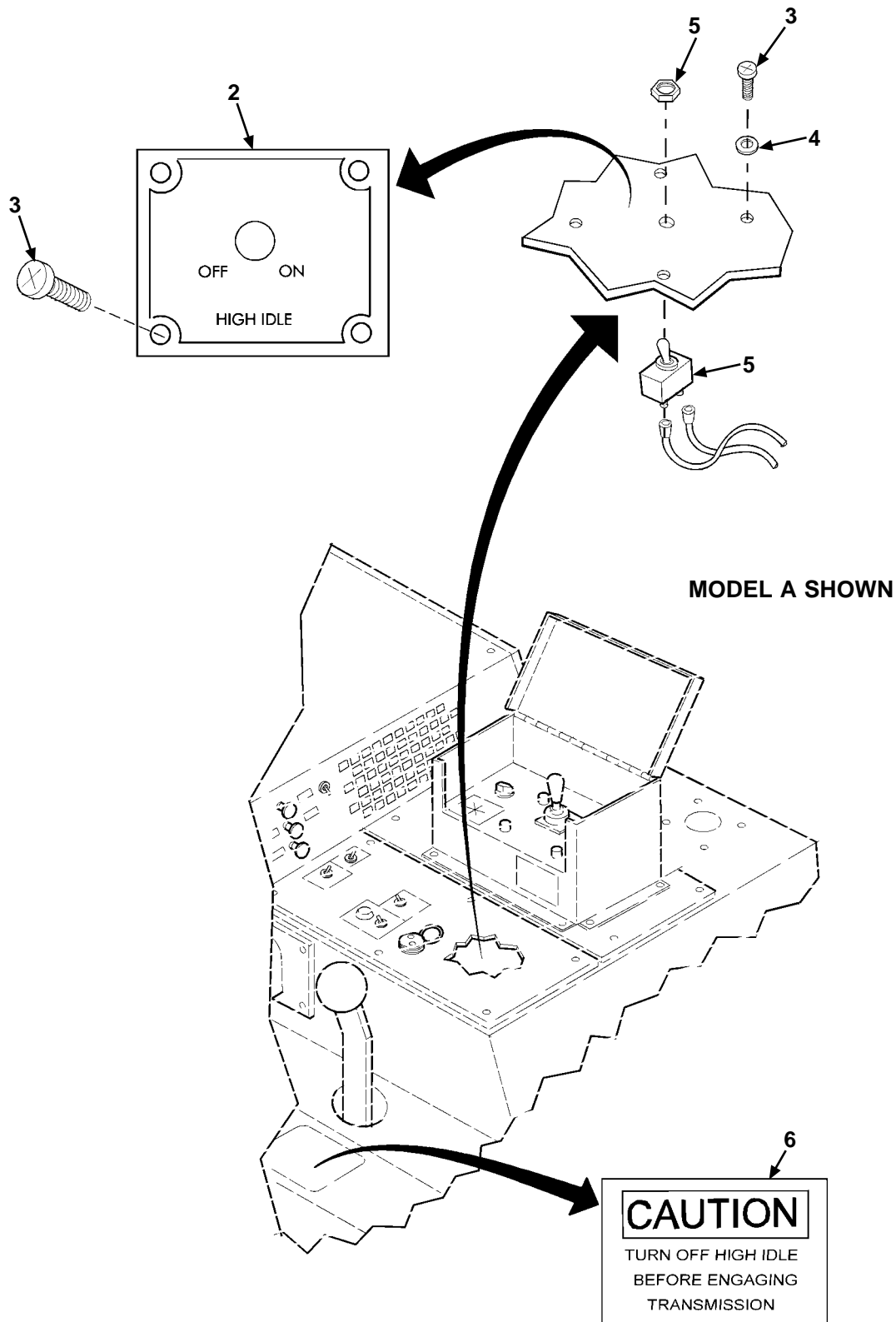


Figure 41. High Idle Switch



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2210 CHASSIS ELECTRICAL						
FIG. 41 HIGH IDLE SWITCH						
* 1	PAOZZ	5305011664410	088A2	45A115-P29	SCREW,MACHINE.....	3
* 2	PFOZZ	7690014586990	45152	3119531	LABEL HIGH IDLE.....	1
* 3	PAOZZ	5305002535614	80205	MS21318-20	SCREW,DRIVE 0.114 X 2.00 NOM.....	4
* 4	PAOZZ	5310007755139	35510	2434	WASHER,LOCK 0.31 NOM.....	6
5	PAOZZ	5930007817101	96906	MS24658-22G	SWITCH,TOGGLE WITH NUT.....	1
* 6	PFOZZ	7690014556358	45152	3063846	LABEL TRANSMISSION CAUTION, HIGH IDLE.....	1

END OF FIGURE

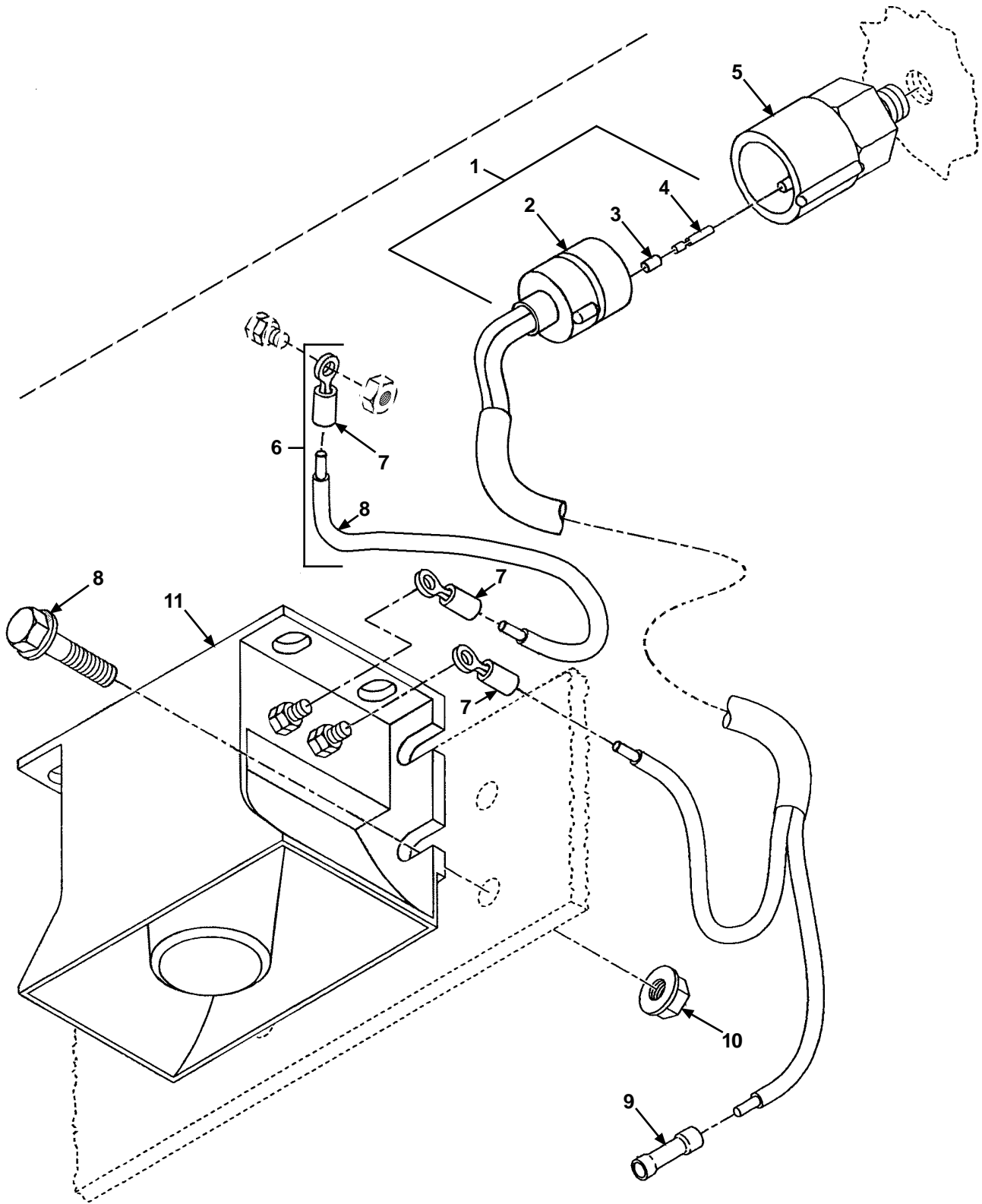


Figure 41A. Backup Alarm and Harness (Model B Only)

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2210 CHASSIS ELECTRICAL FIG. 41A BACKUP ALARM AND HARNESS (MODEL B ONLY)						
* 1	PAOZZ		45152	3061973	HARNESS,WIRING,ELEC REVERSE ALARM..	1
* 2	PAOZZ	5935007677936	96906	MS27145-1	CONNECTOR,PLUG,ELEC PART OF P/N 3061973.....	1
* 3	PAOZZ	5975011484607	77060	297002	CABLE,NIPPLE,ELEC PART OF P/N 3061973.....	2
* 4	PAOZZ	5940003996676	19207	8338564	TERMINAL SET,QUICK PART OF P/N 3061973.....	2
* 5	PAOZZ	5930002920520	34623	5972752	SWITCH,SENSITIVE BACKUP LIGHT, TRANSMISSION MOUNTED.....	1
* 6	AOOZZ		45152	3061998	LEAD ASSEMBLY,ELECT GROUND.....	1
* 7	PAOZZ	5940005574345	96906	MS25036-118	TERMINAL,LUG PART OF P/N 3061973 & 3061998.....	1
* 8	MOOZZ		45152	3061998-4	WIRE,ELECTRICAL PART OF P/N 3061998, MAKE FROM ELECTRICAL WIRE, P/N M16878/2BKE93, 4 IN LG.....	1
* 9	PAOZZ	5940013689579	00779	327025	SPLICE,CONDUCTOR PART OF P/N 3061973.....	1
* 10	PAOZZ	5310013469445	45152	1600460	NUT,SELF-LOCKING,CL 0.250-20 UNC...	4
* 11	PAOZZ	6350013199161	57013	688-411-4	ALARM,BACK-UP,VEHIC.....	1
* 12	PAOZZ	5305013379120	45152	1754140	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.00 IN LG.....	4

END OF FIGURE



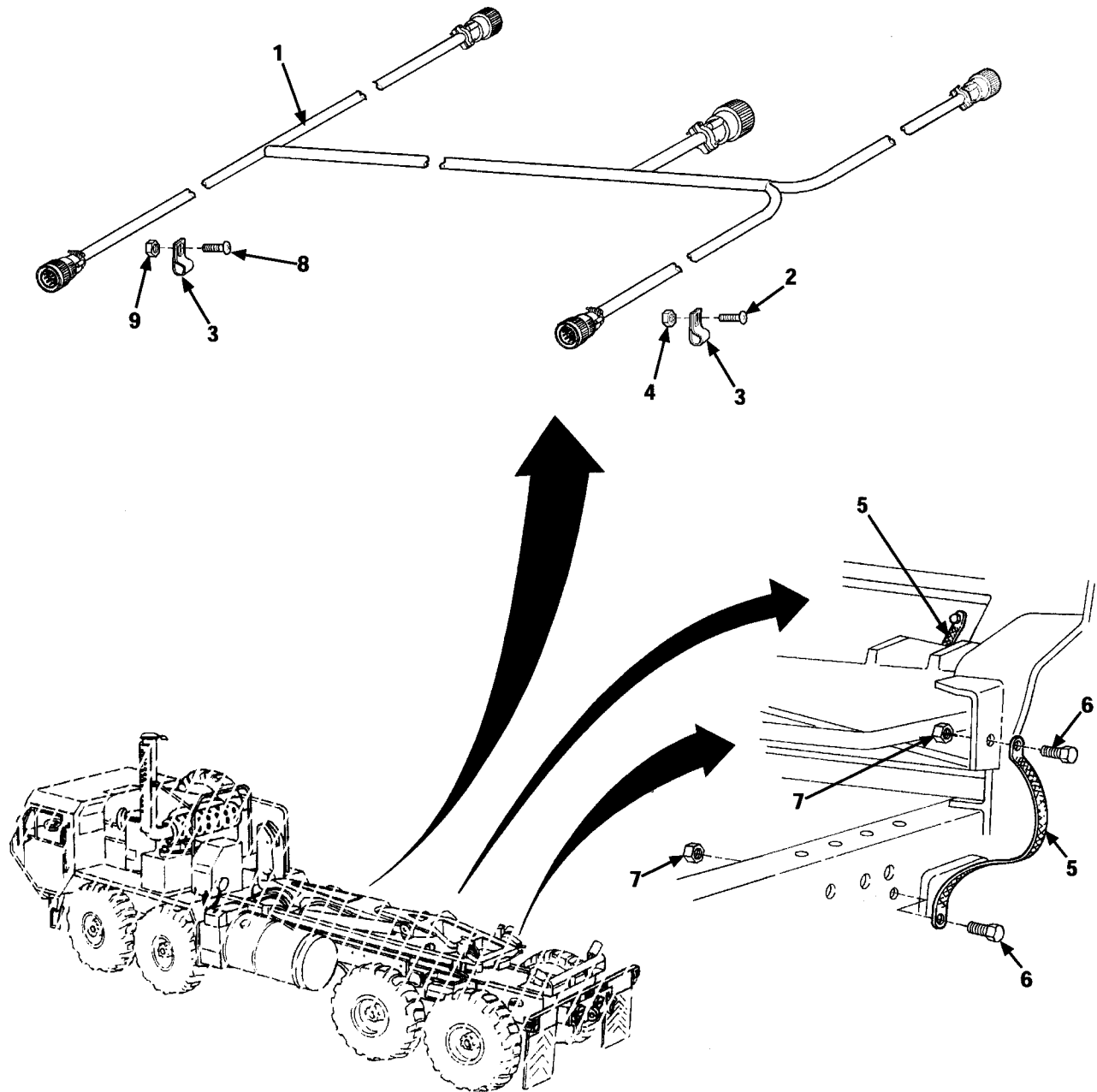


Figure 42. Clearance Wire Harness (Model A) (Sheet 1 of 2)

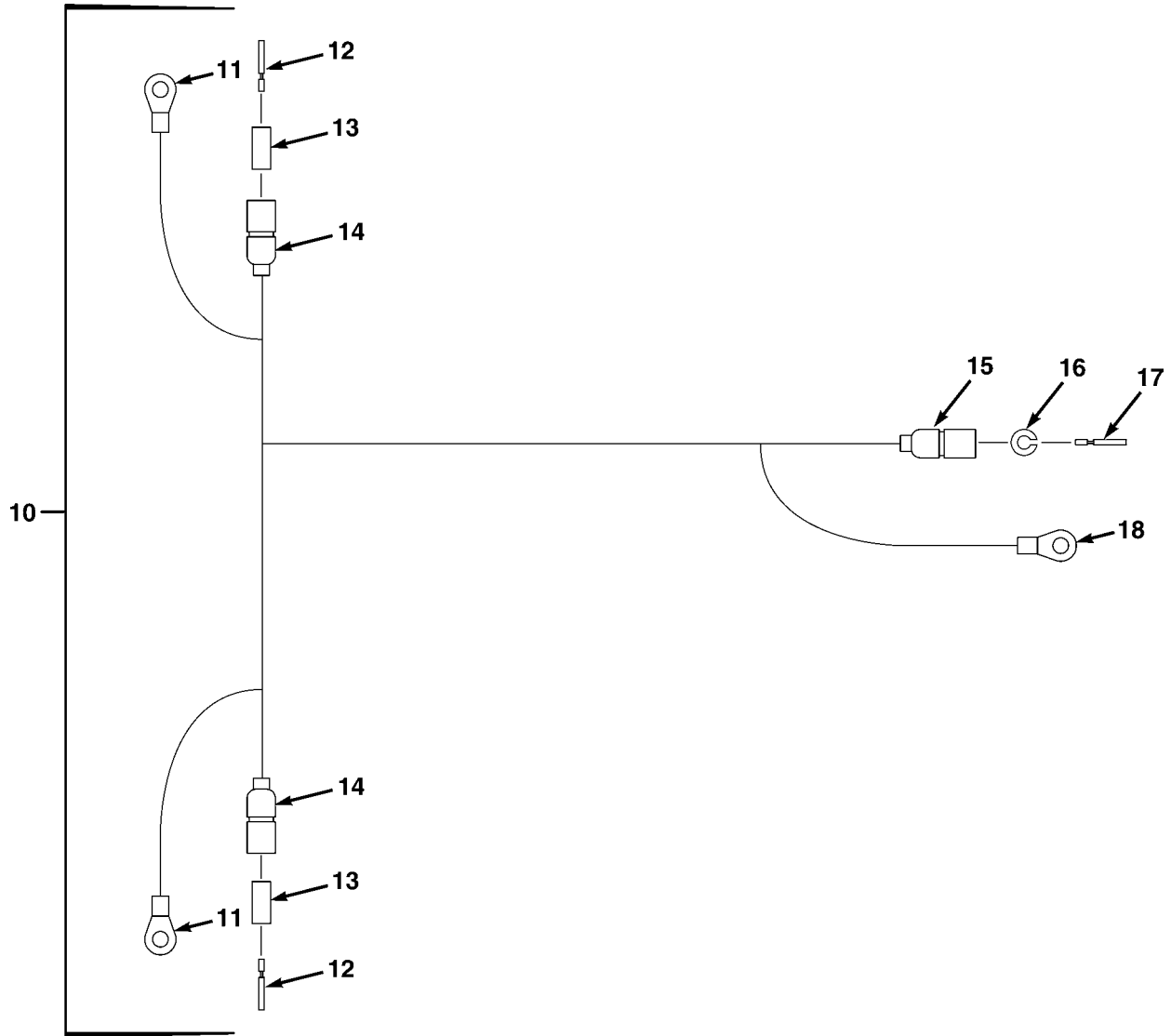


Figure 42. Clearance Wire Harness (Model B) (Sheet 2 of 2)

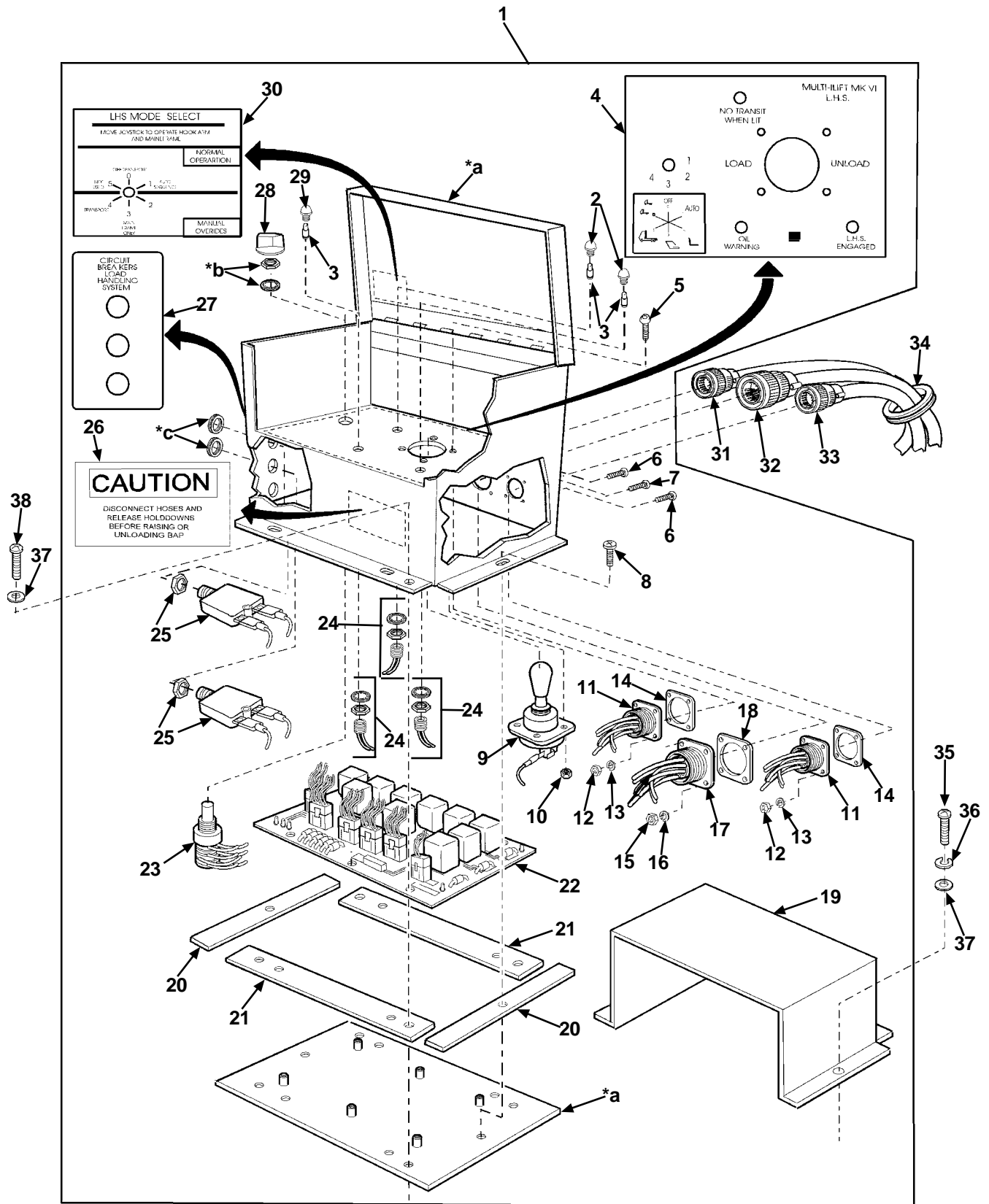
## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2220 ELECTRICAL CONTROLS FIG. 42 CLEARANCE WIRE HARNESS						
1	PAOZZ	6150014573828	45152	3119729	WIRING HARNESS, BRAN CLEARANCE (MODEL A ONLY).....	1
2	PAOZZ	5305013379120	45152	1754140	SCREW, CAP, HEXAGON H 0.250-20 UNC X 1.00 IN LG.....	3
3	PAOZZ	5340010389481	75272	COV050971	CLAMP, LOOP.....	12
4	PAOZZ	5310013469445	45152	1600460	NUT, SELF-LOCKING, CL 0.250-20 UNC...	3
5	PAOZZ	5999012980527	45152	1622080	STRIP, ELECTRICAL GR.....	2
6	PAOZZ	5306012875715	52167	WC0414PB	BOLT, MACHINE 0.38-16 X 1.25 IN LG, G5.....	4
7	PAOZZ	5310012881116	82458	T893R	NUT, SELF-LOCKING, EX 0.382-16 UNC G5.....	4
8	PAOZZ	5305012498564	45152	59031AX	SCREW, MACHINE 0.190-24 UNC-2A X 0.750 IN LG.....	6
9	PAOZZ	5310002081918	88044	AN365-1024A	NUT, SELF-LOCKING, HE 0.190-24 UNC...	6
* 10	PAOZZ	6150014782954	45152	3055130	WIRING HARNESS, BRAN CLEARANCE (MODEL B ONLY).....	1
* 11	PAOZZ	5940001434780	96906	MS25036-108	.TERMINAL, RING, #10.....	2
* 12	PAOZZ	5940003996676	19207	8338564	.TERMINAL ASSEMBLY.....	2
* 13	PAOZZ	5970008338562	19207	8338562	.INSULATOR, BUSHING.....	2
* 14	PAOZZ	5975006605962	19207	8724494	.CABLE NIPPLE, ELECTR.....	2
* 15	PAOZZ	5935006915591	97403	13207E6498-2	.SHELL, ELECTRICAL CO.....	1
* 16	PAOZZ	5310008338567	19207	8338567	.WASHER, SLOTTED.....	1
* 17	PAOZZ	5999000572929	19204	572929	.CONTACT, ELECTRICAL.....	1
* 18	PAOZZ	5940002835281	81343	MS25036-109	.TERMINAL, RING, .31 .....	1

END OF FIGURE



\*a Part of Item #1  
 \*b Part of Item #24  
 \*c Part of Item #26

Figure 43. Cab Control Box (Model A Only)



## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2220 ELECTRICAL CONTROLS						
FIG. 43 CAB CONTROL BOX						
(MODEL A ONLY)						
* 1	PBOOO	6110014586162	0ENJ2	DA-00E-150	DISTRIBUTION BOX CAB.....	1
* 2	PAOZZ	6220012652467	71744	139A-404Y	.LENS,LIGHT AMBER.....	2
* 3	XOOZZ		71744	CM387	.LAMP,INCANDESCENT.....	3
* 4	PFOZZ	7690014584249	0ENJ2	195-01-679	.LABEL CAB CONTROL.....	1
5	PAOZZ	5305001575621	96906	MS51849-56	.SCREW,MACHINE 0.164-32 UNC X 0.750 IN LG.....	4
* 6	PAOZZ	5305008892999	96906	MS35206-217	.SCREW,MACHINE 0.112-40 UNC X 0.500 IN LG.....	8
* 7	PAOZZ	5305000685415	80205	MS16995-20	.SCREW,CAP,SOCKET HE 0.138-32 UNC X 0.750 IN LG.....	4
8	PAOZZ	5305000516751	96906	MS16995-16	.SCREW,CAP,SOCKET HE 0.138-32 UNC X 0.250 IN LG.....	6
* 9	PAOZZ	5895014603046	0ENJ2	295-01-604	.JOYSTICK,DATA ENTRY.....	1
* 10	PAOZZ	5310014573244	39428	90631A009	.NUT,SELF-LOCKING,HE NO. 8-32.....	4
11	PAOZZ	5935013176762	71468	CA3102R18-1S-F80	.CONNECTOR,RECEPTACL J1, J3.....	2
12	PAOZZ	5310009349739	96906	MS35649-242	.NUT PLAIN,HEXAGON 0.112-40 UNC....	8
* 13	PAOZZ	5310005432410	96906	MS35338-40	.WASHER,LOCK 0.118 NOM.....	8
14	PAOZZ	5305005080753	58536	A52481-6	.GASKET.....	2
* 15	PAOZZ	5310009349747	96906	MS35649-262	.NUT,PLAIN,HEXAGON 0.138-32 UNC....	4
* 16	PAOZZ	5310000454007	96906	MS35338-41	.WASHER,LOCK 0.145 NOM.....	4
17	PAOZZ	5935012290140	96906	MS3452W24-28S	.CONNECTOR,RECEPTACL J2.....	1
18	PAOZZ	5330009681753	96906	MS52000-7	.GASKET.....	1
* 19	PFOZZ	5340014578960	0ENJ2	DA-00E-552	.COVER,ACCESS.....	1
20	MOOZZ		39428	93325K51-8	.STRIP,RUBBER MAKE FROM RUBBER STRIP, P/N 93325K51, 8 IN LG.....	2
21	MOOZZ		39428	93325K51-10	.STRIP,RUBBER MAKE FROM RUBBER STRIP, P/N 93325K51, 10 IN LG.....	2
* 22	PAOZZ	5998014569734	0ENJ2	P0-006-201	.CIRCUIT CARD ASSEMBLY RELAY OUTPUT BOARD.....	1
23	PAOZZ	5930013037430	81073	44A60-03-1-6N	.SWITCH,ROTARY MODE SELECT.....	1
* 24	PAOZZ	6210012938119	71744	5139-038	.LIGHT,INDICATOR.....	3
25	PAOZZ	5925002836048	77342	W58XB1A4A-5	.CIRCUIT BREAKER 5 AMP.....	2
* 26	PFOZZ	7690014584242	0ENJ2	195-01-684	.LABEL LHS MODE SELECT.....	1
* 27	PFOZZ	7690014584245	0ENJ2	195-01-680	.LABEL CIRCUIT BREAKERS.....	1
* 28	PAOZZ	5355014578843	0ENJ2	310-01-602	.DIAL,CONTROL.....	1
* 29	PAOZZ	6220014585419	0ENJ2	375-10-605	.LENS,LIGHT RED.....	1
* 30	PFOZZ	7690014584240	0ENJ2	195-01-683	.LABEL CAUTION, BAP UNLOADING.....	1
* 31	PAOZZ	6150014590360	45152	3107623	WIRING HARNESS JUNCTION BOX, 9 PIN.	1
* 32	PAOZZ	6150014587246	45152	3107622	WIRING HARNESS CAB TO JUNCTION, 24 PIN.....	1
* 33	PAOZZ	6150014590361	45152	3107621	WIRING HARNESS PANEL, SUPPLY.....	1
* 34	PAOZZ	5325008824438	70485	2804	GROMMET,NONMETALLIC.....	1
35	PAOZZ	5305009846212	96906	MS35206-265	SCREW,MACHINE 0.190-24 X 0.750 IN LG.....	4
36	PAOZZ	5310000453296	96906	MS35338-43	WASHER,LOCK 0.196 ID NOM.....	4
37	PAOZZ	5310000145850	96906	MS27183-42	WASHER,FLAT 0.225 ID NOM.....	8
38	PAOZZ	5305009846214	96906	MS35206-267	SCREW,MACHINE 0.190-24 X 1.00 IN LG.....	4

END OF FIGURE

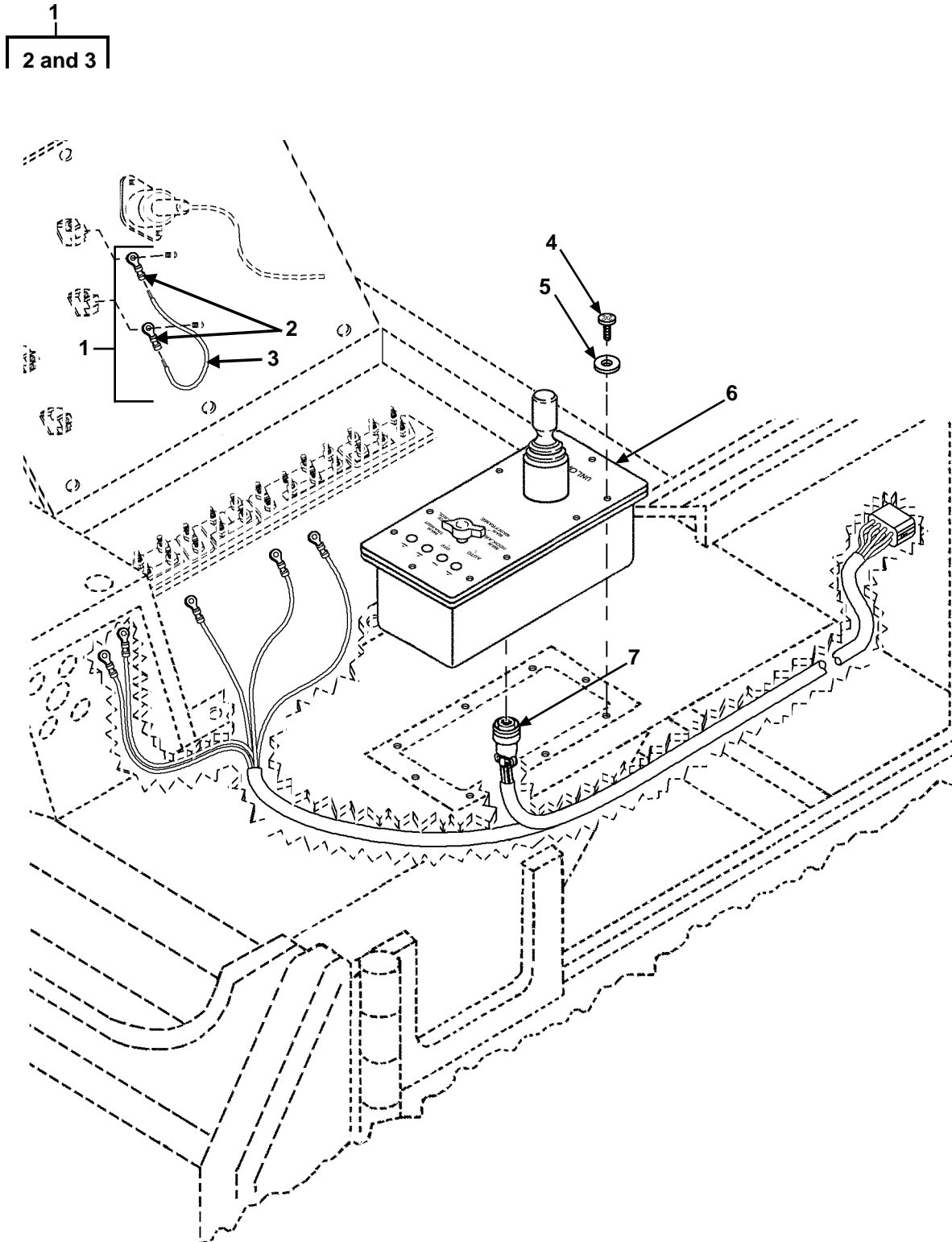


Figure 43A. Cab Control Box (Model B Only)

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2220 ELECTRICAL CONTROLS FIG. 43A CAB CONTROL BOX (MODEL B ONLY)						
* 1	AOZZ		45152	3014584	WIRE ASSEMBLY HIGH IDLE SWITCH TO PTO SWITCH.....	1
* 2	PAZZ	5940005574345	96906	MS25036-118	TERMINAL,LUG PART OF P/N 3014584...	2
* 3	MOZZ		45152	3014584-6	WIRE ASSEMBLY MAKE FROM WIRE, ELECTRICAL, P/N 1927FX, 6 IN LG, PART OF P/N 3014584.....	1
* 4	PAZZ	5305006140245	96906	MS35265-44	SCREW,MACHINE 0.190-24 UNC X 0.625 IN LG.....	8
* 5	PAZZ	5310008238804	96906	MS27183-9	WASHER,FLAT 0.245 NOM.....	8
* 6	PBOLL		45152	3278945	CONTROL BOX,CAB.....	1
* 7	PAZZ		45152	3282417	WIRING HARNESS,ELEC CAB CONTROL BOX.....	1

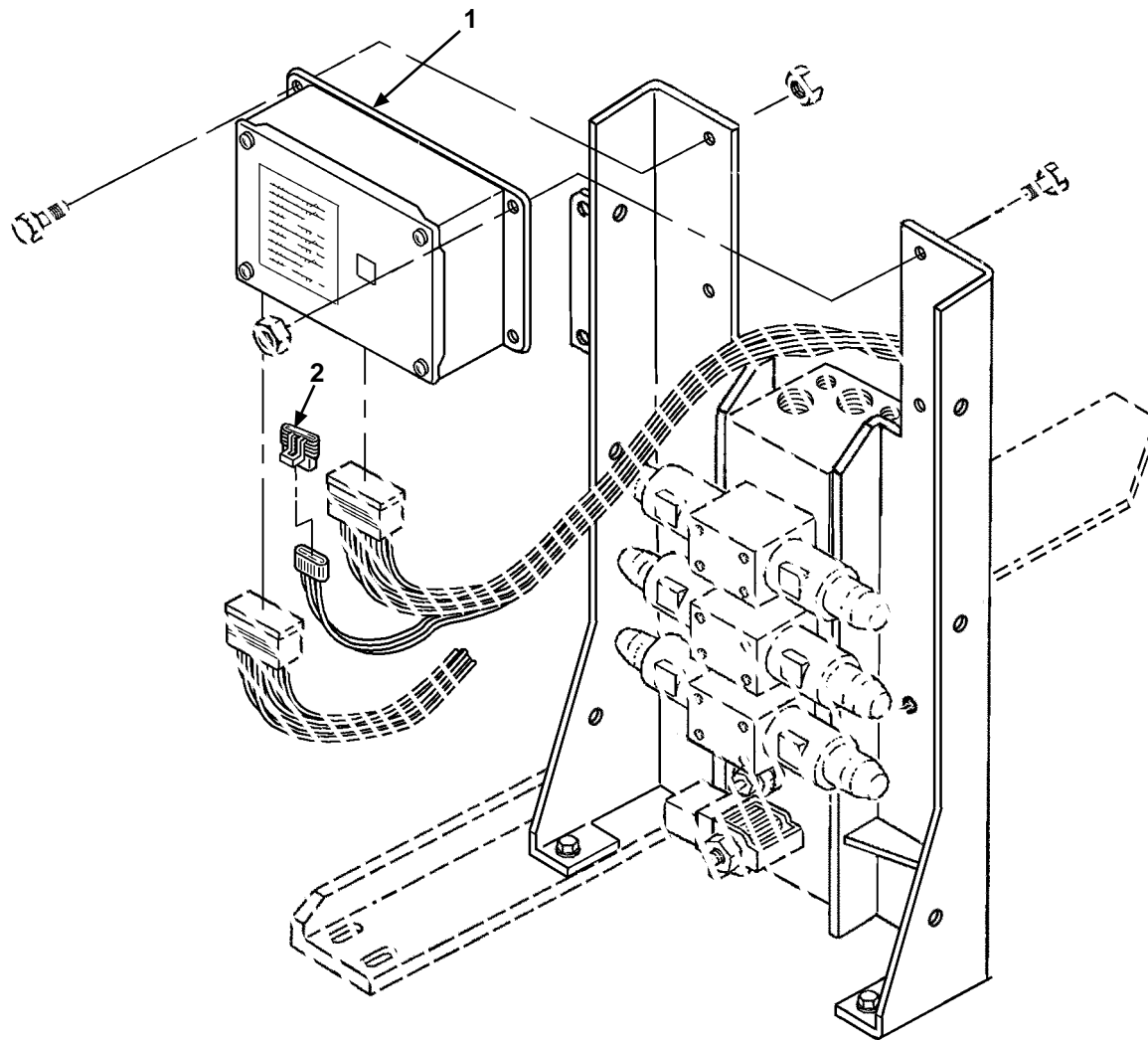


Figure 43B. Digital Control Box (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM	SMR			PART		
NO	CODE	NSN	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
					GROUP 2220 ELECTRICAL CONTROLS	
					FIG. 43B DIGITAL CONTROL BOX	
					(MODEL B ONLY)	
* 1	PBOLL		45152	3276458	DIGITAL CONTROLLER.....	1
* 2	PAOZZ		0EUT9	3285646	RESISTOR ASSEMBLY.....	1
					END OF FIGURE	

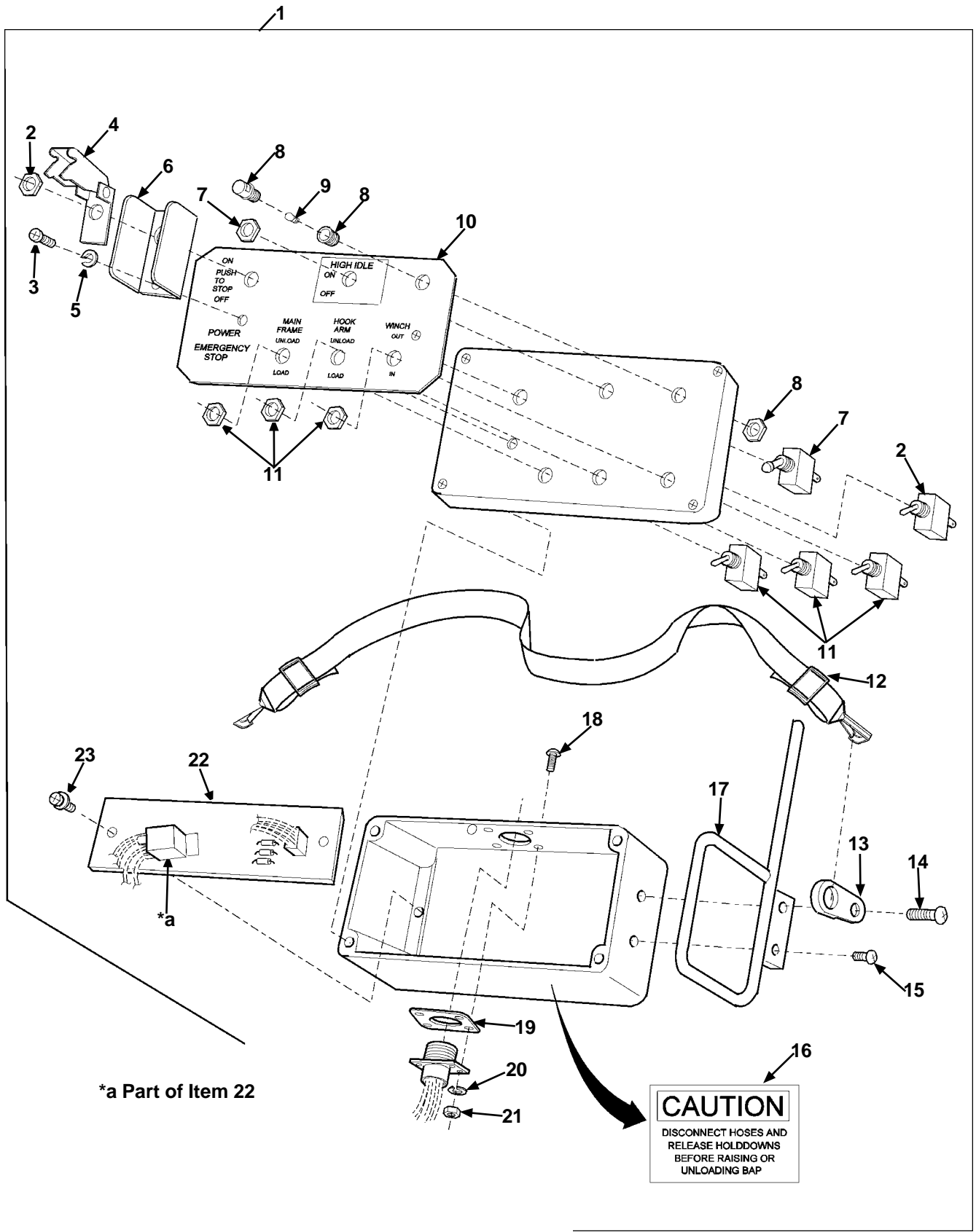


Figure 44. Remote Control Unit

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2220 ELECTRICAL CONTROLS						
FIG. 44 REMOTE CONTROL UNIT						
* 1	PAOOO	5895014677784	0ENJ2	DA-00E-900	CONTROL,POWER SUPPL REMOTE CONTROL.	1
* 2	PAOZZ		91929	31NT91-1	.SWITCH,TOGGLE.....	1
3	PAOZZ	5305000889044	96906	MS35207-260	.SCREW,MACHINE 0.199-32 X 0.312 IN LG.....	1
4	PAOZZ	5930006156731	96906	MS25224-1	.GUARD,SWITCH.....	1
* 5	PAOZZ	5310009338120	96906	MS35338-138	.WASHER,LOCK 0.190 NOM.....	1
* 6	PFOZZ	5930014583844	0ENJ2	380-07-600	.RETAINER,ELECTRICAL.....	1
* 7	PAOZZ	5930014573028	91929	31NT91-2	.SWITCH,TOGGLE.....	1
* 8	PAOZZ	2920014578996	0ENJ2	375-10-600	.SOCKET,LIGHT,VEHICU.....	1
9	PAOZZ	6240011384366	71744	CM8176	.LAMP,INCANDESCENT.....	1
* 10	PFOZZ	9905014578344	0ENJ2	195-01-678	.PLATE,INSTRUCTION BOX COVER.....	1
* 11	PAOZZ	5930014569303	0ENJ2	435-04-603	.SWITCH,TOGGLE ON-OFF-ON.....	3
* 12	PAOZZ	5340014583660	0ENJ2	158-01-600	.STRAP,WEBBING.....	1
* 13	PAOZZ	5340014592193	0ENJ2	380-04-600	.BRACKET,MOUNTING.....	2
14	PAOZZ	5305009931848	96906	MS35207-265	.SCREW,MACHINE 0.190-32 X 0.875 IN LG.....	2
15	PAOZZ	5305009897435	96906	MS35207-264	.SCREW,MACHINE 0.190-32 X 0.625 IN LG.....	2
* 16	PFOZZ	7690014584240	0ENJ2	195-01-683	.LABEL CAUTION BAP UNLOADING.....	1
* 17	PAOZZ	5340014578962	0ENJ2	DA-00E-501	.HANDLE,BOW.....	2
* 18	PAOZZ	5305008892999	96906	MS35206-217	.SCREW,MACHINE 0.112-40 X 0.50 IN LG.....	4
19	PAOZZ	5330009681753	96906	MS52000-7	.GASKET.....	1
* 20	PAOZZ	5310005432410	96906	MS35338-40	.WASHER,LOCK 0.115 NOM.....	4
21	PAOZZ	5310002759301	96906	MS35649-43	.NUT,PLAIN,HEXAGON 0.112-14.....	4
* 22	PAOZZ		0ENJ2	PA-006-201	.TERMINAL BOARD DIODE ARRAY BOARD..	1
* 23	PAOZZ	5305014568936	51506	1812-10S-PS-E31	.SCREW,MACHINE M6 X 10.....	2

END OF FIGURE

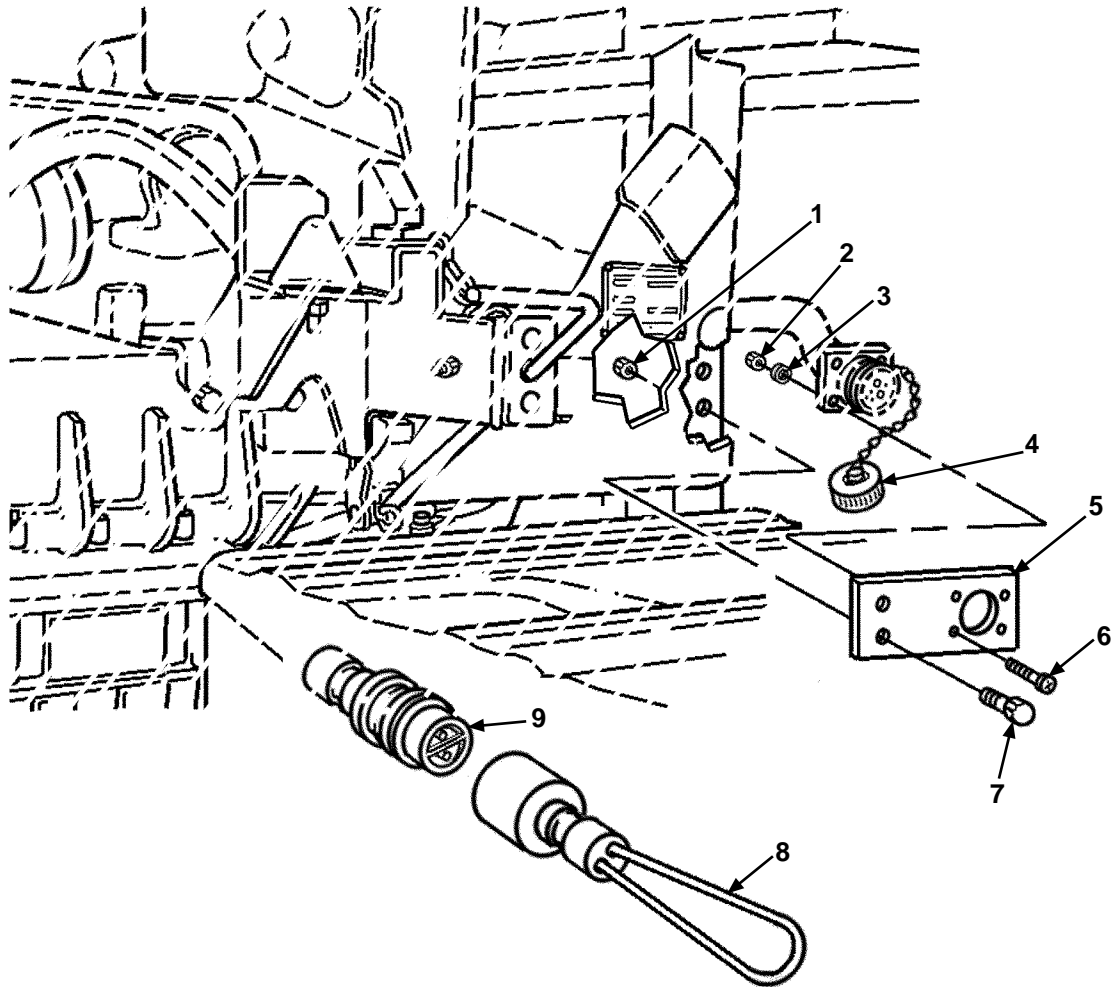
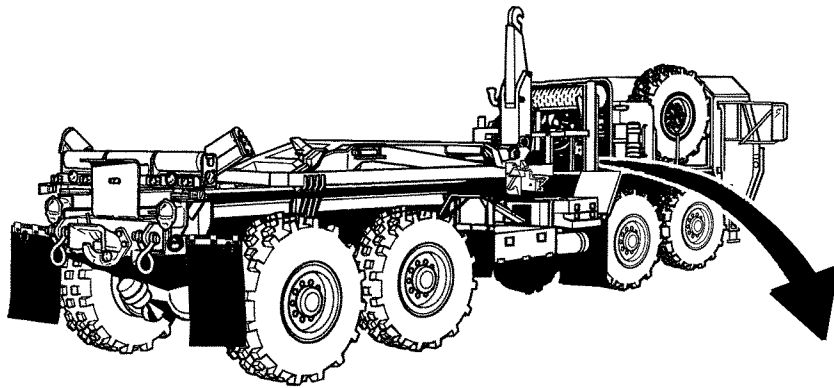


Figure 44A. Remote Control Connector (Model B Only)



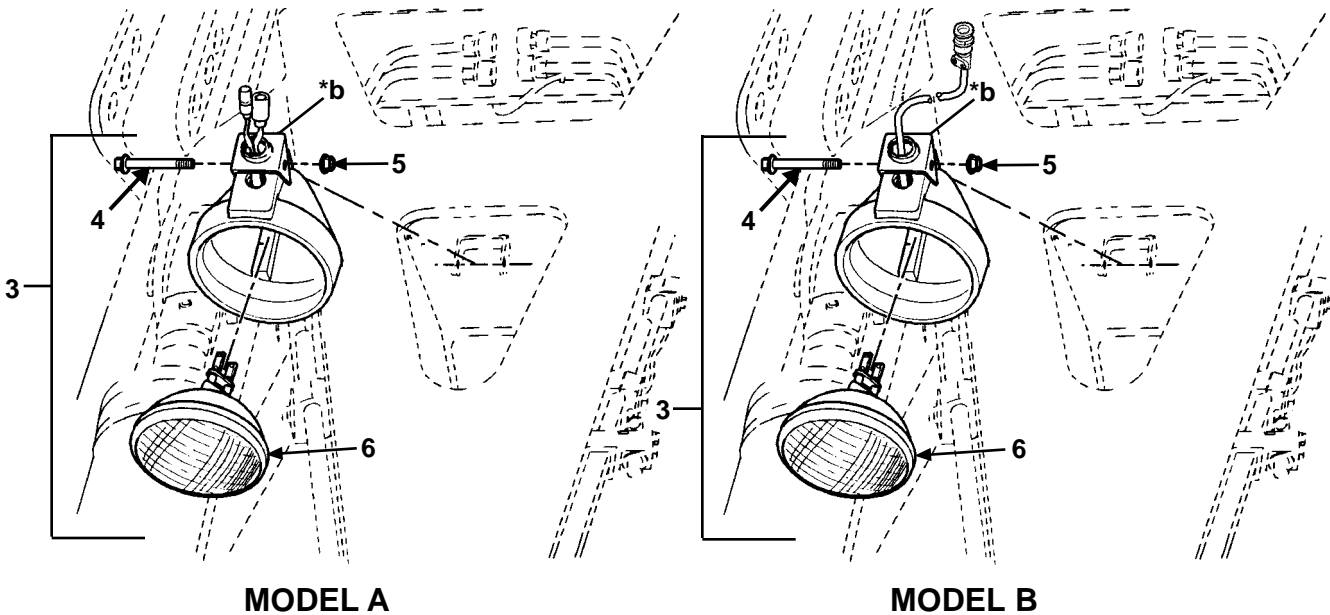
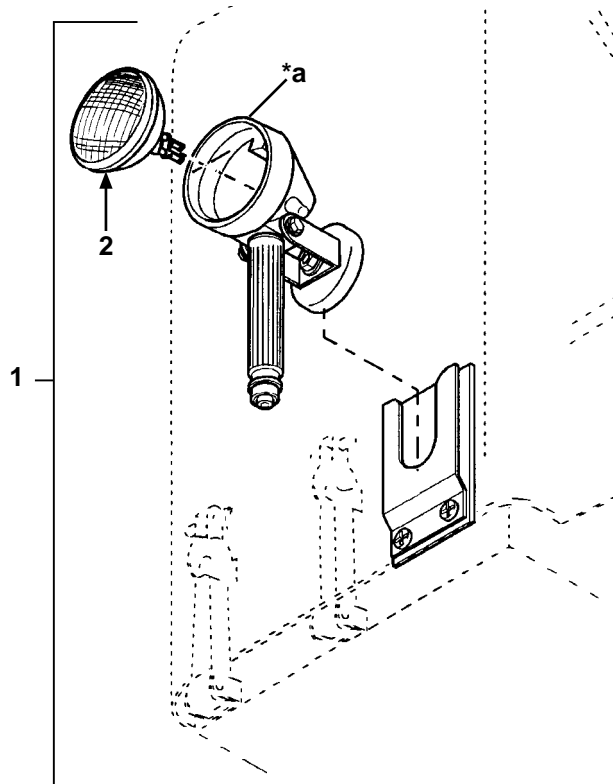
## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2220 ELECTRICAL CONTROLS FIG. 44A REMOTE CONTROL CONNECTOR (MODEL B ONLY)						
* 1	PAOZZ	5310013405671	45152	1333510	NUT, SELF-LOCKING, EX 0.312-18 UNC G5.....	4
* 2	PAOZZ	5310006000751	11599	25851	NUT, PLAIN ROUND NO. 8-32 UNF.....	8
* 3	PAOZZ	5310000453299	96906	MS35338-42	WASHER, LOCK.....	8
* 4	PAOZZ	5340013679122	71468	CA121003-9	CAP-PLUG, PROTECTIVE.....	2
* 5	PFOZZ		45152	3299731	PLATE, BULKHEAD.....	1
* 6	PAOZZ	5305009846197	96906	MS35206-249	SCREW, MACHINE 0.164-32 X 1.00 IN LG	8
* 7	PAOZZ	5306012875714	52167	WC0412PB	BOLT, MACHINE 0.382-16 X 1.00 IN LG.	4
* 8	PAOZZ	6150014591293	45152	3123908	LEAD ASSEMBLY, ELEC.....	1
* 9	PAOZZ	5935011745183	71468	SS2P	CONNECTOR, PLUG, ELEC.....	1

END OF FIGURE



- \* a Part of Item 1
- \* b Part of Item 3

Figure 45. Transporter Lighting and Related Parts

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2230 LHS LIGHTS						
FIG. 45 TRANSPORTER LIGHTING AND RELATED PARTS						
* 1	PAOZZ	6220013262286	78422	1400182	SPOTLIGHT (MODEL A & B).....	1
* 2	PAOZZ	6420001325317	08108	4593	LAMP, INCANDESCENT PART OF P/N 1400182.....	1
* 3	PAOZZ	6230013648663	78422	1401322	LIGHT, EXTENSION WORKLAMP (MODEL A ONLY).....	1
* 3	PFOZZ		45152	3278880	LIGHT EXTENSION WORKLAMP (MODEL B ONLY).....	1
* 4	PAOZZ	5305012806631	78422	5340920	SCREW, CAP, HEXAGON H 0.312-18 UNC X 2.250 IN LG, PART OF P/N 1401322 & 3278880.....	1
* 5	PAOZZ	5310012806538	78422	5340910	NUT SELF-LOCKING, H 0.312-18, PART OF P/N 1401322 & 3278880.....	1
* 6	PAOZZ	6220014325670	78422	4578	LAMP, INCANDESCENT PART OF P/N 1401322 & 3278880.....	1

END OF FIGURE

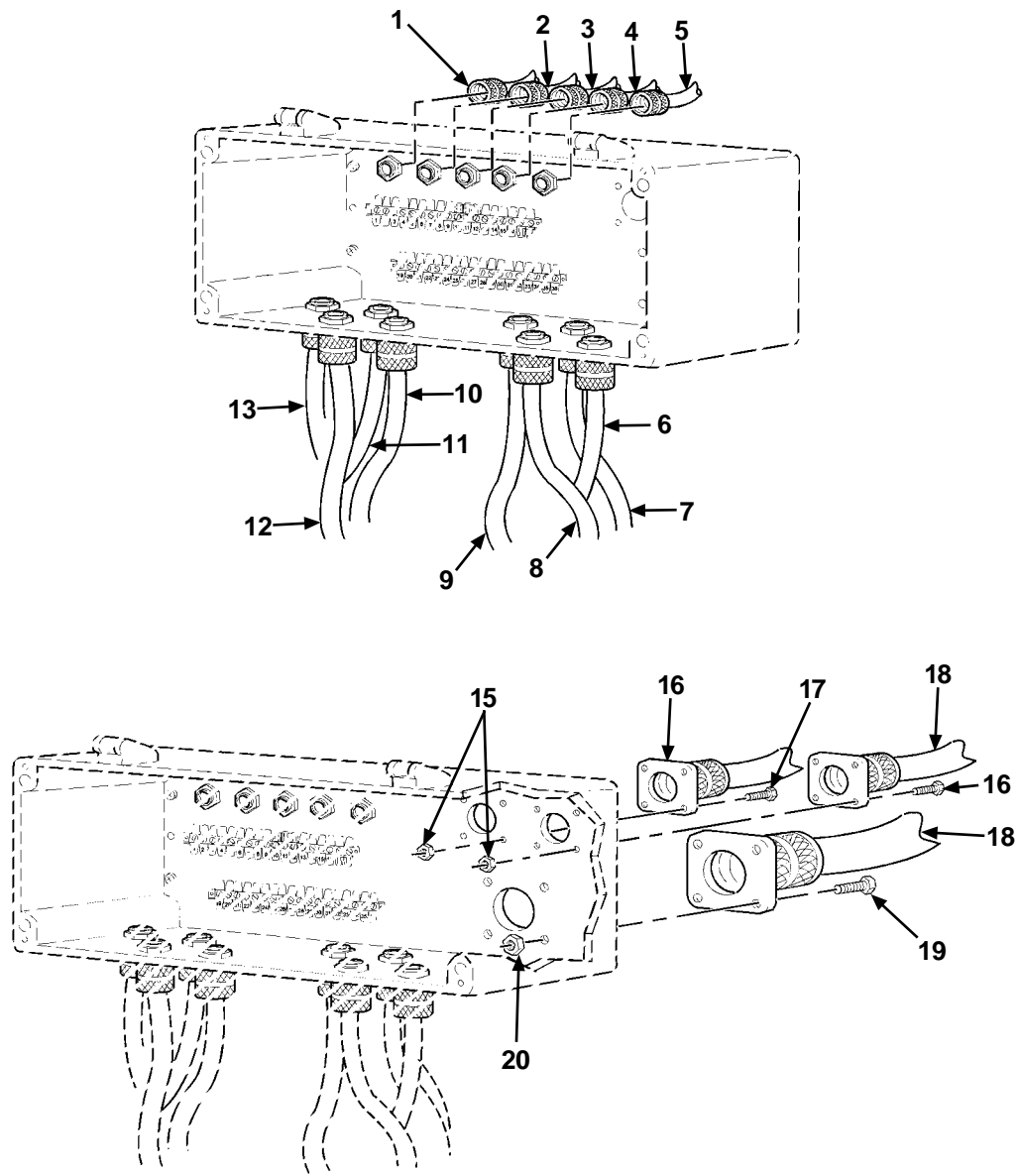


Figure 46. Main Junction Box Wiring Harnesses (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2240 LHS WIRING HARNESSSES FIG. 46 MAIN JUNCTION BOX WIRING HARNESSSES (MODEL A ONLY)						
* 1	PAOZZ	6150014584841	45152	3115343	WIRING HARNESS, BRAN HAND-HELD SPOTLIGHT.....	1
* 2	PAOZZ	6150014583951	45152	3071959	WIRING HARNESS, BRAN REMOTE LINKING RH.....	1
* 3	PAOZZ	6150014583946	45152	3071960	WIRING HARNESS, BRAN REMOTE LINKING LH.....	1
* 4	PAOZZ	6150014583939	45152	3065845	WIRING HARNESS, BRAN MAIN CYCLE.....	1
* 5	PAOZZ	5930014583853	45152	3071957	SWITCH, PROXIMITY HOOK ARM DOWN.....	1
* 6	PAOZZ	6150014583945	45152	3065841	WIRING HARNESS, BRAN HOOK ARM VALVE A (LOAD).....	1
* 7	PAOZZ	6150014573951	45152	3104679	WIRING HARNESS OIL TEMPERATURE.....	1
* 8	PAOZZ	6150014583942	45152	3065843	WIRING HARNESS, BRAN MAIN RAM VALVE A (LOAD).....	1
* 9	PAOZZ	6150014583322	45152	3065839	WIRING HARNESS, BRAN SOLENOID A WINCH (IN).....	1
* 10	PAOZZ	6150014583325	45152	3065838	WIRING HARNESS, BRAN SOLENOID B WINCH (OUT).....	1
* 11	PAOZZ	6150014585879	45152	3065842	WIRING HARNESS, BRAN FREE FLOW VALVE	1
* 12	PAOZZ	6150014584843	45152	3065844	WIRING HARNESS, BRAN MAIN RAM VALVE B (UNLOAD).....	1
* 13	PAOZZ	6150014583950	45152	3065840	WIRING HARNESS, BRAN HOOK ARM VALVE B (UNLOAD).....	1
14	PAOZZ	5330013554809	0D5M6	731740-002	GASKET.....	11
* 15	PAOZZ	5310005420087	78189	511-041810-01	NUT, PLAIN, ASSEMBLED 0.112-40 UNC...	8
* 16	PAOZZ	6150014583938	45152	3065849	WIRING HARNESS 9 PIN LINKING.....	1
17	PAOZZ	5305009836730	96906	MS35206-218	SCREW, MACHINE 0.112-40 UNC X 0.62 IN LG.....	8
* 18	PAOZZ	6150014583949	45152	3065848	WIRING HARNESS, BRAN MAIN JUNCTION BOX.....	1
* 19	PAOZZ	6150014583941	45152	3065847	WIRING HARNESS, BRAN 24 PIN LINKING.	1
* 20	PAOZZ	6150014583947	45152	3064907	WIRING HARNESS, BRAN MAIN LHS.....	1
21	PAOZZ	5305008893001	96906	MS35206-231	SCREW, MACHINE.....	4
22	PAOZZ	5310013527732	45152	1571870	NUT, SELF-LOCKING, AS.....	4

END OF FIGURE

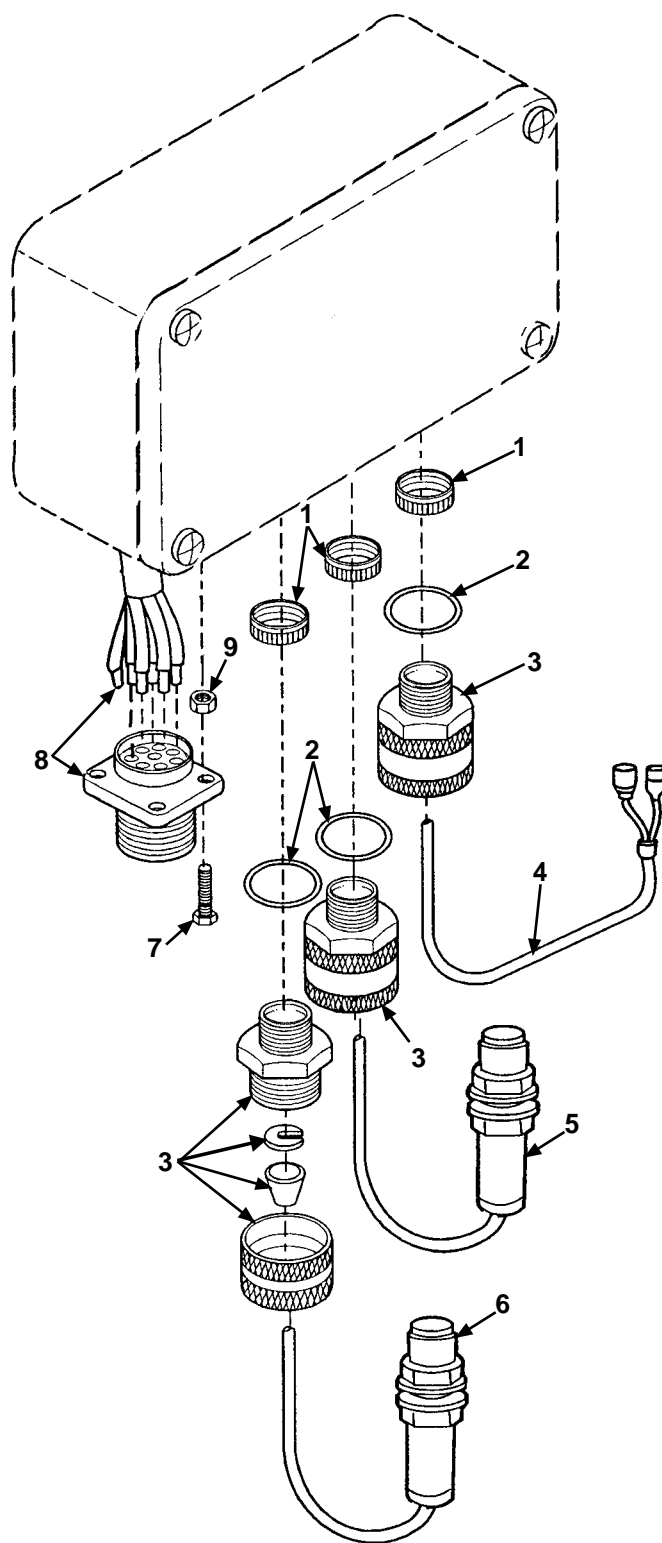


Figure 47. Main Frame Junction Box Wiring Harnesses (Model A Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2240 LHS WIRING HARNESSSES						
FIG. 47 MAIN FRAME JUNCTION BOX						
WIRING HARNESSSES (MODEL						
A ONLY)						
1	PAOZZ	5310011191811	15235	141	LOCKNUT,ELECTRICAL 0.50-14 NPT.....	3
2	PAOZZ	5330005880892	56501	5262	O-RING 0.790 ID X 0.138 NOM.....	3
3	PAOZZ	5975012070230	81992	SHC-1022	BOX CONNECTOR,ELECT 0.50 NPT X	3
					0.25.....	
* 4	PAOZZ	6150014583940	45152	3064150	WIRING HARNESS,BRAN WORKLAMP.....	1
* 5	PAOZZ	5930014582843	45152	3064147	SWITCH,PROXIMITY MAIN FRAME.....	1
* 6	PAOZZ	5930014571137	45152	3064148	SWITCH,PROXIMITY HOOK ARM UP.....	1
* 7	PAOZZ	5310005420087	78189	MS35206-218	SCREW,MACHINE 0.112-40 UNC X 0.625	4
					IN LG.....	
* 8	PAOZZ	6150014583948	45152	3064149	WIRING HARNESS,BRAN MAIN FRAME	1
					JUNCTION BOX.....	
* 9	PAOZZ	5305009836730	96906	511-041810-01	NUT,PLAIN,ASSEMBLED 0.112-40 UNC...	4
END OF FIGURE						





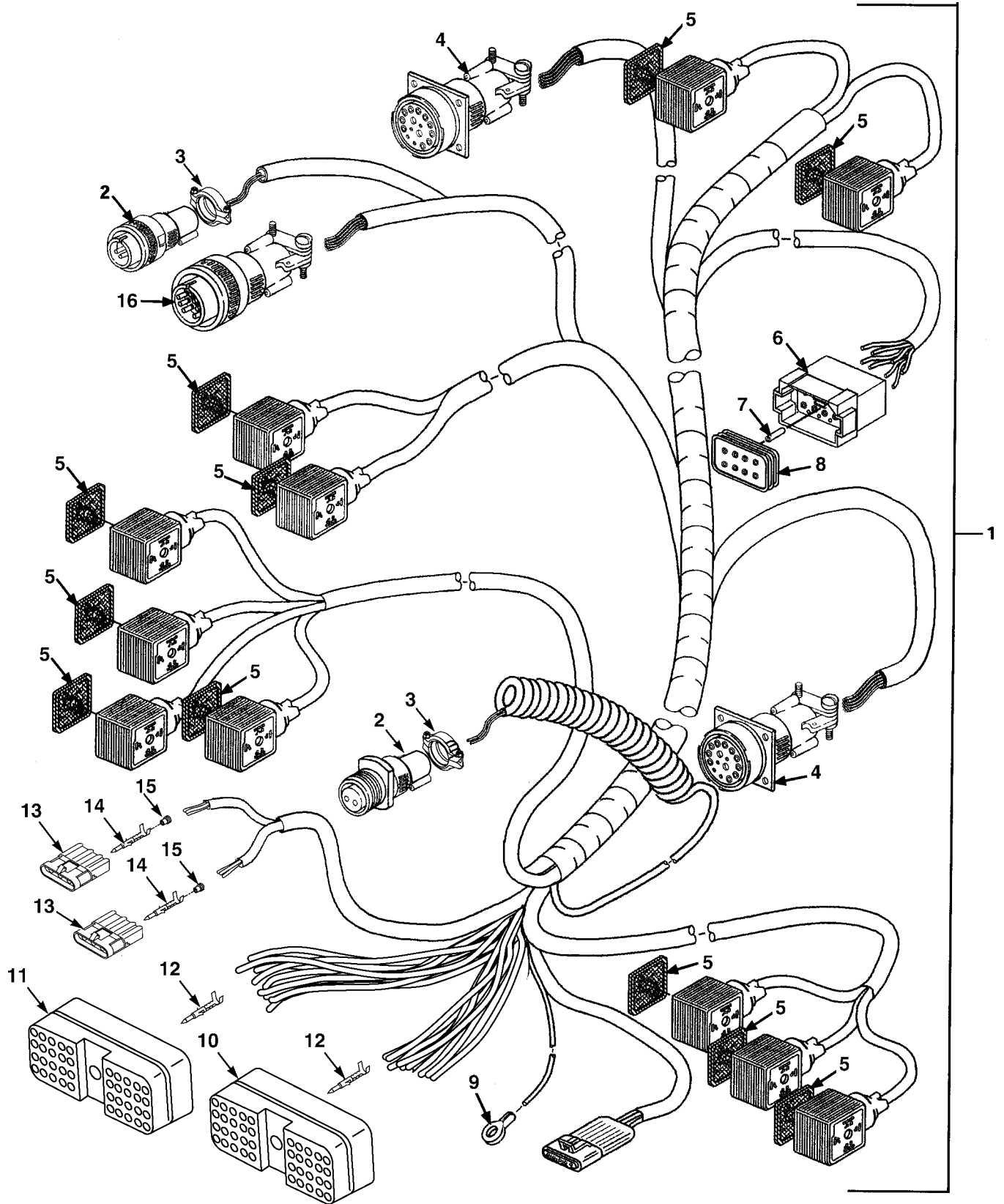


Figure 47A. Digital Controller Wiring Harness (Model B Only) (Sheet 1 of 2)

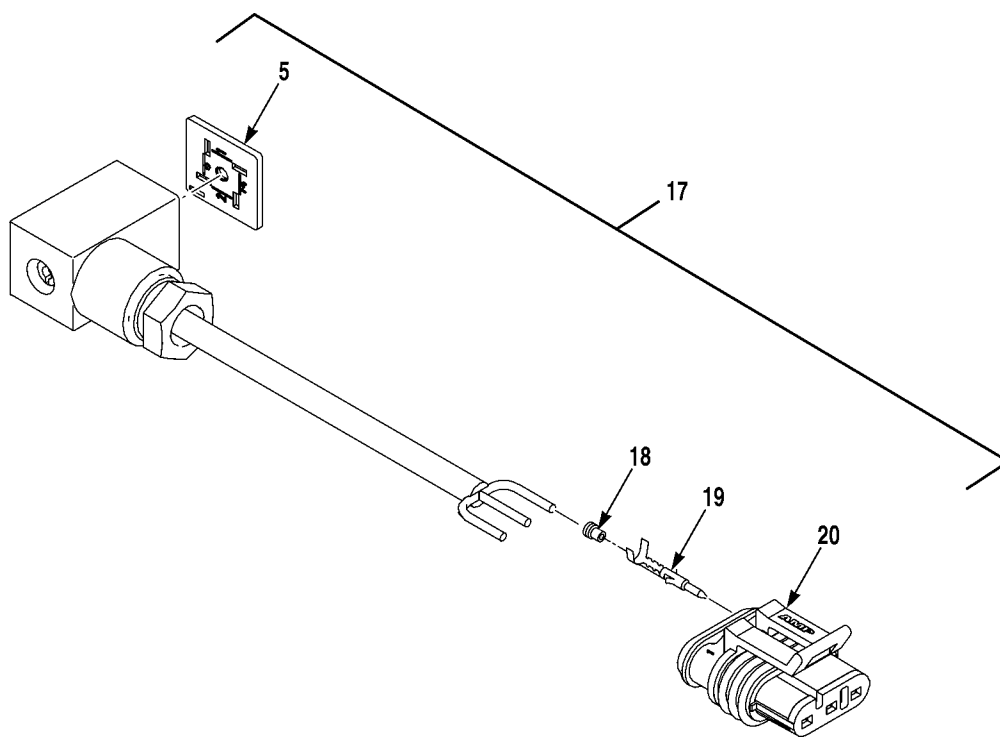


Figure 47A. Digital Controller Wiring Harness (Model B Only) (Sheet 2 of 2)

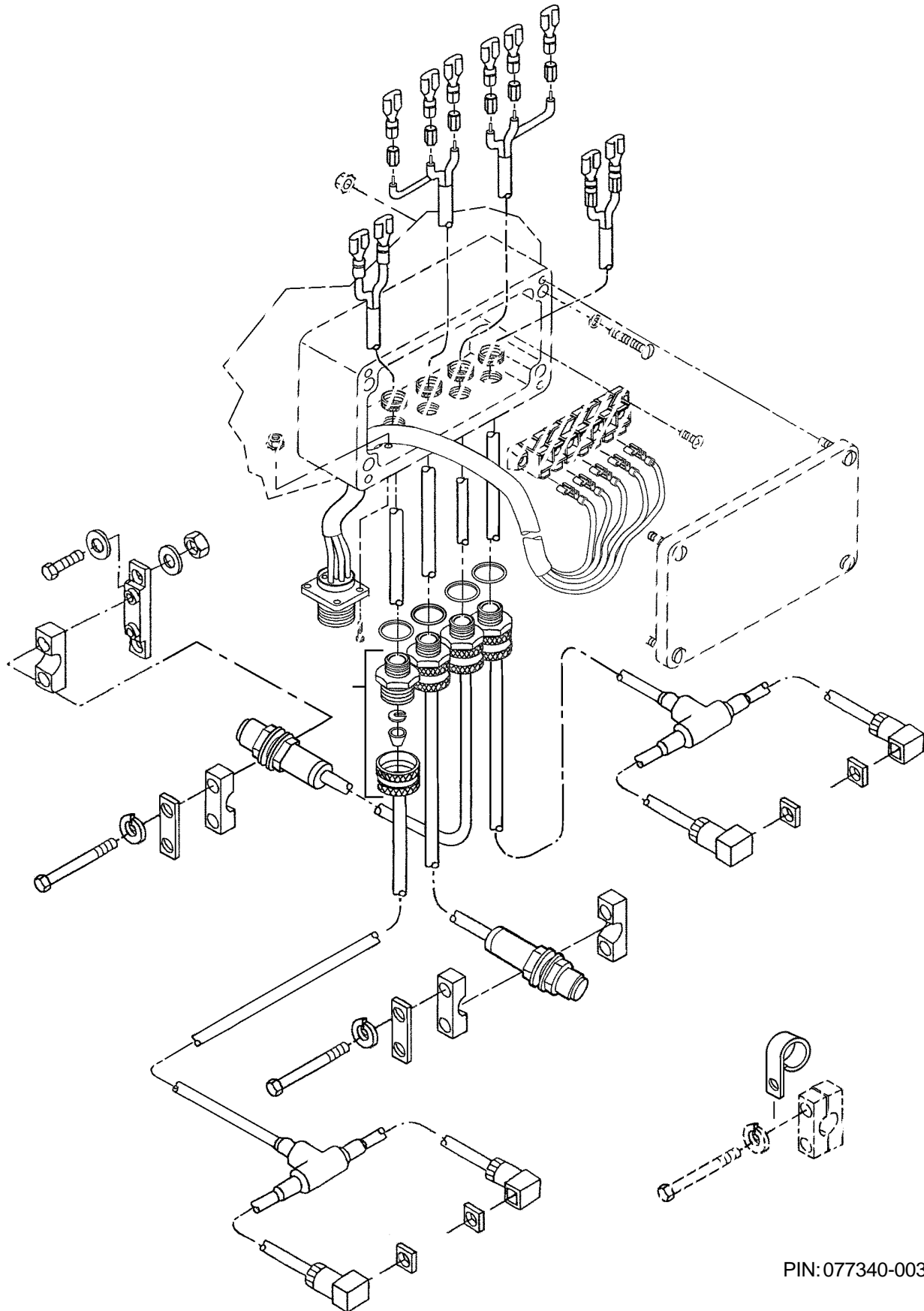
## SECTION II

C02

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2240 LHS WIRING HARNESSSES FIG. 47A DIGITAL CONTROLLER WIRING HARNESS (MODEL B ONLY)						
* 1	PAOOO		45152	3420553	WIRING HARNESS,ELEC DIGITAL CONTROLLER WIRING HARNESS.....	1
* 2	PAOZZ		71468	CA3101F12S- 3SF80F42	.CONNECTOR,PLUG,ELECT.....	2
* 3	PAOZZ		00779	206358	.CLAMP,CABLE.....	2
* 4	PAOZZ		71468	CA3100E24- 7SXB-F80-05	.CONNECTOR,PLUG,ELECT.....	2
* 5	PAOZZ	5330013554809	0D5M6	731739-002	.GASKET.....	13
* 6	PAOZZ	5935014120435	43473	DT04-8P	.CONNECTOR,PLUG,ELECT	1
* 7	PAOZZ	5999013234494	43473	0460-215-16141	.TERMINAL,ELECTRICAL PART OF P/N DT04-8P.....	8
* 8	PAOZZ	5935014884980	11139	W89	.WEDGE LOCK.....	1
* 9	PAOZZ	5940000824939	96906	MS35438-3	.TERMINAL,LUG.....	1
* 10	PAOZZ		43473	DRC18-40SB	.CONNECTOR,40 PIN.....	1
* 11	PAOZZ		43473	DRC18-40SA	.CONNECTOR,40 PIN.....	1
* 12	PAOZZ	5999013724955	43473	0462-209-16141	.TERMINAL,SOCKET.....	50
* 13	PAOZZ		00779	282105-1	.CONNECTOR,ELECT.....	2
* 14	PAOZZ	5999000579163	57712	183024-1	.TERMINAL,ELECTRICAL.....	6
* 15	PAOZZ		00779	281934-3	.SEAL.....	6
* 16	PAOZZ	5935011129782	71468	CA3106F18-1PF80	.CONNECTOR,PLUG,ELEC.....	1
* 17	PA000		45152	3420554	HARNESS,TRANSDUCER.....	2
* 18	PAOZZ		00779	281934-3	.SEAL,WIRE.....	6
* 19	PAOZZ		00779	183025-1	.CONTACTS.....	6
* 20	PAOZZ		00779	282087-1	.CONNECTOR,RECEPTACLE.....	2

END OF FIGURE



PIN:077340-003

Figure 47B. Main Frame Junction Box Wiring Harness (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2240 LHS WIRING HARNESSSES FIG. 47B MAIN FRAME JUNCTION BOX WIRING HARNESS (MODEL B ONLY)						
* 1	PAOZZ	5940008749033	00779	41274	TERMINAL,QUICK DISC.....	6
* 2	PAOZZ	4710011752368	75078	003708	TUBE SHRINK.....	6
* 3	PAOZZ	6150013632162	45152	1878900	CABLE ASSEMBLY,SPEC HOOK ARM RH, NON-FUNCTIONAL.....	1
* 4	PAOZZ	5330013554809	OD5M6	731740-002	GASKET.....	4
* 5	PAOZZ	5340012044888	84971	TA720-S8	CLAMP,LOOP.....	4
* 6	PAOZZ	5340013558246	53790	2180PA	CLAMP,BLOCK.....	2
* 7	PAOZZ	5930014649574	52090	XS1M18PA370TF	SWITCH,PROXIMITY HOOK ARM UP.....	1
* 8	PAOZZ	5305010645470	45152	45092AX	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.50 IN LG.....	4
* 9	PAOZZ	5310005825965	96906	MS35338-44	WASHER,LOCK 0.250 NOM.....	4
* 10	PAOZZ	5340013556821	53790	DP-2	COVER,ACCESS.....	2
* 11	PAOZZ	6150013625218	45152	1878910	WIRING HARNESS HOOK ARM LH, NON-FUNCTIONAL.....	1
* 12	PAOZZ	5930014649574	52090	XS1M18PA370TF	SWITCH,PROXIMITY MAIN FRAME DOWN...	1
* 13	PAOZZ	5330012060213	56501	5262	O-RING 0.790 1D X 0.138 NOM.....	4
* 14	PAOZZ	5975012070230	81992	SHC-1022	BOX CONNECTOR,ELECT 0.50 NPT X 0.55 CORD.....	4
* 15	PAOZZ	5310011191811	15235	141	NUT,LOCK 0.50-14 UNC.....	4
* 16	PAOZZ	5305012807901	80204	B1821BH025C100N	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.00 IN LG.....	2
* 17	PAOZZ	5310008094058	96906	MS27183-10	WASHER,FLAT 0.281 NOM.....	4
* 18	PAOZZ	5935013761003	45152	1997520 W	PLATE,RETAINING,ELE.....	1
* 19	PAOZZ	5310010666759	72962	21NE-040	NUT,SELF-LOCKING,HE 0.250-20 UNC...	2
* 20	PAOZZ	6150013625217	45152	1891410	WIRING HARNESS INSIDE LHS JUNCTION BOX.....	1

END OF FIGURE

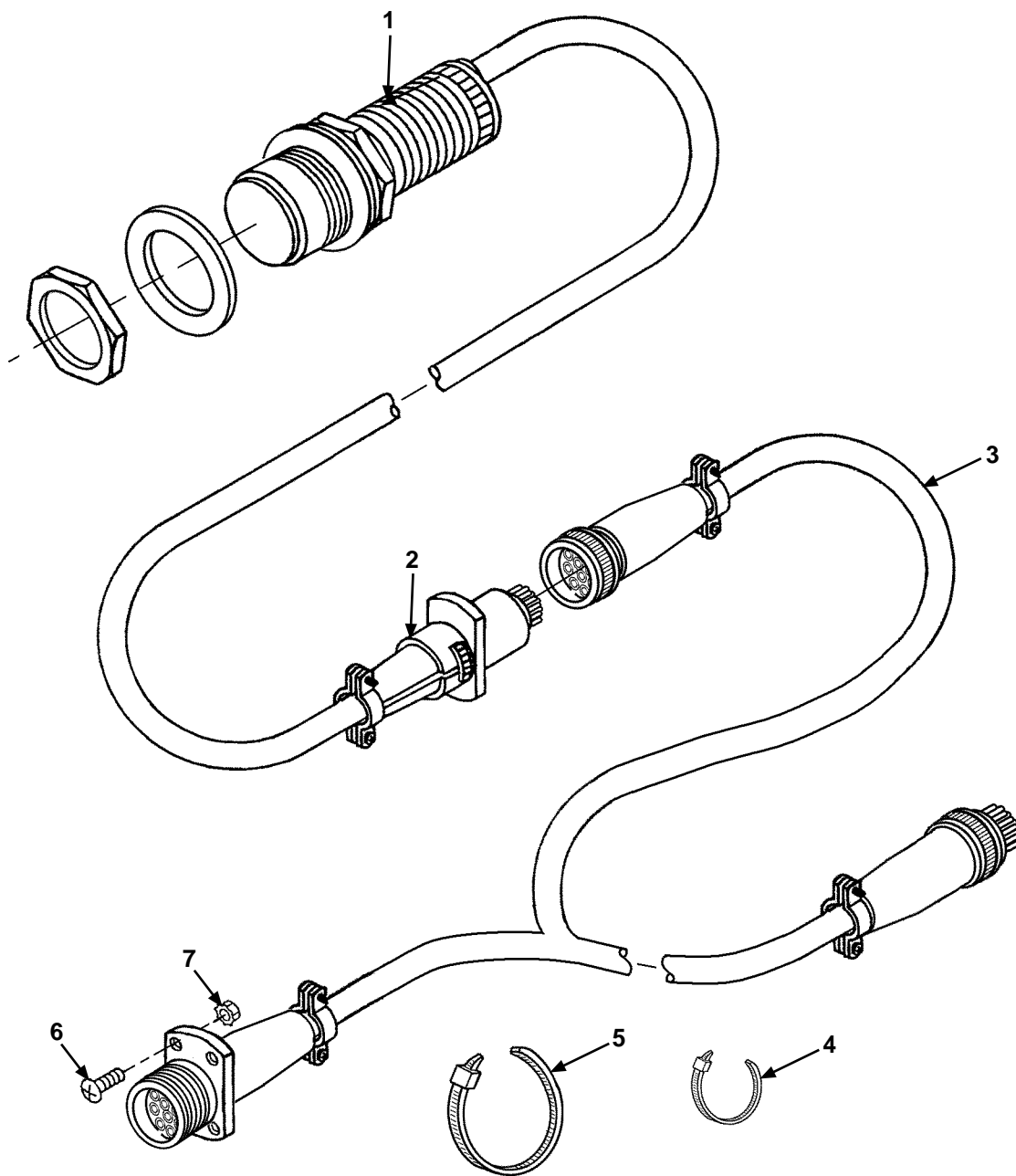


Figure 47C. Main Frame Proximity Switch and Wiring Harness (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2240 LHS WIRING HARNESSSES FIG. 47C MAIN FRAME PROXIMITY SWITCH AND WIRING HARNESS (MODEL B ONLY)						
* 1	PAOZZ	5930014649581	52090	XS1M30PA370TF	SWITCH,PROXIMITY NO-TRANSIT LIGHT..	1
* 2	PAOZZ	5935013571036	71468	CA3101F10SL 3PF80	CONNECTOR,PLUG,ELECT.....	1
* 3	PAOZZ	6150013625216	45152	1860820	WIRING HARNESS MAIN FRAME.....	1
* 4	PAOZZ	5975000742072	96906	MS3367-1-9	STRAP,TIEDOWN,ELECT 7.50 IN LG.....	46
* 5	PAOZZ	5340010531331	45152	5201HX	STRAP,TIEDOWN,ELECT 11.0 IN LG.....	3
* 6	PAOZZ	5305009836730	96906	MS35206-218	SCREW,MACHINE 0.112-40 UNC X 0.625 IN LG.....	4
* 7	PAOZZ	5310005420087	78189	511-041810-01	NUT,PLAIN,ASSEMBLED 0.112-40 UNC...	4
END OF FIGURE						

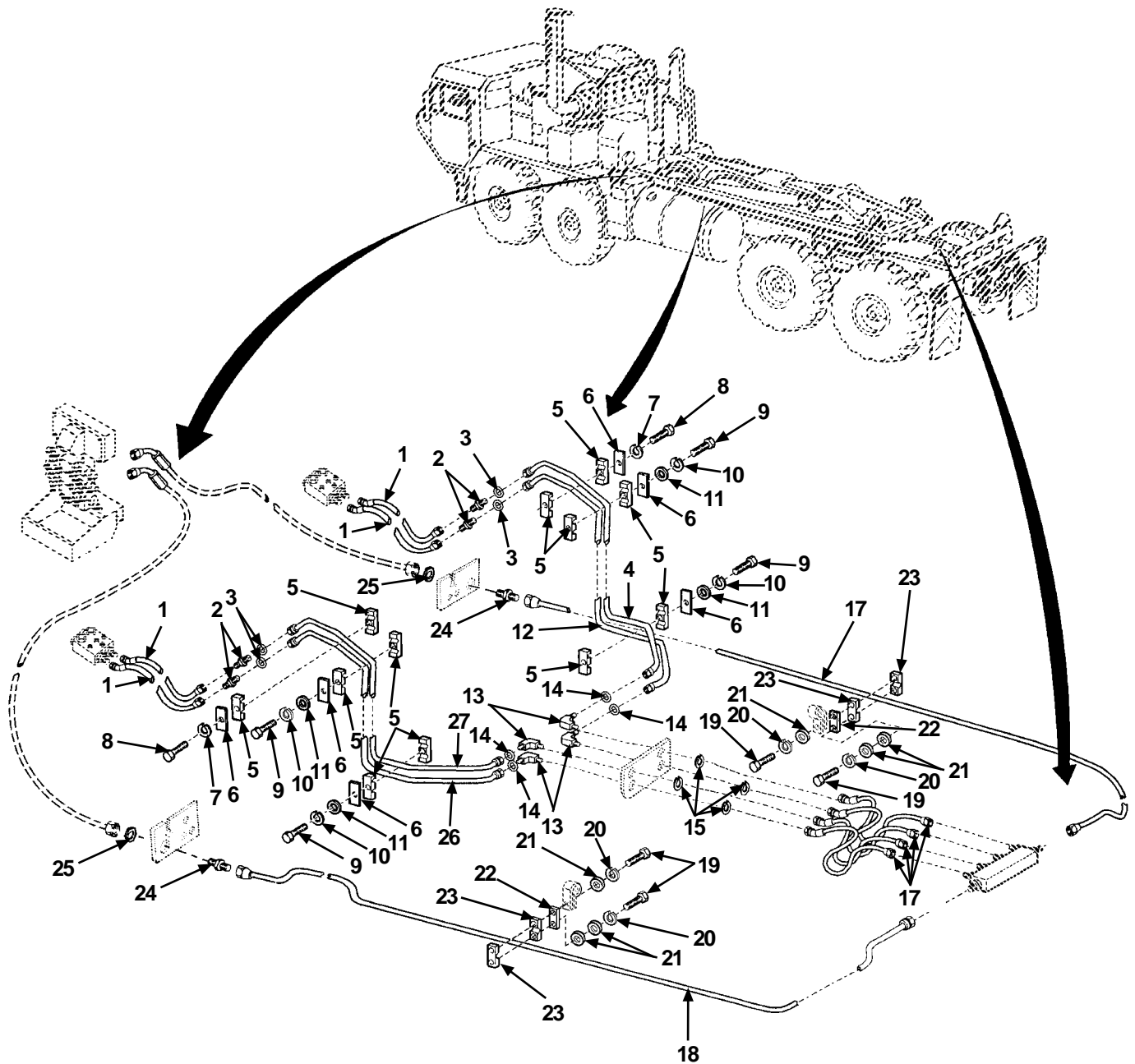


Figure 48. Hook Arm Cylinder Hydraulic Lines and Fittings



## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2300 LHS HYDRAULICS FIG. 48 HOOK ARM CYLINDER HYDRAULIC LINES AND FITTINGS						
1	PAFZZ	4720013566804	01276	FK1328HHH0224	HOSE ASSEMBLY, NONME.....	4
2	PAFZZ	4730013559000	45152	1890820	ADAPTER, STRAIGHT, TU 0.750-12 UNC X 1.062-12 UN.....	4
3	PAFZZ	5331013611505	8C563	200-116-4490	O-RING PART OF P/N 1890820.....	4
4	PAFZZ	4710013613985	45152	1862600	TUBE ASSEMBLY, METAL RH HOOK ARM, TOP.....	1
5	PAOZZ	5340013553733	53790	3190/190-PA	CLAMP, LOOP.....	6
6	PAOZZ	5340011721566	53790	GD-DS3	COVER, ACCESS.....	6
7	PAOZZ	5310011415565	45152	2150HX1	WASHER, LOCK 0.312.....	2
8	PAOZZ	5306011647437	45152	1849HX1	BOLT, MACHINE 0.312-18 UNC X 1.75 IN LG.....	2
9	PAOZZ	5306008165272	96906	MS35307-340	BOLT, MACHINE 0.312-18 UNC X 2.00 IN LG.....	4
10	PAOZZ	5310010688446	45152	354AX	WASHER, LOCK 0.312 NOM.....	4
11	PAOZZ	5310010617452	45152	1804HX	WASHER, FLAT 0.344 NOM.....	4
12	PAFZZ	4710013609502	45152	1862590	TUBE, BENT, METALLIC HOOKARM RH, BOTTOM.....	1
13	PAFZZ	4730013562653	45152	1890810	ELBOW, TUBE TO BOSS 0.750 OD X 0.750 JIC WITH ADAPTER.....	4
14	PAFZZ	5331013611505	8C563	200-116-4490	O-RING PART OF P/N 1890810.....	4
15	PAOZZ	5310005503714	96906	MS35333-47	WASHER, LOCK 0.750 NOM.....	4
16	PAFZZ	4720013564555	01276	FK1329HHH0244	HOSE ASSEMBLY, NONME 0.750.....	4
17	PAFZZ	4710013602292	45152	1862620	TUBE, BENT, METALLIC COMPRESSION FRAME RH.....	1
18	PAFZZ	4710013567535	45152	1862610	TUBE, BENT, METALLIC COMPRESSION FRAME LH.....	1
19	PAOZZ	5305012038360	45152	1337630	SCREW, CAP, HEXAGON H 0.250-20 X 1.750 IN LG.....	16
20	PAOZZ	5310010614480	96906	MS35338-44	WASHER, LOCK 0.250 NOM.....	16
* 21	PAOZZ	5310008094058	96906	MS27183-10	WASHER, FLAT 0.281 NOM.....	16
22	PAOZZ	5340012313916	53790	DP-3	COVER, ACCESS.....	8
23	PAOZZ	5340013558247	57390	3254PA	CLAMP, BLOCK 1.00 OD.....	8
24	PAFZZ	4730013568646	45152	1890800	UNION, TUBE 1.00 OD X 1.062.....	2
25	PAFZZ	5331003955737	02697	3-912N552-90	O-RING PART OF P/N 1890800.....	2
26	PAFZZ	4710013586946	45152	1862570	TUBE, BENT, METALLIC LH HOOK ARM, BOTTOM.....	2
27	PAFZZ	4710013602293	45152	1862580	TUBE, BENT, METALLIC RH HOOKARM, TOP.	1

END OF FIGURE

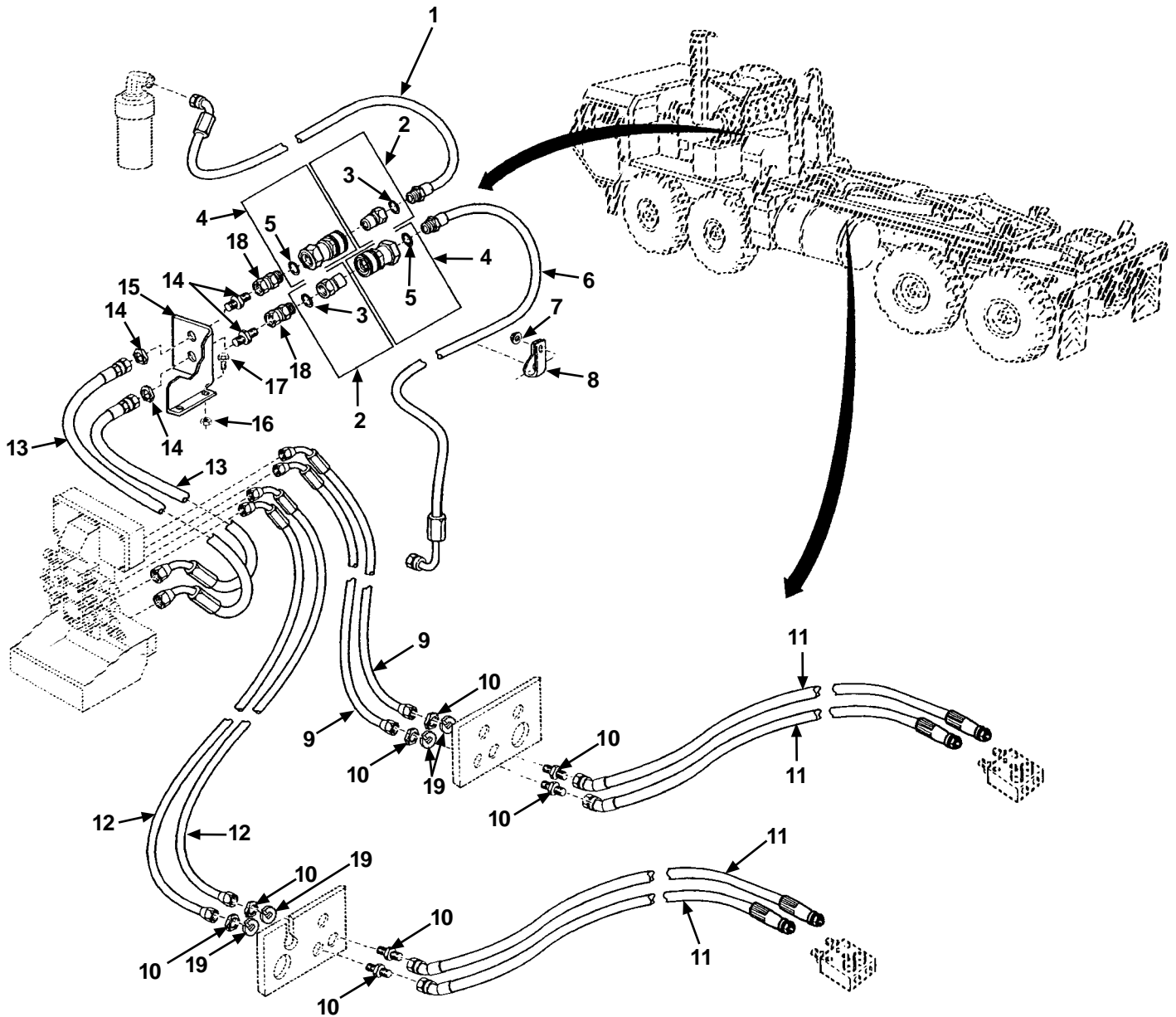


Figure 49. Main Cylinder Hydraulic Lines and Fittings

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2300 LHS HYDRAULICS FIG. 49 MAIN CYLINDER HYDRAULIC LINES AND FITTINGS						
* 1	PAFZZ	4720014537345	45152	3109542	HOSE ASSEMBLY, NONME.....	1
2	PAFZZ	4730012208297	01276	FD45-1168-16-16	COUPLING HALF, QUICK MALE.....	2
* 3	PAOZZ	5331014573518	01276	FF9446-19	O-RING PART OF P/N FD45-1168-16-16.	1
4	PAFZZ	4730012212080	01276	FD45-1169-16-16	COUPLING HALF, QUICK FEMALE.....	2
* 5	PAOZZ	5331014573518	01276	FF9446-19	O-RING PART OF P/N FD45-1169-16-16.	1
* 6	PAFZZ	4720014537311	45152	3109540	HOSE ASSEMBLY, NONME.....	1
* 7	PAOZZ	5310013405671	45152	1333510	NUT, SELF-LOCKING, EX 0.312-18 UNC...	1
* 8	PAOZZ	5340004044100	75272	C0V2113	CLAMP, LOOP 1.250 NOM.....	1
* 9	PAFZZ	4720014537766	45152	3062735	HOSE ASSEMBLY, NONME.....	2
* 10	PAFZZ	4730002266772	96906	MS51520A8S	ADAPTER, STRAIGHT, TU 0.750-16 X 0.750-16.....	4
11	PAFZZ	4720013564556	01276	FU680HHH0260180	HOSE ASSEMBLY, NONME.....	4
* 12	PAFZZ	4720014544731	45152	3062733	HOSE ASSEMBLY, NONME.....	2
* 13	PAFZZ	4720014537291	45152	3062740	HOSE ASSEMBLY, NONME.....	2
14	PAFZZ	4730008070930	96906	MS24393-16	NIPPLE, TUBE 1.312 UNF.....	2
* 15	PAOZZ	5340014568528	45152	3107526	BRACKET, ANGLE.....	1
* 16	PAOZZ	5310012881116	82458	T893R	NUT, SELF-LOCKING, EX 0.382-16 UNC... G5.....	2
17	PAOZZ	5306012875714	52167	WC0412PB	BOLT, MACHINE 0.382-16 UNC X 1.00 IN LG.....	2
18	PAFZZ	4730012414670	01276	2266-16-16S	ADAPTER, STRAIGHT, TU.....	2
* 19	PAFZZ	5310005503714	96906	MS35333-47	WASHER, LOCK 0.750 NOM (MODEL B ONLY).....	4

END OF FIGURE

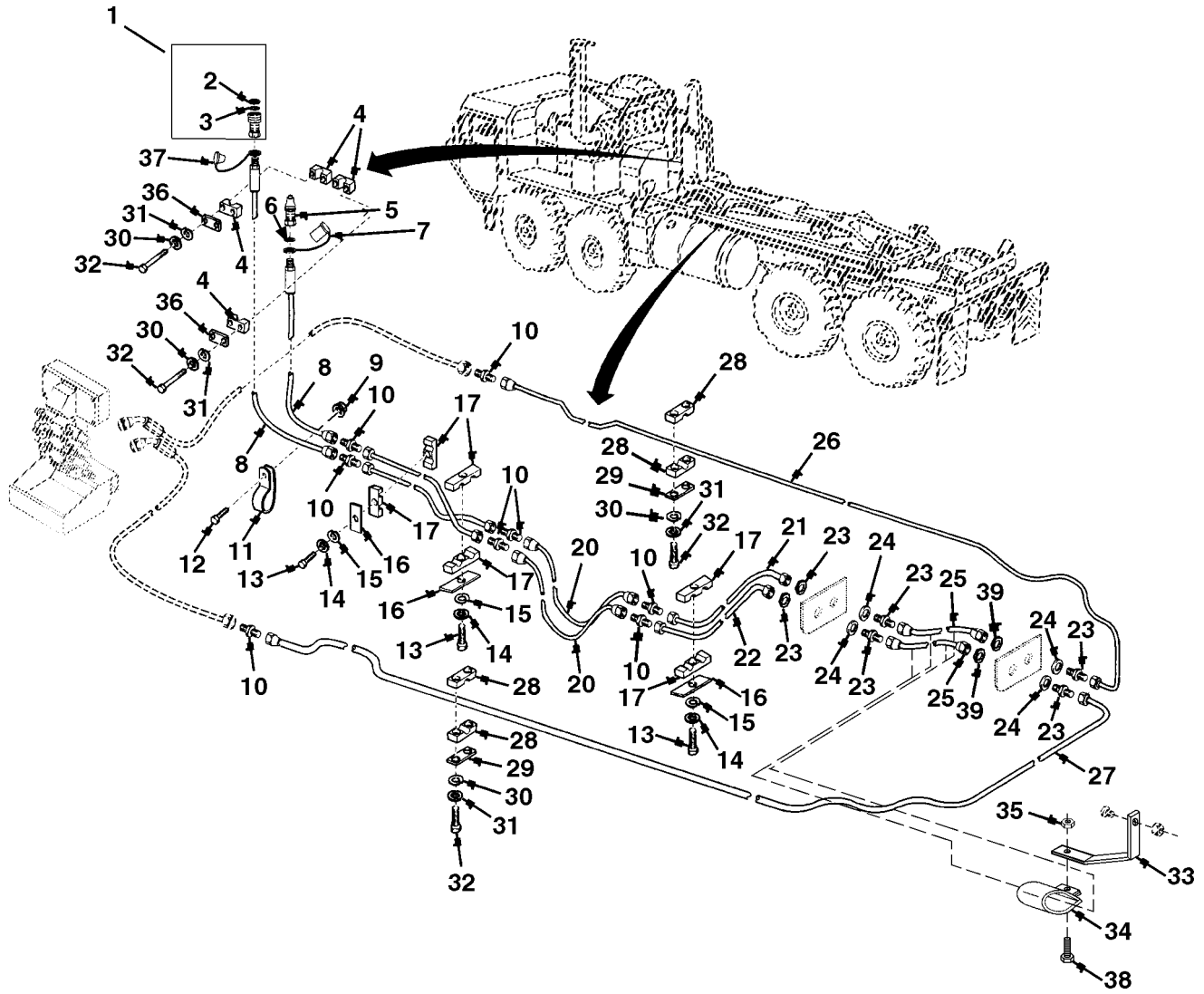


Figure 50. Winch Hydraulic Lines and Fittings

## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2300 LHS HYDRAULICS FIG. 50 WINCH HYDRAULIC LINES AND FITTINGS						
1	PAFZZ	4730010254918	01276	5608-10-10S	COUPLING HALF,QUICK FEMALE.....	1
2	PAFZZ	5330000179253	01276	22550-211	PACKING,PREFORMED PART OF P/N 5608-10-10S.....	1
3	PAFZZ	5340007898409	01276	22021-10	RING,BACKUP PART OF P/N 5608-10-10S	1
4	PAOZZ	5340014568523	45152	3126736	CLAMP,BLOCK 1.125 NOM ID.....	2
5	PAOZZ	4730010241347	01276	5610-10-10S	COUPLING HALF,QUICK MALE.....	1
6	PAOZZ	5330013444335	99517	S1E10164	ITEM 17 O-RING 0.375 PORT, PART OF P/N 5610-10-10S.....	1
7	PAOZZ	5340014587239	97111	6657-10	CAP,PROTECTIVE,DUST.....	1
8	PAFZZ	4720014537816	45152	3062738	HOSE ASSEMBLY,NONME.....	2
9	PAOZZ	5310013405671	45152	1333510	NUT,SELF-LOCKING,EX 0.312-18 UNC G5.....	2
10	PAFZZ	4730011434223	45152	39630AX	COUPLING,HOSE.....	8
11	PAOZZ	5340010813419	45152	2362HX	CLAMP,LOOP 2.00 ID.....	2
12	PAOZZ	5305014569449	45152	1955110	SCREW,CAP,HEXAGON H 0.31-18 X 0.750 IN LG.....	2
13	PAOZZ	5306008165272	96906	MS35307-340	BOLT,MACHINE 0.312-18 UNC X 2.00 IN LG.....	3
14	PAOZZ	5310010617452	45152	1804HX	WASHER,FLAT 0.344 NOM.....	3
15	PAOZZ	5310010688446	45152	354AX	WASHER,LOCK 0.312 NOM.....	3
16	PAOZZ	5340011721566	53790	GD-DS3	COVER,ACCESS.....	3
17	PAOZZ	5340014568547	53790	3160/160-PA	CLAMP,BLOCK.....	3
18	PAFZZ	5310010688446	45152	3062917	TUBE ASSEMBLY,METAL HOOK ARM 0.625 OD.....	1
19	PAFZZ	4710014567210	45152	3062916	TUBE ASSEMBLY,METAL HOOK ARM 0.625 OD.....	1
20	PAFZZ	4720014537999	45152	3062736	HOSE ASSEMBLY,NONME.....	2
21	PAFZZ	4710014537695	45152	3117335	TUBE ASSEMBLY,METAL.....	1
22	PAFZZ	4710014537700	45152	3062913	TUBE ASSEMBLY,METAL 0.625 OD.....	1
23	PAFZZ	5935001031774	01276	2041-10-10S	ADAPTER,CONNECTOR WITH NUT.....	4
24	PAOZZ	5310006601819	96906	MS35333-48	WASHER,LOCK 0.875 NOM.....	4
25	PAFZZ	4720014537944	45152	3062737	HOSE ASSEMBLY,NONME.....	2
26	PAFZZ	4710014567927	45152	3062915	TUBE ASSEMBLY,METAL 0.625 OD, RH COMP FRAME.....	1
27	PAFZZ	4710014567909	45152	3062914	TUBE ASSEMBLY,METAL 0.625 OD, LH COMP FRAME.....	1
28	PAOZZ	5340014568525	45152	3115382	CLAMP,BLOCK 0.625 DIA.....	10
29	PAOZZ	5340013556821	53790	DP-2	COVER,ACCESS.....	10
30	PAOZZ	5310008238804	96906	MS27183-10	WASHER,FLAT 0.281 NOM.....	24
31	PAOZZ	5310005825965	96906	MS35338-44	WASHER,LOCK 0.250 NOM.....	24
32	PAOZZ	5305012038360	45152	1337630	SCREW,CAP,HEXAGON H 0.250-20 UNC X 1.750 IN LG.....	20
33	PAOZZ		45152	3165325	BRACKET.....	1
* 34	PAOZZ	2510014801128	45152	3256916	CLAMP,LOOP 2.250 ID.....	1
35	PAOZZ	5310012881116	82458	T893R	NUT,SELF-LOCKING HE 0.382-16 UNC G5.....	1
36	PAOZZ	5340014571222	45152	3126738	COVER,ACCESS.....	2

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
* 37	PAOZZ	5340014587237	97111	6659-10	CAP, PROTECTIVE, DUST.....	1
* 38	PAOZZ	5306012875714	52167	WC0412PB	BOLT, MACHINE 0.382-16 X 1.00 IN LG, G5.....	1

END OF FIGURE



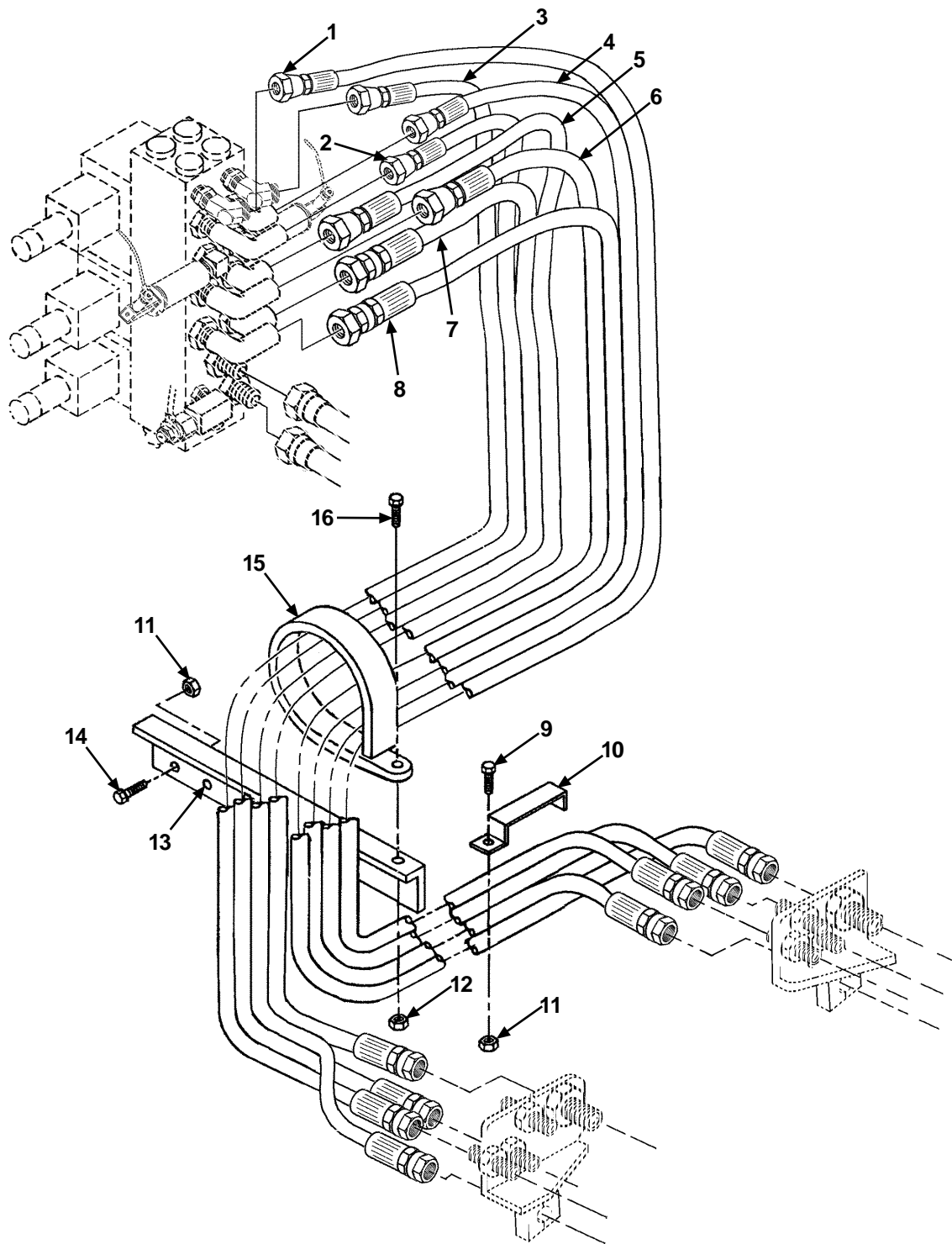


Figure 50A. LHS Main Manifold to Compression Frame Hoses (Model B Only)



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2300 LHS HYDRAULICS FIG. 50A LHS MAIN MANIFOLD TO COMPRESSION FRAME HOSES (MODEL B ONLY)						
* 1	PAFZZ		45152	3056244	HOSE ASSEMBLY, NONME.....	1
* 2	PAFZZ		45152	3056241	HOSE ASSEMBLY, NONME.....	1
* 3	PAFZZ		45152	3056242	HOSE ASSEMBLY, NONME.....	1
* 4	PAFZZ		45152	3056245	HOSE ASSEMBLY, NONME.....	1
* 5	PAFZZ		45152	3056239	HOSE ASSEMBLY, NONME.....	1
* 6	PAFZZ		45152	3056238	HOSE ASSEMBLY, NONME.....	1
* 7	PAFZZ		45152	3276323	HOSE ASSEMBLY, NONME.....	1
* 8	PAFZZ		45152	3276324	HOSE ASSEMBLY, NONME.....	1
* 9	PAOZZ	5306013410712	45152	1756870	BOLT, MACHINE 0.31-18 X 1.25 IN LG G5.....	1
* 10	PAOZZ	5340013636141	45152	1779770	BRACKET, MULTIPLE AN.....	1
* 11	PAOZZ	5310013405671	45152	1333510	NUT, SELF-LOCKING, EX 0.312-18 UNC G5.....	3
* 12	PAOZZ	5310012881116	82458	T893R	NUT, HEX 0.382-16 UNC G5.....	1
* 13	PAOZZ		45152	3057867	BRACKET, HOSE CLAMP.....	1
* 14	PAOZZ	5305013400225	45152	1754210	SCREW, CAP, HEX HD 0.312-18 UNC X 1.00 IN LG, G5.....	2
* 15	PAOZZ	5340002241204	84971	TA720S24	CLIP, CUSHIONED.....	1
* 16	PAOZZ	5306012875714	52167	WCO412PB	BOLT, MACHINE 0.382-16 UNC X 1.00 IN LG, G5.....	1

END OF FIGURE

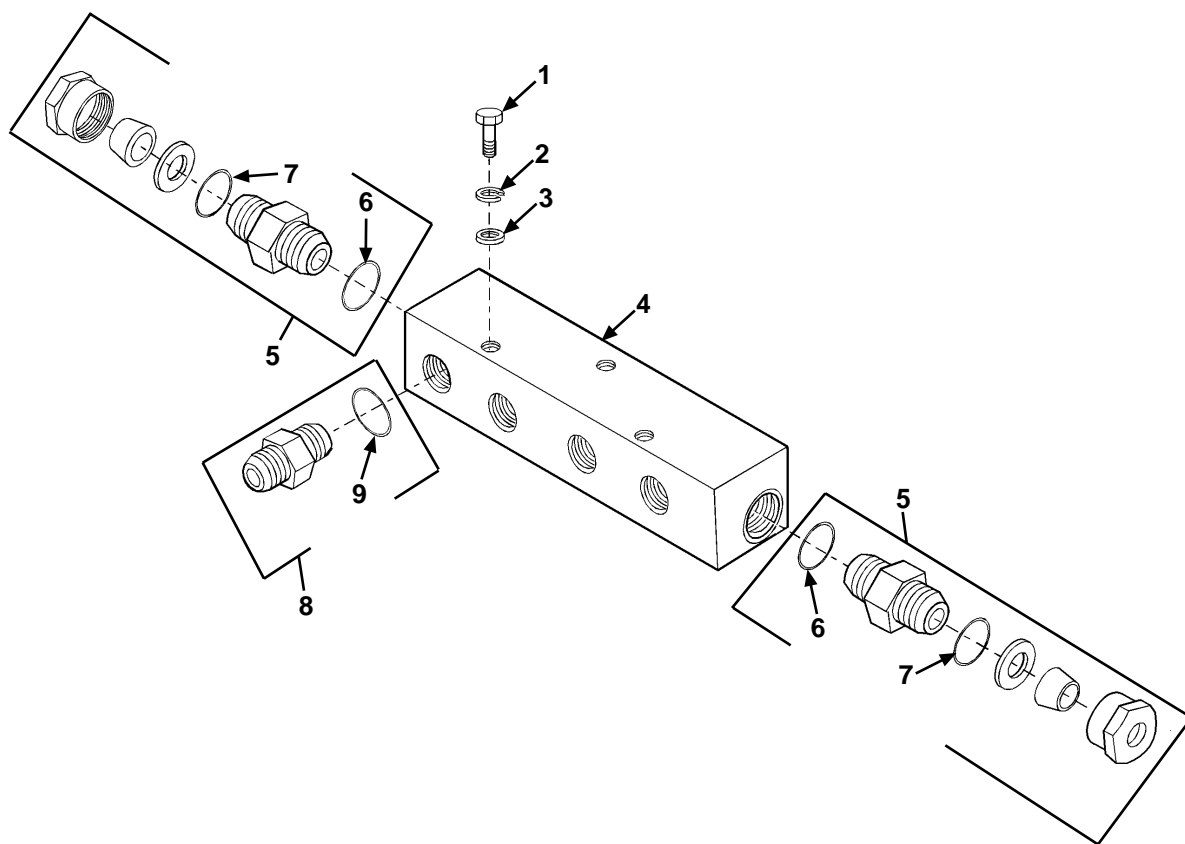


Figure 51. Diverter Manifold

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2300 LHS HYDRAULICS						
FIG. 51 DIVERTER MANIFOLD						
1	PAOZZ	5305013445532	45152	1846HX1	SCREW,CAP,HEXAGON H 0.318-18 UNC X 1.00 IN LG.....	3
*	2	PAOZZ	5310010688446	45152	354AX WASHER,LOCK 0.312 NOM.....	3
*	3	PAOZZ	5310010617452	45152	1804HX WASHER,FLAT 0.344 NOM.....	3
	4	PAFZZ	4730013561018	45152	1891380 MANIFOLD,HYDRAULIC DIVERTER.....	1
	5	PAFZZ	4730013560687	45152	1890830 ADAPTER,STRAIGHT,TU MALE, 1.0625 UNC.....	2
*	6	PAFZZ	5331003955737	02697	3-912N552-90 O-RING PART OF P/N 1890830.....	1
*	7	PAFZZ	5331011168112	02697	2-214N552-90 O-RING PART OF P/N 1890830.....	1
*	8	PAOZZ	4730011797575	98441	8F50X-S NIPPLE,PIPE WITH O-RING, 0.750-16 JIC (MODEL A ONLY).....	4
*	8	PAOZZ	4730011564835	81343	8-8 070120CA ADAPTER,STRAIGHT WITH O-RING (MODEL B ONLY).....	4
*	9	PAOZZ	5330012752602	02697	3-908N552-90 O-RING PART OF P/N 8F50X-S & 8-8 070120CA.....	1
END OF FIGURE						

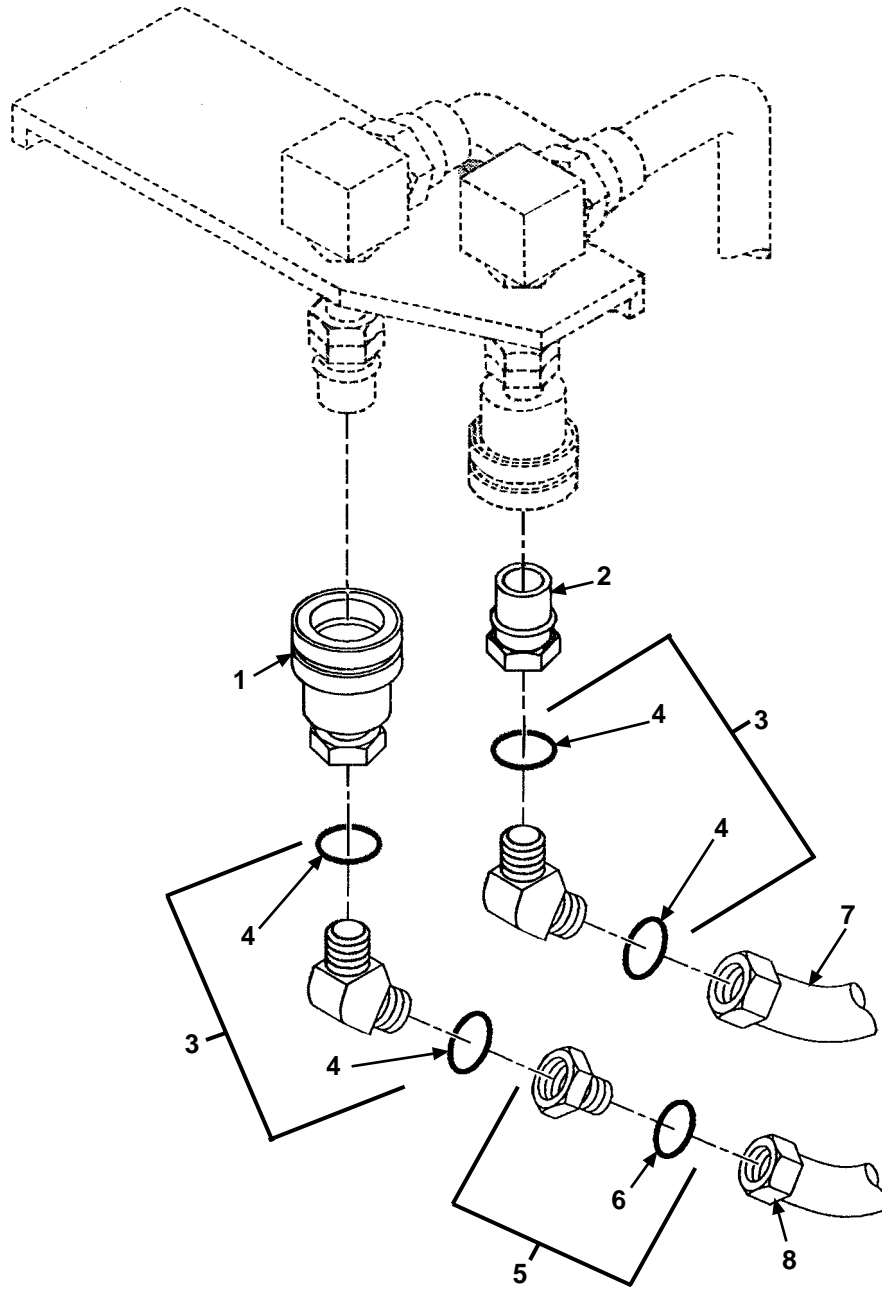


Figure 51A. LHS Disconnect Adapters (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2300 LHS HYDRAULICS						
FIG. 51A LHS DISCONNECT ADAPTER						
(MODEL B ONLY)						
* 1	PAFZZ	4730012212080	01276	FD45-1169-16-16	COUPLING HALF,QUICK FEMALE.....	1
* 2	PAFZZ	4730012208297	01276	FD45-1168-16-16	COUPLING HALF,QUICK MALE.....	1
* 3	PFFZZ	4730009355355	96906	MS51528A16	ELBOW,TUBE TO PIPE.....	2
* 4	PFFZZ	5330012442513	01276	22617-8	O-RING PART OF P/N MS51528A16.....	2
* 5	PFFZZ	4730014622632	01276	221501-16-12S	REDUCER,ADAPTER,FIT.....	1
* 6	PAFZZ	5331002287196	01276	22617-12	PACKING,PREFORMED PART OF P/N 221501-16-12S.....	1
* 7	PFFZZ		45152	1456530	HOSE ASSEMBLY,NONME.....	1
* 8	PFFZZ		45152	3056237	HOSE ASSEMBLY,NONME.....	1

END OF FIGURE

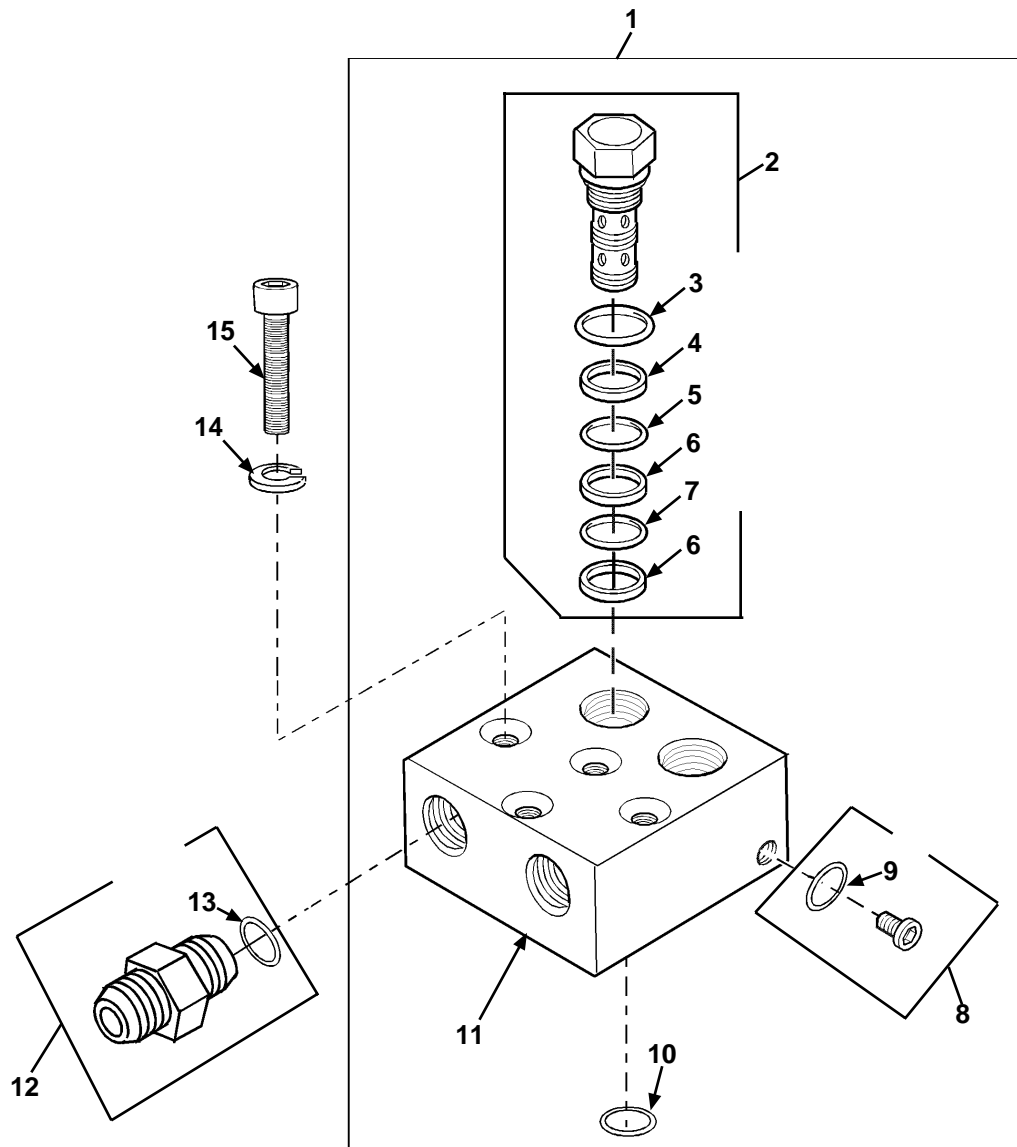


Figure 52. Hook Arm Manifold

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2310 MANIFOLD, HOOK ARM FIG. 52 HOOK ARM MANIFOLD						
* 1	PBFZZ	4730014537916	0FHH8	9S000340-A	MANIFOLD,ASSEMBLY H HOOK ARM ASSEMBLY (MODEL A ONLY).....	2
* 1	PBFZZ	4730013555140	45152	1891390	MANIFOLD ASSEMBLY H HOOK ARM ASSEMBLY (MODEL B ONLY), NON-FUNCTIONAL.....	2
* 2	PAFZZ	4820014542292	0FHH8	E2F050Y4350N	VALVE,HOLD BOOM HOI FOR REPAIR USE KIT SK3-0039N-1, PART OF P/N 9S000340-A, 5 LB-FT.....	1
* 3	KFFZZ		0FHH8	8024N912	O-RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 4	KFFZZ		0FHH8	8025N9015	RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 5	KFFZZ		0FHH8	8023N7015	O-RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 6	KFFZZ		0FHH8	8025N9014	RING,BACK-UP PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	2
* 7	KFFZZ		0FHH8	8022N7017	O-RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F0504350N.....	1
* 8	PAFZZ	5340013893462	0FHH8	801001M	PLUG,PROTECTIVE,DUS 5 LB-FT, PART OF P/N 95000340-A.....	2
* 9	PAFZZ		0FHH8	8024N902	O-RING PART OF P/N 801001M.....	1
* 10	PAFZZ	5330013559911	0FHH8	8023N7013	O-RING PART OF P/N 9S000340-A.....	2
* 11	XAFZZ		0FHH8	9P001041	BLOCK M/C PART OF P/N 9S000340-A	1
* 12	PAOZZ	4730011797575	98441	8F50X-S	NIPPLE,PIPE WITH O-RING, 0.750-16 JIC (MODEL A ONLY).....	4
* 12	PAOZZ		45152	14947FX	NIPPLE,PIPE (MODEL B ONLY).....	4
* 13	PAFZZ	5330012752602	02697	3-908N552-90	O-RING PART OF P/N 8F50X-S & 14947FX.....	1
* 14	PAOZZ	5310013558798	45152	1937550	WASHER,LOCK 0.385 NOM.....	8
* 15	PAOZZ	5305014593059	45152	3064801	SCREW,CAP,SOCKET HE 0.36-16 X 2.75 IN LG.....	8

END OF FIGURE

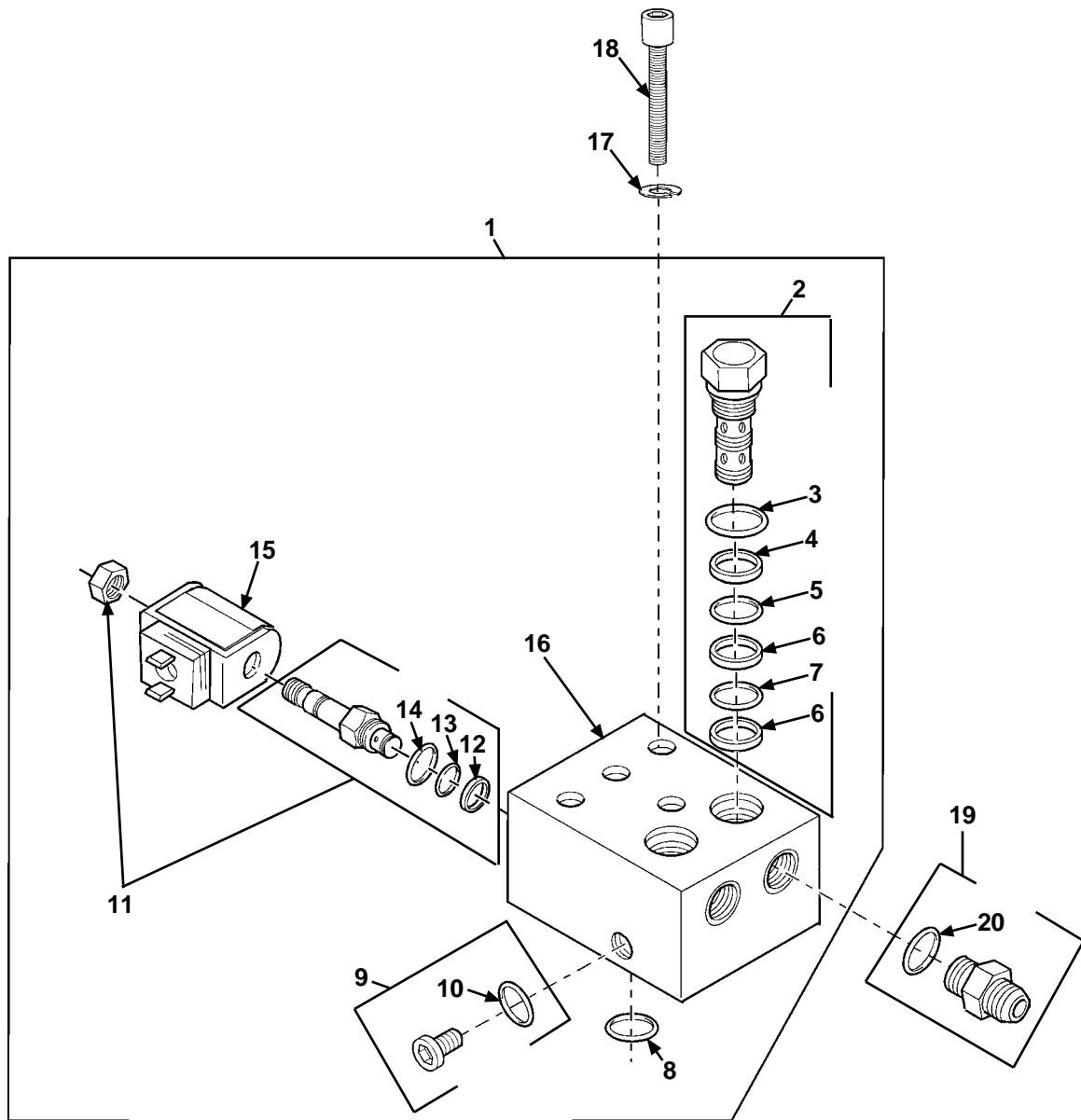


Figure 53. Main Frame Manifold



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2320 MANIFOLD, MAIN CYLINDER FIG. 53 MAIN FRAME MANIFOLD						
* 1	PBFZZ	4730014537915	0FHH8	9S000339-A	MANIFOLD ASSEMBLY H MAIN CYLINDER.....	2
* 2	PAFZZ	4820014542292	0FHH8	E2F050Y4350N	VALVE,HOLD,BOOM HOI FOR REPAIR USE KIT SK3-0039N-1, PART OF P/N 9S000339-A, 55 LB-FT.....	2
* 3	KFFZZ		0FHH8	8024N912	O-RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 4	KFFZZ		0FHH8	8025N9015	RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 5	KFFZZ		0FHH8	8023N7015	O-RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 6	KFFZZ		0FHH8	8025N9014	O-RING,BACK-UP PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	2
* 7	KFFZZ		0FHH8	8022N7017	O-RING PART OF KIT P/N SK3-0039N-1, PART OF P/N E2F050Y4350N.....	1
* 8	PAFZZ	5330013559911	0FHH8	8023N7013	O-RING PART OF P/N 9S000339-A.....	2
* 9	PAFZZ	5340013893462	0FHH8	801001M	PLUG,PROTECTIVE,DUS PART OF P/N 9S000339-A.....	2
* 10	PAFZZ		0FHH8	8024N902	O-RING PART OF P/N 801001M.....	1
* 11	PAFZZ	4810014539543	0FHH8	GS027400N	VALVE,SOLENOID PART OF P/N 9S000339-A.....	2
* 12	PAFZZ	5330014653236	0FHH8	8025N9009	RING,WIPER PART OF KIT P/N SK3-0006N, PART OF P/N GS027400N....	1
* 13	KFFZZ		0FHH8	8023N7009	O-RING PART OF KIT P/N SK3-0006N, PART OF P/N GS027400N.....	1
* 14	KFFZZ	5331014571834	0FHH8	8024N908	O-RING PART OF KIT P/N SK3-0006N, PART OF P/N GS027400N.....	1
* 15	PAFZZ	5950014267978	0FHH8	CCP024D	COIL,ELECTRICAL 24 VDC 3 LB-FT, PART OF P/N 9S000339-A.....	2
* 16	XAFZZ		0FHH8	9P000948	BLOCK M/C PART OF P/N 9S000339-A...	1
* 17	PAOZZ	5310013558798	45152	1937550	WASHER,LOCK 0.385 NOM.....	8
* 18	PAOZZ	5305014593059	45152	3064801	SCREW,CAP,SOCKET HE 0.36-16 X 2.75 IN LG.....	8
* 19	PAOZZ	4730011797575	98441	8F50X-S	NIPPLE,PIPE WITH O-RING 0.750-16 JIC.....	4
* 20	PAFZZ	5330012752602	02697	3-908N552-90	O-RING PART OF P/N 8F50X-S.....	1

END OF FIGURE

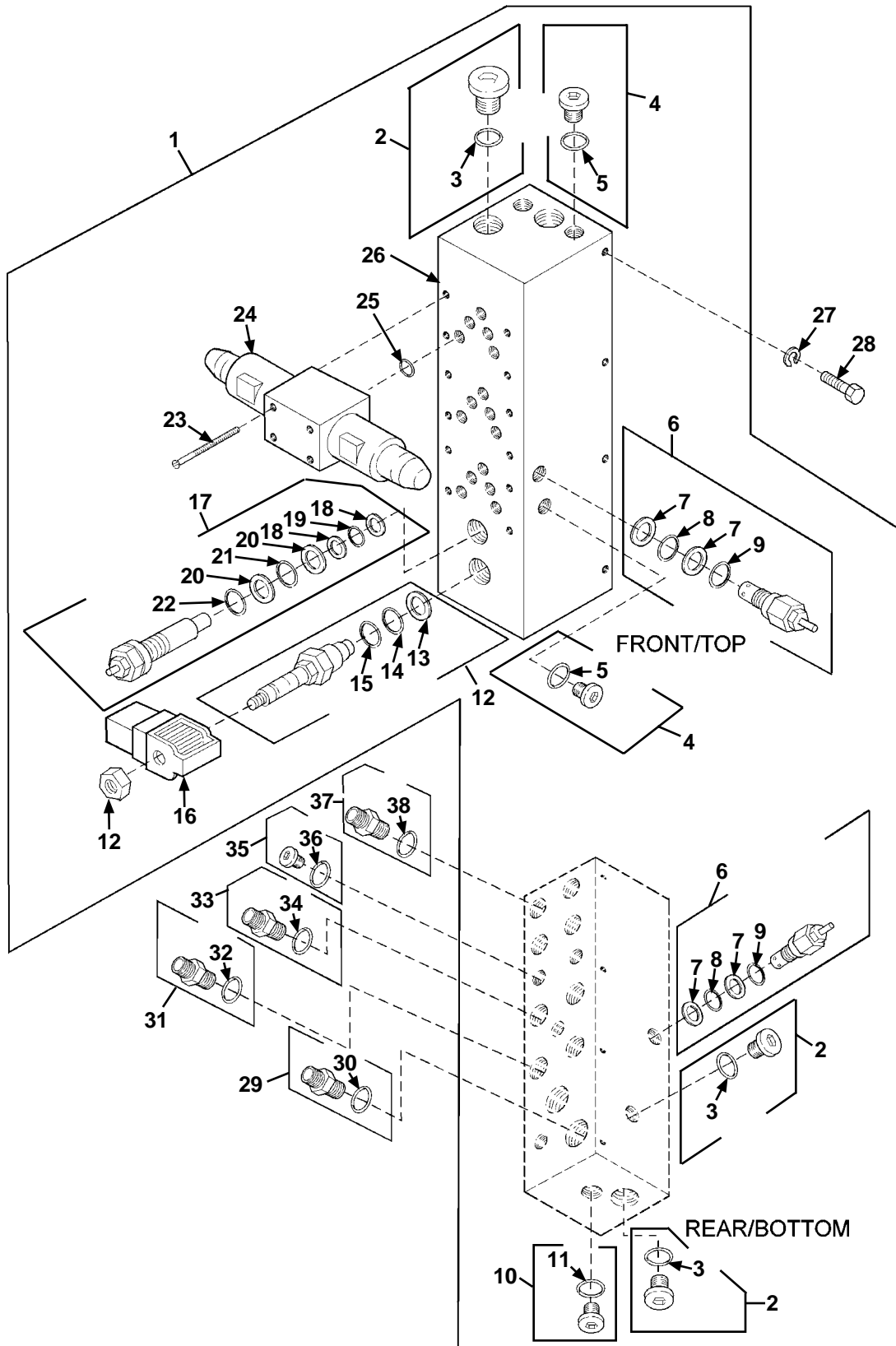


Figure 54. Main Hydraulic Manifold

## SECTION II

C01

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2350 MANIFOLD, MAIN FIG. 54 MAIN HYDRAULIC MANIFOLD						
* 1	PBFZZ	4730014538630	0FHH8	9S000342-A	MANIFOLD ASSEMBLY,H (MODEL A ONLY).	1
* 1	PAFZZ		0FHH8	9DD000606	MANIFOLD ASSEMBLY,H (MODEL B ONLY).	1
* 2	PAFZZ	5365013555142	0FHH8	801006M	PLUG,MACHINE THREAD PART OF P/N 9S000342-A (MODEL A ONLY).....	4
* 2	PFFZZ		0FHH8	820008M	PLUG,MACHINE THREAD PART OF P/N 9DD000606 (MODEL B ONLY).....	4
* 3	PAFZZ	5331014571834	0FHH8	8024N908	O-RING PART OF P/N 801006M.....	1
* 4	PAFZZ	5365013615599	0FHH8	801005M	PLUG,MACHINE THREAD PART OF P/N 9S000342-A (MODEL A ONLY).....	3
* 4	PFFZZ		0FHH8	820006M	PLUG,MACHINE THREAD PART OF P/N 9DD000606 (MODEL B ONLY).....	3
* 5	PAFZZ	5331014609137	0FHH8	8024N906	O-RING PART OF P/N 801005M.....	1
* 6	PAFZZ	4820014580402	0FHH8	A04G2PZ20-145N	VALVE,SAFETY RELIEF PART OF KIT P/N SK30503N-1, PART OF P/N 9S000342-A (MODEL A ONLY).....	2
* 6	PFFZZ		0FHH8	A04G2HZ4-145N	VALVE,SAFETY RELIEF PART OF KIT P/N SK30503N-1 PART OF P/N 9DD000606 (MODEL B ONLY).....	2
* 7	KFFZZ		0FHH8	8014590N014	RING,BACK-UP PART OF KIT P/N SK30503N-1, PART OF P/N A04G2PZ20-145N.....	2
* 8	KFFZZ		0FHH8	8023N9011	O-RING PART OF KIT P/N SK30503N-1, PART OF P/N A04G2PZ20-145N.....	1
* 9	KFFZZ		0FHH8	8024N910	O-RING PART OF KIT P/N SK30503N-1, PART OF P/N A04G2PZ20-145N.....	1
* 10	PAFZZ	4730013559043	0FHH8	801003M	PLUG PIPE PART OF P/N 9S000342-A (MODEL A ONLY).....	1
* 10	PFFZZ		0FHH8	820004M	PLUG,PIPE PART OF P/N 9DD000606 (MODEL B ONLY).....	1
* 11	PAFZZ	5331014573314	0FHH8	8024N904	O-RING PART OF P/N 801003M.....	1
* 12	PAFZZ	4810013560505	0FHH8	GS028510N	VALVE,SOLENIOD PART OF KIT P/N SK3-0006N, PART OF P/N 9S000342-A & 9DD000606 (MODEL A & B).....	1
* 13	KFFZZ	5330014653236	0FHH8	8025N9009	RING,BACK-UP PART OF KIT P/N SK3-0006N, PART OF P/N GS028510N....	1
* 14	KFFZZ		0FHH8	8023N7009	O-RING PART OF KIT P/N SK3-0006N, PART OF P/N GS028510N.....	1
* 15	KFFZZ	5331014571834	0FHH8	8024N908	O-RING PART OF KIT P/N SK3-0006N, PART OF P/N GS028510N.....	1
* 16	PAFZZ	5950013557136	0FHH8	CCS024D	COIL,ELECTRICAL 24 VDC, PART OF P/N 9S000342-A & 9DD000606 (MODEL A & B)	1
* 17	PAFZZ	4820014573136	0FHH8	A4B125T20-250N	VALVE,SAFETY RELIEF PART OF KIT P/N SK3-0024N-1, PART OF P/N 9S000342-A (MODEL A ONLY).....	2
* 17	PFFZZ		0FHH8	A4B125T-250N	VALVE,SAFETY RELIEF PART OF KIT P/N SK3-0024N-1, PART OF P/N 9DD000606 (MODEL B ONLY).....	1

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
* 18	KFFZZ		0FHH8	8025N9017	RING, BACK-UP PART OF KIT P/N SK3-0024N-1, PART OF P/N A4B125T20-250N.....	2
* 19	KFFZZ		0FHH8	8023N7017	O-RING PART OF KIT P/N SK3-0024N-1, PART OF P/N A4B125T20-250N.....	1
* 20	KFFZZ		0FHH8	8035N9018	RING, BACK UP PART OF KIT P/N SK3-0024N-1, PART OF P/N A4B125T20-250N.....	2
* 21	KFFZZ		0FHH8	8023N7018	O-RING PART OF KIT P/N SK3-0024N-1, PART OF P/N A4B125T20-250N.....	1
* 22	KFFZZ		0FHH8	8024N914	O-RING PART OF KIT P/N SK3-0024N-1, PART OF P/N A4B125T20-250N.....	1
* 23	PAFZZ	5305013551355	0FHH8	804902B1W	SCREW, CAP, SOCKET HE PART OF P/N 9S000342-A & 9DD000606 (MODEL A & B)	12
* 24	PAFZZ	4810013564487	0FHH8	9DD000240	VALVE, LINEAR, DIRECT PART OF P/N 9S000342-A & 9DD000606 (MODEL A & B)	3
* 25	PAFZZ	5331014609149	0FHH8	8023N7011	O-RING PART OF KIT P/N 9DD000461, PART OF P/N 9S000342-A & 9DD000606 (MODEL A & B).....	1
* 26	XAFZZ		0FHH8	9P001043	BLOCK PART OF P/N 9S000342-A & 9DD000606 (MODEL A & B).....	1
* 27	PAFZZ	5310011290450	45152	351AX	WASHER, LOCK 0.382 NOM.....	8
* 28	PAFZZ	5305010580611	80204	B1821BH038C113N	SCREW, CAP, HEXAGON H 0.382-16 UNC X 1.25 IN LG.....	8
* 29	PAFZZ	4730009305392	96906	MS51525A16	ADAPTER, STRAIGHT, TU.....	2
* 30	PAFZZ		30780	3-916	PACKING, PREFORMED PART OF P/N MS51525A16.....	1
* 31	PAFZZ	4730010278261	01276	202702-12-10S	ADAPTER, STRAIGHT, TU.....	2
* 32	PAFZZ	5331002287196	01276	22617-12	O-RING PART OF P/N 202702-12-10S...	1
33	PAFZZ	4730007105571	01276	202702-12-12S	ADAPTER, STRAIGHT, TU.....	2
* 34	PAFZZ	5331002287196	01276	22617-12	O-RING PART OF P/N 202702-12-12S...	1
* 35	PAFZZ	5365012143822	30780	5HP50N-S	PLUG, MACHINE THREAD.....	4
* 36	PAFZZ	5331001675166	02697	3-905	O-RING PART OF P/N 5HP50N-S.....	1
* 37	PAFZZ	4730011797575	98441	8F50X-S	NIPPLE, PIPE WITH O-RING, 0.750-16 JIC.....	4
* 38	PAFZZ	5330012752602	02697	3-908N552-90	O-RING PART OF P/N 8F50X-S.....	1

END OF FIGURE



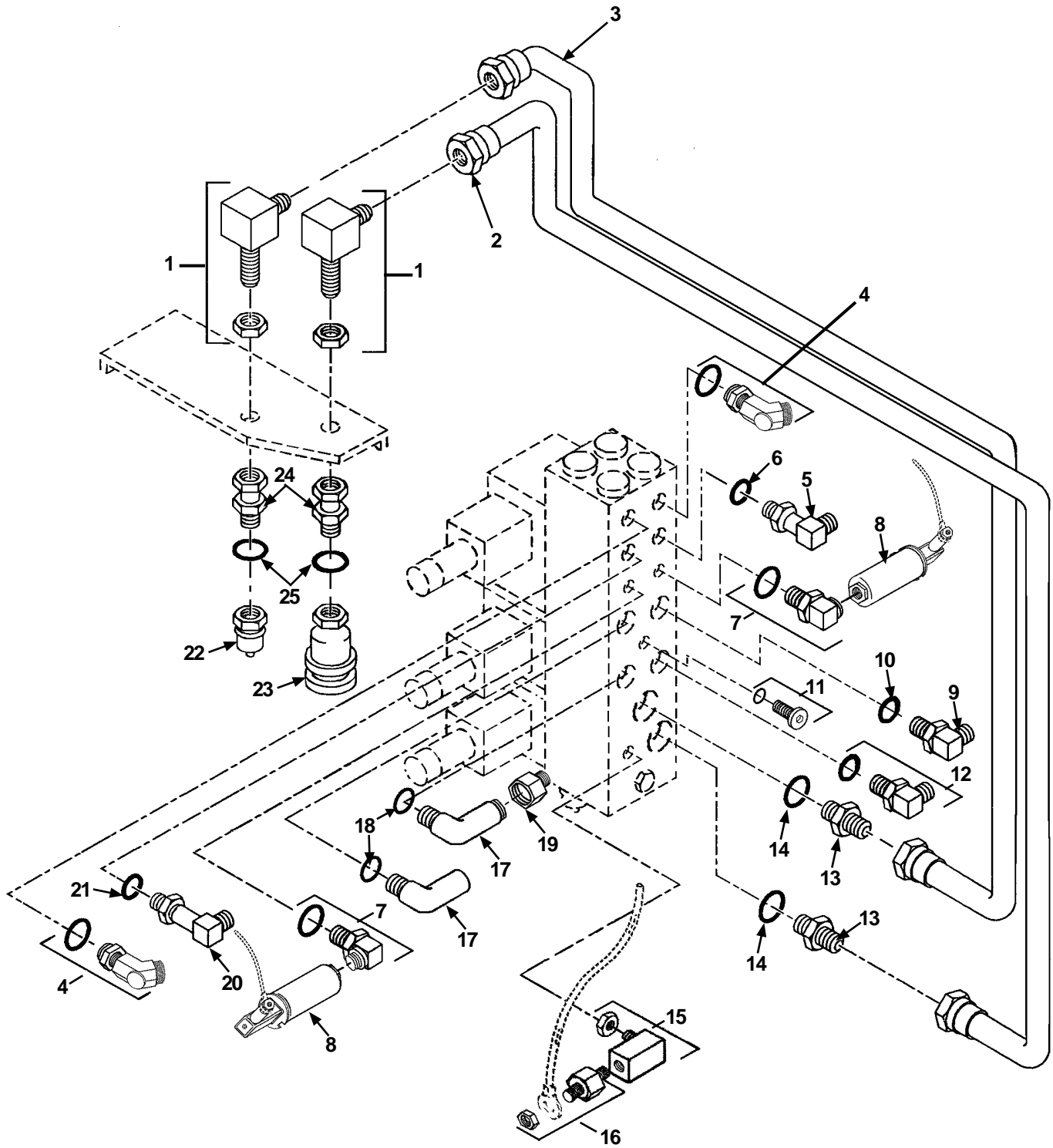


Figure 54A. Main Hydraulic Manifold Fittings and Adapters (Model B Only)

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2350 MANIFOLD, MAIN FIG. 54A MAIN HYDRAULIC MANIFOLD FITTINGS AND ADAPTERS (MODEL B ONLY)						
* 1	PAFZZ	4730013277081	00624	2043-16-16S	ELBOW, TUBE.....	2
* 2	PAFZZ		45152	3276325	TUBE ASSEMBLY, METAL.....	1
* 3	PAFZZ		45152	3276326	TUBE ASSEMBLY, METAL.....	1
* 4	PFFZZ	4730000625470	96906	MS51528B8	ELBOW, TUBE TO BOSS 45 DEGREE.....	1
* 5	PAFZZ	4730008225609	96906	MS51527A8	ELBOW, TUBE TO BOSS.....	1
* 6	PAFZZ	5331002287196	01276	22617-12	O-RING PART OF P/N MS51527A8.....	1
* 7	PFFZZ		6W637	3279640-1	ELBOW.....	2
* 8	PAFZZ		OEWP5	1200CGH4004A3UA	TRANSDUCER, PRESSURE.....	2
* 9	PAFZZ	4730010117736	96906	MS51525A12	ELBOW, TUBE TO BOSS.....	1
* 10	PAFZZ	5331002287196	01276	22617-12	O-RING PART OF P/N MS51525A12.....	1
* 11	PFFZZ		30780	5-HP50N	PLUG, HYDRAULIC MANI.....	1
* 12	PAFZZ	4730010774889	01276	2062-12-10S	ELBOW, TUBE TO BOSS.....	1
* 13	PAFZZ	4730001731881	96906	MS51525A12-16	ADAPTER, STRAIGHT, TU.....	2
* 14	PAFZZ	5331002287196	01276	22617-12	O-RING PART OF P/N MS51525A12-16...	2
* 15	PFFZZ		6W637	101199-01	ELBOW.....	1
* 16	PAFZZ		2K112	02023-00	TRANSMITTER, TEMPERA TEMPERATURE....	1
* 17	PAFZZ	4730013559003	01276	206209-12-12S	ELBOW, TUBE TO BOSS.....	2
* 18	PAFZZ	5331002287196	01276	22617-12	O-RING PART OF P/N 206209-12-12S...	2
* 19	PAFZZ	4730010121674	96906	MS39323-12-10	REDUCER, TUBE.....	1
* 20	PAFZZ	4730012421290	01276	206209-8-8S	ELBOW, TUBE TO BOSS.....	1
* 21	PAFZZ	5330012442273	01276	22617-8	O-RING PART OF P/N 206209-8-8S.....	1
* 22	PAFZZ	4730012208297	01276	FD45-1168-16-16	COUPLING HALF, QUICK QUICK DISCONNECT, MALE.....	1
* 23	PAFZZ	4730012212080	01276	FD45-1169-16-16	COUPLING HALF, QUICK QUICK DISCONNECT, FEMALE.....	1
* 24	PAFZZ	4730012414650	01276	2266-16-16S	ADAPTER, STRAIGHT, TU.....	2
* 25	PAFZZ	5330011680885	01276	22617-16	O-RING PART OF P/N 2266-16-16S.....	2

END OF FIGURE

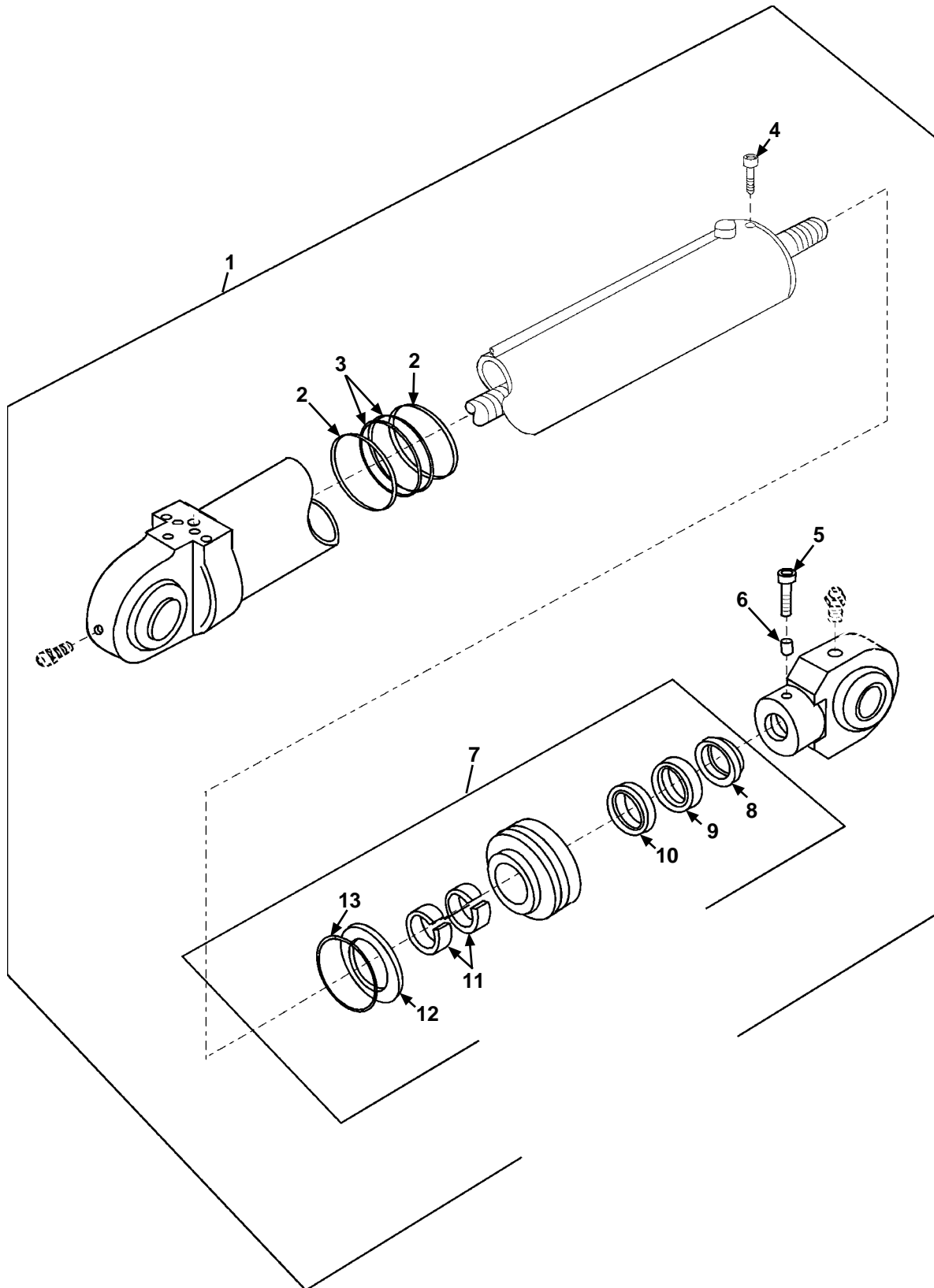


Figure 55. Hook Arm Cylinder



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2360 CYLINDER, MAIN ARM						
FIG. 55 HOOK ARM CYLINDER						
1	PAFFF	3040013744803	45152	150234B	CYLINDER ASSEMBLY,A HOOK ARM.....	2
2	KFHZZ		63899	721176A	.RING,WEAR PART OF KIT P/N 430457B.	2
* 3	KFHZZ	3040013730500	63899	700079A	.RING,PISTON PART OF KIT P/N 430457B .....	1
4	PAHZZ	5305013552641	63899	711053A	.SCREW,CAP,HEXAGON H.....	1
5	PAHZZ	5305013552642	63899	711083A	.SCREW,CAP,HEXAGON H.....	1
6	PFHZZ	5340013723982	63899	715001A	.PLUG,PROTECTIVE,DUS.....	1
7	PAHZZ	5365013559965	63899	500419B	.BUSHING,MACHINE THR.....	1
* 8	KFHZZ		63899	702001A	.WIPER,ROD PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 9	KFHZZ		63899	701121A	.SEAL,ROD PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 10	KFHZZ		63899	706069A	.STEP SEAL,K-R PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 11	KFHZZ		63899	721175A	.RING,WEAR PART OF KIT P/N 430457B, PART OF P/N 500419B.....	2
* 12	KFHZZ		63899	704425A	.RING,BACKUP PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 13	KFHZZ		63899	703425A	.PACKING,PREFORMED PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1

END OF FIGURE

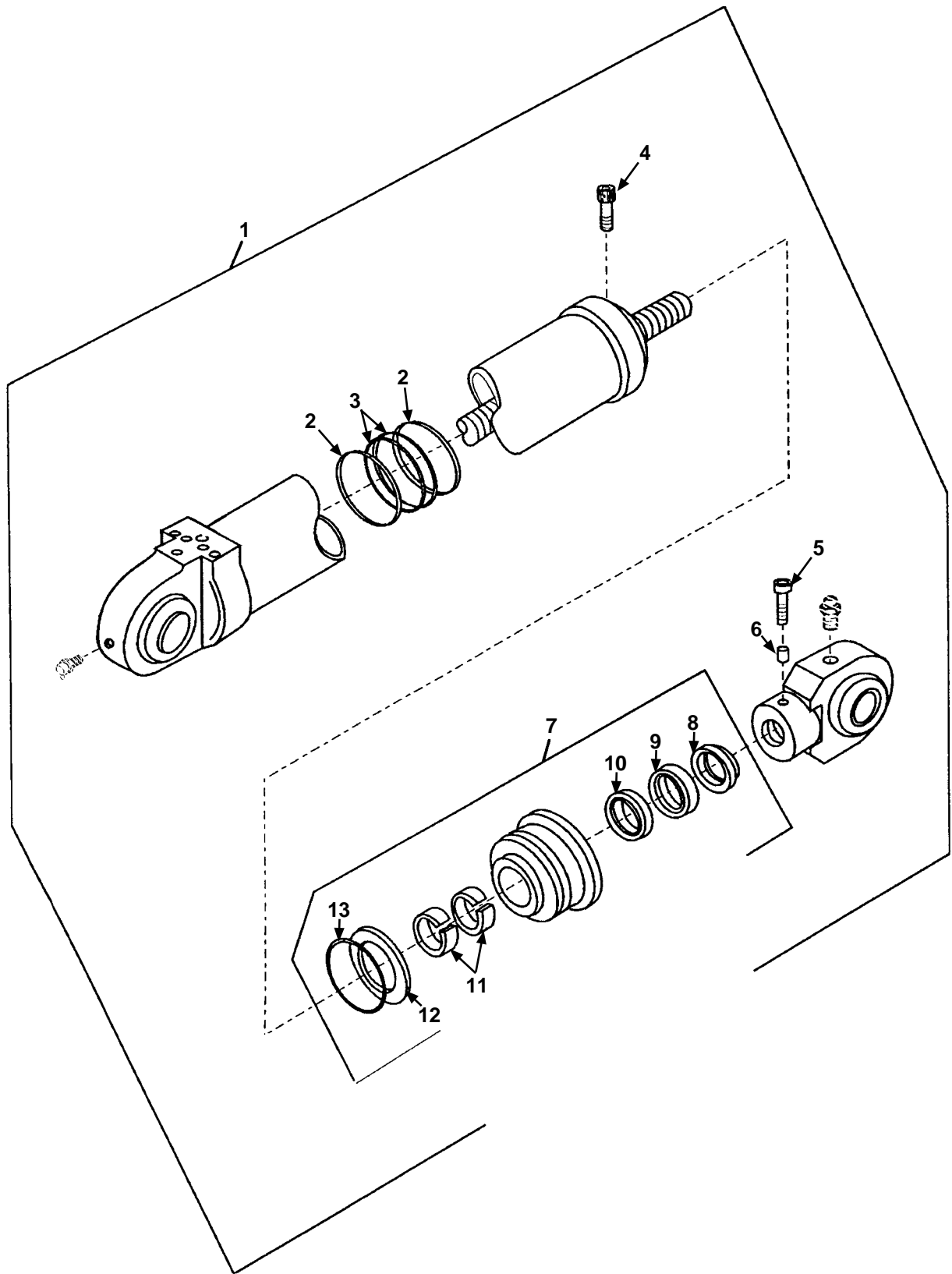


Figure 56. Main Frame Cylinder

SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 2360 CYLINDER, MAIN ARM						
FIG. 56 MAIN FRAME CYLINDER						
1	PBFHH	3040013562707	63899	150235B	CYLINDER ASSEMBLY,A MAIN.....	2
2	KFHZZ		63899	721176A	.RING,WEAR PART OF KIT P/N 430457B.	2
* 3	KFHZZ	3040013730500	63899	700079A	.RING,PISTON PART OF KIT P/N 430457B .....	1
4	PAHZZ	5305013552641	63899	711053A	.SCREW,CAP,HEXAGON H.....	1
5	PAHZZ	5305013552642	63899	711083A	.SCREW,CAP,HEXAGON H.....	1
6	PAHZZ	5340013723982	63899	715001A	.PLUG,PROTECTIVE,DUS.....	1
7	PAHHH	5365013559965	63899	500419B	.BUSHING,MACHINE THR.....	1
* 8	KFHZZ		63899	702001A	.WIPER,ROD PART OF KIT P/N 430457B, PART OF P/N 5004191B.....	1
* 9	KFHZZ		63899	701121A	.SEAL,ROD PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 10	KFHZZ		63899	706069A	.STEP SEAL,K-R PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 11	KFHZZ		63899	721175A	.RING,WEAR PART OF KIT P/N 430457B, PART OF P/N 500419B.....	2
* 12	KFHZZ		63899	703425A	.PACKING,PREFORMED PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1
* 13	KFHZZ		63899	704425A	.RING,BACKUP PART OF KIT P/N 430457B, PART OF P/N 500419B.....	1

END OF FIGURE



SECTION II

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 3000 REPAIR KITS						
FIG. KITS REPAIR KITS						
10	PAFZZ	5330014223885	OFHH8	SK3-0006N	PARTS KIT SEAL REPL.....	1
					O-RING ( 1) 53-13	
					O-RING ( 1) 54-14	
					O-RING ( 1) 53-14	
					O-RING ( 1) 54-15	
					RING, BACK-UP ( 1) 53-12	
					RING, BACK-UP ( 1) 54-13	
					VALVE, SOLENOID ( 1) 54-12	
20	PAFZZ	5330013577512	OFHH8	SK3-0024N-1	PARTS KIT, SEAL REPL.....	1
					O-RING ( 1) 54-19	
					O-RING ( 1) 54-21	
					O-RING ( 1) 54-22	
					RING, BACK-UP ( 2) 54-18	
					RING, BACK UP ( 2) 54-20	
					VALVE, SAFETY RELIEF( 2) 54-17	
30	PAFZZ	5330013577510	OFHH8	SK3-0039N-1	PARTS KITS SEAL REP.....	1
					O-RING ( 1) 52-7	
					O-RING ( 1) 53-7	
					O-RING ( 1) 52-5	
					O-RING ( 1) 53-5	
					O-RING ( 1) 52-3	
					O-RING ( 1) 53-3	
					RING, BACK-UP ( 2) 52-6	
					RING, BACK-UP ( 2) 53-6	
					RING ( 1) 52-4	
					RING ( 1) 53-4	
* 40	PAFZZ	5330014573787	OFHH8	SK30503N-1	KIT, SEAL.....	1
					O-RING ( 1) 54-9	
					O-RING ( 1) 54-8	
					O-RING ( 2) 54-7	
					VALVE, SAFETY RELIEF( 2) 54-6	
* 50	PAFZZ	533001K657831	38335	23157	KIT, SEAL.....	1
					O-RING ( 1) 17-11	
					O-RING ( 1) 20-5	
					O-RING ( 1) 19-13	
					O-RING ( 1) 20-8	
					O-RING ( 1) 20-9	
					OIL SEAL ( 1) 18-9	
					OIL SEAL ( 1) 19-2	
60	PAHZZ	5330013943549	63899	430457B	PARTS KIT, SEAL REPL.....	1
					RING, PISTON ( 1) 56-3	
					RING, PISTON ( 1) 55-3	
					SEAL, ROD ( 1) 56-9	
					SEAL, ROD ( 1) 55-9	
					WIPER, ROD ( 1) 56-8	
					WIPER, ROD ( 1) 55-8	
					PACKING, PREFORMED ( 1) 56-12	

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
					PACKING, PREFORMED	( 1) 55-13
					RING, BACKUP	( 1) 56-13
					RING, BACKUP	( 1) 55-12
					STEP SEAL, K-R	( 1) 56-10
					STEP SEAL, K-R	( 1) 55-10
					RING, WEAR	( 2) 56-11
					RING, WEAR	( 1) 55-11
					RING, WEAR	( 2) 56-2
					RING, WEAR	( 2) 55-2
* 70	PAFZZ	5330014573525	0FHH8	9DD000461	KIT, SEAL.....	3
					O-RING	( 1) 54-25

END OF FIGURE

## SECTION II

C03

TM 5-5420-234-14&amp;P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 4000 BULK MATERIAL						
FIG. BULK BULK MATERIAL						
1	PAOZZ	4010012377544	80535	031-0424	CHAIN,WELDED #4 LINK, STRAIGHT.....	V
2	PAOZZ	4720000514712	81349	M24135/10-05	HOSE,NONMETALLIC 0.25 NOM ID X 0.578 NOM ID.....	V
3	PAOZZ	4720008471710	97403	13221E4806-1	HOSE,NONMETALLIC SYNTHETIC RUBBER TUBE, BRAIDED REINFORCEMENT, 0.25 ID X 0.247 OD.....	V
4	PAOZZ	2590011111851	10237	115820-26	PAD,RUBBER PRESSURE SENSITIVE BACKING, 0.120 IN THK, 1.750 IN WD, BLACK.....	V
5	PAOZZ		39482	93325K51	STRIP,RUBBER.....	V
6	PAOZZ	4710014538578	39428	5175K51	TUBE,METALLIC COPPE 0.25 NOM, 0.375 OD X 0.030 WALL THICK.....	V
7	PAOZZ	4710014535622	39428	89955K27	TUBE,METALLIC STEEL 0.625 OD X 0.035 WALL THICKNESS.....	V
* 8	PAOZZ		45152	3609FX	WIRE ROPE ASSEMBLY 18 GAGE.....	V
9	PAOZZ	6145000206708	81349	M16878/2BKE93	WIRE,ELECTRICAL 14 GAGE.....	V
10	PAOZZ	6145010747535	45152	1927FX	WIRE,ELECTRICAL 16 GAGE.....	V
11	PAOZZ	4010014548588	39428	97840A66	WIRE ROPE ASSEMBLY.....	V

END OF FIGURE

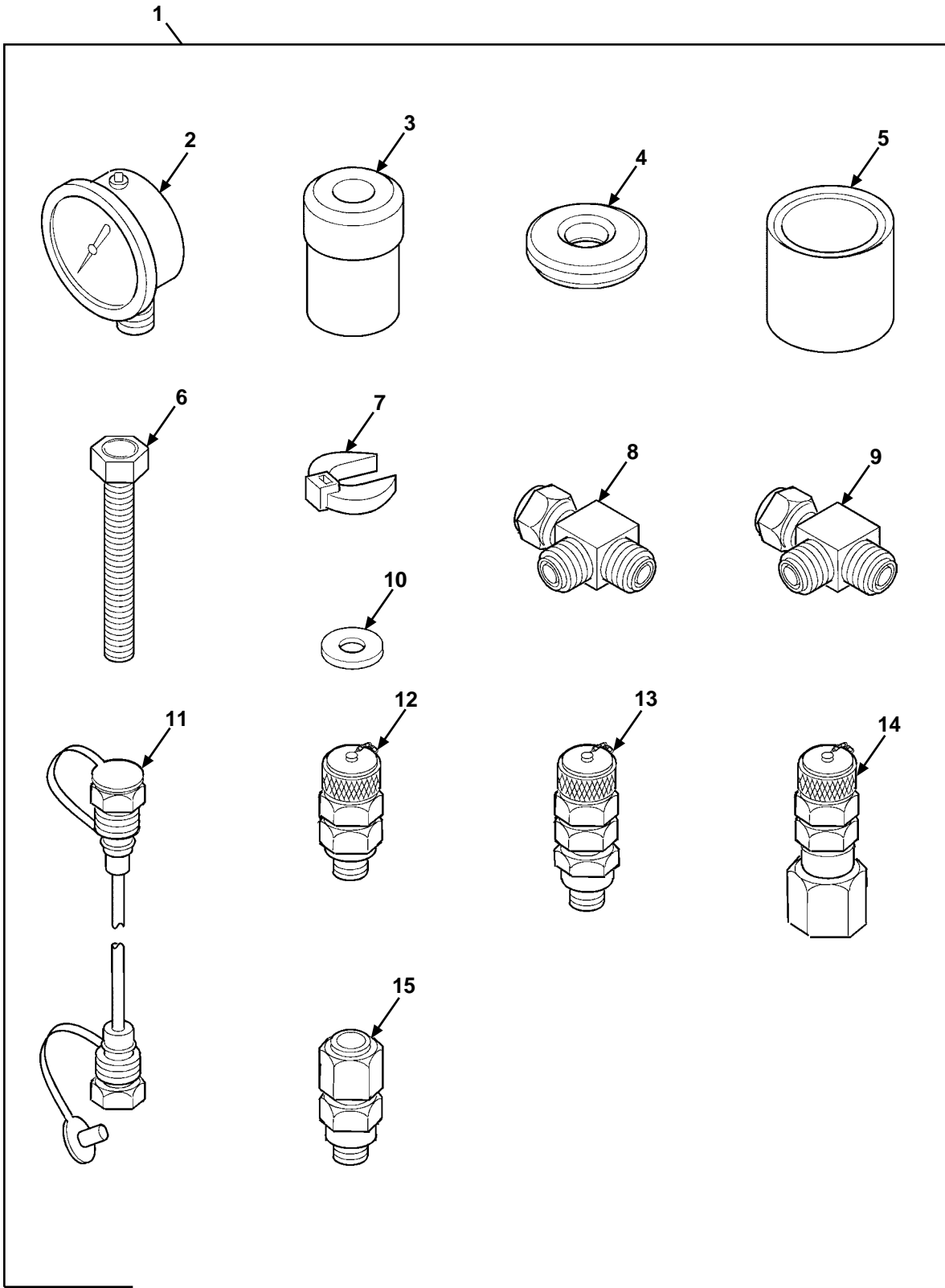


Figure 57. Special Tools



SECTION III

C01

TM 5-5420-234-14&P

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 5000 SPECIAL TOOLS						
FIG. 57 SPECIAL TOOLS						
1	PEFZZ	5180014562749	19207	57K4185	KIT,SPECIAL TOOLS.....	1
* 2	PEFZZ	6685013737976	61349	151469	GAGE,PRESSURE,DIAL 0-6000 PSI, PART OF P/N 57K4185.....	1
* 3	PEFZZ	5120014573912	45152	2215060	REMOVER,INSTALLER PART OF P/N 57K4185.....	1
* 4	PEFZZ	5120014573911	45152	2215070	REMOVER,INSTALLER PART OF P/N 57K4185.....	1
* 5	PEFZZ	5120014574153	45152	2215090	REMOVER PART OF P/N 57K4185.....	1
* 6	PEFZZ	5120014573913	45152	2215080	SCREW WITH NUT 125-12 UNF X 1000, PART OF P/N 57K4185.....	1
* 7	PEFZZ	5120014288040	55719	GAN8508-29B	CROWFOOT ATTACHEMENT PART OF P/N 57K4185.....	1
* 8	PEFZZ	4730004914983	01276	203102-8-8S	TEE,TUBE PART OF P/N 57K4185.....	1
* 9	PEFZZ	4730010240915	01276	203102-10-10S	TEE,TUBE PART OF P/N 57K4185.....	1
* 10	PEFZZ	5310000926831	28158	AE30574	WASHER FLAT 1.312 NOM ID, PART OF P/N 57K4185.....	1
* 11	PEFZZ	4720013739871	53790	HFF20-060	HOSE ASSEMBLY,NONME 60 IN., PART OF P/N 57K4185.....	1
* 12	PEFZZ	4730013729701	53790	TCM20-1/2UNF-V	ADAPTER STRAIGHT,PI PART OF P/N 57K4185.....	1
* 13	PEFZZ	4730013732692	53790	TCM20-1/2JIC-V	ADAPTER STRAIGHT,PI PART OF P/N 57K4185.....	1
* 14	PEFZZ	4730013687590	53790	TCM20-5/8 JIC-V	COUPLING HALF,QUICK PART OF P/N 57K4185.....	1
* 15	PEFZZ	4730013681207	53790	GAH20-1/4 NPT-V	UNION,PIPE TO TUBE 0.250 NOM, PART OF P/N 57K4185.....	1



## CROSS REFERENCE INDEXES

## PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
75078	003078	4710-01-175-2368	47B	2
2K112	0203-00		54A	16
74687	028561	5340-01-092-1637	36	4
		5340-01-092-1637	25A	12
3D374	031-00724		31B	2
80535	031-0424	4010-01-237-7544	BULK	1
30780	0603-10-4	4730-01-116-1658	14	14
13548	07195		40B	10
13548	07196		40A	1
13548	07197		40A	4
			40B	11
13548	07198		40A	6
			40B	15
0CHW9	075-444		13A	15
0CHW9	075-504		13A	11
30780	10-12 C50XS	4730-01-077-4889	14	26
30780	10-6TRTX-S	4730-00-999-9830	14	15
6W637	101199-01		54A	15
0CHW9	108-016		13A	7
45152	108708A	5310-01-177-4625	36	33
19207	10892331	5310-00-880-0626	26	8
		5310-00-880-0626	34	14
		5310-00-880-0626	31A	18
		5310-00-880-0626	34A	15
30780	10BTX-S	4730-00-897-2043	14	13
30780	10F50XS	4730-00-906-0721	14	4
96652	11-043	5315-01-458-2064	35	17
96652	11-289	5315-01-288-6747	35	24
45152	110310A	5310-01-159-8178	26	12
		5310-01-159-8178	31	3
		5310-01-159-8178	35	36
		5310-01-159-8178	26A	7
		5310-01-159-8178	31A	10
		5310-01-159-8178	32A	3
45152	110311A	5310-01-111-0645	28	4
		5310-01-111-0645	32	10
		5310-01-111-0645	26A	4
		5310-01-111-0645	34A	47
45152	110312A	5310-01-150-5918	30	14
		5310-01-150-5918	32	4
		5310-01-150-5918	32A	6
		5310-01-150-5918	34A	30
0CHW9	111-018		13A	6
45152	111319A	5305-01-196-8088	32A	11
45152	111320A	5305-01-149-1934	32	6
		5305-01-149-1934	32A	10
48152	111452A	5306-01-159-6549	34A	44
45152	111454A	5305-01-149-1935	30	13
		5305-01-149-1935	32	5
45152	114111A		31A	21
8A932	11446173	5305-01-210-7413	35	33

CROSS REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	115293A	5305-01-150-7736	31	21
		5305-01-150-7736	35	35
45152	115309A	5305-01-150-3996	31	1
10237	115820-26	2590-01-111-1851	BULK	4
45152	118941A	5305-01-156-5099	26	10
OEWP5	1200CGH4004A3UA		32	8
45152	120622A	5306-01-150-7726	54A	8
		5306-01-150-7726	34A	45
31902	12208	9905-01-456-4287	11	3
45152	123341A	5306-01-171-5897	28	1
45152	126536A	5305-01-185-8668	32A	9
31902	12785	5315-01-454-2338	15	8
31902	12790	7690-01-456-5113	3	1
45152	128131A	5305-01-167-9408	32A	1
31902	12825	5340-01-453-2528	24	30
31902	12959	4320-01-453-6465	23	4
31902	12959-2	5365-01-454-9557	23	5
31902	12959-5	6680-01-462-1797	23	7
31902	13005	4730-01-453-5411	22	14
45152	1307840	5360-01-236-2072	26A	9
45152	1312410	2540-01-134-3714	31	14
		2540-01-134-3714	31B	11
45152	1317120	5305-01-154-4323	32	6
		5305-01-154-4323	32A	12
45152	1320590	9905-01-157-1026	33	3
		9905-01-157-1026	33A	6
45152	1321600	2540-01-131-6242	31A	19
97403	13221E4806-1	4720-00-847-1710	BULK	3
97403	13221E4806-1-2.125		35	15
45152	1324510	5305-01-157-5624	31A	7
45152	1324980	5305-01-155-3478	32	9
		5305-01-155-3478	32A	13
		5305-01-155-3478	34A	33
45152	1330560	5340-01-153-0313	31	16
		5340-01-153-0313	31A	2
45152	1333510	5310-01-340-5671	26	25
		5310-01-340-5671	29	25
		5310-01-340-5671	31	13
		5310-01-340-5671	49	7
		5310-01-340-5671	50	9
		5310-01-340-5671	25A	6
		5310-01-340-5671	29A	3
		5310-01-340-5671	31A	20
		5310-01-340-5671	44A	1
		5310-01-340-5671	50A	11
45152	1337630	5305-01-203-8360	29	5
		5305-01-203-8360	36	16
		5305-01-203-8360	48	20
		5305-01-203-8360	50	32
45152	1345280	5305-01-159-8544	31	5
31902	13472-1		12	2

## CROSS REFERENCE INDEXES

## PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
31902	13472-2		12	2
31902	13473-1	5340-01-453-9094	12	15
31902	13473-2	5340-01-456-5631	12	15
31902	13474-1		12	20
31902	13474-2		12	20
31902	13475-1		12	12
31902	13475-2		12	12
31902	13476-1	2510-01-453-7303	12	32
31902	13476-2	2510-01-454-0909	12	32
31902	13477-1	5360-01-454-0425	12	13
31902	13477-2	5360-01-454-0427	12	13
31902	13478	5315-01-454-4326	12	3
31902	13479	5315-01-454-6758	8	3
31902	13480-1	2510-01-454-0929	12	1
31902	13480-2	1440-01-454-7251	12	1
31902	13481	5340-01-453-2520	9	2
31902	13493	3110-01-454-3228	7	9
31902	13497-1	3515-01-454-6001	12	22
31902	13497-2	5315-01-454-2368	12	16
31902	13512-1	5340-01-455-2090	6	17
31902	13512-2	5340-01-455-2092	6	17
31902	13514	5315-01-454-6761	6	11
31902	13516	5315-01-454-6752	6	8
31902	13517	5340-01-453-2542	9	21
31902	13519-1	5340-01-455-2093	6	14
31902	13519-2	5340-01-455-2095	6	14
31902	13525-1	5340-01-453-2532	6	4
31902	13525-2	5340-01-455-1836	6	4
31902	13531-1	5340-01-453-2544	9	7
31902	13531-2	5340-01-453-2533	9	7
31902	13532	5315-01-455-4898	6	6
31902	13533	5310-01-454-3837	6	12
31902	13537	5315-01-454-2514	9	6
31902	13538	5340-01-453-2554	9	15
31902	13551-1	3990-01-461-0443	1	10
31902	13551-2	5340-01-461-0414	1	2
31902	13553	3990-01-461-0423	1	3
31902	13554	3990-01-461-0440	1	6
0CHW9	13566		23	12
31902	13581	3040-01-453-8635	9	9
31902	13585-1	5340-01-455-1839	22	19
31902	13585-2	5340-01-455-1838	22	21
31902	13586-1	4720-01-453-5517	22	16
31902	13586-2	4720-01-453-5169	22	17
31902	13586-3	4720-01-453-5420	22	32
31902	13586-4	4720-01-453-5448	22	1
31902	13590-4	9905-01-456-5361	11	2
31902	13590-5	9905-01-456-3829	11	4
31902	1590-8	9905-01-456-4282	11	6
31902	13591	5340-01-476-1306	10	7
45152	1367HX1	5305-01-062-1017	27	1

CROSS REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	1367HX1	5305-01-062-1017	29	7
		5305-01-062-1017	36	18
		5305-01-062-1017	25A	3
		5305-01-062-1017	29A	1
		5305-01-062-1017	35A	8
31902	13786	3040-01-453-8796	9	5
31902	13788	5340-01-457-7628	5	14
31902	13789	5310-01-454-3840	5	13
31902	13790	3040-01-453-8771	5	9
31902	13795-1	5315-01-454-8224	5	15
31902	13795-2	5315-01-454-8256	5	2
31902	13798	5315-01-454-2268	5	8
31902	13799	5340-01-459-1294	5	6
45152	1379HX	5310-01-361-8388	29	10
		5310-01-361-8388	36	5
31902	13800	3040-01-453-8773	5	1
31902	13815	5340-01-453-2469	12	25
45152	1381HX1	5305-01-134-2052	33A	4
31902	13882-1	2590-01-453-9122	6	21
31902	13882-2	2950-01-453-9248	6	21
45152	1394510-018		34A	20
45152	1394510-12		34	19
			34A	7
45152	1394510-17.6		34	7
71744	139A-404Y	6210-10-010-2521	43	2
78422	1400182	6220-01-326-2286	45	1
78422	1401322	6230-01-364-8663	45	3
31902	14028	9905-01-457-8347	11	7
31902	14029	9905-01-457-8351	11	8
31902	14047	8145-01-457-1170	4	2
31902	14058	2590-01-456-5819	12	19
31902	14079	5310-01-461-4474	6	15
31902	14084	9905-01-457-8348	11	5
31902	14085	5340-01-457-6136	5	12
31902	14096	4710-01-456-8765	22	11
31902	14097	4710-01-457-0954	14	1
31902	14098	4710-01-457-0952	14	28
31902	14099	4710-01-457-1284	14	17
56501	141	5975-00-152-1075	37	2
		5975-00-152-1075	38	8
15325	141	5310-01-119-1811	47	1
		5310-01-119-1811	47B	15
31902	14101	4710-01-457-1297	14	25
31902	14102	4710-01-457-0931	14	29
31902	14103	4710-01-457-1080	14	22
31902	14104		14	21
31902	14105	4710-01-457-1303	22	31
31902	14106	4710-01-458-0122	22	28
31902	14107	4710-01-456-9299	22	29
31902	14108	4710-01-456-9295	22	26
31902	14109	4710-01-457-1375	22	30

## CROSS REFERENCE INDEXES

## PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
31902	14110	4710-01-457-1599	22	6
31902	14127		9	11
45152	1434HX	5305-01-155-5237	40B	18
45152	1456530		51A	7
45152	14947FX		52	12
45152	1500280-1		31B	6
45152	150234B	3040-01-374-4803	55	1
63899	150235B	3040-01-356-2707	56	1
45152	1507220	5305-01-428-9165	35A	30
61319	151469	6685-01-373-7976	57	2
45152	1533100-12		36	23
45152	1533100-18		36	24
45152	1533100-22		34A	35
45152	1571850	5310-01-288-5096	31	8
		5310-01-288-5096	40	4
		5310-01-288-5096	40B	7
45152	1571870	5310-01-352-7732	37	6
		5310-01-352-7732	39	7
		5310-01-352-7732	46	22
0ENJ2	158-01-600	5340-01-458-3660	44	12
45152	1598030	5310-01-342-8595	34	16
		5310-01-342-8595	35	39
		5310-01-342-8595	34A	17
81343	16-16 080320CA		51A	3
45152	1600460	5310-01-346-9445	25	2
		5310-01-346-9445	29	15
		5310-01-346-9445	31	20
		5310-01-346-9445	36	12
		5310-01-346-9445	36	22
		5310-01-346-9445	42	4
		5310-01-346-9445	31A	14
		5310-01-346-9445	35A	4
		5310-01-346-9445	35A	18
		5310-01-346-9445	40B	21
		5310-01-346-9445	40B	26
		5310-01-346-9445	41A	10
45152	1606140	5305-01-344-8899	25	6
		5305-01-344-8899	31	19
		5305-01-344-8899	36	7
		5305-01-344-8899	36	17
		5305-01-344-8899	31A	4
		5305-01-344-8899	35A	17
		5305-01-344-8899	40B	3
45152	1622080	5999-01-298-0527	42	5
42366	16282B-35005	5342-01-384-9511	40B	20
0CHW9	165-143		13A	3
45152	1754140	5305-01-337-9120	29	13
		5305-01-337-9120	42	2
		5305-01-337-9120	35A	19
		5305-01-337-9120	40B	28
45152	1754140	5305-01-337-9120	41A	12

## CROSS REFERENCE INDEXES

## PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	1754210	5305-01-340-0225	50A	14
45152	1754220	5305-01-353-8267	26	2
		5305-01-353-8267	31A	1
45152	1754280	5305-01-340-5061	35A	22
45152	1754300	5305-01-353-8268	31A	5
45152	1754310	5305-01-357-4682	26	6
45152	1756870	5306-01-341-0712	31	15
		5306-01-341-0712	50A	9
45152	1768HX1	5310-01-057-0822	35	13
45152	1779140	5340-01-363-7320	36	8
45152	1779770	5340-01-363-6141	50A	10
45152	1783090	2510-01-357-8795	31A	6
45152	1783100	2510-01-357-8796	31A	6
45152	1783110	2510-01-357-2507	31A	13
45152	1783190	9905-01-361-8611	30	6
45152	1785220	9905-01-358-6746	33A	12
45152	1804HX	5310-01-061-7452	36	30
		5310-01-061-7452	48	12
		5310-01-061-7452	50	14
		5310-01-061-7452	51	3
		5310-01-061-7452	29A	2
51506	1812-10S-PS-E31	5305-01-456-8936	44	23
45152	1846HX1	5305-01-344-5532	51	1
45152	1849HX1	5306-01-164-7437	48	9
45152	1860250 W	2530-01-356-4614	34	21
		2530-01-356-4614	35	42
		2530-01-356-4614	34A	22
45152	1860310 W	2530-01-356-4613	34	24
		2530-01-356-4613	34A	25
45152	1860820	6150-01-362-5216	47C	3
45152	1862230W	3910-01-397-5277	30	11
45152	1862340	3120-01-355-8843	30	18
45152	1862350	5340-01-355-3794	30	2
45152	1862360	5340-01-355-5248	30	10
45152	1862510 W	5340-01-355-5259	35A	29
45152	1862530 W	5340-01-355-5268	35A	11
45152	1862570	4710-01-358-6946	48	27
45152	1862580	4710-01-360-2293	48	28
45152	1862590	4710-01-360-9502	48	13
45152	1862600	4710-01-361-3985	48	5
45152	1862610	4710-01-356-7535	48	19
45152	1862620	4710-01-360-2292	48	18
45152	1862690W	3040-01-356-6837	34	36
		3040-01-356-6837	34A	28
45152	1862720 W	5315-01-361-2721	34	5
		5315-01-361-2721	34A	5
45152	1862770	5340-01-356-8373	34	10
		5340-01-356-8373	34A	11
45152	1862820	5365-01-355-7357	34	25
45152	1862820	5365-01-355-7357	34A	26
45152	1862830	5365-01-355-7358	34	22



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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	1862830	5365-01-355-7358	35	41
		5365-01-355-7358	34A	23
45152	1863010W	3040-01-356-4589	34	15
		3040-01-356-4589	34A	16
45152	1867670	5340-01-358-6695	40B	22
45152	1878900	6150-01-363-2162	47B	3
45152	1878910	6150-01-362-5218	47B	11
45152	1883460U		35A	1
45152	1890800	4730-01-356-8646	48	25
45152	1890810	4730-01-356-2653	48	14
45152	1890820	4730-01-355-9000	48	3
45152	1890830	4730-01-356-0687	51	5
45152	1891380	4730-01-356-1018	51	4
45152	1891390	4730-01-355-5140	52	1
45152	1891410	6150-01-362-5217	47B	20
45152	1891540	5940-01-358-1127	39	1
45152	1897980	5340-01-355-9368	34	11
		5340-01-355-9368	35	38
		5340-01-355-9368	34A	12
45152	1911HX1	5306-01-165-3256	36	28
45152	1921380	2510-01-357-5691	31A	16
45152	1927FX	6145-01-074-7535	BULK	10
45152	1937190	5310-01-356-8487	31A	11
45152	1937550	5310-01-355-8798	52	14
		5310-01-355-8798	53	17
0ENJ2	195-01-678	9905-01-457-8344	44	10
0ENJ2	195-01-679	7690-01-458-4249	43	4
0ENJ2	195-01-680	7690-01-458-4245	43	27
0ENJ2	195-01-683	7690-01-458-4240	43	30
		7690-01-458-4240	44	16
0ENJ2	195-01-684	7690-01-458-4242	43	26
45152	1953740	5340-01-363-6139	30	5
45152	1955110	5305-01-456-9449	29	1
		5305-01-456-9449	50	12
45152	1956170	5315-01-363-6984	35	6
		5315-01-363-6984	34A	36
45152	1965220	5315-01-363-7062	35	7
		5315-01-363-7062	34A	37
45152	1971460 W	5670-01-408-8386	26A	1
45152	1976560	5340-01-364-4343	31A	3
45152	1976570	5340-01-364-1959	31A	3
45152	1987130		33A	8
45152	1997520 W	5935-01-376-1003	34	31
		5935-01-376-1003	47B	18
02697	2-214N552-90	5331-01-116-8112	51	7
8C563	200-116-4490	5331-01-361-1505	48	4
		5331-01-361-1505	48	15
38335	20034	5365-01-198-3321	20	11
38335	20063		19	11
45152	2008730	9905-01-457-8345	33	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	2013HX1	5305-01-061-7910	34	12
		5305-01-061-7910	34A	13
38335	20171	4030-21-910-6656	19	15
38335	20183	2590-01-217-8142	21	7
45152	2019940	3440-01-342-0700	25A	13
01276	202702-12-10S	4730-01-027-8261	54	31
01276	202702-12-12S	4730-00-710-5571	54	33
01276	203102-10-10S	4730-01-024-0915	57	9
01276	203102-8-8S	4730-00-491-4983	57	8
38335	20340	5360-01-199-6157	20	6
38335	20372	5365-01-217-7125	18	12
01276	2041-10-10S	5935-00-103-1774	50	23
45152	2041HX		44A	2
00624	2043-16-16S	4730-01-327-7081	54A	1
38335	20450	5365-01-278-6157	18	6
38335	20458		19	9
45152	2048840W	5340-01-394-2420	35A	12
45152	2048850W	5340-01-394-2421	35A	23
01276	2062-12-10S	4730-01-077-4889	54A	12
01276	206209-12-12S	4730-01-355-9003	54A	17
01276	206209-8-8S	4730-01-242-1290	54A	20
45152	2063940	5365-01-394-3553	35A	5
38335	20640		21	8
38335	20662		19	12
38335	20663	5325-21-914-9925	19	7
38335	20664		19	5
38335	20670		18	7
45152	2068380	2510-01-364-4489	31A	17
93061	207ACBH-2	4730-00-574-8807	24	10
93061	207ACBH-4	4730-01-164-3365	24	6
45152	2083HX	5310-01-214-4946	30	12
		5310-01-214-4946	32	2
		5310-01-214-4946	35	25
		5310-01-214-4946	34A	42
38335	21079		20	4
45152	2150HX1	5310-01-141-5565	48	8
53790	2160/160 PP	5340-01-375-6141	14	20
53790	2160PP	5340-01-216-1165	14	30
10988	218-444	4730-01-057-9597	22	10
53790	2180PA	5340-01-355-8246	34	30
		5340-01-355-8246	47B	6
45152	2185360	9905-01-457-8346	33A	1
72962	21NE-040	5310-01-066-6759	29	3
		5310-01-066-6759	34	32
		5310-01-066-6759	35	16
		5310-01-066-6759	36	17
		5310-01-066-6759	38	3
		5310-01-066-6759	31B	10
72962	21NE-040	5310-01-066-6759	35A	10
		5310-01-066-6759	40B	6
		5310-01-066-6759	47B	19

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
01276	22021-10	5342-00-789-8409	14	40
		5342-00-789-8409	50	3
01276	221501-16-12S	4730-01-462-2632	51A	5
45152	2215060		57	3
45152	2215070		57	4
45152	2215080		57	6
45152	2215090		57	5
38335	22214		21	6
38335	22272		18	11
38335	22273		19	14
38335	22277		21	1
38335	22360		19	3
38335	22361		19	1
38335	22374		18	5
38335	22399		19	10
38335	22400	3040-21-914-9942	18	14
38335	22402		18	13
01276	22550-211	5330-00-017-9253	14	41
		5330-00-017-9253	50	2
01276	22617-12	5331-00-228-7196	54	32
		5331-00-228-7196	54	34
		5331-00-228-7196	51A	6
		5331-00-228-7196	54A	6
		5331-00-228-7196	54A	10
		5331-00-228-7196	54A	14
		5331-00-228-7196	54A	18
01276	22617-16	5330-01-168-0885	54A	25
01276	22617-8	5330-01-244-2273	51A	4
		5330-01-244-2273	54A	21
01276	2266-16-16S	4730-01-241-4650	49	18
		4730-01-241-4650	54A	24
38335	22834		18	10
38335	22836		20	12
39428	2292T52	5340-01-457-8615	8	2
01604	229612	4820-01-454-0733	24	19
38335	23071	4710-21-914-5839	17	3
38335	23088		20	7
38335	23157		KITS	50
45152	2362HX	5340-01-081-3419	50	11
80045	23MS35338-46	5310-00-637-9541	3	9
		5310-00-637-9541	5	3
		5310-00-637-9541	6	3
		5310-00-637-9541	9	14
		5310-00-637-9541	13	16
35510	2434	5310-00-775-5139	29	11
		5310-00-775-5139	31	9
		5310-00-775-5139	39	2
35510	2434	5310-00-775-5139	41	4
06853	244095	5310-01-105-7229	29	9
38335	25016		17	11
38335	25024	5365-01-198-1650	20	10

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
38335	25031	4730-00-042-8988	20	3
38335	25032	4730-01-211-5222	19	8
38355	25085	4730-01-204-5145	19	16
38335	25148		18	9
38335	25150		19	4
38335	25187		21	9
38335	25264	5305-01-217-2126	17	6
		5305-01-217-2126	20	1
38335	25265	5305-01-271-3276	18	1
38335	25275	5330-01-219-3994	20	5
38335	25328	5310-01-212-2299	18	2
10001	2533408-26	5310-01-343-5712	32	1
		5310-01-343-5712	34A	40
38335	25480	3110-21-893-3048	18	8
38335	25484		19	13
38335	25489		19	6
38335	25492		21	10
38335	25500		21	2
38335	25539	5325-01-240-7163	21	5
38335	25716		17	5
38335	25869		20	8
38335	25870		20	9
38335	25895		17	1
38335	26049		19	2
38335	26091		18	4
38335	26120		17	2
38335	26125		17	4
35338	26194	5331-01-458-9296	17	10
38335	26924		18	3
38335	26384		17	8
64386	277-A-80-1	5340-01-156-6776	29	6
		5340-01-156-6776	36	19
		5340-01-156-6776	25A	5
96652	28-04	5315-01-355-3744	34	20
		5315-01-355-3744	34A	21
70485	2804	5325-00-882-4438	43	34
0CHW9	29010024		13A	12
0ENJ2	295-01-604	5895-01-460-3046	43	9
77060	297002	5975-01-148-4607	41A	3
02697	3-905	5331-00-167-5166	54	36
30780	3-906V0894	5330-01-460-4706	14	3
02697	3-908N552-90	5331-00-929-8171	51	9
		5331-00-929-8171	52	13
		5331-00-929-8171	53	20
		5331-00-929-8171	54	38
02697	3-910	5330-00-485-3586	14	5
		5330-00-485-3586	14	12
30780	3-912		14	27
02697	3-912N552-90	5331-00-395-5737	48	26
		5331-00-395-5737	51	6
30780	3-916		54	30

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
93061	3/8-HP-S	4730-00-958-8599	22	15
45152	3014585		43A	1
45152	3014584-6		43A	3
36621	30182-4-4B	4730-00-028-7021	24	15
13548	30250R	5980-01-459-1848	40B	13
13548	30250Y	5980-01-459-2073	40A	2
45152	3051121	2510-01-453-8548	34	35
		2510-01-453-8548	34A	29
45152	3051376	2510-01-453-8556	35	5
45152	3051989		32A	8
45152	3051990		32A	8
45152	3053453		32A	2
45152	3053657		35A	20
45152	3053658		35A	24
45152	3053774		34A	46
45152	3053775		34A	46
45152	3053776		34A	48
45152	3053777		34A	48
45152	3053912		32A	14
45152	3053913		34A	31
45152	3054536		26A	5
45152	3054537		26A	3
45152	3055128		32A	15
45152	3055129		34A	32
45152	3055130		42	1
45152	3055132		34A	38
45152	3055925		32A	7
45152	3056237		51A	8
45152	3056238		50A	6
45152	3056239		50A	5
45152	3056241		50A	2
45152	3056242		50A	3
45152	3056244		50A	1
45152	3056245		50A	4
45152	3056868	5340-01-456-8539	32	3
45152	3056869	5340-01-456-7145	32	7
45152	3056871	5340-01-456-8540	32	14
45152	3056872	2510-01-457-5270	28	6
		2510-01-457-5270	34A	51
45152	3056873	5340-01-458-0154	28	3
45152	3056874	5340-01-456-8537	28	2
45152	3057007	2510-01-457-5009	35	1
45152	3057009		26	13
45152	3057867		50A	13
45152	3059934	3040-01-454-2704	34	2
		3040-01-454-2704	34A	2
45152	3059948	4030-01-454-1349	34	1
		4030-01-454-1349	34A	1
45152	3060630		36	2
45152	3061973		41A	1
45152	3061998		41A	6

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	3061998-4		41A	8
45152	3062266	2990-01-453-9105	27	5
45152	3062267	5340-01-454-7250	27	4
45152	3062269	2990-01-453-8306	27	3
45152	3062733	4720-01-454-4731	49	12
45152	3062735	4720-01-453-7766	49	9
45152	3062736	4720-01-453-7999	50	20
45152	3062737	4720-01-453-7944	50	25
45152	3062738	4720-01-453-7816	50	8
45152	3062740	4720-01-453-7291	49	13
45152	3062913	4710-01-453-7700	50	22
45152	3062914	4710-01-456-7909	50	27
45152	3062915	4710-01-456-7927	50	26
45152	3062916	4710-01-456-7210	50	19
45152	3062917	4710-01-456-7899	50	18
45152	3063147	5340-01-454-7268	27	7
45152	3063846	7690-01-455-6358	41	6
45152	3063942	5342-01-453-8566	29	26
45152	3063943	5342-01-454-9188	29	2
45152	3063944	5975-01-458-1901	29	27
45152	3064067		33A	5
45152	3064068		33A	7
45152	3064073	5340-01-456-8536	25	1
45152	3064074	5340-01-456-8532	25	4
45152	3064075	7690-01-456-7954	27	6
45152	3064076	7690-01-456-7955	26	23
45152	3064077	7690-01-456-7957	26	24
45152	3064081		25	3
45152	3064147	5390-01-458-2843	47	5
45152	3064148	5390-01-457-1137	47	6
45152	3064149	6150-01-458-3948	47	8
45152	3064150	6150-01-458-3940	47	4
45152	3064801	5305-01-459-3059	52	15
		5305-01-459-3059	53	18
45152	3064907	6150-01-458-3947	46	20
45152	3065633	5342-01-453-8560	36	1
45152	3065636	5340-01-457-8921	36	25
45152	3065838	6150-01-458-3325	46	10
45152	3065839	6150-01-458-3322	46	9
45152	3065840	6150-01-458-3950	46	13
45152	3065841	6150-01-458-3945	46	6
45152	3065842	6150-01-458-5879	46	11
45152	3065843	6150-01-458-3942	46	8
45152	3065844	6150-01-458-4843	46	12
45152	3065845	6150-01-458-3939	46	4
45152	3065846	5940-01-458-1013	37	11
45152	3065847	6150-01-458-3941	46	19
45152	3065848	6150-01-458-3949	46	18
45152	3065849	6150-01-458-3938	46	16
98441	30682-4-4B	4730-00-555-1152	24	12
45152	3070941		25	5

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	3070943		29	21
45152	3071910	6680-01-457-6644	38	4
45152	3071957	5930-01-458-3853	46	5
45152	3071958	6150-01-458-4842	38	5
45152	3071959	6150-01-458-3951	46	2
45152	3071960	6150-01-458-3946	46	3
45152	3074871	7690-01-455-6357	36	10
0ENJ2	310-01-602	5355-01-457-8843	43	28
45152	3104679	6150-01-457-3951	46	7
45152	3107526	5340-01-456-8528	49	15
45152	3107576	5340-01-456-8538	31	7
45152	3107592	5340-01-456-8533	31	18
45152	3107597		31	6
45152	3107621	6150-01-459-0361	43	33
45152	3107622	6150-01-458-7246	43	32
45152	3107623	6150-01-459-0360	43	31
45152	3109540	4720-01-453-7311	49	6
45152	3109542	4720-01-453-7345	49	1
45152	3115343	6150-01-458-4841	46	1
45152	3115349	5365-01-457-8369	32	11
45152	3115350	5340-01-455-0143	26	9
45152	3115374	5340-01-456-8529	29	17
45152	3115375	5340-01-456-8527	26	19
45152	3115382	5340-01-456-8525	50	28
45152	3117335	4710-01-453-7695	50	21
45152	3119531	7690-01-458-6990	41	2
45152	3119729	6150-01-457-3828	42	1
45152	3123908	6150-01-459-1293	44A	8
45152	3126523	9905-01-457-8346	33	4
45152	3126736	5340-01-456-8523	50	4
45152	3126738	5340-01-457-1222	50	36
45152	3127533	5340-01-454-7270	31	2
45152	3127559	5340-01-457-1221	40	8
45152	3128740	5340-01-458-7187	36	9
45152	3129059	5360-01-456-6943	35	31
45152	3130933	5340-01-457-8923	35	27
45152	3130939	2590-01-458-9401	35	29
30966	3131197	5340-01-458-7192	35	11
45152	3133645	5340-01-457-8924	40	7
45152	3138348	2590-01-458-9395	35	20
45152	3138396	5340-01-456-6964	35	8
45152	3145757	5340-01-456-6969	35	9
45152	3149272	5360-01-456-5633	35	23
45152	3150238	5340-01-456-8530	26	3
45152	3150300	2510-01-457-5316	26	1
45152	3153166		40B	1
45152	3153187	9905-01-457-1710	35	34
		9905-01-457-1710	33A	9
45152	3154864		40B	2
53790	3160/160-PA	5340-01-456-8547	50	17
45152	3165325		50	33

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
45152	3181920		33A	3
53790	3190/190-PA	5340-01-355-3733	48	6
91929	31NT91-1		44	2
91929	31NT91-2		35	28
45152	3234829		35	30
45152	3234830		35	28
45152	3234843		35	26
57390	3254PA	5340-01-355-8247	48	24
45152	3263040		31B	1
00779	327025	5940-01-368-9579	41A	9
45152	3274524		35	43
45152	3274525		35	43
45152	3274653		35	44
45152	3276180		35	45
45152	3276323		50A	7
45152	3276324		50A	8
45152	3276325		54A	2
45152	3276326		54A	3
45152	3276335		26	26
45152	3276347		40B	30
45152	3276458		43B	1
45152	3278945		43A	6
45152	3278880		45	3
6W637	3279640-1		54A	7
1DK67	3280639		33A	11
45152	3282417		43A	7
45152	3285646		43B	2
45152	3294623		47A	1
45152	3299731		44A	5
45152	3300699		25A	10
72447	330734	5310-01-216-2799	34	8
		5310-01-216-2799	34A	9
0CHW9	341057		13A	8
45152	351AX	5310-01-029-0450	34	13
		5310-01-029-0450	54	27
		5310-01-029-0450	34A	14
		5310-01-029-0450	40B	5
45152	354AX	5310-01-068-8446	27	2
		5310-01-068-8446	29	8
		5310-01-068-8446	30	3
		5310-01-068-8446	48	11
		5310-01-068-8446	50	15
		5310-01-068-8446	51	2
		5310-01-068-8446	35A	7
45152	355AX	5310-01-133-2130	30	9
		5310-01-133-2130	35	12
45152	356AX	5315-01-377-1554	35	32
45152	362-AX	5310-01-062-3379	35A	25
45152	36850AX	5305-01-227-5660	35	14
45152	3737FX3	5342-01-175-0316	35A	15
0ENJ2	375-10-600	2920-01-457-8996	44	8



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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
0ENJ2	375-10-605	6220-01-458-5419	43	29
11757	378429-8	5306-01-154-6949	38	1
0ENJ2	380-04-600	5340-01-459-2193	44	13
0ENJ2	380-07-600	5930-01-458-3844	44	6
45152	39630AX	4730-01-143-4223	50	10
45152	3SK804	3990-01-358-1146	30	1
45152	3SK805	3990-01-357-1944	30	15
81343	4-2 120102BA	4730-00-277-8750	24	9
81343	4-2 120202BA	4730-00-921-3240	24	20
81343	4-4 120101BA	4730-00-277-9672	24	8
81343	4-4 120102BA	4730-00-270-4580	24	7
81343	4-4 120202BA	4730-00-118-5177	24	5
81343	4-6 070102C	4730-00-942-9147	22	5
81834	40152-3	9905-00-917-7168	10	6
81834	40153-3	9905-00-917-7167	10	1
00779	41274	5940-00-874-9033	47B	1
63899	430457B	5330-01-394-3549	KITS	60
45152	434-A	5310-01-063-8970	40B	4
0ENJ2	435-04-603	5930-01-456-9303	44	11
81073	44A60-03-1-6N	5930-01-303-7430	43	23
45152	45092AX	5305-01-064-5470	34	27
		5305-01-064-5470	47B	8
78422	4578	6240-00-643-0687	45	6
08108	4593	6240-00-132-5317	45	2
088A2	45A115-P29	5305-01-166-4410	26	16
		5305-01-066-4410	29	20
		5305-01-166-4410	41	1
43473	460-215-16141		47A	6
98441	4C50X-S	4730-01-388-9668	17	9
30780	5-HP50N		54A	11
63899	500419B	5365-01-355-9965	55	7
		5365-01-355-9965	56	7
19541	502-D		12	14
45152	50619AX	5305-01-355-1428	35A	27
45152	51047AX	5305-01-456-6925	35	10
78189	511-041810-01	5310-00-542-0087	35	2
		5310-00-542-0087	46	15
		5310-00-542-0087	47	2
		5310-00-542-0087	47	9
		5310-00-542-0087	47C	7
71744	5139-038	6210-01-293-8119	43	24
39428	5175K51	4710-01-453-8578	BULK	6
39428	5175K51-AR	4710-01-453-8578	24	1
45152	5201HX	5340-01-053-1331	47C	5
56501	5262	5330-00-588-0892	37	3
		5330-00-588-0892	38	7
		5330-00-588-0892	47	2
		5330-00-588-0892	47B	13
78422	5340910	5310-01-280-6538	45	5
78422	5340920	5305-01-280-6631	45	4
28839	535213	5305-00-014-5454	9	17

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
13548	5370		40A	5
			40B	16
70485	559	5325-00-925-9838	40B	25
01276	5606-8-10S	4730-01-327-5244	14	38
01276	5608-10-10S	4730-01-025-4918	14	39
		4730-01-025-4918	50	1
01276	5610-10-10S	4730-01-024-1347	14	34
		4730-01-024-1347	50	5
01276	5691-8-10S	4730-01-453-5390	14	35
19207	57K4185	5180-01-456-2749	57	1
45152	59031AX	5305-01-249-8564	26	15
		5305-01-249-8564	31	12
		5305-01-249-8564	35	18
		5305-01-249-8564	40	1
		5305-01-249-8564	42	8
		5305-01-249-8564	25A	1
		5305-01-249-8564	40B	17
34623	5972752	5930-00-292-0520	41A	5
30780	5HP50N-S	5365-01-214-3822	54	35
30780	5P50N-S	5365-01-071-8261	22	12
45152	615FX	4730-01-217-1115	34A	5
97111	6657-10	5340-01-458-7239	50	7
97111	6659-10	5340-01-458-7237	50	37
64386	67D794	2540-01-152-7764	29	4
		2540-01-152-7764	36	15
		2540-01-152-7764	25A	2
45152	68404AX	5310-00-833-8567	26	20
		5310-00-833-8567	29	16
57013	688-411-4	6350-01-319-9161	41A	11
63899	700079A	3040-01-373-0500	55	3
		3040-01-373-0500	56	3
63899	701121A		55	9
			56	9
63899	702001A		55	8
			56	8
63899	703425A		55	13
			56	12
63899	704425A		55	12
			56	13
63899	706069A		55	10
			56	10
63899	711053A	5305-01-355-2641	55	4
		5305-01-355-2641	56	4
63899	711083A	5305-01-355-2642	55	5
		5305-01-355-2642	56	5
63899	715001A	5340-01-372-3982	55	6
		5340-01-372-3982	56	6
45152	720HX	5310-01-457-8573	26A	8
63899	721175A		55	11
			56	11
63899	721176A		55	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
63899	721176A		56	2
45152	721893	4010-01-476-0348	BULK	8
45152	721893-AR		37	12
005M6	73014-002		47A	9
0D5M6	731740-002	5330-01-355-4809	46	4
		5330-01-355-4809	47A	4
		5330-01-355-4809	47B	4
45152	738HX4	5305-01-328-4384	30	8
57733	752023	5340-01-168-7285	35A	2
45152	767HX1	5310-01-058-3183	37	8
55996	78-500-1	5342-01-454-7088	27	8
81343	8-8 070120CA	4730-01-156-4835	51	8
0FHH8	801001M	5340-01-389-3462	52	9
		5340-01-389-3462	53	9
0FHH8	801003M	4730-01-355-9043	54	10
0FHH8	801005M	5365-01-361-5599	54	4
0FHH8	801006M	5365-01-355-5142	54	2
0FHH8	8014590N014		54	7
0FHH8	8022N7017		52	7
			53	7
0FHH8	8023N7009		53	13
			54	14
0FHH8	8023N7011	5331-01-460-9149	54	25
0FHH8	8023N7013	5331-01-355-9911	52	10
		5331-01-355-9911	53	8
0FHH8	8023N7015		52	5
			53	5
0FHH8	8023N7017		54	19
0FHH8	8023N7018		54	21
0FHH8	8023N9011		54	8
0FHH8	8024N902		52	9
			53	10
0FHH8	8024N904	5331-01-457-3314	54	11
0FHH8	8024N906	5331-01-460-9137	54	5
0FHH8	8024N908	5331-01-457-1834	53	14
		5331-01-457-1834	54	3
		5331-01-457-1834	54	15
0FHH8	8024N910		54	9
0FHH8	8024N912		52	3
			53	3
0FHH8	8024N914		54	22
0FHH8	8025N9009	5330-01-465-3236	53	12
0FHH8	8025N9009	5330-01-465-3236	54	13
0FHH8	8025N9014		52	6
			53	6
0FHH8	8025N9015		52	4
			53	4
0FHH8	8025N9017		54	18
0FHH8	8035N9018		54	20
0FHH8	804902B1W	5305-01-355-1355	54	23
01212	80X100X10	5330-01-355-9269	34	3

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
01212	80X100X10	5330-01-355-9269	34A	3
0S7U8	810046	5340-01-454-7279	6	16
35111	811	4030-01-456-1150	34	6
		4030-01-456-1150	34A	8
0FHH8	820004M		54	10
0FHH8	820006M		54	4
0FHH8	820008M		54	2
19207	8338564	5940-00-399-6676	41A	4
5A910	8338566	5975-01-230-4370	26	22
		5975-01-230-4370	29	14
02697	836-4-62		24	16
02697	836-4-9.5		24	14
74400	85006	6645-01-417-3524	38	9
39428	89955K27	4710-01-453-5622	BULK	7
39428	89955K27-18		23	9
98441	8F50X-S	4730-01-179-7575	51	8
		4730-01-179-7575	52	12
		4730-01-179-7575	53	19
		4730-01-179-7575	54	37
01276	900598-8S	5365-01-217-4133	36	27
39428	90177A216	5340-01-303-2997	36	20
39428	90177A224	5340-01-343-5833	22	24
39428	90312A310-6		9	16
			24	28
39428	90312A610-10		22	25
39428	90631A009	5310-01-457-3244	43	10
39428	92196A585	5305-01-455-5055	6	20
39428	92316A716	5305-01-456-9393	12	34
39428	92735A430	5315-01-457-9220	12	31
39428	93325K51		BULK	5
39428	93325K51-10		43	21
39428	93325K51-8		43	20
11939	93544216	5305-01-082-0049	30	4
11939	93604342	5310-01-081-5351	36	26
13548	94626	6150-01-459-1811	40A	3
		6510-01-459-1811	40B	12
39428	94895A25	5310-01-458-5052	12	30
39428	9729K74	5340-01-455-1671	23	10
39428	97840A66	4010-01-454-8588	BULK	11
39428	98026A033	5310-01-364-4211	12	7
39428	9833K22	2805-01-244-0125	12	36
39428	98416A011	5315-01-453-9031	24	27
39428	98497A661	531501-457-2385	4	1
63910	99-51505-017	5310-00-619-4848	12	6
0FHH8	9DD000240	4810-01-356-4487	54	24
0FHH8	9DD000461	5330-01-457-3525	KITS	70
0FHH8	9DD000606		54	1
0FHH8	9P000948		53	16
0FHH8	9P001041		52	11
0FHH8	9P001043		54	26
0FHH8	9S000339-A	4730-01-453-7915	53	1

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
0FHH8	9S000340-A	4730-01-453-7916	52	1
0FHH8	9S000342-A	4730-01-453-8630	54	1
71400	A 203107-NL	5940-01-357-9199	39	4
0FHH8	A04G2HZ4-145N		54	6
0FHH8	A04G2PZ20-145N	4820-01-458-0402	54	6
31902	A4806096	4720-01-453-5137	14	32
31902	A4809088	3950-01-453-5422	13	7
31902	A4809089	3950-01-453-5524	13	8
31902	A4809131	4030-01-454-8215	15	2
31902	A4809149	4030-01-454-8706	16	14
31902	A4809151	5340-01-454-7281	16	9
31902	A4809152	3040-01-453-8731	16	6
31902	A4809163	5365-01-453-7218	15	5
31902	A4809164	3120-01-453-2303	13	11
31902	A4809165	5365-01-453-6479	13	6
31902	A4809173	3950-01-450-5478	16	1
31902	A4809183	4030-01-458-0680	15	6
31902	A4809184	4030-01-454-8219	15	7
31902	A4809185	4010-01-454-8213	15	3
31902	A4809195	3020-01-453-8749	13	21
0CHW9	A4809211		13	22
31902	A4809240		15	1
31902	A4809250		13	20
31902	A4809260	5315-01-453-8667	13	18
31902	A4809270	5315-01-454-0517	13	1
31902	A4809280	3020-01-454-0316	13	9
31902	A4809290	5315-01-454-5458	13	19
31902	A4809300	3020-01-454-0321	13	5
31902	A4809370	5340-01-454-7280	16	5
31902	A4809380	5340-01-454-7283	16	10
31902	A4809400	3040-01-453-8550	16	8
31902	A4810055	3040-01-453-8753	7	8
31902	A4810056	5365-01-454-9554	7	7
31902	A4810074	3040-01-453-8714	7	3
31902	A4810075	5365-01-454-9552	7	1
31902	A4810080	3910-01-460-3891	7	6
31902	A480110	3990-01-453-9712	7	2
31902	A484810151	5340-01-454-7287	3	11
31902	A4810260	2540-01-453-8763	3	3
31902	A4810263	5340-01-454-7284	3	6
31902	A4810440	5315-01-454-5755	1	9
31902	A4810480	5340-01-454-7285	3	13
31902	A4814071	5340-01-454-7282	24	24
0FHH8	A4B125T-250N		54	17
0FHH8	A4B125T20-250N	4820-01-457-3136	54	17
58536	A52481-6	5330-00-508-0753	43	14
31902	A6208060		13	10
28158	AE30574	5310-00-092-6831	57	10
88044	AN365-1024A	5310-00-208-1918	26	21
		5310-00-208-1918	35	21
		5310-00-208-1918	36	6

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
88044	AN365-1024A	5310-00-208-1918	42	9
		5310-00-208-1918	25A	9
80205	AN970-5	5310-00-167-0767	35A	6
0CHW9	APEX50-ZP-1/2-601612		13A	9
75160	AR21837	4730-00-908-3195	22	7
53790	AS-2-D	5306-01-453-5940	14	18
27737	AS3047	3110-01-121-5318	21	3
27737	AXK3047	3110-00-455-0374	21	4
07505	B159167	5330-00-795-4269	23	6
80204	B1821BH025C075N	5305-00-068-0508	5	10
		5305-00-068-0508	7	11
		5305-00-068-0508	29	23
80204	B1821BH025C100N	5305-01-280-7901	14	31
		5305-01-280-7901	34	34
		5305-01-280-7901	47B	16
80204	B1821BH025C175N	5305-00-071-2510	25A	4
80204	B1821BH025C175N	5305-00-071-2510	25A	4
80204	B1821BH031C050N	5306-00-226-4822	12	26
80204	B1821BH031C075N	5306-00-226-4825	3	12
80204	B1821BH031C125N	5306-00-226-4829	24	29
80204	B1821BH031C150N	5305-00-226-4831	23	3
80204	B1821BH031C175N	5306-00-226-4832	22	4
80204	B1821BH038C088N	5305-01-140-9118	5	7
80204	B1821BH038C100N	5305-00-068-0510	3	7
		5305-00-068-0510	5	4
		5305-00-068-0510	9	13
80204	B1821BH038C113N	5305-00-543-2419	6	22
		5305-00-543-2419	13	13
		5305-00-543-2419	54	28
80204	B1821BH038C400N	5305-00-781-3928	36	31
80204	B1821BH044C150N	5305-00-071-2055	16	13
80204	B1821BH044C175N	5305-00-071-2056	31B	5
80204	B1821BH050C550N	5305-00-071-2084	6	13
80204	B1821BH075C250N	5305-00-922-7994	16	15
80204	B1821BH075C500N	5305-00-947-4362	32	12
80204	B1821BH075F100N	5305-01-296-1863	14	37
80204	B1821BHC31C100N	5360-00-226-4827	31B	4
97111	B20-3-BP	4730-01-383-6756	24	17
93907	B71-10015-002	5305-01-352-2066	40A	8
0CHW9	BBD01468		13A	10
0CHW9	BBD20000AM		13A	2
0CHW9	BBD20003AM		13A	4
0CHW9	BBD20006AM		13A	14
0CHW9	BBD20013AM		13A	13
0CHW9	BBD20014AM		13A	5
0CHW9	BBD22001IK		13A	1
0CHW9	BBD30075	4010-01-528-1747	15	3
0CHW9	BBD-42898		23	13
3Z048	BTT43	5320-01-351-5621	30	7
		5320-01-351-5621	33	1
		5320-01-351-5621	36	11

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
3Z048	BTT43	5320-01-351-5621	33A	2
92830	C0975-105-2500M	5360-01-455-7581	6	10
75272	C0V2113	5340-00-404-4100	49	8
		5340-00-404-4100	35A	14
92830	C1225-085-5000S	5360-01-453-7577	1	7
1W385	C152C	2590-01-453-7423	5	16
		2590-01-453-7423	9	22
79470	C35705X4	4730-00-522-1910	22	27
26952	C7900SR		23	8
71468	CA121003-9	5340-01-367-9122	35	4
		5340-01-367-9122	44A	4
71468	CA3101E12S-3SF80		47A	2
71468	CA3101F10SL-3PF80	5935-01-357-1036	47C	2
71468	CA3100E24-7SF80		47A	3
71468	CA3102R18-1S-F80	5935-01-317-6762	43	11
71468	CA3106F18-1PF80	5935-01-112-9782	47A	10
54035	CBEA-LAN-BCK	4820-01-453-6133	14	8
7B735	CCN-91001	5340-01-455-8403	35	19
0FHH8	CCP024D	5950-01-426-7978	53	15
0FHH8	CCS024D	5590-01-355-7136	54	16
53606	CJV-0809	5340-01-317-5450	35A	16
71744	CM387		43	3
71744	CM8176	6240-01-138-4366	44	9
75272	C0V050971	5340-01-038-9481	42	3
19541	D-2540	5310-01-461-1608	12	28
19541	D231-3	5340-01-133-8831	12	29
0ENJ2	DA-00E-150	6110-01-458-6162	43	1
0ENJ2	DA-00E-501	5340-01-457-8962	44	17
0ENJ2	DA-00E-552	5340-01-457-8960	43	19
0ENJ2	DA-00E-900	5895-01-467-7784	44	1
49367	DB-9	5975-00-284-5095	37	4
53790	DP-2	5340-01-355-6821	34	29
		5340-01-355-6821	50	29
		5340-01-355-6821	47B	10
53790	DP-3	5340-01-231-3916	48	23
28520	DP-312	5340-01-081-1718	31A	8
43473	DT04-8P	5935-01-412-0435	47A	5
56048	E0850-085-2750M	5360-01-453-8119	12	33
56048	E1750-207-5500M	5360-01-453-7574	12	17
92830	E2000-177-8000M	5360-01-453-5457	13	14
0FHH8	E2F050Y4350N	4820-01-454-2292	52	2
		4820-01-454-2292	53	2
19220	EAA-8600U	2540-01-421-4686	36	29
45152	EE-103647	5306-01-086-2368	34A	43
01276	FD40-1000-04-04	4730-01-155-3163	24	18
01276	FD45-1168-16-16	4730-01-220-8297	49	2
		4730-01-220-8297	51A	2
		4730-01-220-8297	54A	22
01276	FD45-1169-16-16	4730-01-221-2080	49	4
		4730-01-221-2080	51A	1
		4730-01-221-2080	54A	23

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
01276	FF9446-19	5331-01-457-3518	49	3
		5331-01-457-3518	49	5
01276	FK1328HHH0224	4720-01-356-6804	48	2
01276	FK1329HHH0244	4720-01-356-4555	48	17
01276	FU680HHH0260180	4720-01-356-4556	49	11
53790	GAH20-1/4 NPT-V	4730-01-368-1207	57	15
55719	GAN8508-29B	5120-01-428-8040	57	7
53790	GD-DS3	5340-01-172-1566	48	7
		5340-01-172-1566	50	16
2K272	GLY.PG 808560 A	5365-01-355-9529	34	4
		5365-01-355-9529	34A	4
2K272	GLY.PGZ 0606A		36	32
0FHH8	GS027400N	4810-01-453-9543	53	11
0FHH8	GS028510N	4810-01-356-0505	54	12
83014	H360-5-2	5340-01-151-8391	31A	9
83014	H360-6-2	5340-01-224-8368	40B	9
83014	H360K2598	5340-01-419-1315	40B	8
53790	HFF20-060	4720-01-373-9871	57	11
81349	M12133/1-12P	5310-01-038-2294	32	13
		5310-01-038-2294	34A	41
81349	M1678/2BKE93	6145-01-074-7535	BULK	9
81349	M24135/10-05	4720-00-051-4712	BULK	2
81349	M45913/1-5CG5C		31B	3
81349	M45913/1-7CG5C	5310-00-575-5329	31B	7
81349	M83248/1-905	5331-00-167-5166	22	13
90202	M885AG	4030-00-278-0715	32A	4
0EUT9	MCL 0116360900		37	1
96906	MS16208-137	5306-00-087-3762	7	5
96906	MS16562-227	5315-00-058-9756	1	8
96906	MS16562-236	5315-00-058-9782	5	5
96906	MS16562-240	5315-00-200-3183	6	9
96906	MS16624-1250	5325-00-806-2357	34	23
		5325-00-806-2357	35	40
		5325-00-806-2357	35	40
		5325-00-806-2357	34A	24
96906	MS16624-1315	5325-00-200-6684	34	26
		5325-00-200-6684	34A	27
96906	MS16995-16	5305-00-051-6751	43	8
80205	MS16998-20	5305-00-068-5415	43	7
96906	MS17984-516	5315-00-198-7653	13	15
96906	MS17984C415	5315-00-904-1673	9	18
96906	MS19068-091	5310-00-185-6461	30	20
96906	MS19068-121	5310-00-185-6345	34	18
		5310-00-185-6345	34A	19
96906	MS20392-3C31	5315-00-081-7015	24	26
96906	MS20470A4-4	5320-00-584-9078	3	2
80205	MS21318-20	5305-00-253-5614	11	1
		5305-00-253-5614	41	3
		5305-00-253-5614	33A	10
96906	MS21333-122	5340-00-833-8476	36	13
96906	MS21333-21	5340-00-926-5334	40B	27



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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS21333-3	5340-00-057-2890	24	2
96906	MS24393-16	4730-00-807-0930	49	14
96906	MS24658-22G	5930-00-781-7101	41	5
96906	MS24665-136	5315-00-017-9252	24	21
96906	MS24665-15	5315-00-917-6226	34A	10
96906	MS24665-283	5315-00-842-3044	35	22
96906	MS24665-289	5315-00-845-7787	12	24
96906	MS24665-360	5315-00-298-1499	16	4
96906	MS24665-360	5315-00-298-1499	16	4
96906	MS24665-511	5315-00-576-0421	8	1
96906	MS24665-513	5315-00-239-8032	9	12
80205	MS24665-624	5315-00-059-0217	31B	12
96906	MS24665-625	5315-00-209-7273	6	7
96906	MS24665-625	5315-00-209-7273	13	2
80205	MS24665-717	5315-00-187-9240	32A	5
96906	MS24665-768	5315-00-899-5931	34	9
96906	MS25036-118	5940-00-557-4345	41A	7
		5940-00-557-4345	43A	2
96906	MS25224-1	5930-00-615-6731	44	4
96906	MS27145-1	5935-00-767-7936	41A	2
96906	MS27183-10	5310-00-809-4058	34	33
		5310-00-809-4058	35	47
		5310-00-809-4058	37	7
		5310-00-809-4058	48	22
		5310-00-809-4058	50	30
		5310-00-809-4058	47B	17
96906	MS27183-12	5310-00-081-4219	14	7
		5310-00-081-4219	22	2
96906	MS27183-14	5310-00-080-6004	3	8
		5310-00-080-6004	13	12
96906	MS27183-17	5310-00-809-5997	1	4
		5310-00-809-5997	6	18
		5310-00-809-5997	12	11
		5310-00-809-5997	12	35
96906	MS27183-23	5310-00-809-8533	12	23
96906	MS27183-27	5310-00-809-8541	12	4
96906	MS27183-42	5310-00-014-5850	43	37
96906	MS27183-9	5310-00-823-8804	43A	5
96906	MS3367-1-9	5975-00-074-2072	47C	4
96906	MS3368-1-9E	5975-01-386-4837	40B	29
96906	MS3452W24-28S	5935-01-229-0410	43	17
80205	MS35190-289	5305-00-958-5246	35A	3
96906	MS35190-292	5305-00-990-1347	9	1
96906	MS35198-70	5305-00-206-3689	9	3
96906	MS35198-87	5305-00-052-7485	12	18
96906	MS35206-217	5305-00-889-2999	43	6
		5305-00-889-2999	44	18
96906	MS35206-218	5305-00-983-6730	35	3
		5305-00-983-6730	46	17
		5305-00-983-6730	47	7
		5305-00-983-6730	47C	6

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS35206-231	5305-00-889-3001	37	10
		5305-00-889-3001	39	5
		5305-00-889-3001	46	21
96906	MS35206-263	5305-00-984-6210	10	2
		5305-00-984-6210	22	20
		5305-00-984-6210	24	25
		5305-00-984-6210	29	28
		5305-00-984-6210	36	3
96906	MS35206-267	5305-00-984-6211	29	12
96906	MS35206-265	5305-00-984-6212	10	8
		5305-00-984-6212	22	22
		5305-00-984-6212	43	35
96906	MS35206-267	5305-00-984-6214	10	5
		5305-00-984-6214	43	38
96906	MS35206-269	5305-00-984-6216	39	3
96906	MS35206-280	5305-00-988-1724	31A	21
96906	MS35206-281	5305-00-988-1725	31B	8
96906	MS35206-286	5305-00-988-9265	37	9
96906	MS35207-260	5305-00-088-9044	44	3
96906	MS35207-264	5305-00-989-7435	44	15
96906	MS35207-265	5305-00-993-1848	44	14
96906	MS35265-44	5305-00-614-0245	43A	4
96906	MS35307-340	5306-00-816-5272	48	10
		5306-00-816-5272	50	13
		5310-00-550-3714	48	16
96906	MS35333-47	5310-00-550-3714	49	19
		5310-00-660-1819	50	24
96906	MS3533-48	5310-00-261-7163	9	4
96906	MS35336-29	5310-00-933-8120	44	5
96906	MS35338-138	5310-00-543-2410	43	13
96906	MS35338-40	5310-00-543-2410	44	20
96906	MS35338-41	5310-00-045-4007	43	16
96906	MS35338-42	5310-00-045-3299	44A	3
96906	MS35338-43	5310-00-045-3296	10	3
		5310-00-045-3296	22	8
		5310-00-045-3296	24	3
		5310-00-045-3296	43	36
		5310-00-582-5965	5	11
96906	MS35338-44	5310-00-582-5965	7	10
		5310-00-582-5965	9	20
		5310-00-582-5965	12	8
96906	MS35338-44	5310-00-582-5965	29	24
		5310-00-582-5965	34	28
		5310-00-582-5965	38	2
		5310-00-582-5965	48	21
		5310-00-582-5965	50	31
		5310-00-582-5965	47B	9
96906	MS35338-45	5310-00-407-9566	3	5
		5310-00-407-9566	12	27
		5310-00-407-9566	14	9
		5310-00-407-9566	22	3

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS35338-45	5310-00-407-9566	23	1
		5310-00-407-9566	24	22
96906	MS35338-46	5310-00-637-9541	40	9
96906	MS35338-47	5310-00-209-0965	13	3
		5310-00-209-0965	13	3
96906	MS35338-50	5310-00-820-6653	7	4
96906	MS35338-51	5310-00-584-7888	14	36
		5310-00-584-7888	16	3
96906	MS35338-65	5310-00-011-5093	17	7
		5310-00-011-5093	20	2
96906	MS35387-1	9905-00-205-2795	31	4
		9905-00-205-2795	31	17
		9905-00-205-2795	31B	9
		9905-00-205-2795	40B	19
96906	MS35387-2	9905-00-202-3639	26	14
		9905-00-202-3639	31A	22
96906	MS35423-1	6220-00-577-3434	26	17
		6220-00-577-3434	29	18
96906	MS35423-2	6220-00-726-1916	31	10
		6220-00-726-1916	40	2
96906	MS35438-3	5940-00-082-4939	47A	8
96906	MS35489-49	5325-00-276-5954	35	37
96906	MS35649-205	5310-00-934-9764	10	4
		5310-00-934-9764	22	9
		5310-00-934-9764	24	4
96906	MS35649-242	5310-00-934-9739	43	12
96906	MS35649-262	5310-00-934-9747	43	15
96906	MS35649-43	5310-00-275-9301	44	21
54214	MS39162-3	4730-00-254-6211	24	11
96906	MS39323-12-10	4730-01-012-1674	54A	19
96906	MS45904-76	5310-00-061-1258	40	6
		5310-00-061-1258	40B	23
96906	MS51105-367	5305-01-118-8860	35A	26
96906	MS51500A4-4S	4730-00-837-7073	14	23
96906	MS51504A6	4730-00-812-7999	5	17
96906	MS51504A6	4730-00-812-7999	5	17
96906	MS51510-A10	4730-00-784-2633	14	16
96906	MS51520A8S	4730-00-226-6772	49	10
96906	MS51525A12-16	4730-00-173-1881	54A	13
96906	MS51525A16	4730-00-930-5392	54	29
96906	MS51527A12	4730-01-011-7736	54A	9
96906	MS51527A6	4730-00-143-3941	14	2
96906	MS51527A8	4730-00-822-5609	54A	5
96906	MS5128B8	4730-00-062-5470	54A	4
96906	MS51529A10	4730-00-421-1363	14	11
96906	MS51844-43	4030-01-258-0467	36	21
		4030-01-258-0467	34A	34
	MS51849-56	5305-00-157-5621	43	5
96906	MS51849-74	5305-00-470-3321	35A	9
96906	MS51922-33	5310-00-225-6993	1	5
		5310-00-225-6993	6	19

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS51922-33	5310-00-225-6993	22	23
96906	MS51922-9	5310-00-984-3806	3	4
		5310-00-984-3806	6	1
		5310-00-984-3806	12	21
		5310-00-984-3806	16	11
96906	MS51943-31	5310-00-061-4650	25A	11
96906	MS51958-64	5305-00-059-3660	40A	7
		5305-00-059-3660	40B	14
96906	MS51963-87	5305-00-724-5834	15	4
96906	MS51967-2	5310-00-761-6882	9	19
96906	MS51967-23	5310-00-763-8921	16	2
96906	MS51967-5	5310-00-880-7744	14	10
		5310-00-880-7744	23	2
		5310-00-880-7744	24	23
96906	MS51967-8	5310-00-732-0558	3	10
		5310-00-732-0558	6	5
		5310-00-732-0558	13	17
96906	MS51987-422	5315-01-140-4870	9	8
96906	MS52000-7	5330-00-968-1753	43	18
		5330-00-968-1753	44	19
96906	MS90725-109	5305-00-044-4153	22	18
96906	MS90725-113	5305-01-325-8388	1	1
96906	MS90725-3	5305-00-068-0500	12	9
96906	MS90725-31	5306-00-225-8496	24	31
96906	MS90725-36	5306-01-075-8519	23	11
96906	MS90725-41	5306-00-226-4834	14	6
96906	MS90725-64	5305-01-325-8387	6	2
		5305-01-325-8387	9	23
96906	MS90727-89	5305-00-709-8539	13	4
08162	N08	5310-00-185-6389	30	17
80205	NAS1352C5-12	5305-01-358-8402	16	7
0ENJ2	P0-006-201	5998-01-456-9734	43	22
18265	P14-9099	4820-01-197-1880	29	22
0ENJ2	PA-006-201		44	22
U8623	PK16906	5340-99-894-1046	9	10
03743	PLG-50RA	4730-01-071-2875	36	6
76005	RS40-7	5315-00-241-7332	12	5
48482	S-19693-SS		30	21
78500	S-268-1	5306-01-084-5390	40B	24
18076	S-340-N-36	5340-01-363-7414	50	34
99517	S1E10164 ITEM 17	5330-01-344-4335	14	33
		5330-01-344-4335	50	6
81343	SAE J1508-06	4730-00-908-3195	24	13
81992	SHC-1022	5975-01-207-0230	37	5
		5975-01-207-0230	38	6
		5975-01-207-0230	47	3
		5975-01-207-0230	47B	14
0FHH8	SK3-0006N	5330-01-422-3885	KITS	10
0FHH8	SK30024N-1	5330-01-357-7512	KITS	20
0FHH8	SK3-0039N-1	5330-01-357-7510	KITS	30
0FHH8	SK30503N-1	5330-01-457-3787	KITS	40

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
53970	SP3	5340-01-453-2747	14	19
71468	SS2P	5935-01-174-5183	44A	9
82458	T893R	5310-01-288-1116	26	7
		5310-01-288-1116	40	10
		5310-01-288-1116	42	7
		5310-01-288-1116	49	16
		5310-01-288-1116	50	35
		5310-01-288-1116	25A	7
		5310-01-288-1116	31A	15
		5310-01-288-1116	35A	21
		5310-01-288-1116	50A	12
84971	TA720-S8	5340-01-204-4888	34A	39
		5340-01-204-4888	47B	5
84971	TA720S24	5340-00-224-1204	50A	15
57390	TCM20-1/2JIC-V	4730-01-373-2692	57	13
57390	TCM20-1/2UNF-V	4730-01-372-9701	57	12
53790	TCM20-5/8 JIC-V	4730-01-368-7590	57	14
09990	VCL4P05A	4820-01-038-2313	14	24
2K272	W 08	5310-01-355-8794	30	16
2K272	W 09	5310-01-459-6126	30	19
2K272	W 12 LOCKWASHER	5310-01-458-0248	34	17
		5310-01-458-0248	34A	18
81348	W-L-00111/60	6240-00-155-8717	26	18
		6240-00-155-8717	29	19
		6240-00-155-8717	31	11
		6240-00-155-8717	40	3
77342	W58XB1A4A-5	5925-00-283-6048	43	25
43473	W8P		47A	7
52167	WC0210PB	5305-01-344-8899	35A	9
52167	WC0412PB	5306-01-287-5714	26	4
		5306-01-287-5714	49	17
52167	WC0412PB	5306-01-287-5714	50	38
		5306-01-287-5714	35A	13
		5306-01-287-5714	44A	7
		5306-01-287-5714	50A	16
52167	WC0414PB	5306-01-287-5715	26	5
		5306-01-287-5715	40	5
		5306-01-287-5715	42	6
		5306-01-287-5715	25A	8
		5306-01-287-5715	35A	28
52167	WE0628TB	5305-01-341-3090	26A	6
52167	WE0630TB	5305-01-156-5445	31A	12
52167	WE0816TB	5306-01-150-5884	34A	50
52167	WE0818TB	5306-01-106-7496	26A	2
52167	WE0820TB	5306-01-156-5429	28	7
		5306-01-156-5429	34A	49
52167	WE0822TB	5306-01-147-9723	25A	8
52167	WH0612TB	5305-01-357-4683	26	11
		5305-01-357-4683	35	46
52167	WH0818TB	5306-01-106-7496	28	5
52090	XS1M18PA370TF	5930-01-464-9574	47B	7
		5930-01-464-9574	47B	12
52090	XS1M30PA370TF	5930-01-464-9581	47C	1

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
5310-00-011-5093	17	7	5306-00-087-3762	7	5
5310-00-011-5093	20	2	5305-00-088-9044	44	3
5305-00-014-5454	9	17	5310-00-092-6831	57	10
5310-00-014-5850	43	37	5935-00-103-1774	50	23
5315-00-017-9252	24	21	4730-00-118-5177	24	5
5330-00-017-9253	14	41	6240-00-132-5317	45	2
5330-00-017-9253	50	2	4730-00-143-3941	14	2
4730-00-042-8988	20	3	5975-00-152-1075	37	2
5305-00-044-4153	22	18	5975-00-152-1075	38	8
5310-00-045-3296	10	3	5975-00-152-1075	47	1
5310-00-045-3296	22	8	6240-00-155-8717	26	18
5310-00-045-3296	24	3	6240-00-155-8717	29	19
5310-00-045-3296	43	36	6240-00-155-8718	31	11
5310-00-045-3299	44A	3	6240-00-155-8717	40	3
5310-00-045-4007	43	16	5305-00-157-5621	43	5
4720-00-051-4712	BULK	2	5310-00-167-0767	35A	6
5305-00-051-6751	43	8	5331-00-167-5166	22	13
5305-00-052-7845	12	18	5331-00-167-5166	54	36
5340-00-057-2890	24	2	4730-00-173-1881	54A	13
5315-00-058-9756	1	8	5310-00-185-6345	34	18
5315-00-058-9782	5	5	5310-00-185-6345	34A	19
5315-00-059-0206	12	10	5310-00-185-6389	30	17
5315-00-059-0217	31B	12	5310-00-187-9420	30	20
5305-00-059-3660	40A	7	5315-00-187-9420	32A	5
5305-00-059-3660	40B	14	5315-00-198-7653	13	15
5310-00-061-1258	40	6	5315-00-200-3183	6	9
5310-00-061-1258	40B	23	5325-00-200-6684	34	26
5310-00-061-4650	25A	11	5325-00-200-6684	34A	27
4730-00-062-5470	54A	4	9905-00-202-3639	26	14
5305-00-068-0500	12	9	9905-00-202-3639	31A	22
5305-00-068-0508	5	10	9905-00-205-2795	31	4
5305-00-068-0508	7	11	9905-00-205-2795	31	17
5305-00-068-0508	29	23	9905-00-205-2795	31B	9
5305-00-068-0510	3	7	9905-00-205-2795	40B	19
5305-00-068-0510	5	4	5305-00-206-3689	9	3
5305-00-068-0510	9	13	5310-00-208-1918	26	21
5305-00-068-5415	43	7	5310-00-208-1918	35	21
5305-00-071-2055	16	13	5310-00-208-1918	36	6
5305-00-071-2056	31B	5	5310-00-208-1918	42	9
5305-00-071-2084	6	13	5310-00-208-1918	25A	9
5305-00-071-2510	25A	4	5310-00-209-0965	13	3
5975-00-074-2072	47C	4	5310-00-209-0965	16	12
5310-00-080-6004	3	8	5310-00-209-0965	49	19
5310-00-080-6004	13	12	5315-00-209-7273	6	7
5310-00-081-4219	14	7	5315-00-209-7273	13	2
5310-00-081-4219	22	2	5340-00-224-1204	50A	15
5315-00-081-7015	24	26	5310-00-225-6993	1	5
5940-00-082-4939	47A	8	5310-00-225-6993	6	19

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
5310-00-225-6993	22	23	5330-00-485-3586	14	5
5306-00-225-8496	24	31	5330-00-485-3586	14	12
5306-00-226-4822	12	26	4730-00-491-4983	57	8
5306-00-226-4825	3	12	5330-00-508-0753	43	14
5360-00-226-4827	31B	4	4730-00-522-1910	22	27
5306-00-226-4829	24	29	5310-00-542-0087	35	2
5305-00-226-4831	23	3	5310-00-542-0087	46	15
5306-00-226-4831	22	4	5310-00-542-0087	47	9
5306-00-226-4834	14	6	5310-00-542-0087	47C	7
4730-00-226-6772	49	10	5310-00-543-2410	43	13
5331-00-228-7196	54	32	5310-00-543-2410	44	20
5331-00-228-7196	54	34	5305-00-543-2419	6	22
5331-00-228-7196	51A	6	5305-00-543-2419	13	13
5331-00-228-7196	54A	6	5305-00-543-2419	54	28
5331-00-228-7196	54A	10	5310-00-550-3714	48	16
5331-00-228-7196	54A	14	5310-00-550-3714	49	19
5331-00-228-7196	54A	18	4730-00-555-1152	24	12
5315-00-239-8032	9	12	5940-00-557-4345	41A	7
5315-00-241-7332	12	5	5940-00-557-4345	43A	2
5305-00-253-5614	11	1	4730-00-574-8807	24	10
5305-00-253-5614	35	33	5310-00-575-5329	31B	7
5305-00-253-5614	41	3	5315-00-576-0421	8	1
5305-00-253-5614	33A	10	6220-00-577-3434	26	17
4730-00-254-6211	24	11	6220-00-577-3434	29	18
5310-00-261-7163	9	4	5310-00-582-5965	5	11
4730-00-270-4580	24	7	5310-00-582-5965	7	10
5310-00-275-9301	44	21	5310-00-582-5965	9	20
5325-00-276-5954	35	37	5310-00-582-5965	12	8
4730-00-277-8750	24	9	5310-00-582-5965	29	24
4730-00-277-9672	24	8	5310-00-582-5965	34	28
4030-00-278-0715	32A	4	5310-00-582-5969	38	2
5925-00-283-6048	43	25	5310-00-582-5965	48	21
5975-00-284-5095	37	4	5310-00-582-5965	50	31
5930-00-292-0520	41A	5	5310-00-582-5965	47B	9
5315-00-298-1499	16	4	5310-00-584-7888	14	36
5331-00-395-5737	48	26	5310-00-584-7888	16	3
5331-00-395-5737	51	6	5320-00-584-9078	3	2
5940-00-399-6676	41A	4	5330-00-588-0892	37	3
5340-00-404-4100	49	8	5330-00-588-0892	38	7
5340-00-404-4100	35A	14	5330-00-588-0892	47	2
5310-00-407-9566	3	5	5330-00-588-0892	47B	13
5310-00-407-9566	12	27	5310-00-600-0751	44A	2
5310-00-407-9566	14	9	5305-00-614-0245	43A	4
5310-00-407-9566	22	3	5930-00-615-6731	44	4
5310-00-407-9566	23	1	5310-00-619-4848	12	6
5310-00-407-9566	24	22	5310-00-637-9541	3	9
4730-00-421-1363	14	11	5310-00-637-9541	5	3
3110-00-455-0374	21	4	5310-00-637-9541	6	3
5305-00-470-3321	35A	9	5310-00-637-9541	9	14

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
5310-00-637-9541	13	16	5310-00-833-8567	26	20
5310-00-637-9541	40	9	5310-00-833-8567	29	16
6240-00-643-0687	45	6	4730-00-837-7073	14	23
5310-00-660-0687	50	24	5315-00-842-3044	35	22
5305-00-709-8539	13	4	5315-00-845-7787	12	24
4730-00-710-5571	54	33	4720-00-847-1710	35	15
5305-00-724-5834	15	4	4720-00-847-1710	BULK	3
6220-00-726-1916	31	10	5940-00-874-9033	47B	1
6220-00-726-1916	40	2	5310-00-880-0626	26	8
5310-00-732-0558	3	10	5310-00-880-0626	34	14
5310-00-732-0558	6	5	5310-00-880-0626	31A	18
5310-00-732-0558	13	17	5310-00-880-0626	34A	15
5310-00-761-6882	9	19	5310-00-880-7744	14	10
5310-00-763-8921	16	2	5310-00-880-7744	23	2
5935-00-767-7936	41A	2	5310-00-880-7744	24	23
5310-00-775-5139	29	11	5325-00-882-4438	43	34
5310-00-775-5139	31	9	5305-00-889-2999	43	6
5310-00-775-5139	41	4	5305-00-889-2999	44	18
5305-00-781-3928	36	31	5305-00-889-3001	37	10
5930-00-781-7101	41	5	5305-00-889-3001	39	5
4730-00-784-2633	14	16	5305-00-889-3001	46	21
5340-00-789-8409	14	40	4730-00-897-2043	14	13
5340-00-789-8409	50	3	5315-00-899-5931	34	9
5330-00-795-4269	23	6	5315-00-904-1673	9	18
5330-00-795-4269	23	7	4730-00-906-0721	14	4
5325-00-806-2357	34	23	4730-00-908-3195	22	7
5325-00-806-2357	35	40	4730-00-908-3195	24	13
5325-00-806-2357	34A	24	5315-00-917-6226	34A	10
4730-00-807-0930	49	14	9905-00-917-7167	10	1
5310-00-809-4058	34	33	9905-00-917-7168	10	6
5310-00-809-4058	35	47	4730-00-921-3240	24	20
5310-00-809-4058	37	7	5305-00-922-7994	16	15
5310-00-809-4058	48	22	5325-00-925-9838	40B	25
5310-00-809-4058	50	30	5340-00-926-5334	40B	27
5310-00-809-4058	47B	17	5331-00-929-8171	51	9
5310-00-809-5997	1	4	5331-00-929-8171	52	13
5310-00-809-5997	6	18	5331-00-929-8171	53	20
5310-00-809-5997	12	11	5331-00-929-8171	54	38
5310-00-809-5997	12	35	4730-00-930-5392	54	29
5310-00-809-8533	12	23	5310-00-933-8120	44	5
5310-00-809-8541	12	4	5310-00-933-8120	48	30
4730-00-812-7999	5	17	5310-00-934-9739	43	12
5306-00-816-5272	48	10	5310-00-934-9747	43	15
5306-00-816-5272	50	13	5310-00-934-9764	10	4
5310-00-820-6653	7	4	5310-00-934-9764	22	9
4730-00-822-5609	54A	5	5310-00-934-9764	24	4
5310-00-823-8804	43A	5	4730-00-935-5355	51A	3
5340-00-833-8476	36	13	4730-00-942-9147	22	5



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5305-00-947-4362	32	12	5310-01-058-3183	37	8
5305-00-958-5246	35A	3	5310-01-061-7452	36	30
4730-00-958-8599	22	15	5310-01-061-7452	48	12
5330-00-968-1753	43	18	5310-01-061-7452	50	14
5330-00-968-1753	44	19	5310-01-061-7452	51	3
5305-00-983-6730	35	3	5310-01-061-7452	29A	2
5305-00-983-6730	46	17	5305-01-061-7910	34	12
5305-00-983-6730	47	7	5305-01-061-7910	34A	13
5305-00-983-6730	47C	6	5305-01-062-1017	27	1
5310-00-984-3806	3	4	5305-01-062-1017	29	7
5310-00-984-3806	6	1	5305-01-062-1017	36	18
5310-00-984-3806	12	21	5305-01-062-1017	25A	3
5310-00-984-3806	16	11	5305-01-062-1017	29A	1
5305-00-984-6197	44A	6	5305-01-062-1017	35A	8
5305-00-984-6210	10	2	5310-01-062-3379	35A	25
5305-00-984-6210	22	20	5310-01-063-8970	40B	4
5305-00-984-6210	24	25	5305-01-064-5470	34	27
5305-00-984-6210	29	28	5305-01-064-5470	47B	8
5305-00-984-6210	36	3	5310-01-066-6759	29	3
5305-00-984-6211	29	12	5310-01-066-6759	34	32
5305-00-984-6212	10	8	5310-01-066-6759	35	16
5305-00-984-6212	22	22	5310-01-066-6759	36	17
5305-00-984-6212	43	35	5310-01-066-6759	38	3
5305-00-984-6214	10	5	5310-01-066-6759	31B	10
5305-00-984-6214	43	38	5310-01-066-6759	35A	10
5305-00-984-6216	39	3	5310-01-066-6759	40B	6
5305-00-988-1724	31A	21	5310-01-068-8446	27	2
5305-00-988-1725	31B	8	5310-01-068-8446	29	8
5305-00-988-9265	37	9	5310-01-068-8446	30	3
5305-00-988-7435	44	15	5310-01-068-8446	48	11
5305-00-990-1347	9	1	5310-01-068-8446	50	15
5305-00-993-1848	44	14	5310-01-068-8446	51	2
4730-00-999-9830	14	15	5310-01-068-8446	35A	7
6210-01-010-2521	43	2	4730-01-071-2875	39	6
4730-01-011-7736	54A	9	5365-01-071-8261	22	12
4730-01-012-1674	54A	19	6145-01-074-7535	BULK	9
4730-01-024-0915	57	9	6145-01-074-7535	BULK	10
4730-01-024-1347	14	34	5306-01-075-8519	23	11
4730-01-024-1347	50	5	4730-01-077-4889	14	26
4730-01-025-4918	14	39	4730-01-077-4889	54A	12
4730-01-025-4918	50	1	5340-01-081-1718	31A	8
4730-01-027-8261	54	31	5340-01-081-3419	50	11
5310-01-038-2294	32	13	5310-01-081-5351	36	26
5310-01-038-2294	34A	41	5305-01-082-0049	30	4
4820-01-038-2313	14	24	5306-01-084-5390	40B	24
5340-01-038-9481	42	3	5306-01-086-2368	34A	43
5340-01-053-1331	47C	5	5340-01-092-1637	36	4
5310-01-057-0822	35	13	5340-01-092-1637	25A	12
4730-01-057-9597	22	10			

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5310-01-105-7229	29	9	2540-01-152-7764	36	15
5306-01-106-7496	28	5	2540-01-152-7764	25A	2
5306-01-106-7496	26A	2	5340-01-153-0313	31	16
5310-01-111-1645	28	4	5340-01-153-0313	31A	2
5310-01-111-0645	32	10	5305-01-154-4323	32	6
5310-01-111-0645	26A	4	5305-01-154-4323	32A	12
5310-01-111-0645	34A	47	4730-01-155-3163	24	18
2590-01-111-1851	BULK	4	5305-01-155-3478	32	9
5935-01-112-9782	47A	10	5305-01-155-3478	32A	13
4730-01-116-1658	14	14	5305-01-155-3478	34A	33
5331-01-116-8112	51	7	5305-01-155-5237	40B	18
5305-01-118-8860	35A	26	4730-01-156-4835	51	8
5310-01-119-1811	47B	15	5305-01-156-5099	26	10
3110-01-121-5318	21	3	5306-01-156-5429	28	7
5310-01-129-0450	34	13	5306-01-156-5429	34A	49
5310-01-129-0450	54	27	5305-01-156-5445	31A	12
5310-01-129-0450	34A	14	5340-01-156-6776	29	6
5310-01-129-0450	40B	5	5340-01-156-6776	36	19
2540-01-131-6242	31A	19	5340-01-156-6776	25A	5
5310-01-133-2130	30	9	9905-01-157-1026	33	3
5310-01-133-2130	35	12	9905-01-157-1026	33A	6
5340-01-133-8831	12	29	5305-01-157-5624	31A	44
5305-01-134-2052	33A	4	5310-01-159-8178	26	12
5340-01-133-8831	12	29	5310-01-159-8178	31	3
5305-01-134-2052	33A	4	5310-01-159-8178	35	36
2540-01-134-3714	31	14	5310-01-159-8178	26A	7
2540-01-134-3714	31B	11	5310-01-159-8178	31A	10
6240-01-138-4366	44	9	5310-01-159-8178	32A	3
5315-01-140-4870	9	8	5305-01-159-8544	31	5
5305-01-140-9118	5	7	4730-01-164-3365	24	6
5310-01-141-5565	48	8	5306-01-164-7437	48	9
4730-01-143-4223	50	10	5306-01-165-3256	36	28
5306-01-145-6949	38	1	5305-01-166-4410	26	16
5306-01-147-9723	25A	8	5305-01-166-4410	29	20
5975-01-148-4607	41A	3	5305-01-166-4410	41	1
5305-01-149-1934	32	6	5305-01-167-9408	32A	1
5305-01-149-1934	32A	10	5330-01-168-0885	54A	25
5305-01-149-1935	30	13	5340-01-168-7285	35A	2
5305-01-149-1935	32	5	5306-01-171-5897	28	1
5305-01-150-3996	31	1	5340-01-172-1566	48	7
5306-01-150-5884	34A	50	5340-01-172-1566	50	16
5310-01-150-5918	30	14	5935-01-174-5183	44A	9
5310-01-150-5918	32	4	5342-01-175-0316	35A	15
5310-01-150-5918	32A	6	4710-01-175-2368	47B	6
5310-01-150-5918	34A	30	5310-01-177-4625	36	33
5306-01-150-7726	32	8	4730-01-179-7575	51	8
5306-01-150-7726	34A	45	4730-01-179-7575	52	12
5305-01-150-7736	31	21	4730-01-179-7575	53	19
5305-01-150-7736	35	35	4730-01-179-7575	54	37
5340-01-151-8391	31A	9	5305-01-185-8668	32A	9
2540-01-152-7764	29	4			

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
5305-01-196-8088	32A	11	4730-01-242-1290	54A	20
4820-01-197-1880	29	22	2805-01-244-0125	12	36
5365-01-198-1650	20	10	5330-01-244-2273	51A	4
5365-01-198-3321	20	11	5330-01-244-2273	54A	21
5360-01-199-6157	20	6	5305-01-249-8564	26	15
5305-01-203-8360	29	5	5305-01-249-8564	31	12
5305-01-203-8360	36	16	5305-01-249-8564	35	18
5305-01-203-8360	48	20	5305-01-249-8564	40	1
5305-01-203-8360	50	32	5305-01-249-8564	42	8
5340-01-204-4888	34A	39	5305-01-249-8564	25A	1
5340-01-204-4888	47B	5	5305-01-249-8564	40B	17
5975-01-207-0230	37	5	4030-01-258-0467	36	21
5975-01-207-0230	38	6	4030-01-258-0467	34A	34
5975-01-207-0230	47	3	5305-01-271-3276	18	1
5975-01-207-0230	47B	14	5365-01-278-6157	18	6
4730-01-211-5222	19	8	5310-01-280-6538	45	5
5310-01-212-2299	18	2	5305-01-280-6631	45	4
5365-01-214-3822	54	35	5305-01-280-7901	14	31
5310-01-214-4946	30	12	5305-01-280-7901	34	34
5310-01-214-4946	32	2	5305-01-280-7901	47B	16
5310-01-214-4946	35	25	5306-01-287-5714	26	4
5310-01-214-4946	34A	42	5306-01-287-5714	49	17
5340-01-216-1165	14	30	5306-01-287-5714	50	38
5310-01-216-2799	34	8	5306-01-287-5714	35A	13
5310-01-216-2799	34A	9	5306-01-287-5714	44A	7
4730-01-217-1115	34A	5	5306-01-287-5714	50A	16
5305-01-217-2126	17	6	5306-01-287-5715	26	5
5305-01-217-2126	20	1	5306-01-287-5715	40	5
5365-01-217-4133	36	27	5306-01-287-5715	42	6
5365-01-217-7125	18	12	5306-01-287-5715	25A	8
2590-01-217-8142	21	7	5306-01-287-5715	35A	28
5330-01-219-3994	20	5	5310-01-288-1116	26	7
4730-01-220-8297	49	2	5310-01-288-1116	40	10
4730-01-220-8297	51A	2	5310-01-288-1116	42	7
4730-01-220-8297	54A	22	5310-01-288-1116	49	16
4730-01-221-2080	49	4	5310-01-288-1116	50	35
4730-01-221-2080	51A	1	5310-01-288-1116	25A	7
4730-01-221-2080	54A	23	5310-01-288-1116	31A	15
5340-01-224-8368	40B	9	5310-01-288-1116	35A	21
5305-01-227-5660	35	14	5310-01-288-1116	50A	12
3935-01-227-5660	35	14	5310-01-288-5096	31	8
5935-01-229-0140	43	17	5310-01-288-5096	40	4
5975-01-230-4370	26	22	5310-01-288-5096	40B	7
5975-01-230-4370	29	14	5315-01-288-6747	35	24
5340-01-231-3916	48	23	6210-01-293-8119	43	24
5360-01-236-2072	26A	9	5999-01-298-0527	42	5
4010-01-237-7544	BULK	1	5340-01-303-2997	36	20
5325-01-240-7163	21	5	5930-01-303-7430	43	23
4730-01-241-4650	49	18	5340-01-317-5450	35A	16
4730-01-241-4650	54A	24			

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
5935-01-317-6762	43	11	5310-01-346-9445	42	4
6350-01-319-9161	41A	11	5310-01-346-9445	31A	14
5305-01-325-8387	6	2	5310-01-346-9445	35A	4
5305-01-325-8387	9	23	5310-01-346-9445	35A	18
5305-01-325-8388	1	1	5310-01-346-9445	40B	21
6220-01-326-2286	45	1	5310-01-346-9445	40B	26
4730-01-327-5244	14	38	5310-01-346-9445	41A	10
4730-01-327-7081	54A	1	5320-01-351-5621	30	7
5305-01-328-4384	30	8	5320-01-351-5621	33	1
5305-01-337-9120	29	13	5320-01-351-5621	33A	2
5305-01-337-9120	42	2	5305-01-352-2066	40A	8
5305-01-337-9120	35A	19	5310-01-352-7732	37	6
5305-01-337-9120	40B	28	5310-01-352-7732	39	7
5305-01-337-9120	41A	12	5310-01-352-7732	46	22
5305-01-340-0225	50A	14	5305-01-353-8267	26	2
5305-01-340-5061	35A	22	5305-01-353-8268	31A	1
5305-01-340-5671	26	25	5305-01-353-8268	31A	5
5305-01-340-5671	29	25	5305-01-355-1355	54	23
5305-01-340-5671	31	13	5305-01-355-1428	35A	27
5305-01-340-5671	49	7	5305-01-355-2641	55	4
5305-01-340-5671	50	9	5305-01-355-2641	56	4
5305-01-340-5671	25A	6	5305-01-355-2642	55	5
5305-01-340-5671	29A	3	5305-01-355-2642	56	5
5305-01-340-5671	31A	20	5340-01-355-3733	48	6
5305-01-340-5671	44A	1	5315-01-355-3744	34	20
5305-01-340-5671	50A	11	5315-01-355-3744	30	2
5306-01-341-0712	31	15	5340-01-355-3794	30	2
5306-01-341-0712	50A	9	5330-01-355-4809	46	14
5305-01-341-0712	26A	6	5330-04-355-4809	47A	4
5310-01-342-8595	34	16	5330-01-355-4809	47B	4
5310-01-342-8595	35	39	4730-01-355-5140	52	1
5310-01-342-8595	34A	40	5365-01-355-5142	54	2
5340-01-343-5833	22	24	5340-01-355-5248	30	10
5330-01-344-4335	14	33	5340-01-355-5259	35A	29
5330-01-344-4335	50	6	5340-01-355-5268	35A	11
5330-01-344-5532	51	1	5340-01-355-6821	34	29
5305-01-344-8899	25	6	5340-01-355-6821	50	29
5305-01-344-8899	31	19	5340-01-355-6821	47B	10
5305-01-344-8899	36	7	5950-01-355-7136	54	16
5305-01-344-8899	36	14	5365-01-355-7357	34	25
5305-01-344-8899	31A	4	5365-01-355-7357	34A	26
5305-01-344-8899	35A	9	5365-01-355-7358	34	22
5305-01-344-8899	35A	17	5365-01-355-7358	35	41
5305-01-344-8899	40B	3	5365-01-355-7358	34A	23
5310-01-346-9445	25	2	5340-01-355-8246	34	30
5310-01-346-9445	29	15	5340-01-355-8246	47B	6
5310-01-346-9445	31	20	5340-01-355-8247	48	24
5310-01-346-9445	36	12	5310-01-355-8794	30	16
5310-01-346-9445	36	22			

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
5310-01-355-8798	52	14	2510-01-357-8796	31A	6
5310-01-355-8798	53	17	5940-01-357-9199	39	4
3120-01-355-8843	30	18	5940-01-358-1127	39	1
4730-01-355-9000	48	3	3990-01-358-1146	30	1
4730-01-355-9003	54A	17	5340-01-358-6695	40B	22
4730-01-355-9043	54	10	9905-01-358-6746	33A	12
5330-01-355-9269	34	3	4710-01-358-6946	48	27
5330-01-355-9269	34A	3	5305-01-358-8402	16	7
5340-01-355-9368	34	11	4710-01-360-2292	48	18
5340-01-355-9368	35	38	4710-01-360-2293	48	28
5340-01-355-9368	34A	12	4710-01-360-9502	48	13
5365-01-355-9529	34	4	5331-01-361-1505	48	4
5365-01-355-9529	34A	4	5331-01-361-1505	48	15
5331-01-355-9911	52	10	5315-01-361-2721	34	5
5331-01-355-9911	53	8	5315-01-361-2721	34A	6
5365-01-355-9965	55	7	4710-01-361-3985	48	5
5365-01-355-9965	56	7	5365-01-361-5599	54	4
4810-01-356-0505	54	12	5310-01-361-8388	29	10
4730-01-356-0687	51	5	5310-01-361-8388	36	5
4730-01-356-0108	51	4	9905-01-361-8611	30	6
4730-01-356-2653	48	14	6150-01-362-5216	47C	3
3040-01-356-2707	56	1	6150-01-362-5217	47B	20
4810-01-356-4487	54	24	6150-01-362-5218	47B	11
4720-01-356-4555	48	17	6150-01-363-2162	47B	3
4720-01-356-4556	49	11	5340-01-353-6139	30	5
3040-01-356-4589	34	15	5340-01-363-6141	50A	10
3040-01-356-4589	34A	16	5315-01-363-6984	35	6
2530-01-356-4613	34	24	5315-01-363-6984	34A	36
2530-01-356-4613	34A	25	5315-01-363-7062	35	7
2530-01-356-4614	34	21	5315-01-363-7062	34A	37
2530-01-356-4614	35	42	5340-01-363-7320	36	8
2530-01-356-4614	34A	22	5340-01-353-7414	50	34
4720-01-356-6804	48	2	5340-01-364-1959	31A	3
3040-01-356-6837	34	36	5310-01-364-4211	12	7
3040-01-356-6837	34A	28	5340-01-364-4343	31A	3
4710-01-356-7535	48	19	2510-01-364-4489	31A	17
5340-01-356-8373	34	10	6230-01-364-8663	45	3
5340-01-356-8373	34A	11	5340-01-367-9122	35	4
5340-01-356-8487	31A	11	5340-01-367-9122	44A	4
4730-01-356-8646	48	25	4730-01-368-1207	57	15
5935-01-357-1036	47C	2	4730-01-368-7590	57	14
3990-01-357-1944	30	15	5940-01-368-9579	41A	9
2510-01-357-2507	31A	13	5340-01-372-3982	55	6
5305-01-357-4682	26	6	5340-01-372-3982	56	6
5305-01-357-4683	26	11	4730-01-372-9701	57	12
5305-01-357-4683	35	46	3040-01-373-0500	55	3
2510-01-357-5691	31A	16	3040-01-373-0500	56	3
5330-01-357-7510	KITS	30	4730-01-373-2692	57	13
5330-01-357-7512	KITS	20	6685-01-373-7976	57	2
2510-01-357-8795	31A	6	4720-01-373-9871	57	11

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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
3040-01-374-4803	55	1	5365-01-453-6479	13	6
5340-01-375-6141	14	20	5365-01-453-7218	15	5
5935-01-376-1003	34	31	4720-01-453-9791	49	13
5935-01-376-1003	47B	18	2510-01-453-7303	12	32
5315-01-377-1554	35	32	4720-01-453-7311	49	6
4730-01-382-2862	24	15	4720-01-453-7345	49	1
4730-01-383-6756	24	17	2590-01-453-7423	5	16
5342-01-384-9511	40B	20	2590-01-453-7423	9	22
5975-01-386-4837	40B	29	5360-01-453-7574	12	17
4730-01-388-9668	17	9	5360-01-453-7577	1	7
5340-01-389-3462	52	8	4710-01-453-7695	50	21
5340-01-389-3462	53	9	4710-01-453-7700	50	22
5340-01-394-2420	35A	12	4720-01-453-7766	49	9
5340-01-394-2421	35A	23	4720-01-453-7816	50	8
5330-01-394-3549	KITS	60	4730-01-453-7915	53	1
5365-01-394-3553	35A	5	4730-01-453-7916	52	1
3910-01-397-5277	30	11	4720-01-453-7944	50	25
5670-01-408-8386	26A	1	4720-01-453-7999	50	20
5935-01-412-0435	47A	5	5360-01-453-8119	12	33
6645-01-417-3524	38	9	2990-01-453-8306	27	3
2540-01-421-4686	36	29	2510-01-453-8548	34	35
5330-01-422-3885	KITS	10	2510-01-453-8548	34A	29
5950-01-426-7978	53	15	3040-01-453-8550	16	8
5120-01-428-8040	57	7	2510-01-453-8556	35	5
5305-01-428-9165	35A	30	5342-01-453-8560	36	1
3950-01-450-5478	16	1	5342-01-453-8566	29	26
3120-01-453-2303	13	11	4710-01-453-8578	24	1
5340-01-453-2469	12	25	4710-01-453-8578	BULK	6
5340-01-453-2520	9	2	4730-01-453-8630	54	1
5340-01-453-2528	24	30	3040-01-453-8635	9	9
5340-01-453-2532	6	4	5315-01-453-8667	13	18
5340-01-453-2533	9	7	3040-01-453-8706	16	14
5340-01-453-2542	9	21	3040-01-453-8714	7	3
5340-01-453-2544	9	7	3040-01-453-8731	16	6
5340-01-453-2554	9	15	3020-01-453-8749	13	21
5340-01-453-2747	14	19	3040-01-453-8753	7	8
4720-01-453-5137	14	32	2540-01-453-8763	3	3
4720-01-453-5169	22	17	3040-01-453-8771	5	9
4730-01-453-5390	14	35	3040-01-453-8773	5	1
4730-01-453-5411	22	14	3040-01-453-8796	9	5
4720-01-453-5420	22	32	5315-01-453-9031	24	27
3950-01-453-5422	13	7	5340-01-453-9094	12	15
4720-01-453-5448	22	1	2990-01-453-9105	27	5
5360-01-453-5457	13	14	2590-01-453-9122	6	21
4720-01-453-5517	22	16	2590-01-453-9248	6	21
3950-01-453-5524	13	8	4810-01-453-9543	53	11
4710-01-453-5622	BULK	7	3990-01-453-9712	7	2
5306-01-453-5940	14	18	3020-01-454-0316	13	9
4820-01-453-6133	14	8	3020-01-454-0321	13	5
4320-01-453-6465	23	4			

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5360-01-454-0425	12	13	5365-01-454-9557	23	5
5360-01-454-0427	12	13	5340-01-455-0143	26	9
5315-01-454-0517	13	1	5340-01-455-1671	23	10
4820-01-454-0733	24	19	5340-01-455-1836	6	4
2510-01-454-0909	12	32	5340-01-455-1838	22	21
2510-01-454-0929	12	1	5340-01-455-1839	22	19
4030-01-454-1349	34	1	5340-01-455-2090	6	17
4030-01-454-1349	34A	1	5340-01-455-2092	6	17
5315-01-454-2268	5	8	5340-01-455-2093	6	14
4820-01-454-2292	52	2	5340-01-455-2095	6	14
4820-01-454-2292	53	2	5315-01-455-4898	6	6
5315-01-454-2338	15	8	5305-01-455-5055	6	20
5315-01-454-2368	12	16	7690-01-455-6357	36	10
5315-01-454-2514	9	6	7690-01-455-6358	41	6
3040-01-454-2704	34	2	5360-01-455-7581	6	10
3040-01-454-2704	34A	2	5340-01-455-8403	35	19
3110-01-454-3228	7	9	4030-01-456-1150	34	6
5310-01-454-3837	6	12	4030-01-456-1150	34A	8
5310-01-454-3840	5	13	5180-01-456-2749	57	1
5315-01-454-4326	12	3	9905-01-456-3829	11	4
4720-01-454-4731	49	12	9905-01-456-4282	11	6
5315-01-454-5458	13	19	9905-01-456-4287	11	3
5315-01-454-5755	1	9	7690-01-456-5113	3	1
5315-01-454-6001	12	22	9905-01-456-5361	11	2
5315-01-454-6752	6	8	5340-01-456-5631	12	15
5315-01-454-6758	8	3	5360-01-456-5633	35	23
5315-01-454-6761	6	11	2590-01-456-5819	12	19
5342-01-454-7088	27	8	5305-01-456-6925	35	10
5340-01-454-7250	27	4	5360-01-456-6943	35	31
1440-01-454-7251	12	1	5340-01-456-6964	35	8
5340-01-454-7268	27	7	5340-01-456-6969	35	9
5340-01-454-7270	31	2	5340-01-456-7145	32	7
5340-01-454-7279	6	16	4710-01-456-7210	50	19
5340-01-454-7280	16	5	4710-01-456-7899	50	18
5340-01-454-7281	16	9	4710-01-456-7909	50	27
5340-01-454-7282	24	24	4710-01-456-7927	50	26
5340-01-454-7283	16	10	7690-01-456-7954	27	6
5340-01-454-7284	3	6	7690-01-456-7955	26	23
5340-01-454-7285	3	13	7690-01-456-7957	26	24
5340-01-454-7287	3	11	5340-01-456-8523	50	4
4010-01-454-8213	15	3	5340-01-456-8525	50	28
4030-01-454-8215	15	2	5340-01-456-8527	26	19
4030-01-454-8219	15	7	5340-01-456-8528	49	15
5315-01-454-8224	5	15	5340-01-456-8529	29	17
5315-01-454-8256	5	2	5340-01-456-8530	26	3
4010-01-454-8588	BULK	11	5340-01-456-8532	25	4
5342-01-454-9188	29	2	5340-01-456-8533	31	18
5365-01-454-9552	7	1	5340-01-456-8536	25	1
5365-01-454-9554	7	7	5340-01-456-8537	28	2

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5340-01-456-8538	31	7	9905-01-457-8345	33	2
5340-01-456-8539	32	3	9905-01-457-8346	33	4
5340-01-456-8540	32	14	9905-01-457-8347	11	7
5340-01-456-8547	50	17	9905-01-457-8348	11	5
4710-01-456-8765	22	11	9905-01-457-8351	11	8
5305-01-456-8936	44	23	5365-01-457-8369	32	11
4710-01-456-9295	22	26	5310-01-457-8573	26A	8
4710-01-456-9299	22	29	5340-01-457-8615	8	2
5930-01-456-9303	44	11	5355-01-457-8843	43	28
5305-01-456-9393	12	34	5340-01-457-8921	36	25
5305-01-456-9449	29	1	5340-01-457-8923	35	27
5305-01-456-9449	50	12	5340-01-457-8924	40	7
5998-01-456-9734	43	22	5340-01-457-8960	43	19
4710-01-457-0931	14	29	5340-01-457-8962	44	17
4710-01-457-0952	14	28	2920-01-457-8996	44	8
4710-01-457-0954	14	1	5315-01-457-9220	12	31
4710-01-457-1080	14	22	4710-01-458-0122	22	28
5930-01-457-1137	47	6	5340-01-458-0154	28	3
8145-01-457-1170	4	2	5310-01-458-0248	34	17
5340-01-457-1221	40	8	5310-01-458-0248	34A	18
5340-01-457-1222	50	36	4820-01-458-0402	54	6
4710-01-457-1284	14	17	4030-01-458-0680	15	6
4710-01-457-1297	14	25	5940-01-458-1013	37	11
4710-01-457-1303	22	31	5975-01-458-1901	29	27
4710-01-457-1375	22	30	5315-01-458-2064	35	17
4710-01-457-1599	22	6	5930-01-458-2843	47	5
9905-01-457-1710	35	34	6150-01-458-3322	46	9
9905-01-457-1710	33A	9	6150-01-458-3325	46	10
5331-01-457-1834	53	14	5340-01-458-3660	44	12
5331-01-457-1834	54	3	5930-01-458-3844	44	6
5331-01-457-1834	54	15	5930-01-458-3853	46	5
5315-01-457-2385	4	1	6150-01-458-3938	46	16
5930-01-457-3028	44	7	6150-01-458-3939	46	4
4820-01-457-3136	54	17	6150-01-458-3940	47	4
5310-01-457-3244	43	10	6150-01-458-3941	46	19
5331-01-457-3314	54	11	6150-01-458-3942	46	8
5331-01-457-3518	49	3	6150-01-458-3945	46	6
5331-01-457-3518	49	5	6150-01-458-3946	46	3
5330-01-457-3525	KITS	70	6150-01-458-3947	46	20
5330-01-457-3787	KITS	40	6150-01-458-3948	47	8
6150-01-457-3828	42	1	6150-01-458-3949	46	18
6150-01-457-3951	46	7	6150-01-458-3950	46	13
2510-01-457-5009	35	1	6150-01-458-3951	46	2
2510-01-457-5270	28	6	7690-01-458-4240	44	16
2510-01-457-5270	34A	51	7690-01-458-4242	43	26
2510-01-457-5316	26	1	7690-01-458-4245	43	27
5340-01-457-6136	5	12	7690-01-458-4249	43	4
6680-01-457-6644	38	4	6150-01-458-4841	46	1
5340-01-457-7628	5	14	6150-01-458-4842	38	5
9905-01-457-8344	44	10			



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STOCK NUMBER	FIG	ITEM	STOCK NUMBER	FIG	ITEM
6150-01-458-4843	46	12	3110-21-893-3048	18	8
5310-01-458-5052	12	30	4030-21-910-6656	19	15
5220-01-458-5419	43	29	4710-21-914-5839	17	3
6150-01-458-5879	46	11	5325-21-914-9925	19	7
6110-01-458-6162	43	1	3040-21-914-9942	18	14
7690-01-458-6990	41	2	5340-99-894-1046	9	10
5340-01-458-7187	36	9			
5340-01-458-7192	35	11			
5340-01-458-7237	50	37			
5340-01-458-7239	50	7			
6150-01-458-7246	43	32			
5331-01-458-7246	43	32			
5331-01-458-9296	17	10			
2590-01-458-9395	35	20			
2590-01-458-9401	35	29			
6150-01-459-0360	43	31			
6150-01-459-0361	43	33			
6150-01-459-1293	44A	8			
5340-01-459-1294	5	6			
6150-01-459-1811	40A	3			
6150-01-459-1811	40B	12			
5980-01-459-1848	40B	13			
5980-01-459-2073	40A	2			
5980-01-459-2073	40B	13			
5340-01-459-2193	44	13			
5305-01-459-3059	52	15			
5305-01-459-3059	53	18			
5310-01-459-6126	30	19			
5895-01-460-3046	43	9			
3910-01-460-3891	7	6			
5330-01-460-4706	14	3			
5331-01-460-9137	54	5			
5331-01-460-9149	54	25			
5340-01-461-0414	1	2			
3990-01-461-0423	1	3			
3990-01-461-0440	1	6			
3990-01-461-0443	1	10			
5310-01-461-1608	12	28			
5310-01-461-4474	6	15			
6680-01-462-1797	23	7			
4730-01-462-2632	51A	5			
5930-01-464-9574	47B	7			
5930-01-464-9574	47B	12			
5930-01-464-9581	47C	1			
5330-01-465-3236	53	12			
5330-01-465-3236	54	13			
5895-01-467-7784	44	1			
4010-01-476-0348	BULK	8			
5340-01-476-1306	10	7			
4010-01-528-1747	15	3			



## APPENDIX G

### LUBRICATION INSTRUCTIONS

#### G-1. GENERAL.

#### NOTE

These instructions are MANDATORY.

- a. This appendix contains lubrication instructions for the Common Bridge Transporter's (CBT's) Load Handling System (LHS) and the Bridge Adapter Pallet (BAP). For lubrication instructions for the Heavy Expanded Mobility Tactical Truck (HEMTT), refer to LO 9-2320-279-12.
- b. The LHS and the BAP must receive lubrication with approved lubricants at recommended intervals in order to be mission ready at all times.

#### G-2. INTERVALS.

Intervals (on-condition or hard-time) and related man-hours are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval.

- a. **Hard Time.** The LHS and the BAP are not enrolled in the Army Oil Analysis Program (AOAP). **HARD-TIME INTERVALS APPLY.** Hard-time maintenance is scheduled maintenance conducted at predetermined fixed intervals based on age, calendar, or usage (e.g., operating time). Change the hard-time interval if your lubricants are contaminated or if you are operating under adverse environmental conditions. The intervals may be extended during periods of low activity providing adequate preservation precautions have been taken. The HEMTT is enrolled in the AOAP (refer to LO 9-2320-279-12).
- b. **On Condition.** On-condition maintenance is scheduled maintenance performed based on the condition of the CBT as determined by regularly scheduled evaluations. On-condition intervals shall be determined by the AOAP laboratory and shall apply unless you are otherwise notified by your supervisor. Hard-time intervals will be applied to the HEMTT AOAP (refer to LO 9-2320-279-12). For equipment under manufacturer's warranty, hard-time oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (such as longer than usual operating hours, extended idling periods, extreme dust).

#### G-3. SPECIFIC LUBRICATION INSTRUCTIONS.

- a. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.
- b. Maintain a record of lubrication performed and report any problems noted during lubrication. Refer to DA Pam 738-750 for maintenance forms and procedures for recording and reporting any findings.
- c. Keep all external parts not requiring lubrication free of lubricants. After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.
- d. After parts are cleaned, rinse and dry them thoroughly. Apply a light grade of oil to all polished metal surfaces to prevent rusting.

**G-3. SPECIFIC LUBRICATION INSTRUCTIONS (continued).**

- e.* When authorized to install new parts, remove any preservative materials, such as rust-preventive compound or protective grease, prior to installation. Apply lubricant prescribed in the lubrication instructions if required.
- f.* Clean and lubricate bearings as specified in TM 9-214.
- g.* Refer to FM 9-207 for lubrication instructions in cold weather.
- h.* After operation in mud or in sandy or dusty conditions, clean and inspect all points of lubrication for fouled lubricants. Change lubricants as required.
- i.* All fittings must be lubricated after fording, submersion in water, or high-pressure washing.

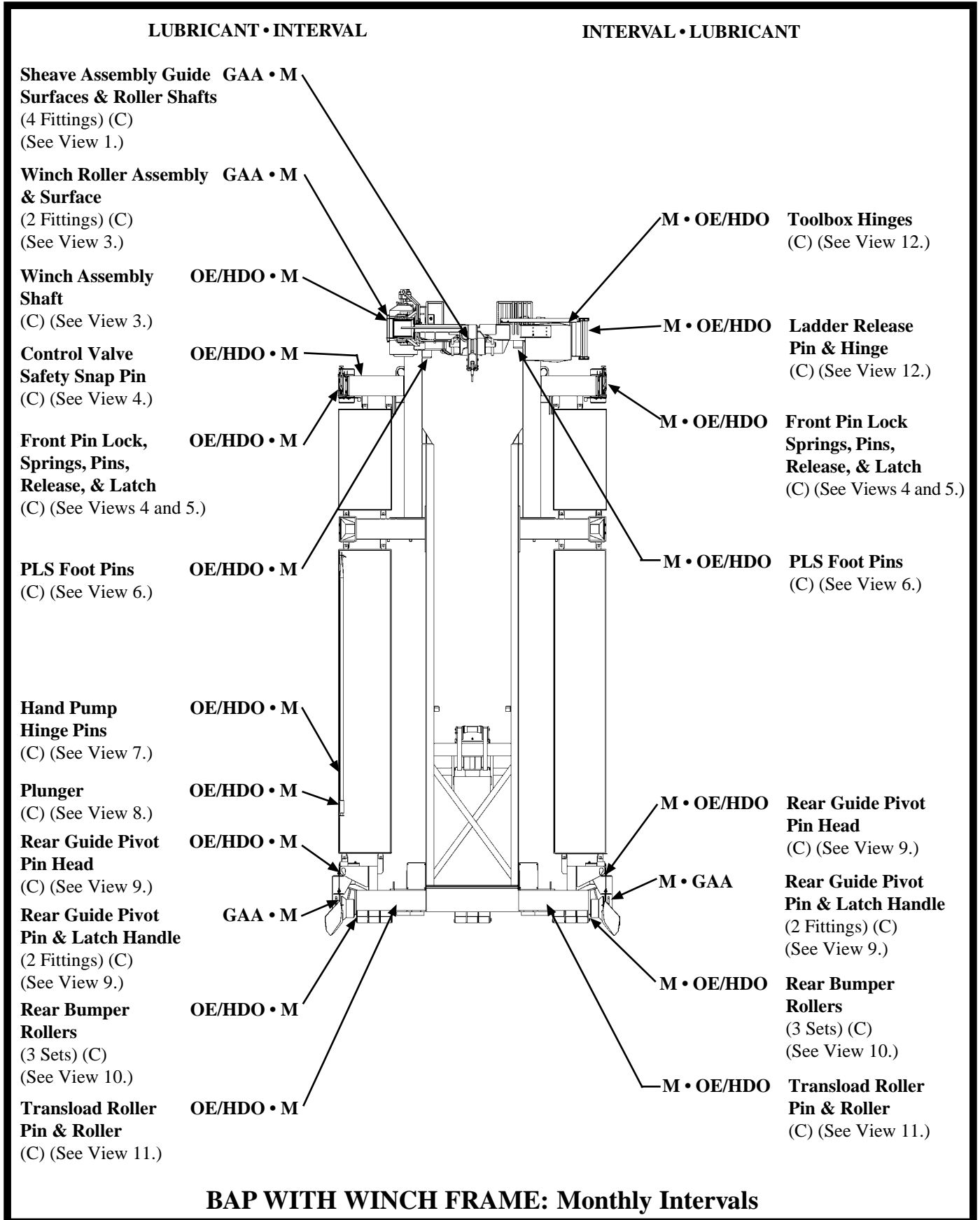
**WARNING**

**Drycleaning solvent is TOXIC and flammable. Wear protective goggles and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes; and do not breathe vapors. Keep away from heat or flame. Never smoke when using drycleaning solvent; the flashpoint for Type II is 140 degrees F (60 degrees C), and for Type III it is 200 degrees F (93 degrees C). Failure to follow this warning may result in injury or death to personnel.**

- j.* Clean all fittings and the area around lubrication points with drycleaning solvent (Item 13, Appendix E) or the equivalent before lubricating equipment. After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.

**G-4. LUBRICATION CHART.**

- a.* The Lubrication Chart starting on page G-3 covers lubrication points for the LHS and the BAP.
- b.* The KEY (p. G-12) lists lubricants to be used in all temperature ranges and shows the intervals.
- c.* The Lubrication Chart shows lubrication points, items to be lubricated, required lubricants, and recommended intervals for lubrication. Any special lubricating instructions for specific components are contained in NOTES (p. G-12). Reference to the appropriate localized view is given after each lubrication entry.
- d.* Recommended intervals are based on normal conditions of operation; the intervals given represent the allocated hours of operation between each scheduled lubrication. Under extreme conditions, lubricants should always be changed more frequently. When in doubt, notify your supervisor.
- e.* The lowest level of maintenance authorized to lubricate a point is indicated in parentheses by use of the following: (C) for Operator/Crew or (O) for Unit maintenance.





LUBRICANT • INTERVAL

**LHS Hook Arm Pin** ANTISEIZE • 1.5/S

(See Notes 5 and 11.) (C)  
(See View 18.)

**Lift Hook** GAA • M/50 HR

(See Notes 10 and 12.) (C)

**Hook Arm Cylinder Pivot Pin (Front)** GAA • M/50 HR

(2 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 19.)

**Main Cylinder Pivot Pins** GAA • M/50 HR

(2 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 20.)

**Hook Arm Cylinder Pivot Pin (Rear)** GAA • M/50 HR

(2 Fittings)  
(See Notes 9, 11, and 12.) (C)  
(See View 21.)

**Hook Arm Pivot Pin (Rear)** GAA • M/50 HR

(2 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 22.)

**Main Cylinder Pivot Pin (Rear)** GAA • M/50 HR

(2 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 23.)

**Middle Frame Pivot Pin (Rear)** GAA • M/50 HR

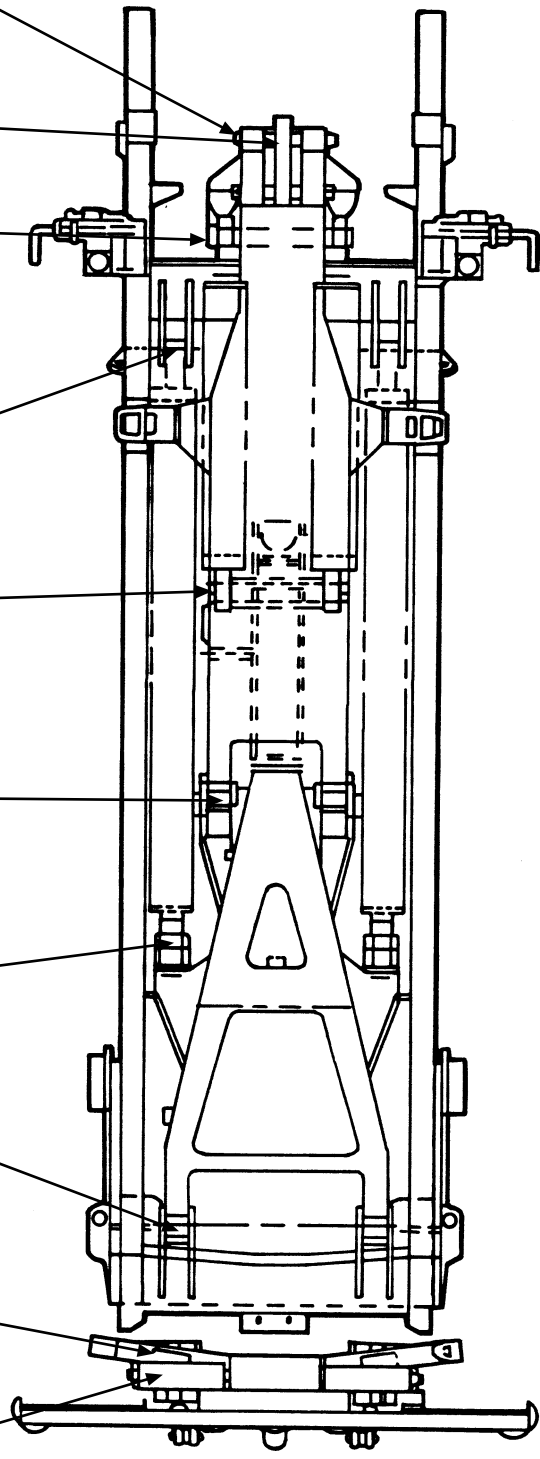
(2 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 24.)

**Angled Rollers** GAA • M/50 HR

(4 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 25.)

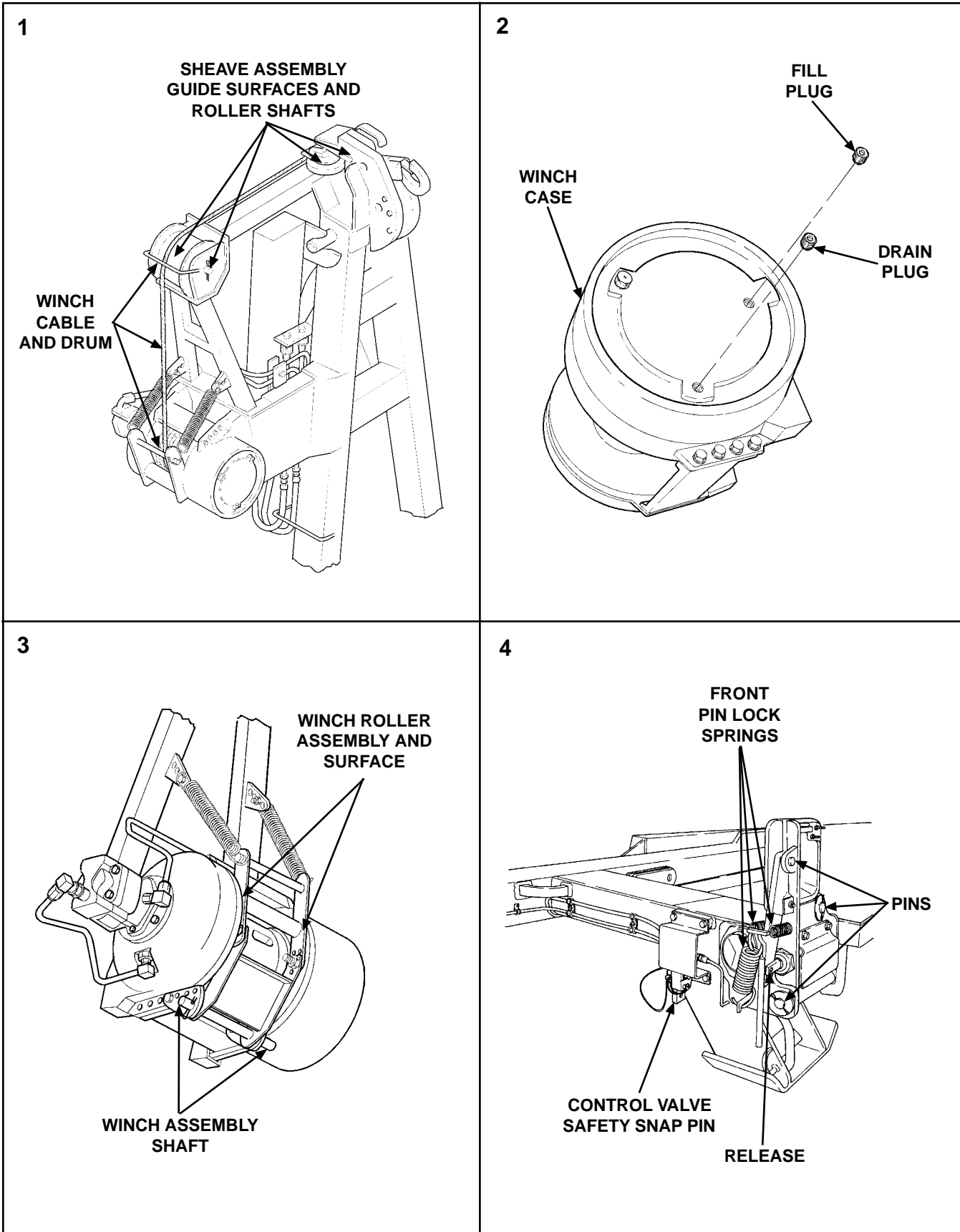
**Horizontal Rollers** GAA • M/50 HR

(4 Fittings)  
(See Notes 9 and 12.) (C)  
(See View 25.)



**LHS: Monthly and Semiannual Intervals**

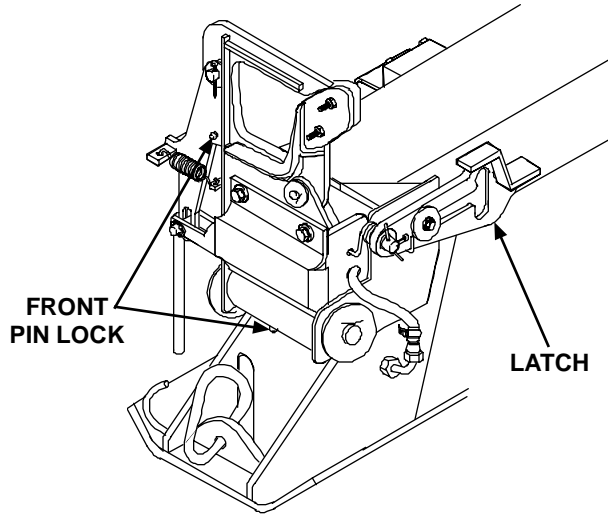
### LOCALIZED VIEWS OF LUBRICATION POINTS



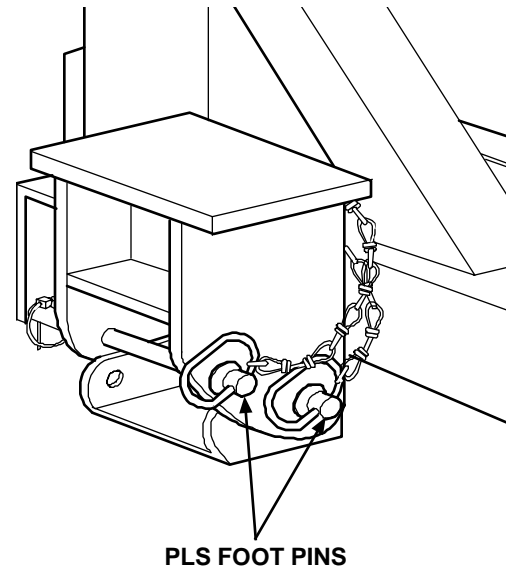


LOCALIZED VIEWS OF LUBRICATION POINTS (continued)

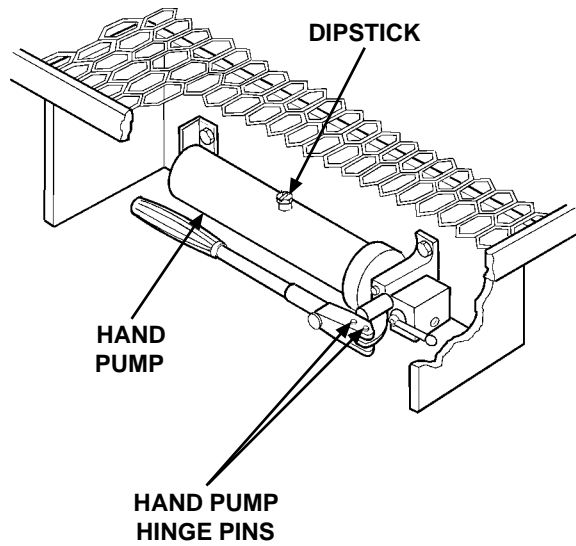
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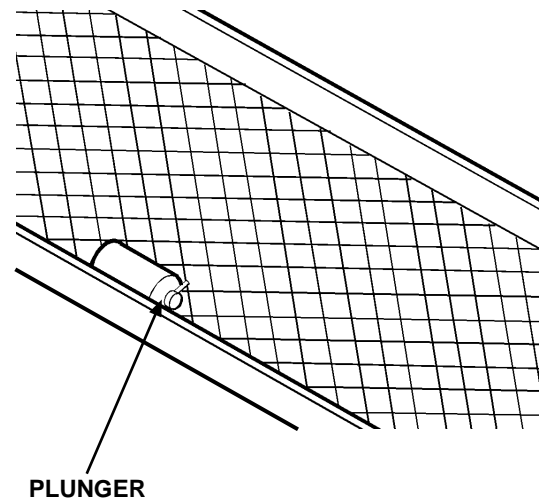
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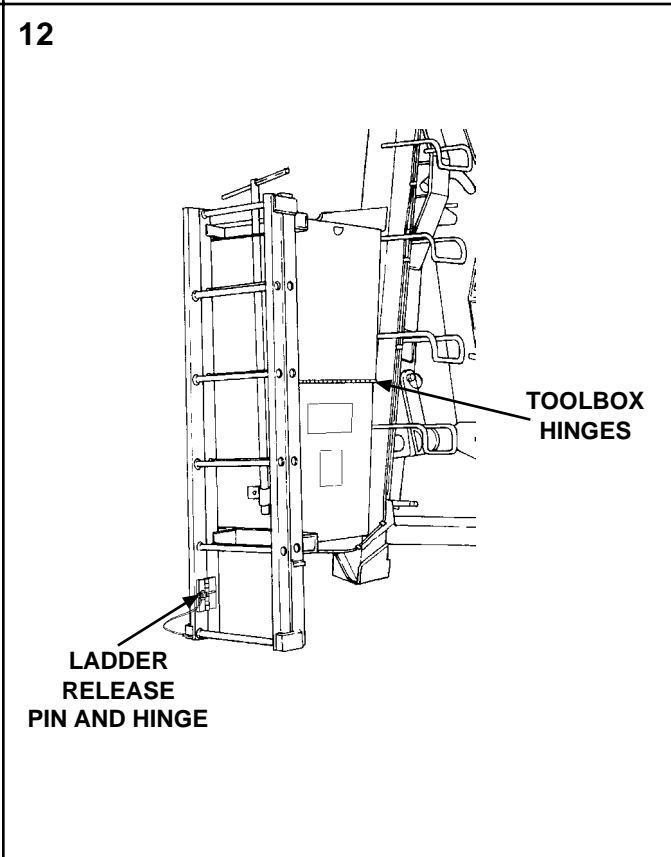
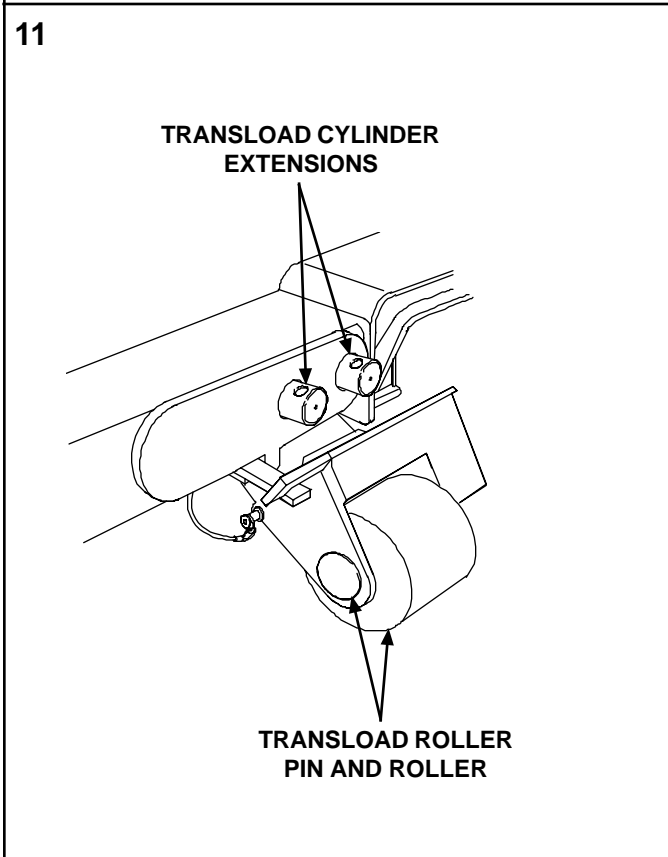
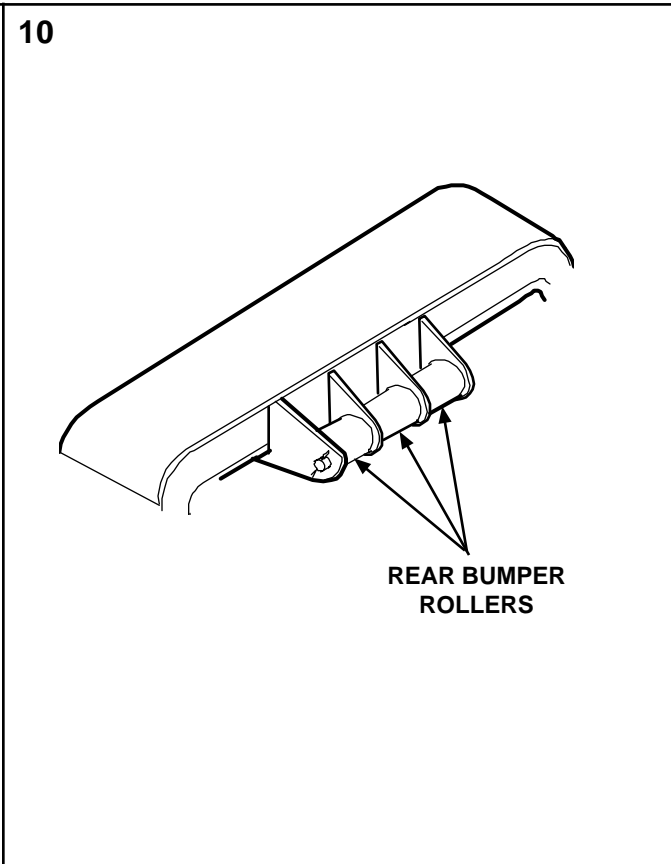
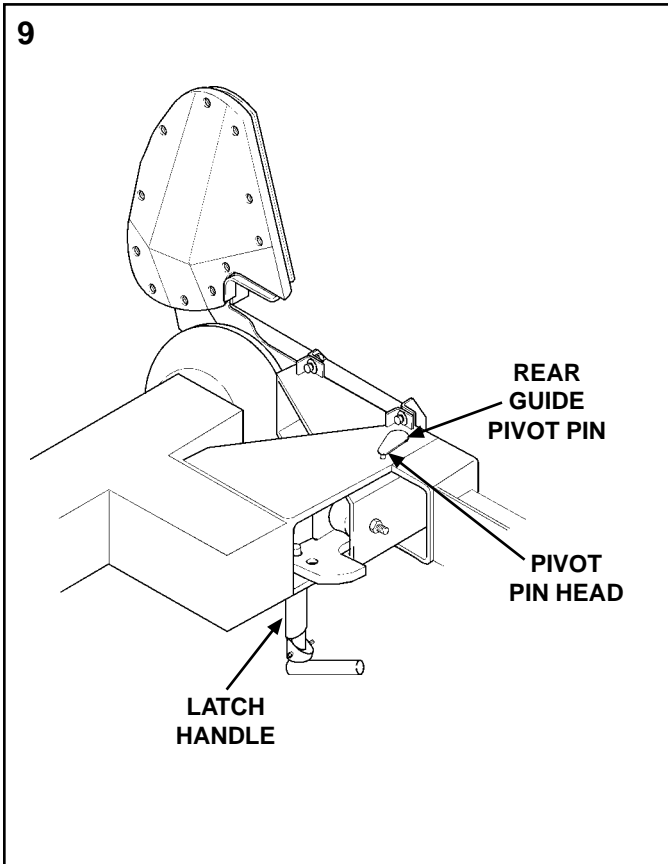
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8

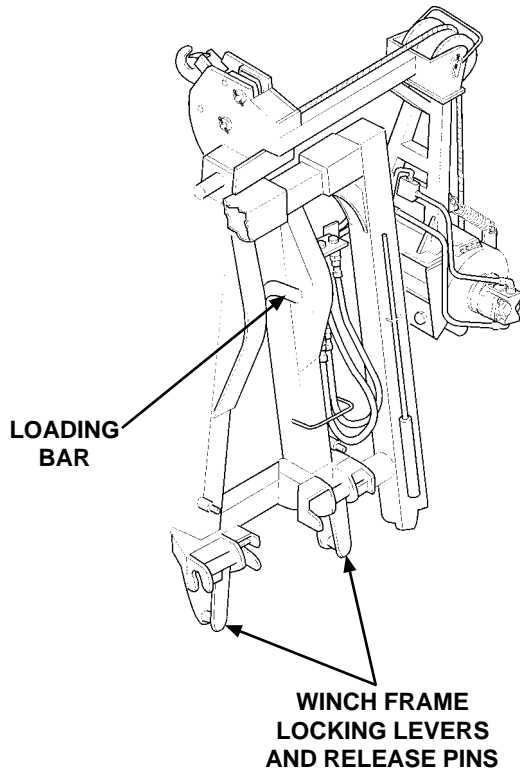


LOCALIZED VIEWS OF LUBRICATION POINTS (continued)

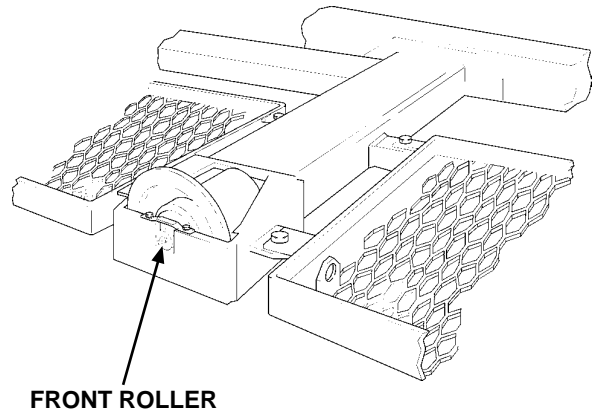


LOCALIZED VIEWS OF LUBRICATION POINTS (continued)

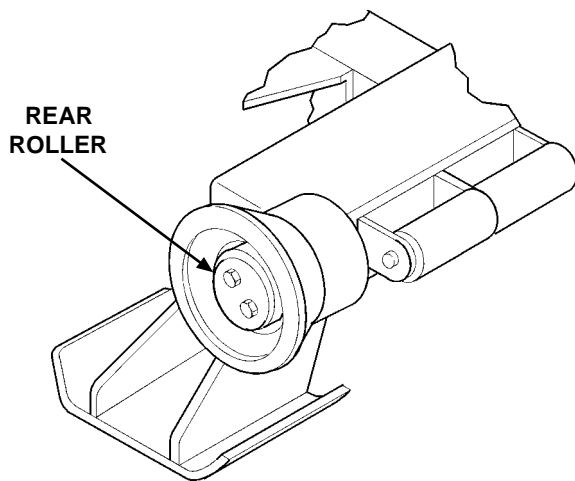
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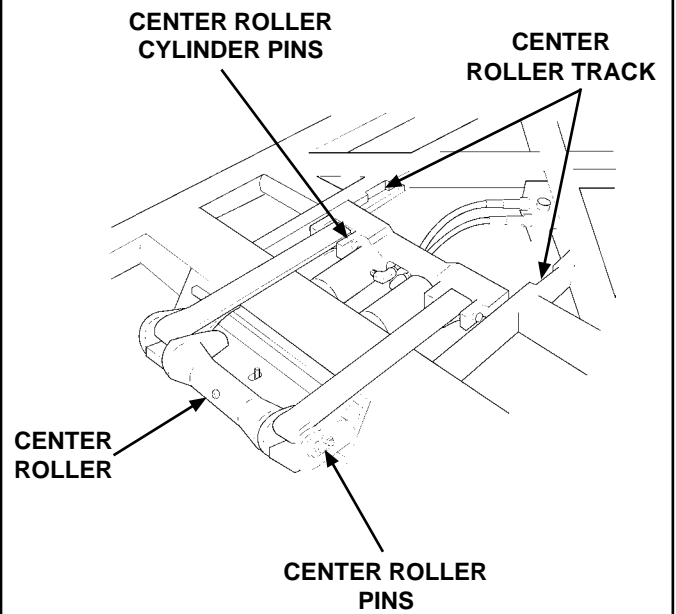
14



15

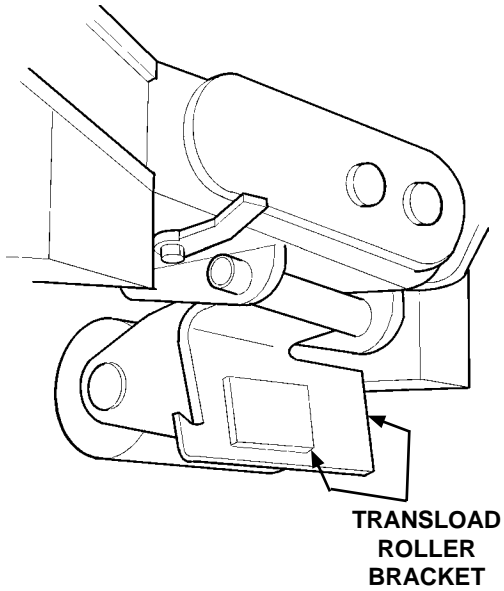


16

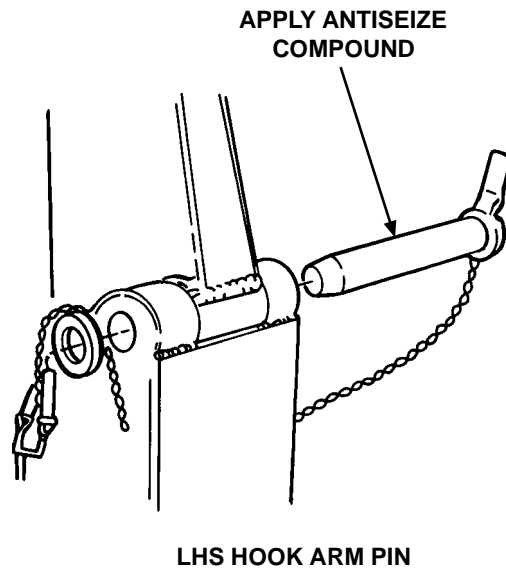


LOCALIZED VIEWS OF LUBRICATION POINTS

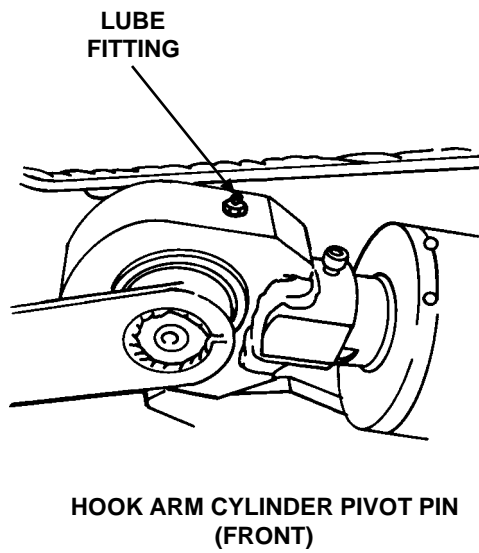
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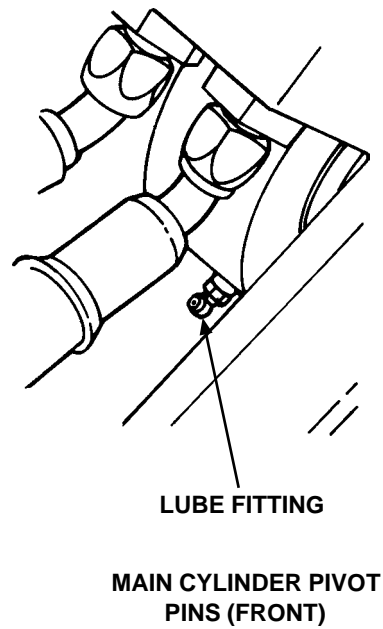
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19

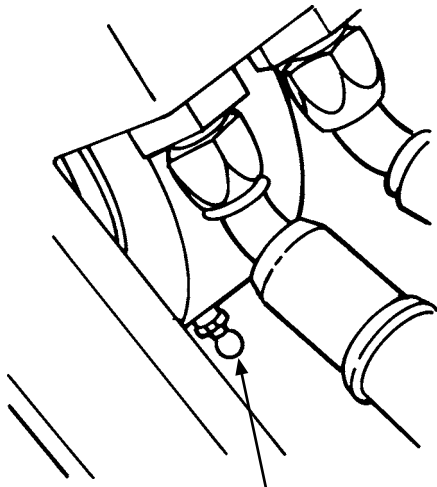


20



LOCALIZED VIEWS OF LUBRICATION POINTS (continued)

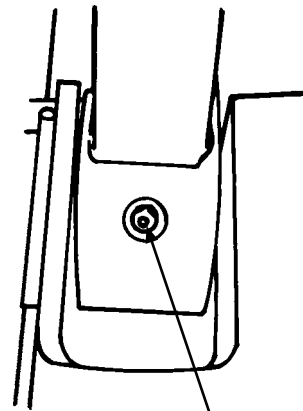
21



LUBE FITTING

HOOK ARM CYLINDER PIVOT  
PIN (REAR)  
(LOCATED UNDERNEATH  
VEHICLE)

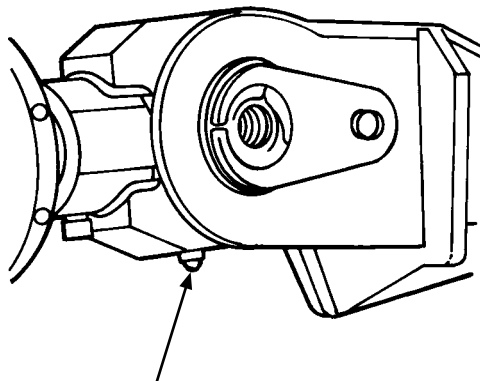
22



LUBE FITTING

HOOK ARM PIVOT  
PIN (REAR)

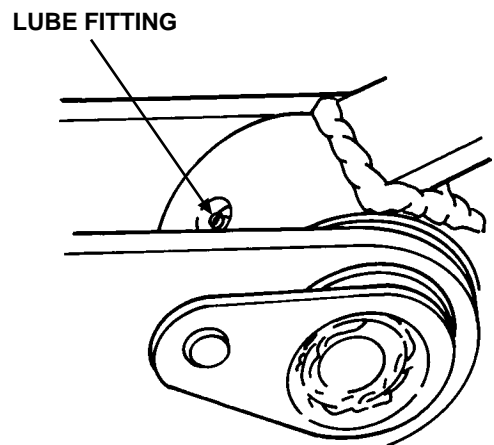
23



LUBE FITTING

MAIN CYLINDER PIVOT PIN (REAR)  
(LOCATED ON TOP OF VEHICLE)

24

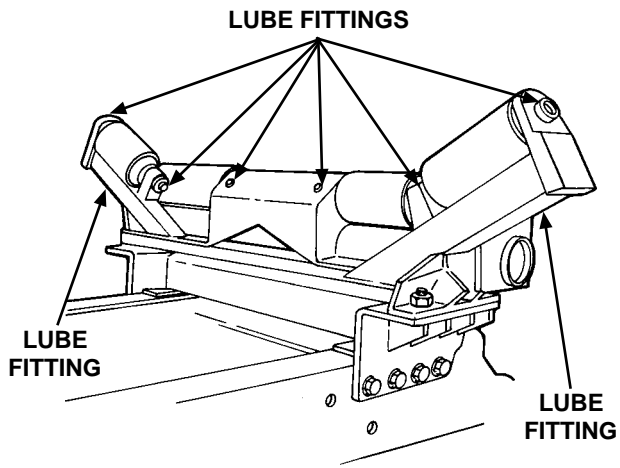


LUBE FITTING

MIDDLE FRAME  
PIVOT PIN (REAR)

LOCALIZED VIEWS OF LUBRICATION POINTS (continued)

25



HORIZONTAL ROLLER ASSEMBLY  
LUBRICATE 8 PLACES



4. WINCH FRAME LOCKING LEVERS AND PINS. Apply OEA by hand to locking lever pivot points.
5. Remove safety pin and washer to remove LHS pin. Lubricate LHS pin and reinstall with washer and safety pin.
6. WINCH CABLE, DRUM, SHEAVES, ROLLERS, GUIDES, AND HOOK ARM SURFACE. Every month clean and lubricate with new GAA. Every six months, if cable is not generally used, unwind entire cable, clean, and lubricate with new GAA. Wipe off excess and coat winch drum with GAA before rewinding cable on drum.
7. HOOK ARM HOOK AND BAP LOADING BAR. Lubricate with grease as needed.
8. WINCH CASE AND HAND PUMP. Operator is to remove fill plug and check for correct oil level. Oil level should be up to filler plug. Unit maintenance removes fill plug and drain plug to drain oil. Fill winch with OE/HDO through fill plug port. Unit maintenance to check oil in hand pump by removing dipstick and filling until fluid level reaches notch in dipstick.
9. PURGING OF LUBRICANT. When using a grease gun, apply lubricant to the fitting until clean lubricant squeezes out of the part being lubricated.
10. LIFT HOOK. Apply grease to lift hook more often if vehicle truck mileage is low but LHS hours are high.
11. To allow access to the hook arm cylinder rear grease fittings and LHS hook arm pin, the LHS should be fully extended.
12. The 50-hour interval is based on actual LHS operating hours. The hours can be tracked by the operator using the hourmeter. The LHS should be lubricated monthly or every 50 operating hours, whichever comes first.



# APPENDIX H

## ILLUSTRATED LIST OF MANUFACTURED ITEMS

### Section I. INTRODUCTION

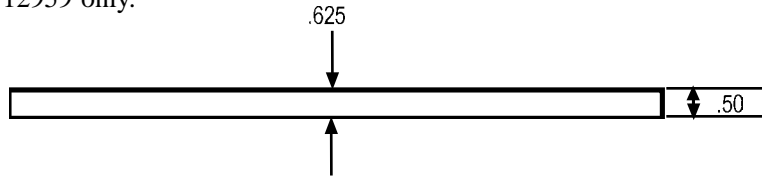
<b>H-1. GENERAL.</b>
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This appendix includes complete instructions for making items authorized to be manufactured.

Section II. MANUFACTURED ITEMS

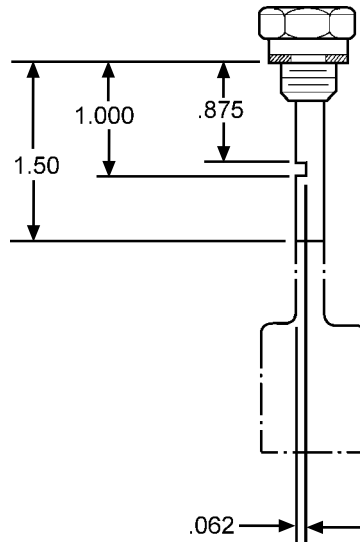
**H-2. HAND PUMP LEVER FABRICATION - BAP Part Number 12959.**

Make from pipe stock 89955K27, 18 inches long. Thread exterior of pipe as indicated, with 1/2-inch NPT pipe threads for BAP Part Number 12959 only.



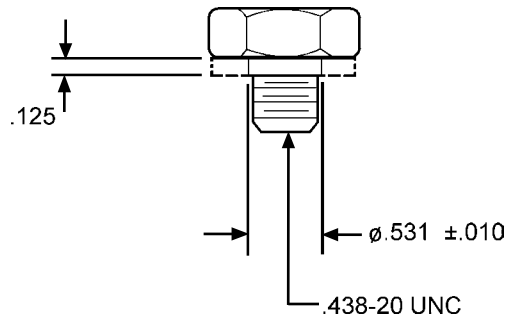
**H-3. DIPSTICK - BAP Part Number 12959-5.**

- a. Make from DAYCO (6408-1); cut dipstick as indicated.
- b. Relocate dipstick (part number 12959-5) and gasket to new fill port in hand pump.

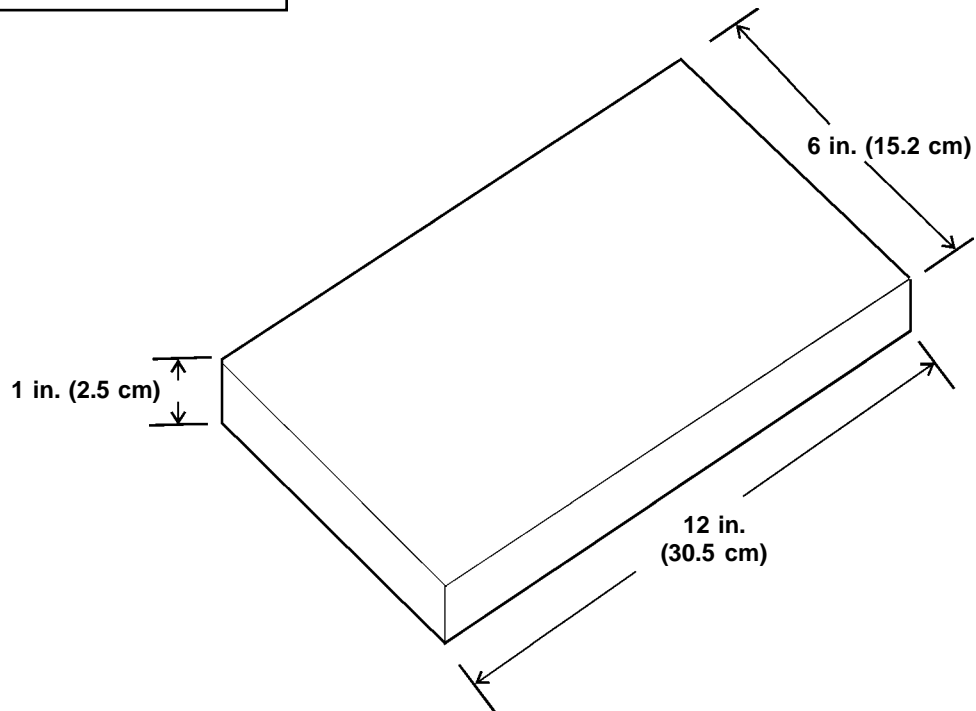


**H-4. GASKET - BAP Part Number B159167.**

- a. Cut gasket as indicated.
- b. Relocate gasket (part number B159167) on hand pump.

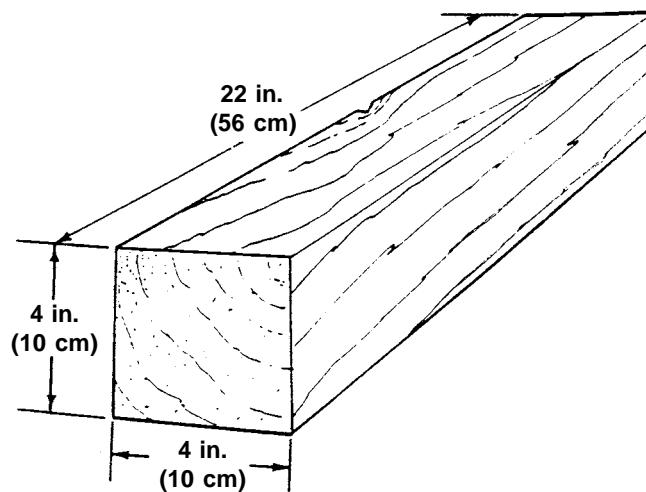


**H-5. SPACER PLATE.**



- a. Fabricate from 1-in. (2.5 cm) thick mild steel stock.
- b. Using cutting torch outfit, cut to dimensions shown.
- c. Using a file or grinder, remove all rough edges.

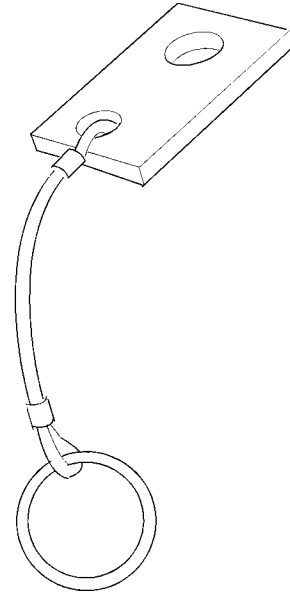
**H-6. WOODEN BLOCKS.**



- a. Fabricate from MML751 lumber stock.
- b. Using saw and standard planing machine, cut stock to size required.

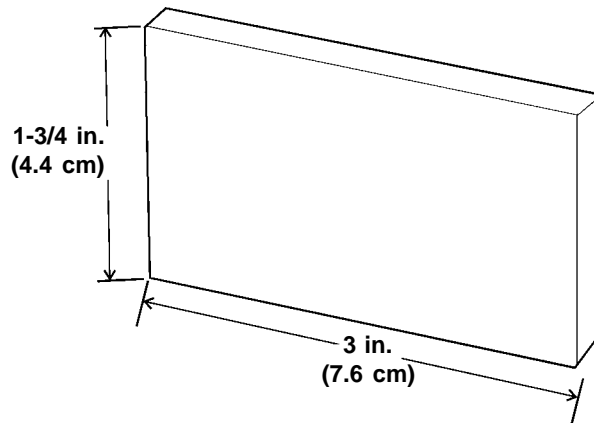
**H-7. LANYARD KIT.**

- a. Make from lanyard kit 97840A66.
- b. Cut cable 4 in. (10.2 cm) in length longer than required.



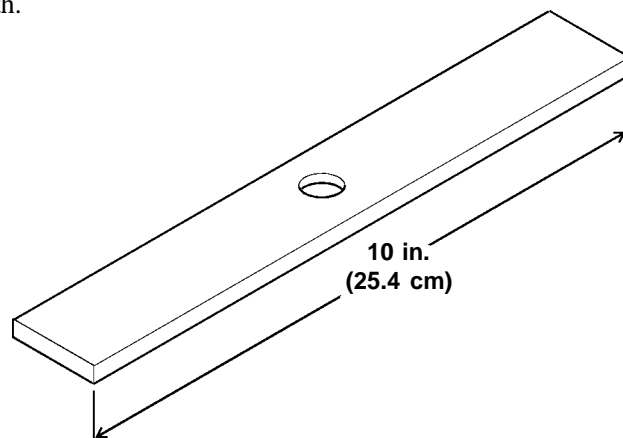
**H-8. LADDER BRACKET PAD.**

- a. For 3064081, cut pad 3 in. x 1-3/4 in. (7.6 cm x 4.4 cm)
- b. For 3070941, cut pad 1-1/2 in. x 1-3/4 in. (3.8 cm x 4.4 cm).



**H-9. CAB CONTROL BOX PAD.**

- a. For 93325K51-10, cut strip 10 in. (25.4 cm) in length.
- b. For 93325K51-8, cut strip 8 in. (20.3 cm) in length.



## APPENDIX I

### TORQUE VALUES

#### I-1. GENERAL.

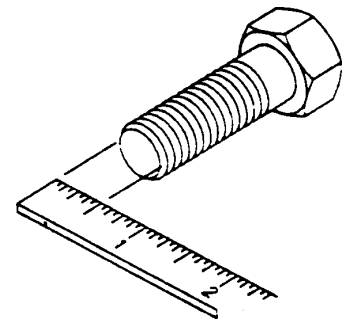
This appendix provides general torque limits for screws used on the CBT. Special torque limits are shown in the maintenance procedures for applicable components. Use the general torque limits given in this appendix when specific torque limits are not given in the maintenance procedures. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached.

#### I-2. TORQUE LIMITS.

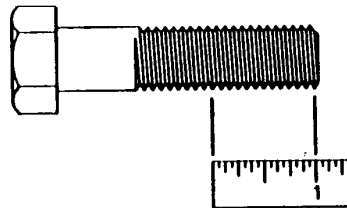
Table I-1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table I-2 lists wet torque limits. Wet torque limits are used on screws with high pressure lubricants applied to threads. Table I-3 lists dry torque limits for metric screws. Table I-4 lists wet torque limits for flange nuts.

#### I-3. USE OF TORQUE TABLES.

- a. Measure the diameter of the screw you are installing.



- b. Count the number of threads per inch.








- c. Under the heading DIAMETER look down the column until you find the diameter of the screw. (There are usually two lines beginning with the same diameter.)

#### NOTE






Step (4) is not required for metric screws.

- d. Under the heading THREADS PER INCH, find the number of threads per inch that matches the number you counted in Step (2).
- e. To find the grade of the screw, match the markings on the head of the screw to the correct picture under CAPSCREW HEAD MARKINGS on the torque table.
- f. Look down the column under the picture you found in Step (5) until you find the torque limit (lb-ft or N•m) for the diameter and threads per inch of the screw.




Table I-1. Torque Limits for Dry Fasteners

 <b>NOTE</b> Manufacturer's marks may vary. These are all SAE Grade 5.			CAPSCREW HEAD MARKINGS							
			 SAE GRADE NO. 2	 SAE GRADE NO. 5	 SAE GRADE NO. 6 or 7	 SAE GRADE NO. 8	TORQUE			
DIAMETER		THREADS PER INCH	LB-FT		N•M		LB-FT		N•M	
IN.	MM		LB-FT	N•M	LB-FT	N•M	LB-FT	N•M	LB-FT	N•M
1/4	6.35	20	5	7	8	11	10	14	12	16
1/4	6.35	28	6	9	10	14	12	16	14	19
5/16	7.94	18	11	15	17	23	21	28	24	34
5/16	7.94	24	12	16	19	26	24	33	27	34
3/8	9.53	16	20	27	30	41	40	54	44	61
3/8	9.53	24	23	31	35	47	45	61	49	68
7/16	11.11	14	30	41	50	68	60	81	70	95
7/16		20	35	47	55	75	70	95	78	108
1/2	12.70	13	50	68	75	102	95	129	105	149
1/2		20	55	75	90	122	100	136	120	163
9/16	14.29	12	65	88	110	149	135	183	155	203
9/16		18	75	102	120	163	150	203	170	231
5/8	15.88	11	90	122	150	203	190	258	210	298
5/8		18	100	136	180	244	210	285	240	325
3/4	19.05	10	160	217	260	353	320	434	375	515
3/4		16	180	244	300	407	360	488	420	597
7/8	22.23	9	140	190	400	542	520	705	605	814
7/8		14	155	210	440	597	580	786	675	895
1	25.40	8	220	298	580	786	800	1085	910	1220
1		12	240	325	640	868	860	1166	990	1356
1-1/8	25.58	7	300	407	800	1085	1120	1519	1280	1736
1-1/8		12	340	461	880	1193	1260	1709	1444	1953
1-1/4	31.75	7	420	570	1120	1519	1580	2142	1820	2468
1-1/4		12	460	624	1240	1681	1760	2387	2000	2712
1-3/8	34.93	6	560	759	1460	1980	2080	2820	2300	3227
1-3/8		12	640	868	1680	2278	2380	3227	2720	3688
1-1/2	38.10	6	740	1003	1940	2631	2780	3770	3160	4285
1-1/2		12	840	1139	2200	2983	3100	4204	3560	4827

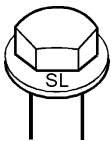
**Table I-2. Torque Limits for Wet Fasteners**

			CAPSCREW HEAD MARKINGS							
										
 <b>NOTE</b> Manufacturer's marks may vary. These are all SAE Grade 5.			SAE GRADE NO. 2	SAE GRADE NO. 5	SAE GRADE NO. 6 or 7	SAE GRADE NO. 8				
DIAMETER		THREADS PER INCH	TORQUE							
IN.	MM		LB-FT	N•M	LB-FT	N•M	LB-FT	N•M	LB-FT	N•M
1/4	6.35	20	4	6	6	8	8	11	9	12
1/4	6.35	28	5	7	7	9	9	12	10	14
5/16	7.94	18	8	11	13	18	16	22	18	24
5/16	7.94	24	9	12	14	19	18	24	20	27
3/8	9.53	16	15	20	23	31	30	41	35	47
3/8	9.53	24	17	23	25	34	30	41	35	47
7/16	11.11	14	24	33	35	47	45	61	55	75
7/16		20	25	34	40	54	50	68	60	81
1/2	12.70	13	35	47	55	75	70	95	80	108
1/2		20	40	54	65	88	80	108	90	122
9/16	14.29	12	50	68	80	108	100	136	110	149
9/16		18	55	75	90	122	110	149	130	176
5/8	15.88	11	70	95	110	149	140	190	170	231
5/8		18	80	108	130	176	160	217	180	244
3/4	19.05	10	120	163	200	271	240	325	280	380
3/4		16	140	190	220	298	280	380	320	434
7/8	22.23	9	110	149	300	407	400	542	460	624
7/8		14	120	163	320	434	440	597	500	678
1	25.40	8	160	217	440	597	600	814	680	922
1		12	170	231	480	651	660	895	740	1003
1-1/8	25.58	7	220	298	600	814	840	1139	960	1302
1-1/8		12	260	353	660	895	940	1275	1080	1464
1-1/4	31.75	7	320	434	840	1139	1100	1492	1360	1844
1-1/4		12	360	488	920	1248	1320	1790	1500	2034
1-3/8	34.93	6	420	570	1100	1492	1560	2115	1780	2414
1-3/8		12	460	624	1260	1709	1780	2414	2040	2766
1-1/2	38.10	6	560	760	1460	1980	2080	2820	2360	3200
1-1/2		12	620	841	1640	2224	2320	3146	2660	3607

**Table I-3. Torque Limits for Dry Metric Fasteners**

		CAPSCREW HEAD MARKINGS					
		 METRIC GRADE 8.8		 METRIC GRADE 10.9		 METRIC GRADE 12.9	
DIAMETER		TORQUE					
IN.	MM	LB-FT	N•M	LB-FT	N•M	LB-FT	N•M
0.157	4	2	3	3	4	4	5
0.197	5	4	5	6	8	7	9
0.237	6	7	9	10	14	11	15
0.276	7	11	15	16	22	20	27
0.315	8	18	24	25	34	29	39
0.394	10	32	43	47	64	58	79
0.473	12	58	79	83	113	100	136
0.552	14	94	127	133	180	159	216
0.630	16	144	195	196	266	235	319
0.709	18	190	258	269	365	323	438
0.788	20	260	353	366	496	440	597
0.867	22	368	499	520	705	678	919
0.946	24	470	637	664	900	794	1077
1.064	27	707	959	996	1351	1235	1675
1.182	30	967	1311	1357	1840	1630	2210

**Table I-4. Torque Limits for Wet Flange Nuts**

SPIRALOCK FLANGE NUT MARKINGS GRADE 8 	DIAMETER		THREADS PER INCH	TORQUE	
	LB-FT	N•M		LB-FT	N•M
	1/4	6.35	20	15	20
	5/16	7.94	18	25	34
	3/8	9.65	16	45	61
	1/2	12.70	13	110	149
	5/8	15.75	11	210	285
	3/4	19.05	10	375	508



## **APPENDIX J**

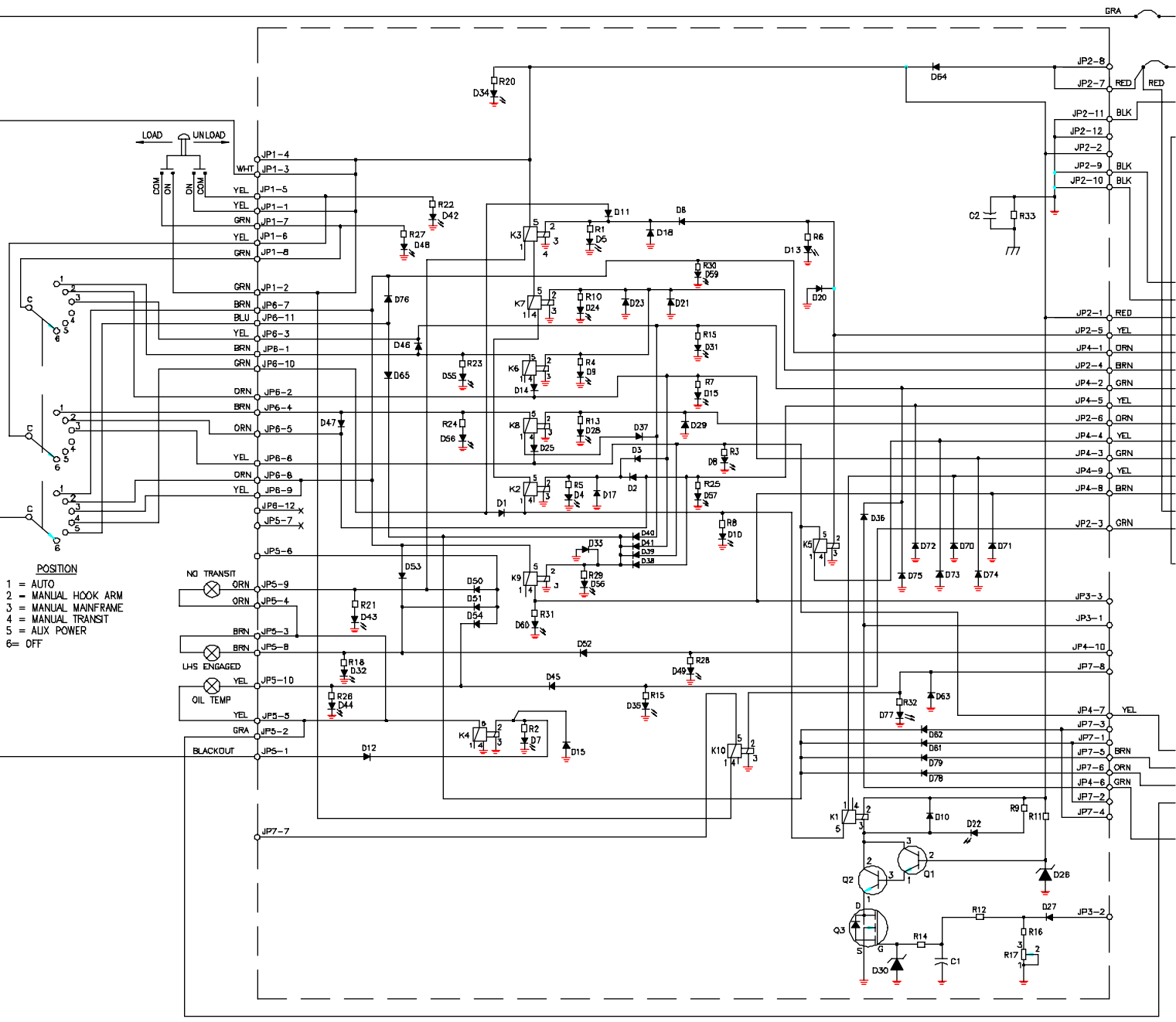
### **SCHEMATICS**

This appendix contains electrical and hydraulic schematics and a hydraulic flow diagram. Refer to these schematics when performing electrical or hydraulic troubleshooting.



SCHEMATIC.

CAB CONTROL BOX



- POSITION**
- 1 = AUTO
  - 2 = MANUAL HOOK ARM
  - 3 = MANUAL MAINFRAME
  - 4 = MANUAL TRANSIT
  - 5 = AUX POWER
  - 6 = OFF

GRA

JP2-8

JP2-7

JP2-11

JP2-12

JP2-2

JP2-9

JP2-10

JP2-1

JP2-5

JP4-1

JP2-4

JP4-2

JP4-5

JP2-6

JP4-4

JP4-3

JP4-9

JP4-8

JP2-3

JP3-3

JP3-1

JP4-10

JP7-8

JP4-7

JP7-3

JP7-1

JP7-5

JP7-6

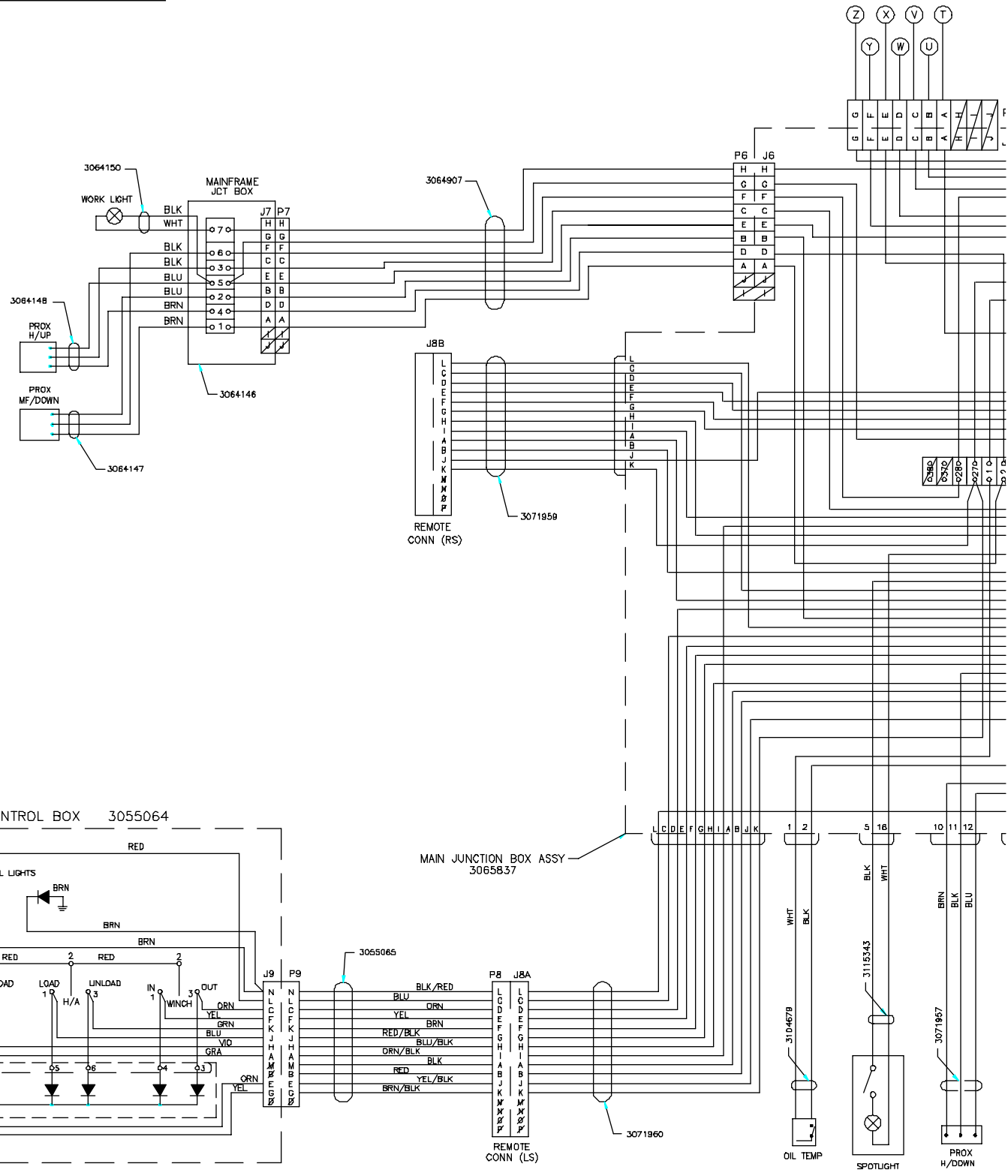
JP4-6

JP7-2

JP7-4

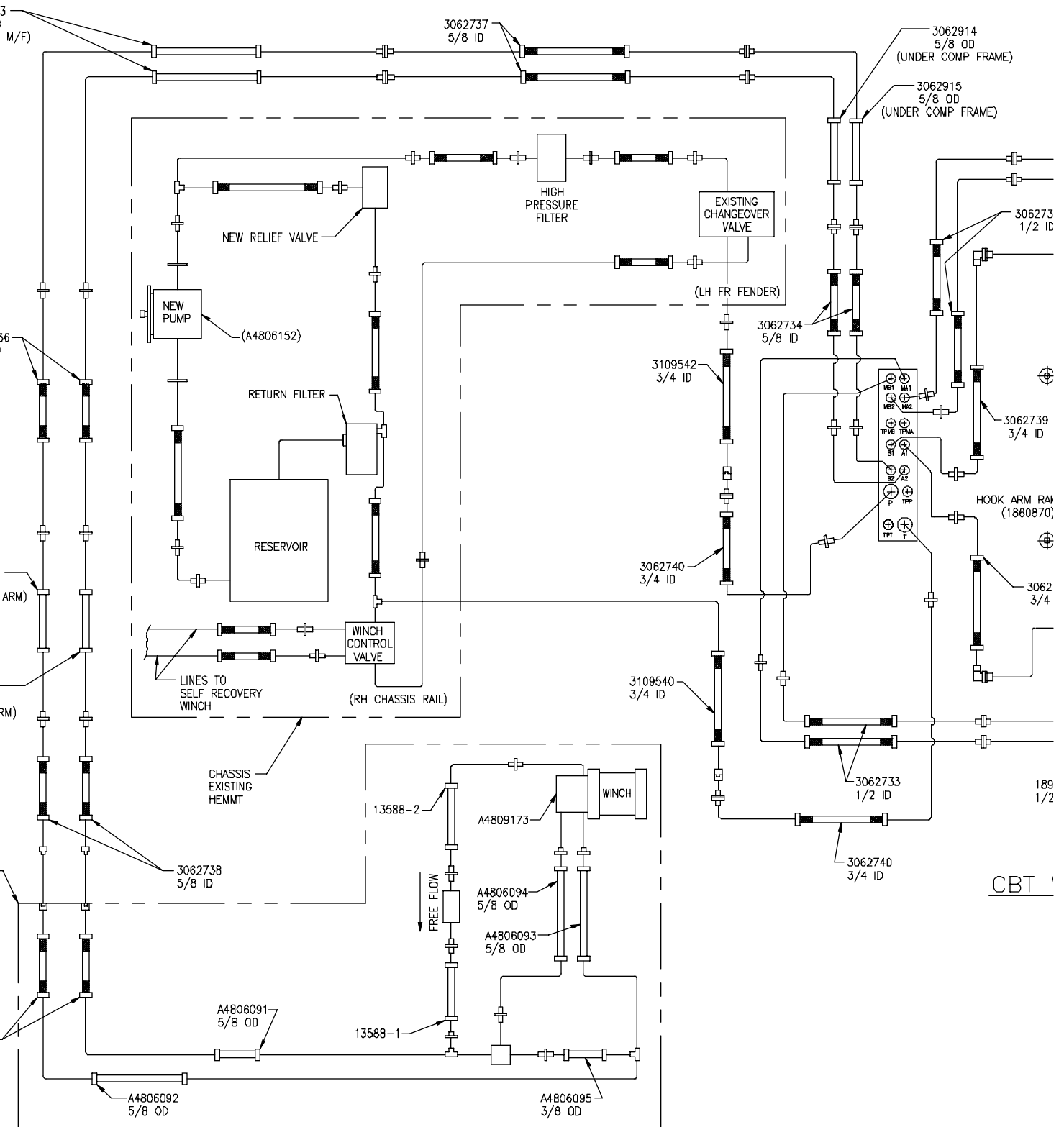
JP3-2







EMATIC.

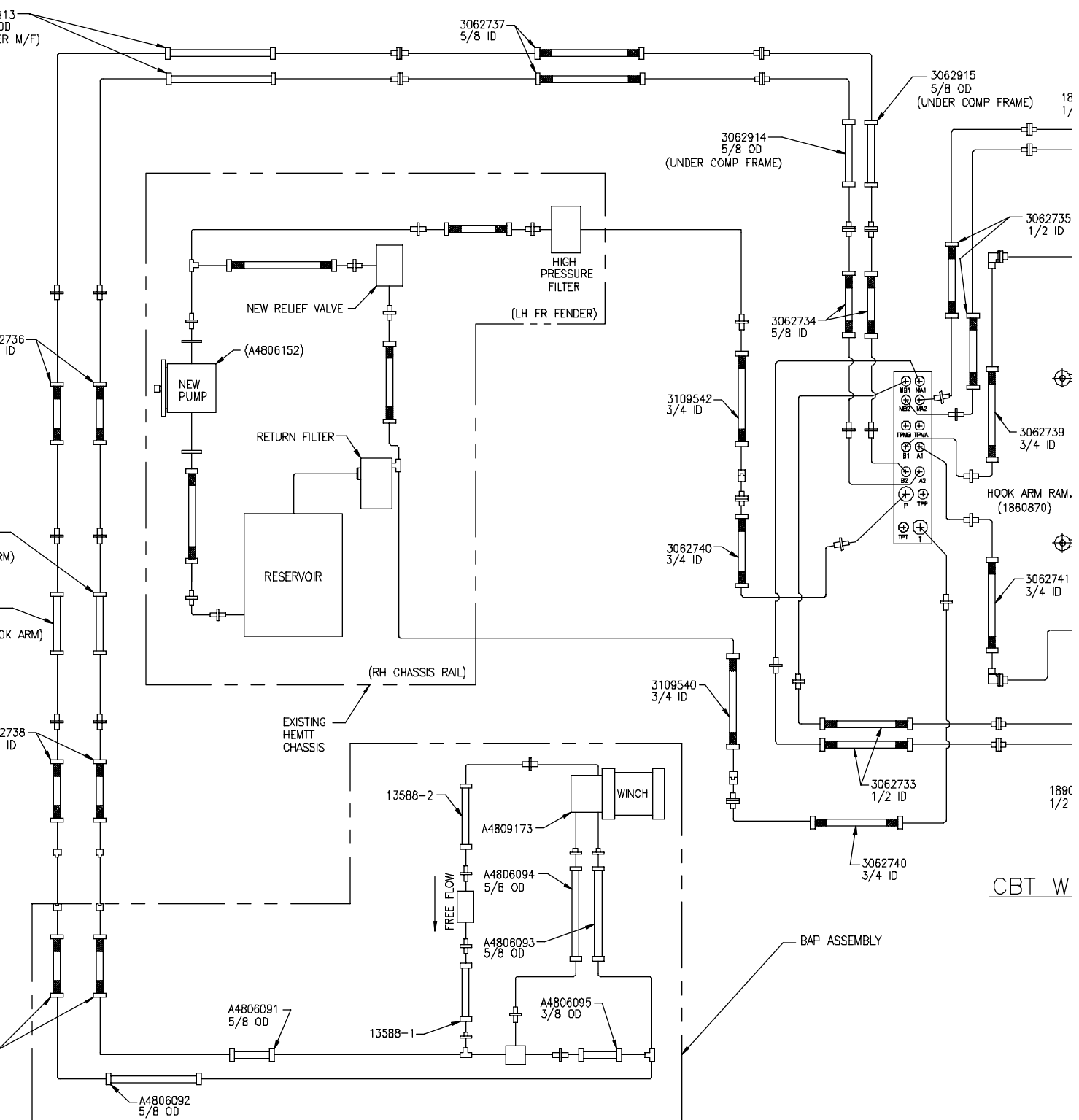


CBT





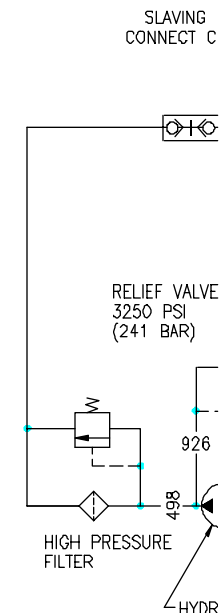
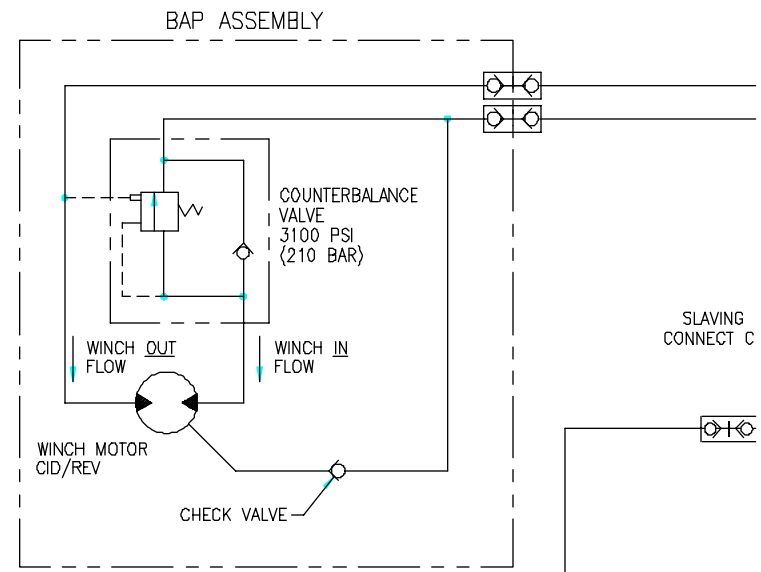
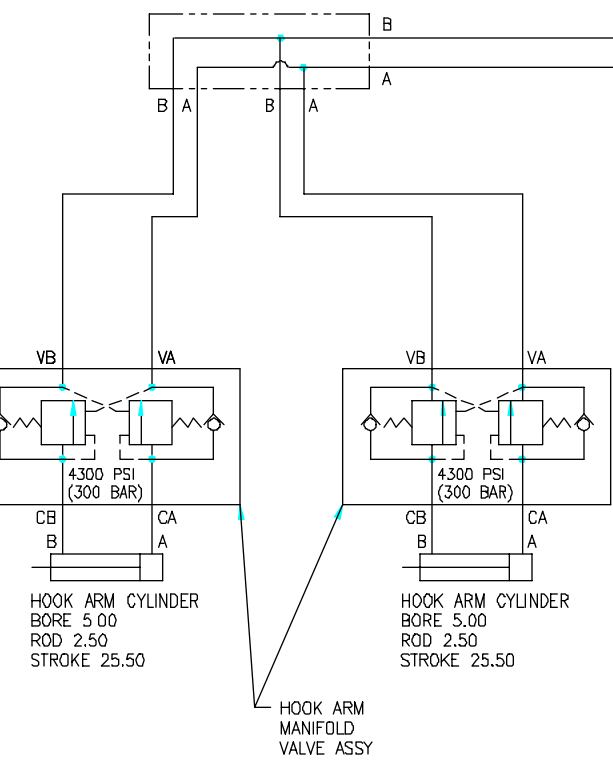
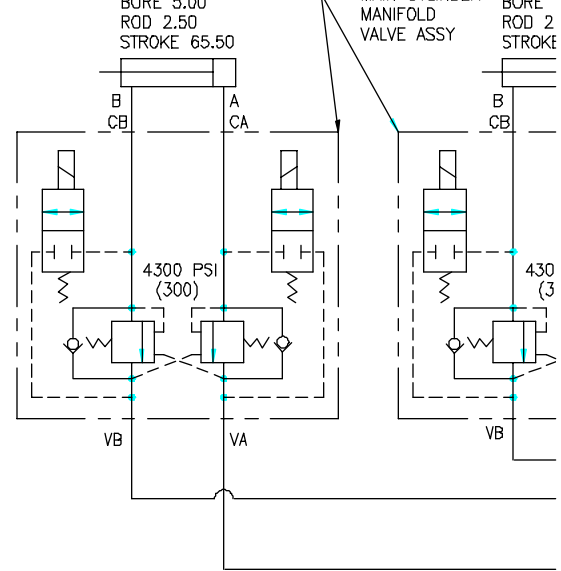
EMATIC.



CBT W



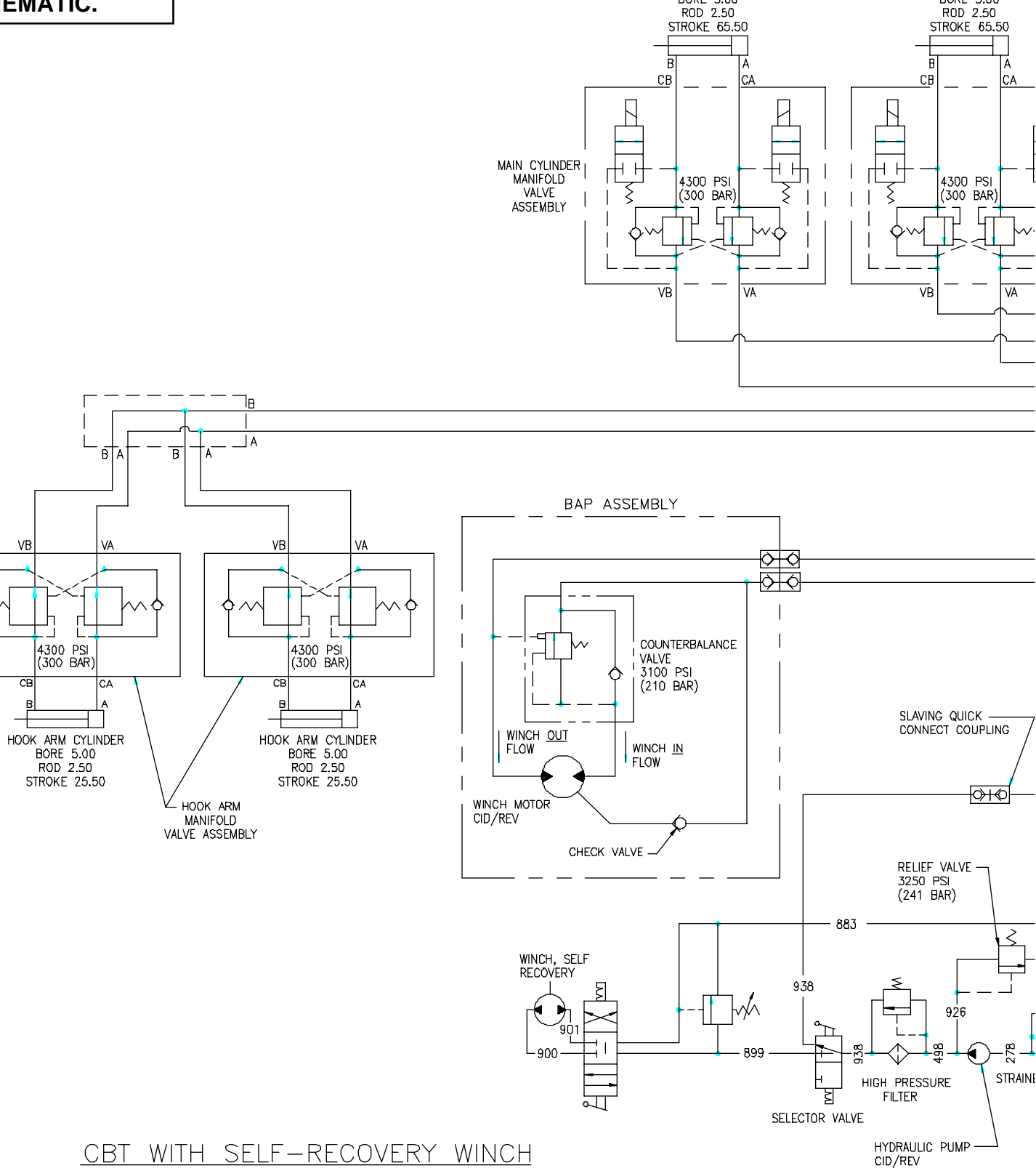
EMATIC.



CBT WITHOUT SELF-RECOVERY WINCH

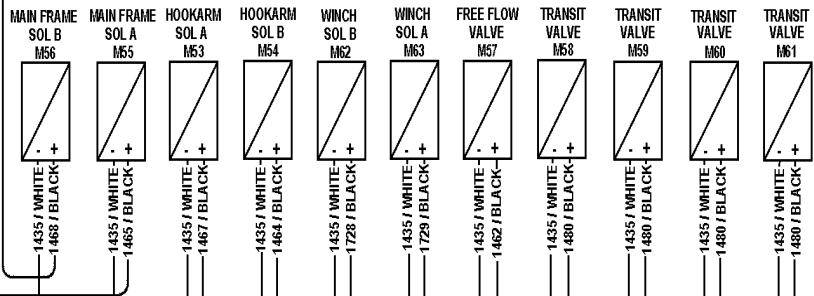


EMATIC.



CBT WITH SELF-RECOVERY WINCH

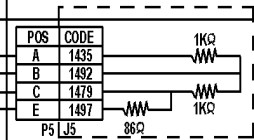




HAND HEL  
WORK LIG

P12	J1
POS	CO
A	14
B	14

480



POS	CODE
1	1435
2	1473
3	1474
4	1490
5	1489
6	1040
7	1680
8	1843

- GND CONNECTION IN CAB
- CAB IGN CIRCUIT BREAKER CB9
- TO CAB WORK LIGHT SWITCH
- TO BLACKOUT LIGHT CAB CONNECTION CB1
- TO CAB HIGH IDLE SWITCH

HARNESS 3282417

MC27

POS	CODE	CAB OPERATOR CONTR
E	1489	DATA RECIEVE
D	1490	DATA TRANSIT
C	1474	POWER OUT. CONTROL
B	1435	GROUND
A	1473	POWER 24V IN





## APPENDIX K

### MANDATORY REPLACEMENT PARTS

Para	Contents	Page
K-1	General .....	K-1
K-2	Explanation of Columns .....	K-1
	Table K-1. Mandatory Replacement Parts List .....	K-2

**K-1. GENERAL.**

This appendix is a cross-reference of item numbers to part numbers and is included for that purpose only.

**K-2. EXPLANATION OF COLUMNS.**

The four columns of Table K-1 (p. K-2) have the following headings:

- (1) **Item Number.** This number is assigned to the entry in Table K-1 for cross-referencing to the part number. The item number appears in the "Materials/Parts" listing of each maintenance procedure.
- (2) **Item Name.** This is the name given to the item in the "Materials/Parts" listing and in the text of the maintenance procedure.
- (3) **Part Number.** This is the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements, to identify an item or range of items.
- (4) **National Stock Number.** When available, the national stock number is listed.

Table K-1. Mandatory Replacement Parts List

(1) Item Number	(2) Item Name	(3) Part Number	(4) National Stock Number
1	Locknut	AN365-1024A	5310-00-208-1918
2	Hook latch kit	A4809184	4030-01-454-8219
2.1	Rivet	BTT43	5320-01-351-5621
3	Cotter pin	EE42698	
4	Bushing	GLY.PG808560A	5365-01-355-9529
5	O-ring	FF9446-19	5331-01-457-3518
5.1	Springwasher	M12133/1-12P	5310-01-038-2294
5.2	Locknut	M45913/1-5CG5C	5310-00-984-3806
5.3	Locknut	M45913/1-7CG5C	5310-00-575-5329
6	O-ring	M83248/1-905	5331-00-167-5166
7	Spring pin	MS16562-227	5315-00-058-9756
8	Spring pin	MS16562-236	5315-00-058-9782
9	Spring pin	MS16562-240	5315-00-200-3183
10	Ring, retaining	MS16624-1250	5325-00-806-2357
10.1	Ring, retaining	MS16624-250	5325-00-175-1315
11	Ring, retaining	MS16624-315	5325-00-282-7149
12	Locknut	MS19068-091	5310-00-185-6461
13	Locknut	MS19068-121	5310-00-185-6345
14	Lockwasher	MS19070-091	5310-00-186-0968
15	Rivet	MS20470A4-4	5320-00-584-9078
16	Drive screw	MS21318-20	5305-00-253-5614
17	Cotter pin	MS24665-136	5315-00-017-9252
18	Cotter pin	MS24665-289	5315-00-845-7787
19	Cotter pin	MS24665-360	5315-00-298-1499
20	Cotter pin	MS24665-491	5315-00-059-0206
21	Cotter pin	MS24665-511	5315-00-576-0421
22	Cotter pin	MS24665-513	5315-00-239-8032
22.1	Cotter Pin	MS24665-624	5315-00-059-0217
23	Cotter pin	MS24665-625	5315-00-209-7237
24	Cotter pin	MS24665-752	5315-00-846-4297
25	Star washer	MS35336-29	5310-00-261-7163
26	Lockwasher	MS35338-138	5310-00-933-8120
27	Lockwasher	MS35338-40	2130-00-543-2410
28	Lockwasher	MS35338-41	5310-00-045-4007
28.1	Lockwasher	MS35338-42	5310-00-045-3299
29	Lockwasher	MS35338-43	5310-00-045-3296

Table K-1. Mandatory Replacement Parts List (continued)

(1) Item Number	(2) Item Name	(3) Part Number	(4) National Stock Number
30	Lockwasher	MS35338-44	5310-00-582-5965
31	Lockwasher	MS35338-45	5310-00-407-9566
32	Lockwasher	MS35338-46	5310-00-637-9541
33	Lockwasher	MS35338-47	5310-00-209-0965
34	Lockwasher	MS35338-50	5310-00-820-6653
35	Lockwasher	MS35338-51	5310-00-584-7888
36	Lockwasher	MS35338-54	5310-00-850-1611
37	Lockwasher	MS35338-65	5310-00-011-5093
38	Grounding washer	MS45904-76	5310-00-061-1258
39	Self-locking nut	MS51922-33	5310-00-225-6993
40	Self-locking nut	MS51922-9	5310-00-984-3806
40.1	Locknut	MS51943-31	5310-00-061-4650
40.2	Locknut	MS51967-23	5310-00-763-8921
41	Spring pin	MS51987-422	5315-01-140-4870
42	Ring, retaining	MS16624-1315	5325-00-200-6684
43	Cotter pin	RS40-7	5315-00-241-7332
44	O-ring	S1E10164, Item17	5330-01-344-4335
44.1	Seal Kit	SK3-0002N-1	5330-01-357-7904
45	Seal kit	SK3-0006N	5330-01-422-3885
46	Seal kit	SK3-0024N-1	5330-01-357-7512
47	Seal kit	SK30093N-1	
48	Seal kit	SK30503N-L	
48.1	Locknut	T893R	5310-01-288-1116
48.2	Lockwasher	V75502830	5310-01-344-6738
49	Lockwasher	W 08	5310-01-355-8794
50	Lockwasher	W 12 Lockwasher	5310-01-458-0248
51	Locknut	108707A	
52	Locknut	108708A	5310-01-177-4625
53	Locknut	110310A	5310-10-159-8178
54	Locknut	110311A	5310-01-111-0645
55	Locknut	110312	
56	Locknut	110312A	5310-01-150-5918
57	Locknut	11311A	5310-01-111-0645
58	O-ring	114859-00	5330-01-066-5343
58.1	Screw, tapping	1324510	5305-01-157-5624
59	Locknut	1333510	5310-01-340-5671
59.1	Locknut	1437220	5310-01-288-1116

Table K-1. Mandatory Replacement Parts List (continued)

(1) Item Number	(2) Item Name	(3) Part Number	(4) National Stock Number
60	Locknut	1571850	5310-01-288-5096
61	Locknut	1571870	5310-01-352-7732
62	Locknut	1598030	5310-01-342-8595
63	Locknut	1600460	5310-01-346-9445
64	Spring washer	1730440	5310-01-038-2294
65	Gasket	186-01-605	5330-01-459-1255
66	Gasket	186-01-606	5330-01-459-1260
67	Lockwasher	1937550	5310-01-355-8798
68	Locknut	1955110	5305-01-456-9449
69	O-ring	200-116-4490	5331-01-054-8419
69.1	O-ring	200-214-4490	5331-01-116-8112
69.2	O-ring	200-912-4490	5331-00-395-5737
70	Spacer	20372	5365-01-217-7125
71	Locknut	21NE-040	5310-01-066-6759
72	O-ring	2-214N552-90	5331-01-116-8112
73	Lockwasher	2152HX	5310-00-550-3714
74	Lockwasher	2153HX	5310-00-660-1819
75	Backup ring	22021-10	5342-00-789-8409
76	Preformed packing	22550-211	5330-00-017-9253
77	O-ring	22617-10	5331-01-040-4227
78	O-ring	22617-12	5330-00-228-7196
79	O-ring	22617-16	5330-01-168-0885
80	O-ring	22617-5	5331-01-213-5212
81	O-ring	22617-8	5330-01-244-2273
82	Seal kit	23157	
83	Lockwasher	2434	5310-00-775-5139
83.1	O-ring	25016	
84	Lockwasher	25328	5310-01-212-2299
85	Locknut	2533408-26	5310-01-343-5712
86	O-ring	25716	
87	O-ring	26194	
88	Locknut	3055168	
89	Lockwasher	351AX	5310-01-129-0450
89.1	Lockwasher	353A	5310-01-582-5965
90	Lockwasher	353AX	5310-00-582-5965
91	Lockwasher	354AX	5310-01-068-8446
92	Lockwasher	354AX1	

Table K-1. Mandatory Replacement Parts List

(1) Item Number	(2) Item Name	(3) Part Number	(4) National Stock Number
93	Lockwasher	355AX	5310-01-133-2130
94	Cotter pin	356AX	5315-01-377-1554
95	Lockwasher	371AX	5310-00-775-5139
96	O-ring	3-906V0894	5330-01-460-4706
97	O-ring	3-910	5330-00-485-3586
98	O-ring	3-912	
99	O-ring	3-12N552-90	5331-00-395-5737
100	Piston seal assembly	430357B	
100.1	Locknut	511-041810-01	5310-00-542-0087
101	Gasket, mounting	5370	
102	Lockwasher	5584	5310-00-775-5125
103	Lockwasher	58058AX	
104	Locknut	64050AX	
105	Locknut	66419AX	5310-01-066-6759
106	Cap, end splice	7040700	
107	Screw	711053A	5305-01-355-2641
108	Plug, nylon	715001A	5340-01-372-3982
109	Gasket	731740-002	5330-01-355-4809
110	Locknut	767HX1	5310-01-058-3183
111	O-ring	8023N7011	5331-01-460-9149
111.1	Seal	80X100X10	5330-01-355-9269
112	Seal kit	9S000106	5330-01-372-8377
113	Locknut	90631A009	5310-01-457-3244
114	Lockwasher	93613642	5310-01-068-8446



## APPENDIX L

### SIGN GUIDE (MODEL B ONLY)

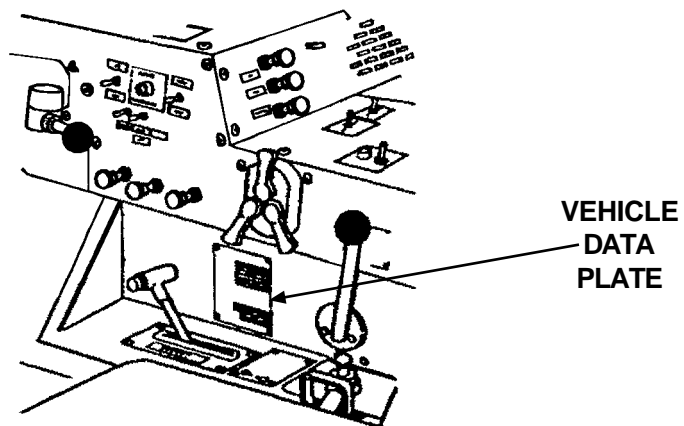
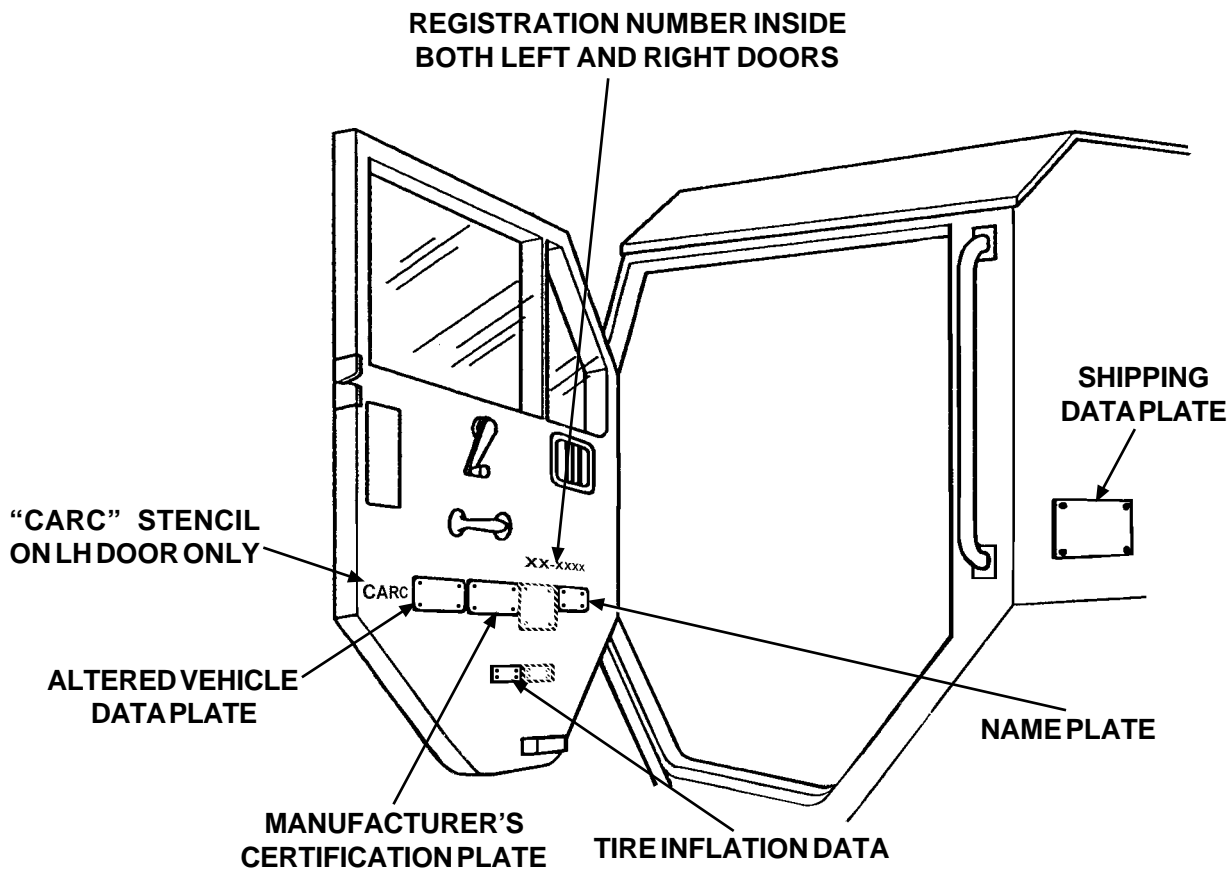
#### L-1. SCOPE.

This appendix shows locations for data plates, decals, and stencils that are required to be in place on the M1120 vehicles.

#### L-2. GENERAL.

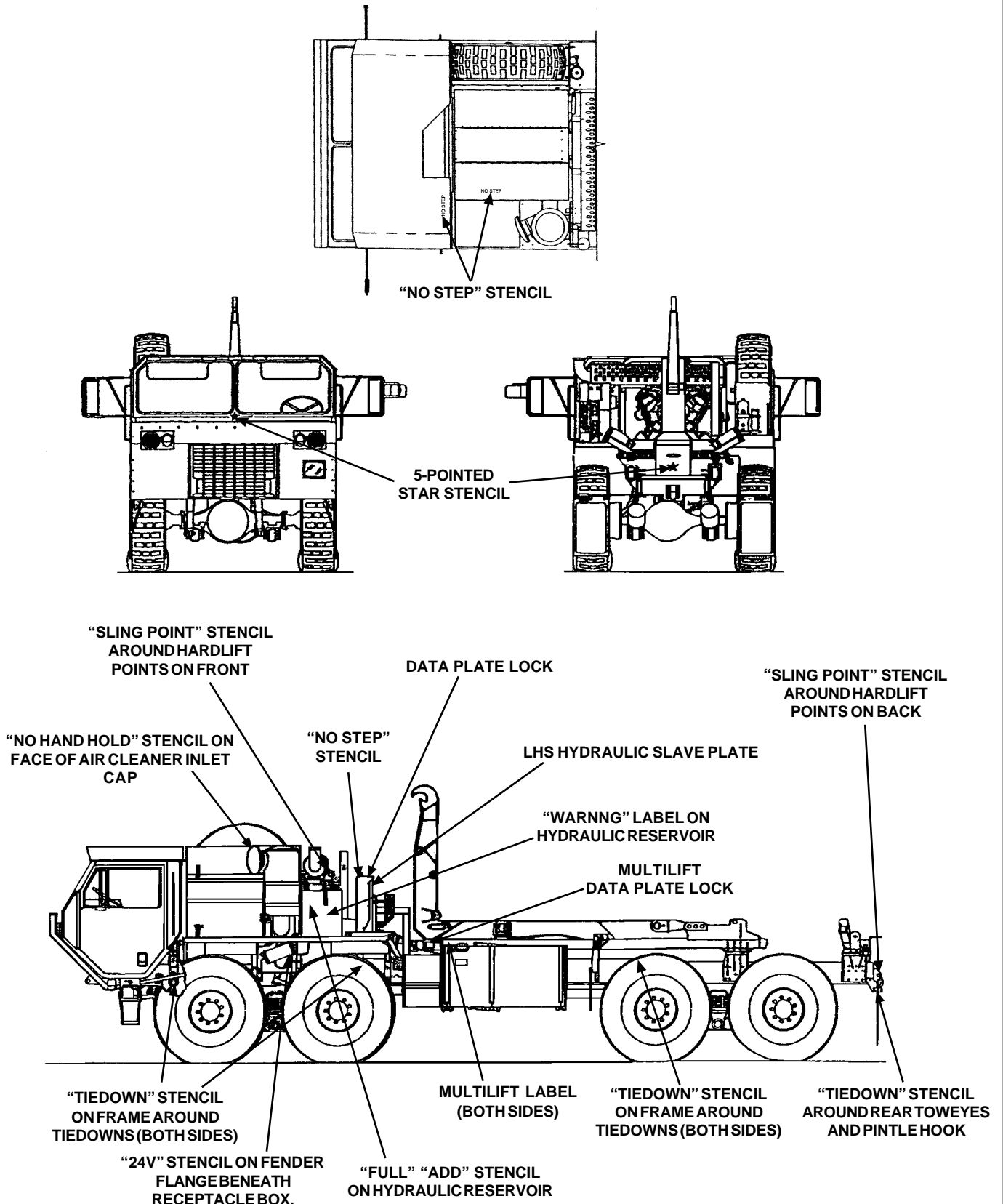
The figures on the next pages show the location of metal signs, decals, and stencils used on the vehicle. Most of these signs and stencils contain cautions or information needed to operate the vehicle safely.

APPENDIX L. SIGN GUIDE (MODEL B ONLY) (continued).





APPENDIX L. SIGN GUIDE (MODEL B ONLY) (continued).





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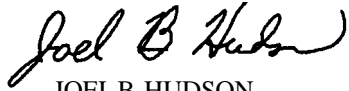
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IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Item 10. Change illustration. Reason: Tube end shown assembled on wrong side of lever cam.

Item 3. The NSN and P/N are not listed on the AMDF nor the MCRL. Request correct NSN and P/N be furnished.

Preventive Maintenance Checks and Services. Item 7 under "Items to be inspected" should be changed to read as follows: Firing linkage and firing mechanism pawl.

Since there are both 20- and 30- round magazines for this rifle, data on both should be listed.

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## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches  
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches  
 1 Kilometer = 1000 Meters = 0.621 Miles

### WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces  
 1 Kilogram = 1000 Grams = 2.2 Lb.  
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

### LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces  
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

### SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches  
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet  
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

### CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches  
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

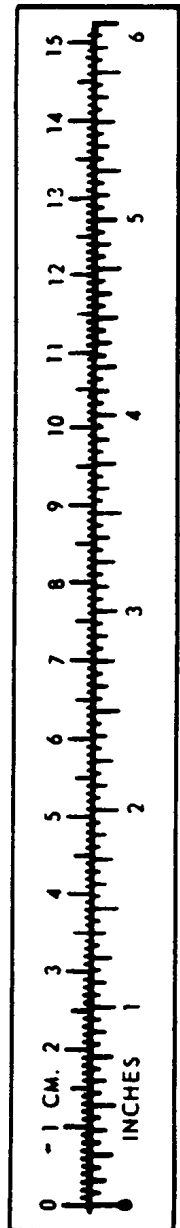
### TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 212° Fahrenheit is equivalent to 100° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 $9/5 ^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

### APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches .....	Centimeters .....	2.540
Feet .....	Meters .....	0.305
Yards .....	Meters .....	0.914
Miles .....	Kilometers .....	1.609
Square Inches .....	Square Centimeters .....	6.451
Square Feet .....	Square Meters .....	0.093
Square Yards .....	Square Meters .....	0.836
Square Miles .....	Square Kilometers .....	2.590
Acres .....	Square Hectometers .....	0.405
Cubic Feet .....	Cubic Meters .....	0.028
Cubic Yards .....	Cubic Meters .....	0.765
Fluid Ounces .....	Milliliters .....	29.573
Pints .....	Liters .....	0.473
Quarts .....	Liters .....	0.946
Gallons .....	Liters .....	3.785
Ounces .....	Grams .....	28.349
Pounds .....	Kilograms .....	0.454
Short Tons .....	Metric Tons .....	0.907
Pound-Feet .....	Newton-Meters .....	1.356
Pounds per Square Inch .....	Kilopascals .....	6.895
Miles per Gallon .....	Kilometers per Liter .....	0.425
Miles per Hour .....	Kilometers per Hour .....	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters .....	Inches .....	0.394
Meters .....	Feet .....	3.280
Meters .....	Yards .....	1.094
Kilometers .....	Miles .....	0.621
Square Centimeters .....	Square Inches .....	0.155
Square Meters .....	Square Feet .....	10.764
Square Meters .....	Square Yards .....	1.196
Square Kilometers .....	Square Miles .....	0.386
Square Hectometers .....	Acres .....	2.471
Cubic Meters .....	Cubic Feet .....	35.315
Cubic Meters .....	Cubic Yards .....	1.308
Milliliters .....	Fluid Ounces .....	0.034
Liters .....	Pints .....	2.113
Liters .....	Quarts .....	1.057
Liters .....	Gallons .....	0.264
Grams .....	Ounces .....	0.035
Kilograms .....	Pounds .....	2.205
Metric Tons .....	Short Tons .....	1.102
Newton-Meters .....	Pound-Feet .....	0.738
Kilopascals .....	Pounds per Square Inch .....	0.145
Kilometers per Liter .....	Miles per Gallon .....	2.354
Kilometers per Hour .....	Miles per Hour .....	0.621



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