

TECHNICAL MANUAL

**OPERATOR'S ORGANIZATIONAL, DIRECT
SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL**

**TOPOGRAPHIC SUPPORT SYSTEM
CAMERA SECTION
TOPOGRAPHIC REPRODUCTION SET
SEMI-TRAILER MOUNTED
MODEL 1983
NSN: 3610-01-105-1694**

HEADQUARTERS, DEPARTMENT OF THE ARMY

20 JUNE 1986

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 27 FEB 1991

Operator's, Organizational, Direct Support and General Support
Maintenance Manual

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TM 5-3610-257-14, 20 June 1986, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages

i and ii
1-1 and 1-2
C-9 through C-12

Insert pages

i and ii
1-1 and 1-2
C-9 through C-12

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

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Chief of Staff

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WARNING

HIGH VOLTAGE is used in this equipment. **DEATH ON CONTACT** or severe injury may result if personnel fail to observe safety precautions.

Do not be misled by the term **LOW VOLTAGE**. Low voltage can cause serious injury or **DEATH**.

Test procedures requiring the operator or maintenance personnel to investigate equipment or restore casualties with interlocks disconnected or covers removed may result in **DEATH ON CONTACT** if personnel fail to observe safety precautions.

Voltages in switches and circuit breaker panels may result in **DEATH ON CONTACT** if personnel fail to observe safety precautions.

Failure to ground the section or equipment may result in **DEATH ON CONTACT** if personnel fail to observe safety procedures.

For Artificial Respiration refer to FM 21-11.

WARNING

Fumes and chemicals used may result in **DEATH** or **BLINDNESS** if personnel do not operate equipment with proper ventilation.

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 100° F to 1380 F (380 C to 590 C).

Chemicals used in reproduction and photographic processes may result in **BLINDNESS** if personnel do not use eye protection when required.

WARNING

Rotating and spinning equipment may snag loose clothing, hair or jewelry resulting in **SEVERE PERSONNEL INJURY**.

WARNING

Attempting to move overweight or top-heavy equipment that is unsecured may result in **SEVERE PERSONNEL INJURY**. Always have sufficient personnel and equipment to accomplish the task.

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**OPERATOR’S, ORGANIZATIONAL, DIRECT SUPPORT
AND
GENERAL SUPPORT MAINTENANCE MANUAL
CAMERA SECTION**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

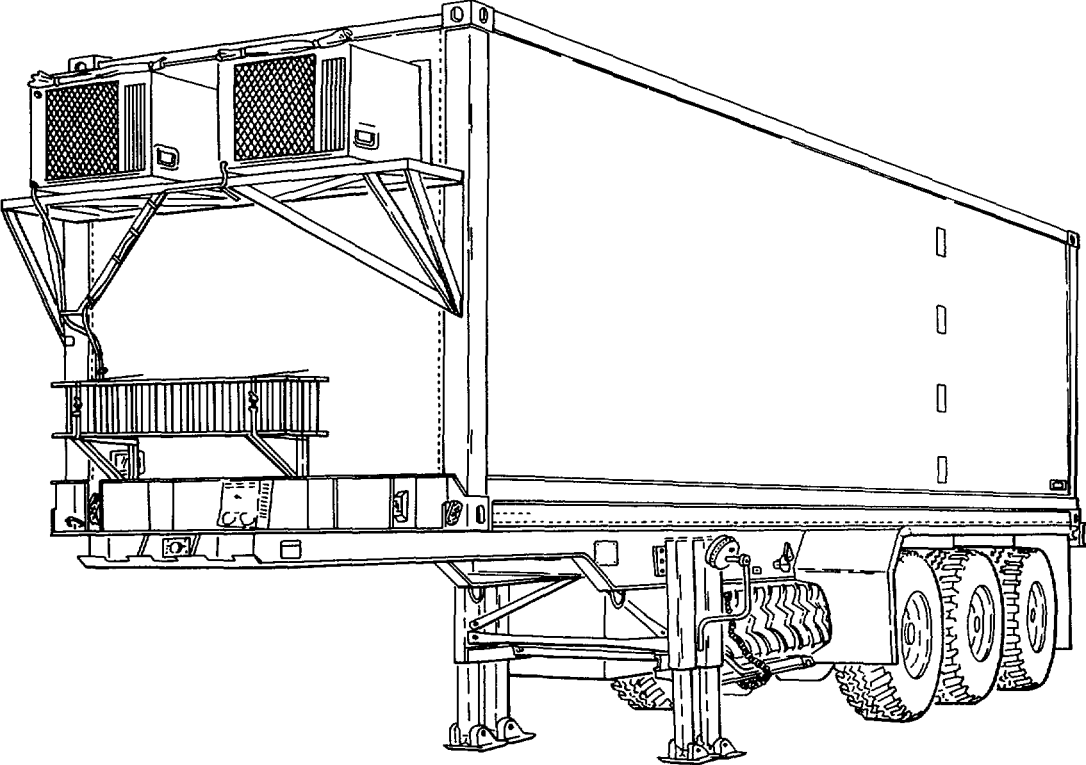
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CHAPTER 1

CAMERA SECTION

Section I. INTRODUCTION

1-1. GENERAL INFORMATION.

1-1.1. Scope. This manual contains operating and maintenance instructions for the Camera Section, Topographic Support System (TSS). The trailer chassis is covered in TM 5-2330-305-14, Operator, Organizational, Direct Support and General Support Maintenance manual, Topographic Support System, Chassis, Semitrailer, ISO Container Transporter. Repair parts and special tools are listed in TM 5-3610-257-24P, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List, Camera Section, Topographic Support System. Lubrication instructions are contained in LO 5-3610-257-12, Lubrication Order, Camera Section, Topographic Support System. All authorized equipment, supplies, and their locations for transport are shown in Location and Description of Major Components of this manual.

1-1.2. Purpose of Equipment. To provide a transportable facility for accurately scaled, undistorted line, halftone, and continuous tone negatives and positives for map reproduction.

1-1.3. Maintenance Forms and Records. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS).

1-1.4. Reporting Equipment Improvements (EIR's). If the Camera Section needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: U.S. Army Troop Support Command, ATTN: AMSTR-MOF, 4300 Goodfellow U Blvd, St Louis, MO 63120-1798. We will send you a reply.

1-1.5. Destruction of Material to Prevent Enemy Use. For information on destruction of material to prevent enemy use, refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-1.6. Preparation for Storage or Shipment.

- a. Perform your preparation for movement procedures.
- b. For administrative storage of equipment, refer to TM 740-90-1.
- c. The chapters of this manual describe special shipping instructions for major components located in the section.
- d. In the event this equipment must be removed from the section for repair or replacement, contact your battalion for packing and shipping instructions.

1-1.7. Hand Receipt (-HR) Manual. This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). TM 5-3610-257-14-HR consists of preprinted hand receipts (DA Form 2062) that list end item-related equipment (i.e., Components of End Item, Basic Issue Items, and Additional Authorization Lists) for which you must account. As an aid to property accountability, additional -HR manuals may be requisitioned from the following source in accordance with procedures in Chapter 3, AR 310-2: The U.S. Army Adjutant General Publications Center, 2800 Eastern Blvd, Baltimore, MD 21220.

1-2. EQUIPMENT DESCRIPTION.

1-2.1. Equipment Characteristics, Capabilities, and Features.

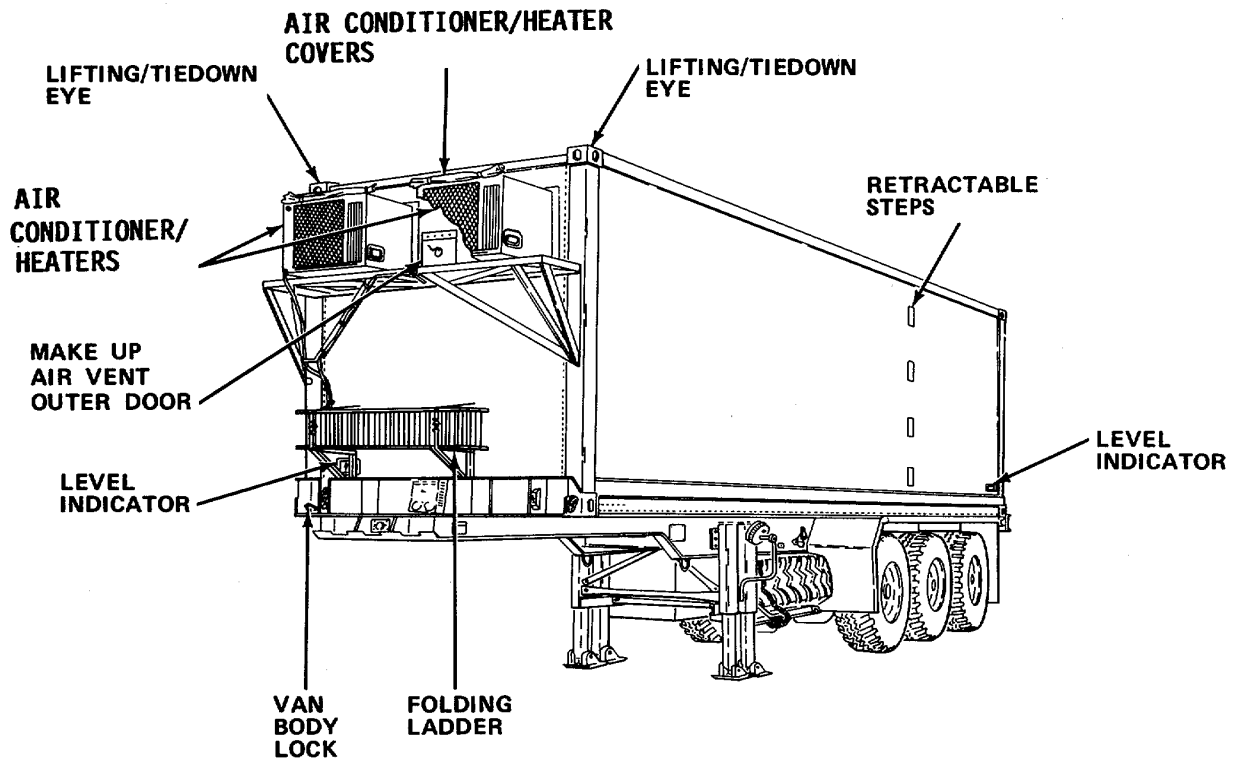
- a. Air and sea transportable.
- b. Transportable when mounted on trailer chassis.
- c. Controlled internal environment.

1-2.2. Special Considerations.

- a. Site must permit section to be leveled within $\pm 1/2^\circ$ division on level indicator be well drained, and provide adequate overhead concealment. Wooded areas and other obstacles must not impede movement of transporters.
- b. Power is normally supplied by mobile unit generators. Commercial electric power should be used if it is compatible and available.
- c. Power is normally supplied by mobile unit generators. Commercial electric power should be used if it is compatible and available.
- d. Cross-country capability of sections and transporters is limited. Relocation should be accomplished over hard-surfaced, all-weather roads whenever possible.

1-2.3. Location and Description of Major Components.

a. Roadside Exterior.



VAN BODY LOCK. Locks van body to trailer chassis.

AIR CONDITIONERS/HEATERS. Two air conditioner/heater units for internal environmental control.

LIFTING/TIEDOWN EYES. Attachment point for lifting or tying down van body.

AIR CONDITIONER/HEATER COVERS. Cover air conditioners to prevent water/air entering air conditioner units when in transport or storage.

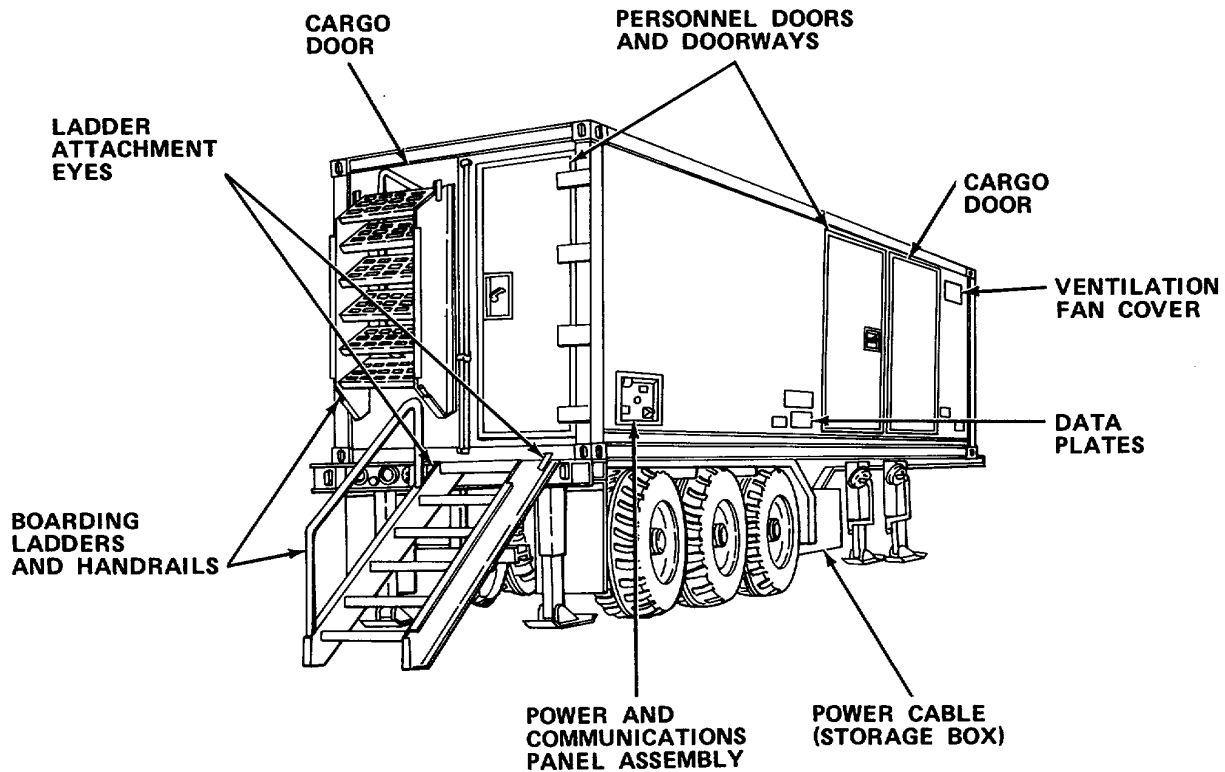
MAKE UP AIR VENT OUTER DOOR. Covers make up air vent opening.

RETRACTABLE STEPS. Provide access to roof.

LEVEL INDICATORS. Indicate van body inclination.

FOLDING LADDER. Allows access to air conditioners and top of van.

b. Curbside Exterior.



CARGO DOOR. Access for equipment removal/installation.

PERSONNEL DOORS. Provide access to the Section.

VENTILATION FAN COVER. Covers ventilation fan opening.

DATA PLATES. Provide weight/moment data.

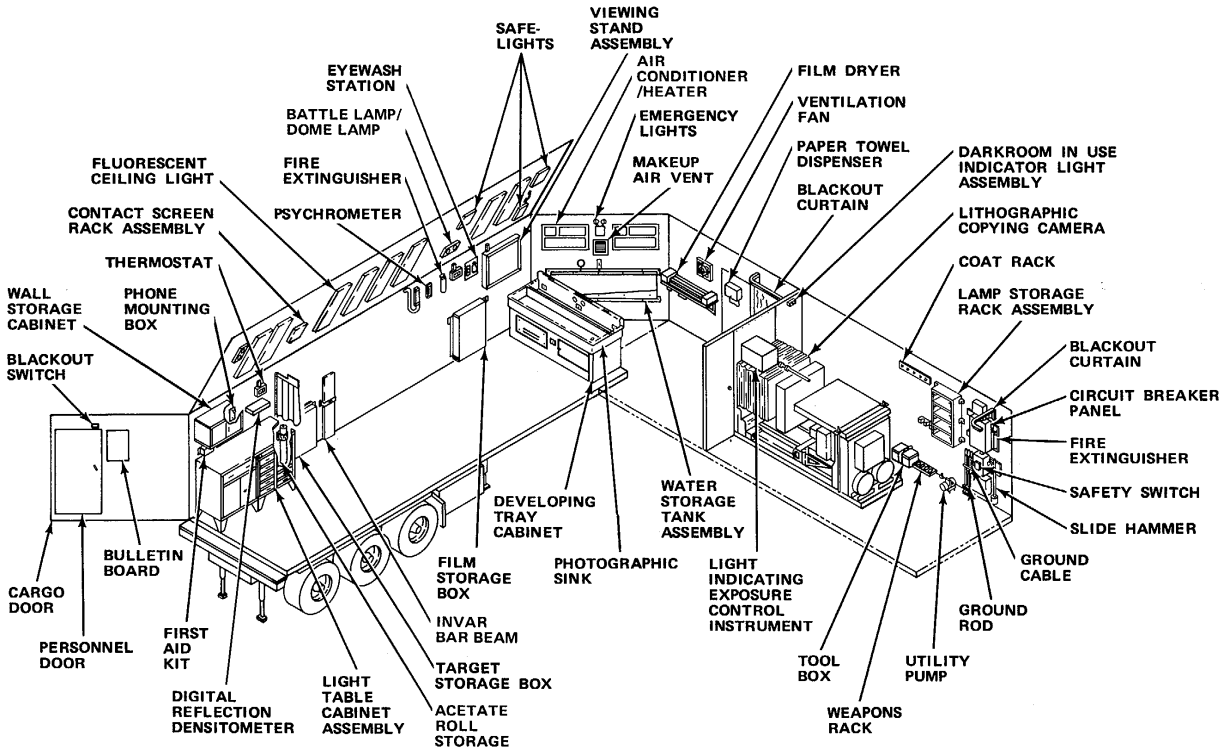
POWER CABLE. Power cable is in two 50 ft (15.2m) sections. (Stored in trailer chassis storage box.)

POWER AND COMMUNICATIONS PANEL ASSEMBLY. Contains terminals for ground cable, power cables, and telephone lines.

LADDER ATTACHMENT EYES. Attachment points for boarding ladder.

BOARDING LADDERS AND HANDRAILS. Provide access to section.

c. Interior.



CARGO DOOR. Access for equipment removal/installation.

PERSONNEL DOOR. Weatherproof, fitted with blackout switch.

BLACKOUT SWITCH. Turns ceiling lights off when activated.

BULLETIN BOARD. Vertical display board.

FIRST AID KIT. Limited first aid supplies.

WALL STORAGE CABINET. Storage.

DIGITAL REFLECTION DENSITOMETER. Measures density of copy.

LIGHT TABLE CABINET ASSEMBLY. For viewing of negatives, transparencies, or overlays.

ACETATE ROLL STORAGE. Secure acetate roll.

TARGET STORAGE BOX. Camera target storage.

INVAR BAR BEAM. Reference for accurate linear measurement.

PHONE MOUNTING BOX. Mounting and storage for field telephone.

THERMOSTAT. Controls air conditioner/heater.

BATTLE LAMP/DOME LIGHT. Battle lamp red-lensed, 120 V ac light actuated when blackout switch operates, dome light, white lensed, 12 V ac, actuate from 12 V ac power source.

CONTACT SCREEN RACK ASSEMBLY. Storage for contact screens.

FLUORESCENT CEILING LIGHT. White, two-level (high/low) overhead light.

PSYCHROMETER. Measures temperature and relative humidity.

FILM STORAGE BOX. Storage for photographic film.

FIRE EXTINGUISHER. Dry chemical fire extinguisher.

EYEWASH STATION. Equipment to irrigate eyes if chemicals are splashed in them.

SAFELIGHTS. For use in darkroom environment.

VIEWING STAND ASSEMBLY. Illuminated surface for viewing film.

AIR CONDITIONERS/HEATER. Internal environmental control.

EMERGENCY LIGHTS. Battery-powered lighting actuated by power failure.

MAKE UP AIR VENT. Permits filtered make up air to enter section.

PHOTOGRAPHIC SINK. Temperature controlled sink for processing exposed photographic materials.

DEVELOPING TRAY CABINET. Provides storage for developing tray.

WATER STORAGE TANK ASSEMBLY. Storage for water supply.

FILM DRYER. Dries film.

VENTILATION FAN. Provides ventilation. Fitted with lightproof louvers and weatherproof cover.

PAPER TOWEL DISPENSER. Dispenses paper towels.

BLACKOUT CURTAIN. Lightproof cover for personnel door.

DARKROOM IN USE INDICATOR LIGHT ASSEMBLY. Indicates film exposure or developing operations are in progress.

LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT. Automatically computes exposure time.

LITHOGRAPHIC COPYING CAMERA. Produces line, halftone, and continuous tone photos.

COAT RACK. Storage.

TOOL BOX. Storage.

WEAPONS RACK. Weapon storage.

LAMP STORAGE RACK ASSEMBLY. Storage for pulsed xenon lamps.

UTILITY PUMP. Used to fill water storage tank.

GROUND ROD. Electrical ground for section.

GROUND CABLE. Used with ground rod.

CIRCUIT BREAKER PANEL. Circuit breakers with voltage and phase test indicator.

SAFETY SWITCH. Main power safety disconnect switch.

SLIDE HAMMER. Used to drive in and pull out ground rod.

VACUUM CLEANER. Cleaning equipment.

WASTE RECEPTACLE. Waste disposal.

1-2.4. Equipment Data - ISO Container (Unmounted).

Dimensions	
Length	30 ft (9.1 m)
Width	8 ft (2.44 m)
Height	8 ft (2.44 m)
Cubage	1920 ft3 (54.4 m3)
Connections	
Telephones	One telephone (three-post) connection
Power	18.4 kW. One 120/ 208 V, three-phase, four-wire connection and one 12 V dc connection
Ground	Ground lug
Air Conditioner/Heater (Two Units)	
Cooling	18,000 Btu/hr (5274 W) each
Heating	14,300 Btu/hr (4190 W) (Max) each
Power Requirements	208 V ac, Hz, three- phase
Ventilation Fan	289 ft3/min (8.18 m3/min)
Make Up Air Vent	289 ft3/min (8.18 m3/min)
Weight	
Gross (Container and Chassis)	25,840 lbs (11,721 kg)
Tare (Container Only)	14,440 lbs (6,550 kg)
Water Storage Tanks Capacity	42.5 gal (160.9 l)

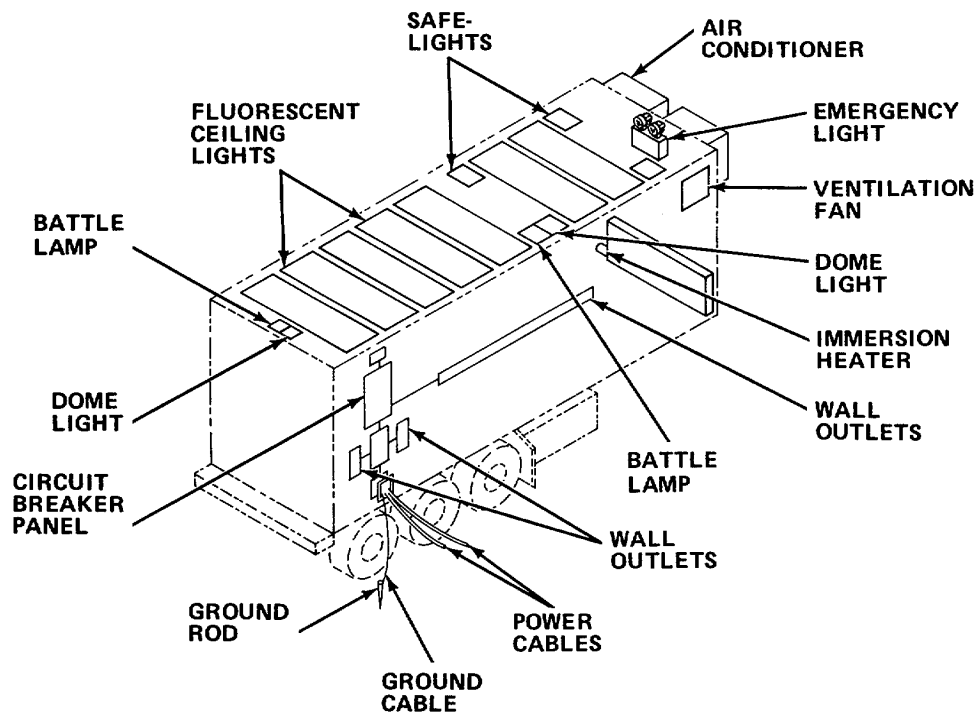
1-2.5. Equipment Data - ISO Container and Chassis.

Dimensions	
Length	33.2 ft (10.1 m)
Width	8.2 ft (2.5 m)
Height	12.6 ft (3.8 m)
Cubage	3430 ft3 (97.1 m3)

1-3. TECHNICAL PRINCIPLES OF OPERATION.

1-3.1. General. The operation of major components is explained in the chapter for that equipment.

1-3.2. Electrical System.



GROUND ROD. Used to ground van body.

GROUND CABLE. Used with ground rod.

CIRCUIT BREAKER PANEL. Contains voltage indicator, phase monitor, and circuit breakers.

DOMELIGHTS. White-lensed, 12 V dc lights powered from external source. Separately switched and fused.

VENTILATION FAN. Plug-in fan. Separately fused.

FLUORESCENT CEILING LIGHTS. Two-level (high/low) overhead lights with blackout override switches.

SAFELIGHTS. Used when processing film to protect undeveloped film.

EMERGENCY LIGHTS. Battery powered. Activated by power loss.

AIR CONDITIONER/HEATER. Air conditioner and electrical heater powered by three phase, V-238 V, 30 amp current.

BATTLE LAMPS. Red lensed, 120 V ac lights actuated when blackout switch operates.

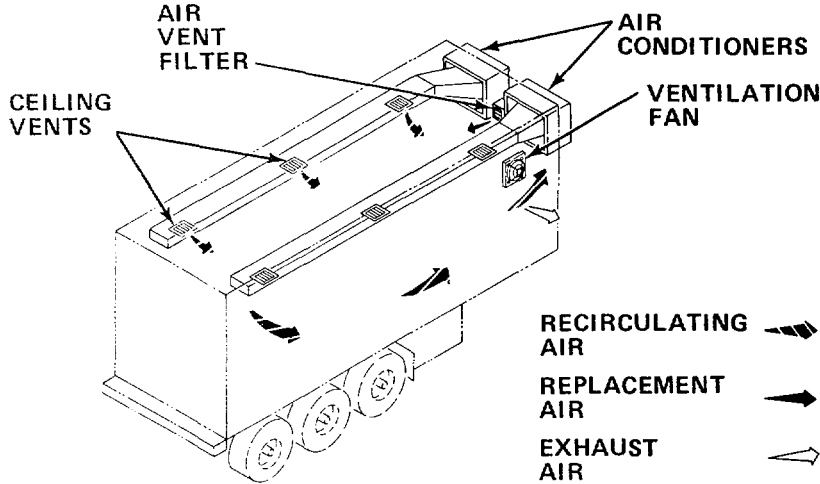
WALL OUTLETS. Provide grounded outlets for portable or plug-in equipment.

POWER CABLES. Power input (120/208 V ac and 12 V dc).

IMMERSION HEATER. Heats water in storage tank.

1-3.3. **Wiring Diagram.** A foldout wiring diagram is provided at the end of this manual.

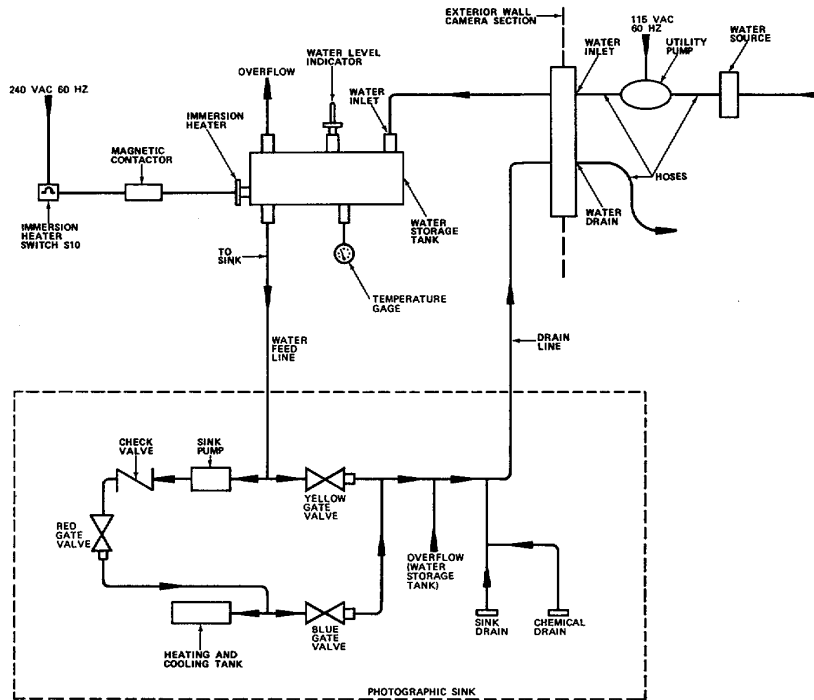
1-3.4. **Ventilation System.**



Ventilation fan exhausts air. Replacement air flows into the section through the make up air vent filter. Recirculating air is filtered as it enters the air conditioners. From the air conditioners, it flows through the ceiling vents and into the section.

NOTE

Detailed description of air conditioner operation is contained in TM 5-4120-367-14, Operator, Organizational, Direct Support, and General Support Maintenance Manual, Air Conditioner, Horizontal, Compact, 18,000 Btu/hr Cooling, and TM 5-4120-367-24P, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair) for Air Conditioner, Horizontal, Compact, 18,000 Btu/hr (5274W).



1-3.5. Water System and Drain System. The water storage tank provides heated water to the photographic sink. The water storage tank is filled by opening all gate valves in the photograph sink. Hoses are connected to the WATER INLET from the utility pump and water source. A hose is also connected to the WATER DRAIN on the section. When 120 V 60 Hz is applied to the utility pump, water is pumped from the water source through the utility pump, water inlet and into the water storage tank. The water storage tank has baffles to reduce the water motion from side to side. When the water storage tank is full, water will flow out of the overflow into the drain.

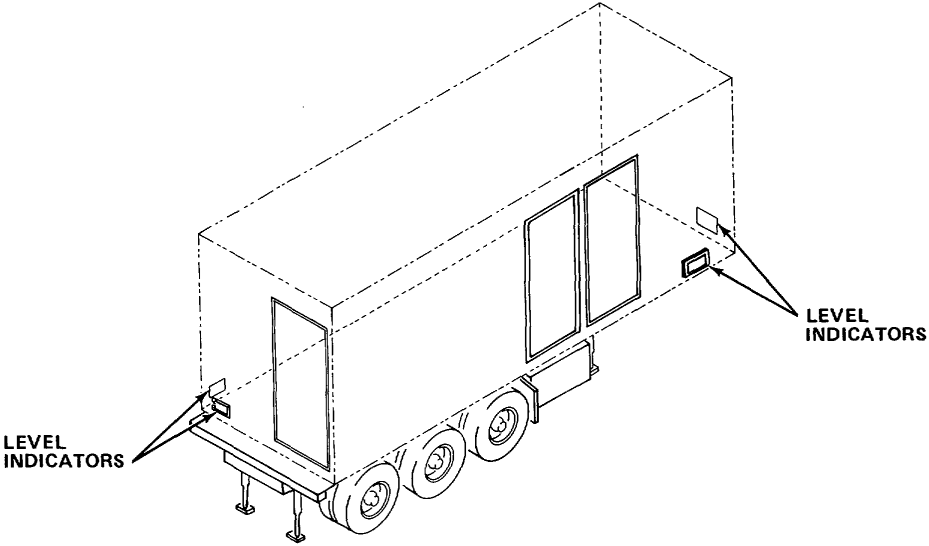
The water is heated by an immersion heater. When the IMMERSION HEATER lighted switch is closed, 208 V ac, 60 Hz is applied to the immersion heater through a magnetic contactor and IMMERSION HEATER SWITCH S10. S10 has a lamp in its circuit that will remain on until the water temperature reaches 700 F (210 C). The water temperature can be monitored by the remote reading thermometer. The thermometer has a temperature range of 00F - 2580 F (-17.70C - 125.50C). The amount of water in the water storage tank is monitored by the water level gage. The water level gage uses a float assembly in the water storage tank assembly to monitor the water level.

Draining the water storage tank is accomplished by opening all gate valves and removing the water drain cap on the water drain.

Section II. OPERATING INSTRUCTIONS

1-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.

Controls or Indicators	Function
------------------------	----------

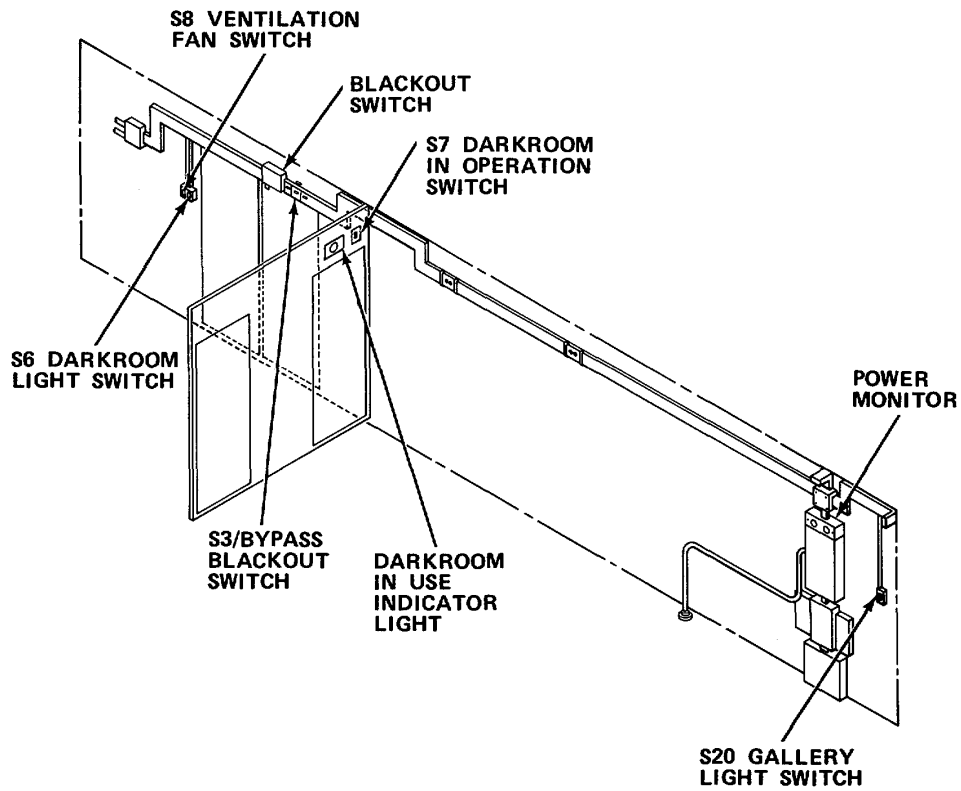


Level Indicators

Indicate when section is level.

Controls or Indicators

Function



S8 VENTILATION FAN Switch
 S6 DARKROOM LIGHTS Switch

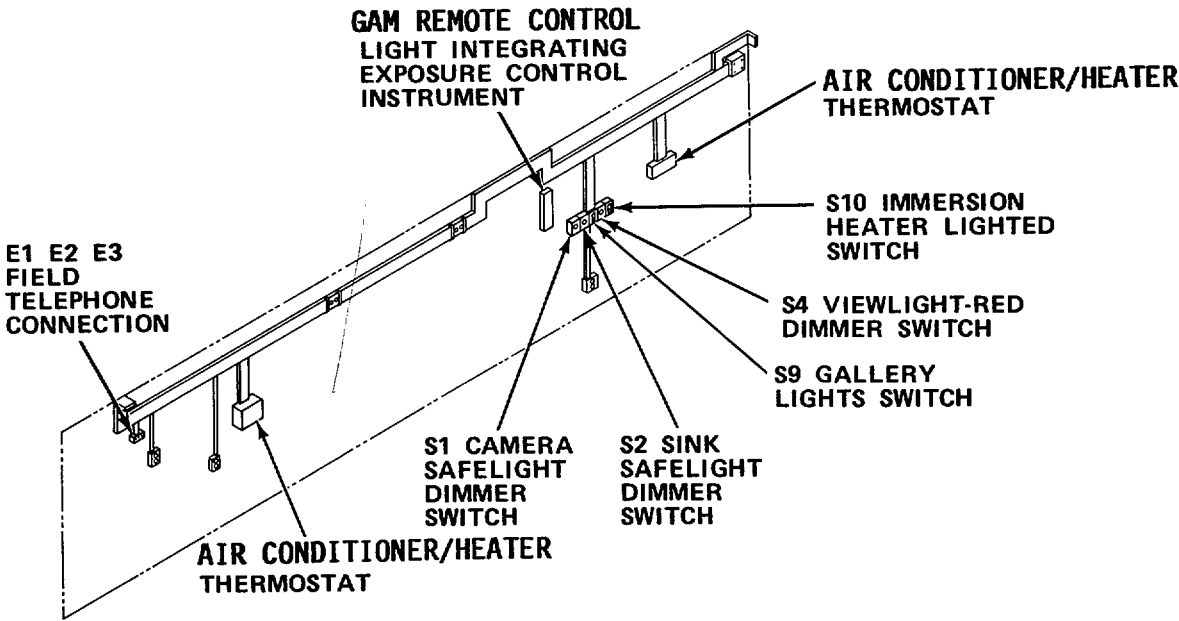
S3/BYPASS BLACKOUT Switch(2)

Controls fan.
 Controls fluorescent lights in darkroom.
 BLACKOUT: Lights are controlled by blackout switch (below).
 BYPASS: Turns on white lights.

NOTE

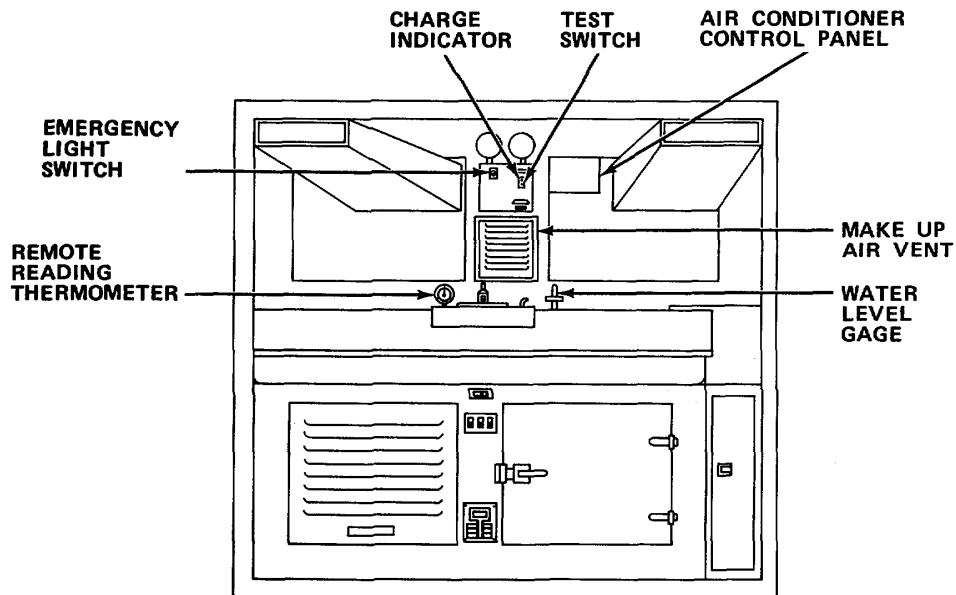
For proper operation, both switches must be in same position.

Controls or Indicators	Function
Blackout Switch(2) Door open:	Turns on blackout lights. Door closed: Turns on white lights.
S7 DARKROOM IN OPERATION Switch	Controls DARKROOM IN USE indicator light.
DARKROOM IN USE Indicator Light	Indicates film exposure or developing operations are in progress.
Power Monitor	Monitors ac phase, frequency, and voltage.
S20 GALLERY LIGHTS Switch	Controls fluorescent lights in gallery.



E1 E2 E3 Field Telephone Connection	Connection for field telephone.
Air Conditioner/Heater Thermostat (2)	Remote control of air conditioner.
GAM Remote Control	Activates light integrating exposure control instrument.

Controls or Indicators	Function
S1 CAMERA SAFELIGHT Dimmer Switch	Controls intensity of safelight mounted near camera.
S2 SINK SAFELIGHT Dimmer Switch	Controls intensity of safelights mounted above sink.
S9 GALLERY LIGHTS Switch	Controls fluorescent lights in gallery.
S4 VIEWLIGHT-RED Dimmer Switch	Controls intensity of red lights in viewing stand.
S10 IMMERSION HEATER Lighted Switch	Lights when temperature in water storage tank is below 700 F (210 C). Turn on IMMERSION HEATER Switch.



Remote Reading Thermometer

Indicates temperature in water storage tank.

Controls or Indicators	Function
Water Level Gage	Indicates amount of water in water storage tank.
Make Up Air Vent	Permits make up air to enter as required.
Emergency Light Switch	OFF position removes ac power. Battery will not be charged. READY Position: Battery will be recharged.
CHARGE Indicator	Indicates charging rate of battery. Bright CHARGE indicator means high charge. Dim CHARGE indicator means battery is fully charged.
TEST Switch	Push to test emergency light.
Air Conditioner/Heater Panel	Permits local control of air conditioner/heater mode of operation and temperature.

1-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

1-5.1. PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.

c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.

d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.

e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Leakage definitions for operator PMCS shall be classified as follows:

- (1) Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
- (2) Class II Leakage of fluid great enough to form drops but not enough to cause drops to drip from the item being checked/inspected.
- (3) 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 leakage (Class I or 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 to your supervisor or organizational maintenance.**

g. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

h. Interval column. This column determines the time period designated to perform your PMCS.

i. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

j. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

k. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Wire Brush	1 ea
6 in. Adjustable Wrench	1 ea
Flat Tip Screwdriver	1 ea
Vacuum Cleaner	1 ea
Cheesecloth (Item 4, Appendix E)	ar
General Purpose Detergent (Item 8, Appendix E)	ar
Paint (Item 29, Appendix E)	ar
Paint Brushes	ar

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W	<p><u>VAN BODY</u></p> <p><u>Inspect Exterior.</u></p> <p>1. Inspect surfaces for punctures, cracks, or open seams that could permit moisture to enter wall.</p> <div style="text-align: center;"> </div> <p>W</p> <p>2. Inspect four level indicators for damage and to check that section is level.</p>	

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

		B- Before D - During A - After	W- Weekly M - Monthly Q - Quarterly	AN - Annually S - Semiannually BI - Biennially	(Number) - Hundreds of Hours		
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES				FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:	
1	W	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Exterior - Cont</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>To prevent death or serious injury, do not handle or clean power cable or connectors when cable is connected to power source.</p>					
	W	3.	<p>Inspect power cable assembly for dirt or damaged connectors.</p> <p>a. Wipe cable insulation with clean, dry cloth to remove dirt.</p> <p>b. Clean corrosion from terminals.</p>				Connector damaged.
<p>The diagram shows a rectangular power entry panel with a grid of mounting holes. At the top left is a 'POWER ENTRY PANEL' with a handle. To its right are 'UTILITY OUTLETS'. Below the power entry panel is a 'TELEPHONE BINDING POST'. In the center, there is a '12 V DC CONNECTION' terminal. To the right of this is a 'WING-NUT' used to secure a 'POWER CABLE CONNECTION'. Two 'CAUTION' labels are present: one at the bottom left reads 'CAUTION GROUND TRAILER BEFORE APPLYING MAIN POWER' and another at the bottom right reads 'CAUTION DO NOT OPERATE THIS EQUIPMENT WITH MAIN POWER APPLIED'.</p>							

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W W W W	<p><u>VAN BODY - Cont</u> <u>Inspect Exterior - Cont</u></p> <p>4. Inspect power and communications panel for accumulated dirt, water, or corrosion. Clean power and communications panel.</p> <p>5. Inspect power and communications panel to be sure any unused receptacles are covered.</p> <div style="text-align: center;"> </div> <p>6. Inspect air conditioner drain tube to be sure tube is positioned as shown. Check for breaks and crimps in hose and check connections for damage or leakage.</p>	

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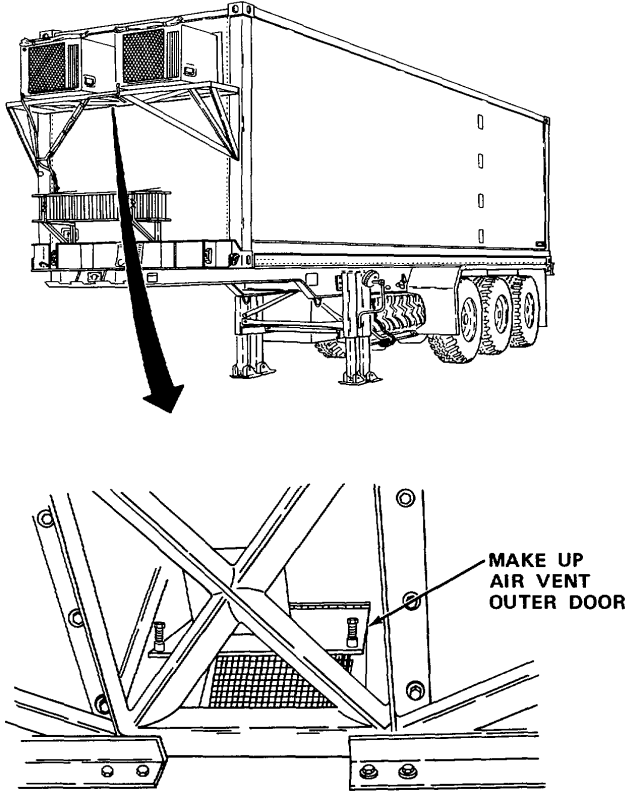
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W	<p><u>VAN BODY - Cont</u> <u>Inspect Exterior - Cont</u></p>	 <p>MAKE UP AIR VENT OUTER DOOR</p>	
	W	7.	<p>Inspect ventilation fan cover and make up air vent outer door to be sure they are not blocked or clogged. Clean as required. Clean screen with vacuum cleaner as necessary.</p>	

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

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1	W W	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Exterior - Cont</u></p> <p>8. Visually inspect ground connections to be sure ground cable is connected to terminal lug and ground rod. If necessary, clean.</p> <p style="text-align: center;"><u>WARNING</u></p> <p>Electrical shock hazard. Power cable must be deenergized before servicing power and communications panel connections. Death can result from failure to observe these safety precautions.</p> <p>a. Turn power off to cable. Disconnect from power source.</p> <p>b. Disconnect ground lug from ground rod.</p> <p>c. Clean lug, cable end, and rod with wire brush.</p> <p>d. Reconnect ground cable lug to rod.</p> <p>e. Disconnect ground cable end from power and communications panel.</p> <p>f. Clean terminal and cable end with wire brush.</p> <p>g. Reconnect ground cable to power and communications panel.</p> <p>h. Reconnect cable to power source. Turn power on.</p>	Ground connections are broken or missing.

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W W B/D /A Q Q	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Exterior - Cont</u></p> <p>9. Inspect two boarding ladders for:</p> <ul style="list-style-type: none"> a. Secure attachment of handrails. b. Steps not broken. c. Quick-release pins in place. <p>10. Inspect front and rear van body locks to be sure locks are fully engaged.</p> <p>11. Inspect gaskets on personnel doors for leaks or damage.</p> <p>12. Clean and paint blistered, pitted, or flaking areas and bare metal spots in accordance with instructions contained in TM 43-0139, Painting Instructions for Field Use.</p>	
2	W D D	<p><u>Inspect Interior.</u></p> <p>1. Test emergency lights by pressing test button.</p> <p>2. Inspect plug connectors to be sure all plug connectors are tight and firmly seated. Tighten if necessary.</p> <p>3. Inspect for burned out light bulbs and fluorescent tubes. Replace as required.</p>	Emergency lights do not light.

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
2	B/D D W W D B/M Q	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Interior - Cont</u></p> <p>4. Check safelights. Replace bulbs if necessary.</p> <p>5. Inspect walls, ceiling, and floor for holes, open seams, or signs of seepage or leaks.</p> <p>6. Water system. Check for leaks beneath sink and water storage tank.</p> <p>7. Check storage cabinets for broken hinges, latches, and locks.</p> <p>8. Inspect fire extinguishers. Be sure security seals are not broken.</p> <p>9. Inspect circuit breaker panel.</p> <p style="text-align: center;">NOTE</p> <p>Inspection is to be conducted on a not-to-interfere basis with work being conducted. Individual equipment will be inspected as directed by the appropriate chapter of this manual.</p>	<p>Leaks are present.</p> <p>Defective circuit breaker.</p>

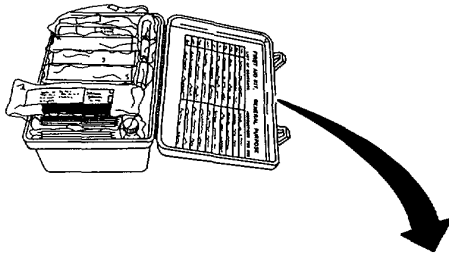
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2	M	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Interior - Cont</u></p> <div style="text-align: center;">  </div> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption style="text-align: center;">FIRST AID KIT, GENERAL PURPOSE</caption> <thead> <tr> <th colspan="2" style="text-align: left;">LIST OF CONTENTS</th> <th style="text-align: left;">INSTRUCTIONS FOR USE</th> </tr> </thead> <tbody> <tr> <td>3 ROLLS</td> <td>ADHESIVE TAPE, SURGICAL, 1"x1 1/2" YARDS</td> <td>USE FOR MINOR CUTS AND CLOTHING REPAIR</td> </tr> <tr> <td>18 EACH</td> <td>BANDAGE, ADHESIVE, 1"x2"</td> <td>MINOR CUTS, AS REQUIRED</td> </tr> <tr> <td>2 EACH</td> <td>BANDAGE, GAUZE, COMPRESSED, CAMOUFLAGED, 2"x6 YARDS</td> <td>CUT IN LENGTHS AS REQUIRED FOR BANDAGE INJURIES</td> </tr> <tr> <td>1 EACH</td> <td>BANDAGE, MUSLIN, COMPRESSED, CAMOUFLAGED, 20"x25 INCH</td> <td>USE FOR SLING</td> </tr> <tr> <td>1 PKG</td> <td>BLADE, SURGICAL PREPARATION RAZOR, STRAIGHT, SINGLE EDGE, 3/4</td> <td>SHAVING HAIR AND OPENING WOUNDS AS REQUIRED</td> </tr> <tr> <td>1 PKG</td> <td>COMPRESS AND BANDAGE, CAMOUFLAGED, 2"x2", 6</td> <td>FOR WOUNDS</td> </tr> <tr> <td>3 EACH</td> <td>DRESSING, FIRST AID, FIELD, 6x7 INCHES</td> <td>FOR LARGE WOUNDS, EXCESSIVE BLEEDING</td> </tr> <tr> <td>1 EACH</td> <td>FIRST AID KIT, EYE DRESSING</td> <td>FOR EYE WOUNDS, SEE INSTRUCTIONS</td> </tr> <tr> <td>1 PKG</td> <td>GAUZE, PETROLATUM, 2"x36", 3</td> <td>FOR BURNS, APPLY PAD OVER BURN</td> </tr> <tr> <td>1 BTL</td> <td>POVIDONE, IODINE SOLUTION, 1/2 OUNCE</td> <td>AS DISINFECTANT AND CLEANSER OF CUTS AND WOUNDS. APPLY BEFORE BANDING</td> </tr> <tr> <td>1 EACH</td> <td>AMMONIA INHALANTS</td> <td>CRUSH INHALANT BETWEEN FINGERS. HOLD A FEW INCHES FROM NOSE. HOLD CLOSE AS AMMONIA GETS WEAKER. WHEN TOO WEAK, USE FRESH INHALANT.</td> </tr> <tr> <td>1 EACH</td> <td>INSTRUCTION BOOKLET AND FIRST AID EXPLANATIONS</td> <td></td> </tr> </tbody> </table>	LIST OF CONTENTS		INSTRUCTIONS FOR USE	3 ROLLS	ADHESIVE TAPE, SURGICAL, 1"x1 1/2" YARDS	USE FOR MINOR CUTS AND CLOTHING REPAIR	18 EACH	BANDAGE, ADHESIVE, 1"x2"	MINOR CUTS, AS REQUIRED	2 EACH	BANDAGE, GAUZE, COMPRESSED, CAMOUFLAGED, 2"x6 YARDS	CUT IN LENGTHS AS REQUIRED FOR BANDAGE INJURIES	1 EACH	BANDAGE, MUSLIN, COMPRESSED, CAMOUFLAGED, 20"x25 INCH	USE FOR SLING	1 PKG	BLADE, SURGICAL PREPARATION RAZOR, STRAIGHT, SINGLE EDGE, 3/4	SHAVING HAIR AND OPENING WOUNDS AS REQUIRED	1 PKG	COMPRESS AND BANDAGE, CAMOUFLAGED, 2"x2", 6	FOR WOUNDS	3 EACH	DRESSING, FIRST AID, FIELD, 6x7 INCHES	FOR LARGE WOUNDS, EXCESSIVE BLEEDING	1 EACH	FIRST AID KIT, EYE DRESSING	FOR EYE WOUNDS, SEE INSTRUCTIONS	1 PKG	GAUZE, PETROLATUM, 2"x36", 3	FOR BURNS, APPLY PAD OVER BURN	1 BTL	POVIDONE, IODINE SOLUTION, 1/2 OUNCE	AS DISINFECTANT AND CLEANSER OF CUTS AND WOUNDS. APPLY BEFORE BANDING	1 EACH	AMMONIA INHALANTS	CRUSH INHALANT BETWEEN FINGERS. HOLD A FEW INCHES FROM NOSE. HOLD CLOSE AS AMMONIA GETS WEAKER. WHEN TOO WEAK, USE FRESH INHALANT.	1 EACH	INSTRUCTION BOOKLET AND FIRST AID EXPLANATIONS	
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- a. Remove first aid kit from bracket.
- b. Remove contents.
- c. Inspect container for damage.
- d. Inspect contents for damage. Then use check-list to inventory contents.
- e. Replace damaged or missing items.
- f. Repack kit.
- g. Reinstall kit.

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2	B S B	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Interior - Cont</u></p> <p>14. Inspect eyewash station. Check that eyewash bottle is in place and full of solution.</p> <p>15. Inspect blackout curtains.</p> <p style="padding-left: 20px;">a. Inspect blackout curtains and valances for tears, missing hooks, or broken eyelet's.</p> <p style="padding-left: 20px;">b. Inspect nylon hook and pile tape on curtain and wall for security of attachment.</p>	
3		<p><u>Inspect Air Conditioner.</u> Refer to TM 5-4120-367-14 for preventive maintenance checks and services.</p>	
4	M	<p><u>Service Power Cable.</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>Power cable must be deenergized before servicing. Death or serious injury may occur from failure to observe this safety precaution.</p> <p>1. Turn off safety switch.</p> <p>2. Disconnect cable from power and communications panel.</p> <p>3. Wrap any cuts or abrasions in cable with electrical insulation tape.</p> <p>4. Reconnect power cable to power and communications panel.</p>	<p>Power Cable Damage.</p>

1-6. OPERATION UNDER USUAL CONDITIONS. Operation of the Camera Section consists of activation of power after the section has been located at the operation site and 12 V dc power disconnected.

1-6.1. Preparation for Use.

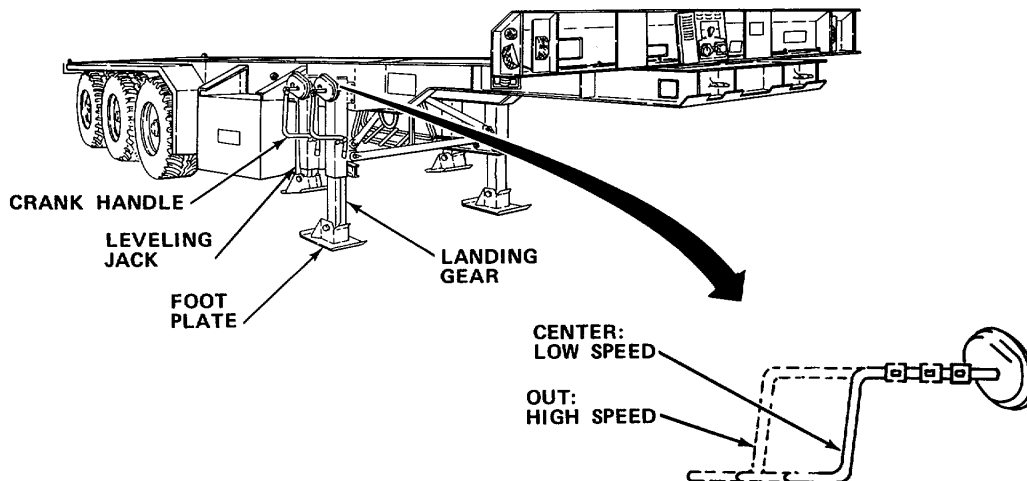
- a. Procedures for leveling.

CAUTION

Trailer-mounted section must be on surface that is approximately level to avoid unnecessary stress or twisting of chassis when section is leveled.

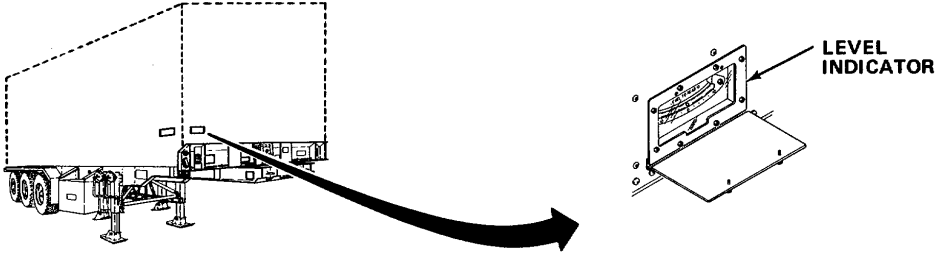
NOTE

- Snow or ice should be removed from under leveling foot plate before attempting to level section.
- Sand, soft ground, or mud requires that shoring or scrap material be placed under leveling foot plate to increase surface area and prevent sinking into surface.
- Be sure that air suspension is deflated as indicated in TM 5-2330-305-14.



- (1) Deflate air suspension in accordance with TM 5-2330-305-14.
- (2) Approximately level trailer chassis by raising or lowering landing gear.
- (3) Move handle from secured location and swing out.

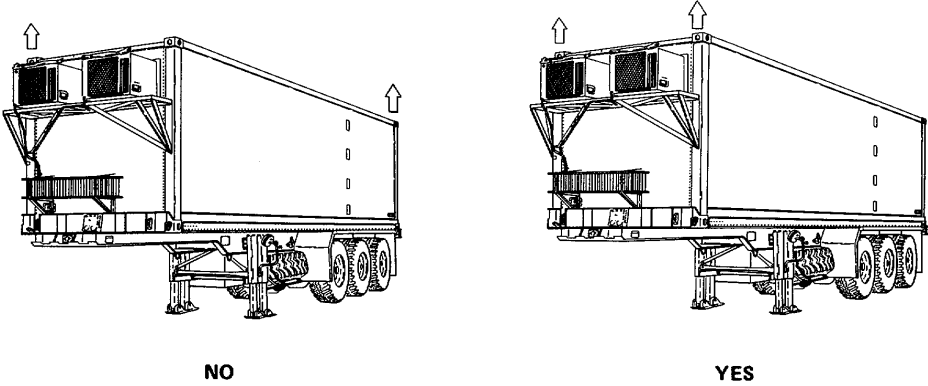
- (4) Pull crank handle on each leveling jack all the way out and engage. There are two positions when handle is engaged. Fully out is high speed. Partially out is low speed.
- (5) Lower each leveling jack by turning crank to right at high speed until foot plate just contacts ground.



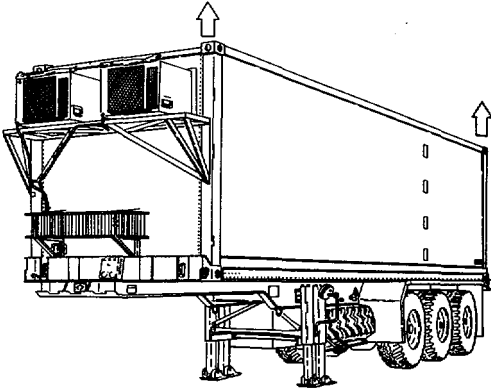
- (6) Station personnel to have a clear view of level indicators at both front and rear of section.
- (7) Observe level indicators to determine which end and side must be raised.

CAUTION

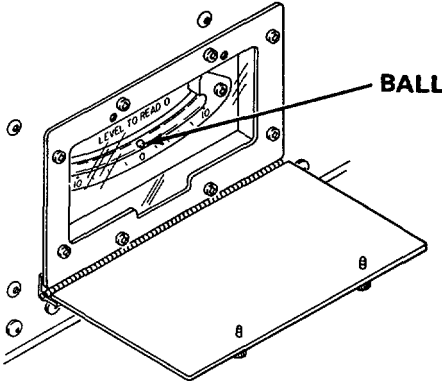
Do not attempt to level section by lifting at diagonal corners, or frame will be twisted.



- (8) Raise low end by extending both leveling jacks at low end. Use low speed.



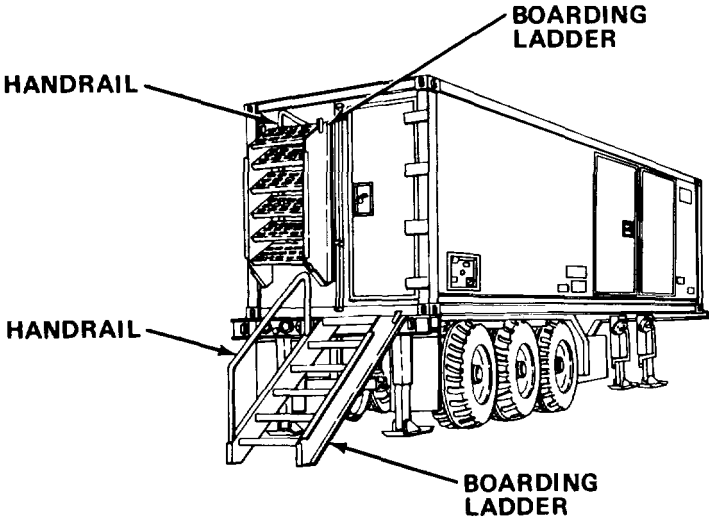
(9) Raise low side by extending both leveling jacks at low side.



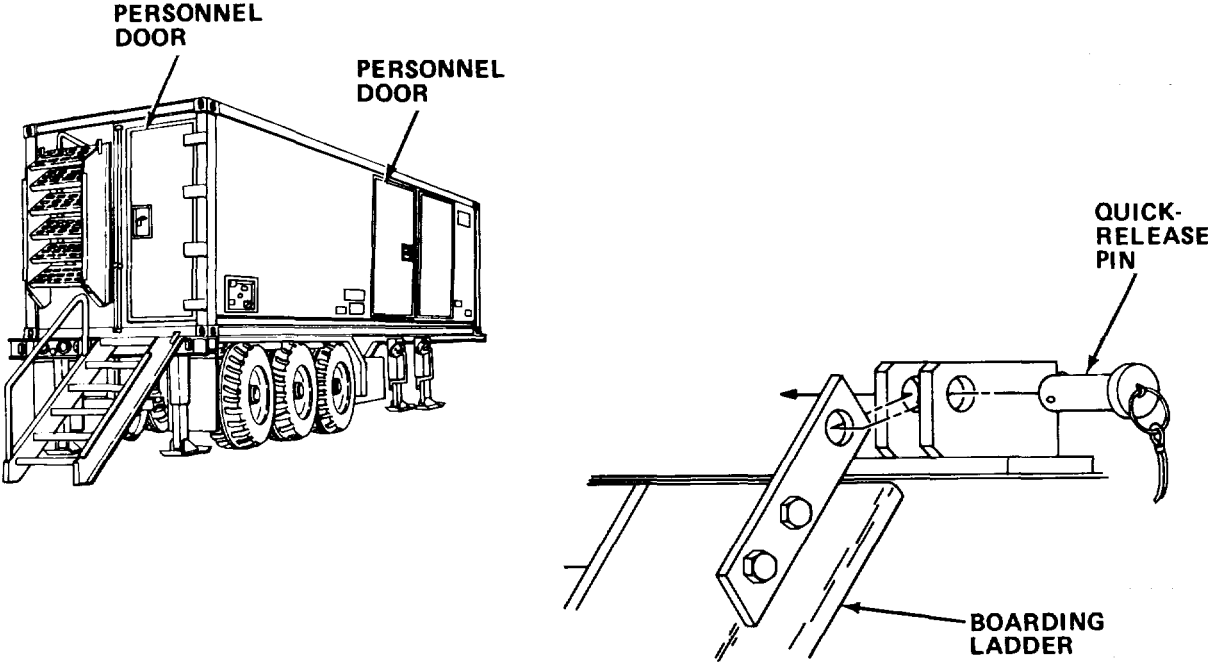
NOTE

Be sure ball is centered on all four level indicators $\pm 1/2^\circ$.

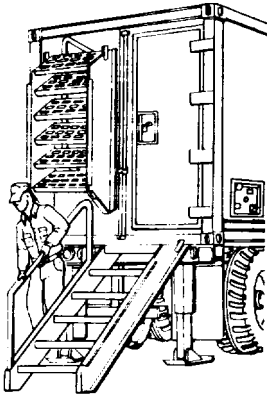
- (10) Pull leveling crank handles away from trailer chassis, and lower crank handle to stowed position.
 - b. Procedures to activate section.



- (1) Remove boarding ladders and handrails from rear of section.
- (2) Remove handrails from ladders.



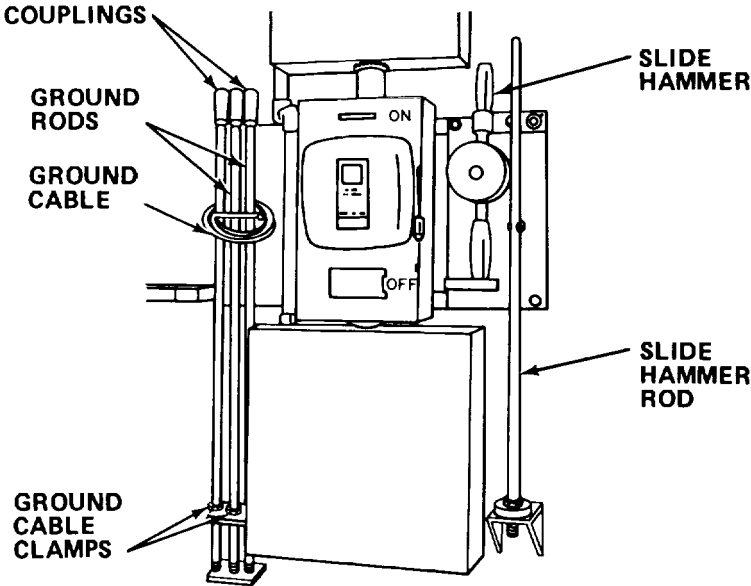
- (3) Mount ladders at personnel doors and secure with quick-release pins.



- (4) Mount one handrail on each ladder.
- (5) Enter section and check that safety switch, main circuit breaker, and all equipment power supply switches are off.

WARNING

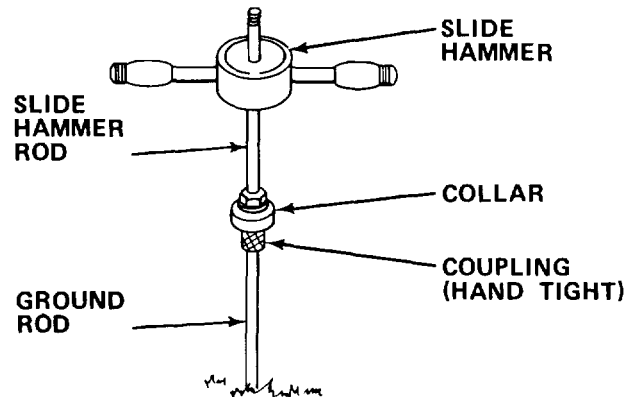
Death or serious injury may occur from connecting power cable to section before grounding.



- (6) Remove ground rod, slide hammer, and ground cable from section.

NOTE

- Apply a thin film of grease to threaded ends of rods before driving into ground. This will permit easy disassembly upon removal from ground.
- Bottom ground rod must be numbered or identified so that it will always be the first rod driven into the ground.
- These instructions supplement TC 11-6, Grounding Techniques.



(7) Select an area as close to power and communications panel as possible to install ground rod. Then assemble the first ground rod and coupling to the slide hammer rod.

CAUTION

Do not allow ground rod to rotate when removing the slide hammer rod. Rods must be kept screwed together to make a good electrical ground.

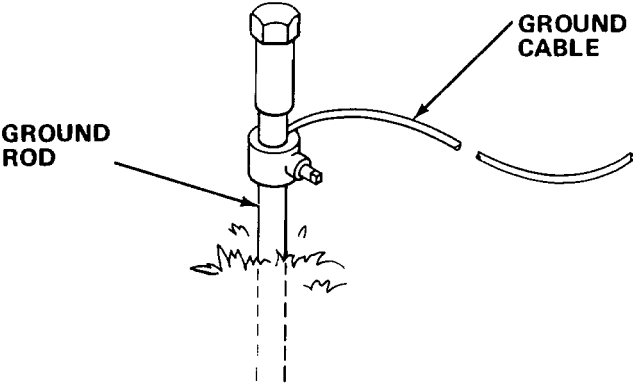
NOTE

Before driving ground rod be certain that rods meet inside coupling. Be sure collar is handtight against coupling.

(8) Place slide hammer on hammer rod end, and drive ground rod into ground. Remove slide hammer rod. Attach slide hammer to a new section of ground rod, and repeat procedure until only 12 in. (30.5 cm) of the third rod is above ground.

(9) Remove slide hammer and hammer rod, and place in section.

(10) Secure ground cable clamp and ground cable to ground rod.

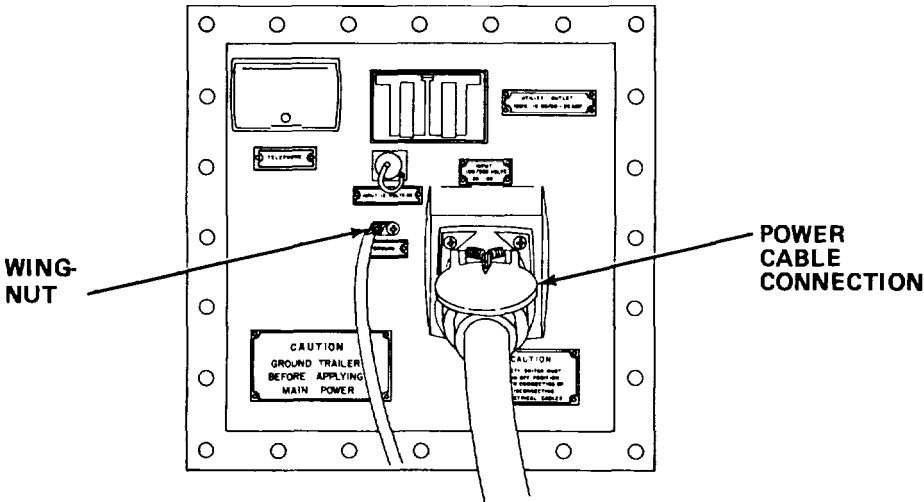


WARNING

To prevent death or serious injury, do not handle or clean power cable or connectors when cable is connected to power source.

NOTE

The section must be properly grounded before power is connected. If it is not possible to drive the three sections of ground rod fully into ground, the rods may each be driven into the ground separately and connected in series. If it is impossible to drive a ground rod, a suitable alternative ground must be found, such as a buried metal water pipe. See TC 11-6, Grounding Techniques for additional instructions.

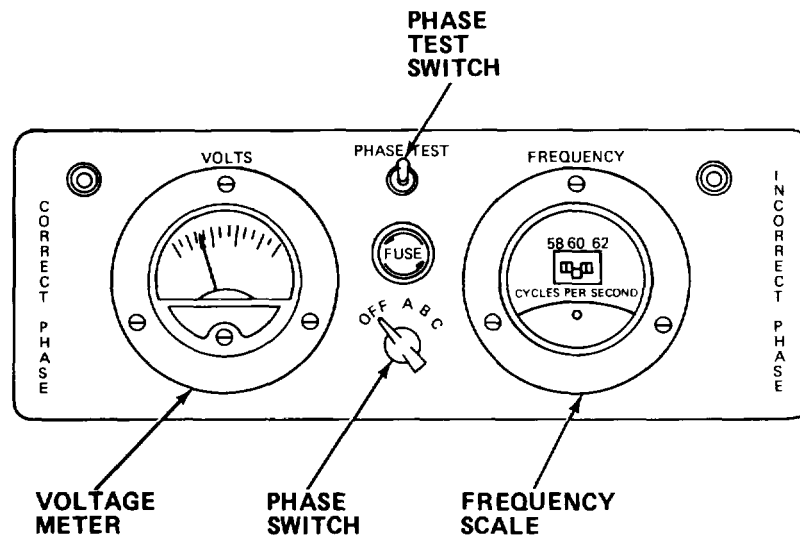


(11) Connect ground cable to ground lug with wingnut.

CAUTION

Be sure safety switch is off before connecting power cable to avoid equipment damage.

- (12) Firmly connect the power cable to the power receptacle.



- (13) Turn on safety switch.

CAUTION

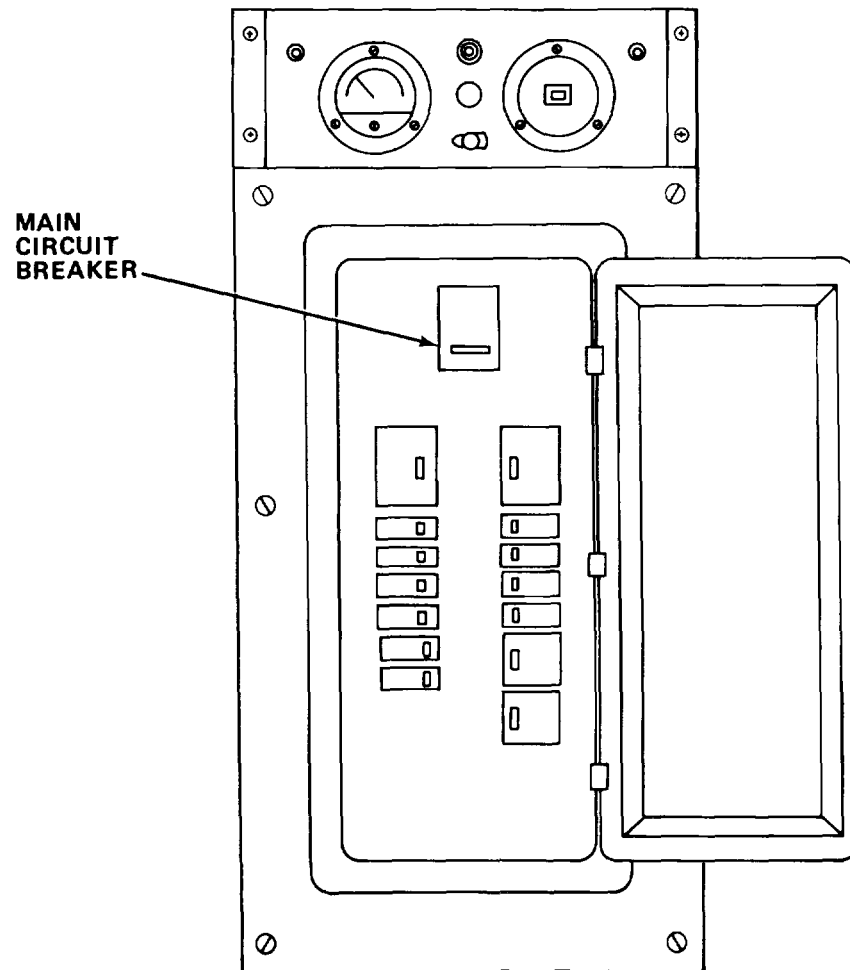
Do not energize section if incorrect phase lamp lights. Damage to equipment may result.

- (14) Check voltage and frequency as follows:
- Push phase test switch. Observe correct phase lamp lights.
 - Turn phase switch to A.

CAUTION

Voltage must be between 110 and 120, and frequency must be at 60 Hz +1 Hz on each leg before turning on main circuit breaker or damage to equipment may result.

- Read voltage on meter.
- Read frequency on scale.
- Repeat for position B and C on phase switch.



- (15) Set main circuit breaker ON.

NOTE

This step must be accomplished if section is placed in operation in darkness, fog, mist, or under blackout conditions.

- (16) Close blackout curtains, if required.
(17) Turn on circuits in following order:
(a) Individual lighting switches.
(b) Curbside and roadside air conditioners.
(c) Curbside and roadside receptacles.

- (d) Immersion heater.
- (18) Check blackout switches.
- (19) Plug in emergency lighting and turn switch to READY.

- (20) Adjust air conditioner/heater controls for a section temperature of 75°F ±30F (240C ±20C).
- (21) Check relative humidity with psychrometer as follows:

NOTE

Relative humidity in the section should be at the proper level for photographic processing. Good conditions are when the section temperature is 750F +30F (240C +20C) and relative humidity is 45% + 3%. Adjust air conditioner controls until the proper temperature and relative humidity is reached.

- (a) Check water level in cistern.
- (b) Add water to saturate wick and fill cistern.
- (c) Allow 5 minutes to lapse before recording wet and dry bulb readings.

Table 1-2. RELATIVE HUMIDITY, PERCENT - FAHRENHEIT TEMPERATURES

PRESSURE EQUALS 30.0 INCHES

PRESSURE EQUALS 30.0 INCHES

AIR TEMP	DEPRESSION OF WET-BULB THERMOMETER t-t1																									
	t	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.3	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5				
20	92	85	77	70	62	55	48	40	33	26	19	12	5													
21	92	85	78	71	63	56	49	42	35	28	21	16	8	1												
22	93	86	78	71	65	58	51	44	37	31	24	17	11	4												
24	93	87	80	73	67	60	54	47	41	35	29	22	16	10	4											
25	94	87	81	74	68	62	55	49	43	37	31	25	19	13	7	1										
26	94	87	81	75	69	63	57	51	45	39	33	27	21	16	10	4										
27	94	88	82	76	70	64	58	52	47	41	35	29	24	18	13	7	2									
28	94	88	82	76	71	65	59	54	48	43	37	32	26	21	15	10	5									
29	94	88	83	77	72	66	60	53	50	44	39	34	28	23	18	13	8	3								
30	94	89	83	78	73	67	62	56	51	46	41	36	31	26	21	16	11	6	1							
31	94	89	84	78	73	68	63	58	52	47	42	37	33	28	23	18	13	8	4							
32	95	89	84	79	74	69	64	59	54	49	44	39	35	30	25	20	16	11	7	2						
33	95	90	85	80	75	70	65	60	56	51	46	41	37	32	27	23	18	14	9	5	0					
34	95	90	86	81	76	71	66	62	57	52	48	43	38	34	29	25	21	16	12	8	5	3				
35	95	91	86	81	77	72	67	63	58	54	49	45	40	36	32	27	23	19	14	10	6					
36	95	91	86	82	77	73	68	64	60	55	51	46	42	38	34	29	25	21	17	13	9					
37	95	91	87	83	78	74	69	65	61	57	53	48	44	40	36	31	27	23	19	15	11					
38	96	91	87	83	79	75	70	66	62	58	54	50	46	42	37	33	29	25	21	17	14					
39	96	92	87	83	79	75	71	67	63	59	55	51	47	43	39	35	31	27	24	20	16					
40	96	92	87	83	79	75	71	68	64	60	56	52	48	45	41	37	33	29	26	22	18					
41	96	92	88	84	80	78	72	69	65	61	57	54	50	46	42	39	35	31	28	24	20					
42	96	92	88	85	81	77	73	69	65	62	58	55	51	47	44	40	36	33	30	26	23					
43	96	92	88	85	81	77	73	70	66	63	59	55	52	48	45	42	38	35	31	28	25					
44	96	93	89	85	81	78	74	71	67	63	60	56	53	49	46	43	39	36	33	30	26					
45	96	93	89	86	82	78	74	71	67	64	61	57	54	51	47	44	41	38	34	31	28					
46	96	93	89	86	82	79	75	72	68	65	61	58	55	52	48	45	42	39	35	32	29					
47	96	93	89	86	82	79	75	72	69	66	62	59	56	53	49	46	43	40	37	34	31					
48	96	93	90	86	83	79	76	73	69	66	63	60	57	54	50	47	44	41	38	35	32					
49	96	93	90	86	83	80	76	73	70	67	64	61	57	54	51	48	45	42	39	36	34					
50	96	93	90	87	83	80	77	74	71	67	64	61	58	55	52	49	46	43	41	38	35					
51	97	94	90	87	84	81	78	75	71	68	65	62	49	56	53	50	47	45	42	39	36					
52	97	94	90	87	84	81	78	75	72	69	66	63	60	57	54	51	49	46	43	40	37					
53	97	94	90	87	84	81	78	75	72	69	66	63	61	58	55	52	50	47	44	41	39					
54	97	94	91	88	85	82	79	76	73	70	67	64	61	59	56	53	50	48	45	42	40					
55	97	94	91	88	85	82	79	76	73	70	68	65	62	59	57	54	51	49	46	43	41					
56	97	94	91	88	85	82	79	76	73	71	68	65	63	60	57	54	51	49	47	44	42					
57	97	94	91	88	85	82	80	77	74	71	69	66	63	61	58	55	53	50	48	45	43					
58	97	94	91	88	85	83	80	77	74	72	69	66	64	61	59	56	54	51	49	46	44					
59	97	94	91	89	86	83	80	78	75	72	70	67										9	47	45		
																					INTERSECTION					
DRY BULB	1	89	86	83	81	78	75	73	70	68										0	48	46				
AIR TEMP	2	89	86	84	81	78	76	73	71	68	65	63	61	58	56	54	54	54	54	52	50	57				
	3	89	86	84	81	79	76	74	71	69	66	65	61	59	57	57	57	57	57	57	57	57				
	4	89	87	84	82	79	77	74	71	69	67	66	62	60	57	55	53	50	48							
	5	89	87	84	82	79	77	74	72	70	67	65	63	60	58	56	53	51	49							
	6	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	7	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	8	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	9	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	10	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	11	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	12	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	13	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	14	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	15	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	16	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	17	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	18	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	19	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	20	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	21	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	22	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52	50							
	23	89	87	84	82	79	77	74	72	70	67	65	63	61	59	56	54	52								

Table 1-2. RELATIVE HUMIDITY, PER CENT - FAHRENHEIT TEMPERATURES - Cont
 PRESSURE EQUALS 30.0 INCHES

AIR TEMP	DEPRESSION OF WET-BULB THERMOMETER t-t1																					
	t 11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	
35	2																					
36	5	1																				
37	7	3																				
38	10	6	2																			
39	12	9	5	1																		
40	16	11	7	4	0																	
41	17	13	10	6	3																	
42	19	16	12	9	5	2																
43	21	18	14	11	8	4	1															
44	23	20	16	13	10	7	4	0														
45	25	22	18	15	12	9	6	3														
46	26	23	20	17	14	11	8	5	2													
47	28	25	22	19	16	13	10	7	5	2												
48	29	26	23	21	18	15	12	9	7	4	1											
49	31	28	25	22	19	17	14	11	9	6	3	1										
50	32	29	27	24	21	18	16	13	10	8	5	3	0									
51	34	31	28	26	23	20	17	15	12	9	7	4	2									
52	35	32	29	27	24	22	19	17	14	11	9	6	4	1								
53	36	33	31	28	26	23	20	18	16	13	10	8	6	3	1							
54	37	35	32	29	27	24	22	20	17	15	12	10	8	5	3	1						
55	38	36	33	31	28	26	23	21	19	16	14	12	9	7	5	2	0					
56	39	37	34	32	30	27	25	22	20	18	16	14	11	9	7	4	2					
57	40	38	35	33	31	28	26	24	22	19	17	15	13	10	8	6	4	2				
58	41	39	37	34	32	30	27	25	23	21	18	16	14	12	10	8	6	3	1			
59	42	40	38	35	33	31	29	26	24	22	20	18	16	13	11	9	7	5	3	1		
60	43	41	39	37	34	32	30	28	26	23	21	19	17	15	13	11	9	7	5	3	1	
61	44	42	40	38	35	33	31	29	27	25	22	20	18	16	14	12	10	8	7	5	3	
62	45	43	41	39	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	
63	46	44	42	40	37	35	33	31	29	27	25	23	21	19	17	15	13	11	10	8	6	
64	47	45	43	41	38	36	34	32	30	28	26	24	22	20	18	17	15	13	11	9	7	
65	48	46	44	41	39	37	35	33	31	29	27	25	24	22	20	18	16	14	12	11	9	
66	48	46	44	42	40	38	36	34	32	30	29	27	25	23	21	19	17	16	14	12	10	
67	49	47	45	43	41	39	37	35	33	31	30	28	26	24	22	20	19	17	15	13	12	
68	50	48	46	44	42	40	38	36	34	32	31	29	27	25	23	21	20	18	16	15	13	
69	51	49	47	45	43	41	39	37	35	33	32	30	28	26	24	23	21	19	18	16	14	
70	51	49	48	46	44	42	40	38	36	34	33	31	29	27	25	24	22	20	19	17	15	
71	52	50	48	46	45	43	41	39	37	35	33	32	30	28	27	25	23	22	20	18	17	
72	53	51	49	47	45	43	42	40	38	36	34	33	31	29	28	26	24	23	21	19	18	
73	53	51	50	48	46	44	42	40	39	37	35	34	32	30	29	27	25	24	22	20	19	
74	54	52	50	48	47	45	43	41	39	38	36	34	33	31	29	28	26	26	23	21	20	

- (d) Convert WET and DRY bulb thermometer readings to relative humidity (Table 1-2).

EXAMPLE:

Air Temperature (DRY Bulb): 68°F

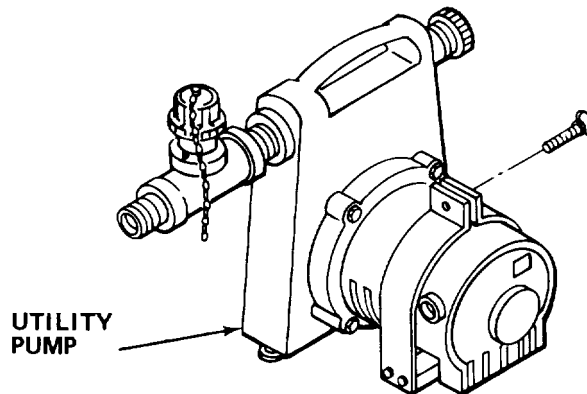
WET Bulb: 62°F

Depression + DRY Bulb (t) - WET Bulb (tl) + 68°F - 62°F = 6°F

Depression = 6°F

Use column on left to find air temperature of 68°F Use top row to find depression of 6°F The intersection of both columns gives the percent of relative humidity, in this case 71%

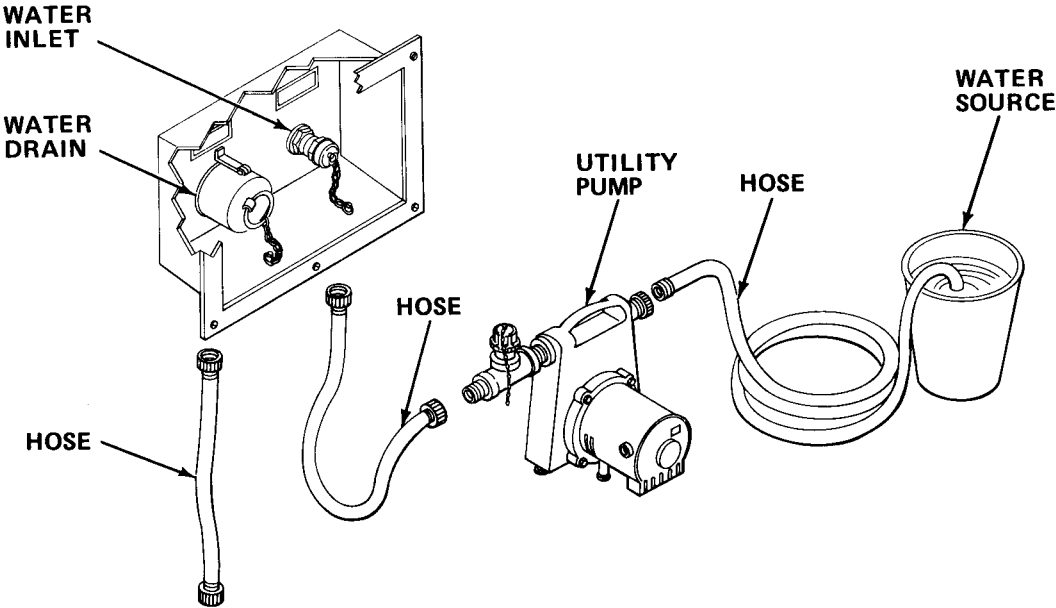
- (22) Adjust air conditioning controls to reach proper temperature and relative humidity.
- (23) Darkroom photographic safelight.
- (a) Insert filter by lowering filter holder.
 - (b) Lay filter inside so that filter identification can be read from outside.
 - (c) Raise filter holder.
 - (d) Position darkroom photographic safelight so that it provides desired illumination. For direct illumination, darkroom safelight should face work area. For indirect illumination, it should face wall.



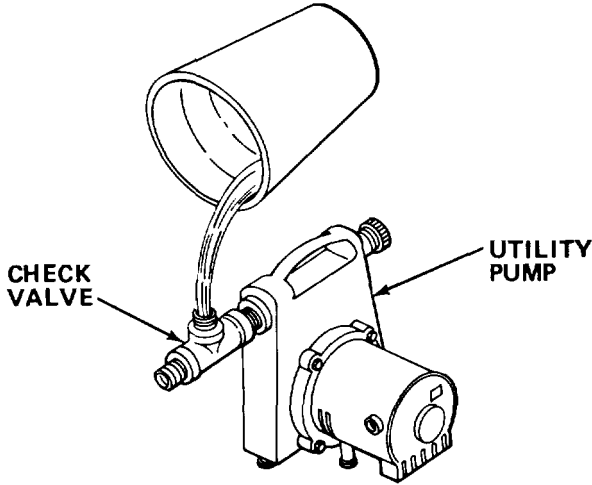
- (24) Remove utility pump and carry it outside.

NOTE

The utility pump can be placed up to 25 ft (7.6 m) from section. There is another 50 ft (15.2 m) hose available. The water source must be within 75 ft (22.8 m) of the section.



- (25) Connect hoses to WATER INLET, utility pump, and water source.
- (26) Connect hose to WATER DRAIN.

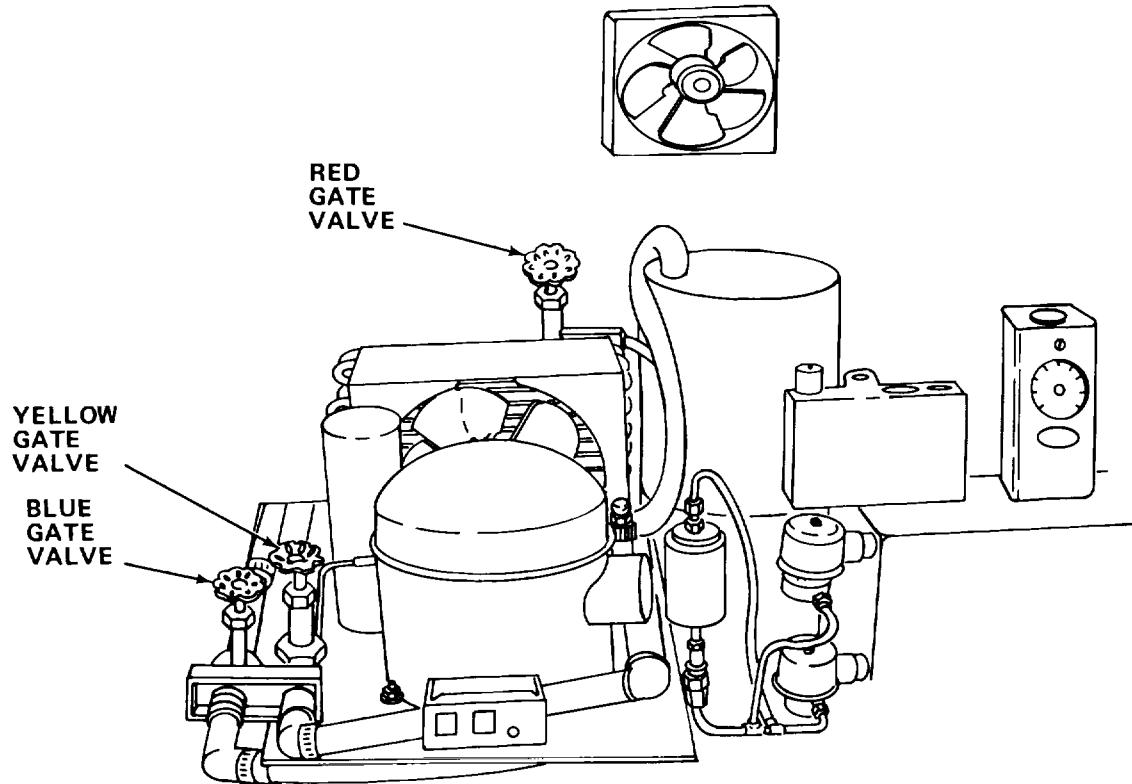


- (27) Prime utility pump with approximately half a gallon of water.
- (28) Install pipe cap.

WARNING

Do not plug or unplug electrical cord while standing on a wet or damp surface. Death or serious injury may occur.

- (29) Fill water storage tank assembly.
 - (a) Plug utility pump cord into outside receptacle.



- (b) Open red, blue and yellow gate valves under the sink.
- (c) Fill water storage tank until water flows from water drain hose.
- (d) Unplug utility pump cord from outside receptacle.
- (e) Allow utility pump to cool for twenty minutes.
- (30) Disconnect hoses from WATER INLET, utility pump, and water source.
 - (a) Install pipe cap on WATER INLET.
 - (b) Store hoses.
 - (c) Store utility pump.
- (31) Close red, yellow, and blue gate valves under the sink.

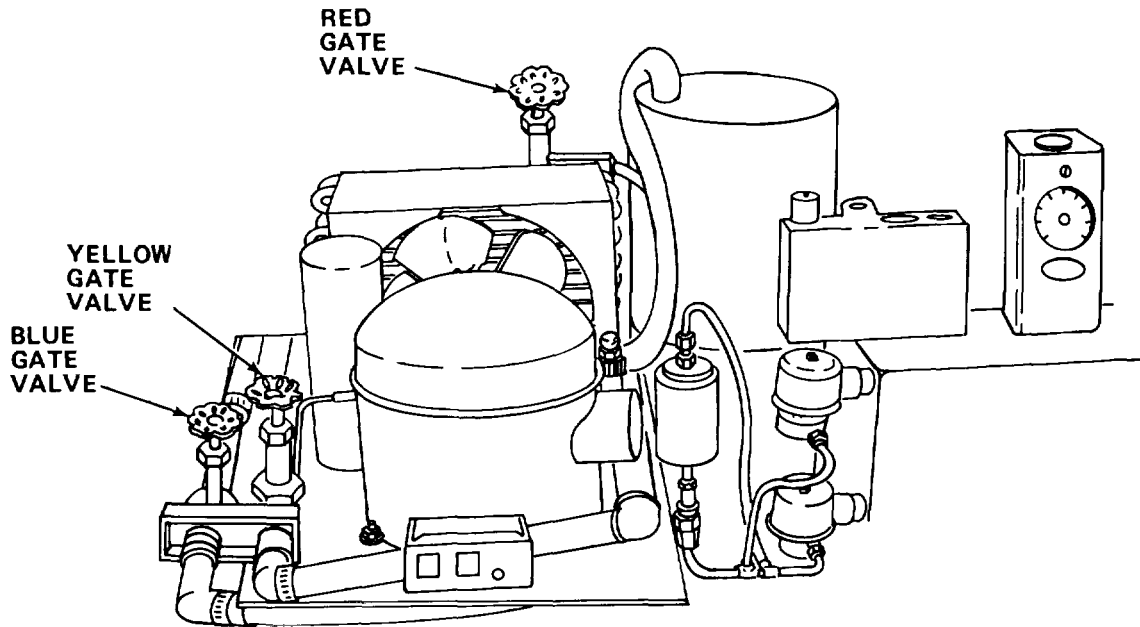
1-6.2. **Preparation for Movement.**

- a. Inventory equipment and supplies.
- b. Secure authorized equipment in proper containers or as specified by appropriate chapters.
- c. Turn off S10 IMMERSION HEATER switch.

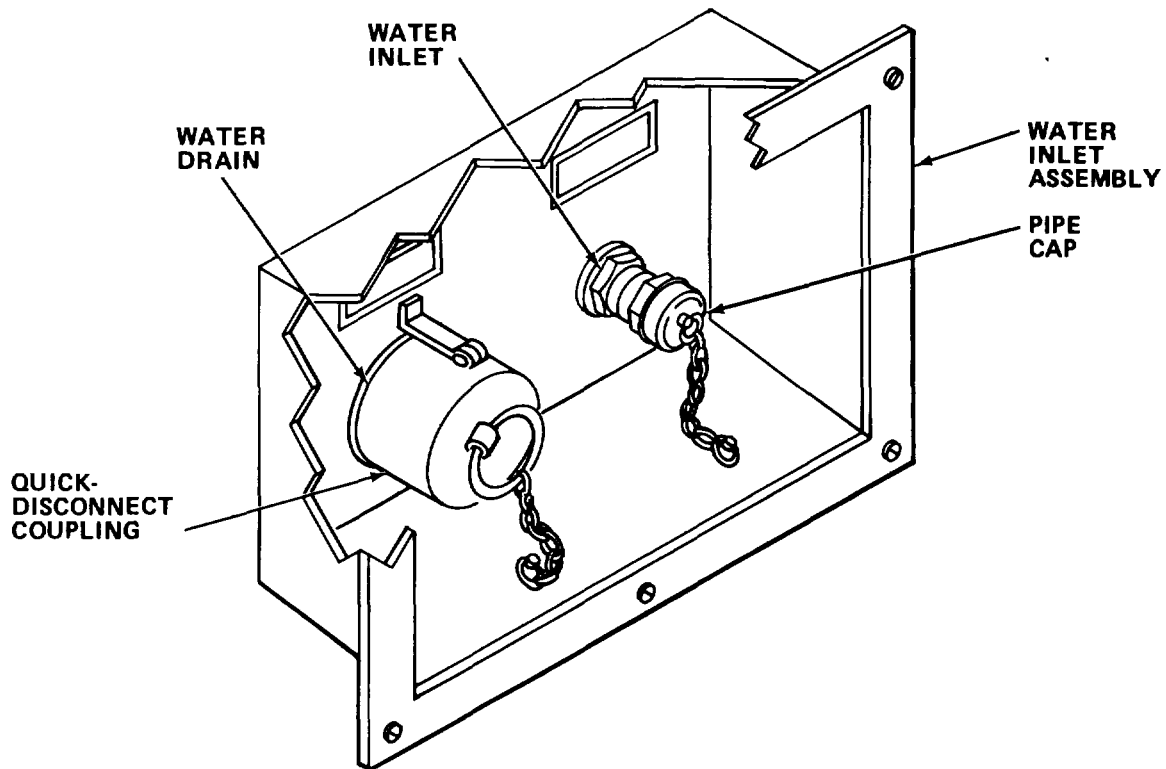
CAUTION

If water storage tank is not drained, water may freeze and rupture tank.

- d. Drain water storage tank.



- (1) Open red, yellow, and blue gate valves under the sink.

**WARNING**

Wear protective gloves and stand clear of water drain hose. Chemicals and water are being drained. Serious chemical burns may occur if protective gloves are not worn while handling drain hose.

- (2) Remove pipe cap on WATER INLET.
- (3) Disconnect water drain hose.
- (4) Install pipe cap and quick-disconnect coupling.
- (5) Store hose.

WARNING

Death or serious injury may occur if power cable is disconnected while power is on.

- e. Turn equipment switches OFF.
- f. Turn main circuit breaker OFF.

- g. Turn safety switch OFF.
- h. Have power cable disconnected at supply end. Then disconnect power cable from receptacle. Put cable in storage box on trailer chassis.
- i. Turn emergency light switch OFF.
- j. Disconnect telephone cables from power and communications panel.

CAUTION

To prevent loss of rod or thread damage, do not allow ground rod to rotate and unscrew when removing the slide hammer rod.

- k. Remove ground rod with slide hammer, and put ground rods, couplings, and slide hammer inside section. Clean threads on each ground rod before storing.

NOTE

Be certain ventilation fan cover and make up air vent door is securely closed.

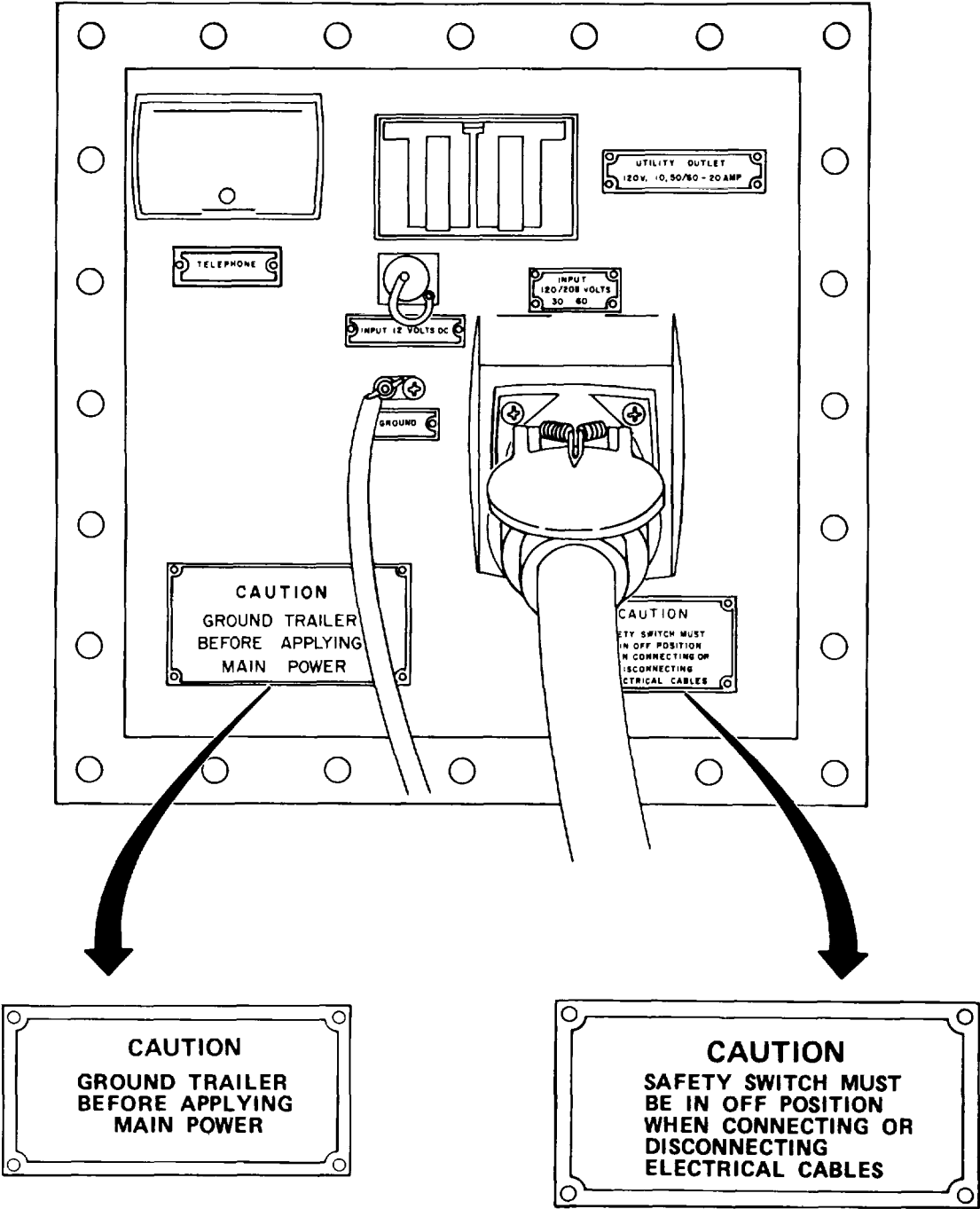
- l. Reinspect section interior for loose equipment and close all vents.
- m. Close section. Secure and lock all personnel doors and cargo door.

NOTE

Be sure air conditioner/heater covers are down and secured.

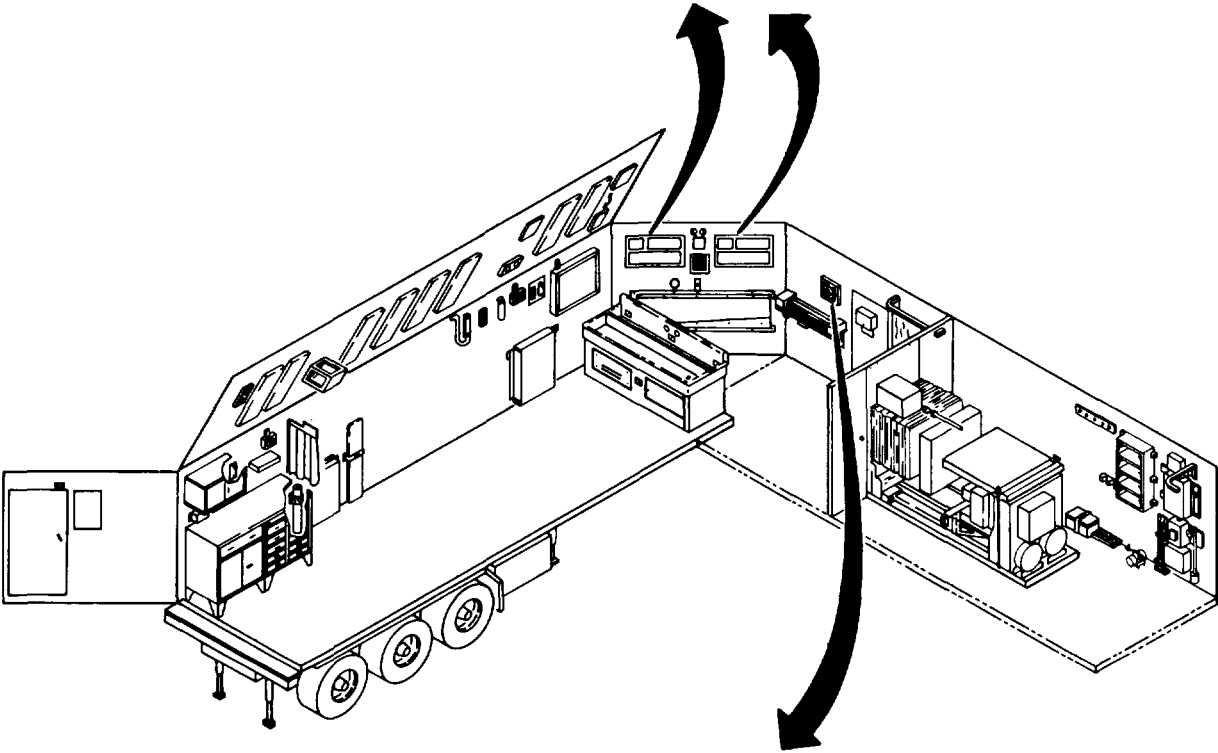
- n. Remove handrails from boarding ladders.
- o. Remove boarding ladders and insert handrails into back of ladders.
- p. Secure ladders to back of section.
- q. Fully extend landing gear.
- r. Retract leveling jacks.
- s. Visually inspect section exterior to be sure all equipment and covers are secured.

1-6.3. Operating Instructions on Decals and Instruction Plates.



CAUTION
FOR SAFE OPERATION
SEE TM FOR PROPER
INTERNAL AND EXTERNAL
GROUNDING

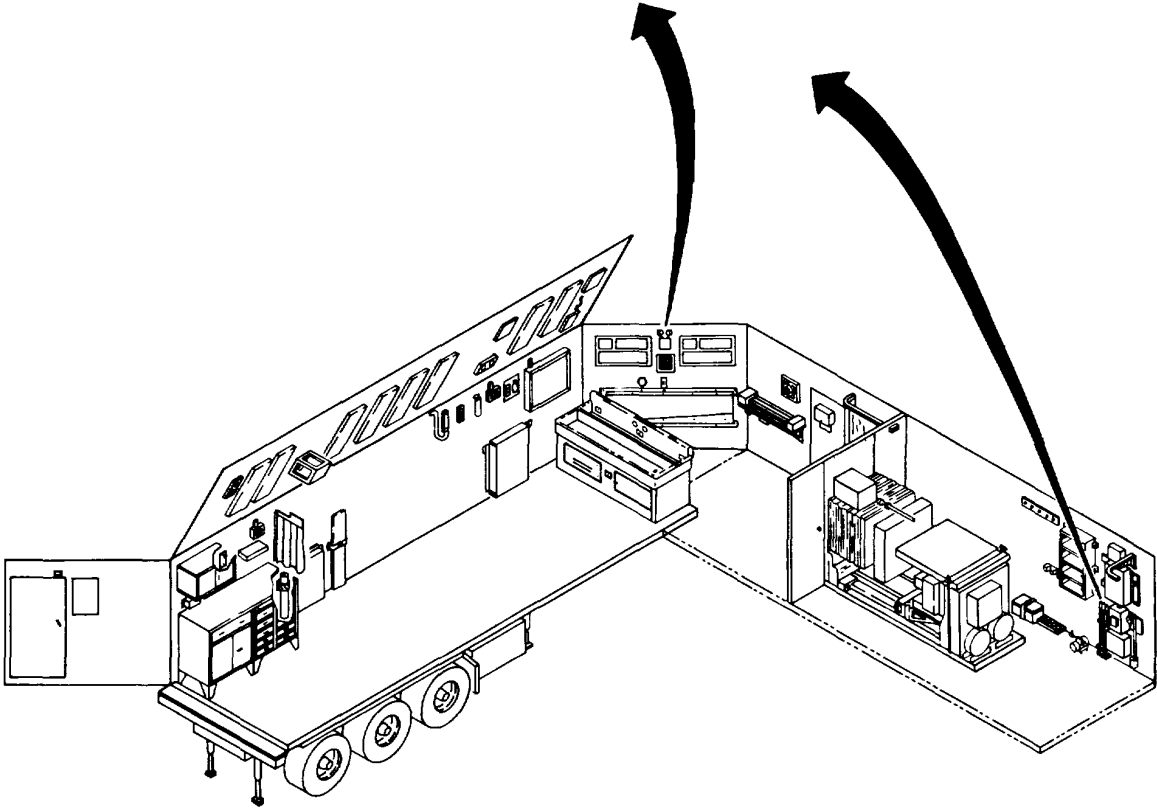
CAUTION TO START UNIT ON "COOL"
MODE AT 0°F AMBIENT
JUMPER LACO SWITCH (S-5)



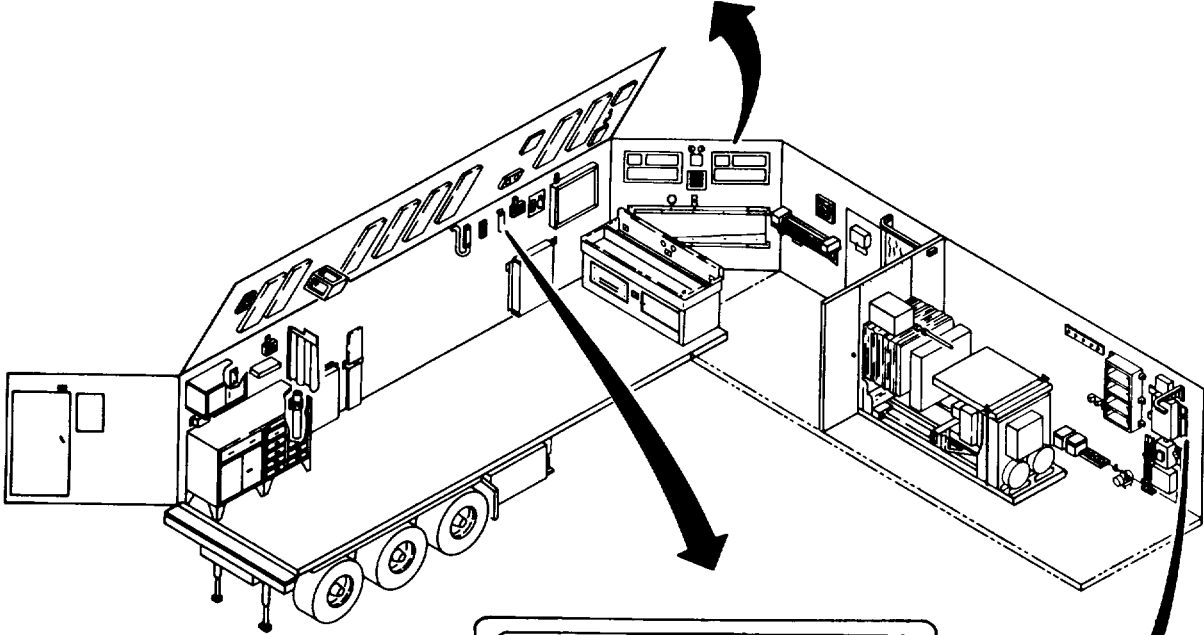
CAUTION
OPEN OUTSIDE VENT BEFORE
OPERATING FAN

CAUTION
EMERGENCY LIGHT SWITCH
MUST BE IN THE OFF POSITION
WHEN ELECTRICAL POWER
IS INTENTIONALLY DISCONNECTED

SWITCH MUST BE IN THE READY
POSITION FOR NORMAL EMERGENCY
LIGHT OPERATION



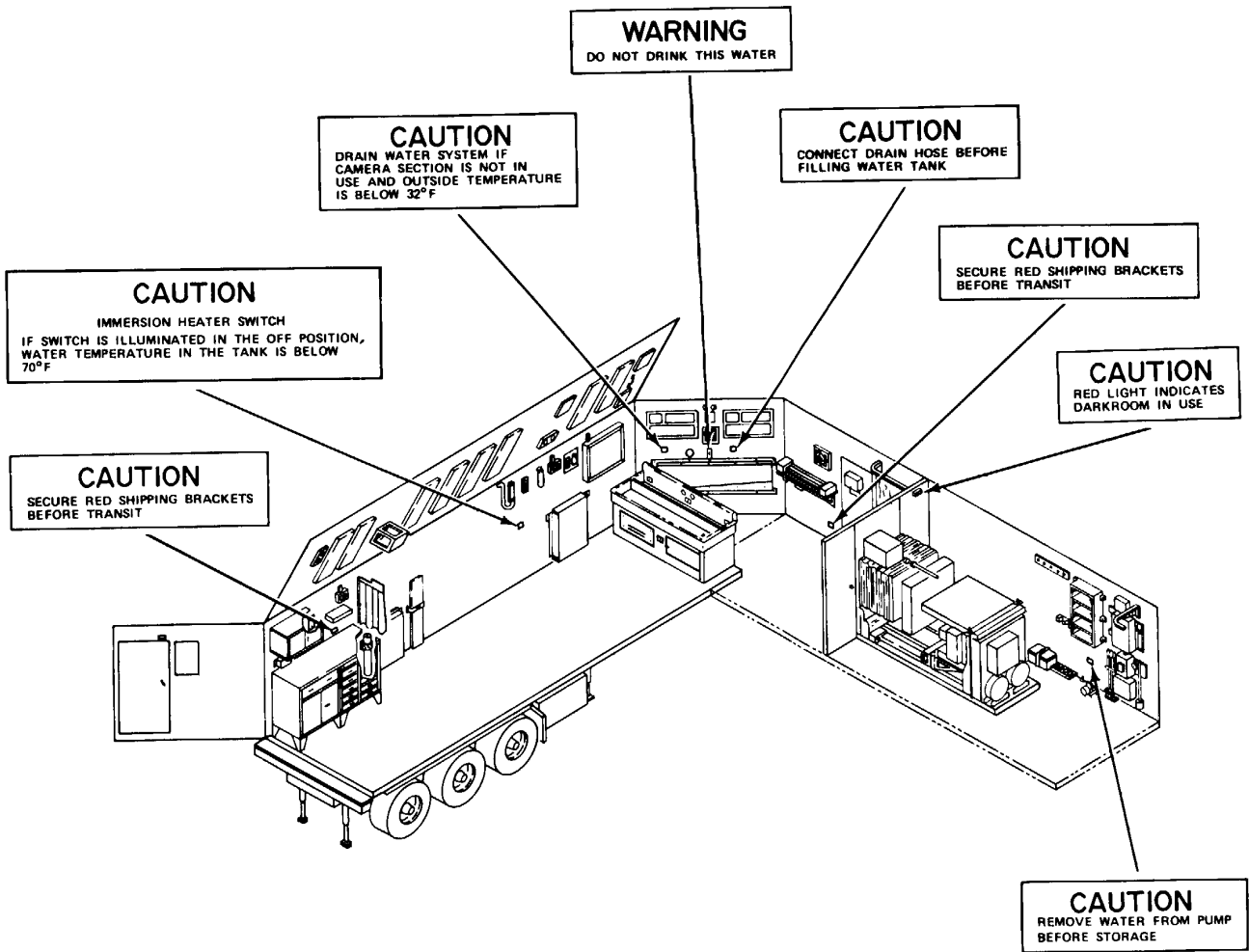
CAUTION
OPEN OUTSIDE FLAPS
PRIOR
TO OPERATING AIR COND



TO OPERATE

1. PULL RING PIN
2. POINT HORN CLOSE TO BASE OF FIRE
3. DEPRESS TRIGGER FOR DISCHARGE AND KEEP BASE OF FLAMES COVERED
4. AVOID BREATHING OF SMOKE
5. REMOVE VALVE AND HORN ASSEMBLY AND DISCARD USED CYLINDER

EXTINGUISHER, FIRE, CF₃BR, 2 3/4 LB



1-7. OPERATION UNDER UNUSUAL CONDITIONS.

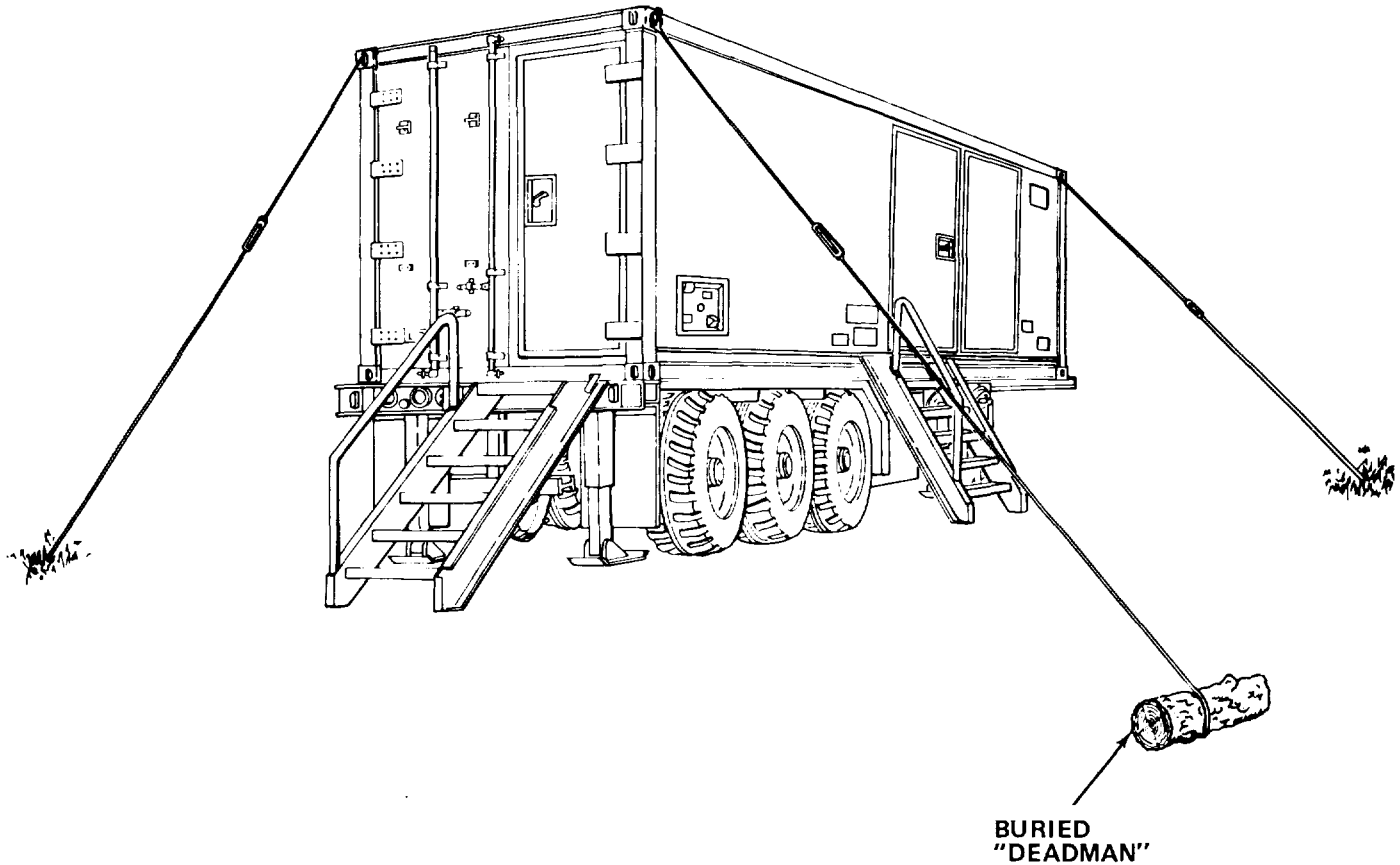
NOTE

Damage to container permitting light leaks, water, or dirt entry must be temporarily repaired using available material on hand. Maintenance personnel will conduct permanent repairs; however, crew must maintain operational capability of section.

1-7.1. Operation High Wind or Storm Conditions.

- a. Relocate section if trees or structures present hazard.

SUGGESTED METHOD OF ANCHORING THE SECTION IN HIGH WINDS



- b. Secure section corners at lifting eyes to deadmen or substantial objects.
- c. Remove all loose objects from area.

1-7.2. Operation in Cold Weather.

a. The operation of the internal equipment is performed within environmentally controlled conditions; however, in extreme cold, the main power supply cable and ground cable will become hard, brittle, and difficult to handle. When connecting or disconnecting cables, be careful that kinks and unnecessary loops will not result in permanent damage.

b. Make certain that connections and cable receptacles on the outside of the section are free of frost, snow, and ice.

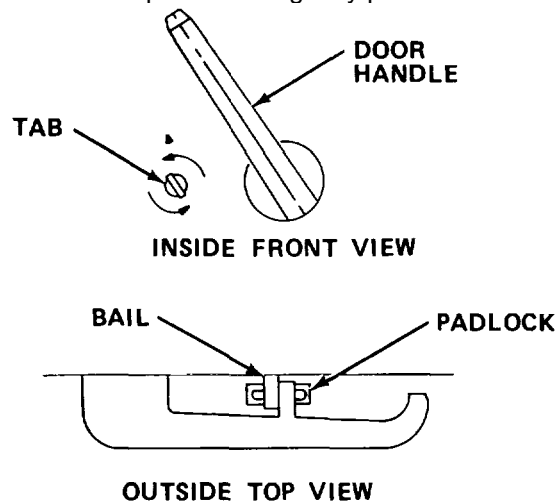
c. When section heaters are not operating or when the section is being transported, liquid consumable supplies may freeze, break their containers, then melt, and ruin equipment or documents. Store these items in an area to prevent equipment or document damage. Water in storage tank may freeze unless tank is drained, or heater is turned on.

1-7.3. Operation in Extreme Heat. The operation of the internal equipment is performed within environmentally controlled conditions; however, during transportation or when air conditioning units are not operating, consumable supplies may suffer reduced shelf life, and internal components may have accelerated deterioration of gaskets, seals, or insulation.

1-7.4. Operation in Tropical Conditions. Fungi, mildew, or mold will form on and in equipment, documents, and supplies if internal environmental control equipment is not operating and outside heat and humidity are allowed to enter the section.

1-7.5. Operation in Desert Conditions. Dust, grit, and sand will ruin supplies, equipment, and documents. Extreme care must be taken to prevent dust, grit, and sand from entering the section. Air filters will be changed whenever airflow is restricted, and cleaning of section interior must be conducted more frequently than specified by PMCS schedules.

1-7.6. Emergency Procedures. There are no specific emergency procedures for operation of the section.



1-7.7. Emergency Means of Exit. In the event personnel are locked in the section, the tab may be turned to the left until the bail on the padlock falls free. The door handle is now free to turn.

1-7.8. Emergency Eyewash. If chemicals are accidentally splashed into eyes, the emergency eyewash station provides a means to flush chemicals from the eyes. Immediate action is required to minimize injury. Personnel must use the eyewash station to wash their eyes thoroughly, then report for medical treatment.

Section III. OPERATOR MAINTENANCE

1-8. LUBRICATION INSTRUCTIONS.

a. Lubrication instructions for the Camera Section are contained in LO 5-3610257-12, Lubrication Order, Camera Section, Topographic Support System. The intervals and man-hours specified in the Lubrication Order are based on normal operations. During inactive periods, lubrication periods may be extended with adequate preservation.

b. Topographic equipment and all optical equipment require special care in lubrication. When a specified lubricant is called for, substitutions are not authorized. Minimum amounts of lubricant are to be used and all excess lubricant is to be immediately removed. Spray lubricants must not be used in the vicinity of optical equipment unless optics are completely protected. No lubricant is to be applied unless a thorough cleaning is conducted first to remove dirt, dust, or abrasive material.

c. Be sure that you refer to the appropriate chapter before any equipment is stored after use, that the temperature has stabilized, and that lubrication required after use is accomplished.

1-9. TROUBLESHOOTING PROCEDURES.

a. Table 1-3 lists the common malfunctions which you may find during operation or maintenance of the Camera Section, or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 1-3. TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1.	NO ELECTRICAL POWER TO SECTION.	<p style="text-align: center;"><u>WARNING</u></p> <p>Death or serious injury may result. Do not perform any electrical maintenance or make electrical connections or disconnection at main power receptacle when power cable is energized.</p> <p>Step 1. Observe voltage and frequency for phases A, B, and C. Read 120 \pm5 V, 60 +1 Hz.</p> <ul style="list-style-type: none"> <li>(a) If voltage and frequency are correct, proceed to step 2. <li>(b) If voltage and frequency are incorrect, notify your supervisor. <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not energize section if voltage and frequency are not correct. Damage to equipment may result.</p> <p>Step 2. Press phase test switch on power panel for A, B, and C.</p> <ul style="list-style-type: none"> <li>(a) If phases A, B, and C are correct, proceed to step 3. <li>(b) If incorrect phase lamp lights, notify your supervisor. <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not energize section if incorrect phase lamp lights. Damage to equipment may result.</p>

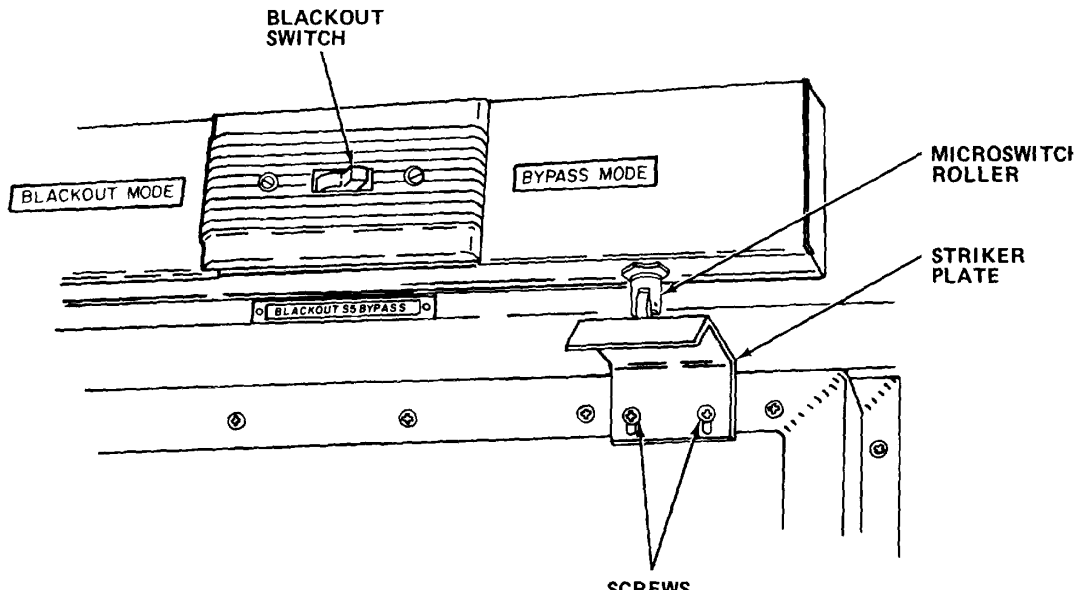
Table 1-3. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. NO ELECTRICAL POWER TO SECTION - Cont	Step 3. Check safety switch position.	(a) If safety switch is ON, proceed to step 4. (b) If safety switch is OFF, turn ON.
	Step 4. Check main circuit breaker position.	(a) If circuit breaker is OFF, turn ON. (b) If circuit breaker is ON, notify your supervisor. (c) If circuit breaker trips repeatedly, notify your supervisor.
2. NO ELECTRICAL POWER TO EQUIPMENT.	Step 1. Check equipment power switch.	(a) If power switch is on, proceed to step 2. (b) If power switch is OFF, turn ON.
	Step 2. Check power cord.	(a) If power cord is plugged in, proceed to step 3. (b) If power cord is unplugged, plug in.
	Step 3. Inspect circuit breaker panel for breakers in OFF position.	(a) If all circuit breakers are ON, refer to organizational maintenance. (b) If any circuit breakers are OFF, turn ON.

Table 1-3. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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3.	BLACKOUT SWITCH DOES NOT OPERATE.	
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**Step 1. Check blackout switch position.**

- (a) If switch is ON, proceed to step 2.
- (b) If switch is OFF, reset switch to BLACKOUT.

Step 2. Check to see that striker plate contacts roller on microswitch.

- (a) Loosen screws, and move plate up or down until microswitch operates.
- (b) If blackout switch still fails to operate, refer to organizational maintenance.

1-10. MAINTENANCE PROCEDURES.

- a. This section contains instructions covering operator maintenance functions for the Camera Section. Personnel required are listed only if the task requires more than one.

- b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Fluorescent Tube in Ceiling Light.....	1-10.1
Service Air Conditioning Ducts.....	1-10.2
Replace Battle Lamp/Dome Light.....	1-10.3

1-10.1. Replace Fluorescent Tube in Ceiling Light.

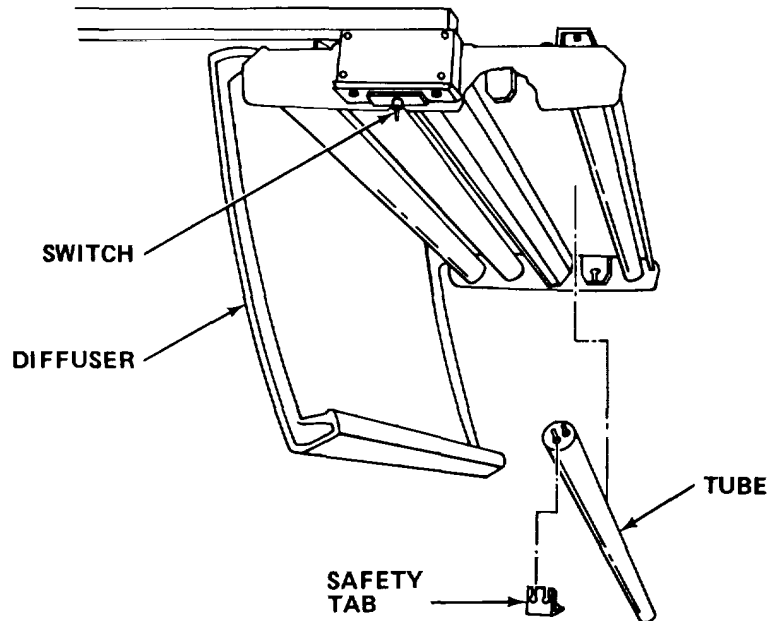
MOS: 83E, Photo and Layout Specialist

TOOLS: Flat Tip Screwdriver

SUPPLIES: Fluorescent Tube

WARNING**Death or serious injury may occur if power is left on while servicing lamp.**

- a. Turn switch OFF.
- b. Remove raceway plates securing diffuser.



- c. Gently pull diffuser from light bracket, and place diffuser out of the way to prevent damage.
- d. Remove safety tab from tube socket.
- e. Rotate defective tube until prongs are free from slot and remove.
- f. Insert new tube prongs into slot and rotate 90 degrees.
- g. Reinstall safety tab into tube socket.
- h. Reinstall diffuser.
- i. Reinstall raceway plates.
- j. Turn power ON.

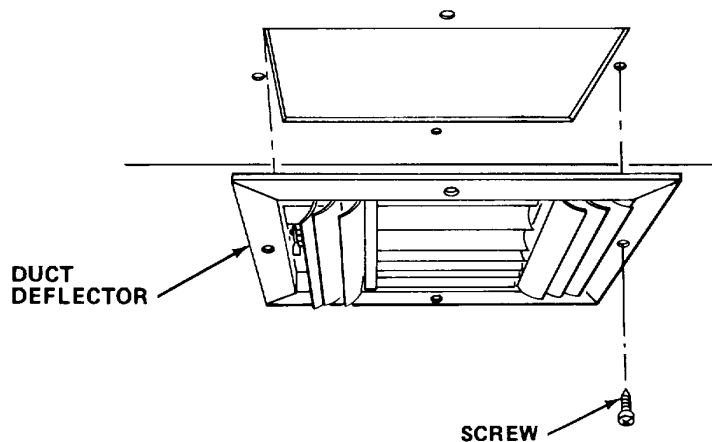
1-10.2. Service Air Conditioning Duct.

MOS: 83E, Photo and Layout Specialist

TOOLS: Vacuum Cleaner
Cross Tip Screwdriver

SUPPLIES: None

- a. Cover equipment to prevent dust from entering equipment.
- b. Close all doors and cabinets.
- c. Remove any documents or other work that may be damaged by dirt/dust.
- d. Turn off air conditioner.



- e. Remove four screws from each air conditioning duct deflector.
- f. Remove all duct deflectors.
- g. Vacuum dirt or dust from deflector louvers.
- h. Insert vacuum cleaner probe into air conditioning duct at each deflector hole, and vacuum as far as probe will reach.
- i. Reinstall deflectors and secure with four screws.
- j. Turn on air conditioner.
- k. Vacuum any dislodged dirt or dust from interior of section.
- l. Remove covers for operation.

1-10.3. Replace Battle Lamp/Dome Light.

MOS: 83E, Photo and Layout Specialist
 TOOLS: None
 SUPPLIES: Light (12 V)
 Silicone Spray (Item 47, Appendix E)

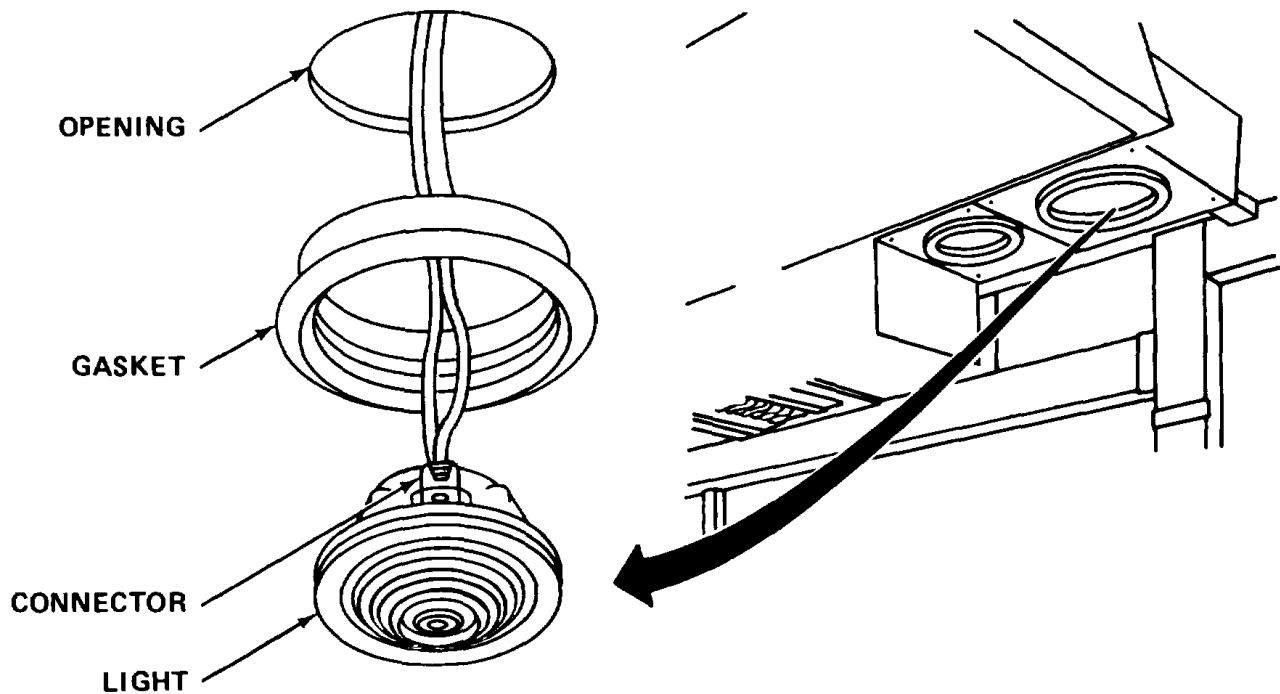
WARNING

Death or serious injury may occur if power is left on while servicing lamp.

NOTE

Battle lamp and dome light are sealed units. No bulb replacement is possible. Complete light must be replaced.

- a. Set switch to OFF.



- b. Push light and gasket up into opening.
- c. Separate gasket from light.
- d. Tilt and remove light and gasket from opening.
- e. Disconnect defective light from connector.
- f. Connect new light to connector.
- g. Reinstall gasket in opening.

NOTE

The use of silicone spray on the gasket will help to position light.

- h. Position light in gasket and push in.

Section IV. ORGANIZATIONAL MAINTENANCE

1-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication at this level of maintenance.

1-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

1-12.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

1-12.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

1-12.3. Repair Parts. Repair parts for this equipment are listed in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering organizational maintenance for this equipment.

1-13. SERVICE UPON RECEIPT.

NOTE

The section may be received mounted on a chassis, or as a van body for mounting on an available transporter, or onsite. Inspection of the chassis is covered in TM 5-2330-305-14. Inspection of the air conditioner/heater is covered in TM 5-4120-367-14.

1-13.1. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

(1) Visually inspect the section exterior starting at the rear to cover rear, curbside, roadside, front, top, and bottom. Inspect for damage, tears, breaks, or corrosion.

(2) Enter section and inspect for broken equipment, tool boxes, chairs, or equipment loose and not secured.

(3) Close doors and vents to determine if light leaks exist.

(4) Inspect doors for damage, torn or rotted seals, and tightness of closure.

(5) Inspect interior for evidence of water damage, fungi, mildew, or corrosion.

(6) Report damage or discrepancies in accordance with AR 735-11 and AR 735-11-2.

b. Check the equipment against the packing list to see if shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

(1) Inventory section against Components of End Item and Basic Issue Items Lists (Appendix C).

(2) Inventory expendable supplies contained in section as shown in Appendix E.

(3) Conduct operational checks on equipment in accordance with the chapters in this manual when operators are available and power can be safely provided to the section.

c. Check to see whether the equipment has been modified.

1-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. PMCS are designed to keep the equipment in good working condition by performing certain tests, inspections, and services. The intervals provide you, the organizational technician, with time schedules that determine when to perform specified tasks.

b. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording the results of PMCS.

c. Interval column. This column determines the time period designated to perform your PMCS.

d. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

e. Preventive maintenance checks and services for the air conditioners are contained in TM 5-4120-367-14.

f. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Vacuum Cleaner	1 ea
8 in. Adjustable Wrench	1 ea
Cross Tip Screwdriver	1 ea
Flat Tip Screwdriver	1 ea
Spring Scale	1 ea
Padlock	1 ea
Flashlight	1 ea

Table 1-4. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

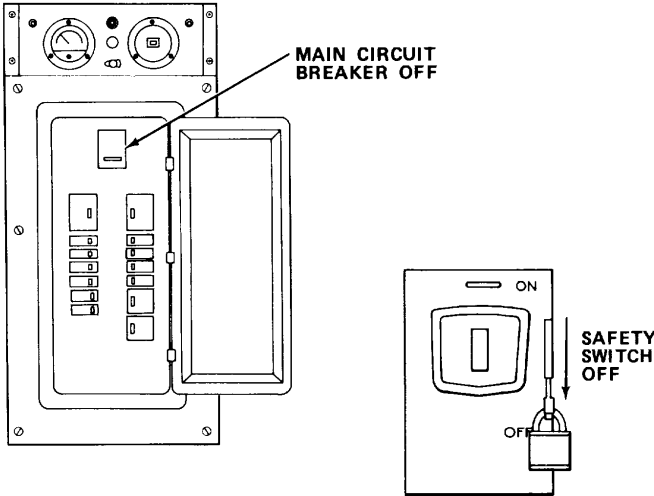
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	M	<p><u>VAN BODY</u> <u>Service Air Conditioner.</u> Refer to TM 5-4120-367-14 for preventive maintenance checks and services.</p>	
2	M	<p><u>Service Electrical System.</u></p>  <p style="text-align: center;"><u>WARNING</u></p> <p>Do not open circuit breaker panel or service electrical connections, cables, or switches until main power is off, and multimeter confirms circuit is not energized. Death may result from failure to observe these safety precautions.</p> <p>1. Turn off main circuit breaker. Turn off safety switch.</p> <p style="text-align: center;">1-65</p>	

Table 1-4. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

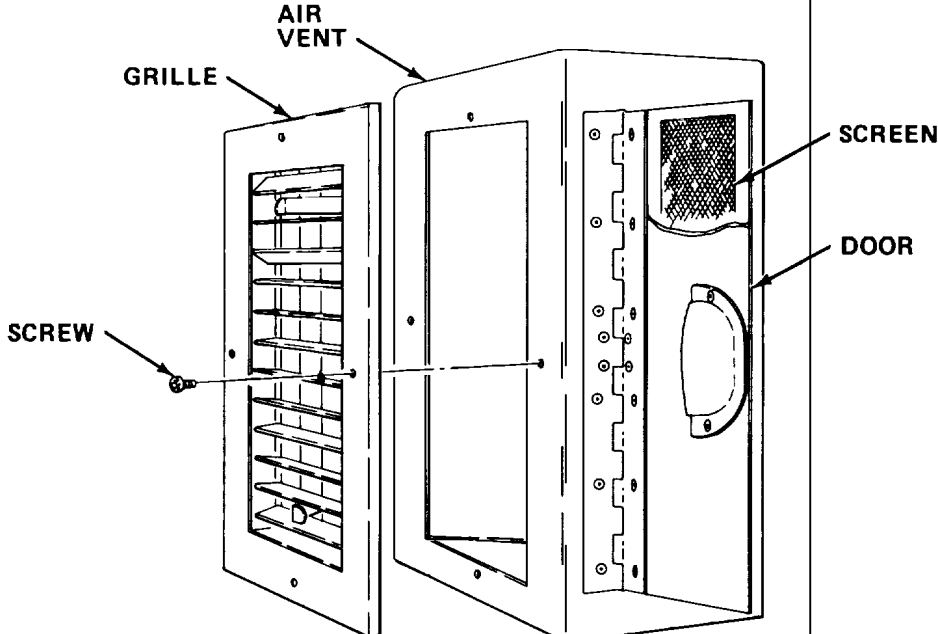
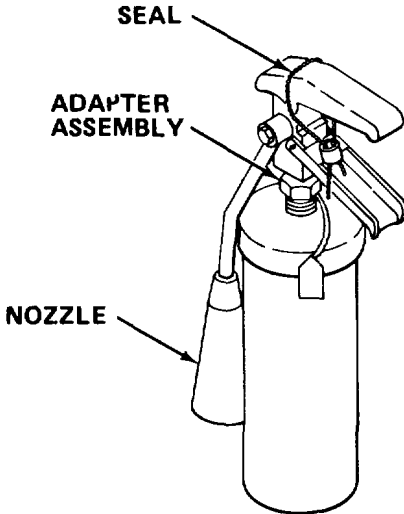
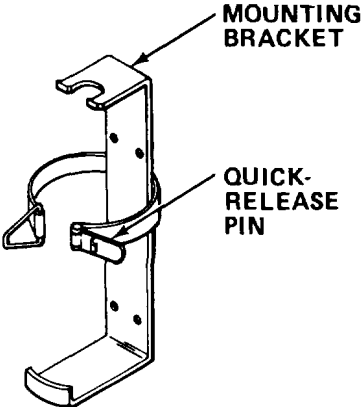
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
2	M	<p><u>VAN BODY - Cont</u> Service Electrical System - Cont</p> <ol style="list-style-type: none"> 2. Padlock safety switch. 3. Tighten all loose screws, bolts, and clamps. 4. Check which switches, switch plate outlets, receptacles, and posts require repair. 5. Check for loose screws and nuts on ceiling, console lights, circuit breaker panels, and conduits. 6. Remove padlock. 7. Turn on main circuit breaker and safety switch. 	
3	M	<p><u>Service Make Up Air Assembly.</u></p>  <ol style="list-style-type: none"> 1. Remove screws from front of grille. 	

Table 1-4. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
		<p><u>VAN BODY - Cont</u></p> <p><u>Service Make UD Air Assembly - Cont</u></p> <ol style="list-style-type: none"> 2. Remove front grille. 3. Using vacuum cleaner, clean screens on side doors. Vacuum inside of make up air assembly. 4. Reinstall grille and secure with screws. <p><u>Inspect Fire Extinguisher.</u></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <ol style="list-style-type: none"> 1. Remove from mounting bracket. Check free movement of bracket. 2. Inspect nozzle and adapter assembly for damage. 3. Inspect seal. Be sure it is not broken. <p style="text-align: center;">1-67</p>

1-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/ inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the facing schematic or the foldout located at the end of this manual for further fault analysis.

d. If any component of the Camera Section does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power troubleshooting procedures for dead receptacle (Table 1-4).

Table 1-5. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

WARNING

Electrical shock hazard. Be sure power is off when checking continuity at troubleshooting points. Death or serious injury could result from failure to do so.

1. FLUORESCENT CEILING LIGHT IS INOPERATIVE.

Step 1. Check for continuity of fluorescent light switch.

(a) If continuity exists, proceed to step 2.

(b) If continuity does not exist, replace switch (paragraph 1-16.3).

Step 2. Check for continuity of light ballast.

Table 1-5. ORGANIZATIONAL TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. FLUORESCENT CEILING LIGHT IS INOPERATIVE - Cont	(a) If continuity exists, proceed to step 3. (b) If continuity does not exist, replace light ballast (paragraph 1-16.1).	Step 3. Check for shorts in RF filter transformer. Replace RF filter transformer (paragraph 1-16.2).
2. VENTILATION FAN IS INOPERATIVE.	Step 1. Check on/off switch for continuity. If continuity does not exist, replace switch (paragraph 1-16.4).	
3. EMERGENCY LIGHTS ARE INOPERATIVE.	Press in test indicator. If lamps do not light, replace emergency light (paragraph 1-16.8).	
4. NO POWER TO EQUIPMENT.	Step 1. Check circuit breaker ON/OFF position (a) If circuit breaker is ON, proceed to step 2. (b) If circuit breaker is OFF, turn ON. (c) If circuit breaker trips repeatedly, notify your supervisor.	

Table 1-5. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. NO POWER TO EQUIPMENT - Cont		
	Step 2.	Check circuit breaker input for 120 V ac. (a) If input voltage is present, proceed to step 3. (b) If input voltage is not present, refer to direct/general support maintenance for repair or replacement of defective wiring.
	Step 3.	Check circuit breaker output for 120 V ac. (a) If output voltage is present, proceed to step 4. (b) If output voltage is not present, refer to direct/general support maintenance for circuit breaker replacement (paragraph 1-20.5).
	Step 4.	Remove receptacle and check for 120 V ac input. (a) If present, replace receptacle (paragraph 1-16.6). (b) If not present, repair or replace defective wiring.

1-16. MAINTENANCE PROCEDURES.

- a. This section contains instructions covering organizational maintenance functions for the Camera Section. Personnel required are listed only if the task requires more than one.
- b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning

INDEX

PROCEDURE	PARAGRAPH
Replace Fluorescent Light Ballast.....	1-16.1
Replace Radio Frequency (RF) Filter Transformer.....	1-16.2
Replace Fluorescent Light Switch	1-16.3
Replace On/Off Switch	1-16.4
Replace Battle Lamp/Dome Light Microswitch.....	1-16.5
Replace Receptacle	1-16.6
Replace Wire Raceway Cover.....	1-16.7
Replace Emergency Light	1-16.8
Repair Blackout Curtain	1-16.9
Repair Van Body Skin (Temporary).....	1-16.10
Replace Level Indicator	1-16.11
Replace Make Up Air Vent Screen.....	1-16.12
Replace Make Up Air Vent Outer Door	1-16.13
Repair Personnel Ladder.....	1-16.14

1-16.1. Replace Fluorescent Light Ballast.

MOS: 83FJ6, Reproduction Equipment Repairer

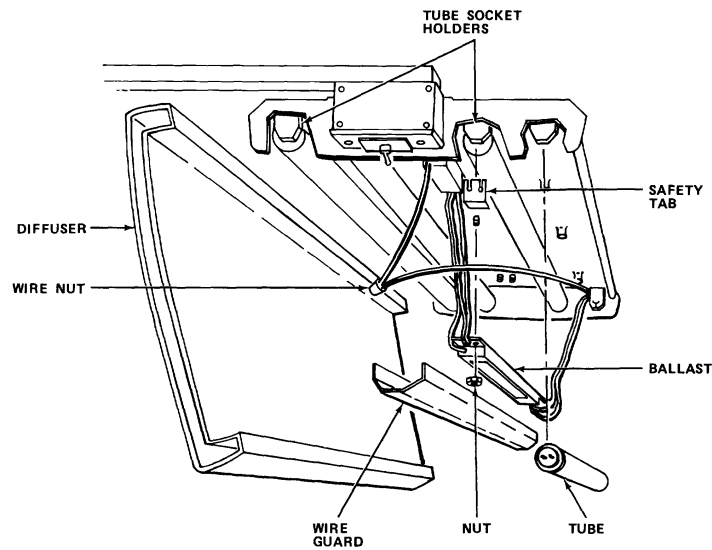
TOOLS: Flat Tip Screwdriver
 1/4 inch Drive Socket Set
 Scriber
 Flashlight

SUPPLIES: Ballast
 Electrical Component Straps

WARNING

Death or serious injury may occur unless overhead light circuit breaker and main circuit breaker are turned off before working on light fixture.

- a. Turn off overhead light, circuit breaker, and main circuit breaker.



- b. Remove raceway plates securing diffuser.
- c. Remove diffuser from light fixture.
- d. Remove safety tabs and tubes. Place in diffuser.
- e. Squeeze light wire guard and remove.
- f. Remove electrical component straps as required.
- g. Tag wires from ballast for reference.
- h. Disconnect ballast wire from wire nut connection.
- i. Pry out tube socket holder with flat tip screwdriver.
- j. Using scribe, depress wire clips and disconnect ballast wiring.
- k. Remove nut and defective ballast.
- l. Install new ballast and secure with nuts.
- m. Connect wires to corresponding tube socket holders.
- n. Reconnect ballast wire to wire nut connection.
- o. Remove tags.
- p. Install new electrical component straps, as required.

NOTE

Be sure wires are free of kinks and do not interfere with placement of wire guard.

- q. Reinstall wire guard.
- r. Reinstall tube and safety tabs.
- s. Reinstall diffuser.
- t. Reinstall raceway plates.
- u. Turn on overhead light circuit breaker and main circuit breaker.

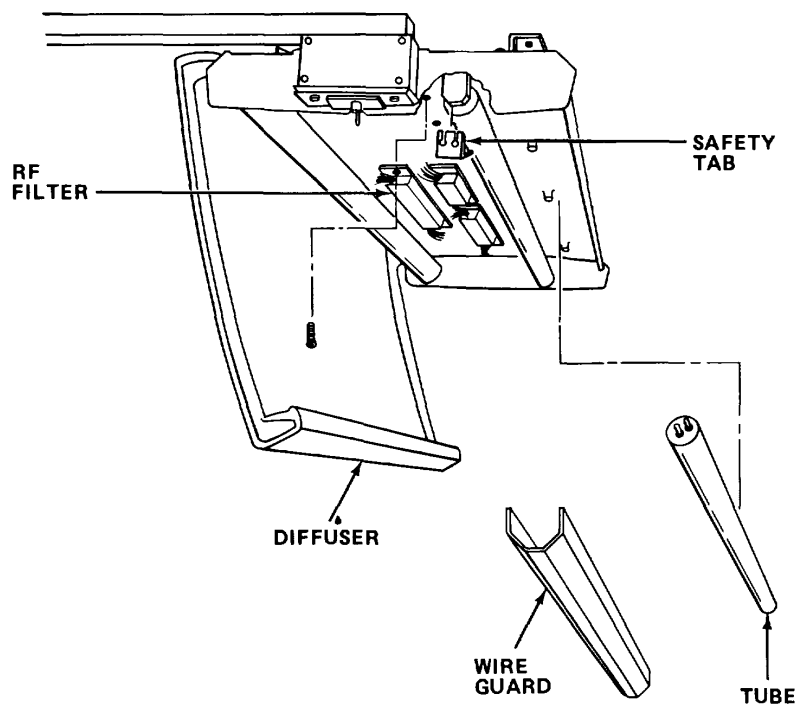
1-16.2. Replace Radio Frequency (RF) Filter Transformer.

- MOS: 83FJ6, Reproduction Equipment Repairer
 or
 41B, Topographic Instrument Repair Specialist
- TOOLS: Flat Tip Screwdriver
 1/4 inch Drive Socket Set
- SUPPLIES: Transformer
 Electrical Component Straps

WARNING

Death or serious injury may occur unless overhead light switch is turned OFF before working on light fixture.

- a. Turn overhead light switch OFF.



- b. Remove diffuser from light fixture.
- c. Remove safety tabs and tubes. Place in diffuser.
- d. Squeeze light wire guard and remove.
- e. Remove electrical component straps as required.
- f. Tag wires to transformer.
- g. Remove wire nuts and disconnect transformer wires.
- h. Remove nuts and defective transformer.
- i. Install new transformer. Secure with nuts.
- j. Reconnect transformer wires and secure with wire nuts.
- k. Remove tags.
- l. Install new electrical component straps.

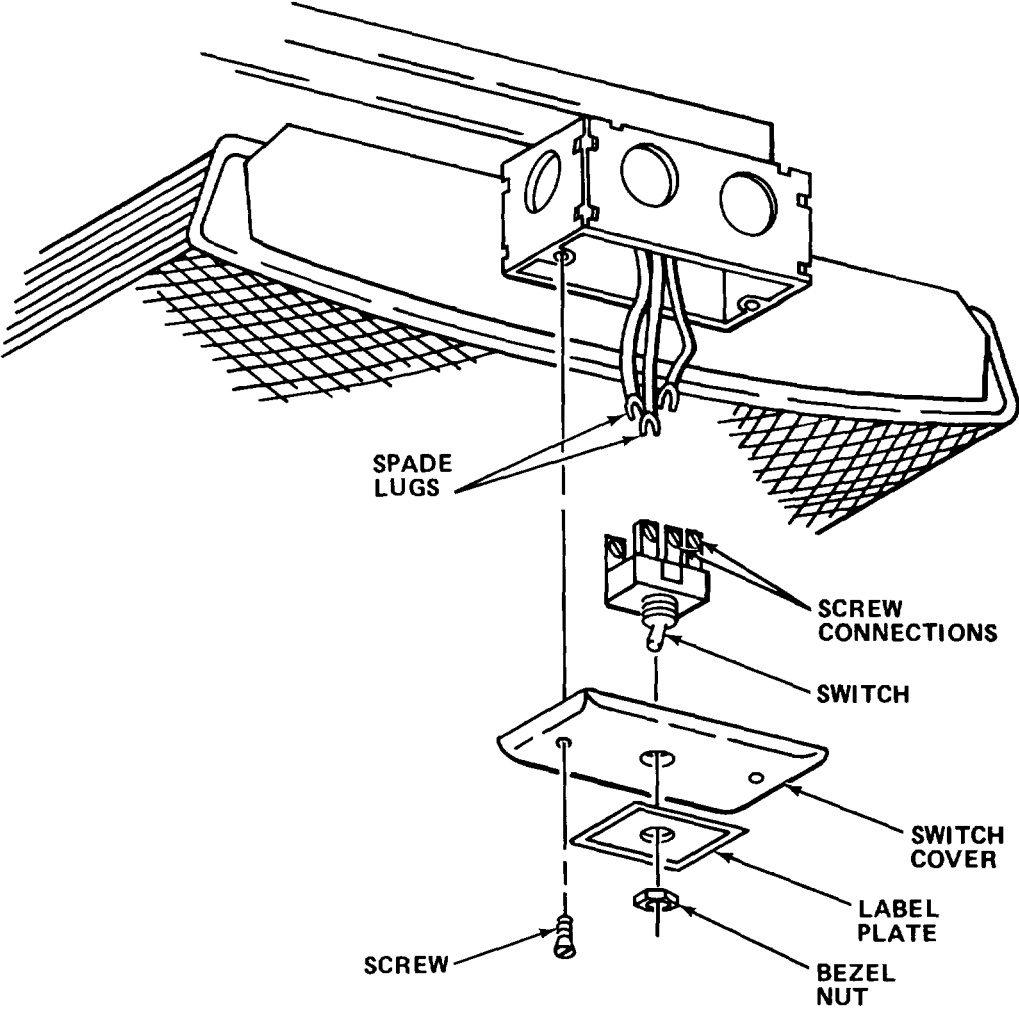
NOTE

Be sure wires are free of kinks and do not interfere with placement of wire guard.

- m. Reinstall wire guard.
- n. Reinstall tubes and safety tabs.
- o. Reinstall diffuser.
- p. Turn on light switch.

1-16.3. Replace Fluorescent Light Switch.

- MOS: 83FJ6, Reproduction Equipment Repairer
or
41B, Topographic Instrument Repair Specialist
- TOOLS: Flat Tip Screwdriver
Needle Nose Pliers
Flashlight
- SUPPLIES: Toggle Switch



WARNING

Death or serious injury may occur if lighting circuit breaker is not turned off before working on lamp assembly.

NOTE

Alternate lighting is required to perform this task.

- a. Turn circuit breaker OFF.
- b. Remove bezel nut.
- c. Note notch on label plate and remove label plate.
- d. Loosen screws.

NOTE

Note position of cover and reinstall as noted.

- e. Remove cover plate.
- f. Tag and disconnect wires from defective switch.
- g. Install new switch and connect wires.
- h. Insert switch through cover plate and label plate.

NOTE

Be sure label plate is in same direction as when removed. Secure with bezel nut.

- i. Aline cover plate with holes and secure with screws.
- j. Turn circuit breaker ON.

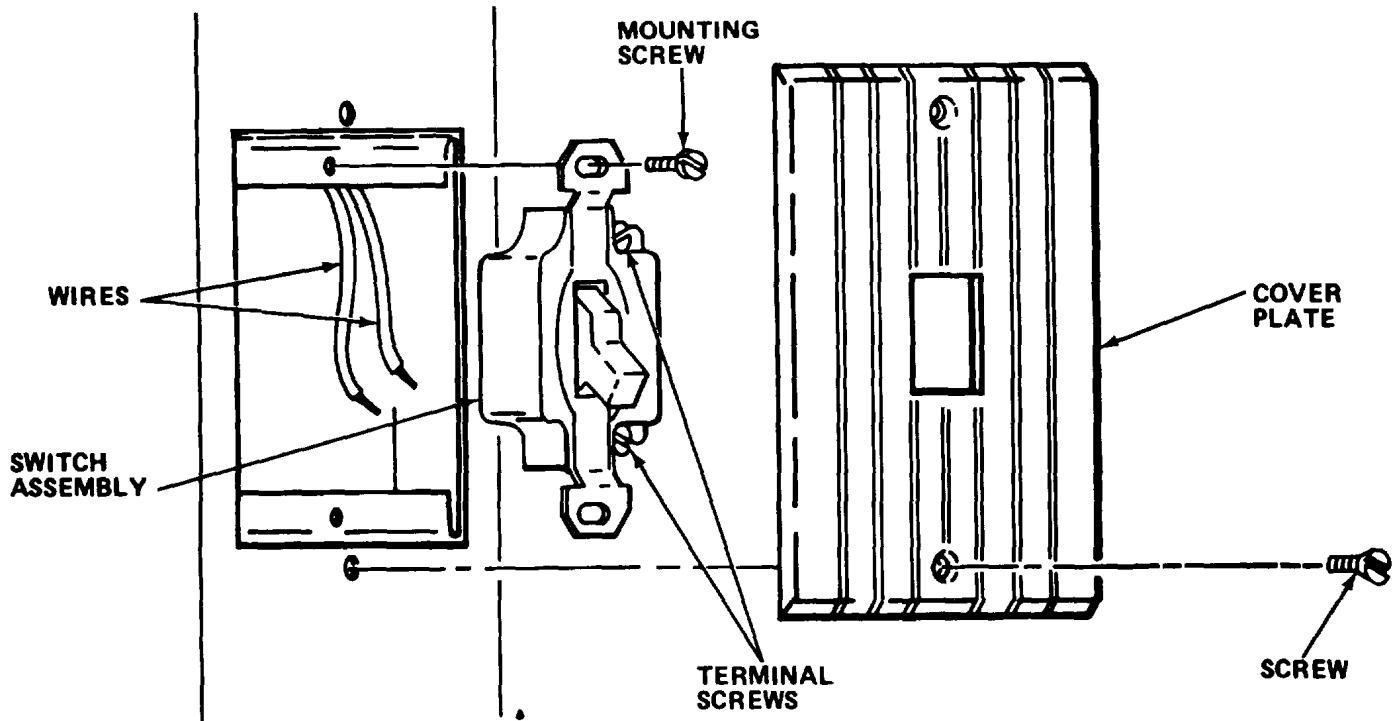
1-16.4. Replace On/Off Switch.

MOS: 83FJ6, Reproduction Equipment Repairer
 or
 41B, Topographic Instrument Repair Specialist
 TOOLS: Flat Tip Screwdriver
 SUPPLIES: Switch

WARNING

Death or serious injury may occur if switch circuit breaker is not turned off before working on switch.

- a. Turn off appropriate circuit breaker.



- b. Remove screws.
- c. Remove cover plate.
- d. Remove mounting screws.
- e. Pull switch assembly from wire guide to gain access to wires.

- f. Loosen terminal screws; then disconnect wires.
- g. Install new switch.
- h. Reconnect wires.
- i. Guide switch into wire guide, alining holes.

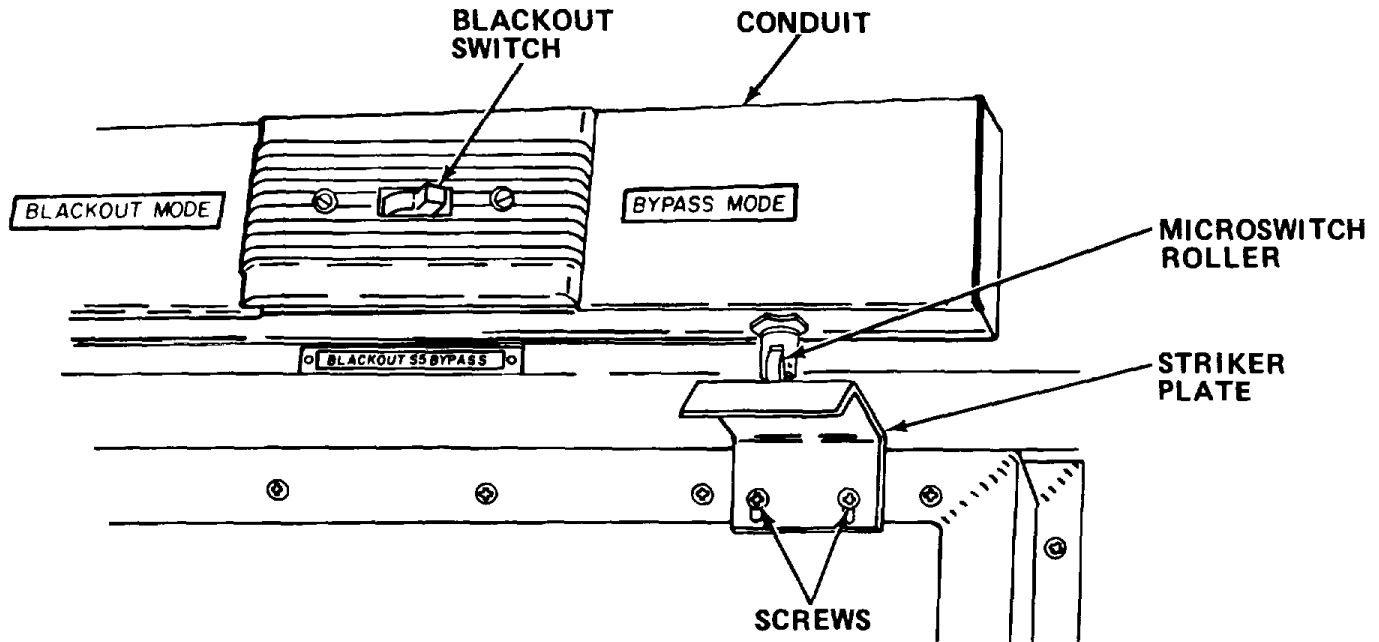
NOTE

Be sure wires are not kinked or strained.

- j. Reinstall mounting screws.
- k. Reinstall cover plate and secure with screw.
- 1. Turn on switch circuit breaker.

1-16.5. Replace Battle Lamp/Dome Light Microswitch.

MOS: 83FJ6, Reproduction Equipment Repairer
 TOOLS: Flat Tip Screwdriver
 6 inch Adjustable Wrench
 SUPPLIES: Microswitch

**WARNING**

Death or serious injury may occur from electrical shock unless power is off before servicing.

- a. Turn off battle lamp/dome light circuit breaker.
- b. Remove raceway cover.
- c. Remove nut and pull out switch to expose wiring.
- d. Disconnect wires from defective switch.
- e. Connect wires to new switch.
- f. Install switch and secure with nut.
- g. Adjust striker plate until plate contacts roller.
- h. Reinstall raceway cover.
- i. Turn on circuit breaker.

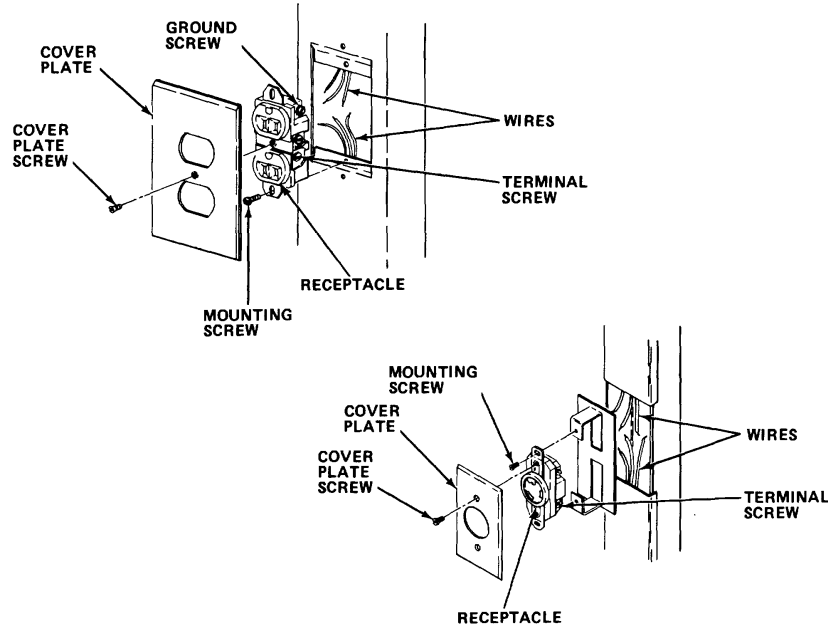
1-16.6. Replace Receptacle.

MOS: 83FJ6, Reproduction Equipment Repairer TM 5-3610-257-14
 TOOLS: Flat Tip Screwdriver
 SUPPLIES: Receptacle

WARNING

Death or serious injury may occur if receptacle circuit breaker is not turned off before working on receptacle.

- a. Turn off receptacle circuit breaker.



- c. Remove cover plate.
- d. Remove mounting screws.
- e. Withdraw receptacle to gain access to wires.
- f. Loosen terminal screws and ground screw; then disconnect wires.
- g. Reconnect wires. Connect green (ground) wire first.
- h. Install new receptacle.
- i. Guide receptacle into wire guide.

NOTE

Be sure wires are not kinked or strained.

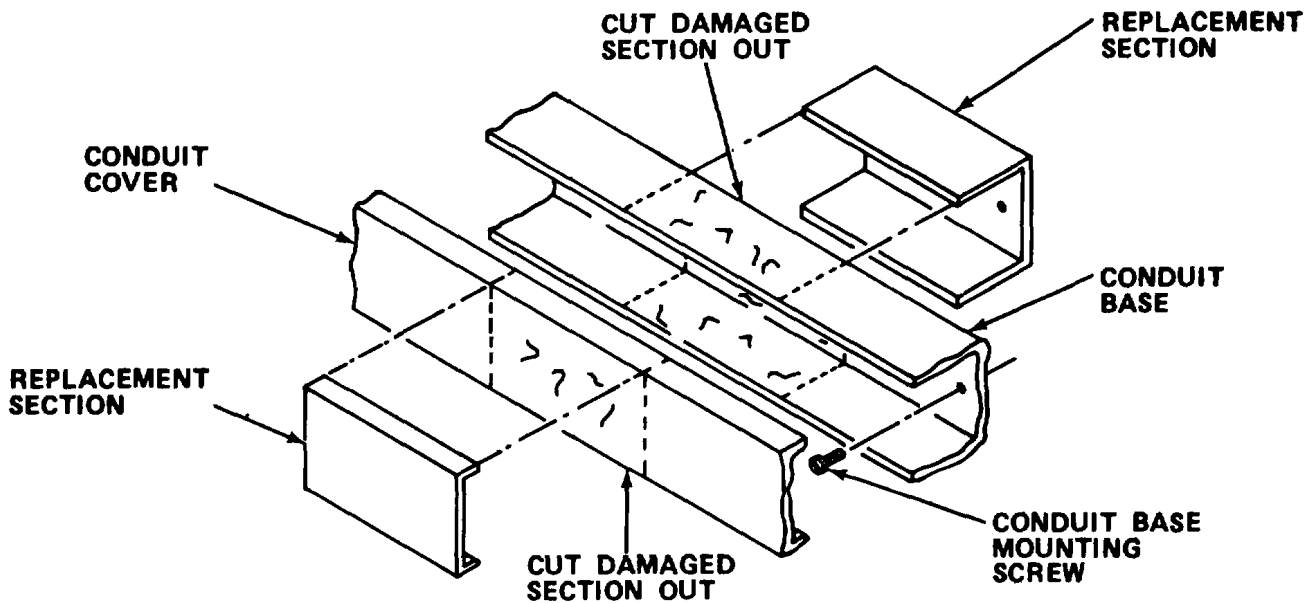
- j. Secure receptacle with screws.
- k. Reinstall cover plate. Secure with screw.
- l. Turn on receptacle circuit breaker.

1-16.7. Replace Wire Raceway Cover.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS:
 Flashlight
 Paint Brush
 Multimeter
 Flat Tip Screwdriver
 Hacksaw
 Drill and Drill Bits
 File
 Machinist Rule
 Cross Tip Screwdriver

SUPPLIES:
 Paint (Item 30, Appendix E)
 Cheesecloth (Item 4, Appendix E)
 Raceway Base
 Raceway Cover
 Padlock



WARNING

Death or serious injury may occur from failure to turn off and padlock safety switch before repairing raceway.

NOTE

Alternate lighting is required to perform this task.

- a. Turn off and padlock safety switch.

- b. Remove raceway cover.
- c. Inspect wires for damage.

NOTE

Refer to direct/general support maintenance for wiring repair if necessary.

- d. Loosen wiring and carefully pull it from the entire base section.
- e. Remove screws and base from wall.
- f. Mark and measure damaged area on raceway. Record measurement.
- g. Cut damaged area from raceway.
- h. Cut section from new raceway to the length recorded in step f.
- i. Using damaged area as a template, mark mounting holes on new piece.
- j. With a number 25 drill bit, drill holes in new raceway.
- k. With file, remove all burred edges.
- l. Paint base section as required.
- m. Reinstall raceway base on wall with screws.
- n. Carefully place wiring back in raceway base.
- o. Reinstall cover on base.
- p. Test wiring with power on.

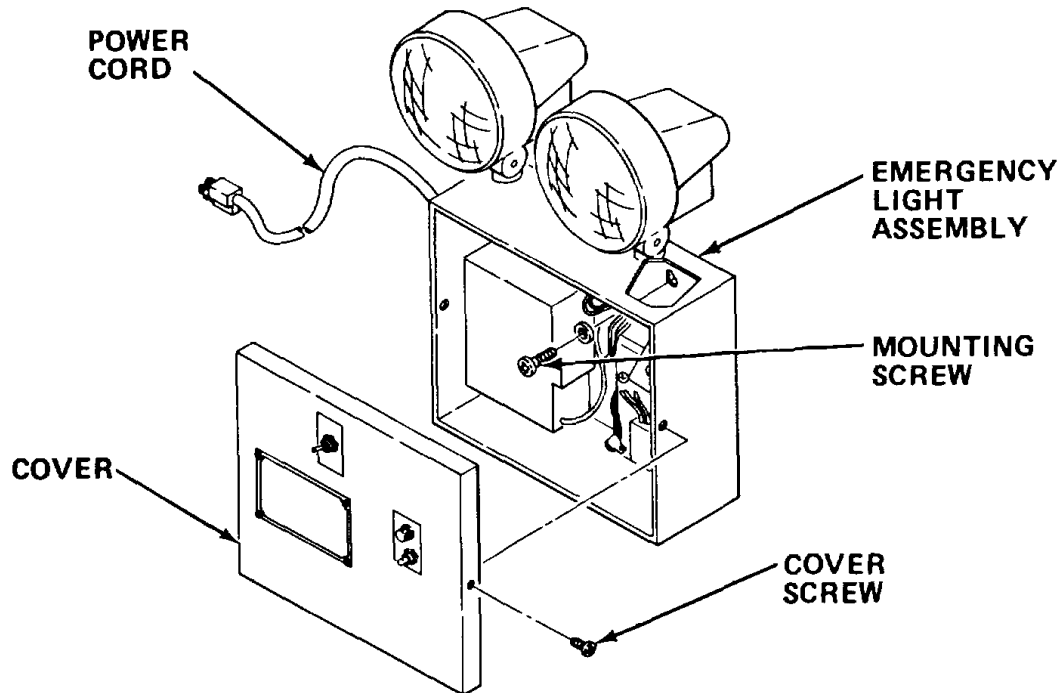
1-16.8. Replace Emergency Light.

MOS: 83FJ6, Reproduction Equipment Repairer TM 53610-257-14
 TOOLS: Flat Tip Screwdriver
 Cross Tip Screwdriver
 Off Set Cross Tip Screwdriver.

SUPPLIES: Emergency Light

WARNING

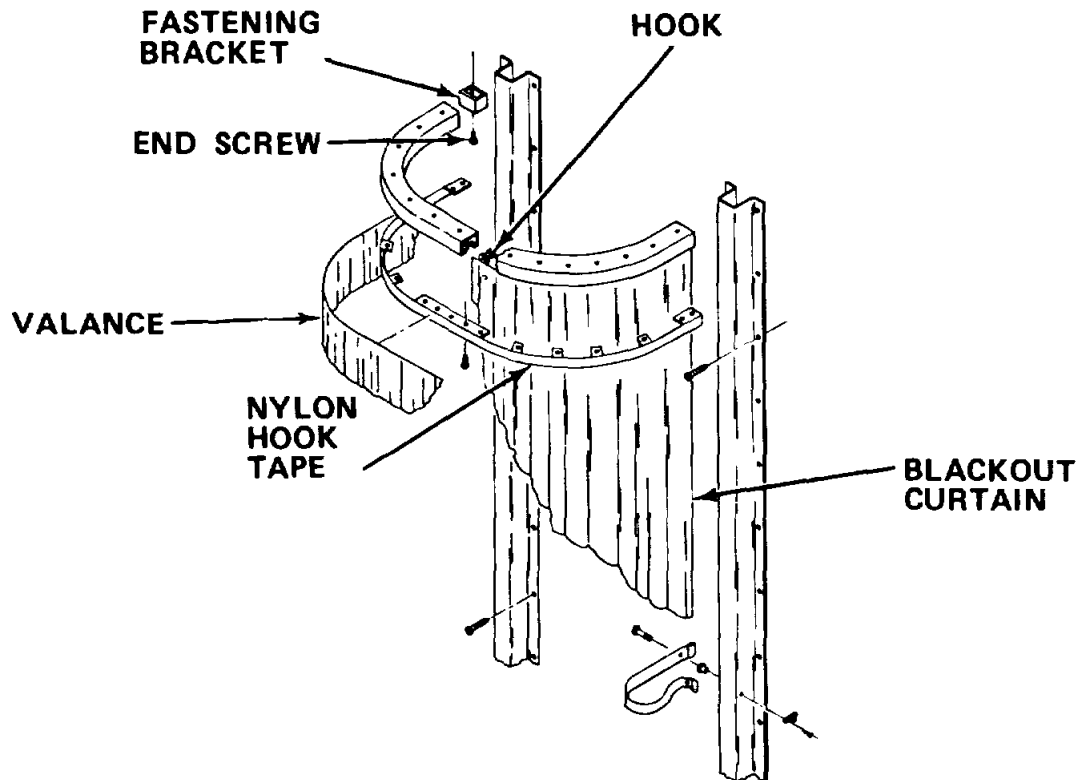
Death or serious injury may occur if power cord is not unplugged before servicing.



- a. Unplug power cord.
- b. Remove cover screws. Move cover out of way.
- c. Remove mounting screws.
- d. Remove emergency light.
- e. Install new emergency light. Secure with screws.
- f. Secure cover with screws.
- g. Plug in power cord.

1-16.9. Repair Blackout Curtain,

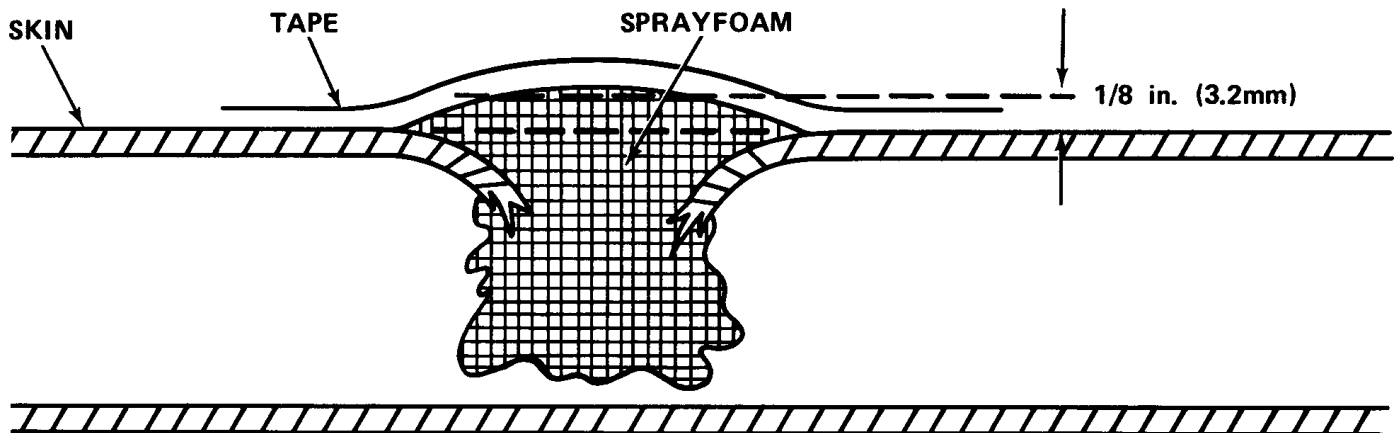
MOS: 83FJ6, Reproduction Equipment Repairer
 TOOLS: Cross Tip Screwdriver
 SUPPLIES: Hooks
 Valance
 Nylon Hook Tape
 Adhesive (Item 2, Appendix E)



- a. Remove curtain from hooks.
- b. Pull curtain and valance from nylon hook tape.
- c. Remove end screw, lockwasher, and fastening bracket from ceiling.
- d. Replace damaged hooks.
- e. Reinstall fastening bracket with hooks. Fasten with end screw and lockwasher.
- f. Glue loose nylon hook tape to wall or bracket. Replace tape if worn out.
- g. Hook curtain to bracket.
- h. Attach valance.
- i. Check curtain for free movement.

1-16.10. Repair Van Body Skin (Temporary).

MOS: 52C, Utilities Equipment Repairer
 TOOLS: Slip Joint Pliers
 Ball Peen Hammer
 Scissors or Utility Knife
 SUPPLIES: Cloth Duct Sealing Tape (Item 49, Appendix E)
 Silicone Sealant (Item 37, Appendix E)
 Sprayfoam (Item 48, Appendix E)
 Cheesecloth (Item 4, Appendix E)



- a. Bend broken edges of punctured skin inward into puncture hole. Do not attempt to remove fragments of skin by bending or pulling outward. Bend skin inward only enough to put broken edges below surface of unbroken skin.
- b. Remove any loose fragments of foam which are not now held in place by bent broken skin. Removing small pieces of foam or dust is more important than removing chunks.
- c. Using cloth slightly dampened with water, wipe area around puncture to remove any dirt or mud and wipe dry.
- d. Inject sprayfoam into puncture. Mound sprayfoam to about 1/8 in. (3.2 mm) above surface of unbroken skin. Apply bead of sealant about 1/4 in. (6.4 mm) wide over all cuts in skin leading out from puncture. Do not smooth out sealant.
- e. Plan how puncture is to be covered with tape before applying any tape. Length and width of tape, number of tape strips, overlapping, and how tape is applied will affect sealing capability of repair. Each piece of tape should extend about 1-1/2 in. (3.81 cm) beyond sealant it will cover. If this will require more than one strip of tape, tape should 1-87 overlap about 1/2 in. (12.7 mm). If three or more strips of tape are required, center strip should be applied first.

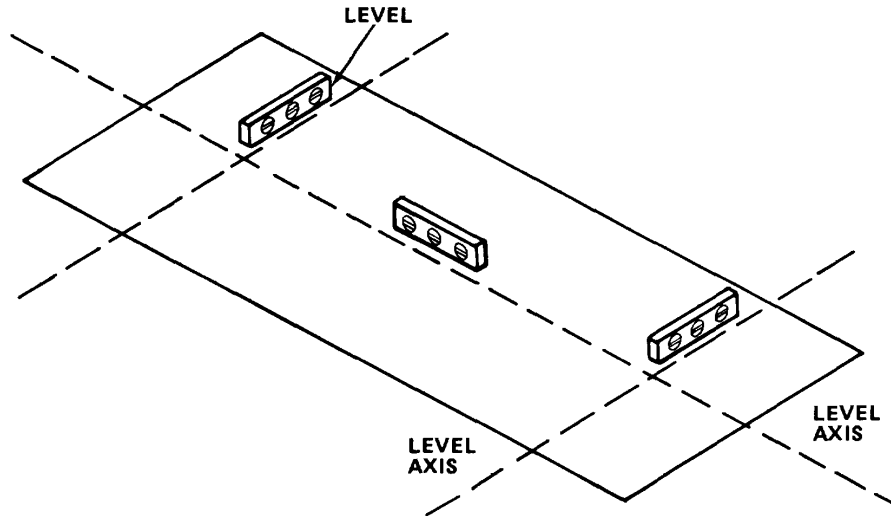
- f. Holding it taut, apply tape perpendicular to panel skin. Do not apply with rolling motion either end-to-end or center-to-ends. Do not rub each strip in place individually. Apply all strips lightly with proper overlap. Then rub into place.
- g. If necessary, damaged tape can be replaced; however, it should be removed with careful peeling motion to avoid damage to sealant. If sealant also peels back, new sealant should be applied. Complete removal of old sealant is not necessary. Permanent repair by direct support, or higher category of maintenance, should be made as soon as possible.

1-16.11. Replace Level Indicator.

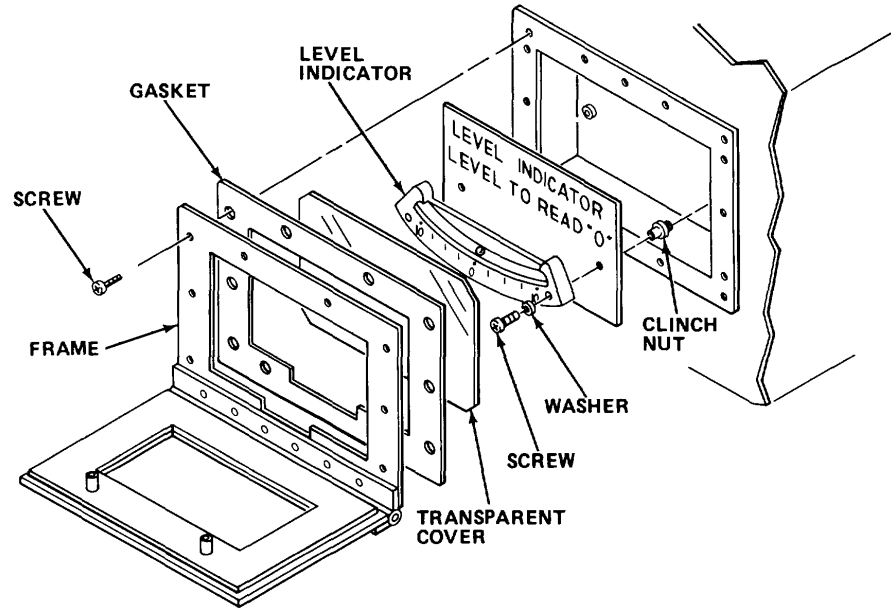
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Carpenter's level
Cross Tip Screwdriver
Knife, TL-29

SUPPLIES: Ball Bank Indicator
Level Indicator Window
Level Indicator Gasket
Level Indicator Plate Cover



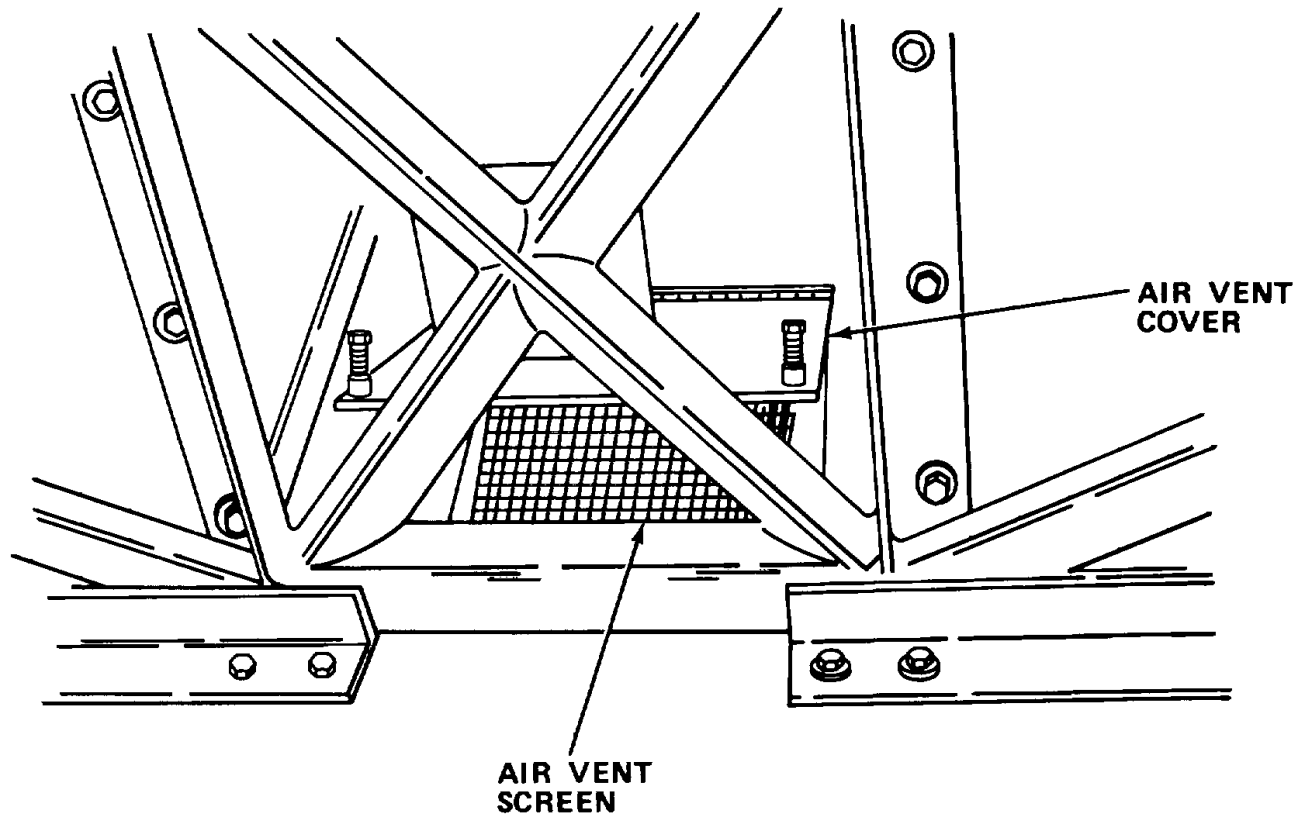
- a. Level section using level indicators. Then confirm section is level by using carpenter's level on floor inside section.
- b. Adjust section leveling jacks until section is level as indicated by carpenter's level at front-rear and left-right at each end as shown in illustration.



- c. Loosen knurled screws and move cover away from level assembly.
- d. Remove screws and washers to release cover plate and gasket.
- e. Remove level indicator window.
- f. Remove screws and washers to remove ball bank indicator.
- g. Replace ball bank indicator and secure with screws and washers.
- h. Reinstall level indicator window.
- i. Install new gasket.
- j. Reinstall cover plate and secure with screws and washers.

1-16.12. Replace Make Up Air Vent Screen.

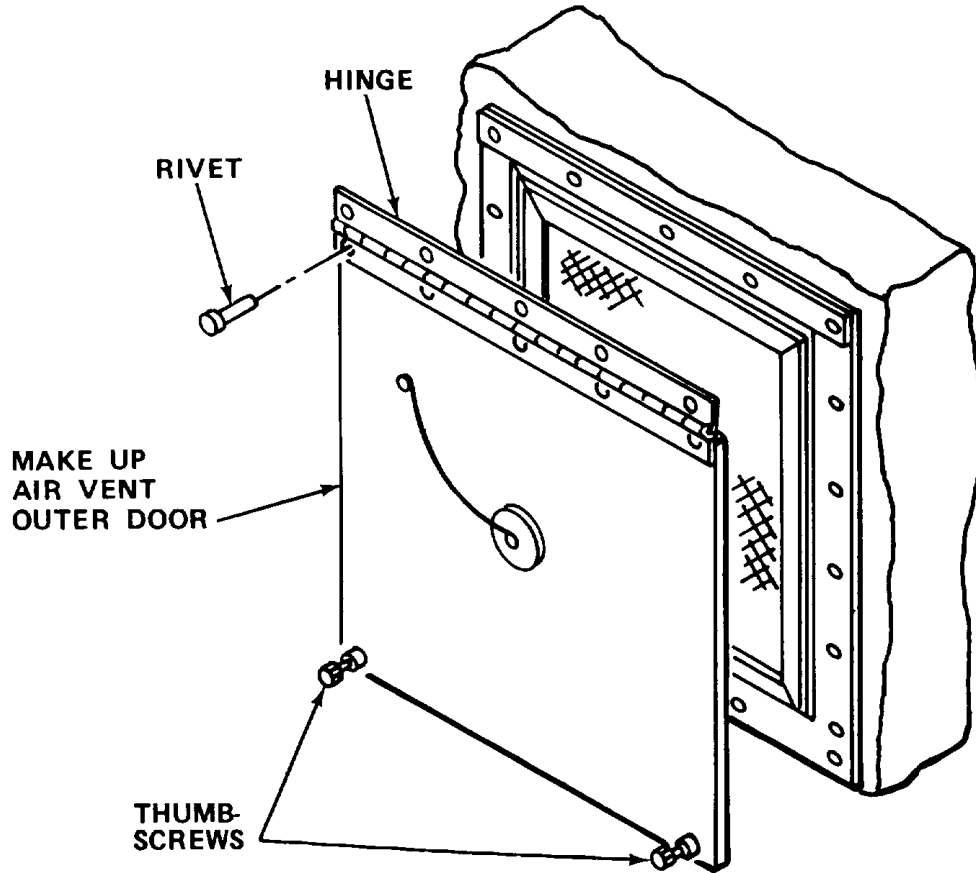
MOS: 83FJ6, Reproduction Equipment Repairer
 TOOLS: Cross Tip Screwdriver
 Scissors
 SUPPLIES: Rubber Adhesive (Item 2, Appendix E)
 Nylon Screen (Item 41, Appendix E)



- a. Raise make up air vent door and remove screws holding screen frame to section.
- b. Remove screen and frame.
- c. Clean all old screen material and adhesive from frame.
- d. Cut new screen material to size and attach to frame with adhesive.
- e. Reinstall frame to section and secure with screws. Lower make up air vent door.

1-16.13. Replace Make UD Air Vent Outer Door.

MOS: 83FJ6, Reproduction Equipment Repairer
 TOOLS: Drill and Drill Bits
 Rivet Gun
 SUPPLIES: Make Up Vent Outer Door
 Blind Rivets



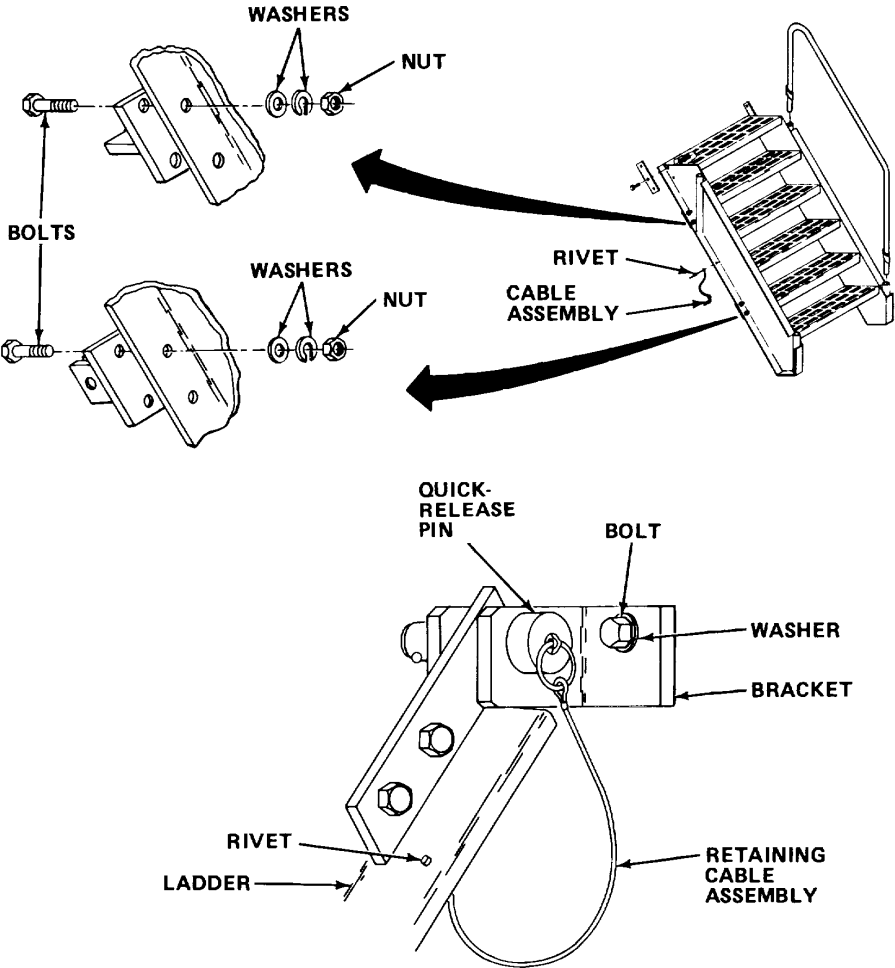
- a. Loosen thumbscrews.
- b. Drill rivets from hinge. Remove make up air vent outer door.
- c. Aline holes and rivet new make up air vent outer door to section.
- d. Tighten thumbscrews.

1-16.14. Repair Personnel Ladder.

MOS: 83FJ6, Reproduction Equipment Repairer TM 5-3610257-14

- TOOLS: Drill and Drill Bits
Rivet Gun
Combination Wrench Set
8 inch Adjustable Wrench

- SUPPLIES: Cable Assembly
Quick-Release Pins
Blind Rivets
Mounting Brackets



- a. Remove ladder from mounting bracket.
- b. Remove bolts, washers, and nuts securing damaged mounting brackets to ladder.
- c. Remove damaged cable assembly from ladder by drilling out rivet.
- d. Reinstall or install new mounting brackets. Secure with bolts, washers, and nuts.
- e. Rivet new cable assembly to ladder.

NOTE

Be sure ladder mounting brackets fit section on rear door and under personnel doors.

- f. Reinstall ladder on mounting bracket.

1-17. PREPARATION FOR STORAGE OR SHIPMENT.

- a. Section may be stored or shipped either mounted on trailer chassis or unmounted. Preparation of trailer chassis is covered in TM 6-2330-305-14 and should be referred to when trailer-mounted section is prepared for storage and shipment. TM 5-4120-367-14 must be reviewed for instructions covering air conditioner/heater.
- b. Remove consumable supplies that have limited shelf life or broken seals. Replace missing items and be sure that all remaining consumable supplies are at authorized levels. Be sure all major components are operational.
- c. Remove all unauthorized or personal equipment from section.
- d. Move all classified material or sensitive data to proper storage. Complete all accountability and/or transfer of documents.
- e. Refer to Preparation for Movement (paragraph 1-6.2) and follow applicable steps and any additional steps directed by proper authority.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE**1-18. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

1-18.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

1-18.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

1-18.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering direct/general support maintenance for this equipment.

1-18.4. Electrical System. Direct/general support level of maintenance for the repair of the section's electrical system will consist of electrical wiring repair using standard electrical wiring repair procedures.

1-19. DIRECT/GENERAL SUPPORT TROUBLESHOOTING PROCEDURES.

a. Direct/general support troubleshooting procedures cover the most common malfunctions that may be repaired at the direct/general support level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by lower level maintenance should be conducted in addition to the direct/general support troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/ inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the facing schematic or the foldout located at the end of this manual for further fault analysis.

Table 1-6. DIRECT/GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. PERSONNEL/CARGO DOORS DO NOT CLOSE COMPLETELY.	Step 1. Be sure that latch rollers rotate freely. Step 2. Check to see if latch rods are bent. Step 3. Check to see if door gasket is torn or broken.	Replace latches (paragraph 1-20.2). Replace latch rods (paragraph 1-20.2). Replace door gasket (paragraph 1-20.3)
2. PERSONNEL/CARGO DOORS DO NOT LATCH PROPERLY.	Check door latch for missing or damaged components.	Replace door latch (paragraph 1-20.2)
3. AIR OR WATER ENTERS SECTION AROUND DOOR.	Check to see if door gasket is worn or broken.	Replace door gasket (paragraph 1-20.3)

Table 1-6. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

4. RECEPTACLES DO NOT OPERATE BUT CIRCUIT BREAKERS ARE ON.

WARNING

Turn off main circuit breaker before inspecting or servicing circuit breakers or receptacles. Failure to do so may result in death or serious injury.

- Step 1. Check to see if power cable is firmly connected to power entry panel.
Connect power cable.
- Step 2. Check to see if voltage meter and frequency scale and INCORRECT PHASE or CORRECT PHASE lamp indicate necessary power.
- Notify your supervisor for service of power supply at source.

5. CIRCUIT BREAKERS TRIP CONTINUALLY.

WARNING

Turn off and padlock safety switch before inspecting or servicing circuit breakers or receptacles. Failure to do so may result in death or serious injury.

- Step 1. Check to see if receptacles are overloaded.
Reconnect equipment to different receptacles.
- Step 2. Check to see if receptacles are damaged.
Replace receptacles (paragraph 1-16.6)
-

Table 1-6. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. LIGHT LEAKS AROUND DARKROOM DOOR ASSEMBLY.	Check for defective magnetic door gasket.	Replace door gasket (paragraph 1-20.9).
7. LIGHT LEAKS AROUND BOTTOM OF DARKROOM DOOR ASSEMBLY.	Check for defective threshold seal.	Replace seal (paragraph 1-20.10).
8. LIGHT LEAKS AROUND PANEL OF DARKROOM PARTITION ASSEMBLY.	Check for openings between top frame, ceiling fan and partition panel.	Seal openings with silicone sealant.
9. DARKROOM IN USE INDICATOR LIGHT DOES NOT TURN ON.	Step 1. Check for defective darkroom in use indicator light assembly.	a. If assembly is operative, proceed to step 2. b. Replace defective assembly (paragraph 1-20.11).
	Step 2. Check for defective darkroom in use light switch.	Replace switch (paragraph 1-16.4).

1-20. MAINTENANCE PROCEDURES.

a. This section contains instructions covering direct/general support maintenance functions for the Camera Section. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

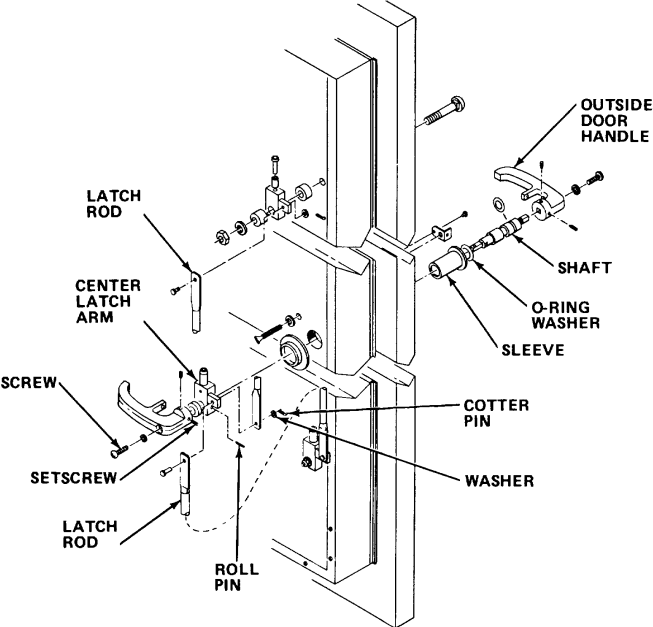
INDEX

PROCEDURE	PARAGRAPH
Repair Personnel Door Handle.....	1-20.1
Replace Cargo Door Latch Assembly	1-20.2
Replace Personnel/Cargo Door Gasket	1-20.3
Replace Personnel/Cargo Door	1-20.4
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Replace Darkroom Door Assembly Threshold.....	1-20.10
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Replace Air Conditioner.....	1-20.12
Replace Air Conditioner Support Bracket.....	1-20.13
Replace Air Conditioning Duct.....	1-20.14

1-20.1. Repair Personnel Door Handle.

- MOS: 63W, Wheel Vehicle Repairer
TOOLS: Cross Tip Screwdriver
Needle Nose Pliers
Combination Wrench Set
Ball Peen Hammer
Center Punch
Socket Head Screw Key Set

- SUPPLIES: O-ring Washer
Sleeve
Roll Pin
Personnel Door Handle
Cheesecloth (Item 4, Appendix E)
Oil, Lubricating, General Purpose (Item 26, Appendix E)
Hand Oilier
Cotter Pin



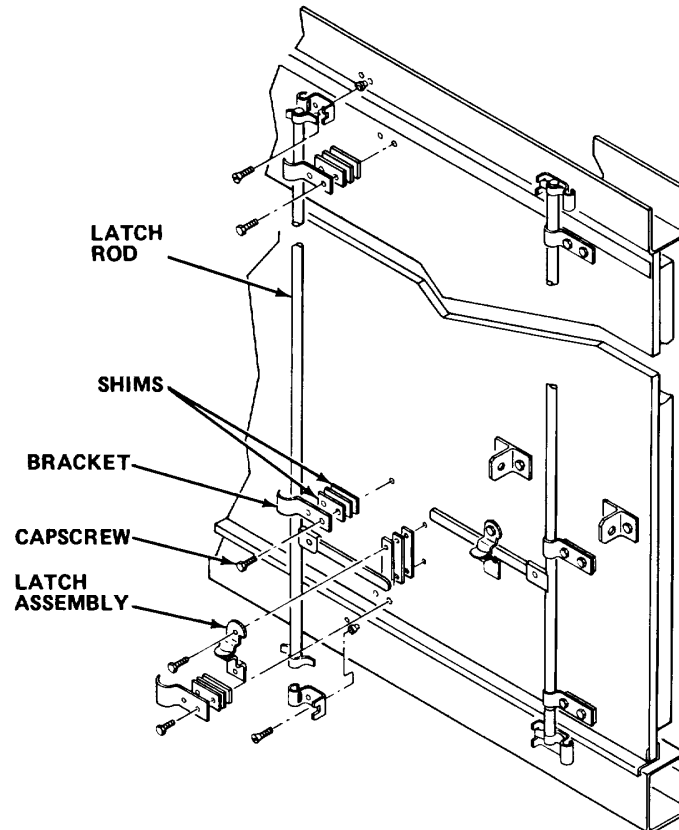
- a. Loosen screw and socket head setscrews. Remove defective inside door handle.
- b. Remove cotter pin and pins from center latch arm assembly.
- c. Move latch rods out of way.
- d. Punch roll pin from center latch arm assembly and pull latch arm assembly from shaft.
- e. Withdraw latch and defective door handle.
- f. Inspect all components for wear.
- g. Replace worn O-ring washer and sleeve.
- h. Replace other worn components as needed.
 - i. Reinstall latch and new door handle.
 - j. Aline center latch arm assembly on shaft. Secure with new roll pin.
- k. Aline latch rods. Attach to latch arms with pins, washers, and new cotter pin.
- l. Reinstall new inside door handle.
- m. Lightly oil all moving parts. Wipe up surplus oil.

1-20.2. Replace Cargo Door Latch Assembly.

MOS: 63W, Wheel Vehicle Repairer

TOOLS: Combination Wrench Set

SUPPLIES: Cargo Door Latch Assembly



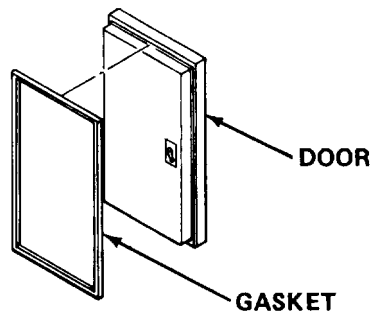
- Unlock latch.
- Remove capscrews and washers from brackets. Remove brackets and shims.
- Remove defective latch assembly and latch rod.
- Install new latch assembly and latch rod.
- Reinstall shims, brackets, washers, and capscrews.
- Check movement at latch rod and latch assembly. Lock latch.

1-20.3. Replace Personnel/Cargo Door Gasket.

MOS: 63W, Wheel Vehicle Repairer

TOOLS: Knife, TL-29

SUPPLIES: Vinyl Gasket
 Adhesive (Item 2, Appendix E)
 Solvent P-D-680 (Item 45, Appendix E)
 Disposable Gloves (Item 21, Appendix E)
 Goggles
 Cheesecloth (Item 4, Appendix E)



- a. Open door completely and secure in open position.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent-impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 1000 F to 1380 F (380 C to 590 C).

- b. Remove defective gasket by prying gasket from door. Scrape traces of gasket and adhesive from door. Wash with solvent P-D-680.
- c. Coat gasket area on door with adhesive.
- d. Firmly press new gasket onto door.
- e. Wipe excess adhesive from gasket.
- f. Close door and wipe excess adhesive from door and frame.
- g. Allow adhesive to dry before using door.

1-20.4. Replace Personnel/Cargo Doors.

MOS: 63W, Wheel Vehicle Repairer

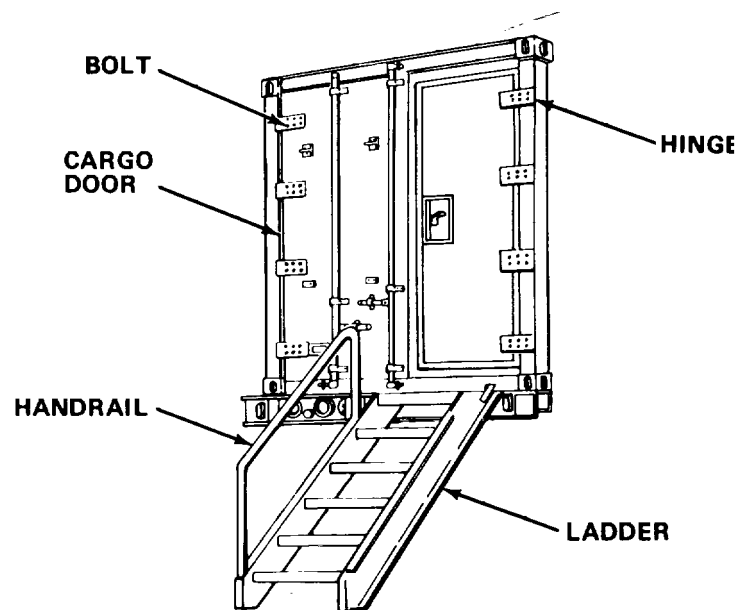
PERSONNEL: Two persons are required to perform this procedure.

TOOLS: Rivet Gun
Electric Drill and Bits
Hoist
Combination Wrench Set
Paint Brush

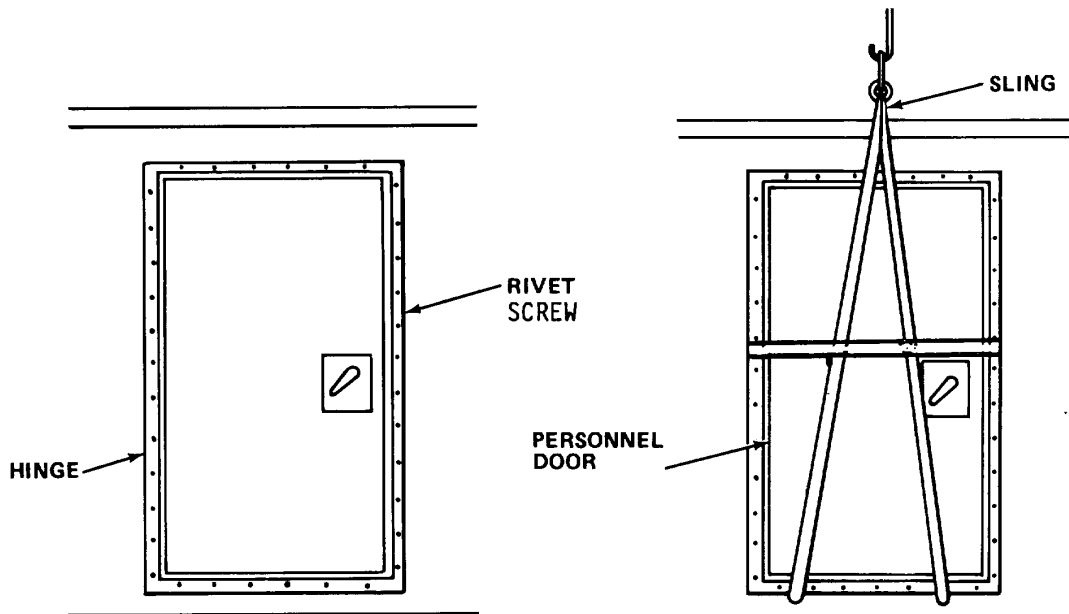
SUPPLIES: Personnel/Cargo Door
Blind Rivets
Vinyl Gasket
Paint (Item 29, Appendix E)
Paint (Item 30, Appendix E)
Adhesive (Item 2, Appendix E)
Cheesecloth (Item 4, Appendix E)

WARNING

To prevent personal injury or equipment damage, do not attempt to remove doors unless suitable lifting equipment and hoist are available.



- a. Remove handrails and ladders if rear cargo door is to be replaced.
- b. Unlock and open door to be replaced.



- c. Place sling around door and put a slight strain on hoist to remove weight from hinges.
- d. Remove bolts from hinges on rear personnel door. On side personnel door, remove screw from hinge. Remove hinges from door.
- e. Remove damaged door using hoist.
- f. Install new door using hoist.
- g. Reinstall hinges on rear personnel door. Secure with bolts. Reinstall hinges on side personnel door. Secure with screw.
- h. Remove sling from door.
- i. Install new gaskets on door after it is mounted (paragraph 1-20.3).
- j. Repaint as needed.
- k. Close and lock door.

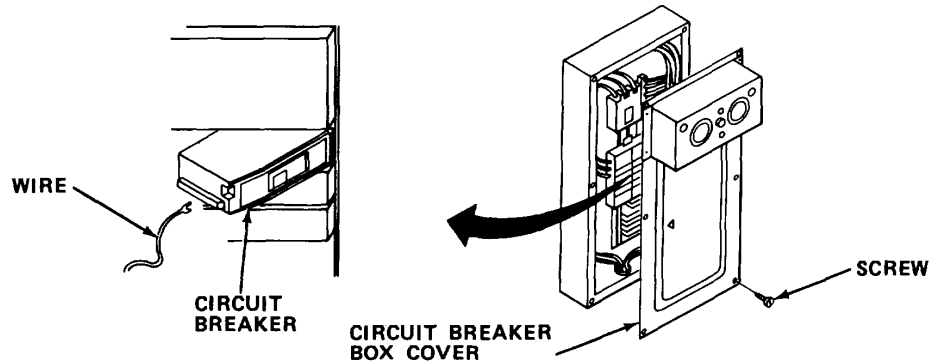
1-20.5. Replace Circuit Breaker.

MOS: 35E, Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver

Multimeter

SUPPLIES: Circuit Breaker

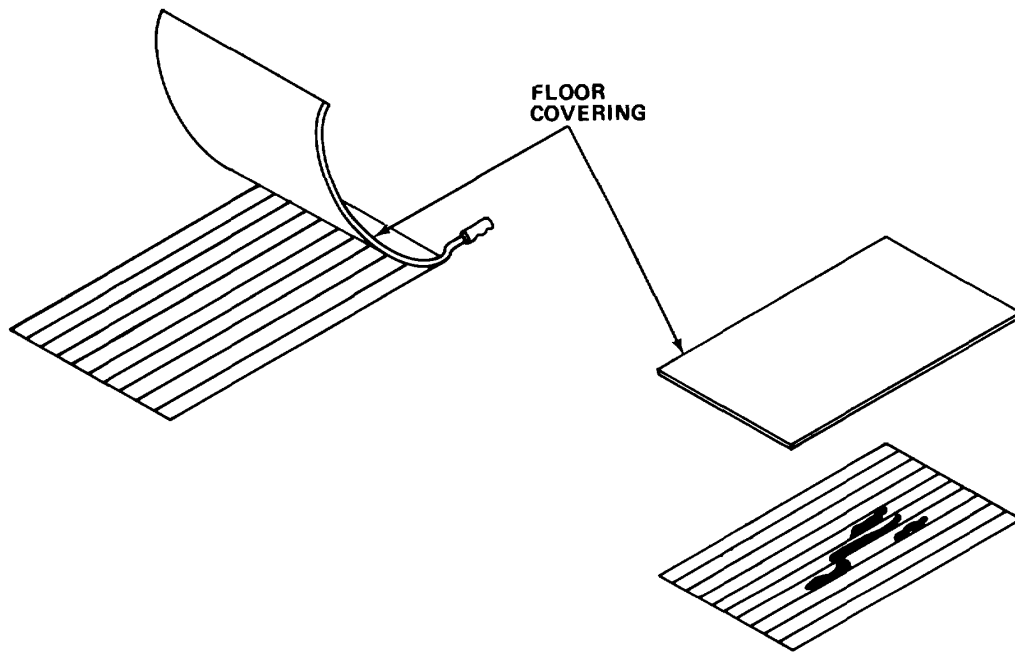
**WARNING**

Turn off and padlock safety switch. Turn off all individual circuit breakers before inspecting or servicing circuit breakers. Failure to do so may result in death or serious injury.

- a. Turn off and padlock safety switch. Turn off individual circuit breakers.
- b. Remove circuit breaker box cover.
- c. Use multimeter to make sure voltage is not present.
- d. Remove defective circuit breaker by pushing and snapping out of place.
- e. Tag and remove wires from defective circuit breaker.
- f. Pull circuit breaker from panel.
- g. Reconnect wires to new circuit breaker. Secure wires with screws.
- h. Install new circuit breaker by pushing and snapping into place.
- i. Reinstall circuit breaker box cover.
- j. Remove padlock and turn on safety switch and individual circuit breakers.

1-20.6. Repair Floor Covering.

MOS: 52C, Utilities Equipment Repairer

TOOLS: Utility Knife
Scraper
StraightedgeSUPPLIES: Vinyl Floor Covering
Cheesecloth (Item 4, Appendix E)
Adhesive (Item 2, Appendix E)

- a. Cut a rectangular area from damaged floor covering.
- b. Remove damaged floor covering.
- c. Cut new floor covering to fit.
- d. Apply adhesive to floor.
- e. Press down new floor covering.
- f. Clean up excess adhesive.

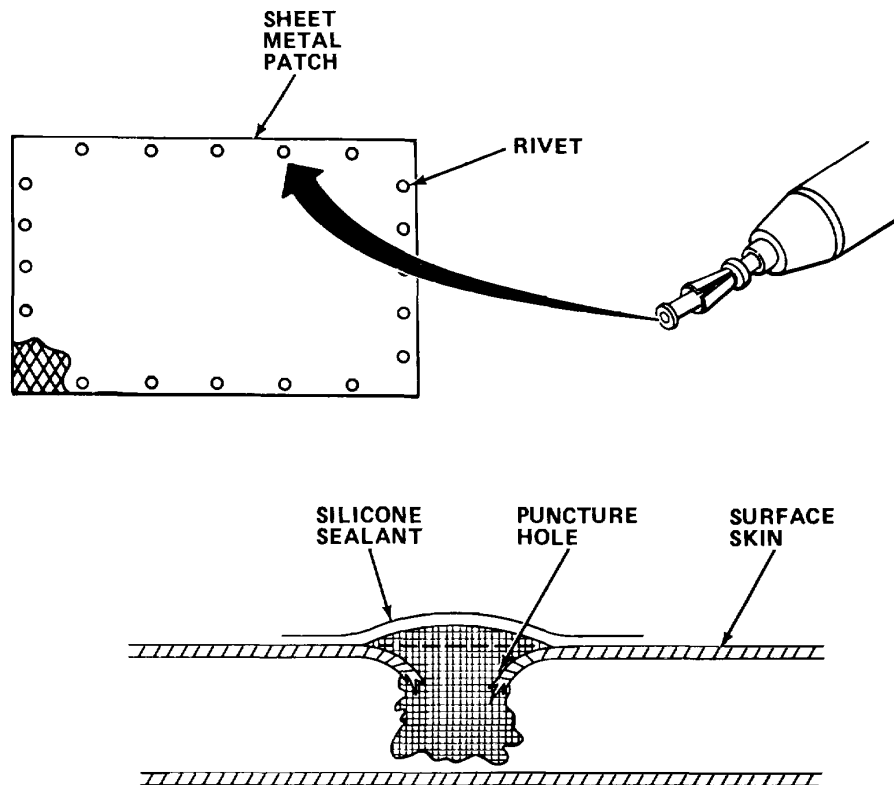
1-20.7. Repair Van Body Skin (Permanent).

MOS: 63W, Wheel Vehicle Repairer

TOOLS: Rivet Gun
 Electric Drill and Bits
 Paint Brush

SUPPLIES: Blind Rivets
 Sprayfoam (Item 48, Appendix E)
 Silicone Sealant (Item 37, Appendix E)
 Sheet Metal
 Paint (Item 29, Appendix E)
 Cheesecloth (Item 4, Appendix E)

- a. Bend broken edges of skin inward into puncture hole. Do not attempt to remove fragments of skin by bending or pulling out.
- b. Remove any loose fragments of foam.
- c. Use cloth dampened with water to clean area around puncture. Wipe dry.
- d. Inject sprayfoam into puncture. Fill to 1/8 in. (3.2 mm) above surface of unbroken skin. Apply sealant to cracks leading to puncture.



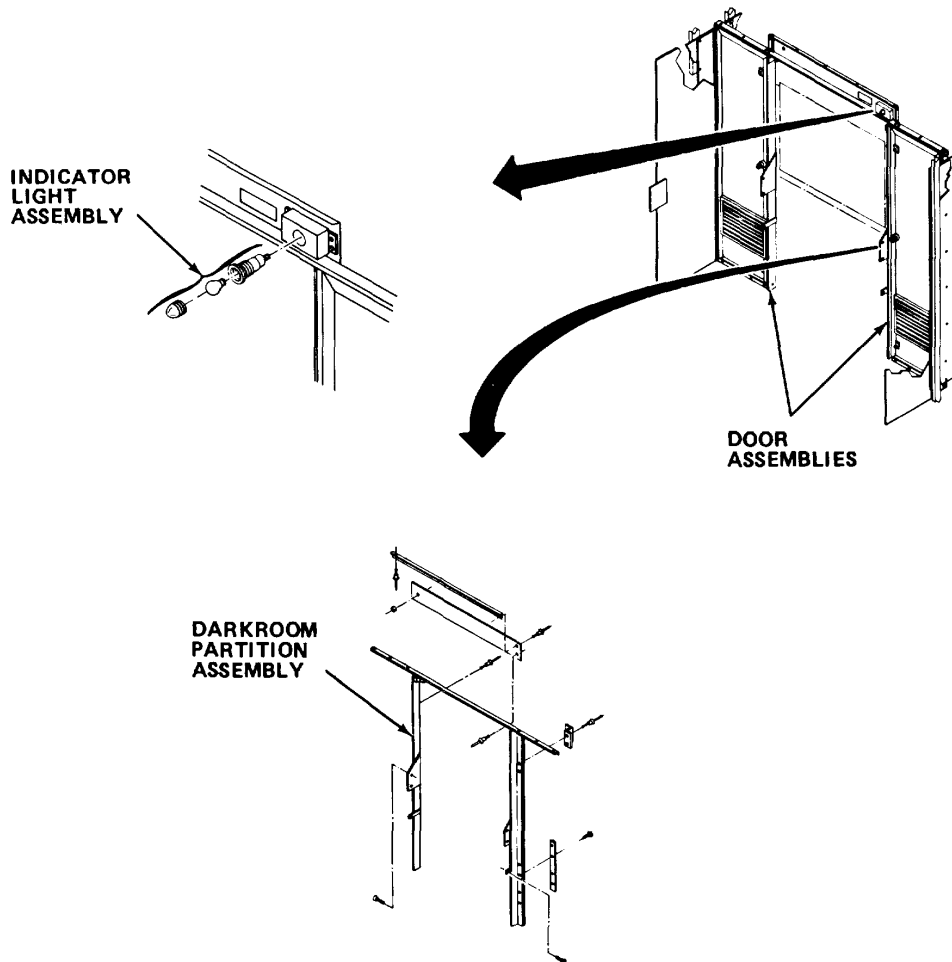
- e. Prepare sheet metal patch large enough to cover damaged area with overlap.
- f. Place patch over damaged area and mark all around edges of patch.
- g. Drill holes 1 in. (25.4 mm) apart.
- h. Apply sealant to edges of patch.
- i. Apply patch to van body.
- j. Install rivets beginning at center of each side. Rivets should be placed 1 in. (25.4 mm) apart.
- k. Paint as needed.

1-20.8. Replace Darkroom Partition Assembly.

MOS: 83FJ6 Reproduction Equipment Repairer

TOOLS: Drill and Bits
 Cross Tip Screwdriver
 Combination Wrench Set
 Riveter Kit

SUPPLIES: Darkroom Partition Assembly
 Blind Rivets
 Silicone Sealant (Item 37, Appendix E)



WARNING

Death or serious injury may occur from electrical shock unless darkroom in use circuit breaker is turned off before servicing.

- a. Turn off circuit breaker.
- b. Remove darkroom in use indicator light assembly and power cord.
- c. Remove light integrating exposure control instrument remote station cord.
- d. Remove door assemblies.
- e. Remove screws securing camera to post assemblies.
- f. Remove rivets and defective darkroom partition assembly.
- g. Install new darkroom partition assembly.
- h. Install screws securing camera to post assemblies.
- i. Install door assemblies.
- j. Install light integrating exposure control instrument remote station cord.
- k. Install darkroom in use indicator light assembly and power cord.
- l. Test for light leaks. Repair any leaks with silicone sealant.

1-20.9. Replace Darkroom Door Gasket.

MOS: 83FJ6 Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver

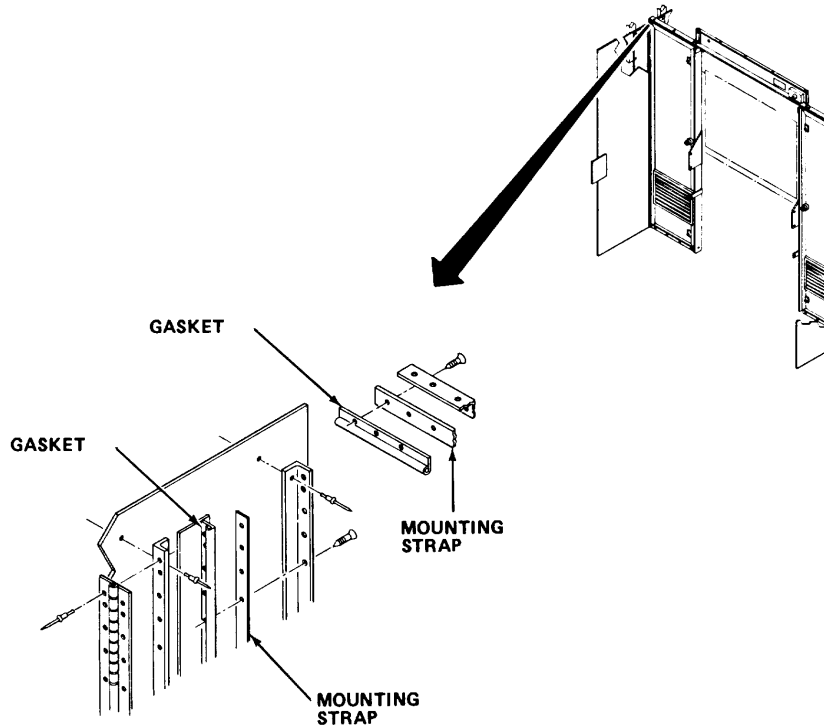
Rivet Gun

Electric Drill

Drill Bits

SUPPLIES: Door Gasket

Blind Rivets



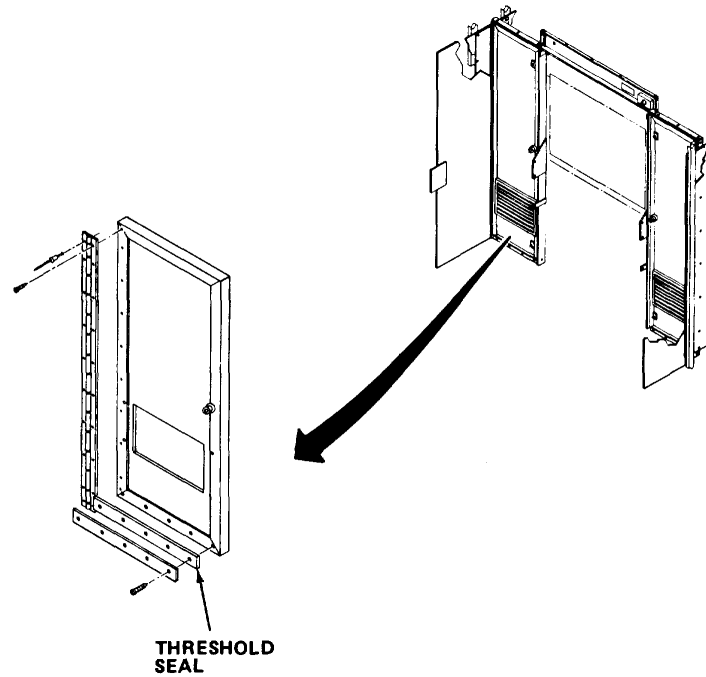
- a. Drill out rivets securing gasket mounting strap and remove strap.
- b. Remove defective gasket.
- c. Position new gasket and mounting strap on door frame and secure it with rivets.
- b. File rivets head smooth to prevent damage to camera canves.

1-20.10. Replace Darkroom Door Assembly Threshold Seal.

MOS: 83FJ6 Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Threshold Seal



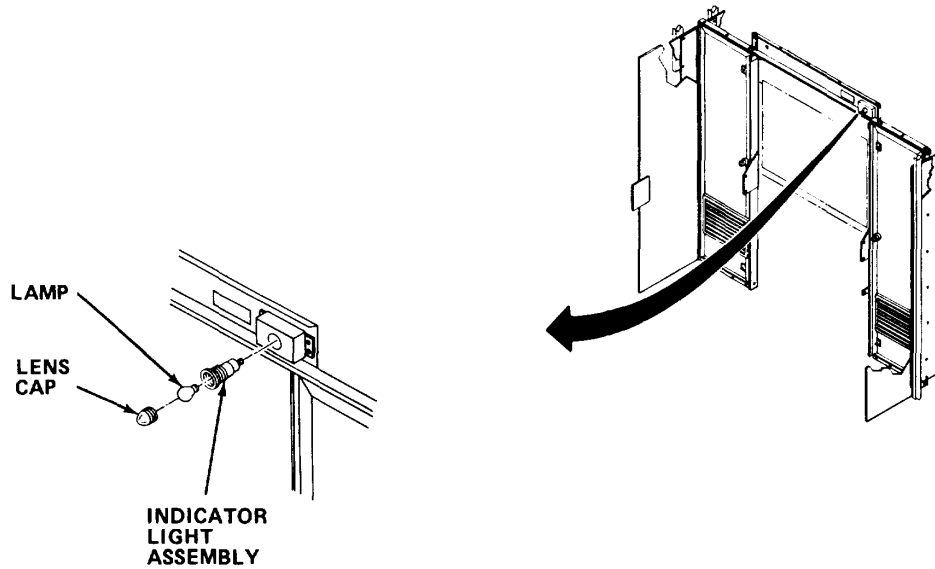
- a. Remove screws securing threshold seal to bottom of darkroom door.
- b. Remove defective threshold seal.
- c. Position new seal on door and secure with screws.

1-20.11. **Replace Darkroom In Use Indicator Light Assembly.**

MOS: 35E Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Indicator Light Assembly



WARNING

Death or serious injury may occur from electrical shock if darkroom in use indicator light circuit breaker is not turned off prior to servicing.

- a. Turn off circuit breaker.
- b. Remove lens cap.
- c. Remove lamp.
- d. Remove defective indicator light assembly.
- e. Install new indicator light assembly.
- f. Install lamp.
- g. Install lens cap.

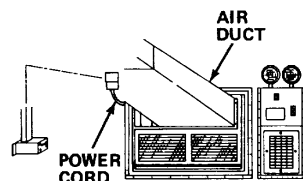
1-20.12. Replace Air Conditioner.

MOS: 63W, Wheel Vehicle Repairer TM 5-3610-25

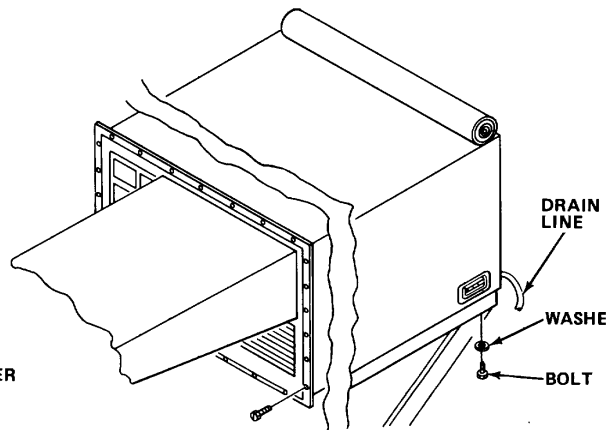
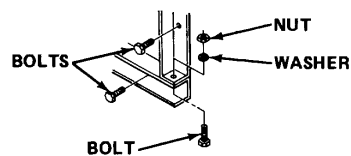
PERSONNEL: Two persons are required to perform this procedure.

TOOLS: Cross Tip Screwdriver
Lifting Equipment
8 inch Adjustable Wrench
Combination Wrench Set

SUPPLIES: Air Conditioner
Solvent P-D-680 (Item 45, Appendix E)
Gasket
Sealant (Item 37, Appendix E)
Adhesive (Item 2, Appendix E)
Cheesecloth (Item 4, Appendix E)
Goggles
Disposable Gloves (Item 21, Appendix E)



AIR CONDITIONER MOUNTING



WARNING

- Use hoist or proper lifting equipment to replace air conditioner/heater. Failure to do so may result in death or serious injury.
- Turn off air conditioner circuit breaker and unplug power cord. Failure to do so may result in death or serious injury.
 - a. Turn off air conditioner circuit breaker. Unplug or disconnect power cord as appropriate.

- b. Remove screws holding air conditioning duct to air conditioner.
- c. Remove nut, washer, and screw from each corner of air conditioner mounting. Remove screws securing mounting to section wall.
- d. Disconnect drain lines from air conditioner.
- e. Attach sling to lifting handles. Raise hoist enough to remove slack from sling.
- f. Remove mounting bolts and washers.
- g. Slide out air conditioner until other lifting handles are free. Attach sling to handles.
- h. Raise defective air conditioner with hoist until unit is free from brackets and section.
- i. Place air conditioner on flat-bed truck or pallet.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent-impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 1000 F to 1380 F (380 C to 590 C).

- j. Clean sealant from opening using dry cleaning solvent P-D-680.
- k. Remove damaged gasket and replace with new gasket.
- l. Raise air conditioner until it rests on air conditioner brackets.
- m. Remove two sling hooks as unit is eased into hole until grille touches duct.
- n. Remove remaining sling.
- o. Reinstall washers and mounting bolts.
- p. Reconnect drain lines.
- q. Reinstall screws securing air conditioner mounting to section wall. Reinstall screw, washer, and nut to each corner of mounting.
- r. Reinstall screws securing air duct to air conditioner.
- s. Reconnect or plug in power cord. Turn on air conditioner circuit breaker.

1-20.13. Replace Air Conditioner Support Bracket.

MOS: 63W, Wheel Vehicle Repairer

PERSONNEL: Two persons are required to perform this procedure.

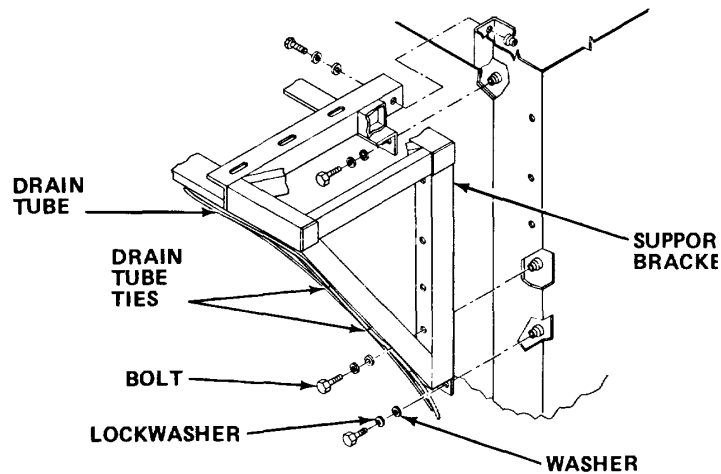
TOOLS: Combination Wrench Set

Lifting Equipment

Knife, TL-29

SUPPLIES: Air Conditioner Support Bracket

Drain Tube Ties

**WARNING**

Serious injury to personnel or damage to equipment may occur unless two or more personnel are used to remove and replace air conditioner because of weight and balance of air conditioner.

- a. Remove air conditioner (paragraph 1-20.12).
- b. Cut drain tube ties, and remove drain tube from support bracket.
- c. Remove bolts, lockwashers, and washers securing support bracket.
- d. Remove defective support bracket.
- e. Install new support bracket. Secure to section with bolts, lockwashers, and washers.
- f. Reinstall drain tube on support bracket, and secure with new ties.
- g. Reinstall air conditioner (paragraph 1-20.12).

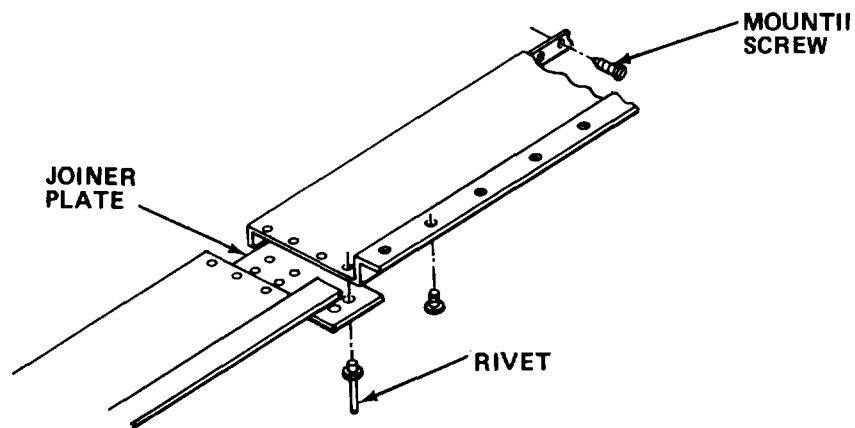
1-20.14. Replace Air Conditioning Duct.

MOS: 52C, Utilities Equipment Repairer

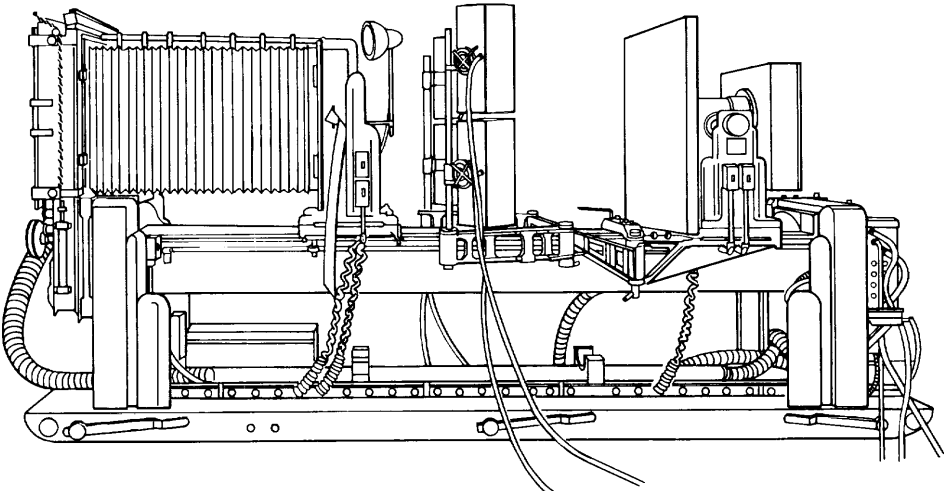
TOOLS: Hacksaw
 Electric Drill and Bits
 Ball Peen Hammer
 Rivet Gun
 Paint Brush
 Cross Tip Screwdriver

SUPPLIES: Sealant (Item 37, Appendix E)
 Wood Block
 Blind Rivets
 Paint (Item 30, Appendix E)
 Cheesecloth (Item 4, Appendix E)
 Salvaged Air Conditioning Duct

- a. Turn off air conditioner so air will not blow through duct



- b. Drill rivets from damaged section of duct. Remove joint plates.
 c. Remove mounting screws to remove damaged sections of duct.
 d. Straighten remaining sections of duct at edges using hammer and wood block.
 e. Place sealant on mounting edges.
 f. Install new duct section cut from salvaged duct. Secure with screws.
 g. Reinstall joiner plates. Install rivets to secure.
 h. Paint as necessary.
 i. Turn on air conditioner.



CHAPTER 2

LITHOGRAPHIC COPYING CAMERA

Section I. INTRODUCTION

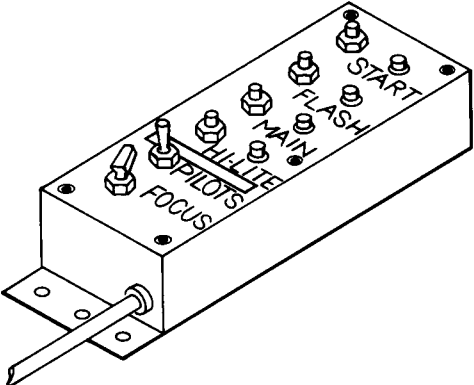
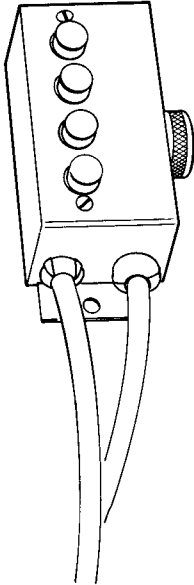
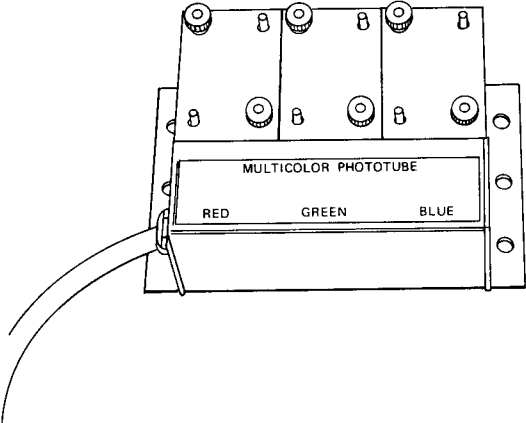
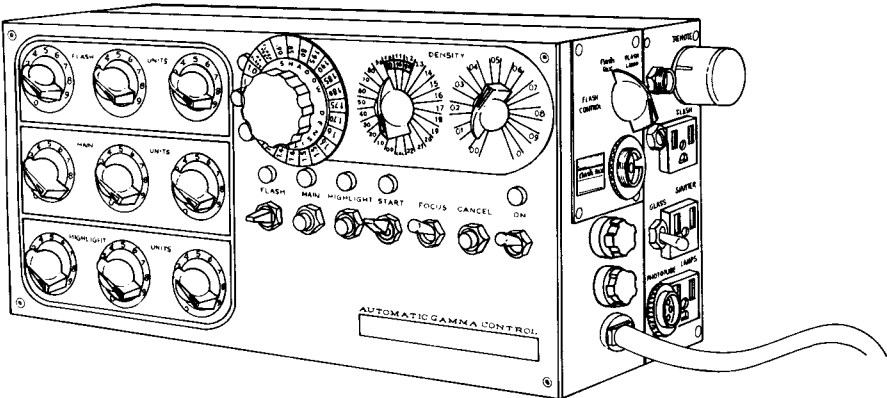
2-1. GENERAL INFORMATION.

2-1.1. Scope.

- a. Model Number and Equipment Name. Lithographic Copying Camera.
- b. Purpose of Equipment. Reproduces any original such as photographs, drawings, charts, maps, or written documents. Original may be line or continuous-tone. Copy may be enlarged or reduced.

2-1.2. Reference Information.

TM 5-3610-258-14, Operator's, Organizational, Direct Support, and General Support Maintenance Manual, Lithographic Copying Camera contains the information applicable to this equipment.



CHAPTER 3

LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT

Section I. INTRODUCTION

3-1. GENERAL INFORMATION.

3-1.1. Scope.

- a. Model Number and Equipment Name. Model GM-100 Light Integrating Exposure Control Instrument.
- b. Purpose of Equipment. Measures light and alters exposure time to compensate for copy density.

3-1.2. Nomenclature Cross Reference List.

Common Name

Official Nomenclature

Exposure Control Instrument

Light Integrating Exposure Control Instrument

Flash Lamp

Lamp, Reflector

3-1.2. Glossary.

Decade Dialing System

Each dial has 10 positions from 0-9.

Density

A numerical value given to measure opacity.

Diffuser (Phototube)

Frosted glass used as a screen to soften light.

Opaque Material
the passage of light.

Any material that will prevent

Translucent Material

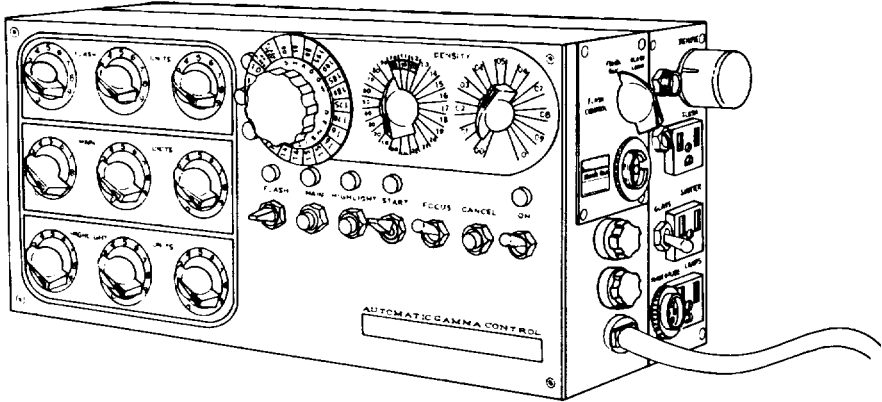
Any material that will permit the passage of light of particular wave lengths.

3-2. EQUIPMENT DESCRIPTION.

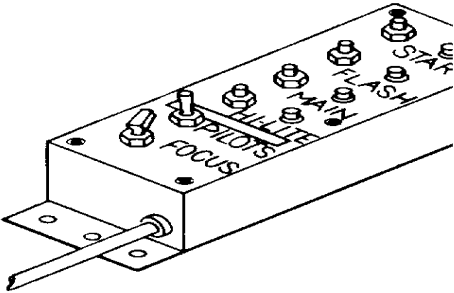
3-2.1. Equipment Characteristics, Capabilities, and Features. Measures light and alters exposure time to compensate for copy density to enhance negative quality and control. The light integrating exposure control instrument has the following capabilities and features:

- a. Compensates for changes in line voltage.
- b. Remote control capability.

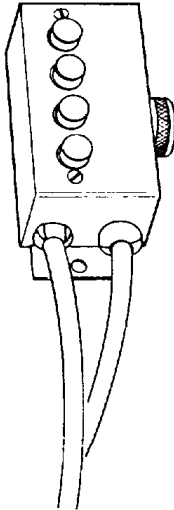
3-2.2. Location and Description of Major Components.



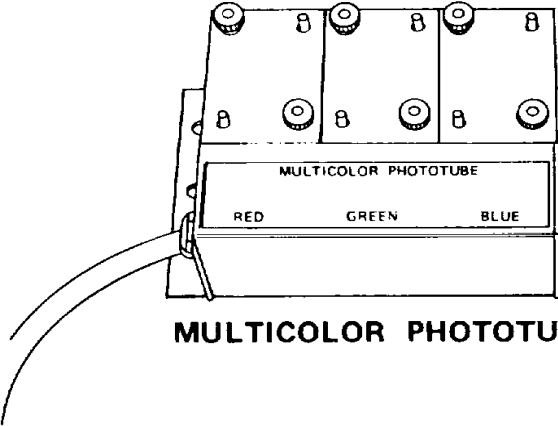
LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT



REMOTE CONTROL UNIT



MULTI COLOR PHOTOTU CONTROL SWITCH



MULTICOLOR PHOTOTU

LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT. Contains controls and electrical circuits needed for automatic control of camera lights and shutter.

REMOTE CONTROL UNIT. Provides for control of exposure control instrument from a remote location.

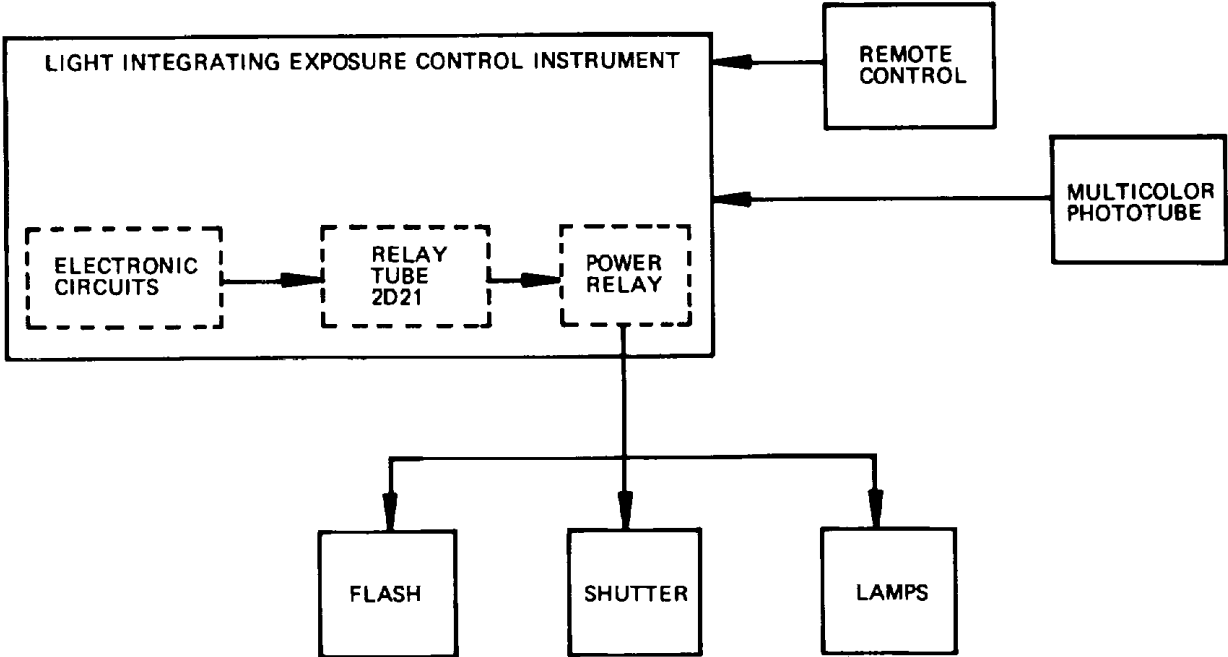
MULTICOLOR PHOTOTUBE. Used to adjust color exposure times.

COLOR PHOTOTUBE CONTROL SWITCH. Used to select individual color phototubes or combination of color phototubes.

3-2.3. Equipment Data.

Power Requirements	95 to 135 V ac, 60 Hz.
Output Power	117 V ac 60 Hz, 4 amps max.
Flash Exposure Measurement	1-999 units
Main Exposure Measurement	1-999 units
Highlight Exposure Measurement	1-999 units
Density Range	0.00 to 2.30
Linearity	+1/2 of 1%
Repeatability	+1/10 of 1%
Size	15 in. wide x 7 in. high x 7-1/4 in. deep (38.1 cm wide x 17.8 cm high x 18.4 cm deep)
Weight	20 lbs (9.07 kg)

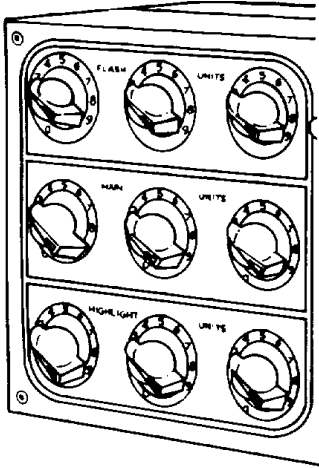
3-3. TECHNICAL PRINCIPLES OF OPERATION.



3-3.1. General.

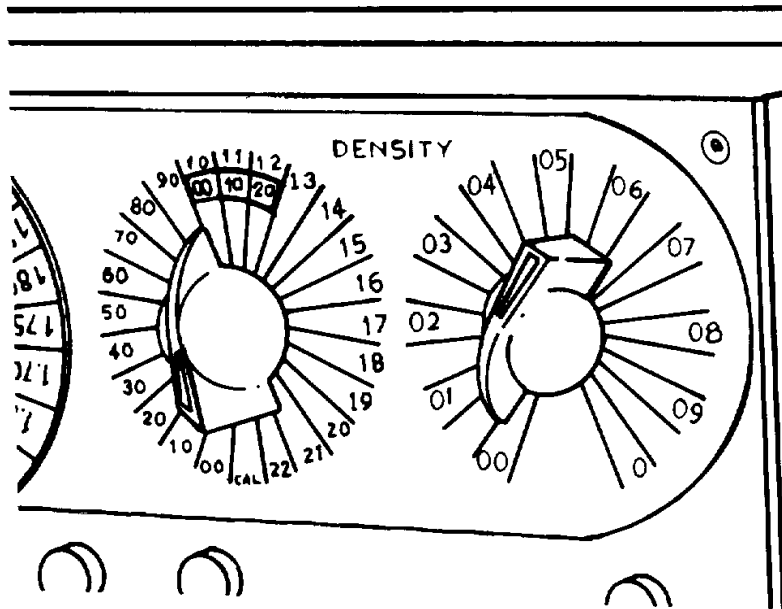
- a. The light integrating exposure control instrument is a precision integrated process control unit. The multicolor phototube provides calibrated time (seconds) reference to the instrument for setting exposure times.
- b. The exposure control instrument automatically computes copy range exposure time for highlight densities within the range of .00 through .30. The instrument provides electrical power to the flash, shutter, and lamps circuits at required times.
- c. The exposure control instrument can be operated remotely with the addition of the remote control station.

3-3.2. Detailed.



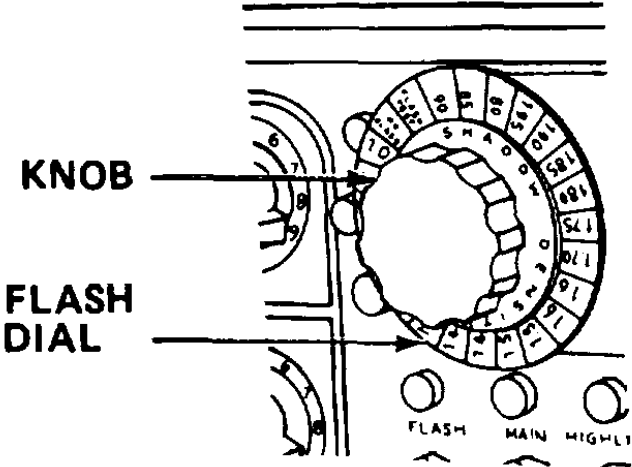
TIME UNIT DIALS

a. Time unit dials. The time unit dials form a decade dialing system. While initially programmed on basis of "seconds", reference to time unit dials is in "units". For example, each position on left dial is programmed for 10 seconds but would represent 100 units. Each position on center dial is programmed for 1 second but would represent 10 units, and each position on right dial is programmed for 1/10th of a second but would represent 1 unit. First position (1) on left dial would be 100 units or 10 seconds, second position (2) would be 200 units or 20 seconds, etc. First position (1) on center dial would be 10 units or 1 second, second position (2) would be 20 units or 2 seconds, etc. First position (1) on right dial would be 1 unit or 1/10th of a second, second position (2) would be 2 units or 2/10ths of a second, etc.

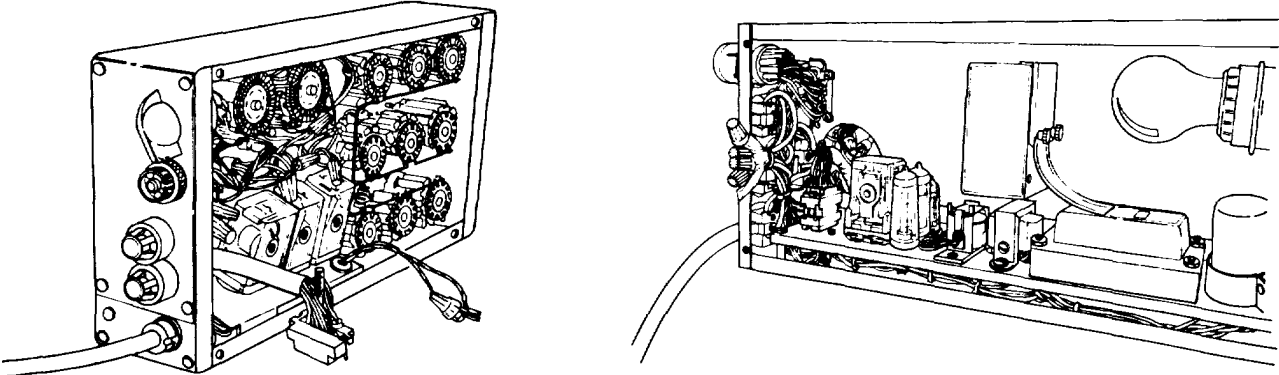


DENSITY DIALS

b. DENSITY dials. The control of exposures by the exposure control instrument is accomplished by the DENSITY dials. Increase or decrease in exposure is the result of density dial settings, plus setting of time unit dials. Combination of DENSITY dials and time unit dials provides control of exposure that can be predicted, controlled, and repeated. Amount of time shutter is open and camera lights are on is determined by the coordinated settings of DENSITY dials and time unit settings. DENSITY dials override time unit dials when using MAIN or HIGHLIGHT UNITS. For example, if instrument is set with left time unit at number 1, this provides 100 units. Normally phototube is adjusted to provide 10 seconds at this position when left DENSITY dial is at 1.0 and right DENSITY dial is at .00 (10 seconds at 100 units). When left DENSITY dial is turned to 1.30, exposure cycle becomes 20 seconds. The DENSITY dials increase exposure cycle in direct relation to densities of copy (see Table 3-3, Density Dial Settings).

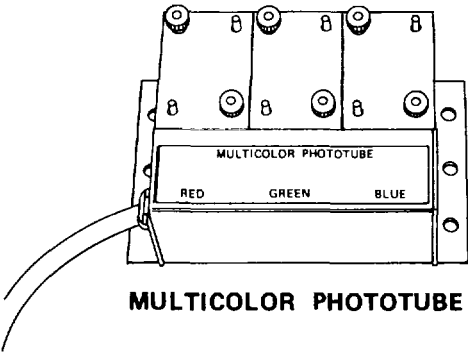


c. Flash dial. Controls length of flash exposure and is composed of two components that can be moved separately or together. By holding knob, numbered dial can be moved separately from knob, allowing basic density range of screen to be placed under "NO FLASH" position of the knob. By rotation of knob, shadow density of copy can be indexed opposite lighted lamp to compute correct flash exposure. With highlight density of .30 or less, one of three red lamps located on left side of dial will be on indicating point where flash dial is set for copy shadow density prior to starting flash exposure. FLASH TEST position is used in making a test of flash time required for the desired shadow dot.

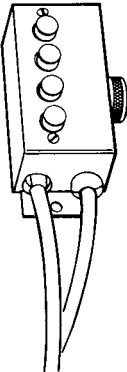


ELECTRONIC CIRCUITS

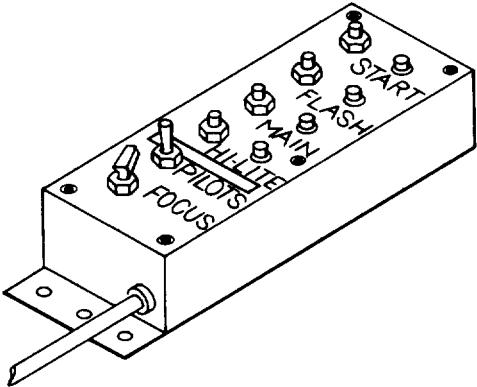
d. Electronic circuits. Supply line voltage to preselected camera and lighting circuits during an exposure cycle at the correct time and for required duration.



e. Multicolor phototube. Used to adjust the reference for exposure time (seconds) to be used in setting up the exposure control instrument.



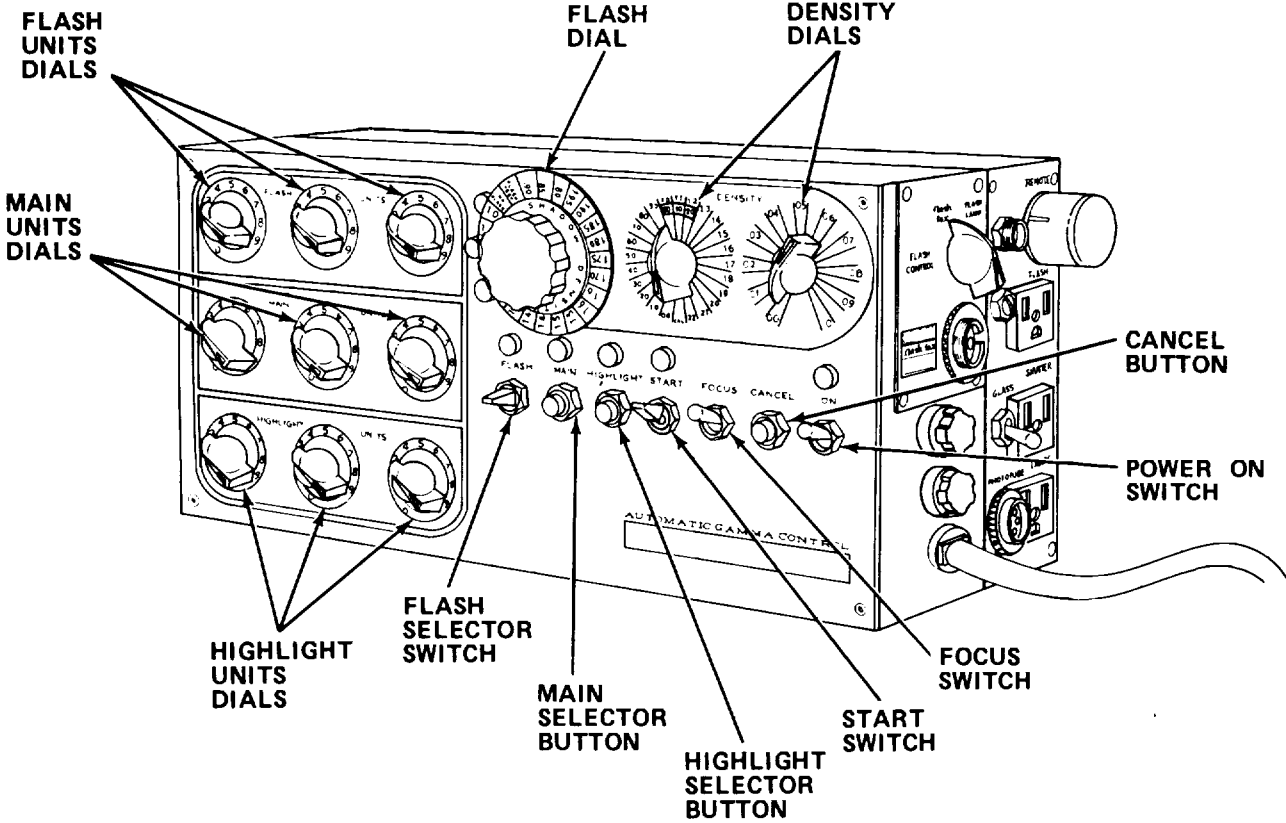
f. Multi color phototube control switch. Used to turn on each color or combination of colors on the multicolor phototube.



g. Remote control unit. Used to operate the exposure control instrument from a remote location.

Section II. OPERATING INSTRUCTIONS

3-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



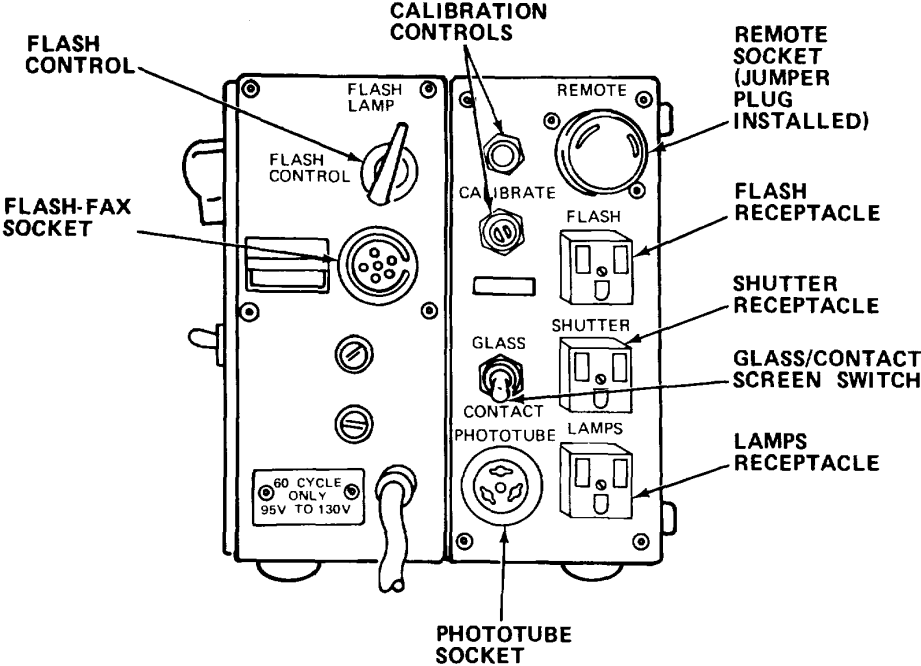
Control or Indicator	Function
Power ON Switch	Applies power to exposure control instrument.
CANCEL Button	Immediately terminates any exposure cycle and places instrument in ready position for new exposure.
FOCUS Switch	Opens shutter and turns on camera lamps. This condition will continue until switch is turned off.

Controls or indicators	Function
Control or Indicator Function	
START Switch	Starts a predetermined highlight, main, or flash exposure cycle.
HIGHLIGHT Selector Button	Presets instrument for a highlight exposure. Pressed prior to pressing START button.
MAIN Selector Button	Presets instrument for a main exposure. Pressed prior to pressing START button.
FLASH Selector Switch	Down position presets instrument for a flash exposure. Switch must be set to down position and released prior to pressing START switch. The up position is for flash test. After flash test is complete, switch must be returned to middle position.
FLASH UNITS Dials	Set time units for flash exposure.
MAIN UNITS Dials	Set time units for main exposure.
HIGHLIGHT UNITS Dials	Set time units for high light exposure.
DENSITY Dials	Used to set copy density. Inside scale (black area) gives instrument automatic subtraction of highlight density from shadow density for flash exposure control within a .30 highlight density range. CAL position is used when calibrating the instrument.

Control or Indicators	Function
-----------------------	----------

Flash Dial

Used to control the length of flash exposure. Flash dial is composed of two components that can be moved separately or together.



GLASS/CONTACT Screen Switch

When in CONTACT position, only flash lamp will operate during flash exposure. When in GLASS position, flash lamp and shutter will operate.

FLASH CONTROL

Used to set flash system to desired operation.

Flash-fax Socket

Not used.

FLASH Receptacle

Provides electrical power to flash lamp.

REMOTE Socket

Accepts remote control/jumper plug.

Control or Indicators	Function
SHUTTER Receptacle	Provides 117 V ac power to shutter during main and highlight exposure cycle. Power is also supplied during flash exposure cycle when GLASS/CONTACT screen switch set to GLASS position.
LAMPS Receptacle	Provides 117 V ac power to camera lighting control circuits during highlight and main exposure. Maximum of 4 amps.
Calibration Controls	Used to adjust exposure control instrument.
PHOTOTUBE Socket	Accepts multicolor phototube cord.

3-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNING and CAUTION. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

3-5.1. PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.

e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

g. Interval columns. This column determines the time period designated to perform your PMCS.

h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Dusting Brush	1 ea
Cheesecloth (Item 4, Appendix E)	ar
Detergent (Item 8, Appendix E)	ar
Vaccum Cleaner	1 ea

Table 3-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can safely be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	B	<p><u>LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT</u> <u>Inspect.</u></p> <ol style="list-style-type: none"> 1. Remove exposure control instrument power cord from outlet. 2. Inspect power cord for cuts, breaks, broken plug, and other signs of damage. 3. Remove remote and multicolor phototube control cords from exposure control instrument. 4. Inspect cords for cuts, breaks, broken plug or pins, and other signs of damage. 5. Inspect exterior of exposure control instrument, remote control station, multi color phototube unit, and multi color phototube switch for dents, scratches, broken or missing parts/components. 	<p>Power cord has cuts, breaks, or broken plug.</p> <p>Cord(s) has cuts, broken plug or pins.</p> <p>Broken or missing parts/components.</p>

Table 3-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

		B- Before D - During A - After	W- Weekly M - Monthly Q - Quarterly	AN - Annually S - Semiannually BI - Biennially	(Number) - Hundreds of Hours	
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED			PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
2	B	<u>LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT - Cont</u> <u>Clean.</u>			<p><u>WARNING</u> Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.</p> <ol style="list-style-type: none"> 1. Unplug exposure control instrument power cord. 2. Vacuum loose dust from exposure control instrument, remote control station, phototube unit, and color phototube switch. 3. Clean each unit using cheesecloth moistened with mild detergent and warm water. 4. Plug in power cord. 	<p>Phototube diffusers will not come clean.</p>

3-6. OPERATION UNDER USUAL CONDITIONS.

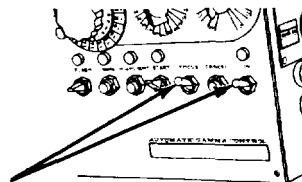
NOTE

Copy board has two thumb screws, top center for mounting multi color phototube.

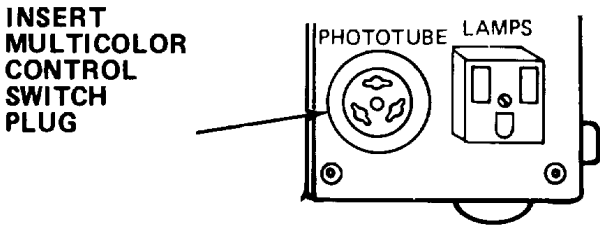
3-6.1. Assembly and Preparation for Use.

- a. Remove multicolor phototube front storage cabinet and mount on copy board.
- b. Plug multicolor phototube cord into phototube extension cord socket.

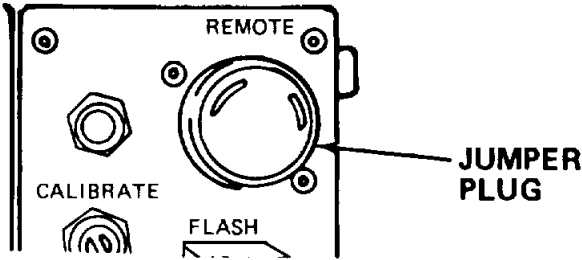
ON AND FOCUS SWITCHES



- c. Turn both power ON and FOCUS switches to off (down) position



d. Insert plug from phototube control switch into exposure control instrument PHOTOTUBE socket and tighten the threaded retaining ring.

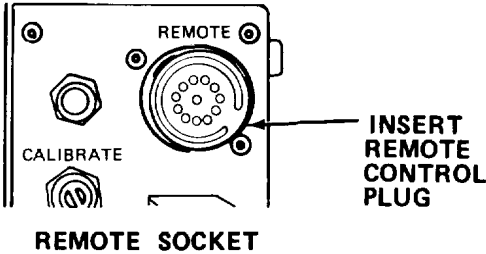


JUMPER PLUG IN REMOTE SOCKET

NOTE

If remote control will not be used, leave jumper plug in REMOTE socket.

e. If remote control is used, remove jumper plug.

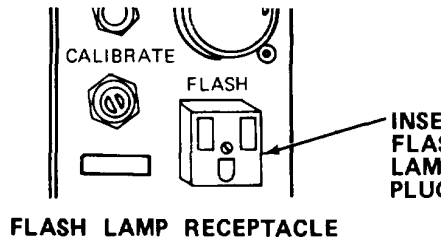


f. Insert remote control plug into REMOTE socket.

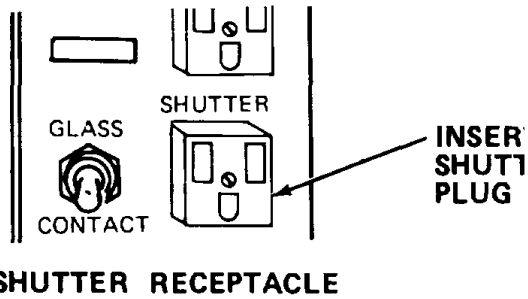
CAUTION

Flash lamps larger than 150 watts should not be used or damage to electronic circuits may occur.

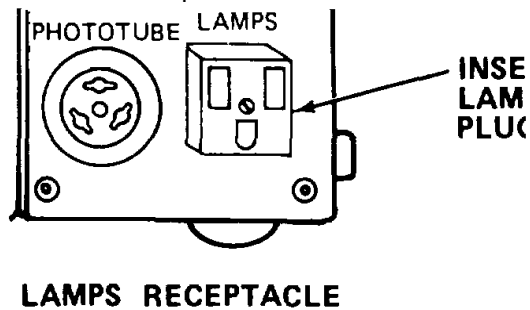
- g. Mount flash lamp so that its position and distance in relation to the lens may be duplicated each time a flash exposure is made.



- h. Plug camera flash lamp power cord into FLASH receptacle



- i. Plug camera shutter power cord into SHUTTER receptacle



NOTE

Camera lamp power is provided from an external circuit, not from the exposure control instrument. The instrument only applies 117 V ac to a lamp switching relay.

- j. Plug camera lamp power cord into LAMPS receptacle.

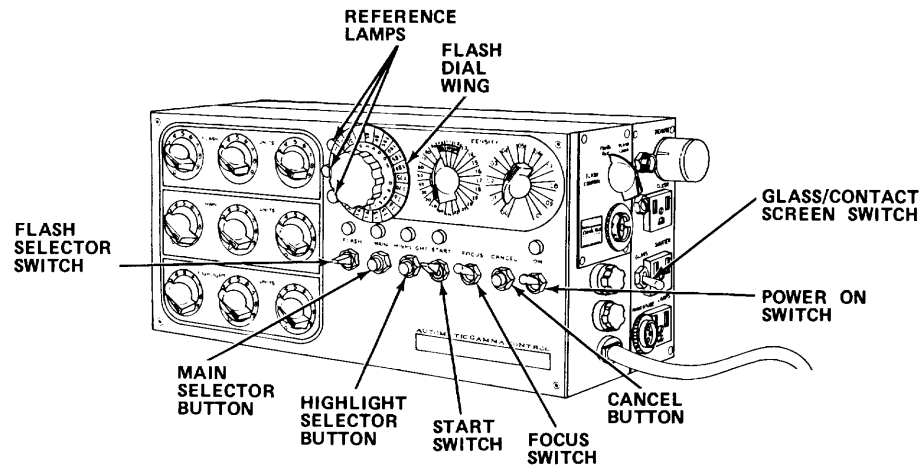
CAUTION

The exposure control instrument supplies line voltage to preselected camera and lighting circuits during an exposure cycle. Be sure power ON and FOCUS switches are off before plugging in instrument power cord, or damage to equipment may occur.

- k. Plug exposure control instrument power cord into ceiling outlet.
- l. Set camera AUTO/MAN switch to AUTO.
- m. For further operation instructions of camera, refer to TM 5-3610-258-14.

3-6.2. Initial Adjustments, Daily Checks, and Self-Test.

- a. Initial preoperation check.

**NOTE**

This check should be performed upon, receipt of equipment and after movement.

- (1) Check that power cord is plugged in.
- (2) Place power switch to ON.

CAUTION

To prevent damage to electrical components, the multicolor phototube must be unplugged for initial check.

- (3) Unplug multicolor phototube from extension cord.
- (4) Press main selector button. Lamp will light.
- (5) Press START switch and check for proper operation of camera lamps and shutter.

NOTE

Red lamp over HIGHLIGHT selector button will light when HIGHLIGHT selector button is pressed.

- (6) Press HIGHLIGHT selector button.
- (7) Press START switch and check for proper operation of camera lamps and shutter.

NOTE

Red lamp over FLASH selector switch will light when FLASH selector switch is pushed down.

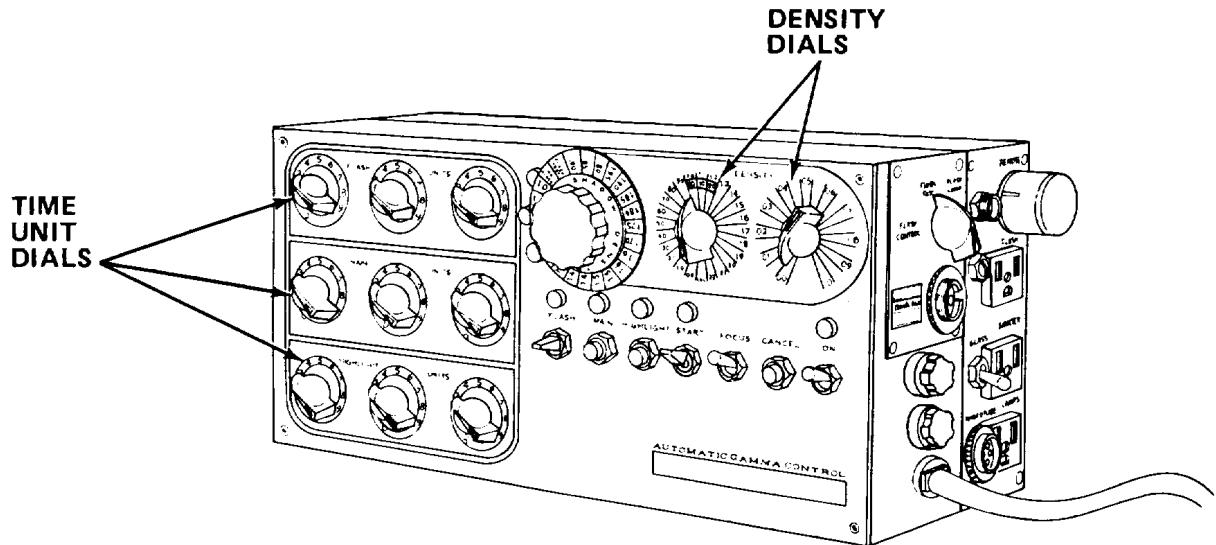
- (8) Set left FLASH unit dial to 1.
- (9) Push FLASH selector switch down.
- (10) Set screen switch to GLASS. If red lamp will not stay on, turn flash dial to right until NO FLASH part of dial wing is turned past lighted reference lamp. Push FLASH selector down again.
- (11) Press START switch and check for proper operation of flash lamp and shutter.
- (12) Press main selector button.
- (13) Set left main unit dial to 1.
- (14) Place FOCUS switch to FOCUS and check lamps and shutter for proper operation.
- (15) Turn off FOCUS switch.
- (16) Turn PILOTS switch on remote control to PILOTS and repeat steps (1) through (11) using remote control unit.
- (17) If any check-out step fails, recheck camera electrical circuits. When all steps are satisfactory, instrument is ready for calibration.
- (18) Plug multicolor phototube into extension cord.

b. Initial adjustment.

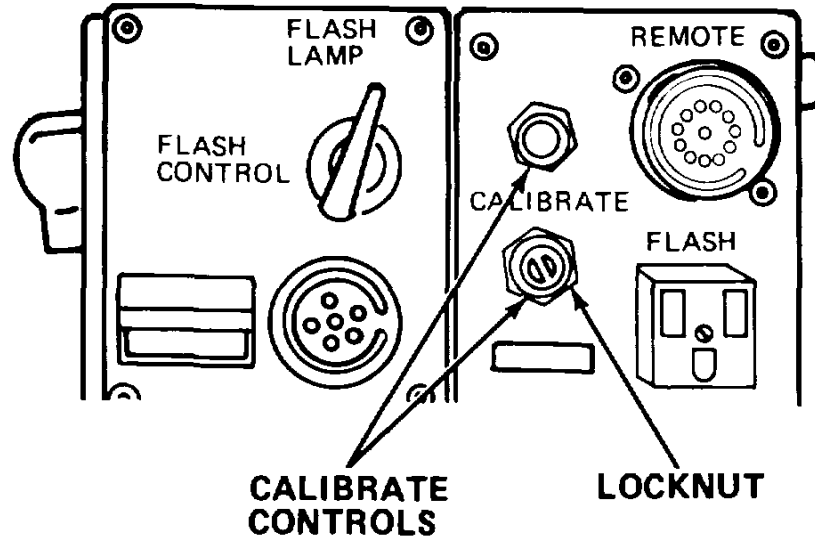
NOTE

- This adjustment must be made in order to monitor and properly control the extremely short exposure cycles.
- Adjustment of exposure control instrument and phototubes should be performed under normal section conditions with equal light level and correct line voltage.
- Initial adjustment should be accomplished each time power source is changed and/or when instrument is off for an extended period of time.

(1) Exposure control instrument.



- (a) Preset all time unit dials to 0.
- (b) Preset left DENSITY dial to CAL.
- (c) Preset right DENSITY dial to .00

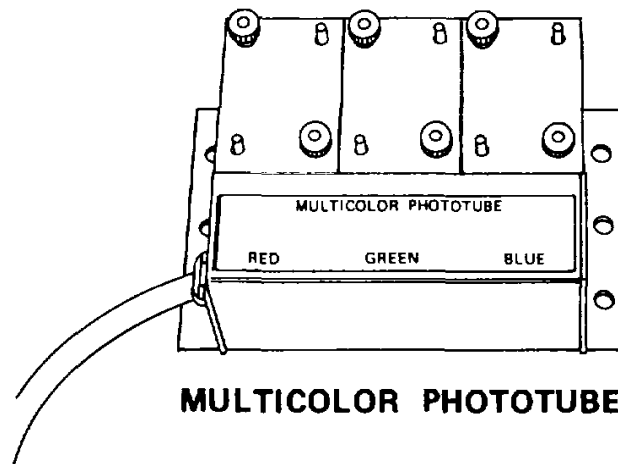


- (d) Loosen locknut on CALIBRATE screw.
- (e) Press and hold CALIBRATE button.

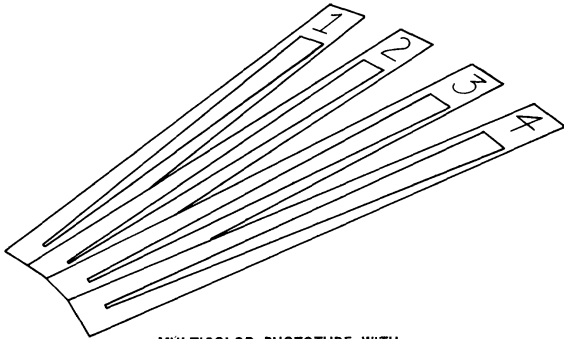
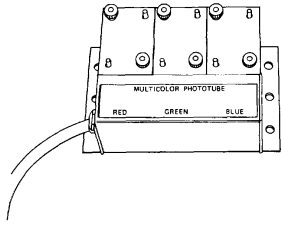
NOTE

If no humming sound is heard, proceed to step (g).

- (f) Turn CALIBRATE screw to right until humming sound stops.
- (g) Slowly turn CALIBRATE screw to left until humming sound just starts.
- (h) Tighten locknut.
- (i) Release CALIBRATE button.



(2) Multicolor Phototube. Cameras with color phototubes are normally adjusted to provide a 10 second exposure cycle with 100 time units and left DENSITY dial set at .00.



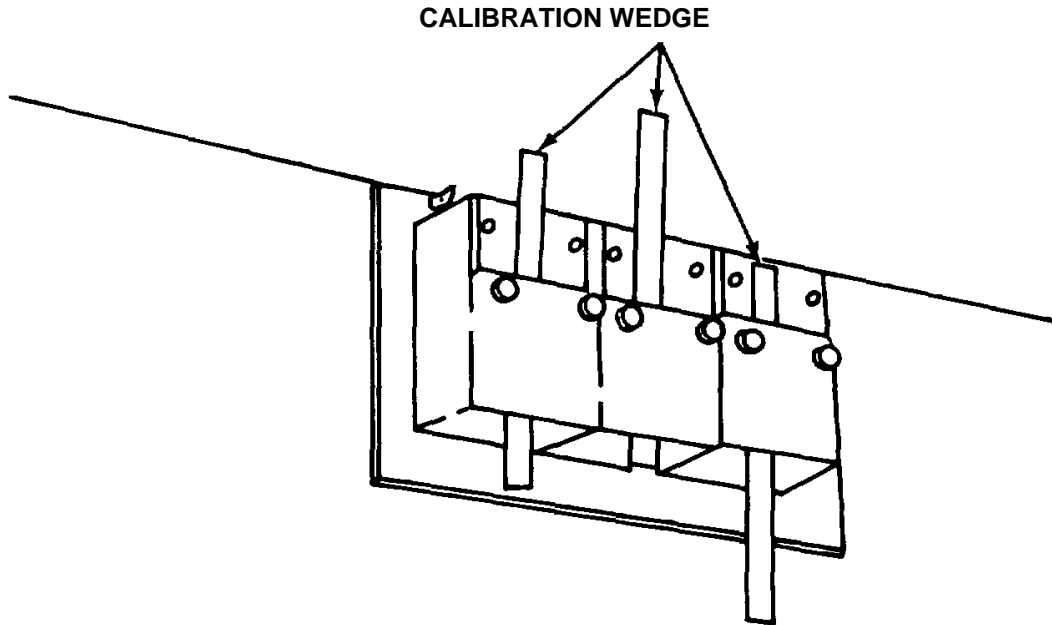
MULTICOLOR PHOTOTUBE WITH CALIBRATION WEDGES

To adjust color phototube for making color separations, place same filters as those used in making actual separations in respective phototube along with calibration wedge. Red phototube then responds to red area of the spectrum; green to green area, and blue to blue area. Each individual phototube then responds only to specific area of spectrum transmitted through lens when making particular filter separation. This provides automatic monitoring and response to any change in color of light source. Phototube "standard" adjustment (100 units at 1.00 density) may be from 5 seconds to 50 seconds. This is the maximum range for perfect repeatability. Adjust multicolor phototube as follows:

NOTE

Adjustment of MAIN UNITS automatically adjusts HIGHLIGHT UNITS to same number of seconds. FLASH UNITS are set at factory to give flash exposure cycle of approximately 10 seconds at 100 time units.

- (a) Position main power switch to ON.
- (b) Place camera copy board in proper position for exposure.
- (c) Position camera lamps to provide even film exposure.



NOTE

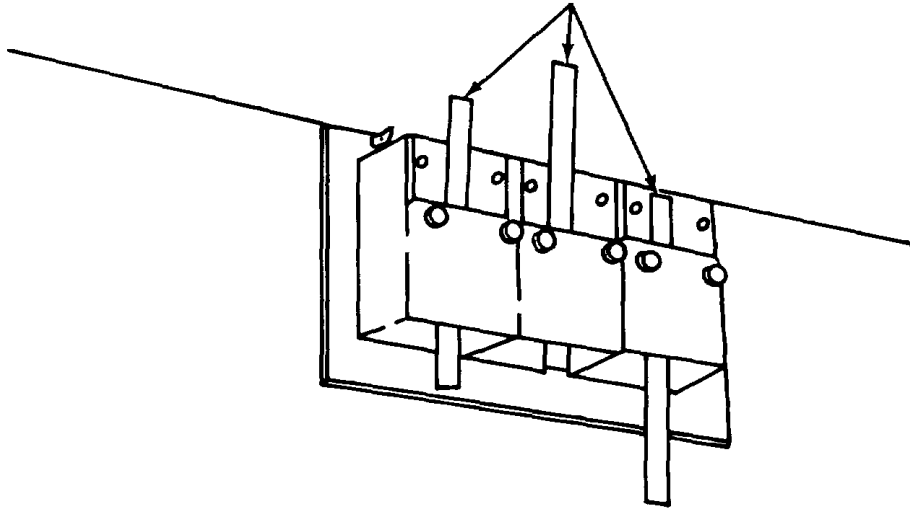
Filter is positioned under calibration wedge. Filters provided with the section must be trimmed to the same width as the wedges. Filters may be held in place with a small piece of tape at the top of the filter. Be sure tape does not cover opening of phototube.

- (d) Place filter for each color and calibration wedge under each diffuser.

NOTE

Adjustment of MAIN UNITA automatically adjusts HIGHLIGHT UNITS to same number of seconds. Flash exposure cycle of approximately 10 seconds 10 seconds at 100 times units.

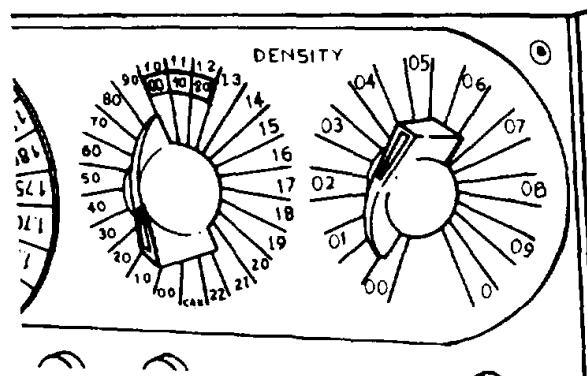
- (a) Position main power switch to ON.
- (b) Place camera copyboard in proper position for exposure .
- (c) Position camera lamps to provide even film exposure.



NOTE

Filter is positioned under calibration wedge. Filters provided with the section must be trimmed to the same width as the wedges. Filters may be held in place with a small piece of tape at the top of the filter. Be sure tape does not cover opening of phototube.

- (d) Place filter for each color and calibration wedge under each diffuser.



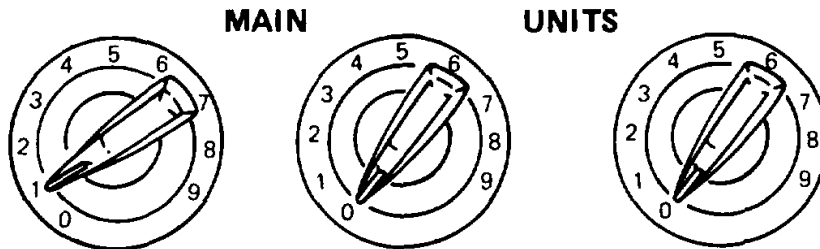
DENSITY DIALS SET FOR PHOTOTUBE CALIBRATION

- (e) Set left DENSITY dial to 1.0.
- (f) Set right DENSITY dial to .00.

NOTE

Red lamp above MAIN selector button will light when button is pressed.

- (g) Press MAIN selector button.



MAIN TIME UNIT DIALS SET TO 100 UNITS

- (h) Set MAIN UNITS dials to 100.

NOTE

- Pressing of **START** switch and starting stop watch must occur at same time.
- Each color of phototube is calibrated individually. Pushing of color buttons on control switch enables same color of phototube.

- (i) On control switch, select color (3-6.3a).
- (j) Press **START** switch and start stop watch.

(k) Note how long lights are on. If time is longer than 10 seconds (or desired time), slide wedge to place the word **GAM** closer to top of diffuser. If time is less than 10 seconds (or desired time), slide wedge to place the word **GAM** further from top of diffuser.

NOTE

It may be necessary to change wedges to bring exposure time within desired range.

- (l) Repeat steps (j) and (k) until desired exposure time is attained.
- (m) Repeat steps (i), (j), (k), and (1) for remaining colors/color combinations.
- (n) Carefully tighten diffuser thumbscrews until snug, to keep wedge(s) stationary.
- (o) Upon satisfactory completion of this adjustment procedure, exposure control instrument will be ready for operation.

3-6.3 Operating Procedures.

NOTE

Paragraphs 3-6.1, 3-6.2a, and 3-6.2b should be accomplished or verified prior to actual operation.

- a. Using color phototube control switch. Refer to Table 3-2 for purpose of each color button on control switch.

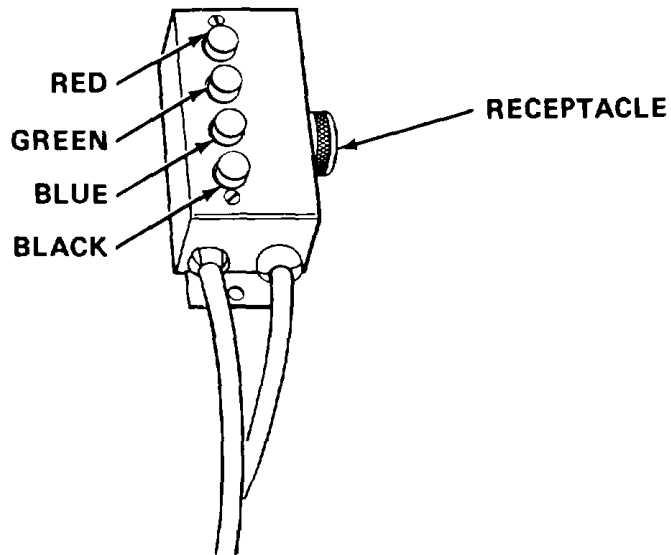
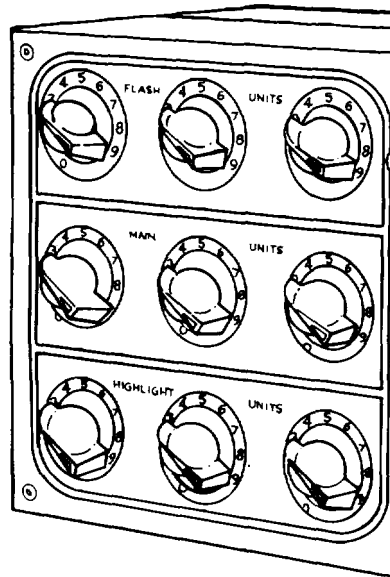


Table 3-2. CONTROL SWITCH POSITIONS

Light Response	Control Button
<p>NOTE Green responds to area of spectrum to which orthochromatic film is most sensitive.</p>	
<p>Red Green Blue Yellow White</p>	<p>Red Green Blue Red, Green Red, Green, Blue</p>

b. Using time unit dials.

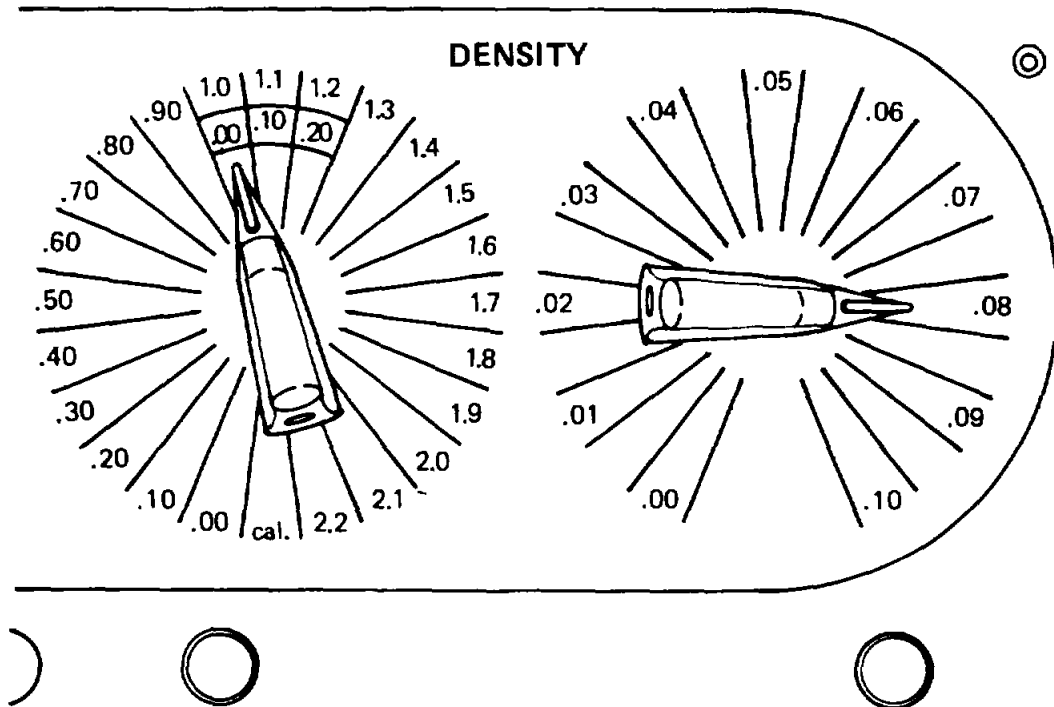


TIME UNIT DIALS

NOTE
Each position of left dial is 100 units or 10 seconds. Each position of center dial is 10 units or 1 second. Each position of right dial is 1 unit or 1/10th of a second.

- (1) Set time unit dials to indicate desired time (seconds).
- (2) Change as necessary.

c. Using DENSITY dials.



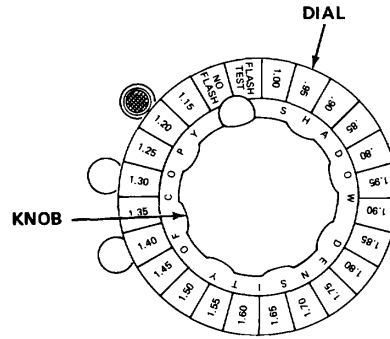
NOTE

- The right DENSITY dial adds density to left DENSITY dial in steps of .01. Density setting is the total of the two dials.
- Turning left DENSITY dials to right from 1.0 will add exposure, turning to left will subtract exposure.
- The DENSITY dials override the time unit dials when using MAIN or HIGHLIGHT UNITS.
 - (1) Set DENSITY dials to indicate desired density.
 - (2) Refer to Table 3-3 for effects of changing dial settings.

Table 3-3. DENSITY DIAL SETTINGS

DIAL SETTINGS	RESULT
NOTE	
<ul style="list-style-type: none"> • This table is referenced to 10 seconds with time unit dials set at 100 and density set at 1.0 on left dial and .00 on right dial. 	
<ul style="list-style-type: none"> • The inside scale is set to give automatic subtraction of highlight density from shadow density for flash exposure control within a .30 highlight density range. 	
Add .30	Doubles exposure time.
Subtract .30	Cuts exposure time in half.
Add .10	Increases exposure time by 1/3.
Subtract .10	Decreases exposure time by 1/3.
Add .03	Increases exposure time approximately 10%.
Subtract .03	Decreases exposure time approximately 10%.

d. Using flash dial.



FLASH DIAL

NOTE

• By holding knob, numbered dial can be moved separately from the knob to set range of screen under NO FLASH position of knob.

• With highlight density of .30 or less, one of the three red lamps on left side of dial will be on.

- (1) Set basic density range of screen (as determined) under NO FLASH position of knob.
- (2) Turn knob to position shadow density of copy opposite lamp that is on to compute correct flash exposure.

NOTE

Flash test position is used in making a test of flash time required for desired shadow dot.

e. Exposing line copy. Time unit dials make possible a quick and accurate setting based on seconds of exposure for line copy.

Example:

- (1) Standard line exposure is 18 seconds.
- (2) HIGHLIGHT UNITS presently set at 10 seconds (100 units).

- (3) Reset HIGHLIGHT UNITS to read 180 (18 seconds).
- (4) Standard for all line exposures is now 18 seconds when using same film, chemistry and other materials.

f. Using filter factors. The following table, when used, will greatly reduce the time required to compute an exposure to compensate for filter factor.

Table 3-4. FILTER FACTOR RATIO TO DENSITY

FILTER FACTOR	ADD DENSITY
---------------	-------------

NOTE

- To use filter factor table, set density value found opposite filter factor, on density dials of exposure control instrument.
- The instrument automatically increases exposure to compensate for added filter factor. This increase is added to copy density.

1	.00
1.5	.18
2	.30
2.5	.40
3	.48
3.5	.54
4	.60
4.5	.65
5	.70
5.5	.74
6	.78
6.5	.81
7	.85
7.5	.88
8	.90

Table 3-4. FILTER FACTOR RATIO TO DENSITY - Cont

FILTER FACTOR	ADD DENSITY
9	.95
10	1.00
12	1.08
14	1.15
16	1.20
18	1.26
20	1.30
22	1.34
24	1.38
26	1.42
28	1.45
30	1.48
32	1.51

Example:

- (1) Find filter factor of 3.
- (2) Note added density of .48.

NOTE

When setting density, start at 1.0 on outer scale and add filter factor to 1.0.

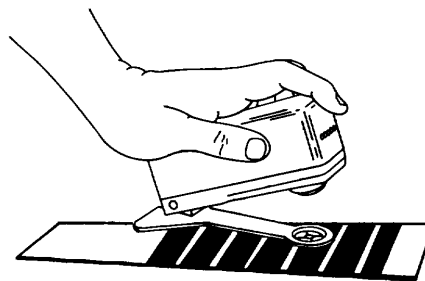
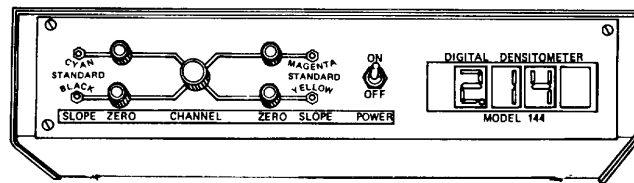
- (3) Set left DENSITY dial to 1.4 on outside scale and right DENSITY dial to .08.
- (4) The instrument is now compensated for added factor of .48.

g. Halftone exposure control.

NOTE

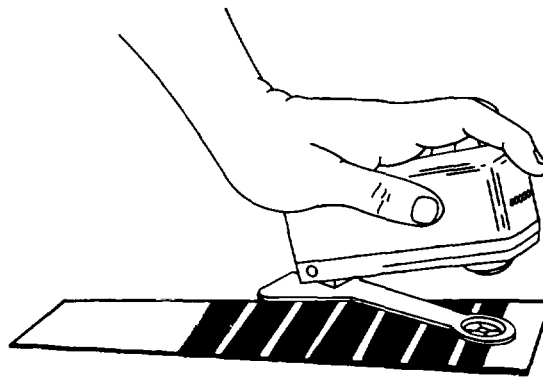
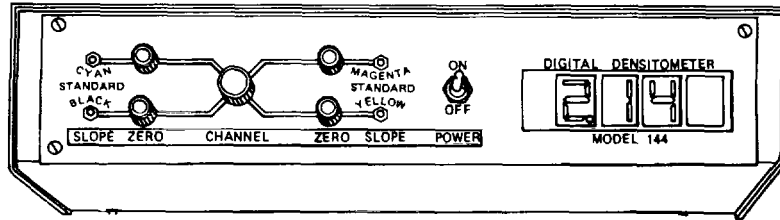
- To establish basic main exposure time units with the exposure control, instrument will require only two separate exposures.
- A magenta contact screen (negative) should be used for this test setup.
- A gray scale is used to make this test.

(1) Locate step on gray scale where 50% dot (0.50 density) should be for best plate and printing section condition. This point will change with type of paper, type of press, and desired effect. For this test, choose the step that is normal.



READING DENSITY OF GRAY SCALE FOR 50% DOT

- (2) With digital densitometer, read density of this step.
- (3) Make note of density and step number.



**READING DENSITY OF GRAY SCALE STEP NO. 1
(READING ON DENSITOMETER IS ARBITRARY)**

- (4) Measure highlight density to step number 1 of gray scale with densitometer and set value on DENSITY dials of exposure control instrument.
- (5) Set MAIN UNITS dials at approximately 4 times number of time units required for normal line exposure.
- (6) Make an exposure with MAIN UNITS only.
- (7) Develop exposure under normal section conditions.

EXPOSURE RECORD

Screen	Separation	Filter	Screen Range
EXPOSURE	FLASH	MAIN	HIGHLIGHT OTHER
LENS STOP			
TIME UNITS			
CONTROL AND			
DIRECTION			

(8) Check predetermined .50 step. If negative has a 50% dot, exposure is proper. Record this setting on exposure record card. This setting is now the normal MAIN UNIT setting.

(9) If 50% dot is on another step, read density of this step and find the difference between this and desired 50% step.

(10) If difference found in above step indicates density is less, proper exposure will be less; if greater, exposure must be more.

LESS DENSITY

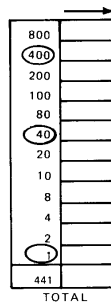
-0.55	-0.50	-0.45	-0.40	-0.35	-0.30	-0.25	-0.20	-0.15	-0.10	-0.05	.00
225	253	284	318	357	401	450	505	566	635	713	800
113	126	142	159	179	200	225	252	283	318	357	400
56	63	71	80	89	100	112	126	142	159	178	200
28	32	35	40	45	50	56	63	71	79	89	100
23	25	28	32	36	40	45	50	57	64	71	80
11	13	14	16	18	20	22	25	28	32	36	40
6	6	7	8	9	10	11	13	14	16	18	20
3	3	4	4	4	5	6	6	7	8	9	10
2	3	3	3	4	4	4	5	6	6	7	8
1	1	1	2	2	2	2	3	3	3	4	4
1	1	1	1	1	1	1	1	1	2	2	2
0	0	0	0	0	1	1	1	1	1	1	1

MORE DENSITY

.00	+0.05	+0.10	+0.15	+0.20	+0.25	+0.30	+0.35	+0.40	+0.45	+0.50	+0.55
800	898	1007	1130	1268	1423	1596	1791	2010	2255	2530	2839
400	449	504	565	634	711	798	895	1005	1127	1265	1419
200	224	252	283	317	356	399	448	502	564	632	710
100	112	126	141	158	178	200	224	251	282	316	355
80	90	101	113	127	142	160	179	201	225	253	284
40	45	50	57	63	71	80	90	100	113	126	142
20	22	25	28	32	36	40	45	50	56	63	71
10	11	13	14	16	18	20	22	25	28	32	35
8	9	10	11	13	14	16	18	20	23	25	28
4	4	5	6	6	7	8	9	10	11	13	14
2	2	3	3	3	4	4	4	5	6	6	7
1	1	1	1	2	2	2	2	3	3	3	4

DENSITY AND TIME UNITS COMPENSATION TABLE

(11) Use Density and Time Units Compensation Table above to make density range changes. The following is an example:



RECORD PAD

- (a) MAIN UNIT dials set at 441 for trial exposure.
- (b) Circle 400, 40, and 1 on small record pad; add this up at bottom to total 441.

(c) Locate density set from table. Density set is the difference between ideal 50% density and step which test negative had 50% dot. Determine the density set as follows:

If ideal gray scale step is 16, with measured density of .52, test negative had a 50% dot in step 14 with density reading of .42 or :

$$\begin{aligned} \text{Step 16} &= .52 \text{ density} \\ \text{Step 14} &= \underline{.42 \text{ density}} \\ & \quad .10 \text{ difference} \end{aligned}$$

Above problem indicates a new exposure is needed that will produce a negative that will move the 50% dot to a point with a .10 density higher on gray scale.

MORE DENSITY

	+.10	+.15	+.20	+.25	+.30	+.35	+.40	+.45	+.50	+.55
800	1007	1130	1268	1423	1596	1791	2010	2255	2530	2839
400	504	565	634	711	798	895	1005	1127	1265	1419
200	252	283	317	356	399	448	502	564	632	710
100	126	141	158	178	200	224	251	282	316	355
80	101	113	127	142	160	179	201	225	253	284
40	50	57	63	71	80	90	100	113	126	142
20	25	28	32	36	40	45	50	56	63	71
10	13	14	16	18	20	22	25	28	32	35
8	10	11	13	14	16	18	20	23	25	28
4	5	6	6	7	8	9	10	11	13	14
2	3	3	3	4	4	4	5	6	6	7
1	1	1	2	2	2	2	3	3	3	4
441	1	1	2	2	2	2	3	3	3	4
TOTAL	USING DENSITY AND TIME UNITS COMPENSATION TABLE									

(d) Find column marked +.10 on compensation table.

(e) Place small record pad with arrows lined up with heavy lines on

(f) Record unit numbers opposite previously circled numbers in blank column on right side of pad (numbers should be 504, 50, and 1).

(g) Add recorded numbers (total should be 555). This becomes the new MAIN UNITS setting and will place the 50% dot at the appropriate .50 density step of gray scale.

(12) To establish time units setting for highlight no-screen exposure, proceed as follows:

(a) Set in approximately 6% of MAIN UNITS on HIGHLIGHT dials.

(b) Make an exposure test; check for desired highlight dot.

NOTE

Very small unit changes should be made during test because the highlight dot will close up fast.

- (c) If required, make necessary adjustments to HIGHLIGHT UNITS to achieve desired highlight dot.
- (d) When proper number of highlight units have been determined, record on exposure record card.

(13) Once time units have been determined, they become the basic time unit setting and will not change as long as same halftone screen, film, chemistry, and developing technique are used.

h. Basic screen range. A basic screen range test must be made for every halftone screen used, whether contact or glass.

- (1) Using previously determined main and highlight exposures, make a test exposure.
- (2) From this test negative, determine where on gray scale a normal size shadow dot will be and record step number.
- (3) With digital densitometer check density of step on gray scale where shadow dot was recorded.
- (4) Determine basic screen range density by subtracting density of first step (on gray scale) from density reading obtained in step 3 above.

Example:

1.17	Density of gray scale where shadow dot recorded.
-.07	Density of first step of gray scale.
1.10	Basic density range of screen.

NOTE

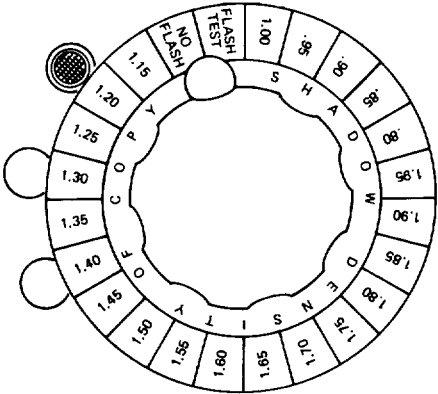
The basic screen range is an important factor in determining and controlling flash exposures.

- (5) Place determined basic screen range on flash dial (3-6.3e).
- (6) Record this basic screen range on exposure record card.

i. Flash test. The purpose of this test is to determine number of time units required with a particular halftone screen to produce desired shadow dot.

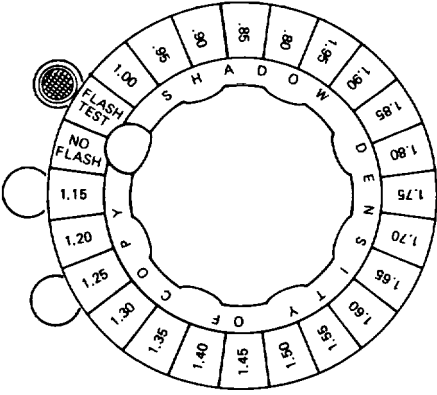
NOTE

The basic screen range can be modified by factors such as exposure technique, agitation rate, film and developer combinations, and the combination of F-stops used. This test should be performed each time after cleaning screen.



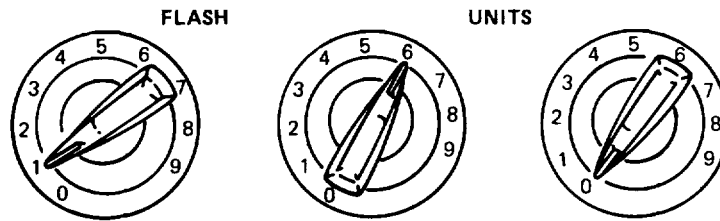
BASIC SCREEN DENSITY OF 1.10 PLACED UNDER "NO FLASH" POSITION OF FLASH DIAL

- (1) Place basic density range of screen directly under NO FLASH position on flash dial (illustration shows 1.10 basic screen density under NO FLASH).



FLASH TEST

- (2) Turn flash dial until FLASH TEST is opposite lamp marked FLASH TEST.
- (3) Place FLASH switch in up position.



**FLASH TIME UNIT DIALS
SET TO 160 TIME UNITS**

(4) Set FLASH UNITS dials at setting that is about 20% of normally used flash exposure (normal flash exposure of 10 seconds, dials are set for 020 units or 2 seconds) for each exposure in making flash test.

(5) Place a piece of film (approximately 10 to 12 in.) on vacuum back of camera.

NOTE

Do not expose film through lens unless flashing through lens.

(6) Place halftone screen over film.

(7) Cover film with a piece of black paper or cardboard except for about a 1 in. (25.4 mm) strip at top of film.

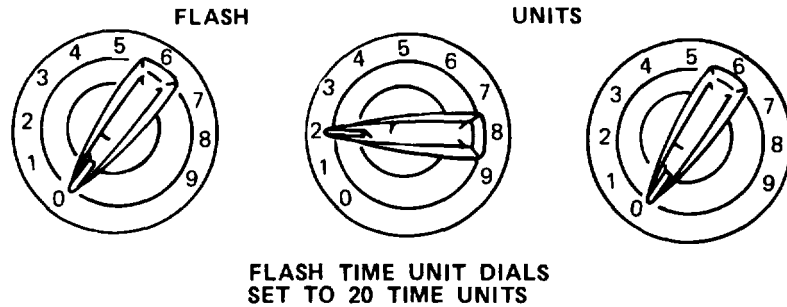
(8) Make a flash exposure (approximately 2 seconds).

(9) Move paper or cardboard down an additional inch and expose again. Continue this procedure until at least ten exposures are on film (first step exposed has an accumulated exposure of 200 units, last step has an exposure of 020 units).

(10) Develop film for a normal halftone exposure.

(11) From negative, choose step that has desired shadow dot (should be same size dot as recorded when determining basic screen range).

(12) Determine proper setting of time unit dials by number of time units given desired shadow dot. For example:



- (a) Assume step that was exposed 8 times has desired shadow dot.
- (b) Multiply number of exposures (8) by time units (020).
- (c) Basic flash exposure is now 160 time units.
- (d) Set FLASH UNITS dials to 160.

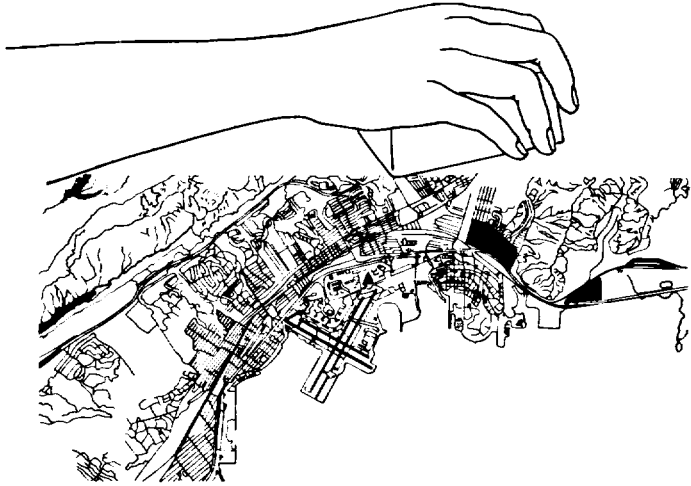
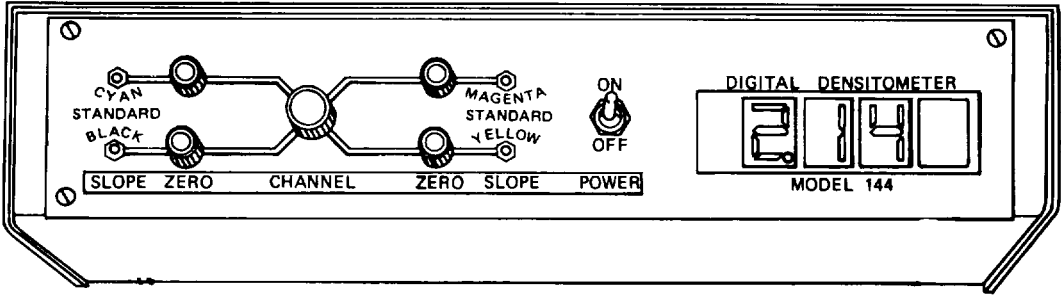
NOTE

Save flash test negative for later comparison if a larger or smaller shadow dot is desired.

(13) If necessary, use test negative again to perform previous step (12) shadow dot is of desired size.

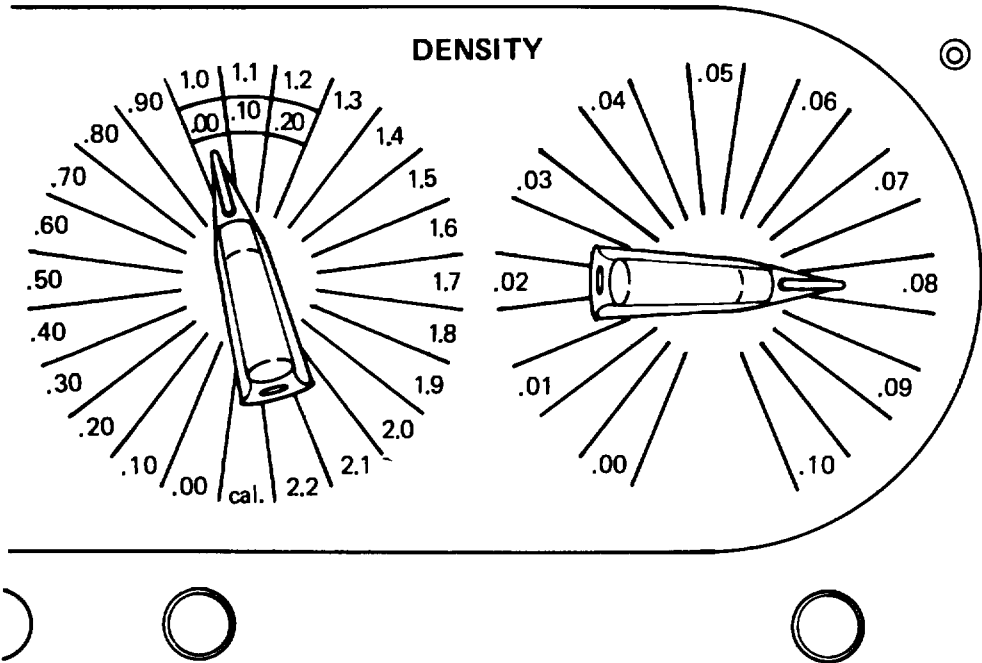
(14) Time units as determined by this procedure now become the standard setting for flash exposure with that particular screen.

j. Halftone exposure system. The exposure control instrument is now ready to full range halftones with very high repeat accuracy. The following procedure can be used to check operation of instrument on normal copy.



READING HIGHLIGHT DENSITY WITH DENSITOMETER

- (1) Read highlight density of copy with densitometer.

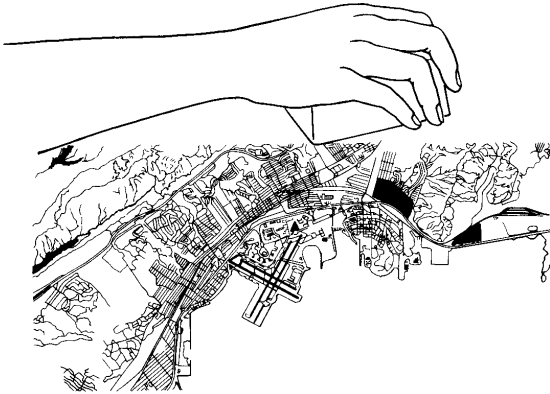
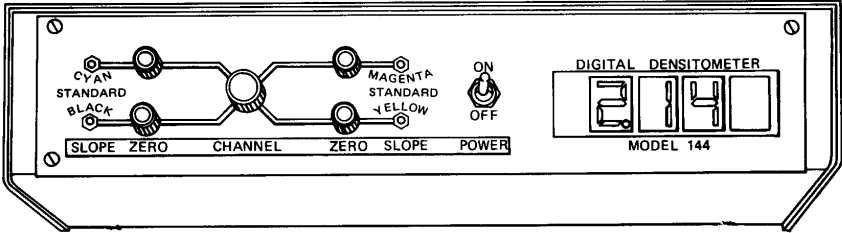


DENSITY DIALS SET FOR
HIGHLIGHT DENSITY OF .08

NOTE

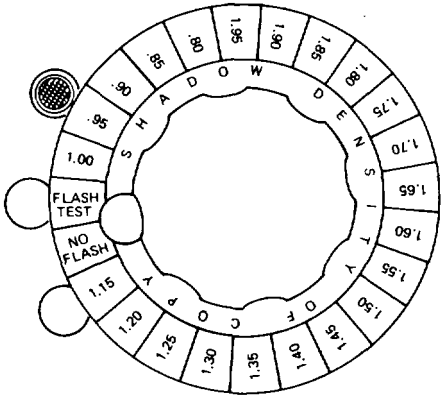
Highlight DENSITY dials must be set before flash dial is set.

- (2) Set this density (0.08) on DENSITY dials.



READING SHADOW DENSITY WITH DENSITOMETER

(3) Read shadow density of copy with densitometer.



FLASH DIAL SET FOR 2.14

NOTE

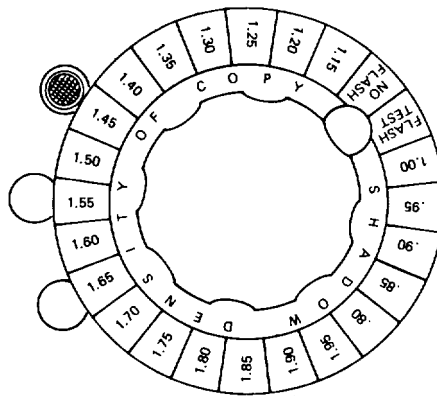
- Shadow densities greater than 1.95 are set in by counting the clicks of the flash dial. Each click past 1.95 adds .05 up to .10 of basic screen range.
- If shadow density is less than .05 higher than basic screen range, the instrument will automatically switch from flash to main (see short range copy).
- If NO FLASH is turned past lamp marked FLASH TEST while setting dial, instrument will automatically switch from flash to main.

(4) Locate density (step 3 above) within .05, on flash dial; set this number opposite lamp that is lighted on left side of flash dial.

NOTE

The exposure control instrument will compute proper ratio and total exposure time in seconds for all three separate exposures to match copy range to screen range.

(5) Make exposure using determined time units for highlight, main, and flash.



FLASH DIAL SET FOR 1.48

NOTE

If highlight density is greater than .30, instrument will not automatically subtract highlight density from the flash exposure.

(6) If highlight density is greater than .30, operator must subtract highlight density from shadow density and set this copy density number on flash dial opposite lamp marked FLASH TEST.

Example:

$$\begin{array}{r} 1.80 \text{ Shadow density} \\ - 0.32 \text{ Highlight density} \\ \hline 1.48 \text{ Copy density range} \end{array}$$

k. Short range copy (very flat copy). When density range of copy is less than density range of screen, a change in basic screen range is needed to match short copy range. The technique is to subtract from the main exposure and increase the no-screen highlight exposure to compress screen range and add contrast to flat copy.

- (1) Subtract .30 from normal screen range.
- (2) Divide MAIN UNITS in half.
- (3) Double highlight exposure.

NOTE

Procedures 1. through n. are accomplished sequentially.

1. Basic screen range (gray screen, negative type). Basic screen range test for a gray screen is made with only a main exposure (3-6.3g).

- (1) Adjust exposure to place a 95% dot (5% printing) in step 1 of gray scale.
- (2) If test negative is too open in step 1, refer to "Density and Time Units Compensation Table" (3-6.3g).
- (3) Record basic density range of gray screen on exposure record card.
- (4) Place basic screen on flash dial (3-6.3d).

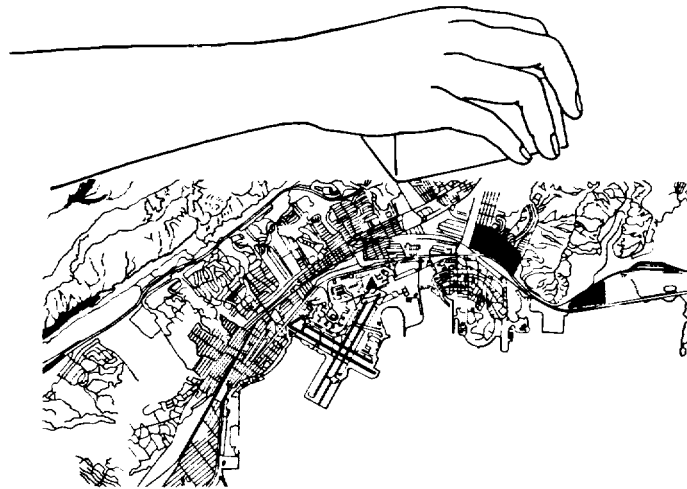
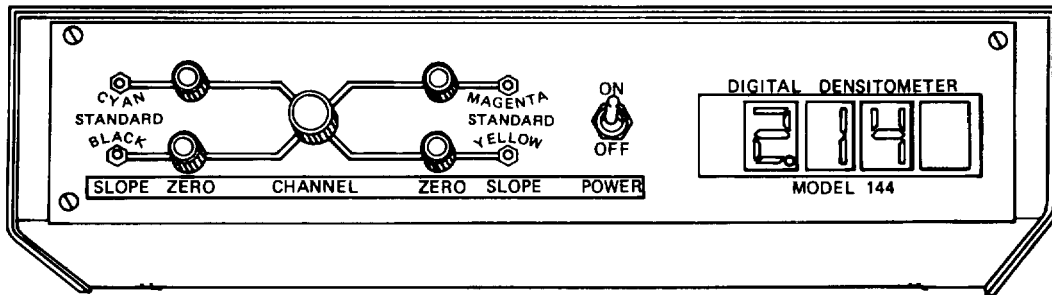
m. Flash test (gray screen). Basic flash test procedures for a gray screen is same as flash test in paragraph 3-6.3i.

NOTE

- **With a gray screen, yellow or white light may be used in flashing lamp.**
- **Due to additive effect of a gray screen, the test negative will usually have a solid step (1) and too large a shadow dot.**

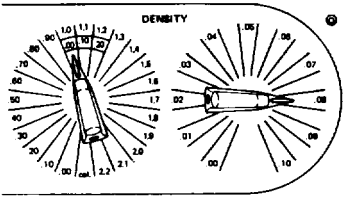
- (1) Using previously determined MAIN and FLASH UNITS, make a test exposure.
- (2) Reduce (if necessary) both main and flash exposures (time units) about 10%.
- (3) Adjust time units until desired dot size is produced.
- (4) Record new time on exposure record card.

n. Halftone exposure system (gray screen). The exposure control instrument is now ready to produce full range two exposure halftones with very high repeat accuracy.



READING HIGHLIGHT DENSITY WITH DENSITOMETER

- (1) Read highlight density of print copy with densitometer.

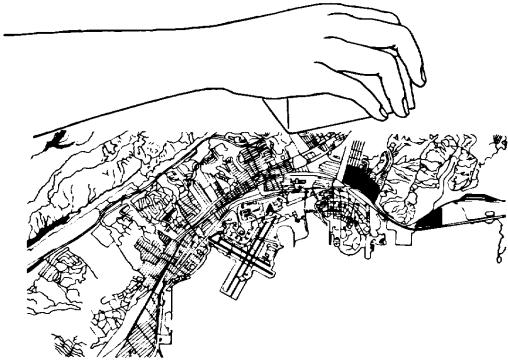
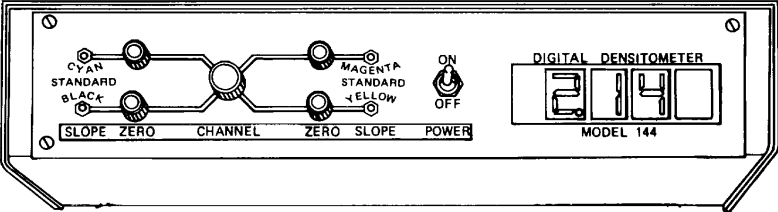


DENSITY DIALS SET FOR HIGHLIGHT DENSITY OF .08

NOTE

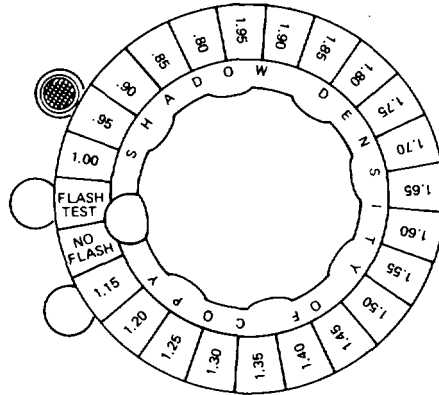
Highlight DENSITY dials must be set before flash dial is set.

- (2) Set this density (0.08) on DENSITY dials.



READING SHADOW DENSITY WITH DENSITOMETER

- (3) Read shadow density of copy with densitometer.



FLASH DIAL SET FOR 2.14

NOTE

- Shadow densities greater than 1.95 are set in by counting the clicks of the flash dial. Each click past 1.95 adds .05 up to .10 of basic screen range.
- If shadow density is less than .05 higher than basic screen range, the instrument will automatically switch from flash to main (see Short Range Copy).
- If NO FLASH is turned past lamp marked FLASH TEST while setting dial, instrument will automatically switch from flash to main.

(4) Locate density (step 3 above) within .05 on flash dial; set this number opposite lamp that is lighted on left side of flash dial.

NOTE

The exposure control instrument will compute proper ratio and total exposure time for the two separate exposures to match copy range to screen range.

(5) Make an exposure using recorded time units for main and flash.

(6) For very high highlight and shadow densities, see paragraph 3-6.2j.

o. Short range copy (gray screen). When highlights are dark and shadows are much lighter than normal, a change in basic screen range to match short copy range is needed.

- (1) Reduce MAIN UNITS to one-half of normal value.
- (2) Reduce flash screen range by .30 density.
- (3) Add a highlight exposure of 3% to 10% of new main exposure.
- (4) Read highlight density of copy with densitometer and set this density on the DENSITY dials.

NOTE

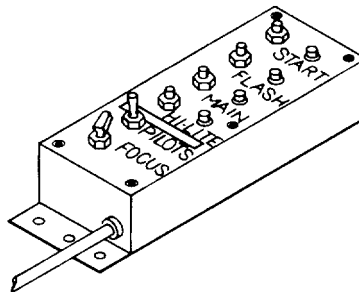
If shadow density of copy is same as or less than new screen range, a flash exposure is not required.

- (5) Read shadow density of copy with densitometer and set this density into flash dial (3-6.2d).

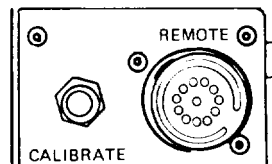
NOTE

The correct percent of highlight exposure will vary with each screen and developing conditions used.

- (6) Make a series of test exposures, each with a different highlight percent. Record the results.
 - (7) For very short range copy, see paragraph 3-6.2k.
- p. Using remote control station. Provides control of the exposure control instrument from remote station.



REMOTE CONTROL STATION



**REMOTE CONTROL SOCKET
(JUMPER PLUG REMOVED)**

NOTE

- **PILOTS switch in PILOTS position allows lighting of red lamps on remote control unit.**

- (1) Remove jumper plug from REMOTE socket.
- (2) Insert remote control unit cord into REMOTE socket.
- (3) Position ON switch on exposure control instrument to ON.
- (4) Control operations from remote control unit.

q. Shutdown procedures.

- (1) Set FOCUS switch to off position.
- (2) Return all time units to 000.
- (3) Set left DENSITY dial to 1.0 and right DENSITY dial to .00.
- (4) Set ON switch to off position.

3-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

3-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

3-9. TROUBLESHOOTING PROCEDURES.

a. The table lists the common malfunctions which you may find during operation or maintenance of the light integrating exposure control instrument, or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 3-5. TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

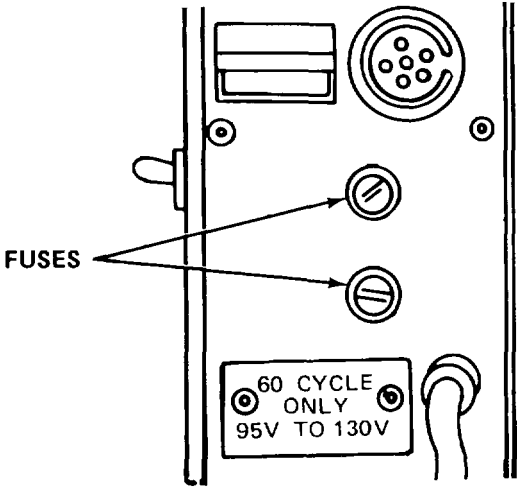
1. EXPOSURE CONTROL INSTRUMENT WILL NOT TURN ON.

Step 1. Check that power cord is plugged in.

Plug in power cord.

Step 2. Check circuit breaker at power panel.

Reset circuit breaker.



WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

Step 3. Check for defective power fuse(s).

- (a) Remove power cord from outlet.
- (b) Remove fuse by pushing holder in and turning holder to left.
- (c) Check fuse(s); replace defective fuse(s).

Table 3-5. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

2. CAMERA LAMPS WILL NOT TURN ON.

Step 1. Check position of FOCUS switch.

- (a) If FOCUS switch is in FOCUS position, proceed to step 2.
- (b) Set FOCUS switch to FOCUS position.

Step 2. Check that power cord is plugged in.

- (a) If plugged in, proceed to step 3.
- (b) Plug in power cord.

Step 3. Check if light bulbs are defective.

- (a) If bulbs are not defective, refer to direct/general support maintenance.
- (b) If bulbs are defective, replace light bulbs (paragraph 3-20.1).

Step 4. If camera lamps will not come on, Ref. TM 5-3610-258-14.

3. CAMERA LAMPS WILL NOT TURN OFF.

Step 1. Check position of remote control unit FOCUS switch.

- (a) If switch is off, proceed to step 2.
- (b) Place remote control unit FOCUS switch to off.

Step 2. Check position of main FOCUS switch.

- (a) If switch is off, proceed to step 3.
- (b) Place instrument FOCUS switch to off (down) position.

Step 3. Lamps still will not turn off.

Turn off circuit breaker and refer to direct/general support maintenance.

Table 3-5. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. FLASH WILL NOT TURN ON.	Step 1. Check that FLASH switch set to ON. Set FLASH switch to ON.	
	Step 2. Check that flash power cord is plugged in. Plug in power cord.	
	Step 3. Check that FLASH dial is in flash position. Set FLASH dial to desired setting.	
	Step 4. Refer to direct/general support maintenance.	
5. EXPOSURE CONTROL INSTRUMENT WILL NOT "BUZZ" DURING CALIBRATION.	Check DENSITY and time unit dials for proper setting.	
	Set DENSITY dial to CAL and time unit dials to 000 positions.	
6. LAMPS TURN ON WHEN INSTRUMENT "ON" SWITCH IS TURNED ON.	Step 1. Check that FOCUS switch on instrument or remote control unit is in FOCUS position.	
	Set FOCUS switch(es) to off position.	
	Step 2. If lamps remain on, turn off circuit breaker and refer to direct/general support maintenance.	
7. EXPOSURE CHANGES FROM INITIAL PHOTOTUBE ADJUSTMENT.	Step 1. Check if instrument adjustment has changed. Adjust instrument and/or phototubes (paragraph 3-6.2b).	
	Step 2. Check if camera lamp angle has changed. Position lamps to provide even lighting of copyboard.	

Table 3-5. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. EXPOSURE CHANGES FROM INITIAL PHOTOTUBE ADJUSTMENT - Cont	Step 3. If exposure still changes, refer to direct/general support maintenance.	
8. FLASH CYCLE WILL NOT START.	Check that all controls are set properly and restart flash cycle (paragraph 3-6.2a).	If flash cycle still does not start, refer to direct/general support maintenance.
9. HIGHLIGHT EXPOSURE WILL NOT START.	Check that all controls are set properly and restart highlight exposure (paragraph 3-6.2a).	If highlight exposure still does not start, refer to direct/general support maintenance.
3-10. MAINTENANCE PROCEDURES. There are no operator maintenance procedures assigned for this equipment.		

Section IV. ORGANIZATIONAL MAINTENANCE

3-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

3-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT. These items are not required at this level of maintenance.

3-13. SERVICE UPON RECEIPT.

3-13.1 Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738750.

c. Check to see whether the equipment has been modified.

3-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

3-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES. There are no organizational troubleshooting procedures assigned for this equipment.

3-16. MAINTENANCE PROCEDURES. There are no organizational maintenance procedures assigned for this equipment.

3-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

3-18. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

3-18.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-18.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

3-18.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering direct/general support maintenance for this equipment.

3-19. DIRECT/GENERAL SUPPORT TROUBLESHOOTING PROCEDURES.

a. Direct/general support troubleshooting procedures cover the most common malfunctions that may be repaired at the direct/general support level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by lower level maintenance should be conducted in addition to the direct/general support troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the foldout located at the end of this manual for further fault analysis.

Table 3-6. DIRECT/GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. CAMERA LAMPS WILL NOT TURN ON.	Check for defective lamps receptacle.	Replace receptacle (TM 5-3610-258-14).
2. CAMERA LIGHTS WILL NOT TURN OFF.	Check for defective lamp relay.	Refer to Lithographic Copying Camera maintenance instructions (TM 5-3610-258-14).

Table 3-6. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

3. EXPOSURE DRIFTS OR DEVIATES FROM INITIAL PHOTOTUBE CALIBRATION.

- Step 1. Check for defective 2D21 thyratron tube.
- (a) If 2D21 is not defective, proceed to step 2.
 - (b) Replace defective tube (paragraph 3-20.2).
- Step 2. Check for defective OB2 regulator tube(s).
Replace defective tube(s) (paragraph 3-20.2).

4. FLASH CYCLE IS ERRATIC.

- Step 1. Check for defective 2D21 thyratron or OB2 regulator tube(s).
Replace defective tube(s) (paragraph 3-20.2).
- Step 2. Check for defective internal bulb or loose calibration wedge.

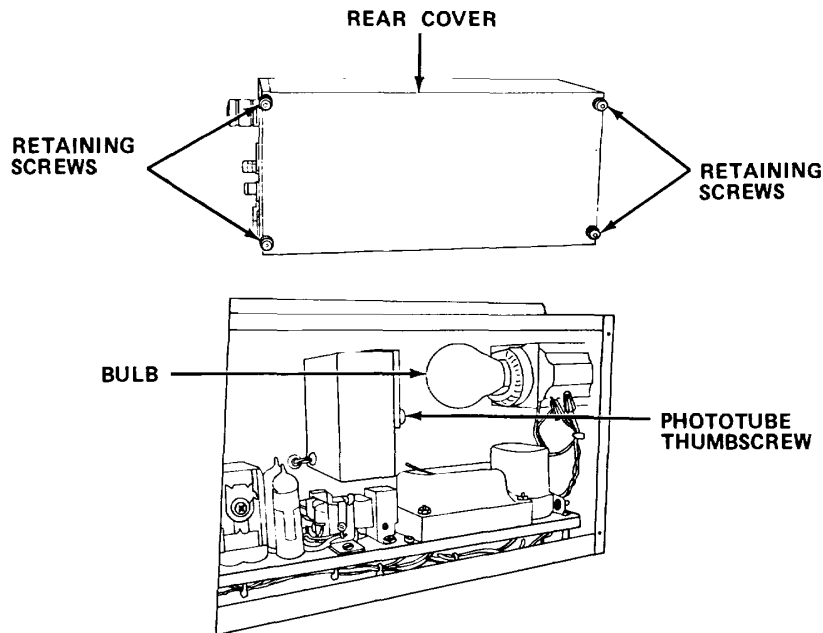


Table 3-6. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. FLASH CYCLE IS ERRATIC - Cont		<ul style="list-style-type: none"> <li>(a) Remove retaining screws with rubber washers attached. <li>(b) Remove rear cover. <li>(c) Tighten/replace bulb (paragraph 3-20.1). <li>(d) Tighten thumbscrews on photo tube.
5. LAMPS TURN ON WHEN INSTRUMENT POWER ON SWITCH IS TURNED ON.		<p>Check for defective camera lamp contactor.</p> <p>Refer to Lithographic Copying Camera maintenance instructions (TM 5-3610-258-14).</p>
6. FLASH CYCLE WILL NOT START.		<p>Check for defective flash relay.</p> <p>Troubleshoot through selective replacement of plug-in relays located in front section (paragraph 3-20.4).</p>
7. HIGHLIGHT EXPOSURE WILL NOT START.		<p>Check for defective highlight relay.</p> <p>Troubleshoot through selective replacement of plug-in relays located in front section (paragraph 3-20.4).</p>
8. CANCEL BUTTON WILL NOT OPERATE.		<p>Check for defective cancel relay.</p> <p>Replace cancel relay (paragraph 3-20.5).</p>
9. START OPERATION WILL NOT FUNCTION.		<p>Check for defective plug-in relay in rear case.</p> <p>Replace plug-in relay (paragraph 3-20.3).</p>

3-20. MAINTENANCE PROCEDURES.

a. This section contains instructions covering direct/general support maintenance functions for the light integrating exposure control instrument. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

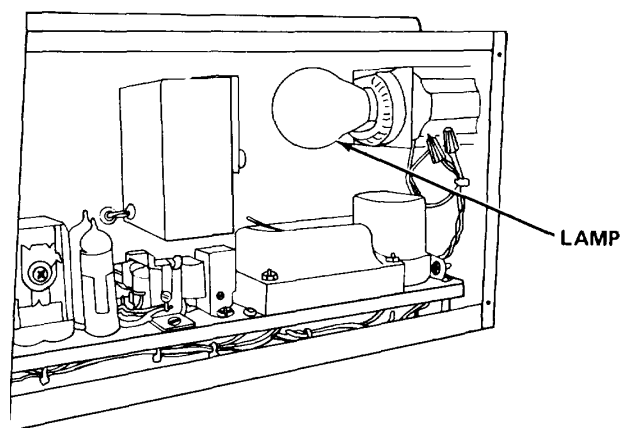
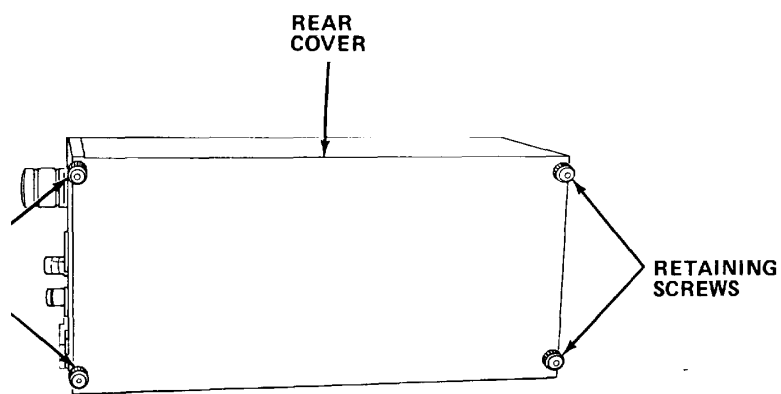
PROCEDURE	PARAGRAPH
Replace Internal Lamp	3-20.1
Check/Replace 2D21 and/or OB2 Tube(s)	3-20.2
Replace Plug-In Relay (Rear Section).....	3-20.3
Replace Plug-In Relay(s) (Front Section).....	3-20.4
Replace Cancel Relay	3-20.5
Replace Power Cord	3-20.6
Replace Multicolor Phototube Bulb(s)	3-20.7
Replace Light Integrating Exposure Control Instrument.....	3-20.8

3-20.1 Replace Internal Lamp.

- MOS: 35E, Special Electronic Devices Repairer
- TOOLS: Flat Tip Screwdriver
- SUPPLIES: Bulb

WARNING

- **Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**
- **If internal lamp has recently failed, it may be hot enough to cause severe burns. Allow lamp to cool before attempting to change.**
 - a. Unplug power cord and remove exposure control instrument from mounting bracket.



REPLACE INTERNAL BULB

- b. Remove rear cover.
- c. Replace bulb.
- d. Reinstall rear cover.
- e. Reinstall exposure control instrument in mounting bracket and plug in power cord.

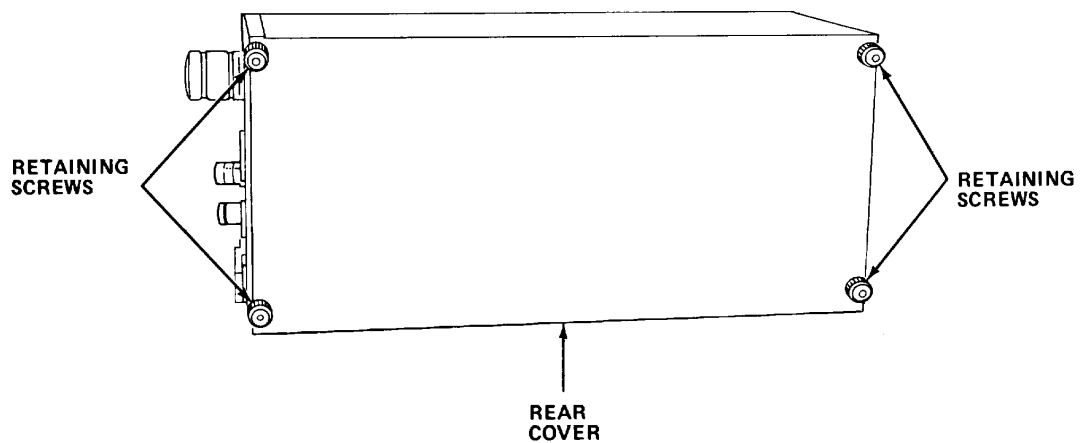
3-20.2 . Check/Replace 2D21 and/or OB2 Tube(s).

MOS: 35E, Special Electronic Devices Repairer

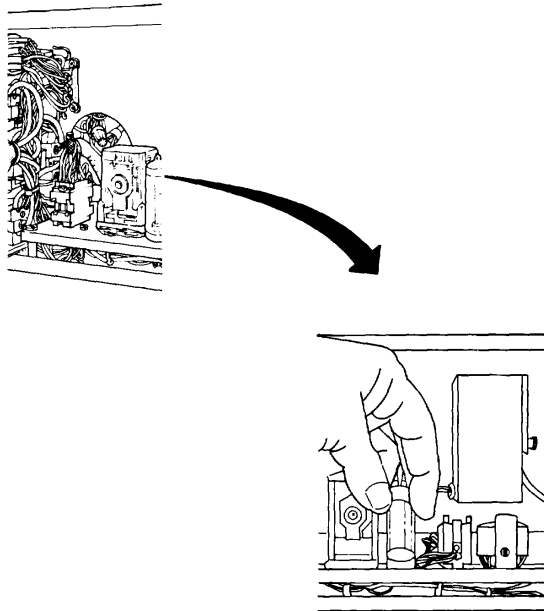
TOOLS: Flat Tip Screwdriver

SUPPLIES: 2D21 and/or OB2 Tube(s), (Thyratron or Regulator Tube)
Electronic Test Set**WARNING****Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

- a. Unplug exposure control instrument power cord.



- b. Remove rear cover retaining screws with rubber washers attached.
- c. Remove rear cover.



- d. Remove 2D21 and/or OB2 tube(s) and check on electronic test set.
- e. Replace defective tube(s).
- f. Reinstall rear cover.
- g. Plug in power cord.

3-20.3. Replace Plug-In Relay (Rear Section).

MOS: 35E, Special Electronic Devices Repairer

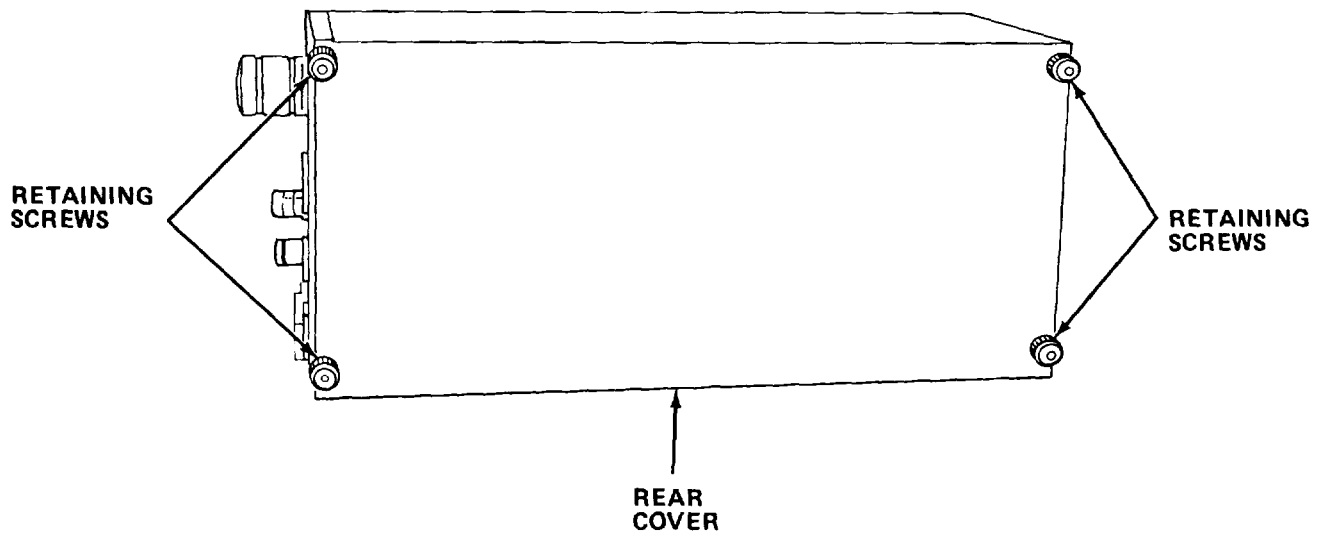
TOOLS: Flat Tip Screwdriver

SUPPLIES: Relay

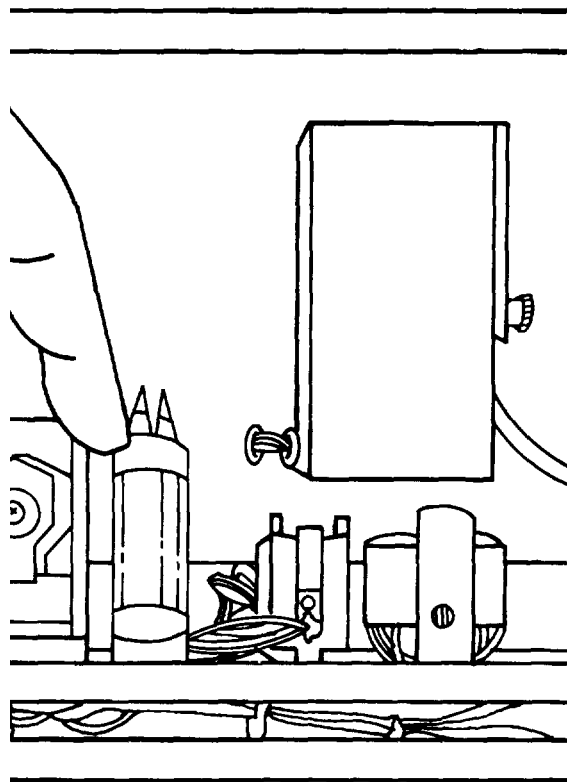
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug exposure control instrument power cord.



- b. Remove rear cover retaining screws with rubber washers attached.
- c. Remove rear cover.



PLUGIN RELAY (REAR SECTION)

- d. Remove defective relay.
- e. Install new relay.
- f. Reinstall rear cover.
- g. Plug in power cord.

3-20.4. Replace Plug-In Relay(s) (Front Section).

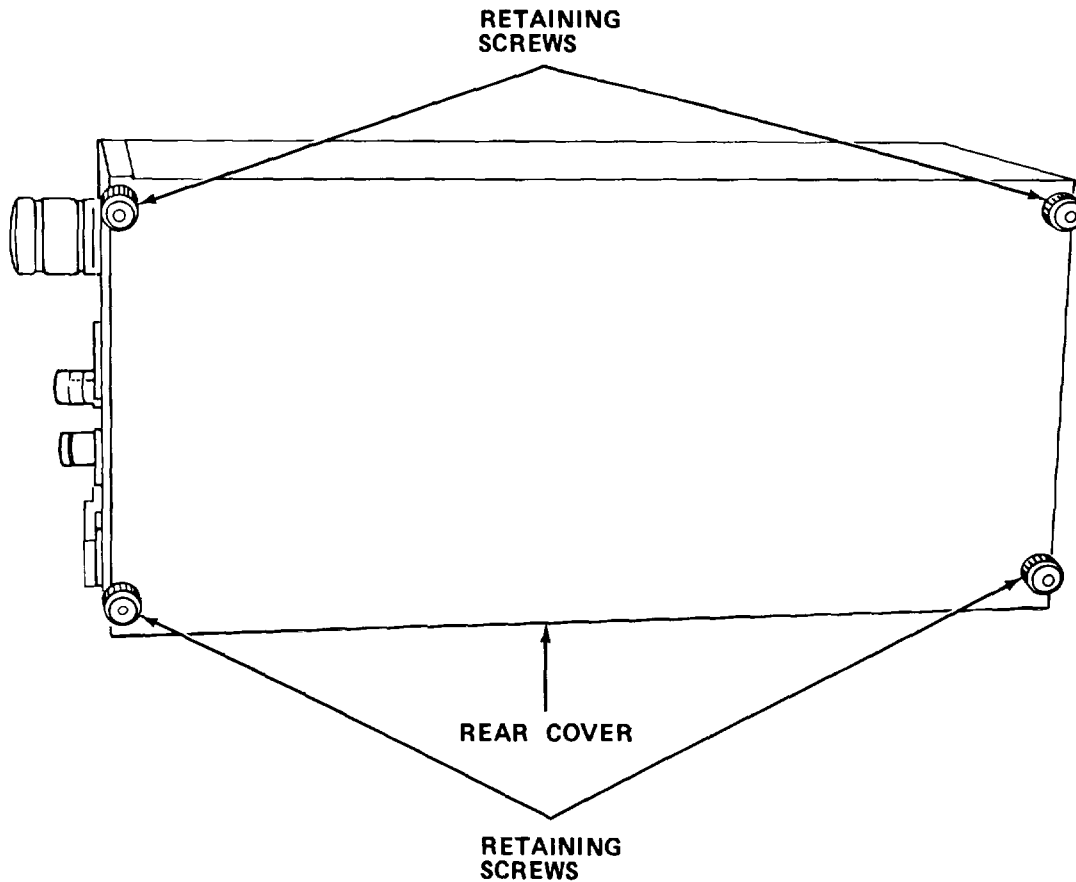
MOS: 35E, Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Relay(s)

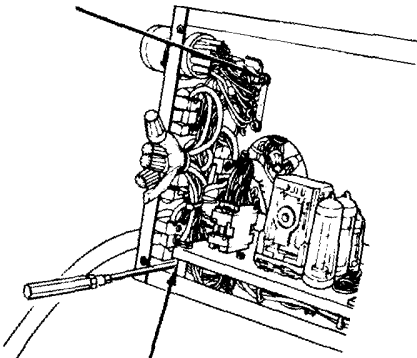
WARNING**Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

- a. Unplug exposure control instrument power cord.



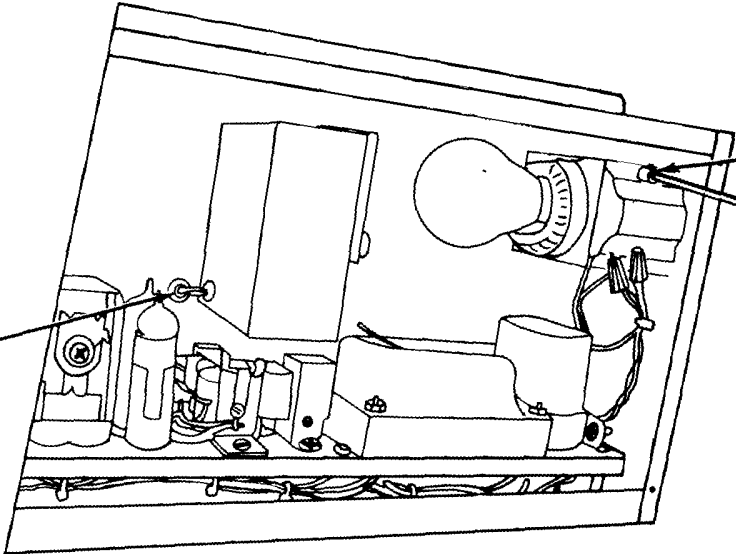
- b. Remove rear cover retaining screws with rubber washers attached.
- c. Remove rear cover.

**FRONT SECTION
RETAINING
SCREW**



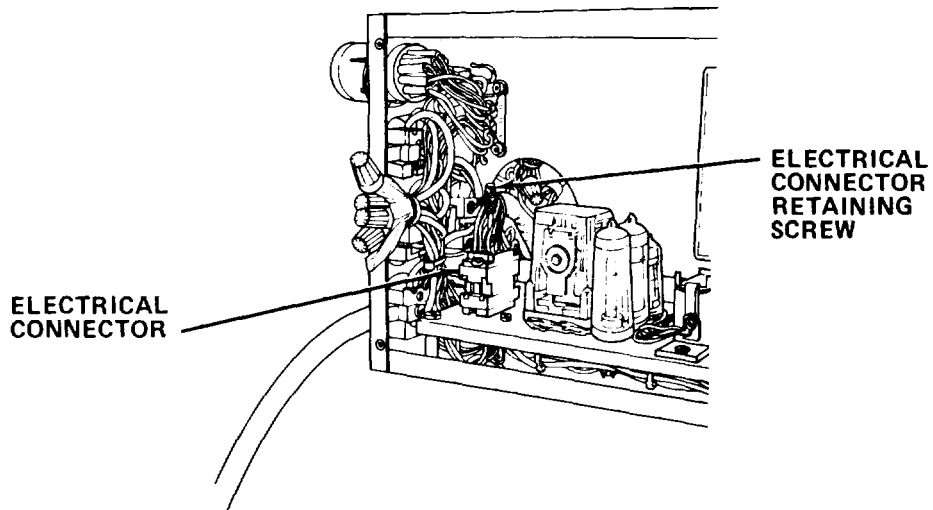
**FRONT SECTION
RETAINING
SCREW**

**PHOTOTUBE
RE LEADING
FRONT SECTION**



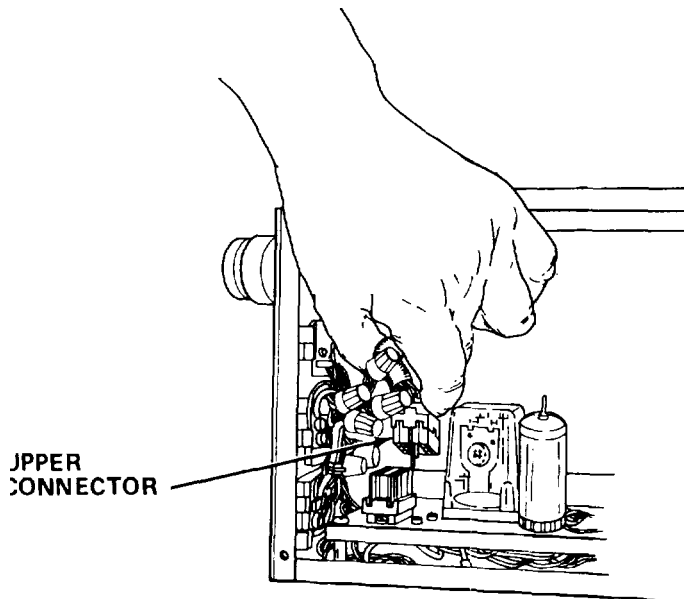
**FRONT SECTION
RETAINING
SCREW**

d. Remove front section retaining screw.



REMOVING ELECTRICAL CONNECTOR

- e. Turn electrical connector retaining screw left to loosen.

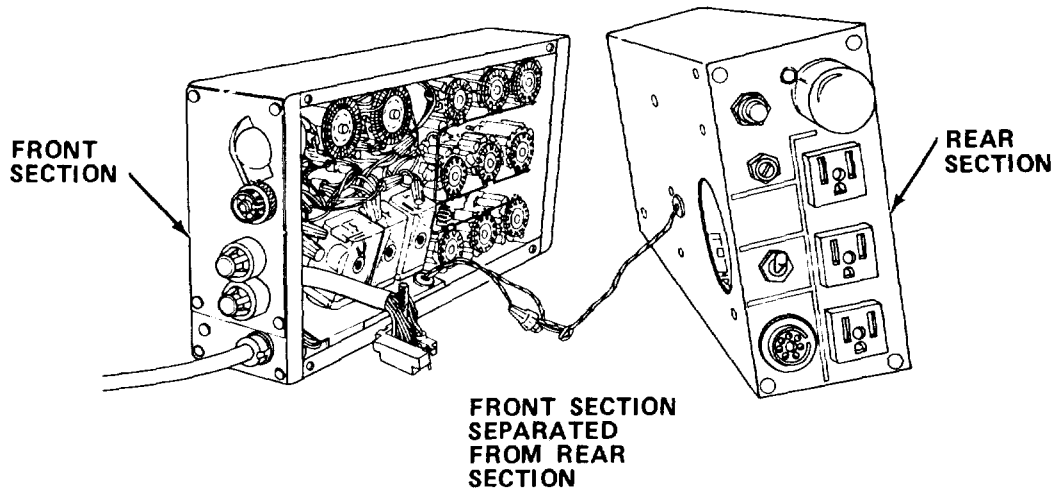


UPPER CONNECTOR REMOVED

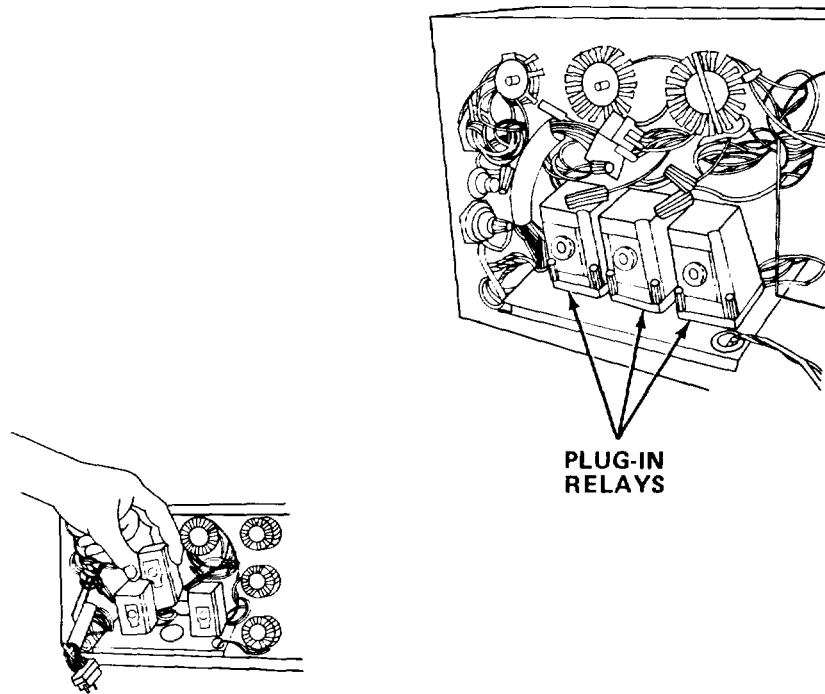
- f. Remove upper electrical connector.

CAUTION

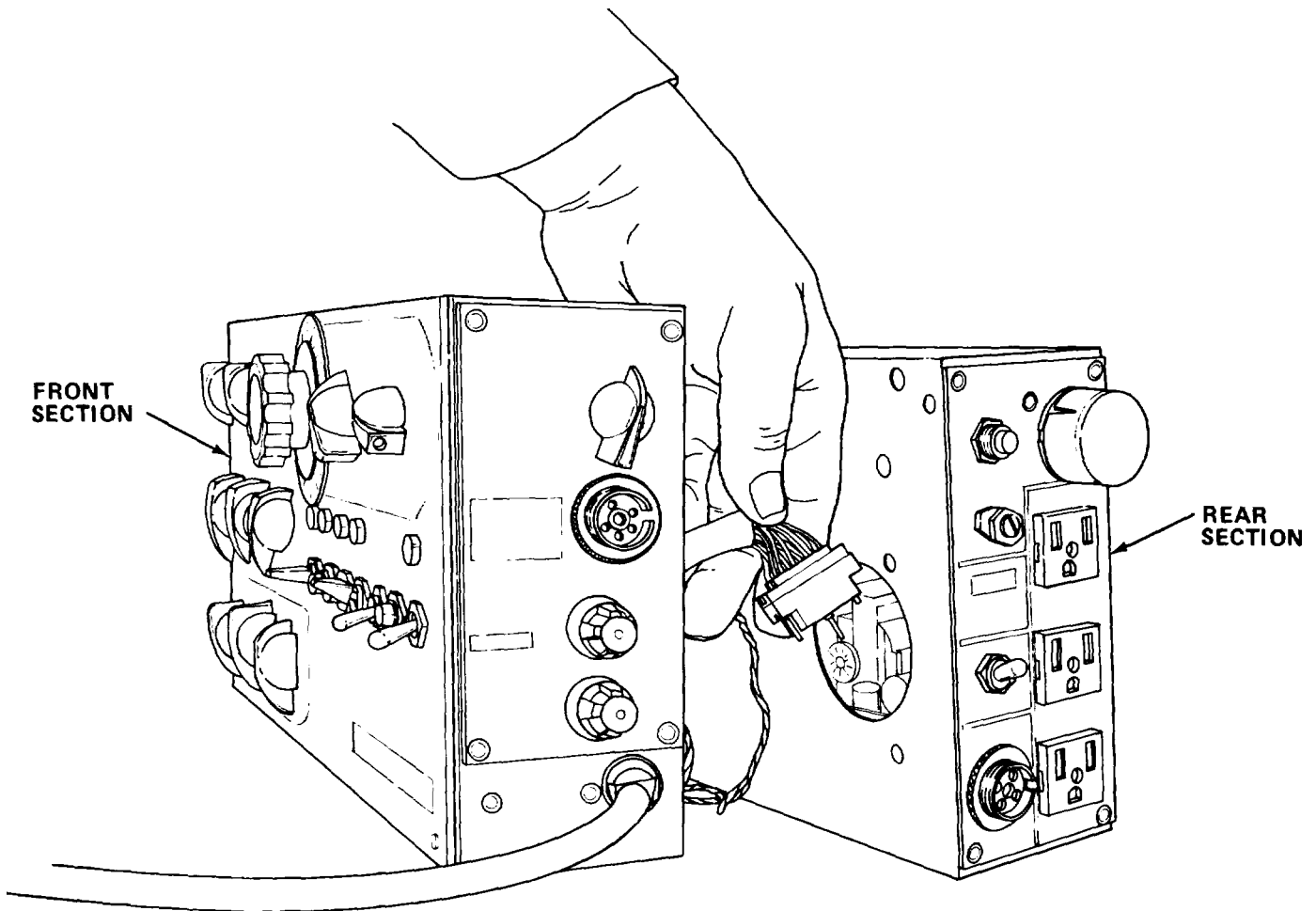
Internal phototube wires connect to front section. Use care when separating rear section from front section or damage to phototube and wiring may occur.



- g. Separate rear section from front section and position front section to allow access to plug-in relays.



- h. Remove defective plug-in relay(s).
- i. Install new plug-in relay(s).



**POSITION CONNECTOR
THROUGH HOLE**

NOTE

Be sure connector is put through hole prior to joining sections.

- j. Reconnect rear section to front section.
- k. Reinstall upper electrical connector.
- l. Reinstall rear cover.
- m. Plug in power cord.

3-20.5. Replace Cancel Relay.

MOS: 35E, Special Electronic Devices Repairer

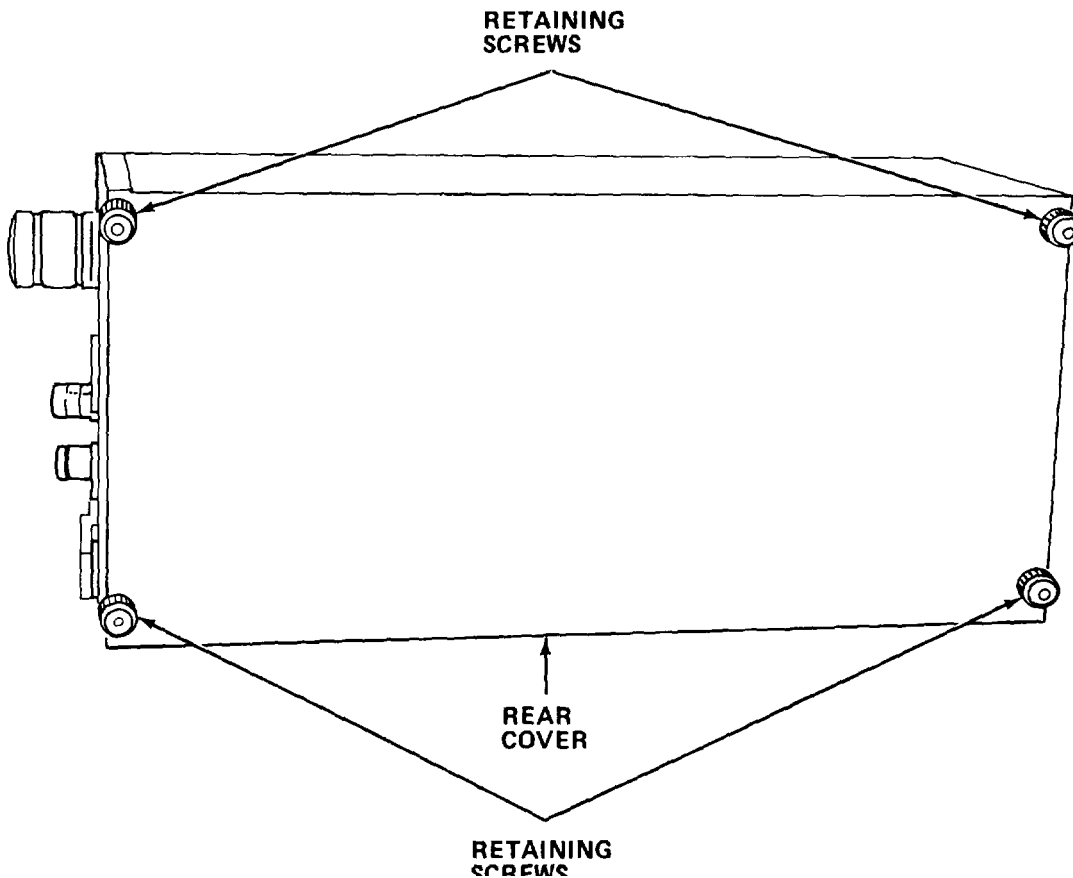
TOOLS: Flat Tip Screwdriver

SUPPLIES: Relay

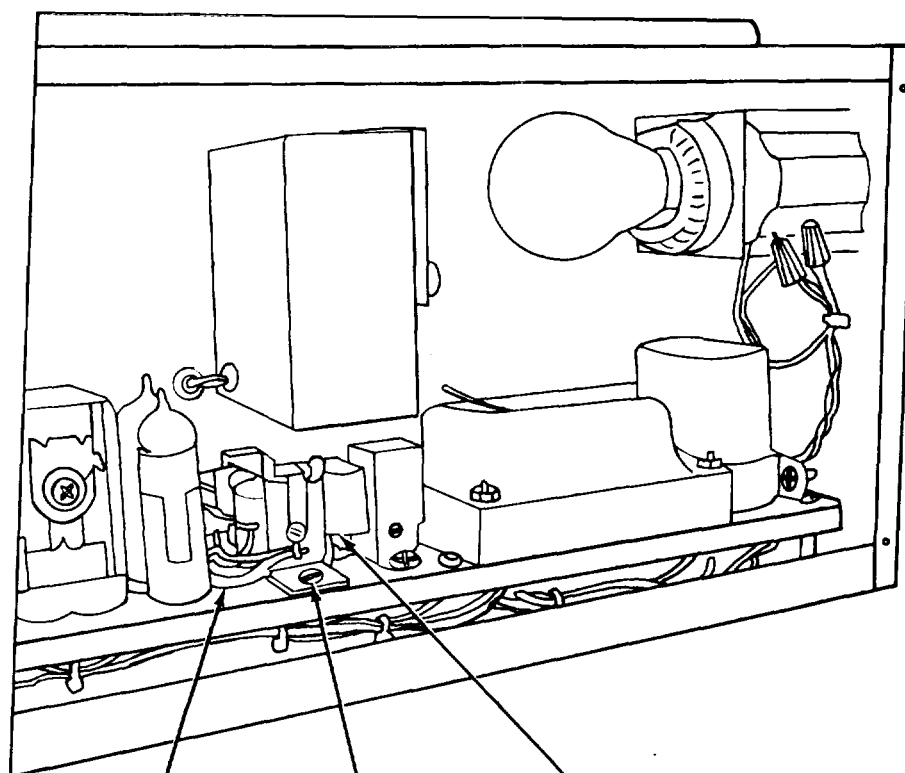
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug exposure control instrument power cord.



- b. Remove rear cover retaining screws with rubber washers attached.
- c. Remove rear cover.



RELAY
WIRES

RETAINING
SCREW
(SCREW ALSO
LOCATED AT
FRONT OF
RELAY)

CANCEL
RELAY

- d. Remove screws retaining relay.
- e. Lift defective relay (with wire connected) from chassis.
- f. Note wire positions and remove wires.
- g. Remove defective relay.
- h. Connect wires to new relay as noted.
- i. Install new relay and retain with screws.
- j. Reinstall rear cover.
- k. Plug in power cord.

3-20.6. Replace Power Cord.

MOS: 35E, Special Electronic Devices Repairer

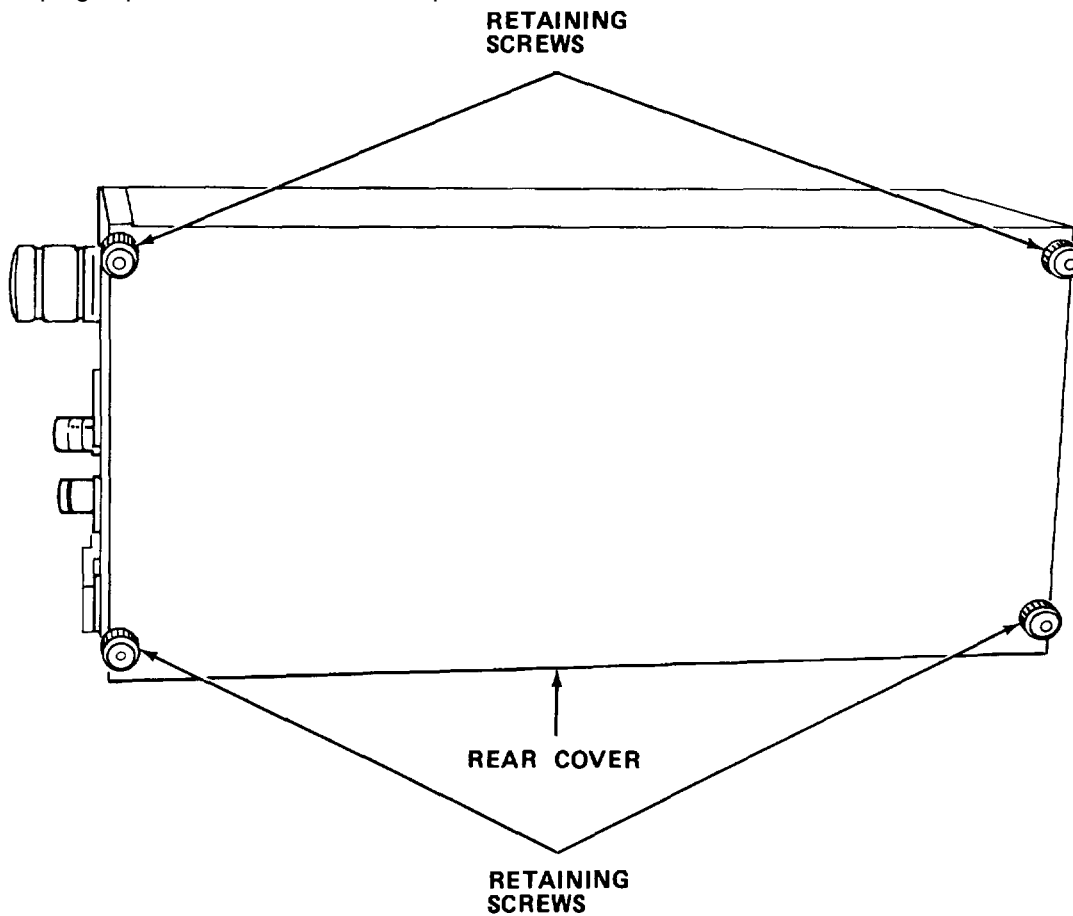
TOOLS: Flat Tip Screwdriver

SUPPLIES: Power Cord

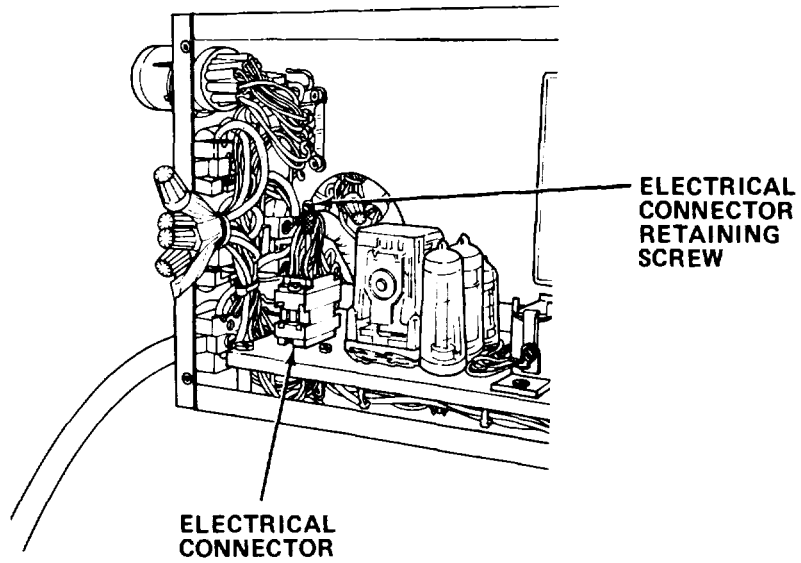
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug exposure control instrument power cord.

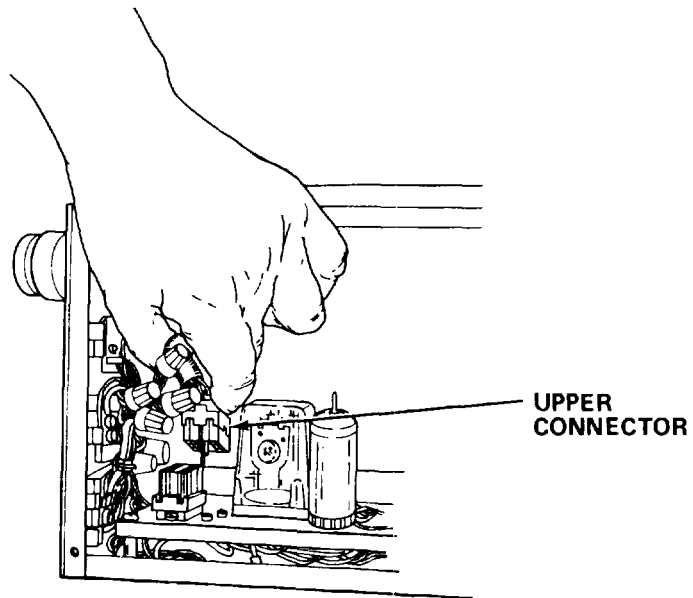


- b. Remove rear cover retaining screws with rubber washers attached.
- c. Remove rear cover.



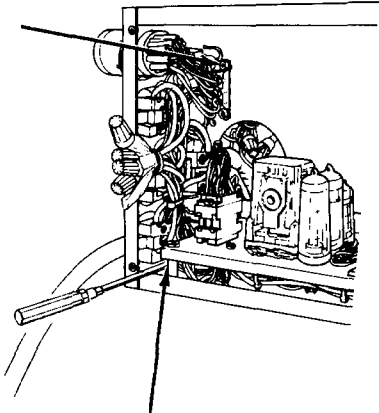
REMOVING ELECTRICAL CONNECTOR

- d. Turn upper electrical connector retaining screw to left.

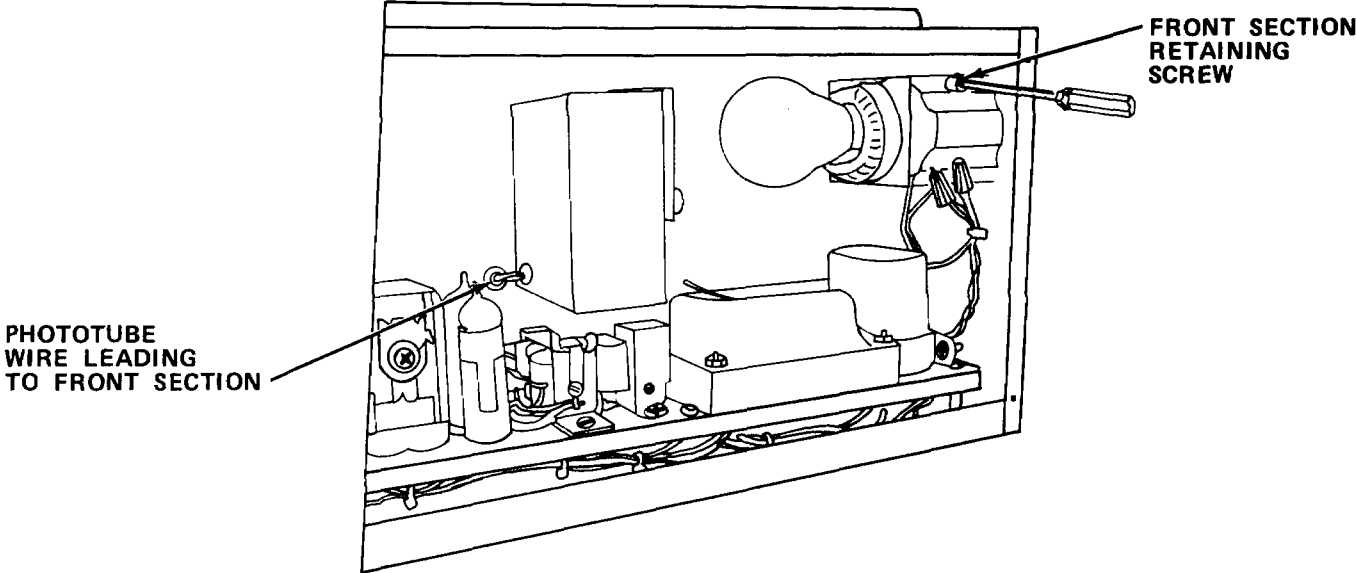


- e. Remove upper electrical connector.

FRONT SECTION
RETAINING
SCREW



FRONT SECTION
RETAINING SCREW



PHOTOTUBE
WIRE LEADING
TO FRONT SECTION

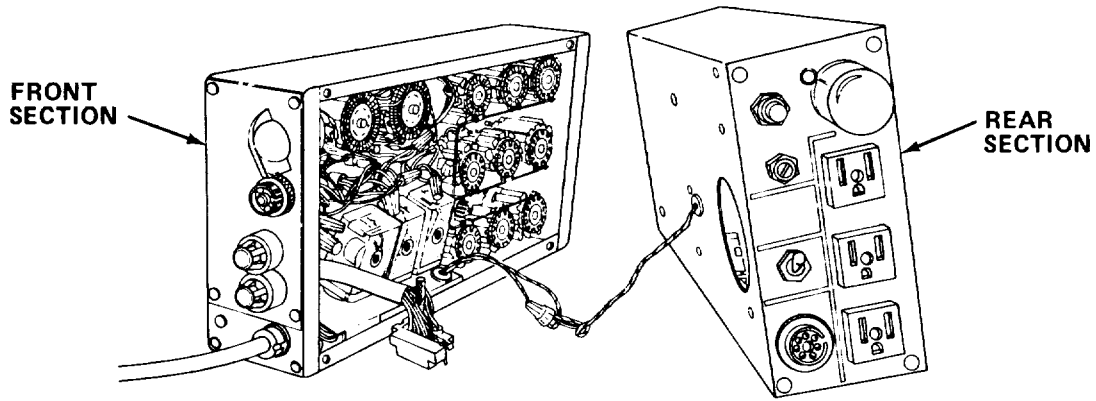
FRONT SECTION
RETAINING
SCREW

LOCATING FRONT SECTION
RETAINING SCREWS

f. Remove front section retaining screws.

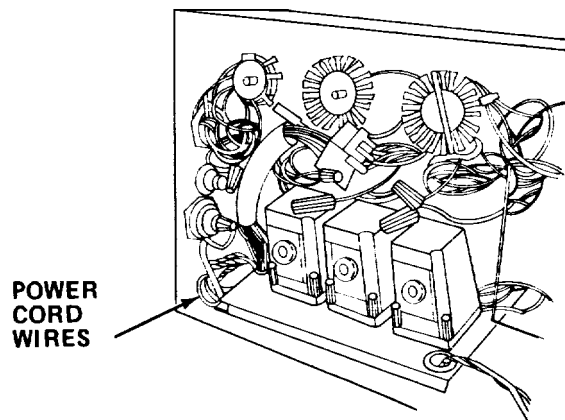
CAUTION

Internal phototube wires connect to front section . Use care when separating rear section from front section or damage to phototube and wiring may occur.



**FRONT SECTION
SEPARATED
FROM REAR SECTION**

- g. Separate rear section from front section and position front section to gain access to power cord connections.



- h. Note power cord electrical connections and remove connections.
- i. Remove defective power cord.
- j. Install new power cord.
- k. Reconnect rear section to front section.
- l. Reinstall upper electrical connector.
- m. Reinstall rear cover.
- n. Plug in power cord.

3-20.7. Replace Multicolor Phototube Bulb(s).

MOS: 35E, Special Electronic Devices Repairer

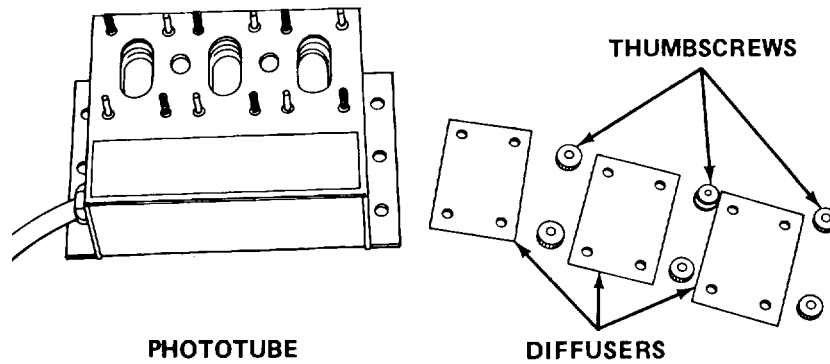
TOOLS: Flat Tip Screwdriver

SUPPLIES: Multicolor Phototube Bulb(s)

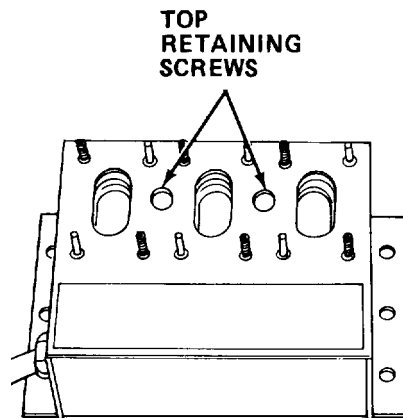
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

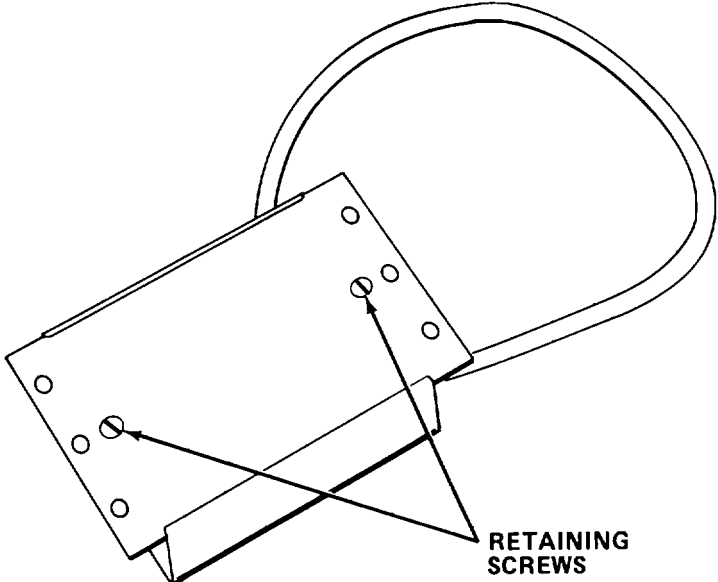
- a. Unplug exposure control instrument power cord.
- b. Remove phototube from mounting.



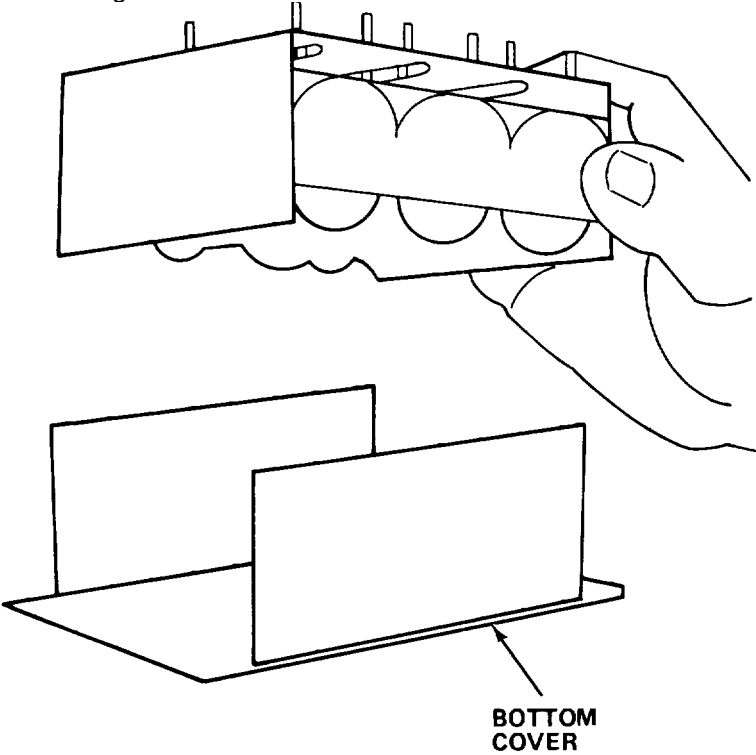
- c. Remove thumbscrews and diffusers.



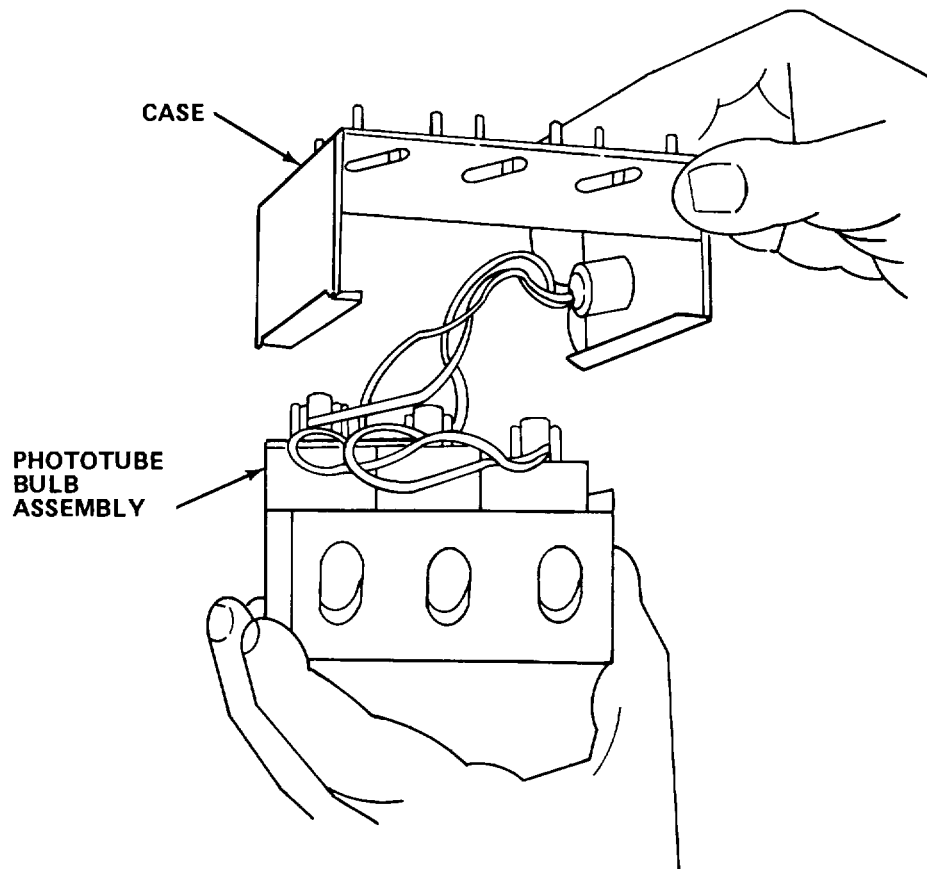
- d. Remove top retaining screws.



e. Remove bottom retaining screws.



f. Remove bottom cover.



- g. Remove phototube bulb assembly from case.
- h. Note wire positions on defective phototube bulb(s) and remove wires.
- i. Remove defective phototube bulb(s) from holder.
- j. Install new phototube bulb(s) into holder.
- k. Reconnect wires as noted.
- l. Install phototube bulb assembly into case.
- m. Reinstall bottom cover.
- n. Reinstall top retaining screws.
- o. Reinstall diffusers.
- p. Remount phototube.
- q. Plug in power cord.

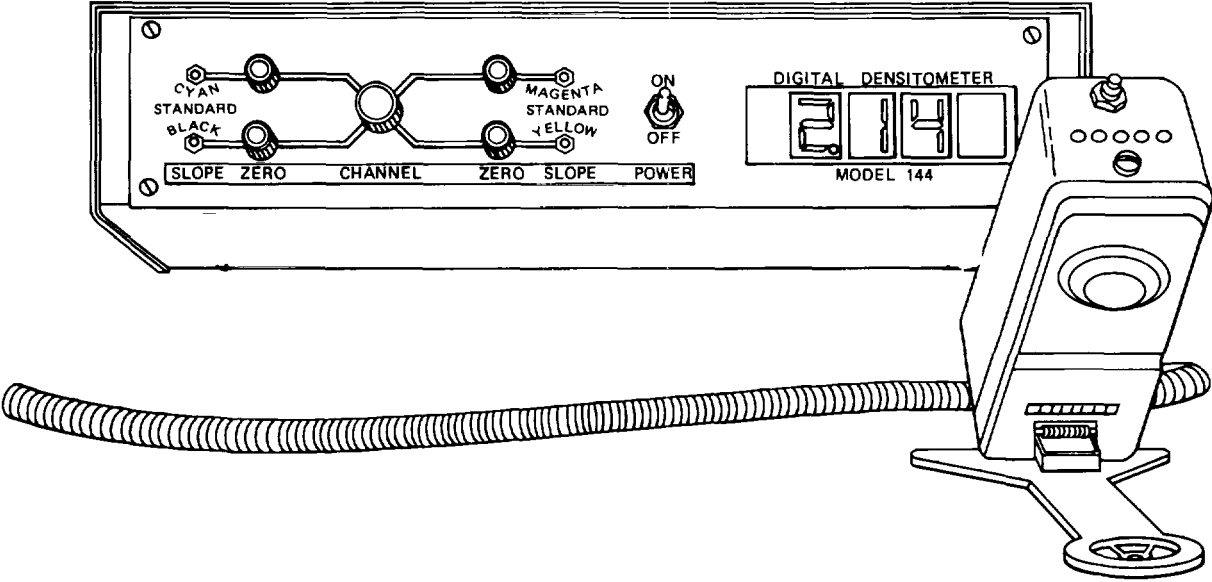
3-20.8. Replace Light Integrating Exposure Control Instrument.

MOS: 35E, Special Electronic Devices Repairer

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before removal.

- a. Turn power off.
- b. Unplug power cord.
- c. Remove all cables and store as directed.
- d. Remove wingnuts and top holddown bar.
- e. Remove exposure control instrument.
- f. Install exposure control instrument.
- g. Reinstall top holddown bar and wingnuts.
- h. Reconnect cables (paragraph 3-6.1).
- i. Plug in power cord.



CHAPTER 4

DIGITAL REFLECTION DENSITOMETER

Section I. INTRODUCTION

4-1. GENERAL INFORMATION.

4-1.1. Scope.

- a. Model number and equipment name. Model RD-144 Digital Reflection Densitometer.
- b. Purpose of equipment. To measure color and black and white densities.

4-1.2. Glossary.

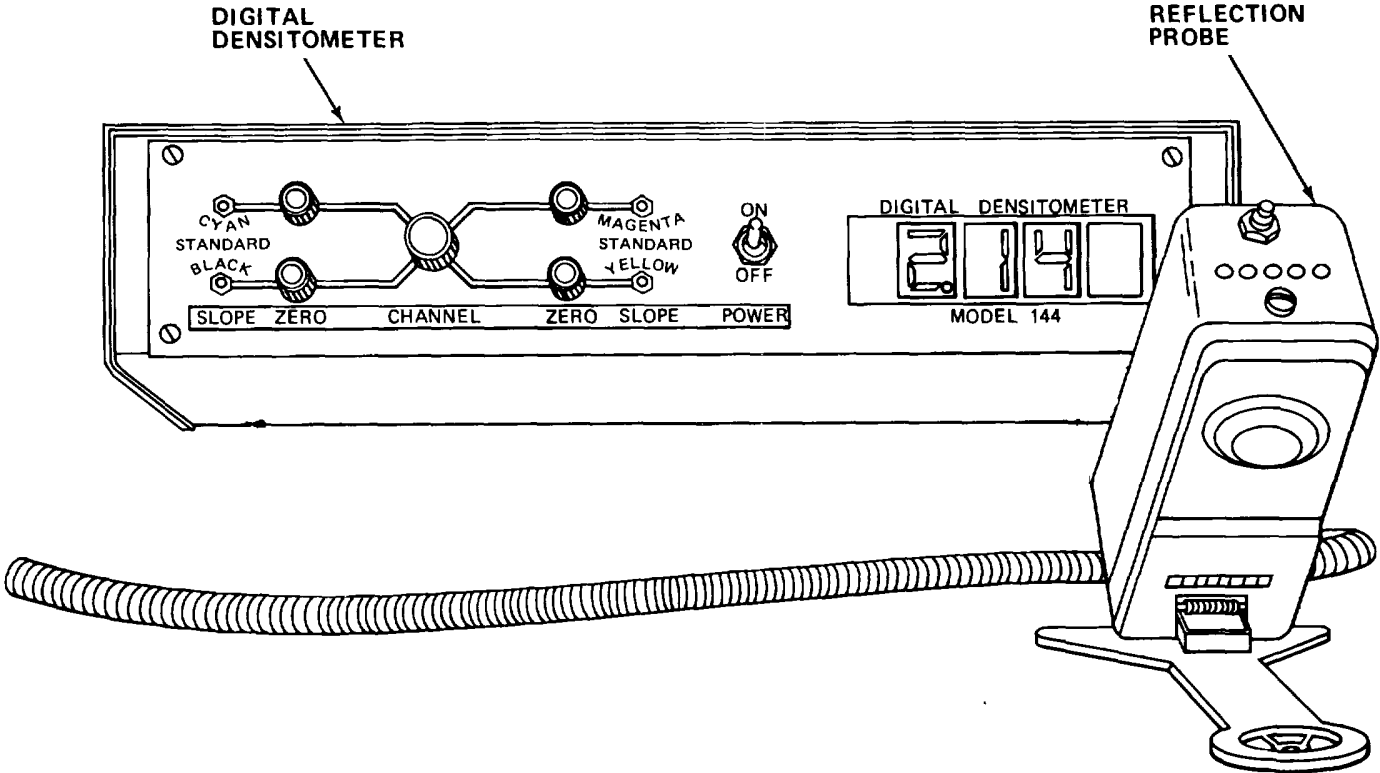
Cathode	The negative electrode of a tube or diode.
Dynode	An electrode that amplifies current by means of secondary electron emission in an electron tube.
Photomultiplier Tube	A phototube with one or more dynodes between its photocathode and its output electrode.

4-2. EQUIPMENT DESCRIPTION.

4-2.1. Equipment Characteristics, Capabilities, and Features. Used for measuring color and black and white densities. The digital reflection densitometer has the following capabilities and features:

- a. Independent filter calibration controls.
- b. Quick-disconnect probe cable connector.
- c. 120 V ac or 220 V ac operation.
- d. Solid state circuitry.
- e. Four digit digital readout.
- f. Readout hold.

4-2.2. Location and Description of Major Components.



DIGITAL DENSITOMETER. Determines density and provides a digital readout.

REFLECTION PROBE. Collects diffused light from sample surface and inputs it to densitometer.

4-2.3. Equipment Data.

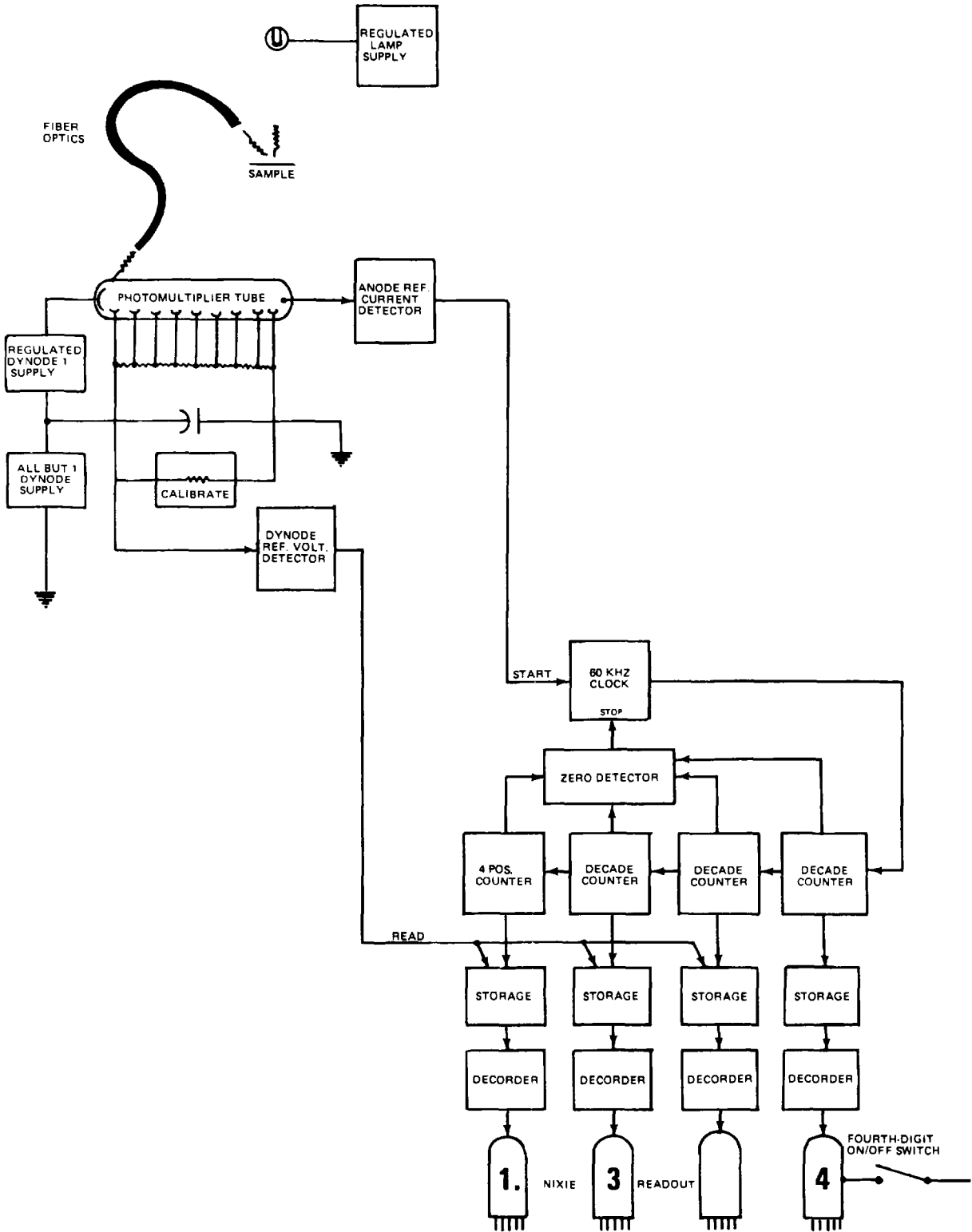
Weight	
Densitometer	13.5 lbs (6.1 kg)
Reflection Probe	1.5 lbs (.7 kg)
Dimensions	
Densitometer	
Width	15.3 in. (38.9 cm)
Height	4.0 in. (10.2 cm)
Depth	12.0 in. (30.5 cm)

Reflection Probe	
Width	2.3 in. (5.8 cm)
Height	2.6 in. (6.6 cm)
Depth	5.3 in. (13.5 mm)
Power Requirements	85 - 135 V ac or 170 - 270 V ac, 50/60 Hz, single phase
Density Range	0.000 to 4.000
Readout	4 digit, 7/8 in. (22 mm) high numerals
Digital Readout Accuracy Range	±0.015
Measurement Time	1/50 second max.
Sampling Rate	5 measurements per second minimum
Standard Filters	Visual(Gold) Wratten #106
	Red Wratten #25
	Green Wratten #58
	Blue Wratten #47
Lamp Life	20,000+ hours

4-3. TECHNICAL PRINCIPLES OF OPERATION.

4-3.1. General. The digital reflection densitometer is a self-contained light measuring instrument. It consists of the densitometer and reflection probe. The reflection probe directs light from a lamp through a lens and mirror optical system which strikes the unknown sample. Diffused light from the surface of the sample is collected by a group of fiber optic bundles. The bundles direct the light to the densitometer, where it is translated into a density measurement and displayed as a digital readout.

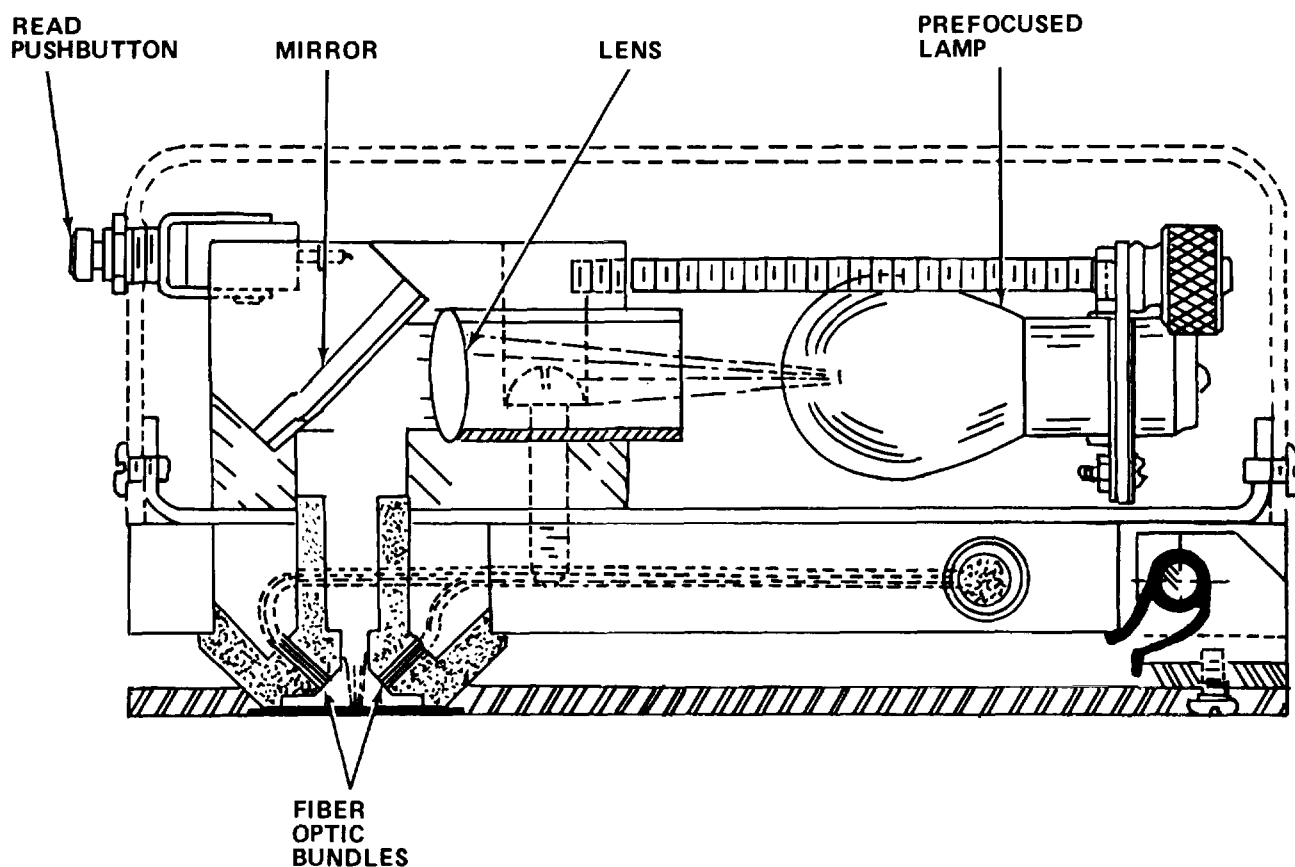
4-3.2 Detailed.



4-4

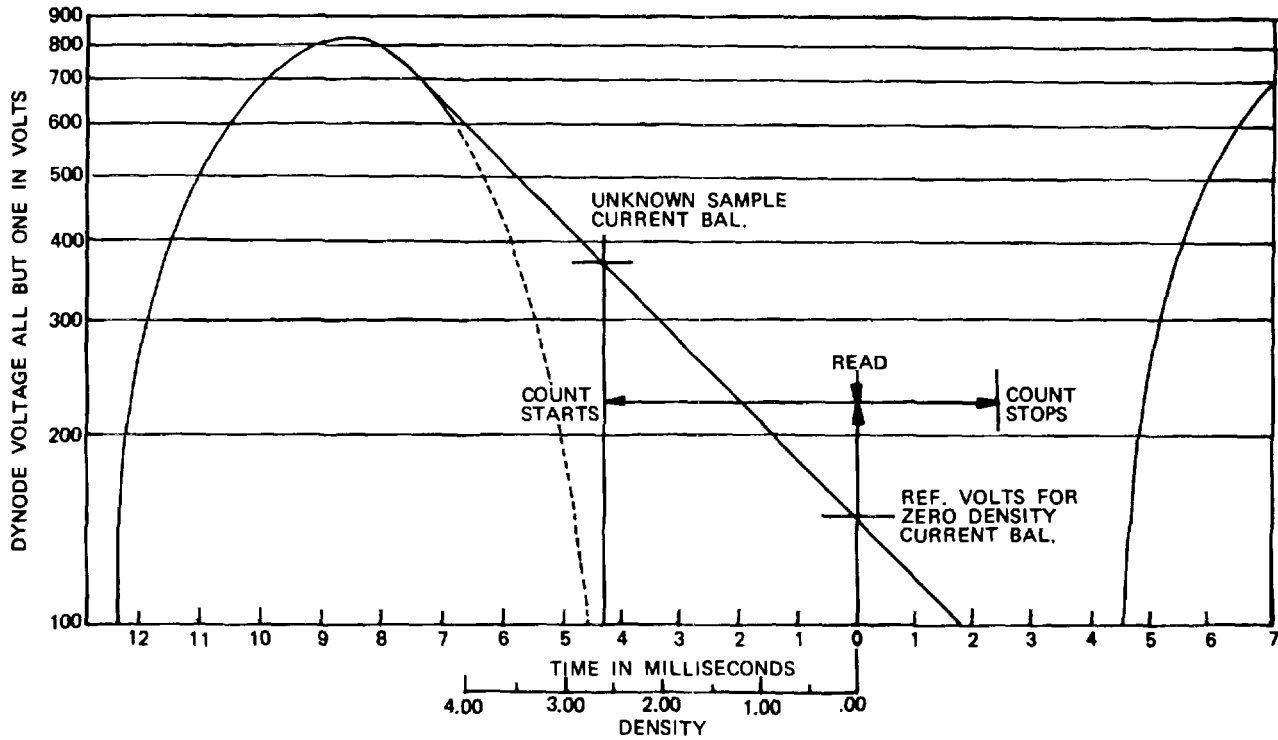
a. The densitometer employs a technique whereby density of an unknown sample is converted to a time period. This time period is precisely proportional to the density of the sample. Measurement of the time period results in a digital readout which is calibrated in terms of density. The entire measurement cycle occurs within 1/50 of a second.

b. A regulated power supply provides low voltage power for the filament lamp located within the reflection probe housing.



c. Within the probe housing, light from the prefocused lamp is directed by a lens and mirror and caused to strike the unknown sample. The light strikes the sample at a 90 degree angle relative to the surface. Diffused light from the surface of the sample is collected by a group of fiber optic bundles. The bundles are spaced evenly between 0 degree and 360 degrees at a 45 degree angle relative to the surface. Light collected by the fiber optic bundles is directed back to the densitometer. The light passes through a filter system and is directed on the photosensitive cathode of the photomultiplier tube. Power from the internal power supply is periodically applied to the photomultiplier tube dynode network. Each cycle of power results in the measurement of the unknown sample density.

d. When the READ pushbutton is pressed, it causes the measured density to be displayed as a digital readout. During a portion of each cycle of the power source, the photomultiplier tube dynode network charges to a voltage greater than that required for measurement of the maximum density within the range of the densitometer. During the remaining portion of the power source cycle, the photomultiplier tube dynode network voltage decreases with time. This produces the change in dynode voltage required for a linear density measurement.



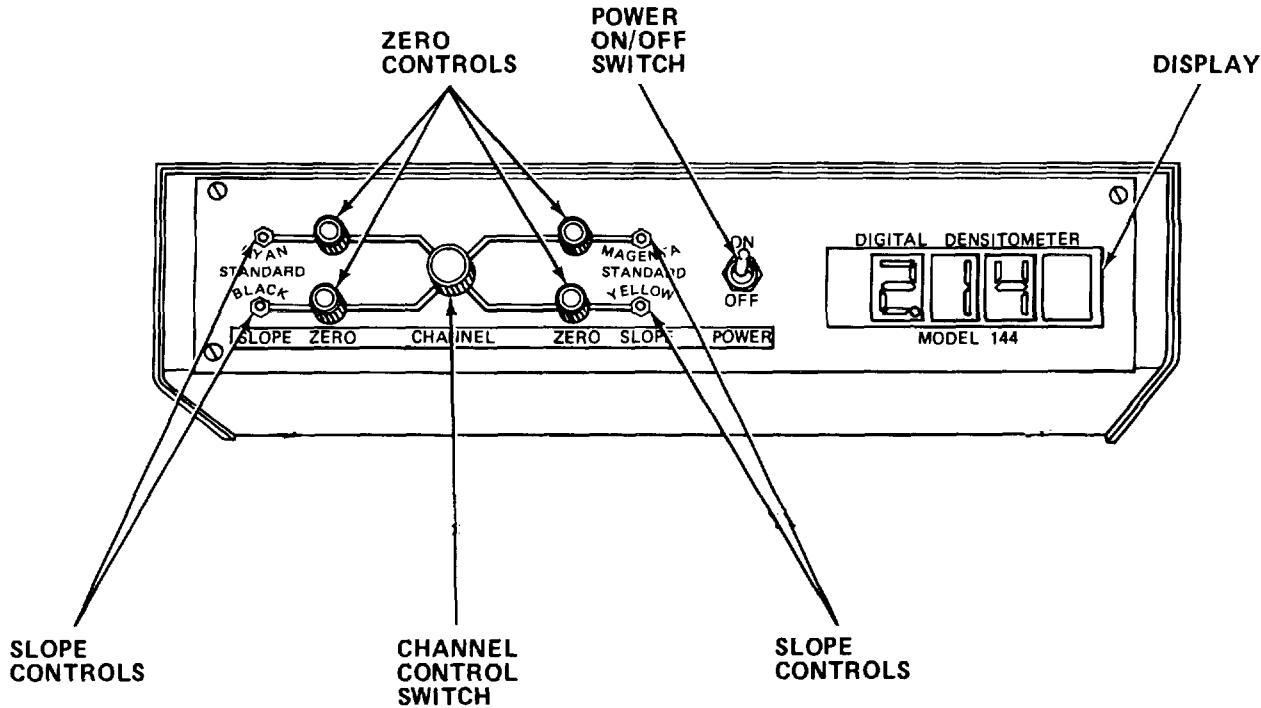
e. Current from the photomultiplier tube is monitored, and a START pulse is generated when the output current equals a predetermined reference value. When the dynode voltage has decreased to the standard reference value, approximately 150 volts, a READ pulse is generated. The time between these two pulses (START and READ) increases directly proportional to increasing density values. The START pulse starts the operation of a 60,000 Hz oscillator. The oscillator supplies clock pulses to the integrated circuit counters which begin counting upward from zero. Occurrence of the READ pulse transfers the accumulated clock pulse count into the storage registers, where it is used to produce the corresponding reading in the digital readouts.

f. The counter continues counting until it has accumulated 400 counts. This is electrically equivalent to zero counts. At this time the counter is stopped until the next measurement cycle. Releasing the probe READ pushbutton allows the last 4 measured value to remain displayed in the digital readout. If the READ pulse occurs before the START pulse, a minus (-) sign will appear at the left side of the display. This is to prevent the possibility of setting a ZERO control incorrectly.

Section II. OPERATING INSTRUCTIONS

4-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.

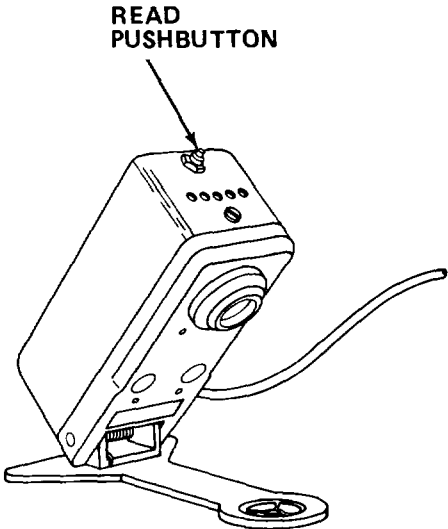
Controls or Indicator	Function
-----------------------	----------



POWER ON/OFF switch	Applies power to all circuits in the densitometer and reflection probe.
CHANNEL control switch	Selects filter to be used in the optical system.
ZERO controls (four)	Standardize low density readings.
SLOPE controls (four)	Adjust calibration of densitometer.
Display	Displays density of sample.

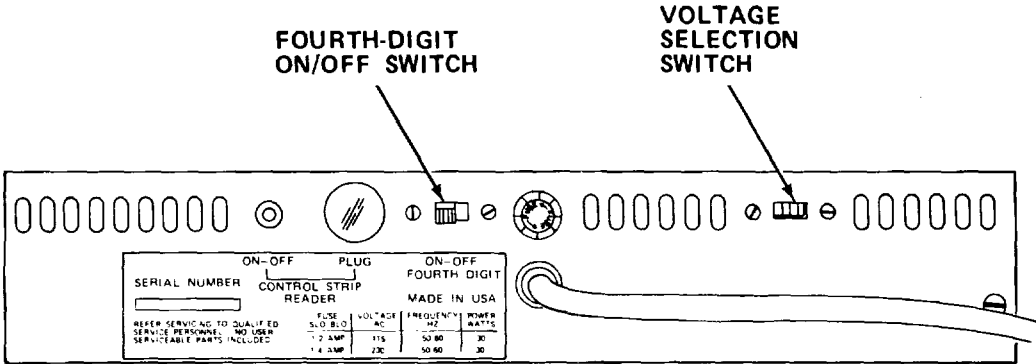
Controls or Indicator

Function



READ pushbutton

Enables densitometer to display a reading.



FOURTH-DIGIT ON/OFF switch

Turns on or off fourth-digit in readout.

Voltage selection switch

Selects 115 V ac or 230 V ac operation.

4-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before you operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While you operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After you operate. Be sure to perform your after (A) PMCS.
- d. If your equipment fails to operate. Troubleshoot with the proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

4-5.1. PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operations if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.
- g. Interval column. This column determines the time period designated to perform your PMCS.
- h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart, (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.
- i. Equipment is Not Ready/Available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Lens Brush	1
Cheesecloth (Item 4, Appendix E)	ar
Detergent (Item 8, Appendix E)	ar

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

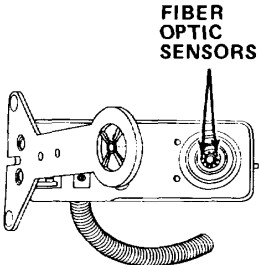
Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	Q	<p><u>DIGITAL REFLECTION DENSITOMETER</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or serious injury may occur if power cord is not unplugged before servicing densitometer.</p> <p>Inspect.</p> <ol style="list-style-type: none"> 1. Check power cord for cuts, cracks, or broken plug. 2. Check densitometer case for dents, scratches, or damaged condition. Check for missing or broken knobs or switches. <p style="text-align: center;">4-10</p>	<p>Power cord has cuts, cracks, or broken plug.</p> <p>Missing or broken knobs or switches.</p>

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	Q	<p><u>DIGITAL REFLECTION DENSITOMETER - Cont</u></p> <p>Inspect - Cont</p> <ol style="list-style-type: none"> 3. Check reflection probe base for area damage or accumulation of dirt. Check target is damaged. 4. Check probe cord for cuts, cracks, or broken pins. 	<p>Bottom of reflection</p> <p>Probe cord has cuts, cracks, or broken pins.</p>
2	W	<p><u>Clean.</u></p> <ol style="list-style-type: none"> 1. Clean densitometer using cheesecloth dampened with mild detergent and warm water. <div style="text-align: center;">  <p>FIBER OPTIC SENSORS</p> </div> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not use solvents on probe tip or serious damage to fiber optic system may occur.</p> <ol style="list-style-type: none"> 2. Using cheesecloth or lens brush, clean fiber optic sensors. 3. Clean bottom of probe base with slightly damp cheesecloth. 4. Clean lint and dust from target area. <p style="text-align: center;">4-11</p>	

4-6. OPERATION UNDER USUAL CONDITIONS.**4-6.1. Assembly and Preparation for Use.****CAUTION**

Be sure correct voltage is selected prior to applying power or serious damage to equipment may occur.

- a. Be sure densitometer voltage selection switch on rear panel is set to correct position for the power available.
- b. Plug in reflection probe cable.
- c. Plug in densitometer.

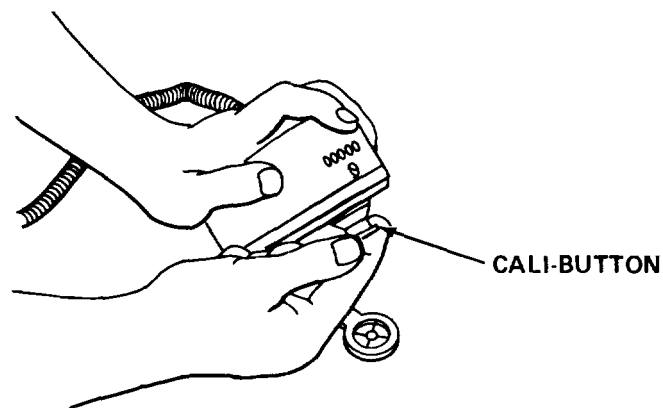
NOTE

For the highest possible accuracy, the densitometer should be turned on and allowed to reach normal operating temperature (one half hour or more) before use.

- d. Move POWER switch to ON position.
- e. Be sure digital display and reflection probe lamp light.

4-6.2. Initial Adjustments, Daily Checks, and Self Test.

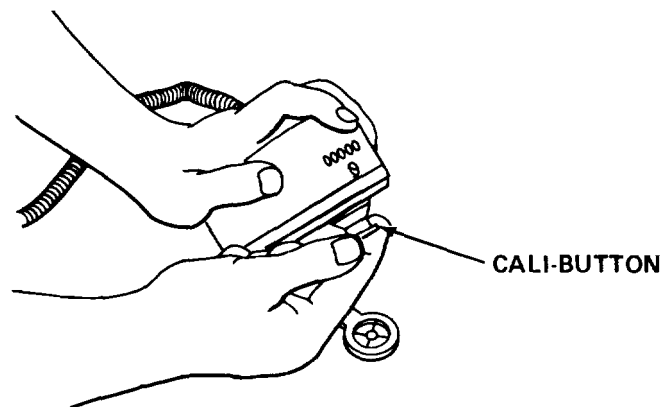
- a. Turn on densitometer and allow to warm up for one half hour.



- b. Place white cali-button in probe tip.
- c. Press READ pushbutton.

- d. Adjust ZERO control knob of channel selected until a reading of 0.000 is obtained.
- e. Repeat step d. for each channel position.
- f. Place cyan-colored cali-button in probe tip.
- g. Place CHANNEL control switch in the cyan-colored position.
- h. Press READ pushbutton.
- i. If necessary, adjust SLOPE control so that display shows reading recorded on cali-button case top.
- j. Repeat step i. for each of the remaining colors.

4-6.3. Operating Procedures.



- a. Place probe on unknown area of sample or copy.
- b. Center desired area in probe target.
- c. Press upper portion of probe downward until it rests firmly on probe base.
- d. Depress and hold READ pushbutton until a reading is obtained on the digital readout. If desired, move probe or sample around, while holding the READ pushbutton to obtain maximum and minimum values.

NOTE

The digital readout will automatically hold and display the last measured value when the READ pushbutton is released.

- e. Release READ pushbutton when desired reading is obtained.
- f. Return hinged portion of probe to its raised position.

4-6.4. Preparation for Movement.

- a. Set densitometer POWER switch to OFF position.
- b. Unplug reflection probe and place probe in secure storage.

4-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

4-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

4-9. TROUBLESHOOTING PROCEDURES.

a. The table lists the common malfunctions which you may find during operation or maintenance of the densitometer, or its components. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 4-2. TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

1. DENSITOMETER WILL NOT TURN ON.

- Step 1. Check that power cord is plugged in and circuit breaker is on
 - (a) Plug in power cord
 - (b) Turn circuit breaker on
 - (c) If no power at duplex receptacle, refer to higher level of maintenance.
- Step 2. Check for defective fuse.

Table 4-2. TROUBLESHOOTING - Cont

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before troubleshooting.

- (a) Remove power cord from duplex receptacle.
- (b) Remove two thumb-screws and remove densitometer from mounting bracket.
- (c) Remove fuse by pushing in fuse holder and turning holder to left.
- (d) Visually inspect fuse; if fuse filament is broken, replace fuse.
- (e) Mount densitometer into mounting bracket.

4-10. MAINTENANCE PROCEDURES. Operator maintenance is limited to regular preventive maintenance checks and services and replacing of a fuse.

Section IV. ORGANIZATIONAL MAINTENANCE

4-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

4-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT. These items are not required at this level of maintenance.

4-13. SERVICE UPON RECEIPT.

4-13.1. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

4-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

4-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the facing schematic or the foldout located at the end of this manual for further fault analysis.

d. If any component of the Rectifier I Section does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power troubleshooting procedures for dead receptacle (Table 4-3).

Table 4-3. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. DEISITOMETER WILL NOT ENERGIZE.		
Step. 1.	Check for power at outlet.	(a) If power present, proceed to step 2. (b) Restore power to outlet.
Step. 2.	Check for defective power cord.	(a) If power cord is not defective, proceed to step 3. (b) Replace power cord (paragraph 4-16.11).
Step. 3.	Check for defective power switch.	(a) If power switch is not defective, proceed to step 4. (b) If power switch defective, replace switch. (paragraph 4-16.9)
Step. 4.	Check for defective fuse holder.	(a) If fuse holder is not defective, proceed to step 5. (b) If fuse holder is defective, replace fuse holder. (paragraph 4-16.6)
Step. 5.	Check for defective power select switch.	(a) If power select switch is not defective, proceed to step 6. (b) If power select switch is defective, replace power select switch. (paragraph 4-16.5)
Step. 6.	Check for defective power transformer.	(a) If power transformer is not defective, proceed to step 7. (b) If power transformer is defective, replace transformer. (paragraph 4-16.8)

Table 4-3. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
Step. 7.	Check for defective power capacitor.	(a) If power capacitor is not defective, notify supervisor. (b) If power capacitor is defective, replace capacitor.
2. PROBE LAMP WILL NOT LIGHT.		
Step. 1.	Check for defective lamp.	(a) If lamp is not defective, proceed to step 2. (b) If lamp is defective, replace lamp. (paragraph 4-16.2)
Step. 2.	Check for broken wires or connection in probe.	(a) If wires and connections are intact, proceed to step 3. (b) Replace/repair any loose or broken wires.
Step. 3.	Check for defective probe connector.	(a) If probe connector is not defective, notify supervisor. (b) If probe connector is defective, replace connector, (paragraph 4-16.14)
3. NO RESPONSE TO PROBE READ PUSHBUTTON.		
Step. 1.	Check for defective read pushbutton.	(a) If pushbutton is not defective, proceed to step 2. (b) If pushbutton is defective, replace pushbutton, (paragraph 4-16.4)
Step. 2.	Check for defective probe connector.	

Table 4-3. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		<ul style="list-style-type: none"> (a) If connector is not defective, notify supervisor. (b) If connector is defective, replace connector. (paragraph 4-16.14)
4. ERRATIC OPERATION OF DIGITAL DISPLAY.		
Step. 1.	Check for defective controls.	<ul style="list-style-type: none"> (a) If controls are not defective, proceed to step 2. (b) If controls are defective, replace controls. (paragraph 4-16.7 or 4-16.10)
Step. 2.	Check for defective filter.	<ul style="list-style-type: none"> (a) If filter is not defective, notify supervisor. (b) IF filter is defective, replace filter, (paragraph 4-16.3)
5. DIGITAL DISPLAY DOES NOT CHANGE WHEN CHANNEL CONTROL SWITCH IS ROTATED.		
	Loose channel control switch knob.	Tighten knob.
6. NO DIGITAL DISPLAY OF FOURTH DIGIT WITH FOURTH DIGIT ON/OFF SWITCH IN ON POSITION.		
	Defective fourth digit on/off switch.	Replace fourth digit on/off switch. (paragraph 4-16.12)
7. DIFFICULT TO ZERO ADJUST REFLECTION PROBE WITH WHITE CALI-BUTTON INSTALLED.		
	Reflection probe optical system out of alinement.	Aline reflection probe optical system. (paragraph 4-16.15)

4-16. ORGANIZATIONAL MAINTENANCE PROCEDURES.

a. This section contains instructions covering Organizational maintenance functions for the densitometer. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Remove/Install Densitometer	4-16.1
Replace Probe Lamp.....	4-16.2
Replace Filter	4-16.3
Replace READ Pushbutton	4-16.4
Replace Power ON/OFF Switch.....	4-16.5
Replace Fuse Holder.....	4-16.6
Replace ZERO Control.....	4-16.7
Replace Transformer	4-16.8
Replace Voltage Selection Switch.....	4-16.9
Replace SLOPE Control.....	4-16.10
Replace Power Cord	4-16.11
Replace FOURTH-DIGIT ON/OFF Switch	4-16.12
Replace Capacitor	4-16.13
Replace Connector.....	4-16.14
Aline Reflection Probe Optical System.....	4-16.15

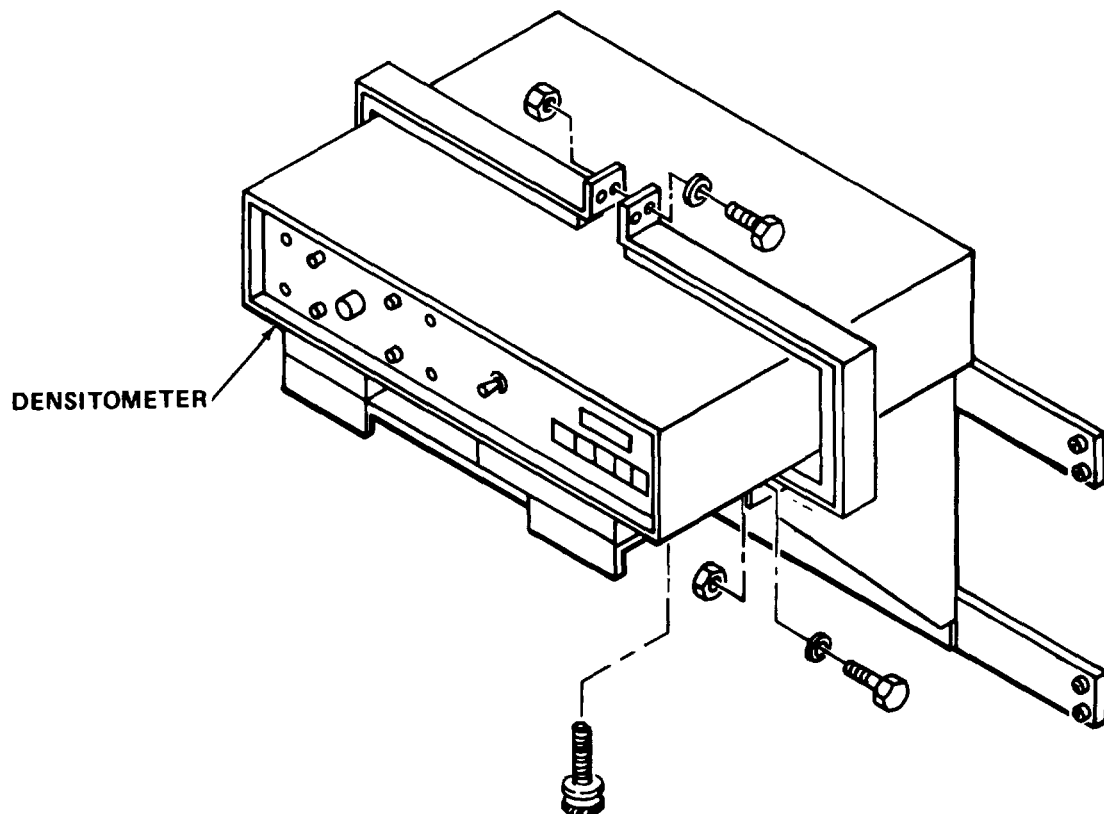
4-16.1. Remove/Install Densitometer

MOS: 83FJ6 Reproduction Equipment Repairman

TOOLS: None

SUPPLIES: Densitometer

- a. Unplug power cord and reflection probe.



- b. Remove two thumb-screws from bottom of densitometer.
- c. Remove defective densitometer.
- d. Position new densitometer in place.
- e. Install thumb-screws.
- f. Plug in power cord and reflection probe.

4-16.2. Replace Probe Lamp.

MOS: 83FJ6 Reproduction Equipment Repairman

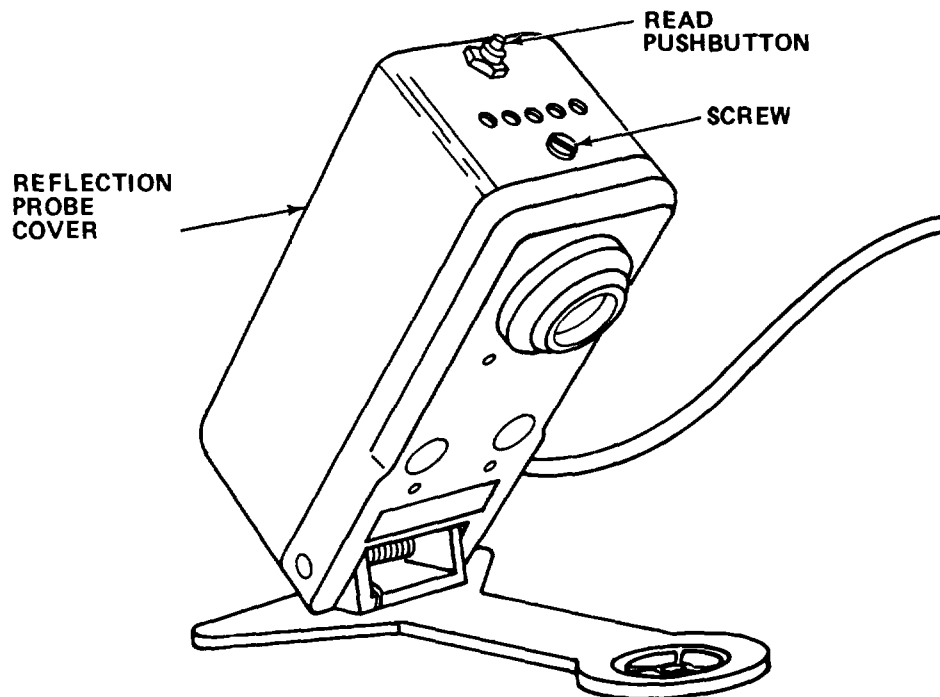
TOOLS: Flat Tip Screwdriver

SUPPLIES: Lamp

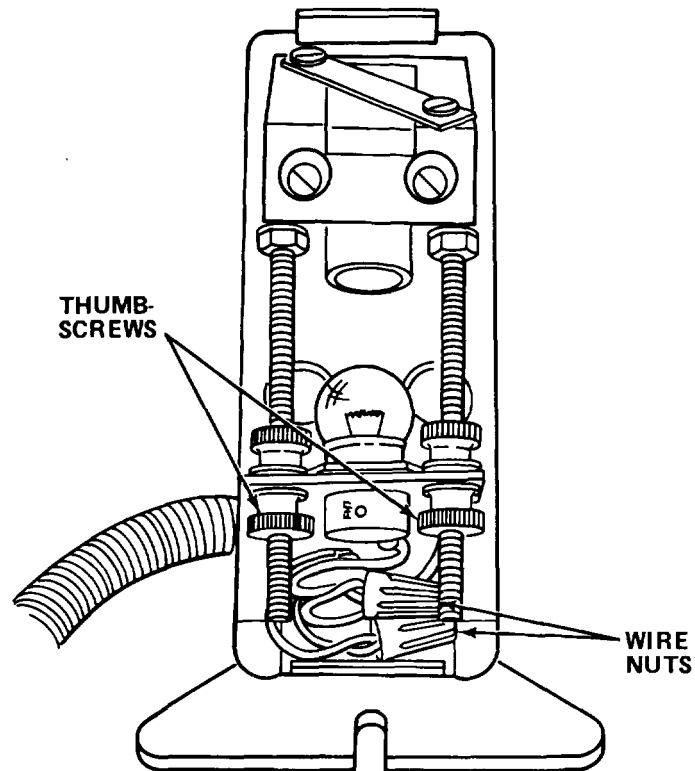
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Unplug reflection probe cable.



- c. Remove probe housing cover.
- d. Remove cover carefully to prevent damage to wires attached to READ pushbutton.
- e. Remove wire nuts, and note wire color connections; then disconnect lamp wires.



- f. Remove thumbscrews.
- g. Remove defective probe lamp.
- h. Install new probe lamp.
- i. Mate wires by color code and carefully twist wires together.
- j. Install wire nuts.
- k. Install probe housing cover.
- l. Plug in power cord.
- m. Check lamp alignment (paragraph 4-20.21).
- n. Reconnect reflection probe cable. 423

4-16.3. Replace Filter.

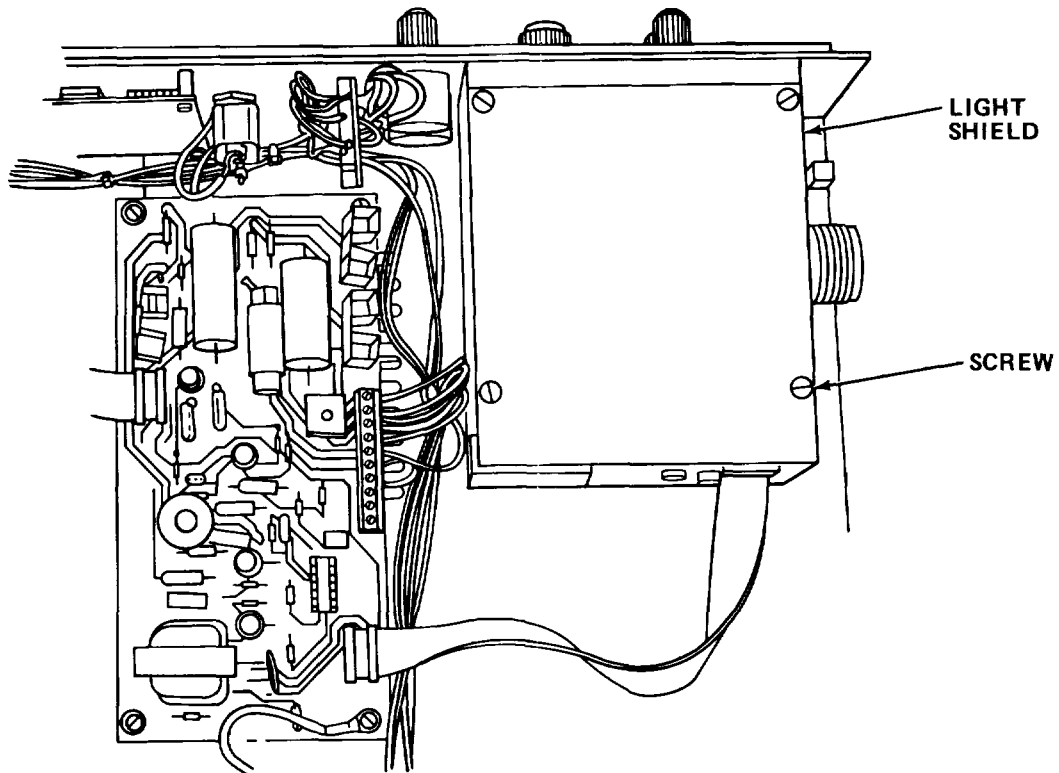
MOS: 83FJ6 Reproduction Equipment Repairman

TOOLS: Flat Tip Screwdriver

SUPPLIES: Filter

WARNING**Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Remove filter light shield.

CAUTION

Use care not to touch surface of new filter during replacement. Acid from finger can damage new filter.

- d. Remove defective filter.
- e. Install new filter.
- f. Install light shield.
- g. Install chassis cover.
- h. Install densitometer (paragraph 4-20.1).
- i. Adjust as necessary.

4-16.4. Replace READ Pushbutton.

MOS: 35E, Special Electronic Devices Repairer

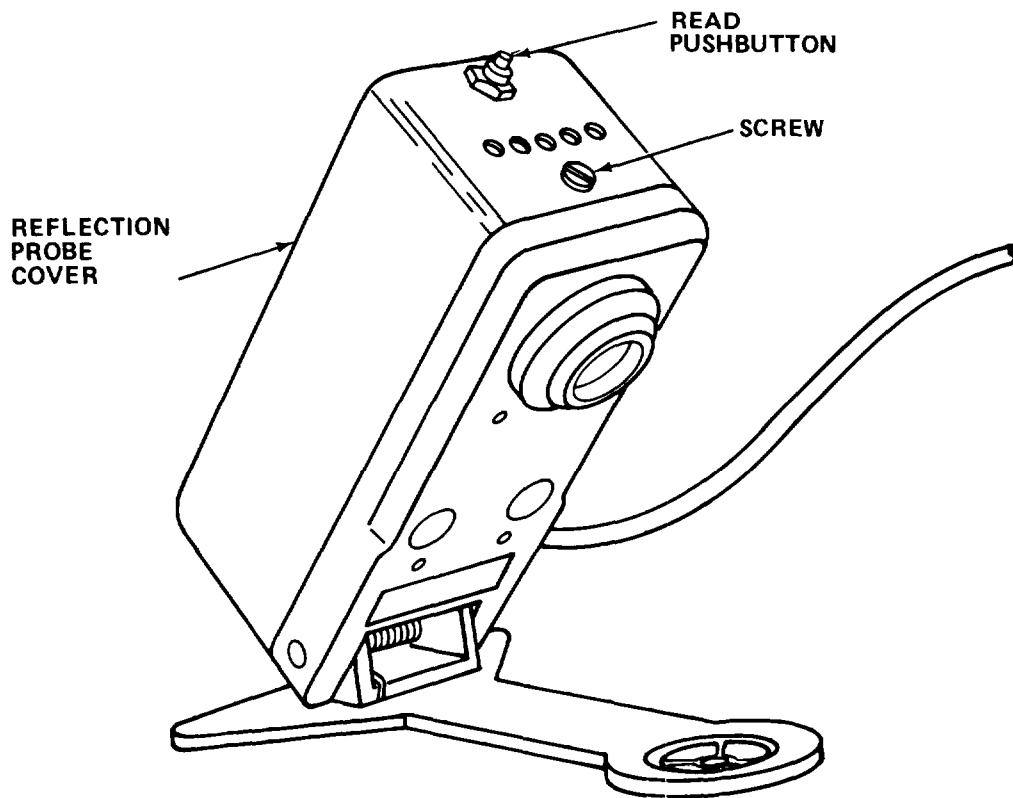
TOOLS: Flat Tip Screwdriver
 Combination Wrench Set
 Soldering Iron

SUPPLIES: READ Pushbutton
 Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Unplug reflection probe cable.



- c. Remove cover.
- d. Remove READ pushbutton from probe housing cover.
- e. Tag and unsolder wires on READ pushbutton.
- f. Remove defective READ pushbutton.
- g. Solder wires to new pushbutton and remove tags.
- h. Install new pushbutton.
- i. Install reflection probe cover.
- j. Plug in reflection probe.
- k. Plug in power cord.

4-16.5. Replace POWER ON/OFF Switch

MOS: 35E, Special Electronic Devices Repairer

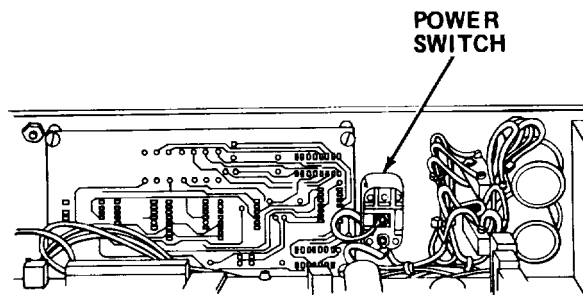
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Soldering Iron

SUPPLIES: POWER ON/OFF Switch
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Tag and unsolder wires from POWER switch.
- d. Remove nut securing switch from front panel.
- e. Remove defective switch.
- f. Install new switch.
- g. Solder wires to new switch and remove tags.
- h. Install chassis cover.
- i. Install densitometer (paragraph 4-20.1).

4-16.6. Replace Fuse Holder.

MOS: 35E, Special Electronic Devices Repairer

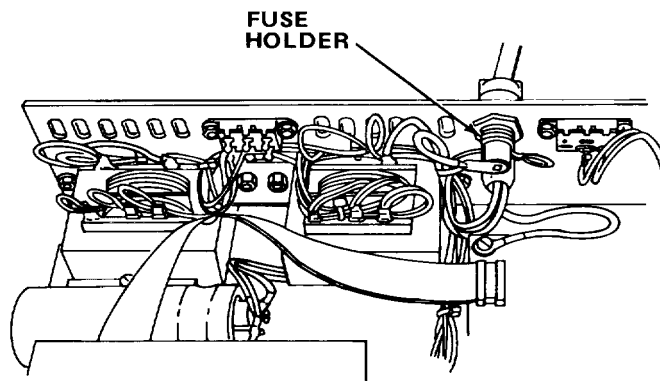
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Hex Head Wrench Set
Soldering Iron

SUPPLIES: Fuse Holder
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Tag and unsolder wires from ZERO control.
- d. Remove fuse.
- e. Remove defective fuse holder.
- f. Install new fuse holder.
- g. Install fuse.
- h. Solder wires and remove tags.
- i. Install chassis cover. 429
- j. Install densitometer (paragraph 4-20.1).

4-16.7. Replace ZERO Control.

MOS: 35E, Special Electronic Devices Repairer

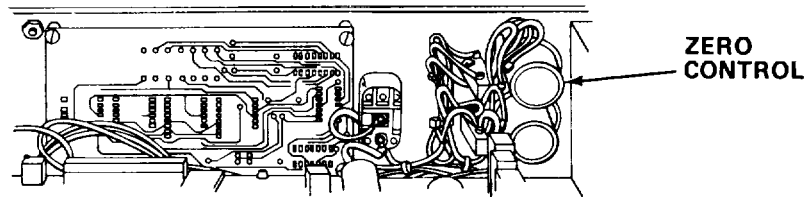
TOOLS: Flat Tip Screwdriver
Hex Head Wrench Set
Combination Wrench Set
Soldering Iron

SUPPLIES: Potentiometer (ZERO Control)
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.
- c. If ZERO control is under light shield, remove four screws securing filter light shield to chassis; remove light shield. If not under light shield, proceed to step d.



- d. Tag and unsolder wires from ZERO control.
- e. Remove knob.
- f. Remove nut securing ZERO control from chassis.
- g. Remove defective ZERO control.
- h. Install new ZERO control.
- i. Solder wires to new ZERO control and remove tags.
- j. Install knob.
- k. Install light shield (if removed).
- l. Install chassis cover.
- m. Install densitometer (paragraph 4-20.1).

4-16.8. Replace Transformer.

MOS: 35E, Special Electronic Devices Repairer

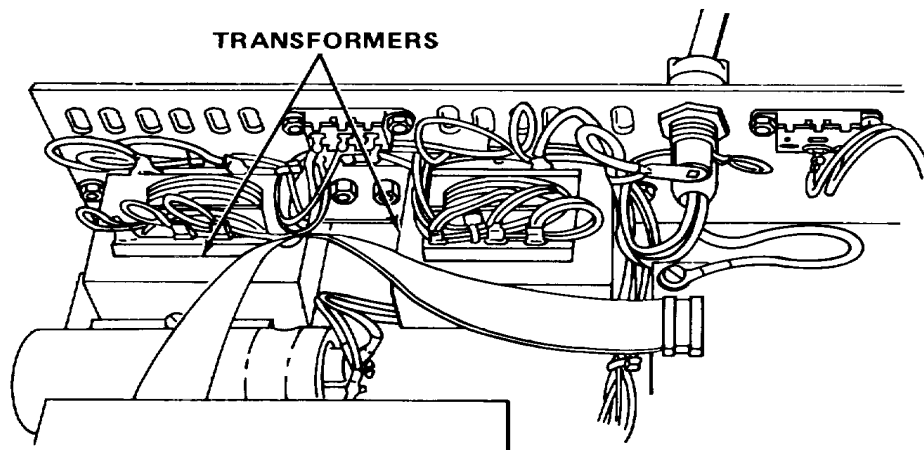
TOOLS: Flat Tip Screwdriver
Soldering Iron

SUPPLIES: Transformer
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Tag and unsolder wires from defective transformer.
- d. Remove transformer from chassis.
- e. Install new transformer.
- f. Solder wires and remove tags.
- g. Install chassis cover.
- h. Install densitometer (paragraph 4-20.1).

4-16.9. Replace Voltage Selection Switch.

MOS: 35, Special Electronic Devices Repairer

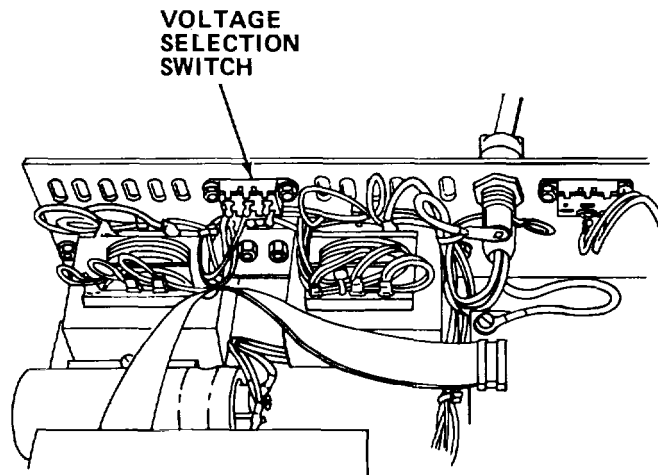
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Soldering Iron

SUPPLIES: Voltage Selection Switch (Volt Switch)
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Tag and unsolder wires from voltage selection switch.
- d. Remove voltage selection switch from chassis.
- e. Install new voltage selection switch.
- f. Solder wires and remove tags.
- g. Install chassis cover.
- h. Check that voltage selection switch is in correct position for voltage source.
- i. Install densitometer (paragraph 4-20.1).

4-16.10. Replace SLOPE Control.

MOS: 35E, Special Electronic Devices Repairer

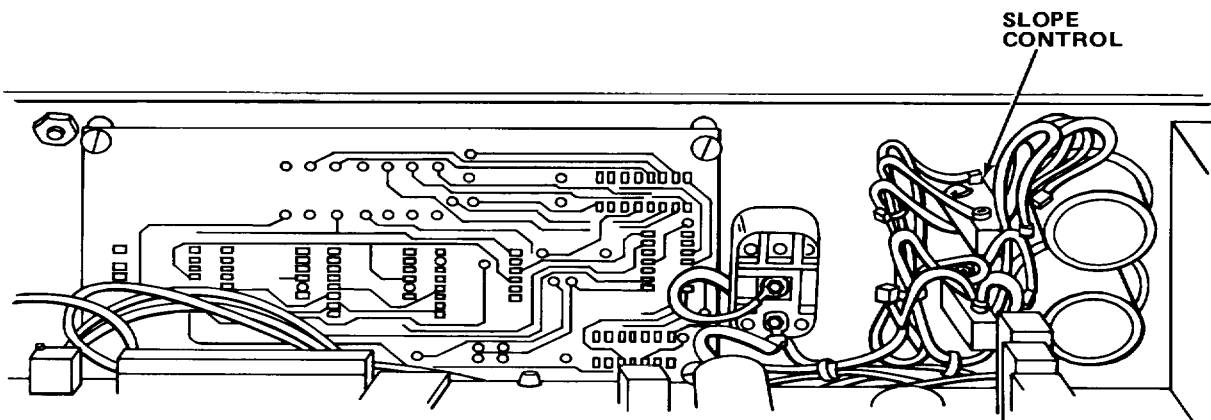
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Soldering Iron

SUPPLIES: SLOPE Control (Potentiometer)
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.
- c. If SLOPE control is under filter light shield, remove four screws securing filter light shield; remove light shield.



- d. Tag and unsolder wires from SLOPE control.
- e. Remove nut securing SLOPE control from chassis
- d. Remove defective SLOPE control.
- e. Install new SLOPE control.
- f. Solder wires and remove tags.
- g. Install light shield (if removed).
- h. Install chassis cover.
- i. Install densitometer (paragraph 4-20.1).

4-16.11. **Replace Power Cord.**

MOS: 35E, Special Electronic Devices Repairer

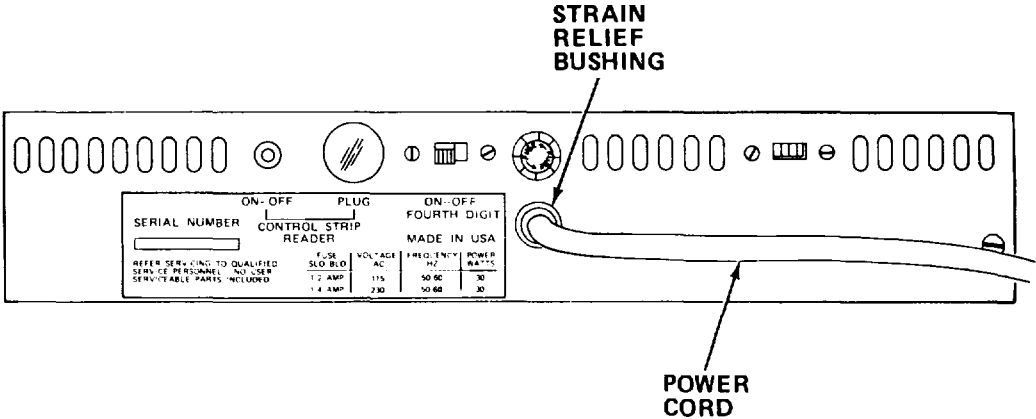
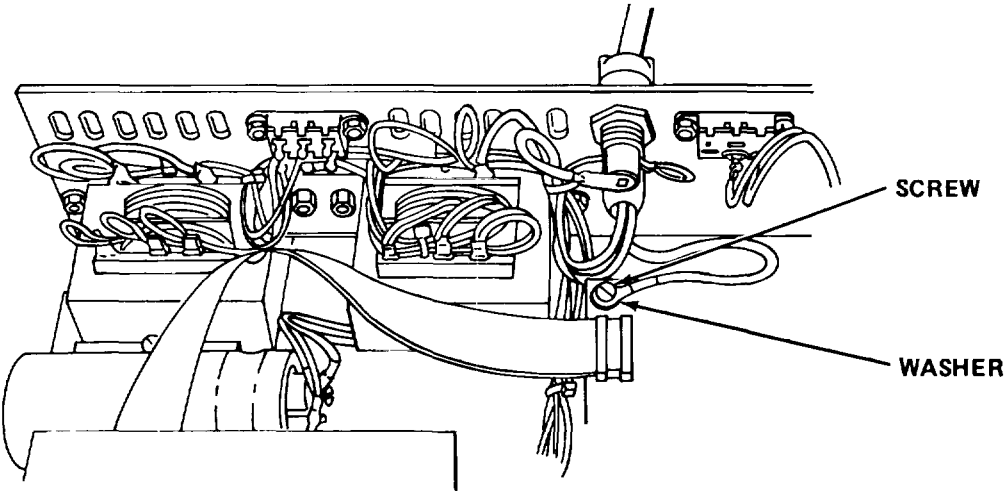
TOOLS: Flat Tip Screwdriver
Soldering Iron

SUPPLIES: Power Cord (Cable)
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Note terminal that white wire is attached to unsolder and remove power cord white and black wires.
- d. Remove green wire from chassis.
- e. Remove and retain strain relief bushing.
- f. Remove defective power cord.
- g. Install new power cord with strain relief bushing.
- h. Install green wire to chassis.
- i. Solder white wire as noted and black wire to fuse holder.
- j. Install chassis cover.
- k. Install densitometer (paragraph 4-20.1).

4-16.12. Replace FOURTH-DIGIT ON/OFF Switch.

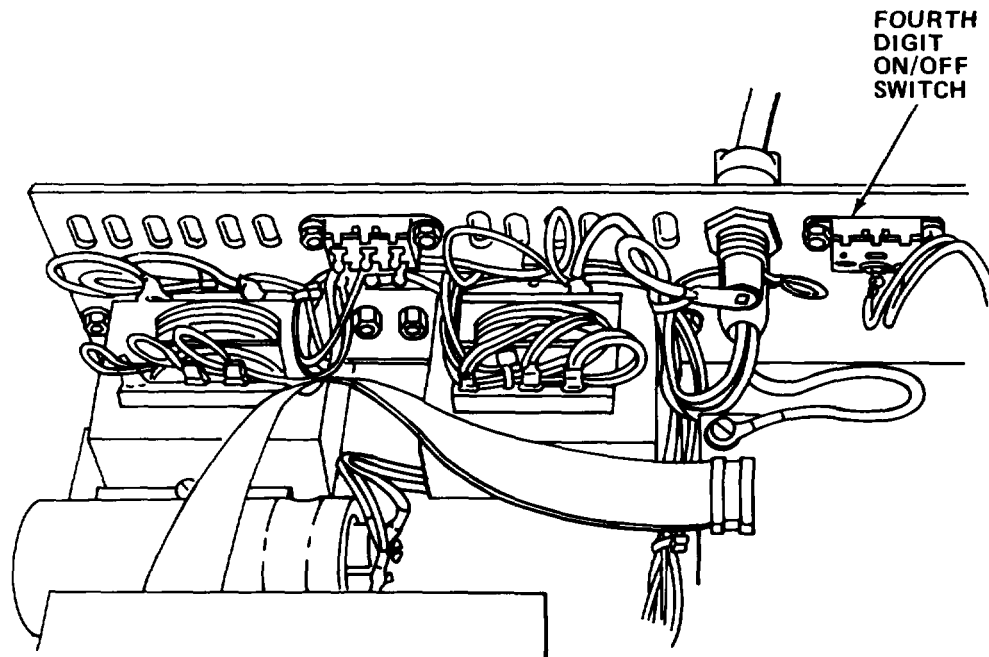
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Soldering Iron

SUPPLIES: FOURTH-DIGIT ON/OFF Switch
Solder

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Tag and unsolder wires from switch.
- d. Remove defective FOURTH-DIGIT ON/OFF switch.
- e. Install new FOURTH-DIGIT ON/OFF switch.
- f. Solder wires and remove tags.
- g. Install chassis cover.
- h. Install densitometer (paragraph 4-20.1).

4-16.13. Replace Capacitor.

MOS: 35E, Special Electronic Devices Repairer

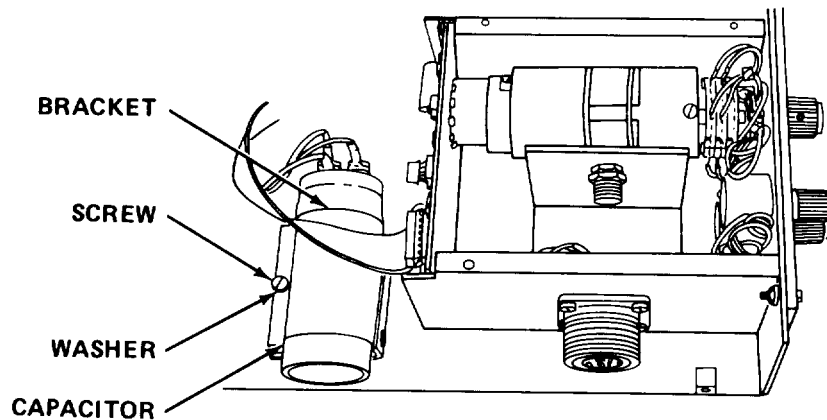
TOOLS: Flat Tip Screwdriver

SUPPLIES: Capacitor

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.

**WARNING**

High voltages that are capable of causing death may be stored in capacitor after power is removed. Be sure capacitor is discharged and reduced to zero volts.

- c. Tag and disconnect wires from capacitor.
- d. Remove defective capacitor.
- e. Install new capacitor.
- f. Reconnect wires and remove tags.
- g. Install chassis cover.
- h. Install densitometer (paragraph 4-20.1).

4-16.14. Replace Connector.

MOS: 35E, Special Electronic Devices Repairer

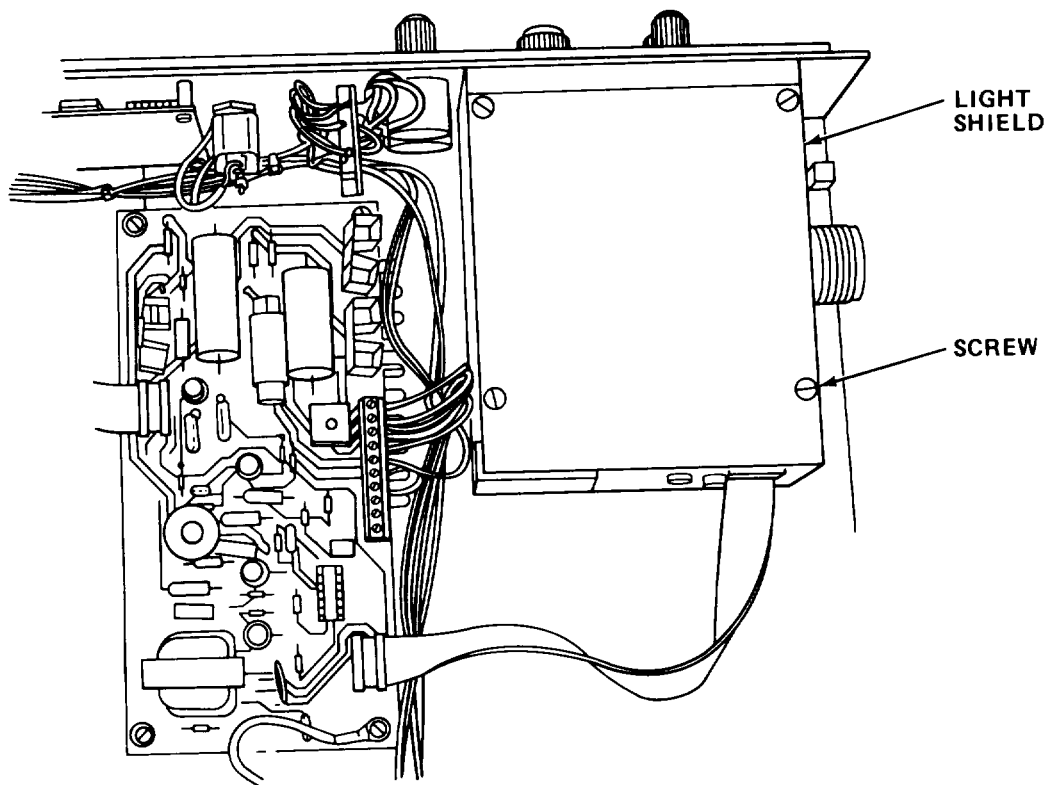
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Soldering Iron

SUPPLIES: Connector
Solder

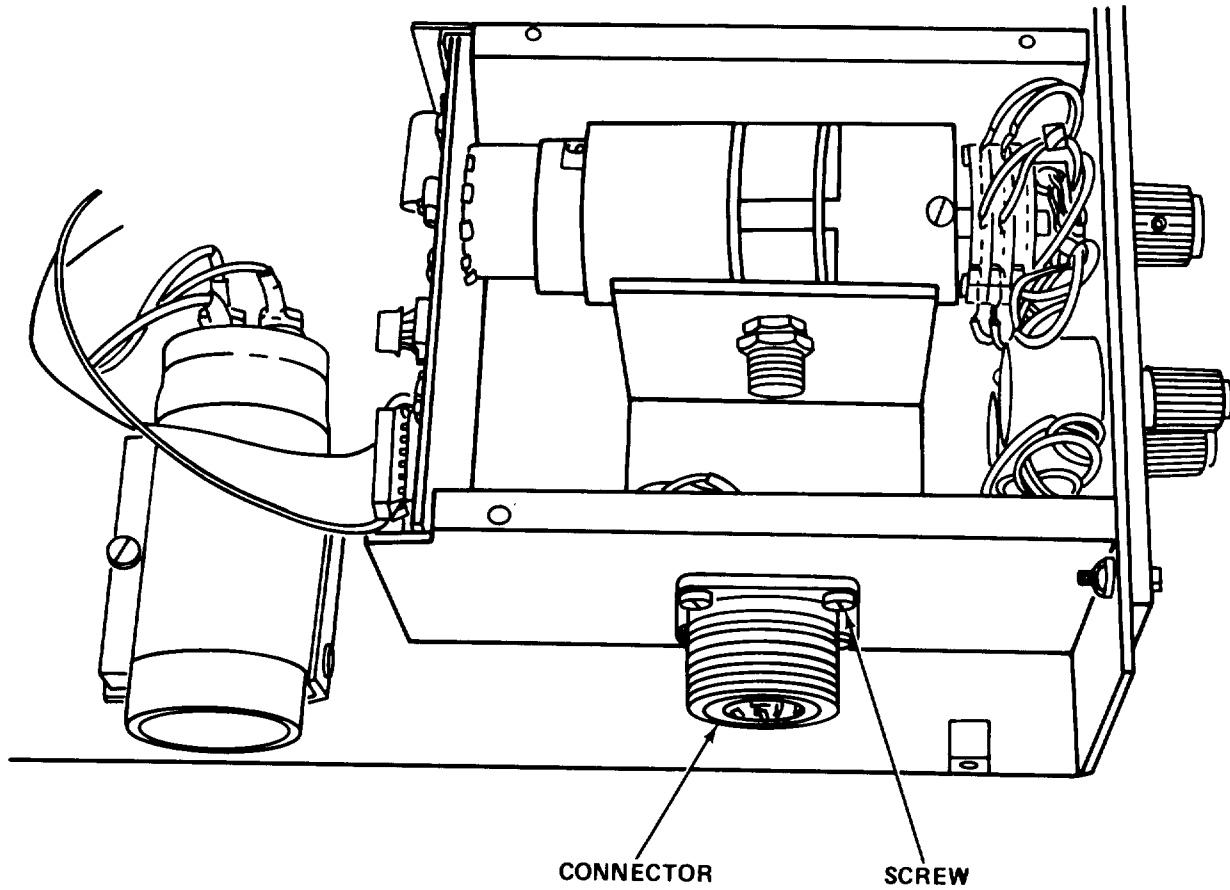
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Remove light shield cover.
- d. Tag and unsolder wires from connector.



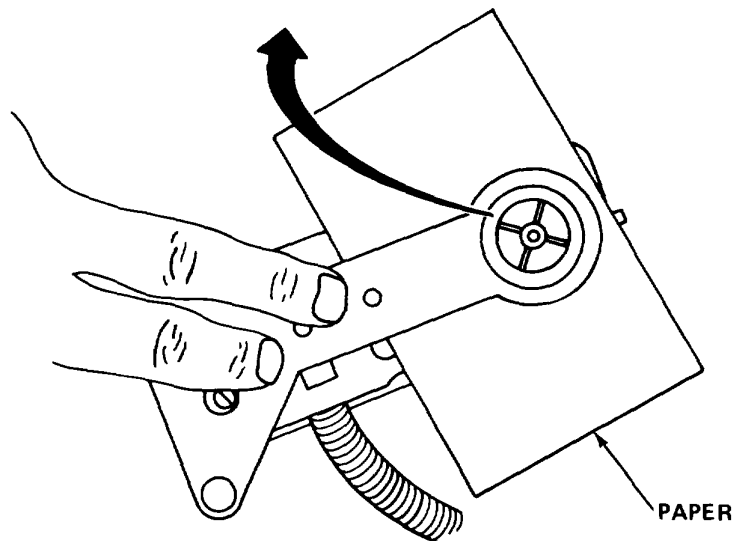
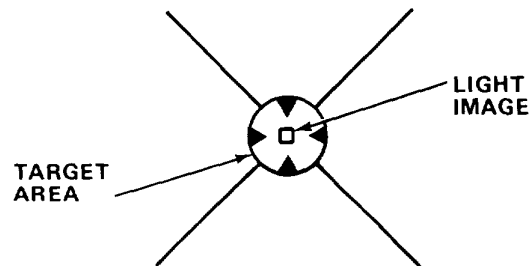
- e. Remove defective connector.
- f. Install new connector.
- g. Solder wires to new connector and remove tags.
- h. Install filter light shield cover.
- i. Install chassis cover.
- j. Install densitometer (paragraph 4-20.1).

4-16.15. Aline Reflection Probe Optical System.

MOS: 83FJ6 Reproduction Equipment Repairman

TOOLS: Flat Tip Screwdriver

- a. Apply pressure against reflection probe body and probe base, causing body and base to mate in the normal measurement position.
- b. Check to see that base bottoms-out against probe tip.
- c. If necessary, loosen two base screws and realine.



- d. Place a piece of translucent white paper over target area.
- e. Check to see that a focused rectangular image appears approximately in the center of target area.
- f. If necessary, remove probe housing cover and adjust physical position of lamp.

4-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE**4-18. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

4-18.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-18.2. Special Tools; Test, Measurements and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

4-18.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM5-3610-257-24P covering direct/general support maintenance for this equipment.

4-19. DIRECT/GENERAL SUPPORT TROUBLESHOOTING PROCEDURES.

a. Direct/general support troubleshooting procedures cover the most common malfunctions that may be repaired at the direct/general support level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by lower level maintenance should be conducted in addition to the direct/general support troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the schematics located at the end of this chapter for further analysis.

4-20. MAINTENANCE PROCEDURES.

a. This section contains instructions covering direct/general support maintenance functions for the densitometer. Personnel required are listed only if the _ task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace CHANNEL Control Switch.....	4-20.1
Replace Clock Board Assembly	4-20.2
Replace Logic Board Assembly.....	4-20.3
Replace Power Supply Board Assembly	4-20.4
Replace Display Board Assembly	4-20.5
Replace Photomultiplier Board/Tube.....	4-20.6

Table 4-4. DIRECT/GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. DENSITOMETER WILL NOT ENERGIZE.		
	Step 1. Check for defective power supply board.	
	(a) If power supply board is not defective, proceed to Step 2.	
	(b) If power supply board is defective, replace power supply board (paragraph 4-20.4) Step 2. Check for defective display board.	
	(a) If display board not defective, notify supervisor.	
	(b) If display board defective, replace display board (paragraph 4-20.5)	
2. REFLECTION PROBE LAMP WILL NOT LIGHT.		
	Defective power supply board assembly	
	Replace power board assembly (paragraph 4-20.4)	
3. NO RESPONSE TO PROBE READ PUSHBUTTON.		
	Step 1. Check for defective logic board assembly (a) If logic board assembly is not defective, proceed to step 2.	
	(b) If logic board assembly is defective, replace logic board assembly (paragraph 4-20.3) Step 2. Check for defective clock board assembly.	
	(a) If clock board assembly not defective, notify supervisor.	
	(b) If clock board assembly defective, replace clock board assembly (paragraph 4-20.2)	
4. TWO NUMBERS DISPLAYED IN SAME COLUMN OR ONE NUMBER MISSING IN CLOUMN.		
	Defective display board assembly	
	Replace display board assembly (paragraph 4-20.5).	

Table 4-4. DIRECT/GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<hr/>		
5. DIGITAL DISPLAY DOES NOT CHANGE WHEN CHANNEL CONTROL SWITCH IS ROTATED.		
Step 1.	Check for defective channel control switch	
(a)	If switch is not defective, proceed to step 2	
(b)	If switch is defective, replace switch (paragraph 4-20.1)	
Step 2.	Check for defective display board.	
(a)	If display board is not defective, notify supervisor	
(b)	If display board is defective, replace display board (paragraph 4-20.5)	
6. FIRST DIGIT OF DIGITAL DISPLAY MAINTAINS A WHOLE NUMBER FOR ALL SAMPLES TESTED.		
	Defective photomultiplier board assembly	
	Replace photomultiplier board assembly (paragraph 7-20.6)	

4-20.1. Replace CHANNEL Control Switch.

MOS: 35E, Special Electronic Devices Repairer

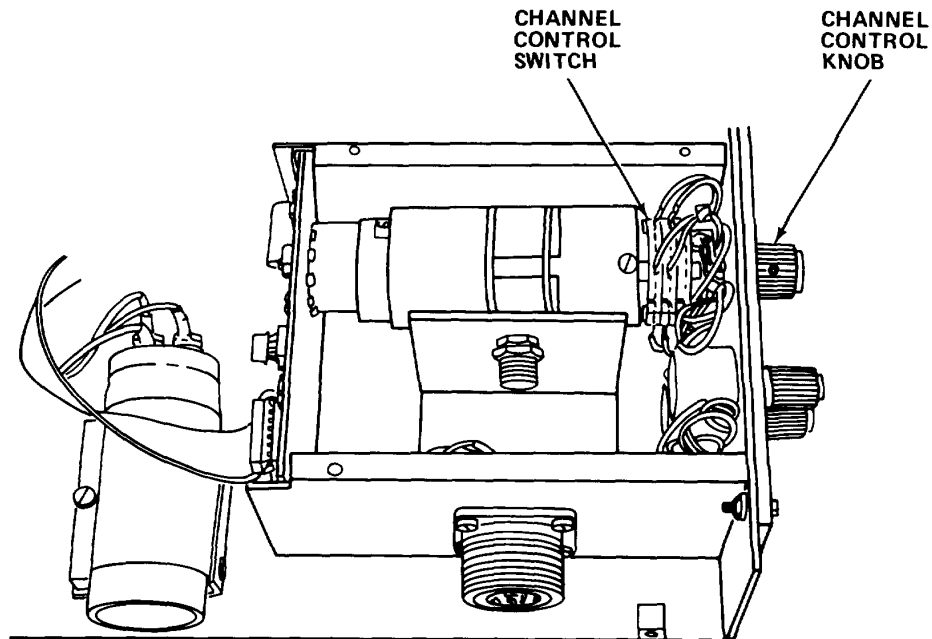
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Soldering Iron
Hex Head Screw Key Set

SUPPLIES: CHANNEL Control Switch (Rotary Switch)
Solder (Item 44, Appendix E)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.
- c. Remove four screws securing filter light shield to chassis and remove light shield.
- d. Remove photomultiplier board (paragraph 4-20.20).



NOTE

Before removing CHANNEL control knob, note position of knob pointer. Record color of filters visible on filter holder tube. Failure to do so will result in incorrect alignment of the filters when the new CHANNEL control switch is installed.

- e. Remove CHANNEL control switch knob.
- f. Remove nut securing CHANNEL control switch from chassis.
- g. Remove defective CHANNEL control switch.
- h. Tag and desolder wires from CHANNEL control switch.

NOTE

Before removing drive wheel from defective CHANNEL control switch, note position of the drive wheel in relation to the shaft. The set screw locking the drive wheel must be on the flat side of the shaft.

- i. Loosen setscrew and remove drive wheel from defective CHANNEL control switch.
- j. Install drive wheel on new CHANNEL control switch.
- k. Solder wires to new CHANNEL control switch and remove tags.
- l. Install new CHANNEL control switch to chassis with nut.
- m. Reconnect wires to switch and remove tags.
- n. Install switch knob.
- o. Install photomultiplier board (paragraph 4-20.20).
- p. Install light shield.
- q. Install chassis cover.
- r. Install densitometer (paragraph 4-20.1).

4-20.2. Replace Clock Board Assembly.

MOS: 35E, Special Electronic Devices Repairer

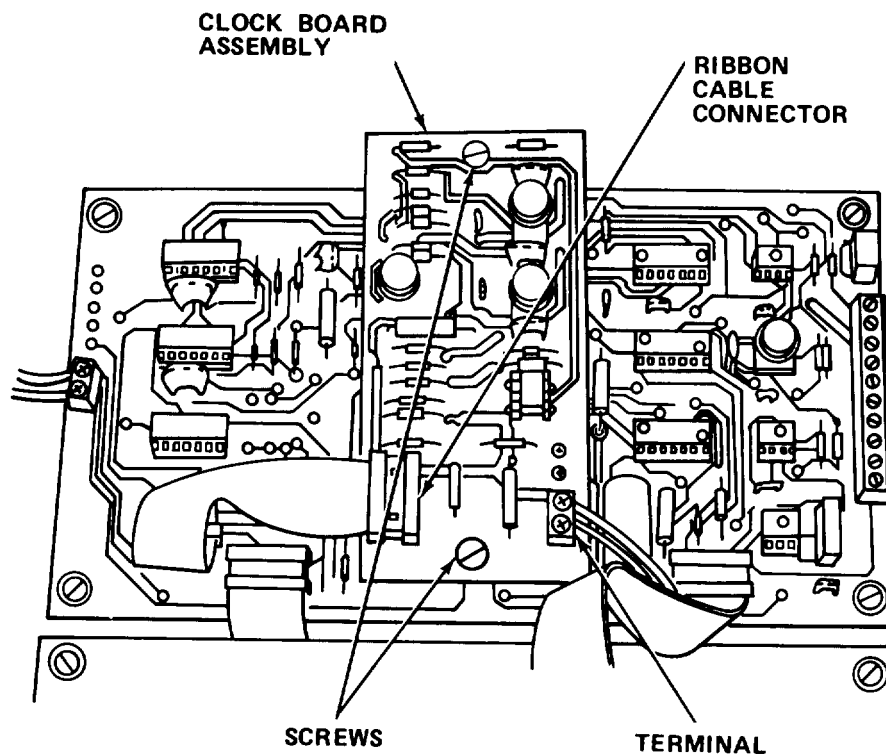
TOOLS: Flat Tip Screwdriver

SUPPLIES: Clock Board Assembly (PCB)

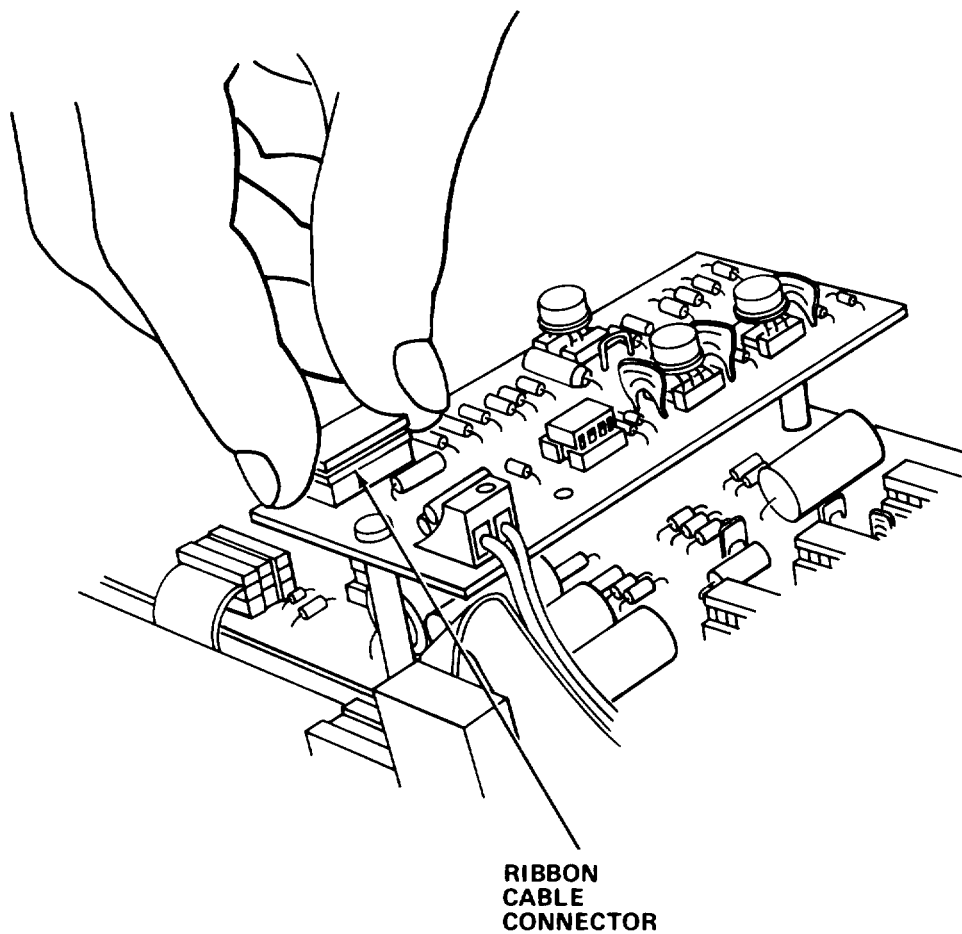
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



- c. Remove ribbon cable connector.
- d. Tag and disconnect wires from terminal.
- e. Remove defective clock board assembly.
- f. Install new clock board assembly.
- g. Reconnect wires and remove tags.



- h. Aline pins on ribbon cable connector with holes in socket. Apply even pressure to seat connector.
- i. Install chassis cover.
- j. Install densitometer (paragraph 4-20.1).

4-20.3. Replace Logic Board Assembly.

MOS: 35E, Special Electronic Devices Repairer

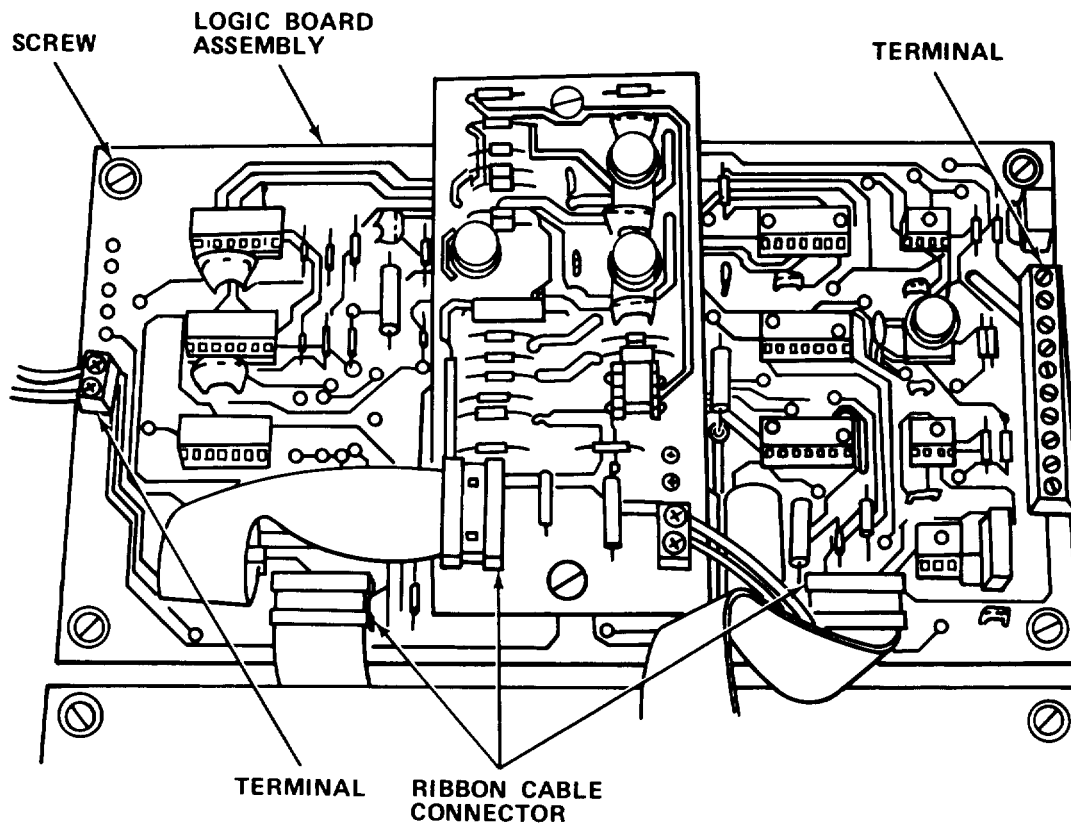
TOOLS: Flat Tip Screwdriver

SUPPLIES: Logic Board Assembly (PCB)

WARNING

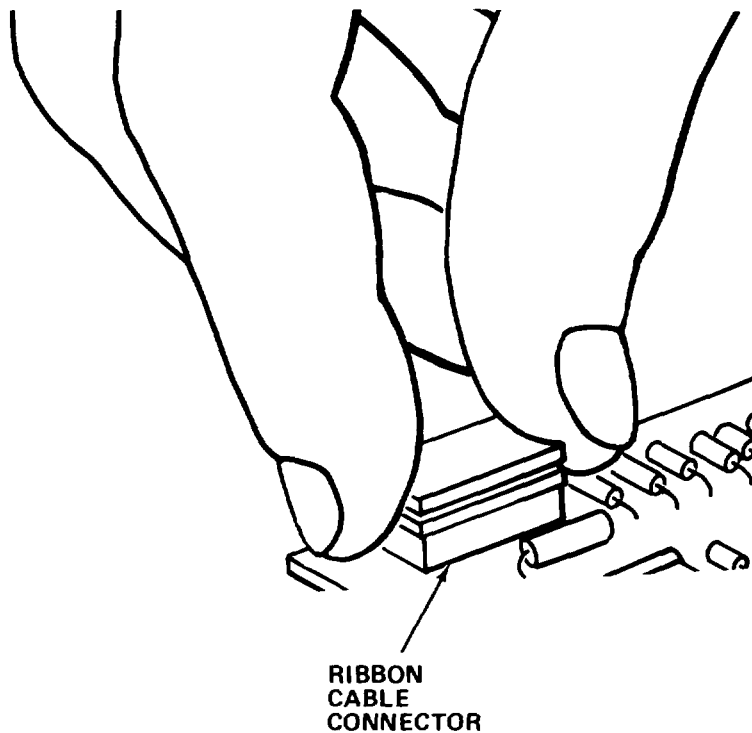
Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.
- c. Remove clock board assembly (paragraph 4-20.13).



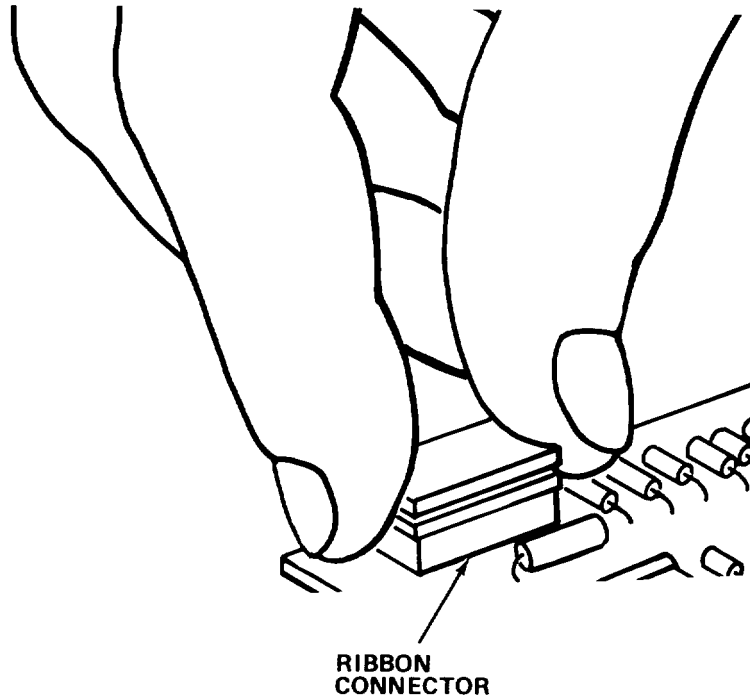
- d. Remove ribbon cable connectors.
- e. Tag and disconnect wires from terminals.

- c. Remove ribbon cable connectors.
- d. Tag and disconnect wires from terminal.
- e. Disconnect green wire.
- f. Remove defective power supply board assembly.
- g. Install new power supply board assembly and reconnect green wire.
- h. Reconnect wires to terminals and remove tags.
- i. Aline pins on ribbon cable connectors with holes in sockets.



- j. Apply even pressure to seat connectors.
- k. Install chassis cover.
- l. Install densitometer (paragraph 4-20.1).
- m. Adjust densitometer (paragraph 4-6.2).

- g. Install new logic board assembly.
- h. Reconnect wires to terminals and remove tags.
- i. Aline pins on ribbon cable connectors with holes in sockets.



- j. Apply even pressure to seat connectors.
- k. Install clock board assembly (paragraph 4-20.13).
- l. Install chassis cover.
- m. Install densitometer (paragraph 4-20.1).
- n. Adjust densitometer (paragraph 4-6.2).

4-20.4. Replace Power Supply Board Assembly.

MOS: 35E, Special Electronic Devices Repairer

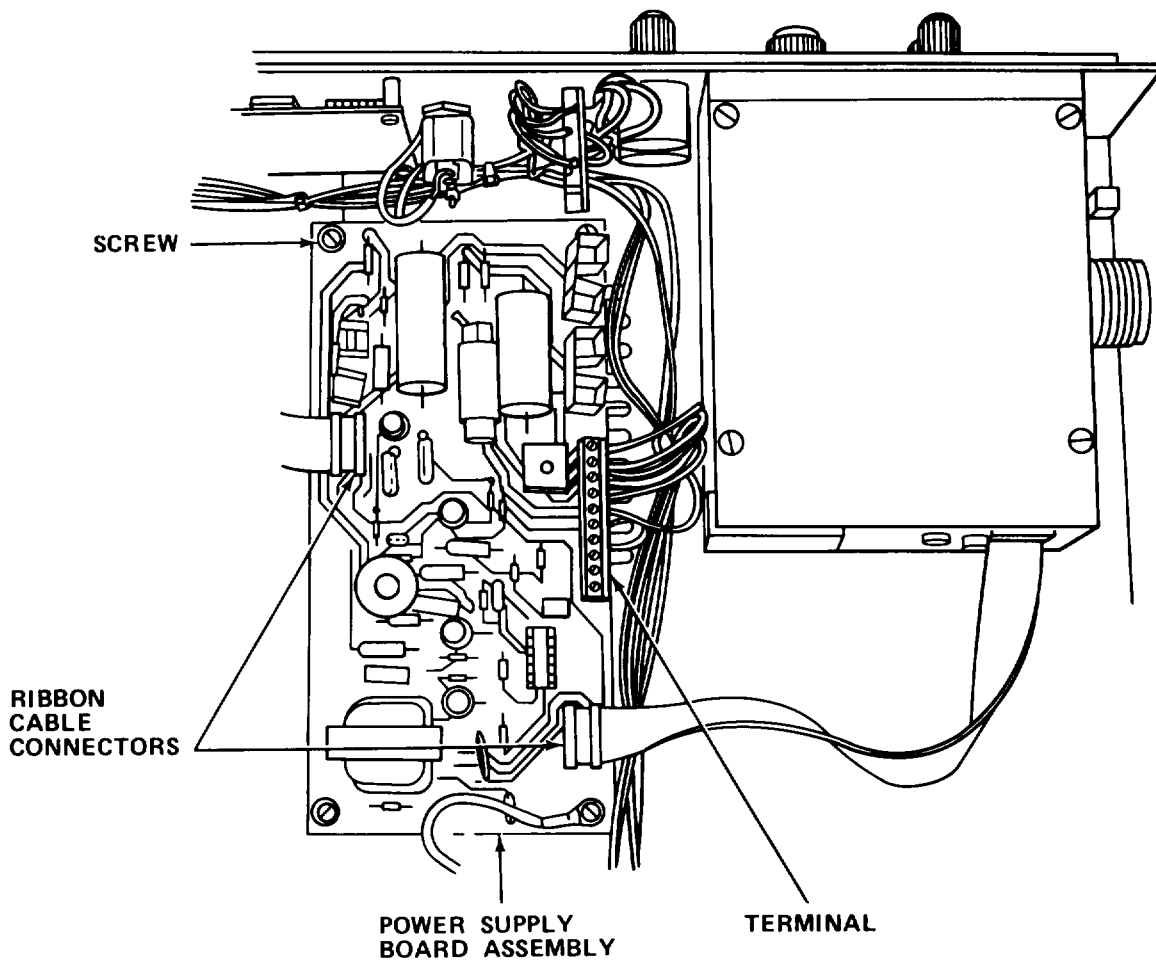
TOOLS: Flat Tip Screwdriver

SUPPLIES: Power Supply Assembly (PCB)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



4-20.5. Replace Display Board Assembly.

MOS: 35E, Special Electronic Devices Repairer

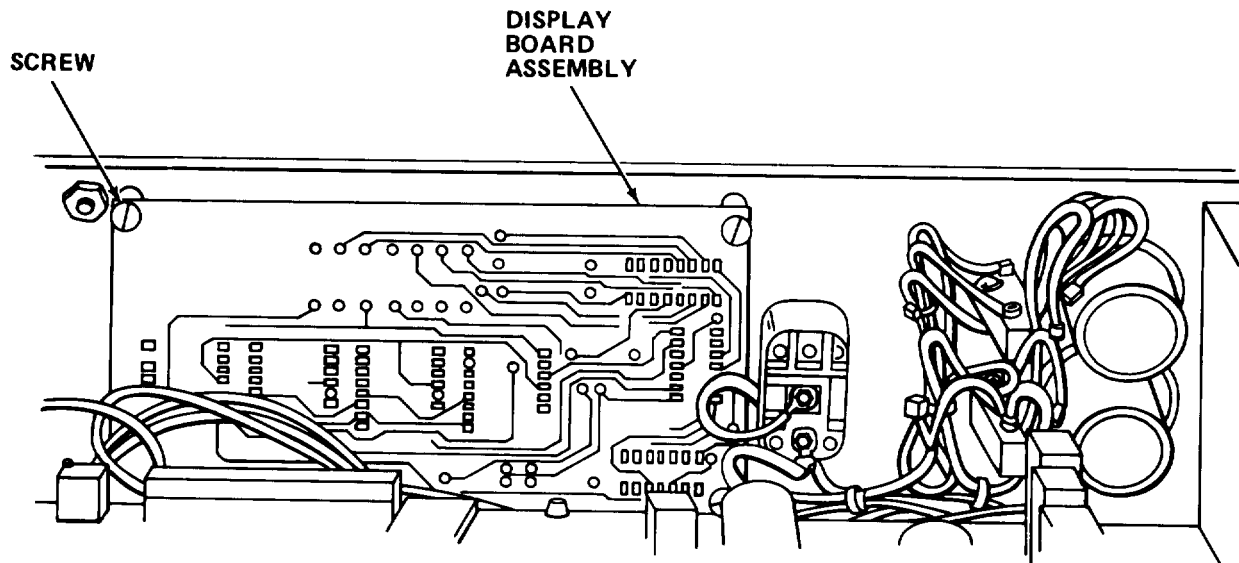
TOOLS: Flat Tip Screwdriver
Off Set Flat Tip Screwdriver

SUPPLIES: Display Board Assembly (PCB)

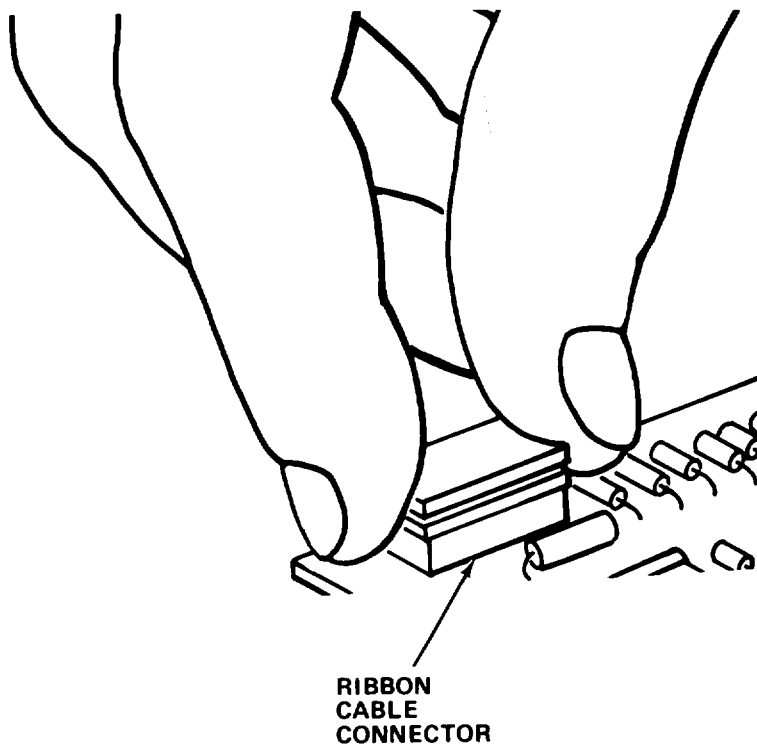
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.
- c. Remove ribbon cable connector.



- d. Remove defective display board assembly.
- e. Aline pins on connector with holes in socket on new display board assembly.



- f. Apply even pressure to seat connector.
- g. Install new display board assembly.
- h. Install chassis cover.
- i. Install densitometer (paragraph 4-20.1).

4-20.6. Replace Photomultiplier Board/Tube.

MOS: 5E, Special Electronic Devices Repairer

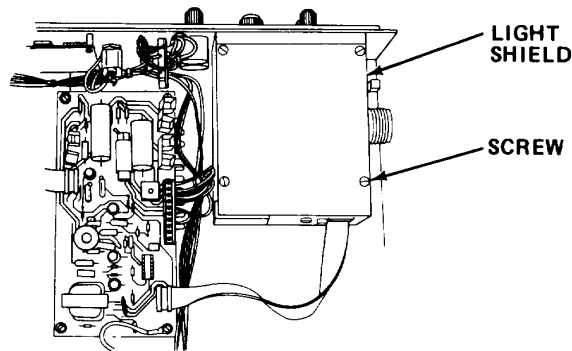
TOOLS: Flat Tip Screwdriver
Hex Head Key Wrench Set
Combination Wrench Set

SUPPLIES: Photomultiplier Board Assembly (PM Tube PCB)
Photomultiplier Tube (PM Tube)

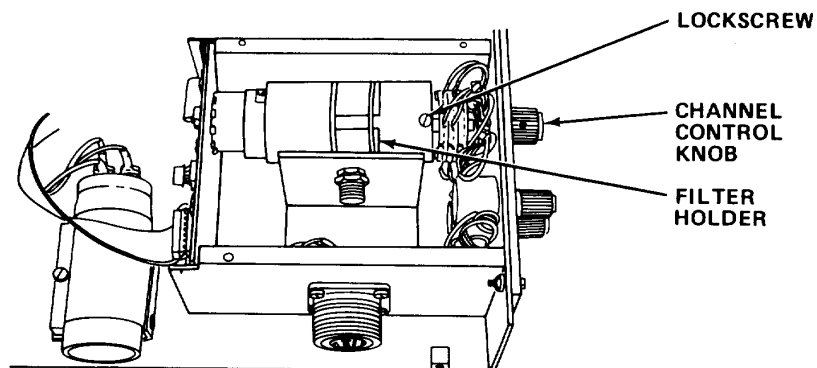
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

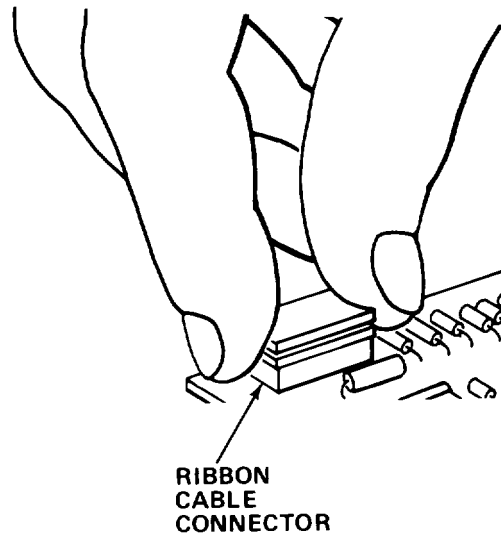
- a. Remove densitometer (paragraph 4-20.1).
- b. Remove chassis cover.



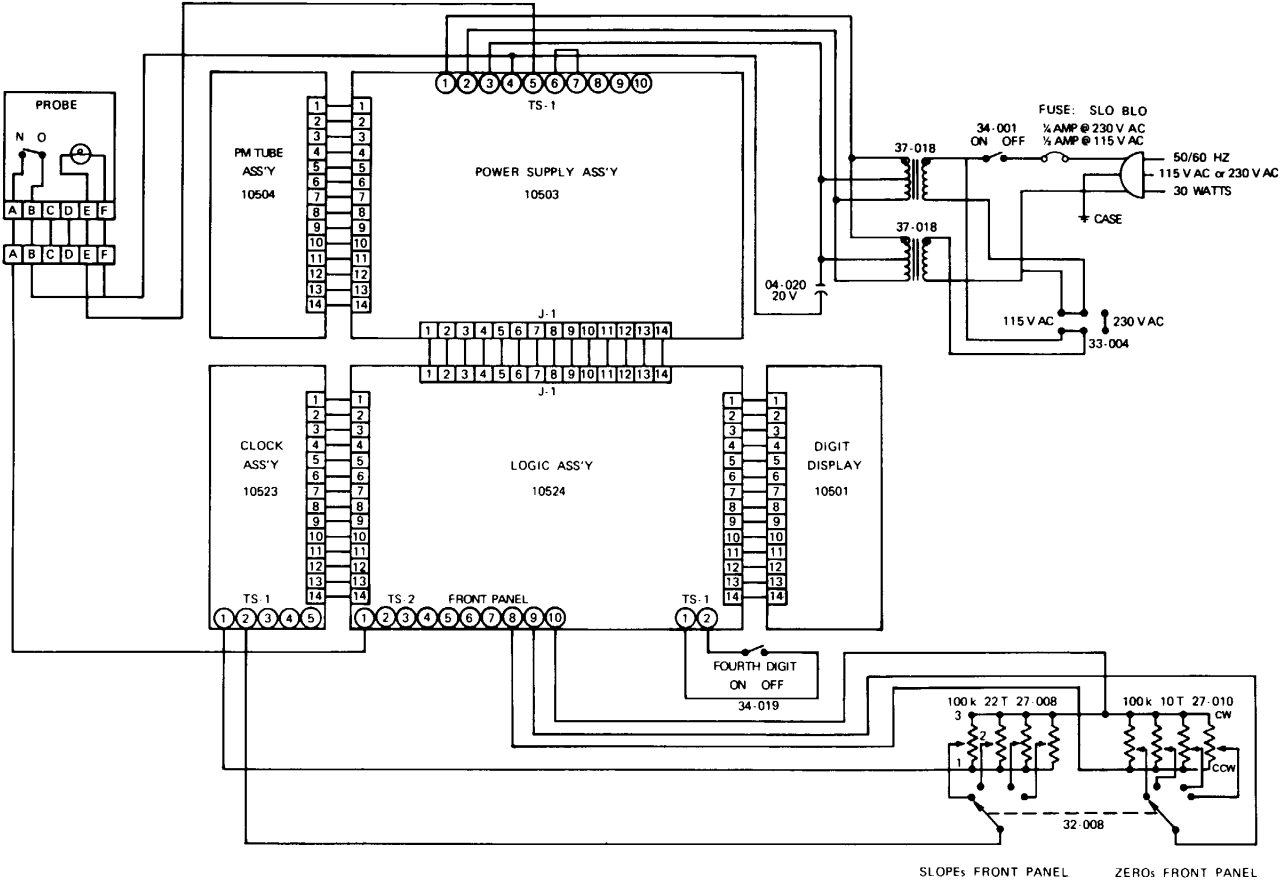
- c. Remove light shield.



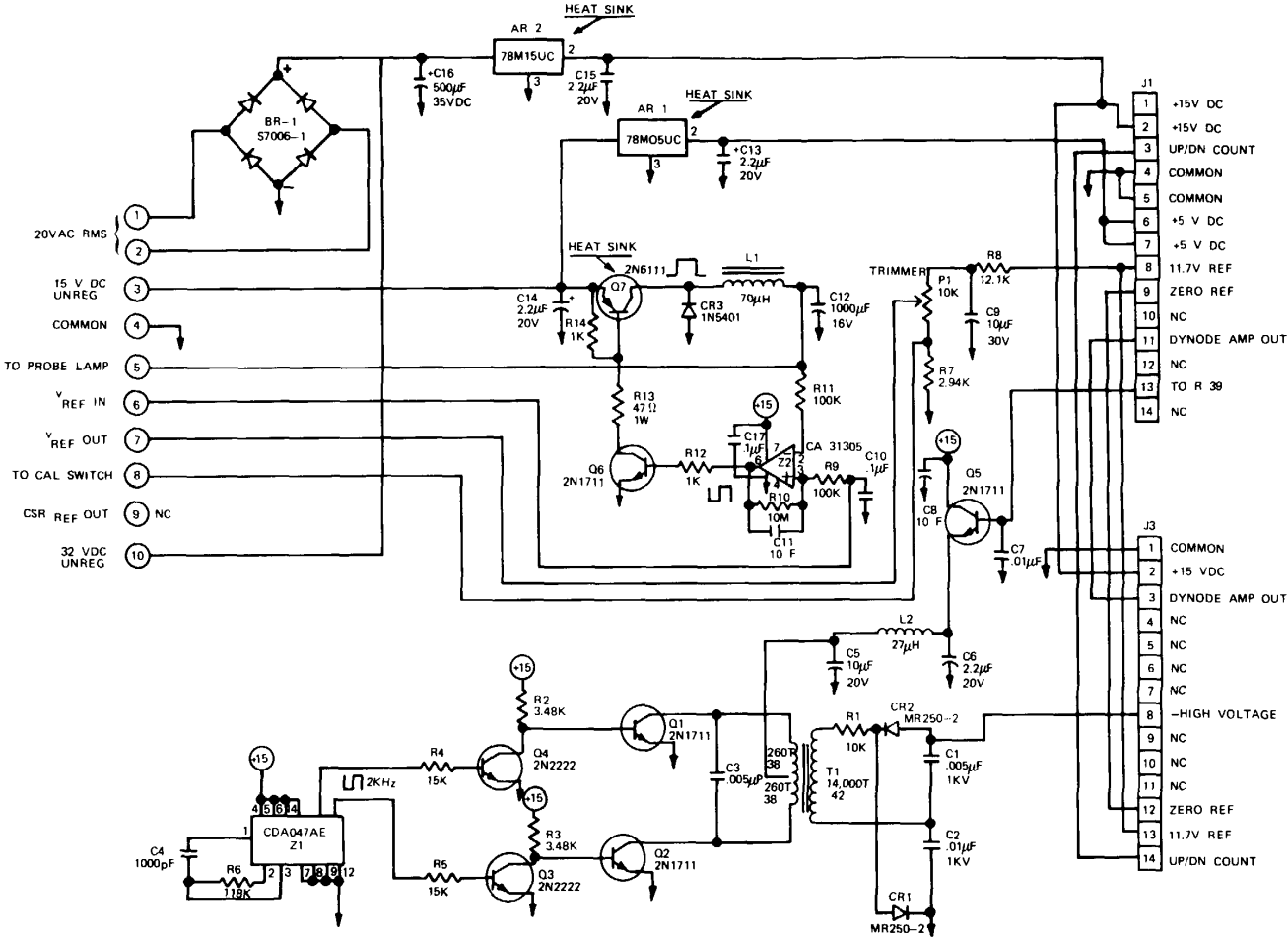
- d. Turn CHANNEL control knob until lockscrew is accessible and remove lockscrew.
- e. Slide filter holder tube to rear of unit.
- f. Carefully remove defective photomultiplier board assembly.
- g. Slide filter holder tube off photomultiplier tube.
- h. Remove and retain photomultiplier tube.
- i. Remove ribbon cable connector.
- j. Aline pins on ribbon cable with holes in socket on new photomultiplier board assembly.

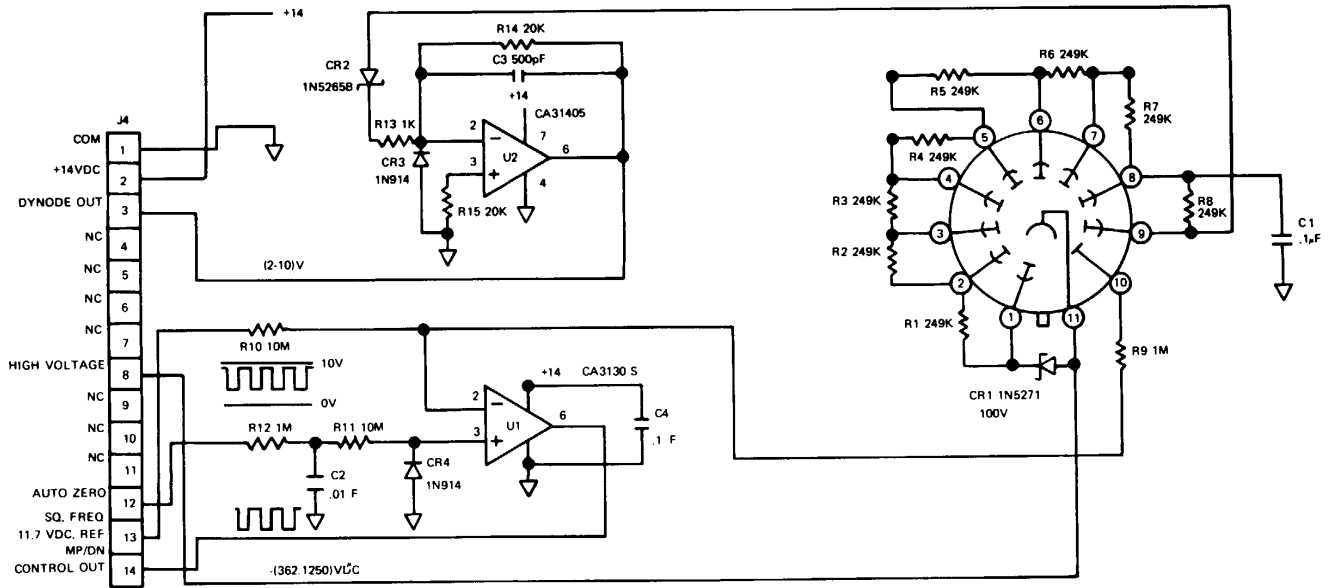


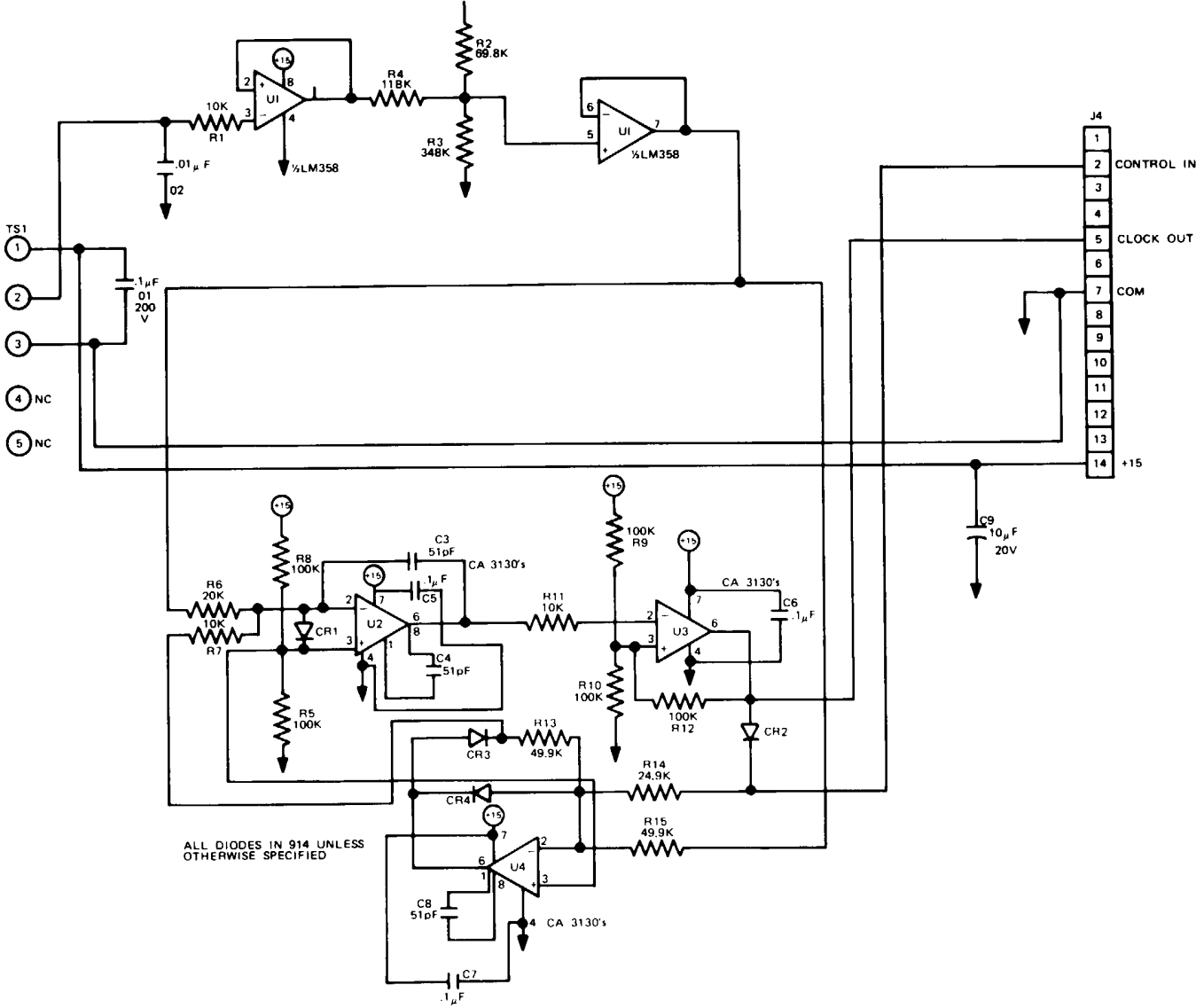
- k. Apply even pressure to seat connector.
- l. Install photomultiplier tube.
- m. Slide filter holder tube on photomultiplier tube.
- n. Carefully install photomultiplier board assembly back into holder.
- o. Slide filter holder tube forward and install lockscrew.
- p. Install filter light shield.
- q. Install chassis cover.
- r. Install densitometer (paragraph 4-20.1).

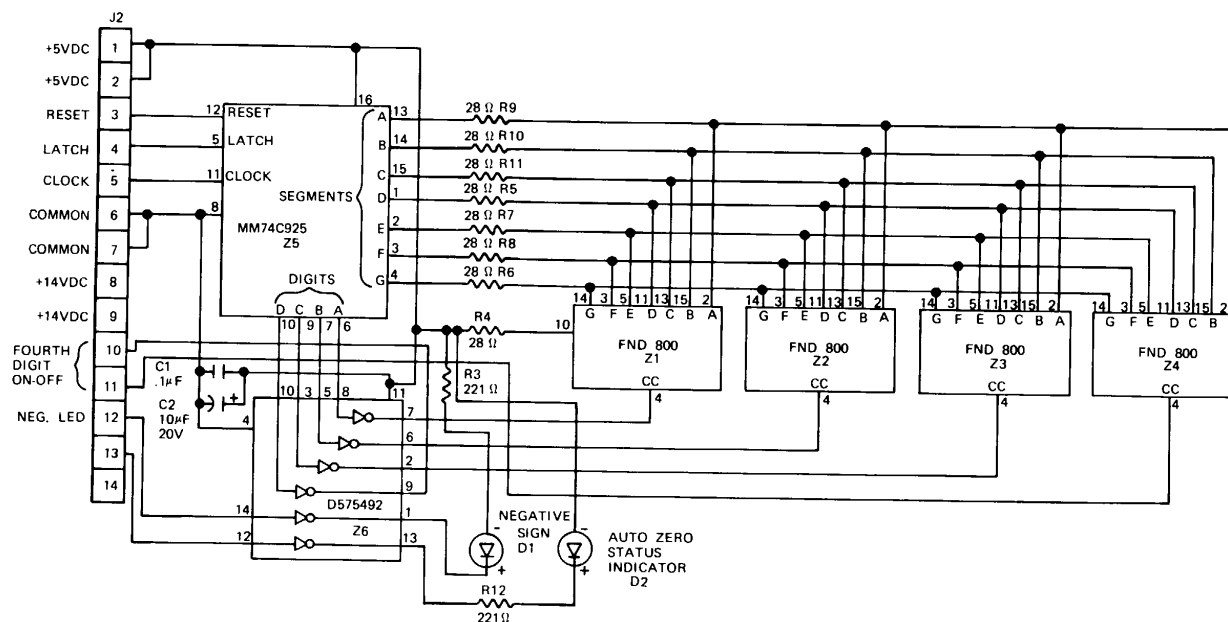


SLOPEs FRONT PANEL ZEROs FRONT PANEL



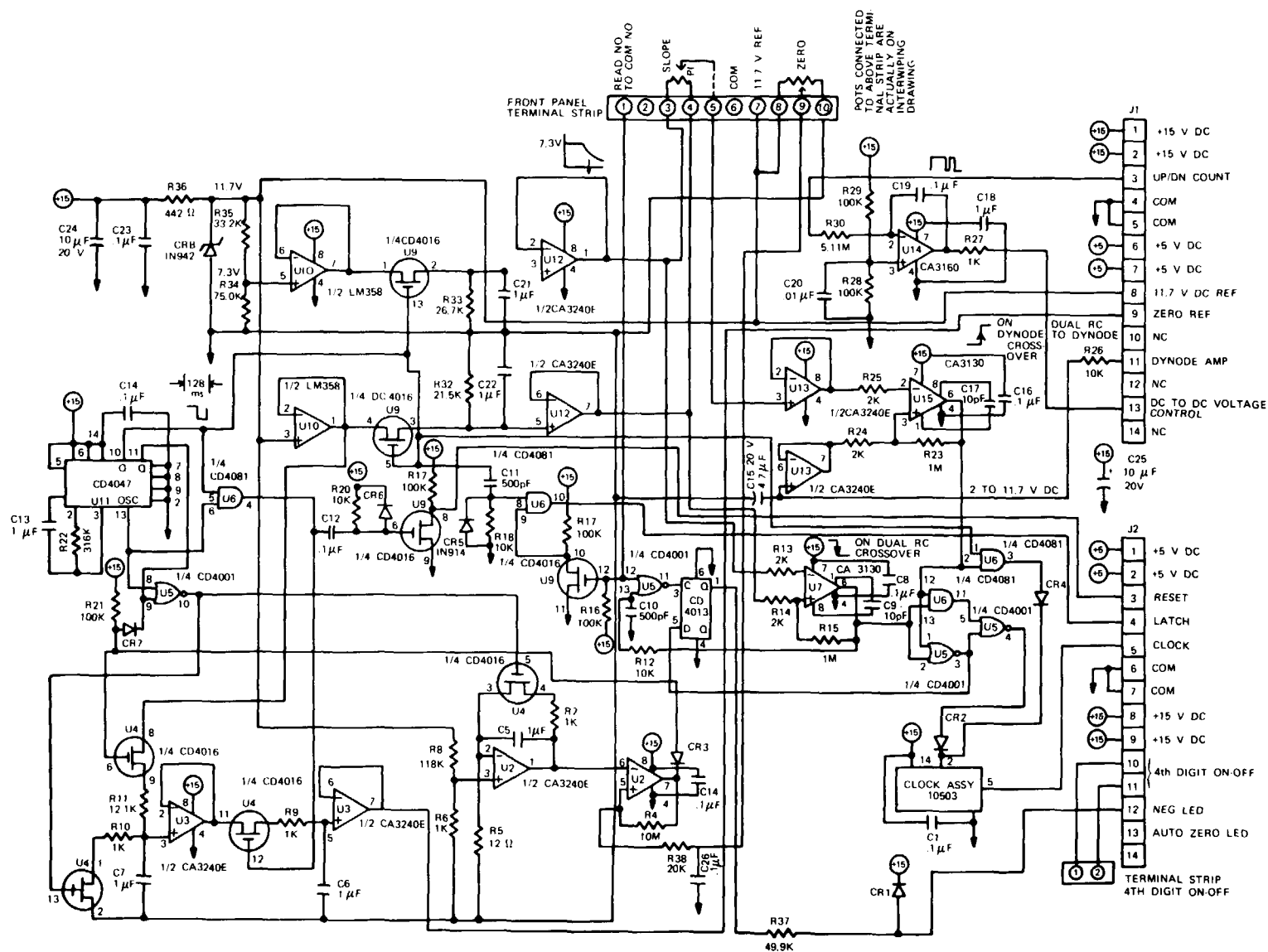


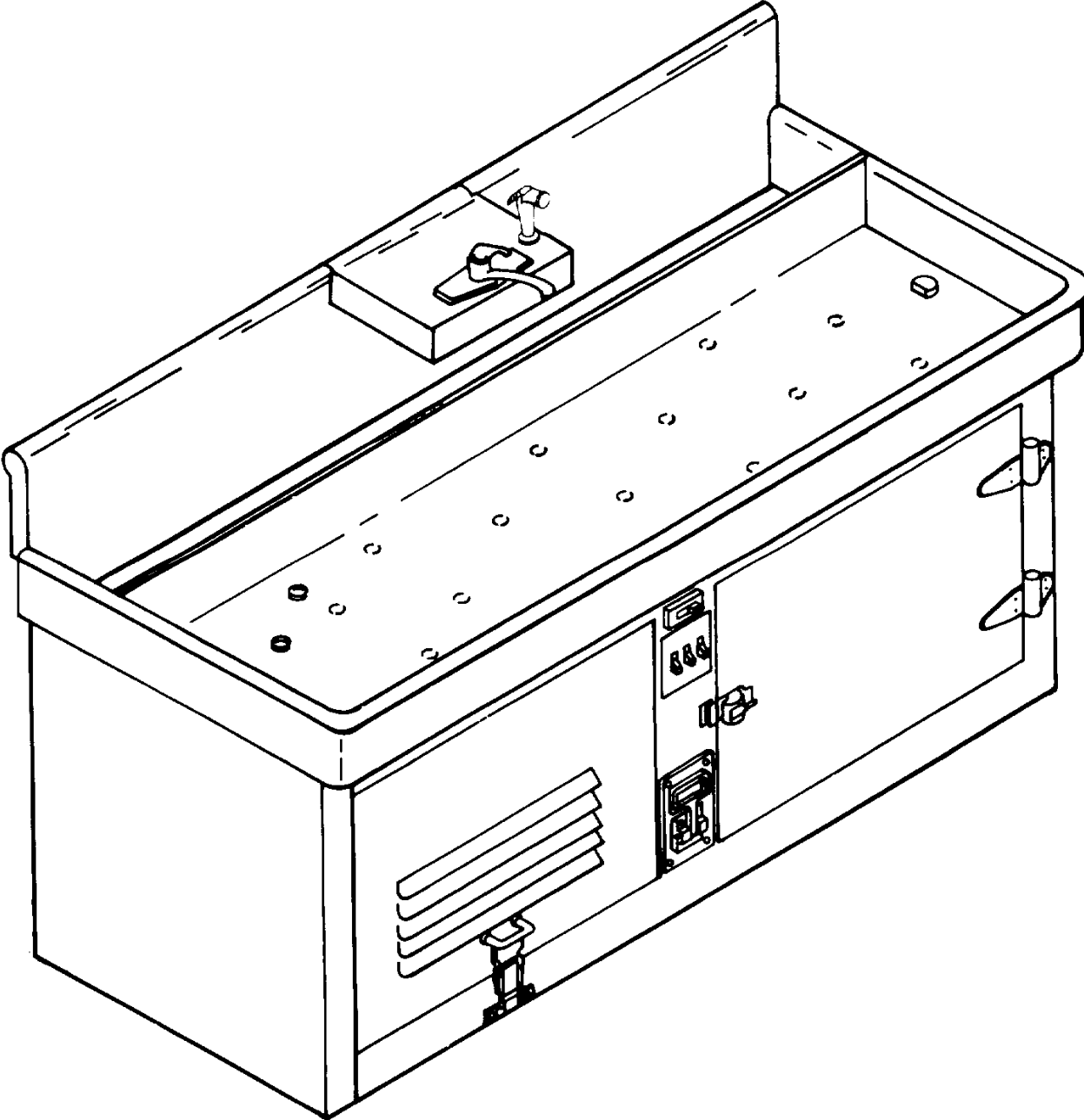




NOTES:

1. ALL RESISTORS RN55D, 1% METAL FILM, 1/4 WATT
2. ALL DIODES IN914
3. AUTO ZERO STATUS INDICATOR D2 NOT USED ON D-1.





CHAPTER 5

PHOTOGRAPHIC PROCESSING SINK

Section I. INTRODUCTION

5-1. GENERAL INFORMATION.

5-1.1. Scope.

a. Model Number and Equipment Name. Model 71-RC (Modified) Temperature controlled Photographic Processing Sink.

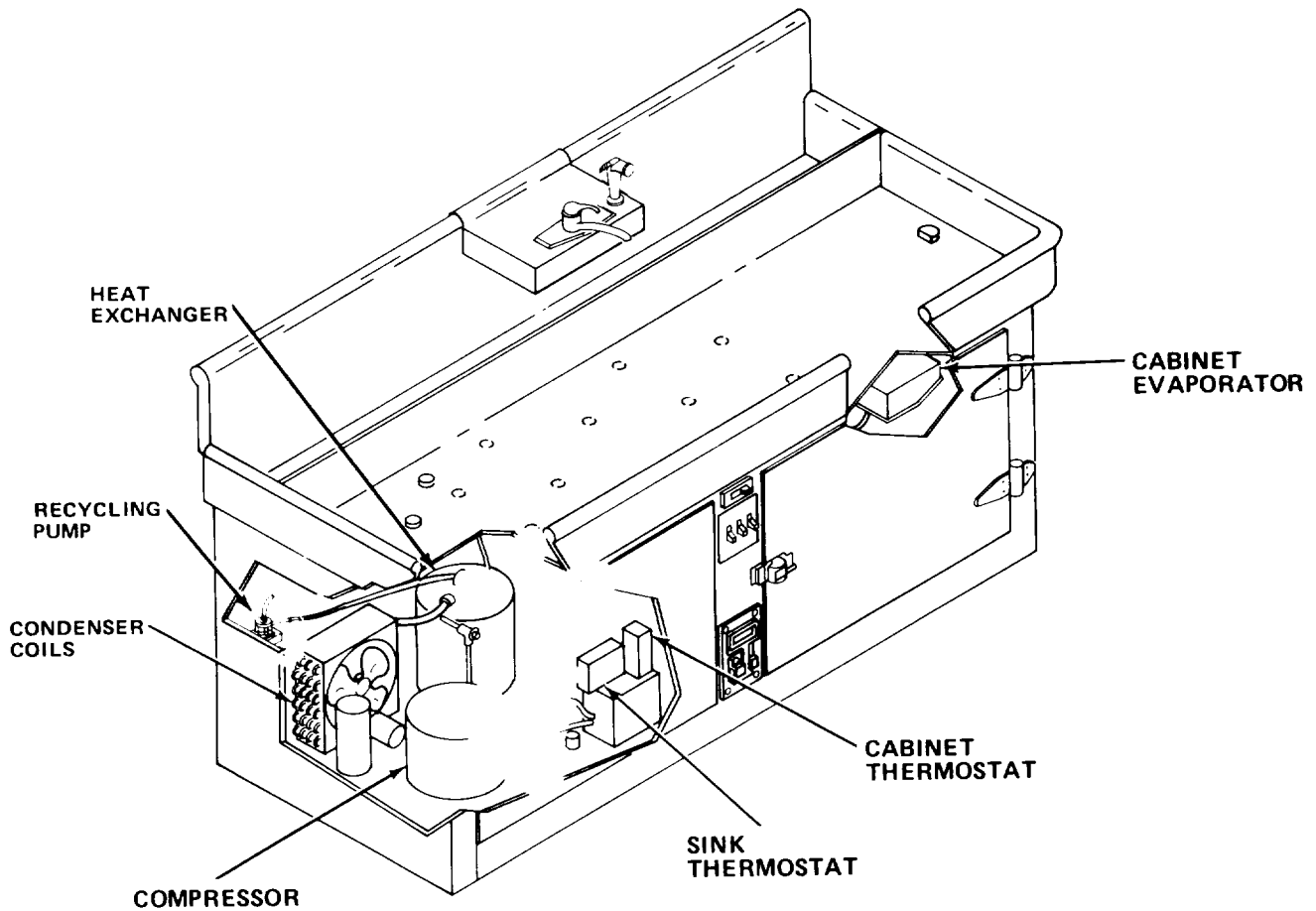
b. Purpose of Equipment. To provide a constant water bath temperature for stabilizing photographic chemicals.

5-2. EQUIPMENT DESCRIPTION.

5-2.1. Equipment Characteristics, Capabilities, and Features. Used to provide a instant water bath temperature for stabilizing photographic chemicals. The photographic processing sink has the following capabilities and features:

- a. Thermostatically controlled refrigeration storage cabinet for photographic chemicals.
- b. Heat exchanger maintains preset recirculating water temperature.
- c. Stainless steel sink construction.
- d. Magnetic-drive recycling pump.

5-2.2. Location and Description of Major Components.



COMPRESSOR. Compresses freon gas to perform refrigeration process.

CONDENSER COILS. Air-cooled condenser coils remove heat from compressed freon gas.

HEAT EXCHANGER. Contains refrigeration evaporator coils for cooling and electrical resistance heater for warming water.

RECYCLING PUMP. Magnetic-drive, centrifugal pump used to circulate water through heat exchanger and into sink.

CABINET EVAPORATOR. Cools cabinet through expansion of freon gas from compressor. It has a fan to aid airflow through coils.

CABINET THERMOSTAT. Controls refrigeration cabinet temperature. Adjustable.

SINK THERMOSTAT. Controls temperature of water in sink. Adjustable.

5-2.3. Equipment Data.

Dimensions

Overall	80.0 in. X 45.0 in. X 49.0 in. (203.2 cm X 88.9 cm X 116.8 cm)
Refrigeration Cabinet	27.8 in. X 27.5 in. X 23.3 in. (70.6 cm X 69.9 cm X 59.2 cm)
Sink	75.0 in. X 25.0 in. X 3.9 in. (190.5 cm X 63.5 cm X 9.9 cm)
Power Requirements	120 V, 60 Hz, 16 amps
Thermostat Settings	
Sink	68+20F (20+11C)
Cabinet	60OF (15.60C)
Refrigerant	Freon R-12
Compressor Motor Horsepower	1/2 hp

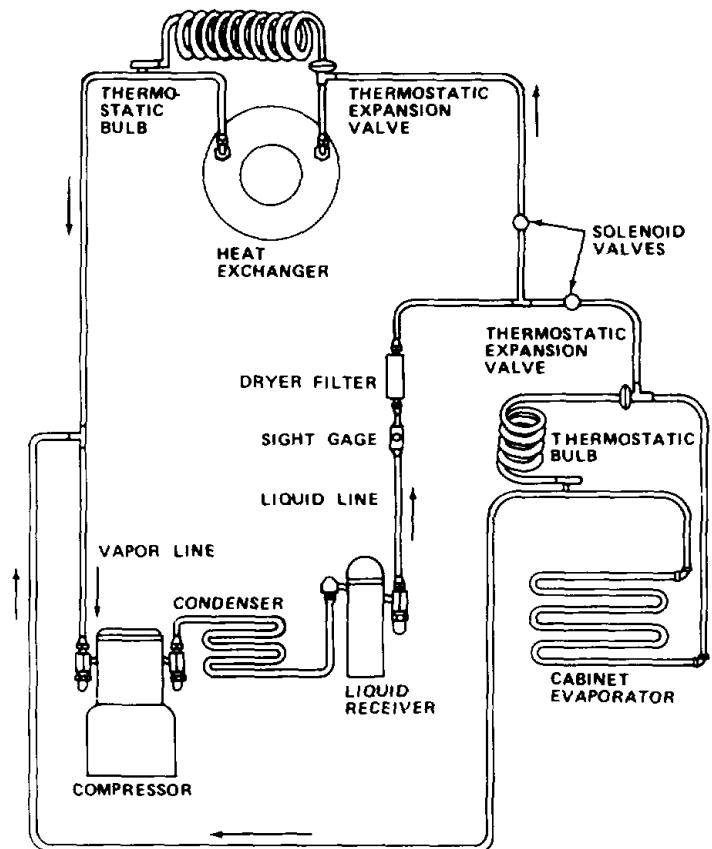
5-3. TECHNICAL PRINCIPLES OF OPERATION. The purpose of the sink is to provide a temperature-controlled medium for use in tray processing. It also contains a refrigerated storage cabinet for photographic chemistry. It consists of:

Refrigeration System
Recirculating System
Heating System
Electrical System

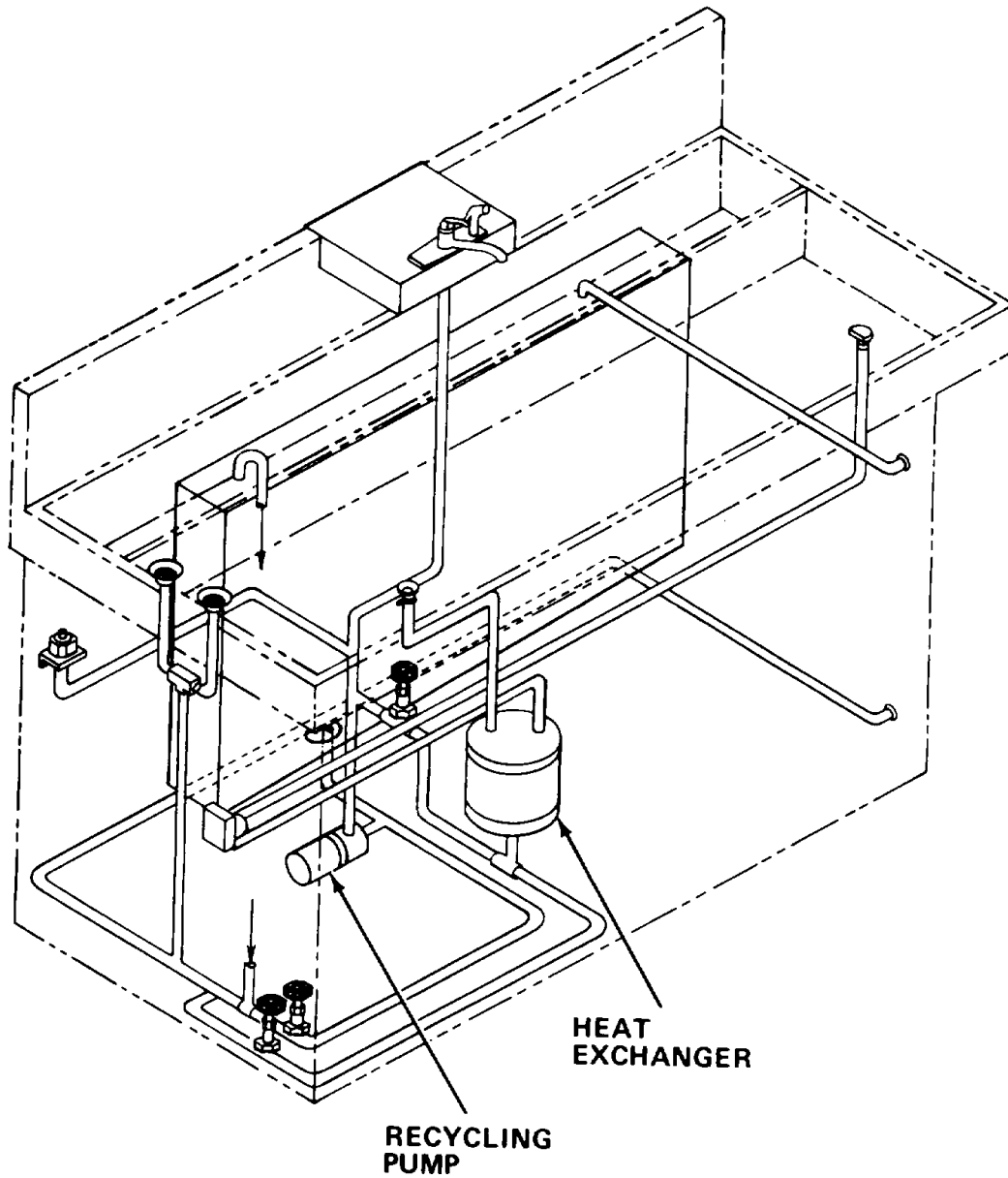
5-3.1. Refrigeration System. Removes heat from recirculating water and storage cabinet.

- a. Compressor. Compresses freon gas for refrigeration process. It is a sealed, single-piston unit driven by an electric motor.
- b. Condenser. Contains the compressed liquid refrigerant. After exiting the compressor unit, the compressed refrigerant gives up heat through the air-cooled condenser coils.
- c. Liquid receiver. Acts as a storage tank and contains approximately one pound of liquid refrigerant in excess of actual requirements.

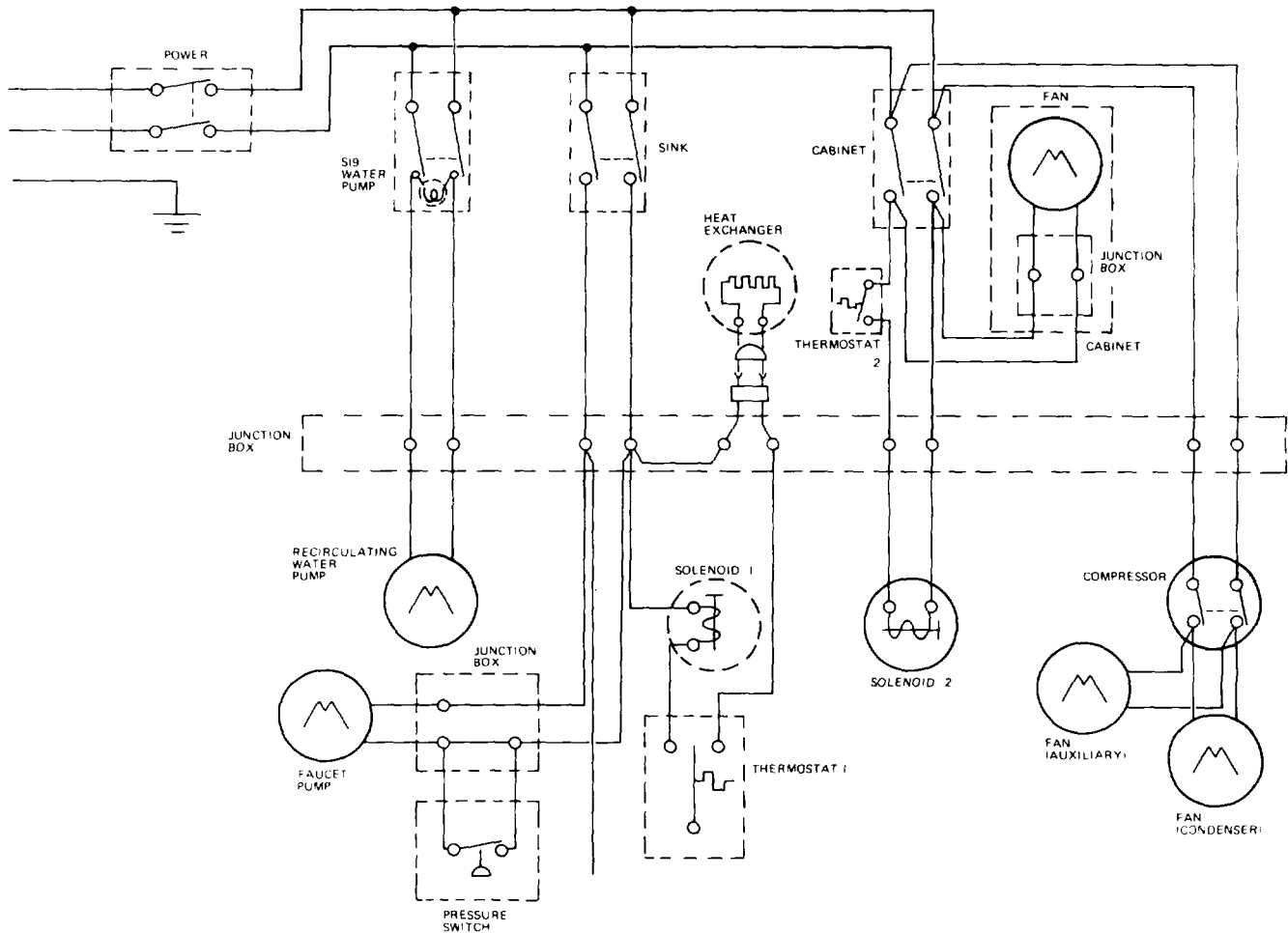
- d. Sight gage. Indicates if freon lines are charged to capacity. With compressor running, a solid stream of liquid refrigerant should be visible in the glass sight gage. If bubbles are present, the system is not fully charged.
- e. Dryer filter. Removes moisture from liquid refrigerant lines between liquid receiver and thermostatic expansion valves.
- f. Solenoid valves. Controls liquid refrigerant flow to heat exchanger and cabinet evaporator coils.
- 9. Thermostatic expansion valve. Thermostatically and pressure-regulated ball valve creates a pressure drop in refrigerant flow. The pressure drop changes the refrigerant from liquid to gas, and heat is absorbed during the process.
- h. Cabinet evaporator. Located in the refrigeration cabinet. Its coils absorb heat from the cabinet. The evaporator coils contain refrigerant which is vaporized by an expansion valve.
- i. Heat exchanger. Contains evaporator coils inside a solid housing which absorb heat from water pumped through housing. The evaporator coils contain refrigerant which is vaporized by an expansion valve. The heat exchanger also contains an immersion-type resistance heater to warm the water if temperature is too low.



5-3.2. Recirculating System. Provides a temperature-controlled water bath to maintain a proper processing temperature for processing solution trays located in the sink. It consists of a magnetic-drive, centrifugal pump which recirculates water from the sink, through the heat exchanger, and back to the sink.



5-3.3. Heating System. A controlled, electrical heating system for the recirculating water. Consists of an electrical resistance, immersion-type element submerged in the water of the heat exchanger. Controlled by the heater thermostat.

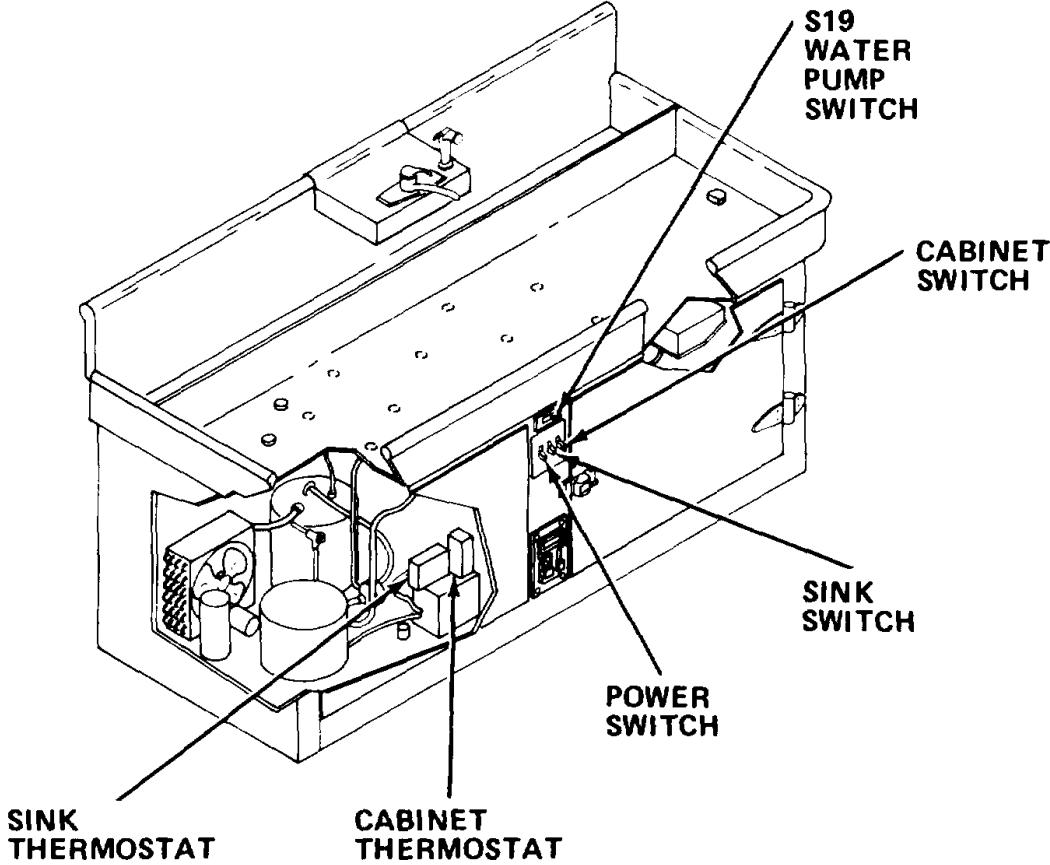


5-3.4. Electrical System. Provides power to various systems.

- a. Sink thermostat. Controls temperature of water in sink. Monitors water temperature through a liquid-filled copper element connected to a diaphragm. The diaphragm operates contacts which energize the heater or open solenoid valve in the refrigeration system.
- b. Cabinet thermostat. Controls the temperature in the refrigeration cabinet. Activates the solenoid valve in the refrigerant line to allow liquid refrigerant to flow to the cabinet evaporator.
- c. POWER switch. Master switch for the sink. With the switch on, the compressor starts and power is supplied to the SINK, CABINET, and S19 WATER PUMP switches.
- d. SINK switch. Supplies power to the faucet pump and activates the sink thermostat. A pressure sensing switch controls the faucet pump.
- e. CABINET switch. Activates the cabinet thermostat to maintain a preset temperature, and turns on cabinet fan.
- f. S19 WATER PUMP switch. Activates the recirculating water pump.

Section II. OPERATING INSTRUCTIONS

5-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Controls or Indicators	Function
Sink Thermostat	Controls recirculating water temperature in heat exchanger.
Cabinet Thermostat	Controls temperature in refrigeration cabinet.
POWER Switch	Controls all power to the sink.
SINK Switch	Activates faucet pump and sink thermostat.
CABINET Switch	Activates refrigeration cabinet thermostat and fan.
S19 WATER PUMP Switch	Activates recirculating water pump.

5-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTION S. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTION S. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

5-5.1. PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Leakage definitions for operator PMCS shall be classified as follows:
 - (1) Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
 - (2) Class II Leakage of fluid great enough to form drops but not enough to cause drops to drip from the item being checked/inspected.
 - (3) 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 leakage (Class I or 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 to your supervisor or organizational maintenance.

g. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

h. Interval column. This column determines the time period designated to perform your PMCS.

i. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific time to be inspected.

j. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

k. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Lubricating Oil (Item 26, Appendix E)	ar
Cheesecloth (Item 4, Appendix E)	ar
Flat Tip Screwdriver	1 ea
Hand Oilier	1 ea

Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can safely be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

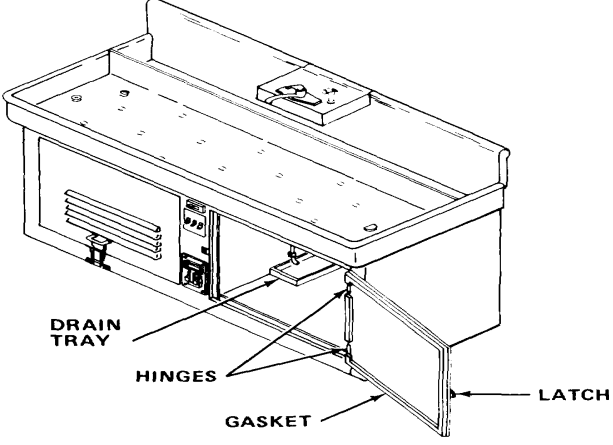
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W	<p><u>PHOTOGRAPHIC PROCESSING SINK</u></p> <p><u>Inspect Cabinet.</u></p>  <p>1. Check hinges and latches for loose, damaged, or missing screws or mountings. 2. Check door gasket for holes or tears.</p>	Gasket is damaged.

Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES- Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W	<p><u>PHOTOGRAPHIC PROCESSING SINK - Cont</u> <u>Inspect Cabinet - Cont</u> 3. Check drain tray in cabinet for water accumulation. Clean with cheesecloth, if necessary. 4. Lubricate hinges with a few drops of lubricating oil.</p>	
2.	W	<p><u>Inspect Sight Gage.</u> 1. Release latch and remove front cover.</p> <div style="text-align: center;"> </div> <p>2. Check refrigerant line sight gage for presence of bubbles which indicate inadequate refrigerant charge. (Check with compressor running.)</p>	<p>Bubbles are present.</p>

Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES- Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

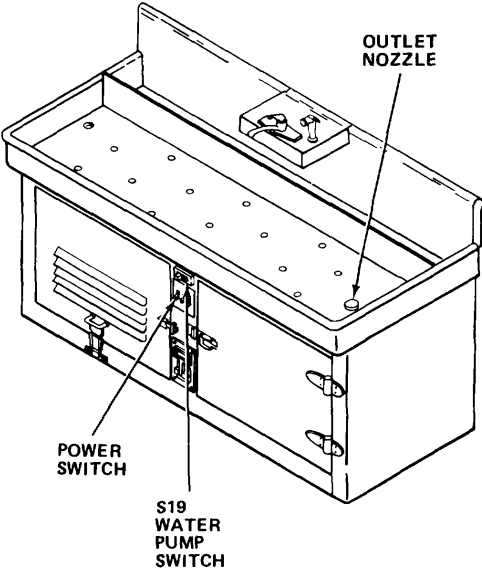
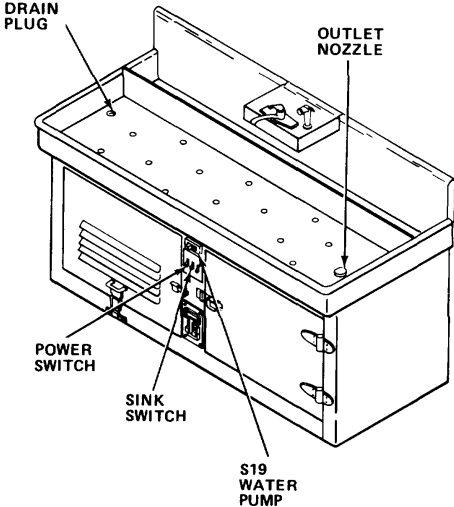
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
4	W	<p><u>PHOTOGRAPHIC PROCESSING SINK - Cont</u> <u>Inspect Recirculating System.</u></p>  <p>1. Turn POWER switch on.</p> <p style="text-align: center;">NOTE Do not overfill sink and allow trays to float.</p> <p>2. Fill sink until water exiting nozzle does not splash. Do not overfill. Trays should move easily, but not float.</p>	

Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES- Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
4	W	<p><u>PHOTOGRAPHIC PROCESSING SINK - Cont</u> <u>Inspect Recirculating System - Cont</u></p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not turn S19 WATER PUMP switch on unless water is in sink, or recycling pump will burn out.</p> <p>3. Turn S19 WATER PUMP switch on. 4. Check pump operation by observing water exiting outlet nozzle.</p>	Water does not exit nozzle.
5	W	<p><u>Inspect Plumbing.</u></p> <p>1. Check all hoses and fittings for leaks. 2. Tighten clamps if leaks are observed. 3. Replace damaged hoses, if necessary. 4. Replace front cover and secure with latch.</p>	Hoses are damaged.

Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES- Cont

		B- Before D - During A - After	W- Weekly M - Monthly Q - Quarterly	AN - Annually S - Semiannually BI - Biennially	(Number) - Hundreds of Hours
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES			FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
6	W	<p><u>PHOTOGRAPHIC PROCESSING SINK - Cont</u> <u>Clean Recirculating System.</u></p>  <ol style="list-style-type: none"> 1. Turn POWER, SINK, and S19 WATER PUMP switches on. 2. Remove drain plug. 3. Run fresh water into sink until fresh, clean water exits outlet nozzle. 4. Reinstall drain plug and fill sink to proper water level. 			

5-6. OPERATION UNDER USUAL CONDITIONS.**5-6.1. Operating Procedures.**

a. Starting Unit.

- (1) Plug in power cord.

CAUTION

Do not turn S19 WATER PUMP switch on unless water is in sink, or recycling pump will burn out.

- (2) Fill sink with water to proper level.
- (3) Turn on POWER, SINK, CABINET, and S19 WATER PUMP switches.
- (4) Place processing trays in sink and add processing chemicals.
- (5) Run unit for approximately 15 min to allow chemical temperature to stabilize.

b. Shutting Unit Down.

- (1) Turn POWER, SINK, CABINET, and S19 WATER PUMP switches off.

CAUTION

Prior to disposal of developer and fixer, field users should contact their local environmental coordinator or their local industrial hygienist for instructions on proper disposal of chemicals.

- (2) Place container, if required, under drain on outside of section and remove drain cap.
- (3) Dispose of used chemicals into dump trough at rear of sink and remove trays.
- (4) Rinse trays and flush trough.
- (5) Remove drain plug and drain sink.
- (6) Reinstall outside drain cap.

5-6.2. Preparation for Movement.

a. Drain storage tank as follows:

- (1) Turn off storage tank heater switch.

- (2) Remove storage tank drain cap from drain connection on outside of section.
- (3) Open storage tank drain valve and drain tank.
- (4) After storage tank is drained, open spigot for sink and drain hose into sink trough bin.

b. Drain sink as follows:

- (1) Turn off POWER, SINK, and CABINET switches.
- (2) Secure any loose items that have been stored in refrigeration cabinet.
- (3) Remove sink and trough bin drain plugs.
- (4) Open drain valve for heat exchanger.
- (5) Close heat exchanger drain valve.
- (6) Wipe sink and trough bin dry.
- (7) Disconnect sink power cord.

Step 2. Check that POWER and S19 WATER PUMP switches are on.

- (a) If switches are on, proceed to step, 3.

5-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

5-8. LUBRICATION INSTRUCTIONS. Refer to operator PMCS for required lubrication.

5-9. TROUBLESHOOTING PROCEDURES.

a. The table lists the common malfunctions which you may find during operation or maintenance of the sink, or its components. You should perform the tests/inspections and corrective actions in the order listed.

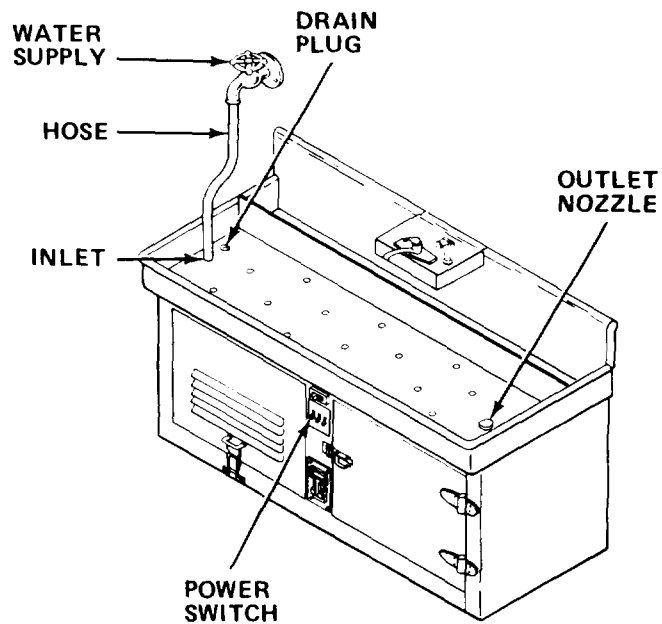
b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 5-2. TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

1. **WATER IN SINK DOES NOT RECIRCULATE.**

- | | | |
|---------|--|--|
| Step 2. | Check that POWER and S19 WATER PUMP switches are on. | (a) If switches are on, proceed to step 3.
(b) Turn POWER and S19 WATER PUMP switches on. |
| Step 1. | Check for unplugged power cord. | (a) If power cord is plugged in, proceed to step 2.
(b) Plug in power cord. |
| Step 3. | Check recirculating water pump for trapped air. | If air bubbles are present, prime pump. |



- (a) Fill sink with water until water level is approximately 1/2 inch above pump inlet and outlet nozzle.

Table 5-2. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. WATER IN SINK DOES NOT RECIRCULATE - Cont	<ul style="list-style-type: none"> (b) Place open hose end over pump inlet fitting and allow water to flow through recirculating system until no air bubbles exit outlet nozzle. (c) Run pump until air bubbles stop. 	
2. REFRIGERATED CABINET DOES NOT MAINTAIN PRESET TEMPERATURE.	<ul style="list-style-type: none"> Step 1. Check that POWER and CABINET switches are on. <ul style="list-style-type: none"> (a) If switches are on, proceed to step 2. (b) Turn POWER and CABINET switches on. Step 2. Check for unplugged power cord. <ul style="list-style-type: none"> (a) If power cord is plugged in, proceed to step 3. (b) Plug in power cord. Step 3. Check for improperly adjusted cabinet thermostat. <ul style="list-style-type: none"> Adjust cabinet thermostat (paragraph 5-10.2). 	
3. WATER RECIRCULATES BUT IS TOO HOT OR COLD.	<ul style="list-style-type: none"> Step 1. Check that SINK switch is on. <ul style="list-style-type: none"> (a) If switch is on, proceed to step 2. (b) Turn SINK switch on. Step 2. Check for improperly adjusted sink thermostat. <ul style="list-style-type: none"> Adjust sink thermostat (paragraph 5-10.1). 	

5-10. OPERATOR'S MAINTENANCE PROCEDURES.

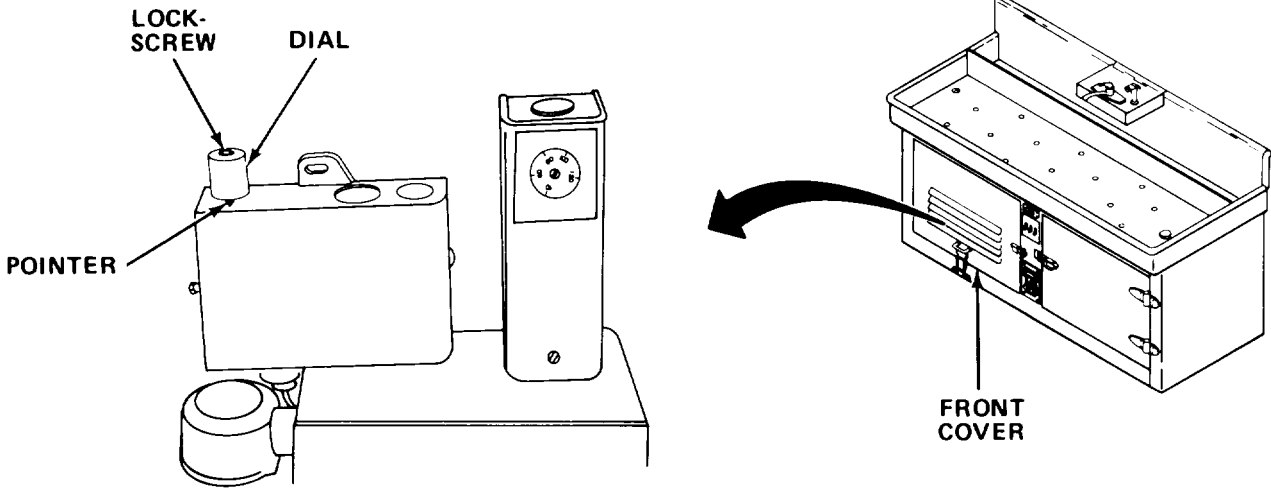
- a. This section contains instructions covering operator maintenance functions for the sink. Personnel required are listed only if the task requires more than one.
- b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Adjust Sink Thermostat	5-10.1
Adjust Cabinet Thermostat.....	5-10.2

5-10.1. Adjust Sink Thermostat.

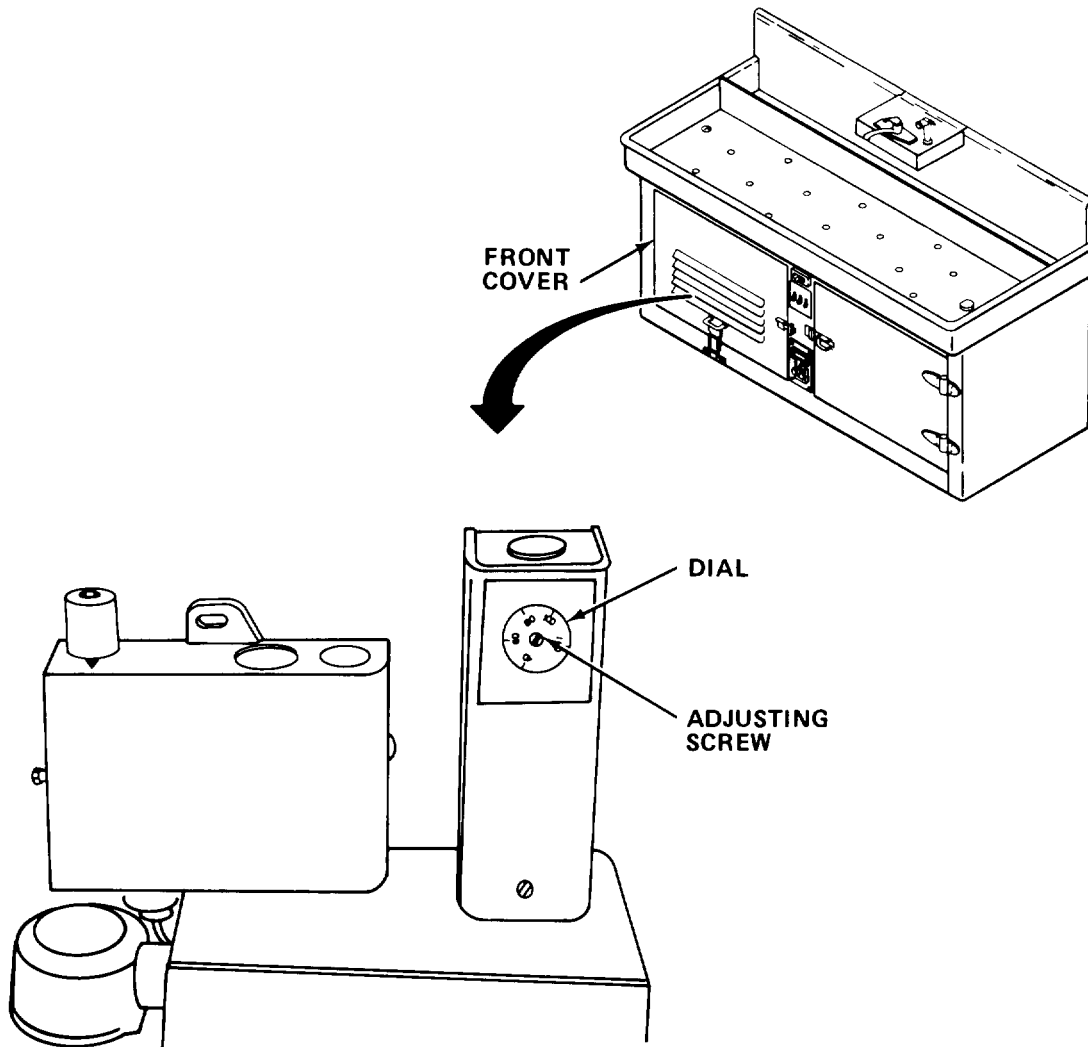
MOS: 83E, Photo and Layout Specialist
 TOOLS: Hex Head Key Wrench Set



- a. Unlatch and remove front cover.
- b. Loosen recessed lock screw.
- c. Rotate dial until desired temperature corresponds with pointer reading.
- d. Tighten lock screw.
- e. Reinstall front cover and secure with latch.

5-10.2. Adjust Cabinet Thermostat.

MOS: 83E, Photo and Layout Specialist
TOOLS: Flat Tip Screwdriver



- a. Unlatch and remove front cover.

NOTE

Minimum cabinet temperature possible is 55°F (12.8°C).

- b. Rotate adjusting screw until desired temperature is indicated on dial.
- c. Reinstall front cover and secure with latch.

Section IV. ORGANIZATIONAL MAINTENANCE

5-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

5-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

5-12.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-12.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

5-12.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering organizational maintenance for this equipment.

5-13. SERVICE UPON RECEIPT.

5-13.1. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738750.

c. Check to see whether the equipment has been modified.

5-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

5-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/ inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. If any component of the sink does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power troubleshooting procedures for dead receptacle (table 1-4).

Table 5-3. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. WATER DOES NOT RECIRCULATE.	Step 1. Check for kink or blockage in hose.	(a) If no kink or blockage exists, proceed to step 2. (b) Fix kink or clear blockage.
	Step 2. Check for defective recirculating water pump.	(a) If pump is not defective, proceed to step 3. (b) Repair or replace defective recirculating water pump (paragraphs 5-16.4 or 5-16.5).
	Step 3. Check for defective S19 WATER PUMP switch. Replace defective switch (paragraph 5-16.7).	
2. WATER DOES NOT MAINTAIN PROPER TEMPERATURE.	Step 1. Check that SINK switch is on.	(a) If switch is on, proceed to step 2. (b) Turn SINK switch on.
	Step 2. Check for improperly adjusted sink thermostat.	(a) If thermostat is properly set, proceed to step 3. (b) Adjust sink thermostat (paragraph 5-16.1).
	Step 3. Check for defective sink thermostat.	(a) If thermostat is not defective, proceed to step 4. (b) Replace sink thermostat (paragraph 5-16.2).
	Step 4. Check for defective heating element.	(a) If heating element is not defective, proceed to step 5. (b) Replace heating element (paragraph 5-16.10).

Table 5-3. ORGANIZATIONAL TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. WATER DOES NOT MAINTAIN PROPER TEMPERATURE - Cont	Step 5. Check condenser fan for operation when compressor runs. (a) If condenser fan operates properly, proceed to step 6. (b) Replace condenser fan motor (paragraph 5-16.8).	Step 6. Check auxiliary fan for operation when compressor runs. Replace auxiliary fan (paragraph 5-16.9).
3. SINK CABINET DOES NOT MAINTAIN PRESET TEMPERATURE.	Step 1. Check for defective CABINET switch. (a) If switch is not defective, proceed to step 2. (b) Replace CABINET switch (paragraph 5-16.7).	Step 2. Check for defective cabinet thermostat. (a) Replace cabinet thermostat (paragraph 5-16.3).

5-16. MAINTENANCE PROCEDURES.

a. This section contains instructions covering organizational maintenance functions for the sink. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURES	PARAGRAPH
Adjust Sink Thermostat (Calibrate)	5-16.1
Replace Sink Thermostat	5-16.2
Replace Cabinet Thermostat.....	5-16.3
Repair Recirculating Water Pump	5-16.4
Replace Recirculating Water Pump	5-16.5
Replace Faucet Pump.....	5-16.6
Replace Switch.....	5-16.7
Replace Condenser Fan Motor	5-16.8
Replace Auxiliary Fan.....	5-16.9
Replace Heating Element.....	5-16.10
Replace Photographic Processing Sink	5-16.11
Replace Water Storage Tank	5-16.12

5-16.1. Adjust Sink Thermostat (Calibrate).

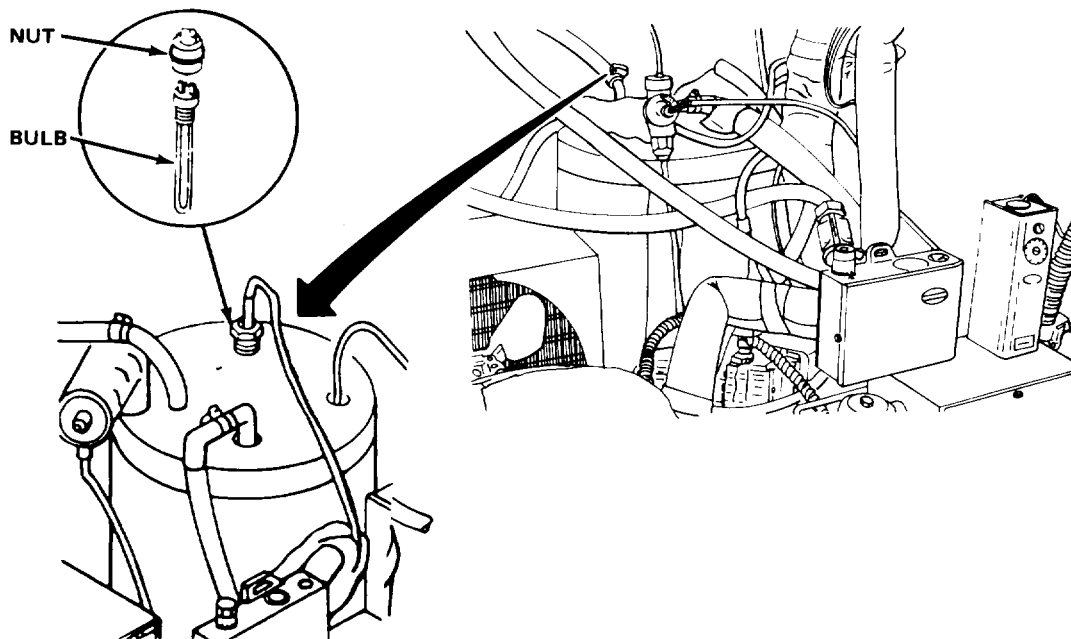
MOS: 35E, Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver
 Thermometer
 Combination Wrench Set

WARNING

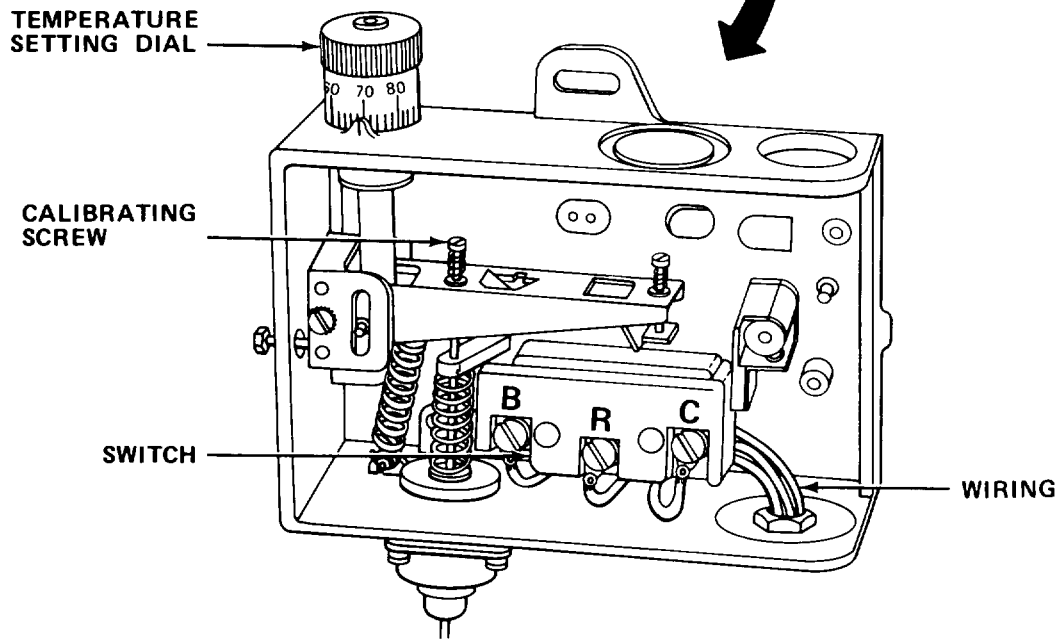
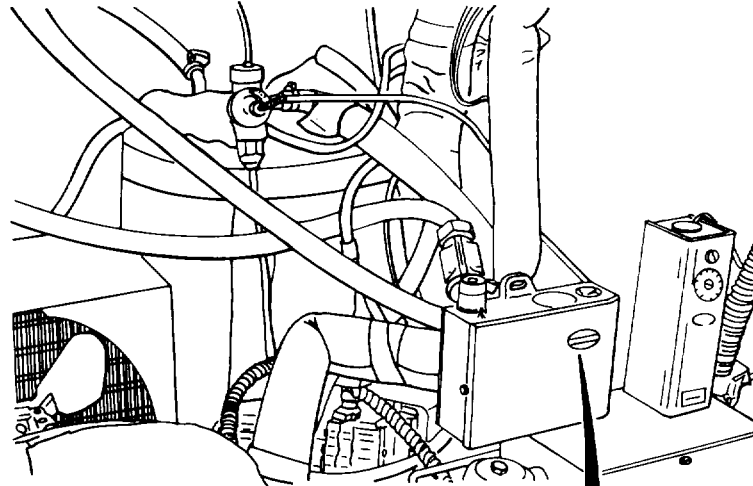
Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Remove plug and drain water from sink.
- c. Unlatch and remove front cover.

**CAUTION**

Use care when removing sensing bulb to avoid damaging sensing tube.

- d. Loosen bushing and carefully remove sensing bulb from heat exchanger.
- e. Immerse sensing bulb into water of known temperature (approximately 70OF (210C) for about 10 minutes.



- f. Loosen retaining screws and remove thermostat cover.
- g. Rotate dial to setting corresponding to water temperature.

NOTE

Turning calibrating screw to right lowers control point temperature, and turning to left raises control point temperature.

- h. Turn calibrating screw as required until switch clicks.

- i. Rotate calibrating screw in opposite direction until switch clicks again.

NOTE

One full turn of calibrating screw represents a temperature change of approximately 12OF (7.20C).

- j. Set calibrating screw halfway between points where switch clicked.
- k. Reinstall thermostat cover and tighten retaining screw.

NOTE

Be sure bulb gasket seats properly in bushing.

- l. Reinstall bulb and gasket in heat exchanger. Tighten bushing securely.
- m. Reinstall front cover and secure with latch.
- n. Refill sink with water to proper level.
- o. Plug in power cord.

5-16.2. Replace Sink Thermostat.

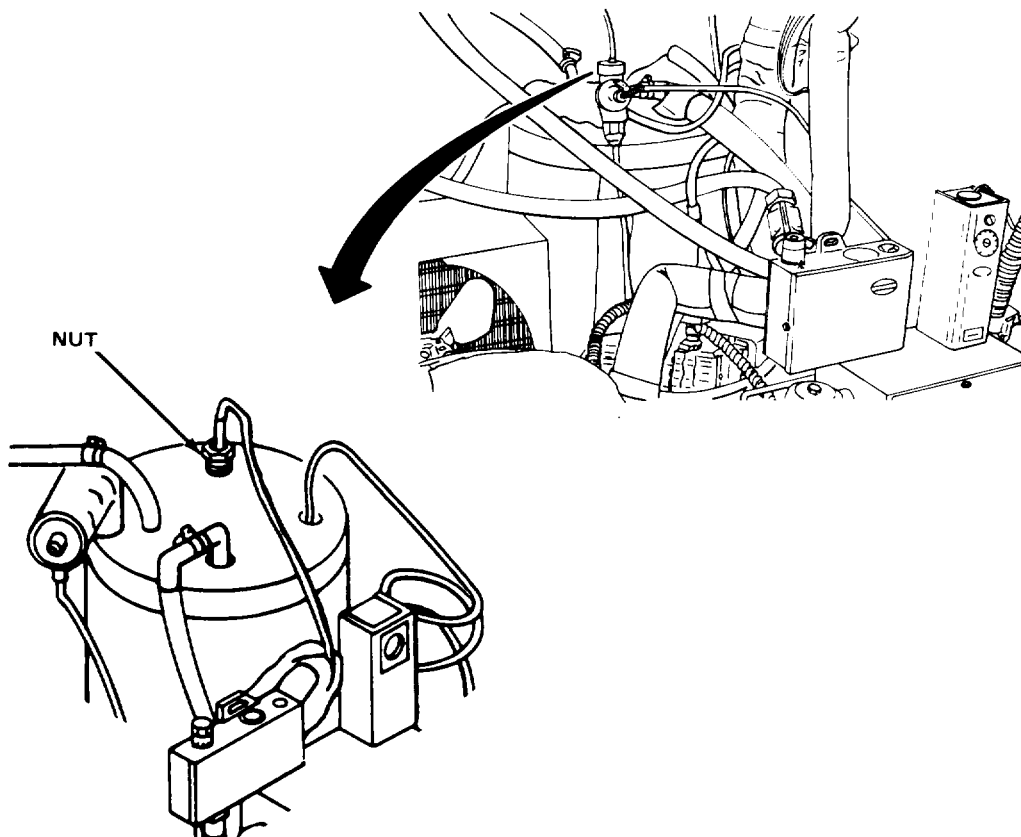
MOS: 35E, Special Electronic Devices Repairer

TOOLS: Cross Tip Screwdriver
Flat Tip Screwdriver
Combination Wrench Set

SUPPLIES: Sink Thermostat

WARNING**Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

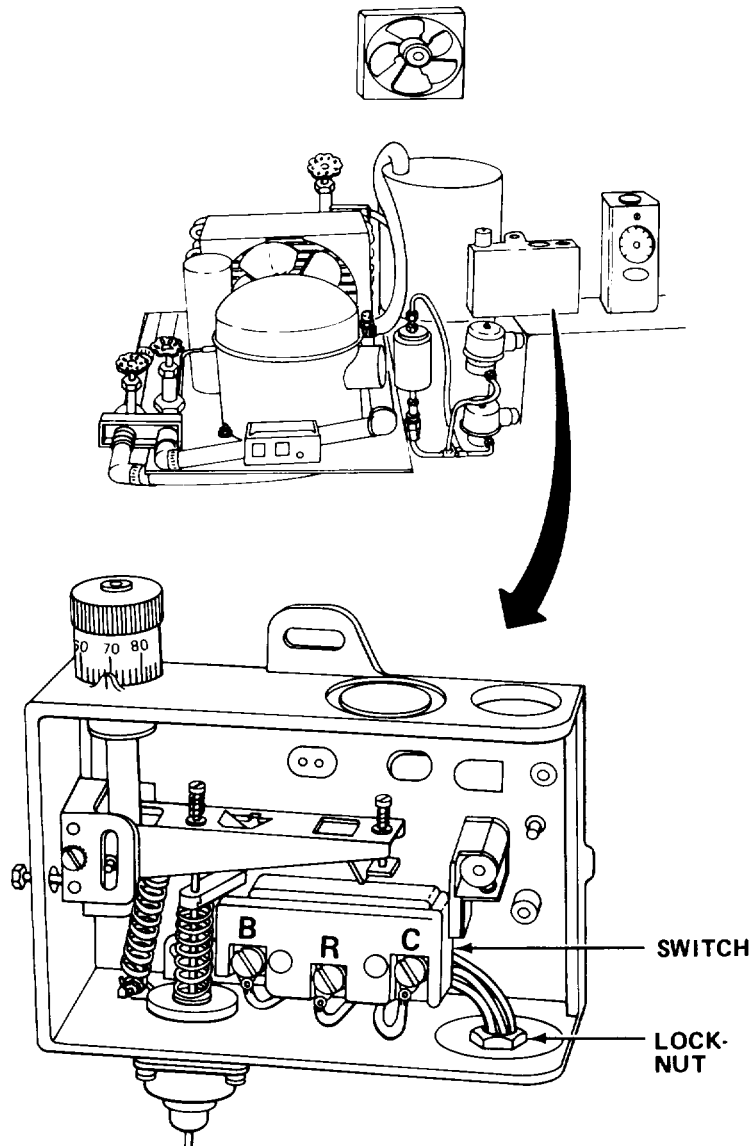
- a. Unplug power cord.
- b. Remove plug and drain water from sink.
- c. Unlatch and remove front cover.



CAUTION

Use care when removing sensing bulb to avoid damaging sensing tube.

- d. Loosen nut and carefully remove sensing bulb from heat exchanger.



- e. Loosen retaining screw and remove thermostat cover.
- f. Tag and remove wiring from switch.
- g. Remove retaining screws and defective thermostat.

- h. Install new thermostat and reinstall retaining screws.
- i. Reinstall wiring in proper reassembly order.
- j. Adjust thermostat (paragraph 5-16.1)

NOTE

Be sure bulb gasket seats properly in bushing.

- k. Reinstall sensing bulb and gasket into heat exchanger. Retain securely with bushing.
- l. Reinstall thermostat cover and retain with screw.
- m. Reinstall front cover and secure with latch.
- n. Refill sink with water to proper level.
- o. Plug in power cord.

5-16.3. Replace Cabinet Thermostat.

MOS: 35E, Special Electronic Devices Repairer

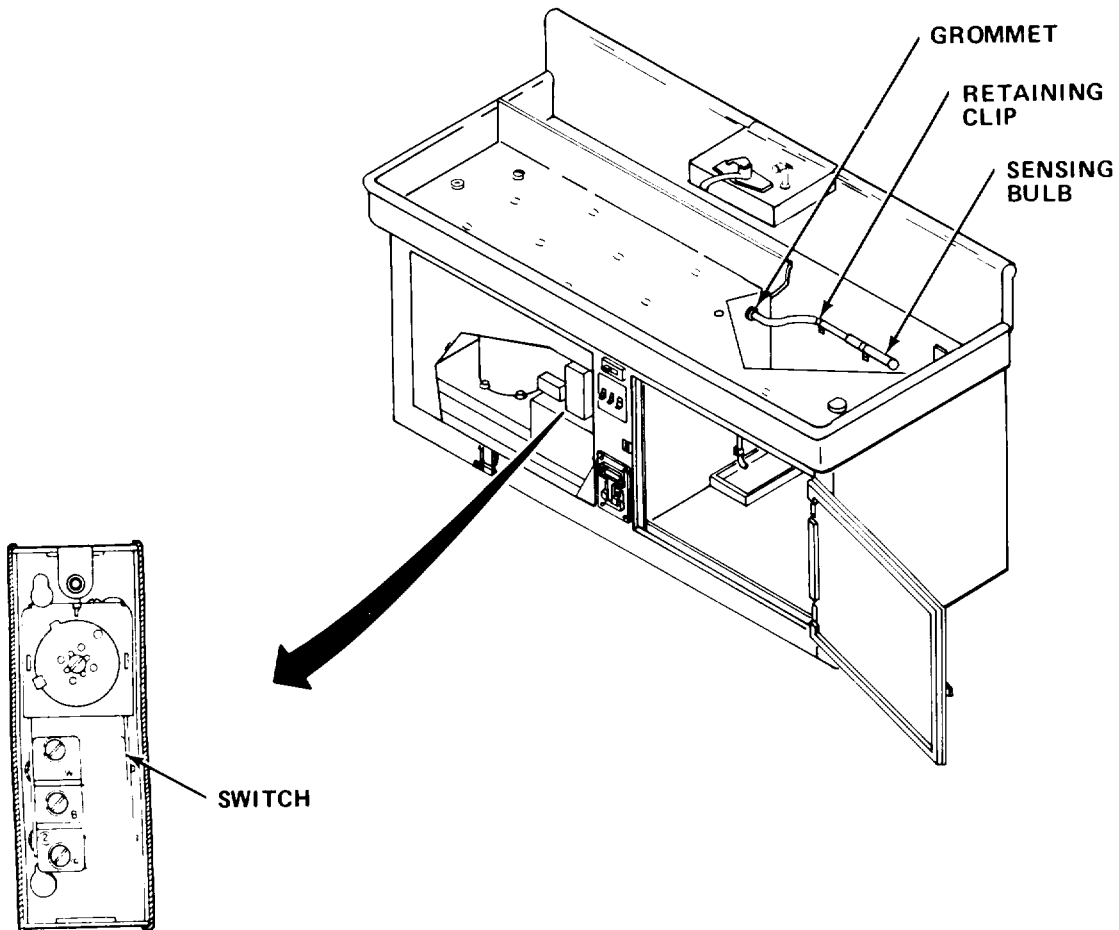
TOOLS: Flat Tip Screwdriver

SUPPLIES: Cabinet Thermostat

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Unlatch and remove front cover.
- c. Loosen retaining screw and thermostat cover.



CAUTION

Use care when removing sensing bulb to avoid damaging sensing tube.

- d. Remove retaining clips and cabinet grommet. Carefully remove sensing bulb and tube from cabinet.
- e. Tag and remove wiring from thermostat switch terminals.
- f. Loosen retaining screws and remove defective thermostat.
- g. Install new thermostat and tighten retaining screws.
- h. Reinstall electrical wiring to thermostat switch terminals in proper reassembly order.
- i. Using care to avoid damaging sensing tube, insert sensing bulb and tube through cabinet wall and retain with clips.
- j. Reinstall thermostat cover and tighten retaining screws.
- k. Adjust thermostat to 60°F (15.6°C).
- l. Reinstall front cover and tighten retaining screws.
- m. Plug in power cord.

5-16.4. Repair Recirculating Water Pump.

MOS: 83FJ6, Reproduction Equipment Repairer

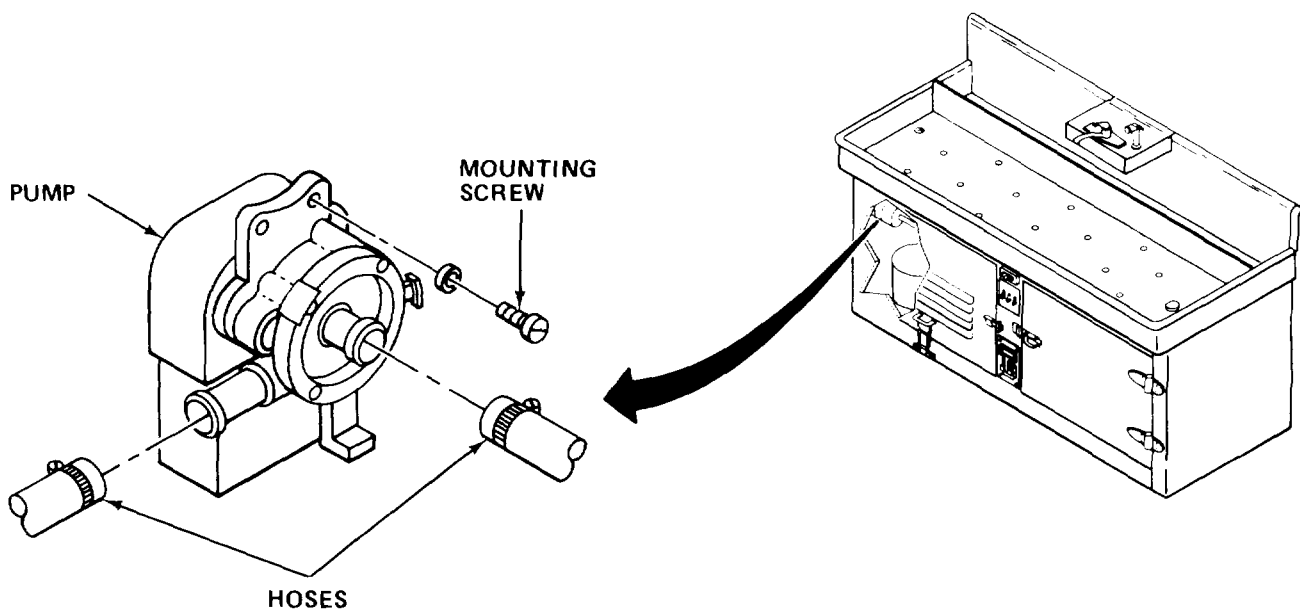
TOOLS: Flat Tip Screwdriver -

SUPPLIES: Impeller Assembly
 Housing 0-ring
 Bracket 0-ring
 Thrust Washer

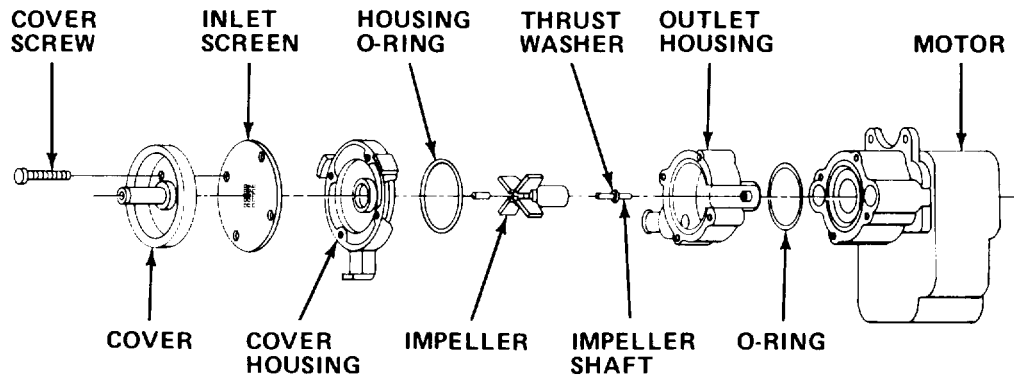
WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Remove plug and drain water from sink.
- c. Unlatch and remove front cover.



- d. Loosen clamps and remove hoses from pump.
- e. Unplug pump power cord.
- f. Remove mounting screws and pump from sink mounting bracket.



- g. Remove four pump impeller cover screws. Remove cover and inlet screen.
- h. Remove cover housing and housing 0-ring.
- i. Remove impeller, impeller shaft, and thrust washer.
- j. Remove outlet housing and 0-ring.
- k. Discard and replace any defective parts.
- l. Install 0-ring and reinstall outlet housing.
- m. Install impeller shaft, thrust washer, and impeller.
- n. Install housing 0-ring and cover housing.
- o. Reinstall inlet screen, impeller cover, and retaining screws.
- p. Reinstall pump to sink mounting bracket and retain with screws.
- q. Plug in pump power cord.
- r. Reinstall hoses and tighten clamps securely.
- s. Reinstall front cover and secure with latch.
- t. Reinstall sink drain plug and fill sink with water to proper level.
- u. Plug in power cord.

5-16.5. Replace Recirculating Water Pump.

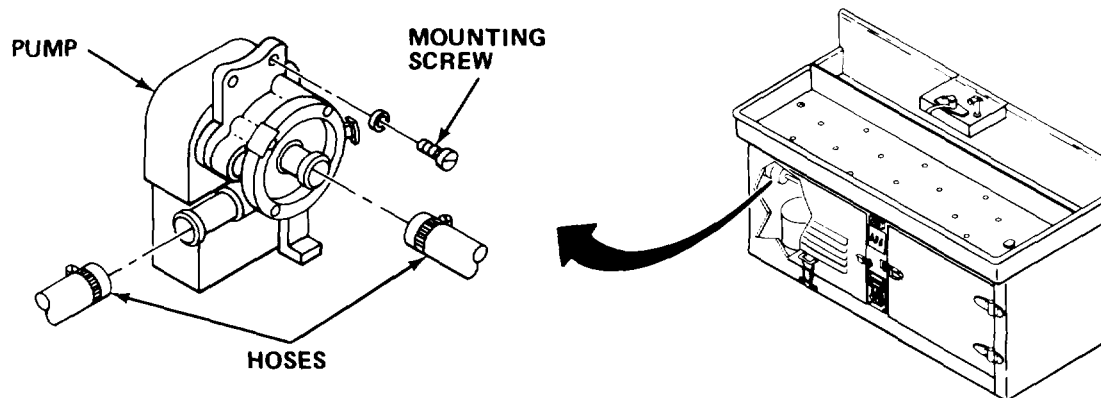
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Recirculating Water Pump

WARNING**Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

- a. Unplug power cord.
- b. Remove plug and drain water from sink.
- c. Unlatch and remove front cover.



- d. Loosen clamps and remove hoses from pump.
- e. Unplug pump power cord.
- f. Remove mounting screws and defective pump from sink mounting brackets.
- g. Reinstall new pump to sink mounting brackets and retain with screws.
- h. Plug in pump power cord.
- i. Reinstall hoses and tighten clamps securely.
- j. Reinstall front cover and secure with latch.
- k. Reinstall sink drain plug and fill sink with water to proper level.
- l. Plug in power cord.

5-16.6. Replace Faucet Pump.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Faucet Pump

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Drain watch tank and sink.
- c. Loosen hose clamps and disconnect all three hoses.
- d. Remove screw from support bracket.
- e. Remove four holddown screws.
- f. Disconnect pump leads in junction box.
- g. Remove pump with check valve and gate valve still attached.
- h. Remove plumbing from defective pump and install on new pump.
- i. Install replacement pump. Fasten bracket and four holddown screws.
- j. Connect wires in distribution box.
- k. Connect hoses, tighten hose clamps, and remove hose blocking clamps.
- l. Plug in power cord.

5-16.7. Replace Switch.

MOS: 35E, Special Electronic Devices Repairer

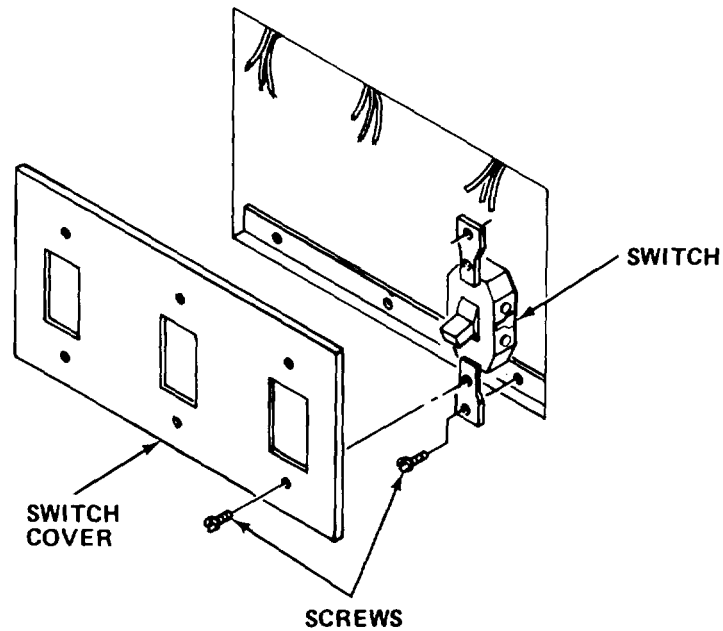
TOOLS: Flat Tip Screwdriver -

SUPPLIES: Switch

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.



- b. Remove retaining screws and switch cover.
- c. Remove retaining screws and defective switch.
- d. Disconnect wiring to defective switch.
- e. Connect wiring to new switch.
- f. Install new switch and tighten retaining screws.
- g. Reinstall switch cover and retaining screws.
- h. Plug in power cord.

5-16.8. Replace Condenser Fan Motor.

MOS: 35E, Special Electronic Devices Repairer

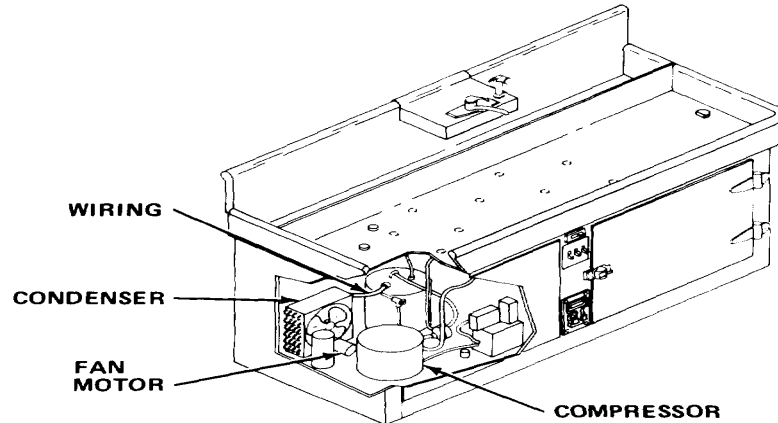
TOOLS: Flat Tip Screwdriver
1/4 inch Drive Socket Set
Crimping Tool

SUPPLIES: Fan Motor
In-Line Splices (2)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Remove retaining screws and front cover.



- b. Unlatch and remove front cover.
- c. Cut electrical wires from motor.
- d. Loosen mounting screws and remove motor and fan from mounting brackets.
- e. Remove fan blade from defective motor.
- f. Install fan blade on new motor.
- g. Reinstall motor and fan to mounting brackets and retain with screws.
- h. Splice electrical wires together.
- i. Reinstall front cover and secure with latch.
- j. Plug in power cord.

5-16.9. Replace Auxiliary Fan.

MOS: 35E, Special Electronic Devices Repairer

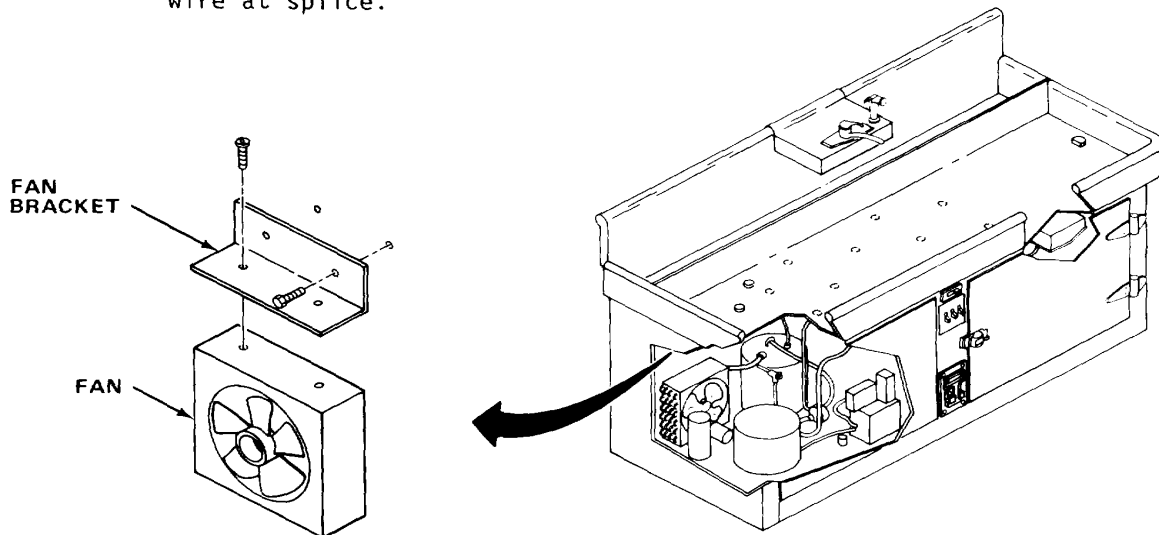
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Crimping Tool

SUPPLIES: Fan
In-Line Splices (2)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Unlatch and remove front cover
- c. Cut shrink wrapping back until splices from fan motor leads are exposed. Cut wire at splice.



- d. Remove screws holding fan bracket to sink and remove fan with bracket.
- e. Remove screws and bracket from defective fan and install on new fan.
- f. Install new fan with bracket and screws.
- g. Splice fan wires together.
- h. Install front cover and secure with latch.
- i. Plug in power cord.

5-16.10. Replace Heating Element.

MOS: 35E, Special Electronic Devices Repairer

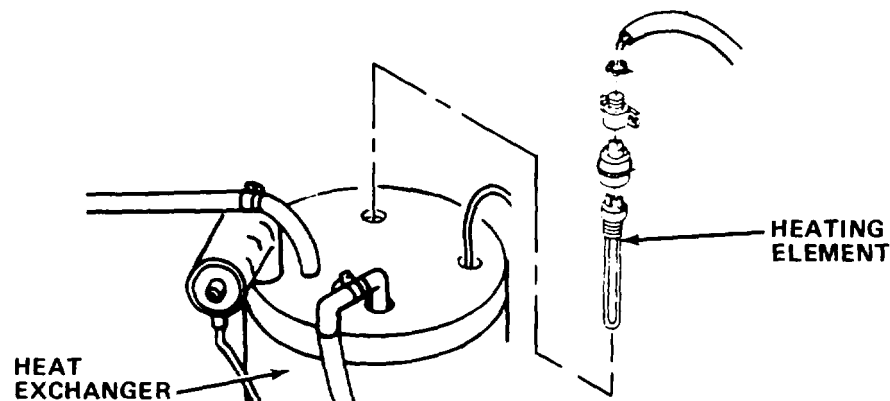
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Water Pump Pliers

SUPPLIES: Heating Element
Teflon Thread Sealant (Item 38, Appendix E)
Duct Tape
Single Edge Razer Blade

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Unlatch and remove front cover.
- c. Remove plug and drain water from sink.



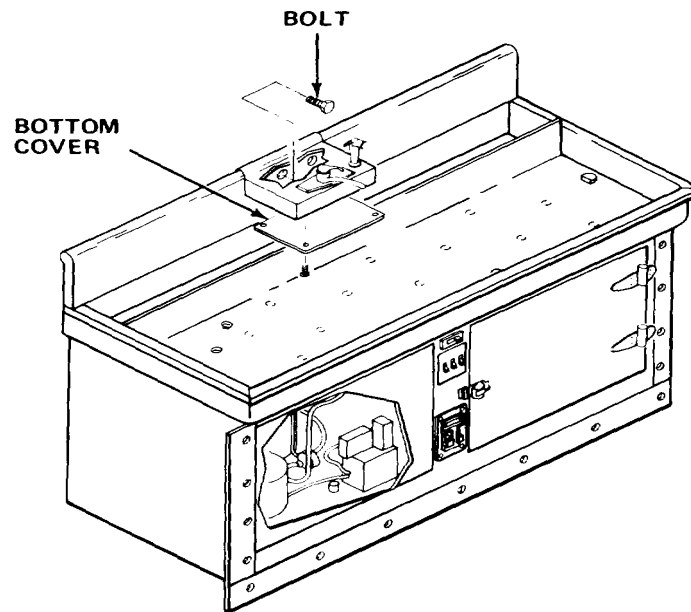
- d. Unplug cord from heating element.
- e. Cut top of insulation until nut is accessible.
- f. Unscrew and remove heating element from heat exchanger.
- g. Coat threads of new heating element with sealant. Install securely into heat exchanger.
- h. Patch cut in insulation with duct tape.
- i. Plug power cable into new heating element.
- j. Reinstall plug and fill sink with water to proper level.
- k. Reinstall front cover and secure with latch.
- l. Plug in power cord.

5-16.11. Replace Photographic Processing Sink.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver
Cross Tip Screwdriver
Combination Wrench Set

SUPPLIES: Photographic Processing Sink
Cheesecloth (Item 4, Appendix E)

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Drain water storage tank assembly.
- c. Disconnect water storage tank assembly overflow line and water storage tank assembly feed line.
- d. Disconnect sink drain line.
- e. Remove film storage box.

- f. Remove left, right, and bottom splash guards from sink.
- g. Remove bottom cover from faucet assembly.
- h. Remove two bolts holding top of sink to wall.
- i. Remove locking pins from rails beneath sink. Slide sink out to remove.
- j. To install sink engage sink on rails and slide in place. Insert locking pins.
- k. Bolt top of sink to wall.
- l. Connect sink drain line.
- m. Connect water storage tank assembly feed and overflow line.
- n. Fill water storage tank assembly.
- o. Plug in power cord.
- p. Turn on all switches on sink. Fill sink so water is 1/2" deep.
- q. Check recirculating system and cabinet for proper operation.
- r. Install splash guards and faucet assembly bottom cover.
- s. Install film storage box.

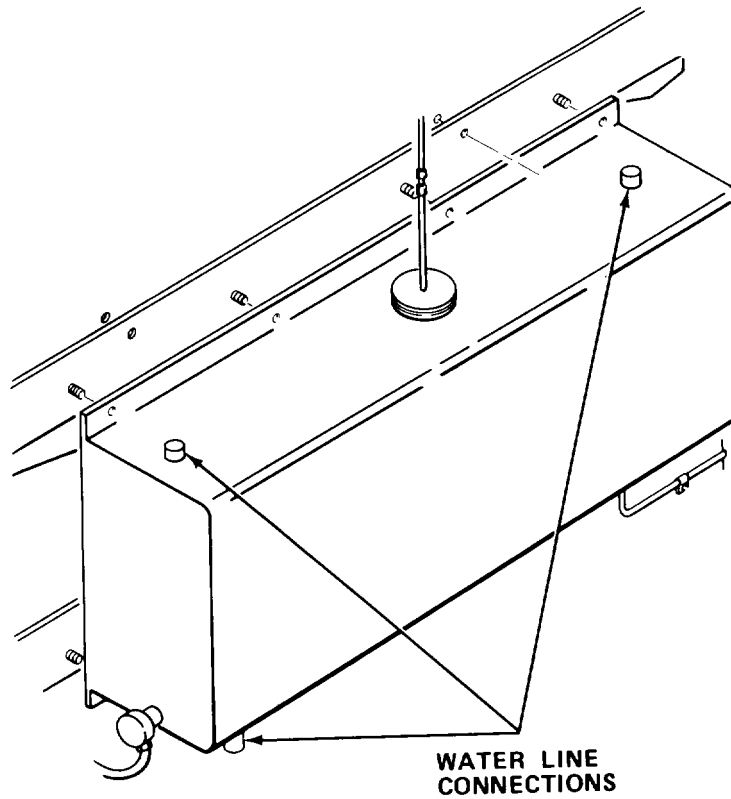
5-16.12. Replace Water Storage Tank.

MOS: 83FJ6 Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver
Combination Wrench Set
18 inch Pipe Wrench

SUPPLIES: Water Storage Tank

- a. Remove photographic processing sink (paragraph 5-16.11).
- b. Remove remote reading thermometer bulb (paragraph 5-20.3).
- c. Remove water level gage (paragraph 5-20.4).
- d. Remove immersion heater (paragraph 5-20.5).



- e. Disconnect water lines.
- f. Remove retaining nuts.
- g. Slide defective water tank off of studs and remove.
- h. Install new water tank.
- i. Install retaining nuts.
- j. Install immersion heater (paragraph 5-20.5).
- k. Install water level gage (paragraph 5-20.4).
- l. Install remote reading thermometer bulb (paragraph 5-20.3).
- m. Install photographic processing sink (paragraph 5-16.11).

5-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

5-18. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

5-18.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-18.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

5-18.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering direct/general support maintenance for this equipment.

5-19. DIRECT/GENERAL SUPPORT TROUBLESHOOTING PROCEDURES.

a. Direct/general support troubleshooting procedures cover the most common malfunctions that may be repaired at the direct/general support level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by lower level maintenance should be conducted in addition to the direct/general support troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

Table 5-4. DIRECT/GENERAL SUPPORT TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. COMPRESSOR RUNS BUT DOES NOT COOL CABINET AND WATER.	Check for insufficient refrigerant charge.	Recharge system with freon R-12 refrigerant.
2. COMPRESSOR COOLS EITHER CABINET OR WATER, BUT NOT BOTH.	Step 1.	Check for inoperable solenoid valve. (a) Remove retaining screws and front cover. (b) Rotate applicable thermostat adjustment knob back and forth while listening for solenoid valve to click while activating and deactivating. This indicates proper operation of solenoid valve. (c) If no click is heard, replace defective solenoid valve and recharge refrigerant.
	Step 2 Check for defective thermostatic expansion valve.	Replace thermostatic expansion valve (paragraph 5-20.2).
3. COMPRESSOR DOES NOT OPERATE OR RUNS NOISILY.	Check for defective compressor.	Replace compressor assembly (paragraph 5-20.1).
4. TEMPERATURE INDICATED BY REMOTE READING THERMOMETER DOES NOT AGREE WITH APPARENT WATER TEMPERATURE.	Check for difference between actual and indicated temperatures.	Replace remote reading thermometer (paragraph 5-20.3).

Table 5-4. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. WATER LEVEL GAGE DOES NOT INDICATE.	Check water level in tank.	Replace water level gage (paragraph 5-20.4).
6. WATER IS NOT AT CORRECT TEMPERATURE.	Step 1. Check for the presence of 208 V ac at immersion heater input.	<ul style="list-style-type: none"> a. If voltage is not present, proceed to step 2. b. If voltage is present, replace the immersion heater (paragraph 5-20.5).
	Step 2. Check for the presence of 208 V ac at input to magnetic contactor.	If voltage is present, replace the magnetic contactor (paragraph 5-20.6).

5-20. MAINTENANCE PROCEDURES.

a. This section contains instructions covering direct/general support maintenance functions for the sink. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Compressor Assembly	5-20.1
Replace Thermostatic Expansion Valve	5-20.2
Replace Remote Reading Thermometer	5-20.3
Replace Water Level Gage	5-20.4
Replace Immersion Heater.....	5-20.5
Replace Magnetic Contactor	5-20.6

5-20.1 Replace Compressor Assembly.

MOS: 52C, Utilities Equipment Repairer

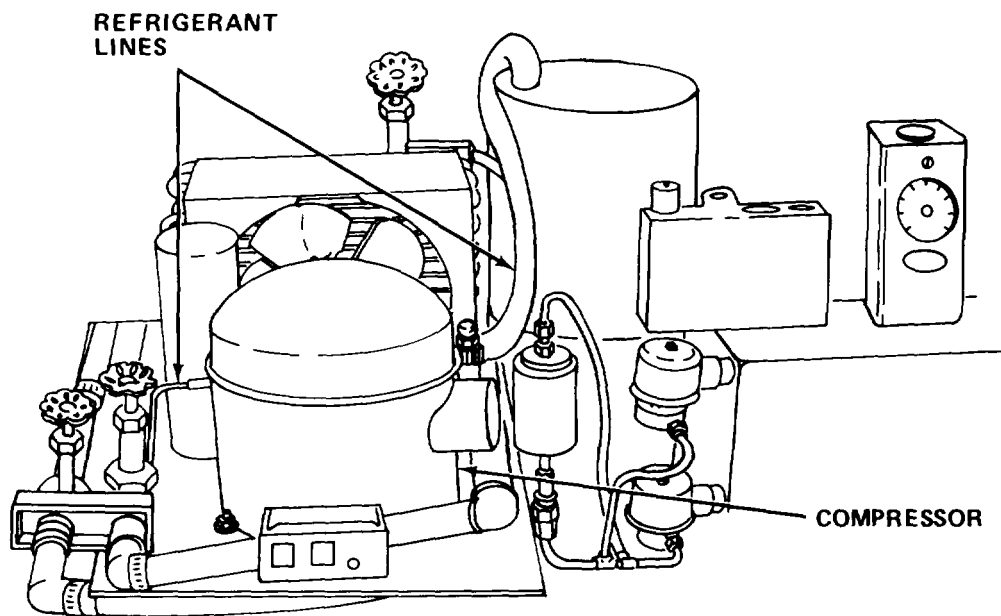
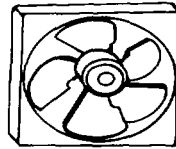
TOOLS: Flat Tip Screwdriver
 8 inch Adjustable Wrench
 Propane Torch
 Charging and Testing Manifold

SUPPLIES: Rosin Core Solder (Item 44, Appendix E)
 Freon R-12 (Item 19, Appendix E)
 Compressor Assembly

WARNING

- **Dangerous chemicals are used in this equipment. Death or severe injury may result if personnel fail to observe safety precautions.**
- **Use care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin and eye contact is possible.**
- **Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.**
- **Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

- a. Unplug power cord.
- b. Loosen retaining screws and remove front cover.



- c. Disconnect wiring to compressor motor.
- d. Remove four mounting screws from base.
- e. Evacuate refrigerant from system.
- f. Desolder refrigerant lines from defective compressor assembly and remove.
- g. Install new compressor and solder refrigerant lines.
- h. Reinstall mounting screws.
- i. Evacuate refrigerant lines and recharge system with freon R-12.
- j. Reconnect wiring to compressor motor.
- k. Reinstall front cover and retaining screws.
- l. Plug in power cord.

5-20.2. Replace Thermostatic Expansion Valve.

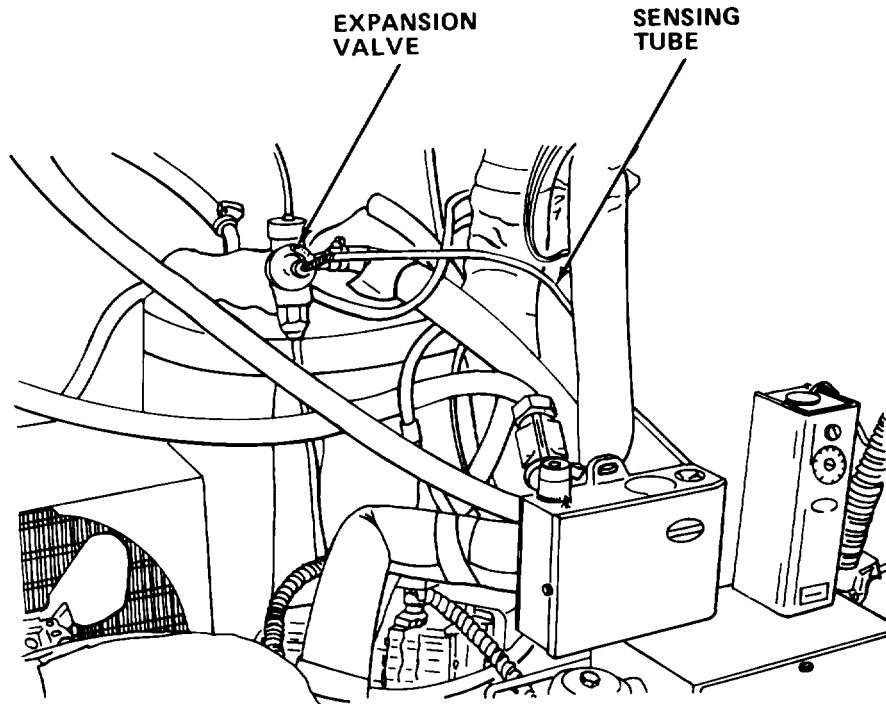
MOS: 52C, Utilities Equipment Repairer

TOOLS: Flat Tip Screwdriver
8 inch Adjustable Wrench
Propane Torch
12 inch Adjustable Wrench
Charging and Testing Manifold

SUPPLIES: Rosin Core Solder (Item 44, Appendix E)
Freon R-12 (Item 19, Appendix E)
Expansion Valve

WARNING

- **Dangerous chemicals are used in this equipment. Death or severe injury may result if personnel fail to observe safety precautions.**
 - **Use care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin and eye contact is possible.**
 - **Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.**
 - **Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**
- a. Unplug power cord.
 - b. Remove covers for access.
 - c. Evacuate freon from refrigerant lines.



- d. Desolder connections and remove defective valve.

CAUTION

Use care when removing or installing valve to avoid damaging sensing tube.

- e. Loosen clips and remove sensing bulb from refrigerant line.
- f. Reinstall sensing bulb to refrigerant line.
- g. Install new valve and solder connections.
- h. Evacuate refrigerant lines and recharge with freon R-12.
- i. Reinstall covers.
- j. Plug in power cord.

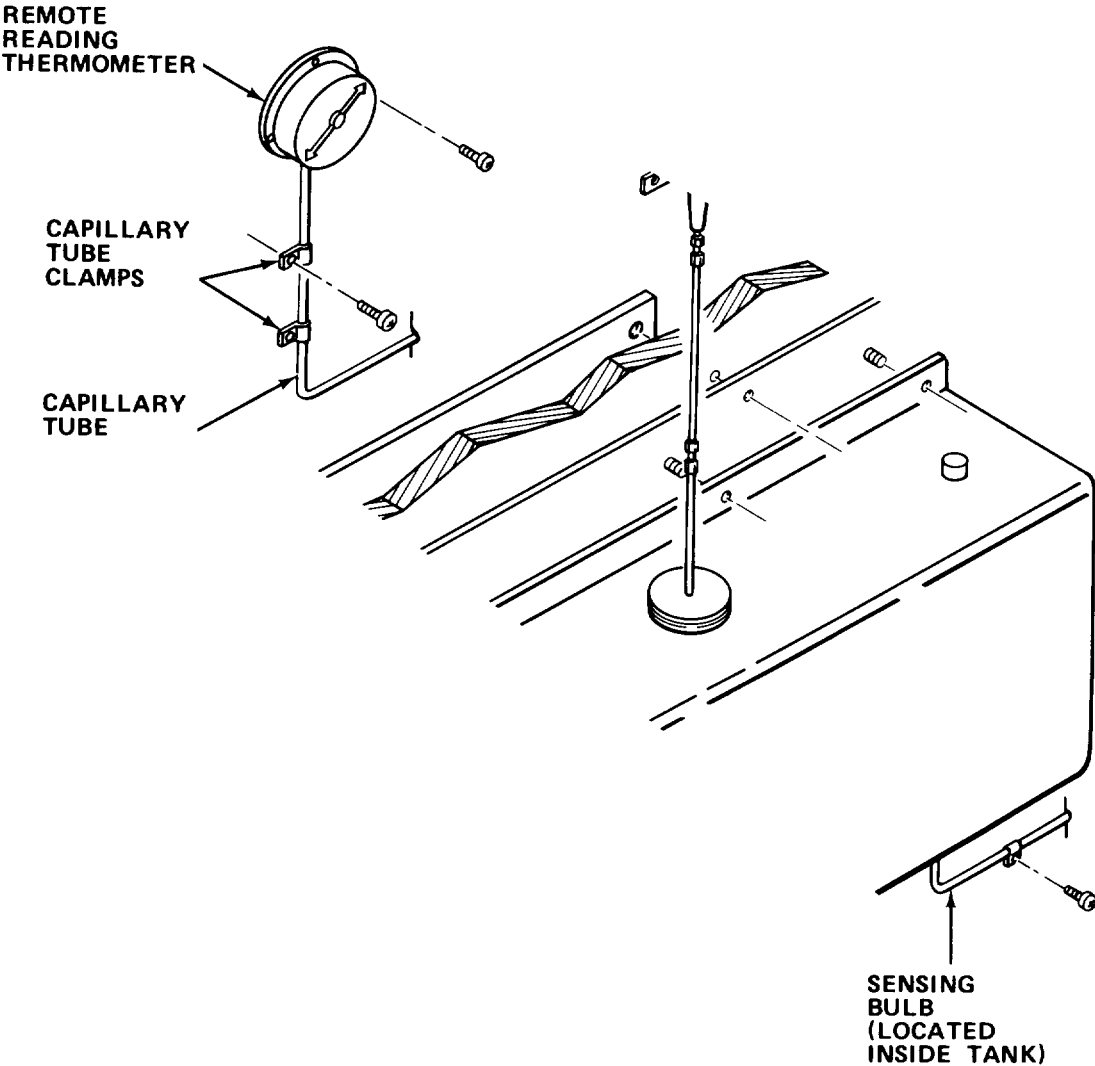
5-20.3. Replace Remote Reading Thermometer.

MOS: 52C Utilities Equipment Repairer

TOOLS: Cross Tip Screwdriver (2)
8 inch Adjustable Wrench

SUPPLIES: Remote Reading Thermometer
Teflon Thread Sealant (Item 38, Appendix E)

- a. Remove photographic processing sink (paragraph 5-16.11).



- b. Disconnect sensing bulb from underside of water tank.
- c. Remove capillary tube clamps.
- d. Remove defective thermometer from van wall. -
- e. Install new thermometer.

CAUTION

Damage to equipment may occur from fluid leaks unless bulb union threads are coated with thread sealant prior to installation.

- f. Coat bulb union threads with teflon thread sealant.
- g. Install bulb and tighten union.
- h. Route capillary tube and install clamps.
- i. Install photographic processing sink (paragraph 5-16.11).

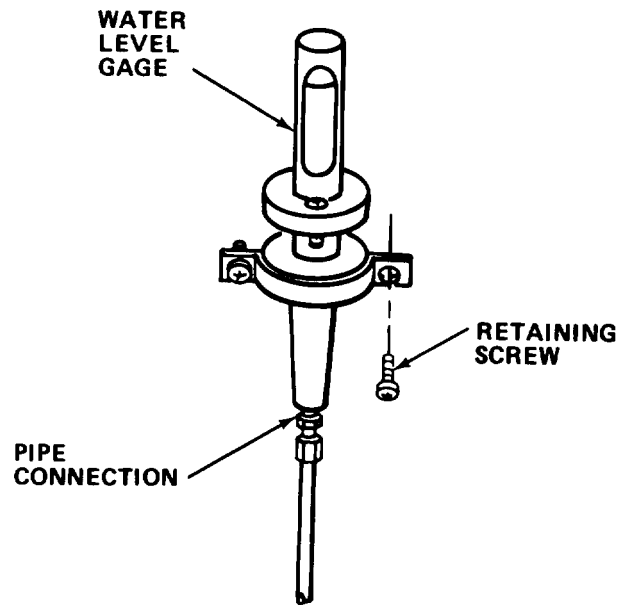
5-20.4. Replace Water Level Gage.

MOS: 52C, Utilities Equipment Repairer

TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Cross Tip Screwdriver

SUPPLIES: Water Level Gage

- a. Remove photographic processing sink (paragraph 5-16.11).



- b. Disconnect gage pipe coupling.
- c. Remove retaining screws and defective gage from van wall.
- d. Disconnect beaded chain from gage.
- e. Connect beaded chain to new gage.
- f. Start gage retaining screws.
- g. Connect gage pipe coupling.
- h. Tighten retaining screws.
- i. Install photographic processing sink (paragraph 5-16.11).

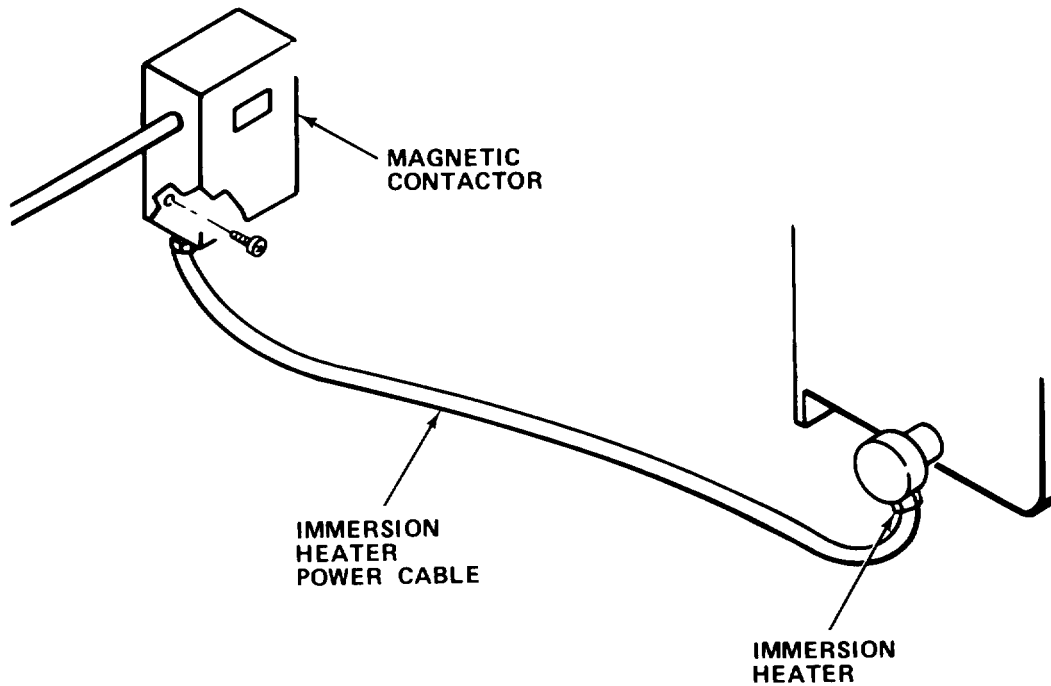
5-20.5. Replace Immersion Heater.

MOS: 52C, Utilities Equipment Repairer

TOOLS: Flat Tip Screwdriver
18 inch Pipe Wrench

SUPPLIES: Immersion Heater
Teflon Thread Sealant (Item 38, Appendix E)

- a. Remove photographic processing sink (5-16.11).

**WARNING**

Death or serious injury may occur from electrical shock unless immersion heater circuit breaker is turned off before servicing.

- b. Turn off immersion heater circuit breaker.
- c. Remove magnetic contactor cover.
- d. Disconnect immersion heater power cable.

- e. Drain water storage tank.
- f. Remove defective immersion heater.
- g. Set new immersion heater thermostat to 70°F (21°C).

CAUTION

Damage to equipment may occur from fluid leaks unless threads of immersion heater are coated with thread sealant prior to installation.

- h. Coat immersion heater threads with teflon thread sealant.
- i. Install immersion heater.
- j. Connect immersion heater power cable.
- k. Reinstall magnetic contactor cover.
- l. Install photographic processing sink (paragraph 5-16.11).
- m. Turn ON immersion heater circuit breaker.

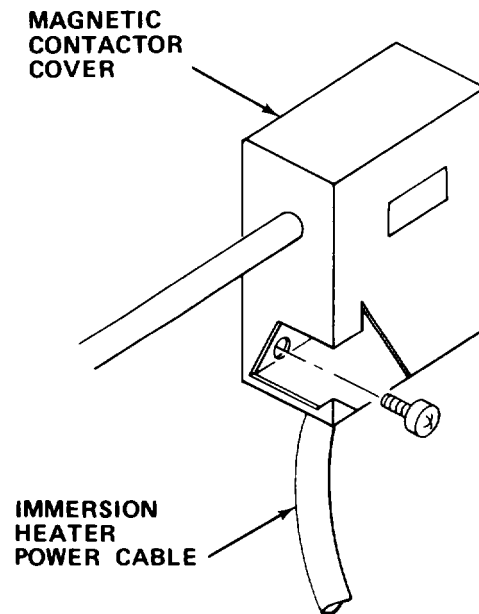
5-20.6. Replace Magnetic Contactor.

MOS: 35E Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver -

SUPPLIES: Magnetic Contactor

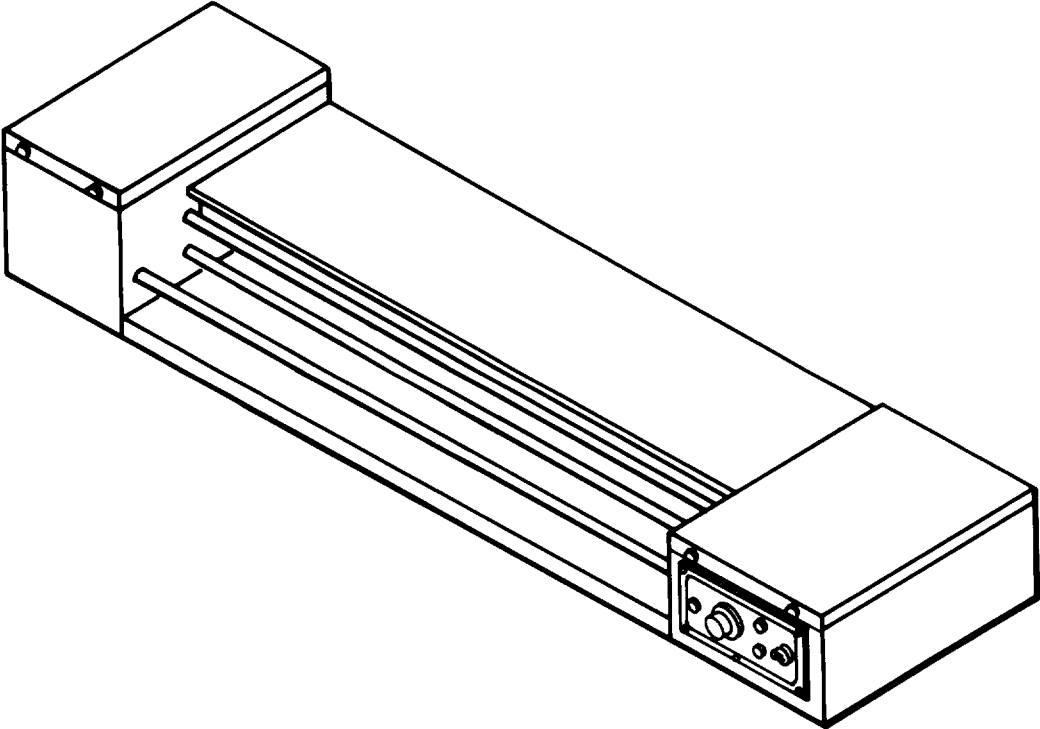
- a. Remove photographic processing sink (paragraph 5-16.11).

**WARNING**

Death or serious injury may occur from electrical shock unless immersion heater circuit breaker is turned off before servicing.

- b. Turn OFF immersion heater circuit breaker.
- c. Remove magnetic contactor cover.
- d. Disconnect immersion heater power cable.
- e. Disconnect incoming line power cable.
- f. Remove defective magnetic contactor.
- g. Install new magnetic contactor.
- h. Connect incoming line power cable.

- i. Connect immersion heater power cable.
- l. Install cover.
- k. Install photographic processing sink (paragraph 5-16.11).
- l. Turn ON immersion heater circuit breaker.



CHAPTER 6

FILM DRYER

Section I. INTRODUCTION

6-1. GENERAL INFORMATION.

6-1.1. Scope.

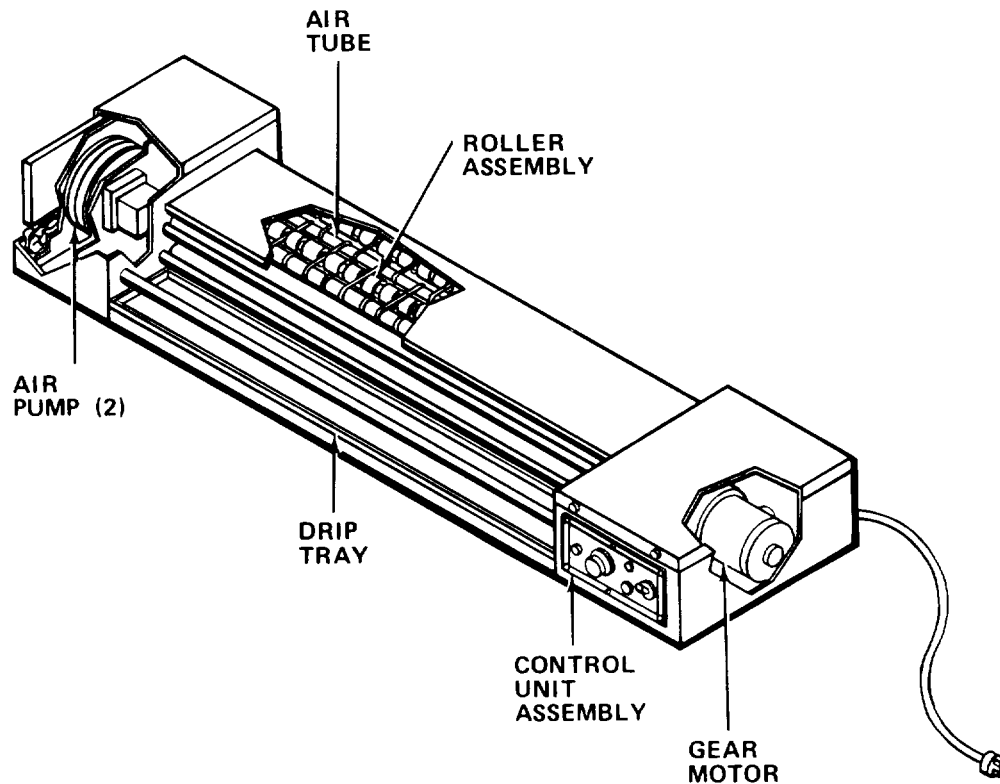
- a. Model Number and Equipment name. Model 3040 Film Dryer.
- b. Purpose of equipment. To dry film.

6-2. EQUIPMENT DESCRIPTION.

6-2.1. Equipment Characteristics, Capabilities, and Features.

- a. Variable-speed drive motor adjusts for various drying conditions.
- b. Reversible motor ejects jammed material.
- c. Corrosion-resistant, easily cleaned.
- d. Nylon bearings require no lubrication.

6-2.2. Location and Description of Major Components.



GEAR MOTOR. Provides geared-down rotary motion to drive rollers.

ROLLER ASSEMBLY. Transports wet film through machine.

AIR TUBES. Provide concentrated blast of air to dry film.

AIR PUMPS. Provide high-volume air to air tubes.

CONTROL UNIT ASSEMBLY. Contains power switch, motor speed control, FWD/REV switch, fuse and holder, and fuse indicator lamp.

DRIP TRAY. Catches excess fluid that has been removed by squeegee rollers.

6-2.3. Equipment Data.

Manufacturer	Buckingham Graphics, Inc.
Weight	35.0 lbs (15.9 kg)
Width	47.3 in. (120.1 cm)
Height	7.0 in. (17.8 cm)
Depth	12.5 in. (31.8 cm)
Feed Capacity Width	32.0 in. (76.2 cm)
Power Requirements	117 V ac 60 Hz 14 amps 160 watts.

6-3. TECHNICAL PRINCIPLES OF OPERATION. The purpose of the film dryer is to dry film after processing. It is composed of:

Transport System

Drying System

Electrical System

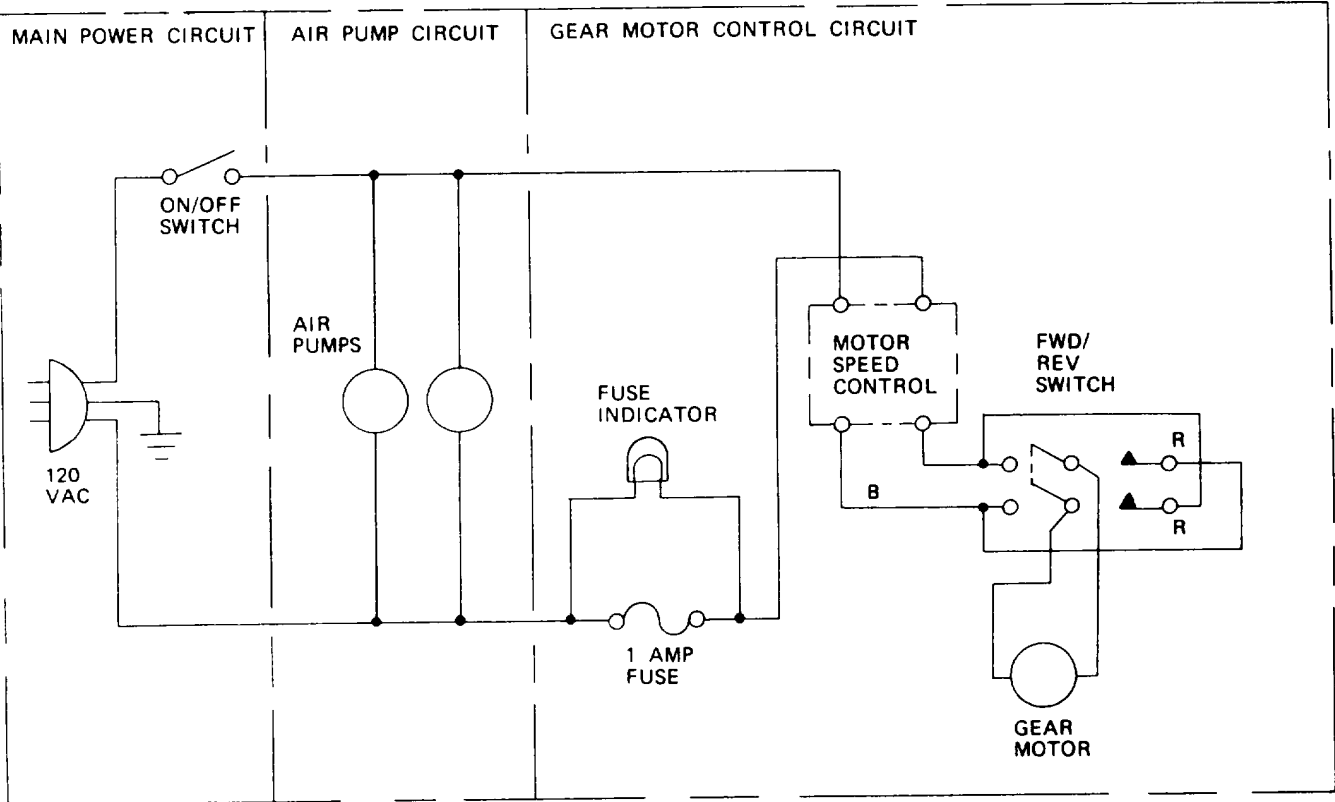
6-3.1. Transport System. Moves the film through the drying system.

- a. Squeegee rollers. Squeeze excess water from the film. The excess water is collected in a removable drip tray under the squeegee rollers.
- b. Conveyor rollers. Guide the paper through the drying system and out through the rear.
- c. Gear motor. Drives the squeegee rollers and conveyor rollers.

6-3.2. Drying System. Removes the remaining fluid from the film using jets of air directed at the surface of the film.

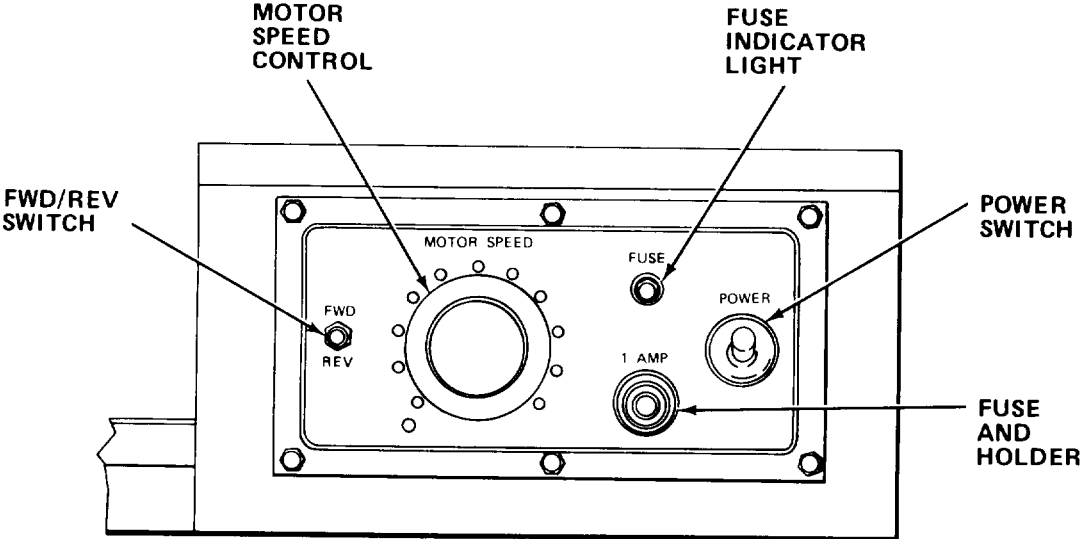
- a. Air Pumps. Draw fresh air from outside the case and channels it to the air tubes.
- b. Air tubes. Direct the airflow over the surface of the print through a series of holes drilled in the tubes and directed toward the surface.
- c. Buffer rings. Located on the front air tubes to keep the paper traveling in a straight line path between the air tubes and conveyor rollers.

6-3.3. Electrical System. The power switch supplies power to the two air pumps and the gear motor control circuit. The gear motor is controlled by a variable MOTOR SPEED control and a FWD/REV switch. The gear motor circuit is protected by a 1 AMP fuse. A FUSE indicator lights if the fuse is blown.



Section II. OPERATING INSTRUCTIONS

6-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Controls or Indicator	Function
MOTOR SPEED Control	Determines transport speed. LEFT: Decreases speed. RIGHT: Increases speed.
FUSE Indicator Light	Indicates blown fuse.
Fuse and Holder	Provides protection for electrical circuitry in transport system.
POWER Switch	Provides power for gear motor and air pumps.
FWD/REV Switch	Controls direction of transport mechanism. Normal operating position is FWD. REV position is used to free jammed material.

6-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

6-5.1. PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.
- g. Interval column. This column determines the time period designated to perform your PMCS.
- h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.
- i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Socket Wrench Set (1/4 in. Drive)	1 ea
Roller Cleaner (Item 6, Appendix E)	ar
Cheesecloth (Item 4, Appendix E)	ar
Air Pump Filter	1 ea

Table 6-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before W - Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

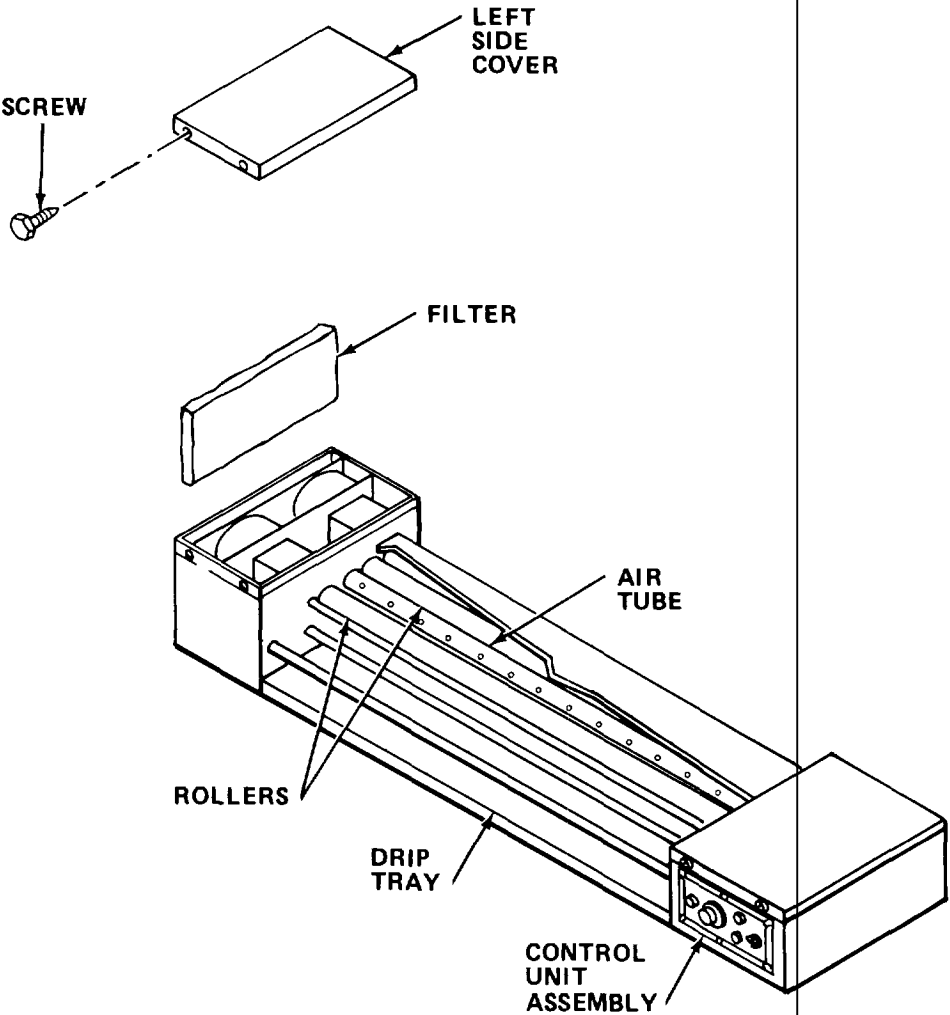
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W	<p><u>FILM DRYER</u></p> <p>Inspect.</p>  <p>The diagram shows an exploded view of a film dryer. At the top, a 'LEFT SIDE COVER' is shown with a 'SCREW' being inserted into it. Below this, a 'FILTER' is shown above the main body of the dryer. The main body contains 'ROLLERS' and an 'AIR TUBE'. At the bottom, there is a 'DRIP TRAY' and a 'CONTROL UNIT ASSEMBLY' with various knobs and switches.</p>	

Table 6-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	W	<p><u>FILM DRYER - Cont</u></p> <p><u>Inspect - Cont</u></p> <ol style="list-style-type: none"> 1. Check rollers for chemical residue. Clean with Cheesecloth dampened with water. 2. Check drip tray for cleanliness. Empty if necessary. 3. Remove screws and left side cover. Remove filter. Check filter for cleanliness. Replace filter if required. 4. Reinstall cover. Cover must seal against air leaks. Check all covers for leaks, cracks and missing screws. <p style="text-align: center;">6-9</p>	<p>Covers are cracked.</p>

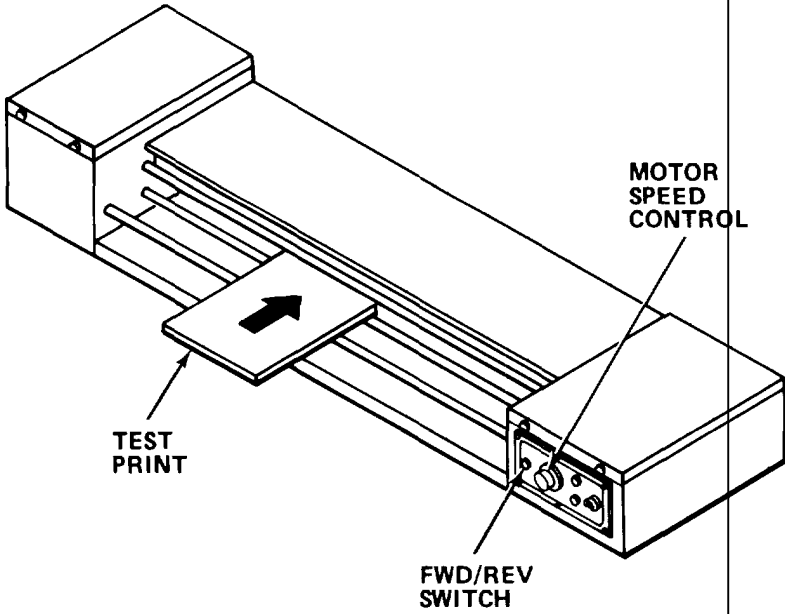
Table 6-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before
 D - During
 A - After

W- Weekly
 M - Monthly
 Q - Quarterly

AN - Annually
 S - Semiannually
 BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
2	D	<p>FILM DRYER - Cont <u>Test.</u></p>  <p>1. Check control unit assembly for damaged knobs or switches. (a) Turn on film dryer. Check for roller rotation and airflow. (b) Adjust MOTOR SPEED control from slow to fast. Observe roller speed changes. (c) Move FWD/REV switch to REV position. Observe roller direction changes.</p> <p>2. Dry several film and inspect each for signs of pulling, Prints are stretching, spotting, streaking, or distortion of image. torn or Check for rips and tears. distorted.</p> <p style="text-align: center;">6-10</p>	<p>Speed does not change.</p>

6-6. OPERATION UNDER USUAL CONDITIONS.**6-6.1. Operating Procedures.**

- a. Starting unit.
 - (1) Plug in power cord.
 - (2) Move POWER switch to on position.
 - (3) Check that FWD/REV switch is in FWD position.
 - (4) Adjust MOTOR SPEED control for satisfactory drying.
- b. Operating unit.

NOTE

Do not squeegee film. Feed into machine wet.

- (1) Center material to be dried, and squarely insert between two squeegee rollers.

NOTE

Guide large or long material from rear. Do not pull.

- (2) Remove film from rear.
- c. Stopping unit. Move POWER switch to OFF position.
 - d. Removing jammed material.
 - (1) With POWER switch in ON position, set FWD/REV switch to REV position.
 - (2) When material is ejected, set switch to FWD position.

6-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

6-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

6-9. TROUBLESHOOTING PROCEDURES.

- a. The table lists the common malfunctions which you may find during operation or maintenance of the film dryer, or its components. You should perform the test/ inspections and corrective actions in the order listed.
- b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

Table 6-2. TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. ROLLERS DO NOT ROTATE.		
	Step 1. Check for unplugged power cord.	
	(a) If power cord is plugged in, proceed to step 2.	
	(b) Plug in power cord.	
	Step 2. Check for tripped circuit breaker switch.	
	(a) If circuit breaker is not tripped, proceed to step 3.	
	(b) Reset circuit breaker.	
	Step 3. Check FUSE indicator light.	
	Replace fuse (paragraph 6-10.1).	
	Step 4. Check motor speed control setting. Adjust motor speed control.	
2. ROLLERS ROTATE BUT AIRFLOW IS RESTRICTED.		
	Check for dirty filter.	
	Replace filter (paragraph 6-10.2).	

6-10. MAINTENANCE PROCEDURES.

- a. This section contains instructions covering operator maintenance functions for the film dryer. Personnel required are listed only if the task requires more than one.
- b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Fuse	6-10.1
Replace Fuse	6-10.2

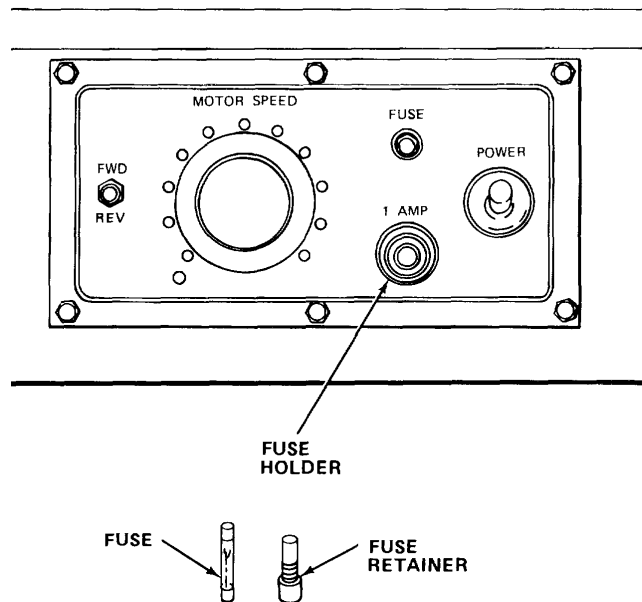
6-10.1. Replace Fuse.

MOS: 83E, Photo and Layout Specialist

SUPPLIES: Fuse, lamp

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- Unplug power cord.
- Unscrew fuse retainer and defective fuse from fuse holder. Remove defective fuse from fuse retainer.
- Insert new fuse and retainer into fuse holder. Tighten securely.
- Plug in power cord.

6-10.2. Replace Filter.

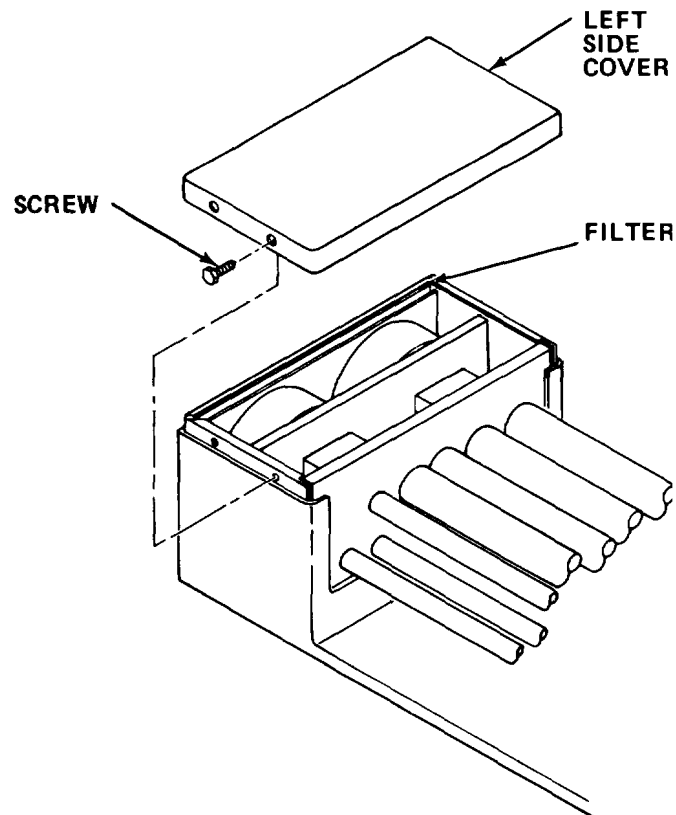
MOS: 83E, Photo and Layout Specialist

TOOLS: Socket Wrench Set (1/4 in. Drive)

SUPPLIES: Filter

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- a. Unplug power cord.
- b. Remove four retaining screws and left side cover
- c. Remove filter and discard.
- d. Install new filter.
- e. Reinstall left side cover and retaining screws.
- f. Plug in power cord.

Section IV. ORGANIZATIONAL MAINTENANCE

6-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

6-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

6-12.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

6-12.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

6-12.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering organizational maintenance for this equipment.

6-13. SERVICE UPON RECEIPT.

6-13.1. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

6-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

a. PMCS are designed to keep the equipment in good working condition by performing certain tests, inspections, and services. The intervals provide you, the organizational technician, with time schedules that determine when to perform specified tasks.

b. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording the results of PMCS.

c. Interval columns. This column determines the time period designated to perform your PMCS.

d. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

e. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Flat Tip Screwdriver	1 ea
Socket Head Screw Key Set	1 ea
Socket Wrench Set (1/4 in. Drive)	1 ea
Liquid Detergent (Item 8, Appendix E)	ar
Sponge (Item 46, Appendix E)	ar
Tube Corks	ar
Buffer Rings	ar
Ty-Belts	ar
Rubber Grommets	ar
Air Pump Gaskets	ar
Nylon Drive Gears	ar
Nylon Bearings	ar
Filter	ar

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
1	S	<p>FILM DRYER <u>Service Film Dryer.</u></p> <p style="text-align: center;">WARNING</p> <p>Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Servicing of film dryer will require complete disassembly and assembly. • Use this procedure for defective part replacement, as well as for service. <ol style="list-style-type: none"> 1. Unplug power cord and remove drip tray. 2. Remove screws and right side cover. 3. Remove screws and left side cover. <p style="text-align: center;">NOTE</p> <p>It may be necessary to pry up slightly on side stations to assist in removal of roller assemblies.</p> <ol style="list-style-type: none"> 4. Remove screws and top roller assembly.

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

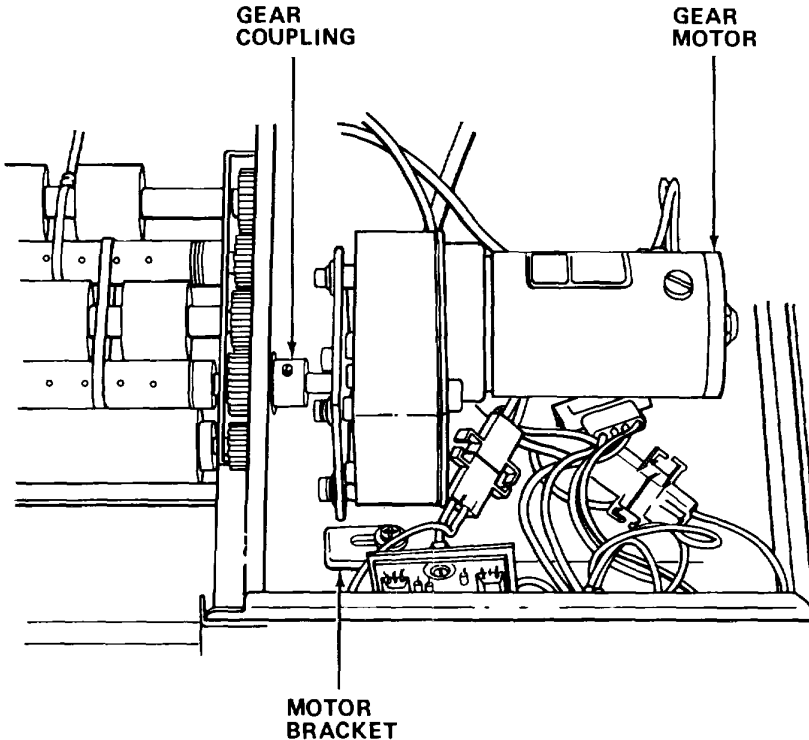
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
1	S	<p><u>FILM DRYER - Cont</u> <u>Service Film Dryer - Cont</u></p>  <p>5. Loosen (do not remove) screws securing gear motor and bracket to cabinet. 6. Slide gear motor and bracket to right to free gear coupling.</p>

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES -Cont

B- Before
 D - During
 A - After

W- Weekly
 M - Monthly
 Q - Quarterly

AN - Annually
 S - Semiannually
 BI - Biennially

(Number) - Hundreds of Hours

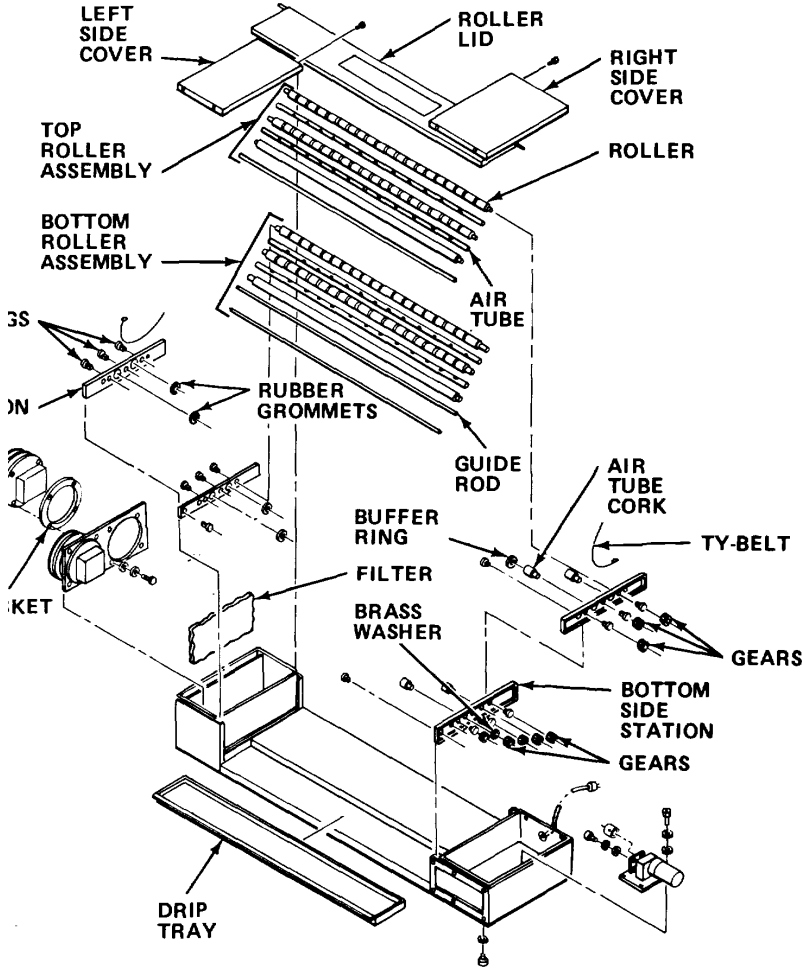
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES
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1

S

FILM DRYER - Cont

Service Film Dryer - Cont



7. Remove bottom roller assembly by lifting bottom side stations upward and free of their tracks.

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
1	S	<p><u>FILM DRYER - Cont</u></p> <p><u>Service Film Dryer - Cont</u></p> <p style="text-align: center;">NOTE</p> <p>Before removing gears, note location of metal gear. It must be reinstalled on the same air tube.</p> <p>8. Remove five gears and two brass washers from bottom roller assembly. Visually inspect and replace if necessary.</p> <p>9. Remove three gears from upper roller assembly. Visually inspect for wear and replace if necessary.</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Mark position of rollers with respect to their locations before disassembly. • Your machine may contain ty-belts around rollers. That must be cut prior to removing rollers. • Before removing side stations, note position and quantities of washers at each end of roller lid. Be sure quantities are matched on both ends. <p style="text-align: center;">CAUTION</p> <p>Do not attempt to remove air tubes from right side (gear side) station. Damage to the right side station will occur.</p> <p>10. Remove bottom side stations from bottom roller assembly. Remove top side stations from top roller assembly.</p> <p>11. Visually inspect nylon bearings and rubber grommets in all side stations for wear. Replace if necessary.</p> <p style="text-align: center;">NOTE</p> <p>Your machine may not contain buffer rings or air tube corks. Perform following procedures accordingly.</p> <p style="text-align: center;">6-20</p>

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
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 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
1	S	<p><u>FILM DRYER - Cont</u></p> <ul style="list-style-type: none"> • Your machine may be equipped with a slot key that will allow removal of air tubes from right side (gear side) station. Carefully check your configuration. <p>12. Remove buffer rings and air tube corks. Visually inspect and replace if worn or damaged.</p> <p>13. Cut ty-belts and discard.</p> <p><u>Service Film Dryer - Cont</u></p> <p>14. Wash rollers, buffer rings, and drip tray with water and mild detergent. Rinse thoroughly.</p> <p>15. Reinstall air tubes and rubber grommets in left side stations (top and bottom).</p> <p>16. Reinstall nylon bearings and rollers into right side (gear side) and left side stations (top and bottom).</p> <p style="text-align: center;">NOTE</p> <p>Rubber doughnuts of front conveyor rollers are closer to gear end than rear set.</p> <p>17. Install buffer rings on each front air tube.</p> <p>18. Position buffer rings to left of every other doughnut on front roller.</p> <p>19. Reinstall five gears and two brass washer on bottom right side station.</p>

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before
 D - During
 A - After

W- Weekly
 M - Monthly
 Q - Quarterly

AN - Annually
 S - Semiannually
 BI - Biennially

(Number) - Hundreds of Hours

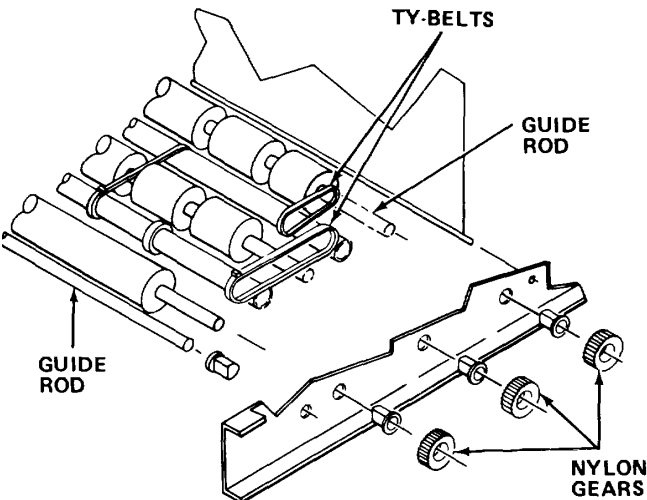
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
1	S	<p>FILM DRYER - Cont <u>Service Film Dryer - Cont</u></p>  <ol style="list-style-type: none"> 20. Reinstall three gears on upper roller assembly. 21. Reinstall guide rods. 22. Install ty-belts if necessary. 23. Replace filter. 24. Remove air pump bracket and air pumps by pulling upward. 25. Disconnect air pump electrical connections. 26. Remove screws and air pumps from bracket. Inspect gaskets and replace if necessary. 27. Clean air pumps so they are free of dust and dirt. Reinstall air pumps to bracket and reinstall assembly in cabinet.

Table 6-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before **W - Weekly** **AN - Annually** **(Number) - Hundreds of Hours**
D - During **M - Monthly** **S - Semiannually**
A - After **Q - Quarterly** **BI - Biennially**

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES
1	S	<p><u>FILM DRYER - Cont</u></p> <p><u>Service Film Dryer - Cont</u></p> <p>28. Reinstall bottom roller assembly.</p> <p>29. Slide gear motor and bracket left to engage gear coupling. Tighten mounting screws.</p> <p>30. Reinstall top roller assembly and secure with screws.</p> <p>31. Reinstall left side cover and secure with screws.</p> <p>32. Reinstall right side cover and secure with screws.</p> <p>33. Replace drip tray and plug in power cord.</p>

6-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action notify your supervisor.

c. For unidentified electrical malfunctions, refer to schematic on page 6-4 for fault analysis.

d. If the film dryer does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no power troubleshooting procedures for dead receptacle (Table 1-4).

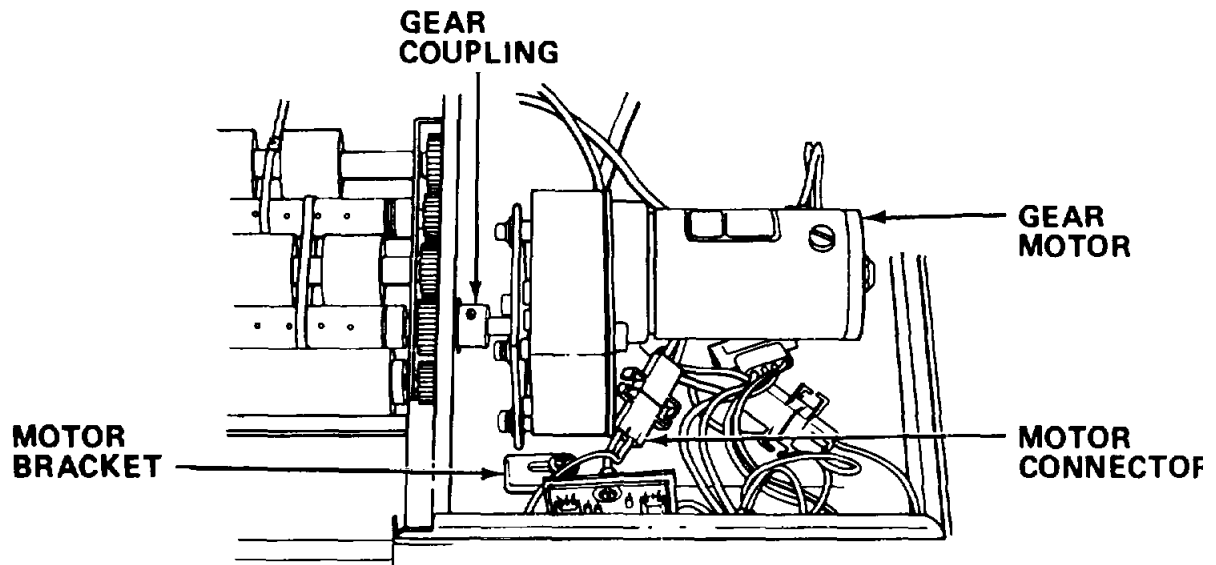
Table 6-4. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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1. ROLLERS DO NOT OPERATE BUT AIR PUMPS DO.

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



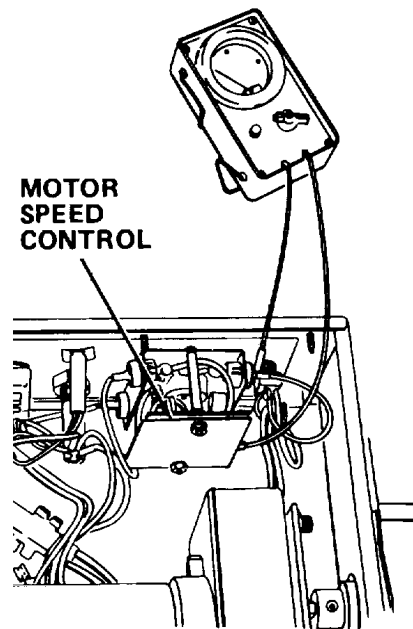
- Step 1. Check that gear coupling is tight.
 (a) If tight, proceed to step 2.
 (b) Tighten gear coupling.
- Step 2. Check that gear motor bracket is at far left position and mounting screws are tight.
 (a) If bracket is positioned correctly, proceed to step 3.
 (b) Adjust to far left and tighten screws.
- Step 3. Check that motor connector is tight.
 (a) If motor connector is tight, proceed to step 4.
 (b) Tighten motor connector.

Table 6-4. ORGANIZATIONAL TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

1. ROLLERS DO NOT OPERATE BUT AIR PUMPS DO - Cont

- | | | |
|---------|---|--|
| Step 4. | Check gear motor continuity. | |
| | (a) | Separate connector. |
| | (b) | Using multimeter, connect leads to female terminals. Reading should be 50 ± 10 ohms. |
| | (c) | If reading is correct, proceed to step 5. |
| | (d) | Replace gear motor (paragraph 6-16.2). |
| Step 5. | Check continuity of FWD/REV switch in both positions. | |
| | (a) | If continuity is present, proceed to step 6. |
| | (b) | Replace switch (paragraph 6-16.1). |



- | | | |
|---------|--|--------------------------------|
| Step 6. | Check continuity of MOTOR SPEED control. | |
| | (a) | Set multimeter to RX100 scale. |

Table 6-4. ORGANIZATIONAL TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. ROLLERS DO NOT OPERATE BUT AIR PUMPS DO - Cont		
	(b) Connect multimeter leads to the two terminals on the MOTOR SPEED control. Turn MOTOR SPEED control fully right. Meter should read 0. Slowly turn MOTOR SPEED control to the full left position. Meter reading should increase accordingly.	
	(c) If readings are correct, proceed to step 7.	
	(d) Replace MOTOR SPEED control (paragraph 6-16.1).	
Step 7.	Check that wire end connector to POWER switch from bottom of MOTOR SPEED control is connected. Connect wire end connector.	
2. ROLLERS OPERATE BUT AIR PUMPS DO NOT.		
<u>WARNING</u>		
Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.		
Step 1.	Check that two air pump wire connectors in the plenum are connected properly.	
	(a) If wires are properly connected, proceed to step 2.	
	(b) Reconnect air pump wire connectors.	
Step 2.	Check that wire connector from POWER switch to the two air pump wires is properly connected.	
	(a) If connection is properly made, proceed to step 3.	
	(b) Reconnect wire connector.	
Step 3.	Check for loose wire from POWER switch to air pump connector.	
	Reattach wires.	

6-16. MAINTENANCE PROCEDURES.

a. This section contains instructions covering organizational maintenance functions for the film dryer. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURES	PARAGRAPH
Replace Controls	6-16.1
Replace Gear Motor and Gear Coupling	6-16.2
Replace Air Pumps	6-16.3
Replace Film Dryer	6-16.4

6-16.1. Replace Controls.

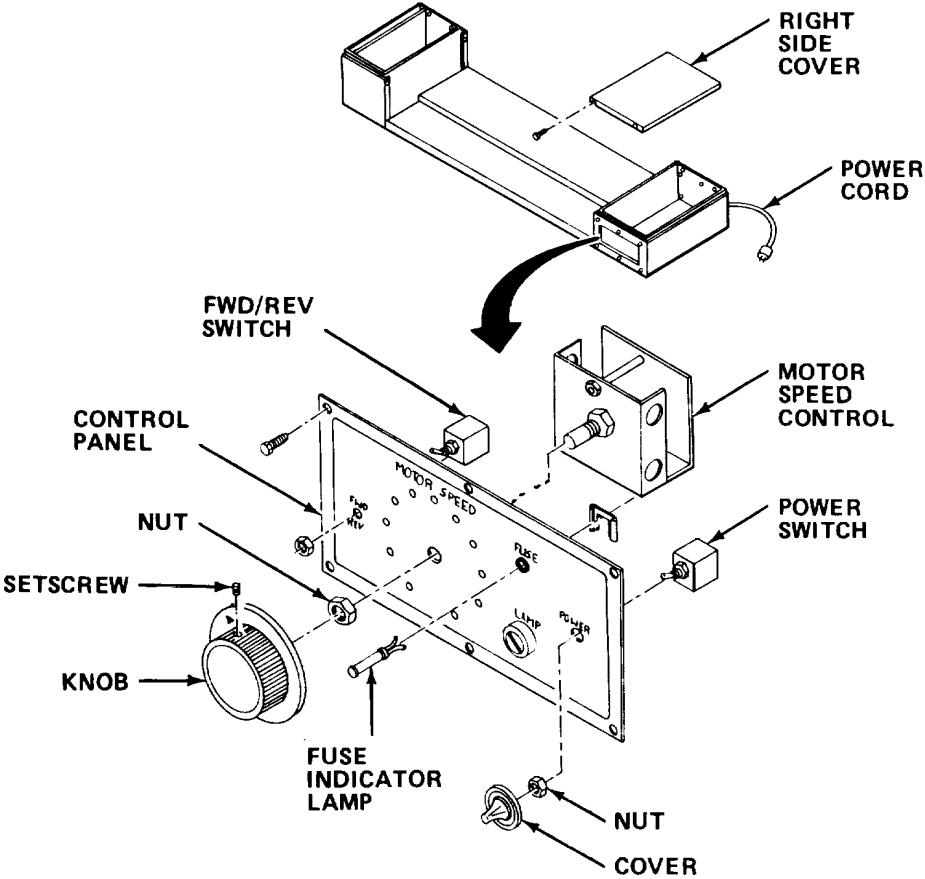
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Socket Head Screw Key Set
Socket Wrench Set (1/4 in. Drive)
Combination Wrench Set
Soldering Iron

SUPPLIES: MOTOR SPEED Control
POWER Switch
Fuse Indicator Lamp
FWD/REV Switch
Solder (Item 44, Appendix E)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- a. Unplug power cord.
- b. Remove screws and right side cover.
- c. Tag and disconnect wiring at connectors and remove control panel.

NOTE

Tag electrical connections to be sure of proper reassembly.

- d. Loosen nut on POWER switch behind control panel. Unscrew and remove POWER switch protective cover. Remove nut and defective switch from rear of control panel.
- e. Tag and disconnect wiring.
- f. Reconnect wiring to new switch and install switch.
- g. Reinstall nut and protective cover and secure switch with nut.
- h. Loosen setscrews on MOTOR SPEED control knob. Remove knob and securing nut and washer. Remove control from rear of control panel.
- i. Tag and disconnect wiring.
- j. Connect wiring on new MOTOR SPEED control and install.

NOTE

Be sure control is set all the way to left and knob is pointing to lower setting.

- k. Reinstall securing nut and knob.
- l. Remove securing nut from FWD/REV switch.
- m. Tag and desolder wiring from defective switch.
- n. Solder wiring on new switch and install switch. Secure with retaining nut.
- o. Remove securing clip from fuse indicator lamp at rear of control panel. Tag and desolder wiring and remove fuse indicator lamp from front of control panel.
- p. Install new fuse indicator lamp into front of control panel. Slip retaining clip over wiring and secure lamp to rear of panel. Resolder wiring.
- q. Reinstall right side cover.

6-16.2. Replace Gear Motor and Gear Coupling.

MOS: 83FJ6, Reproduction Equipment Repairer

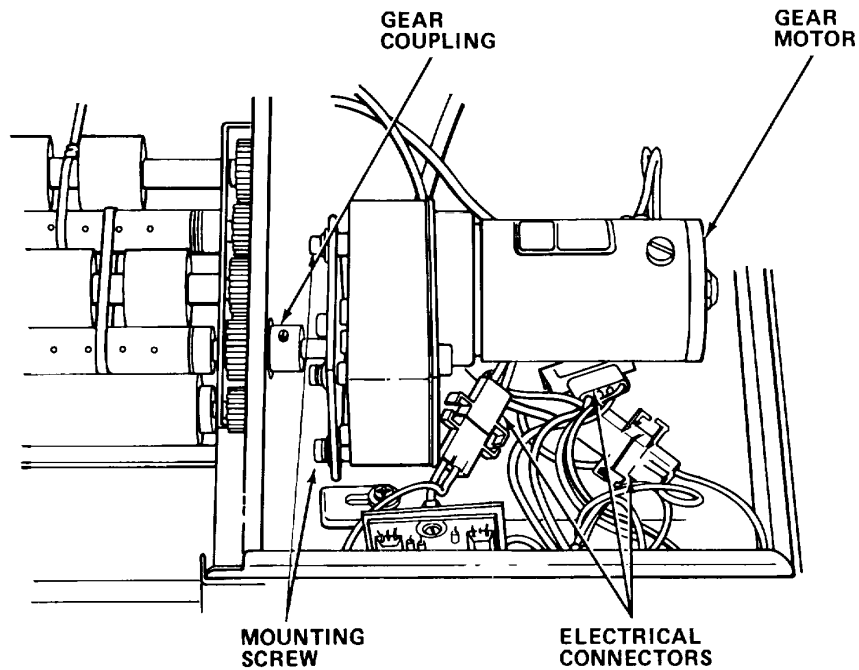
TOOLS: Socket Wrench Set (1/4 in. Drive)
Socket Head Screw Key Set

SUPPLIES: Gear Motor
Gear Coupling

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord and remove drip tray.
- b. Remove screws and right side cover.



- c. Disconnect ground wire.
- d. Remove gear motor mounting screws.
- e. Remove gear motor assembly from cabinet.

NOTE

Note position of gear coupling on gear motor shaft.

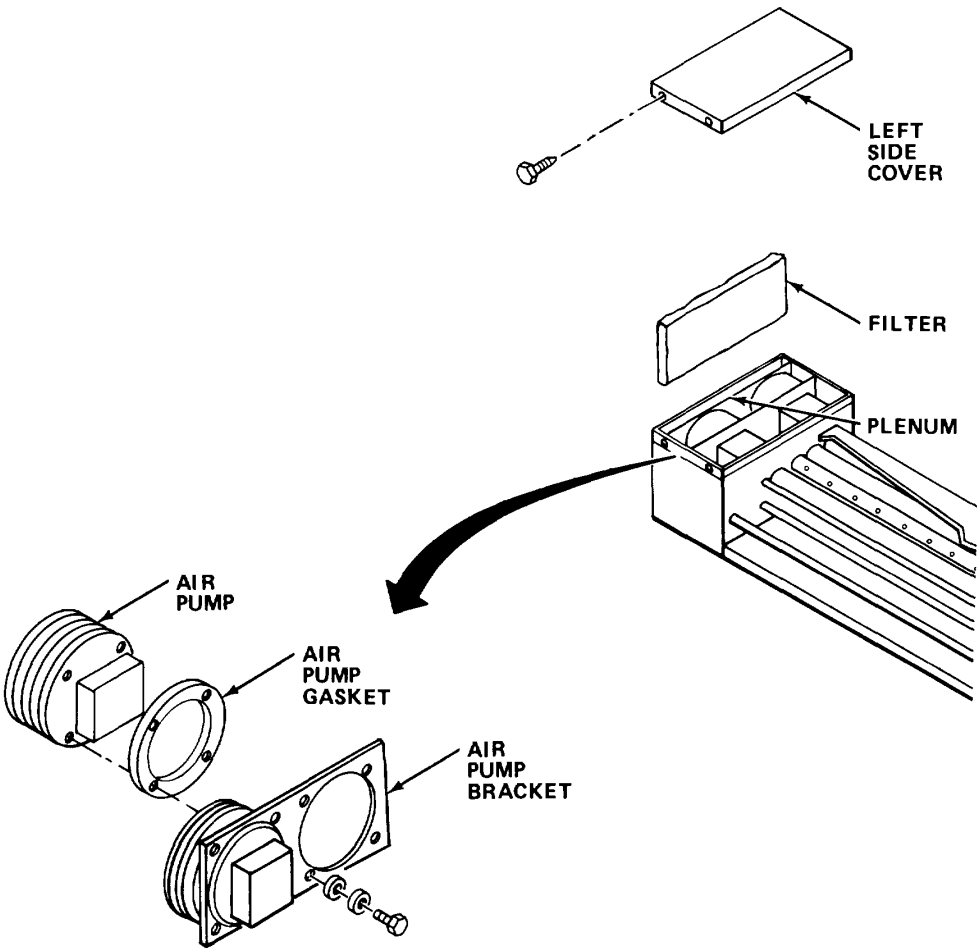
- f. Install new gear coupling in correct position.
- g. Reinstall gear motor assembly in cabinet and mesh gear coupling with roller gears.
- h. Secure gear motor assembly with mounting screws.
- i. Reconnect electrical connectors.
- j. Reinstall right side cover.
- k. Reinstall drip tray.
- l. Plug in power cord.

6-16.3. Replace Air Pumps.

- MOS: 83FJ6, Reproduction Equipment Repairer
- TOOLS: Flat Tip Screwdriver
Socket Head Screw Key Set
- SUPPLIES: Air Pump(s)
Air Pump Gasket(s)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



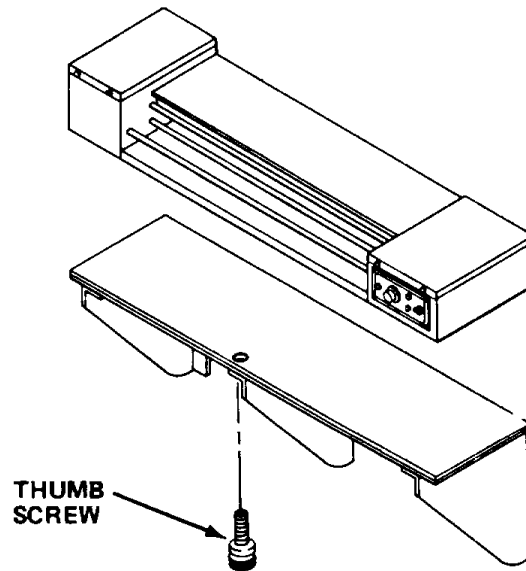
- a. Unplug power cord.
- b. Remove screws and left side cover.
- c. Remove filter.
- d. Remove air pump bracket containing air pumps by pulling upward.
- e. Unplug connectors, remove screws and air pumps from air pump bracket. Check air pump gasket(s) and replace if necessary.
- f. Install new air pump(s) and gasket(s) to air pump bracket. Install screws and tighten.
- g. Plug in connectors and install air pump bracket into cabinet.
- h. Reinstall filter into cabinet recess.
- i. Reinstall left side cover and secure with screws.
- j. Plug in power cord.

6-16.4. Replace Film Dryer.

MOS: 83FJ6, Reproduction Equipment Repair

TOOLS: None

SUPPLIES: Film Dryer

**NOTE**

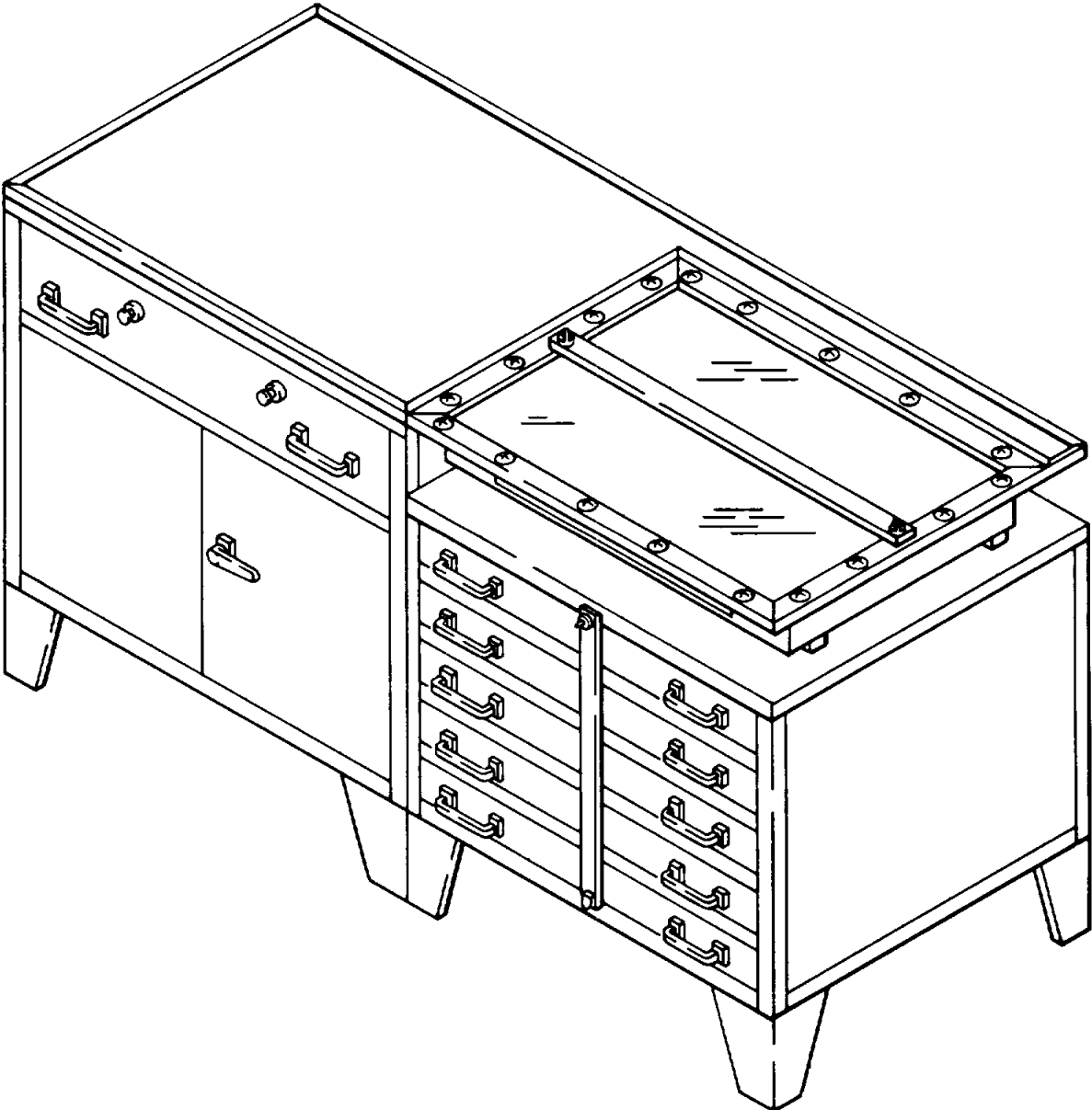
Remove mounting plate from old dryer and install on new dryer.

- a. Unplug power cord.
- b. Remove thumb-screw.
- c. Remove film dryer.
- d. Install new film dryer and fasten with thumb-screw.
- e. Plug in power cord.

6-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

There are no direct/general support maintenance procedures assigned for this equipment.



CHAPTER 7

LIGHT TABLE CABINET ASSEMBLY

Section I. INTRODUCTION

7-1. GENERAL INFORMATION.

7-1.1. Scope.

- a. Model Number and Equipment Name. Light Table Cabinet Assembly.
- b. Purpose of Equipment. To provide storage, with an illuminated work surface for viewing of negatives, transparencies, or overlays.

7-2. EQUIPMENT DESCRIPTION.

7-2.1. Equipment Characteristics, Capabilities, and Features. Used to provide storage, with an illuminated work surface for tracing or scribing.

- a. Diffused light source.
- b. Stationary.

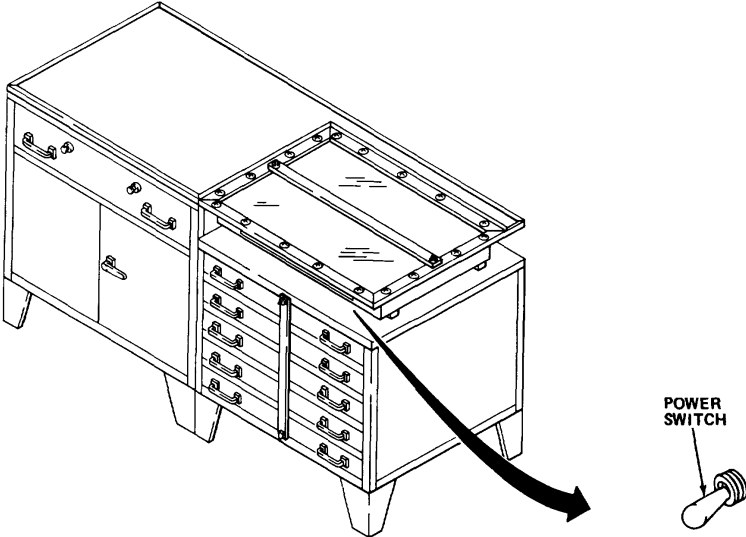
7-2.2. Equipment Data.

Power Requirements	120 V, 60 Hz
Illumination	Three 20 W fluorescent tubes
Work Surface	
Light Table	25.0 in. x 32.0 in. (63.5 cm x 81.3 cm)
Total	31.5 in. x 66.6 in. (80.0 cm x 169.2 cm)

7-3. TECHNICAL PRINCIPLES OF OPERATION. Principles of operation is combined with operator's controls and indicators for this equipment.

Section II. OPERATING INSTUCTIONS

7-4. DESCRIPTION AND USE OF OPERATOR'S CONTROL AND INDICATORS.



Control or Indicator	Function
Power Switch	Two-position toggle switch. Controls Illumination.

7-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNING and CAUTION. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNING and CAUTION. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

7-5.1. PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.
- g. Interval column. This column determines the time period designated to perform your PMCS.
- h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.
- i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.
- j. List of tools and materials required for PMCS is as follows:

Item	Quantity
Cheesecloth (Item 4, Appendix E)	ar

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can safely be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

Table 7-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B- Before **W- Weekly** **AN - Annually** **(Number) - Hundreds of Hours**
D - During **M - Monthly** **S - Semiannually**
A - After **Q - Quarterly** **BI - Biennially**

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	B	<p><u>LIGHT TABLE CABINET ASSEMBLY</u></p> <p><u>Inspect External Surface.</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.</p> <ol style="list-style-type: none"> 1. Unplug power cord. 2. Inspect power cord for kinks, frays, or burns. <p style="text-align: center;">NOTE</p> <p>If power cord is defective, refer to organizational maintenance.</p> <ol style="list-style-type: none"> 3. Plug in power cord. 4. Turn on power. 5. Check fluorescent tubes for flickering. 6. Check glass surface for cracks or breaks. 	<p>Power cord is kinked, frayed, or burned.</p> <p>Fluorescent tubes do not light.</p> <p>Broken or missing glass.</p>

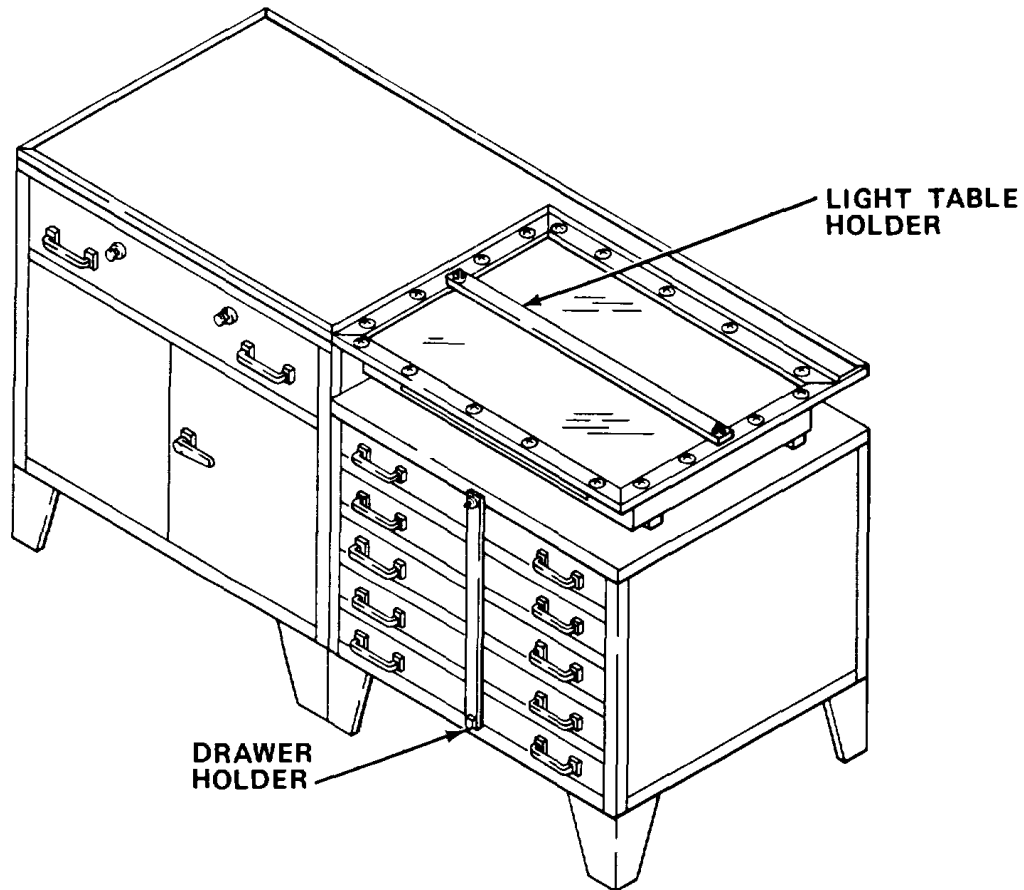
Table 7-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1.	B	<p><u>LIGHT TABLE CABINET ASSEMBLY - Cont</u></p> <p><u>Inspect External Surface - Cont</u> 7. Turn off power.</p>	
2.	B	<p><u>Clean Glass.</u></p> <p style="text-align: center;"><u>WARNING</u></p> <ul style="list-style-type: none"> • Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing. • Death or serious injury may occur if running or excessive water is used to clean table. <p style="text-align: center;"><u>CAUTION</u></p> <p>Abrasive cleaners will scratch work surface.</p> <ol style="list-style-type: none"> 1. Turn off power. 2. Unplug power cord. 3. Wipe glass with cheesecloth moistened with water. 4. Wipe glass with clean, dry cheesecloth to remove smears or streaks. <p style="text-align: center;">7-5</p>	

7-6. OPERATION UNDER USUAL CONDITIONS.

7-6.1. Assembly and Preparation for Use.



- a. Remove drawer holder.
- b. Remove light table holder.

7-6.2. Operation.

- a. Plug in power cord.
- b. Turn on power switch.

7-6.3. Preparation for Movement.

- a. Install drawer holder.
- b. Install light table holder.

7-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

7-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

7-9. TROUBLESHOOTING PROCEDURES

a. The table lists the common malfunctions which you may find during operation maintenance of the light table, or its components. You should perform the tests/ inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not correct by listed corrective actions, notify your supervisor.

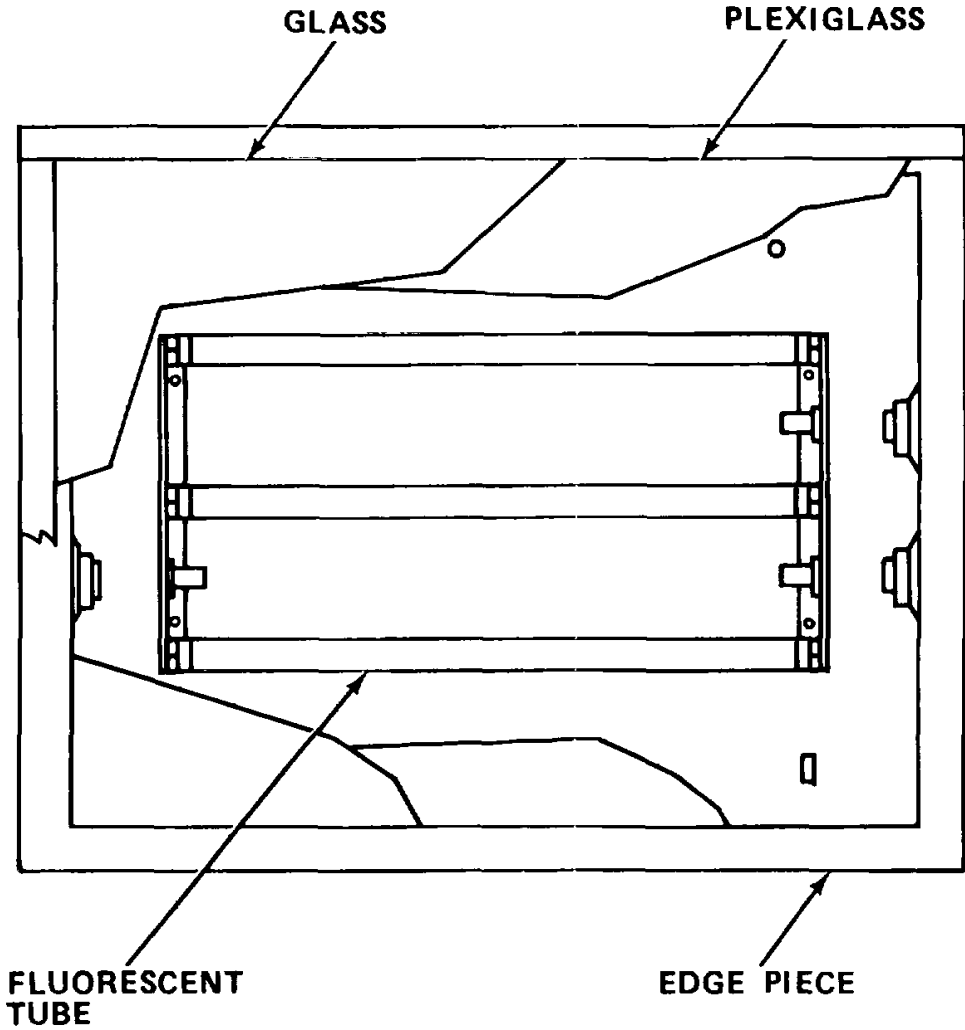
Table 7-2. TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

UNEVEN ILLUMINATION.

WARNING

When power cord is connected and glass surface is removed, electrical shock hazard exists. Death or serious injury may occur if care is not used in handling.



Step 1. Remove screws edge piece and spacers from frame

Table 7-2. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

CAUTION

Glass surface must be handled with care to avoid chipping or breaking.

- Step 2. Remove glass surface. Remove plexiglass.
- Step 3. Plug in power cord, turn on power, and observe fluorescent tubes.
 - (a) If one fluorescent tube flickers or is dark, replace tube (paragraph 7-10.1).
 - (b) If reflector is dirty behind fluorescent tube, clean reflector.
 - (c) If both fluorescent tubes flicker, replace ceramic condenser (paragraph 7-10.2).

7-10. MAINTENANCE PROCEDURES.

- a. This section contains instructions covering operator maintenance functions for the light table cabinet. Personnel required are listed only if the task requires more than one.
- b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Fluorescent Tube	7-10.1
Replace Ceramic Condenser	7-10.2
Replace Glass	7-10.3

7-10.1. Replace Fluorescent Tube.

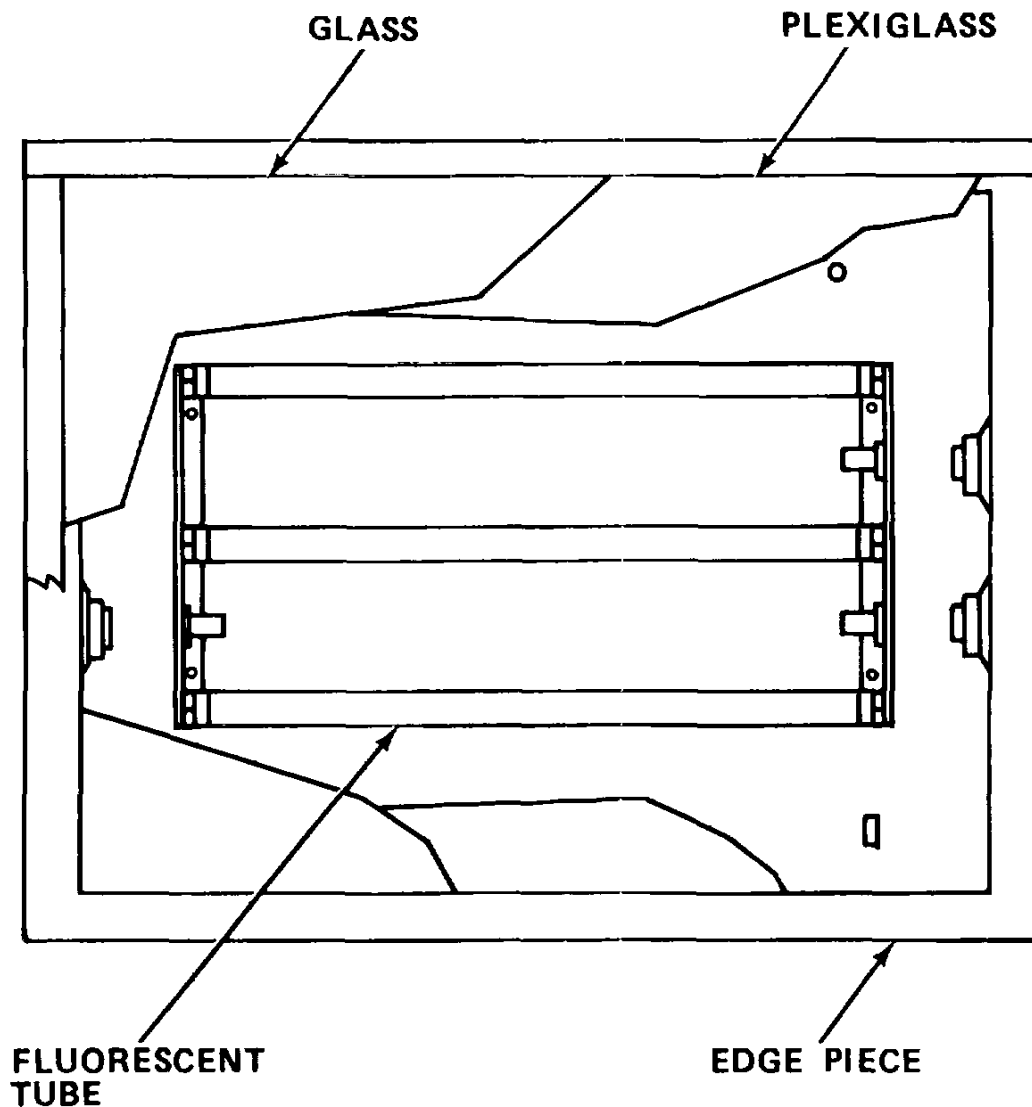
MOS: 83E, Photo and Layout Specialist

TOOLS: Cross Tip Screwdriver
Hex Head Key Set

SUPPLIES: Fluorescent Tube (20 W)

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- Turn off power.
- Unplug power cord.
- Remove screws edge piece and spacers from frame

CAUTION

Glass surface must be handled carefully to avoid chipping or breaking.

- d. Remove glass.
- e. Remove plexiglass.
- f. Remove defective fluorescent tube.
- g. Install new fluorescent tube.
- h. Install plexiglass.
- i. Reinstall glass.
- j. Install spacers, edge piece and screws.
- k. Plug in power cord.

7-10.2. Replace Ceramic Condenser.

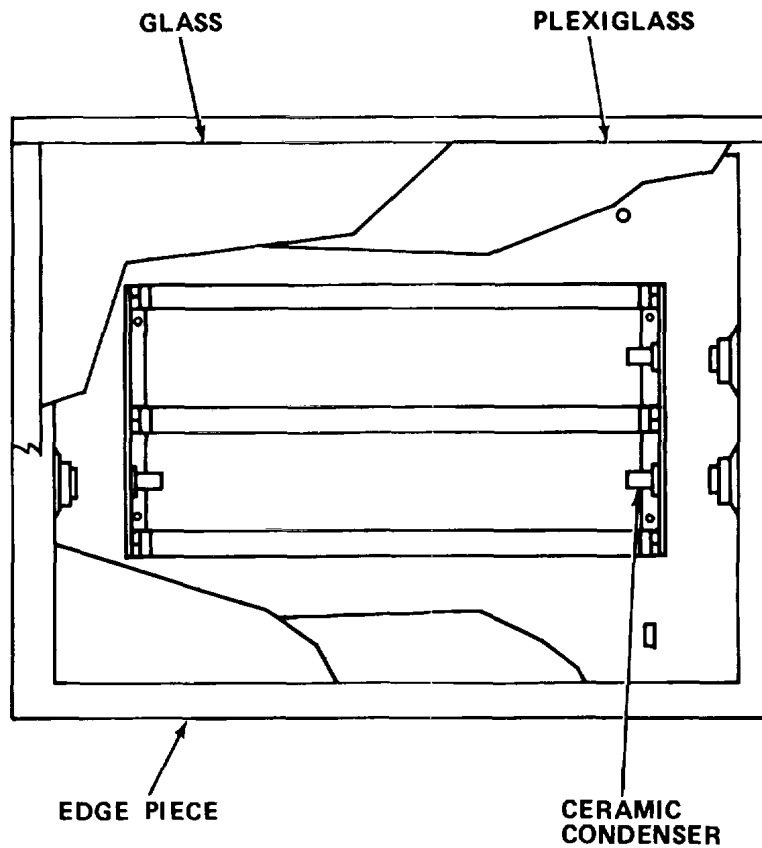
MOS: 83E, Photo and Layout Specialist

TOOLS: Cross Tip Screwdriver
Hex Head Key Set

SUPPLIES: Ceramic Condenser

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- a. Turn off power.
- b. Unplug power cord.
- c. Remove screws, edge piece and spacers from frame.

CAUTION

Glass surface must be handled carefully to avoid chipping or breaking.

- d. Remove glass.
- e. Remove plexiglass.
- f. Remove defective ceramic condenser by pushing in and rotating to left until free.
- g. Install new ceramic condenser in socket, push in, and turn to right until locked.
- h. Reinstall plexiglass.
- i. Reinstall glass.
- j. Reinstall spacers edge piece and screws.
- k. Plug in power cord.

7-10.3. Replace Glass.

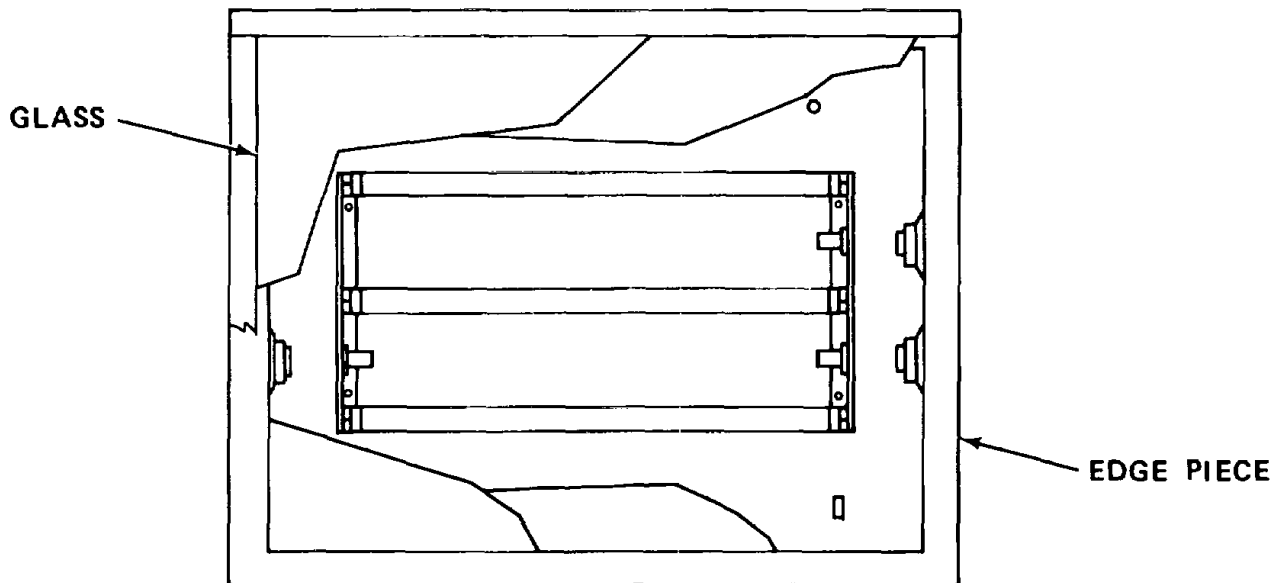
MOS: 83E, Photo and Layout Specialist

TOOLS: Cross Tip Screwdriver
Hex Head Key Set

SUPPLIES: Glass

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- a. Turn off power.
- b. Unplug power cord.
- c. Remove screws edge piece and spacers from frame.

CAUTION

Glass surface must be handled with care to avoid chipping or breaking.

- d. Replace glass.
- e. Reinstall spacers, edge piece and screws.
- f. Plug in power cord.

Section IV. ORGANIZATIONAL MAINTENANCE

7-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

7-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

7-12.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

7-12.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

7-12.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering organizational maintenance for this equipment.

7-13. SERVICE UPON RECEIPT.

7-13.1. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738750.

c. Check to see whether the equipment has been modified.

7-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

7-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/ inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. If the light table cabinet does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power troubleshooting procedures for dead receptacle (Table 1-4).

Table 7-3. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
NO ILLUMINATION.	Test power switch for continuity.	<ul style="list-style-type: none"> (a) If continuity exists, proceed to step 2. (b) Replace power switch (paragraph 7-16.1).

7-16. MAINTENANCE PROCEDURES.

a. This section contains instructions covering organizational maintenance functions for the light table cabinet. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Power Switch.....	7-16.1
Replace Ballast.....	7-16.2
Replace Light Table Cabinet Assembly	7-16.3

7-16.1. Replace Power Switch.

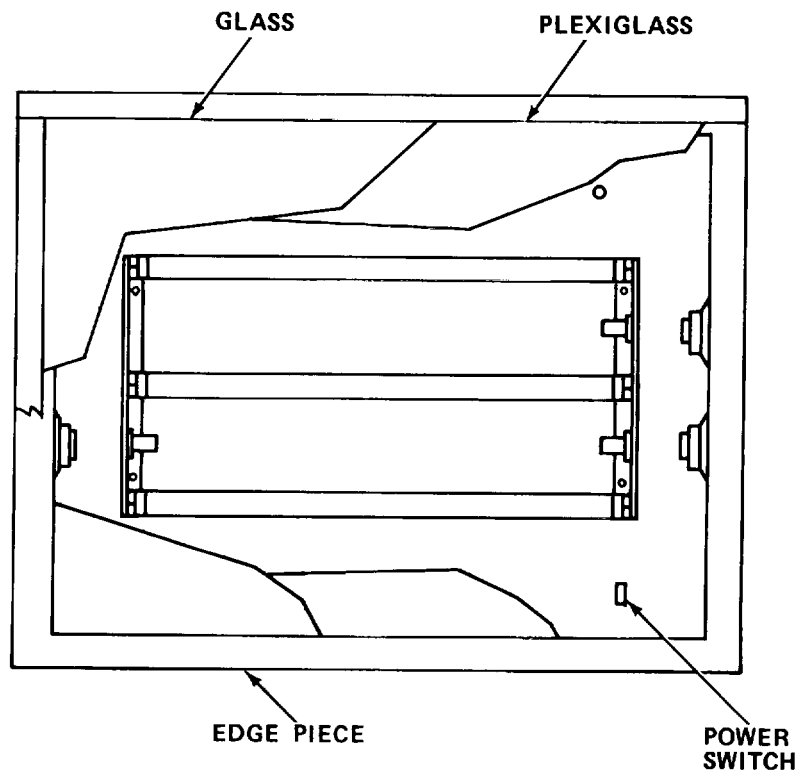
MOS: 35E, Special Electronic Devices Repairer

TOOLS: 6 inch Adjustable Wrench
Hex Head Key Set

SUPPLIES: Power Switch

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- a. Turn off power.
- b. Unplug power cord.
- c. Remove screws, edge piece and spacers from frame.
- d. Slide glass out.

- e. Slide out plexiglass.
- f. Remove bezel nut and label from power switch.
- g. Remove defective power switch from inside board and disconnect wiring.
- h. Reconnect wiring to new power switch.
- i. Adjust nut so that power switch will protrude through top enough to operate properly.
- j. Reinstall label.
- k. Reinstall bezel nut.
- l. Reinstall plexiglass.
- m. Reinstall glass.
- n. Replace spacers edge piece and screws.
- o. Plug in power cord.

7-16.2. Replace Ballast.

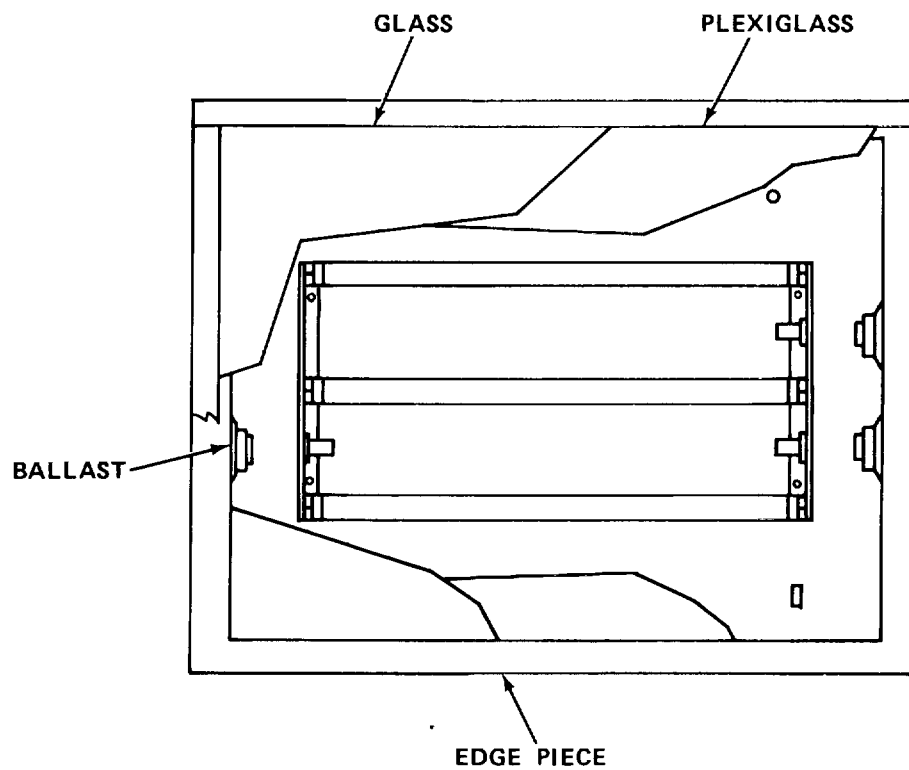
MOS: 35E, Special Electronic Devices Repairer

TOOLS: Hex Head Key Set
Combination Wrench Set

SUPPLIES: Ballast

WARNING**Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.**

- a. Turn off power.
- b. Unplug power cord.



- c. Remove screws edge piece and spacers.
- d. Remove glass.

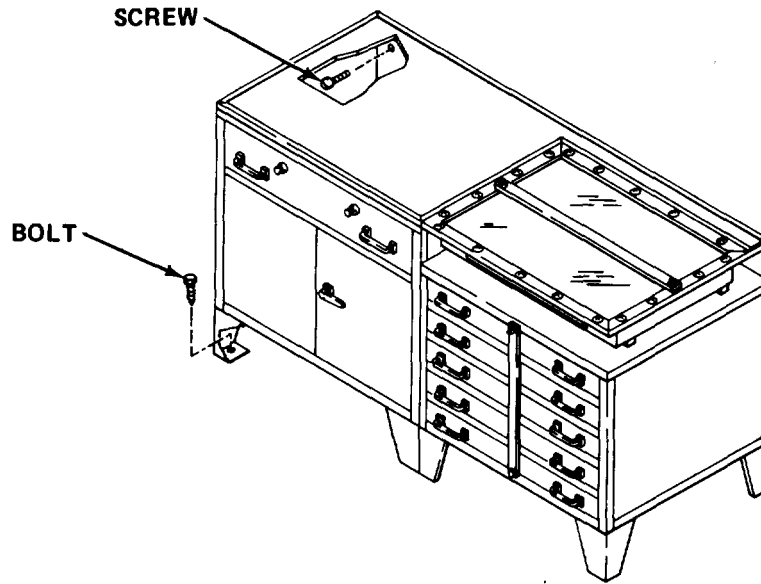
- e. Remove plexiglass.
- f. Disconnect defective ballast transformer wires.
- g. Remove nuts and defective ballast transformer.
- h. Install new ballast transformer.
- i. Reinstall nuts.
- j. Reconnect wires.
- k. Reinstall plexiglass.
- l. Reinstall glass.
- m. Reinstall spacers edge piece and screws.
- n. Plug in power cord.

7-16.3. Replace Light Table Cabinet Assembly.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver
Combination Wrench Set

SUPPLIES: Light Table Cabinet

**WARNING**

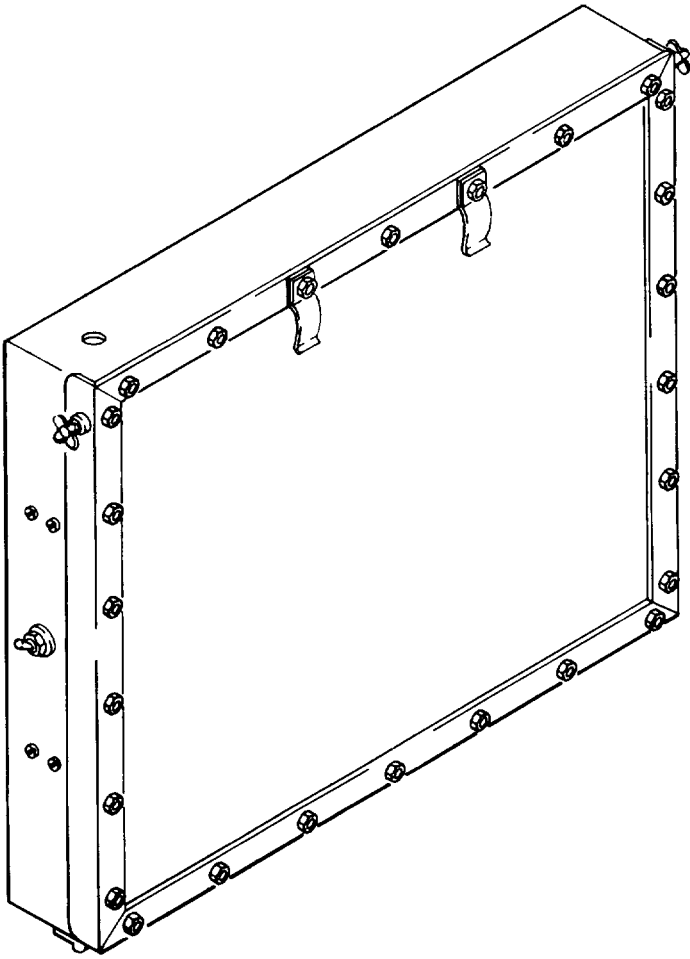
Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.
- b. Remove top drawer of left cabinet. Remove screws holding light table cabinet to wall.
- c. Remove bolts which hold front legs to floor. Remove defective light table cabinet.
- d. Aline holes in legs of new light table cabinet with those in floor and install bolts.
- e. Fasten rear of light table cabinet to wall with screws. Reinstall top left drawer.

7-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

7-18. There are no direct/general support maintenance procedures assigned for this equipment.



CHAPTER 8

VIEWING STAND ASSEMBLY

Section I. INTRODUCTION

8-1. GENERAL INFORMATION.

8-1.1. Scope.

- a. Model Number and Equipment Name. Model 13226E4460 Viewing Stand Assembly.
- b. Purpose of Equipment. To provide a source of diffused light to view film negatives.

8-2. EQUIPMENT DESCRIPTION.

8-2.1. Equipment Characteristics, Capabilities, and Features. Used to provide a source of diffused light to view film negatives. The viewing stand has the following capabilities and features:

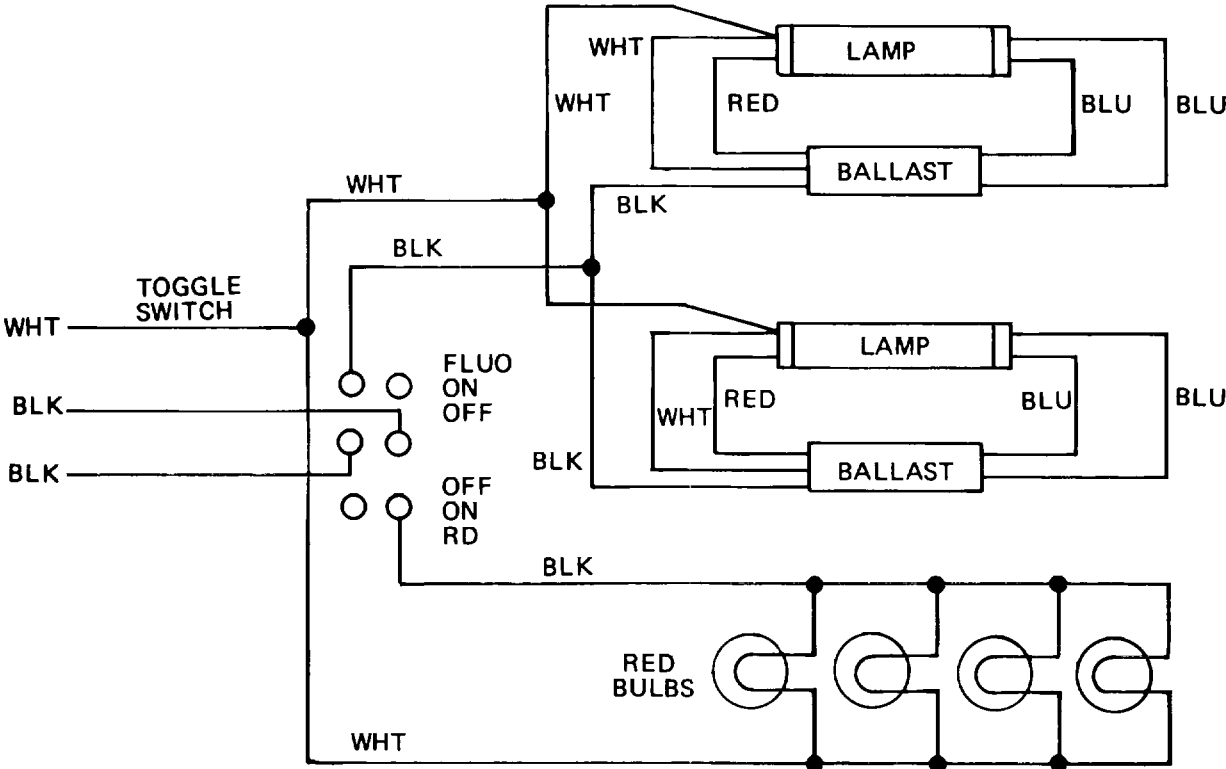
- a. Dual red or white illumination.
- b. Plastic diffuser for long life.
- c. Simple construction with one control switch.

8-2.2. Equipment Data.

Dimensions

Height	26.0 in. (66.0 cm)
Width	31.0 in. (78.7 cm)
Depth	5.1 in. (13.0 cm)
Power Requirements	120 V, 60 Hz

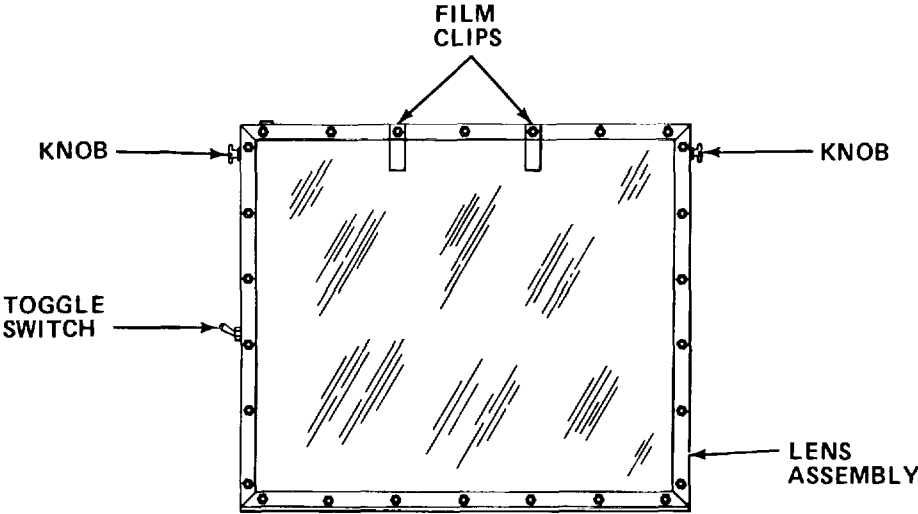
8-3. TECHNICAL PRINCIPLES OF OPERATION.



Toggle switch controls 120 V, 60 Hz power to two ballast transformers to light two white fluorescent lights, or power to four red incandescent lights.

Section II. OPERATING INSTRUCTIONS

8-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Controls or Indicator	Function
Toggle Switch	Three position. Controls power to red incandescent lights or white fluorescent lights housed in light box assembly.
Knobs	Retain lens assembly in closed (viewing) position.
Film Clips	Hold film in place on viewing surface.
Lens Assembly	Provides diffused light to viewing surface.

8-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.

c. After You Operate. Be sure to perform your after (A) PMCS.

d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

8-5.1. PMCS Procedures.

a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.

b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.

c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.

d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.

e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

g. Interval column. This column determines the time period designated to perform your PMCS.

h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows

<u>Item</u>	<u>Quantity</u>
Combination Wrench Set	1 ea
Cheesecloth (Item 4, Appendix E)	ar

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can safely be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

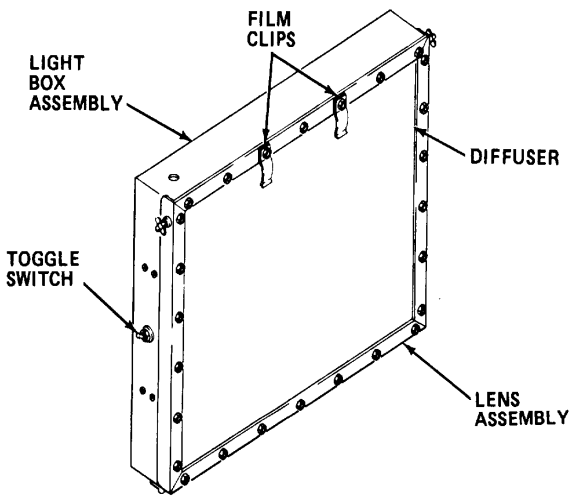
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
1	B	<p><u>VIEWING STAND ASSEMBLY</u></p> <p>Inspect lens Assembly Exterior Surface.</p>  <ol style="list-style-type: none"> 1. Check film clips for looseness or damage. Tighten if necessary. 2. Check lens assembly nuts for looseness. Tighten if necessary. 3. Check diffuser for cracks or breaks. 	Cracked or diffuser surface.

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
2	D	<p><u>VIEWING STAND ASSEMBLY - Cont</u></p> <p>Inspect Light Box Assembly Exterior.</p> <ol style="list-style-type: none"> 1. Check lens assembly knobs for security. 3. Place toggle switch in up position and check for full illumination of fluorescent lights. 3. Place toggle switch in down position and check for full illumination of red incandescent lights. 4. Check for looseness of toggle switch. Tighten if necessary. 	<p>Fluorescent light(s) will not light.</p> <p>Incandescent light(s) will not light.</p>
3	B	<p><u>Inspect Light Box Assembly Interior.</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.</p> <ol style="list-style-type: none"> 1. Turn off circuit breaker. 2. Check for loose incandescent and fluorescent lights. 3. Clean interior with dry cheesecloth. 	

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B- Before W- Weekly AN - Annually (Number) - Hundreds of Hours
 D - During M - Monthly S - Semiannually
 A - After Q - Quarterly BI - Biennially

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED PROCEDURES	FOR READINESS REPORTING EQUIPMENT IS NOT READY / AVAILABLE IF:
4	B	<p><u>VIEWING STAND ASSEMBLY - Cont</u></p> <p>Clean Diffuser Interior and Exterior Surfaces.</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>Do not use abrasive cleaner which will scratch diffuser surfaces.</p> <ol style="list-style-type: none"> 1. Clean interior and exterior surfaces with cheesecloth dampened with water. 2. Wipe both surfaces dry with cheesecloth. 	

8-6. OPERATION UNDER USUAL CONDITIONS.

- a. Place film negative under film clips.
- b. Turn toggle switch to RED position and adjust light intensity with S4 VIEW LIGHT RED dimmer switch.

NOTE

The viewing stand can be used with the switch in the WHITE position for viewing developed film.

8-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

8-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

8-9. TROUBLESHOOTING PROCEDURES

a. The table lists the common malfunctions which you may find during operation or maintenance of the viewing stand, or its components. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 8-2. TROUBLESHOOTING

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
--------------------	---------------------------	--------------------------

1. NO ILLUMINATION IN EITHER SWITCH POSITION.

- Step 1. Check that circuit breaker is on.
 - (a) If circuit breaker is on, proceed to step 2.
 - (b) Turn on circuit breaker.
- Step 2. Check that toggle switch is on.
 - (a) If toggle switch is on, refer to organizational maintenance.
 - (b) Turn on toggle switch.

2. WHITE ILLUMINATION UNEVEN.

- Step 1. Check for loose or burned out fluorescent light(s).
Tighten or replace defective fluorescent light(s).
- Step 2. Check for flickering or dimly lit fluorescent light(s).
Replace defective light(s).

Table 8-2. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. RED ILLUMINATION UNEVEN.		
Step 1.	Check for loose or burned out incandescent light(s).	Tighten or replace defective incandescent light(s).
Step 2.	Check for flickering or dimly lit incandescent light(s).	Replace defective incandescent light(s).
4. NO WHITE ILLUMINATION (RED ILLUMINATION NORMAL).		
		Refer to organizational maintenance.
5. NO RED ILLUMINATION (WHITE ILLUMINATION NORMAL).		
		Refer to organizational maintenance.

8-10. MAINTENANCE PROCEDURES. There are no operator maintenance procedures assigned for this equipment.

Section IV. ORGANIZATIONAL MAINTENANCE

8-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

8-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

8-12.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

8-12.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

8-12.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-3610-257-24P covering organizational maintenance for this equipment.

8-13. SERVICE UPON RECEIPT.

8-13.1. Checking Unpacked Equipment.

- a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.
- b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.
- c. Check to see whether the equipment has been modified.

8-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

8-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.

- a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.
- b. This manual cannot list all the possible malfunctions or every possible test/ inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.
- c. If the viewing stand does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power troubleshooting procedures for dead receptacle (Table 1-4).

Table 8-3. ORGANIZATIONAL TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. NO ILLUMINATION WITH LIGHT SWITCH IN ANY POSITION.

- Step 1. Check that circuit breaker is on.
 - (a) If circuit breaker is on, proceed to step 2.
 - (b) Reset circuit breaker.

Table 8-3. ORGANIZATIONAL TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. NO ILLUMINATION WITH LIGHT SWITCH IN ANY POSITION - Cont		<p style="text-align: center;"><u>WARNING</u></p> <p>Death or serious injury may occur from electrical shock when performing checks with power on viewing stand assembly. Observe appropriate safety precautions.</p> <p>Step 2. Check for continuity through toggle switch.</p> <p>Replace toggle switch (paragraph 8-16.4).</p>
2. WHITE ILLUMINATION UNEVEN.		<p>Remove nonoperating fluorescent light from fluorescent light fixture and check for continuity through fixture.</p> <p>Replace fluorescent light fixture (paragraph 8-16.5).</p>
3. RED ILLUMINATION UNEVEN.		<p>Remove nonoperating incandescent light(s) from porcelain socket(s) and check for continuity through fixture.</p> <p>Replace porcelain socket(s) (paragraph 8-16.3).</p>
4. NO WHITE ILLUMINATION (RED ILLUMINATION NORMAL).		<p>Check for continuity through white illumination side of toggle switch.</p> <p>Replace toggle switch (paragraph 8-16.4).</p>
5. NO RED ILLUMINATION (WHITE ILLUMINATION NORMAL).		<p>Check for continuity through red illumination side of toggle switch.</p> <p>Replace defective toggle switch (paragraph 8-16.4).</p>

8-16. MAINTENANCE PROCEDURES.

a. This section contains instructions covering organizational maintenance functions for the viewing stand. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

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PROCEDURES	PARAGRAPH
Replace Lens Assembly	8-16.1
Replace Film Clip	8-16.2
Replace Porcelain Light Socket(s)	8-16.3
Replace Toggle Switch.....	8-16.4
Replace Fluorescent Light Fixture.....	8-16.5

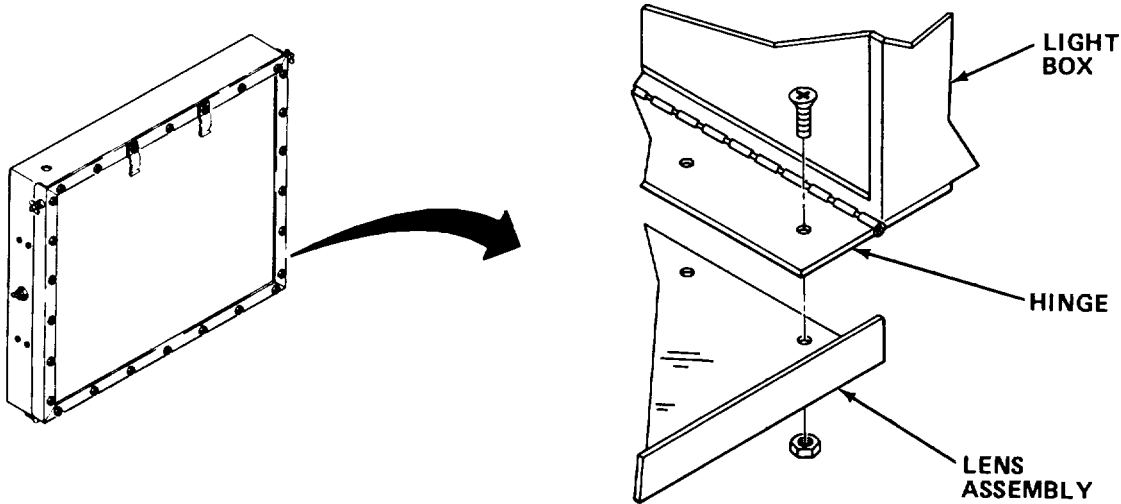
8-16.1. Replace Lens Assembly.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver
Combination Wrench Set

SUPPLIES: Lens Assembly

a. Loosen knobs and carefully swing open lens assembly.



- b. While supporting lens assembly, remove nut and screw securing lens assembly to light box assembly hinge.
- c. Replace lens assembly.
- d. Secure lens assembly to light box assembly hinge with screws and nuts.

CAUTION

Do not use abrasive cleaner which will scratch diffuser surfaces.

- e. Clean inside and outside surfaces of lens assembly diffuser with cheese-cloth moistened with water. Wipe dry.
- f. Close lens assembly and secure with knobs.

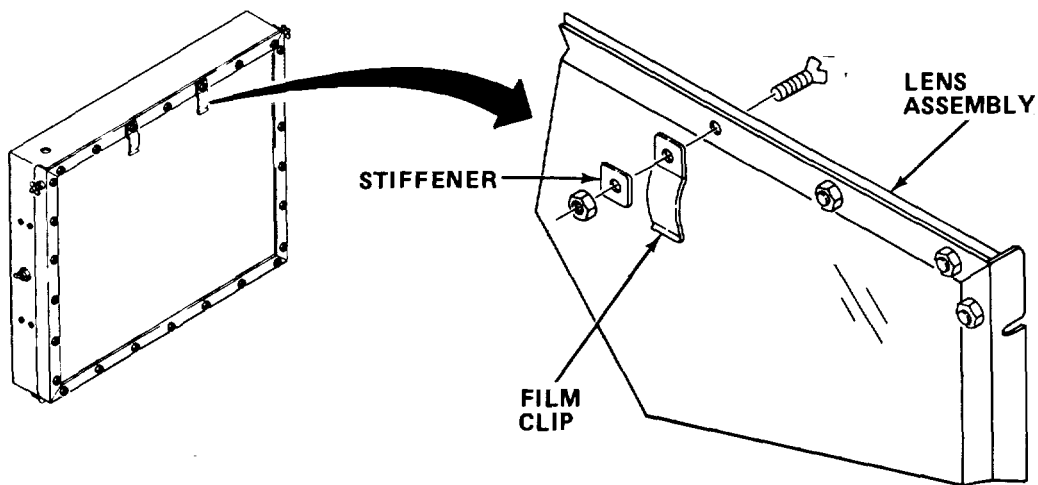
8-16.2. Replace Film Clip.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver
Combination Wrench Set

SUPPLIES: Film Clip

- a. Loosen knobs and carefully swing open lens assembly.



- b. Remove nut and screw securing film clip and remove stiffener and defective film clip.
- c. Position new film clip and secure with stiffener, screw, and nut.
- d. Close lens assembly and secure with knobs.

8-16.3. Replace Porcelain Socket(s).

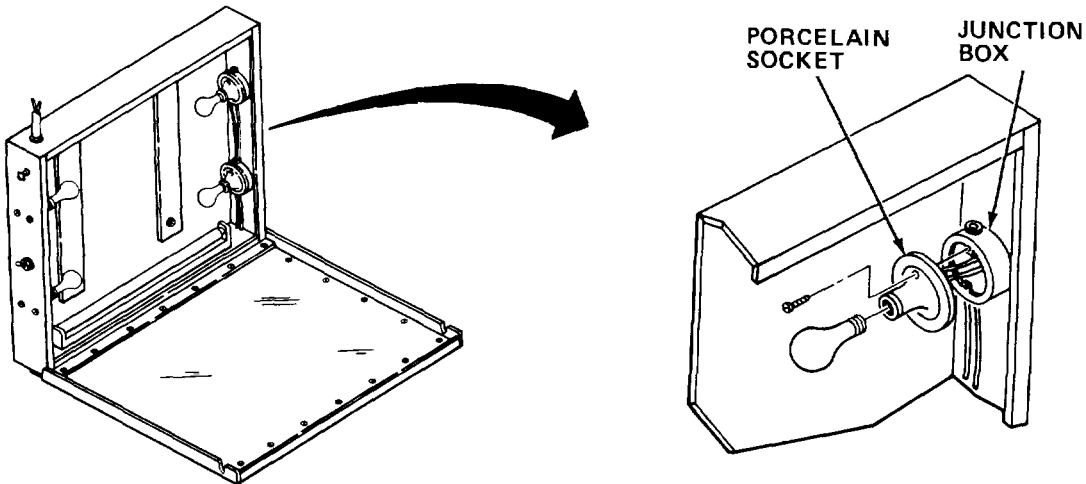
MOS: 35E, Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Porcelain Socket(s)

WARNING**Death or serious injury may occur from electrical shock unless circuit breaker is turned off before servicing.**

- a. Turn off circuit breaker.
- b. Loosen knobs and carefully swing open lens assembly.



- c. Remove incandescent light from socket.
- d. Remove screws and pull socket from junction box.
- e. Disconnect wires and remove defective socket.
- f. Reconnect wires to new socket.
- g. Secure socket with screws.
- h. Install incandescent light.
- i. Close lens assembly and secure with knobs.
- j. Turn on circuit breaker.

8-16.4. Replace Toggle Switch.

MOS: 35E, Special Electronic Devices Repairer

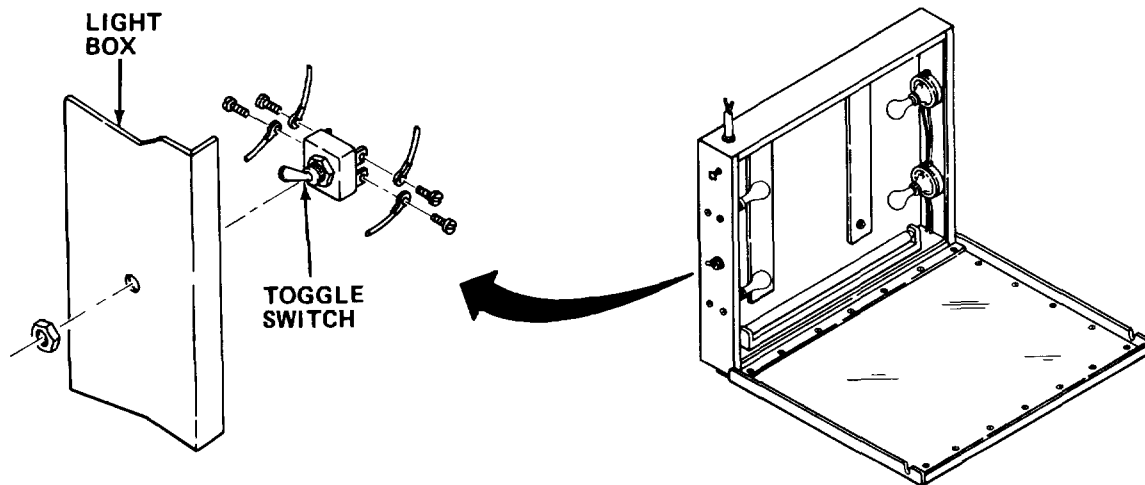
TOOLS: Combination Wrench Set
Flat Tip Screwdriver

SUPPLIES: Toggle Switch

WARNING

Death or serious injury may occur from electrical shock unless circuit breaker is turned off before servicing.

- a. Turn off circuit breaker.
- b. Loosen knobs and carefully swing open lens assembly.



- c. Remove bezel nut securing toggle switch to light box assembly.
- d. Withdraw toggle switch to gain access to wires.
- e. Tag and disconnect wires from defective switch.
- f. Reconnect wires to new switch and remove tags.
- g. Insert switch through light box assembly and secure switch with bezel nut.
- i. Close lens assembly and secure with knobs.
- j. Turn on circuit breaker.

8-16.5. Replace Fluorescent Light Fixture.

MOS: 35E, Special Electronic Devices Repairer

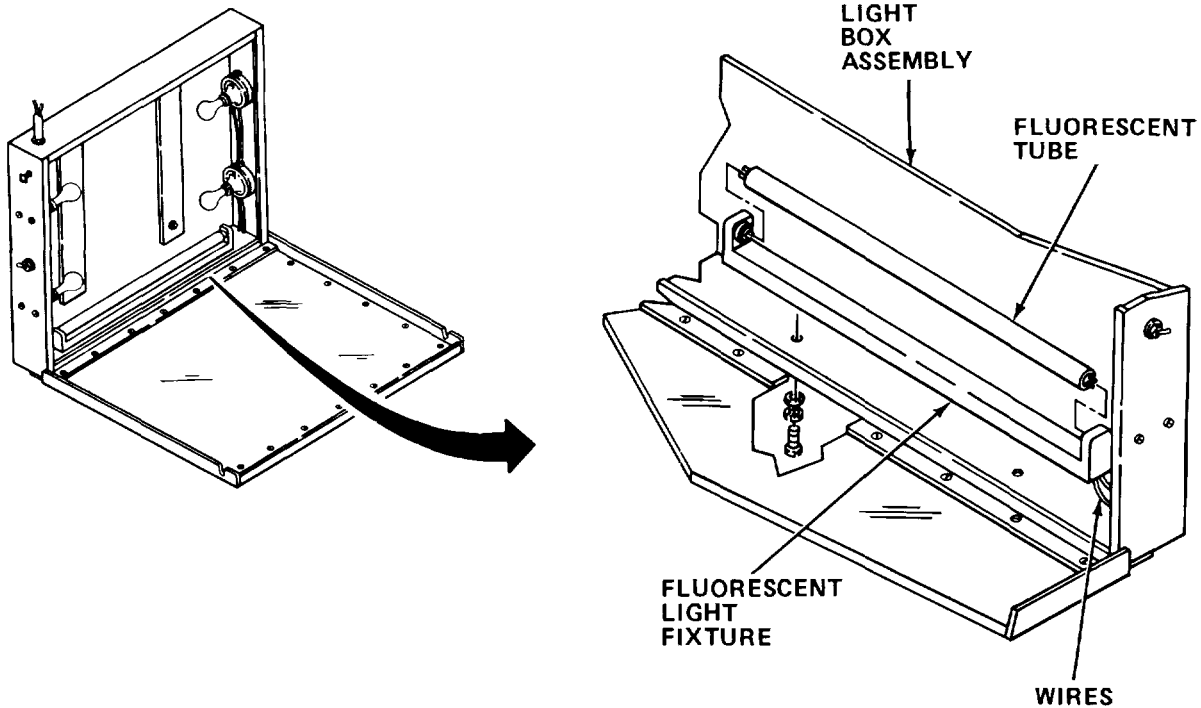
TOOLS: Flat Tip Screwdriver
Combination Wrench Set
Drill and Drill bit Set
Rivet Gun

SUPPLIES: Fluorescent Light Fixture

WARNING

Death or serious injury may occur from electrical shock unless circuit breaker is turned off before servicing.

- a. Turn off circuit breaker.
- b. Loosen knobs and carefully swing open lens assembly.



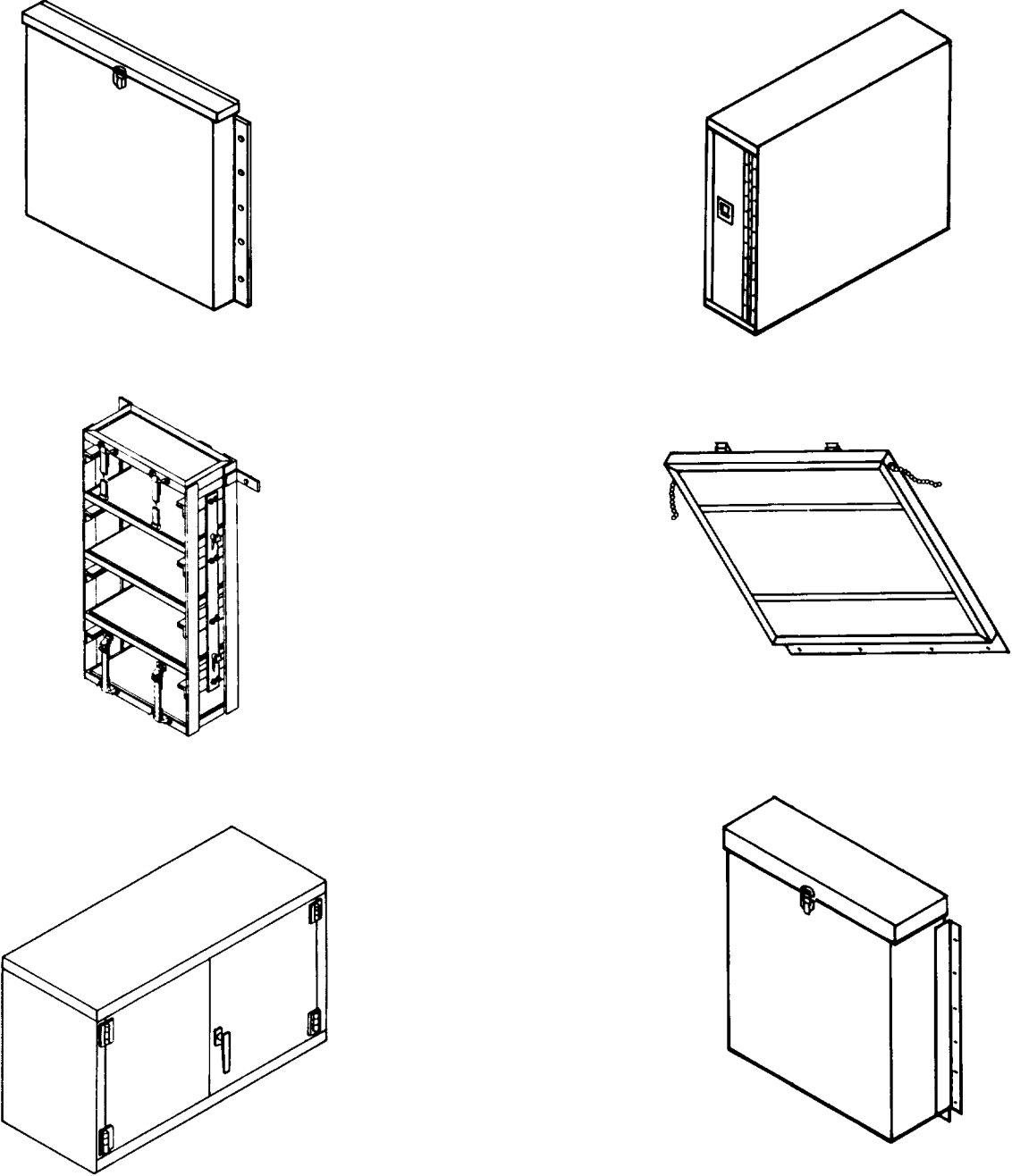
- c. Remove safety clips and fluorescent tube. Tag and disconnect wires to fluorescent light fixture.
- d. Release clip and remove fixture cover.
- e. Drill out rivets securing light fixture and remove defective fixture.
- f. Secure new light fixture with rivets.

- g. Reconnect light fixture wires and remove tags.
- h. Secure light cover. Install fluorescent light.
- i. Close lens assembly and secure with knob.
- j. Turn on circuit breaker.

8-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

8-18. There are no direct/general support maintenance procedures assigned for this equipment.



CHAPTER 9

FURNITURE AND CABINETS

Section I. INTRODUCTION

9-1. GENERAL INFORMATION.

9-1.1. **Scope.** This chapter contains the description of all furniture and cabinets contained in this section.

9-2. EQUIPMENT DESCRIPTION.

a. Wall storage cabinet. Used for miscellaneous storage. There are two shelves. The two doors are held shut by a handle-type latch. Dimensions:

Width	30.0 in. (76.2 cm)
Depth	12.0 in. (30.5 cm)
Height	18.0 in. (45.7 cm)

b. Contact screen rack assembly. Used to store contact screens. Dimensions:

Width	33.8 in. (85.9 cm)
Length	33.7 in. (81.5 cm)
Depth	1.0 in. (3.3 cm)

c. Lamp storage rack assembly. Used for lamp storage. Dimensions:

Width	22.0 in. (55.9 cm)
Depth	9.8 in. (24.9 cm)
Height	41.0 in. (104.1 cm)

d. Developing tray cabinet. Used to store developing trays. Dimensions:

Width	8.8 in. (22.4 cm)
Depth	35.5 in. (90.2 cm)
Height	34.0 in. (86.4 cm)

e. Target storage box. Stores an aluminum reproduction of photogrid of the ground glass assembly. Dimensions:

Width	29.3 in. (76.2 cm)
Depth	3.5 in. (8.9 cm)
Height	32.3 in. (82.0 cm)

f. Film storage box. Provides for storage of film used with the camera. Dimensions:

Width	30.0 in. (76.2 cm)
Depth	5.5 in. (14.0 cm)
Height	35.5 in. (90.2 cm)

9-3. TECHNICAL PRINCIPLES OF OPERATION. There are no specific principles of operation for this equipment.

Section II. OPERATING INSTRUCTIONS

9-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS. This equipment has no operator's controls or indicators.

9-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no operator PMCS procedures assigned for this equipment.

9-6. OPERATION UNDER USUAL CONDITIONS. Operation of the furniture and cabinets under usual conditions consists of normal usage during routine evolutions.

9-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

9-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

9-9. TROUBLESHOOTING PROCEDURES. There are no operator troubleshooting procedures assigned for this equipment.

9-10. MAINTENANCE PROCEDURES.

a. This section contains instructions covering operator maintenance functions for the furniture and cabinets. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

9-10.1. Inspect Furniture and Cabinets. Inspect furniture and cabinets for structural damage, rust, and proper operation of all latches, hinges, drawer slides, and adjustment mechanisms.

Section IV. ORGANIZATIONAL MAINTENANCE

9-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

9-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.

9-12.1. Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

9-12.2. Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

9-12.3. Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 3610-257-24P covering organizational maintenance for this equipment.

9-13. SERVICE UPON RECEIPT.

9-13.1. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

9-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

9-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES. There are no organizational troubleshooting procedures assigned for this equipment.

9-16. MAINTENANCE PROCEDURES.

a. This section contains instructions covering organizational maintenance functions for the furniture and cabinets. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational checks to be sure that equipment is properly functioning.

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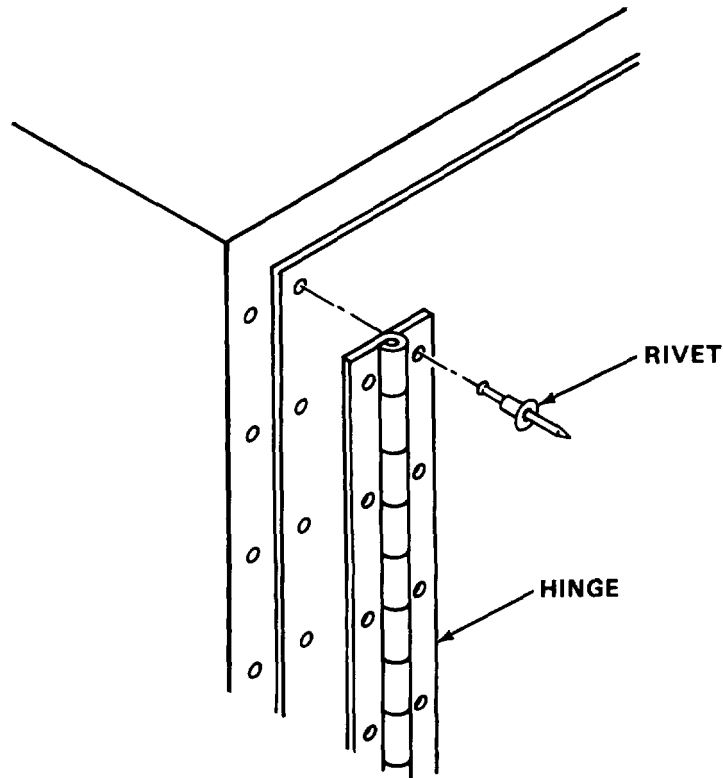
PROCEDURES	PARAGRAPH
Replace Door Hinge (Piano Hinge)	9-16.1
Replace Door Latch (Wall Storage Cabinet)	9-16.2
Remove/Install Wall Storage Cabinet	9-16.3
Replace Contact Screen Rack Chain	9-16.4
Replace Contact Screen Rack Cupboard Catch	9-16.5
Remove/Install Contact Screen Rack.....	9-16.6
Replace Strap and Buckle (Lamp Storage Rack)	9-16.7
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Remove/Install Lamp Storage Rack.....	9-16.9
Replace Developing Tray Cabinet Latch	9-16.10
Replace Film Storage Box.....	9-16.11
Replace Target Storage Box.....	9-16.12

9-16.1. Replace Door Hinge (Piano Hinge).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Electric Drill
 Rivet Gun
 Drill Bit Set

SUPPLIES: Hinge
 5/32 inch Blind Rivets
 8-32 x 1/2 inch Screws (4 required)
 8-32 Nuts (4 required)



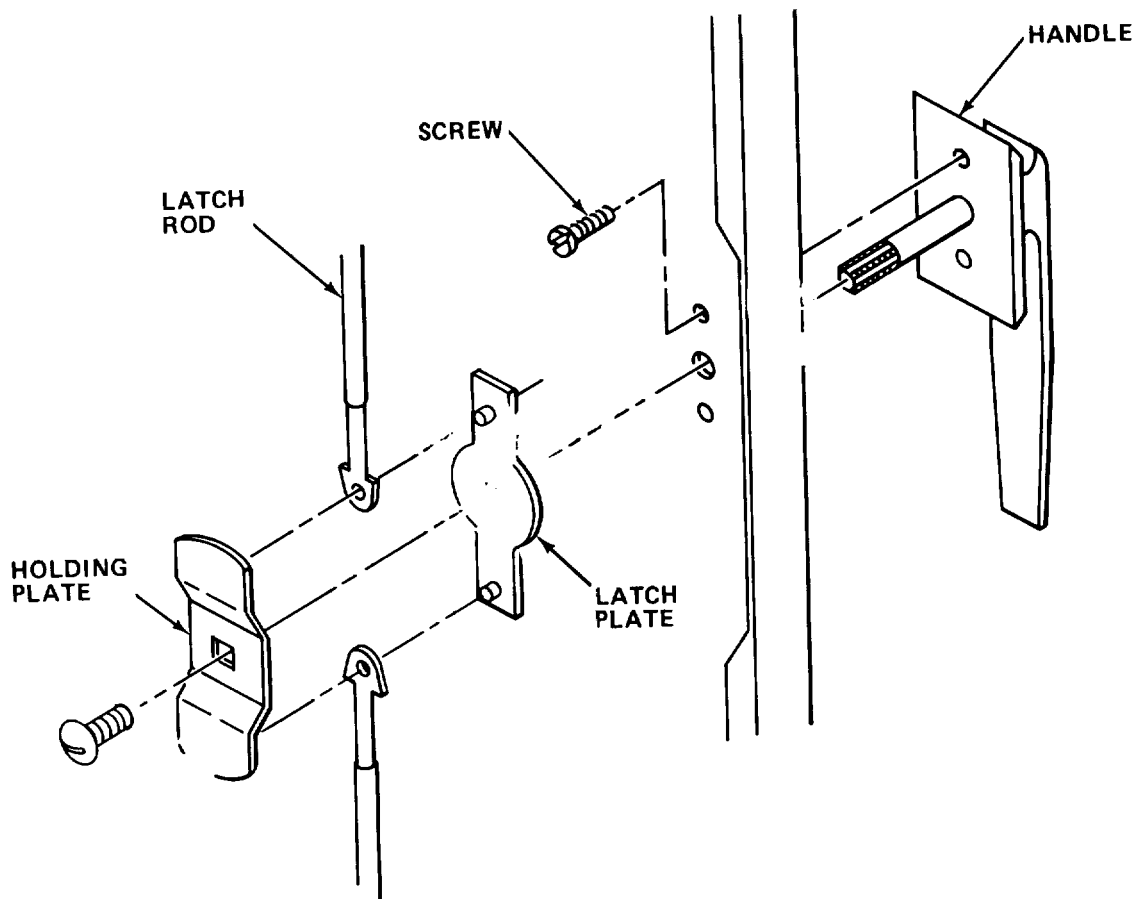
- a. Drill out blind rivets holding hinge to cabinet and door and remove hinge.
- b. Install new hinge with blind rivets.

9-16.2. Replace Door Latch (Wall Storage Cabinet).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Combination Wrench Set
 Flat Tip Screwdriver
 Socket Head Screw Key Set

SUPPLIES: Handle-Type Latch



- a. Remove holding plate retaining screw.
- b. Remove holding plate and latch rods.
- c. Remove side latch plate.
- d. Remove handle retaining screws.
- e. Remove handle.

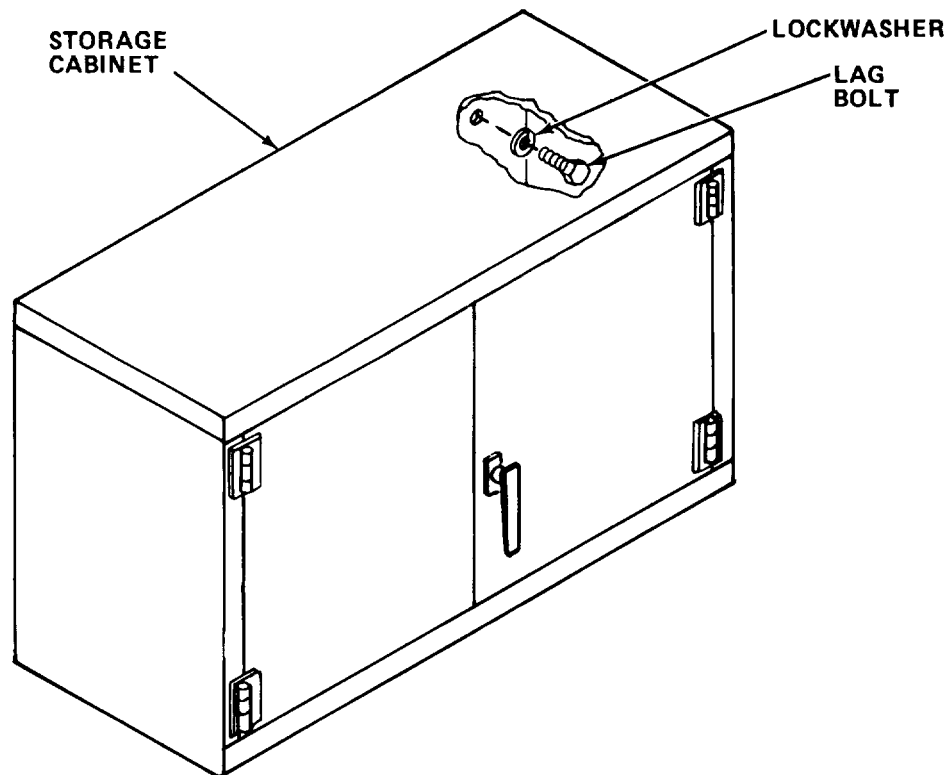
- e. Install new handle and secure with screws.
- f. Install latch plate and rods.
- g. Reinstall latch rod holding plate, and secure with screw.

9-16.3. Remove/Install Wall Storage Cabinet.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 1/2 inch Drive Socket Set

SUPPLIES: Wall Storage Cabinet



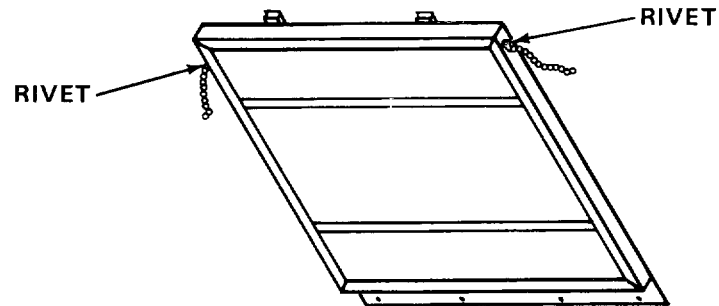
- a. Remove bolts and lockwashers which secure cabinet to wall.
- b. Remove defective cabinet.
- c. Install new cabinet and secure to wall with lockwashers and bolts.

9-16.4. Replace Contact Screen Rack Chain.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Rivet Gun
Electric Drill and Drill Bits

SUPPLIES: Bead Chain
Blind Rivets



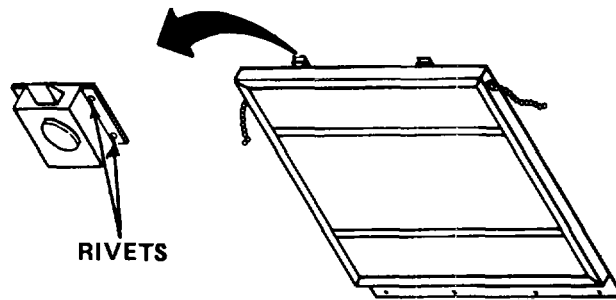
- a. Drill out blind rivets from each end of chain.
- b. Remove defective chain.
- c. Install new chain and secure with blind rivets.

9-16.5. Replace Contact Screen Rack Cupboard Catch.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Rivet Gun
Electric Drill and Drill Bits

SUPPLIES: Cupboard Catch
Blind Rivets



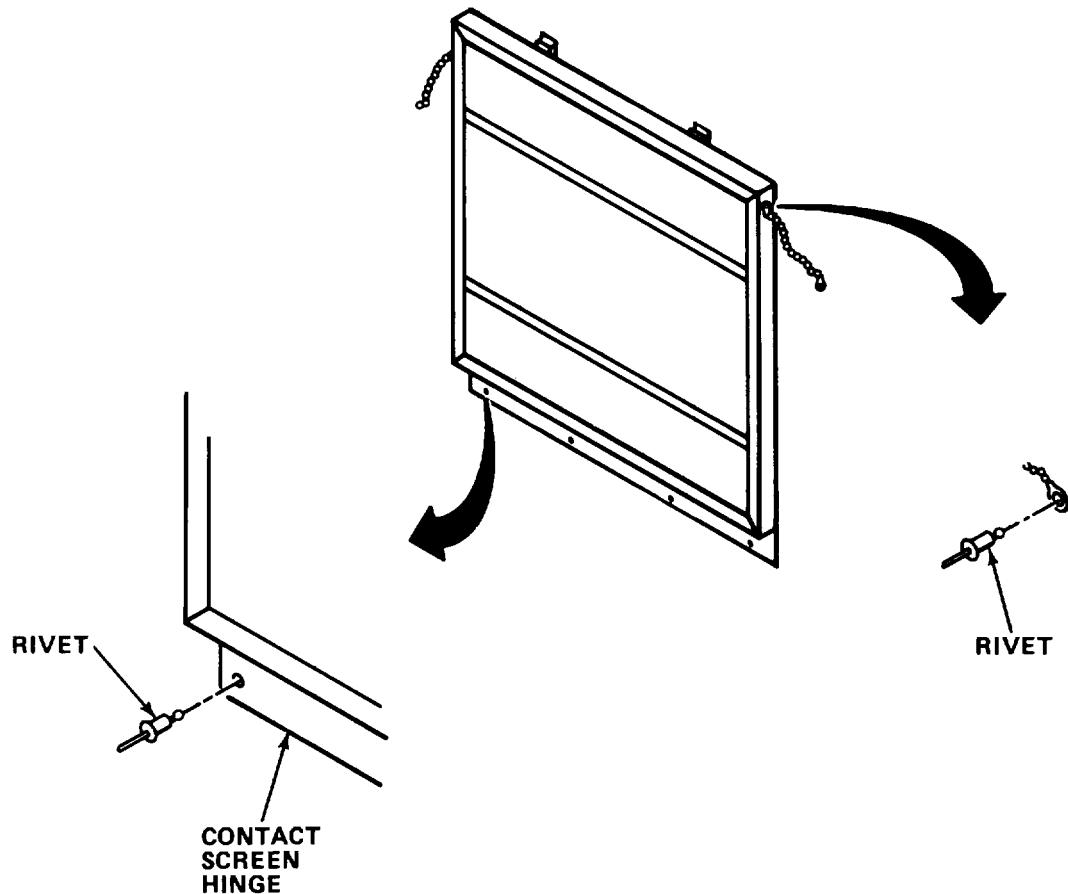
- a. Drill out blind rivets from cupboard catch.
- b. Remove defective catch.
- c. Install new cupboard catch and secure with blind rivets.

9-16.6. Remove/Install Contact Screen Rack.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Rivet Gun
Electric Drill and Drill Bits

SUPPLIES: Contact Screen Rack
Blind Rivets



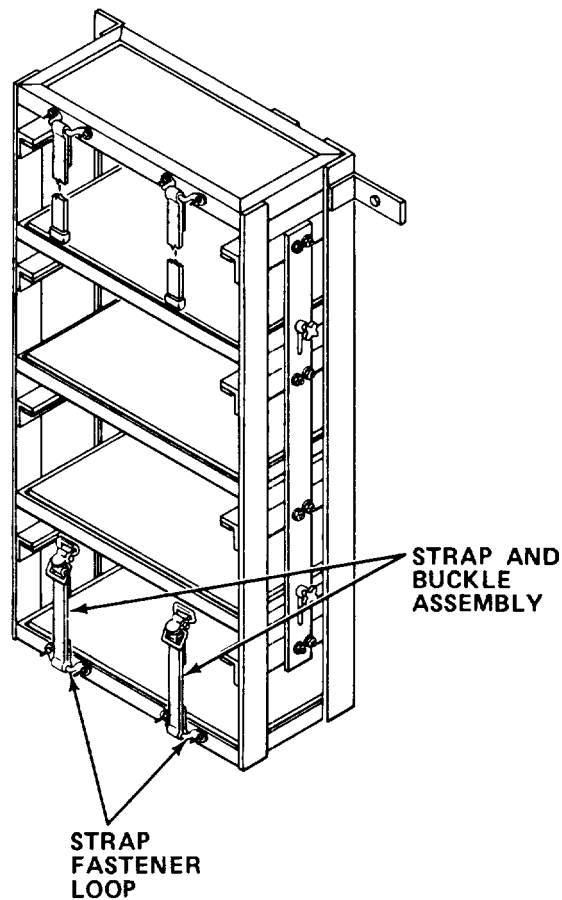
- a. Drill out blind rivets from ceiling end of chains.
- b. Drill out blind rivets from contact screen hinge.
- c. Remove defective contact screen rack.
- d. Install new contact screen rack and secure to ceiling with blind rivets.
- e. Install chains to ceiling and secure with blind rivets.

9-16.7. Replace Strap and Buckle (Lamp Storage Rack).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Rivet Gun
Knife, TL-29

SUPPLIES: Strap and Buckle Assembly
Blind Rivets



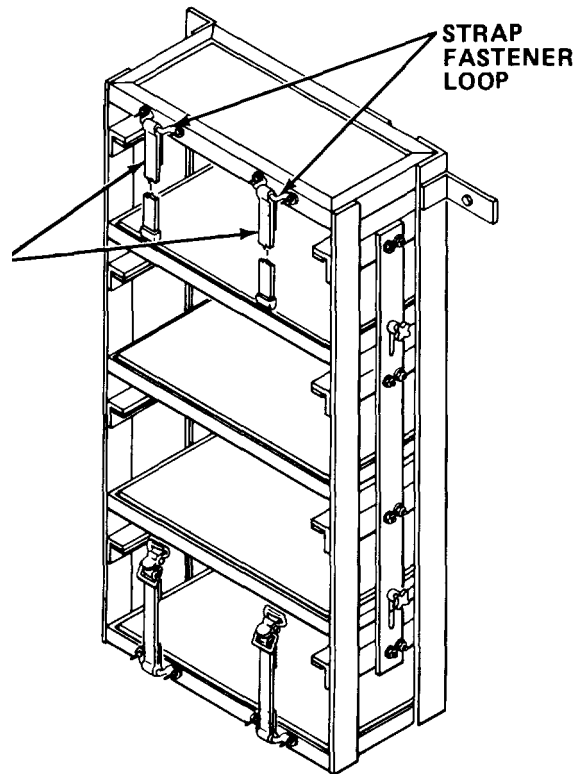
- a. Cut strap and buckle from strap fastener loop.
- b. Drill out blind rivets from strap fastener loop and remove loop.
- c. Insert strap fastener loop through pocket in end of new strap.
- d. Aline holes in strap fastener loop with holes in storage rack and install blind rivets.

9-16.8. Replace Strap and Clip (Lamp Storage Rack).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Rivet Gun
Knife, TL-29

SUPPLIES: Strap and Clip
Blind Rivets



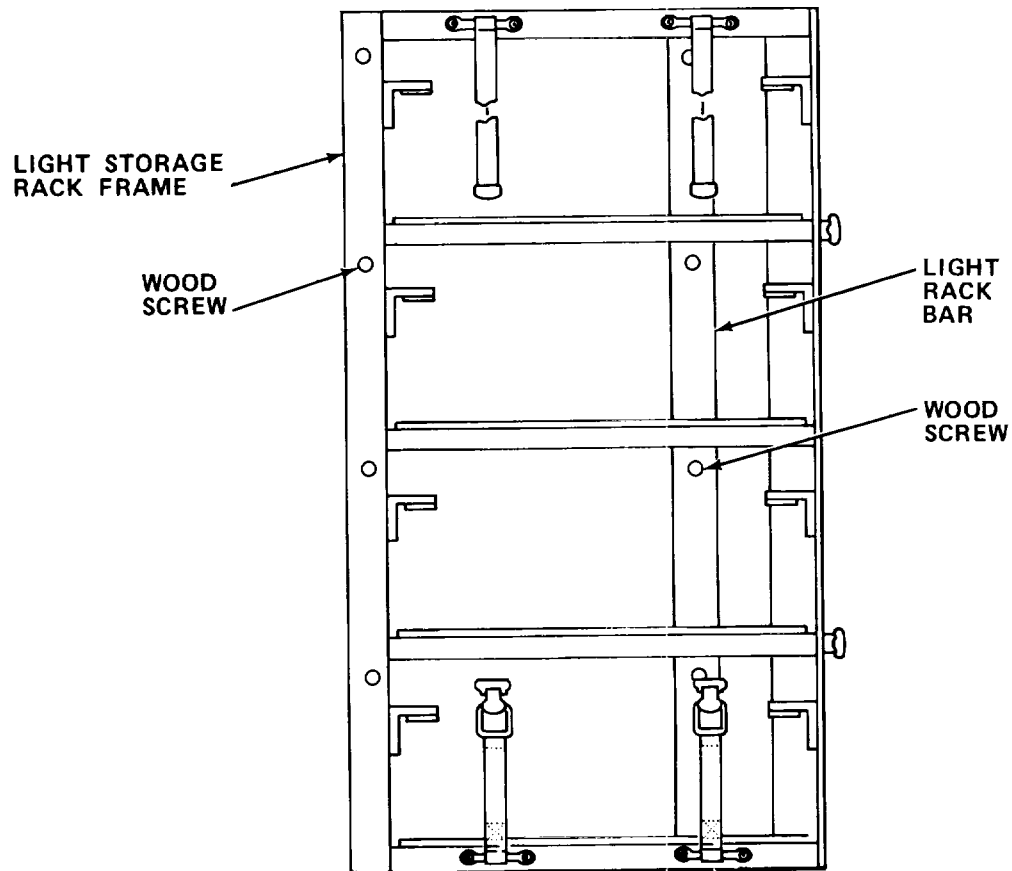
- a. Cut strap and clip from strap fastener loop.
- b. Drill out blind rivets from strap fastener loop and remove loop.
- c. Insert strap fastener loop through pocket in end of new strap.
- d. Aline holes in strap fastener loop with holes in storage rack and install blind rivets.

9-16.9. Remove/Install Lamp Storage Rack.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver
3/8 Drive Socket Set.

SUPPLIES: Lamp Storage Rack



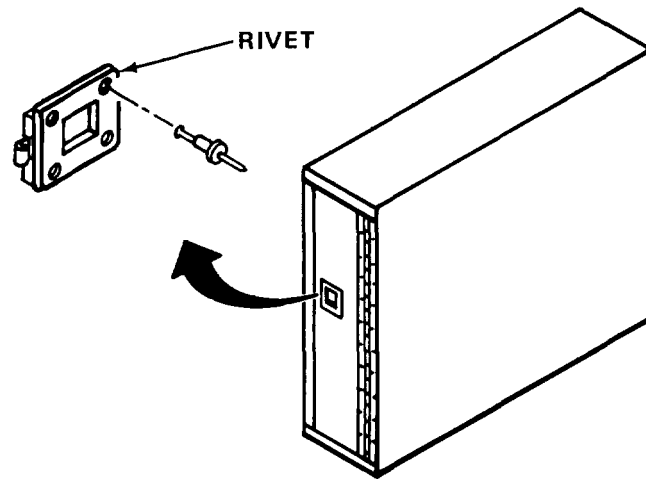
- Remove all lamps from storage rack.
- Remove screws and lag bolts from light rack bar and light storage rack frame; retain screws.
- Remove defective lamp storage rack.
- Install new lamp storage rack and secure with screws and lag bolts.

9-16.10. Replace Developing Tray Cabinet Latch.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Rivet Gun

SUPPLIES: Latch
Blind Rivets



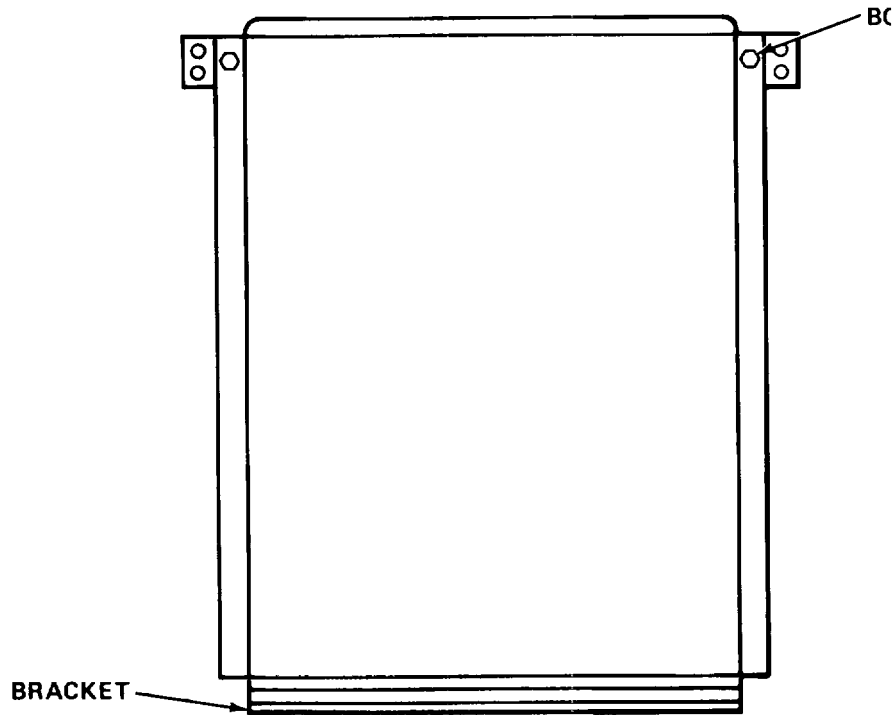
- a. Drill out blind rivets from latch.
- b. Remove defective latch.
- c. Install new latch and secure with blind rivets.

9-16.11. Replace Film Storage Box.

MOS: 83FJ6, Reproduction Equipment Repair

TOOLS: Combination Wrench Set

SUPPLIES: Film Storage Box



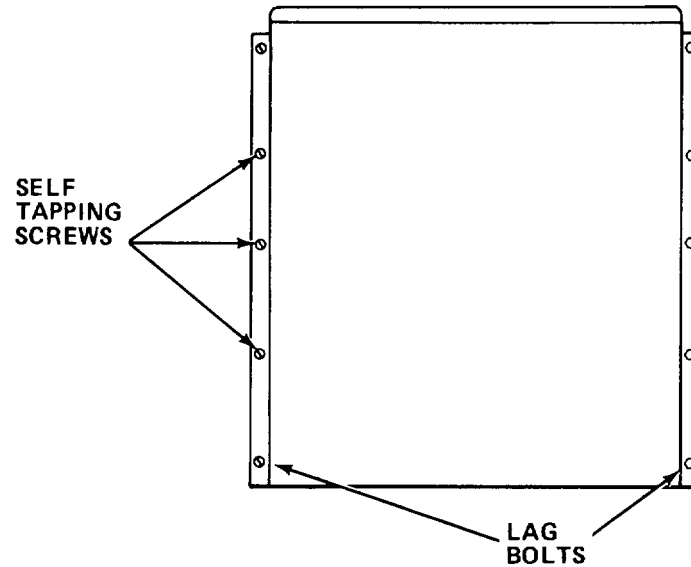
- a. Remove bolts at top of box.
- b. Remove defective film storage box.
- c. Insert bottom flange of new box behind bracket on wall and fasten top in place with bolts.

9-16.12. Replace Target Storage Box.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Combination Wrench Set
Cross Tip Screwdriver

SUPPLIES: Target Storage Box

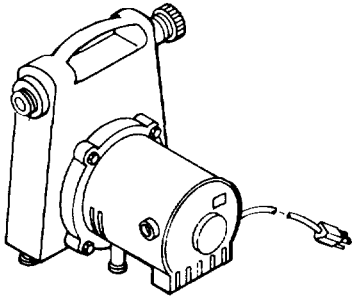
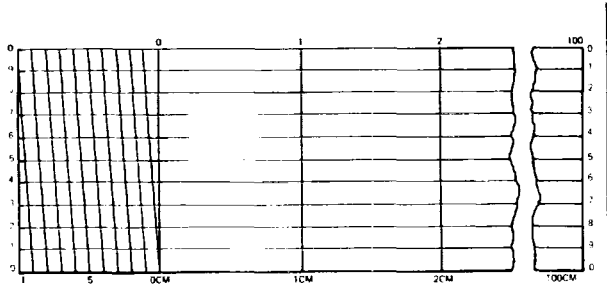
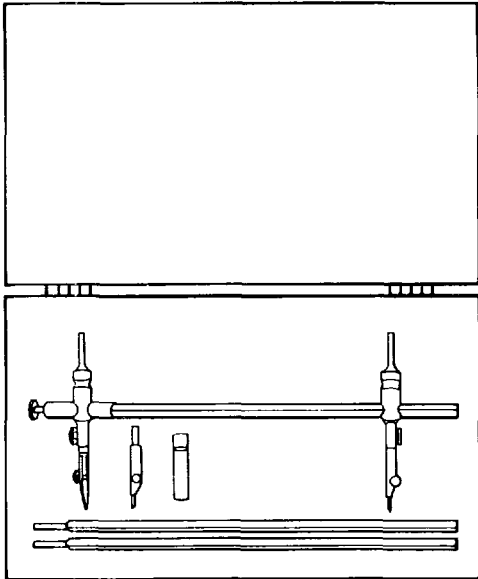
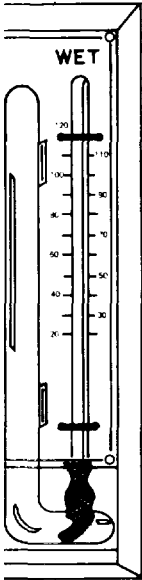


- a. Remove lag bolts and self-tapping screws.
- b. Remove defective target storage box.
- c. Install new target storage box and secure with lag bolts and selftapping screws.

9-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

9-18. There are no direct/general support maintenance procedures assigned for this equipment.



CHAPTER 10

SUPPORT ITEMS

Section I. INTRODUCTION

10-1. GENERAL INFORMATION.

10-1.1. Scope. This chapter covers the support items contained in the Camera Section. The support items consist of the following equipment:

Model 314 Mason-Type Psychrometer

Invar Bar and Beam Compass

Utility Pump

10-2. EQUIPMENT DESCRIPTION.**10-2.1. Equipment Characteristics, Capabilities, and Features.**

a. Model 314 Mason-type Psychrometer. Has both wet and dry bulbs, with cistern and wicks. Measures relative humidity.

b. Invar Bar and Beam Compass. Used for precision measurements of linear distances.

c. Utility Pump. Used to fill water storage tank.

10-2.2. Equipment Data.

a. Model 317 Mason-Type Psychrometer. Range 20°F to 120°F (-7°C to 49°C).

b. Invar Bar and Beam compass. Calibrated in inches and centimeters.

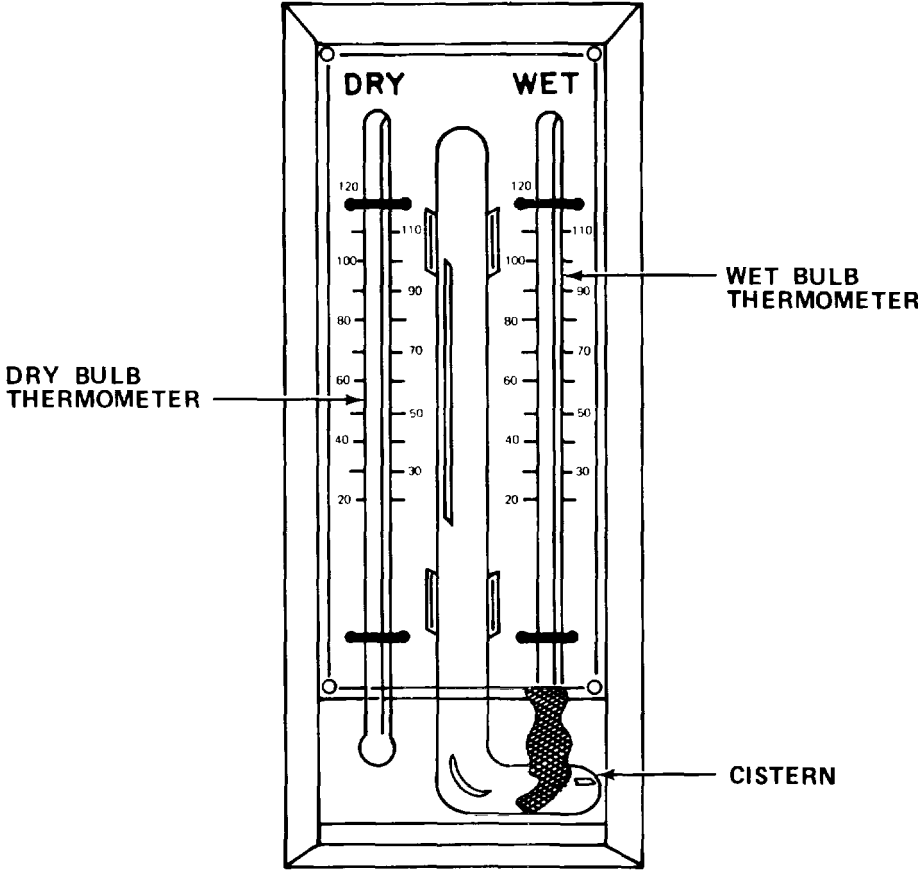
c. Utility Pump. 1/2 hp, self-priming, centrifugal pump operates on 120 V ac.

10-3. TECHNICAL PRINCIPLES OF OPERATION. Principles of operation are combined with operator's controls and indicators.

Section II. OPERATING INSTRUCTIONS

10-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.

10-4.1. Psychrometer.



Controls or indicators

Function

WET Bulb Thermometer

Measures temperature of wick in Fahrenheit.

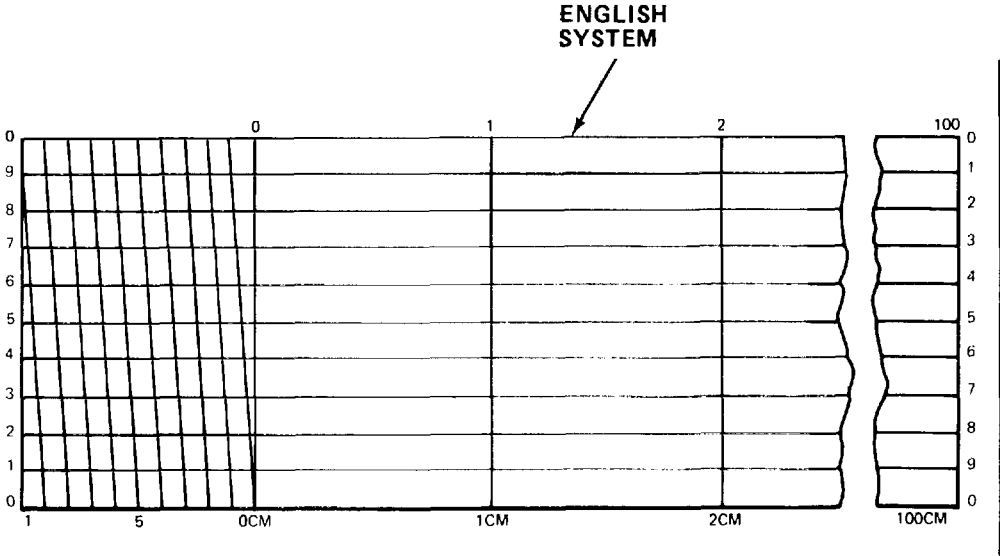
Cistern

Contains water to keep wick on WET bulb thermometer completely saturated.

DRY Bulb Thermometer

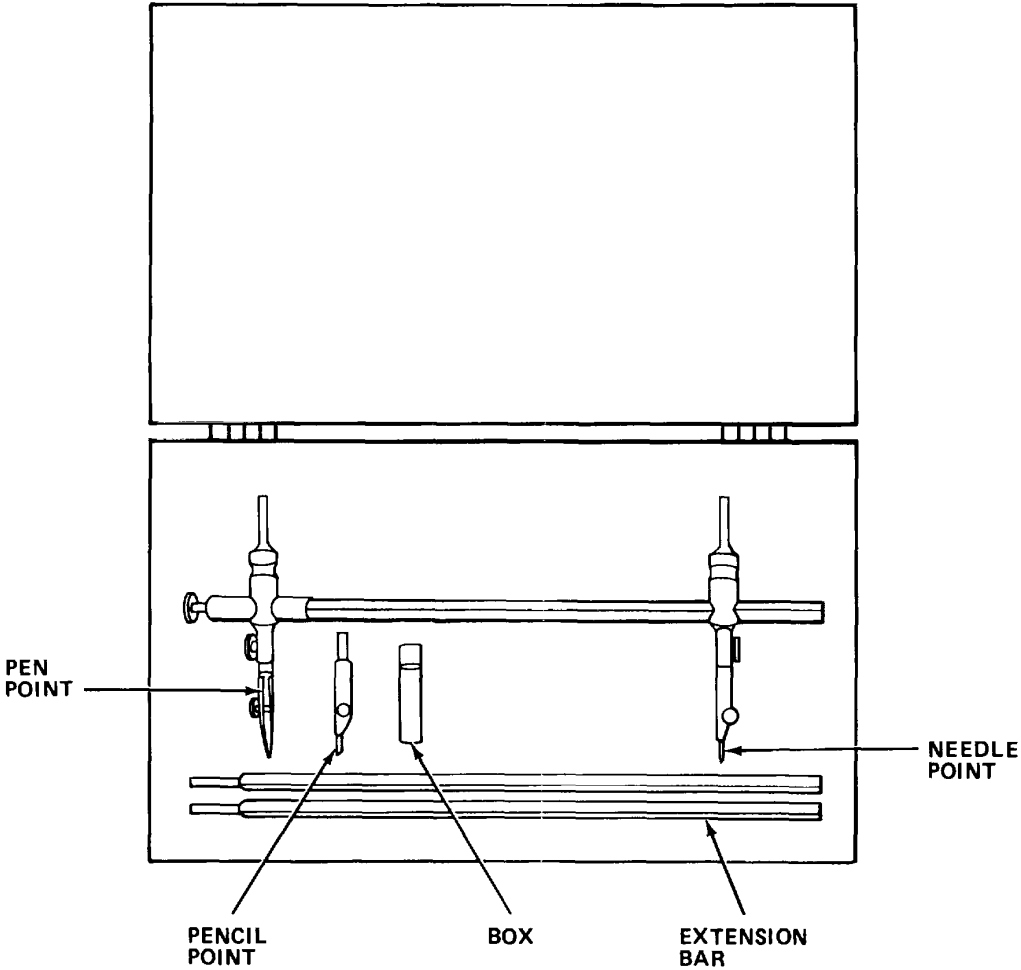
Measures air temperature in Fahrenheit.

10-4.2. Invar Bar.



Controls or indicators	Function
Plotting Scale	Calibrates invar bar in English and Metric System to .001 inches.

10-4.3. Beam Compass.

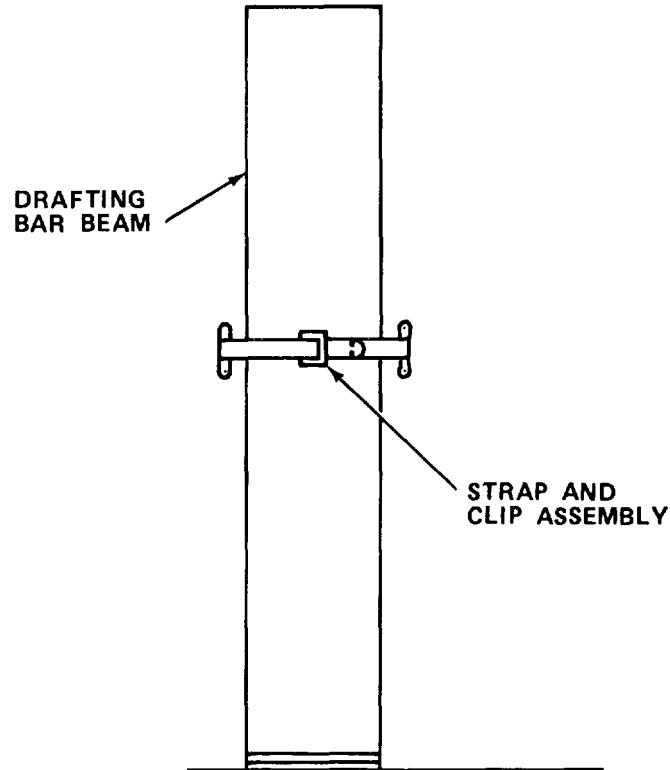


Controls or indicators	Function
Extension Bar	Used to increase radius.
Pen Point	Draws arcs and circles.
Pencil Point	Draws arcs and circles.
Needle Point	Used as a reference for measuring.
Box	Contains extra leads and needle point.

10-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no operator PMCS procedures assigned for this equipment.

10-6. OPERATION UNDER USUAL CONDITIONS.

10-6.1. Beam Compass and Invar Bar Operating Procedure.

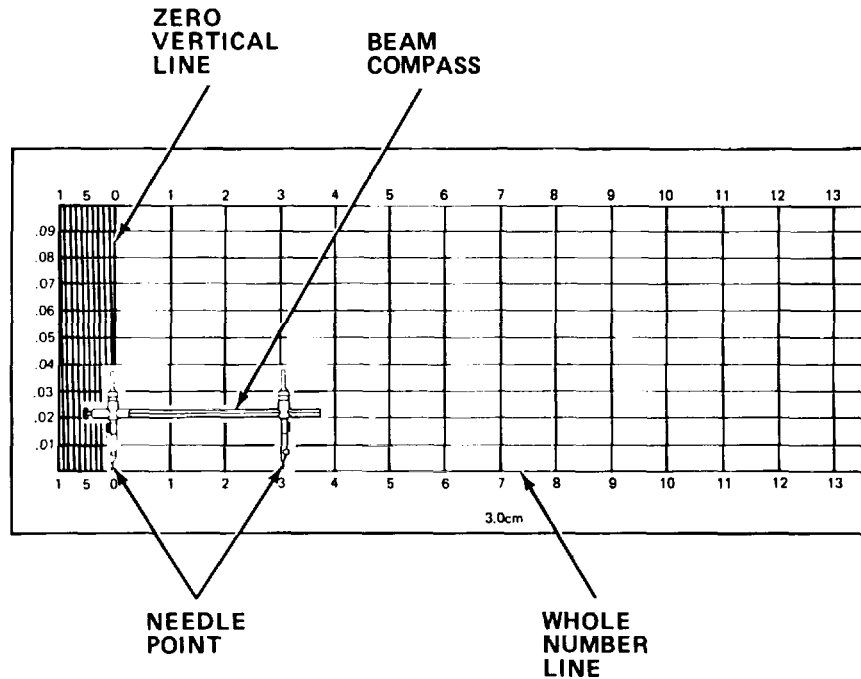


- a. Remove drafting bar beam from storage.

CAUTION

Invar bar may be damaged if removed from its protective box.

- b. Open box. Remove beam compass.



MEASURING WHOLE NUMBERS

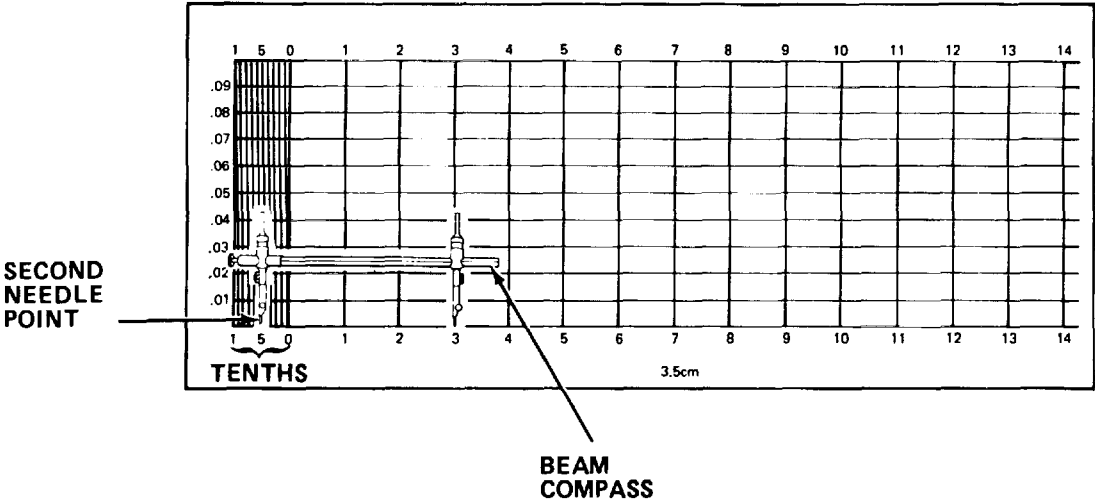
CAUTION

To avoid scratching surface of the scale, use care when adjusting the points on the beam compass to a desired measurement. Make preliminary adjustments on the side of the box.

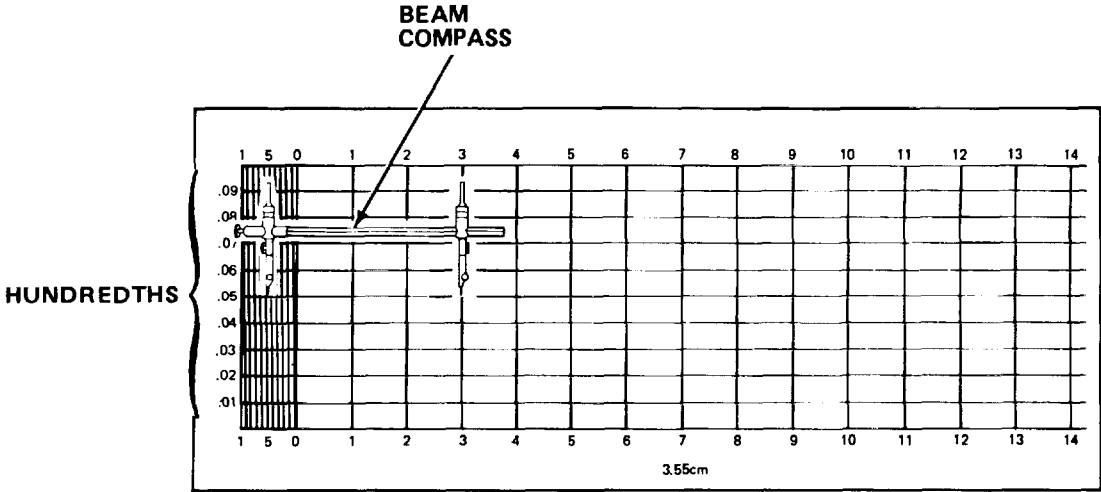
NOTE

To use reverse side, close the box, turn it over, and reopen the box.

- c. Place one point of needle point to whole number line.
- d. Adjust second needle point until it touches the intersection of the zero vertical line and invar scale base line.

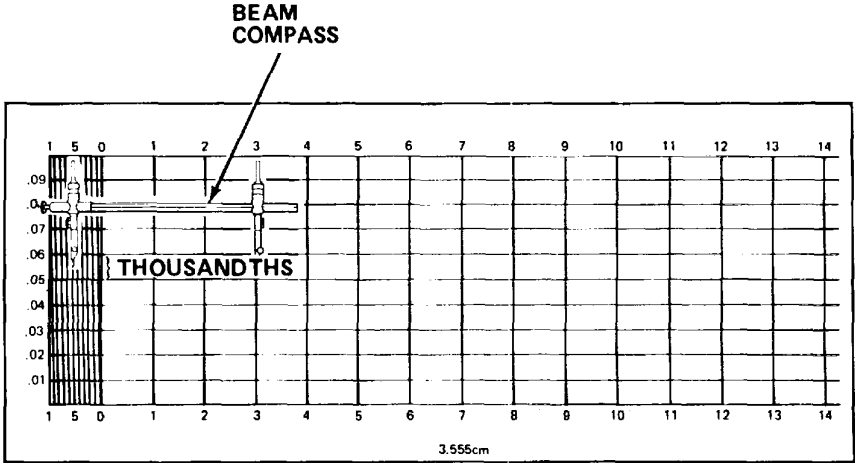


e. To measure tenths, adjust beam compass until second needle point touches desired tenths line along base line.



f. To measure hundredths, the beam compass must be moved vertically on the scale along the line representing the whole number until the desired hundredth value is reached.

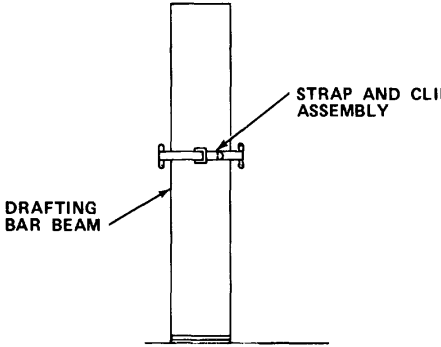
g. Adjust second needle point until it touches the intersection of the vertical tenths line and desired hundredth line.



- h. Estimate the thousandths between the hundredths line that the beam compass is on and the next hundredth line.
- i. Place second needle point at the estimated position.
- j. Make sure the first needle point remains along the whole number line.
- k. Keep beam compass out until second needle point touches the vertical tenths line.

10-6.2. Preparation for Movement.

- a. Store beam compass.
- b. Store invar bar.



- c. Store drafting beam compass.

10-7. OPERATION UNDER UNUSUAL CONDITIONS. This equipment is designed for operation only in a controlled environment.

Section III. OPERATOR MAINTENANCE

10-8. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

10-9. TROUBLESHOOTING PROCEDURES. There are no operator troubleshooting procedures assigned for this equipment.

10-10. MAINTENANCE PROCEDURES. There are no operator maintenance procedures signed for this equipment.

Section IV. ORGANIZATIONAL MAINTENANCE

10-11. LUBRICATION INSTRUCTIONS. This equipment does not require lubrication.

10-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (DE); AND SUPPORT EQUIPMENT. These items are not required at the organizational level of maintenance.

10-13. SERVICE UPON RECEIPT.

10-13.1. Checking Unpacked Equipment.

- a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.
- b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.
- c. Check to see whether the equipment has been modified.

10-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. There are no organizational PMCS procedures assigned for this equipment.

10-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES. There are no organizational troubleshooting procedures assigned for this equipment.

10-16. MAINTENANCE PROCEDURES.

- a. This section contains instructions covering organizational maintenance functions for the utility pump. Personnel required are listed only if the task requires more than one.
- b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

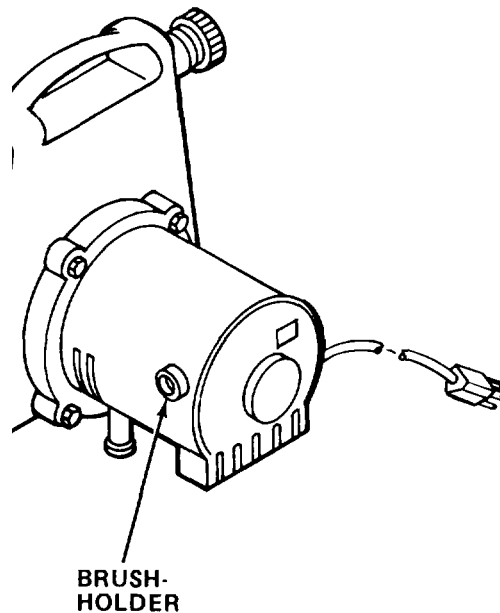
PROCEDURE	PARAGRAPH
Replace Utility Pump Brushes.....	10-16.1

10-16.1. Replace Utility Pump Brushes.

MOS: 35E, Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Brushes



- a. Remove brushholder, spring, and defective brush, from each side of motor.
- b. Install new brush, with spring and brushholder, in each side of motor.

10-17. PREPARATION FOR STORAGE OR SHIPMENT. Contact your battalion for packing and shipping instructions.

Section V. DIRECT/GENERAL SUPPORT MAINTENANCE

10-18. There are no direct/general support maintenance procedures assigned for this equipment.

APPENDIX A

REFERENCES

A-1. SCOPE.

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

A-2. 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

The Army Maintenance Management System (TAMMS)..... DA Pam 738-750

Quality Deficiency Report..... SF 368

A-3. FIELD MANUALS.

Camouflage FM 5-20

Nuclear, Biological and Chemical (NBC)
Defense (Reprinted w/Basic Incl C1) FM 21-40

Basic Cold Weather Manual..... FM 31-70

Northern Operations..... FM 31-71

Metal Body Repair and Related Operations..... FM 43-2

First Aid for Soldiers FM 21-11

A-4. TECHNICAL MANUALS.

Administrative Storage of Equipment..... TM 740-90-1

Chemical, Biological and Radiological (CBR)
Decontamination TM 3-220

Hand Receipt Covering Contents of Components of End
Item (COEI), Basic Issue Items (BII) and Additional
Authorization List (AAL) for Camera Section..... TM 5-3610-257-14-HR

Operator, Organizational, Direct Support and General Support Maintenance Manual: Air Conditioner, Horizontal, Compact, 208-Volt, 3-Phase, 18,000 Btu Cooling, 12,000 Btu Heating..... TM 5-4120-367-14

Operator, Organizational, Direct Support and General Support Maintenance Manual: Lithographic Copying Camera..... TM 5-3610-258-14

Operator, Organizational, Direct Support and General Support Maintenance Manual for Chassis, Semi-Trailer, Container Transporter (ADCOR) TM 5-2330-305-14

Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Air Conditioner/Heater..... TM 5-4120-367-24P

Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Chassis, Semi-Trailer, Container Transporter (ADCOR)..... TM 5-2330-305-24P

Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (RPSTL) (Including Depot Maintenance Repair Parts and Special Tools) for Camera Section TM 5-3610-257-24P

Painting Instructions for Field Use..... TM 43-0139

Procedure for the Destruction of Equipment to Prevent Enemy Use TM 750-244-3

Use and Care of Hand Tools and Measuring Tools TM 9-243

A-5. MISCELLANEOUS PUBLICATIONS.

Lubrication Order: Topographic Support System Chassis, Semi-Trailer, Container Transporter (ADCOR) LO 5-2330-305-12

Index of Technical Publications..... DA Pam 310-1

APPENDIX B**MAINTENANCE ALLOCATION CHART****Section I. INTRODUCTION****B-1. GENERAL.**

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The application of maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS. Maintenance functions will be limited to and defined as follows:

a. 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).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or 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.

g. 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.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. Repair. The application of maintenance services¹, including fault location/troubleshooting², removal/installation, and disassembly/assembly³ procedures, and maintenance actions⁴ 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.

j. 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 (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. 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 (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies and modules with the next higher assembly. End item group number shall be "00."

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

¹Services Inspect, test, service, adjust, aline, calibrate and/or replace.

²Fault locate/troubleshoot 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).

³Disassemble/assemble Encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned an SMR code) for the category of maintenance under consideration.

⁴Actions Welding, grinding, riveting, straightening, facing, remachining and/or resurfacing.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance categories, appropriate work time figures will be shown for each category. 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 operation conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The symbol designations for the various maintenance categories are as follows:

- COperator or Crew
- OOrganizational Maintenance
- F.....Direct Support Maintenance
- HGeneral Support Maintenance
- L.....Specialized Repair Activity⁵
- DDepot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

⁵This maintenance category is not included in Section II, column (4) of the Maintenance Allocation Chart. To identify functions to this category of maintenance, enter a work time figure in the "H" column of Section II, column (4), and use an associated reference code in the Remarks column (6). Key the code to Section IV, Remarks, and explain the SRA complete repair application there. The explanatory remark(s) shall reference the specific Repair Parts and Special Tools List (RPSTL) TM which contains additional SRA criteria and the authorized spare/repair parts.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Column 1, Reference Code. The code recorded in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	CAMERA SECTION								
01	VAN BODY (ISO CONTAINER)	Inspect	0.5						D
		Service	0.5						
		Repair				2.5		10,26, 30	C
	VAN EXTERIOR ASSEMBLY	Inspect	0.5					13,14, 15,19	
		Service		0.2					
		Replace		1.0				1,3	C
	PERSONNEL LADDER	Repair		0.5				1,4,26	C
		Repair			0.5			7,22, 29	C
	ELECTRICAL SYSTEM	Service		2.5				7	C
		Repair		3.0				1,7,13, 14	C
	CIRCUIT BREAKER INSTALLATION, CAMERA	Repair			0.2			7	C
	POWER AND COMMUNICATION ELECTRIC	Service		0.8					
	EMERGENCY LIGHT	Replace			0.3			7	C
	LIGHTING SYSTEM	Repair		0.3	0.8			1,7	C
AIR CONDITIONER AND MAKEUP AIR SYSTEM	Inspect		0.5						
	Service			7.1			8	D	
	Replace					3.0	7,22	B	
AIR CONDITIONER DUCT SYSTEM	Repair			1.0			1,7,29	C	
	Service		0.3				19	D	
BLACKOUT CURTAIN ASSEMBLY, SIDE DOOR	Repair				1.0		1,7,13, 14,18, 29	C	
	Repair						7	C	
		B-5							

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01 - Cont	VAN BODY (ISO CONTAINER) Cont								
	PERSONNEL AND REAR DOOR INSTALLATION	Replace Repair			4.5	1.5		7,13,14, 22,29 1,7,16, 22	C
02	LITHOGRAPHIC COPYING CAMERA	Remove/ Install					3.3		
03	LIGHT INTEGRATING EXPOSURE CONTROL INSTRUMENT	Inspect Test Service Replace Repair	0.3 0.3 0.5		0.8 2.5			19 11	
04	REFLECTION DENSITOMETER	Inspect Service Aline Remove/ Install Repair	0.8 0.5	0.5 0.3	4.5 4.0			12 22 5,16,18	A,C
05	PHOTGRAPHIC SINK	Inspect Adjust Replace Repair	0.3 0.5	0.5 4.0 7.6	4.4			19 16,19,32 18,19,22 1,2,7,8.	C C
	WATER STORAGE TANK	Replace				1.5		8,19,22	C
		B-6							

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
06	FILM DRYER	Inspect	0.5					23	
		Test	0.2						
		Service		1.3				16,19,23	
07	LIGHT TABLE CABINET ASSEMBLY	Remove/ Install		0.8				7,23	C
		Repair	0.3	1.0				5,16,19, 22,23	C
		Inspect	0.3						
08	VIEWING STAND ASSEMBLY	Service	0.3						
		Replace		1.0				19,22	
		Repair	1.5	2.5				18,19,24	
09	LAMP STORAGE RACK	Inspect	0.3						
		Service	0.3						
		Repair		2.8				18,19,22	
10	CONTACT SCREEN RACK ASSEMBLY	Remove/ Install		0.3				18	
		Repair		1.0				1,29	C
	STORAGE CABINET	Remove/ Install		0.3				7,29	C
		Repair		0.4				7,29	C
		Remove/ Install		0.8				7	C
	TARGET STORAGE BOX	Repair		0.8				16,19,22	
	FILM STORAGE BOX	Replace		0.5				19,22	
DEVELOPING TRAY CABINET LATCH	Replace		0.5				22		
UTILITY PUMP	Repair		0.5				29	C	
		Repair		0.5				19	
		B-7							

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference code	(2) Maintenance category	(3) Nomenclature	(4) National Stock number (NSN)	(5) Tool number
1	O	Tool Kit, General Mechanic's Automotive	5180-00-177-7033	W33004
2	O	Shop Equipment, Automotive Maintenance and Repair	4190-00-754-0654	E32593
3	O	Tool Kit, Carpenter's	5180-00-293-2875	W34648
4	O	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	W37251
5	O	Tool Kit, Electronic Equipment TK-105/G	5180-00-610-8177	W37388
6	O	Tool Kit, Precision Instrument Repair	5180-00-596-1538	W49307
7	O,F	Tool Kit, Light Machine Repair	5180-00-596-1540	W43827
8	O,F	Tool Kit, Service, Refrigeration Unit	5180-00-596-1474	W51362
9	F	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	W37483
10	F	Tool Kit, Master Mechanic's, Equipment Maintenance and Repair	5180-00-699-5273	W45060
11	C	Brush, Dusting	7920-00-291-5812	
12	C	Brush, Lens	7920-00-205-1427	
13	C	Brush, Paint	8020-00-245-4522	
14	C	Brush, Paint	8020-00-245-4520	
15	C	Brush, Wire	7927-00-282-9246	
16	C	Key Set, Socket Head	5120-00-935-4641	

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference code	(2) Maintenance category	(3) Nomenclature	(4) National Stock number (NSN)	(5) Tool number
17	C	Oiler, Hand	4930-00-277-1547	
18	C	Screwdriver, Cross Tip	5120-00-234-8912	
19	C	Screwdriver, Flat Tip	5120-00-234-8910	
20	C	Screwstarter	5120-00-293-3178	
21	C	Timer, Interval	6645-00-732-7789	
22	C	Wrench Set, Combination (01255) BW-20		
23	C	Wrench Set, Socket	5120-00-089-3663	
24	C	Wrench, Adjustable 6 in.	5120-00-264-3795	
25	O	C-Clamp, 3 in.	5120-00-180-0907	
26	D	Knife, Utility	5110-00-240-7070	
27	O,D	Multimeter, AN/URM-105	6625-00-999-6282	
28	O,D	Multimeter, Digital AN/PSM-45	6625-01-139-2512	
29	O,D	Riveter Kit	5120-00-017-2849	
30	D	Straightedge	5210-00-273-1960	
31	D	Test Set, Electronic	6625-00-069-0733	
32	O	Thermometer, Self- Indicating	6685-00-051-9480	
33	C,O	Vacuum Cleaner	7910-00-205-3400	
34	O,D	Voltmeter, Digital 3435A	6625-01-117-0503	

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Replacement of printed circuit boards authorized by the MAC are those identified as damaged or otherwise defective which: a) Can be readily removed/installed with easy-to-use tools. b) Do not require critical adjustment, calibration, or alinement before or after installation.
B	See TM 5-4120-367-14 for maintenance procedures.
C	Maintenance task tools are authorized to HMC TOE 05336H600 and 05337H600 and carried in TSS Section 7 Maintenance Van.
D	Operator PMCS and maintenance task tools not resident in section are carried in TSS section 7 Maintenance Van.

APPENDIX C**COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS**

Section I. INTRODUCTION**C-1. SCOPE.**

This appendix lists components of end item and basic issue items for the Camera Section to help you inventory items required for safe and efficient operation.

C-2. GENERAL.

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II: Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III: Basic Issue Items (BII). These are the minimum essential items required to place the Camera Section in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the Camera Section during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII based on TOE/ MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listings:

a. Column (1): Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

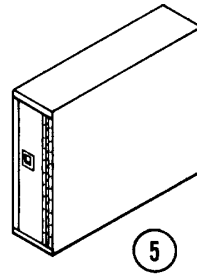
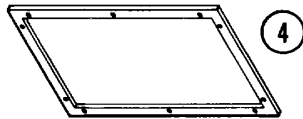
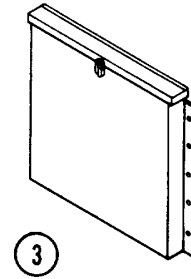
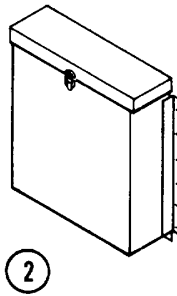
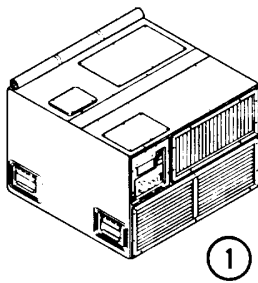
b. Column (2): National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3): Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4): Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

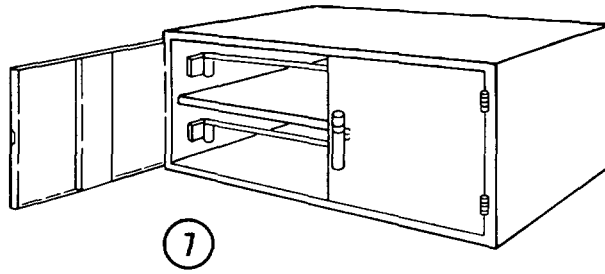
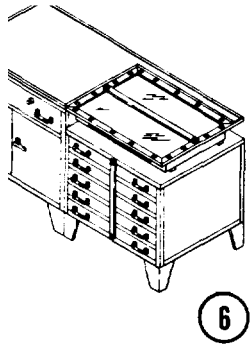
e. Column (5): Quantity Required (Qty Rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM



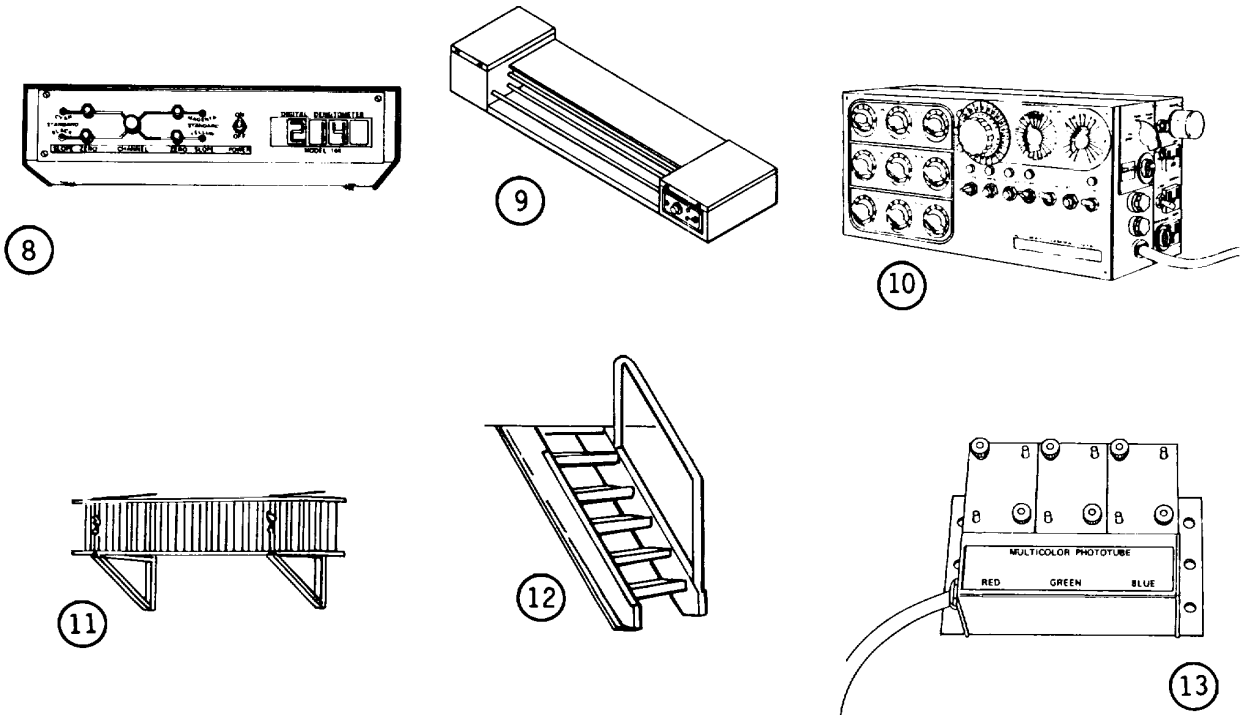
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, FSCM and Part Number	(4) U/M	(5) QTY Reqd
1	4120-01-076-1753	Air Conditioner (94833) F18H-3	ea	2
2		Box, Film Storage (97403) 13226E4410	ea	1
3		Box, Target Storage (97403) 13226E4429	ea	1
4		Bulletin Board (39428) 6092T22	ea	1
5		Cabinet, Developing Tray (97403) 13226E4457	ea	1

Section II. COMPONENTS OF END ITEM



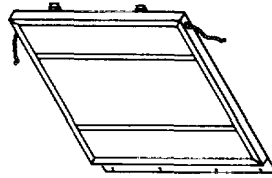
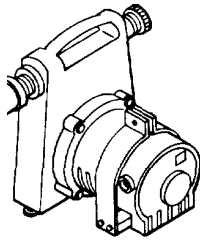
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6		Cabinet Assembly, Light Table consists of : 13226E4504 Light Table (93791) VLT32T Storage Cabinet (81349) MIL-C-40060/15	ea	1
7	7125-00-286-5259	Storage Cabinet (81349) MIL-C-40060/16 Cabinet, Wall Storage (97403) 13226E4411	ea	1

Section II. COMPONENTS OF END ITEM - Cont

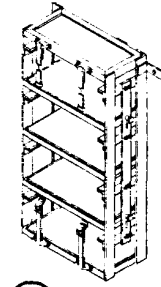


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, FSCM and Part Number	(4) U/M	(5) QTY Reqd
8		Densitometer, Digital Reflection (51490) RD-144	ea	1
9		Dryer, Film (59166) 3040	ea	1
10		Exposure Control Instrument, Light Integrating (51490) 10037	ea	1
11	5440-01-152-7751	Ladder, Folding	ea	1
12	2540-01-133-9726	(39428) 8028T16	ea	2
13		Ladder Assembly, Vehicle Boarding Phototube Assembly, Multicolor (51490) G-202	ea	1

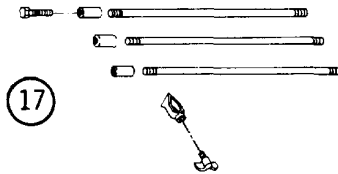
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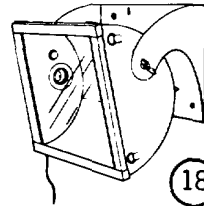
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16



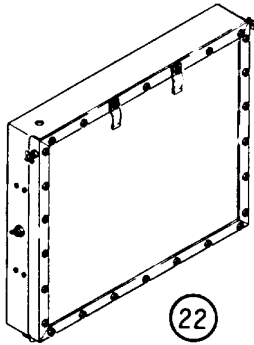
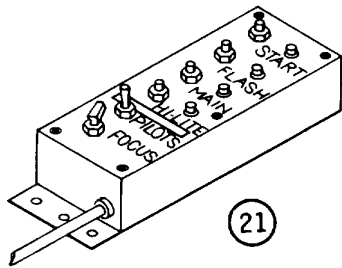
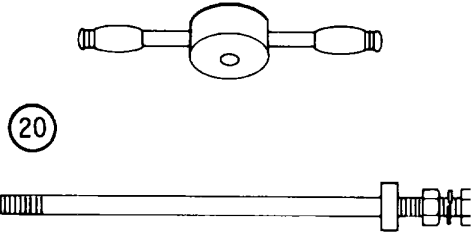
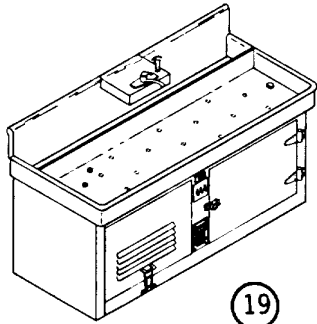
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18

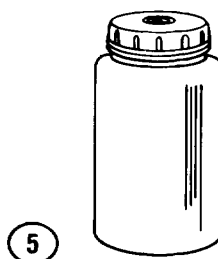
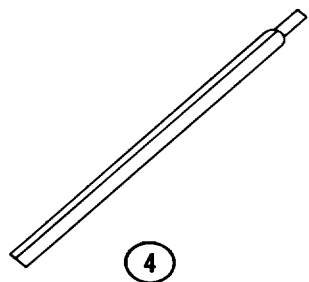
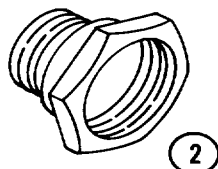
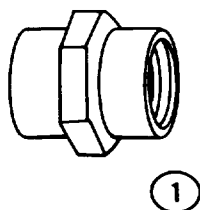
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, FSCM and Part Number	(4) U/M	(5) QTY Reqd
14		Pump, Utility Self-Priming (50340) 15883	ea	1
15		Rack Assembly, Contact Screen (97403) 13226E4513	ea	1
16		Rack Assembly, Lamp Storage (97403) 13226E4519	ea	1
17	5975-00-878-3791	Rod, Ground (81790) 6253-SGLW	ea	1
		Safelight, Darkroom (97403) 13226E7810	ea	1

Section II. COMPONENTS OF END ITEM - Cont



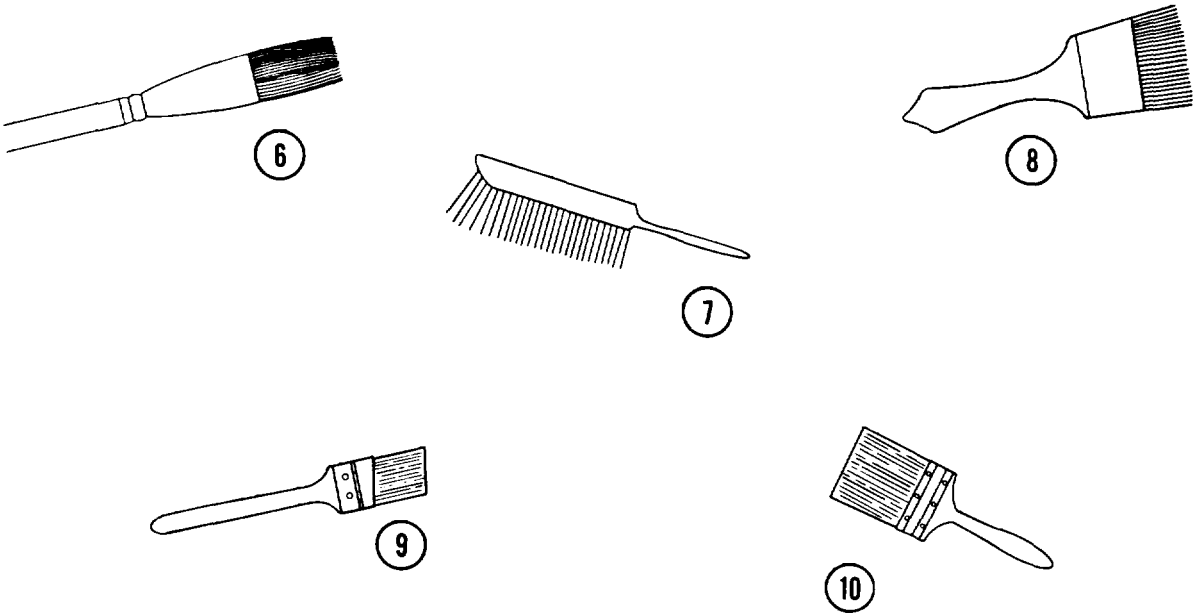
(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, FSCM and Part Number	(4) U/M	(5) QTY Reqd
19	5120-01-013-1676	Sink, Modified, Photographic Processing (97403) 13226E4568	ea	1
20		Slide Hammer (45225) P74-144	ea	1
21		Station, Remote Control (51490) GM/100	ea	1
22		Viewing Stand Assembly (97403) 13226E4460	ea	1

Section III. BASIC ISSUE ITEMS



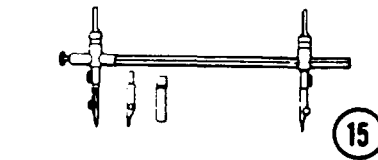
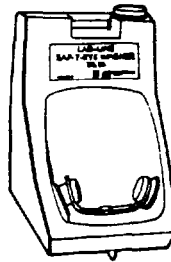
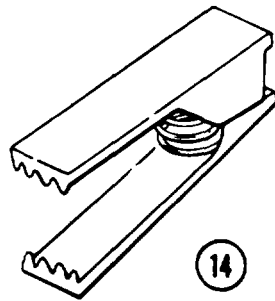
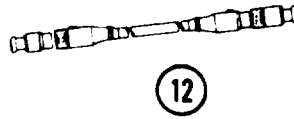
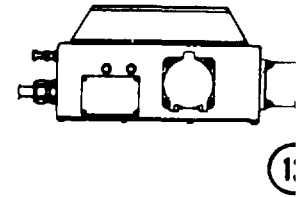
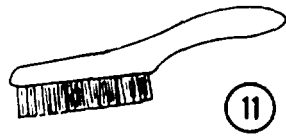
(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
1	4730-00-595-2625	Adapter: Brass 3/4 in. ext. x 3/4 in. ext.	ea	1
2	4730-00-293-7883	Adapter: Copper 3/4 in. ext. x 3/4 in. int.	ea	1
3	8415-00-222-8074	Apron, Laboratory (05668) C-6538-61	bx	2
4	6675-01-114-7226	Bar, Extension Beam, Compass (33363) 55-1818	ea	1
5	8125-00-174-0852	Bottle, Screw Cap (05668) C-6057-20	ea	1

Section III. BASIC ISSUE ITEMS



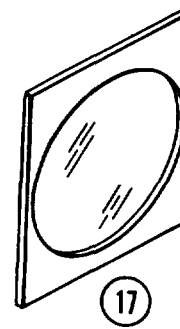
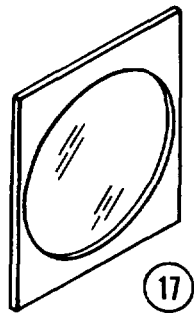
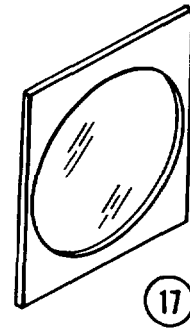
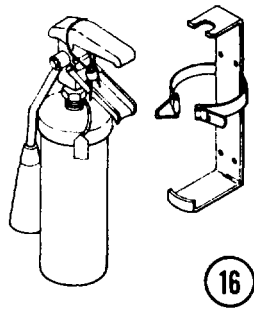
(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
6	8020-00-619-8929	Brush, Artist's (06608) 13308-K	ea	2
7	7920-00-291-5812	Brush, Dusting (81562) 153369	ea	1
8	7920-00-205-1427	Brush, Lens (19139) 149 9714	ea	1
9	8020-00-245-4522	Brush, Paint 1 1/2 inch (06608) 2815-K	ea	1
10	8020-00-245-4520	Brush, Paint 4 inch ea 1 (17699) 122		

Section III. BASIC ISSUE ITEMS - Cont



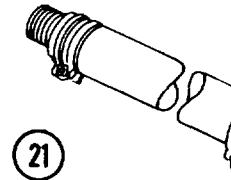
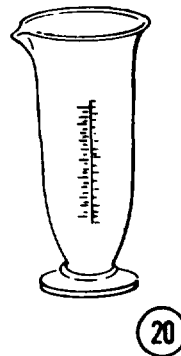
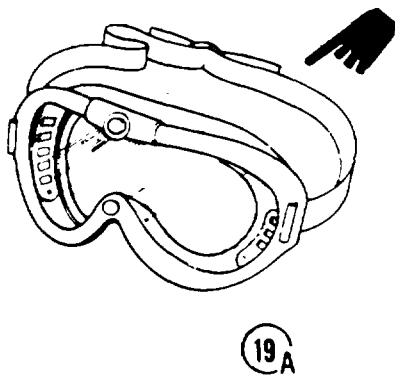
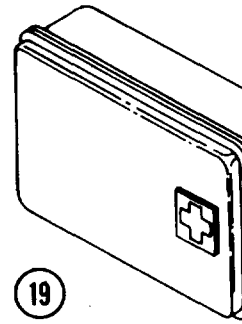
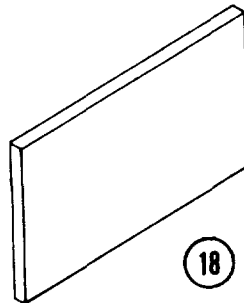
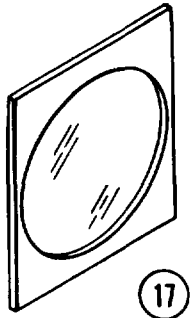
(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
11	7920-00-282-9246	Brush, Wire Scratch (17699) 44065	ea	1
12	6150-00-134-0847	Cable Assembly, Power Electrical (19207) 11601643	ea	1
13	6150-01-081-9264	Cable Terminal Box (97403) 13222E6250	ea	1
14	6740-00-224-9586	Clip, Photographic Film (19139) 149 2594	ea	100
15	6675-00-904-1947	Compass, Drafting (33363) 55 1806	ea	2
15a	4240-01-298-9317	Eye Wash Station (95632) 98	ea	1

Section III. BASIC ISSUE ITEMS - Cont



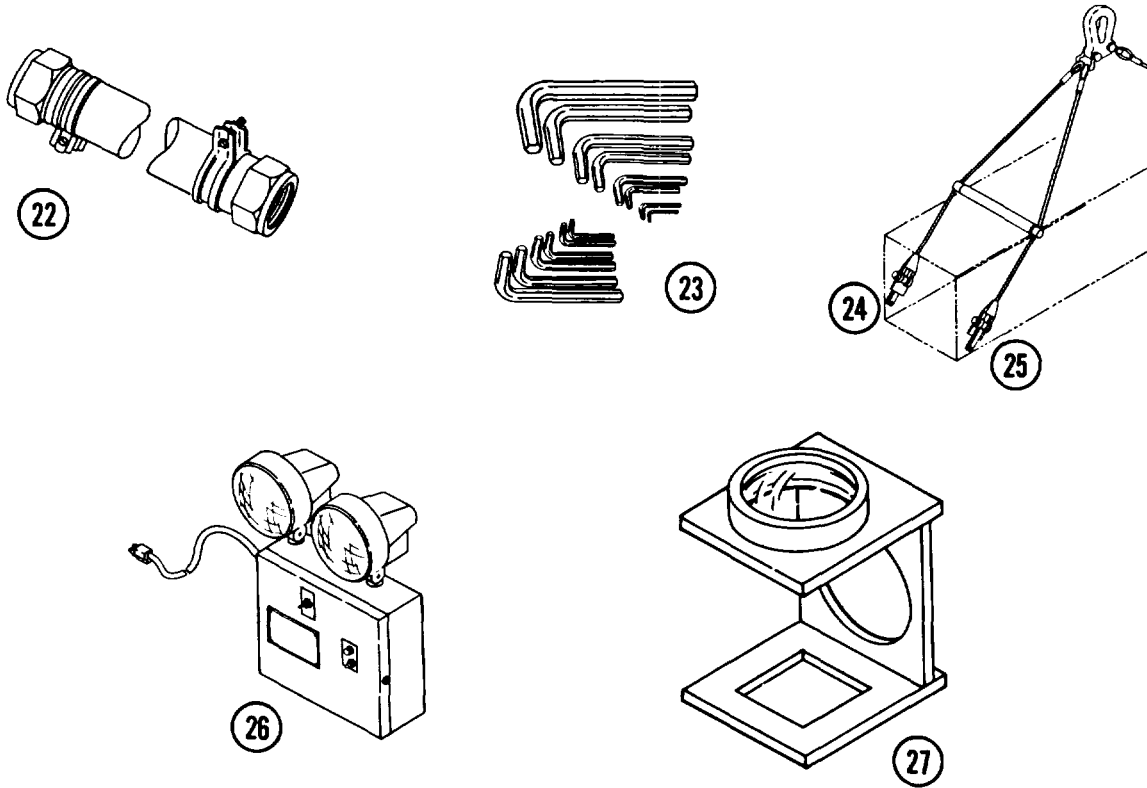
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16	4210-00-555-8837	Extinguisher, Fire (06539) FH-900-2	ea	2
17	6760-00-141-6764	Blue Filter, Light, Photographic Lens: (19139) 149 4368 Green	ea	1
17	6760-00-141-6765	Filter, Light, Photographic Lens: (19139) 149 4442 Red	ea	1
17	6760-00-286-8544	Filter, Light, Photographic Lens: (19139) 149 4178		

SECTION III. BASIC ISSUE ITEMS



(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
17	6760-00-141-6751	Filter, Light, Photographic Lens: Yellow (19139) 149 4061	ea	1
18	6740-00-282-9320	Filter, Photographic Darkroom Safelight (19139) 152 1731	ea	1
19	6545-00-922-1200	First Aid Kit (81348) U-A-500	ea	1
19a	4240-00-052-3776	Goggles, Industrial (81348) A-A-1110	pr	4
20	6640-00-427-5250	Graduate, Liquid, Laboratory (96906) MS35956-6	ea	2
21	4720-00-202-6722	Hose Assembly, Nonmetallic	ea	2

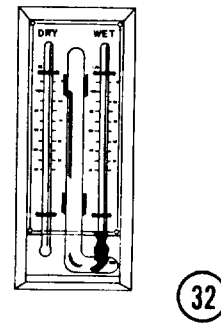
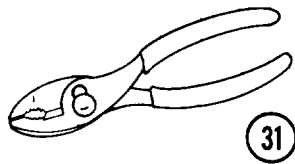
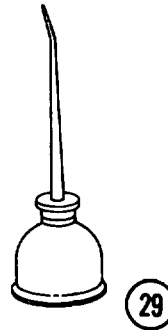
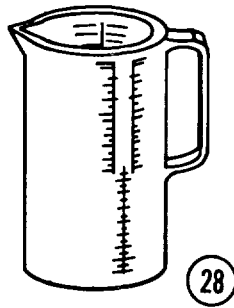
Section III. BASIC ISSUE ITEMS - Cont



(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
22	4720-00-202-6483	Hose Assembly, Wire Reinforced	ea	1
23	5120-00-935-4641	Key Set, Socket Head Screw (55719) AW1020K	se	1
24		Device, Toe Hooks: LH (52555) 1390-4	ea	2
25		Device, Toe Hooks: RH (52555) 1390-3	ea	2
26		Light, Emergency (51745) ADC-1773	ea	1
27	6650-00-255-8268	Magnifier, Monocular (94480) 12-064-10	ea	1

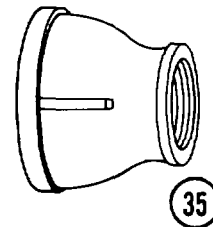
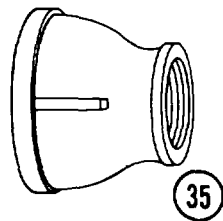
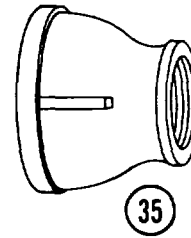
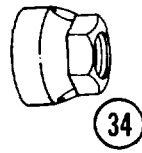
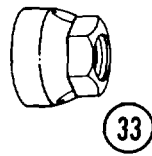
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Section III. BASIC ISSUE ITEMS - Cont



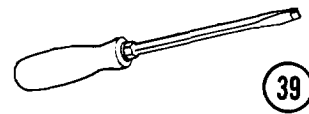
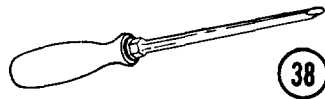
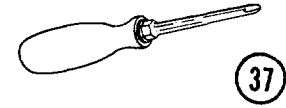
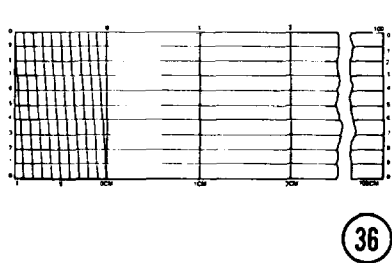
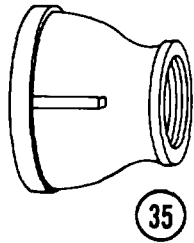
(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
28	7240-00-138-7985	Measure, Liquid (64484) S-40507-A	ea	1
29	4930-00-277-1547	Oiler, Hand (72798) 274T	ea	1
30	5340-00-682-1505	Padlock Set (96906) MS21313-52	ea	1
31	5120-00-223-7396	Pliers, Slip Joint (93389) 276	ea	1
32	6685-00-641-3580	Psychrometer (64467) 314	ea	1

Section III. BASIC ISSUE ITEMS



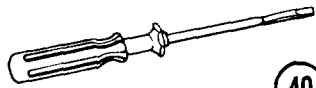
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33	4730-00-277-5649	Reducer, Pipe (82666) 179 2 x 3/4	ea	1
34	4730-00-277-5536	Reducer, Pipe (82666) 179 3 x 1 1/2	ea	1
35	4730-00-227-6929	Reducer, Pipe (82666) 678 3/4 x 1/2	ea	1
35	4730-00-227-6933	Reducer, Pipe (82666) 678 1 x 3/4	ea	1
35	4730-00-231-5661	Reducer, Pipe (82666) 678 1 1/2 x 3/4	ea	1

Section III. BASIC ISSUE ITEMS - Cont

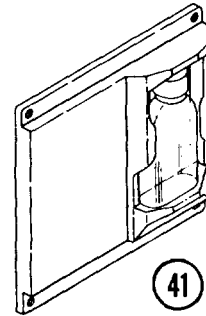


(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
35	4730-00-231-5656	Reducer, Pipe (82666) 678 1 1/4 x 3/4	ea	1
36	6675-00-580-5077	Invar Bar (81348) MILS20197	ea	1
37	5120-00-764-8080	Screwdriver, Cross Tip (52346) HA3B077	ea	1
38	5120-00-234-8912	Screwdriver, Cross Tip #3 (55719) SSDP63	ea	1
39	5120-00-234-8910	Screwdriver, Flat Tip (55719) SSD6	ea	1

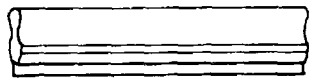
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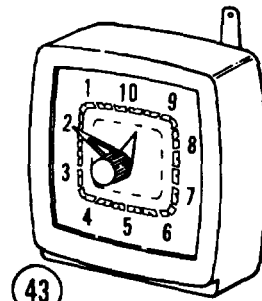
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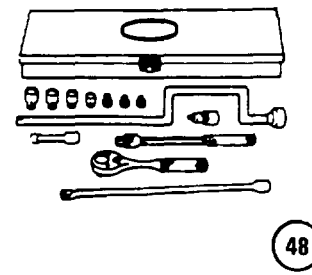
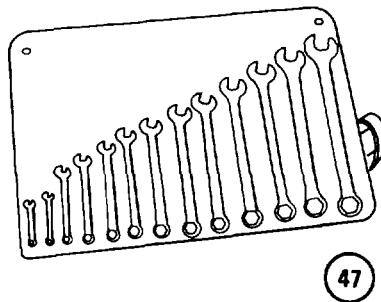
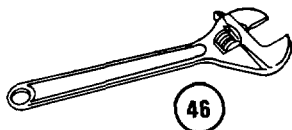
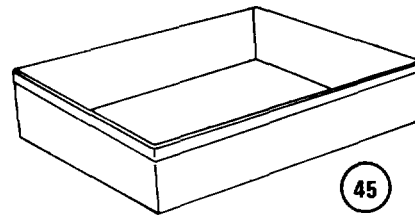
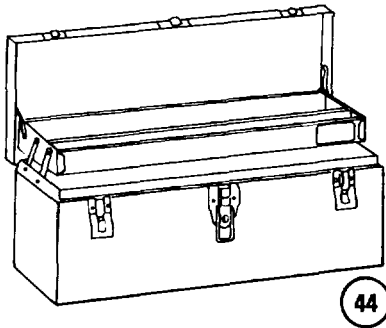
42



43

(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
40	5120-00-293-3178	Screwdriver, Screwstarter (79061) K28	ea	1
41		Station, Eyewash (11392) 12-60-31	ea	1
42	7920-00-234-5121	Squeegee (76708) 5100	ea	1
43	6645-00-732-7789	Timer, Interval (08474) 62348-000	ea	1

Section III. BASIC ISSUE ITEMS - Cont



(1) Illus/ Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable On Code U/M	(5) Qty Rqr
44	5140-00-331-5496	Tool Box, Portable (75206) CS19	ea	1
45		Tray, Developing (97403) 13226E4384	ea	3
46	5120-00-264-3795	Wrench, Adjustable 6 inch (93389) 706	ea	1
47		Wrench Set, Combination (01255) BW-20	se	1
48	5120-00-089-3663	Wrench Set, Socket (96508) PS120	se	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 Camera Section.

D-2. GENERAL.

This list identifies items that do not have to accompany the Camera Section and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA or JTA.

D-3. EXPLANATION OF LISTING.

National stock numbers, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description FSCM and Part Number	(3) U/M	(4) Qty Auth
<u>TOE AUTHORIZED ITEMS</u>			
Not Applicable			

**APPENDIX E
EXPENDABLE SUPPLIES AND MATERIALS LIST**

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the Camera Section. This listing is for information purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except Medical, Class V, Repair Parts and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

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 material (e.g., "Use cleaning compound, Item 5, Appendix E.").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by two-character alphabetical abbreviations (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	C	6750-00-141-6558	Acetic Acid Glacial, Photographic	bt
2	0	8040-00-174-2610	Adhesive, Rubber	cn
3	C	8330-00-965-1722	Chamois, Leather, Sheepskin	ea
4	C	8305-00-222-2423	Cheesecloth	yd
5	C	7930-00-144-7061	Cleaner, Glass	ea
6	C	7950-00-286-6993	Cleaner, Roller	bt
7	C	6850-00-227-1887	Cleaning Compound, Optical Lens	bt
8	C	7930-00-530-8067	Detergent, General Purpose	gl
9	C	6750-00-249-7468	Developer, Photographic	kt
10	C	7520-00-285-1772	Dispenser, Pressure Sensitive Adhesive Tape	ea
11	C	7510-00-223-7044	Eraser, Rubber Light Emulsion Sensitivity)	dz
12	C	6750-00-279-3125	Film, Photographic (Artificial Emulsion Sensitivity)	bx
13	C	6750-00-364-1620	Film Photographic (Orthochromatic Emulsion Sensitivity)	bx
14	C	6750-00-586-9275	Film Photographic (Orthochromatic Emulsion Sensitivity)	bx
15	C	6750-00-297-1675	Film Photographic (Panchromatic	bx
16	C	6750-00-463-4292	Film Photographic (Still Picture Film Type)	bx
17	C	6750-00-802-5471	Fixing Bath, Photographic	cn
18	F	5610-00-618-0258	Floor Patch	gl
19	F		Freon-12 (3D536) 2W217	cy
20	C	7240-00-243-3614	Funnel	ea

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST - Cont

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
21	0	8415-00-248-3228	Gloves, Disposable	bx
22	C	7930-00-190-0904	Grease, GAA	1b
23	C	8520-00-965-2109	Hand Cleaner if	1b
24	C	7510-00-285-5866	Lead, Pencil, Graphite	pg
25	C	7520-00-295-6170	Lead Repointer, Pencil	ea
26	C	9150-00-273-2389	Oil, General Purpose	cn
27	C	7420-00-060-6006	Pail Utility, Plastic	ea
28	C	7420-00-160-0455	Pail Utility, Steel	ea
29	C	8010-00-111-7937	Paint, Forest Green (Ext.)	gl
30	C	8010-00-298-3859	Paint, Light Green (Int.)	gl
31	C	6640-00-597-6745	Paper, Lens	bk
32	C	7520-00-222-1250	Pencil, Mechanical	ea
33	C	9330-00-282-8319	Plastic Sheet	pg
34	C	6750-00-200-4527	Potassium Ferricyanide, Photographic Crystal	bt
35	C	7240-00-965-4427	Receptacle, Waste	ea
36	F	8010-01-030-7254	Resin, Epoxy	kt
37	0	8040-00-851-0211	Sealant, Silicone	tu
38	0		Sealant, Teflon Thread (71643) T18-1-2	ro
39	C	3610-00-542-2832	Screen, Halftone	ea
40	C	3610-01-114-7378	Screen, Halftone	ea
41	0		Screen, Nylon (39428) 1017A31	ro

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST - Cont

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
42	C	5110-00-162-2207	Shears, Straight Trimmers	ea
43	C	6750-00-356-5781	Sodium Thiosulfate	dr
44	0	3439-00-273-3722	Solder, Rosin Core	sl
45	0	6850-00-274-5421	Solvent, P-D-680	cn
46	F	7920-00-240-2555	Sponge, Cellulose	ea
47	C	6850-00-880-1013	Spray, Silicone	cn
48	F		Sprayfoam, Sealant (39428) 7627T1	cn
49	0	5640-00-103-2254	Tape, Duct Sealing Cloth	ro
50	C	7510-00-551-9823	Tape, Plastic Transparent	ro
51	C	7510-00-285-6403	Tape, Plastic (Red 1/2 in.)	ro
52	C	7510-00-051-1171	Tape, Plastic (Red 1 in.)	ro
53	C	7920-00-823-9772	Towel, Paper	bx

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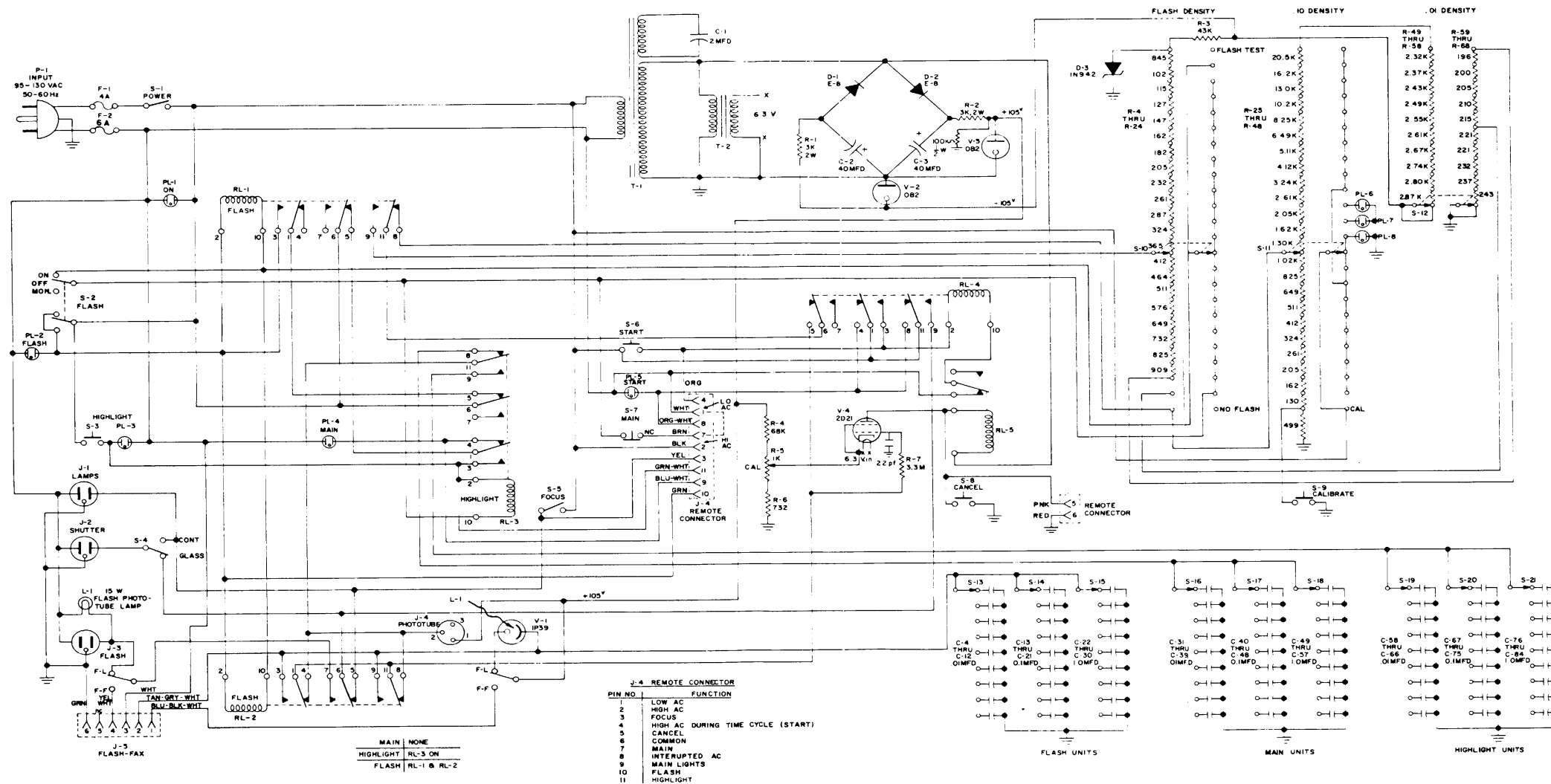
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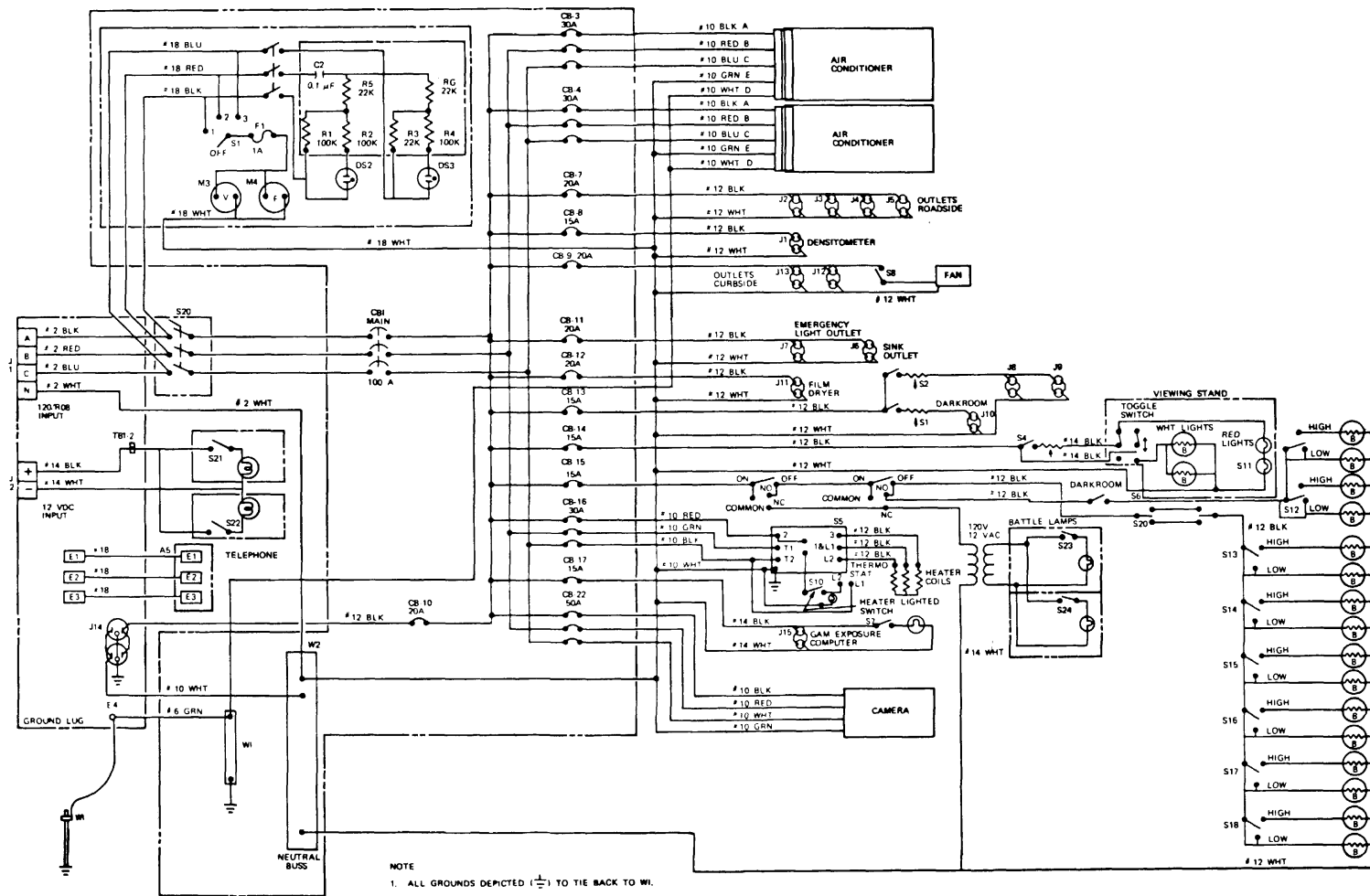
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1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

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Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
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feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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