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NAVSHIPS-900,210

INSTRUCTION BOOK

for

RADIO TELEGRAPH AND TELEPHONE TRANSMITTING EQUIPMENT TCK SERIES

TCK to TCK-7 Inclusive

GENERAL ELECTRIC CO.
BRIDGEPORT, CONN.

NAVY DEPARTMENT BUREAU OF SHIPS

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Section 993-100

NAVY DEPARTMENT
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17 October 1945

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CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

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CONTRACTUAL GUARANTEE

The equipment including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation, is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b. any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided that such guarantee will not obligate the Contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design with the understanding that if ten per cent (10%) or more of any such said item, but not less than two of such item, of the total quantity comprising such item furnished under the contract, are found to be defective as to design, such item will be conclusively presumed to be of defective design and subject to one hundred per cent (100%) correction or replacement by a suitably redesigned item.

All such defective items will be subject to ultimate return to the Contractor. In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective items for repair or replacement without jeopardizing the integrity of Naval communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such items in order to prevent extended interruption of communications. In such cases the return of the defective items for examination by the Contractor prior to repair or replacement will not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure will be acceptable as a basis for affecting expeditious adjustment under the provisions of this contractual guarantee.

The above one year period will not include any portion of time the equipment fails to perform satisfactorily due to any such defects, and any items repaired or replaced by the Contractor will be guaranteed anew under this provision.

INSTALLATION RECORD

Contract Numbers	*Dates of Contracts*	*Contract Numbers*	*Dates of Contracts*
NOs —83834	2 April, 1941	NXss—18783	22 February, 1943
NOs —87454	18 June, 1941	TCG —36083	16 June, 1943
TCG —34112	26 December, 1941	TCG —36083	30 June, 1943
NXss—18783	11 February, 1943	NXsr—53304	16 March, 1944

Serial Number of equipment.....

Date of acceptance by the Navy.....

Date of delivery to contract destination.....

Date of completion of installation.....

Date placed in service.....

Blank spaces in this table shall be filled in at time of installation. Operating personnel shall also mark the "date placed in service" on the date of acceptance plate located below the model nameplate on the equipment, using suitable methods and care to avoid damaging the equipment.

REPORT OF FAILURE

Report of failure of any part of this equipment, during its service life, shall be made to the Bureau of Ships in accordance with current instructions. The report shall cover all details of the failure and give the date of installation of the equipment. For procedure in reporting failures, see Chapter 67 of the "Bureau of Ships Manual," or superseding instructions.

ORDERING PARTS

All requests or requisitions for replacement material should include the following data:

1. Navy stock number or, when ordering from an Army supply depot, the Army stock number.
2. Name of part.

If the Navy stock number has not been assigned, the requisitions should specify the following:

1. Equipment model designation.
2. Name of part and complete description.
3. Manufacturer's designation.
4. Contractor's drawing and part number.
5. AWS, JAN, or Navy type designation.

DESTRUCTION OF ABANDONED MATERIAL IN THE COMBAT ZONE

In case it should become necessary to prevent the capture of this equipment, and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or what ever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper or wood.
4. Grenades and shots from available firearms.
5. Burying all debris, or disposing of it in streams or other bodies of water, where possible and when time permits.

Procedure:

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch and instrument boards.
3. Destroy all controls, switches, relays, connections and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil, and water cooling systems in gas engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!

SAFETY NOTICES

The attention of officers and operating personnel is directed to chapter 67 of Bureau of Ships Manual or superseding instructions on the subject of Radio-Safety precautions to be observed.

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES (1800 VOLTS) WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE SUPPLY ON. DO NOT DEPEND UPON DOOR SWITCHES OR INTERLOCKS FOR PROTECTION BUT ALWAYS SHUT DOWN MOTOR GENERATORS OR OTHER POWER EQUIPMENT. UNDER CERTAIN CONDITIONS DANGEROUS POTENTIALS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE OFF POSITION DUE TO CHARGES RETAINED BY CAPACITORS, ETC. TO AVOID CASUALTIES, ALWAYS REMOVE POWER, DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM.

Since the use of high voltages (1800 volts) which are dangerous to human life is necessary to the successful operation of the equipment covered by these instructions, certain reasonable precautionary measures must be carefully observed by operating personnel during the adjustment and operation of the equipment.

The major portions of the equipment are within shielding enclosures, provided where necessary with access doors which are generally fitted with safety interlock switches which act to shut off dangerous voltages within the enclosures when the access doors are open.

It should be borne in mind that interlocks are provided only on normal access doors on certain major units and therefore side, back or top screens or commutator covers if removed will not cause interlocks to function and will thereby allow access to circuits carrying voltages dangerous to human life.

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed.

KEEP AWAY FROM LIVE CIRCUITS. Under no circumstances should any person other than authorized maintenance personnel be permitted to reach within or in any manner gain access to the enclosure with interlocked doors closed or with power supply line switches to the equipment closed; or to approach or handle any portion of the equipment which is supplied with power, or to connect any apparatus external to the enclosure to circuits within the equipment or to apply voltages to the equipment for testing purposes while any noninterlocked portion of the shielding or enclosure is removed or open. Wherever feasible in testing circuits, maintenance personnel should check for continuity and resistance rather than directly checking voltage at various points.

DON'T SERVICE ALONE. Under no circumstances should any person reach within or enter the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

DON'T TAMPER WITH INTERLOCKS. Under no circumstances should any access door or safety interlock switch be removed, short circuited, or tampered with in any way, by other than authorized maintenance personnel, nor reliance be placed upon the interlock switches for removing voltages from the equipment.

RESUSCITATION

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY THE PRONE PRESSURE METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH RADIO, RADAR OR SONAR ENCLOSURE. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

NOTES

SECTION 1
GENERAL DESCRIPTION

1. INTRODUCTION.

This instruction book contains data on a series of similar Model TCK equipments. The models included are: —Models TCK, TCK-1, TCK-2, TCK-3, TCK-4, TCK-5 TCK-6, and TCK-7. Although the equipments are similar electrically and mechanically in most cases, they are not interchangeable due to minor circuit considerations. Paragraph 9(a) contains a table indicating the Navy Type numbers of the units that must be used together to make up the individual model equipments of the TCK-series.

2. EQUIPMENT DESCRIPTION.

a. General.—The Navy Model TCK-series are Radio Telegraph and Telephone Transmitting Equipments designed for use on almost all ships including submarines, destroyers, and cruisers, or in any shore installation. Each equipment consists of a radio transmitter unit and its associated power supply. The power supply consists of either a motor-generator and its associated magnetic controller or a vacuum tube rectifier unit.

The equipment provides phone or CW transmission with precision, speed and reliability and without causing interference to other units operating in the same frequency band. Preliminary calling is made unnecessary by the accuracy of the tuning.

Representative units making up the TCK-series equipments are shown in Fig. 1-1.

b. Transmitter Unit. –The components in the radio transmitter are mounted on decks which are supported by a welded steel frame. It contains all of the necessary circuits, tubes and control apparatus to provide amplitude-modulated phone or telegraphically keyed CW signals in the frequency range of 2000 to 18,100 kilocycles. The nominal power output is 400 watts for telegraph signals and 100 watts for phone operation.

The operating controls and meters required for the operation are arranged on the front panel for maximum accessibility. The side and rear panels of the cabinet are removable, exposing the circuits for service adjustment. Tubes are available for replacement through access doors on the front panel.

The equipment is designed so that it may be readily started, stopped, and operated using either a four-wire or six-wire remote control unit.

c. Power Converter Units.—Four basic power converters, one for each of the various voltage sources encountered, provide the necessary d-c and a-c operating voltages for the TCK equipments. They are as follows: 115 volt d-c motor-generator; 230 volt d-c motor-generator; 220/440 volt a-c, three-phase, motor-generator; and a 110/220 volt a-c, single phase vacuum tube rectifier unit. The output voltages of these units are 1800/500/115/12 volts d-c and the a-c filament voltages.

The vacuum tube rectifier is a three-chassis cabinet unit, similar in construction to the transmitter. A control panel at the top of the front panel contains the only operating controls. A service door extends from this control panel to the base of the front of the unit to provide access to the tubes, fuses, and relays for servicing.

The a-c and d-c motor-generator units are of single unit construction. They are supplied with a separate magnetic controller contained in a weatherproof box. The individual controllers are designed to conform to one of the three voltage ratings and for a-c or d-c service. Controllers for different voltages and types of service are not interchangeable.

d. Transmission Line Coupling Unit.—The Models TCK-4 and TCK-6 equipments are provided with a transmission line coupling unit which permits operation of these models into a balanced two-wire transmission line. The coupling unit construction is similar to the transmitter unit and mounts directly to the top of the transmitter. All operating controls are contained on the front panel.

3. CONSTRUCTION OF TRANSMITTER UNIT.

a. General.—The d-c operated transmitter shown in Fig. 1-2 has all of the general construction features of the transmitters supplied with all Model TCK equipments. Slight changes occur in the location of front panel controls on the a-c operated units and an additional unit for coupling to a transmission line is mounted on top of the Model TCK-4 and -6 transmitters.

The frame of the transmitter is constructed of chrome molybdenum steel tubing, welded to form an extremely strong, yet light-weight structure to enclose and mount the various chassis and component parts. All shields, subbases, partitions, and front panels are made of aluminum or aluminum alloy. The sides, rear and top of the cabinet are provided with removable, perforated panels which make the interior accessible by merely loosening thumbscrews.

Four hoisting shackles are provided at the top of the frame permitting it to be lifted or lowered readily during installation. Shock mounts consist of four rubber shock absorbers fastened to the bottom of the mounting

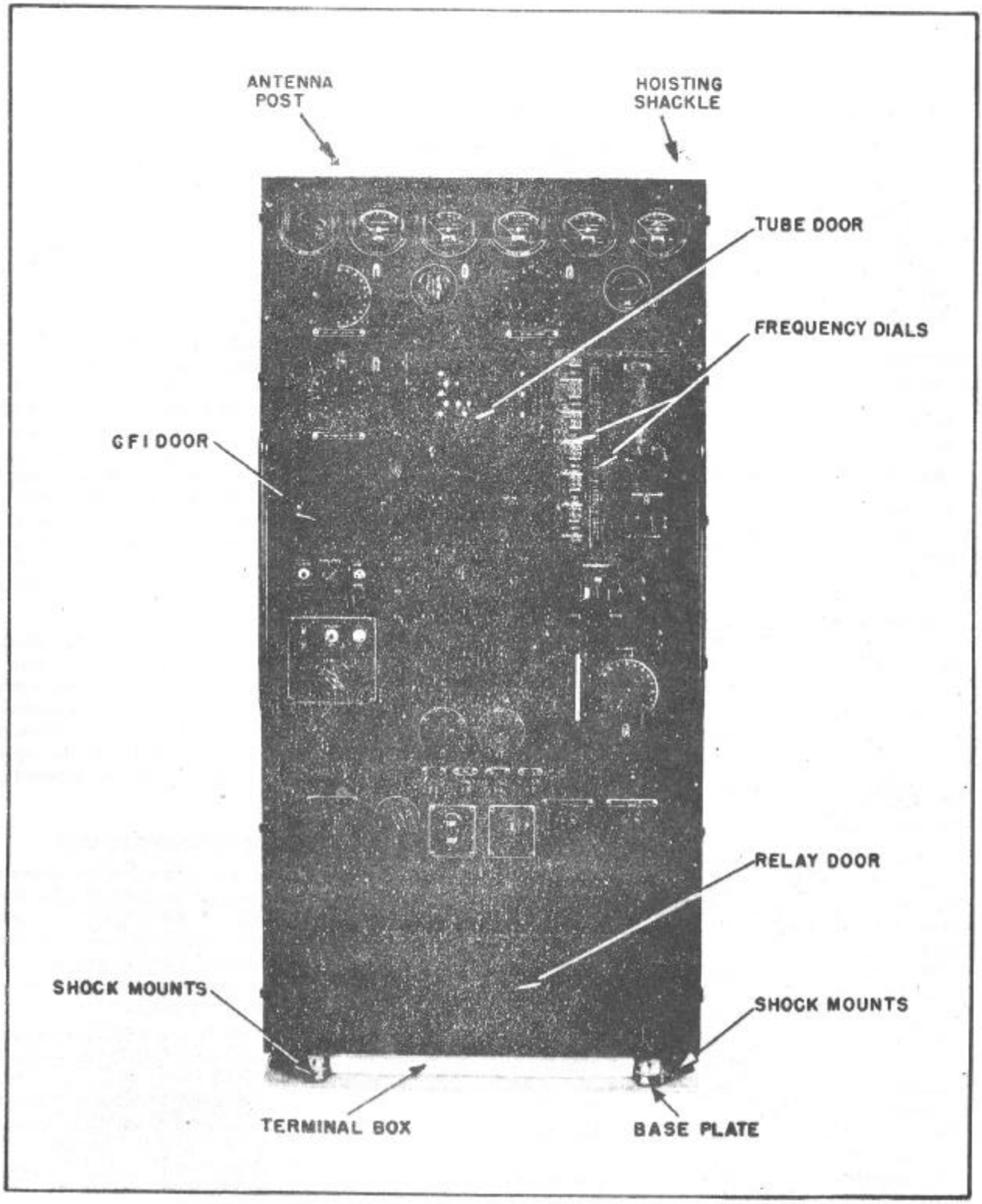


Figure 1-2—Model TCK Transmitter Equipment

base. The motion of the transmitter under heavy shock or vibration is limited by an adjustable snubber on each rubber shock absorber. The shock absorbers may be removed for land base operation where a rigid mounting is desired. At the rear corners near the top of the transmitter are attached two rubber shock absorbers which mount against the rear bulkhead to provide stabilization, and prevent excessive sway.

All operating controls, switches and meters are mounted on the front panel and are arranged for maximum utility. There are six meters located across the top panel that provide ease in observing the operating voltages and currents. Three service doors are built into the front panel so that the vacuum tubes may be readily inspected and replaced if necessary. Each service door is electrically interlocked so that all power, except to the MO heater, is removed when a door is opened. The output post to the antenna is located on the top cover of the unit.

b. Circuit Orientation.—The power amplifier (P-A), the work circuit and the intermediate power amplifier (I-P-A) components are located at the center of the transmitter unit. The tubes for these r-f circuits are accessible through the "tube door" shown in Fig. 1-2. The tuning of the transmitter is accomplished by the Uni-Control knob located to the right of the tube door. This knob is used to control the main tuning condenser gang. Immediately below the frequency dials is located the master oscillator (M-O) unit, the components of which are assembled into a temperature-controlled box. The crystal frequency indicator (C-F-I) unit consists of a chassis which is mounted on a deck behind the CFI door. The controls for the unit are brought out to the front panel. Behind the relay door at the bottom of the front panel, is mounted the Modulator unit. This is a single chassis bolted to the bottom deck of the transmitter. Just inside the relay door and in front of the modulator is the external connection terminal board. All leads from the motor-generator or rectifier, control circuits, and remote control circuits connect into the transmitter at this board. The antenna loading coil and tuning capacitor are in the top section of the radio transmitter to the left of the P-A stage.

c. Tuning Arrangement.—The main tuning condensers that control the frequency of the master oscillator, the power amplifier, the intermediate power amfier and the work circuit of the master oscillator, extend vertically along the right side of the transmitter. They are ganged and operate from one control (Frequency Control "A") on the front panel to provide uni-control tuning of all stages. The M-O plate, the P-A, and I-P-A tuning condensers, are mounted on a casting which in turn is securely mounted to the main frame of the transmitter. The M-O condenser is mounted within the temperature-controlled MO box and is ganged with the other condensers through a rigid insulated coupling. The method of assembly assures accurate line-up and provides a tuning assembly that will withstand vibration shock, and normal service use.

The Frequency Dial, generally known as the Uni-Control mechanism, shown in Fig. 1-3 is designed to provide accurate direct reading of the frequency as determined by the M-O condenser setting. A recurrent counter type of dial scale has been employed in this design to provide a compact scale with a high degree of accuracy. It will be noted that the main tuning control knob drives directly the ganged tuning condenser assembly through a worm and worm gear. Immediately behind the control panel at the Frequency control "A" is mounted a casting shown in Fig. 1-3, which holds the necessary gears to operate a vertical shaft from which the various counter mechanisms operate. This method of attaching the dial scales eliminates the necessity for any heavy driving load being applied to the dial and its gear train.

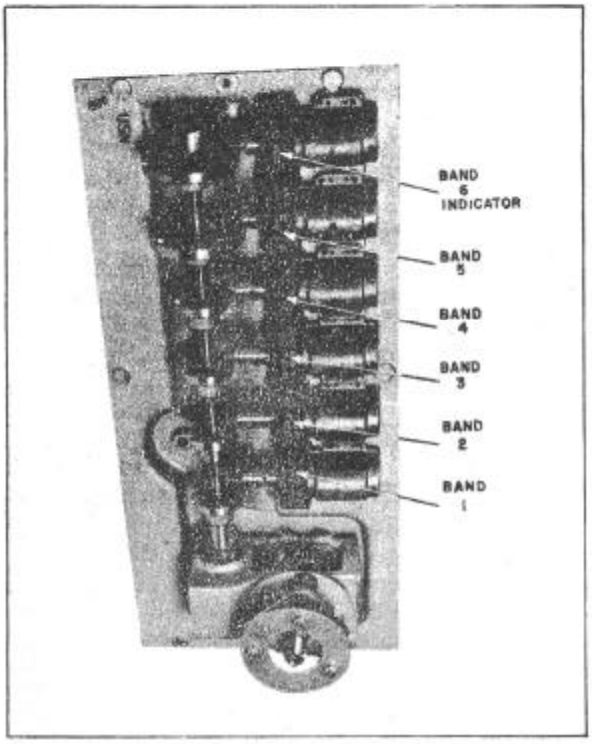


Figure 1-3—Uni-Control Mechanism

The Frequency control is provided with a lever which when turned counterclockwise locks the control in position so that it cannot be accidentally changed. This lever controls a brake mechanism consisting of two brake shoes applied in opposite directions to the brake drum. This arrangement permits locking of the control without disturbing the frequency setting.

In the design of the uni-control and dial mechanism, back-lash has been reduced to a minimum by employing split gears. Extra precision ball bearings are incorporated in the counters and condensers to insure free running and a minimum of friction. Dust covers are provided for all ball bearings.

A stop mechanism for the main tuning condenser drive shaft travel is located immediately behind the gear casting of the control knob. This stop mechanism prevents damage to the condensers and mechanism at the ends of the rotor travel by exerting a braking action before the main end stop is reached so as to slow down the control motion before reaching the positive stop. It also serves as a warning that the operator is beyond the band limit. Sufficient over-travel is provided on the band ends so that the stops are needed only on rare occasions.

d. R-F Amplifiers.—The power amplifier and intermediate amplifier components are mounted in the upper center portion of the transmitter frame. Beside the condenser gang described in the previous paragraph, other circuit components consist of the tank coils, tubes, band change switch and the miscellaneous meters, resistors and capacitors.

Twin power output tubes are mounted vertically on the upper deck of the transmitter and are accessible through the tube door from the front panel. The I-P-A tube is mounted immediately below the P-A tubes on a deck which also holds other components of that circuit. The I-P-A and P-A tube positions are provided with tube clamps to prevent the tubes from working loose under conditions of severe vibration. The clamps vary somewhat in mechanical construction with the various models.

The tank circuits for the r-f stages consist of variable condensers and inductance coils, mechanically and electrically altered to provide the frequency coverage of the transmitter. The tuning arrangement over a single band has already been described. To provide for six bands of frequencies, separate inductances are switched into the plate and grid circuits of the r-f tubes by the Band Change "B" control. Since the circuits are located in different parts of the transmitter assembly, a mechanical linkage system is incorporated to couple the various tank circuit switches. Two interlocks mounted on the band switch remove r-f power from the switch contacts during the switching operation. This prevents arcing, which would burn the controls and shorten the life of the switch.

e. Master Oscillator.—The M-O Unit, shown in Fig. 1-4, houses all of the components of the master oscillator with the exception of the plate tank circuit, or work circuits. The box, housing this unit, is made of an aluminum casting with an outside covering of balsa plywood for heat insulation. The dial and controls are mounted on the front panel and the oscillator tube is accessible through the tube door.

The M-O box is maintained at its operating temperature of 60°C by two thermostatically-controlled heating elements. These elements are connected either in series or in parallel, depending upon the supply voltage applied. A pilot lamp (M-O Heater) is mounted on the front panel and lights when the heating element circuit is closed. A fan inside the box provides constant circulation of air and maintains a uniform temperature throughout the box. The oscillator tube is mounted horizontally on

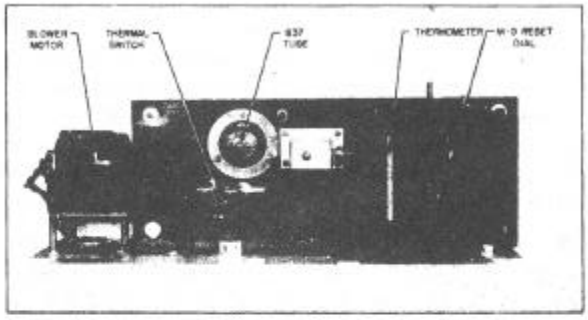


Figure 1-4—Master Oscillator Unit

the outside of the box where it is readily accessible through the center tube access door. The tank circuit tuning condensers of the grid and plate are driven by the Uni-Control tuning mechanism. The inductances are changed by means of a switch which is ganged to the Main Band Change switch.

The oven temperature is controlled by a mercury column-type thermostat (S108) and a heater relay. Until the temperature reaches 60°C, the thermostat circuit remains open and permits power to flow into the heater elements through the heater relay. When the box temperature reaches 60°C, the mercury column thermostat circuit closes and removes heater power. Another thermostat (S109) is incorporated within the oven as a safety device and opens the heater circuit should the temperature rise to approximately 70°C.

The rugged construction of the M-O box and the temperature control over its components insure frequency stability under practically all conditions of temperature and humidity.

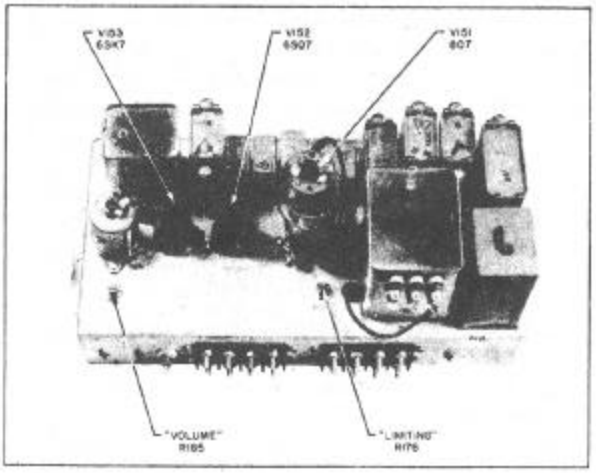


Figure 1-5—Modulator Unit

f. Modulator.—The modulator or audio amplifier unit is constructed on a single chassis as shown in Fig. 1-5. This unit bolts to the lower deck of the transmitter unit and is located directly behind the relay door. This provides easy access to the tubes for servicing. The complete unit may be removed by removing six bolts which

hold it to the base and then removing the leads from the terminal boards.

The modulator tube is provided with a tube clamp which is similar to the P-A and 1-P-A tube clamps.

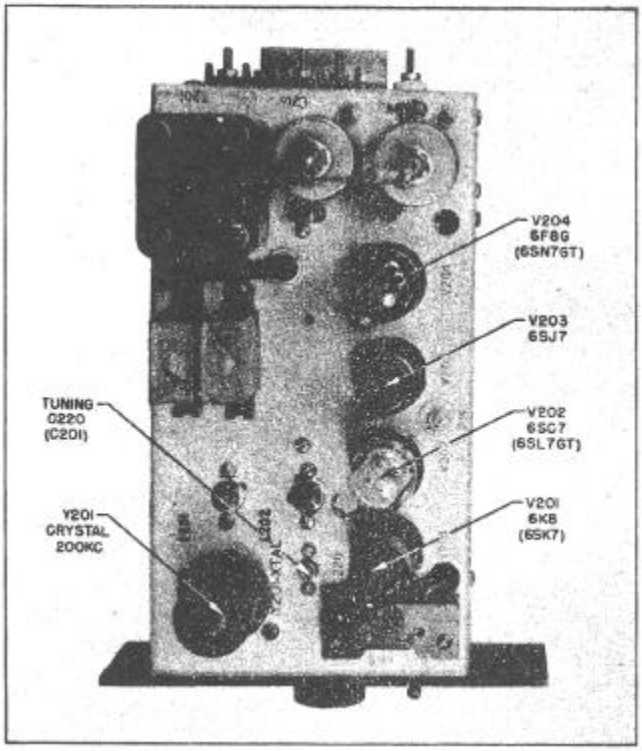


Figure 1-6—Crystal Frequency Indicator Unit

g. Crystal Frequency Indicator.—The CFI Unit is built on a chassis similar to that employed for the modulator unit, as shown in Fig. 1-6. It mounts directly on the center deck of the transmitter and is located to the extreme left of the Uni-Control dial. Tubes are accessible for replacement through the CFI service door shown in Fig. 1-2.

h. Connection Boards, Fuses.— All external connections terminate at terminal board TB-1 mounted in a junction box under the lower deck of the transmitter unit directly inside of the relay door. Each terminal is numbered and the corresponding lead connections to the units are numbered similarly. The terminal board TB-8 is located on the bottom of the deck immediately above the relay door and is available through the lower access door opening.

Besides the overload relays, the transmitter unit is protected by three fuses (F101, F102 and F103). These fuses are cartridge type with renewable links and are located to the left of the relay door.

4. CONSTRUCTION OF MOTOR-GENERATOR.

All models of the TCK-series, except Models TCK-4 and TCK-6, use a motor-generator to provide the d-c bias and plate voltages and the a-c filament supply for the transmitter. A d-c motor-driven unit is shown in Fig. 1-7. It is a four-unit, two-bearing type construction and is supported on two mounting feet. Each unit is enclosed with removable brush covers; all four units have a common drive shaft which make the motor a direct drive. All units can be disassembled for service or overhaul.

Two enclosed terminal boxes mount on top of the assembly. They provide external cable termination and also contain the necessary protective fuses.

Electrically, the motor-generator consists of a driving motor, a high-voltage generator, a dual medium voltage generator, and an overhung low voltage generator. To provide for the different power supplies available, the motors are mechanically interchangeable. The normal speed is 3480 rpm with a motor output rating of 2 horsepower. This makes three combinations available to operate in the following power supplies: (a) 220 or 440 volts, 3-phase, 60 cycles; (b) 115 volts d-c; and (c) 230 volts d-c. When the d-c power supply is used, the motor is provided with slip rings adjacent to the commutator from which a-c may be taken off for the tube filament supply for the transmitter.

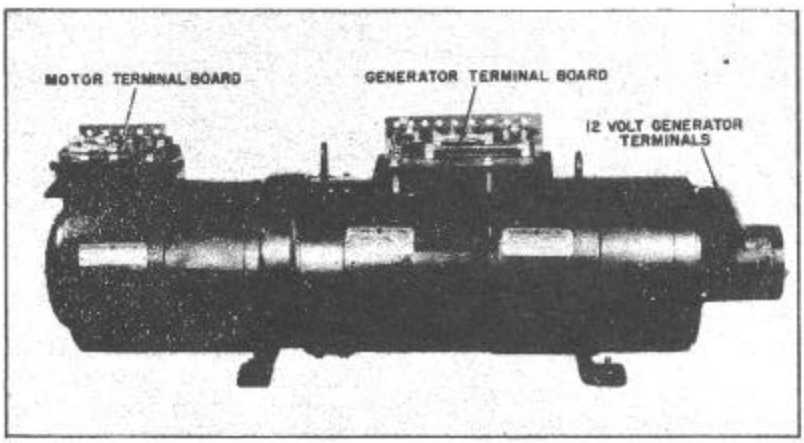


Figure 1-7—Motor-generator Unit

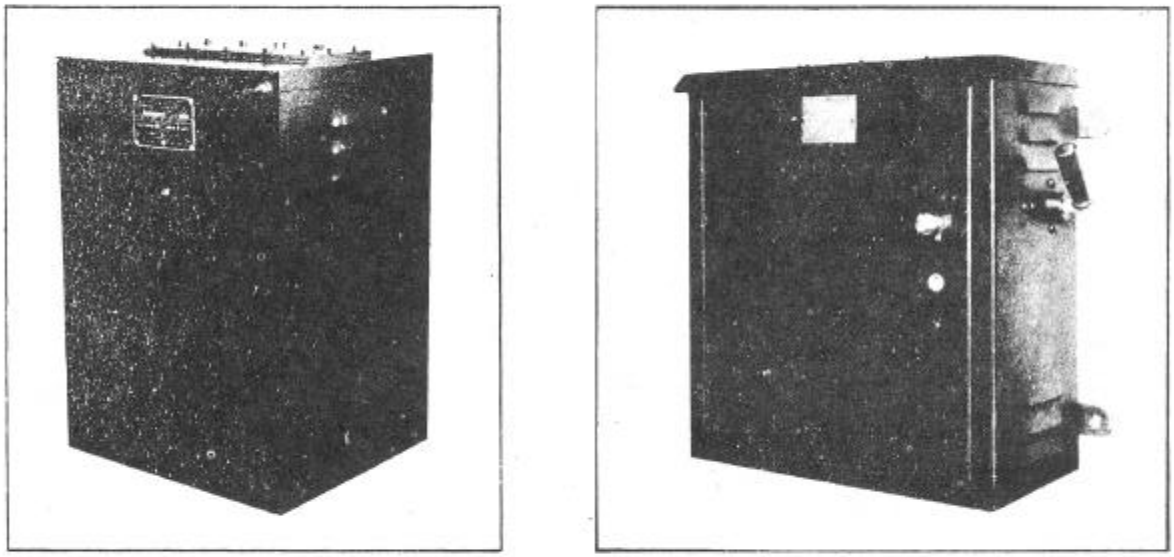


Figure 1-8—Magnetic Controllers

5. CONSTRUCTION OF MAGNETIC CONTROLLER.

The magnetic controller provides semi-automatic starting of the motor of the motor-generator power supply. The principal differences between units are the voltage rating and type of service, either a-c or d-c. The controller used with the Model TCK-7 was designed to be more shock resistant, more compact and weigh less than those with the earlier units. Two types of controllers are shown in Fig. 1-8, the one for the TCK-7 on the left and the a-c controller on the right.

The unit is constructed in a steel drip-proof case with a door on the front to permit ready access to the components mounted on the interior of the case. Removable conduit plates at both top and bottom permit the incoming and outgoing conduits or cables to be connected easily. These openings are covered by a metal plate when not used. Side louvers permit circulation of air about the components for cooling purposes. All models except the TCK-7 make use of mounting feet, with holes for mounting bolts fastened to the rear and exterior of the case. The controller for the Model TCK-7 has mounting holes provided through the rear of the case from the interior.

On the a-c controller, the line switch control handle is brought out to the exterior of the case. On the other models this switch is available on the inside through the front cover. This switch is used only when it is desired to de-energize all circuits, otherwise the Start-Stop switch on the transmitter is used. An overload relay reset button is incorporated on the front door of each unit so that the power can be restored to the motor-generator circuits when the overload is removed.

6. CONSTRUCTION OF MICROPHONE.

The audio input to the transmitter is designed for a single button carbon microphone equipped with a push-to-talk button. This is supplied with some of the equipments, either as a hand or chest type unit. A representative chest type microphone is shown in Fig. 1-9.

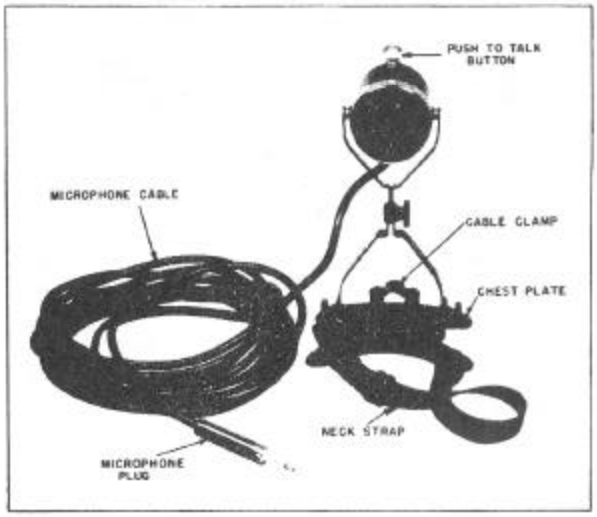


Figure 1-9—Chest Type Microphone

Three-wire microphone cable is supplied with each unit. The three wires are for ground, microphone current, and control voltage. The push-to-talk switch on the chest microphone that is illustrated, is at the top of the microphone unit itself. Another chest type has the switch located in a separate hand control switch box, while the hand microphone has the push-button located in the handle of the microphone.

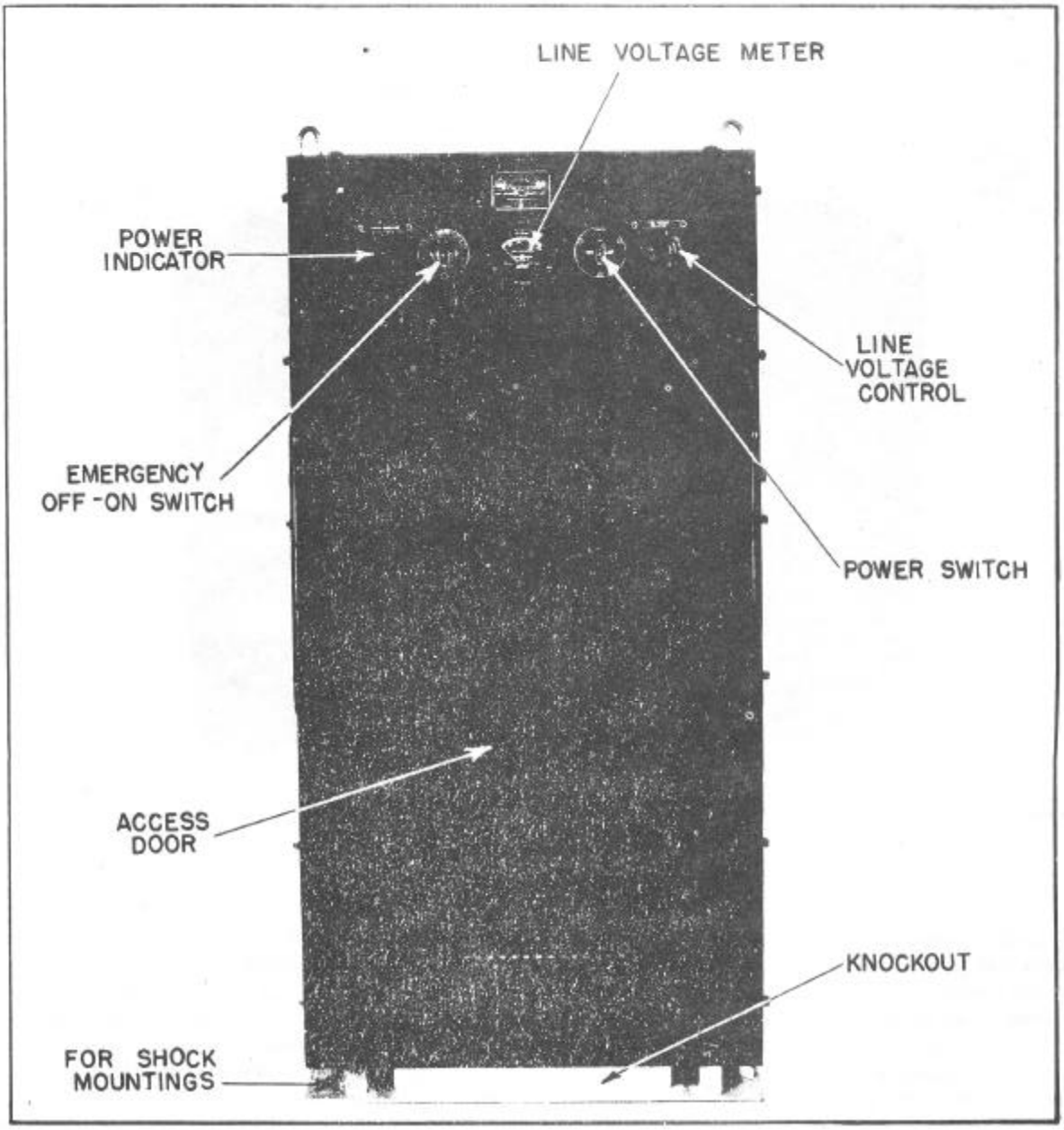


Figure 1-10—Rectifier Unit

7. CONSTRUCTION OF RECTIFIER POWER UNIT.

The Models TCK-4 and TCK-6 make use of a vacuum tube rectifier power unit to provide the d-c voltages from either a 110 or 220 volts, 1-phase, 60 cycle source. The front view of the units is shown in Fig. 1-10.

The frame of the unit is similar in construction to the transmitter, using chrome molybdenum steel tubing welded to form a strong lightweight frame structure to enclose the three chassis of the unit. The "high voltage" chassis occupies the lower area of the frame, the "relay" chassis occupies the upper section; while the "low voltage" chassis is in the center portion. Hoisting shackles installed at each of the top corners permit easy handling during installation.

The front panel of the unit is divided into two principal sections. The top section is permanently attached to the frame and contains the Power switch, Line Voltmeter, Power Indicator lamp, Voltage Regulator Control, and the Emergency switch. Below this panel, the lower section contains the tube and terminal board access door which permits easy access to these components.

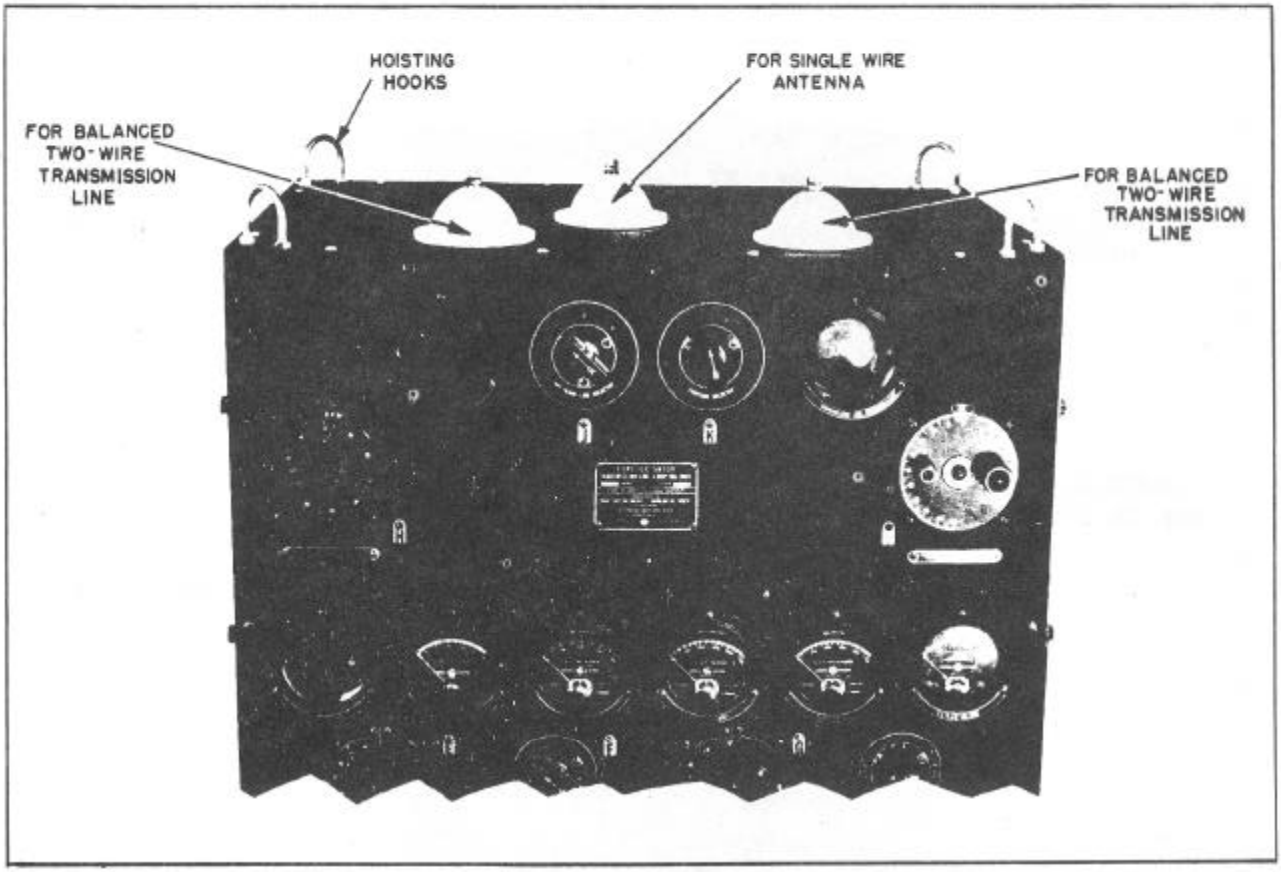


Figure 1-11—Transmission Line Coupling Unit

This access door, extending down the front of the panel, is perforated to permit observation of the rectifier tubes in operation and also acts as a means of ventilation. This door is interlocked so that when opened, all voltages in excess of 230 volts are removed from the unit.

The three chassis may be removed through the front of the unit when the lower panel is removed. Loosen the three holding screws on the front of each chassis, disconnect the terminal boards and slide the chassis forward.

All cable connections are made to the terminal board TB-20 through the knockouts provided in the junction box located on the bottom of the rectifier.

8. CONSTRUCTION OF TRANSMISSION LINE COUPLING UNIT.

The transmission line coupling unit, shown in Fig. 1-11, is used with the Model TCK-4 and TCK-6 equipments to provide operation into a balanced two-wire transmission line at any frequency from 2,000 to 18,100 kilocycles. Provision is also made for use of a single wire antenna of the type generally encountered on submarines, destroyers, and light cruisers. This unit, in general, is used on land-based installations.

The unit is constructed to the same width and depth as the transmitter unit and is assembled on the transmitter at the factory. This increases the height of the transmitter by approximately ten inches. On the front panel are located the tuning controls and antenna current meters.

The assembly of the coupling unit does not require any changes to the transmitter except for the removal of the hoisting shackles. These shackles are assembled on top of the coupling unit in a similar manner to which they were assembled on the transmitter. The antenna post on top of the transmitter centers in a hole in the bottom of the coupling unit and is electrically connected to the coupling unit circuit. Interlock connections to the transmitter are made through terminal boards on each unit. There are three antenna posts on top of the coupling unit. Viewed from the front of the unit, the middle post is for connection to the single wire antenna and the two outer posts are for the balanced two-wire transmission line.

9. QUICK REFERENCE DATA.

NOTE

This instruction book includes data on the following TCK-series of equipments—Models TCK, TCK-1, TCK-2, TCK-3, TCK-4, TCK-5, TCK-6 and TCK-7. The following chart shows the type service, Navy type numbers and components of each model.

a. Equipments, Components and Type Service.

TABLE 1-1

MODEL	TCK	TCK-1	TCK-2	TCK-3	TCK-4 TCK-6	TCK-5	TCK-7
1. TRANSMITTER							
115 V.D-C	CG-52214	.....	.....	CG-52214A	.....	CG-52214A	.....
230 V.D-C	CG-52215	.....	.....	CG-52215A	.....	.....	CG-52345
220/440 V.A-C, 3φ	CG-52216	CG-52216	CG-52216A	CG-52216A	.....	.....	.....
110/220 V.A-C, 1φ	.....	.....	.....	.....	CG-52299	.....	.....
2. MOTOR-GEN.							
115 V. D-C	CG-21631	.....	.....	CG-21631A	.....	CG-21631A	.....
230 V. D-C	CG-21632	.....	.....	CG-21632A	.....	.....	CGU-21632A
220/440 V.A-C, 3φ	CG-21633	CG-21633	CG-21633	CG-21633A	.....	.....	.....
3. RECTIFIER							
110/220 V.A-C, 1φ	.....	.....	.....	.....	CG-20219	.....	.....
4. MAGNETIC CONTROLLER							
115 V. D-C	CG-21627	.....	.....	CG-21627	.....	CG-21627	.....
230 V. D-C	CG-21628	.....	.....	CG-21628	.....	.....	CG-211297
220 V. A-C, 3φ	CG-21629	CG-21629	CG-21629	CG-21629	.....	.....	.....
440 V. A-C, 3φ	CG-21630	.....	CG-21630	.....	.....	.....	.....
5. MICROPHONE							
HAND	CAU-51006A	.....	.....	.....	.....	.....	.....
CHEST	CAU-51016A	CAU-51016A	.....	CAU-51044A	CAU-51044A	CAU-51044A	CAU-51078
6. COUPLING UNIT	.....	.....	.....	.....	CG-51039	.....	.....
7. MICROPHONE CIRCUIT FILTER	CG-53087	CG-53087	.....	.....	.....	.....	.....

TABLE 1-2 EQUIPMENT SUPPLIED

QUAN. PER EQUIP.	NAME OF UNIT	MODEL OF EQUIP.	NAVY TYPE DESIGNATION	POWER GROUP*	OVERALL DIMENSIONS—INCHES						VOLUME—CU. FT. A—Crated B—Uncrated		WEIGHT—LBS. A—Crated B—Uncrated	
					A—CRATED		B—UNCRATED							
					HEIGHT		WIDTH		DEPTH					
					A	B	A	B	A	B	A	B	A	B
1	Transmitter	TCK	CG-52214	III	60	52 5/16	39	25	32	18 1/4	43.4	13.8	540	275
		TCK	CG-52215	IV	60	52 5/16	39	25	32	18 1/4	43.4	13.8	545	280
		TCK, TCK-1	CG-52216	II	60	52 5/16	39	25	32	18 1/4	43.4	13.8	550	285
		TCK-3, TCK-5	CG-52214A	III	60	52 5/16	39	25	32	18 1/4	43.4	13.8	540	275
		TCK-3	CG-52215A	IV	60	52 5/16	39	25	32	18 1/4	43.4	13.8	545	280
		TCK-2, TCK-3	CG-52216A	II	60	52 5/16	39	25	32	18 1/4	43.4	13.8	550	285
		TCK-4, TCK-6	CG-52299	I	72 1/2	52 5/16	39	25	32	18 1/4	47.7	13.8	575	290
		TCK-7	CG-52345	IV	60	52 5/16	39	25	32	18 1/4	43.4	13.8	550	285
1	Motor-Gen.	TCK	CG-21631	III	18	14 1/8	49	41 15/16	15	11 1/4	7.7	3.9	430	370
		TCK	CG-21632	IV	18	14 1/8	49	41 15/16	15	11 1/4	7.7	3.9	430	370
		TCK, TCK-1, TCK-2	CG-21633	II	18	14 1/8	45	38 1/4	15	11 1/4	7.1	3.9	380	320
		TCK-3, TCK-5	CG-21631A	III	18	14 1/8	49	41 15/16	15	11 1/4	7.7	3.9	430	370
		TCK-3	CG-21632A	IV	18	14 1/8	49	41 15/16	15	11 1/4	7.7	3.9	430	370
		TCK-3	CG-21633A	II	18	14 1/8	45	38 1/4	15	11 1/4	7.1	3.9	380	320
		TCK-7	CGU-21632A	IV	19	14 1/8	49	41 15/16	15	11 1/4	7.7	3.9	415	345
1	Rectifier	TCK-4, TCK-6	CG-20219	I	62 3/4	51 29/32	38 1/2	24 13/16	34	16	47.5	12.0	525	375
1	Magnetic Controller	TCK, TCK-3, TCK-5	CG-21627	III	35	29 3/16	26	19 7/16	19	13 11/16	10	4.5	145	130
		TCK, TCK-3	CG-21628	IV	35	29 3/16	26	19 7/16	19	13 11/16	10	4.5	145	130
		TCK, TCK-1, 2, 3	CG-21629	II	23 1/2	19 15/16	27	20 7/16	13 1/2	8 13/16	4.9	3.2	90	40
		TCK, TCK-2	CG-21630	II	23 1/2	19 15/16	27	20 7/16	13 1/2	8 13/16	4.9	3.2	90	40
		TCK-7	CG-211297	IV	25	17 5/16	16	11 9/16	15 1/2	10 3/4	3.6	1.3	95	46
1	Transmission Line Coupling Unit	TCK-4, TCK-6	CG-51039	I	...	11 15/32	...	25	...	16 3/32	...	2.7	...	65
					MOUNTED ON TOP OF TRANSMITTER CG-52299									
1	Microphone	TCK	CAU-51006A	....	5	3 3/8	5	3 1/4	4	2 3/4	PACKED WITH EQUIPMENT SPARES		2	1
		TCK, TCK-1	CAU-51016A	....	12	9 3/4	7	5 1/4	4	2 1/2			3	2
		TCK-3, 4, 5, 6	CAU-51044A	...	12	9 3/4	7	5 1/4	4	2 1/2			3	2
		TCK-7	CAU-51078	....	13	10 3/8	7	5 1/4	4	2 3/8			3	2 1/4
1	Microphone Circuit Filter	TCK, TCK-1	CG-53087	....	12	9 3/32	10	7 7/16	7	5 3/16	PACKED WITH TRANSMITTER UNIT		12	9
	Tubes	TCK, TCK-1, 2, 3, 4, 5, 6, 7	...	....	28	...	17	...	17	...	4.7	...	15	3
	Spare Parts	TCK	Box 1	....	34	...	22	...	19	...	8.2	...	250	95
			Box 2	....	47	...	25	...	15	...	10.2	...	240	150
			Box 3	....	34	...	20	...	15	...	5.9	...	120	85
		TCK-1	Box 1	....	38	...	28	...	15	...	9.3	...	147	82
			Box 2	....	48	...	28	...	15	...	11.7	...	212	161
		TCK-2	Box 1	....	39	...	21	...	15	...	7.1	...	195	95
			Box 2	....	33	...	18	...	15	...	5.2	...	154	92
		TCK-3	Box 1	....	17 1/4	...	28 3/8	...	18 1/8	...	5.2	...	155	105
		TCK-4	Box 1	....	39	...	21	...	15	...	7.1	...	195	148
		TCK-5	Box 1	....	12 1/4	...	40 5/8	...	15	...	3.5	...	150	105
			Box 2	....	17 1/4	...	28 3/8	...	18 1/8	...	5.2	...	200	150
		TCK-6	Box 1	....	39	...	21	...	15	...	7.1	...	195	148
		TCK-7	Box 1	....	12 1/4	...	40 5/8	...	15 1/8	...	3.5	...	130	85
			Box 2	....	17 1/4	...	28 3/8	...	18 1/8	...	5.2	...	134	90
			Box 3	....	17 1/4	...	28 3/8	...	18 1/8	...	5.2	...	134	90
			Box 4	....	17 1/4	...	28 3/8	...	18 1/8	...	5.2	...	134	90
			Box 5	....	17 1/4	...	28 3/8	...	18 1/8	...	5.2	...	134	90

*Power Group Symbol.
I—110/220, 1φ, 60 cycles.
II—220/440, 3φ, 60 cycles.
III—115 v, d-c.
IV—230 v, d-c.

b. Contract Dates.

Model	*Contract*	*Date*
TCK	NOs —83834	2 April, 1941
TCK-1	NOs —87454	18 June, 1941
TCK-2	TCG —34112	26 December, 1941
TCK-3	NXss—18783	11 February, 1943
TCK-4	NXss—18783	22 February, 1943
TCK-5	TCG —36083	16 June, 1943
TCK-6	TCG —36083	30 June, 1943
TCK-7	NXsr—53304	16 March, 1944

c. Contractor.—General Electric Company, Schenectady, N. Y.

d. Naval Inspector.—Inspector of Naval Material, Schenectady, N. Y., and Bridgeport, Conn.

e. Frequency Range.—2,000 to 18,100 kilocycles.

f. Tuning Bands and Range.

Band 1..... 2,000 to 3,000 kc.
Band 2..... 3,000 to 4,500 kc.
Band 3..... 4,500 to 6,000 kc.
Band 4..... 6,000 to 9,000 kc.
Band 5..... 9,000 to 12,000 kc.
Band 6.....12,000 to 18,100 kc.

g. Pre-Set Frequencies.—On Bands 1, 2, 3 and 4, 100 kc check points are provided by use of the CF1 unit. 200 kc check points are provided on Bands 5 and 6.

h. Type of Frequency Control.—Temperature controlled master oscillator.

i. Type of Emission and Modulation Capability.—Amplitude modulation, CW (A1); Phone (A3). Modulation capability of 75% with not over 15 per cent RMS distortion at 400 cps.

j. Output Power.—(Measured into a 50 ohm resistance load.)

(1) *CW POWER OUTPUT.*
400 watts on Bands 1, 2, 3, 4 and 5.
300 watts on Band 6.

(2) *PHONE POWER OUTPUT.*
100 watts on Bands 1, 2, 3, 4 and 5.
75 watts on Band 6.

k. Power Factor of Equipment.

Motor-Generator Supply—approx. 0.85 (full load)
Rectifier-Power Supply —approx. 0.88 (full load)

l. Crystal Characteristics.

Used in Crystal Frequency Indicator Unit to control multivibrator.

Type: GT cut, hermetically sealed.

Frequency: 200 kilocycles.

m. Frequency Stability Data.

(1) *TEMPERATURE—KEY LOCKED.*—Ambient temperature change between 0° and 50°C. Average output frequency change not greater than 0.0005%/deg. C after ½ hr. warm-up.

(2) *LINE VOLTAGE — FULL POWER — KEY LOCKED.*—With 10% change in supply voltage, output frequency change will not be greater than 0.0025% from the frequency at the lowest voltage.

(3) *HUMIDITY.*—With ambient between 40 and 45°C, humidity change from 30 to 95% will change output frequency not greater than 0.02%.

(4) *CONTINUOUS OPERATION.*—With locked key operation for 2 hours at full power output and ambient between 20 and 30°C in the first five minutes frequency changes not greater than 0.004%. For the remainder of the time, the frequency will not vary more than 0.004% from the frequency measured at the end of the first five minutes.

n. Impedances.

(1) *LINE INPUT TO AUDIO UNIT.*—Connected for 500-ohm line at zero db level (may be reconnected to operate from 200-ohm line).

(2) *MICROPHONE INPUT TO AUDIO UNIT.*—Designed to match a 70-ohm single button carbon microphone.

(3) *SIDE TONE OUTPUT FROM AUDIO UNIT.*—Matches a 500-ohm line. Maximum side tone level is zero db.

(4) *CFI-AUDIO OUTPUT.*—Matches 3000 ohms (may be reconnected to match 220 ohms).

o. Electrical Characteristics of Recommended Antenna for TCK-4 and TCK-6.

(1) R-f resistance—26 to 3500 ohms.
(2) Inductive reactance—0 to 2000 ohms.
(3) Capacitive reactance—0 to 2000 ohms.
(4) Transmission line—Lengths up to 20 feet.

p. Power Converter Equipment.

(1) *RECTIFIER UNIT.*—110/220 V. A-C.

Input Rating: 110/220 volts a-c, single phase, 50 or 60 cycles.

Output: 1800 volts, 0.42 amp. d-c.
500 volts, 0.3 amp. d-c.
115 volts, 0.5 amp. d-c.
12 volts, 0.8 amp. d-c.

(2) *MOTOR GENERATOR.*—115 V. D-C.

Input Rating:
Motor—2 hp—3480 rpm—115 v. d-c—40°C continuous operation.

Output Rating:
Slip Rings—81 v. a-c—4.3 amps.—1 phase—60 cycles.
H.V. Generator—1800 v. d-c—0.4 amp.—0.72 kw — compound wound; 500/150 v. d-c—0.35/1.5 amps.—0.35 kw.
L.V. Generator—12 v. d-c—2 amps.—0.34 kw.

(3) *MOTOR GENERATOR.*—230 V. D-C.

Input Rating:

Motor—2 hp—3480 rpm—230 v. d-c—40°C continuous operation.

Output Rating:

Slip Rings—163 v. a-c—2.15 amps.—1 phase —60 cycles.

H.V. Generator—1800 v. d-c—0.4 amp.—0.72 kw — compound wound; 500/115 v. d-c—0.35/1.5 amps.—0.35 kw.

L.V. Generator—12 v. d-c—2 amps.—0.024 kw.

(4) *MOTOR GENERATOR.*—220/440 V. D-C.

Input Rating:

Motor—2 hp—3480 rpm—2 pole—220/440 v. a-c—3 phase—60 cycles—40°C continuous—connect for 220 or 440 volt operation.

Output Rating:

H.V. Generator—1800 v. d-c—0.4 amp.—0.72 kw — compound wound; 500/150 v. d-c—0.35/1.5 amps.—0.35 kw.

L.V. Generator—12 v. d-c—2 amps.—0.024 kw.

q. Primary Power Supply Requirements.—The primary power supply requirements are listed under Table 1-3 below.

r. Equipment Supplied.—The equipment supplied by contract is shown in 9*a*. All units for all contracts are tabulated in Table 1-1 on page 1-9. Table 1-2 includes the dimensions, weights, and volumes of the units, either crated or uncrated.

s. Vacuum Tube Complement.

TABLE 1-4

TUBE	QUAN.	TYPE NO.
Master Oscillator (V101)	1	837
Intermediate Power (V102)	1	837
Power Amplifier (V103, 104)	2	813
Modulator (V151)	1	807
2nd Speech Amplifier (V152)	1	6SQ7
1st Speech Amplifier (V153)	1	6SK7
Crystal Oscillator (V201)	1	6K8 (6SK7)*
Multivibrator (V202)	1	6SC7(6SL7GT)*
CFI Detector (V203)	1	6SJ7
CFI Amplifier (V204)	1	6F8G(6SN7GT)*
H.V. Rectifier (V301, 302, 303, 304)	4	836
L.V. Rectifier (V305, 306)	2	836

*Tubes shown in brackets appear in Model TCK-7, Transmitter CG-52345, only. They replace adjacent tube types.

TABLE 1-3

VOLTAGE/PHASE/ FREQUENCY	115 V. D-C	230 V. D-C	110/1/60 A-C	220/1/60 A-C	220/3/60 A-C	440/3/60 A-C
TYPE	MOTOR-GENER-ATOR	MOTOR-GENER-ATOR	RECTI-FIER	RECTI-FIER	MOTOR-GENER-ATOR	MOTOR-GENER-ATOR
1. Starting Current	60 amps.	30 amps.	.....	.....	47* amps.	23.5* amps.
2. Stand-By Current (key open)	13.6 amps.	6.8 amps.	3.4 amps.	1.7 amps.	5.2* amps.	2.6* amps.
3. Operate Current (key locked at 2 mc)	22.4 amps.	11.2 amps.	18 amps.	9 amps.	7.4* amps.	3.7* amps.
4. Input Power (key locked at 2 mc)	2.3 kw.	2.3 kw.	1.8 kw.	1.8 kw.	2.4 kw.	2.4 kw.

*Current per line.

t. Frequeny Range of Bands and Crystal Check Points

Table 1-5

FREQUENCY RANGE OF BANDS AND CRYSTAL CHECK POINTS

BAND	1	2	3	4	5	6
Frequency Range of M.O. (kc)	1000 1500	1500 2250	2250 3000	3000 4500	2250 3000	3000 4525
Strong 100 kc Crystal Check Points	2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000	3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 Etc.	4500 4600 4700 4800 4900 5000 5100 5200 5300 5400 5500 Etc.	6000 6100 6200 6300 6400 6500 6600 6700 6800 6900 7000 Etc.	9000 9200 9400 9600 9800 10000 10200 10400 10600 10800 11000 Etc.	12000 12200 12400 12600 12800 13000 13200 13400 13600 13800 14000 Etc.
Frequency Range of Work Circuit (kc)	2000 3000	3000 4500	4500 6000	6000 9000	4500 6000	6000 9000
Frequency Range of I.P.A. (kc)	2000 3000	3000 4500	4500 6000	6000 9000	9000 12000	12000 18000
Frequency Range of P.A. (kc)	2000 3000	3000 4500	4500 6000	6000 9000	9000 12000	12000 18000

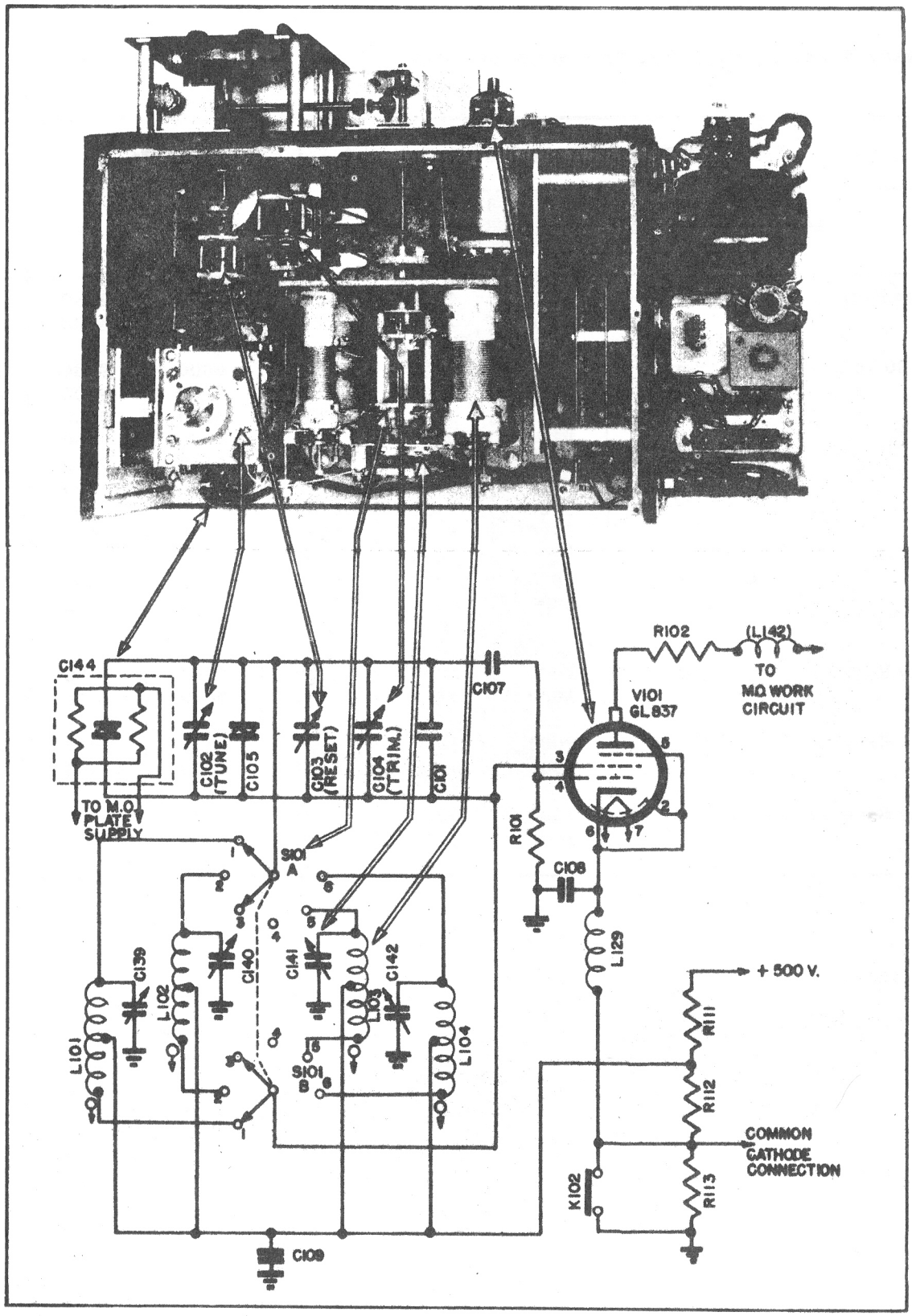


Figure 2-1—Master Oscillator Schematic

SECTION II
THEORY OF OPERATION

1. GENERAL.

The Model TCK transmitters are capable of either continuous wave (C.W.) or amplitude-modulated (A.M.) transmission at any carrier frequency between 2000 and 18,100 kilocycles. They operate from their own power converter, either rectifier or motor-generator set and can produce 400 watts of r-f power. The models utilizing the rectifier type of power converter operate from a 110 or 220 v. a-c single-phase line, while those utilizing a motor-generator set operate from a 220 or 440 v. a-c three-phase line in one case, a 115 v. d-c line in another, and a 230-volt d-c line in a third case.

The wide frequency range of operation is obtained by the use of six bands, each covering a portion of the range with a slight overlapping of adjacent bands. A single front panel BAND CHANGE control selects the proper components in each circuit as the equipment is switched from band to band. When the equipment is used for continuous wave operation, the cathodes of the transmitting tubes are biased beyond plate current cut-off with the key open, and with the key closed the bias is lowered, thereby permitting the generation and emission of an r-f signal. Grid modulation of the power amplifier-tubes is employed for A.M. (microphone) operation.

The r-f generating and amplifying circuits consist of a master oscillator (M.O.), an intermediate power amplifier (I.P.A.), and a power amplifier (P.A.). Auxiliary circuits are the antenna coupling circuits, crystal frequency indicator (C.F.I.), modulator unit, and the control circuits. These same circuits appear in all models of the TCK equipment and the only major difference in the series occurs in the substitution of newer tube types in the C.F.I. unit of the Model TCK-7. The control circuit arrangements vary slightly with changes in the power source because transformers and power connections must be modified to accommodate the widely different supply voltages.

In the following discussion it will be helpful to refer occasionally to the complete schematic diagrams at the rear of the book. The transmitters included on each are indicated by the legends.

2. MASTER OSCILLATOR (M.O.) (*See Figure 2-1.*)

The Master Oscillator circuit uses a single 837 tube as both oscillator and buffer amplifier by letting the screen grid of the tube act as the plate in the oscillator circuit and employing electron coupling to the tube plate for the output signal. The oscillator circuit is of the Hartley type, consisting of a coil in parallel with tuning capacitors between the control and screen grids of the oscillator tube. A center tap of each coil is connected to r-f ground through a by-pass capacitor. Four separate coils, each wound on a separate ceramic form and tuned independently by both an internal slug and a shunting capacitor, are employed to cover the six frequency bands. These coils are selected in order as the BAND CHANGE switch is advanced, the first two coils for bands #1 and #2 respectively and the second two coils for bands #3 and #5 and bands #4 and #6 respectively. Each of the latter two coils is made to supply two bands through frequency multiplication in succeeding stages of the transmitter.

The shunting capacitors across the coils are zero temperature coefficient ceramic trimmers, and in combination with the internal tuning slugs make it possible to track the calibrations on the front panel FREQUENCY indicators. The FREQUENCY control actually operates only one tuning capacitor, therefore the capacity, including stray capacity, across all coils must be equal if the same variation is to be obtained in each band for any specific change in the tuning capacity.

Two variable air-dielectric trimmer capacitors are connected across the M.O. tank circuit on all bands. One of these is used for making initial calibration adjustments and the other is the front panel M.O. RESET control for adjusting the M.O. frequency during operation. Three additional capacitors also connected across the M.O. circuit: one is a fixed mica and the other two are negative coefficient ceramic capacitors. One of the latter compensates for frequency drift due to heating of the tube elements when the equipment is first turned on. It is enclosed in a case with two heater resistors which are in series with the M.O. tube plate supply. When the transmitter key is closed the M.O. plate current flows through the resistors, causing them to heat; this heat affects the capacitor and compensates for changes in tube interelectrode capacities during the warm-up period. The other negative coefficient capacitor compensates for the effects of small changes in ambient temperature on the other circuit components, such as coils and trimmers. All of the M.O. components are contained in a temperature controlled compartment to keep these ambient changes to a minimum.

Grid bias is obtained for the oscillator tube by means of a grid leak resistor connected to ground and a d-c isolating capacitor connected between the M.O. grid and the oscillator tank circuit. Rectified grid current must return to ground through the resistor, producing a negative d-c potential on the grid. Screen voltage is applied through the center tap of the oscillator coils from a voltage divider circuit in the 500 v. supply.

The M.O., I.P.A., and P.A. tubes have a common cathode connection through either a resistor or the keying relay contacts to ground. With the keying relay

open (C.W. operation—key open), the tube cathode currents plus an additional bleeder current flow through the common cathode resistor and prevent oscillation in any of the stages. With the relay closed (C.W. operation—key closed, or A.M. operation), the common cathode resistor is short circuited by the keying relay contacts and the cathodes are connected to ground to permit the circuits to function. A choke coil between the oscillator cathode and the relay, plus an r-f by-pass capacitor to ground, prevent any r-f voltage from feeding back into the relay and power supply circuits.

Electron coupling within the oscillator tube conducts the oscillator r-f signal to the plate. Any parasitic oscillations which tend to occur in the output are suppressed by a resistor inserted between the plate and the circuit into which it works. Models TCK-4, -6, and -7 have a small series inductance added at this point for the same purpose.

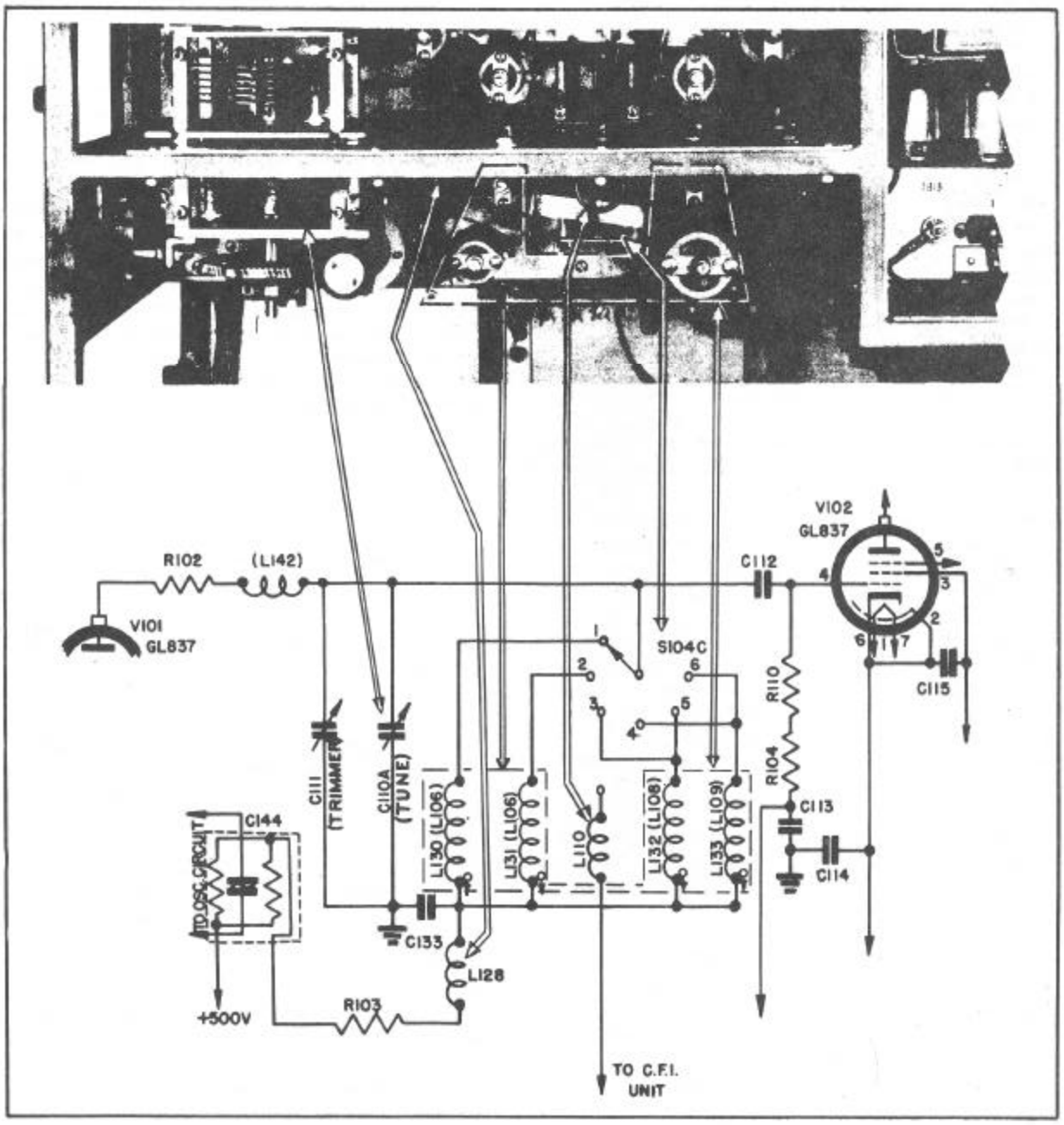


Figure 2-2—Master Oscillator Work Circuit Schematic

3. WORK CIRCUIT. (*See Figure 2-2.*)

The plate load or "WORK CIRCUIT" for the M.O. tube consists of a tank circuit for frequency selection and a coupling circuit to the grid of the I.P.A. tube. The tank circuit consists of any one of four coils connected in parallel with a tuning and a trimming capacitor, each combination corresponding to one of the four oscillator frequency bands. The tuning capacitor is ganged with the one in the oscillator for simultaneous tuning of the two circuits and the coils are selected by the BAND CHANGE switch at the same time that it selects oscillator coils; thus the WORK CIRCUIT tuning is made to track the tuning of the oscillator on all bands. It is tuned, however, to twice the frequency of the oscillator, offering maximum impedance to the second harmonic of the signal and shunting the fundamental to ground. "Slug tuning" is used in these coils, as in the M.O., to make the tuning track the FREQUENCY control calibrations.

Plate current for the M.O. tube is taken from the +500 v. supply through the resistors in the M.O. capacity compensator, an additional series resistor, an r-f choke, and the WORK CIRCUIT. The r-f choke, plus a large capacitor between the power supply side of the tank circuit and ground, keeps all r-f signals out of the 500 v. supply. A fifth coil located near the WORK CIRCUIT inductances is a pick-up coil for obtaining a signal to use in the C.F.I. unit. Although this coil is shown on the WORK CIRCUIT schematic, it has no other function than signal pick-up.

4. INTERMEDIATE POWER AMPLIFIER (I.P.A.) (*See Figure 2-3*).

The loading circuit for coupling to the grid of the I.P.A. stage (Type 837 tube) consists of a coupling capacitor to the grid and a grid leak resistor to a-c ground. Fixed grid bias, taken from a potentiometer in the —115v. supply, and applied through the grid leak resistor, protects the tube from damage in the absence of a driving voltage from the M.O.

The cathode connection to the I.P.A. was mentioned in conjunction with the oscillator tube and the application of cathode bias to control C.W. operation. The screen voltage is supplied by a simple voltage dropping resistor from the +500 v. supply. An r-f by-pass capacitor from screen to cathode keeps r-f currents out of the power supply. Another capacitor from cathode to ground keeps the r-f currents out of the common cathode circuit and keying relay.

C.W. and PHONE operation require different suppressor grid voltages on the I.P.A. in order to obtain full driving voltage for C.W. transmission and to obtain half voltage when the output signal is to be modulated. Due to the fact that the response of the circuits varies with frequency and the percentage modulation must be kept relatively constant for all bands, it is necessary to adjust separately for each band the amount of driving voltage supplied to the Power Amplifier by the I.P.A. If this adjustment were not provided, under-modulation, resulting in low efficiency, would occur on certain frequencies and over-modulation, with its resulting interference would occur on other frequencies. The adjustment is accomplished by applying the proper negative voltages to the suppressor grid of the I.P.A. for PHONE operation and connecting the suppressor to ground for C.W. operation. The BAND CHANGE switch selects a different negative voltage for each band by selecting a different potentiometer in the —115 volt supply each time the switch is changed. For simplicity, only the variable resistors of the potentiometer circuits are shown in the accompanying schematic diagram. Actually, each consists of the one variable and two additional fixed resistors, connected in series to provide both accurate adjustment and low power drain. The potentiometers are adjusted for each band to the point where the correct driving voltage for ¼ power output will be applied to the P.A. by the I.P.A.

The plate circuit of the intermediate power amplifier is much the same as the M.O. WORK CIRCUIT, except that a separate "slug-tuned" inductance is used for each of the six bands. These inductances are selected by the BAND CHANGE switch, the first four being tuned to the same frequency as the four M.O. WORK CIRCUIT coils and the last two to the second harmonics of M.O. coils 3 and 4. A glance at the table of frequency bands given below will show how frequency doubling in these two stages ("WORK CIRCUIT" and I.P.A.) has developed all six of the desired operating bands from the original four oscillator frequencies.

TABLE 2-1

	M.O.	WORK CIRCUIT	I.P.A.
Band 1	1000 1500	2000 3000	2000 3000
Band 2	1500 2250	3000 4500	3000 4500
Band 3	2250 3000	4500 6000	4500 6000
Band 4	3000 4500	6000 9000	6000 9000
Band 5	2250 3000	4500 6000	9000 12000
Band 6	3000 4500	6000 9000	12000 18000

An additional wafer on the BAND CHANGE switch short circuits the first band coil of the I.P.A. when bands 4, 5, and 6 are in use. Because of the large size of the coil, objectionable resonant losses would occur

if stray voltages were not prevented from building up across it by the shorting switch. A choke coil in series with the +500 v. plate supply, plus a large capacitor to ground, keep r-f currents from this stage out of the power supply and meters. Both the plate voltmeter and ammeter have the additional protection of by-pass capacitors.

The I.P.A. plate tuning capacitor is ganged to those in the two previous stages. A trimmer capacitor which is connected in parallel with the tuning capacitor has a control on the front panel of the unit. This is provided to enable the operator to align the circuit more accurately than can be done with the main tuning capacitor during a major frequency change. Its tuning range has been restricted to make it impossible to resonate the I.P.A. tank circuit at any frequency other than that selected by the main tuning capacitor and BAND CHANGE switch. Thus maximum output from the tank circuit may be realized at all times without danger of operating on a harmonic of the desired frequency.

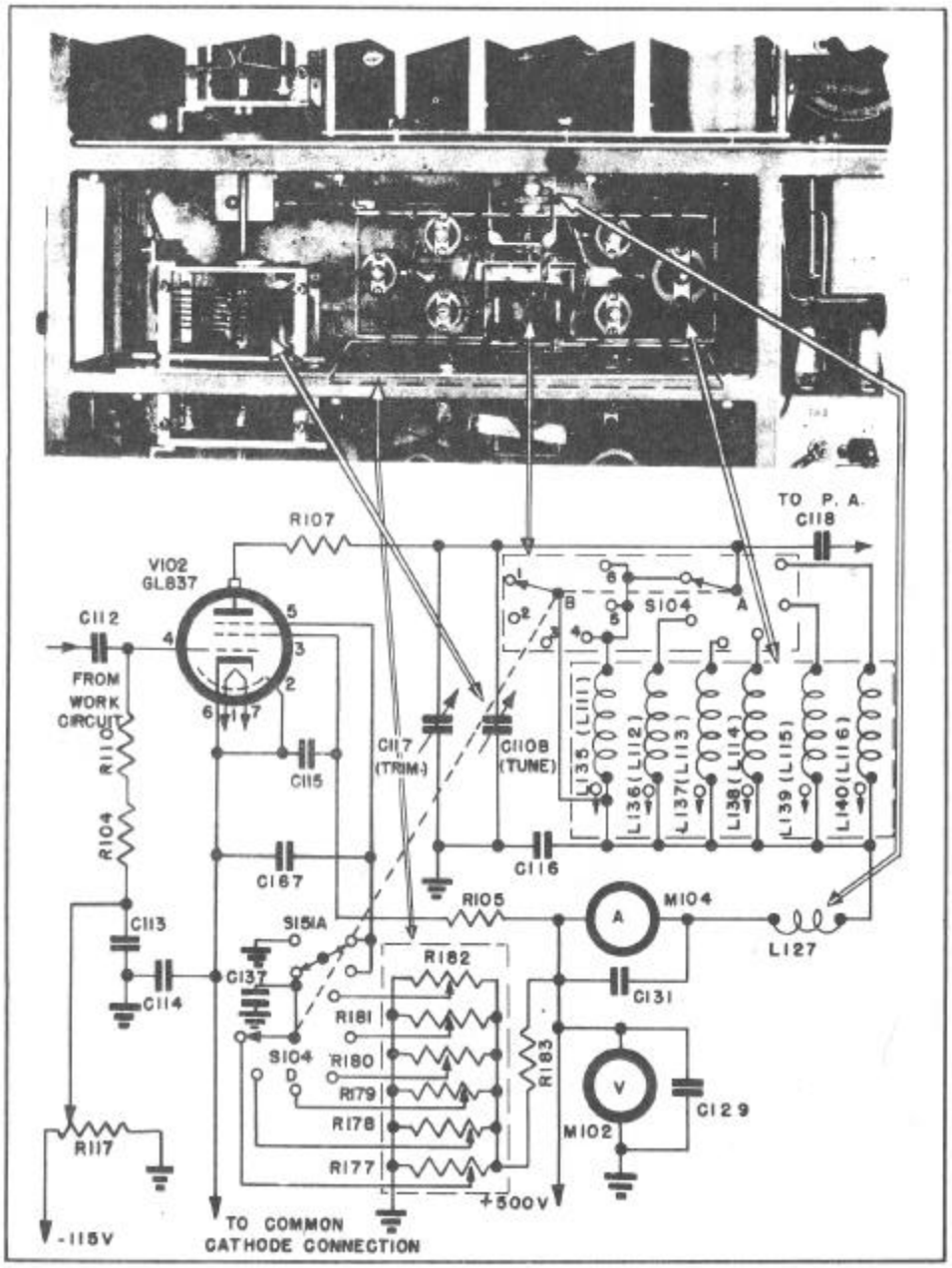


Figure 2-3—Intermediate Power Amplifier Schematic

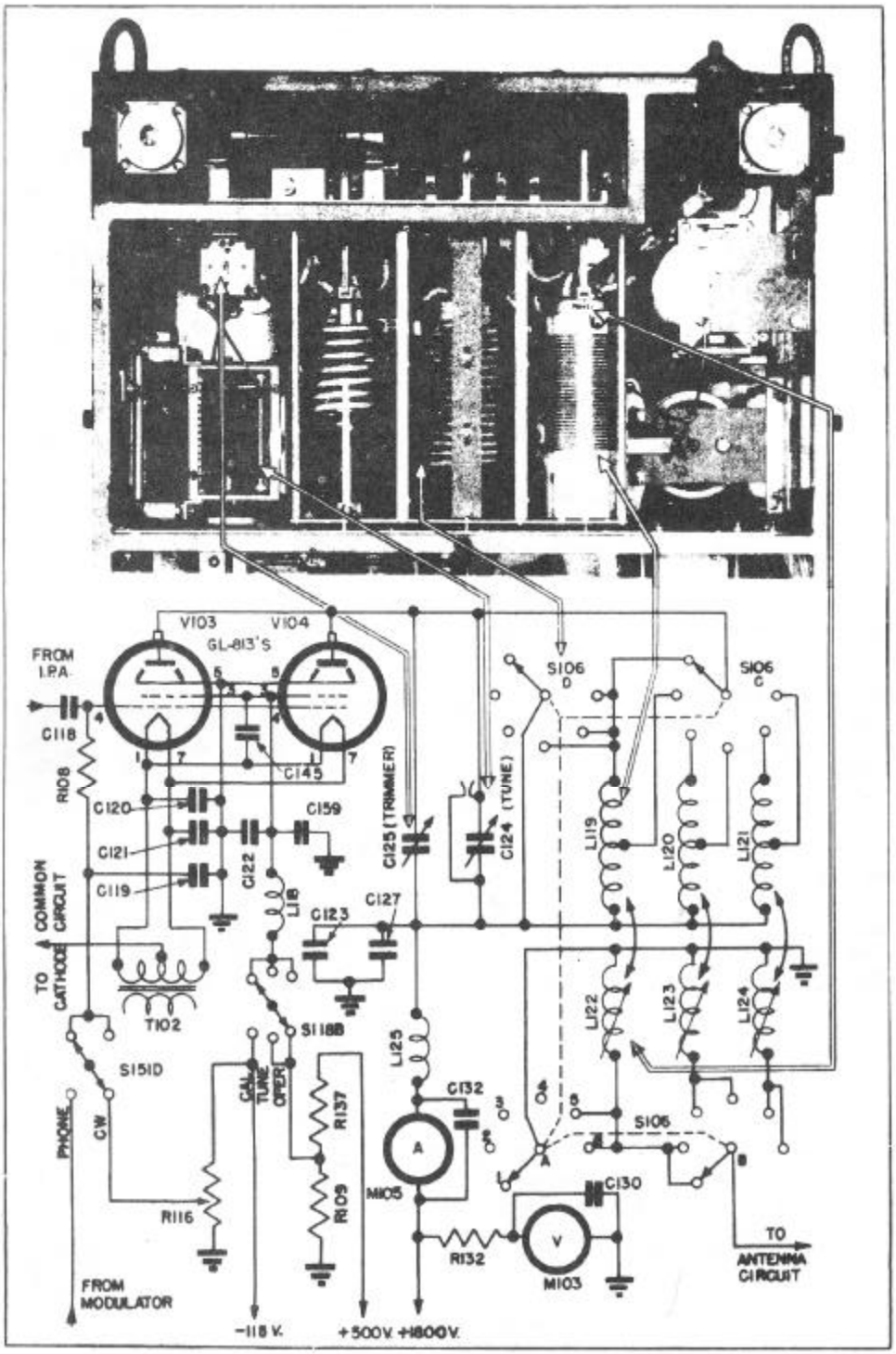


Figure 2-4—Power Amplifier Schematic

5. POWER AMPLIFIER (P.A.) (*See Figure 2-4*).

During C.W. operation, the coupling circuit to the grids of the two parallel-connected power amplifier tubes is the same as that used for the I.P.A. It consists of a coupling capacitor from the previous stage to the grids and a resistor in series with a negative bias voltage. For PHONE operation, however, the output transformer of the modulator unit is connected in series between the resistor and negative supply, super-imposing the audio signal on the negative voltage at the P.A.

grids. The grid resistor is of the wirewound type to offer maximum impedance to r-f voltages and minimum impedance to the audio modulation frequencies. The capacitor on the ground side of the resistor is made small (.005 mfd) so as to shunt little of the audio to ground and still keep r-f out of the modulator circuit.

The P.A. stage is made up of two beam-power, Type 813 tubes operated in parallel. Their cathode connection, although biased in common with the M.O. and I.P.A. is slightly different due to the directly heated cathode elements. The center tap of the P.A. filament transformer is connected to the common cathode circuit and both sides of the filaments are bypassed to ground by capacitors. The beam-forming plates of both tubes are connected directly to ground at the base of the tubes and the screen grids are bypassed through large capacitors to one side of the filament and to ground.

Screen current is drawn from a voltage divider in the +500 volt supply through a choke coil for purposes of r-f isolation. When calibrating the equipment this connection is broken by the CAL-TUNE-OPERATE switch and the screen is connected to —115 volts to cut off the stage and prevent radiation of undesired signals.

The P.A. plate tank circuit differs slightly from the I.P.A. tank circuit in that three, instead of six, inductances serve for the six bands. That is, each coil is used for two bands. This is accomplished by using the entire winding of the coil for the lower frequency band and using only a part of the coil winding for the higher frequency bands. The coil selector switch for this stage is ganged with the other sections of the BAND CHANGE switch and the tuning capacitor with the other tuning capacitors. The P.A. TRIMMER capacitor is controlled from the front panel, the same as the I.P.A. TRIMMER, to afford more accurate alignment of this stage when a major frequency change is made.

The plate potential for the P.A. tubes is +1800 volts and is applied through an inductance and the tank circuit coils. The inductance and two capacitors to ground keep r-f current out of the power source and also out of the plate current meter which is in series with the tubes. Both the +1800-volt and the 500-volt source are equipped with voltmeters for checking and regulating the supply voltage and ammeters for measuring plate currents. A shunting capacitor is used across each meter to protect it from stray r-f currents.

The output coupling from this stage is accomplished by means of mutual inductance between the three P.A. tank circuit coils and three concentric antenna pick-up coils. The pick-up coil inside the active coil of the P.A. tank circuit is selected by the BAND CHANGE switch, and the amount of coupling is varied by sliding the antenna coil further in or out of the P.A. coil. When bands #5 and #6 are in use the relatively large first coil is shorted to prevent the build up of spurious voltages and the resulting loss of power.

6. OUTPUT MATCHING CIRCUIT. (*See Figure 2-5*).

The output from the antenna pick-up coils is fed into a tuning circuit. The inductor in this circuit is continuously variable over a wide range by means of the ANT. TUNING (INDUCTIVE) control on the front panel. The capacitor, which may be switched in or out of the circuit, is also tunable over a wide range from the front panel by the ANT. TUNING (CAPACITIVE) control.

The ANTENNA CIRCUIT SELECTOR switch provides a means for selecting the proper circuit parameter to enable matching into single-ended antennas with a wide range of characteristics. Either voltage or current feed can be accomplished by means of this switch. Positions 1 and 2 are used for current feed into low impedance antennas (Position 1 for short, and Position 2 for long antennas) and Position 3 is used for voltage feed into a high impedance antenna.

An r-f ammeter in the output gives a continuous check on output power.

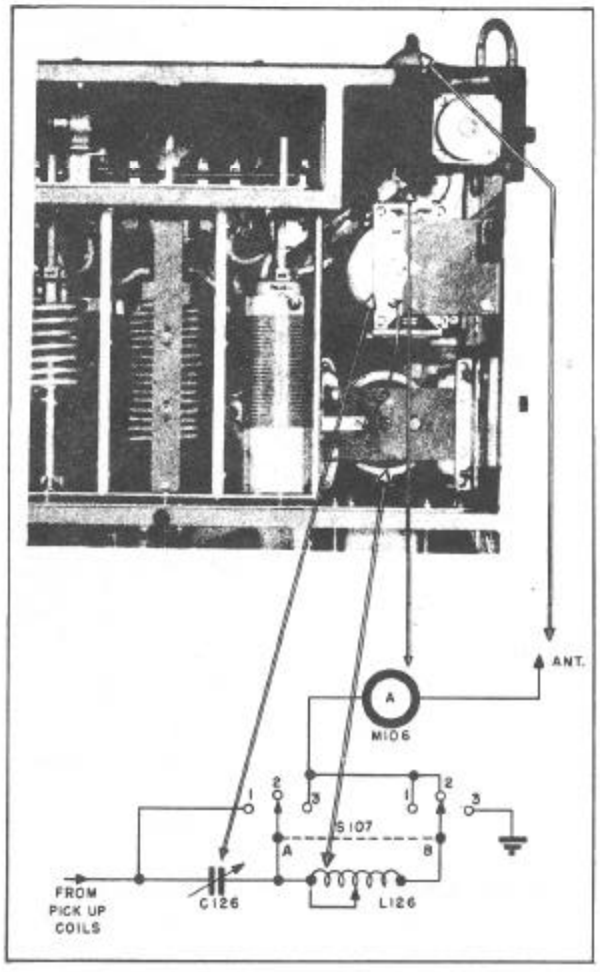


Figure 2-5—Output Matching Circuit Schematic

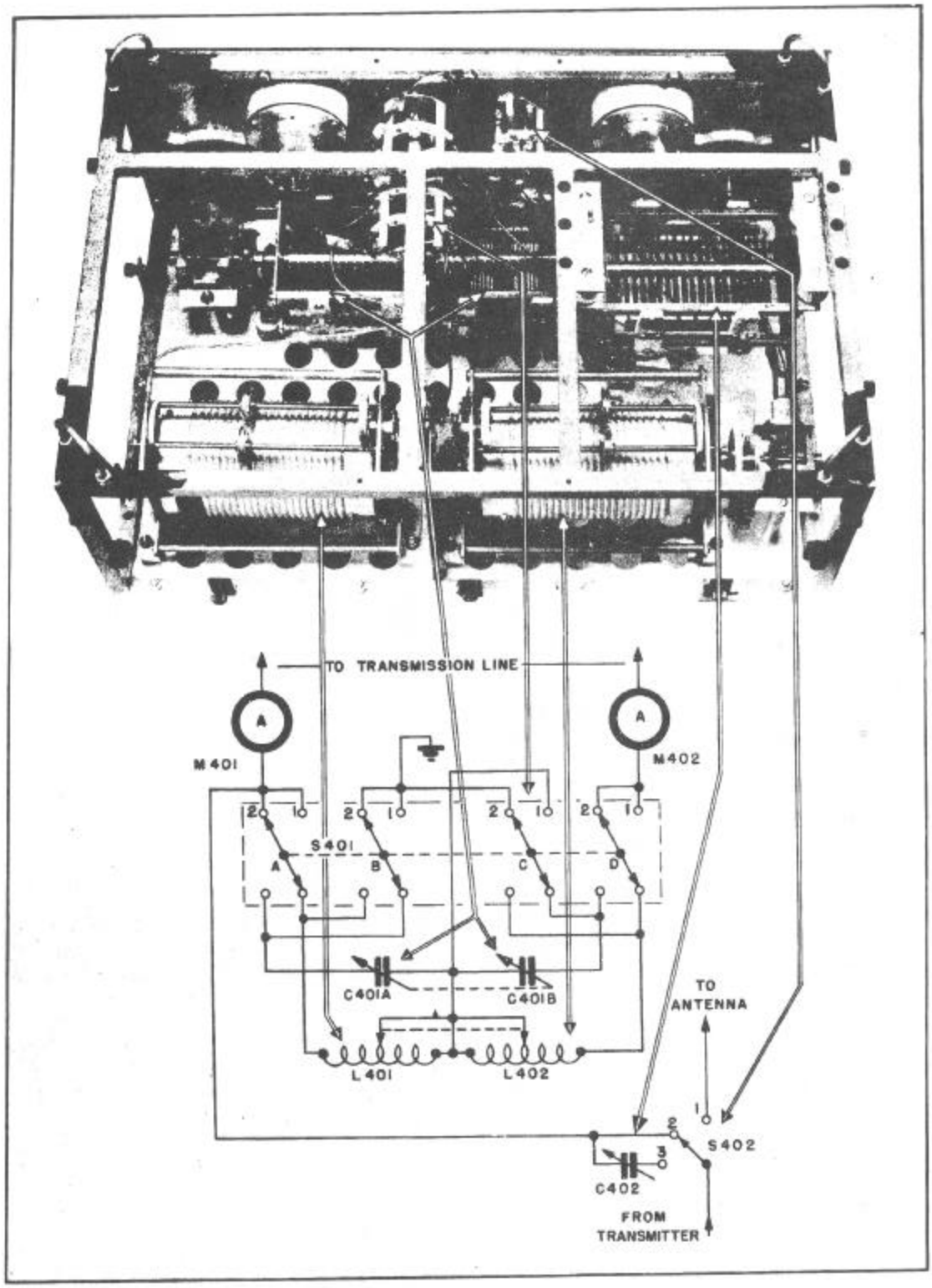


Figure 2-6—Transmission Line Coupling Unit Schematic

7. TRANSMISSION LINE COUPLING UNIT. (*See Figure 2-6*).

Two of the transmitter models, the TCK-4 and -6, have an additional output matching circuit designed for feeding into a balanced transmission line. This circuit consists of two identical variable inductances and capacitances and two switches for circuit selection. The first switch, the ANT.-TRANS. LINE SELECTOR, is used

to connect the transmitter to a single wire antenna or to the coupling unit. When it is in Position 1, the transmitter is connected directly to the antenna, and in Position 2 the transmitter is connected to the transmission line coupling unit. In Position 3, the transmitter is connected to the coupling unit through a variable coupling capacitor. This capacitor is used at the higher frequencies for varying the amount of coupling.

The second switch, COUPLING SELECTOR, changes the connections in the Coupling Unit to provide inductive reactance for capacitive transmission lines (in Position 2) or to provide capacitive reactance for inductive transmission lines (in Position 1), thereby providing proper matching to any balanced transmission line whose sending-end r-f resistance and reactance fall within the following limits:

RF RESISTANCE	REACTANCE
26- 50 ohms	0 ± 400 ohms
50- 100 ohms	0 ± 800 ohms
100- 500 ohms	0 ± 1000 ohms
500-3500 ohms	0 ± 2000 ohms

8. MODULATOR UNIT. (*See Figure 2-7*).

The Modulator Unit is a high gain audio amplifier, employing an automatic limiting or volume control circuit. It is capable of amplifying an audio input signal, varying from —10 to +5 db (using 6 milliwatts at 500 ohms as zero level), sufficiently to produce at least 75% modulation of the r-f carrier signal.

a. Input Circuit.—To make the set more versatile, the input transformer is supplied with two primary windings, one for matching a single-button carbon microphone and the other for matching a 500-ohm audio transmission line (at zero db level) to the input of the modulator unit. Thus audio signals from either local or remote positions may be introduced into the modulator.

The microphone input jack has three contacts: one a ground connection, one a push-to-talk button connection, and the other an input to the modulator transformer from the microphone. When a carbon microphone is used, a small current is necessary for operation and is supplied through the modulator transformer from an adequately filtered 12-volt power source. The current flows through the transformer and microphone in series and any fluctuations in the current caused by the change in internal resistance of the microphone due to a sound wave striking its diaphragm will induce voltages in the secondary winding of the transformer. A series resistor is used to limit the current flowing in the carbon microphone to a safe value during all conditions of operation.

b. Microphone Control.—A push-to-talk button is provided on the microphone supplied with this equipment. When this button is pushed the carrier control relay on the modulator unit is energized from the 12-volt source and its contacts close a circuit in parallel with the operator's key. Thus the keying relay is closed and the bias is removed from the frequency generating circuits, causing the emission of a signal.

c. First Amplifier.—The first stage in the modulator uses a Type 6SK7 pentode with the plate, screen and suppressor grids tied together to operate as a triode. Low-level audio voltage is applied to the grid from the secondary winding of the microphone input transformer and appears amplified across the two parallel plate load resistors. The amount of amplification realized in this stage depends upon two factors: first, the setting of the volume control potentiometer across the input transformer secondary; and second, the d-c bias between grid and cathode. It is the d-c bias level which is utilized for automatic limiting by applying to the grid a d-c voltage which is proportional to the modulator output. That is, if a very strong signal is applied at the grid of the first stage, a correspondingly large d-c bias voltage will be supplied to the stage by the limiter. When this occurs, the gain is reduced and a leveling effect on the signal results.

Suitable ground returns for the audio voltages are provided by capacitors on both the primary and the secondary windings of the microphone input transformer and on the power supply side of the plate resistors. Plate current is drawn from the 500-volt source through series resistors which lower the voltage and decouple this stage from the others to prevent feedback. A cathode resistor is provided for partial bias because in the case of zero or a low output signal there would be practically no grid bias supplied by the limiter. Since the resistor is not bypassed, it tends to follow the grid and allow only a small change in the grid-to-cathode bias for a relatively large change in grid-to-ground potential. This causes a small amount of signal degeneration to reduce distortion.

d. Second Amplifier.—From the plate of the first amplifier the signal is resistance-capacitance coupled to the grid of the second tube, a duplex-diode, high-mu-triode Type 6SQ7, where it is further amplified. For operation of the diode in the limiter circuit, the tube cathode must be operated at a fixed positive potential as will be explained later. The potential is obtained by connecting the cathode resistor to a voltage divider in the plate supply and by-passing the cathode to ground with a large capacitor. If the grid resistor of the triode were returned to ground with the cathode operated at this relatively high voltage, it would tend to produce plate current cut-off. Instead, the cathode resistance is made up of two series resistors and the grid return connected between them. In this way only the relatively low voltage across the resistor next to the cathode appears as bias for the triode. To complete the audio circuit, a capacitor to ground is connected to the point where the grid resistor ties into the cathode circuit.

The output from the triode is resistance-capacitance coupled into the the grid of the modulator tube and its

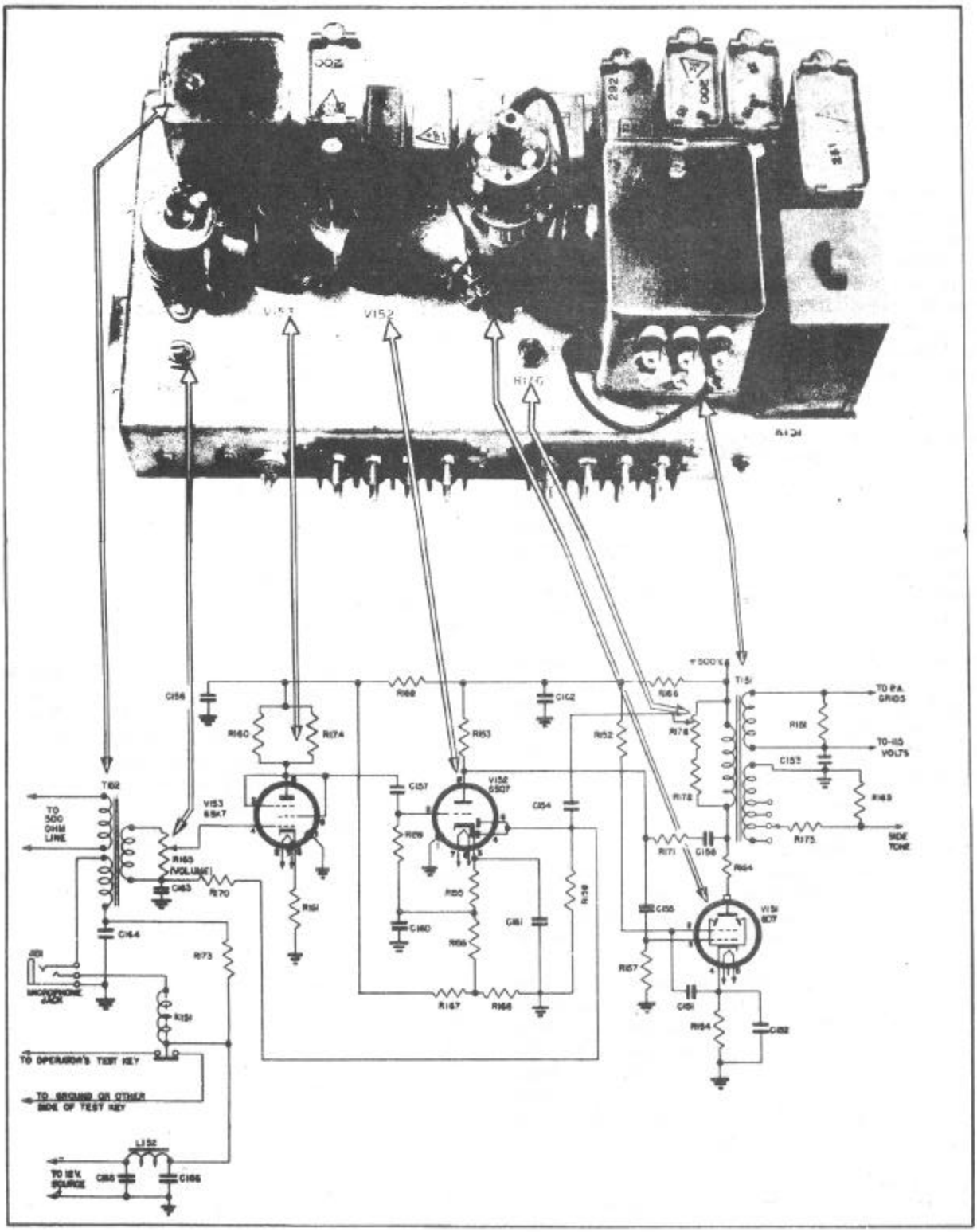


Figure 2-7—Modulator Unit Schematic

plate voltage is obtained from the +500 volt supply through two series resistors. A capacitor connecting from between the resistors to ground supplies a path for audio voltages to keep them out of the power supply. From this same point between the supply resistors a series dropping resistor supplies voltage to the screen of the modulator tube.

e. Power Amplifier.—A Type 807 beam power tube is used as the power amplifier. Its output feeds through a low resistance (for the suppression of parasitics) into the primary of the modulation transformer and plate current is supplied to the tube through the transformer from the 500-volt source. A small portion of the output is coupled back to the grid circuit through a resistor and capacitor, providing negative feedback to reduce distortion in this stage.

f. Automatic Limiting.—The feedback for automatic limiting also originates in the output of the final stage. A potentiometer in series with a resistor is connected across the primary of the modulation transformer and the variable tap is capacity-coupled to the two diode plates of the 6SQ7 (second amplifier tube) to provide a control for the amount of limiting desired. As mentioned before, the cathode of the 6SQ7 is operated at a positive voltage with respect to ground. This is to fix the magnitude of the positive audio voltage which will cause the diodes to conduct. As soon as the audio voltage exceeds the cathode potential, the plates begin to pass current and this rectified current returning to ground through a resistor produces a negative d-c voltage at the diode plates. The voltage becomes more and more negative as the audio signal increases in magnitude and makes the diodes pass more current.

A high resistance connected to the diode plates and followed by a capacitor to ground filter out the audio frequencies and allow only the d-c component to be applied through the secondary winding of the microphone transformer to the grid of the first stage. Thus the negative d-c bias applied to the grid of the first amplifier will be proportional to the magnitude of the input signal. Since the first amplifier tube is of the variable mu type the higher the negative voltage applied to the grid the less will be the amplification and overall gain of the modulator circuit. This limiting action keeps the output of the modulator relatively constant with wide variations in input signal strength, thereby preventing over-modulation to a large degree but in no way affecting the amplification of weak signals which are too small to cause conduction in the diodes.

g. Output Circuit.—One secondary winding of the modulator output transformer provides an audio signal for driving the grids of the P.A. tubes and a second winding provides a side-tone for monitoring the output. The latter winding is tapped at several points for the purpose of adjusting the output to the desired level. Both secondaries are loaded by resistors which reflect back an optimum plate load to the amplifier tube and also provide the proper terminating impedance of 500 ohms for the side-tone line. One side of each winding is connected to a-c ground, the side-tone winding directly and the modulation winding (which is operated at —115 volts d-c) through a capacitor. The modulating signal is superimposed on the —115 volts and the resultant supplied to the grids of the power amplifier tubes. The power output, when operating the transmitter on PHONE, is approximately 25% of the C.W. output.

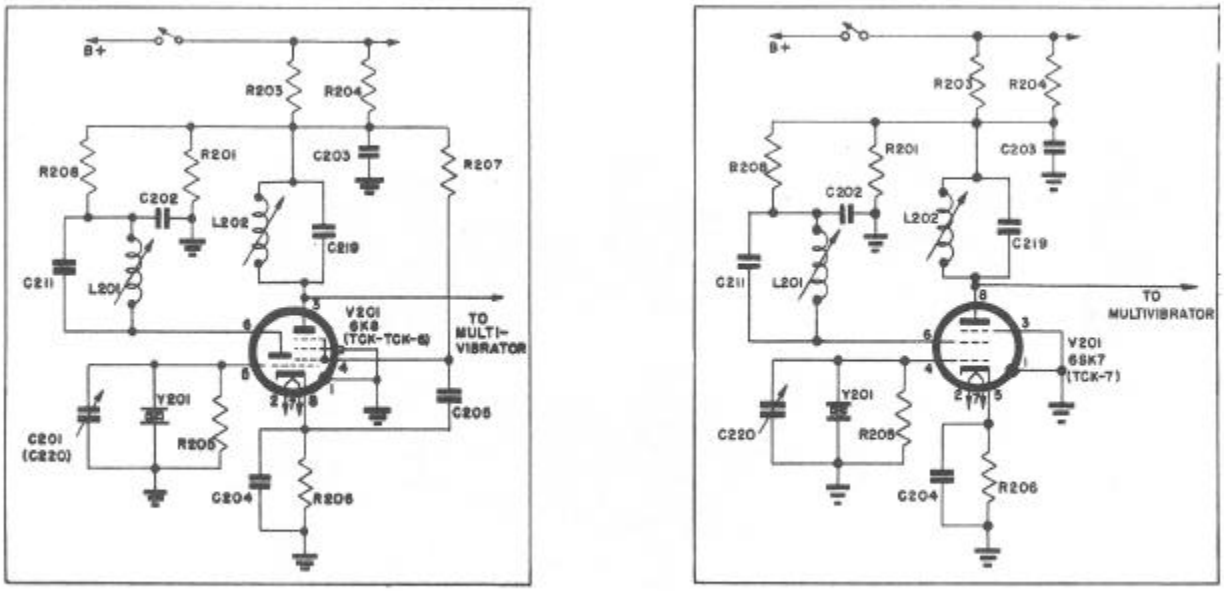
9. CRYSTAL FREQUENCY INDICATOR (C.F.I.)

The Crystal Frequency Indicator is a self-contained unit used as a frequency standard in making accurate adjustments of the Master Oscillator circuit. A small amount of r-f voltage from the M.O. WORK CIRCUIT is fed into the C.F.I. unit where it is mixed with the output of a 100 kc multivibrator and produces a beat note representing the difference in frequency. The multivibrator is driven by a very stable crystal controlled local oscillator and, since its output is very rich in harmonics, strong beat notes are produced at 100 kc intervals along the tuning range of the WORK CIRCUIT. When the M.O. is tuned to a point that gives a zero beat note the output frequency of the transmitter is some multiple of 100 kc. (On bands #5 and #6 it will be a multiple of 200 kc because of the frequency doubling in the I.P.A. stage.)

a. Crystal Oscillator. (*See Figure 2-8*).—The oscillator consists of a 200 kc, GT-cut crystal (sealed in a gas-filled metal envelope) controlling an oscillator tube. In Models TCK through TCK-6 the tube is a Type 6K8 triode-hexode, and in the Model TCK-7 it is a Type 6SK7 pentode. Essentially, the operation with either tube is the same. The triode section of the 6K8 is used as the crystal-controlled oscillator and the hexode section is used as a buffer amplifier. In the pentode tube the first and second grids act as oscillator grid and plate and electron coupling to the plate supplies the buffer amplifier function.

The 6K8 tube has a cathode and control grid common to both sections, therefore oscillations of the crystal in the triode circuit, which appear on the grid, cause corresponding oscillations in the hexode section. In parallel with the crystal, between the grid and ground, are a grid leak resistor and a small variable air capacitor for tuning the crystal frequency to exactly 200 kc. In series with the plate of the triode section is a tank circuit which is also tuned to 200 kc by a slug-tuned variable inductance. Plate current for the triode is supplied through the tank circuit and a series dropping resistor from a voltage divider in the B+ supply. A capacitor between the tank circuit and the resistor returns r-f currents to ground.

In the hexode unit of the 6K8, grid No. 3 acts as the suppressor and is connected to ground. Grids No. 2 and No. 4 are connected together to serve as a screen grid and are supplied through a series dropping resistor from the same voltage divider that supplies the crystal oscillator circuit. Plate voltage for the hexode is also taken



A—Type 6K8 Tube *B—Type 6SK7 Tube*

Figure 2-8—Crystal Oscillators

from this divider, and a large capacitor at the common connection prevents feed back from any of the circuits to the power supply. Between the plate of the hexode and the divider is a tank circuit composed of a fixed capacity and variable inductance. This tank is similar to the triode tank circuit and is also tuned to 200 kc to give a high impedance plate load. Cathode bias is developed by means of a cathode resistor by-passed with a capacitor.

When a 6SK7 pentode tube is used, the circuit becomes a conventional electron-coupled oscillator. The crystal is connected in parallel with a resistor and variable capacitor between control grid and ground. The same tank circuit which was the triode plate load for the 6K8 becomes the screen supply for the 6SK7, and what were the hexode plate load and cathode bias circuits remain the same for the pentode. The screen circuit for the hexode is eliminated and the pentode suppressor grid is tied to ground.

b. Multivibrator. (*See Figure 2-9*).—The 200 kc output from the buffer-amplifier drives a multivibrator tube, a Type 6SC7 in Models TCK through TCK-6 and a Type 6SL7 in Model TCK-7. Both tube types are dual triodes and are the same with the exception of a single cathode in the 6SC7 and two cathodes in the 6SL7. In both cases the cathodes are connected to ground and the tube operation is the same.

The multivibrator circuit used here is, in reality, a relaxation type oscillator which is synchronized by the crystal oscillator to operate at a sub-multiple of the crystal frequency. That is, the multivibrator will oscillate at a rate of 100 kc, even though it is synchronized by a 200 kc signal.

The plate of each section of the multivibrator is capacity coupled to the grid of the opposite section. Thus if the plate of the first section goes positive, the grid of the second section is driven less negative, causing the plate current in the second section to increase and its plate voltage to drop accordingly. The grid voltage of the first section will follow this drop and cut-off plate current, allowing its plate voltage to rise to the value of the B+ supply. If nothing disturbs the circuit it remains in this condition with one tube conducting and the other cut off until the positive charge on the grid of the second section can leak off through the grid resistor to ground, at which time the second section current is reduced and its plate starts to swing positive. This positive plate swing is coupled to the grid of the first section where it starts conduction, thereby feeding a negative-going voltage back to the grid of the second section and cutting it off. Thus, a "see-saw" operation is obtained with first one tube conducting, then the other. The natural period of each cycle of the "see-saw" depends upon the time constant of the feed-back capacitors to the grids and the grid leak resistors to ground, and in the TCK and TCK-1 can be adjusted by means of variable grid resistors. In the TCK-2 through TCK-7, this adjustment is omitted because it was found to be non-critical for this application. In all cases, however, the natural frequency of the multivibrator must be somewhat less than 100 kc so that the signal from the crystal oscillator will trip the circuit prematurely and synchronize its operation.

The 200 kc signal from the oscillator is supplied to both plates (thus both grids) of the multivibrator simutaneously. This is done by coupling the multivibrator plates through resistors to the plate of the oscillator for

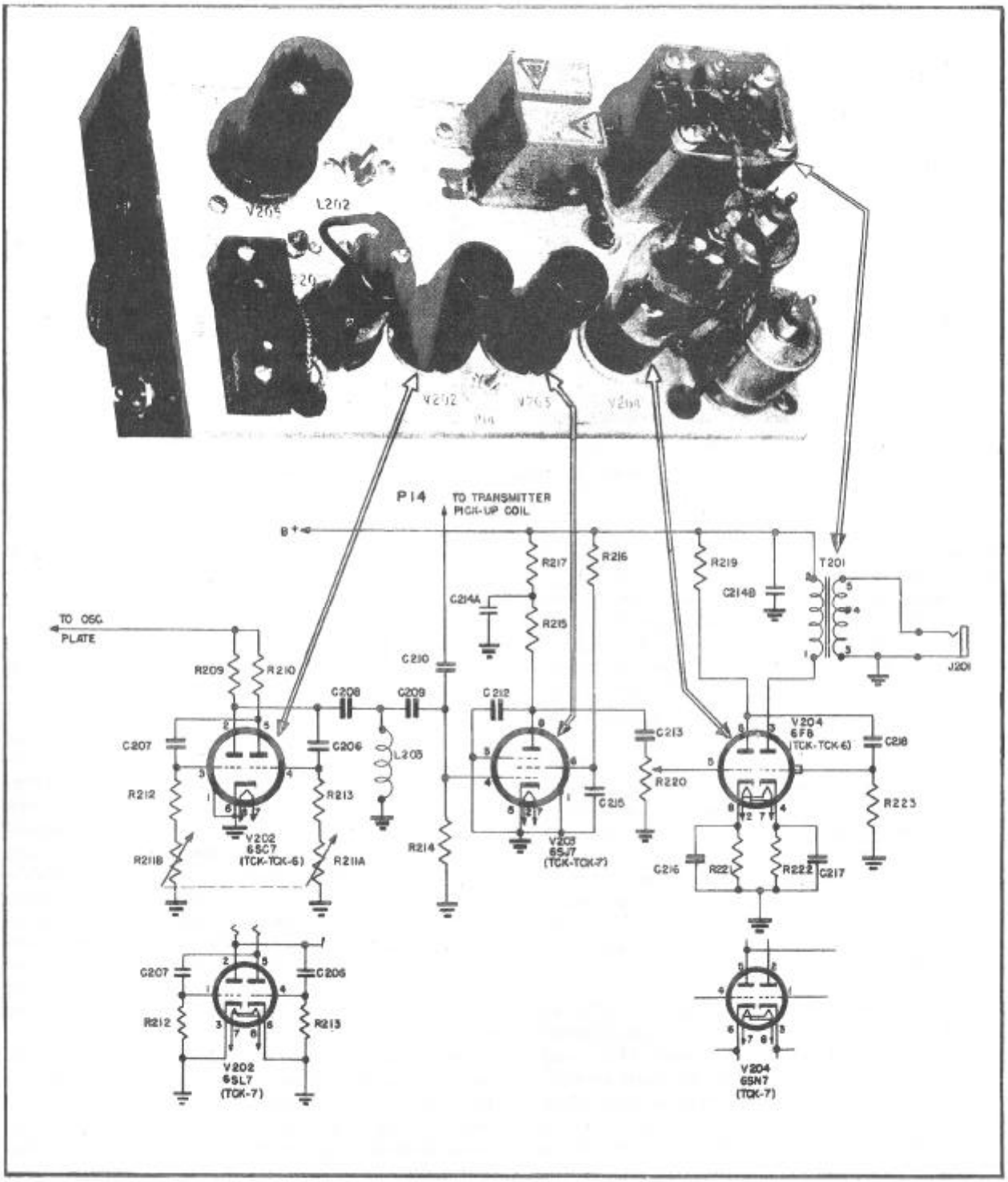


Figure 2-9—Crystal Frequency Indicator Schematic

their B+ supply. As the voltage from the oscillator goes positive, so do both multivibrator plates and grids. Since the grid of one is already positive there is very little change in its plate current, but the grid of the other is just below cut-off and comes up to where conduction starts. Each positive-cycle from the oscillator, therefore, trips the multivibrator, shifting conduction from one tube to the other. When the oscillator voltage swings negative there is also a tendency for it to trip the circuit but the grid of the conducting section is very positive at the time the negative-going voltage is applied and is, therefore, not lowered to a point where the tube current is reduced. The circuit is tripped at 200 kc intervals (positive oscillator cycles) which gives either multivibrator plate a 100 kc frequency, swinging positive on one positive oscillator swing, and negative on the next.

The multivibrator output is essentially a square wave of voltage and it should be noted that a square wave may be broken down into a sine wave of the fundamental frequency plus an infinite number of both odd and even harmonics. This square wave of 100 kc voltage is then passed through a wave-trap designed to pass frequencies in the range of the transmitter and shunt the lower frequencies to ground.

c. Detector.—The multivibrator output signal, after passing through the wave trap, is capacity-coupled to the grid of a detector tube where it is mixed with the incoming signal from the Master Oscillator. The signal from the Master Oscillator is obtained by means of a small coil mounted in close proximity to the M.O. WORK CIRCUIT. By mutual inductance this coil picks up some of the RF voltage and couples it through a capacitor to the detector tube grid.

The mixed M.O. and multivibrator signals form an audio beat note when rectified, or detected, and amplified in the 6SJ7 pentode detector tube. The cathode of this tube is tied to ground and bias is supplied by the flow of rectified grid current through a grid leak resistor. The suppressor grid is connected to ground and the screen voltage is supplied through a dropping resistor from B+.

Plate voltage for the detector is drawn from B+ through two resistors in series (with a capacitor to ground between them to keep the audio signal out of the power source). A small capacitor between the plate of the tube and ground removes any r-f voltages present in the output and a second capacitor is used to couple the audio signal to a volume control potentiometer in the grid of the next stage, an audio amplifier.

d. C.F.I. Audio Amplifier.—The audio amplifier tube is a double triode Type 6F8 in the TCK through TCK-6, and Type 6SN7 in the TCK-7. Electrically these tubes are identical and both are used as two stage resistance-capacitance coupled audio amplifiers. The grid of the first section receives the audio beat note from the variable tap on the volume control potentiometer and the output of this stage is capacity-coupled to the grid of the second tube section. The two cathodes of the tube are separately biased, each bias resistor being supplied with an audio by-pass capacitor. Plate voltage for the first tube section is supplied through a series resistor from B+ and for the second section it is drawn through the secondary winding of an audio output transformer.

The B+ supply for the CFI unit is obtained from the 500 v. power source through a voltage divider located between 500 volts and ground. This lowers the voltage supply to between 250 and 300 volts during operation. When the CFI ON-OFF switch is closed, the voltage is applied to the tubes and, since their filaments are on whenever the transmitter is on, the circuit functions instantly.

The audio output transformer is designed for output to headphones. Two taps are provided on the secondary winding for supplying either high or low impedance phones and a single-circuit output jack is mounted on the front panel for the purpose of connecting the headphones to the unit.

10. CONTROL CIRCUITS.

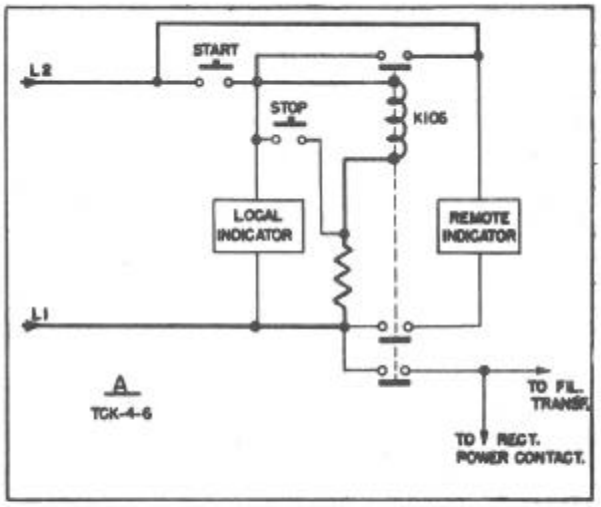
The control circuits for the transmitters may be segregated into three general classifications: (1) the primary power controls, (2) the M.O. temperature control, and (3) the transmission controls. Under primary power controls are the starting contactor with its associated push-button stations, the power contactors for the Motor-Generator set or the Rectifier Unit, and the safety interlocks and overload protection relays. Under transmission controls are the keying relay, the CW-PHONE switch, the CAL-TUNE-OPERATE* selector, and the high voltage control.

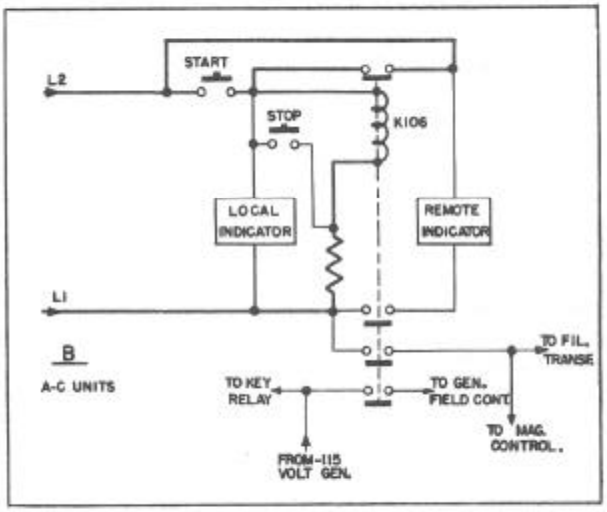
a. Starting Contactor.—The starting contactor is the central control point for primary power and is energized directly from the supply line. The actual relay circuit varies with the power source, as shown in the simplified schematics, Fig. 2-10, but the general function remains unchanged. When a six-wire START-STOP control unit is used, pushing the start button closes the relay coil circuit across the line and the contacts are "picked up".

In the case of the "A" circuit which appears in the TCK-4 and -6, one pair of contacts are in parallel with the start switch and hold the relay closed. The second pair of contacts close the circuit to the remote push-button station indicator light, and the third pair connect power to the transmitter filament transformers and the Rectifier Unit power contactor. Pushing the stop button shorts the starting contactor coil and allows it to drop out, opening all of the circuits.

In the case of the "B" circuit which is used in the three phase AC units of the TCK, -1, -2, and -3, one additional pair of contacts have been added and are used to connect the armature of the -115 v. generator to the rheostat controlling its shunt field. The line which in

*On models TCK-4 and TCK-6 this control is marked CAL-REDUCED POWER-OPERATE.





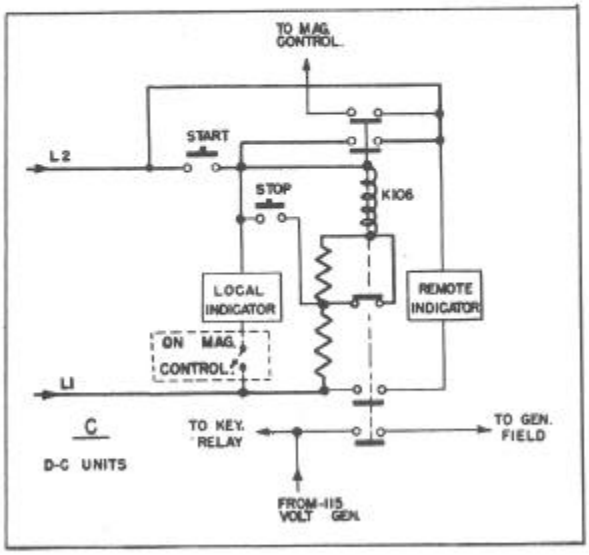


Figure 2-10—Starting Contactors

the TCK-4 and -6, was connected to the Rectifier Unit power contactor now connects to the main power contactor in the motor controller.

The "C" circuit, which is used in all of the d-c models, has several modifications, including one pair of normally closed contacts. The holding, the remote station indicator, and the generator field control contacts remain unchanged. The connection to the motor controller power contactors is connected to the other side of the power line and does not supply the transmitter filament transformers as it did in the case of the a-c models.

The normally closed contacts are used to insert a current limiting resistor in series with the contactor coil after it has picked up. When the start button is pushed, a large current flows, causing rapid closing action, then the above-mentioned contacts open and the current is reduced to a value which will just hold the contactor closed without dissipating a large amount of power in the coil. The other resistor which appears in series with the coil in all three circuits, is to prevent short circuiting the line when the STOP switch is operated.

When a four-wire control station switch replaces the push-button switch, the holding contactor connections are not used. A tumbler switch is used to close the circuit at the point where the START button originally appeared, and the circuit remains closed until the switch is opened.

b. Power Contactors.—The power contactor, which is closed by contacts on the starting contactor, applies line power to either the Motor-Generator set or to the Rectifier Unit, whichever is used. The most simple contactor is the type for three phase a-c units in which three sets of instantaneously closing contacts supply three phase power directly to the motor. For the d-c motor controller the contactor is complicated by time-delay closing contacts which short out the series starting resistor after the motor has reached operating speed. Some d-c controllers use one power contactor and some use two, but in both cases the contacts are closed instantaneously by the transmitter starting contactor and they in turn connect power to the motor armature through a starting resistor. After about two seconds, during which time the motor picks up speed, the delay contacts close and short out the starting resistance to place the motor directly across the line. A second set of time delay closing (T.D.C.) contacts also supply a special line to the transmitter. On this special line are the local indicator light and a circuit which supplies keying voltage when the four-wire control station is used. When the six-wire control station is used, the keying voltage is taken from the —115 v. generator and the special line connects only to the power indicator light.

The power contactor in the Rectifier Unit instantly closes the line to all rectifier tube filament transformers and to two selenium rectifier supply transformers. A time delay contact which closes after about 40 seconds

completes the circuit to another contactor which applies line voltage to the high voltage transformer circuits.

c. Overload Protection.—Overload relay protection is provided for the motor of the motor-generator set and for the 500- and 1800-volt supplies. In addition, all primary and control power lines are fused to provide adequate protection against overload damage.

The motor-generator thermal overload relays are located in the magnetic controller and connected in series with the motor. When an overload occurs these relays open the control circuit to the power contactors and the contactors open to remove the line voltage from the motor. The overload relays must be reset by hand, after allowing sufficient time for the thermal elements to cool.

The 500- and 1800-volt instantaneous overload relays are connected in series with the ground side of the high-voltage supplies. When an overload occurs in either of these circuits the overload relays operate immediately to open the 115-volt generator shunt field circuit, in the case of the motor-generator set, and to open the high voltage primary power relay in the case of the Rectifier Unit. Opening the 115-volt generator shunt field removes all d-c voltages because this generator supplies excitation for the other generator fields; opening the rectifier relay removes line power from the high voltage transformers only and the filament circuits remain energized.

A second coil on each of the high voltage overload relays is used for resetting. When the transmitter RELAY RESET button is pushed, these coils are connected to 115 volts a-c (obtained from the filament transformers) and act to reclose both overload relays.

d. Door Interlocks.—Interlocks are provided on the three front panel doors of the transmitter. When any one of these doors is opened, the interlock breaks the circuit to the starting contactor and, in the models equipped with M-G sets, shuts down all power. In the TCK-4 and -6, which have the rectifier units, the interlocks are in series with the rectifier high voltage control contactor and remove high voltage only.

e. Keying Relay. (*See Figure 2-11*).—The keying relay, when it is closed removes cathode bias from the transmitting tubes and permits the emission of power. In normal operation with a six-wire push-button control the test key is connected between one side of the relay coil and ground and the other side of the coil is connected to the —115 volt source. Shunted across the test key is the carrier control relay in the audio or modulator unit, and the operator's key on the remote 6-Wire Control Unit. Closing any one of these three parallel keys will apply the —115 volts across the keying relay actuating coil and start transmission.

When a Four Wire Control Unit is used with a d-c motor-generator set, the keying relay is operated from the incoming line instead of between —115 volts and ground. This is because the four wire unit must use a common conductor for the keying circuit and the start-stop circuit and safety considerations do not permit grounding either incoming line. Simplified schematics for the two types of controller units are shown below as they appear in the TCK-7. In the earlier models the voltage dividing resistors R196, R197, and R198 were included in the magnetic controller as resistors "C" and "D" but otherwise the schematics apply to all d-c transmitters.

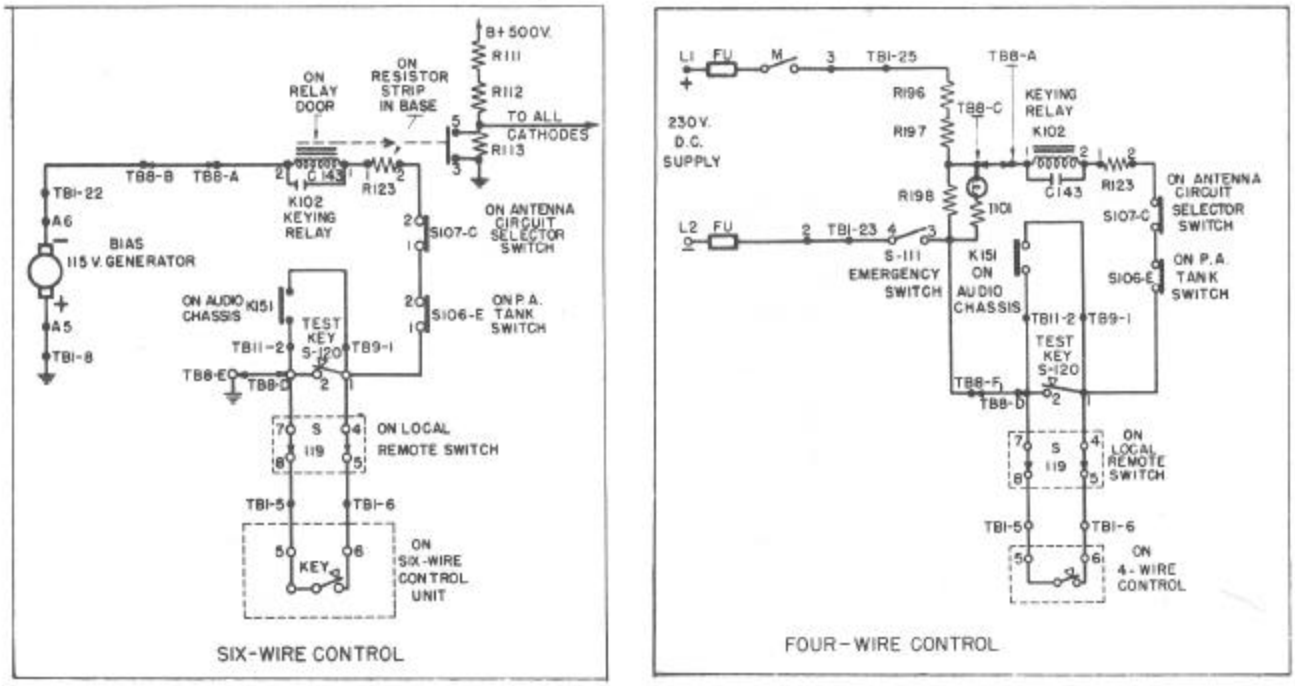


Figure 2-11—Keying Relay Circuit

f. Switch Interlocks.—On the units equipped with a transmission line coupling unit (TCK-4 and -6), four interlocks are connected in series with the keying relay. These interlocks are located on the various switches in the output circuits to remove r-f power while switching. This is a precaution against burning the switch contacts while changing bands and gives much longer service life. Two of the switch interlocks are on the two switches in the Transmission Line Coupling Unit and two are on the P.A. stage BAND CHANGE and ANTENNA SELECTOR switches. The latter two switch interlocks appear in all models of the equipment, with or without the coupling unit.

g. Phone Operation Switch.—The CW-PHONE switch has been mentioned several times previously but its function will be listed together here. In the C.W. position it connects the screen grid of the I.P.A. tube to ground and connects the grid return of the P.A. tubes to a negative voltage. In the PHONE position, the switch connects the I.P.A. screen grid to a variable resistor network and connects the P.A. grid return to the Modulator Unit output. In this position it also provides both microphone and B+ voltage to the Modulator Unit.

h. Emission Power Switch.—The CAL-TUNE (REDUCED POWER)-OPERATE switch performs two functions, it selects either of two voltages for the screen grids of the P.A. tubes and one of three voltages for the P.A. plate supply. In the CALIBRATE position, the P.A. screen grids are connected to —115 volts to bias these tubes beyond cut-off and prevent transmission during calibration. In the TUNE and OPERATE positions, the screen grids are connected to approximately +400 volts d-c, which is provided by a voltage divider network.

When a motor-generator set is used for the power supply, the shunt field strength determines the P.A. plate supply voltage. In the CALIBRATE position the H.V. field circuit is opened giving zero voltage, in the TUNE position low field excitation is applied giving approxmately half voltage, and in the OPERATE position full excitation is applied producing the full 1800 volts. When the Rectifier Unit is used for a power supply, two contactors operated by the CAL-REDUCED POWER-OPERATE switch are used to control the P.A. plate voltage. In the CALIBRATE position, both contactors are de-energized and no power is applied to the high voltage rectifier transformer. In the REDUCED POWER position, one of the contactors is energized and connects the line across the full primary transformer windings. Connecting across all of the primary gives a low step-up ratio and reduced voltage output. In the OPERATE position the first contactor is "dropped out" and the second contactor is energized. This connects the line across only a portion of the primary to give a higher step-up ratio and maximum output voltage. Interlocks on the two contactors prevent the closing of one before the other has opened.

i. M.O. Temperature Control.—The Master Oscillator Unit of the Transmitter is contained in a heat-insulated, temperature-regulated compartment. A blower motor keeps the air circulating within the compartment at all times to maintain an even temperature throughout. Two open grid-type heaters with a mercury-column thermostat control supply the temperature regulation. Whenever the temperature in the compartment exceeds a certain value the expanding mercury column in the thermostat completes the circuit to a relay and the relay opens the heater circuit. When the compartment has cooled to another specified temperature, the relay is de-energized by the contracting mercury and the heaters go on. The thermostat and relay are d-c operated in all units, drawing power directly from d-c lines in the case of d-c operated equipments, and employing a transformer and copper-oxide rectifier in the case of a-c equipments. The blower motor and heater circuit are connected across the line so that they are energized even though the equipment is not operating (unless the M.O. HEATER switch or the EMERGENCY switch is opened). A high-temperature protective thermostat is provided to open the heater circuit in case of failure of the usual temperature control circuit. This is a bi-metallic type of thermostat which will open if the compartment temperature should rise more than about 10°C above the normal compartment temperature of 60°C.

11. RECTIFIER POWER SUPPLY.

The Rectifier Unit, in addition to the power control contactors, contains four rectifier units and their associated filter circuits. Two of the rectifiers, supplying the -115 volts and -12 volts respectively, are selenium (dry disc type) rectifiers, bridge connected for full-wave operation. The rectifier supplying the +500 volts is a conventional full-wave rectifier employing two half-wave high vacuum rectifier tubes connected back-to-back.

The 1800-volt rectifier circuit employs four half-wave high vacuum rectifier tubes bridge connected for full-wave operation from an ungrounded transformer. The bridge circuit used here makes it possible to obtain full transformer secondary voltage at the output instead of only the half voltage resulting from a grounded center tap.

12. MOTOR-GENERATOR SETS.

The motor-generator contains a motor armature and three separate generator armatures on one shaft: one generator produces 12 volts d-c, one 1800 volts d-c, and one, both 500 and 115 volts d-c. The motor may be either a three phase a-c induction motor or a compound wound d-c motor. The d-c motors are supplied with slip rings for providing a-c voltage to the transmitter filament transformers.

SECTION III
INSTALLATION AND ADJUSTMENT

1. INSTALLATION.

a. Unpacking.—The similarity between the various models of the TCK-series makes possible the following general precautions and procedures for all units.

(1) The transmitter, rectifier, and motor-generator weigh several hundred pounds each, therefore sufficient personnel should be made available when it is desired to move or uncrate them. Keep the boxes upright and do not subject them to sudden shock such as may be experienced when the unit is dropped a short distance. Lifting eyes are provided on each unit for attaching a hoist. Where the unit is equipped with four lifting eyes, the slings should be attached to all four and should have at least enough slack to allow approximately one foot of space between the hook and top of the unit to prevent straining the lifting eyes.

(2) Remove three sides of the crate. The heavy units are mounted on a skid which must be unbolted. A waterproof bag covers the unit and may be ripped off after the base is removed. It will be noted that the unit is equipped with gaskets where the skid bolts protrude through the waterproof cover. These gaskets may be thrown away as they are only used for packing.

(3) After the units are unpacked, remove the side panels of the transmitter and rectifier units and inspect the components for possible damage during shipment. White tying tapes are used to secure resistors, relay moving parts, etc., in the transmitter, rectifier and motor controller units during shipment. These must be removed before the equipment is put in operation.

b. General Installation Considerations.—Before installing the units permanently in place, consideration

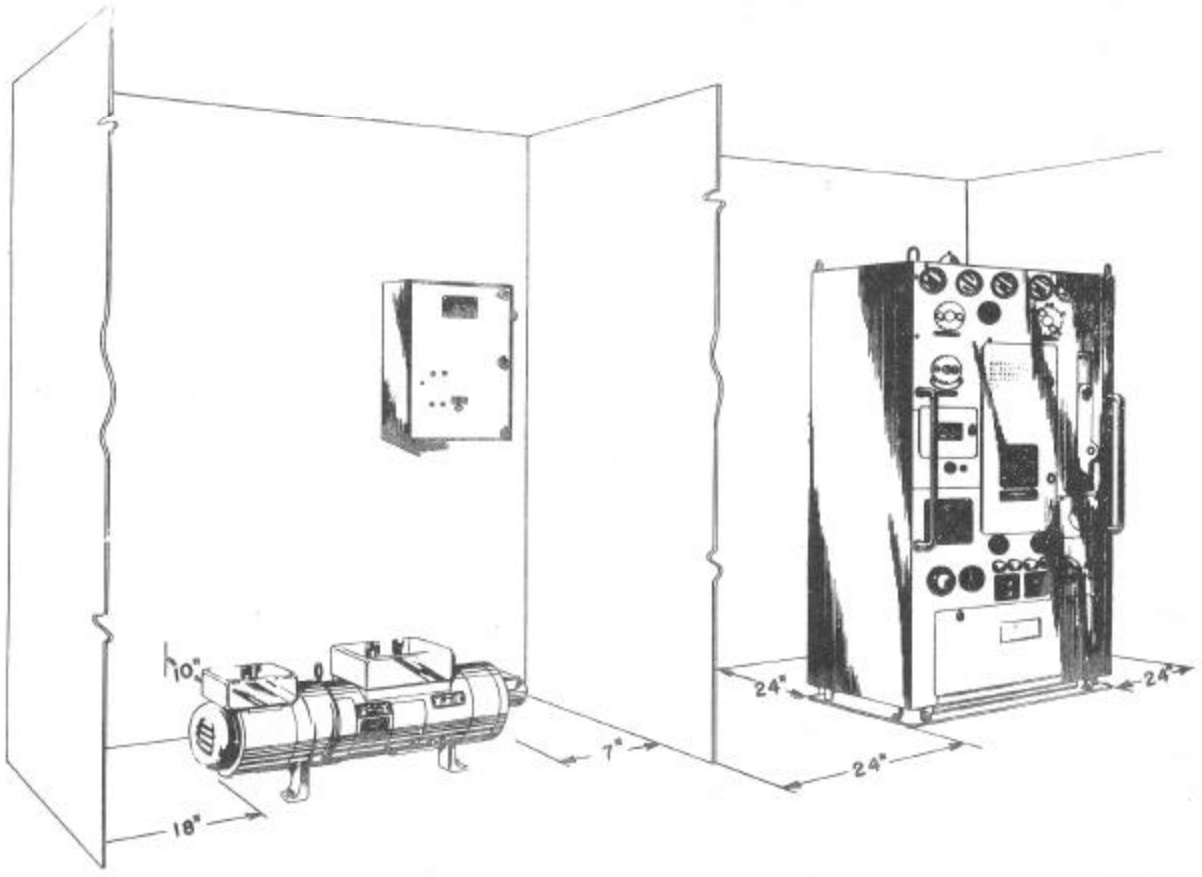


Figure 3-1 TCK Installation with Motor Generator Set

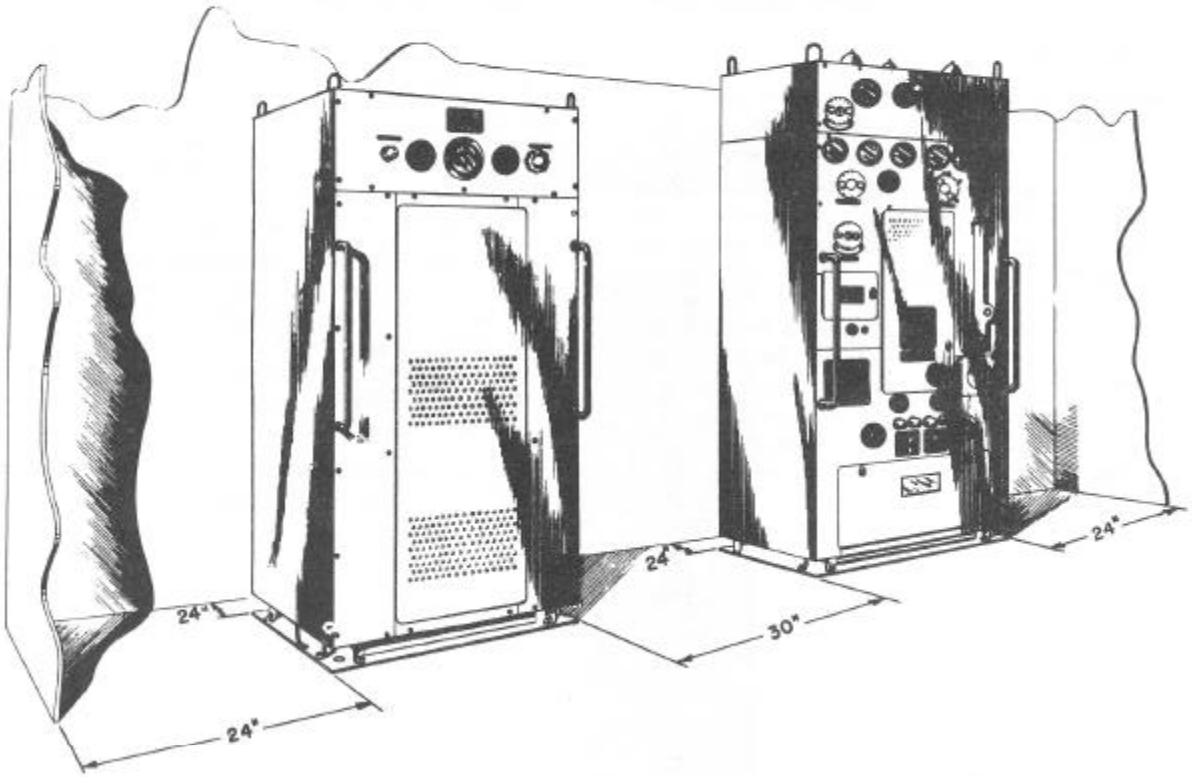


Figure 3-2 TCK Installation with Rectifier Unit

should be given to the most efficient and convenient arrangement of the equipment as a whole. Some precautions to consider are:

(1) The transmitter, rectifier and motor-generator liberate a considerable amount of heat in operation; hence adequate ventilation should be afforded to prevent excessive rise in component temperature and to prevent operator fatigue.

(2) Sufficient illumination to permit adequate visibility of all panel controls and meters must be provided. Illumination of the sides and rear of the transmitter and rectifier units is desirable in case of service adjustments.

(3) If permissible, clearance of 1½ to 2 feet should be left on each side of the major units to permit ease in servicing without the necessity of removing the unit from its mounted position. Suggested clearances are shown in Figs. 3-1 and 3-2.

(4) It is desirable to locate the motor-generator unit in a compartment or room separated by a bulk head from the transmitter. This reduces mechanical noise interference when operating the transmitter with a local microphone.

(5) The rectifier unit or motor-generator should be located convenient to the power source. The source must be capable of supplying the voltage and currents shown in paragraph 10*q* of Section I, with good regulation.

(6) The transmitter should be located close enough to the antenna so that the interconnecting transmission line does not have to exceed twenty feet. Avoid any sharp bends in the transmission line and use ceramic insulators where it penetrates bulkheads.

c. Shock Mount Installation or Removal.—Some of the transmitter and rectifier units of the Models TCK-4 and TCK-6 equipments were shipped with rigid mounting feet. All transmitter and rectifier units installed on board ship or other locations where severe vibration is encountered, must be equipped with shock mounts. The shock mountings and all necessary hardware items are supplied with the transmitters in kit form and should be attached to the equipment in accordance with the following instructions.

(1) Remove the back and side shields from the equipment. Attach a hoist to the four lifting eyes provided and hoist the unit approximately one foot from the floor.

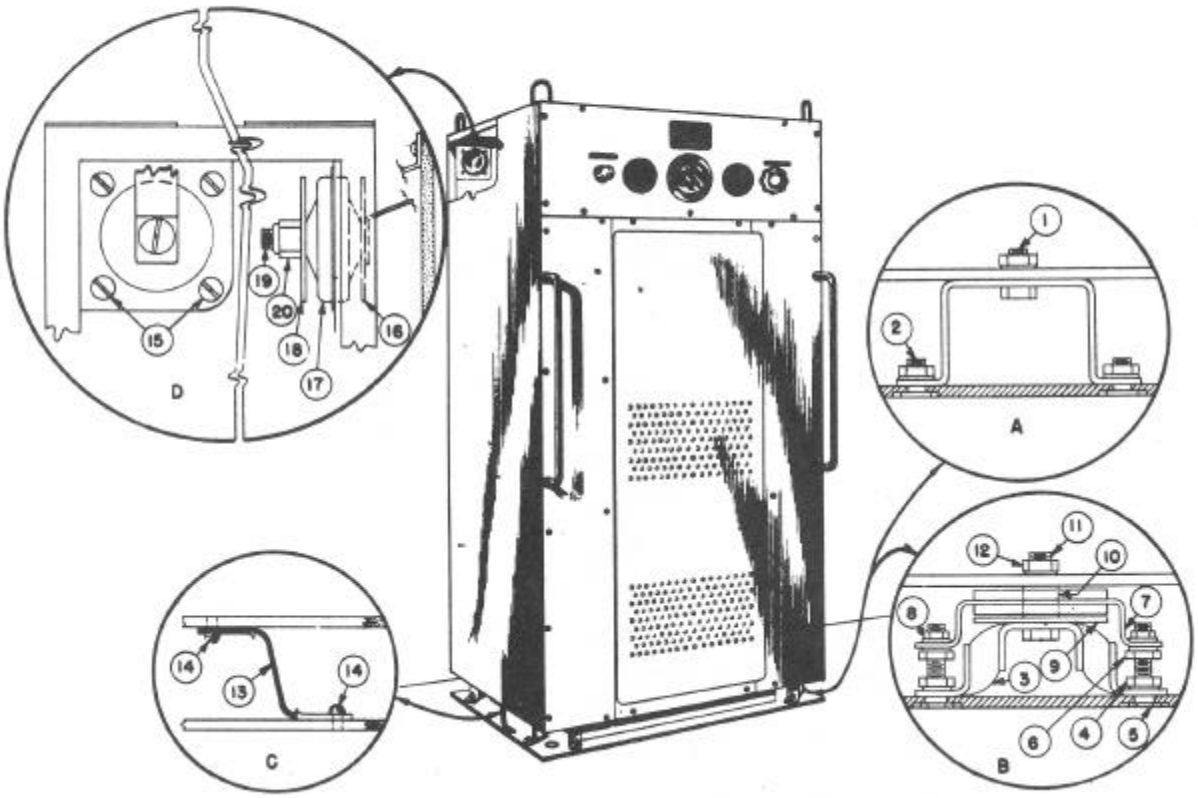


Figure 3-3 Rectifier Unit, showing Mounting Details

(2) Remove the rigid mounts shown in (A) of Fig. 3-3 by removing the center bolts ① holding the base assembly to the frame of the unit. There are four base mounts on both the transmitter and rectifier which must be removed. This allows the entire base assembly to fall away from the unit where it may be more easily handled.

(3) Remove the rigid mounts from the base plate by removing the two bolts ② holding each to the plate. These parts should be stored in the spare parts box for future use where rigid mounting may be desired.

(4) Attach the shock mount shown in (B) of Fig. 3-3 as follows:

(*a*) Attach mounting ③ to the plate by means of the bolts, lockwashers, and nuts provided ④, ⑤. Tighten the nuts ④ securely.

(*b*) Next thread second nuts ⑥ on about halfway, place lockwashers on top of these nuts, then place snubber ⑦ on top of the lockwashers. Finally, place lockwashers on top of snubber and thread nuts ⑧ loosely on to the projecting bolt.

(*c*) Place plate ⑨ on mounting ③, push bushing ⑩ down through hole in snubber until it rests on the plate.

(*d*) Push bolt ⑪ up through the hole in the mounting plate, bushing, and frame of unit. Drop a lockwasher over end of bolt, thread nut ⑫ on to bolt and tighten securely, making sure that the plate ⑨ is parallel with the mounting.

NOTE

Four shock mounts are to be attached to the transmitter and six to the rectifier.

(4) Attach the grounding strap connectors ⑬ to the unit frame and mounting plate on both sides of the unit by means of the #10-24 x 5/16" screws ⑭ and lockwashers supplied, as shown in (C) of Fig. 3-3. In most units tapped holes are provided for the grounding strap screws, otherwise attach grounding strap connector to the frame by removing the nut from one of the screws that pass through the frame, add the connector lug, replace nut, and tighten securely.

(6) Lower the unit to the floor and with the full weight of unit supported, on the shock mounts adjust the location of the snubber at each shock mount. This is accomplished by screwing the two lower nuts ⑥ up or down until the clearance between the rubber portion of the snubber and plate ⑨ and frame of unit are approximately equal. Make sure that the snubber plate is approximately parallel to the mounting plate. Hold lower nuts in position and tighten upper nuts ⑧ securely.

(7) Install two upper shock mounts at the top rear of the transmitter and rectifier units as shown in (D) of Fig. 3-3, with the hardware provided for this purpose ⑮, ⑯, ⑰, ⑱, ⑲, ⑳.

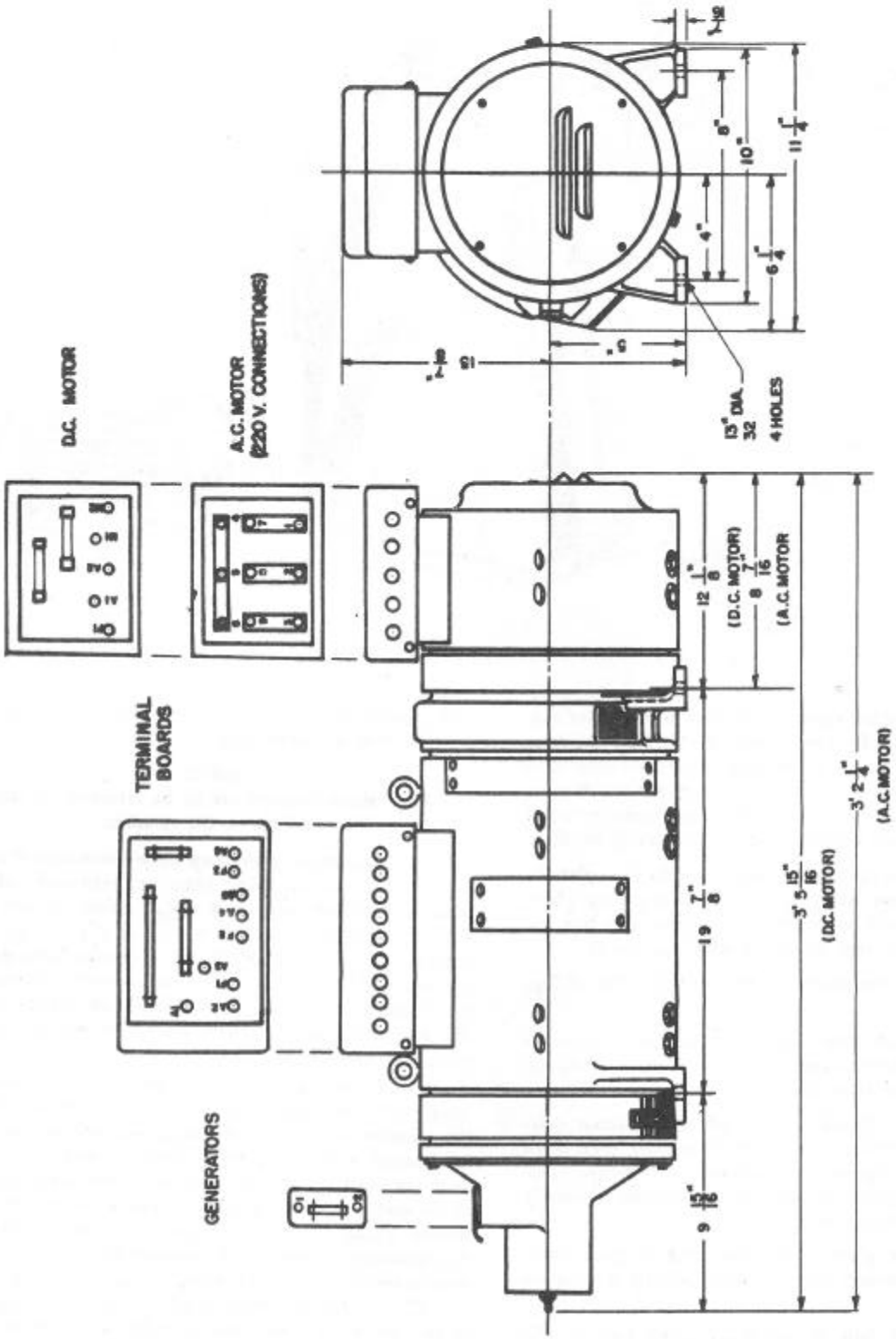


Figure 3-4 Outline Drawing of Motor-Generator Set

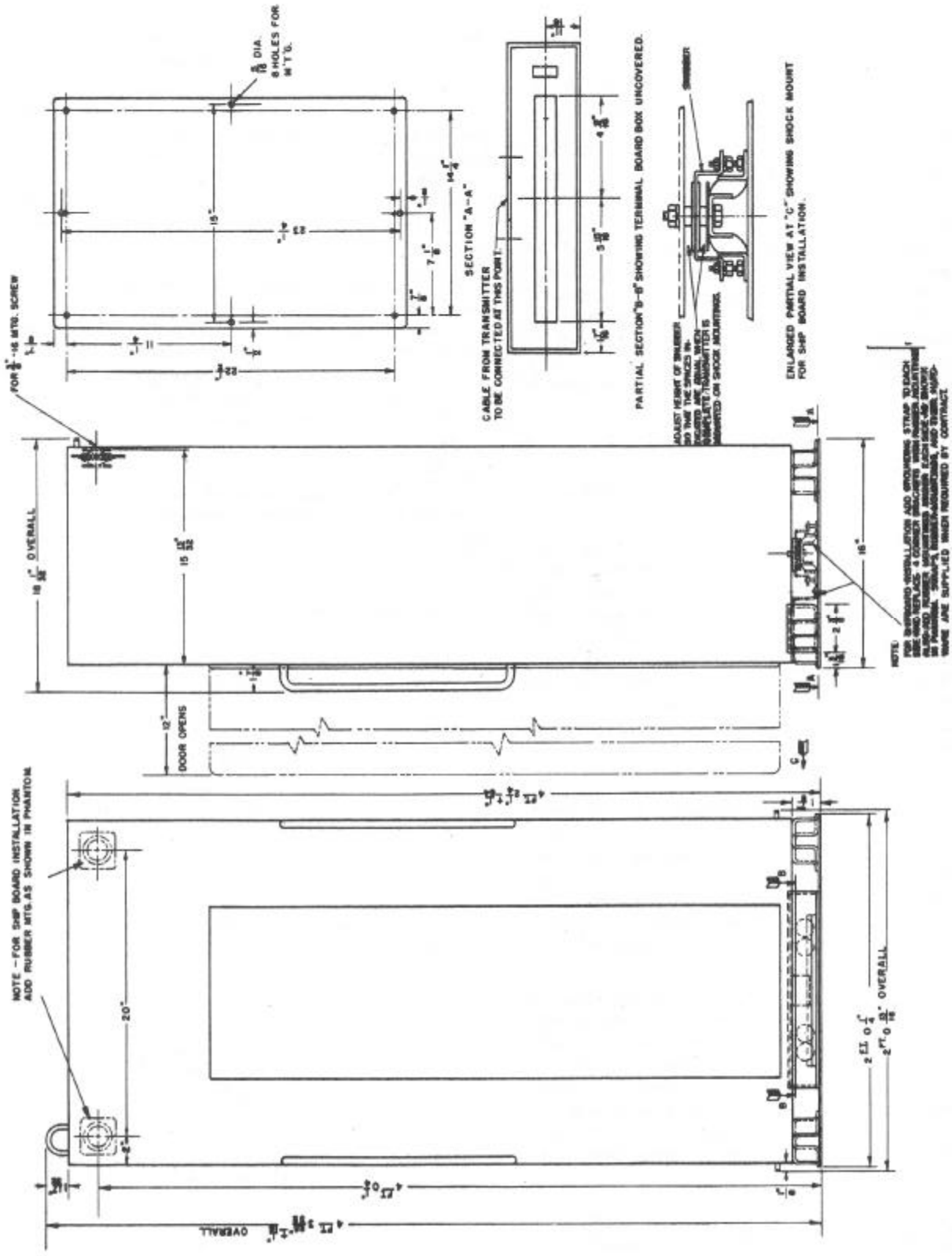


Figure 3-5 Outline of Rectifier Unit

d. Transmitter Unit Installation.—As suggested in Figs. 3-1 and 3-2, a clearance of 18 to 24 inches should be provided on all sides of the transmitter so that access may be made to the rear and sides without dismantling the transmitter from its installed position. This unit is mounted to the deck by 8 bolts which pass through the base plate. The bolts should be long enough to pass through both the base plate and the deck. Refer to Fig. 3-19 for clearances and the drilling plan for the base of the unit.

When the unit is installed on board ship, all of the provided shock mountings must be utilized. This may require that the transmitter unit be installed with its back against the bulkhead to secure the upper rear shock mounts. By providing brackets, however, as suggested in (D) of Fig. 3-3, the transmitter may be mounted away from the bulkhead to allow clearance behind it. The grounding strap shown in (C) of Fig. 3-3 must be provided between the mounting plate and transmitter frame.

NOTE

If the deck is non-metallic, a grounding strap must be provided between the base plate and a suitable ground point.

After the transmitter is installed, insert glass type tubes and the crystal in accordance with the number stamped near each socket. Lock the tubes in place with the safety clamps, where provided. These clamps are designed to grip the base of the tube sufficiently to prevent it from working out of the socket under vibration. When installing the plate cap on the Types 813 and 807 tubes, the dress of the cap lead should be arranged so that it does not come in close proximity to any metal parts of the frame which may cause corona or arc-over to that part.

e. Motor-Generator Installation.—It is advisable, as mentioned previously, to locate the motor-generator unit in a compartment separated from the transmitter by a bulkhead so as to reduce interference during phone operation. Adequate clearance for easy servicing of the set and the magnetic controller should be provided. Fig. 3-1 shows a good installation with suggested clearances.

The motor-generator is provided with two hoisting shackles. Lift it by these and remove the wooden shipping block from the mounting feet, then lower the unit into place and bolt it to the deck by means of four mounting bolts. The drilling dimensions and overall clearances are shown on the outline drawing, Fig. 3-4. It should be noted that the a-c and d-c units vary somewhat in overall length but not in mounting dimensions.

NOTE

The motor-generator set should be installed so that the shaft runs parallel to the centerline of the ship. This will minimize bearing wear caused by rolling of the ship.

f. Rectifier Unit Installation. — The Rectifier Unit may be installed at one side of the Transmitter Unit, as shown in Fig. 3-2. A clearance of 18 to 24 inches between units is desirable so that they may be serviced without removing them from their mounted position.

The mounting dimensions and clearances are shown in Fig. 3-5. The Rectifier is very similar to the transmitter unit in construction and dimensions. When installed aboard ship, shock mounts must be attached and used exactly as described for the transmitter in a preceding paragraph. Six shock mounts must be attached to the rectifier unit base and two at the upper rear of the frame.

g. Magnetic Controller Installation. — This unit is used with each motor-generator power supply and is mounted on the bulkhead near the motor-generator unit as shown in Fig. 3-1. Sufficient clearance should be allowed so that the door may be swung open for service adjustments. It is essential that the reset button on the door be readily accessible at all times.

The mounting and clearance dimensions are shown in Figs. 3-6, 3-7, and 3-8. It will be noted that the mounting details and design of the d-c controller for the Model TCK-7 differs considerably from those pro-

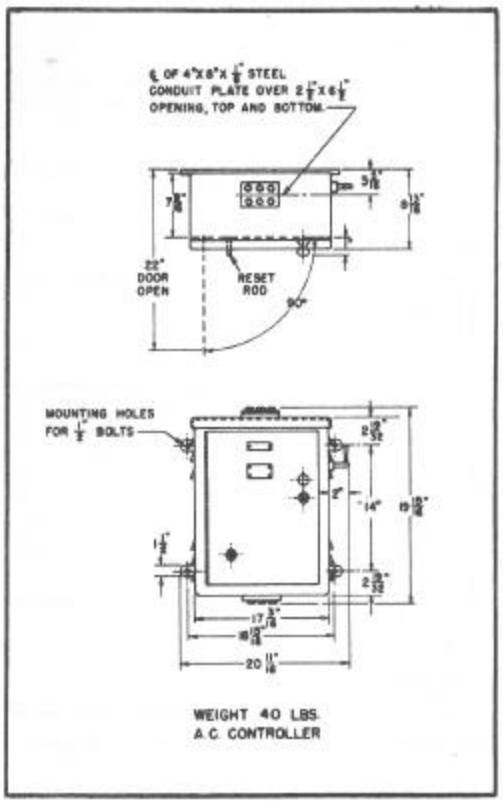


Figure 3-6 Outline Drawing of A-C Magnetic Controller

vided with other models of the series. The mounting bolts for the Model TCK-7 controller pass through the back of the case from the inside, while all other a-c and d-c controllers are provided with exterior mounting feet.

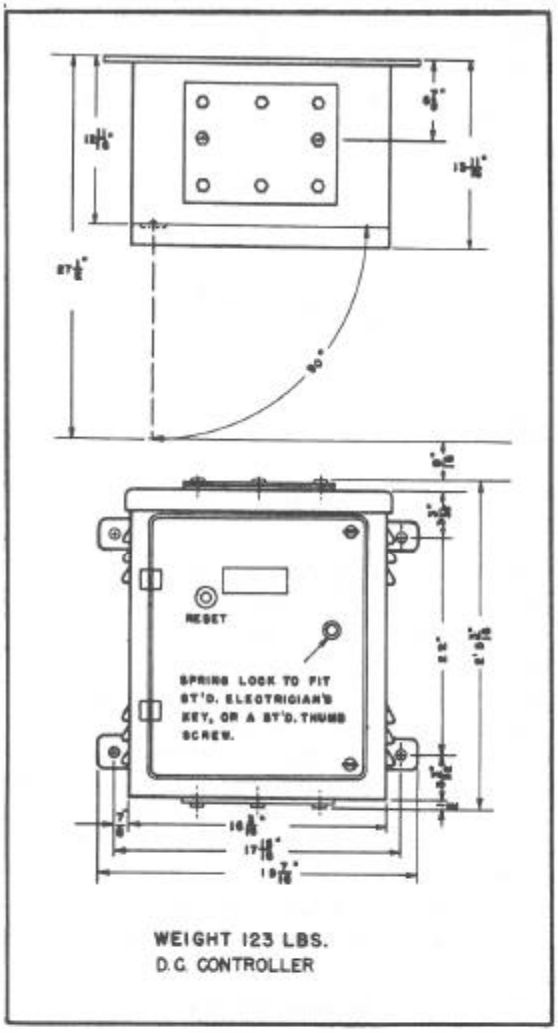


Figure 3-7 Outline Drawing of D.C. Magnetic Controller

h. Microphone Circuit Filter Installation.—This filter unit is used only with installations of Models TCK and TCK-1 equipments. It may be installed in any position on the deck or bulkhead between the motor-generator and transmitter units. Clearance should be left so that the cover may be opened for service and installation purposes. The installation and clearance dimensions are shown on the outline drawing, Fig. 3-9.

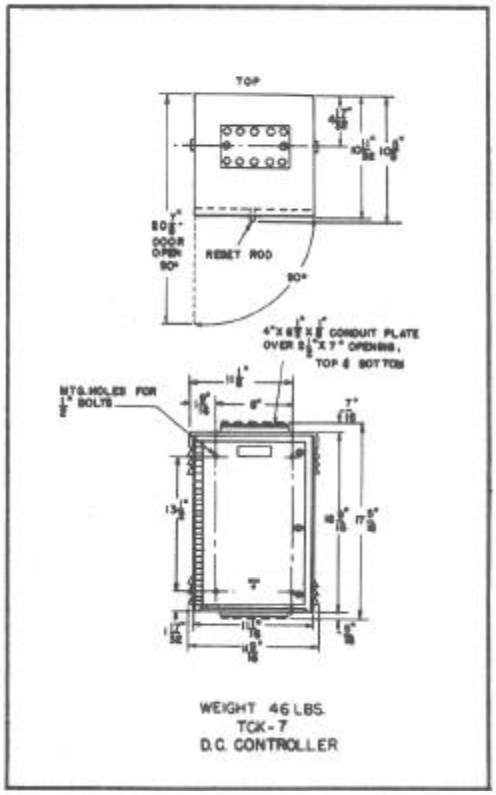


Figure 3-8 Outline Drawing of D.C. Magnetic Controller for TCK-7

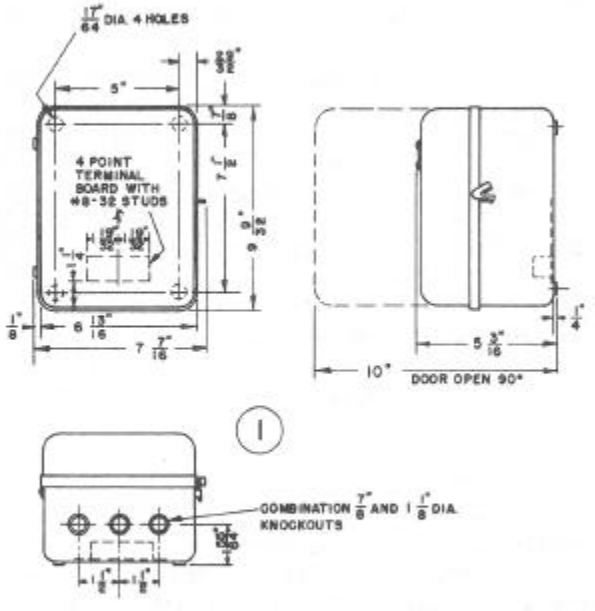


Figure 3-9 Outline Drawing of Microphone Filter Unit

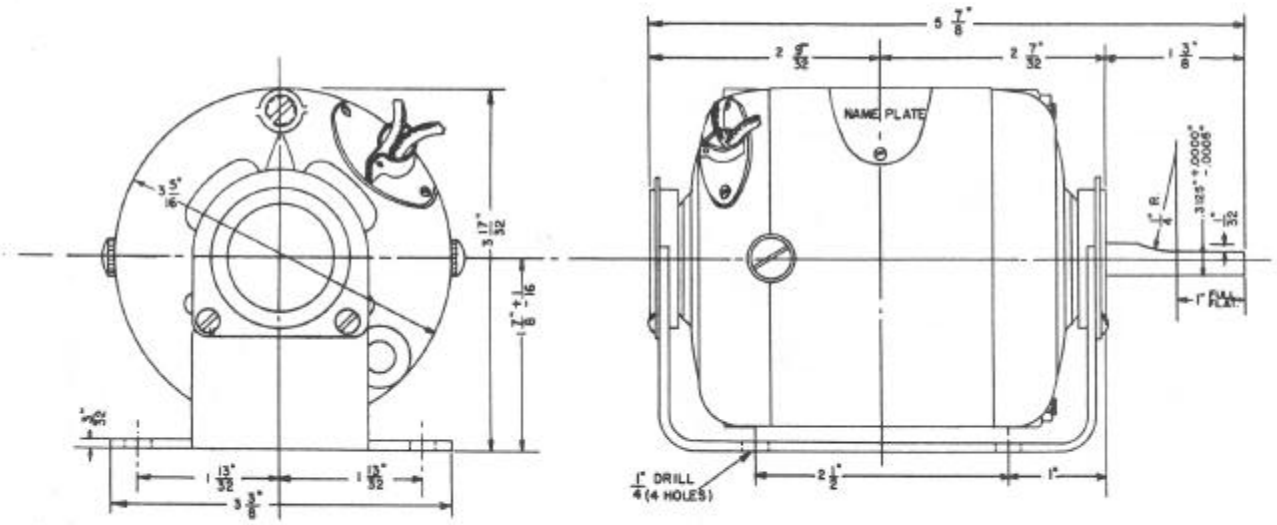


Figure 3-10 Outline of Blower Motor used in Transmitter Unit

***j.* Transmission Line Coupling Unit.**—This unit is supplied with the Models TCK-4 and TCK-6 equipments. It is normally connected and bolted in place on top of the transmitter before shipping. With reference to Fig. 3-19, it will be seen that when this unit is installed, it appears to be a part of the transmitter. This additional height must be taken into consideration whenever the unit is installed.

If it is desired to remove the Transmission Line Coupling Unit, the bolts which secure it to the transmitter frame are removed, the connections to the antenna post and terminal board TB-2 on the transmitter are removed, then the transmission line coupling unit may be lifted from the transmitter frame. If desired, the hoisting shackles may be transferred from the coupling unit to the transmitter frame. The terminals on TB-2 must be connected together when the Transmission Line Coupling Unit is removed.

The antenna post from the transmitter should be connected to the Coupling Unit by the tinned copper strap hanging off of S403.

2. CABLING.

With the exception of the TRANSMITTER-TO-RECTIFIER cable supplied with the Models TCK-4 and TCK-6 equipments, all external interconnection cables must be furnished by the installing activity. Figs. 3-11 through 3-15 show the external wiring between major units for all combinations of the Model TCK-series equipments. A chart on each diagram lists the insulation and recommended size for each lead. Reference to paragraph 10 (*q*) of Section I, shows the power requirements from the ship's supply line.

The location of knockouts for entrance of the cables to the unit is shown on the respective outline drawings for the units. The cables to the transmitter unit may be brought through the rear or side. The Magnetic Control Unit has removable plates at both top and bottom, either of which may be replaced by a plate with a terminal tube of the proper size to accommodate connection cables.

Transmission lines should be as short as possible and within the limits of the equipment's maximum transmission line runs.

The antenna transmission line from either the Transmitter antenna post or Transmission Line Coupling Unit should be made of at least No. 10 bare wire or copper tubing. It should be supported on stand-off insulators and held at least 4 inches away from the nearest metallic surface. Sharp bends should be avoided. The location of the antenna post of the transmitter is shown on the outline drawing of the unit. On the Transmission line coupling unit (Figure 3-15) the two posts near the front panel are used for a balanced two-wire transmission line, and the centrally located post is used for a single-wire antenna connection.

The following table gives the location of the connection boards or terminals shown on the external cabling diagrams.

TABLE 3-1

TERMINAL BOARD LOCATIONS

TERMINAL BOARD	UNIT	LOCATION	SHOWN IN FIGURE
TB1	TRANS. UNIT	In terminal box behind audio unit access door of transmitter unit.	3-16
TB8	TRANS. UNIT	Behind and above audio unit access door.	3-16
TB20	RECTIFIER UNIT	In terminal box behind access door of rectifier unit.	
TB2	TRANS. UNIT	Through hole in top cover of transmitter unit(Models TCK-4, TCK-6 only).	3-16
TB30	TRANSMISSION LINE Coupling Unit.	Base of Coupling Unit.	3-16
Motor Terminal Board	MOTOR-GEN. UNIT	In fuse box on top of motor frame.	3-4
H.V. Terminal Board	MOTOR-GEN. UNIT	In fuse box on top of H.V. generator frame.	3-4
L.V. Terminal Board	MOTOR-GEN. UNIT	In fuse box on top of H.V. generator frame.	3-4

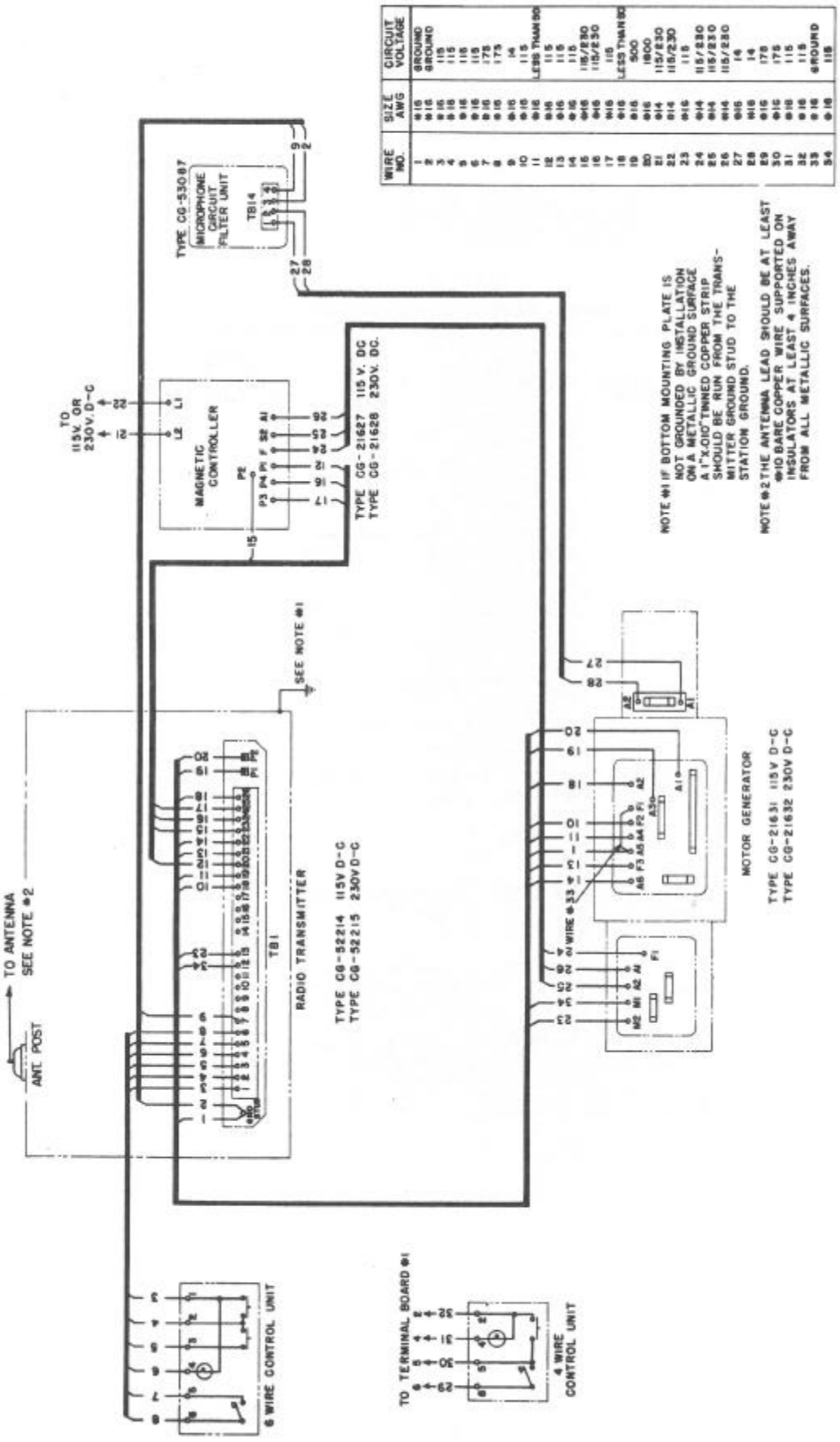


Figure 3-11 External Connection Diagram, D-C Model TCK

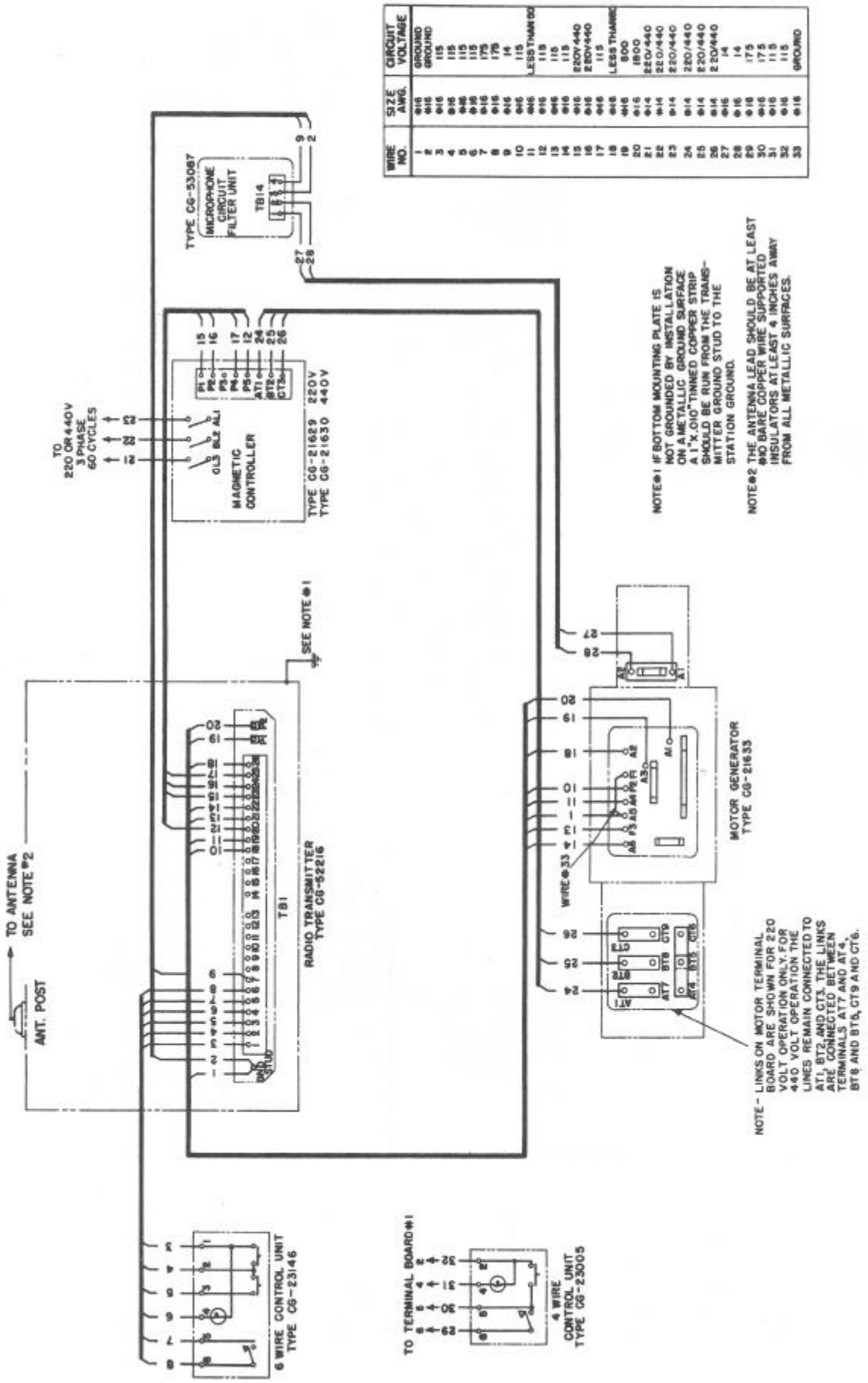


Figure 3-12 External Connection Diagram, A-C Model TCK and TCK-1

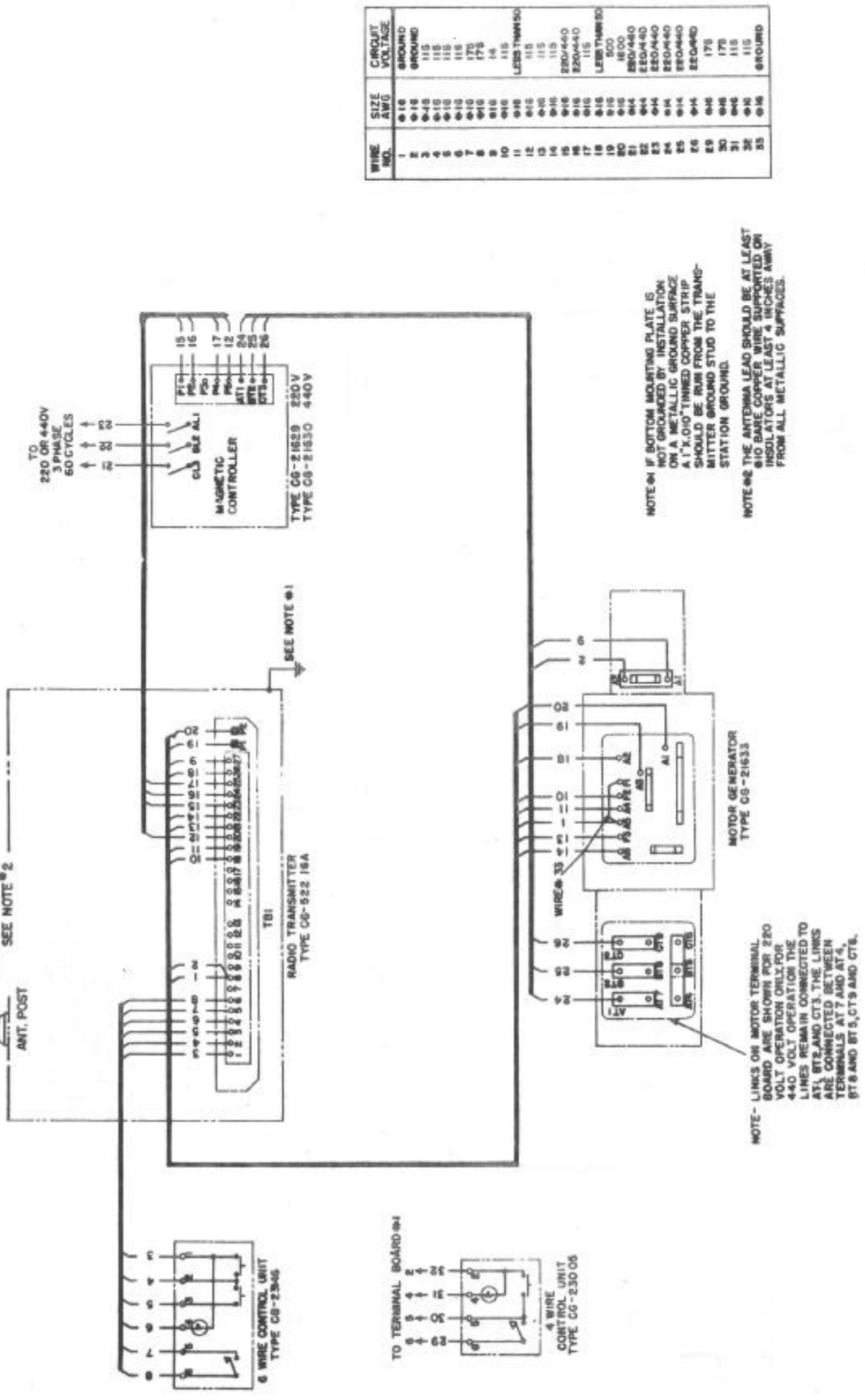


Figure 3-13 External Connection Diagram, A-C Model TCK-2 and TCK-3

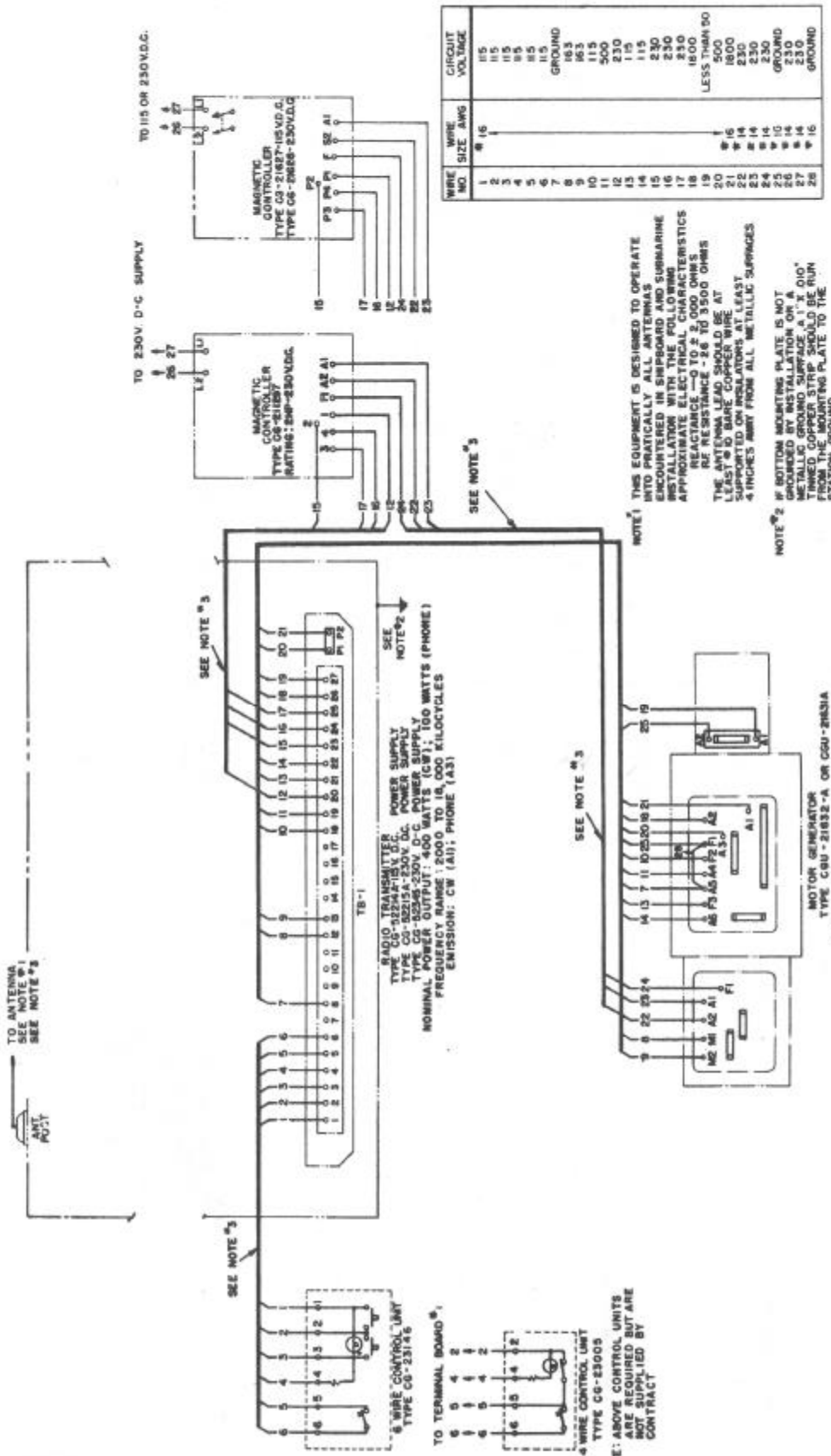
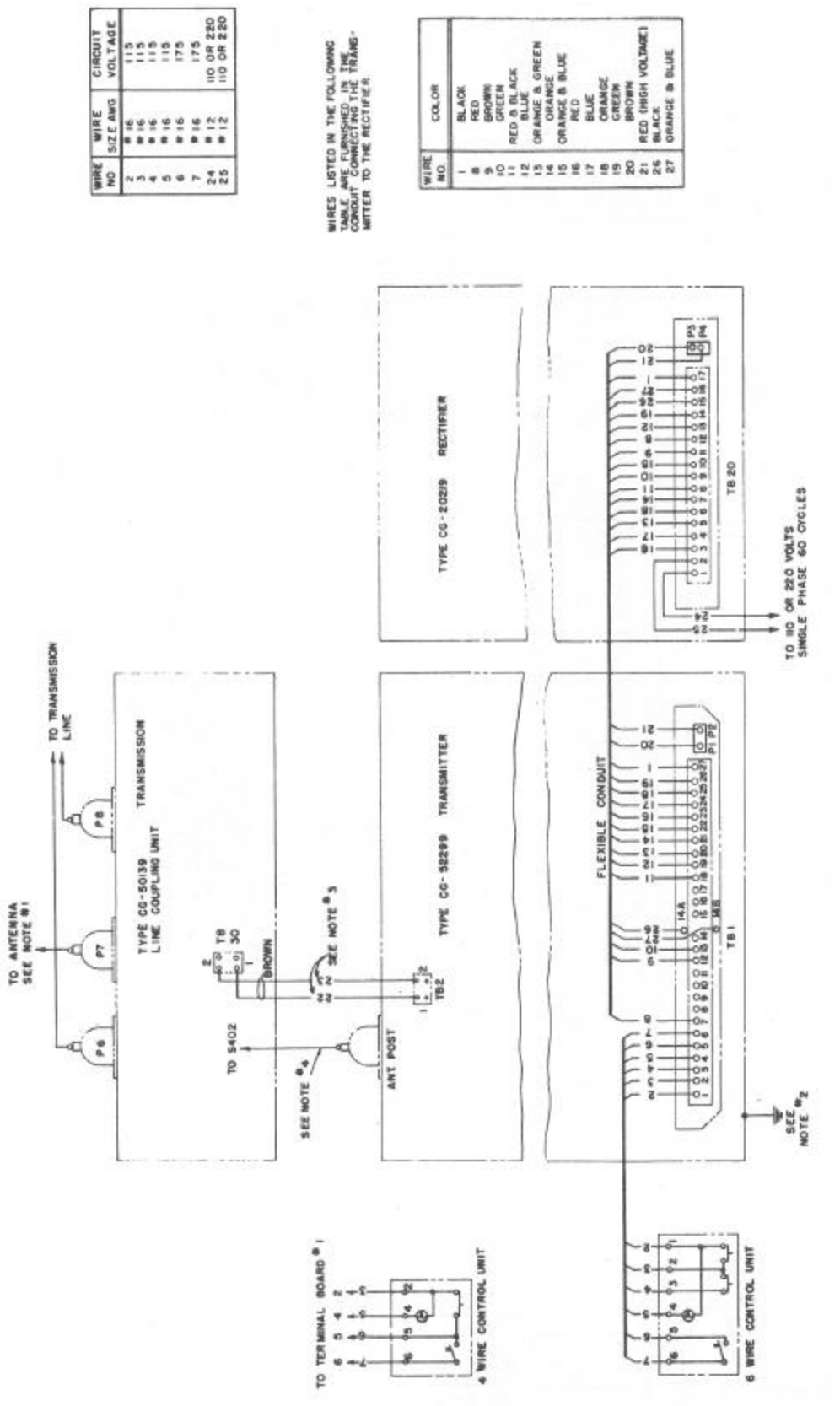


Figure 3-14 External Connection Diagram, D-C Model TCK-3, TCK-5, TCK-7



WIRE NO	WIRE SIZE AWG	CIRCUIT VOLTAGE
2	#16	115
3	#16	115
4	#16	115
5	#16	115
6	#16	175
7	#16	175
24	#12	110 OR 220
25	#12	110 OR 220

WIRES LISTED IN THE FOLLOWING TABLE ARE FURNISHED IN THE CONDUIT CONNECTING THE TRANSMITTER TO THE RECTIFIER.

WIRE NO.	COLOR
1	BLACK
8	RED
9	BROWN
10	GREEN
11	RED & BLACK
12	BLUE
13	ORANGE & GREEN
14	ORANGE
15	ORANGE & BLUE
16	RED
17	BLUE
18	ORANGE
19	GREEN
20	BROWN
21	RED (HIGH VOLTAGE)
26	BLACK
27	ORANGE & BLUE

NOTES:
#1- THE ANTENNA LEAD SHOULD BE AT LEAST #10 BARE COPPER WIRE SUPPORTED ON INSULATORS AT LEAST 4 INCHES AWAY FROM ALL METALLIC SURFACES
#2- IF BOTTOM MOUNTING PLATE IS NOT GROUNDED BY INSTALLATION ON A METALLIC GROUND SURFACE, A 1"X.040" TINNED COPPER STRIP SHOULD BE RUN FROM THE TRANSMITTER MOUNTING PLATE TO THE STATION GROUND.
#3- WIRES #22 & #23 ARE #16 AWG AND ARE FURNISHED WITH THE EQUIPMENT.
#4- ANTENNA POST FROM TRANSMITTER TO BE CONNECTED TO THE TRANSMISSION LINE COUPLING UNIT BY THE 1/4 X .020" TINNED COPPER STRAP MAKING OFF OF S402 IN THE TRANSMISSION LINE COUPLING UNIT.

Figure 3-15 External Connection Diagram, Model TCK-4 and TCK-6

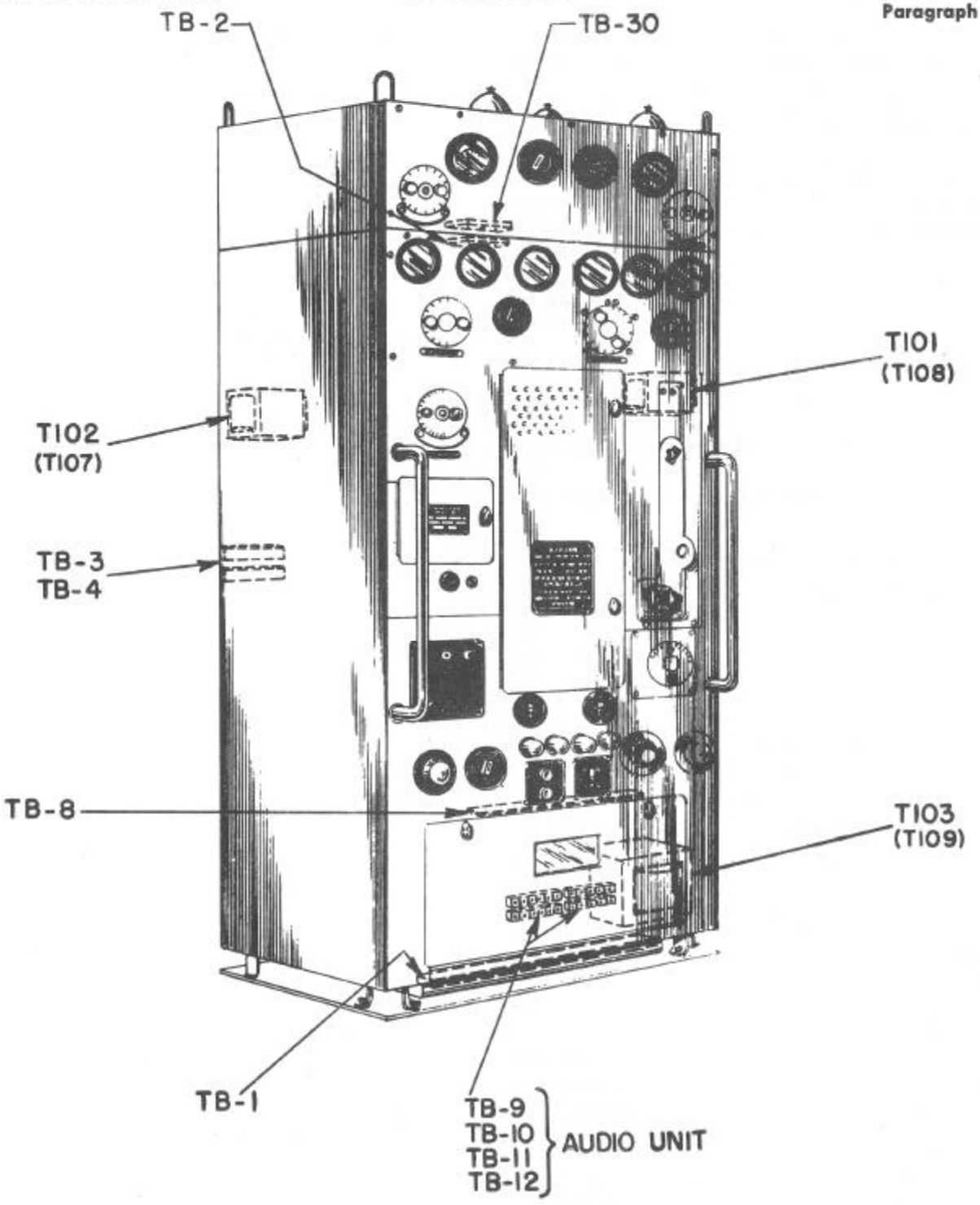


Figure 3-16 Terminal Board Connections

3. MODIFICATION OF TRANSMITTER FOR 4-WIRE OR 6-WIRE KEYING CONTROL UNIT.

All Transmitter units as supplied by the manufacturer are connected for operation with a 6-wire remote control keying unit. To modify the connections for operation with a four-wire control unit, proceed as in paragraph 3 (a). Refer to Fig. 3-16 for the location of all affected items.

a. Six-Wire to Four-Wire Conversion.

(1) Obtain switch S112 and its associated switch plate from the spare parts box.

(2) Unfasten the MG START-STOP switch S113 from the panel by removing the four mounting screws. On the Type CG-52299 Transmitter (Models TCK-4 and TCK-6) Unit, switch S113 is labeled "TRANSMITTER START-STOP".

(3) Remove the S113 switch leads from terminal board TB-8. (This terminal board is located on the back of the front panel just below S113 and is available through the Relay Door.) Store S113 in the spare parts box.

(4) Remove the link from terminals F_2 to G of TB-8. Also, on Transmitter Type CG-52345 (Model TCK-7) only, remove the links from terminals A to B and terminals D to E on TB-8.

(5) On all Transmitter units, except Type CG-52345, connect a link between terminals A and B of TB-8. On Transmitter unit, Type CG-52345, connect links between terminals A and C and between terminals D and F_1 of TB-8.

(6) Connect switch S112 to terminal board TB-8, as follows:

LEAD COLOR	TERMINAL
Orange	#1 of TB-8
Blue	#4 of TB-8
Red	#3 of TB-8

(7) Place the switch S112 in the position formerly occupied by S113 and secure to the front panel by four screws through the switch plate.

(8) Make external connections from the 4-wire control to terminal board TB-1, as shown on the schematic diagram for the Transmitter at the rear of the book.

b. Four-Wire to Six-Wire Conversion.—In the event that the Transmitter unit has been connected for four-wire control and it is desired to change back to a six-wire control, proceed as follows:

(1) Obtain switch S113 and its accompanying switch plate from the spare parts.

(2) Unfasten the MG START-STOP switch S112 from the panel by removing the four mounting screws. On Transmitter Unit, Type CG-52299 (Models TCK-4 and TCK-6) the switch S112 is labeled "TRANSMITTER START-STOP".

(3) Remove the S112 switch leads from terminal board TB-8 and store S112 in the spare parts box.

(4) On all transmitters except Type CG-52345 (Model TCK-7), remove the link between terminals F_2 and G of TB-8. On Transmitter Type CG-52345, remove link from terminals A and C, also from terminals D and F_1 of TB-8.

(5) Connect a link between terminals F_2 and G of TB-8. On Transmitter CG-52345 connect links between terminals A and B, also between D and E of TB-8.

(6) Connect switch S113 to terminal board, TB-8, as follows:

LEAD COLOR	TERMINAL
Brown	G of TB-8
Blue	3 of TB-8
Red	4 of TB-8
Green	2 of TB-8

(7) Place the switch S113 in the position formerly occupied by S112, and secure to the front panel by four mounting screws through the switch plate.

(8) Make external connections from the 6-wire control to the terminal board TB-1, as shown on the schematic or cabling diagram for the transmitter.

4. INSTALLATION FOR REMOTE PHONE OPERATION.

Connections into the Transmitter Unit for remote phone operation is provided. The control box is connected into the transmitter circuits at terminals Nos. 7, 8, 9, 10, and 11 on terminal board TB-1, as shown on the schematic diagram of the transmitter at the rear of the book. These terminals supply the following:

TABLE 3-2
REMOTE MICROPHONE CONNECTIONS

TB-1 TERMINAL	CIRCUIT
#7	−12 volts for microphone supply.
#8	Ground connection.
#9	Microphone transformer input.
#10	Microphone transformer input.
#11	Microphone push-to-talk button.

5. D-C POWER SUPPLY VOLTAGE CONVERSION (TRANSMITTER UNIT, TYPES CG-52214, CG-52215, CG-55214A, CG-52215A).

The Radio Transmitter Unit, Type CG-52214, CG-52215, CG-52214A, or CG-52215A, was not designed to facilitate ready change-over from 115 volts d-c to 230 volts d-c or vice versa in the field. However, it is possible to make the change-over to the Transmitter Unit by changing some of its component parts. It will also be necessary to substitute the correct motor-generator set, magnetic controller and remote control unit. The correct motor-generator and magnetic controller for each voltage is shown in 10 (a) of Section I.

The following components must be substituted when a change from one voltage to another is made. The ratings are found by referring to the Parts List at the rear of the book.

TABLE 3-3

VARIATIONS IN COMPONENTS WITH DIFFERENT D-C VOLTAGES

115 V. D-C OPERATION		230 V. D-C OPERATION	
Symbol	Resistance	Symbol	Resistance
R124	50	R133	160
R125	630	R134	1250
R118A	25	R135A	98
R118B	62	R135B	230
		R139	800

The above resistor substitutions are shown on the schematic diagram for the transmitters.

To connect the heater resistors in the M-O box for 115 or for 230 volt d-c operation, refer to the upper left corner of the schematic diagram for the transmitter. The diagram shows the heaters connected for 230 volt d-c operation. For 115 volt d-c, remove the flexible wire link from terminal 5 on TB4 to terminal 6 on TB3. Make the connections in the M-O box indicated by the dash lines on the diagram. The terminal boards TB-3 and TB-4 are available from the rear of the transmitter in the approximate location shown in Fig. 3-16.

For 230-volt operation an 800-ohm resistor, R139, must be used in series with the M-O blower motor. Holes for mounting this resistor on two insulated posts will be found on the right-hand side of the bottom shelf. The two wires (orange and green) for connecting the resistor in the circuit, are tied back into the cable which will be found near the rear right-hand corner.

The schematic diagram shows the filament transformers T101 and T102 (at the lower right-hand corner) connected for 230-volt d-c operation. For 115 volt d-c operation, remove the links between terminals 3 and 5 of these transformers. Connect links between terminals 1 and 3, also between 5 and 6 of each transformer.

After the proper motor-generator set, magnetic controller and remote control units have been installed and the transmitter unit is converted for the desired voltage operation, turn R138 counterclockwise, in the direction of the 230-volt d-c arrow, as far as possible. R138 is located adjacent to the M-O blower motor and is available through the left side of the unit. Close the EMERGENCY switch S111 and the M-O HEATER switch S115. This applies voltage to the M-O heaters and blower circuit. Connect a 30-volt d-c voltmeter between terminal 2 of TB-5 and terminal 2 of TB-6. Adjust R138 to the position where the voltage between the terminals equals 18 volts. *Do not change this control under any other conditions.* This adjustment is applicable when either 115-volt or 230-volt conversion is made.

6. A-C POWER SUPPLY VOLTAGE (MOTOR-GENERATOR) CONVERSION; (TRANSMITTER UNIT, TYPES CG-52216, CG-52216A).

Radio Transmitter Unit, Type CG-52216 or CG-52216A, is designed to facilitate the change-over from 220 volts to 440 volts a-c in the field, providing the proper magnetic controller for the voltage is available. For the correct Magnetic Controller to use under the two voltage conditions, refer to paragraph 10 (a) in Section I.

The only connection change in the Transmitter Unit involves the transformer T103. Change the link connections on top of the transformer to adapt it to the desired voltage, as shown on the schematic diagram for the Transmitter Unit and in the following table:

TRANSFORMER	220 VOLT A-C OPERATION	440 VOLT A-C OPERATION
T103	Link from 1 to 3 Link from 2 to 4 Link from 5 to 7 Link from 6 to 8	Link from 1 to 3 Link from 2 to 4 Link from 6 to 7

The motor terminal box on the motor-generator set must be changed to conform to the proper voltage rating. Fig. 3-17 shows the connection modifications necessary for the two voltages.

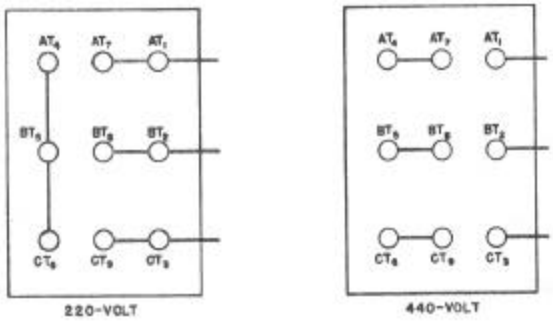


Figure 3-17 A-C Motor Terminal Board Connections

7. A-C POWER SUPPLY VOLTAGE (RECTIFIER) CONVERSION (TRANSMITTER UNIT, TYPE CG-52299).

Radio Transmitter, Type CG-52299, does not require any changes for operation from either a 110 or 220 volts a-c source. All modifications for changes in power supply voltage are made at the Rectifier Unit.

The Rectifier Unit, Type CG-20219, is modified for 110 or 220 volt operation by changing the link connections on the voltage regulator VR301 to conform to the following table. The voltage regulator is located

behind the front panel above the top chassis of the Rectifier Unit.

COM-PONENT	110 V. A-C OPERATION	220 V. A-C OPERATION
VR301	Link from 4 to 8 Link from 2 to 3 Link from 1 to 5	Link from 1 to 2 Link from 2 to 3 Link from 3 to 4

Although the equipment was designed to operate from a 60-cycle power source, changes may be made in the field to adapt it for use on 50 cycles. The change is made in Rectifier Unit CG-20219 by replacing the four relay actuating solenoids on the relay chassis with four coils from the 50-cycle conversion kit supplied with the equipment. After changing the coils, make certain that the contactors can open and close freely.

8. OPERATIONAL CHECK.

WARNING

This equipment makes use of high voltages which are dangerous to life. Operating personnel must at all times observe all safety regulations. See "SAFETY NOTICE" at front of book. Do not change tubes or make adjustments inside the equipment with the high-voltage supplies on. Do not depend upon door switches or interlocks for protection but always shut down the motor-generator or rectifier unit and open the main switch in the supply to the equipment.

(Reference is made to Fig. 3-18 for location of components mentioned in this section.)

a. Remove the primary power to the input of the equipment by opening the line at the distribution panel or disconnect switch. On all models, except Model TCK-7, a disconnect switch is supplied on the Magnetic Controller or the Rectifier Unit.

b. Make a mechanical inspection of all relays in the Transmitter and Rectifier Unit, (their locations are shown in Fig. 3-18). Make sure that the armature or movable contact arm of each relay is not bound and is free to move within the confines of the component limitations. In the transmitters the relays are located behind the lower relay access door, and in the Rectifier they are behind the front panel door of the unit.

c. On the Transmitter Unit—throw EMERGENCY switch to OFF and M-O HEATER switch to OFF. Turn CAL-TUNE-OPERATE switch to CAL. position and CW-PHONE switch to CW. Turn the FILAMENT VOLTAGE, PLATE VOLTAGE, AND P.A. PLATE VOLTAGE controls to counterclockwise positions. Throw REMOTE CONTROL—LOCAL switch to LOCAL position and TEST KEY to mid-position.

d. When Rectifier Power Supply Unit, Type CG-20219, is used, throw the Rectifier EMERGENCY switch to OFF and POWER switch to OFF position. Turn the LINE VOLTAGE control as far counterclockwise as it will go.

e. Turn ON the main supply power to the Magnetic Controller or Rectifier Unit. On the four Magnetic Controllers Types CG-21628, CG-21628, CG-21629, and CG-21630, a line switch is contained in the unit which must be thrown ON. This switch is located inside of the cover on some controllers and a handle protrudes through the right side of the case of others.

f. On 60-cycle a-c installations where the Rectifier Unit, Type CG-20219, is used, the pointer on the TIME DELAY RELAY inside the front panel access door should be set to read approximately 40. On 50-cycle installations, this pointer can be set between 35 and 40.

g. On Models TCK-4 and TCK-6, at the Rectifier Unit Type CG-20219, throw the POWER switch to the ON position. The POWER INDICATOR lamp will glow. Turn the LINE VOLTAGE control knob clockwise until the LINE VOLTAGE meter reads 118, or to the red mark on scale. Throw the EMERGENCY switch to OPERATE. This supplies power to the interconnecting lines between the rectifier and transmitter.

h. At Transmitter Unit—throw EMERGENCY switch to OPERATE position. This energizes the control power lines of the transmitter.

i. Throw M-O HEATER switch to ON position. The M-O HEATER indicator lamp should glow. After approximately thirty minutes, the thermometer on the front panel should reach 60°C, and remain there all during the time that the M-O HEATER switch is ON. After this temperature is reached, the M-O HEATER indicator lamp will turn OFF and ON as the thermostatic control operates. This is a normal operating condition.

j. Throw the FIL. STAND-BY switch to ON position. (This switch is included only on the a-c transmitters, Types CG-52216, CG-52216A, and CG-52299.) Turn the FILAMENT VOLTAGE control clockwise and observe the FILAMENT VOLTAGE meter. Adjust the control until the meter reads 12.6 or to the red mark. This indicates that the filament voltage control is functioning properly. Turn the FIL. STAND-BY switch OFF.

k. Push in on the START button on the START-STOP switch. Relays will be heard to operate and in all Transmitter Units except Type CG-52299, the three remaining indicator lamps (BIAS, PLATE, and POWER) will glow almost instantly. On Type CG-52299 Transmitter Unit (Models TCK-4 and TCK-6) the POWER indicator will glow immediately when the push-button is depressed, then, after a 40-second delay, the BIAS and PLATE indicators will glow.

l. Readjust the FILAMENT VOLTAGE control until the FILAMENT VOLTAGE meter reads at 12.6 volts,

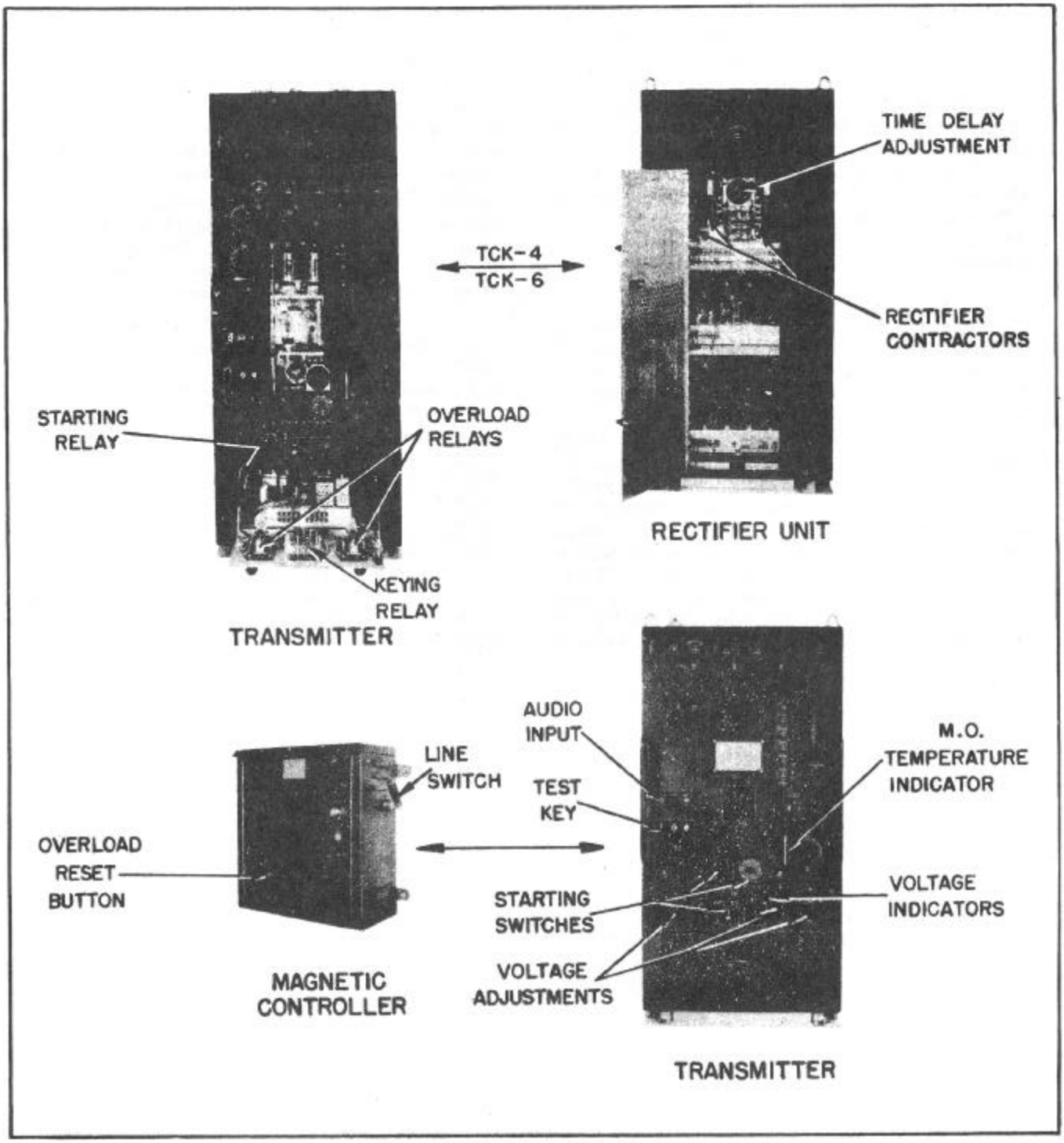


Figure 3-18 Control Identification

or to the red mark. The illumination of the tube filaments may be observed through the ventilation holes in the front door.

m. On Transmitter Unit, Type CG-52299, the PLATE VOLTAGE meter should read approximately 500 volts or at the red mark after the LINE VOLTAGE control on Rectifier Unit CG-20219 is adjusted to give 118 volts on the LINE VOLTAGE meter. On all other transmitters, turn the PLATE VOLTAGE control clockwise until the PLATE VOLTAGE meter reads 500 volts or at the red mark. Throw TEST KEY to upper position. Plate current should be observed on the I.P.A. PLATE CURRENT meter. If there is no PLATE VOLTAGE reading, push in the RELAY RESET button.

n. Move the TEST KEY up and down rapidly, observing or listening for the keying relay to operate. The keying relay is located on the rear of the relay access door and may be seen through the window of the door when the door is closed. The relay should operate instantaneously when the circuit is closed with the TEST KEY.

o. Plug a pair of headphones in the C.F.I. AUDIO OUTPUT jack, and throw C.F.I. ON-OFF switch to ON position and the key to the upper position. Turn VOLUME control full clockwise and then turn the FREQUENCY control (A) a few turns.

NOTE

Make sure the lever below this dial is in the FREE position before attempting to turn the FREQUENCY control. As the dial setting is changed, beat notes should be heard at regular intervals.

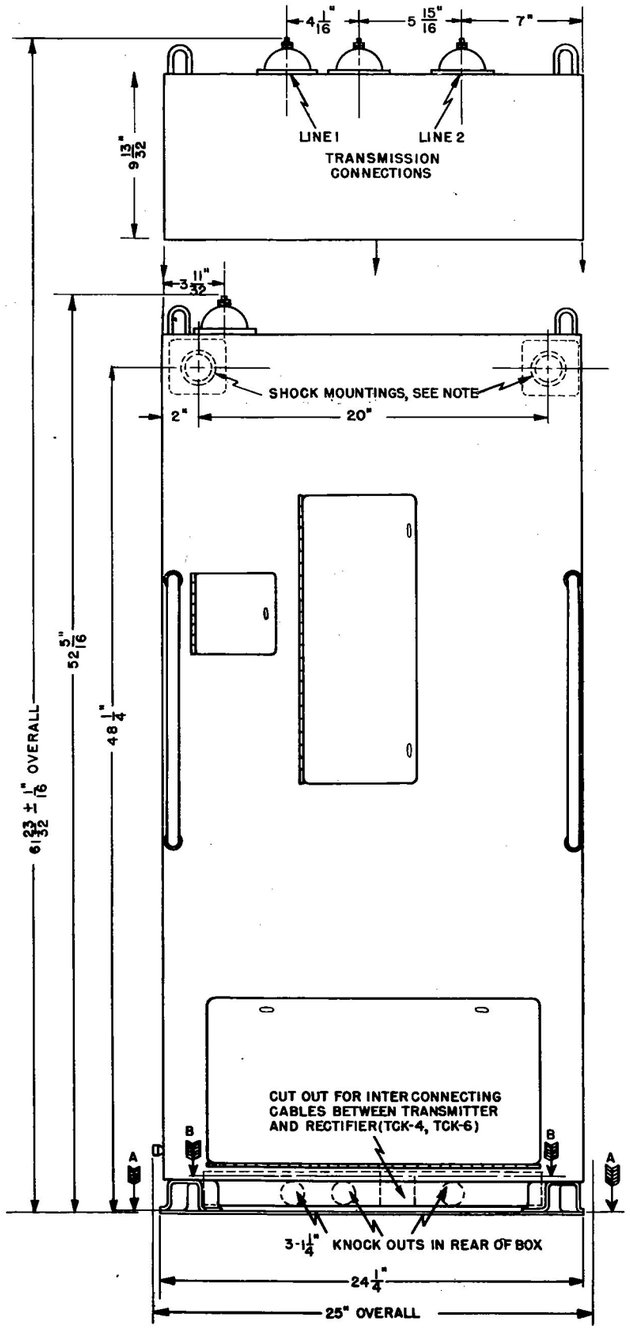
p. Turn CAL-TUNE-OPERATE switch to TUNE position and TEST KEY to the upper position. On Transmitter Unit, type CG-52299, the P.A. PLATE VOLTAGE meter should read between 700 and 1000 volts and the P.A. PLATE CURRENT meter should read an indefinite value but not above the red mark on the scale. On all other transmitters, turn the P.A. PLATE VOLTAGE control until the P.A. PLATE VOLTAGE meter reads approximately 750 volts. The P.A. PLATE CURRENT meter should read an indefinite value of current but it should be below the red mark on the scale.

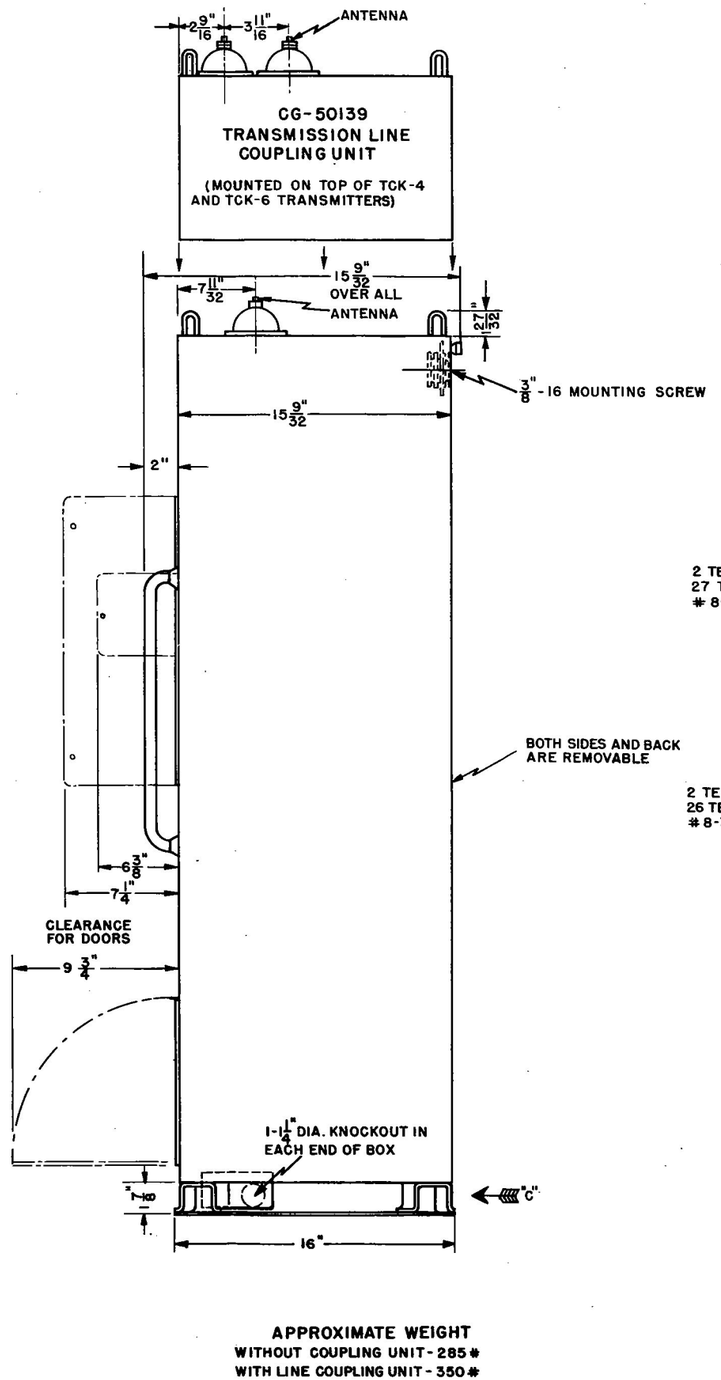
q. Test each door interlock to make sure it shuts off all plate voltage from the transmitter when the door is opened. The interlocked doors on the Transmitter Unit consist of the tube access door, the CFI unit access door, and the relay door. On the Rectifier unit, the front access door should be tested. Upon closing the door and locking it shut, the plate voltage should be restored.

r. The full application of plate voltage to the P.A. stage is made by switching the CAL-TUNE-OPERATE switch to the OPERATE position. This MUST NOT be done until after the transmitter unit is tuned as described in the "OPERATION" section of this book.

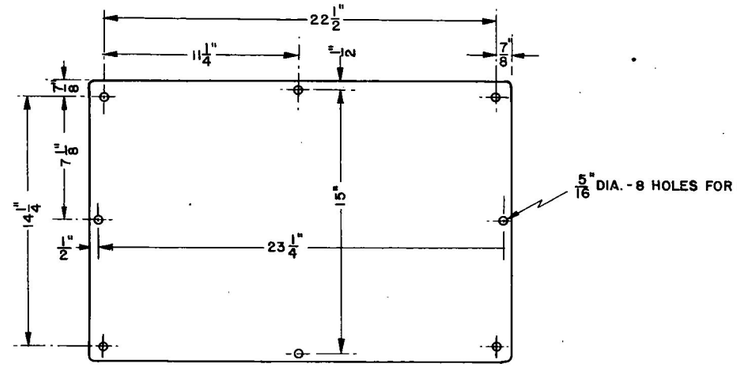
s. When the six-wire control unit is used, tests for correct operation are made by throwing the LOCAL-REMOTE switch to REMOTE, the transmitter TEST KEY to its mid-position, and then operating the START-STOP switch on this remote control unit to make sure it turns the transmitter on and off. The TEST KEY on the remote unit can be tested by pushing it either up or down and watching for readings on the I.P.A. and P.A. PLATE CURRENT meters.

t. To stop the equipment, push the STOP button. To shut the equipment down for a long period, turn the M-O HEATER to OFF and the transmitter EMERGENCY to OFF. The rectifier POWER switch may also be turned to OFF if the equipment will be out of service for a few days.

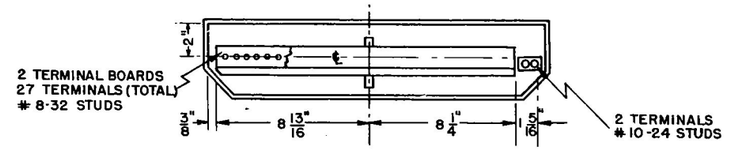




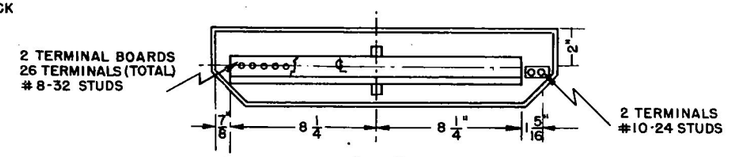
APPROXIMATE WEIGHT
WITHOUT COUPLING UNIT - 285#
WITH LINE COUPLING UNIT - 350#



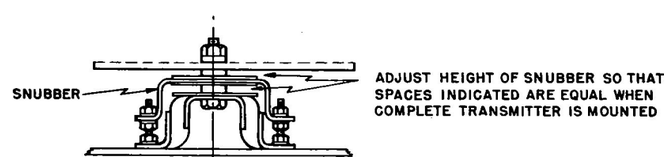
SECTION "A-A"



PARTIAL SECTION "B-B". TERMINAL BOARD BOX FOR MODELS TCK-2,3,4,5,6, AND 7



PARTIAL SECTION "B-B". TERMINALS BOARD BOX FOR MODELS TCK AND TCK-1



ENLARGED PARTIAL VIEW AT "C" SHOWING CONSTRUCTION OF SHOCK MOUNTINGS

NOTE

SHOCK MOUNTS ARE SUPPLIED WITH ALL TCK TRANSMITTERS AND SHOULD BE USED FOR SHIPBOARD INSTALLATION. IF THE SHOCK MOUNTS ARE NOT IN PLACE THEY ARE SUPPLIED IN AN ACCOMPANYING KIT. A GROUNDING STRAP MUST BE USED WITH THE SHOCK MOUNTS.

Figure 3-19 Outline Drawing Transmitter Unit

SECTION IV.
OPERATION

1. GENERAL.

The most effective operation of this radio telephone and telegraph transmitting equipment will be obtained by operators who thoroughly understand what they are doing. Proper tuning will result in a strong, clear signal that may be picked up thousands of miles away, while incorrect operation can cut the range down to zero. The operator should take a great deal of pride in his ability to operate the equipment correctly, as evidenced by being able to communicate with any point at any time.

Numerous factors enter into wireless communication, many of which cannot be covered in this book.The effects of the time of day and of frequency on range of transmission may be obtained from any standard textbook on radio communication or wave propagation. The purpose of the following description is to obtain the greatest amount of power output without overloading or damaging the equipment.

The actual tuning of the Model TCK transmitters is covered in a few simple steps, but before any power is applied the operator must become familiar with the "why" of each control.

All of the knobs and switches on the front panel of the transmitter are associated with one of three general functions: (1) turning on the power; (2) tuning to a specified frequency; (3) switching to C.W. (continuous wave or key) operation or to PHONE operation. In manipulating the controls it will be well to remember the general function of each.

The power controls include switches and rheostats for applying and adjusting voltages to the various circuits. Even though the equipment will operate with incorrect power control settings, the operation will not be efficient and may cause damage to the vacuum tubes.

The tuning controls are for tuning four separate circuits. These are the M.O. (Master Oscillator) which generates the fundamental frequency signals, the I.P.A. (Intermediate Power Amplifier) which performs the first amplification of the signal, the P.A. (Power Amplifier) which performs the final amplification of the signal, and the ANTENNA TUNING circuit which when properly adjusted, permits the antenna to radiate the maximum energy. In a few equipments (TCK-4 and TCK-6), an additional circuit, the Transmission Line Coupling Unit is installed on top of the transmitter. This unit is used for connecting the output to either a balanced transmission line or single-wire antenna and when used it should be considered as part of the ANTENNA TUNING circuit.

At the left side of the front panel are the C.F.I. (Crystal Frequency Indicator) controls. These are for checking the Master Oscillator frequency to make sure it is the same as the frequency indicated by the FREQUENCY selector dial.

Briefly, the tuning procedure is:

a. Check the M.O. frequency against the C.F.I. and adjust the M.O. RESET until the frequency agrees with the dial reading.

b. Tune the I.P.A. circuit with the I.P.A. TRIMMER for minimum I.P.A. plate current.

c. Tune the P.A. circuit with the P.A. TRIMMER for minimum P.A. plate current.

d. Tune the antenna with the two antenna tuning controls (and the transmission line, if used, with the two additional controls) for correct matching to the antenna system in use.

Operation is designed for either key or microphone and changing from one to the other is done with a single switch. Because of the characteristics of the transmitted wave, the C.W. output contains four times as much carrier power as PHONE. In emergencies, when maximum range is required, always use C.W. transmission.

The complete operation procedure is subdivided into several headings, each heading starts on a new page. The related photograph showing the location of controls is conveniently located on the page opposite the procedure.

2. FREQUENCY OF OPERATION.

This transmitter may be used for communication on any frequency between 2,000 and 18,100 kc. On the front panel are six frequency dials with a band number and a frequency range engraved beside each. The band number refers to the position of the BAND CHANGE switch and the range to the frequencies covered by that particular band. The dial readings are given directly in kc and the operators are cautioned not to operate outside of the limits engraved below each dial.

Across the top of the transmitter are six meters which indicate the voltages and currents in critical circuits. Correct meter readings indicate proper operation, while incorrect meter readings indicate trouble in some part of the equipment.

Across the lower portion of the front panel are four indicator lights which glow when the power is on in certain circuits. This power comes from the line through either a motor-generator set or a rectifier unit. The operation will differ only slightly with the two kinds of power converters and is equally simple with each. When a motor-generator is used, it is accompanied by a magnetic controller box. Except for the controller with the TCK-7 equipments, a line switch which is inside of the box must be closed before starting. This switch may be closed and left closed at all times unless repairs are being made inside the transmitter. On the front of the Rectifier Unit, which is supplied with the TCK-4 and TCK-6 only, are two line switches which should be turned on and left on, the same as the switch in the controller.

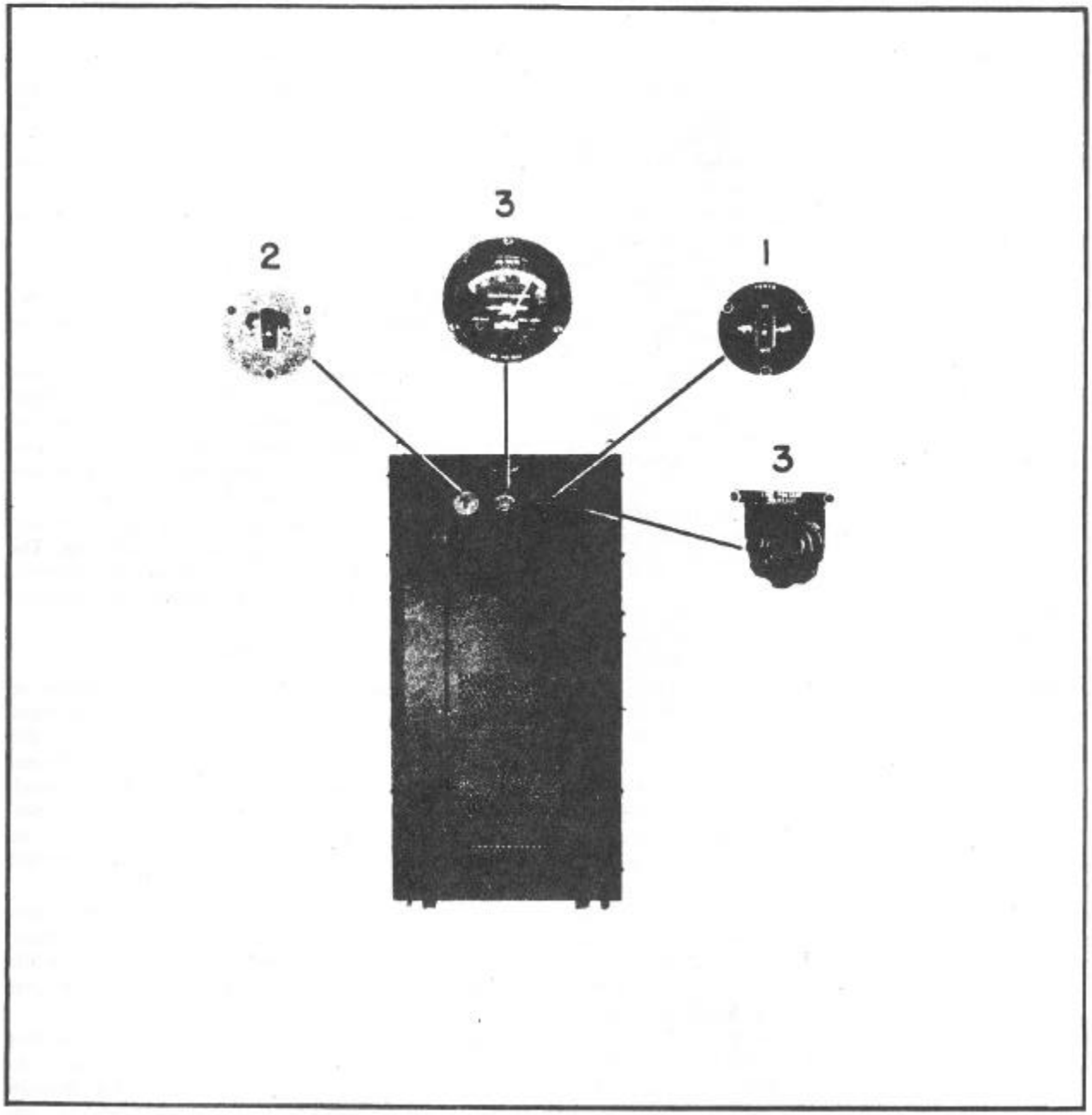


Figure 4-1 Rectifier Unit Controls and Meter

3. BEFORE STARTING.

On the central front panel door of the transmitter is the model nameplate. Read the data on this plate carefully and note particularly whether the supply is a-c or d-c, and whether the equipment supplied includes a rectifier or a motor-generator and magnetic controller. The operation varies slightly, depending upon these two factors. Set the controls as listed below.

Models TCK, TCK-1, TCK-2, TCK-3, TCK-5 and TCK-7.

MAGNETIC CONTROLLER SWITCHES	POSITION	FUNCTION
(1) Line Switch	Closed	A knife switch connecting to the power line. May be closed and left closed at all times. (This switch does not appear in the TCK-7 Controller.)
(2) Overload	Push to reset	An overload relay in the supply line which must be closed by pushing the button in the door of of the controller.

Models TCK-4 and TCK-6.

RECTIFIER UNIT	POSITION	FUNCTION
(1) "POWER"	"ON"	Connects line power to the Rectifier Unit. May be turned on and left on at all times.
(2) "EMERGENCY"	"OPERATE"	Applies power to the control wires between the rectifier and the transmitter. May be turned on and left on at all times.
(3) "LINE VOLTAGE"	Adjust until meter needle is at 118 v. (Red portion on meter scale.)	Regulates the supply voltage which should be maintained at 118 volts at all times.

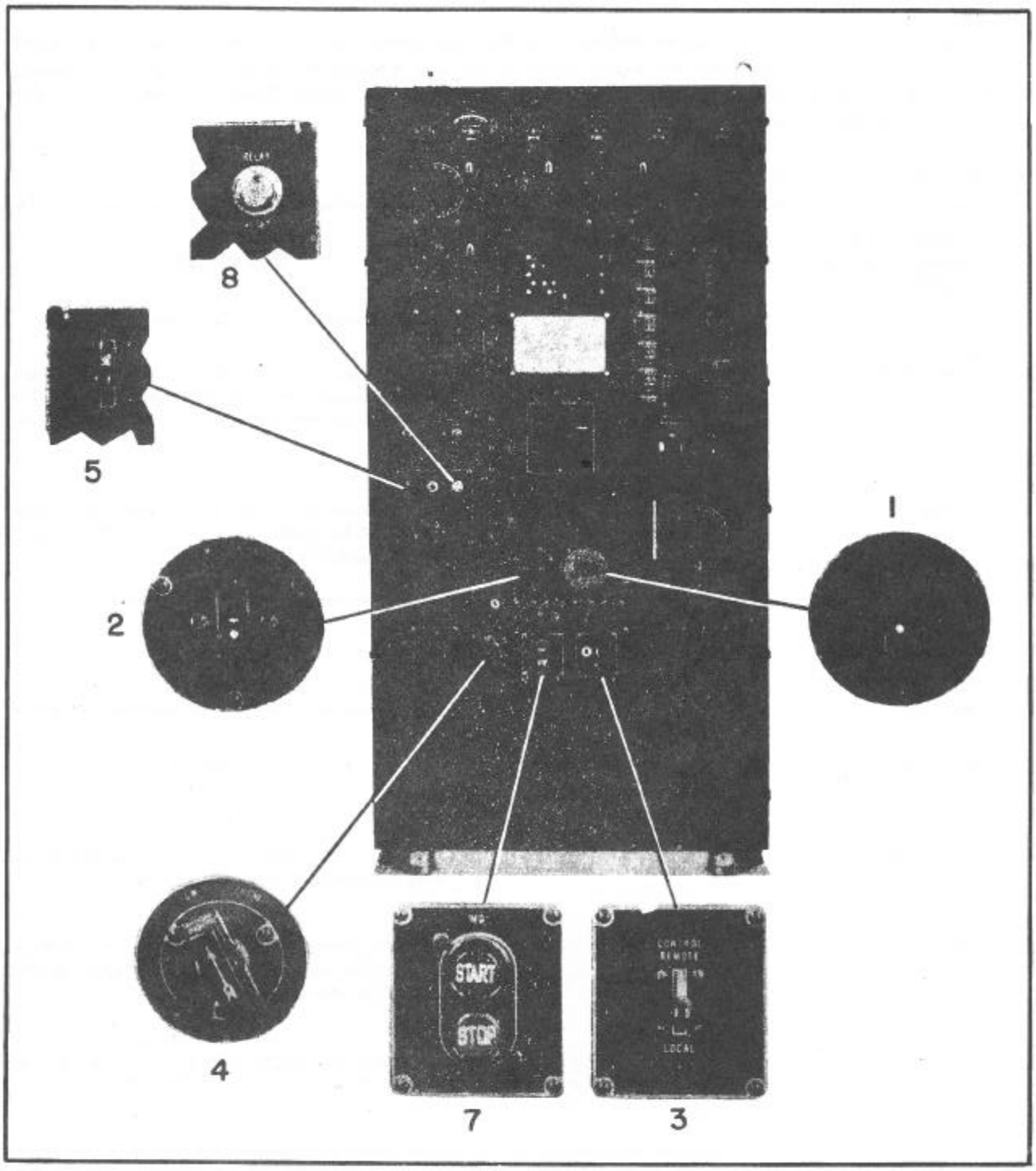


Figure 4-2 Transmitter Starting Controls

4. STARTING.

Set the Transmitter controls in the order listed below.

CONTROL	POSITION	FUNCTION
(1) "EMERGENCY"	"OPERATE"	Supplies power to control circuits within the Transmitter.
(2) "M-O HEATER"	"ON" (This should be on at least 30 minutes before tuning, if accurate calibration is desired.)	Applies power to the temperature control circuit for the M-O compartment. This prevents the M-O from changing frequency due to a change in temperature. The M-O HEATER Indicator should light when the switch is closed and should go out when the M.O. unit is at the proper temperature.
(3) "REMOTE-LOCAL CONTROL"	"LOCAL"	Permits local operation of the Transmitter rather than control from a remote station.
(4) "CW—PHONE"	"CW"	Selects key instead of microphone operation. (The equipment must always be tuned on "CW" even though Phone operation may be used later.)
(5) "TEST KEY"	Horizontal position	Moving the lever of this key either up or down starts transmission. In the horizontal position it cuts off all of the transmitting tubes. When pressed down, this control gives momentary contact and when in the upper position, it locks closed.
(6) "FIL. STAND-BY" (A-C units only)	"OFF" (See note in next column.)	In the "OFF" position it connects the P.A. tube filaments in with the other tubes and they all come on when the START switch is closed. In the "ON" position all tube filaments except P.A. are on all of the time that the EMERGENCY switch is on, keeping the unit ready for instant starting. (Note—Proper operation can be obtained with switch in either "ON" or "OFF" position.)
(7) "START-STOP"	"START"	Closes power contactor to M-G set or Rectifier unit. POWER Indicator should light instantly on the Rectifier Unit installation, after a short delay (40 sec. max.) the BIAS and PLATE Indicators should come on.
(8) "RELAY RESET"	Push momentarily	Closes plate and high voltage overload relays. If BIAS and PLATE indicators fail to light, push this button.

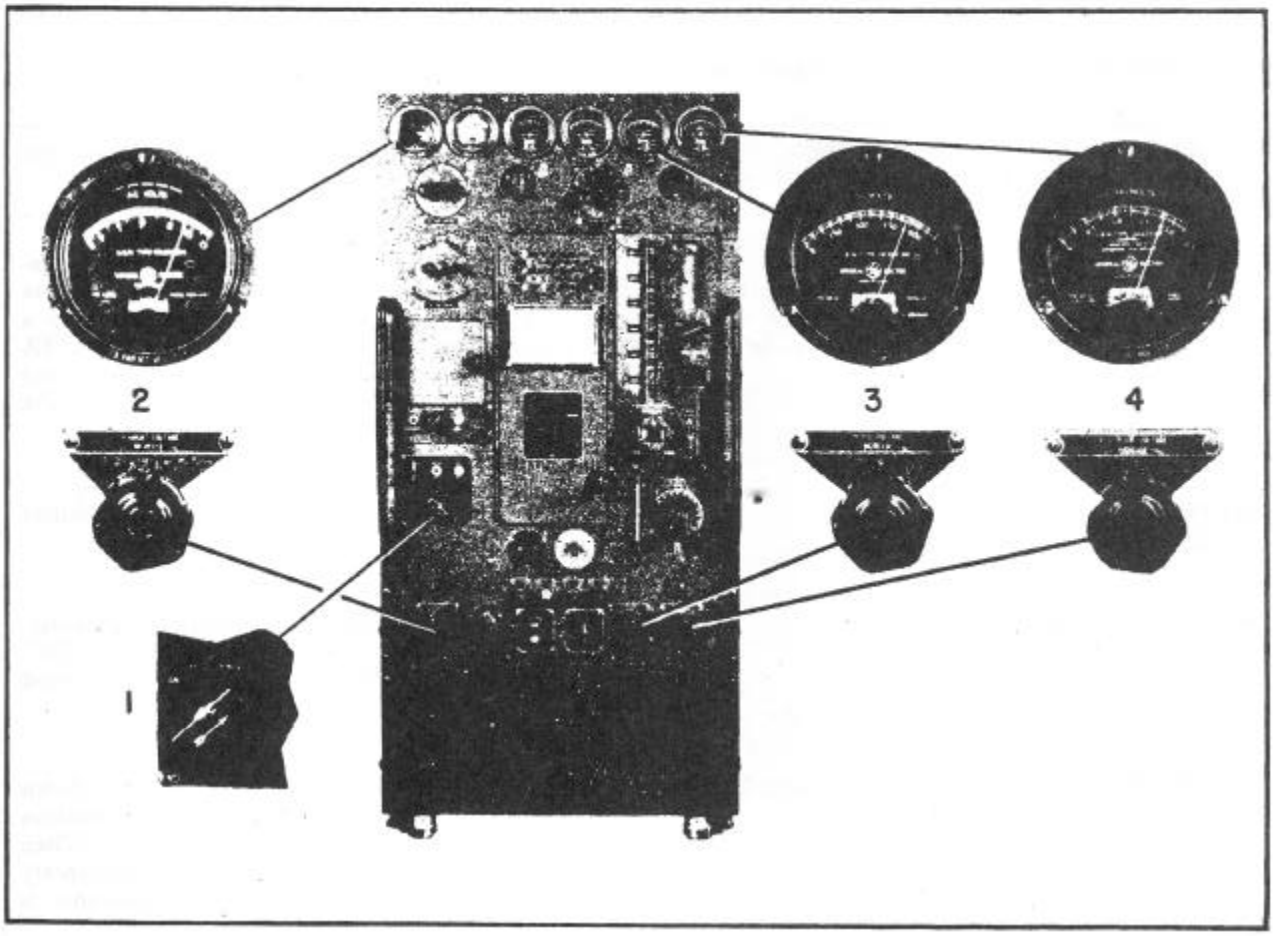


Figure 4-3 Transmitter Voltage Adjustment Controls and Meters

5. ADJUSTING VOLTAGES.

Make the following initial adjustments.

CONTROL	POSITION	FUNCTION
(1) "CAL-TUNE (REDUCED POWER) —OPERATE" *	"OPERATE"	Applies high voltage to power amplifying tubes and to meters at the top of the transmitter.
(2) "FILAMENT VOLTAGE"	12.6 volts	Adjust the rheostat at the bottom of the Transmitter until the meter at the top reads at the red mark on the scale.
(3) "PLATE-VOLTAGE" (Not on TCK-4 and -6)	500 volts	Adjust the rheostat at the bottom of the Transmitter until the meter at the top reads at the red mark on the scale.
(4) "P.A. PLATE VOLTAGE" (Not on TCK-4 and -6)	1800 volts	Adjust the rheostat at the bottom of the Transmitter until the meter at the top reads at the red mark on the scale.
(5) "LINE VOLTAGE" (On Rectifier Unit of TCK-4 and -6 only)	118 volts	Adjust the rheostat until the meter is at the red mark on the scale.

*CAL-TUNE-OPERATE is marking for M-G supplied equipments.

CAL-REDUCED POWER-OPERATE is marking for Rectifier supplied equipments.

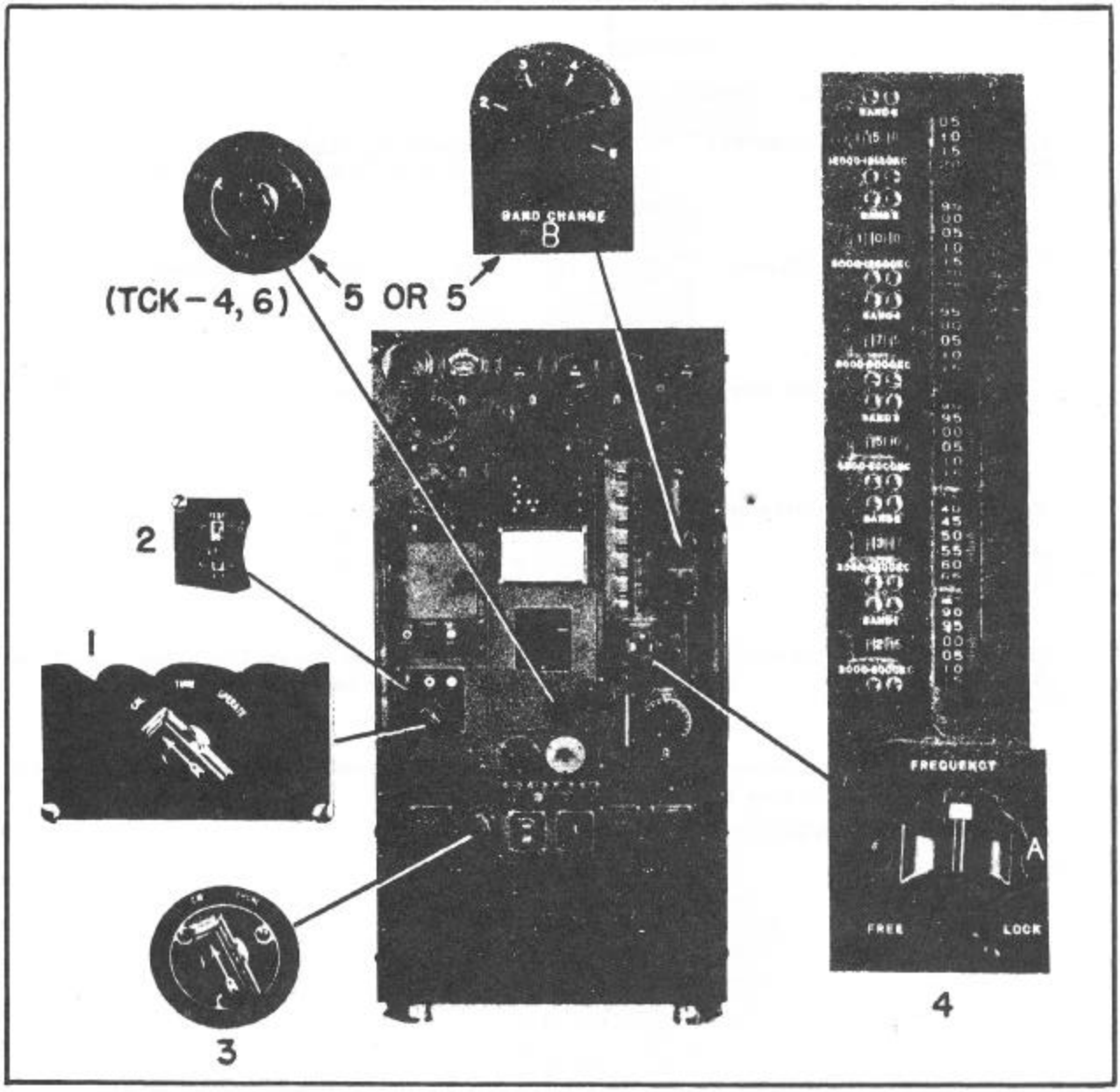


Figure 4-4 Frequency Setting Controls

6. SELECTING A FREQUENCY.

CONTROL	POSITION	FUNCTION
(1) "CAL-TUNE (REDUCED POWER)—OPERATE"	"CAL"	Removes high voltage from power amplifiers to protect them during tuning.
(2) "TEST KEY"	Upper or locked	Removes cut-off bias from Transmitter tubes and allows M-O and I.P.A. stages to function.
(3) "CW-PHONE"	"CW"	All tuning must be done with this switch set for CW operation.
(4) "FREQUENCY"	Assigned frequency or frequency at which it is desired to operate.	The large knob turns the counters, or indicators, and roughly tunes the Transmitter circuits. Obtain the desired frequency reading on the proper dial (the one which includes the reading between the limits assigned to that counter).
(5) "BAND CHANGE"	Band number corresponding to counter in use on FREQUENCY control.	Selects frequency band indicated beside FREQUENCY counter.

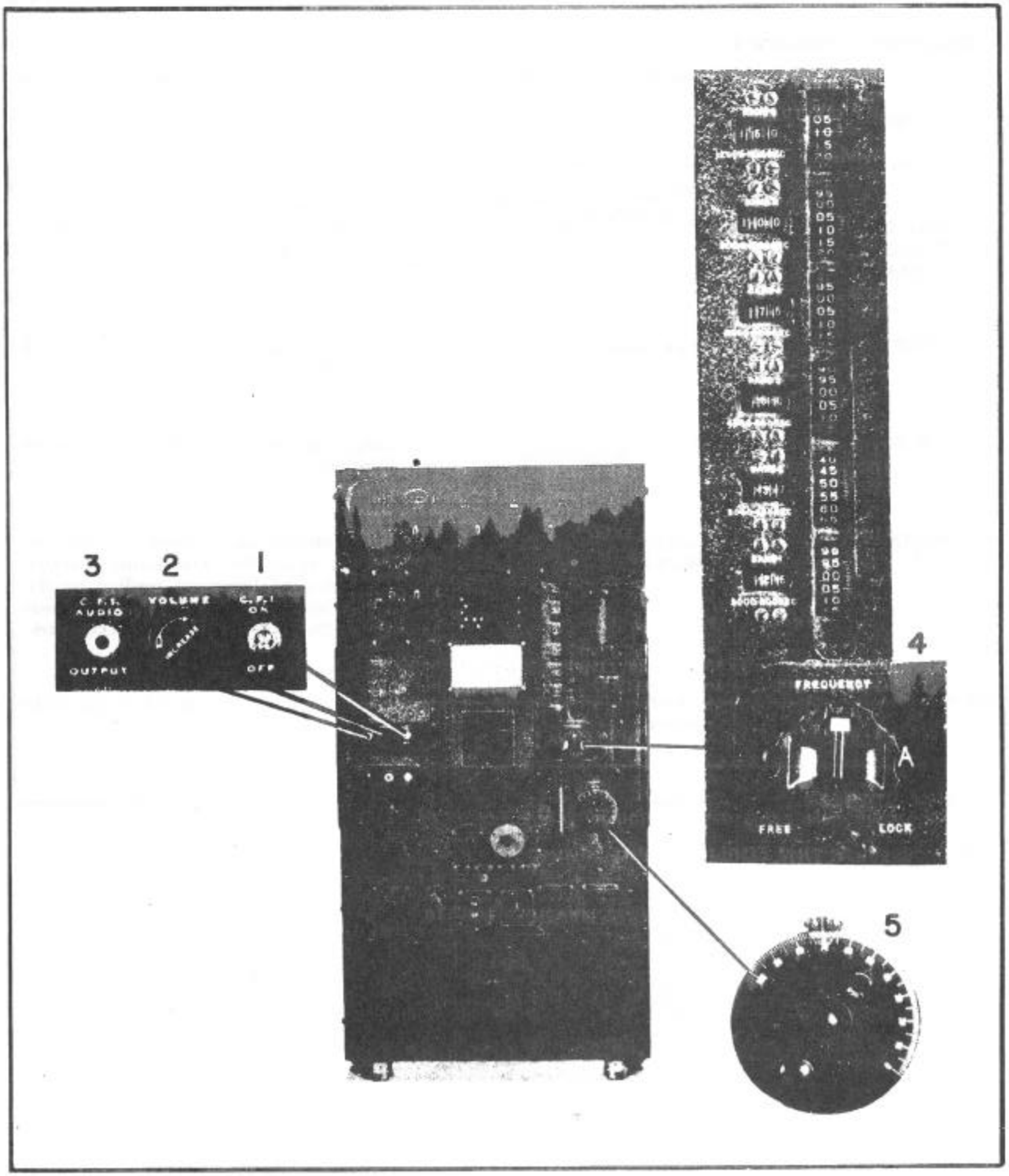


Figure 4-5 CFI Unit and Master Oscillator Controls

7. CHECKING THE MASTER OSCILLATOR FREQUENCY.

CONTROL	POSITION	FUNCTION
(1) "CFI ON-OFF"	"ON"	Applies plate voltage to the CFI Unit.
(2) "VOLUME"	Maximum clockwise	Regulates audio output to be heard in earphones.
(3) "CFI AUDIO OUTPUT"	Plug earphones into jack.	A beat note or whistle should be heard in the earphones.
(4) "FREQUENCY"	Nearest check point to the desired operating frequency. Check points are at even 100 kc intervals on bands 1 to 4 and at even 200 kc intervals on bands 5 and 6: i.e. 2000, 2100, 2200, etc., or 12,000, 12,200, 12,400, etc.	As the FREQUENCY dial is rotated slowly, the tone of the note will get very low, disappear, then reappear and become higher until it disappears again. The quiet space between *low* notes is called "zero beat". Several of these zero beat points may occur between 100 kc intervals but the correct one, or check point, will be much stronger than the others.
(5) "M-O RESET"	Adjust for zero beat note at the check point. Lock the control in position by turning the lock knob. Turn off the CFI.	This tunes the M-O circuit to the exact frequency shown on the dial. Be certain that the beat note is the loudest to be heard within 50 kc on either side of the check point.

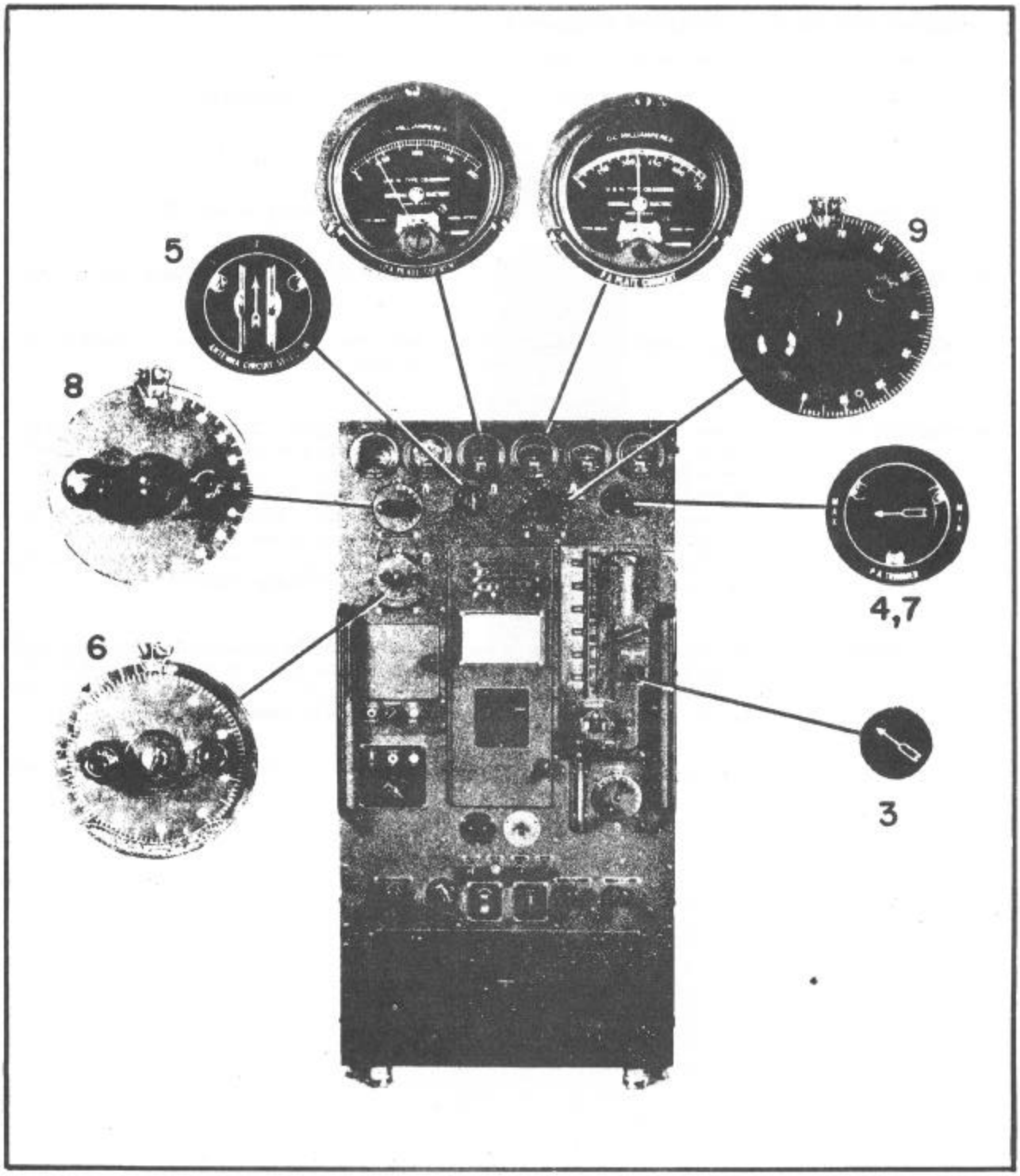


Figure 4-6 Transmitter Tuning Controls

8. TUNING—After all previous steps have been completed, precede with the tuning adjustments below:

CONTROL	POSITION	FUNCTION
(1) "FREQUENCY"	Turn to desired operating frequency. Push lever below control to "LOCK" after tuning is set.	Return to the operating frequency after setting the "MO RESET" at the nearest check point.
(2) "CAL-TUNE (REDUCED POWER)—OPERATE"*	"TUNE" (or "REDUCED POWER")	Applies reduced voltage to the power amplifiers so that they may be tuned without overloading.
(3) "I.P.A. TRIMMER"	To where minimum I.P.A. PLATE CURRENT meter reading is obtained.	Tunes I.P.A. circuit to desired frequency.
(4) "P.A. TRIMMER"	To where minimum P.A. PLATE CURRENT meter reading is obtained. This will appear as a sharp dip in the meter reading.	Tunes P.A. circuit to desired operating frequency.
NOTE: On Models TCK-4 and TCK-6.—Omit steps (5) through (9) and proceed to paragraph 9.		
(5) "ANTENNA CIRCUIT SELECTOR"	Position 1, 2, or 3.	This setting will depend upon the next step. Select the position which gives maximum current in step (6).
(6) "ANTENNA TUNING INDUCTIVE"	To where maximum P.A. PLATE CURRENT meter reading is obtained. *Do not exceed 360 ma.**	Roughly, matches output circuit to antenna for maximum output power.
(7) "P.A. TRIMMER"	Readjust as in (4) for minimum P.A. PLATE CURRENT.	Repeat after each adjustment of "ANTENNA TUNING" controls until further adjustment does not reduce plate current.
(8) "ANTENNA TUNING CAPACITIVE"	To where maximum P.A. PLATE CURRENT meter reading is obtained. *Do not exceed 360 ma.**	Repeat after each adjustment of "P.A. TRIMMER" until further adjustment does not increase plate current.**
(9) "ANTENNA COUPLING"	To reading of less than 100 ma. on P.A. PLATE CURRENT meter.	Regulates the amount of power which is coupled to the antenna.

*If BIAS and PLATE indicators go off or if P.A. PLATE CURRENT exceeds 360 ma., reduce "ANTENNA COUPLING," then push "RELAY RESET" to restore voltage.

**"P.A. TRIMMER" and "ANTENNA TUNING CAPACITIVE" must be alternately tuned (after one preliminary or rough tuning of "ANTENNA TUNING INDUCTIVE") until further adjustment of the trimmer *increases* current and further adjustment of the antenna control *decreases* current.

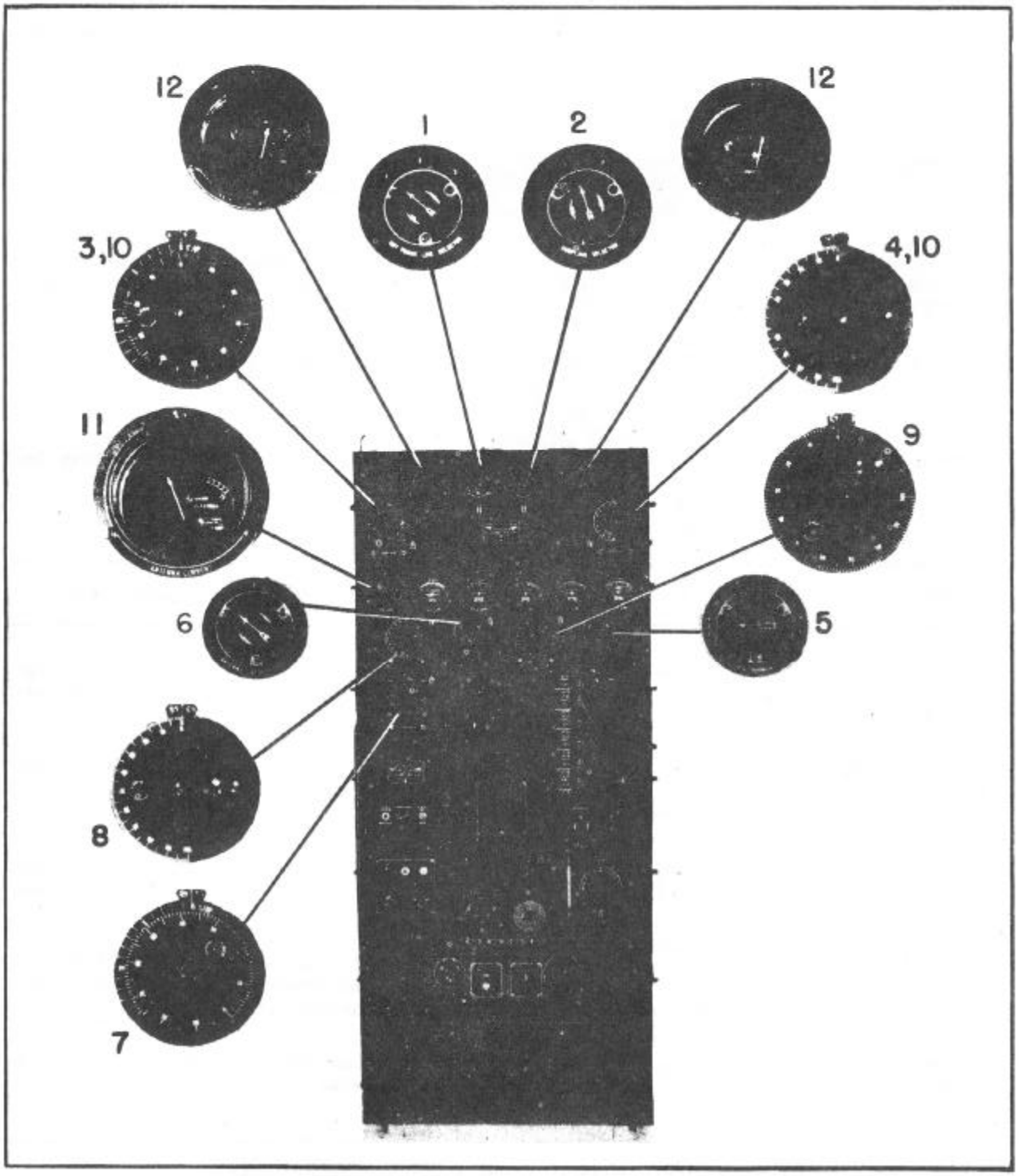


Figure 4-7 Transmission Line Coupling Unit and P-A Tuning Controls

9. TRANSMISSION LINE COUPLING UNIT TUNING.

The following steps apply only to Models TCK-4 and TCK-6 supplied with TRANSMISSION LINE COUPLING UNITS.

CONTROL	POSITION	FUNCTION
(1) "ANT.-TRANS. LINE SELECTOR"	1—(ANTENNA) 2—(TRANS. LINE) 3—(TRANS. LINE)	POSITION ONE connects directly to the antenna post. TWO and THREE connect to the transmission line through the coupling unit. Either 2 or 3 to the line may be used, depending upon later adjustments. Try tuning in POSITION 2 and if that fails, try in POSITION 3. In POSITION 1, the coupling unit is not used and tuning should follow Par. 8, steps (5) through (9).*
(2) "COUPLING SELECTOR"	1—(HIGH FREQ.) 2—(LOW FREQ.)	There is no distinct dividing line between 1 and 2, but, in general, position 1 is best for the higher frequencies and position 2 for the lower frequencies.
(3) "COUPLING INDUCTOR"	*Freq.* — *Approx. Setting* 2000 — 1000 3000 — 1250 4000 — 1350 6000 — 1800 9000 — 1900 12000 — 1900 18000 — 2000	Partially matches transmission line impedance.
(4) "COUPLING CAPACITOR"	*Freq.* — *Approx. Setting* 2000 — 0 3000 — 20 4000 — 40 6000 — 60 9000 — 70 12000 — 80 18000 — 100	Partially matches transmission line impedance.
(5) "P.A. TRIMMER"	To *minimum* P.A. PLATE CURRENT meter reading.	Tune this control continuously while making all subsequent adjustments.
(6) "ANTENNA CIRCUIT SELECTOR"	Position 1, 2, or 3.	Whichever position allows "peaking" of ANT. TUNING controls.
(7) "ANTENNA TUNING INDUCTIVE"	To where *maximum* P.A. PLATE CURRENT meter reading is obtained. *Do not exceed 360 ma.***	Matches output to TRANS. LINE COUPLING UNIT.
(8) "ANTENNA TUNING CAPACITIVE"	To where maximum P.A. PLATE CURRENT meter reading is obtained.	This is a supplementary adjustment to be used in combination with ANT. TUNING IND.
(9) "ANTENNA COUPLING"	To reading of 150 ma. on P.A. PLATE CURRENT meter.	Increase power into the transmission line.
(10) "COUPLING INDUCTOR" and "COUPLING CAPACITOR"	Adjust for equal and maximum readings of TRANSMISSION LINE CURRENT meters. If no current is obtained, try different switch settings.	This is a fine adjustment and will require a slight balancing of all antenna and coupling unit controls.
(11) "ANTENNA CURRENT"	Less than 5 amp.	This is just a check on the previous adjustments. If the reading is above 5 amps when the ANTENNA COUPLING dial reads in the lower half of scale, try for more output (less current) with a different switch combination. Change only one switch at a time and retune.
(12) "TRANSMISSION LINE CURRENT"	In general, the SELECTOR SWITCH settings giving the highest current are the best.	

*CAUTION: When "ANT-TRANS LINE SELECTOR" switch is in position 1, the TRANSMISSION LINE COUPLING UNIT should be thoroughly *detuned* to prevent the absorption of power which should be going into the antenna.

**If P.A. PLATE current approaches 360 ma. reduce ANTENNA COUPLING.

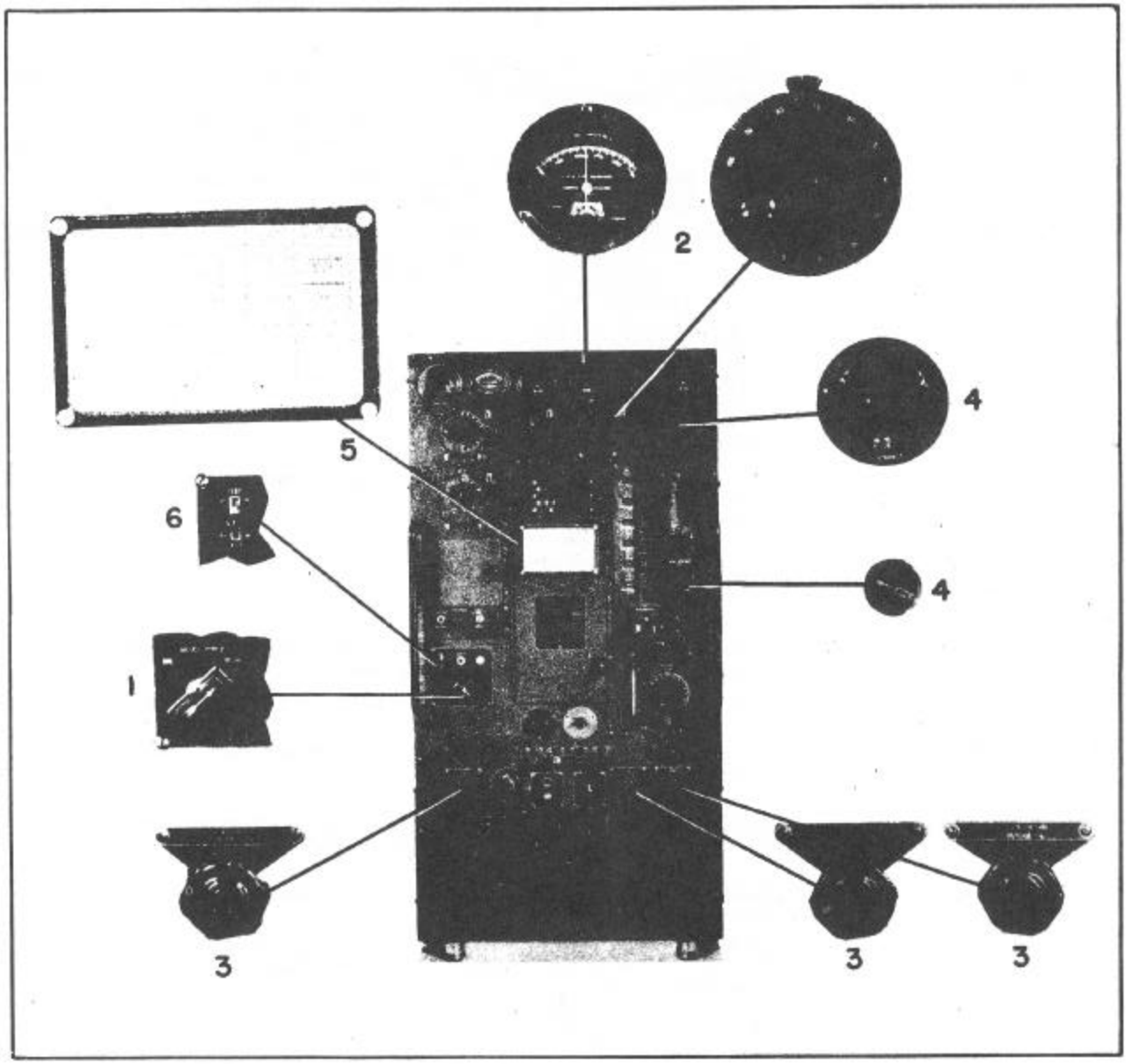


Figure 4-8 Transmitter Operating Controls

10. OPERATING.

After the transmitter has been tuned to the proper frequency.

a. C. W. Operation.

CONTROL	SETTING	FUNCTION
(1) "CAL-TUNE (REDUCED POWER)—OPERATE"	"OPERATE"	Supply full voltage to power amplifiers.
(2) "ANTENNA COUPLING"	To reading of 360 ma. on P.A. PLATE CURRENT meter.	Increases power coupled to antenna to rated power output.
(3) Voltage control rheostats.	Readjust all voltages to coincide within red mark on scale.	Loading the circuits will slightly lower all voltages.
(4) Tuning Controls	Readjust all tuning controls (except MO RESET) and lock them in place.	This is just a check on the tuning steps.
(5) Tuning record chart	Record all dial readings.	This is the small chart mounted on the front panel door. After complete tuning, record all dial readings on chart to simplify retuning to this frequency.
(6) "KEY"	Horizontal or neutral position.	Cuts off transmitting tubes and leaves transmitter ready for key operation.

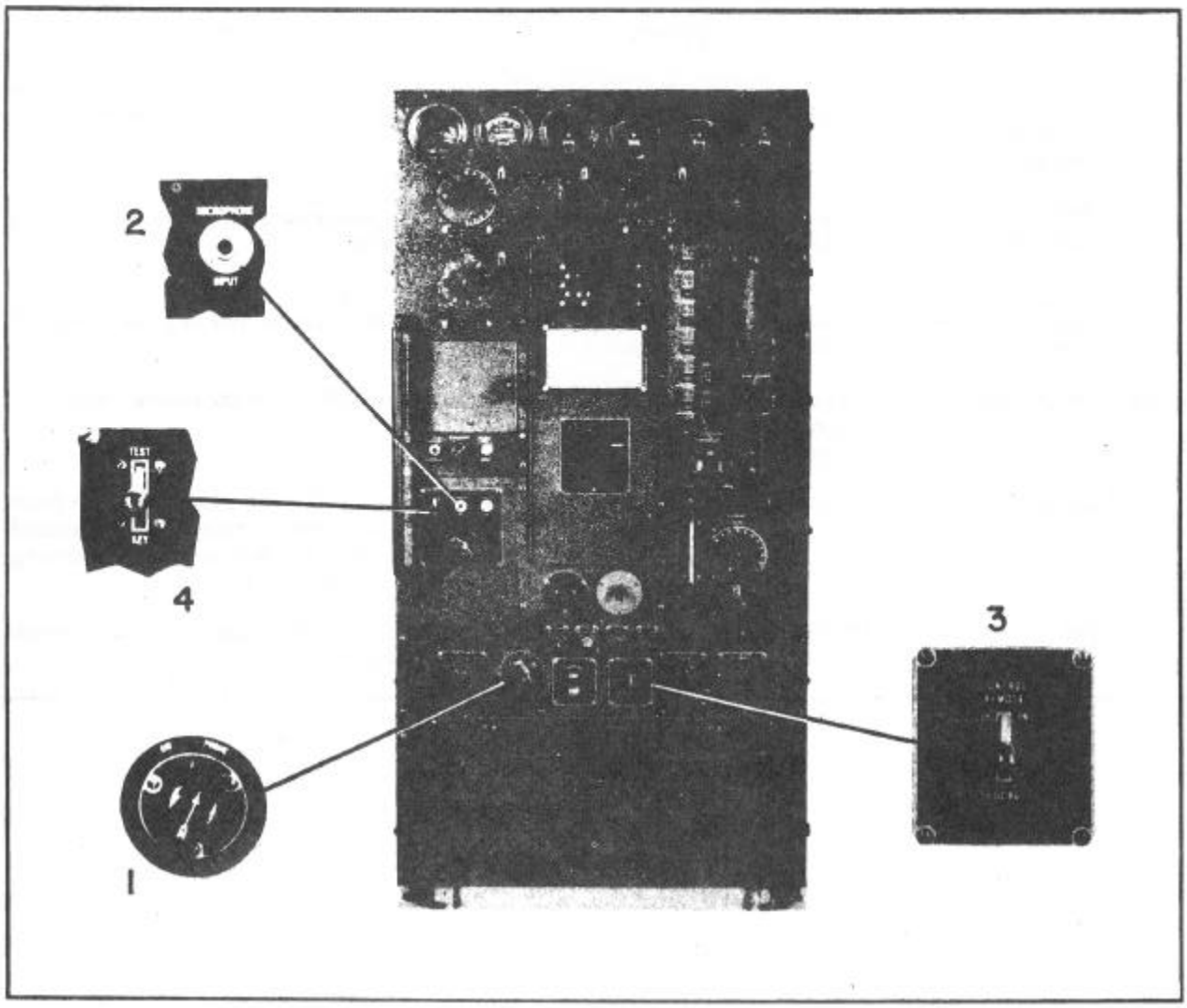


Figure 4-9 Phone Operation Controls

***b.* Phone Operation.**—After tuning transmitter and operating it on C. W.

WARNING—Always tune and adjust plate currents on C. W. operation, never on PHONE operation.

CONTROL	POSITION	FUNCTION
(1) "CW-PHONE"	"PHONE"	Reduces power output to ¼ C.W. output so that the carrier may be voice modulated.
(2) "MICROPHONE INPUT"	Plug a push-to-talk microphone into this jack.	Pushing the microphone button starts transmission, the same as closing the key.
(3) "LOCAL-REMOTE"	"LOCAL" or "REMOTE" for operation of microphone plugged into Transmitter or for Microphone at remote station, if one is used.	Switches "START-STOP" and key control only. Either microphone will work.
(4) "TEST KEY"	Horizontal or neutral.	Allows control of carrier by button on microphone.

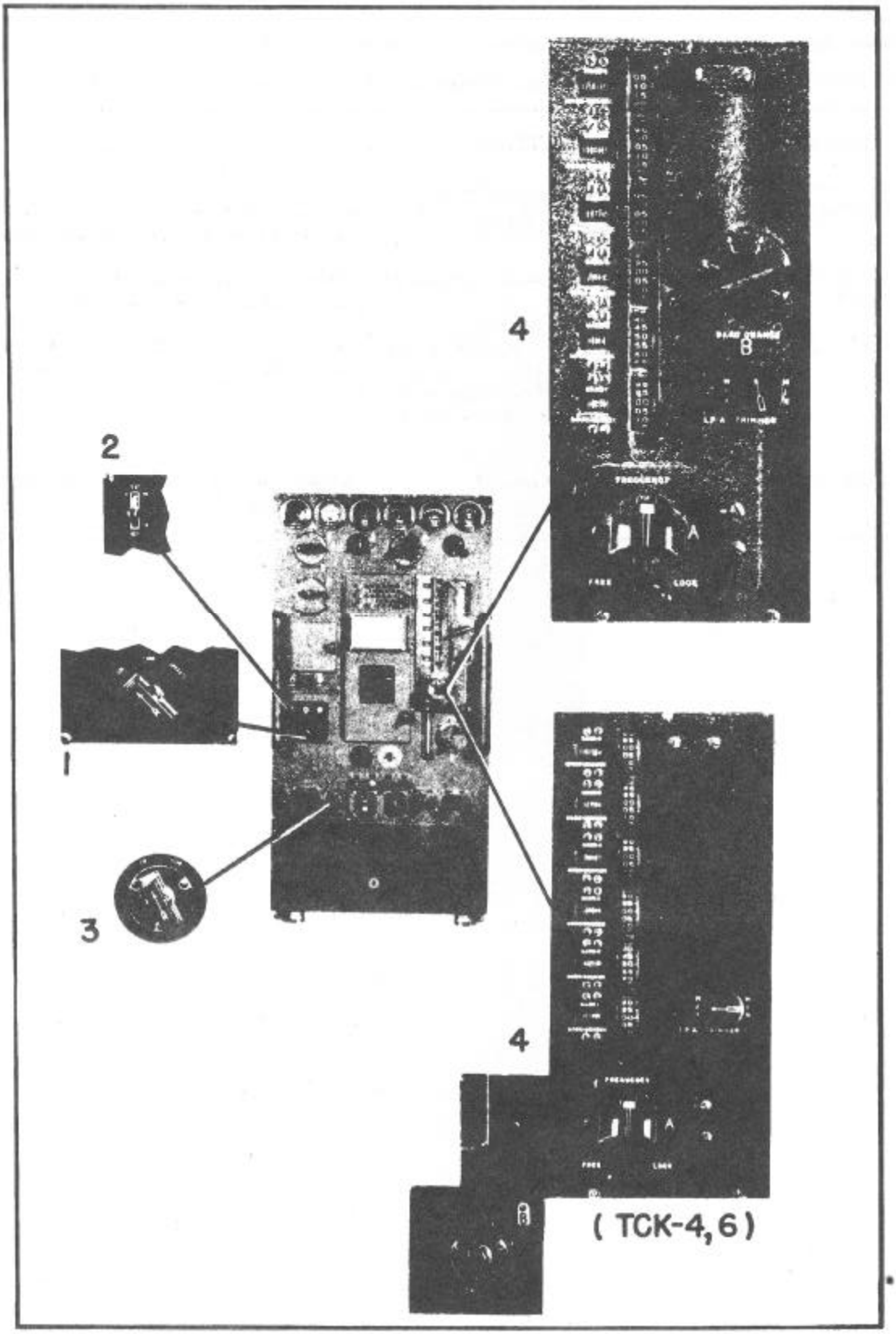


Figure 4-10 Frequency Change Controls

c. Changing Frequency During Operation.—At start of watch, select and tune for all frequencies to be used during the watch. Record dial settings for each frequency in the table on the control panel door for quick reference.

CONTROL	POSITION	FUNCTION
(1) "CAL-TUNE (REDUCED POWER)—OPERATE"	"CAL"	Removes voltage from power amplifier tubes.
(2) "TEST KEY"	Upper position.	Locks key closed.
(3) "C.W.—PHONE"	"C.W."	Tuning must be done on C.W.
(4) "FREQUENCY" and "BAND"	Set to desired Frequency and Band.	
(5) Tuning controls	Set all controls for this frequency to values indicated on the front panel table.	
(6) "CAL-TUNE (REDUCED POWER)—OPERATE"	"TUNE"	
(7) I.P.A. and P.A. Trimmers	Adjust for minimum plate currents.	
(8) "CAL-TUNE (REDUCED POWER)—OPERATE"	"OPERATE"	
(9) Tuning controls.	Readjust all tuning controls (except M.O. RESET).	To be certain all are correct.

d. Output Power Control.—The only accurate measure of output power is the ANTENNA CURRENT or TRANSMISSION LINE CURRENT meter, and for each of these the resistance of the load must be known before power can be calculated. P.A. PLATE CURRENT, however, gives a good indication of power after the transmitter has been tuned, and will read in the red portion for rated power output on C.W. transmission. In extreme emergencies, the output may be increased slightly by increasing plate voltages until the P.A. PLATE CURRENT increases 10 to 20 ma. This is a dangerous thing to do, however, because it quickly burns out the P.A. tubes. The plates of the P.A. tubes (the carbon cylinder inside of the tube which surrounds the other elements) as observed through the holes in the front panel door, should never be allowed to get even faintly red from excessive current.

When switching from C.W. to PHONE operation, the P.A. PLATE CURRENT will drop to about half of its original value. This is normal and operators are cautioned against trying to increase the current.

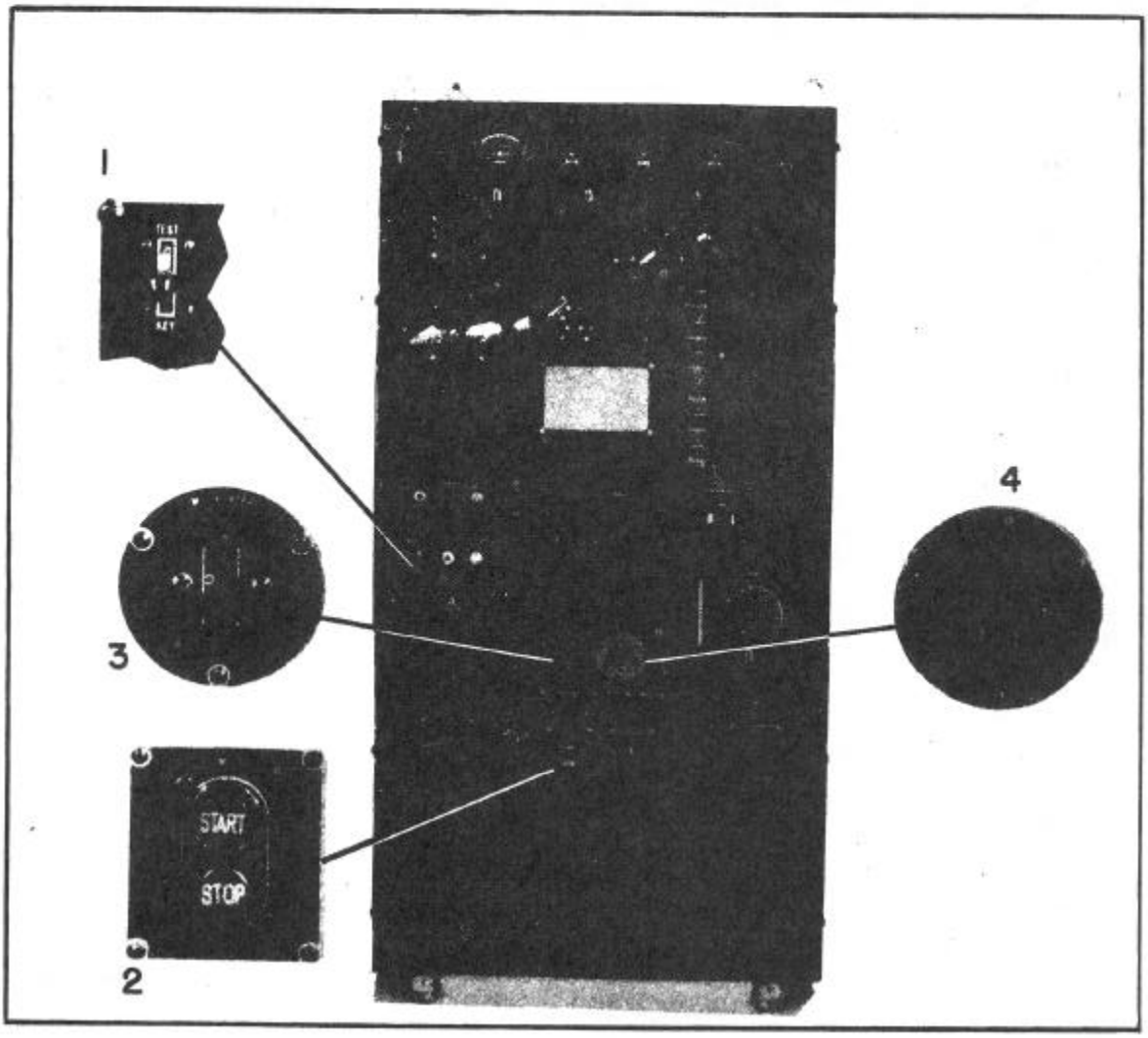


Figure 4-11 Transmitter Shut-down Controls

11. STOPPING THE TRANSMITTER.

CONTROL	POSITION	FUNCTION
(1) "KEY"	Horizontal or Neutral.	Cut off transmitting tubes.
(2) "START-STOP"	"STOP"	Removes tube voltages and opens control circuits, shutting down the transmitter.
(3) "M.O. HEATER"	"OFF"	Allows M.O. chamber to cool.
(4) "EMERGENCY"	"OFF"	This turns off all of the above simultaneously in case of an emergency. It is not necessary to turn this off except when shutting equipment down indefinitely.

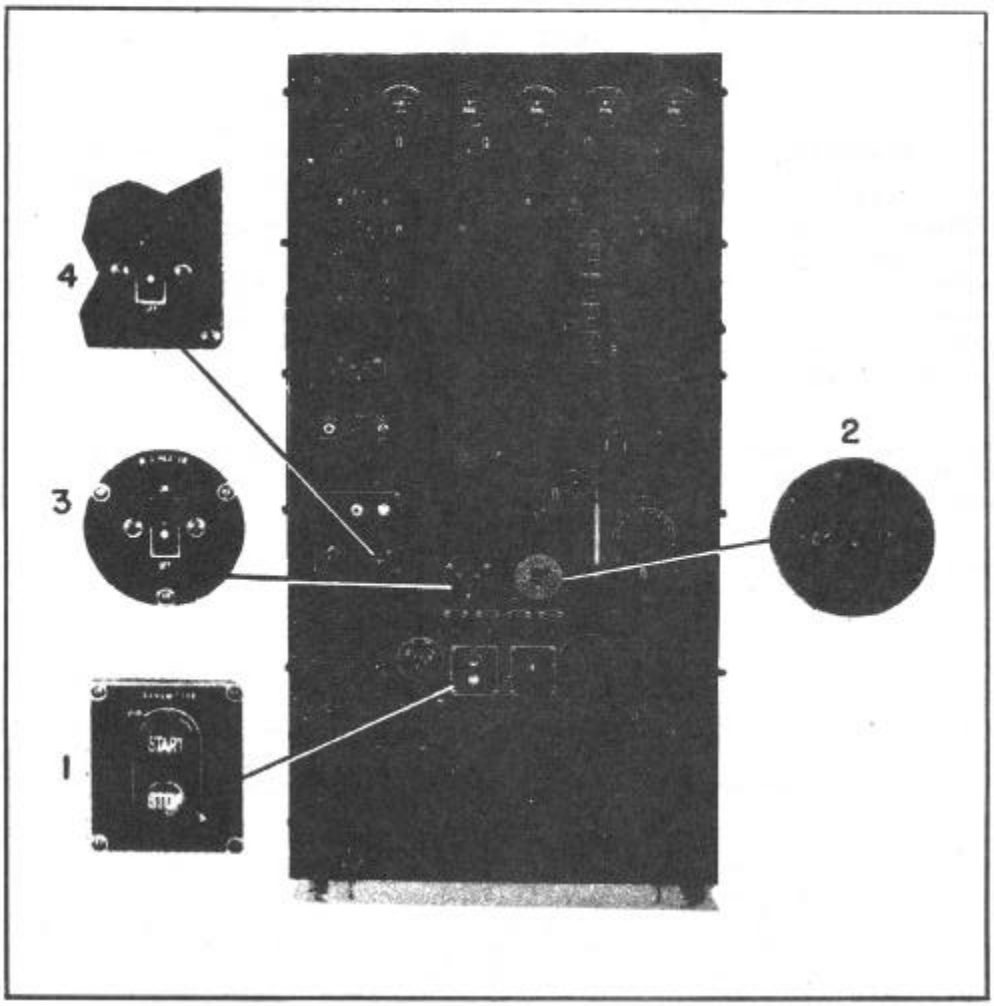


Figure 4-12 Transmitter Standby Controls

12. STAND-BY OPERATION.

Keeping the transmitter ready for instant operation without power in the tube circuits.

CONTROL	POSITION	FUNCTION
(1) "START-STOP"	"STOP"	Removes tube voltages and opens control circuits, shutting down the transmitter and M-G set or Rectifier.
(2) "EMERGENCY"	"ON"	Keeps transmitter control power on for instant starting when "START" button is pushed.
(3) "M.O. HEATER"	"ON"	Keeps M.O. chamber at constant temperature.
(4) "FIL. STANDY" (A-C units only)	"ON"	Keeps all tube filaments (except P.A.) hot.

SECTION V
OPERATOR'S MAINTENANCE

WARNING

Operation of this equipment involves the use of high voltages (1800 volts) which are dangerous to life. Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage supply on. Do not depend upon door switches or interlocks for protection but always shut down motor generators or other power equipment. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors, etc. To avoid casualties, always remove power, discharge and ground circuits prior to touching them.

Except in emergencies, the operator's maintenance activity will be limited to operational checks. During battle or at other times when a technician is not available, however, the operator will be expected to replace defective fuses and vacuum tubes.

1. OPERATOR'S CHECK LIST.

UNDERWAY—EACH WATCH

WHAT	WHEN AND HOW	PRECAUTIONS
1. METERS	Every 30 minutes and whenever transmitter frequency is changed. Check readings with table of values listed below.	Incorrect readings indicate defective operation which will shorten the life of vacuum tubes.
2. OSCILLATOR FREQUENCY	At beginning of each watch and whenever switching to a new frequency band. Select nearest Oscillator Check Point from the table below, tune to this value and listen to CFI Unit for zero beat.	Temperature changes quite often cause slight frequency shifts. Also incorrect initial adjustments will become obvious during this check and may be remedied.

2. NORMAL METER READINGS.

Table 5-1

METER	STANDBY		OPERATION	
	Min.	Max.	Min.	Max.
FILAMENT VOLTAGE	12.6	12.6	12.6	12.6
I.P.A. CURRENT (m.a.)	0	0	20	45
P.A. CURRENT (m.a.)	0	0	360	360
PLATE VOLTAGE	500	500	500	500
P.A. PLATE VOLTAGE	1800	1800	1800	1800
M.O. TEMPERATURE	60°C	60°C	60°C	60°C
ANTENNA CURRENT (amps.)	0	0	1.5	7.5 (depends upon antenna & frequency)
TRANSMISSION LINE CURRENT (ON TCK-4 AND -6 ONLY)	0	0	(depends upon line, load, and frequency)	
A.C. VOLTS (RECTIFIER UNIT)	118	118	118	118

3. OSCILLATOR CHECK POINTS (K.C.)

Table 5-2

BAND 1	BAND 2	BAND 3	BAND 4	BAND 5	BAND 6
2000	3000	4500	6000	9000	12,000
2100	3100	4600	6100	9200	12,200
2200	3200	4700	6200	9400	12,400
2300	3300	4800	6300	9600	12,600
Etc.	Etc.	Etc.	Etc.	Etc.	Etc.
to	to	to	to	to	to
3000	4500	6000	9000	12,000	18,000

4. EMERGENCY FUSE REPLACEMENT.

WARNING

Danger—always open the line switch and remove all power before replacing fuses. Voltages dangerous to life (500 and 1800 volts) exist in the transmitter and power converter circuits.

CAUTION

Never replace a fuse with one of a higher rating unless continued operation of the equipment is more important than probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause of trouble has been corrected.

SYMPTOM OF FAILURE	FUSE NO. AND FUNCTION	VALUE AMPS.	LOCATION ON TRANSMITTER
1. Closing START button on transmitter has no effect.	F101 on incoming control power line.	10 amp.	Lower left-hand corner behind front panel door. Top one of three fuses.
2. All indicator lights remain dark and Motor-Generator set does not run. (On models supplied by M-G sets.)	Either line or control fuses in motor controller.	A-C Line 30 amp.; A-C Control 10 amp.; D-C Control 10 amp.	In Magnetic Motor Controller.
3. Rectifier Unit indicator is dark and meter shows zero a-c volts. (On TCK-4 and -6).	F301 F302 Incoming power line.	25 amp. 25 amp.	In Rectifier Unit on upper chassis behind front panel door. Center two of four fuses.
4. Pressing Microphone button does not close microphone relay nor cause an increase in IPA plate current. Motor Generator is running (or Rectifier Meter shows a-c voltage).	F303 F304 In rectifier; transformer primary circuit.	3 amps. 3 amps.	In Rectifier Unit on upper chassis behind front panel door. Top and bottom of four fuses.
	In Motor-Generator set—12 v. generator fuse.	6 amps.	See Motor-Generator photograph for location of fuse.
5. Bias and Plate indicators are dark. M-G set is running (or rectifier meter shows a-c voltage).	F303 F304 In Rectifier; transformer primary circuit.	3 amps. 3 amps.	In Rectifier Unit on upper chassis behind front panel door. Top and bottom of four fuses.
	In Motor-Gen. set—115 v. gen. fuse.	6 amp.	See Motor-Generator photo for location of fuse.
6. No reading on PLATE VOLTAGE meter. Bias and plate indicators are glowing.	F306 In rectifier; 500 v. supply fuse.	½ amp. 1000 v.	In Rectifier Unit on top of middle chassis behind front panel door.
	In Motor-Gen. set +500 v. gen. fuse.	½ amp. 1000 v.	See M-G Photo for location of fuse.

4. FUSE REPLACEMENT CHART (Cont'd)

SYMPTOM OF FAILURE	FUSE NO. AND FUNCTION	VALUE AMPS.	LOCATION ON TRANSMITTER
7. No reading on P.A. PLATE VOLTAGE meter. Bias and plate indicators are glowing.	F307 In rectifier; 1800 v. supply fuse.	1 amp. 2500 v.	In Rectifier Unit on front of bottom chassis behind front panel door.
	In Motor-Gen. set +1800 v. gen. fuse.	2 amp. 3000 v.	See M-G photo for location of fuse.
8. No reading on FILAMENT VOLTAGE meter. PLATE VOLTAGE meters show normal readings.	In D-C Motor-Gen. sets—the A-C take-off fuses.	(230 V. M-G) 6*a* fuse; (115 V. M-G) 10*a* fuse.	See M-G Photo for location of fuses.
9. M.O. temperature is below 60°C and M.O. HEATERS indicator is dark. Blower motor is not running.	F102 F103 Line power to M.O. temperature control circuit.	6 amp. 6 amp.	Lower left-hand corner behind front panel door. Lower two of three fuses.

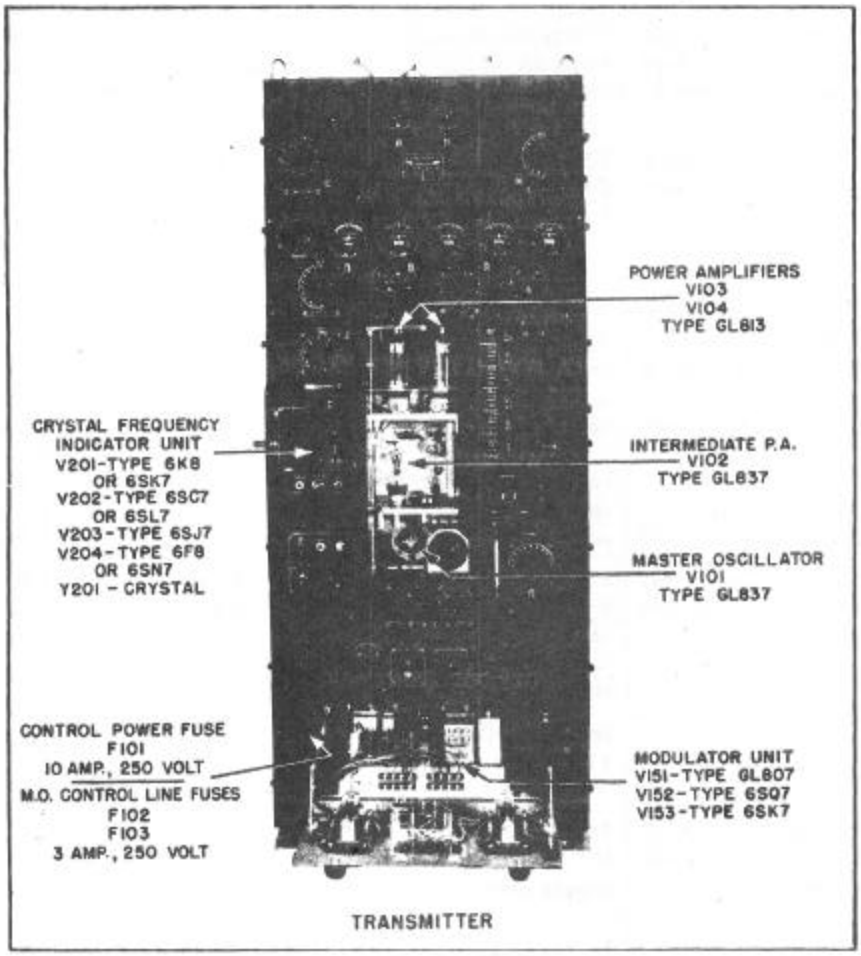


Figure 5-1 Fuse and Tube Location on Transmitter Unit

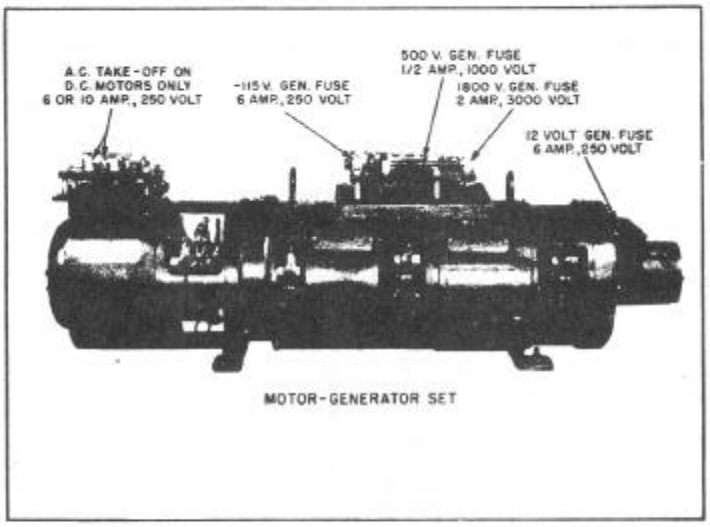


Figure 5-2 Fuse Location on Motor-Generator Unit

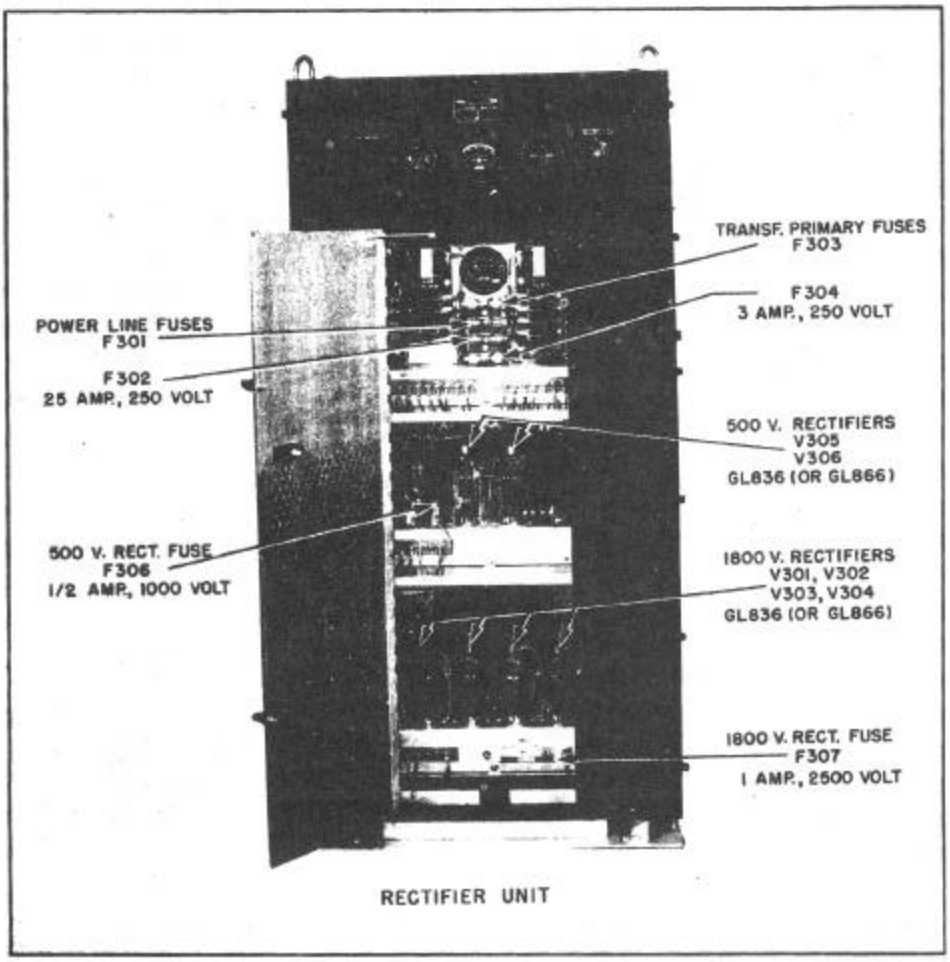


Figure 5-3 Tube and Fuse Location on Rectifier Unit

5. EMERGENCY TUBE REPLACEMENT.

The majority of equipment failures are due to vacuum tubes. If all fuses are known to be good and a technician is not available, the operator should attempt to correct defective operation by replacing tubes. Most tube failures will be preceded by low power output.

WARNING

Danger—Always open the line switch and remove all power before changing vacuum tubes. Voltages dangerous to life (500 and 1800 volts) exist in the circuits around the tubes.

CAUTION

After changing tubes be sure plate caps are in place and plate leads will not come in contact with anything when the panel door is closed.

SYMPTOM OF FAILURE	TUBE NUMBER AND FUNCTION	TUBE TYPE	TUBE LOCATION ON TRANSMITTER
	TRANSMITTER UNIT		
1. High or low P.A. PLATE CURRENT and low ANTENNA CURRENT. I.P.A. CURRENT normal.	V103 V104 Power Amplifiers	813 813	Pair of tubes behind top of central front panel door.
2. High or low I.P.A. PLATE CURRENT.	V101 Master Oscillator V102 Intermediate Power Amplifier	837 837	Tube extending horizontally from M.O. heater chamber. Vertical tube at center of opening behind central front panel door.
3. Satisfactory operation with key but weak or no voice modulation.	V151—Modulator V152 2nd Audio Amplifier V153 1st Audio Amplifier	807 6SQ7 6SK7	All are on Modulator Unit behind lower front panel door.
4. Weak or no crystal tone from CFI Unit.	V201—Oscillator V202—Multivibrator V203—Detector V204—Audio Amplifier Y201—Crystal	6K8 or 6SK7(TCK-7) 6SC7 or 6SL7(TCK-7) 6SJ7 6F8 or 6SN7(TCK-7) 200 KC crystal	All are on CFI Unit behind left side front panel door.
5. Frequency of transmission tends to drift excessively. Temp. of M.O. compartment normal.	V101 Master Oscillator	837	Extending horizontally from M.O. heater chamber behind central front panel door.
6. Power output is slightly low and the elements in one of the P.A. tubes begins to glow bright red.	V103 V104 Power Amplifiers. The tube which *does not* glow is defective.	813 813	Pair of tubes behind top of central front panel door.

5. EMERGENCY TUBE REPLACEMENT (Continued)

SYMPTOM OF FAILURE	TUBE NUMBER AND FUNCTION	TUBE TYPE	TUBE LOCATION ON TRANSMITTER
Rectifier Unit (TCK-4 and TCK-6)			
7. No reading on Transmitter PLATE VOLTAGE meter or reading is very low.	V305 V306 500 v. rectifiers	836 836 (These tubes may be type 866 tubes in some units. *Tube types* should not be interchanged by operators.)	On center chassis behind front panel door of *Rectifier*.
8. No reading on transmitter P.A. PLATE VOLTAGE meter or reading very low.	V301 V302 V303 V304 1800 v. rectifiers	836 836 836 836 (These tubes may be type 866 tubes in some units. *Tube types* should not be interchanged by operator.)	On lower chassis behind front panel door of *Rectifier*.

SECTION VI
PREVENTIVE MAINTENANCE

1. TEST AND INSPECTION SCHEDULE.

INTERVAL	CHECK
Daily	*a.* Check all control circuits for proper operation. *b.* Check and record all meter and thermometer readings. *c.* Check the tuning of the equipment on each of the six bands. *d.* Dust all exterior surfaces of the equipment. *e.* Wipe off any moisture on the equipment.
Weekly	*a.* Dust the entire equipment, inside and out. *b.* Wipe off antenna and transmission line insulators. *c.* Check all terminal board connections for tightness. *d.* Clean and inspect all relays and contactor contacts. Dress contacts only when necessary, using fine sandpaper. *e.* Clean and inspect all switch contacts. *f.* Check the speed of the Motor-Generator set and the delay time of the starting contactor, or— *g.* Check the delay time of the power contactor in the rectifier unit. *h.* Inspect motor-generator commutators and clean only when necessary. *i.* Inspect motor-generator brushes and replace them when necessary. **CAUTION** Always replace brushes in the brushholder from which they were removed and in the same position to prevent brush chatter and interference noise.
Monthly	*a.* Clean the rotating variable inductance coils and wheels with a clean cloth and carbon tetrachloride. Do not lubricate any part of the mechanism. *b.* Check all tubes. The readings of plate current and output over a long period will serve as a check on the transmitting tubes, showing a gradual reduction with time. When the output drops to 80% of the value obtained when the tubes were new, the tubes may be replaced and a complete failure avoided. If full plate supply voltages can no longer be obtained from the rectifier unit, the rectifier tubes should be replaced. *c.* Make sure all fuses are tight in their clips and the clips are clean.
Semi-Annually	*a.* Repack the bearings of the blower motor with Navy Type 14L3 grease. *b.* Clean gears of Uni-Control mechanism with a pipe cleaner dipped in naphtha. Do not lubricate. *c.* Lubricate switch contacts sparingly with a solution of 90% carbon tetrachloride and 10% lanolin. Lubricate sliding type contacts and detent only. *d.* Place one or two drops of instrument oil, G.E. oil "K-7879298" or Navy Symbol #5065, on switch shafts, bearings, and gears (except Uni-Control gears).
Every three years	*a.* Repack Motor-Generator bearings with Navy Type 14L3 grease.

DAILY MAINTENANCE RECORD

Week Ending.....

CONTROL SWITCHES		METER READINGS WITH TRANSMITTER OPERATING ON BAND #3 AT 5000 KC							TUNING DIAL ERROR	TUNE ON ALL BANDS
Local Operation	Remote Operation	Antenna Current Amps. (50 ohm Antenna)	Filament Voltage Volts	I.P.A. Plate Current MA.	P.A. Plate Current MA.	Plate Voltage Volts	P.A. Plate Voltage Kilo-Volts	M.O. Temp. Deg.	Freq. Adjusted to 5000 KC Exactly*	Complete Tuning Check
OK	OK	3.6	12.6	25	360	500	1.8	60	0.1	OK

*Adjust for zero beat point nearest to the 5000 KC reading on dial.

Figure 6-1 Sample Record Sheet

2. TRANSMITTER MAINTENANCE TUNING CHECK.

The Model TCK transmitters are carefully aligned and the adjustments sealed at the factory. Unless components have to be replaced because of damage, the equipment may never have to be realigned. The following daily checks will assure maximum efficiency and performance from the equipment at all times.

Turn on the transmitter and allow it to warm up for at least 30 minutes or until the M.O. thermometer indicates 60° C before tuning.

TUNING STEPS	ADJUSTMENT
1. Adjust filament voltages to 12.6 volts and plate voltages to 500 and 1800 volts.	*a.* Use front panel voltage controls. (High voltage control is Line Voltage Adjuster on rectifier unit of Models TCK-4, -6.)
2. Set equipment for C.W. operation from the local station.	*a.* LOCAL-REMOTE switch on LOCAL. *b.* C.W.—PHONE switch on C.W.
3. Turn on CFI Unit and prepare for calibration.	*a.* C.F.I. power switch ON. *b.* CAL.—TUNE (REDUCE POWER)—OPERATE switch on CAL. *c.* TEST KEY up.
4. Plug earphones into C.F.I. audio jack and turn up volume until a note is clearly audible.	*a.* It may be necessary to change transmitter FREQUENCY control to obtain a note. Tune through at least 100 kc to be sure beat note selected is the strongest.
5. On band #4, tune to exactly 6000 kc.	*a.* BAND CHANGE switch to #4. *b.* FREQUENCY to 6000 kc.
6. Tune M.O. RESET for zero beat note in earphones.	*a.* If the M.O. RESET dial does not read more than 20 and less than 70, the M.O. should be realigned as described under electrical adjustments.
7. Check Bands #1, 2, 3, 5, and 6 at 2000, 3000, 4500, 9000, and 12,000 kc respectively for position of zero beat notes.	*a.* Advance the BAND CHANGE SWITCH to 1, 2, 3, 5, and 6. *b.* At each frequency, readjust the M.O. RESET to obtain zero beat. The adjustment should not exceed 5 divisions on the dial, i.e. if the average dial reading is 52, no adjustment should be more than 57 or less than 47.
8. Check bands #1, 2, 3, 4, 5, and 6 at 3000, 4500, 6000, 9000, 12,000, and 18,000 respectively for zero beat note.	*a.* Advance the BAND CHANGE switch to 1, 2, 3, 4, 5, and 6, and adjust FREQUENCY for value. *b.* If the shift of the M.O. RESET from the average value exceeds five divisions, the M.O. should be aligned completely. *c.* After this check, turn the CFI unit OFF.
9. Tune to the desired operating frequency and adjust for minimum I.P.A. PLATE CURRENT.	*a.* CAL. - TUNE (REDUCE - POWER)—OPERATE switch to TUNE (or REDUCE-POWER). *b.* BAND CHANGE switch to desired band. *c.* FREQUENCY to desired frequency. *d.* I.P.A. TRIMMER to point giving minimum I.P.A. PLATE CURRENT meter reading.

2. TRANSMITTER MAINTENANCE TUNING CHECK.—Continued.

TUNING STEPS	ADJUSTMENT
10. Check the P.A. circuit for resonance.	*a.* P.A. TRIMMER to point giving minimum P.A. PLATE CURRENT meter reading. *b.* CAL.-TUNE-OPERATE switch to OPERATE and adjust for 500 v. plate and 1800 v. P.A. plate. If overload relays trip, reduce ANTENNA COUPLING and push RESET button. *c.* ANTENNA TUNING—INDUCTIVE to approximately maximum P.A. PLATE CURRENT. If plate current tends to exceed 360 ma., reduce ANTENNA COUPLING. *d.* Readjust P.A. TRIMMER for minimum plate current. *e.* Adjust ANTENNA TUNING—CAPACITIVE to give maximum plate current. *f.* Increase ANTENNA COUPLING until P.A. PLATE CURRENT reaches 360 ma. *g.* If transmitter fails to give full output and tubes are good, P.A. circuit should be realigned.
11. Check operation of modulator unit.	*a.* Plug microphone in MICROPHONE INPUT. *b.* CW-PHONE switch to PHONE. *c.* Depress button on microphone and observe P.A. PLATE CURRENT meter for a reading. *d.* If a monitor speaker or phones are connected to the transmitter or if a radio receiver is available, have some one speak into the microphone and check the quality of the modulation signal by listening to it.
12. Check modulated output for $\frac{1}{4}$ power at the desired operating frequency.	*a.* CAL.-TUNE-OPERATE switch on OPERATE. *b.* BAND CHANGE switch to desired frequency. *c.* C.W.-PHONE switch first on C.W. for tuning to maximum antenna current, then on PHONE. On PHONE the ANTENNA CURRENT meter should read just half the value obtained with the switch on C.W. If it is more or less than $\frac{1}{2}$ and the tubes are good, the transmitter circuits should be realigned.
13. Check operation, both C.W. and PHONE, from the remote position, providing this position is installed with the equipment.	*a.* LOCAL-REMOTE switch to REMOTE. *b.* LOCAL START switch to ON if a 4-Wire Remote Controller is used. *c.* Close the remote START switch. *d.* CW-PHONE switch on CW and operate remote key. Check operation of transmitter. *e.* CW-PHONE switch on PHONE and operate remote microphone, if used. Check operation of transmitter.

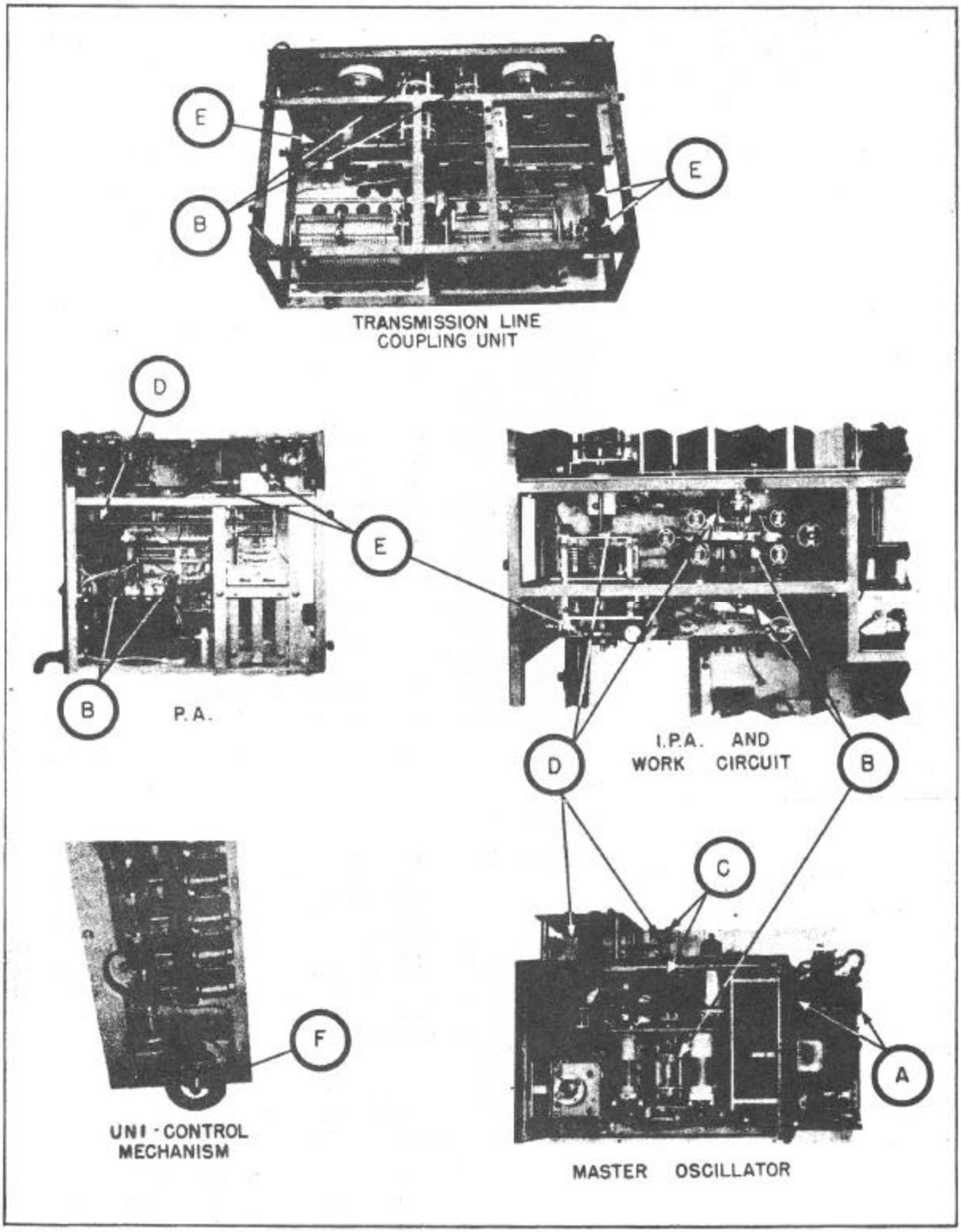


Figure 6-2 Points to be Lubricated

3. LUBRICATION CHARTS. (See *Figure 6-2*).

Lubricate all parts except the Motor-Generator set semi-annually or after 2500 hours of operation, whichever occurs first.

POINT	PART	LOCATION	LUBRICANT	INSTRUCTIONS
A.	Blower Motor Bearings.	Either end of motor shaft.	Navy type 14L3 grease.	Disassemble motor (see Mechanical Adjustments) and clean bearings, then pack about ⅓ full. (M.O. heated compartment must be removed.)
B.	Rotary Switch Contacts.	On each wafer of switches.	10% lanolin; 90% carbon tetrachloride by volume.	This is not essential and may be omitted except under the most corrosive operating conditions.
C.	Switch Bearings.	Where switch shaft penetrates panel.	Instrument Oil, Navy Symbol #5065	Not more than 1 or 2 drops. Wipe off excess. (May be omitted except under most corrosive conditions.)
D.	Switch Gears.	At ends of shaft for Band Change switch.	Instrument Oil, Navy Symbol #5065	Not more than 1 or 2 drops. Wipe off the excess.
E.	Other Gears.	On shafts to antenna and transmission line coupling coils, and tuning condensers.	Instrument Oil, Navy Symbol #5065	Not more than 1 or 2 drops. Wipe off the excess.
F.	Uni-control lead screw.	Threaded brass screw which limits travel of FREQUENCY dials.	Instrument Oil, Lubriplate #103	Not more than 1 or 2 drops. Wipe off the excess.

CAUTION.

DO NOT LUBRICATE ANY ITEM NOT LISTED ABOVE. PARTICULARLY AVOID GETTING ANY OIL OR GREASE ON THE UNI-CONTROL GEARS, CONDENSERS, AND SHAFT OR ON THE ANTENNA TUNING COIL, ROLLERS, OR ROLLER GUIDE BARS. CLEAN THESE PARTS ONLY AS DIRECTED, USING NAPHTHA OR CARBON TETRACHLORIDE.

MOTOR-GENERATOR SET

POINT	LOCATION	LUBRICANT	INSTRUCTIONS
Ball Bearings.	Both ends of Generator Shaft.	Navy Spec. 14L3 Grease.	Once every three years: Disassemble M-G set and remove bearings. (See Mechanical Adjustments.) Remove bearing grease seals, clean and repack races one third full.

SECTION VII
CORRECTIVE MAINTENANCE

1. FAILURE REPORTS.

FAILURE REPORTS

A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from any Electronics Officer.

Sample Failure Report Cards Properly Filled in

2. LOCATION AND CORRECTION OF TROUBLE

WARNING

Service, either electrical or mechanical, should be attempted only by a qualified personnel authorized for such work. Operation of this equipment involves the use of high voltages. Operating personnel must at all times observe all safety regulations. Always disconnect equipment from power supply before changing tubes or attempting service.

(See Section V, Operator's Maintenance, for information on the replacement of fuses and vacuum tubes.)

If the items in the Trouble Shooting Chart, Table 7-2, are investigated in order, starting with *a*, it will be quite easy to localize most operational difficulties. Once the difficulty is recognized as the result of a defect in a particular circuit or component, that component may be repaired or replaced. Helpful information about all components is included in the following paragraphs, in the list of parts and spare parts, and on the schematic diagram.

Experience has shown that about 90 per cent of all difficulties result from tube failures, thus the tubes in the defective circuit should be checked before any other investigation is attempted. A conventional tube checker does not necessarily give a conclusive test and more definite results should be obtained by replacing in the circuits the doubtful tubes with tubes which are known to be good.

ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK.

3. SOCKET VOLTAGES.

WARNING

Extreme caution should be used when making measurements of 500 volts or over. *Never check voltages when alone.* Stand on a platform of insulating material and use heavily insulated leads. Ground proper lead of meter to chassis. Using only one hand, touch other lead of meter to point of voltage to be measured, being careful to avoid bodily contact to frame of transmitter.

It is possible to open the tube access door in the front panel of the transmitter and short the interlock for the purpose of measuring the tube voltages for V101, V102, V103 and V104. For this reason socket voltages are listed in Table 7-1. MEASURING TUBE VOLTAGE IS NOT RECOMMENDED, HOWEVER, BECAUSE THE VOLTAGES TO BE MEASURED ARE DANGEROUS TO LIFE (1800 VOLTS) AND ALSO REQUIRE SPECIAL METERS AND LEADS. The best method is always to remove power and measure the resistance of a circuit, comparing the value obtained to the total resistance of the circuit as shown on the schematic.

The following voltages in Table 7-1 are obtained with power on and the transmitter tuned. Unless otherwise noted, the readings are for CW operation with the TEST KEY closed.

Socket voltages for the Modulator Unit, and the C.F.I. Unit can be checked with Figures 7-1, 7-2 and 7-3.

TABLE 7-1

TRANSMITTING TUBES SOCKET VOLTAGES

TUBE	ELEMENT	VOLTAGE	CURRENT
V101	Plate	430-465	18-35 ma.
	Screen-Grid	190-225	3.5-7 ma.
V102	Plate	500	20-45 ma.
	Screen-Grid	300-390	10-15 ma.
V103	Plate	1800	180 ma. (per tube)
	Screen-Grid	300-380	5-15 ma.
V104	Plate	1800	180 ma. (per tube)
	Screen-Grid	300-380	5-15 ma.

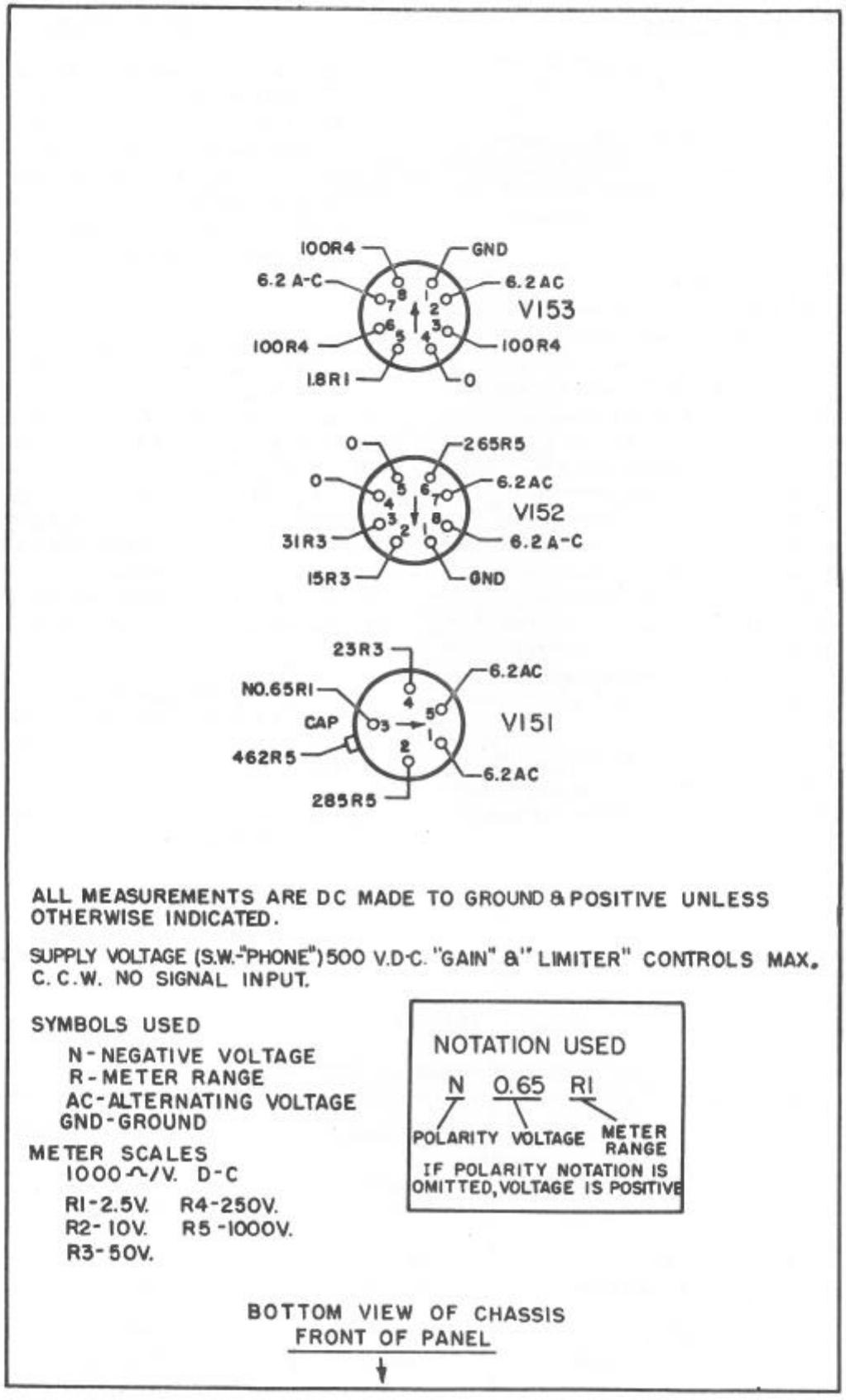


Figure 7-1—Modulator Unit Socket Voltages

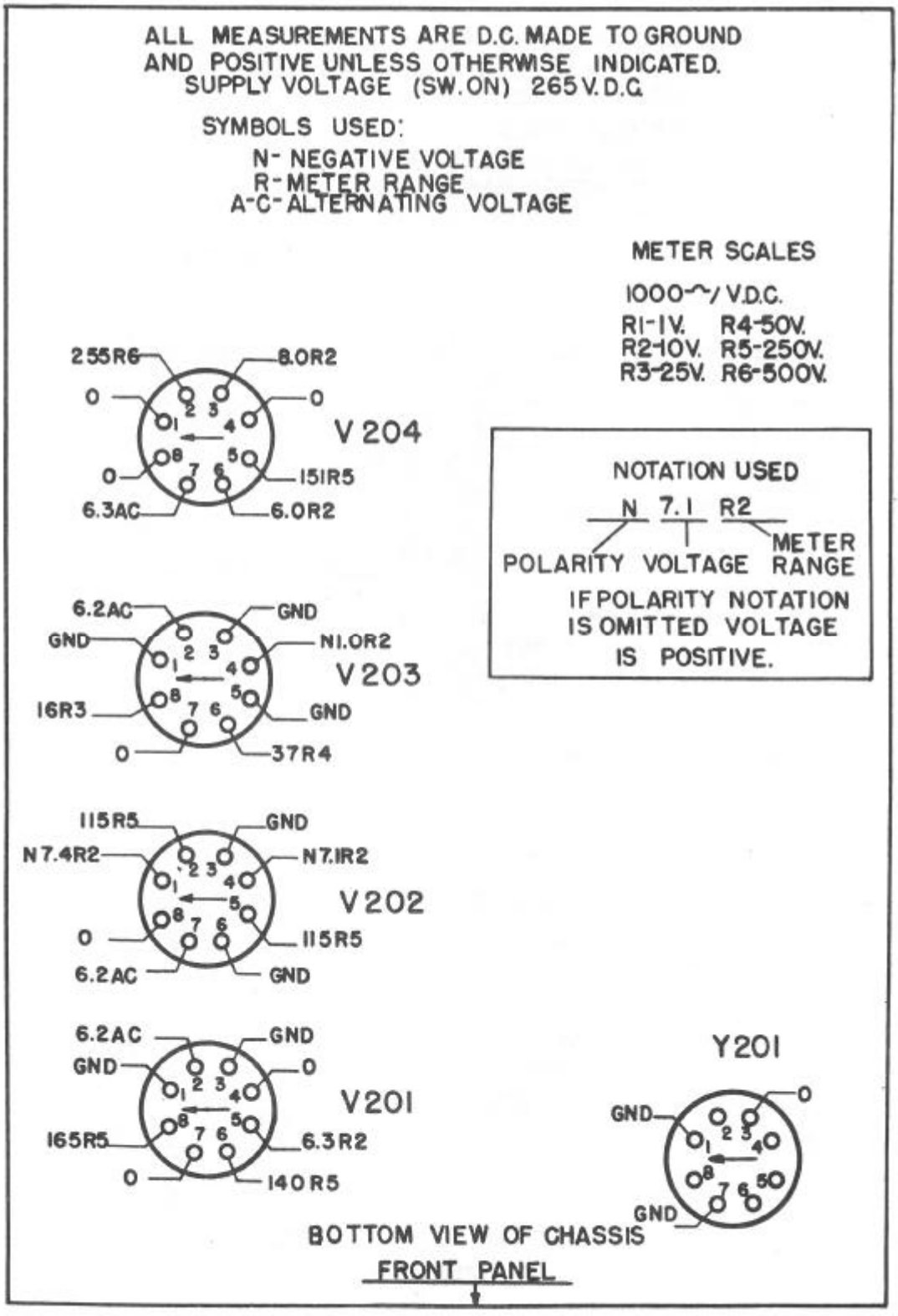


Figure 7-2—C.F.I. Unit Socket Voltages (except Model TCK-7)

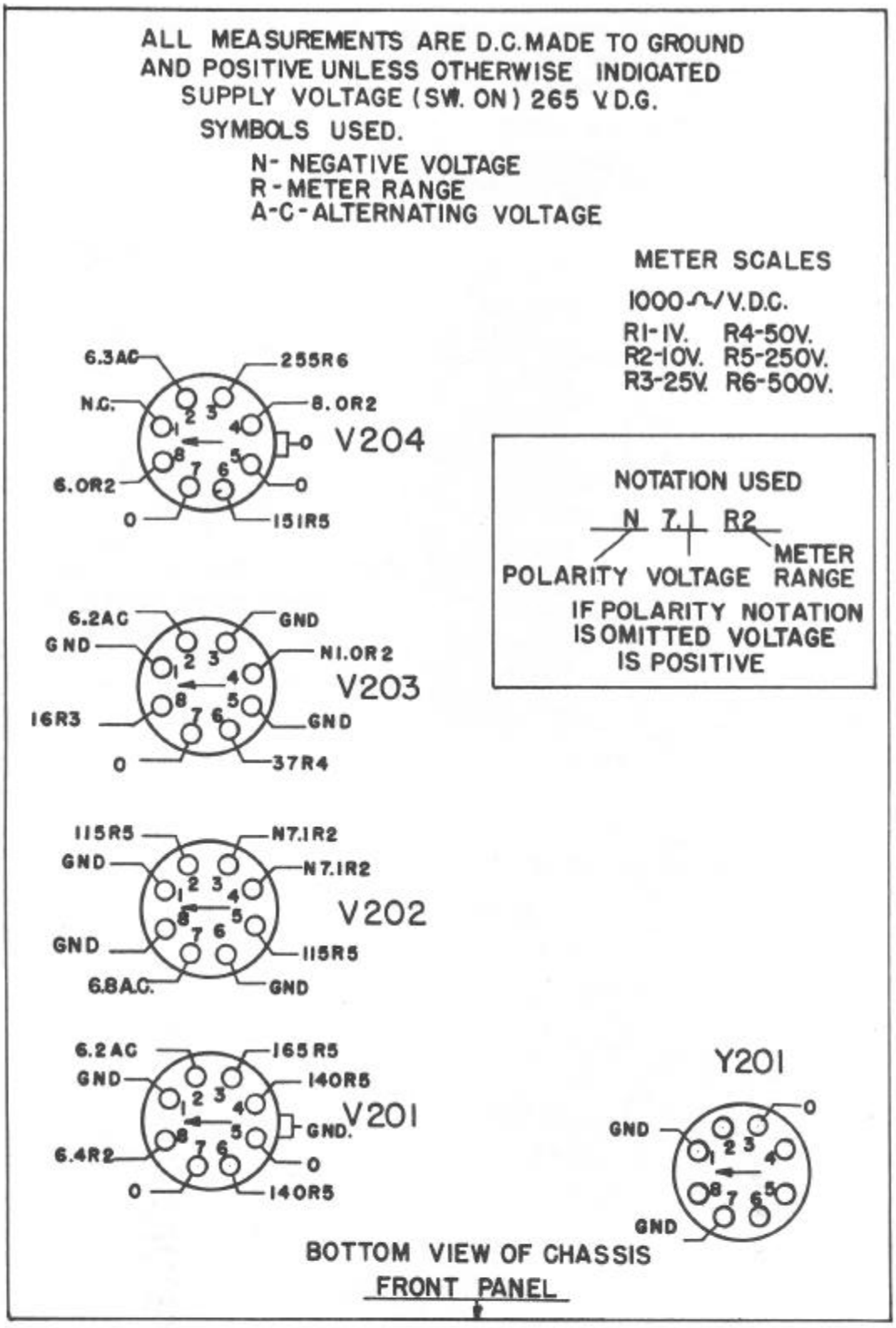


Figure 7-3—C.F.I. Unit (Model TCK-7) Socket Voltages

NAVSHIPS 900,210

TABLE 7-2—TROUBLE SHOOTING CHART.

a. "START" SWITCH ON THE TRANSMITTER DOES NOT START THE M-G SET (OR RECTIFIER)

DEFECTIVE

M-G SET SUPPLY

(1) Is the "EMERGENCY" switch in the "OPERATE" position?

(2) If the four-wire control circuit is used, is the "CONTROL" switch in the "LOCAL" position, if the radio transmitter is to be started locally?

(3) Are the connections made between the motor-generator set and the magnetic controller? Are the connections P1, P2 and P-4 on the magnetic controller connected to the transmitter? Are power lines connected to the magnetic controller?

(4) Are magnetic controller fuses making good contact in their clips and are the fuses good?

(5) Is line fuse F101 in the radio transmitter making good contact in the clips and is the fuse good?

(6) Is the "MG START-STOP" switch making good contact?

(7) Are all doors closed so that interlocks S114, S116 and S117 are making good contact?

(8) Is the overload "Reset" on the magnetic controller closed?

(9) Can you hear the starting contactor close?

(10) Do the Magnetic Controller contactors close?

(11) Is there voltage between A1 and A2 on the D.C. M-G set? (Between AT1, AT2, and AT3 on the A.C. M-G set?)

RECTIFIER SUPPLY

(1) Are the "EMERGENCY" switches in the "OPERATE" position?

(2) If the four-wire control circuit is used, is the "CONTROL" switch in the "LOCAL" position for starting the transmitter locally?

(3) Are all connections made to the Rectifier Unit from the Transmitter? Are power lines connected to the Rectifier?

(4) Are Rectifier and Transmitter control fuses making good contact in their clips and are the fuses good?

(5) Is the Transmitter "START-STOP" contactor making good contact?

(6) Are all doors closed so that the interlocks are not open?

(7) Is the line voltage above 110 volts?

STARTS OK

b. FILAMENTS NOT ON WHEN M-G SET (OR RECTIFIER) IS RUNNING.

DEFECTIVE

(1) Are tubes firmly seated in their sockets and properly locked?

(2) Check for burned out tubes or corrosion on the filament contacts to the sockets.

(3) Is filament rheostat set properly?

(4) Is there a-c voltage between M1 and M2 on the D.C. M-G set?

(5) Are motor slip-ring fuses good and are they making contact in their clips?

(6) Are starting relay contacts closed on A-C Units?

(7) Do Rectifier Power Contactors close?

FILAMENTS OK

c. PLATE AND P.A. PLATE VOLTAGE METERS SHOW LOW OR NO READING BIAS AND PLATE INDICATORS ARE DARK.

DEFECTIVE

(1) Push the "Relay Reset" on the transmitter.

(2) Are the 115 v. generator field contacts closed on the starting relay?

(3) Is the "Plate voltage" rheostat turned up? Is the slider making good contact?

(4) Is the 115 v. generator fuse good? Is it making good contact in the clips?

METERS OK

d. NO PLATE CURRENT WHEN TEST KEY IS CLOSED.

DEFECTIVE

(1) Overload relays K103 and K104 may be open. To close, push the "RELAY RESET" switch on the front panel.

(2) Are filaments of tubes hot?

(3) Is the "BAND CHANGE" switch "B" fully centered into position by detent mechanism so that interlock switch S106E is closed?

(4) Is "ANTENNA CIRCUIT SELECTOR" switch "F" fully centered into position by detent mechanism so that interlock switch S107E is closed? Keying relay cannot be energized with either S106E or S107E open.

(5) Are contacts 3 and 5 of keying relay making contact?

(6) Check bias voltage; fuse may be open.

(7) Check 500 and 1800 v. supply fuses. DANGER—Stop the Motor-Generator set (or shut-off Rectifier before removing or testing fuses). Do not touch fuse clips with fingers as a severe shock may result, even with the power turned off.

PLATE CURRENT OK

e. KEYING RELAY DOES NOT OPERATE.

DEFECTIVE

(1) Are the "BAND CHANGE" switch "B" and the "ANTENNA CIRCUIT SELECTOR" switch "F" fully centered into position by detent mechanism?

(2) Check bias voltage (—115 v.).

(3) When using four-wire control with D.C. Motor-Generator, note if I101 "POWER" Indicator is on. If not, check contacts in the Magnetic Controller and check I101.

(4) Are Transmission Line Coupling Unit (if used) interlocks closed on both switches?

OPERATES OK

f. MASTER OSCILLATOR NOT OSCILLATING.

DEFECTIVE

(1) The "BAND CHANGE" switch "B" may have been forced to stop between normal positions. Are switch points making contact?

(2) Check for open grid resistors by measuring resistance from socket X101, pin 4 to ground. Should read 51,000 ohms.

(3) Check for shorted plates on the tuning capacitor or reset capacitors.

(4) Check for damaged m-o tube.

(5) Is the m-o plate resistor R103 open?

(6) Are contacts 3 and 5 of the keying relay making contact?

(7) Check for burned out resistors in compensator C144 by measuring the resistance across terminals 4 and 3. The resistance measured should be 450 ohms.

(8) Is the PLATE VOLTAGE supply 500 volts?

OSCILLATING OK

g. I.P.A. AND P.A. CIRCUIT TROUBLES.

DEFECTIVE

(1) Check for open grid resistors.

(2) Check for low excitation from the master oscillator for the intermediate power amplifier. Replacement of tubes from spares may remedy this circumstance.

(3) Is the "BAND CHANGE" switch "B" fully centered into position by detent mechanism?

(4) Check for shorted plates in the air capacitors.

(5) Check for open screen grid resistors in either i-p-a or p-a circuits.

(6) Are contacts of the "CW-PHONE" switch making contact?

(7) Check for open plate current meters in the i-p-a or p-a circuits.

I.P.A. AND P.A. OK

h. NO ANTENNA CURRENT.

DEFECTIVE

(1) Is the "ANTENNA CIRCUIT SELECTOR" switch "F" making contact?

(2) Check for grounded or open antenna systems.

(3) Check for improper antenna connection.

(4) Are contact wheels on the antenna coil L126 making good contact on the same turn?

ANTENNA CURRENT OK

i. P.A. TUBES HEAT EXCESSIVELY, ONE OR BOTH PLATES GET RED.

DEFECTIVE

(1) Check for shorted p-a screen-grid resistor R137.

(2) Is the power amplifier maintained at resonance? Adjust the "P-A TRIMMER" control for minimum plate current.

(3) If the plate of one tube gets hot and the other does not, the tube which stays cool is usually defective.

TUBES OK

j. VOLTAGE BREAK-DOWN IN ANTENNA CIRCUIT.

DEFECTIVE

(1) Check for moisture on insulators.

(2) Check for bent air-capacitor plates or excessive dust and foreign material adhering to them.

(3) Is the antenna too short?

CIRCUIT OK

k. NO MODUL

DEFECTIVE

(1) Is the "CW-PHONE" switch set to the "PHONE" position? Check for open contacts.

(2) Is the gain control R165 turned up sufficiently?

(3) Check connections to the audio unit.

(4) Check 12 v. microphone voltage before and after the filter.

(5) Check audio voltage, output, from audio unit, with an a-c voltmeter or earphones.

(6) Check the tubes of the audio unit for shorts and emission.

'ROUBLE SHOOTING CHART.

SWITCH ON THE TRANSMITTER DOES NOT
IE M-G SET (OR RECTIFIER)

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STARTS OK

RECTIFIER SUPPLY

(1) Are the "EMERGENCY" switches in the "OPERATE" position?

(2) If the four-wire control circuit is used, is the "CONTROL" switch in the "LOCAL" position for starting the transmitter locally?

(3) Are all connections made to the Rectifier Unit from the Transmitter? Are power lines connected to the Rectifier?

(4) Are Rectifier and Transmitter control fuses making good contact in their clips and are the fuses good?

(5) Is the Transmitter "START-STOP" contactor making good contact?

(6) Are all doors closed so that the interlocks are not open?

(7) Is the line voltage above 110 volts?

b. FILAMENTS NOT ON WHEN M-G SET (OR RECTIFIER) IS RUNNING.

DEFECTIVE

(1) Are tubes firmly seated in their sockets and properly locked?

(2) Check for burned out tubes or corrosion on the filament contacts to the sockets.

(3) Is filament rheostat set properly?

(4) Is there a-c voltage between M1 and M2 on the D.C. M-G set?

(5) Are motor slip-ring fuses good and are they making contact in their clips?

(6) Are starting relay contacts closed on A-C Units?

(7) Do Rectifier Power Contactors close?

FILAMENTS OK

c. PLATE AND P.A. PLATE VOLTAGE METERS SHOW LOW OR NO READING BIAS AND PLATE INDICATORS ARE DARK.

DEFECTIVE

(1) Push the "Relay Reset" on the transmitter.

(2) Are the 115 v. generator field contacts closed on the starting relay?

(3) Is the "Plate voltage" rheostat turned up? Is the slider making good contact?

(4) Is the 115 v. generator fuse good? Is it making good contact in the clips?

METERS OK

d. NO PLATE CURRENT WHEN TEST KEY IS CLOSED.

DEFECTIVE

(1) Overload relays K103 and K104 may be open. To close, push the "RELAY RESET" switch on the front panel.

(2) Are filaments of tubes hot?

(3) Is the "BAND CHANGE" switch "B" fully centered into position by detent mechanism so that interlock switch S106E is closed?

(4) Is "ANTENNA CIRCUIT SELECTOR" switch "F" fully centered into position by detent mechanism so that interlock switch S107E is closed? Keying relay cannot be energized with either S106E or S107E open.

(5) Are contacts 3 and 5 of keying relay making contact?

(6) Check bias voltage; fuse may be open.

(7) Check 500 and 1800 v. supply fuses. DANGER—Stop the Motor-Generator set (or shut-off Rectifier before removing or testing fuses). Do not touch fuse clips with fingers as a severe shock may result, even with the power turned off.

PLATE CURRENT OK

e. KEYING RELAY DOES NOT OPERATE.

DEFECTIVE

(1) Are the "BAND CHANGE" switch "B" and the "ANTENNA CIRCUIT SELECTOR" switch "F" fully centered into position by detent mechanism?

(2) Check bias voltage (—115 v.).

(3) When using four-wire control with D.C. Motor-Generator, note if I101 "POWER" Indicator is on. If not, check contacts in the Magnetic Controller and check I101.

(4) Are Transmission Line Coupling Unit (if used) interlocks closed on both switches?

OPERATES OK

f. MASTER OSCILLATOR NOT OSCILLATING.

DEFECTIVE

(1) The "BAND CHANGE" switch "B" may have been forced to stop between normal positions. Are switch points making contact?

(2) Check for open grid resistors by measuring resistance from socket X101, pin 4 to ground. Should read 51,000 ohms.

(3) Check for shorted plates on the tuning capacitor or reset capacitors.

(4) Check for damaged m-o tube.

(5) Is the m-o plate resistor R103 open?

(6) Are contacts 3 and 5 of the keying relay making contact?

(7) Check for burned out resistors in compensator C144 by measuring the resistance across terminals 4 and 3. The resistance measured should be 450 ohms.

(8) Is the PLATE VOLTAGE supply 500 volts?

OSCILLATING OK

g. I.P.A. AND P.A. CIRCUIT TROUBLES.

DEFECTIVE

(1) Check for open grid resistors.

(2) Check for low excitation from the master oscillator for the intermediate power amplifier. Replacement of tubes from spares may remedy this circumstance.

(3) Is the "BAND CHANGE" switch "B" fully centered into position by detent mechanism?

(4) Check for shorted plates in the air capacitors.

(5) Check for open screen grid resistors in either i-p-a or p-a circuits.

(6) Are contacts of the "CW-PHONE" switch making contact?

(7) Check for open plate current meters in the i-p-a or p-a circuits.

I.P.A. AND P.A. OK

h. NO ANTENNA CURRENT.

DEFECTIVE

(1) Is the "ANTENNA CIRCUIT SELECTOR" switch "F" making contact?

(2) Check for grounded or open antenna systems.

(3) Check for improper antenna connection.

(4) Are contact wheels on the antenna coil L126 making good contact on the same turn?

ANTENNA CURRENT OK

i. P.A. TUBES HEAT EXCESSIVELY, ONE OR BOTH PLATES GET RED.

DEFECTIVE

(1) Check for shorted p-a screen-grid resistor R137.

(2) Is the power amplifier maintained at resonance? Adjust the "P-A TRIMMER" control for minimum plate current.

(3) If the plate of one tube gets hot and the other does not, the tube which stays cool is usually defective.

TUBES OK

j. VOLTAGE BREAK-DOWN IN ANTENNA CIRCUIT.

DEFECTIVE

(1) Check for moisture on insulators.

(2) Check for bent air-capacitor plates or excessive dust and foreign material adhering to them.

(3) Is the antenna too short?

CIRCUIT OK

k. NO MODULATION.

DEFECTIVE

(1) Is the "CW-PHONE" switch set to the "PHONE" position? Check for open contacts.

(2) Is the gain control R165 turned up sufficiently?

(3) Check connections to the audio unit.

(4) Check 12 v. microphone voltage before and after the filter.

(5) Check audio voltage, output, from audio unit, with an a-c voltmeter or earphones.

(6) Check the tubes of the audio unit for shorts and emission.

MODULATION OK

l. M.O. COMPARTMENT DOES NOT HEAT.

DEFECTIVE

(1) Check relay for bad contacts (K105 or K107).

(2) Check switch S109 for bad contacts.

(3) Check mercury switch S108 for broken mercury column.

(4) Check for bad contacts of the "M-O HEATER" switch S115.

(5) Is the Blower Motor running?

(6) Check for presence of control voltage for relay (K105 or K107).

(7) Check for defective heaters inside M.O. box.

HEATS OK

m. NO SIGNAL FROM C.F.I. UNIT.

DEFECTIVE

(1) Check for "shorting to ground" of the r-f pickup coil (L110) or its wiring.

(2) Check tubes for shorts and emission.

(3) Check connections to the c-f-i unit.

(4) Check for a faulty crystal, especially if rough note is heard.

C.F.I. OK

n. MICROPHONE SWITCH DOES NOT OPERATE THE TRANSMITTER.

DEFECTIVE

(1) Operate Test Key. If Transmitter operates then check 12-volt generator voltage.

(2) If no voltage is apparent in generator, remove generator brushes and examine commutator for dirt and film. Clean commutator with fine sandpaper.

CAUTION:

Do not use emery cloth on commutator or brushes.

(3) Check for poor contact between micro-phone jack and plug.

4. TERMINAL RESISTANCES.

WARNING

Remove all power from the units before taking measurements by opening main line power switch.

If unable to locate trouble by simpler means, a check of circuit resistance will be necessary. When checking the resistance, always keep the following table and a copy of the schematic diagram visible. In this way a resistance value which seems incorrect may be traced to the most probable cause on the schematic before investigating the transmitter components or wiring.

This table is intended only for a quick check of the power input circuits. If a circuit which should have infinite resistance shows a low value, there is probably an insulation failure. If one which should have zero resistance shows a high value, one of the components is probably open. If the terminal resistance for a circuit seems to be correct although the trouble has been localized in that circuit, the resistance of each component should be checked separately and compared to the value for that component shown on the schematic diagram or in the parts list.

TABLE 7-3

READINGS WERE MADE WITH THE FOLLOWING CONDITIONS

All switches OFF or open and no external connections.
TEST KEY in neutral or horizontal position.
Voltage controls full counterclockwise.
LOCAL-REMOTE CONTROL switch on REMOTE.
Transmitter connected for 6-wire control unit.
C.W.-PHONE switch on C.W.
All resistances given in ohms.

FROM TERMINAL	TO TERMINAL	TRANSMITTER SUPPLIED BY A-C MOTOR-GENERATOR	TRANSMITTER SUPPLIED BY D-C MOTOR-GENERATOR	TRANSMITTER SUPPLIED BY RECTIFIER UNIT
1-1	GND.	Inf.	Inf.	Inf.
1-1	1-12	N.C.	Inf.	Inf.
1-1	1-20	19.7	Inf.	17.1
1-1	1-25	0	1365†	0
1-2	GND.	Inf.	Inf.	Inf.
1-2	1-3	57	5000	57
1-3	GND.	Inf.	Inf.	Inf.
1-3	1-21	Inf.	Inf.	50
1-4	GND.	Inf.	Inf.	Inf.
1-5	GND.	0	0	0
1-6	GND.	1500	1500	Inf.
1-7	GND.	Inf.	Inf.	Inf.
1-7	1-11	300	300	300
1-8	GND.	0*	0*	0*
1-9	GND.	Inf.	Inf.	Inf.
1-9	1-10	347	347	347
1-10	GND.	Inf.	Inf.	Inf.
1-11	GND.	N.C.	N.C.	N.C.
1-12	GND.	N.C.	Inf.	Inf.
1-12	1-13	N.C.	75‖	0‡
1-13	GND.	N.C.	Inf.	Inf.
1-14	GND.	Inf.	Inf.	Inf.
1-14	1-15	0	0	0
1-15	GND.	Inf.	Inf.	Inf.
1-15	1-16	Inf.	Inf.	Inf.
1-16	GND.	Inf.	Inf.	Inf.
1-17	GND.	175	175	175

NOTES

Inf.—Infinite resistance.
*—CW-PHONE switch on PHONE.
N.C.—No connection.
†—780 on Model TCK-7.
‖—18.5 for 115 v. d-c supply and 75 for 230 v. d-c supply.
‡—CAL.-REDUCED POWER-OPERATE switch on OPERATE.
¶—CAL.-TUNE-OPERATE switch on TUNE.
•—1.31 for 220 v. a-c supply and 5.25 for 440 v. a-c supply.

TABLE 7-3 (Cont'd)

FROM TERMINAL	TO TERMINAL	TRANSMITTER SUPPLIED BY A-C MOTOR-GENERATOR	TRANSMITTER SUPPLIED BY D-C MOTOR-GENERATOR	TRANSMITTER SUPPLIED BY RECTIFIER UNIT
1-18	GND.	Inf.	Inf.	Inf.
1-18	1-22	1600¶	1600¶	Inf.
1-19	GND.	57	57	57
1-20	GND.	Inf.	Inf.	Inf.
1-21	GND.	Inf.	Inf.	Inf.
1-22	GND.	400	400	400
1-23	GND.	Inf.	Inf.	Inf.
1-23	1-24	5.25•	Inf.	Inf.
1-24	GND.	Inf.	Inf.	Inf.
1-25	GND.	Inf.	Inf.	Inf.
1-26	GND.	57	57	54
1-27	GND.	Inf.	Inf.	0
P1	GND.	5000	5000	5000
P2	GND.	2.5 meg.	2.5 meg.	2.5 meg.
14-A	1-24	N.C.	N.C.	1.28
14-B	1-23	N.C.	N.C.	1.28

NOTES

Inf.—Infinite resistance.
*—CW-PWONE switch on PHONE.
N.C.—No connection.
†—780 on Model TCK-7.
‖—18.5 for 115 v. d-c supply and 75 for 230 v. d-c supply.
‡—CAL.-REDUCED POWER-OPERATE switch on OPERATE.
¶—CAL.-TUNE-OPERATE switch on TUNE.
•—1.31 for 220 v. a-c supply and 5.25 for 440 v. a-c supply.

5. INSULATOR SPECIFICATIONS.

The following six pages give the molding specifications for insulators used in the transmitters. The following listing gives the figure in which each insulator may be found.

INSULATOR SYMBOL NUMBER	FIGURE	INSULATOR SYMBOL NUMBER	FIGURE
E117	7-4a	E138	7-4a
E118	7-4b	E159	7-4e
E121	7-4c	E163	7-4f
E122	7-4d	E164	7-4f
E123	7-4e	E165	7-4f
E124	7-4d	E169	7-4b
E125	7-4e	E172	7-4b
E126	7-4d	E173	7-4d
E128	7-4d	E175	7-4f
E129	7-4d	E176	7-4f
E131	7-4e	E177	7-4f
E132	7-4d	E178	7-4c
E133	7-4e	E179	7-4d
E135	7-4f	E181	7-4e
E136	7-4e	E182	7-4c
E137	7-4f	E189	7-4e

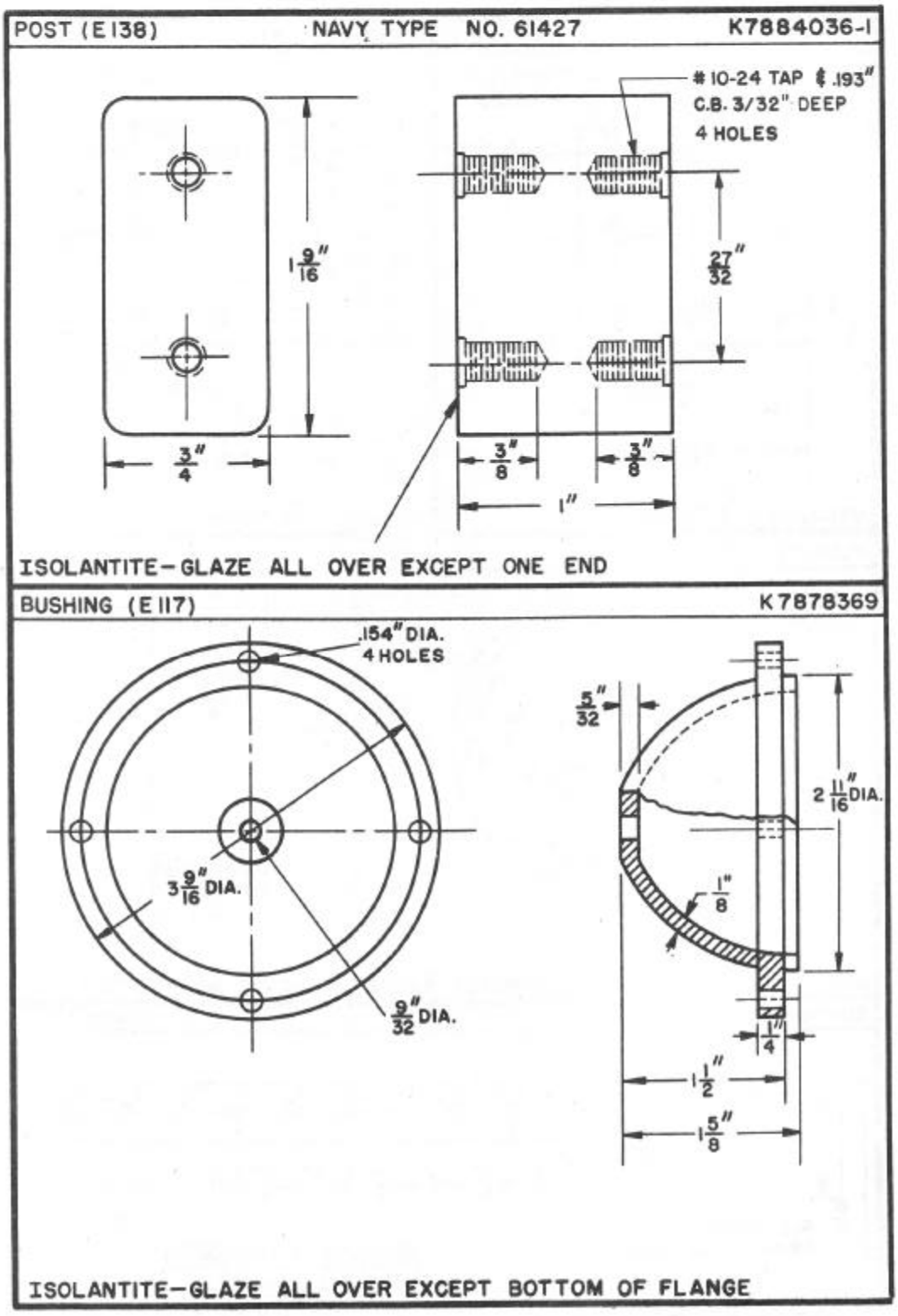


Figure 7-4a—Insulator Specifications

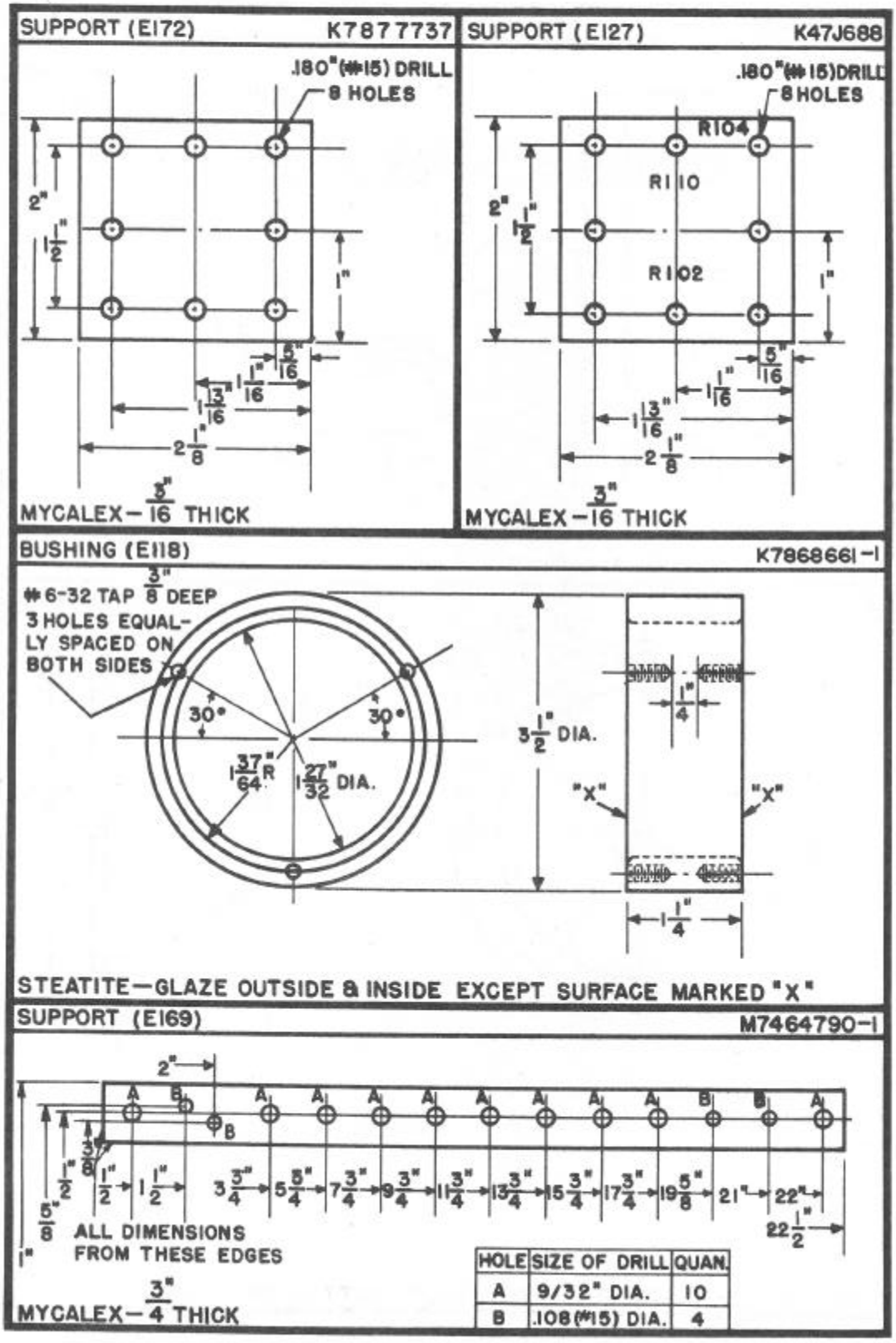


Figure 7-4b—Insulator Specifications

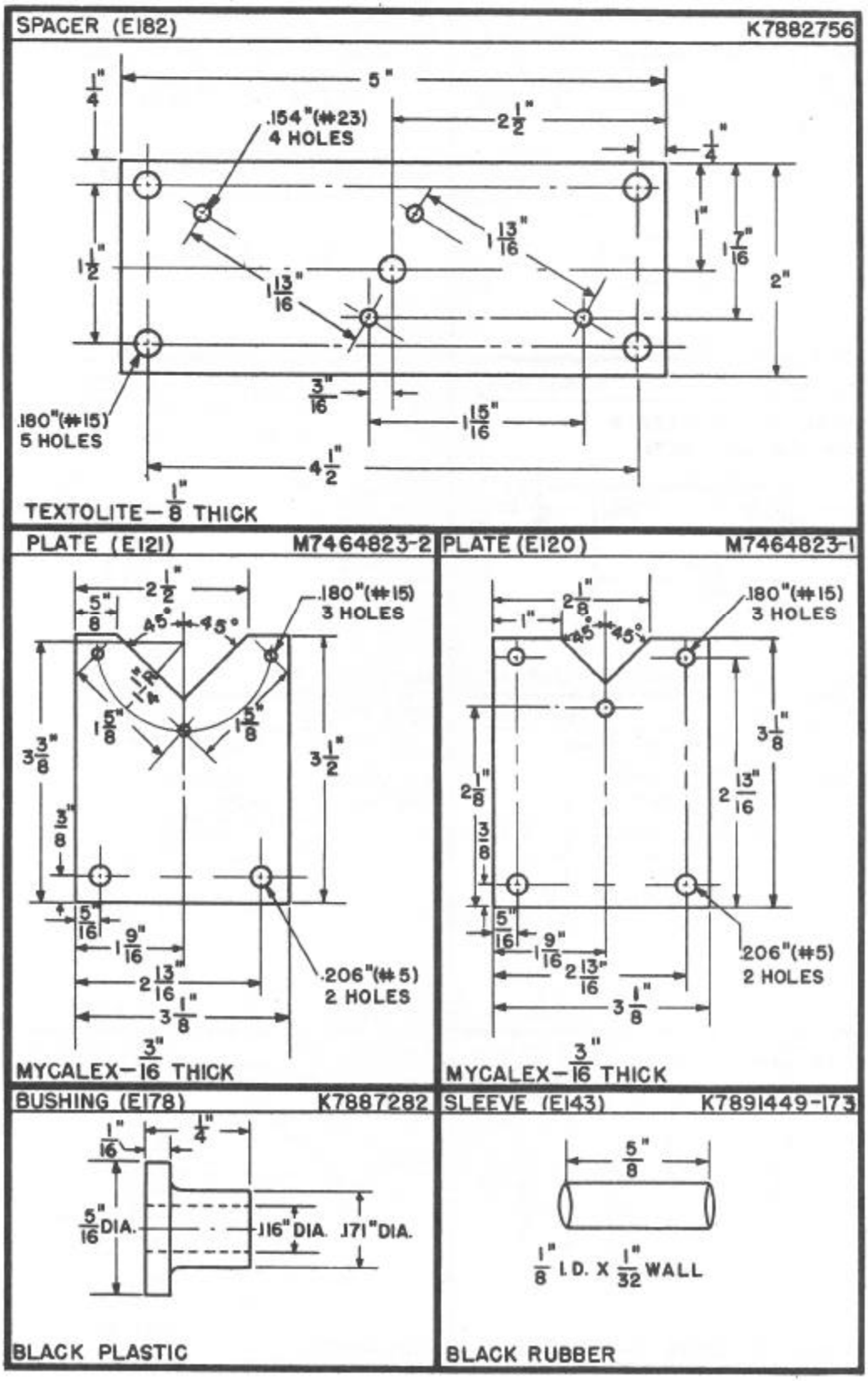


Figure 7-4c—Insulator Specifications

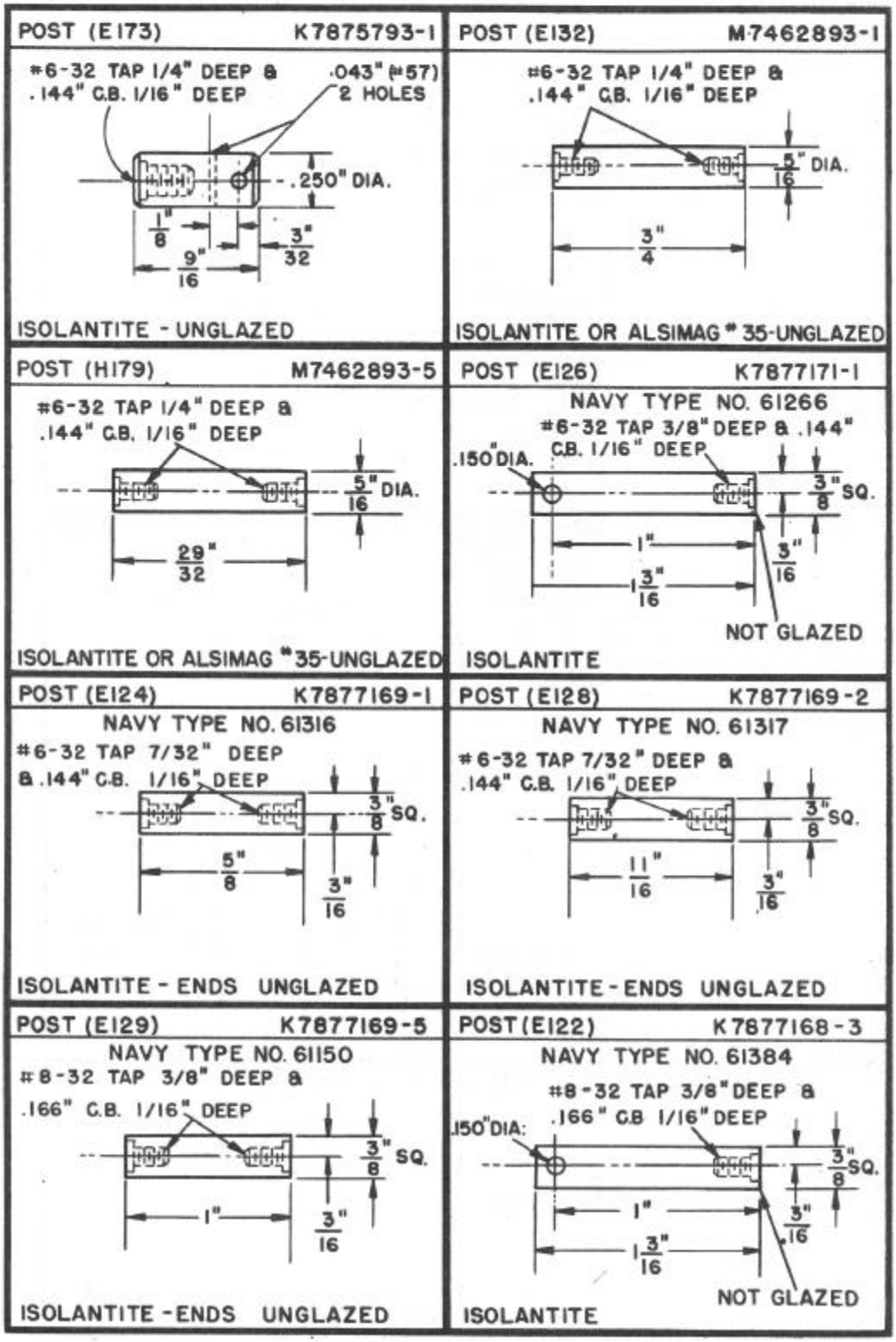


Figure 7-4d—Insulator Specifications

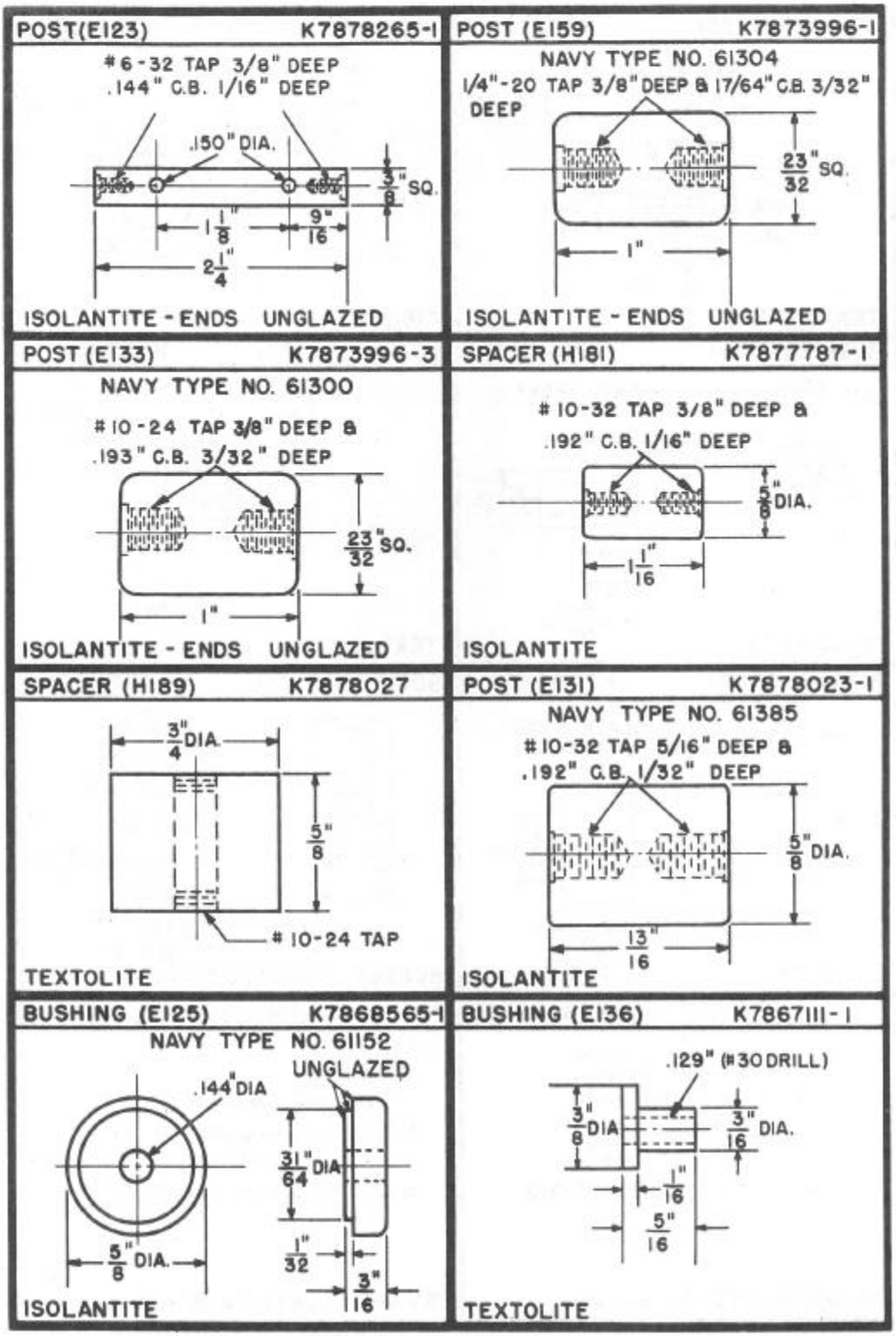


Figure 7-4e—Insulator Specifications

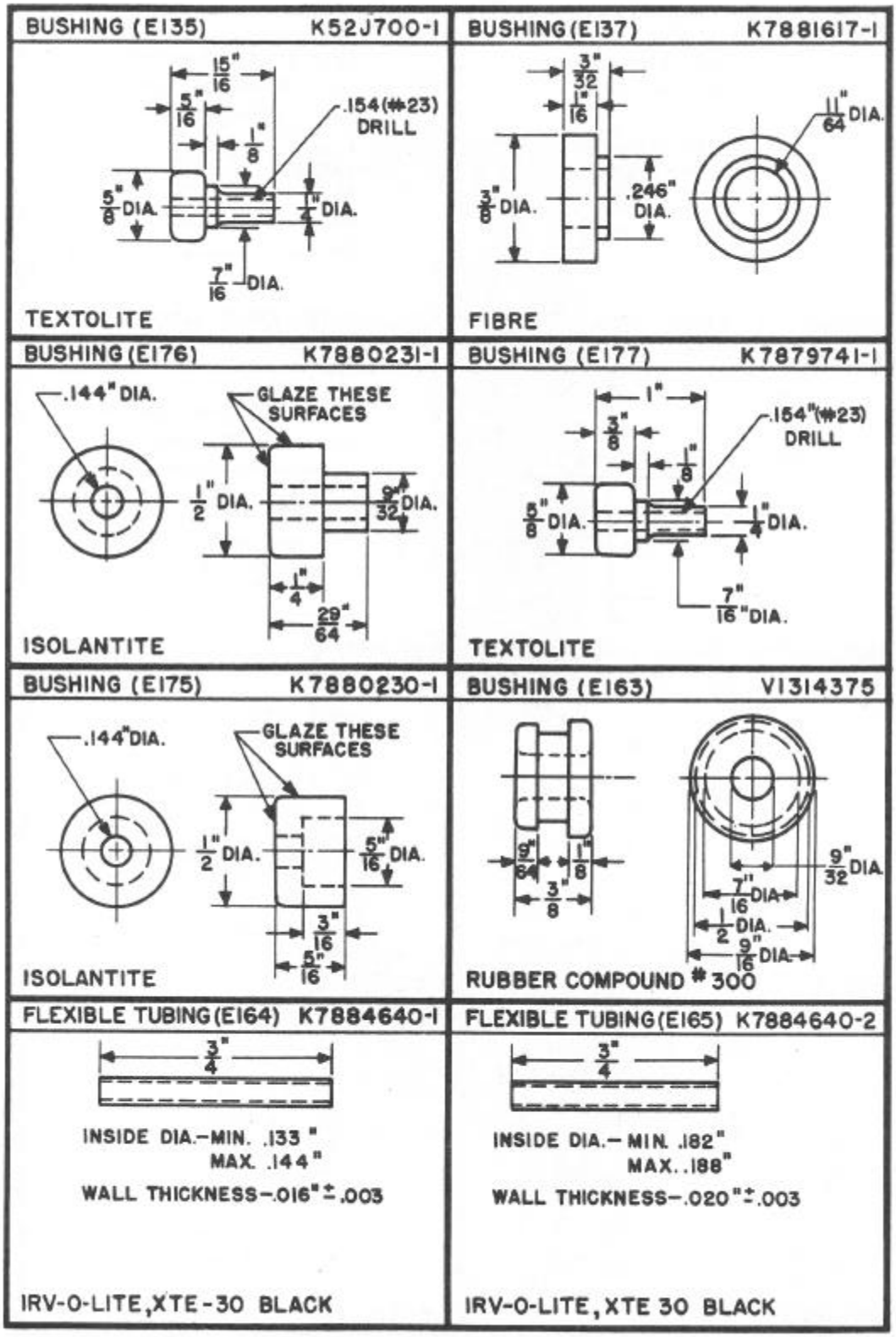
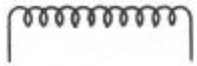
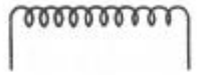
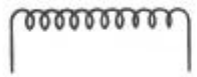
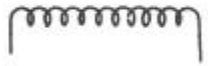
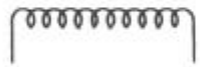
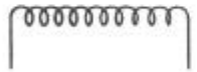


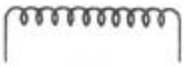
Figure 7-4f—Insulator Specifications

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
L101*	M48J562-G2		Single	.040″ Dia., Bare, Tinned Copper Wire (#8 AWG)	43½ Tapped at 17½ Turns	.163Ω	62 μh	—	Isolantite Form — 2¼″ Dia.
L102*	M48J559-G2		Single	.040″ Dia., Bare, Tinned Copper Wire (#18 AWG)	33 Tapped at 15 Turns	.163Ω	25.5 μh	—	Isolantite Form — 1¾″ Dia., 14 grooves per inch, 33 full turn
L103*	M48J560-G2		Single	.040″ Dia., Bare, Tinned Copper Wire (#18 AWG)	26 Tapped at 12 Turns	.065Ω	14.4 μh	—	Isolantite Form — 1½″ Dia.
L104*	M48J563-G2		Single	.040″ Dia., Bare, Tinned (#18 AWG)	23 Tapped at 11 Turns	.045Ω	6.6 μh	—	Isolantite Form — 1″ Dia.
L106 (TCK & TCK-1 only)	M7464676-G1		Single	.0253″ Bare, 0.283″ D.E. Copper Wire (#22 AWG)	39	.334Ω	36.25 μh	—	Isolantite Form — 1½″ Dia.
L107 (TCK & TCK-1 only)	M7464679		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	36	.153Ω	16.1 μh	—	Isolantite Form — 1″ Dia.
L108 (TCK & TCK-1 only)	M7464680		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	28	.134Ω	9.3 μh	—	Isolantite Form — 1″ Dia.
L109 (TCK & TCK-1 only)	M7464681		Single	.0253″ Bare, .2083″ D.E. Copper Wire (#22 AWG)	17	.080Ω	3.4 μh	—	Isolantite Form — 1″ Dia.
L110 (TCK, TCK-1, 3, 5, and TCK-7)	K52J579-1		Single	0.08″ Dia., Tinned Copper Wire (#12 AWG)	3	.002Ω	0.5 μh	—	3 turns, equally spaced, with terminals on either end.
L111 (TCK & TCK-1 only)	M7464676-G2		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	41	.265Ω	40 μh	—	Isolantite Form — 1½″ Dia.
L112 (TCK & TCK-1 only)	Same as L107	—	—	—	—	—	—	—	—

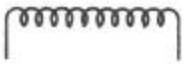
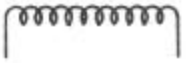
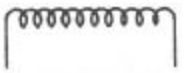
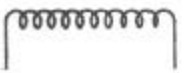
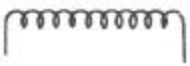
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
L113 (TCK & TCK-1 only)	M7464680-G2		Single	.0253" Bare, .0283" D.E. Copper Wire (#22 AWG)	29	.140Ω	9.85 μh	—	Isolantite Coil Form — 1" Dia.
L114 (TCK & TCK-1 only)	Same as L109	—	—	—	—	—	—	—	—
L115 (TCK & TCK1 only)	M7464682-G1		Single	.061" Dia., Tinned Copper Wire (#14 AWG)	13	.010Ω	2.0 μh	—	Isolantite Coil Form — 1" Dia.
L116 (TCK & TCK-1 only)	M7464684-G1		Single	.061" Dia., Tinned Copper Wire (#14 AWG)	6½	.010Ω	1.05 μh	—	Isolantite Coil — 1" Dia.
L118*	M48J307-G1		Universal Wound	.020" Bare, .028 D.O.C. (#24 AWG)	75	.053Ω	117 to 127 μh	—	4 crosses per turn on ½" dia. grooved Isolantite coil form, Pressure 3, gearing 115.60 Gain Set at 5, Cam 3/16".
L119*	M48J381-G1		Single	.081" Bare, Tinned Copper Wire (#12 AWG)	30 Tapped at 16⅛ Turns	.035Ω	27.8 μh	—	Isolantite Coil Form — 2½" Dia.
L120*	M48J385-G1		Single	3/16" O.D. x 1/32" wall x 10.58 lg. Copper Tubing	15 Tapped at 8 Turns	.010Ω	7.2 μh	—	Mounted between two 9 13/16" lg. x 1" wide boards.
L121*	M48J382-G1		Single	¼" O.D. x 1/32" wall x 4, 5⅜" long Copper Tubing	7 Tapped at 2⅛ Turns	.010Ω	2.2 μh	—	Mounted to one 9 13/16" lg. x 1" wide board.
L122*	M48J384-G1		Single	.081" Dia. Copper Wire (#12 AWG)	10	.020Ω	4.6 μh	—	Isolantite Coil Form — 1⅞" Dia.
L123*	M48J383-G1		Single	.081" Dia. Copper Wire (12 AWG)	5	.021Ω	1.6 μh	—	Isolantite Coil Form — 1⅞" dia.
L124*	M48J386-G1		Single	3/16" O.D. x 1/32" wall, Copper Tubing	4¾	.017Ω (for 5 turns)	1.0 μh (for 5 turns)	—	Coil Mounted on Isolantite Post, Leads brought out through end cover. Fish spine beads threaded on lead.
L125*	Same as L118	—	—	—	—	—	—	—	—

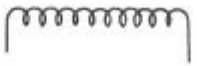
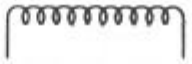
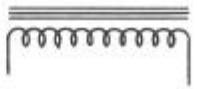
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
L126*	P42J93-G1		Single	.153″ Dia. Med. Hard Drawn Copper Wire, Silver Coated	22½ Rt. Hand, beginning at Start 1¼T at 3T per in. 20T at 4½T per in. 1¼T at 3T per in.	.010Ω	23.5 μh	—	Shaft Centralized in 3½″ dia. Isolantite Coil Form on Bracket Assem. with Contact Wheel Assem.
L127*	Same as L118	—	—	—	—	—	—	—	—
L128*	Same as L118	—	—	—	—	—	—	—	—
L129*	Same as L118	—	—	—	—	—	—	—	—
L130 (Used in TCK-2, 3, 4, 5, 6, 7)	M48J287-G2		Single	0.255″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	39	.334Ω	36.25 μh	—	Isolantite Coil Form—1½″ Dia.
L131 (Used in TCK-2, 3,4 4, 5, 6, 7)	M48J362-G2		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	36	.153Ω	16.1 μh	—	Isolantite Coil Form—1″ Dia.
L132 (Used in TCK-2, 3, 4, 5, 6, 7)	M48J363-G2		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	27	.130Ω	9.0 μh	—	Isolantite Coil Form—1″ Dia. (Coil form has 28 full turn grooves. Wind coil so that unused turn is at the end of coil.)
L133 (Used on TCK-2, 3, 4, 5, 6, 7)	M48J358-G3		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	17	.080Ω	3.4 μh	—	Isolantite Coil Form—1″ Dia. (Coil form has 18 full turn grooves. Wind coil so that unused turn is at the end of coil.)
L135 (Used on TCK-2, 3, 4, 5, 6, 7)	M48J359-G2		Single	.0253″ Bare, .0283″ D.E. Copper Wire (#22 AWG)	41	.265Ω	40 μh	—	Isolantite Coil Form—1″ Dia.
L136 (Used on TCK-2, 3, 4, 5, 6, 7)	Same as L131	—	—	—	—	—	—	—	—

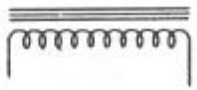
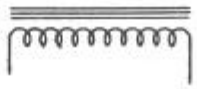
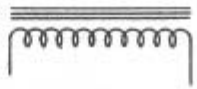
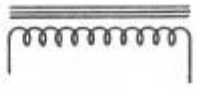
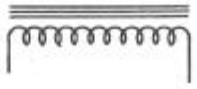
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
L137 (Used on TCK-2, 3, 4, 5, 6, 7)	M48J360-G2		Single	.0253" Bare, .0283" D.E. Copper Wire (#22 AWG)	29	.140Ω	9.85 μh	—	Isolantite Coil Form—1" Dia.
L138 (Used on TCK-2, 3, 4, 5, 6)	Same as L133	—	—	—	—	—	—	—	—
L138 (Used on TCK-7)	M48J358-G4		Single	.0253" Bare, .0283" D.E. Copper Wire (#22 AWG)	16	.070Ω	3.0 μh	—	Isolantite Coil Form—1" Dia. Coil Form has 18 full turn grooves. Wind coil so that there will be one unused groove at each end.
L139 (Used on TCK-2, 3, 4, 5, 6, 7)	M48J361-G2		Single	.061" Dia. Tinned Copper Wire (#14 AWG)	13	.010Ω	2.0 μh	—	Isolantite Coil Form—1" Dia.
L140 (Used on TCK-2, 3, 4, 5, 6, 7)	M48J355-G2		Single	.061" Dia. Tinned Copper Wire (#14 AWG)	6½	.010Ω	1.05 μh	—	Isolantite Coil Form—1" Dia.
L141 (TCK-4 & 6)	Same as L110	—	—	—	—	—	—	—	—
L142 (TCK-4 & 6)	K56J439-G1		Solenoid Space Wound	Tinned Copper Wire, 0.060" Dia. (#14 AWG)	6	.002Ω	0.2 μh	—	⅜" spiral — equally spaced.
L152*	M7466270		8 Layers	.0508" Dia. Copper E Wire (#16 AWG)	28 turns to layer; total 220	.61Ω	.075 hys. at 1 amp. d-c	Test voltage to ground 2500 v.	Insulated for .75 kv. circuit. Navy Type No. CG-30768.
L201*	M7466170-1		3/32" Cam, Universal Wound	22W9, QQ-W341, 12/44 AWG E.S. Copper Wire	181 turns per section, Two Sections, Total turns—362	.13Ω	2.1 mhy.	—	Variable Tuning—Must tune to 915 kc with 10 mmf, when mounted on a grounded metal plate with inside end of coil grounded.
L202*	Same as L201	—	—	—	—	—	—	—	—

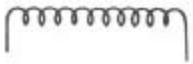
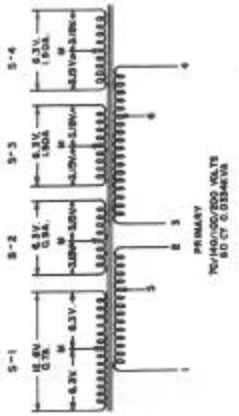
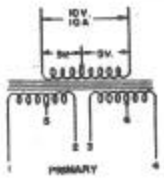
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
L203*	K7877090-1		Universal ¼" Cam	.0126" Dble. Silk Enameled Copper Wire (#28 AWG)	352	5.65Ω	2 mhy.	—	2 crosses per turn. Avoid excess use of glyptal.
L301 (TCK-4 & 6)	M7469131		24 layers	.0253" Copper E Wire (#22 AWG)	103 turns to layer; Total—2470	49.7Ω	15 hys. at .42 amp. d-c	Test voltage to ground—4500	—
L302 (TCK-4 & 6)	M7469132		21 layers	.0253" Copper E Wire (#22 AWG)	71 turns to layer; Total—1490	22.4Ω	5 hys. at .42 amp. d-c	Test voltage to ground—2000	—
L303 (TCK-4 & 6)	M7469133		26 layers	.0201" Copper E Wire (#24 AWG)	88 turns to layer; Total—2288	52.9Ω	10 hys. at .3 amps. d-c	Test voltage to ground—2000	—
L304 (TCK-4 & 6)	M7469134		17 layers	.0320" Copper E Wire (#20 AWG)	57 turns to layer; Total—969	10.2Ω	3 hys. at .5 amps. d-c	Test voltage to ground—1500 v.	—
L305 (TCK-4 & 6)	Same as L304	—	—	—	—	—	—	—	—
L306 (TCK-4 & 6)	Same as L304	—	—	—	—	—	—	—	—
L307 (TCK-4 & 6)	M7469135		9 layers	.0453" Copper E Wire (#17 AWG)	31 turns to layer; Total—279	.871Ω	0.1 hys. at 1.5 amps. d-c	1500 v. test voltage to ground	Coil must be thoroughly vacuum impregnated.
L308 (TCK-4 & 6)	Same as L307	—	—	—	—	—	—	—	—
L401 (TCK-4 & 6)	P42J93-G2		Single	.153" Dia. Med. Hard Drawn Copper Wire, Silver Coated	22½ Rt. Hand; Beginning at Start 1¼T at 3T per in.; 20T at 4½T per in.; 1¼T at 3T per in.	.010Ω	23.5 μh	—	Shaft centralized in Isolantite Coil Form—3½" Dia. Coil Form on Bracket Assem. with Contact Wheel Assem.

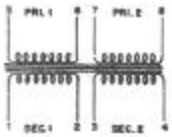
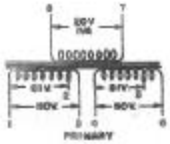
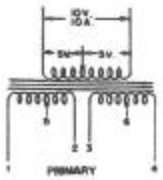
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
L402 (TCK-4 & 6)	P42J93-G3		Single	.153" Dia. Med. Hard Drawn Copper Wire, Silver Coated	22½ Left Hand; Beginning at Start 1¼T at 3T per in.; 20T at 4½T per in.; 1¼T at 3T per in.	.010Ω	23.5 μh	—	Shaft centralized in Isolantite Coil Form, 3½" Dia. Coil Form on Bracket Assem. with Contact Wheel Assem.
T101 (TCK-1, 2, 3, 5, 7)	M7465625-1		Primary (2 coils) 4 layers;	.0159" Copper E Wire (#26 AWG)	81T to layer, total 300; tap at 208T each coil	16.3Ω		2500	Rating— Primary: 60 cycles, 0.0334 KVA; 70/140/100/200 v. Secondary: 12.6/6.3-6.3/3.15-6.3/3.15 v., 55 deg. C ambient.
			Sec. #1, 1 layer;	.0253" Copper E Wire (#22 AWG)	Total 40T, tap at 20T	.486Ω	—	2500	
			Sec. #2, ½ layer;	.0285" Copper E Wire (#21 AWG)	20T, tap at 10T	.207Ω			
			Sec. #3, ½ layer;	.0359" Copper E Wire (#19 AWG)	20T, tap at 10T	.131Ω			
			Sec. #4, 1 layer	.0359" Copper E Wire (#19 AWG)	20T, tap at 10T	.138Ω			
T102 (TCK-1, 2, 3, 5, 7)	M7465624-1		Primary, 4 layers (2 coils)	.2085" Copper E Wire (#21 AWG)	50T to layer, Total 191, Tap at 134T	4.35Ω	—	1500	Rating— Primary: 60 cycles, 0.100 KVA; 70/140/100/200 v. Secondary: 10/5 volts, 55 deg. C, ambient
			Secondary 2 layers	.0680" Copper E Wire (2 wide) (#13 AWG)	10T to layer, Total 20, Tap at 10T	.0256Ω	—	3000	

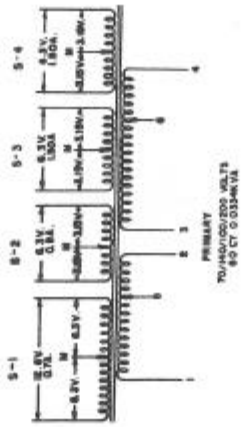
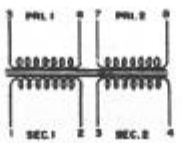
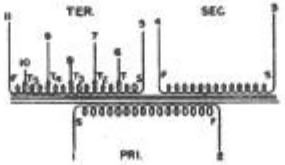
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
T103 (TCK-1, 2, 3, 5)	M7465100-1		Primary (5—6) (7—8)	.0359" Copper E Wire (#19 AWG)	224 224	5.25Ω Coils in Series	—	Primary 2500 v.	Rating— Primary: 50/60 cycles, 0.500 KVA; 200/440 volts. Secondary: 110/220 v.
			Secondary (1—2) (3—4)	.0508" Copper E Wire (#16 AWG)	116 116	1.125Ω Coils in Series	—	Secondary 2500 v.	
T106*	M7465622-1		Primary (2 coils) 13 layers;	.0031" Copper E Wire (#40 AWG)	155T to layer, Total 2000, tap at 1472T (each coil)	1132Ω	—	1, 4 at 1500 v. RMS with 7 grounded to can. 7 at 1000 v. RMS with 1, 4 grounded to can	Rating— Primary: 50/60 cycles, .001 KVA; 110/220 v. (tapped for 81/162) Secondary: 20 v.
			Secondary 5 layers	.0056" Copper E Wire (#35 AWG)	92T to layer, Total 455	47.8Ω	—		
T107 (TCK-4 & 6)	M7469138		Primary (A & B) (2 coils)	.0253" Copper E Wire (#22 AWG)	4 layers, 53T, total 172 tap at 119T	4.77Ω (Full wdg. series connected)	—	3000 v.	Rating— Primary: 50/60 cycles, .100 KVA; 70/140/100/200. Secondary: 10/5 v.
			Secondary	.115" x .070" D.C. Copper Wire (#19 AWG)	2 layers 9T, total 18, tap at 9T	.0234Ω			

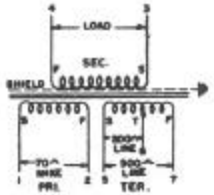
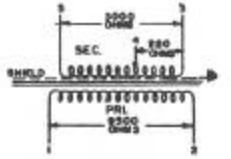
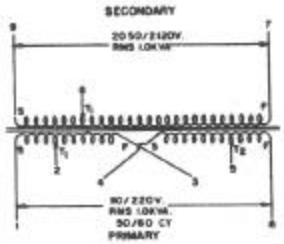
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
T108 (TCK-4 & 6)	M7469137		Primary (A & B)	.0142" Copper E Wire (#27 AWG)	4 layers, 76T, total 1239	16.5Ω total	—	2500 v. Primary	Rating— Primary: 50/60 cycles, .0334 KVA; 70/140/100/200. Secondary: 12.6/6.3 6.3/3.15 6.3/3.15 6.3/3.15
			S-1	.0253" Copper E Wire (#22 AWG)	32 (tap at 16T) 2 layers—8T	0.404Ω	—	2500 v. each Secondary Winding	
			S-2	.0285" Copper E Wire (#21 AWG)	16 (tap at 8T)	0.170Ω			
			S-3	.0359" Copper E Wire (#19 AWG)	16 (tap at 8T)	0.144Ω			
			S-4	.0359" Copper E Wire (#19 AWG)	16 (tap at 8T)	0.124Ω			
T109 (TCK-4 & 6)	M7469136		Primary (5—6)	.0508" Copper E Wire (#16 AWG)	L.V.—3½" layers, 35T—Total 116; H.B.—4½" layers, 25T—Total 112;	1.28Ω	—	Primary 2500 v.	Rating— Primary: 50/60 cycles, 0.5/KVA; 110/220 v. Secondary: 110/220 v.
			(7—8)	2 (.0359") Copper E Wire in parallel (#19 AWG)					
			Secondary (1—2)	.0508" Copper E Wire (#16 AWG)	L.V.—3½" layers, 35T—Total 116; H.V.—4½ layers, 25T—Total 112	1.07Ω	—	Secondary 1500 v.	
			(3—4)	2 (.0359") Copper E Wire in parallel (#19 AWG)					
T151*	M7465620-1		Primary 16 layers;	.005" Copper E Wire (#36 AWG)	132T to layer, total 2080;	360Ω	9.0 hys. at 20 v. minimum	(2—3)—600 v.	Rating—Input Transformer; Ratio $\frac{NP}{NS}$ = 2.50—200-300 cycles.
			Secondary .8 layers;	.005" Copper E Wire (#36 AWG)	132T to layer, total 832;	121Ω		(2—5)—600 v.	
			Tert. 1 layer.	.005" Copper E Wire (#36 AWG)	120 turns tapped at 53, 60, 68, 90, 105 turns	23Ω		(3—5)—2800 v.	

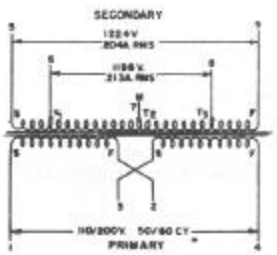
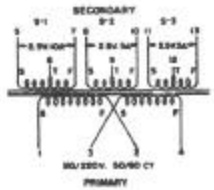
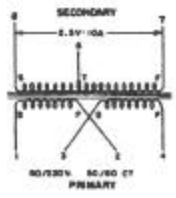
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

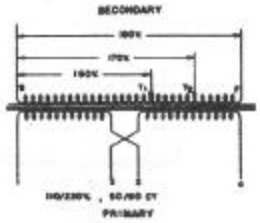
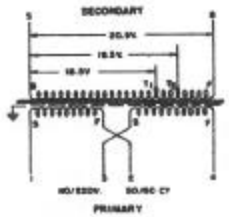
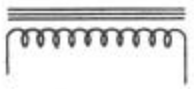
Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
T152*	M7465621-1		Primary 4 layers;	.0080" Copper E Wire (#32 AWG)	71T to layer, total 264;	11.17Ω	.13 hys. min., 100A.D.C. in pri. at 1.5 v., 60 cy.	(2—7)—1000	Rating: Class A Audio Input 70Ω microphone or 500/200 ohm line to Grid of RCA 807 tube. Turn Ratio $\frac{N_p}{N_s}$ = 1/15.
			Secondary 23 layers;	.0031" Copper E Wire (#40 AWG)	176T to layer, total 3960;	1357Ω		(2—6)—1000	
			Tert. 5 layers.	.0031" Copper E Wire (#40 AWG)	176T to layer, total 880.	347Ω		(3—7)—1000	$\frac{N_p}{N_s} = \frac{1}{3.33/2.11}$
T201*	M7465623-1		Primary, 10 layers;	.0031" Copper E Wire (#40 AWG)	144T to layer, total 1440;	345Ω	—	1000	Rating: Output Transformer; Turn Ratio $\frac{NP}{NS}$ = 6.60/1.77
			Sec. #1 3 layers;	.0063" Copper E Wire (#34 AWG)	74T to layer, total 218;	14.3Ω (st. to tap)	—	1000	50 to 5000 cycles. D.C. Current in Pri.— .005 amp.
			Sec. #2 6 layers.	.0040" Copper E Wire (#38 AWG)	113T to layer, total 596	105Ω (tap to fin.)	—	—	—
T301 (TCK-4 & 6)	M7469125		Pri. Ext.	.0403" Copper E Wire (#18 AWG)	2 layers, 85T, total 165;	.90Ω	—	—	Rating: Primary: 50/60 cycles, 110/220 v. RMS, 1.0 KVA. Secondary: 2050/2120 v. RMS under rated load of 1.0 KVA.
			Pri.	.120" x .065" Copper D.C.	4 layers 42T, total 165;	.188Ω	—	2500	
			Shield S-1	.005" x 6.0" .0285" Copper E Wire (#21 AWG)	1 turn 10 layers 164T, total 1635;	28.2Ω	—	5000	
			S-2	.0285" Copper E Wire (#21 AWG)	10 layers 164T, total 1635	28.2Ω	—	—	—

*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

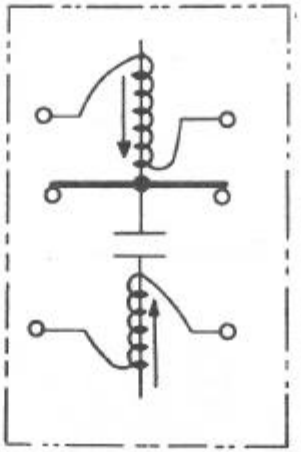
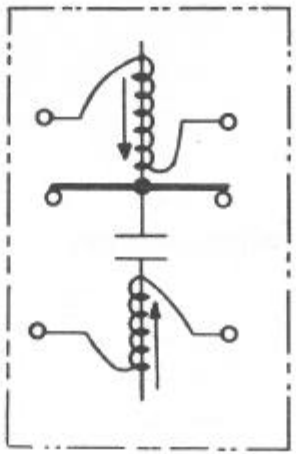
Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
T302 (TCK-4 & 6)	M7469126		Primary (2 coils)	.0359" Copper E Wire (#19 AWG)	3 layers 77T, total 231;	3.08Ω	—	2500	Rating: Primary: 50/60 cycles, 110/220 v. RMS, .18 KVA; Secondary: 612, 593, 593 612 v. RMS under rated load of 0.250 KVA.
			Secondary	.0159" Copper E Wire (#26 AWG)	18 layers 162T, total 2680, Tap #1 at 40T, Tap #2 at 1340T, Tap #3 at 2640T.	129Ω	—	3500	
T303 (TCK-4 & 6)	M7469127		Primary (2 coils)	.0179" Copper E Wire (#25 AWG)	2 x 247	11.17Ω total;	—	1500	Rating: Primary: 110/220 v., 50/60 cycles; Secondary: 2.5 v., 5 amp.; 2.5 v., 5 amp.; 2.5 v., 10 amp.
			Sec. #1	.120" x .065" D.C. (#14 AWG)	6T, tap at 3T	.00698Ω	—	5000	
			Sec. #2	.100" x .040" D.C. (#18 AWG)	6T, tap at 3T	.0151Ω	—	5000	
			Sec. #3	.100" x .040" D.C. (#18 AWG)	6T, tap at 3T	.0161Ω	—	5000	
T304 (TCK-4 & 6)	M7469128		Primary (2 coils)	.0126" Copper E Wire (#28 AWG)	2 x 707T	46.2Ω total	—	2500	Rating: Primary: 110/220 v., 50/60 cycles; Secondary: 2.5 v., 10 amp.; center tapped.
			Secondary	.095" x .095" D.C.	18T (Tap at 9 turns)	.0132Ω	—	5000	

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
T305 (TCK-4 & 6)	M7469129		Primary (2 coils)	.0201" Copper (#24 AWG)	2 x 375T	12.4Ω	—	1500	Rating: Primary: 50/60 cycles, 110/220 v., .075 KVA; Secondary: 160/170/180 v. RMS under rated load of .075 KVA.
			Secondary	.0226" Copper (#23 AWG)	652T, Tap 1 at 579T; Tap 2 at 615T.	10.72Ω	—	1500	
T306 (TCK-4 & 6)	M7469130		Primary (2 coils);	.0159" Copper E Wire (#26 AWG)	2 x 528T, 105T, Tap 1 at 95T,	24.7Ω	—	1500	Rating: Primary: 50/60 cycles, 110/220 v. RMS, .031 KVA; Secondary: 18.5, 19.5, 20.5 v. RMS under rated load of .031 KVA.
			Secondary	.0453" Copper E Wire (#17 AWG)	Tap 2 at 100T.	.393Ω	—	1500	
K101 (TCK-1, 2, 3, 4, 5, 6)	P7763201-2 Contactor Coil		Layer	.0113" Copper E Wire (#29 AWG)	1980	57Ω	—	—	110 v.—60 cycles—4 movable contacts, 8 stationary contacts.
K102*	P7761314-1 Keying Relay Coil		Random Layer	.0071" Dia. Copper Bare, (#33 AWG) .0079" Dia. Copper E Wire (#32 AWG)	5000	230Ω max.; 200Ω min.	—	—	—

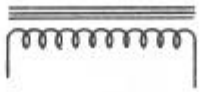
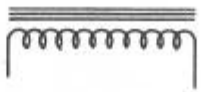
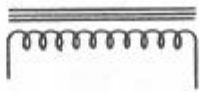
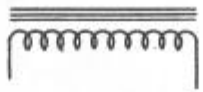
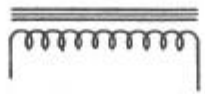
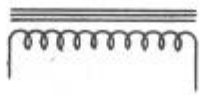
*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000—	Hi-Pot. A-C Volts	Remarks
K103*	P7763585-4 Reset Coil		Layer	.010" Copper E Wire (#30 AWG)	2440	57Ω	—	—	—
	Trip Coil		Layer	.0126" Copper E Wire (#28 AWG)	1550	22Ω	—	—	—
K104*	P7763585-3 Reset Coil		Layer	.010" Copper E Wire (#30 AWG)	2440	57Ω	—	—	—
	Trip Coil		Layer	.0113" Copper E Wire (#29 AWG)	2210	41Ω	—	—	—

*All TCK Equipment.

WINDING DATA ON COILS, RELAYS AND TRANSFORMERS—Continued

Symbol Designation	G.E. Dwg. Number	Diagram	Winding	Wire Size and Type	Turns	D-C Resistance at 20°	Inductance at 1000 ~	Hi-Pot. A-C Volts	Remarks
K105 (TCK-1, 2, 3, 4, 5, 6)	K7877805-1 Relay Coil		Layer	.0050" Copper E Wire (#36 AWG)	19,700	1300Ω	—	—	13 v. to 95 v., .010 amp. min.
K106 (TCK-1, 3, 5, 7)	P7763201-1 Contactor Coil		Layer	.0113" Copper E Wire (#29 AWG)	1980	57Ω	—	—	115 v. d-c—230 v. d-c.
K107 (TCK-1, 3, 5, 7)	Same as K105	—	—	—	—	—	—	—	—
K151*	M7465163-3		Layer	.008" Copper E Wire (#32 AWG)	10,500	300Ω	—	—	4.5 v. to 50 volts, .015 amp.
K301 (TCK-4 & 6)	P7765414-4		Layer	.0113" Copper E Wire (#29 AWG)	1470	43Ω	—	—	—
K302 (TCK-4 & 6)	P7765414-1		Layer	.0113" Copper E Wire (#29 AWG)	1470	43Ω	—	—	—
K303 (TCK-4 & 6)	P7765414-5		Layer	.0113" Copper E Wire (#29 AWG)	1470	43Ω	—	—	—
K304 (TCK-4 & 6)	Same as K303	—	—	—	—	—	—	—	—

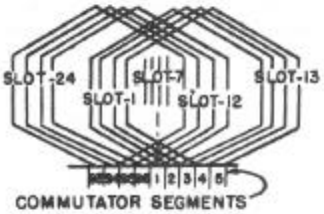
*All TCK Equipment.

6. WINDING DATA—Continued

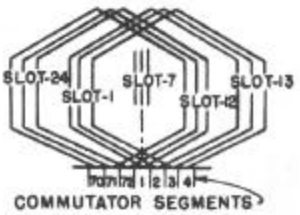
GENERATOR WINDING DATA ARMATURES

ARMATURE WINDINGS-H.V.GEN.			
	L.V. TOP	L.V. BOTTOM	HIGH VOLT
NO. OF SLOTS	24	24	24
NO. OF SINGLE COILS	72	72	96
NO. COMM. SEGMENTS	72	72	96
CONDUCTOR COPPER	.010"	.0201"	.010"
COND. INSULATION	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX
TURNS PER COIL	25	6	34
DEV. L'GTH. IN FT PER COIL	33	8	53
RES. AT 25°C. - OHMS	625	37	158
WT. OF COPPER - LBS.	715	.69	1.52
TREATMENT OF COMPLETED ARMATURE			
1. PREBAKE 1 HR. 150°C. 2. DIP IN 1678 (52V13 GR. CB) VARN. 4 MIN. 3. BAKE 5 HRS. 150°C. 4 PLUGE IN 1678 (52V13 GR. CB) VARN. 5 REPEAT NO. 3.			

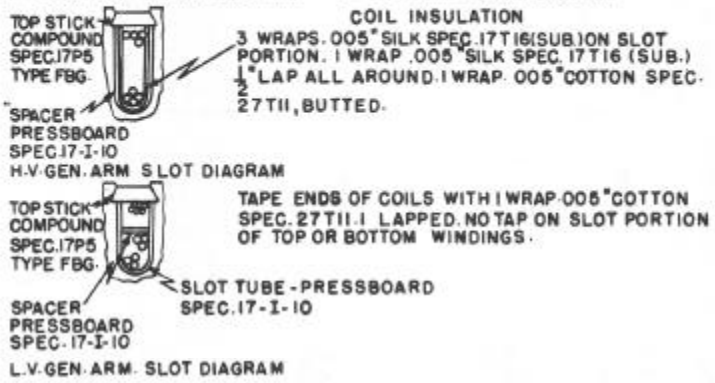
ARMATURE WINDINGS - 12V. GEN.	
NO. OF SLOTS	16
NO. OF SINGLE COILS	16
NO. OF COMM. SEGMENTS	16
CONDUCTOR COPPER	.032"
CONDUCTOR INSULATION	HFC
TURNS PER COIL	11
DEV. LGTH. IN FEET PER COIL	6.8
RES. AT 25°C - OHMS	.262
WT. OF COPPER - LBS.	.333
TREATMENT OF COMPETED ARMATURE	
1. PREHEAT 1 HR. AT 135°C. 2. DIP 30 MIN. IN NO. 612 C HARVEL VARNISH (52V13GR.CB). 3. BAKE 3 HRS. AT 135°C. 4. DIP IN NO. 612C HARVEL VARNISH (52V13GR.CB). 5. BAKE 8 TO 10 HRS. AT 135°C.	



H.V. GEN. ARM-WINDING DIAGRAM



L.V. GEN. ARM. WINDING DIAGRAM



FIELDS

FIELD WINDINGS											
	MAIN FIELDS						COMM. FIELDS			12V. GEN. FIELDS
	L.V. UPPER		L.V. LOWER		HIGH VOLTAGE		SPLIT COIL		H.V.	
	SERIES	SHUNT	SERIES	SHUNT	SERIES	SHUNT	L.V. 115 V	L.V. 500V	SERIES	SHUNT
CONDUCTOR	.0305"	.0159"	.0159"	.0159"	.0179"	.0179"	.0305"	.0159"	.0179"	.0179"
CONDUCTOR INSULATION	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	
CONDUCTORS IN MULTIPLE	1	1	1	1	1	1	1	1	1	1
TURNS PER COIL	1441	2020	672	2020	800	1600	151	825	1420	260
DEV. L'GTH. IN FT. PER COIL	192	2071	761	2071	738	2007	70	349	1165	180
RES. PER COIL AT 25°C OHMS	2.92	86.6	31.8	86.6	24.4	66.2	.795	14.6	38.5	5.9
WT. OF COPPER PER COIL - LBS	.542	2.01	.582	2.01	.715	1.95	.197	.267	1.13	0.180
MAIN & COMM. FIELD COIL TREATMENT										
1. PREBAKE 2 HRS. 150°C. 2. APPLY VACUUM AND FLOW IN 456 (52V13GR.BB) VARNISH. 3. VACUUM BAKE 2½ HRS. 135°C. 4. DIP COILS IN 1678 (52V13GR.CB) VARNISH. 5. BAKE 1½ HRS. 150°C. 6. REPEAT NO. 4. 7. REPEAT NO. 5.										

6. WINDING DATA—Continued

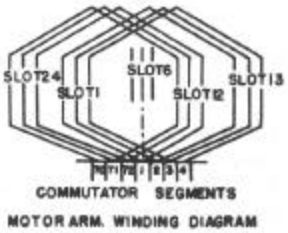
MOTOR WINDING DATA FOR MOTOR-GENERATOR SETS

TCK MOTOR-GENERATOR SETS

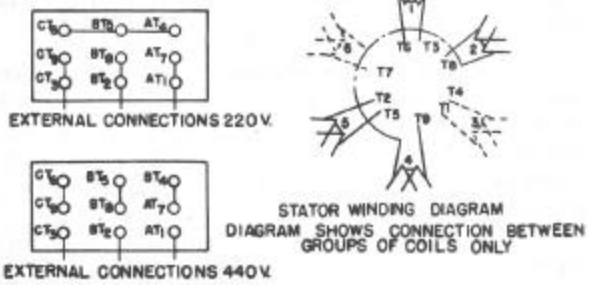
115 V.D.C. FIELD WINDINGS				230 V.D.C. FIELD WINDINGS		
	SHUNT	SERIES	COMM.	SHUNT	SERIES	COMM.
CONDUCTOR	.0143 .0155	2 (.076)	2 (.076)	.0113	.072	.076
CONDUCTOR INSULATION	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX	HEAVY FORMEX
CONDUCTORS IN MULTIPLE	1	1	1	1	1	1
TURNS PER COIL	1475 1605	2	69	3935	4	125
DEV. L'GTH IN FT. PER COIL	1737 1119	3	58	4978	6	102
RES. PER COIL AT 25°C-OHMS	2.0 2.64	.0027	.00526	411	.012	.186
WT. OF COPPER PER COIL-LBS.	1.098 .848	0102	2.01	1.93	.1	1.78
1. PREBAKE 2 HOURS 150°C. 2. APPLY VACUUM AND FLOW IN 458 (52VI3GR.B.B.) VARNISH. 3. VACUUM BAKE 2 1/2 HOURS 135°C. 4. DIP COILS IN 1678 (52VI3GR.CB) VARNISH. 5. BAKE 1 1/2 HOURS 150°C. 6. REPEAT NO. 4. 7. REPEAT NO. 5.						

	ARMATURE WINDINGS	
	115 V.D.C.	230 V.D.C.
NO. OF SLOTS	24	24
NO. OF SINGLE COILS	72	72
NO. OF COMM. SEGMENTS	72	72
CONDUCTOR COPPER	2 (.042)	.0453
CONDUCTOR INSULATION	HEAVY FORMEX COTTON	HEAVY FORMEX BONDED COTTON
TURNS PER COIL	3	5
DEV. L'GTH IN FT. PER COIL	4.5	7.5
RES. AT 25°C -OHMS	.237	.676
WT. OF COPPER-LBS.	3.37	3.24
1. PREBAKE 1 HOUR 150°C. 2. DIP IN 1678 (52VGR.CB) VARNISH 4 MINUTES. 3. BAKE 5 HOURS 150°C. 4. PLUNGE IN 1678 (52VGR-CB) VARNISH. REPEAT NO. 3.		

220/440 V. A.C. STATOR WINDINGS	
NO. OF POLES	2
TYPE OF CONNECTION	2 CIR.Y 220 V. 4 CIR.Y 440 V.
NO. OF SLOTS	24
NO. OF COILS	24
GROUPING OF COILS	GROUPS OF 4
WINDING PITCH IN SLOTS	1 TO 9
TURNS IN SERIES PER COIL	33
CONDUCTOR	.0285
CONDUCTOR INSULATION	FORMEX
RESISTANCE BETWEEN TERM.-OHMS	2.61 220 V. 11.6 440 V.
WT. OF COPPER-LBS.	3.12
1. DIP COLD STATOR IN 9535 (52VI3GR.CB) VARNISH. 2. BAKE 8 HOURS 150°C. 3. REPEAT NO. 1 4. REPEAT NO. 2. 5. SPRAY END WINDINGS WITH 1201 (17)16TY.G.1SUB) VARNISH 6. BAKE 1 HOUR 150°C.	



MOTOR ARM. WINDING DIAGRAM



STATOR WINDING DIAGRAM
DIAGRAM SHOWS CONNECTION BETWEEN GROUPS OF COILS ONLY

WINDING DATA FOR BLOWER MOTOR B102

ARMATURE WINDING DATA	
NUMBER OF SLOTS	11
NUMBER OF SEGMENTS	22
NUMBER OF COILS	22
CONDUCTOR DIAMETER	.005"
CONDUCTOR INSULATION	DOUBLE SILK
TURNS PER COIL	85
NUMBER OF COILS PER SLOT	2
WEIGHT OF CONDUCTOR	.077 LBS.

FIELD WINDING DATA	
TYPE	PD
CONDUCTOR DIAMETER	.010"
CONDUCTOR INSULATION	ENAMEL
TURNS PER COIL	915
RESISTANCE PER COIL—OHMS	109.2 ± 8.2
WEIGHT OF CONDUCTOR PER COIL	.32 LBS.

7. MECHANICAL ADJUSTMENT AND REPLACEMENT OF COMPONENTS.

WARNING

Operation of this equipment involves the use of high voltages. Operating personnel must at all times observe all safety regulations. Always disconnect equipment from power supply before attempting service.

a. General.—Because of the high frequencies and amplifications used in the Transmitter, replacement of defective components must be made with care. Use only recommended parts, as substitutes may prove unsatisfactory. The physical dress of parts and wiring was carefully considered in the original design and must be duplicated as closely as possible; for example, the exact point of grounding a capacitor, as well as its lead length, must be maintained. If it should be necessary to replace any of the coils or tuning capacitors, the tuned frequencies will be changed sufficiently to require electrical re-alignment of the circuit affected.

If service work requires soldering or unsoldering of leads, use only a rosin core solder. The use of acid or acid core solder will cause destructive corrosion and severe losses in the r-f circuits. When it is necessary to solder tube socket terminals, the tube should be removed to preclude the possibility of soldering the tube prong to the socket terminal. To insure good soldering without applying excessive heat, use a hot iron, well tinned, and tin the lead to be connected before attaching it to the terminal. A very short application of the soldering iron will then allow good fusing of the solder. Leads should be crimped before soldering in order to make a strong mechanical connection which does not rely on solder for its strength.

b. Uni-Control Condenser Gang.—The several tuning capacitors of the uni-control mechanism must be so aligned that all are in the minimum capacity position when Band #6 is tuned to 18,436.4 kc. Taped to one of the frame numbers of each capacitor is a feeler gage for use in this adjustment.

(1) With the power off, tune the FREQUENCY control to exactly 18,436.4 kc on BAND #6, and lock in this position.

(2) Remove the back and right side shields from the transmitter and the back from the M.O. compartment.

(3) Determin which, if any, of the capacitors must be adjusted. The uppermost is the P.A. capacitor, the two below it is the I.P.A. and work circuit capacitors and below these is the M.O. capacitor inside of the M.O. chamber. If this line-up is being made after a periodic removal of the M.O. chamber, only the M.O. tuning capacitor should need aligning and steps (4) through (8) may be omitted.

(4) If a large adjustment is necessary, loosen one of the set screws in the ceramic coupling between the front panel FREQUENCY control knob and the worm gear drive for the capacitors. The set screw should be loosened just enough to allow turning of the capacitor rotors by hand.

(5) With the FREQUENCY locked at 18,436.4 kc, adjust the I.P.A. circuit capacitor. Using the gage (a small flat piece of metal attached to the capacitor frame with a piece of tape) turn the capacitor rotor to the minimum capacity position. The exact position will be reached when the edges of the capacitor stator plates are against one side of the gage and the edges of the rotor plates are turned until they just touch the other side of the gage. Tighten the set screw in the ceramic coupling to hold this adjustment. If only a small adjustment is required, use the adjustable arm as described in steps (7) and (8).

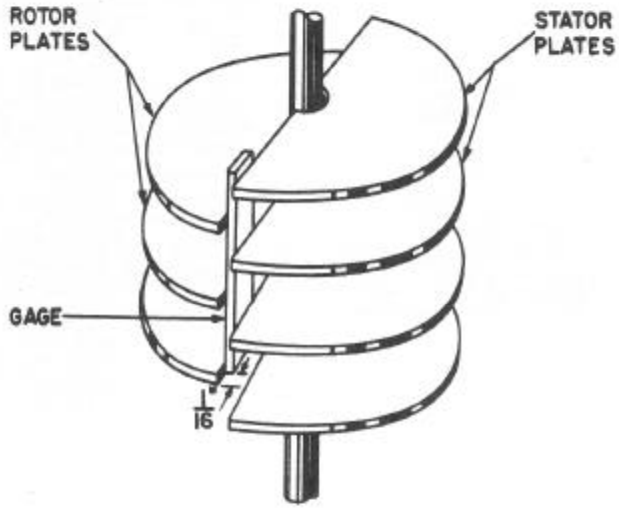


Figure 7-5—Positioning of Tuning Capacitors

(6) The capacitor shafts have positioning holes in them to receive the set screws from the couplings. If at any time the positioning holes become too large for the cone-point Allen screws, cup-point Allen screws will fit firmly. Check the couplings between the P.A. and the I.P.A. circuit capacitors to be sure the set screws are in the holes.

(7) Just below the ceramic part of the coupling to the P.A. capacitor is an adjustable arm. In this arm are four set screws, two for clamping to the shaft and two for adjusting the arm position relative to the coupling. Loosen the two adjusting screws at the ends of this arm about one turn each.

(8) Check the setting of the FREQUENCY indicator to be certain it is still locked at 18,436.4 kc and then position the P.A. capacitor by hand to the minimum capacity position. Use the gage attached to the P.A. capacitor frame for locating the minimum point in the same manner as was used for the I.P.A. capacitor. Tighten the adjusting screws on the adjustable arm,

being careful not to change the position of the P.A. capacitor rotor in the process. If, after tightening the screws, the rotor is not quite in the exact minimum position it can be moved by backing off the screw at one end of the arm and tightening the screw at the other end.

(9) Check the couplings between the I.P.A. and M.O. capacitors for proper centering (as in step (6) on the preceding page).

(10) Just below the brass anti-back lash gear is an adjustable arm similar to that described in step (7). Loosen the two adjusting screws at the ends of the arm about one turn each.

(11) Check the setting of the FREQUENCY indicator on the front panel to be certain it is still locked on 18,436.4 kc. Using the gage attached to its frame, adjust the M.O. capacitor rotor to the minimum capacity position in the manner described in step (5). Tighten the adjusting screws in the adjustable arm without changing the M.O. capacitor rotor position. If the rotor is not quite at the minimum position after the screws are tightened, it may be moved by backing off one of the adjusting screws and tightening the other until the proper position is reached.

(12) Recheck the setting of each capacitor by unlocking the FREQUENCY control and tuning from 18,400 to 18,436.4 kc. The rotor plates of each capacitor should touch the gage against the stator plates at 18,346.4 and not before. Correct the alignment if necessary. Fasten the gages to the frames from which they were removed so that they will be available when they are needed again. Use tape or string but do not use wire to secure them.

c. Master Oscillator Compartment Removal.

(1) Remove all power from the transmitter.

(2) Open the central front access door and remove m-o tube V101.

(3) Disconnect all leads from terminal boards TB3 and TB4 and tag them for proper replacement.

(4) Disconnect the sleeve coupling between tuning capacitor C102 and the worm gear drive from the unicontrol mechanism. This can be done by the use of a No. 8 Bristol wrench.

(5) Turn "BAND CHANGE" switch "B" to position "1".

(6) Remove the four bolts, located on the aluminum angle at the right top side of the m-o box, which clamp the m-o box to the frame.

(7) Remove the five bolts holding the bottom of the m-o box to the frame members below it.

(8) Remove the three screws and drive out the three taper pins along the back edge of the m-o box which pin the mounting plate to the frame.

(9) Draw the m-o box out from the rear of the transmitter.

(10) The top and back of the box must be removed to work on the components. If it is necessary to remove the coils from inside the box, the ceramic coupling to the switch assembly must be disconnected by removing the set screws and taper pin from the coupling and the four bolts holding the coil casting to the box. Disconnect the wires to capacitors C109 and C102, and slide out the casting with the coils attached.

(11) Before replacing the m-o box, be sure all connections have been made properly and all parts reassembled. Also be sure all parts of the band change switch are located in position 1.

(12) Replace the top of the m-o box.

(13) Slide the box back into the transmitter frame and pin it in place with the taper pins across the rear of the shelf.

(14) Replace the five bolts holding the bottom of the m-o box to the frame.

(15) Replace the four bolts removed from the allminum angle on the right top side of the m-o box, clamping the box to the frame.

d. C.F.I. Unit Chassis Removal.

(1) Remove all power from the transmitter.

(2) Remove the left side transmitter shield to expose the C-F-I Unit.

(3) Disconnect all leads from TB-9, P13 and P14 and tag for proper replacement.

(4) Remove the two rear bolts, located under TB-7, from the bottom of the C-F-I chassis.

(5) Remove the four bolts holding the C-F-I front panel to the frame.

(6) The C-F-I unit may be pulled out from the front of the transmitter.

e. Modulator Unit Chassis Removal.

(1) Remove all power from the transmitter.

(2) Open the lower front panel door and remove the two transmitter side shields.

(3) Disconnect all leads from terminal boards TB-9, TB-10, TB-11, TB-12, and P16.

(4) Remove the six bolts holding the chassis to the transmitter frame, three bolts at each end of the chassis.

(5) The modulator may be pulled out through the front panel door.

***f.* Wafer Switch Replacement**—Each contact of the rotary-type switches may be replaced separately, although it will usually be easier to replace an entire switch. The contacts are each held in place by a small bolt through the contact and ceramic wafer. On the underside of the wafer a nut has been locked on the bolt with solder.

If it is desired to remove one of the switches as a unit, all of the connections to it should be removed first. Unsolder these connections, do not cut them, and when replacing the switch try not to change the length or position of the leads.

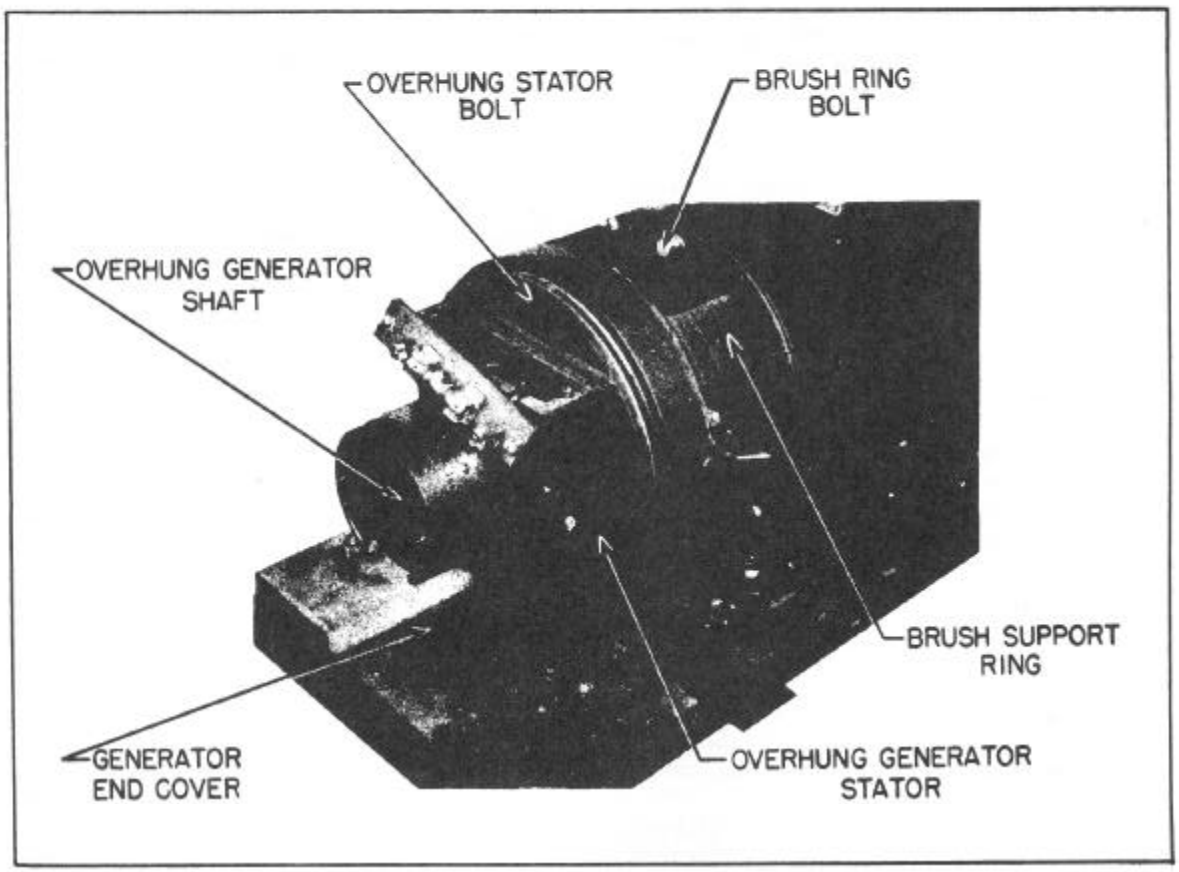


Figure 7-6—Generator End of M-G Set

Each switch assembly is held to its mounting by three screws in a metal plate at one end of the assembly. (The screws are under the nameplates of the switches mounted on the front panel.) The switch wafers are held to the plate by three bolts. As soon as the bolts are removed, the wafer assembly may be removed.

g. Motor-Generator Set.—(*See figures 7-6 and* 7-7.)

(1) Cleaning and regreasing the motor-generator bearings will require that the armatures be removed. This involves an almost complete disassembly of the unit and should be performed with extreme care to avoid damage to the commutators and windings. If possible the mounting bolts should be removed and the set pulled out in the open, away from bulkheads, to where all sides of it are accessible.

(2) Open the numerous hand holes along the frame and remove all of the brushes. When removing brushes, mark each one at the end near the pigtail in such a way that when replaced it may be returned to the same brush holder and in the same position. Brushes should never be moved from one holder to another or turned over. The brush holders for the middle commutator (115 volts and the brush holders next to the fan housing (500 volts) must be loosened on the ceramic studs and swung away from the commutator to allow removal of the armature. Loosen the brush holder sufficiently to avoid chipping the ceramic.

(3) Remove the two nuts holding the end cover at the 12 volt generator end, and the four bolts holding the cover on the motor end. Remove both covers to expose the ends of armature.

(4) Remove the 12-volt generator armature. This overhung armature is on a removable shaft section which is threaded into the main shaft. At the overhung end the shaft is flat on two sides to provide a grip for a wrench. Hold the motor armature stationary (hold it by hand, do not wedge it to prevent turning) and unscrew the overhung generator armature. The generator shaft has a left-hand thread and must be unscrewed in a clockwise direction. To get it started, use a sudden motion such as a quick jerk or gentle tap on the wrench with a mallet.

(5) If the motor is d-c (with a commutator and slip rings), perform steps (6) and (7). If the motor is a a-c (no windings or commutator on the motor rotor) perform steps (6a) and (7a).

(6) D-C Motors; remove the bolt from the motor end of the shaft and replace it with the jack screw supplied with the equipment. The motor shaft is actually

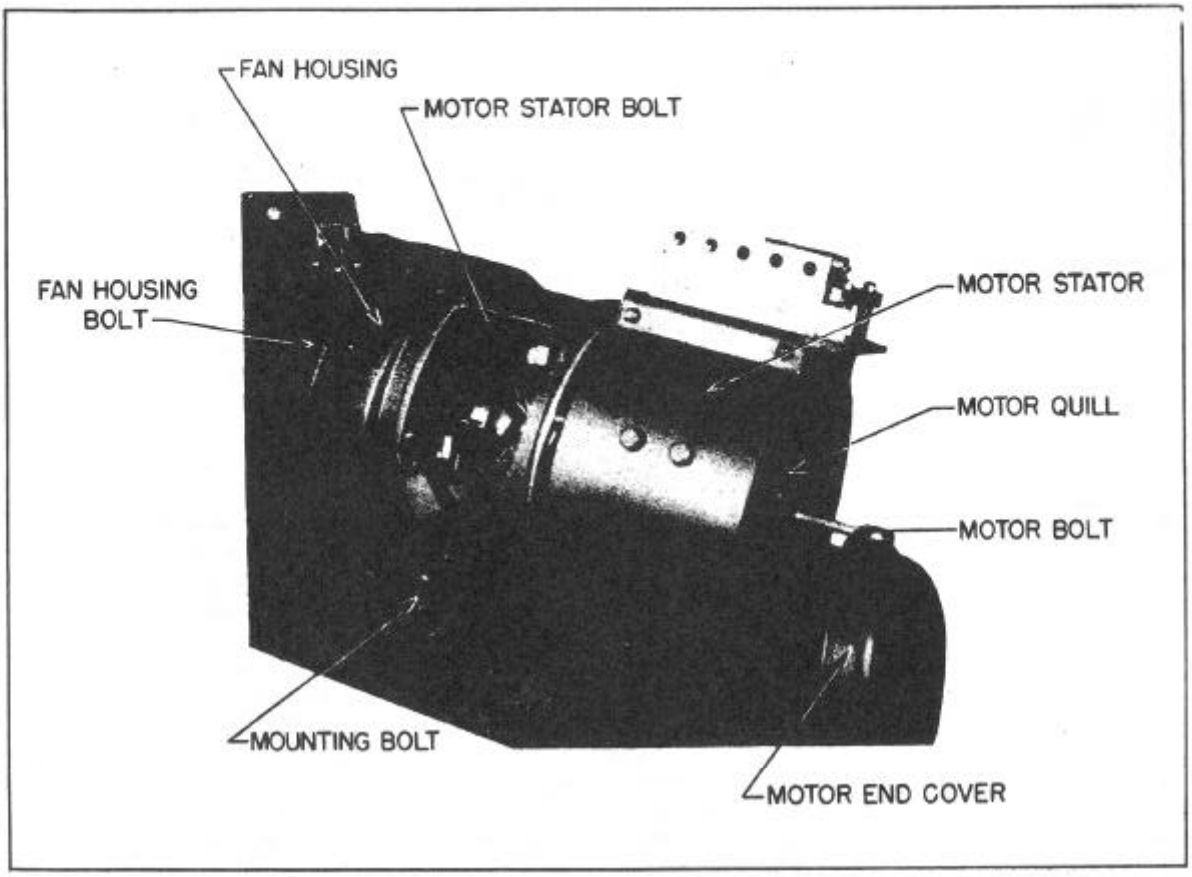
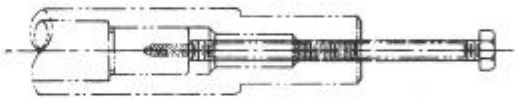
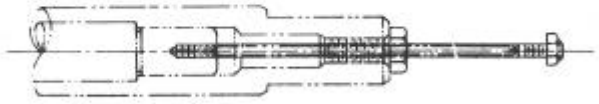


Figure 7-7—Motor End of M-G Set

a quill keyed to the main shaft. Tightening the jack screw will pull the quill loose from the shaft and allow it to be drawn out of the end of the stator.



JACK SCREW USED TO REMOVE D-C MOTOR ARMATURE FROM GENERATOR ARMATURE



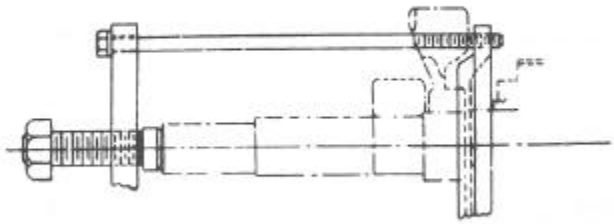
ASSEMBLY USED TO JACK D-C MOTOR ARMATURE ON GENERATOR ARMATURE

Figure 7-8—D.C. Motor Armature Jack Screws

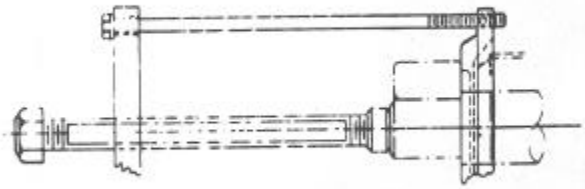
(7) In some cases it may be desirable to remove just the motor stator. This requires the removal of all connections to the brush holders and of the four motor stator bolts.

It is generally more convenient to remove the stator and fan housing together without breaking connections. To do this remove the four nuts on the fan housing bolts, and the two bolts through the motor mounting feet and into the deck. Place a support under the low voltage generator stator and pull the fan housing and motor stator toward the motor end of the shaft. The bearing seat is in the fan housing and as the housing is removed the armature will tend to come with it, therefore push the shaft toward the generator end and at the same time prevent the armature from dropping as the housing is withdrawn.

(6a) A-C Motors; remove the nuts from the four fan housing bolts at the generator end of the housing. These bolts free the motor stator and it may be pulled off. Then remove the bolt from the end of the motor armature and, using the bearing puller, remove the motor rotor. This rotor has been pressed on the shaft and keyed in place.



PULLER USED TO REMOVE FAN-BEARING



PULLER USED TO REMOVE GENERATOR ARMATURE BEARING

Figure 7-9—Bearing Pullers

(7a) Remove the two bolts through the mounting feet and into the deck to free the fan housing. Place a support under the low voltage generator stator and pull the fan housing toward the motor end of the shaft. The bearing seat is in the fan housing and as the housing is removed the armature will tend to come with it, therefore push the shaft toward the generator end and at the same time prevent the armature from dropping as the housing is removed.

(8) Very carefully withdraw the generator armatures from the motor end of the stators. Use extreme caution to prevent the commutators from touching the stators in the process because even a slight blow will permanently damage the soft copper.

(9) Locate and clean all washers, both in the bearing seats and on the shaft and make sure they will be returned to the same end from which they were removed. It is very important that the original washers or washers of equal thickness and spring pressure be used at each end.

(10) With the bearing pullers supplied with the equipment, remove both the motor and generator end bearings. On the motor end it will be necessary to pull the bearing and fan simultaneously.

(11) Remove the grease seals from the bearing races and thoroughly wash both parts with clean naphtha. After washing, dry the bearings thoroughly, using a stream of compressed air if available. Test the reassembled races for any rough spots by holding the outer race with one hand and turning the inner race with the other hand. Apply pressure while turning in such a way that the bearings are pinched between the races. If there seems to be a rough spot, compare the feel to that of new bearings and if the old ones feel rough in comparison, replace them.

(12) Disassembly of the generator stators may be completed by removing the overhung generator stator and the high voltage brush mounting ring. Four nuts around the periphery of the overhung stator hold it to the brush ring and four bolts in the brush ring hand holes hold the brush ring to the high voltage generator.

(13) When replacing the bearings on the shaft never apply pressure on the outer ring. If the bearings are heated for one hour in an oven at about 240 degrees Fahrenheit they will slide on the shaft without forcing.

CAUTION

BALL BEARINGS SHOULD NEVER BE DRIVEN ON A SHAFT.

(14) Reassemble the unit in the exact reverse order from that by which it was taken apart. Before inserting the generator armatures, replace the end washers in the bearing seats with just sufficient grease to "wet" the surface. All parts should fit together without using a hammer. Above all, do not use a hammer to seat the bearings in the end shields; if the bearings are not "cocked" on the shaft, they will slip into place easily.

(15) D-C Motors; replace the Motor quill (and key) on the shaft by using the double jack screw supplied with the equipment. Push the inner bolt of the jack screw through the end of the motor shaft and screw it into the end of the main shaft. Tighten the outer screw until it has pushed the quill all of the way onto the main shaft, then remove the jack screws and replace with the original motor bolt.

(15a) A-C Motors; replace the motor rotor (and key) on the shaft using the end bolt and washers to press it on tightly. Simply screw the bolt into the end of the shaft until the rotor is firmly wedged onto the shaft.

***h.* Blower Motor.**—Disassembly of the blower motor for repairs and regular greasing will entail the removal of the m-o compartment. This makes the job rather lengthy but it cannot be avoided because if periodic greasing is neglected the motor will fail and the m-o will become inaccurate.

(1) emove the m-o compartment as described in paragraph 7*c*. in this section steps (1) to (9). Remove the top of the box to gain access to the fan.

(2) Loosen the set screws holding the fan on the motor shaft and remove the screws holding the motor mounting.

(3) Disconnect the motor connections from terminal board TB-15 and remove the motor and shock mounting from the m-o chassis.

(4) Remove the two screws at each end of the motor which hold it to the shock mount and lift the motor free.

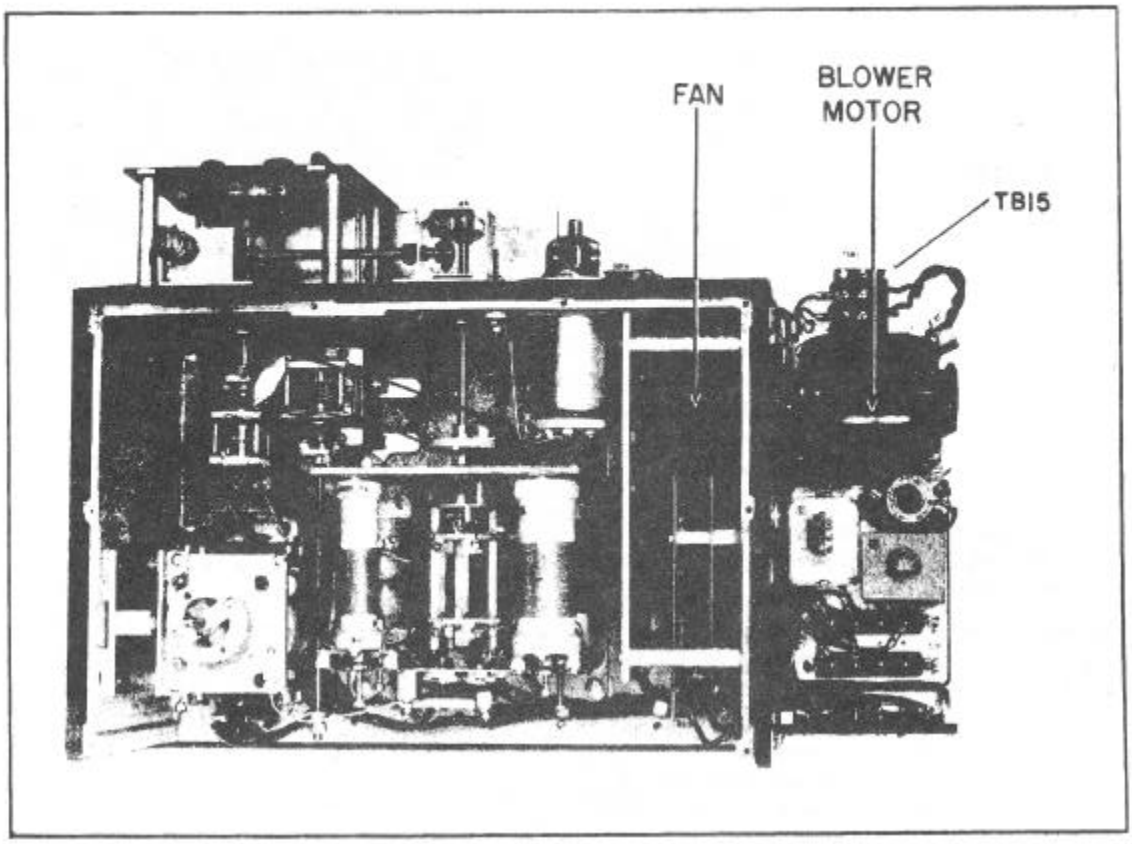


Figure 7-10—Blower Motor and Fan

(5) The motor may be either a-c (B101) or d-c (B102). If it is a d-c motor, remove the brushes before disassembling.

Remove the two bolts extending through the motor and pull off the end bells. The bearings should remain on the armature shaft.

(6) Pull the bearings off of the shaft by hand, if possible, and wash them in naphtha. Dry thoroughly in compressed air blast, or allow sufficient time to air dry. Test for worn bearings by holding the outer race with one hand and turning the inner race with the other hand. Apply pressure while turning in such a way that the bearings are pinched between the races. If there seems to be a rough spot, compare the feel to that of new bearings and if the old ones feel rough in comparison replace them. Pack bearings two-thirds full of Navy Spec. 14L3 grease and reassamble motor, making sure that the grease shield on each bearing faces to the outside of the motor.

***i.* Copper-Oxide Rectifier (CR101—Used on All A-C Models).** —Copper-oxide type rectifier unit characteristics will change considerably with time so as to supply a lower rectified voltage. After a considerable length of time, the aging effects may be so pronounced that the d-c voltage output may not be sufficient to operate the temperature control relay (K105). A simple test to determine the efficiency of the rectifier may be made as follows:

(1) With just the m-o power switch on front panel of the transmitter closed, the m-o indicator light should glow. To test the operation of the rectifier, short circuit the terminals of thermostat S108. If the m-o indicator light goes out, the rectifier is operating properly.

(2) If light does not go out, measure d-c voltage across terminals of thermostat (S-108). If voltage is lower than about 8 volts, Rectifier Unit (CR101) should be replaced. If no voltage is present, check the following:

(a) Relay coil for continuity.

(b) Transformer (T106) secondary a-c voltage.

If tests (a) and (b) above are positive and wiring is OK, Rectifier Unit (CR101) should be replaced. When replacing unit, care should be taken to replace leads to the new unit exactly as they were removed from the original unit. The units should always be mounted with the bolt or stud axis in the horizontal position.

***j.* M-O Thermostat.** — To check operation of Thermostat (S108) preceed as follows:

(1) Turn on m-o heater switch and allow the m-o compartment temperature to reach approximately 60°C. This will require about 30 minutes. When the tem-

perature reaches 60°C, the heaters should go off. This is indicated by the M-O Heater Indicator light going off.

(2) If Indicator light does not go off by the time the temperature in the m-o compartment reaches 61°C, short-circuit the terminals of S108 by means of a short lead. If Indicator light now goes off, the Thermostat (S108) is defective and should be replaced. Sometimes the mercury column in this thermostat becomes separated. Provided the unit is not broken, it is possible to restore proper operation by joining the mercury columns. This may be accomplished in one or two ways:

(a) Apply heat cautiously and slowly to the bulb of the thermostat until the column is forced into the upper end of the glass tube. Use only enough heat to drive column up to the upper end of the tube, otherwise the expansion will break the glass tube. A temperature of approximately 100° C is usually sufficient to join the columns.

(b) Apply cold by means of a brine solution of ice, dry ice, or electric refrigerator until the mercury is drawn into the lower bulb.

***k.* Dial Counters and Drums.**

Instructions of the mechanical alignment of the dial counters and drums is the following:

(1) With transmitter set on band one, turn dial mechanism to read 2000 kc on band one. Band two should read 3000 kc, band three should read 4500 kc, band four should read 6000 kc, band 5 should read 9000 kc, and band 6 should read 12,000 kc.

(2) Errors in adjustment of dial drums may be corrected by changing the spacing of the counter mechanism connected to the drum. This is accomplished by slight adjustment of the bristol headset screws holding mechanism to back of dial mechanism panel. There are four screws on the top of each counter mechanism and four on the bottom. Two of these screws hold the counter mechanism to the panel and the other two screws are for spacing the mechanism. Adjustment of the spacing screws and holding screws will rotate the counter slightly to correct for minor errors in calibration.

(3) Wide errors in calibration indicates that these adjustment screws have become loose and the gear meshed with the drive shaft has slipped. This can be corrected by rotating the drum in error until approximately the correct frequency is read on the dial and final calibration made as noted in paragraph two above.

(4) It should be noted that errors of one-half division in the higher frequency counters when the counter mechanism is set up as suggested in paragraph one is of very little consequence as final calibration of the transmitter is made by adjusting the M-O Reset capacitor C103 when the dial is set on the end points of any band or at any 100 kc calibration point on the band.

***l.* Keying Relay.** —The keying relay incorporated in the radio transmitter has been adjusted at the factory and should not require adjustment under ordinary conditions. In case of faulty operation, the relay should be adjusted according to the following instructions:

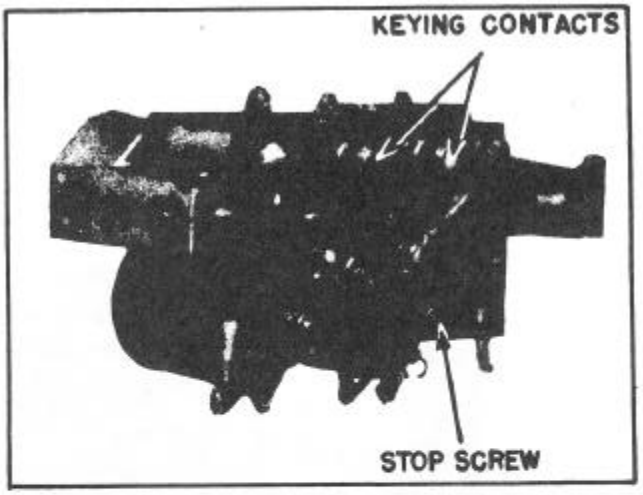


Figure 7-11—Keying Relay

In general, it is desirable to maintain the adjustment of the keying relay contacts as closely as possible as this insures the greatest possible quenching of the small arc which is formed upon opening the keying circuit. Care should be taken, however, that the contacts are not adjusted so closely that the arc holds or persists when the key is open.

The stop screw should be adjusted so that the spacing between stop screw and armature (with armature held firmly against pole shoes) should be .020" ± .002".

The contacts of the keying relay K102 should be kept properly aligned. The keying contacts (top of relay) are factory adjusted to a spacing of .015" ± .002" when the relay is de-energized (armature against stop screw). The lower contact is spaced .020" ± .002" with the armature rotated to rest solidly against the pole shoes. If necessary, readjustment may be made to the specified spacings provided extreme care is exercised. The contact tips may be resurfaced with fine emery cloth or a Swiss file (No. 2 or finer). The amount of material removed in resurfacing should be kept to a minimum, and the tips should be flat and smooth. Re-glyptal any places where adjustment has broken the Glyptal staking.

8. ELECTRICAL ADJUSTMENTS.

***a.* General.** —Correct line-up of the tuning circuits is essential to the direct calibration of the Uni-control system. The counters which form the frequency indicators have linear scales and to coincide with these scales the circuit tuning must also be linear. Because of the special design of the tuning capacitor plates this will be the case when, and only when, the circuits are properly adjusted.

Two variables appear in all of the tuned circuits; they are the capacity and the inductance. The inductance in each case is a slug-tuned coil and the capacity is one or more trimmers in addition to the main variable tuning capacitor.

In each circuit the principle of the adjustment is the same. First, the tuning capacity is set at maximum and the coil is tuned to resonance at the frequency of the lower limit of the band. Then the tuning capacity is set at minimum and the additional capacitors or trimmers are used to tune the circuit to resonance at the frequency of the high end of the band. Changing the minimum circuit capacity during this adjustment will produce a slight change in the maximum capacity, making it necessary to recheck the low frequency end of the band and readjust the coil. Each repeated adjustment, first at one end of the band and then the other, will bring points on the tuning curve a little closer to exact coincidence with the tuning dial scale readings.

All of the variable circuit elements are aligned and locked in place at the factory. If good quality vacuum tubes are used and the internal wiring of the transmitter is not altered, it should not be necessary to change the alignment. The following procedure is included for use in emergencies when for some reason the equipment alignment has been disturbed; for instance, if a defective part has been replaced.

CAUTION

Do not tamper with the inductance line-up adjustment until absolutely certain that realignment is necessary. Adhere strictly to the following recommended procedure.

b. Line-Up of the Master-Oscillator Circuit. —The master oscillator circuit should be aligned first.

(1) Make the following dial settings.

(*a*) Place the "EMERGENCY" switch in "OPERATE" position.

(*b*) Place the "CAL.-TUNE (REDUCED POWER)-OPERATE" switch in the "CAL." position.

(*c*) Place the "CW-PHONE" switch in the "CW" position.

(*d*) Place the "CONTROL" switch in the "LOCAL" position.

(*e*) Place the "C.F.I. ON-OFF" switch in the "ON" position.

(*f*) Place the "M-O HEATER" switch in the "ON" position.

(*g*) On Models TCK-4, -6:

1. Turn the Rectifier POWER switch to ON.

2. Turn the Rectifier EMERGENCY switch to OPERATE.

(*h*) Place the "BAND CHANGE" switch "B" to "BAND 1" position.

(*i*) Turn "FREQUENCY" control "A" to exactly 3000 kc.

(2) Allow the m-o box to warm up to its normay temperature of 60 degrees Centigrate as indicated by the thermometer located adjacent to the m-o dial. The thermometer will read 60 degrees Centigrade approximately 30 minutes after the heater is turned on. It is advised, however, that the m-o box be heated for at least two hours to assure that all of the enclosed components in the m-o compartment are thoroughly heated to the required temperature.

(3) Turn the transmitter on by depressing the "START" button on the "MG START-STOP" switch. Close the TEST KEY to the upper or locked position.

(4) Insert the headphone plug into the "C.F.I. AUDIO OUTPUT" jack, turn the VOLUME control in a clockwise direction, and adjust the "M-O RESET" control until a loud audio note is heard at exactly 3000 kc. Bring this audio note to zero beat by means of the "M-O RESET" control. (In selecting the beat note on which to tune, turn the FREQUENCY control through 100 kc and use the loudest note in that range. There may or may not be weaker notes.)

(5) Rotate "FREQUENCY" control "A" until the "BAND 1" counter scale reads 2000 kc. Powerful beat notes should be heard at every 100-kc interval. If the circuit is properly aligned, these strong beat notes should be close to zero beat at exactly 100 kc intervals. Adjust "FREQUENCY" control "A" (not M.O. RESET) until the beat note at approximately 2000 kc is reduced to zero beat.

(6) Note the dial reading of "A", Band #1. If is more than 0.5 kc away from 2000 kc, the circuit is out of alignment.

(7) Be certain that the circuit is out of alignment before attempting to realign it. *This process is delicate and exacting and should not be undertaken unless absolutely necessary.* If the circuit is found to be out of alignment, remove the back shield of the m-o compartment. Unfasten the balsa wood sheet from the metal shield and replace the metal shield on the back of the m-o box. Some means, such as corks, wooden plugs, or tape will have to be employed to close the access holes in the metal shield so the temperature in the box may be held constant. When an adjustment is made on a capacitor or coil, a plug may be removed, but after the adjustment has been made the plug must be replaced. The capacitors accessible through the back shield of the m-o box are C104, C139, C140, C141, and C142, all of which are adjustable. See Figure 7-11. The inductances are coils L101, L102, L103, and L104, all of which may be varied by means of an adjustment screw mounted axially in the coil. These adjustment screws and all other alignment adjusting mechanisms have been staked at the factory with Glyptal Varnish. Before any attempt is made to alter these alignment adjustment settings the varnish should be carefully removed by means of General Electric Co. No. 1501 Thinner or by acetone.

(8) Note whether "FREQUENCY" control "A" reads more or less than the actual frequency of 2000 kc. If the control reads low, then the inductance L101 is low. Should the reading of the FREQUENCY control be as much as 30 kc from 2000, a frequency meter (or radio

receiver) should be used to check the output. The meter should pick-up the signal at 2000 kc, not 2100 or 1900.

(9) Remove the access plug to L101 and loosen the lock nut, then using a small insulated screwdriver, carefully turn the adjusting screw of L101. Clockwise rotation decreases inductance, while counterclockwise rotation increases inductance. The screw should be rotated until zero beat is heard in the earphones when FREQUENCY control "A" is set to 2000 kc. Replace the access plug after making this adjustment.

(10) Set the M-O RESET control to 50 and rotate "FREQUENCY" control "A" until it reads 3000 kc. If zero beat is not heard in the earphones at this setting, remove the access plug from C104, unlock it, and adjust until zero beat occurs.

(11) Rotate "FREQUENCY" control "A" until it reads 2000 kc. If zero beat is not obtained, readjust L101.

(12) Rotate "FREQUENCY" control "A" until it reads 3000 kc. If zero beat is not obtained, remove access plug and adjust C139. Then rotate "FREQUENCY" control "A" until it reads 2000 kc. If zero beat is not heard, readjust L101.

This procedure must be continued until zero beat does occur at both 3000 and 2000 kc, or within the limits of 0.5 kc and 0.3 kc, respectively. If it is not possible to do this by adjusting L101 and C139, then C104 should be adjusted slightly and the above procedure repeated. When alignment is accomplished, tighten the lock nut on C104.

(13) BANDS 2, 4, and 5 should also be checked for alignment. The master oscillator must track at the check points listed in the following table:

BAND	DIAL "A" FREQUENCY		TOLERANCE IN KC
	High Frequency End	Low Frequency End	
1	3000	2000	0.3
2	4500	3000	0.55
4	9000	6000	1.2
5	12000	9000	1.5

(14) If the dial and frequency differ at the low end of the band by any more than the tolerance value stipulated in the above table (or at the high end by very much more) with the "M-O RESET" control set at 50, that band should be realigned. The other bands are aligned in an identical fashion to that used for "BAND 1," with the exception that C104 is not adjusted on any except "Band 1." The inductances are varied until the dial and frequency agree at the low-frequency end of the band as before.

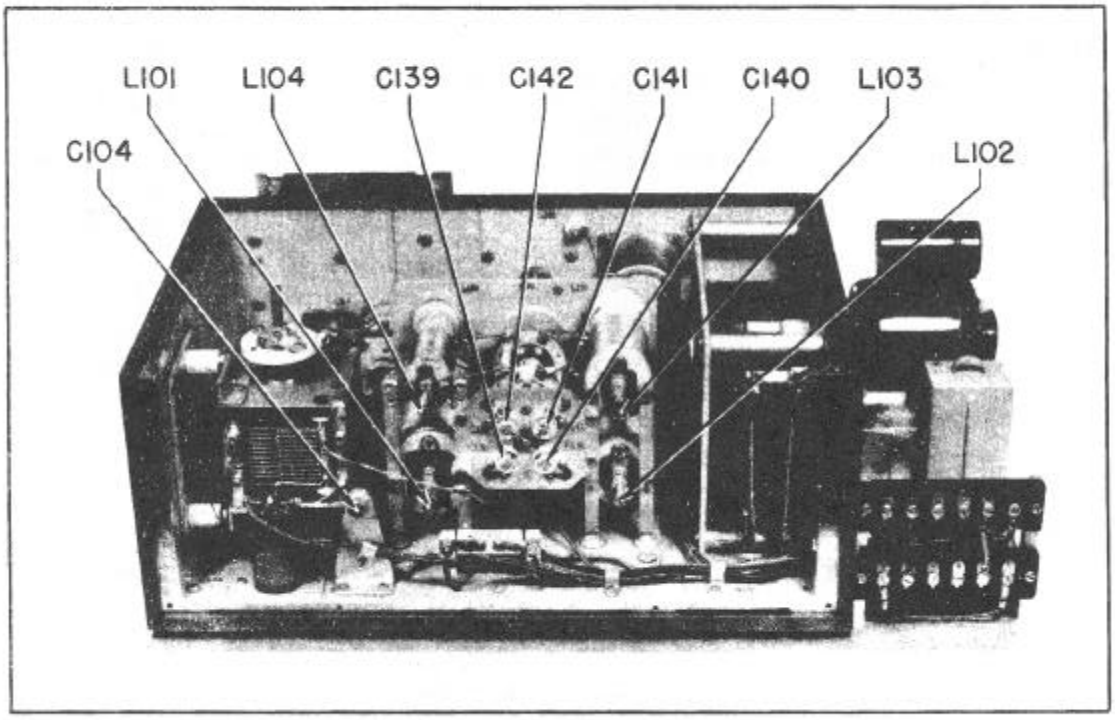


Figure 7-12—M-O Adjustments

BAND	COIL (Adjust for Low Frequency)	TRIMMER (Adjust for High Frequency)
1	L101	C139, C104
2	L102	C140
4	L104	C142
5	L103	C141

(15) When properly aligned, the inductance adjusting screws should be restaked with Glyptal and C104 should be relocked.

(16) Bands "3" and "6" require no m-o line-up since the master oscillator uses the same coil for "BAND 3" that it does for "BAND 5" and the same coil for "BAND 6" that it does for "BAND 4."

c. Line-Up of the Work Circuit. (*See Figure 7-13.*)

(1) Make the following dial settings.

(*a*) Place the "CAL.-TUNE (REDUCED POWER)-OPERATE" switch in the "CAL." position.

(*b*) Place the "BAND CHANGE" switch "B" to "BAND 6" position.

(*c*) Turn FREQUENCY control "A" to 18,000 kc.

(2) Tune the i-p-a plate current to a minimum by means of the "I.P.A. TRIMMER" control. Turn FREQUENCY dial "A" from 18,000 kc to 12,000 kc and retune the i-p-a plate current to a minimum value. If it is not possible to resonate the intermediate power amplifier at both ends of the band, vary the slug position of L140 (or L116)* until it is possible to keep the intermediate power amplifier tuned by means of the "I.P.A. TRIMMER" for all frequencies on "BAND 6."

(3) Set the "FREQUENCY" control "A" to 12,000 kc and trim the intermediate power amplifier to minimum plate current by means of the "I.P.A. TRIMMER" control. Remove the right side shield from the Transmitter and loosen the lock nut on the m-o work circuit trimming condenser C111. With a screwdriver carefully vary C111 (observing the "I.P.A. PLATE CURRENT" meter) to the position resulting in minimum i-p-a plate current.

(4) Set the "FREQUENCY" control "A" to 18,000 kc and trim the intermediate power amplifier by means of its trimmer control. Again, carefully vary C111. If the i-p-a plate current has its minimum value at the same value of C111 as set in (3), then the "BAND 6" work circuit is properly aligned. If, however, minimum plate current is obtained at a different value of C111, the circuit is not tracking properly.

* Symbol numbers in parentheses refer to coils used in models TCK and TCK-1.

BAND	COIL (TCK, TCK-1)	COIL (CTK-2 to TCK-7)
1	L106	L130
2	L107	L131
5	L108	L132
6	L109	L133

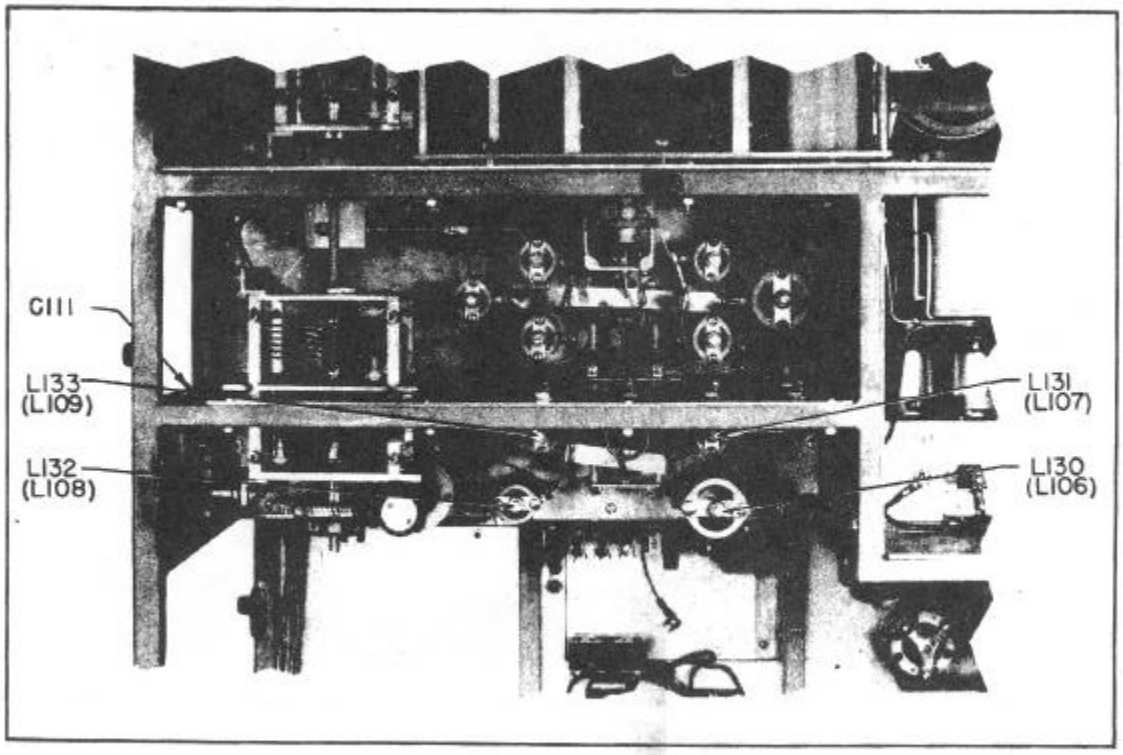


Figure 7-13—Work Circuit Adjustments

requires a lower capacity setting at the high-frequency end of the band than it does at the low-frequency end, then L133 (or L109)* is low in inductance.

(5) Assuming the circuit is out of line, L133 (or L109)* must be adjusted slightly and the procedure of steps 3 and 4 repeated. When minimum i-p-a plate current occurs at 12,000 and 18,000 kc for the same setting of C111, "BANDS 4" and "6" are tracking properly.

(6) Relock C111, replace the side shield on the transmitter and make certain proper tracking occurs with all shields securely fastened in place.

(7) Make the following dial settings.

(*a*) Place the "BAND CHANGE" switch "B" to "BAND 5" position.

(*b*) Adjust the "FREQUENCY" control "A" to 9,000 kc.

(8) Trim the intermediate power amplifier to resonance.

(9) Remove the rear transmitter shield, remove the "Glyptal" staking and vary the adjustment of L132 (or L108)* until minimum i-p-a current results, after which lock L132 in place.

(10) Repeat steps (7), (8), and (9), with "BAND CHANGE" switch "B" at "BAND 2" position and the "FREQUENCY" control "A" at 3,000 kc, varying L131 (or L107).*

(11) Repeat steps (7), (8), and (9), with the "FREQUENCY" control "A" at 2,000 kc, varying L130 (or L106).*

(12) The same coil used on "BAND 3" is used an "BAND 5"; likewise, the coil on "BAND 4" is the same as on "BAND 6." Thus, if "BANDS 5" and "6" are properly aligned, "BANDS 3" and "4" should be correct also. As an added check, repeat steps (7), (8), and (9) for these last two bands. If a slightly different value of inductance is required, then a compromise value should be used. It is very unlikely, however, that such a condition will occur.

(13) The work circuit is now tuned to provide adequate drive for the intermediate power amplifier throughout the entire frequency range. No other IPA frequency adjustment is required and the inductance adjustments should be restaked to prevent movement.

d. Line-Up of the I.P.A. Plate Circuit. (*See figure 7-14.*)—This alignment is somewhat similar to that of the work circuit except that there are six instead of four coils for the six bands.

(1) As before, set the "FREQUENCY" control "A" to the low-frequency end of each band and adjust the "I.P.A. TRIMMER" control to minimum i-p-a plate current.

(2) Set the "FREQUENCY" control "A" to the high-frequency end of each band and note which way the "I.P.A. TRIMMER" control must be tuned to again obtain minimum i-p-a plate current. If the trimmer

* Symbol numbers in parenthesis refer to coils used in models TCK and TCK-1.

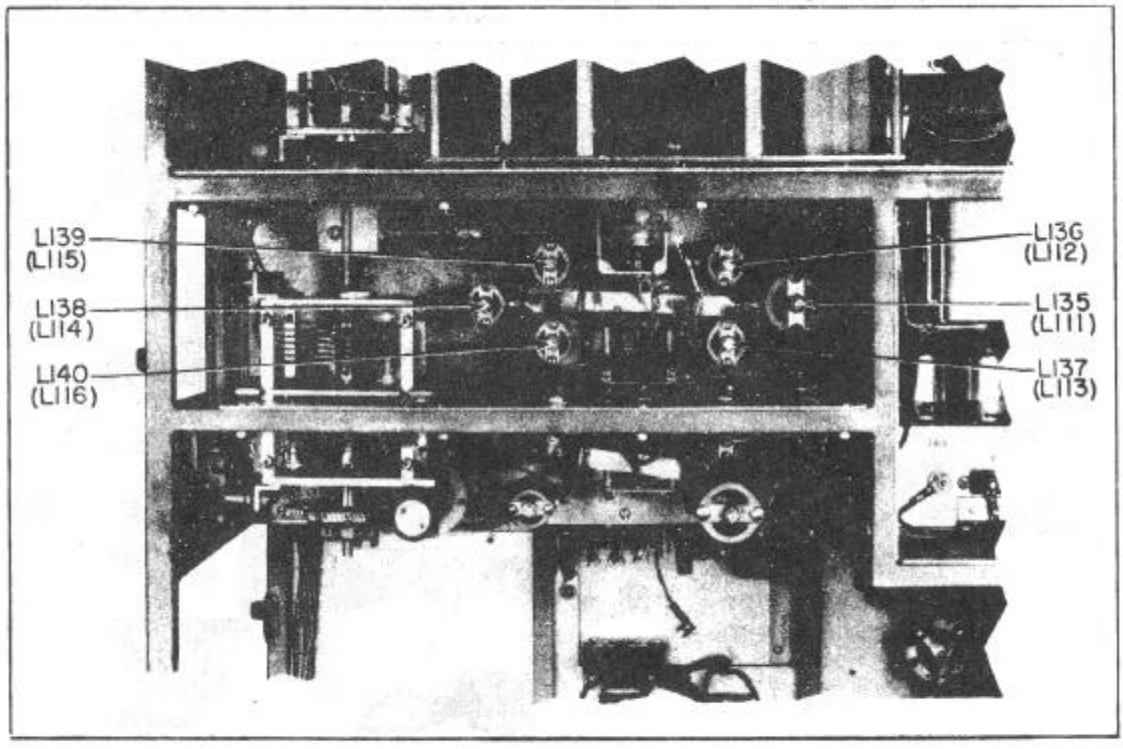


Figure 7-14—I.P.A. Adjustments

capacitor is reduced (clockwise), then the inductance of the coil in use is high. If the trimmer capacitor is increased; then the inductance is low.

(3) Adjust the inductances by changing the position of the slug. Turning clockwise reduces inductance while turning counterclockwise increases inductance, as on the previous slug-tuned coils.

BAND	COIL (TCK-2 to TCK-7)	COIL (TCK, TCK-1)
1	L111	L135
2	L112	L136
3	L113	L137
4	L114	L138
5	L115	L139
6	L116	L140

(4) Although it is desirable that the intermediate power amplifier track perfectly over the entire band, it is not absolutely necessary. It is essential, however, that the intermediate power amplifier be resonated at all frequencies in the entire range by means of the "I.P.A. TRIMMER" control C117.

e. Line-Up of the P.A. Circuit.

(1) Remove all antenna or Coupling Unit connections from the Transmitter and make the following dial settings.

(*a*) Place the "CAL.-TUNE (REDUCED POWER)-OPERATE" switch in the "TUNE" (or "REDUCED POWER") position.

(*b*) Place the "ANTENNA CIRCUIT SELECTOR" switch "F" on position "1".

(*c*) Turn the "ANTENNA COUPLING" control "G" to "O".

(2) Check all bands and determine whether all frequencies can be resonated by means of the "P.A. TRIMMER" control.

(3) If a band is found that cannot be tuned, the coil used on that band must be varied. This is readily done by slightly changing the spacing between the coil windings. If the inductance is high, the spacing should be increased; if it is low, the spacing should be decreased. Stretch or compress the coil as required.

WARNING

Be sure all power is turned off before making the above adjustments.

(4) Due to the inherently large amount of stray capacity in the p-a coil system, it is not possible to maintain resonance while tuning without constantly adjusting the "P.A. TRIMMER" control for minimum p-a plate current.

NOTE

Do not confuse the dip where the p-a trimmer goes through minimum capacity with the resonance dip in plate current.

(5) The p-a circuits will be properly aligned if a minimum plate current can be secured at any point in the frequency range by use of the "P.A. TRIMMER" control.

f. Final Circuit Line-Up. —After all stages have been lined up, the m-o tracking should be carefully rechecked and realigned if necessary. Use a frequency meter or a radio receiver to check one operating frequency of each band. If any band is 100 kc off-frequency, it has been aligned on the wrong C.F.I. beat note.

g. Antenna Coupling and Transmission Line Coupling Units.—There are no electrical adjustments to be made on the output coupling circuits, other than tuning them from the front panel. If their operation appears defective, inspect the circuit components for mechanical failures.

h. Adjustment of Carrier Power-Level for Phone Operation.—The carrier power input to the P.A. stage must be at a different level for each band on PHONE operation. After a change in tubes it may be necessary to adjust this level to maintain the power output at one-quarter of that realized during CW operation. One-quarter power output will be measured as one-half of both r-f voltage and current.

(1) Tune BAND 1, 2000 kc, for maximum power output on CW operation.

(2) Connect one end of a wire to the vertical deflection plate of an oscilloscope and place the other end near the transmitter antenna post. This wire should not actually touch the antenna post.

(3) Turn on the "scope," using a 60-cycle sweep, and adjust the wire next to the antenna post until the scope pattern becomes high enough to measure easily. It may be necessary to form a pick-up loop at the end of the wire to obtain sufficient signal.

(4) Turn the CW-PHONE switch to PHONE and again measure the scope pattern height. This height should be one-half of that obtained on CW operation.

(5) Adjust R177, see figure 7-15, on the panel above the M.O. chamber at the back of the unit, until the PHONE pattern is one-half as high as the CW pattern.

NOTE

If the ANTENNA CURRENT meter reading is in the upper half of the scale during CW operation, the meter reading may be used for a rough setting of the power output. For PHONE operation, the meter should read one-half the current obtained with CW operation. These meter readings are not too reliable, however, and an oscilloscope should be used if available.

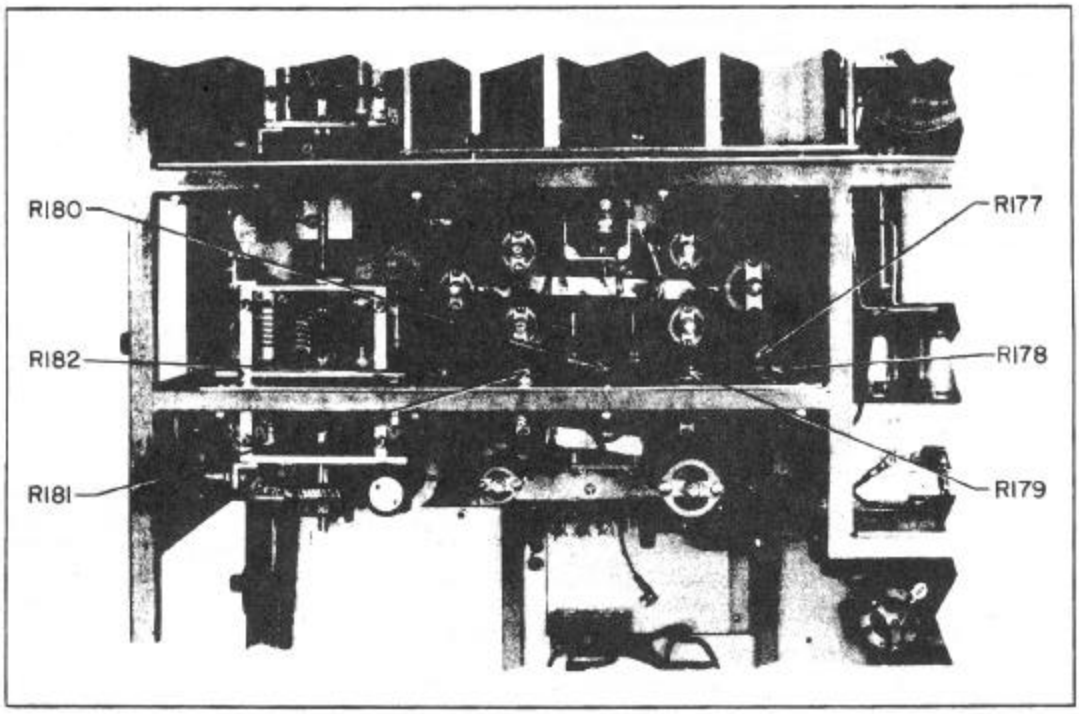


Figure 7-15—Carrier Power-Level Adjustments

(6) Follow the same procedure for the other five bands, using the frequencies and adjusting resistors indicated in the following table:

BAND	FREQUENCY (KC)	CONTROL
1	2000	R177
2	3000	R178
3	4500	R179
4	6000	R180
5	9000	R181
6	12000	R182

i. CFI Unit Adjustments.—The CFI unit has been carefully calibrated at the factory and all of its adjustments staked with "Glyptal" varnish. Two of the adjustments which appear only on the TCK and TCK-1 are non-critical (R211A and R211B) and will never have to be moved. Of the other three adjustments, L201, L202, and C220 (or C201), only C220 (or C201) should have to be adjusted. For this adjustment a very stable and accurate frequency standard is required.

(1) Connect a standard frequency signal of exactly 100 kc or some harmonic of 100 kc to P14 on top of the CFI chassis. This is a high impedance circuit and will not load the standard generator.

(2) Turn the CFI unit ON, start the Transmitter, allow the equipment to reach operating temperature, and switch the TEST KEY to the horizontal or neutral position.

(3) Plug earphones into the CFI AUDIO OUTPUT and listen for a beat note.

(4) Unlock C220 (or C201) on top of the CFI chassis and adjust it with a screwdriver to the zero beat point.

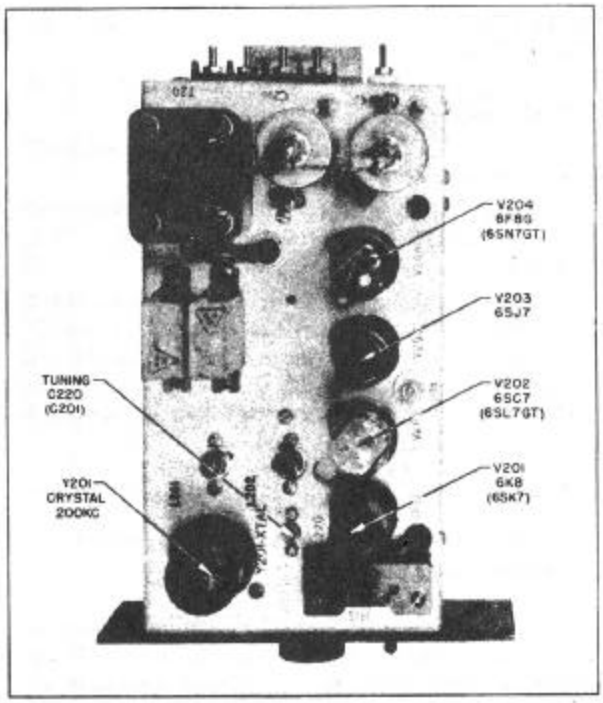


Figure 7-16—C.F.I. Adjustments

(5) If it is impossible to bring the output to zero beat with C220 (or C201) and the standard is unquestionably 100 kc, adjust L201 very slightly and try again. When zero beat is obtained, the CFI unit is aligned.

***j.* Modulator Unit Adjustments.**—The Modulator Unit has only two adjustments: the volume (R165) and the limiting (R176). To adjust these properly an oscilloscope and a calibrated audio oscillator are essential.

(1) Connect one end of a wire to the vertical deflection plate of an oscilloscope and place the other end close to the transmitter antenna post.

(2) Turn on the oscilloscope and the transmitter, then check the PHONE operation on BAND 1, 2000 kc, for one-quarter power output. This will appear on the scope as a pattern one-half as high for PHONE operation as for CW operation.

(3) Obtain a calibrated audio oscillator and couple it to the 500-ohm line input of the Modulator Unit. This is done by connecting it across terminals 9 and 10 of terminal board TB-1, or terminals 2 and 3 of TB-10. If the output of the oscillator is not designed for 500 ohms, it must be matched to the 500-ohm modulator input.

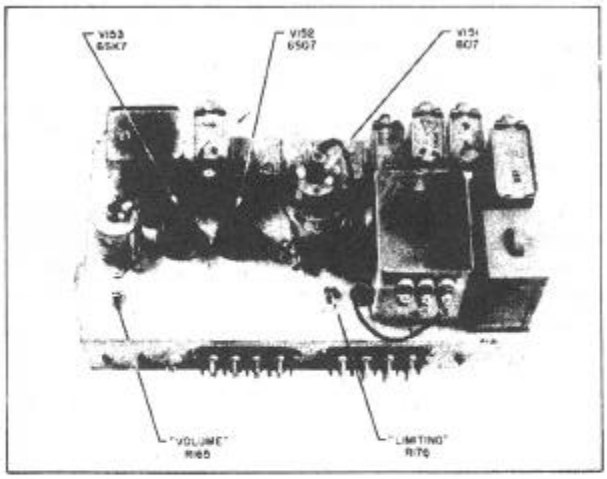


Figure 7-17—Modulator Adjustments

(4) Using 6 milliwatts input (1.73 volts) as zero db level, adjust the input to the modulator to —10 db. (1.55 volts) at 400 cycles.

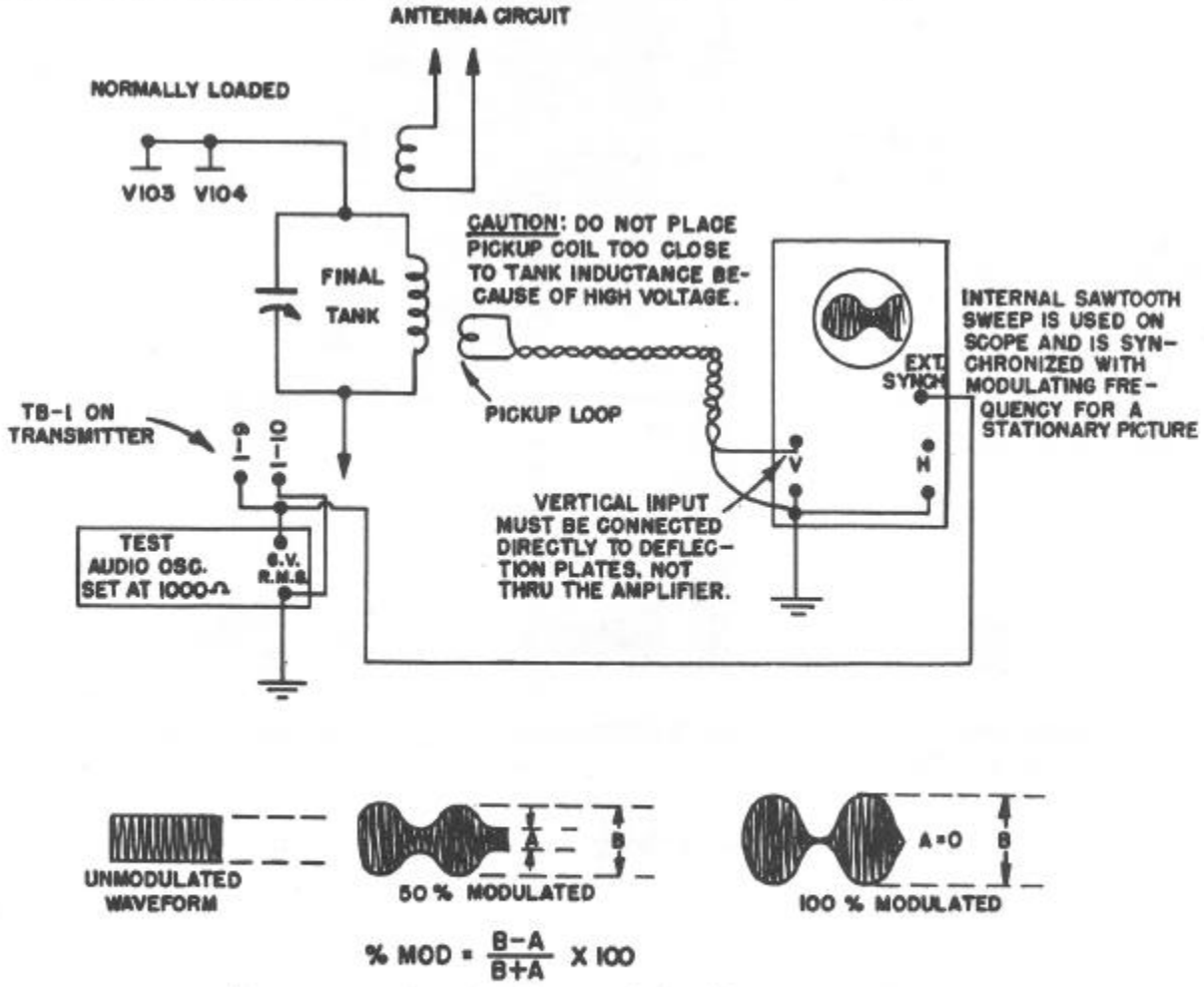


Figure 7-18—Wave Envelope Method of Checking Modulation

(5) Turn the limiter (R176) all of the way clockwise (out) and adjust the gain (R165) until the oscilloscope pattern shows 75% modulation.

(6) Adjust the input to the modulator to +5 db. (1.85 volts) and adjust the limiter (R176) until 75% modulation is again realized.

***k.* Adjusting the Modulation by Use of the Oscilloscope**—(*See Figures 7-18 and 7-19.*)

The vertical height of the image on the screen can be regulated by varying the coupling of the pick-up coil to the tank circuit.

The internal sweep circuit of the oscilloscope is synchronized by feeding the voltage from the audio oscillator to the external sync terminal on the scope.

The transmitter is modulated by feeding a 1000-cycle signal to the input transformer of the audio amplifier, as shown. The amplitude of this signal should be 6 volts r.m.s.

The transmitter should be adjusted for 75% modulation by adjusting the gain control R165 on the audio amplifier until the waveform appearing on the scope indicates 75% modulation.

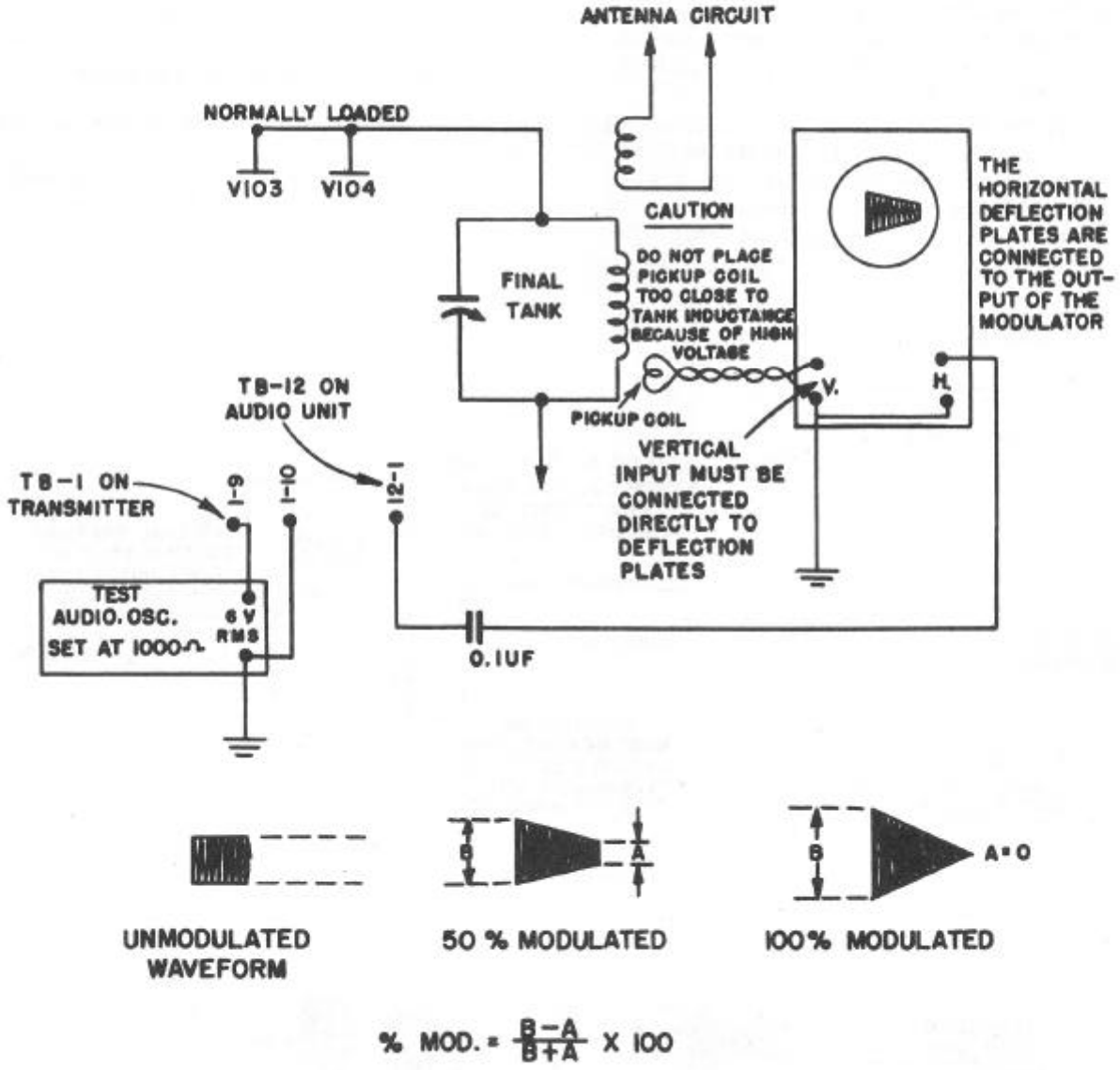


Figure 7-19—Trapezoid Envelope Method of Checking Modulation

***l.* Control Circuits.**—For the most part the control circuits are not adjustable. The exceptions to this are the time delay and pick-up voltages of the contactors.

(1) CONTACTOR TIME DELAYS.—The high voltage contactor in the rectifier unit is intended to close 40 seconds after the main power contactor. To adjust this delay, open the front panel door of the rectifier unit and locate the time indicator between the contactors at the top. The indicator is calibrated in seconds and turning the knurled screw on the front moves a pointer over the scale to select the desired number of seconds. The calibrations are for a 60-cycle supply and will not be accurate for any other frequency.

The time delay closing contactors in the D-C Motor Controllers are actuated by the main power contactor mechanism. The time delay is introduced mechanically as a damping of the motion of the delay contacts. Changing the spring tension will change the delay time. If there is a tendency for any of the contactors to "stick" in the closed position when power is removed, a thin (.005") copper strip may be inserted permanently between the contactor armature and the pole piece.

(2) LOW VOLTAGE.—In some installations, the line voltage will occasionally be so low that the transmitter starting contactor will not "pick-up" when the START button is pushed. This may be remedied by bending the bottom stationary contacts slightly upward with a pair of pliers. This will push up the armature and movable contacts, reducing the air gap in the contactor.

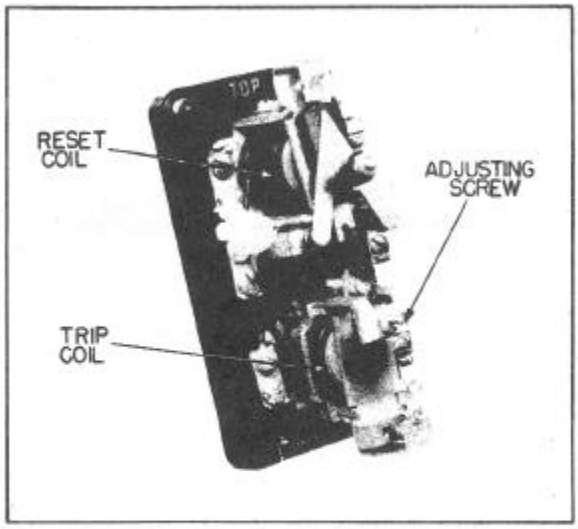


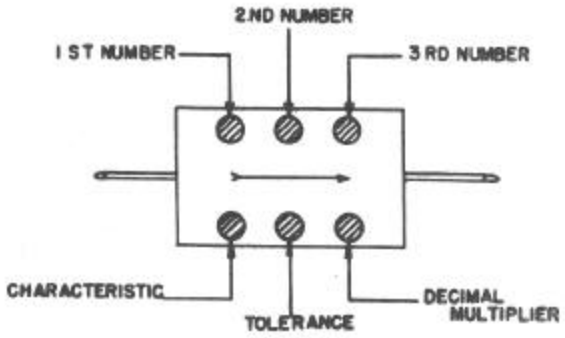
Figure 7-20—Overload Relay

(3) H.V. OVERLOAD RELAYS.—The high voltage circuits (500 and 1800 volts) are both provided with overload protection in the form of instantaneous overcurrent relays. The value of current at which these relays operate is set by means of the adjusting screw shown in Fig. 7-20. The 1800-volt circuit relay should trip when the current reaches 406 ma. and the 500 volt circuit relay should operate on a current of 350 ma.

TABLE 7-4

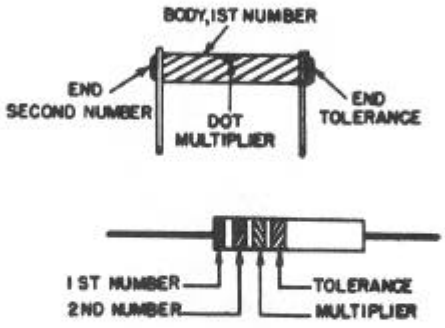
AMERICAN WAR STANDARDS

COLOR CODE FOR FIXED MICA CAPACITORS
VALUE READ IN MMF



Color	*1st, 2nd, 3rd No.*	*Decimal Multiplier*	*Tolerance*	*Characteristic*
Black	0	1		A
Brown	1	10		B
Red	2	100	2%	C
Orange	3	1,000		D
Yellow	4			E
Green	5			F
Blue	6			G
Violet	7			
Gray	8			
White	9			
Gold		0.1	5%	
Silver		0.01	10%	
Black			20%	

TABLE 7-4 (Con't)



COLOR CODE FOR RESISTORR

Color	*1st Number*	*2nd Number*	*Multiplier*
Black		0	1
Brown	1	1	10
Red	2	2	100
Orange	3	3	1,000
Yellow	4	4	10,000
Green	5	5	100,000
Blue	6	6	1,000,000
Violet	7	7	
Gray	8	8	
White	9	9	

Tolerance Color Code Values

Gold 5% Silver 10% No Color 20%

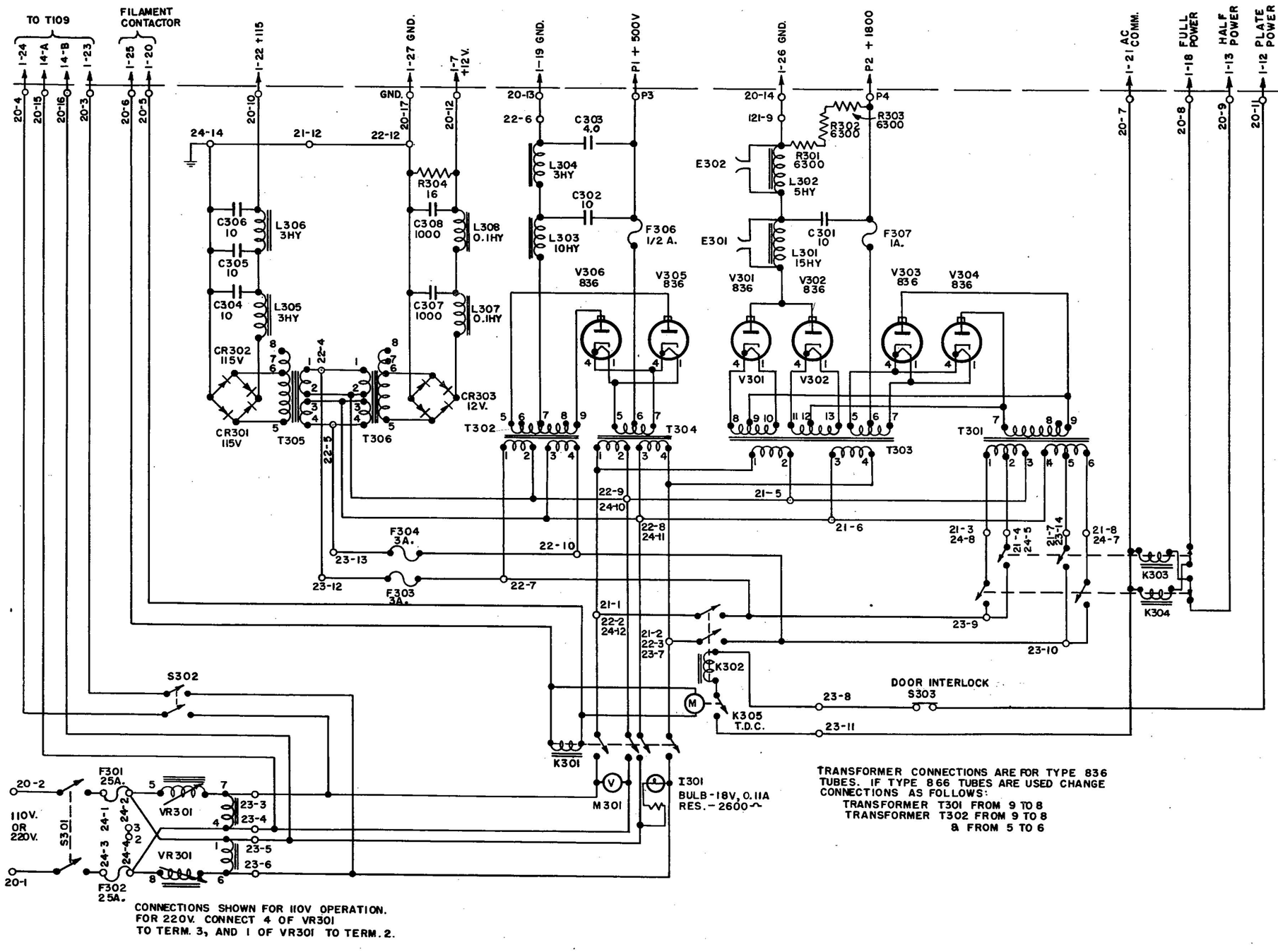


Figure 7-21—Rectifier Unit Schematic Diagram

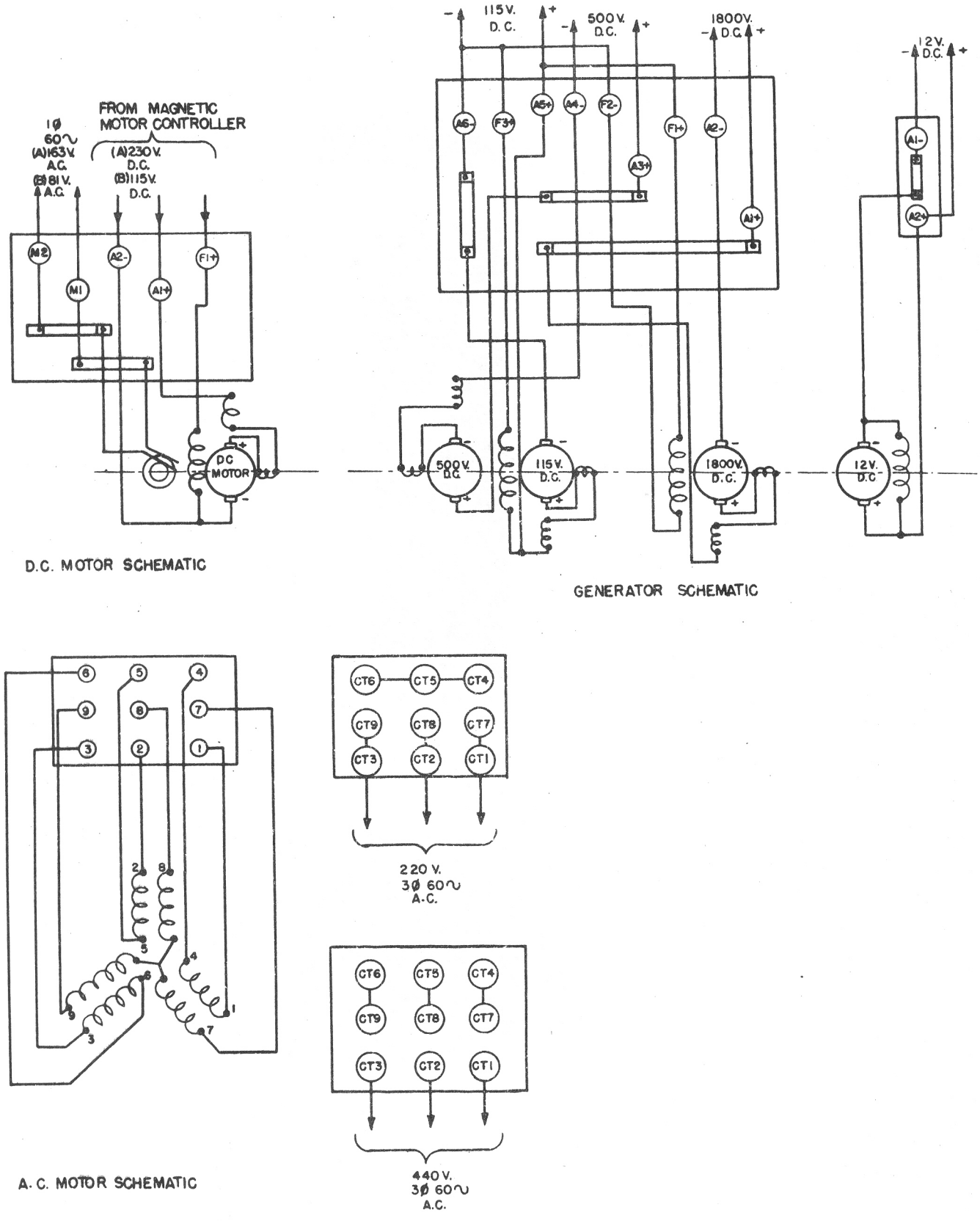
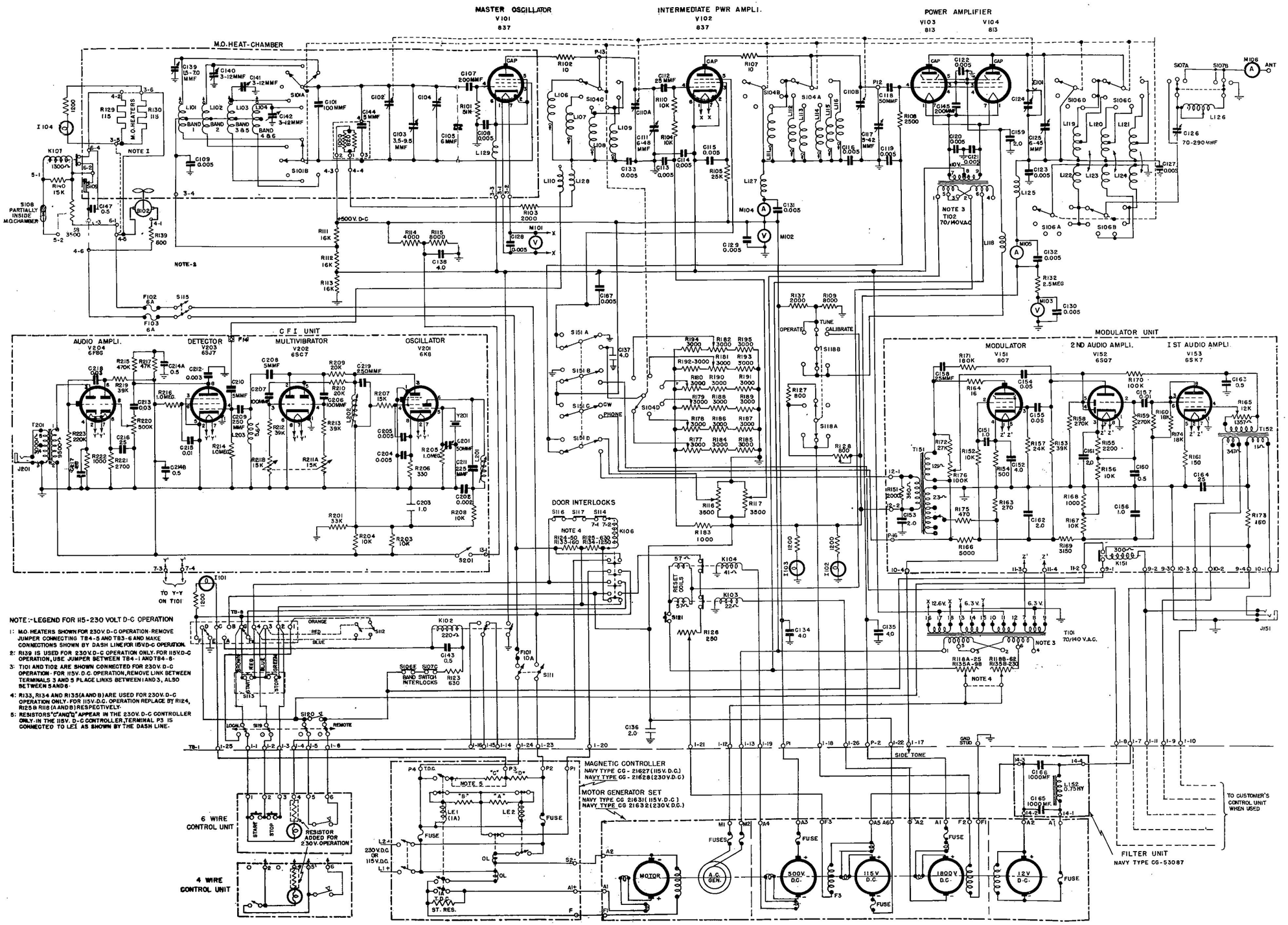


Figure 7-22—Motor Generator Sets Schematic Diagrams



NOTE:- LEGEND FOR 115-230 VOLT D-C OPERATION

1: M.O. HEATERS SHOWN FOR 230 V. D-C OPERATION - REMOVE JUMPER CONNECTING TB4-5 AND TB3-6 AND MAKE CONNECTIONS SHOWN BY DASH LINE FOR 115 V. D-C OPERATION.

2: R139 IS USED FOR 230 V. D-C OPERATION ONLY. FOR 115 V. D-C OPERATION, USE JUMPER BETWEEN TB4-1 AND TB4-8.

3: T101 AND T102 ARE SHOWN CONNECTED FOR 230 V. D-C OPERATION. FOR 115 V. D.C. OPERATION, REMOVE LINK BETWEEN TERMINALS 3 AND 5 PLACE LINKS BETWEEN 1 AND 3, ALSO BETWEEN 5 AND 8.

4: R133, R134 AND R135 (A AND B) ARE USED FOR 230 V. D-C OPERATION ONLY. FOR 115 V. D.C. OPERATION REPLACE BY R124, R125 & R118 (A AND B) RESPECTIVELY.

5: RESISTORS "C" AND "D" APPEAR IN THE 230 V. D-C CONTROLLER ONLY. IN THE 115 V. D-C CONTROLLER, TERMINAL P3 IS CONNECTED TO LE1 AS SHOWN BY THE DASH LINE.

Figure 7-23—Model TCK Schematic Diagram, DC Unit

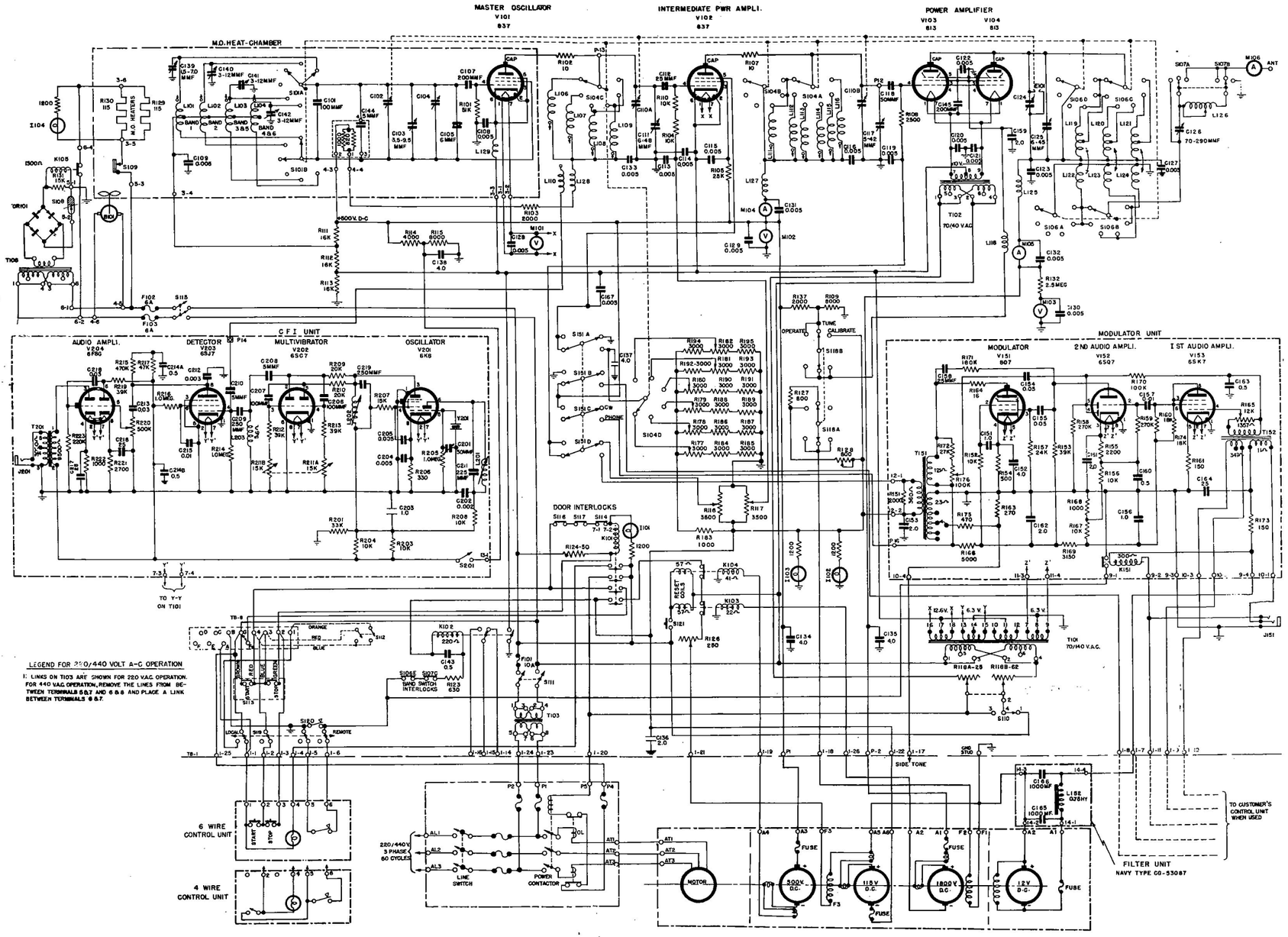


Figure 7-24—Models TCK and TCK-1 Schematic Diagram, AC Units

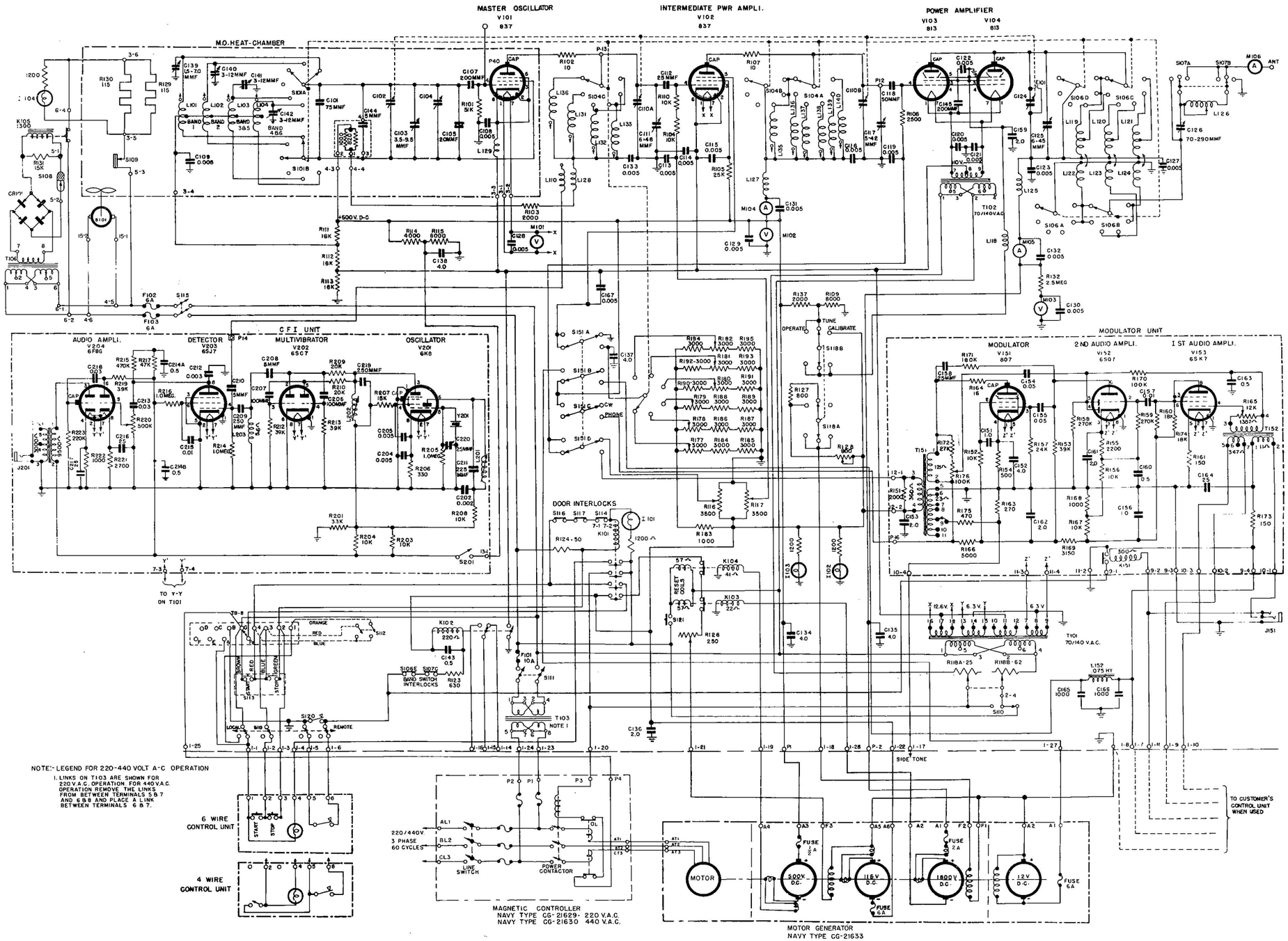


Figure 7-25—Models TCK-2 and TCK-3 Schematic Diagram, AC Models

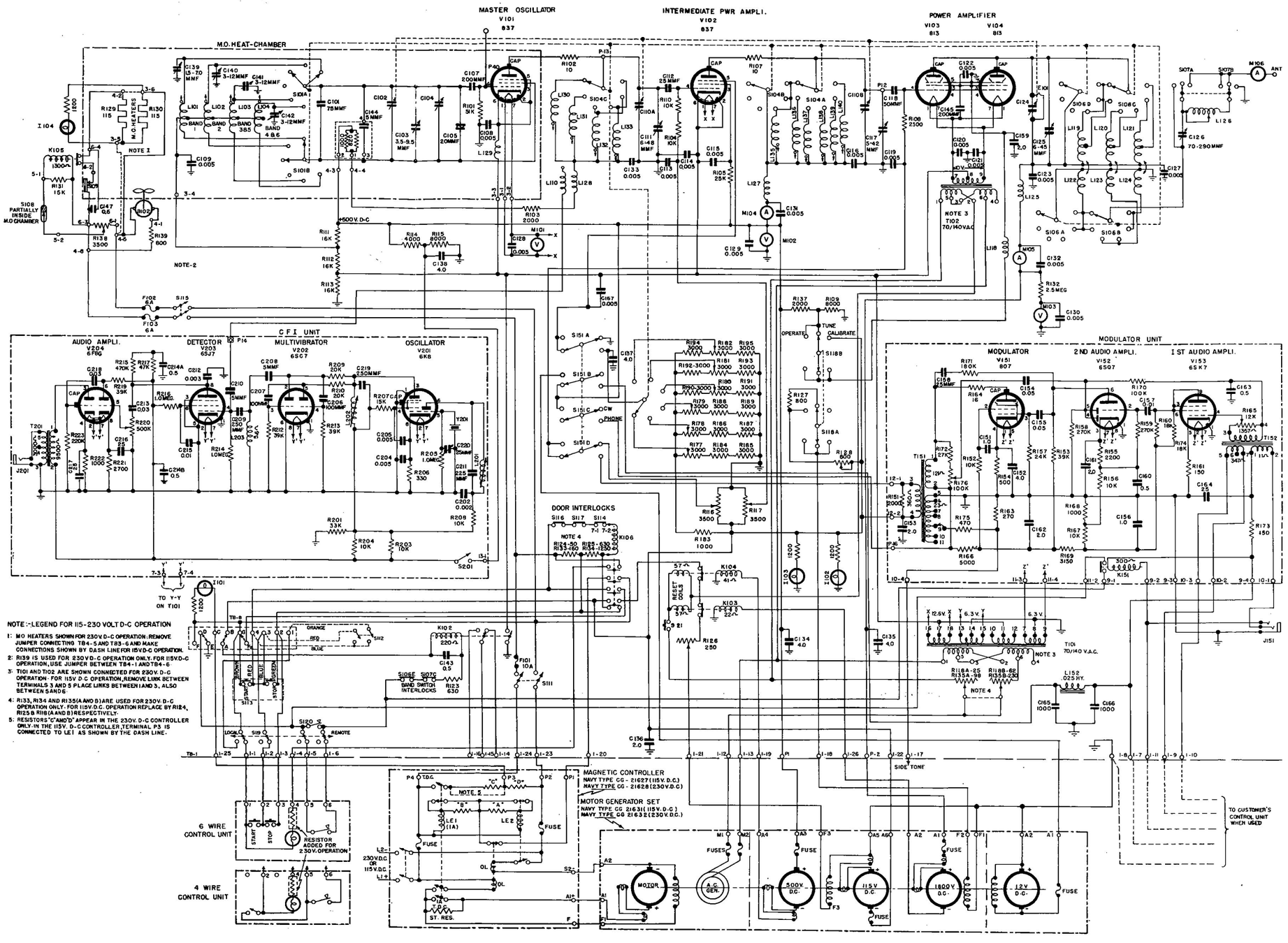


Figure 7-26—Models TCK-3 and TCK-5 Schematic Diagram, DC Units

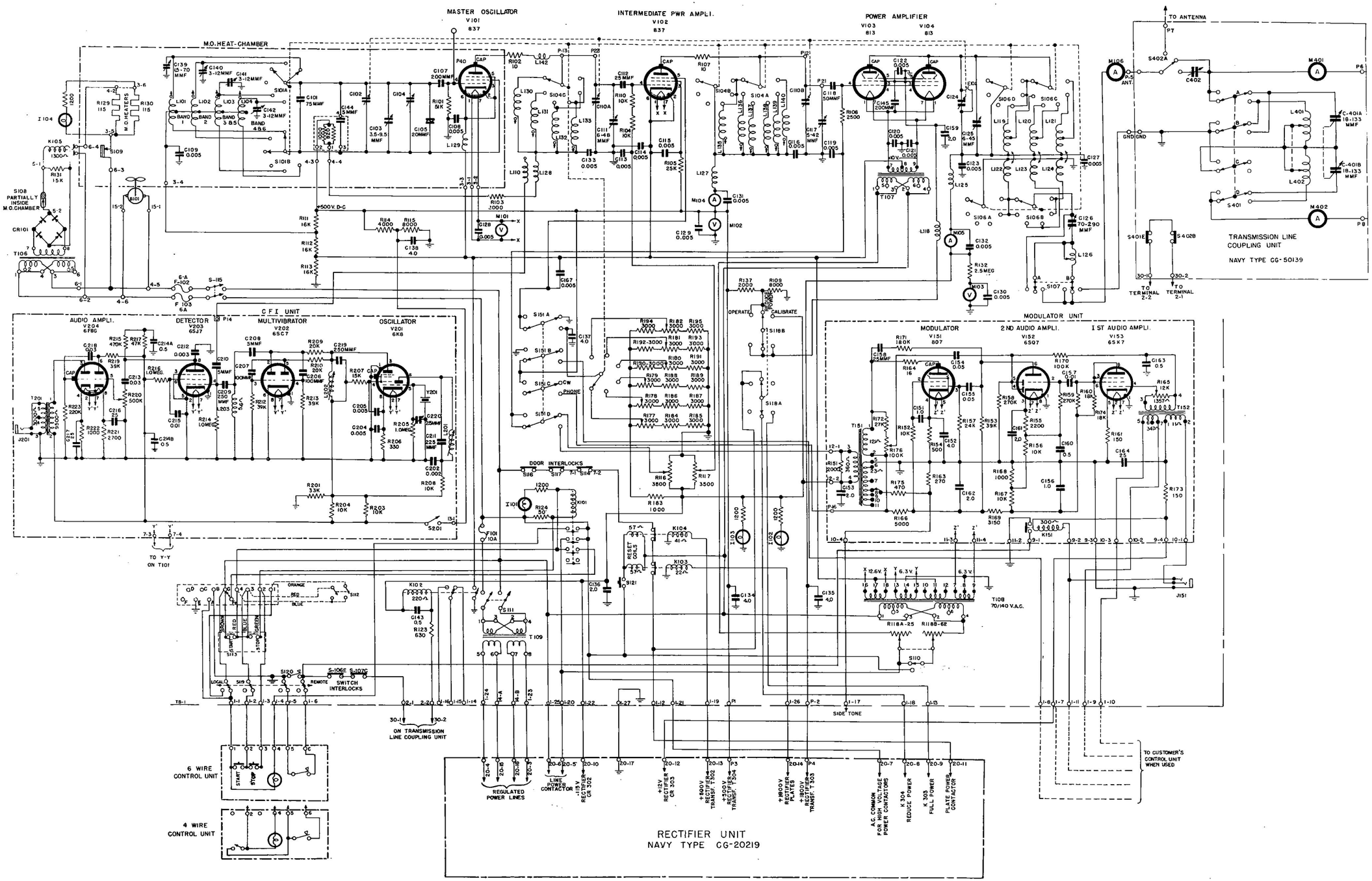


Figure 7-27—Models TCK-4 and TCK-6 Schematic Diagram

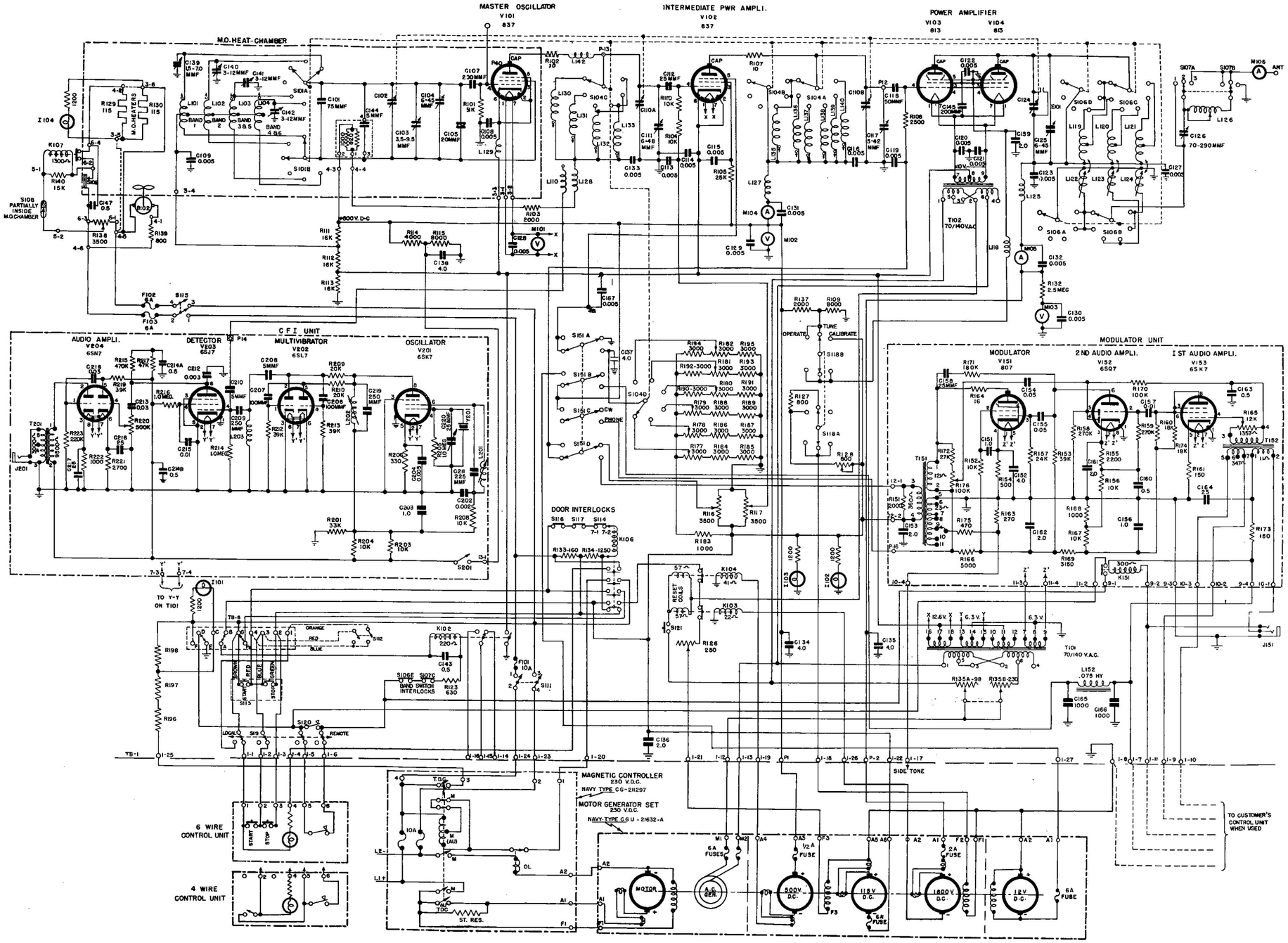


Figure 7-28—Schematic Diagram, Model TCK-7

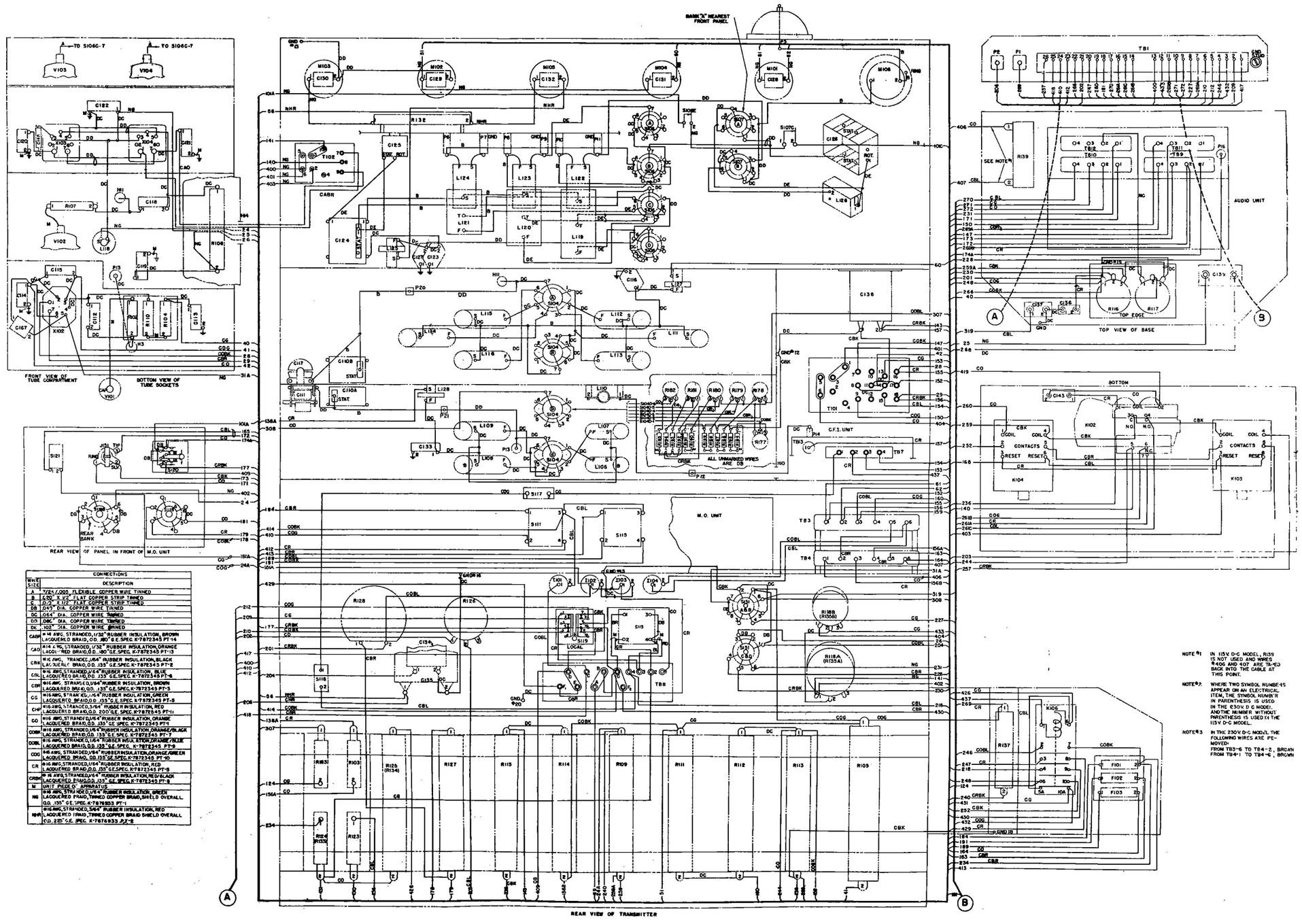
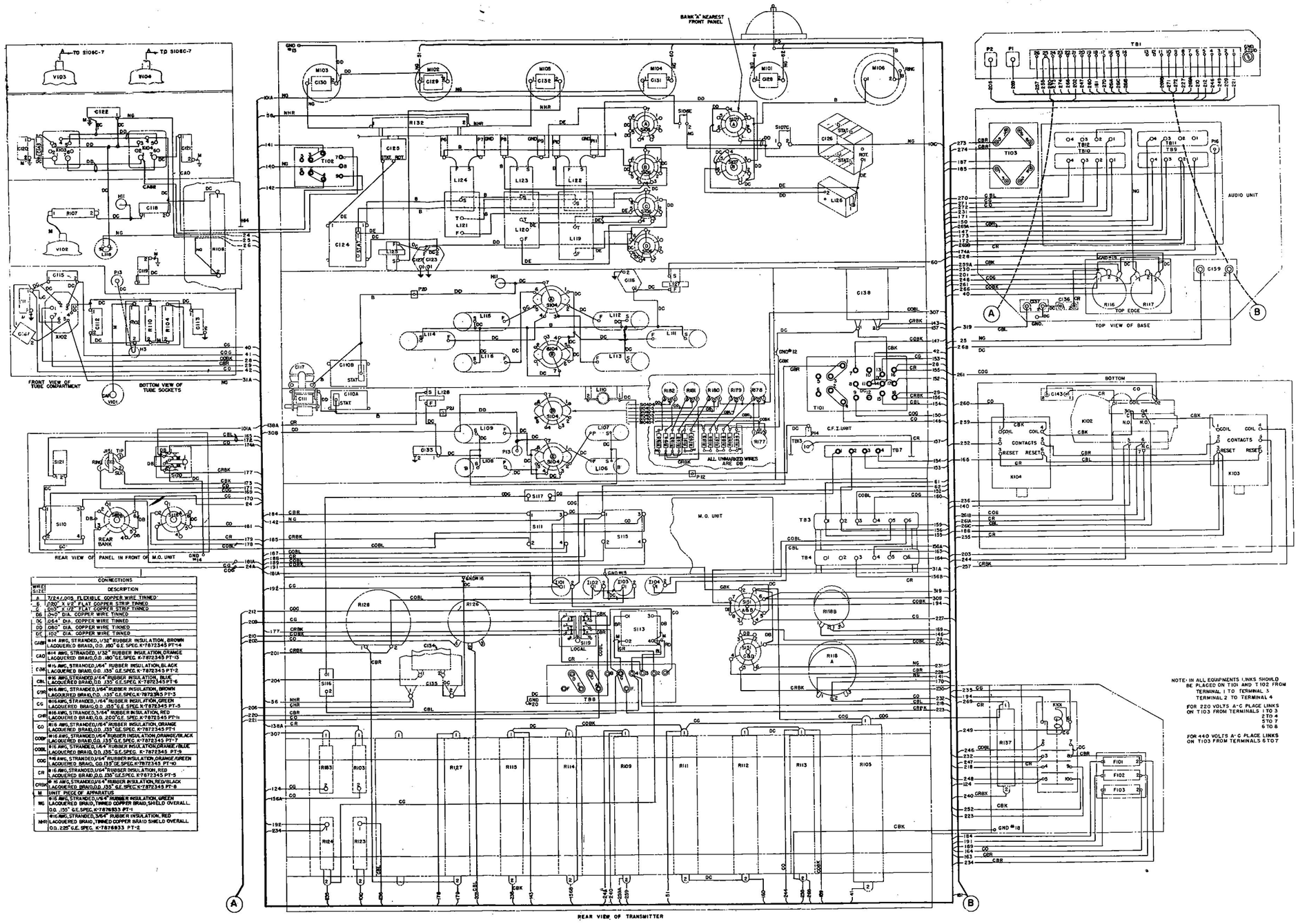


Figure 7-29—Connection Diagram of Transmitters, Type CG-52214 and Type CG-52215



WIRE SIZE	CONNECTIONS DESCRIPTION
A	7/24/.005 FLEXIBLE COPPER WIRE TINNED
B	.070" X 1/2" FLAT COPPER STRIP TINNED
C	.010" X 1/8" FLAT COPPER STRIP TINNED
DB	.040" DIA. COPPER WIRE TINNED
DC	.064" DIA. COPPER WIRE TINNED
DD	.080" DIA. COPPER WIRE TINNED
DE	.102" DIA. COPPER WIRE TINNED
CAB	#14 AWG, STRANDED, 1/32" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. .180" G.E. SPEC. K-7872345 PT-14
CAO	#14 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. .180" G.E. SPEC. K-7872345 PT-13
CBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-2
CBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-6
CBR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-3
CG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-5
CR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. .200" G.E. SPEC. K-7872345 PT-11
CO	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-1
COBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-7
COBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-9
COG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-10
CR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-5
CRBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D. .135" G.E. SPEC. K-7872345 PT-8
M	UNIT PIECE OF APPARATUS
NG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL O.D. .155" G.E. SPEC. K-7876833 PT-1
NHR	#16 AWG, STRANDED, 3/64" RUBBER INSULATION, RED LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL O.D. .225" G.E. SPEC. K-7876833 PT-2

Figure 7-30—Connection Diagram of Transmitter, Type CG-52216

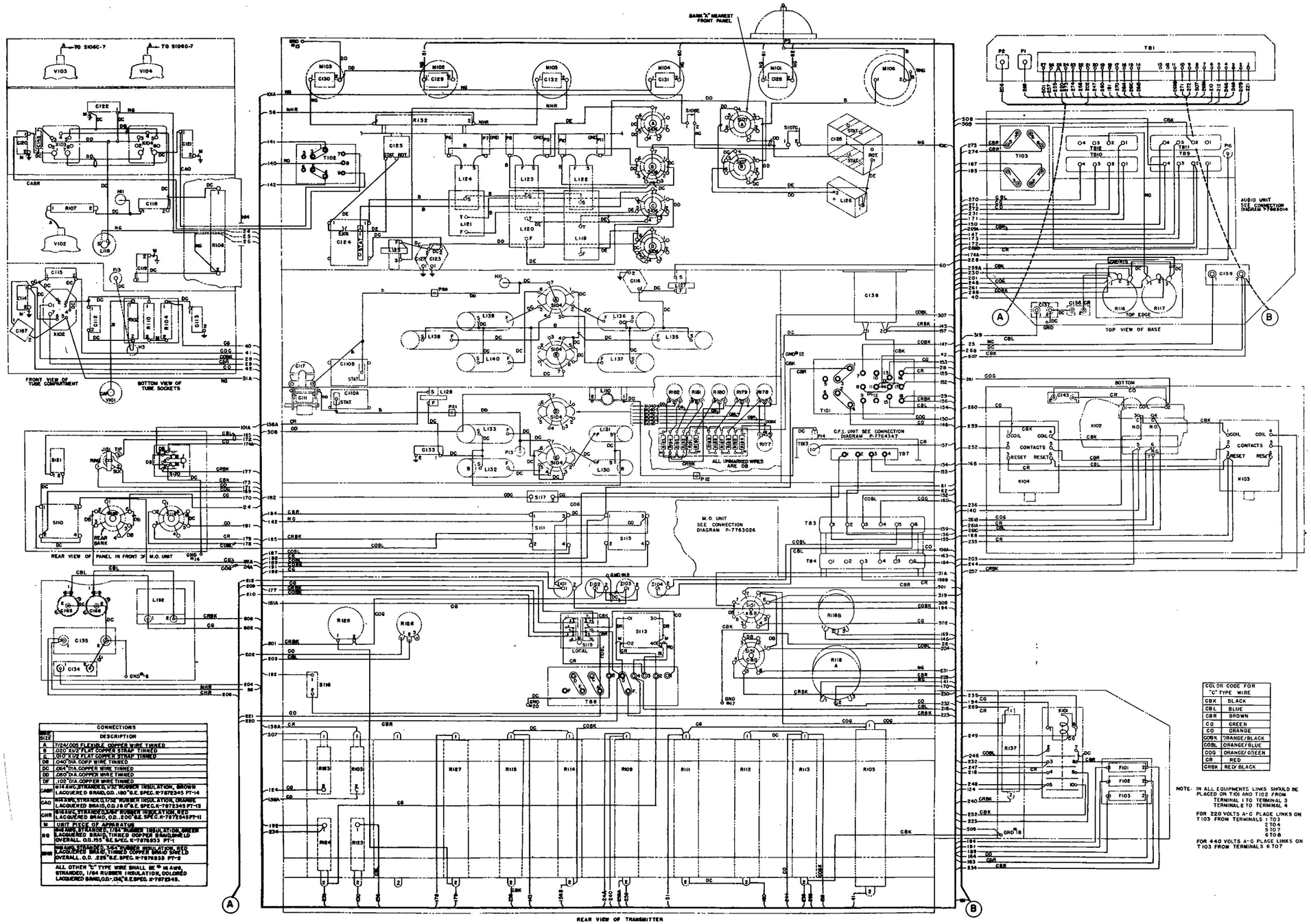
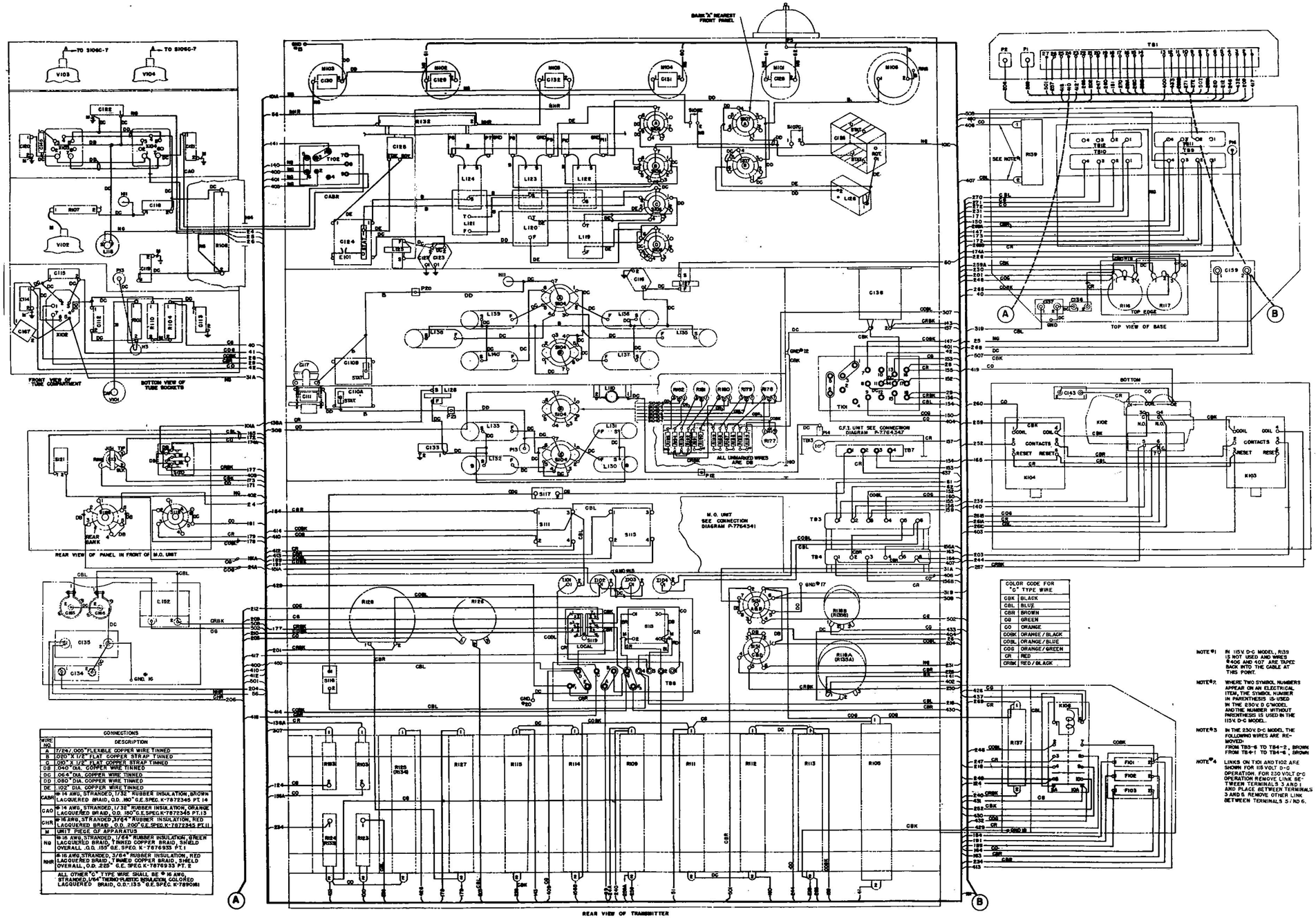


Figure 7-31—Connection Diagram of Transmitter, Type CG-52216A



CONNECTIONS	
WIRE NO.	DESCRIPTION
A	.1704", 005" FLEXIBLE COPPER WIRE TINNED
B	.020" X 1/2" FLAT COPPER STRAP TINNED
C	.020" X 1/2" FLAT COPPER STRAP TINNED
DB	.040" DIA. COPPER WIRE TINNED
DG	.064" DIA. COPPER WIRE TINNED
DD	.050" DIA. COPPER WIRE TINNED
DE	.102" DIA. COPPER WIRE TINNED
CABR	#14 AWG, STRANDED, 1/32" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. .180" G.E. SPEC. K-7872345 PT 14
CAO	#14 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. 180" G.E. SPEC K-7872345 PT.13
CHR	#14 AWG, 37 STRANDED 3/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. 200" G.E. SPEC. K-7872345 PT.11
M	UNIT PIECE OF APPARATUS
NG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID, SHIELD OVERALL O.D. .150" G.E. SPEC K-7876935 PT.1
NHR	#16 AWG, STRANDED, 3/64" RUBBER INSULATION, RED LACQUERED BRAID, TINNED COPPER BRAID, SHIELD OVERALL, O.D. .225" G.E. SPEC K-7876935 PT. 2
	ALL OTHER "C" TYPE WIRE SHALL BE #16 AWG, STRANDED, 1/64" THERMO-PLASTIC INSULATION, COLORED LACQUERED BRAID, O.D. .135" G.E. SPEC K-7890161

COLOR CODE FOR "C" TYPE WIRE	
CBK	BLACK
CBL	BLUE
CBR	BROWN
CG	GREEN
CO	ORANGE
CORK	ORANGE/BLACK
COBL	ORANGE/BLUE
COG	ORANGE/GREEN
CR	RED
CRBK	RED/BLACK

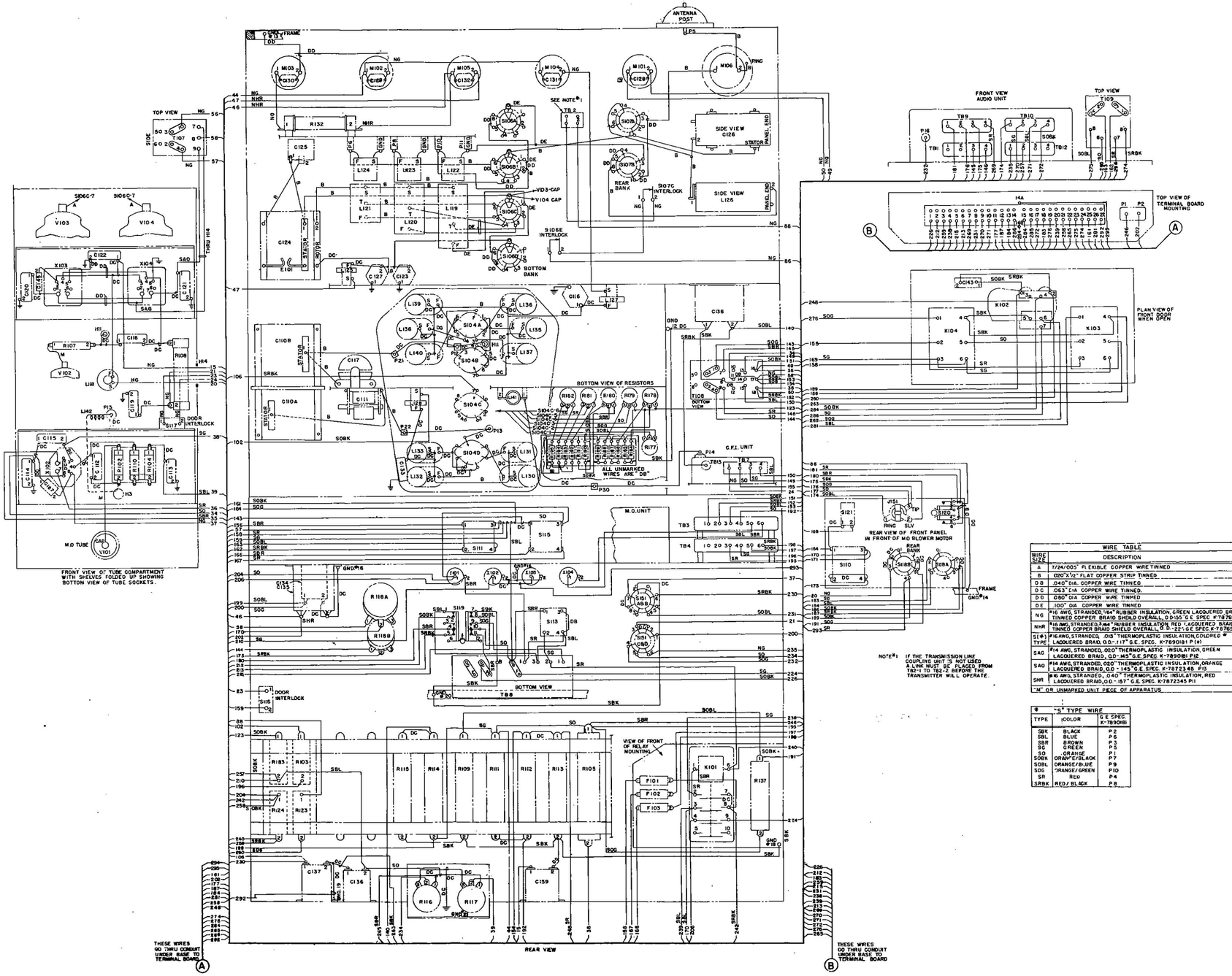
NOTE *1: IN 115V D-C MODEL, R139 IS NOT USED AND WIRES #406 AND 407 ARE TAPED BACK INTO THE CABLE AT THIS POINT.

NOTE *2: WHERE TWO SYMBOL NUMBERS APPEAR ON AN ELECTRICAL ITEM, THE SYMBOL NUMBER IN PARENTHESIS IS USED IN THE 230V D C MODEL AND THE NUMBER WITHOUT PARENTHESIS IS USED IN THE 115V D-C MODEL.

NOTE *3: IN THE 230V D-C MODEL THE FOLLOWING WIRES ARE REMOVED:
FROM TB3-6 TO TB4-2, BROWN
FROM TB4-1 TO TB4-6, BROWN

NOTE *4: LINKS ON T101 AND T102 ARE SHOWN FOR 115 VOLT D-C OPERATION. FOR 230 VOLT D-C OPERATION REMOVE LINK BETWEEN TERMINALS 3 AND 1 AND PLACE BETWEEN TERMINALS 3 AND 5. REMOVE OTHER LINK BETWEEN TERMINALS 5 / NO 6.

Figure 7-32—Connection Diagram of Transmitter, Type CG-52214A and Type CG-52215A



WIRE TABLE	
WIRE SIZE	DESCRIPTION
A	7/24/.005" FLEXIBLE COPPER WIRE TINNED
B	.020"X.1/2" FLAT COPPER STRIP TINNED
D B	.040" DIA. COPPER WIRE TINNED
D G	.063" DIA COPPER WIRE TINNED.
D D	.080" DIA COPPER WIRE TINNED
D E	.100" DIA COPPER WIRE TINNED
NG	#16 AWG, STRANDED, .164" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL, O.D-155" G.E. SPEC. K-7878933 P1
NHR	#16 AWG, STRANDED, .164" RUBBER INSULATION RED LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL, O.D. -221" G.E. SPEC. K-7878933 P2
S(#) TYPE	#16 AWG, STRANDED, .015" THERMOPLASTIC INSULATION, COLORED # LACQUERED BRAID, O.D-.117" G.E. SPEC. K-7890181 P (#)
SAG	#14 AWG, STRANDED, .020" THERMOPLASTIC INSULATION, GREEN LACQUERED BRAID, O.D-.145" G.E. SPEC K-7890181 P12
SAO	#14 AWG, STRANDED, .020" THERMOPLASTIC INSULATION, ORANGE LACQUERED BRAID, O.D -.145" G.E. SPEC. K-7872345 P13.
SHR	#16 AWG, STRANDED, .040" THERMOPLASTIC INSULATION, RED LACQUERED BRAID, O.D-.157" G.E. SPEC. K-7872345 P11
"M" OR UNMARKED	UNIT PIECE OF APPARATUS

# "S" TYPE WIRE		
TYPE	COLOR	G E SPEC. K-7890181
SBK	BLACK	P 2
SBL	BLUE	P 6
SBR	BROWN	P 3
SG	GREEN	P 5
SO	ORANGE	P 1
SOBK	ORANGE/BLACK	P 7
SOBL	ORANGE/BLUE	P 9
SOG	ORANGE/GREEN	P 10
SR	RED	P 4
SRBK	RED/BLACK	P 8

Figure 7-33—Connection Diagram of Transmitter Type CG-52299

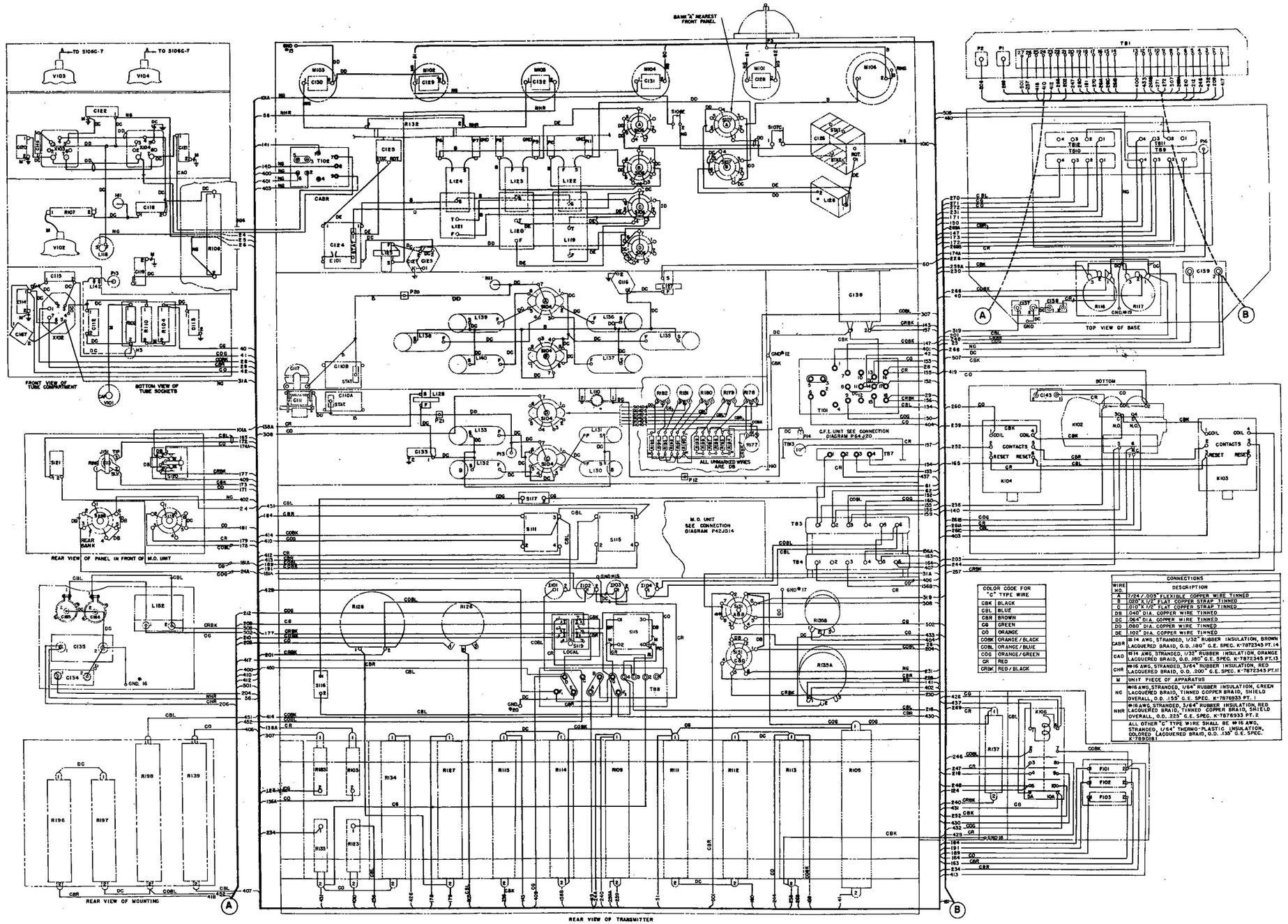


Figure 7-34—Connection Diagram of Transmitter, Type CG-52345

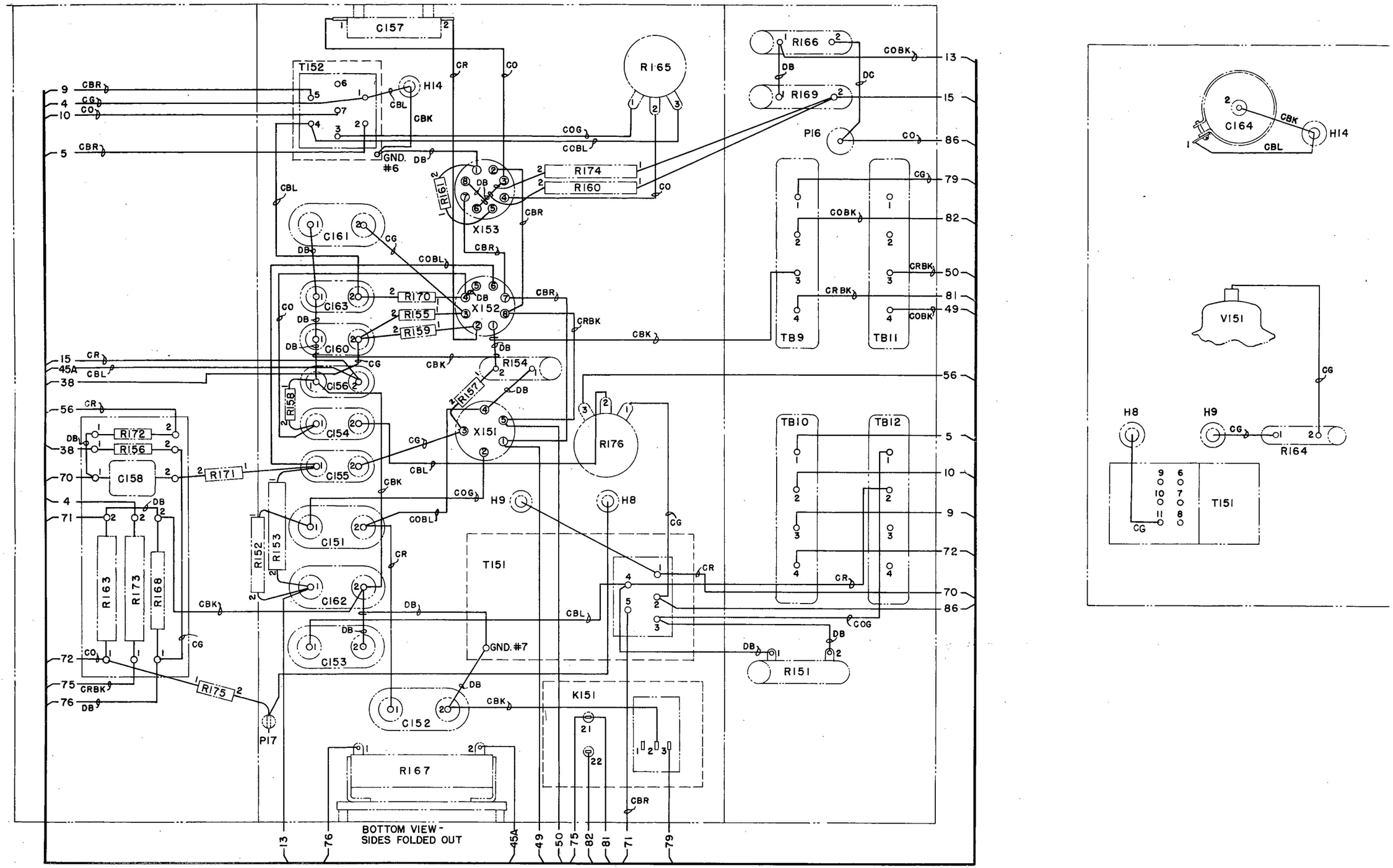
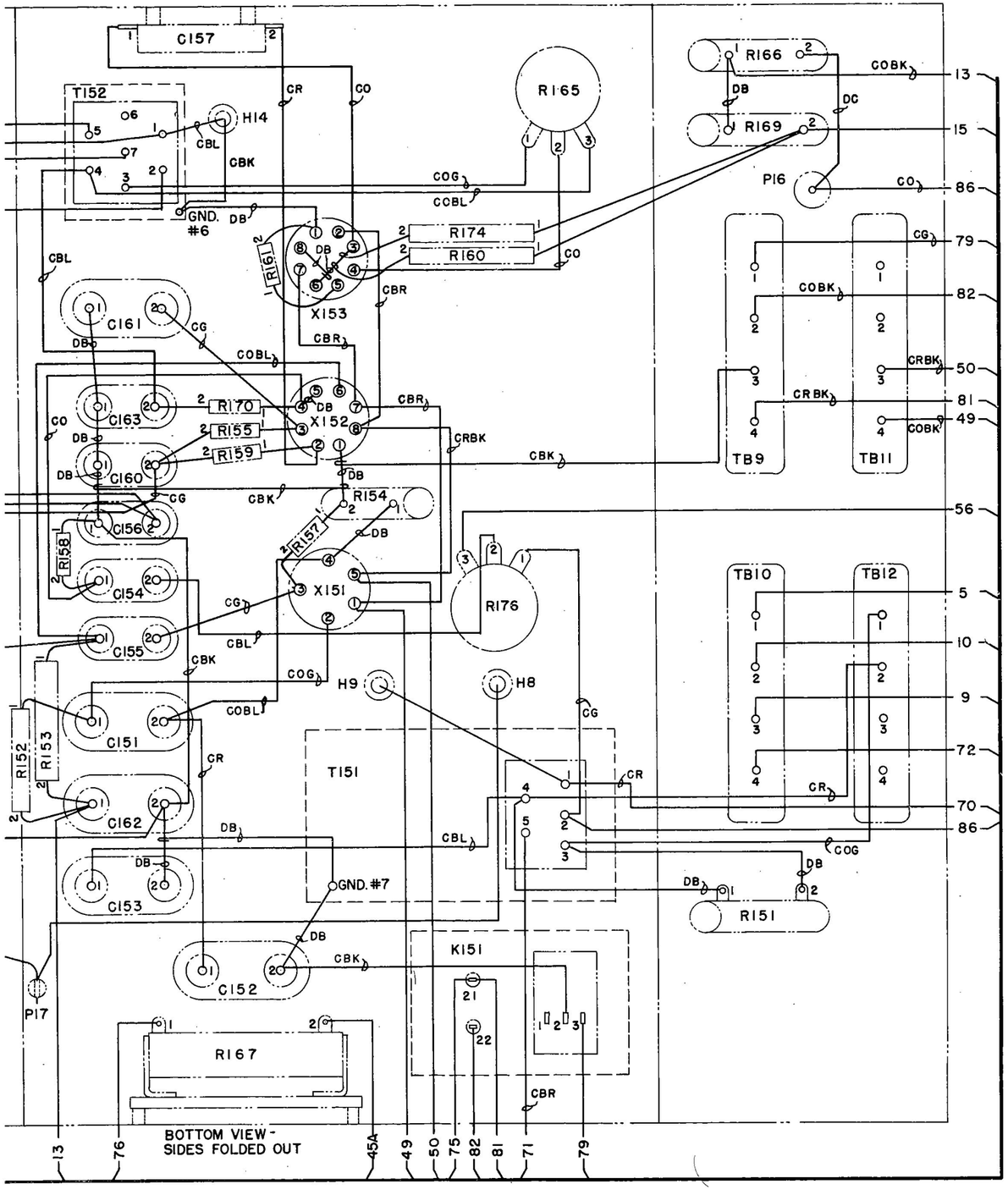
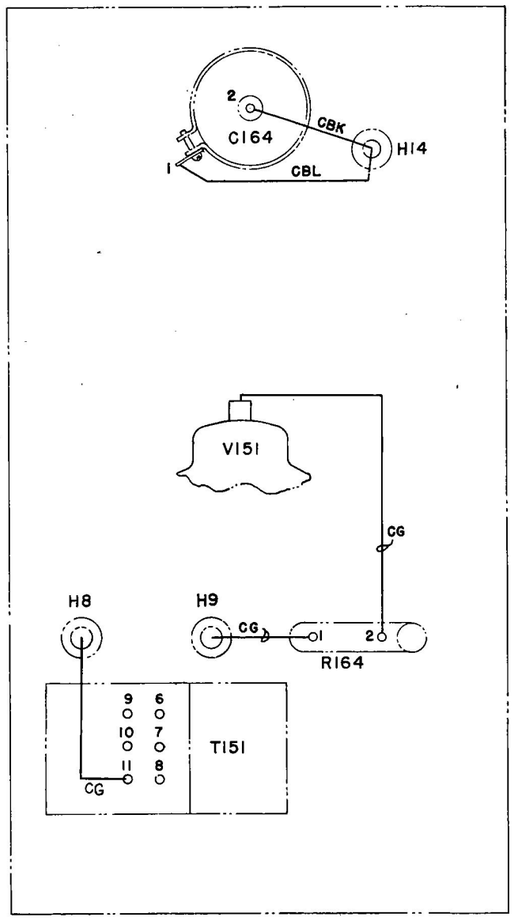


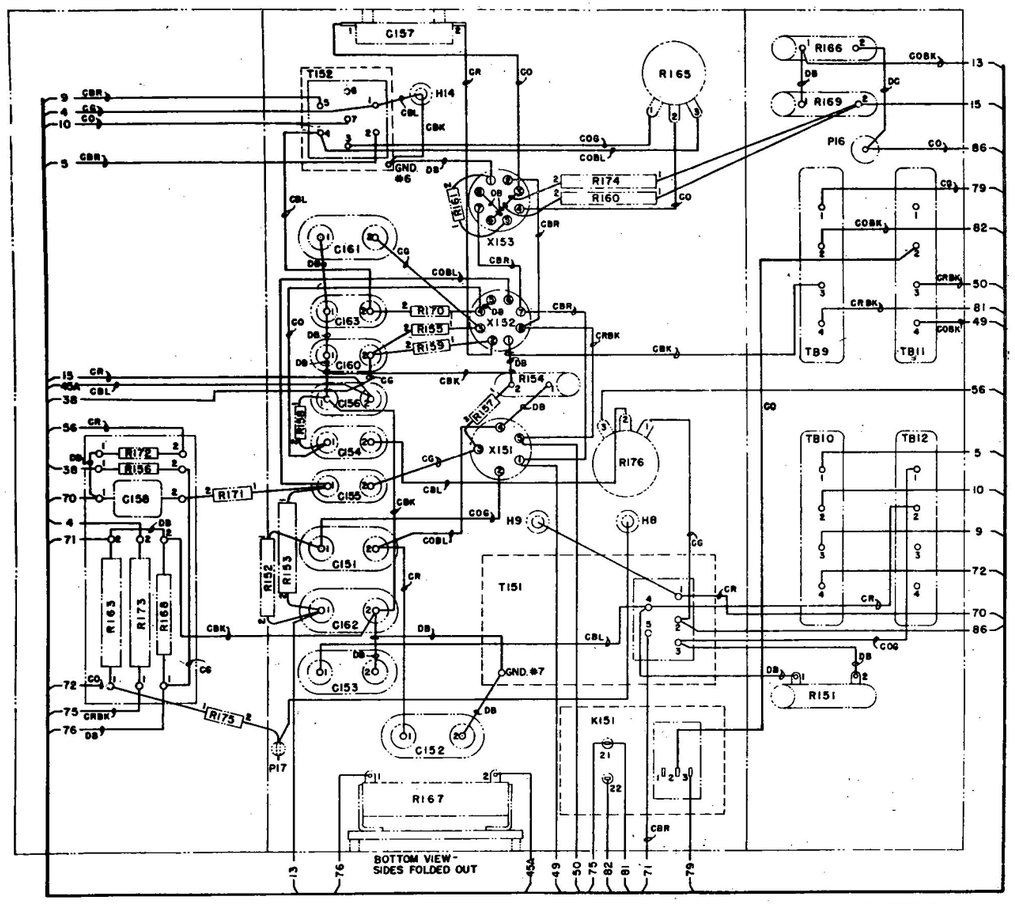
Figure 7-35—Connection Diagram of Modulator Unit, on Transmitter Types CG-52214, CG-52215, and CG-52216

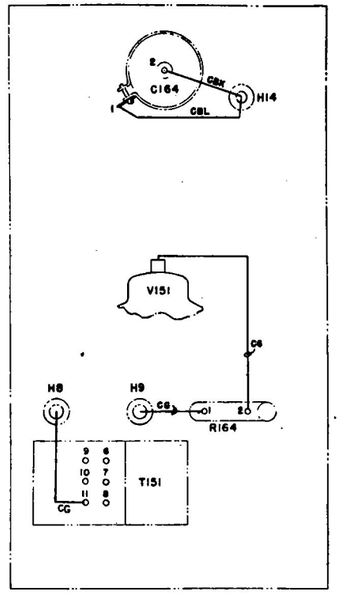




CONNECTION	DESCRIPTION
CBK	#16 AWG, BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-2
CBL	#16 AWG, BLUE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-6
CBR	#16 AWG, BROWN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-3
CG	#16 AWG, GREEN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-5
CO	#16 AWG, ORANGE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-1
COBK	#16 AWG, ORANGE/BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-7
COBL	#16 AWG, ORANGE/BLUE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-9
COG	#16 AWG, ORANGE/GREEN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-10
CR	#16 AWG, RED, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-4
CRBK	#16 AWG, RED/BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-8
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
"M" OR UNMARKED	UNIT PIECE OF APPARATUS

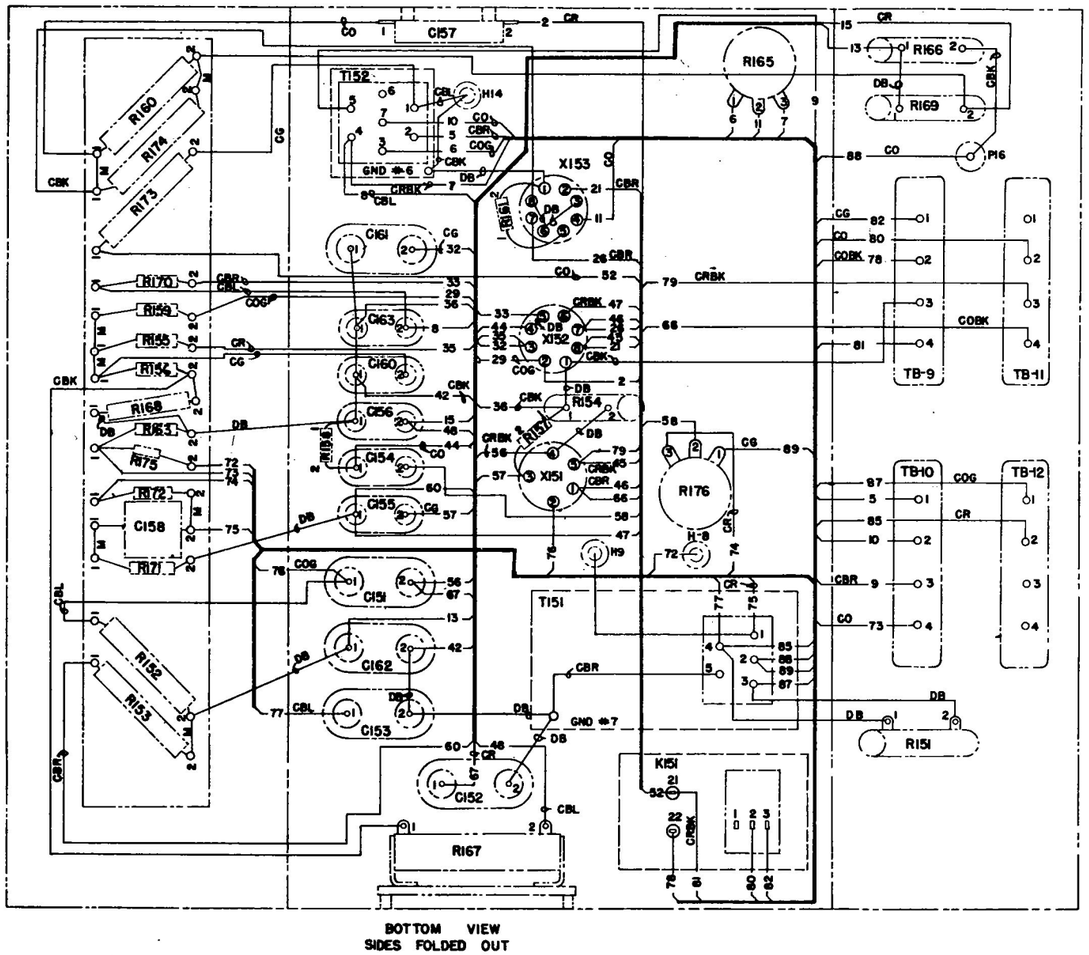
Figure 7-35—Connection Diagram of Modulator Unit, on Transmitter Types CG-52214, CG-52215, and CG-52216





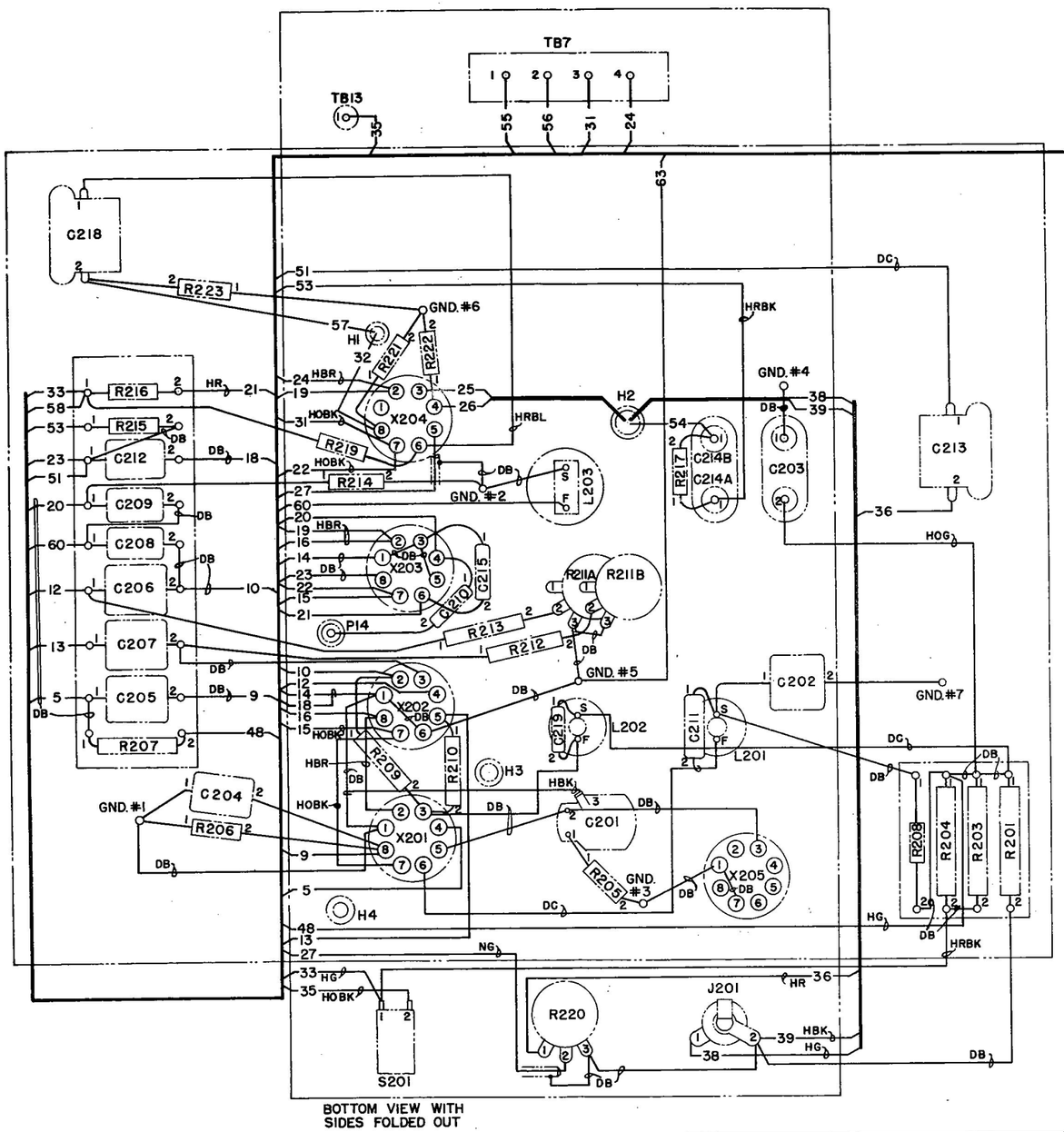
CONNECTION	DESCRIPTION
CBK	#16 AWG, BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-2
CBL	#16 AWG, BLUE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-6
CBR	#16 AWG, BROWN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-3
CG	#16 AWG, GREEN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-5
CO	#16 AWG, ORANGE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-1
COBK	#16 AWG, ORANGE/BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-7
COBL	#16 AWG, ORANGE/BLUE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-9
COG	#16 AWG, ORANGE/GREEN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-10
CR	#16 AWG, RED, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-4
CRBK	#16 AWG, RED/BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT-8
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
"M" OR UNMARKED	UNIT PIECE OF APPARATUS

Figure 7-36—Connection Diagram of Modulator Unit on Transmitter Types CG-52214A, CG-52215A, and CG-52216A



CONNECTION	DESCRIPTION
CBK	#16 AWG, BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 2
CBL	#16 AWG, BLUE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 6
CBR	#16 AWG, BROWN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 3
CG	#16 AWG, GREEN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 5
CO	#16 AWG, ORANGE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 1
COBK	#16 AWG, ORANGE/BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 7
COBL	#16 AWG. ORANGE/BLUE, RUBBER INSULATION, G.E. SPEC. K-7872345 PT.-9
COG	#16 AWG. ORANGE/GREEN, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 10
CR	#16 AWG, RED, RUBBER INSULATION, G.E. SPEC. K-7872345 PT.4
CRBK	#16 AWG, RED/BLACK, RUBBER INSULATION, G.E. SPEC. K-7872345 PT. 8
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
"M" OR UNMARKED	UNIT PIECE OF APPARTUS

Figure 7-37—Connection Diagram of Modulator Unit on Transmitter Type CG-52345



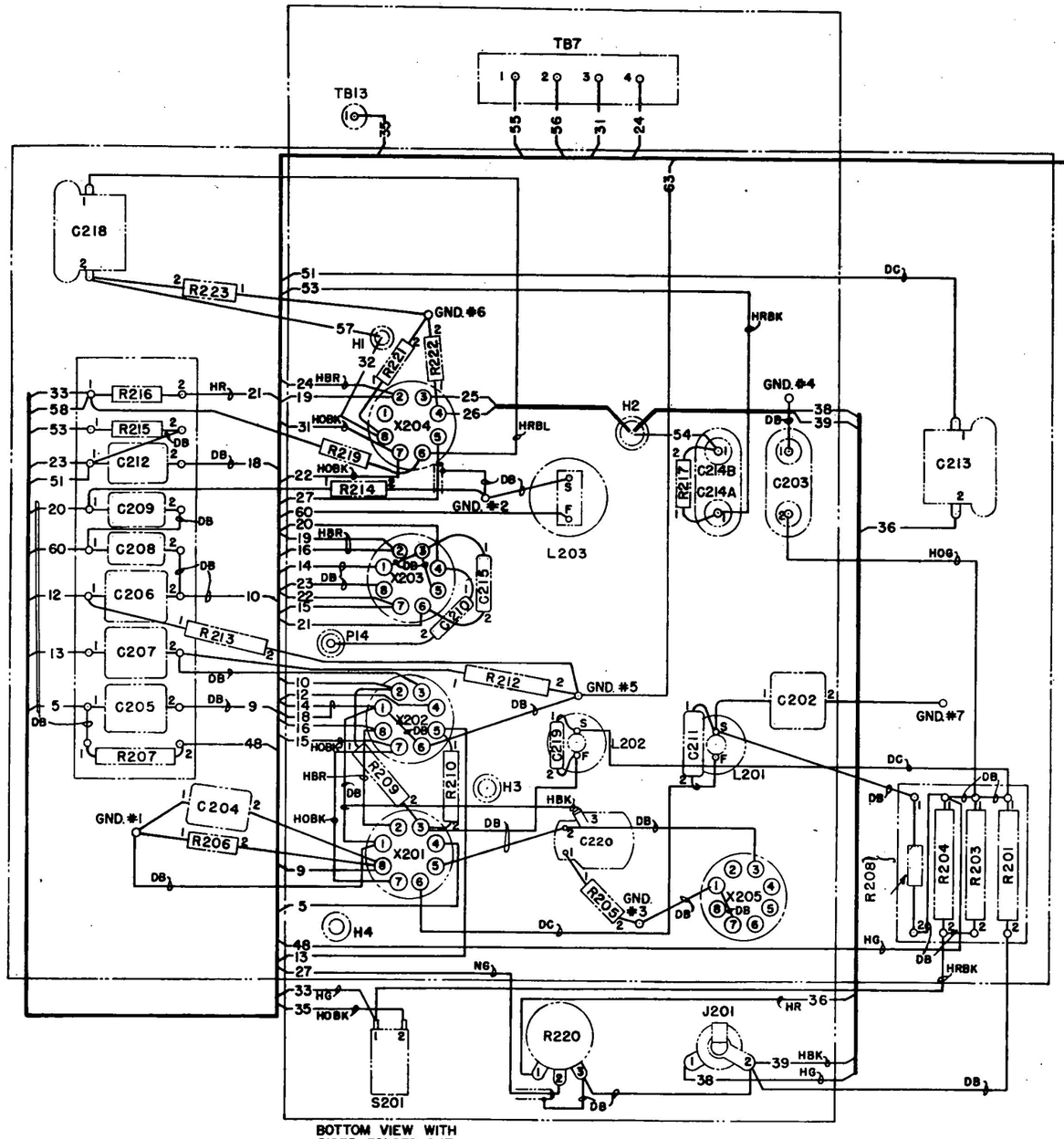
TOP VIEW

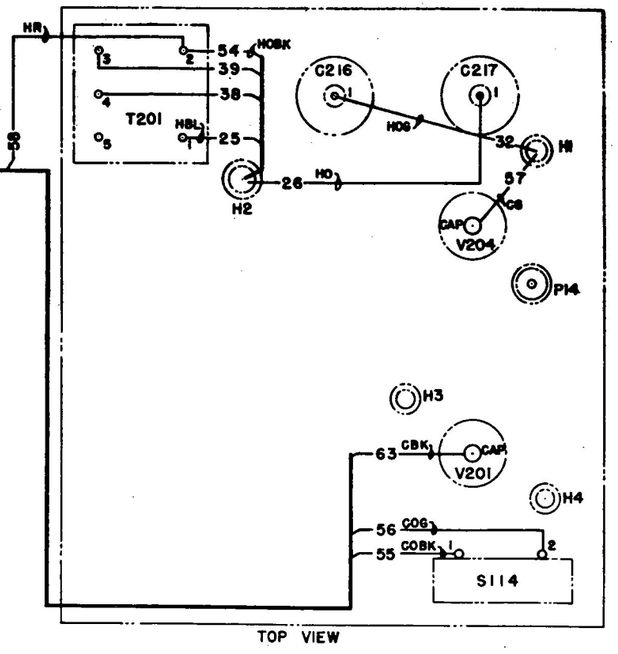
BOTTOM VIEW WITH SIDES FOLDED OUT

WIRE TABLE	
CONNECTION	DESCRIPTION
CBK	#16AWG, STRANDED, 1/32" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P2
CG	#16AWG, STRANDED, 1/32" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P5
COBK	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P7
COG	#16AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P10
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
HBK	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLACK TRACER, G.E. SPEC. K-7875044 P2
HBL	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLUE TRACER, G.E. SPEC. K-7875044 P6
HBR	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BROWN TRACER, G.E. SPEC. K-7875044 P3
HG	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH GREEN TRACER, G.E. SPEC. K-7875044 P5
HO	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH ORANGE TRACER, G.E. SPEC. K-7875044 P1
HOBK	# 22 AWG, CELLULOSE ACETATE BRAID, WITH ONE ORANGE AND ONE BLACK TRACER, G.E. SPEC. K-7875044 P7
HOG	# 22 AWG, CELLULOSE ACETATE BRAID, WITH ONE ORANGE AND ONE GREEN TRACER, G.E. SPEC. K-7875044 P10
HR	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH RED TRACER, G.E. SPEC. K-7875044 P4
HRBK	# 22 AWG, CELLULOSE ACETATE BRAID WITH ONE RED AND ONE BLACK TRACER. G.E. SPEC. K-7875044 P8
HRBL	# 22 AWG, CELLULOSE ACETATE BRAID WITH ONE RED AND ONE BLUE TRACER. G.E. SPEC. K-7875044 P9

WIRE TABLE (CONT'D)	
CONNECTION	DESCRIPTION
NG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL. O.D.-.155" GE. SPEC. K-7876933 PT-1
UNMARKED	UNIT PIECE OF APPARATUS

Figure 7-38—Connection Diagram of C.F.I. Unit on Transmitter Types CG-52214, CG-52215, and CG-52216

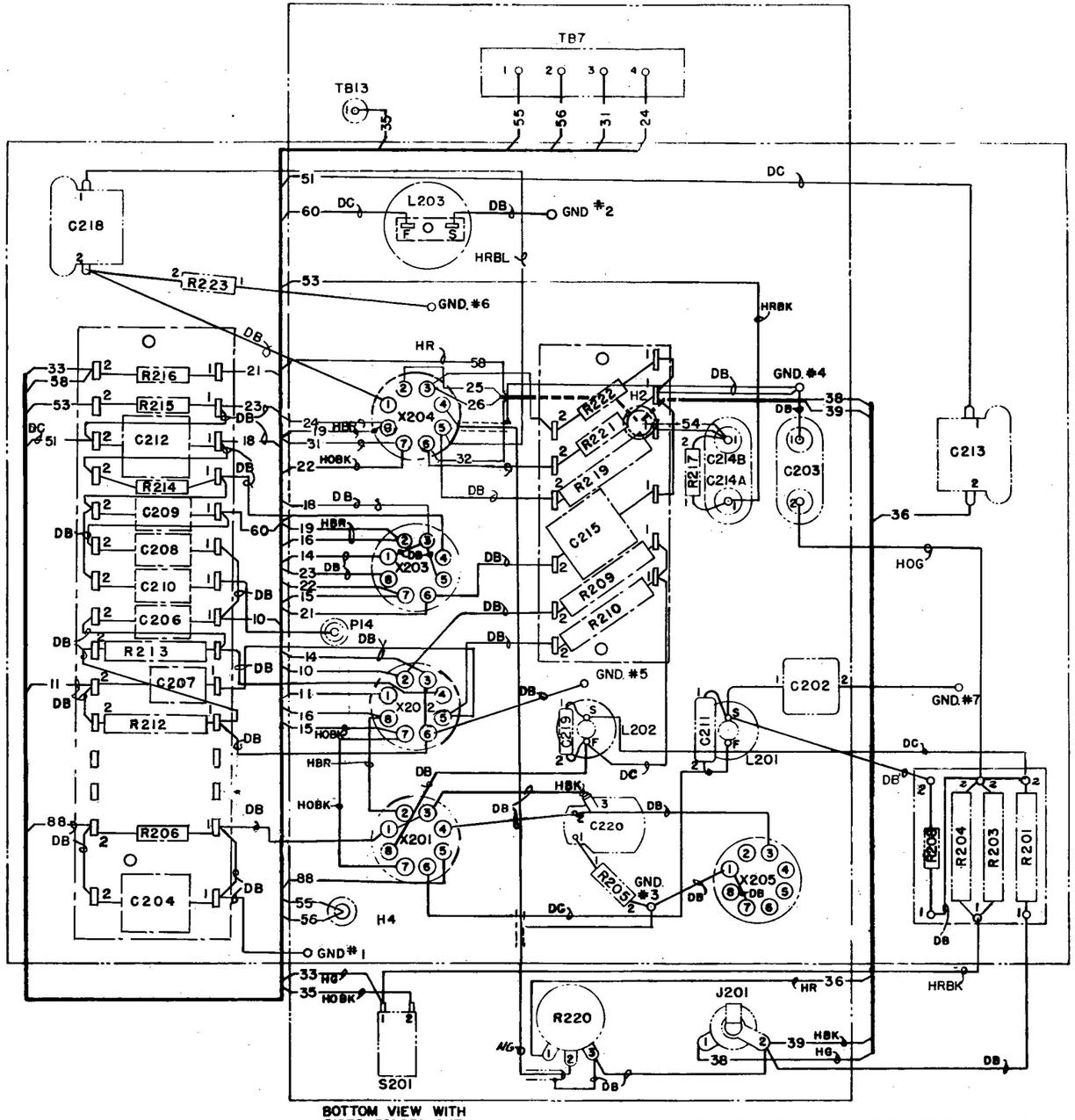




WIRE TABLE	
CONNECTION	DESCRIPTION
CBK	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P2
CG	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P5
COBK	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P7
COG	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P10
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
HBK	#22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLACK TRACER, G.E. SPEC. K-7875044 P2
HBL	#22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLUE TRACER, G.E. SPEC. K-7875044 P6
HBR	#22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BROWN TRACER, G.E. SPEC. K-7875044 P3
HG	#22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH GREEN TRACER, G.E. SPEC. K-7875044 P5
HO	#22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH ORANGE TRACER, G.E. SPEC. K-7875044 P1
HOBK	#22 AWG, CELLULOSE ACETATE BRAID, WITH ONE ORANGE AND ONE BLACK TRACER, G.E. SPEC. K-7875044 P7
HOG	#22 AWG, CELLULOSE ACETATE BRAID, WITH ONE ORANGE AND ONE GREEN TRACER, G.E. SPEC. K-7875044 P10
HR	#22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH RED TRACER, G.E. SPEC. K-7875044 P4
HRBK	#22 AWG, CELLULOSE ACETATE BRAID WITH ONE RED AND ONE BLACK TRACER. G.E. SPEC. K-7875044 P8
HRBL	#22 AWG, CELLULOSE ACETATE BRAID WITH ONE RED AND ONE BLUE TRACER. G.E. SPEC. K-7875044 P9

WIRE TABLE (CONT'D)	
CONNECTION	DESCRIPTION
NG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL. O.D. - .155" G.E. SPEC. K-7876933 PT-1
UNMARKED	UNIT PIECE OF APPARATUS

Figure 7-39—Connection Diagram of C.F.I. Unit on Transmitter Types CG-52214A, CG-52215A, CG-52216A, and CG-52299



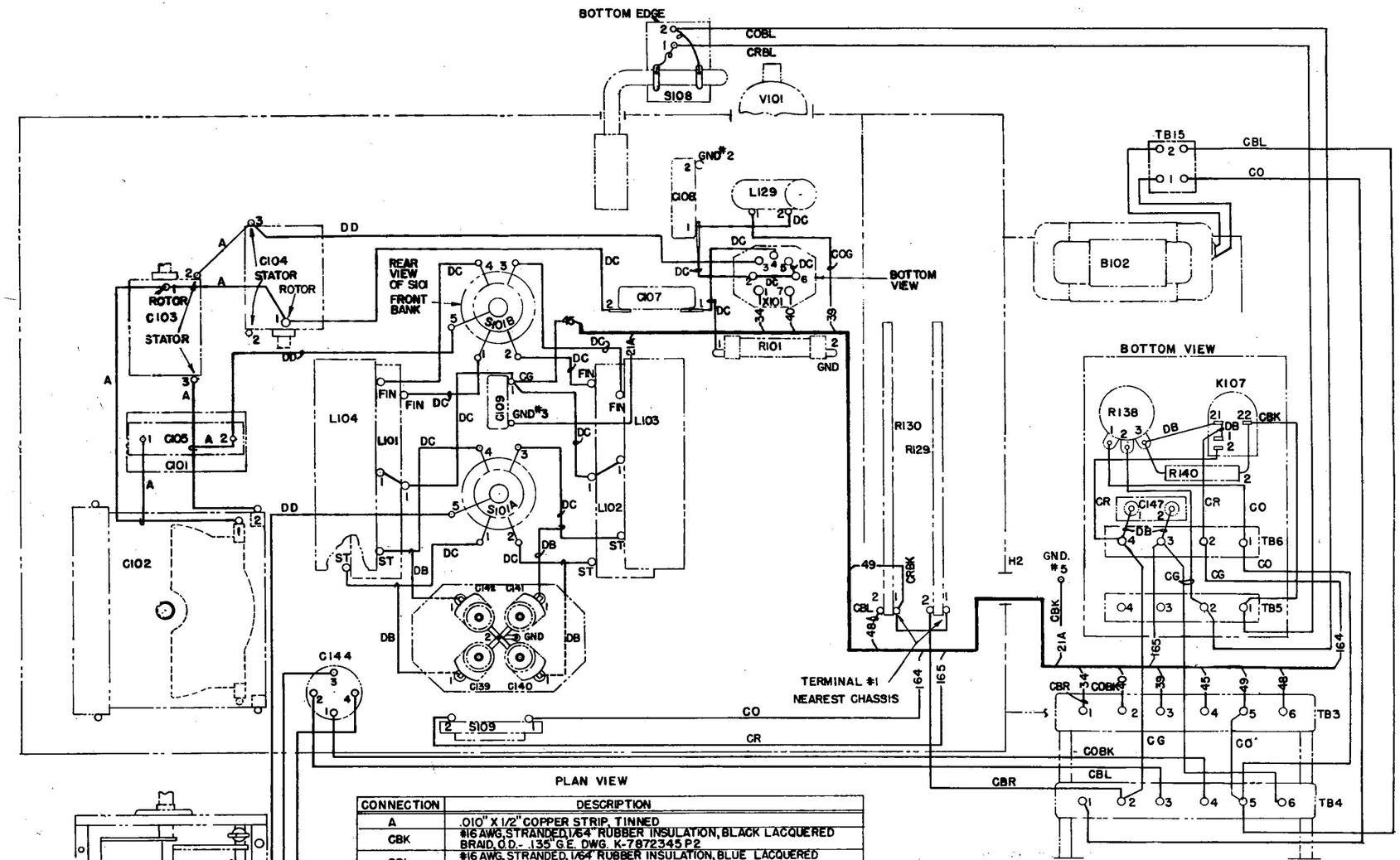
TOP VIEW

BOTTOM VIEW WITH SIDES FOLDED OUT

WIRE TABLE	
CONNECTION	DESCRIPTION
CBK	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P2
CG	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P5
COBK	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P7
COG	#16 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. SPEC. K-7872345 P10
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
HBK	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLACK TRACER, G.E. SPEC. K-7875044 P2
HBL	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLUE TRACER, G.E. SPEC. K-7875044 P6
HBR	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BROWN TRACER, G.E. SPEC. K-7875044 P3
HG	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH GREEN TRACER, G.E. SPEC. K-7875044 P5
HO	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH ORANGE TRACER, G.E. SPEC. K-7875044 P1
HOBK	# 22 AWG, CELLULOSE ACETATE BRAID, WITH ONE ORANGE AND ONE BLACK TRACER, G.E. SPEC. K-7875044 P7
HOG	# 22 AWG, CELLULOSE ACETATE BRAID, WITH ONE ORANGE AND ONE GREEN TRACER, G.E. SPEC. K-7875044 P10
HR	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH RED TRACER, G.E. SPEC. K-7875044 P4
HRBK	# 22 AWG, CELLULOSE ACETATE BRAID WITH ONE RED AND ONE BLACK TRACER, G.E. SPEC. K-7875044 P8.
HRBL	# 22 AWG, CELLULOSE ACETATE BRAID WITH ONE RED AND ONE BLUE TRACER. G.E. SPEC. K-7875044 P9

WIRE TABLE (CONT'D)	
CONNECTION	DESCRIPTION
NG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID SHIELD OVERALL. O.D. - .155" G.E. SPEC. K-7876933 PT-1
UNMARKED	UNIT PIECE OF APPARATUS

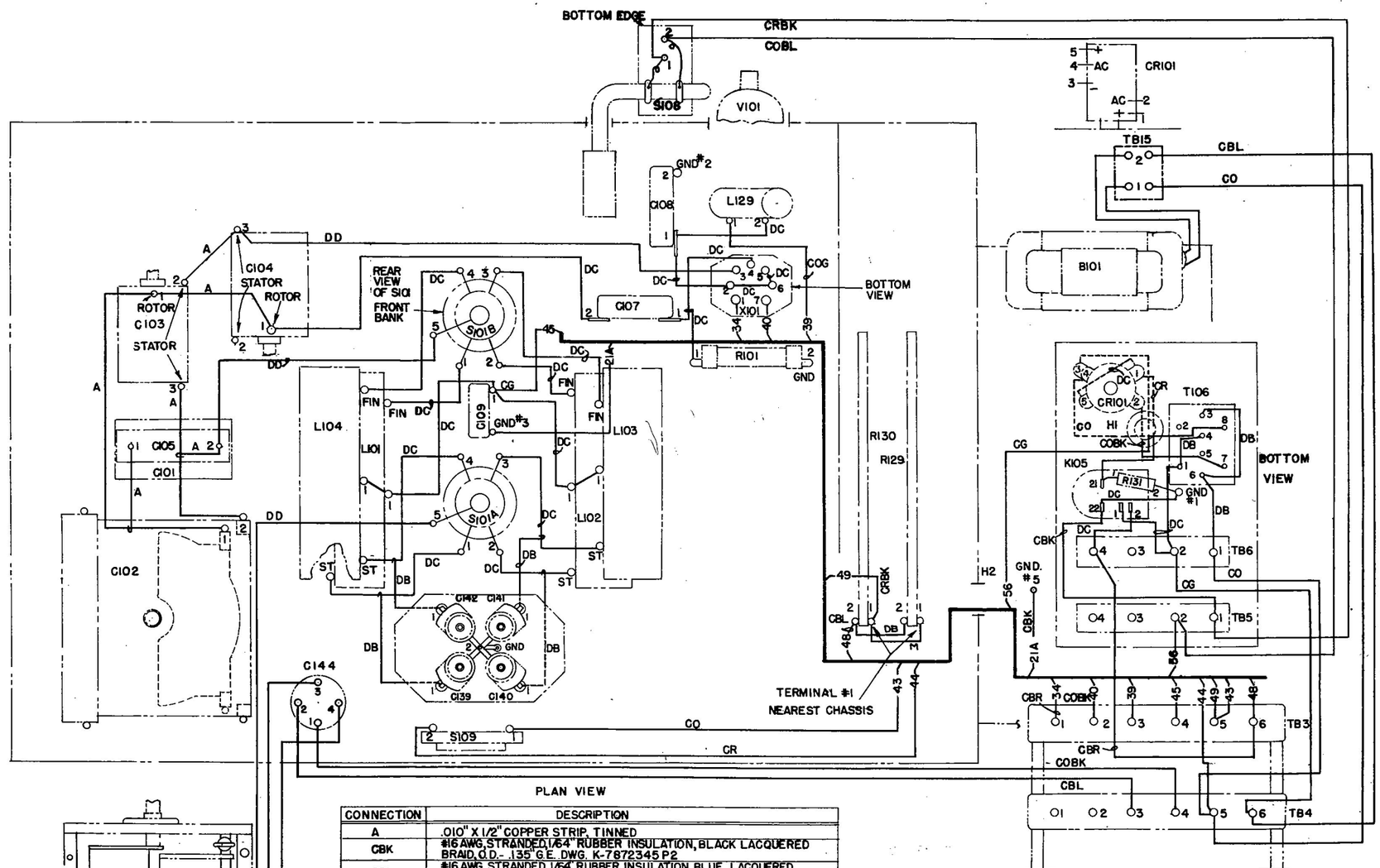
Figure 7-40—Connection Diagram of C.F.I. Unit on Transmitter Type CG-52345



CONNECTION	DESCRIPTION
A	.010" X 1/2" COPPER STRIP, TINNED
CBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P2
CBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P6
CBR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P3
CG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P5
CO	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P1
COBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION ORANGE/BLACK LACQUERED BRAID, O.D. - .135" GE. DWG. K-7872345 P7
COBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P9
COG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P10
CR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P4
CRBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P8
DB	.040" DIA. TINNED COPPER WIRE.
DC	.001" DIA. TINNED COPPER WIRE.
DD	.080" DIA. TINNED COPPER WIRE.
"M" OR UNMARKED	UNIT PIECE OF APPARATUS.

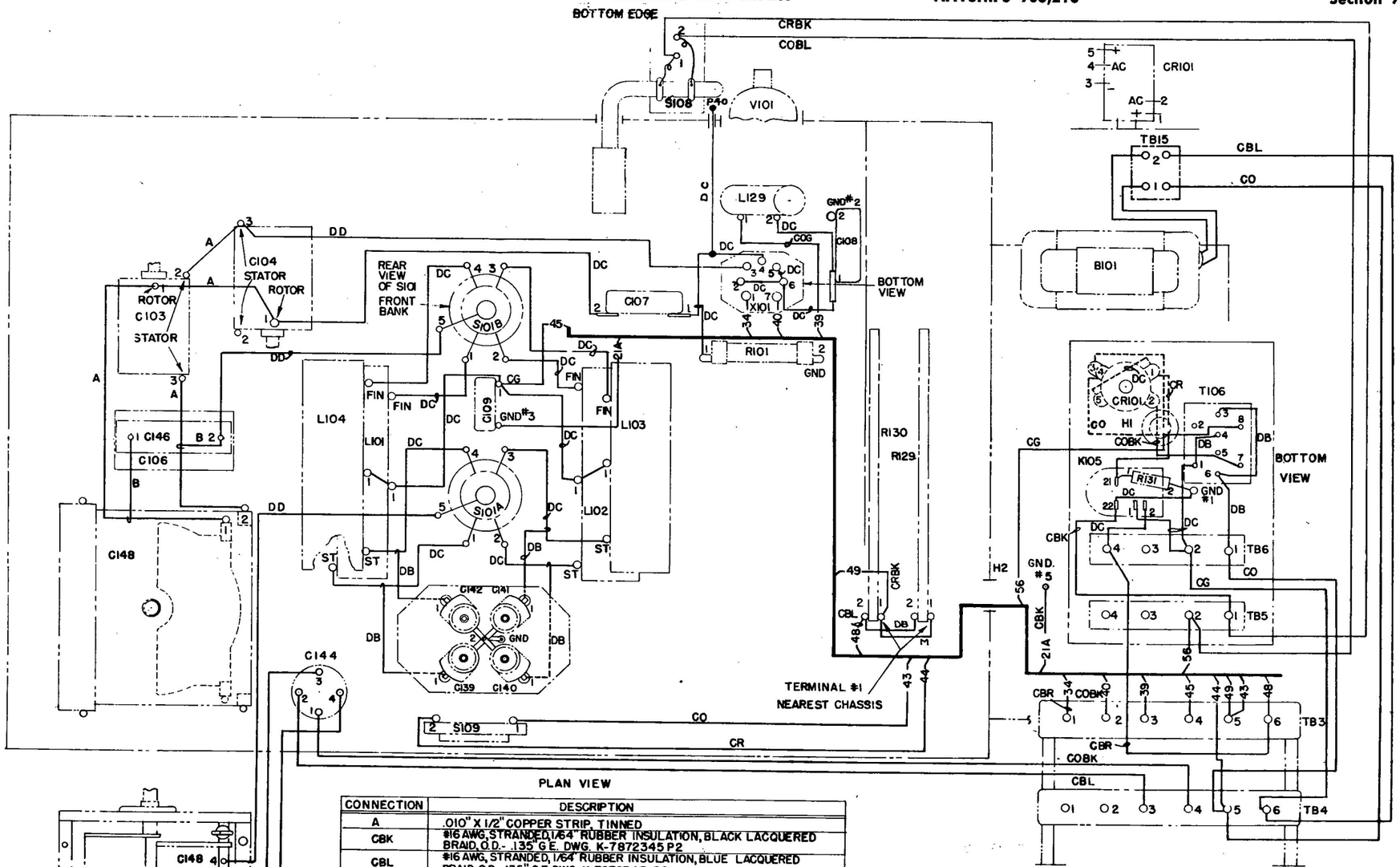
NOTE: FOR 230 V. D-C OPERATION CHANGE FLEXIBLE WIRE LINK FROM TB4-5 TO TB3-5 TO RUN FROM TB4-5 TO TB 3-6.

Figure 7-41—Connection Diagram of M-O Unit on Transmitter Types CG-52214, CG-52215, CG-52214A, and CG-52215A



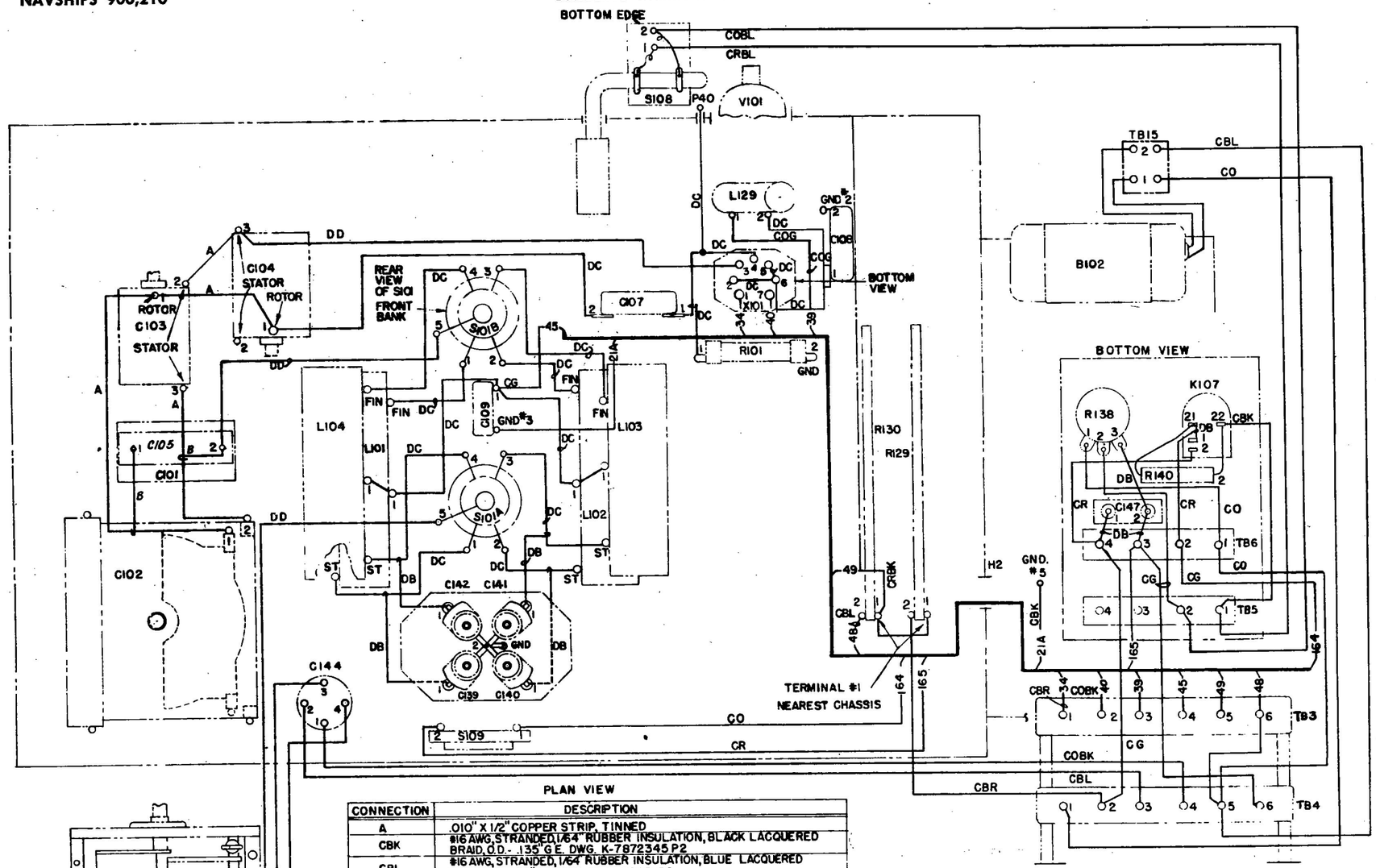
CONNECTION	DESCRIPTION
A	.010" X 1/2" COPPER STRIP, TINNED
CBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P2
CBL	#16 AWG, STRANDED, 1/64 RUBBER INSULATION, BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P6
CBR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P3
CG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P5
CO	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P1
COBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION ORANGE/BLACK LACQUERED BRAID, O.D. - .135" GE DWG K-7872345 P7
COBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P9
COG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P10
CR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P4
CRBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P8
DB	.040" DIA. TINNED COPPER WIRE.
DC	.063" DIA. TINNED COPPER WIRE.
DD	.080" DIA. TINNED COPPER WIRE.
"M" OR UNMARKED	UNIT PIECE OF APPARATUS.

Figure 7-42—Connection Diagram of M-O Unit of Transmitter Types CG-52216 and CG-52216A



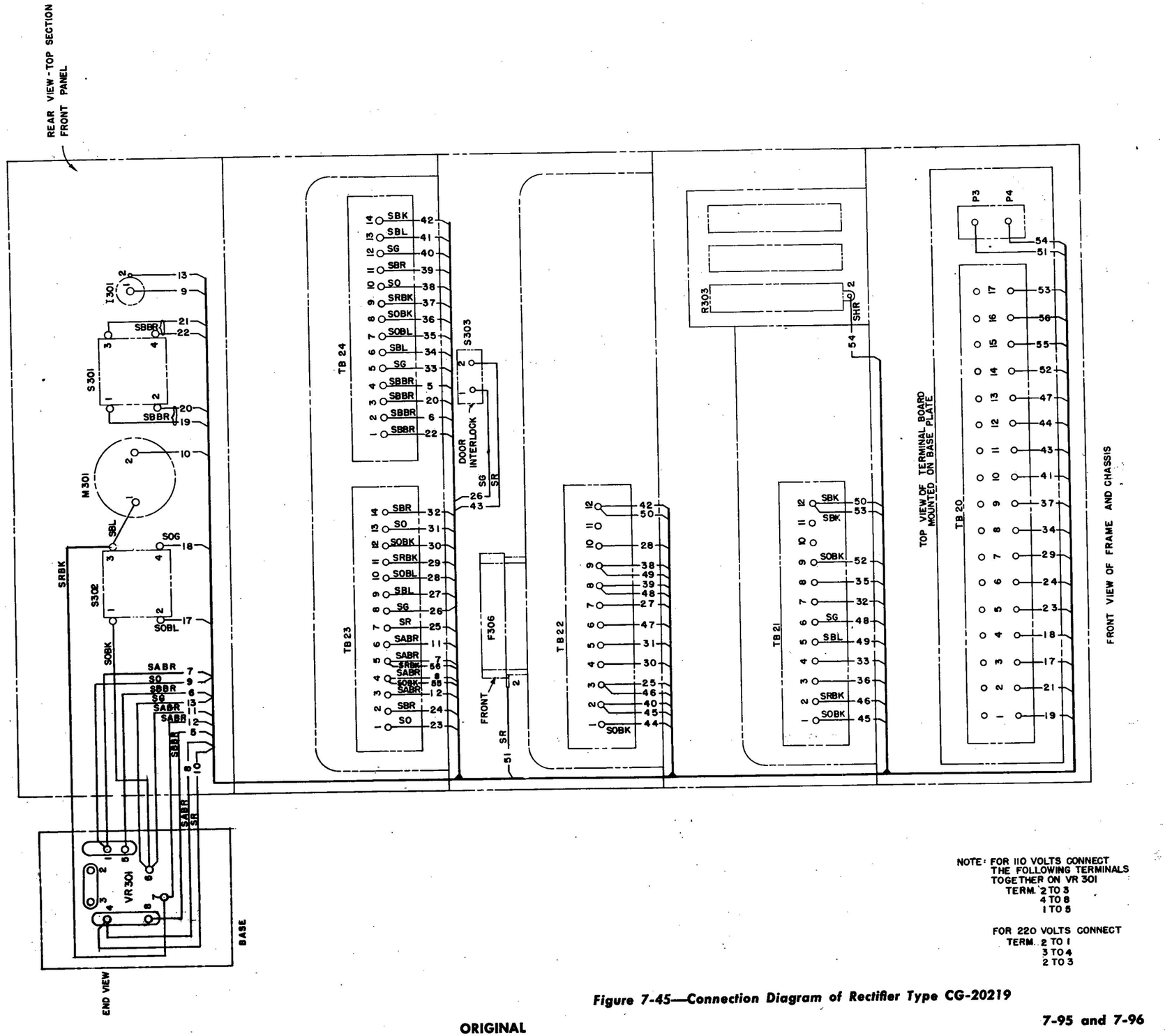
CONNECTION	DESCRIPTION
A	.010" X 1/2" COPPER STRIP, TINNED
CBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P2
CBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P6
CBR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P3
CG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P5
CO	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P1
COBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION ORANGE/BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P7
COBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P9
COG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P10
CR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P4
CRBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P8
DB	.040" DIA. TINNED COPPER WIRE.
DC	.063" DIA. TINNED COPPER WIRE.
DD	.080" DIA. TINNED COPPER WIRE.
"M" OR UNMARKED	UNIT PIECE OF APPARATUS.
B	.020" X 1/2" COPPER STRIP, TINNED

Figure 7-43—Connection Diagram of M-O Unit on Transmitter Type CG-52299



CONNECTION	DESCRIPTION
A	.010" X 1/2" COPPER STRIP, TINNED
CBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P2
CBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P6
CBR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P3
CG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P5
CO	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P1
COBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION ORANGE/BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P7
COBL	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P9
COG	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P10
CR	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P4
CRBK	#16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D. - .135" G.E. DWG. K-7872345 P8
DB	.040" DIA. TINNED COPPER WIRE.
DC	.001" DIA. TINNED COPPER WIRE.
DD	.080" DIA. TINNED COPPER WIRE
"M" OR UNMARKED	UNIT PIECE OF APPARATUS.
B	.020" X 1/2" COPPER STRIP, TINNED

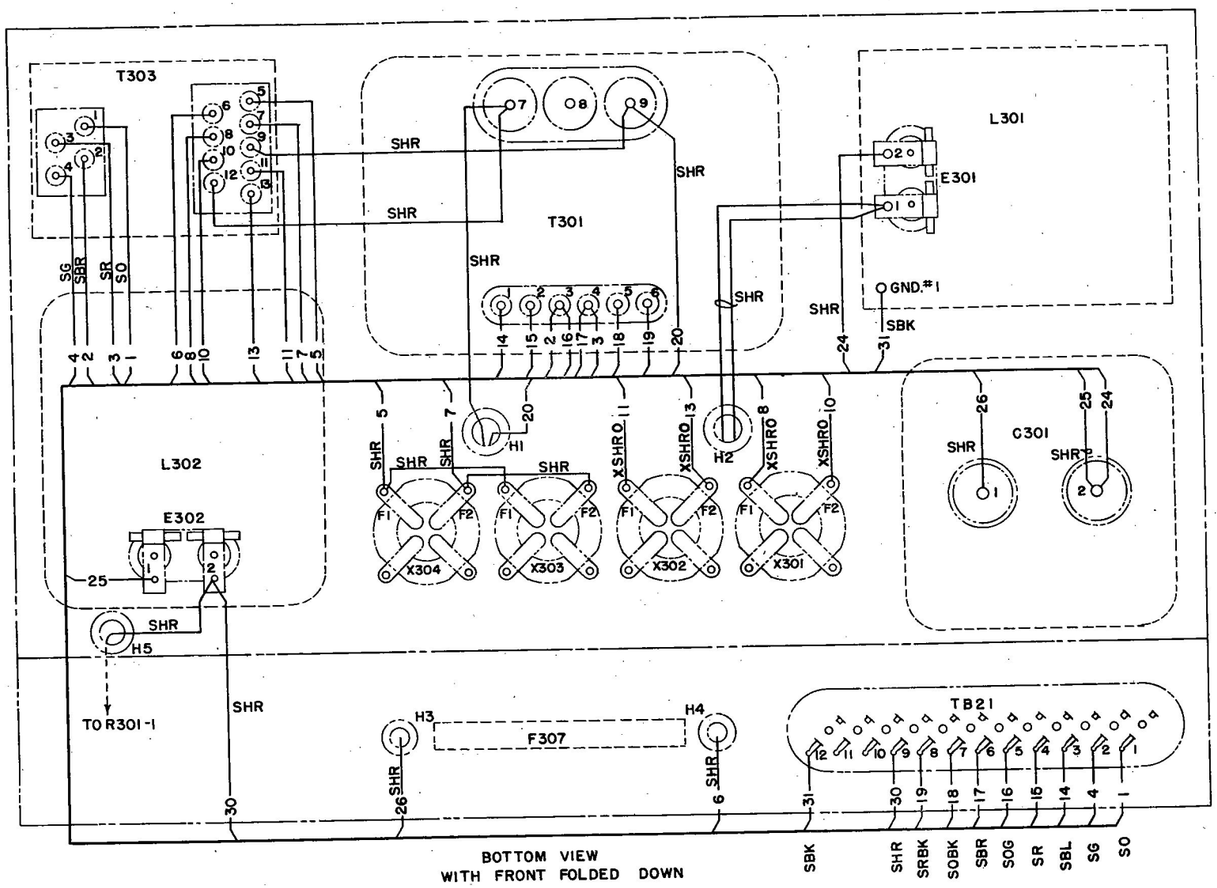
Figure 7-44—Connection Diagram of M-O Unit on Transmitter Type CG-52345



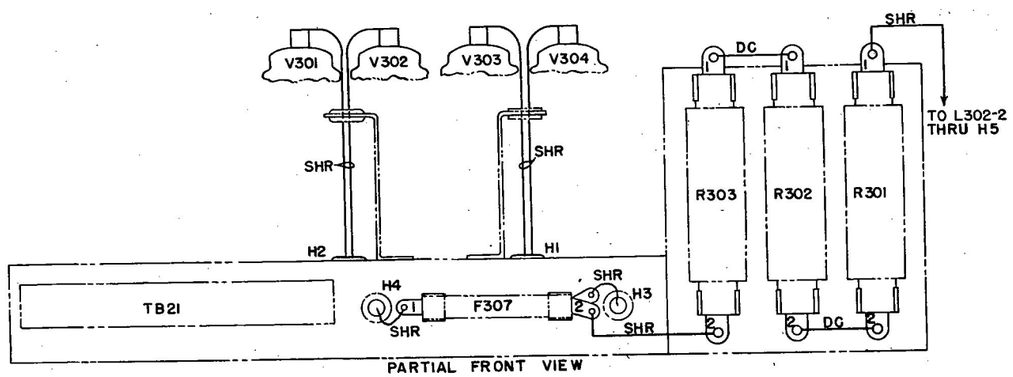
NOTE: FOR 110 VOLTS CONNECT THE FOLLOWING TERMINALS TOGETHER ON VR 301
TERM. 2 TO 3
4 TO 8
1 TO 5

FOR 220 VOLTS CONNECT
TERM. 2 TO 1
3 TO 4
2 TO 3

Figure 7-45—Connection Diagram of Rectifier Type CG-20219

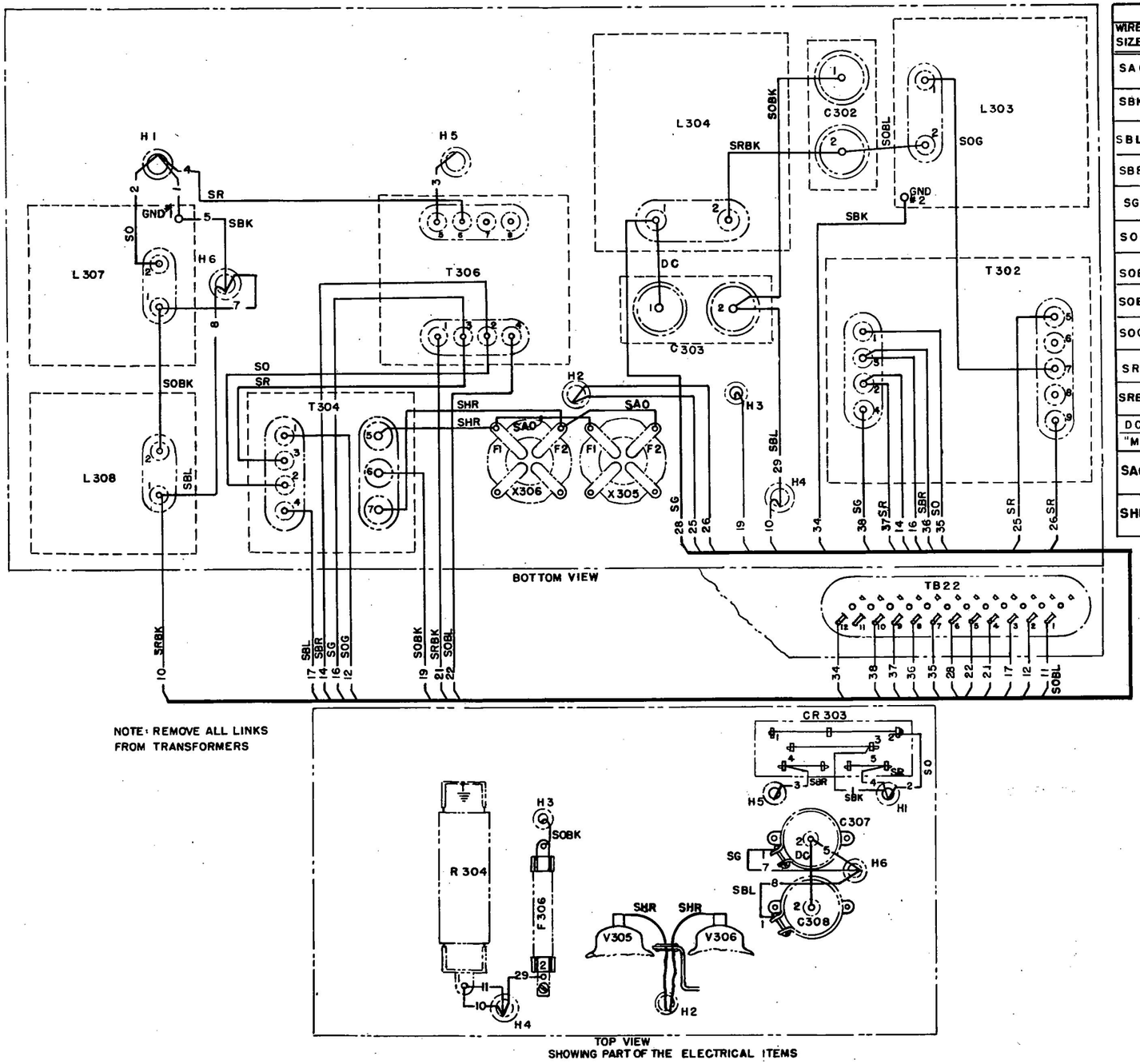


NOTE: REMOVE ALL LINKS FROM TRANSFORMERS.



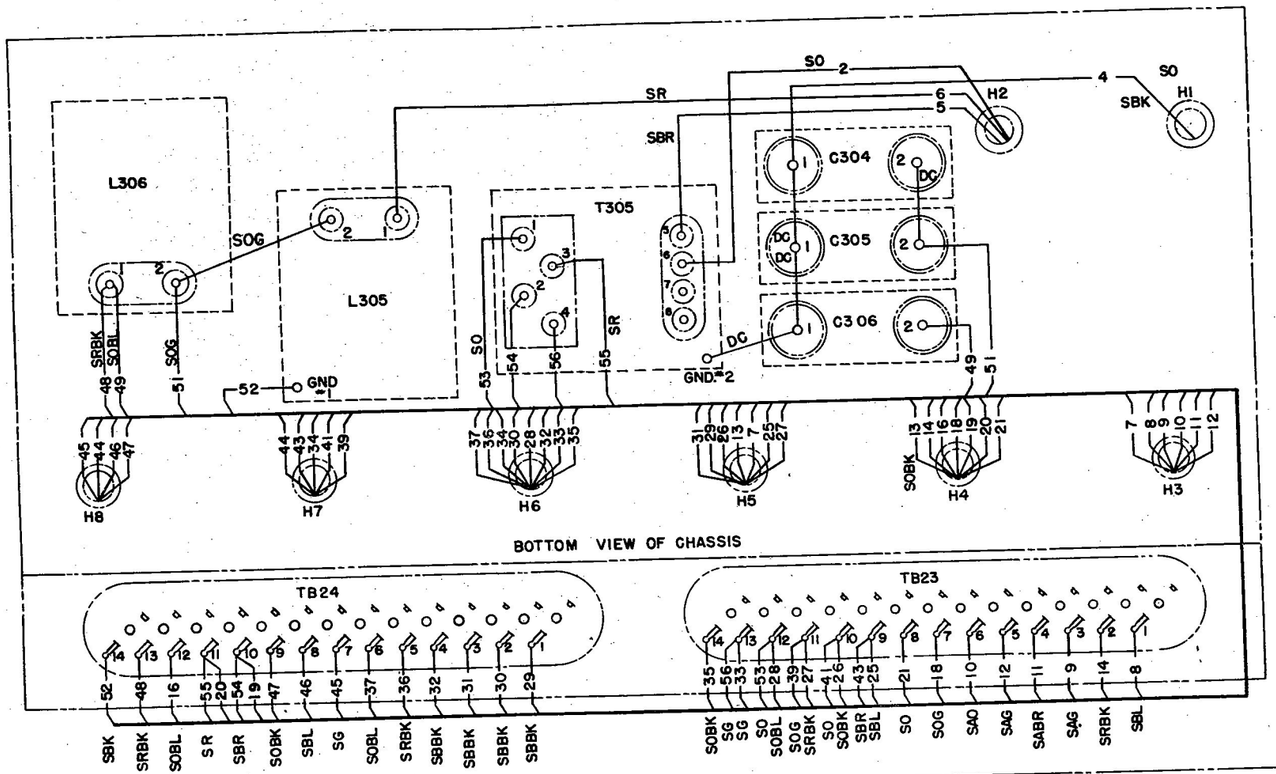
WIRE TABLE	
WIRE SIZE	DESCRIPTION
SBK	#16 AWG. STRANDED, 1/64" THERMOPLASTIC INSULATION, BLACK LACQUERED BRAND, O.D.-.117" G.E. SPEC. K-7890181 P2
SBL	#16 AWG. STRANDED, 1/64" THERMOPLASTIC INSULATION, BLUE LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P6
SBR	#16 AWG. STRANDED, 1/64" THERMOPLASTIC INSULATION, BROWN LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P3
SG	#16 AWG. STRANDED, 1/64" THERMOPLASTIC INSULATION, GREEN LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P5
SHR	#16 AWG. STRANDED, .040" THERMOPLASTIC INSULATION, RED LACQUERED BRAID, O.D.-.157" G.E. SPEC. K-7890181 P11
SHRB	#14 AWG. STRANDED, .040" THERMOPLASTIC INSULATION, RED/BLACK LACQUERED BRAID, O.D.-.177" G.E. SPEC. K-7890181 P15
SO	#16 AWG STRANDED, 1/64" THERMOPLASTIC INSULATION, ORANGE LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P1
SOBK	#16 AWG. STRANDED, 1/64" THERMOPLASTIC INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P7
SOBL	#16 AWG. STRANDED 1/64" THERMOPLASTIC INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P9
SOG	#16 AWG STRANDED, 1/64" THERMOPLASTIC INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P10
SR	#16 AWG. STRANDED, 1/64" THERMOPLASTIC INSULATION, RED LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P4
SRBK	#16 AWG STRANDED, 1/64" THERMOPLASTIC INSULATION, RED/BLACK LACQUERED BRAID, O.D.-.117" G.E. SPEC. K-7890181 P8
DC	.063" DIA. COPPER WIRE TINNED.
XSHRO	# 18 AWG STRANDED .040" THERMOPLASTIC INSULATION. RED/ORANGE LACQUERED BRAID O.D. .175" G.E. SPEC K52J120-P4 COVERED FULL LENGTH WITH #4 BLACK IRVOLITE TUBING

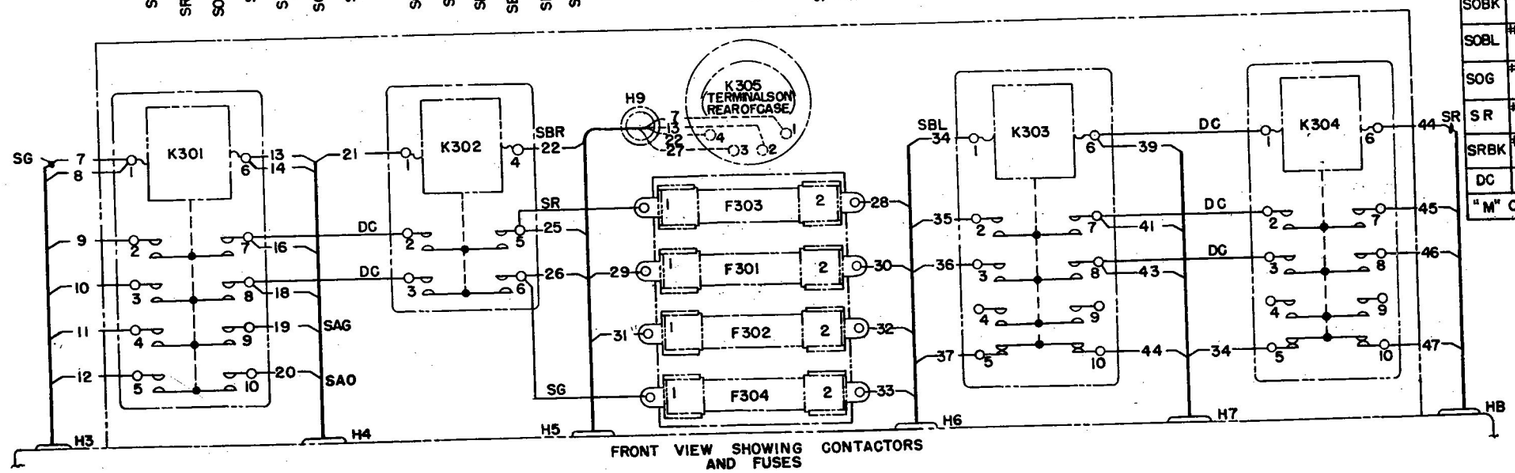
Figure 7-46—Connection Diagram of High Voltage Unit on Rectifier, Type CG-20219

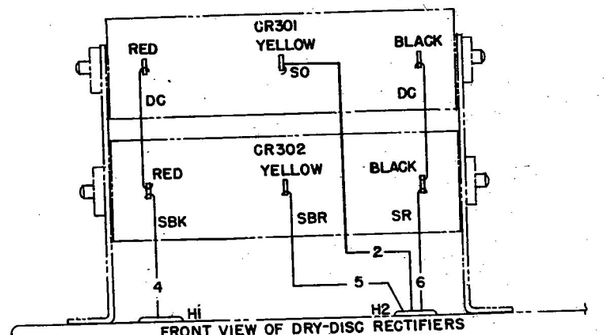


WIRE TABLE	
WIRE SIZE	DESCRIPTION
SAG	#14 AWG. STRANDED .020" THERMOPLASTIC INSULATION GREEN LACQUERED BRAID O.D-.145" G.E. SPEC. K-7890181 P 12
SBK	#16 AWG. STRANDED 1/4 THERMOPLASTIC INSULATION BLACK LACQUERED BRAID O.D.-.117" G.E.SPEC. K7890181 P 2
SBL	#16 AWG. STRANDED 1/4 THERMOPLASTIC INSULATION BLUE LACQUERED BRAID O.D-117" G.E.SPEC. K-7890181 P6
SBR	#16AWG. STRANDED 1/4 THERMOPLASTIC INSULATION BROWN LACQUERED BRAID O.D.-.117" G.E.SPEC. K-7890181 P-3
SG	#16 AWG. STRANDED 1/4 THERMOPLASTIC INSULATION GREEN LACQUERED BRAID O.D-.117" G.E SPEC. K-7890181 P 5
SO	#16AWG. STRANDED 1/4 THERMOPLASTIC INSULATION ORANGE LACQUERED BRAID OD-117" G.E. SPEC. K-7890181 P 1
SOBK	#16 AWG. STRANDED 1/4 THERMOPLASTIC INSULATION ORANGE/BLACK LACQUERED BRAID O.D.117" G.E.SPEC. K-7890181 P 7
SOBL	#16AWG. STRANDED 1/4 THERMOPLASTIC INSULATION ORANGE/BLUE LACQUERED BRAID O.D.117" G.E. SPEC. K-7890181P9
SOG	#16 AWG. STRANDED 1/4 THERMOPLASTIC INSULATION ORANGE/GREEN LACQUERED BRAID O.D.-117 G.E SPEC. K-7890181 P10
SR	#16 AWG. STRANDED 1/4 THERMOPLASTIC INSULATION RED LACQUERED BRAID O.D.-.117" G.E. SPEC. K-7890181 P4
SRBK	#16AWG. STRANDED 1/4 THERMOPLASTIC INSULATION RED/BLACK LACQUERED BAID O.D.-117 G.E.SPEC. K-7890181 P 8
DC	.063"DIA.COPPER WIRE TINNED
"M" OR UNMARKED, UNIT PIECE OF APPAPATUS	
SAO	#14 AWG. STRANDED .020" THERMOPLASTIC INSULATION ORANGE LACQUER BRAID O.D. 145 G.E. SPEC. K7890181P13
SHR	#16AWG. STRANDED .040" THERMOPLASTIC INSULATION RED LACQUER BRAID O.D.157" G.E. SPEC. K 7890181P11

Figure 7-47—Connection Diagram of Low Voltage Unit on Rectifier, Type CG-20219

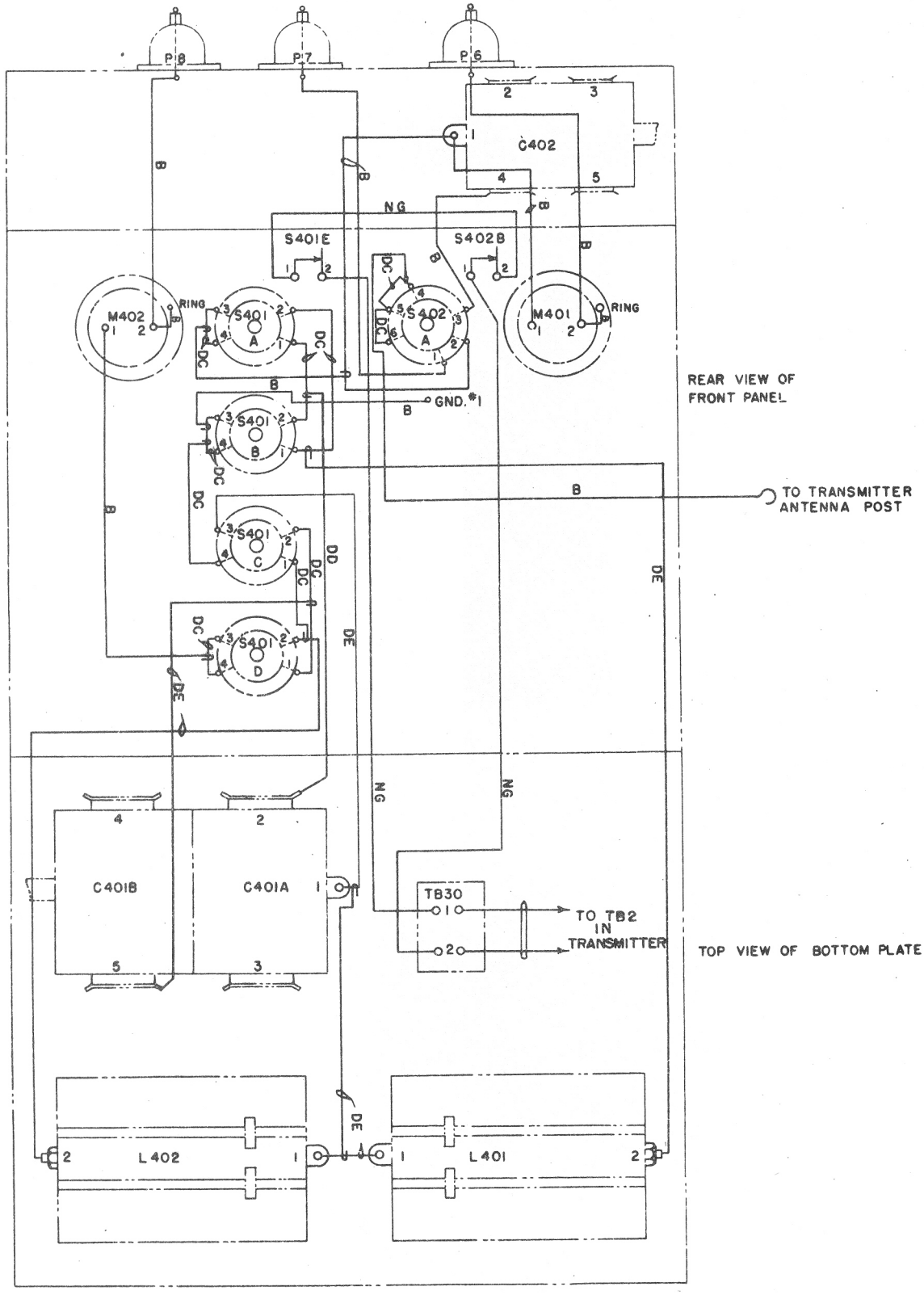






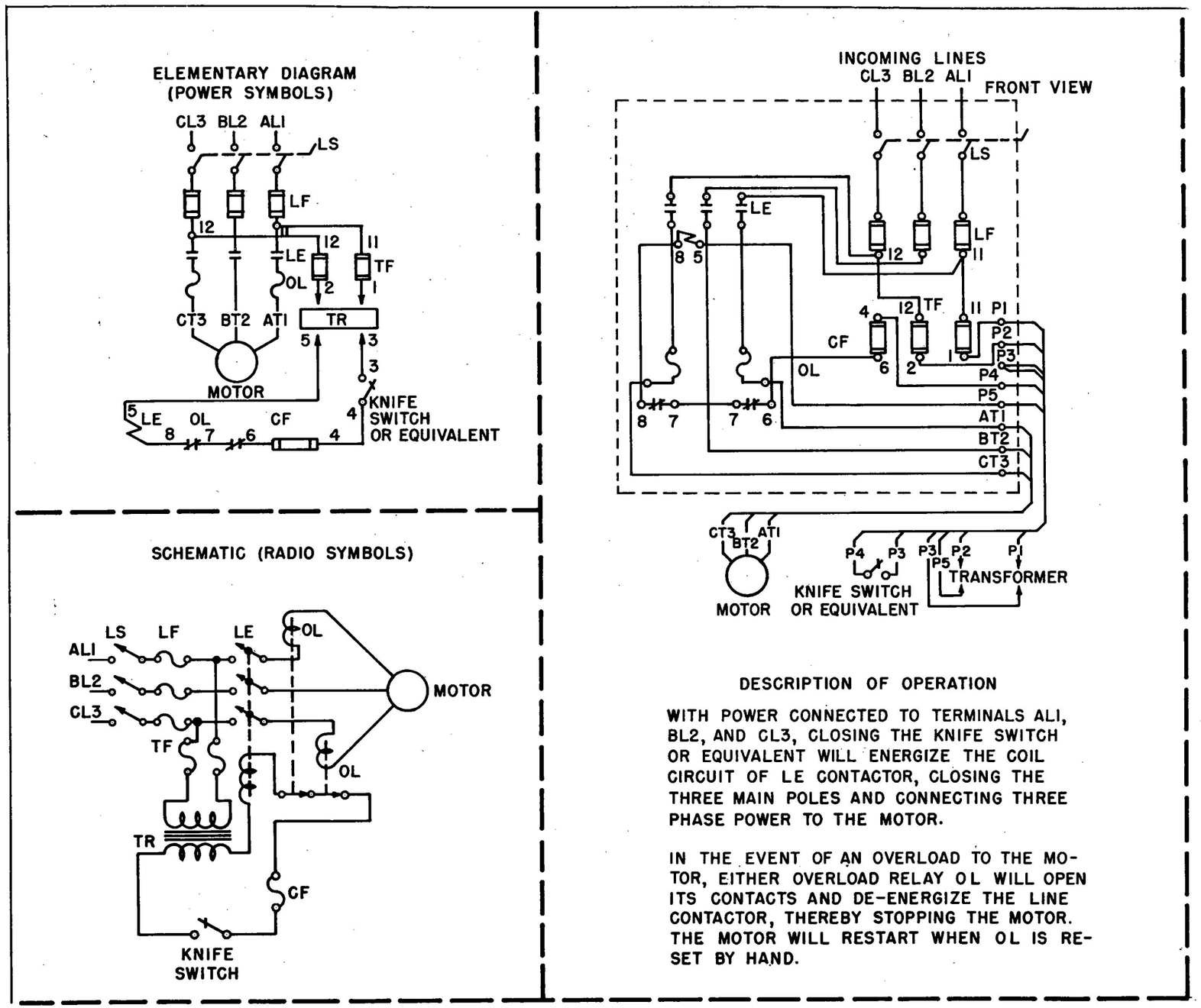
WIRE SIZE	WIRE TABLE DESCRIPTION
SABR	#14 AWG, STRANDED .020" THERMOPLASTIC INSULATION, BROWN LACQUERED BRAID, O.D. -.145" G.E. SPEC. K-7890181 P14
SAG	#14 AWG. STRANDED .020" THERMOPLASTIC INSULATION, GREEN LACQUERED BRAID, O.D. .145" G.E. SPEC. K-7890181 P12
SAO	#14 AWG. STRANDED .020" THERMOPLASTIC INSULATION, ORANGE LACQUERED BRAID, O.D. -.145" G.E. SPEC. K-7890181 P13
SBBK	#12 AWG. STRANDED .020" THERMOPLASTIC INSULATION, BLACK LACQUERED BRAID, O.D. -.161", G.E. SPEC. K-7890181 P19
SBK	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, BLACK LACQUERED BRAID, O.D. -.117 G.E. SPEC. K7890181 P2
SBL	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, BLUE LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P6.
SBR	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, BROWN LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P3
SG	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, GREEN LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P5
SO	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, ORANGE LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P1
SOBK	#16 AWG. STRANDED 1/64" THERMOPLASTIC INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P7
SOBL	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P9
SOG	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D. -.117" G.E. SPEC K-7890181 P10
SR	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, RED LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P4
SRBK	#16 AWG. STRANDED 1/64 THERMOPLASTIC INSULATION, RED/BLACK LACQUERED BRAID, O.D. -.117" G.E. SPEC. K-7890181 P8
DC	.063" DIA. COPPER WIRE TINNED
"M"	ORUNMARKED, UNIT PIECE OF APPARATUS.

Figure 7-48—Connection Diagram of Relay Unit on Rectifier, Type CG-20219



CONNECTIONS		
WIRE SIZE	DESCRIPTION	
B	020 x 1/2" FLAT COPPER STRIP TINNED	
DC	.063" DIA. COPPER WIRE TINNED	
DD	.080" DIA. COPPER WIRE TINNED	
DE	.100" DIA. COPPER WIRE TINNED	
NG	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, TINNED COPPER BRAID OVERALL,	

Figure 7-49—Connection Diagram of Transmission Line Coupling Unit, Type CG-51039



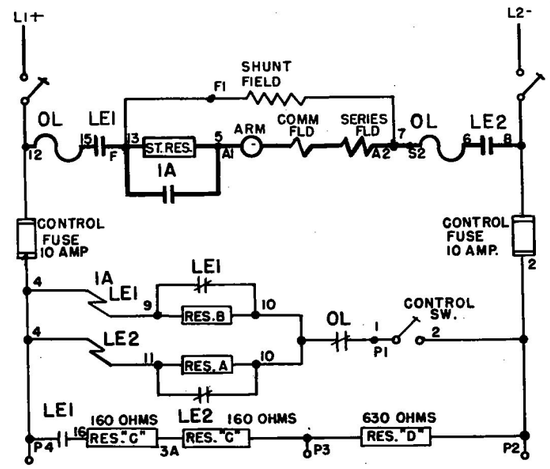
DESCRIPTION OF OPERATION

WITH POWER CONNECTED TO TERMINALS ALI, BL2, AND CL3, CLOSING THE KNIFE SWITCH OR EQUIVALENT WILL ENERGIZE THE COIL CIRCUIT OF LE CONTACTOR, CLOSING THE THREE MAIN POLES AND CONNECTING THREE PHASE POWER TO THE MOTOR.

IN THE EVENT OF AN OVERLOAD TO THE MOTOR, EITHER OVERLOAD RELAY OL WILL OPEN ITS CONTACTS AND DE-ENERGIZE THE LINE CONTACTOR, THEREBY STOPPING THE MOTOR. THE MOTOR WILL RESTART WHEN OL IS RESET BY HAND.

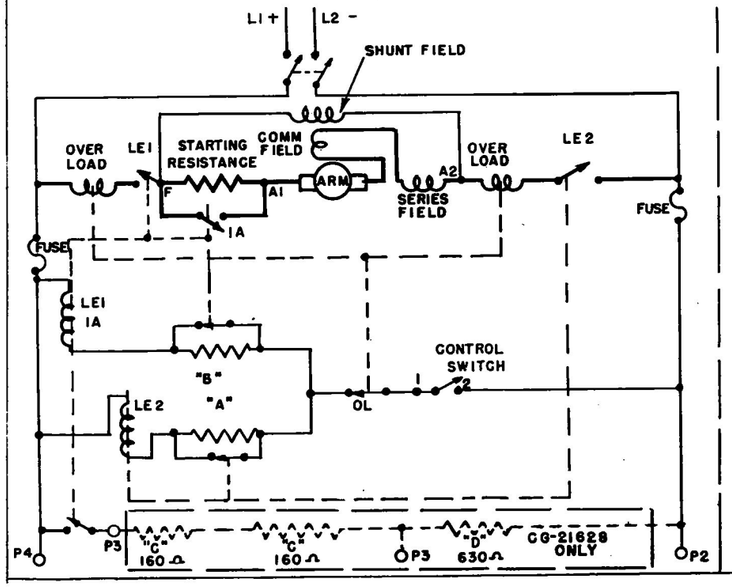
Figure 7-50—Connection Diagram of Type CG-21629, A-C Magnetic Controller

MOTOR CONTROLLER (POWER SYMBOLS)

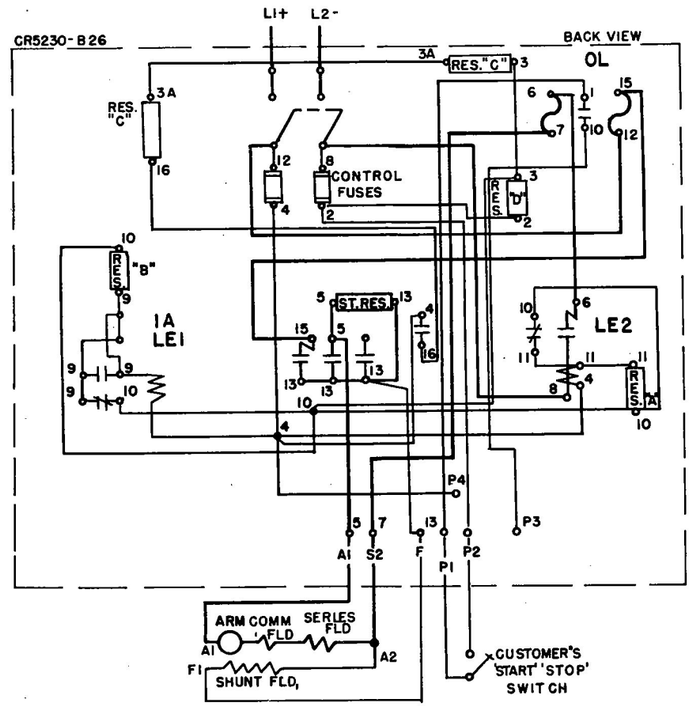


NOMENCLATURE
LE1-IA-LINE AND ACCELERATING RELAY
(IA IS TIME CLOSING CONTACT)
LE2--- LINE CONTACTOR
OL--- THERMAL OVERLOAD RELAY (HAND RESET)

MOTOR CONTROLLER (RADIO SYMBOLS)



MOTOR CONTROLLER (WIRING DIAGRAM)



DESCRIPTION OF OPERATION

WITH L1 AND L2 CONNECTED TO THE SOURCE OF POWER, AND WITH THE LINE SWITCH CLOSED, THE CONTROLLER WILL OPERATE AS FOLLOWS:

CLOSING THE CONTROL SWITCH WILL ENERGIZE THE COILS OF LINE CONTACTORS LE2 AND LE1. THE CONTACTORS WILL CLOSE AND APPLY FULL VOLTAGE TO THE MOTOR WITH THE STARTING RESISTOR IN SERIES WITH THE ARMATURE CIRCUIT. AFTER A DEFINITE ADJUSTABLE TIME, CONTACT IA ON LE1 WILL CLOSE AND SHORT CIRCUIT THE STARTING RESISTOR PLACING THE MOTOR ACROSS THE LINE. PROTECTIVE RESISTORS "A" AND "B" ARE INSERTED IN THE CONTACTOR COIL CIRCUITS BY MEANS OF NORMALLY CLOSED INTERLOCKS ON LE1 AND LE2. AFTER IA CLOSES, CONTACT 4-16 WILL TIME CLOSE, ENERGIZING THE CIRCUIT THROUGH RESISTORS "C" AND "D" AND THUS SUPPLYING POWER FOR THE TRANSMITTER KEYING CIRCUIT.

IN CASE OF OVERLOAD, THE CONTACTS OF THE OVERLOAD RELAY, OL, WILL OPEN AND DE-ENERGIZE THE LINE CONTACTORS, STOPPING THE MOTOR AND DISCONNECTING RESISTORS "C" AND "D". THE MOTOR CANNOT BE RESTARTED BY THE CONTROL SWITCH UNTIL THE OVERLOAD RELAY HAS BEEN RESET BY HAND AT THE CONTROLLER.

IN CASE OF VOLTAGE FAILURE, THE LINE CONTACTORS WILL OPEN AND THE MOTOR WILL RESTART UPON RESTORATION OF NORMAL VOLTAGE UNLESS THE CONTROL SWITCH HAS BEEN OPENED.

THE MOTOR IS NORMALLY STOPPED BY OPENING THE CONTROL SWITCH.

CG-21627	115 V. D.C.
CG-21628	230V. D.C.

Figure 7-51—Connection Diagram of Types CG-21627 and CG-21628 Magnetic Controllers

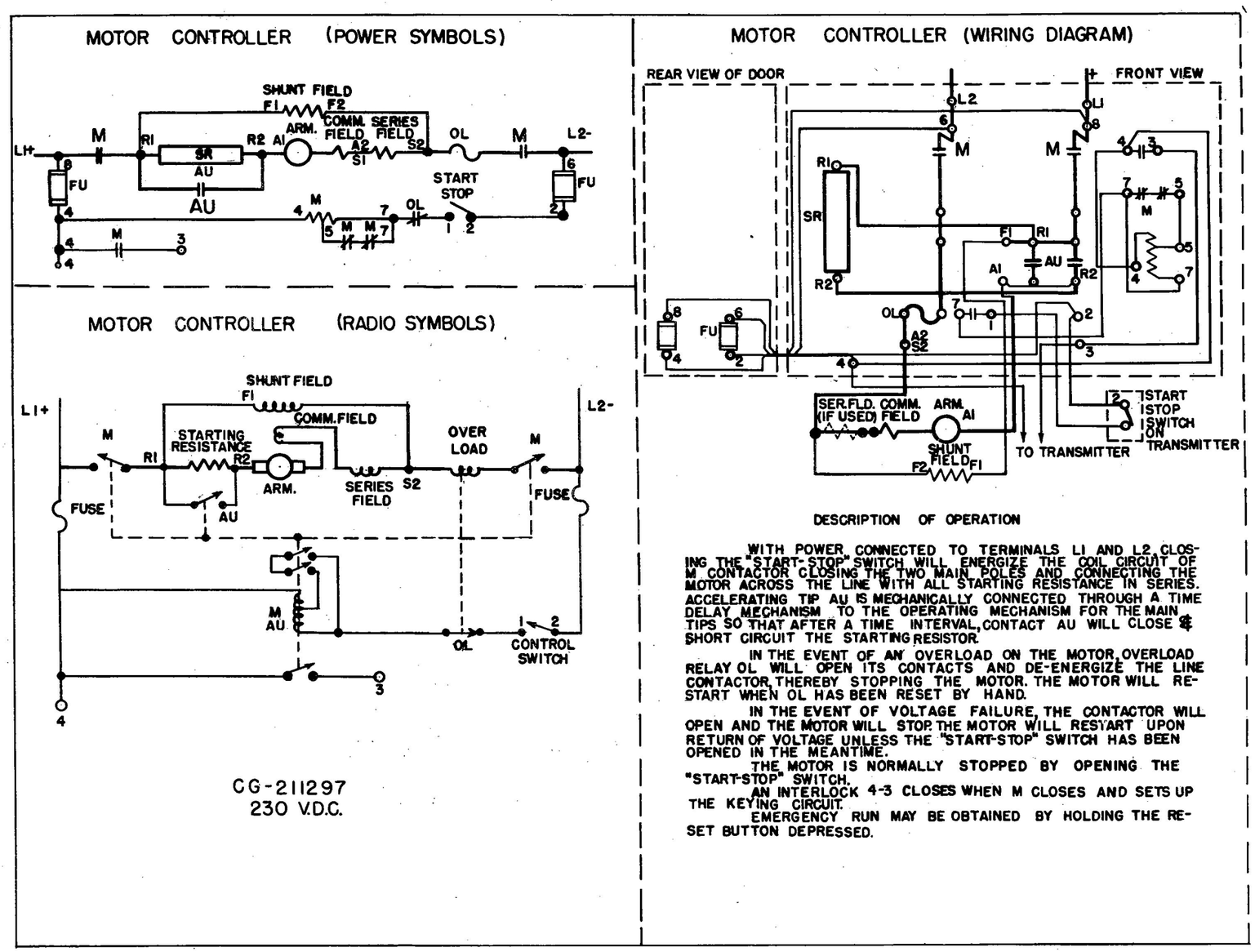


Figure 7-52—Connection Diagram of Type CG-211297 Magnetic Controller

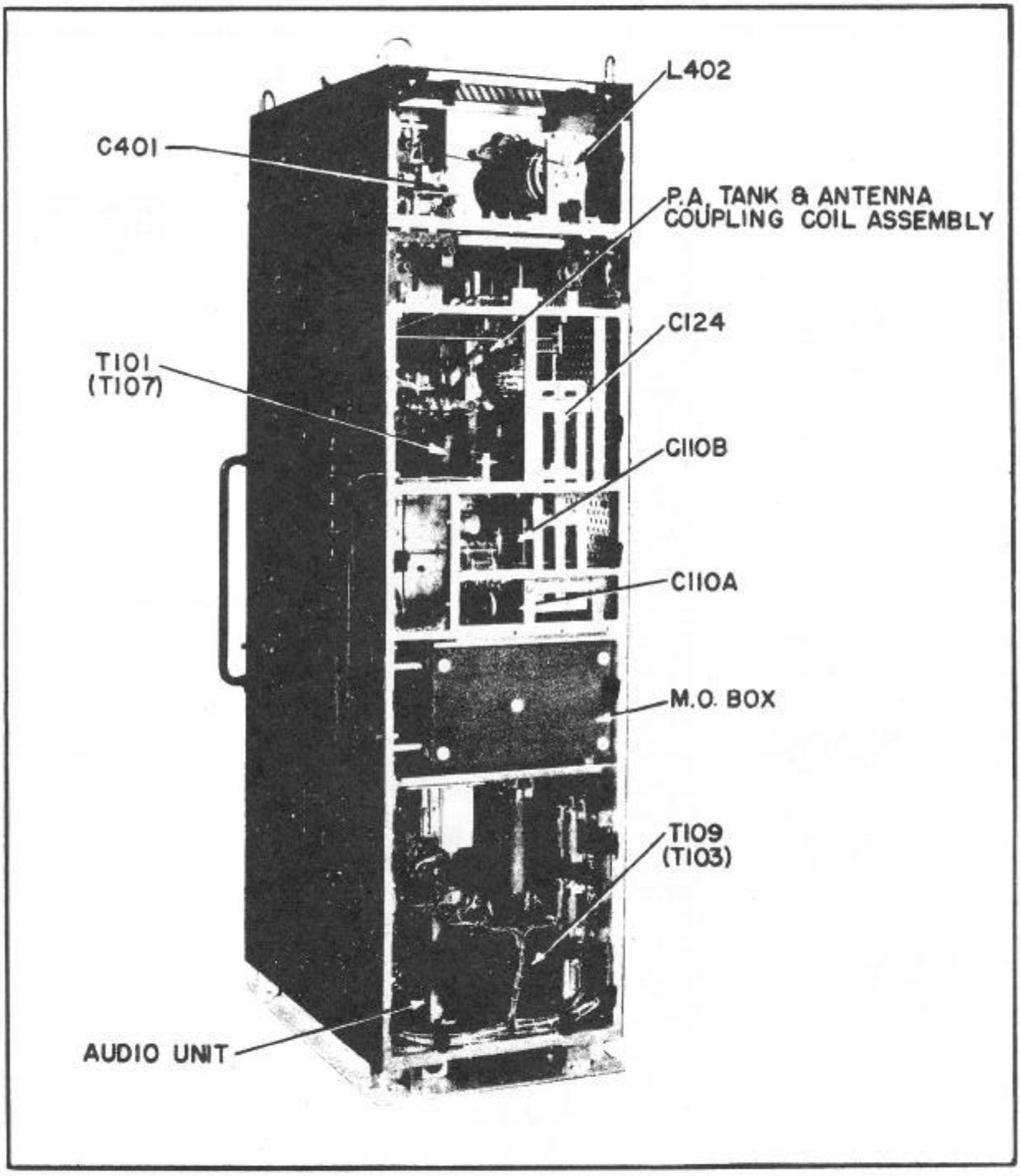


Figure 7-53—Right-side View of Transmitter with Side Shield Removed

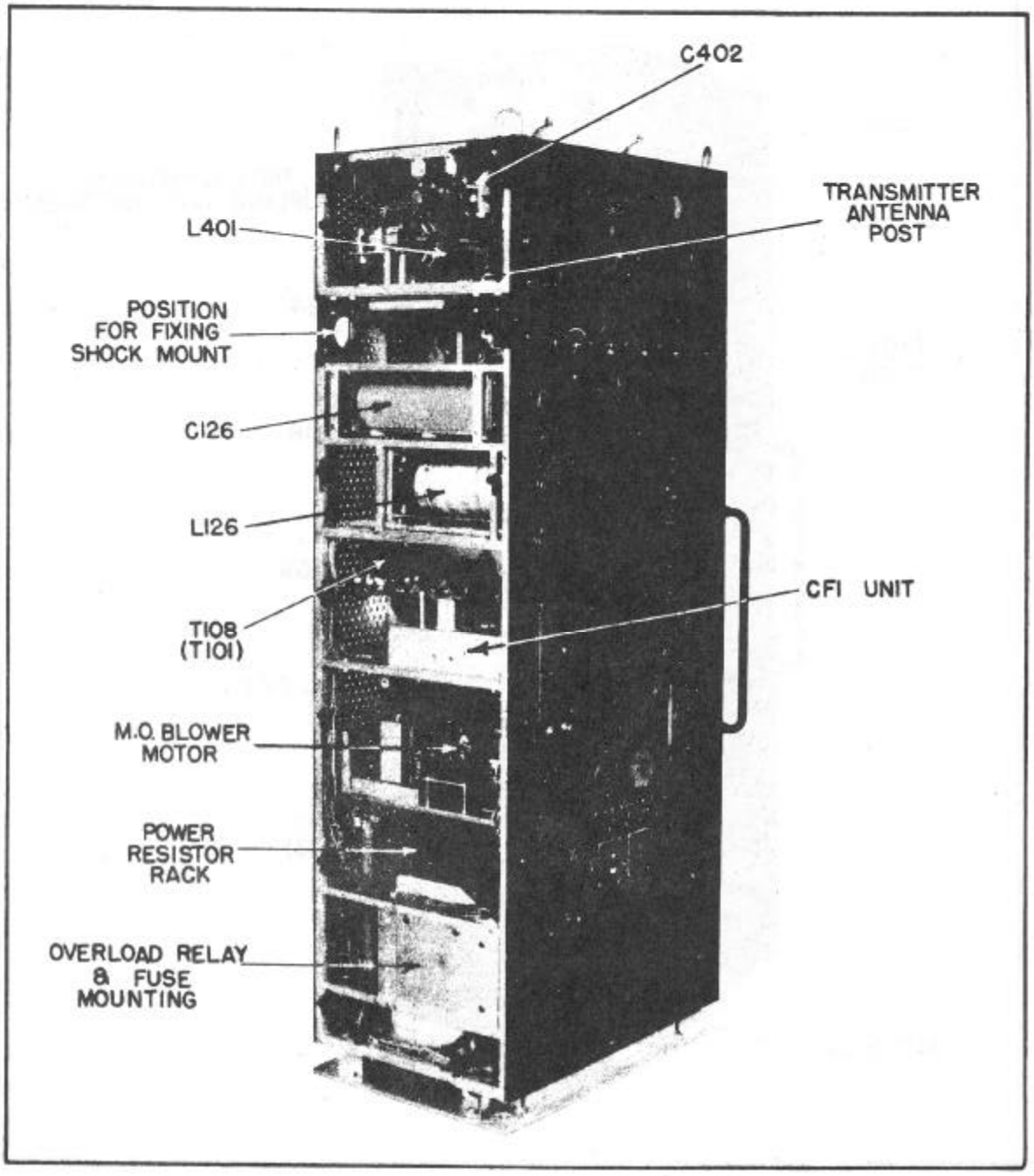


Figure 7-54—Left-side View of Transmitter with Side Shield Removed

TABLE 8-1

LIST OF MAJOR PARTS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	Major Unit	Navy Type Number	Symbol Group	Drawing Number
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.				
	X											Radio Transmitter	CG-52214	101-299	4G22A2
X												Radio Transmitter	CG-52215	101-299	4G22A3
		X	X									Radio Transmitter	CG-52216	101-299	4G22A1
				X			X					Radio Transmitter	CG-52216A	101-299	4G22B1
					X				X			Radio Transmitter	CG-52214A	101-299	4G22D1
						X						Radio Transmitter	CG-52215A	101-299	4G22D3
								X		X		Radio Transmitter	CG-52299	101-299	4G22C1
											X	Radio Transmitter	CG-52345	101-299	4G22E1
	X				X				X			Magnetic Controller	CG-21627	(3)	11K1390G1
X						X						Magnetic Controller	CG-21628	(4)	11K1481G1
		X	X				X					Magnetic Controller—220 V.	CG-21629	(4)	11K1361G1
		X	X									Magnetic Controller—440 V.	CG-21630	(6)	11K1362G1
				X								Magnetic Controller—220 V.	CG-21629	(3)	11K1361G1
				X								Magnetic Controller—440 V.	CG-21630	(4)	11K1362G1
											X	Magnetic Controller	CG-211297	(3)	11K2503-1
X												Motor—Generator Set	CG-21631		WW6639974
												Motor		(7)	WW6639974
												L. V. Generator		(8)	WW6639974
												H. V. Generator		(9)	WW6639974
												Overhung Generator		(10)	W8118216
X												Motor Generator Set	CG-21632		WW6626802
												Motor		(11)	WW6626802
												L. V. Generator		(12)	WW6626802
												H. V. Generator		(13)	WW6626802
												Overhung Generator		(14)	W8118216
		X	X									Motor Generator Set	CG-21633		WW6626618
												Motor		(15)	WW6626618
												L. V. Generator		(16)	WW6626618
												H. V. Generator		(17)	WW6626618
												Overhung Generator		(18)	W8118216
				X								Motor Generator Set	CG-21633		WW6626618
												Motor		(5)	WW6626618
												L. V. Generator		(6)	WW6626618
												H. V. Generator		(7)	WW6626618
												Overhung Generator		(8)	W8118216
					X				X			Motor Generator Set	CG-21631A		WW8433445
												Motor		(7)	
												L. V. Generator		(8)	
												H. V. Generator		(9)	
												Overhung Generator		(10)	
						X						Motor Generator Set	CG-21632A		WW8433444
												Motor		(11)	
												L. V. Generator		(12)	
												H. V. Generator		(13)	
												Overhung Generator		(14)	
							X					Motor Generator Set	CG-21633A		WW8433446
												Motor		(15)	
												L. V. Generator		(16)	
												H. V. Generator		(17)	
												Overhung Generator		(18)	
											X	Motor Generator Set	CG-21632A		K522657-P3
												Motor		(4)	
												L. V. Generator		(5)	
												H. V. Generator		(5)	
												Overhung Generator		(6)	
X	X	X	X									Microphone Filter Unit	CG-53087	C165, C166, C152	ML7763970-G1
X	X	X	X									Chest Microphone	CAU-51016A		P7764898P1
					X	X	X	X	X	X		Chest Microphone	CG-51044A	(20)	P7764898
X	X											Hand Microphone	CAU-51006A		M7468281
											X	Chest Microphone	CAU-51078		P64582-P1
								X		X		Rectifier	CG-20219	301-99	ML4MR14A-1
								X		X		Transmission Line Coupling Unit	CG-50139	401-402	ML4MY63A-1

Number and Date of Contract: TCK—Nos-83834—2 April, 1941
TCK 1-Nos-87454—18 June, 1941
TCK 2-TCG-34112—26 December, 1941
TCK 3-NXss-18783—11 February, 1943
TCK 4-NXss-18783—22 February, 1943
TCK 5-TCG-36083—16 June, 1943
TCK 6-TCG-36083—20 June, 1943
TCK 7-NXsr-53304—16 March, 1944

TABLE 8-2

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-62216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
											X	A-101	SHOCK MOUNTING	Base Shock Mounts				137	ML7881793-G1	A-101 (H-191-TCK 1 & 3)	4	4	1	6	4	8	4
							X																1		4		12
X	X	X			X	X	X		X														0		0		0
								X		X		A-101	SHOCK MOUNT KIT	Base and Rear Shock Mounts				137	K56J594-1	A-101	1	1	4		0		0
											X	A-102	SHOCK MOUNTING	Rear Shock Mounts				137	ML7883087-G1	A-102 (H-192-TCK 1 & 3)	2	4	1	6	2	8	4
							X																1		2		6
X	X	X			X	X	X		X														0		0		0
		X		X		X						B-101	BLOWER MOTOR—115 v. 60 cycles, 1 phase, Form A-5W, 3000 rpm, 40° C. continuous	M-O Heater Blower Motor	21634			138-5KSC52HA44	K7880193-1	B-101	1		1		0		0
			X					X															1		0		3
						X	X		X	X													1		2		2
								X															1		0		0
		X		X								B-101A	MOTOR BEARING	Part of B-101				138-7038	K7880193-P3	B-101A	2		4		0		0
						X	X	X	X	X													4		0		2
																							1		2		2
								X															1		0		0
X	X											B-102	BLOWER MOTOR—5 watts, 3000 rpm, 115 volts d-c, 40°C. continuous	M-O Heater Blower Motor	21766			138-5PD52EA46	K7884274-P1	B-102	1		1		0		0
											X											4	1	6	2	8	3
X	X											B-102A	MOTOR BEARING	Part of B-102			3H4580A/Q44	138-7038	K5895156AA1	B-102A	2		4		0		0
											X											4	1	6	2	8	2
X	X											B-102B	MOTOR BRUSHES	Part of B-102				138	K5863334AK1	B-102B	10		40		0		0
											X											4	10	6	20	8	40
											X	B-102C	BRUSH HOLDER	Part of B-102				138	K5899529AA1	B-102C	2	4	2	6	8	8	12
X	X																						0		0		0
											X	B-102D	BRUSH RIGGING INSULATION	Part of B-102				138	K5899531AA1	B-102D	2	4	2	6	4	8	6
X	X																						0		0		0
X	X										X	B-102E	BRUSH HOLDER CAPS	Part of B-102				138	K5899534AA1	B-102E	2	4	2	6	8	8	12
																							0		0		0
X	X	X	X	X								C-101	CAPACITOR—Mica, 0.0001 MFD ± 2%, 3,000 v. test, 60 cycles rms	M-O Fixed Capacitor	48690-B10			7-PL583-15H	P7762067-P3	C-101	1		1		0		0
			X		X	X		X				C-101	CAPACITOR—Mica, 75 MMFD ± 2%, 300 v. test, 60 cycles rms	M-O Fixed Capacitor	65D750G			7-PL845-15H	P7762067-P4	C-101	1		1		0		0
											X												1		1		1
X	X	X	X	X	X	X	X		X		X	C-102	CAPACITOR—Variable, 1750 v., 60 cycles rms	M-O Tuning Capacitor				12	P7762980-G1	C-102	1		0		0		0

TCK															PART											SPARE PARTS					
			TCK 1	TCK 2	TCK 3				TCK 4	TCK 5	TCK 6	TCK 7														Equip.		Tender		Stock	
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X		X	X	X	X	X	X	X	X	C-103	CAPACITOR—Variable, 3.5-4.5 MMFD min., 8.0-9.5 MMF max., 1750 v. test, 60 cycles rms	M-O Reset Capacitor				12	P7762991-P2	C-103	1		0		0		0
			X									C-103	CAPACITOR — Compensating 10 MMFD ±0.5 MMFD	M-O Capacitor Compensator				19	K7880018-P1	C-103	1		1		1		1
X	X	X	X	X	X	X	X	X	X	X	X	C-104	CAPACITOR — Variable 6-9 MMFD min., 40-45 MMFD max., 1750 v. test 60 cycles rms	M-O Alignment				12	P7762991-P13	C-104	1		0		0		0
				X								C-105	CAPACITOR — Compensating 6 MMFD ±0.5 MMFD	M-O Capacitor Compensator				19	K7880176	C-105	1		1		0		0
X	X	X	X									C-105	CAPACITOR — Compensating 10 MMFD ±0.5 MMFD	M-O Capacitor Compensator				19	K7880018-P1	C-105	1		1		0		0
					X	X			X			C-105	CAPACITOR — Compensating 20 MMFD ±2.0 MMFD	M-O Capacitor Compensator				19	K7891873-1	C-105	1		1		0		0
			X				X				X	.....	.....	.....	.....	.....	.....	.....	.....	.....			1		1		1
								X		X		C-106	Same as C-101	M-O Fixed Capacitor	65D750G	.....	.....	.....	.....	.....			–		–		–
X	X	X		X	X	X			X	X		C-107	CAPACITOR — Mica, 0.0002 MFD ±2%, 2500 v. d. c working	M-O Grid Capacitor	48982-B2	.....	.....	7-9LS-53020	P7762664-P18	C-107	1		1		0		0
			X				X	X				.....	.....	.....	.....	.....	.....	.....	.....	.....			1		1		1
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		1
X	X	X		X	X	X			X	X		C-108	CAPACITOR — Mica, 0.005 MFD ±10%, 600 v. d.c working	M-O Cathode Bypass	48023-B10	.....	.....	7-9LS-12050	P7764888-P46	C-108, 13, 14, 15, 20, 21, 22, 28, 29, 31	10		5		0		0
			X				X	X				.....	.....	.....	.....	.....	.....	.....	.....	.....			2		6		6
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			5		0		10
												.....	.....	.....	.....	.....	.....	.....	.....	.....		4	2	6	6	8	10
X	X	X		X			X					C-109	CAPACITOR — Mica, 0.005 MFD ±10%, 1200 v.d.c. working	M-O Bypass	48409-B10	.....	.....	7-9LS-22050	P7764888-47	C-109, 16, 19, 33	4		2		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			1		3		3
					X	X			X	X		C-109	CAPACITOR — Mica, 0.005 MFD ±10%, 1200 v d. c. working	M-O Bypass	48409-B10	.....	.....	7-9LS-22050	P7762664-47	C-109, 16, 19, 33	4		2		0		0
									X	X	X	.....	.....	.....	.....	.....	.....	.....	.....	.....			2		0		2
												.....	.....	.....	.....	.....	.....	.....	.....	.....		4	1	6	3	8	4
X	X	X	X	X	X	X	X	X	X	X	X	C-110	CAPACITOR — Variable, 2500 v. test, 60 cycles rms. Includes C-110A and C-110B C-110A—Part of C-110 C-110B—Part of C-110	Tuning Capacitor Oscillator Plate Tuning I-P-A Tuning		.....	.....	12	P7762972-G1	C-110	1		0		0		0
X	X	X	X	X	X	X	X	X	X	X	X	C-111	CAPACITOR — Variable 6-8.5 MMFD min., 43-48 MMFD max., rotor grounded 2500 v. test rms, 60 cycles	Oscillator Plate Alignment		.....	.....	12	P7762991-P3	C-111	1		0		0		0
X	X	X		X	X	X			X	X		C-112	CAPACITOR—Mica, 0.000025 MFD ±2%, 1200 v. d. c.	I-P-A Grid Coupling	48885-2	.....	.....	7-9LS-24025	P7762664-P2	C-112	1		1		0		0
			X				X	X				.....	.....	.....	.....	.....	.....	.....	.....	.....			1		1		1
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		4	1	6	0	8	1
X	X	X	X	X	X	X	X	X	X	X	X	C-113	Same as C-108	I-P-A Grid Bypass	48023-B10	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-114	Same as C-108	I-P-A Cathode Bypass	48023-B10	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-115	Same as C-108	I-P-A Screen Bypass	48023-B10	.....	.....	.....	.....	.....			–		–		–

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X	X	X	X	X	X	X	X	X	X	C-116	Same as C-109	I-P-A Plate Bypass	48409-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X		C-117	CAPACITOR—Variable, 5-7.5 MMFD min., 38-42 MMFD max., 2,500 v. test rms, 60 cycles, rotor grounded	I-P-A Plate Trimmer				12	P7762991-P4	C-117	1		0		0		0
											X	C-117	CAPACITOR — Variable, 5-7.5 MMFD min., 33-37 MMFD max., 2,500 v. test rms, 60 cycles, rotor grounded	I-P-A Plate Trimmer				12	K57J194-P1	C-117	1		0		0		0
X	X	X		X	X	X			X	X		C-118	CAPACITOR—Mica, 50 MMFD ± 2%, 1,200 v. d-c. working	P-A Grid Coupling	48910-B2			7-9LS-24050	P7762664-P8	C-118	1		1		0		0
			X								X												1		1		1
							X	X															1		0		1
X	X	X	X	X	X	X	X	X	X	X	X	C-119	Same as C-109	P-A Grid Bypass	48409-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-120	Same as C-108	P-A Filament Bypass	48023-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-121	Same as C-108	P-A Filament Bypass	48023-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-122	Same as C-108	P-A Screen Grid Bypass	48023-B10								-		-		-
X	X	X		X	X	X			X	X		C-123	CAPACITOR — Mica, 0.005 MFD ± 10%, 2,500 v.d-c. working	P-A Plate Bypass	48372-B10			7-9LS-52050	P7764888-P48	C-123, 27, 30, 32	4		2		0		0
			X																				1		3		3
							X	X															1		0		1
											X											4	2	6	3	8	4
X	X	X	X	X								C-124	CAPACITOR—Variable, 3,750 test volts rms, 60 cycles	P-A Tuning				3	ML7762981-G1	C-124	1		0		0		0
					X	X	X	X	X	X		C-124	CAPACITOR—Variable, 3,400 test volts rms, 60 cycles	P-A Tuning				12	P42J92-G1	C-124	1		0		0		0
											X												0	6	1	8	1
X	X	X	X	X	X	X	X	X	X	X	X	C-125	CAPACITOR — Variable 6-9 MMFD min., 41-45 MMFD max., 3,750 test rms, 60 cycles	P-A Trimmer				12	P7762991-P6	C-125	1		0		0		0
X	X	X	X	X	X	X	X	X	X	X	X	C-126	CAPACITOR — Variable, 290 MMF max., 70 MMF min., 220 MMF min. swing	Antenna Tuning				12-TC-290-H	M7464727-P1	C-126	1		0		0		0
X	X	X	X	X	X	X	X	X	X	X	X	C-127	Same as C-123	P-A Plate Bypass	48372-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-128	Same as C-108	Filament Voltmeter Bypass	48023-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-129	Same as C-108	Auxiliary Voltmeter Bypass	48023-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-130	Same as C-123	P-A Plate Voltmeter Bypass	48372-B10								-		-		-
X	X	X	X	X	X	X	X	X	X	X	X	C-131	Same as C-108	I-P-A Ammeter Bypass	48023-B10								-		-		-

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X	X	X	X	X	X	X	X	C-132	Same as C-123	P-A Plate Ammeter Bypass	48372-B10								–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-133	Same as C-109	M-O Plate Bypass	48409-B10								–		–		–
X	X	X			X	X	X		X			C-134	CAPACITOR—Paper, Pyranol Askanel Filled, 4 MFD, 600 v., d-c. working	Auxiliary Voltage Filter	481249			10-23F103	P7763476-P3	C134, 37, 38, 52, 303	5		2		0		0
			X																				2		6		6
								X															2		0		10
				X					X														3		0		3
										X													3		0		0
											X												3		0		0
																						4	2	6	6	8	10
X	X	X			X	X	X		X	X		C-135	CAPACITOR—Mica, 4 MFD, 2000 v. d-c. working	High Voltage Filter	48979			10-25F70	M7464792-P1	C-135	1		1		0		0
			X																				1		2		2
								X															1		0		3
				X					X														1		0		1
										X													1		0		3
											X												1		0		0
																						4	1	6	2	8	3
X	X	X			X	X	X		X	X		C-136	CAPACITOR—Paper, Pyranol Askarel Filled, 2 MFD, 600 v. d-c. working	Bias Generator Filter	48777			10-23F102	P7763476-P2	C-136, 53, 59, 61, 62	5		3		0		0
			X																				3		8		8
								X															3		0		13
				X					X														3		0		3
										X													3		0		0
											X												3		8		13
																						4		6		8	
X	X	X	X	X	X	X	X	X	X	X	X	C-137	Same as C-134	I-P-A Suppressor Filter	481249								–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-138	Same as C-134	C.F.I.Plate Voltage Filter	481249								–		–		–
X	X	X			X	X	X		X	X		C-139	CAPACITOR—Variable, Ceramic, 1.5 MMF MIN., 7.0 MMF max., zero coeff. MMF/MMF/deg. C.	M-O Trimmer (Band 1)				58-NPO	P7763949-P1	C-139	1		0		0		0
			X																				1		1		1
								X															0		0		
X	X	X			X	X	X		X	X		C-140	CAPACITOR—Variable, Ceramic, 3.0 MMF min., 12.0 MMF max., zero coeff. MMF/MMF/deg. C.	M-O Trimmer (Band 2)				58-NPO	P7763949-P2	C-140, 41, 42	1		0		0		0
			X																				1		2		2
								X															0		0		3
				X					X														1		2		3
										X													0		0		
											X												1		2		3
																						4	1	6	2	8	3
X	X	X	X	X	X	X	X	X	X	X	X	C-141	Same as C-140	M-O Trimmer (Bands 3 and 5)									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-142	Same as C-140	M-O Trimmer (Bands 4 and 6)									–		–		–
X	X	X			X	X	X		X	X		C-143	CAPACITOR—Paper, Pyranol Askarel Filled, 0.5 MFD, 500 v. d-c. working	Keying Relay Bypass	48946			10-9CE6A3	P7763475-P3	C-143	1		1		0		0
			X																				1		2		2
								X															1		0		3
				X					X														1		0		1
										X													1		0		3
											X												1		0		0
																						4	1	6	2	8	3
X	X	X			X	X	X		X	X		C-144	CAPACITOR—Capacity test, terminals 3 to 4, 6.1 MMFD ±.5 MMFD. Resistance test, terminals 1 and 2, 450 ohms ±6%	M-O Compensating	481445			137-	M48J556	C-144	1		1		0		0
			X																				1		1		1
								X															1		0		
				X					X														1		1		1
										X													1		0		
											X												1		1		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-62299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X		X	X		C-145	CAPACITOR—Ceramic, 200 MMF ±2.5%	P-A Screen Bypass	481815-5			8-Class B (Mod.)	P7763767-P40	C-145	1		1		0		0
			X								X												1		0		1
								X	X														1				
									X			C-146	CAPACITOR—Compensator, 20 MMF ±2%	M-O Capacity				19	K7891873	C-146	1	1	1		0	1	1
										X												1	1		0		0
X	X				X	X			X			C-147	CAPACITOR—Paper, Pyranol Askarel Filled, 0.5 MFD, 500 v. d-c. working	M-O Heater Bypass	481334			10-23F114	P7763475-P4	C147, 60, 63	3		2		0		0
			X																				2		4		4
								X														4	1	6	0	8	6
											X												2		5		8
									X			C-148	CAPACITOR—Variable, 1750 v. rms, 60 cycles	M-O Tuning				19	P7765447-1	C-148	1		0		0		0
X	X	X			X	X	X		X	X		C-151	CAPACITOR—Paper, Pyranol Askarel Filled, 1 MFD, 600 v., d-c. working	Screen Bypass	481278			10-23F101	P7763476-P1	C-151	1		1		0		0
			X																				1		2		2
								X															1		0		3
									X													4	1	6	2	8	3
											X												1		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-152	Same as C-134	Cathode Bypass	481249												
X	X	X	X	X	X	X	X	X	X	X	X	C-153	Same as C-136	Bias Generator Bypass	48777												
X	X	X			X	X	X		X	X		C-154	CAPACITOR—Paper, Pyranol Askarel Filled, 0.05 +10% −3% at 20°C, 1000 v. d-c. working	Diode Feedback	481333			10-25F86	P7763475-P10	C-154, 55	2		1		0		0
			X																				1		3		3
								X														4	1	6	0	8	5
									X														1		3		5
											X												1		–		–
X	X	X	X	X	X	X	X	X	X	X	X	C-155	Same as C-154	Audio Coupling	481333												
X	X	X			X	X	X		X	X		C-156	CAPACITOR—Paper, Pyranol Askarel Filled, 1.0 MFD, 500 v. d-c. working	Plate Supply Filter	481190			10-23F115	P7763475-P6	C-156, 203	2		1		0		0
			X																				1		3		3
								X														4	1	6	0	8	5
									X														1		3		5
											X												1		–		–
X	X	X			X	X	X		X	X		C-157	CAPACITOR—Mica, 0.01 MFD ±10%, 600 v. d-c. working	Audio Coupling	48487-B10			7-4LS-11010	P7762925-P51	C-157	1		1		0		0
			X																				1		1		1
								X															1		0		1
									X														1		0		1
											X												1		0		1
X	X	X			X	X	X		X	X		C-158	CAPACITOR—Mica, 25 MMFD ±10%, 500 v. d-c. working	Feedback Capacitor	481468-B10			7-1WLS	P7762455-P5	C-158	1		1		0		1
			X																				1		1		1
								X															1		0		1
									X														1		0		1
											X												1		0		1

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X	X		X	X	X	X	X	X	X	C-159	Same as C-136	P-A Screen Grid Bypass	48777								–		–		–
X	X	X	X		X	X	X	X	X	X	X	C-160	Same as C-147	Grid Bypass	481334								–		–		–
X	X	X	X		X	X	X	X	X	X	X	C-161	Same as C-136	Cathode Bypass	48777								–		–		–
X	X	X	X		X	X	X	X	X	X	X	C-162	Same as C-136	Plate Supply Filter	48777								–		–		–
X	X	X	X		X	X	X	X	X	X	X	C-163	Same as C-147	Diode Time Constant	481334								–		–		–
X	X	X			X	X	X		X	X		C-164	CAPACITOR—Electrolytic, 25 MFD, 25 v. d-c. working	Microphone Filter	48109S			7-EP-10029	K7875699-P1	C-164, 216, 17	3		2		0		0
			X								X												4		9		9
							X	X															2		0		2
X	X	X			X	X	X		X			C-165	CAPACITOR—Electrolytic, 1000 MFD +50%, −10%, 15 v. d-c. working	Microphone Filter	481335			7-KP-10034	K7882346-P1	C-165, 66	2		1		0		0
			X								X												3		6		6
							X																1		0		6
X	X	X	X		X	X	X	X	X		X	C-166	Same as C-165										–		–		–
X	X	X			X	X	X		X	X		C-167	CAPACITOR—Mica, 0.005 MFD ±10%, 300 v. d-c. working	I-P-A Suppressor Bypass	481037-B10			7-1WLS	P7762455-P26	C-167, 204, 05	3		2		0		0
			X																				1		2		2
							X	X															2		0		2
											X												2		0		3
																					4		1	6	2	8	3
X	X	X	X									C-201	CAPACITOR—Variable, 50 MMFD	C-O Tank Capacitor	48787			3-Type APC	P7761345-P2	C-101	1		0		0		0
X	X	X			X	X	X		X	X		C-202	CAPACITOR—Mica, 0.002 MFD ±10%, 500 v. d-c. working	C-O Plate Supply Filter	48856			7-1WLS	P7762455-P22	C-102	1		2		0		0
			X								X												1		1		1
							X	X															1		0		1
X	X	X	X		X	X	X	X	X	X	X	C-203	Same as C-156	Plate Supply Filter	481190								–		–		–
X	X	X	X		X	X	X	X	X	X	X	C-204	Same as C-167	C-O Cathode Bypass	481037-B10								–		–		–
X	X	X	X		X	X	X	X	X	X	X	C-205	Same as C-167	C-O Screen Bypass	481037-B10								–		–		–
X	X	X			X	X	X		X	X		C-206	CAPACITOR—Mica, 100 MMFD ±5%, 500 v. d-c. working	Multivibrator Feedback	48674-D5			7-5RS	M7463969-P26	C-206, 07	2		1		0		0
			X								X												1		2		2
							X	X															1		0		2
X	X	X	X		X	X	X	X	X	X	X	C-207	Same as C-206	Multivibrator Feedback	48674-D5								–		–		–
X	X	X			X	X	X		X	X		C-208	CAPACITOR—Mica, 5MMFD ±10%, 500 v. d-c. working	Output Coupling	48771-B10			7-5WLS	M7463930-P1	C-208, 10	2		1		0		0
			X								X												1		2		2
							X	X															1		0		2
X	X	X			X	X	X		X	X		C-209	CAPACITOR—Mica, 250 MMFD ±10%, 500 v. d-c. working	Detector Coupling	48690-B10			7-5WLS	M7463930-P13	C-209	1		1		0		0
			X								X												1		1		1
							X	X															1		0		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X	X	X	X	X	X	X	X	X	X	C-210	Same as C-208	R.F. Input Coupling	48771-B10								–		–		–
X	X	X			X	X	X		X	X		C-211	CAPACITOR — Mica, 225 MMFD ±5%, 500 v. d-c. working	C-O Tank Capacitor				16-Molded Silver	K7877485-P49	C-211	1		1		0		0
				X				X			X												1		1		1
								X															1		0		1
X	X	X			X	X	X		X	X		C-212	CAPACITOR — Mica, 0.003 MFD ±10%, 500 v. d-c. working	Detector Plate R. F. Bypass	481036-B10			7-1WLS	P7762455-P24	C-212	1		1		0		0
				X				X			X												1		1		1
								X															1		0		1
X	X	X			X	X	X		X	X		C-213	CAPACITOR—Mica 0.03 MFD ±10%, 600 v. d-c. working	First Audio Coupling	481178-B10			7-4LS-11030	P7762925-P54	C-213, 18	2		1		0		0
				X				X			X												1		2		2
								X															1		0		2
								X															1		0		1
X	X	X			X	X	X		X	X		C-214	CAPACITOR—Paper, Pyranol Askarel Filled, 0.5-0.5 MFD, 300 v. d-c. working		48775			10-25F188	P7763475-P2	C-214	1		1		0		0
													C214A—Part of C214	Filter Detector Plate Supply													
													C214B—Part of C214	Filter 1st Audio Plate Supply													
				X				X															1		2		2
								X															1		0		1
								X															1		0		1
											X											4	1	6	2	8	3
	X	X			X	X	X		X	X		C-215	CAPACITOR—Mica, 0.01 MFD ±5%, 300 v. d-c. working	Detector Screen Bypass	48848-B5			7-1WLS	P7762455-P62	C-215	1		1		0		0
				X				X			X												1		1		1
								X															1		0		1
	X	X	X	X	X	X	X	X	X	X	X	C-216	Same as C-169	Cathode Bypass	481095								–		–		–
	X	X	X	X	X	X	X	X	X	X	X	C-217	Same as C-164	Cathode Bypass	481095								–		–		–
	X	X	X	X	X	X	X	X	X	X	X	C-218	Same as C-210	2nd Audio Coupling	48117-B10								–		–		–
X	X	X			X	X	X		X	X	X	C-219	CAPACITOR — Mica, 250 MMFD ±5%, 500 v. d-c. working	Amplifier Tank Cap.				16-Molded Silver	K7877485-P26	C-219	1		1		0		0
				X				X			X												1		1		1
								X															1		0		1
	X	X	X	X	X	X	X	X	X	X	X	C-220	CAPACITOR—Variable, Air, 25 MMFD, 1120 v. d-c.	C. O. Tank Capacitor	481881-A			12-APG Type C	P7761345-P1	C-220	1		0		0		0
		X	X	X								CR-101	RECTIFIER—Copper Oxide—10 v. at 65 ma. d-c.	M-O Heater Relay				1-6RC2K11V	K7877890	CR-101	1		0		0		0
								X		X		CR-101	RECTIFIER—Copper Oxide—10 v. at 65 ma. d-c.	M-O Heater Relay				495-6RC2E30V	K7892772	CR-101	1		0		0		0
		X						X															1		1		1
																							0		0		2

TCK				TCK 1	TCK 2		TCK 3			TCK 4		TCK 5	TCK 6	TCK 7									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	230/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X	X	X	X	X	X	X	X	X	X	X	E-101	SPARK GAP	Protective Spark Gap				137	K7890592 and K7890593	E-101	1		0		0		0
X	X	X		X	X	X	X		X	X	X		E-102	RESISTOR CLIP — Phosphor Bronze	Support for R-167 in Audio Unit				371	K7872828	E-102 (E-107-TCK 1 & 3)	2		0		0		0
			X					X				X												0		0		5
X	X	X		X	X	X	X		X	X	X		E-103	RESISTOR CLIP — Phosphor Bronze	Clip for R-101, R-102, R-104, R-109	28005			153-2049	K7875857	E-103 (E-108-TCK 1 & 3)	8		0		0		0
			X					X				X												0		0		10
X	X	X		X	X	X	X		X	X	X		E-104	RESISTOR CLIP — Phosphor Bronze-Silver-Plate, .001" thk.	Clip for R-105, R-109, R-111, R-113, R-112, R-115	28004			315-1695	M7464081-1	E-104 (E-109-TCK 1 & 3)	12		0		0		0
			X					X				X												0		0		20
X	X	X		X	X	X	X		X	X	X		E-105	RESISTOR CLIP — Phosphor Bronze-Silver-Plate, .001" thk.	Clip for R-137, R-108	28003			315-1683	M7464081-2	E-105 (E-110-TCK 1 & 3)	4		0		0		0
			X					X				X												0		0		5
X	X	X		X	X	X	X		X	X	X		E-106	RESISTOR CLIP — Phosphor Bronze-Silver-Plate, .001" thk.	Clip for R-103, R-123, R-124, R-183, F-101, F-102, F-103	28002			315-1675	M7464081-3	E-106 (E-103, 4, 5, 11-TCK 1 & 3)	14		0		0		0
		X					X					X												0		0		21
																							4	1	6	2	8	21
X	X	X		X	X	X	X		X	X	X		E-107	SMALL RESISTOR CLIP—Phos. Bronze .020" x ¼"	Clip for Wrench and for Switch (S-108) Support				315	V419102	E-107 (E-106-TCK 1 & 3)	3		0		0		0
			X					X				X												0		0		5
																							4	1	6	1	8	7
X	X	X		X	X	X	X		X	X	X		E-108	CONTACT CLIP, Copper	Contact for C-105 in M-O Unit				325	K7872651-1	E-108 (E-113-TCK 1 & 3)	2		0		0		0
			X					X				X												0		0		2
																							4	2	6	6	8	10
X	X	X		X	X	X	X		X	X	X		E-109	WHEEL CONTACT ASSEM.	Rotating Contact Used on L-126 Assem.				137	K57J58-G1	E-109 (E-101-TCK 1 & 3)	2		0		0		0
			X					X				X												2		6		6
																								0		0		10
																							4	2	6	6	8	10
X	X	X		X	X	X	X		X	X	X		E-110	SLIDING CONTACT ASSEM.	Used on Antenna Loading Coil L-126				137	K47J923-G1	E-110 (E-102-TCK 1 & 3)	2		0		0		0
			X					X				X												2		6		6
																								0		0		10
																							4	2	6	6	8	10
X	X	X		X	X	X	X	X	X	X	X		E-111	GRID CONNECTOR ASSEM.	M-O and I-P-A Plate Clip (V-101 and V-102)				137	K52J182-P1	E-111 (E-191, E-192-TCK 1)	2		0		0		0
			X									X												0		0		1
				X	X	X	X	X	X	X	X		E-112	GRID CONNECTOR ASSEM.	Plate Clips for P-A Tubes (V-103 and V-104)				137	K52J580	E-112, (E-193, E-194-TCK 1)	1		0		0		0
X	X	X		X																				1		0		0
			X																					1		0		1
																								1		0		1
X	X	X		X									E-113	GRID CLIP ASSEM.	Plate Clip for V-151 in Audio Unit				137	K52J175-1	E-113 (E-195-TCK 1)	1		1		0		0
			X																					1		0		1
						X	X	X	X		X													0		0		0
										X		X												9		3		0
																								3		0		0
																								0		0		0
																								0		0		0
													X											0		0		1
																								0		0		0
																								0		0		0
																								0		0		1
																								0		0		0
																								0		0		0
																								0		0		0
													X											0		0		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
							X					E-114	GRIP CLIP ASSEM.—Brass, Cadmium Plated					513	K7876973	E-114	8	1	2		0	1	2
										X												1	2		0		0
X	X	X	X	X	X	X	X		X	X		E-115	GRID CLIP ASSEM.—Beryllium Copper					117-#6004	K7877499-1	E-115	8	1	2		0		0
								X														1	2		0	1	2
X	X	X			X	X	X		X	X		E-116	RESISTOR CLIP—Phos. Bronze	Resistor Clip				153	K7875596	E-116 (E-112-TCK 1 & 3)	2		0		0		0
			X					X			X												0		0		5
X	X	X			X	X	X		X	X		E-117	INSULATOR—Isolantite 3⅛" dia., center dia. ⅜"	Antenna Insulator Bushing				148	K7878369	E-117 (E-118-TCK 1 & 3)	4		0		0		0
			X								X												0		1		1
								X															0		0		1
X	X	X			X	X	X		X	X		E-118	BUSHING—Stealite 1¼" thk., 3⅛" dia.	Meter Mounting Insulating Ring (M-106)				106	K7868661-1	E-118 (E-119-TCK 1 & 3)	3		0		0		0
			X								X												0		1		1
								X															0		0		1
X	X	X			X	X	X		X	X		E-119	PLATE—Mycalex, ⅛" thk., 3⅛" x 3⅛"	Rear Support for C-126				465	M7464823-1	E-119 (E-120-TCK 1 & 3)	1		0		0		0
			X								X												0		1		1
								X															0		0		1
X	X	X			X	X	X		X	X		E-120	PLATE—Mycalex, ⅛" thk., 3⅛" x 3⅛"	Front Support for C-126				465	M7464823-2	E-120 (E-121-TCK 1 & 3)	1		0		0		0
			X								X												0		1		1
								X															0		0		1
X	X	X			X	X	X		X	X		E-122	POST—Isolantite, 1⅛" lg. x ⅜" dia.	Terminal Supports for P.A. Coupling Coils, L-122, L-123, L-124				148	K7877168-3	E-122 (E-123-TCK 1 & 3)	3		0		0		0
			X								X												2		3		3
								X															0		0		3
																						4	2	6	3	8	6
X	X	X			X	X	X		X	X		E-123	POST—Isolantite, glazed 2¼" lg.	Support Insulator used on L-124				148	K7878265-1	E-123 (E-127-TCK 1 & 3)	2		0		0		0
			X								X												1		1		1
								X															0		0		2
																						4	1	6	1	8	2
X	X	X			X	X	X		X	X		E-124	INSULATOR POST—Isolantite ⅜" dia. x ⅜" lg.	Insulator Post for Small Resistors and Fuse Mountings	61316			168	K7877169-1	E-124 (E-128-TCK 1 & 3)	5		0		0		0
			X								X												3		5		5
								X															0		0		10
																						4	3	6	5	8	10
X	X	X			X	X	X		X	X		E-125	INSULATOR BUSHING—Isolantite 3/16" thk., ⅜" dia.	Insulator Feed-thru used on C. F. I. and Audio Units	61152			148	K7868565-1	E-125 (E-129-TCK 1 & 3)	8		0		0		0
			X								X												5		10		10
								X															0		0		20
																						4	5	6	10	8	20

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X	X	X	X		E-126	POST—Isolantite, 3/8" dia., 1 1/16" lg.	Mica Capacitor Mount	61266			148	K7877171-1	E-126 (E-130-TCK 1 & 3)	8		0		0		0
			X																				5		10		10
							X																0		0		20
											X											4	5	6	10	8	20
X	X	X			X	X	X	X	X	X		E-127	PLATE—Mycalex 1/16" thk., 2" x 2 1/4"	Resistor Support for R-102, R-104, R-110				137	K47J688-1	E-127 (E-131-TCK 1 & 3)	1		0		0		0
			X																				1		1		1
							X																0		0		2
											X											4	1	6	1	8	2
X	X	X			X	X	X	X	X	X		E-128	INSULATOR POST—Isolantite 3/8" dia. x 11/16 lg.	M-O Heater Resistor Supports and Misc. Mtg. Brackets	61317			163	K7877169-2	E-128 (E-132-TCK 1 & 3)	4		0		0		0
			X																				3		6		6
							X																0		0		12
											X											4	3	6	6	8	12
X	X	X			X	X	X	X	X	X		E-129	INSULATOR POST—Isolantite 3/8" dia. x 1" lg.	Mounting Support for R-101 on M-O Unit	61150			168	K7877169-5	E-129 (E-140-TCK 1 & 3)			0		0		0
			X																				1		1		1
							X																0		0		2
											X											4	1	6	1	8	2
X	X	X			X	X	X	X	X	X		E-130	TUBING—Textolite, 1 3/4" lg., 3/8"-20 Thread, 3/8" dia.	Protective Tubing for Thermostat S-108 in M-O Unit				19	K7890848-1	E-130 (E-142-TCK 1 & 3)	1		0		0		0
			X																				1		1		1
							X																0		0		2
											X											4	1	6	1	8	2
X	X	X			X	X	X	X	X	X		E-131	POST—Isolantite, 3/8" dia. 1 5/8" dia.	Support for M-O Trimmer	61385			148	K7878023-1	E-131 (E-143-TCK 1 & 3)	3		0		0		0
			X																				2		3		3
							X																0		0		6
											X											4	2	6	3	8	6
X	X	X			X	X	X	X	X	X		E-132	INSULATOR POST—Isolantite 1/8" dia., 3/8" lg. #6-32 tap	Spacer for M-O Heater				106	M7462893-1	E-132 (E-144-TCK 1 & 3)	5		0		0		0
			X																				3		5		5
							X																0		0		10
											X											4	3	6	5	8	10
X	X	X			X	X	X	X	X	X		E-134	POST—Isolantite, 29/64" square x 1" lg.	Insulator Post for Resistor Mtg. for R-108, R-137	61300			148	K7873996-3	E-133 (E-146-TCK 1 & 3)	5		0		0		0
			X																				2		4		4
							X																0		0		8
											X											4	2	6	4	8	8
X	X	X			X	X	X	X	X	X		E-135	BUSHING—Textolite 1/2" lg., 5/8" O.D., .154" I.D.	Resistor Mounting Bushing for R-151, R-166, R-169				191	K52J700-1	E-135 (E-153-TCK 1 & 3)	6		0		0		0
			X																				3		6		6
							X																0		0		12
											X											4	3	6	6	8	12
X	X	X			X	X	X	X	X	X		E-136	BUSHING—Textolite, 3/4" O.D., .129" I.D., 1/2" lg.	Support Bushing for R-164 in Audio				191	K7867111-1	E-136 (E-154-TCK 1 & 3)	2		0		0		0
			X																				1		2		2
							X																0		0		4
											X											4	1	6	2	8	4
X	X	X			X	X	X	X	X	X		E-137	BUSHING—Fibre, 3/4" O.D., 11/16" I.D., 1/8" lg.	Feed-thru Bushing used on Audio Unit				108	K7881617-1	E-137 (E-155-TCK 1 & 3)	8		0		0		0
			X																				2		4		4
							X																0		0		8
											X											4	2	6	4	8	8

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X		X	X	X		E-138	POST INSULATOR—Isolantite #10-24 tap, 4 holes, 1½" x ⅝" x 1" high	Insulator Block for P1 and P2 on TB-1	61427			148	K7884036-1	E-138 (E-156-TCK 1 & 3)	2		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X	X	X	X	X	X	X	X	X		E-139	FLEXIBLE BRAID—⅛" x .025" x 3 ft. Tinned Copper	Insulation				137	K7891449-167	E-139	1		1		0		0
								X															1		0		1
X	X	X		X	X	X	X	X	X	X		E-140	FISH SPINE BEAD—Isolantite #40	Used on P-A Coupling Coil L-122, L-123, L-124				137	DL4W505A-412	E-140 (E-190-TCK 1 & 3)	60		60		0		0
			X					X			X												60		60		60
																							60		0		60
X	X	X	X	X	X	X	X	X	X	X		E-141	FLEXIBLE BRAID—7/37" x 005" x 5 ft. Tinned Copper	Insulation				137	K7891449-168	E-141	1		1		0		0
								X															1		0		1
X	X	X		X	X	X		X	X	X		E-142	TERMINAL—Copper Strip .030" thk., Approx. Dev. Length 31/64"	Used on P-A Coupling Coils L-122, L-123, L-124				137	V46J720	E-142 (H-102-TCK 1 & 3)	12		0		0		0
			X				X				X												12		12		12
																							0		0		12
X	X	X	X	X	X	X		X	X	X		E-143	SLEEVE—¼" I.D. x ⅛" Wall x ⅝" lg., Rubber	Insulation				137	K7891449-173	E-143	1		2		0		0
							X																2		0		2
X	X	X		X	X	X		X	X	X		E-146	SPRING—Steel Wire ¼" O.D., Cadmium Plate, 1.26" max. lg.	Used on Switch S-106, S-107				19	K2415876-1	E-146 (H-204, H-206-TCK 1 & 3)	2		0		0		0
			X				X				X												2		4		4
																							0		0		10
																					4		2	6	4	8	10
X	X	X		X	X	X		X	X	X		E-147	GUIDE SPRING—Beryl. Copper, .015" thk.	Used on P-A Tank and Coupling				403	K7888060-1	E-147 (H-101-TCK 1 & 3)	3		0		0		0
			X				X				X												3		6		6
																							0		6		15
																					4		3	6	6	8	15
X	X	X		X	X	X		X	X	X		E-148	SPRING—Double Coil-13 turns-free length 7/16", Beryllium Copper	Used on Antenna Loading Coil L-126				632	K7873342	E-148 (H-103-TCK 1 & 3)	4		0		0		0
			X				X				X												4		8		8
																							0		8		20
																					4		4	6	8	8	20
X	X	X		X	X	X		X	X	X		E-149	SPRING—Beryl. Copper, 1/16" thk., Approx. Dev. Length, 2 9/64"	Used on Antenna Loading Coil L-126				325	K7876491	E-149 (H-104-TCK 1 & 3)	2		0		0		0
			X				X				X												1		2		2
																							0		2		5
																					4		1	6	2	6	5
X	X	X		X	X	X		X	X	X		E-150	SPRING—Steel Wire, ¼" O.D., 1.26" Max. Length	Detent Spring for S-101, S-118				19	K2417050	E-150 (H-200, H-201-TCK 1 & 3)	2		0		0		0
			X				X				X												2		4		4
																							0		4		10
																					4		2	6	4	8	10

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7		PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/230 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X		X	X	X		E-151	SPRING, Bronze, 0.030" thk.	Rear Support Spring for S-106, S-107				325	K7872572-1	E-151 (H-205, H-207-TCK 1 & 3)	2		0		0		0
			X				X				X												2		4		4
								X															2		4		10
																						4	2	6	4	8	10
X	X	X		X	X	X		X	X	X		E-152	SPRING, Bronze, 0.020" thk.	Rear Support Spring for S-101, S-118				325	K7869778-1	E-152 (H-202, H-203-TCK 1 & 3)	2		0		0		0
			X				X				X												2		4		4
								X														4	2	6	4	8	10
X	X	X		X	X	X		X	X	X		E-153	SPRING—For Split Worm Gear —Beryl. Copper	Used on I-P-A Variable Capacitor C-110				632	K7887998	E-153 (H-113-TCK 1 & 3)	3		0		0		0
			X				X				X												3		6		6
								X														4	3	6	6	8	15
X	X	X		X	X	X		X	X	X		E-154	SPRING—Coil 1/8" O.D., 1.15" lg.	For Uni-Control Brake				19	K2416212-1	E-154 (H-114-TCK 1 & 3)	2		0		0		0
			X				X				X												2		4		4
								X														4	2	6	4	8	10
X	X	X		X	X	X		X	X	X		E-155	SPRING—COIL, 1/8" O.D., 11/16" lg.	For Split Helical Gear				19	K2415892	E-155 (H-115-TCK-1 & 3)	3		0		0		0
			X				X				X												3		6		6
								X														4	3	6	6	8	15
X	X	X		X	X	X		X	X	X		E-156	TUBE CLAMP—Nickel Silver, Alloy "A"	Tube Clamp for P-A Tubes				531	K56J655-1	E-156 (H-188-TCK-1 & 3)	2		0		0		0
			X				X				X												1		1		1
								X															0		0		1
X	X	X		X				X	X	X		E-157	TUBE CLAMP—Nickel Silver, Alloy "A"	Clamp for V-102, V-151				19	M48J890-1	E-157	2		0		0		0
			X								X												1		1		1
								X														4	1	6	1	8	1
X	X	X		X	X	X		X	X	X		E-159	INSULATOR POST—Isolantite 3/16" square x 1" lg.	Resistor Mounting Insulator	61304			148	K7873996-1	E-159 (E-122-TCK 1 & 3)	12		0		0		0
			X								X												6		10		10
								X															4		8		21
																						4	4	6	8	9	16
X	X	X		X	X	X	X	X	X	X	X	E-161	MOUNTING BOARD—Textolite 1/16" thk., 1 3/8" x 6 1/4"	Mtg. Board in C. F. I. Unit				19	M7463234-3	E-161	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-162	MOUNTING BOARD—Textolite, 1/16" thk., 2 1/16" x 2 1/4"	Mtg. Board in C. F. I. Unit				19	K7878676-3	E-162	1		0		0		0
			X																				1		1		1
X	X	X	X	X	X	X	X	X	X	X	X	E-163	BUSHING—Rubber 1/8" O.D., 1/16" I.D. 3/16" high	Grommet/ for Conduit Boxes				19	V1314375-1	E-163	2		0		0		0
			X																				2		3		3
X	X	X		X	X	X	X	X	X	X	X	E-164	Tubing—Flexible Insulating Iro-o-lite, XTE 30, Black, .133" I.D.	Plastic tubing for covering wires				536	K7884640-1	E-164	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-166	MARKER—Textolite 1/16" thk., 16 3/16" x 1 11/16"	Terminal Board Marker Strip				19	M7465525-1	E-166	1		0		0		0
			X																				0		0		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X	X	X	X	X	X	E-167	Terminal Board, Textolite ⅛" thk., 3⅜" x 1"	Terminal Bd. used on M-O				19	K7890845-1	E-167	1		0		0		0
			X																				1		1		2
X	X	X		X	X	X	X	X	X	X	X	E-168	STRIP—Textolite ⅛" thk., ⅜" x 2⅛ lg.	Thermometer Block Support in M-O Unit				19	K7877885-1	E-168	1		0		0		0
			X																				1		2		2
X	X	X		X	X	X	X	X	X	X	X	E-169	SUPPORT—Mycalex ¾" thk., 1" x 22½" lg.	Large Resistor Mounting Support in Base of Transmitter				19	M7464790-1	E-169	1		0		0		0
			X																				0		1		1
X	X	X		X	X	X	X	X	X	X	X	E-170	TERMINAL BOARD, Textolite, 5/16" thk., 6¼" lg. x 2" w.	External Connector				19	M7464759-3	E-170	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-171	Board, Textolite ⅛" thk., 2¼" x 4⅝"	Fuse Mtg. Board				19	K7878074-1	E-171	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-172	SUPPORT—Mycalex ⅛" thk., 2" x 2⅝"	Resistor Support				19	K7877737-1	E-172	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-173	POST—Isolantite, unglazed 5/16" long	Resistor Support				148	K7875793-1	E-173	2		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-174	BOARD—Textolite, ⅛" thk., 1½" x 4 15/16"	Terminal Board				19	K7879739-1	E-174	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-175	INSULATOR—Isolantite, 5/16" high, ½" O.D., .144" I.D.	Feed-thru Bushing				148	K7880230-1	E-175	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-176	INSULATOR—Isolantite, 5/16" high, ½" O.D., .144" I.D.	Feed-thru Bushing				148	K7880231-1	E-176	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-177	BUSHING—Textolite, 1" long, ⅜" O.D., .154" I.D.	Resistor Support Bushing				19	K7878741-1	E-177	6		0		0		0
			X																				3		6		6
X	X	X		X	X	X	X	X	X	X	X	E-178	BUSHING—Black Plastic, ¼" O.D., .116" I.D., ⅛" high	Resistor Support Bushing				19	K7887282-1	E-178	2		0		0		0
			X																				1		2		2
X	X	X		X	X	X	X	X	X	X	X	E-179	BOARD—Textolite ⅛" thk., 4 15/16" x 1⅜"	Term. Bd. Spacer				19	K7888006-2	E-179	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-180	TERMINAL BOARD—4 Term. Jones type, 3 1/16" long	Connection Block				151-/142	M7465531-6	E-180	1		0		0		0
			X																				0		1		1

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X	X	X	X	X	X	E-181	MARKER, Textolite 1/8" thk., 3 3/4" x 1 1/16"	Term. Bd. Marker strip				19	K7882322	E-181	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-182	SPACER—Textolite 1/8" thk., 4 1/2" x 2"	Term. Bd. Spacer				19	K7882756-1	E-182	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-183	BOARD — Textolite 1/8" thk., 1/2" x 2 5/8" lg.	Terminal Board				19	K7877894-1	E-183	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-184	BOARD—Textolite, 1/8" thk., 11/16" x 3 1/4" lg.	Terminal Board				19	K7877896-1	E-184	1		0		0		0
			X																				1		1		1
X	X	X	X		X	X	X	X	X	X	X	E-135	BOARD—Textolite, 1/8" thk., 1/2" x 2 5/8" lg.	Terminal Board				19	K7877892-1	E-185	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-186	TEXTOLITE SHEET — 1/8" thk., 12" square	For making General Repairs				137	K57J693-1	E-186	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-187	FIBRE ROD—Black, 12" lg., 1" dia.	For making General Repairs				137	K57J694-2	E-187	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-188	FIBRE ROD—Black, 12" lg., 1/2" dia.	For making General Repairs				137	K57J694-1	E-188	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-189	POLYSTYRENE ROD, 12" lg., 1" dia.	For Making General Repairs				137	K57J695-1	E-189	1		0		0		0
			X																				1		1		1
X	X	X		X	X	X	X	X	X	X	X	E-196	GRID CAP—Beryl Copper	Grid Connector for V201				117-6004	K52J689-1	E196, E197	1		0		0		0
			X																				1		1		1
X	X	X	X	X	X	X	X	X	X	X	X	E-197	Same as E-197	Grid Connector for V-202									–		–		–
X	X	X		X	X	X			X	X		F-101	FUSE—Cartridge, renewable, 10 amps., 250 v.	Control Circuit Fuse				19-GE1022	DL4W505A-130	F-101	1		2		0		0
			X				X																2		4		4
								X															2		0		10
									X														2		0		2
											X											4	2	6	4	9	10
X	X	X		X	X	X			X	X		F-101A	FUSE LINK #1099	Replaceable link for F-101				137-#1099	DL4W505-131	F-101A	1		10		0		0
			X				X																10		20		20
								X															10		0		50
									X														10		0		10
											X											4	10	6	20	8	50
X	X	X		X	X	X			X	X		F-102	FUSE—Cartridge, renewable, 6 amp., 250 v.	M-O Heater Fuse				19-GE1020	DL4W505A-132	F-102, F-103	2		2		0		0
			X				X																4		8		8
								X															2		0		20
									X														2		0		2
											X											4	4	6	8	9	20

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X			X	X		F-102A	FUSE LINK—#1097	Replacement Link for F-102				132-#1097	DL4W505A-133	F-102A, F-103A	4	1	10		0		0
			X				X	X			X												20		40		40
																						1	10		0	1	10
																						1	10		0	1	100
																						4	20	6	40	9	100
X	X	X	X	X	X	X	X	X	X	X	X	F-103	Same as F-102	M-O Heater Fuse									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	F-103A	Same as F-102A	Replacement Link for F-103									–		–		–
X	X	X		X	X	X		X	X	X		H-101	ELASTIC STOP NUT—Plated Brass, #4-40	Used on M-O Unit, etc.				326	K7861714-1	H-101 (H-117-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-102	ELASTIC STOP NUT—Plated Brass, #6-32	Used on M-O Unit, etc.				326	K7861714-2	H-102 (H-118-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-103	ELASTIC STOP NUT—Plated Brass, #8-32	Used on Transmitter Frame, etc.				326	K7861714-4	H-103 (H-119-TCK 1 and 3)	25		0		0		0
			X				X				X												0		0		25
X	X	X		X	X	X		X	X	X		H-104	ELASTIC STOP NUT—Plated Brass, #10-24	Used on Transmitter Frame, etc.				326	K7861714-6	H-104 (H-120-TCK 1 and 3)	70		0		0		0
			X				X				X												0		0		70
X	X	X		X	X	X		X	X	X		H-105	ELASTIC STOP NUT—Plated Brass, 5/16"-16	Used on Upper Shock Mtg. on Transmitter				326	K7861714-10	H-105 (H-121-RCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-106	ELASTIC STOP NUT—Alum., #4-40	Used on S-108 Support, etc.				326	K7861714-12	H-106 (H-122-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-107	ELASTIC STOP NUT—Alum., #6-32	Used on Uni-Control Mechanism				326	K7861714-13	H-107 (H-123-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10
X	X	X		X	X	X		X	X	X		H-108	ELASTIC STOP NUT—Alum., #8-32	Used on Uni -Control Mechanism				326	K7861714-14	H-108 (H-124-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10
X	X	X		X	X	X		X	X	X		H-109	ELASTIC STOP NUT—#8-32, Brass	Used on Terminal Boards				326-92TM82	DL4W505A-177 DL4W526A-170	H-109 (H-125-TCK 1 and 3)	30		0		0		0
			X				X				X												0		0		30
X	X	X		X	X	X		X	X	X		H-110	ELASTIC STOP NUT—#8-32, Thin Hex	Used on Transmitter				326-99T82	DL4W505A-178 DL4W526A-171	H-110 (H-126-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10
X	X	X		X	X	X		X	X	X		H-111	STUD—#6-32 x 3/8", Brass, Threaded Full Length (Plated)	Used in M-O Unit Heater Assem.				137	DL4W505A-180	H-111 (H-127-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X			X	X		H-112	STUD—#6-32 x 5/8", Brass, threaded full length (plated)	Used on S-101 Assem.				137	DL4W505A-181	H112 (H-128-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X	X	X	X		H-113	STUD—#6-32 x ¾", brass, threaded full length (plated)	Used on S-106 Assem.				137	DL4W505A-182	H-113 (H-129-TCK 1 and 3)	15		0		0		0
			X								X												0		0		15
X	X	X			X	X	X	X	X	X		H-114	STUD—#6-32 x 1¼", brass, threaded full length (plated)	Used on Coupling Coil Terminals				137	DL4W505A-183	H-114 (H-130-TCK 1 and 3)	10		0		0		0
			X								X												0		0		10
X	X	X			X	X	X	X	X	X		H-115	STUD—#6-32 x 1⅜", brass, threaded full length (plated)	Part of P-16 on Audio Unit, P-14 on CFI Unit, etc.				137	DL4W505A-184	H-115 (H-131-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-116	STUD—#6-32 x 1⅞", brass, threaded full length (plated)	Used on M-O Heater Assem.				137	DL4W505A-185	H-116 (H-132-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-117	STUD—#6-32 x 1½", brass, threaded full length (plated)	Used on Transmitter				137	DL4W505A-186	H-117 (H-133-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-118	STUD—#6-32 x 2½", brass, threaded full length (plated)	Used on P-40 in M-O Unit				137	DL4W505A-187	H-118 (H-134-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-119	STUD—#6-32 x 5½", brass, threaded full length (plated)	Used on Switch S-104				137	DL4W505A-188	H-119 (H-135-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-120	STUD—#8-32 x 1⅛", brass, threaded full length (plated)	Used on TB-8 in Transmitter				137	DL4W505A-189	H-120 (H-136-TCK 1 and 3)	15		0		0		0
			X								X												0		0		15
X	X	X			X	X	X	X	X	X		H-121	STUD—#10-24 x 1", brass, threaded full length (plated)	Used on TB-1				137	DL4W505A-190	H-121 (H-137-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-122	STUD—#10-32 x 1", brass, threaded full length (plated)	Used on C-124 MTG				137	DL4W505A-191	H-122 (H-138-TCK 1 and 3)	10		0		0		0
			X								X												0		0		10
X	X	X			X	X	X	X	X	X		H-123	STUD—#10-32 x 1⅛", brass, threaded full length (plated)	Used on C-110 Mtg				137	DL4W505A-192	H-123 (H-139-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-124	STUD—Brass, cad. finish, ⅜" lg. #8-32, threaded ⅝"	Used on C-101 Assem.				387	K7877574	H-124 (H-140-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-125	STUD—¼"-28 thread	Used on Switch and Coil Assem.				337	K7881614-1	H-125 (H-141-TCK 1 and 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-126	STUD, Brass, 7 11/16" lg., .140" Dia.	Used on S106 Assem.				386	K7892369-1	H126 (H142-TCK 1 & 3	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-127	STUD CONNECTION—Copper Rod, 11/16 lg., #6-32 Thread	Used on Ceramic Coil Forms as a terminal				505	K7870388-1	H127 (H143-TCK 1 & 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-128	SET SCREW—Multiple-spline, Cup-point, Bristol, #8-32 x 1/8" lg.	Used on Uni-Control Mechanisms, Couplings and knobs			6L30908-339	113	K27J972-3	H-128 (H144-TCK 1 & 3)	5		0		0		0
			X								X												0		0		5

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X	X	X	X		H-129	SET SCREW—Multiple-spline, Cup-point, Bristol, #6-32 x 3/16" lg.	Used on Uni-Control Mechanisms, Couplings and Knobs			6L18506-290	113	K27J972-15	H-124 (H145-TCK 1 & 3)	15		0		0		0
			X								X												0		0		15
X	X	X			X	X	X	X	X	X		H-130	SET SCREW—Multiple-spline, Cone-point, Bristol, #6-32 x 3/16" lg.	Used on Uni-Control Mechanisms, Couplings and Knobs				113	K27J972-25	H-130 (H146-TCK 1 & 3	15		0		0		0
			X								X												0		0		15
X	X	X			X	X	X	X	X	X		H-131	SET SCREW—Multiple-spline, Cup-point, Bristol, #6-40 x 1/16" lg.	Used on Pinions and Flexible Couplings				113	K7871266	H-131 (H141-TCK 1 & 3)	15		0		0		0
			X								X												0		0		15
X	X	X			X	X	X	X	X	X		H-132	SET SCREW—Hex Socket, Allen Type, Cup-point, #8-32 x 1/4" lg.	Used on Transmitter assem.				102	K-7868954-1	H-132 (148-TCK 1 & 3)	10		0		0		0
			X								X												0		0		10
X	X	X			X	X	X	X	X	X		H-133	SET SCREW—Multiple-spline, Cup-point, Bristol, #8-32 x 1/8" lg.	Used on Transmitter assem.				113	K-7876450-1	H-133 (H199-TCK 1 & 3)	40		0		0		0
			X								X												0		0		40
X	X	X			X	X	X	X	X	X		H-134	SET SCREW—Multiple-spline, Cup-point, Bristol, #8-32 x 1/4" lg.	Used on Transmitter assem.				113	K7876450-3	H-134 (H150-TCK 1 & 3)	30		0		0		0
			X								X												0		0		30
X	X	X			X	X	X	X	X	X		H-135	SET SCREW—Multiple-spline, Cup-point, Bristol, #8-32 x 1/2" lg.	Used on Transmitter assem.				113	K7876450-4	H-135 (H-151-TCK 1 & 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-136	SET SCREW—Multiple-spline, Cup-point, Bristol, #6-40 x 1/4" lg.	Used on Transmitter assem.				113	K7876450-5	H-136 (H-152-TCK 1 & 3)	15		0		0		0
			X								X												0		0		15
X	X	X			X	X	X	X	X	X		H-137	BOLT—1/4"-24 Thread, 1 1/4" lg. Steel	Used on Transmitter Base				137	K7883284-1	H-137 (H-156-TCK 1 & 3)	10		0		0		0
			X								X												0		0		10
X	X	X			X	X	X	X	X	X		H-138	NUT—1/4"-24—Steel ♦	Used on Transmitter Base				137	K7883283-1	H-138 (H-157-TCK 1 & 3)	10		0		0		0
			X								X												0		0		10
X	X	X			X	X	X	X	X	X		H-139	ANCHOR CLIP, Phos. Bronze .020" thick, Dev. Legth-1"	Used on Resistor Mountings				371	K7888320	H-139 (E-114-TCK 1 & 3)	20		0		0		0
			X								X												0		0		20
X	X	X			X	X	X	X	X	X		H-140	PIN—1/4"-20 Thd, 2 15/16" long	Used on Antenna Bushings				370	K7878370-1	H-140 (H-153-TCK 1 & 3)	5		0		0		0
			X								X												0		0		5
X	X	X			X	X	X	X	X	X		H-141	THUMB SCREW—#6-32 thread	Used to hold Chart Frame to Transmitter Door				412	K7867439-1	H-141 (H-154-TCK 1 & 3)	4		0		0		0
			X								X												0		0		5

TCK				TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X		X	X	X		H-142	BRACKET—Stainless steel, .062" thk., dev. length 2 11/16" approx.	Hold-down Clamp for Pyranol Capacitors				137	K7879663-1	H-142 (H-155-TCK 1 and 3)	20		0		0		0
			X				X																0		0		20
X	X	X		X	X	X		X	X	X		H-143	SCREW—Self-tapping, #4-40 x 3/4", stainless steel	Nameplate Screws				320	M7461853-11	H-143 (H-158-TCK 1 and 3)	25		0		0		0
			X				X				X												0		0		25
X	X	X		X	X	X		X	X	X		H-144	SCREW—Self-tapping #4-40 x 1/4", stainless steel	Nameplate Screws				320	M6961853-12	H-144 (H-159-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-145	SCREW—Self-tapping #8-32 x 1/4", stainless steel	Used on Transmitter Frame				392	K7878452-2	H-145 (H-160-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10
X	X	X		X	X	X		X	X	X		H-146	SCREW—Self-tapping #8-32 x 3/8", stainless steel	Used on Transmitter Frame				392	K7878452-3	H-146 (H-161-TCK 1 and 3)	35		0		0		0
			X				X				X												0		0		35
X	X	X		X	X	X		X	X	X		H-147	SCREW—#10-24 x 2" lg., brass	Screw for Pyranol Capacitor Mounting Clamp				137	K7879710-1	H-147 (H-162-TCK 1 and 3)	2		0		0		0
			X				X				X												0		0		2
X	X	X		X	X	X		X	X	X		H-148	SCREW—#10-24 x 3 3/4" lg., brass	Screw for Pyranol Capacitor Mounting Clamp				137	K7879710-3	H-148 (H-163-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10
X	X	X		X	X	X		X	X	X		H-149	SCREW—#10-24 x 3 1/4" lg., brass	Screw for Pyranol Capacitor Mounting Clamp				137	K7879710-4	H-149 (H-164-TCK 1 and 3)	8		0		0		0
			X				X				X												0		0		8
X	X	X		X	X	X		X	X	X		H-150	TAPER PIN—#00000, 1/2" lg., stainless steel	For Holding Couplings to Shafts on Coil and Sw. Assem.				109	M7461888-4	H-150 (H-165-TCK 1 and 3)	20		0		0		0
			X				X				X												0		0		20
X	X	X		X	X	X		X	X	X		H-151	TAPER PIN—#00000 5/8" lg., stainless steel	For Holding Couplings to Shaft on Tank and Coupling Assem.				109	M7461888-6	H-151 (H-167-TCK 1 and 3)	10		0		0		0
			X				X				X												0		0		10
X	X	X		X	X	X		X	X	X		H-152	TAPER PIN—#00000, 1/2" lg., stainless steel	Used on M-O Band Change Coupling Assem.				109	M7461888-5	H-152 (H-166-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-153	TAPER PIN—#0, 1 1/8" lg., stainless steel	Locating pins for M-O Mtg. Plate				109	M7461888-36	H-153 (H-168-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-154	RD. HD. SCREW—#10-32 x 5/8" brass (plated)	Used in Transmitter				137	DL4W505A-239	H-154 (H-169-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-155	RD. HD. SCREW—1/4"-28 x 1", brass (plated).	Used in Transmitter				137	DL4W505A-240	H-155 (H-170-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-156	RD. HD. SCREW—#10-32 x 1 1/4", Brass (plated)	Used in Transmitter				137	DL4W505A-241	H-156 (H-171-TCK 1 and 3)	5		0		0		0
			X				X				X												0		0		5

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X		X	X	X		H-157	F.R.H. SCREW—#10-32 x 5/8", Brass (Plated)	Used in Transmitter				137	DL4W505A-242	H-157 (H-172-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-158	F.R.H. SCREW—#10-32 x 1", Brass (Plated)	Used in Transmitter				137	DL4W505A-244	H-158 (H-174-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-159	F.R.H. SCREW—5/16"-16 x 1 1/2", Brass (Plated)	Used in Transmitter				137	DL4W505A-243	H-159 (H-173-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-160	F.R.H. SCREW—#10-32 x 1/8", Brass (Plated)	Used in Transmitter				137	DL4W505A-247	H-160 (H-175-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-161	HEX NUT—#10-32 Brass (Plated)	Used in Transmitter				137	DL4W505A-248	H-161 (H-176-TCK 1 & 3)	20		0		0		0
			X				X				X												0		0		20
X	X	X		X	X	X		X	X	X		H-162	HEX NUT—5/16"-24, Steel (Plated)	Used in Transmitter				137	DL4W505A-250	H-162 (H-178-TCK 1 & 3)	4		0		0		0
			X				X				X												0		0		4
X	X	X		X	X	X		X	X	X		H-163	HEX NUT—1/2"-24 Steel (Plated)	Used in Transmitter				137	DL4W505A-251	H-163 (H-179-TCK 1 & 3)	16		0		0		0
			X				X				X												0		0		16
X	X	X		X	X	X		X	X	X		H-164	HEX HD. SCREW—5/16"-24 x 1 1/4"	Used in Transmitter				137	DL4W505A-254	H-164 (H-182-TCK 1 & 3)	4		0		0		0
			X				X				X												0		0		4
X	X	X		X	X	X		X	X	X		H-165	COTTER PIN—1/8" dia. x 1 1/4", Brass (Plated)	Used on M-O Band Switch				137	DL4W505A-256	H-165 (H-184-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-166	COTTER PIN—1/8" dia. x 3/8", Brass (Plated)	Used on Dial Lock Mechanisms				137	DL4W505A-257	H-166 (H-185-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-167	COTTER PIN—1/8" dia. x 1", Brass (Plated)	Used on M-O Unit Coupling				137	DL4W505A-258	H-167 (H-186-TCK 1 & 3)	5		0		0		0
			X				X				X												0		0		5
X	X	X		X	X	X		X	X	X		H-168	PAD—2 1/16" O.D., 2 1/16" I.D., Black Felt, 1/8" thick	Meter Mtg. Pad for M106				588	K7861237-2	H-168 (H-108-TCK 1 & 3)	2		0		0		0
			X				X				X												1		2		2
																					4		1		1		4
																						6		6		9	
X	X	X		X	X	X		X	X	X		H-169	GASKET—1/8" Felt, 3 5/16" dia.	Gasket for Antenna Insulator Bushing				583	K7892427-1	H-169 (H-106-TCK 1 & 3)	4		0		0		0
			X				X				X												1		2		2
																					4		1		1		4
																						6		6		9	

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X		X	X	X	H-170	PAD—Felt 1/8" thk., 3 1/2" O.D., 2 1/16" I.D., Black	Mtg. Pad for 3 1/2" Meter				588	K7861237-1	H-170 (H-107-TCK 1 & 3)	8		0		0		0
			X					X															8		16		16
											X												0		0		32
																					4		8	6	16	9	32
X	X	X			X	X	X		X	X	X	H-171	GASKET—Felt 1 1/4" I.D., 1 3/4" O.D., 1/8" thk.	Gasket for M-O Tuning Capacitor Shaft				438	K7878006	H-171 (H-109-TCK 1 and 3)	2		0		0		0
			X					X															1		2		2
											X												0		0		4
																					4		1	6	2	9	4
X	X	X			X	X	X		X	X	X	H-172	WASHER—0.221" I.D., 1" O.D., 1/8" thk. felt	Used on M-O Unit for M-O Reset Shaft				627	K7873608	H-172 (H-110-TCK 1 and 3)	2		0		0		0
			X					X															2		4		4
											X												0		0		4
																					4		1	7	2	9	4
X	X	X			X	X	X		X	X	X	H-173	WASHER—3/8" I.D., 1 3/4" O.D., thk. felt	Used on M-O Unit for S-108 Shaft				588	K7890849-1	H-173 (H-111-TCK 1 and 3)	2		0		0		0
			X					X															1		2		2
											X												0		0		4
																					4		1	6	2	9	4
X	X	X			X	X	X		X	X	X	H-174	WASHER—1 1/4" O.D., 3/8" I.D., 1/4" thk. felt, notched	Used between M-O Box and Heat Ins.				588	K7890849-2	H-174 (H-112-TCK 1 and 3)	1		0		0		0
			X					X															1		2		2
											X												0		0		4
																					4		1	6	2	9	4
X	X	X			X	X	X		X	X	X	H-175	GASKET — DK-126 Corprene 6 1/16" x 4 3/8" x 1/16" thk.	For Chart Frame				116	K7857820-17	H-175 (H-105-TCK 1 and 3)	1		0		0		0
			X					X															1		2		2
											X												0		0		4
																					4		1	6	2	9	4
X	X	X			X	X	X		X	X	X	H-176	GASKET—Black felt 1/8" thk., 3 1/4" O.D., 1 3/4" I.D.	Used on M-O Unit where V-101 enters Box				627	K7887725-1	H-176 (H-116-TCK 1 and 3)	1		0		0		0
			X					X															2		4		4
											X												0		0		8
																					4		2	6	4	9	8
					X	X						H-177*	HEX NUT — 1/4"-28, brass, (plated)	Used on Trans. Assem.				137	DL4W526A-243	H-177*	10		0		0		0
			X				X																0		0		10
X	X	X			X	X	X		X	X	X	H-177	BOARD—Mycalex 1/4" thk., 1" x 9 15/16" long	Mtg. Board for P-A Tank Inductor L120				358	K7887888-1	H-177 (E-124-TCK 1 and 3)	1		0		0		0
			X					X															0		1		1
											X												0		0		1
X	X	X			X	X	X		X	X	X	H-178	BOARD—Mycalex 1/4" thk., 1" x 9 15/16" long	Spacer Board for L-120 Mtg. Board				465	K7878131-1	H-178 (E-125-TCK 1 and 3)	1		0		0		0
			X					X															0		1		1
											X												0		0		2
																							0	6	1	9	2
X	X	X			X	X	X		X	X	X	H-179	SPACER—Isolantite 1/8" dia., 9/16" lg., #6-32 tap	Insulating Spacer used on S-106				106	M7462893-5	H-179 (E-126-TCK 1 and 3)	3		0		0		0
			X					X															6		6		12
											X												0		0		12
																					4		6	6	12	9	24
					X	X						H-180*	HEX NUT — 5/16"-18 Steel (plated)	Used in Trans. Assem.				137	DL4W526A-246	H-180*	12		0		0		0
			X				X																0		0		12

*TCK 1 and 3 only.

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X		X	X	X		H-180	SPACER—Alum. alloy ⅜" dia. ⅛" lg. #10-32 tap	Mtg. Spacer for C-110				184	K7877791-2	H-180 (E-133-TCK 1 and 3)	3		0		0		0
			X				X				X												2		3		3
																						4	0	6	3	9	6
			X		X	X		X				H-181*	HEX NUT-⅜"-16 steel (plated)	Used in Trans. Assem.				137	DL4W526A	H-181*	4		0		0		4
X	X	X		X	X	X		X	X	X		H-181	SPACER—Isolantite-⅜", Dia., 1.0625" lg. #10-32 tap	Mtg. Insulator Spacer for C154				8	K1877787-1	H-181-(E-134-TCK 1 and 2)	2		0		0		0
			X				X				X												2		3		3
																						4	0	6	3	9	6
X	X	X		X	X	X		X	X	X		H-182	TERMINAL MARKER—Lamacoid—⅛" thk., 2⅛" x 1⅜"	Terminal Marker Strip Used on TB 15 on M-O				191	K7888919-1	H-182 (E-145-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
			X		X	X		X				H-183*	HEX HD. CAP. SCREW, ⅜"-16 x ⅜" Steel Plated	Used on Transmitter				137	DL4W526A-249	H-183	4		0		0		0
							X																0		0		4
X	X	X		X	X	X		X	X	X		H-183	MTG. BOARD—Textolite ⅛" thk., 4¾" x 2¼"	Fuse Mtg. Board for F101, F102, F103				137	K47J725-1	H-183 (E-147-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		H-184	SUPPORT—Mycalex ⅛" thk, 2½" x 8⅝" lg.	Mtg. Supports for R103, R123, R133, R183				187	K7878077-1	H-184 (E-148-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		H-185	SUPPORT—Mycalex ¾" thk., 1" x 22½" long	Mtg. Support for large resistors				465	M48J729-2	H-185 (E-150-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		H-186	BOARD—Mycalex ⅛" thk., ¾" x 4⅛" lg.	Mtg. Board for R167 (audio unit)				19	K7879744-1	H-186 (E-152-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		H-187	MARKER STRIP—Lamacoid ⅛" thk, 1¹¹⁄₁₆" x 17¼" lg.	Marker Strip used on TB-1				465	M7465525-2	H-187 (E-159-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		H-188	SUPPORT—Mycalex ¾" thk., 1" x 22½" lg.	Mtg Support for large Resistors				465	M48J729-1	H-188 (E-149-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
					X	X						H-189*	TUBE CLAMP, Phos. Bronze	Tube Clamp for V102, V151				137	K52J180-1	H-189	2		0		0		0
			X				X																0		1		1
																							0		0		1

TCK				TCK 1	TCK 2	TCK 3				TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X			X	X	X		H-189	SPACER—Textolite, ¾" dia. x ¼" thick	Spacer for M-O Box				106	K7878027	H-189 (E141-TCK 1 and 3)	4		0		0		0
			X						X				X												4	4	6	8	9	8
																										0		0		16
						X	X							H-190*	TUBE CLAMP, Phos. Bronze	Tube Clamp for V102, V151				19	ML-7873966-G1	H-190	2		0		0		0
			X																							0		1		1
									X																	0		1		1
X	X	X			X	X	X			X	X	X		H-190	WRENCH — Multiple spline, Bristol, #6 "L"	Used for adjusting Bristol type set screws				113	V38J247-2	H-190 (H-195-TCK 1 and 3)	1		0		0		0
			X																							2		2		2
									X																	0		0		4
													X												4	2	6	2	9	4
X	X	X			X	X	X			X	X	X		H-191	WRENCH — Multiple-spline, Bristol, #8 "T"	Used for adjusting Bristol type set screws				113	ML7889140-G1	H-191 (H-196-TCK 1 and 3)	1		0		0		0
			X																							1		1		2
									X																	0		0		2
													X												4	1	6	1	9	2
X	X	X			X	X	X			X	X	X		H-192	WRENCH—Hex, Allen, #8 "L"	Used for adjusting Allen type Set Screws				102	K7868935-1	H-192 (H-197-TCK 1 and 3)	1		0		0		0
			X																							2		2		2
									X																	0		0		4
													X												4	2	6	2	9	4
X	X	X			X	X	X			X	X	X		H-193	WRENCH — Multiple-spline, Bristol, #8 "L"	Used for adjusting Bristol type Set Screws				113	K7876451-1	H-193 (H-198-TCK 1 and 3)	1		0		0		0
			X																							2		2		2
									X																	0		0		4
													X												4	2	6	2	9	4
			X											H-193†	SHOCK MOUNT	Lower Shock Mounts				19	ML7884080-G1	H-193†	4		1		2		2
			X											H-194†	SHOCK MOUNT	Upper Shock Mounts				19	ML7884080-G2	H-194†	2		1		2		2
			X											H-199†	TUBE CLAMP, phos. bronze	Tube Clamp for P-A Tubes				19	ML7878434-G1	H-199†	1		1		1		1
X	X	X			X	X	X				X	X		I-101	INDICATING LAMP ASSEM. Rating: 110-146 v. consisting of bulb, 18 v., 0.11 amp., resistor 1200 ohms	Power Indicator				489-DL-6159655	M7460883-3	I-101, 102, 103,	4		4		0		0
			X							X	X															1		2		4
													X												4	1	6	2	9	4
X	X	X			X	X	X				X	X		I-101A	COLOR CAP—Red	Cap for I-101				489	K7874582-2	I-101A, 102-A	2		2		0		0
			X							X	X															1		1		2
													X												4	1	6	1	9	2
X	X	X			X	X	X				X	X		I-101B	LAMP—Mazda T4-18 v., 11 amps	Lamp for I-101				137-Mazda T4	DL505A-401	I-101B, 102B, 103B, 104B	4		0		0		0
			X							X	X															8		16		16
													X												4	8	6	16	9	24
X	X	X	X	X	X	X	X	X	X	X	X	X	X	I-102	Same as I-101	Plate Indicator									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X	X	I-102A	Same as I-101A	Cap for I-102									–		–		–

†TCK 1 only
*TCK 1 and 3 only

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X	X	X	X	X	X	X	X	I-102B	Same as I-101B	Lamp for I-102									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	I-103	Same as I-101	Bias Indicator									–		–		–
X	X	X		X	X	X			X	X		I-103A	COLOR CAP—Green	Cap for I-103				489	K7874582-3	I-103A	1		1		0		0
			X								X												1		0		1
								X	X														1		0		1
X	X	X	X	X	X	X	X	X	X	X	X	I-103B	Same as I-101B	Lamp for I-103									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	I-104	Same as I-101	M-O Heater									–		–		–
X	X	X		X	X	X			X	X		I-104A	COLOR CAP—Amber	Cap for I-104				489	K7874582	I-104A	1		1		0		0
			X								X												1		0		1
								X	X														1		0		1
X	X	X	X	X	X	X	X	X	X	X	X	I-104B	Same as I-101B	Lamp for I-104									–		–		–
X	X	X		X	X	X		X	X	X		J-151	MICROPHONE JACK—Three circuit, short frame	Microphone Jack	49039			19	ML7463113-G1	J-151	1		0		0		0
			X																				1		0		1
							X																1		0		2
											X											4	1	7	1	9	2
X	X	X		X	X	X		X	X	X		J-201	HEAD PHONE JACK—Single open circuit	C.F.I. Phone Jack	490254			19	ML7463112-G1	J-201	1		0		0		0
			X																				1		0		1
							X				X											4	1	7	1	9	2
		X		X				X		X		K-101	RELAY—4 N.O. contacts, 110 v., 60 cycles coil	Main Starting Coil				490-CR-2820	P7763201-1	K-101	1		0		0		0
				X				X															0		0		2
		X		X						X		K-101A	CONTACTOR COIL	Coil for K-101				490-22D2G227	K7891449-128	K-101A	1		1		0		0
																							1		2		2
								X															1		0		3
																							1		0		1
		X		X						X		K-101B	CONTACT	Movable Contact for K-101				490	K3863767-2	K101-B, K-106A	2		4		0		0
																							2		6		6
								X															4		0		10
		X		X						X		K-101C	CONTACT	Stationary Contact for				490	K4900573-1	K-101C, K-106B	2		4		0		0
								X															4		0		10
																							2		6		6
		X		X						X		K-101D	CONTACT	Stationary Contact for K-101				490	K4900573-2	K-101D, K-106C	2		4		0		0
			X																				2		6		6
								X															4		0		10

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X		X	X		K-102	RELAY—Single pole, double throw and single throw, single throw	Keying Relay				629	ML7661314-G1	K-102	1		0		0		0
			X					X															1		2		2
									X														0		0		3
											X											4	4	7	2	9	3
X	X	X			X	X	X		X	X		K-102A	CONTACT—¼" dia. x 5/16" long	Lower Stationary Contacts for K-102				19	ML7871063-G1	K-102A	2		4		0		0
			X					X															1		2		2
									X														4		0		3
											X											4	4	7	2	9	3
X	X	X			X	X	X		X	X		K-102B	CONTACT—¼" dia. x 5/16" long	Upper Stationary Contact for K-102				19	ML7873179-G1	K-102B	2		4		0		0
			X					X															1		2		2
									X														4		0		3
											X											4	4	7	2	9	3
X	X	X			X	X	X		X	X		K-102C	CONTACT—.010" x 11/64" x 53/64"	Lower Movable Contact for K-102				19	ML7873195-G1	K-102C	1		4		0		0
			X					X															1		2		2
									X														4		0		3
											X											4	4	7	2	9	3
X	X	X			X	X	X		X	X		K-102D	CONTACT—.010" x 5/16" x 53/64	Upper Movable Contact for K-102				19	ML7874575-G1	K-102D	1		4		0		0
			X					X															1		3		3
									X														4		0		4
											X											4	4	7	3	9	5
X	X	X			X	X	X		X	X		K-102E	CONTACTOR COIL	Coil for K-102				629	ML47462352-G4	K-102E	1		1		0		0
			X					X															1		3		3
									X														2		0		5
											X											4	4	7	3	9	5
X	X	X			X	X	X		X	X		K-103	Relay-One normally closed contact reset Coil and trip coil	P-A Plate Overload				19-CR-X 2820-1726	P7765230-18	K-103	1		0		0		0
			X					X															0		0		3
									X														0		0		2
											X											4	4	7	0	9	2
X	X	X			X	X	X		X	X		K-103A	CONTACT	Movable Contacts for K-103				19	K6977141-G1	K-103A, K-104A	2		4		0		0
		X						X															4		12		12
			X						X														4		0		20
											X											4	4	7	12	10	4
	X	X	X		X	X	X	X		X		K-103B	CONTACT	Stationary Contacts for K-103				19	K6977140-G1	K-103B, K-104B	2		4		0		0
			X					X															4		12		12
									X														4		0		20
											X											4	4	7	12	10	4
X	X	X			X	X	X		X	X		K-103C	CONTACT	Stationary Contacts for K-103				19	K6977140-G2	K-103C, K-104C	2		4		0		0
			X					X															4		12		12
									X														4		0		20
											X											4	4	7	12	10	4

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK															PART									SPARE PARTS					
			TCK 1	TCK 2	TCK 3				TCK 4	TCK 5	TCK 6	TCK 7												Equip.		Tender		Stock	
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X		X	X	X			X	X	X		K-103D	TRIP COIL—115 v., 60 cycles	Trip Coil for K-103				19-1D36G16	DL4W505A-461 K7891999-133	K-103D	1		1		0	
			X				X	X				X														2		2
																										0		3
																										0		1
																						4	1	7	2	10		3
X	X	X		X	X	X			X	X			K-103E	RESET COIL—0.46 amp.	Reset for K-103				19-1D36G1	DL4W505A-463 K7891449-132	K-103E, K-104E	2		1		0	
			X				X	X				X														3		5
																										0		1
																						4	1	7	3	10		5
X	X	X		X	X	X			X	X	X		K-104	RELAY—One normally closed contact, reset Coil and trip Coil	Auxiliary Circuit overload relay				19-CR-2820-1726 C-C4A	P-7765230-3	K-104	1		0		0		2
			X				X	X				X											0		0			
X	X	X	X	X	X	X	X	X	X	X	X	X	K-104A	Same as K103A	Movable Contacts for K-104									–		–		–	
X	X	X	X	X	X	X	X	X	X	X	X	X	K-104B	Same as K103B	Stationary Contacts for K104									–		–		–	
X	X	X	X	X	X	X	X	X	X	X	X	X	K-104C	Same as K103	Stationary Contacts for K104									–		–		–	
X	X	X		X	X	X			X	X	X		K-104 D	TRIP COIL—0.32 amp.	Trip Coil for K104				19-1D36G15	DL4W505A-462	K-104D	1		1		0	
			X				X	X				X														2		2
																										0		3
																						4	1	7	2	10		3
X	X	X	X	X	X	X	X	X	X	X	X	X	K-104E	Same as K103E	Reset Coil of K104									–		–		–	
		X		X				X		X			K105	Relay—Type Aga.—1300 ohms Code # 2—One "B" Contact	M-O Heater Relay				344-H-70829-5	K7877805-1	K105, K107	1		0		0		0
			X				X					X											0		0			2
		X		X				X		X			K-105A	Relay Coil	Coil for K105				344-Z5552-2	K7891449-130	K105A, K107A	1		1		0		0
			X				X					X											1		0			3
		X		X				X		X			K-105B	CONTACT	Contact for K105				19-Z3198-2	K7891449-137	K-105B, 107B	4		4		0		0
			X				X					X											1		0			3
		X		X				X		X			K-105C	CONTACT	Contact for K105				19-Z3198-3	K7891449-138	K-105C, 107C	4		4		0		0
			X				X					X											1		0			3
X	X				X	X			X				K-106	RELAY—Five normally open contacts, one normally closed contact	Starting Contactor				19-CR-2820-1097 EN88	P7763201-1	K-106	1		0		0		0
												X											0		0	10		2

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X				X	X			X			K-106A	Same as K-101-B	Movable Contacts for K-106							4		4		0		0
											X											4	3	7	9	10	15
X	X				X	X			X			K-106B	Same as K-101C	Stationary Contacts for K-106							4		4		0		0
											X											4	3	7	9	10	13
X	X				X	X			X			K-106C	Same as K-101D								4		4		0		0
											X											4	3	7	9	10	13
X	X				X	X			X			K-106D	CONTACT	Stationary Contact for K-106				19	K4900573-G3	K-106D	2	1	4		0		0
											X											4	1	7	2	10	3
X	X				X	X			X			K-106E	CONTACT	Stationary Contact for K-106				19	K4900573-G4	K-106E	2	1	4		0		0
											X											4	1	7	2	10	3
X	X				X	X			X			K-106F	COIL	Coil for K-106				19-22D2G227	DL4W505A-468	K-106-F	1	1	1		0		0
											X											4	1	7	2	10	3
X	X				X	X			X			K-107	RELAY—One B Contact, Code No. 2, 6 Gage, Coil, Bakelite Impregnated	M-O Heater Relay				344-AQ4	K7877805-1	K-107	1		0		0		0
											X												0		0	10	2
X	X				X	X			X			K-107A	Same as K-105A	Relay Coil for K-107							1		1		0		0
											X											4	1	7	2	10	3
X	X				X	X			X			K-107B	Same as K-105B	Contact for K-107							4		4		0		0
											X											4	1	7	2	10	3
X	X				X	X			X			K-107C	Same as K-105C	Contact for K-107							4		4		0		0
											X											4	1	7	2	10	3
X	X	X	X	X	X	X	X		X	X	X	K-151	RELAY—One "C" Contact, Code No. 4 Coil	Carrier Control				344-AQA-Z-9599	M7465163-P3	K-151	1		0		0		0
								X			X												0		0		2
X	X	X	X	X	X	X	X		X	X	X	K-151A	COIL—300 ohms, 12 volts D.C.	Coil for K-151				344-H-77139-7	DL4W505A-466	K-151A	1		1		0		0
								X															1		0		3
											X											4	1	7	2	10	3
X	X	X	X	X	X	X	X		X	X	X	K-151B	SPRING	Spring for K-151				344-3D-104058	DL4W505A-489	K-151B	1		4		0		0
								X															4		0		3
											X											4	1	7	2	10	3
X	X	X	X	X	X	X	X		X	X	X	K-151C	SPRING	Spring for K-151				344-D104016	DL4W505A-490	K-151C	1		4		0		0
								X															4		0		3
											X											4	1	7	2	10	4
X	X	X	X	X	X	X	X		X	X	X	K-151D	SPRING	Spring for K-151				344-D104065	DL4W505A-491				4		0		0
								X															4		0		3
											X											4	1	7	2	10	4
X	X	X			X	X	X		X	X	X	L-101	COIL—43½ turns, 0.040 in. dia. bare tinned copper wire wound on 2¼" dia. Coil Form No. 1 tap at 17¾ turns from start	M-O Tank Inductance (Band 1)				137	M48J562-G2	L-101	1		0		0		0
			X					X			X												0		1		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X		X	X	X		L-102	COIL—33 turns, 0.040 in. dia. bare tinned copper wire wound on 1¾" dia. Coil Form No. 1 Tap at 15 turns from start	M-O Tank Inductance (Band 2)				137	M48J559-G2	L-102	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		L-103	COIL—26 turns, 0.040 in. dia. bare tinned copper wire wound on 1¾ in. dia. Coil Form No. 1 Tap at 12 turns from start	M-O Tank Inductance (Band 3)				137	M48J560-G2	L-103	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		L-104	COIL—23 turns, 0.040 in. dia. bare tinned copper wire wound on 1 in. dia. Coil Form No. 1 Tap at 11 turns from start	M-O Tank Inductance				137	M48J563-G2	L-104			0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X	X									L-106	COIL—39 turns 0.0253 in. dia. bare, 0.0283 in. dia. D.E. copper wire wound on 1⅜ in. dia. coil form	Work Circuit Inductance (Band 1)				137	ML7464676-G-1	L106	1		0		0		0
X	X	X	X									L-107	COIL—36 Turns 0.0253 in. dia. bare, 0.0283 in. dia. D.E. copper wire wound on 1 in. dia. coil form	Work Circuit Inductance (Band 2)				19	ML7464679-G1	L-107, L-112	2		0		0		0
X	X	X	X									L-108	COIL—28 Turns 0.0253 in. dia. bare, 0.0283 in. dia. D.E. copper wire wound on 1 in dia. coil form	Work Circuit Inductance (Band 3 & 5)				19	ML7464680-G1	L-108	1		0		0		0
X	X	X	X									L-109	COIL—17 Turns 0.0253 in. dia. bare, 0.0283 in. dia. D.E. copper wire wound on 1 in. dia. coil form	Work Circuit Inductance (Band 4 & 6)				19	ML7464681-G1	L109, L-114	2		0		0		0
X	X	X	X	X	X	X	X		X		X	L-110	COIL—3 turns equally spaced 0.080 in. dia. turned copper wire	CFI-Pickup Coil				137	K52J579-1	L-110	1		0		0		0
X	X	X	X									L-111	COIL—41 Turns 0.0253 in. dia. bare, 0.0283 in. dia. D.E. copper wire wound on 1¾" dia. coil form	I-P-A Tank Inductance (Band 1)				19	ML-7464676-G2	L-111	1		0		0		0
X	X	X	X									L-112	Same as L-107	I-P-A Tank Inductance (Band 2)									–		–		–
X	X	X	X									L-113	COIL—29 Turns 0.0253 in. dia. bare, 0.0283 in. dia. D.E. copper wire wound on 1" dia. coil form	I-P-A Tank Inductance (Band 3)				19	ML7464680-G2	L-113	1		0		0		0
X	X	X	X									L-114	Same as L-109	I-P-A Tank Inductance (Band 4)									–		–		–
X	X	X	X									L-115	COIL—13 Turns 0.061 in. dia. tinned copper wire wound on 1" dia. Coil form	I-P-A Tank Inductance (Band 5)				19	ML7464682-G1	L-115	1		0		0		0

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/230 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Ten-der		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X									L-116	COIL—6½ Turns 0.061 in. dia. tinned copper wire wound on 1" dia. Coil form	I-P-A Tank Inductance (Band 6)				19	ML74646849-G1	L-116	1		0		0		0
X	X	X			X	X	X		X	X		L-118	COIL—75 turns 0.020 in. dia. bare, 0.028 in. D.O.C. copper wire. Universal wound, 4 crosses per turn on ⅜ in. dia. Coil form	P-A Screen Grid Choke				137	M48J307-G1	L-118, 125, 127, 128,129	5		3		0		0
			X																				0		3		3
							X	X															3		0		3
											X												3		0		5
																							0	7	3	10	5
X	X	X			X	X	X		X	X		L-119	COIL—30 Turns, .081 in. diam. bare tinned copper wire on 2½ in. dia. Coil form. No. 1 tap at 16⅓ turns from start	P-A Tank Inductance (Bands 1 & 2)				137	M48J381-G1	L-119	1		0		0		0
			X								X												0		1		1
							X																0		0		1
X	X	X	X	X	X	X	X	X	X	X	X	L-120	COIL—15 turns, ¼" O.D., copper Tubing. Tap 8 turns from start	P-A Tank Inductance (Bands 3 & 4)				137	M48J385-G1	L-120	1		0		0		0
X	X	X	X	X	X	X	X	X	X	X	X	L-121	COIL—7 turns, ¼" O.D. Copper Tubing. Tap 2⅓ turns from start	P-A Tank Inductance (Bands 5 & 6)				137	M48J382-G1	L-121	1		0		0		0
X	X	X			X	X	X		X	X		L-122	COIL—10 turns, 0.081 in. dia. bare tinned copper wire wound on 1⅜ in. dia. coil form	P-A Coupling Coil (Band 1 & 2)				137	M48J389-G1	L-122	1		0		0		0
			X								X												0		1		1
							X																0		0		1
X	X	X			X	X	X		X	X		L-123	COIL—5 turns, 0.081 in. dia. bare tinned copper wire wound on 1¾ in. dia. coil form	P-A Coupling Coil (Band 3 & 4)				137	M48J383-G1	L-123	1		0		0		0
			X								X												0		1		1
							X																0		0		1
X	X	X	X	X	X	X	X	X	X	X	X	L-124	COIL—4 complete right hand turns of ⅛ in. O.D. Copper tubing	P-A Coupling Coil (Band 5 & 6)				137	M48J386-G1	L-124	1		0		0		0
X	X	X	X	X	X	X	X	X	X	X	X	L-125	Same as L-118	P-A Plate Choke									–		–		–
X	X	X			X	X	X		X	X		L-126 *	ROTATING COIL—22½ right hand Turns, 0.153 in. dia. Copper Wire on 3½" Coil form	Antenna Loading				137	P42J93-G1	L-126	1		0		0		0
			X								X												0		1		1
							X																0		0		1
X	X	X	X	X	X	X	X	X	X	X	X	L-127	Same as L-118	Work Circuit and Plate Choke									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	L-128	Same as L-118	I-P-A Plate Choke									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	L-129	Same as L-118	M-O Decoupling Choke									–		–		–
				X	X	X		X	X	X		L-130	COIL—39 Turns 0.0253 in. dia. bare, 0.0283 in. dia. D. E. copper wire wound on 1⅜ in. dia. Coil form	Work Circuit Inductance (Band 1)				137	M48J287-G2	L-130	1		0		0		0
							X				X												0		1		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
				X	X	X		X	X	X		L-131	COIL—36 Turns 0.0253 in. dia. base, 0.0283 in. dia. D. E. copper wire wound on 1 in. dia. Coil form	Work Circuit Inductance (Band 2)				137	M48J362-G2	L-131, L-136	2		0		0		0
							X				X												0		1		1
																							0		1		2
				X	X	X		X	X	X		L-132	COIL—28 Turns 0.0253 in. dia. base, 0.0283 in. dia. D. E. copper wire wound on 1 in. dia. Coil form	Work Circuit Inductance (Band 3 & 5)				137	M48J363-G2	L-132	1		0		0		0
							X				X												0		1		1
				X	X	X		X	X	X		L-133	COIL—17 turns 0.0253 in. dia. base, 0.0283 in. dia. D.E. copper wire wound on 1 in. dia. Coil form	Work Circuit Inductance (Bands 4 & 6)				137	M48J358-G3	L-133	1		0		0		0
							X				X												0		1		1
				X	X	X		X	X	X		L-135	COIL—41 Turns 0.0253 in. dia. base 0.0283 in. dia. D. E. copper wire wound on 1½ in. dia. Coil form	I-P-A Tank Inductance (Band 1)				137	M48J359-G2	L-135	1		0		0		0
							X				X												0		1		1
				X	X	X	X	X	X	X	X	L-136	Same as L-131	I-P-A Tank Inductance (Band 2)									–		–		–
				X	X	X		X	X	X		L-137	COIL—29 Turns 0.0253 in. dia. base, 0.0283 in. diam. D. E. copper wire wound on 1 in. dia. Coil form	I-P-A Tank Inductance (Band 3)				137	M48J360-G2	L-137	1		0		0		0
							X				X												0		1		1
				X	X	X		X	X	X		L-138	COIL—16 Turns 0.0253 in. dia. base, 0.0283 in. dia. D. E. copper wire wound on 1 in. dia. Coil form	I-P-A Tank Inductance (Band 4)				137	M48J358-G4	L-138	1		0		0		0
							X				X												0		1		1
				X	X	X		X	X	X		L-139	COIL—13 Turns 0.061 in. dia. Tinned Copper Wire Wound on 1 in. Coil form	I-P-A Tank Inductance (Band 5)				137	M48J361-G2	L-139	1		0		0		0
							X				X												0		1		1
				X	X	X		X	X	X		L-140	COIL—6½ Turns 0.061 in. dia. Tinned Copper Wire Wound on 1 in. Coil Form	I-P-A Tank Inductance (Band 6)				137	M48J355-G2	L-140	1		0		0		0
							X				X												0		1		1
								X		X		L-141	COIL—3 Turns Equally Spaced 0.080 in. dia. Tinned Copper Wire	C-F-I Pickup Coil				137	K52J579-G2	L-141	1		0		0		0
								X		X		L-142	COIL—6 Turns Equally Spaced 0.060 in. dia. Tinned Copper Wire	M-O Suppressor Coil				137	K56J439-G1	L-142	1		0		0		0
X	X	X		X	X	X		X	X	X		L-152	COIL—220 Turns 0.0508 in. E Tinned Copper Wire on Coil Form	Microphone Filter Choke	CG-30768			138-67G911	M7466270	L-152	1		0		0		0
							X				X												0		1		1
																							0		0		1

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X			X	X	X		L-201	COIL—Wave Trap, 362 Turns, 22W9, QQ-W341, 12/44 AWG E.S. Copper Wire, Universal Wound, 181 Turns per Section	Crystal Oscillator Plate Coil				137	M7466170	L-201, 202	2		1		0		0
			X				X																1		1		1
								X															1		0		2
											X												0		1		1
																					4		1	8	1	11	2
X	X	X	X	X	X	X	X	X	X	X	X	L-202	Same as L-201	Amplifier Plate Circuit Choke									–		–		–
X	X	X		X	X	X			X	X		L-203	COIL—352 turns #28 AWG D.S.E. Copper Wire, Universal Wound, 2 Crosses per Turn	Multivibrator Output Choke				16	K7877090-P1	L-203	1		1		0		0
			X					X			X												0		1		1
							X	X															1		0		1
X	X	X	X	X					X			M-101	METER—0-15 v. a-c. with Red Mark at 12.6 v.	Filament Voltmeter	22080A			65-8A022	P7765919-P1	M-101	1		1		0		0
					X	X	X	X															0		0		0
										X	X												1		0		1
																							0		0		1
X	X	X	X	X					X			M-102	METER—0-750 v. d-c. with Red Mark at 500 v.	Auxiliary Circuit Plate Voltmeter	22319B			65-8D0-41	P7765919-P2	M-102	1		1		0		0
					X	X	X																0		0		0
								X															1		0		1
										X	X												0		0		1
X	X	X	X	X					X			M-103	METER—0-2500 v. d-c. with Red Mark at 1800 v., furnished without External Multiplier. Calibrated for use with 2.5 meg. ± ½% External Resistance	P-A Plate Voltmeter	22310A			65-8D0-41	P7765919-P3	M-103	1		1		0		0
					X	X	X																0		0		0
								X															1		0		1
										X	X												0		0		1
X	X	X	X	X					X			M-104	METER—0-200 ma.	I-P-A Plate Ammeter	22063-A			65-8D0-41	P7765919-P4	M-104	1		1		0		0
					X	X	X																0		0		0
								X															1		0		1
										X	X												0		0		1
X	X	X	X	X					X			M-105	METER—0-750 ma. with Red Mark at 360 ma.	P-A Plate Ammeter	22255-B			65-8D0-41	P7765919-5	M-105	1		1		0		0
					X	X	X																0		0		0
								X															1		0		1
										X	X												0		0		1
X	X	X	X	X					X			M-106	METER—0-15 amp. R-F	Antenna Ammeter	22352A			19-8DW-44	P7761557-17	M-106	1		1		0		0
					X	X	X																0		0		0
								X															1		0		1
										X	X												0		0		1
X	X	X		X	X	X			X	X		M-107	THERMOMETER—For 60°C., calibrated 58° to 62°C.	M-O Heater Box Thermometer	40014			7	M7461725-P4	M-107 (M-108-TCK 2,3,4,5,6,7)	1		2		0		0
			X					X															1		2		2
							X	X															2		0		2
X	X	X		X	X	X			X	X		O-101	INSULATED COUPLING ASSEM. and Antenna Capacitor C-124	Insulated Coupling between Panel Control and C-124				137	K47J999-1	O-101 (O-127-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
								X															0		0		1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X		X	X	X		X	X	X		O-102	INSULATED COUPLING ASSEM.—Flexible	Insulated Coupling for Control Shaft on C-125, C117				385	K47J939-1	O-102 (O-126-TCK 1 and 3)	2		0		0		0
			X				X				X												0		2		2
																							0		0		4
																							0	9	2	11	4
X	X	X		X	X	X		X	X	X		O-103	INSULATED COUPLING ASSEM.	Insulated Coupling for L-126				137	K52J46-1	O-103 (O-113-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
			X									O-104†	COUPLING	Used on C-103 in M-O Unit				137	ML-7878853-1	O-104†	1		0		1		1
X	X	X		X	X	X		X	X	X		O-104	INSULATED COUPLING ASSEM.	Coupling betweenC-124 and C-110				137	K47J925-2	O-104, O-112 (O-112-TCK 1 and 3)	2		0		0		0
			X				X																0		1		1
											X												0		0		1
																							0	9	2	11	2
X	X	X		X	X	X		X	X	X		O-105	FLEXIBLE COUPLING ASSEM.	Coupling for M-O Band Change Switch				137	M55J493-G2	O-105 (O-124-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		O-106	UNIVERSAL JOINT	Universal Joint for Antenna Coupling Drive Shaft				137	K7877999-1	O-106 (O-126-TCK 1 and 3)	2		0		0		0
			X				X																0		1		1
											X												0		0		2
																							0	9	1	11	2
X	X	X		X	X	X		X	X	X		O-107	FLEXIBLE COUPLING ASSEM.	Coupling for M-O Band Change Switch				137	M55J493-G1	O-107 (O-131-TCK 1 and 3)	1		0		0		0
			X				X																0		1		1
											X												0		0		2
																							0	9	1	11	2
X	X	X		X	X	X		X	X	X		O-108	INSULATED COUPLING ASSEM.	Coupling for C-103, C-104				137	K52J452	O-108 (O-104-TCK 1 and 3)	2		0		0		0
			X				X																0		1		1
											X												0		0		2
																							0	9	1	11	2
X	X	X		X	X	X		X	X	X		O-109	INSULATED COUPLING ASSEM.	Coupling for C-102				370	K52J398-1	O-109 (O-102-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1
X	X	X		X	X	X		X	X	X		O-110	RIGID COUPLING	Coupling on Switch S-104				137	K7876315-1	O-110 (O-130-TCK 1 and 3)	1		0		0		0
			X				X				X												0		1		1
																							0		0		1

TCK				TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																							Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X			X	X	X		X	X	X		O-111	SPECIAL COUPLING ASSEM.	Coupling Mounted on Split Gear on C-110				137	K57J226-G1	O-111 (O-101-TCK 1 and 3)	1		0		0		0
			X					X				X												0		1		1
																								0		0		1
				X									O-111†	COUPLING—Insulated	Used on P-A Cap. C-124				137	K47J925-1	O-111†	1		0		1		1
X	X	X	X		X	X	X		X	X	X	X	O-112	Same as O-104	Coupling between Unit-Control Mechanism and Worm Gear on C-110									–		–		–
X	X	X			X	X	X		X	X	X		O-113	MITRE GEAR—1.0442″ dia., Stainless Steel, 32 teeth, dia. pitch 32, tooth angle 2°46′	Used in small gear boxes on P-A Coupling and Band Change Mechanism				572	M7465270-1	O-113 (O-115-TCK 1 and 3)	12		0		0		0
			X					X				X												0		5		5
																								0		0		10
																								0	9	16	11	12
X	X	X			X	X	X		X	X	X		O-114	SPUR GEAR	Used in P-A Coupling Mechanisms				572	M7468352-1	O-114 (O-116-TCK 1 and 3)	3		0		0		0
			X					X				X												0		2		2
																								0		0		3
																								0	9	2	11	3
X	X	X			X	X	X		X	X	X		O-115	GEAR RACK	Used in P-A Coupling Mechanisms				459	M7468353-1	O-115 (O-117-TCK 1 and 3)	3		0		0		0
			X					X				X												0		2		2
																								0		0		3
																								0	9	2	11	3
X	X	X			X	X	X		X	X	X		O-116	WORM GEAR ASSEM.	Worm Gear mounted on lower end of C-110				19	ML7764134-G1	O-116 (O-118-TCK 1 and 3	1		0		0		0
			X					X				X												0		1		1
																								0		0		1
X	X	X			X	X	X		X	X	X		O-117	WORM—Stainless Steel, 3⅝″ long, 0.5608″ O.D., 72 teeth	Worm used with Worm Gear above as drive for C-110				631	M7464820-1	O-117 (O-119-TCK 1 and 3)	1		0		0		0
		X										X												0		1		1
																								0		0		1
X	X	X			X	X	X		X	X	X		O-118	UNI-CONTROL MECHANISM	Main Frequency Tuning Mechanism				137	DL4W458A-G1	O-118 (O-114-TCK 1 and 3)	1		0		0		0
			X					X				X												0		1		1
																								0		0		1
X	X	X			X	X	X		X	X	X		O-119	OPERATING MECHANISM	Dial Mechanisms for Antenna Tuning Cap. and M-O Reset				19	ML7761961-G1	O-119 (O-120-TCK 1 and 3)	2		0		0		0
			X					X				X												0		1		1
																								0		0		2
																								0	9	1	12	2
X	X	X			X	X	X		X	X	X		O-120	OPERATING MECHANISM	Dial Mechanisms for Antenna Coupling Control				19	ML7761961-G6	O-120 (O-121-TCK 1 and 3)	1		0		0		0
			X					X				X												0		1		1
																								0		0		2
																								0	9	1	12	2
X	X	X			X	X	X		X	X	X		O-121	OPERATING MECHANISM	Dial Mechanisms for Antenna Tuning Control (Inductive)				19	ML7762474-G3	O-121 (O-122, TCK 1 and 3)	1		0		1		1
			X					X				X												0		1		1

† TCK 1 only

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X	X	X	X	X	X	X	X	X	X	O-122	INSULATED COUPLING	Insulated coupling for S-101				137	K54J739	O-122	1		0		0		0
											X												0	9	1	12	1
X	X	X			X	X	X	X	X	X		O-123	RIGID COUPLING	Coupling between C-102 and C-110				137	K7878038	O-123 (O-103-TCK 1 and 3)	1		0		0		0
			X								X												0		0		1
				X				X															0		1		1
			X									O-123†	WORM GEAR	Used on I-P-A Tuning Capacitor Tuning				19	ML7466150-2	O-123	1		0		1		1
X	X	X			X	X	X	X	X	X	X	O-125	COUPLING	Dial Lock Disc for P.A. Trimmer Control				19	ML7876451-G2	O-125	1		0		0		0
			X																				0		1		1
X	X	X			X	X	X	X	X	X	X	O-128	COUPLING INSULATED	Shaft Coupling for M-O Band Change Switch				137	K52J399-1	O-128	1		0		0		0
			X																				0		1		1
X	X	X			X	X	X	X	X	X	X	O-129	COUPLING	Shaft Coupling for M-O Band Change Switch				19	K7890844-1	O-129	1		0		0		0
			X																				0		1		1
X	X	X			X	X	X		X	X		R-101	RESISTOR—Metallized 51,000 ohms ±5%, 2 ohms	M-O Grid Resistor	63426			28-Type No. F-2	P7762298-209	R-101	1		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5
X	X	X			X	X	X		X	X		R-102	RESISTOR—Carbon, 10 ohms ±15%, 3 watts	M-O Parasitic Resistor	631053			493-Globar Type "B"	K7877741-1	R-102, R-107	2		1		0		0
			X					X															1		6		6
									X														1		0		10
											X											4	1	9	6	12	10
X	X	X			X	X	X			X	X	R-103	RESISTOR—Wirewound, 2000 ohms ±5%, Grade 1, Class 1, Style E	M-O Plate Resistor	63752F			59	M7464454-34	R-103	1		1		0		0
			X					X															1		2		2
									X														1		0		3
											X											4	1	9	2	12	3
X	X	X			X	X	X			X	X	R-104	RESISTOR—Metallized, 10,000 ±5%, 2 watts	I-P-A Grid Repeator	63426			28-Type No. F-2	P7762298-183	R-104, R-110	2		1		0		0
			X					X															1		6		6
									X														1		0		10
											X											4	1	9	6	12	10
X	X	X			X	X	X			X	X	R-105	RESISTOR—W.W. 25 K. ohms ±5%, Grade 1, Class 1, Style E	I-P-A Screen Grid	63220F			59	M7464450-45	R-105	1		1		0		0
			X					X															1		2		2
									X														1		0		3
											X											4	1	9	2	12	3

TCK																PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	TCK 1	220/440 V. A.C.	TCK 2	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	TCK 4	110/220 V. A.C.	TCK 5	115 V. D.C.	TCK 6	110/220 V. A.C.	TCK 7	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X		X	X	X		X		X		X		X	R-107	Same as R-102	I-P-A Parasitic Resistor	631053								–		–		–
X	X	X		X		X	X	X		X		X		X		X	R-108	RESISTOR—W.W. 2500 ohms ±5%, Grade 1, Class 1, Style C.	P-A Grid Resistor	63023F			59	M7464452-35	R-108	1		1		0		0
			X						X																			1		2		2
										X																		1		0		3
															X												4	1	9	2	12	3
X	X	X		X		X	X	X		X		X		X		X	R-109	RESISTOR—W.W. 8,000 ohms ±5%, Grade 1, Class 1, Style B	P-A Screen Grid Resistor	63152F			59	M7464451-40	R-109, R-115	2		1		0		0
			X						X																			1		3		3
										X																		1		0		5
															X												4	1	9	3	12	5
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R-110	Same as R-104	I-P-A Grid Resistor	63426								–		–		–
X	X	X		X		X	X	X				X	X				R-111	RESISTOR—W.W. 16,000 ohms ±5%, Grade 1, Class 1, Style B	M-O Screen Grid Voltage Divider	63157F			59	M7464451-43	R-111, R-112,	3		2		0		0
			X						X																			2		5		5
										X																		2		0		8
															X												4	2	9	5	12	8
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R-112	Same as R-111	Bleeder	63157F								–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R-113	Same as R-111	Keying	63157F								–		–		–
X	X	X		X		X	X	X				X	X				R-114	RESISTOR—W.W., 4000 ohms, ±5%, Grade 1, Class 1, Style B	Voltage Divider	63147F			59	M7464451-37	R-114	1		1		0		0
			X						X																			1		2		2
										X																		1		0		3
															X												4	1	9	2	12	3
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R-115	Same as R-109	Bleeder	63152F								–		–		–
X	X	X		X		X	X	X				X	X				R-116	POTENTIOMETER — 3500 ohms ±5%, 0.084 amp. max.	P-A Bias				58-PR-25 Mod.	P7763270-1	R-116, R-117	2		1		0		0
			X						X																			1		6		6
										X																		1		0		10
															X												4	1	9	6	12	10
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R-117	Same as R-116	I-P-A Bias									–		–		–
	X	X	X	X	X	X	X		X	X	X	X					R-118	RHEOSTAT—Consists of 2 rheostat ganged in tandem with a single front panel control					28	P7763265-P3	R-118	1		0		0		0
																		R-118A—25 ohms ±5%, 1.41 amp. max.	P-A Filament Rheostat					No. PR-50								
																		R-118B—62 ohms ±5%, 0.633 amp. max.	Aux. Filament Rheostat					No. PR-25								
X	X	X		X		X	X	X				X	X				R-123	RESISTOR—W.W. 630 ohms ±5%, Grade 1, Class 1, Style E	Keying Relay Resistor	63983F			59	M7464454-29	R-123	1		1		0		0
			X						X																			1		3		3
										X																		1		0		5
															X												4	1	9	3	12	5
	X	X		X		X						X	X				R-124	RESISTOR—W.W. 500 ohms ±5%, Grade 1, Class 1, Style B	Contactor Surge Resistor	63275F			59	M7464454-18	R-124	1		1		0		0
			X						X																			1		3		3
										X																		1		0		5

† TCK 1 only

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-62345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
	X				X			X				R-125	Resistor—W.W. 630 ohms ±5%	Contactor Surge Resistor	63843			59	M7464451-29	R-125	1		1		0		0
X	X	X	X	X	X	X	X	X		X		R-126	RHEOSTAT—250 ohms ±5%, 0.447 amp. max.	Auxiliary Field Rheostat				28-PR-50	P7763268-2	R-126	1		0		0		0
X	X	X		X	X	X		X				R-127	RESISTOR—W.W. 800 ohms ±5%, Grade 1, Class 1, Style B	Main Field Series	63139F			59	M7464451-30	R-127, R-139	2		1		0		0
			X																				1		2		2
							X																1		0		3
											X											4	1	9	3	12	5
X	X	X	X									R-128	RHEOSTAT—800 ohms ±10%, 0.95 max., 0.132 amp. min.	Main Field Rheostat				59-Type 4"SS	M7464957-1	R-128	1		0		0		0
				X	X	X	X	X		X	X	R-128	RHEOSTAT — 44 steps, 22.5 ohms ±20% per step from taps 1 to 34, 6 ohms ±20% per step from taps 34 to 44, .869 amp. max., .123 amp. min.	Main Field Rheostat				59-Type 4"SS	M7464957-2	R-128	1		0		0		0
X	X	X		X	X	X		X	X			R-129	RESISTOR — Carbon, 1 amp., 115 ohms	M-O Heater				492-WRS-25 (Type C)	K7884199-1	R-129, R-130	2		1		0		0
			X																				1		6		6
							X																1		0		10
								X															1		0		1
											X											4	1	9	6	12	10
X	X	X	X	X	X	X	X	X	X	X	X	R-130	Same as R-129	M-O Heater									–		–		–
	X			X						X		R-131	RESISTOR—Metallized, 15,000 ohms ±10%, 2 w.	M-O Heater Relay Shunt	63474			28-Type BT-2	P7762301-76	R-131, R-140	2		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
X	X	X		X	X	X			X	X		R-132	RESISTOR — Fixed, 2.5 meg. ohms, 1.0 ma. max., 2.5 k v. ±1% at 25°C.	P-A Plate Voltmeter Series Resistor	63774			28-Style MFB	M7464483-4	R-132	1		1		0		0
			X																				1		3		3
							X																1		0		5
								X															1		0		1
											X											4	1	9	3	12	5
X						X						R-133	RESISTOR—Wire Wound—160 ohms ±5%, Grade 1, Class 1, Style E	Contactor Surge	63978F			59	M7464454-23	R-133	1		1		0		0
											X											4	1	9	2	12	3
X						X						R-134	RESISTOR—Wire Wound—1250 ohms ±5%, Grade 1, Class 1, Style B	Contactor Surge	63376F			59	M7464451-32	R-134	1		1		0		0
											X											4	1	9	2	12	3

TCK 230 V. D.C.	TCK 115 V. D.C.	TCK 220/440 V. A.C.	TCK 1 220/440 V. A.C.	TCK 2 220/440 V. A.C.	TCK 3 115 V. D.C.	TCK 3 230 V. D.C.	TCK 3 220/440 V. A.C.	TCK 4 110/220 V. A.C.	TCK 5 115 V. D.C.	TCK 6 110/220 V. A.C.	TCK 7 230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X						X					X	R-135	RHEOSTAT — Two Rheostats Ganged in Tandem					28	P7763265-4	R-135	1		0		0		0
													R-135A — 98 Ohms ±5%, 0.715 amp max.	P.A. Filament													
													R135B — 230 Ohms ±5%, 10.330 amp. max.	Auxiliary Filament													
X	X	X		X	X	X			X	X		R-137	RESISTOR—Wire Wound, 2000 Ohms ±5%, Grade 1, Class 1, Style B	P-A Screen Voltage	63079F			59	M7464453-34	R-137	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X											R-138	POTENTIOMETER — 3500 Ohms ±5%, 0.084 amp. max.	M-O Heater Control Circuit Resistor	632096			28-Type PR-25 (Mod.)	P7763270-5	R-138	1		0		0		0
					X	X			X														1		0		0
											X											4	1	9	3	12	5
X					X	X	X		X		X	R-139	Same as R-127	M-O Heater Blower Motor Resistor	63139F								—		—		—
X	X				X	X	X		X			R-140	Same as R-131	M-O Heater Relay Shunt Resistor	63494								—		—		—
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-151	RESISTOR — Wire Wound—2,000 Ohms ±5%, Grade 1, Class 1, Style V	Modulator Transformer Load Resistance	63688F			59-Type 2" A	K52J634-1	R-151	1		1		0		0
			X																				1		3		3
							X																1		0		5
								X															1		0		1
											X											4	1	9	3	12	5
X	X	X		X	X	X			X	X		R-152	RESISTOR—Metallized, 10,000 Ohms ±10%, 2 Watts	Screen Dropping	63474			28-Type BT-2	P7762301-74	R-152, R-203, R-204	3		2		0		0
			X																				2		5		5
							X																2		0		8
								X															2		0		2
											X											4	2	9	5	12	8
X	X	X		X	X	X			X	X		R-153	RESISTOR—Metallized, 39,000 Ohms ±10%, 2 Watts	Plate Resistor	63474			28-Type BT-2	P7762301-81	R-153	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-154	RESISTOR—Wire Wound, 500 Ohms ±5%, Grade 1, Class 1, Style V	Cathode Resistor	631108F			59-Type 1"Z	K52J635-2	R-154	1		1		0		0
			X																				1		3		3
							X																1		0		5
								X															1		0		1
											X											4	1	9	3	12	5
X	X	X		X	X	X			X	X		R-155	RESISTOR—Metallized, 2,200 Ohms ±10%, ½ Watt	Cathode Resistor	63360			28-Type BT½	P7762299-66	R-155	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-62345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X		X	X		R-156	RESISTOR—Metallized, 10,000 Ohms ±10%, ½ Watt	Diode Delay Voltage Resistor	63360	.....	.....	28-Type BT½	P7762299-74	R-156, R-208	2		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5
X	X	X			X	X	X		X	X		R-157	RESISTOR—Metallized, 24,000 Ohms ±5%, ½ Watt	Modulator Grid Resistor	63355	.....	.....	28-Type BT½	P7762299-192	R-157	1		1		0		0
			X					X															1		2		3
									X														1		0		5
											X											4	1	9	2	12	5
X	X	X			X	X	X		X	X		R-158	RESISTOR—Metallized, 270,000 Ohms ±10%, ½ Watt	Diode Resistor	63360	.....	.....	28-Type BT½	P7762299-91	R-158, R-159	2		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5
X	X	X	X	X	X	X	X	X	X	X	X	R-159	Same as R-158	Diode Resistor	63360	.....	.....						–		–		–
X	X	X			X	X	X		X	X		R-160	RESISTOR—Metallized, 18,000 Ohms ±10%, 2 Watts	Plate Load	63474	.....	.....	28-Type BT-2	P7762301-77	R-160, R-174	2		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5
X	X	X			X	X	X		X	X		R-161	RESISTOR—Wire Wound, 150 Ohms ±10%, ½ Watt	Cathode Resistor	63678-10	.....	.....	28-Type BW½	P7763146-34	R-161	1		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5
X	X	X			X	X	X		X	X		R-163	RESISTOR — Metallized, 270 Ohms ±10%, ½ Watt	Side Tone Load	63360	.....	.....	28-Type BT½	P7762299-55	R-163	1		1		0		0
			X					X															1		2		3
									X														1		0		3
											X											4	1	9	2	12	3
X	X	X			X	X	X		X	X		R-164	RESISTOR—Wire Wound, 16.0 Ohms ±5%, 1 Watt, Grade 1, Class 1, Style V	Parasitic Resistor	631055	.....	.....	59-Type 1"Z	K52J635-1	R-164	1		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5
X	X	X			X	X	X		X	X		R-165	RESISTOR — Variable, 12,000 Ohms ±20%	Audio Volume Control	632070-20	.....	.....	6-Type J	P7763271-3	R-165	1		1		0		0
			X					X															1		3		3
									X														1		0		5
											X											4	1	9	3	12	5

TCK 230 V. D.C.	TCK 115 V. D.C.	TCK 220/440 V. A.C.	TCK 1 220/440 V. A.C.	TCK 2 220/440 V. A.C.	TCK 3 115 V. D.C.	TCK 3 230 V. D.C.	TCK 3 220/440 V. A.C.	TCK 4 110/220 V. A.C.	TCK 5 115 V. D.C.	TCK 6 110/220 V. A.C.	TCK 7 230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Spare Parts Equip. Box No.	Spare Parts Equip. Quan.	Spare Parts Tender Box No.	Spare Parts Tender Quan.	Spare Parts Stock Box No.	Spare Parts Stock Quan.
X	X	X		X	X	X			X	X		R-166	RESISTOR — Wire Wound, 5,000 Ohms ±5%, Grade 1, Class 1, Style V	Decoupling Resistor	63634F			59-Type 2" A	K52J634-3	R-166	1		1		0		0
			X																				1		3		3
							X																1		0		5
								X															1		0		1
											X											4	1	9	3	12	5
X	X	X		X	X	X			X	X		R-167	RESISTOR — Wire Wound, 10,000 Ohms ±5%, Grade 1, Class 2, Style W	Bleeder	63692E			28-Type DJ	M7465153-41	R-167	1		1		0		0
			X																				1		3		3
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-168	RESISTOR—Metallized, 1,000 Ohms ±10%, 1 Watt	Bleeder	63288			28-Type BT-1	P7762300-62	R-168	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-169	RESISTOR — Wire Wound, 3,150 Ohms ±5%, Grade 1, Class 1, Style V	Decoupling	631057			59-Type 2" A	K52J634-2	R-169	1		1		0		0
			X																				1		3		3
							X																1		0		5
								X															1		0		1
											X											4	1	9	3	12	5
X	X	X		X	X	X			X	X		R-170	RESISTOR—Metallized, 100,000 Ohms ±10%, ½ Watt	Diode Time Control	63360			28-Type BT½	P7762299-86	R-170	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-171	RESISTOR—Metallized, 180,000 Ohms ±10%, ½ Watt	Feedback Resistor	63360			28-Type BT½	P7762299-89	R-171	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-172	RESISTOR—Metallized, 27,000 Ohms ±10%, ½ Watt	Diode Network	63360			28-Type BT½	P7762299-79	R-172	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											4	1	9	2	12	3
X	X	X		X	X	X			X	X		R-173	RESISTOR—Wire Wound, 150 Ohms ±10%, 2 Watts	Microphone Dropping	63705-10			28-Type BW-2	P7763148-27	R-173	1		1		0		0
			X																				1		3		3
							X																1		0		5
								X															1		0		1
											X											5	1	10	3	12	5
X	X	X	X	X	X	X	X	X	X	X	X	R-174	Same as R-160	Plate Load	63474								—		—		—
X	X	X		X	X	X			X	X		R-175	RESISTOR—Composition, 470 Ohms ±10%, ½ Watt	Sidetone Bleeder	63360			6-Type EB½	P7763599-58	R-175	1		1		0		0
			X																				1		2		2
							X																1		0		3
								X															1		0		1
											X											5	1	10	2	12	3

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X			X	X		R-176	POTENTIOMETER — 100,000 Ohms ±20%	Volume Limit Control	631399-20			6-Type No. J	P7763271-2	R-176	1		1		0		0
			X				X																1		3		3
								X															1		0		5
											X											5	1	10	0	12	1
																									3		5
X	X	X		X	X	X			X	X		R-177	POTENTIOMETER — 3,000 Ohms ±5% −0%	I-P-A Suppressor Voltage (Band 1)				1-SPO-13037	K7883439	R-177, 178, 179, 180, 181, 182	6		3		0		0
			X				X																3		18		18
								X															3		0		30
											X											5	3	10	0	12	3
																									18		30
X	X	X	X	X	X	X	X	X	X	X	X	R-178	Same as R-177	I-P-A Suppressor Voltage (Band 2)									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-179	Same as R-177	I-P-A Suppressor Voltage (Band 3)									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-180	Same as R-177	I-P-A Suppressor Voltage (Band 4)									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-181	Same as R-177	I-P-A Suppressor Voltage (Band 5)									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-182	Same as R-177	I-P-A Suppressor Voltage (Band 6)									–		–		–
X	X	X		X	X	X			X	X		R-183	RESISTOR—Wire Wound, 1,000 Ohms ±5%, Grade 1, Class 1, Style E	I-P-A Voltage Divider	63011F			59	M7464454-31	R-183	1		1		0		0
			X				X																1		2		2
								X															1		0		3
											X											5	1	10	2	12	1
																									0		3
X	X	X		X	X	X			X	X		R-184	RESISTOR—Metallized, 3,000 Ohms ±5%, 1 Watt	I-P-A Voltage Divider (Band 1)	63291			28	P7762300-170	R-184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195	12		6		0		0
			X				X																6		18		18
								X															6		0		30
											X											5	6	10	0	12	6
																									18		30
X	X	X	X	X	X	X	X	X	X	X	X	R-185	Same as R-184	I-P-A Voltage Divider (Band 1)	63291								–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-186	Same as R-184	I-P-A Voltage Divider (Band 2)	63291								–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-187	Same as R-184	I-P-A Voltage Divider (Band 2)	63291								–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-188	Same as R-184	I-P-A Voltage Divider (Band 3)	63291								–		–		–

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X	X	X	X	X	X	X	X	R-189	Same as R-184	I-P-A Voltage Divider (Band 3)	63291	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-190	Same as R-184	I-P-A Voltage Divider (Band 4)	63291	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-191	Same as R-184	I-P-A Voltage Divider (Band 4)	63291	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-192	Same as R-184	I-P-A Voltage Divider (Band 5)	63291	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-193	Same as R-184	I-P-A Voltage Divider (Band 5)	63291	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-194	Same as R-184	I-P-A Voltage Divider (Band 6)	63291	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-195	Same as R-184	I-P-A Voltage Divider (Band 6)	63291	.....	.....	.....	.....	.....			–		–		–
											X	R-196	RESISTOR—Wire Wound, 160 Ohms ±5%, Grade 1, Class 1, Style C	Keying Relay Voltage Divider	63929F	.....	.....	59	M7470058-23	R-196, R-197		5	1	10	3	12	5
											X	R-197	Same as R-196	Keying Relay Voltage Divider	63929F	.....	.....	.....	.....	.....			–		–		–
											X	R-198	RESISTOR—Wire Wound, 630 Ohms ±5%, Grade 1, Class 1, Style B	Keying Relay Voltage Divider	63843F	.....	.....	59	M7470057-29	R-198	1	5	1	10	2	12	3
X	X	X			X	X	X		X	X		R-201	RESISTOR—Metallized, 33,000 Ohms ±10%, 2 Watts	Voltage Divider Bleeder	63474	.....	.....	28-Type BT 2	P7762301-80	R-201	1		1		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
							X					.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		5
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		5
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	2	12	5
X	X	X	X	X	X	X	X	X	X	X	X	R-203	Same as R-152	Voltage Divider	63474	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	R-204	Same as R-152	Voltage Divider	63474	.....	.....	.....	.....	.....			–		–		–
X	X	X			X	X	X		X	X		R-205	RESISTOR — Metallized, 1.0 Megohm ±10%, ½ Watt	C.O. Grid Resistor	63360	.....	.....	28-Type BT½	P7762299-98	R-205, 214, 216	3		2		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			2		5		5
							X					.....	.....	.....	.....	.....	.....	.....	.....	.....			2		0		8
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....			2		0		8
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		5	2	10	5	12	8
X	X	X			X	X	X		X	X		R-206	RESISTOR — Metallized, 330 Ohms ±10%, ½ Watt	C-O Cathode Resistor	63360	.....	.....	28-Type BT 1	P7762300-76	R-206	1		1		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
							X					.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		5
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		5
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	5	12	8
X	X	X			X	X	X		X	X		R-207	RESISTOR—Metallized, 15,000 Ohms ±10%, 1 Watt	C-O Screen Resistor	63288	.....	.....	28-Type BT 1	P7762300-76	R-207	1		1		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
							X					.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		5
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		5
X	X	X	X	X	X	X	X	X	X	X	X	R-208	Same as R-156	C-O Screen Grid Resistor	63360	.....	.....	.....	.....	.....			–		–		–

TABLE 8-2—Continued

COMBINED PARTS AND SPATE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-62216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X		X	X	X			X	X		R-209	RESISTOR—Metallized, 20,000 Ohms ±5%, 1 Watt	Multivibrator Plate Resistor	63291			28-Type BT 1	P7762800-190	R-209, 210	2		1		0		0
			X				X																1		3		3
								X															1		0		5
											X											5	1	10	3	12	5
X	X	X	X	X	X	X	X	X	X	X	X	R-210	Same as R-209	Multivibrator Plate Resistor	63291								–		–	–
X	X	X										R-211	POTENTIOMETER — Dual, 15,000 Ohms ±20%, Rheostat	Adjustable Grid Resistor				6-Type J	P7763285-1	R-211	1		1		0		0
			X																				1		3		3
X	X	X		X	X	X			X	X		R-212	RESISTOR—Metallized, 39,000 Ohms ±10%, 1 Watt	Multivibrator Grid Resistor	63288			28-Type BT-1	P7762300-81	R-212, 213, 219	3		2		0		0
			X				X																2		5		5
								X															2		0		8
											X											5	2	10	5	12	8
X	X	X	X	X	X	X	X	X	X	X	X	R-213	Same as R-212	Multivibrator Grid Resistor	63288								–		–	–
X	X	X	X	X	X	X	X	X	X	X	X	R-214	Same as R-205	Detector Grid Resistor	63360								–		–	–
X	X	X		X	X	X			X	X		R-215	RESISTOR—Metallized, 470,000 Ohms ±10%, ½ Watt	Detector Load Resistor	63360			28-Type BT½	P7762299-74	R-215	1		1		0		0
			X				X																1		2		2
								X															1		0		3
											X											5	1	10	2	13	3
X	X	X	X	X	X	X	X	X	X	X	X	R-216	Same as R-205	Detector Screen Grid Resistor	63360								–		–	–
X	X	X		X	X	X			X	X		R-217	RESISTOR—Metallized, 41,000 Ohms ±10%, ½ Watt	Detector Filter Resistor	63360			28-Type BT½	P7762299-82	R-217	1		1		0		0
			X				X																1		2		2
								X															1		0		3
											X											5	1	10	2	13	3
X	X	X	X	X	X	X	X	X	X	X	X	R-219	Same as R-212	1st Audio Plate Resistor	63288								–		–	–
X	X	X		X	X	X			X	X		R-220	POTENTIOMETER — 500,000 Ohms ±20%	Volume Control	632069-20			6-Type J	P7763271-1	R-220	1		1		0		0
			X				X																1		3		3
								X															1		0		5
											X											5	1	10	3	13	5
X	X	X		X	X	X			X	X		R-221	RESISTOR—Metallized, 2,700 Ohms ±10%, ½ Watt	1st Audio Cathode Resistor	63360			28-Type BT½	P7762299-67	R-221	1		1		0		0
			X				X																1		2		2
								X															1		0		3
											X											5	1	10	2	13	3

ORIGINAL

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X			X	X	X		X	X		R-222	RESISTOR—Metallized, 1,000 Ohms ±10%, ½ Watt	2nd Audio Cathode Resistor	63360			28-Type BT½	P7762299-62	R-222	1		1		0		0
			X																				1		2		2
								X															1		3		3
									X													5	1	10	2	13	3
X	X	X			X	X	X		X	X		R-223	RESISTOR—Metallized, 220,000 Ohms ±10%, ½ Watt	2nd Audio Grid Resistor	63360			28-Type BT½	P7762299-90	R-223	1		1		0		0
			X																				1		2		2
								X															1		3		3
									X													5	1	10	2	13	3
X	X	X			X	X	X	X	X	X		S-101	SWITCH—Rotary Tap, 2 bank, 6 positions, include S-101A, S-101B	M-O Band Change Switch				189	P42J198-1	S-101	1		0		0		0
											X											5	1	10	1	13	1
			X									S-101†	SWITCH—Rotary Tap, 2 bank, 6 positions	M-O Band Change Switch				189	ML7762984-G1	S-101†	1		1		1		1
X	X	X			X	X	X	X	X	X		S-104	SWITCH—Wafer, 6 position S-104A—Part of S-104 S-104B—Part of S-104 S-104C—Part of S-104 S-104D—Part of S-104	I-P-A Band Switch I-P-A Shooting Switch Work Circuit Switch I-P-A Suppressor Voltage				137	M48J356-P1	S-104	1		0		0		0
			X																				1		2		2
								X															0		0		4
									X													5	1	10	2	13	4
			X									S-104†	SWITCH—4 bank, 6 positions, Wafer	M-O Plate and I-P-A Band				137	P7762995-2	S-104†	1		0		0		1
X	X	X			X	X	X		X	X		S-106	SWITCH—Rotary Tap, 4 bank, 6 positions S-106A—Part of S-106 S-106B—Part of S-106 S-106C—Part of S-106 S-106D—Part of S-106 S-106E—Part of S-106	P-A Inductance Shorting Antenna Coupling P-A Band Change P-A Inductance Shorting P-A Band Change				189	P42J276-1	S-106	1		0		0		0
			X																				1		1		1
								X															0		0		1
X	X	X			X	X	X		X	X		S-107	SWITCH—Rotary Tap, 2 bank, 3 positions S-107A—Part of S-107 S-107B—Part of S-107 S-107C—Part of S-107	Ant. Circuit (Resistance) Ant. Circuit (Inductance) Ant. Circuit (Interlock)				189	P7762998-1	S-107	1		0		0		0
			X																				2		2		2
								X															0		0		2
X	X	X			X	X	X		X			S-108	THERMOSTAT—Angle, 70 v., 20 ma. (rms) 60 cycles a-c., 12 v., 12 ma. d-c. for 60°C. operation	M-O Thermostat	40010			491	M7461727-2	S-108	1		2		0		0
			X																				4		2		2
								X															2		0		2
									X													5	2	10	2	13	4

†TCK 1 only.

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X		X	X	X			X	X		S-109	THERMOSTAT — To carry, make or break 3 amp. at 110 v., 60 cycles; 3 amps at 115 v. d-c. or 1.5 amps. at 230 v. d-c.; Contacts to open at 70°C. ±5% when adjusted and tested in a forced flow of air	M-O Thermal Cutout	.....	.....	.....	19	K7874589-1	S-109	1		1		0		0
		X					X					.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		2		2
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		0		1
											X	S-109	THERMOSTAT — To carry, make or break 3 amp. at 110 v., 60 cycles; 3 amps. at 115 v. d-c. or 1.5 amps. at 230 v. d-c. Contacts to open at 80°C. ±5% when adjusted and tested in a forced flow of air	M-O Thermal Cutout	.....	.....	.....	19	K57J858-1	S-109	1	5	1	10	2	13	4
		X		X						X		S-110	SWITCH—125 v., 30 amp., Contacts reversed for 3 way operation	Standby—Filament	.....	.....	.....	19-286652	M7465200-2	S-110	1		1		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		1		1
							X	X				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		0		1
X	X	X		X	X	X			X	X		S-111	SWITCH — 125 v., 30 amp. D.P.S.T. or 250 v., 20 amps., tumbler	Emergency Stop Switch	.....	.....	.....	19-235685	M7465200-1	S-111, 112, 115, 301, 02	3		1		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		2		2
							X					.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		2		0		2
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		2		0		2
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	1	10	2	13	3
X	X	X	X	X	X	X	X	X	X	X	X	S-112	Same as S-111	Start-Stop Switch	.....	.....	.....	.....	.....	.....		–		–		–
X	X	X		X	X	X			X	X		S-113	SWITCH—2 contacts normally open, 3.0 amp. 110 v. a-c. or 0.2 amps, 550 v. d-c.	Start-Stop Switch	.....	.....	.....	19-CR-2940	M7464438-1	S-113	1		1		0		0
			X								X	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		1		1
							X	X				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		0		1
X	X	X		X	X	X			X			S-114	SWITCH—10 amps., 250 v.	Tube Door Interlock	24067	.....	.....	19	M7460330-4	S-114, 116, 117, 303	3		2		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		1		2		2
							X					.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		2		0		3
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		4		0		4
										X		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		4		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	1	10	2	13	3
X	X	X	X	X	X	X	X	X	X	X	X	S-115	Same as S-111	M-O Heater Control	.....	.....	.....	.....	.....	.....		–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	S-116	Same as S-114	Tube Door Interlock	24067	.....	.....	.....	.....	.....		–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	S-117	Same as S-114	Tube Door Interlock	24067	.....	.....	.....	.....	.....		–		–		–

TCK															PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	TCK 1	220/440 V. A.C.	TCK 2	115 V. D.C.	230 V. D.C.	TCK 3	220/440 V. A.C.	TCK 4	110/220 V. A.C.	115 V. D.C.	TCK 5	110/220 V. A.C.	TCK 6	230 V. D.C.	TCK 7	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X				X	X	X		X	X	X		X				S-118	SWITCH—Rotary Tap, 2 bank, 3 position	Power Control				189	M7468212-1	S-118	1		0		0		0
			X																										2
								X																					0
																X											5	2	10	2	13	2
X	X	X				X	X	X				X		X				S-119	SWITCH—Key type—5 sets of "A" contacts each, side stop pin so located that knob will not go beyond center position	Remote-Local				344-H-70278-2	P7763305-2	S-119	1		1		0		0
			X						X	X						X												1		1		1
																													1		0		1
X	X	X				X	X	X				X		X				S-120	SWITCH—Key type, one set of "A" contacts on each side, momentary contacts on one side	Test Key				344-H-70278-1	P7763305-1	S-120	1		1		0		0
			X						X	X						X												1		1		1
																													1		0		1
X	X	X				X	X	X				X		X				S-121	SWITCH—3 amp. at 250 v., Single Circuit, normally open, momentary contact switch	Overload Relay Reset	24132			110-3592-D	K7889423	S-121	1		1		0		0
			X						X	X						X												1		1		1
																													1		0		1
	X	X	X			X		X	X			X		X		X		S-151	SWITCH—Rotating Tap, 4 bank 2 position	Phone—CW				189	ML7464910-G1	S-151	1		0		0		0
				X						X							X												2		2		2
																													0		0		2
																			S-151A—Part of S-151	Supplies Suppressor Voltage on PHONE Grounds Suppressor on on CW													
																			S-151B—Part of S-151	Supplies Microphone Voltage on PHONE													
																			S-151C—Part of S-151	Supplies "B" Voltage to Audio Unit on PHONE													
																			S-151D—Part of S-151	INSERTS Audio Output into grid circuit of P-A on PHONE and supplies fixed grid bias to P-A on CW													
X	X	X				X	X	X				X		X				S-201	SWITCH—Toggle, Single-pole, single-throw, 3 amp., 250 v.	OFF-ON Switch				110-20991-B	K7875315-1	S-201	1		1		0		0
			X							X	X						X												1		1		1
																													1		0		1
X	X	X				X	X	X				X						T-101	TRANSFORMER — Rating 60 cycles, 0.0334 KVA Pri. 70/140/100/200 v. Sec. 12.1/6.3-6.3/3.15-6.3/3.15 v., 55°C. ambient. Ins. for 2.5 KV test	Auxiliary Circuit Filament Transformer	30742			138-67G416	M7465625-1	T-101	1		0		0		0
				X						X							X												1		2		2
																													0		0		2
																												5	1	10	2	13	3
X	X	X				X	X	X				X						T-102	TRANSFORMER — Rating, 60 cycles, 0.100 KVA Pri. 70/190/100/200 v. Sec. 10/5 v., 55°C. ambient. Ins. for 3 KV test	P-A Filament TRANSFORMER	30743			138-67G417	M7465624-1	T-102	1		0		0		0
				X						X							X												1		2		2
																													0		0		2
																												5	1	10	2	13	3

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
		X		X				X		X		T-103	TRANSFORMER—Rating .500 KVA Pri. 220/449 v. 50/60 cycles Sec. 110/220 v., 4.56/-2.28 amps	Stepdown Transformer	30324	.....	.....	138-9TD1222E1	M7465100-1	T-103	1		0		0		0
			X				X					.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....			0		0		3
		X		X				X		X		T-106	TRANSFORMER—Rating 50/60 cycles, 0.001 kva., 110/220 (tapped for 81/163) v. pri., 20 v. sec.	M-O Heater Relay Transformer	30745	.....	.....	19-67G513	M7465622-1	T-106	1		0		0		0
			X				X					.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
								X				.....	.....	.....	.....	.....	.....	.....	.....	.....			0		0		3
								X		X		T-107	TRANSFORMER — Rating, Pri. 50/60 cycles, 100 kva., 70/140/100/200 Sec. 10/5-sec. test Ins. for 3 kvs, ambient temp. 55°C.	P-A Filament	.....	.....	.....	19-7469138	M7469138	T-107	1		0		0		0
								X		X		T-108	TRANSFORMER — Rating, Pri. 50/60 cycles, .0334 kva, 70/140/100/200 Sec. 12.6/6.3, 6.3/3.15, 6.3/3.15, 6.3/3.15, Sec. Ins. for 2.5 kv test, ambient test 55°C.	Auxiliary Circuit Filament	.....	.....	.....	19-7469137	M7469137	T-108	1		0		0		0
								X		X		T-109	TRANSFORMER — Rating, Pri 110/220 v., 50/60 cycles Sec. 110/220 v., 500 volt amp., Sec. test voltage 1500 v. ambient temp. 60°C.	Stepdown Transformer	.....	.....	.....	19-7469136	M7469136	T-109	1		0		0		0
X	X	X		X	X	X	X	X	X	X		T-151	TRANSFORMER — Rating input transformer NP —— — 250, 200-3000 cycles NS	Modulation Transformer	30747	.....	.....	138-67G660	M7465620-1	T-151	1		0		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
					X							.....	.....	.....	.....	.....	.....	.....	.....	.....			0		0		3
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	2	13	3
X	X	X		X	X	X	X	X	X	X		T-152	TRANSFORMER — Class A Audio Input 70 ohms, microphone or 500/200 ohm line to grid of RCA Type 807 Tube. Turn ratio NP/NS = 1/15, NP/NT . . 1/3.33/2.11	Microphone Transformer	30748	.....	.....	138-67G661	M7465621-1	T-152	1		0		0		0
			X									.....	.....	.....	.....	.....	.....	.....	.....	.....			1		2		2
					X							.....	.....	.....	.....	.....	.....	.....	.....	.....			0		0		3
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	2	13	3

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART								SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X	X	X			X	X	X	X	X	X		T-201	TRANSFORMER — Output transformer turn ratio NP/NS= 1.77/6.60, 50 to 5000 cycles, d-c., current in pri. 0.005 amps	Output Transformer	30744			138-68G224	M7465623-1	T-201	1		0		0		0
			X																				1 0		2 0		2 3
							X				X											5	1	10	2	13	3
X	X	X	X	X	X	X	X	X	X	X		TB-1A	TERMINAL BOARD — Jones Strip, 13 Terminals (Med.)	Main Connection Term. Board on Transmitter				151	M7465531-1	TB-1A (E-157-TCK 1 & 3)	1		0		0		0
											X												0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		TB-1B	TERMINAL BOARD — Jones Strip, 14 Terminals (Med.)	Main Connection Term. Board on Transmitter				151	M7465531-1	TB-1B (E-158-TCK 1 & 3)	1		0		0		0
											X												0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		TB-3	TERMINAL BOARD—6 Terminal	M-O Connection Term. Board				19	KS2J394-1	TB-3, TB-4 (E-136-TCK 1 & 3)	2		0		0		0
											X												0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X	X	TB-4	Same as TB-3	M-O Connection Term. Board									–		–		–
X	X	X	X	X	X	X	X	X	X	X		TB-5	TERMINAL BOARD — 4 Threaded Stud Terminals on Composition Term. Board	M-O Connection Term. Board				19	M48J304-1	TB-5, TB-6 (E-138-TCK 1 & 3)	2		0		0		0
											X												0	10	2	13	4
X	X	X	X	X	X	X	X	X	X	X	X	TB-6	Same as TB-5	M-O Connection Term. Board									–		–		–
X	X	X	X	X	X	X	X	X	X	X		TB-7	TERMINAL BOARD — 4 Threaded Stud Terminals on Board	CFI Connection Term. Board				19	M48J306	TB-7, 9, 10, 11, 12 (E-135-TCK 1 & 3)	5		0		0		0
											X												0	10	3	13	5
X	X	X	X	X	X	X	X	X	X	X		TB-8	TERMINAL BOARD — 12 Terminals, Textolite Board, Engraved	4-6 Wire Control Connections (above lower door on Transmitter)				137	M48J357-2	TB-8 (E-139-TCK 1 & 3)	1		0		0		0
											X												0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X	X	TB-9	Same as TB-7	Terminal Board on Audio Unit									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	TB-10	Same as TB-7	Terminal Board on Audio Unit									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	TB-11	Same as TB-7	Terminal Board on Audio Unit									–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	TB-12	Same as TB-7	Terminal Board on Audio Unit									–		–		–
X	X	X	X	X	X	X	X	X	X	X		TB-15	TERMINAL BOARD — 2 Terminal Jones Strip (Med.)	M-O Blower Meter Terminal Board				151	P7764909-11	TB-15 (E-137-TCK 1 & 3)	1		0		0		
											X												0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		TB-101	TERMINAL BOARD — For R-210, R-222, etc., less components	C.F.I. Term. Strip				137	M55J606-5	TB-101 (E-117-TCK 1 & 3)	1		0		0		0
											X												0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		TB-102	TERMINAL BOARD — For R-203, R-208, etc., less components	C.F.I. Term. Strip				137	M55J606-2	TB-102 (E-116-TCK 1 & 3)	1		0		0		0
											X												0	10	1	13	1

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-52214, CG-52215, CG-52216, CG-52214A, CG-52215A, CG-52216A, CG-52299, CG-52345 TRANSMITTERS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X	X	X	X	X	X	X		TB-103	TERMINAL BOARD — For R-216, R-212, C-209 etc., less components	C.F.I. Term. Strip	.....	.....	.....	137	P42J786-2	TB-103 (E-115-TCK 1 & 3)	1		0		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....			0	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		V-101	VACUUM TUBE—R.F. Power Amplifier Pentode	Master Oscillator	837	.....	.....	45-RCA-837	DL4W505A-720	V-101, V-102	2		2		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	4		6		0
X	X	X	X	X	X	X	X	X	X	X	X	V-102	Same as V-101	Intermediate Power Amplifier	837	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X		V-103	VACUUM TUBE — Transmitting Beam Power Amplifier	Power Amplifier	813	.....	.....	45-RCA-813	DL4W505-721	V-103, V-104	2		2		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	4		6		0
X	X	X	X	X	X	X	X	X	X	X	X	V-104	Same as V-103	Power Amplifier	813	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X		V-151	VACUUM TUBE—Transmitter Beam Power Amplifier	Modulator	807	.....	2J807	45-RCA-807	DL4W505-722	V-151	1		1		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	2		3		0
X	X	X	X	X	X	X	X	X	X	X		V-152	VACUUM TUBE — Duplex-Diode, High-mu triode	Second Speech Amplifier	6SQ7	.....	.....	45-RCA-6SQ7	DL4W505-723	V-152	1		1		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	2		3		0
X	X	X	X	X	X	X	X	X	X	X		V-153	VACUUM TUBE—Triple grid, Super-control Amplifier	1st Speech Amplifier	6SK7	.....	.....	45-RCA-6SK7	DL4W505-724	V-153, V-201	2		1		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	4		6		0
											X	V-201	Same as V-153	Crystal Oscillator	6SK7	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X		V-201	VACUUM TUBE—Triode-Hexode Converter	Crystal Oscillator	6K8	.....	.....	45-RCA-6K8	K7880232-V-201	V-291	1		1		0		0
X	X	X	X	X	X	X	X	X	X	X		V-202	VACUUM TUBE—Twin-Triode Amplifier	Multivibrator	6SC7	.....	.....	45-RCA-6SC7	K7880232-V-202	V-202	1		1		0		0
											X	V-202	VACUUM TUBE—Twin-Triode Amplifier	Multivibrator	6SL7GT	.....	2J6SL7GT	45-RCA-6SL7GT	DL4W505-726	V-202	1	5	2		3		0
X	X	X	X	X	X	X	X	X	X	X		V-203	VACUUM TUBE—Triple Grid Detector Amplifier	Detector	6SJ7	.....	2J6SJ7	45-RCA-6SJ7	DL4W505-727	V-203	1		1		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	2		3		0
X	X	X	X	X	X	X	X	X	X	X		V-204	VACUUM TUBE—Twin-Triode Amplifier	Audio Amplifier	6F8G	.....	.....	45-RCA-6F8G	K7880232-V-204	V-204	1		1		0		0
											X	V-204	VACUUM TUBE—Twin-Triode Amplifier	Audio Amplifier	6SN7W	.....	2J6SN7W	45-RCA-6SN7W	DL4W505-728	V-204	1	5	2		3		0
X	X	X	X	X	X	X	X	X	X	X		W-101	CABLE — Flexible Braid M11Y2A2, 1/8" x 0.025" x 3 ft.	Used in Transmitter	.....	.....	.....	137	DL4W505A-410	W101 (W-102-TCK 7)	1		0		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		W-102	CABLE — Flexible Braid 81-s714-11 7/37/0.005" x 5 ft.	Used in Transmitter	.....	.....	.....	137	DL4W505A-411	W-102 (W-103-TCK 7)	1		0		0		0
											X		.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	1	13	1

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN, or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X	X	X	X	X	X	X		W-103	CABLE—Flexible Conduit	Lead going to Lower Deck (Left Side)	.....	.....	.....	660	M7464936-1	W-103, W-104 (W-104-TCK 7)	2		0		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			5	2	12	2	13	2
X	X	X	X	X	X	X	X	X	X	X	X	W-104	Same as W-103	Lead going to Lower Deck (Right Side)	.....	.....	.....	.....	.....	.....			–		–		–
X	X	X	X									X-101	SOCKET (Interchangeable with K52J716)	Socket for V-101	.....	.....	.....	.....	K7873980-1	X-101,			0		0		0
X	X	X	X	X	X	X	X	X	X	X		X-101	SOCKET—Standard 7 Contact Socket Isolantite	Socket for V-101	49366	.....	.....	12-S227	K52J716	X-101, X-102	2		0		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			5	1	10	1	13	2
X	X	X	X	X	X	X	X	X	X	X	X	X-102	Same as X101	Socket for V-102	49366	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X		X103	SOCKET — Giant 7 Contact Socket	Socket for V-103	49384	.....	.....	358	M7466795-1	X-103, X-104	2		0		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			5	1	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X	X	X-104	Same as X-103	Socket for V-104	49384	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X		X-151	SOCKET—Amphenol Ceramic, Standard 5 Contact Socket	Socket for V-151	49369	.....	.....	107-SS5	K7874004	X-151	1		0		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			5	1	10	1	13	1
X	X	X	X	X	X	X	X	X	X	X		X-152	SOCKET—Ceramic, Octal Tube Socket	Socket for V-152	49373	.....	.....	107-	K35J527-7	X152, 153, 201, 202, 203, 204, 205	7		0		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....			5	4	10	4	13	7
X	X	X	X	X	X	X	X	X	X	X	X	X-153	Same as X-152	Socket for V-153	49373	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X-201	Same as X-152	Socket for V-201	49373	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X-202	Same as X-152	Socket for V-202	49373	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X-203	Same as X-152	Socket for V-203	49373	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X-204	Same as X-152	Socket for V-204	49373	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X	X	X-205	Same as X-152	Socket for Y-201	49373	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X	X	X	X	X	X	X		Y-201	CRYSTAL—Quartz, 200 kc	Crystal and Holder	40128	.....	.....	10-32640169	K7889597-1	Y-201	1		1		0		0
											X	.....	.....	.....	.....	.....	.....	.....	.....	.....		5	1	10	1	13	1

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-20219 RECTIFIER

								X				C-301	CAPACITOR — Pyranol, 10 MFD, 2000 v. d-c. w. +10%, −3%, 20°C.	Main Plate Rectifier Filament Capacitor	481794	.....	.....	19-23F120	P7763477-4	C-301	1		1		0		1
										X		.....	.....	.....	.....	.....	.....	.....	.....	.....			1		0		0
								X				C-302	CAPACITOR — Pyranol, 10 MFD, 600 v. d-c. w., +10%, −3%, 20°C.	Main Plate Rectifier	48867	.....	.....	19-23F104	P7763476-4	C-302, 4, 5, 6	4		2		0		2
										X		.....	.....	.....	.....	.....	.....	.....	.....	.....			2		0		0
								X		X		C-303	Same as C-134	Auxiliary Plate Rectifier Filter	481244	.....	.....	.....	.....	.....			–		–		–

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-20219 RECTIFIER

TCK			TCK 1	TCK 2	TCK 3		TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Ten-der		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
							X		X			C-304	Same as C-302	Auxiliary Plate Rectifier Filter	48867								–		–		–
							X		X			C-305	Same as C-302	S. Rectifier Filter	48867								–		–		–
							X		X			C-306	Same as C-302	S. Rectifier Filter	48867								–		–		
							X					C-307	CAPACITOR — Electrolytic, 1,000 MFD, 15 v. d-c. w., +50% −10%	S. Rectifier Filter	481335			497-KP-1003A	K7882946	C-307, 308	3		1		0		1
										X													1		0		0
							X		X			C-308	Same as C-307	S. Rectifier Filter	481335								–		–		–
							X		X			CR-301	RECTIFIER—115 v. at 0.5 amp. d-c.	Selenium Rectifier				19	K7891795-1	CR-301, CR-302	2		0		0		0
							X		X			CR-302	Same as CR-301	Selenium Rectifier									–		–		–
							X		X			CR-303	RECTIFIER—12 v. at 1.5 amp. d-c.	Selenium Rectifier				19	K7891795-2	CR-303	1		0		0		0
							X		X			E-301	PROTECTIVE SPARK GAP					19	K472980-1	E-301, 302	2		0		0		0
							X		X			E-302	Same as E-301										–		–		–
							X					F-301	FUSE — Cartridge, renewable, 250 v., 25 amp.	Line Fuse				19-1026	K7891586-18	F-301, F-302	2		2		0		2
										X													2		0		0
							X			X		F-301A	FUSE LINK—25 amp., 250 v.	Link for F-301				137-1103	K7891586-19	F-301A, 302A	4		10		0		10
																							10		0		0
							X		X			F-302	Same as F-301	Line Fuse									–		–		–
							X		X			F-302A	Same as F-301A	For F-302									–		–		–
							X					F-303	FUSE—Cartridge, renewable, 3 amps., 250 v.	Rectifier Fuse				137-1017	K7891586-20	F-303, 304	2		2		0		2
										X													2		0		0
							X					F-303A	FUSE LINK—3 amp., 250 v.	For F-303				137-1094	K7891586-21	F-303A, F-304B	4		10		0		10
										X													10		0		0
							X		X			F-304	Same as F-303	Rectifier Fuse									–		–		–
							X		X			F-304A	Same as F-303A	For F-304									–		–		–
							X					F-306	FUSE—½ amp., 1000 v., 3 in. long	500 v. Plate Supply Fuse				19-78X48	K7878690-2	F-306	1		10		0		0
										X													10		0		10
							X					F-307	FUSE—1 amp., 2500 v., 4½ in. long	1800 v. Plate Supply Fuse				19-95X334	K7878690-9	F-307	1		10		0		0
										X													10		0		10
							X					I-301	INDICATOR LAMP ASSEMBLY	Filament Voltage Ind.				489-Mazda T-4 QLK-1924006	M7480883-5	I-301	1		1		0		1
										X													1		0		0

TCK 230 V. D.C.	TCK 115 V. D.C.	TCK 220/440 V. A.C.	TCK 1 220/440 V. A.C.	TCK 2 220/440 V. A.C.	TCK 3 115 V. D.C.	TCK 3 230 V. D.C.	TCK 3 220/440 V. A.C.	TCK 4 110/220 V. A.C.	TCK 5 115 V. D.C.	TCK 6 110/220 V. A.C.	TCK 7 230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Spare Parts Equip. Box No.	Spare Parts Equip. Quan.	Spare Parts Tender Box No.	Spare Parts Tender Quan.	Spare Parts Stock Box No.	Spare Parts Stock Quan.
								X				I-301A	CAP—Blue	For I-301				489-	K7874583-5	I-301A	1		1		0		1
										X													1		0		0
								X		X		I-301B	BULB—18 v., 0.11 amp.	For I-301				489-		I-301B	1		0		0		0
								X		X		I-301C	RESISTOR—2600 ohms					489-QLK1924006		I-301C	1		0		0		0
								X		X		K-301	RELAY—Four normally open contacts; coil, 110 v. d-c., 60 cycles	Overload Relay				19-CR-2820-1746-M2	P7765417-P4	K-301	1		0		0		0
								X				K-301A	MOVABLE CONTACT					19	K8072657-G2	K-301A, 02A, 03A, 04A	8		4		0		4
										X													4		0		0
								X				K-301B	STATIONARY CONTACT					19	K8072657-G1	K-301B, 02B, 03B, 04B	8		4		0		4
										X													4		0		0
								X				K-301C	LOAD SPRING					19	K2416821	K-301C, 02C, 03C, 04C	4		1		0		1
										X													1		0		0
								X				K-301D	CONTACT SPRING					19	K2413966	K-301D, 02D, 03D, 04D	4		1		0		1
										X													1		0		0
								X				K-301E	COIL—110 v. d-c. 60 cycles					19-CR9502D101-A2	K7891586-35	K-301E, 02E, 03E, 04E	4		1		0		1
										X													1		0		0
								X				K-301F	COIL—110 v. d-c. 50 cycles (modification)					19-*f*-9502D101-A7	ML7884630-7	K-301F, 02F, 03F, 04F	4		0		0		1
										X													0		0		0
								X		X		K-302	RELAY—Two normally open Contacts; Coil, 110 v., 60 cycles	Plate Power Relay				19-CR-2820-1746J2	P7765414-P1	K-302	1		0		0		0
								X		X		K-302A	Same as K-301A										–		–		
								X		X		K-302B	Same as K-301B														
								X		X		K-302C	Same as K-301C										–		–		–
								X		X		K-302D	Same as K-301D										–		–		–
								X		X		K-302E	Same as K-301E										–		–		–
								X		X		K-303	RELAY—Three normally open contacts, one normally closed contact, 110 v. d-c., 60 cycles	Full Power Relay				19-CR-2820-1746-N2	P7765417-5	K-303, K-304	2		0		0		0
								X		X		K-303A	Same as K-301A										–		–		–
								X		X		K-303B	Same as K-301B										–		–		–
								X		X		K-303C	Same as K-301C														
								X		X		K-303D	Same as K-301D											–		–	–
								X		X		K-303E	Same as K-301E										–		–		–
								X		X		K-304	Same as K-303	Reduced Power Relay									–		–		–
								X		X		K-304A	Same as K-301A										–		–		–
								X		X		K-304B	Same as K-301B										–		–		–

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-20219 RECTIFIER

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
								X		X		K-304C	Same as K-301C	.....	.....	.....	.....	.....	.....	.....			-		-		-
								X		X		K-304D	Same as K-301D	.....	.....	.....	.....	.....	.....	.....			-		-		-
								X		X		K-304E	Same as K-301E	.....	.....	.....	.....	.....	.....	.....			-		-		-
								X		X		K-305	RELAY—Normally open Contacts, 110 v. d-c., 60 cycles	.....	.....	.....	.....	21-TD 1 1205	M7469406-P1	K-305	1		0		0		0
								X		X		L-301	COIL—Rating: 15 hys., 0.42 amp., 49.7 ohms ±6%, 4,500 v. test voltage to ground	Main Plate Rectifier Reactor	301104	.....	.....	19-7469131	M7469131	L-301	1		0		0		0
								X		X		L-302	COIL—Rating: 5 hys., 0.42 amps., 21.1 ohms ±6%, test voltage 2,000 v.	Main Plate Rectifier Reactor	301105	.....	.....	19-7469132	M7469132	L-302	1		0		0		0
								X		X		L-303	COIL—Rating: 10 hys., 0.3 amps., 46.5 ohms ±6%, test voltage 2,000 v.	Auxiliary Plate Rectifier Reactor	301106	.....	.....	19-7469133	M7469133	L-303	1		0		0		0
								X		X		L-304	COIL—Rating: 3 hys., 0.5 amps., 10.2 ohms ±6%, test voltage 1,500 v.	Auxiliary Plate Rectifier Reactor	301107	.....	.....	19-7469134	M7469134	L-304, 05, 06	3		0		0		0
								X		X		L-305	Same as L-304	S. Rectifier Reactor	301107	.....	.....	.....	.....	.....			-		-		-
								X		X		L-306	Same as L-304	S. Rectifier Reactor	301107	.....	.....	.....	.....	.....			-		-		-
								X		X		L-307	COIL—Rating: 0.1 hys., 1.5 amp., 0.871 ohms ±6%, test voltage 1,500 v.	S. Rectifier Reactor	301108	.....	.....	19-7469135	M7469135	L-307, 08	2		0		0		0
								X		X		L-308	Same as L-307	S. Rectifier Reactor	301108	.....	.....	.....	.....	.....			-		-		-
								X		X		M-301	METER—Rated at 150 v. a-c. with Red Mark at 110 v.	Filament Voltmeter	22084-A	.....	.....	19-8AO-22	K54J940	M-301	1		0		0		0
								X				R-301	RESISTOR—W.W. 6,300 ohms ±5%, 20°C., Grade 1, Class 1, Style B	Main Plate Rectifier Filter Discharge	63830-F	.....	.....	59	M7464451-39	R-301, 02, 03	3		2		0		2
											X												2		0		0
								X		X		R-302	Same as R-301	Main Plate Rectifier Filter Discharge	63830-F	.....	.....	.....	.....	.....			-		-		-
								X		X		R-303	Same as R-301	Main Plate Rectifier Filter Discharge	63830-F	.....	.....	.....	.....	.....			-		-		-
								X				R-304	RESISTOR—W.W., 16 ohms ±5%, 20°C., Grade 1, Class 1, Style D	Copper-Oxide Rectifier Filter Discharge	63830-F	.....	.....	59	M7464453-13	R-304	1		1		0		1
											X												1		0		0
								X		X		S-301	Same as S-111	START-STOP Switch	.....	.....	.....	.....	.....	.....			-		-		-
								X		X		S-302	Same as S-111	EMERGENCY Switch	.....	.....	.....	.....	.....	.....			-		-		-
								X		X		S-303	Same as S-114	Tube Door Interlock	.....	.....	.....	.....	.....	.....			-		-		-

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
								X		X		T-301	TRANSFORMER — Rating, Pri.: 50/60 cycles, 110/220 v. rms 1.0 kva Sec.: 2050/2120 v. rms under rated load of 1.0 kva, Sec. test voltage 5000 v.	Main Rectifier Plate Transformer	301109	.....	.....	19-7469125	M7469125	T-301	1		0		0		0
								X		X		T-302	TRANSFORMER — Rating, Pri.: 50/60 cycles, 110/220 v. rms .18 kva Sec.: 612, 593, 593, 612 v. rms underrated load of 0.250 kva sec. test voltage 2500	Auxiliary Rectifier Plate Transformer	301110	.....	.....	19-7969126	M7469126	T-302	1		0		0		0
								X		X		T-303	TRANSFORMER — Rating, Pri.: 50/60 cycles, 110/220 v. rms Sec.: 2.5 v. 5 amp., 2.5 v. 5 amp., 2.5 v. 10 amp., sec. test voltage 5000 v.	Main Rectifier Filament	301111	.....	.....	19-7469127	M7469127	T-303	1		0		0		0
								X		X		T-304	TRANSFORMER — Rating, Pri.: 50/60 cycles, 110/220 v. rms Sec.: 2.5 v. 10 amp. center tapped, sec. test 5000 v.	Auxiliary Rectifier Filament Transformer	301112	.....	.....	19-7469128	M7469128	T-304	1		0		0		0
								X		X		T-305	TRANSFORMER — Rating, Pri.: 50/60 cycles, 110/220 v., 0.075 kva Sec.: 160/170/180 v. rms underrated load of 0.075 kva, sec. test voltage 1500 v.	Selenium Rectifier Filament Transformer	301113	.....	.....	19-7469129	M7469129	T-305	1		0		0		0
								X		X		T-306	TRANSFORMER — Rating, Pri.: 50/60 cycles, 110/220 v. rms Sec.: 18.5, 19.5, 20.5 v. rms under-rated load of 0.031kva, sec. ins. 250 v.	Selenium Rectifier Filament Transformer	301114	.....	.....	19-7469130	M7469130	T-306	1		0		0		0
								X		X		V-301	VACUUM TUBE—Full wave, high vacuum rectifier tube	Main Rectifier Tube	836	.....	.....	45-RCA-836	K7891555-	V-301, 02, 03, 04, 05, 06	6		6		0		0
								X		X		V-302	Same as V-301	Main Rectifier Tube	836	.....	.....						–		0		0
								X		X		V-303	Same as V-301	Main Rectifier Tube	836	.....	.....						–		0		0
								X		X		V-304	Same as V-301	Main Rectifier Tube	836	.....	.....						–		0		0
								X		X		V-305	Same as V-301	Auxiliary Rectifier Tube	836	.....	.....						–		0		0
								X		X		V-306	Same as V-301	Auxiliary Rectifier Tube	836	.....	.....						–		0		0
								X		X		VR-301	REGULATOR — 110/220 v., 50/60 cycles, max. amb. 50°C.	Voltage Regulator	.....	.....	.....	19	P7765554-P1	.....	1		0		0		0
								X		X		X-301	TUBE SOCKET—5 watt socket	Socket for V-301	.....	.....	.....	358-209-SB	K47J998-1	.....	6		0		0		0
								X		X		X-302	Same as V-301	Socket for V-302	.....	.....	.....						0		0		0
								X		X		X-303	Same as V-301	Socket for V-303	.....	.....	.....						0		0		0
								X		X		X-304	Same as V-301	Socket for V-304	.....	.....	.....						0		0		0
								X		X		X-305	Same as V-301	Socket for V-305	.....	.....	.....						0		0		0
								X		X		X-306	Same as V-301	Socket for V-306	.....	.....	.....						0		0		0

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-51039 TRANSMISSION LINE COUPLING UNIT

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
								X		X		C-401	CAPACITOR — Variable, max. 265 MFD, min. 36 MFD C-401A—Part of C-401 C-401B—Part of C-401	Transmission Line Balance Capacitor	.....	.....	.....	12-TCD-265-J	P7765555-1	C-401	1		0		0		0
								X		X		C-402	CAPACITOR—Variable, 6000 v., test rms, 60 cycles	.....	.....	.....	.....	19	P7765547-1	C-402	1		0		0		0
								X		X		L-401	COIL — Right-hand Winding, 22½ turns 1¼ T at 3 T per in., 20 T at 4½ T per in., 1¼ T at per in.	Transmission Line Balance Coil	.....	.....	.....	19	P42J93-2	L-401	1		0		0		0
								X		X		L-402	COIL—Left-hand Winding, 22½ turns, 1¼ T at 3 T per in., 20 T at 4½ T per in., 1¼ T at 3 T 3 T per in.	Transmission Line, Balance Coil	.....	.....	.....	19	P42J93-3	L-402	1		0		0		0
								X		X		M-401	AMMETER—Rating 0-4 amp. R.F.	Transmission Line Ammeter	22024-A	.....	.....	19-8DW44	K47J844	M-401, 402	2		0		0		0
								X		X		M-402	Same as M-401	Transmission Line Ammeter	22024-A	.....	.....	.....	.....	.....			–		–		–
								X		X		S-401	SWITCH—4 Bank, 2 positions	Balancing Circuit Selector Switch	.....	.....	.....	19-	P7765558-1	S-401	1		0		0		0
								X		X		S-402	SWITCH—3 positions switch with stops, single bank S-402A—Part of S-402	.....	.....	.....	.....	19-	T7660154-5	S-402	1		0		0		0
													S-402B—Part of S-402	Antenna Transmission Selector Switch Switch Interlock	.....	.....	.....	.....	.....	.....							

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21627 MAGNETIC CONTROLLER

	X				X			X				(3) 22	MAIN STATIONARY CONTACT—115 v.	21627	.....	.....	.....	19	K5306170-1	.....	1		1		0		0
	X				X			X				(3) 23	MAIN MOVABLE CONTACT —115 v.	.....	.....	.....	.....	19	K5904068-1	.....	2		1		0		0
	X				X			X				(3) 24	CONTACT SPRING—115 v.	.....	.....	.....	.....	19	K2415142	.....	1		1		0		0
	X				X			X				(3) 25	RESILIENT STOP SPRING—	.....	.....	.....	.....	19	K2416412	.....	1		1		0		0
	X				X			X				(3) 5	CONTACTOR SHUNT COIL—115 v.	.....	.....	.....	.....	19-22D85G14	—	.....	1		1		0		0
	X				X			X				(3) 26	STATIONARY INTERLOCK CONTACT	.....	.....	.....	.....	19	K5308244-G1	.....	2		2		0		0

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
	X				X				X			(3) 27	MOVABLE INTERLOCK TACT					19	K5377842-G3		1		1		0		0
	X				X				X			(3) 28	INTERLOCK SPRING—115 v.					19	K2415977		1		1		0		0
	X				X				X			(3) 29	ACCELERATING STATIONARY CONTACT					19	K6978682-G3		1		1		0		0
	X				X				X			(3) 30	MAIN and ACCELERATING MOVABLE CONTACT					19	K6978682-G1		2		2		0		0
	X				X				X			(3) 31	MOVABLE INTERLOCK CONTACT					19	K5344049-G2		1		1		0		0
	X				X				X			(3) 32	STATIONARY INTERLOCK CONTACT					19	K5344048-G1		1		1		0		0
	X				X				X			(3) 33	MAIN STATIONARY CONTACT					19	K6978682-G5		1		1		0		0
	X				X				X			(3) 34	CUT-OFF SWITCH ASSEMBLY—115 v.					19-11K1390-PC34	K3845750-G11		1		1		0		0
	X				X				X			(3) 9	CONTACTOR SHUNT COIL					19-22D104G9	—		1		1		0		0
	X				X				X			(3) 35	MAIN and ACCELERATING SPRING FOR TIPS		21627			19-	K52593		3		3		0		0
	X				X				X			(3) 36	CLUTCH SPRING—115 v.					19-	K2415678		1		1		0		0
	X				X				X			(3) 37	INTERLOCK SPRING—115 v.					19-	K2414612		1		1		0		0
	X				X				X			(3) 12	FUSE—10 amp., 250 v.					19-1022	—		2		2		0		0
	X				X				X			(3) 38	FUSE LINK—10 amp., 250 v.					19-1099	—		4		10		0		0
	X				X				X			(3) 7	RESISTOR "A"—325 ohms ±5%, 120 w.					19-87X580	—		1		1		0		0
	X				X				X			(3) 10	RESISTOR "B"—360 ohms ±5%, 120 w.					19-98X298	—		1		1		0		0
	X				X				X			(3) 39	RESISTOR UNIT—2.3 ohms +10% −8½%, 570 w.					19-9033B2	—		1		1		0		0
	X				X				X			(3) 40	MECHANICAL RESET SPRING—115 v.					19 —	K2414890		1		1		0		0
	X				X				X			(3) 41	HEATER ELEMENTS—0.0139 ohms ±7½%, 8.7 amp.					19 —	K2096588-P2		2		2		0		0

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21628 MAGNETIC CONTROLLER

X						X						(4) 35	STATIONARY INTERLOCK CONTACT—230 v.					19-	K5344048-1		2		2		0		0
X						X						(4) 36	MAIN STATIONARY CONTACT—230 v.					19-	K6978682-4		1		1		0		0

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21628 MAGNETIC CONTROLLER

TCK			TCK 1	TCK 2	TCK 3		TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X						X						(4) 37	CUT-OFF SWITCH ASSEMBLY—230 v. d-c.					19-11K1481-PC37	K3845750-11		1		1		0		0
X						X						(4) 9	CONTACTOR SHUNT COIL—230 v.					19-22D104G10	—		1		1		0		0
X						X						(4) 38	MAIN and ACCELERATING SPRING FOR TIPS					19-	K52598		3		3		0		0
X						X						(4) 39	SPRING FOR CLUTCH					19-	K2415678		1		1		0		0
X						X						(4) 12	FUSE—10 amp., 250 v.					19-1022	—		2		2		0		0
X						X						(4) 41	FUSE LINKS—10 amp., 250 v.					19-1099	—		4		10		0		0
X						X						(4) 7	RESISTOR "A"—1250 ohms ±5%, 120 w.					19-98X299	—		1		1		0		0
X						X						(4) 10	RESISTOR "B"—1450 ohms ±5%, 120 w.					19-98X300	—		1		1		0		0
X						X						(4) 42	RESISTOR UNIT, 6.6 ohms +10%, −8½%, 570 w.					19-9033B6.60	—		1		1		0		0
X						X						(4) 43	MECHANICAL RESET SPRING—230 v.					19-	K2414890		1		1		0		0
X						X						(4) 44	HEATING ELEMENT—0.050 ohms					19-	K2096587-P4		2		2		0		0
X						X						(4) 23	RESISTOR UNIT "C"—160 ohms ±5%, Grade 1, Class 1, Style C	21628	63929F			19-	M7464452-23		1		1		0		0
X						X						(4) 22	RESISTOR UNIT "D"—630 ohms ±5%, Grade 1, Class 1, Style B		6-3843F			19-	M7464451-29		1		1		0		0
X						X						(4) 25	MAIN STATIONARY CONTACT—230 v.					19-	K5806170-1		1		1		0		0
X						X						(4) 26	MAIN MOVABLE CONTACT—230 v.					19-	K5904068-1		1		1		0		0
X						X						(4) 27	CONTACT SPRING—230 v.					19-	K2415142		1		1		0		0
X						X						(4) 28	RESILIENT STOP SPRING—230 v.					19-	K2416412		1		1		0		0
X						X						(4) 5	CONTACTOR SHUNT COIL—230 v. d-c.					19-	22D85G1		1		1		0		0
X						X						(4) 29	STATIONARY INTERLOCK CONTACT—230 v.					19-	K5308244-1		2		2		0		0
X						X						(4) 30	MOVABLE INTERLOCK CONTACT—230 v.					19-	M5377842-3		1		1		0		0

TCK													PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	TCK 1 220/440 V. A.C.	TCK 2 220/440 V. A.C.	TCK 3 115 V. D.C.	230 V. D.C.	220/440 V. A.C.	TCK 4 110/220 V. A.C.	TCK 5 115 V. D.C.	110/220 V. A.C.	TCK 6 230 V. D.C.	TCK 7	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
X						X							(4) 31	INTERLOCK SPRING—120 v.					19-	K3415977		1		1		0		0
X						X							(4) 32	ACCELERATING STATIONARY CONTACT					19-	K6978683-3		1		1		0		0
X						X							(4) 33	MAIN AND ACCELERATING MOVABLE CONTACT					19-	K6978683-1		2		2		0		0
X						X							(4) 34	MOVABLE INTERLOCK CONTACT—230 v.					19-	K5344049-2		1		1		0		0

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPES—CG-21629, CG-21630 MAGNETIC CONTROLLER

		X	X				X						(5) 6	LINE CONTACTOR SHUNT—220 v.	220/3/60 Controller				19-22D2G247	—		1		1		0		0
				X									(3) 6	Same as (5) 6										1		0		0
		X	X				X						(5) 25	LINE CONTACTOR MOVABLE CONTACT—220 v.					19-	K4314800-5		3		3		0		0
				X									(3) 25	Same as (5) 25										3		0		0
		X	X				X						(5) 26	LINE CONTACTOR STATIONARY CONTACT—220 v.					19-	K4314800-2		3		6		0		0
				X									(3) 26	Same as (5) 26										6		0		0
		X	X				X						(5) 27	LINE CONTACTOR SPRING					19-	K3413673		3		3		0		0
				X									(3) 27	Same as (5) 27										3		0		0
		X	X				X						(5) 28	OVERLOAD RELAY SPRING					19-	K3915685		2		2		0		0
				X									(3) 28	Same as (5) 28										2		0		0
		X	X				X						(5) 29	OVERLOAD RESET SPRING					19	K3415686		1		1		0		0
				X									(3) 29	Same as (5) 29										1		0		0
		X	X				X						(5) 30	SWITCH OPERATING MECHANISM SPRING					19-	K3415934		1		1		0		0
				X									(3) 30	Same as (5) 30										1		0		0
		X	X				X						(5) 10	LINE FUSE—Removable, 30 amp., 250 v.					19-1027	—		2		2		0		0
				X									(3) 10	Same as (5) 10										2		0		0
		X	X				X						(5) 31	FUSE LINK—30 amp., 250 v.					19-1104	—		4		10		0		0
				X									(3) 31	Same as (5) 31										10		0		0
		X	X				X						(5) 13	CONTROL FUSE—Renewable, 10 amp., 250 v.					19-1022	—		2		2		0		0

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21629, CG-21630 MAGNETIC CONTROLLER

TCK			TCK 1	TCK 2	TCK 3		TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Ten-der		Stock	
																					Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
				X							(3) 13	Same as (5) 13										2		0		0
		X	X				X				(5) 32	FUSE LINK—10 amps, 250 v.					19-1099	—		4		10		0		0
				X							(3) 32	Same as (5) 32										10		0		0
		X	X								(6) 6	CONTACTOR SHUNT COIL—440 v.	440/3/60 Controller				19-22D2G247			1		1		0		0
				X							(4) 6	Same as (6) 6										1		0		0
		X	X								(6) 26	LINE CONTACTOR MOVABLE CONTACT—440 v.					19-	K4314800-G5		3		3		0		0
				X							(4) 26	Same as (6) 26										3		0		0
		X	X								(6) 27	LINE CONTACTOR STATIONARY CONTACT—440 v.					19-	K4314800-G2		3		6		0		0
				X							(4) 27	Same as (6) 27										6		0		0
		X	X								(6) 28	LINE CONTACTOR SPRING					19-	K2413673		3		3		0		0
				X							(4) 28	Same as (6) 28										3		0		0
		X	X								(6) 29	OVERLOAD RELAY SPRING					19	K2415685		2		2		0		0
				X							(4) 29	Same as (6) 29										2		0		0
		X	X								(6) 30	OVERLOAD RESET SPRING					19	K2415686		1		1		0		0
				X							(4) 30	Same as (6) 30										1		0		0
		X	X								(6) 31	SWITCH OPERATING MECHANISM SPRING					19	K2415934		1		1		0		0
				X							(4) 31	Same as (6) 31										1		0		0
		X	X								(6) 10	FUSE—20 amp., 250 v.					19-1025			2		2		0		0
				X							(4) 10	Same as (6) 10										2		0		0
		X	X								(6) 32	FUSE LINK—20 amp., 250 v.					19-1102			4		10		0		0
				X							(4) 32	Same as (6) 32										10		0		0
		X	X								(6) 13	FUSE—10 amp., 250 v.					19-1022			2		2		0		0
				X							(4) 13	Same as (6) 13										2		0		0
		X	X								(6) 33	FUSE LINK—10 amp., 250 v.					19-1099			4		10		0		0
				X							(4) 33	Same as (6) 33										10		0		0

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION
FOR NAVY TYPE—CG-21297 MAGNETIC CONTROLLER

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
											X	(3) 17	MAIN STATIONARY CONTACT	Arcing Contact	.....	.....	.....	19-6914856-G2	6914856-G2	(3) 17	3	4	3	6	6	8	6
											X	(3) 58	MAIN MOVABLE CONTACT	Arcing Contact	.....	.....	.....	19-2840261-G3	2840261-G3	(3) 58	3	4	3	6	6	8	6
											X	(3) 126	INTERLOCK STATIONARY CONTACT	Arcing Contact	.....	.....	.....	19-8627410-G1	8627410-G1	(3) 126	3	4	3	6	6	8	6
											X	(3) 129	INTERLOCK MOVABLE CONTACT	Arcing Contact	.....	.....	.....	19-8627410-G2	8627410-G2	(3) 129	3	4	3	6	6	8	6
											X	(3) 2G	CONTACTOR SHUNT	Part of Contactor Unit	.....	.....	.....	19-8627325-G3	8627325-G3	(3) 2G	1	4	1	6	1	8	1
											X	(3) 2H	CONTACTOR SHUNT	Part of Contactor Unit	.....	.....	.....	19-8627325-G1	8627325-G1	(3) 2H	3	4	3	6	3	8	3
											X	(3) 69	CONTACT TIP SPRING	Part of Contactor Unit	.....	.....	.....	19-2417168	2417168	(3) 69	3	4	3	6	3	8	3
											X	(3) 76	MAIN SPRING	Part of Contactor Unit	.....	.....	.....	19-2417175	2417175	(3) 76	1	4	1	6	1	8	1
											X	(3) 92	CONTACTOR COIL	Part of Contactor Unit	.....	.....	.....	19-1D79G3	1D79G3	(3) 92	1	4	1	6	3	8	3
											X	(3) 9	FUSE—10 amp., 250 v.	.....	.....	.....	.....	19-3169	DL4W533A-42	(3) 9	2	4	20	6	40	9	100
											X	(3) 10	FUSE CLIP	.....	.....	.....	.....	19	K8625873-G6	(3) 10	1	4	1	6	1	9	1
											X	(3) 6	COVER GASKET	Gasket Enclosure	.....	.....	.....	19-8627593-2	8627593-2	(3) 6	1	4	1	6	2	9	4
											X	(3) 3	OVERLOAD RELAY	.....	.....	.....	.....	19-CR5882-C1E	8230530E	(3) 3	1		0	7	1	9	2
											X	(3) 5	RESISTOR UNIT ASSEM.	Starting Resistor	.....	.....	.....	19	8627447-G9	(3) 5	1	4	1	9	3	12	3

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION
FOR NAVY TYPE—CG-21632, 21631, 21633, 21631A, 21632A, 21633A, CGU-21632A MOTOR GENERATORS

	X					X			X			(7)	MOTOR—2 hp., 3,480 rpm., 115 v. d-c., 40°C continuous	.....	.....	.....	.....	19-Type LY-2	WW6639974	(7)	1		0		0		0
X							X					(11)	MOTOR—2 hp., 3,480 rpm., 230 v., d-c., 40°C continous	.....	.....	.....	.....	19.....	WW6626802	(11)	1		0		0		0
											X	(4)	MOTOR—2 hp., 3,480 rpm., 230 v. d-c., 40°C continous	.....	.....	.....	.....	.....	K52J657-P3	(4)	1		0		0		0
		X	X					X				(15)	MOTOR—2 hp., 440 v., 2 phase, 3 phase, 60 cycles, 40°C.	.....	.....	.....	.....	19.....	WW6626618	(15) (5)	1		0		0		0
				X								(5)	MOTOR—Same as (15)	.....	.....	.....	.....	.....	.....	.....	1		0		0		0
	X					X			X			(8)	L-V GENERATOR—0.35 kw., 500/115 v., 0.35/1.50 amp., 3,480 rpm., 40°C. continuous	.....	.....	.....	.....	19.....	WW6639974	(8)	1		0		0		0

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21631, 21632, 21633, 21631A, 21632A, 21633A, CGU-21632A MOTOR GENERATORS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Ten-der		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X						X						(12)	L-V GENERATOR—0.35 kw., 500/115 v., 0.35/1.50 amp., 3,480 rpm., 40°C. continuous					19	WW62680	(12)	1		0		0		0
											X	(5)	L-V. GENERATOR						K52J657	(5)	1		0		0		0
		X	X				X					(16)	L-V GENERATOR—0.35 kw., 500/115 v., 0.35/1.50 amp., 3,480 rpm., 40°C. continuous					19	WW6626618	(16) (6)	1		0		0		0
				X								(6)	L-V GENERATOR—Same as (16)								1		0		0		0
	X				X			X				(9)	H-V GENERATOR—0.72 kw., 1,800 v., 0.4 amp., 3,480 rpm., 40°C. continous					19	WW6639974	(9)	1		0		0		0
X						X						(13)	H-V GENERATOR—0.72 kw., 1,800 v., 0.4 amp., 3,480 rpm., 40°C. continuous					19	WW6626802	(13)	1		0		0		0
											X	(5)	H-V GENERATOR						K52J657	(5)	1		0		0		0
		X	X				X					(17)	H-V GENERATOR—0.72 kw., 1,800 v., 0.4 amp., 3,480 rpm., 40°C. continuous					19	WW6626618	(17) (7)	1		0		0		0
				X								(7)	H-V GENERATOR—Same as (17)								1		0		0		0
	X				X			X				(10)	OVERHUNG GENERATOR—0.24 kw., 12 v., 2 amp., 3,480 rpm., 40°C. continuous					19	W8118216	(10) (14) (18) (8) (6)	1		0		0		0
											X	(6)	Same as (10)								1		0		0		0
X						X						(14)	Same as (10)								1		0		0		0
		X	X				X					(18)	Same as (10)								1		0		0		0
				X								(8)	Same as (10)								1		0		0		0
X	X											(7) (11) 129	ARMATURE	D-C. Motor				137	M6639932-G1		1		1		0		0
					X				X			(7) 55											1		0		0
						X					X	(11) 55 (4) 55	ARMATURE	D-C. Motor				137 659-B4484	M6626431-G1		1	2	1	2	1	2	2
X	X	X	X	X								(7) (11) (15) 11	BRUSH HOLDER ASSEM.	Motor				659	M6639471-1		4		1		0		0
					X	X	X		X			(7) (11) 80											1		0		0
											X	(4) 11										3	4	4	8	4	12

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART										SPARE PARTS					
230 V. D.C.	115 V. D.C.	230/440 V. A.C.	230/440 V. A.C.	230/440 V. A.C.	115 V. D.C.	230 V. D.C.	230/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X											(7) (11) 73	BRUSH HOLDER ASSEM.	D-C. Motor				137	M4832520-3		2		2		0		0
					X	X			X			(7) (11) 77											2		0		0
											X	(4) 77	BRUSH HOLDER ASSEM.	D-C. Motor				659-B4482G4	M4832520-G4		2	3	2	4	4	5	6
X	X											(7) (11) 79	BRUSH HOLDER SPRING	D-C. Motor				659-A2532	K8410220		2		3		0		0
					X	X			X			(7) (11)											3		0		0
											X	(15) 12 (4) 12										3	6	4	12	5	18
X	X											(7) (11) 137	BRUSH HOLDER SPRING	D-C. Motor				659-A2509	K4885337		2		3		0		0
					X	X			X			(7) (11) 76											3		0		0
											X	(4) 76										3	3	4	6	5	9
X	X											(7) (11) 74	BRUSH	D-C. Motor				137	K1332335		4		40		0		0
					X	X			X			(7) (11) 75											40		0		0
											X	(4) 58	TERM. BOARD—Textolite, 6" x 4¼" x ⅝" thick	D-C. Motor				659-A2533	K8420908		1	3	1	4	1	5	2
X	X											(7) (11) 52	WASHER	D-C. Motor				659-A2535	V6655047		2		4		0		0
					X	X			X			(7) (11) 47											4		0		0
											X	(4) 47										3	4	4	8	5	12
X	X											(7) (11) 113	MAIN FIELD COIL	D-C. Motor					3205000-155		1		2		0		0
X	X											(7) (11) 136	COMMUTATOR FIELD COIL	D-C. Motor					3205000-193		1		2		0		0
X	X	X	X									(7) (11) (15) 77	BRUSH—L.H. Carbon	Motor				659-#2821	K1334299		2		20		0		0
				X	X	X			X			(7) (11) 38											60		0		0
							X					(15) 30											40		0		0
											X	(4) 114										3	10	4	20	2	40
X	X											(7) (11) 78	BRUSH—R.H. Carbon	Motor				659-#2822	K1334287		2		20		0		0
					X	X			X			(7) (11) 39											60		0		0
							X					(15) 29											40		0		0
											X	(4) 115										3	10	4	20	2	40
X	X											(7) (11) 71	BRUSH HOLDER STUD	D-C. Motor				659-A2558	V6621492		1		2		0		0
					X	X			X			(7) (11) 51											2		0		0
											X	(4) 51										3	2	4	4	5	6
X	X											(7) (11) 45	WASHER—Fibre	D-C. Motor				659-A2536	V5530276		1		2		0		0
					X	X			X			(7) (11) 44											2		0		0
											X	(4) 44										2	2	4	4	5	6
					X				X			(7) 57	COIL	115 v. d-c. Motor				495	3205000-155		1		2		0		0

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21631, 21632, 21633, 21631A, 21632A, 21633A, CGU-21632A MOTOR GENERATORS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip. Box No.	Equip. Quan.	Tender Box No.	Tender Quan.	Stock Box No.	Stock Quan.
					X				X			(7) 74	COIL	115 v. d-c. Motor				495	3205000-193		1		2		0		0
						X					X	(11) 57	COIL—Copper Winding	230 v. d-c. Motor				495	3205000-122		1		2		0		0
											X	(4) 57						659				3	1	5	4	6	8
						X					X	(11) 74	COIL—Copper Winding	230 v. d-c. Motor				495	3205000-175		1		2		0		0
											X	(4) 74										3	2	4	4	7	8
							X					(15) 88	JACK SCREW (ON)	A-C. Motor				495	V8429704		1		1		0		0
X	X											(7) 175	BEARING PULLER	Motor				495	M8432092-G1		1		1		0		0
					X				X			(11) 170 (7) (11)											1		0		0
							X					107 (15) 83											1		0		0
											X	(4) 107										3	1	4	1	5	2
					X				X			(7) (11) 106	STUD BUSHING	Motor				659-A2542	M8429361		4		12		0		0
							X					(15) 87											6		0		0
											X	(4) 106										3	12	4	24	5	36
					X		X		X			(7) (11) (15) 15	STUD	Motor				495	M8429341		2		6		0		0
											X	(4) 107	MOTOR BEARING PULLER ADAPTER	D-C. Motor				659-B4522-G1	M8434419-G1		1	3	1	4	1	5	2
					X		X		X			(7) 111 (11) 109	JACK SCREW (ON)	D-C. Motor				659-A2515	8429701		1		1		0		0
											X	(4) 109										3	1	4	1	5	2
X	X											(7) 173 (11) 170	JACK SCREW (OFF)	D-C. Motor				495	V8427683		1		1		0		0
					X		X		X			(7) (11) 108											1		0		0
											X	(4) 108										3	1	4	1	5	2
	X											(7) 171	FUSE—10 amp., 250 v.	D-C. Motor				137-#1022	K7844824-70		2		2		0		0
					X				X			(7) 109											2		0		0
	X											(7) 172	FUSE LINKS—10 amp., v.	D-C. Motor				137-#1099	K7844824-71		4		10		0		0
					X				X			(7) 110											10		0		0
X												(11) 106	FUSE—6 amp., 250 v.	D-C. Motor				137-#1020			2		2		0		0
											X	(4) 88	FUSE—6 amp., 250 v.	D-C. Motor				659-A-2801			2	3	40	4	80	5	200
X												(11) 157	FUSE LINKS—6 amp., 250 v.	D-C. Motor				137-#1097			4		10		0		0
											X	(4) 89	FUSE CLIP—Phos. Bronze (For (4) (5) (6) 88)	D-C. Motor				659-A2591	V8427177		4	3	1	4	1	5	4
											X	(4) 75	BRUSH (COLL.)	Brush ⅜ x ⅛ Carbon				659-A2469	K1330685		4	3	20	4	40	4	80

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X								(8) (12) (16) (6) 79	BRUSH HOLDER SPRING	L-V. Generator				659	E8410220		4		3		0		0
					X	X	X		X			(8) (12) (16) 12	(Included with Motor Spares (7) (11) (15) 12										–		0		0
											X	(5) 12	Included with Motor Spares (4) 12										–		0		0
X	X	X	X	X	X	X	X		X			(8) (12) (16) (6) 77	BRUSH—L.H. Carbon, L-V.	L-V. Generator				659-A2470	K1334299		4		40		0		0
											X	(5) 30										3	20	4	40	2	80
X	X	X	X	X	X	X	X		X			(8) (12) (16) (6) 78	BRUSH—R.H. Carbon, L-V.	L-V. Generator				659-A2641	K1334287		4		40		0		0
											X	(5) 29										3	20	4	40	4	80
X	X	X	X	X	X	X	X		X			(8) (12) (16) (6) 8	BRUSH HOLDER STUD	L-V. Generator				137	V6621230		3		3		0		0
											X	(5) 15	BRUSH HOLDER STUD	L-V. Generator				659-A2548	V8429341		3	3	6	4	12	5	18
X	X	X	X	X								(8) (12) (16) (6) 33	MAIN FIELD COIL—Copper Winding	L-V. Generator				659-B4630	3205241-1		1		2		0		0
					X	X	X		X			(8) (12) (16) 35											2		0		0
											X	(5) 35										2	1	2	2	5	4
X	X	X	X	X								(8) (12) (16) (6) 34	MAIN FIELD COIL—Copper Winding	L-V. Generator				659-B4625	3205241-2		1		2		0		0
					X	X	X		X			(8) (12) (16) 34											2		0		0
											X	(5) 34										2	1	2	2	5	4
X	X	X	X	X								(8) (12) (16) (6) 85	COMMUTATOR FIELD COIL	L-V. Generator				659	3205242-1		1		2		0		0
					X	X			X			(8) (12) 106											2		0		0
							X					(16) 72											2		0		0
											X	(5) 102										3	1	4	2	2	4
X	X	X	X	X								(8) (12) (16) (6) 108	FUSE—½ amp., 1,000 v.	L-V. Generator				137 #78 X 782	K7894824-67		2		10		0		0
					X	X			X			(8) (12) 93											10		0		0
							X					(16) 63											10		0		0
											X	(5) 93	FUSE—½ amp., 1,000 v.	L-V. Generator				659-A2802	DL4W530A-130		2	3	20	4	40	5	100
X	X	X	X	X								(8) (12) (16) (6) 106	FUSE—6 amp., 250 v.	L-V. Generator				137-1020	K7894824-68		2		2		0		0
					X	X			X			(8) (12) 88											2		0		0
							X					(16) 59											2		0		0
											X	(5) 88	FUSE—Included with Motor Spares (4) 88										–		–		–

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21631, 21632, 21633, 21631A, 21632A, 21633A, CGU-21632A MOTOR GENERATORS

TCK			TCK 1	TCK 2	TCK 3			TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Tender		Stock	
																						Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X											(8) (12) 157	FUSE LINKS—6 amp., 250 v.	L-V. Generator	.....	.....	.....	137	#1097	.....	4		10		0		0
		X	X	X								(16) (6) 130	.....	.....	.....	.....	.....	.....	.....	.....			10		0		0
					X	X			X			(8) (12) 90	.....	.....	.....	.....	.....	.....	.....	.....			10		0		0
							X					(16) 61	.....	.....	.....	.....	.....	.....	.....	.....			10		0		0
X	X	X	X	X								(8) (12) (18) (6) 3	BALL BEARING	L-V. Generator	.....	.....	.....	499-NH43607	K7894824-7	.....	2		2		0		0
					X	X	X		X			(8) (12) (16) 5	.....	.....	.....	.....	.....	.....	.....	.....			2		0		0
											X	(5) 5	.....	.....	.....	.....	.....	.....	.....	.....		3	2	4	2	2	2
		X	X	X								(6) (16) 142	BEARING PULLER	L-V. Generator	.....	.....	.....	137	M8432092-G1	.....	1		1		0		0
											X	(5) 89	FUSE CLIP—Included with Motor Spares (4)89	L-V. Generator	.....	.....	.....	.....	.....	.....			–		–		–
X	X	X	X	X								(8) (12) (16) (6) 20	ARMATURE	L-V. Generator	.....	.....	.....	.....	P6618789-1	.....	2		1		0		0
					X	X	X		X			(8) (12) (16) 21	.....	.....	.....	.....	.....	.....	.....	.....			1		0		0
											X	(5) 21	.....	.....	.....	.....	.....	.....	.....	.....		1	1	1	1	1	1
X	X	X	X	X								(8) (12) (16) (6) 80	BRUSH HOLDER ASSEM.	L-V. Generator	.....	.....	.....	.....	M6639471-G1	.....	4		1		0		0
					X	X	X		X			(8) (12) (16) 80	(Included with Motor Spares)	.....	.....	.....	.....	.....	.....	.....			–		–		–
											X	(5) 11	(Included with Motor Spares)	.....	.....	.....	.....	.....	.....	.....			–		–		–
											X	(5) 106	STUD BUSHING — Included with Motor Spares (4) 106	L-V. Generator	.....	.....	.....	.....	.....	.....			–		–		–
											X	(5)	COVER GASKET—Vellumoid 6¼" x 1¾" x 1/8 thick	L-V. & H-V. Generator	.....	.....	.....	659-A2586	V6648667	.....	2	3	1	4	2	5	4
											X	(5)	COVER GASKET—Vellumoid 11⅛" x 3¼" x 1/8" thick	L-V. & H-V. Generator	.....	.....	.....	659-A2601	V3429288	.....	2	3	2	4	4	5	8
											X	(5) 97	TERM. BOARD—Compound	Generator	.....	.....	.....	659-A-2660	V6638666	.....	1	3	1	4	1	5	2
											X	(5) 26	TERM. BOARD—Mycalex, 8" x 5⅛" x 3/8" thick	Generator	.....	.....	.....	659-A2517	E8420917	.....	1	3	1	4	1	5	2
X	X	X	X									(9) (13) (17) (7) 20	ARMATURE (Included with L-V. Generator Spares (8) 20)	H-V. Generator	.....	.....	.....	659	P6618789-G1	.....	4		–		0		0
					X	X	X		X			(9) (13) (17) 20	.....	.....	.....	.....	.....	.....	.....	.....			–		0		0
											X	(3)21	(Spares included with L-V. Generator (5) 21)	.....	.....	.....	.....	.....	.....	.....			–		0		0

TCK															PART									SPARE PARTS					
		TCK 1		TCK 2	TCK 3			TCK 4		TCK 5		TCK 6	TCK 7											Equip.		Tender		Stock	
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.		110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Function	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
X	X	X	X	X									(9) (13) (17) (7) 80	BRUSH HOLDER ASSEMBLY (Included with L-V. Generator Spares (8) 80)	H-V. Generator				659	M6639471-G1		4		–		0		0
					X	X	X		X				(9) (13) (17) (7) 80	Included with Motor Spares (4) 11										–		0		0
													(5) 11											–		0		0
X	X	X	X	X	X	X	X	X	X				(9) (13) (17) (7) 79	BRUSH HOLDER SPRING (Included with L-V. Generator Spares (8) 79)	H-V. Generator				659	K8410220		4		–		0		0
												X	(5) 12	Included with Motor Spares (4) 12										–		0		0
X	X	X	X	X	X	X	X	X	X				(9) (13) (17) (7) 75	BRUSH—L-H.	H-V. Generator				659-A2642	K1334288		4		20		0		0
					X	X	X		X				(9) (13) (17) 14											20		0		0
												X	(5) 14										3	10	4	20	2	40
X	X	X	X	X	X								(9) (13) (17) (7) 76	BRUSH—R.H.	H-V. Generator				659-A2659	K1334298		4		20		0		0
					X	X	X		X				(9) (13) (17) 13											20		0		0
												X	(5) 13										3	10	4	20	2	40
X	X	X	X	X	X								(9) (13) (7) (17) 8	BRUSH-HOLDER STUD	H-V. Generator				V6621230			4		3		0		0
												X	(5) 15	BRUSH-HOLDER STUD (Included with L.V. Generator Spares (5) 15)	H-V. Generator									–		–		–
X	X	X	X	X	X								(9) (13) (17) (7) 17	MAIN FIELD COIL	H-V. Generator				137-3205164-7	3205164-7		1		2		0		0
					X	X	X		X				(9) (13) (17) (7) 9											2		0		0
												X	(5) 19										2	1	3	2	3	4
X	X	X	X	X	X								(9) (13) (17) (7) 84	COMMUTATOR FIELD COIL	H-V. Generator				137-3205163-3			1		2		0		0
					X	X		X		X			(9) (13) 103											2		0		0
							X						(17) 71											2		0		0
												X	(5) 103										2	1	3	2	3	4
X	X	X	X	X	X								(9) (13) (17) (7) 107	FUSE—2 amp. 3000 v.	H-V. Generator				137-76X660			2		10		0		0
					X	X		X		X			(9) (13) 94											10		0		0
							X						(17) 65											10		0		0
												X	(5) 94	FUSE—2 amp., 3000 v.	H-V. Generator				659-A2803	DL4WS30A-121		2	3	20	4	40	5	100
X	X	X	X	X	X								(9) (13) (17) (7) 2	BALL BEARING (Included with L-V. Generator Spare (8) (12) (16) (6) 3)	H-V. Generator				499-NH43607			4		–		0		0
												X	(5) 5	Included with L-V. Gen. Spares (5) 5										–		–		–

TABLE 8-2—Continued

COMBINED PARTS AND SPARE PARTS LIST BY SYMBOL DESIGNATION

FOR NAVY TYPE—CG-21631, 21632, 21633, 21631A, 21632A, 21633A, CGU-21632A MOTOR GENERATORS

TCK		TCK 1	TCK 2	TCK 3				TCK 4	TCK 5	TCK 6	TCK 7	PART									SPARE PARTS					
230 V. D.C.	115 V. D.C.	220/440 V. A.C.	220/440 V. A.C.	115 V. D.C.	230 V. D.C.	220/440 V. A.C.	110/220 V. A.C.	115 V. D.C.	110/220 V. A.C.	230 V. D.C.	Symbol Desig.	Name of Part and Description	Fupction	AWS, JAN. or Navy Type Desig.	Navy Stock No.	Army Stock No.	Mfr. and Mfr's Desig.	G.E. Drawing and Part No.	All Symbol Desig. Involved	Total No. Per Equip.	Equip.		Ten-der		Stock	
																					Box No.	Quan.	Box No.	Quan.	Box No.	Quan.
		X	X	X							(17) (7) 142	BEARING PULLER (Included with L-V. Generator Spares (16) 142)	H-V. Generator				M8432092-G1			1		–		0		0
										X	(5) 106	STUD BUSHING — Included with Motor Spares (4) 106	H-V. Generator							4		–		0		0
										X	(5) 92	FUSE CLIP—Phos. Bronze—For (5) 93, 94	H-V. Generator				659-A2539	V8427178		4	3	1	4	1	5	2
X	X	X	X	X	X	X	X	X			(10) (14) (8) (18)6	BRUSH ASSEMBLY	Overhung Generator				659-A2494	A5863334AB15		2		20		0		0
										X	(6) 118										3	10	4	20	4	40
X	X	X	X	X	X	X	X	X			(10) (14) (18) (8) 7	BRUSH HOLDER AND INSULATION	Overhung Generator				495	A5863333AD2		2		2		0		0
										X	(6) 117	BRUSH HOLDER AND CAP	Overhung Generator				659-A2490	DL4W530A-55		2	3	2	4	8	5	12
X	X	X	X	X	X	X	X	X			(10) (14) (18) (8) 8	INSULATOR SCREW CAP	Overhung Generator				495	KS86333AB1		2		2		0		0
X	X	X	X	X	X	X	X	X			(10) (14) (18) (8) 11	PRENITE WASHER	Overhung Generator				495	KS861433AA1		2		2		0		0
X	X	X	X	X	X	X	X	X			(10) (14) (18) (8) 9	FIELD COIL	Overhung Generator				495	V5872256AA		1		2		0		0
										X	(6) 119										3	2	4	4	2	8
X	X	X	X	X	X	X	X	X			(10) (14) (18) (8) 3	ARMATURE	Overhung Generator				495	V5872257AA		2		1		0		0
										X	(6) 116										2	1	2	1	2	2
										X	(6) 88	FUSE—6 amp. x 250 v. Included with Motor Spares (4) 88	Overhung Generator							2		–		–		–
										X	(6) 89	FUSE CLIP — Included with Motor Spares (4) 89	Overhung Generator							4		–		–		–

TABLE 8-3
LIST OF MANUFACTURERS

VENDOR'S NUMBER	PREFIX NUMBER	MANUFACTURER	ADDRESS
1	CMA	P. R. Mallory & Company	1941 Thomas St., Indianapolis, Ind.
6	CBZ	Allen-Bradley Company	118 W. Greenfield Ave., Milwaukee, Wisc.
7	CD	Cornell-Dubilier Corp.	1000 Hamilton Blvd., So. Plainfield, N. J.
8	CBN	Central Radio Laboratory	900 E. Keefe Ave., Milwaukee, Wis.
10	CG	General Electric Company	100 Woodlawn Ave., Pittsfield, Mass.
12	CHC	Hamarlund Mfg. Co., Inc.	424 W. 33rd St., New York, N. Y.
16	CFW	Sickles Mfg. Co.	Springfield, Mass.
19	CG	General Electric Company	Schenectady, New York
28	CIR	International Resistance Corp.	401 N. Broad St., Philadelphia, Pa.
45	CRC	Radio Corp. of America	Harrison, New Jersey
58	CER	Erie Resistor Corp.	640 W. 12th St., Erie, Pa.
59	CAO	Ward Lenord Electric Co.	6 South St., Mt. Vernon, N. Y.
65	CG	General Electric Co.	West Lynn, Mass.
102		Allen Manufacturing	133 Sheldon St., Hartford, Conn.
106	CAS	American Lava Corp.	Cherokee Blvd. & Mfgr's Rd., Chattanooga, Tenn.
107	CPH	American Phenolic Corp.	1250 W. Van Buren St., Chicago, Ill.
108	CMH	American Radio Hardware	476 Broadway, New York, N. Y.
109		Anti-Corrosive Metal Products, Inc.	50 River Rd., Castleton-on-Hudson, N. Y.
110	CHH	Arrow, Hart & Hegeman Elec. Co.	102 Hawthorne St., Hartford, Conn.
113	CTB	The Bristol Company	117 Bristol Rd., Waterbury, Conn.
116		Canfield Rubber Company	708 Richard St., Bridgeport, Conn.
117	CMG	Cinch Mfg. Company	2339 West Van Buren St., Chicago, Ill.
137	CG	General Electric Co.	1285 Boston Ave., Bridgeport, Conn.
138	CG	General Electric Co.	1635 Broadway, Fort Wayne, Ind.
148	CBU	Isolantite Incorporated	343 Courtland St., Belleville, N. J.
151	CJC	Howard B. Jones Company	2300 Wabansia Ave., Chicago, Ill.
153	CLF	Littelfuse, Inc.	4765 Ravenswood Ave., Chicago, Ill.
168	CSJ	Stupakoff Ceramic & Mfg. Co.	Hillview Ave., Latrobe, Pa.
184		C. B. Rogers	Danbury, Conn.
189		Ucinite Company	Forestville, Conn.
191		Insulating Fabricators	12 East 12th St., New York, N. Y.
315	CGT	Trumbell Electric	Plainville, Conn.
320		Shakeproof Lockwasher, Inc.	2573 N. Keeler Ave., Chicago, Ill.
325		Wallace Barnes Co.	100 Wallace St., Bristol, Conn.
326		Elastic Stop Nut Co.	2321 Vauxhall Rd., Union, N. J.
337		Tropper Brass Turning Co.	103 Mott St., New York, N. Y.
344		American Automatic Elec. Sales	1031 W. Van Buren St., Chicago, Ill.
358	CEJ	E. F. Johnson	Waseca, Minn.
370		Goodell Company	Antrim, N. H.
371		I. D. Watchcase Company	121 Varick St., N. Y.
376		New Depature	Bristol, Conn.
385		Weidlich Brothers	Connecticut Ave., Bridgeport, Conn.
392		Shakeproof, Inc.	41 Park Row, New York, N. Y.
403		Ostby & Barton	118 Richmond St., Providence, R. I.
412		Great Eastern Brass Co.	36-34th St., Long Island City, N. Y.
438		American Felt Co.	315 Fourth Ave., New York, N. Y.
459		Novelty Tool Co.	Lenox St., Devon, Conn.
465	CEZ	Electronics Mechanics Co.	85 Hazel St., Patterson, N. J.
467		Teckna Plastics	788 Union St., Brooklyn, N. Y.
489	CG	General Electric Co.	Philadelphia, Pa.
490	CG	General Electric Co.	Bloomfield, N. J.
491	CPT	Precision Therometer & Instrument Co.	Philadelphia, Pa.
492	CSO	The States Co.	Hartford, Conn.
493	CCO	Carborundum Co. (Globar Div.)	Niagara Falls, N. Y.
495	CG	General Electric River Works	Lynn, Mass.
497	CRI	Taylor-Instrument Co.	38 Amest St., Rochester, N. Y.
505		Bernard Products	794 East 140th St., New York, N. Y.
513		National Radio Products	Malden, Mass.
531		J. B. Waterfield	Attleboro, Mass.
536		Irvington Varnish & Insulator Co.	Irvington, N. J.
576		Charles E. Crofoot Co.	60 Central St., So. Easton, Mass.
583		The Felters Co., Inc.	214 So. St., Boston, Mass.
588		Western Felt Works	4029 Ogden Ave., Chicago, Ill.
627		Continental Felt Co.	New York, N. Y.
629	CRY	C. P. Clare Co.	4719 Sunnyside Ave., Chicago, Ill.
631		G. Schwolsky	Hartford, Conn.
632		American Machine & Foundry Co.	5522 2nd Ave., Brooklyn, N. Y.
660		Breeze Corp.	Newark, N. J.