

# TM 11-5815-281-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR AND ORGANIZATIONAL  
MAINTENANCE MANUAL

DISTRIBUTOR-TRANSMITTER  
SET, TELETYPEWRITER  
AN/GGC-9



*HEADQUARTERS, DEPARTMENT OF THE ARMY*  
*23 FEBRUARY 1962*



## WARNING

### DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working on the 115-volt ac motor circuit, the signal line circuits, and 120-volt dc power supply circuit. Serious injury or death may result from contact with these circuits. Turn off the power and discharge all high-voltage capacitors before making any connections or replacing any parts inside the equipment.

**DON'T TAKE CHANCES!**

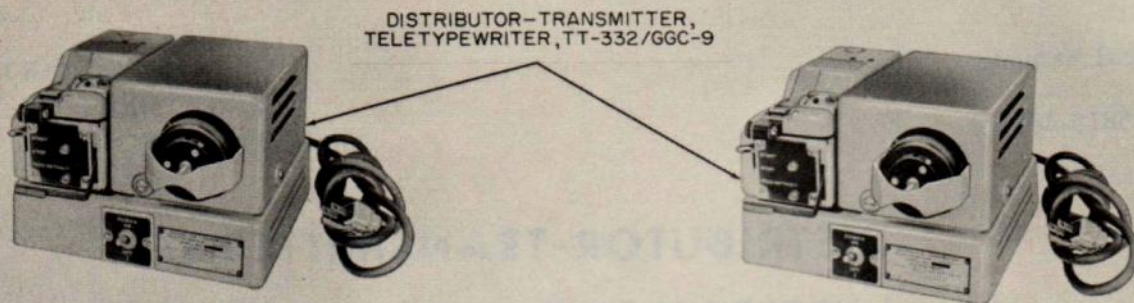
Technical Manual  
 No. 11-5815-281-12

HEADQUARTERS,  
 DEPARTMENT OF THE ARMY  
 WASHINGTON 25, D. C., 23 February 1962

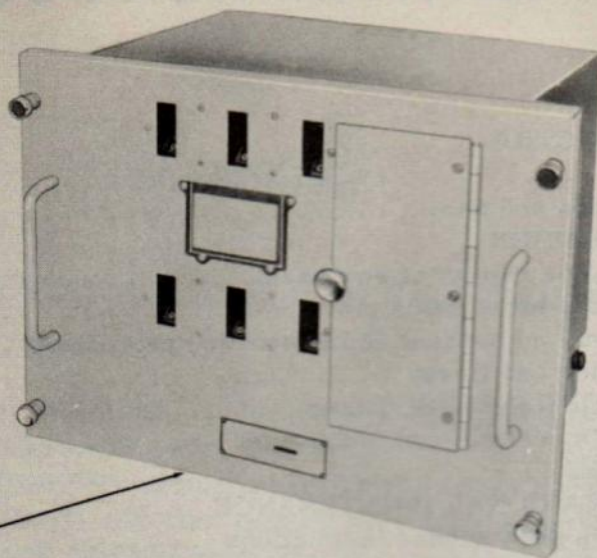
## DISTRIBUTOR-TRANSMITTER SET, TELETYPEWRITER AN/GGC-9

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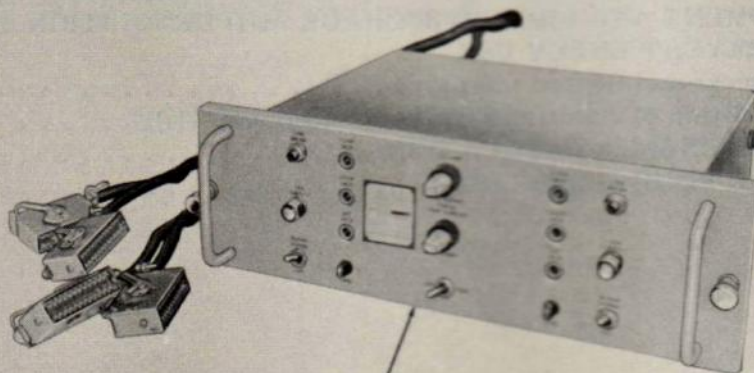




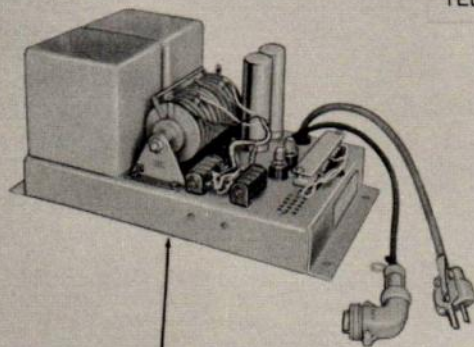
DISTRIBUTOR-TRANSMITTER,  
TELETYPEWRITER, TT-332/GGC-9



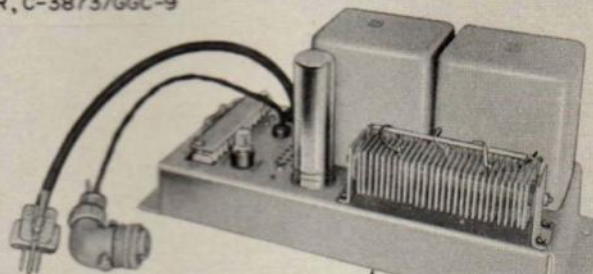
NUMBERING UNIT,  
TELETYPEWRITER,  
MESSAGE, MX-3650/GGC-9



CONTROL,  
DISTRIBUTOR-TRANSMITTER,  
TELETYPEWRITER, C-3873/GGC-9



POWER SUPPLY, PP-3131/GGC-9



POWER SUPPLY, PP-1801/FG

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Figure 1. Distributor-Transmitter Set, Teletypewriter AN/GGC-9,  
less cable assemblies and running spares.

# CHAPTER 1

## INTRODUCTION

### Section I. GENERAL

#### 1. Scope

This manual describes Distributor-Transmitter Set, Teletypewriter AN/GGC-9 and covers its installation, operation, and organizational maintenance. It includes normal operating procedures, cleaning and inspection of the equipment, and replacement of parts available to first and second echelon maintenance personnel.

#### 2. Forms and Records

*a. Unsatisfactory Equipment Reports.* Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) as specified in AR 700-38.

*b. Report of Damaged or Improper Shipment.* Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army).

*c. Preventive Maintenance Forms* (fig. 26 and 27). Prepare DA Form 11-252

(Maintenance Check List for Signal Equipment (Teletypewriter)) in accordance with instructions on the form.

*d. Parts List Form.* Fill out and forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9), direct to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS-MLM, Fort Monmouth, N. J. to recommend changes in, or to comment on, Basic Issue Items List or Repair Parts and Special Tools Lists.

*e. Comments on Manual.* Forward all other comments on this publication direct to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS-PA2d, Fort Monmouth, N. J.

*f. Index of Equipment Publications.* Refer to DA Pamphlet 310-4 to determine what Changes to, or revisions of, this publication are current.

### Section II. DESCRIPTION AND DATA

#### 3. Purpose and Use

*a. Distributor-Transmitter Set, Teletypewriter AN/GGC-9* transmits teletypewriter messages from perforated tape. It also transmits message identification and processing information consisting of channel designating letters, message numbers, and message processing information for either automatic or semiautomatic teletypewriter switching systems.

*b. The AN/GGC-9* is used in mobile communications centers. The MX-3650/GGC-9 and the C-3873/GGC-9 are usually rack mounted. The two TT-322/GGC-9's, the PP-3131/GGC-9, and the PP-1801/FG are usually mounted on shelves. Each TT-322/GGC-9 is associated with a separate

signal line circuit. Gear sets for 60- and 100-word per minute (wpm) are supplied with the set. Gear sets for 66- or 75-wpm may be obtained through normal supply channels.

#### 4. Technical Characteristics

*a. Distributor-Transmitter Set, Teletypewriter AN/GGC-9.*

Power input requirement	Approx 4 amperes, 105- to 125-volt, 50- to 60-cycle, single-phase, ac.
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Signaling code . . .	Five-unit, start-stop; stop impulse length equals start impulse length multiplied by 1.42.
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Type of signals . . Neutral (20 or 60 ma).  
Speed:

Operations 368.1, 404<sup>a</sup>, 460<sup>a</sup>, or  
per minute 600.  
Words per 60,66<sup>a</sup>, 75<sup>a</sup>, or 100.  
minute

Total weight of 133-1/2 lb.  
components

**b. Distributor-Transmitter, Teletypewriter TT-322/GGC-9.**

Motor type . . . . . Series-governed.  
Motor speed . . . . . 3,600 rpm.  
Tape width . . . . . 7/8 and 11/16 inch.  
Power 105- to 125-volt, 50-  
requirement to 60-cycle, single-  
phase, ac input.  
Transmitted Less than 5 percent.  
signal bias

**c. Numbering Unit Teletypewriter Message MX-3650/GGC-9.**

Numbering range . 001 to 999.  
Power input 48-volt dc.  
requirement

**d. Control, Distributor-Transmitter, Teletypewriter C-3873/GGC-9.**

Power input 48-volt dc (filtered  
requirement and unfiltered); 120-  
volt dc; and 105- to  
125-volt ac.

Number of lines Two.  
served

**e. Power Supply PP-3131/GGC-9.**

Power input 105- to 125-volt, 50-  
requirement to 60-cycle, single-  
phase, ac.  
Output . . . . . 48-volt unfiltered dc;  
48-volt filtered dc;  
150-volt filtered dc.

**f. Power Supply PP-1801/FG.**

Power input 105- to 125-volt, 50-  
requirement to 60-cycle, single-  
phase, ac.  
Output . . . . . 120-volt filtered dc.

**5. Components of Distributor-Transmitter Set, Teletypewriter AN/GGC-9.**

**a. Components.**

Quantity	Item	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
2	Distributor-Transmitter, Teletypewriter TT-322/GGC-9	6-1/2	11-1/2	9-1/2	19-1/2
1	Numbering Unit, Teletypewriter, Message MX-3650/GGC-9	12-1/2	14	17-1/2	31
1	Control, Distributor-Transmitter, Teletypewriter C-3873/GGC-9	5-1/2	14	17-1/2	26
1	Power Supply PP-3131/GGC-9	7	15-1/2	8-1/4	33-1/2
1	Power Supply PP-1801/FG	6-1/2	6	15	23-1/2
1	Cable Assembly, Special Purpose, Electrical, Branched CX-7640/GGC-9				
1	Cable Assembly, Power, Electrical, Branched CX-7641/GGC-9				
2	Cable Assembly, Special Purpose, Electrical CX-7642/GGC-9				
1	Cable Assembly, Power, Electrical CX-7643/U				
2	TM 11-5815-281-12				
1 set	Running spares (b below)				

**b. Running Spares.**

Quantity	Item
15	Fuse, 1.6 ampere, 115 v
5	Fuse, 2 ampere, 125 v
5	Fuse, 0.3 ampere, 250 v
1	Worm, 100 wpm
1	Worm gear, 100 wpm

<sup>a</sup>Spare gear sets for this operational speed must be separately procured.

**6. Common Names**

To avoid continuous repetition of nomenclature throughout the manual, common names have been assigned to the items listed below:

Item	Common name
Distributor-Transmitter Set, Teletypewriter AN/GGC-9	Distributor set



Item	Common name
Distributor-Transmitter, Teletypewriter TT-322/GGC-9	Transmitter
Numbering Unit, Teletypewriter, Message MX-3650/GGC-9	Numbering base
Control, Distributor-Transmitter, Teletypewriter C-3873/GGC-9	Control base
Power Supply PP-3131/GGC-9	48-volt power supply
Power Supply PP-1801/FG	120-volt power supply

### 7. Description of Distributor-Transmitter Set, Teletypewriter AN/GGC-9 (fig. 1)

The distributor set consists of two Distributor-Transmitters, Teletypewriter TT-322/GGC-9; one Numbering Unit, Teletypewriter, Message MX-3650/GGC-9; one Control, Distributor-Transmitter, Teletypewriter C-3873/GGC-9; one Power Supply PP-3131/GGC-9; and one Power Supply PP-1801/FG. The transmitters, numbering base, and control base are enclosed to prevent dirt from entering the operating mechanisms. The numbering and control bases are usually mounted in

vertical, racks. The power supplies and transmitters have holes for mounting to suitable horizontal surfaces.

### 8. Description of Distributor-Transmitter, Teletypewriter TT-322/GGC-9. (fig. 2)

Distributor-Transmitter, Teletypewriter TT-322/GGC-9 consists of a mounting base, a transmitter mechanism, and a motor. The transmitter mechanism is mounted on the left of the mounting base and is enclosed with dust covers. The controls are at the front of the transmitter. The motor is mounted on the right of the mounting base and has a louvered dust cover. The governor portion of the motor extends through the front of the dust cover to permit convenient motor speed adjustment. A control switch is on the front of the mounting base. The dust covers and base are painted light gray.

### 9. Description of Numbering Unit, Teletypewriter, Message MX-3650/GGC-9. (fig. 3)

Numbering Unit, Teletypewriter.



Figure 2. Distributor-Transmitter, Teletypewriter TT-322/GGC-9.



Message MX-3650/GGC-9 is equipped with four captive mounting screws and two handles at the front for rack mounting. The front panel has two horizontal sets of message number indicator openings. A door on the front panel protects the numbering controls from accidental operation. Four plugs at the rear of the numbering base facilitate cable connections.

#### 10. Description of Control, Distributor-Transmitter, Teletypewriter C-3873/GGC-9.

(fig. 4)

Control, Distributor-Transmitter, Teletypewriter C-3873/GGC is equipped with two captive mounting screws and two handles at the front for rack mounting. The switches, controls, and fuses for the equipment are mounted on the front panel. Signal line terminals and the cables and jacks required for interconnection to the associated components are mounted on the rear panel.

#### 11. Description of Power Supply PP-3131/GGC-9.

(fig. 5)

Power Supply PP-3131/GGC-9 consists of a transformer, and inductor, rectifiers, capacitors, fuses, and a terminal board mounted on a formed, sheet-metal base. Other components are mounted within the base. A power cord and an output cord are provided for input and output connections.

#### 12. Description of Power Supply PP-1801/FG

(fig. 6)

Power Supply PP-1801/FG consists of a transformer, inductor, rectifier, capacitor, fuse, and terminal board mounted on a formed, sheet-metal base. Other components are mounted within the base. A power cord and an output cord are provided for input and output connections.

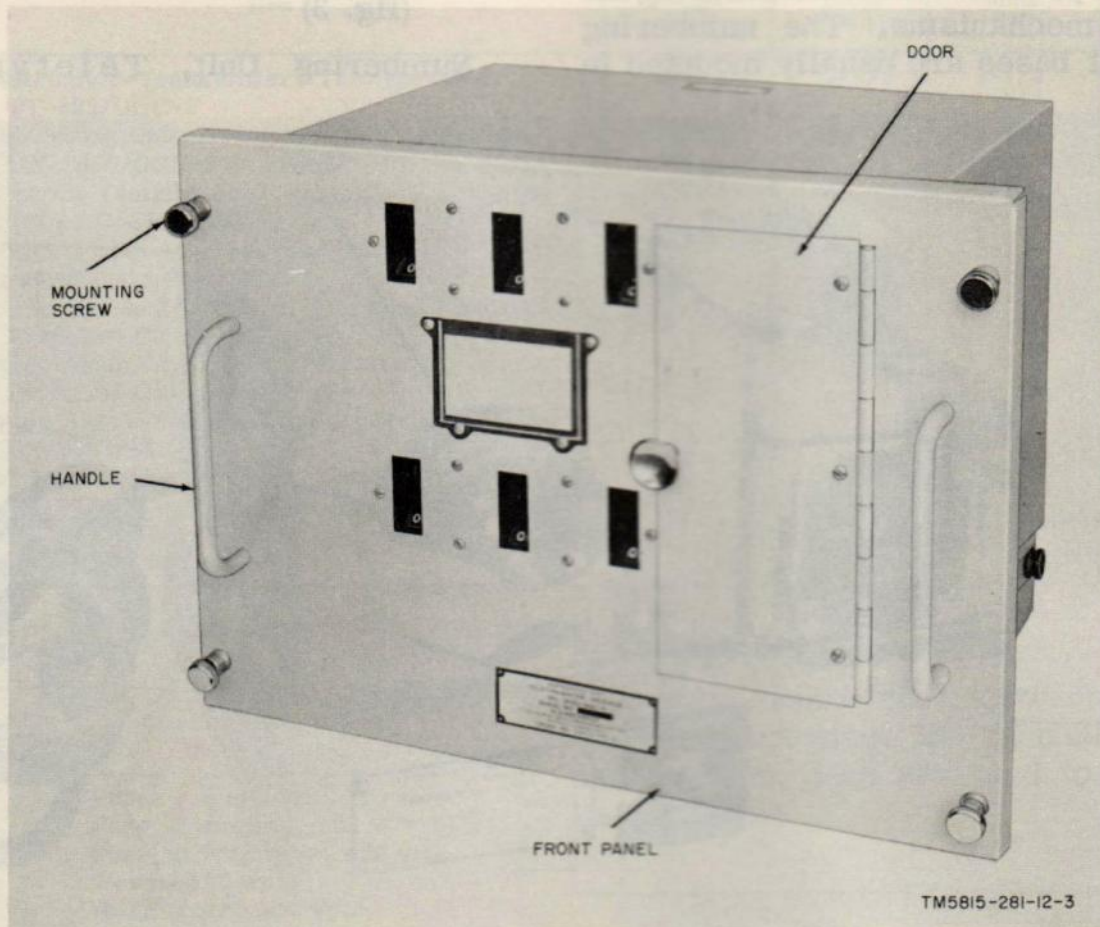


Figure 3. Numbering Unit, Teletypewriter, Message, MX-3650/GGC-9.



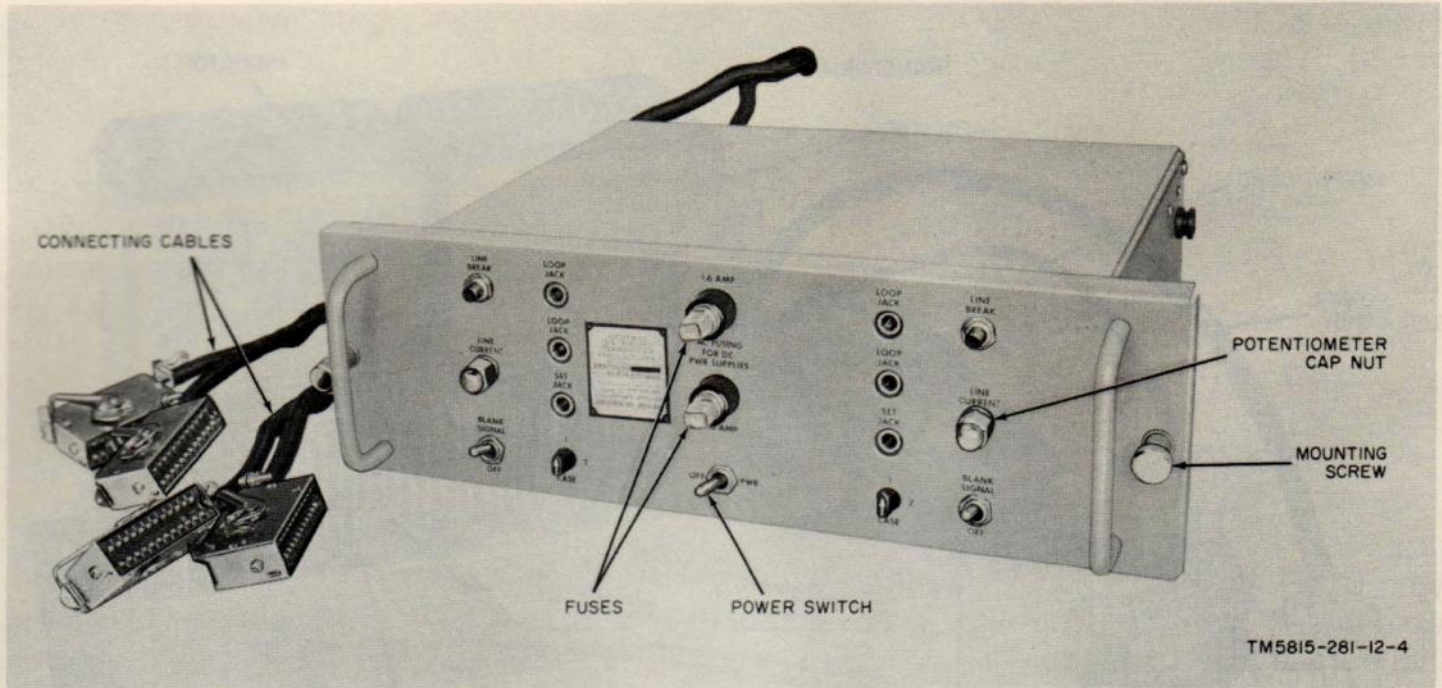


Figure 4. Control, Distributor-Transmitter, Teletypewriter C-3873/GGC-9.

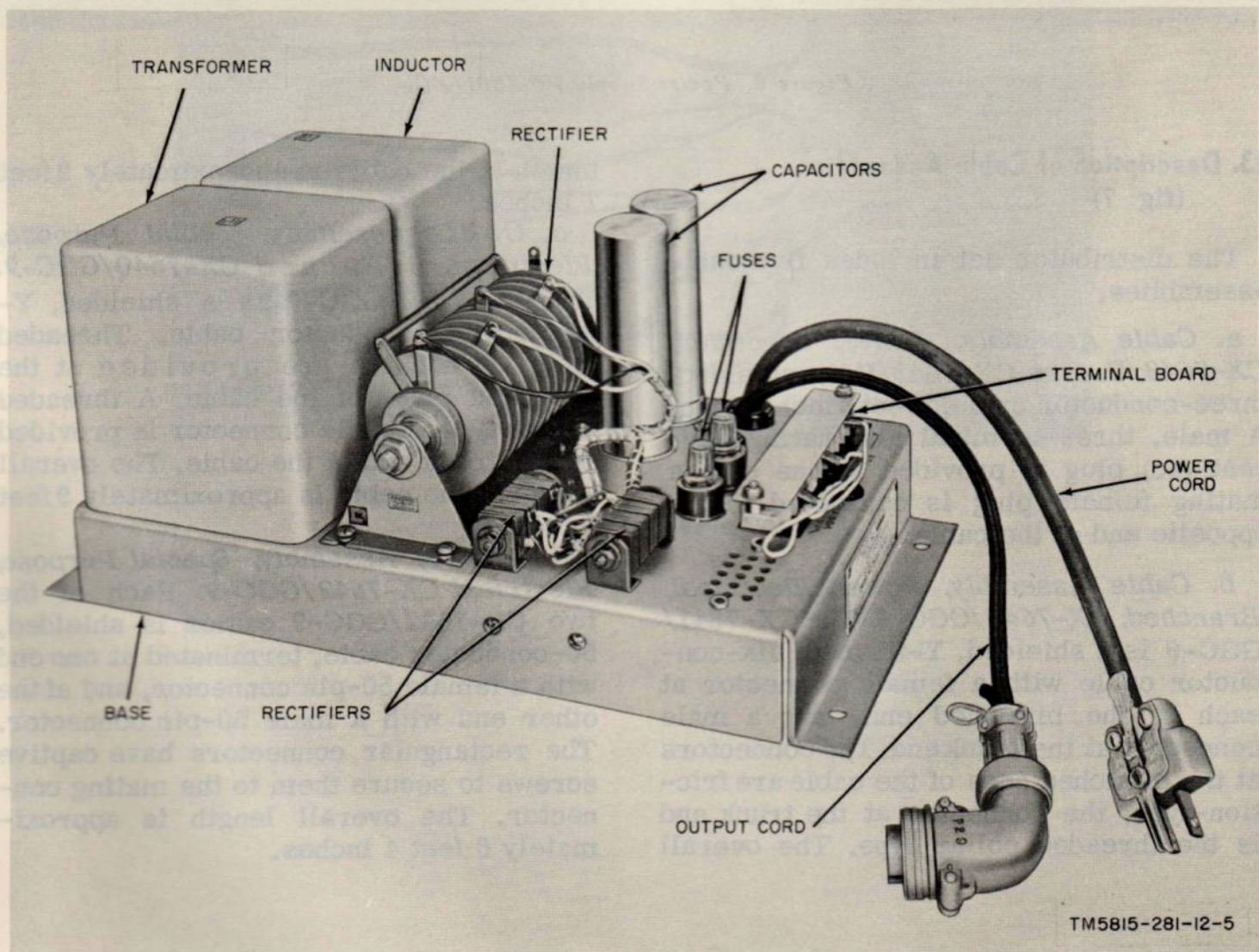


Figure 5. Power Supply PP-3131/GGC-9.



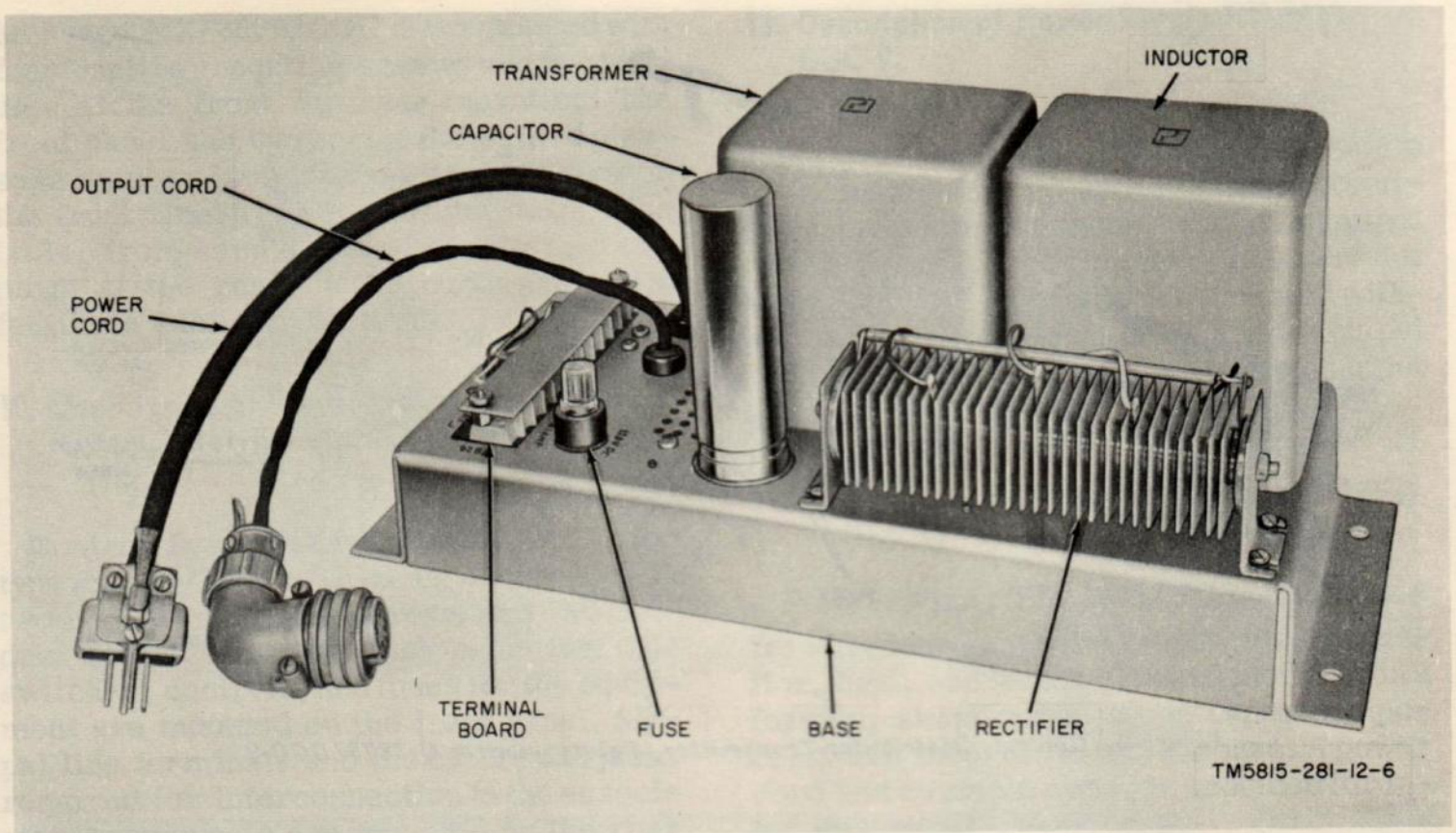


Figure 6. Power Supply PP-1801/FG.

### 13. Description of Cable Assemblies (fig. 7)

The distributor set includes five cable assemblies.

a. *Cable Assembly, Power, Electrical CX-7643/U.* The CX-7643/U is a shielded, three-conductor cable, 7 feet 3 inches long. A male, three-terminal alternating-current (ac) plug is provided at one end; a mating female plug is connected to the opposite end of the cable.

b. *Cable Assembly, Power, Electrical, Branched, CX-7641/GGC-9.* The CX-7641/GGC-9 is a shielded, Y-formed, six-conductor cable with a female connector at each of the branched ends and a male connector at the trunk end. The connectors at the branched ends of the cable are friction-type; the connector at the trunk end is the threaded collar type. The overall

length of the cable is approximately 9 feet 7 inches.

c. *Cable Assembly, Special Purpose, Electrical, Branched CX-7640/GGC-9.* The CX-7640/GGC-9 is a shielded, Y-formed, 11-conductor cable. Threaded male connectors are provided at the branched ends of the cable. A threaded collar-type, female connector is provided at the trunk end of the cable. The overall length of the cable is approximately 9 feet 7 inches.

d. *Cable, Assembly, Special Purpose, Electrical CX-7642/GGC-9.* Each of the two CX-7642/GGC-9 cables is shielded, 50-conductor cable, terminated at one end with a female 50-pin connector, and at the other end with a male 50-pin connector. The rectangular connectors have captive screws to secure them to the mating connector. The overall length is approximately 6 feet 4 inches.



# CHAPTER 2 INSTALLATION

## Section I. SERVICE UPON RECEIPT OF EQUIPMENT

Note: The information in this chapter is intended for installation personnel only.

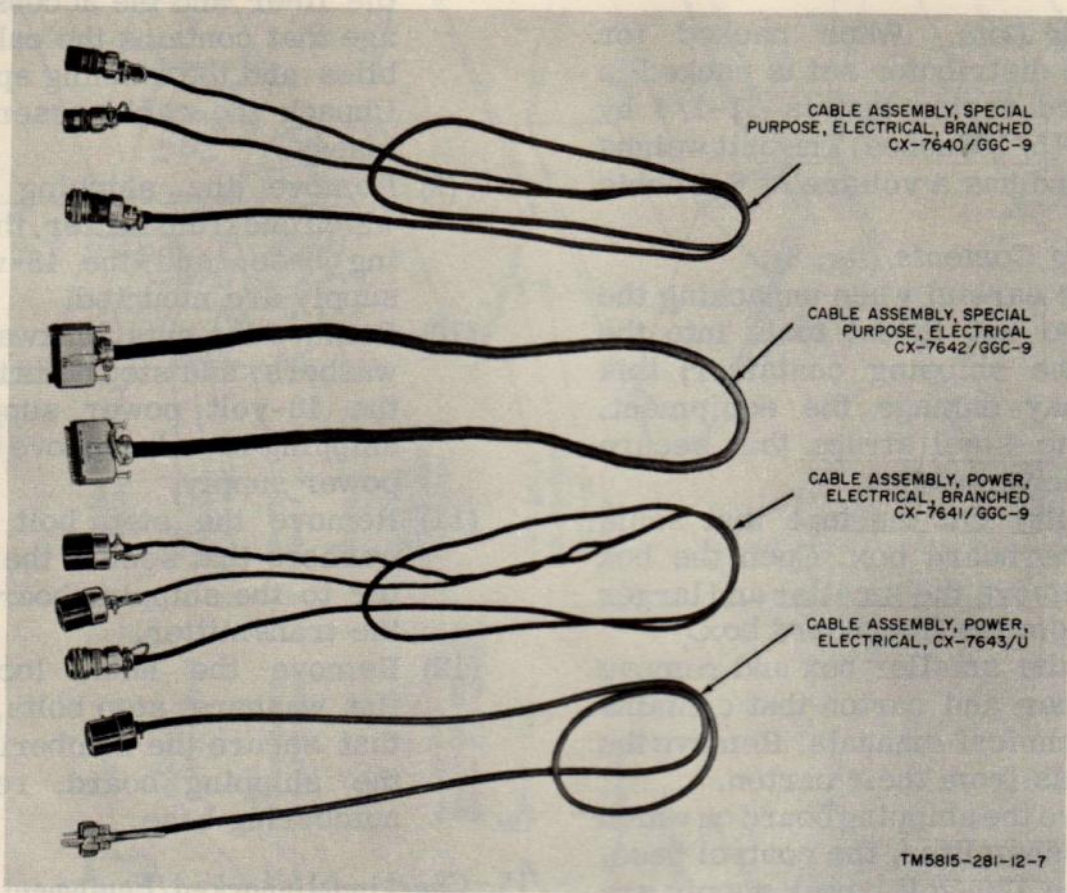


Figure 7. Cable assemblies.



## CHAPTER 2

# INSTALLATION

### Section I. SERVICE UPON RECEIPT OF EQUIPMENT

*Note:* The information in this chapter is for use by installation personnel only.

#### 14. Unpacking

*a. Packaging Data.* When packed for shipment, the distributor set is packed in one fiberboard carton that is 31-1/4 by 20-3/4 by 21-15/16 inches. The unit weighs 165 pounds and has a volume of 8.4 cubic feet.

*b. Removing Contents* (fig. 8).

**Caution:** Be careful when unpacking the equipment. Do not thrust tools into the interior of the shipping container; this procedure may damage the equipment.

- (1) Cut the steel straps that secure the fiberboard box.
- (2) Carefully cut the tape that seals the fiberboard box. Open the box and remove the smaller and larger box from the fiberboard box.
- (3) Open the smaller box and remove the liner and carton that contains the technical manuals. Remove the manuals from their carton.
- (4) Remove the shipping board on which one transmitter, the control base, and the 120-volt power supply are mounted.
- (5) Remove the nuts, lockwashers, flat washers, and step bolts that secure the 120-volt power supply to the shipping board; remove the 120-volt power supply.
- (6) Remove the step bolts and lockwashers that secure the transmitter to the shipping board; remove the transmitter.
- (7) Remove the nuts, lockwashers, flat washers, step bolts, and clips that secure the control base to the shipping board. Lift the control base from the shipping board and remove the protective paper from the jacks on the ends of the cables.
- (8) Open the larger box and remove

the liner and the accessory package that contains the cable assemblies and the running spare fuses. Unpack the cable assemblies and fuses.

- (9) Remove the shipping board on which one transmitter, the numbering base, and the 48-volt power supply are mounted.
- (10) Remove the nuts, lockwashers, flat washers, and step bolts that secure the 48-volt power supply to the shipping board; remove the 48-volt power supply.
- (11) Remove the step bolt and lockwashers that secure the transmitter to the shipping board; remove the transmitter.
- (12) Remove the nuts, lockwashers, flat washers, step bolts, and clips that secure the numbering base to the shipping board; remove the numbering base.

#### 15. Checking Unpacked Equipment

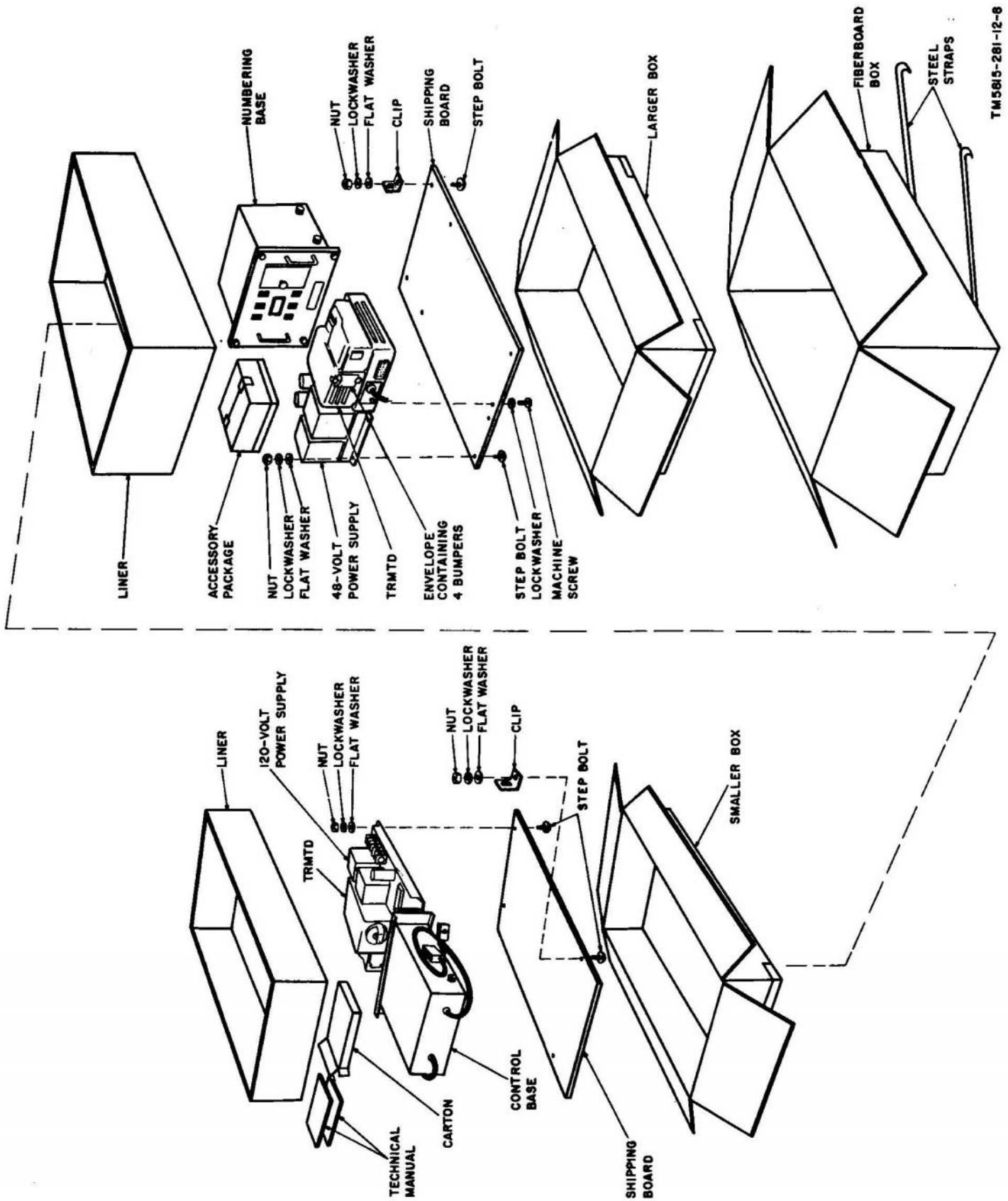
Check the equipment against the table of components (para 5) or the basic issue item list (appx II). The list indicates the accessories, attachments, and component assemblies which constitute the complete equipment.

#### 16. Siting

Consider the following when selecting a site for the distributor set:

- a.* A space of at least 30 inches in front of the distributor set is required for operation of the set.
- b.* A 105- to 125-volt, 50- to 60-cycle, alternating-current source is required for operation of the equipment.
- c.* Adequate lighting is required for both day and night operation.





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Figure 8. Distributor set packed for shipment.



## Section II. PRELIMINARY INSTALLATION PROCEDURES

### 17. Tools, Test Equipment, and Materials

The following tools, test equipment, and materials are required for installation of the distributor set but are not furnished as part of the set:

- a. Tool Equipment TE-50-B.
- b. Multimeter TS-352/U.
- c. A teletypewriter receiver, preferable a page printer equipped with a telephone-type plug for a signal connection.
- d. The only material required is Oil, Lubricating, Federal stock No. 9150-K60-4297.

### 18. Assembly of Components (fig. 9)

a. The numbering base and control base are designed to be mounted in a vertical-type metal rack. To mount these units, position them on the rack and secure them by tightening the captive screws on the front panels.

b. The power supplies are designed to be base mounted with four mounting screws. They are normally mounted in a horizontal

position. Insert the screws from the top downward into the base.

c. The transmitter bases are provided with tapped mounting holes to secure the unit to a table or shelf. Insert the screws from under the table or shelf upward into the mounting holes in the transmitter base. If the installation does not require the transmitters to be anchored, install the four rubber bumpers provided with the equipment.

### 19. Interunit Cable Connections

All plugs and jacks on the components are clearly identified as indicated in figure 10. Connect each numbered plug to its like-numbered jack. Jacks J1 through J4 should be secured to their mating plugs as shown in figure 11.

### 20. Fuse Check

The distributor set is shipped with fuses installed. Check the value of each of the fuses listed in the chart below before applying power.

Component	Circuit	Fuse symbol	Fuse rating		Reference illustration
			Amp	Volts	
Control base	48-volt power supply ac input	F5	1.6	115	12
Control base	120-volt power supply ac input	F4	1.6	115	12
48-volt power supply	Unfiltered output	F1	2	125	13
48-volt power supply	Filtered output	F2	2	125	13
120-volt power supply	120-volt output	F3	0.3	250v	14
Transmitter	Motor circuit	F1	1.6	115	15
Transmitter	Motor circuit	F2	1.6	115	15

### 21. Ground and Power Connections

a. *Ground Connections.* Connect a wire lead from an unpainted portion of the control base to a low-resistance ground connection.

b. *48-Volt Power Supply Adjustment.* Adjust the 48-volt power supply transformer taps and connect power to the distributor set as follows:

- (1) Set the POWER switch of the transmitter (fig. 2) to OFF.

- (2) Set the control base power switch (fig. 4) to OFF.
- (3) Use a voltmeter and check the voltage at the ac source.
- (4) Remove the cover from terminal board TB25 (fig. 13) on the 48-volt power supply. Check to see that the white ac line voltage on the terminal board is connected to the terminal (105, 115, or 125) that corresponds most closely to the voltage reading obtained as



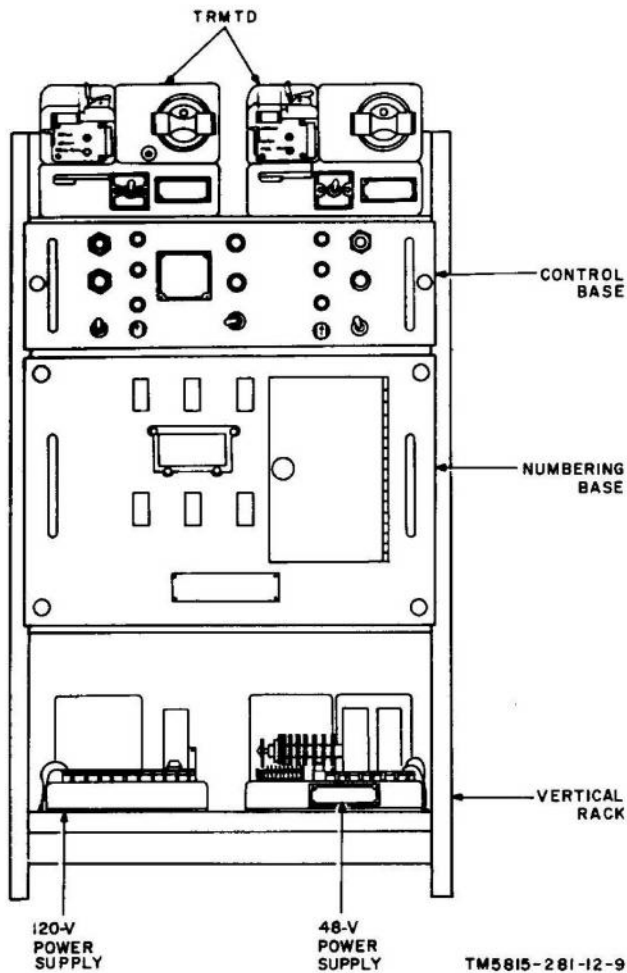


Figure 9. Typical distributor set installation.

instructed in (3) above. If the voltage reading is midway between two of these readings, connect the white lead to the higher-numbered terminal.

- (5) Insert the plug of the ac input cable on the control base (fig. 10) into the ac power source. Set the control base power switch at PWR (fig. 4), to energize the 48-volt power supply.
- (6) Disconnect jack J29 from plug P29. Check the direct-current (dc) output across pins F and G of plug P29. The correct no-load output reading is 54 volts. If adjustment is necessary, turn the power switch on the control base to OFF before adjusting the output ((7) and (8) below).
- (7) The dc output is adjustable. Coarse adjustments are made by moving the yellow lead connected to 79, 72,

or 65 of TB25. Fine adjustments are made by moving the position of the yellow-white lead connected to 8, 6, 4, 2, or  $\pm$  of TB25. Adjust the position of the leads, as required, to obtain the output nearest the desired output of 54 volts.

- (8) After an adjustment, turn the power switch on the control base to PWR and recheck the output across pins F and G of plug P29. If necessary, turn the power switch on the control base to OFF and readjust.

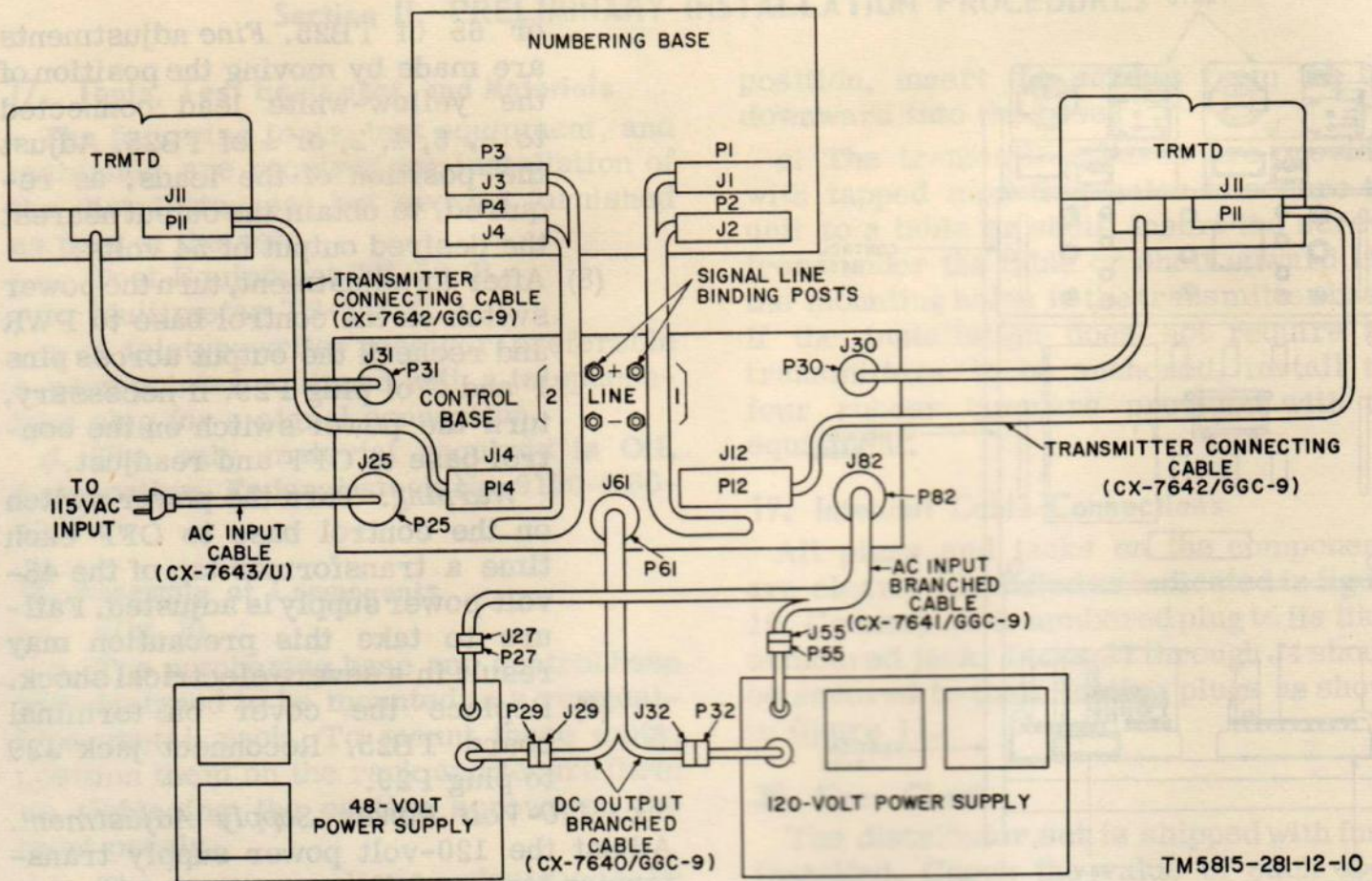
**Warning:** Turn the power switch on the control base to OFF each time a transformer tap of the 48-volt power supply is adjusted. Failure to take this precaution may result in a severe electrical shock.

- (9) Replace the cover on terminal board TB25. Reconnect jack J29 to plug P29.

c. **120-Volt Power Supply Adjustment.** Adjust the 120-volt power supply transformer taps as follows:

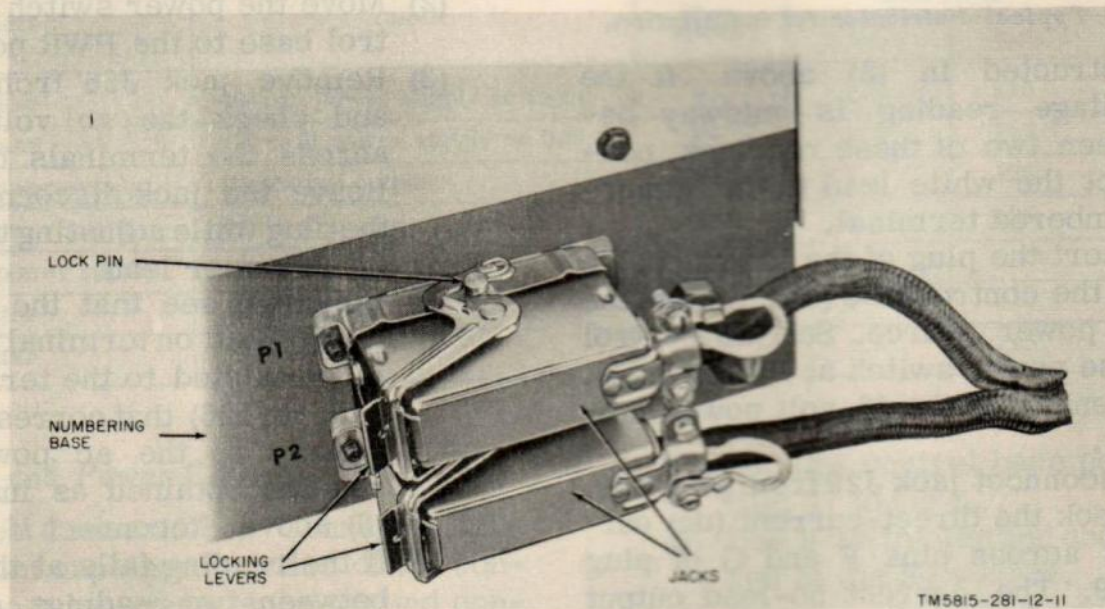
- (1) Remove the cover from terminal board TB26 (fig. 14) on the 120-volt power supply.
- (2) Move the power switch of the control base to the PWR position.
- (3) Remove jack J55 from plug P55 and check the ac voltage output across the terminals of jack J55. Leave the jack disconnected from the plug while adjusting the primary transformer lead.
- (4) Check to see that the white (primary) lead on terminal board TB26 is connected to the terminal (105, 115, or 125) that corresponds most closely to the ac power source reading obtained as instructed in (3) above. Reconnect if necessary. If the reading falls at the midpoint between two readings, connect the lead to the higher-numbered terminal.
- (5) Connect jack J55 to plug P55 and disconnect jack J32 from plug P32. Use a voltmeter and check to see that the dc output of the power supply across terminals A and B of plug P32 is 120 volts. If the reading





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Figure 10. Distributor-Transmitter Set, Teletypewriter AN/GGC-9, cabling diagram.



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Figure 11. Interconnecting jacks, locking device.

is not 120 volts, turn the power switch on the control base to OFF and move the black-green lead connected to the coarse adjustment terminal (160, 170, or 180) of TB26. Move the black-green lead to a

higher-numbered terminal to increase the voltage output; move the lead to a lower-numbered terminal to decrease the voltage output.

(6) Turn the power switch on the



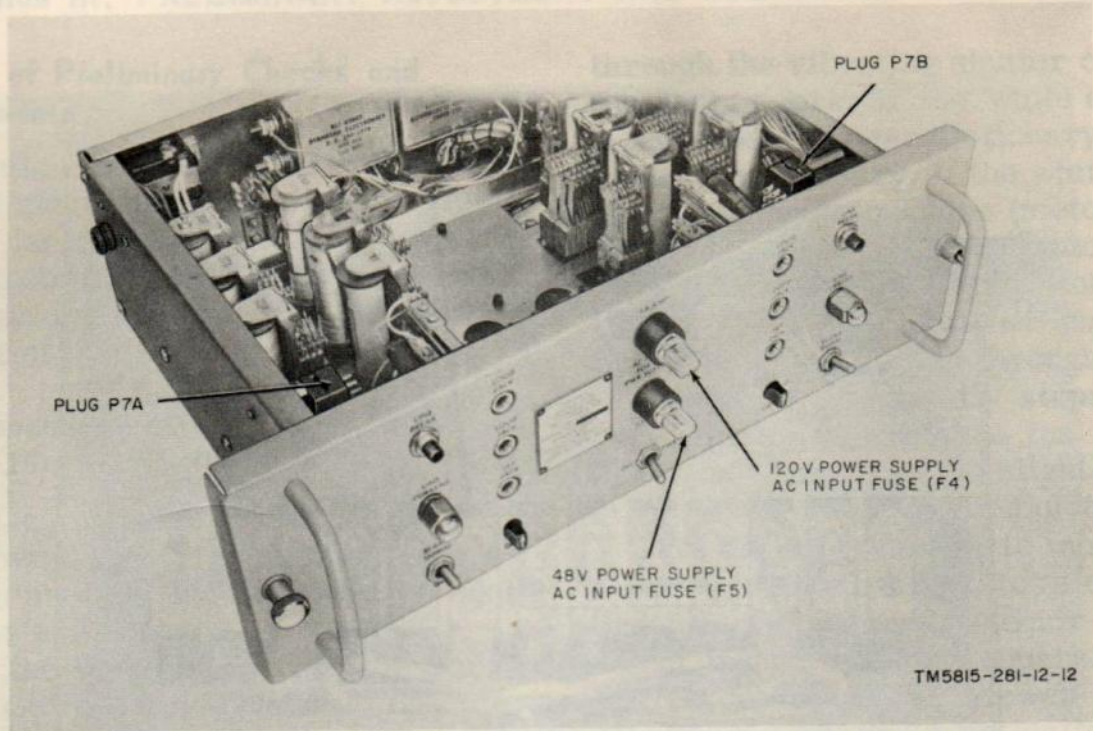


Figure 12. Control base fuse locations.

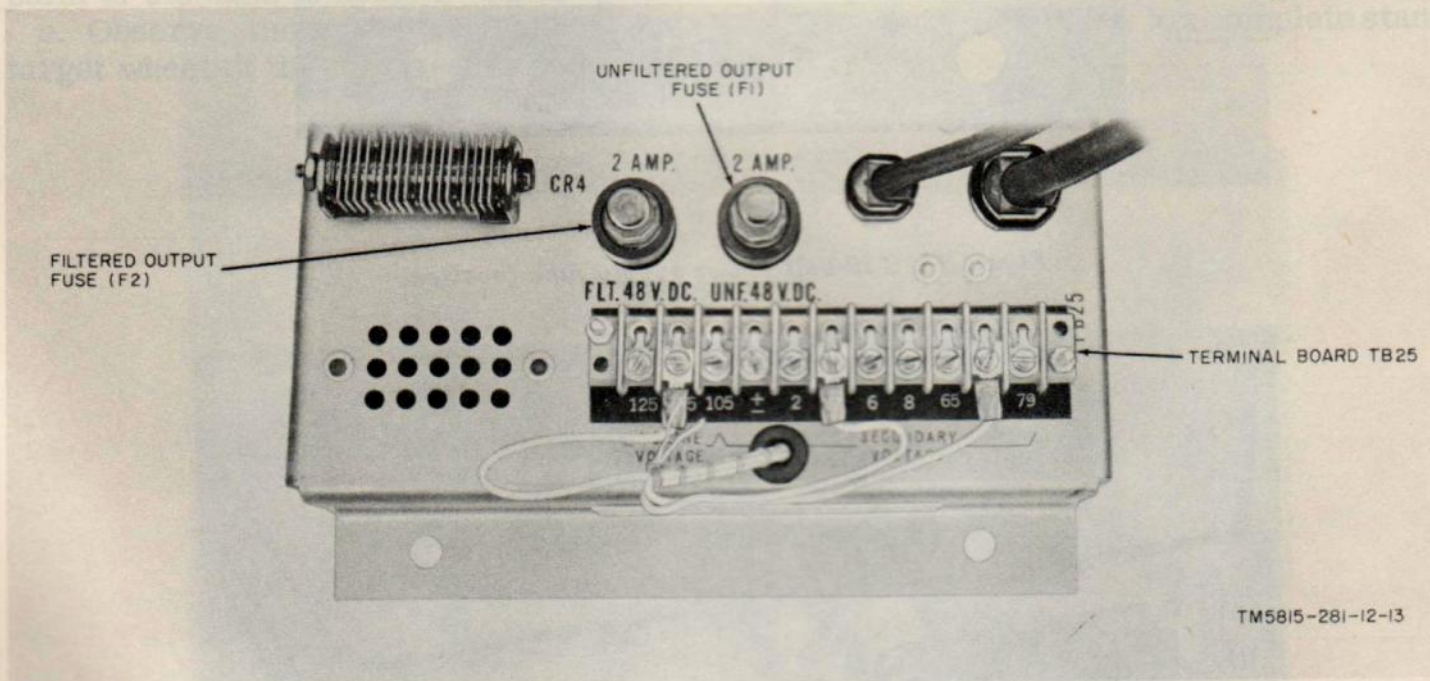


Figure 13. 48-volt power supply fuse locations.

control base to PWR and recheck the output across terminals A and B of plug P32. If necessary, operate the power switch on the control base to OFF and move the yellow-violet lead connected to the fine adjustment terminal ( $\pm$ , 2, 4, 6, or 8) on TB26 to secure the correct no-load output of 120 volts.

**Warning:** Turn the power switch on the control base to OFF before adjusting the position of a transformer tap of the 120-volt power supply. Failure to observe this precaution may result in severe electrical shock.

- (7) Replace the cover on terminal board TB26 and reconnect jack J32 and plug P32.



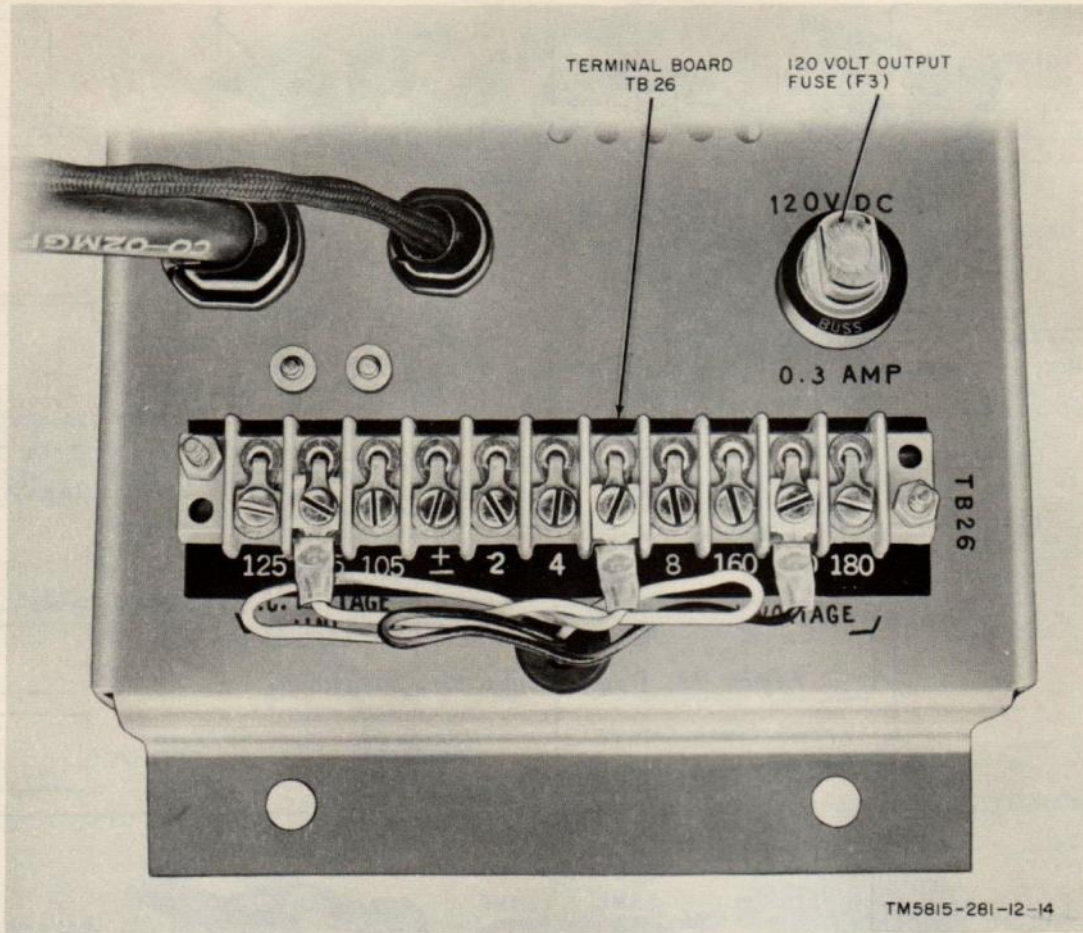


Figure 14. 120-volt power supply fuse location.

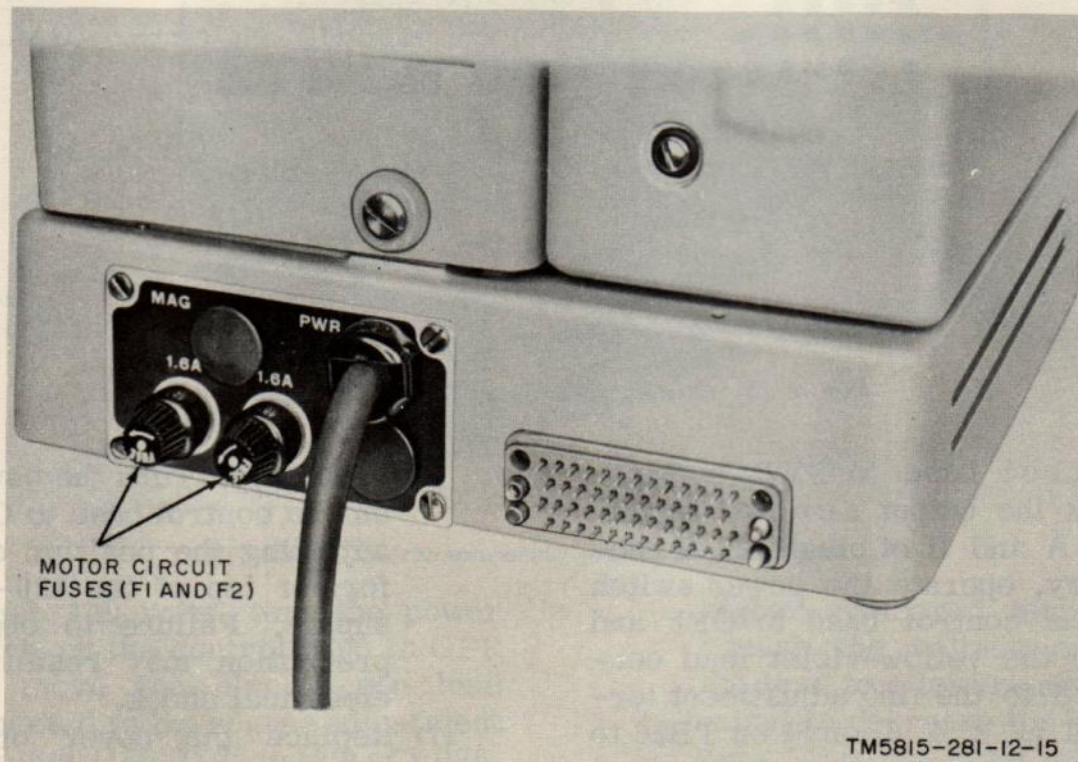


Figure 15. Transmitter fuse locations.



## Section III. PRELIMINARY ADJUSTMENT AND LUBRICATION PROCEDURES

### 22. Extent of Preliminary Checks and Adjustments

This section covers checks and adjustments that must be made before the equipment can be operated or installed in a working circuit. A preliminary adjustment of the motor speed should be made before adjustment of the friction clutches.

### 23. Motor Speed Adjustment (fig. 16)

With the equipment connected (para 19) and the power switch on the control base at PWR adjust the motor speed of each transmitter as follows:

- a. Move the POWER switch on the transmitter to ON. The motor should operate.
- b. Strike a shuttered 180-vibration-per-second (vps) tuning fork gently against the palm of the hand to start it vibrating.
- c. Observe the spots on the rotating target wheel of the series-governed motor

through the vibrating shutter on the end of the tuning fork. If the white spots on the target wheel appear stationary, no adjustment is necessary. If the white spots appear to move clockwise (motor speed too fast), pull the end of the motor-governor adjustment worm outward. Hold it out until the apparent clockwise motion of the target spots as viewed through the vibrating shutter, practically stops. To avoid overadjustment, release the motor-governor adjustment worm slightly before the target spots come to a complete standstill.

d. If the spots appear to move counter-clockwise (motor speed too slow), push the end of the motor-governor adjustment worm inward until the apparent motion of the target spots, as viewed through the vibrating shutter, practically stops. To avoid overadjustment, release the motor-governor adjustment worm slightly before the target spots come to a complete standstill.

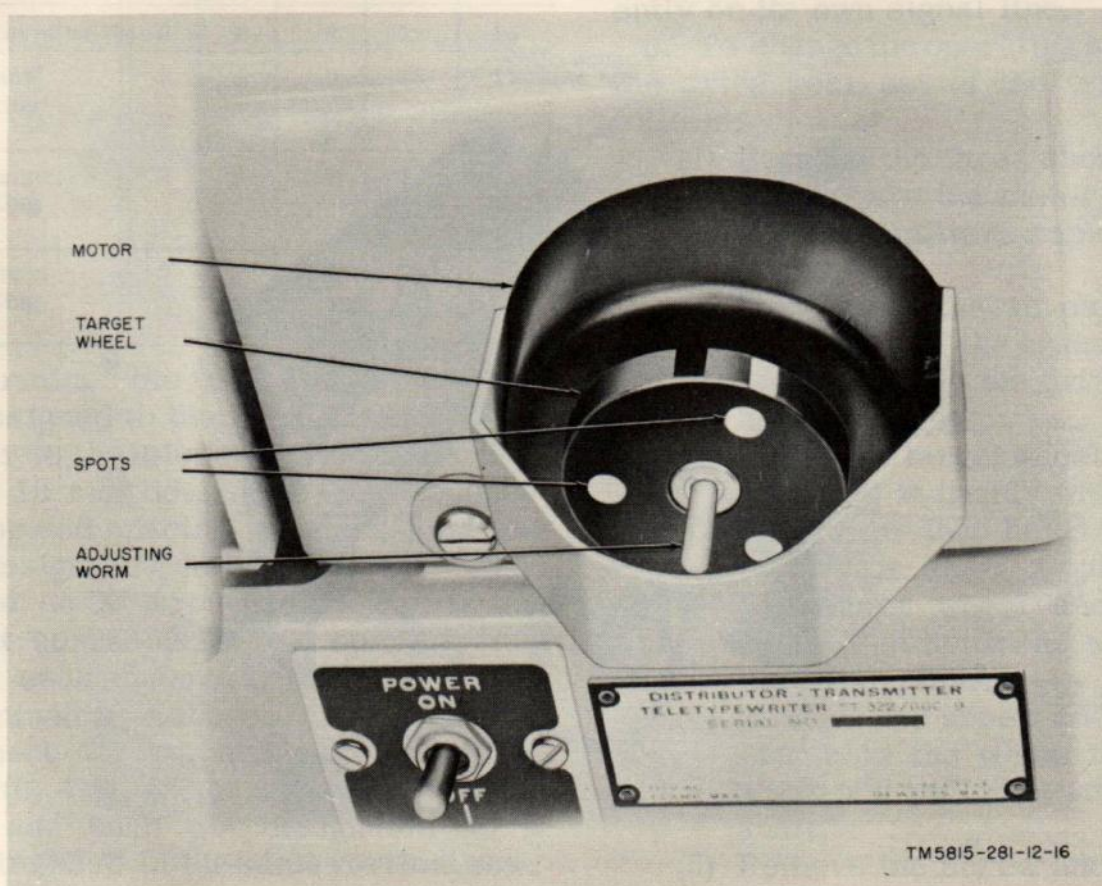


Figure 16. Motor-governor adjustment.



## 24. Lubrication of Friction Clutches

a. *Recommended Lubricants.* The recommended lubricant for the equipment is Oil, Lubricating, FSN 9150-K60-4297.

b. *Lubrication.* Remove the three shoulder screws that secure the motor dust cover on the transmitter; remove the dust cover. Apply 10 to 15 drops of oil on each felt washer (fig. 17) in the friction clutch assemblies. Wipe off any excess oil with a cloth.

## 25. Friction Clutch Adjustment (fig. 18)

a. *Requirement.* Enough tension should be applied to the friction clutch to insure complete and proper rotation of the transmitter camshaft assembly.

b. *Method of Checking.* Insert a message tape into the transmitter as for normal transmission. Operate the stop-start lever from the STOP to the START position and back to STOP several times and check the requirement, then allow the transmitter to run continuously and recheck the requirement.

c. *Adjustment.* Loosen the machine screws in the friction adjusting collar. Turn the collar to decrease the tension of the friction clutch spring until the transmitter camshaft does not rotate properly. Turn the collar of the friction clutch in the opposite direction until the clutch does operate properly. Turn the collar another one-half to three-quarter turn tighter. Tighten the machine screws. Recheck the requirement.

## 26. Strapping for Channel Designating Letters

The numbering base will automatically transmit three channel designating letters for each channel when the correct straps are installed on plug P7A associated with transmitter A and plug P7B associated with transmitter B. The channel designating letters are used to identify the message at the receiving station. Any three letters of the alphabet may be transmitted, as required. Strap the plugs individually following the procedure outlined below:

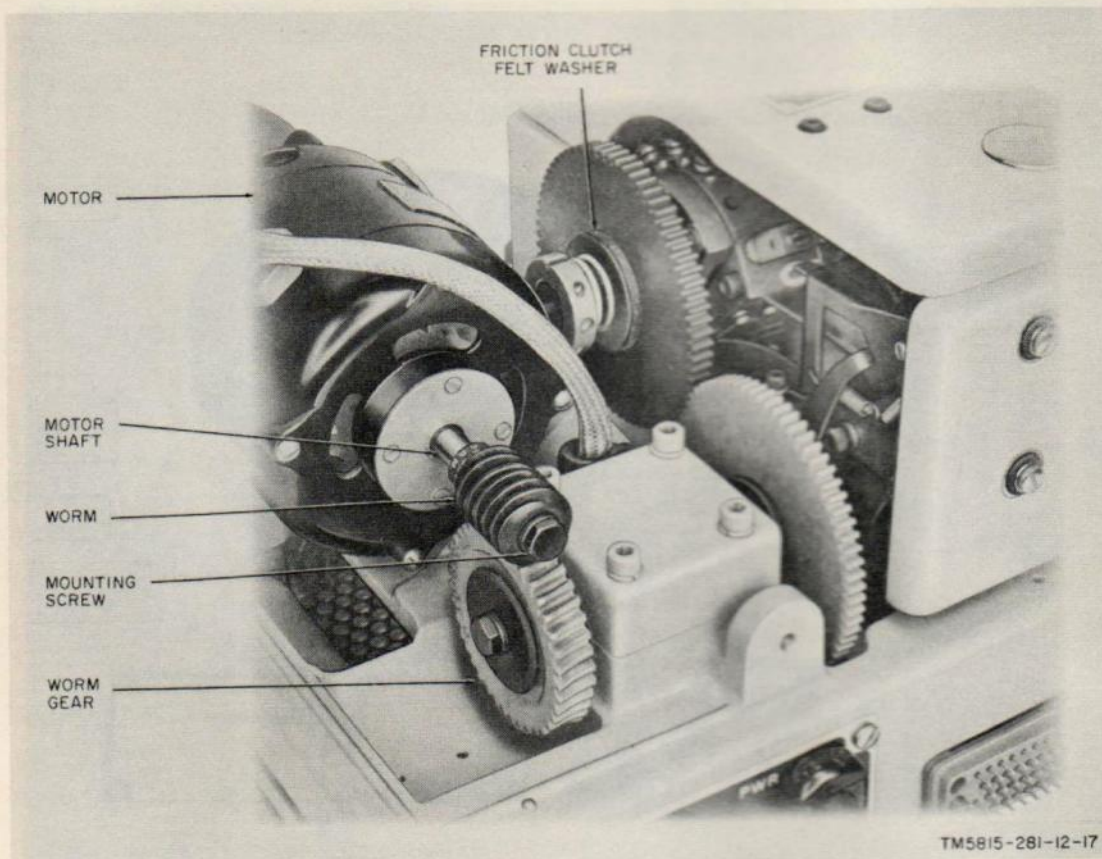


Figure 17. Friction clutch assembly and drive gear set.



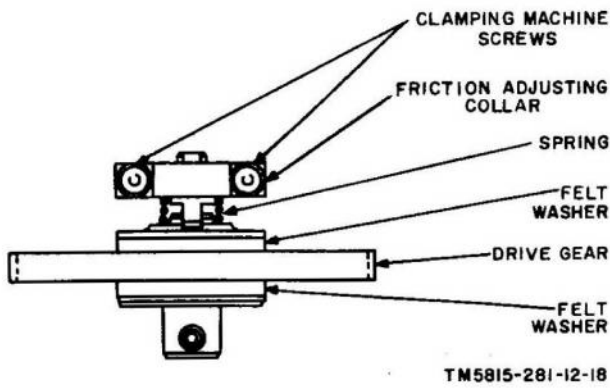


Figure 18. Friction clutch adjustment.

a. Remove the machine screws that secure the top plate to the control base; remove the top plate.

b. Remove plug P7A or P7B, as applicable. Notice the physical location and numbering of the pins.

c. Prepare a chart similar to that shown below for each plug to be wired.

Pins	Impulses				
	1	2	3	4	5
Common terminal	0	4	8	12	16
First channel designating letter	1	5	9	13	17
Second channel designating letter	2	6	10	14	18
Third channel designating letter	3	7	11	15	19

d. Determine the channel designating letters assigned to the transmitter.

e. Refer to the teletypewriter code chart in figure 19 and determine the sequence of marking and spacing impulses for each channel designating letter.

f. Place an X through each box in the chart that corresponds to a marking impulse for each channel designating letter as determined in e above.

g. Connect a wire between the common terminal (0, 4, 8, 12, or 16) in each vertical row and each pin designated for a marking impulse in the same vertical row.

h. The chart below and the plug wired in figure 20 are arranged for the channel designating letters R, B, and I.

Pins	Impulses				
	1	2	3	4	5
Common terminal	0	4	8	12	16
First channel designating letter	1	X	9	X	17
Second channel designating letter	X	6	10	X	X
Third channel designating letter	3	X	X	15	19

i. Replace the plug on its mating receptacle (fig. 12).

j. Replace the top plate and secure with the machine screws previously removed.

## 27. Changing the Operating Speed (fig. 17)

a. The distributor set has the 60-word-per-minute gears installed. Gears for 10 wpm are mounted on studs inside the transmitter motor dust cover. The two transmitter units can be operated at either the same speeds or at different speeds, as required, since each operates independently on its own signal line.

b. To change the operating speed, change the drive gear set of the transmitter as follows:

- (1) Remove the three shoulder screws that secure the motor dust cover to the transmitter; remove the dust cover.
- (2) Disconnect the ac plug to prevent the motor of the transmitter from starting while the drive gear set is being changed.
- (3) Grasp the target wheel on the motor and hold it firmly while loosening the screw that holds the worm on the motor shaft. Continue to hold the target wheel and loosen the screw that holds the worm gear to the power shaft.
- (4) Remove the screw and lockwasher that hold the worm to the motor shaft and pull the worm from the shaft.
- (5) Remove the screw and lockwasher that hold the worm gear to the power shaft and remove the worm gear.



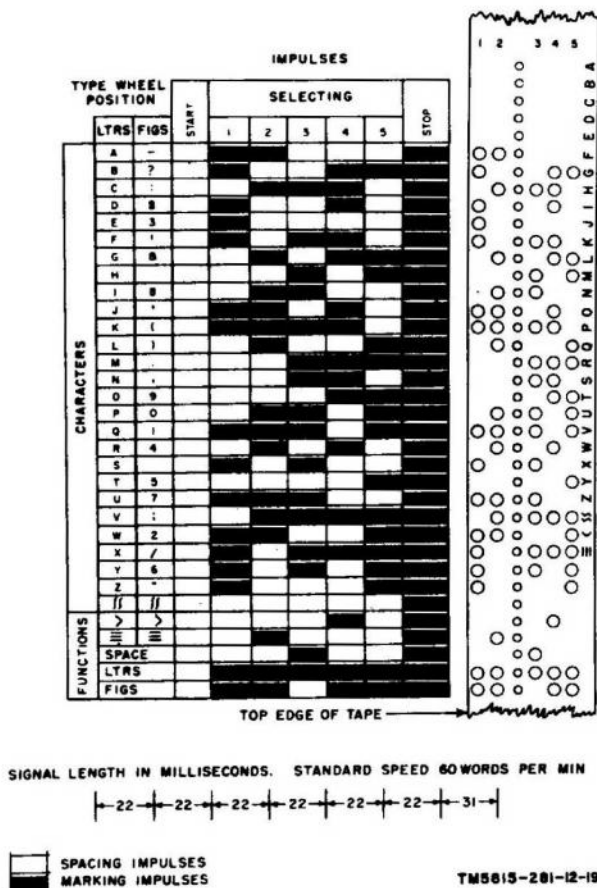


Figure 19. Stop-start, five-unit code chart.

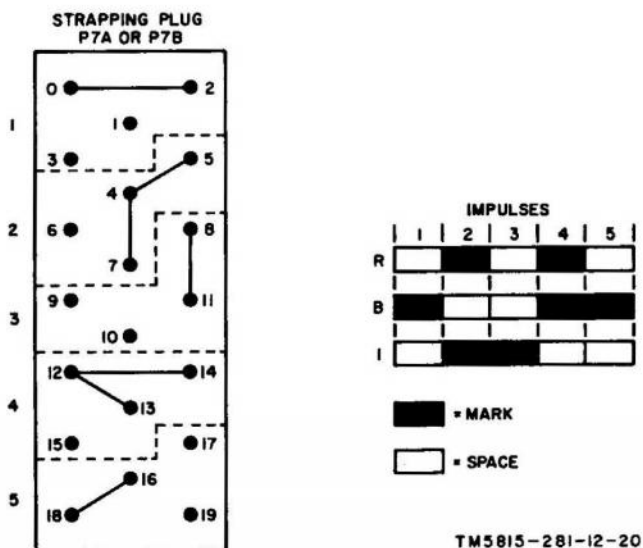


Figure 20. Channel-designating letters RBI strapped into plug P7A or P7B.

- (6) Remove the cotter pins that hold the replacement drive gear set to the studs inside the transmitter motor dust cover; remove the gears. Position the worm gear of the new

drive gear set on the power shaft. Make sure it engages the gear keys on the shaft. Secure by installing the screw and lockwasher.

- (7) Position the worm of the new drive gear set on the motor shaft. If necessary, loosen the motor mounting screws to get proper clearance to mount the worm. Secure the worm with a screw and lockwasher.
- (8) Position the motor so that just perceptible backlash exists between the gears. Make sure there is no binding between the gears.
- (9) Install the removed drive gear set in the stud in the transmitter motor dust cover. Install the dust cover on the transmitter motor; insert the ac plug into its associated jack.

## 28. Preparation for Local Testing

- a. Make sure the power switch (fig. 4) on the control base is at OFF.
- b. Connect a milliammeter (adjusted to read on the 100-milliampere (ma) scale) across the + and - terminals of LINE 1.
- c. Connect a good teletypewriter receiver (preferably a page printer), that supplies its own bias current, into either LOOP JACK on the left side of the front panel of the control base.
- d. Remove the capnut from the shaft of the LINE CURRENT potentiometer at the left front of the control base. Turn the potentiometer shaft fully counterclockwise.
- e. Move the power switch of the control base to PWR. With the multimeter connected across the LINE 1 output terminals, turn the potentiometer shaft clockwise until the milliammeter reads 20 or 60 ma, depending on which will be used on the signal line. Install the capnut on the potentiometer shaft.

f. Move the power switch to OFF. Disconnect the meter from the LINE 1 output terminals and replace it with an electrical strap to hold the signal line closed during the equipment check.

g. Repeat the instructions in b through f above, to adjust the line current for



LINE 2; use the LINE CURRENT potentiometer and one of the LOOP JACK positions on the right front of the control base.

h. Obtain several message tapes containing the following test message:

THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 12345-67890, letters shift, carriage return, line feed, figures shift and all remaining upper-case characters.

## 29. Local Tests

*Note:* The items listed in the *Corrective measures* column in the chart below are only for the use of the installer.

After setting up the equipment (para 28), check the operation of the distributor set in the sequence listed in the chart below. Start the test with transmitter A and repeat the operations for transmitter B. After completing the test remove the straps from across the LINE 1 and LINE 2 output terminals.

Item No.	Item	Action or condition	Normal indications	Corrective measures
1	Power switch on control base (fig. 24).	Operate to PWR -----	None-----	None.
2	CASE switch. -----	Operate to 1 -----	None-----	None.
3	BLANK SIGNAL-OFF switch.	Operate to OFF -----	None-----	None.
4	POWER switch on transmitter (fig. 22).	Operate to ON-----	Transmitter motors start.	Check fuses F1 and F2; check power source connections. Examine motor commutator for cleanliness. Check brushes.
5	Message numbering reset switch on numbering base (fig. 23).	Move to RESET and release.	Message numbering indicators step to 000 if not already there.	Check numbering reset circuit.
6	Stop-start lever on transmitter <sup>a</sup> .	Move from FEED RETRACT to STOP.	Feed claw engages tape feed holes.	Check lever linkage and tape-out lever linkage.
7	Stop-start lever on transmitter.	Move from STOP to START and to FEED RETRACT.	Feed claw is moved out of engagement with feed holes.	Check lever linkage and tape-out lever linkage.
8	Message tape.	Insert in transmitter and move lever from FEED RETRACT to STOP.	Feed claw engages tape feed holes.	Check lever linkage.
9	Stop-start lever on transmitter.	Move to START.	Transmitter starts transmitting 13 character message identification followed by the information on the message tape.	Check distributor clutch magnet, reader clutch magnet, and associated circuits.
10	Teletypewriter receiver.	Check start-of-message indicator.	Should be five blank code groups.	Check circuits associated with case switch.
11	Teletypewriter receiver.	Check channel-designating letters on received message.	Three letters should be assigned for associated transmitter.	Check strapping of plug P7.
12	Teletypewriter receiver.	Check message number on received message.	Message number should be 001.	Check numbering stepping switch circuits.
13	Teletypewriter receiver.	Check accuracy of received message.	Text of message agrees with transmitted tape.	Check distributor and reader contacts of TRMTD.
14	Message numbering indication.	Check reading.	Upper indicators should read 001; lower 000.	Check numbering circuits.
15	Repeat items No. 8 through 14.	Check message numbering indicator reading.	Upper indicators should read 002; lower 000.	Check numbering circuits.
16	CASE switch -----	Operate to 2. -----	None-----	None.
17	BLANK SIGNAL-OFF switch.	Move to BLANK SIGNAL --	None-----	None.



Item No.	Item	Action or condition	Normal indications	Corrective measures
18	Message tape.	Insert in transmitter and move stop-start lever to START; run until message is completed.	Transmitter sends message identification information; then tape message.	Check distributor clutch magnet, reader clutch magnet, and associated circuits.
19	Teletypewriter receiver.	Check start of message indicator.	Should read "BLANK" Z, C, Z, C.	Check associated circuits through CASE switch (S10 or S11 as applicable).
20	Teletypewriter receiver.	Check text for accuracy.	Should record message text without error.	Check transmitter contacts.
21	Teletypewriter receiver.	Check for the receipt of blank code groups at the end of the message.	Teletypewriter will cycle through blank function without printing.	Check blank signal mechanism and circuit.
22	LINE BREAK switch on control base.	Press -----	Teletypewriter receiver should run open.	Check circuit through LINE BREAK switch.
23	Numbering base FORWARD STEP switches.	Depress UNITS, TENS, and HUNDREDS switches.	Associated message numbering indicator should step once for each operation of switch.	Check numbering stepping switch circuits.
24	Numbering base message numbering reset switch.	Operate to RESET -----	Three associated message numbering indicators should step to 000.	Check numbering stepping switch circuit.
25	Repeat items No. 1 through 24 with transmitter B (connected to jack J14); use components associated with that unit.	Same as items No. 1 through 24.	Same as items No. 1 through 24.	Same as items No. 1 through 24.

## Section IV. INSTALLATION AND LINEUP

### 30. Equipment Application

The components of Distributor-Transmitter Set, Teletypewriter AN/GGC-9 are designed to operate on two signal lines on a duplex, transmit only basis. The transmitter connected to jack J12 on the control base transmits to LINE 1 and the transmitter connect to jack J14 transmits to LINE 2. Paragraphs 31 through 33 contain detailed procedures to install the equipment on the signal circuits.

### 31. Installation Options

Subparagraphs a through c below list the various installation options of the distributor set. The controls described are on the front panel of the control base (fig. 24). One set of controls is provided for each transmitter; the set on the left is associated with the transmitter connected to jack J12 on the rear of the control base. This transmitter transmits to LINE 1. The

set of controls on the right is associated with the transmitter connected to jack J14 on the rear of the control base. This transmits to LINE 2.

a. *Local Current Supply Option.* The distributor set normally supplies line current for 20- to 60-ma operation on the signal line for both transmitters. The change from one line current level to the other is made by adjusting the associated LINE CURRENT potentiometer (fig. 24). A separate potentiometer is provided for each of the two signal lines and the potentiometers are individually adjusted to meet the requirements of the separate circuits.

b. *External Current Supply Option.* The AN/GGC-9 may be used with an external current supply furnished on either both lines or on a single line. Three methods of modifying the equipment are described below. The first procedure prepares the equipment for use when both transmitters (A and B) are to be used with an external



source of signal line current. The second procedure prepares the equipment for external battery supplied to transmitter A with transmitter B furnishing line current locally. The third procedure described the necessary modification to prepare transmitter B for an external line current supply with transmitter A furnishing line current locally (a above).

(1) *External current supplied on both lines.*

- (a) Disconnect jacks J32 and J55 (fig. 10). This completely removes the 120-volt power supply from the equipment.
- (b) Remove the bottom cover from the control base.
- (c) Install a strap between terminals 6 and 7 of terminal board TB1 to complete both signal circuits.
- (d) Replace the bottom cover on the control base.

(2) *External current supply for transmitter A only.*

- (a) Move the power switch on the control base to OFF.
- (b) Remove the bottom cover from the control base.
- (c) Loosen the screw that secures a gray-green lead and an orange-black lead to terminal 7 of terminal TB1.
- (d) Remove the gray-green lead and tighten the screw on terminal 7.
- (e) Connect the gray-green lead to the terminal screw which fastens two red-black leads on terminal 6 of TB1.
- (f) Replace the bottom cover on the control base.
- (g) Position the power switch of the control base to PWR.

(3) *External current supply for transmitter B only.*

- (a) Move the power switch on the control base to OFF.
- (b) Remove the bottom cover from the control base.
- (c) Loosen the screw that secures a single gray-green lead to terminal 7 of terminal board TB1.
- (d) Disconnect the gray-green lead from its terminal and reconnect

it with the *single red-black* lead on terminal 6 of TB1.

- (e) Replace the bottom cover on the control base.
- (f) Position the power switch of the control base to PWR.

c. *Case Switch Option.* The type of receiving equipment used to receive the messages from the distributor set will determine the option to be used. If the receiver is a normal teletypewriter tributary, move the CASE switch to 1, so that the start-of-message indicator consists of five successive blanks. If the receiver is a part of Automatic Switching Center AN/FGC-30 or similar equipment, move the CASE switch to 2, so that the start-of-message indicator consists of one blank code group followed by the code groups for ZCZC.

d. *Blank Signal Switch Option.* If a predetermined number of blank signals are to be transmitted automatically at the end of each message to facilitate tape handling at the receiving station, move the BLANK SIGNAL-OFF switch to BLANK SIGNAL. If the receiving equipment is a page printer, or if the receiving equipment does not require the transmission of blank signals at the end of each message, move the BLANK SIGNAL-OFF switch to OFF.

### 32. Adjusting Number of Blank Signals Transmitted

The blank signal counter mechanism has an adjustable range from 10 to 80. If more or less blank signals are to be transmitted automatically at the end of each message, remove the dummy plug from the hole in the top rear of the transmitter and adjust the blank signal counter mechanism as follows:

a. To transmit fewer blank signals after a message, rotate the counter indexing ratchet (fig. 21) towards the rear of the transmitter. Count the clicks caused as the detent engages each ratchet tooth. Each click reduces by two the number of blanks that will be transmitted. Reduce the number as desired.

b. To transmit more blank signals after a message, use a small screwdriver to move the detent out of engagement with the



counter indexing ratchet. Rotate the ratchet toward the front of the transmitter. Watch the lines on the side of the counter indexing ratchet. When the ratchet is moved the equivalent of one of the spaces between the lines on the side of the ratchet, the number of blank spaces the unit will transmit is increased by 10. Release the detent.

### 33. Signal Line Connections

(fig. 10)

Connect the signal lines to the LINE 1 and LINE 2 terminal posts at the rear of the control base. Transmitter A connected

to jack J12 is associated with LINE 1. Transmitter B connected to jack J14 is associated with LINE 2.

### 34. Circuit Lineup

For best operation, adjust the distributor set to meet the conditions of the signal lines. Circuit lineup for the distributor set consists of adjusting the line current to the required level. Before the equipment is installed on the line, the installer must know what signal line current is required and the operation speed to be used.

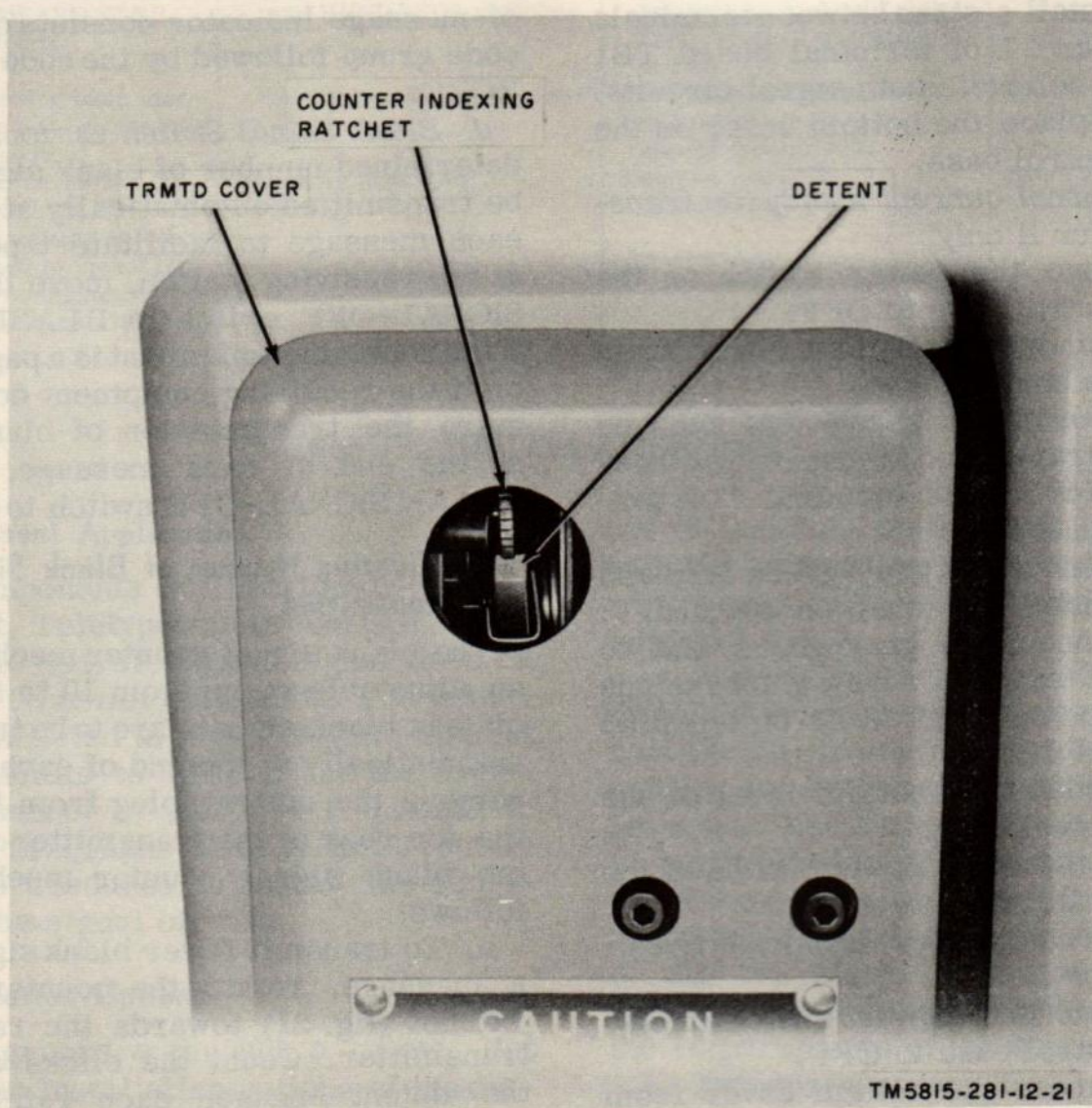


Figure 21. Blank signal counter mechanism adjustment points.



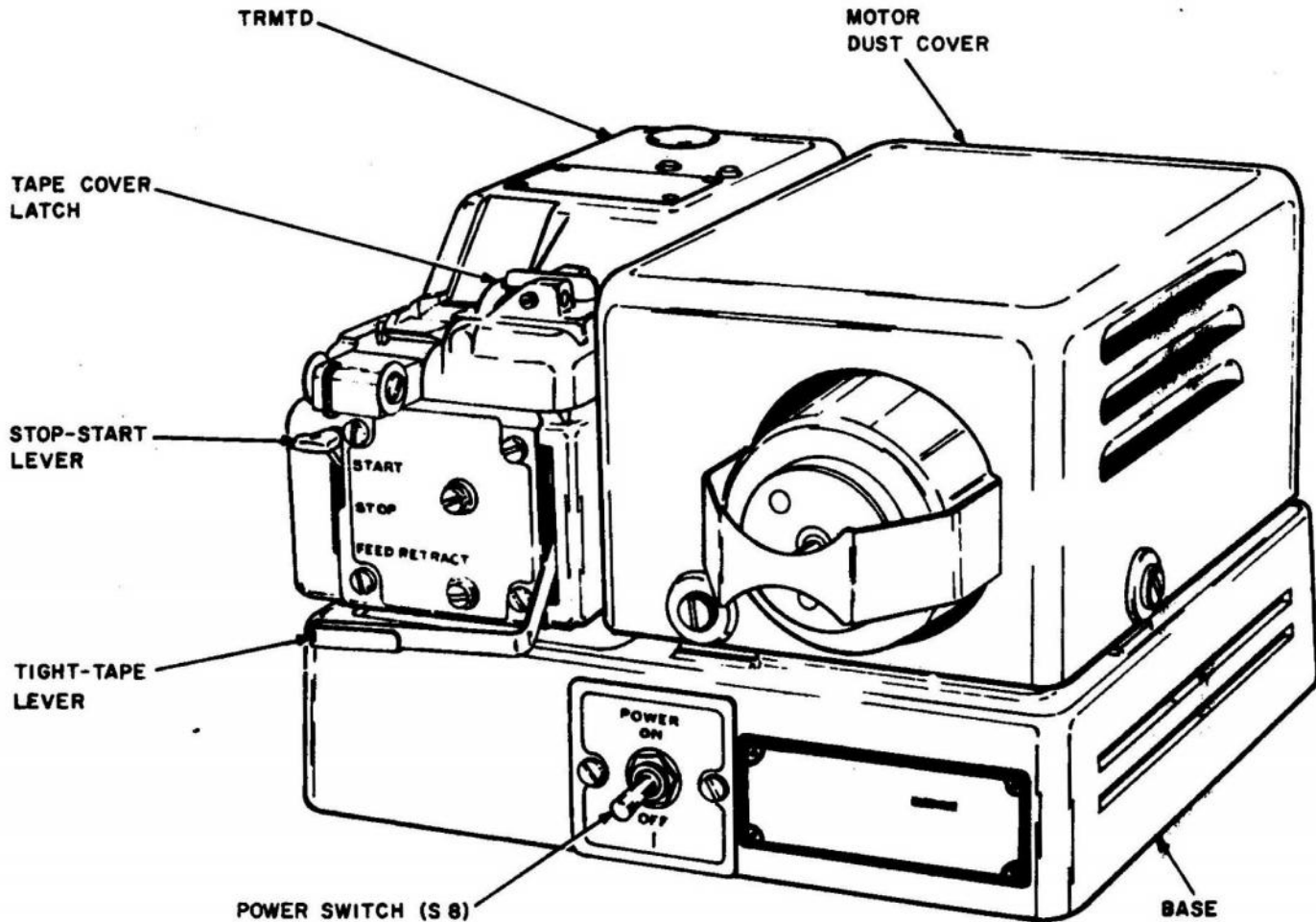
# CHAPTER 3

## OPERATING INSTRUCTIONS

### Section I. OPERATOR'S CONTROLS AND INDICATORS

#### 35. Distributor-Transmitter, Teletypewriter TT-322-GGC-9 Controls (fig. 22)

Control	Function	
POWER switch -----	<i>Sw pos</i> ON OFF	<i>Action</i> Closes ac circuit to operate transmitter motor. Opens ac circuit to stop transmitter motor.
Stop-start lever -----	<i>Pos</i> FEED RE- TRACT  STOP  START	<i>Action</i> Lowers feed pins to permit message tape to be inserted and conditions equipment to send 13-character message identification information before transmitting text of message. Stops transmission. (tape feed pins engage feed holes.) Starts transmission.
Tape cover latch -----	Releases tape cover to permit message tape to be removed. When tape binds or becomes taut, lever raises and stops transmission.	
Tight-tape lever -----		



TM5815-281-12-12-22

Figure 22. Transmitter controls.