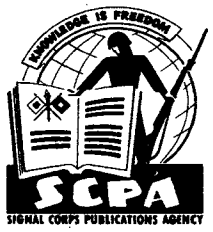
INSTRUCTION BOOK

FOR

DYNAMOTOR DY-93/U AND DYNAMOTOR-POWER SUPPLIES DY-98/G AND DY-100/U



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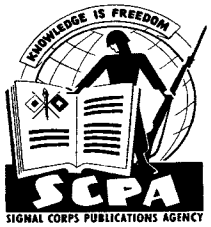

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WARNING

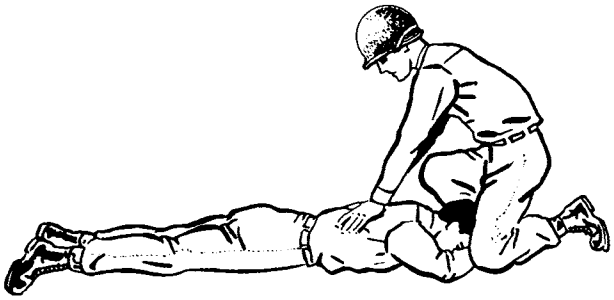
HIGH VOLTAGE

is used in the operation
of this equipment.

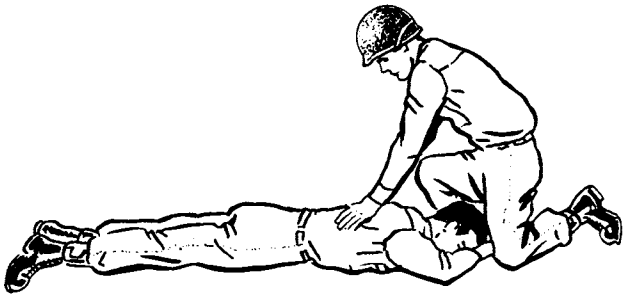
DEATH ON CONTACT

may result if personnel fail
to observe safety precautions.

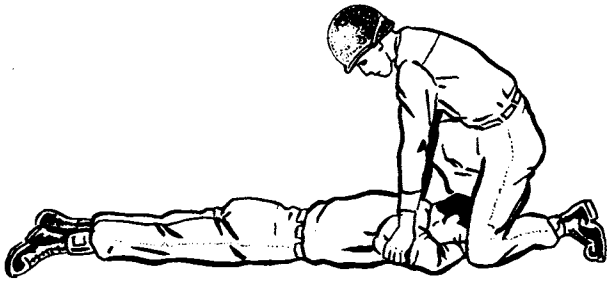
Be careful not to contact high-voltage connections or input connections when working on or near this equipment. When working inside the equipment, after the power has been turned off, always short-circuit the high-voltage capacitors.



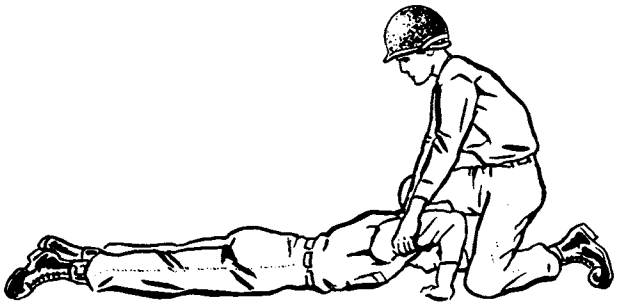
A Position of operator and victim



B Compression phase



C Expansion phase (arm lift)



D Expansion phase (arm release)

TM AR-2

ARTIFICIAL RESPIRATION

GENERAL PRINCIPLES

1. Seconds count! Begin at once! Don't take time to move the victim unless you must. Don't loosen clothes, apply stimulants or try to warm the victim. Start resuscitation! Get air in the lungs! You may save a life!
2. Place the victim's body in a prone position, so that any fluids will drain from the respiratory passages. The head should be extended and turned sideward *never flexed forward;* the chin shouldn't sag, since obstruction of the respiratory passages may occur.
3. Remove any froth or debris from the mouth with your fingers. Draw the victim's tongue forward.
4. Begin artificial respiration. Continue it rhythmically and without any interruption until natural breathing starts or the victim is pronounced dead. Try to keep the rhythm smooth. Split-second timing is not absolutely essential.
5. When the victim starts breathing, or when additional help is available loosen the clothing; remove it, if it's wet; keep the victim warm. Shock should receive adequate attention. Don't interrupt the rhythmical artificial technique for these measures. Do them only when you have help or when natural breathing has started.
6. When the victim is breathing, adjust your timing to assist him. Don't fight his efforts to breathe. Synchronize your efforts with his. After resuscitation, keep him lying down until seen by a physician or until recovery seems certain.
7. Don't wait for mechanical resuscitation! If an approved model is available, use it, but, since mechanical resuscitators are only slightly more effective than properly performed "push-pull" manual technique, *never* delay manual resuscitation for it.

BACK-PRESSURE ARM LIFT METHOD

1. *Position of Victim.* Place the victim in the prone (face-down) position. Bend his elbows; place one hand upon the other. Turn his face to one side, placing his cheek upon his hands.
2. *Position of Operator.* Kneel on your left or right knee, at the victim's head, facing him. Your knee should be at the side of the victim's head close to his forearm, your foot should be near his elbow. Kneel on both knees if you find it more comfortable, with one knee on each side of the head. Place your hands on the flat of the victim's back so that their heels are just below the lower tip of his shoulder blades. With the tip of your thumbs touching spread your fingers downward and outward. (See **A**)

3. *Compression Phase.* Rock forward until your arms are approximately vertical and allow the weight of the upper part of your body to exert a slow, steady, even, downward pressure upon your hands. This forces air out of the lungs. Keep your elbows straight and press almost directly downward on the back. (See B).
4. *Expansion Phase.* Release the pressure, avoid any finish thrust, and commence to rock backward slowly. Place your arms upon the victim's arms just above the elbows, and draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the victim's shoulders. Don't bend your elbows. As you rock backward, the victim's arms will be drawn toward you. (The arm lift expands the chest by pulling on the chest muscles, arching the back and relieving the weight on the chest.) Drop the arms gently to the ground or floor. This completes the cycle. (See C and D). Now, repeat the cycle.
5. *Cycle Timing and Rhythm.* Repeat the cycle 10 to 12 times per minute. Use a steady uniform rate of Press, Release, Lift, Release. Longer counts of about equal length should be given to the "Press" and "Lift" steps of the compression and expansion phases. Make the "Release" periods of minimum duration.
6. *Changing Position or Operator.*

(*a*) Remember that you can use either or both knees or can shift knees during the procedure, provided you don't break the rhythm. Observe how you rock forward with the back-pressure and backward with the arm-lift. The rocking motion helps to sustain the rhythm and adds to the ease of operation.

(*b*) If you tire and another person is available, you can "take turns." Be careful not to break the rhythm in changing. Move to one side and let your replacement come in from the other side. Your replacement begins the "Press-Release" after one of the "Lift-Release" phases, as you move away.

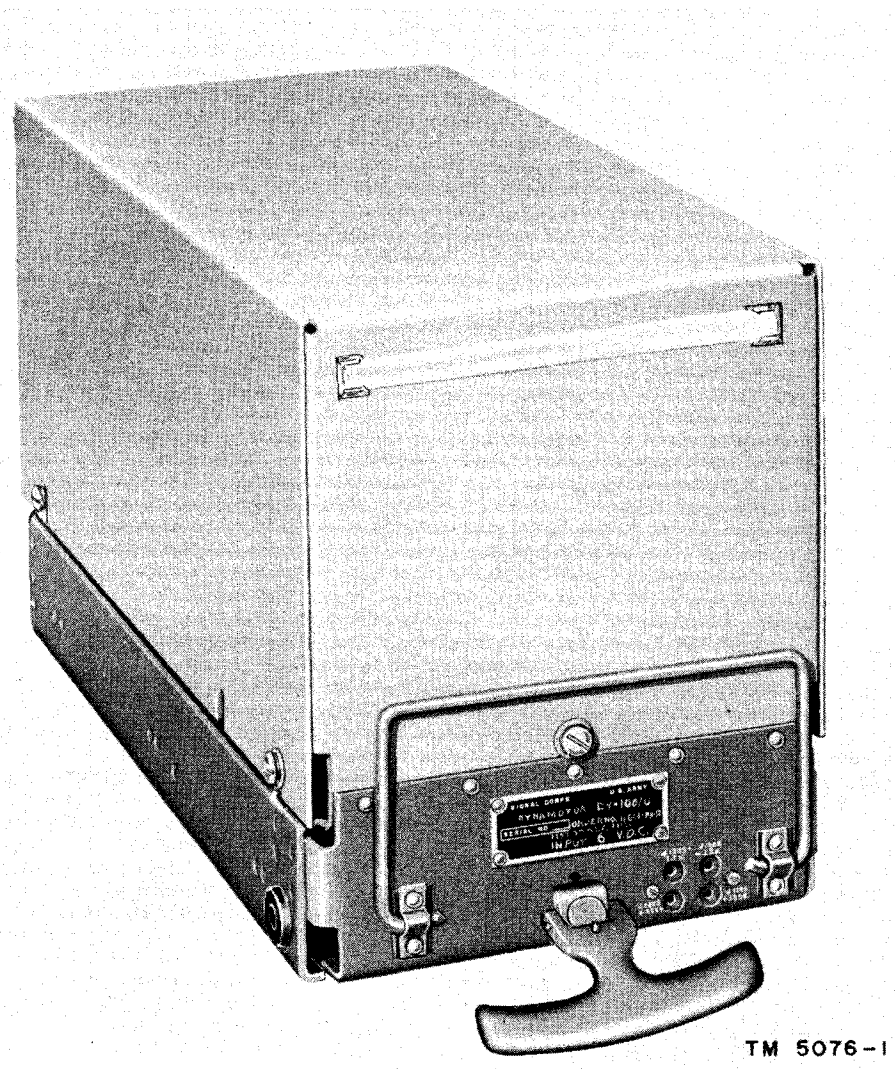


Figure 1. Dynamotor-Power Supply DY-100/U, oblique view.

Note. This instruction book will be replaced by TM 11-5076 which, when published, will be listed on SR 310-20-4.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This instruction book contains information pertaining to the description and theory of Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G and DY-100/U, and provides instructions for the installation, operation, maintenance and repair of the units. In addition to these instructions, there are two appendixes covering a list of references and an identification table of parts.

b. The three power supplies listed above are alike in most respects, and they are discussed simultaneously in this manual. Where specific differences exist among the units, these differences are discussed with reference to the particular unit involved.

2. Forms and Records

The following forms will be used for reporting unsatisfactory conditions of Army materiel and equipment.

a. DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5 (Army), NAV DEPT SERIAL 85POO (Navy), and AFR 71-4 (Air Force).

b. DA AGO Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office of the Chief Signal Officer as prescribed in SR 700-45-5.

c. USAF Form 54, Unsatisfactory Report, will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700-45-5 and AFR 65-26.

d. DA AGO Form 11-238 (fig. 10), Operator First Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form.

e. DA AGO Form 11-239 (fig. 11), Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form.

f. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. Purpose and Use
(fig. 1)

a. Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G and DY-100/U derive power from 12-, 24-, and 6-volt vehicular storage batteries, respectively. The units are designed to supply operating power for the radio transmitters used in the various communication systems listed in paragraph 4.

b. The dynamotor in each power supply combines a motor and a generator in a single frame, requiring only two bearings. The armature consists of two separate windings mounted on a single shaft and excited by the same field winding. For maximum protection against high-voltage breakdown, the windings are insulated from each other and from the frame. The dynamotor is designed to operate through a duty cycle of 3 minutes on and 12 minutes off when the ambient temperature is 75° C (167° F). In a cooler environment, the

dynamotor might be operated through a longer duty cycle. However, because of a 50° C (90° F) temperature rise occurring when the dynamotor is operating continuously, caution must be taken to prevent rapid deterioration of the insulation that will occur if the dynamotor attains a temperature of 105° C (221° F). The over-all efficiency of the dynamotor is rated at 58 percent. Under average mobile service conditions, the dynamotor should deliver 100,000 ten-second transmissions without requiring maintenance.

4. System Application

(fig. 2)

a. Dynamotor DY–93/U and Dynamotor-Power Supplies DY–98/G and DY–100/U convert low-voltage battery power to power at the various proper voltages required by the transmitters. The following table lists the power supply used in each system.

Power supply	Input voltage	Radio Set
DY–100/U	6 volts dc (direct current)	AN/VRC–19Y
DY–93/U	12 volts dc	AN/VRC–19X
DY–98/G	24 volts dc	AN/VRC–19

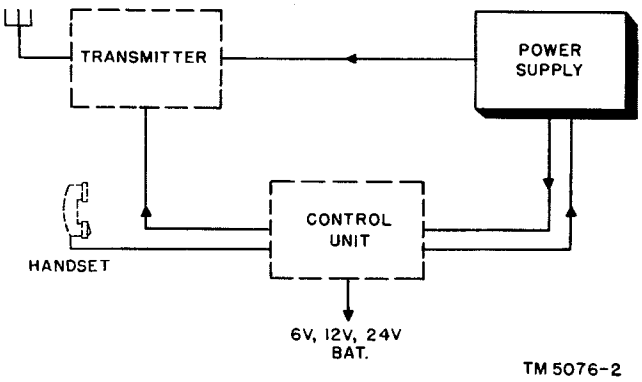


Figure 2. Typical power supply, system application, block diagram.

b. The system application is illustrated in the system block diagram (fig. 2). Input to the power supply is controlled by a switch ganged to the VOLUME control located on the control unit. The high-voltage power supplied to the transmitter is controlled by the push-to-talk switch on the handset.

5. Technical Characteristics

Power input:

Dynamotor-Power Supply DY–100/U	6 volts dc, 40 amp (amperes).
Dynamotor DY–93/U	12 volts dc, 20 amp.
Dynamotor-Power Supply DY–98/G	24 volts dc, 10 amp.

Power output:

380 volts dc	180 ma (milliamperes).
225 volts dc	70 ma (available at pin 9 for Radio Transmitter T–278/U).
225 volts dc	45 ma (available at pin 3 for Radio Transmitter T–208/U).
−25 volts dc	5 ma.
24 volts dc	1.2 amp (DY–98/G).
6.3 volts ac (alternating current)	2 amp (DY–98/G).
6 volts dc	0.3 amp.
6 volts dc	0.9 amp (DY–100/U and DY–93/U).
6 volts dc	2 amp (DY–100/U and DY–93/U).
1.3 volts dc	0.2 amp.
1.3 volts dc	1 amp.

5. Technical Characteristics (Contd)

Adaptability to service conditions:

Altitude	10,000 ft, maximum.
Shocks and vibrations	Will withstand shocks, strains, and vibrations in a vehicle traveling over rugged terrain.
Weather and climate	Fungiproofed and moistureproofed.
Normal operating temperature	−40° C (−40° F) to +65° C (149° F).
Weight	22⅛ lb.
Dimensions	14½ in. long by 7 in. wide, by 8⅝ in. high.

6. Description

(figs. 3 through 9)

a. General. Dynamotor DY–93/U and Dynamotor-Power Supplies DY–98/G and DY–100/U are similar in mechanical arrangement, consisting in each case of a panel and chassis assembly. The entire power supply is held in a compartment of the cabinet by a lock-in assembly at the rear of the chassis. A handle on the front panel is provided for removing the power supply.

b. Chassis. In each power supply, the sockets for two current regulator tubes and the plug-in relays are mounted on the top of the chassis, along with larger parts, such as capacitors, reactors, and the dynamotor. Dynamotor-Power Supply DY–98/G also has a transformer and vibrator mounted on the top of the chassis. Resistors, capacitors, and other smaller parts, including the fuse in the line from the power source, are mounted under the chassis.

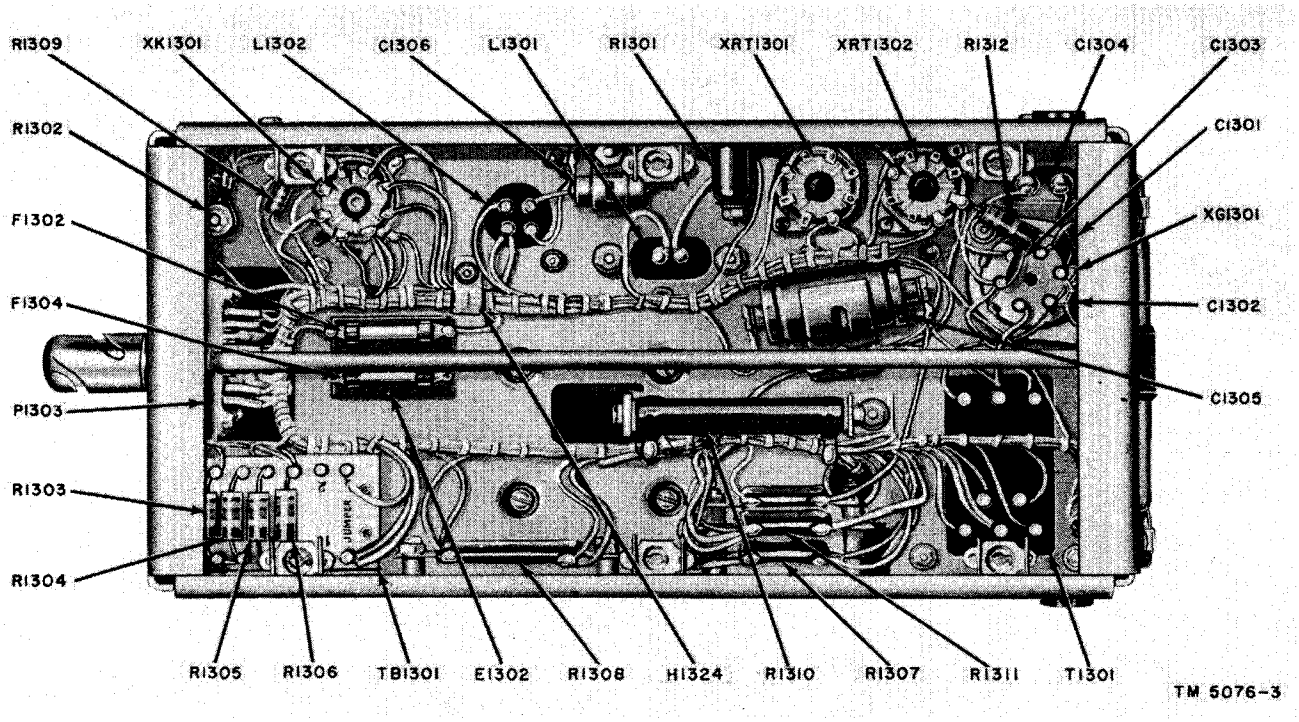


Figure 3. Dynamotor DY–98/G, bottom view.

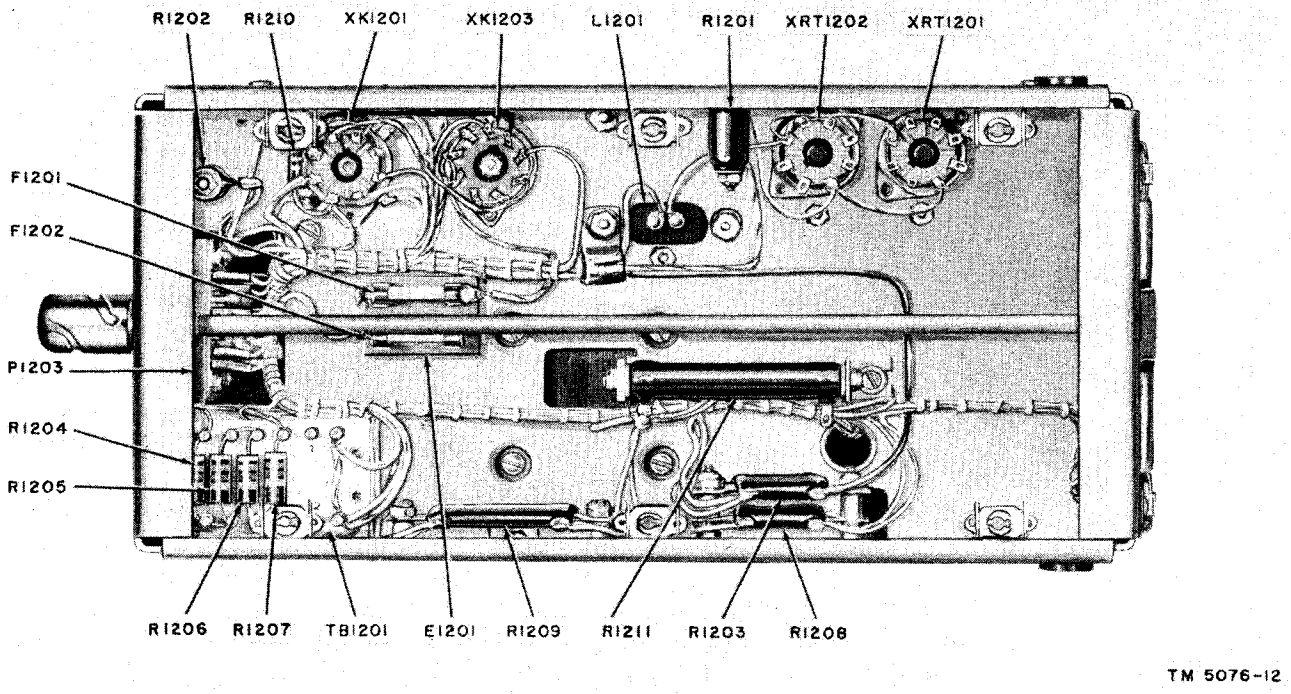


Figure 4. Dynamotor-Power Supply DY–100/U, bottom view.

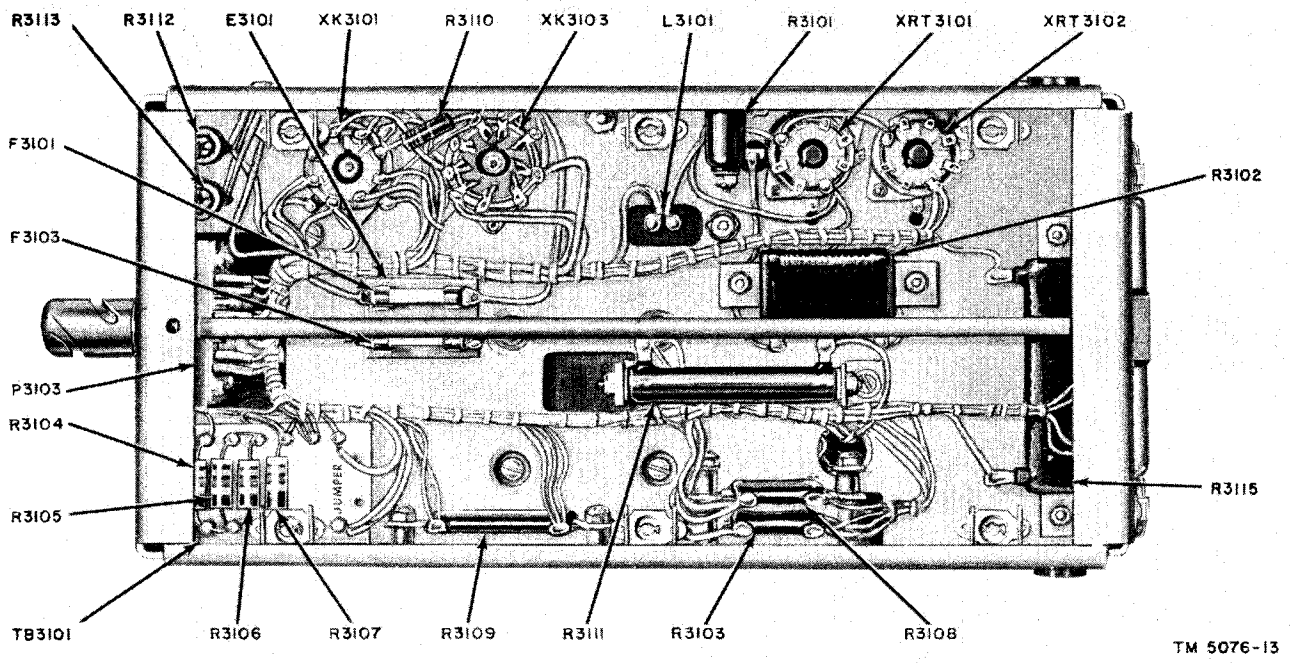


Figure 5. Dynamotor DY–93/U, bottom view.

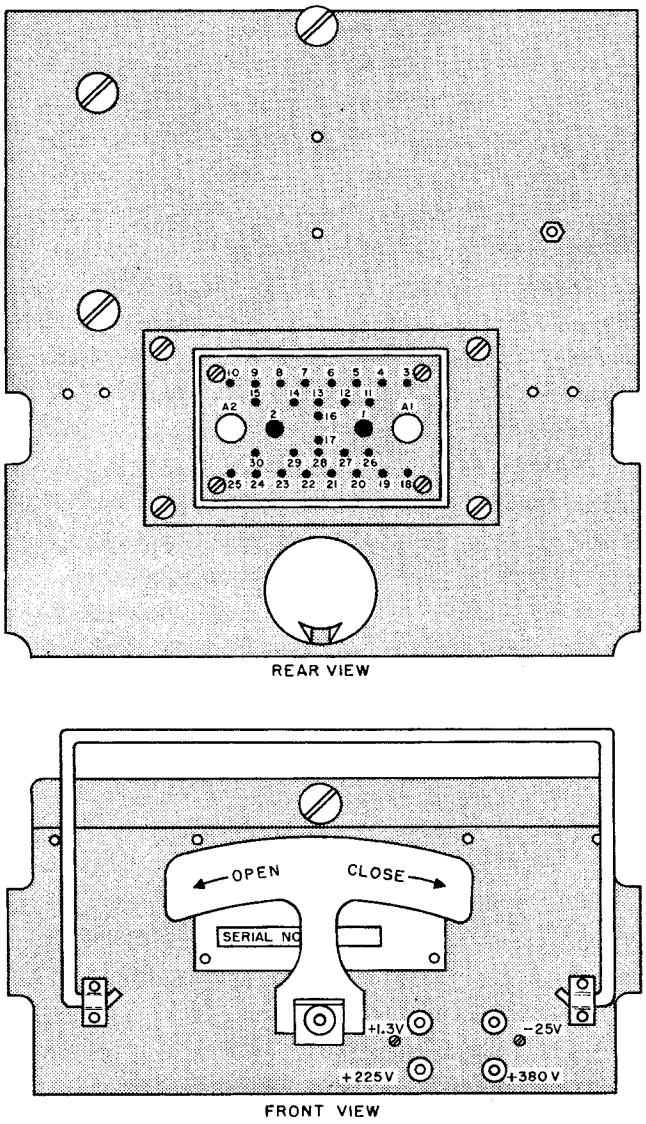


Figure 6. Typical power supply, front and rear views.

c. Rear Panel. The dynamotor control relay, and a 30-contact recessed male connector, which serves to make all connections to the power supply, are mounted on the rear panel of all models. In Dynamotor-Power Supply DY–98/G, a selenium rectifier and a 20-ampere fuse for the dynamotor circuit also are mounted on the rear panel.

d. Front Panel. Four jacks, mounted on the front panel, serve as voltage test points to check the operation of the power supply without removal from the cabinet. Each power supply is inclosed and protected on the bottom, top, and both sides by two removable covers.

7. Spare Parts

Running spares for normally expendable items are provided in each system's spare parts kit. (TM 11–297, par. 22). Spare fuses are clipped in fuseholders adjacent to the fuses which they are designed to replace.

Caution: Never replace a fuse with one having a different current rating except in an emergency when the proper fuse is not available.

8. Additional Equipment Required

Dynamotor DY–93/U and Dynamotor-Power Supplies DY–98/G and DY–100/U require 12-, 24-, and 6-volt storage batteries, respectively, and a suitable load. Radio Transmitters T–278/U and T–208/U, properly operating, or the dummy load resistors (fig. 14) constitute a suitable load.

Caution: Do not operate the power supply without a suitable load, or the high output voltages will cause damage.

9. Difference in Models

The three power supplies are identical in shape and size. They differ mainly in the input power requirements which are listed in paragraph 5. Dynamotor-Power Supply DY–98/G, for conservation of battery power, uses a vibrator and transformer to supply the filament voltages. The power transformer, vibrator, buffer capacitor, and two filter reactors associated with this circuit are mounted on the chassis. The rectifier is mounted on the rear panel. Dynamotor-Power Supply DY–100/U and Dynamotor DY–93/U, each are equipped with a Power-On relay mounted on the chassis. The voltage drop and power loss which would result from long power leads to a remote control panel is eliminated by this relay.

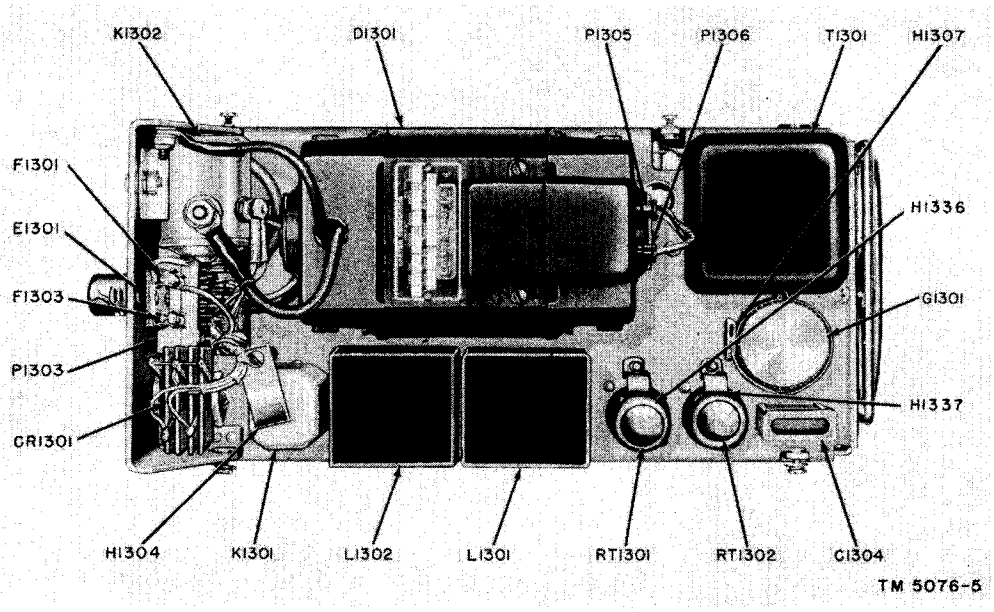


Figure 7. Dynamotor-Power Supply DY–98/G, top view.

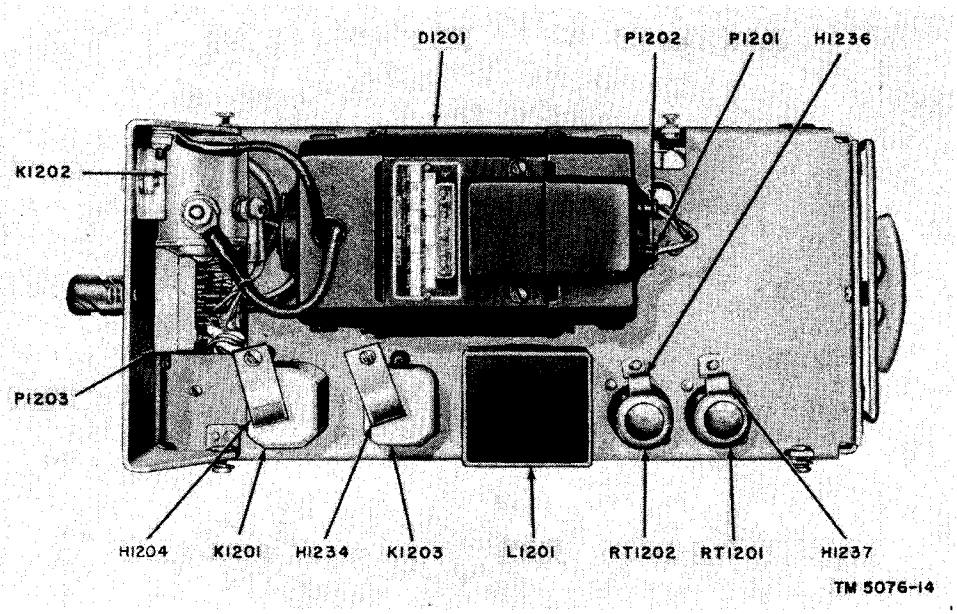


Figure 8. Dynamotor-Power Supply DY–100/U, top view.

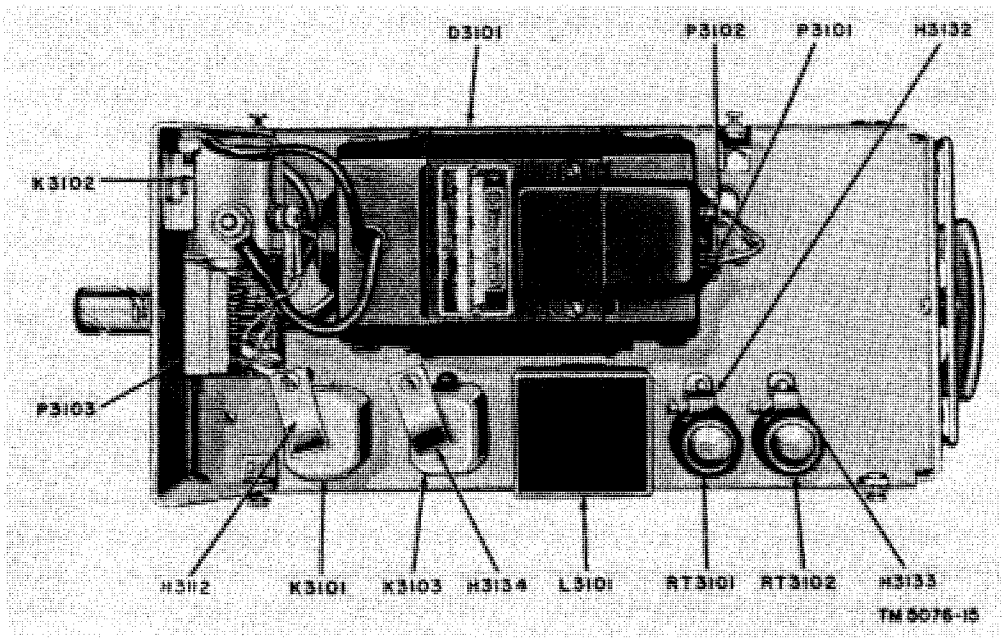


Figure 9. Dynamotor DY-93/U, top view.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF DYNAMOTOR DY-93/U AND DYNAMOTOR POWER SUPPLIES DY-98/G AND DY-100/U

10. Connections

All connections between the power supplies and batteries and transmitters are made through multicontact plugs and receptacles which are engaged automatically when the individual units are inserted in their proper positions on the cabinet. The wiring between the receptacles on the cabinet is installed in an inclosed compartment in the rear of the cabinet.

11. Service upon Receipt of Used or Reconditioned Equipment

Check the used or reconditioned equipment for tags or other indications pertaining to changes in the wiring of the equipment. If any changes in wiring have been made, note the change or changes in this manual, preferably on the schematic diagram.

Section II. CONTROLS AND THEIR USES

12. General

Haphazard operation or improper setting of the controls can cause damage to electronic equipment. For this reason, it is important to know the function of every control. The actual operation of the equipment is discussed in the particular system book.

13. Controls and Functions

There are no controls on the power supplies. The controls which affect the power supplies are located on other units of the systems.

Control	Located on	Function
Push-to-talk switch	Handset	Energizes transmitting relay.
VOLUME-OFF switch (S1501B)	Control unit	Connects power supply to battery source.

Section III. OPERATION UNDER USUAL CONDITIONS

14. Preliminary Starting Procedure

Rotate the VOLUME-OFF switch on the control unit to the first position from the OFF position. Press the push-to-talk switch on the handset to the talk position.

15. Initial Adjustments

There are no adjustments or settings to be made on the power supply.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. PREVENTIVE MAINTENANCE SERVICES

16. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment to keep it in good working order so that break-downs and needless interruptions In service will be kept to a minimum. Preventive maintenance differs from trouble shooting and repair since its object is to prevent certain troubles from occurring. See AR750–5.

17. General Preventive Maintenance Techniques

a. Use #000 sandpaper to remove corrosion. Never use steel wool. (If protective finish is scarred or damaged, refer to paragraphs 23 and 41.)

b. Use a clean, dry, lint-free cloth or a dry brush for cleaning.

(1) If necessary, except for electrical contacts, moisten the cloth or brush with Solvent, Dry Cleaning (SD); then wipe the parts dry with a cloth.

(2) Clean electrical contacts with a cloth moistened with carbon tetrachloride; then wipe them dry with a cloth.

Caution: Repeated contact of carbon tetrachloride with the skin or prolonged breathing of the fumes is dangerous. Make sure adequate ventilation is provided.

c. If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch to remove dust from inaccessible places; be careful, however, or mechanical damage from the air blast may result.

d. For further information on preventive maintenance, refer to TB SIG 178.

18. Use of Preventive Maintenance Forms (figs. 10 and 11)

a. The decision as to which items on DA AGO Forms 11–238 and 11–239 are applicable to this equipment is a tactical decision to be made in the case of first echelon maintenance by the communication officer/chief or his designated representative, and in the case of second and third echelon maintenance, by the individual making the inspection. Instructions for the use of each form appear on the reverse side of the form.

b. Circled items in figures 10 and 11 are partially or totally applicable to the equipment covered in this manual. References in the ITEM block refer to paragraphs in text which contain additional maintenance information.

19. Performing Exterior Preventive Maintenance

Caution: Tighten screws, bolts, and nuts carefully. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

a. Check for normal operation.

b. Inspect connector for rust, corrosion, and moisture.

c. Inspect chassis, mountings, and exposed metal surfaces for rust, corrosion, and moisture.

d. Inspect wire for cuts, breaks, and deterioration.

e. Inspect for looseness of accessible items.

f. Inspect storage batteries for damaged cases, dirt, loose terminals, electrolytic level and specific gravity.

g. If deficiencies noted were not corrected during inspection, indicate action taken for correction.

OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: *See other side*

EQUIPMENT NOMENCLATURE	EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (X) Defect corrected.
NOTE: Strike out items not applicable.

DAILY

NO.	ITEM	CONDITION S	M	T	W	T	F	S
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT *(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories).*							
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION.							
3	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS, COMPONENT PANELS.							
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS.							
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION.							
(6)	CHECK FOR NORMAL OPERATION. **PAR. 19a**							

WEEKLY

NO.	ITEM	CONDITION	NO.	ITEM	CONDITION
(7)	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. **PAR. 19 b,c**		(13)	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES. **PAR. 19f**	
(8)	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. **PAR. 19 b,c**		14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.	
(9)	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. **PAR. 19 d**		15	INSPECT METERS FOR DAMAGED GLASS AND CASES.	
10	INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.		16	INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING.	
11	INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.		17	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.	
(12)	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWERSTATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES. **PAR. 19c**		18	CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.	

(19) IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

DA AGO FORM 1 MAY 51 11-238 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM 5076-16

Figure 10. DA AGO Form 11-238.

SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE | EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (X) Defect corrected.
NOTE: Strike out items not applicable.

NO.	ITEM	CONDITION
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT *(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories).*	
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION.	
3	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS, COMPONENT PANELS.	
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS.	
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION.	
(6)	CHECK FOR NORMAL OPERATION. PAR. 19a	
(7)	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. PAR. 19b,c	
(8)	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 19b,c	
(9)	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 19d	
10	INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.	
11	INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.	
(12)	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWERSTATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES. PAR. 19e	
(13)	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES. PAR. 19f	
14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.	
15	INSPECT METERS FOR DAMAGED GLASS AND CASES.	
16	INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHERPROOFING.	
17	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.	
18	CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.	
19	ELECTRON TUBES - INSPECT FOR LOOSE ENVELOPES, CAP CONNECTORS, CRACKED SOCKETS; INSUFFICIENT SOCKET SPRING TENSION; CLEAN DUST AND DIRT CAREFULLY; CHECK EMISSION OF RECEIVER TYPE TUBES.	
20	INSPECT FILM CUT-OUTS FOR LOOSE PARTS, DIRT, MISALIGNMENT AND CORROSION.	
21	INSPECT FIXED CAPACITORS FOR LEAKS, BULGES, AND DISCOLORATION.	
(22)	INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR LOOSE MOUNTINGS; BURNED, PITTED, CORRODED CONTACTS; MISALIGNMENT OF CONTACTS AND SPRINGS; INSUFFICIENT SPRING TENSION; BINDING OF PLUNGERS AND HINGE PARTS. PAR. 20a	
23	INSPECT VARIABLE CAPACITORS FOR DIRT, MOISTURE, MISALIGNMENT OF PLATES, AND LOOSE MOUNTINGS.	
(24)	INSPECT RESISTORS, BUSHINGS, AND INSULATORS, FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE. PAR. 20b	
(25)	INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR CORROSION, DIRT AND LOOSE CONTACTS. PAR. 20c	
(26)	CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES, AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE. PAR. 20d	
(27)	INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	
28	CHECK SETTINGS OF ADJUSTABLE RELAYS.	
29	LUBRICATE EQUIPMENT IN ACCORDANCE WITH APPLICABLE DEPARTMENT OF THE ARMY LUBRICATION ORDER.	
(30)	INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS, FOR BRUSH WEAR, SPRING TENSION, ARCING, AND FITTING OF COMMUTATOR. PAR. 20f	
(31)	CLEAN AND TIGHTEN CONNECTIONS AND MOUNTINGS FOR TRANSFORMERS, CHOKES, POTENTIOMETERS, AND RHEOSTATS. PAR. 20g	
(32)	INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS, AND RHEOSTATS FOR OVERHEATING AND OIL-LEAKAGE. PAR. 20h	
33	BEFORE SHIPPING OR STORING - REMOVE BATTERIES.	
34	INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.	
35	INSPECT BATTERIES FOR SHORTS AND DEAD CELLS.	
36	INSPECT FOR LEAKING WATERPROOF GASKETS, WORN OR LOOSE PARTS.	
(37)	MOISTURE AND FUNGIPROOF. PAR. 20i	
(38)	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.	

DA AGO FORM 1 MAY 51 11-239 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE. 68—IG—64382-1

TM 5076-17

Figure 11. DA AGO Form 11-239.

20. Performing Interior Preventive Maintenance

Caution: Disconnect all power before performing the following operations. Upon completion, reconnect power and check for satisfactory operation.

a. Inspect relays for loose mounting.

b. Inspect resistors and insulators for cracks, blistering, discoloration, and moisture.

c. Inspect terminals of resistors for corrosion, dirt, and loose contacts.

d. Clean and tighten terminal blocks and relay cases; clean interior of chassis.

e. Inspect terminal blocks for loose connections, cracks, and breaks.

f. Inspect dynamotor for brush wear and fitting to commutator

g. Clean and tighten connections and mountings for transformers and inductors.

h. Inspect transformers and inductors for overheating.

i. Check for adequacy of moistureproofing and fungiproofing.

j. If deficiencies noted were not corrected during inspection, indicate action taken for correction.

Section II. LUBRICATION AND WEATHERPROOFING

21. Lubrication

The power supplies described in this manual do not require lubrication. Never apply oil or grease to any parts of these units.

22. Weatherproofing

a. General. Signal Corps equipment, when operated under severe climatic conditions such as prevail in tropical, arctic, and desert regions, requires special treatment and maintenance. Fungus growth, insects, dust, corrosion, salt spray, excessive moisture, and extreme temperatures are harmful to most materials.

b. Tropical Maintenance. A special moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection. This treatment is explained in TB SIG 13 and TB SIG 72.

c. Winter Maintenance. Special precautions necessary to prevent poor performance or total operational failure of equipment in extremely low temperatures, low humidity, and excessive sand and dust are explained in TB SIG 75.

23. Rustproofing and Painting

a. Rust and corrosion can be prevented by touching up bared surfaces. Clean where necessary with #00 or #000 sandpaper; obtain a bright smooth finish.

Caution: Do not use steel wool as minute particles frequently enter the cabinet and cause internal shorting or grounding of circuits.

b. When a touch-up job is necessary, apply paint with a small brush. Remove rust from the cabinet by cleaning corroded metal with solvent (SD). In severe cases it may be necessary to use solvent (SD) to soften the rust and to use sandpaper to complete the preparation for painting. Paint used will be authorized and consistent with existing regulations.

Section III. TROUBLE SHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

24. Scope

a. The trouble shooting and repair work that can be performed at the organizational maintenance level (operators and repairmen) is limited necessarily in scope by the tools, test equipment, and replacement parts issued, and by the existing situation. Accordingly, trouble shooting is based on the performance of the equipment and the use of the senses in determining such troubles as overheated resistors, cracked insulators, etc.

b. The paragraph which follows helps in localizing a fault in the power supply to a particular part.

25. Visual Inspection

a. Failure of this equipment to operate properly usually will be caused by one or more of the fol-

lowing faults:

(1) Improperly connected battery cable.
(2) Burned-out fuses.
(3) Relay contacts burned because of overloads.
(4) Wires broken because of excessive vibration.
(5) Overheated resistors.

b. When failure is encountered and the cause is not immediately apparent, check as many of the above items as is practicable before starting a detailed examination of the component parts. If possible, obtain information from the operator of the equipment regarding performance at the time trouble occurred.

CHAPTER 4

THEORY

26. Block Diagrams
(figs. 12 and 13)

Figure 12 is a functional block diagram of Dynamotor-Power Supply DY–98/G. Figure 13 is a functional block diagram which applies to Dynamotor DY–93/U and Dynamotor-Power Supply DY–100/U. Complete schematic diagrams are shown in figures 21, 22, and 23.

a. The three power supplies develop the voltages listed in paragraph 5 which are necessary for the operation of the radio transmitters. The input power for the units is obtained from vehicular storage batteries; the units are similar with the exception of the required battery and the associated input circuits.

(1) Dynamotor-Power Supply DY–100/U requires a 6-volt storage battery as its power source.
(2) Dynamotor DY–93/U requires a 12-volt storage battery as its power source.
(3) Dynamotor-Power Supply DY–98/G requires a 24-volt storage battery as its power source.

b. The voltages which are required for the plate, screen, and bias supply circuits are developed in the dynamotor.

c. The low voltages which are required for the transmitter filaments, the antenna relay, and the crystal heater are obtained in different ways, according to the input voltage used. The same diagram, figure 13, is used for both Dynamotor-Power Supply DY–100/U and Dynamotor DY–93/U because the circuit differences are minor. Dynamotor-Power Supply DY–98/G employs a vibrator and transformer arrangement for furnishing the low voltages. The diagram, figure 12, illustrates the operation.

d. The battery switch located on the control unit must be closed and the relays energized in order to supply operating current to the transmitter. This switch is attached to the VOLUME control.

27. Stage Analysis of Dynamotor-Power Supply DY-100/U
(fig. 21)

a. General. Dynamotor-Power Supply DY–100/U is designed to be operated from a 6-volt vehicular storage battery. The d-c input voltage is applied to terminals 1 and 2 on connector P1203 as soon as the power supply unit is plugged into the cabinet of the system.

b. Power Input Circuits. The d-c input power first is applied through the switch ganged to the VOLUME control located on the control unit to power-on relay K1203, energizing it and causing its switch contacts to close. This sets up transmitting relay K1201 and dynamotor control relay K1202. Relay K1201 is energized when the push-to-talk switch on the handset is operated. When relay K1201 is energized, it completes the circuit to dynamotor control relay K1202.

c. Switching.

(1) *General.* No power reaches the transmitter, receiver, or any part of the power supply itself, beyond terminals 1, 2, and 18 on P1203, until the VOLUME-OFF switch is closed. This switch must be closed before the push-to-talk switch can be used to energize the transmitting relay, and the transmitting relay must be energized before dynamotor control relay K1202 can be energized.
(2) *Switch on VOLUME control.* Terminals 18 and 19 on P1203 are connected through the external switch ganged to the VOLUME control.

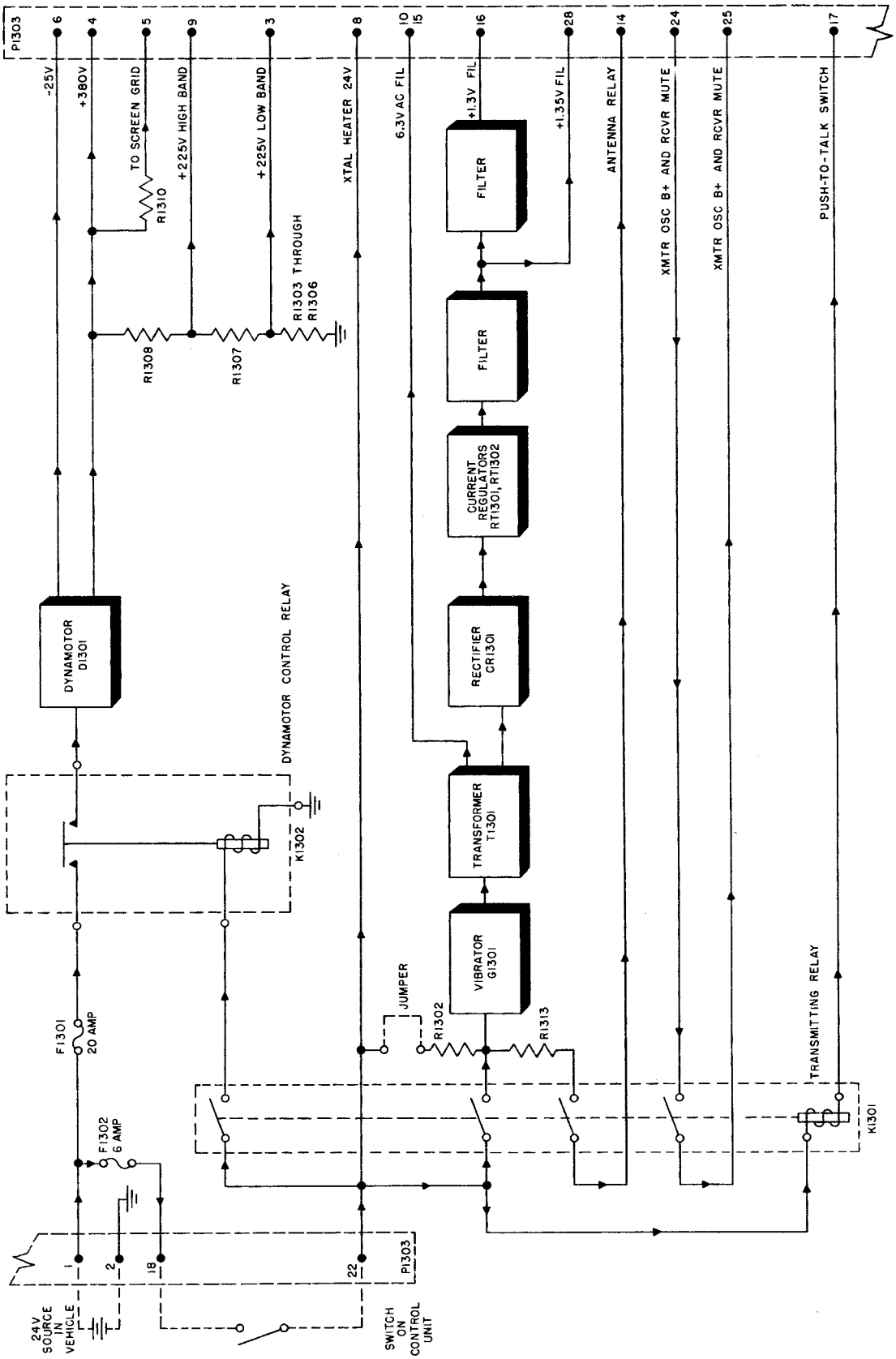


Figure 12. Dynamotor-Power Supply DY-98/G, functional block diagram.

(3) *Push-to-talk switch.* A push-to-talk switch is located on the handset. One side of this switch is grounded; the other side is connected to terminal 17 on P1203, which, in turn, is connected to transmitting relay K1201. When the switch is depressed, it completes the circuit through the relay coil. This action energizes the relay.

(4) *Power-on relay.* The grounded side of the storage battery already is connected to the winding of power-on relay K1203. When the VOLUME-OFF switch is closed, current is permitted to flow through terminal 1 on P1203, through a 15-ampere fuse, F1201, to terminal 18 on P1203; through the VOLUME-OFF switch to terminal 19 on P1203 and from there to the grounded side of the coil winding on relay K1203. When current from the storage battery passes through the relay coil, an electromagnetic field of force is set up, which attracts the armature and closes the switch contacts of the relay. Thus, the function of the relay is to act as a remotely controlled switch for the storage battery. Its purpose is to reduce the line voltage drop and the power loss which would result if battery current for all circuits had to pass through a long cable to the VOLUME-OFF switch and then back to the power supply. Fuse F1201 protects the circuits from damage due to overloading.

(5) *Transmitting relay.* With the switch contacts of relay K1203 closed, battery power is available at terminal 8 of transmitting relay K1201. When the push-to-talk switch on the handset is depressed, current flows through the relay coil, energizes the relay, and returns to the battery through ground. Relay K1201 has four sets of switch contacts, all of which are closed when the relay is energized. Actually only three circuits are closed, because two sets of contacts are connected together at terminals 2 and 7. This parallel arrangement of contacts doubles the conductivity at this point for the comparatively heavy current which passes through this part of the relay whenever the push-to-talk switch is depressed.

(6) *Dynamotor control relay.* With the switch contacts of relays K1203 and K1201 closed, current from the storage battery has a short path from terminal 1 on P1203, through the fuse, through the relay switch contacts, and through the coil winding of dynamotor control relay K1202 to ground. Resistor R1210 is connected across the coil terminals of relay K1202 to protect the contacts of transmitting relay K1201 from pitting by suppressing the spark caused by the inductance of the K1202 winding.

(7) *Dynamotor output plugs.* Since terminal 2 on P1203 is connected to ground, one side of the storage battery likewise will be grounded as soon as connection is made to terminals 1 and 2. Terminal 1 then would be known as the *ungrounded* battery lead. If terminal 1 is connected to the positive terminal of the battery, the two dynamotor output plugs are connected to the jacks on the dynamotor as shown in figure 21, the red plug P1201 connecting with jack J1201 and the black plug P1202 connecting with jack J1202. In some cases, however, it will be found that the positive side of the storage battery is grounded at the vehicle. When this is the case, dynamotor output plugs P1201 and P1202 must be reversed.

(8) *Jumper wire.* A jumper wire, when used, connects resistor R1202 across terminals 2 and 8 of relay K1201 to permit the transmitter tube filaments to be heated by a reduced voltage during stand-by periods (relay inoperative).

(9) *Receiver mute.* The switch across terminals 3 and 4 on transmitting relay K1201 is closed when the relay is energized, thus silencing the receiver during transmission periods.

d. Power Output Circuits.

(1) *Circuits controlled by transmitting relay.*

(*a*) *General.* The bias and high voltages are developed by dynamotor D1201. The dynamotor is a combination motor and generator which changes the low voltage supplied by the battery to a high voltage which is required by the circuits feeding the transmitter.

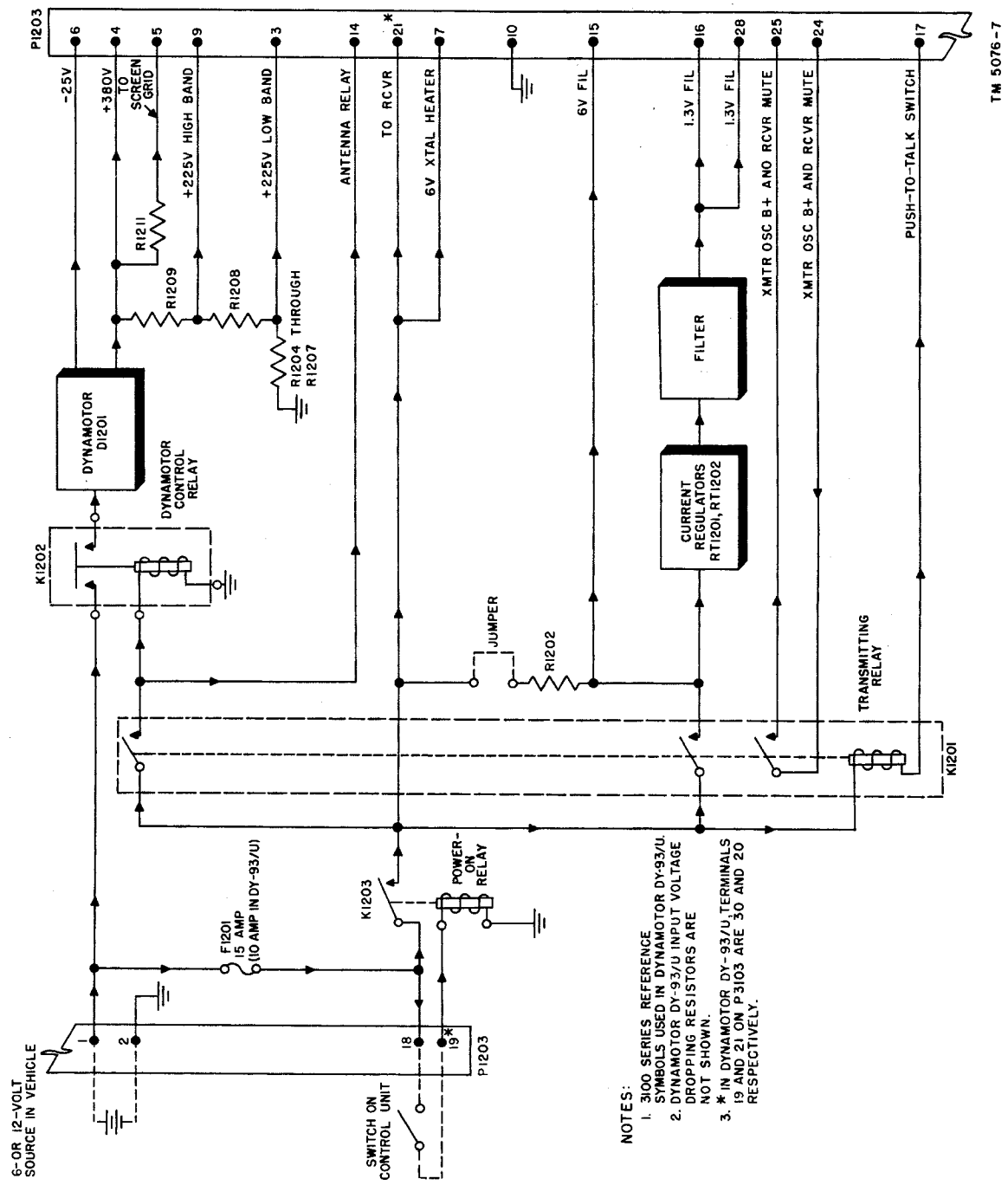


Figure 13. Dynamotor-Power Supply DY-100/U and Dynamotor DY-93/U, functional block diagram.

(*b*) *Voltage divider.* Seven resistors, R1209, R1208, R1207, R1206, R1205, R1204, and R1203, are connected between the positive output terminal and the negative output terminal of the dynamotor, from P1201 to P1202, respectively. These resistors, by acting as a constant load on the dynamotor, improve the voltage regulation. They also constitute a voltage divider network. Various voltages are available at the points where the resistors are joined together.

(*c*) *Bias.* The point between R1203 and R1204 is connected to ground in order to permit a negative 25 volts to be taken from the other end of R1203 and made available at terminal 6 of P1203 for the bias supply.

(*d*) *Plate.* The positive 380 volts is taken from the high end of the voltage divider, where R1209 is connected to the dynamotor. This voltage is available at terminal 4 of P1203 for the driver and power amplifier plates of the transmitter.

(*e*) *Screen.*

1. The 380 volts is reduced by R1211, and the resulting lower voltage is available at terminal 5 of P1203 for the screen grids of the transmitter driver and power amplifier.

2. Terminal 3 of P1203 is connected between R1207 and R1208 to provide 225 volts at 45 ma for use in Radio Transmitter T–208/U.

3. Radio Transmitter T–278/U also requires 225 volts but draws 70 ma. The additional current would result in a potential of less than 225 volts if the connection were made to terminal 3. To allow for this reduction in voltage at the higher current, a tap is provided between R1208 and R1209, which is connected to terminal 9 of P1203 for use with Radio Transmitter T–278/U. Therefore, two separate 225-volt terminals are necessary to provide 225 volts at different current drains. Terminal 9 furnishes 225 volts at 70 ma for the high-band transmitter and terminal 3 furnishes 225 volts at 45 ma for the low-band transmitter. Only one of these transmitters can be used at a time.

(*f*) *Filaments.*

1. The jumper wire and resistor R1202 determine the status of the transmitter filament circuits during stand-by periods. If the jumper wire is removed, transmitter filaments receive their full rated voltage during transmission periods, when the push-to-talk switch is closed, but receive no power when the push-to-talk switch is released during stand-by periods. With the jumper wire in the circuit, voltage-reducing resistor R1202 is connected effectively across switch contact terminals 2 and 8 of relay K1201, so that all transmitter tube filaments continue to operate at reduced voltage during stand-by periods but still receive their full rated voltage when the push-to-talk switch is closed.

2. The 6-volt filament power for the transmitter comes directly from the battery through terminal 1 on P1203, line fuse F1201, the switch contacts of power-on relay K1203, and the switch contacts on K1201 to terminal 15 on P1203.

3. The 1.3-volt filament power for the transmitter is obtained from the 6-volt circuit by means of a connection made from terminal 15 on P1203 through voltage-reducing resistor R1201, through current regulators RT1201 and RT1202, and through L1201 to terminals 16 and 28 on P1203. The resistance of the current regulator changes in direct proportion to any change in current. This maintains a constant current for the 1.3-volt filament supply. L1201 is a reactor that smooths any fluctuation in the circuit.

(*g*) *Antenna relay.* A connection is made from switch terminal 5 on transmitting relay K1201 to terminal 14 of P1203 so that when the push-to-talk switch energizes the transmitting relay, battery power is available for the antenna relay.

(2) *Circuits not controlled by transmitting relay.*

(*a*) *Crystal heater.* When the VOLUME-OFF switch is closed, energizing relay K1203, power is made available at terminal 7 on P1203 for the crystal heater.

(*b*) *Receiver.* When the VOLUME-OFF switch is closed, energizing relay K1203, power is made available at terminal 21 of P1203 for the receiver filaments and receiver power supply.

(3) *Test jacks.* Four jacks are mounted on the front panel of the power supply for the purpose of making voltage checks during operation without removing the unit from the cabinet. Jack J1203, connected to terminal 16 on P1203, is used to test the 1.3-volt filament voltage. Jack J1204, connected to terminal 6, is used to test the bias voltage. Jack J1205, connected to terminal 3, is used to test the voltage for the low-band transmitter. Jack J1206, connected to terminal 4, is used to test the plate voltage.

28. Stage Analysis of Dynamotor DY-93/U

(fig. 22)

The circuit description used for Dynamotor-Power Supply DY–100/U can be used for Dynamotor DY–93/U with the following changes:

a. Power Supply DY–93/U is designed for operation from a 12-volt vehicular storage battery.

b. The reference symbols for parts are in the 3100 series.

c. Resistor R3112 is added to reduce the antenna relay voltage to 6 volts.

d. Resistor R3113 is added to reduce the crystal heater voltage to 6 volts.

e. Resistor R3114 is added to improve the filament voltage regulation.

f. Resistor R3115 is added to reduce the filament voltage to 6 volts.

g. Fuses F3101 and F3102 are 10-ampere fuses.

h. Terminals 19 and 21 on P1203 are changed to 30 and 20, respectively, on P3103.

29. Stage Analysis of Dynamotor-Power Supply DY-98/G

(fig. 23)

a. General. Dynamotor-Power Supply DY–98/G is designed to be operated from a 24-volt vehicular storage battery. The d-c input voltage is applied to terminals 1 and 2 on connector P1303 as soon as the power supply unit is plugged into the cabinet of the system.

b. Power Input Circuits. The d-c input power is first applied through the switch ganged to the VOLUME control as described in paragraph 27*b*. Two line fuses are provided to protect the associated circuits from damage due to overloads. F1302 is a 6-ampere fuse in series with the battery supply. F1301, also in series with the battery supply, protects the dynamotor from damage due to overload. F1301 is a 20-ampere fuse. Spares are provided for both these fuses in adjacent fuseholders.

c. Switching. Relays K1301 and K1302 must be energized to supply the associated circuits with the input voltage. Transmitting relay K1301 is energized by the push-to-talk switch. Dynamotor control relay K1302 is energized when the transmitting relay is operated. This supplies power to the dynamotor. No power-on relay is required for Dynamotor-Power Supply DY–98/G since the line voltage drop which had to be considered in the case of 6- and 12-volt batteries is negligible in the case of a 24-volt source. In all other respects, the switching arrangement of the DY–98/G is identical to that described in paragraph 27*c*.

d. Power Output Circuits.

(1) *General.* Dynamotor-Power Supply DY–98/G is designed to provide a 6.3-volt a-c output and two 1.3-volt d-c outputs for the transmitter being used. Provision also is made for 6-volt dc for the antenna relay, 24-volt dc for the crystal heater, and various voltages for the plate, screen, and bias requirements of the transmitter. All output voltages in DY–98/G are for use by the transmitter and associated circuits. None of the output voltages is used in the receiver.

(2) *High voltage and bias.* The description given for Dynamotor-Power Supply DY–100/U applies equally to the DY–98/G with the exception of the reference symbols.

(3) *Filaments.*

(*a*) *6.3-volt ac.* For higher efficiency, a vibrator is used in the filament circuit. Vibrator G1301 is a nonsynchronous-type vibrator operating at a frequency

of 95 cycles per second. It changes the 24-volt dc to 24-volt ac which is applied to the transformer T1301. When the circuit is energized, electrons will flow from ground through current limiting resistor R1312, through the reed, through the driving coil to pin 3 of the vibrator, and through a switch of relay K1301 to the positive terminal of the battery (assuming that the negative terminal is grounded). Current through the driving coil develops a magnetic field which causes the reed to close contacts 4 and 5. In this position the coil and R1312 are taken out of the battery circuit. The electrons will flow at this instant from ground to contact 5, through the reed to contact 4, through winding 3-2 of T1301, and through the switch of relay K1301 to the positive terminal of the battery. Since the driving coil is taken out of the circuit, the field collapses and the reed is returned by spring action to the original position. The reed inertia, however, carries it through the original position and causes it to close contacts 1 and 2. Electrons then will flow from ground through contact 1 and through the reed to contact 2 and to the driving coil. The current divides at this point. Part of the current will flow through contact 2, through winding 1-2 of T1301, and through the switch of relay K1301 to the ungrounded terminal of the battery. The current flow is a direction opposite to that which previously flowed through winding 3-2 of T1301. The remaining current will return, by way of the driving coil, through the switch of relay K1301 directly to the ungrounded terminal of the battery. The current passing through the driving coil causes a magnetic field to be developed, and the cycle will be repeated. Thus the current flow through the driving coil is interrupted by periodic short-circuiting of the coil. As the reed vibrates, electrons flow alternately through vibrator contacts 2 and 4 connected to the primary winding. This reversal of current flow through the primary of T1301 constitutes an alternating current which induces a stepped-down a-c voltage in the two secondary windings (6-7-8 and 4-5). Buffer capacitor C1304 serves to reduce sparking and thereby prevents damage to the vibrator contacts due to high-voltage transients. It also improves the waveshape. Capacitors C1301, C1302, C1303, and C1305 serve to bypass r-f (radio-frequency) voltage to ground. Secondary terminals 4 and 5 provide 6.3-volt ac, for the 6-volt filaments, which is applied directly to terminals 10 and 15 of connector P1303.

(*b*) *1.3-volt dc.* Secondary terminals 6, 7, and 8 of transformer T1301 provide the current for the 1.3-volt filaments. The 7.5-volt ac furnished by the center-tapped secondary of T1301 is rectified by full-wave selenium rectifier CR1301. The 1.3-volt filament circuit is completed from rectifier CR1301 through RT1301 and RT1302, through L1301, and R1301. Here it divides. Part of the current will go directly to terminal 28 of connector P1303 and the remaining current will go through L1302 before being applied to terminal 16 of P1303. RT1301 and RT1302 regulate the current through the 1.3-volt filament circuit. The resistance of these current regulators will change in proportion to any change in current, keeping the current constant. Reactors L1301 and L1302 serve to filter the a-c ripple from the circuit. Capacitor C1306 across the secondary of L1302 increases the reactance of the primary winding, allowing a physically smaller reactor to be used with the same relative efficiency. R1301 is a filament voltage-reducing resistor.

(4) *Crystal heater.* The 24-volt d-c input is available directly at terminal 8 for the crystal heater. This circuit is closed as soon as the VOLUME-OFF switch is turned on.

(5) *Antenna relay.* The antenna relay power is obtained through voltage dropping resistor R1313 which is connected to the 24-volt source. It is delivered to terminal 14 on P1303 through contacts 5 and 6 of relay K1301.

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

Note. This chapter contains information for field maintenance. The amount of repair that can be performed by units having field maintenance responsibility is limited only by the tools and test equipment available, and by the skill of the repairman.

Section I. TROUBLE SHOOTING AT FIELD MAINTENANCE LEVEL

Warning: When servicing the power supply be extremely careful of the high voltages exposed. Keep one hand in pocket when measuring voltages with the probe. Before touching any part after the voltage is shut off, short the part to ground.

30. Trouble-shooting Procedures

a. General. The tests listed in this chapter aid in isolating the source of trouble. To be effective the procedure should be followed in the order given. Remember that servicing procedure should cause no further damage to the power supply. The first step in servicing a defective power supply is to localize the trouble to a single circuit. The second step is to isolate the trouble within that circuit. Some faults, such as burned-out resistors and shorted transformers, often can be located by sight, smell, and hearing. The majority of faults, however, must be isolated by *checking voltage and resistance.*

b. Servicing Procedure. The servicing procedure is summarized as follows:

(1) *Visual inspection.* The purpose of visual inspection (par. 25) is to locate any visible trouble. Through this inspection alone, the repairman frequently may discover the trouble, or determine the stage in which the trouble exists. This inspection is valuable in avoiding damage to the power supply which might occur through improper servicing methods and in forestalling future failures. If any abnormal conditions are found, the defects should be remedied before proceeding with trouble shooting and other tests.

(2) *Short-circuit check* (par. 34). These measurements prevent further damage to the power supply from possible short circuits. Since this test gives an indication of the condition of the filter circuits, its function is more than preventive.

(3) *Operational test* (par. 35). The operational test is important because it frequently indicates the general location of trouble. In many instances the information gained will determine the exact nature of the fault. To utilize this information fully, all symptoms must be interpreted in relation to one another.

(4) *Trouble-shooting chart.* The trouble symptoms listed in this chart (par. 38) will aid greatly in localizing trouble.

(5) *Resistance measurements* (par. 36). These measurements are made to locate faults or defective parts and wiring.

(6) *Voltage measurements* (par. 37). Voltage measurements at significant points of the circuit may disclose faults not observable during previous tests.

(7) *Intermittents.* In all these tests the possibility of intermittents should not be overlooked. If present, this type of trouble often may be made to appear by tapping or jarring the set. It is possible that the trouble may be due to external conditions. In this event, test the installation, if possible.

31. Trouble-shooting Data

Take advantage of the material supplied in this manual. It will help in rapid location of faults. Consult the following trouble-shooting data.

Fig. or par. No.	Description
Figs. 5, 3, and 4	Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G and DY-100/U, bottom views.
Figs. 9, 7, and 8	Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G and DY-100/U, top views.
Fig. 12	Dynamotor-Power Supply DY-98/G, functional block diagram.
Fig. 13	Dynamotor-Power Supply DY-100/U and Dynamotor DY-93/U, functional block diagram.
Fig. 14	Power supplies, operational test set-up.
Figs. 16, 17, and 15	Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G and DY-100/U, voltage and resistance diagrams.
Figs. 22, 23, and 21	Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G and DY-100/U, schematic diagrams.
Pars. 34 and 36	Resistance charts.
Pars. 35 and 37	Voltage charts.

32. Test Equipment Required for Trouble Shooting

The test equipment required for trouble shooting the power supplies and the technical manuals associated with the test equipment are listed below.

Test equipment	Technical manual
1 Multimeter TS-352/U	TM 11-5527
1 Electronic Multimeter TS-505/U	TM 11-5511
1 Voltohmmeter TS-294/U	TM 11-2624B

33. General Precautions

Whenever the power supply is serviced, observe the following precautions:

a. Be careful when the power supply unit is in operation; dangerous voltages are exposed.

b. To prevent overheating, do not allow the dynamotor to run more than 3 minutes out of every 15.

c. Careless replacement of parts often makes new faults inevitable. Note the following points:

(1) Before a part is unsoldered, note the position of the leads. If the part, such as a transformer, has a number of connections, tag each lead.

(2) Be careful not to damage other leads by pulling or pushing them out of the way.

(3) Do not allow drops of solder to fall into the unit, since they may cause short circuits.

(4) A carelessly soldered connection may create a new fault. It is very important to make well-soldered joints, since a poorly soldered joint is one of the most difficult faults to find.

34. Short-Circuit Checks

a. Resistance Measurements. Trouble within the power supply often may be detected by checking the resistance of the filament and high-voltage circuits before applying power to the equipment, thereby preventing damage to the power supply. Make the following checks before attempting to put the power supply in operation. For these measurements, power should be disconnected from the equipment and all plug-in parts and the two dynamotor plugs removed from their sockets. Remove the jumper, if provided with the power supply. Be sure the fuses are good.

(1) *Dynamotor-Power Supply DY–100/U, resistance measurements.*

Terminal on P1203	Nominal reading (ohms)
2 to 1	infinity
2 to 3	18,800
2 to 4	22,200
2 to 5	28,500
2 to 6	100
2 to 7	infinity
2 to 9	20,000
2 to 10	zero
2 to 14	4
2 to 15	infinity
2 to 16	infinity
2 to 17	infinity
2 to 18	infinity
2 to 19	infinity
2 to 21	infinity
2 to 24	infinity
2 to 25	infinity
2 to 28	infinity

(2) *Dynamotor DY–93/U, resistance measurements.*

Terminal on P3103	Nominal reading (ohms)
2 to 1	infinity
2 to 3	18,800
2 to 4	22,200
2 to 5	28,500
2 to 6	100
2 to 7	infinity
2 to 9	20,000
2 to 10	zero
2 to 14	26
2 to 15	68
2 to 16	infinity
2 to 17	infinity
2 to 18	infinity
2 to 20	infinity
2 to 24	infinity
2 to 25	infinity
2 to 28	infinity
2 to 30	infinity

(3) *Dynamotor-Power Supply DY–98/G, resistance measurements.*

Terminal on P1303	Nominal reading (ohms)
2 to 1	infinity
2 to 3	18,800
2 to 4	22,200
2 to 5	28,500
2 to 6	100
2 to 8	infinity
2 to 9	20,000
2 to 10	infinity
2 to 14	infinity
2 to 15	infinity
2 to 16	infinity
2 to 17	infinity
2 to 18	infinity
2 to 22	infinity
2 to 24	infinity
2 to 25	infinity
2 to 28	infinity
10 to 15	.1

b. Abnormal Readings. If readings within 10% of those required are not obtained, refer to the schematic diagram (figs. 21, 22, or 23), to determine which part or parts may be responsible for the trouble. Abnormal readings may be due to a defective connector, wiring, burned resistor, or a wire or lug on one of the parts shorted to the chassis. Check the plug-in parts while they are out of their sockets. Check the wires and the lugs on all parts. Repair as necessary. Do not apply power until the trouble has been cleared and all the readings in the table have been obtained.

35. Operational Test

a. The purpose of the operational test described in this paragraph is to determine whether the power supply delivers the proper output voltages and draws the rated amount of current from the battery when loads simulating actual operating conditions are connected across the output terminals. Based upon the results of these measurements, the trouble in the power supplies may be localized directly to one of the circuit sections. Refer to the detailed checks outlined in paragraphs 36 and 37 to trace the fault to a specific part within the particular circuit section.

b. Refer to the operational test setup (fig. 14) and proceed as follows. Make sure all plug-in parts are inserted properly.

(1) Remove the top and bottom covers from the power supply.

(2) Select a storage battery having the required voltage (12, 24, or 6 volts for Dynamotor DY–93/U and Dynamotor-Power Supplies DY–98/G and DY–100/U, respectively).

(3) Connect the ungrounded battery lead to terminal 1 of the connector.

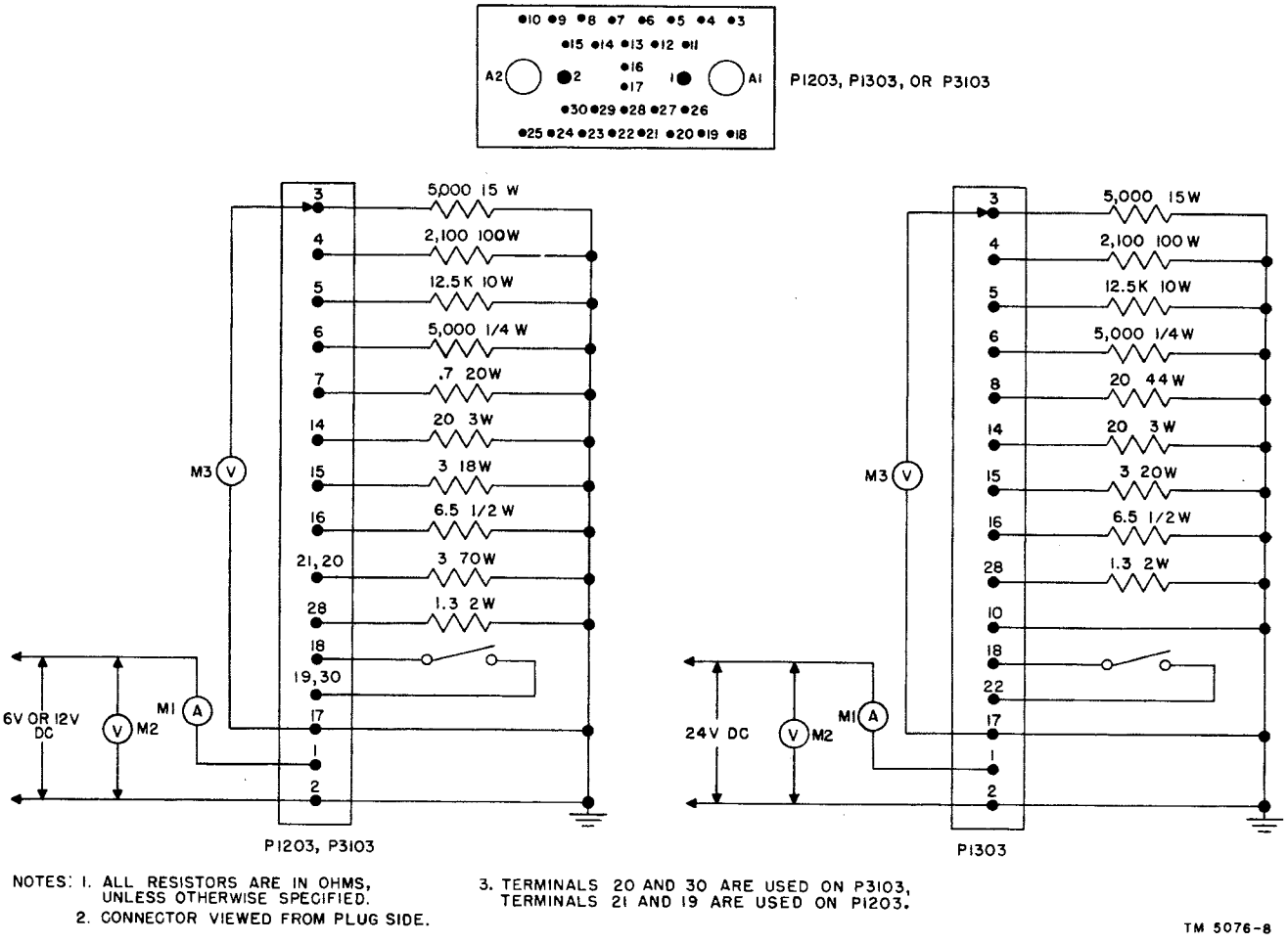


Figure 14. Power supplies, operational test set-up

(4) Connect the grounded battery lead In series with the ammeter to terminal 2 of the connector. Use the 0 to 20 ampere range on the ammeter.

(5) Connect the load resistors between terminal 2 and each of the other terminals of the connector as indicated in figure 14. Be sure that correct load resistors are connected for the particular condition of operation. A properly loaded and alined transmitter, T–208/U or T–278/U, may be used in place of the load resistors.

(6) Terminal 17 on the connector must be grounded to operate the transmitting relay. The required readings are shown in the following table:

Terminals on connector	Nominal reading (volts, dc)
6 to 2	−25
4 to 2	380
5 to 2	220
3 to 2	225
14 to 2	6
21 to 2 (DY–100/U)	6
20 to 2 (DY–93/U)	12
22 to 2 (DY–98/G)	24
7 to 2 (DY–100/U) (DY–93/U)	6 6
8 to 2 (DY–98/G)	24
10 to 15 (DY–100/U) (DY–93/U) (DY–98/G)	6 6 6 ac
16 to 2	1.3
28 to 2	1.3

c. When the required readings are obtained, proceed with the additional tests given in paragraph 45. If the required voltages are not obtained, proceed with the detailed trouble-localization checks given in paragraphs 36 and 37.

36. Resistance Measurements

These checks are intended to locate the defective parts or wiring responsible for failure to meet the requirements of paragraph 35. Before these checks are made make the checks listed in paragraph 34 to locate the defective section of the power supply. For these checks remove the power supply from the cabinet; remove all plug-in parts and the two dynamotor plugs. Use Electronic Multimeter TS–505/U or an equivalent meter. The points to be tested, the required readings, and the probable cause of trouble if the readings are incorrect, are listed in the following table. Replace any part found to be defective. Replace all parts removed during tests after the tests are completed.

a. Input Circuits. To check the input circuits make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, input circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 1 on P1203 to term. 1 on K1202	zero	Defective wiring
Term. 1 to term. 18 on P1203	zero	Defective F1201

(2) *Dynamotor DY–93/U, input circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 1 on P3103 to term. 1 on K3102	zero	Defective wiring
Term. 1 to term. 18 on P3103	zero	Defective F3101

(3) *Dynamotor-Power Supply DY–98/G, input circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 1 on P1303 to term. 1 on K1302	zero	Defective F1301
Term. 1 to term. 18 on P1303	zero	Defective F1302

b. Negative 25-Volt Supply Circuit. If the voltage measurement made between terminals 6 and 2 of the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, bias circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 2 on P1203 to P1202	100	Defective R1203
Term. 2 on P1203 to term. 2 on K1202	4	Defective R1210, K1202

(2) *Dynamotor DY–93/U, bias circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 2 on P3103 to P3102	100	Defective R3103
Term. 2 on P3103 to term. 2 on K3102	14	Defective R3110, K3102

(3) *Dynamotor-Power Supply DY–98/G, bias circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 2 on P1303 to P1306	100	Defective R1311
Term. 2 on P1303 to term. 2 on K1302	61	Defective R1309, K1302

c. 380-Volt Supply Circuit. If the voltage measurement made between terminals 4 and 2 on the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 380-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 4 to term. 5 on P1203	6,300	Defective R1211
Term. 4 on P1203 to P1201	zero	Defective wiring

(2) *Dynamotor DY–93/U, 380-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 4 to term. 5 on P3103	6,300	Defective R3111
Term. 4 on P3103 to P3101	zero	Defective wiring

(3) *Dynamotor-Power Supply DY–98/G, 380-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 4 to term. 5 on P1303	6,300	Defective R1310
Term. 4 on P1303 to P1305	zero	Defective wiring

d. 6-Volt Filament Circuit. If the voltage measurement made between terminals 10 and 15 on the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 6-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 15 on P1203 to term. 2 on XK1201	zero	Defective wiring

(2) *Dynamotor DY–93/U, 6-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 15 on P3103 to term. 5 on XK3101	zero	Defective wiring

(3) *Dynamotor-Power Supply DY–98/G, 6-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 10 to term. 15 on P1303	.02	Defective T1301, wiring

e. 1.3-Volt Filament Circuit. If the voltage measurement made between terminals 28 and 2 or terminals 16 and 2 of the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 1.3-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 1 to term. 2 on L1201	1.2	Defective L1201
Term. 15 on P1203 to term. 7 on XRT-1201 or XRT1202	1	Defective R1201

(2) *Dynamotor DY–93/U, 1.3-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 1 to term. 2 on L3101	1.3	Defective L3101
Term. 15 on P3103 to term. 7 on XRT-3101 or XRT3102	1	Defective R3101

(3) *Dynamotor-Power Supply DY–98/G, 1.3-volt circuit resistance.*

Point of measurement	Nominal reading (ohms)	Probable trouble
Term. 1 to term. 2 on L1301	1.3	Defective L1301
Term. 6 to term. 8 on T1301	.3	Defective T1301
Term. 1 to term. 3 on T1301	1.5	Defective T1301

f. Plug-in Parts. The plug-in parts that were taken out of the circuit also must be checked to insure proper operation. If any of the following readings are not obtained, replace the faulty part.

(1) *Relays K1201, K3101, and K1301 resistance.*

Relay pins	Nominal reading (ohms)
3 to 4	infinity
5 to 6	infinity
2 to 8	infinity
7 to 8	infinity
1 to 8	K1301 (240), K3101 (60), K1201 (15)

(2) *Relays K1203 and K3103 resistance.*

Relay pins	Nominal reading (ohms)
4 to 6	infinity
1 to 4	infinity
1 to 6	infinity
1 to 9	K1203 (12), K3103 (48)

(3) *Current regulator tubes resistance.*

Point of measurement	Nominal reading (ohms)
Term. 2 to term. 7 on RT1201, RT1202, RT3101, RT3102, RT1301, and RT1302	1

37. Voltage Measurements

The voltage measurements in this paragraph supplement the resistance measurements of paragraph 36 and are intended to find defects which are not readily determined by resistance measurements. For these measurements, replace all plug-in parts. Connect the load resistors as described in paragraph 35. Before these measurements are made, make the measurements in paragraph 35 to sectionalize the defective part. Refer to the schematic diagram (figs. 21, 22, and 23) to identify the points of measurements with the circuit involved. Use Electronic Multimeter TS–505/U or an equivalent meter. Apply the power to the input circuits. The tables in subparagraph *a* below

list measurements at significant points in the circuits of the power supply.

Caution: High voltages are present at the measuring points. Use well-insulated test leads. Use the proper range on the multimeter.

a. Input Circuits. Make the following measurements if the output voltages are incorrect on any connector terminals.

(1) *Dynamotor-Power Supply DY–100/U, input circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Term. 1 to term. 2 on P1203	6	Improper battery connection, defective P1203
Term. 18 to term. 2 on P1203	6	Defective F1201
Term. 19 to term. 2 on P1203	6	VOLUME switch in OFF position, or defective
Term. 21 to term. 2 on P1203	6	Defective K1203
Term. 5, 2, and 7 on XK1201 to term. 2 on P1203	6	Defective K1201

(2) *Dynamotor DY–93/U, input circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Term. 1 to term. 2 on P3103	12	Improper battery connection, defective P3103
Term. 18 to term. 2 on P3103	12	Defective F3101
Term. 30 to term. 2 on P3103	12	VOLUME switch in OFF position, or defective
Term. 20 to term. 2 on P3103	12	Defective K3103
Term. 2 and 7 on K3101 to term. 2 on P3103	12	Defective K3101

(3) *Dynamotor-Power Supply DY–98/G, input circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Term. 1 to term. 2 on P1303	24	Improper battery connection, defective P1303
Term. 18 to term. 2 on P1303	24	Defective F1302
Term. 22 to term. 2 on P1303	24	VOLUME switch in OFF position or defective
Term. 1 on K1302 to term. 2 on P1303	24	Defective F1301

b. Negative 25-Volt Supply Circuit. If the voltage reading made between terminals 6 and 2 on the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, negative 25-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Term. 2 on P1203 to P1202	−25	Defective D1201, R1203
Term. 1 of K1202 to term. 2 on P1203	6	Defective wiring
Term. 2 of K1202 to term. 2 on P1203	6	Defective K1202, R1210
Term. 4 of K1202 to term. 2 on P1203	6	Defective K1202

(2) *Dynamotor DY–93/U, negative 25-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
P3102 to term. 2 on P3103	−25	Defective D3101, R3103
Term. 1 of K3102 to term. 2 on P3103	12	Defective wiring
Term. 2 of K3102 to term. 2 on P3103	12	Defective K3102, R3110
Term. 4 of K3102 to term. 2 on P3103	12	Defective K3102

(3) *Dynamotor-Power Supply DY–98/G, negative 25-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
P1306 to term. 2 on P1303	−25	Defective D1301, R1311
Term. 2 on K1302 to term. 2 on P1303	24	Defective K1302, R1309
Term. 4 on K1302 to term. 2 on P1303	24	Defective K1302

c. 380-Volt Supply Circuit. If the voltage reading made between terminals 4 and 2 on the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 380-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
P1201 to term. 2 on P1203	380	Defective D1201

(2) *Dynamotor DY–93/U, 380-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
P3101 to term. 2 on P3103	380	Defective D3101

(3) *Dynamotor-Power Supply DY–98/G, 380-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
P1305 to term. 2 on P1303	380	Defective D1301

d. 225-Volt Circuit. If the voltage reading made between terminals 3 and 2 on the connector (when the T–208/U is used) or terminals 9 and 2 on the connector (when the T–278/U is used) is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 225-volt circuit voltage.*

Point of measurement	Radio Transmitter	Nominal reading (volts dc)	Probable trouble
Between R1208 and R1209 to term. 2 on P1203	T–208/U	280	Defective R1209
Between R1207 and R1208 to term. 2 on P1203	T–208/U	225	Defective R1204, R1205, R1206, R1207, or R1208
Between R1208 and R1209 to term. 2 on P1203	T–278/U	225	Defective R1204, R1205, R1206, R1207, R1208, or R1209

(2) *Dynamotor DY–93/G, 225-volt circuit voltage.*

Point of measurement	Radio Transmitter	Nominal reading (volts dc)	Probable trouble
Between R3108 and R3109 to term. 2 on P3103	T–208/U	280	Defective R3109
Between R3107 and R3108 to term. 2 on P3103	T–208/U	225	Defective R3104, R3105, R3106, R3107, or R3108
Between R3108 and R3109 to term. 2 on P3103	T–278/U	225	Defective R3104, R3105, R3106, R3107, R3108, or R3109

(3) *Dynamotor-Power Supply DY–98/G, 225-volt circuit voltage.*

Point of measurement	Radio Transmitter	Nominal reading (volts dc)	Probable trouble
Between R1307 and R1308 to term. 2 on P1303	T–208/U	280	Defective R1308
Between R1306 and R1307 to term. 2 on P1303	T–208/U	225	Defective R1303, R1304, R1305, R1306, or R1307
Between R1307 and R1308 to term. 2 on P1303	T–278/U	225	Defective R1303, R1304, R1305, R1306, R1307, or R1308

e. 6-Volt Filament. If the voltage reading made between terminals 10 and 15 on the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 6-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Between R1201 and R1202 to term. 2 on P1203	6	Defective wiring, K1201

(2) *Dynamotor DY–93/U, 6-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Between R3101 and R3102 to term. 2 on P3103	6	Defective wiring, K3101

(3) *Dynamotor-Power Supply DY–98/G, 6-volt circuit voltage.*

Point of measurement	Nominal reading (volts ac)	Probable trouble
Term. 4 to term. 5 on T1301	6.3	Defective T1301, G1301, K1301

f. 1.3-Volt Filament. If the voltage reading made between terminals 16 and 2 or 28 and 2 on the connector is not normal, make the following measurements:

(1) *Dynamotor-Power Supply DY–100/U, 1.3-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Term. 7 on XRT1201 and XRT1202 to term. 2 on P1203	3	Defective R1201

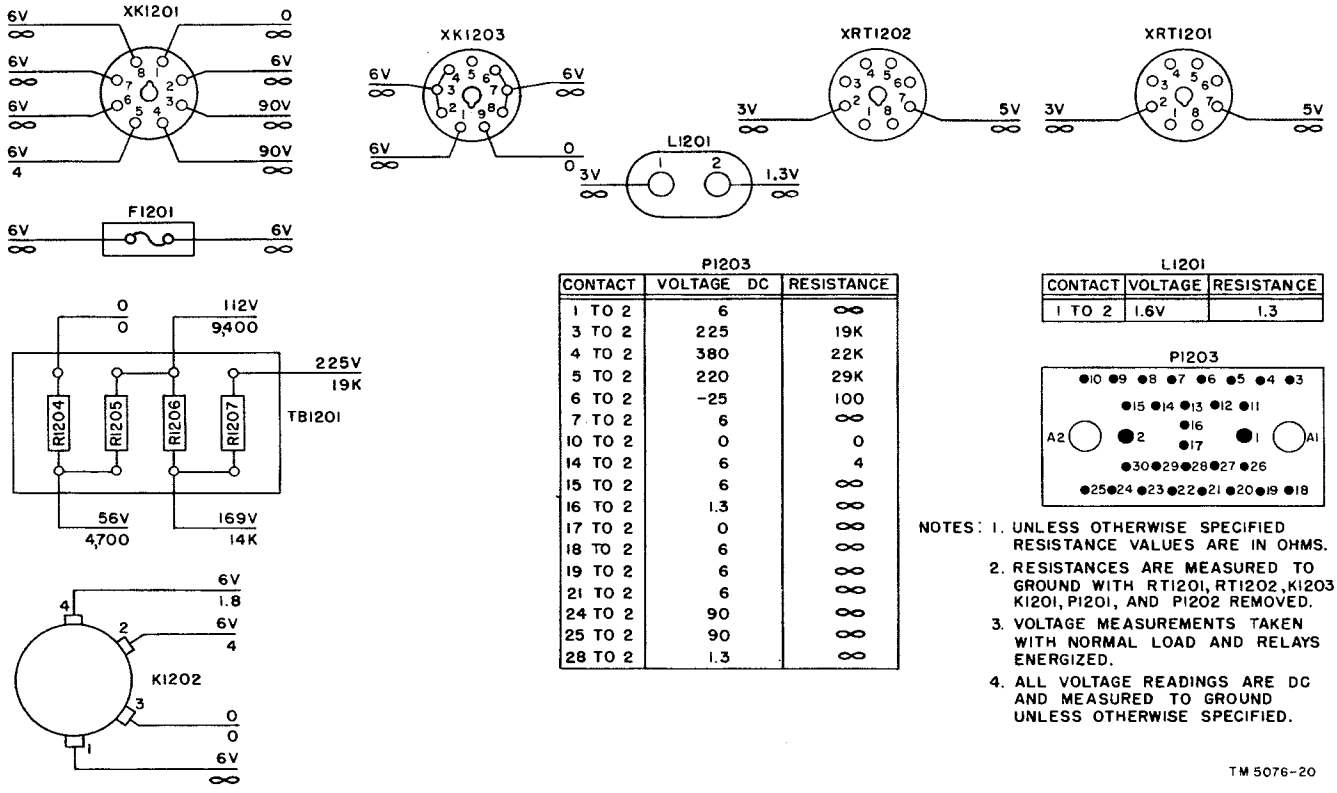


Figure 15. Dynamotor-Power Supply DY–100/U, voltage and resistance diagram.

(2) *Dynamotor DY–93/U, 1.3-volt circuit voltage.*

Point of measurement	Nominal reading (volts dc)	Probable trouble
Term. 7 on XRT3101 and XRT3102 to term. 2 on P3103	3	Defective R3101

(3) *Dynamotor-Power Supply DY–98/G, 1.3-volt circuit voltage.*

Point of measurement	Nominal reading (volts ac)	Probable trouble
Between L1301 and R1301 to term. 2 on P1303	2.5	Defective L1301, RT1301, RT-1302, or K1301
Term. 2 on XRT1301 and XRT1302 to Term. 2 on P1303	5	Defective RT-1301, RT1302, or K1301

38. Dynamotor Trouble-shooting Chart

The following chart shows the symptoms, probable causes, and action to be taken in the case of dynamotor malfunction. Before these checks are made, be sure the trouble is not in another part of the power supply.

Symptom	Probable cause	Action
Dynamotor starts with a delayed action, runs unsteadily at low starting speeds, or heats badly when motor has been running a short time.	Armature winding short-circuited.	Clean, replace, or rewind armature.
Severe sparking at commutator at one segment.	Open circuit in armature winding.	Replace or rewind armature.
Hash noise in receiver.	Open capacitor on top of dynamotor.	Replace capacitor.
	Worn brushes.	Replace brushes.
No output voltage; armature overheats.	Shorted capacitor on top of dynamotor.	Replace capacitor.
Dynamotor overheats at bearings or is noisy.	Bearings not fitting properly or are worn.	Replace bearings.
Output voltages low or intermittent.	Poor brush contact.	Replace brushes.
Dynamotor does not start or no output voltage.	Open field winding.	Replace dynamotor.

39. D-c Resistances of Transformers, Coils, and Relays

The d-c resistances of the transformer windings, the relay windings, and the coils in the power supplies are listed below:

Component	Terminals	Ohms
T1301	1-2	.75
	2-3	.75
	4-5	.1
	6-7	.15
	7-8	.15
K1201	1-8	15
K1202	2-3	4
K1203	1-9	12
K3101	1-8	60
K3102	2-3	16
K3103	1-9	48
K1301	1-8	240
K1302	2-3	64
L1201	1-2	1.3
L3101	1-2	1.3
L1301	1-2	1.3
L1302	1-2	.4

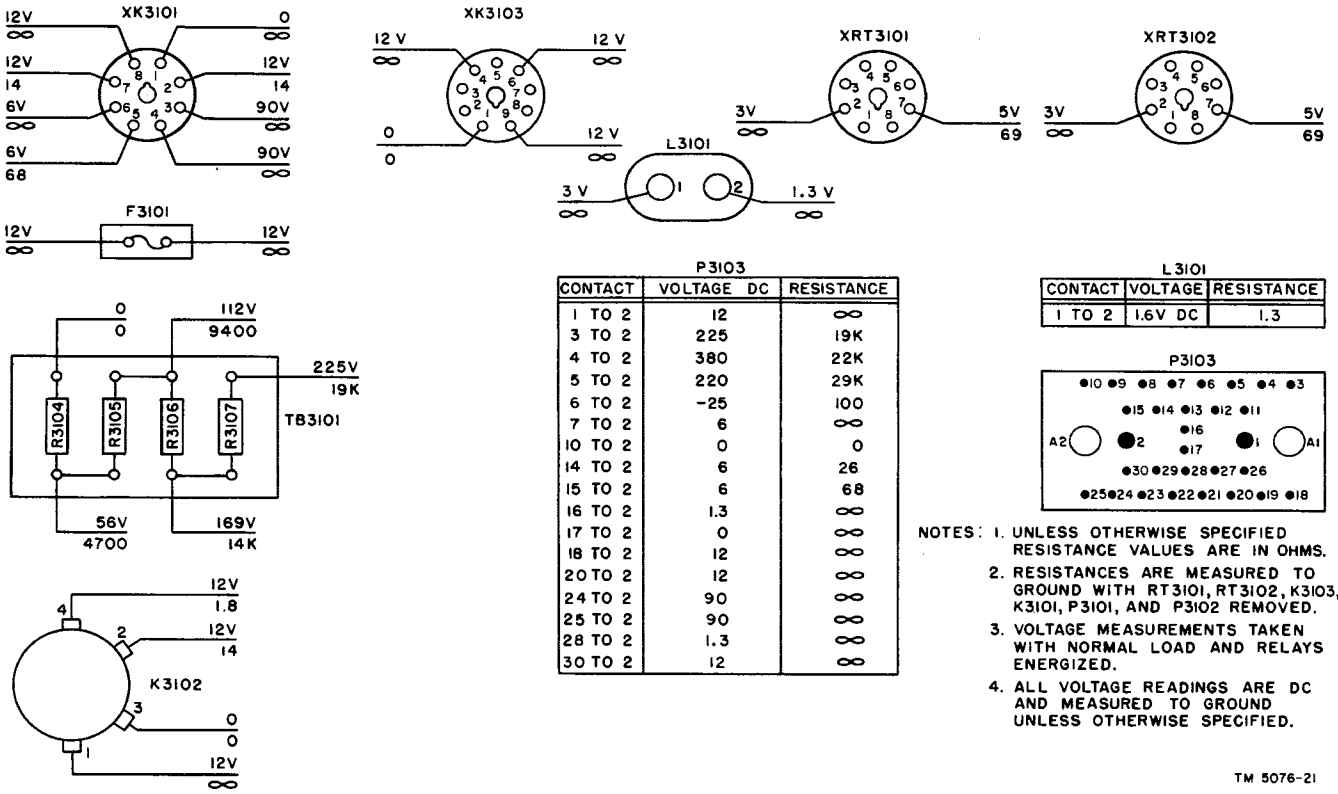


Figure 16. Dynamotor DY-93/U, voltage and resistance diagram.

Section II. REPAIRS

40. Replacement of Parts

a. Tagging Leads. Tag all leads to insure correct rewiring will be made when a part is replaced. Before unsoldering any leads, tie together the leads that are attached to each part. Use small tags or short pieces of adhesive tape to identify all wires in accordance with their numbered connections. Draw a schematic diagram of the section which is to be repaired. Identify every lead that is to be removed.

b. Parts and Substitutions. When damaged parts must be replaced, identical parts should be used. If identical parts are not available and the damaged part is beyond repair, a substitution must be made. The part substituted must have identical electrical properties and must have equal or higher voltage and current ratings.

Caution: Fuses may be replaced only by those having identical voltage and current ratings, except in an emergency when the specified type is not available.

c. Location. The relocation of a substituted part may develop hum or other interference and is not recommended.

d. Mounting. Mount the new or repaired part in the mounting that the damaged part occupied originally. Fasten all mountings securely.

e. Soldering. Before soldering any connections, carefully scrape all parts that will be touched by the solder until all traces of rust, corrosion, paint, or varnish are removed. Dust the scraped parts with a small clean brush. Tin all surfaces to be soldered. Wrap the wire around the lug to be soldered to obtain mechanical support. Solder the connection, using a minimum amount of solder with sufficient heat to make the solder flow evenly around the tinned surfaces.

f. Retropicalization. If the part to be replaced requires special treatment, such as retropicalization, follow the instructions given in the appropriate publications referred to in paragraph 23.

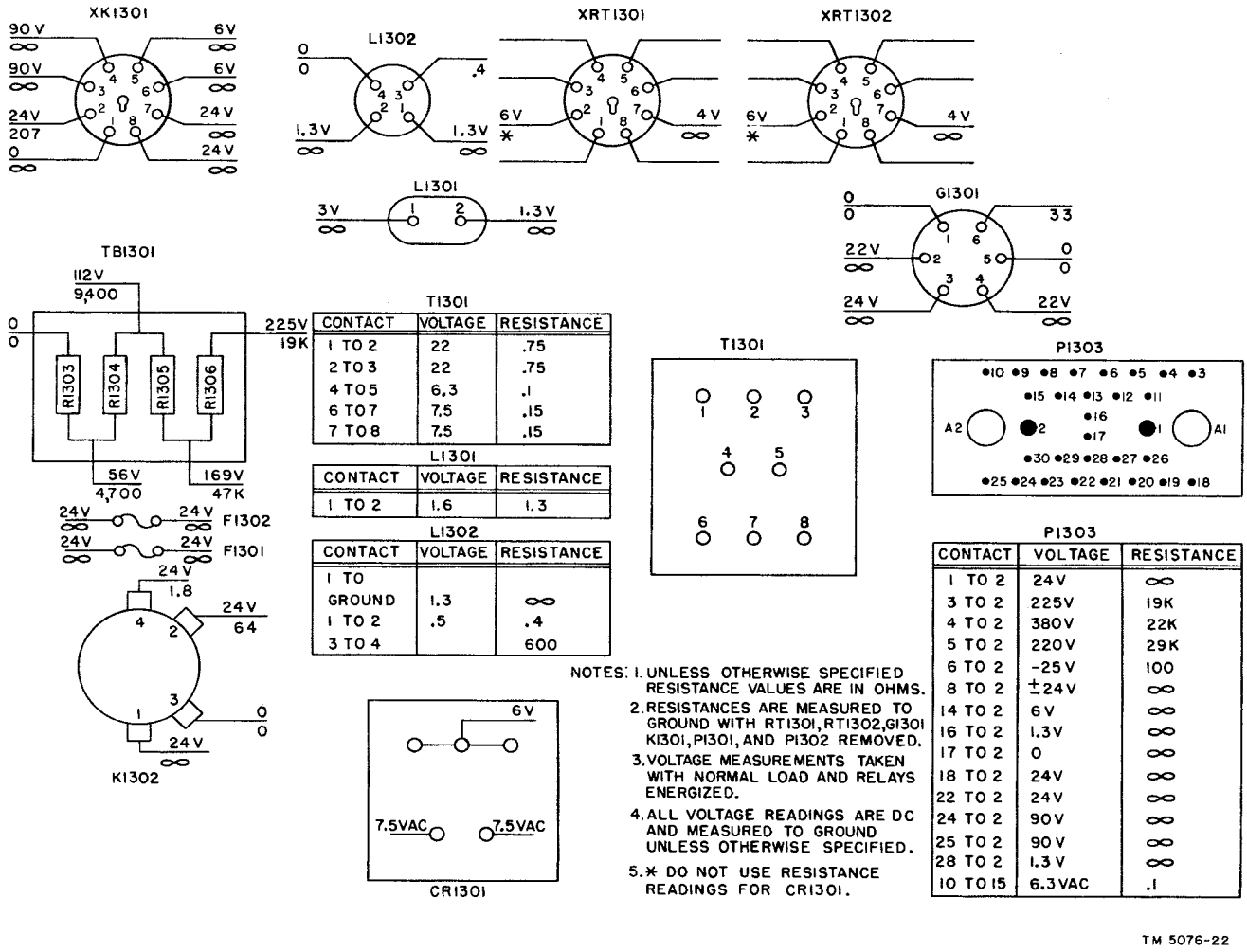


Figure 17. Dynamotor-Power Supply DY-98/G, voltage and resistance diagram.

41. Refinishing

Instructions for refinishing badly marred panels and exterior surfaces of cases are given in TM 9-2851.

42. Special Repair Procedures

Most of the parts in these power supplies are readily accessible and can be replaced easily without special procedure instructions. Special repair procedures required for repairing or replacing sockets, filter reactors, and transformers are given in subparagraphs *a*, *b*, and *c* below. For information on dynamotors, see TB SIG 134.

a. Sockets. All sockets are attached to the chassis by means of rivets. To change a socket:

(1) Remove the part plugged into the socket.

(2) Tag and unsolder the wires connected to the socket.

(3) Drill out the two rivets.

(4) Substitute a new socket and fasten it with rivets or machine screws, lockwashers, and nuts.

(5) Resolder the wires to the socket.

(6) Clean the unit thoroughly to remove solder drops and metal chips.

(7) Check the new connections with those shown in the schematic for that unit.

b. Filter Reactors.

(1) Tag all leads connected to the reactor terminals.

(2) Carefully unsolder all leads connected to the terminals.

(3) Remove the four mounting nuts on the mounting plate.

(4) Carefully slide the reactor from the mounting holes and replace it.
(5) Resolder the leads to the terminals.

c. Transformers.
(1) Tag all leads.
(2) Unsolder all leads to the terminals.
(3) Remove the nuts which hold the transformer secure at the base.
(4) Carefully slide the transformer out of the mounting holes and replace it.
(5) Resolder the leads to the terminals.

d. Dynamotor Disassembly. Because of the special design and construction of these dynamotors, it is not advisable to disassemble and repair them in the field. All repairs or maintenance other than routine brush replacement should be made at the depot where special test equipment and tools are available. Disassembly procedure is as follows:
(1) Remove the nut that fastens the ground lead of the dynamotor to the power supply chassis.
(2) Remove the nut that fastens the dynamotor input lead to the dynamotor control relay.
(3) Remove the two dynamotor output plugs.
(4) Remove the screws that hold the capacitor in place.
(5) Remove the dynamotor strap from the chassis.
(6) Remove the four mounting screws from the under side of the chassis.
(7) Remove the four brushes by removing the four caps located on the two sides of the dynamotor.
(8) Remove the two nuts and lockwashers on the output bearing bracket. (Do not attempt to remove the input bearing bracket end because the field coil is soldered to the input brush holders. These holders can be reached only from the output end.)
(9) Insert a screw driver between the bracket and the frame and gently ease the bearing and bracket off with a lever action. Be careful not to damage the bearing or the bracket locating pins installed in the frame.
(10) Spread the ends of the field coils slightly with automobile valve lifters or a similar tool to permit removal and passage of the armature. Pull the armature straight out; be careful not to damage the armature or the field coils. Count and save the fiber spacer washers that are loosely held at the end of each bearing.

e. Dynamotor Reassembly. Reassemble the unit by reversing the disassembly procedure. Be careful when placing the bearings in the housing. The end bracket should be installed by hand pressure only and should not be tapped with a hammer or other tool. After the armature is reinstalled, look into the brush holders to be sure proper brush alinement is allowed on the commutators. The armature can be shifted for proper alinement with the fiber bearing spacer washers. Reinstall the used brushes in their original positions; use the original holders.

Note. The armature end play should be adjusted from .005 inch to .008 inch for proper bearing operation. The adjustment is made by means of the addition, removal, or shifting of the spacer washers. Do not remove the bearing tension spring to achieve the desired end play.

f. Bearing Replacement. The dynamotor is equipped with single roll precision fit ball bearings containing sufficient grease for the life of the dynamotor. The bearing is equipped with a seal on the commutator side and a shield on the outside, which prevents the grease from becoming contaminated or from running out at extremely high temperatures. The grease used will operate satisfactorily from −54° C (−65° F) to 121° C (250° F). The limits of bearing end play are from .0015 inch to .003 inch. Field replacement of ball bearings is not recommended. To replace the ball bearings, be sure the replacement bearing is mounted on the shaft with the pressure placed against the inner race. If the outer race is used to press the bearings on the shaft, the bearings will become damaged and noisy operation will result. Bearing replacement must be done with a properly alined arbor press and fixtures.

Section III. FINAL TESTING

43. General

This section is intended as a guide to be used in determining the quality of a repaired power supply. The minimum test requirements outlined in paragraphs 44 through 46 may be performed by maintenance personnel with adequate test equipment and the necessary skills.

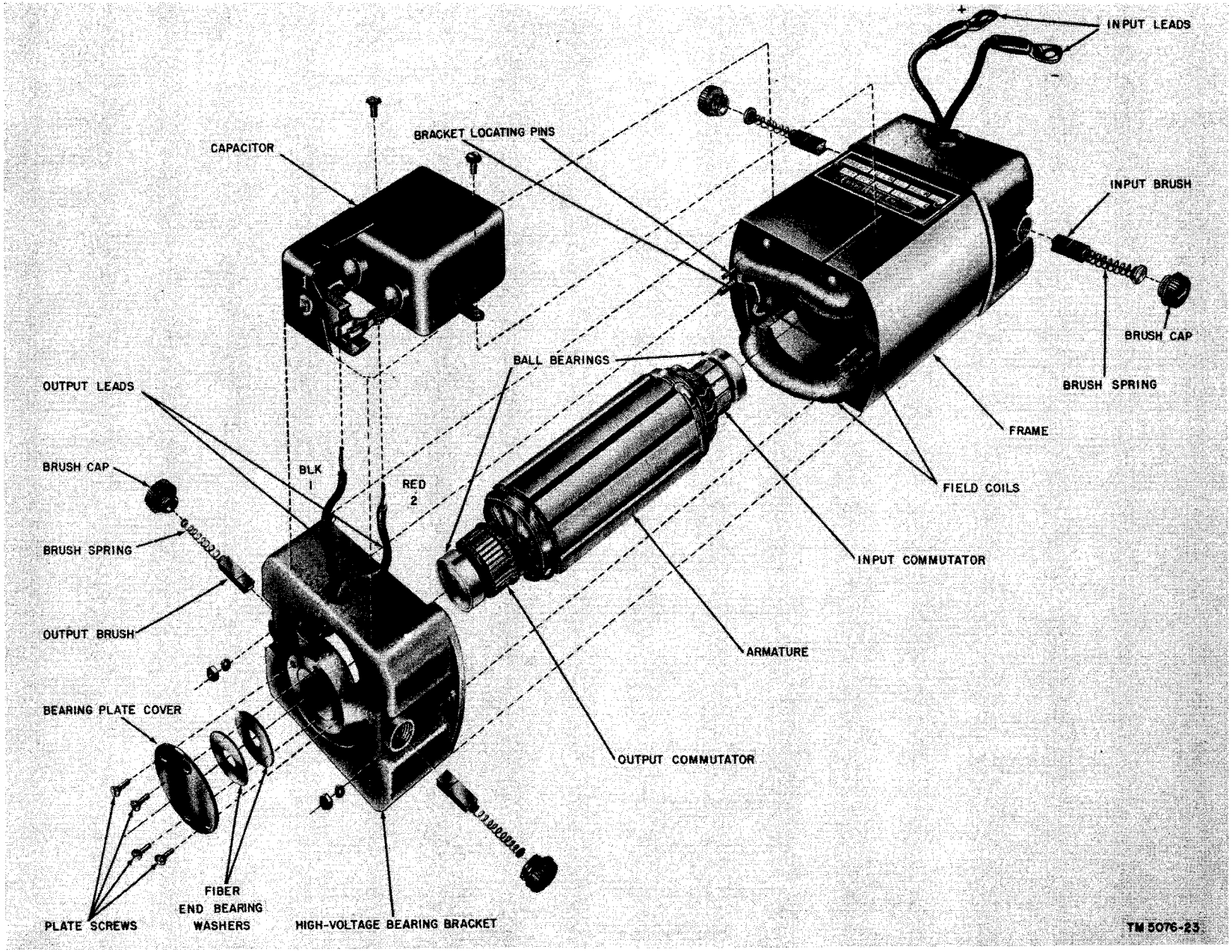


Figure 18. Exploded view of dynamotor.

44. Test Equipment Required for Final Testing

The instruments needed for testing the repaired equipment are listed below:

One storage battery: 12, 24, and 6 volts for Dynamotor DY–93/U and Dynamotor-Power Supplies DY–98/G and DY–100/U, respectively.
One Voltohmmeter TS–294/U or equivalent.
One Multimeter TS–352/U (d-c ammeter).
Vacuum-tube voltmeter, Electronic Multimeter ME–6/U or equivalent.
Fuses: one 6 ampere and one 20 ampere for Dynamotor-Power Supply DY–98/G; one 10 ampere for Dynamotor DY–93/U; one 15 ampere for Dynamotor-Power Supply DY–100/U.
One capacitor, paper, 2 uf (microfarad) ±10%, 600 vdcw.
One resistor, composition, 5000 ohms ±10%, 1 watt.
One resistor, composition, 6.5 ohms ±10%, 1 watt.
One resistor, WW, 20 ohms ±10%, 5 watts.
One resistor, WW, 1.3 ohms ±10%, 5 watts.
Two resistors, WW, 3 ohms ±10%, 30 watts.
One resistor, WW, 12.5K ohms ±10%, 10 watts.
One resistor, WW, 5000 ohms ±10%, 20 watts.
One resistor, WW, 20 ohms ±10%, 50 watts.
One resistor, WW, 2100 ohms ±10%, 100 watts.
One resistor, WW, .7 ohms ±10%, 20 watts.

45. A-c Ripple Voltage Measurements

a. Connect the equipment as indicated in section I of this chapter, with the following exception: Substitute an a-c voltmeter (Electronic Multimeter ME–6/U or equivalent) for M3 and connect it in series with a 2-uf 600-volt d-c capacitor.

b. With the a-c voltmeter on a suitable range, measure the a-c voltage present at terminals 3, 4, 5, 6, 9, 16, and 28. The a-c reading should be less than 1 percent of the nominal d-c voltage on terminals 3, 4, 5, 6, 9, and 16. The a-c reading should be less than 5 percent of the nominal d-c voltage on terminal 28. See paragraph 44. Refer to the schematic diagrams (figs. 21, 22, and 23) to identify the defective part.

46. Output Voltage Variations

Normal changes in output loads will affect the output voltage of the power supply. Output voltage variations up to 10 percent will not necessarily indicate a faulty part.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

47. Repacking for Shipment or Limited Storage

a. The exact procedure in repacking for shipment or limited storage depends on the material available and the conditions under which the equipment is to be shipped or stored.

b. Whenever practicable, place a dehydrating agent such as silica gel inside the chests. Protect the chests with a waterproof paper barrier. Seal the seams of the paper barrier with waterproof sealing compound or tape. Pack the protected chests in a padded wooden case, providing at least 3 inches of excelsior padding or some similar material between the paper barrier and the packing case.

48. Demolition of Materiel to Prevent Enemy Use

The demolition procedures outlined below will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commander.

49. Methods of Destruction

a. Smash. Smash capacitors, transformers, resistors, sockets, terminal boards, plugs, and vibrators, using sledges, axes, handaxes, pickaxes, hammers, crowbars, or heavy tools.

b. Cut. Cut wiring, using axes, handaxes, or machetes.

c. Burn. Burn technical literature, resistors, capacitors, transformers, and vibrators, using gasoline, kerosene, oil, flame throwers, and incendiary grenades.

d. Bend. Bend chassis, panels, and covers.

e. Explosives. If explosives are necessary, use firearms, grenades, or TNT.

f. Disposal. Bury or scatter the destroyed parts in slit trenches, fox holes, or other holes, or throw them into streams.

g. Destroy. Destroy everything.

APPENDIX I

REFERENCES

Note. For availability of items listed, check SR 310-20-3, SR 310-20-4, and SR 310-20-5. Check Department of the Army Supply Catalog SIG 1 for Signal Corps Supply Catalog pamphlets.

1. Army Regulations

AR 380-5	Military Security (Safeguarding Military Information).
AR 750-5	Maintenance of Supplies and Equipment (Maintenance Responsibilities and Shop Operation).

2. Supply Bulletins

SB 11-6	Dry Battery Supply Data.
SB 11-47	Preparation and Submission of Requisitions for Signal Corps Supplies.
SB 11-76	Signal Corps Kit and Materials for Moisture- and Fungi-Resistant Treatment.

3. Auxiliary Equipment and Test Equipment

NAVSHIPS 91269	Electronic Multimeter ME-6A/U.
NAVSHIPS 91493	Electronic Multimeter ME-6B/U.
TM 11-303	Test Sets I-56-C, I-56-D, I-56-H, and I-56-J.
TM 11-2613	Voltohmmeter I-166.
TM 11-2624B	Voltohmmeters, TS-294/U, TS-294B/U, and TS-294C/U.
TM 11-2626	Test Unit I-176, I-176-A, and I-176-B.
TM 11-4700	Electrical Indicating Instruments and Test Sets, Repair Instructions.
TM 11-5511	Electronic Multimeter TS-505/U.
TM 11-5527	Multimeter TS-352/U.

4. Painting, Preserving, and Lubrication

TB SIG 13	Moistureproofing and Fungiproofing Signal Corps Equipment.
TM 9-2851	Painting Instructions for Field Use.

5. Camouflage, Decontamination, and Demolition

FM 5-20	Camouflage, Basic Principles.

FM 5–25	Explosives and Demolitions.
TM 3–220	Decontamination.

6. Other Publications

FM 24–18	Field Radio Techniques.
FM 72–20	Jungle Warfare.
SR 310–20–3	Index of Training Publications.
SR 310–20–4	Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, Modification Work Orders.
SR 310–20–5	Index of Administrative Publications.
SR 700–45–5	Unsatisfactory Equipment Report (Reports Control Symbol CSGLD–247).
SR 745–45–5	Report of Damaged or Improper Shipment (Reports Control Symbols CSGLD–66 (Army) and AF–MC–U2 (Air Force)).
TB SIG 4	Methods for Improving the Effectiveness of Jungle Radio Communication.
TB SIG 25	Preventive Maintenance of Power Cords.
TB SIG 54	Working through Jamming with Frequency Modulated Radio Sets.
TB SIG 66	Winter Maintenance of Signal Equipment.
TB SIG 72	Tropical Maintenance of Ground Signal Equipment.
TB SIG 75	Desert Maintenance of Ground Signal Equipment.
TB SIG 123	Preventive Maintenance Practices for Ground Signal Equipment.
TB SIG 134	Dynamotor Limited Repairs and Replacement Plan.
TB SIG 178	Preventive Maintenance Guide for Radio Communication Equipment.
TB SIG 219	Operation of Signal Equipment at Low Temperatures.
TB SIG 223	Field Expedients for Wire and Radio.
TM 9–2857	Storage Batteries Lead-Acid Type.
TM 11–415	Dry Batteries.
TM 11–430	Batteries for Signal Communication. Except those pertaining to Aircraft.
TM 11–453	Shop Work.
TM 11–455	Radio Fundamentals.
TM 11–661	Electrical Fundamentals (Direct Current).
TM 11–681	Electrical Fundamentals (Alternating Current).
TM 11–4000	Trouble Shooting and Repair of Radio-Equipment.
TM 11–483	Suppression of Radio Noises.

APPENDIX II

IDENTIFICATION TABLE OF PARTS

1. Requisitioning Parts

The fact that a part is listed in this table is not sufficient basis for requisitioning the item. Requisitions must cite an authorized basis, such as a specific T/O&E, T/A, or SIG 7&8, list of allowances of expendable material or another authorized supply basis. The Department of the Army Supply Catalogs applicable to the equipment covered in this manual are SIG 7&8–DY–93/U, SIG 7&8–DY–98/G, and SIG 7&8–DY–100/U. For an index of available supply catalogs in the Signal portion of the Department of the Army Supply Catalog, see the latest issue of SIG 1, Introduction and Index.

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
Fig. 1			DYNAMOTOR-POWER SUPPLY DY-98/G: 24 v dynamotor and vibrator type; outputs 380 v dc, .18 amp; 225 v dc, .07 amp; 225 v dc, .045 amp; 1.3 v dc, 1 amp; 1.3 v dc, .2 amp; −25 v dc, 5 ma; 6 v ac, 2 amp; input 24 v dc, 10 amp; 13 13/16″ lg x 6 7/8″ wd x 6 1/4″ h o/a; p/o Army-Navy Radio Set AN/VRC-6 and AN/VRC-19; Motorola, Inc. part #201V1076; Army spec #N-11539 amendment #2.	24-volt d-c power supply for Transmitters T-208/U and T-278/U.	
	Fig. 1		DYNAMOTOR-POWER SUPPLY DY-100/U: 6 v dynamotor type; output 380 v dc, .18 amp; 225 v dc, .07 amp; 225 v dc, .045 amp; 6 v dc, 2 amp; 6 v dc, 3.6 amp; 1.3 v dc, .2 amp; 1.3 v dc, 1 amp; −25 v dc, 5 ma; input 6 v dc, 40 amp; 13 13/16″ lg x 6 7/8″ wd x 6 1/4″ h o/a; p/o Army-Navy Radio Set AN/VRC-6Y; and AN/VRC-19Y; Motorola, Inc. part #201V1081; Army spec #N-11539 amendment #2.	6-volt d-c power supply for Radio Transmitters T-208/U and T-278/U.	3H1535-100
		Fig. 1	DYNAMOTOR DY-93/U: 12-v dynamotor type; outputs 380 v dc, .18 amp; 225 v dc, .07 amp; 225 v dc, .045 amp; 6 v dc, 2 amp; 6 v dc, 3.6 amp; 1.3 v dc, .2 amp; 1.3 v dc, 1 amp; −25 v dc, 5 ma; input 12 v dc, 21 amp; 13 13/16″ lg x 6 7/8″ wd x 6 1/4″ h o/a; p/o Army-Navy Radio Set AN/VRC-6X and AN/VRC-19X; Motorola, Inc. part #201V1197; Army spec #N-11539 amendment #2.	12-volt d-c power supply for Transmitters T-208/U and T-278/U.	

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
A1301	A1201	H3115	BRACKET: "L" shape; aluminum alloy, iridite; 15/16" lg x 5/8" wd x 11/16" h; Motorola, Inc. part #207B1018.	Resistor support bracket.	2Z1239.370
E1309, E1310			BRUSH, electrical contact: rectangular shape; 3/4" lg x 1/4" wd x 1/4" thk o/a; Carter Motor Co. part #32; Motorola, Inc. part #239T1103.	Dynamotor input commutator brush.	3H525GA-4
E1311, E1312		E3110	BRUSH, electrical contact: rectangular shape; 3/4" lg x 1/4" wd x 1/8" thk o/a; Carter Motor Co. part #2; Motorola, Inc. part #239T1102.	Dynamotor output commutator brush.	3H1505-4/B4
	E1208, E1209		BRUSH, electrical contact: rectangular shape; 3/4" lg x 1/4" wd x 1/4" thk o/a; Carter Motor Co. part #7A; Motorola, Inc. part #239T1101.	Dynamotor input commutator brush.	3H525GA-5
	E1210, E1211		BRUSH, electrical contact: rectangular shape; 3/4" lg x 1/4" wd x 1/4" thk o/a; Carter Motor Co. part #32; Motorola, Inc. part #239T1103.	Dynamotor output commutator brush.	3H525GA-4
		E3109	BRUSH, electrical contact: rectangular shape; 1 11/16" lg x 1/4" wd x 1/4" thk o/a; Carter Motor Co. part #18C; Motorola, Inc. part #239T1104.	Dynamotor input commutator brush.	3H450-18
C1301, C1302, C1303			CAPACITOR, fixed: ceramic dielectric; 10,000 uuf −20% +80%; 500 vdcw; Centralab part #DD-103; Motorola, Inc. part #921R165.	Vibrator hash filter.	3DA10-562
C1304			CAPACITOR, fixed: paper dielectric; 1 uf ±10%; 400 vdcw; JAN type CP611EE105K.	Vibrator output filter.	3DB1-320
C1305			CAPACITOR, fixed: paper dielectric; .5 uf −10% +20%; 200 vdcw; Sprague Electric Co. part #48P14 Hypass; Motorola, Inc. part #208T1013.	R-f filter capacitor for vibrator.	3D9000.5-7
C1306			CAPACITOR, fixed: paper dielectric; .06 uf ±10%; 200 vdcw; John E. Fast Co. part #X7923; Motorola, Inc. part #208A1015.	Part of resonant filter.	3DA60-27
		H3109	CLAMP, electrical: steel; 2 7/8" lg x 4 3/16" wd x 3 1/2" h o/a; mtd by four 10-32 spade bolts 2 1/8" c to c; Motorola, Inc. part #242C1113.	Dynamotor hold-down.	2Z2642.876

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
H1322	H1202		CLAMP, electrical: plastic; 1″ lg x ½″ w x 7/16″ h o/a; one No. 8 screw mtg hole ea end; accom material up to 3/16″ dia; Commercial Plastics Co. part #CPC-742-3; Motorola, Inc. part #242T1031.	Cable clamps.	8P1-101-2
H1324	H1208		CLAMP, electrical: plastic; 13/16″ lg x ½″ w x 5/16″ h o/a; one 8-32 screw mtg hole ea end; accom material up to ¼″ max dia; Commercial Plastic Co. part #CPC-742-4; Motorola, Inc. part #242T1002.	Cable clamps.	8P1-101-1
H1304	H1204, H1234	H3112	CLIP: phosphor bronze; 1 11/32″ lg x 5/8″ wd x 1/16″ thk; Motorola, Inc. part #241B-1012.	H1304, H1204, H3112: Hold down transmitting relays. H1234: Holds down power-on relay.	2Z2712.382
P1305	P1201	P3101	CONNECTOR, plug: 1 male cont; straight type; 3/8″ lg x 3/8″ dia o/a excluding cont; cylindrical shape; red phenolic; American Phenolic Corp. #T71-1L (314); Motorola, Inc. part #228B1011.	Dynamotor output plugs.	2Z7111.80
P1306	P1202	P3102	CONNECTOR, plug: 1 male cont; straight type: 3/8″ lg x 3/8″ dia o/a excluding cont; cylindrical shape; black phenolic; American Phenolic Corp. #T71-1L; Motorola, Inc. part #228K1012.	Dynamotor output plugs.	2Z3021-198
P1303	P1203	P3103	CONNECTOR, receptacle: 30 male cont; straight type; 3 3/8″ lg x 1 11/16″ wd x 1 7/64″ h o/a; rectangular shape; aluminum alloy; Cannon Electric Co. part #DPD30-34P type L; Motorola, Inc. part #228T1005.	Connects power supplies to cabinets.	2Z3046.39
TB1302	TB1202	TB3102	CONNECTOR, receptacle: 4 round, female cont; straight type; 1.687″ lg x .687″ w x .062″ h o/a excluding protruding cont and term.; rect body; 2 mtg holes .163″ dia; 1.312″ c to c; Motorola, Inc. part #231B1026.	Contain voltage check points.	2Z3065-127
D1301			DYNAMOTOR: output 405 v dc at .27 amp; input 24 v dc at 7 amp; intermittent 3 min on, 12 min off; 5600 rpm; 7 1/16″ lg x 4 3/16″ wd x 4 1/16″ h o/a; Carter Motor Co. part #4027ESG; Motorola, Inc. part #259K1003.	Converts power from a 24-volt d-c source to 405 volts dc.	3H1506-11

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
	D1201		DYNAMOTOR: output 405 v dc at .27 amp; input 5.9 v dc at 30 amp; intermittent 3 min on, 12 min off; 5600 rpm; 7 1/16" lg x 4 3/16" wd x 4 1/16" h o/a; Carter Motor Co. part #4027VSC; Motorola, Inc. part #259D1001.	Converts power from a 6-volt d-c source to 405 volts dc.	3H1506-12
		D3101	DYNAMOTOR: output 405 v dc at .27 amp; input 12.6 v dc at 15 amp; intermittent 3 min on, 12 min off; 5600 rpm; 7 1/16" lg x 4 3/16" wd x 4 1/16" h o/a; Carter Motor Co. part #4027BSC; Motorola, Inc. part #259K1002.	Converts power from a 12-volt d-c source to 405 volts dc.	3H1505-11
F1302, F1304			FUSE, cartridge: 6 amp, 250 v; instantaneous; ferrule type term.; glass body; one time; 1 1/4" lg x 1/4" dia; MIL spec type #FO2G6ROOA; MIL spec #MS90078; Motorola, Inc. part #965R108.	F1302: Overload protection for all circuits other than those supplied by D1301. F1304: Spare for F1302.	3Z2606.3
	F1201, F1202		FUSE, cartridge: 15 amp, 32 v; instantaneous; ferrule type term.; glass body; one time; 1 1/4" lg x 1/4" dia; MIL spec type #FO4A15ROA; MIL spec #MS90080; Motorola, Inc. part #965R107.	F1201: Overload protection for all circuits other than those supplied by D1201. F1202: Spare for F1201.	3Z2015-1
		F3101, F3102	FUSE, cartridge: 10 amp, 32 v; instantaneous; ferrule type term.; glass body; one time; 1 1/4" lg x 1/4" dia; MIL spec type #FO4A10ROA; MIL spec #MS-90080; Motorola, Inc. part #965R114.	F3101: Overload protection for all circuits other than those supplied by D3101. F3102: Spare for F3101.	3Z2610.23
F1301, F1303			FUSE, cartridge: 20 amp, 32 v; instantaneous; ferrule type term.; glass body; one time; 1 1/4" lg x 9/32" dia; MIL spec type #FO5A20ROA; MIL spec #MS90081; Motorola, Inc. part #965R105.	F1301: Protects dynamotor circuits from overload. F1303: Spare for F1301.	3Z1942
E1301			FUSEHOLDER: block type; accom two cartridge type fuses; 1 3/8" lg x 1 1/4" wd x 3/4" h o/a; four solder lug term.; Motorola, Inc. part #209B1020.	Mounts fuses F1301 and F1303.	3Z3282-51.1
E1302			FUSEHOLDER: block type; accom two cartridge type fuses; 1 5/8" lg x 1 1/8" wd x 21/32" h o/a; four solder lug term.; Motorola, Inc. part #209B1019.	Mounts fuses F1302 and F1304.	3Z3282-51
	E1201		FUSEHOLDER: block type; accom two cartridge type fuses; 1 5/8" lg x 1 1/8" wd x 21/32" h o/a; four solder lug term.; Motorola, Inc. part #209K1101.	Mounts fuses F1201 and F1202.	3Z3282-51.2
		E3101	FUSEHOLDER: block type; accom two cartridge type fuses; 1 5/8" lg x 1 1/8" wd x 21/32" h o/a; four solder lug term.; Motorola, Inc. part #209K1046.	Mounts fuses F3101 and F3102.	3Z3282-51.6

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
E1303 thru E1308	E1202 thru E1207	E3102 thru E3108, and E3111	INSULATOR, bushing: natural teflon; dim, MBCA Ref Dwg Group 9, D-7/16", E-1/16", F-1/4" max, H-5/32", L-1/8"; Motorola, Inc. part #204B1005.	Insulate resistors from brackets.	3G100-309
		H3117	KNOB: round steel, dimen 1/2" dia x 1/4" thk to accom 1/4" shaft; pin fastening; Motorola, Inc. part #202B1011.	Part of lock-in rod assembly.	2Z5822-807
L1301	L1201	L3101	REACTOR: 1 sect.; .06 h 1.3 ohms dc; 500 v rms test voltage; Motorola, Inc. part #225C1008.	Filters filament voltage supply.	3C549-6
L1302			REACTOR: 1 sect.; .06 h .4 ohms dc; 500 v rms; Motorola, Inc. part #225C1007.	Filters filament voltage supply.	3C549-7
CR1301			RECTIFIER, metallic: selenium; output 10 v dc at 3 amp max current; input 26 v ac; Sarkes Tarzian, Inc. part #5NF-26-1C2-ZGM; Motorola, Inc. part #248B1013.	Rectifies part of the vibrator output.	3H4860-264
K1301			RELAY, armature: normally open; single break; HS case; 18 to 30 v dc, 240 ohms; Motorola, Inc. part #280K1003.	Transmitting relay.	2Z7599A-446
	K1201		RELAY, armature: normally open; single break; HS case; 4.5 to 7.5 v dc, 15 ohms; Motorola, Inc. part #280C1001.	Transmitting relay.	2Z7599A-445
		K3101	RELAY, armature: normally open; single break; HS case; 9 to 15 v dc, 60 ohms; Motorola, Inc. part #280K1002.	Transmitting relay.	2Z7590-284
	K1203		RELAY, armature: normally open; single break; HS case; 4.5 to 7.5 v dc, 12 ohms; Motorola, Inc. part #280C1006.	Power-on relay.	2Z7599A-447
		K3103	RELAY, armature: normally open; single break; HS case; 9 to 15 v dc, 48 ohms; Motorola, Inc. part #280C1021.	Power-on relay.	2Z7590-285
K1302			RELAY, solenoid: normally open; double break; dustproof; 18 to 30 v dc, 64 ohms; Motorola, Inc. part #280K1010.	Dynamotor control relay.	2Z7599A-449
	K1202		RELAY, solenoid: normally open; double break; dustproof; 4.5 to 7.5 v dc, 4 ohms; Motorola, Inc. part #280C1008.	Dynamotor control relay.	2Z7599A-448
		K3102	RELAY, solenoid: normally open; double break; dustproof; 9 to 15 v dc, 16 ohms; Motorola, Inc. part #280K1009.	Dynamotor control relay.	2Z7585-219

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
R1303 thru R1306	R1204 thru R1207	R3104 thru R3107	RESISTOR, fixed: comp; 4700 ohms ±10%; 2 w; JAN type RC42BF472K.	High voltage bleeder and part of voltage divider network.	3RC42BF472K
R1309			RESISTOR, fixed: comp; 1500 ohms ±10%; 1 w; JAN type RC30BF152K.	Relay coil bleeder.	3RC30BF152K
	R1210	R3110	RESISTOR, fixed: comp; 100 ohms ±10%; 1 w; JAN type RC30BF101K.	Relay coil bleeders.	3RC30BF101K
R1312			RESISTOR, fixed: comp; 33 ohms ±10%; 1 w; JAN type RC30BF330K.	Vibrator current limiting.	3RC30BF330K
RT1301, RT1302	RT1201, RT1202	RT3101, RT3102	RESISTOR, thermal: 1 ohm, 2.4 w; Amperite Co., Inc. part #6-1H; Motorola, Inc. part #265T1004.	Regulate filament current.	3Z6925-3.35
		R3114	RESISTOR, fixed: comp; 68 ohms ±10%; 2 w; JAN type RC42BE680K.	Improves regulation of filament voltages.	3RC42BF680K
R1301			RESISTOR, fixed: WW; .5 ohm ±10%; 7 w; JAN type RW30GR50.	1.3-volt filament voltage dropping resistor.	3RW4401
	R1201, R1202	R3101	RESISTOR, fixed: WW; 1 ohm ±5%; 8 w; JAN type RW30G1RO.	R1201, R3101: 1.3V filament voltage dropping. R1202: Filament voltage dropping for stand-by operation.	3RW6330
R1302			RESISTOR, fixed: WW; 2 ohms ±5%; 8 w; JAN type RW30G2RO.	Drops input voltage to vibrator for stand-by.	3RW8131
R1311	R1203	R3103	RESISTOR, fixed: WW; 100 ohms ±5%; 15 w; JAN type RW20G101.	Bias supply.	3RW18362
R1313			RESISTOR, fixed: WW; 40 ohms ±5%; 15W; JAN type RW20G400.	Antenna relay voltage dropping.	
		R3102	RESISTOR, fixed: WW; 1.2 ohms ±5%; 22 w; JAN type RW21G1R2.	Reduces filament voltage for stand-by.	3RW6921
R1307	R1208	R3108	RESISTOR, fixed: WW; 1200 ohms ±5%; 15 w; JAN type RW20G122.	225-volt low band voltage dropping, and part of voltage divider.	3RW24914
R1308	R1209	R3109	RESISTOR, fixed: WW; 2200 ohms ±5%; 15 w; JAN type RW21G222.	225-volt high band voltage dropping, and part of voltage divider.	3RW26420
R1310	R1211	R3111	RESISTOR, fixed: WW; 6300 ohms ±5%; 18 w; JAN type RW33G632.	Screen voltage dropping.	3RW29129
		R3112	RESISTOR, fixed: WW; 12 ohms ±5%; 8 w; JAN type RW30G120.	Antenna relay voltage dropping.	3RW12902
		R3113	RESISTOR, fixed: WW; 8 ohms ±5%; 8 w; JAN type RW30G8RO.	Crystal heater voltage dropping.	3RW11714

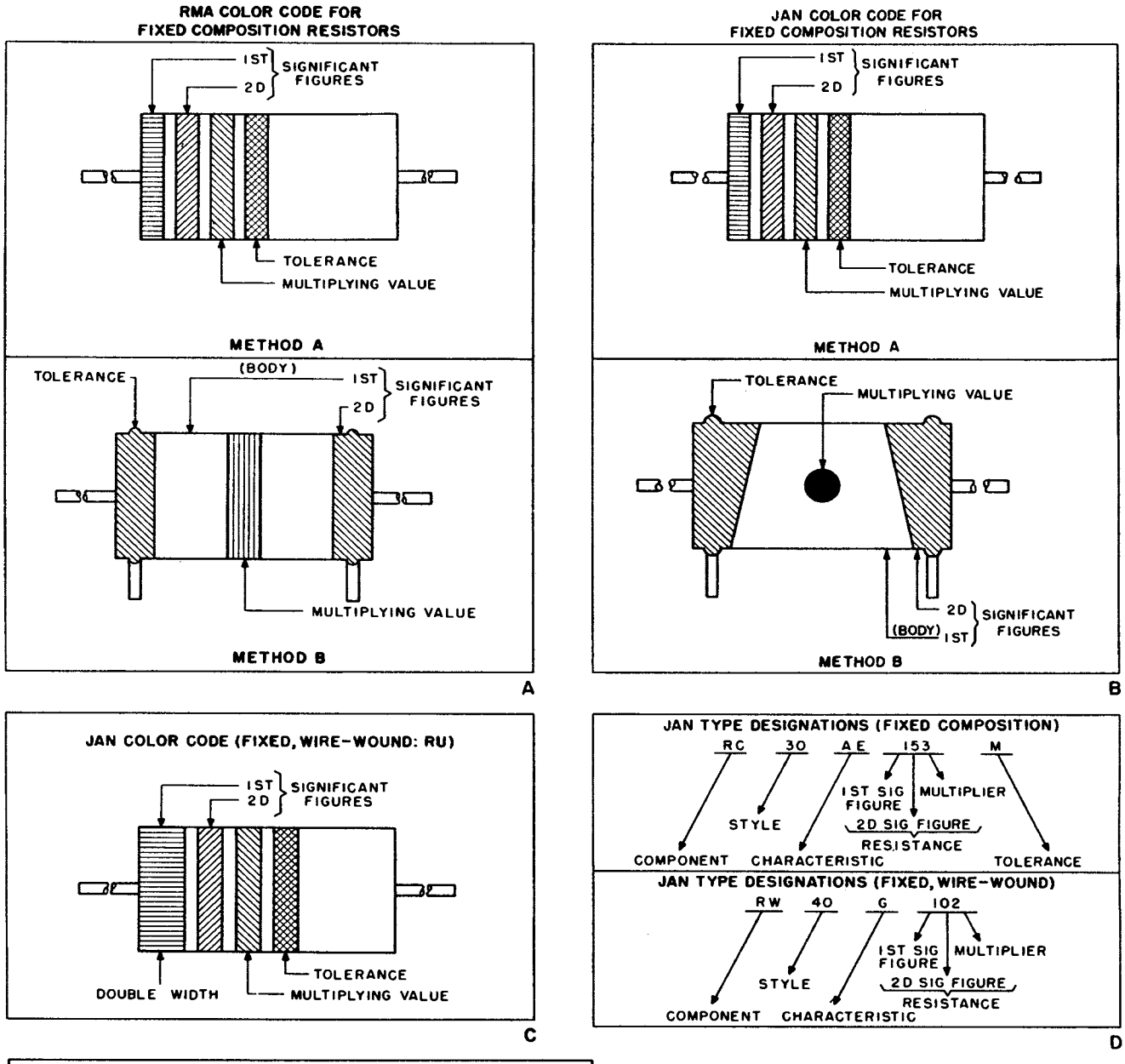
2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
		R3115	RESISTOR, fixed: WW; 1.8 ohms; 37 w; JAN type RW22G1R8.	Filament voltage dropping.	3RW7802
H1307			RETAINER, electron tube: steel; lever type; 1 5/8" dia x 3/4" h o/a; holds material 1 3/16" max dia; Motorola, Inc. part #242T1032.	Clamp for vibrator.	2Z2642.164
H1325 thru H1330	H1221 thru H1226	H3101 thru H3106	RETAINER, fastener stud: steel, cad pl and chromated; 1" lg x 33/64" wd x 3/16" h o/a; Monadnock Mills part #99871-P-.098; Motorola, Inc. part #209T1025.	Retains cover fastener stud.	6Z7852-9
H1331	H1227, H1233		RETAINER, spring: 1 1/2" lg x 5/8" wd x 45/64" thk o/a; Motorola, Inc. part #201B1304.	Hold down relays.	2Z7780-234
		H3111	RETAINER, spring: 1 1/8" lg approx x 5/8" w x 5/16" h o/a.	Hold-down spring for relay K1301.	2Z7780-241
H1334, H1335			SHIM, spacer: steel, cad pl and chromated; 5/8" lg x 5/8" w x 14° rise from 1/32" thk; tapered; Motorola, Inc. part #243B1106.	Angle spacers.	
XG1301			SOCKET, electron tube: 6 cont; 1-piece saddle mtg; Navy type 49357; Motorola, Inc. part #209T1001.	Socket for vibrator.	2Z8676.36
XK1301	XK1201	XK3101, XRT3101, XRT3102	SOCKET, electron tube: 8 cont; JAN type TS-101PO1.	Sockets for relays and current regulators.	2Z8670.33
	XK1203	XK3103	SOCKET, electron tube: 9 cont; Motorola, Inc. part #209T1029.	Sockets for relays.	
XRT1301, XRT1302	XRT1201, XRT1202		SOCKET, electron tube: 8 cont; Motorola, Inc. part #909R156.	Sockets for current regulators.	2Z8670.61
H1302	H1207		STUD: steel, cad pl and chromate finish; 3.875" lg x .138" dia o/a; 5/8" of 6-32 NC thd ea end; Motorola, Inc. part #247B1004.	H1302: Mounts R1310. H1207: Mounts R1211.	6L31165-1
H1303	H1203, H1232	H3110	STUD: steel, cad pl and chromated; 2 11/32" lg max x 3/8" dia; 5/8" of 8-32 int thd one end, 1/2" of 8-32 int thd other end; Motorola, Inc. part #246B1016.	H1303, H1203, H1232 and H3110: Mount hold-down springs for relays K1301, K1201, K1203, and K3101 respectively.	6L31165
H1308 thru H1313	H1209 thru H1214	H3118 thru H3123	STUD: steel, chromate finish; RH type stud w/screw driver slot; 33/64" lg x 11/64" dia; mounts by cross pin at right angle to stud axis; Monadnock Mills part #98293-2-.160; Motorola, Inc. part #246K1024.	Studs for Airloc fasteners	6Z8585-8

2. Identification Table of Parts for Dynamotor DY-93/U and Dynamotor-Power Supplies DY-98/G, and DY-100/U (contd)

Ref symbol			Name of part and description	Function of part	Signal Corps stock No.
DY-98/G	DY-100/U	DY-93/U			
TB1301			TERMINAL BOARD: phenolic; 12 term.; 2¾″ lg x 1⅝″ wd x 1/16″ thk; Motorola, Inc. part #231K1102.	Mounts resistors R1303, R1304, R1305, and R1306.	3Z770–12.140
	TB1201		TERMINAL BOARD: phenolic; 12 term.; 2¾″ lg x 1⅝″ wd x 1/16″ thk; Motorola, Inc. part #231B1025.	Mounts resistors R1204, R1205, R1206, and R1207.	3Z770–12.141
		TB3101	TERMINAL BOARD: phenolic; 12 term.; 2¾″ lg x 1⅝″ wd x 1/16″ thk; Motorola, Inc. part #231K1089.	Mounts resistors R3104, R3105, R3106, and R3107.	3Z770–12.147
T1301			TRANSFORMER, power step-down: input 24 v ac each side of center tap at 95 cycles; output 2 windings, 6.3 v ac at 3 amp, 15 v ac at 1.2 amp; Motorola, Inc. part #225C1009.	Filament voltage transformer.	2Z9621–568
G1301			VIBRATOR, nonsynchronous: input 24 v dc at 1.65 amp; 95 cycles ±6%; single reed; Motorola, Inc. part #248B1005.	Main component of circuit which converts dc into ac.	3H6691–59

RESISTOR COLOR AND LETTER CODE



STANDARDS				
COLOR	SIGNIFICANT FIGURE	MULTIPLYING VALUE	TOLERANCE (%)	JAN LETTER TOLERANCE
BLACK	0	1	–	–
BROWN	1	10	± 1	F
RED	2	100	± 2	G
ORANGE	3	1,000	± 3	–
YELLOW	4	10,000	± 4	–
GREEN	5	100,000	± 5	–
BLUE	6	1,000,000	± 6	–
VIOLET	7	10,000,000	± 7	–
GRAY	8	100,000,000	± 8	–
WHITE	9	1,000,000,000	± 9	–
GOLD	–	0.1	± 5	J
SILVER	–	0.01	±10	K
NO COLOR	–	–	±20	M

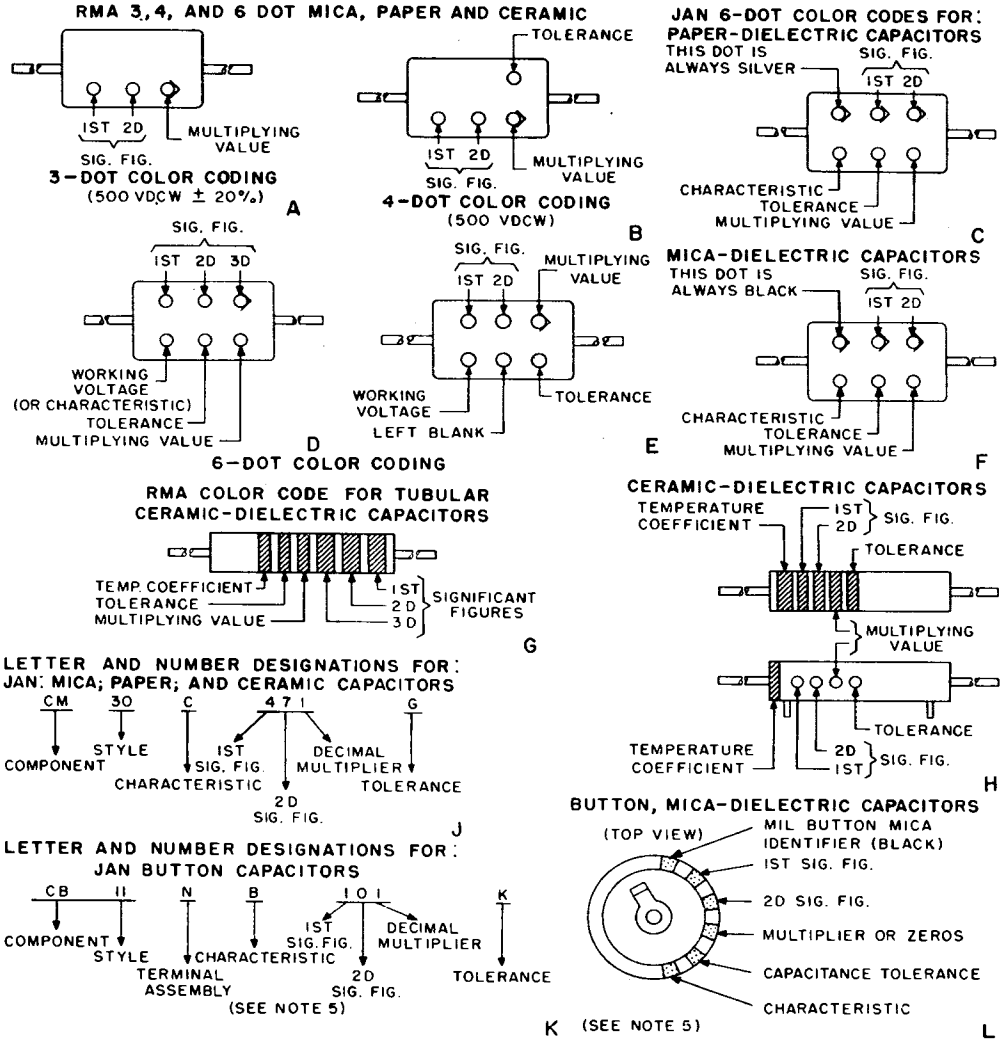
NOTES:

1. RESISTORS WITH AXIAL LEADS ARE INSULATED. RESISTORS WITH RADIAL LEADS ARE NON-INSULATED.
2. RMA: RADIO MANUFACTURERS ASSOCIATION.
3. JAN: JOINT ARMY-NAVY.
4. THESE COLOR AND NUMBER CODES GIVE ALL RESISTANCE VALUES IN OHMS.
5. RESISTIVE COMPONENTS USED FOR LETTER TOLERANCES ARE: RC, RN, AND RU.
6. WATTAGE FOR RW TYPES IS FOUND IN THE JAN SPECIFICATIONS UNDER CHARACTERISTICS.

TM RC

Figure 19. Resistor color and letter codes.

CAPACITOR COLOR AND LETTER CODES



- STANDARDS -					JAN MICA-CM		JAN PAPER-CN		JAN CERAMIC-CC					
										CAP. TOL. FOR MORE THAN 10 UUF		CAP. TOL. FOR 10 UUF OR LESS		
COLOR	SIG. FIG.	DECIMAL MULTIPLIER	% TOL.	VDCW	LETTER TOL.	CHARAC-TERISTIC	LETTER TOL.	CHARAC-TERISTIC	DEC. MULT.	%	LETTER DESIG-NATION	UUF	LETTER DESIG-NATION	CHARAC-TERISTIC
BLACK	0	1	±20	500	M	A	M	A	1	±20	M	±2.0	G	C
BROWN	1	10	± 1	100	-	B	-	E	10	± 1	F	-	-	H
RED	2	100	± 2	200	G	C	-	H	100	± 2	G	-	-	L
ORANGE	3	1,000	± 3	300	-	D	N*	J	1,000	-	-	-	-	P
YELLOW	4	10,000	± 4	400	-	E	-	P	-	-	-	-	-	R
GREEN	5	100,000	± 5	500	-	F	-	R	-	± 5	J	±0.5	D	S
BLUE	6	1,000,000	± 6	600	-	G	-	S	-	-	-	-	-	T
VIOLET	7	10,000,000	± 7	700	-	-	-	T	-	-	-	-	-	U
GRAY	8	100,000,000	± 8	800	-	-	-	-	0.01	-	-	±0.25	C	B
WHITE	9	1,000,000,000	± 9	900	-	-	-	-	0.1	± 10	K	±1.0	F	SL
GOLD	-	0.1	± 5	1,000	J	-	-	-	-	-	-	-	-	A
SILVER	-	0.01	±10	2,000	K	-	K	-	-	-	-	-	-	-
NO COLOR	-		±20	500	-	-	-	-	-	-	-	-	-	-
* THE TOLERANCE OF THIS CAPACITOR IS ±30%, NOT ±3%														

NOTES

JAN: JOINT ARMY-NAVY
RMA: RADIO MANUFACTURERS ASSOCIATION

1. THESE COLOR AND LETTER CODES GIVE CAPACITANCES IN MICROMICROFARADS
2. THIS TABLE IS ADAPTED FOR JAN AND RMA COLOR AND JAN LETTER TYPE DESIGNATIONS
3. CERAMIC AND MICA CAPACITORS, BOTH JAN AND RMA, ARE GENERALLY 500 VDCW
4. BUTTON CAPACITORS ARE GENERALLY 300 VDCW
5. READ BUTTON CAPACITOR TOLERANCE UNDER CERAMICS OF MORE THAN 10 UUF
6. CHARACTERISTICS ARE AVAILABLE IN JAN CAPACITOR SPECIFICATION MANUALS
7. THE COMPONENTS USED ABOVE FOR JAN LETTER TYPE DESIGNATIONS ARE:
   CB MICA BUTTON: *CC* CERAMIC; *CM* MICA MOULDED: *CN* PAPER MOULDED

TM CC

Figure 20. Capacitor color and letter codes.

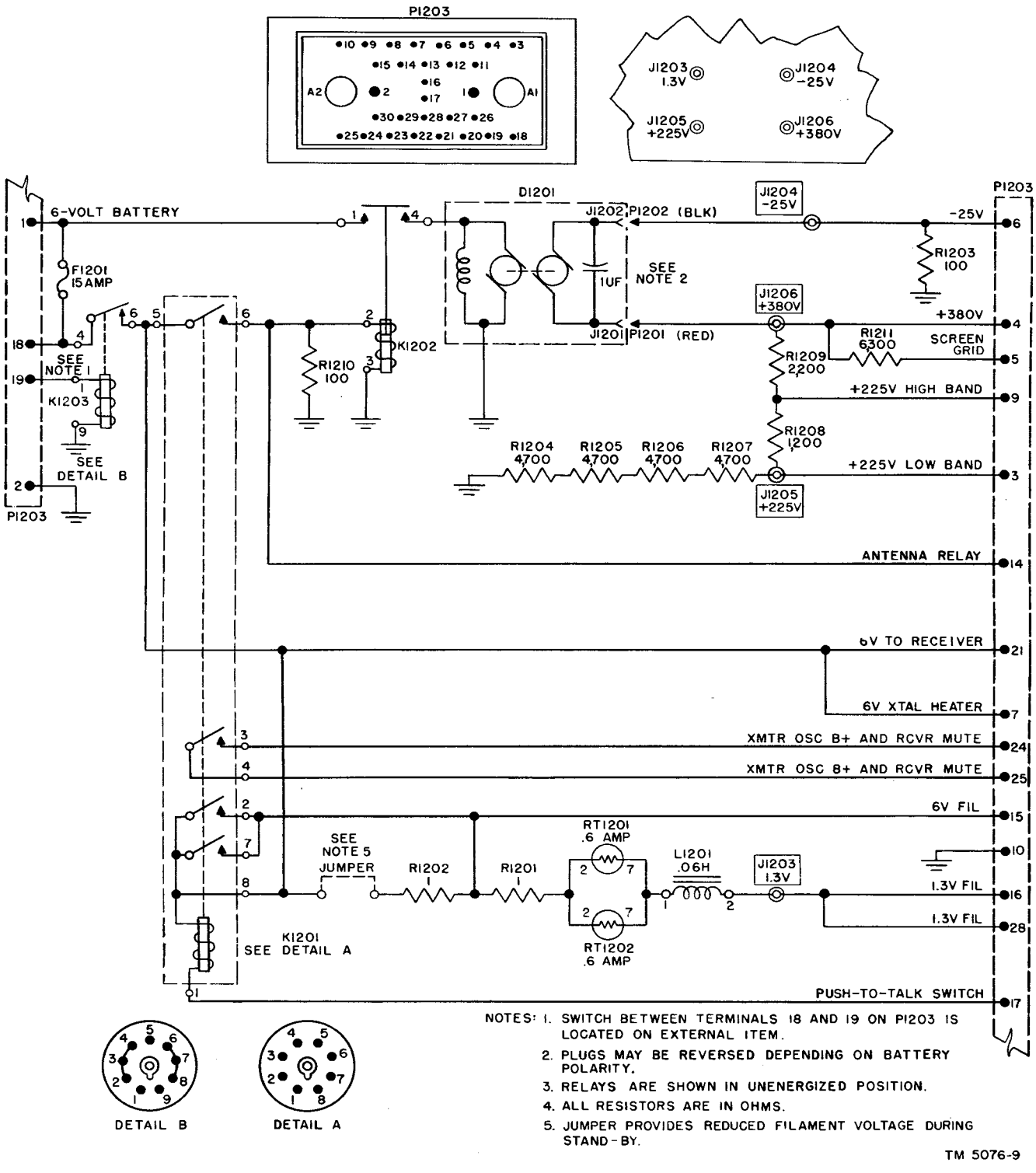


Figure 21. Dynamotor-Power Supply DY-100/U, schematic diagram.

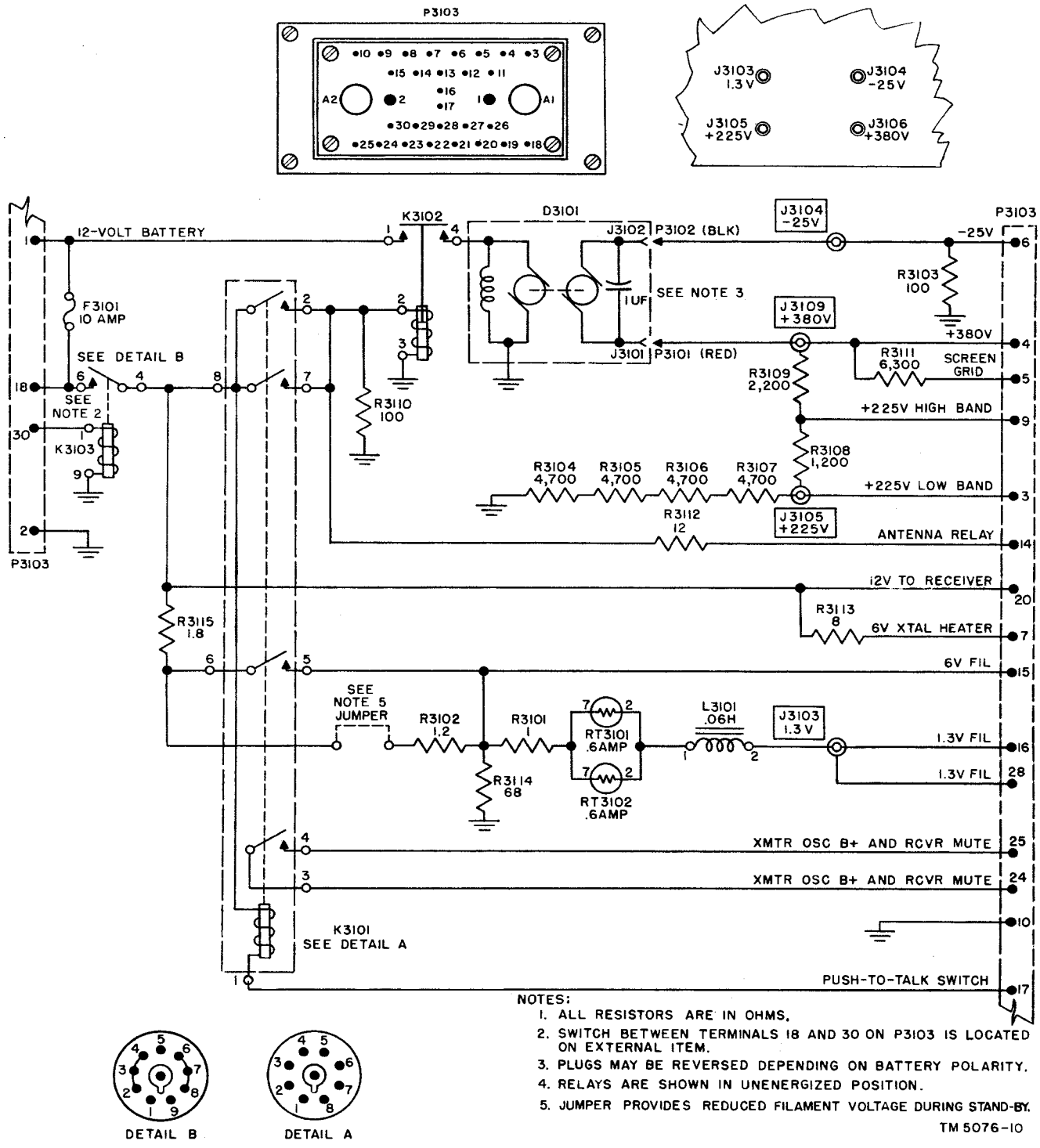


Figure 22. Dynamotor DY—98/U, schematic diagram.

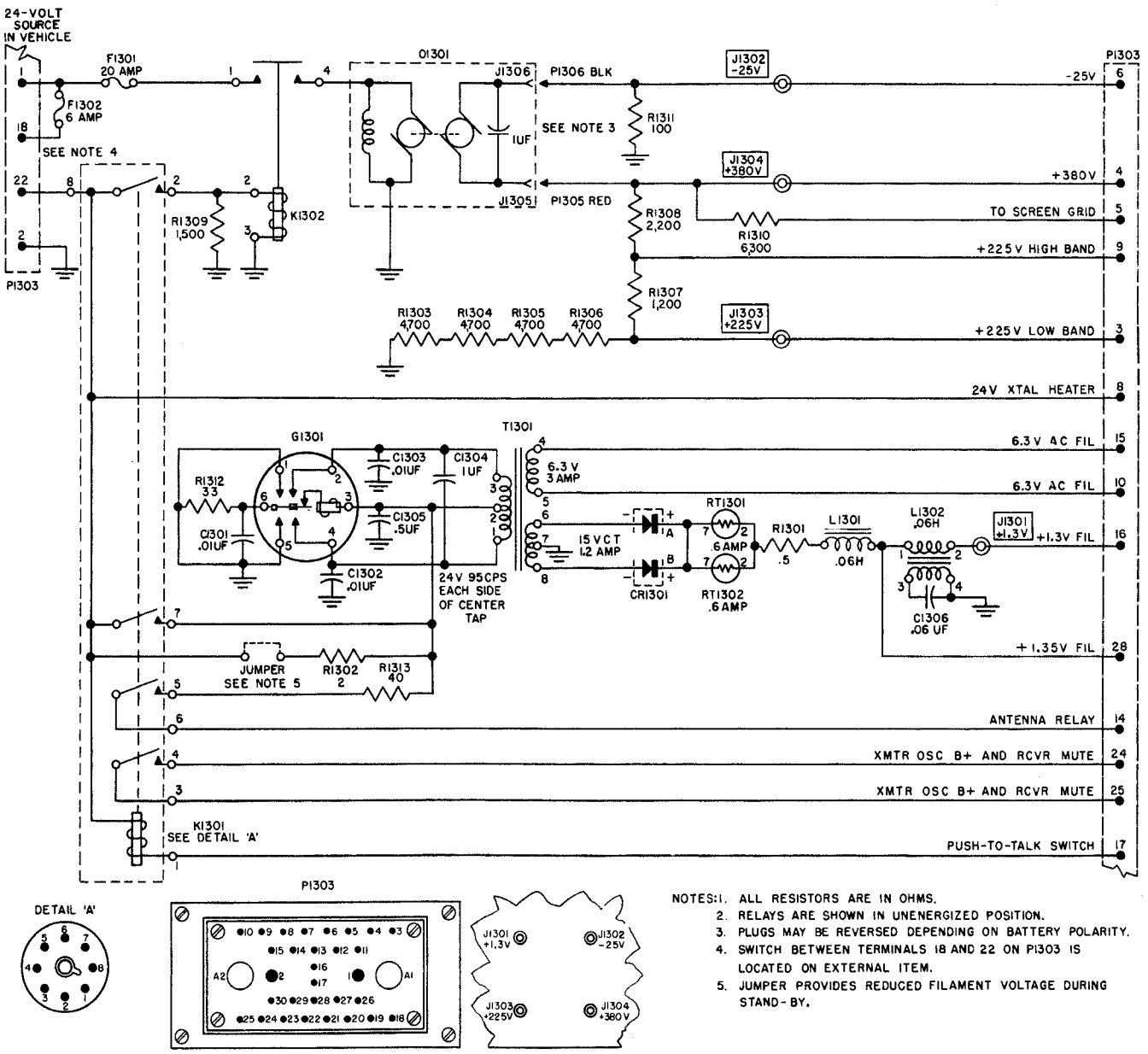


Figure 23. Dynamotor-Power Supply DY-98/G, schematic diagram.