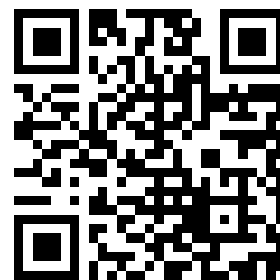


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5:11-2506

# TM 11-2506

DEPARTMENT TECHNICAL MANUAL

TEST SETS I-83-A, -B, -C,  
-D, -E, -F, -G, -H, -J, and -K



R DEPARTMENT

15 JUNE 1944



W1.35:11-2506

# TM 11-2506

WAR DEPARTMENT TECHNICAL MANUAL

TEST SETS I-83-A, -B, -C,  
-D, -E, -F, -G, -H, -J, and -K



WAR DEPARTMENT

15 JUNE 1944

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WASHINGTON 25, D. C., 15 JUNE 1944.

TM 11-2506, Test Sets I-83-A, -B, -C, -D, -E, -F, -G, -H, -J, and -K is published for the information and guidance of all concerned.

[A. G. 300.7 (28 Jan. 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,  
The Adjutant General.*

DISTRIBUTION: IC 11(10)

(For explanation of symbols see FM 21-6.)

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## **DESTRUCTION NOTICE**

**WHY** - To prevent the enemy from using or salvaging this equipment for his benefit.

**WHEN** - When ordered by your commander.

- HOW** -
1. Smash—Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.
  2. Cut—Use axes, handaxes, machetes.
  3. Burn—Use gasoline, kerosene, oil, flame throwers, incendiary grenades.
  4. Explosives—Use firearms, grenades, TNT.
  5. Disposal—Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

**USE ANYTHING IMMEDIATELY AVAILABLE  
FOR DESTRUCTION OF THIS EQUIPMENT.**

- WHAT** -
1. Smash—Meters on the front panel, rheostats, and meter-range switch.
  2. Cut—Wiring cable in several pieces.
  3. Burn—Technical manual and instructions.
  4. Bend—Socket prongs, lugs.
  5. Bury or scatter—Any or all of the above pieces after breaking.

## **DESTROY EVERYTHING**



## **SAFETY NOTICE**

**Extreme caution must be observed when operating this equipment. Voltages in excess of 500 volts are generated by dynameters under test. Throw switch S-1 to OFF or disconnect wires at the power source before changing dynameters. Avoid contact with binding posts on Cord CD-430 when set is in operation. Do not use test set with rear cover removed. Do not leave equipment in operation when unattended.**

# SECTION I

## Description

---

**1. GENERAL.** Test Set I-83-(\*) is a dynamotor test used primarily to measure the input and output characteristics of low-wattage dynamotors. The equipment is designed for d-c measurements on low-voltage, high-current input, and for high-voltage, low-current output dynamotors. Separate input and output meters, and input and output controls are provided for rapidly and accurately determining the electrical characteristics of the dynamotor under test. Test Set I-83-(\*) is used in this manual to refer to Test Sets I-83-A through I-83-H, and I-83-J and I-83-K. These sets are identical in operation and maintenance, and their parts are generally interchangeable.

**a. Range.** The range of the equipment is as follows:

(1) **INPUT CIRCUIT.** Two voltage ranges: up to 14 volts, and up to 28 volts. Current up to 10 amperes.

(2) **OUTPUT CIRCUIT.** Up to 500 volts. Current up to 250 milliamperes.

(3) **INPUT AND OUTPUT RIPPLE VOLTAGE MEASUREMENTS.** From 2 to 200 volts, full scale.

**b. Panel Controls.** Rheostats controlled from the front panel are provided in the test set for adjusting input voltage and output current of the dynamotors under test.

**c. Equipment to be Tested with Test Set I-83-(\*):**

Dynamotor Units BD-(\*)-69  
 BD-(\*)-83  
 BC-AG-83  
 BD-87-(\*)  
 BD-(\*)-93  
 BD-94-A

Dynamotors DM-18  
 DM-20  
 DM-20-A  
 DM-22-A  
 DM-23-A  
 DM-24-B  
 DM-28-B  
 DM-29-A  
 DM-30

Other d-c dynamotors may be tested provided the voltage and current range of the test set is not exceeded.

**2. LIST OF COMPONENTS (fig. 1).** The following table lists the components of Test Set I-83-(\*), with the weights and dimensions of the components.

TABLE OF WEIGHTS AND DIMENSIONS

| Quantity | Unit              | Dimensions (in.)         |        |        | Weight (lb) |
|----------|-------------------|--------------------------|--------|--------|-------------|
|          |                   | Length                   | Width  | Height |             |
| 1        | Test Set I-83-(*) | 12 3/4                   | 10 3/4 | 12 3/4 | 20.0        |
| 1        | Cord CD-429       | 3 ft long x 1/2 in. diam |        |        | 1.0         |
| 1        | Cord CD-430       | 3 ft long x 1/2 in. diam |        |        | 1.85        |
| 1        | Cord CD-431       | 7 in.                    |        |        | 1.15        |

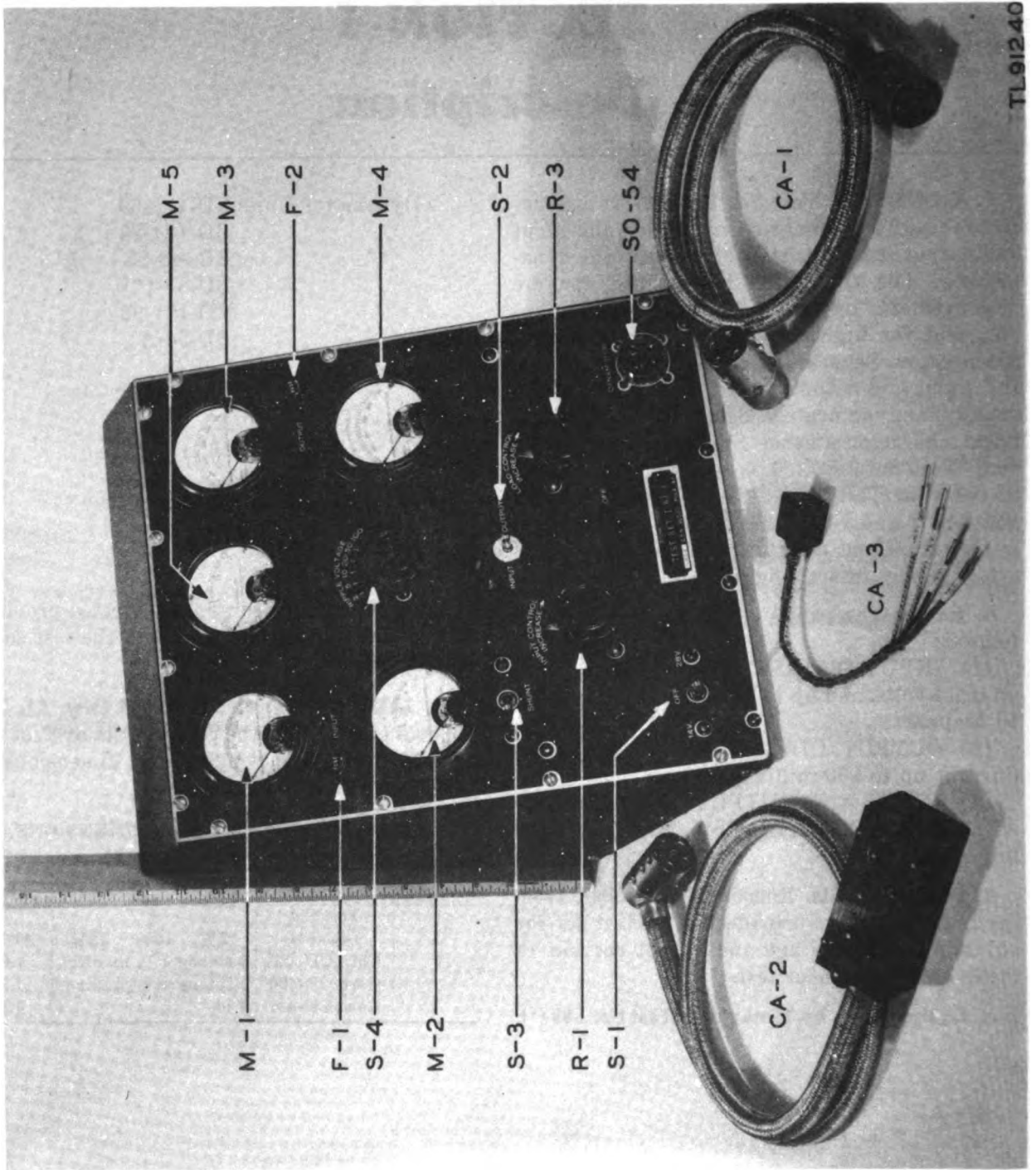


Figure 1. Test Set I-83-(\*), front view with components.

# SECTION II

## Installation and Operation

---

**3. PANEL CONTROLS ON TEST SET I-83-(\*).** Before connecting dynamotors or power supply to the test set, check the panel controls as follows (fig. 2).

- a. Set the 14V-OFF-28V switch (S-1) to OFF.
- b. Turn the INPUT CONTROL knob (R-1) to extreme counterclockwise position.
- c. Turn the LOAD CONTROL knob (R-3) to OFF, extreme counterclockwise position.
- d. Remove INPUT fuse-holder (F-1) and check or install a 20-ampere fuse.
- e. Remove OUTPUT fuse-holder (F-2) and check or install a 1/2-ampere fuse.

**4. CONNECTING LOW-VOLTAGE POWER TO TEST SET I-83-(\*).**

- a. Connect the terminal strip (TS-1) at the rear of the test set (fig. 3) to batteries or an equivalent low-voltage d-c source of power. Use color coded insulated wire of No. 14 AWG (stranded) or larger. Connect from the terminal strip (TS-1) to power source as follows:
  - (1) From TS-1 — to negative of power source.
  - (2) From TS-1 + 16 to positive of power source.
  - (3) From TS-1 + 32 to positive of power source.
- b. If batteries are used, check the state of charge. Use fully charged batteries of sufficient ampere-hour capacity. Use short leads between the terminal strip and power source to avoid an excessive voltage drop.

**CAUTION:** Connect wire to the terminal strip (TS-1) before connecting to the batteries. Use care to avoid shorting batteries.

**5. CONNECTING FROM TEST SET I-83-(\* ) TO DYNAMOTORS.**

- a. Use Cord CD-430 (CA-2) for dynamotors

with leads.

- b. Use Cord CD-429 (CA-1) for dynamotor with six-prong plug (fig. 2).
- c. Use Cord CD-431 (CA-3) as an adapter between Cord CD-430 (CA-2) and dynamotors which require this type of plug.

**CAUTION:** When connecting dynamotors be sure the output circuit is properly completed before operating equipment.

**6. MEASUREMENT OF DYNAMOTORS** (figs. 2 and 4). After the completion of the installation as outlined in paragraphs 3, 4, and 5, proceed as follows:

- a. See dynamotor nameplate for data regarding:

- (1) Type or model.
- (2) Input volts.
- (3) Input current.
- (4) Output volts.
- (5) Output current.

- b. Throw the 14V-OFF-28V switch to the 14V or 28V position, according to the input voltage rating listed on the dynamotor nameplate.

- c. Turn the INPUT CONTROL knob (R-1) slowly in a clockwise direction until the dynamotor starts and reaches approximately normal speed. Adjust the control knob until the INPUT voltmeter reaches the rated input voltage of the dynamotor.

- d. Turn the LOAD CONTROL knob (R-3) until the output current as indicated by the OUTPUT milliammeter (M-4) reaches the output current rating of the dynamotor.

- e. Check the INPUT voltmeter (M-1) and readjust, if necessary, the INPUT CONTROL knob (R-1) to return the input voltage to normal value.

- f. Check the OUTPUT milliammeter (M-4) and readjust, if necessary, the LOAD CONTROL knob (R-3) to return the output current to normal value.

*g.* Repeat procedure in subparagraphs *e* and *f* above until input voltage and output current as read on the INPUT voltmeter (M-1) and the OUTPUT milliammeter (M-4) correspond to the dynamotor nameplate data.

*h.* Hold the SHUNT switch (S-3) to the left and read the input current on INPUT ammeter (M-2). If reading does not correspond to the current listed on the dynamotor nameplate, see paragraph 8. Do not readjust the INPUT CONTROL (R-1) as it already has been correctly set.

*i.* Read the output voltage on OUTPUT voltmeter (M-3). If reading does not correspond to the voltage listed on the dynamotor nameplate, see paragraph 8. Do not readjust the LOAD CONTROL knob (R-3) as it already has been correctly set.

### **7. RIPPLE VOLTAGE MEASUREMENT.**

Read the input and output ripple voltage, as follows:

*a.* **Input Ripple Voltage.** Throw the INPUT-

OUTPUT switch (S-2) to INPUT and note reading of a-c voltmeter (M-5). If no reading is indicated, slowly turn RIPPLE VOLTAGE knob (S-4) counterclockwise, one step at a time, until voltage indicated on a-c voltmeter (M-5) is readable. Input ripple voltage is equal to the meter scale reading multiplied by the RIPPLE VOLTAGE knob setting. For example, if the meter reading is 1 volt and the RIPPLE VOLTAGE pointer is on 5, the ripple voltage is 1 times 5, or 5 volts.

*b.* **Output Ripple Voltage.** Throw the INPUT-OUTPUT switch (S-2) to OUTPUT. Proceed from this setting as in subparagraph *a* above to measure the output ripple voltage.

### **8. INCORRECT INPUT CURRENT OR OUTPUT VOLTAGE READINGS.**

When the input voltage or output current are correctly set, the input current and output voltage should correspond to the values stipulated on the dynamotor nameplate. If otherwise, consult the instruction book provided with the dynamotor for help in remedying the trouble.

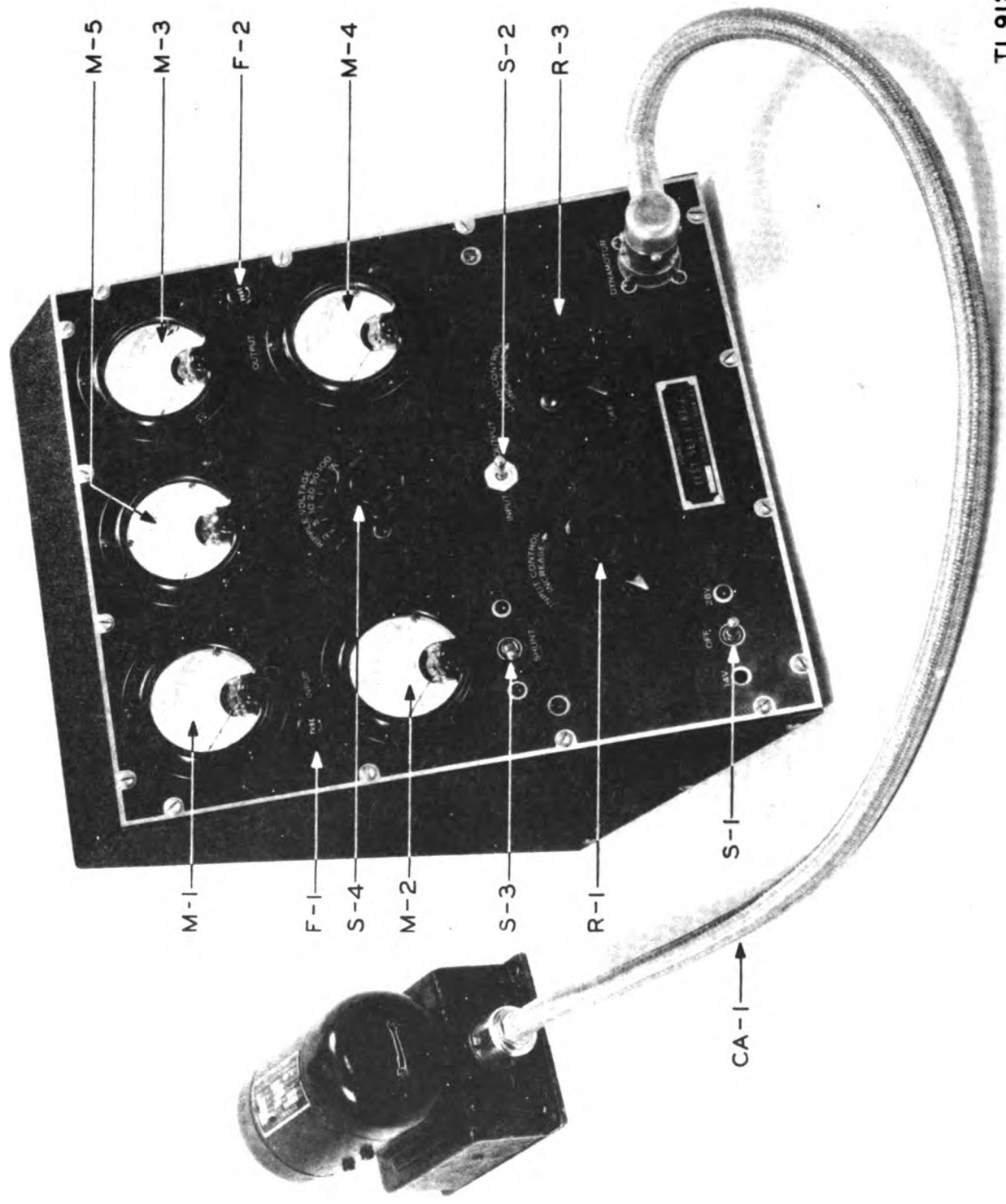
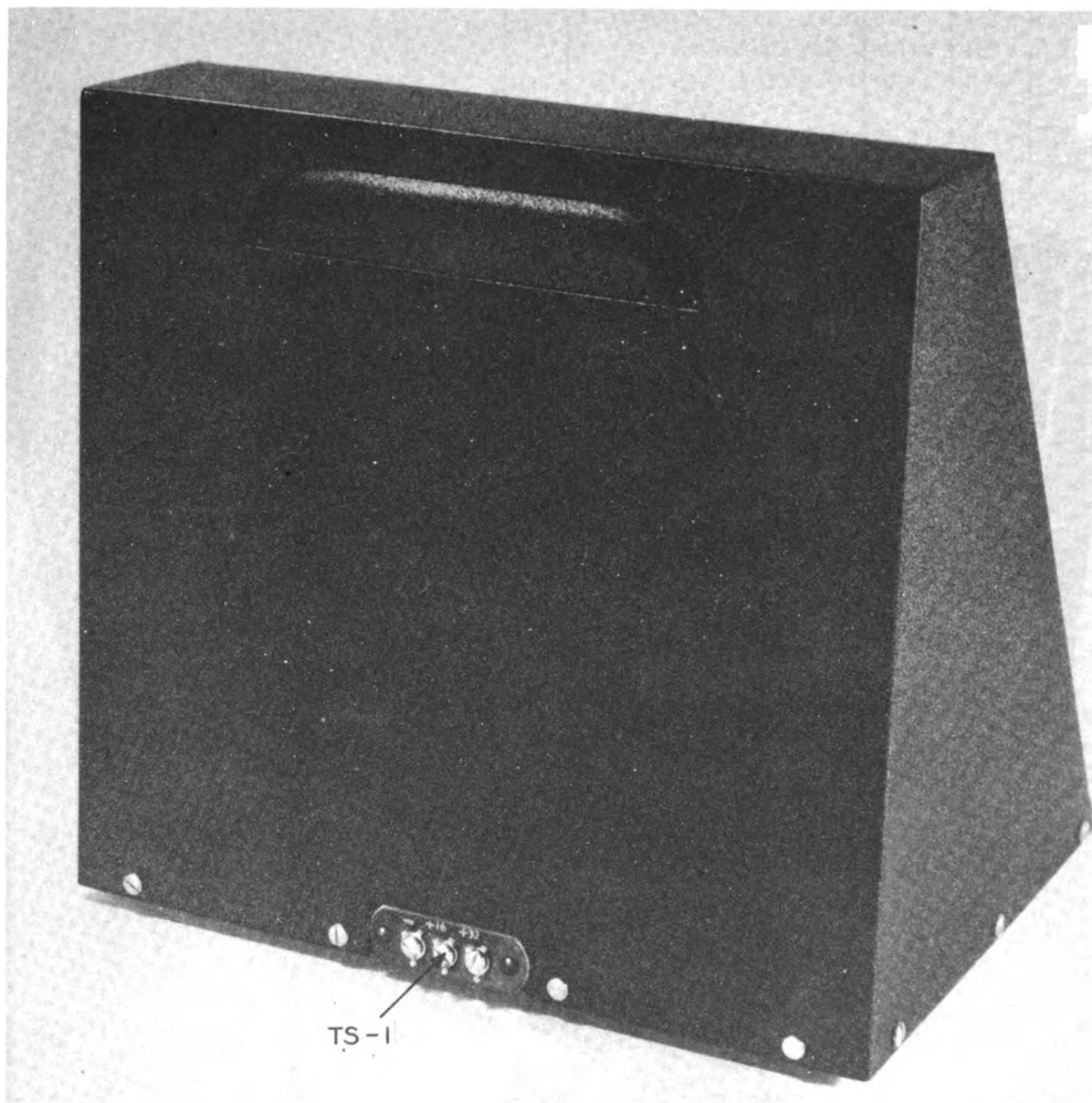
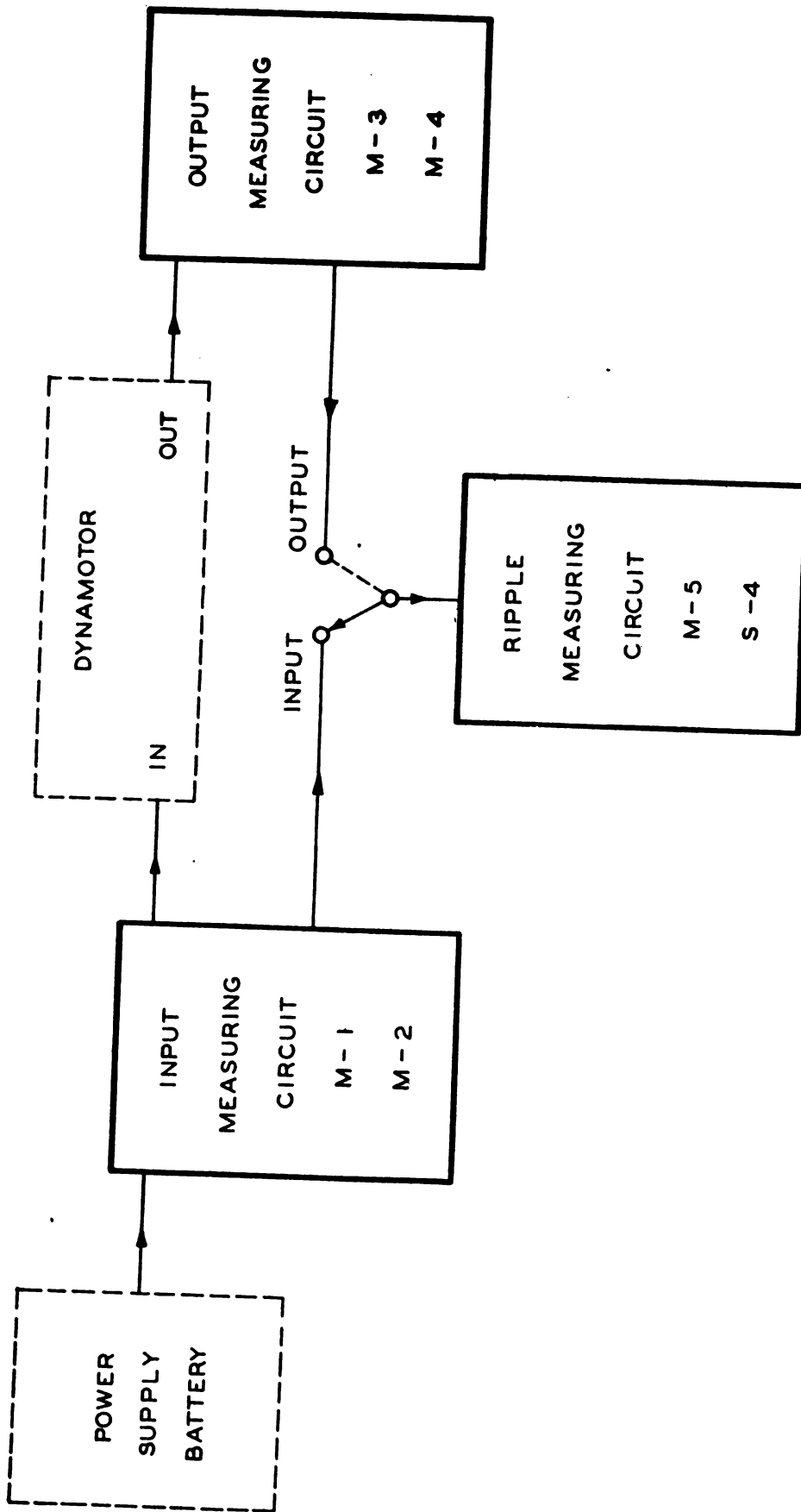


Figure 2. Test Set I-83(\*), connected to dynamotor.



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*Figure 3. Test Set I-83-(\*), rear view.*



TL-91243

Figure 4. Test Set I-88-(\*), simplified block diagram.



# SECTION III

## Functioning of Parts

---

**9. LOCATION AND FUNCTION OF COMPONENTS.** The circuit of Test Set I-83- (\*) consists of an input-measuring circuit, an output-measuring circuit, and a ripple indicator. See figure 4 for a block diagram of operation. For a schematic diagram of the electrical circuit, see figure 5. The description and function of the chief electrical components shown in this figure are as follows:

*a. S-1.* This is a single-pole, three-position, break-before-make toggle switch. Its function is to control the input power and to provide the selection of either a 14-volt or a 28-volt input.

*b. F-1.* This is a 20-ampere fuse contained in a fuse-extractor post ((FH-1) fig. 7) which protrudes through the front panel. Its function is to protect the parts of the input circuit from excess current.

*c. R-1.* This is a 5-ohm single-gang rheostat controlled from the front panel by a knob marked INPUT CONTROL. Its function is to provide a means of adjusting the input current to the dynamotor.

*d. M-2.* This is a d-c ammeter, range 0-10 amperes. Its function is to indicate the input current to the dynamotor.

*e. S-3.* This is a single-pole, single-circuit, normally-closed toggle switch. Its function is to protect the input ammeter (M-2) against high starting current.

*f. M-1.* This is a d-c voltmeter, range 0-35 volts. Its function is to indicate the voltage applied to the input of the dynamotor.

*g. T-1 (fig. 7).* This is a filament-type transformer connected in the circuit as a current transformer. The low-resistance, low-voltage winding is connected in series with the negative lead of the battery supplying the dynamotor.

The high-resistance, high-voltage winding is connected to the a-c indicating meter and multiplier switch (S-4). The function of this transformer is to step up the low voltage a-c ripple component appearing across the primary.

*h. M-3.* This is a d-c voltmeter, range 0-500 volts: Its function is to indicate the output voltage of the dynamotor.

*i. M-4.* This is a d-c milliammeter, range 0-250 milliamperes. Its function is to indicate the output load current of the dynamotor.

*j. R-2 and R-3.* Resistor R-2 (fig. 7) is a 2,000-ohm fixed resistor. Its function is to fix a minimum value of load resistance that can be obtained. Rheostat (R-3) is a 10,000-ohm single-gang rheostat, controlled from the front of the panel by a knob marked LOAD CONTROL. This rheostat is connected in series with the fixed resistor (R-2). The function of the rheostat (R-3) is to provide an adjustable load for the dynamotor.

*k. F-2.* This is a 1/2-ampere fuse contained in fuse-extractor post (FH-2) which protrudes from the front panel. The function of the fuse is to protect the parts of the output circuit from excess current.

*l. C-1.* This is a 2- $\mu$ f capacitor. Its function is to block the d-c component of the output voltage from the a-c voltmeter (M-5), when measuring the output ripple voltage.

*m. S-2.* This is a double-pole, double-throw, make-before-break toggle switch. Its function is to connect the ripple-measuring circuit to either the dynamotor input or dynamotor output circuit.

*n. S-4.* This is an L-type of meter multiplier network. The input impedance remains constant at 20,000 ohms at all settings of the control

knob. The function of this switch is to extend the range of the a-c voltmeter.

*o. M-5.* This is an a-c rectifier-type voltmeter, range 0-2 volts rms, 10,000 ohms per volt. Its function is to indicate the ripple voltage present.

**10. THEORY OF OPERATION, D-C CIRCUIT (fig. 6).** The following presupposes that power supply and dynamotor have been correctly connected as outlined in paragraphs 3, 4, and 5.

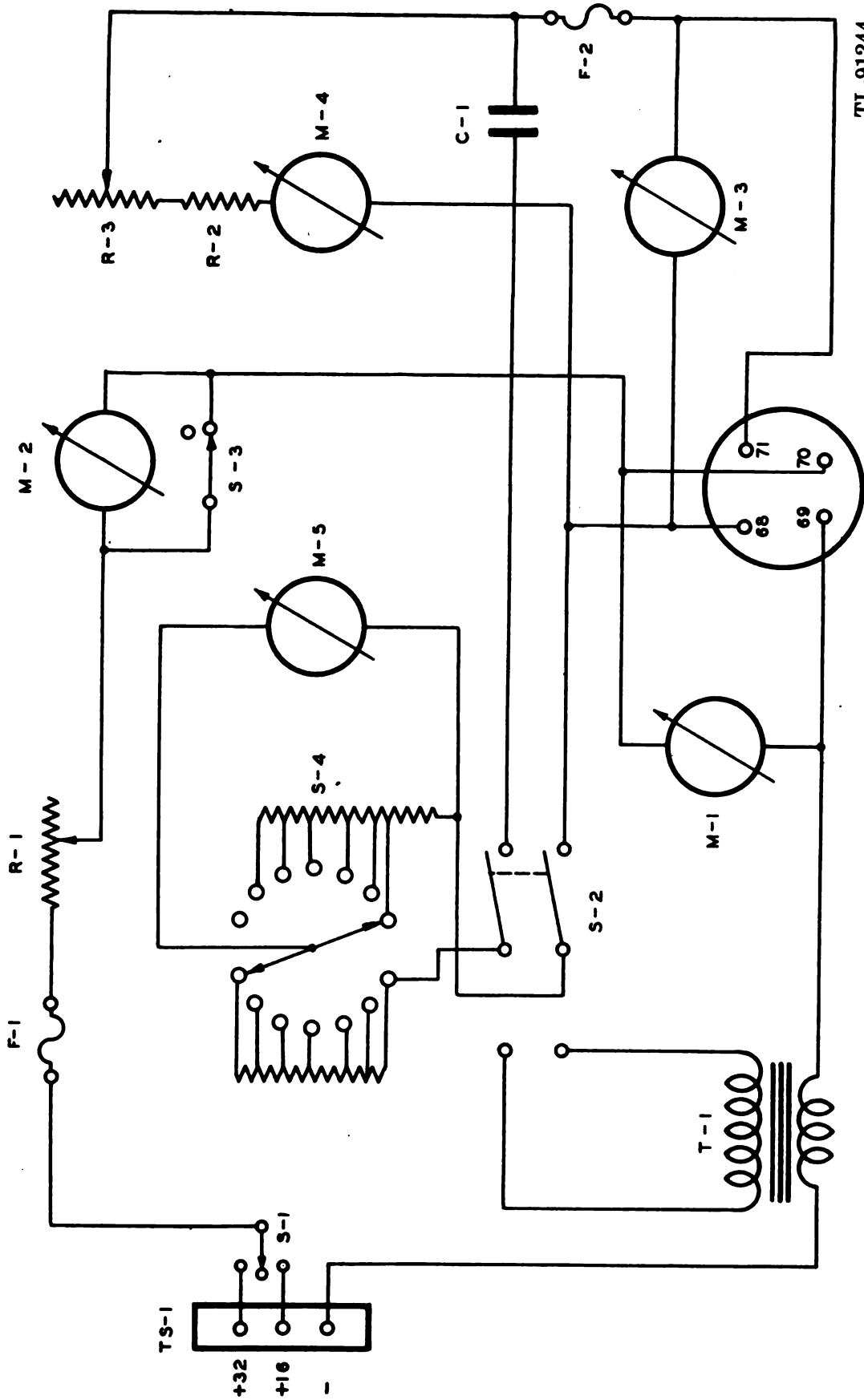
*a. Input Circuit.* Throw the 14V-OFF-28V switch to either 14V or 28V position (consult dynamotor nameplate data). Current then flows from the plus side of the power supply (fig. 5) through switch (S-1), fuse (F-1), rheostat (R-1), switch (S-3), input of dynamotor, through primary of transformer (T-1), and back to the minus side of the power supply. At zero rpm the magnitude of the current is controlled by rheostat (R-1) and the resistance of the dynamotor input circuit. For this reason rheostat (R-1) *must* be set at the extreme counterclockwise position to limit the starting current. As the dynamotor armature comes up to speed, a counter emf is set up and the starting current falls. Rheostat (R-1) can then be adjusted to control the input voltage, input current, and speed.

*b. Output Circuit.* At zero rpm the magnitude of the output current is zero. As the dynamotor comes up to speed, current flows from the plus side of the dynamotor output, through meter (M-4), through the load resistor (R-2) and rheostat (R-3), through fuse (F-2) and back to the minus side of the dynamotor output. The magnitude of the output current depends upon the internal resistance of the dynamotor output circuit and the value of resistor (R-2) and rheostat (R-3). In order to protect OUTPUT volt ammeter (M-4), rheostat (R-3) should be kept in the counterclockwise position when starting a test.

## **11. THEORY OF OPERATION, RIPPLE CIRCUIT.**

*a. Input Circuit.* When the dynamotor armature is revolving, the direct current flowing from the battery is interrupted (varied) at a rapid rate by the commutator segments and any foreign matter present between the commutator and brushes. This interrupted direct current may take the form of a re-occurring variation or it may be random in its appearance. This re-occurring interrupted direct current takes the form of an a-c wave with frequencies up to 20,000 cycles superimposed on the direct current, and appears across the battery, resistor R-1, and primary of transformer (T-1). The load on the secondary of transformer (T-1) is 20,000 ohms and the impedance ratio is equal to the square of 110 divided by 2.5, or 1,935. Therefore, the primary a-c impedance of transformer (T-1) is equal to 20,000 divided by 1,935, or approximately 10.35 ohms. Since the internal impedance of the battery and dynamotor are variable, and the resistance of resistor (R-1) can be varied from the front panel and approaches the impedance of transformer (T-1), the ripple voltage as measured in the input circuit has no definite value. Comparative values of input ripple voltage, however, may be recorded. In addition, the input ripple voltage as noted in this input circuit can be used when setting brushes, cleaning commutators, etc., and recording the reduction in the indication shown on the a-c voltmeter (M-5).

*b. Output Circuit.* A superimposed a-c voltage also appears across the load resistor (R-2) and rheostat (R-3), in addition to the d-c output voltage of the dynamotor. This output a-c ripple voltage is dependent upon the dynamotor and any filtering connected between the output of the dynamotor and the Test Set I-83-(\*). Since there are no variables in the output ripple circuit, the ripple voltage as indicated by the a-c voltmeter (M-5) is a fair indication of the actual ripple obtained from the dynamotor.



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SOCKET SO-54

Figure 5. Test Set I-88-(\*), schematic diagram.

# SECTION IV

## Maintenance

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**NOTE:** Unsatisfactory performance of this equipment will be reported immediately on WD AGO Form No. 488. If form is not available, see TM 38-250.

**12. REPLACEMENT OF FUSES.** If no indication is obtained on any of the meters, check the INPUT fuse. If it is defective, replace it. If after replacing the INPUT fuse, the INPUT voltmeter (M-1) and ammeter (M-2) indicate normally, but the OUTPUT voltmeter (M-3) and the milliammeter (M-4) show no indication, check the OUTPUT fuse. If it is defective replace it. Replace fuses with one no larger than 20-ampere size in the INPUT and one no larger than  $\frac{1}{2}$ -ampere in the OUTPUT side. When removing fuses for inspection or replacement, push in and rotate the knurled head of the fuse-holder, or use a small screwdriver in the red slot of the fuse-holder (depending on the model of Test Set I-83). Fuses removed for inspection may be checked with an ohmmeter using any convenient scale.

### 13. CLEANING EXTERNAL CONNECTIONS.

*a. Battery Connections.* Clean off any corrosion. Neutralize acid. Wash off residue with clean distilled water. Tighten clamps and, if possible, cover terminals with white vaseline to reduce chemical action.

*b. Terminals on Terminal Strip (TS-1).* At regular intervals check leads and tighten screws to break oxidizing film.

*c. Plug Connections.* Keep connections clean and tight.

**14. REMOVING CASE.** Remove the case of Test Set I-83-(\*) as follows:

*a.* Unscrew the panel-mounting screws located on the top, the left, and the right edges of

the front panel.

*b.* Turn test set around and unscrew the base-mounting screws located around the base of the cabinet.

**NOTE:** Do not remove the four black nickel-plated machine screws located on the bottom edge of the front panel. The screws to be removed are bright nickel.

*c.* Lift up and pull backward on the cabinet (figs. 3 and 6).

**15. CARE OF CONTACTS** (fig 6). Clean the brushes on the contact arm and contact surface of rheostat (R-1) and resistor (R-2), using a soft cloth moistened with carbon tetrachloride or solvent, dry cleaning. After the surface is dry, apply a small protective coat of unmedicated petrolatum (white vaseline) to the contact surface and rotate the switch arm. Remove the excess of lubrication which collects at the ends of the arm movement from the contact surface. Do not use carbon tetrachloride or solvent, dry cleaning, on the arms and contacts of multiplier switch (S-4). On this switch apply only a small amount of white vaseline and clean off the excess as outlined above.

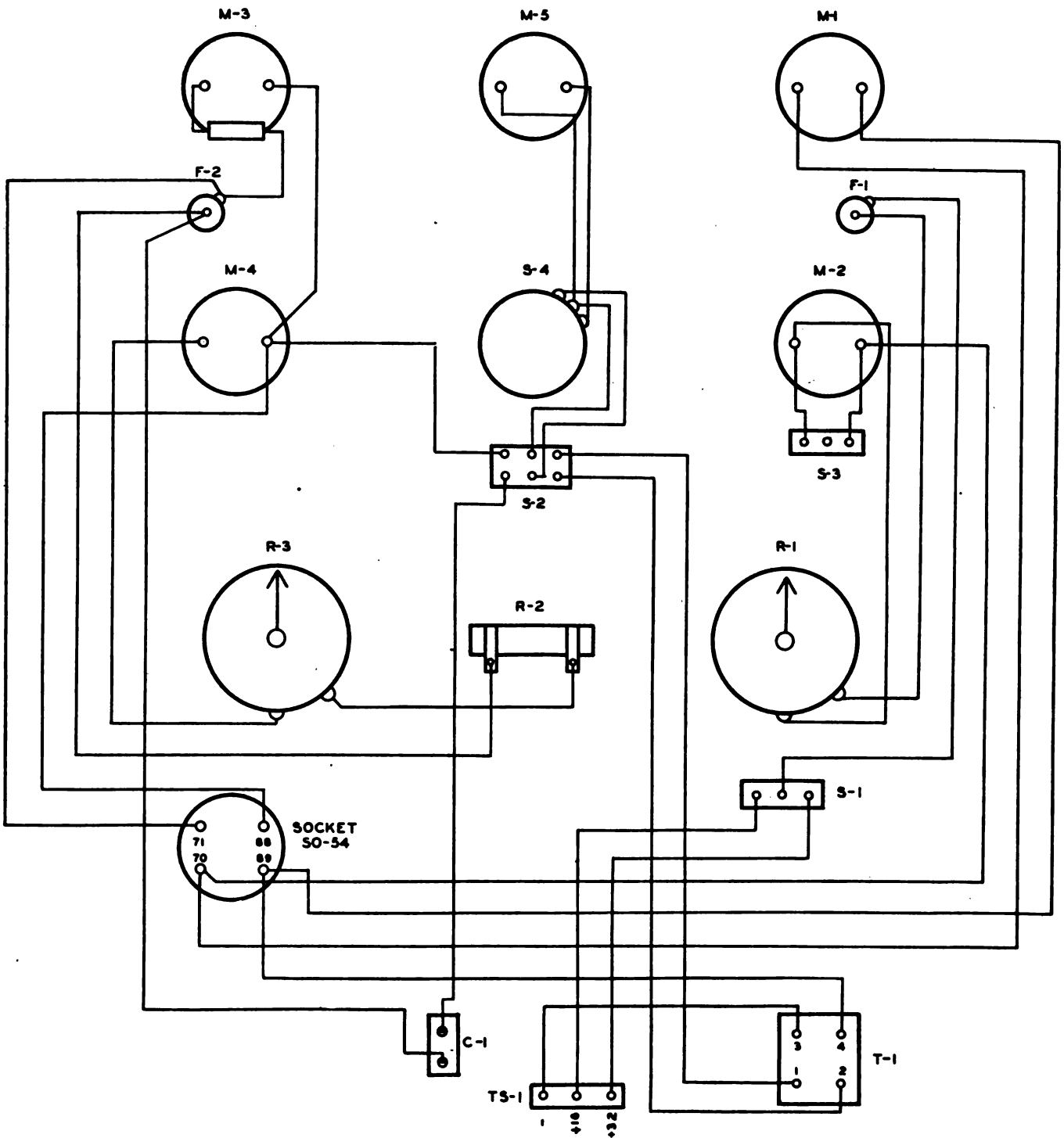
**16. CIRCUIT CHECKING.** If the test set fails to function correctly after good fuses are installed, connections cleaned (pars. 12, 13, 14, and 15), and the external circuit checked, remove the test set from the cabinet and proceed as follows:

*a. Continuity Check on Input Circuit.*

(1) Remove leads from terminal strip (TS-1).

(2) Remove plug from socket (SO-54) and short-circuit input terminals No. 69 and No. 70 (bottom pair).

(3) Throw 14V-OFF-28V switch to either



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Figure 6. Test Set I-89-(\*), wiring diagram.

14V or 28V position. Use the procedure which follows for either position.

(4) With lowest reading scale of ohmmeter, check resistance between — and +16 or +32 terminals on terminal strip (TS-1). The following readings should be obtained:

| Position of<br>INPUT CONTROL<br>knob | Ohms<br>(approximately) |
|--------------------------------------|-------------------------|
| Off                                  | 5                       |
| 1/4 on                               | 4                       |
| 1/2 on                               | 3                       |
| 3/4 on                               | 2                       |
| Full on                              | 1                       |

**b. Location of Trouble in Input Circuit.** If resistance readings as indicated in subparagraph *a* (4) above are not obtained, check for continuity as follows:

(1) Across the 14V-OFF-28V switch (S-1). If open is indicated, replace switch.

(2) Across the INPUT fuse (F-1). If open is indicated, replace fuse or repair contacts on the fuse-holder (FH-1).

(3) Across the INPUT CONTROL rheostat (R-1). Check contact arm and replace if defective.

(4) Across terminals 3 and 4 on transformer (T-1). If open is indicated, replace transformer.

**c. Continuity Check on Output Circuit.**

(1) With highest reading scale of ohmmeter, check resistance between output terminals No. 68 and No. 71 (top pair) on socket (SO-54). The following readings should be obtained:

| Position of<br>LOAD CONTROL<br>knob | Ohms<br>(approximately) |
|-------------------------------------|-------------------------|
| Off                                 | 1/2 meg                 |
| 1/4 on                              | 10,000                  |
| 1/2 on                              | 8,000                   |
| 3/4 on                              | 5,000                   |
| Full on                             | 2,000                   |

**d. Location of Trouble in Output Circuit.** If resistance readings as indicated in subparagraph *c* (1) above are not obtained, check for continuity as follows:

(1) If reading is infinity with LOAD CONTROL knob in extreme counterclockwise position, the meter multiplier on the OUTPUT voltmeter (M-3) may be open.

(2) Across resistor (R-2). If open is indicated, replace resistor.

(3) Across the LOAD CONTROL rheostat (R-3), check for several positions. (Should read open only in extreme counterclockwise position.) Check contact arm and contact surface. Replace if defective.

(4) Across OUTPUT milliammeter (M-4). If open is indicated, replace meter.

**e. Continuity Check on Input Ripple Measuring Circuit.**

(1) Remove one lead from secondary of transformer (T-1).

(2) Throw INPUT-OUTPUT switch (S-2) to INPUT.

(3) Using a high reading scale on ohmmeter, measure the resistance between the lead removed from the transformer and the secondary lead remaining on the transformer. A reading of approximately 20,000 ohms should be obtained for all positions of the RIPPLE VOLTAGE knob (S-4).

**f. Location of Trouble in Input Ripple Measuring Circuit.** If resistance readings as indicated in subparagraph *e* (3) above are not obtained, check the continuity of the components as follows:

(1) Across INPUT-OUTPUT switch (S-2) from each center lug to each input lug (connected to input ripple circuit). If open is indicated, replace the switch.

(2) Across In (input) and C (common), Out (output) and C (common) and In and Out of RIPPLE VOLTAGE switch (S-4). If open is indicated in any position of RIPPLE VOLTAGE knob, replace the switch.

(3) Across secondary of transformer (T-1). If open is indicated, replace transformer.

**g. Continuity Check on the Output Ripple Measuring Circuit.**

(1) Throw INPUT-OUTPUT switch (S-2) to OUTPUT.

(2) Using a high reading scale on ohmmeter, measure the resistance between terminal No. 68 on socket (SO-54) and the front terminal of capacitor (C-1). A reading of approximately 20,000 ohms should be obtained for all positions of the RIPPLE VOLTAGE knob.

**h. Location of Trouble in the Output Ripple Measuring Circuit.** If resistance readings as indicated in subparagraph *g* (2) above are not obtained, check the continuity of the components as follows:

(1) Across INPUT-OUTPUT switch (S-2),

from each center lug to each output lug (connected to output ripple circuit). If open is indicated, replace the switch.

(2) Across In (input) and C (common),

Out (output) and C (common), and In and Out of RIPPLE VOLTAGE switch (S-4). If open is indicated in any position of RIPPLE VOLTAGE knob, replace the switch.

# SECTION V

## Supplementary Data

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**17. CHARACTERISTICS OF TWO TYPICAL DYNAMOTORS UNDER TEST WITH TEST SET I-83-(\*).** The dynamotors used

were chosen at random. The results, though typical, are *not* presented as a standard for proper operating dynamotors.

*a.* Dynamotor Type DM-24-B.

Input: 13.8 volts, 2.45 amperes  
 Output: 2.45 volts, 70 milliamperes

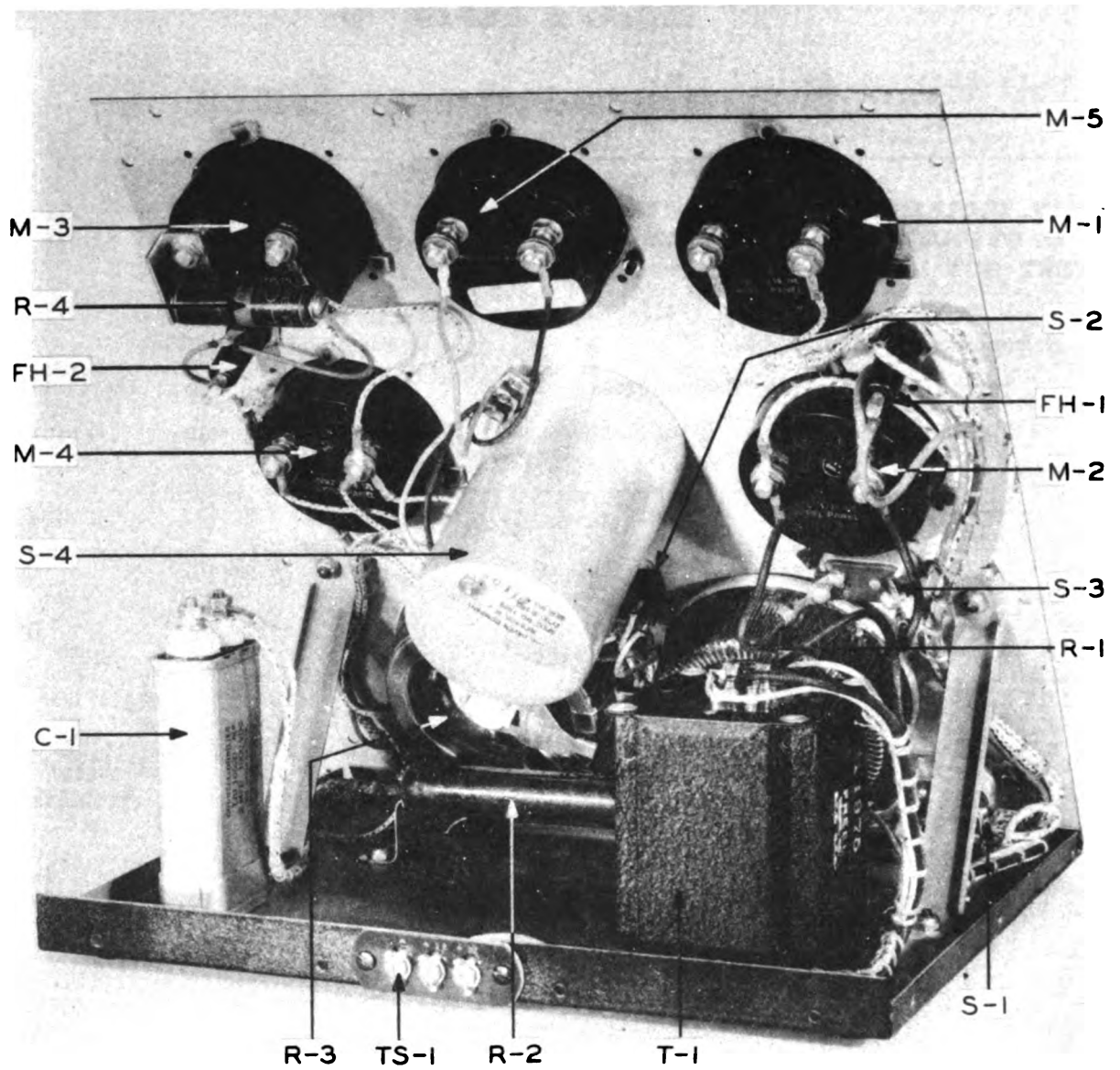
*b.* Dynamotor Type DM-28-B.

Input: 27.9 volts, 1.23 amperes  
 Output: 220 volts, 70 milliamperes

| INPUT |         |                | OUTPUT |              |    |
|-------|---------|----------------|--------|--------------|----|
| Volts | Amperes | RIPPLE (volts) | Volts  | Milliamperes |    |
| 14    | 2.4     | 1.4            | 0.70   | 220          | 70 |
| 12    | 1.0     | 1.3            | 0.50   | 180          | 60 |
| 10    | 1.0     | 1.0            | 0.20   | 150          | 50 |
| 8     | 0.9     | 0.9            | 0.10   | 120          | 40 |
| 6     | 0.8     | 0.7            | 0.10   | 80           | 30 |
| 4     | 0.7     | 0.7            | 0.09   | 50           | 20 |

| INPUT |         |                | OUTPUT |              |    |
|-------|---------|----------------|--------|--------------|----|
| Volts | Amperes | RIPPLE (volts) | Volts  | Milliamperes |    |
| 27    | 1.4     | 0.80           | 0.70   | 220          | 80 |
| 26    | 0.7     | 0.80           | 0.60   | 210          | 75 |
| 24    | 0.5     | 0.70           | 0.60   | 195          | 70 |
| 22    | 0.3     | 0.60           | 0.59   | 170          | 65 |
| 20    | 0.3     | 0.60           | 0.59   | 150          | 70 |
| 18    | 0.38    | 0.40           | 0.49   | 140          | 75 |





TL91246

Figure 7. Test Set I-83(\*), rear view with cover removed.

# 18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*).

NOTE: Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model            |                  |   |   | Ref symbol | Signal Corps stock No. | Name of part and description  | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|------------------|------------------|---|---|------------|------------------------|---|---------------|----------------|------------|--------|---------|---------|-------------|
| A<br>B<br>C<br>G | D<br>E<br>F<br>H | J | K |            |                        |   |               |                |            |        |         |         |             |
| x                | x                |   | x | M-2        | 3F1010-33              | AMMETER: d-c; 0- to 10-amps; (rectangular bakelite housing; body 2¾" diam; 4 mounting holes spaced 2¼" apart; secured to panel by No. 6-32 screws); Weston type 301; GE type DO-53; Westinghouse type RX-35; Burlington model 31; Triplett model 327-A; Simpson model 27. | 1             |                |            | *      | *       | *       | *           |
|                  |                  |   | x | M-2        | 3F901-3                | AMMETER: d-c; 0- to 10-amps; (3½" round, black bakelite housing; body 2¾" diam; 3 mounting holes spaced 2¼" apart; secured to panel by No. 6-32 screws); Weston 301 or equal.   | 1             |                |            | *      | *       | *       | *           |
| x                | x                | x | x |            | 3Z737-6.1              | BINDING POST: screw type; (plastic cap; attached to Cord CD-430); Ensign No. 36.  | 4             |                |            | *      | *       | *       | *           |
| x                | x                | x | x | C-1        | 3DB2.10020-2           | CAPACITOR: 2μf (fixed; oilfilled; 1,000-v dc (working); metal case; slotted mounting holes); Cornell-Dubilier type TJU No. 10020 or Sprague type No. 2538-5.  | 1             |                |            | *      | *       | *       | *           |
| x                | x                | x | x | CA-1       | 3E1429                 | CORD CD-429: ½" diam x 37" long; (4-conductor shielded flexible conduit; 1 Plug PL-Q74; 1 Plug PL-P62).   | 1             |                |            | *      | *       | *       | *           |
| x                | x                | x | x | CA-2       | 3E1430                 | CORD CD-430: ½" diam x 37" long; (4-conductor shielded flexible conduit; 1 Plug PL-Q74; bakelite panel, metal terminal box with 4 binding posts).   | 1             |                |            | *      | *       | *       | *           |
| x                | x                | x | x | CA-3       | 3E1431                 | CORD CD-431: (pin-type cord tips with tag markers on one end and 1 socket S-306 FBT on the other end).  | 1             |                |            | *      | *       | *       | *           |
| x                | x                | x | x | F-2        | 3Z1946                 | FUSE FU-46: ½-amp, 250-volt; type Bussman 3AG; (glass enclosed, 1¼" long, ¼" diam); Littelfuse No. 1046.  | 1             |                |            | *      | *       | *       | *           |
| x                | x                | x | x | F-1        | 3Z1911                 | FUSE FU-11: 20-amp, 25-volt; (glass enclosed, 1¼" long, ¼" diam); Littelfuse type 3AG, No. 1083.  | 1             |                |            | *      | *       | *       | *           |
| x                | x                |   | x | FH-1       | 3Z3275                 | FUSEPOST: extractor; panel mounting; Littelfuse 1075.   | 2             |                |            | *      | *       | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

## 18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*). (contd.)

**NOTE:** Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model |   |   |   |   | Ref symbol | Signal Corps stock No. | Name of part and description  | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------|---|---|---|---|------------|------------------------|---|---------------|----------------|------------|--------|---------|---------|-------------|
| A     | D | J | K | B |            |                        |   |               |                |            |        |         |         |             |
|       |   |   | x |   | FH-1       | 3ZK3275.4              | FUSEHOLDER: panel mounting with screw cap; Bussman HCM.   | 2             |                |            | *      | *       | *       | *           |
| x     |   |   |   | x |            | 2Z5788-8               | KNOB: rheostat; black bakelite fluted; (1½" diam; fastens to ¼" shaft with 2 setscrews; metal pointer); type 5109; Kurz-Kasch No. S-309-64-40261; Daven No. A-1358-28.  | 3             |                |            | *      | *       | *       | *           |
|       |   |   |   | x |            | 2Z5748.22              | KNOB: black bakelite fluted, with celluloid pointer; (fastens to shaft with 2 setscrews); Crowe Mfg. Co., type No. 6465.  | 3             |                |            | *      | *       | *       | *           |
| x     | x |   |   |   | M-4        | 3F925-13               | AMMETER: 0 to 250 ma d-c; (rectangular bakelite housing; body 2¾" diam; 4 mounting holes spaced 2¼" apart; secured to panel by No. 6-32 screws); Weston type 301; GE DO-43; Westinghouse type RX-35; Burlington model 31; Triplett model 327-A; Simpson model 27. | 1             |                |            | *      | *       | *       | *           |
|       |   |   |   |   |            |                        |   |               |                |            |        |         |         |             |
|       |   |   |   |   | M-4        | 3F925-2                | AMMETER: 0 to 250 ma d-c; (3½" round black bakelite cases; body 2¾" diam; 3 mounting holes spaced 2¼" apart; secured to panel by No. 6-32 screws); Weston 301.  | 1             |                |            | *      | *       | *       | *           |
| x     | x | x |   |   | S-4        | 3Z9903A-27             | MULTIPLIER SWITCH ASSEMBLY: (2-circuit, 7-position; one circuit shorting, one nonshorting; spring return to extreme clockwise position; ¼" diam shaft); Shallcross Mfg. Co. No. 445; Espey Co. No. G-255-C or Daven Co. D-180.                                    | 1             |                |            | *      | *       | *       | *           |
|       |   |   |   |   |            |                        |   |               |                |            |        |         |         |             |
|       |   |   |   |   | S-4        | 3Z9903A-25             | MULTIPLIER SWITCH ASSEMBLY: same as above; Dayton-Acme Co. type 1 (no substitute).  | 1             |                |            |        | *       | *       | *           |
| x     | x | x | x |   |            | 2Z7174.1               | PLUG PL-Q74: right-angle collar; (4-prong chromium finish, brass shell).  | 2             |                |            | *      | *       | *       | *           |
| x     | x | x | x |   |            | 2Z7162.2               | PLUG PL-P62: (6-prong, 3-wired; chromium finish, brass shell).  | 1             |                |            | *      | *       | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

**18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*). (contd.)**

NOTE: Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model |   |   |   | Ref symbol | Signal Corps stock No. | Name of part and description  | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------|---|---|---|------------|------------------------|---|---------------|----------------|------------|--------|---------|---------|-------------|
| A     | D | J | K |            |                        |   |               |                |            |        |         |         |             |
| B     | E |   |   |            |                        |   |               |                |            |        |         |         |             |
| C     | F |   |   |            |                        |   |               |                |            |        |         |         |             |
| G     | H |   |   |            |                        |   |               |                |            |        |         |         |             |
| x     | x | x |   |            | 3Z6020-87              | RESISTOR:fixed;wire-wound;200-ohm ± 1%; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   |   | x          | 3Z6020-79              | RESISTOR:fixed;wire-wound;200-ohm ± ½%; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                    | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6020B2-1             | RESISTOR:fixed;wire-wound;202-ohm ± 1%; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   |   | x          | 3Z6020B2               | RESISTOR:fixed;wire-wound;202-ohm ± ½%; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                    | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6020F6-3             | RESISTOR:fixed;wire-wound;206-ohm ± 1%; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   |   | x          | 3Z6020F6-2             | RESISTOR:fixed;wire-wound;206-ohm ± ½%; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                    | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6060-65              | RESISTOR:fixed;wire-wound;600-ohm ± 1%; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   |   | x          | 3Z6060-61              | RESISTOR:fixed;wire-wound;600-ohm ± ½%; 1 watt (wire leads); part of multiplier switch assembly; International Resistor Co.                     | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6064D4-1             | RESISTOR:fixed;wire-wound;644-ohm ± 1%; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

### 18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*). (contd.)

NOTE: Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model |   |   |   | Ref symbol | Signal Corps stock No. | Name of part and description   | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------|---|---|---|------------|------------------------|--|---------------|----------------|------------|--------|---------|---------|-------------|
| A     | D | J | K |            |                        |  |               |                |            |        |         |         |             |
| B     | E |   |   |            |                        |  |               |                |            |        |         |         |             |
| C     | F |   |   |            |                        |  |               |                |            |        |         |         |             |
| G     | H |   |   |            |                        |  |               |                |            |        |         |         |             |
|       |   |   | x |            | 3Z6064D4               | RESISTOR: fixed; wire-wound; 644-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                    | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6100-166             | RESISTOR: fixed; wire-wound; 1,000-ohm $\pm 1\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   | x |            | 3Z6100-154             | RESISTOR: fixed; wire-wound; 1,000-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                  | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6117-1               | RESISTOR: fixed; wire-wound; 1,170-ohm $\pm 1\%$ ; 1 watt; (wire leads) part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co.  | 1             |                |            |        |         | *       | *           |
|       |   |   | x |            | 3Z6117                 | RESISTOR: fixed; wire-wound; 1,170-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                  | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6200-123             | RESISTOR: fixed; wire-wound; 2,000-ohm $\pm 1\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   | x |            | 3Z6200-112             | RESISTOR: fixed; wire-wound; 2,000-ohm $\pm 1/4\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                  | 1             |                |            |        |         | *       | *           |
| x     | x | x | x | R-2        | 3Z6200-47              | RESISTOR: fixed; 2,000-ohm $\pm 10\%$ ; 100 watt; Ohmite No. 0611.   | 1             |                |            | *      | *       | *       | *           |
| x     | x | x |   |            | 3Z6277H8-1             | RESISTOR: fixed; wire-wound; 2,778-ohm $\pm 1\%$ ; (wire leads); 1 watt; part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

# 18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*). (contd.)

NOTE: Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model |   |   |   | Ref symbol | Signal Corps stock No. | Name of part and description  | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------|---|---|---|------------|------------------------|---|---------------|----------------|------------|--------|---------|---------|-------------|
| A     | D | J | K |            |                        |   |               |                |            |        |         |         |             |
| B     | E |   |   |            |                        |   |               |                |            |        |         |         |             |
| C     | F |   |   |            |                        |   |               |                |            |        |         |         |             |
| G     | H |   |   |            |                        |   |               |                |            |        |         |         |             |
|       |   |   | x |            | 3Z6277H8               | RESISTOR: fixed; wire-wound; 2,778-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                   | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6560-41              | RESISTOR: fixed; wire-wound; 6,000-ohm $\pm 1\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co.  | 1             |                |            |        |         | *       | *           |
|       |   |   | x |            | 3Z6560-36              | RESISTOR: fixed; wire-wound; 6,000-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                   | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6610-187             | RESISTOR: fixed; wire-wound; 10,000-ohm $\pm 1\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   | x |            | 3Z6610-171             | RESISTOR: fixed; wire-wound; 10,000-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                  | 1             |                |            |        |         | *       | *           |
| x     | x | x |   |            | 3Z6615-117             | RESISTOR: fixed; wire-wound; 15,000-ohm $\pm 1\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; Shallcross type 108A; Instrument Resistor Co. | 1             |                |            |        |         | *       | *           |
|       |   |   | x |            | 3Z6615-109             | RESISTOR: fixed; wire-wound; 15,000-ohm $\pm 1/2\%$ ; 1 watt; (wire leads); part of multiplier switch assembly; International Resistor Co.                  | 1             |                |            |        | *       | *       | *           |
| x     | x | x | x |            | 3Z6750-63              | RESISTOR: wire-wound; 500,000-ohm $\pm 2\%$ max; 2-watt; Daven No. A-1358-8.  | 1             |                |            |        |         | *       | *           |
| x     | x | x | x | R-1        | 3Z7005-2               | RHEOSTAT: variable; 0 to 5-ohm; 150-watt; Ohmite No. 0528, type L.  | 1             |                |            | *      | *       | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

**18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*) (contd.)**

NOTE: Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model |   |   |   | Ref symbol | Signal Corps stock No. | Name of part and description  | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|-------|---|---|---|------------|------------------------|---|---------------|----------------|------------|--------|---------|---------|-------------|
| A     | D | J | K |            |                        |   |               |                |            |        |         |         |             |
| x     | x | x | x | R-3        | 3Z7410-5               | RHEOSTAT: variable; 0 to 10,000-ohm 150-watt; OFF position at extreme counterclockwise rotation; Ohmite No. 0540, type L. | 1             |                |            | *      | *       | *       | *           |
| x     | x | x | x |            | 2Z8676.60              | SOCKET: 6-prong; female; Jones Mfg. Co. No. S-306 PHT.  | 1             |                |            | *      | *       | *       | *           |
| x     | x | x | x | SO-54      | 2Z875A                 | SOCKET SO-54: 4-terminal; male . . . .  | 1             |                |            | *      | *       | *       | *           |
| x     | x | x | x | S-2        | 3Z9845.283             | SWITCH: toggle; (double-pole, double-throw; 3-amp at 250 volt; 1 1/8" mounting hole); Cutler-Hammer Inc. No. 8363.        | 1             |                |            | *      | *       | *       | *           |
| x     | x | x | x | S-3        | 3Z9849.61              | SWITCH: toggle; momentarily open, normally closed; (single-pole; 35-amp at 24-volt); Cutler-Hammer, Inc. No. 8213.        | 1             |                |            | *      | *       | *       | *           |
| x     | x | x | x | S-1        | 3Z9849.7               | SWITCH: toggle; 1-pole; 3-position, center position OFF; (20-amp at 24-volt); Cutler-Hammer, Inc. No. 8200.               | 1             |                |            | *      | *       | *       | *           |
| x     | x | x | x | TS-1       | 3Z12513-50             | TERMINAL STRIP: 3 terminals; Jones Mfg. Co., type 3-50.   | 1             |                |            | *      | *       | *       | *           |
|       |   |   | x | TS-1       | 2Z9403.48              | TERMINAL STRIP: 3 terminals; soldering lugs; Jones Mfg. Co., type 3-1.  | 1             |                |            | *      | *       | *       | *           |
| x     |   |   | x | T-1        | 2Z9611.159             | TRANSFORMER: (110-volt primary; 2.5-volt, 10-amp secondary); United Transformer Corp. No. 55487.                          | 1             |                |            |        | *       | *       | *           |
|       | x |   |   | T-1        | 2Z9611.174             | TRANSFORMER: filament; GTC No. 9N886.   | 1             |                |            |        | *       | *       | *           |
|       |   | x |   | T-1        | 2Z9611.173             | TRANSFORMER: (110-volt primary; 2.5-volt, 10-amp secondary); Freed No. Q-1762.  | 1             |                |            |        | *       | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

# 18. MAINTENANCE PARTS LIST FOR TEST SET I-83-(\*). (contd.)

NOTE: Order maintenance parts by stock number, name, and description.

Only maintenance parts listed can be requisitioned.

| Model            |                  |   |   | Ref symbol | Signal Corps stock No. | Name of part and description   | Quan per unit | Running spares | Orgn stock | 3d ech | 4th ech | 5th ech | Depot stock |
|------------------|------------------|---|---|------------|------------------------|--|---------------|----------------|------------|--------|---------|---------|-------------|
| A<br>B<br>C<br>G | D<br>E<br>F<br>H | J | K |            |                        |  |               |                |            |        |         |         |             |
| x                | x                |   | x | M-5        | 3F8002.1               | VOLTMETER: a-c; 0- to 2-volts; (rectangular black bakelite housing body 2-3/4" diam; 4 mounting holes spaced 2 1/4" apart; secured to panel by No. 6-32 screws); Weston type 301; GE DO-55; Westinghouse type RC-35; Triplett model 327-A; Simpson model 47.           | 1             |                |            | *      | *       | *       | *           |
|                  |                  |   | x | M-5        | 3F8002-2               | VOLTMETER: a-c; 0- to 2-volts; (round black bakelite housing body 3 1/4" diam; 3 mounting holes spaced 2 3/4" apart; secured to panel by No. 6-32 screws); Weston 301.   | 1             |                |            | *      | *       | *       | *           |
| x                | x                |   | x | M-1        | 3F8035                 | VOLTMETER: d-c; 0- to 35-volts; (rectangular black bakelite case; body 2 1/4" diam; 4 mounting holes spaced 2 1/4" apart; secured to panel by No. 6-32 screws); Weston 301; GE DO-53; Westinghouse RX-35; Burlington model 31; Triplett model 327-A; Simpson model 27. | 1             |                |            | *      | *       | *       | *           |
|                  |                  |   | x | M-1        | 3F8050-13              | VOLTMETER: d-c; 0- to 35-volts; 3 1/2" (round black bakelite case; body 2 3/4" diam; 3 mounting holes spaced 2 3/4" apart; secured to panel by No. 6-32 screws); Weston 301.   | 1             |                |            | *      | *       | *       | *           |
| x                | x                |   | x | M-3        | 3F8500-12              | VOLTMETER: d-c; 0- to 500-volts; (rectangular black bakelite case; body 2 1/4" diam; 4 mounting holes spaced 2 1/4" apart; secured to panel by No. 6-32 screws); GE DO-53; Westinghouse RX-35; Triplett model 327-A.   | 1             |                |            | *      | *       | *       | *           |
|                  |                  |   | x | M-3        | 3F8500-3               | VOLTMETER: d-c; 0- to 500-volts; (3 1/2" round black bakelite case; 3 mounting holes spaced 2 3/4" apart; secured to panel by No. 6-32 screws); Weston 301.  | 1             |                |            | *      | *       | *       | *           |

\* Indicates stock available.

x Indicates model for which part is maintained.

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