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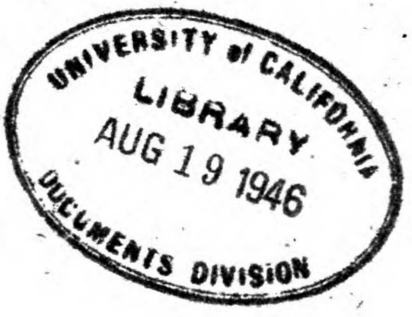
# TM 11-2571

WAR DEPARTMENT TECHNICAL MANUAL

U. S. Dept. of Army

# BATTERY TESTER

# TS-183/U




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# BATTERY TESTER

# TS-183/U

*WAR DEPARTMENT • 1 OCTOBER 1945*

*United States Government Printing Office*
*Washington : 1946*

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WAR DEPARTMENT,

Washington 25, D. C., 1 October 1945.

TM 11–2571, Battery Tester TS–183/U, is published for the information and guidance of all concerned.

[AG 300.7 (6 Jan 45)]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL
*Chief of Staff*

OFFICIAL:
EDWARD F. WITSELL
*Major General*
*Acting The Adjutant General*

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For explanation of distribution formula, 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—Case, meter, load resistors, multiplier resistors.
2. Cut —Prod and plug leads, circuit wiring.
3. Burn —Meter, prods, load resistors, multiplier resistors.
4. Bend —Panel.
5. Bury or scatter—All parts.

## DESTROY EVERYTHING

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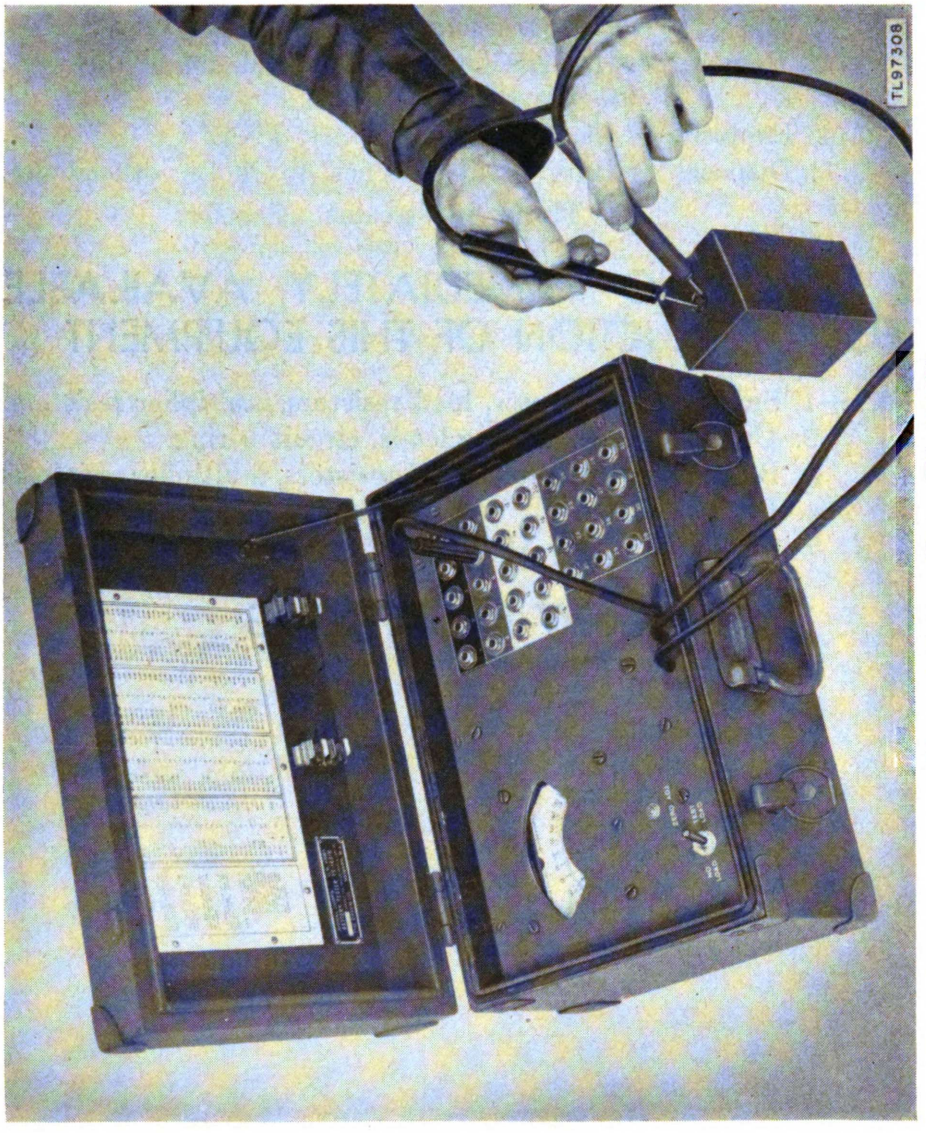



*Figure 1. Battery Tester TS–183/U.*



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# PART ONE
# INTRODUCTION

## Section I. DESCRIPTION OF BATTERY TESTER TS–183/U

### 1. General (fig. 1)

*a.* Battery Tester TS–183/U is designed to provide an accurate and rapid means of checking the terminal voltages under load of dry batteries used by the Signal Corps. The battery tester is a portable and self-contained instrument.

*b.* The battery tester contains a multiple-range voltmeter, a set of battery-loading resistors, a set of multiplier resistors, and a jack-switching arrangement that connects the load resistors across the voltmeter in a total of 32 different voltmeter-load resistor combinations.

### 2. Application

Battery Tester TS–183/U is designed primarily for measuring the voltage, under load, of dry batteries ranging in voltage rating from 1.5 volts to 180 volts.

### 3. Technical Characteristics

The table below lists the resistance of the battery tester as measured from the prods and the operating range of the voltmeter for each of the 32 jack-switching positions.

| Jack No. | Voltage range | Resistance ohms | Jack No. | Voltage range | Resistance ohms |
|---|---|---|---|---|---|
| 1 | 0–2 | 1.998 ±1% | 17 | 0–50 | 2919.0 ±5% |
| 2 | 0–2 | 3.991 ±1% | 18 | 0–50 | 3271.4 ±5% |
| 3 | 0–2 | 5.983 ±1% | 19 | 0–50 | 18,750 ±5% |
| 4 | 0–2 | 19.80 ±1% | 20 | 0–50 | 22,220 ±5% |
| 5 | 0–10 | 7.935 ±1% | 21 | 0–200 | 856.2 ±5% |
| 6 | 0–10 | 11.99 ±1% | 22 | 0–200 | 995.0 ±5% |
| 7 | 0–10 | 19.95 ±1% | 23 | 0–200 | 1292.0 ±5% |
| 8 | 0–10 | 34.88 ±1% | 24 | 0–200 | 1980.0 ±5% |
| 9 | 0–10 | 39.85 ±1% | 25 | 0–200 | 3053.0 ±5% |
| 10 | 0–10 | 49.75 ±1% | 26 | 0–200 | 3440.0 ±5% |
| 11 | 0–50 | 99.80 ±1% | 27 | 0–200 | 4879.0 ±5% |
| 12 | 0–50 | 298.2 ±1% | 28 | 0–200 | 7230.0 ±5% |
| 13 | 0–50 | 544.0 ±1% | 29 | 0–200 | 8648.0 ±5% |
| 14 | 0–50 | 845.4 ±5% | 30 | 0–200 | 11,320 ±5% |
| 15 | 0–50 | 1267.0 ±5% | 31 | 0–200 | 13,995 ±5% |
| 16 | 0–50 | 1923.0 ±5% | 32 | 0–200 | 40,000 ±5% |



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## 4. Description of Components

*a.* Case (fig. 2). An olive-drab-finished wooden case contains and protects the parts of the battery tester. A nonremovable cover is hinged to the case. A composition gasket is assembled to the upper edge of the case. This gasket serves to make the case waterproof when the cover is closed and the catches are secured. Four clips, used to rigidly hold the test prods during transportation, are mounted in the cover.

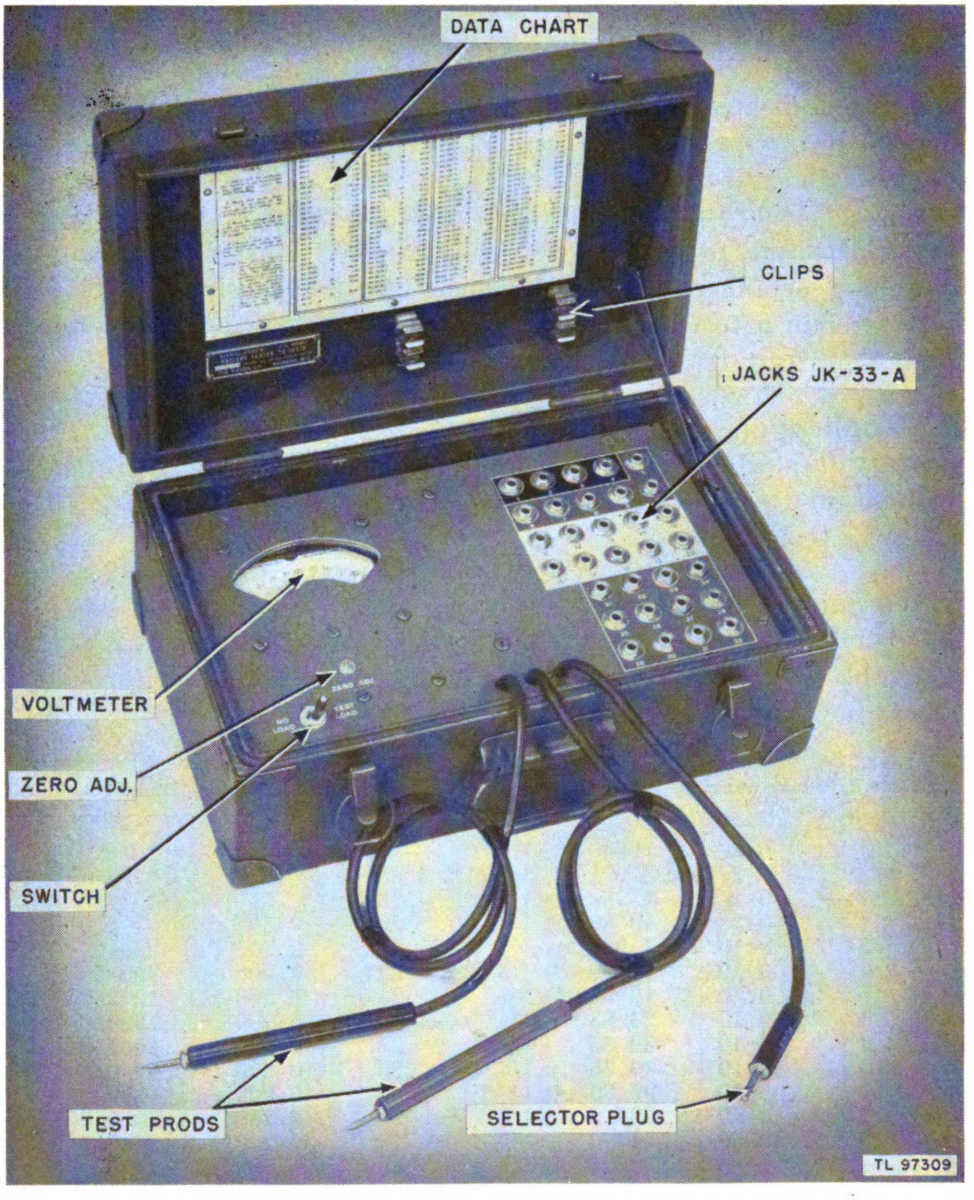



*Figure 2. Battery Tester TS–183/U with case open.*



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*b.* Operating Panel (fig. 3). The battery tester contains a metal panel upon which are mounted the voltmeter, the load resistors, the multiplier resistors, 32 Jacks JK–33–A, test cords, and the toggle switch.

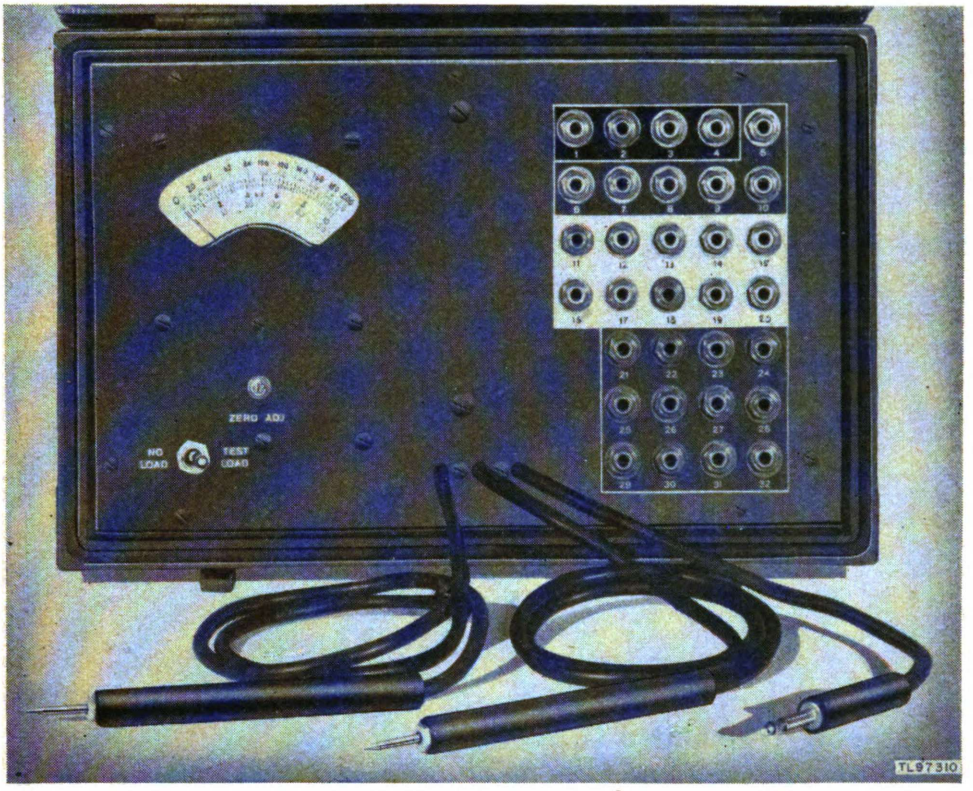



*Figure 3. Operating panel, Battery Tester TS–183/U.*

(1) *Voltmeter.* The voltmeter located on the left side of the panel is hermetically sealed in a metal case. The voltmeter has four voltage scales, 0 to 2 volts, 0 to 10 volts, 0 to 50 volts, and 0 to 200 volts. The numerals on each of the meter ranges are printed in color, a different color being used for each range. The meter pointer is adjusted to the zero division on the meter scale by turning the ZERO ADJUST screw located below the voltmeter.

(2) *Load resistors.* The load resistors are sealed into an oil-filled metal container mounted on the under side of the operating panel.

(3) *Multiplier resistors.* The multiplier resistors are arranged in two hermetically sealed, wax-filled metal containers mounted on the under side of the operating panel.

(4) *Jacks.* Thirty-two Jacks JK–33–A are located on the left side of the operating panel. The jacks are arranged on the panel in four different color zones, each corresponding to one of the color scales on the voltmeter.



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(5) *Test cords.* Three insulated cords are attached to the operating panel. The two left-hand cords are terminated in test prods, used to contact the terminals of the battery under test. The cord on the right terminates in Plug PL–68 for connection to Jacks JK–33–A.

(6) *Switch.* A NO LOAD-TEST LOAD switch is located on the left side of the operating panel. This switch is a single-pole, double-throw toggle switch of the spring return type, which normally rests in the TEST LOAD position.

## 5. List of Components

The following table gives the weights and dimensions of the components of Battery Tester TS–183/U.

| Quantity | Name of component | Dimensions (inches) | | | Unit weight (lb) |
|---|---|---|---|---|---|
| | | Length | Width | Depth | |
| 1 | Case | 15 | 9½ | 7 | 7. 75 |
| 1 | Operating panel | 13⅝ | 8⅜ | ⅛ | 1. 3 |
| 1 | Voltmeter | 4½ | 4½ | 3 | 2. 6 |
| 1 | Load resistor assembly | 4⅞ | 2¾ | 2⅞ | 2. 4 |
| 2 | Multiplier resistor assembly | 2¾ | ⅞ | 1½ | 0. 16 |
| 32 | Jack JK–33–A | ⅞ | 1 | ⅞ | 0. 03 |
| 2 | Test cord | 36 | | | 0. 2 |
| 1 | Test cord | 9 | | | 0. 06 |
| 1 | Switch | 1⅛ | ⅝ | 2 | 0. 06 |

## 6. Shipping Weight and Dimensions of Packed Set

Battery Tester TS–183/U is packed in a wooden box 18½ inches long, 13 inches wide, and 14 inches deep. The shipping weight is 45 pounds. For dimensions of the unpacked battery tester, see figure 5 and consult paragraph 5. The volume is 1.95 cubic feet.

# Section II. INSTALLATION AND ASSEMBLY OF BATTERY TESTER TS–183/U

## 7. Unpacking, Uncrating, and Checking (fig. 4)

Exercise particular care when unpacking or handling the equipment because it may be easily damaged when not protected by the packing case. In unpacking the set, proceed according to the steps outlined below:

*a.* Place the packing case in a convenient location where it can be opened easily.

*b.* Clip the metal bands that bind the box.

*c.* Remove the nails with a nail puller, and remove the top of the packing case. *Prying the top off may result in damage to the equipment.*

*d.* Tear open the heavy waterproof paper surrounding the carton.



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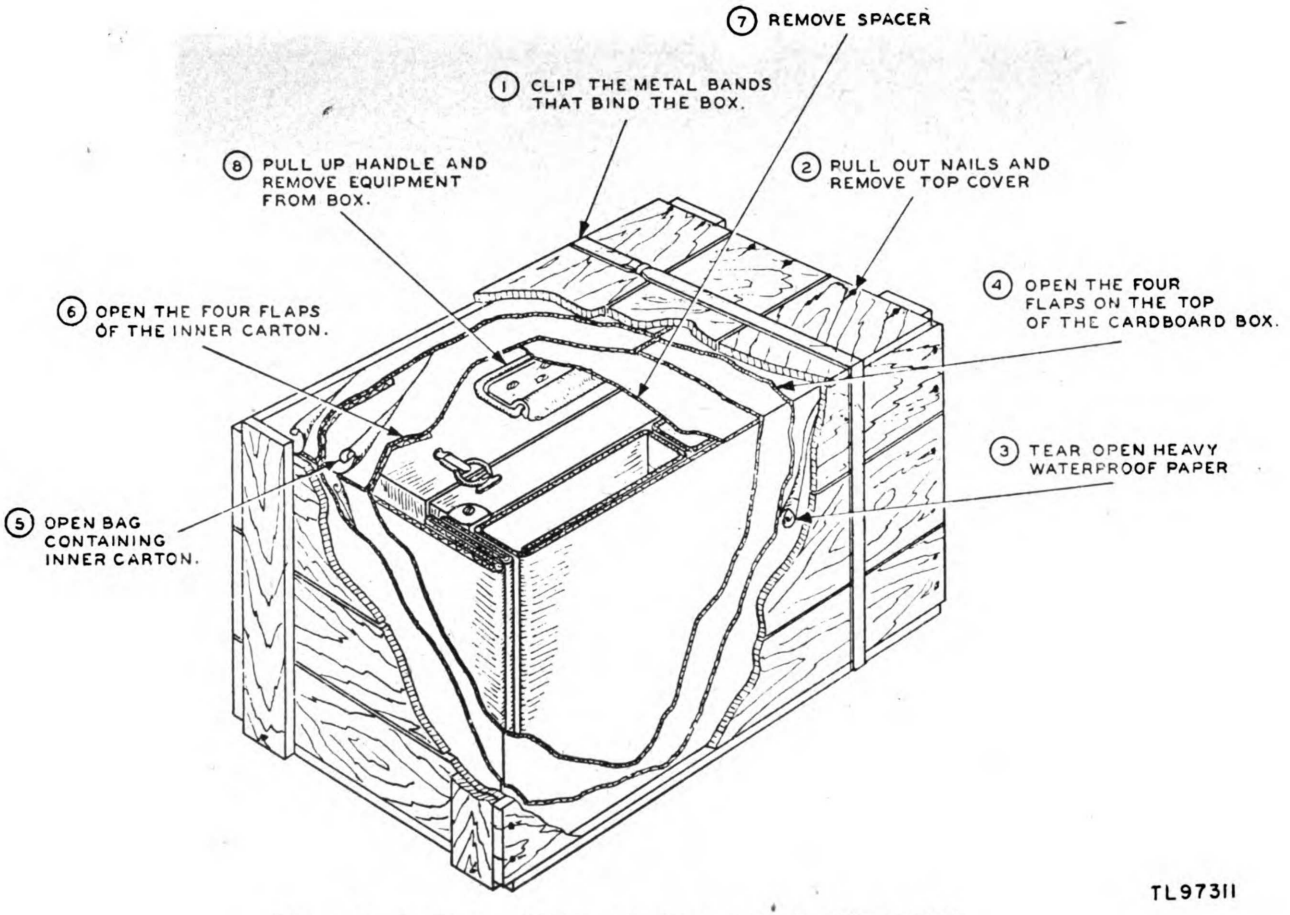



*Figure 4. Packaging diagram for Battery Tester TS–183/U.*



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*e*. Open the four flaps of the carton and remove the bag containing the inner carton.

*f*. Open the four flaps of the inner carton, remove the spacer, and carefully lift the test set by its handle from the carton.

*g*. Thoroughly inspect the instrument for possible damage during shipment.

## 8. Installation

Battery Tester TS–183/U is ready for immediate operation when removed from the packing case. No installation is necessary.

## 9. Removal From Service (fig. 5)

When the battery tester is not in use, place the test prods in the clips provided in the cover of the case. Close the cover and secure the catches. This will protect the set from moisture and insure its readiness for transportation.




*Figure 5. Battery Tester TS–183/U, prepared for transportation.*



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# PART TWO

# OPERATING INSTRUCTIONS

*Note.* For information on destroying the equipment to prevent enemy use, refer to the destruction notice at the front of the manual.

## Section III. PREOPERATIONAL PROCEDURES

### 10. Preparation for Use

*a.* Open the catches on the front of the case and lift up the cover. (See table I.)

*b.* Remove the test prods from the clips in the case cover.

### 11. Visual Inspections

*a.* See that the meter pointer is at the zero point on the voltmeter scale. If the pointer is above or below the zero point, realign the pointer by turning the ZERO ADJUST screw with a screwdriver.

*b.* Check to see that the battery tester is clean and dry.

## Section IV. OPERATION

### 12. Step-by-Step Operation of Battery Tester TS–183/U

*a.* Refer to the data chart mounted on the inside of the case cover. (See table I.)

*b.* Select the jack for the particular dry battery to be tested and insert the selector plug.

*c.* Apply the test prods, observing polarity, to the terminals of the battery for a maximum time of 15 seconds.

*d.* Observe chart for minimum acceptable voltage before the particular battery is issued.

### 13. Use of NO LOAD-TEST LOAD Switch

The NO LOAD-TEST LOAD toggle switch provides a means for checking the battery tester for proper operation. In all dry battery tests, excepting those for a very new battery, depressing the switch to the NO LOAD side should result in an increased voltmeter reading, which is an indication that the load resistor in use is functioning properly. (See sec. IX.)



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*Table I*

| Battery No. | Jack No. | Minimum voltage | Battery No. | Jack No. | Minimum voltage |
|---|---|---|---|---|---|
| BA–1 | 6 | 2. 80 | BA–202/UF | 3 | 1. 35 |
| BA–2 | 17 | 21. 00 | BA–203/U | 7 | 5. 60 |
| BA–8 | 15 | 21. 00 | BA–204/U | 7 | 2. 80 |
| BA–9 | 7 | 3. 80 | BA–205/U | 7 | 2. 80 |
| BA–15A | 3 | 1. 40 | BA–206/U | 7 | 8. 40 |
| BA–23 | 3 | 1. 45 | BA–207/U | 7 | 8. 40 |
| BA–26 | 16 | 43. 00 | BA–208/U | 8 | 2. 80 |
| BA–27 | 7 | 4. 00 | BA–209/U | 6 | 2. 80 |
| BA–28 | 10 | 4. 20 | BA–210/U | 9 | 5. 60 |
| BA–30 | 3 | 1. 35 | BA–211/U | 14 | 21. 00 |
| BA–31 | 7 | 3. 80 | BA–212/U(A) | 1 | 1. 45 |
| BA–32(A) | 5 | 2. 80 | BA–212/U(B) | 27 | 84. 00 |
| BA–32(M) | 10 | 4. 20 | BA–213/U(A) | 5 | 2. 80 |
| BA–32(C) | 13 | 13. 00 | BA–213/U(B) | 26 | 150. 00 |
| BA–32(B) | 26 | 135. 00 | BA–214/U | 12 | 11. 00 |
| BA–33 | 31 | 125. 00 | BA–215/U | 23 | 55. 00 |
| BA–34 | 8 | 6. 40 | BA–216/U | 5 | 4. 20 |
| BA–35 | 3 | 1. 45 | BA–217/U | 13 | 21. 00 |
| BA–36 | 17 | 42. 00 | BA–218/U($A_1$) | 5 | 2. 80 |
| BA–37 | 3 | 1. 40 | BA–218/U($A_2$) | 1 | 1. 40 |
| BA–38 | 25 | 95. 00 | BA–218/U(B) | 26 | 145. 00 |
| BA–39(A) | 8 | 7. 00 | BA–218/U(C) | 10 | 6. 50 |
| BA–39(B) | 26 | 140. 00 | BA–219/U | 13 | 21. 00 |
| BA–40(A) | 1 | 1. 40 | BA–220/U(A) | 2 | 1. 40 |
| BA–40(B) | 24 | 84. 00 | BA–220/U(B) | 24 | 84. 00 |
| BA–41 | 19 | 25. 00 | BA–221/U(A) | 4 | 1. 40 |
| −A to +B | | | BA–221/U($B_1$) | 27 | 125. 00 |
| BA–41 | 32 | 55. 00 | BA–221/U(C) | 10 | 4. 00 |
| $-B_2$ to $+B_2$ | | | BA–222/U | 6 | 5. 60 |
| BA–42 | 3 | 1. 40 | BA–223/U | 15 | 42. 00 |
| BA–43(A) | 2 | 1. 40 | BA–225/U | 5 | 2. 90 |
| BA–43(B) | 28 | 84. 00 | BA–226/U | 7 | 4. 20 |
| BA–43(C) | 20 | 42. 00 | BA–227/U | 10 | 2. 70 |
| BA–44 | 6 | 5. 60 | BA–228/U | 18 | 42. 00 |
| BA–48(A) | 3 | 1. 45 | BA–230/U | 13 | 21. 00 |
| BA–48(B) | 29 | 84. 00 | BA–231/U | 3 | 1. 20 |
| BA–49(A) | 2 | 1. 40 | BA–232/U | 18 | 21. 00 |
| BA–49($B_1$) | 24 | 63. 00 | BA–233/U | 20 | 30. 00 |
| BA–49($B_2$) | 24 | 63. 00 | BA–234/U | 20 | 40. 00 |
| BA–50 | 9 | 2. 60 | BA–235/U | 11 | 13. 00 |
| BA–51 | 24 | 63. 00 | BA–236/U | 6 | 8. 00 |
| BA–53 | 18 | 42. 00 | BA–237/U(A) | 4 | 1. 40 |
| BA–56 | 15 | 42. 00 | BA–237/U(B) | 31 | 84. 00 |
| BA–57(A) | 2 | 1. 40 | BA–237/U(C) | 10 | 3. 60 |
| BA–57(B) | 28 | 84. 00 | BA–238/U(A) | 1 | 1. 45 |
| BA–58 | 4 | 1. 35 | BA–238/U(B) | 27 | 185. 00 |
| BA–59 | 15 | 40. 00 | BA–239/U | 26 | 125. 00 |
| BA–63 | 18 | 42. 00 | BA–240/U(B) | 31 | 84. 00 |
| BA–65 | 3 | 1. 45 | BA–240/U(C) | 10 | 2. 60 |
| BA–67(A) | 5 | 2. 80 | BA–241/U(A) | 1 | 1. 45 |
| BA–67(B) | 28 | 84. 00 | BA–241/U($B_1$) | 31 | 125. 00 |
| BA–70(A) | 5 | 4. 35 | BA–241/U($B_2$) | 27 | 185. 00 |
| BA–70($B_1$) | 23 | 84. 00 | BA–241/U(C) | 4 | 1. 35 |
| BA–70($B_2$) | 21 | 55. 00 | BA–241/U(S) | 11 | 11. 00 |
| BA–80(A) | 5 | 4. 35 | BA–242/U | 5 | 2. 90 |
| BA–80($B_1$) | 23 | 84. 00 | BA–244/U(A) | 1 | 1. 40 |
| BA–80($B_2$) | 21 | 55. 00 | BA–244/U(B) | 25 | 63. 00 |
| BA–200/U | 9 | 5. 60 | BA–244/U(C) | 10 | 6. 60 |



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# PART THREE

# MAINTENANCE INSTRUCTIONS

## Section V. PREVENTIVE MAINTENANCE TECHNIQUES

### 14. Meaning of Preventive Maintenance

Preventive maintenance is a systematic series of operations performed at regular intervals on equipment, when turned off, to eliminate major break-downs and unwanted interruptions in service, and to keep the equipment operating at top efficiency. To understand what is meant by preventive maintenance, it is necessary to distinguish between preventive maintenance, trouble shooting, and repair. The prime function of preventive maintenance is to *prevent* break-downs and, therefore, the need for repair. The prime function of trouble shooting and repair is to locate and correct *existing* defects. The importance of preventive maintenance cannot be overemphasized. The entire system of communications depends upon the readiness and operating efficiency of each item of equipment when it is needed. In a similar manner, the test equipment by which this condition of readiness in communications equipment is realized must be kept in excellent operating condition at all times.

### 15. Description of Preventive Maintenance Techniques

*a.* GENERAL. Most of the electrical parts used in Battery Tester TS–183/U require routine preventive maintenance. Those requiring maintenance differ in the amount and kind required. Because hit-or-miss maintenance techniques are not reliable, definite and specific instructions are needed. This section of the manual contains these specific instructions and serves as a guide for personnel assigned to perform the six basic maintenance operations, namely: Feel, Inspect, Tighten, Clean, Adjust, and Lubricate. Throughout this manual the lettering system for the six operations will be as follows:

| | |
|---|---|
| F—Feel. | C—Clean. |
| I—Inspect. | A—Adjust. |
| T—Tighten. | L—Lubricate.* |

*Lubrication of Battery Tester TS–183/U is not required.



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The first two operations establish the need for the other four. The selection of operations is based on a general knowledge of field needs. For example, the dust encountered on dirt roads during cross-country travel filters into the equipment no matter how much care is taken to prevent it. Rapid changes in weather (such as heavy rain followed by blistering heat), excessive dampness, snow, and ice tend to cause corrosion of exposed surfaces and parts. Without frequent inspections and the necessary performance of tightening, and cleaning operations, equipment becomes undependable and subject to break-down when it is most needed.

*b.* FEEL. The feel operation is used to check the tightness of the jack contact springs and for leakage of oil from the load resistor cases.

*c.* INSPECT. Inspection is the most important operation in the preventive maintenance program. A careless observer will overlook the evidences of minor trouble. Although these defects may not interfere with the performance of the equipment, valuable time and effort can be saved if they are corrected before they lead to major break-downs. Make every effort to become thoroughly familiar with the indications of normal functioning, in order to be able to recognize the signs of a defective set. Inspection consists of carefully observing all parts of the equipment, noticing their color, placement, state of cleanliness, etc. Inspect for the following conditions:

(1) Placement, by observing that all leads and cabling are in their original positions.

(2) Cleanliness, by carefully examining all recesses in the units for accumulation of dust, especially between connecting terminals. Parts, connections, and joints should be free of dust, corrosion, and other foreign matter. In tropical and high-humidity locations, look for fungus growth and mildew.

(3) Tightness, by testing any connection or mounting which appears to be loose.

*d.* TIGHTEN, CLEAN, AND ADJUST. These operations are self-explanatory. Specific procedures to be followed in performing them are given wherever necessary throughout part three.

***Caution:*** Do not tighten screws, bolts, and nuts carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

## 16. Common Materials Needed

The following materials will be needed in performing preventive maintenance:

Clean cloth.
#0000 sandpaper.
Crocus cloth.
Solvent, Dry Cleaning.



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Carbon tetrachloride, technical grade.
Polish, metal, paste.

*Note.* Gasoline will not be used as a cleaning fluid for any purpose. Solvent, Dry Cleaning, is available as a cleaning fluid through established supply channels. Oil, Fuel, Diesel, may be used for cleaning purposes when dry-cleaning solvent (SD) is not on hand. Carbon tetrachloride will be used as a cleaning fluid only in the following cases: where inflammable solvents cannot be used because of the fire hazard, and for cleaning electrical contacts including relay contacts, plugs, commutators, etc.

## 17. Voltmeter (fig. 6)

*a.* INSPECT (I). Inspect the meter case for cracks at soldered joints. Check the hermetically sealed bushings for cracked or broken insulation. Check the soldered connections to the meter. Inspect the meter bellows for fractures.

*b.* TIGHTEN (T). Tighten the four screws which secure the meter to the operating panel.

*c.* CLEAN (C). Clean the meter case and the glass cover with a clean, dry cloth or a cloth moistened with dry-cleaning solvent (SD) if dirt is difficult to remove.

*d.* ADJUST (A). The meter must be zero-adjusted if the pointer does not return exactly to zero when the battery tester is not in operation. View the pointer from the front and tap lightly with the fingers to overcome any slight bearing friction before deciding that adjustment is necessary. If adjustment is necessary, slowly turn the ZERO ADJUST screw, located below the meter, until the pointer is at zero.

## 18. Load Resistor and Multiplier Resistor Cases

*a.* FEEL (F). Feel the surfaces of the load resistor cases for leaking oil.

*b.* INSPECT (I). Inspect the resistor cases for cracks at the soldered joints. Examine all soldered connections on the terminals of the resistor cases.

*c.* TIGHTEN (T). Tighten all screws which secure the resistor cases to the operating panel.

*d.* CLEAN (C). Clean the hermetical-seal bushings with a clean cloth moistened with dry-cleaning solvent (SD).

## 19. Jacks

*a.* FEEL (F). Insert Plug PL–68 in each of the 32 jacks. Observe by feeling, which jacks loosely hold the plug.

*b.* INSPECT (I). Inspect the jacks for loose mounting nuts. Check the wiring to each of the jacks for broken or shorted connections. Inspect the contact surfaces of the jacks for dirt and corrosion.



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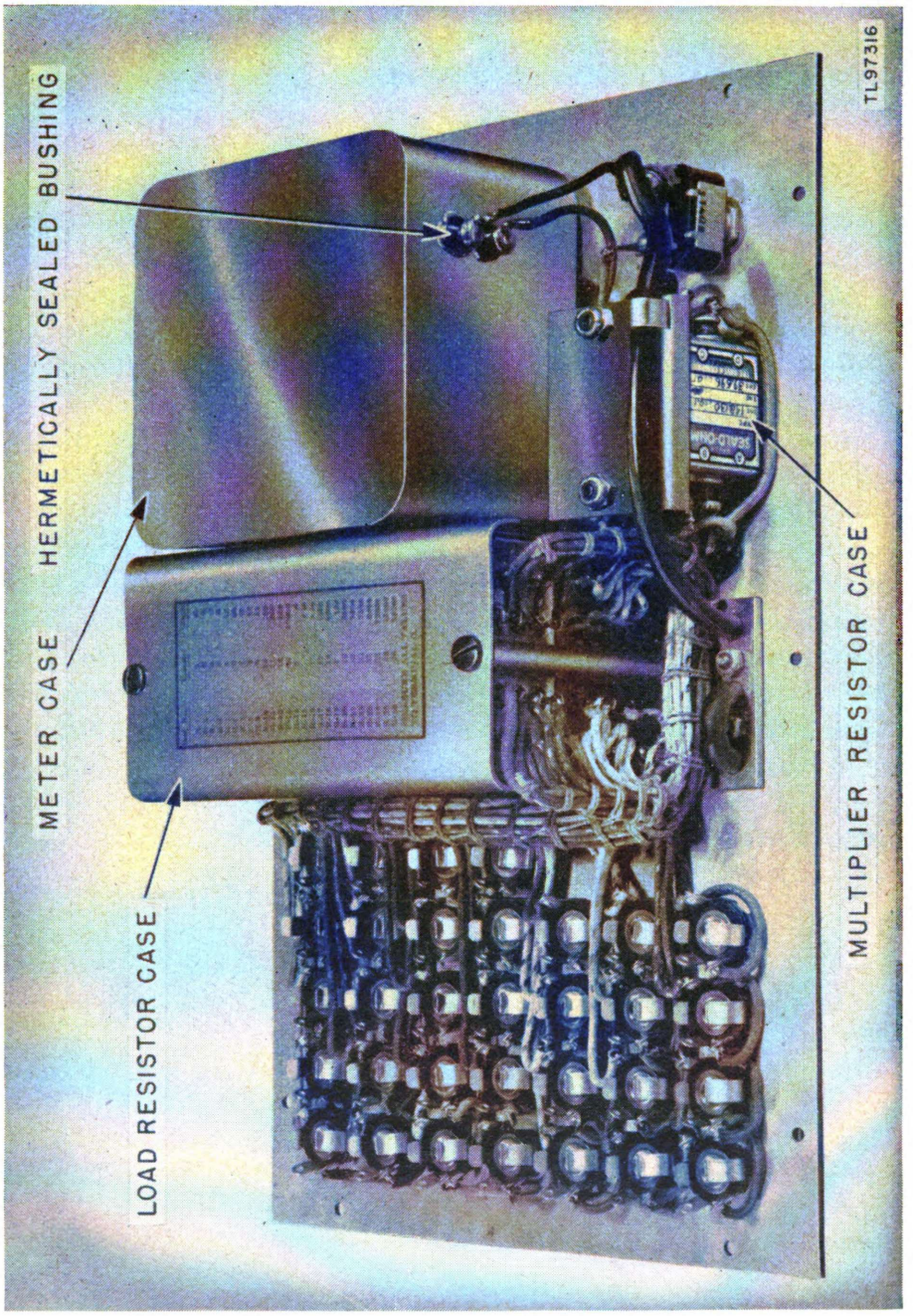



*Figure 6. Underside of operating panel, Battery Tester TS–183/U.*



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*c.* TIGHTEN (T). Tighten all loose jack mounting nuts.

*d.* CLEAN (C). Clean the contact surfaces on the jack contact springs with crocus cloth or #0000 sandpaper. Wipe springs and dirty insulation with a clean cloth moistened with carbon tetrachloride, technical grade.

*e.* ADJUST (A). Adjust the jack contact springs which do not exert sufficient pressure, to tightly hold the plug when it is inserted.

## 20. Plug and Test Prods

*a.* INSPECT (I). Inspect the plugs and test prods for broken or cracked cases and dirt or corrosion on the contact surfaces. Inspect the leads to which the plug and test prods are connected for broken or frayed insulation. Loosen and slide back the insulating sleeves to expose the soldered joints. Inspect the joints for solid connections.

*b.* CLEAN (C). Clean all dirt or corrosion from the contact surfaces of the plug and test prods.

***Warning:*** Jacks JK–33–A and Plug PL–68 must be visually inspected at least once each week and cleaned with Polish, Metal, Paste, Signal Corps stock No. 6G1516, when necessary. Failure to comply with this operation will result in erroneous voltage measurements due to excessive jack and plug contact-resistance.

## 21. Preventive Maintenance Check List

The following check list is a summary of the preventive maintenance to be performed on Battery Tester TS–183/U. The suggested time intervals shown on the check list may be reduced at any time by the local commander. However, for the best performance of the equipment, perform operations at least as frequently as called for in the check list. Extremely hot, cold, or dusty locations may necessitate more frequent scheduling of maintenance operations. Operations are indicated by the letters of the word FITCAL. For example, if the letters ITC are in the operations column, the item to be treated must be inspected (I), tightened (T), and cleaned (C).

| Item No. | Operations | Description of item | When performed | |
|---|---|---|---|---|
| | | | Weekly | Monthly |
| 1 | FITCA | Jacks | (*) | |
| 2 | IC | Plug and test prods | (*) | |
| 3 | ITCA | Voltmeter | | (*) |
| 4 | FITC | Load and multiplier resistor cases | | (*) |

| F | I | T | C | A | L |
|---|---|---|---|---|---|
| Feel | Inspect | Tighten | Clean | Adjust | Lubricate* |

*Lubrication of Battery Tester TS–183/U is not required.



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## Section VI. LUBRICATION

*Note.* No lubrication is required for Battery Tester TS–183/U.

## Section VII. MOISTUREPROOFING AND FUNGIPROOFING

*Note.* Moistureproofing and fungiproofing of Battery Tester TS–183/U is not required.



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# PART FOUR
# AUXILIARY EQUIPMENT

(Not used)

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# PART FIVE

# REPAIR INSTRUCTIONS

*Note.* Failure or unsatisfactory performance of equipment used by Army Ground Forces and Army Service Forces will be reported on WD AGO Form 468 (Unsatisfactory Equipment Report); by Army Air Forces, on Army Air Forces Form 54 (Unsatisfactory Report). If either form is not available, prepare the data according to the sample form reproduced in figure 8.

## Section VIII. THEORY OF EQUIPMENT

### 22. General (fig. 7)

*a.* VOLTMETER CIRCUIT. The voltmeter circuit used in Battery Tester TS–183/U is entirely conventional and contains a 0–1-milliampere D'Arsonval-type meter, which is used in conjunction with a set of series-connected multiplier resistors. The meter resistance is 100 ohms and the sensitivity of the arrangement is 1,000 ohms per volt.

*b.* CIRCUIT SWITCHING. Circuit switching between voltmeter ranges and load resistors in the battery tester is accomplished by the insertion of Plug PL–68, which terminates one test cord, into any one of the 32 Jacks JK–33–A. The cord attached to the positive prod connects to both the tip and ring of the plug. The insertion of the plug into a jack connects the positive terminal of a battery first to one side of a load resistor, and then to one of the junctions between the series connected multipliers. The other side of the load resistor is connected to a line common with one side of all load resistors. The common line connects through the NO LOAD-TEST LOAD toggle switch to the negative test cord, thereby completing the load resistor circuit.

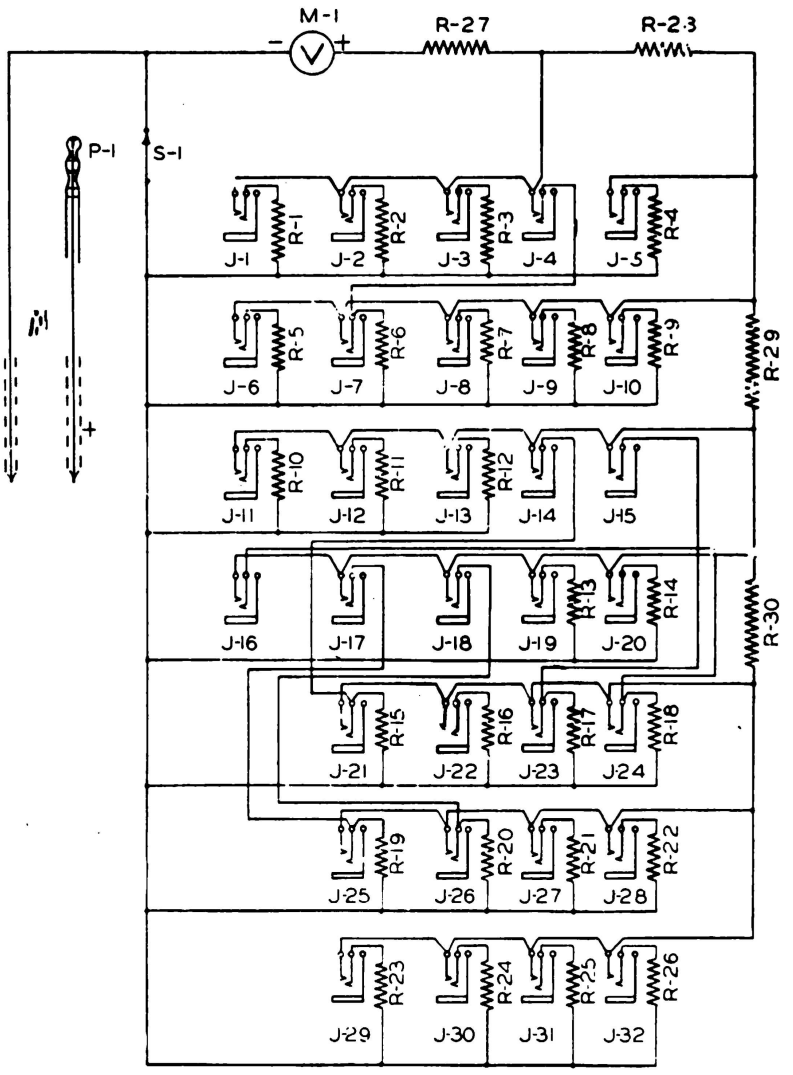
## Section IX. TROUBLE-SHOOTING PROCEDURES

### 23. Step-by-Step Procedure

*a.* COMMON FAULTS. Faulty operation of Battery Tester TS–183/U may be experienced through either the failure of the voltmeter or of the load resistors to operate with the plug inserted into one or more of the 32 jacks. Faulty operation of the load resistors is not so easily apparent as faulty operation of the voltmeter. In normal operation of the set, this defect will be noticed by an unchanged



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| REF. NO. | OHMS |
|---|---|
| R-1 | 2 |
| R-2 | 4 |
| R-3 | 6 |
| R-4 | 8 |
| R-5 | 12 |
| R-6 | 20 |
| R-7 | 35 |
| R-8 | 40 |
| R-9 | 50 |
| R-10 | 100 |

| REF. NO. | OHMS |
|---|---|
| R-11 | 300 |
| R-12 | 550 |
| R-13 | 30000 |
| R-14 | 40000 |
| R-15 | 860 |
| R-16 | 1000 |
| R-17 | 1300 |
| R-18 | 2000 |
| R-19 | 3100 |
| R-20 | 3500 |

| REF. NO. | OHMS |
|---|---|
| R-21 | 5000 |
| R-22 | 7500 |
| R-23 | 9000 |
| R-24 | 12000 |
| R-25 | 15000 |
| R-26 | 50000 |
| R-27 | 1900 |
| R-28 | 8000 |
| R-29 | 40000 |
| R-30 | 150000 |

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*Figure 7. Schematic Diagram of Battery Tester TS-183/U.*



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voltage reading as the toggle switch is pressed from the TEST-LOAD side to the NO-LOAD side. This operational feature has been previously mentioned in paragraph 13.

*b.* Checking Load Resistor Operation. When uncertain whether the load resistor circuit is functioning properly, measure the input resistance of the set from the test prods. Check the values obtained against those given in paragraph 3.

*c.* Wiring Diagram (fig. 9). To aid in checking through the circuit, the wiring diagram of the battery tester has been included in this Technical Manual.

## 24. Trouble-Shooting Chart

| *Symptom* | *Probable location of fault* |
|---|---|
| *a.* Voltmeter fails to operate for all plug positions. | Broken or loose connection to tip of plug.<br>Open multiplier resistor.<br>Defective meter. |
| *b.* Voltmeter fails to operate for one or more plug positions. | Weak jack contact spring.<br>Broken connection to jack contact spring.<br>Open multiplier resistor. |
| *c.* All load resistors apparently have no loading effect. | Broken or loose connection to ring of plug.<br>Faulty toggle switch.<br>Faulty connections to toggle switch. |
| *d.* One load resistor apparently has no loading effect. | Weak jack contact spring.<br>Broken connection to jack contact spring.<br>Defective resistor. |

## 25. Painting and Refinishing

If the finish on the panel or on the metal parts of the case has been badly scarred or damaged, the repairman should touch up the bared surfaces to prevent rust and corrosion. When painting and refinishing are necessary, proceed as follows:

*a.* Clean the scarred surface down to the bare metal. Use #00 or #000 sandpaper to obtain a bright smooth finish. To remove rust, first clean the corroded metal with dry-cleaning solvent (SD). For severe rust, use dry-cleaning solvent (SD) to soften the rust and then use sandpaper to remove the rust.

***Caution:*** Do not use steel wool instead of sandpaper. Minute particles of the metal frequently enter the case and cause harmful internal electrical shorting or grounding of circuits.

*b.* When a touch-up job is necessary, apply paint with a small brush. Use authorized paint, consistent with existing regulations.

## 26. Unsatisfactory Equipment Report

*a.* When trouble in equipment used by Army Ground Forces or Army Service Forces occurs more often than repair personnel feel



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is normal, WD AGO Form 468 (Unsatisfactory Equipment Report) should be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C.

*b.* When trouble in equipment used by Army Air Forces occurs more often than repair personnel feel is normal, Army Air Forces Form 54 should be filled out and forwarded through channels.

*c.* If either form is not available, prepare letter containing the data elicited by the sample form (fig. 8), without reproducing copies of the form.

WAR DEPARTMENT
UNSATISFACTORY EQUIPMENT REPORT

| | | |
|---|---|---|
| FOR | TECHNICAL SERVICE: Signal Corps — MATÉRIEL | DATE: 1 Sep 45 |
| FROM | ORGANIZATION: 51st Signal Depot Company | STATION: APO 822 |
| TO | NEXT SUPERIOR HEADQUARTERS: Signal Officer 10th Army — STATION: APO 246 | TECHNICAL SERVICE: Signal Corps |

COMPLETE MAJOR ITEM

| NOMENCLATURE | TYPE | MODEL |
|---|---|---|
| Battery Tester TS-185/U | Dry battery tester | |

| MANUFACTURER | U. S. A. REG. No. | SERIAL No. | DATE RECEIVED |
|---|---|---|---|
| Infany Electric Co. | 12542-P-45-26 | 59 | 10 Jul 45 |

EQUIPMENT WITH WHICH USED (*If applicable*):

DEFECTIVE COMPONENT—DESCRIPTION AND CAUSE OF TROUBLE

| PART No. | TYPE | MANUFACTURER | DATE INSTALLED |
|---|---|---|---|
| 225555-A | Jack JK-55-A | Jones Jack Co. | 12 Jul 45 |

DESCRIPTION OF FAILURE AND PROBABLE CAUSE (*If additional space is required, use back of form*):
High-resistance contact due to corrosion.

| DATE OF INITIAL TROUBLE | TOTAL TIME INSTALLED | | | TOTAL PERIOD OF OPERATION BEFORE FAILURE | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | YEARS | MONTHS | DAYS | YEARS | MONTHS | DAYS | HOURS | MILES | ROUNDS |
| 1 Aug 45 | 0 | 0 | 20 | 0 | 0 | 17 | - | - | - |

BRIEF DESCRIPTION OF UNUSUAL SERVICE CONDITIONS AND ANY REMEDIAL ACTION TAKEN:
High humidity in area of operations.

| TRAINING OR SKILL OF USING PERSONNEL | | | RECOMMENDATIONS (*If additional space is required, use back of form*) |
|---|---|---|---|
| POOR | FAIR | GOOD | |
| | | X | Use corrosion-resistant material for jack contacts |

ORIGINATING OFFICER

| TYPED NAME, GRADE, AND ORGANIZATION | SIGNATURE |
|---|---|
| B. A. Howe, 1st Lt, Sig C | B. A. Howe |

FIRST ENDORSEMENT

| TO CHIEF | TECHNICAL SERVICE | OFFICE | |
|---|---|---|---|
| NAME, GRADE, AND STATION | | STATION | DATE |

*Instructions*

1. It is imperative that the chief of technical service concerned be advised at the earliest practical moment of any constructional, design, or operational defect in material. This form is designed to facilitate such reports and to provide a uniform method of submitting the required data.
2. This form will be used for reporting manufacturing, design, or operational defects in material, petroleum fuels, lubricants, and preserving materials with a view to improving and correcting such defects, and for use in recommending modifications of material.
3. This form will not be used for reporting failure, isolated material defects or malfunctions of material resulting from fair-wear-and-tear or accidental damage nor for the replacement, repair or the issue of parts and equipment. It does not replace currently authorized operational or performance records.
4. Reports of malfunctions and accidents involving ammunition will continue to be submitted as directed in the manner described in AR 750-10 (change No. 2).
5. It will not be practicable or desirable in all cases to fill all blank spaces of the report. However, the report should be as complete as possible in order to expedite necessary corrective action. Additional pertinent information not provided for in the blank spaces should be submitted as inclosures to the form. Photographs, sketches, or other illustrative material are highly desirable.
6. When cases arise where it is necessary to communicate with a chief of service in order to assure safety to personnel, more expeditious means of communication are authorized. This form should be used to confirm reports made by more expeditious means.
7. This form will be made out in triplicate by using or service organization. Two copies will be forwarded direct to the technical service; one copy will be forwarded through command channels.
8. Necessity for using this form will be determined by the using or service troops.

W. D., A. G. O. Form No. 468
30 August 1944

This form supersedes W. D., A. G. O. Form No. 468, 1 December 1943, which may be used until existing stocks are exhausted.

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TL 97315

*Figure 8. WD AGO Form 468 (Unsatisfactory Equipment Report), filled out.*



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# APPENDIX

## Section X. REFERENCES

### 27. Parts List

| | |
|---|---|
| SIG 1 | Introduction to ASF Signal Supply Catalog (when published). |
| SIG 2 | Complete Index to ASF Signal Supply Catalog (when published). |
| SIG 3 | List of Items for Troop Issue. |
| SIG 4–1 | Allowances of Expendable Supplies. |
| SIG 5 | Stock List of All Items. |
| SB 11–6 | Dry Battery Supply Data. |

### 28. Technical Manuals on Test Equipment

| | |
|---|---|
| TM 11–2613 | Voltohmmeter I–166. |
| TM 11–2626 | Test Unit I–176. |
| TM 11–472 | Repair and Calibration of Electrical Measuring Instruments. |

### 29. Painting and Preserving

| | |
|---|---|
| TB SIG 6 | A Method of Prolonging the Life of Dry Batteries. |

### 30. Shipping Instructions

| | |
|---|---|
| U. S. Army spec No. 100–14A. | Army-Navy General Specification for Packaging and Packing for Overseas Shipment. |

### 31. Decontamination

| | |
|---|---|
| TM 3–220 | Decontamination. |

### 32. Demolition

| | |
|---|---|
| FM 5–25 | Explosives and Demolitions. |



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## 33. Other Publications

| | |
|---|---|
| FM 21–6 | List and Index of War Department Publications. |
| FM 21–7 | List of Training Films, Film Strips, and Film Bulletins. |
| TB SIG 66 | Winter Maintenance of Ground Signal Equipment. |
| TB SIG 72 | Tropical Maintenance of Ground Signal Equipment. |
| TB SIG 75 | Desert Maintenance of Ground Signal Equipment. |
| TM 1–455 | Electrical Fundamentals. |
| TM 11–430 | Batteries for Signal Communication Except Those Pertaining to Aircraft. |
| TM 11–453 | Shop Work. |
| TM 37–250 | Basic Maintenance Manual. |

## 34. Forms

W D A G O Form 468.
AAF Form 54.

# Section XI. MAINTENANCE PARTS

## 35. Maintenance Parts for Battery Tester TS–183/U

No maintenance parts are authorized for this equipment as it will be replaced as complete unit.

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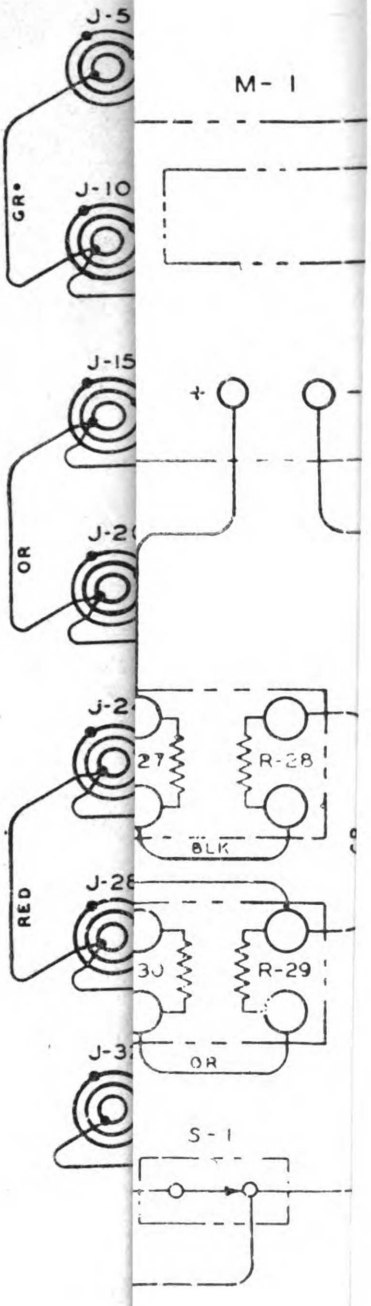
For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 15 cents



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