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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FLUXMETER
TS-15C/AP



DEPARTMENT OF THE ARMY

• MAY 1955

**FORWARD COMMENTS ON THIS PUBLICATION
DIRECTLY TO:**

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ATTN: Standards Division

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FLUXMETER TS-15C/AP

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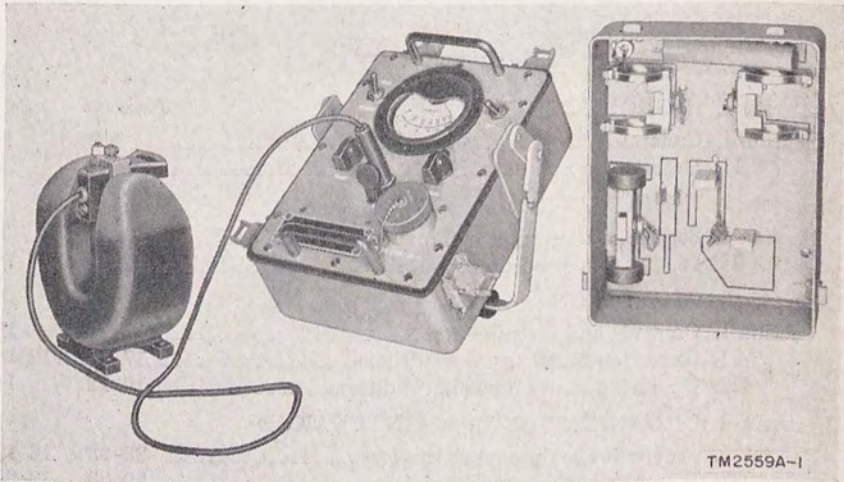


Figure 1. Fluometer TS-15C/AP.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

This manual is published for the information and guidance of all concerned. It contains instructions for the installation, operation, maintenance, and repair of Fluxmeter TS-15C/AP (fig. 1).

2. Forms and Records

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

a. DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5.

b. DA 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. DD Form 535, Unsatisfactory Report, will be filled out and forwarded as prescribed in SR 700-45-5 and AF TO 00-35D54.

d. DA Form 11-238, 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 (fig. 5).

e. DA Form 11-239, 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 (fig. 6).

f. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

Fluxmeter TS-15C/AP (fig. 1) is a portable test set, designed specifically to provide quantitative measurements of the flux densities in magnets. It can be used to measure magnetic flux densities in the range of 1,200 to 9,600 gauss from any source.

4. Technical Characteristics

Measurement ranges (in gaussess)	1,200 to 2,400.
	2,400 to 4,800.
	4,800 to 9,600.
Power supply	1.5-volt battery.
Weight	6 lb.

5. Packaging Data

(fig. 3)

When packaged for shipment, Fluxmeter TS-15C/AP is packed in a corrugated fiber carton 9 inches by 8½ inches by 10½ inches. The volume of the carton is 0.5 cubic foot, and the total weight is 9½ pounds. Within the carton, the fluxmeter is protected from shock by the use of another carton, adequate cardboard cells, and other padding. The inner carton is sealed within a moisture-vaporproof bag. Inside the equipment is a bag of silica gel (par. 11).

Note. Items may be packaged differently from the manner shown, depending on the supply channel.

6. Table of Components

(fig. 2)

Components of Fluxmeter TS-15C/AP are listed below.

Component	Required No.	Width (in.)	Depth (in.)	Height (in.)	Unit weight (lb)	Volume (cu ft)
Fluxmeter TS-15C/AP	1	6	6½	8½	6	0.19
Test Set Adapter MX-1028/U.	1		1⅛ dia	3⅞ to 4⅞		
Test Set Adapter MX-915/U	1	2	1.5	1⅞		
Adapter for ⅞" to 1⅞" pole face dia and 0.6" to 0.7" gap.	1	1⅞	1	1⅜		
Adapter for 1.5" to 2" pole face dia and 1.3" to 1.5" gap.	1	2	1.5	1⅜		
Handle	1		¾ dia	5¼		
Probe meter	1	1⅝	1¾	2⅝		

Note. This list is for general information only. See appropriate supply publications for information pertaining to the requisition of spare parts.

7. Description of Fluxmeter TS-15C/AP

(fig. 2)

a. Fluxmeter TS-15C/AP is a ruggedly constructed, submersion-proof equipment which consists mainly of a gauss meter and a probe meter. The gauss meter and associated circuit and controls are mounted in a panel-chassis assembly, contained in a metal carrying

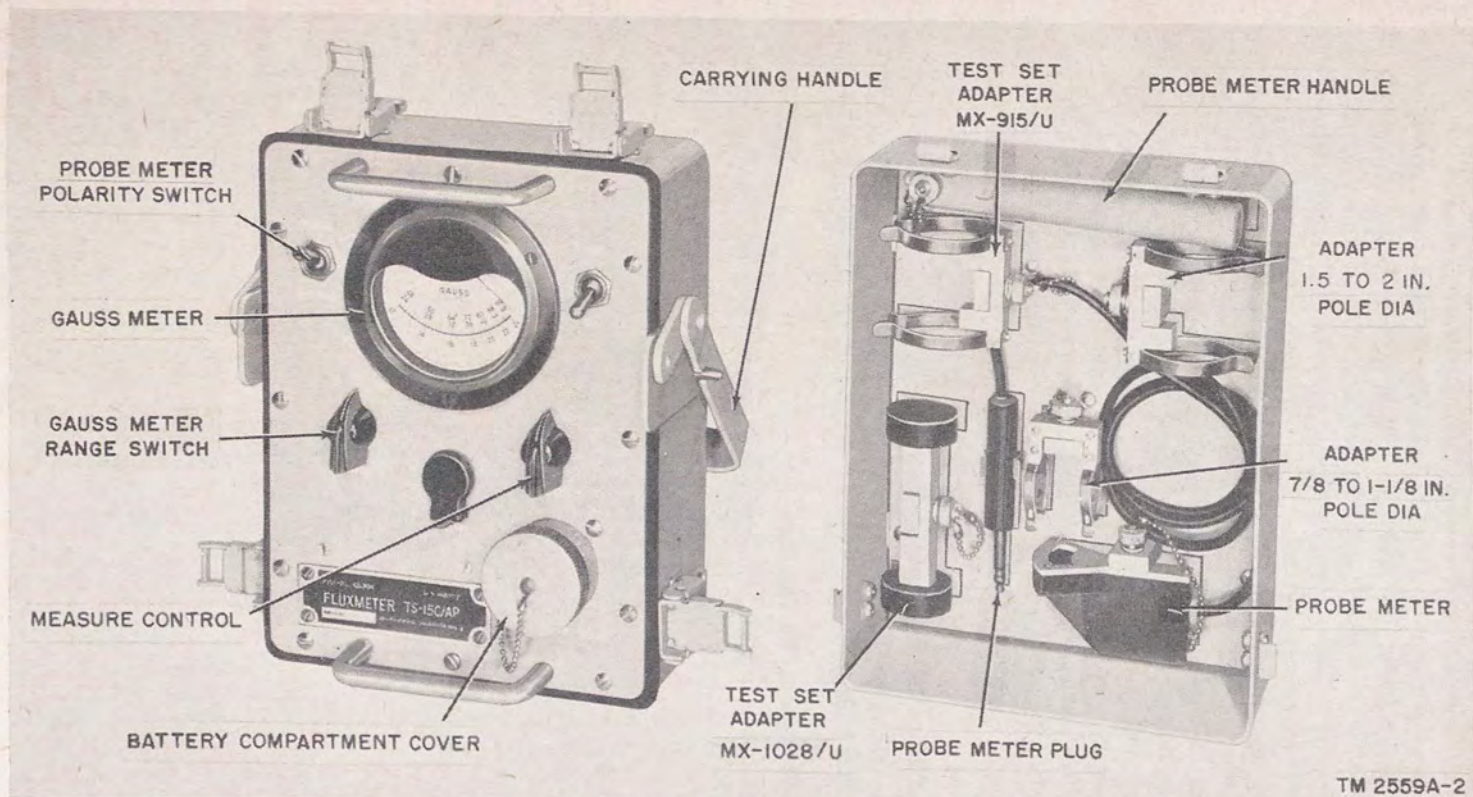


Figure 2. Fluxmeter TS-150/AP operating components.

case. The case is provided with a carrying handle that can be locked in an easel position or a folded position. A detachable cover, which protects the meter face and the controls when the equipment is not in use, also serves as a storage place for four adapters, a handle, and the probe meter. The probe meter is incorporated in a special probe head attached to a length of cable terminating in a mating plug. By inserting the plug into the PROBE receptacle on the front panel of the fluxmeter, the probe meter is connected into the overall equipment circuit. Mounted on the front panel of the fluxmeter are the PROBE receptacle, the GAUSS meter, the four operating controls, and the battery compartment cover.

b. Four adapters are provided to make it possible to mount the probe meter between the poles of magnets (fig. 1) which have gaps extending from 0.6 inch to $4\frac{7}{16}$ inches. For magnets with larger gaps, a handle is provided so the probe meter can be held between the magnet poles by hand.

8. Additional Equipment Required

One Battery BA-30 is required for the operation of Fluxmeter TS-15C/AP; it is *not* supplied as part of the equipment.

9. Differences in Models

The following table lists the differences between Fluxmeters TS-15/AP, TS-15A/AP, TS-15B/AP, and TS-15C/AP:

Item	TS-15/AP	TS-15A/AP	TS-15B/AP	TS-15C/AP
Dimensions	4½ in. d. 6 in. w. 10 in. lg.	4½ in. d. 6 in. w. 10 in. lg.	4½ in. d. 6 in. w. 10 in. lg.	6 in. d. 6 in. w. 8½ in. lg.
Weight	6½ lb.	6½ lb.	6½ lb.	6 lb.
Case	Wood	Wood	Wood	Metal.
Carrying handle	Leather	Leather	Metal	Metal.
Measurement ranges (in gaussses)	1,210-4,500 A 1,200-2,300 B 1,700-3,200 C 2,400-4,500	1,200-9,600 A 1,200-2,400 B 2,400-4,800 C 2,800-9,600	1,200-9,600 A 1,200-2,400 B 2,400-4,800 C 4,800-9,600	1,200-9,600. 1,200-2,400. 2,400-4,800. 4,800-9,600.
Probe meter adapters	One: For gap of 1.3 to 1.5 in. and pole face dia of 1.5 to 2 in.	Two: One the same as for TS-15/AP; the other for gap of .6 to .7 in. and pole face dia of 7/8 to 1½ in.	Two: The same as for TS-15A/AP; plus one probe meter handle.	Four: Two the same as for TS-15A/AP; one Test Set Adapter MX-915/U for gap of 1½ in. to 1¾ in. and pole face dia of 1.5 to 2 in.; and one Test Set Adapter MX-1028/U for gap of 3¼ to 4¼ in. and pole face dia of 1½ in., plus one probe meter handle.

Note. The probe meter supplied with Fluxmeters TS-150/AP cannot be used with other fluxmeters.

CHAPTER 2

INSTALLATION

Section I. SERVICE UPON RECEIPT OF FLUXMETER TS-15C/AP

10. Placement of Equipment

Fluxmeter TS-15C/AP is a portable-type test equipment that may be operated in any convenient location. Keep the fluxmeter as far away as possible from the magnets to be tested and from any other source of strong magnetic field. Continued exposure to the strong magnetic field may magnetize portions of the D'Arsonval meter movement and may result in permanent reading errors.

11. Uncrating, Unpacking, and Checking New Equipment

Note. For used or reconditioned equipment, refer to paragraph 14.

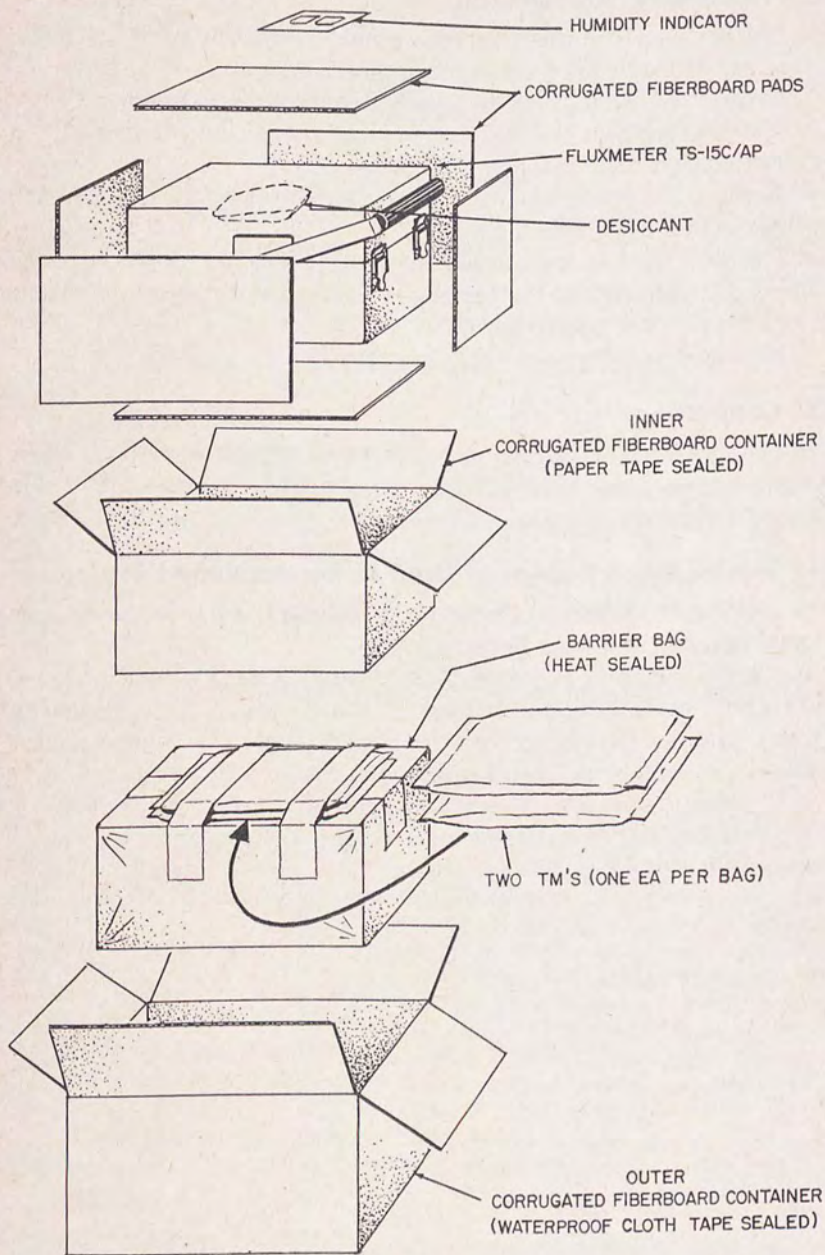
a. General. The fluxmeter may be shipped in an oversea packing case, in a domestic packing case, or in its own carrying case. When new equipment is received, select a location where the equipment may be unpacked without exposure to the elements and that is convenient to the operating location.

Caution: Be careful when uncrating, unpacking, and handling the fluxmeter; it is easily damaged. If it becomes damaged or exposed, a complete overhaul may be required or the fluxmeter may be rendered useless.

b. Step-by-Step Instructions for Uncrating and Unpacking Domestic Shipments (fig. 3).

- (1) Place the packing case near the operation position.
- (2) Open the flaps on top of the carton.
- (3) Remove the two bags containing the manuals.
- (4) Lift out the inner carton.
- (5) Slit open the waterproof barrier that protects the inner carton.
- (6) Open the flaps on top of the inner carton.
- (7) Remove the padding from the top and sides of the equipment and take out the equipment.

c. Checking. Always check the equipment for possible damage, such as a bent case, loose knobs, or a broken meter face. Check the contents of the carton against the packing list.



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Figure 3. Fluxmeter TS-15C/AP, packaging diagram.

Section II. INSTALLATION PROCEDURES

12. Preliminary Adjustments

- a.* Before operating the fluxmeter, remove the front panel from the instrument transit case by removing the 12 screws.
- b.* Inspect the wiring and be sure all connections are secure.
- c.* Check to see that the nut that mounts the lug on the rear of the battery compartment is tight.
- d.* Replace the front panel in its instrument transit case and secure it with the same 12 mounting screws.
- e.* Unscrew the battery compartment cover (fig. 2) and install one Battery BA-30. When the battery is inserted into the compartment be sure its positive end is down.
- f.* Replace the battery cover.

13. Connections

When using the fluxmeter, only one connection is necessary. Place the probe meter cable plug into its mating receptacle marked PROBE on the front panel (fig. 4).

14. Service Upon Receipt of Used or Reconditioned Equipment

- a.* Follow the instructions given in paragraph 11 for uncrating, unpacking, and checking the equipment.
- b.* 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 in this manual, preferably on the schematic diagram.
- c.* Check the operating controls for ease of rotation.
- d.* Perform the installation and connection procedures given in paragraphs 12 and 13.

CHAPTER 3

OPERATION

Note. This chapter locates, illustrates, and furnishes the operator with sufficient information pertaining to the various controls and instruments provided for the proper operation of the equipment.

Section I. CONTROLS AND INSTRUMENTS

15. General

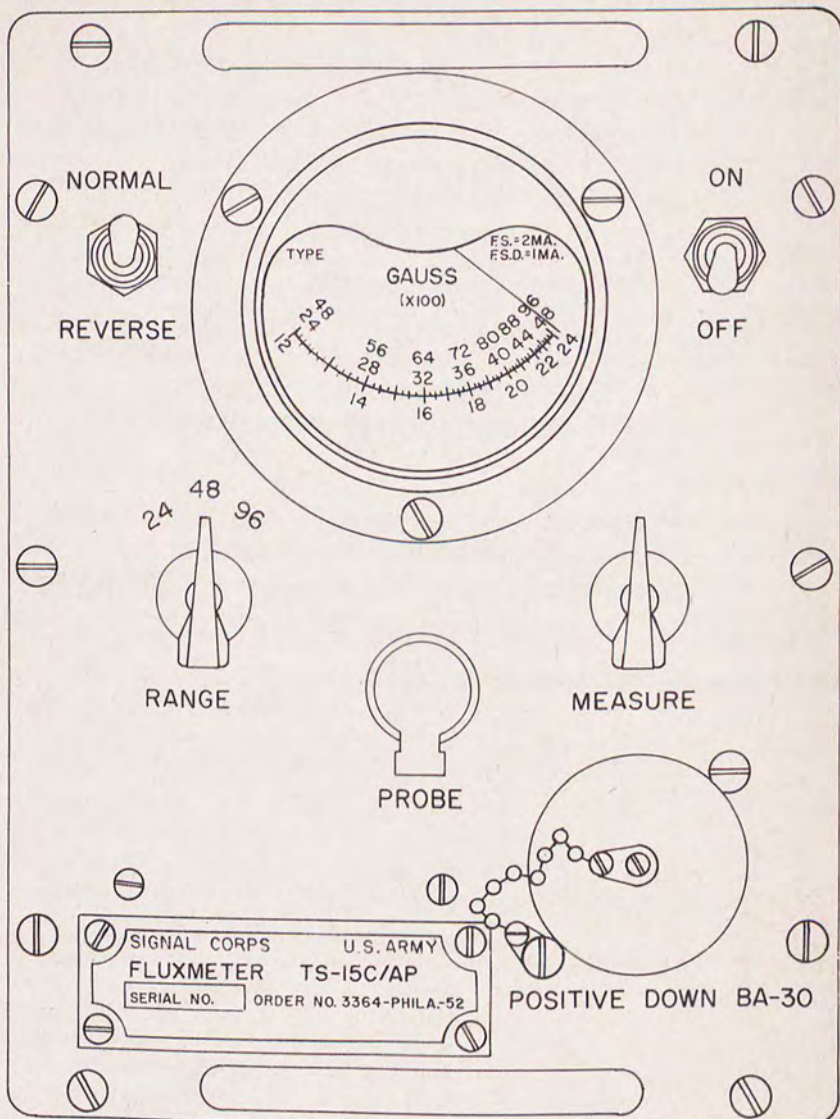
Haphazard operation or improper setting of the controls can cause damage to electronic equipment. For this reason, it is important to know the function of every control. The actual operation of the equipment is discussed in paragraphs 17 and 18.

16. Fluxmeter TS-15C/AP Controls

(fig. 4)

The following table lists the controls of the fluxmeter and indicates their functions:

Control	Function
Power switch.....	Turns fluxmeter ON or OFF.
NORMAL-REVERSE switch..	Proper deflection of the probe meter pointer depends on the direction of the magnetic field in the magnet under test. The probe meter pointer may deflect backward when the probe meter is placed between the poles of the magnet. This can be corrected by the use of the NORMAL-REVERSE switch.
Gauss meter RANGE switch... ..	Used to select the desired gauss meter range.
Position 24.....	1,200 to 2,400 range.
Position 48.....	2,400 to 4,800 range.
Position 96.....	4,800 to 9,600 range.
Gauss meter.....	Gives direct readings of flux densities in gauss.
MEASURE control.....	When measurements are being made with the fluxmeter, the desired probe meter indication is obtained by adjusting the MEASURE control.
PROBE receptacle.....	Receptacle for the probe meter plug.



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Figure 4. Fluxmeter TS-15C/AP, front panel.

Section II. OPERATION UNDER USUAL CONDITIONS

17. Starting Procedure

a. Preliminary.

- (1) Place the power switch to OFF.
- (2) Remove the probe meter from its storage location in the cover of the fluxmeter.
- (3) Select the applicable adapter for mounting the probe meter to the magnet and attach it to the probe meter with the nickel-

plated bolt. The dimensions of the magnet pole faces and the gaps with which the different adapters can be used are given in paragraph 9. For magnets with other dimensions, use the probe meter handle ((5) below).

- (4) Mount the probe meter between the pole faces of the magnet; be sure the meter is well seated and centered. The face of the probe meter must be horizontal.
- (5) When using the probe meter handle (for magnets with too large a gap for the adapters provided), the probe meter must be held within the space where the magnetic flux is strongest. This is in the center of the gap between the magnet poles. In addition, the probe meter face must be in a horizontal position.
- (6) Plug the probe meter cable plug into the PROBE receptacle on the front panel of the fluxmeter.
- (7) Place the fluxmeter cabinet as far from the magnet as the probe cable will permit.

Caution: The gauss meter in the cabinet is magnetically shielded. However, close proximity to powerful magnets of the type which this instrument is designed to test will introduce serious errors in its readings. Continued exposure may result in permanent errors.

b. Starting.

- (1) Set the NORMAL-REVERSE switch to NORMAL.
- (2) Set the MEASURE control to its maximum counterclockwise position.
- (3) Set the RANGE selector to the proper position. If the approximate value of the flux density is unknown, set the RANGE selector switch to position 96.
- (4) Place the power switch to ON.
- (5) Rotate the MEASURE control slowly in the clockwise direction and at the same time watch the probe meter.
- (6) If the pointer of the probe meter deflects backward, set the power switch to OFF. Set the NORMAL-REVERSE switch to the REVERSE position, and repeat the operations described in (4) and (5) above.
- (7) Advance the MEASURE control until the pointer of the probe meter is alined with the red mark on its scale, or until the gauss meter pointer reaches full-scale deflection. If the latter occurs first, place the power switch to OFF and set the RANGE selector switch to the next lower range. Repeat the procedure described in (2), (4), and (5) above and in this subparagraph.
- (8) With the probe meter pointer accurately set to the red mark on its scale, the flux density can be read directly in hundreds of gauss on the appropriate gauss meter scale. Read the

value on the 12 to 24 scale, on the 24 to 48 scale, or on the 48 to 96 scale, depending on whether the RANGE selector switch is set at 24, 48, or 96 respectively. Multiply the reading by 100 to find the value in gaussses.

18. Stopping Procedure

After all measurements have been made, place the power switch to OFF. Make sure the instrument is turned off; otherwise, there will be a constant drain on the battery, which will make it useless. Remove the probe meter from the magnet, remove the probe meter cable plug from the PROBE receptacle, and store the unit in the cover of the fluxmeter as shown in figure 2. Store the mounting adapter or handle in its proper place in the cover.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

19. General

The operation of Fluxmeter TS-15C/AP may be difficult in regions where extreme cold, heat, humidity, moisture, and sand conditions prevail. In paragraphs 20 through 22, instructions are given on procedures for minimizing the effect of these unusual operating conditions.

20. Operation in Arctic Climates

Subzero temperatures and climatic conditions associated with cold weather affect the operation of the equipment. Instructions and precautions for operation under such adverse conditions follow:

- a.* Handle the equipment carefully.
- b.* Keep the equipment warm and dry.
- c.* When the equipment has been exposed to the cold and is brought into a warm room, it will sweat until it reaches room temperature. When the equipment has reached room temperature, dry it thoroughly. This condition also arises when the equipment warms up during the day after exposure during a cold night.

21. Operation in Tropical Climates

When operated in tropical climates, this equipment may be stored in tents, huts, or, when necessary, in underground dugouts. When the equipment is stored below ground or is used in swamp areas, moisture conditions are more acute than normal. Ventilation usually is very poor, and the high relative humidity causes condensation of moisture on the equipment whenever its temperature becomes lower than that of the surrounding air. To minimize this condition, keep the equipment warm.

22. Operation in Desert Climates

- a.* The main problem that arises when equipment is operated in desert areas is the large amount of sand, dust, and dirt which enters

the parts of the equipment. The ideal precaution is to house the equipment in a dustproof shelter. Since such a building is seldom available and would require air conditioning, the next best precaution is to make the building in which the equipment is located as nearly dustproof as possible with available materials. Hang wet sacking over the windows and doors, cover the inside walls with heavy paper, and secure the side walls of the tents with sand to prevent their flapping in the wind.

b. Be careful to keep the equipment as free from dust as possible. Make frequent preventive maintenance checks (par. 27).

c. A drastic fall in temperature at night can cause condensation. To prevent this, cover the equipment and keep it warm.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

Section I. PREVENTIVE MAINTENANCE SERVICES

23. Tools and Materials Used With Fluxmeter TS-15C/AP

Tools and materials used, but not supplied, with the fluxmeter are listed below. The tools and materials contained in Tool Equipment TE-41 are listed in Department of the Army Catalog SIG 6-TE-41.

a. Tools.

Tool Equipment TE-41.

b. Materials.

Carbon tetrachloride.

Cheesecloth, bleached, lint-free.

Sandpaper, flint No. 000.

Solvent, Dry Cleaning (SD).

24. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment (usually when the equipment is not in use) to keep it in good working condition so breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from trouble-shooting and repair; its object is to prevent troubles from occurring.

25. General Preventive Maintenance Techniques

a. Use No. 000 sandpaper to remove corrosion.

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 (SD); then wipe the parts dry with a cloth.

(2) Clean electrical contacts with a cloth moistened with carbon tetrachloride; then wipe 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; use with caution to prevent mechanical damage from the air blast.

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

26. Use of Preventive Maintenance Forms (figs. 5 and 6)

a. The decision concerning the items on DA Forms 11-238 and 11-239 that 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.

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.				
FLUXMETER TS-15C/AP									
LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; ① Defect corrected. NOTE: Strike out items not applicable.									
DAILY									
NO.	ITEM	CONDITION							1 2 3 4 5 6
		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). PAR.27a								
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. PAR.27b								
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTIONS, VIBRATORS, PLUG-IN COILS AND RESISTORS.								
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, WORN OR CHIPPED GEARS, MISALIGNMENT, POSITIVE ACTION. PAR.27c								
6	CHECK FOR NORMAL OPERATION. PAR.27d								
WEEKLY									
NO.	ITEM	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	ITEM	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	ITEM	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
7	CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS. PAR.27e		13	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.					
8	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR.27f		14	CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES. PAR.27j					
9	INSPECT CORD, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR.27g		15	INSPECT METERS FOR DAMAGED GLASS AND CASES. PAR.27k					
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. PAR.27h		17	CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.					
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, JACKS, CONNECTIONS, ELECTRICAL TRANSFORMERS, POWER-STATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES. PAR.27i		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. PAR.27l								

DA FORM 11-238
1 MAY 51

REPLACES DA AGO FORM 439, 1 DEC 50, WHICH IS OBSOLETE.

Figure 5. DA Form 11-238.

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SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, KADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE: **FLUXMETER TS-15C/AP** EQUIPMENT SERIAL NO. _____

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

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

DA FORM 11-239
 1 MAY 51

REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

46-11-4400-1

TM2559A-6

Figure 6. DA Form 11-239.

tion. Instructions for the use of each form appear on the reverse side of the form.

b. Circled items in figures 5 and 6 are partially or totally applicable to the equipment. References in the ITEM block are to paragraphs in this manual which contain additional maintenance information.

27. Performing Exterior Preventive Maintenance

Caution: Tighten screws and nuts carefully. Fittings tightened beyond the pressure for which they are designed may become damaged or broken.

a. Check for completeness and satisfactory condition of the flux-meter.

b. Remove dirt and moisture.

c. Inspect the panel controls for binding, scraping, excessive looseness, and positive action.

d. Check for normal operation.

e. Clean and tighten the panel mountings.

f. Inspect exposed metal surfaces for rust, corrosion, and moisture.

g. Inspect probe meter cable for cuts, breaks, fraying, deterioration, and strain.

h. Inspect the manuals for general condition.

i. Inspect switches and knobs for looseness.

j. Clean the name plate and meter windows.

k. Inspect the meters for damaged glass and cases.

l. If deficiencies noted are not corrected during inspection, indicate the action taken to correct them.

28. Performing Interior Preventive Maintenance

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

b. Clean and tighten switches, terminal board, and rear of panel and case not readily accessible.

c. Inspect the terminal board for loose connections, cracks, and breaks.

d. Clean and tighten the potentiometer.

e. Check adequacy of moistureproofing and fungiproofing.

f. Before shipping or storing, remove the battery.

g. Inspect the front panel gasket and probe meter gasket.

h. If deficiencies noted are not corrected during inspection, indicate the action taken to correct them.

Section II. WEATHERPROOFING AND LUBRICATION

29. Weatherproofing and Lubrication

a. *General.* Signal Corps equipment, when operated under severe climatic conditions such as those prevailing 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 fully explained in TB SIG 13 and TB SIG 72. The moistureproofing and fungiproofing treatment is necessary only when parts are replaced or repaired, because the equipment is given this treatment at the factory.

c. Desert Maintenance. Special precautions necessary to prevent equipment failure in areas subject to extremely high temperatures, low humidity, and excessive sand and dust are fully explained in TB SIG 75.

d. Arctic Maintenance. Special precautions necessary to prevent poor performance or total operational failure of equipment in extremely low temperatures are fully explained in TB SIG 66 and TB SIG 219.

e. Lubrication. No lubrication is necessary for the fluxmeter.

30. Rustproofing and Painting

a. When the finish on the case has been badly scarred or damaged, rust and corrosion can be prevented by touching up bared surfaces. Use No. 00 or No. 000 sandpaper to clean the surface down to the bare metal; obtain a bright, smooth finish.

Caution: Do not use steel wool. Very small particles frequently enter the case and cause internal shorting or grounding of circuits.

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

Section III. TROUBLESHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

31. General

a. The troubleshooting and repair work that can be performed at the organizational maintenance level (operators and organizational repairmen) are necessarily limited in scope by the tools, test equipment, and replacement parts issued, and by the existing tactical situa-

tion. Accordingly, troubleshooting is based on the performance of the equipment and the use of the senses in determining such troubles as broken cords or cracked insulators.

b. Paragraphs 32 through 34 may assist in determining which part of the fluxmeter is at fault.

32. Visual Inspection

a. Failure of the fluxmeter to operate properly usually will be caused by one or more of the following faults:

- (1) Battery defective or improperly connected.
- (2) Dirty battery contacts.
- (3) Worn, broken, or disconnected probe meter cable or plug.
- (4) Defective resistors.
- (5) Wires broken from excessive vibration.

b. When a 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 of the fluxmeter. If possible, obtain information from the operator of the equipment regarding its performance at the time the trouble occurred.

33. Troubleshooting by Using Equipment Performance Checklist

a. *General.* The equipment performance check list (par. 34) will help the operator locate trouble in the equipment. This list gives the item to be checked, the normal indications of correct operation, and the corrective measures the operator may take. To use this list, follow the items in numerical sequence.

b. *Action or Condition.* For some items, the information given in the *Action or condition* column consists of various switch and control settings under which the item is to be checked. For other items, it represents an action that must be taken to check the normal indication given in the *Normal indications* column.

c. *Normal Indications.* The normal indications listed include the visible signs that the operator should see when the items are checked. If the indications are not normal, the operator should apply recommended corrective measures.

d. *Corrective Measures.* The corrective measures listed are those the operator can make without turning in the equipment for repairs. A paragraph reference in the chart indicates that the trouble cannot be corrected during operation and that trouble shooting by an experienced repairman is necessary. If the fluxmeter is completely inoperative, or if the recommended corrective measures do not yield results, troubleshooting is necessary.

34. Equipment Performance Checklist

	Item No.	Item	Action or condition	Normal indications	Corrective measures
P R E P A R A T O R Y	1	Power switch.....	Set at OFF.		
	2	Probe meter.....	Mount on magnet according to instructions given in paragraph 17a and plug cable into PROBE receptacle.		
	3	Fluxmeter cabinet.....	Place as far from magnet as probe cable will permit.		
	4	NORMAL-REVERSE switch.	Set to NORMAL.		
	5	MEASURE control.....	Turn to maximum counter-clockwise position.		
	6	RANGE switch.....	Set to range which covers flux density of magnet (par. 17b).		
S T A R T I N G	7	Power switch.....	Set to ON.		
	8	MEASURE control.....	Rotate slowly in clockwise direction. At the same time watch the probe meter pointer.	Probe meter pointer deflects toward red line.	Set the power switch to OFF, then set NORMAL-REVERSE switch to REVERSE. Repeat starting procedure.

STOPPING	10	Power switch-----	Set to OFF-----	No meter indications-----	Refer to paragraph 44.
	PERFORMANCE EQUIPMENT	9	MEASURE control-----	Rotate until probe meter pointer is alined with red mark, or until the gauss meter pointer reaches full deflection.	Probe meter pointer alines with red mark. Gauss meter indicates flux density.

CHAPTER 5

THEORY OF FLUXMETER TS-15C/AP

35. Gauss Meter

The circuit of Fluxmeter TS-15C/AP consists of two milliammeters (the probe meter and the gauss meter) in series with a 1.5-volt battery and various components used to control the currents through the meters. The gauss meter is a conventional D'Arsonval meter. The probe meter has no internal magnet but is actuated by the magnetic field in the gap of the magnet under test. The amount of deflection of the probe meter pointer depends on two factors: the amount of current through the probe meter coil, and the flux density in the magnet gap. These two factors determine the torque on the coil. For any specific value of torque, the current and flux density vary inversely with each other. The probe meter will require less current through its coil in strong magnetic fields and more current through the coil in weak magnetic fields for a fixed amount of deflection. In operation, the strength of the magnetic field is unknown. By assigning a fixed value to the torque, the strength of the magnetic field can be determined by measuring the current through the coil. The predetermined value of torque is obtained by varying the current through the coil until the deflection of the probe meter pointer reaches a fixed value. That value is indicated by a red mark on the probe meter face. The gauss meter is calibrated so that it will read directly in hundreds of gauss on three scales. (The gauss is a unit of measurement of magnetic flux density, which is proportional to magnetic field intensity.)

36. RANGE Switch

Referring to the schematic diagram (fig. 10), note that by operating RANGE switch S3, it is possible to shunt the gauss meter with either one of two resistances (R_4 or R_5) which have different values. To use the low range of the fluxmeter, set the RANGE switch to position 24, which puts the lowest value of resistance (R_4) in shunt with the gauss meter. This allows the maximum amount of current to pass through the probe meter coil, permitting full-scale deflection of the probe meter pointer with small values of flux density. When the RANGE switch is set to position 48, a larger value of resistance (R_5) shunts the gauss meter and a larger value of flux density can be measured.

The maximum range is available when the RANGE switch is set to position 96, which disconnects all meter shunts. With the selection of the larger value shunt resistance and finally the removal of the shunt, the current through the probe meter is proportionately decreased and greater flux densities are required to give full-scale deflection of the probe meter pointer. In this manner, the effective range of the fluxmeter is increased, permitting measurements over a wide range of flux densities. The three ranges on the gauss meter are 1,200 to 2,400, 2,400 to 4,800, and 4,800 to 9,600 gauss and the RANGE switch is labeled 24, 48, and 96 to correspond with the three meter scales.

37. Probe Meter

When the probe meter is inserted in a magnet gap, the direction in which the probe meter pointer deflects depends on the direction of the magnetic field and the direction of the current flow through the probe meter coil. Since most magnets are not marked to indicate their magnetic polarity, the probe meter may be inserted into the field in a way that will cause the pointer to deflect backwards. To correct this condition, either the position of the probe unit must be reversed in the magnet gap, or the direction of current flow through the meter coil must be reversed. To avoid the necessity of reversing the position of the probe unit, a double-pole, double-throw switch S2 is incorporated in the fluxmeter circuit to change the direction of the current flow and thus cause the meter pointer to deflect in the proper direction over the scale. This switch is located to the left of the gauss meter and is marked NORMAL and REVERSE.

38. MEASURE Control

The MEASURE control R1, R2, R3, and resistors R6, R7, and R8 regulate the amount of current through the fluxmeter circuit. The MEASURE control is used in the actual measurements of magnetic flux densities (par. 17*b*). Resistor R9 serves to limit the current flow through the fluxmeter circuit. Resistor R10, which is shunted across the probe meter, serves as a calibrating resistor for the probe meter.

CHAPTER 6

FIELD MAINTENANCE

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. TROUBLESHOOTING AT FIELD MAINTENANCE LEVEL

39. Troubleshooting Procedures

The tests listed below will aid in isolating the source of trouble. Follow the procedure in the order given. Remember that servicing procedure should cause no further damage to the fluxmeter.

a. Visual Inspection. Visual inspection (par. 32) frequently reveals where the trouble exists. This inspection is valuable in avoiding additional damage to the fluxmeter through improper servicing methods, and in forestalling future failures.

b. Operational Test. The operational test (par. 43) is important because it frequently indicates the general location of trouble and often determines the exact nature of the fault. All symptoms must be interpreted in relation to one another.

c. Troubleshooting Chart. The trouble symptoms listed in this chart (par. 44) will aid greatly in localizing trouble.

d. Intermittents. In all these tests, the possibility of intermittents should not be overlooked. If present, this type of trouble often can be made to appear by tapping or jarring the equipment.

40. Troubleshooting Data

Take advantage of the material supplied in this manual. It will help in the rapid location of faults. Consult the following troubleshooting data:

Fig. No.	Description
4	Fluxmeter TS-15C/AP, front panel.
7	Fluxmeter TS-15C/AP, rear view of front panel.
9	Resistor color code.
10	Fluxmeter TS-15C/AP, schematic diagram.

41. Tool and Test Equipment Required

The tool and test equipment required for troubleshooting Fluxmeter TS-15C/AP is listed below. The manuals associated with the test equipment also are listed.

Tool and test equipment	Manuals
Tool Equipment TE-21.....	
Instrument Tool Equipment TK-3/MSM-2.....	
Meter Test Equipment AN/GSM-1.....	TM 11-2535
Multimeter TS-352/U.....	TM 11-5527

42. Checking Continuity, Shorts, and Resistances

Trouble in the fluxmeter often can be detected by checking for continuity, shorts, and resistance values. Use Meter Test Equipment AN/GSM-1 for checking resistance values and Multimeter TS-352/U for checking for continuity and shorts.

Caution: Do not attempt to measure the resistance of the meters. Disconnect the meters from the circuit before making the above checks.

43. Operational Test

Operate Fluxmeter TS-15C/AP as directed in the equipment performance checklist (par. 34). This checklist is important because it frequently indicates the general location of trouble.

44. Troubleshooting Chart

The following chart is supplied as an aid in locating trouble in the fluxmeter. This chart lists the symptoms which the repairman observes, the probable trouble, and the correction.

Symptom	Probable trouble	Correction
<p>1. Instrument dead.....</p> <p>2. Probe meter deflects on all ranges, but gauss meter does not.</p> <p>3. Probe meter and gauss meter deflect on all three ranges.</p> <p>4. Probe meter pointer will not reach red mark on any range.</p> <p>5. Difficult to set probe meter pointer on red mark. Moving MEASURE control causes erratic and jumpy movements of the pointer.</p>	<p>1. Dead battery..... Probe meter cable not plugged into PROBE receptacle. Battery is not making contact in the case. Switch S1 or R9 defective..... Switch S2 or S3 defective..... Open probe meter cable.....</p> <p>2. Dry cell is reversed in battery case.....</p> <p>3. Shorted probe cable..... Shorted probe meter coil.....</p> <p>4. Weak battery..... Magnet field strength below 1,200 gauss. Obstruction inside probe meter.....</p> <p>5. Defective MEASURE control R1, R2, R3.</p>	<p>1. Replace battery. Plug cable into PROBE receptacle. Clean the contacts. Make certain the cap is closed tightly. Replace defective component. Check switches; replace if defective. Check and replace if necessary. Refer to paragraph 45c.</p> <p>2. Remove and reverse the dry cell.</p> <p>3. Check cable connections; repair if necessary. Replace entire probe meter.</p> <p>4. Replace battery. Refer to paragraph 45c.</p> <p>5. Replace resistor assembly.</p>

Section II. REPAIRS

45. Replacement of Parts

(figs. 7 and 8)

a. All parts of Fluxmeter TS-15C/AP are easily accessible and easily replaced if found to be defective.

b. Careless replacement of parts often causes new faults. Note the following points:

- (1) Before a part is unsoldered, note the position of the leads. If the part, such as a switch, has a number of connections, tag each of the leads to avoid misconnection when the part is replaced.

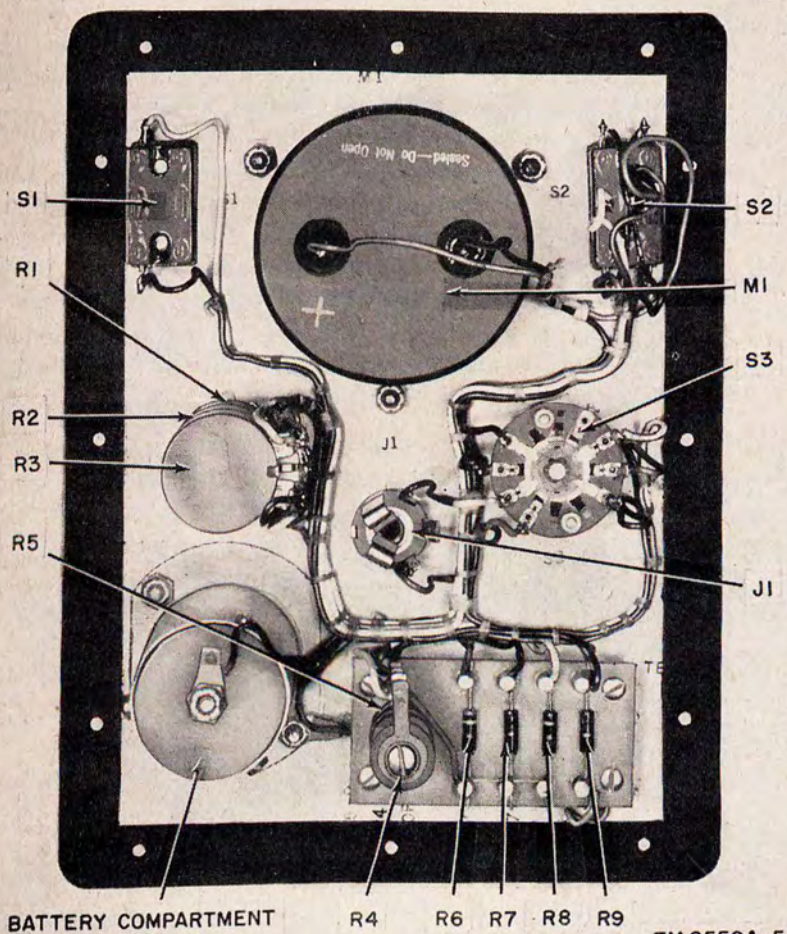


Figure 7. Fluxmeter TS-15C/AP, rear view of front panel.

- (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. They may cause short circuits.
- (4) A carelessly soldered connection may create a new fault. It is very important to make well-soldered joints; a poorly soldered joint is one of the most difficult faults to find.
- (5) Be sure to doublecheck new connections to avoid misconnections which would cause additional damage to the equipment.

c. To gain access to the probe meter cable connections for replacement of the cable, or to check for obstructions inside the probe meter, it is necessary to remove the probe meter cover and gasket from the body of the meter. To do this, remove the three mounting screws and lockwashers. The cover and gasket can then be removed.

- (1) *Probe meter cable replacement.* Unsolder the two wires connected to the two lugs shown in figure 8. Unscrew and remove the packing nut and rubber sealing washer, then remove the cable. When replacing the cable, be sure the wires are dressed in the manner shown in figure 8.
- (2) *Checking for obstruction inside probe meter.* When it has been definitely ascertained that the reason for the probe meter pointer not reaching the red mark is due to an obstruction inside the probe meter, remove the cover and gasket as directed above. Check for foreign matter catching the pointer or obstructing the movement of the coil. Check to see that the lead wire is not caught on the balance tail. Remove obstructions with tweezers or by careful blowing.

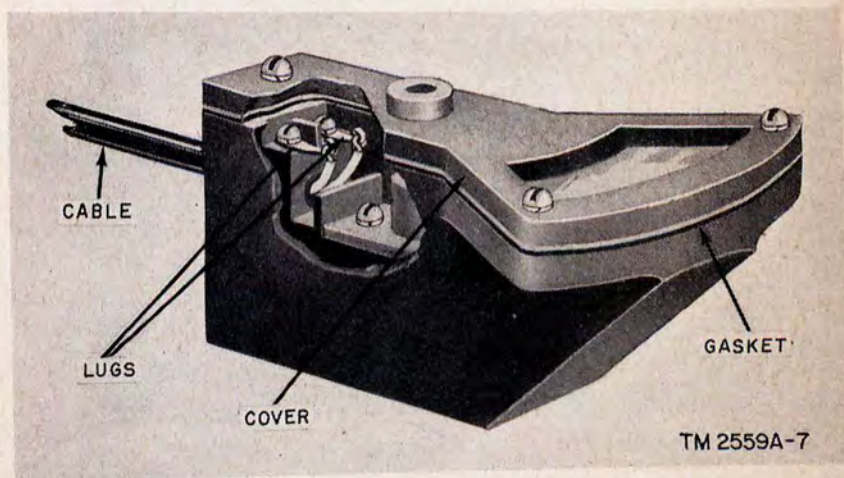


Figure 8. Fluometer TS-15C/AP, probe meter.

46. Refinishing

Instructions for refinishing are given in paragraph 30. If the equipment is worn and badly marred, the exterior should be refinished in accordance with instructions in TM 9-2851, before it is returned as satisfactory.

Section III. FINAL TESTING

47. General

This section is intended as a guide to be used in determining the quality of a repaired Fluxmeter TS-15C/AP. The test outlined in paragraph 49 may be performed by maintenance personnel with adequate test equipment and the necessary skills. Repaired equipment meeting the minimum requirements will give uniformly satisfactory operation.

48. Test Equipment Required for Final Testing

A magnet and another Fluxmeter TS-15C/AP known to be in good operating condition are used in checking the repaired fluxmeter.

Item	Technical manual
Fluxmeter TS-15C/AP----- Magnet Assembly (Signal Corps stock No. 2Z6390-5).	TM 11-2559A

Note. The Fluxmeter TS-15C/AP will be used as a standard to check the magnet assembly only.

49. Comparison Test

a. Check the flux density of the magnet assembly (Signal Corps stock No. 2Z6390-5) by means of a laboratory standard Fluxmeter TS-15C/AP. Clearly mark the correct reading on the magnet assembly. Perform this test at least once a week while the magnet is being used to check repaired fluxmeters. The magnet must have a flux density of 2,000 gauss ± 10 percent.

b. Test the fluxmeter by measuring the field intensity of the calibrated magnet assembly. Keep the probe meter perfectly level while making readings.

c. The meter reading must be within ± 5 percent of the standard fluxmeter reading as marked on the calibrated magnet assembly.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

50. Disassembly

Use the following procedure to prepare Fluxmeter TS-15C/AP for shipment and storage:

a. Disconnect the probe meter from the fluxmeter. Store the probe meter and the mounting device in their proper location (fig. 2).

b. Remove the dry cell from the battery compartment.

c. Close the case and secure fastenings.

Note. The fluxmeter should never be shipped or stored with the battery in place.

51. Materials Required

The following materials are required for packaging Fluxmeter TS-15C/AP:

Material	Quantity
Waterproof barrier material	3 square feet.
Single-faced, flexible, corrugated paper	3 square feet.
Pressure-sensitive tape	5 feet.
Gummed paper tape	6 feet.

52. Field Repackaging

Package Fluxmeter TS-15C/AP as follows:

a. Wrap the fluxmeter with single-faced flexible corrugated paper.

b. Fasten the wrapping with gummed paper tape.

c. Put each manual in a close-fitting bag made of waterproof barrier material. Seal all seams and openings with pressure-sensitive tape.

53. Field Packing and Marking

a. Make a wooden box to fit the packaged fluxmeter and manual snugly. If more than one fluxmeter is to be shipped, make a box large enough to hold the fluxmeters to be packed. Do not exceed a total weight of 150 pounds for any one shipping container.

- b.* Fit the shipping container with a lining of waterproof barrier material. Seal all seams and openings with pressure-sensitive tape.
- c.* Place fluxmeter or fluxmeters in the lined shipping container; make sure the fluxmeters fit snugly. If necessary, add corrugated paper as filler to prevent movement of the fluxmeter during shipment.
- d.* Place the manuals on top of the packed fluxmeters.
- e.* Place the cover on the shipping container and nail it in place. Strap shipping containers for intertheater movements only.
- f.* Mark shipping containers in accordance with the requirements of SR 55-720-1, section II.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

54. General

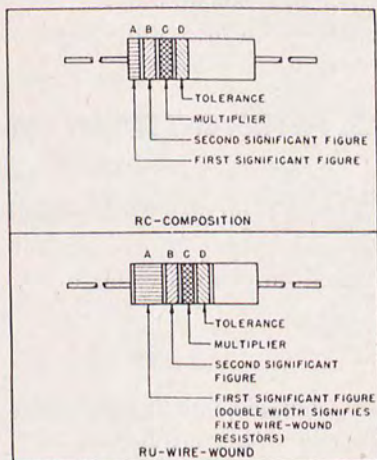
The demolition procedures outlined in paragraph 55 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commanding officer.

55. Methods of Destruction

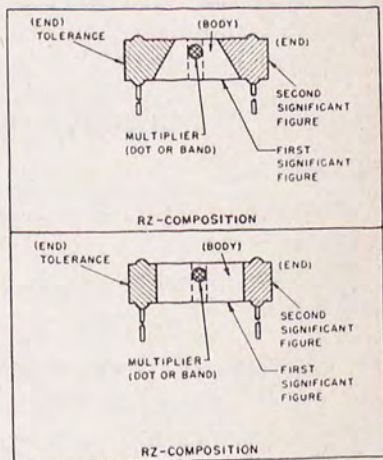
- a. Smash.* Smash the switches, meters, controls, and resistors; use sledges, axes, pickaxes, hammers, crowbars, or other heavy tools.
- b. Cut.* Cut wires and cables; use axes, handaxes, or machetes.
- c. Burn.* Burn cord, resistors, wiring, and manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.
- d. Bend.* Bend panel, cabinet, and chassis.
- e. Explosives.* If explosives are necessary, use firearms, grenades, or TNT.
- f. Disposal.* Bury or scatter the destroyed parts in slit trenches, foxholes or other holes, or throw them into streams.
- g. Destroy.* Destroy everything.

RESISTOR COLOR CODE MARKING
(MIL-STD RESISTORS)

AXIAL-LEAD RESISTORS
(INSULATED)



RADIAL-LEAD RESISTORS
(UNINSULATED)



RESISTOR COLOR CODE

BAND A OR BODY*		BAND B OR END*		BAND C OR DOT OR BAND*		BAND D OR END*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1	BODY	± 20
BROWN	1	BROWN	1	BROWN	10	SILVER	± 10
RED	2	RED	2	RED	100	GOLD	± 5
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000		
GREEN	5	GREEN	5	GREEN	100,000		
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	GOLD	0.1		
WHITE	9	WHITE	9	SILVER	0.01		

* FOR WIRE-WOUND-TYPE RESISTORS, BAND A SHALL BE DOUBLE-WIDTH WHEN BODY COLOR IS THE SAME AS THE DOT (OR BAND) OR END COLOR, THE COLORS ARE DIFFERENTIATED BY SHADE, GLOSS, OR OTHER MEANS.

EXAMPLES (BAND MARKING):

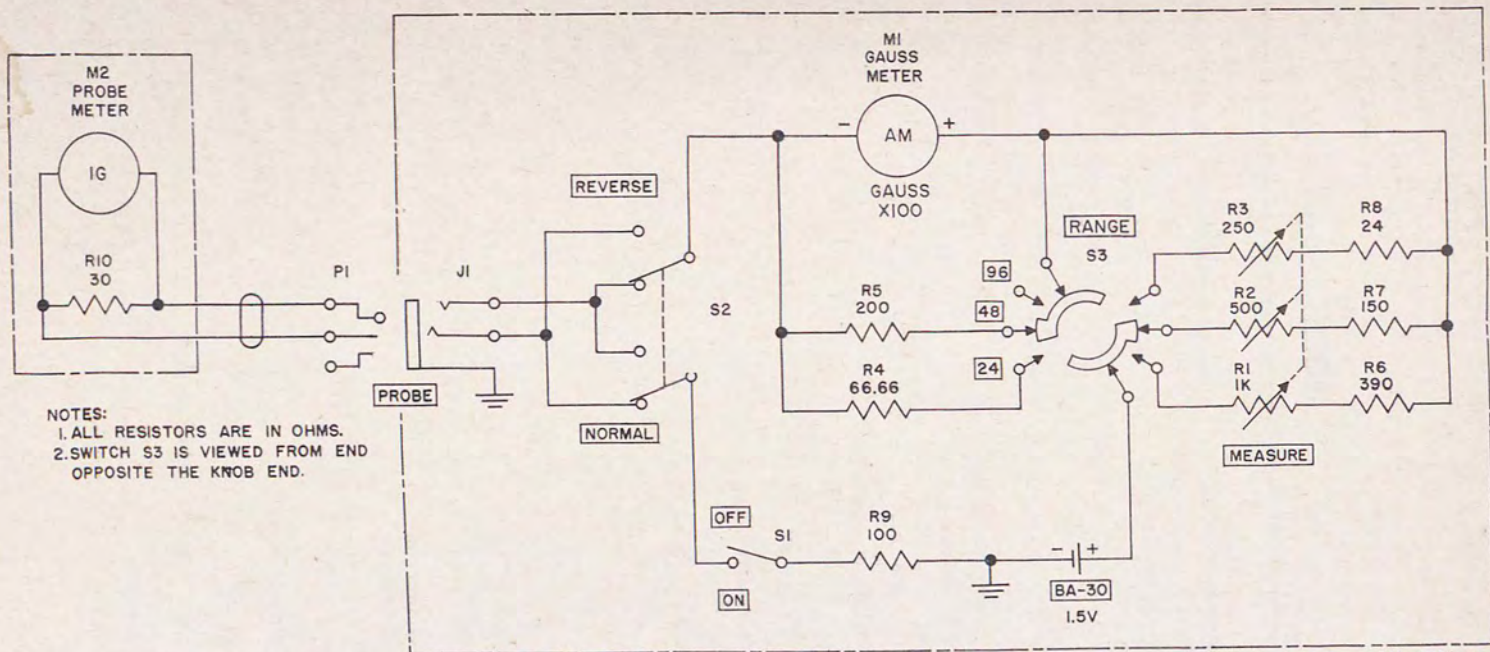
10 OHMS ± 20 PERCENT: BROWN BAND A, BLACK BAND B, BLACK BAND C; NO BAND D.
4.7 OHMS ± 5 PERCENT: YELLOW BAND A, PURPLE BAND B, GOLD BAND C; GOLD BAND D.

EXAMPLES (BODY MARKING):

10 OHMS ± 20 PERCENT: BROWN BODY, BLACK END, BLACK DOT OR BAND, BODY COLOR ON TOLERANCE END.
3,000 OHMS ± 10 PERCENT: ORANGE BODY, BLACK END, RED DOT OR BAND, SILVER END.

STD-R1

Figure 9. Resistor color code.



NOTES:
 1. ALL RESISTORS ARE IN OHMS.
 2. SWITCH S3 IS VIEWED FROM END OPPOSITE THE KNOB END.

TM2559A-8

Figure 10. Fluxmeter TS-15C/AP, schematic diagram.

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BY ORDER OF THE SECRETARY OF THE ARMY:

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Chief of Staff.

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Major General, United States Army,
The Adjutant General.

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Tec Svc Bd (1)
CONARC (5)
CONARC Bd (incl ea Test Sec)
(1)
Army AA Comd (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5)
Corps (2)
Tng Div (2)
Ft & Cp (2)
Gen & Br Svc Sch (5)
SigC Sch (25)
Gen Depots (2)
SigC Sec, Gen Depots (10)
SigC Depots (20)
POE (2)

OS Sup Agencies (2)
SigC Fld Maint Shops (3)
SigC Lab (5)
Mil Dist (1)

Units organized under following TOE's:

11-7, Sig Co Inf Div (2)
11-16A, Hq & Hq Co, Sig Bn,
Corps or Abn Corps (2)
11-57, Armd Sig Co (2)
11-127, Sig Rep Co (2)
11-128A, Sig Depot Co (2)
11-500A (AA-AE), Sig Svc
Org (2)
11-557A, Abn Sig Co (2)
11-587A, Sig Base Maint Co
(2)
11-592A, Hq & Hq Co, Sig
Base Depot (2)
11-597A, Sig Base Depot Co
(2)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

Unless otherwise noted, distribution applies to ConUS and overseas.

For explanation of abbreviations used, see SR 320-50-1.

TM 11-2559A—FLUXMETER TS-15C/AP—1955

TECHNICAL MANUAL

FLUXMETER TS-15C/AP

TM 11-2559A

CHANGE No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 27 September 1963

TM 11-2559A, 10 May 1955, is changed as follows:

Delete the information on the inside of the front cover.

Page 3. Add paragraph 1.1 after paragraph 1:

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended changes to DA technical manual parts lists or supply manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, N.J. 07703. One information copy will be furnished to the individual's immediate supervisor (e.g., officer, noncommissioned officer, supervisor, etc.).

Page 7, note at bottom of chart. Change "TS-150/AP" to: TS-15C/AP.

Page 15, paragraph 22b. Delete the second sentence.

Page 16. Delete sections I and II, and figures 5 and 6 and substitute:

Section I. PREVENTIVE MAINTENANCE

23. Scope of Maintenance

The maintenance duties assigned to the operator and unit repairman of Fluxmeter TS-15C/AP are listed below, together with a reference to the paragraphs covering the specific maintenance functions. The duties assigned do not require tools or test equipment other than those issued with the equipment.

- a. Daily preventive maintenance checks and services (par. 26).
- b. Weekly preventive maintenance checks and services (par. 27).
- c. Monthly preventive maintenance checks and services (par. 28).
- d. Quarterly preventive maintenance checks and services (par. 29).
- e. Cleaning (par. 30).
- f. Touchup painting (par. 30.1).
- g. Visual inspection (par. 32).
- h. Troubleshooting (par. 33).
- i. Equipment performance check (par. 34).

24. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. *Systematic Care.* The procedures given in paragraphs 26 through 30 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. *Preventive Maintenance Checks and Services.* The preventive maintenance checks and services charts (pars. 26-29) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are. The *references* column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by performing the corrective actions listed, higher echelon maintenance or repair is required. Records and

reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

25. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of Fluxmeter TS-15C/AP are required daily, weekly, monthly, and quarterly.

a. Paragraph 26 specifies the checks and services that must be accomplished daily (or at least once each week if the equipment is maintained in standby condition).

b. Paragraphs 27, 28, and 29 specify *additional* checks and services that must be performed on a weekly, monthly, and quarterly basis, respectively.

26. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	See that the equipment is complete (TM 11-6625-234-12P).	None.
2	Exterior surfaces..	Clean the exterior surfaces, including the panel and meter glasses (par. 30). Check all meter glasses for cracks.	None.
3	Connectors	Check the tightness of all connectors.	None.
4	Controls and indicators.	While making the operating checks (item 5), observe that the mechanical action of each knob, dial, and switch is smooth and free of external or internal binding, and that there is no excessive looseness. Also, check the meters for sticking or bent pointers.	None.
5	Operation	Operate the equipment according to paragraphs 33 and 34.	Pars. 33 and 34

27. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cables	Inspect the cable for chafed, cracked, or frayed insulation. Replace connectors that are broken, arced, stripped, or worn excessively.	None.
2	Handles and latches.	Inspect handles, latches, and hinges for looseness. Replace or tighten as necessary.	None.
3	Metal surfaces.....	Inspect exposed metal surfaces for rust and corrosion. Touch-up paint as required.	Par. 30.1.
4	Battery and compartment.	Inspect the battery for loose terminals and leakage. Check the compartment for corrosion.	None.

28. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Jacks	Inspect jacks for snug fit and good contact.	None.
2	Terminal block....	Inspect the terminal block for loose connections and cracked or broken insulation.	None.
3	Resistors	Inspect the resistors for cracks, blistering, or other detrimental defects.	None.
4	Gaskets and insulators.	Inspect gaskets, insulators, bushings, and sleeves for cracks, chipping, and excessive wear.	None.
5	Interior	Clean interior of chassis and cabinet.	None.
6	Battery	Before storing or shipping, remove the battery.	None.

29. Quarterly Preventive Maintenance Checks and Services

Sequence No.	Item	Procedure	References
1	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4
2	Modifications	Check DA Pam 310-4 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-4

30. Cleaning

Inspect the exterior of the equipment. The exterior surfaces should be clean, and free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean soft cloth.

Warning: Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.

b. Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with Cleaning Compound (Federal Stock No. 7930-395-9542). After cleaning, wipe dry with a cloth.

c. Remove dust or dirt from plugs and jacks with a brush.

Caution: Do not press on the meter face (glass) when cleaning; the meter may become damaged.

d. Clean the front panel, meters, and control knobs; use a soft clean cloth. If necessary, dampen the cloth with water; mild soap may be used for more effective cleaning. Wipe dry with a cloth.

30.1. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TM 9-213.

Page 20. Change "section III" to: section II.

Page 31. Delete paragraph 46.

Page 33, paragraph 53. Delete subparagraph f.

Add the following appendix after chapter 7:

APPENDIX REFERENCES

Following is a list of applicable publications available to the operator and repairmen of the equipment:

- DA Pam 310-4 Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
- TM 9-213 Painting Instructions for Field Use.
- TM 11-2535 Meter Test Equipment AN/GSM-1.
- TM 11-5527 Multimeters TS-352/U, TS-352A/U, and TS-352B/U.
- TM 11-6625-234-12P Operator's and Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Fluxmeters TS-15/AP, TS-15A/AP, TS-15B/AP, and TS-15C/AP.
- TM 38-750 The Army Equipment Record System and Procedures.
- TM 11-6625-234-35P Field and Depot Maintenance Repair Parts and Special Tools List for Fluxmeters TS-15/AP, TS-15A/AP, TS-15B/AP, and TS-15C/AP.

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT
Major General, United States Army,
The Adjutant General.

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USA CD Agcy (1)	Ft Huachuca (2)
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USASCC (4)	USA Elct Mat Agcy (12)
MDW (1)	Chicago Proc Dist (1)
Armies (2)	USARCARIB Sig Agcy (1)
Corps (2)	Sig Fld Maint Shop (3)
USA Corps (3)	Units org under fol TOE
USATC AD (2)	(2 cy ea UNOINDC):
USATC Engr (2)	11-7
USATC Inf (2)	11-16
USATC Armor (2)	11-57
USASTC (5)	11-98
Instl (2) except	11-117
Ft Monmouth (65)	11-155
Svc Colleges (2)	11-157
Br Svc Sch (2) except	11-500 (AA-AC)
GENDEP (OS) (2)	11-557
Sig Dep (OS) (2)	11-592
Sig Sec, GENDEP (5)	11-597

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

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