TM 11-2440

TO 16-30 GMM 1-5

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DUPLICATE COPY

RADIOSONDE BASELINE CHECK SET AN/GMM-1

DEPARTMENT OF THE ARMY • DECEMBER 1952

TECHNICAL MANUAL

RADIOSONDE BASELINE CHECK SETS AN/GMM-1 AND AN/GMM-1A

CHANGES No. 2

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *15 July 1954*

TM 11-2440, 31 December 1952, is changed as follows:

CHAPTER 1

INTRODUCTION

Note. Radiosonde Baseline Check * * * as otherwise specified. **Serial Numbers 9 through 108 of the AN/GMM-1A furnished on Order No. 37904-Phila-53 differ slightly from previous AN/GMM-1A's in that each includes a plastic terminal strip on which three binding posts are mounted (fig. 2.1).**

1. Scope

* * * * * * *

b. Rescinded.

Figure 2. Temperature-humidity chamber, **AN/GMM-1 and AN/GMM-1A (Orders No. 25656-Phila-53 and No. 37904-Phila-53, serial Nos. 1 through 8).**

5. Components

a. Temperature-Humidity Chamber (fig. 1, 2, **2.1,** and 3). The temperature-humidity chamber * * * AN/AMT-2A outside the chamber. **The front portion of the frame block for positioning radiosondes in the temperature-humidity chamber of Radiosonde Baseline Check Sets AN/GMM-1A, serial Nos. 9 through 108, furnished on Order No. 37904-Phila-53, is a plastic terminal strip (TB2) on which three binding posts are mounted. A shielded cable assembly connects the binding posts into the testing circuits in parallel with the test connector (P1) so that a radiosonde can be connected to the test set either through the connector (P1) or the binding posts.**

* * * * * * *

14. Operation

* * * * * * *

b. Install the radiosonde within the chamber.

* * * * * * *

(2) Remove the male test connector from the radiosonde and connect it to the female test connector (P1) in the chamber (fig. 2 **and 2.1). Some models of Radiosondes AN/AMT-**

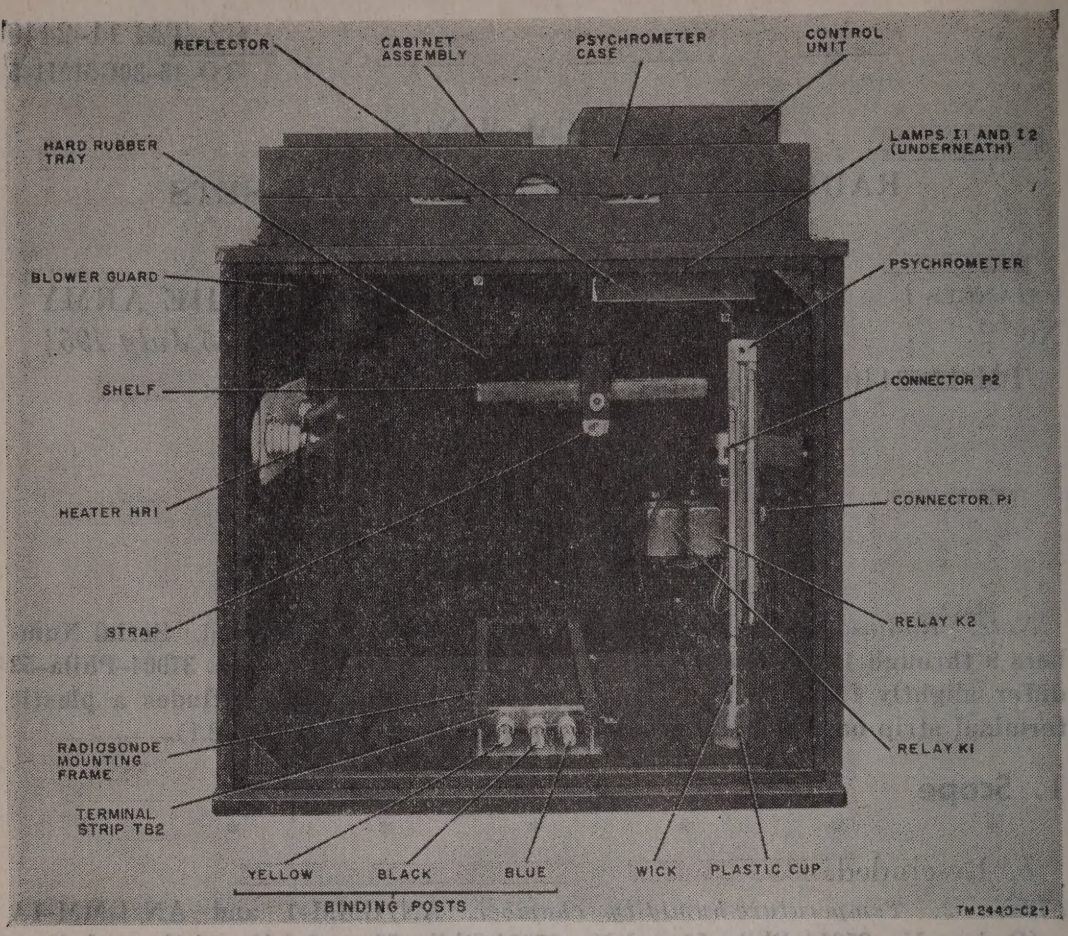


Figure 2.1 (Added). *Temperature and humidity chamber, AN/GMM–1A (Order No. 37904–Phila–53, serial Nos. 9 through 108).*

2 ( ) and AN/AMT–4 ( ) do not have a male test connector. Instead, three test leads, one blue (low-reference connection), one yellow (humidity connection), and one black (ground connection), extend from the side of the radiosonde. When Radiosonde Baseline Check Set AN/GMM–1A, serial Nos. 9 through 108 on Order No. 37904–Phila–53, is being used to test a radiosonde that has three test leads instead of a male test connector, connect each of the three test leads to the correspondingly designated binding post on terminal strip TB2 at the front of the frame block in the temperature-humidity chamber (fig. 2.1).

* * * * * * *

f. If it is * * * to the right.

* * * * * * *

(4) Attach the battery female plug connector to the male connector on the outer right side of the chamber (fig. 1), and attach the battery connector (P2) inside the chamber (fig. 2 **and 2.1)** to the battery connector on the radiosonde.

* * * * * * *

i. To turn the equipment off proceed as follows:

* * * * * * *

(4) Disconnect the radiosonde test connector **or test leads** and **the** battery connector (if in use), and remove the radiosonde.

(5) If the radiosonde * * * under the chamber. **Replace the battery in the radiosonde.**

* * * * * * *

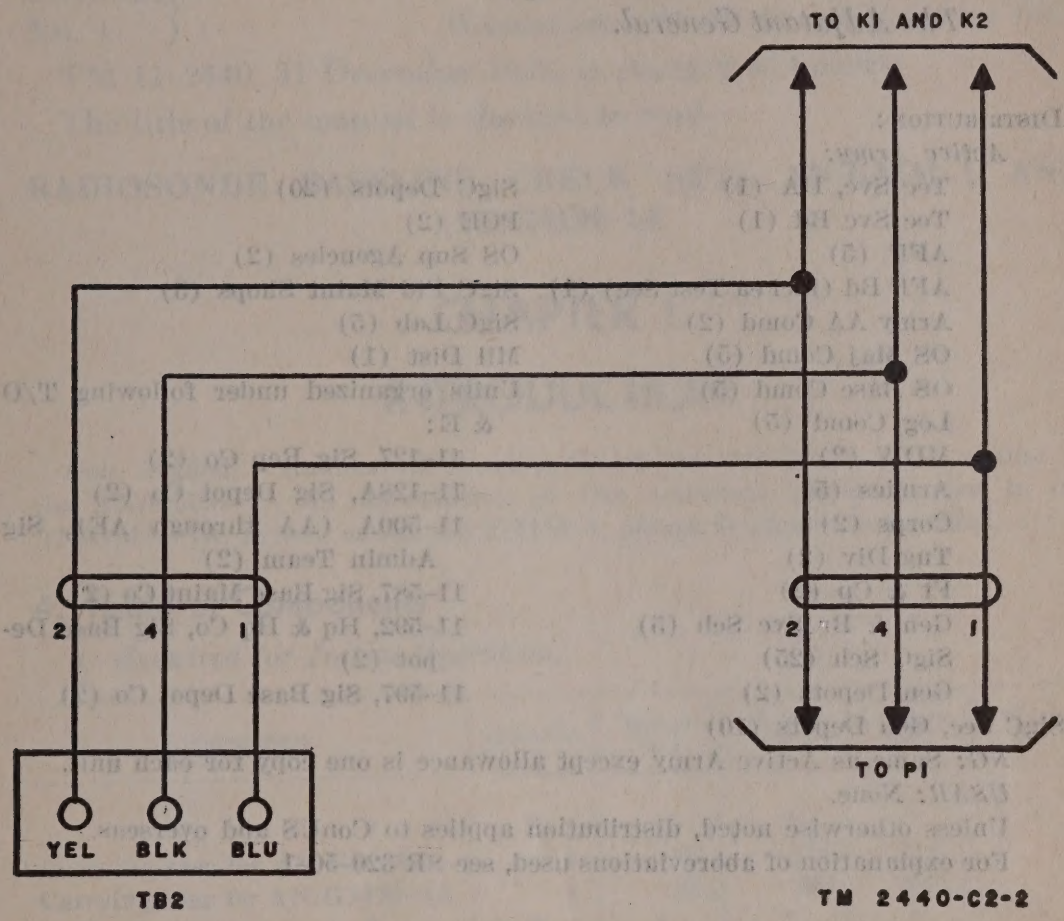


Figure 12.2 (Added). *Terminal strip for test connections, schematic diagram, AN/GMM–1A (Order No. 37904–Phila–53, serial Nos. 9 through 108).*

APPENDIX I

REFERENCES

Rescinded

APPENDIX II

IDENTIFICATION TABLE OF PARTS

Rescinded

[AG 413.6 (28 Jun 54)]

By order of the Secretary of the Army:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

Official:

JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

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Active Army:

Tec Svc, DA (1)
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AFF (5)
AFF Bd (incl ea Test Sec) (1)
Army AA Comd (2)
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MDW (2)
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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 T/O & E:
11–127, Sig Rep Co (2)
11–128A, Sig Depot Co (2)
11–500A (AA through AE), Sig Admin Team (2)
11–587, Sig Base Maint Co (2)
11–592, Hq & Hq Co, Sig Base Depot (2)
11–597, Sig Base Depot Co (2)

NG: Same as Active Army except allowance is one copy for each unit.
USAR: None.
Unless otherwise noted, distribution applies to ConUS and overseas.
For explanation of abbreviations used, see SR 320–50–1.

U. S. GOVERNMENT PRINTING OFFICE: 1954

TECHNICAL MANUAL

RADIOSONDE BASELINE CHECK SET AN/GMM-1 AND AN/GMM-1A

CHANGES No. 1

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *18 November 1953*

TM 11-2440, 31 December 1952, is changed as follows:

The title of the manual is changed to read—

RADIOSONDE BASELINE CHECK SETS AN/GMM-1 AND AN/GMM-1A

CHAPTER 1

INTRODUCTION

Note (Added). Radiosonde Baseline Check Set AN/GMM-1A is similar to the AN/GMM-1. All information in this technical manual applies to the AN/GMM-1A, as well as the AN/GMM-1, except as otherwise specified.

4. Table of Components

a. Required for Initial Operation.

Component	Quantity	Height (in.)	Width (in.)	Length (in.)	Weight (lb.)
* *	*	*	*	*	*
Carrying case for AN/GMM-1	1	17⅛	26¼	34¾	65
Carrying case for AN/GMM-1A	1	17⅛	26¼	35 23/32	65
* *	*	*	*	*	*

b. Spares.

Item	Quantity
* * *	* * * *
Thermometer	6 (AN/GMM-1): 3 (AN/GMM-1A)
* * *	* * * *

Note. This table is * * * of spare parts.

5. Components

* * * * * * *

e. Carrying Case (figs. 7 and 8). The carrying case is a reinforced plywood box approximately 34¾ inches long **(AN/GMM–1) or 35 23/32 inches long (AN/GMM–1A)**, 26¼ inches wide, and 17⅛ inches deep overall. It consists of * * * of the case.

* * * * * * *

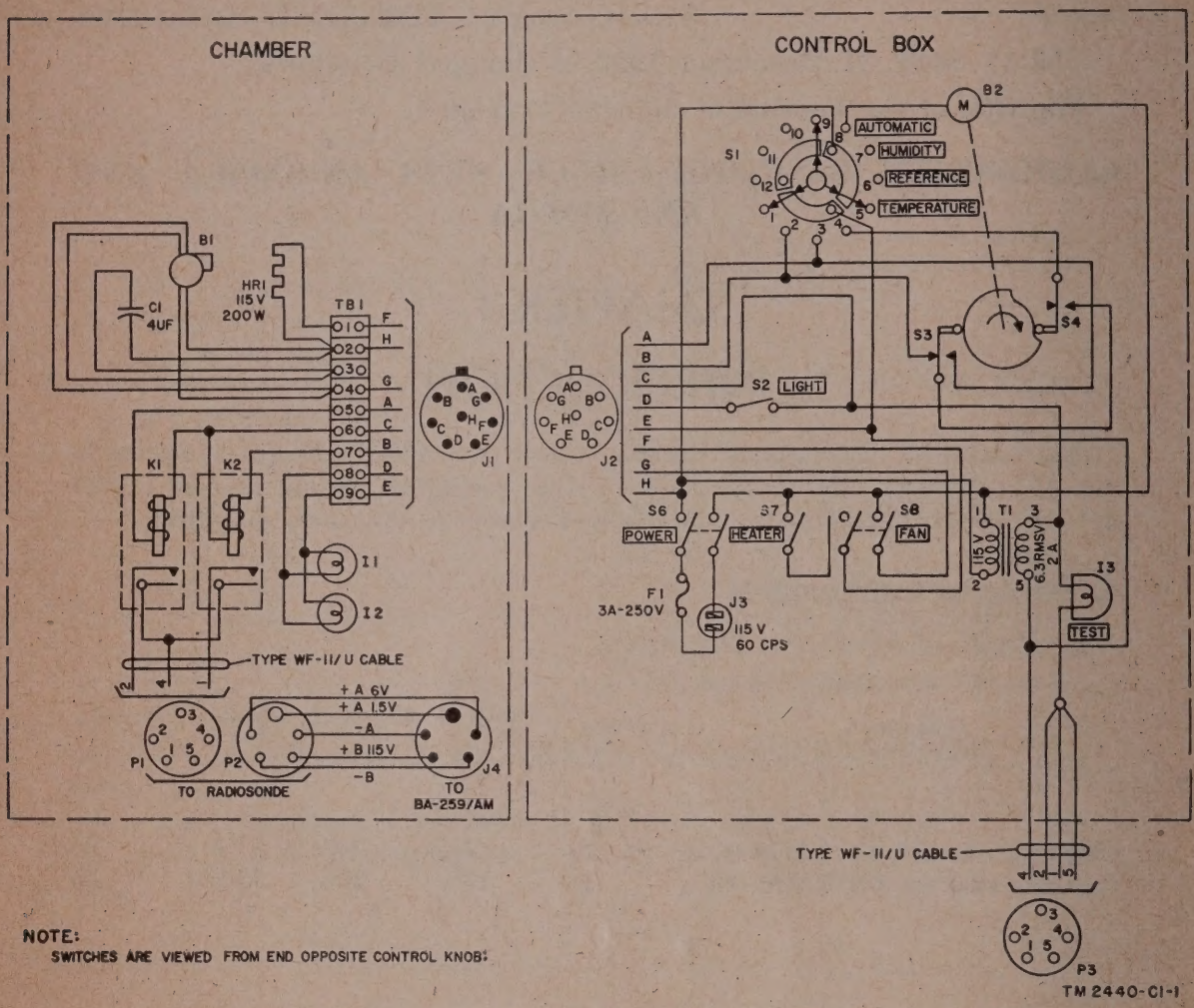


Figure 12.1 (Added). *Radiosonde Baseline Check Set AN/GMM–1A, schematic diagram*

Figure 14 Relay control circuit with selector switch S1 in AUTOMATIC position, simplified schematic diagram, ***Radiosonde Baseline Check Set AN/GMM–1.***

29. Relay Control Circuit for Radiosonde Baseline Check Set AN/GMM/1

(figs. 14, 15, and 16)

The relay control * * * four switch positions.

* * * * * *

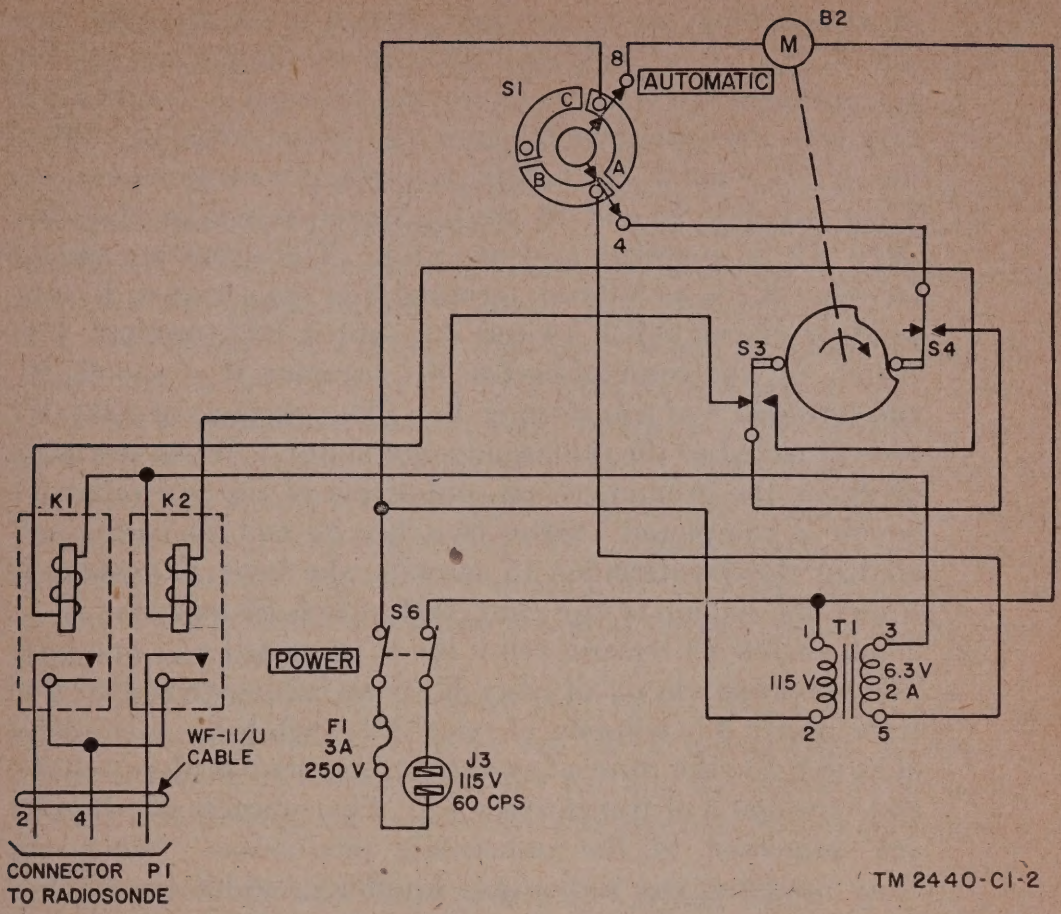


Figure 14.1 (Added). *Relay control circuit with selector switch S1 in AUTOMATIC position, simplified schematic diagram, Radiosonde Baseline Check Set AN/GMM–1A.*

29.1 Relay Control Circuit for Radiosonde Baseline Check Set AN/GMM/1A

(figs. 12.1, 14.1, 15, and 16)
(Added)

The relay control circuit consists of selector switch S1, motor B2, cam-operated microswitches S3 and S4, relays K1 and K2, and transformer T1. Selector switch S1 has four positions: AUTOMATIC, HUMIDITY, REFERENCE, and TEMPERATURE. The switch controls the operation of relays K1 and K2, which are used to switch various radiosonde circuits in or out as required during operation of the check set.

a. AUTOMATIC Position (fig. 14.1).

(1) When POWER switch S6 is closed and selector switch S1 is in the AUTOMATIC position, power is supplied to motor B2. The operating circuit for motor B2 is as follows: one side of jack J3, fuse F1, one side of switch S6, segment A of switch S1, the rotor of switch S1, terminal 8 of switch S1, the motor winding, the other side of switch S6, and the other side of jack J3. Motor B2 is coupled mechanically to a

microswitch-operating cam and rotates the cam at the rate of 1 revolution per minute. Two microswitches, S3 and S4, are operated by the cam. As the lever of a microswitch slips into the indent of the cam, the switch relaxes. When the switch is not in the indent, the switch is compressed.

(2) When switches S3 and S4 are both compressed by the cam, relay K2 is energized and operates. The operating circuit for relay K2 is as follows: terminal 3 of transformer T1, the winding of relay K2, switch S3, switch S4, terminal 4 of switch S1, the rotor of switch S1, segment B of switch S1, and terminal 5 of transformer T1. The contacts of relay K2 are connected to the radiosonde modulator. When the relay operates, the ground-return connection of the low-reference circuit is completed. After switches S3 and S4 have operated in this position for 15 seconds, the lever of switch S3 enters the indent of the cam, and switch S3 relaxes.

(3) When switch S3 relaxes, relay K1 is energized and operates. The operating circuit of relay K1 is as follows: terminal 3 of transformer T1, winding of relay K1, switch S3, terminal 4 of switch S1, the rotor of switch S1, segment B of switch S1, and terminal 5 of transformer T1. The contacts of relay K1 are connected to the radiosonde modulator. When the relay operates, the radiosonde humidity circuit is switched in. After switch S3 has operated in this position for 15 seconds, the switch lever emerges from the indent of the cam, and switches S3 and S4 are both compressed ((2) above). After switches S3 and S4 have operated in this position for 15 seconds, the lever of switch S4 enters the cam, switch S4 relaxes, and for the next 15 seconds neither relay is energized. During this interval, the temperature circuit of the radiosonde operates. After the 15-second interval has elapsed, switches S3 and S4 are compressed again ((2) above).

(4) During each minute of automatic operation, the following cycle is completed: switches S3 and S4 are compressed and energized relay K2, which causes the radiosonde low-interference circuit to operate for 15 seconds; switch S3 relaxes and energizes relay K1, which causes the radiosonde humidity circuit to operate for 15 seconds; switches S3 and S4 are compressed and energize relay K2, which causes the radiosonde low-reference circuit to operate for 15 seconds; and switch S4 relaxes so that neither relay operates during 15 seconds while the radiosonde temperature circuit operates. The cycle is repeated once per minute while switch S1 is operated in the AUTOMATIC position.

b. HUMIDITY Position (fig. 15). When POWER switch S6 is closed, and switch S1 is in the HUMIDITY position, the circuit for relay K1 is completed and the relay operates. The operating circuit is as follows: terminal 3 of transformer T1, winding of relay K1, terminal 3 of switch S1, the rotor of switch S1, segment B of switch S1, and terminal 5 of transformer T1. The contacts of relay K1 are connected to the radiosonde modulator so that, when the relay operates, the radiosonde humidity circuit is switched in.

c. REFERENCE Position (fig. 16). When POWER switch S6 is closed and switch S1 is in the REFERENCE position, the circuit for relay K2 is completed and the relay operates. The operating circuit is as follows: terminal 3 of transformer T1, the winding of relay K2, terminal 2 of switch S1, the rotor of switch S1, segment B of switch S1, and terminal 5 of transformer T1. The contacts of relay K2 are connected to the radiosonde modulator so that, when the relay operates, the ground-return connection of the radiosonde low-reference circuit is completed.

d. TEMPERATURE Position (fig. 12.1). When POWER switch S6 is closed and switch S1 is in the TEMPERATURE position, no power is applied to relay K1 or relay K2, and the relays do not operate. During this period, the radiosonde temperature circuit operates.

43. Disassembly and Reassembly of Control Unit

(figs. 20, **20.1,** 21, and 22).

* * * * * * *

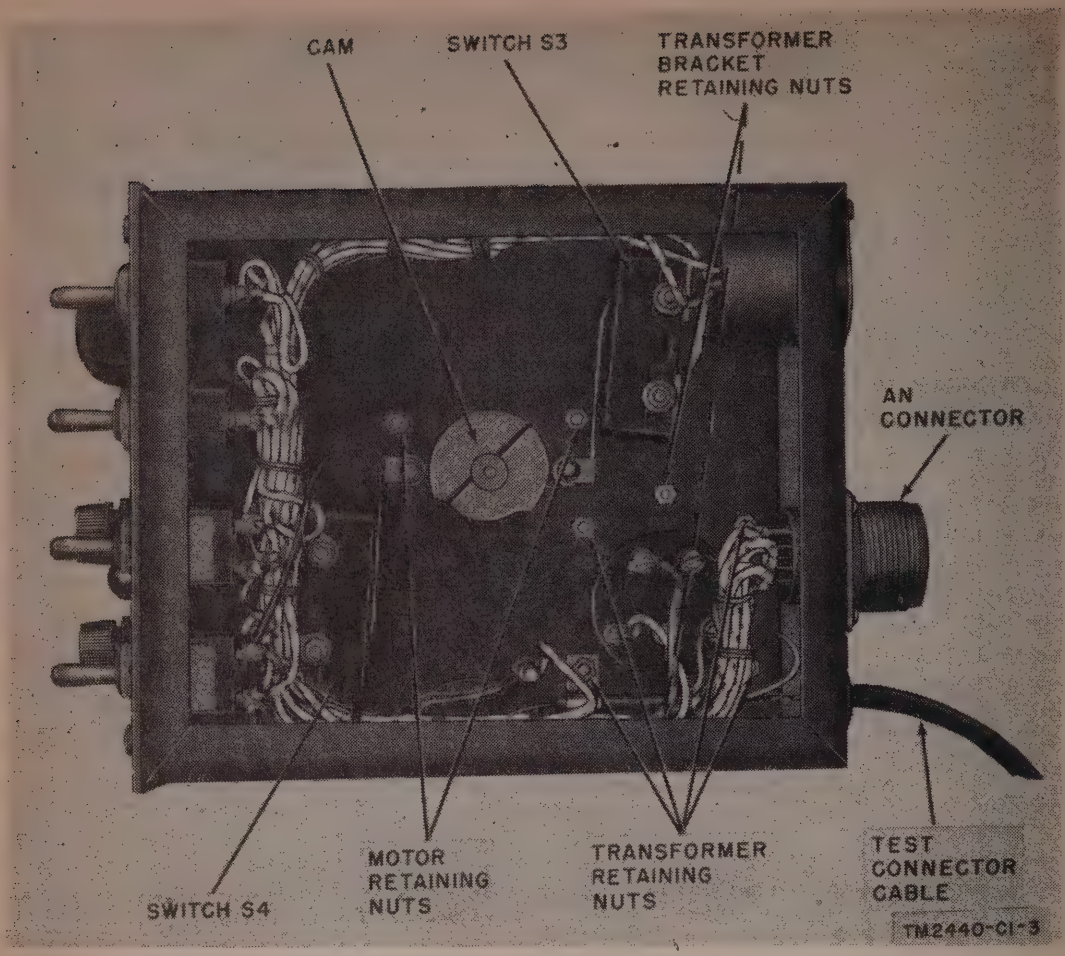


Figure 20.1 (Added). *Control Unit, bottom view, AN/GMM–1A.*

APPENDIX II

IDENTIFICATION TABLE OF PARTS

Note. The following is an identification table of parts for Radiosonde Baseline Check Set AN/GMM–1 **or AN/GMM–1A** (Sig C stock No. 7A794–1). The fact that * * * Introduction and Index.

Fig. No. or ref symbol	Name of part and description	Function of part	Signal Corps stock No.
*	* * *	* *	*
Fig. 25	BLOWER: * * * rotation	Circulates * * * chamber	3H388–95
Figs. 20, 20.1, 22.	CAM: * * * shape	Actuates * * * rollers	2Z1600–162
*	* * *	* *	*
	CLAMP: * * * type	Used * * * cable	2ZK2636–2

Fig. No. or ref symbol	Name of part and description	Function of part	Signal Corps stock No.
P2	CONNECTOR, **receptacle:** electrical; 5 cont; male.	Used * * * radiosonde	2Z3105–32
*	* * *	* *	*
Fig. 9	CONNECTOR, * * * flat	Terminates one end * * * to control unit.	6Z3150–1
*	* * *	* *	*
J2	CONNECTOR, * * * polarized.	Used * * * assembly	**2Z3069–59**
*	* * *	* *	*
Fig. 19	FUSEHOLDER: * * * 8 amp.	Mounts * * * panel	3Z3282–42.6
	GASKET: * * * OD	Seals * * * radiosonde	2Z4867.770
	Gasket: 16⅜″ lg x ¼″ wd	**Seals lid of chamber**	**2Z4867.771**
Fig. 19	GROMMET: rubber; 1″ dia.	Serves * * * unit	6Z4856–38
Fig. 19	GROMMET: rubber; 7/16″ dia.	Serves * * * unit	6Z4895
Figs. 23 and 24.	GROMMET: rubber; ¾″ dia.	Serves * * * relays	6Z4886
I3	LAMP, incandescent	Used * * * chamber	2Z5927
Figs. 19 and 21.	MOTOR, AC: 60 cps; 1 rpm.	Used * * * microswitches	3H3000–197
*	* * *	* *	*
Fig. 4	SWITCH, * * * 4 position	Used * * * automatically	3Z9825–55.19
Figs. 20, 20.1, 22.	SWITCH, * * * type	Actuated * * * circuit	**3Z9558–39.3**
Fig. 4	SWITCH, * * * 1 15/16″ lg	Used * * * OFF	3Z9863–42A
Fig. 4	SWITCH, **toggle:** SPST; 6 term.; 1½″ lg.	Used * * * OFF	3Z9863–52K.1
*	* * *	* *	*

[AG 300.7 (3 Nov 53)]

By order of the Secretary of the Army:

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

Official:

WM. E. BERGIN,
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The Adjutant General.

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NG: Same as Active Army except one copy to each unit.

Army Reserve: None.

For explanation of distribution formula, see SR 310–90–1.

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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TM 11-2440

RADIOSONDE BASELINE CHECK SET AN/GMM-1



DEPARTMENT OF THE ARMY • DECEMBER 1952

United States Government Printing Office
Washington : 1953

DEPARTMENT OF THE ARMY

WASHINGTON 25, D. C., *31 December 1952*

TM 11–2440 is published for the information and guidance of all concerned.

[AG 413.6 (26 Nov 52)]

BY ORDER OF THE SECRETARY OF THE ARMY:

OFFICIAL:

WM. E. BERGIN
Major General, USA
The Adjutant General

J. LAWTON COLLINS
Chief of Staff, United States Army

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For explanation of distribution formula, see SR 310–90–1.

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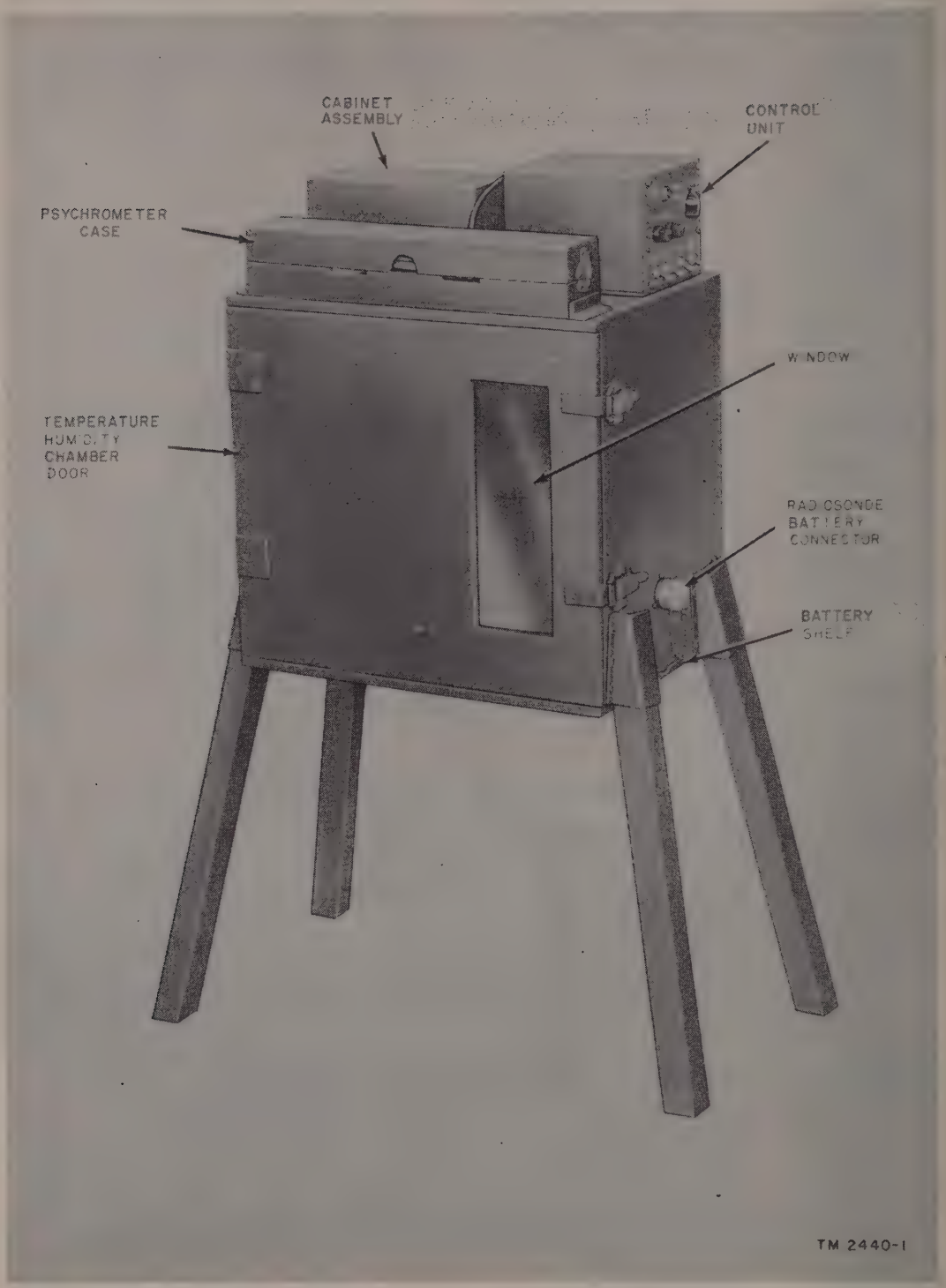


Figure 1. Radiosonde Baseline Check Set AN/GMM-1.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the information and guidance of the personnel to whom this equipment is issued. They contain a description of the equipment; information on operation, organizational maintenance, theory, and field maintenance; instructions for removing the equipment from service and repacking for shipment or limited storage; and instructions for demolishing the equipment to prevent enemy use.

b. Appendix I contains a list of references, including supply catalogs, technical manuals on associated equipment, and other applicable publications. Appendix II contains an identification table of parts.

2. Forms and Records

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

a. DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5 (Army), NAV DEPT SERIAL 85P00 (Navy), and AFR 71-4 (Air Force).

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

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

d. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. General

Radiosonde Baseline Check Set AN/GMM-1 (fig. 1) is basically a transportable chamber for preflight testing of Radiosondes AN/AMT-2 (TM 11-2430), AN/AMT-2A (TM 11-2433), AN/AMT-4 (TM 11-2432), and AN/AMT-4A (TM 11-2432A). The set consists of a temperature-humidity (calibration) chamber and a control unit. The chamber may be

mounted on four legs, which are provided, or on a wall. The control unit may be mounted on top of the chamber or within 100 feet of it. The set operates from a 110- to 115-volt, 60-cycle, a-c (alternating-current) power source, and circuit design permits manual or automatic selection of the reference, temperature, and humidity circuits in the radiosonde under test. A plywood carrying case provides storage and shipping space for the set.

4. Table of Components

a. Required for Initial Operation.

Component	Quantity	Height (in.)	Width (in.)	Length (in.)	Weight (lb)
Temperature-humidity chamber	1	17½	19	13	20
Control unit	1	5⅛	6	7	6
Psychrometer ML-224	1			11½	
Handle	1				
Wick	1				
Thread	1 spool				
Plastic cup	1				
Carrying case	1	17⅛	26¼	34¾	65
Reel unit (with 100-ft extension cable)	1		9 (dia)	11¾	35
Power cable	1			15 ft	

b. Spares.

Item	Quantity
Psychrometer	1
Thermometer	6
Wick	99
Incandescent lamp	6

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

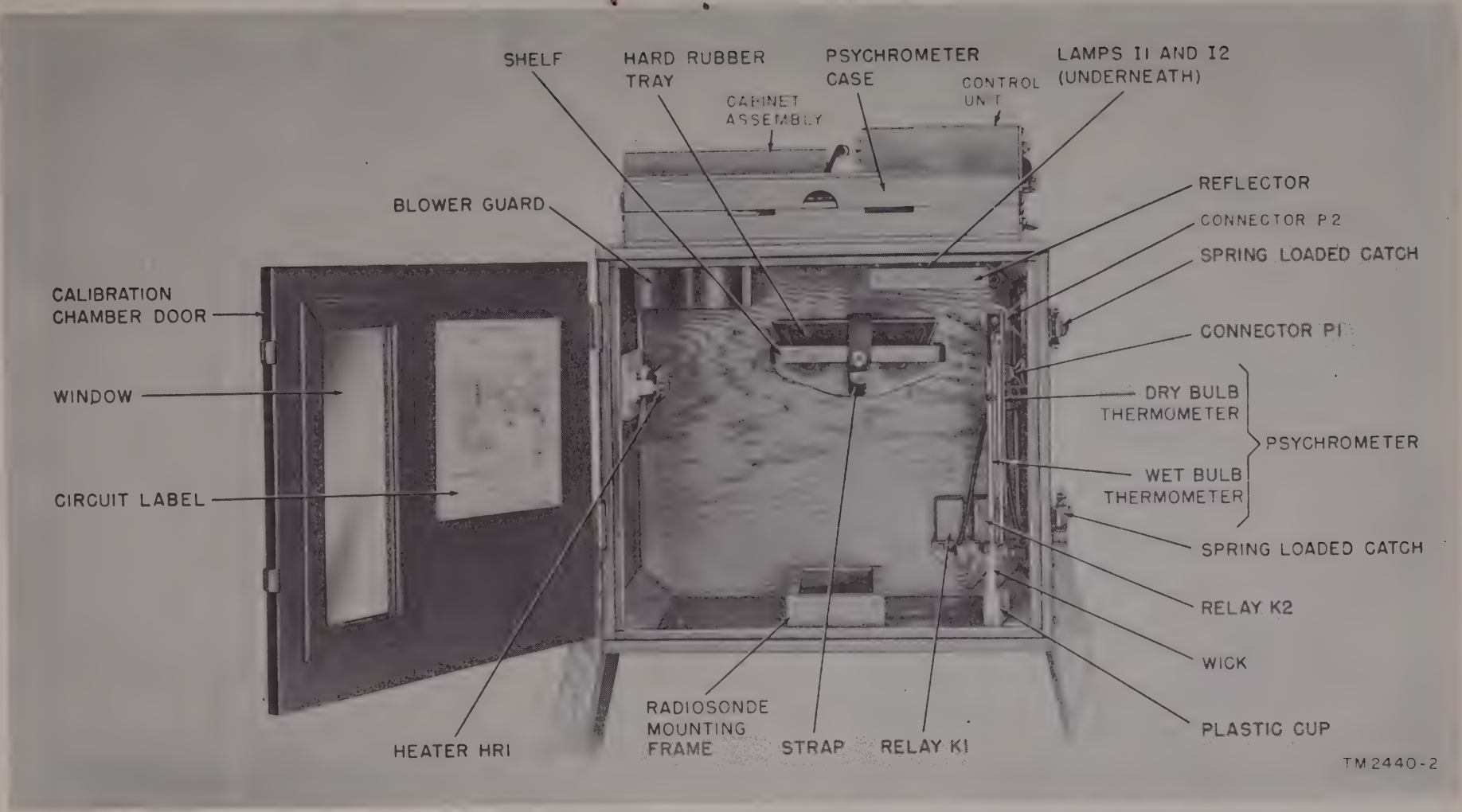


Figure 2. Temperature-humidity chamber

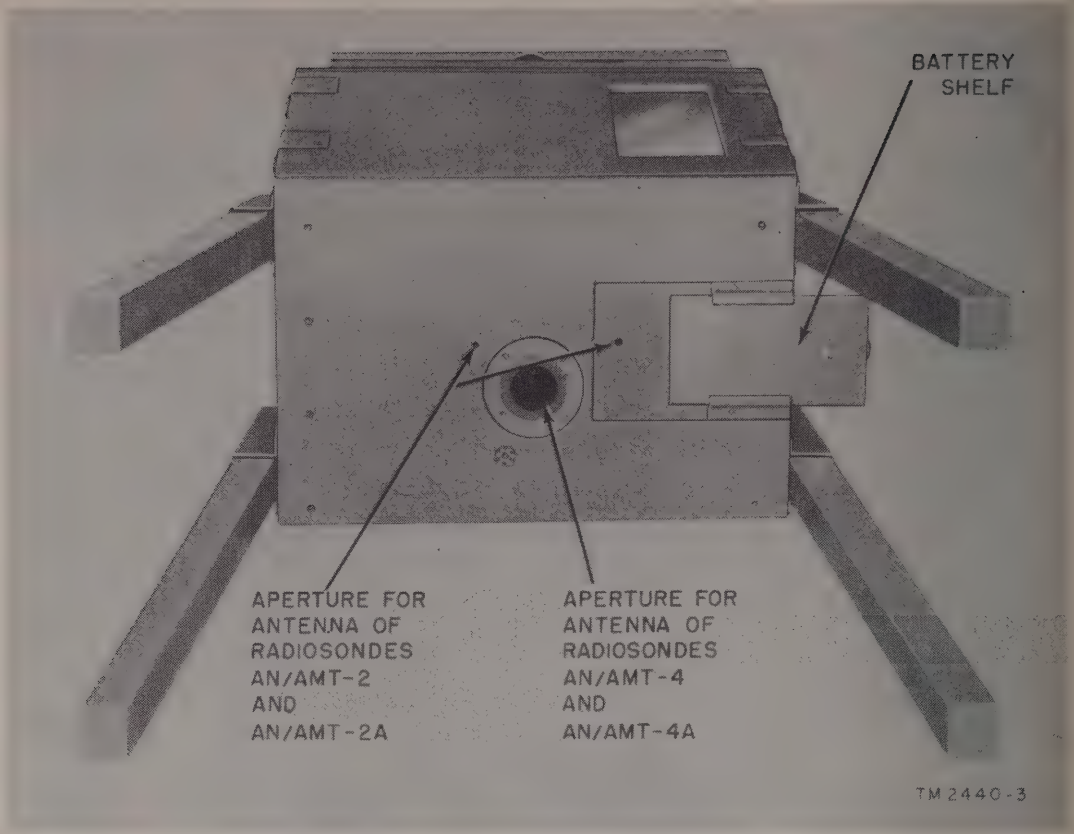


Figure 3. Temperature-humidity chamber, bottom view.

5. Components

a. Temperature-Humidity Chamber (figs. 1, 2, and 3). The temperature-humidity chamber is a sturdy plywood compartment, approximately 17½ inches high, 19 inches wide, and 13 inches deep. The door is hinged on the left and held closed by two pull catches on the right. A clear, plastic window in the door permits observation of the interior when the door is closed and a test is in progress. On top of the chamber are a psychrometer case, a cabinet assembly, and dovetail grooves for mounting the control unit. Sockets are provided at the lower corners for mounting the chamber on supporting legs. On the lower right side is a male receptacle connector (with a protective cap) for attaching a radiosonde battery when it must be located outside the chamber. Directly below this connector is a battery shelf that slides in and out along grooves on the bottom of the chamber. This shelf is used to support the radiosonde battery when it must be located outside the chamber. Air is circulated within the chamber by a motor-driven fan mounted at the to ı left. A tray for distilled water is strapped to a shelf that projects from the upper-right rear wall inside the chamber. A bracket for Psychrometer ML-224 (TM 11-2417) is located on the right wall near the front of the chamber. The interior is illuminated

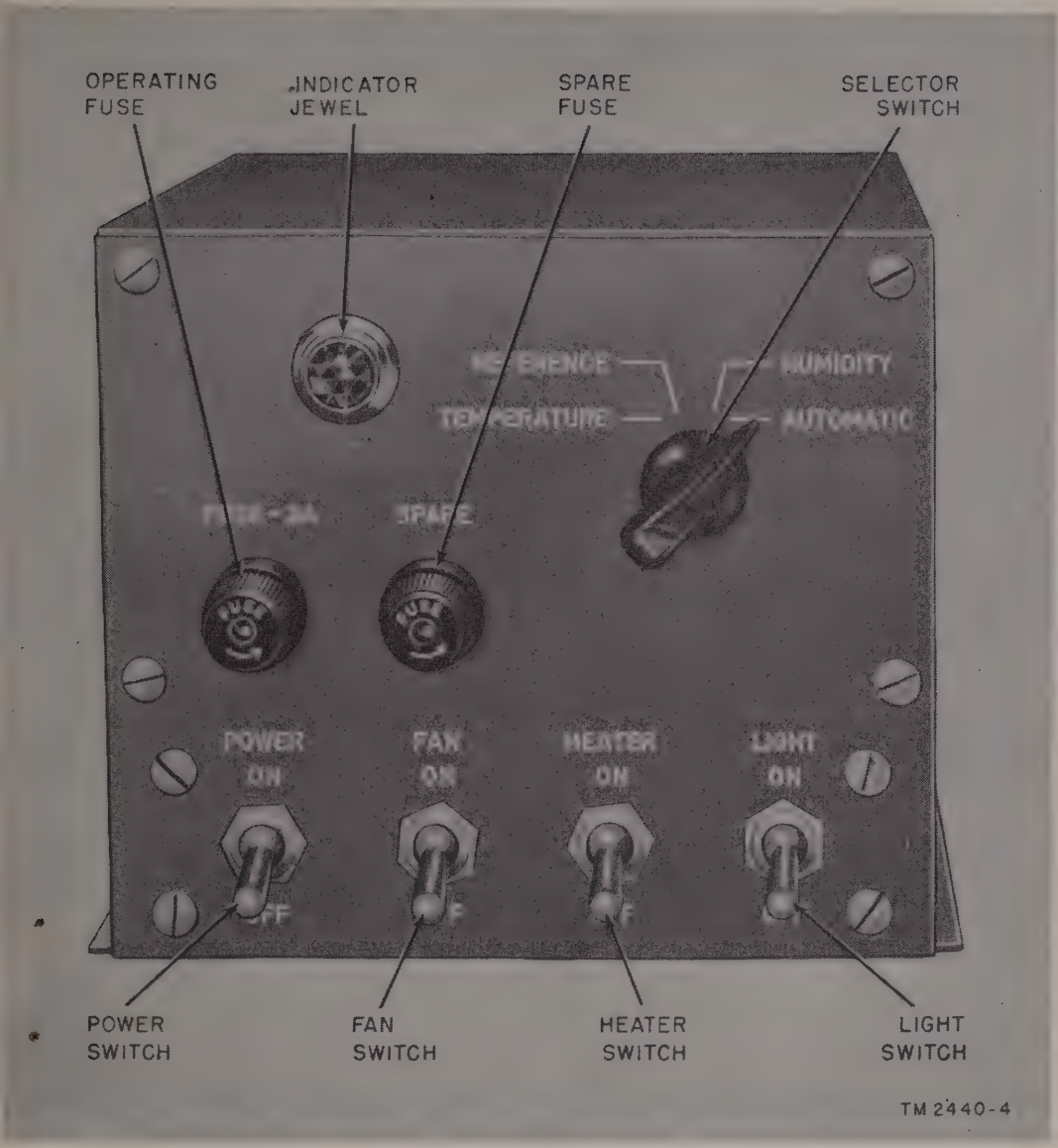


Figure 4. Control unit, view of panel face.

by two miniature, incandescent lamps mounted in a chrome-plated reflector at the top of the chamber. Two relays are mounted on the lower right side of the rear wall and connected to a flexible cable that terminates in a female test plug connector. The test connector (P1) is retained in a spring bracket on the center right wall. An adjacent spring bracket retains a male plug connector (P2), which terminates a flexible cable that leads to the male receptacle connector on the lower right wall. The plug connector is used to connect an exterior battery to the battery connector of a radiosonde inside the chamber. A strip heater mounted on the left wall can be switched on to provide extra heat in the chamber, when necessary. A wooden frame block in the center base of the chamber is used to position a radiosonde for testing. A 2¼-inch opening in the floor below this

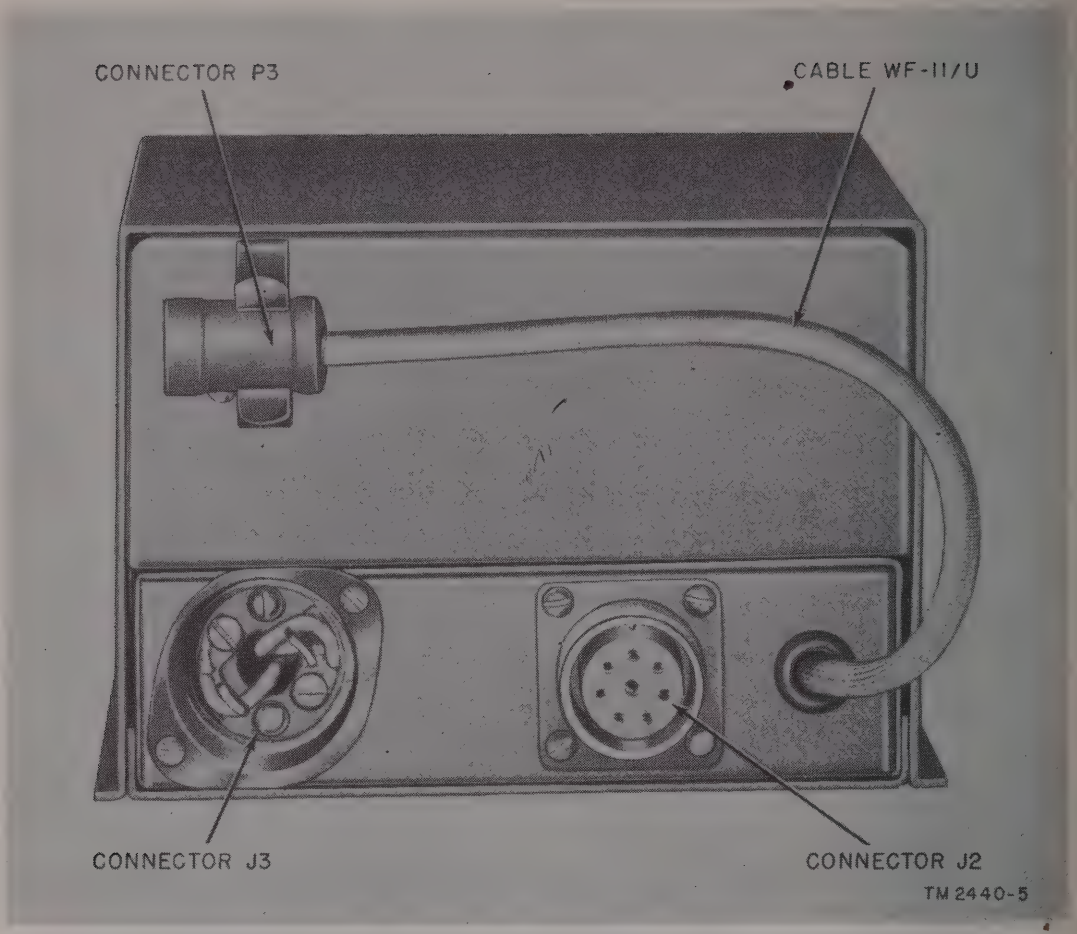


Figure 5. Control unit, rear view.

frame is used to extend the antenna of Radiosonde AN/AMT-4 or AN/AMT-4A outside the chamber. When not in use, the hole is protected by a flat, metal cover, which is pivoted on a screw adjacent to the hole. Two 1/4-inch holes, one near each front corner of the frame block, are used to extend the antenna of Radiosonde AN/AMT-2 or AN/AMT-2A outside the chamber.

b. Control Unit (figs. 4 and 5). The control unit is inclosed in a metal housing, approximately 6 inches wide, 5 1/8 inches high, and 7 inches deep. On the control-unit panel are four single-pole toggle switches, one selector switch, an indicator jewel, a fuse cap, and a spare-fuse cap. At the rear of the control unit (fig. 5) are a power receptacle connector, an AN receptacle connector, a cord with a female test plug connector (P3) attached, and a spring bracket to retain the test connector.

(1) *POWER ON-OFF switch.* The POWER ON-OFF switch is located at the lower left-hand corner of the control panel. When the switch is thrown to ON, the control unit is energized. *The POWER ON-OFF switch must be in the ON position before any other switch is turned ON.*

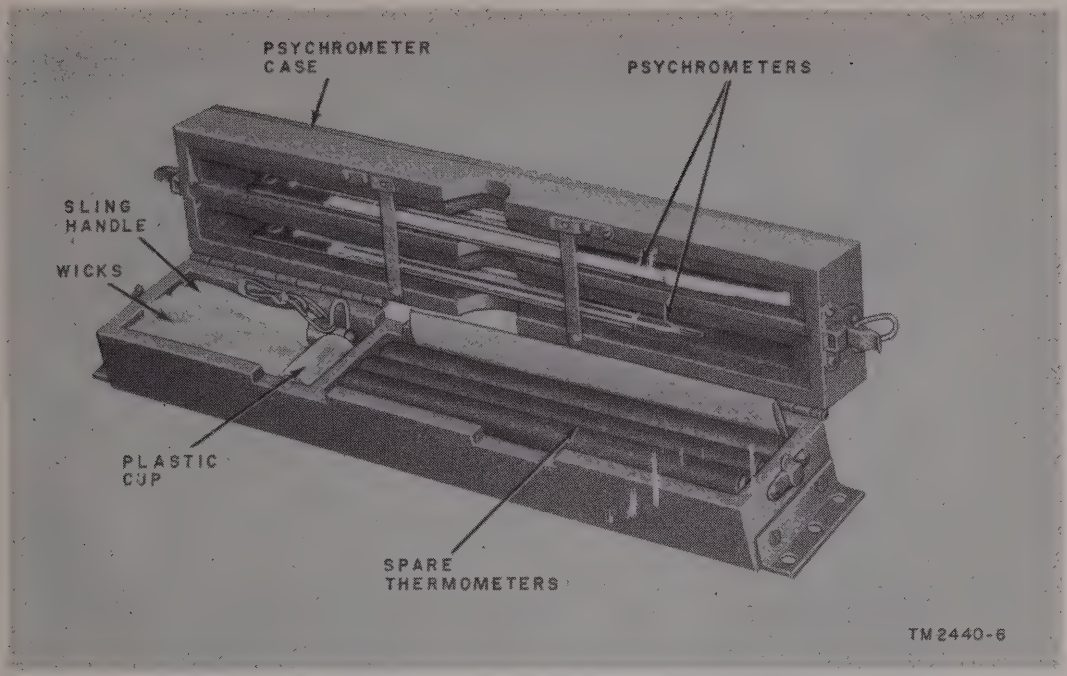


Figure 6. Psychrometer case, with cover open.

(2) *FAN ON-OFF switch.* The FAN ON-OFF switch is located to the right of the POWER ON-OFF switch. When the switch is thrown to ON, the fan operates and circulates air in the chamber.

(3) *HEATER ON-OFF switch.* The HEATER ON-OFF switch is located to the right of the FAN ON-OFF switch. When the switch is thrown to ON, the heater strip operates and raises the temperature in the chamber.

Note. The FAN ON-OFF switch must be in the ON position before the heater switch is turned ON.

(4) *LIGHT ON-OFF switch.* The LIGHT ON-OFF switch is located at the lower right-hand corner of the control panel. When the switch is thrown to ON, two miniature incandescent lights illuminate the chamber.

(5) *Selector switch.* The selector switch permits manual selection of the desired radiosonde electrical circuits: TEMPERATURE, REFERENCE, and HUMIDITY. In AUTOMATIC position, the switch energizes a cam motor, which in turn energizes the radiosonde humidity, reference, and temperature circuits in sequence.

(6) *Indicator jewel.* The indicator jewel is located at the upper left-hand corner of the control panel. The indicator lamp will light when the contact point of the commutator in a radiosonde touches the beginning of a conducting segment. The light will stay on as long as the contact point touches a conducting segment.

(7) *Fuse and spare fuse.* The fuse and spare fuse are located directly above the POWER ON-OFF and FAN ON-OFF switches and are marked



Figure 7. Carrying case, with cover open (furnished with equipments on Order No. 32148-Phila-51).

FUSE-3A and SPARE, respectively. The fuse protects the heater, fan, and light circuits.

c. Cabinet Assembly. The cabinet assembly is protected by a metal cover which is held in place on top of the chamber by eight screws. The assembly includes the fan motor, the motor capacitor, and a terminal strip. An AN connector, which projects outside the metal box, provides for connection to the control unit.

d. Psychrometer ML-224 (figs. 2 and 6). Psychrometer ML-224 consists of a wet-bulb thermometer and a dry-bulb thermometer mounted parallel to each other on a metal frame. Each thermometer is a capillary-bore, cylindrical, glass stem, which terminates at the bottom in a glass bulb containing mercury. The wet-bulb thermometer is mounted about 1½

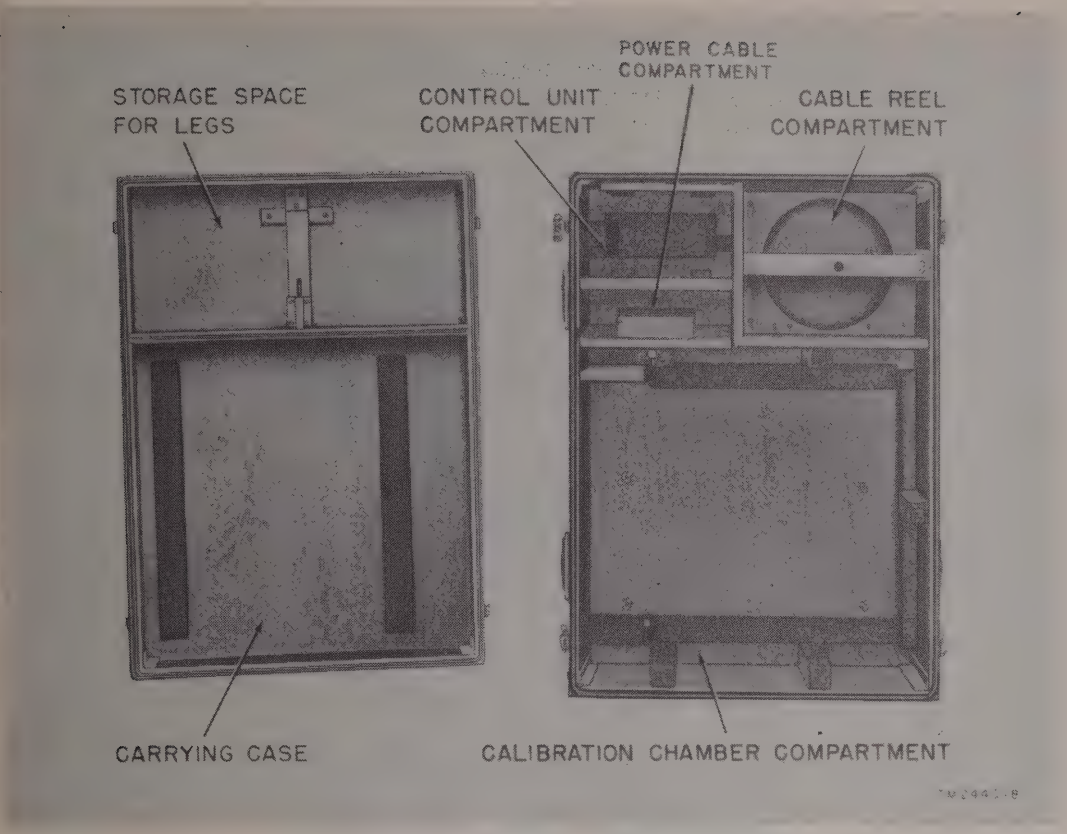


Figure 8. Carrying case, with cover open (furnished with equipments on Order No. 3139-Phila-51).

inches lower than the dry-bulb thermometer. Two psychrometers and six extra thermometers are furnished in a case on top of the temperature-humidity chamber. Included in the case are 100 wicks, a spool of thread, a wooden handle, and a plastic cup for use with the wet-bulb thermometers. The wooden handle may be attached to a psychrometer and used as a sling to whirl the psychrometer for a reading of the ambient temperature.

e. Carrying Case (figs. 7 and 8). The carrying case is a reinforced plywood box approximately 34¾ inches long, 26¼ inches wide, and 17⅛ inches deep over-all. It consists of a partitioned bottom section and a removable lid. The lid and bottom sections are clamped together by four trunk catches. The bottom section is divided into three parts; one is used for storage of the temperature-humidity chamber, another holds the reel unit, and the third contains the control unit, power cable, and spare lamps. Four wooden legs for mounting the chamber are held inside the lid. Four hinged carrying handles are provided on the outside of the case.

f. Reel Unit (fig. 9). The reel unit consists of a metal spool, 9 inches in diameter at top and bottom and 11¾ inches between flanges. One end of the spool fits in the bottom of the case and the other end is held in place by a metal strap and wingnut fastener at the top of the case. One

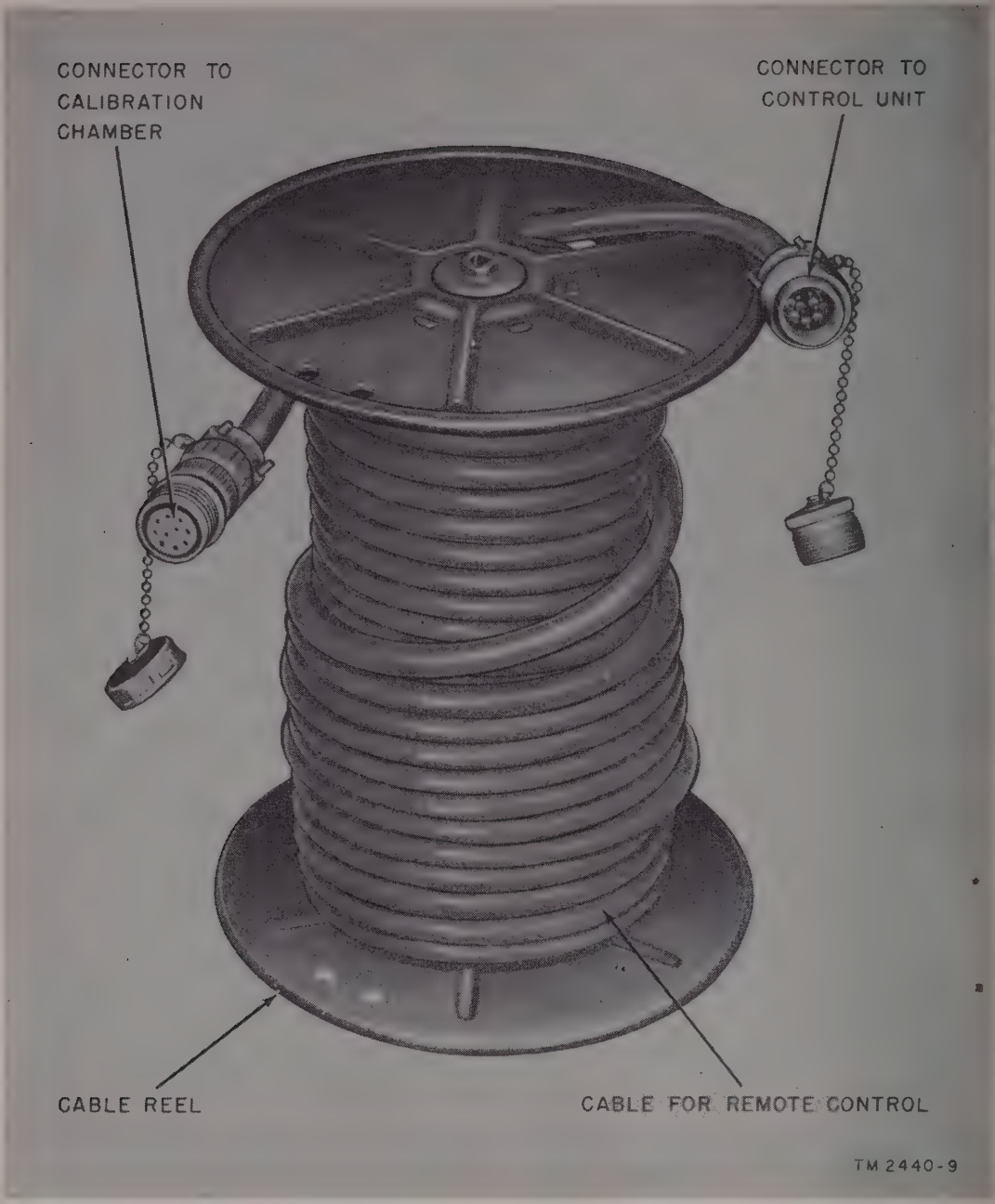


Figure 9. Reel unit.

hundred feet of eight-conductor cable is wound on the spool. The cable is terminated in a female plug connector at one end and a male plug connector at the other end. Each connector is protected by a threaded, screw-on cap on a beaded chain. A hole in the top flange of the reel is used to pull the cable through as it is unwound. The cable is used only when the control unit is located away from the chamber.

6. Packaging Data (fig. 10)

Radiosonde Baseline Check Set AN/GMM-1 is packaged in one box. All components are contained in the carrying case. The equipment is wrapped

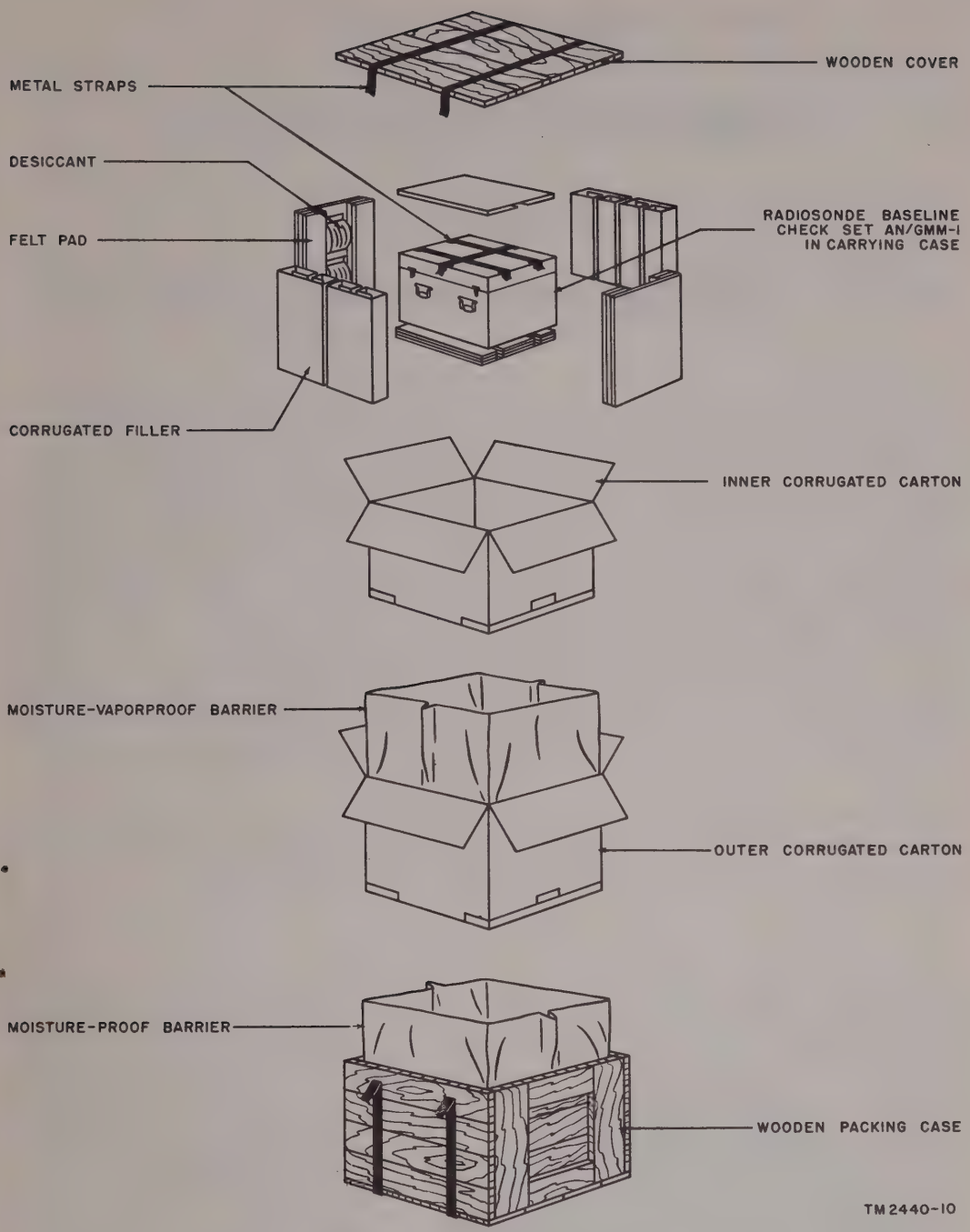


Figure 10. Packaging diagram.

in a corrugated liner, a moisture-vaporproof barrier, a corrugated box, and a waterproof liner. For export shipment the equipment is strapped to a pallet and packaged in a wooden shipping container 22¼ inches wide by 34¼ inches deep by 46 inches wide. Packed for shipment, the equipment weighs approximately 180 pounds.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

7. Location

The preferred location for Radiosonde Baseline Check Set AN/GMM-1 is in a large wooden building as far as possible from sources of electrical interference, particularly that caused by automobile ignition systems. Although local conditions necessarily will determine the site, avoid a location near radio transmitters, electrical machinery, high-tension power lines, teletypewriter lines and machines, and telephone wires. When locating the chamber, be sure to place the control unit (fig. 11) no farther than 15 feet (the length of the power cable) from the power supply. Locate the chamber so that the psychrometer and the radiosonde temperature element are shielded from direct or reflected rays of the sun.

Caution: The area between the chamber and the receiving antenna of the radiosonde receptor should be open and free of obstacles, such as metal buildings and overhead power, telephone, and telegraph lines.

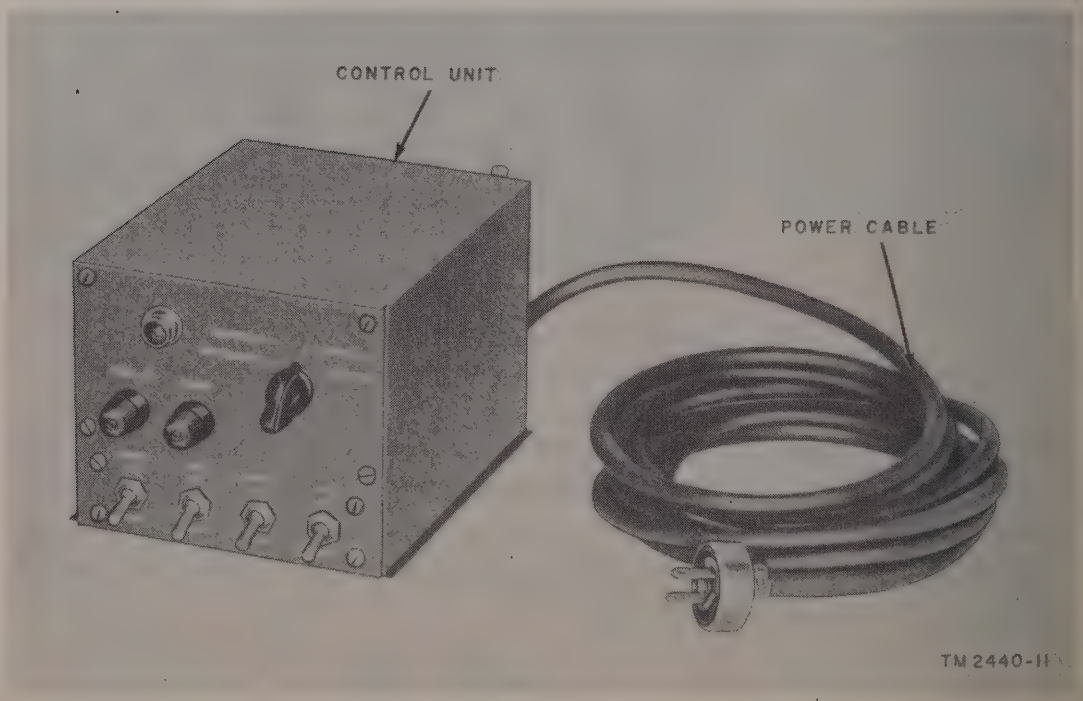


Figure 11. Control unit with power cable attached.

8. Uncrating, Unpacking, and Checking New Equipment

When new equipment is received, select a location convenient to the permanent or semipermanent location, where the equipment may be unpacked without exposure to the elements.

a. Cut and fold back the steel straps.

b. Remove the nails with a nail puller, and remove the top and sides of the packing case. Do not thrust any tools into the case; the equipment may be damaged.

c. Slit the waterproof liner.

d. Cut the corrugated barrier.

e. Slit the moisture-vaporproof barrier and lift out the desiccant.

f. Cut and fold back the steel straps that hold the carrying case to the pallet, remove the corrugated barrier, and then lift the carrying case from the pallet.

g. Unfasten the four trunk catches and lift off the carrying case cover. Inspect the equipment for possible damage incurred during shipment. Check the contents of the carrying case against the packing slip.

Note. Save the packing case and barriers for use in repacking the equipment for shipment or storage.

9. Installaton with Control Unit Located on Top of Chamber

a. Remove the chamber from the carrying case.

b. To mount the chamber on its supporting legs, open the spring-loaded drawbolt that holds the four mounting legs to the inside of the carrying-case cover, and remove the legs. Install the legs in the sockets on the sides of the chamber, and level the chamber. If the chamber is to be wall-mounted, do not use the legs. Remove the screws from the brackets on the rear of the chamber, invert the brackets so that the mounting holes project over the edge of the chamber, and replace the screws. Then screw two mounting screws into the wall, and hang the chamber from them. *Be sure the wall screws will hold the chamber securely.*

c. Open the door of the temperature-humidity chamber.

d. Remove one of the psychrometers, one of the cloth wicks, the plastic cup, and a length of thread from the psychrometer box on top of the chamber. Slip the wick over the wet-bulb thermometer until it projects above the constriction in the tube. Tie the wick securely in place with a short length of thread around the constriction.. Then tie another length of thread tightly around the wick just below the bulb.

Caution: Serious errors in readings of the wet-bulb thermometer may be caused by oil or perspiration transferred from the hands to the wick. Hold a small piece of paper between the fingers and the wick, or wash the hands thoroughly before installing the wick.

e. Remove the knurled nut from the psychrometer mounting screw in the chamber (fig. 2). Place the center hole of the psychrometer bracket on the mounting screw. Clean the plastic cup, fill it with distilled water, and place it in the recess under the psychrometer. Adjust the position of the psychrometer so that the wick extends into the water. Replace the knurled nut, and tighten it to hold the psychrometer firmly in this position.

f. Unhook the strap that holds the hard-rubber tray in place on the shelf that projects from the rear wall inside the chamber. Fill the tray with water, replace the tray, and strap it in place.

g. Mount the control unit on the temperature-humidity chamber by sliding the flanges along the bottom sides of the control unit into the dovetail grooves on top of the chamber (fig. 1) until the AN connector on the control unit and the AN connector on the cabinet assembly fit together. Be sure all switches on the control-unit panel are in the OFF position. Screw the knurled collar on the cabinet-assembly connector securely in place around the control-unit connector.

h. Remove the power cable from its compartment in the carrying case. Attach the female connector at one end of the cable to the male power connector at the rear of the control unit, and twist it clockwise about 20° to lock it in place. Connect the male connector on the other end of the cable to a 110- to 115-volt, 60-cycle, a-c power source.

10. Installation with Control Unit Located Away from Chamber

a. Follow the instructions given in paragraph 9*a* through *f*.

b. Place the control unit at the desired location, no farther than 100 feet from the chamber.

c. Release the reel unit from the carrying case by twisting the cam lock and then lifting the holding strap. Remove the reel unit. Unreel the extension cable to the desired length, pulling the male connector through the hole in the top flange of the reel. Unscrew the protective caps from the connectors that terminate the cable.

Note. Keep the reel unit near the chamber at all times.

d. Connect the female connector on the extension cable to the AN connector on the cabinet assembly.

e. Connect the male connector on the extension cable to the matching AN connector on the control unit.

f. Attach the female connector at one end of the 15-foot power cable to the male power connector at the rear of the control unit. Connect the male connector at the other end of the power cable to a 110- to 115-volt, 60-cycle, a-c power source.

Section II. OPERATION UNDER USUAL CONDITIONS

11. General

a. All controls for Radiosonde Baseline Check Set AN/GMM-1 are located on the front panel of the control unit. There are no operating controls inside the chamber.

b. For detailed information on radiosonde observations, refer to TM 11-2424. For information on the radiosondes to be tested, refer to TM 11-2430 for Radiosonde AN/AMT-2, TM 11-2433 for Radiosonde AN/AMT-2A, TM 11-2432 for Radiosonde AN/AMT-4, and TM 11-2432A for Radiosonde AN/AMT-4A.

12. Controls for Radiosonde Baseline Check Set AN/GMM-1

The following table contains information on the controls used to operate Radiosonde Baseline Check Set AN/GMM-1. This information is required by the operator so that he may operate the equipment efficiently.

Note. The table below lists the controls on the front panel of the control unit and gives the function of each.

Control	Function
POWER ON–OFF switch.	When the switch is turned ON, transformer T1 is energized (fig. 12).
FAN ON–OFF switch.	When the switch is in ON position, the fan is placed in operation and circulates air in the chamber.
HEATER ON–OFF switch.	When the switch is in ON position, the heater is placed in operation to raise the temperature in the chamber.
LIGHT ON–OFF switch.	When the switch is in ON position, two miniature incandescent lights illuminate the inside of the chamber.
Selector switch.	Used for manual selection of desired radiosonde REFERENCE, TEMPERATURE, and HUMIDITY circuits. Selects these circuits in an automatic cycle when set at AUTOMATIC.*

* When the chamber is not in use, the selector switch must be in the TEMPERATURE position.

13. Using Control Unit to Adjust Radiosonde Commutator

At some time shortly before a radiosonde is to be launched, the commutator in the radiosonde should be adjusted. The control unit may be left on top of the temperature-humidity chamber while the adjustment is made,

or it may be used separately at some other location. A detent action of the commutator adjustment screw permits accurate positioning of the commutator point prior to launching of the radiosonde. The detent consists of a notched knob on the adjustment screw and a spring that bears against the knob. As the screw is turned, the detent spring makes a clicking sound at each notch. Each click represents a specific movement of the contact point with respect to the commutator.

a. Connect the power cord to the control unit and to a power source (par. 9*b* or 10*f*).

b. Open the radiosonde, remove the male test connector, and insert it in the female test connector at the rear of the control unit. Place the radiosonde on top of the control unit.

c. Throw the control-unit POWER switch to the ON position.

d. Determine the station barometric pressure.

e. From the pressure calibration chart in the radiosonde, determine to the nearest one-tenth the contact setting that corresponds to the station barometric pressure.

f. Use the contact-arm lifting lever of the radiosonde to lower the contact point to the commutator, and tap the instrument case lightly with the fingers to overcome any friction in the lifting lever.

g. Turn the detent-adjustment screw until the contact point rests on the insulated segment to the left of the contact determined in subparagraph *e* above.

h. Then turn the adjustment screw until the contact point touches the beginning of the contact determined in subparagraph *e* above. When the contact point touches a conducting segment, continuity through the circuit is completed, and the control-unit indicator light will flash on and stay on as long as the contact point touches that segment.

i. Turn the adjustment screw and count the clicks until the indicator light flashes off and then on again to show that the contact point has reached the beginning of the next conducting segment. Record the number of clicks on the pressure calibration chart.

j. Repeat the procedures given in subparagraphs *g*, *h*, and *i* above to check the number of clicks.

k. Multiply the number of clicks required to traverse the entire contact (subpar. *i* above) by the distance in tenths of a contact from the beginning of the contact to the setting determined in subparagraph *e* above. The result will be the number of clicks required to move the contact point from the beginning of the contact to the correct position for flight.

Example: Station barometric pressure = 1,013 millibars.
Contact setting that corresponds to station pressure = 4.5.
Width of fourth contact in detent clicks = 35.

Distance in tenths from beginning of contact to proper setting = 4.5 — 4 = .5.

Number of detent clicks required to move contact point from beginning of contact to correct position = .5 × 35 = 17½, which is rounded off to 18 clicks.

l. Set the contact point at the beginning of the contact in accordance with subparagraph *h* above. Then turn the adjustment screw the exact number of clicks determined in subparagraph *k* above.

m. Throw the control-unit POWER switch to the OFF position.

n. Remove the radiosonde test connector from the female test connector at the rear of the control unit. Replace the control-unit test connector in its spring bracket. Replace the radiosonde test connector in the instrument, and raise the commutator contact arm from the commutator by moving the lifting lever. Close the radiosonde cover.

Note. For other required preflight tests and adjustments, refer to the technical manuals that cover the radiosonde (par. 11*b*).

14. Operation

a. Open the door of the temperature-humidity chamber. Pull out the battery shelf (fig. 3).

b. Install the radiosonde within the chamber.

(1) If Radiosonde AN/AMT-2 or AN/AMT-2A is to be tested, place the radiosonde securely on the frame at the bottom of the chamber, guiding the antenna through a small hole near the front corner of the base of the frame. If Radiosonde AN/AMT-4 or AN/AMT-4A is to be tested, slide the cover away from the large hole in the floor of the chamber, and place the radiosonde securely on the frame, inserting the antenna through the hole. The temperature element of the radiosonde should be on the right side when the radiosonde is placed within the chamber.

(2) Remove the male test connector from the radiosonde, and connect it to the female test connector (P1) in the chamber (fig. 2).

c. Close and latch the door of the chamber.

d. Throw the POWER switch and the FAN switch to the ON position. Under normal conditions, stability within the chamber will be reached in 5 minutes. Ambient temperature must not change more than ± .5°C in 5 minutes, and the ambient relative humidity must not vary more than 5 percent in 5 minutes.

e. If stability is not reached within 5 minutes, throw the HEATER switch to the ON position. The operator must exercise his own judgment in determining how long the heater should be left on.

f. If it is still impossible to reach the required stability, and the ambient temperature is 90°F or over, remove the radiosonde battery from the radiosonde and place it on the battery pull-out shelf located on the under side of the chamber to the right.

(1) Throw the POWER, FAN, and HEATER switches to the OFF position.

(2) Open the temperature-humidity chamber door, and remove the battery from the radiosonde under test.

(3) Set the battery on the battery shelf.

(4) Attach the battery female plug connector to the male connector on the outer right side of the chamber (fig. 1), and attach the battery connector (P2) inside the chamber (fig. 2) to the battery connector on the radiosonde.

(5) Close and latch the chamber door, and follow the instructions given in subparagraphs *d* and *e* above.

g. For automatic operation, turn the selector switch to the AUTOMATIC position. The automatic cycle is as follows: reference (15 seconds), temperature (15 seconds), reference (15 seconds), humidity (15 seconds). Leave the switch at the AUTOMATIC position until a satisfactory baseline is obtained at the recorder.

h. For manual operation, turn the selector switch in the following cycle, and hold the switch at each position as follows: REFERENCE, 15 seconds; TEMPERATURE, 15 seconds; REFERENCE, 15 seconds; HUMIDITY, 15 seconds. Repeat the cycle until a satisfactory baseline is obtained at the recorder.

Note. For further information on preflight checking of radiosondes, refer to TM 11-2424.

i. To turn the equipment off, proceed as follows:

(1) Set the selector switch at the TEMPERATURE position.

(2) Turn off the HEATER, FAN, LIGHT, and POWER switches.

(3) Release the spring-loaded catches that hold the chamber door closed, and open the door.

(4) Disconnect the radiosonde test connector and battery connector (if in use), and remove the radiosonde.

(5) If the radiosonde battery has been placed outside the chamber, disconnect it. Slide the battery shelf into place under the chamber.

(6) Disconnect the power cable at the power source.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

15. General

Special problems may be encountered in operating Radiosonde Baseline Check Set AN/GMM-1 in regions where extreme cold, heat, humidity, or sand conditions predominate. The following paragraphs contain instructions for minimizing the effects of these unusual operating conditions.

16. Operation in Arctic Climates

a. Locate the equipment inside a heated inclosure, where there is no danger of a cold draft striking the psychrometer when the door is opened. If such a location is unavailable, place a blanket or some other barrier between the possible source of draft and the equipment.

b. Equipment which has been exposed to the cold will start to sweat when brought into a warm room and will continue to do so until it reaches the temperature of the room. When the equipment reaches room temperature, dry it thoroughly. A similar condition arises when equipment warms up during the day after being exposed to a sharp drop in temperature during the night.

c. For further information on operation in low temperatures, refer to TB SIG 66.

17. Operation in Tropical Climates

Equipment operated in tropical climates often is installed in tents or huts. Ventilation is usually poor in such locations, and the high relative humidity causes condensation of moisture on the equipment whenever the temperature of the equipment becomes lower than the ambient air. Any means of heating, such as large electric bulbs, will tend to minimize this condition. For detailed information on operation in tropical climates, refer to TB SIG 72.

18. Operation in Desert Climates

a. The main difficulty of operation in desert climates is the large amount of sand and dust in the air. Since an air-conditioned, dustproof shelter seldom is available, precautions should be taken to make the building in which the equipment is operated as dustproof as possible. Hang wet sacking over the windows and doors, cover the inside walls with heavy paper, and secure the side walls of tents with sand to prevent their flapping in the wind.

b. Never tie the cables or other wiring connections to any part of tents. Wind storms, which may jerk the connections loose or break the lines, arise suddenly in desert areas.

c. Keep the equipment as free from dust and sand as possible.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. GENERAL

19. Preventive Maintenance Tools and Materials

The following tools and materials are used to perform preventive maintenance:

Carbon tetrachloride.

Cloth, clean, lint-free.

Solvent, dry-cleaning (SD).

Sandpaper #0000.

Screw driver.

Allen wrench #4.

20. Weatherproofing

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

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

c. WINTER MAINTENANCE. Special precautions to prevent poor performance or total operational failure of equipment in extremely low temperatures are explained in TB SIG 66 and TB SIG 219.

d. DESERT MAINTENANCE. Special precautions necessary to prevent equipment failure in areas subject to extremely high temperatures, low humidity, and excessive sand and dust are explained in TB SIG 75.

Section II. PREVENTIVE MAINTENANCE SERVICES

21. Meaning of Preventive Maintenance

a. DEFINITION. Preventive maintenance is work performed on equipment, usually when it is not in use, to keep it in good condition so that break-downs and interruptions in service will be kept at a minimum. The object of preventive maintenance is to eliminate the need for trouble shooting and repair.

b. IMPORTANCE. Since the failure or inefficient operation of a single part may cause the break-down of the entire equipment, the importance of preventive maintenance is obvious. Operators must maintain equipment in their charge in such condition that it will work at top efficiency at all times.

22. Preventive Maintenance Techniques

a. Use #0000 sandpaper to remove corrosion.

b. Use a clean, dry, lint-free cloth or a dry brush for cleaning. Moisten the cloth or brush with solvent (SD); clean the equipment, *except electrical contacts,* and then wipe the part dry with a fresh cloth. Clean the electrical contacts with a cloth moistened with carbon tetrachloride; then wipe them dry with a clean 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 dry compressed air is available, it may be used at a line pressure not exceeding 40 pounds per square inch to remove dust from inaccessible places in the equipment. If compressed air is used, be very careful not to damage the equipment.

d. Do not tighten screws or nuts carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken.

23. Preventive Maintenance Checklist

The following checklist is designed to assist organizational maintenance personnel in performing preventive maintenance. The checklist shows what to check, when to check, how to check, and precautions that must be taken before, during, and after checking.

23. Preventive Maintenance Checklist (contd)

Item No.	What to check	When to check*	How to check	Precautions
1	Chamber.	D	Dust exterior and interior with a clean cloth. Inspect legs, leg sockets, and door latches for damage. Check to see that the chamber is level.	Be sure the chamber door fits tightly against the chamber when it is closed.
			Inspect window in chamber door to see that it is not discolored or broken. Clean the window on both sides with a clean damp cloth.	
			Inspect psychrometer to see that thermometers are not damaged. Replace damaged thermometers (par. 47).	Do not touch wick with the fingers.
2	Carrying case and psychrometer case.	W	Inspect for dirt and dust. Examine catches for damage. Clean interior and exterior by dusting with a clean cloth or using compressed air.	Do not scratch painted surfaces.
3	Chamber.	M	Inspect connectors for dirt, corrosion, and loose contacts. Use a cloth moistened with carbon tetrachloride to clean connectors, if necessary, and wipe them dry immediately with a clean dry cloth.	
			Inspect cables for cracks, cuts, and frayed insulation.	
			Inspect strip heater for corrosion and loose connections. Remove any corrosion by cleaning the strip with a cloth moistened with carbon tetrachloride, and wipe it dry immediately with a clean cloth.	Do not touch the heater strip if it is turned on or if it has been on recently.

			Inspect fan and blower guard for dirt, loose connections, and corrosion. Tighten loose connections, and remove dirt and corrosion from the units with a cloth moistened with solvent (SD). Dry the units immediately.	
			Inspect the relays for loose connections, corrosion, and cracks. Tighten loose connections. Clean contacts to remove dirt and corrosion (par. 22*b*). Replace any cracked relay.	
4	Control unit.	M	Remove the control-unit cover, and inspect toggle switches and selector switch for dirt, corrosion, loose contacts, and unsatisfactory mechanical action. If necessary, clean switches and switch contacts with a clean cloth moistened with carbon tetrachloride, and dry them immediately with a clean cloth. Tighten loose contacts.	
			Inspect microswitches for loose, dirty, or corroded connections. Tighten terminal nuts if they are loose. Clean dirt and corrosion from switches with a cloth moistened with carbon tertachloride, and dry them immediately.	Do not use force. Tighten nuts gently.
			Check all terminal nuts and mounting nuts for looseness. Tighten any that are loose.	Do not use force.
			Check wiring for torn or frayed insulation and loose connections. Tighten loose connections.	
			Inspect fuseholders for cracks.	

23. Preventive Maintenance Checklist (contd)

Item No.	What to check	When to check*	How to check	Precautions
5	Cabinet assembly.	M	Remove cabinet-assembly cover, and examine interior for dirt and dust. Clean in accordance with paragraph 22*b*.	
			Tighten loose terminal screws or retaining screws.	Do not use force.
			Check wiring for torn or frayed insulation and loose connections. Tighten loose connections.	
6	Power cable.	M	Inspect for cracks, cuts, and frayed insulation. Inspect connectors for dirt, corrosion, and loose contacts.	
			Replace cable that is cut or cracked. Bind frayed sections with friction tape. Clean dirty or corroded contacts with a cloth moistened with carbon tetrachloride, and dry them immediately. Tighten loose contacts.	

*D—Daily; W—Weekly; M—Monthly.

Section III. TROUBLE SHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

24. Scope

a. The trouble shooting and repair that can be performed at the organizational maintenance level are limited in scope by the tools and replaceable parts issued and by the existing tactical situation.

b. The paragraphs of this section will help the repairmen to determine which component of Radiosonde Baseline Check Set AN/GMM-1 is at fault, and to localize some types of fault.

25. Trouble Shooting, Using Equipment Performance Checklist

a. GENERAL. The equipment performance checklist (par. 26) will help the operator to locate trouble in the equipment. The list gives the item to be checked, the action or condition under which the item is to be checked, normal indications of correct operation, and corrective measures.

b. ACTION OR CONDITION. The information given in the *Action or condition* column consists of switch settings at which the item is to be checked.

c. NORMAL INDICATION. The normal indications listed include visible signs that the operator should perceive when he checks the items. If indications are not normal, the operator should apply the recommended corrective measures.

d. CORRECTIVE MEASURES. The corrective measures listed are those the operator can apply without turning the equipment in for repairs. If the equipment is completely inoperative, or if the recommended corrective measures do not yield results, trouble shooting at the field level is required (ch. 5).

26. Equipment Performance Checklist

Item No.	Control	Action or Condition	Normal indication	Corrective measures
1	POWER ON–OFF switch.	Throw to ON position.		
2	FAN ON–OFF switch.	Throw to ON position.	Fan operates.	Be sure POWER switch is ON. Check wiring connections at POWER switch. Check power cable to be sure it is properly connected to control unit and to power source. Check wiring to fan motor and capacitor. Check fuse by substituting spare fuse.
3	HEATER ON–OFF switch	Throw to ON position.	Heater strip begins to warm up.	Be sure POWER switch and FAN switch are ON. Check wiring connections at HEATER switch. Check power cable to be sure it is properly connected to control unit and to power source. Check wiring to heater strip. Check fuse by substituting spare fuse.

4	LIGHT ON–OFF switch.	Throw to ON position.	Lamps in reflector light.	Be sure POWER switch is ON. Check lamps by substituting spare lamps that are known to be in good condition. Check wiring to lamps. Check power cable to be sure it is properly connected to control unit and to power source. Check fuse by substituting spare fuse.

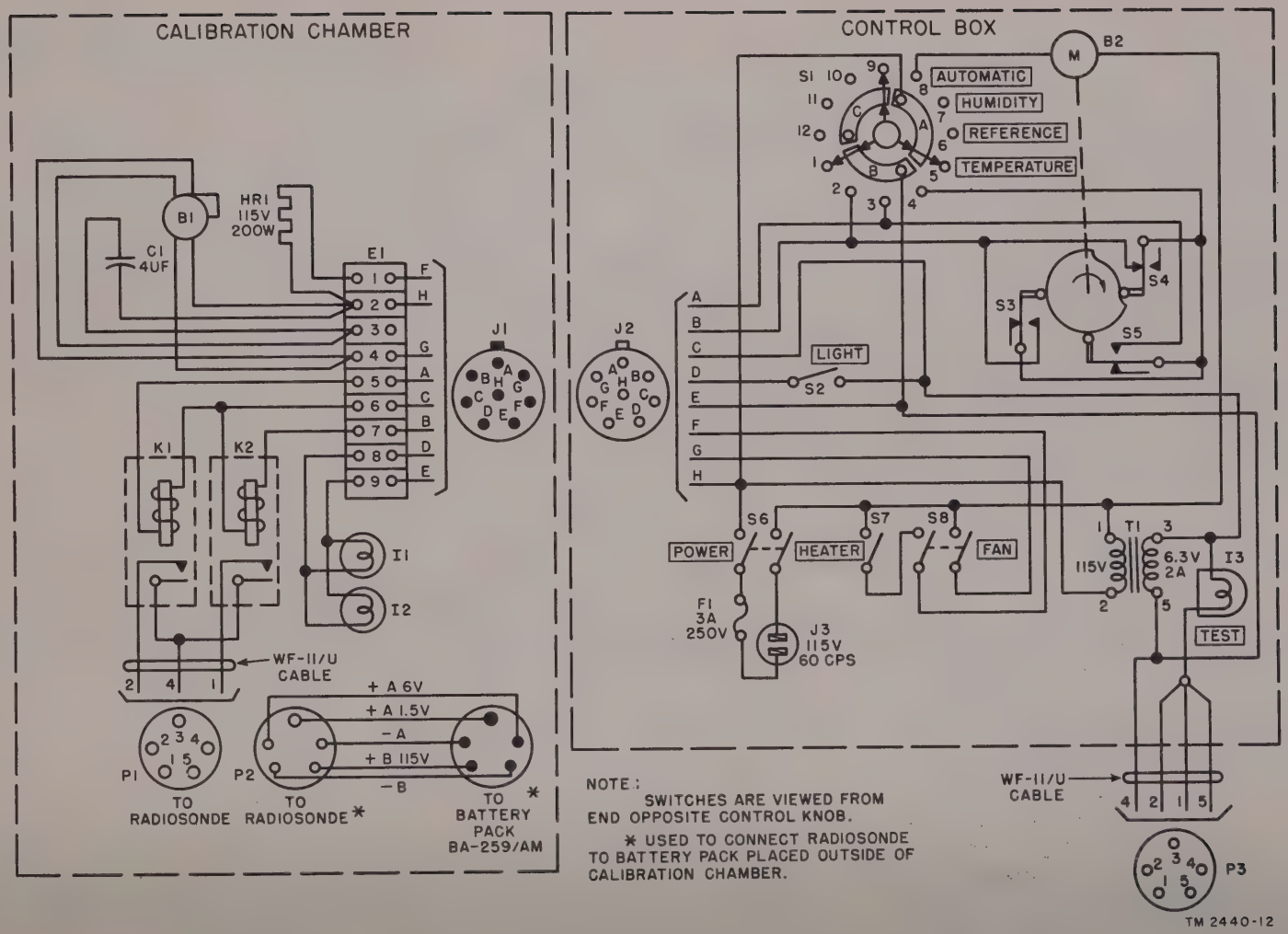


Figure 12. Radiosonde Baseline Check Set AN/GMM-1, complete schematic diagram.

CHAPTER 4

THEORY OF OPERATION

27. Circuit Analysis of Radiosonde Baseline Check Set AN/GMM-1 (fig. 12)

Radiosonde Baseline Check Set AN/GMM-1 includes the following operating circuits: a-c power circuit, relay control circuit, light circuit, fan and heater circuit, and test lamp circuit. The functioning of these circuits is described in the following paragraphs.

28. A-c Power Circuit (fig. 13)

When jack J3 is connected to a source of 110- to 115-volt power, closing POWER switch S6 applies power to the operating circuits of the chamber. Fuse F1 protects the power circuits from overload. When switch S6 is closed, power is applied to the primary of transformer T1. This transformer steps the power down to 6.3 volts in the secondary. The output of the secondary is used to energize lamp I-3 in the control box and two relays and two lights in the chamber (pars. 29 and 30). When POWER switch S6 is closed, power also is applied to motor B2, if selector switch S1 has been set to AUTOMATIC.

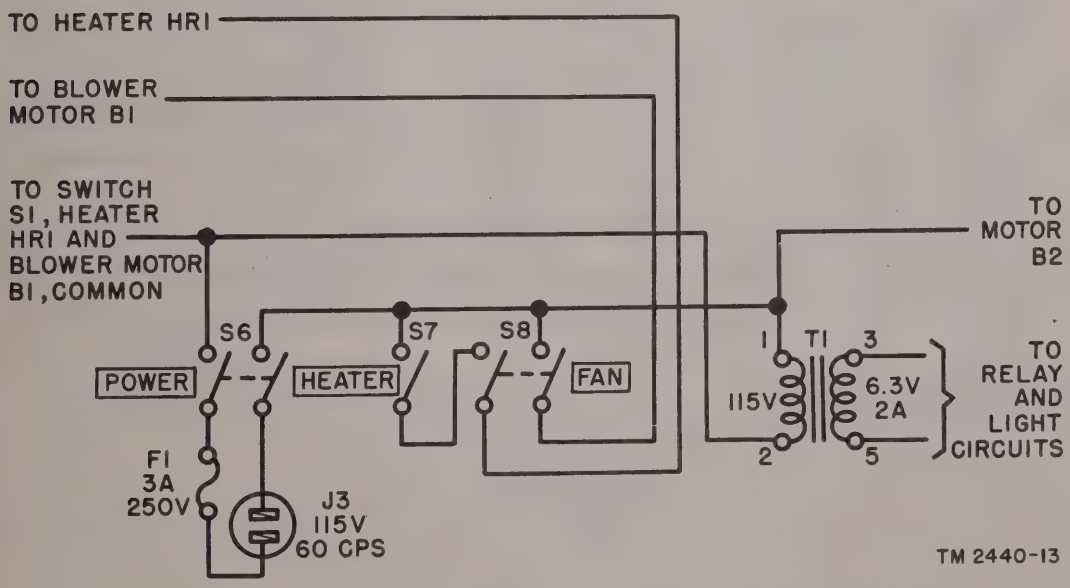


Figure 13. A-c power circuit, simplified schematic diagram.

29. Relay Control Circuit (figs. 14, 15, and 16)

The relay control circuit consists of selector switch S1, motor B2, cam-operated microswitches S3, S4, and S5, relays K1 and K2, and transformer T1. Selector switch S1 has four positions: AUTOMATIC, HUMIDITY, REFERENCE, and TEMPERATURE. The switch is divided into three segments designated A, B, and C for convenience in discussion (fig. 12). Segment C is not used. The selector switch controls the operation of two relays in the calibration chamber. These relays are used to switch various circuits in the radiosonde in and out, as required during operation of the check set. The following subparagraphs describe the functioning of the relay control circuit in each of the four switch positions.

a. Automatic Position (fig. 14). (1) When selector switch S1 is in the AUTOMATIC position and POWER switch S6 is closed, power is applied to motor B2. The operating circuit for motor B2 is as follows: one side of Jack J3, fuse F1, one blade of switch S6, segment A of switch

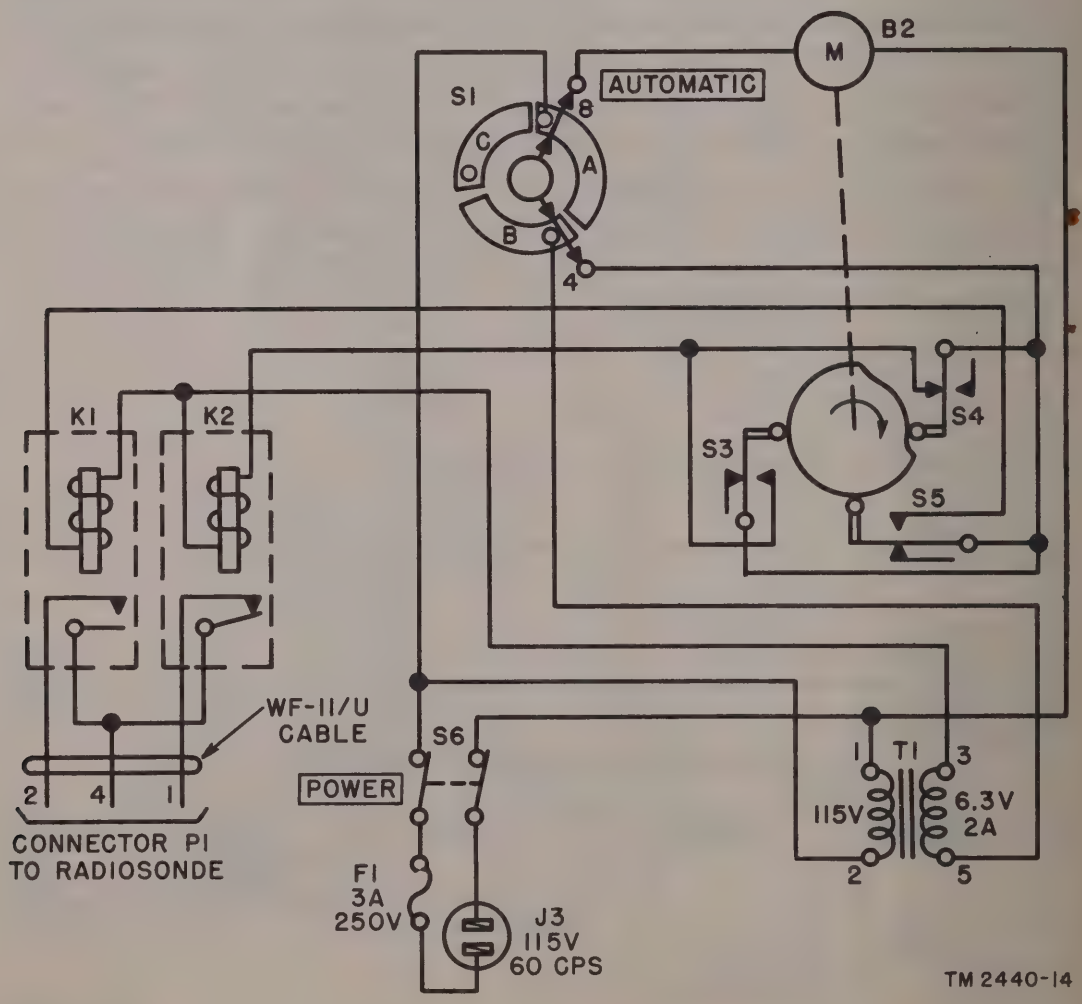


Figure 14. Relay control circuit with selector switch S1 in AUTOMATIC position, simplified schematic diagram.

S1, rotor of switch S1, terminal 8 of switch S1, motor winding, the other blade of switch S6, and the other side of jack J3. Motor B2 is coupled mechanically to a cam and causes the cam to rotate at the rate of 1 rpm (revolution per minute). Three microswitches, S3, S4, and S5, are associated with the cam, and as the lever of a microswitch falls into the indent of the cam, that switch closes.

(2) When switch S3 closes, relay K2 is energized and the relay operates. The operating circuit of relay K2 is as follows: transformer T1 (terminal 3), winding of relay K2, switch S3 stator, switch S3 rotor, switch S1 (terminal 4), switch S1 rotor, segment B of switch S1, and transformer T1 (terminal 5). When relay K2 is energized, its contacts close. During the radiosonde baseline check, the contacts of this relay are connected to the radiosonde modulator and serve to complete the ground-return connection of the low-reference circuit. Switch S3 remains operated for 15 seconds, until its lever emerges from the indent of the cam. A 15-second interval follows during which none of the microswitches is closed. During this interval, the temperature circuit of the radiosonde operates. At the end of this interval, the lever of switch S4 enters the indent of the cam and switch S4 closes.

(3) When switch S4 closes, relay K2 is energized and the relay operates, switching in the low-reference circuit. The operating circuit is the same as that described in subparagraph (2) above, except that the circuit is completed through the contacts of switch S4 instead of switch S3. Switch S4 remains operated for 15 seconds, until its lever emerges from the indent of the cam. The lever of switch S5 then enters the indent of the cam, and switch S5 closes.

(4) When switch S5 closes, relay K1 is energized and the relay operates. The operating circuit of relay K1 is as follows: transformer T1 (terminal 3), winding of relay K1, switch S5 stator, switch S5 rotor, switch S1 (terminal 4), switch S1 rotor, segment B of switch S1, and transformer T1 (terminal 5). When relay K1 is energized, its contacts close. During a radiosonde baseline check, the contacts of this relay are connected to the radiosonde modulator and serve to switch in the humidity circuit. Switch S5 remains operated for 15 seconds until its lever emerges from the indent of the cam, and switch S3 closes (subpar. *a*(1) above).

(5) For each minute of AUTOMATIC operation, the following cycle occurs: switch S4 energizes relay K2, which causes radiosonde low-reference operation for 15 seconds; switch S5 energizes relay K1, which causes radiosonde humidity operation for 15 seconds; switch S3 energizes relay K2, which causes radiosonde low-reference operation for 15 seconds; no microswitch or relay is activated while radiosonde temperature circuit operates for 15 seconds. This cycle is repeated during each minute while switch S1 is operated in the AUTOMATIC position.

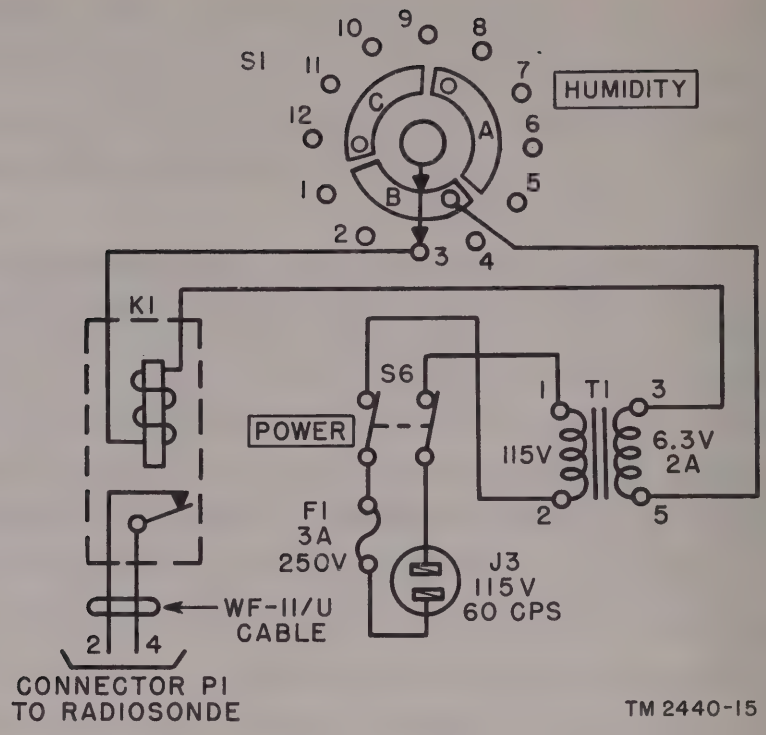


Figure 15. Relay control circuit with selector switch S1 in HUMIDITY position, simplified schematic diagram.

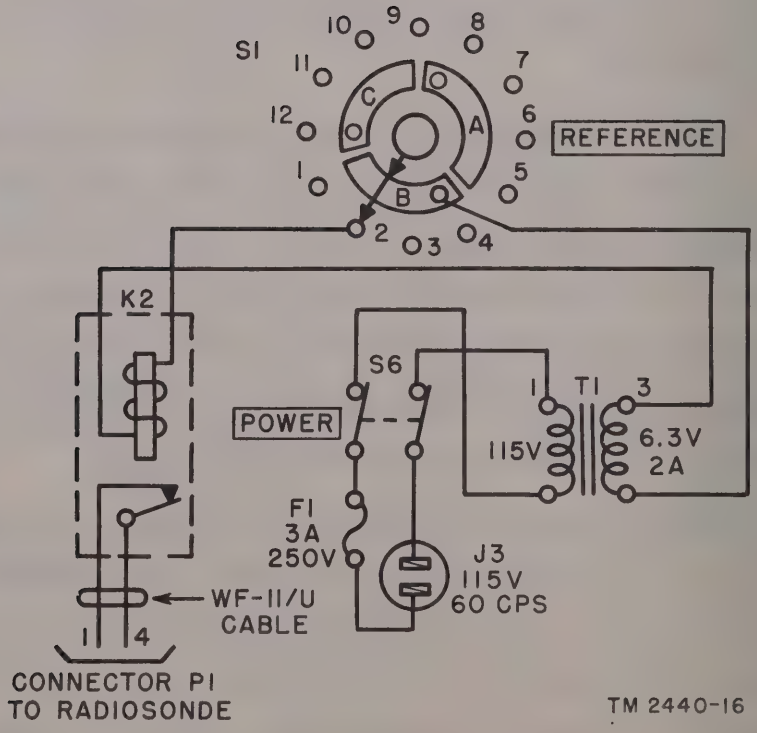


Figure 16. Relay control circuit with selector switch S1 in REFERENCE position, simplified schematic diagram.

b. HUMIDITY POSITION (fig. 15). When switch S1 is in the HUMIDITY position and POWER switch S6 is closed, the circuit for relay K1 is completed and the relay operates. The operating circuit for relay K1 is as follows: terminal 3 of transformer T1, relay K1 winding, terminal 3 of switch S1, switch S1 rotor, segment B of switch S1, terminal 5 of transformer T1. When switch S1 is in the HUMIDITY position, relay K2 is not operated. During radiosonde baseline checking, the contacts of relay K1 are connected to the radiosonde modulator and serve to switch in the humidity circuit.

c. REFERENCE POSITION (fig. 16). When switch S1 is in the REFERENCE position and POWER switch S6 is closed, the circuit for relay K2 is completed and the relay operates. The operating circuit for relay K2 is as follows: terminal 3 of transformer T1, relay K2 winding, terminal 2 of switch S1, switch S1 rotor, segment B of switch S1, terminal 5 of transformer T1. When switch S1 is in the REFERENCE position, relay K1 is not operated. During radiosonde checking, the contacts of relay K2 are connected to the radiosonde modulator and serve to complete the ground-return connection of the low-reference circuit.

d. TEMPERATURE POSITION. When switch S1 is in the TEMPERATURE position, no power is applied to relays K1 and K2 and the relays are not operated. During this period, the temperature circuit in the radiosonde modulator operates.

30. Light Circuit and Test Lamp Circuit (fig. 17)

a. The output of the secondary of transformer T1 is applied through LIGHT switch S2 to lights I-1 and I-2, which are connected in parallel.

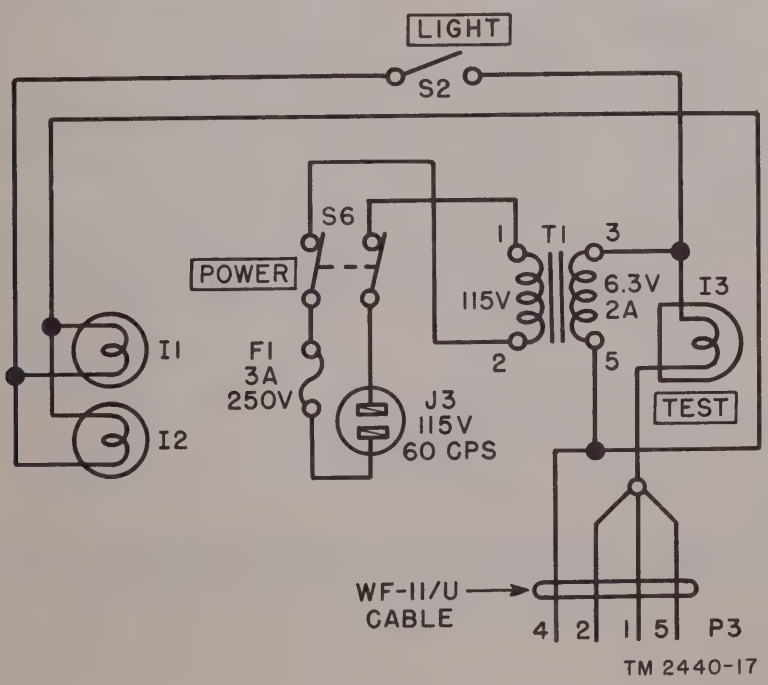


Figure 17. Illumination and TEST light circuits, simplified schematic diagram.

When power is applied through POWER switch S6 and LIGHT switch S2 is closed, I-1 and I-2 are energized and illuminate the interior of the chamber.

b. The 6.3-volt output of the secondary of transformer T1 also is applied to one side of test lamp I-3 and terminal 4 of connector P3. During radiosonde commutator adjustment, connector P3 is connected to the test plug of the radiosonde. When the contact arm of the commutator touches a conducting segment, test lamp I-3 lights, indicating continuity.

31. Fan and Heater Circuit (fig. 18)

Motor B1 and heater HR1 are controlled by FAN switch S8 and HEATER switch S7. These switches are located in the control box.

a. When power is applied to the equipment through connector J3 and POWER switch S6 is closed, closing FAN switch S8 causes motor B1 to operate. The motor is a capacitor-induction, 60-cycle, single-phase, 115-volt motor. Capacitor C1 is a motor-starting capacitor.

b. Heater HR1 is operated by means of HEATER switch S7 and one blade of FAN switch S8. When power is applied to the equipment, the heater is energized by the closing of switch S7 only if switch S8 is also closed.

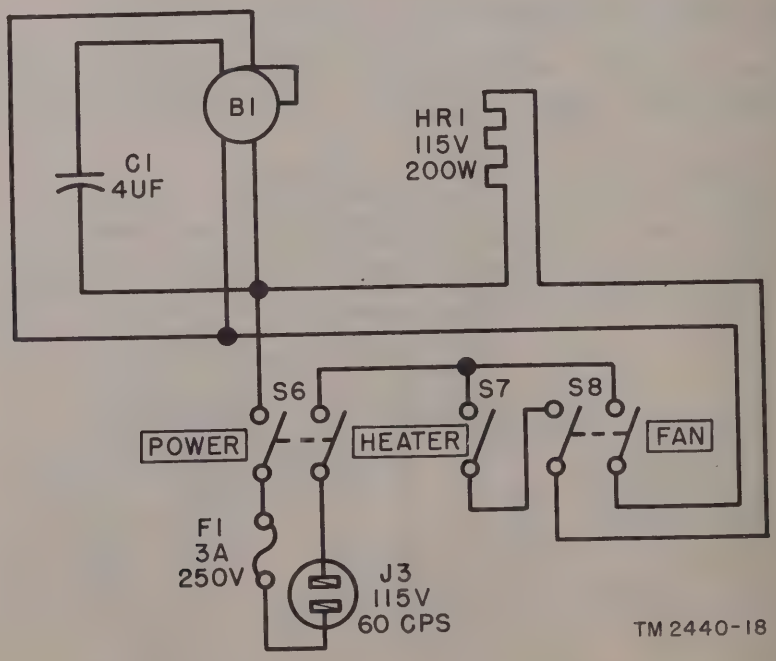


Figure 18. Fan and heater circuit, simplified schematic diagram.

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

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

Section I. PREREPAIR PROCEDURES

32. Tools, Materials, and Test Equipment

Tools, materials, and test equipment required for the repair of Radiosonde Baseline Check Set AN/GMM-1 are as follows:

a. Tools and Materials.

Screw driver.
Orange stick.
Solvent (SD).
Sandpaper #0000.
Friction tape.
Clean, dry cloth.
Soft-bristle brush.
Contact burnisher.
Soldering iron and solder.
Hardwood toothpicks with one flattened end.
Carbon tetrachloride.
Allen wrench.

b. Test Equipment. Multimeter TS-297/U, or equivalent, is required for voltage, continuity, and resistance checks.

33. Removal of Pluck-out Parts

Radiosonde Baseline Check Set AN/GMM-1 contains the following pluck-out parts: test lamp I-3, indicator jewel, fuse F1 and a spare fuse on the control unit front panel, and illuminating lamps I-1 and I-2 in the chamber.

a. To remove test lamp I-3, remove the bayonet type jewel by pressing it in and turning it counterclockwise; then, remove the miniature bayonet lamp by pushing it in and turning it counterclockwise.

b. To remove fuse F1 or the spare fuse, turn the fuse cap in the direction indicated by the arrow on the cap, and pull out the cap and fuse.

c. Lamps I-1 and I-2 are miniature bayonet lamps located beneath a reflector at the right front of the chamber top, just inside the door. Remove either of these lamps by pushing it in and turning it counterclockwise.

34. Inspecting and Testing Removed Parts

a. INSPECTING. Inspect the lamps for burned base or broken filament. Inspect fuses visually for continuity, loose ferrules, and charring.

b. TESTING. Test lamps and fuses for continuity with Multimeter TS-297/U.

35. Inspecting and Cleaning Chassis Assemblies

a. INSPECTING. Inspect the equipment visually to determine the general condition of the equipment when it is turned in for repair. Remove the cover of the control unit and the cover of the cabinet assembly, and open the door of the chamber. Then, proceed as follows:

(1) Examine the equipment for burned insulation and for any discoloration of apparatus and wiring. Inspect the wiring for broken leads, brittle insulation, and corrosion.

(2) Inspect for broken or defective wiring connections. Be sure that no bare wires touch other wires or the chassis.

(3) Test the operation of all the switches in the control unit. They should not bind, and a slight follow should be felt in the action of the switch when it is operated. Inspect for any corrosion, dirt, or foreign matter that might affect operation. Check for bent or broken springs in rotary selector switch S1.

(4) Inspect the power plug connector for bent or broken prongs. Inspect all connectors for defective contacts.

(5) Inspect the entire equipment for loose or missing mounting screws and nuts.

(6) Inspect for loose or missing terminal screws on terminal board E1.

(7) Inspect for loose or missing setscrews in the blower (on the shaft of fan motor B1), in the knob of selector switch S1, and in the cam on the shaft of motor B2.

(8) Check the mechanical operation of motors B1 and B2. The shafts should rotate freely and smoothly without binding.

(9) If there is no indication of damage or fault, connect the equipment for operation (par. 9 or 10) and follow the procedures given in the equipment performance checklist (par. 26) to see that the check set is operating properly.

b. CLEANING. (1) Clean the outside of the equipment with a clean, lint-free cloth.

(2) Use a cloth moistened with clean water to remove dirt and salt spray from the outside of the equipment. Allow the equipment to dry thoroughly before attempting any further cleaning.

(3) Remove the covers from the control unit and the cabinet assembly, and open the door of the chamber. Use air pressure if it is available, to blow out accumulated dust, dirt, sand, lumps of solder, and wire cuttings. Apply the air pressure so that dust is blown away from switch contacts. If air pressure is not available, brush accumulated dust and dirt from the interior of the equipment with a soft-bristle brush. Be careful not to damage equipment wiring. Use probe sticks of wood or insulating material to dislodge caked dirt, and use a toothpick, or an equivalent, for hard-to-reach places.

(4) Remove oil and grease with a cloth moistened with solvent (SD). Wipe dry with a clean, dry cloth. *Do not use solvent (SD) on switch contacts.*

(5) Remove rust, corrosion, fungus growth, and similar foreign material from the structural framework with #0000 sandpaper or a wire brush, and clean with solvent (SD) if necessary.

(6) Clean the contacts of rotary selector switch S1 as follows:

(*a*) Flush the contacts with carbon tetrachloride applied with a clean toothpick. Dip the flat end of the toothpick into the carbon tetrachloride to a depth of about ½ inch and deposit the liquid on the contacts without rubbing. Hold the contacts slightly separated during this process.

(*b*) Dip the flat end of another toothpick into the carbon tetrachloride and deposit the liquid on the contact, also without rubbing, to flush away the dirt loosened by the first application. Be careful to keep the carbon tetrachloride away from the insulators.

(*c*) When the contacts are thoroughly dry, burnish them so that no residue or other foreign matter remains on the contacts. Burnish contacts with the steel blade of the contact burnisher. Clean the contact burnisher before using by wiping the blade with a clean, dry cloth. During the burnishing process, wipe the blade frequently with a cloth moistened with carbon tetrachloride. Rub the burnisher against each contact two or three times. Do not use abrasives other than the burnisher blade.

36. Reassembling Equipment

Replace the lamps in their sockets by pressing and turning them clockwise until they lock in. Replace the lens of test lamp I-3 in the same manner. Replace a fuse by placing it in the fuse cap and inserting the cap and fuse in the fuseholder. Be sure to replace a defective fuse with one of equal rating. If a newly replaced fuse blows there may be trouble elsewhere in the equipment. Test the a-c power circuit before replacing the fuse again. Always reload the SPARE fuseholder after the SPARE fuse has been used to replace the working fuse.

Section II. TROUBLE SHOOTING AT FIELD MAINTENANCE LEVEL

37. Trouble-shooting Procedures

The first step in servicing a defective equipment is to sectionalize the fault. Sectionalizing means tracing the fault to a major component or circuit. The second step is to localize the fault. Localization means tracing the fault to the defective part. Some faults can be located by smell, sight, or hearing. The majority of faults, however, must be localized by checking voltage and resistance.

38. Trouble-shooting Data

Reference to the following will assist maintenance personnel in trouble shooting the equipment:

a. Figure 12, Radiosonde Baseline Check Set AN/GMM-1, complete schematic diagram.

b. Figures 19 through 25, component location illustrations.

c. Paragraph 26, equipment performance checklist.

d. Paragraph 40, operational test.

e. Paragraph 41, trouble-shooting chart.

39. General Precautions

When equipment is to be serviced, always observe the following precautions:

a. If equipment is operated for test purposes with the control unit cover or the fan motor cover removed, observe proper safety precautions; dangerous voltages are exposed.

b. Careless replacement of parts can result in the creation of new faults. Observe the following precautions when replacing parts:

(1) Before unsoldering a part, note the position of the leads connected to it. If the part has a number of connections, tag each of the leads as it is removed. Be careful not to damage other leads by pulling or pushing them out of the way.

(2) Do not allow drops of solder to fall into the set; they may cause short circuits. A carelessly soldered connection may create a new fault. Well-soldered joints are important, because a poorly soldered joint is sometimes difficult to find.

(3) Give particular attention to proper grounding when replacing a part.

40. Operational Test

a. Operate the equipment as described in the equipment performance checklist (par. 26). The equipment performance test frequently indicates the general location of the trouble.

b. Connect a test lead between terminals 2 and 4 of connector P3 in the control unit. Throw POWER switch S6 to ON. Test lamp I-3 on the front panel of the control unit should light. If the test lamp does not light, make the following checks: check fuse F1 (par. 42), power-cable connections (par. 42), and POWER switch S6 (par. 42).

c. Poor response or failure of the radiosonde low-reference and humidity circuits to respond during baseline checks may be due to defective relays in the temperature-humidity chamber. To check the operation of relays K1 and K2, proceed as follows:

(1) Throw POWER switch S6 to ON. Set selector switch S1 to REFERENCE. Connect the test leads of Multimeter TS-297/U, set to the lowest ohms scale, between terminals 1 and 4 of connector P1 of the calibration chamber. The meter should read 0 ohms, indicating that relay K2 is operated and its contacts are closed.

(2) Set POWER switch S6 to ON. Set selector switch S1 to HUMIDITY. Connect the test leads of Multimeter TS-297/U, set to the lowest ohms scale, between terminals 2 and 4 of connector P1 of the calibration chamber. The meter should read 0 ohms, indicating that relay K1 is operated and its contacts are closed.

41. Trouble-shooting Chart

Symptom	Probable trouble	Correction
Set completely inoperative.	Fuse F1 open.	Check fuse (par. 42). Replace, if necessary (par. 43).
	Switch S6 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
Lamps I–1 and/or I–2 do not operate when LIGHT switch S2 is set to ON.	Switch S2 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
	Lamps I–1 and/or I–2 burned out.	Check lamps (par. 42). Replace, if necessary (par. 33*c*).
Fan motor B1 does not operate when FAN switch S8 is set to ON.	Switch S8 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
	Motor B1 winding open or shorted.	Check motor winding (par. 42). Replace motor, if necessary (par. 44).
	Capacitor C1 defective.	Check capacitor (par. 42). Replace, if necessary (par. 44).

41. Trouble-shooting Chart (contd)

Symptom	Probable trouble	Correction
Set does not operate normally when switch S1 is set to AUTOMATIC.	Motor B2 defective.	Check motor (par. 42). Replace if necessary (par. 43).
	Selector switch S1 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
Low-reference circuit in radiosonde (during test) does not operate when switch S1 is set to REFERENCE.	Switch S1 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
	Relay K2 defective.	Check relay (par. 42). Replace, if necessary (par. 45).
Humidity circuit in radiosonde (during test) does not operate when switch is set to HUMIDITY.	Switch S1 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
	Relay K1 defective.	Check relay (par. 42). Replace, if necessary (par. 45).
Heater does not operate when HEATER switch S7 and FAN switch S8 are set to ON.	Switch S7 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
	Switch S8 defective.	Check switch (par. 42). Replace, if necessary (par. 43).
	Heater element HR1 defective.	Check heater element (par. 42). Replace, if necessary (par. 46).
Test lamp I–3 does not light during radiosonde commutator adjustment.	Lamp I–3 burned out.	Check lamp (par. 42). Replace, if necessary (par. 33*a*).

42. Additional Trouble-shooting Information

The following subparagraphs give instructions for performing the electrical checks mentioned in the trouble-shooting chart (par. 41).

Caution: Be sure power cable is disconnected from power source when continuity checks are made.

a. Check fuse F1 by removing it from the control unit (par. 33*b*) and checking continuity through the fuse with Multimeter TS-297/U.

b. Check toggle switches S2, S6, S7, and S8 as follows: Unsolder the wire or wires connected to one side of the switch, and with the switch in the ON position, check continuity through the switch with Multimeter TS-297/U. With the switch in the OFF position, the meter should give no reading.

c. To check lamp I-1, I-2, or I-3, remove the lamp from its socket and check continuity through the lamp by means of an ohmmeter.

d. If fan motor B1 fails to operate, check the connections of power plug J3, fuse F1 (subpar. *a* above), POWER switch S6 and FAN switch S8 (subpar. *b* above), and all associated wiring for loose or defective connections. Check for proper coupling between connectors J1 and J2. Check for loose connections at terminal board E1. If the motor operates, feel the motor casing after applying power, and check for excessive heating. If the motor overheats, replace it. Check capacitor C1 (subpar. *e* below). If none of the preceding checks reveals any defect, disconnect the motor wires at terminals 2, 3, and 4 of terminal board E1. The motor has four wires, coded blue, black, green, and orange, respectively. The green- and orange-coded wires are connected to a single lug. Check this connection for broken wires or defective soldering. Use Multimeter TS-297/U (lowest resistance scale) to check the d-c (direct-current) resistance of the motor windings. The points to check and approximate readings to be expected are as follows:

Check between	*Ohms (approximate)*
Black and blue-coded wires.	220
Black to common of green- and orange-coded wires.	80
Blue to common of green- and orange-coded wires.	140

e. To check capacitor C1, unsolder the wire connected to one terminal of the capacitor. Set Multimeter TS-297/U to the highest resistance range and apply the meter leads to the capacitor terminals. The meter indicator should register a kick, showing that the capacitor charges.

f. To check motor B2, disconnect one of the motor leads and use Multimeter TS-297/U (lowest resistance range) to measure the d-c resistance. This resistance should be approximately 525 ohms.

g. To check selector switch S1, unsolder the wires connected to the switch. Be sure to tag the leads. Use Multimeter TS-297/U to check continuity between the rotor and stator contacts in each position of the switch.

h. To check relays K1 and K2, uncouple connectors J1 and J2. Use Multimeter TS-297/U to check relay K1 by measuring continuity of the relay winding between terminals 5 and 6 of terminal board E1; check relay K2, similarly, between terminals 6 and 7. Count terminal numbers from the end of the terminal board farthest away from motor B1. To check the relay contacts, follow the procedure given in paragraph 40*c*.

i. To check heater HR1, uncouple connectors J1 and J2. Use Multimeter TS-297/U to check the resistance of the heater element between terminals

1 and 2 of terminal board E1. Count terminal numbers from the end of the terminal board away from motor B1. The resistance of the heater element should be approximately 66 ohms.

Section III. REPLACEMENT OF PARTS

43. Disassembly and Reassembly of Control Unit (figs. 19, 20, 21, and 22)

a. Remove the four upper screws from the front panel and slide the control unit out of its housing.

b. To replace a toggle switch proceed as follows:

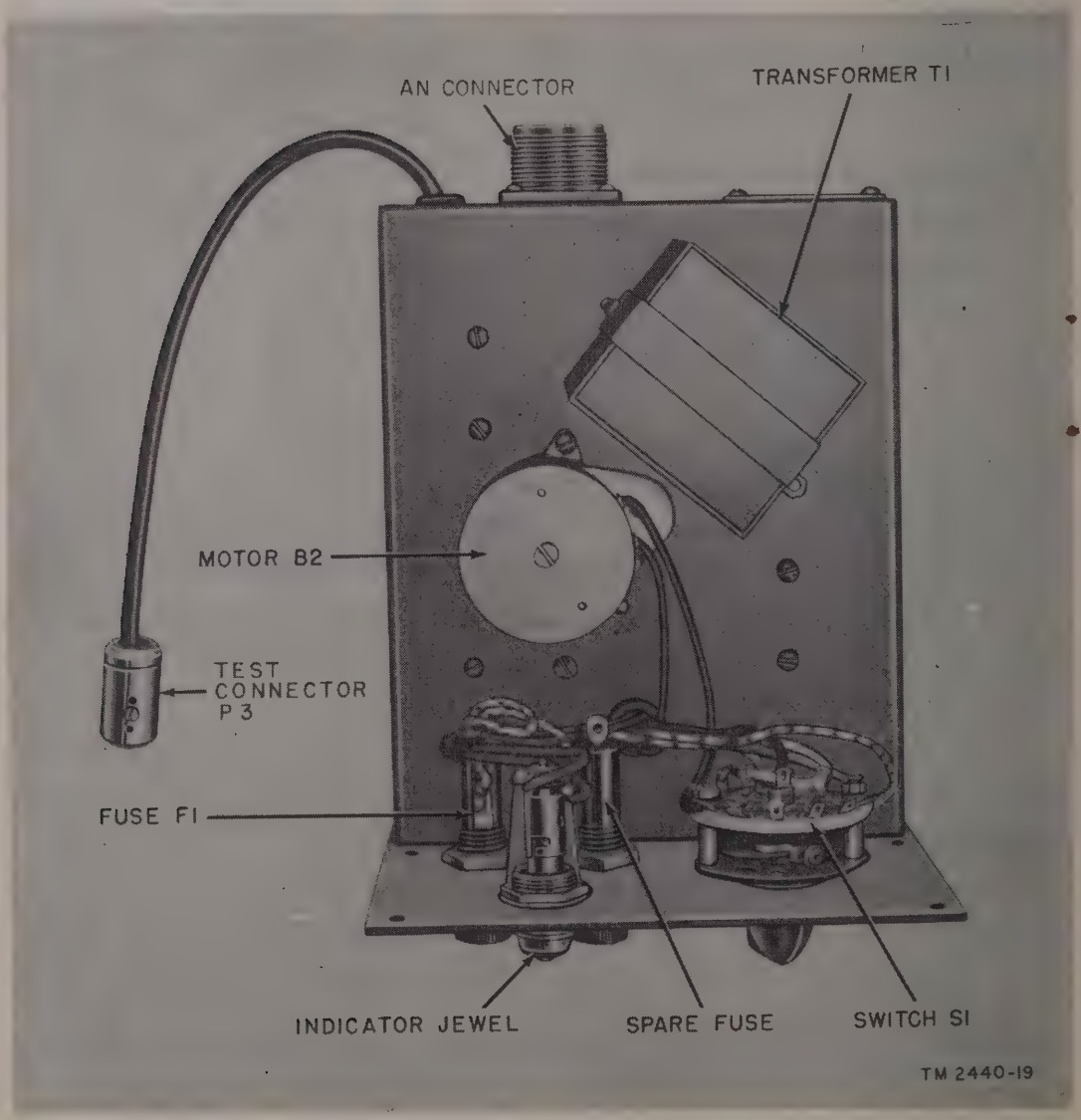


Figure 19. Control unit, cover removed, top view (equipments furnished on Order No. 3139-Phila-51).

(1) Remove the nut and washer from the switch on the front panel of the control unit (fig. 2). Push the switch back through the front panel.

(2) Unsolder the leads of the defective switch and tag each lead as it is removed.

(3) To replace the switch, reverse the procedure (subpars. (1) and (2) above).

c. To replace the selector switch proceed as follows:

(1) Remove the knob from the front of the switch by unscrewing the setscrew in the knob. Push the switch back through the front panel.

(2) Unsolder the leads of the selector switch and tag each one as it is removed.

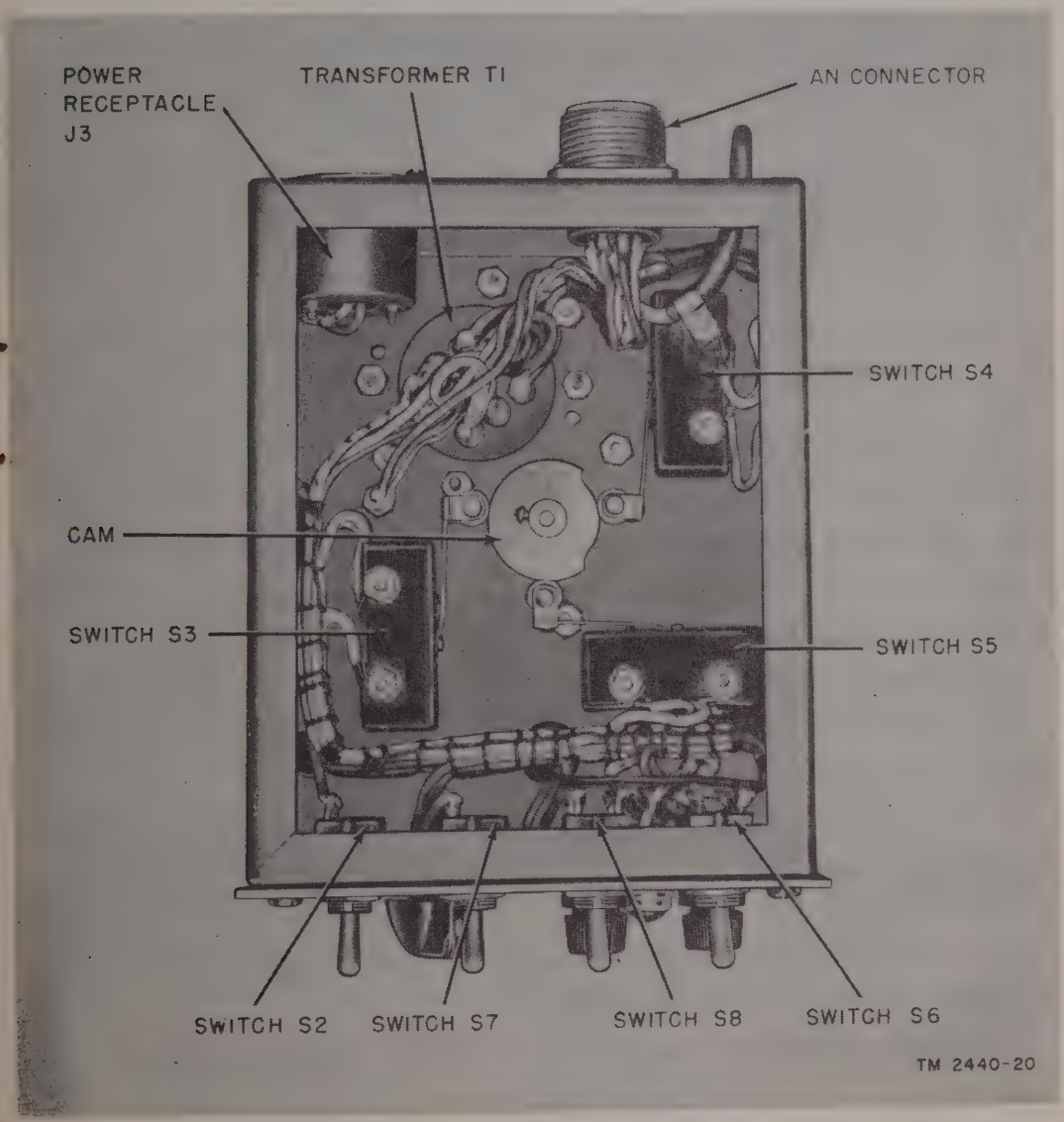


Figure 20. Control unit, bottom view (equipments furnished on Order No. 3139-Phila-51).

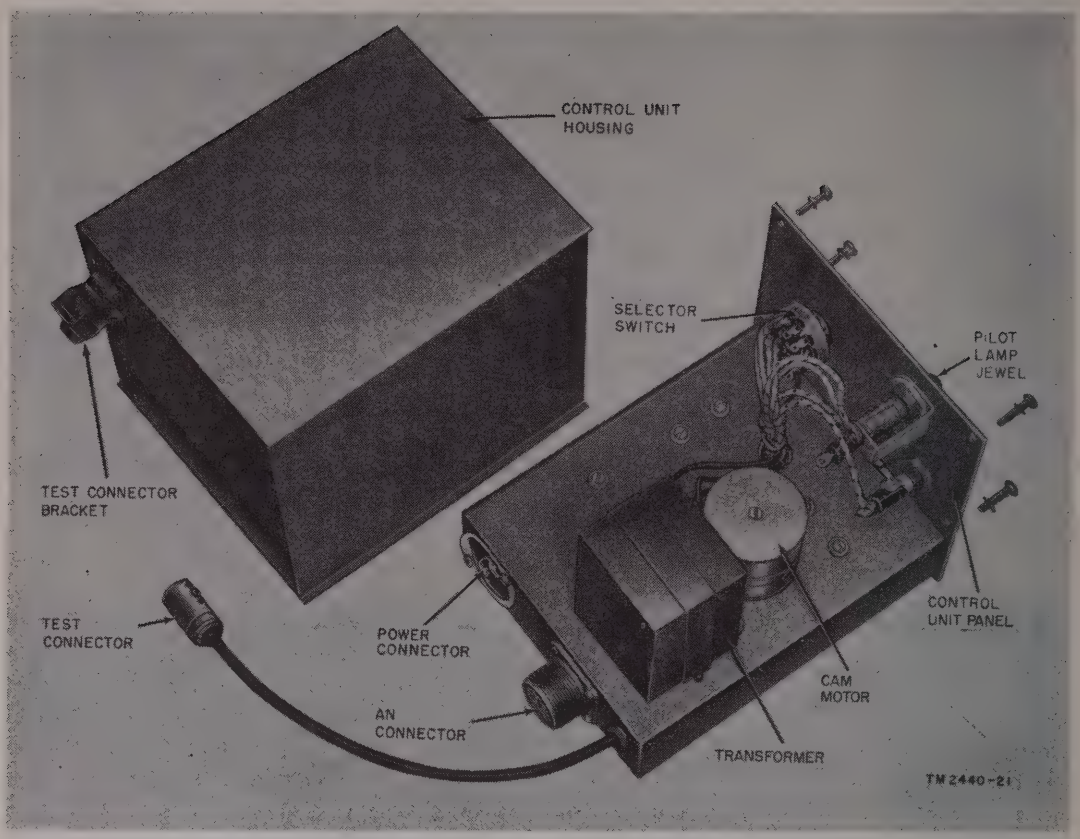


Figure 21. Control unit, cover removed, top view (equipments furnished on Order No. 32148-Phila-51).

(3) To replace the switch, reverse the procedure (subpars. (1) and (2) above).

d. To replace the indicator jewel and lamp I-3 proceed as follows:

(1) Push in on the indicator jewel, turn it counterclockwise, and remove it from the front panel.

(2) Push in on the lamp, turn it counterclockwise, and pull it out.

(3) Replace the lamp if it is defective, and then replace the indicator jewel.

e. To replace the fuse proceed as follows:

(1) Turn the FUSE-3A cap counterclockwise, and pull it out. Remove the defective fuse from the cap.

(2) Turn the SPARE fuse cap counterclockwise, remove the spare fuse, and place it in the FUSE-3A holder.

(3) Replace both fuse caps.

f. To replace switch S3, S4, or S5 proceed as follows:

(1) Remove the nuts and washers from the defective switch (figs. 19 and 20 or figs. 21 and 22).

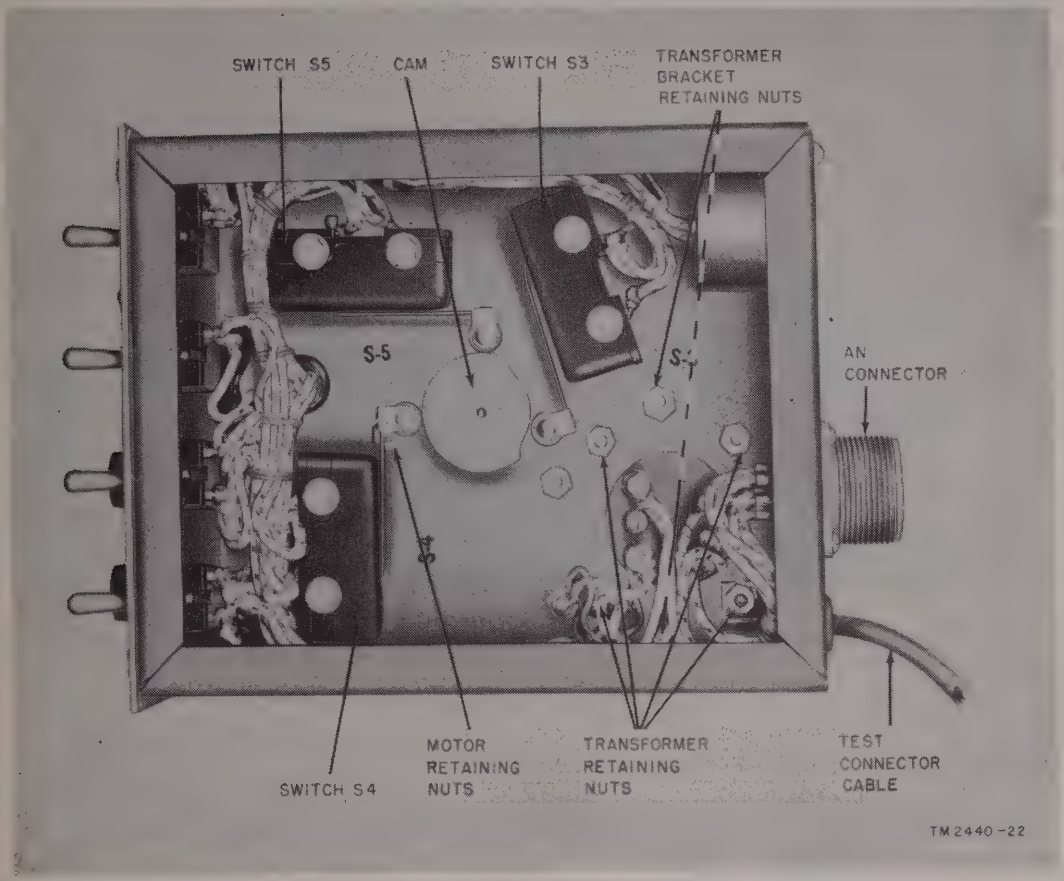


Figure 22. Control unit, bottom view (equipments furnished on Order No. 32148-Phila-51).

(2) Unsolder the leads, and tag each lead as it is removed.

(3) To replace the switch, reverse the procedure (subpars. (1) and (2) above).

g. To replace the cam motor and cam proceed as follows:

(1) Remove the cam (fig. 20 or 21) from the motor shaft by loosening the two setscrews and easing the cam off the cam shaft.

(2) Remove the two nuts (fig. 20 or 21) from the screws that hold the motor to the chassis. Lift off the motor.

(3) Remove the leads that connect the motor to the selector switch and the transformer, and tag each lead as it is removed.

(4) To replace the motor and the cam, reverse the procedure (subpars. (1) through (3) above). *Make sure that the setscrews in the cam are tightened against the flat sides of the shaft.*

h. To replace the transformer, proceed as follows:

(1) From the under side of the chassis, unscrew the two nuts that hold the transformer bracket in place (fig. 21 or 22). Then unscrew the four nuts that hold the transformer to the chassis.

(2) Lift out the transformer.

(3) Remove the leads from the transformer, and tag each lead as it is removed.

(4) To replace the transformer, reverse the procedure (subpars. (1) through (3) above).

44. Disassembly and Reassembly of Fan Assembly (figs. 23, 24, and 25)

a. Remove the cabinet-assembly cover from the top of the chamber by removing the eight screws that hold the cover to the chamber.

b. To disassemble the fan assembly, proceed as follows:

(1) From the outside top of the chamber, remove the five screws that hold the blower guard in place on the under side of the top of the chamber.

(2) Remove the fan from its shaft by removing the two setscrews (fig. 25).

(3) From the inside top of the chamber, remove the four screws that hold the motor in place. Lift the motor off the top of the chamber.

(4) Remove the screw that holds each of the capacitor brackets in place. Remove the brackets.

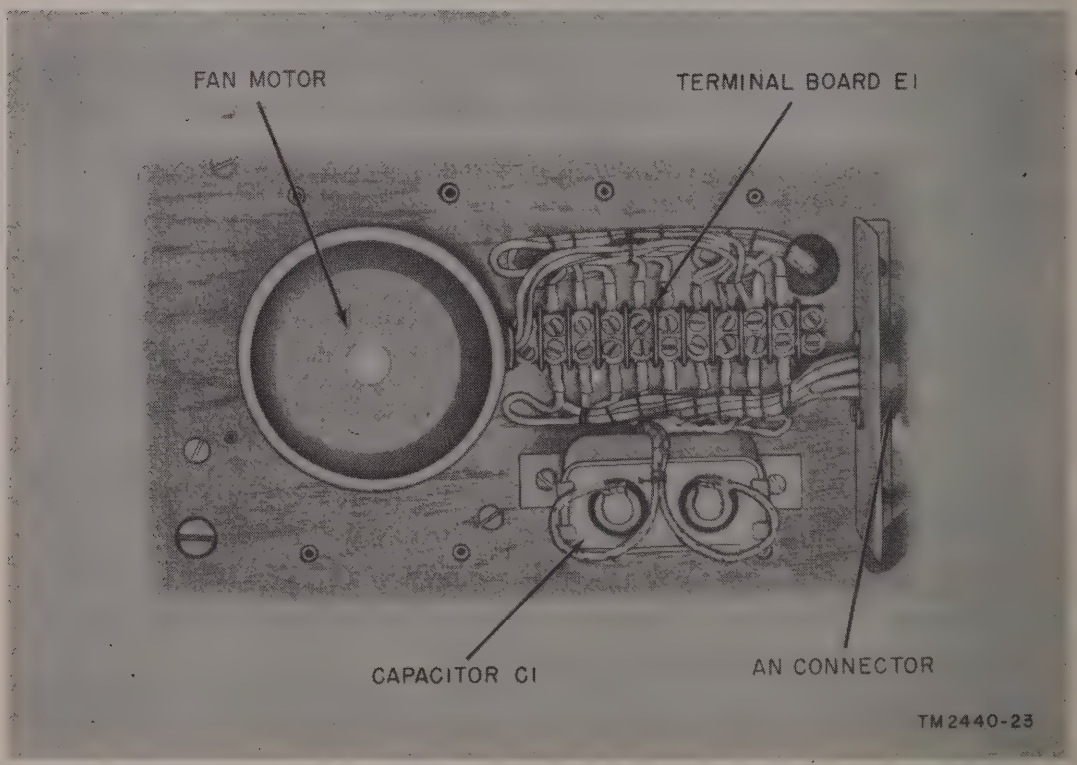


Figure 23. Cabinet assembly, cover removed (equipments procured on Order No. 3139-Phila-51).

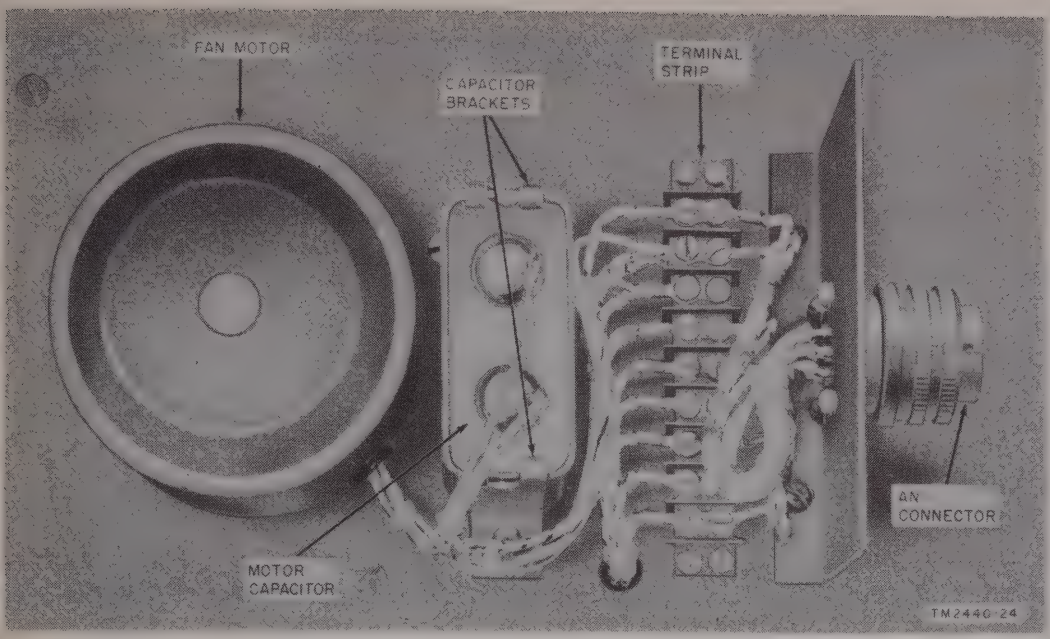


Figure 24. Cabinet assembly, cover removed (equipments procured on Order No. 32148-Phila-51).

(5) Remove the capacitor leads from the terminal board, and tag each lead as it is removed.

(6) Remove the motor leads from the terminal board, and unsolder the motor leads from the capacitor. Tag each lead as it is removed.

c. To replace the fan assembly, reverse the procedure (subpars. (1) through (6) above).

45. Replacement of Relays (fig. 2)

To replace a relay, proceed as follows:

a. Unsolder the leads from the relay terminals, and label each lead as it is removed.

b. Remove the defective relay from the bracket.

c. To replace the relay, reverse the removal procedure (subpars. *a* and *b* above).

Note. Equipments procured on Order No. 32148-Phila-51 were initially provided with large, plug-in relays. If one of these becomes defective, it should be replaced by the small, soldered-connection type (Sig C stock No. 2Z7585-211). Remove the retainer strip that holds the large relays in place at the top, and pull the defective relay from its socket. Unsolder leads from the socket, and label each lead to insure correct rewiring. Remove the socket. Insert terminals of the replacement relay through appropriate holes already provided in the mounting bracket, and solder the leads to the relay terminals in accordance with labels. If one of the

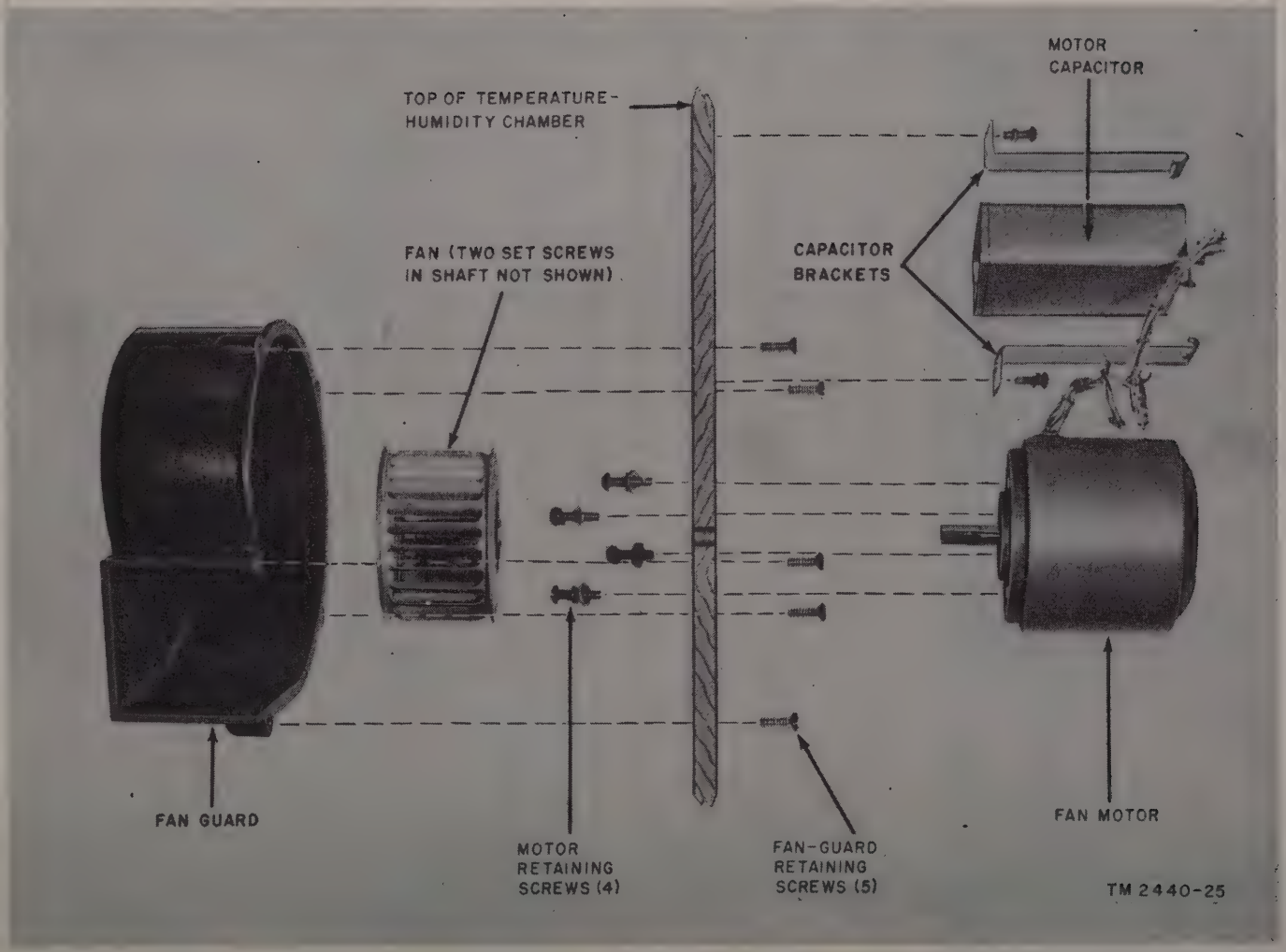


Figure 25. Fan assembly, exploded view.

large plug-in relays still is mounted on the bracket, replace the retainer strip to hold it in place.

46. Disassembly and Reassembly of Heater Strip (fig. 2)

a. Unscrew the two nuts that hold the heater strip to the stand-off.

b. Unscrew the two nuts that secure the leads to the heater, and remove the leads.

c. Replace the heater by reversing the removal procedure (subpars. *a* and *b* above).

47. Replacement of Thermometers (fig. 2)

a. Unscrew the two screws that hold the retainer around the upper part of the thermometer.

b. Pull the top of the thermometer out to free the glass hook from the metal plate, and at the same time lift the thermometer out of the retainer that holds it in place at the bottom.

c. Replace the thermometer by reversing the removal procedure (subpars. *a* and *b* above). Be sure to engage the glass hook at the top of the thermometer in the opening provided for it.

Section IV. REFINISHING AND FINAL TESTING

48. Refinishing

a. GENERAL. Check the appearance and condition of the finish of all surfaces. The finish should show no decided wear. No bare metal or plywood should be exposed because of chipping or scratches on the surface. Refinish surfaces where the finish has been removed completely or worn through. Retouch such surfaces if the bare spots are restricted to small areas, but refinish the entire surface if the bare or damaged areas are large. Discolored, spotted, stained, or faded surfaces are permissible if the original finish is intact.

b. REFINISHING PROCEDURES. After sanding or scratch-brushing, refinish the affected surfaces to match the original finish. Apply one coat of lacquer to parts having a bright metal finish. Apply one coat of matching enamel or paint to painted surfaces. Do not apply lacquer to contact parts of switches or to other surfaces which might affect the mechanical or electrical functioning of the equipment.

c. PRESERVATIVE APPLICATIONS. After the equipment has been refinished completely, moistureproof and fungiproof the equipment according to the instructions in paragraph 20*b*.

49. Final Testing

After repairing or replacing components of Radiosonde Baseline Check Set AN/GMM-1, install the equipment for operation (par. 9 or 10) and perform the following tests to determine the quality of the repaired equipment.

a. Operate the equipment in conformance with the equipment performance checklist in paragraph 26.

b. Test the operation of test lamp I-3 and relays K1 and K2, in accordance with the instructions in paragraph 40*b* and *c*.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

50. Disassembly

a. Disconnect the power cable, and place it in its compartment in the carrying case.

b. If the extension cable has been used, disconnect it from the equipment and rewind it on the reel. Place the reel in the carrying case, and secure it in place by the metal strap and fastener.

c. Empty the water tray and the plastic cup of water. Replace the tray in the chamber, and strap it in place. Place the plastic cup in the psychrometer case.

d. Remove the psychrometer from the mounting bracket in the chamber, and place the psychrometer in the psychrometer case.

e. Place the control unit in its compartment in the carrying case.

f. Remove the legs from the chamber and secure them in the lid of the carrying case. If the chamber has been wall-mounted, remove it from the wall, and reverse the position of the wall brackets. Place the chamber in the carrying case.

g. Replace the lid of the carrying case, and latch it in closed position.

51. Repacking

Repack the equipment for shipment by reversing the instructions given in paragraph 8. If possible, use the original packing materials.

Section II. DEMOLITION TO PREVENT ENEMY USE

52. Methods of Demolition

a. SMASH. Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools.

b. CUT. Use axes, handaxes, machetes.

c. BURN. Use gasoline, kerosene, oil, flame throwers, incendiary grenades.

d. EXPLODE. Use firearms, grenades, TNT.

e. DISPOSE. Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

Note. Use anything immediately available for destruction of this equipment.

53. Destruction of Components

When ordered by your commander, destroy all equipment to prevent its being used or salvaged by the enemy.

a. Smash (par. 52*a*) the controls, switches, capacitors, cases, and psychrometers.

b. Cut (par. 52*b*) cords, wiring, and cables.

c. Burn (par. 52*c*) cords, capacitors, wiring, and technical manuals.

d. Bury or scatter (par. 52*c*) all remaining parts of the equipment.

DESTROY EVERYTHING

APPENDIX 1

REFERENCES

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

1. Army Regulations

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

2. Supply Bulletins

SB 11-6	Dry Battery Supply Data.
SB 11-47	Preparation and Submission of Requisitions for Signal Corps Supplies.

3. Auxiliary Equipment and Test Equipment

TM 11-2417	Thermometers ML-4 and ML-5, Psychrometers ML-24 and ML-224, Shelters ML-41, ML-41-A, and ML-44-B.
TM 11-2424	Instructions for Modulated Audio Frequency Radiosonde Observations (WBAN RAOB Manual).
TM 11-2430	Radiosonde AN/AMT-1 and AN/AMT-2.
TM 11-2432	Radiosonde AN/AMT-4.
TM 11-2432A	Radiosonde AN/AMT-4A.
TM 11-2433	Radiosonde AN/AMT-2A.
TM 11-5500	Multimeter TS-297/U.

4. Painting, Preserving, and Lubrication

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

5. Camouflage, Decontamination, and Demolition

FM 5-20	Camouflage, Basic Principles.
FM 5-25	Explosives and Demolitions.
TM 3-220	Decontamination.

6. Other Publications

SR 310-20-3	Index of Training Publications.
SR 310-20-4 SR 310-20-7	Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, Modification Work Orders, Tables of Organization and Equipment, Reduction Tables, Tables of Allowances, Tables of Organization, and Tables of Equipment.
SR 310-20-5	Index of Administrative Publications.
SR 700-45-5	Unsatisfactory Equipment Report (Reports Control Symbol CSGLD-247).
SR 745-45-5 NAV DEPT SERIAL 85P00 AFR 71-4	Report of Damaged or Improper Shipment (Reports Control Symbols CSGLD-66 (Army), SandA-70-6 (Navy), and AF-MC-U2 (Air Force)).
TB SIG 25	Preventive Maintenance of Power Cords.
TB SIG 66	Winter Maintenance of Signal Equipment.
TB SIG 72	Tropical Maintenance of Ground Signal Equipment.
TB SIG 75	Desert Maintenance of Ground Signal Equipment.
TB SIG 123	Preventive Maintenance Practices for Ground Signal Equipment.
TB SIG 219	Operation of Signal Equipment at Low Temperatures.
TM 11-661	Electrical Fundamentals (Direct Current).
TM 11-681	Electrical Fundamentals (Alternating Current).

APPENDIX II

IDENTIFICATION TABLE OF PARTS

Note. The following is an identification table of parts for Radiosonde Baseline Check Set AN/GMM-1 (Sig C stock No. 7A794-1). The fact that a part is listed in this table is not sufficient basis for requisitioning the item. Requisitions must cite an authorized basis, such as a specific T/O&E, T/A, SIG 7-8-10, SIG 10, list of allowances of expendable material, or another authorized supply basis. The Department of the Army Supply Catalog applicable to the equipment covered in this manual is SIG 7 & 8-AN/GMM-1. For an index of available supply catalogs in the Signal portion of the Department of the Army Supply Catalog, see the latest issue of SIG 1, Introducton and Index.

Identification Table of Parts (contd)

Fig. No. or Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	BOOK, reference: US Dept of Commerce, WB Psychrometric Tables for Obtaining Vapor Pressure, Relative Humidity, and Temperature at the Dew Point; by C. P. Marvin; published by GPO.	Contains tables for obtaining vapor pressure, relative humidity, and temperature at the dew point.	7A1745
Fig. 10	BLOWER: guarded; c/o 1/50 hp motor and fan; direct drive; clockwise rotation.	Circulates air in temperature-humidity chamber.	3H388-95
Fig. 9	CAM: stainless steel; irregular cyl shape.	Actuates microswitch rollers.	2Z1600-162
	CAP: electrical; aluminum, anodize finish.	Covers extension cable female connector when connector is not in use.	2Z1612.17
	CAP: electrical; supplied w/chain which is permanently attached to adapter.	Covers extension cable male connector when connector is not in use.	2ZK3352.18
C1	CAPACITOR, fixed: paper dielectric; 600 v dc; CP70BIEF405K.	Serves as starting capacitor for blower motor.	3DB4-248.
	CLAMP: electrical; steel; cyl shape; locking type.	Used to secure connector to extension cable.	2Z2642.682
P2	CONNECTOR ASSEMBLY, electrical: 5 cont; male.	Used inside chamber to connect exterior battery to radiosonde.	2Z3105-32
P1, P3	CONNECTOR, plug: 5 cont; female; round.	Used as test connector to attach radiosonde to chamber.	2Z3066-96

Fig. 1	CONNECTOR, plug: 5 cont; female; round; straight type.	Used on exterior of chamber to connect radiosonde battery.	2Z3066–97
	CONNECTOR, plug: 8 cont; male; round.	Terminates one end of extension cable; used to connect cable to cabinet assembly.	2Z3028–22
Fig. 6	CONNECTOR, plug: 2 cont; female; flat.	Terminates one end of 15-foot power cable; used to connect cable to control unit.	6Z3150–1
	CONNECTOR, plug: 2 cont; male; flat.	Terminates one end of 15-foot power cable; used to connect cable to power source.	6Z1727
J2	CONNECTOR, plug: 8 cont; female; round; polarized.	Used on control unit to connect control unit to cabinet assembly.	2Z3069.59
J1	CONNECTOR, plug: 8 cont; male; round.	Used on cabinet assembly to connect cabinet assembly to control unit.	2Z3028–76
J3	CONNECTOR, plug: 2 cont; male; curved.	Used on control unit to connect control unit to power cable.	6Z816–2
Fig. 2	CUP, drinking: plastic.	Holds water in which wick of wet-bulb thermometer is immersed.	6Z3462
F1	FUSE, cartridge: 3 amp, 250 v.	Prevents overloading of electrical circuit of check set.	3Z2603.2
Fig. 8	FUSEHOLDER: extractor post type; 8 amp.	Mounts fuse on panel.	3Z3282–42.6
	GASKET: rubber; $3\frac{11}{16}$″ OD.	Seals chamber outlet for antenna of radiosonde.	2Z4867.770

Identification Table of Parts (contd)

Fig. No. or Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
Fig. 9	GROMMET: rubber; 1″ dia.	Serves as feedthrough for Cable WF–11/U at control unit.	6Z4856–38
Fig. 9	GROMMET: rubber; 7/16″ dia.	Serves as feedthrough for wires running through chassis of control unit.	6Z4895
Fig. 11	GROMMET: rubber; 3/4″ dia.	Serves as feedthrough for wires running through top of chamber from cabinet assembly to relays.	6Z4886
I–1, I–2	LAMP, incandescent.	Used to illuminate interior of chamber.	2Z5927
I–3	LIGHT, indicator: supplied w/lens; green.	Lights to indicate that radiosonde contact point is touching conducting segment.	2Z5883–13
Fig. 8	MOTOR, AC: 60 cps; 1 rpm.	Used to drive cam that actuates microswitches.	3H3000–197
Fig. 2	PSYCHROMETER: c/o 2 thermometers, stainless steel back, wooden handle, length of chain, and conversion table.	Used to obtain psychrometric data on interior of chamber.	7A1318
Fig. 2	RELAY, armature: SPST; 3 amp; 6 v operating voltage.	Used in chamber to actuate specific circuit in radiosonde.	2Z7585–211
Fig. 2	RESISTANCE ELEMENT: 200 w power dissipation; 2 term.	Serves as heater element in chamber.	2Z5015–35

Fig. 8	SWITCH, rotary: 1 sect; 4 position.	Used to select temperature, humidity, and reference circuits of radiosonde manually or automatically.	3Z9825-55.19
Fig. 9	SWITCH, sensitive: SPDT; roller leaf type.	Actuated by cam to select specific radiosonde circuit.	3Z9558-39/20
Fig. 9	SWITCH, toggle: SPST; 6 term; $1^{15}/_{16}$″ lg.	Used to turn heater and lights ON and OFF.	3Z9863-42A.
Fig. 9	SWITCH, TOGGLE: SPST; 6 term; $1\frac{1}{2}$″ lg.	Used to turn power and fan ON and OFF.	3Z9863-52K.1
Fig. 2	THERMOMETER: reads from −37° C to +46° C.	Used in combination of two to form psychrometer.	7A1324A/3
	THREAD, cotton: #40.	Used to tie wick to wet-bulb thermometer.	6Z8650W
T1	TRANSFORMER, power: step-down; 115 v, 60 cyc, single ph.	Used to step input power down to 6.3 volts for lights, commutator test circuit, and relays.	2Z9621-464
Fig. 2	TRAY, developing: 7″ lg; hard rubber.	Contains water used to stabilize humidity in chamber.	8A3901
Fig. 2	WICK: mercerized cotton.	Used to keep end of wet-bulb thermometer moistened.	7A1324/4

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Test No. BHC-111

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A-A

PUBLICATION RADIOSONDE BASELINE CHECK SET: MDL: AN/GMM-1, AN/GMM-1A MAINTENANCE MANUAL DTD 31 DEC 52	CHARGE OUT RECORD CARD

DATE ISSUED	SIGNATURE OF RECIPIENT	DIVISION SECTION OR OFFICE	DATE RETURNED

EMC 330 (1 NOV 54)

TM11-2440-2