TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

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

(NSN 6660-00-527-6392) WITH RADIOSONDE TEST SET TS-1348/GMM-1A (NSN 6625-00-924-0327)

This copy is a reprint which includes current pages from Changes 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1971

WARNING

DANGEROUS VOLTAGES

are used in this equipment

DEATH ON CONTACT

may result if safety precautions are not observed

Be careful not to come in contact with 115-volt ac power connections when using this equipment. Turn off the power before making connections or doing work inside the equipment.

DON'T TAKE CHANCES!

CHANGE)
)
No. 2)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 5 *March 1985*

Direct Support and General Support Maintenance Manual
RADIOSONDE BASELINE CHECK SETS AN/GMM-1 AND AN/GMM-1A (NSN 6660-00-527-8392) WITH RADIOSONDE TEST SET TS-1348/GMM-1A (NSN 6625-00-924-0327)

TM 11-6660-219-34, 20 December 1971, is changed as follows:

1. New or revised material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar in front of the figure caption. Remove and insert pages as indicated below:

Remove pages	*Insert Pages*
i	i and ii
1-1	1-1(1-2 blank)
2-9 through 2-14	2-9 through 2-16
3-5 and 3-6	3-5 and 3-6
4-1 and 4-2	4-1 and 4-2
A-1	A-1/(A-2 blank)

2. File this change sheet in front of the publication.

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To be distributed in accordance with DA Form 12-36B. Direct and General Support Maintenance requirements for AN/GMM-1 Equipment.

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No. 11-6660-219-34)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *20 December 1971*

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL
RADIOSONDE BASELINE CHECK SETS AN/GMM-1 AND AN/GMM-1A (NSN 6660-00-527-8392) WITH RADIOSONDE TEST SET TS-1348/GMM-1A (NSN 6625-00-924-0327)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, NJ 07703-5007.

In either case, a reply will be furnished direct to you.

*** This manual together with TM 11-6660-219-12, 20 July 1961, supercedes TM 11-2440, 31 December 1952, including all changes.**

ILLUSTRATIONS

CHAPTER 1
INTRODUCTION

1-1. Scope

a. This manual covers direct and general support maintenance for Radiosonde Baseline Check Set AN/GMM-l and AN/GMM-lA. It includes instructions appropriate to direct and general support for troubleshooting, testing, alignment, and repair of the equipment, replacement of maintenance parts, and repair of specific maintenance parts. It also includes tools, materials and test equipment for direct and general support maintenance. Detailed functions of the equipment are covered in chapter 2.

b. The appendix contains a list of current references, including supply catalogs, test manuals, and other available publications applicable to this equipment.

c. official nomenclature followed by (*) is used to indicate models of similarly nomenclature equipment covered in this manual. Thus, Radiosonde Baseline Check Set AN/GMM-(*) represents Radiosonde Baseline Check Sets AN/GM M-1 and AN/GMM-lA. Radiosonde Set AN/AMT-4(*) represents Radiosonde Sets AN/AMT-4A, AN/AMT-4B, AN/AMT-4C, and AN/AMT-4D. Radiosonde Set AN/AMT-12(*) represents Radiosonde Sets AN/AMT-12 and AN/AMT-12A.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55 /NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

c. *Discrepency in Shipment Record (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. Reporting Equipment Improvement Recommendations (EIR)

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design. Put it on an SF 368 (Quality Deficiency Report), Mail it to the Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007. We will send you a reply.

1-5. Internal Differences in Models

Internal differences in models are listed in the chart below. For external differences and other internal differences, refer to TM 11-6660-219-12.

Model	Differences
AN/GMM-1, Order No. 3139-P-51	Control unit (fig. 3-6): There are 3 micro switches, S3, S4, and S5 (fig. 3-9), cam operated, used to operate relays K1 and K2. Cabinet assembly (fig. 3-4): Terminal board E1 (fig. 3-4) and capacitor C1 are placed lengthwise on chassis.
AN/GMM-1, Order No. 32148-P-51.	Control unit (fig. 3-9): There are 3 microswitches, S3, S4, and S5 (fig. 3-9), cam operated, used to operate relays K1 and K2. Cabinet assembly (fig. 3-3): Terminal hoard E1 (fig. 3-4) and capacitor C1 are placed crosswise on chassis,
AN/GMM-1A	Control unit (fig. 2-1): There are 2 microswitches, S3 and S4 (fig. 3-8), cam operated, used to operate relays K1 and K2. Cabinet assembly (fig. 3-4): Terminal hoard E1 (fig. 3-4) and capacitor C1 are placed crosswise on chassis.

CHAPTER 2

FUNCTIONING OF EQUIPMENT

Section I. TEST SET TS-1348/GMM-1A

2-1. Introduction

Radiosonde Baseline Check Set AN/GMM-l(*) (fig. 2-1), is a dual purpose test set, as modified by MWO 11–6660–219–35/2. The radiosonde set has capabilities for preflight testing with battery packs or other radiosonde sets, using Radiosonde Test Set TS–1348/GMM–lA; it has a transportable, temperature- and humidity-controlled chamber for testing the temperature and humidity circuits and establishing basic values for slide rule evaluation of atmospheric data. These checks are made in conjunction with Rawin Set AN/GMD-1 and Radiosonde Recorder AN/TMQ-5. The rawin set receives the signals transmitted by the radiosonde unit and relays the signals to the radiosonde recorder, which, in turn, records temperature, humidity, and reference on a graph.

2-2. Block Diagram Analysis

For the purpose of block diagram coverage, Radiosonde Baseline Check Set AN/GMM–lA is divided into two major functional areas.

a. Preflight Testing. Preflight tests can be made of the following components: Battery Pack BA–259/U with a dummy load to measure the output voltage, Radiosonde Sets AN/AMT-4(*) and AN/AMT–12(*) when powered by a battery pack, or a 24-volt vehicular battery using Radiosonde Test Set TS-1348/GMM-lA (para 2-3 and 2-7).

b. Baseline Check Set. Testing of assembled radiosonde sets can be made using the transportable chamber for measurement of temperature and humidity circuits under controlled conditions in conjunction with the rawin system (para 2-8 and 2-12).

2-3. Radiosonde Test Set TS-1348/GMM-1, Test Circuits

The block diagram functional description of the test set (fig. 2–2) is divided into four major test areas. The control and indicator settings for the test set (fig. 2-3) and the individual operational functions are described in detail in TM 11–6660-219–12.

a. Ammeter Circuit, A selective load current switch, in conjunction with a current load ammeter, indicates the value of the filament or total plate current in the power circuit under test. Current readings can be made when either a battery pack or a vehicular battery is used as a source of power, using either a rated dummy or a radiosonde load. An internal shunting circuit enables the ammeter to measure two current ranges, 0–50 and 0–250 milliamperes.

b. A1 Circuit. Selector load selector switch S2, in conjunction with a voltmeter connected across the input, measures the Al filament voltage output (1.1 to 1.7 volts) from either a battery pack or a vehicular battery when the circuit is loaded by a radiosonde set or a rated dummy load.

c. A Circuit. The LOAD SELECTOR switch (S2) connects the A-VOLTS meter directly across the input for a measurement of filament voltage (5.5 to 7.9 volts) supplied from the battery pack when the circuit is loaded by a radiosonde set or a rated dummy load. When a vehicular battery is used as a power source, the A-VOLTS meter is connected across an equivalent load, in series with, and equal to the load.

d. B Circuit. The LOAD SELECTOR switch connects the B-VOLTS meter directly across the input for a measurement of plate voltage (100 to 115 volts) direct current (dc) from the battery pack power source, when the B circuit is loaded with a rated dummy load or a radiosonde set. When a vehicular battery is used as a source of power, the B-VOLTS meter is connected across the output of the converter for measurement of plate voltage.

2-4. Ammeter Circuits

Depending on the position of LOAD CURRENT SELECTOR switch S1, LOAD CURRENT meter

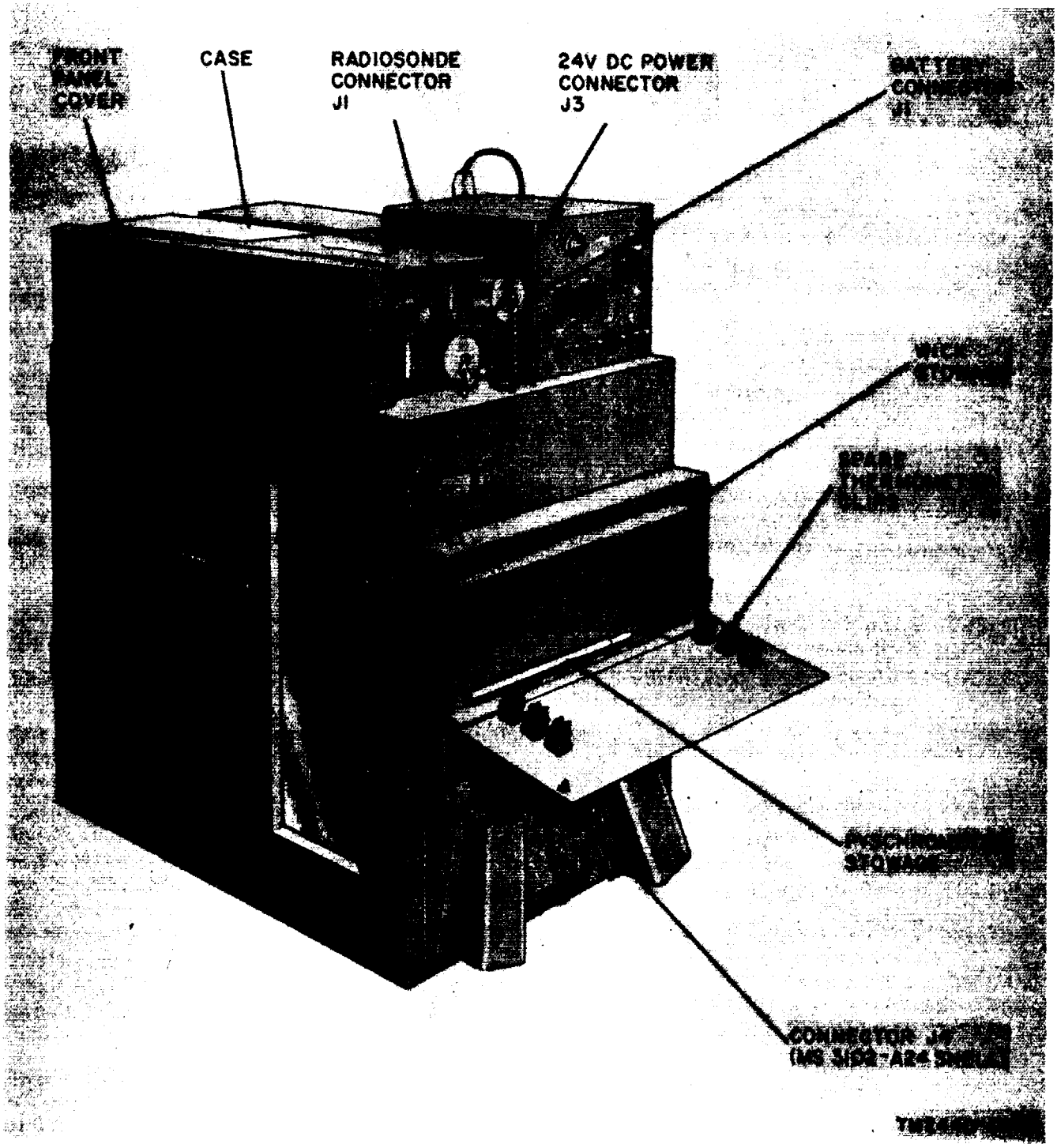
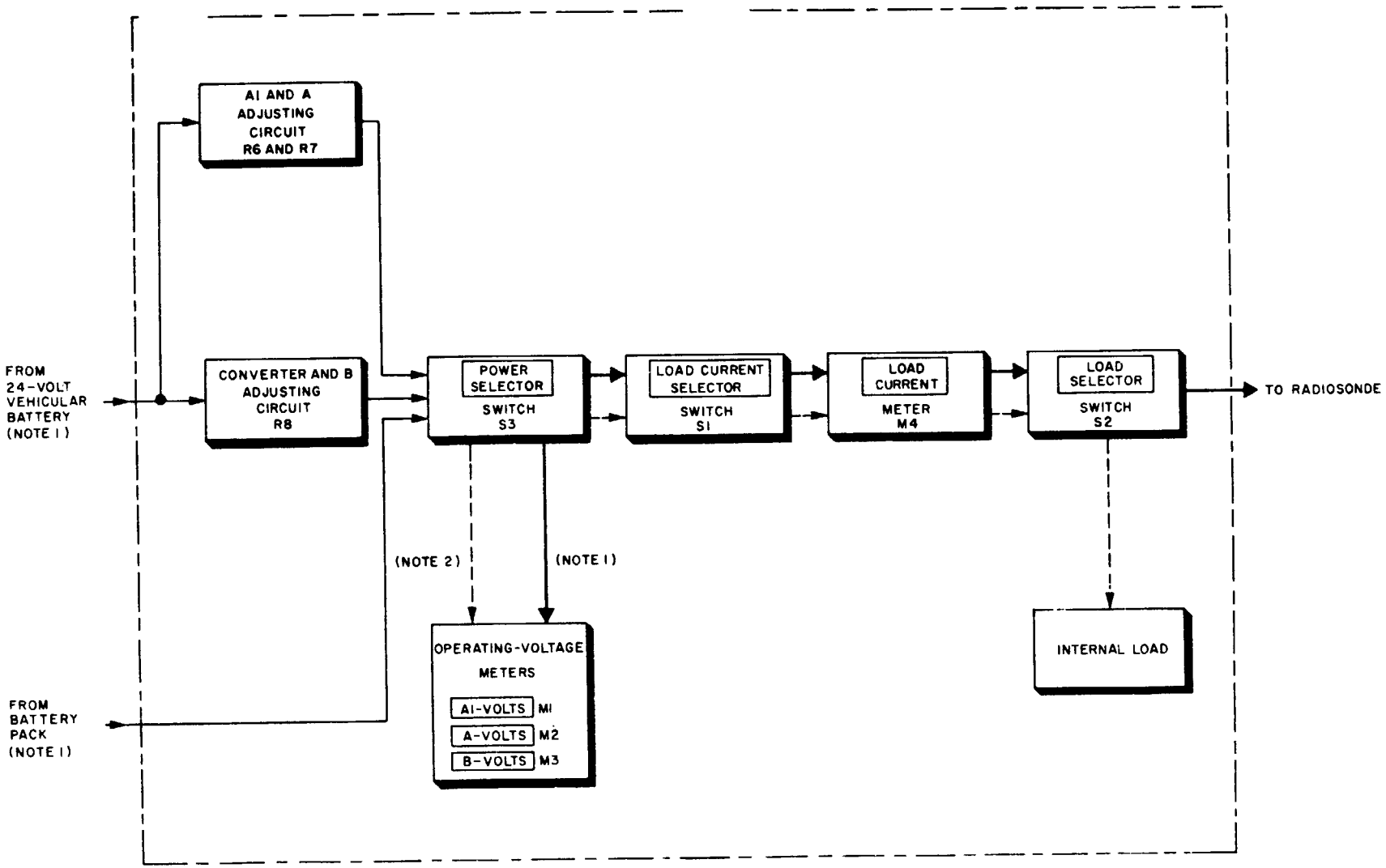


Figure 2–1. Radiosonde Baseline Check Set AN/GMM-1(*).

M4 indicates the value of current in the circuit under test. The current indications are obtained with either a battery pack *(a* below) or a vehicular battery as the source of power *(b* below) and with either type of load (DUMMY or RAD OSONDE), An internal shunting circuit enable the ammeter to measure two current ranges (0-50 and 0–250 milliamperes).



NOTES:

1. INPUT MAY BE FROM EITHER A BATTERY PACK OR A VEHICULAR BATTERY.
2. – – – – INDICATES CIRCUIT SET UP FOR TESTING BATTERY PACK.
3. ——— INDICATES CIRCUIT SET UP FOR TESTING RADIOSONDE.

TM2440-C6-8

Figure 2-2. TS-1848/GMM-1A, block diagram.

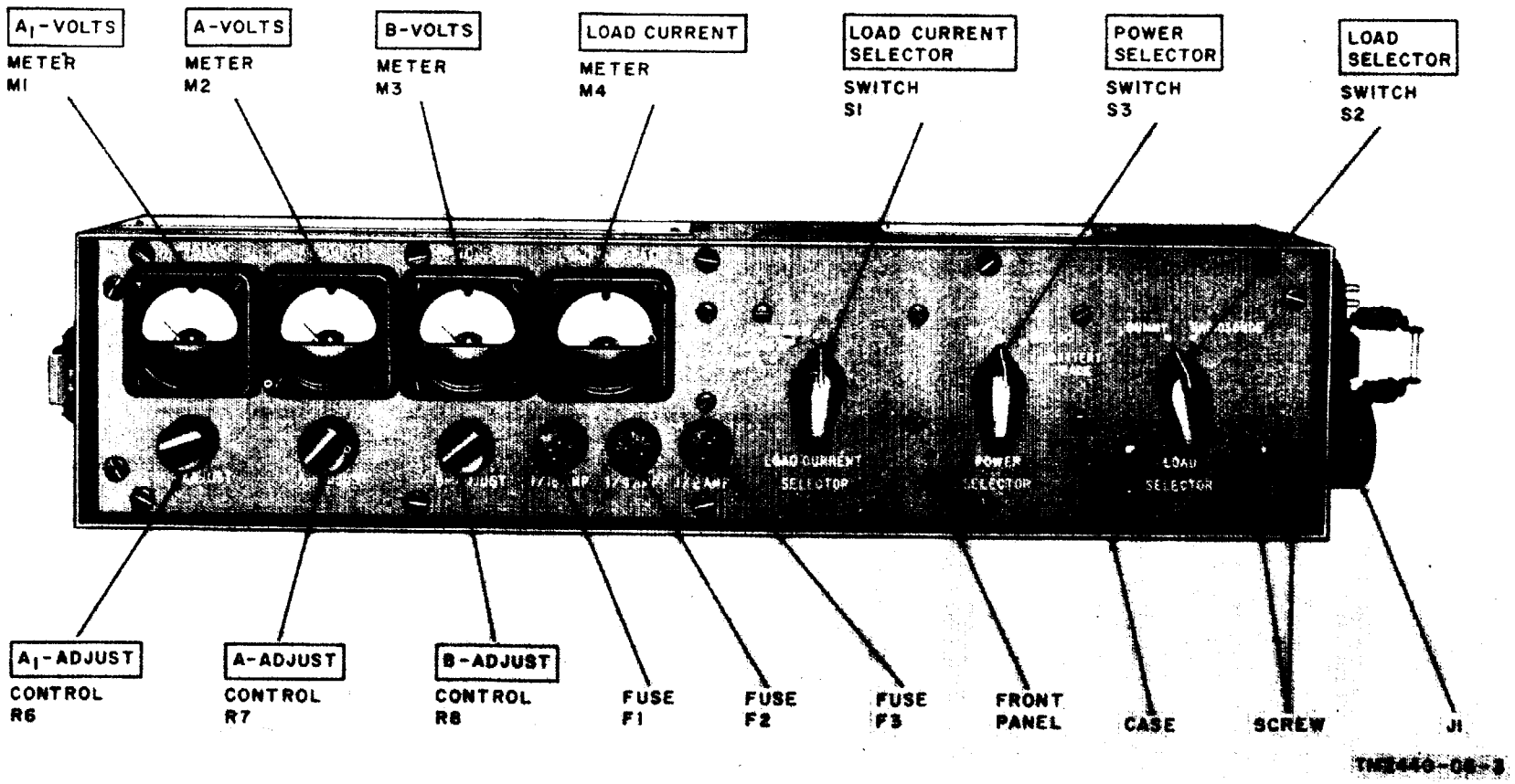


Figure 2-3. TS-1348/GMM-1A, front view.

NOTE

LOAD SELECTOR switch S2 for the positive circuit ($+A_1$) is not affected by the position of the switch. However, on the negative circuit, both the DUMMY and RADIOSONDE positions are affected.

a. Battery Pack Power Source. When a battery pack is used as the input power source, POWER SELECTOR switch S3 is set to BATTERY PACK. LOAD CURRENT SELECTOR switch S1 places LOAD CURRENT meter M4 in series with the load,

(1) *0-250 MA A_1 position (LOAD CURRENT SELECTOR switch S1)* .

(a) Positive circuit. With LOAD CURRENT SELECTOR switch S1 at 0-250 MA A_1, the positive terminal (+250) of meter M4 is connected to the positive side of the input ($+A_1$) through switch S1A contact pin 2, through the wafer and out wiper pin 5, to switch SIB contact pin 5, through the wafer and out wiper pin 8, continuing to switch S3A to wiper at pin 1 through the wafer, out contact pin 3 to connector J2 pin D ($+A_1$ circuit).

(b) DUMMY position (negative). Set LOAD SELECTOR switch S2 to DUMMY. The negative terminal of meter M4 is connected to the negative side of the input (-A) through fuse F2, switches S2 and SIB, wiper pin 4 through the wafer, out contact pin 1, to positive side of load resistor Rl, and from the negative side of load resistor R1 to switch S2 contact pin 3 through the wafer, out wiper pin 2 to switch S3A wiper pin 4, through the wafer, and out contact pin 6 to connector J2 pin E (-A circuit). Meter M4 indicates the value of current drawn by load resistor R1.

(c) RADIOSONDE position (negative). Set LOAD SELECTOR switch S2 to RADIOSONDE. The negative terminal of meter M4 is connected to the negative side of the input (-A) through fuse F2 and switch SIB in wiper pin 4 through the wafer, out contact pin 1 to the connector J1 pin A ($+A_1$ circuit), and from -A circuit connector J1 pin B to switch S2 contact pin through the wafer to wiper pin 2, to switch S3A wiper pin 4, through the wafer and out contact pin 6 to connector T2 pin E (-A circuit). Meter M4 indicates the value of current drawn the radiosonde A_1 circuit.

(2) 0-250 *MA A position (LOAD CURRENT SELECTOR switch S1)* .

(a) Positive circuit. With LOAD CURRENT SELECTOR switch S1 at 0-250 MA A, the positive terminal (+250) of meter M4 is connected to the positive side of the input (+A) through switch S1A contact pin 3, through the wafer and out wiper pin 5, to switch S1B contact pin 10, through the wafer out wiper pin 12 to switch S3C, to wiper pin 7 through the waifer, and out contact pin 9 to connector J2 pin C (+A circuit).

(b) DUMMY position (negative). Set LOAD SELECTOR switch S2 to DUMMY. The negative terminal of meter M4 is connected to the negative side of the input (-B) through fuse F2 and switch S1B, wiper pin 4 through the wafer, to contact pin 3 to positive load resistors R10 and Rll, and from the negative side of load resistor R11 to switch S2 contact pin 11, through the wafer to wiper pin 10, to switch S3A wiper pin 7, through the wafer, and out contact pin 9 to connector J2 pin B (-B circuit). Meter M4 indicates the value of current drawn by load resistors R10 and R1l.

(C) RADISONDE position (negative). Set LOAD SELECTOR switch S2 to RADIOSONDE. The negative terminal of meter M4 is connected to the negative side of the input (-B) through fuse F2 and switch S1B to wiper pin 4, through the wafer to contact pin 3, to connector J1 pin C (+B circuit), and from -B circuit connector J1 pin D to switch S2 contact pin 12, through the wafer to wiper pin 10, to switch S3A wiper pin 7, through the wafer out contact pin 9 and to connector J1 pin B (-B circuit). Meter M4 indicates the value of current drawn by the radiosonde B circuit.

b. Vehicular Battery Power Source. When a vehicular battery is used as the input power source, POWER SELECTOR switch S3 is set to 24VDC. LOAD CURRENT SELECTOR switch S1 places meter M4 in series with the load.

NOTE

LOAD SELECTOR switch S2 for the positive circuit (+A) is not affected by the position of the switch. However, on the negative circuit both the DUMMY and RADIOSONDE positions are affected.

(1) 0-250 *MA A position. (LOAD CURRENT SELECTOR switch S1)* .

(a) Positive circuit. With LOAD CUR RENT SELECT switch S1 at 0-250 MA A, the

positive terminal (+250) of meter M4 is connected to the positive side of the input (resistor R9) through switch S1A, contact pin 2 through the wafer to wiper pin 5, to switch S1B contact pin 5, through the wafer and out wiper pin 8 to switch S3A, to wiper pin 1 through the wafer, and out contact pin 2 to positive side of input resistor R9.

(b) DUMMY position (negative). Set LOAD SELECTOR switch S2 to DUMMY. The negative terminal of meter M4 is connected to the negative side of input (connector J3) through fuse F2 and switch SIB, in wiper pin 4 through the wafer, out contact pin 1 to positive side of load resistor Rl, and from the negative side of load resistor R1 to switch S2 contact pin 3, through the wafer, out wiper pin 2, to switch S3A wiper pin 4, through the wafer, out contact pin 5 in switch S3A wiper pin 10, and contact pin 11 to connector J3 (negative terminal). Meter M4 indicates the value of current drawn by the load resistor R1.

(c) *RADIOSONDE petition (negative).* Set the LOAD SELECTOR switch S2 to RADIOSONDE. The negative terminal of meter M4 is connected to the negative side of input (connector J3) through fuse F2 and switch S13 in wiper pin 4, through the wafer out contact pin 1, to connector J1 pin A (+A circuit), and from -A circuit connector J1 pin B to switch S2 contact pin 4, through the wafer to wiper pin 2, to switch S3A wiper pin 4, and out contact pin 5 to switch S3A in wiper pin 10, through the wafer contact pin 11 to connector J3 (negative terminal). Meter M4 indicates the value of current drawn by the radiosonde A circuit.

(2) 0-250 *MA A position (LOAD CURRENT SELECTOR switch S1)* .

(a) Positive circuit. With LOAD CURRENT SELECTOR switch S1 at 0-250 MA A, the positive terminal (+50) of meter M4 is connected to the positive side of the input (resistor R3) through switch S1A to contact pin 3, through the wafer to wiper pin 5, and to switch SIB contact pin 10, through the wafer to wiper pin 12 to S3C, wiper pin 7 through the wafer, to, contact pin 8 to positive side of input resistor R9.

(b) DUMMY position (negative). Set LOAD SELECTOR switch S2 to DUMMY. The negative terminal of meter M4 is connected to the negative side of the input (connector J3) through fuse F2 and switch SIB, in wiper pin 4 through the wafer, to contact pin 2 to switch S2 wiper pin 6, through wafer contact pin 7, to positive side of load resistor R2, and from the negative side of load resistor R2 to switch S3A wiper pin 4, through the wafer, to contact pin 5, to switch S3A wiper pin 10, through the wafer, to contact pin 11 to connector J3 (negative terminal). Meter M4 indicates the value of current drawn by the load resistor R2.

(c) RADIOSONDE position (negative). Set LOAD SELECTOR switch S2 to RADIOSONDE. The negative terminal of meter M4 is connected to the negative side of the input (connector J3) through fuse F2 and switch SIB in wiper pin 4, through the wafer to contact pin 2, to switch S2 wiper, pin 6, through wafer contact pin 8, to connector J1 pin B (+A circuit), and from -A circuit connector J1 pin B to switch S2 contact pin 4, through the wafer to wiper pin 2, to switch S3A wiper pin 4, through the wafer, to contact pin 5, to switch S3A wiper pin 10, through wafer, to contact pin 11 to connector J3 (negative terminal). Meter M4 indicates the value of current drawn by the radiosonde A circuit.

(3) 0-50 *MA B position (LOAD CURRENT SELECTOR switch S1)* .

(a) Positive circuit. With LOAD CURRENT SELECTOR switch S1 at 0-50 MA 1 the positive terminal (+50) of meter M4 is connected to the positive side of input (resistor R8) through switch S1A, contact pin 4 through the wafer to wiper pin 5, through fuse F1 to switch S1A contact pin 9, through the wafer to wiper pin 10 to switch S3C, wiper pin 4 through wafer, to contact pin 5 to the positive side of input resistor R8.

(b) DUMMY petition (negative). Set LOAD SELECTOR switch S2 to DUMMY. The negative terminal of meter M4 is connected to the negative side of the -115VDC converter output through F2, to switch SIB wiper pin 4 through the wafer, to contact pin 3 to positive load resistors R10 and Rll, and from the negative side of load resistors R10 and Rll to switch S2 contact pin 11, through the wafer to wiper pin 10, to switch S3A wiper pin 7, through the wafer to contact pin 8 to the -115VDC converter output. Meter M4 indicates the value current drawn by the load resistors R10 & R1l.

(c) *RADIOSONDE position (negative).* Set LOAD SELECTOR switch S2 to RADIO SONDE. The negative terminal of meter M4 connected to the negative side of the -115VDC converter output through fuse F2 to switch S1B to wiper pin 4, through the wafer to contact

pin 3, to connector J1 pin C (+B circuit), and from -B circuit connector J1 pin D to switch S2 contact pin 12, through the wafer to wiper pin 10, to switch S3A wiper pin 7, through the wafer to contact pin 8, and to the negative side of the -115VDC converter output.

2-5. A_1 Circuits

The A_1 voltage, supplied from either battery pack (a below) or a vehicular battery (b below), is measured by A_1-VOLTS meter Ml.

a. Battery Pack Power Source. When the A_1 voltage supplied by a battery pack is measured, A_1-VOLTS meter Ml is direct-connected across the input. The A_1 circuit is loaded by a radiosonde set or by a rated dummy load (resistor R1). The load for A_1 input circuit is selected by LOAD SELECTOR switch S2.

(1) With POWER SELECTOR switch S3 at BATTERY PACK, power is obtained from battery pack circuits $+A_1$ and -A to connector J2 (pins D and E) through switch S3. The positive terminal of meter Ml is connected to the $+ A_1$ circuit to connector J2 (pin D) through switches S3B, wiper pin 2 through the wafer, out contact pin 4 to switch S3A, to wiper pin 1, through the wafer, out contact pin 3 to connector J2 pin D (+A, circuit). The negative terminal of meter Ml is connected to the battery pack -A circuit to connector J2 (pin E) through switch S3B in wiper pin 7 through the wafer to contact pin 9 to switch S3A wiper pin 4 through the wafer contact pin 6 to connector J2 pin E (-A circuit).

(2) The load (resistor R1 or radiosonde A_1 circuit) is connected across meter Ml and the input circuit, through LOAD SELECTOR switch S2 and LOAD CURRENT SELECTOR switch S1 (para 2-4a)

b. Vehicular Battery Power Source. When the A_1 voltage supplied by a 24-volt vehicular battery is measured, A_1-VOLTS meter Ml is connected across an equivalent load resistor (R5), and is equal in value to the load (resistor R1 or radiosonde A_1 circuit). Therefore, the voltage across resistor R5, measured by meter Ml, is equal to the voltage that would be measured at the A_1 input or across the load.

(1) With POWER SELECTOR switch S3 at 24VDC, power is obtained from the 24-volt vehicular battery, through Electrical Power Cable Assembly CX-10469/U and diode CR1, and is applied to voltage dropping network R5, R6, and R9. Resistor R6 (A_1-ADJUST) is used to adjust the A_1 voltage to the A_1 voltage range (1.1 to 1.4 volts). Diode CR1 protects the tester if the wrong polarity connection of the CX-10469/U is made.

(2) The positive terminal of meter Ml is connected to the positive side of equivalent load resistor R4 through switch S3B, wiper pin 2 through the wafer to contact pin 3 to resistor R5. The negative terminal of meter Ml is connected to the negative side of equivalent load resistor R5 through switch S3B, wiper pin 7 through the wafer to contact pin 8 to resistor R5.

(3) The positive side of the load (resistor R1 or radiosonde A_1 circuit) is connected to resistor R9 through switch S1B, meter M4, switch S1A, S1B, and S3A. The negative side of the load (resistor R1 or radiosonde -A circuit) is connected to the negative side of input connector J3 through switches S2 and S3A (para 2-4b).

2-6. A Circuits

The A voltage, supplied from either battery pack *(a* below) or a vehicular battery *(b* below), is measured by A-VOLTS meter M2.

a. Battery Pack Power Source. When the A voltage supplied by a battery pack is measured, A-VOLTS meter M2 is direct-connected across the input. The A circuit is loaded by a radiosonde or a rated dummy load (resistor R2). The load for the A input circuit is selected by LOAD SELECTOR switch S2.

(1) With POWER SELECTOR switch S3 at BATTERY PACK, power is obtained from battery pack circuits +A and -A to connector J2 (pins C and E) through switch S3. The positive terminal of meter M2 is connected to the +A circuit to connector J2 (pin C) through switch S3C, wiper pin 10 through the wafer, out contact pin 12 through switch S3C, wiper pin 7 through the wafer, to contact pin 9 to connector J2 pin C (+A circuit). The negative terminal of meter M2 is connected to the -A Circuit to connector J2 (pin E), through switch S3C wiper pin 1, through the wafer to contact pin 3, to switch S3A wiper pin 4, through the wafer, out contact pin 6 to connector J2 pin E (-A circuit).

(2) The load (resistor R2 or radiosonde A circuit) is connected across A-VOLTS meter M2 and the input circuit through LOAD SELEC-

TOR switch S2 and LOAD CURRENT SELECTOR switch S1 (para 2-4a).

b. Vehicular Battery Power Source. When the A voltage supplied a 24-volt vehicular battery is measured, A-VOLTS meter M2 is connected across an equivalent load resistor (R4), and is equal to the load (resistor R2 or radiosonde A circuit). Therefore, the voltage across resistor R4, measured by meter M2, is equal to the voltage that would be measured at the A input or across the load.

(1) With POWER SELECTOR switch S3 at 24VDC, power is obtained from the 24-Volt vehicular battery, through Electrical Power Cable Assembly CX-10469/U and diode CR1 (para 2–5b (1)), and applied to voltage-dropping network R4, R7, and R3. Resistor R7 (A-ADJUST) is used to adjust the A voltage to the A voltage range (4.0 to 4.5 volts).

(2) The positive terminal of meter M2 is connected to the positive side of equivalent load resistor R4 through switch S3C, wiper pin 10, through the wafer to contract pin 11 to resistor R4. The negative terminal of meter M2 is connected to the, negative side of equivalent load resistor R4 through S3C, wiper pin 1, through the wafer to contact pin 2 to resistor R4.

(3) The positive side of the load (resistor R2 or radiosonde A circuit is connected to resistor R3 through switches S2 and S1B, meter M4, and switch S1A, S1B, and S3C. The negative side of the load (resistor R2 or radiosonde -A circuit) is connected to the negative side of input connector J3 through switch S3A (para *2–4b).*

2–7. B Circuits

The B voltage, supplied from either a battery pack *(a* below) or a vehicular battery *(b* below) is measured by B-VOLTS meter M3.

a. Battery Power Source. When the B voltage supplied by a batterv pack is measured, B-VOLTS meter M3 is connected through switch S1, fuses F1 and F2, meter M1, and switch S3. The B circuit is loaded by a radiosonde or a rated dummy load (resistors R10 and R11). The load for the B input circuit is selected by LOAD SELECTOR switch S2.

(1) With POWER SELECTOR switch S3 at BATTERY PACK, power is obtained from battery pack circuits +B and -B, connector J2 (pins A and B), through switch S3. The positive terminal of meter M3 is connected to the +B circuit to connector J2 (pin A) through switches S1A and S3C, through switch SIB contact pin 3, through the wafer out wiper pin 4, through fuse F2, meter M4, and switch S1A contact pin 4, through the wafer, out wiper pin 5, through fuse F1 to switch S1A contact pin 9, through the wafer out wiper pin 10, to switch S3C wiper pin 4, through the wafer out contact pin 6, to connector J2 pin A (+B circuit). The negative terminal of meter M3 is connected to the -B circuit to connector J2 (pin B) through switch S3A, wiper pin 7, through the wafer contact pin 9 to connector J2 pin B (-B circuit), and through switch S3A wiper pin 7, through the wafer, out contact pin 8 to the negative side of the –115-volt dc converter output.

(2) The load (resistors R10 and R11 or radiosonde B circuit) is connected across B-VOLTS meter M3 and the input circuit through LOAD SELECTOR switch S2 and LOAD CURRENT SELECTOR switch S1 (para 2–4).

b. Vehicular Battery Power Source. When the B voltage supplied by a 24-volt vehicular battery is measured, B-VOLTS meter M3 is connected across the output of the converter in series with resistor R8 (B-ADJUST). The converter steps up the 24 volts, supplied by the vehicular battery, to approximately 115 volts dc required by the B circuit.

(1) With POWER SELECTOR switch S3 at 24VDC, power is obtained from the 24-volt vehicular battery, through Electrical Power Cable Assembly CX–10469/U and diode CR1 (para 2–5b (1)), and applied to the converter. The output of the converter is adjusted to the B voltage range (100 to 115 volts) by resistor R8 (B-ADJUST).

(2) The positive terminal of meter M3 is connected to the positive side of the converter through S1B contact pin 3, through the wafer, out wiper pin 4, through fuse F2, meter M4, and switch S1A contact pin 4, through the wafer, out wiper pin 5, through fuse F1 to switch S1A contact pin 9, through the wafer, out wiper pir 10 to switch S3C wiper pin 4, through the wafer out contact pin 5 through resistor R8, to the positive side of the +115VDC converter output.

The negative terminal of meter M3 is connected to the negative side of the output (–115VDC converter).

Section II. BASELINE CHECK SET

2-8. Baseline Check Set Circuits

The block diagram (fig. 2-4) functional description of the baseline check set is divided into five major test areas: ac power, relay control, illuminating and test light, fan and heater, and preflight test.

a. AC Power Circuit. A power jack at the rear of the control panel provides the 115-volt power input. The power input is fused and applied to the operating circuits of the calibration chamber through the POWER switch on the control unit front panel.

b. Relay Control Circuit. A selector switch controls the internal switching circuits of the radiosonde being tested for monitoring the transmitted weather data. The selector switch applies power to microswitches and relay through a motor and cam action to activate one or all the temperature, reference, or humidity circuits in the radiosonde set.

c. Illumination and Test Light Circuit. The control panel light switch applies alternating current (ac) power to illuminate the interior of the calibration chamber.

d. Fan and Heater Circuit. The control panel FAN switch connects the 115-volt power input from the POWER switch to the fan motor. The control panel heater switch connects the 115-volt ac input from the POWER switch to the heater element in the calibration chamber.

e. *Radiosonde Test Set TS-1348/GMM-1A.* This equipment is used during preflight operation only. Ac power will not be used during preflight operation. The test set consists of a series of switching and meter circuits for measuring the output values of a battery pack before installation in a radiosonde unit, or controls for adjusting values of a 24-volt vehicular battery, used as a source of power for checking radiosonde units or measuring the load current values of the radiosonde circuits when either source of power is used.

2-9. Ac Power Circuit (fig. 2-5)

(fig. 2-5)

When jack J3 is connected to a 110- to 115- volt power source and POWER switch S6 is at ON, power is applied to the operating circuits of the calibration chamber. Fuse F1 protects the power circuits from overload. When switch S6 is set to ON, power is applied to the primary of transformer T1. This transformer steps down the power to 6.3 volts in the secondary. The output of the secondary is used to energize lamp 13 on the central unit panel, two relays, and two lights in the calibration chamber (para 2-10). When POWER switch S6 is at ON, power is also applied to motor B2, if switch S1 has been set to AUTOMATIC (fig. 2-6).

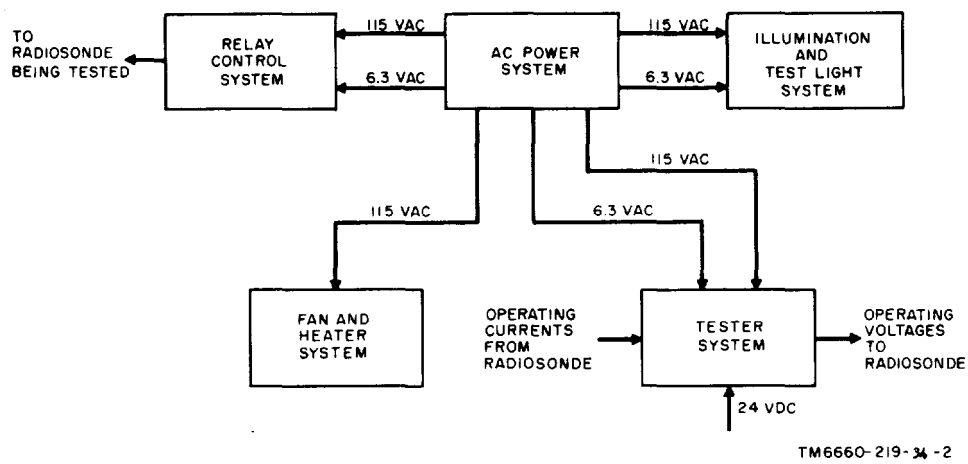


Figure 2-4. Check Set AN/GMM-1(*) Block Diagram.

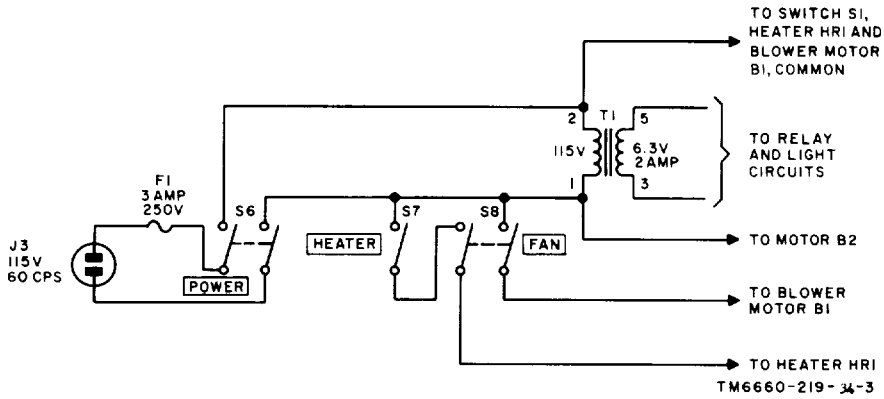


Figure 2-5. Ac Power Circuit, Simplified Schematic Diagram.

2-10. Relay Control Circuit, Manual Operation

a. HUMIDITY position, (fig. 2-7). When POWER switch S6 is at ON, and switch S1 is set to HUMIDITY, the circuit for relay K1 is completed and the relay operates. The operating circuit path is through terminal 3 of transformer T1, winding of relay Kl, terminal 3 of switch S1, the rotor of switch S1, segment Y of switch S1, and terminal 5 of transformer T1. The contacts of relay K1 are connected to the radiosonde modulator during the baseline check so that operation of relay K1 switches in the humidity circuit.

b. REFERENCE position, (fig. 2-8). When POWER switch S6 is set to ON and switch S1 is set to REFERENCE, the circuit for relay K2 is completed and the relay operates. The operating path is through terminal 3 of transformer T1, the winding of relay K2, terminal 2 of switch S1, rotor of switch S1, segment Y of switch S1, and terminal 5 of transformer T1. The contacts of relay K2 are connected to the radiosonde modulator during the baseline check so that operation of relay K2 switches in the ground-return connection of the radiosonde low-reference circuit.

c. TEMPERATURE position, (fig. 2-9). When POWER switch S6 is set to ON and switch S1 is set to TEMPERATURE, no power is applied to relay K1 or K2, and the relays do not operate. During this period of the baseline check, the radiosonde temperature circuit operates.

2-11. Relay Control Circuit, Automatic Operation

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

(1) When switch S1 is placed to the AUTOMATIC position (fig. 2-6), 117 vac is applied to cam motor B2. The operating circuit path is through S6, the rotor of S1, terminal 8 of S1 (segment Y), motor B2, and S6. The power causes B2 and the attached cam to rotate at a speed of one revolution per minute. The cam operates microswitches S3, S4, and S5 to cause relays K1 and K2 to automatically operate at 15-second intervals,

(2) When switch S3 is closed, relay K2 is energized, placing the humidity circuit in operation. The operating path for relay K2 is through terminal 3 of transformer T1, the winding of relay K2, the stator of switch S1, and terminal 5 of transformer T1. When relay K2 is energized, its contacts close. During the radiosonde baseline check, the contacts of relay K2 are connected to the radiosonde modulator and 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. The high end of the rotating cam disconnects all the microswitches for a period of 15 seconds, during which time the temperature circuit of the radiosonde unit 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 operates, switching in the low-reference circuit. The operating circuit is the same as that described in (1) above, except 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; relay K2 is released when the lever of switch S5 enters the indent of the cam, and switch S5 closes.

(4) When switch S5 closes, relay K1 is energized and operates. The operating path of relay K1 is through terminal 3 of transformer T1, the winding of relay K1, the stator of switch S5, the

rotor of switch S5, terminal 4 of switch S1, the rotor of switch S1, segment Yof switch S1, and terminal 5 of transformer T1. When relay K1 is energized, its contacts close. During a radiosonde baseline check, the contacts of relay K1 are connected to the radiosonde modulator, switching in the humidity circuit. Switch 5 remains operated for 15 seconds until its lever emerges from the indent of the cam, releasing relay Kl; then switch S3 closes, repeating the procedure in (1) above.

b. Radiosonde Baseline Check Set AN/GMM-1A.

(1) Automatic operation of relays K1 and K2 in Radiosonde Baseline Check Set AN/GMM-lA is similar to that for model AN/GMM-l except that only two microswitches (S3 and S4) are used (fig. 2-6.1).

(2) When selector switch S1 is placed to the AUTOMATIC position, the ac voltage is applied through terminal 4 of S1 to a contact of microswitch S4. With the cam rotated to a position closing S4, the essential circuit path is through S4, to the center connection of S3. With S3 activated, the circuit is completed to K2. When the cam rotates sufficiently for S3 to switch contacts, the circuit is completed to relay K1. When the cam continues to rotate to the point where the contacts of S4 open, neither relay will be energized and the radiosonde will transmit information depicting the temperature during the baseline check.

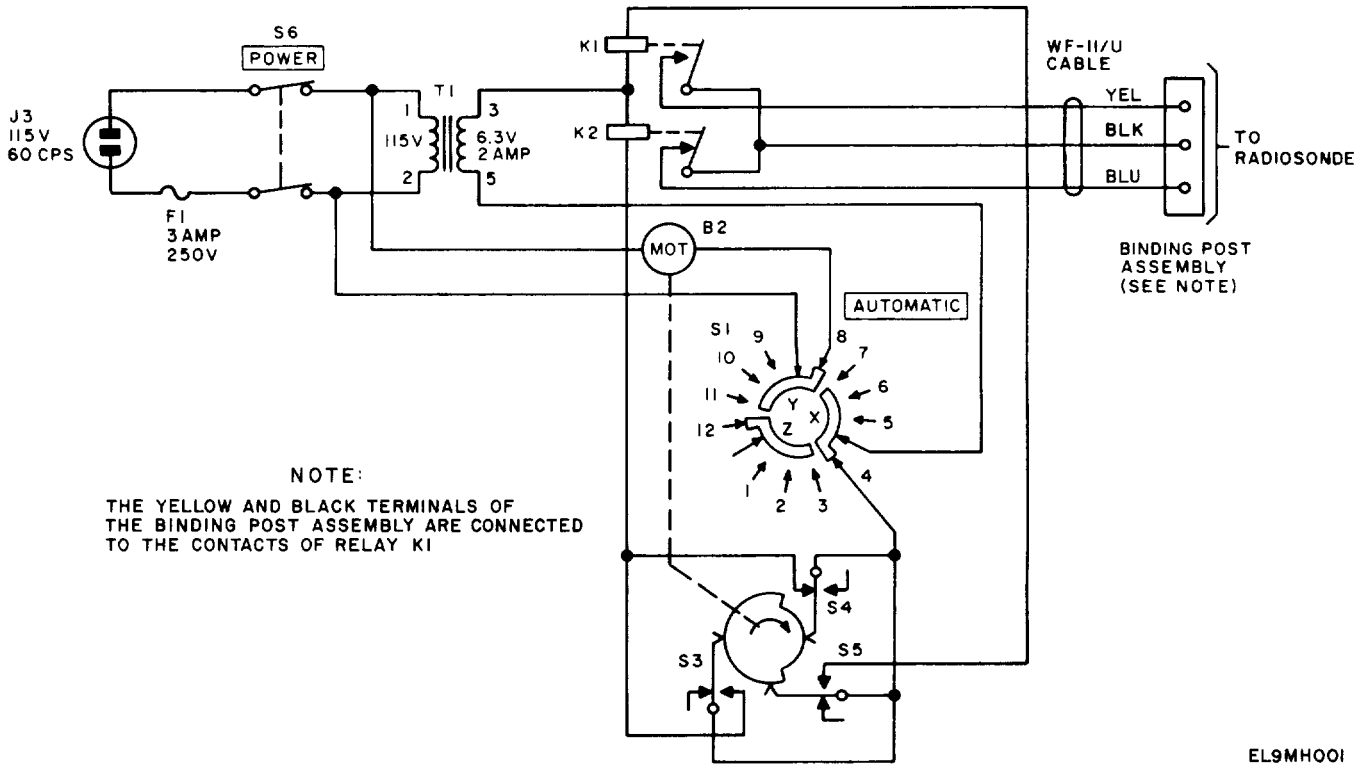


Figure 2-6. Relay Control Circuit With Selector Switch S1 in AUTOMATIC Position, Simplified Schematic Diagram, Radiosonde Baseline Check Set AN/GMM-1.

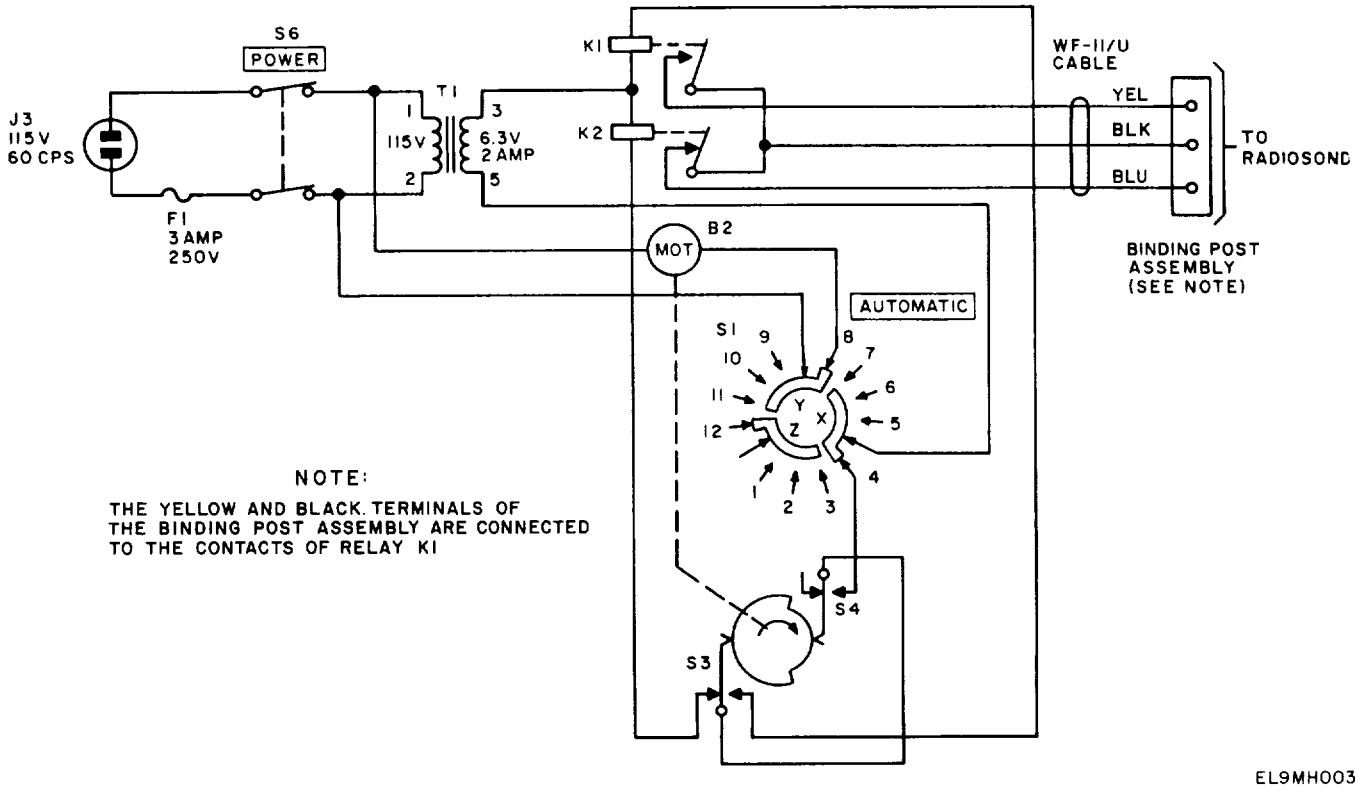


Figure 2-6.1. Relay Control Circuit With Selector Switch S1 in AUTOMATIC Position, Simplified Schematic Diagram, Radiosonde Baseline Check Set AN/GMM-1A.

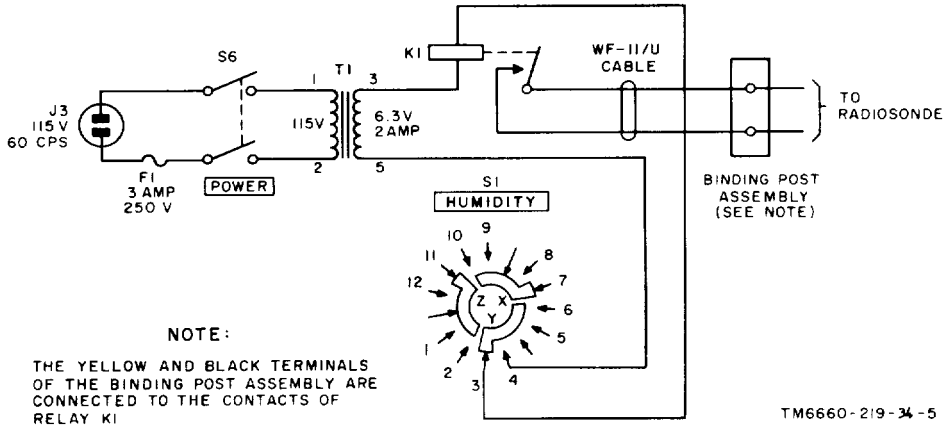


Figure 2-7. Relay Control Circuit With Selector Switch S1 in Humidity Position, Simplified Schematic Diagram.

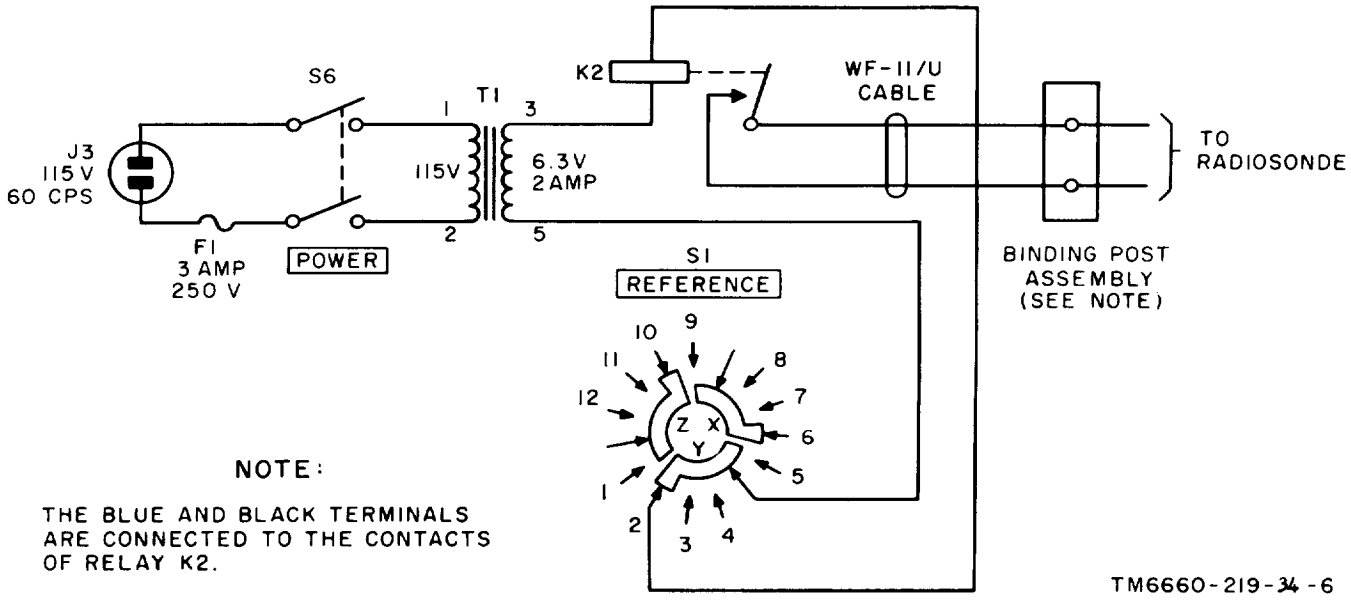


Figure 2-8. Relay Control Circuit With Selector Switch S1 in REFERENCE Position, Simplified Schematic Diagram.

2-12. Illumination and Test Light Circuit (fig. 2-10)

a. The output of transformer T1 secondary winding is applied through LIGHT switch S2 to lights 11 and 12, which are parallel-connected. When power is applied through POWER switch S6 and LIGHT switch S2 is closed, 11 and 12 are energized to illuminate the interior of the calibration chamber.

b. The 6.3-volt output from the secondary winding of transformer T1 is also applied to one side of test lamp 13 and the black lead of the binding post assembly. During the radiosonde commutator adjustment, the biniding post assembly is connected to the test leads of the radiosonde unit. When the contact arm of the commutator touches a conducting segment, test lamp 13 lights to indicate continuity.

2-13. Fan and Heater Circuit (fig. 2-11)

Motor B1 and heater HR1 are controlled by FAN switch S8 and HEATER switch S7. These switches are on the control unit panel.

a. Motor B1 is operated when POWER switch S6 and FAN switch S8 are set to ON. 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 and energized when power is applied to the equipment with HEATER switch S7 and FAN switch S8 closed.

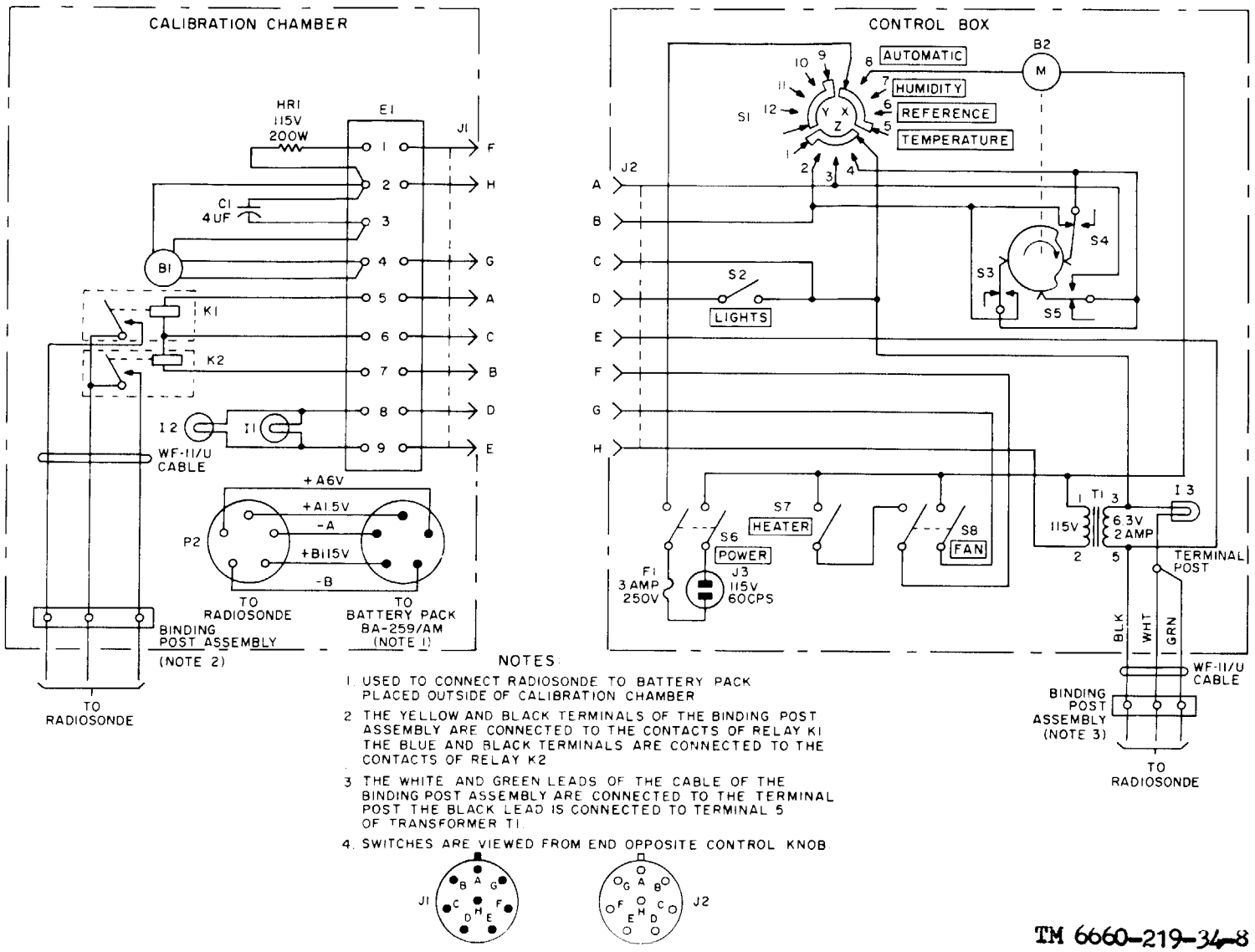
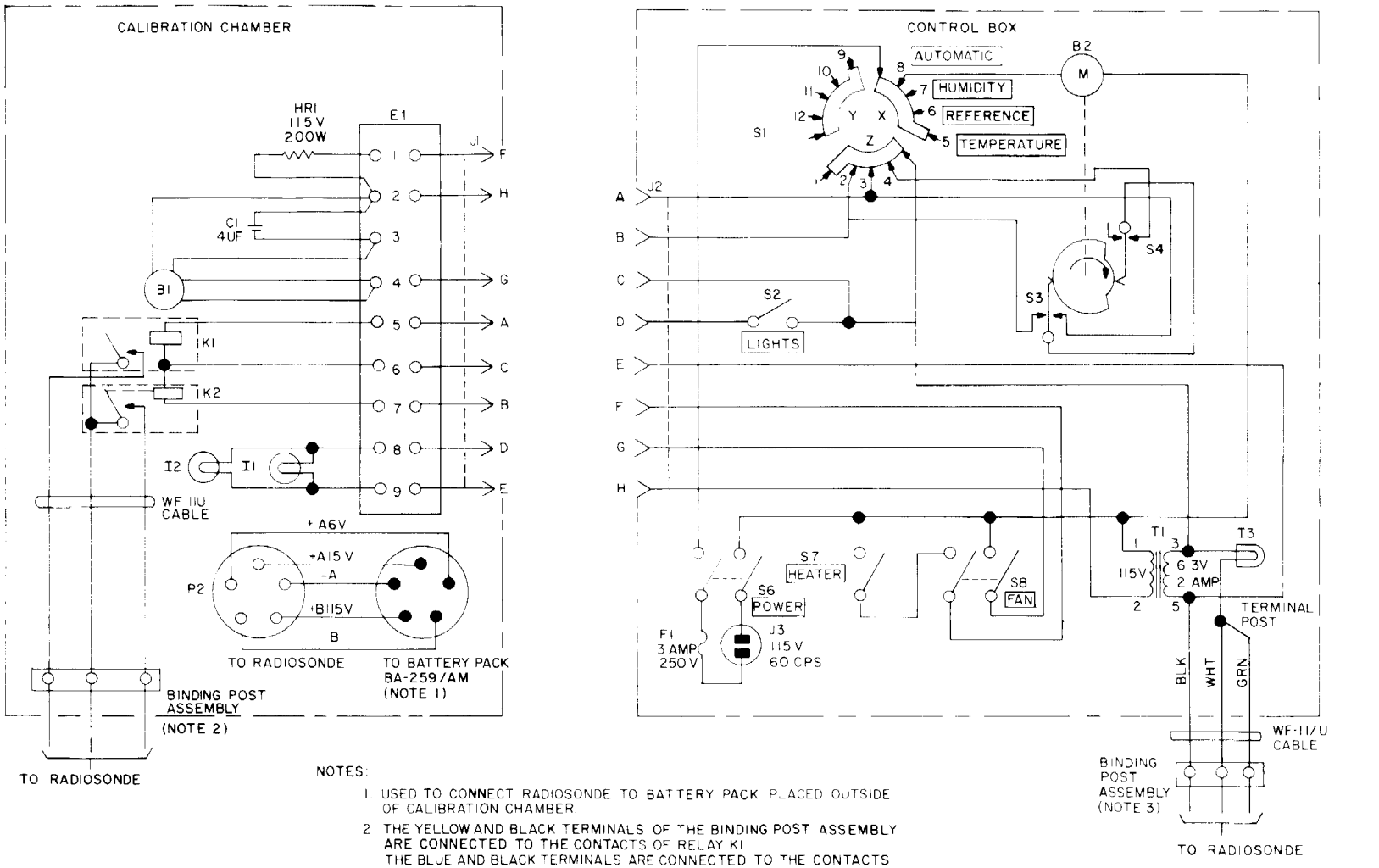


Figure 2-9. Check Set AN/GMM-1, Schematic Diagram.



NOTES:

1. USED TO CONNECT RADIOSONDE TO BATTERY PACK PLACED OUTSIDE OF CALIBRATION CHAMBER.
2. THE YELLOW AND BLACK TERMINALS OF THE BINDING POST ASSEMBLY ARE CONNECTED TO THE CONTACTS OF RELAY K1. THE BLUE AND BLACK TERMINALS ARE CONNECTED TO THE CONTACTS OF RELAY K2.
3. THE WHITE AND GREEN LEADS OF THE CABLE OF THE BINDING POST ASSEMBLY ARE CONNECTED TO THE TERMINAL POST. THE BLACK LEAD IS CONNECTED TO TERMINAL 5 OF TRANSFORMER T1.
4. SWITCHES ARE VIEWED FROM END OPPOSITE CONTROL KNOB.

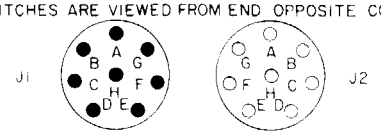


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Figure 2-9.1 Check Set AN/GMM-1A, Schematic Diagram.

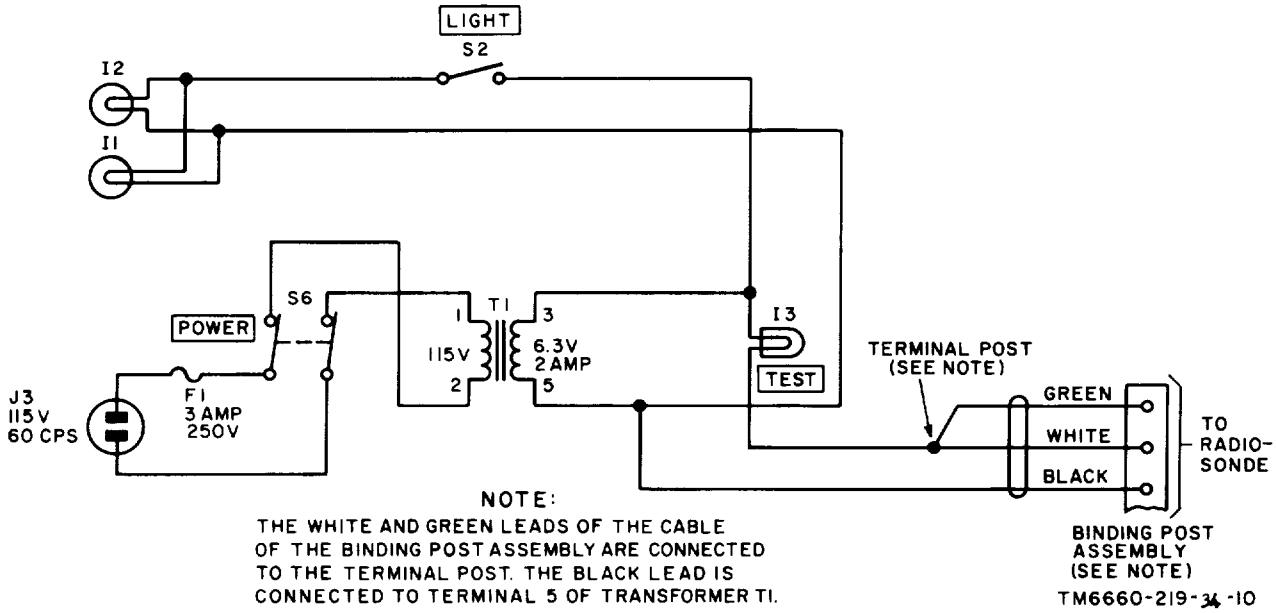

Figure 2-10. Illumination and Test Light Circuit Simplified Schematic Diagram

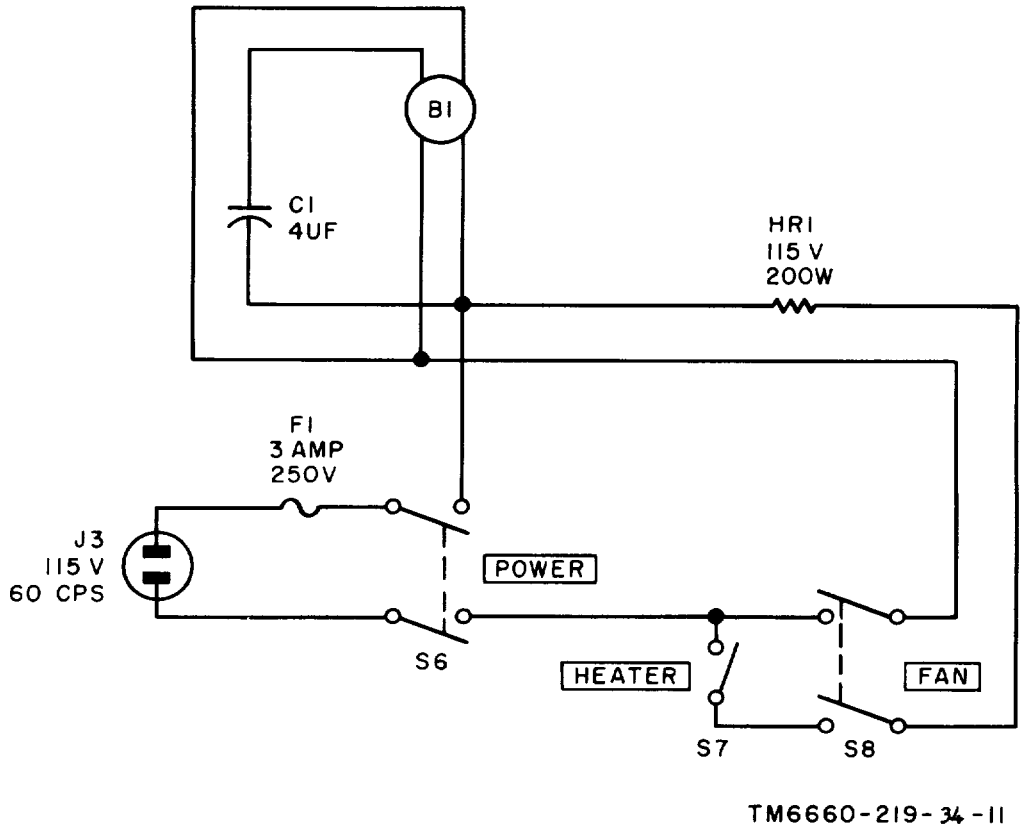

Figure 2-11. Fan and Heater Circuit, Simplified Schematic Diagram.

CHAPTER 3

DIRECT SUPPORT

Section I. GENERAL TROUBLESHOOTING INFORMATION

WARNING

When troubleshooting or making repairs in this equipment, be extremely careful. Dangerous voltages exist in the equipment on the 115-volt ac line connections. Use insulated test probes when making voltage measurements.

3-1. General Instructions

a. Troubleshooting at direct and general support categories includes all the techniques outlined for organizational maintenance and any special or additional techniques required to isolate a defective part. The direct support and general support procedures are not complete in themselves but supplement the procedures described in organizational maintenance. The systematic troubleshooting procedure, which begins with the operational and sectionalization checks performed at an organizational level, must be completed by means of further localizing and isolating techniques. Paragraphs 3-4 through 3-8 provide unit troubleshooting procedures which must be performed at the direct and general support maintenance level.

b. Although some troubleshooting may be performed while the equipment is operating, troubleshooting at the direct and general support maintenance level is usually done with the component removed from the equipment with which it is normally associated. Paragraph 3-2 describes the steps to be followed in a systematic procedure that will enable the maintenance man to isolate the cause of the trouble and correct the fault.

3-2. Organization of Troubleshooting Procedures

a. General The first step in servicing a defecive equipment is to sectionalize the fault. Sectionalization means tracing the fault to the major component. Refer to TM 11–6660–219–12 for the sectionalization procedures. The second step is to localize the fault. Localization means tracing the fault to the defective subchassis or stage. Isolation means tracing the fault to the defective part. Some faults, such as burned-out resistors, arcing, or shorted transformers, often may be isolated by sight, smell, or hearing. The majority of faults must be isolated by checking voltages and resistances.

b. Sectionalization Check. After the trouble has been sectionalized, make an operational test (para 3-8) which serves as a check on the sectionalizing tests. It indicates definitely whether or not the unit is functioning properly. The operational test is made with the suspected unit disconnected from the system and with the power on. If the operational test does not apply, make a continuity test (para 3–9) with the power turned off. When these tests indicate that a component is faulty, the procedures described in (1) and (2) below will often lead the maintenance personnel directly to the source of trouble; if not, the localization and isolation tests *(c* and *d* below) will aid in locating the defective part or circuit. Refer to figure 4–2 for resistor-inductor-capacitor information.

(1) Visual inspection. The purpose of visual inspection is to locate faults without testing or measuring circuits. All meter readings, scope patterns, or other visual signs should be observed and an attempt made to localize the fault to a particular subchassis or stage.

(2) Pluckout parts. Defective tubes and other pluckout parts are responsible for many cases of trouble. Remove and test all pluckout parts suspected of being faulty (TM 11-6660-219-12). Replace each defective part with an identical part known to be good.

c. Localization. The trouble symptoms listed in the troubleshooting charts (para 3-12) will aid in localizing trouble to a component part. First, localize the trouble to a stage or subchassis, and then isolate the trouble within that

stage or subchassis by voltage, resistance, and continuity measurements.

d. Isolation.

(1) *Voltage and resistance measurements.* Make voltage and resistance measurements and continuity checks by using schematic diagrams to isolate troubles.

(2) *Intermittent troubles.* In all tests, the possibility of intermittent troubles should not be overlooked. If present, this type of trouble often may be made to appear by tapping or jarring the equipment. Check the wiring and connections to the units of the baseline check set.

3–3. Tools and Test Equipment Required

Tools and test equipment (other than those required at organizational level) required to perform the testing procedures given in this chapter are listed below.

a. Tools.

Tools	*Federal stock No.*	Qty
Tool Kit, Radio Repair TK-115/G.	5180-856-1578	1

b. Test Equipment.

Nomenclature	*Federal stock No.*	*Technical manual*
Multimeter TS-352B/U or equal.	6625-242-5023	TM 11-6625-366-15
Voltmeter, Electronic AN/USM–98A, or equal.	6625–753-2116	TM 11-6625-599-12

Section II. FUNCTIONAL TROUBLESHOOTING

3-4. General

Prepare Radiosonde Baseline Check Set AN/GMM-1A with Radiosonde Test Set TS-1348/GMM–1 for operation. Make preflight tests of Battery Pack BA–259/AM and the radiosonde unit. The test set is mounted on top of the baseline check set and provides a dummy load to measure the output voltages of the battery pack. The test set also measures the operating currents of the radiosonde unit under test when powered by either a battery pack or 24-volt vehicular battery, When the preflight tests are completed, disconnect the test set before using the baseline check set, which requires a 110- to 115-volt ac power source.

WARNING

Do not attempt to operate the TS-1348/GMM–l when the baseline check set is connected to the 110- to 115-volt ac source. The voltages are high enough to cause shock or injury.

3–5. Setup for Operational Tests on Radiosonde Test Set TS–1348/GMM–1A

a. Battery Check for Battery Pack BA–259/AM.

Operation tests using the control panel

Switch	*Position*	*Results to be obtained*
POWER SELECTOR	OFF	None.
LOAD SELECTOR	DUMMY	None.
POWER SELECTOR	BATTERY	Battery pack under test should indicate the following voltages: A_1-VOLTS meter: 1.1 to 1.7 volts. A-VOLTS meter: 5.5 to 7.9 volts. B-VOLTS meter: 90-120 volts.
POWER SELECTOR	OFF	Voltmeters inoperative, disconnect battery pack.

b. Radiosonde Unit With Battery Pack.

(1) Connect Special Purpose Electrical Cable Assembly CX–10470/U to connector J4 and radiosonde connector J3. Connect the radiosonde battery to connector P2 inside the calibration chamber or to connector J2 on the outside chamber.

Switch	*Position*	*Results to be obtained*
LOAD SELECTOR	Radiosonde	None.
LOAD CURRENT SELECTOR	(in sequence)	LOAD CURRENT meter should indicate the following:
	0-50ma-B	(total plate current) 19.9 to 22.0 ma.
	0-250ma-A	(A filament current) 120 to 150 ma.
	0-250ma-A_1	(A_1 filament current) 64 to 100 ma.
LOAD SELECTOR	Dummy	Disconnect radiosonde set.
POWER SELECTOR	OFF	Equipment shutdown.

(2) Disconnect the battery pack and remove the special purpose cable.

c. Radiosonde Unit With 24-Volt Vehicular Battery Source.

(1) Connect the female end of Electrical Power Cable CX-10568/U to 24-volt dc power connector J3, and the male end to the 24-volt dc vehicular power source. Proceed as follows:

Switch	*Position*	*Results to be obtained*
LOAD SELECTOR	Dummy	None.
POWER SELECTOR	24 VDC	Power indication.

(2) Adjust the voltage controls until the volt meters indicate within the limits given below:

Controls	*Meter*	*Indication*
A_1 ADJUST	A_1-VOLTS	1.1 to l.4 volts (filament voltage).
A ADJUST	A-VOLTS	4.0 to 4.5 volts (A filament voltage).
B-ADJUST	B-VOLTS	100 to 115 volts (B+ voltage).

(8) Connect the special purpose cable with the radiosonde unit and follow the procedure given in b above.

3-6. Resistance and Converter Cheek Measurements for Radiosonde Test Set TS-1348/GMM-1A

a. Remove the test set front panel cover and the front panel (fig. 2-3) and carefully pull the panel out from the case.

b. Set the POWER SELECTOR switch to OFF.

c. Set the LOAD SELECTOR switch to RADIOSONDE.

d. Using the multimeter, set up for resistance measurement, and check the value of resistors R1 through R11 as outlined in TM 11-6660-219-12. Replace any resistor found to be defective as described in paragraph 3-21.

e. Check the value of diode CR1 by connecting the positive lead of the multimeter to the positive (+) terminal of the diode, and the negative lead to the negative terminal (-); the multimeter should indicate 150 ohms.

f. Reverse the multimeter leads, the multimeter should indicate approximately 750,000 hms. If the resistance values indicated in e above and this subparagraph are not obtained, replace the diode as described in paragraph 3-20.

g. Check the test set converter as follows:

(1) Disconnect and tag all leads from the converter terminals.

(2) Connect the positive lead of the multimeter to the positive (+) 24 V terminal of the converter and the negative lead to the negative (-) terminal; the multimeter should indicate 5 ohms.

(3) Reverse the leads on the 24 V terminal, the multimeter should indicate approximately 250 ohms.

(4) Connect the positive lead of the multimeter to the positive (+) 115 VDC terminal, the multimeter should indicate 20,000 ohms.

(5) Reverse the leads on the 120-volt terminal, the multimeter should indicate 30,000 ohms.

(6) If the resistance measurements are not obtained as described above, replace the converter.

3-7. Pretest Setup for Radiosonde Baseline Check Set AN/GMM-1A

a. Set the control unit (fig. 3-1) controls as indicated below to prepare the baseline check for operational tests.

Control	*Setting*
POWER	OFF
FAN	OFF
HEATER	OFF
LIGHT	OFF

b. Connect the control unit to the calibration chamber (fig. 3-2) and to the 115-volt ac power source (TM 11-6660-219-12).

3-8. Operational Test, Fan, Heater, Light, and Indicator Circuits

a. General. The chart in *b* below indicates the

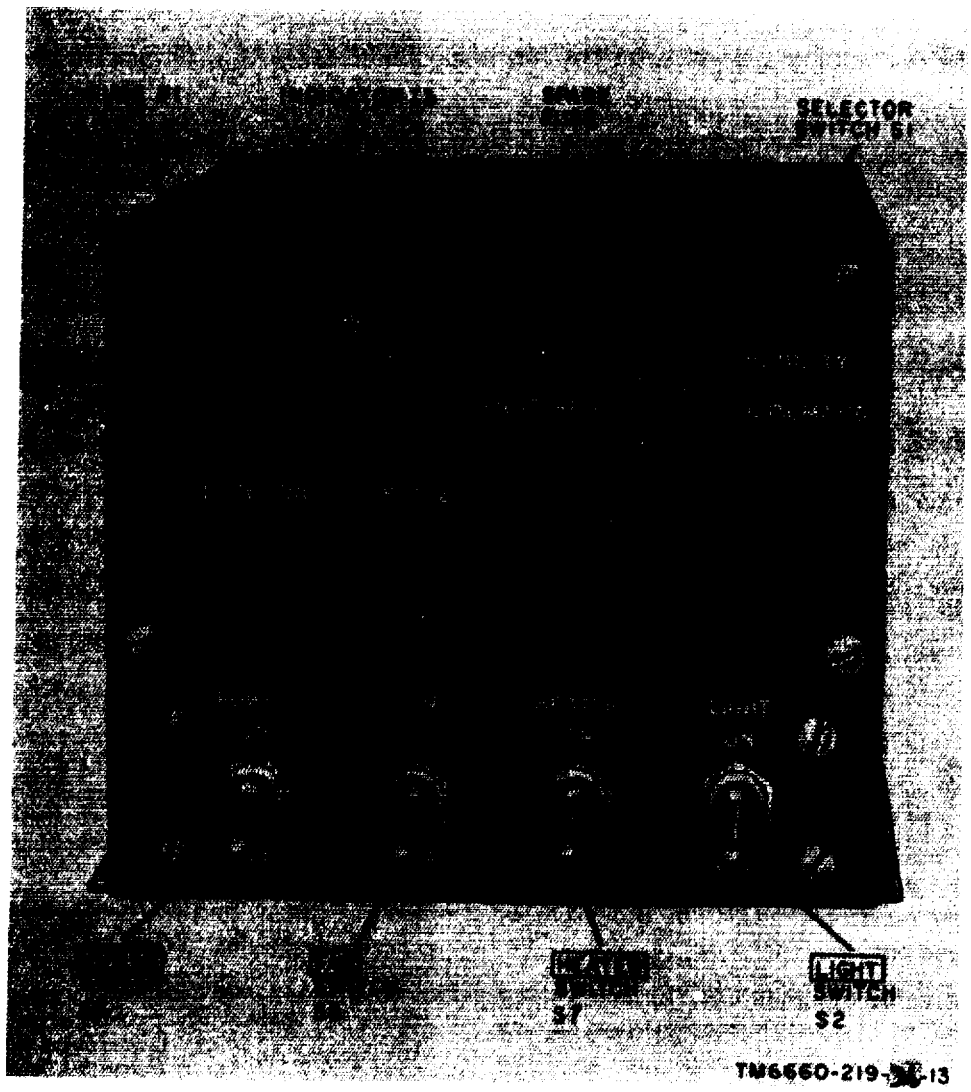

Figure 3-1. Control unit front panel.

equipment switch, and switch position, and the results to be obtained from each test. Perform the tests in the sequence given.

h. Operational Test Chart. After performing each test listed in the chart below, leave each switch in the position listed in the *switch* column.

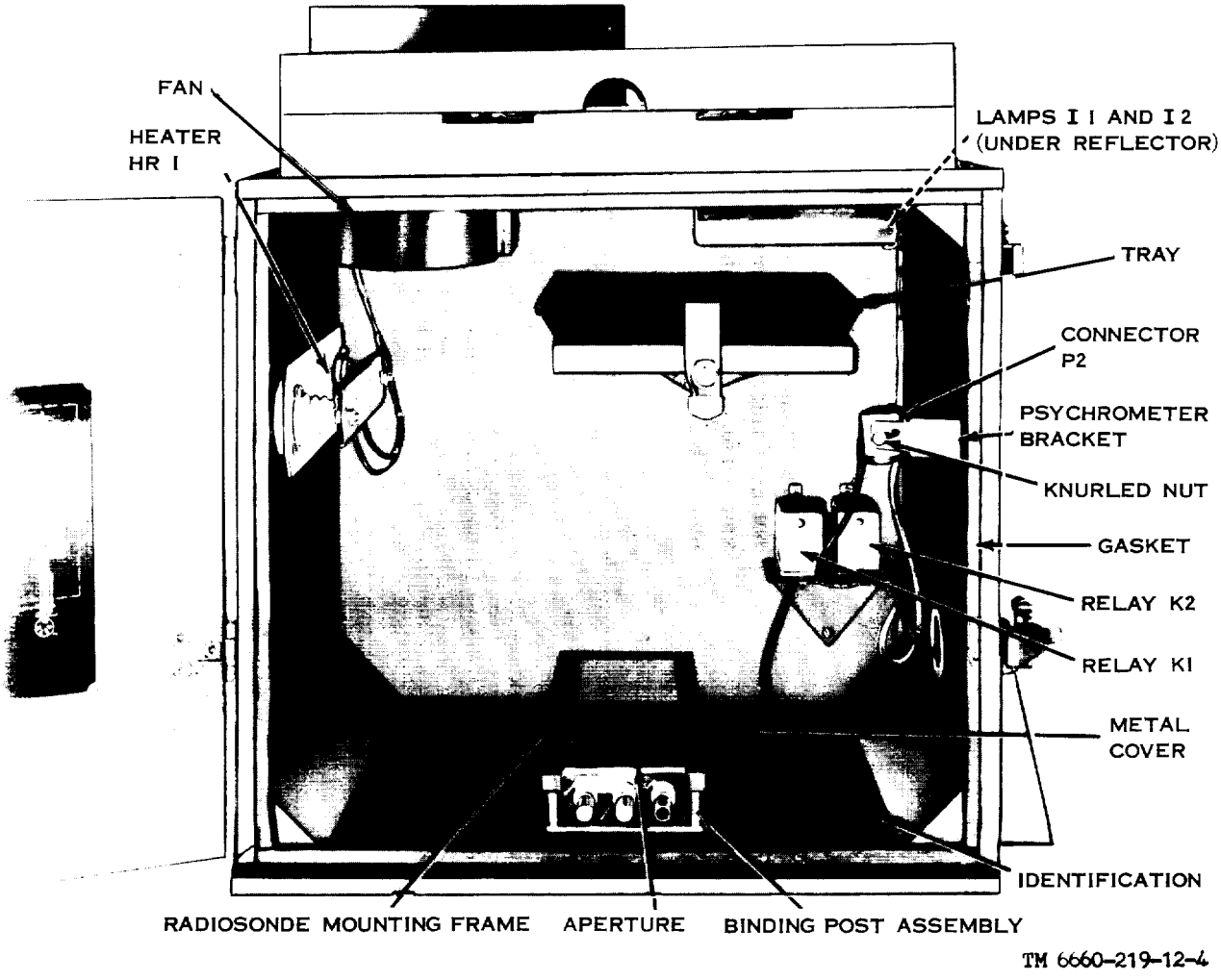

Figure 3-2. Calibration Chamber, Interior View.

Item No.	Equipment	Switch	Procedure	Result to be obtained
1	Control unit	POWER: ON		None.
2	Control unit	FAN: ON		Fan in calibration chamber operates.
3	Control unit	HEATER: ON		Heater begins to warmup.
4	Control unit	LIGHT: ON		Lamps I1 and I2 (fig. 2-10) light.
5	Control unit		*a.* Connect a jumper wire from the black binding post of the binding post assembly, to the yellow binding post, and then to the blue binding post.	Indicator is illuminated when jumper wire is connected to the binding post.
			b. Disconnect the jumper	Indicator goes out.

NOTE

If a radiosonde or rawinsonde system is not available, omit items 6 through 11, and perform paragraph 42.2 of TM 11-6660-219-12.

6	Radiosonde		Place an operative radiosonde in calibration chamber. Connect test leads to binding post assembly. Follow color code in connecting leads.	
7	Rawin set		Place the equipment in the rawinsonde system. For operation of rawin set, refer to TM 11-6660-206-12.	
8	Control unit	Selector switch: TEMPERATURE.		Temperature trace is recorded by the radiosonde recorder. (Refer to the radiosonde recorder manual.)
9	Control unit	Selector switch: REFERENCE.		Low reference trace is recorded by the radiosonde recorder
10	Control unit	Selector switch: HUMIDITY.		Humidity trace is recorded by the radiosonde recorder.
11	Control unit	Selector switch: AUTOMATIC.		The radiosonde recorder records the following traces for periods of 15 seconds in the following order: low reference, temperature, low reference, humidity.
12	Control unit	HEATER: OFF		Heater cools off.
13	Control unit	LIGHT: OFF		Lamps I1 and I2 (fig. 2-10) go out.
14	Control unit	FAN: OFF		Fan stops operating.
15	Control unit	POWER: OFF		None.
16	Rawinsonde system			Turn all power off.

3-9. Continuity Tests for Baseline Check Set

a. Perform the operational test (para 3-8). The operational test frequently indicates the general location of trouble.

b. Connect a test lead between terminal 5 of transformer T1 (fig. 2–10) and the insulated terminal post in the control unit. Throw POWER switch S6 to ON. Test lamp 13 on the control unit front panel should light. If the test lamp does not light, check fuse F1, the power cable connections on J3 (fig. 2–10), and POWER switch S6.

c. If the fan motor (fig. 3–3) fails to operate, check the connections of power receptacle J3 (fig. 2-5), fuse F1 (fig. 2-5), POWER switch S6 (fig. 2–5), and FAN switch S8 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. It the motor overheats, replace it. Check capacitor C1. If none of the preceding checks reveals any defect, disconnect the motor wires at terminals 2, 3, and 4 of terminal board E1 (fig. 3–4). 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 the meter (lowest resistance scale) to check the direct current (dc) resistance of the motor winding. The points to check and approximate readings to be expected are given (1), (2), and (3) below.

(1) Check between the black- and the blue-coded wires; the reading should be approximately 220 ohms.

(2) Check between the black and the common of the green- to orange-coded wires; the reading should be approximately 80 ohms.

(3) Check between the blue and the common of the green- and orange-coded wires; the reading should be approximately 140 ohms.

d. To check motor B2 (figs. 3–3 and 3-4), disconnect one of the motor leads and use a meter

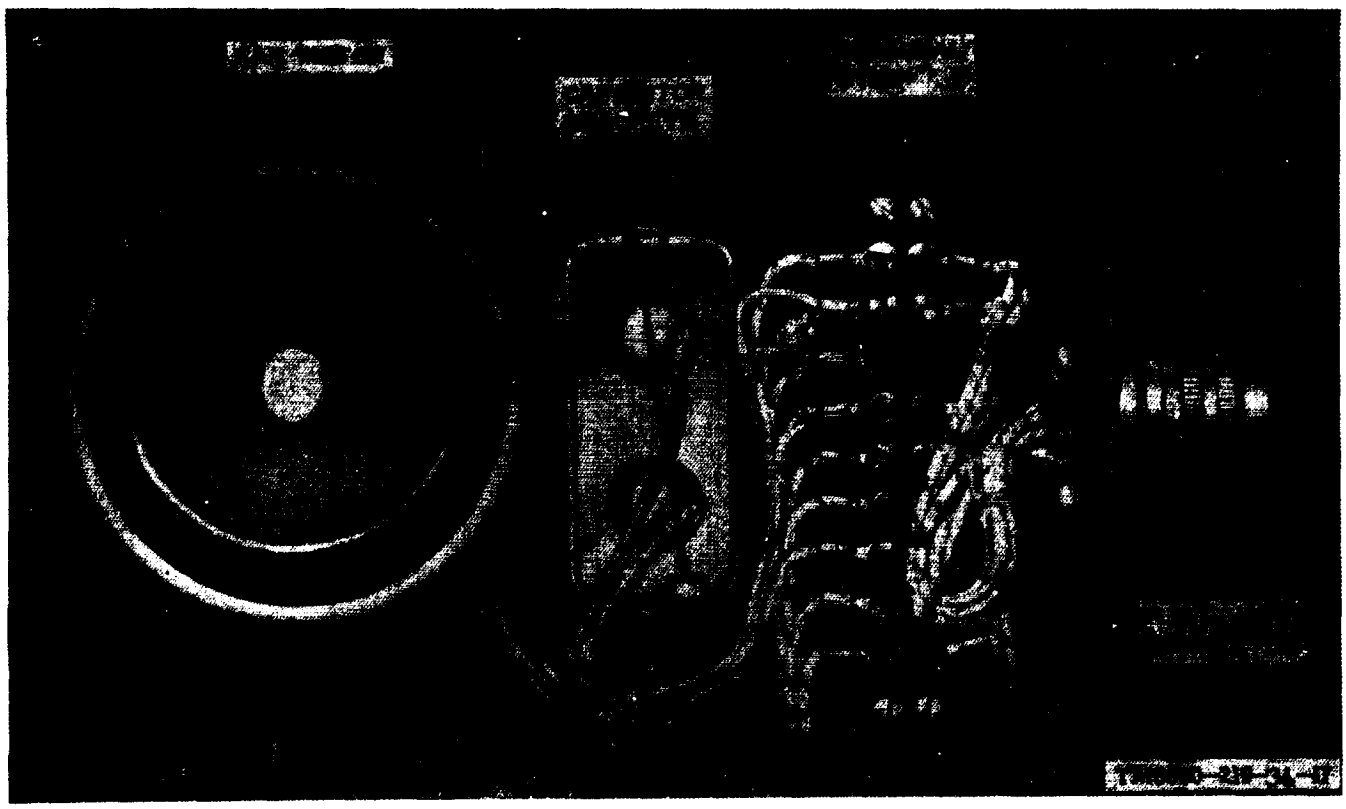

Figure 3-3. Cabinet assembly, cover removed (order No. 32148 Phila-51).

(lowest resistance range) to measure the dc resistance. This resistance should be approximately 525 ohms.

e. To check selector switch S1 (figs. 3–5 and 3-6), unsolder the wires connected to the switch. Be sure to tag the leads. Use a meter to check continuity between the rotor and stator contacts in each position of the switch.

f. To check relays K1 and K2, uncouple connector J2 (figs. 3–7 through 3–10). Use the meter to check relay K1 by measuring the continuity of the relay winding between terminals 5 and 6 of terminal board El (fig. 3-4); check relay K2, similarly, between terminals 6 and 7. Count terminal numbers from the end of the terminal board farthest away from the fan motor (fig. 3-4). To check the relay contacts, follow the procedures given in paragraph 2–9.

g. To check heater HR1, uncouple connector J2. Use the multimeter 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.

3-10. Relay Operation Checks

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 Check the operation of relays K1 and K2: follows:

a. Throw POWER switch S6 (fig. 2–9) to ON. Set switch S1 to REFERENCE. Connect the test leads of the meter, set to its lowest ohms scale, between the blue and the black terminals on the binding posts of the calibration chamber (fig. 2-9). The meter should read 0 ohm, indieating that relay K2 is operated and its contacts are closed.

b. Set switch S1 to HUMIDITY (fig. 2-7). Connect the test leads of the meter, set to its lowest ohms scale, between the blue and black terminals on the binding post assembly connected to the relays of the calibration chamber. The meter should read 0 ohms, indicating that relay K1 is operated and its contacts are closed,

3-11. Localizing Troubles

a. General. Procedures are outlined in the charts in paragraphs 3–12 and 3–13 for localizil troubles to the individual circuit of the com-

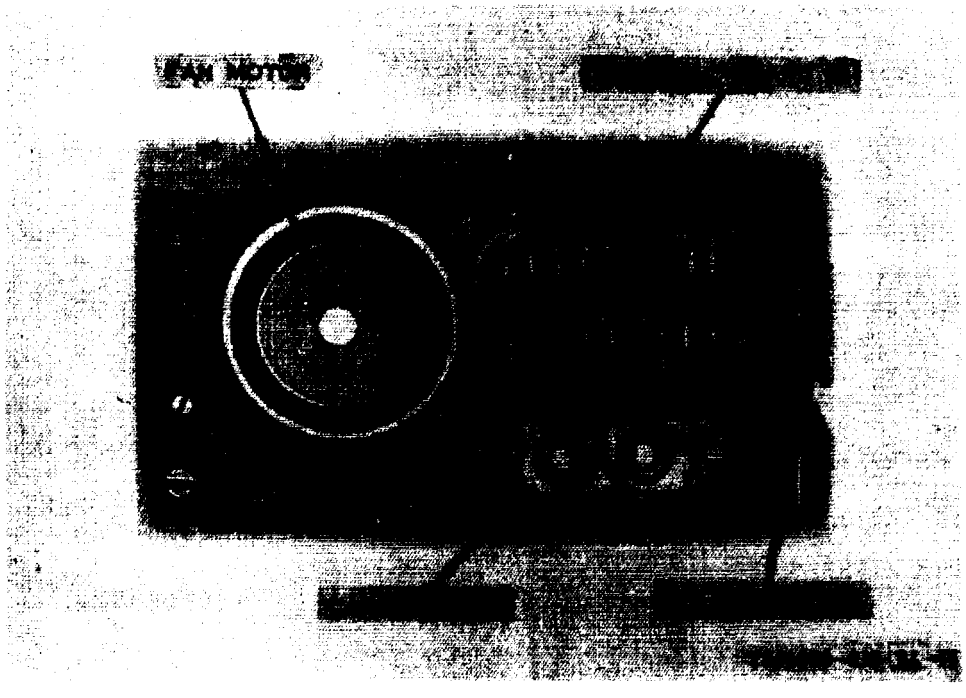

Figure 3-4. Cabinet assembly, cover removed (order No. 3139 Phila-51).

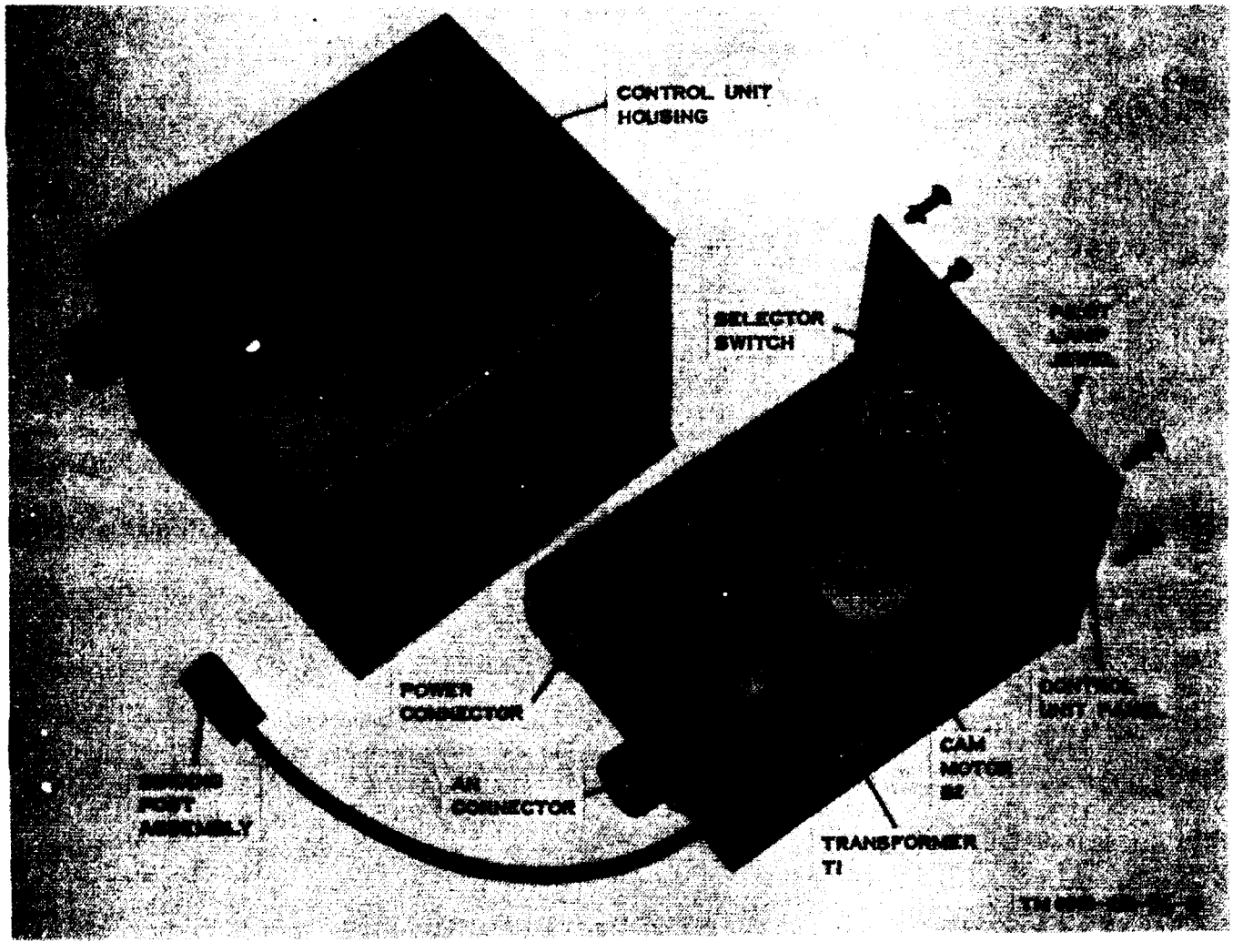

Figure 3–5. Control unit, cover removed, top view (order NO. 321.48 Phila-51).

ponent when results are not obtained by the performance of the operational tests. Depending on the nature of the operational systems, one or more of the localizing procedures will be necessary. When the trouble is localized to a particular stage, use the techniques given in paragraphs 3-14 through 3–28 to repair or replace and isolate the trouble of a particular part.

b. Use of Charts. The troubleshooting charts are designed to supplement the operational checks in the equipment performance checklist and the troubleshooting charts in TM 11-6660-219–12, including the operational tests. If operational procedures are not known, begin at item 1 of the equipment performance checklist (TM 11–6660–219–12) and proceed as directed.

3-12. Troubleshooting Radiosonde Test Set TS-1348/GMM-1A

NOTE

Perform the operations outlined in the equipment performance checklist and the troubleshooting chart in TM 11–6660–219–12, before using this chart, unless the trouble has already been localized. Refer to the schematic diagram (fig. 3–12) to localize component trouble and to the wiring diagram (fig. 3-13) to assist in circuit tracing.

RESCREEN & SQUARE HALFTONES

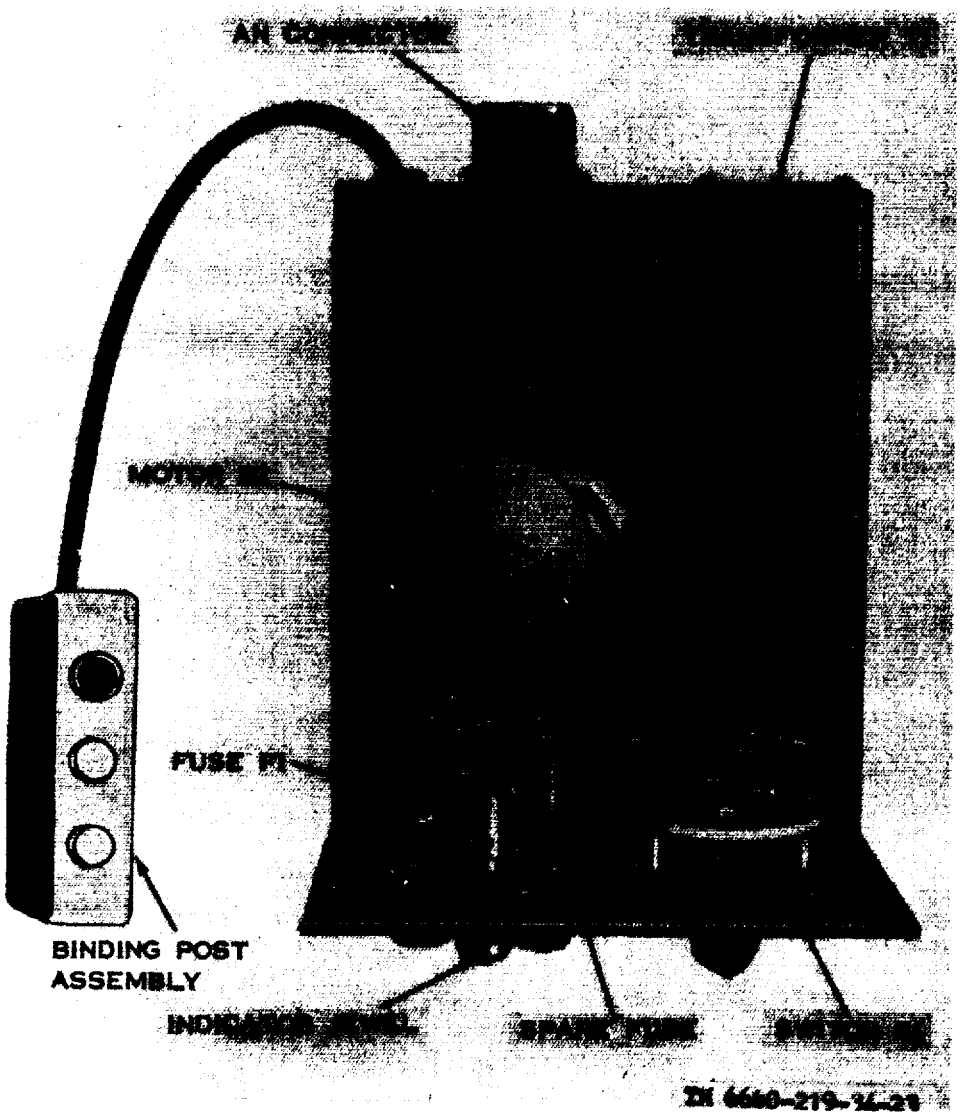

Figure 3-6. Control unit, cover removed, top view (order No. 3139 Phila-51).

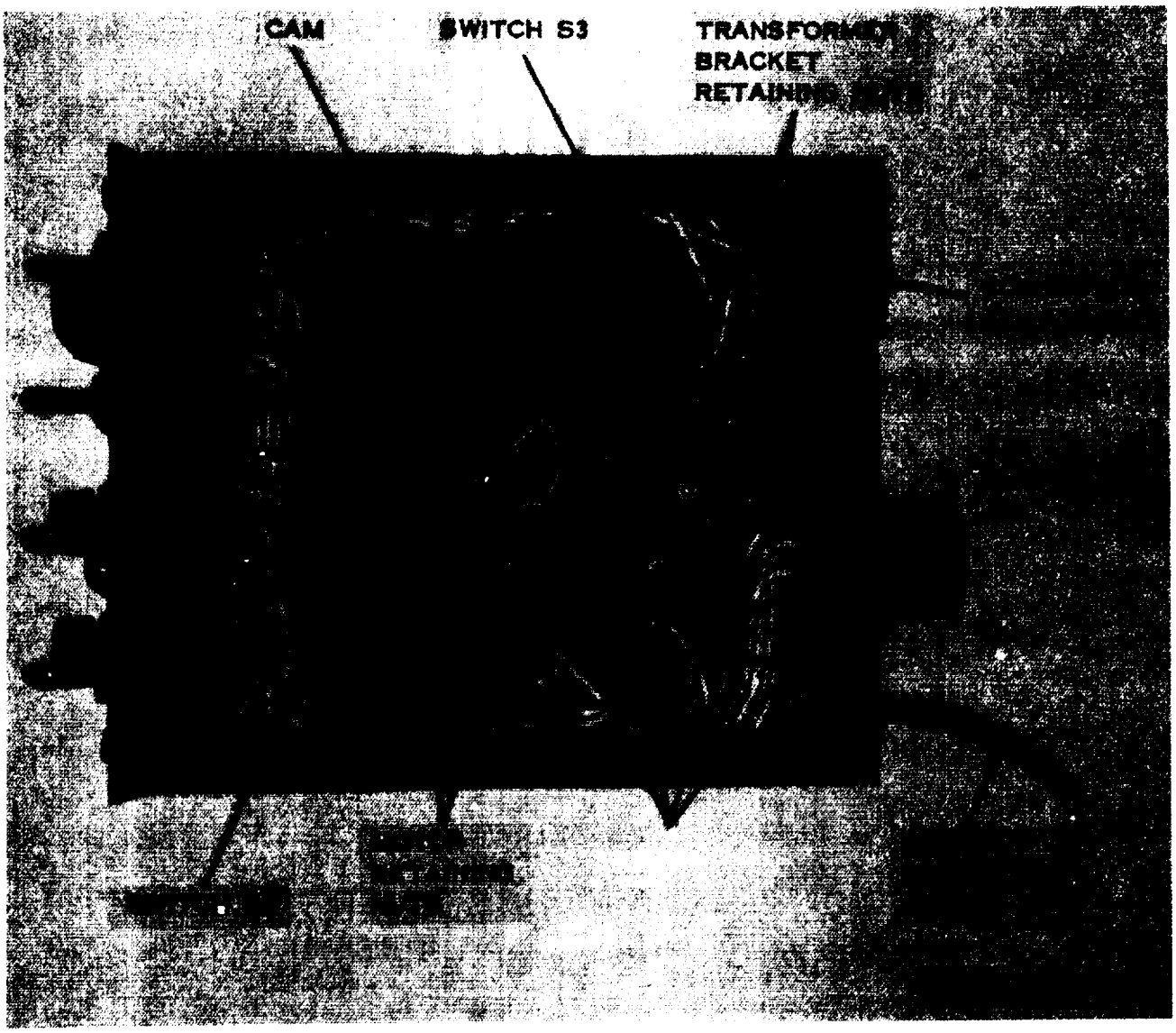

Figure 3–7. AN/GMM–1A control unit, bottom view.

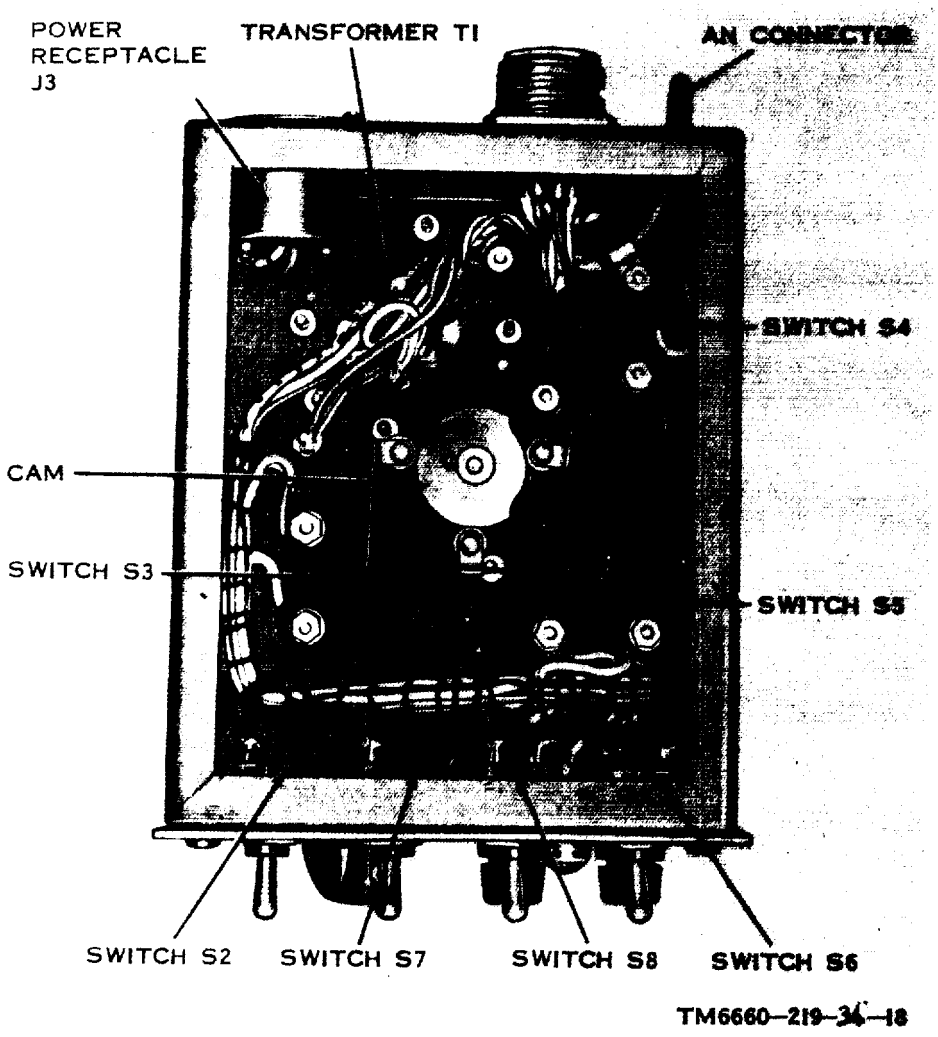

Figure 3–8. Control unit, bottom view (order No. 3139 Phila-51).

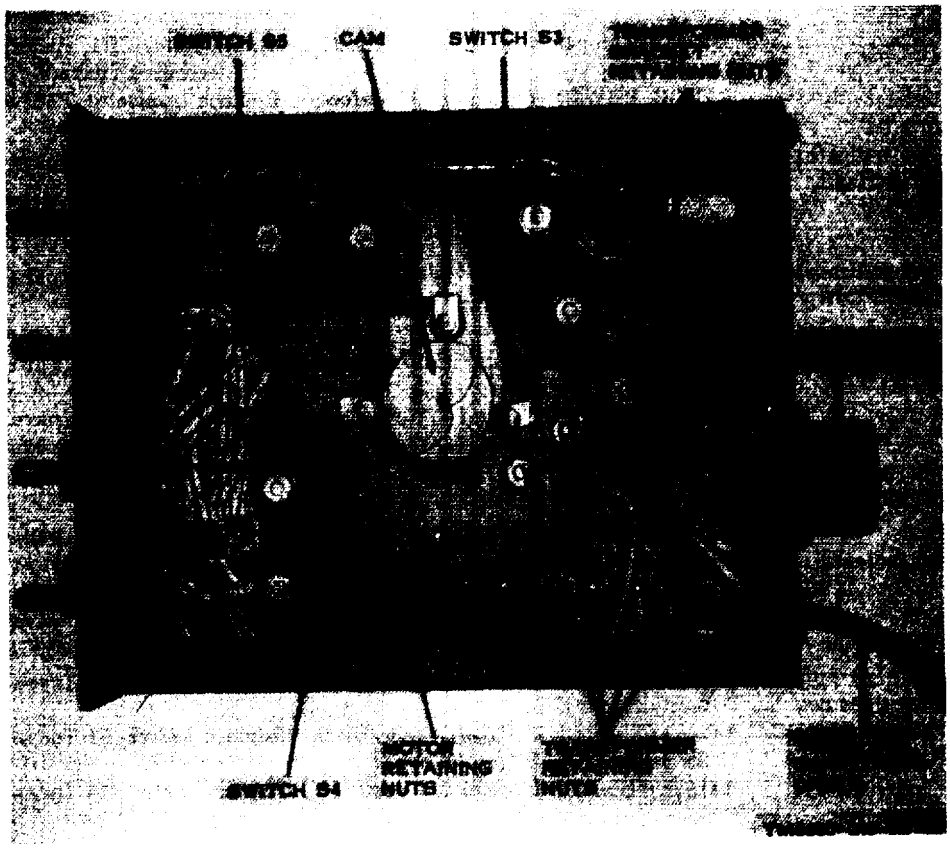

Figure 3–9. Control unit, bottom view. (order No. 32148 Phila-51).

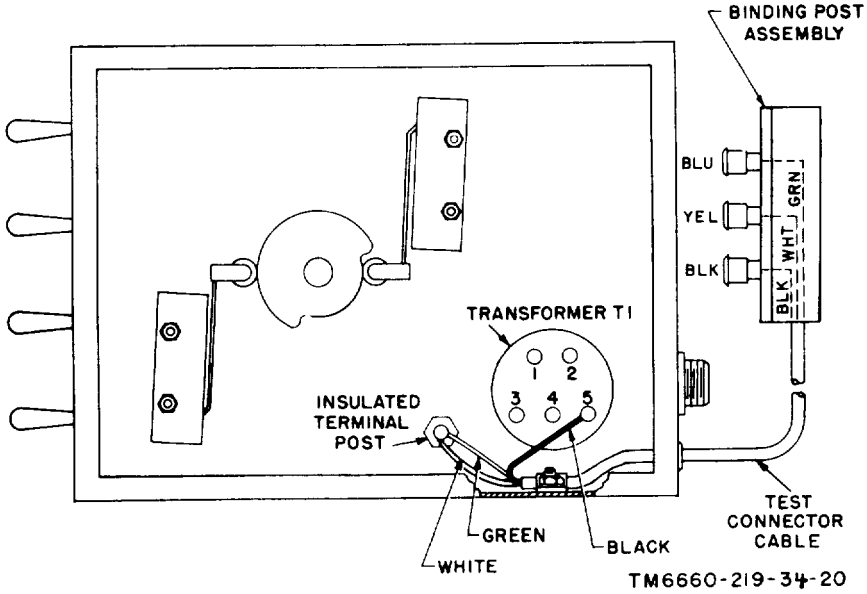

Figure 3-10. Control unit with binding post assembly, bottom view.

a. 24-Volt Vehicular Battery Power Source.

Symptom	*Probable cause*	*Correction*
Meters do not indicate	Diode CR1 oven	Check diode CR1 (para 3-6). Replace if necessary (para 3-20).
	24VDC POWER connector J3 defective.	Replace connector P1 (para 3-14).
A_1-VOLTS meter does not indicate; LOAD CURRENT sELECTOR switch at 0-250 MA A_1.	LOAD CURRENT SELECTOR switch S1 defective.	Replace switch S1 (para 3-16).
	LOAD CURRENT meter M4 open	Replace meter M4 (Para 347).
	A_1-VOLTS meter M1 defective	Replace meter M1 (para 3-17).
A_1-VOLTS meter does not indicate; LOAD CURRENT SELECTOR switch in position.	POWER SELECTOR switch SS defective.	Replace switch S3 (para 3-16).
	A_1-VOLTS meter Ml defective	Replace meter M1 (para 3-17).
A-VOLTS meter does not indicate; LOAD CURRENT SELECTOR switch at 0-250 MA A.	LOAD CURRENT SELECTOR switch S1 defective.	Replace switch S1 (para 3-16).
	LOAD CURRENT meter M4 open	Replace meter M4 (para 3-17).
	A-VOLTS meter M2 defective	Replace meter M2 (para 3-17).
A-VOLTS meter does not indicate; LOAD CURRENT SELECTOR switch in any position.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
	A-VOLTS meter M2 defective	Replace meter M2 (para 3-17).
B-VOLTS meter does not indicate	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
	B-VOLTS meter M3 defective	Replace meter MS (para 3-17).
	Converter defective	Check converter (para 3-6).
B-VOLTS meter indicates high and LOAD CURRENT meter does not indicate; LOAD CURRENT SELECTOR switch at 0-50 MA B.	LOAD SELECTOR switch S2 defective.	Replace switch S2 (para 3-16).
	LOAD CURRENT SELECTOR switch S1 defective.	Replace switch S1 (para 3-16).
	LOAD CURRENT meter M4 open	Replace meter M4 (para 3-17).

b. Battery Pack Power Source.

Symptom	*Probable cause*	*Correction*
A_1-VOLTS meter and LOAD CURRENT meter do not indicate; LOAD CURRENT SELECTOR switch at 0-250 MA A_1.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
A_1-VOLTS meter indicates high; LOAD CURRENT SELECTOR switch at 0-250 MA A_1.	LOAD CURRENT SELECTOR switch S1 defective.	Replace switch S1 (para 3-16).
	LOAD SELECTOR switch S2 defective.	Replace switch S2 (para 3-16).
	LOAD CURRENT meter M4 defective.	Replace meter M4 (para 3-17).
A_1-VOLTS meter indicates high; LOAD CURRENT SELECTOR switch at 0–250 MA A or 0-50 MA B.	LOAD SELECTOR switch S2 defective.	Replace switch S2 (para 3-16).
A_1-VOLTS meter does not indicate LOAD CURRENT meter indicates; LOAD CURRENT SELECTOR switch at 0-250 MA A_1.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
	A_1-VOLTS meter M1 defective	Replace meter M1 (para 3-17).
A-VOLTS meter and LOAD CURRENT meter do not indicate; LOAD CUB RENT SELECTOR switch at 0-260 MA A.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
A-VOLTS meter indicates high; LOAD CURRENT SELECTOR switch at 0-250 MA A.	LOAD CURRENT SELECTOR switch S1 defective.	Replace switch S1 (para 3-16).
	LOAD SELECTOR switch S2 defective.	Replace switch S2 (para 3-16).
	LOAD CURRENT meter M4 defective.	Replace meter M4 (para 3-17).
A-VOLTS meter indicates high; LOAD CURRENT SELECTOR switch at 0-250 MA A_1 or 0-60 MA B.	LOAD SELECTOR switch S2 defective.	Replace switch S2 (pars 3-16).

Symptom	Probable cause	Correction
A-VOLTS meter does not indicate; LOAD CURRENT meter indicates; LOAD CURRENT SELECTOR switch at 0-250 MA A.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
	A-VOLTS meter M2 defective	Replace meter M2 (para 3-17).
R-VOLTS meter and LOAD CURRENT meter do not indicate; LOAD CURRENT SELECTOR switch at 0-60 MA B.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
B-VOLTS meter indicates high; LOAD CURRENT SELECTOR switch at 0-50 MA B.	LOAD CURRENT SELECTOR switch S1 defective.	Replace switch S1 (para 3-16).
	LOAD SELECTOR switch S2 defective.	Replace switch S2 (para 3-16).
	LOAD CURRENT meter M4 defective.	Replace meter M4 (para 3-17).
B-VOLTS meter indicates high; LOAD CURRENT SELECTOR switch at 0-250 MA A, or 0-200 MA A.	LOAD SELECTOR switch S2 defective.	Replace switch S2 (para 3-16).
B-VOLTS meter does not indicate, LOAD CURRENT meter indicates; LOAD CURRENT SELECTOR switch at 0-50 MA B.	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).
	B-VOLTS meter M3 defective	Replace meter M3 (para 3-17).
Meters do not indicate	BATTERY connector J2 defective.	Replace connector J2 (para 3-14).
	POWER SELECTOR switch S3 defective.	Replace switch S3 (para 3-16).

3-13. Troubleshooting Baseline Check Set

NOTE

Perform the operations in the equipment performance checklist and the troubleshooting charts in TM 11–6660-219-12 before using this chart, unless the trouble has already been localized.

a. General Troubleshooting.

Symptoms	Probable cause	Correction
1. Set is completely inoperative	**a.** Fuse F1 open	**a.** Check fuse. Replace if necessary.
	b. Switch S6 defective	**b.** Check switch. Replace if necessary (para 3-16).
2. Lamps 11 and/or 12 do not operate when LIGHT switch S2 is set to ON.	*a.* Switch S2 defective	*a.* Check switch. Replace if necessary (para 3-16).
	b. Lamp 11 and/or 12 burned out	*b.* Check lamps. Replace if necessary (para 3-5 of TM 11-6660-219-12).
3. Fan motor B1 does not operate when FAN switch S8 is set to ON.	*a.* Switch S8 defective	*a.* Check switch. Replace if necessary (para 3-16).
	b. Motor B1 winding open or shorted . .	*b.* Check motor winding, Replace motor, if necessary (para 3-25).
	c. Capacitor Cl defective	*c.* Check capacitor. Replace if necessary (para 3-27).
4. Set does not operate normally when switch S1 is set to AUTOMATIC.	*a.* Motor B2 defective	*a.* Check motor (para 2-9). Replace if necessary (para 3-26).
	b. Selector switch S1 defective	*b.* Check switch (para 29). Replace if necessary (para 3-24).
5. Low-reference circuit in radiosonde (during test) does not operate when switch is set to REFERENCE.	*a.* Switch S1 defective	*a.* Check switch (para 2–9), Replace if necessary (para 3-24).
	b. Relay K2 defective	*b.* Check relay (para 2-9). Replace if necessary (para 3-28).
Humidity-circuit in radiosonde (during test) does not operate when switch is set to HUMIDITY.	*a.* Switch S1 defective	*a.* Check switch (para 2-9). Replace if necessary (para 3-24).
	b. Relay K1 defective	*b.* Check relay (para 2-9). Replace if necessary (para 3-28).

Symptom	Probable cause	Correction
7. Heater does not operate when HEATER switch S7 and FAN switch S8 are set to ON.	*a.* Switch S7 defective	*a.* Check switch (para 2-11). Replace if necessary (para 3-24).
	b. Switch S8 defective	*b.* Check switch (para 2-11). Replace if necessary (para 3-24).
	c. Heater element HR1 defective	*c.* Check heater element (para 2-11). Replace, if necessary (para 41 of TM 11-6660-219-12).
8. Indicator lamp 13 does not light during radiosonde commutator adjustment.	Lamp I3 burned out	Check lamp. Replace if necessary (para 35 of TM 11-6660-219-12).

b. Ac Power System.

Symptom	Probable cause	Correction
1. Set is completely inoperative	*a.* Operating FUSE-3A (F1) open	*a.* Check fuse. Replace if necessary.
	b. Switch S6 (fig. 2-6) defective	*b.* Check switch (para 2-9). Replace if necessary (para 3-24).
2. Both HEATER and FAN switches (fig. 2-6) inoperative after POWER switch S6 has been set to ON and LIGHT circuit is operative.	Switch S8 (fig. 2-6) defective	Check switch (para 2-9). Replace if necessary (para 3-24).
3. FAN switch (fig. 2-5) operative, but HEATER switch inoperative.	Switch S7 or one pair of contacts of switch S8 defective.	Check switch (para 2–9). Replace if necessary (para 3-24).
4. HEATER, FAN, and motor circuits operative, but relay and light circuits inoperative.	Transformer T1 (fig. 2-6) defective.	Check transformer for continuity between terminals 1 and 2 and terminals 3 and 5 (fig. 2-6).

c. Relay Control System.

Symptom	Probable cause	Correction
1. POWER switch S6 (fig. 2-6) is at ON, switch S1 is at AUTOMATIC, but cam motor is inoperative.	*a.* Switch S6 defective	*a.* Check switch (para 3-24). Replace if necessary (para 3-28).
	b. Switch S1 defective	*b.* Check switch (para 3-24). Replace if necessary (para 3-28).
	c. Cam motor (fig. 2-4) defective	*c.* Check cam motor (para 3-9). Replace if necessary (para 3-25).
2. POWER switch S6 (fig. 2-6) is at ON, switch S1 is at AUTOMATIC, cam motor is operative, but relays K1 and K2 are inoperative.	Transformer T1 defective	Check transformer T1 (fig. 2-7) for continuity between terminals 1 and 2 and terminals 3 and 6.
3. POWER switch S6 (fig. 2-6) is at ON, switch S1 is at AUTOMATIC, cam motor is operative, but relay K1 is inoperative.	Microswitch S6 defective or microswitch S3 (fig. 2-9) defective in AN/GMM-1A.	Check switch (para 3-24). Replace if necessary.
4. POWER switch S6 is at ON, switch S1 is at AUTOMATIC, cam motor (fig. 2-6) is operative, but relay K2 is inoperative.	Microswitches S3 (fig. 2-6) and S4 defective.	Check switch (para 3-24). Replace if necessary.
5. POWER switch S6 (fig. 2-7) is at ON, switch S1 is at HUMIDITY, but relay K1 is inoperative.	*a.* Transformer T1 defective	*a.* Check transformer for continuity between terminals 1 and 2 and terminals 3 and 5 (fig. 2-6).
	b. Switch S1 (fig. 2-7) defective	*b.* Check switch (para 3-24), Replace if necessary (para 3-26).
	c. Relay K1 (fig. 2-7) defective	*c.* Check relay (para 3-9). Replace it necessary (para 3-28).
6. POWER switch S6 (fig. 2-8) is at ON, switch S1 is at REFERENCE, but relay K2 is inoperative.	*a.* Transformer T1 (fig. 2-8) defective.	*a.* Check transformer for continuity between terminals 1 and 2 and terminals 3 and 6 (fig. 2-8).
	b. Switch S1 (fig. 2-8) defective	*b.* Check switch (para 3-24). Replace if necessary (para 3-16).
	c. Relay K1 defective	*c.* Check relay (para 8-9). Replace if necessary (para 3-28).

d. Illumination and Test Light System.

Symptom	Probable cause	Correction
1. POWER switch S6 (fig. 2-9) is at ON, LIGHT switch S2 is closed, but lamps 11 and 12 do not light.	*a.* FUSE–3A (F1) blown	*a.* Replace operating fuse F1.
	b. POWER switch S6 or LIGHT switch S2 defective.	*b.* Check switch (para 3–24). Replace if necessary (para 3-16).
	c. Transformer T1 defective	*c.* Check transformer for continuity between terminals 1 and 2 and terminals 3 and 5 (fig. 2-9).
	d. Lamps 11 and 12 defective	*d.* Remove lamp from socket and check continuity with on ohmmeter. Replace if necessary,
2. Test lamp indicator (fig. 3-1) does not light during radiosonde commutator adjustment.	Lamp 13 burned out	Remove lamp from socket and check continuity with an ohmmeter. Replace if necessary.

e. Fan and Heater System.

Symptom	Probable cause	Correction
1. POWER switch S6 (fig. 3-1) is at ON and heater does not operate when HEATER switch S7 and FAN switch S8 are at ON.	*a.* Switch S7 defective	*a.* Check switch. Replace if necessary (para 3-24).
	b. Switch S8 defective.	*b.* Check switch. Replace if necessary.
	c. Heater element HR1 (fig. 2-9) defective.	*c.* Check heater element. Replace if necessary.
2. POWER switch S6 (fig. 3-1) is at ON and fan does not operate when FAN switch S8 is at ON.	*a.* Power plug J3 defective	*a.* Check connections of power plug J3, power connector (fig. 2-9).
	b. Operating FUSE-9A (F1) blown	*b.* Check operating FUSE-3A (F1).
	c. Improper coupling	*c.* Check coupling between J1 and J2 (fig. 2-9).
	d. Loose connections	*d.* Check connections on terminal strip E1 (fig. 2-9).
	POWER switch S6 defective	*e.* Check switch. Replace if necessary.
	f. FAN switch S8 defective	*f.* Check switch. Replace if necessary.
	g. Fan motor defective	*g.* Check fan motor. Replace if necessary (para 3-27).

f. Accessory System.

Symptom	Probable cause	Correction
Only one trace is indicated on radiosonde recorder during baseline check with switch S1 (fig. 2-6) at AUTOMATIC, or a trace other than one for which selector switch on remote control unit is set appears at radiosonda recorder.	*a.* Loose or broken connections on binding post assembly (fig. 2-6).	*a.* Repair any loose or broken wires on binding post assembly or relay K1 or K2 (fig. 2-6).
	b. Defective remote control cable or connector (if used).	*b.* Check continuity between A pins of two connectors on remote control cable.

Section III. ADJUSTMENTS, ALIGNMENT, REPAIR, REMOVAL, AND REPLACEMENT

3-14. General Replacement Techniques

a. This section contains instructions for the removal and replacement of all parts of Radiosonde Test Set TS-1348/GMM-l and Radiosonde Baseline Check Set AN/GMM-lA.

b. The baseline check set consists of three major assemblies: Radiosonde Test Set TS-1348/GMM-lA, the control unit, and the calibration chamber.

c. Paragraphs 3-15 through 3-22 describe the removal and replacement procedures for each of the subassemblies shown in figures 2–1, 2-3, and 3-1.

3-15. Removal and Replacement of TS-1348/GMM-1A Front Panel

a. Remove the front panel as follows:

(1) Remove the cover from the front panel (fig. 2-3).

(2) Remove the 14 screws from the front panel.

(3) Carefully pull out the panel from the

case so that damage to the inner wiring is minimized.

b. Replace the front panel as follows:

(1) Carefully replace the front panel on the case.

(2) Replace the 14 screws and the front cover.

3-16. Removal and Replacement of Selector Switch

CAUTION

When soldering or unsoldering leads from converter, meters, or diode, use a pencil-type iron with a 25-watt maximum capacity. Whenever wiring permits, use a heat sink (long-nose pliers) between the soldering joint and the component.

a. Remove the selector switch as follows:

(1) Remove the knob from the front part of the switch by loosening the setscrew in the knob and unscrewing the retaining nut from the control shaft.

(2) Push the switch back through the front panel.

(3) Unsolder the leads from the selector switch and tag each lead as it is removed.

b. Replace the switch as follows:

(1) Place the switch in the front panel; replace the setscrew and retaining nut.

(2) Resolder the tagged leads, using the wiring diagram (fig. 3-13) as a guide.

3-17. Removal and Replacement of Meters

a. Remove the meter as follows:

(1) Unscrew the four nuts on the back of the meter, and pull the meter out through the front panel.

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

b. Replace the meter as follows:

(1) Replace the four nuts on the back of the meter.

(2) Resolder the tagged leads, using the wiring diagram (fig. 3-13) as a guide.

3-18. Removal and Replacement of Voltage Adjustment Controls

a. Remove the adjustment control as follows:

(1) Remove the knob from the front of the control by unscrewing the setscrew.

(2) Remove the retaining nut by unscrewing it from the control shaft.

(3) Push the adjustment control back through the front panel.

(4) Unsolder the leads from the adjustment control and tag each lead as it is removed.

b. Replace the adjustment control as follows:

(1) Place the adjustment control in the front panel.

(2) Replace the setscrew and retaining nut.

(3) Resolder the tagged leads, using the wiring diagram (fig. 3–13) as a guide.

3-19. Removal and Replacement of Converter

a. Remove the converter as follows:

(1) Unscrew the six screws on the back of the case.

(2) Pull the converter out through the top of the unit.

(3) Unsolder the leads from the converter and tag each one as it is removed.

b. Replace the converter as follows:

(1) Resolder the tagged leads, using the wiring diagram (fig. 3-13) as a guide.

(2) Replace the six screws on the back panel.

3-20. Removal and Replacement of Diode CR1

a. Remove diode as follows:

(1) Unsolder the leads from the diode and tag each lead as it is removed.

(2) Unscrew the diode from the diode mounting plate. Do not remove the diode mounting plate.

b. Replace the diode as follows:

(1) Replace the diode by screwing the new diode into the diode mounting plate.

(2) Solder the tagged leads to the diode.

3-21. Removal and Replacement of Resistors

a. Remove the resistor by unsoldering the leads and tagging each one as it is removed.

b. Replace the resistor by soldering the tagged leads, using the wiring diagram (fig. 3-13) as a guide.

3-22. Removal and Replacement of Control Unit

a. Remove the control unit as follows:

(1) Disconnect the power connector (fig. 3-5) and the AN connector.

(2) Remove the four upper screws on the control unit front panel.

(3) Slide the control unit out of its housing.

b. Replace the control unit chassis as follows:

(1) Slide the control unit back in its housing.

(2) Replace and tighten the four upper screws on the control unit front panel.

(3) Reconnect the power connector and the AN connector.

3-23. Removal and Replacement of Toggle Switches

a. Remove the toggle switches as follows:

(1) Remove the nut and washer from the switch on the control unit (fig. 3-3) front panel. Push the switch back through the front panel.

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

b. Replace the toggle switches as follows:

(1) Remove the tag and connect each lead to the proper connection on the good switch.

(2) Resolder the leads.

(3) Place the switch in position in the front panel.

(4) Replace the washer and nut on the switch.

3-24. Removal and Replacement of Selector Switch

a. Remove the selector switch (fig. 3-1) 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.

b. Replace the selector switch as follows:

(1) Reconnect and resolder the leads to the correct connections on the switch.

(2) Place the switch in position on the front panel. Replace the knob on the shaft of the switch and tighten the setscrew in the knob.

3-25. Removal and Replacement of Cam Motor and Cam

a. Remove the cam motor and cam as follows:

(1) Remove the cam (figs. 3-7 and 3-10) from the motor shaft by loosening the two setscrews and easing the cam off the camshaft.

(2) Remove the two motor retaining nuts (fig. 3-7) 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 (fig. 3-9) and the transformer, and tag each lead as it is removed.

b. Replace the cam motor and cam as follows:

(1) Connect the leads between the motor and the selector switch and the motor and transformer.

(2) Insert the motor shaft through a hole in the chassis and place the motor so that the bolts of the cam motor are inserted through the boltholes in the chassis.

(3) Replace the two motor retaining nuts (fig. 3-7) on the bolts that hold the motor to the control unit chassis.

(4) Replace the cam on the camshaft and position the cam so that the setscrews in the cam are over the flat sides of the shaft.

(5) Tighten the setscrews. Make sure that the setscrews in the cam are tightened against the flat sides of the shaft.

3-26. Removal and Replacement of Transformer

a. Remove the transformer as follows:

(1) From the underside of the chassis unscrew the two transformer bracket retaining nuts (fig. 3-7).

(2) Unscrew the four transformer retaining nuts that hold the transformer to the chassis.

(3) Lift out the transformer.

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

b. Replace the transformer as follows:

(1) Connect the leads to the proper connections on the transformer.

(2) Replace the transformer and replace and tighten the four transformer retaining nuts and bolts (fig. 3-7).

(3) Replace and tighten the two transformer bracket retaining nuts.

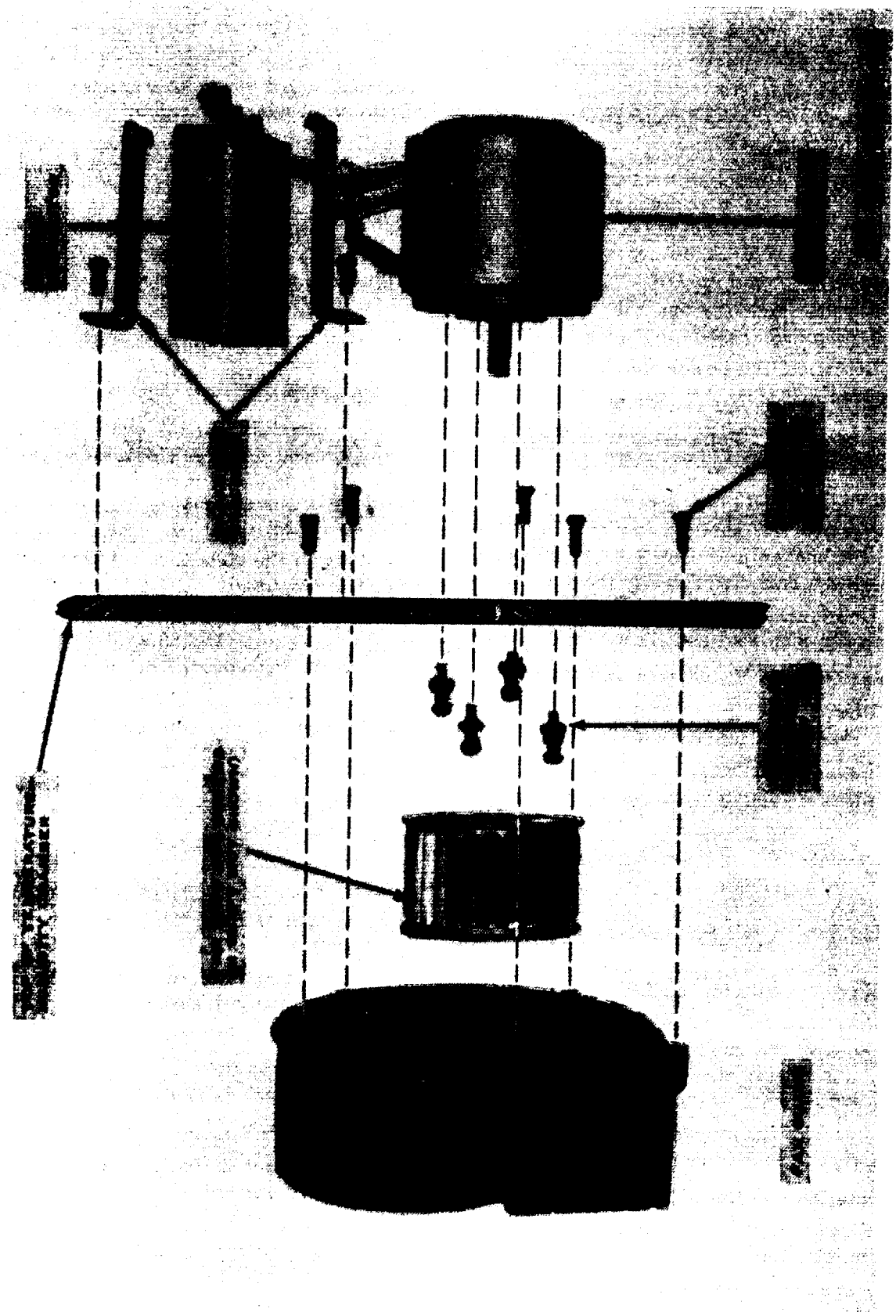

Figure 3-11. Fan assembly, exploded view.

3-27. Removal and Replacement of Fan Assembly

a. Remove the fan assembly as follows:

(1) Remove the eight screws that hold the cabinet assembly (fig. 3–11) cover to the calibration chamber.

(2) From the outside top of the calibration chamber, remove the five fan guard retaining screws (fig. 3–11).

(3) Unscrew the two setscrews on the fan and remove the fan from its shaft.

(4) From the inside top of the calibration chamber (fig. 3–11), remove the four motor retaining screws. Lift the motor off the top of the calibration chamber.

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

(6) Remove the capacitor from the terminal strip (fig. 3-3) and tag each lead as it is removed.

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

b. Replace the fan assembly as follows:

(1) Reconnect the motor leads to the capacitor (fig. 3-11) and solder.

(2) Reconnect the motor leads to the proper terminals on the terminal strip.

(3) Reconnect the capacitor leads to the proper terminals on the terminal strip.

(4) Place the capacitor on the cabinet assembly and, with the screws and nuts, fasten the capacitor brackets (fig. 3-11) of the capacitor to the assembly.

(5) Place the fan motor (fig. 3-11) on the top of the calibration chamber. From the inside top of the calibration chamber, replace the four motor retaining screws.

(6) Replace the fan on the fan motor shaft and tighten the two fan setscrews.

(7) From the outside top of the calibration chamber, replace and tighten the five fan guard retaining screws.

(8) Replace and tighten the eight screws that hold the cabinet assembly cover to the calibration chamber.

3-28. Removal and Replacement of Relays

a. Remove the relays as follows:

(1) Unsolder the leads from the terminals of relay K1 or K2 (fig. 3–2) and label each lead as it is removed.

(2) Remove the defective relay from the bracket by taking out the holding screws.

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 (FSN 5945–283–6610). 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 large plug-in relays still is mounted on the bracket, replace the retainer strip to hold it in place.

b. Replace the relays as follows:

(1) Place the good relay on the bracket in the calibration chamber (fig. 3–2) and fasten it in place with the holding screws.

(2) Fasten the leads to the proper relay connections (fig. 2–9) and solder.

Figure 3-12. TS–1848/GMM–1A, Schematic diagram.
[Located in back of manual]

Figure 3-13. TS-1848/GMM-1A, wiring diagram.
[Located in back of manual]

CHAPTER 4

GENERAL SUPPORT

4-1. General

This section contains instructions for general support testing procedures and repair. This chapter supplements those instructions appearing in chapters 2 and 3. The testing procedures are used by general support maintenance personnel to determine whether repaired equipment is performing satisfactorily for return to users.

4-2. Tools and Test Equipment Required

a. Test Equipment.

Nomeclature	*National Stock No.*
Multimeter TS-352B/U	6625-00-242-5023
Voltmeter, Electronic AN/USM-98A.	6625-00-753-2115

b. Tools.

Nomenclature	*Federal stock No.*	*Qty.*
Toolkit, Radio Repair	5180-856-1578	1

4-3. Operational Test for TS-1348/GMM-1A

a. Prepare the test set for a battery check (para 3-5).

b. Perform the radiosonde unit check with Battery Pack BA-259/U (para *3-5b).*

c. Perform the radiosonde unit check with 24-volt vehicular battery, using special purpose cable CX–10568/U, when power source is available (para 3-5c).

d. Perform resistance and converter check measurements, using Multimeter TS-352B/U (para 3-6).

4-4. Operational Tests for Radiosonde Baseline Check Set AN/GMM-1A

a. Perform the pretest setup for operational tests as described in paragraph 3-7.

b. Perform operational tests on the fan, heater, light, and indicator circuits, using the procedures from the operational chart (para 3-8).

c. Perform continuity tests on the baseline check set as outlined in paragraphs 3-9 and 3-10. Use the multimeter to check the wiring and connections in the control unit and the calibration chamber for open or short circuits.

Technical manual	*Common name*
TM 11-6626-966-16	Multimeter
TM 11-6626-69%12	Voltmeter

4-5. Control Unit Test, Radiosonde Baseline Check Set AN/GMM-1 and AN/GMM-1A

a. Remove the remote control cable from the reel (TM 11-6660-219-12).

b. Connect the female connector of the remote cable to connector J1 on the cabinet assembly, and connect the male connector of the remote cable to connector J2 on the control unit (fig. 4-1).

c. Set the control unit selector switch (fig. 3-1) to TEMPERATURE and set the POWER, FAN, HEATER, and LIGHT switches to OFF.

d. Connect the power cable to POWER CONNECTOR.

e. On the control unit, connect a jumper between terminal 5 of transformer T1 and the terminal post next to transformer T1.

f. Set the control unit (fig. 3-1) POWER switch to ON. The indicator lamp should light.

g. Set the control unit POWER switch to OFF and disconnect the jumper.

h. On the control unit, proceed as follows:

(1) Set the POWER switch to ON.

(2) Set the LIGHT switch to ON. The calibration chamber lamps should light. Set the LIGHT switch to OFF.

(3) Set the FAN switch to ON. The calibration chamber fan motor should operate.

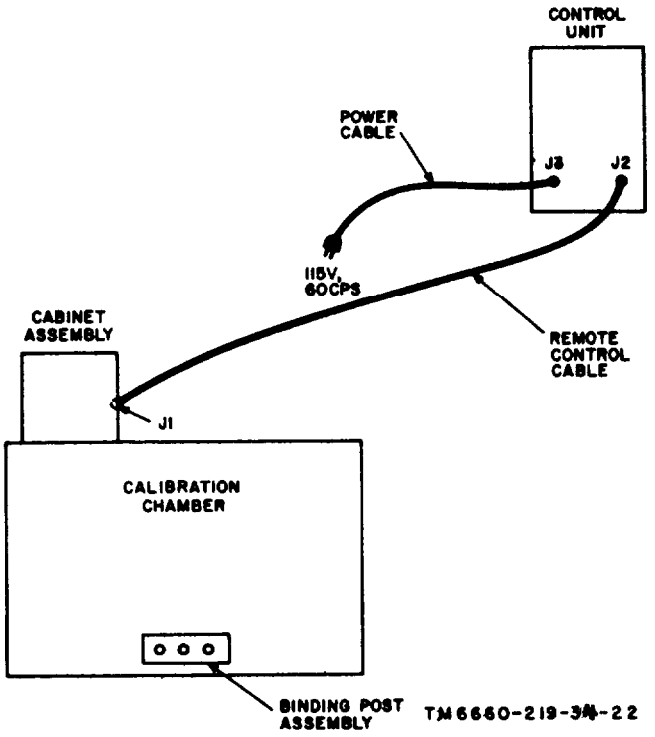

Figure 4-1. Check set AN/GMM-1A, test setup.

(4) Set the HEATER switch to ON. The calibration chamber heater should warmup.

(5) Set the POWER, HEATER, and FAN switches to OFF.

i. Set the multimeters to measure resistance on the RX1 scale.

j. Connect one of the multimeters between the yellow terminal and the black terminal on the binding post assembly (fig. 3-10) and connect the other multimeter between the blue terminal and the black terminal on the binding post assembly.

k. Set the control unit POWER switch to ON. Both multimeters should indicate infinity (open circuit condition).

l. Set the control unit selector switch to REFERENCE. The multimeter connected between the yellow and black terminals of the binding posts assemblies should indicate infinity. The multimeter connected between the black and blue terminals should indicate zero.

m. Set the control unit selector switch to HUMIDITY. The multimeter connected between the yellow and black terminals of the binding post assembly should indicate zero. The multimeter connected between the black and blue terminals should indicate infinity.

n. Set the control unit selector switch to AUTOMATIC. Motor B2 (fig. 2–9) should operate and the cam should rotate.

o. Use a stopwatch to time the indications on the multimeters during 1 cycle of the cam rotation. The test results for control units that contain switches S3, S4, and S5 are given in (1) below. The test results for control units that contain switches S3 and S4 are given in (2) below.

NOTE

Start the timing sequence when the roller of switch S3 enters the indent of the cam.

(1) The sequence of the test results for control units containing switches S3, S4, and S5 is as follows:

(a) The multimeter connected between the blue and black terminals of the binding post assembly should indicate zero for 15 seconds ±0.5. At the same time, the multimeter connected between the yellow and black terminals should indicate infinity.

(b) Both multimeters should then indicate infinity for 15 seconds ±0.5.

(c) The indications on the multimeters should then be the same as noted in (a) above.

(d) The multimeters connected between the yellow and black terminals of the binding post assembly should then indicate zero for 15 seconds ±0.5. At the same time, the multimeter connected between the blue and black terminals should indicate infinity.

(2) The sequence of the test results for control units containing switches S3 and S4 is as follows:

(a) The multimeter connected between the yellow and black terminals of the binding post assembly should indicate zero for 15 seconds ±0.5. At the same time, the multimeters connected between the blue and black terminals should indicate infinity.

(b) The multimeter connected between the blue and black terminals of the binding post assembly should then indicate zero for 15 seconds ±0.5. At the same time, the multimeter connected between the yellow and black terminals should indicate infinity.

(c) Both multimeters should then indicate infinity.

(d) The indications on the multimeter should then be the same as noted in (b) above.

p. Set the control unit POWER switch to OFF.

q. Disconnect the multimeter from the test setup.

Figure 4-2. Resistor-indicator-capacitor color code chart.
[Located in back of manual]

APPENDIX A
REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
DA Pam 738-750	The Army Maintenance Management System (TAMMS).
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army.
TM 11-6625-366-15	Operator's Organizational, DS, GS, and Depot Maintenance Manual: Multimeter TS-352B/U.
TM 11-6625-599-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Voltmeters, Electronic AN/USM-98A and AN/USM-98B.
TM 11-6660-204-10	Operator's Manual, Radiosonde Recorders AN/TMQ-5 (NSN 6660-00-324-9426), AN/TMQ-5A, AN/TMQ-5B (NSN 6660-00-393-2234), and AN/TMQ-5C (NSN 6660-00-682-4500).
TM 11-6660-204-25	Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Depot Overhaul Standards: Radiosonde Recorders AN/TMQ-5 (NSN) 6660-00-324-9426), AN/TMQ-5A, AN/TMQ-5B, (NSN 6660-00-393-2234), and AN/TMQ-5C (NSN 6660-00-682-4500).
TM 11-6660-206-12	Operator's and Organizational Maintenance Manual: Rawin Sets AN/GMD-1A (NSN 6660-00-224-6137), AN/GMD-1C (NSN 6660-01-077-7797) and AN/GMD-1D (NSN 6660-01-072-9995).
TM 11-6660-219-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists, Radiosonde Baseline Check Sets AN/GMM-l and AN/GMM-lA (NSN 6660-00-527-8392).
TM 11-6660-220-10	Operator's Manual: Radiosonde Sets AN/AMT-12 and AN/AMT-12A.
TM 11-6660-222-12	Operator and Organizational Maintenance Manual: Meteorological Balloons Thermometers ML-4, ML-5, and ML-7; Psychrometer ML-24 and ML-224; Instrument Shelter, Meteorological S-101/UM; Support, Instrument Shelter MT-1426/UM and Launching Equipments.
TM 11-6660-228-10	Operator's Manual: Radiosonde Set AN/AMT-4D.

By Order of the Secretary of the Army:

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LOGCOMD (5)
MDW (1)
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Instl (2) except
  Ft Carson (19)
  Ft Gordon (10)
  Ft Huachuca (10)
  WSMR (3)
Svc Colleges (2)
USASCS (10)
USASESS (10)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAINTS (3)
Army Dep (2) except
  SAAD (30)
  LBAD (14)
  TOAD (14)
  ATAD (10)
  LEAD (7)
  NAAD (6)
  SVAD (5)
Gen Dep (2)
Sig See, Gen Dep (5)
Sig Dep (10)
ATS (1)
DPG (5)
JPG (2)
MAAG (1)
WRAMC (1)
USAFABD (2)
USARMIS (1)
USAERDAA (2)
USAERDAW (5)
USACRREL (2)
Sig FLDMS (2)
Units org under fol TOE :-2 ea.
  7 series
  11-15
  11-16
  11-35
  11–36
  11-38
  11-39
  11-85
  11-95
  11–117
  11-158
  11–215
  11-225
  11-228
  11-237
  11-500 (AA-AC)
  29-134
  29-136

ARNG: State AG (3).

USAR: None.

For explanation of abbreviations used, see AR 310-50.

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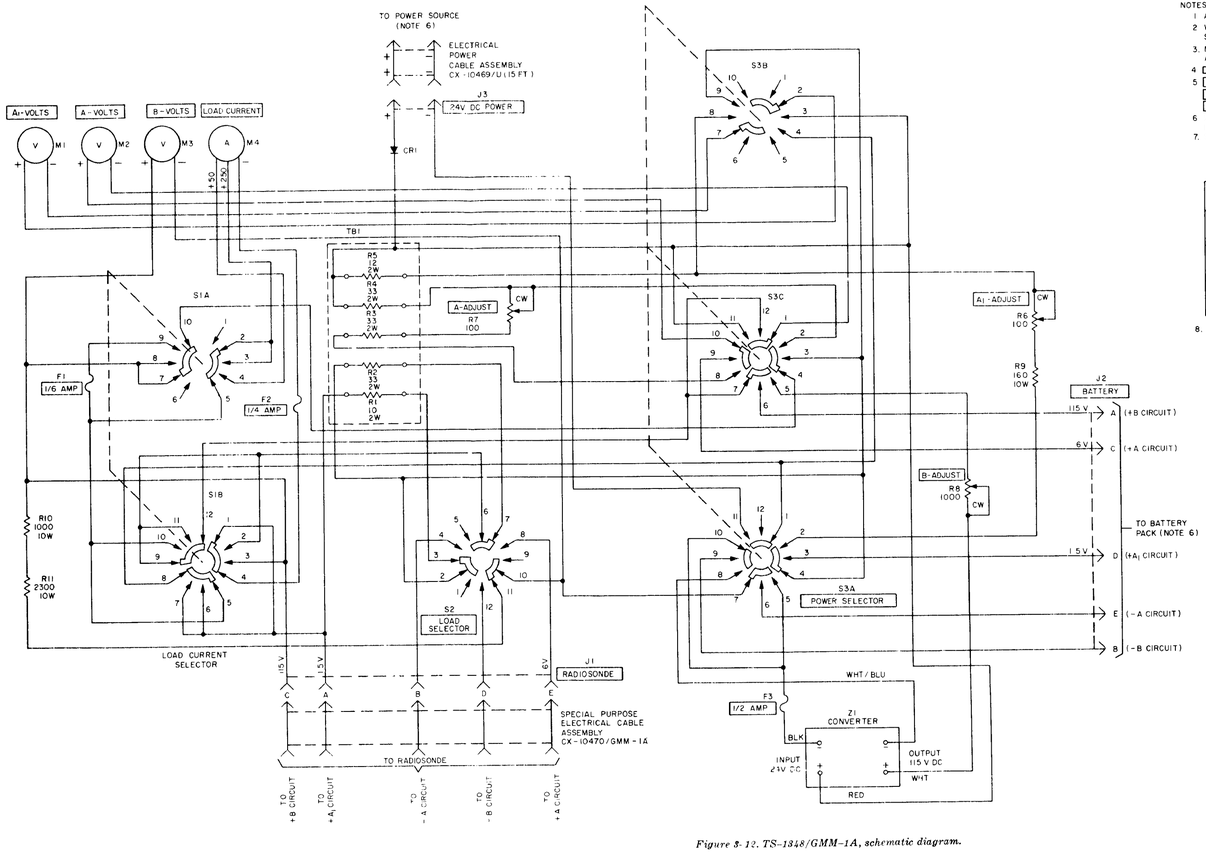


Figure 3-12. TS-1348/GMM-1A, schematic diagram.

NOTES:

1. ALL RESISTANCE VALUES ARE IN OHMS.
2. WAFER SWITCHES ARE VIEWED FROM CONTROL KNOB, SECTION A OF SWITCHES S1 AND S3 IS WAFER CLOSEST TO CONTROL KNOB.
3. NUMBERS ON ALL WAFER SWITCH CONTACTS ARE ARBITRARILY ASSIGNED FOR REFERENCE PURPOSES ONLY.
4. [ ] INDICATES EQUIPMENT MARKING.
5. [POWER SELECTOR] SWITCH S3 IS SHOWN IN [OFF] POSITION.
   [LOAD CURRENT SELECTOR] SWITCH S1 IS SHOWN IN THE [0-250 MA A] POSITION
   [LOAD SELECTOR] SWITCH S2 IS SHOWN IN THE [DUMMY] POSITION
6. DURING OPERATION, THE SOURCE OF POWER MAY BE EITHER A BATTERY PACK OR A 24-VOLT VEHICULAR BATTERY.
7. SWITCH POSITIONS AND CONTACTS MADE

S1
[LOAD CURRENT SELECTOR]

SWITCH POSITION	S1A	S1B
0-250 MA A_1	3 AND 4 10 AND 3	4 AND 3 8 AND 7 12 AND 11
0-250 MA	5 AND 3 10 AND 8	4 AND 2 8 AND 6 12 AND 10
0-50 MA B	5 AND 2 10 AND 7	4 AND 1 8 AND 5 12 AND 9

S2
[LOAD SELECTOR]

SWITCH POSITION	S2
DUMMY	2 AND 3 6 AND 7 10 AND 11
RADIOSONDE	2 AND 4 6 AND 8 10 AND 12

S3
[POWER SELECTOR]

SWITCH POSITION	S3A AND S3C	S3B
24V DC	1 AND 2 4 AND 5 7 AND 8 10 AND 11	2 AND 3 7 AND 8
BATTERY PACK	1 AND 3 4 AND 6 7 AND 9 10 AND 12	2 AND 4 7 AND 9
OFF	NONE	NONE

8. CONNECTORS:

[24V DC POWER] J3
[RADIOSONDE] J1
ELECTRICAL POWER CABLE ASSEMBLY CX-10469/U (15 FT.)
[BATTERY] J2
SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-10470/GMM-1A

TM 2440-06-7

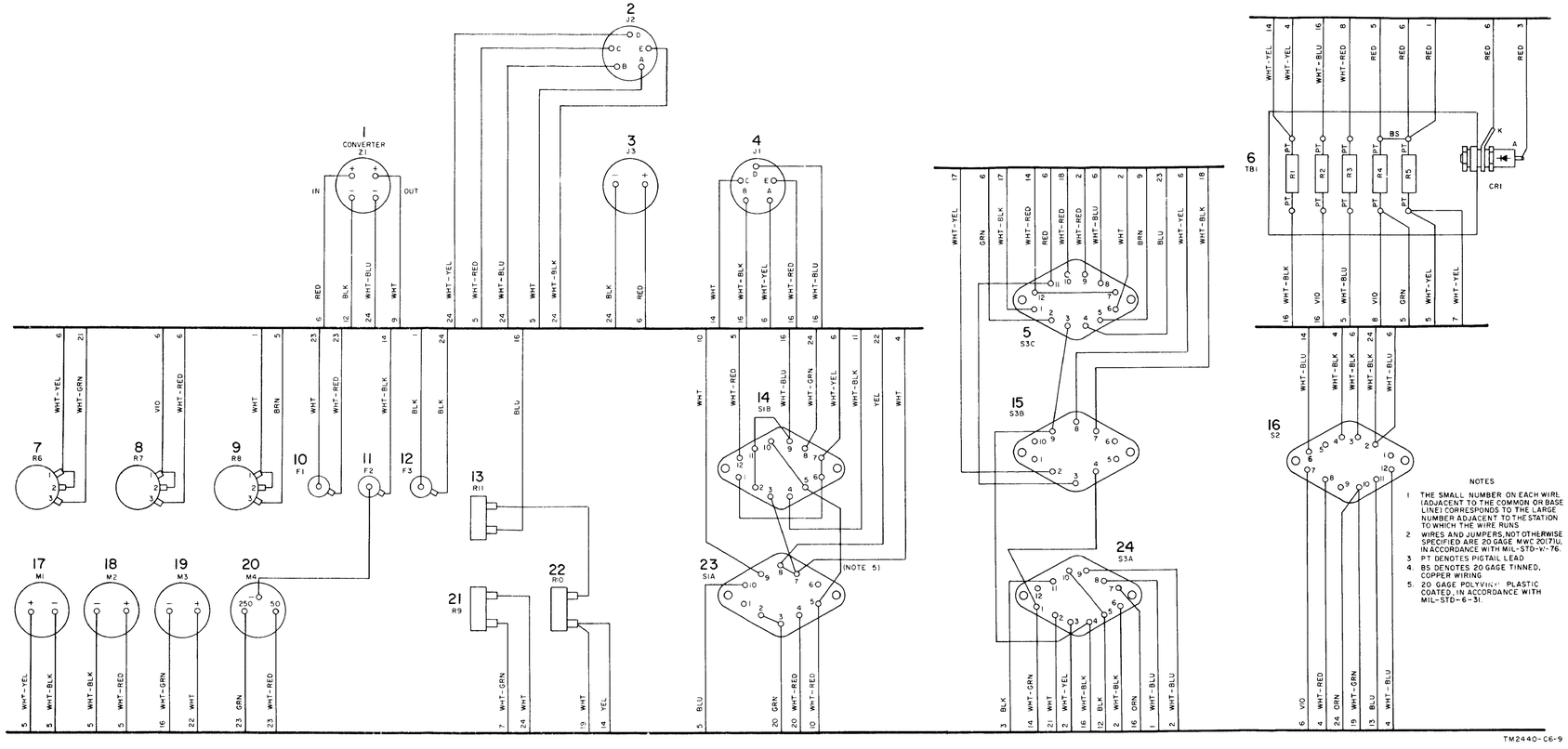
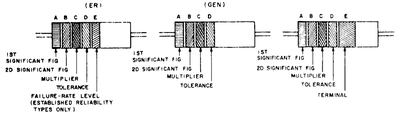


Figure 3-13. TS-1318/GMM-1A, wiring diagram.



COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS.

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM
BLACK	0	BLACK	0	BLACK	1			BROWN	M=1.0	
BROWN	1	BROWN	1	BROWN	10			RED	P=0.1	
RED	2	RED	2	RED	100			ORANGE	R=0.01	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S=0.001	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP TYPE ONLY)	WHITE		SOLDERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5			
BLUE	6	BLUE	6	BLUE	1,000,000	NO	± 2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY)			
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	0.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE - RATE LEVEL; PERCENT FAILURE PER 1,000 HOURS). ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1-1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

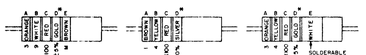
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED.)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE

2R7 = 2.7 OHMS. 10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE 3,900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1,400 OHMS
RESISTANCE TOLERANCE ±10%

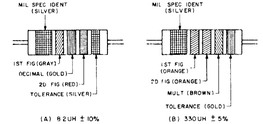
NOMINAL RESISTANCE 3,400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ± 20% AND THE RESISTOR IS NOT MIL-STD

A COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS



COLOR CODING FOR TUBULAR ENCAPSULATED R F CHOKES. AT A, AN EXAMPLE OF OF THE CODING FOR AN 8 2 UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330 UH INDUCTOR ARE ILLUSTRATED

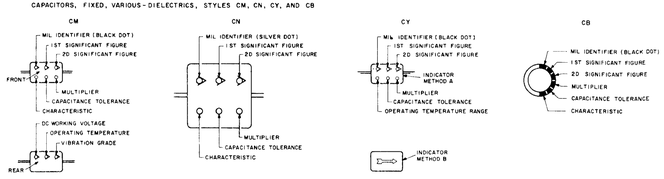
TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED R F CHOKES

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL

B COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB



MICA-DIELECTRIC | PAPER-DIELECTRIC | GLASS-DIELECTRIC, GLASS CASE | MICA, BUTTON TYPE

C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB.

COLOR	MIL ID	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE			CHARACTERISTIC			DC WORKING VOLTAGE	OPERATING TEMP RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CB	CM	CY, CN	CM
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A				-55°to+70°C	10-55Hz
BROWN		1	1	10					B	E	B			
RED		2	2	100	±2%		±2%	±2%	C				-55°to+85°C	
ORANGE		3	3	1,000	±30%				D		D	300		
YELLOW		4	4	10,000					E				-55°to+125°C	10-2,000Hz
GREEN		5	5		±5%				F			500		
BLUE		6	6										-55°to+150°C	
PURPLE (VIOLET)		7	7											
GREY		8	8											
WHITE		9	9											
GOLD				0.1			±5%	±5%						
SILVER	CN				±10%	±10%	±10%	±10%						

TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC

COLOR	TEMPERATURE COEFFICIENT[4]	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		± 2.0 UUF	CC
BROWN	−30	1	1	10	± 1%		
RED	+80	2	2	100	± 2%	± 0.25 UUF	
ORANGE	−150	3	3	1,000			
YELLOW	−220	4	4				
GREEN	−330	5	5		± 5%	± 0.5 UUF	
BLUE	−470	6	6				
PURPLE (VIOLET)	−750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	± 10%		
GOLD	+100					± 1.0 UUF	
SILVER							

1 THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF

2 LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS MIL-C-5, MIL-C-250, MIL-C-11272B, AND MIL-C-11015C RESPECTIVELY.

3 LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D

4 TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE

ESC-FM 1794-71

Figure 4-2. Resistor-inductor-capacitor color code chart.