TECHNICAL MANUAL

OPERATOR'S AND AVIATION INTERMEDIATE MAINTENANCE (AVIM) MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST FOR

PYROMETER AND THERMOCOUPLE TESTER

FIELD, TYPE N-3A
NSN 6695-01-149-5810
P/N 5500

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HEADQUARTERS, DEPARTMENT OF THE ARMY
31 MARCH 1987

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WASHINGTON, D.C., 31 March 1987

OPERATOR'S AND AVIATION INTERMEDIATE MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR PYROMETER AND THERMOCOUPLE TESTER FIELD, TYPE N-3A NSN-6695-01-149-5810 P/N 5500

REPORTING OF ERRORS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications) or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished to you.

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CAUTION

Make sure the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** is set to the **OFF** position and the **COARSE AND FINE RHEOSTATS** are turned fully counterclockwise before commencing tests. This action will prevent the **VOLTMETER** pointer from striking harder than necessary the upper stop because of no load present across the clip leads.

CAUTION

The lead resistance becomes one leg of a null-balance bridge. Thus the tester's clip leads should be attached first to the thermocouple leads with the indicator removed before the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** is rotated to the **LEAD RESISTANCE** position. This procedure prevents unnecessary striking of the **VOLTMETER** pointer against the stops.

CAUTION

To avoid having the **VOLTMETER** pointer strike unnecessarily the full scale stop connect the tester's **RESISTANCE THERMOMETER TEST LEAD** to the indicator's circular connector before switching the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to either the 12 or 24 volt position. Similarly return the switch to the **OFF** position before disconnecting the test lead connector.

CAUTION

Connect the resistance standard to the thermometer lead clips before actuating the **LEAD RESISTANCE CONTROL** to prevent unnecessary striking of the **VOLTMETER** pointer against the stops.

CHAPTER 1. INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE. 1-1

a Type Of Manual: Operator's and Aviation Intermediate Maintenance Manual, (Including Repair Parts and Special Tools List).

b. Model Number And Equipment Name: Baganoff Engineering Inc. Model 5500 Pyrometer and Thermocouple Tester, Field Type N-3A.

c. Purpose Of Equipment: The Pyrometer and Thermocouple Tester Figure 1-1 establishes millivoltage outputs when testing thermocouple indicators, operates as a null-balance galvanometer when measuring thermocouple lead resistances, and provides precision resistance and excitation voltage outputs when testing pyrometer indicators and sensors.

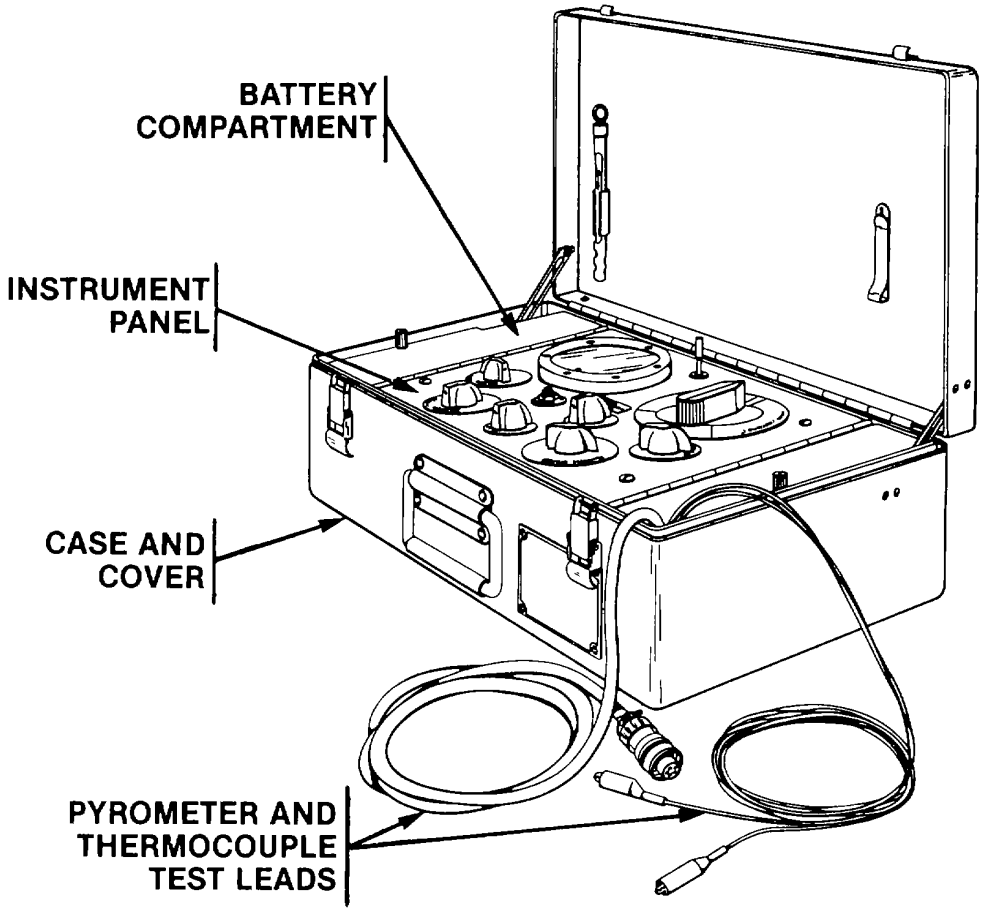


Figure 1-1. Pyrometer And Thermocouple Tester

1-2. MAINTENANCE FORMS, RECORDS AND REPORTS. 1-2

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, Functional Users Manual for The Army Maintenance Management System-Aviation (TAMMS-A).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE. 1-3

Procedures for destroying Army materiel to prevent enemy use are listed in TM 750-244-2.

1-4. PREPARATION FOR STORAGE OR SHIPMENT. 1-4

Instructions are provided in Chapter 3 and in TM 750-90-1.

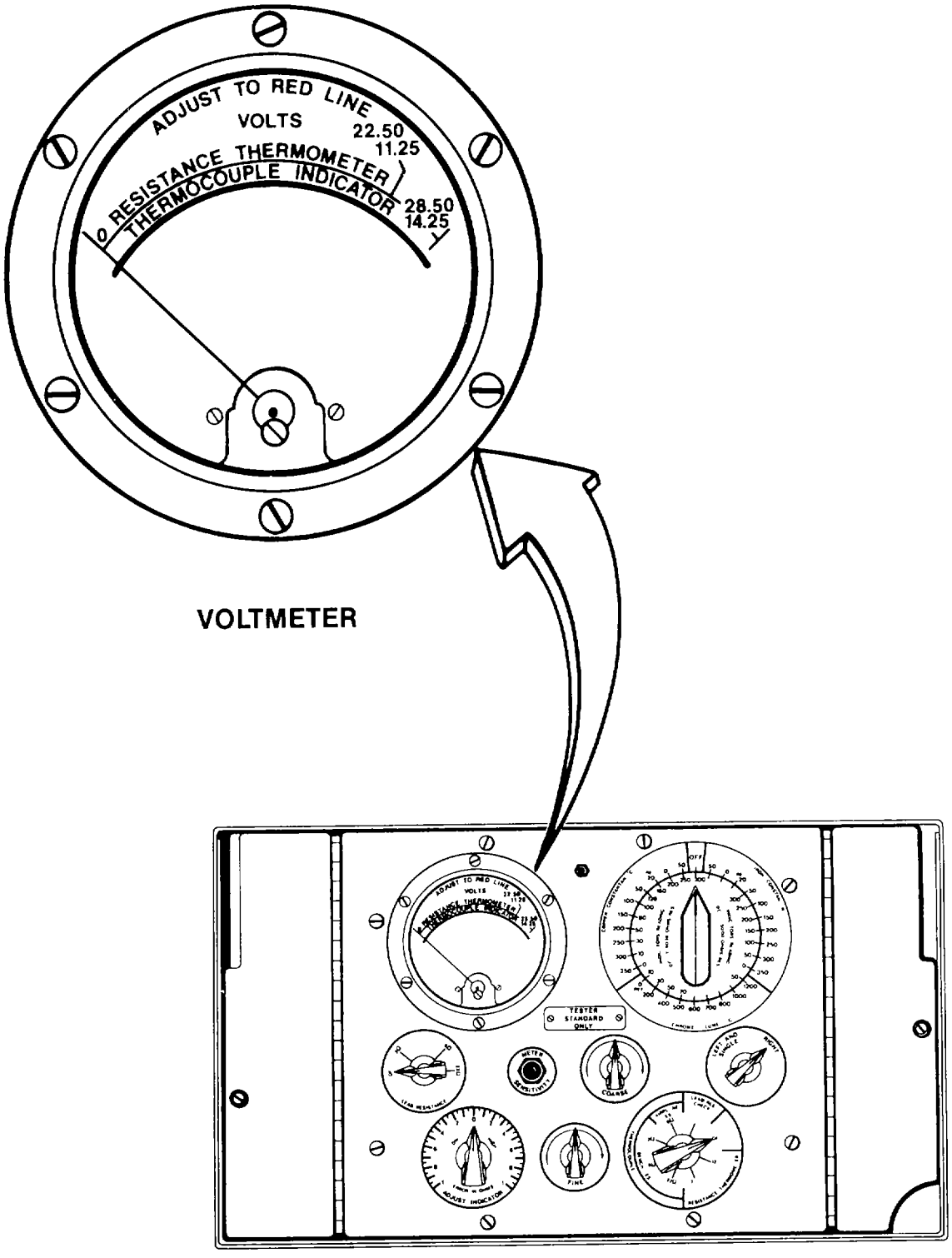
1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). 1-5

If your Thermocouple and Pyrometer Tester needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, U.S. Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Blvd., St. Louis, MO. 63120-1798. We'll send you a reply.

Section II. EQUIPMENT DESCRIPTION AND DATA

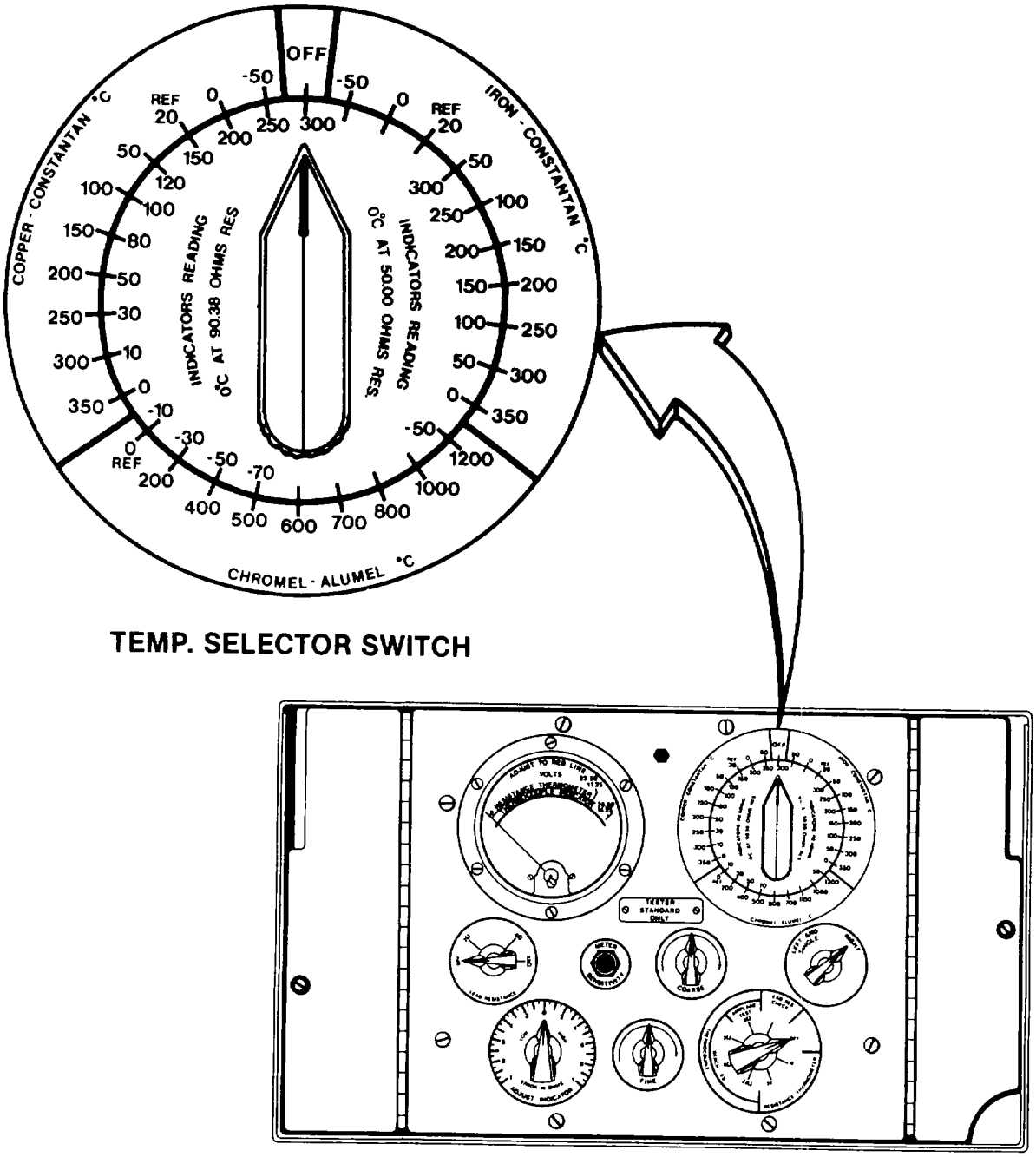
1-6. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. 1-6

a. Voltmeter: Adjustments are made by the operator using the other controls while observing the position of the **VOLTMETER** pointer. The pointer is set in accordance with the operating instructions to prescribed points on the dial. This standardization compensates for varying battery supply potential with usage.


ADJUST TO RED LINE
VOLTS
22.50
11.25
RESISTANCE THERMOMETER
THERMOCOUPLE INDICATOR
28.50
14.25
TESTER
STANDARD
ONLY

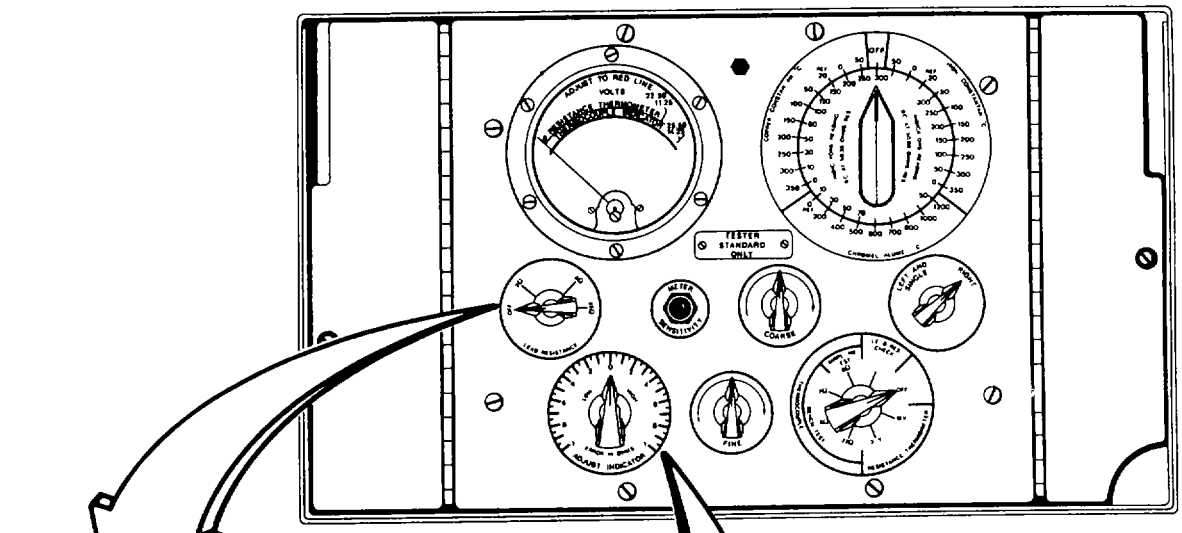
VOLTMETER

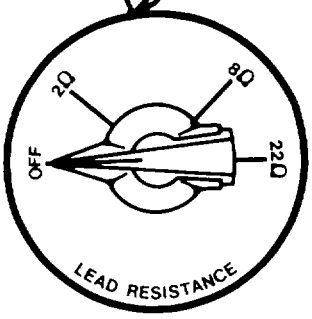
b. Temperature Selector Switch: Positioning of the **TEMPERATURE SELECTOR SWITCH** by the operator causes precision millivoltage outputs to be selected which simulate the aircraft's thermocouple output. Precision resistance outputs are also selected which simulate the aircraft's resistance thermometer output. The outer circle of graduations shown on the dial show temperatures in the range from -50 to 1,200 degrees Celsius, corresponding to the standard thermocouple millivoltages expected for three types of sensor materials. Likewise the inner circle of graduations show temperatures in the range from -70 to + 300 degrees Celsius, corresponding to standard thermometer resistances obtained for two different types of resistance elements.



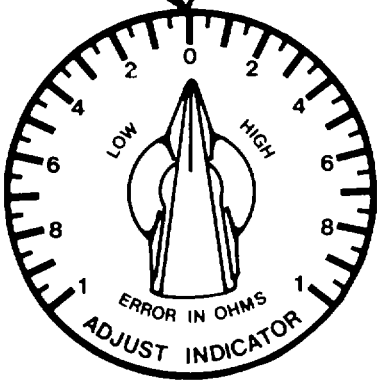
c. Lead Resistance Switch: Setting of the **LEAD RESISTANCE SWITCH** by the operator inserts a precision resistor of either 2, 8 or 22 ohms into one leg of a null-galvanometer bridge circuit. The resistance and thereby condition of the aircraft's thermocouple lead circuit may be determined by comparing it to this preselected resistance.

d. Lead Resistance Error Adjust: The operator varies the **LEAD RESISTANCE ERROR ADJUST** while observing the **VOLTMETER** pointer for a null condition. The error in resistance indicated on the dial either high or low represents the difference in resistance between the preselected precision bridge resistor and that of the aircraft's thermocouple lead circuit.





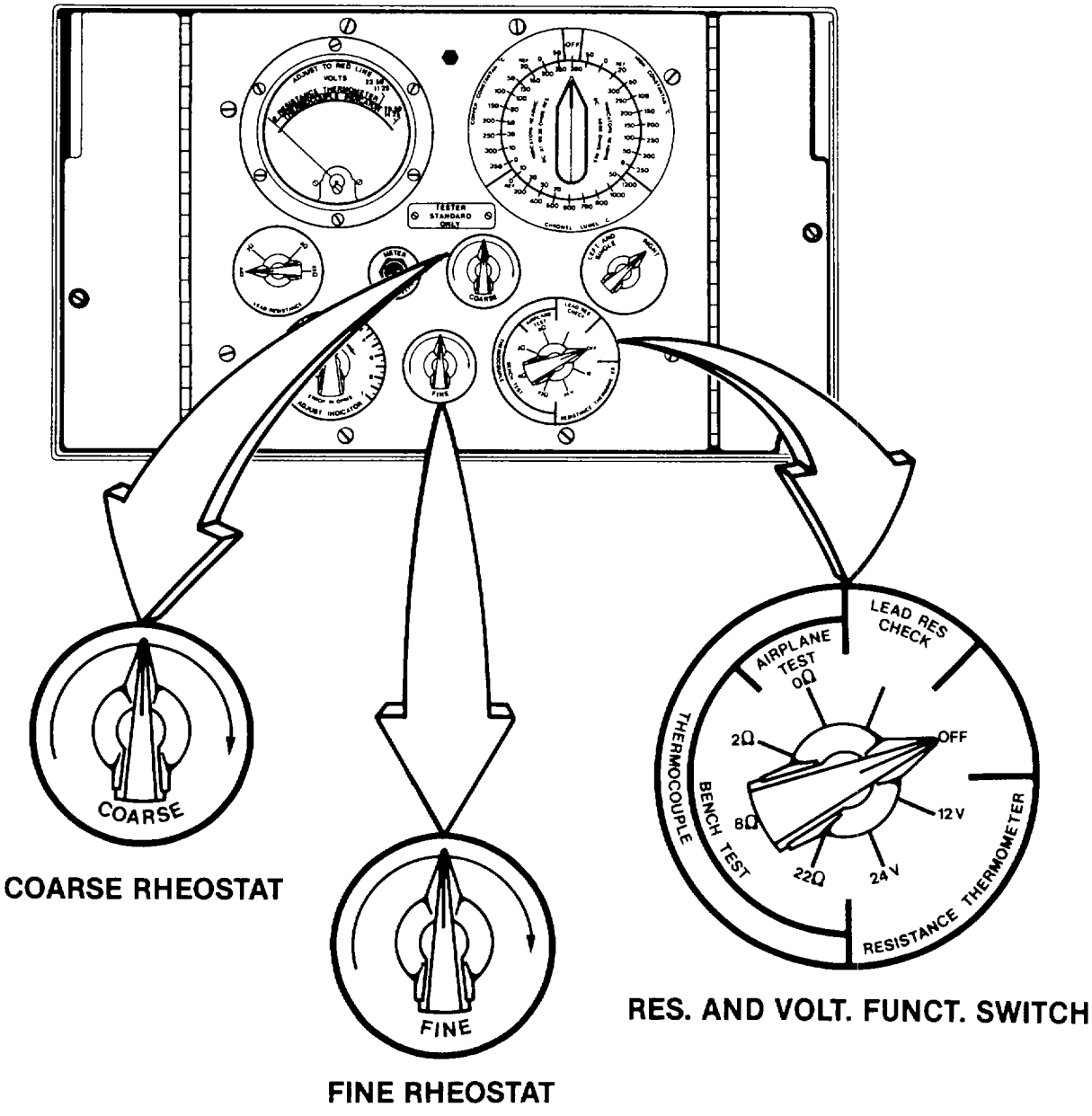
LEAD RES. SWITCH



LEAD RES. CONTROL

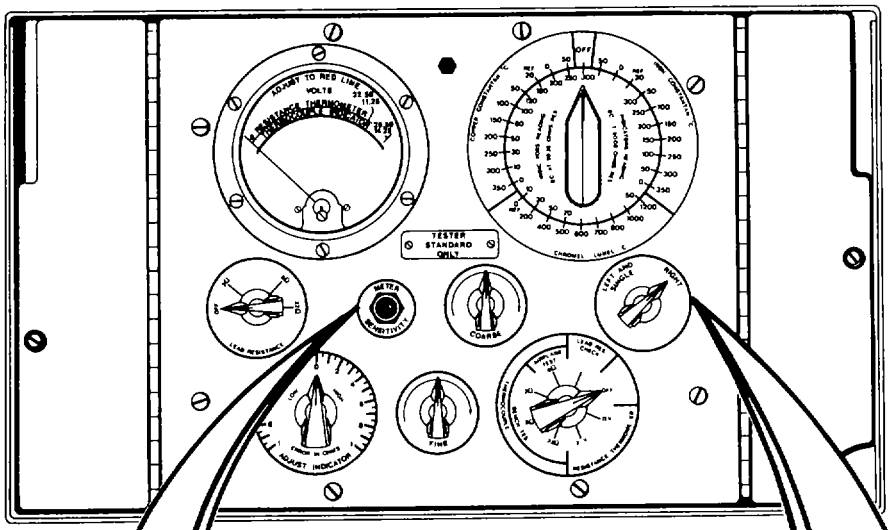
e. Coarse And Fine Rheostats: Alternate adjustments of the **COARSE AND FINE RHEOSTATS** by the operator to obtain a prescribed deflection of the **VOLTMETER** pointer standardizes the battery current flow through the tapped voltage divider to compensate for an aging battery condition.

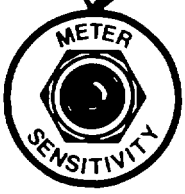
f. Resistance And Voltage Function Switch: The operator, by rotating this multi-position **RESISTANCE AND VOLTAGE FUNCTION SWITCH**, either activates the tapped voltage network or null-balance bridge by connecting these circuits to the 1.5 volt battery. In other positions, it supplies 12 or 24 volt excitation to the aircraft resistance thermometer circuit, by connecting these circuits to the 45 volt battery. Additional positions are available to provide either 2, 8 or 22 ohm precision resistors in series with the tapped voltage output.



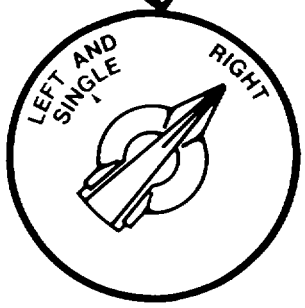
g. Left And Single Switch: This two position **LEFT AND SINGLE SWITCH** directs the resistance thermometer outputs to either a single or dual aircraft circuit.

h. Meter Sensitivity Switch: This momentary **METER SENSITIVITY SWITCH** when depressed by the operator increases the sensitivity of the null-balance circuit.





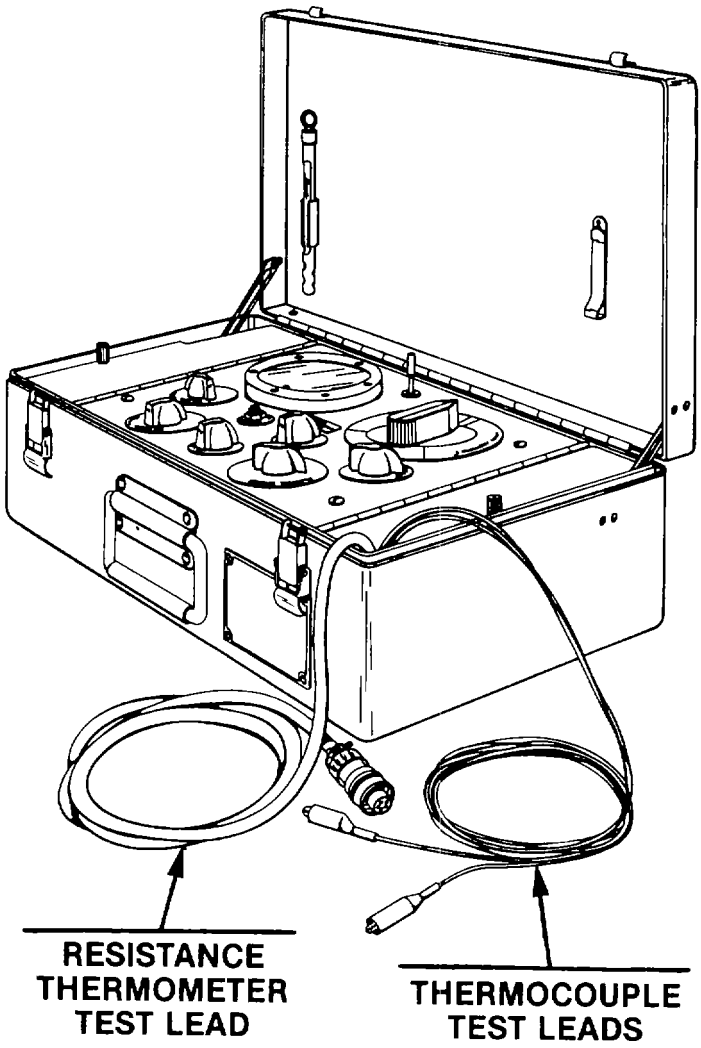
METER SENSITIVITY SWITCH



LEFT AND SINGLE SWITCH

i. Thermocouple Test Leads: The operator connects the two alligator clips located on the ends of the **THERMOCOUPLE TEST LEADS** to the thermocouple indicator or sensor as required by the particular test.

j. Resistance Thermometer Test Lead: The connector on the end of the **RESISTANCE THERMOMETER TEST LEAD** may be attached through a series of cable adapters to various aircraft resistance thermometer circuits.



1-7. TESTER DESCRIPTION. 1-7

EQUIPMENT DATA

Type: Field, N-3A

Weight: 25 pounds

Dimensions: 18" x 10.5" x 6"

Manufacturer: Baganoff Engineering Inc. St. Louis, MO FSCM: 57829

Section III. PRINCIPLES OF OPERATION

1-8. THERMOCOUPLE TESTING SECTION. 1-8

a. The tester may be visualized as consisting of two sections: Thermocouple Thermometer Testing Section and the Resistance Thermometer Testing Section. (See Figure 1-2) The millivoltage source shown is comprised of a 1.5 volt dry cell battery, two current limiting rheostats, a precision multiple-tapped, voltage divider network, and a voltmeter. The operator standardizes the current flowing through the network by adjusting the **COARSE AND FINE RHEOSTATS** and observing the pointer deflection of the **VOLTMETER.** When the pointer is coincident with the red line on the dial, the precision 27 discrete millivoltages reach their calibrated values. The proper precision millivoltage tap is selected for output by setting the pointer of the **TEMPERATURE SELECTOR SWITCH** to the desired temperature, while taking note of the thermocouple material associated with the three colored sectors. Precision resistance of 2, 8 or 22 ohms is further added in series with the source as shown by positioning the **RESISTANCE AND VOLTAGE FUNCTION SWITCH**. This resistance simulates the actual resistance characteristics of the thermocouple junction and the aircraft wiring lead resistance.

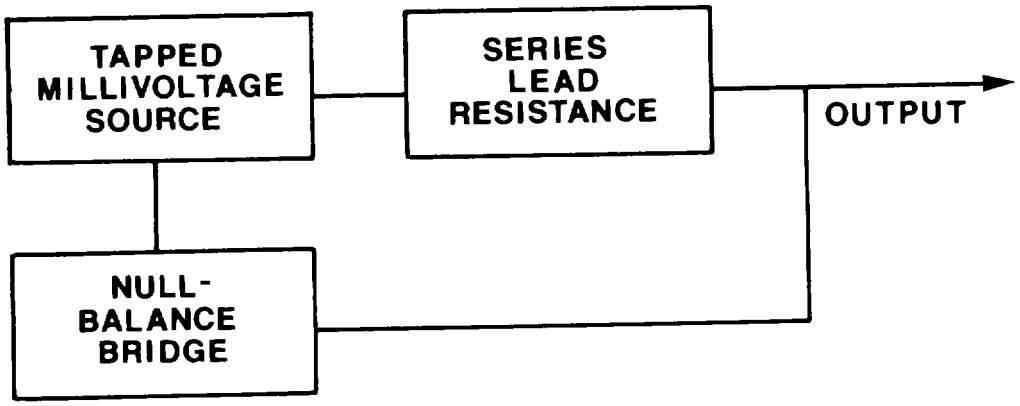


Figure 1-2. Thermocouple Section Flow Diagram

b. The function switch when placed in the **LEAD RESISTANCE** position energizes the null-balance bridge circuit, as shown, within the tester and converts the **VOLTMETER** into a null-galvanometer operation. The **LEAD RESISTANCE SWITCH** is positioned to the resistance shown on the dial that corresponds to the expected nominal resistance of the aircraft's thermocouple wiring. The **LEAD RESISTANCE ERROR CONTROL** can be rotated to obtain up-scale voltmeter readings on either side of the null condition. The resistance error shown on the dial, either high or low, after the **METER SENSITIVITY SWITCH** has been depressed to more accurately determine the null condition represents the difference in resistance between that of the precision resistor in the bridge leg and that of the aircraft circuit.

1-9. RESISTANCE THERMOMETER TESTING SECTION. 1-9

c. Either 12 or 24 volts is selected as an output from the source as shown in Figure 1-3 by the positioning of the **RESISTANCE AND VOLTAGE FUNCTION SWITCH.** The precise values shown on the **VOLTMETER** dial are obtained by utilizing the **COARSE AND FINE RHEOSTATS,** which provide compensation for varying conditions of the 45 volt battery source. Stepped precision resistance values are selected for output by setting the **TEMPERATURE SELECTOR SWITCH** pointer to a particular temperature indicated on the dial, while matching the bulb resistance to that of the resistance thermometer under test.

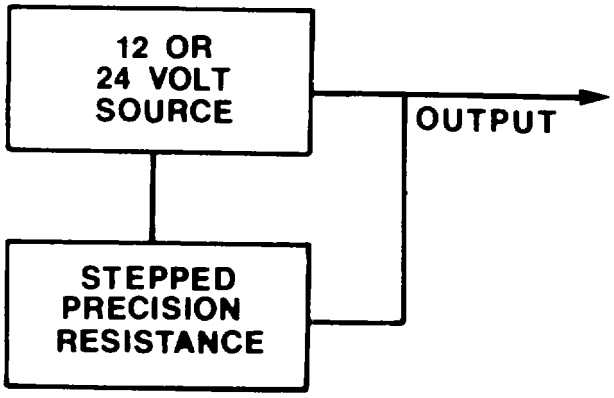


Figure 1-3. Resistance Thermometer Section Flow Diagram

CHAPTER 2. OPERATING INSTRUCTIONS

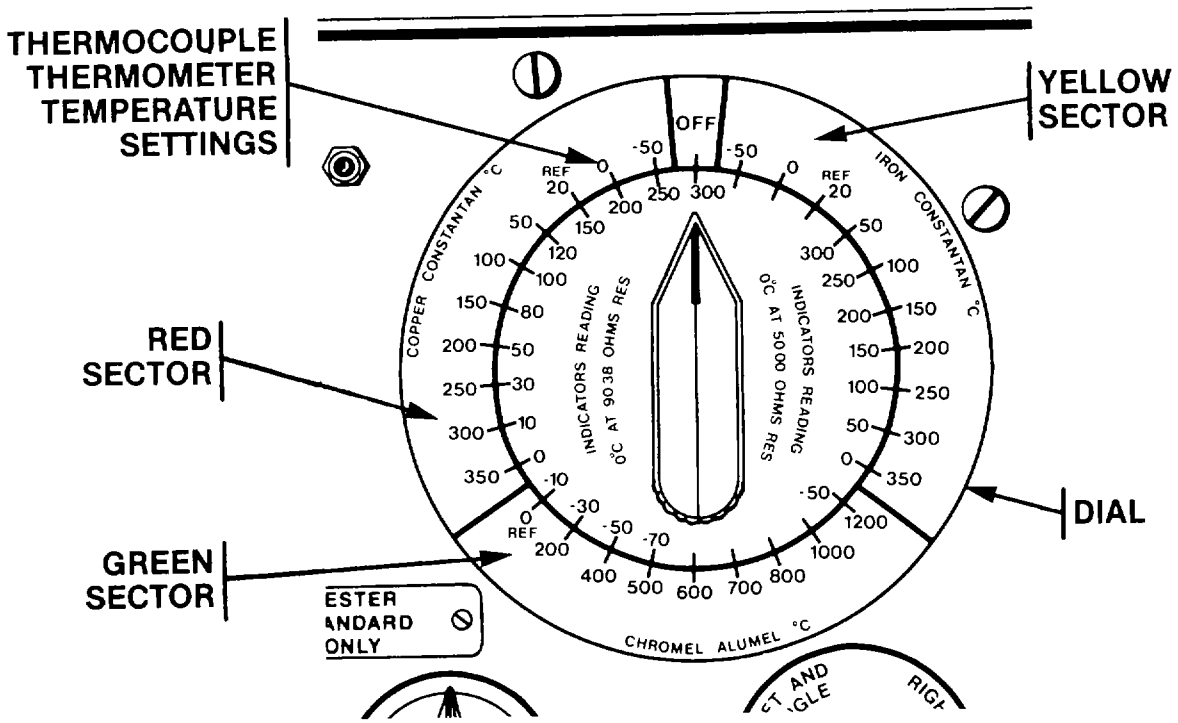
Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. THERMOCOUPLE INDICATOR TEST PROCEDURES. 2-1

CAUTION

Make sure the RESISTANCE AND VOLTAGE FUNCTION SWITCH is set to the OFF position and the COARSE AND FINE RHEOSTATS are turned fully counterclockwise before commencing tests. This action will prevent the VOLTMETER pointer from striking harder than necessary the upper stop because of no load present across the clip leads.

a. Preliminary. As preparatory data, determine the types of material used in the thermocouple sensor and the resistance of the thermocouple leads by referring to the appropriate service manual or indicator nameplate. The types of thermocouple sensors and the temperature ranges over which they can be tested are presented as reference below and can be correlated by looking at the **TEMPERATURE SELECTOR SWITCH** dial.



The tester's capabilities in terms of temperature range and types of thermocouples that can be handled are summarized in Table 2-1.

Table 2-1. Temperature Ranges For Temperature Selector Switch

Copper-Constantan Thermocouple Sensor	-50º to +350ºC
Iron-Constantan Thermocouple Sensor	-70° to +350ºC
Chromel-Alumel Thermocouple Sensor	0° to 1200ºC

b. Prior to checking the indicator for temperature errors over its range of operation, the indicator's reading is made to agree with the tester's reference output by manipulating the zero-adjust on the test unit. At these reference temperatures, one for each colored section, (See Table 2-2) the tester's reference output is precisely zero millivolts.

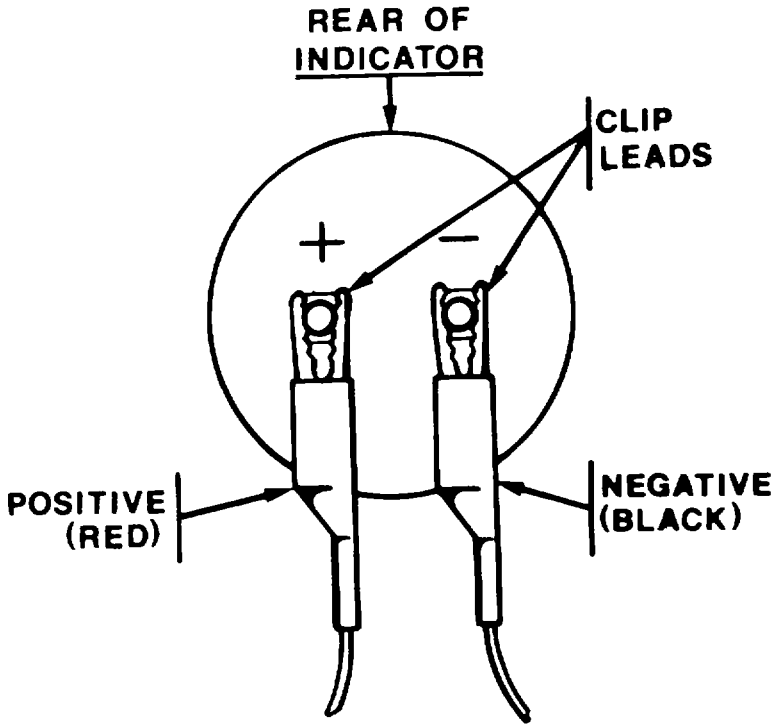
Table 2-2. Thermocouple Material And Corresponding Reference Settings For Temperature Selector Switch

THERMOCOUPLE MATERIAL	TEMPERATURE SELECTOR SWITCH	
	SECTOR	POSITION
Copper-Constantan	Red	20°C Ref.
Iron-Constantan	Yellow	20°C Ref.
Chromel-Alumel	Green	0°C Ref.*

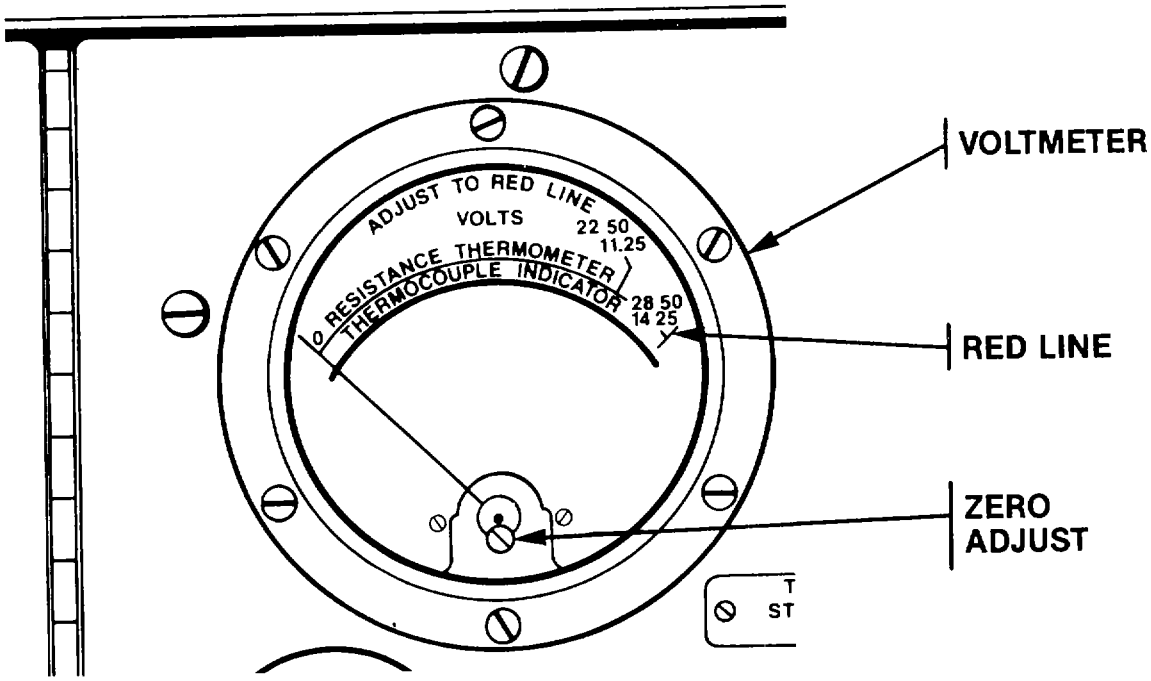
*** NOTE**

The indicator for a chromel-alumel thermocouple is adjusted with the zero-adjust at a mid range point 700°C for 0° to 1000ºC thermocouple and 900ºC for a 0° to 1200ºC thermocouple to produce a 0° error. The proper procedure should be obtained from the indicator manual.

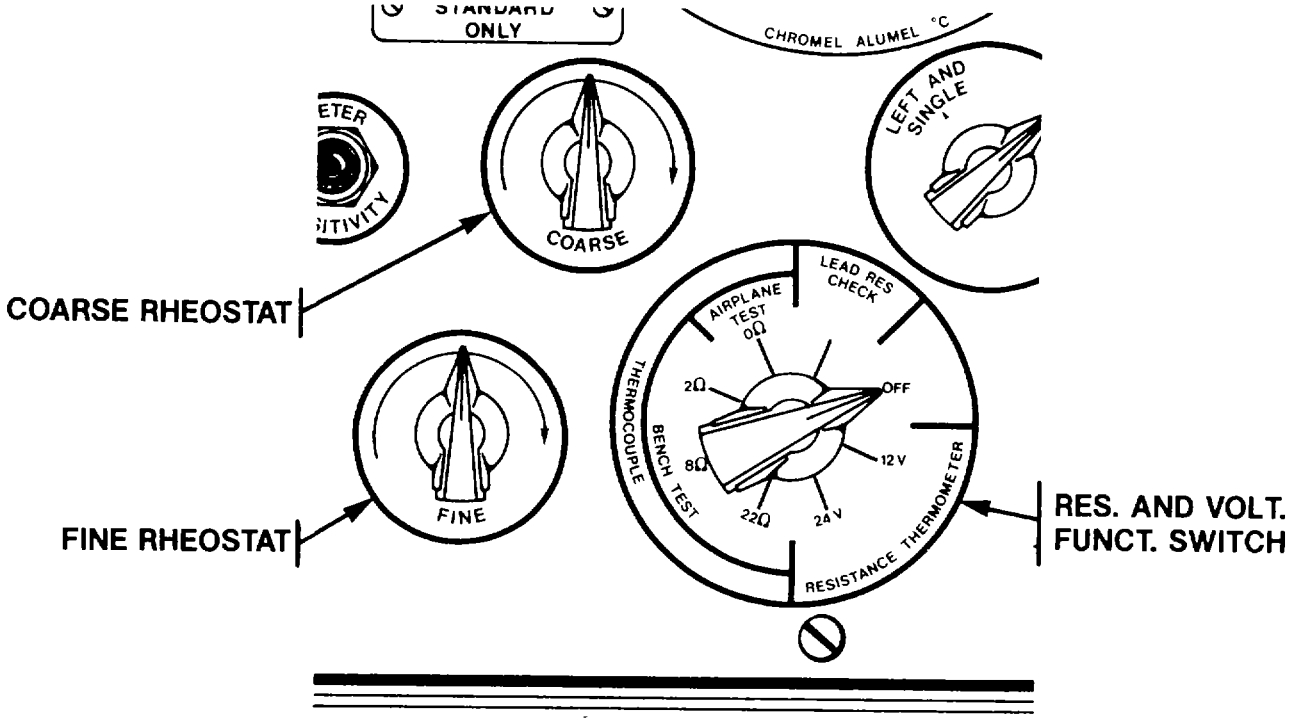
c. Permit the indicator under test to remain at ambient temperature for as long as one hour, depending upon the conditions. The self-contained light holder, if present, must be disconnected during temperature stabilization and subsequent scale error test procedures. Disconnect both thermocouple leads from the indicator and connect the tester's thermocouple lead clips to the indicator, observing the polarities depicted.



d. Check to see if **VOLTMETER** pointer is indicating zero reading. If not manipulate zero adjust with a small screwdriver until



the correct condition is obtained. Rotate the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to either the 2, 8 or 22 ohm position to correspond with the thermocouple lead circuit resistance. This action insures that the tester's output impedance equals that of the thermocouple and its lead circuit. Adjust first the **COARSE RHEOSTAT** and finally the **FINE RHEOSTAT** to bring the **VOLTMETER** pointer up to the red line located at the full-scale position.



e. Copper-Constantan and Iron-Constantan Indicator Test Procedures. Follow the preliminary procedures as contained in paragraphs 2-1a. through d. and normalize the indicator at 20ºC by rotating the zero adjust with a small screwdriver. Next step the **TEMPERATURE SELECTOR SWITCH** in each direction and note the difference between the tester dial and indicator readings.

NOTE

The **VOLTMETER** pointer in its relation to the red line should be occasionally checked and adjustments made to correct for varying battery conditions.

f. The indicator service manual should be referred to for direction on the significance of these temperature errors. When the final reading has been taken, turn the **TEMPERATURE SELECTOR SWITCH** to the

OFF position and disconnect the thermocouple clip leads from the indicator. Observe the ambient temperature registered on the liquid-filled glass thermometer located in the cover of the tester and adjust the indicator to indicate this ambient temperature prior to returning the unit to storage or service.

g. Chromel-Alumel Indicator Test Procedures. Follow the preliminary procedures contained in paragraphs 2-1a. through d. and normalize the indicator using the zero adjust while the **TEMPERATURE SELECTOR SWITCH** is positioned to 700ºC or 900ºC according to Table 2-2. Step the **TEMPERATURE SELECTOR SWITCH** in each direction and note the differences between tester dial and indicator readings. The indicator service manual should be consulted concerning the significance of this error and whether the indicator should be returned to service.

h. Return the **TEMPERATURE SELECTOR SWITCH** to its normalization position in accordance with Table 2-2. Set the indicator pointer using the zero adjust to a reading above that of the **TEMPERATURE SELECTOR SWITCH** by an amount equal to the ambient temperature read from the liquid-filled glass thermometer. As an example, suppose the ambient temperature is 22°C and the **TEMPERATURE SELECTOR SWITCH** setting is 900ºC, then the indicator is adjusted to read 922ºC. To complete the test return the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **OFF** position before disconnecting the tester clip leads from the indicator.

NOTE

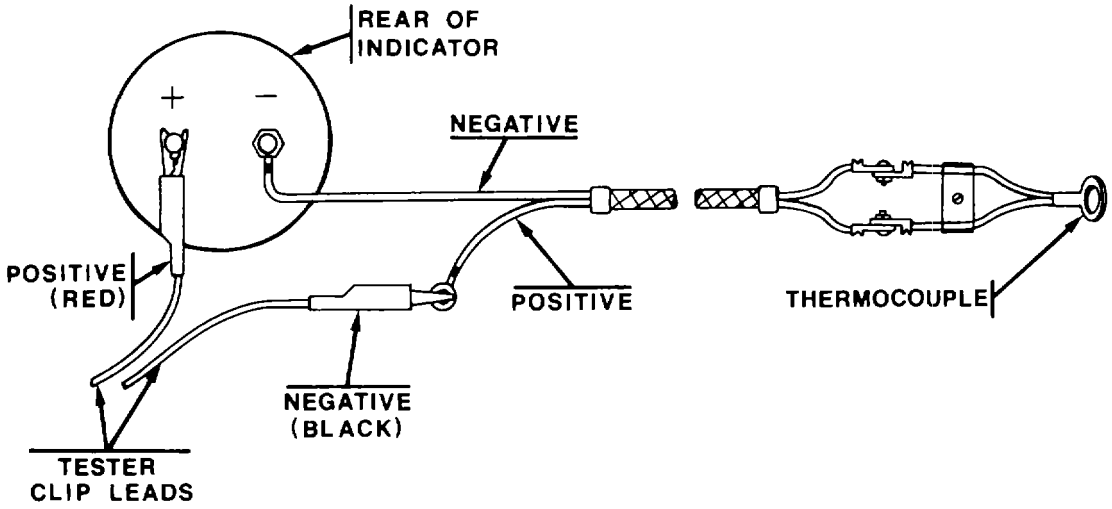
When either the indicator has no zero adjust or the ambient temperature is below 5° C or above 45ºC (41ºF to 113ºF) these alternate instructions in para. 2-li. shall be followed.

i. If the conditions in the Note prevail, the indicator normalization setting shall not be made equal to the algebraic sum of the **TEMPERATURE SELECTOR SWITCH** setting plus the ambient temperature reading as prescribed in para. 2-1h. It would follow that during the test the indicator readings should be compared with the sum of the TEMP**ERATURE SELECTOR SWITCH** setting plus the ambient temperature obtained from the liquid-filled glass thermometer.

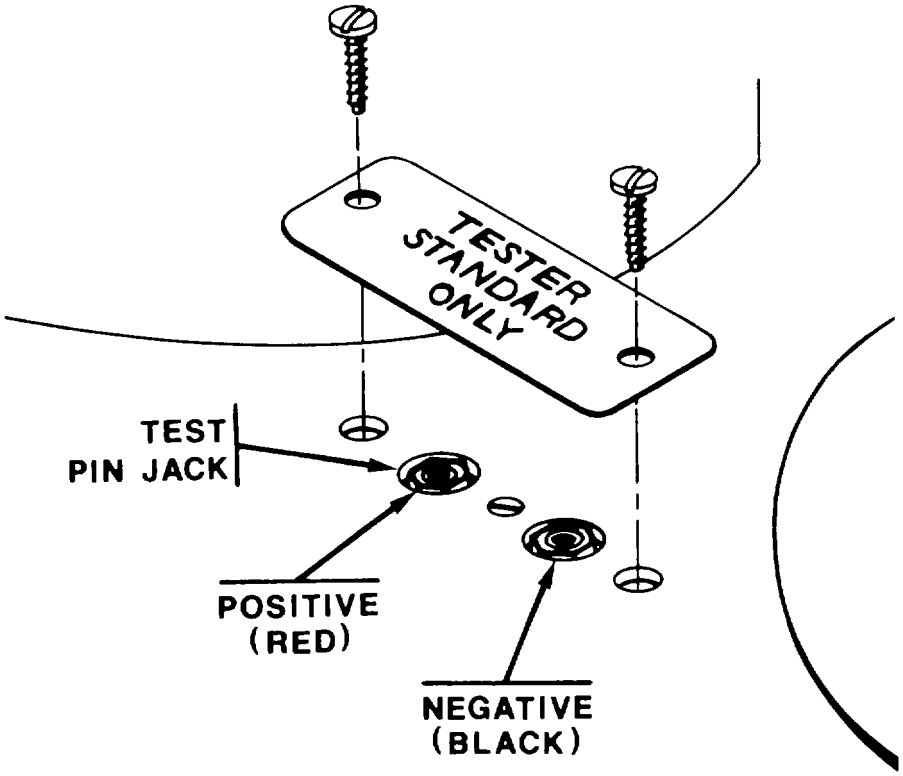
j. Indicator And Thermocouple Leads In Series Test Procedure. Disconnect the positive thermocouple lead from the indicator and reestablish the airplane circuit by connecting the positive tester clip lead to the positive terminal on the indicator and negative clip lead to the positive thermocouple lead. Since the thermocouple leads maintain the proper circuit resistance, set the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to zero ohms. Follow the procedures in paragraphs 2-1e. through i. as appropriate to complete the test.

NOTE

The indicator, thermocouple sensor, and leads must be at the same ambient temperature in order that the potential thermal millivoltage output does not add significantly to the tester output.



k. Servo Thermocouple Indicator Test Procedures. Apply power to the indicator as delineated in the service manual and allow it to stabilize at ambient temperature for 30 minutes under these powered-up conditions. If the indicator is self-lighted, disconnect the lamp circuit during the tests. Use a short length of copper wire to establish a circuit between the (+) jack of the **TESTER STANDARD ONLY** pin jacks and the (+) side or chromel wire connection as delineated in the manual for the indicator. Likewise use a short length of alumel or constantan wire to form a circuit between the (-) jack and the (-) side or alumel wire connection on the indicator. To retain the calibration of the tester connect a 42 ohm resistor across the tester's clip leads.



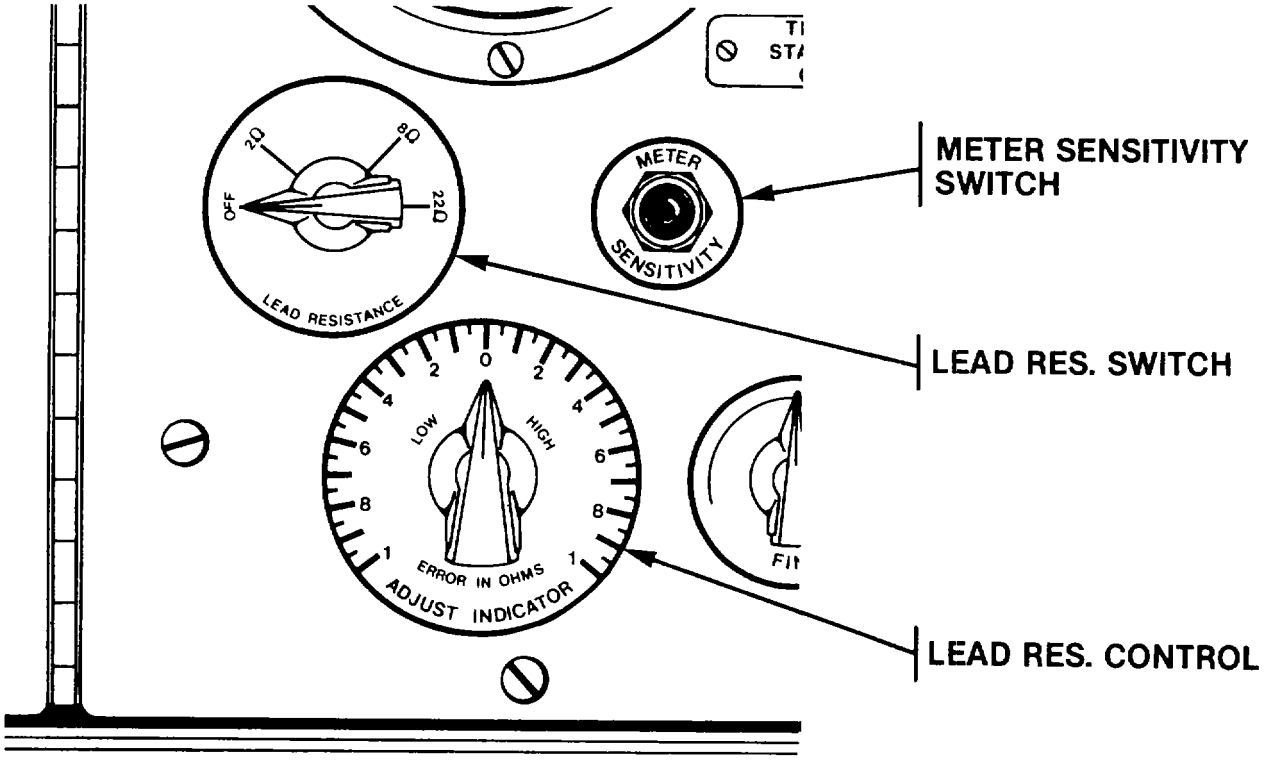
l. Rotate the **TEMPERATURE SELECTOR SWITCH** to the 700º or 900°C location on the green dial sector, depending upon instructions contained in Table 2-2. Turn the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **AIRPLANE TEST,** zero ohm position. Adjust first the **COARSE** and second the **FINE RHEOSTATS** until the **VOLTMETER** pointer rests exactly over the red line. Step the **TEMPERATURE SELECTOR SWITCH** over the entire green sector and note the readings on the test indicator. With the reference temperature compensator located in the indicator working properly the indicator readings should equal the dial temperature plus the ambient temperature registered on the tester's liquid-filled glass thermometer. The indicator's errors are the differences between these two sets of readings.

2-2. THERMOCOUPLE LEAD RESISTANCE TEST PROCEDURES. 2-2

CAUTION

The lead resistance becomes one leg of a null-balance bridge. Thus the tester's clip leads should be attached first to the thermocouple leads with the indicator removed before the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** is rotated to the **LEAD RESISTANCE** position. This procedure prevents unnecessary striking of the **VOLTMETER** pointer against the stops.

a. The indicator manual is consulted to determine the lead resistance, and the tester's **LEAD RESISTANCE SWITCH** is set to match this standard resistance of either **2, 8 or 22 OHMS.** The **LEAD RESISTANCE CONTROL** is rotated both clockwise and counterclockwise until the **VOLTMETER** pointer is positioned directly over the zero mark. This process is continued while the **METER SENSITIVITY SWITCH** is depressed, allowing a more accurate setting of the **LEAD RESISTANCE CONTROL.**



b. The final position of the pointer is the error in ohms either high or low by which the lead resistance differs from the established standard. Note resistance discrepancy and reverse position of red and black clip leads on lead terminals and repeat above procedures to obtain a second resistance error. The average of the two readings becomes the true error for each temperature setting. Return the **LEAD RESISTANCE SWITCH** to the **OFF** position before disconnecting the clip leads. Turn the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **OFF** position at the completion of each test in order to conserve battery energy.

2-3. RESISTANCE THERMOMETER INDICATOR TEST PROCEDURES. 2-3

a. Disconnect the resistance thermometer transmitter from the indicator by unscrewing the circular connector located at the back of the indicator. Consult the manual for information regarding whether the indicator is a single or dual, and whether 12 or 24 volt transmitter excitation voltage is required.

The five adapter cables stored in the right-hand-side compartment of the tester are shown in Figure 2-1.

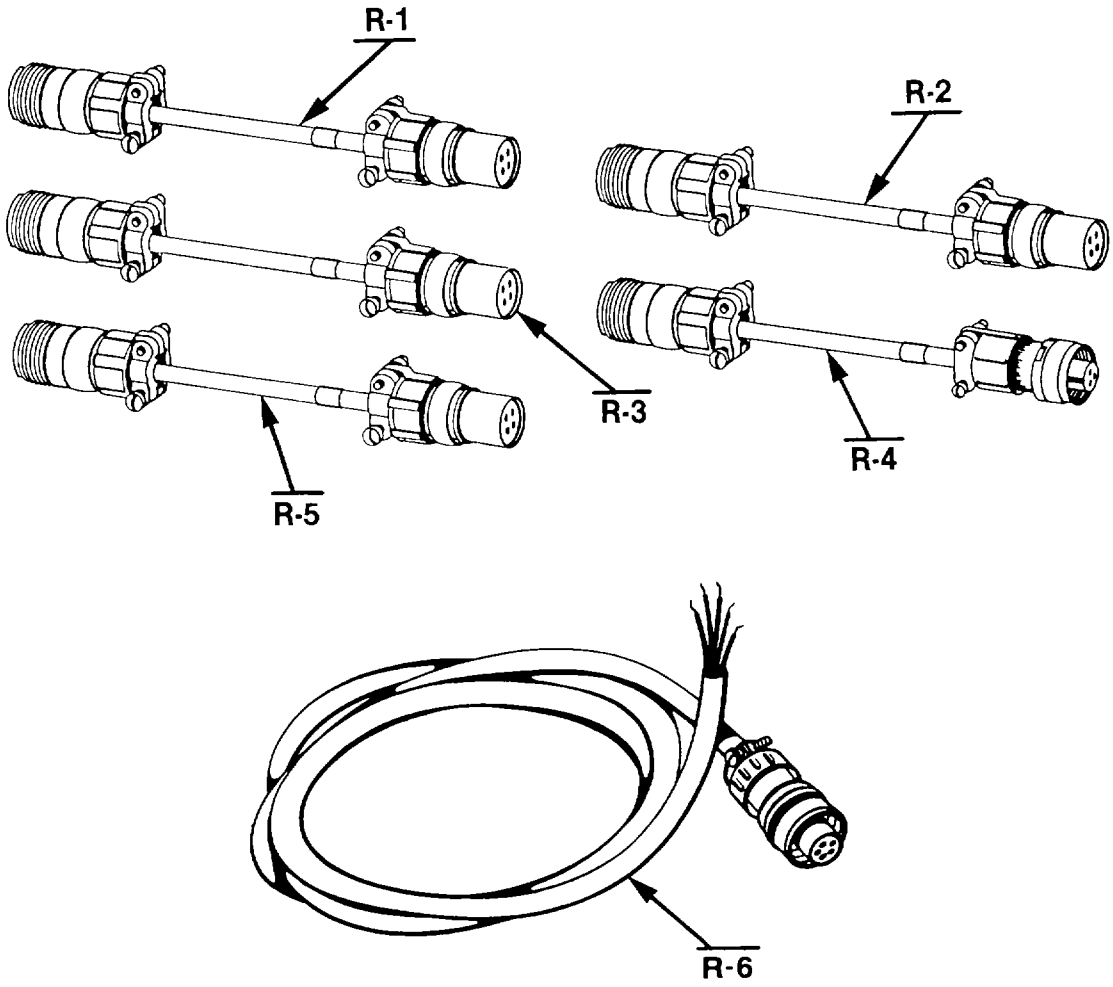


Figure 2-1. Adapter Cables And Resistance Thermometer Test Cable

CAUTION

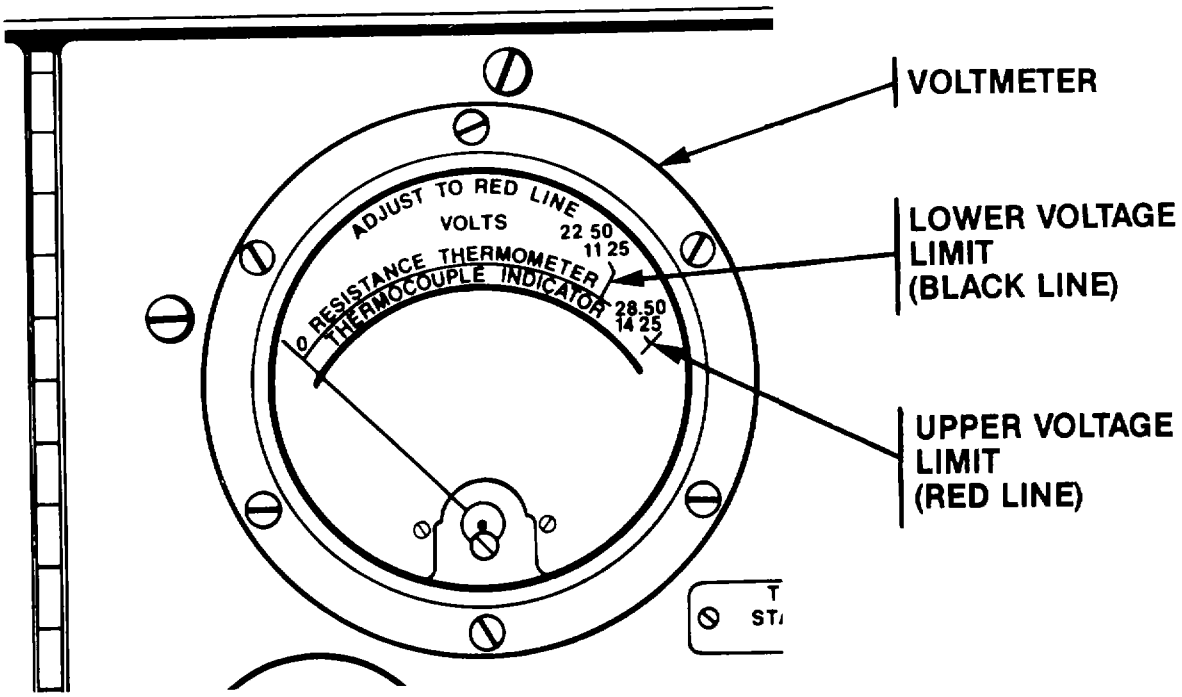
To avoid having the **VOLTMETER** pointer strike unnecessarily the full scale stop connect the tester's **RESISTANCE THERMOMETER TEST LEAD** to the indicator's circular connector before switching the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to either the 12 or 24 volt position. Similarly return the switch to the **OFF** position before disconnecting the test lead connector.

Table 2-3 gives the relationship between the cable adapter identification and the description of the type of resistance thermometer under test. The resistance thermometer cable wiring is shown under symbol R-6.

Table 2-3. Identification Of Adapter Cables And Resistance Thermometer Test Cable

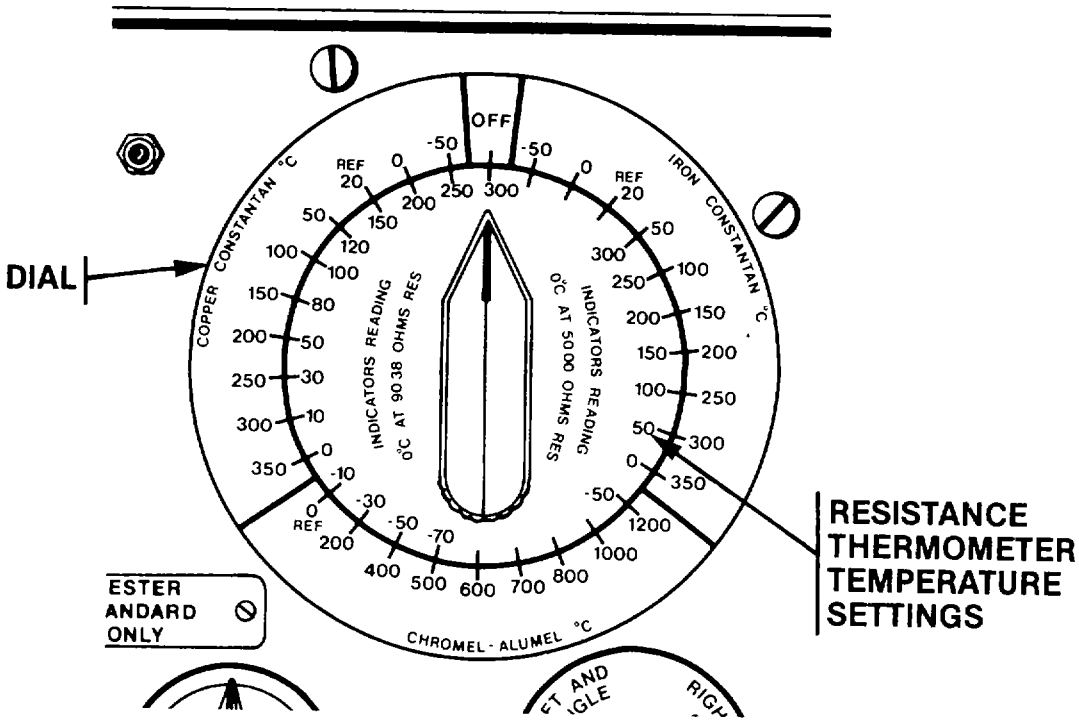
CABLE IDENTIFICATION	RESISTANCE THERMOMETER TYPE MIL-T-58082A (AV)	CONNECTOR PIN	
		TESTER	INDICATOR
R-1	Single Indicator 12 or 24 volt.	A	A
		B	B
		C	C
		D	D
		E	-
R-2	Dual Indicator 12 volt.	A	D
		B	B
		C	A
		D	-
		E	C
R-3	Single Indicator 12 or 24 volt. Identified by three pin connector (old type).	A	A
		B	B
		C	C
		D	A
		E	-
R-4	Single Indicator 24 volt. Bulb resistance of 50 ohms at 0°C.	A	A
		B	B
		C	C
		D	-
		E	-
R-5	Dual Indicator 24 volt. Bulb resistance of 50 ohms at 0°C.	A	A
		B	B
		C	C
		D	-
		E	-
R-6	Plus 28.5 volts.	A	-
	Decade resistance (left and single).	B	-
	Minus decade resistance and ground.	C	-
	Plus 14.25 volts.	D	-
	Decade resistance (right).	E	-

b. The **RESISTANCE THERMOMETER** scale on the **VOLTMETER** shows two voltage ranges: 11.25 (Black) to 14.25 volts (Red) and 22.50 (Black) to 28.50 volts (Red). One of these two voltage ranges is selected by rotating the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the corresponding nominal 12 or 24 volt position. Consult the appropriate manual to learn the exact excitation voltage required for the test indicator. Adjust the **COARSE RHEOSTAT** to position the **VOLTMETER** pointer to the required excitation voltage.



c. When testing a single resistance thermometer or the left side of a dual unit place the **LEFT AND SINGLE SWITCH** to the corresponding position; and when testing the right side of a dual unit place the switch pointer to **RIGHT.** This excitation voltage now appears at one of two possible connector pin pairings while the other pairing has a 100 ohm damping resistor connected across it.

d. The second function of the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** is to select precision resistors for application to the resistance thermometer circuit. These resistance values correspond to that which a platinum wire coil in one leg of a ratiometer would attain at the temperature marked on the dial. The **RESISTANCE AND VOLTAGE FUNCTION SWITCH** has two ranges of temperatures: one for a bulb resistance of 50 ohms at 0°C and the other 90.38 ohms at 0°C. These resistances are applied to the resistance thermometer circuit through the five conductor circular connector. The errors of the test resistance thermometer are the differences noted between the indicator readings and the markings on the temperature dial. Consult the manual about the significance of these errors and whether the resistance thermometer should be returned to service. At the completion of the test return the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **OFF** position to conserve battery energy.



Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-4. GENERAL. 2-4

After the completion of a test use a soft cloth to wipe the accumulated dust and finger prints off of the instrument panel and viewing glass on the voltmeter. Unlatch the battery compartment cover and check to see if the batteries are leaking corrosive battery chemical. If a battery case is found to be leaking remove the defective item and initiate procedures to have the battery replaced. With the tester

resting on a bench top and the instrument panel approximately level adjust the voltmeter's zero adjust so that the pointer is coincident with the zero mark.

Section III. OPERATION UNDER USUAL CONDITIONS

2-5. GENERAL. 2-5

a. If possible operate the pyrometer and thermocouple tester in a sheltered area where there are no extremes of temperature, moisture, or dust-laden wind. Under these moderate conditions the inspection and service intervals can be reduced.

b. When moving the tester from one normal ambient temperature to another in preparation for a test, allow it to stabilize at the new temperature for 15 minutes before commencing the tests. Protect the pyrometer and thermocouple tester when not in operation by keeping it in a sheltered area.

c. After the completion of a test use a soft cloth to wipe the accumulated dust and finger prints off of the instrument panel and viewing glass on the voltmeter. With the tester resting on a bench top and the instrument panel approximately level adjust the voltmeter's zero adjust so that the pointer is coincident with the zero mark.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-6. OPERATION IN EXTREME HEAT. 2-6

a. Protect the pyrometer and thermocouple tester from the direct rays of the sun by building a temporary shelter.

b. Set the tester in a shaded area when not in use.

2-7. OPERATION IN EXTREME COLD. 2-7

a. Protect the pyrometer and thermocouple tester from sleet, snow, or freezing rain by building a temporary shelter. Keep the tester's cover partially closed when the instrument controls are not being used.

b. Set the tester in a moisture-free area when not in use.

2-8. OPERATION IN HIGH HUMIDITY 2-8

a. Protect the pyrometer and thermocouple tester from direct rainfall by building a temporary shelter or using a protective cover if the shelter is not practical.

b. Keep the tester's cover partially closed when the instrument controls are not being used.

c. Wipe the accumulated moisture from the instrument panel as needed using a soft cloth.

2-9. OPERATION IN DUSTY OR SANDY CONDITIONS. 2-9

a. Protect the pyrometer and thermocouple tester from windblown sand or dust by building a temporary shelter. Keep the tester's cover partially closed when the instrument controls are not being used. Wipe the accumulated dust from the instrument panel frequently with a soft cloth.

b. Close the tester's cover and latch when the tester is not in use.

CHAPTER 3. AVIATION INTERMEDIATE MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

a. Tool Kit JTK-17 For 68F Aircraft Electrician And 35H Calibration Repair Specialist. This kit contains hand tools necessary for Intermediate Maintenance of Pyrometer and Thermocouple Tester. The services of a 35H Calibration Repair Specialist will be required to recalibrate the tester after the replacement of some major components.

b. Site And Shelter Requirements. The Pyrometer and Thermocouple Tester was designed for field use. Protection of the tester from direct rain and excessive wind-blown dirt is mandatory for reduced maintenance requirements.

No special tools or support equipment are required for testing the Pyrometer and Thermocouple Tester. The following TMDE equipment is required for testing and calibrating the Pyrometer and Thermocouple Tester:

a. Voltage And Resistance Measurement-Hewlett Packard 6-1/2 Digit Multi-meter Model 3490 or equivalent with 0.1 microvolt and 0.1 milliohm resolutions.

b. Resistance Source-Biddle Gray Decade Resistance Box Model 71650 or equivalent with 10 milliohm steps and ±.05% accuracy.

c. Regulated DC Power Supply-NJE CS36CR30 or equivalent, 0-20 volts, .01% regulation.

Repair parts are listed and illustrated in Appendix C of this manual.

Section II. SERVICE UPON RECEIPT

3-4. INSTALLATION OF BATTERIES. 3-4

a. The Tester is shipped without batteries. Table 3-1 lists the fresh 1.5 volt battery as a BA-35 type and the fresh 45 volt battery as a BA-36 type.

Table 3-1. Battery Type And Hookup

45 V BATTERY = BA-36
+45 V YEL LEAD
+22.5 V BLU
−45 V WHT
1.5 V BATTERY = BA-35
+1.5 V RED LEAD
−1.5 V BLK

b. The proper orientation of the two batteries at installation is shown in Figure 3-1. The spade lugs located at the ends of the five colored leads are attached to the battery terminals as depicted in Table 3-1. The two thumb screws are removed and the two battery latches are rotated out of the way for battery installation in the compartment. The latches are returned to their original position and the thumb screws replaced before the compartment latches are secured.

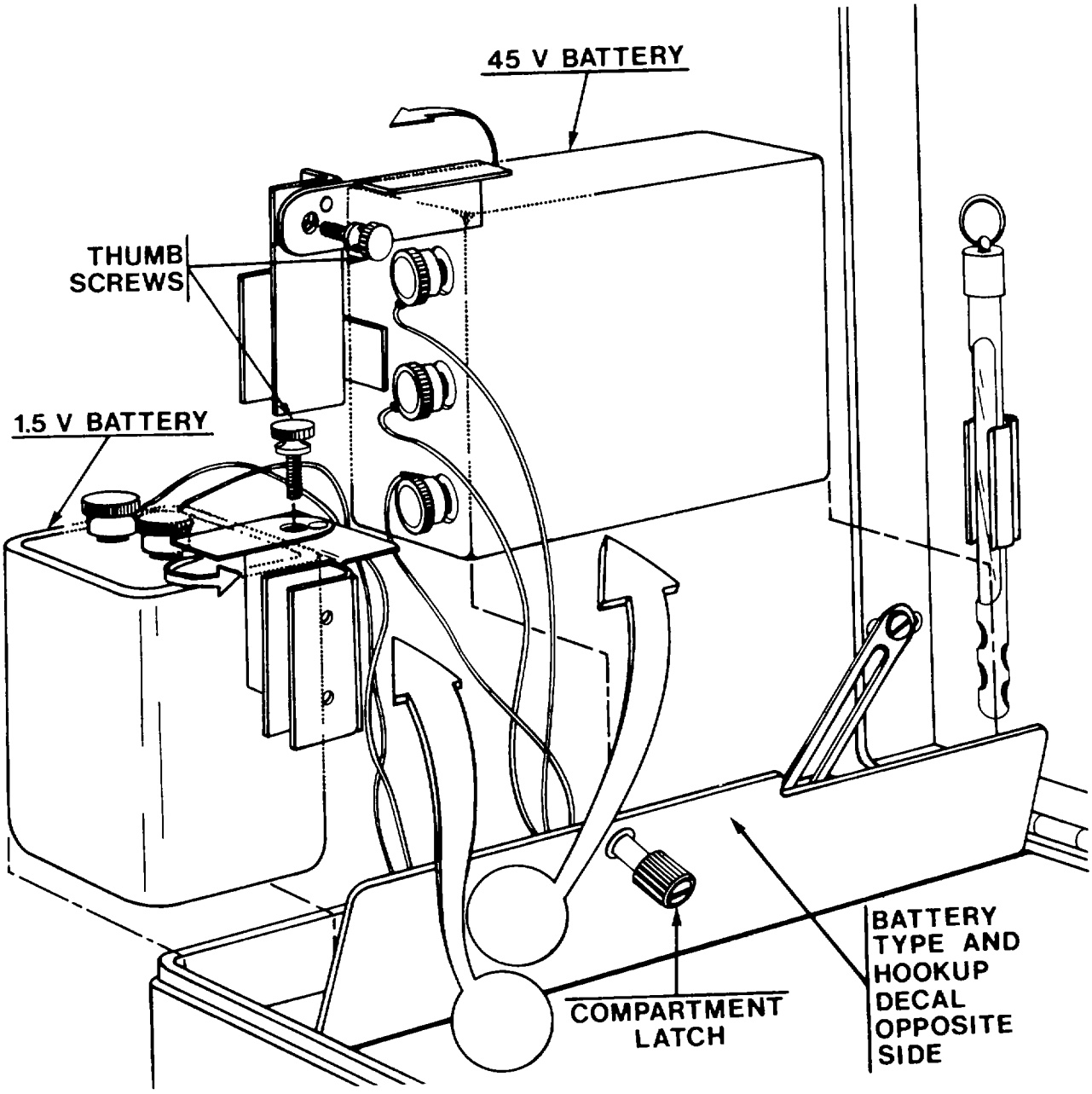


Figure 3-1. Tester Battery Compartment

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-5. PREVENTIVE MAINTENANCE PROCEDURE. 3-5

Refer to Table 3-2 for preventive maintenance checks and services.

Table 3-2. Preventive Maintenance Checks And Services

Item No.	Interval						Item To Be Inspected	Procedures
	W	M	Q	S	A	B/U		
1			●				Temperature Selector Switch	Rotate the switch to determine if it rotates freely and offers uniform detent torque. Inspect knob for secureness on the shaft.
2			●				Other Controls	Rotate controls for freedom of motion and uniform torque. Determine if knobs are securely fastened to shafts.
3						●	Pyrometer And Thermocouple Test Leads	Inspect test leads for missing insulation, broken conductor strands, broken alligator clips, and misaligned pins.
4						●	Adapter Cables	Inspect adapter cables for missing insulation, broken conductor strands and broken connector pins.
5						●	Battery Leads	Inspect battery leads for missing insulation, broken conductor strands, and corroded battery lugs.

W-Weekly M-Monthly Q-Quarterly S-Semiannually A-Annually B/U-Before Use

3-6. INSPECTION OF BATTERIES. 3-6

a. In preparation to determine the condition of the 1.5 volt battery connect the tester clip leads to a typical thermocouple indicator. Rotate the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **BENCH TEST, 8 OHM** position. Adjust the **COARSE RHEOSTAT** clockwise until the **VOLTMETER** pointer is approximately coincident with the red line. The voltage across the battery terminals should read 1.30 volts or greater, using the voltmeter contained in Tool Kit JTK-17.

b. Determine the condition of the 45 volt battery by connecting the resistance thermometer test lead to a representative thermometer circuit. Rotate the LEFT AND SINGLE SWITCH to a position which corresponds to the type of thermometer circuit at hand. Rotate the RESISTANCE AND VOLTAGE FUNCTION SWITCH to the 24V position. The voltage across the 45 volt terminals of the battery should register 40 volts or greater, using the voltmeter contained in Tool Kit JTK-17.

3-7. OPERATIONAL CHECKOUT AND CALIBRATION. 3-7

a. Pyrometer Resistance Checkout.

(1) Begin by disconnecting the 45 and 22.5 volt terminals from the battery to prevent the meter pointer from hitting the upper stop.

(2) Rotate the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **12 V** position and the **LEFT AND SINGLE SWITCH** to the **LEFT** position.

(3) Connect the Digital Multi-meter between connector pins B and C in a 4-lead ohmmeter configuration. The resistance readings between pins B and C shall correspond to those specified in Tables 3-3 and 3-4 within ± 0.05 ohm.

(4) With the Digital Multi-meter connected between pins E and C and the **LEFT AND SINGLE SWITCH** in the **RIGHT** position the resistance values shall also correspond to those values listed in Tables 3-3 and 3-4 within ± 0.05 ohm.

Table 3-3. Pyrometer Resistance Output (90.38 Ohms)

Position of Temperature Switch (° C)	Resistance (Ohms) Tol. = ± .05	Position of Temperature Switch (° C)	Resistance (Ohms) Tol. = ± .05
-70	68.27	80	120.36
-50	74.24	100	128.85
-30	80.56	120	137.78
-10	87.04	150	151.91
0	90.38	200	177.95
+10	93.80	250	208.00
+30	100.91	300	242.70
50	108.39	-	-

Table 3-4. Pyrometer Resistance Output (50.00)

Position of Temperature Switch (° C)	Resistance (Ohms) Tol. = ± .05	Position of Temperature Switch (° C)	Resistance (Ohms) Tol. = ± .05
-50	37.95	-	-
0	50.00	200	116.50
+50	63.55	250	139.00
+100	79.00	300	164.50
150	96.50	-	-

b. Pyrometer Voltage Checkout.

(1) Rotate the **RESISTANCE AND VOLTAGE FUNCTION SWITCH to the 24 V** position and apply a 500 ohm load across connector pins A and C, using the Resistance Box Model 71650 or equivalent.

(2) Connect the Digital Multi-meter or equivalent in parallel with the load across pins A and C.

(3) Connect a 45 volt battery to the appropriate terminals on the tester.

(4) Adjust the **COARSE AND FINE RHEOSTATS** until the VOLTMETER pointer indicates 28.50 volts. The Multimeter reading shall be 28.50 ± 0.50 Vdc.

(5) Adjust the **VOLTMETER** pointer to **22.50 V** mark. The Multi-meter reading shall be 22.50 ± 0.50 Vdc.

(6) Rotate the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **12 V position.**

(7) Move the Multi-meter and 500 ohm load to connector pins D and C.

(8) Adjust the **VOLTMETER** pointer to **14.25 V** mark. The Multi-meter reading shall be 14.25 ± 0.50 Vdc.

(9) Adjust the **VOLTMETER** pointer to **11.25 V** mark. The Multi-meter reading shall be 11.25 ± 0.50 Vdc.

c. Cable Adapter Leads Checkout.

(1) Set the Multi-meter to the 200 milliohm scale and check for continuity between cable ends, while referring to Table 2-3 for wiring information.

(2) Set the Multi-meter to the 20 megaohm range and check for insulation breakdown between the connector metal shell and the pins.

d. Thermocouple Voltage Checkout.

(1) Use the Decade Resistance Box to apply a load across the thermocouple lead clips equal to the values shown in Table 3-5.

Table 3-5. Thermocouple Load Resistance

Type	Resistance (Ohms)
Iron-Constantan (I-C)	17
Copper-Constantan (C-C)	17
Chromel-Alumel (C-A)	42

(2) Adjust the Regulated DC Power Supply or equivalent to 1.34 Vdc and apply this voltage to the appropriate battery leads in place of the 1.5 volt battery.

(3) Adjust first the **COARSE** and second the **FINE RHEOSTAT** between each measurement, readjusting the controls, if necessary, to keep the **VOLTMETER** pointer centered over the red line.

NOTE

Make sure the **VOLTMETER** rests directly over the zero mark with the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** in the **OFF** position as this possible error will affect the results.

(4) Apply the test leads of the Digital Multi-meter to the tester **STANDARDIZING PIN JACKS.**

(5) With the **TEMPERATURE SELECTOR SWITCH** set to the temperature values indicated in Table 3-6, the Multi-meter readings shall correspond within ± 0.04 millivolts between 0 and 20 millivolts, and ±0.06 millivolts between 20 and 50 millivolts.

Table 3-6. Thermocouple Voltage Output

Temperature Switch Test Point (°C)		Millivolts	Temperature Switch Test Point (°C)		Millivolts
I-C	-50	-3.57	C-C	100	3.49
I-C	0	-1.05	C-C	150	5.91
I-C	+20	0.00	C-C	200	8.50
I-C	50	+1.61	C-C	250	11.22
I-C	100	4.35	C-C	300	14.07
I-C	150	7.14	C-C	350	17.03
I-C	200	9.94	C-A	0	0.00
I-C	250	12.74	C-A	200	8.13
I-C	300	15.51	C-A	400	16.39
I-C	350	18.27	C-A	500	20.64*
I-C	-50	-2.59	C-A	600	24.90*
C-C	0	-0.79	C-A	700	29.14*
C-C	+20	0.00	C-A	800	33.31*
C-C	50	+1.25	C-A	1,000	41.31*
-	-	-	C-A	1,200	48.89*

* Indicates Tol. = ±0.06 MV, All Others = ±0.04 MV

CAUTION

Connect the resistance standard to the thermometer lead clips before actuating the **LEAD RESISTANCE CONTROL** to prevent unnecessary striking of the **VOLTMETER** pointer against the stops.

e. Thermocouple Lead Resistance Checkout.

(1) Rotate the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the **LEAD RESISTANCE position.**

(2) Connect the eight ohm resistance standard to the thermocouple lead clips.

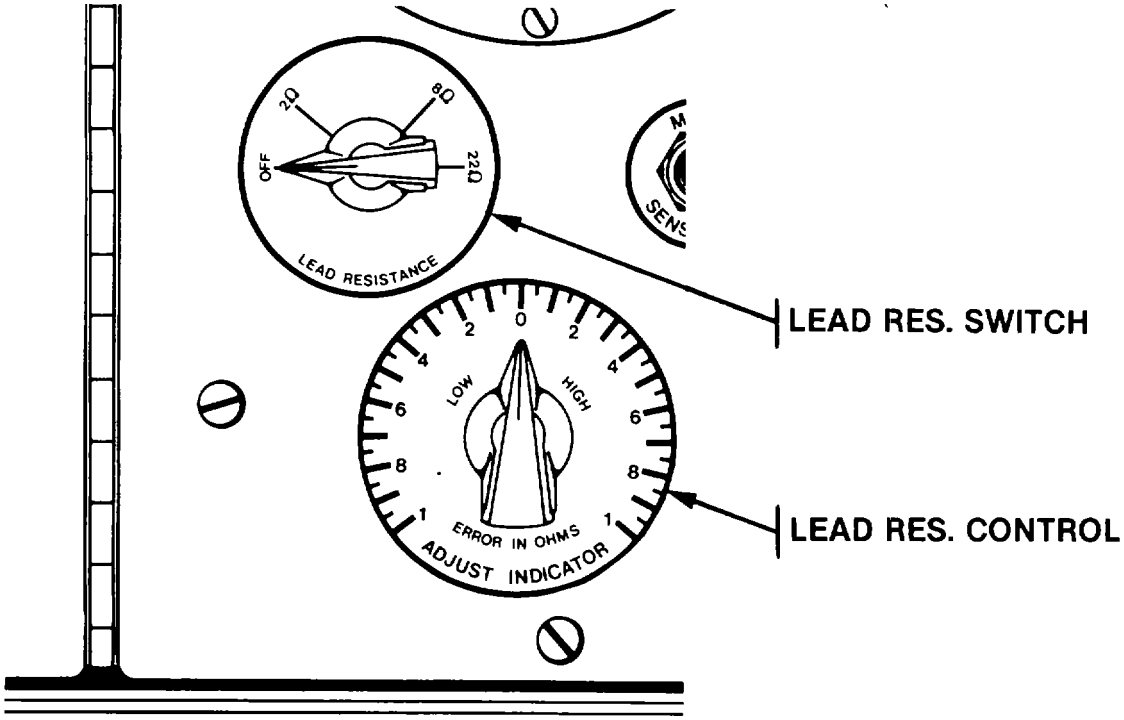
(3) Set the LEAD **RESISTANCE SWITCH** to the 8 OHM position.

(4) Rotate the **LEAD RESISTANCE CONTROL** of the null-balance galvanometer circuit back and forth to bring the **VOLTMETER** pointer over the zero mark.

> **NOTE**
>
> The Decade Resistance Box may be used as a resistance standard, but first each test value must be determined to an accuracy of ± 0.002 ohm using the Digital Multi-meter.

(5) Depress the **METER SENSITIVITY** button to increase the circuit sensitivity and continue to adjust the **LEAD RESISTANCE CONTROL** for a null condition. The error indicated by the **LEAD RESISTANCE CONTROL** shall not differ from the resistance standard value by more than ± 0.02 ohm.

(6) Repeat steps 1 through 5 for resistance standard values of 2 and 22 ohms, each time returning the **LEAD RESISTANCE CONTROL** to the **OFF** position before changing resistors.



f. Thermocouple Test Lead Resistance Checkout.

(1) Connect the Digital Multi-meter or equivalent to the clip leads.

(2) Position the **TEMPERATURE SELECTOR SWITCH** to the **ZERO REFERENCE** line on the **CHROMEL-ALUMEL** sector.

(3) Set the **RESISTANCE AND VOLTAGE FUNCTION SWITCH** to the following position **2, 8 and 22 OHM** in the **BENCH TEST** sector. The measured values shall not differ from the stated circuit values by more than ±0.04 ohm.

(4) Repeat steps 1 through 3 using the **STANDARDIZING PIN JACK** as the measurement point for the **0 OHM AIRPLANE TEST** position.

SECTION IV. TROUBLESHOOTING

3-4. GENERAL. 3-8

a. Pyrometer And Thermocouple Tester. The tester houses the rugged electrical components in a semi-sealed center compartment of the case. Occasional wiping of the instrument panel, battery compartment interior and test cable compartment interior with a soft cloth will reduce the frequency for intermediate maintenance actions.

b. Troubleshooting Chart. The most frequent apparent malfunctions will be concerned with weak batteries. The second most frequent servicing will be adjustment of the zero adjust on the **VOLTMETER,** and third the tightening of a loose knob. A Wiring Diagram shown in FO-1 (located in back of manual) is also stored in the cover of the tester to identify the rotary action of each of the controls.

3-9. TROUBLESHOOTING CHART. 3-9

Refer to Table 3-7 where corrective actions are listed to help one eliminate the malfunction.

Table 3-7. Troubleshooting Chart

Malfunction	Test or Inspection	Corrective Action
1. Voltmeter pointer will not reach desired mark or retain setting when operating in the thermocouple tester mode.		
	Step 1. Check 1.5V battery for voltage above 1.30 volts while connected to the circuit.	If proper voltage is not indicated replace battery, para. 3-6a.
	Step 2. Check battery leads for broken wire.	Repair broken conductor.
2. Voltmeter pointer will not reach desired mark or retain setting when operating in the pyrometer tester mode.		
	Step 1. Check 45V battery for voltage above 40 volts while connected to the circuit.	If proper voltage is not indicated replace battery, para. 3-6b.
	Step 2. Check battery leads for broken wire.	If open circuit condition exists repair or replace wire.
3. Indicator reading is substantially different from temperature dial setting.		
	Repeat test using a previously calibrated indicator.	If discrepancy still exists, the pointer knob needs repositioning on shaft.
4. Tester behavior is different from function switch setting.		
	Check function switch for loose knob.	If knob is loose, rotate switch to **OFF** position and reposition knob to indicate the same position.

Table 3-7. Troubleshooting Chart (Contd)

Malfunction
Test or Inspection
Corrective Action

5. No output is obtained from tester while operating in thermocouple mode.

Check thermocouple test leads for open circuit.

If open circuit is found, repair test lead, para. 3-12.

6. No output is obtained from the tester while operating in pyrometer mode.

Step 1. Check resistance thermometer test cable for broken or shorted conductor, or damaged connector pin.

If condition exists repair or replace wire, or replace connector, para. 3-12.

Step 2. Check to see if correct adapter cable is being used, or whether it has broken conductor or damaged pin.

If condition exists select proper adapter or repair as necessary.

7. Voltmeter pointer sticks during motion.

Step 1. Check for armature loose from pivots.

If condition exists replace meter, para. 3-14.

Step 2. Look for pointer dragging on scale surface.

If condition exists replace meter, para. 3.14.

8. Resistance type temperature indicator reads substantially different value at one step of the temperature selector switch.

Step 1. Check printed circuit board PC-2 for damaged resistor or cut conductor trace.

If condition exists replace PC-2, para. 3-17.

Table 3-7. Troubleshooting Chart (Contd)

Malfunction Test or Inspection Corrective Action
Step 2. Check for corroded or damaged connector pin, P2, broken wire in Cable W2, or dirty contacts on temperature switch. If condition exists replace Cable W1/W2-temperature switch, para. 3-15.
9. Thermocouple type temperature indicator reads substantially different value at one step of the temperature switch.
Step 1. Check voltage shunt on printed circuit board PC-1 for broken or shorted lead. If condition exists replace PC-1, para. 3-17.
Step 2. Check for corroded or damaged connector pin, P1, broken wire in Cable W1, or dirty contacts on temperature switch. If condition exists, replace Cable W1/W2-temperature switch, para. 3-15.
10. Pyrometer indicator excitation voltages 12 and 24V are intermittent.
Step 1. Check coarse and fine rheostats for worn wiper. If wiper is intermittent replace rheostat.
Step 2. Check resistance and voltage function switch for worn contacts. If contacts are worn, replace switch, para. 3-15.

Table 3-7. Troubleshooting Chart (Contd)

Malfunction	Test or Inspection	Corrective Action
11. Thermocouple lead resistance error reads substantially different value from 2, 8, or 22 ohm aircraft test circuit.	Check for loose knob on lead resistance error control.	If condition exists, apply aircraft circuit with known resistance and adjust knob to indicate correct resistance at null-balance.

Section V. MAINTENANCE PROCEDURES

3-10. PYROMETER TESTER-- INSPECT/REPAIR/CALIBRATE. 3-10

This task covers: Inspect, Repair, Replace and Calibrate.

INITIAL SETUP

Personnel Required	Test Equipment
35H Calibration Repair Specialist	ANGSN 286
Tools	**Equipment Condition**
Calibration Repair Specialist's Tool Kit JTK-17	Para. 3-7d. Para. 3-14. Para. 3-17.

1. INSPECT AND REPLACE.

Inspection and replacement of voltmeter, boards PC-1 or PC-2 as described in paragraphs 3-14. and 3-17. requires that tester be recalibrated.

2. CALIBRATE.

a. Set up test equipment as described in para. 3-7d.
b. Adjust coarse and fine rheostats to make digital multi-meter read 48.89 millivolts.

GO TO NEXT PAGE

3-10. PYROMETER TESTER-- INSPECT/REPAIR/CALIBRATE. (Contd) **3-10**

c. Adjust meter multiplier resistor R2-33 until meter pointer is exactly centered over red line (See Figure 3-2).
d. Repeat test in para. 3-7d. to verify calibration.

END OF TASK

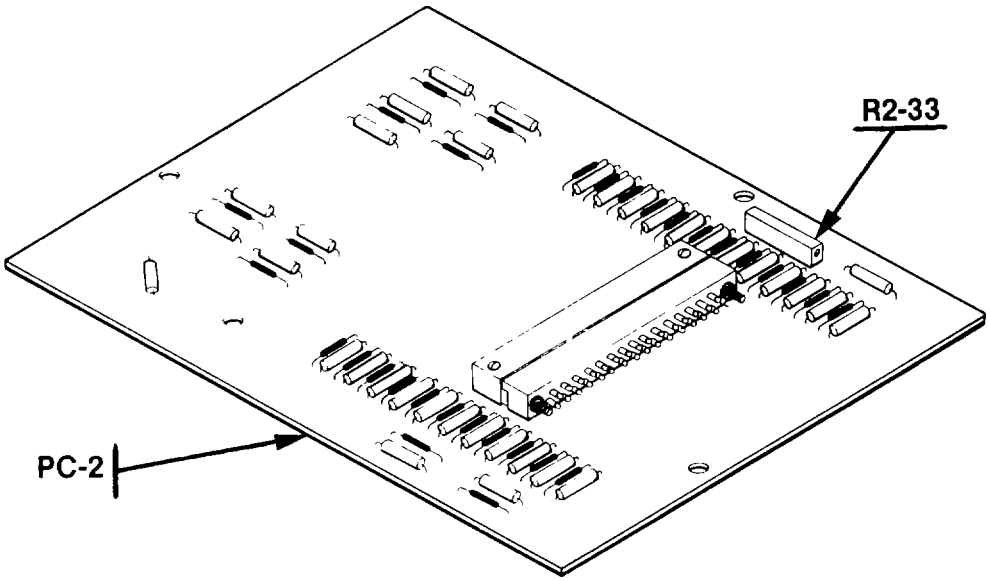


Figure 3-2. Component Layout, Printed Circuit Board PC-2.

3-11. CASE AND COVER-INSPECT/REPAIR/REPLACE. 3-11

This task covers: Inspect, Repair and Replace.

INITIAL SETUP

Personnel Required	Tools
68F Aircraft Electrician	Aircraft Electrician's Tool Kit JTK-17

1. INSPECT.

   a. Check cover for proper closure, if not, note whether one of the two leaves on the hinge is bent.
   b. Inspect case for walls that are deformed or out of line and cause interference during cover closure.
   c. Inspect case for latches that will not work properly (See Figure 3-3).
   d. Check for cover stops that are broken or bent and will not function properly (See Figure 3-4).
   e. Inspect case and cover for areas of missing paint amounting to five square inches or more.

2. REPAIR.

   a. Prime and paint sections of case and cover requiring attention.

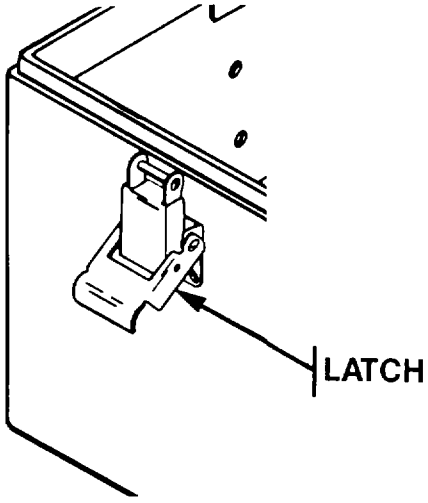


Figure 3-3. Pyrometer Case Latch

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3-11. CASE AND COVER --INSPECT/REPAIR/REPLACE. (Contd) **3-11**

b. Repair and apply light oil to hinge and cover stops (See Figure 3-4).
c. Straighten battery latches.

3. REPLACE.

a. Removal.

(1) Remove damaged cover by removing hinge pin, cover stops, cover stop screws and spacers (See Figure 3-4).
(2) Separate damaged case from the other parts by removing the cover (Step 3-a.) and by removing the instrument panel (See para. 3-13.).

b. Installation.

(1) Attach new cover to case by installing hinge pin, cover stops, cover stop screws and spacers.
(2) Attach cover to new case (Step 3-c.) and reinstall instrument panel.

END OF TASK

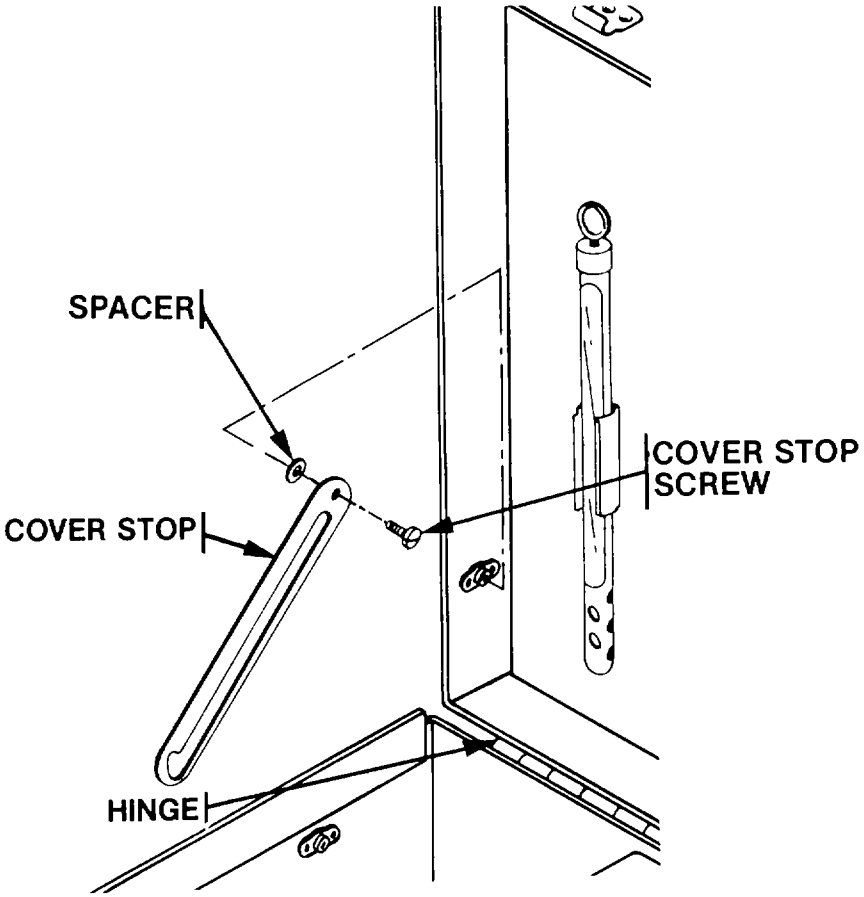


Figure 3-4. Case Hinge, Cover Stop, Cover Stop Screw And Spacer.

3-12. CABLE ASSEMBLIES - INSPECT/REPAIR/REPLACE. 3-12

This task covers: Inspect, Removal, Repair and Replace.

INITIAL SETUP

Personnel Required	Tools
68F Aircraft Electrician	Aircraft Electrician's Tool Kit JTK-17

1. REMOVAL AND INSPECTION.

   a. Extend thermocouple and thermometer test leads full length on work bench (See Figure 3-5).
   b. Slide back insulator boots on alligator clips and inspect for broken copper strands (See Figure 3-6).
   c. Use medium size screwdriver to remove two screws securing cable clamp at end of adapter cables.
   d. Unscrew cable clamp and inspect wiring for frayed insulation or broken copper strands (See Figure 3-7).

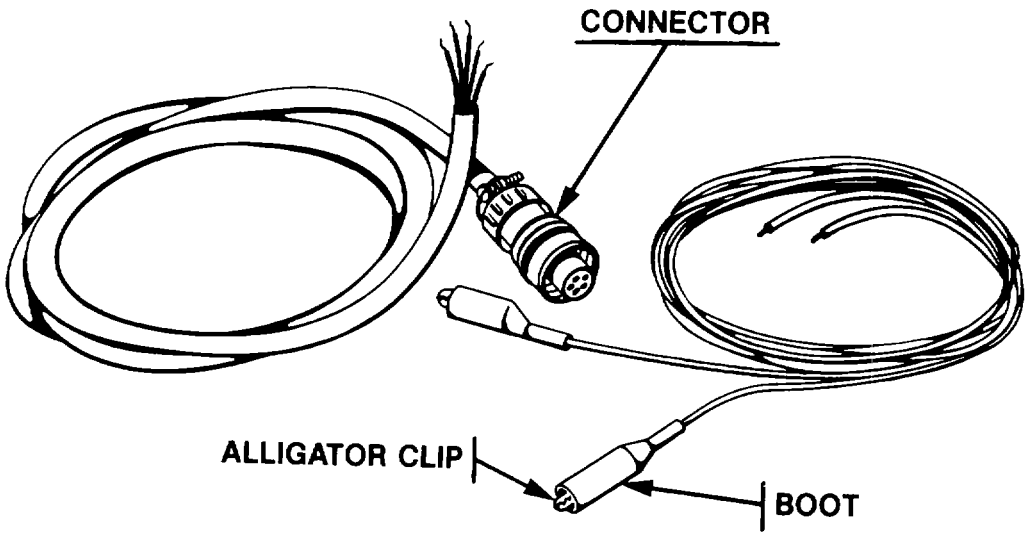


Figure 3-5. Pyrometer And Thermocouple Test Leads.

GO TO NEXT PAGE

3-12. CABLE ASSEMBLIES- INSPECT/REPAIR/REPLACE. (Contd) **3-12**

2. REPAIR.

   a. Cut out section of broken copper strands and solder prepared end of lead to alligator clip.
   b. Cut out section of frayed insulation or broken strands on cable adapter wire and resolder.
   c. If wire is too short replace with new wire.

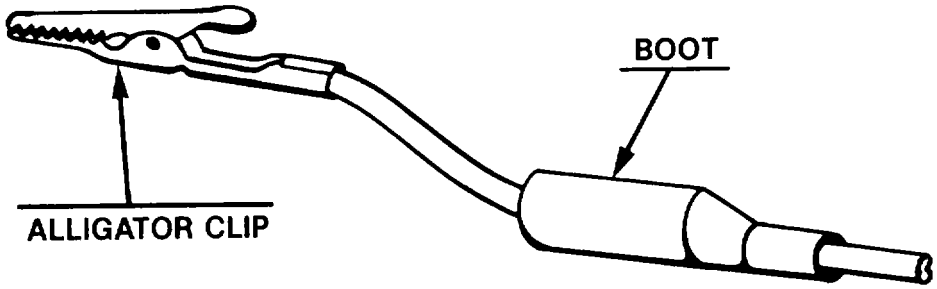


Figure 3-6. Thermocouple Test Lead

3. REPLACE.

   a. Install cable clamp on cable connector and secure with two screws, using medium screw driver (See Figure 3-7).
   b. Slide insulated boots onto alligator clips (See Figure 3-6).

END OF TASK

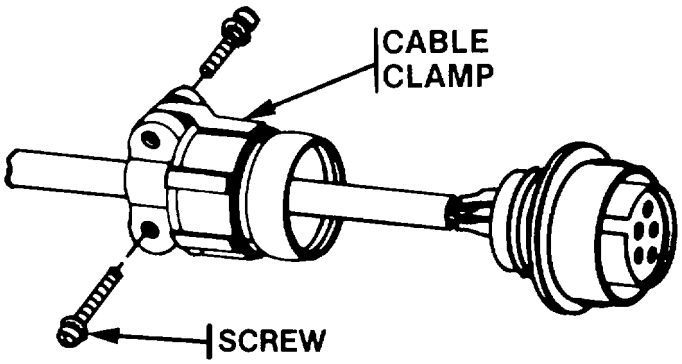


Figure 3-7. Pyrometer Test Lead

3-13. PANEL ASSEMBLY - INSPECT/REPAIR. 3-13

This task covers: Inspect, Removal, Repair and Replace.

INITIAL SETUP

Personnel Required	Tools
68F Aircraft Electrician	Aircraft Electrician's Tool Kit JTK-17

1. REMOVAL AND INSPECTION.

   a. Detach battery leads and use screwdriver to remove eight screws securing instrument panel to case (See Figure 3-8).
   b. Lift panel assembly from instrument compartment and set it down on bench in front of case.
   c. Inspect underneath side of panel and two printed circuit boards for broken and shorted wires, broken resistors, damaged panel controls, and damaged multi-pin connectors.

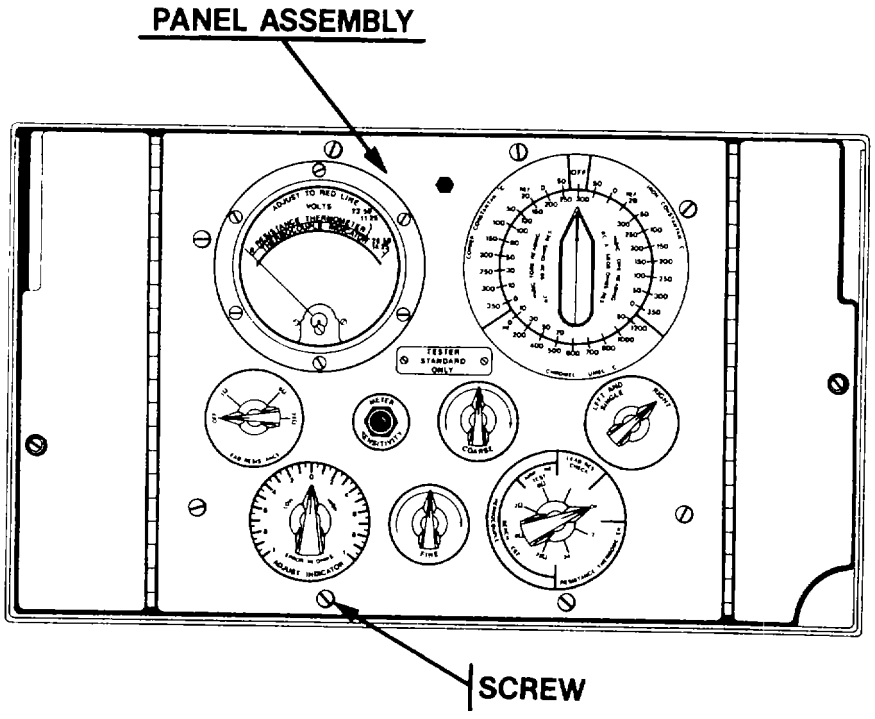


Figure 3-8. Instrument Panel Assembly

GO TO NEXT PAGE

3-13. PANEL ASSEMBLY - INSPECT/REPAIR. (Contd) **3-13**

2. REPAIR.

   a. Repair broken wire on panel assembly by resoldering loose end.
   b. Cut out section of wire with frayed insulation or replace.

3. REPLACE.

   a. Removal.

      (1) Remove instrument panel from case following steps in 1-a. and 1-b.
      (2) Use small crescent wrench to remove panel nuts securing switches and potentiometers.
      (3) Use small screwdriver to remove two screws securing temperature switch to panel.

   b. Installation.

      (1) Secure temperature switch in new panel using two screws.
      (2) Secure switches and potentiometers in panel by passing bushing through panel hole and applying nut using small wrench.
      (3) Secure panel in case using eight screws and medium screwdriver.

END OF TASK

3-14. METER- INSPECT/REPLACE. 3-14

This task covers: Inspect and Replace.

INITIAL SETUP

Personnel Required	Test Equipment
35H Calibration Repair Specialist	ANGSN 286
Tools	**Equipment Condition**
Aircraft Electrician's Tool Kit JTK-17	Para. 3-13.
	Condition Description
	Panel Assembly removed

1. INSPECT.

   Inspect meter for bent pointer and damaged zero adjust.

2. REPLACE.

   a. Removal.

      (1) Use 3/8 inch open-ended wrench to remove two hex nuts securing circuit leads to meter.
      (2) Use wrench and small screwdriver to remove six hex nuts securing meter to panel (See Figure 3-9).

   b. Installation.

      (1) Secure replacement meter with six hex nuts.
      (2) Replace two circuit leads, observing that red colored wire belongs to positive terminal.

GO TO NEXT PAGE

3-14. METER - INSPECT/REPLACE. (Contd) **3-14**

(3) Calibrate tester in accordance with instructions in para. 3-10. after replacing meter.
(4) Replace instrument panel in case, aligning eight screw holes.
(5) Use medium screwdriver to secure panel with eight screws.

END OF TASK

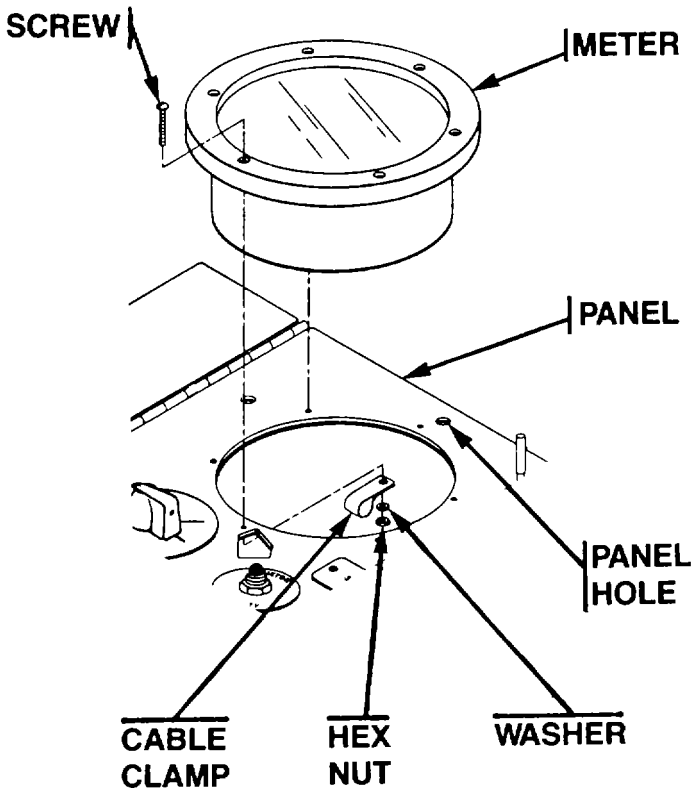


Figure 3-9. Pyrometer Meter Assembly

3-15. PANEL CONTROLS-- INSPECT/REPLACE. 3-15

This task covers: Inspect and Replace.

INITIAL SETUP

Personnel Required	Test Equipment
68F Aircraft Electrician 35H Calibration Repair Specialist	ANGSN 286
Tools	**Equipment Condition**
Aircraft Electrician's Tool Kit JTK-17	Para. 3-13.
	Condition Description
	Panel Assembly removed

1. INSPECT.

   Inspect faulty control for broken terminal.

2. REPLACE.

   a. Removal.

      (1) Unsolder leads from faulty rotary switch or potentiometer, and mark leads with tape.
      (2) Use 3/8 inch open-ended wrench to unscrew hex nut on top side of panel, securing control and lockwasher.
      (3) Secure replacement control with nut and lockwasher.
      (4) Solder leads back onto control, observing tape markings (See Figure 3-10).

GO TO NEXT PAGE

3-15. PANEL CONTROLS-- INSPECT/REPLACE. (Contd) **3-15**

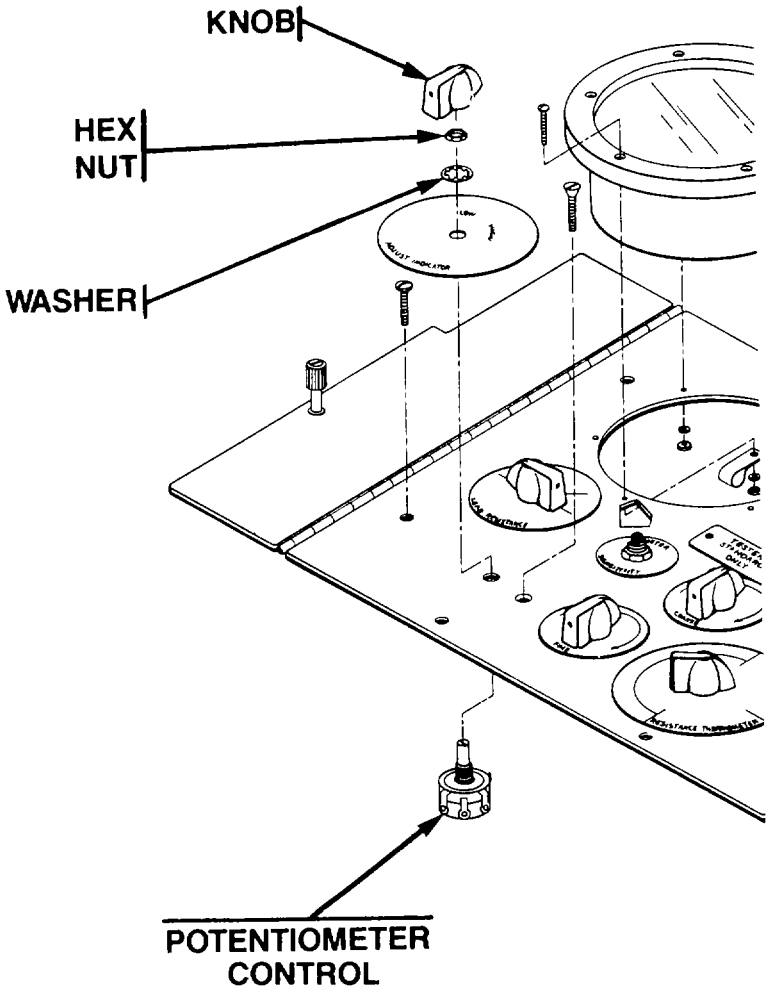


Figure 3-10. Instrument Panel Controls

(5) Loosen two set screws with allen wrench to remove large knob from temperature switch.
(6) Remove dial, exposing two flat screw heads that secures control.
(7) Remove two cable plugs P1 and P2 from circuit boards.

GO TO NEXT PAGE

b. Installation.

(1) Replace entire switch assembly with new one, installing new plugs P1 and P2 and securing control with two machine screws (See Figure 3-11).
(2) Install instrument panel in case, aligning eight screw holes.
(3) Use medium screwdriver to secure panel with eight screws.

END OF TASK

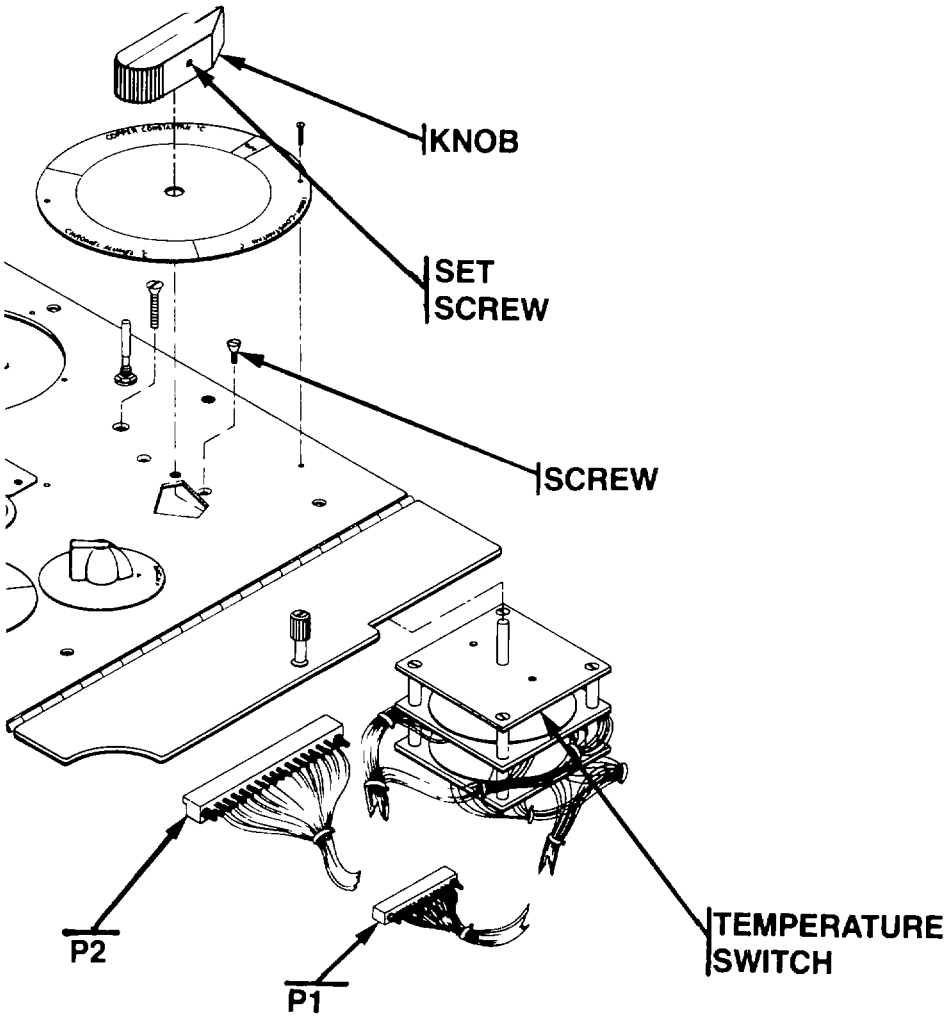


Figure 3-11. Instrument Panel Switch Assembly

3-16. BATTERIES- INSPECT/REPLACE. 3-16

This task covers: Inspect and Replace.

INITIAL SETUP

Personnel Required	Tools
68F Aircraft Electrician	Aircraft Electrician's Tool Kit JTK-17

1. INSPECT.

   Inspect batteries on basis of para. 3-6.

2. REPLACE.

   Replace with fresh BA-35 and fresh BA-36 type batteries.

END OF TASK

3-17. CIRCUIT BOARDS-- INSPECT/REPLACE. 3-17

This task covers: Inspect and Replace.

INITIAL SETUP

Personnel Required	Test Equipment
35H Calibration Repair Specialist	ANGSN 286
Tools	**Equipment Condition**
Aircraft Electrician's Tool Kit JTK-17	Para. 3-13.
	Condition Description
	Panel Assembly removed

1. INSPECT.

   a. Service shall be limited to cleaning surface with damp soft cloth and resoldering any broken copper trace.
   b. Inspect board for broken copper trace

2. REPLACE.

   a. Removal.

      (1) Use medium screwdriver to remove four machine screws securing printed circuit boards (PC) to instrument panel standoffs (See Figure 3-12).
      (2) Lay back the two boards so that both PC-1 and PC-2 are exposed for unsoldering.
      (3) Unsolder the wires at the particular circuit that is to be replaced.
      (4) Mark each wire with a tape that corresponds to notation on the PC board.

   b. Installation.

      (1) If a marker is lost the Wiring Diagram in FO-1 can be consulted to determine where a given wire originates for resoldering.

GO TO NEXT PAGE

3-17. CIRCUIT BOARDS - INSPECT/REPLACE. (Contd) **3-17**

(2) Calibrate tester in accordance with para. 3-10. When replacing either PC board.
(3) Secure PC boards to back of panel with four machine screws and three spacers (See Figure 3-12).
(4) Replace instrument panel in case, aligning eight screw holes.
(5) Use medium screwdriver to secure panel with eight screws.

END OF TASK

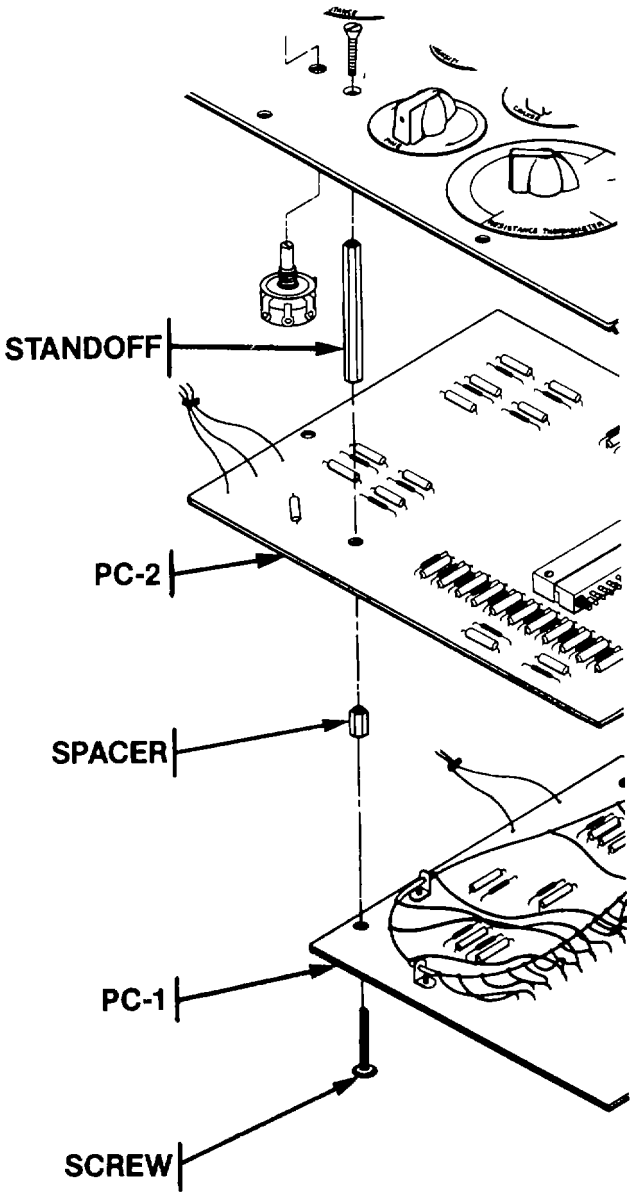


Figure 3-12. Printed Circuit Board Assembly

SECTION VI. PREPARATION FOR STORAGE OR SHIPMENT

3-18. PACKING. 3-18

a. Insure that wiring diagram is properly stowed in clip inside tester cover.

b. Remove batteries from battery compartment and secure compartment latch.

c. Stow test leads and five adapter cables inside their compartment and insure that cover is closed.

d. Remove thermometer from clip inside cover and wrap for storage inside lead compartment.

e. Insure that operation and service manual is stored on top of panel and secure cover latches.

f. Pack tester in packing case for storage or shipment.

3-19. PREPARATION FOR STORAGE OR SHIPMENT. 3-19

Administrative storage of equipment will be accomplished in accordance with TM 740-90-1 and AR 750-1.

APPENDIX A

REFERENCES

A-1. DICTIONARIES OF TERMS AND ABBREVIATIONS

AR 310-25 ..... Dictionary of United States Army Terms
AR 310-50 ..... Authorized Abbreviations and Brevity Codes

A-2. PUBLICATION INDEXES

DA PAM 310-1..... Consolidated Index of Army Publications and Blank Forms

A-3. LOGISTICS AND STORAGE

TM 740-90-1 ..... Administrative Storage of Equipment
TM 743-200-1 ..... Storage and Materiel Handling

A-4. MAINTENANCE OF SUPPLIES AND EQUIPMENT

AR 750-1 ..... Army Materiel Maintenance Concepts and Policies
TM 38-750 ..... The Army Maintenance Management System (TAMMS)
DA PAM 738-751... The Functional Users Manual for The Army Maintenance Management System-Aviation (TAMMS-A)
TM 43-0139 ..... Painting Operations Instructions for Field Use

A-5. OTHER PUBLICATIONS

AR 420-90 ..... Fire Prevention and Protection
AR 55-38 ..... Reporting of Transportation Discrepancies in Shipments
AR 700-58 ..... Packaging Improvement Report
DA PAM 310-13..... Military Publications Posting and Filing
FM-21-11 ..... First Aid for Soldiers
TB 43-180 ..... Calibration and Repair Requirements for the Maintenance of Army Materiel
TM 750-244-2 ..... Procedures for the Destruction of Electronic Materiel to Prevent Enemy Use

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance and repair functions authorized AVUM/AVIM personnel.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the Pyrometer Tester. The application of the maintenance function to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCEFUNCTIONS. Maintenance functions will be limited to defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical and mechanical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Removal/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

c. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the third position code of the SMR code.

d. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting

specific damage, fault, malfunction, or failure in a part, subassembly, or end item.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance of significant components, assemblies, and subassemblies, with the next higher assembly. End item group number is "00".

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, and subassemblies for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2).

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure (hours) in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. The work time figure represents the average time required to restore an item (assembly, subassembly, component, or end item) to a serviceable condition under typical field operating conditions.

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool' sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column, when applicable, contains a letter code, in alphabetic order, which is keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOLS AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool.

c. Column 3, Nomenclature. Name or identification of the tool.

d. Column 4, National Stock Number. The National Stock Number of the tool.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Column 1, Reference Code. The code recorded in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART FOR

PYROMETER TESTER, PN 5500, TYPE N-3A

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY AVUM	AVIM	DEPOT	(5) TOOLS AND EQPT	(6) REMARKS
00	Pyrometer Tester	Inspect		.2		101	
		Repair		4.0		101	
		Calibrate		2.0		102	A
01	Case and Cover Assembly	Inspect	.2			101	
		Repair		1.0		101	
		Replace		3.0		101	
02	Test Cables and Adapter Cables	Inspect	.5			101	
		Repair		1.0		101	
		Replace		2.0		101	
03	Panel Assembly	Inspect	.2			101	
		Repair		1.0		101	
0301	Meter	Inspect	.2			101	
		Replace		2.0		101 & 102	A & B
0302	Rotary and Pushbutton Switches and Potentiometers	Inspect	.2			101	
		Replace		2.0		101	
						101	
						101	
0303	Batteries	Inspect	.2				
		Replace	.5				
0304	Circuit Boards	Inspect		1.0		101	A & B
		Replace		6.0		101 & 102	

Section III. TOOL AND TEST EQUIPMENT

(1) TOOL OR TEST EQPT. REF. CODE	(2) MAINTENANCE CATEGORY	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER
101	Unit and Intermediate Level	Tool Kit JTK-17	
102	Intermediate Level	Test Equipment ANGSN 286	

Section IV. REMARKS

(1) REFERENCE CODE	(2) REMARKS
A.	Function to be performed by calibration repair specialist.
B.	Replacement of either PC-1 or PC-2 boards or meter requires calibration.

APPENDIX C

REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I. INTRODUCTION

C-1. Scope. This RPSTL lists and authorizes spares and repair parts; special tools, special test, measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of Aviation Unit and Aviation Intermediate maintenance of the Pyrometer. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

C-2. General. In addition to Section I, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts In each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair parts kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustration(s)/figure(s).

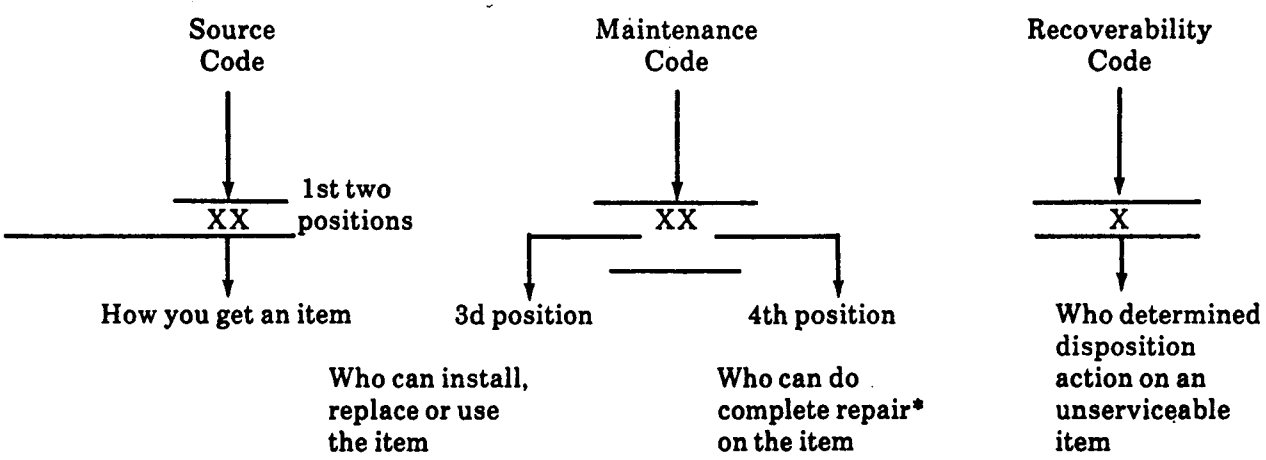
b. Section II. Special Tools List. Not applicable.

c. Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

C-3: Explanation of Columns (Sections II and III).

a. Item No (Column (1)). Indicates the number used to identify items called out in the illustration.

b. SMR Code (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout.



*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

Code	Explanation
PA PB PC** PD PE PF PG	Stocked items, use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3d position of the SMR code. **NOTE: Items coded PC are subject to deterioration
KD KF KB	Items with these codes are not to be requested/requisitioned individually They are part of a kit which is authorized to the maintenance category indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.

Code	Explanation
MO- (Made at org/ AVUM Level) MF- (Made at DS/ AVUM Level) MH- (Made at GS Level) ML- (Made at Specialized Repair Act (SRA)) MD- (Made at Depot)	Items with these codes are not to be requested/requisitioned individually They must be made from bulk material which is Identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3d position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

Code	Explanation
AO- (Assembled by org/AVUM Level) AF- (Assembled by DS/AVIM Level) AH- (Assembled by GS Category) AL- (Assembled by SRA) AD- (Assembled by Depot)	Items with these codes are not to be requested/requisitioned individually The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance

XA - Do not requisition an "XA"-coded item Order its next higher assembly. (Also, refer to the NOTE below.}
XB - If an "XB" item is not available from salvage, order it using the FSCM and part number given.
XC - Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD - Item is not stocked Order an "XD"-coded item through normal supply channels using the FSCM and part number given, if no NSN is available

NOTE: Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance codes tells you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

*(*a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance

Code	Application/Explanation
C	-Crew or operator maintenance done within organizational or aviation unit maintenance.
O	-Organizational or aviation unit category can remove, replace, and use the item.
F	-Direct support or aviation intermediate level can remove, replace, and use the item.
H	-General support level can remove, replace, and use the item.
L	-Specialized repair activity can remove, replace, and use the item.
D	-Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.) (NOTE. Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes) This position will contain one of the following maintenance codes.

Code	Application/Explanation
O	-Organi7ational or (aviation unit) is the lowest level that can do complete repair of the item.
F	-Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H	-General support is the lowest level that can do complete repair of the item.
L	-Specialized repair activity (designate the specialized repair activity) is the lowest level that can do complete repair of the item.
D	-Depot is the lowest level that can do complete repair of the item.
Z	-Nonreparable No repair is authorized.
B	-No repair is authorized (No parts or special tools are authorized for the maintenance of a "B" coded item). However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability Codes	Application / Explanation
Z	-Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of SMR Code.
O	-Reparable item. When uneconomically reparable, condemn and dispose of the item at organizational or aviation unit level.
F	-Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate level.
H	-Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	-Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	-Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA)
A	-Item requires special handling or condemnation procedures because of specific reasons (e g , precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. FSCM (Column (3)). The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc , that supplies the item.

d. Part Number (Column (4)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specification standards, and inspection requirements to identify an item or range of items.

NOTE: When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. Description and Usable On Code (UOC) (Column (5)). This column includes the following information.

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) The physical security classification of the item is indicated by the parenthetical entry (Insert applicable physical security classification abbreviation, e g, Phy Sec C1 (C) - Confidential, Phy Sec C1 (S) - Secret, Phy Sec C1 (T) - Top Secret).

(3) Items that are included in kits and sets are listed below the name of the kit or set.

(4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).

(7) The usable on code, when applicable (see paragraph 5, Special information).

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

f. QTY (Column (6)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

C-4 Explanation of Columns (Sect. IV).

a. National Stock Number (NSN) Index.

(1) Stock Number Column. This column lists the NSN by National item Identification number (NIIN) NSN
NSN
sequence. The NIIN consists of the last nine digits of the NSN (i.e, 5305-01-674-1467). When using this
NIIN
column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) Fig. Column. This column lists the number of the figure where the Item is identified/located. The figures are in numerical order in Section II and Section III.

(3) Item Column. The item number identifies the item associated with the figure listed in the adjacent FIG. Column. This item is also identified by the NSN listed on the same line.

b. Part Number Index. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e, vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) FSCM Column. The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) Part Number Column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

(3) Stock Number Column. This column lists the NSN for the associated part number and manufacturer identified in the Part Number and FSCM Columns to the left.

(4) FIG. Column. This column lists the number of the figure where the item is identified/located in Section II and III.

(5) Item Column. The item number is that number assigned to the item as it appears in the figure referenced In the adjacent figure number column

C-5. Special Information. Use the following subparagraphs as applicable

a. Usable On Code. The usable on code appears in the lower left corner of the Description column heading. Usable on codes are shown as "UOC:..." in the Description Column (justified left) on the first line applicable Item description/nomenclature Uncoded items are applicable to all models. Identification of the usable on codes used in the RPSTL are:

Code	Used On

NOT APPLICABLE

b. Fabrication Instructions. Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source codes to be manufactured or fabricated are not applicable.

c. Assembly Instructions. Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are not applicable. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. Kits. Line item entries for repair parts kits appear in a group in Section II. (Not Applicable).

e. Index Numbers. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

C-6. How to Locate Repair Parts.

a. When National Stock Number or Part Number is Not Known.

(1) First Using the table of contents, determine the assembly group or subassembly group to which the item belongs This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs

(3) Third. Identify the item on the figure and note the item number.

(4) Fourth. Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

(5) Fifth. Refer to the Part Number Index to find the NSN, If assigned

b. When National Stock Number or Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see C-4.1(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see C-4.b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for

(2) Second. After finding the figure and item number, verify that the item is the one you're looking for, then locate the Item number in the repair parts list for the figure.

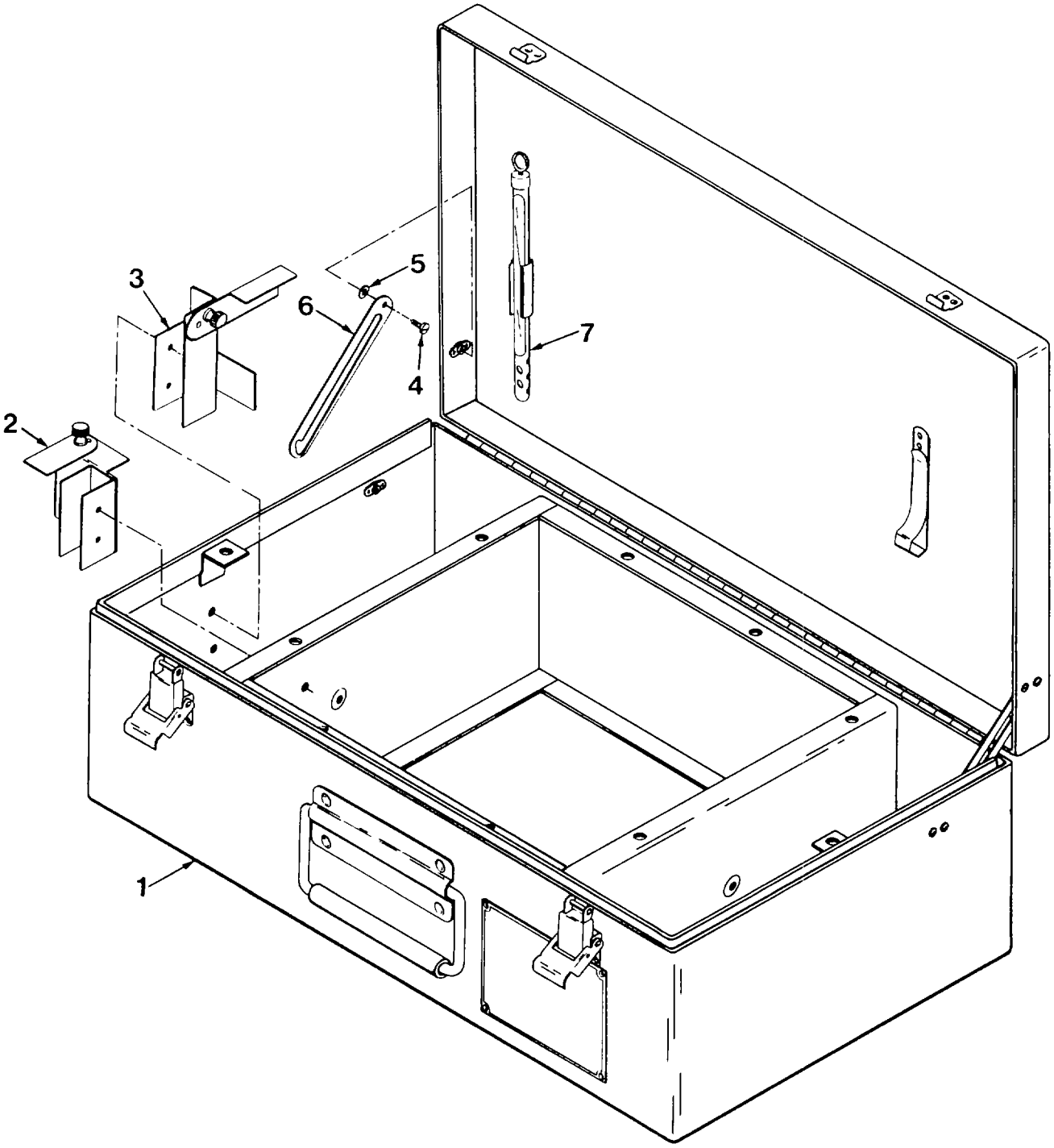


Figure C-1. Case And Cover Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 01 CASE AND COVER ASSEMBLY	
				FIG. C-1 CASE AND COVER ASSEMBLY	
1	XAFZZ	57829	5510	CASE AND COVER ASSY	1
2	XDFZZ	57829	5561	.BRACKET,1.5V BATT	1
3	XDFZZ	57829	5560	.BRACKET,45V BATT	1
4	PAFZZ	73734	17082	.SCREW,PAN HEAD.....	4
5	PAFZZ	73734	96306	.WASHER,FLAT.....	4
6	XDFZZ	57829	7776	.SUPPORT LID	2
7	PAFZZ	21518	21432	.THERMOMETER,SELF-IN INDICATING.....	1

END OF FIGURE

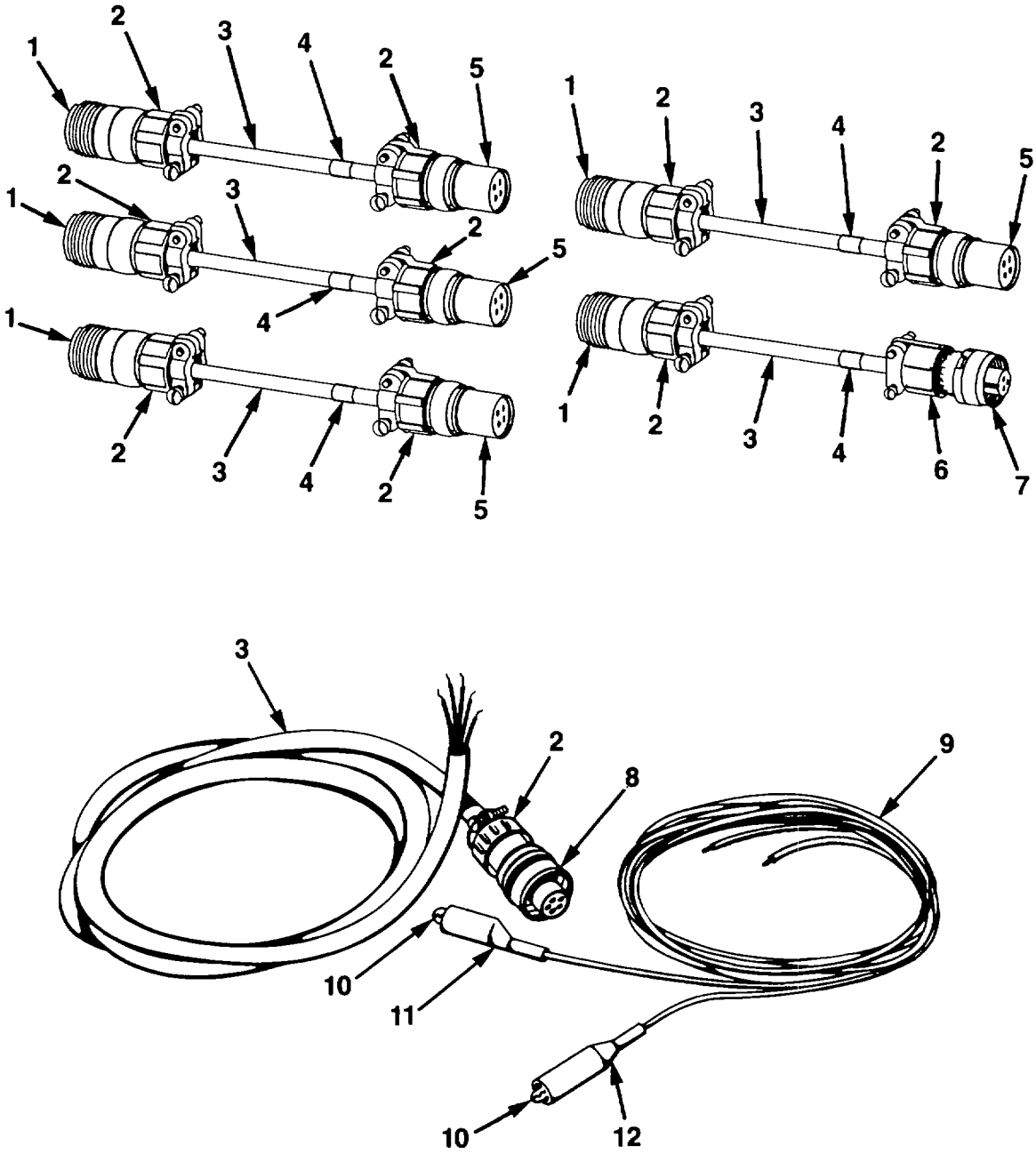


Figure C-2. Cable Assemblies

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 02 CABLE ASSEMBLIES	
				FIG. C-2 CABLE ASSEMBLIES	
I	PAFZZ	96906	MS3451W18-1S	CONNECTOR,RECEPTACL	5
2	PAFZZ	81349	M85049/41-6A	CLAMP,CABLE,ELECTRI	9
3	XDFZZ	57829	5512-1	CABLE,20 GAUGE	V
4	XDFZZ	57829	5511-2	MARKERSWIRE	1
5	PAFZZ	96906	MS3456W1L4S2S	CONNECTOR,PLUG,ELEC	4
6	PAFZZ	81349	M89049/4L-4A	CLAMP,CABLE,ELECTRI	I
7	PAFZZ	96906	MS3456W10SL3S	CONNECTOR,PLUG,ELEC	I
8	PAFZZ	96906	MS3456W14S5S	CONNECTOR,PLUG,ELEC	1
9	XDFZZ	57829	5513-1	LEADS TEST	V
10	XDFZZ	57829	60-U	CLIP,ALLIGATOR	2
11	XDFZZ	57829	62-B	BOOT,BLACK,RUBBER.....	1
12	XDFZZ	57829	62-R	BOOT,RED,RUBBER	1

END OF FIGURE

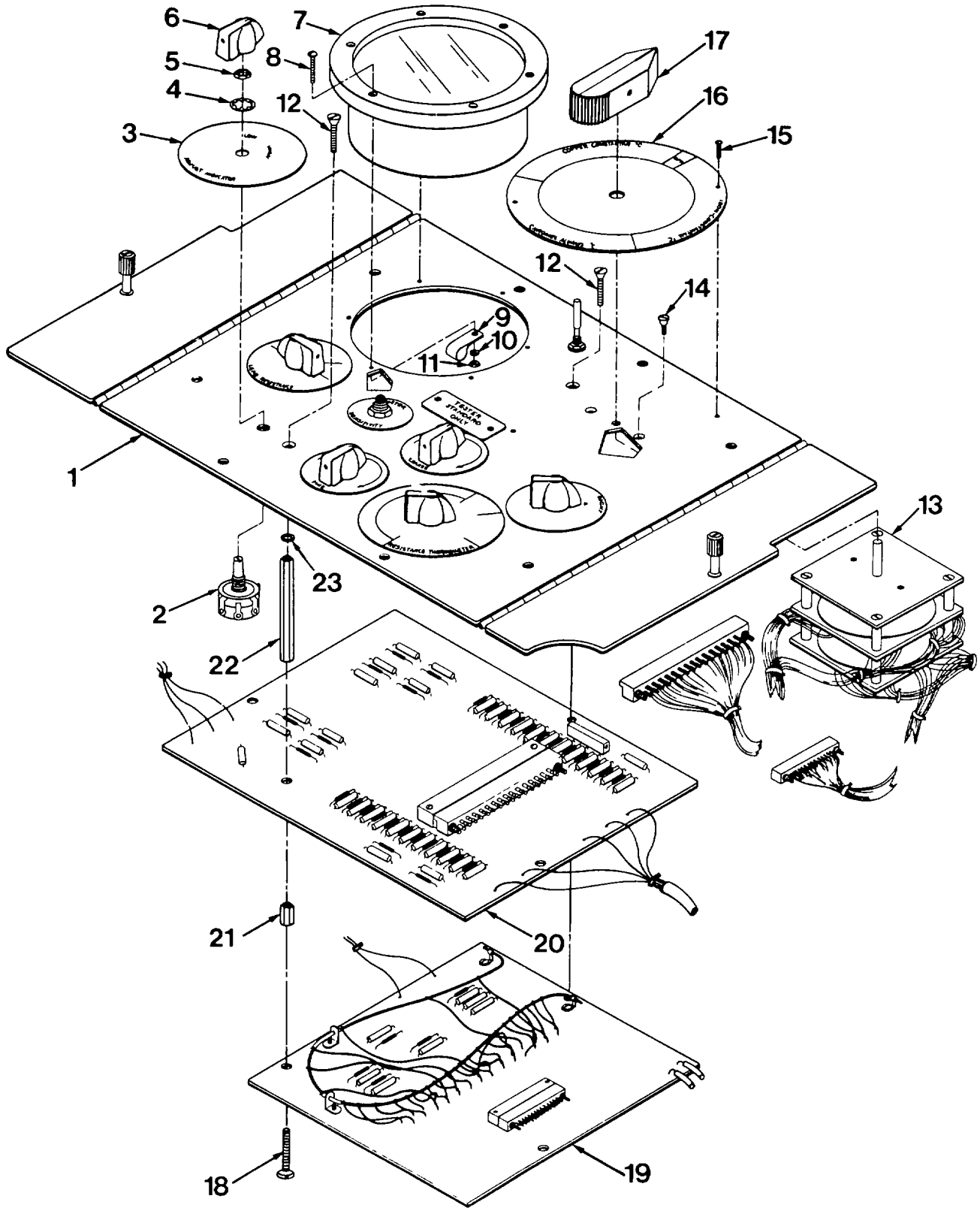


Figure C-3. Pyrometer Tester, Panel Assembly (Sheet 1 of 2)

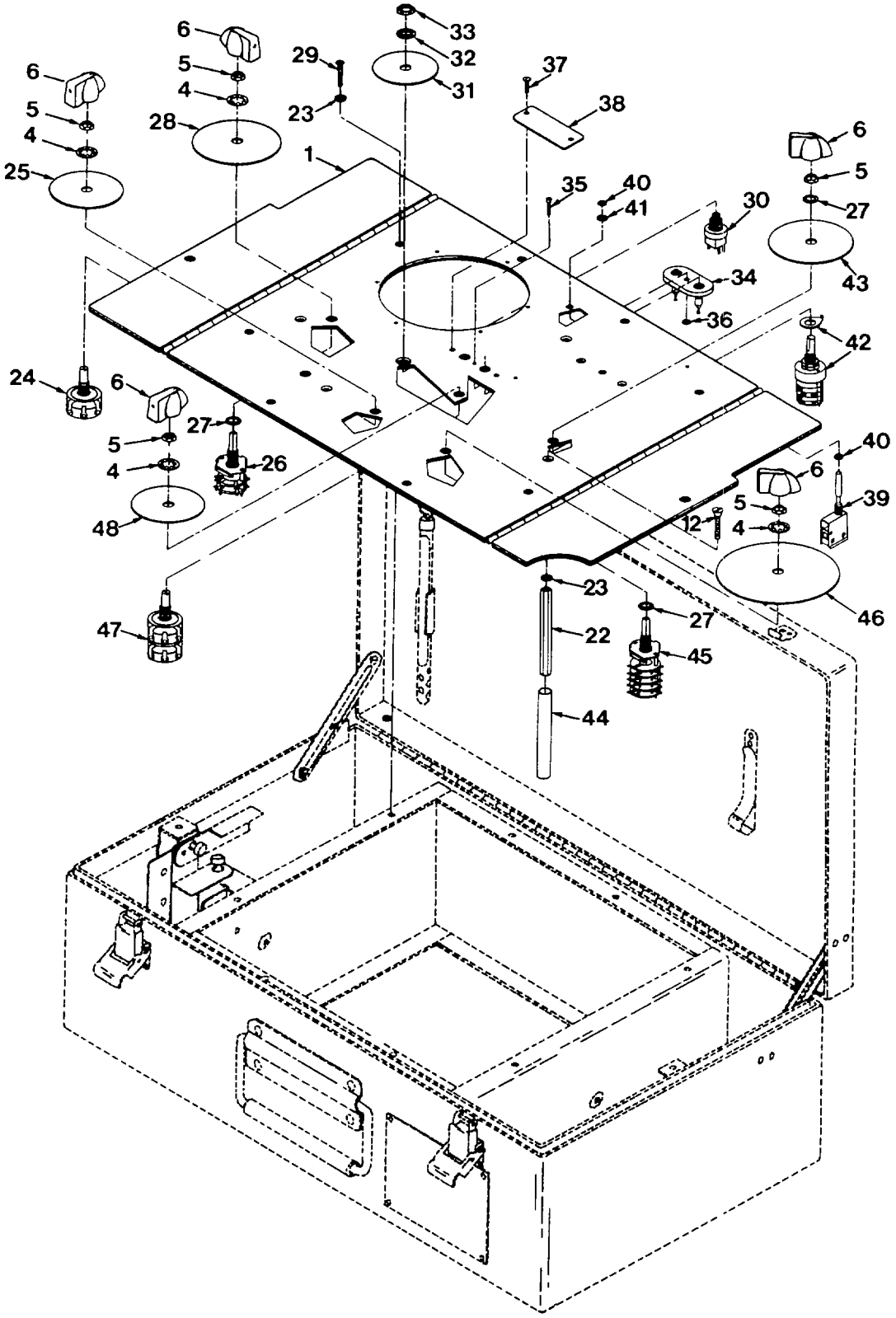


Figure C-3. Pyrometer Tester, Panel Assembly (Sheet 2 of 2)

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 03 PANEL ASSEMBLY	
				FIG. C-3 BYROMETER TESTER, PANEL ASSEMBLY	
I	XAFFF	57829	5520	INST PANEL ASSYCOMP	1
2	PAFZ7	81349	RA2DNASD101A	.RESISTOR,VARIABLE,W.	1
3	XDF7Z	57829	5520-10	.DIAL,LEAD RES	1
4	PAFZZ	73734	30-112	.WASHER,LOCK	6
5	PAFZZ	73734	9021	.NUT,SELF-LOCK[NG,HE	6
6	XDFZZ	57829	292-3L	.KNOB POINTER	6
7	PAF7Z	15309	465-124	.METER,MULTIPLE SCAL	1
8	PAFZZ	73734	3038	.SCREW,MACHINE	6
9	PAFZZ	83330	8926	.CLAMP,LOOP	1
10	PAFZZ	73734	98150	.WASHER,LOCK	6
11	PAFZZ	73734	70135	.NUT,PLAIN,HEXAGON	6
12	PAFZZ	73734	16307	.SCREW,MACHINE	4
13	XDFZZ	57829	5520-20	.TEMP SWITCH W2 ASSY	1
14	PAFZZ	73734	16284	.SCREW,MACH[NE	2
15	PAFZZ	73734	3012	.SCREW,MACHINE	2
16	XDFZZ	57829	5520-11	.DIAL,TEMP.SELECT SW	1
17	XDFZZ	57829	77A4GA/WL	.KNOB,BAR POINTER	
18	PAFZ7	73734	17111	.SCREW,MACHINE	4
19	PAFZZ	57829	5540	.CIRCUIT CARD PC1 (SEE FIG. C-4 FOP DETAIL	1
20	PAFZZ	57829	5550	.CIRCUIT CARD PC2 (SEE FIG.C-5 FOR DETAIL	1
21	PAFZZ	83330	8623	.SPACER,SLEEVE	3
22	XDFZZ	57829	8417-SS	.STANDOFF,5/16 HEX	4
23	XDFZZ	57829	1306	.LOCKWASHER TOOTH	12
24	XDFZZ	57829	RA20NASD250A	.POTENT. WIRE WOUND	1
25	XDFZZ	57829	5520-12	.DIAL,FINE RHEOSTAT	1
26	XDFZZ	57829	754140-001	.SWITCH,ROTARY	1
27	PAFZZ	73734	99105	.WASHER,LOCK	3
28	XDFZZ	57829	5520-13	.DIAL,LEAD RES. SW	1
29	PAFZZ	73734	17108	.SCREW,MACHINE	8
30	XDF7Z	57829	35-3	.SWITCH PUSHBUTTON	1
31	XDFZZ	57829	5520-14	.DIAL,METER SENSITIV	1
32	PAFZZ	73734	1316	.WASHER,LOCK	1
33	XDFZZ	73734	9027	.NUT,PLAIN,HEXAGON	1
34	XDFZZ	57829	5520-21	.PIN JACK ASSY	1
35	PAFZZ	73734	16246	.SCREW,MACHINE	1
36	PAFZZ	73734	70203	.NUT,PLAIN,HEXAGON	1
37	PAFZZ	73734	16064	.SCREW,ROUND HEAD	2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
38	XDFZZ	57829	5520-15	.PLATE,TESTER STD	1
39	XDFZZ	57829	5520-22	.SWITCH,COVER ACT	1
40	PAFZZ	73734	76100	.LOCKNUT 1/4-20 THO	2
41	PAFZZ	73734	30-120	.LOCKWASHER,TOOTH	1
42	XDFZZ	57829	3690-202-2S	SWITCH,ROTARY	1
43	XDFZZ	57829	5520-16	.DIAL,LEFT AND SINGL	1
44	XDFZZ	57829	105-3/8	.INSULATOR TUBING	2
45	XDFZZ	57829	754141-001	.SWITCH,ROTARY	1
46	XDFZ7	57829	5520-17	.DIAL,RES ANO VOLT..	1
47	XDFZZ	57829	S3-07245	.POTENT. WIRE WOUND	1
48	XDFZZ	57829	5520-18	.DIAL,COARSE RHEOST	1

END OF FIGURE

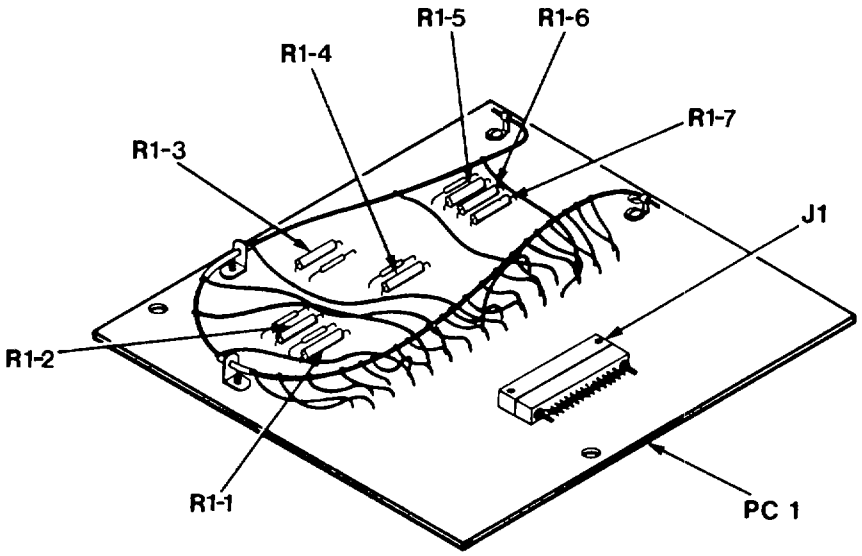


Figure C-4. Printed Circuit Board, PC-1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIG. C-4 PRINTED CIRCUIT BOARD, PC1	
	PAFZZ	57829	5540	CIRCUIT CARD PC1 SEE FIG C-3 FOR REF NHA.	

END OF FIGURE

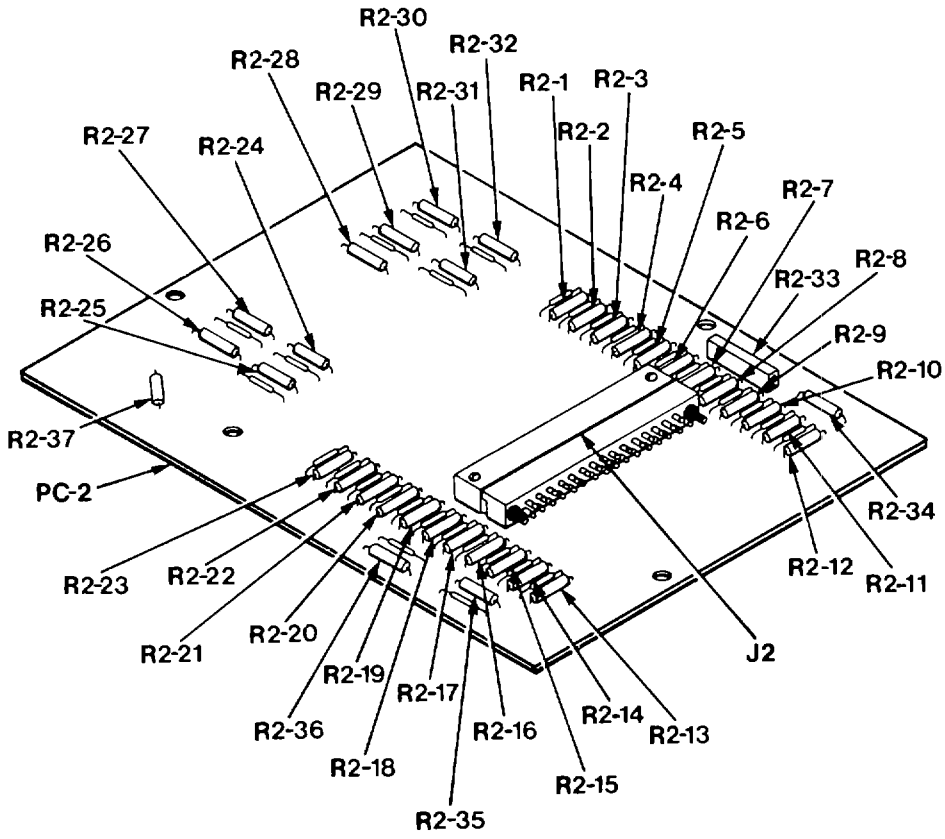


Figure C-5. Printed Circuit Board, PC-2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6)
				FIG. C-5 PRINTED CIRCUIT BOARD,PC2	
	PAFZZ	57829	5550	CIRCUIT CARD PC2 SEE FIG C-3 FOR REF NHA.....	
				END OF FIGURE	

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-139-3003	C-1	5			
6685-00-179-4961	C-1	7			
5310-00-449-2432	C-3	32			
5305-00-494-4881	C-3	15			
5935-00-534-7553	C-2	7			
5935-00-564-5362	C-2	8			
5905-00-581-0449	C-3	2			
5935-00-622-2831	C-2	5			
5310-00-685-7040	C-3	5			
5305-00-768-0336	C-3	35			
5310-00-934-9748	C-3	36			
5365-01-051-5806	C-3	21			
5935-01-149-2540	C-2	6			
5935-01-176-6628	C-2	1			
5935-01-200-0827	C-2	2			
5305-01-220-2973	C-1	4			
5305-01-222-7769	C-3	18			
5305-01-222-7770	C-3	8			
5365-01-222-7771	C-3	40			
5310-01-222-7772	C-3	10			
5310-01-222-7773	C-3	27			
5310-01-222-7774	C-3	4			
5340-01-222-7777	C-3	9			
5999-01-222-7783	C-3	19			
	C-4				
5999-01-222-7784	C-3	20			
	C-5				
5305-01-224-1692	C-3	29			
5305-01-224-2508	C-3	14			
5310-01-230-0188	C-3	11			
6625-01-233-4436	C-3	7			

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS3451W18-lS	5935-01-176-6628	C-2	1
96906	MS3456W10SL3S	5935-00-534-7553	C-2	7
96906	MS3456W14S2S	5935-00-622-2831	C-2	5
96906	MS3456W14S5S	5935-00-564-5362	C-2	8
81349	M85049/41-4A	5935-01-149-2540	C-2	6
81349	M85049/41-6A	5935-01-200-0827	C-2	2
81349	RA2DNASD101A	5905-00-581-0449	C-3	2
57829	RA20NAS0250A		C-3	24
57829	S3-07245		C-3	47
57829	105-3/8		C-3	44
57829	1306		C-3	23
73734	1316	5310-00-449-2432	C-3	32
73734	16064		C-3	37
73734	16246	5305-00-768-0336	C-3	35
73734	16284	5305-01-224-2508	C-3	14
73734	16307		C-3	12
73734	17082	5305-01-220-2973	C-1	4
73724	171 08	5305-01-224-1692	C-3	29
73734	17111	5305-01-222-7769	C-3	18
21518	21432	6685-00-179-4961	C-1	7
57829	292-3L		C-3	6
73734	30-112	5310-01-222-7774	C-3	4
73734	30-120		C-3	41
73734	3012	5305-00-494-4881	C-3	15
73734	3038	5305-01-222-7770	C-3	8
57829	35-3		C-3	30
57829	3690-202-2S		C-3	42
15309	465-124	6625-01-233-4436	C-3	7
57829	5510		C-1	1
57829	5511-2		C-2	4
57829	5512-1		C-2	3
57829	5513-1		C-2	9
57829	5520		C-3	1
57829	5520-10		C-3	3
57829	5520-11		C-3	16
57829	5520-12		C-3	25
57829	5520-13		C-3	28
57829	5520-14		C-3	31
57829	5520-15		C-3	38
57829	5520-16		C-3	43
57829	5520-17		C-3	46
57829	5520-18		C-3	48
57829	5520-20		C-3	13
57829	5520-21		C-3	34
57829	5520-22		C-3	39
57829	5540	5999-01-222-7783	C-3 C-4	19
57829	5550	5999-01-222-7784	C-3 C-5	20
57829	5560		C-1	3
57829	5561		C-1	2

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
57829	60-U		C-2	10
57829	62-B		C-2	11
57829	62-R		C-2	12
73734	70135	5310-01-230-0188	C-3	11
73734	70203	5310-00-934-9748	C-3	36
57829	754140-001		C-3	26
57829	754141-001		C-3	45
73734	76100	5365-01-222-7771	C-3	40
57829	77A4GA/WL		C-3	17
57829	7776		C-1	6
57829	8417-SS		C-3	22
83330	8623	5365-01-051-5806	C-3	21
83330	8926	5340-01-222-7777	C-3	9
73734	9021	5310-00-685-7040	C-3	5
73734	9027		C-3	33
73734	96306	5310-00-139-3003	C-1	5
73734	98150	5310-01-222-7772	C-3	10
73734	99105	5310-01-222-7773	C-3	27

ALPHABETICAL INDEX

ALPHABETICAL INDEX (CONTD)

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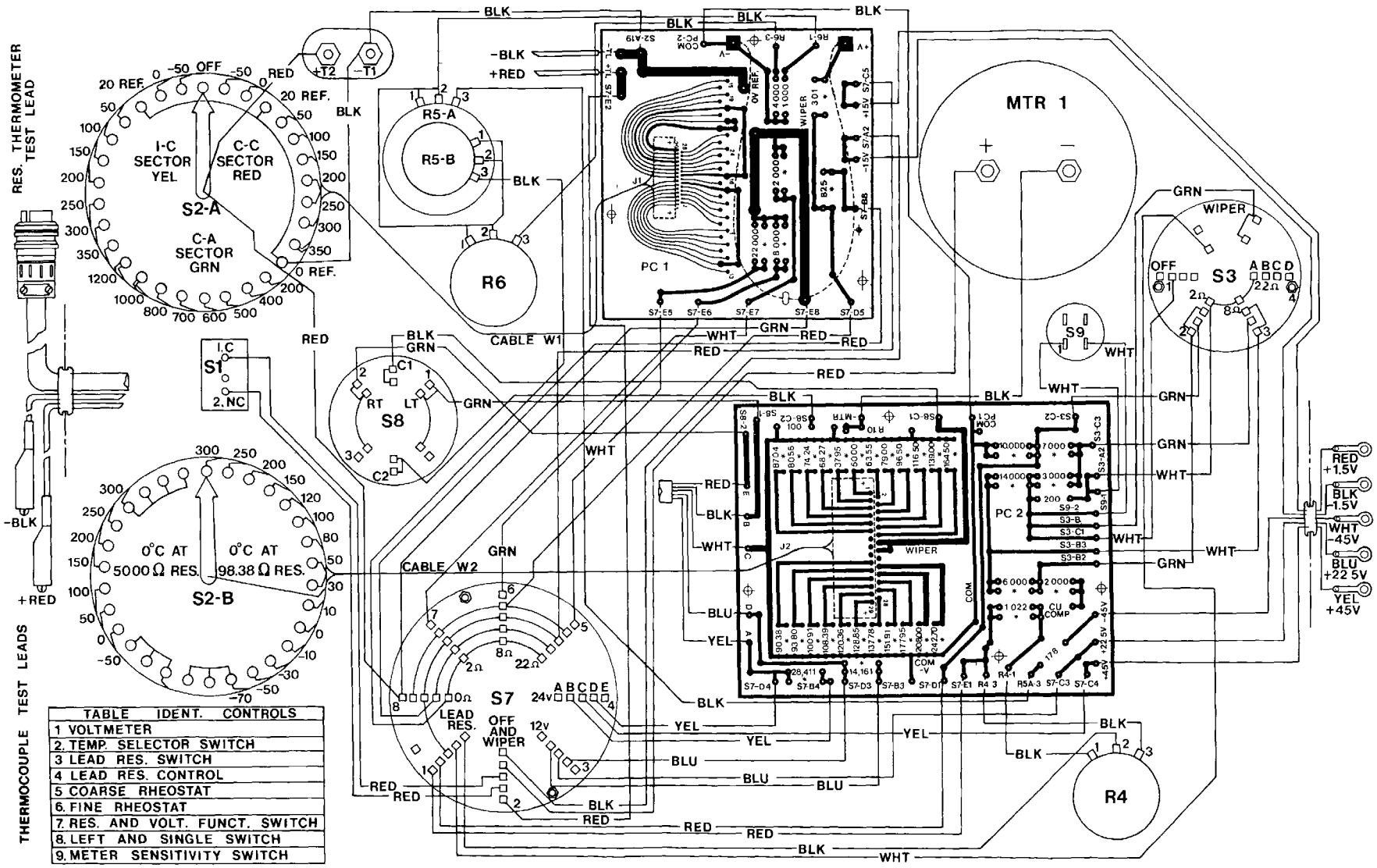

FO-1. SCHEMATIC WIRING DIAGRAM PYROMETER TESTER P/N 5500

FP-1/(FP-2 blank)

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TM 55-6695-220-13&P	31 Mar 87	Operator's and AVIM Manual Including RPSTL for Pyrometer and Thermocouple Tester

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Change the manual to show 4 Cylenders.
B1		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 decameter = 10 meters = 32.8 feet
1 hectometer = 10 decameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
acres
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 deciliter = 10 liters = 2.64 gallons
1 hectoliter = 10 deciliters = 26.42 gallons
1 kilometer = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (center) = 100 sq. decimeters = 10.76 sq. feet
1 sq. decameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. decameters = 2.47

1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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