ARMY TM 3-6665-329-13&P
AIR FORCE TO 11H2-18-1

TECHNICAL MANUAL

OPERATOR INSTRUCTIONS

AND

INTERMEDIATE DIRECT SUPPORT

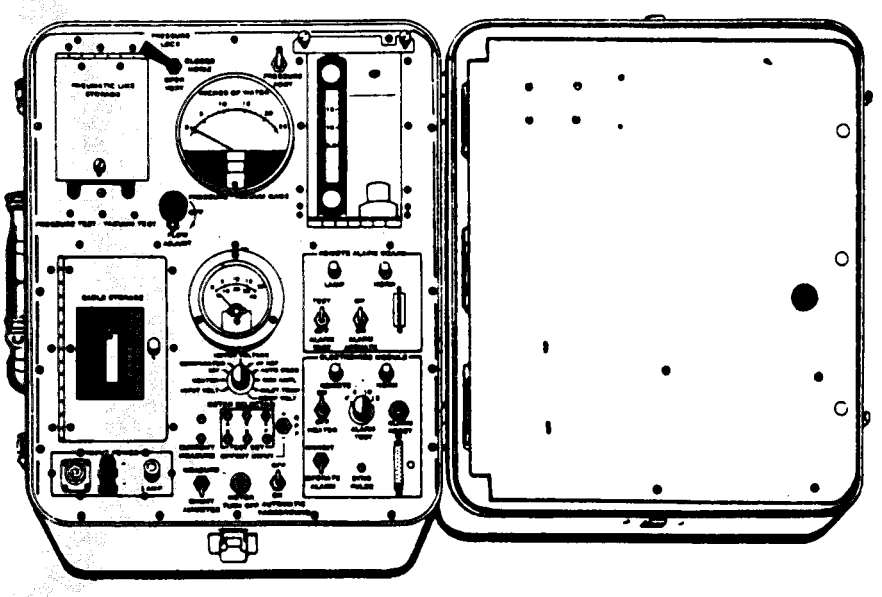
MAINTENANCE INSTRUCTIONS

INCLUDING

REPAIR PARTS AND SPECIAL TOOLS LIST

M140 CHEMICAL AGENT AUTOMATIC ALARM TEST SET

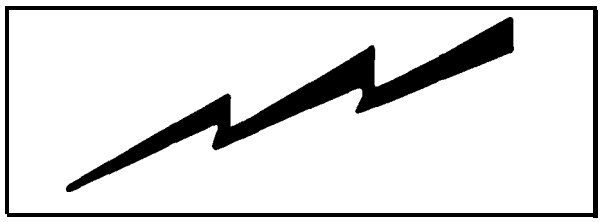
(NSN 6665-01-083-2749)



HEADQUARTERS, DEPARTMENTS OF THE ARMY AND AIR FORCE

22 MARCH 1985

CHANGE 2



WARNING

HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions when performing functional and troubleshooting procedures on the test set.

Shut down equipment and disconnect power supply before beginning work on equipment.

Do not be misled by the term low voltage. Potentials as low as 50 volts may cause death under adverse conditions.

For Artificial Respiration, refer to FM 21-11.

Army TM 3-6665-329-13&P
Air Force TO 11H2-18-1
C3

CHANGE

NO. 3

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND AIR FORCE
WASHINGTON, DC, 15 December 1989

OPERATOR INSTRUCTIONS
AND
INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Including Repair Parts and Special Tools List
for
M140 CHEMICAL AGENT AUTOMATIC ALARM TEST SET
(NSN 6665-01-083-2749)

TM 3-6665-329-13&P, 22 March 1985, is changed as follows:

1. New or changed material are indicated by a vertical bar in the margin of the page. RPSTL listing changes are indicated by an asterisk to the left of the item number column adjacent to the line item.

2. Remove the old pages and insert new pages as indicated below.

Remove Pages	Insert Pages
None	a/(b blank)
i and ii	i and ii
2-9 and 2-10	2-9 and 2-10
2-15 and 2-16	2-15 and 2-16
3-7 and 3-8	3-7 and 3-8
3-59 and 3-60	3-59 and 3-60
E-13 and E-14	E-13 and E-14/(E-15 blank)
E-25 thru E-28	E-25 thru E-28
E-31 thru E-37	E-31 thru E-37/(E-38 blank)

3. File this change sheet in front of the publication for reference purposes.

ARMY TM 3-6665-329-13&P
AIR FORCE TO 11H2-18-1

By Order of the Secretaries of the Army and Air Force:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

LARRY D. WELCH, General, USAF
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CHANGE
NO. 2

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND AIR FORCE
Washington, D.C., 13 March 1988

OPERATOR INSTRUCTIONS AND INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Including Repair Parts and Special Tools List
M140 CHEMICAL AGENT AUTOMATIC ALARM TEST SET
(NSN 6665-01-083-2749)

TM 3-6665-329-13&P, February 1985, and C1 are changed as follows:

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2. Illustration changes are indicated by a miniature pointing hand.

3. Remove the old pages and insert new pages as indicated below.

Remove Pages	*Insert Pages*
i thru iv	i thru iv
2-0 thru 2-6	2-0 thru 2-6
2-11 and 2-12	2-11 and 2-12
3-1 and 3-2	3-1 and 3-2
3-5 and 3-6	3-5 and 3-6
3-9 and 3-10	3-9 and 3-10
3-13 thru 3-28	3-13 thru 3-28
3-45 thru 3-48	3-45 thru 3-48
3-51 and 3-52	3-51 and 3-52
3-57 thru 3-60	3-57 thru 3-60
3-71 and 3-72	3-71 and 3-72
3-85 and 3-86	3-85 and 3-86
3-97 and 3-98	3-97 and 3-98
3-103 and 3-104	3-103 and 3-104
3-121 and 3-122	3-121 and 3-122
A-1 (A-2 BLANK)	A-1 (A-2 BLANK)
B-1 thru B-4	B-1 thru B-4
C-3 (C-4 BLANK)	C-3 (C-4 BLANK)
E-1 thru E-10	E-1 thru E-5
E-11 thru E-14 (E-15 BLANK)	E-11 thru E-14 (E-15 BLANK)
E-17 thru E-22	E-17 thru E-22
E-25 thru E-28	E-25 thru E-28
E-31 thru E-36	E-31 thru E-36
Cover and warning page	Cover and warning page

4. File this sheet and previous change sheet in the back of the publication for reference purposes.

ARMY TM 3-6665-329-13&P
AIR FORCE TO 11H2-18-1

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JOHN A. WICKHAM, JR.
General, United States Army
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The Adjutant General

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Commander, Air Force Logistics Command

Distribution:

To be distributed in accordance with DA Form 12-28, Block 220, Operator Instructions and Direct Support Maintenance (Including Repair Parts and Special Tools List), for Detection Alarm Testers.

TM 3-6665-329-13&P
C1

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 10 April 1986

OPERATOR INSTRUCTIONS
AND
DIRECT SUPPORT MAINTENANCE INSTRUCTIONS
INCLUDING
REPAIR PARTS AND SPECIAL TOOLS LIST

M140 CHEMICAL AGENT
AUTOMATIC ALARM TEST SET
(NSN 6665-01-083-2749)

TM 3-6665-329-13&P, March 1985 is changed as follows:

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3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

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3-9 and 3-10	3-9 and 3-10
3-17 through 3-26	3-17 through 3-26
3-33 and 3-34	3-33 and 3-34
3-37 and 3-38	3-37 and 3-38
3-59 and 3-60	3-59 and 3-60

File this change sheet is front of the publication for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-28, Block 220, Operator Instructions and Direct Support Maintenance (Including Repair Parts and Special Tools List), for Detection Alarm Testers.

WARNING

HEALTH/ENVIRONMENTAL HAZARD

Filters use ASC Whetlerite Carbon which contains Chromium VI. Chromium VI is a known carcinogen if inhaled or swallowed. Damaged or unusable filters are classified as hazardous waste:

DO NOT throw away damaged or unusable filters as ordinary trash.

DO turn in damaged or unusable filters to your hazardous waste management office or Defense Reutilization and Marketing Office (DRMO).

Filters are completely safe to handle and use if they are not damaged in such a way that carbon leaks from them. In unlikely event that carbon should leak, use protection such as a dust respirator to cover nose and mouth and put carbon in container such as self-sealing plastic bag; turn in to hazardous waste management office or DRMO.

Disposal of hazardous waste is restricted by the Resource Conservation and Recovery Act as amended (42 U.S.C.A sec 6901 et seq). Violation of these laws is subject to severe criminal penalties.

ARMY TM 3-6665-329-13&P
AIR FORCE TO 11H2-18-1
C3

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND AIR FORCE
Washington, D.C.
22 March 1985

OPERATOR INSTRUCTIONS AND INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Including Repair Parts and Special Tools List
M140 CHEMICAL AGENT AUTOMATIC ALARM TEST SET
(NSN 6665-01 -083-2749)
Current as of (30 September 1989)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Form), or DA Form 2028-2 located in the back of this manual direct to Commander, U. S. Army Armament, Munitions and Chemical Command, Attn: AMSMC-MAR-T (A), Aberdeen Proving Ground, MD 21010-5423. A reply will be furnished to you.

HOW TO USE THIS MANUAL

This manual includes operation and maintenance instructions for the test set. At the beginning of each chapter, you will find an index of all topics covered in that chapter.

Maintenance instructions are in Chapter 3. You must familiarize yourself with the entire maintenance procedure before beginning a specific maintenance task.

- When you have a maintenance problem, how do you start?

Look at the front cover of this manual. On the right side you will find the listing “Troubleshooting/Symptom Index.” It tells you to go to (para 3-30).

- What symptom does your test set have?

If a malfunction is discovered, you should refer to the Symptom Index in the troubleshooting section. Find the malfunction in this index and go to the appropriate section on the troubleshooting logic tree. If, for example, the input voltage is not correct, you will find “INPUT VOLTAGE READING NOT WITHIN ACCEPTABLE LIMITS on the Symptom Index, which refers you to the start area of the troubleshooting logic tree.

- How do you correct the problem?

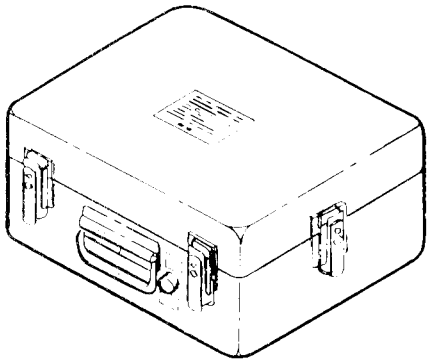
Follow the instructions in the troubleshooting logic tree.

- What about the repair and spare parts information?

Appendix E of the manual contains information for repair and spare parts and special tools.

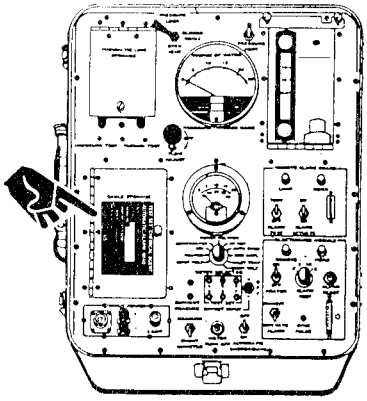
Case:

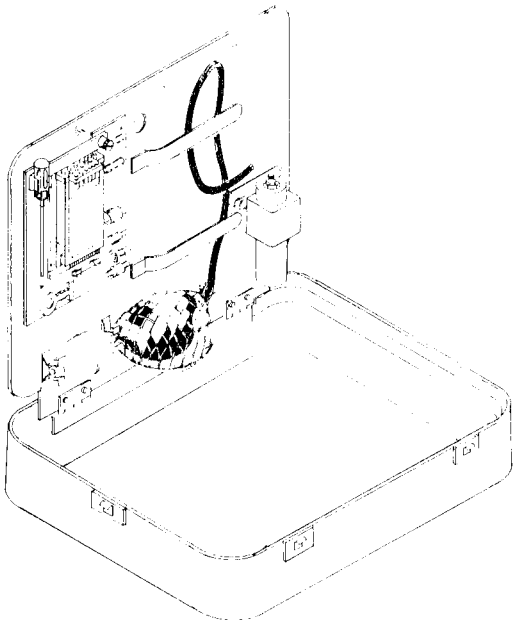
Protects test set components.



Panel Assembly:

Contains electrical and pneumatic circuits for testing components of M43A1 Detector.





Inside lid compartment contains test set accessories

M140 Chemical Agent Automatic Alarm TEST SET

CHAPTER 1

INTRODUCTION

CHAPTER OVERVIEW.

The purpose of this chapter is to introduce you to the general capabilities and requirements of the test set and to the U.S. Army documentation which supports the use and maintenance of this equipment.

Section I. GENERAL INFORMATION

1-1 SCOPE.

a. Type of Manual: Operator instructions and direct support maintenance instructions including repair parts and special tools list.

b. Equipment Name and Model Number: M140 Chemical Agent Automatic Alarm test set.

c. Purpose of Equipment: The test set tests all operational capabilities of the M43A1 detector and the M42 alarm unit.

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

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750. The Army Maintenance Management System (TAMMS) as contained in the maintenance management update.

1-3 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your test needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament Munitions and Chemical Command, Attn: AMSMC-MAR-T(A), Aberdeen Proving Ground, MD 21010-5423. We'll send you a reply.

1-4 NOMENCLATURE CROSS-REFERENCE LIST.

This listing includes nomenclature cross-references used in this manual.

Common Name	Official Nomenclature
Cable Cover Assembly	Cover Assembly Cable Storage
Extender Board	Extender Board Assembly
Test Set	Test Set, Chemical Agent Automatic Alarm: M140
Pressure-Vacuum Gage	Dial Indicating Differential Gage
M43A1 Detector	Detector Unit, Chemical Agent Automatic Alarm: M43A1
Flowmeter	Flowmeter and Bracket Assembly
Line Filter	Radio Frequency Filter
M42 Alarm Unit	Alarm Unit, Chemical: M42
M10 or M10A1 Power supply	Power Supply, Chemical Agent Automatic Alarm. M10 or M10A1
Grommet	Grommet, Nonmetallic
Binding Post	Post, Binding, Electrical
Flowmeter Port	Bushing, Flowmeter
Panel Assembly	Test Set Panel Assembly
Fuseholder	Fuseholder, Extractor

1-5 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Refer to TM 43-0002-31, Section 3, Chemical Defense Equipment, for procedures to destroy the test set.

1-6 PREPARATION FOR STORAGE OR SHIPMENT.

Procedures for preparing the test set for storage or shipment are located in Chapter 3, Section VI.

Section II. EQUIPMENT DESCRIPTION

1-7 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. Characteristics:

(1) Portable.

(2) Light weight.

(3) One man carry.

b. Capabilities and Features:

(1) Tests M43A1 Detector as a unit.

(2) Tests M43A1 Detector vacuum pump unit, RE, electronic amplifier and cell modules separately.

(3) Permits rapid troubleshooting of M43A1 Detector.

(4) Checks M43A1 Detector airflow rate with flowmeter.

(5) Tests M42 Alarm Unit circuit card assembly.

1-8 EQUIPMENT DATA.

WEIGHT AND DIMENSIONS

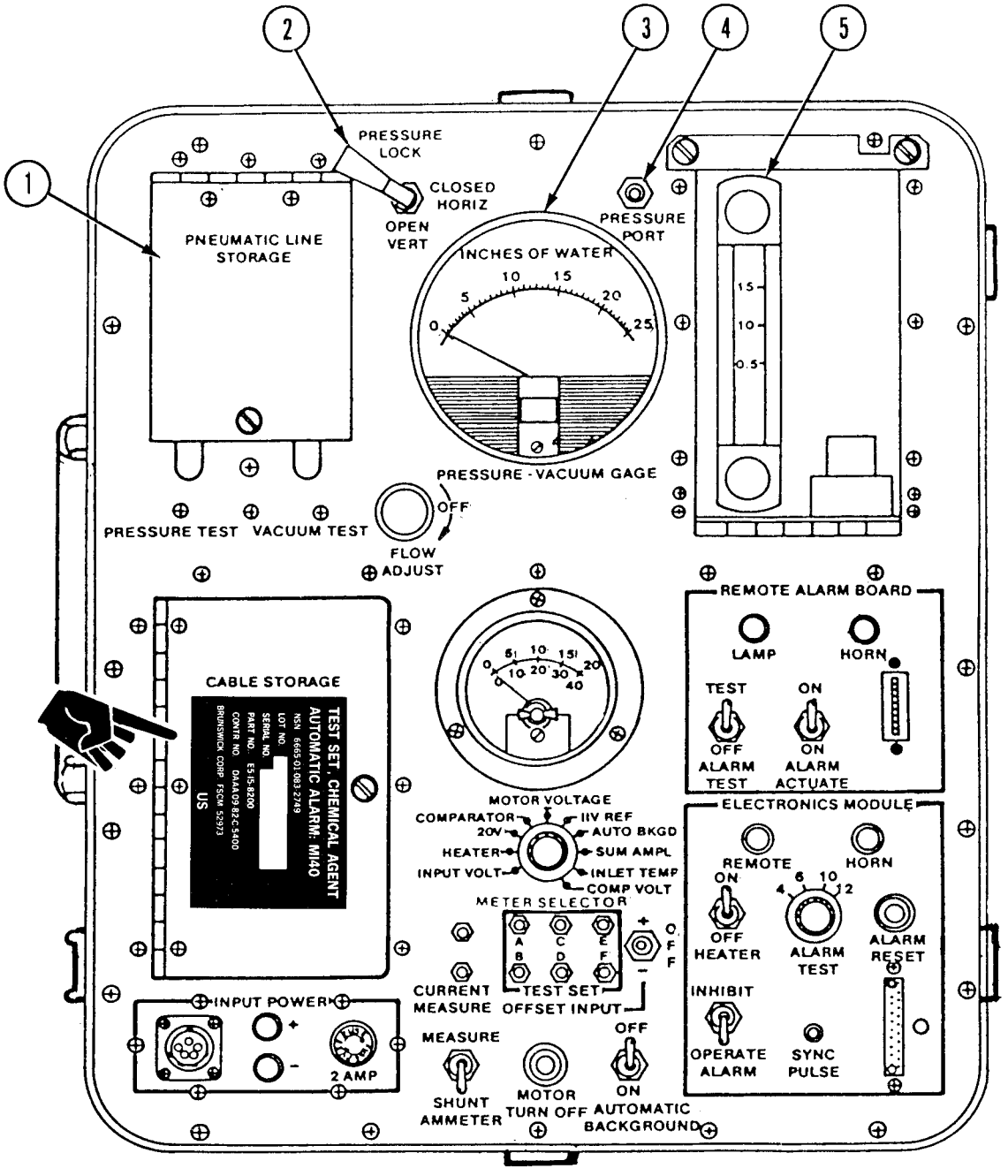
Weight	30 lbs (13.62 kg)
Length	20-3/4 in. (52.7 cm)
Width	17-1/2 in. (44.5 cm)
Height	10 in. (25.4 cm)

1-8 EQUIPMENT DATA (CONT).

POWER REQUIREMENTS	
Min. voltage	24 V dc
Max, voltage	36 V dc
Max. current with M43A1 Detector	2 amps
CARTRIDGE FUSE	
Qty	1
Amps	2
volts	250
GAGE AND METER SENSITIVITY RANGE	
Dial indicating differential gage (PRESSURE-VACUUM GAGE)	
Scale range	0 to 25 inches of water
Scale increment	0.5 in.
AMMETER	
First range (green scale)	0 to 20 amps dc
Second range (blue scale)	0 to 40 amps dc

1-9 SAFETY, CARE AND HANDLING.

The test set contains a pressure-vacuum gage, ammeter, and circuit card assemblies. To prevent damage to these components do not drop test set or store with lid open.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PRESSURE LOCK
CLOSED HORIZ
OPEN VERT
PRESSURE PORT
PNEUMATIC LINE STORAGE
INCHES OF WATER
PRESSURE - VACUUM GAGE
PRESSURE TEST
VACUUM TEST
OFF
FLOW ADJUST
CABLE STORAGE
TEST SET, CHEMICAL AGENT AUTOMATIC ALARM: M140
MOTOR VOLTAGE
COMPARATOR
20V
HEATER
INPUT VOLT
11V REF
AUTO BKGD
SUM AMPL
INLET TEMP
COMP VOLT
METER SELECTOR
CURRENT MEASURE
TEST SET OFFSET INPUT
OFF
INPUT POWER
2 AMP
MEASURE
SHUNT AMMETER
MOTOR TURN OFF
OFF
ON AUTOMATIC BACKGROUND
REMOTE ALARM BOARD
LAMP
HORN
TEST
ON
OFF ALARM TEST
ON ALARM ACTUATE
ELECTRONICS MODULE
REMOTE
HORN
ON
OFF HEATER
ALARM TEST
ALARM RESET
INHIBIT
OPERATE ALARM
SYNC PULSE

CHAPTER 2

OPERATING INSTRUCTIONS

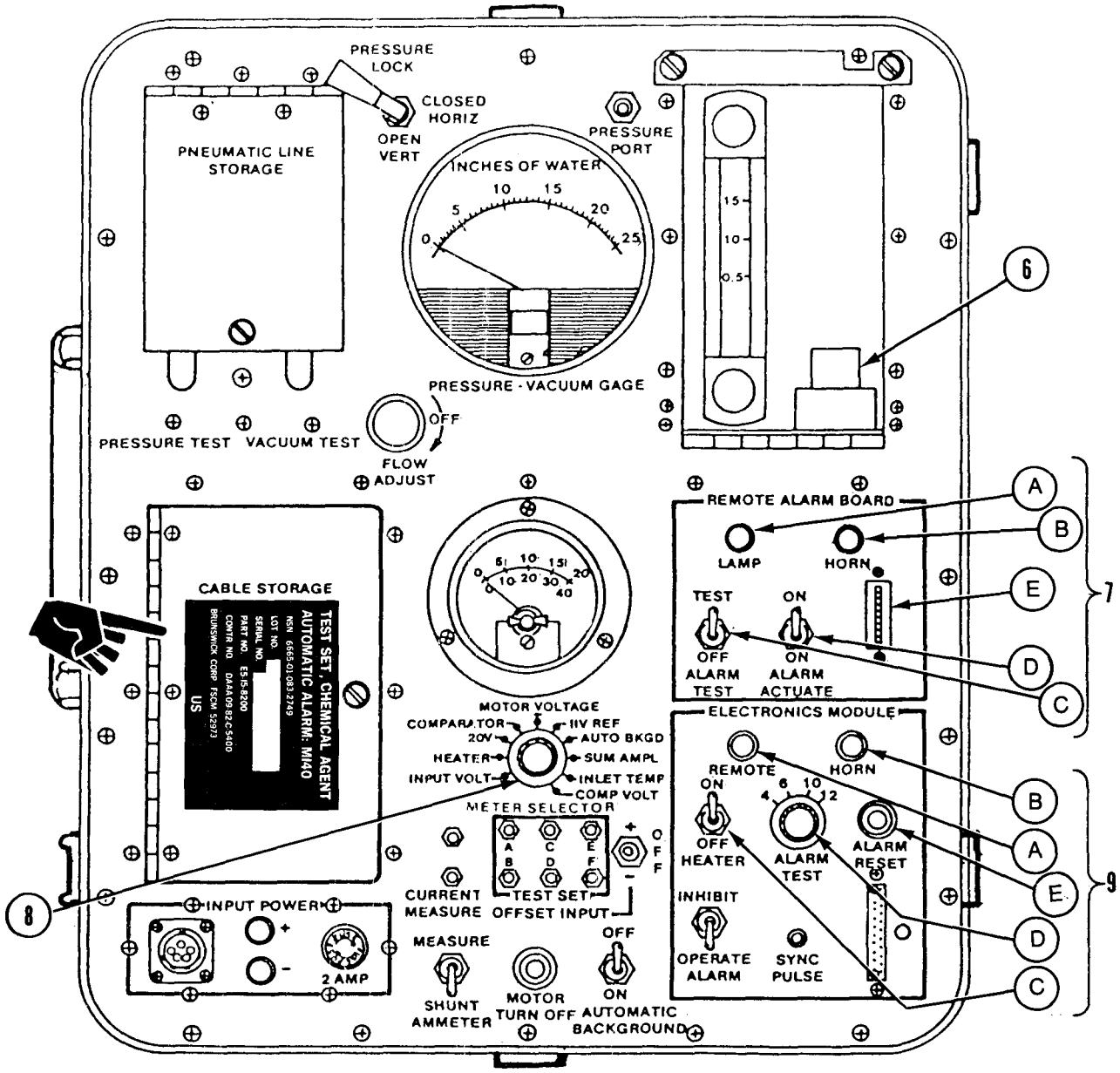
CHAPTER OVERVIEW.

The purpose of this chapter is to familiarize you with specific operator/test set equipment interfaces. You will be instructed in Preventive Maintenance Checks and Services (PMCS) and how to check out the test set.

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

2-1 OPERATOR CONTROLS AND INDICATORS.

Key	Control or Indicator	Function
1	PNEUMATIC LINE STORAGE	Storage compartment for vacuum and pressure tubing.
2	PRESSURE LOCK	Controls flow of air pressure from pump and bellows to M43A1 Detector air inlet.
3	PRESSURE-VACUUM GAGE	Indicates measurement of pressure or vacuum in inches of water.
4	PRESSURE PORT	Attachment point for bellows and pump.
5	FLOWMETER	Graduated scale measuring airflow. Used during vacuum pump unit, RE test and adjustment.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CLOSED HORIZ
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PNEUMATIC LINE STORAGE
PRESSURE PORT
INCHES OF WATER
PRESSURE - VACUUM GAGE
PRESSURE TEST
VACUUM TEST
OFF
FLOW ADJUST
CABLE STORAGE
TEST SET, CHEMICAL AGENT AUTOMATIC ALARM: MI40
MOTOR VOLTAGE
COMPARATOR
20V
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INPUT VOLT
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AUTO BKGD
SUM AMPL
INLET TEMP
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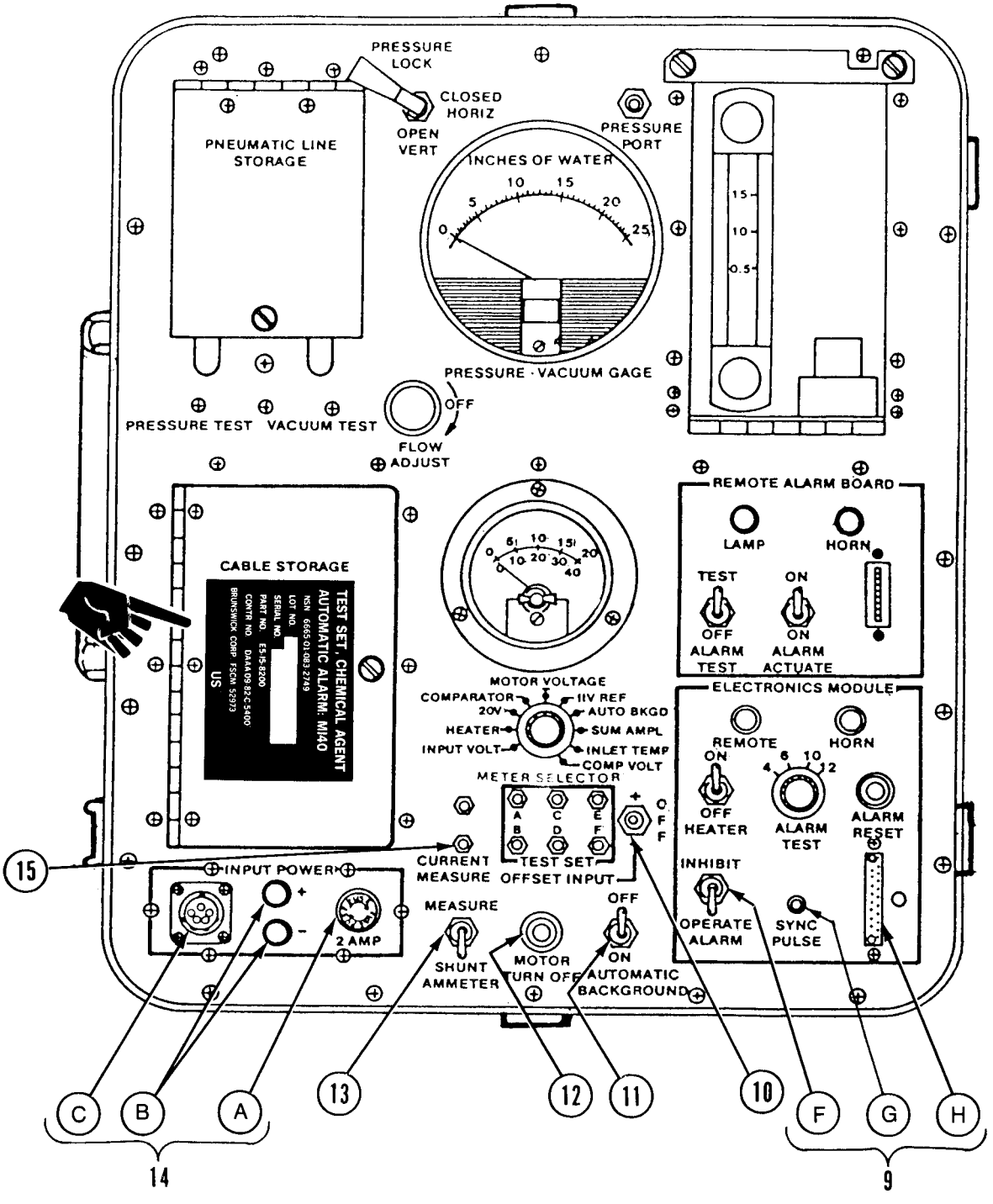
ELECTRONICS MODULE
REMOTE
HORN
ON
OFF HEATER
ALARM TEST
ALARM RESET
INHIBIT
OPERATE ALARM
SYNC PULSE
6
7
8
9
A
B
C
D
E

2-1 OPERATOR CONTROLS AND INDICATORS (CONT).

Key	Control or Indicator	Function
6	Flowmeter port	Used during flowmeter and pneumatic test of M43A1 detector.
7	REMOTE ALARM BOARD	Checks circuit card assembly of M42 alarm unit.
	A. LAMP	Indicates M42 alarm unit circuit board assembly is operational.
	B. HORN (test light only)	Indicates M42 alarm unit circuit board assembly is operational.
	c. ALARM TEST switch	Activates horn and light circuit of M42 alarm unit circuit card assembly.
	D. ALARM ACTUATE SWITCH	When set to ON applies a simulated alarm signal to the M42 alarm circuit card assembly.
	E. Receptacle connector	Receives M42 circuit card assembly.
8	METER SELECTOR switch	Rotary switch for selecting operations of ammeter.
9	ELECTRONICS MODULE	
	A. REMOTE lamp	Monitor output of M43A1 detector electronic amplifier trigger circuit for the M42 alarm unit.
	B. HORN lamp	Monitors output of the M43A1 detector, electronic amplifier trigger circuit, which triggers the circuit for the horn.
	C. HEATER switch	Checks air inlet heater circuit of the M43A1 electronic amplifier.
	D. ALARM TEST switch	Used to self-test the alarm test circuit in the test set with extender board.
	E. ALARM RESET switch	When pressed indicates electronic amplifier circuits are operational.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PRESSURE TEST
VACUUM TEST
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CABLE STORAGE
TEST SET, CHEMICAL AGENT AUTOMATIC ALARM: M14O
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COMPARATOR
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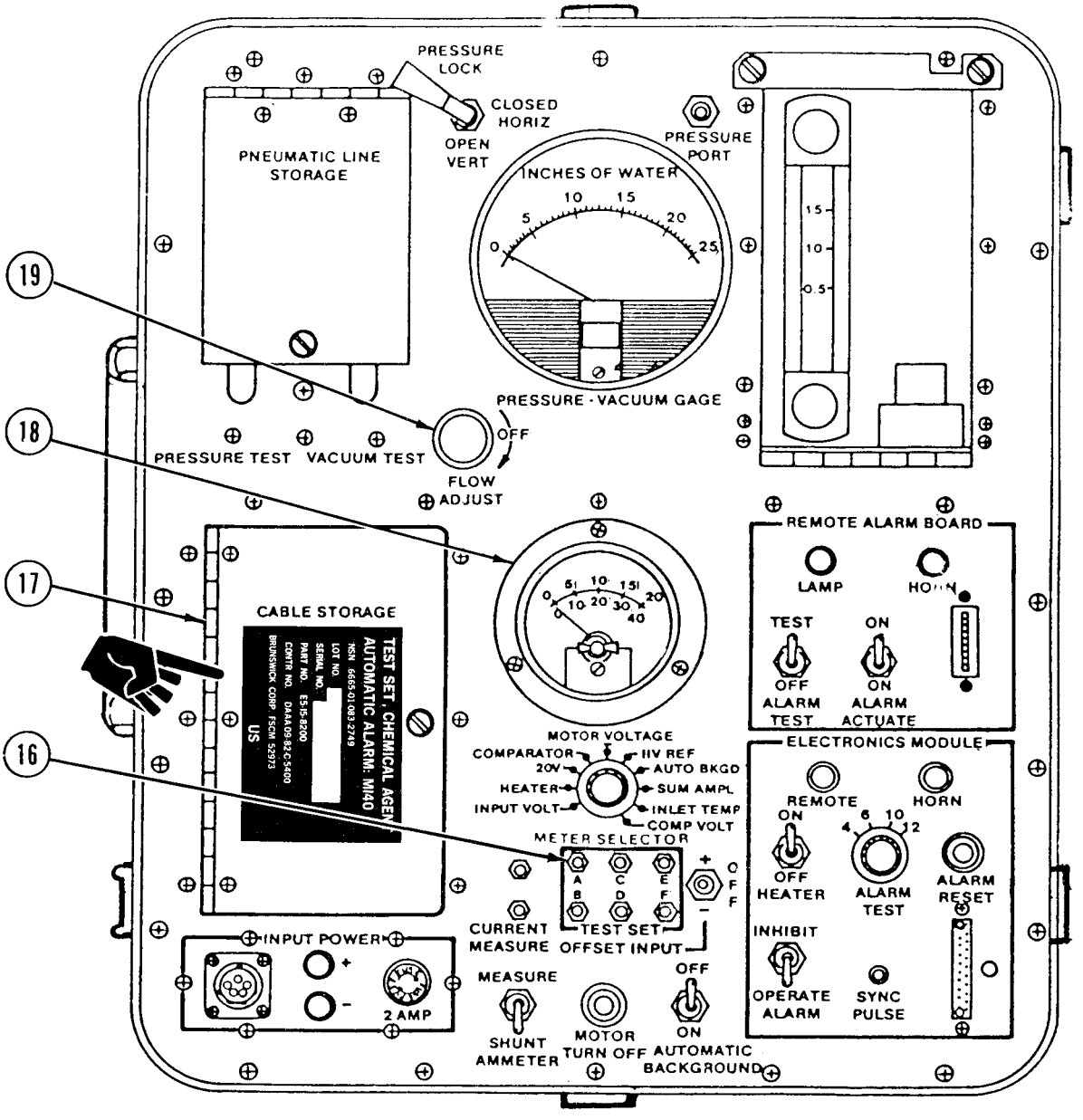
HEATER
INPUT VOLT
11V REF
AUTO BKGD
SUM AMPL
INLET TEMP
COMP VOLT
METER SELECTOR
ELECTRONICS MODULE
REMOTE
HORN
OFF HEATER
ALARM TEST
ALARM RESET
INHIBIT
OPERATE ALARM
SYNC PULSE
CURRENT MEASURE
TEST SET OFFSET INPUT
INPUT POWER
2 AMP
MEASURE
SHUNT AMMETER
MOTOR TURN OFF
OFF
ON AUTOMATIC BACKGROUND
15
C
B
A
13
12
11
10
F
G
H
14
9

2-1 OPERATOR CONTROLS AND INDICATORS (CONT).

Key	Control or Indicator	Function
	F. ALARM switch	Inhibits or permits operation of electronic amplifier alarm circuits.
	G. SYNC PULSE lamp	Flashes 6 times ± 1 in 10 seconds when current is "in phase" during test of M43A1 detector.
	H. Receptacle connector	Receives extender board and M43A1 detector electronic amplifier.
10	OFFSET input switch	Used to check offset input circuits in cell module of M43A1 detector.
11	AUTOMATIC BACKGROUND switch	Used to test automatic background circuit in M43A1 detector.
12	MOTOR TURN-OFF switch	Used to stop and start M43A1 detector vacuum pump unit, RE motor during pump test.
13	AMMETER switch	Controls input to ammeter: SHUNT or MEASURE.
14	INPUT POWER	
	A. 2-AMP fuse	Protects electronics component board against short circuits.
	B. Binding posts	To hook up variable external power supply for testing the test set.
	C. Receptacle connector	Receives power plug from battery, M10 power supply, or M10A1 power supply.
15	CURRENT MEASURE	Tip jacks to receive multimeter probes for measurement of current.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PRESSURE LOCK
CLOSED HORIZ
OPEN VERT
PNEUMATIC LINE STORAGE
PRESSURE PORT
INCHES OF WATER
PRESSURE - VACUUM GAGE
PRESSURE TEST
VACUUM TEST
OFF
FLOW ADJUST
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TEST SET, CHEMICAL AGENT AUTOMATIC ALARM: M43
MOTOR VOLTAGE
COMPARATOR
20V
HEATER
INPUT VOLT
IIV REF
AUTO BKGD
SUM AMPL
INLET TEMP
COMP VOLT
METER SELECTOR
CURRENT MEASURE
TEST SET OFFSET INPUT
OFF
INPUT POWER
2 AMP
MEASURE
SHUNT AMMETER
MOTOR TURN OFF
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OFF ALARM TEST
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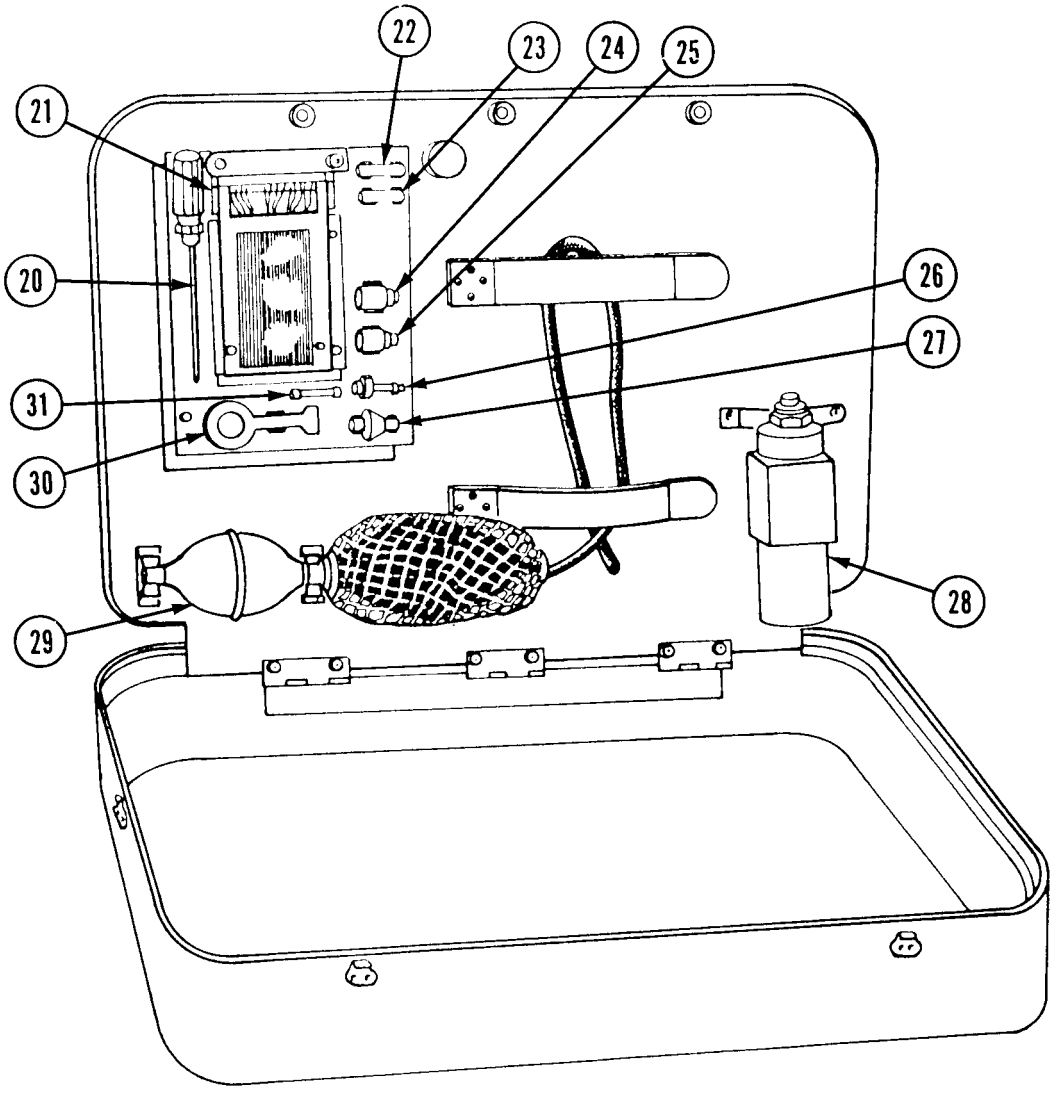
ELECTRONICS MODULE
REMOTE
HORN
ON
OFF HEATER
ALARM TEST
ALARM RESET
INHIBIT
OPERATE ALARM
SYNC PULSE

2-1 OPERATOR CONTROLS AND INDICATORS (CONT).

Key	Control or Indicator	Function
16	TEST SET	Set of six tip jacks used with the multimeter to make internal functional checks within the test set.
17	CABLE STORAGE	Storage compartment for cables required to test M43A1 detector: CHASSIS test cable, PUMP cable, DETECTOR power cable, INLET TEMP cable.
18	Ammeter	Used with METER SELECTOR switch (8) for reading various operating parameters for different circuits within the M43A1 detector.
19	FLOW ADJUST valve	Adjusts flow of air through test set to M43A1 detector during pneumatic testing.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2-1 OPERATOR CONTROLS AND INDICATORS (CONT)

Key	Control or Indicator	Function
20	Ball end hex drive wrench	Used for removal and replacement tasks in M43A1 detector.
21	Extender board	Used for testing electrical circuits of test set.
22	Airflow stop	Used to plug nonmetallic tubing assemblies during vacuum test.
23	Nonmetallic tubing	Used to connect pressure and vacuum nonmetallic tubing assemblies to M43A1 detector.
24	Cell plug cap (nonmetallic)	Used to block port on M32A1 detector cell module.
25	Plug cap (metallic)	Used to block port of M43A1 detector vacuum pump unit, RE
26	Rain shield adapter	Fits into air inlet of M43A1 detector to hold rain shield.
27	Meter adapter	Plugs flowmeter port (next to flowmeter) for self-testing test set.
28	Gas-particulate filter	Used during benchtesting of M43A1 detector to remove environmental contaminates found in shop environment.
29	Bellows and pump	Used to apply pressure or vacuum to test set or M43A1 detector.
30	Inlet port adapter	Used during pressure test of M43A1 detector,
31	Cartridge fuse	Spare 2-AMP fuse for test set.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-2 GENERAL.

Before You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before (B) PMCS.

b. While You Operate, Always keep in mind the CAUTIONS and WARNINGS. Perform your during (D) PMCS.

c. After You Operate. Be sure to perform your after (A) PMCS.

d. If Your Equipment Fails to Operate. Report any deficiencies using the proper forms. See DA PAM 738-750, (TAMMS) as contained in the maintenance management update.

2-3 PMCS Procedures.

a. Your preventive maintenance checks and services table 2-1 lists the inspections and care of your equipment required to keep it in good condition.

b. The item number column shows the numbered order the checks and services should be accomplished.

c. The interval column of your PMCS table tells you when to do a certain check or service.

d. The item to be inspected column lists the short nomenclature of the item to be checked.

e. The procedure column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions.

f. The equipment is not ready/available if column:

(1) Identify conditions that make the equipment not ready/available for readiness reporting.

(2) Deny use of the equipment until corrective maintenance has been performed.

TABLE 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - Before D - During A-After

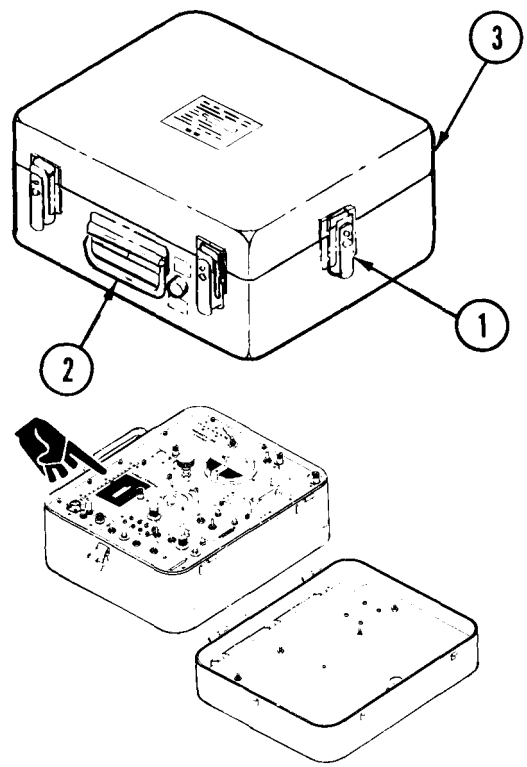
Item No.	Interval B	Interval D	Interval A	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
1	●			Case	Check for cracks or holes that would allow water to enter inside of case. Check for broken or missing Fasteners (1) Check for broken or missing Handle (2). Release four fasteners (1) and lift lid (3), slide off of hinges and lay aside. 	Case is damaged.

TABLE 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONT)

B - Before D - During A-After

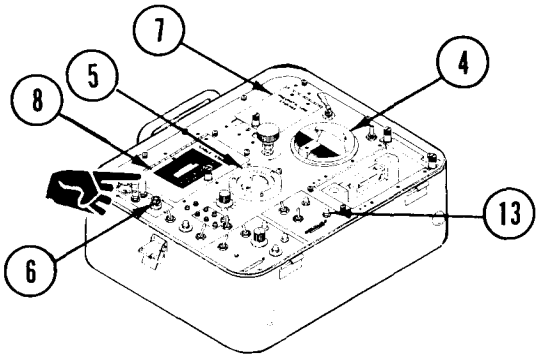
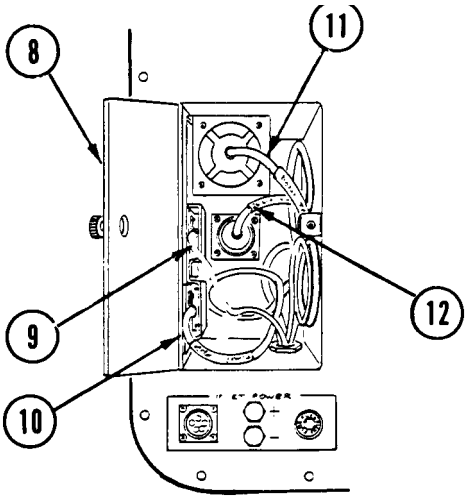
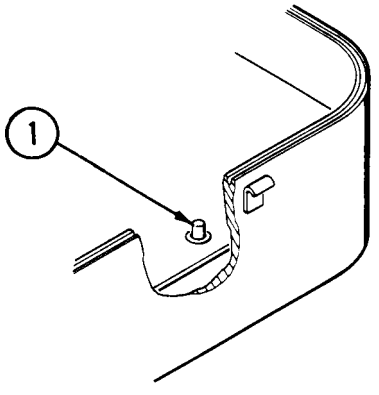
Item No.	Interval B	Interval D	Interval A	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment is Not Ready Available if:
2	●			PRESSURE-VACUUM GAGE and ammeter	Check PRESSURE-VACUUM GAGE (4) and ammeter (5) for broken or cracked glass.	PRESSURE-VACUUM GAGE or ammeter are damaged.
3	●			Cartridge fuse	Unscrew top of fuse holder (6). Check for missing, burnt, or cracked fuse. If fuse is damaged or missing, replace with on-board spare fuse. 	
4	●		●	Light lens and Incandescent	Check for missing lens and lamp (13). Check for cracked lens.	Light lens and lamp missing.
5	●			Pressure and Vacuum Nonmetallic Tubing Assemblies	Open Cover (7). Check nonmetallic tubing assemblies for splits or cracks. Close cover (7).	Nonmettalic Tubing assemblies cracked or split

TABLE 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before D - During A - After

Item No.	Interval B	Interval D	Interval A	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
						
6	●			Electrical Cables	Open cover (8). Check that four cables (9), (10), (11), and (12) are present. Close cover (8).	Cable is missing.
7	●		●	Accessories:	Push in and release three fasteners (1) and open accessory shelf. 	Any of the accessories are damaged or missing

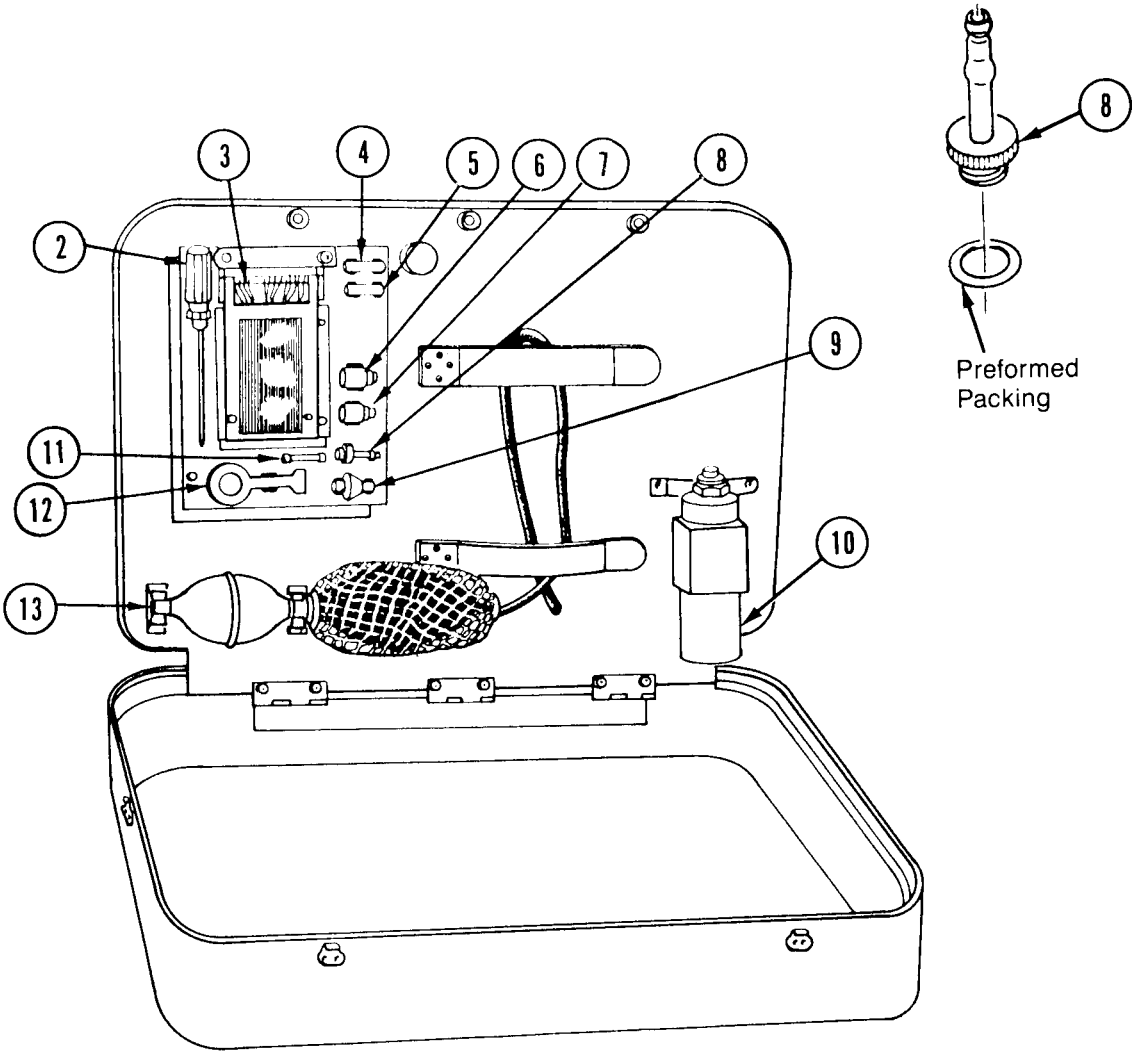

2
3
4
5
6
7
8
9
10
11
12
13
8
Preformed
Packing

TABLE 2.1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONT).

B - Before D - During A - After

Item No.	Interval B	Interval D	Interval A	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
	●		●	Accessories: Ball end hex drive wrench	(Cont) Check for missing or broken ball end hex drive wrench (2)	
				Extender board	Check for missing extender board (3) or cracked printed circuit card.	
				Airflow stop	Check for cracked or missing airflow stop (4)	
				Nonmetallic tubing	Check for cracked or missing nonmettalic tubing (5)	
				Cell plug cap	Check for cracked or missing cell plug cap (6)	
				Plug cap (metallic)	Check for missing plug cap (metallic) (7)	
				Rain shield adapter	Check for rain shield adapter (8) and cracked or missing preformed packing.	
				Meter adapter	Check for cracked or missing meter adapter (9)	
					WARNING **DO NOT throw away damaged or unusable filters as ordinary trash.** **DO turn in damaged or unusable filters to your hazardous waste management office or Defense Reutilization and Marketing Office (DRMO).**	
				Gas particulate filter	Check for cracked or missing particulate filter (10)	
				Cartridge fuse	Check for missing, burnt, or cracked cartridge fuse (11)	
				Inlet port adapter	Check for cracked or missing inlet port adapter (12)	
				Bellows and pump	Check for torn bellows, and missing or cracked pump (13) tubing.	

TABLE 2.1 OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONT).

B - Before D - During A - After

Item No.	Interval B	Interval D	Interval A	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
8	●			Test Set	Perform Functional Test para 3-4.	Malfunction is found.

CHAPTER 3

INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

CHAPTER 3

INTERMEDIATE DIRECT SUPPORT MAINTENANCE INSTRUCTIONS (CONT).

CHAPTER OVERVIEW

The purpose of this chapter is to instruct you in fault isolation and corrective maintenance procedures for the test set. You will learn to troubleshoot the test set using troubleshooting logic trees and remove and replace problem component(s). You will also learn to retest the test set to ensure its renewed operational readiness for use in testing other equipment in the M8A1 system of automatic chemical agent alarm.

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

3-1 COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-2 REPAIR PARTS.

Repair parts are listed and illustrated in appendix E of this manual.

Section II. SERVICE UPON RECEIPT

3-3 GENERAL.

This section provides information the maintenance technician needs to inspect and service the test set before issuing it to the operator.

a. Inspect equipment for cracks, dents, holes or corrosion incurred during shipment. If equipment has been damaged or has corrosion, report this on SF Form 364 Report of Discrepancy.

b. Check equipment against the packing slip to see if shipment is complete. Report all discrepancies in accordance with instructions of DA PAM 738-750 (TAM MS) as contained in the maintenance management update.

c. Upon receipt from Army supply system, perform inspection procedure in Table 3-1.

Table 3.1 Inspection Procedures

	Location	Item	Action	Remarks
1.	Exterior	Case (1)	Inspect for cracks, dents, holes or corrosion. Open PRESSURE EQUALIZER VALVE	
		Identification plate and instruction plates (2 and 3).	Check if missing or illegible	

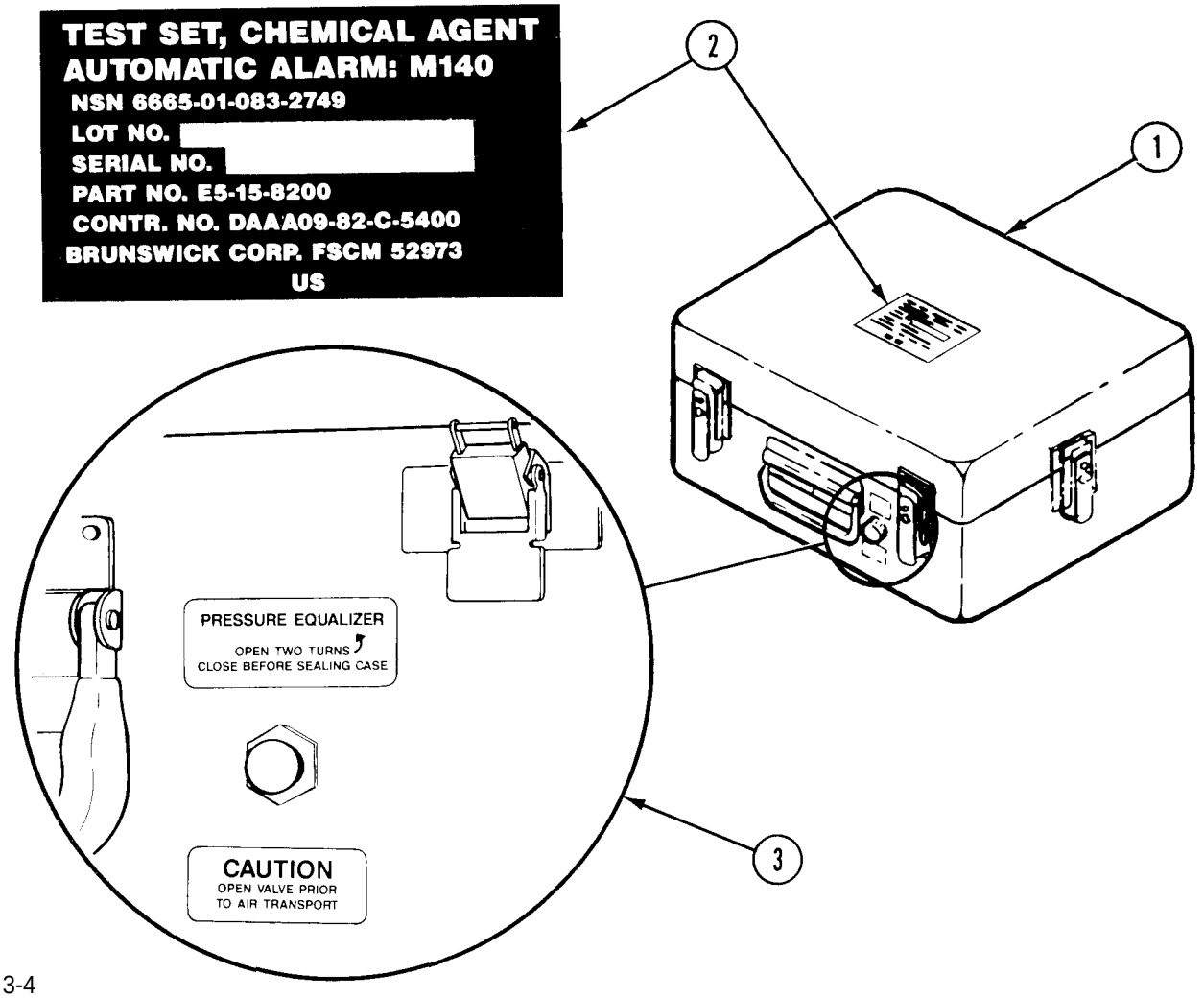
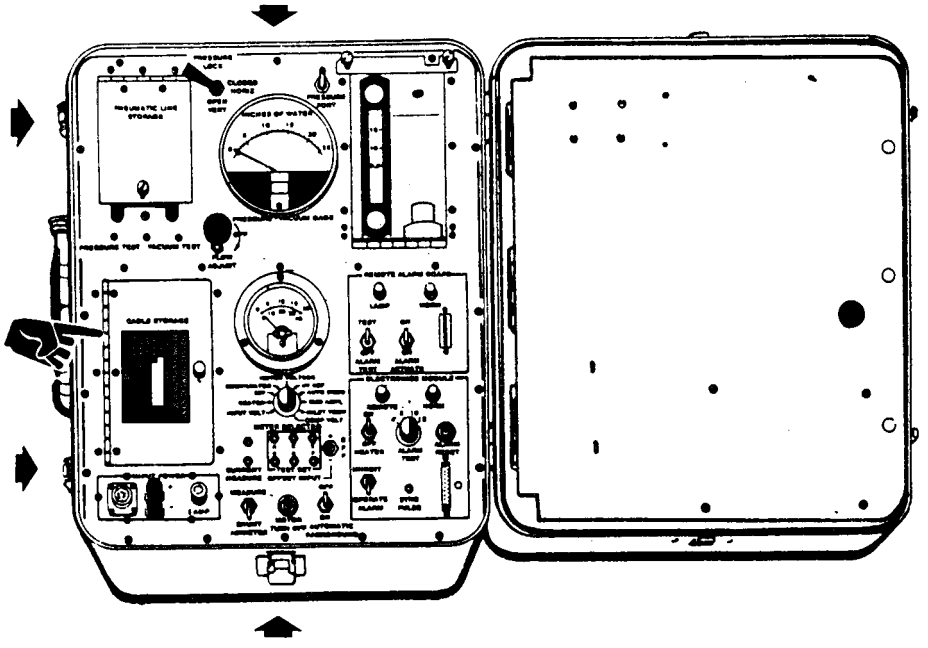


Table 3-1. Inspection Procedures

Location	Item	Action	Remarks
2.	Panel Assembly	Release four fasteners (1). Open case and slide lid from hinges (2).	



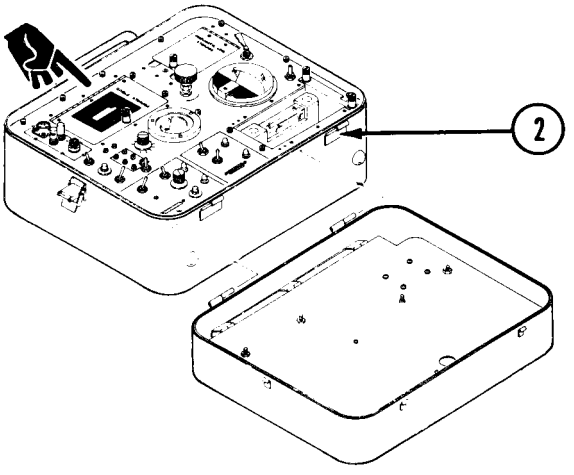


Table 3-1. Inspection Procedures

	Location	Item	Action	Remarks
2.	Panel assembly (cont)	a. PRESSURE VACUUM GAGE (3), ammeter (4), and flowmeter (5).	Check for cracks.	
		b. Flow adjust valve (6), ALARM TEST switch (7) and METER SELECTOR (8).	Check for cracks or missing knobs.	
		c. PNEUMATIC LINE STORAGE compartment (9).	(1) Open cover. (2) Check to see that VACUUM TEST hose and PRESSURE TEST hose are not split or cracked. (3) Close cover.	

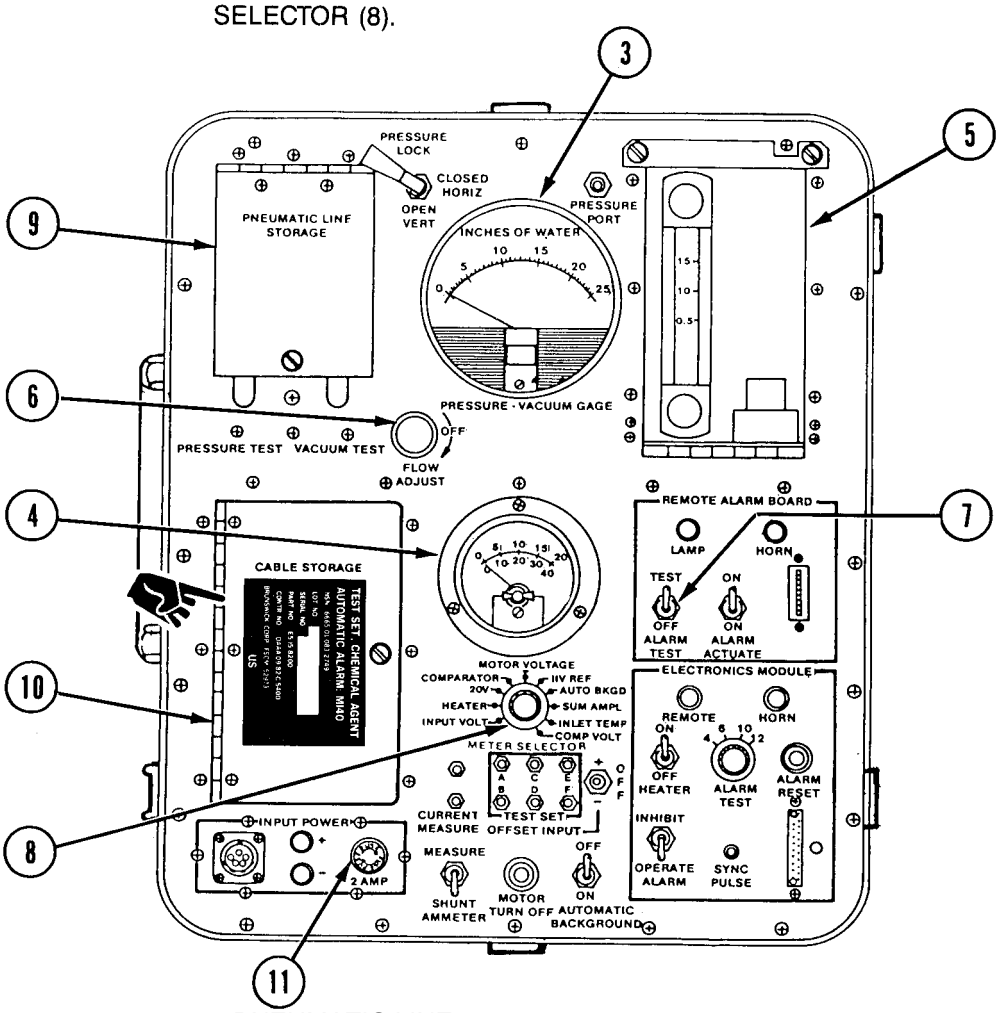
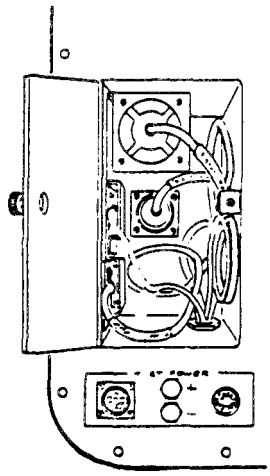


Table 3.1 Inspection Procedures

	Location	Item	Action	Remarks
2.	Panel assembly	d. CABLE STORAGE compartment (10).	(1) Open cover. (2) Check to see that it contains: • Temperature sensor (INLET TEMP) cable • Branched electrical special purpose cable assembly (PUMP POWER) • Branched electrical power cable assembly (DETECTOR POWER) • Branched electrical special purpose cable assembly (CHASSIS TEST) (3) Close cover.	
		e. 2-AMP fuse holder (11).	(1) Unscrew fuse holder and check if fuse is present and is 2 amps. (2) Replace fuse and fuseholder.	
3.	Lid	Accessory storage compartment.	(1) Depress and release three latches (12). (2) Open accessory storage compartment.	



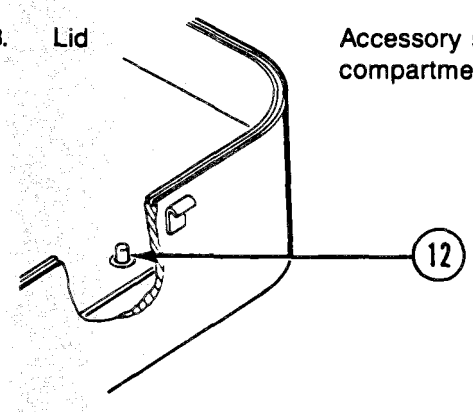
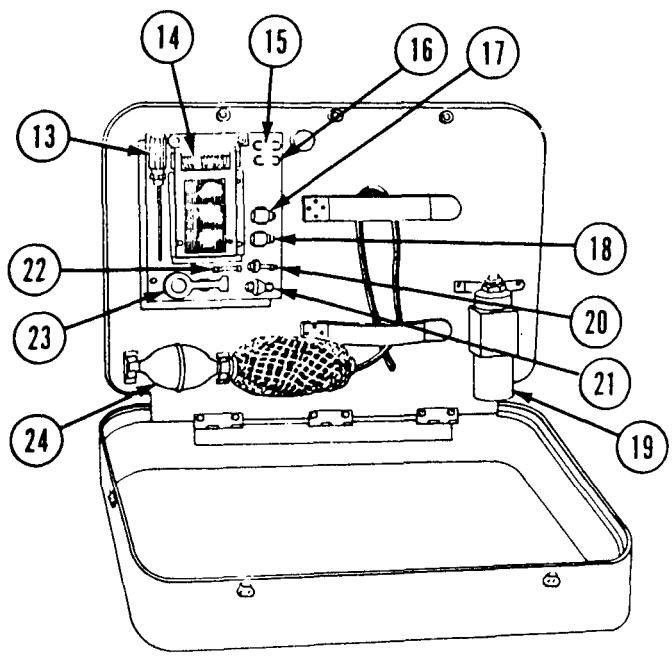


Table 3-1 Inspection Procedures

Location	Item	Action	Remarks
4. Accessory storage compartment	Accessories.	(1) Inspect for missing or broken accessories: Ball end hex drive wrench (13) Extender board (14) Airflow stop (15) Nonmetallic tubing (16) Cell plug cap assembly (17) Plug cap assembly (18) (metallic) Gas particulate filter (19) Rain shield adapter (20) Meter adapter (21) Cartridge fuse (22) Inlet port adapter (23) Bellows and pump (24) (2) Close accessory storage compartment. (3) Slide lid on hinges (2) and secure with four fasteners (2).	



Section III. FUNCTIONAL TEST

3-4 INTRODUCTION.

a. The functional test procedures, Table 3-2 test for failures most common to the test set.

b. The functional test procedures must be completed before referring to Section IV on Troubleshooting in order to isolate the malfunctioning component.

c. If the troubleshooting logic tree does not lead to the correction of the malfunction, refer to Continuity and Voltage Checks (para 3-8) located immediately after the troubleshooting logic tree. Use schematic diagrams FO-1 and FO-2 to assist in making voltage and continuity checks.

d. The following tools and equipment are needed:

(1) Multimeter
(2) variable power supply
(3) Six test leads
(4) Stopwatch
(5) M10 or M10A1 or BA3517/U dry battery

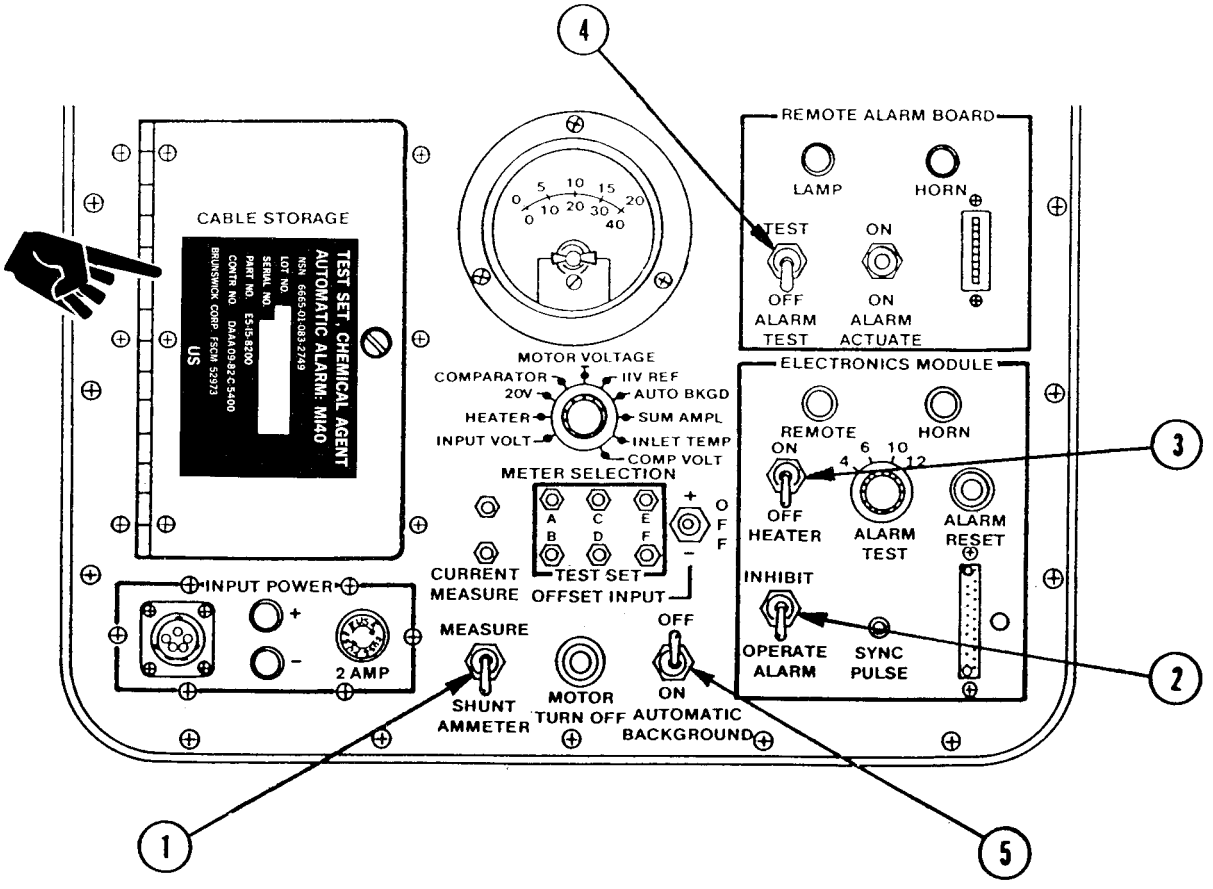
WARNING

DEATH OR SERIOUS INJURY MAY RESULT FROM FAILURE TO OBSERVE SAFETY PRECAUTIONS WHEN PERFORMING FUNCTIONAL TEST PROCEDURES.

3-5 FUNCTIONAL TEST PROCEDURES.

a. Place the test set switches in position as follows:

(1) Ammeter to SHUNT
(2) Alarm to OPERATE
(3) Heater to OFF
(4) Alarm test to OFF
(5) Automatic Background to OFF



3-5 FUNCTIONAL TEST PROCEDURES.

b. Connect power source to test set INPUT POWER connector.

NOTE

When you use a M10 Power Supply, refer to para 1, M10A1 Power Supply, para 2, and BA3517/U Dry Battery go to para 3.

(1) M10 Power Supply.

(a) Make sure power switch (1) is in the OFF position,

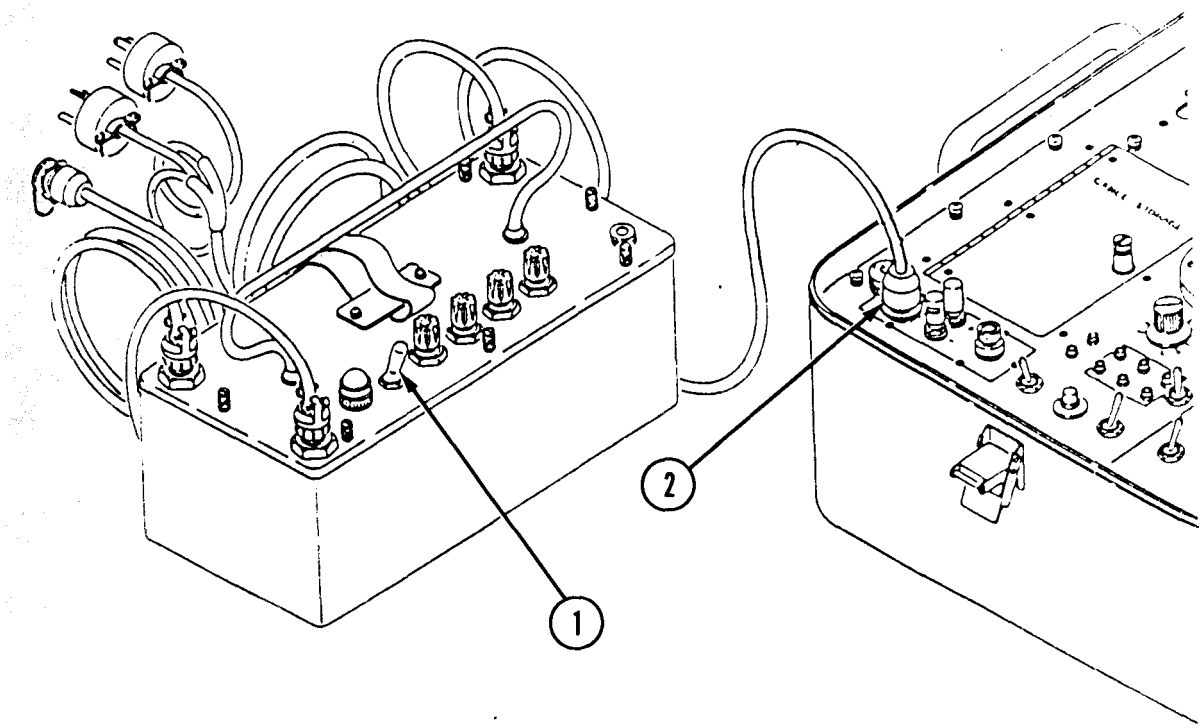
(b) Connect either the 115 volt connector or the 220 volt connector to an AC power source.

(c) Connect detector power cable to set INPUT POWER connector (2).

WARNING

DISCONNECT THE M10 POWER SUPPLY FROM THE POWER SOURCE BEFORE REMOVING THE CARTRIDGE FUSES TO PREVENT POSSIBLE DEATH OR SERIOUS INJURY TO PERSONNEL.

(d) Set power switch (1) on Power Supply to agree with the AC power source used.



3-5 FUNCTIONAL TEST PROCEDURES (CONT).

(2) M10A1 Power Supply.

(a) Place power switch (1) in OFF position.

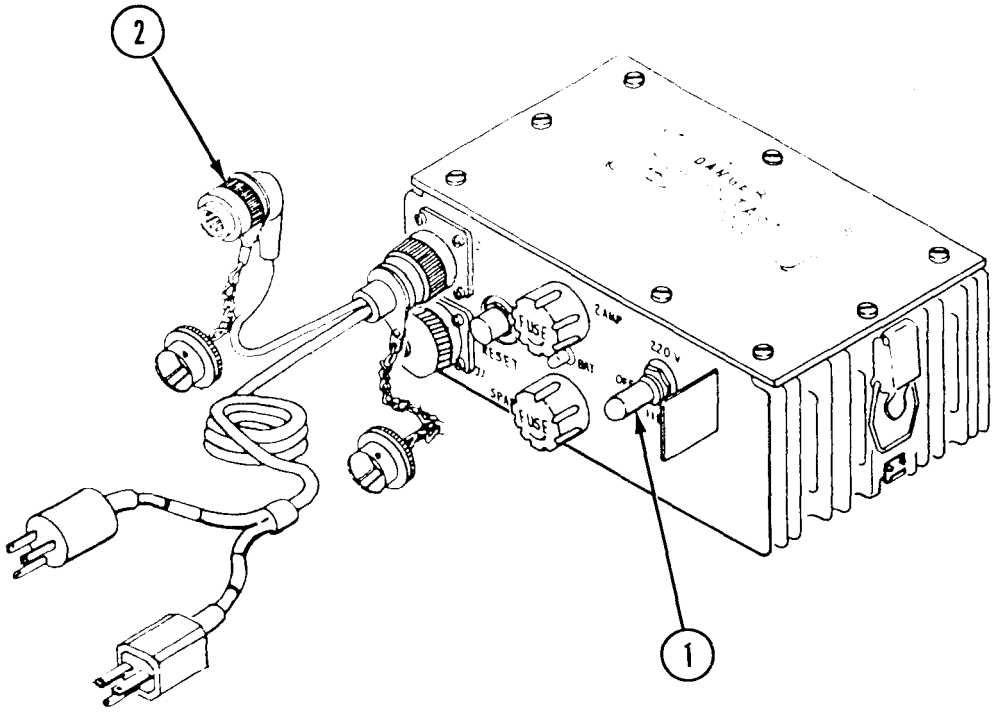
(b) Connect either the 115 volt connector or the 220 volt connector to an ac power source,

(c) Connect cable (2) to test set INPUT POWER connector.

(d) Set power switch (1) on power supply to agree with the ac power source used.

WARNING

DISCONNECT THE M10A1 POWER SUPPLY FROM THE POWER SOURCE BEFORE REMOVING THE CARTRIDGE FUSES TO PREVENT POSSIBLE DEATH OR SERIOUS INJURY TO PERSONNEL.

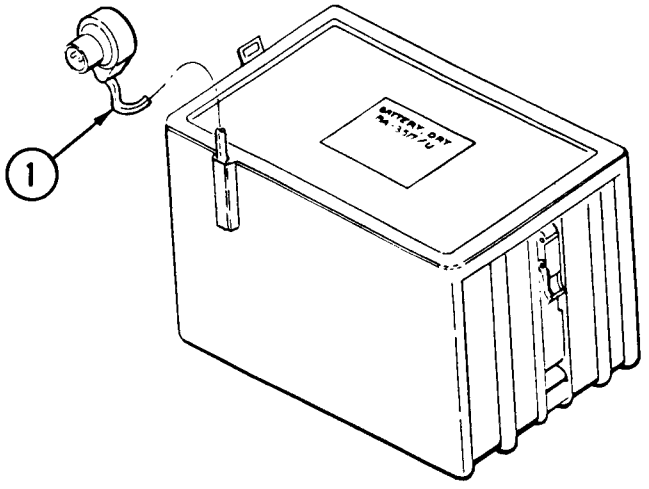


3-5 FUNCTIONAL TEST PROCEDURES.

(3) BA3517/U Dry Battery.

(a) Attach battery cable (1) plug to INPUT POWER receptical connector (2) test set (3).

c. Perform Functional Test procedures in table 3-2.



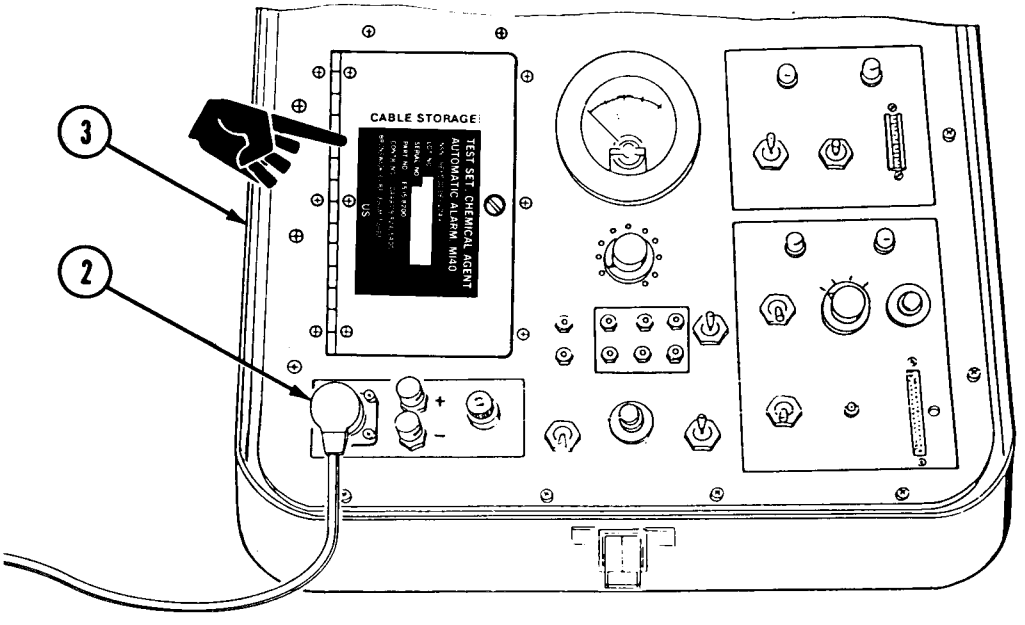
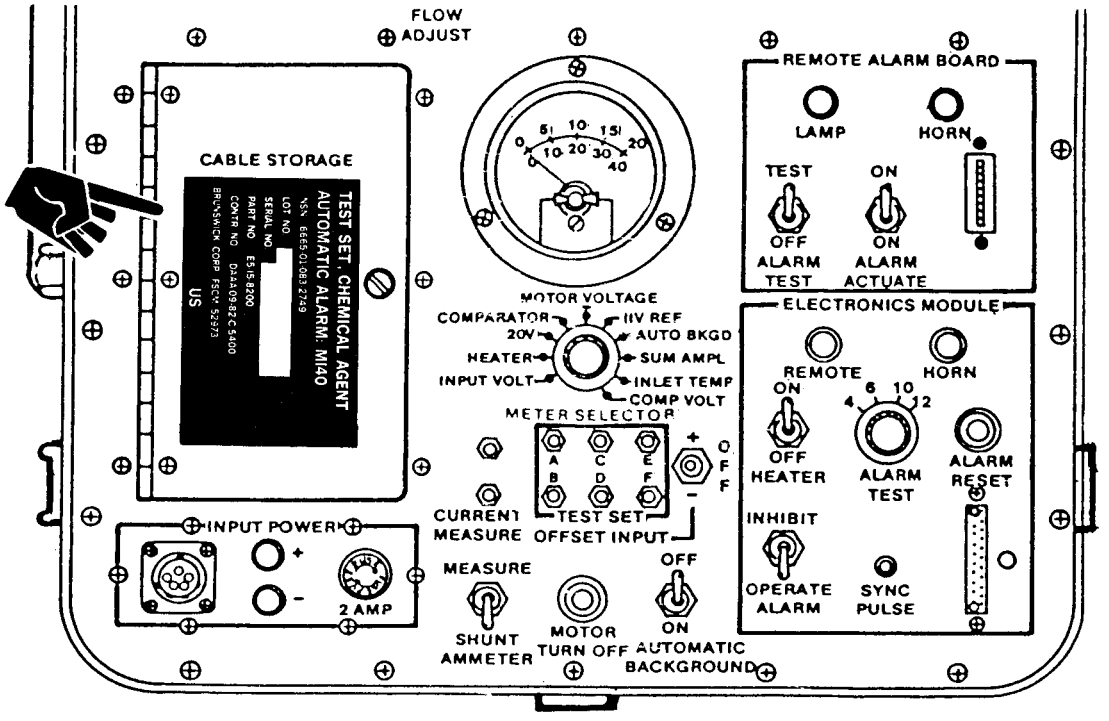


Table 3-2. Functional Test Proceudres

Test No.	Test	Procedure
1	Input Voltage	a. Set test set METER SELECTOR switch to INPUT VOLT position.



b. Read ammeter. If it reads between 24 and 36 volts on the 40 volt (blue) scale, continue testing. If it does not, refer to Troubleshooting paragraph 3-7.1.

c. Power OFF.

Table 3-2. Functional Test Procedures (Cont.)

Test No.	Test	Procedure
2	Nuclear Compensating Circuit Test	a. Set test set METER SELECTOR switch to COMP VOLT position. b. Open CABLE STORAGE compartment and remove CHASSIS TEST and DETECTOR POWER cables. c. ON CHASSIS TEST connector install a jumper wire between pin 8 and Pin 14, and a jumper wire between pin 1 and pin 7. d. Install jumper wire on CHASSIS TEST connector pin 1 to DETECTOR POWER cable connector pin B. e. Power ON. f. Move OFFSET INPUT switch to(+) position and hold.

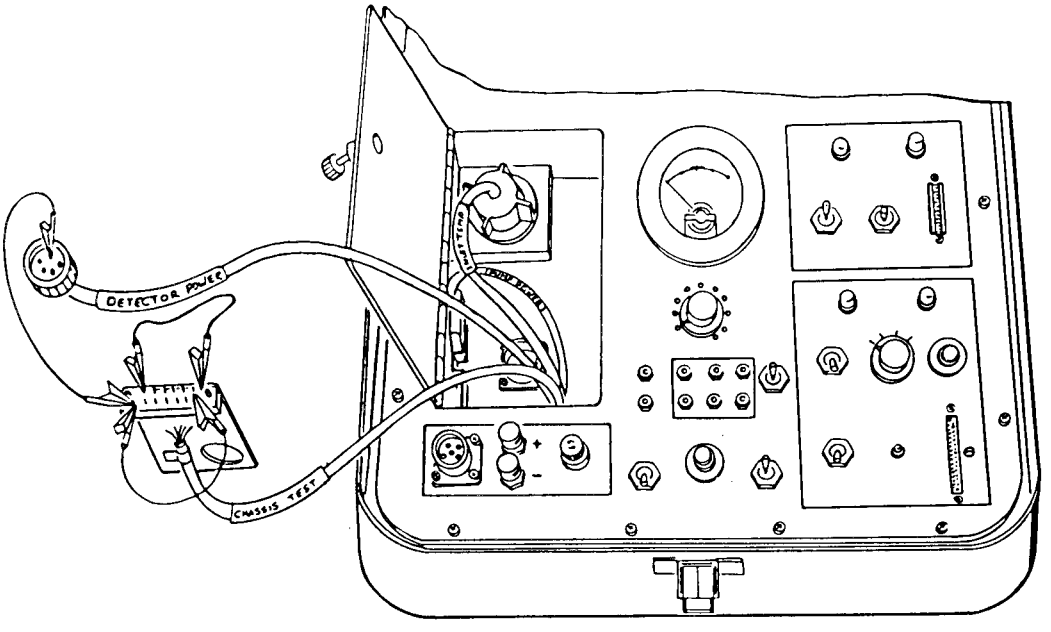


Table 3-2. Functional Test Procedures (Cont)

Test No.		Procedure
2	Nuclear Compensating Circuit Test (cont)	g. Read ammeter. If the meter reads between 12 and 16 volts dc on the 20 volt (green) scale, continue testing. If not, refer to Troubleshooting paragraph 3-7-4.
		h. Release OFFSET INPUT switch. Ammeter will return to zero. If not, refer to Troubleshooting paragraph 3-7-4.
		i. Power OFF.
		j. Remove jumper wires.
		k. Return cables to CABLE STORAGE compartment. Close and secure door.

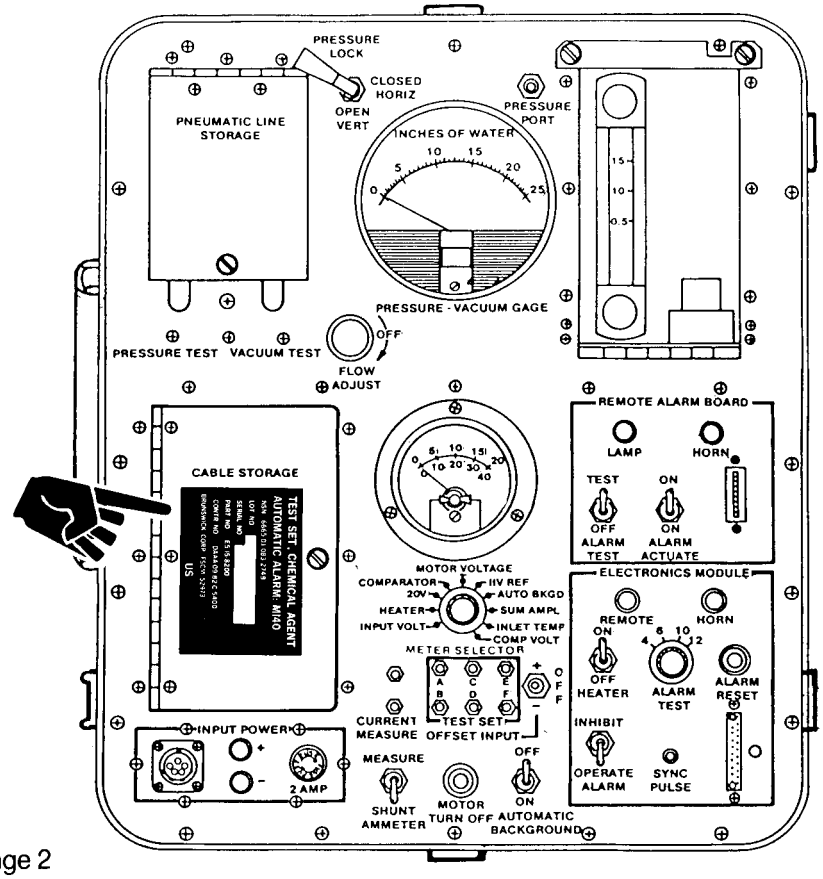
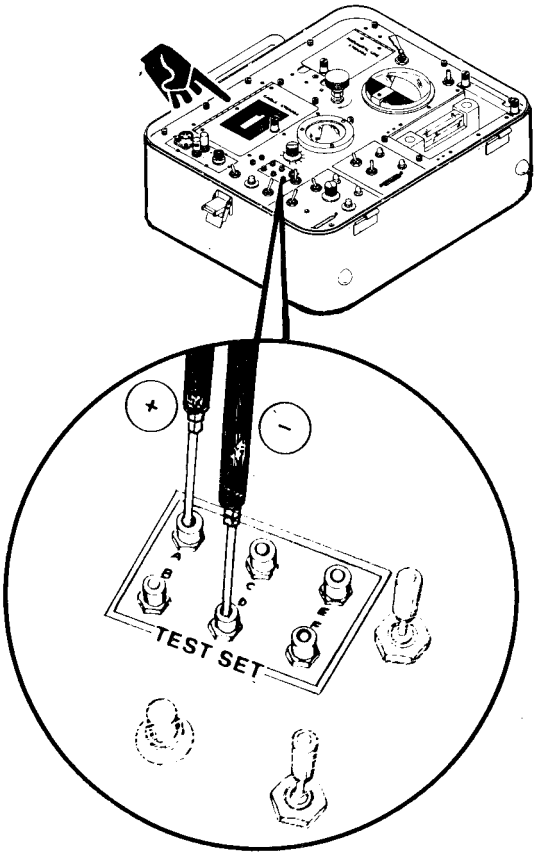


Table 3-2. Functional Test Procedures (Cont)

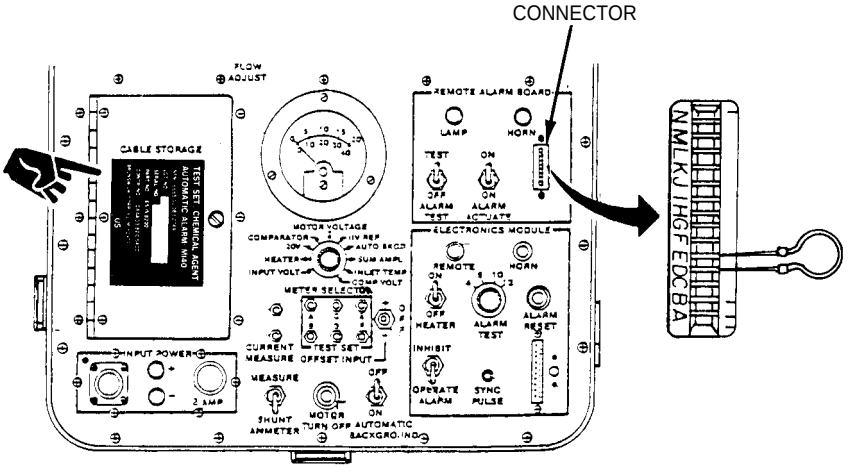
Test No.	Test	Procedure
	11 volt supply	a. Set multimeter to 50 volt dc scale.
		b. Connect multimeter positive (red) lead to test point A and negative (black) lead to test point D.



		c. Power ON,
		d. Read multimeter. If it reads between 10 and 12 volts, continue testing. If it does not, refer to Troubleshooting, paragraph 3-7.4.
		e. Power OFF.

Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
4	Remote Alarm Signal	a. Connect jumper wire between socket D and E of connector.



b. Disconnect multimeter positive (red) lead from test set, test point A.

c. Set multimeter to 10 volt dc scale.

d. Connect multimeter positive (red) lead to TEST SET test point B.

e. Power ON.

f. Read multimeter. If it reads between 4.5 and 6.5 volts, continue testing. If it does not, refer to Troubleshooting paragraph 3-7.4.

g. Power OFF.

h. Remove jumper wire and disconnect multimeter leads.

i. Disconnect cable from input power connector.

j. If used, unplug power supply from ac power source, and set aside.

Table 3-2. Functional Test Procedures

Test No.	Test	Procedure
5	11 V REF	NOTE 20 volts dc input power is required for this test using variable power supply. a. Unscrew and release clamp and remove extender board from accessory storage compartment of test set. b. Plug extender board into ELECTRONICS MODULE connector.

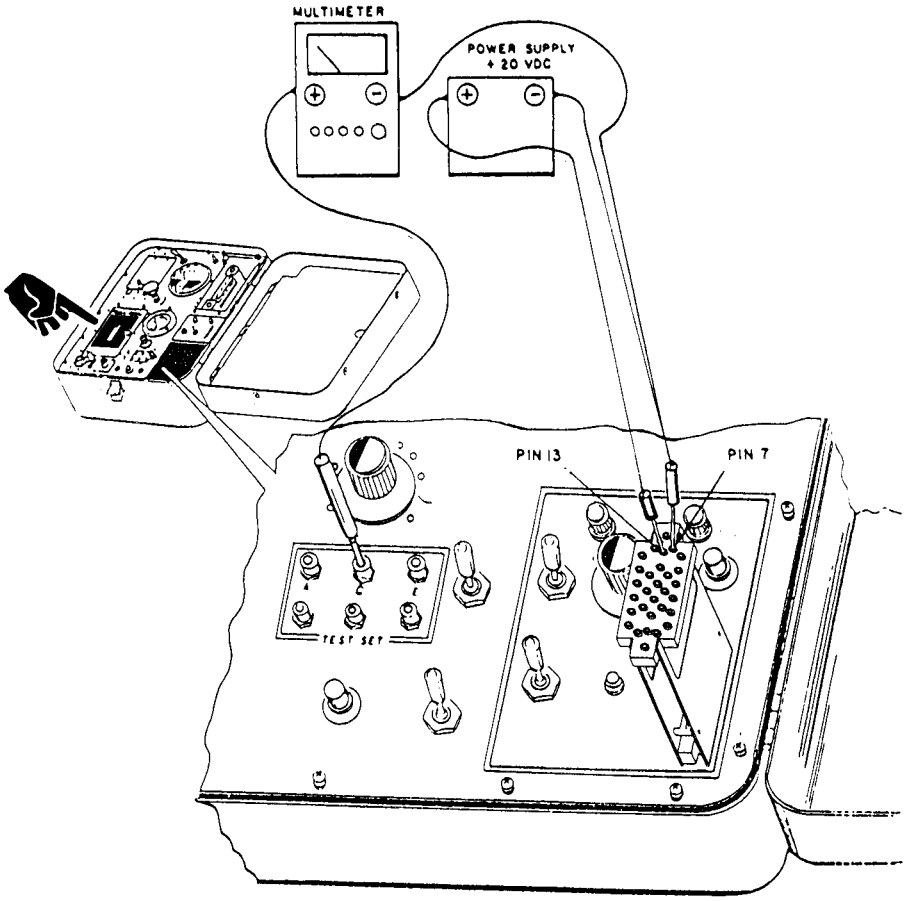
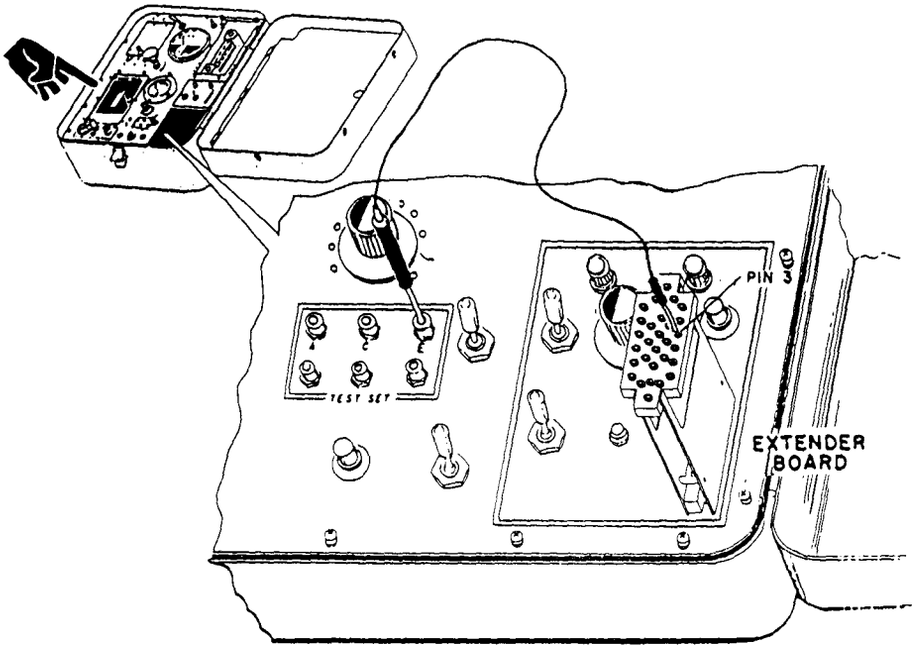


Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
5	11 V REF (cont)	c. Connect variable power supply positive (+) lead to socket 13 and connect (-) lead to socket 7 of the extender board.
		d. Set multimeter to 50 volt dc scale.
		e. Connect multimeter positive (red) lead to test point C.
		f. Connect variable power supply to power source.
		g. Turn variable power supply on and adjust to 20 volts.
		h. Touch multimeter negative (black) lead to socket 7 of extender board.
		i. Read multimeter. If it reads between 10.5 and 11.5 volts, continue testing. If it does not, refer to Troubleshooting paragraph 3-7.4.
		j. Power OFF.
		k. Disconnect variable power supply leads from sockets 7 and 13 of extender board.
		l. Remove multimeter and variable power supply leads.

Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
6	SYNC PULSE Lamp	NOTE This test requires INPUT POWER of 36 volts dc using variable power supply. a. Connect a jumper wire from test set test point E to socket 3 on extender board.



b. Connect variable power supply to INPUT POWER binding posts.

Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
6	SYNC PULSE Lamp (cont)	c. Adjust variable power supply to 36 volts dc.
		d. Count the number of flashes of SYNC PULSE lamp in a 10 second period. If the SYNC PULSE lamp flashes approximately 6 times ± 1 every 10 seconds, continue testing. If not, refer to Troubleshooting paragraph 3-7.3.
■		e. Power OFF.
		f. Disconnect jumper wire between test set point E and socket 3.

Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
7	5 Volts To ELECTRONICS MODULE	a. Connect multimeter positive (red) lead to socket 21 of extender board. b. Set multimeter to 10 volts dc scale. c. Connect multimeter negative (black) lead to socket 7 of extender board. d. Install a jumper wire between socket 7 of extender board and TEST SET test point D on front panel. e. Adjust variable power supply to 20 volts. f. Read multimeter. If it reads between 4.5 and 5.5 volts, continue testing. If not, refer to Troubleshooting paragraph 3-7.4. g. Disconnect variable power supply from input connectors on test set. h. Disconnect jumper wire.

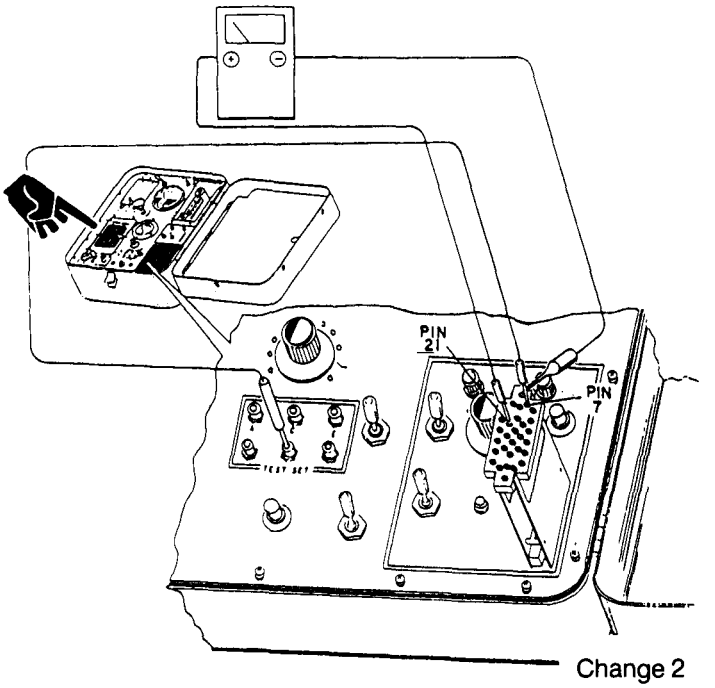


Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
8	Comparator Test	a. Set ALARM TEST switch to position 4. b. Set multimeter to 10 volts dc scale. c. Connect multimeter positive (red) lead to socket 26 of extender board. d. Connect variable power supply negative (black) (-) lead to socket 7 and Positive (red) (+) lead to socket 13 of extender board.

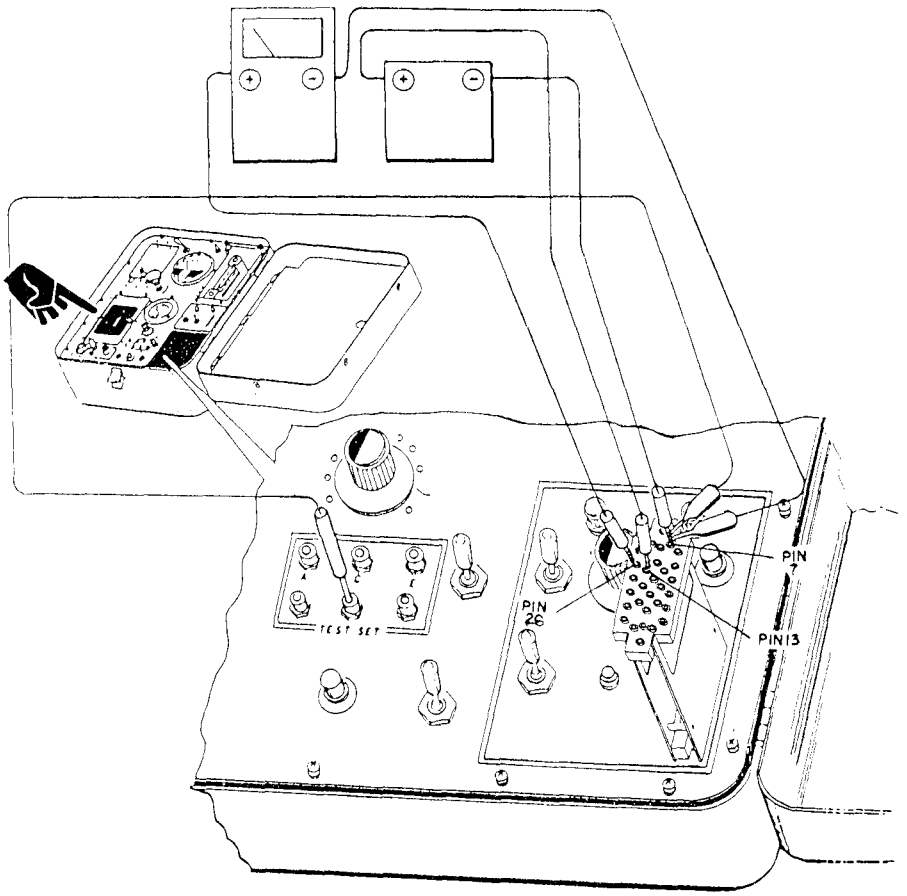


Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
8.	Comparator Test	e. Adjust variable power supply to 20 volts dc.
		f. Read multimeter. If it reads between 3.3 volts and 4.3 volts, continue testing. If not, refer to Troubleshooting paragraph 3-7.4.
		g. Rotate ALARM TEST switch to position 6.
		h. Read multimeter. If it reads between 5.6 volts and 6.6 volts, continue testing. If not, refer to Troubleshooting paragraph 3-7.4.
		i. Set multimeter to measure 50 volts dc scale.
		j. Rotate ALARM TEST switch to position 10.
		k. Read multimeter. If it reads between 9.4 volts and 10.4 volts, continue testing. If not, refer to Troubleshooting paragraph 3-7.4.
		1. Rotate ALARM TEST switch to position 12.
		m Read multimeter. If it reads between 11.6 volts and 12.6 volts, continue testing. If not, refer to Troubleshooting paragraph 3-7.4.
		n. Power OFF.
		o. Remove variable power supply leads from sockets 7 and 13 of extender board.
		p. Remove multimeter leads.
		q. Remove extender board and place in accessory shelf.

Table 3-2. Functional Test Procedures (Cont)

Test No.	Test	Procedure
9	Pressure Test	a. Open PNEUMATIC LINE STORAGE compartment door and pull out free ends of PRESSURE TEST tubing and VACUUM TEST tubing, b. Insert grommets into slots at lower edge of compartment. Close door.

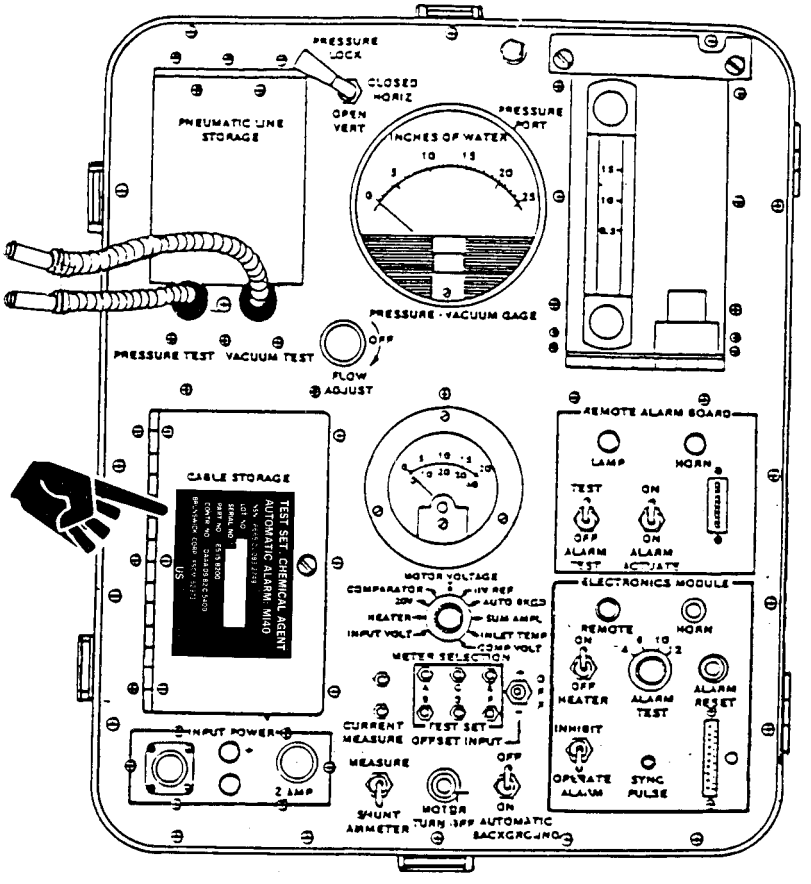


Table 3-2. Functional Test Procedures

Test No.	Test	Procedure
9	Pressure Test	c. Remove the following items from the accessory shelf: Airflow stop (1) Nonmetallic tubing (2) Meter adapter (3) Bellows and pump (4)

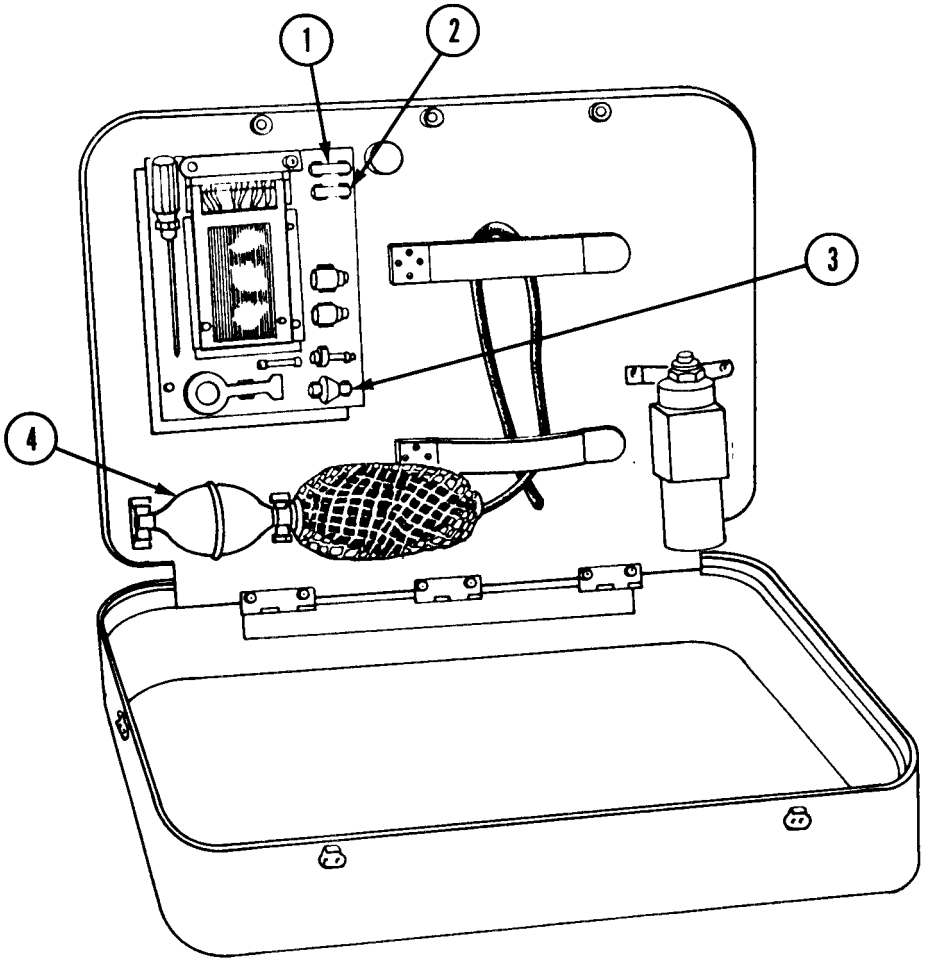
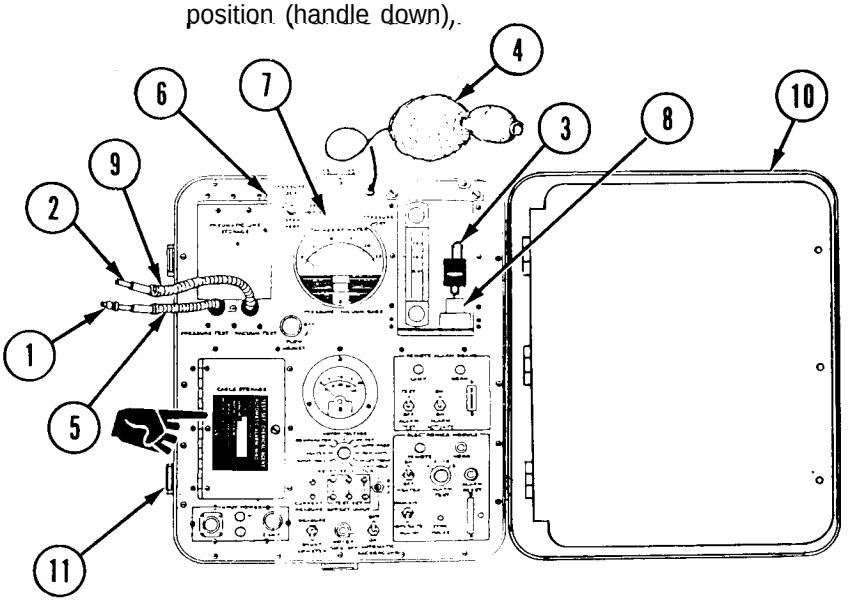


Table 3-2. Functional Test Procedures (Cont).

Test No.	Test	Procedure
9	Pressure Test (cont)	d. Plug PRESSURE TEST tubing (5) with Airflow stop (l).
		e. Connect bellows and pump (4) hose to PRESSURE PORT.
		f. Open PRESSURE LOCK valve (6) to VERT position (handle up).
		g. Operate bellows and pump (4) to obtain an indication of 15 inches of water on PRESSURE-VACUUM GAGE (7).
		h. Close PRESSURE LOCK valve (6) to HORIZ position (handle down).



		i. Observe PRESSURE-VACUUM GAGE (7). Reading should not drop more than 1 inch in 1 minute. If it does, refer to Troubleshooting paragraph 3-7.2.
		j. Plug flowmeter port (8) with meter adapter (3).

Table 3-2. Functional Test Procedures (Cont).

Test No.	Test	Procedure
9	Pressure Test	k. Insert nonmetallic tubing (2) into end of VACCUM TEST tubing (9). l. Disconnect bellows and Pump (4) from PRESSURE PORT and connect to nonmetallic tubing (2) on VACCUM TEST tubing (9). m. Operate bellows and pump (4) until PRESSURE-VACUUM GAGE (7) indicates 1 inch of water. The reading should not increase more than 1 inch in 1 minute. If it does, refer to Troubleshooting paragraph 3-7.2. n. Disconnect bellows and pump (4) from VACUUM TEST tubing (9) and store on accessory shelf. o. Remove nonmetallic tubing (2) from VACUUM TEST tubing (9) and store on accessory shelf. p. Open PRESSURE LOCK valve (6) to VERT positon (handle up). q. Remove airflow stop (1) from PRESSURE TEST tubing (5) and store on accessory shelf. r. Remove meter adapter (3) and store on accessory shelf. s. Secure accessory shelf. t. Remove grommets and return PRESSURE TEST tubing (5) and VACUUM TEST tubing (4) to PNEUMATIC LINE STORAGE compartment and secure door. u. Return PRESSURE LOCK valve (6) handle to HORIZ position (handle down), v. Slide Lid (10) onto hinges and secure with four fasteners (11).

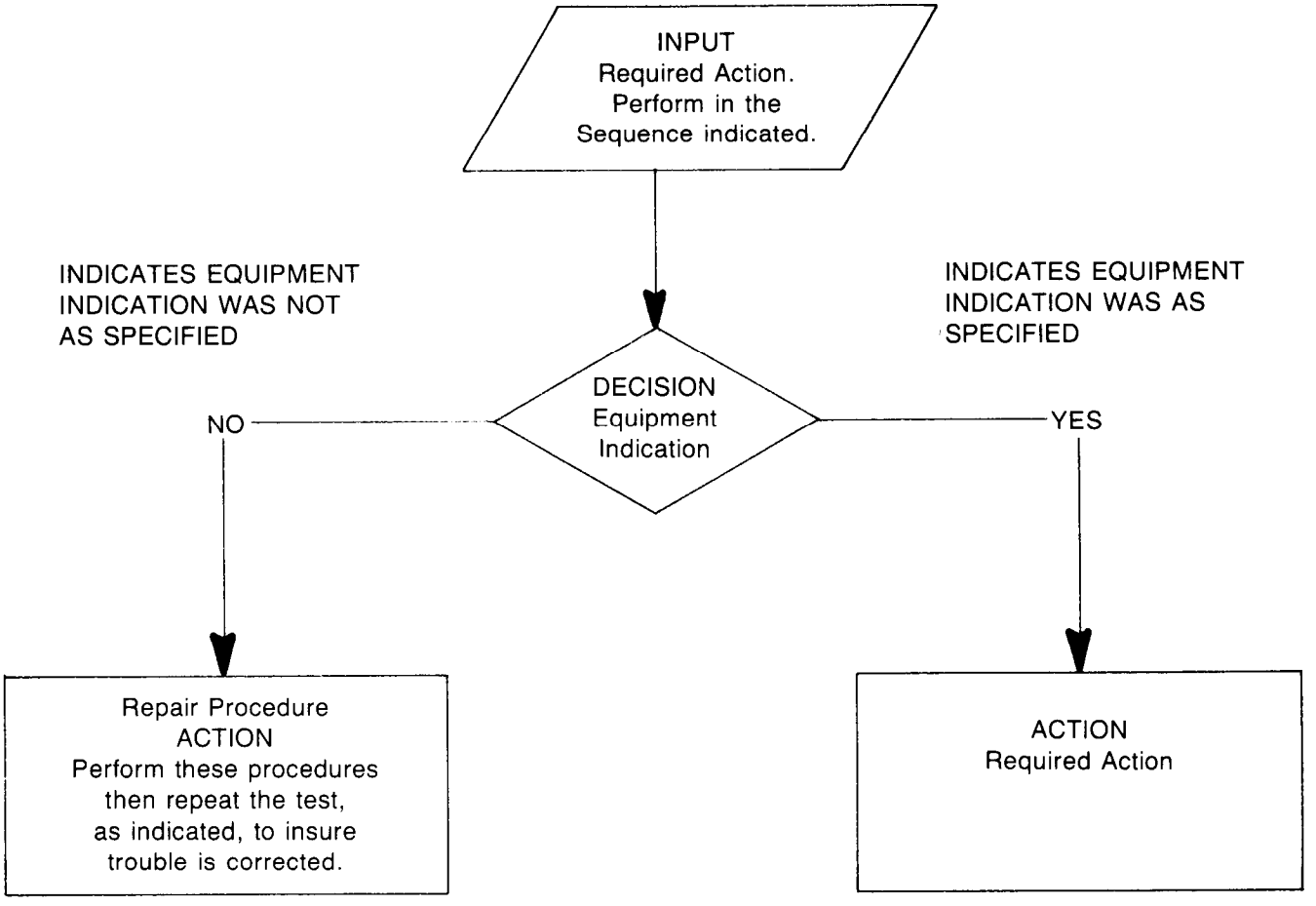
Section IV. TROUBLESHOOTING

3-6 INTRODUCTION.

a. This section provides information for locating and correcting malfunctions in the test set. It cannot list all possible malfunctions or every test/inspection and corrective action.

b. If a malfunction is not listed or corrected by a listed corrective action, refer to continuity and voltage check paragraph 3-8. If the malfunction is still not corrected, notify your supervisor.

c. The following describes the use of the Troubleshooting logic tree.



d. The logic tree will allow for a complete test through to the end of list if everything checks out correctly (YES decision). If there is a problem (a NO decision), the procedures to be used to identify the problem are shown. These procedures are to be used only when a NO decision directs you to that procedure.

e. After consulting the Sympton Index in paragraph 3-7, proceed to the recommended procedure paragraph. It is assumed that the Test Set is connected to a power source at the beginning of each troubleshooting procedure.

3-7 SYMPTOM INDEX.

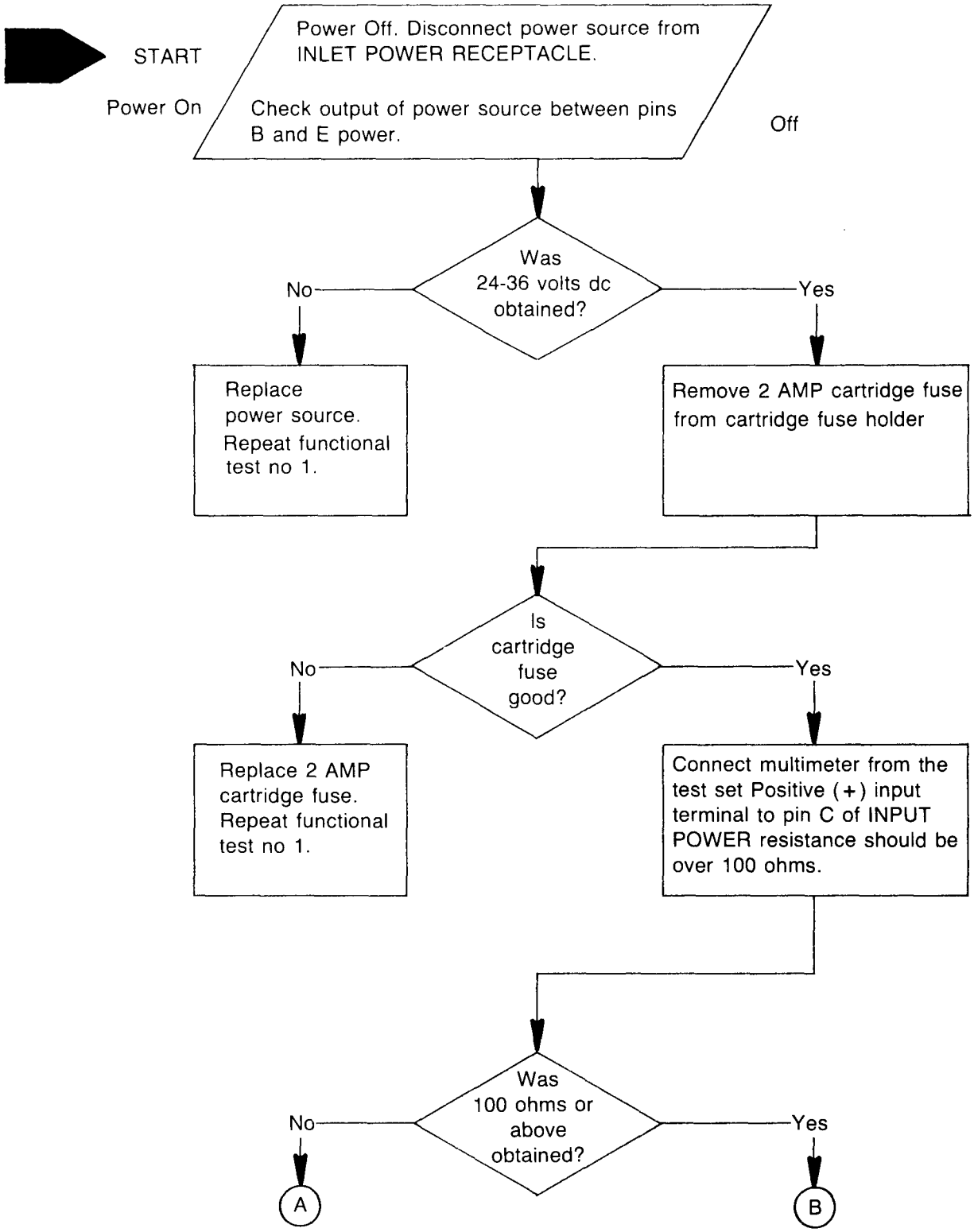
WARNING

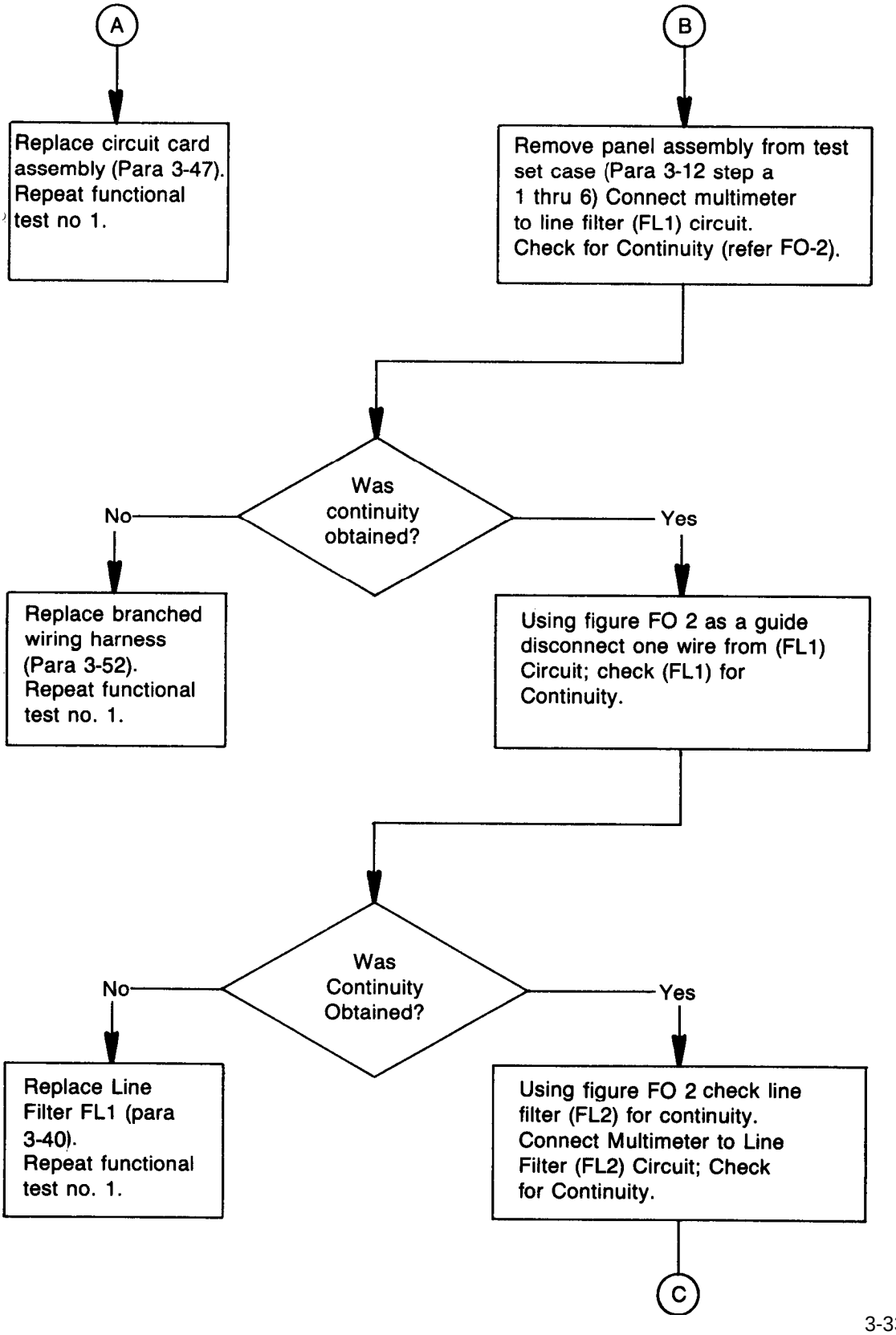
HIGH VOLTAGE IS USED IN THE OPERATION OF THIS EQUIPMENT. DEATH OR SERIOUS INJURY MAY RESULT FROM FAILURE TO OBSERVE SAFETY PRECAUTIONS WHEN PREFORMING TROUBLESHOOTING PROCEDURES OF THE TEST SET.

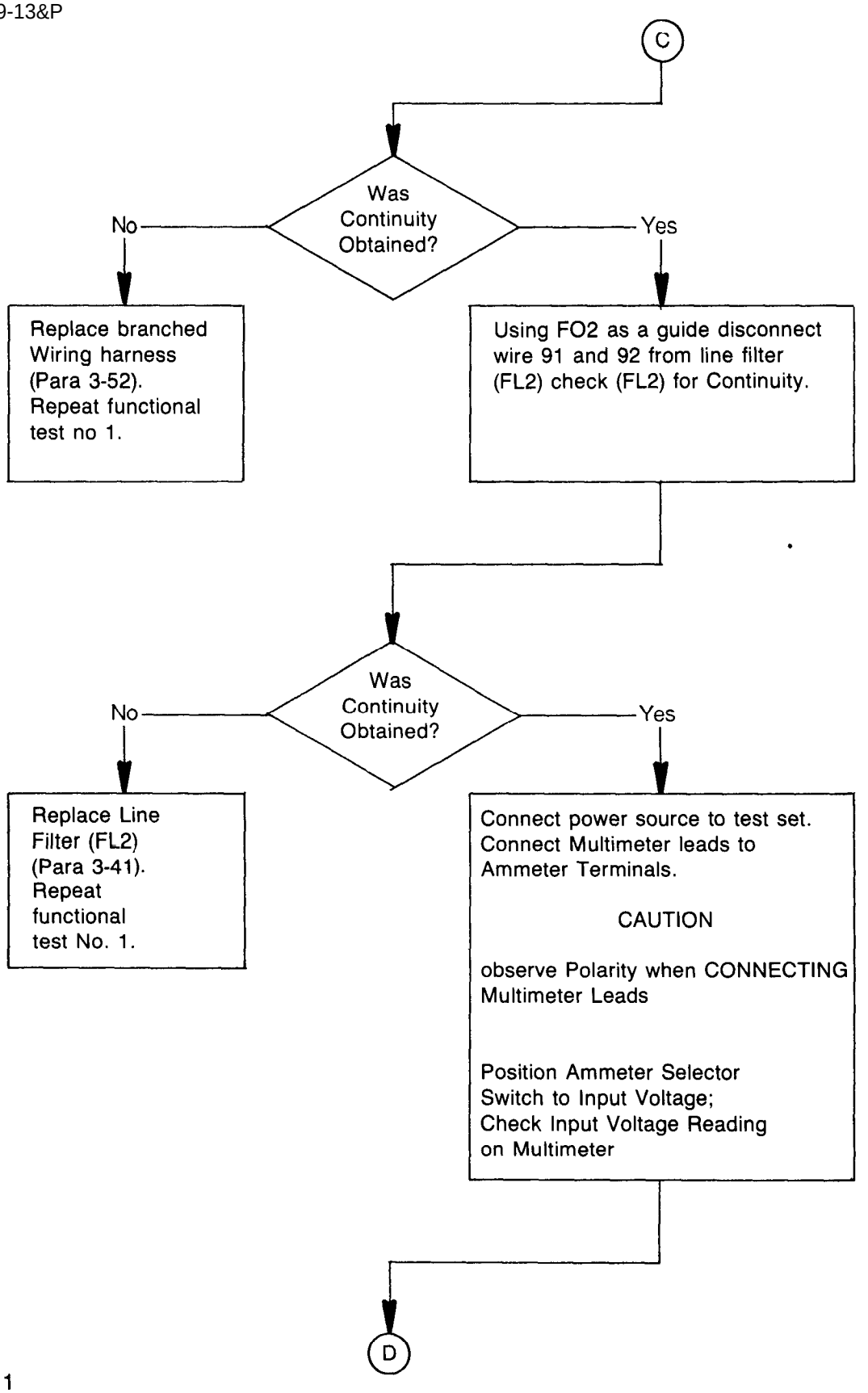
Use this ideas to find where to start the Troubleshooting.

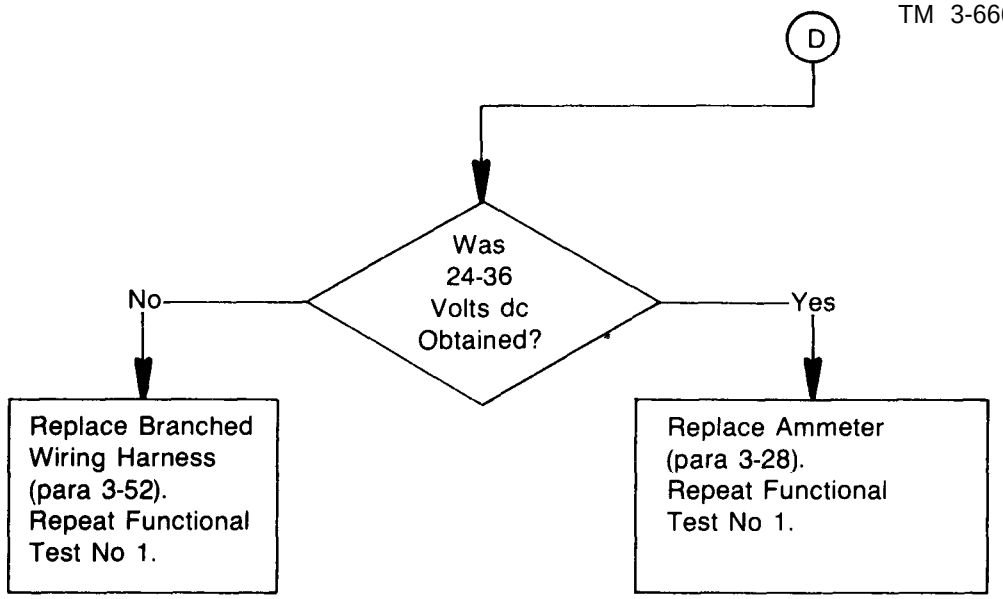
	Symptom	Procedure Paragraph
1.	Input Voltage reading NOT within acceptable limits (24-36 volts).	Para. 3-7.1
2.	PRESSURE-VACUUM GAGE reading shows unit unable to attain/ maintain required pressure.	Para. 3-7.2
2.	SYNC PULSE Lamp does not flash 6 times ± 1 in 10 seconds.	Para. 3-7.3
4.	Voltage readings(s) NOT within acceptable limits (5-20 volts).	Para.3-7.4

3.7.1 MALFUNCTION: Input Voltage NOT within acceptable limits (24-36 V dc)

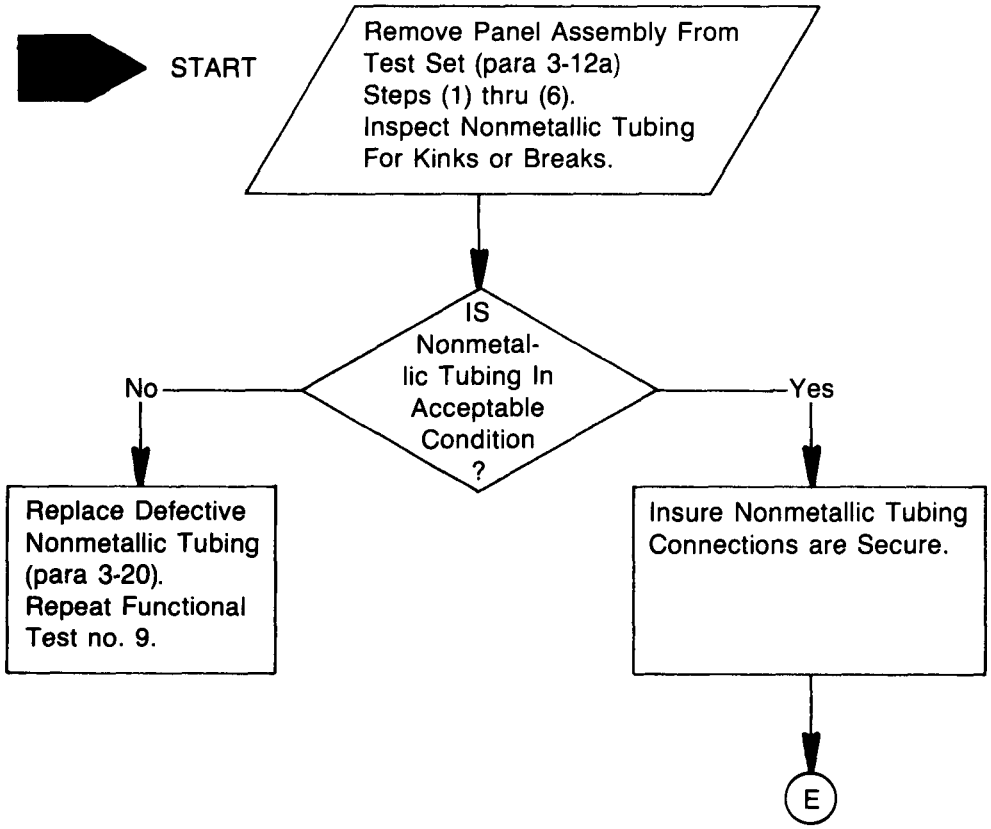


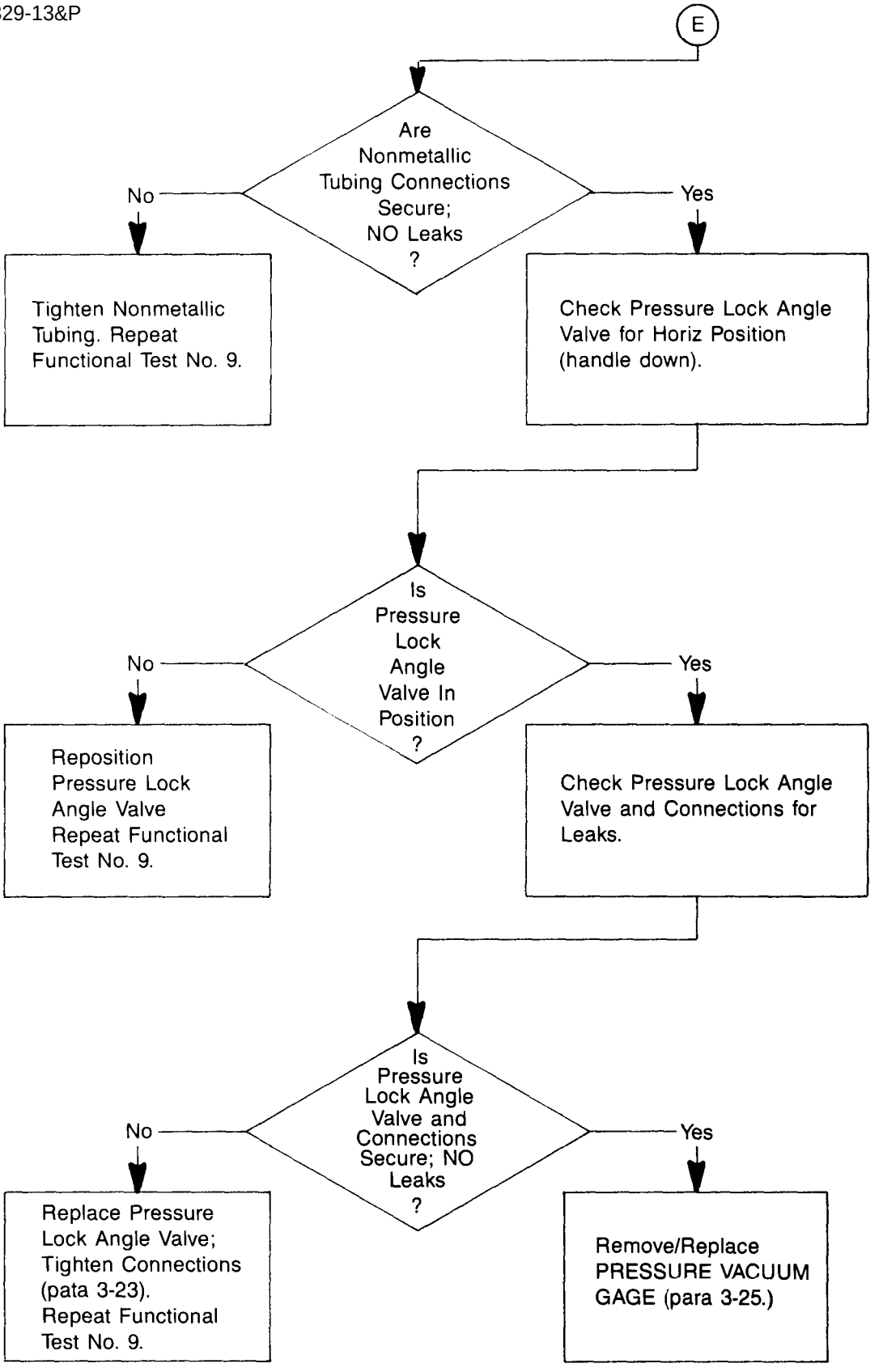

A
B
Replace circuit card assembly (Para 3-47). Repeat functional test no 1.
Remove panel assembly from test set case (Para 3-12 step a 1 thru 6) Connect multimeter to line filter (FL1) circuit. Check for Continuity (refer FO-2).
Was continuity obtained?
No
Yes
Replace branched wiring harness (Para 3-52). Repeat functional test no. 1.
Using figure FO 2 as a guide disconnect one wire from (FL1) Circuit; check (FL1) for Continuity.
Was Continuity Obtained?
No
Yes
Replace Line Filter FL1 (para 3-40). Repeat functional test no. 1.
Using figure FO 2 check line filter (FL2) for continuity. Connect Multimeter to Line Filter (FL2) Circuit; Check for Continuity.
C


C
Was Continuity Obtained?
No
Yes
Replace branched Wiring harness (Para 3-52). Repeat functional test no 1.
Using FO2 as a guide disconnect wire 91 and 92 from line filter (FL2) check (FL2) for Continuity.
Was Continuity Obtained?
No
Yes
Replace Line Filter (FL2) (Para 3-41). Repeat functional test No. 1.
Connect power source to test set. Connect Multimeter leads to Ammeter Terminals.
CAUTION
observe Polarity when CONNECTING Multimeter Leads
Position Ammeter Selector Switch to Input Voltage; Check Input Voltage Reading on Multimeter
D

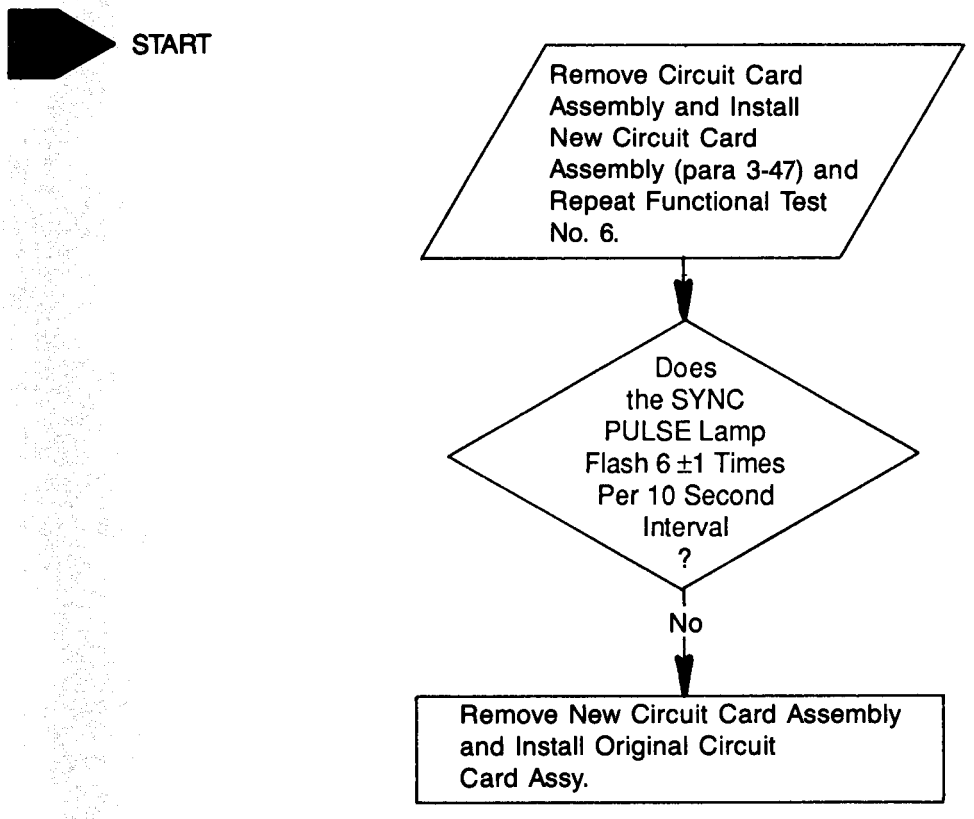


3.7.2 MALFUNCTION: Unable to Attain/Maintain Required Pressure.

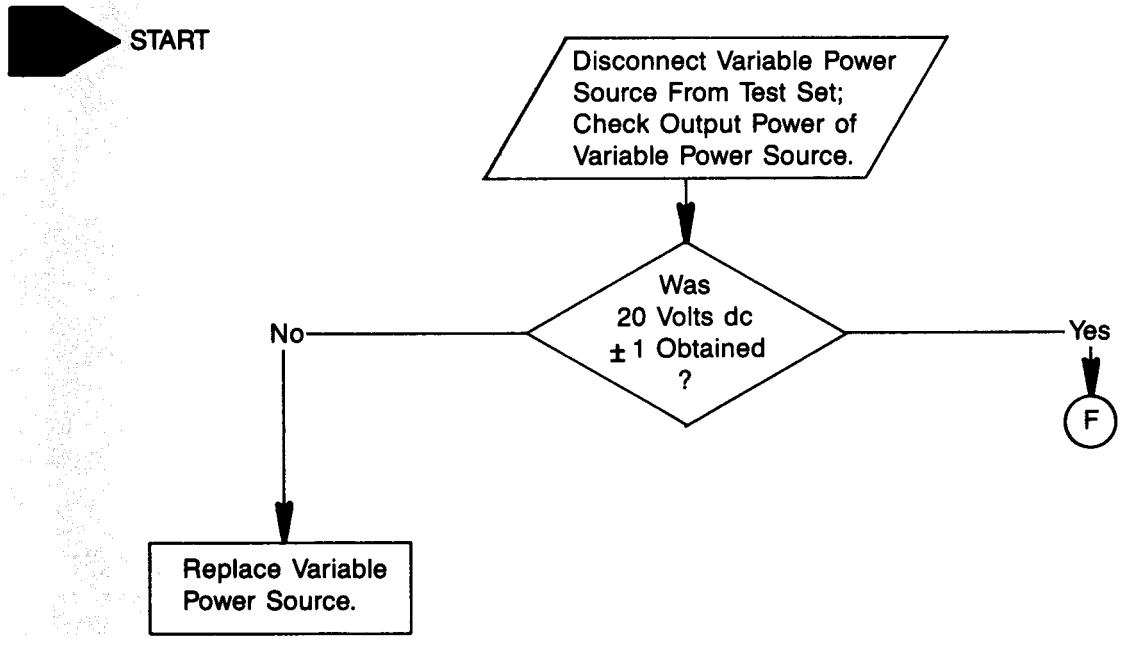


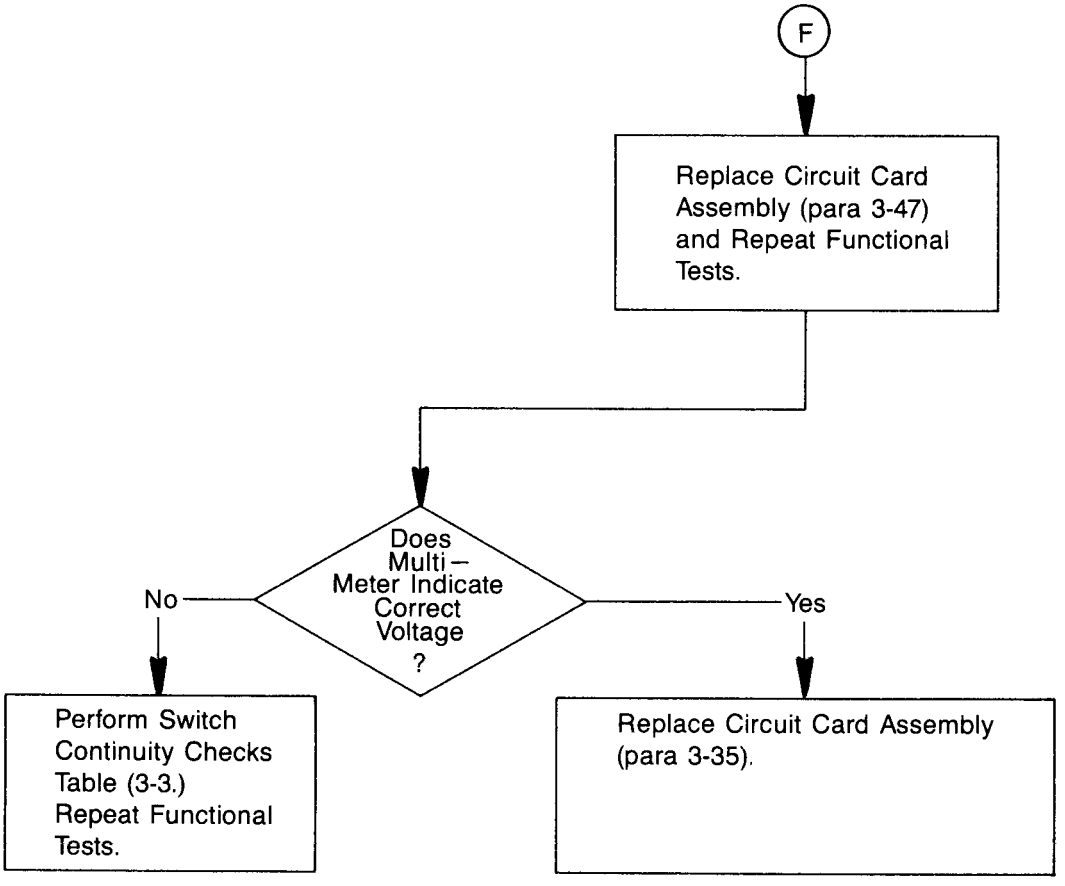

E
Are Nonmetallic Tubing Connections Secure; NO Leaks ?
No
Yes
Tighten Nonmetallic Tubing. Repeat Functional Test No. 9.
Check Pressure Lock Angle Valve for Horiz Position (handle down).
Is Pressure Lock Angle Valve In Position ?
No
Yes
Reposition Pressure Lock Angle Valve Repeat Functional Test No. 9.
Check Pressure Lock Angle Valve and Connections for Leaks.
Is Pressure Lock Angle Valve and Connections Secure; NO Leaks ?
No
Yes
Replace Pressure Lock Angle Valve; Tighten Connections (pata 3-23). Repeat Functional Test No. 9.
Remove/Replace PRESSURE VACUUM GAGE (para 3-25.)

3.7.3 MALFUNCTION: **SYNC PULSE Lamp Flash Count Incorrect.**



3.7.4 MALFUNCTION: Voltage Readings NOT Within Acceptable Limits.




F
Replace Circuit Card Assembly (para 3-47) and Repeat Functional Tests.
Does Multi– Meter Indicate Correct Voltage ?
No
Yes
Perform Switch Continuity Checks Table (3-3.) Repeat Functional Tests.
Replace Circuit Card Assembly (para 3-35).

3-8 CONTINUITY AND VOLTAGE CHECKS.

a. The preceding troubleshooting procedures will detect most faults, if all the preceding checks did not uncover the fault, remove the circuit card assembly from the test set and perform point-to-point continuity checks on the test set wiring harness listed in the following table.

Reference designations are used in the table. The following is a list of components with their reference designation.

Reference Designation	Connector	Location
J1	ELECTRONICS MODULE	Panel Assembly
J2	INPUT POWER	Panel Assembly
J3	Circuit Card Assembly	Behind Panel Assembly
J4	REMOTE ALARM BOARD	Panel Assembly
P1	CHASSIS TEST CABLE	CABLE STORAGE compartment
P2	DETECTOR POWER CABLE	CABLE STORAGE compartment
P3	PUMP POWER CABLE	CABLE STORAGE compartment

Table 3-3. Switch Continuity Checks

Switch Name	Set Switch To	Measure Resistance			If reading is incorrect:
		From	To	Should Read	
ALARM	INHIBIT	J3 Pin 6	P1 Pin 2	Short	1. Test switch. Replace defective switch (Para 3-31) 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).
		J3 Pin 6	J1 Pin 27	Short	
		J3 Pin 6	J1 Pin 7	Short	
		J3 Pin 6	P1 Pin 1	Short	
	OPERATE	J3 Pin 6	J1 Pin 27	Open	
		J3 Pin 6	J1 Pin 7	Short	
		J3 Pin 6	P1 Pin 1	Short	
		J3 Pin 6	P1 Pin 2	Open	
HEATER	ON	J1 Pin 4	J3 Pin 13	Short	1. Test switch. Replace defective switch (Para 3-31) 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).
		J1 Pin 4	J3 Pin 42	Open	
		J1 Pin 19	J3 Pin 14	Short	
		J1 Pin 19	J3 Pin 43	Open	
	OFF	J1 Pin 4	J3 Pin 13	Open	
		J1 Pin 4	J3 Pin 42	Short	
		J1 Pin 19	J3 Pin 14	Open	
		J1 Pin 19	J3 Pin 43	Short	

Table 3-3. Switch Continuity Checks

Switch Name	Set Switch To	Measure Resistance			If reading is incorrect;
		From	To	Should Read	
ALARM RESET (Pushbutton)	Depress Release	J1 Pin 14 J1 Pin 14	J1 Pin 25 J1 Pin 25	Open Short	1. Test switch. Replace defective switch (Para 3-33). 2. Test for broken switch wires. Replace branched wiring harnes (Para 3-52)
ALARM TEST (Electronics) Module Section)	4 6 10 12	J3 Pin 34 J3 Pin 4 J3 Pin 5 J3 Pin 33	J1 Pin 26 J1 Pin 26 J1 Pin 26 J1 Pin 26	Short Short Short Short	1. Test switch Replace defective switch (Para 3-32). 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).
ALARM TEST (Remote Alarmboard Section)	OFF ON	J4 Pin N J4 Pin N	J3 Pin 30 J3 Pin 30	Open Short	1. Test switch. Replace defective switch (Para 3-31). 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52.)
ALARM ACTUATE	ON (UP) NEUTRAL NEUTRAL On (DOWN:	J4 Pin R J4 Pin P J4 Pin P J4 Pin R J4 Pin P J4 Pin R	J3 Pin 29 J4 Pin B J3 Pin 29 J4 Pin B J3 Pin 29 J4 Pin B	Short Short Open Open Short Short	1. Test switch. Replace defective switch (Para 3-31). 2. Test for broken switch wires. Replace branched wiring branched wiring harness (Para 3-52).
AMMETER	SHUNT MEASURE	Black Test Point (Current Measure)	Red Test Point (Current Measure)	Short Open	1. Test switch. Replace defective switch (Para 3-28). 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).

Table 3.3 Switch Continuity Checks

Switch Name	Set Switch To	Measure Resistance			If reading is incorrect:
		From	To	Should Read	
AUTOMATIC BACKGROUND	ON	P1 Pin 3	P1 Pin 4	Open	1. Test switch. Replace defective switch (Para 3-31). 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).
MOTOR TURN-OFF (Push-switch)	OFF Depress Release	P1 Pin 3 P3 Pin 2 P3 Pin 2	P1 Pin 4 P2 Pin B P2 Pin B	Short Short Open	1. Test switch. Replace defective switch (Para 3-33). 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).
OFFSET INPUT	(-) NEUTRAL NEUTRAL (+)	P1 Pin 8 P1 Pin 8 P1 Pin 8 P1 Pin 8	P1 Pin 1 P1 Pin 1 P2 Pin A P2 Pin A	162K ± 2% Open Open 69K ± 2%	1. Test switch. Replace defective switch (Para 3-31). 2. Test for broken switch wires. Replace branched wiring harness (Para 3-52).

Table 3-4. Lamp Resistance Checks

Lamp Name	Switch Settings	Measure Resistance			If reading is incorrect;
		From	To	Should Read	
REMOTE	None	J3 Pin 15	J3 Pin 45	18 ohms	1. Replace lamp (Para 3-29).
HORN (Electronics module section)	None	J3 Pin 17	J3 Pin 24	18 ohms	

Table 3.4. Lamp Resistance Checks

Lamp Name	Switch Settings	Measure Resistance			If reading is incorrect:
		From	To	Should Read	
LAMP (ALARM ACTUATE)	ON (DOWN)	J4 Pin C	J4 Pin R	18 ohms	1. Replace lamp (Para 3-29).
HORN (remote alarm board section)	None	J4 Pin M	J4 Pin B	18 ohms	

Section V. MAINTENANCE PROCEDURES

3-9 INTRODUCTION.

This section contains information and instructions for performing corrective maintenance of the test set. Removal and installation procedures are provided for the following components:

Section V. MAINTENANCE PROCEDURES (CONT).

WARNING

HIGH VOLTAGE IS USED IN THE OPERATION OF THIS EQUIPMENT. DEATH OR SERIOUS INJURY MAY RESULT FROM FAILURE TO OBSERVE SAFETY PRECAUTIONS WHEN PERFORMING TROUBLESHOOTING PROCEDURES.

3-10 IDENTIFICATION PLATE.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools: Electronic equipment tool kits TK-105/G and TK-100/G

Materials/Parts: Technical Acetone (item 4, app D).

a. Removal. If required, remove residue of damaged identification plate (1) with pocket knife, and remove adhesive with Technical acetone (item 4, app D).

b. Installation.

NOTE

Have test set laying with lid on top and handle facing you,

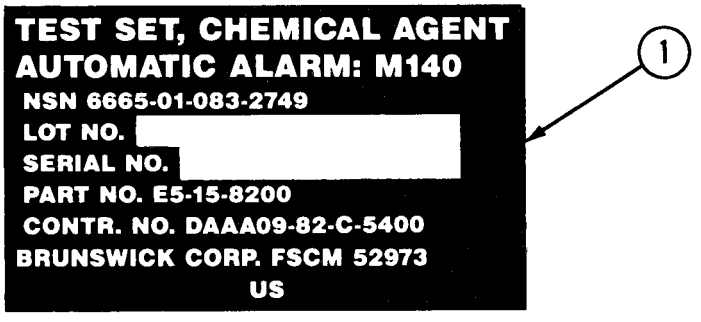
(1) Inscribe test set serial number on new identification plate (1).

(2) Remove protective backing from new identification plate (1).

(3) Using brush, lightly apply Technical acetone (item 4, app D) to back of new identification plate.

(4) Place identification plate on center of lid so nomenclature can be read from left to right or place on center of cable storage door of front panel assembly below the "CABLE STORAGE label.

(5) Press identification plate firmly with heel of hand. Work edges down.



3-11 TEST SET CASE.

This task covers:

a. Inspect.

b. Removal.

c. Installation.

INITIAL STEP

Tools: Electronic equipment tool kit TK-105/G

Materials/Parts:

Identification plate Part No. C5-15-8262
Sealing, locking and retaining compound (item 2, app D) Technical acetone (item 4, app D).

a. Inspect.

NOTE

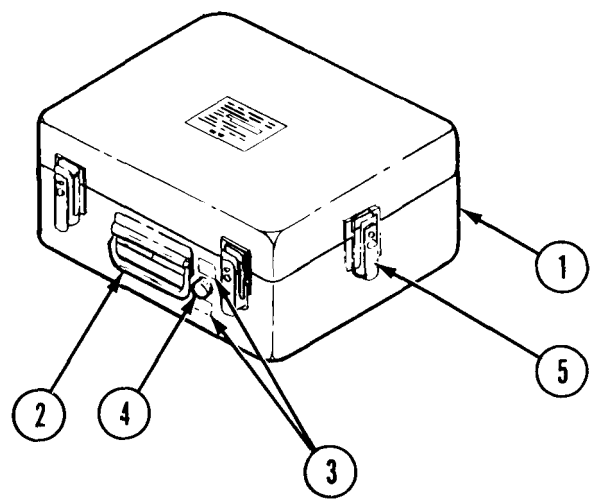
Inspect new case for damage. If damage exists, order new case.

(1) Check case (1) for cracks or holes.

(2) Check if handle (2) is missing.

(3) Check if instruction plate (3) and caution plate (3) are present.

(4) Check if pressure equalizer (4) is present and can be opened and closed.



3-11 TEST SET CASE.

b. Removal.

(1) Unfasten four fasteners (5).

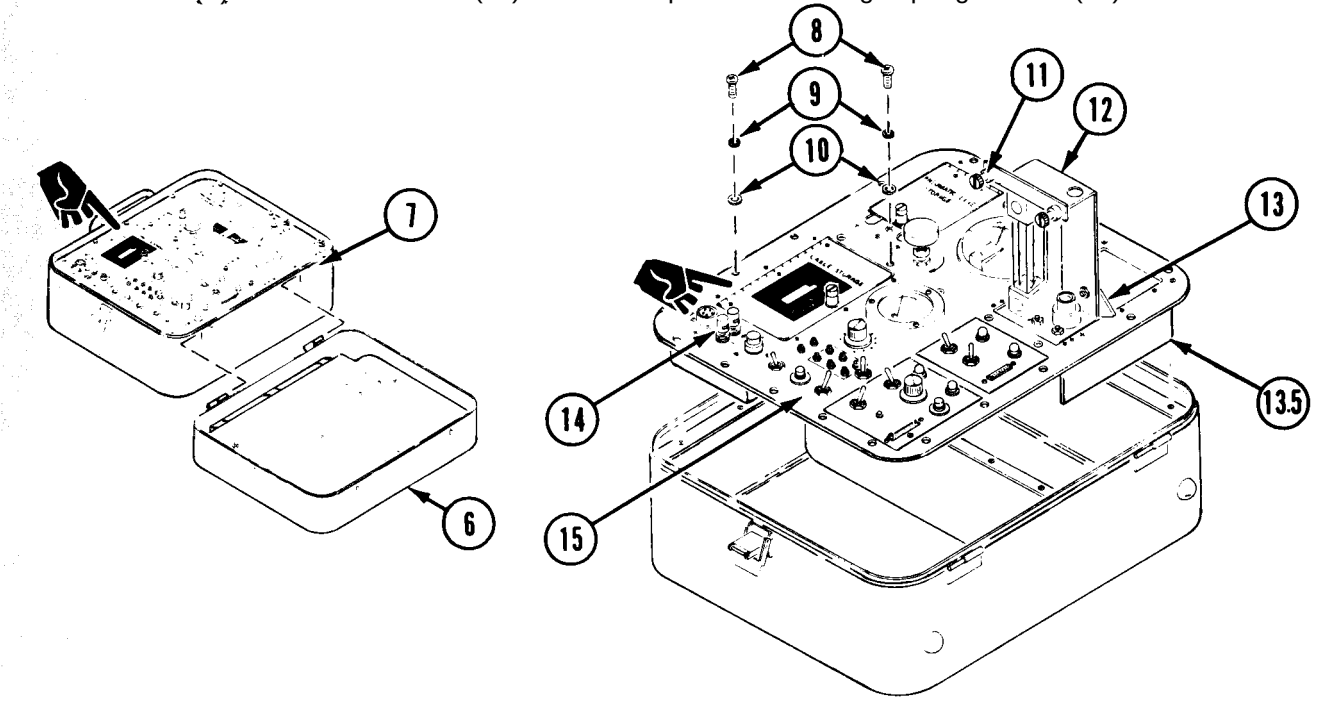
(2) Lift lid (6) and slide off of hinges (7).

(3) Lay lid aside until needed.

(4) Remove 21 screws (8), lockwashers (9), and flatwashers (10).

(5) Unscrew two screws (11).

(6) Raise flowmeter (12) and lock in position with hinge spring bracket (13).



(7) Insert one hand into flowmeter opening and place fingers around right flowmeter bracket (13.5).

(8) Grasp binding posts connectors (14) with other hand and lift panel assembly (15) out of case.

CAUTION

BE CAREFUL NOT TO PINCH OR DAMAGE TUBING WHEN LAYING PANEL ASSEMBLY ASIDE.

3-11 TEST SET CASE (CONT).

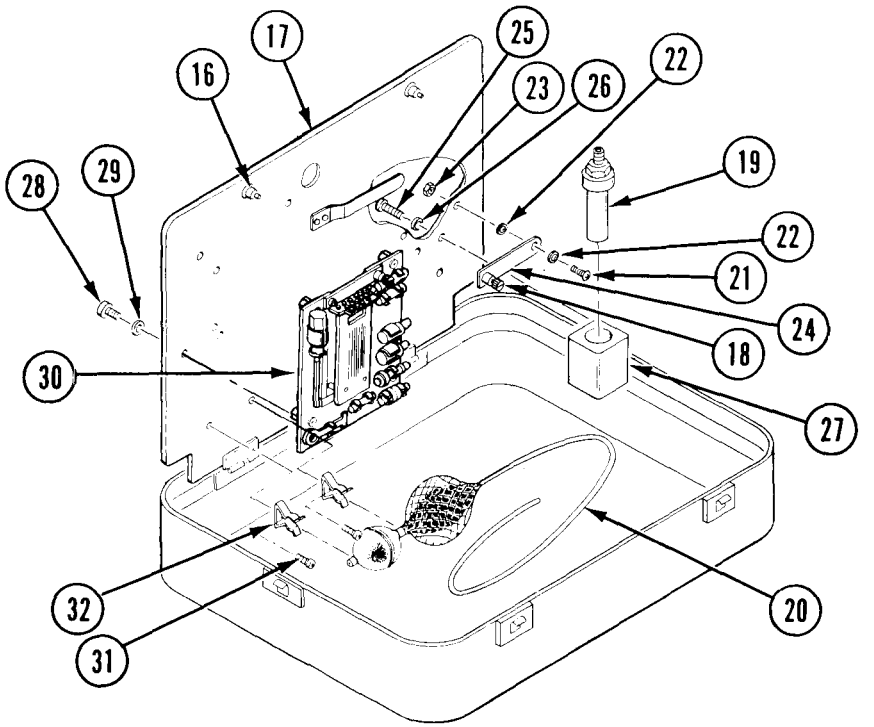
(9) Lay panel assembly aside until needed.

(10) Push in and release three fasteners (16) and lower accessory shelf (17).

NOTE

Observe mounting location on accessory shelf of items being removed for easier installation.

Lay the following items aside until installed in new case.



(11) Unscrew screw (18) and remove gas-particulate filter assembly (19).

(12) Remove bellows and pump (20).

(13) Remove screw (21), washers (22), lock nut (23) and clamp (24).

(14) Remove four screws (25), Iockwashers (26), and filter holder (27),

(15) Remove four screws (28), washers (29), and mounting plate gage (30) with accessories.

(16) Remove one screw (31) and clip (32). Repeat for other clip.

3-11 TEST SET CASE.

c. Installation.

(1) Unfasten four fasteners (5) on new case.

(2) Lift lid (6) and slide off of hinges (7).

(3) Lay lid aside until needed.

(4) Insert one hand into flowmeter opening and place fingers around right flowmeter bracket (13.5).

(5) Grasp binding posts (14) with other hand.

CAUTION

BE SURE NONMETALLIC TUBING IS NOT BETWEEN PANEL ASSEMBLY AND CASE CENTER SUPPORT.

NOTE

To place panel assembly into case, be sure flowmeter is on the hinge side of case.

(6) Place panel assembly (15) into case (1).

(7) Lower flowmeter (12) and finger tighten two screws (11).

(8) Secure to case with 21 flatwashers (10), Iockwashers (9) and screws (8).

(9) Push in and release three fasteners (16) and open accessory shelf (17).

(10) Position filter holder (27) over mounting holes, secure with four Iockwashers (26) and screws (25).

(11) Position clamp (24) in mounting position. Secure wtih one screw (21), washers (22), and locknut (23).

(12) Position clip (32) over mounting hole and between raised areas.

(13) Secure clip with screw (31).

(14) Repeat steps 12 and 13 for other slip.

(15) Apply sealing, locking and retaining compound (item 2, app D) to threads of screws (28).

3-11 TEST SET CASE (CONT).

(16) Position mounting plate gage assembly (30) with accessories over mounting holes. Secure with four washers (29) and screws (28).

(17) Slide filter (19) into filter holder (27). Position screw (18) over threaded hole and hand tighten.

(18) Place bellows and pump (20) in clips (32).

(19) Close accessory shelf and secure by pushing in three fasteners (16).

(20) Slide lid (6) onto hinges (7) and secure with four fasteners (5).

NOTE

Have test set lying flat with lid on top and handle facing you.

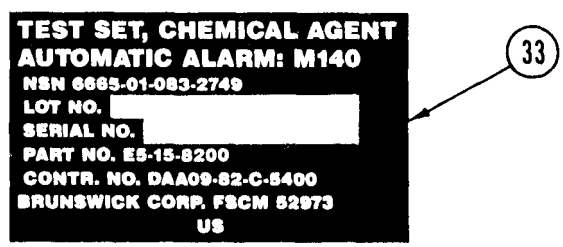
(21) Inscribe test set serial number on new identification plate (33).

(22) Remove protective backing from new identification plate.

(23) Using brush, lightly apply Technical acetone (item 4, app D) to back of new identification plate.

(24) Place identification plate on center of lid so nomenclature can be read from left to right.

(25) Press identification plate firmly with heel of hand. Work edges down.



3-12 PANEL ASSEMBLY.

This task covers:

a. Removal.

b. Testing.

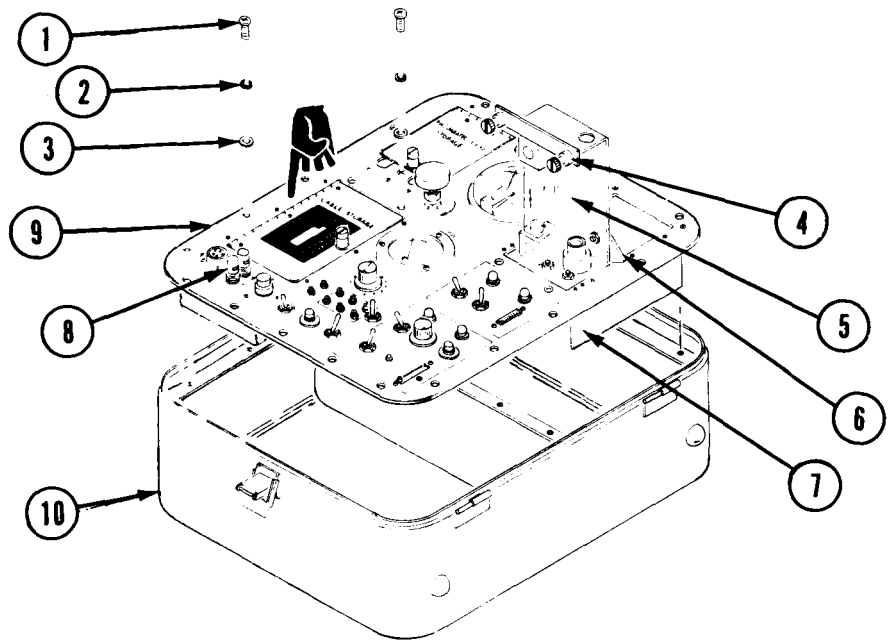
c. Installation.

INITIAL SETUP

Tools: Electronic equipment tool kit TK-105/G

Troubleshooting references: para 3-7.2

Equipment condition: Lid removed during functional testing.



a. Removal.

(1) Remove 21 screws (1), lockwashers (2), and flatwashers (3).

(2) Unscrew two screws (4).

(3) Raise flowmeter (5) and lock in position with spring lock hinge (6).

(4) Place one hand into flowmeter opening and place fingers around right flowmeter bracket (7).

(5) Grasp binding posts (8) with other hand.

(6) Lift panel assembly (9) from test set case (10).

3-12 PANEL ASSEMBLY (CONT).

b. Testing

Perform Functional Test (para 3-5) on new panel assembly,

c. Installation

(1) Unscrew two screws (4) on new panel assembly.

(2) Raise flowmeter (5) and lock in position with spring lock hinge (6).

(3) Insert one hand into flowmeter opening and place fingers around right flowmeter bracket (7).

(4) Grasp binding posts (8) with other hand.

CAUTION

BE SURE TUBING IS NOT BETWEEN PANEL ASSEMBLY AND CASE CENTER SUPPORT.

(5) Place panel assembly (9) into case (10).

(6) Secure to case with 21 flatwashers (3), Iockwashers (2), and screws (1).

(7) Lower flowmeter (5) and finger tighten two screws (4).

3-13 CLAMP.

This task covers:

a. Removal.

b. Installation,

INITIAL SETUP

a. Removal.

(1) Remove lid (para 3-11b steps 1 and 2).

(2) Push in and release three fasteners (1) and open accessory shelf (2).

(3) Unscrew screw (3).

(4) Remove screw (4), two washers (5), locknut (6) and clamp (7).

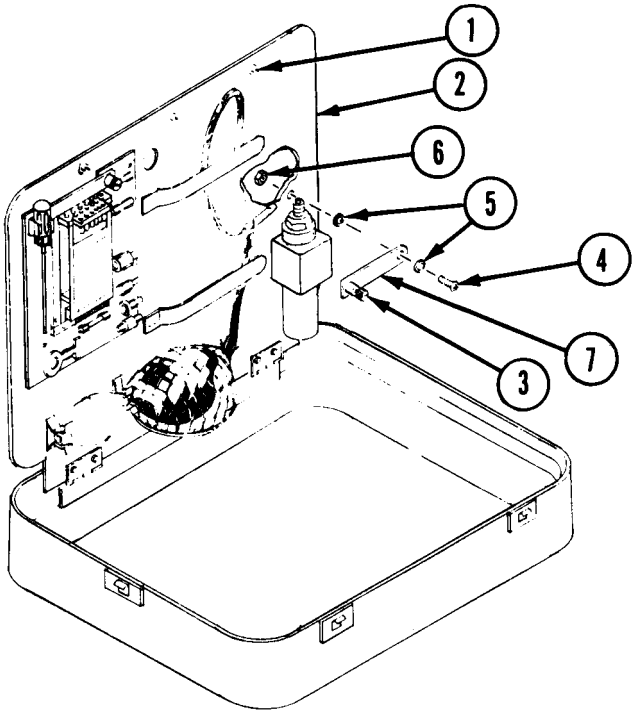
b. Installation.

(1) Install screw (3) on accessory shelf (2).

(2) Position clamp (7) in mounting position. Secure screw (4), two washers (5) and locknut (6).

(3) Tighten screw (3),

(4) Install lid (para 3-11c steps 19 and 20).



3-14 SPRING TENSION CLIP.

This Task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools: Electronic equipment tool kit TK-105/G

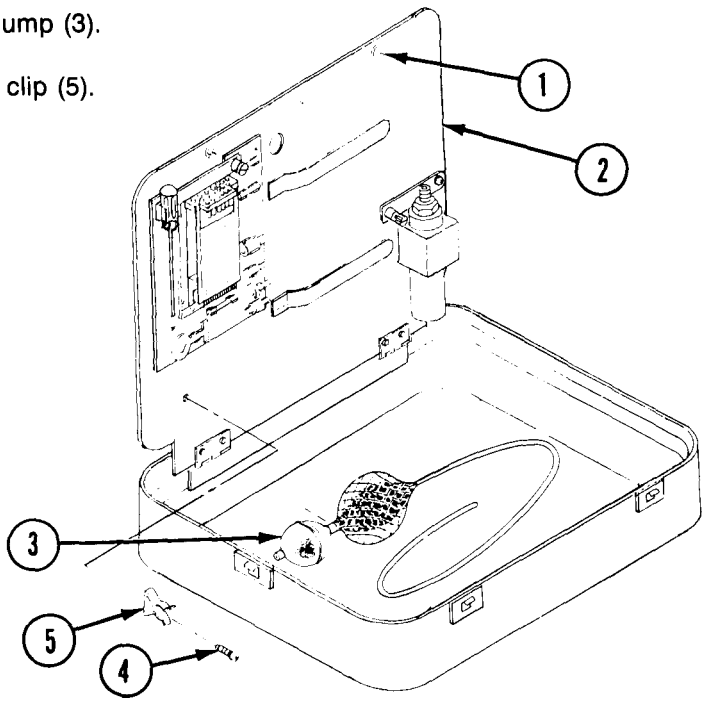
a. Removal.

(1) Remove lid (para 3-11b steps 1 and 2).

(2) Push in and release three fasteners (1) and open accessory shelf (2).

(3) Remove bellows and pump (3).

(4) Remove screw (4) and clip (5).



b. Installation.

(1) Position clip (5) over mounting hole, and between raised areas,

(2) Secure clip with screw (4).

(3) Replace bellows and pump (3).

(4) Close accessory shelf (2) and secure three fasteners (1).

(5) Install lid (para 3-11c step 20).

3-15 GAGE MOUNTING PLATE ASSEMBLY.

This task covers:

a, Preparation.

b. Repair.

c. Completion.

INITIAL SETUP

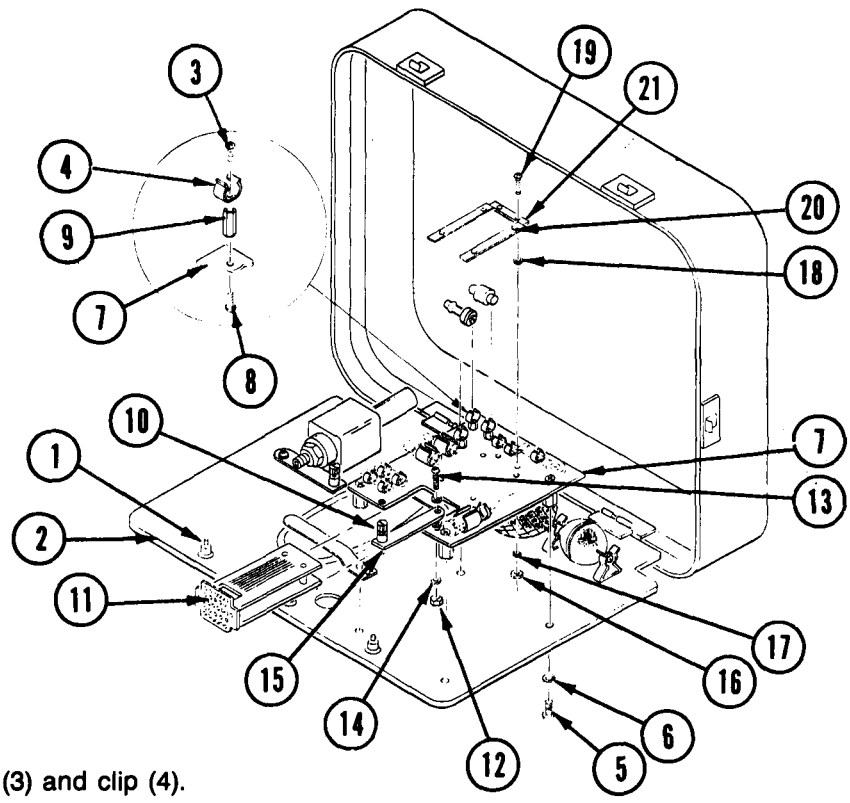
Tools:
Electronic equipment tool
kit TK-105/G

Materials/Parts: Sealing compound (item 2, app D).

a. Preparation.

(1) Remove lid (para 3-11 b steps 1-2).

(2) Push in and release three fasteners (1) and open accessory shelf (2).



b. Repair.

(1) Clip

a. Remove screw (3) and clip (4).

b. Position clip (4) and secure with screws (3).

3-15 GAGE MOUNTING PLATE ASSEMBLY (CONT).

(2) Plain Hexagon Nut

a. Remove four screws (5), washers (6) and gage mounting plate assembly (7).

b. Remove item from clip.

c. Remove screw (3) and clip (4).

d. Remove screw (8), remove plain hexagon nut (9).

e. Apply sealing compound (item 2, app D) to threads of screw (8).

f. Position plain hexagon nut (9) over mounting hole and secure with screw (8).

g. Install clip (4) with screw (3).

h. Apply sealing compound (item 2, app D) to threads of screws (5).

i. Position gage mounting plate assembly (7) over mounting holes. Secure with four four screws (5) and washers (6).

(3) Clamp.

a. Unscrew screw (10) and remove extender board (11).

b. Remove locknut (12), screw (13), washers (14) and clamp (15).

c. Install clamp (15) and secure with screw (13), washers (14), and locknut (12).

d. Install extender board (11) and tighten screw (10).

(4) Guides and Stop.

a. Remove four screws (5), washers (6) and gage mounting plate assembly (7).

b. Unscrew screw (10) and remove extender board (11).

c. Remove two nuts (16), Iockwashers (17), washers (18), screws (19) and guide (20) or stop (21).

d. Install guide (20) or stop (21) and secure with two screws (19), washers (18), Iockwashers (17) and nuts (16).

e. Position gage mounting plate assembly (7) over mounting holes. Secure with four screws (5), and washers (6).

f. Install extender board (11) and tighten screw (10).

c. Completion.

(1) Close accessory shelf (2) and secure by pushing in three fasteners (1),
(2) Install lid (para 3-11c step 20).

3-15.1 GAGE MOUNTING PLATE ASSEMBLY.

This task covers:

a. Removal

b. Installation.

INITIAL SETUP

Tools:
Electronic equipment tool
kit TK-105/G

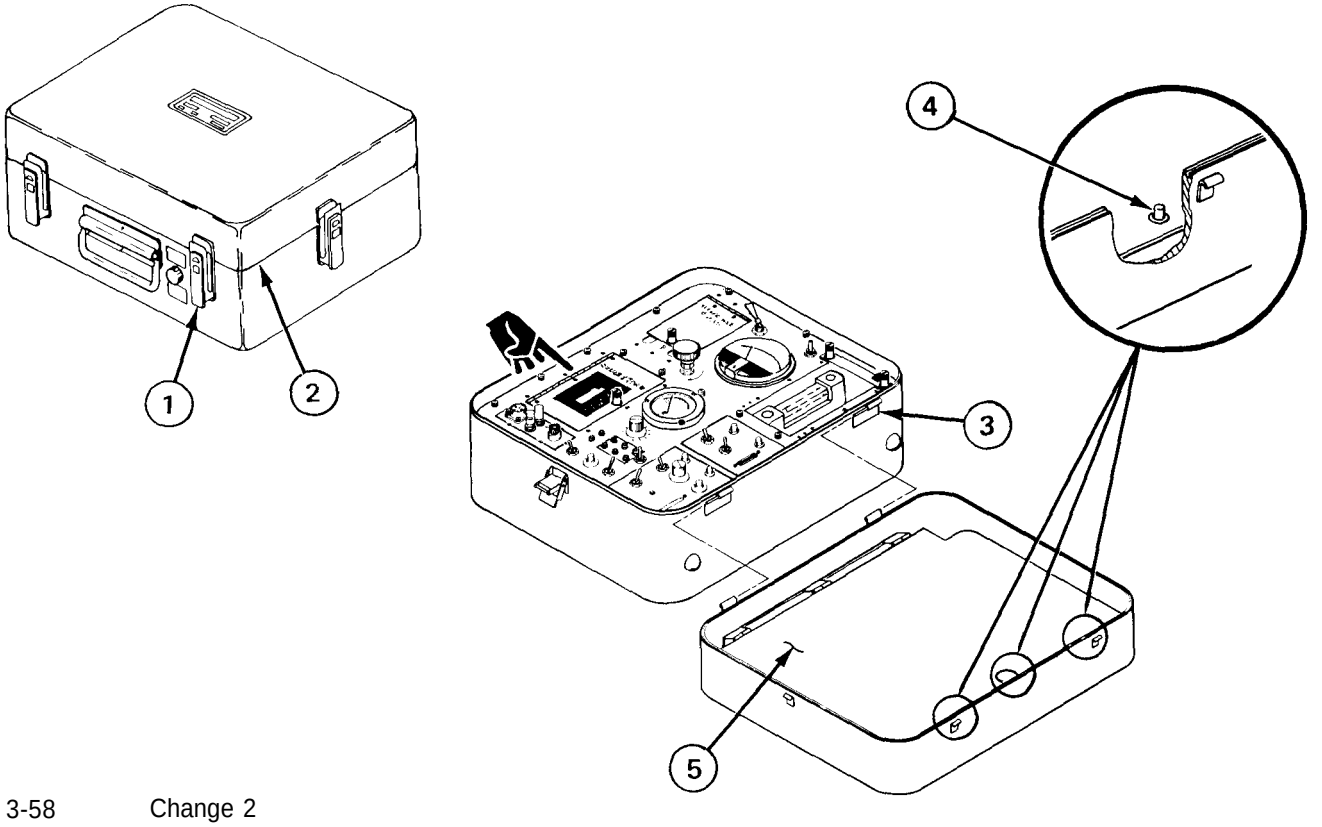
Materials/Parts: Sealing Compound (item 2, app D)

a. Removal

(1) Unfasten four fasteners (1).

(2) Lift lid (2) and slide off hinges (3).

(3) Push in and release three fasteners (4) and open accessory shelf (5).



3-15.1 GAGE MOUNTING PLATE ASSEMBLY.

(4) Remove following items:

Rain shield adapter (6).

Inlet port adapter (7)

Ball end hex drive wrench (8).

Screw (9) and extender board (10).

Cell plug cap assembly (14).

Plug cap assembly (15).

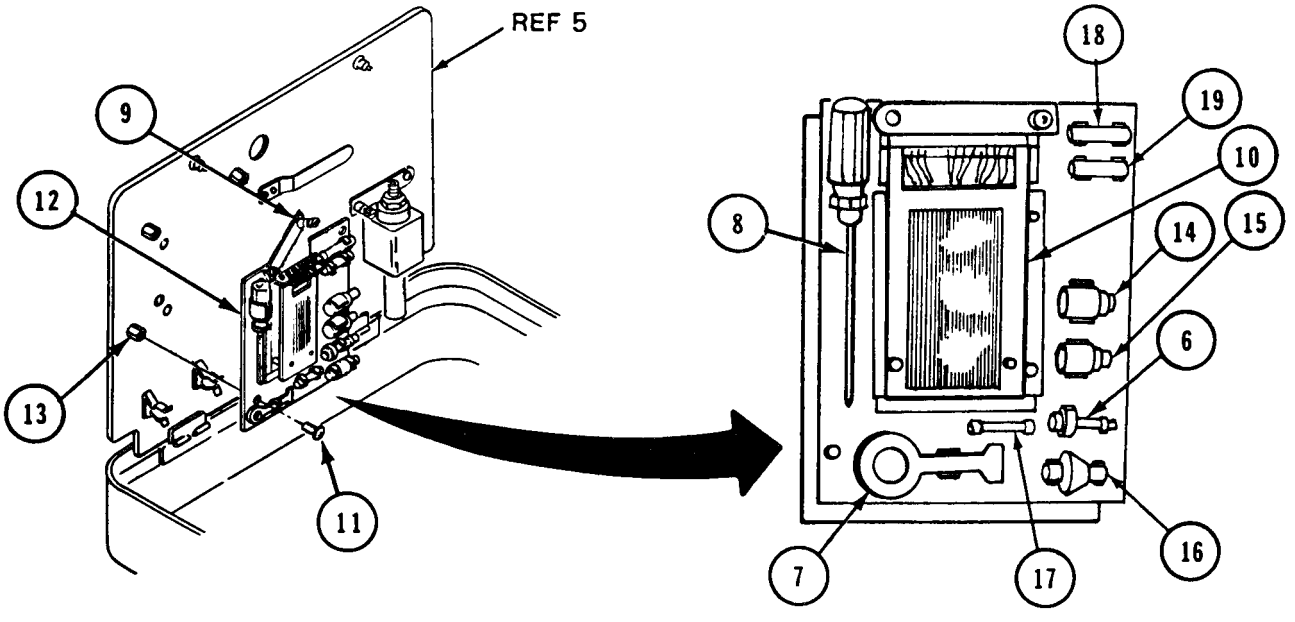
Meter adapter (16).

Cartridge fuse (17).

Airflow stop (18).

Nonmetallic tubing (19).

(5) Remove four screws (11) and gage mounting plate (12).



b. Installation.

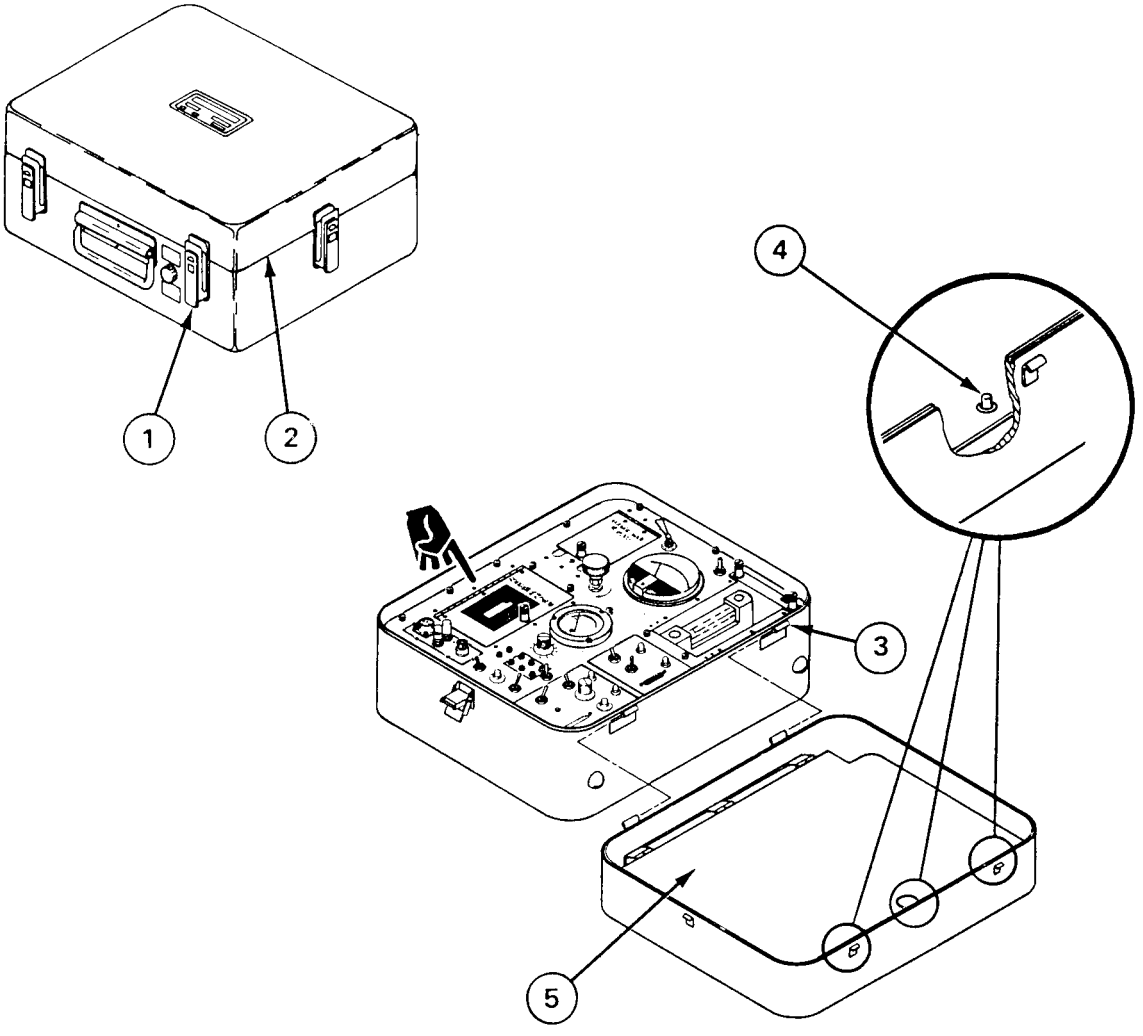
(1) Position gage mounting plate assembly (12) over spacers (13). Secure with four screws (11).

3-15.1 GAGE MOUNTING PLATE ASSEMBLY (CONT).

(2) Install the items removed in para a.4. above.

(3) Close accessory shelf (5) and secure by pushing in three fasteners (4).

(4) Slide lid (2) onto hinges (3) and secure with four fasteners (1).



3-16 PNEUMATIC LINE STORAGE COVER.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

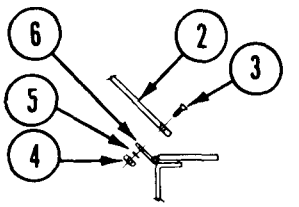
Electronic equipment tool kit TK-105/G

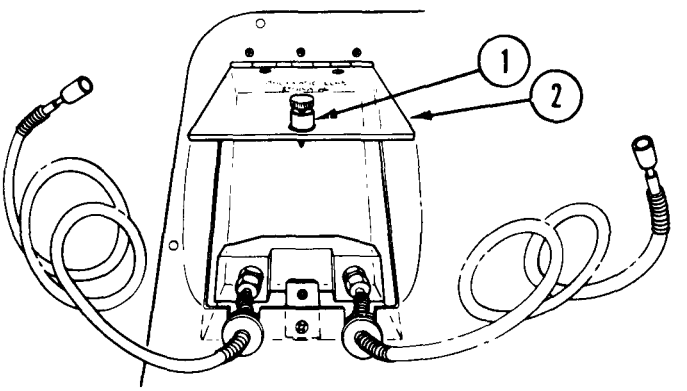
a. Removal.

(1) Remove lid (para 3-11 b steps 1 thru 3).

(2) Unscrew screw (1).

(3) Lift cover (2) and remove two screws (3), nuts (4), and lockwashers (5).





b. Installation.

(1) Install cover on butt hinge (6) using two screws (3) lockwashers (5), and two nuts (4).

(2) Close and secure cover (2) with screw (1).

(3) Install lid (para 3-11c step 20).

3-17 BUTT HINGE.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

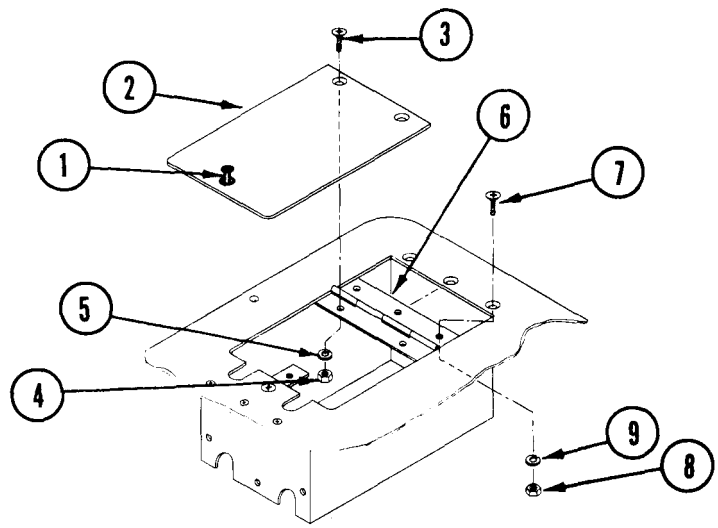
a. Removal.

(1) Remove lid and panel assembly (para 3-11 b steps 1 thru 8).

(2) Unscrew screw (1) and open pneumatic line storage cover (2).

(3) Remove two screws (3), nuts (4), and lockwashers (5), securing door to butt hinge (6).

(4) Remove three screws (7), nuts (8), and lockwashers (9) and butt hinge (6).



b. Installation.

(1) Install butt hinge to panel assembly using three screws (7), lockwashers (9), and nuts (8).

NOTE

Before tightening screws insure that cover (2) is aligned.

3-17 BUTT HINGE.

(2) Secure cover (2) to butt hinge (5) using two screws (3), lockwashers (5) and nuts (4).

(3) Close cover (2) and secure with screw (1).

(4) Tighten screws securing cover (2) to butt hinge (6).

(5) Install panel assembly (para 3-11c steps 4 thru 8 and 20).

3-18 LATCH.

This task covers:

a. Removal,

b. Installation

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

a. Removal

(1) Remove lid (para 3-11 b steps 1 thru 2).

(2) Unscrew screw (1), and lift pneumatic line storage cover assembly (2).

(3) Remove screw (3) and latch (4).

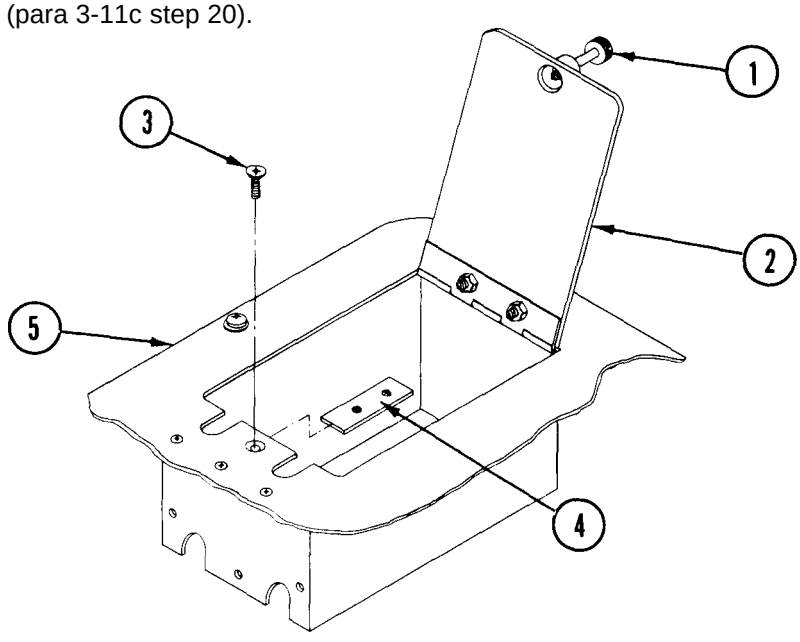
b. Installation

(1) Position latch (4) under mounting hole with threaded boss down,

(2) Secure latch (4) to panel assembly (5) with screw (3).

(3) Close cover assembly (2) and secure with screw (1).

(4) Install lid (para 3-11c step 20).



3-19 GROMMET.

This task covers:

a. Removal.

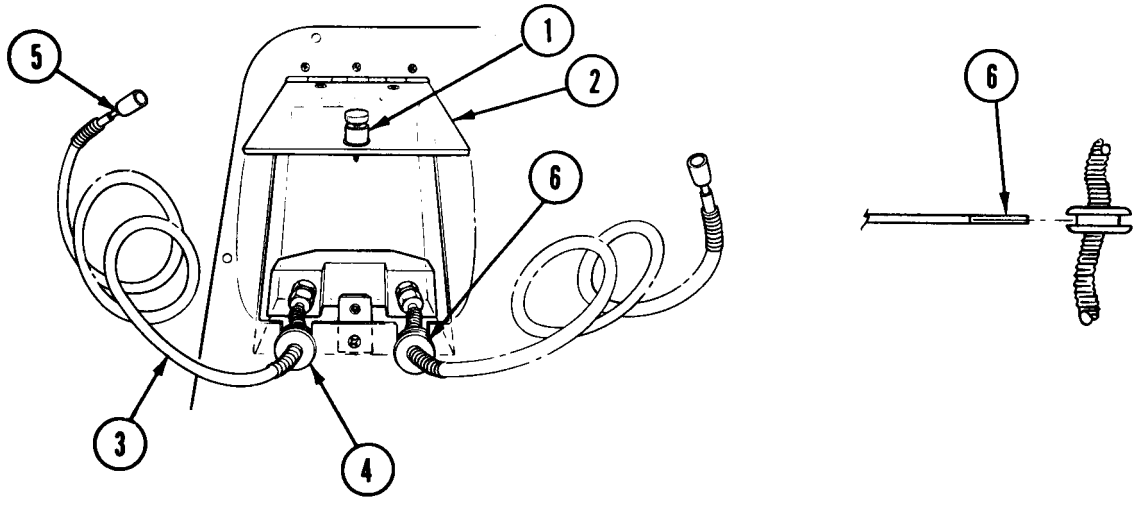
b. Installation.

NOTE
Both grommets are removed and installed in the same manner.

a. Removal

(1) Remove lid and panel assembly (para 3-11 b steps 1 and 2).

(2) Unscrew screw (1) and lift PNEUMATIC LINE STORAGE cover assembly (2).



CAUTION

BE CAREFUL NOT TO DAMAGE NONMETALLIC TUBING ASSEMBLY WHEN REMOVING GROMMET.

(3) Remove nonmetallic tubing assembly (3) from storage compartment.

(4) Cut grommet (4) from nonmetallic tubing assembly (3).

3-19 GROMMET (CONT).

b. Installation.

CAUTION

BE CAREFUL NOT TO BREAK SEAL BETWEEN THE PLUG CAP ASSEMBLY AND NONMETALLIC TUBING ASSEMBLY (4).

(1) Stretch grommet over plug cap assembly (5) and slide down nonmetallic tubing until even with slot (6).

(2) Return nonmetallic tubing assemblies (3) to storage compartment.

(3) Lower PNEUMATIC LINE STORAGE cover assembly (2) and finger tighten screw (1).

(4) Install lid (para 3-11c step 20).

3-20 NONMETALLIC TUBING ASSEMBLY.

NOTE

Following procedures are typical for all nonmetallic tubing assemblies except pressure and vacuum test and flowmeter nonmetallic tubing assemblies.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:
Electronic equipment tool kit TK-100/G

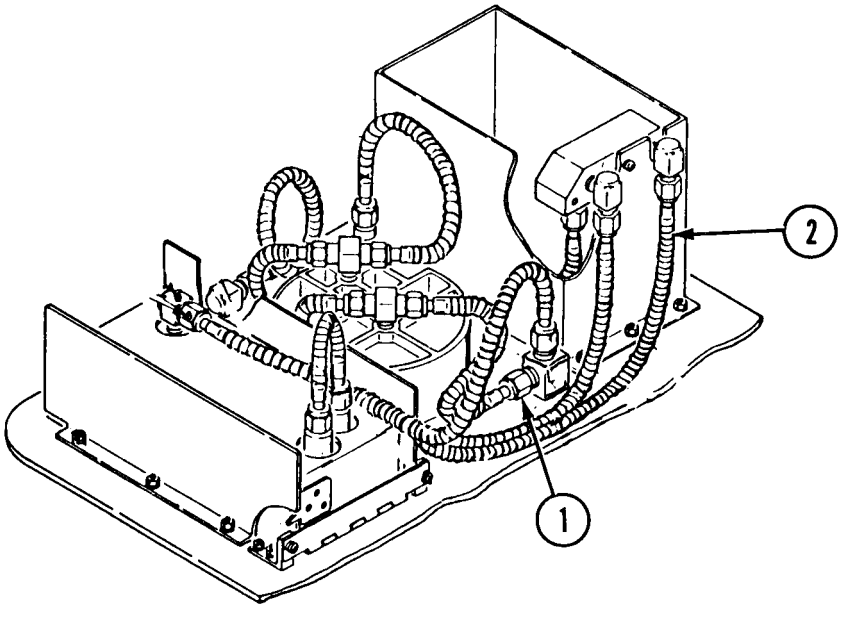
Equipment condition: Lid and panel assembly removed during troubleshooting.

Materials/Parts: Front ferrule Part No. 403-1-2 each
Back Ferrule Part No. 404-1-2 each

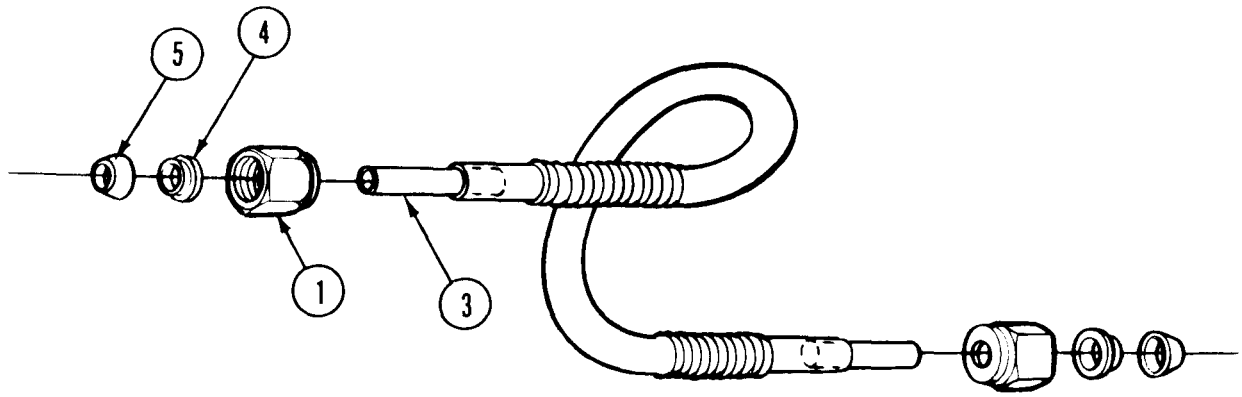
a. Removal

NOTE
Do not remove the panel assembly to replace the nonmetallic tubing assembly connected to the flow rate meter and the flowmeter bushing.

(1) Unscrew two nuts (1) and remove nonmetallic tubing assembly (2).



3-20 NONMETALLIC TUBING ASSEMBLY (CONT).



(2) Cut nonmetallic tubing from metallic tube (3). Repeat procedures on other end of nonmetallic tubing assembly.

(3) Force nut (1) from metallic tube (3) and lay aside.

NOTE
Reuse nuts.

(4) Check nuts (1) for cracks, crossed threads.

b. Installation.

(1) Slide nut (1), back ferrule (4), and front ferrule (5) onto metallic tub (3).

(2) Insert metallic tube (3) into connecting fitting, and wrench tighten nut (1).

(3) Repeat steps one and two for other end.

3-21 NONMETALLIC TUBING ASSEMBLY.

NOTE

Following procedures are typical for both the PRESSURE and VACUUM TEST nonmetallic tubing assemblies.

This task covers:

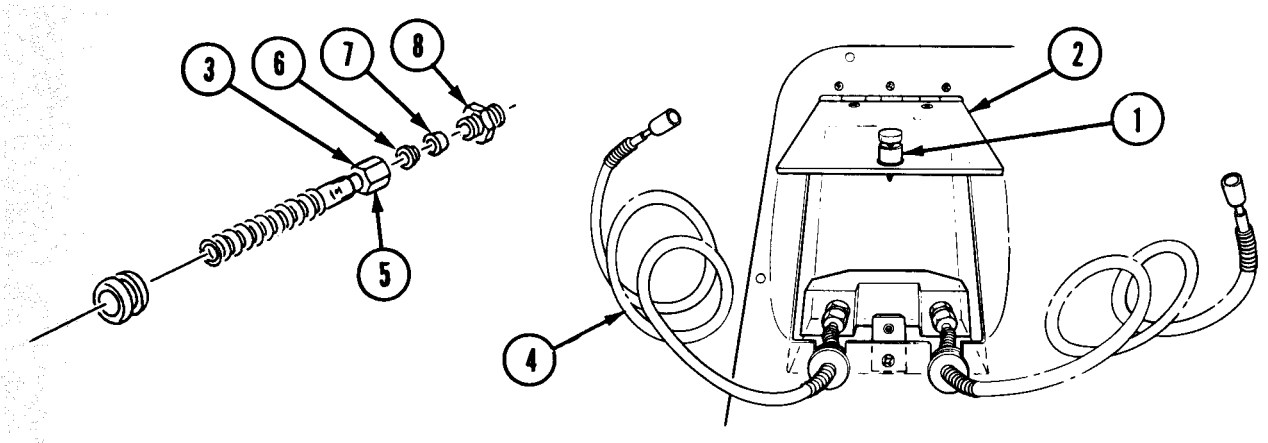
a. Removal

b. Installation.

INITIAL SETUP

Tools:
Electronic equipment tool kit TK-100/G

Materials/Parts: Front Ferrule Part No, 403-1-1 each
Back ferrule Part No. 404-1-1 each.



a. Removal

(1) Remove lid (para 3-11 b steps 1 thru 2).

(2) Unscrew screw (1) and open PNEUMATIC LINE STORAGE cover assembly (2).

(3) Unscrew nut (3) and remove nonmetallic tubing assembly (4).

(4) Cut nonmetallic tubing from metallic tube (5) and remove nut (3).

NOTE

Reuse nut and grommet.

(5) Check nut (3) for cracks or crossed threads.

3-21 NONMETALLIC TUBING ASSEMBLY (CONT).

b. Installation.

(1) Slide nut (3) and back and front (6 & 7) ferrule onto metallic tube (5).

(2) Insert metallic tube (5) into connecting fitting (8), and wrench tighten nut (3).

(3) Perform Functional Test No. 9 (table 3-2).

3-22 NONMETALLIC TUBING ASSEMBLY.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G

Materials/Parts: Front ferrule Part No. 403-1-2 each
Back ferrule Part No. 404-1-2 each

a. Removal.

(1) Remove lid (para 3-11b steps 1 thru 2).

(2) Unscrew screws (1) raise flowmeter bracket (2) and lock in position with hinge spring bracket (3).

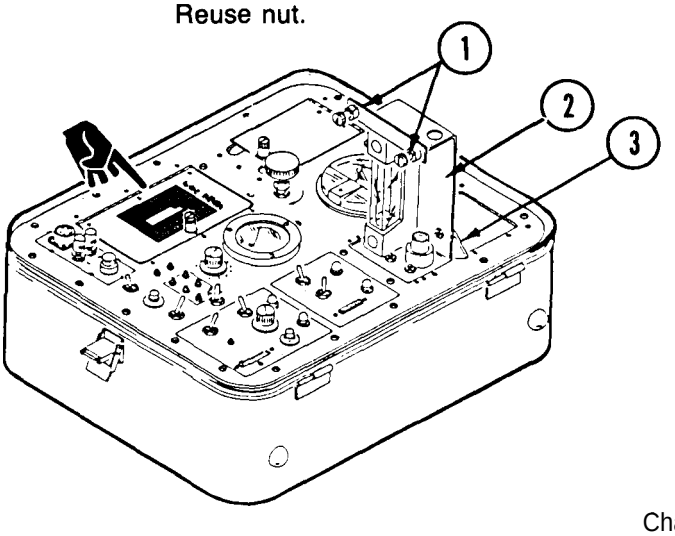
(3) Unscrew two nuts (4) and remove nonmetallic tubing assembly.

(4) Cut nonmetallic tubing (5) from metallic tube (6) and remove nut (4).

(5) Check nuts (4) for cracks or crossed threads.

NOTE

Reuse nut.



3-22 NONMETALLIC TUBING ASSEMBLY (CONT).

b. Installation.

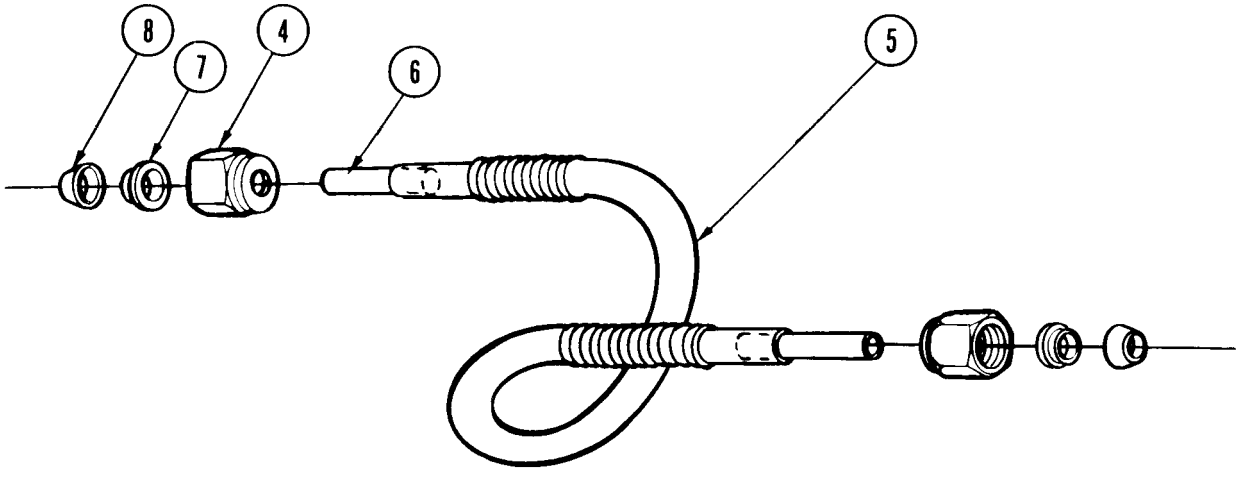
(1) Slide nut (4), back (7), and front (8) ferrules on metallic tube assembly.

(2) Insert tube (5) into connecting fitting and wrench tighten nut (4).

(3) Repeat steps one and two for other end.

(4) Lower flowmeter and secure with screws.

(5) Perform Functional Test No. 9 (table 3-2).



3-23 PRESSURE LOCK ANGLE VALVE.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:
Electronic equipment tool
kit TK-105/G

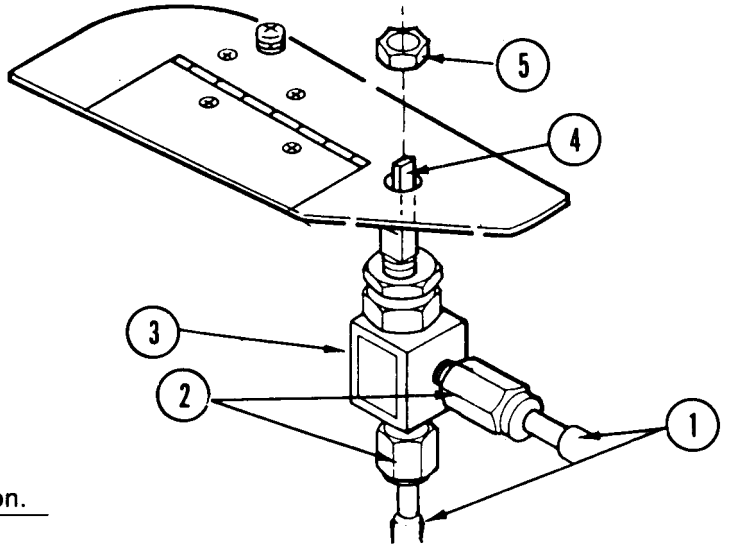
Equipment condition: Lid and panel assembly removed during troubleshooting.

a. Removal.

(1) Unscrew two nuts (2) and remove nonmetallic tubing (1) from PRESSURE LOCK angle valve (3).

(2) Place PRESSURE LOCK angle valve handle (4) in VERT position (straight up).

(3) Remove retaining nut (5) and PRESSURE LOCK angle valve (3).



b. Installation.

(1) Place replacement PRESSURE LOCK angle valve handle (4) in VERT (straight up) position.

(2) Remove two nuts (2) and ferrules from replacement PRESSURE LOCK angle valve.

(3) Install PRESSURE LOCK angle valve (3), and secure with retaining nut (5).

(4) Install nonmetallic tubing (1) and tighten nuts (2).

3-24 FLOW ADJUST REGULATING VALVE.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool kit TK-100/G

a. Removal.

(1) Remove lid and panel assembly (pare 3-11b steps 1 thru 8).

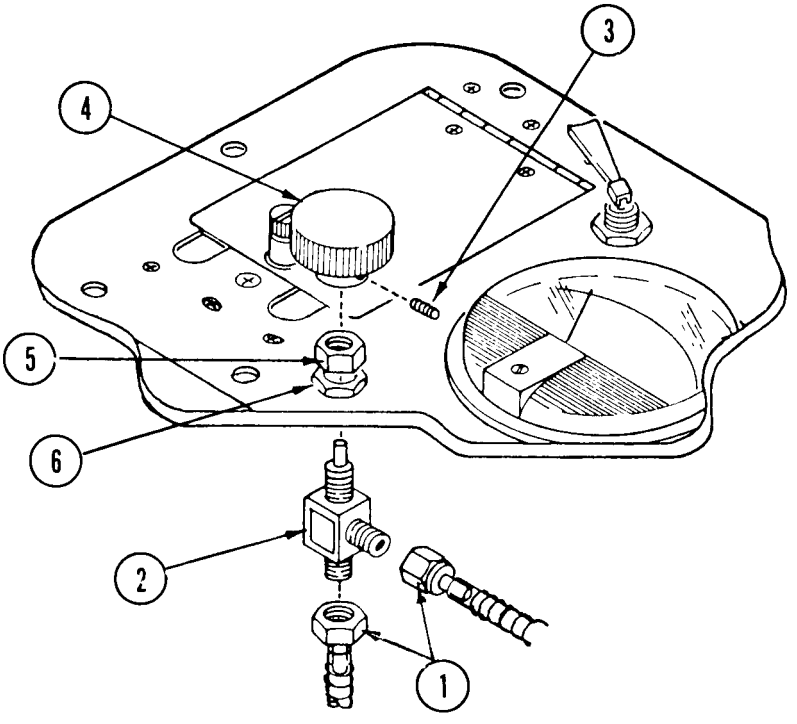
(2) Label and disconnect nonmetallic tubing assemblies from FLOW ADJUST regulating valve (2).

(3) On front panel loosen setscrew (3).

(4) Remove knob (4)

(5) Remove sealing nut (5) and securing nut (6).

(6) Remove FLOW ADJUST regulating valve (2).



3-24 FLOW ADJUST REGULATING VALVE.

b. Installation

(1) Insert FLOW ADJUST regulating valve (2) into panel assembly.

(2) Install securing nut (6) and wrench tighten.

(3) Install sealing nut (5) and wrench tighten.

(4) Install knob (4) on end of FLOW ADJUST regulating valve (2) shaft.

(5) Tighten setscrew (3).

(6) Connect nonmetallic tubing assemblies as labeled and wrench tighten nuts (1)

(7) Install front panel (para 3-11c steps 4 thru 8 and step 20).

(8) Perform Functional Test No. 9 (table 3-2)

3-25 DIAL INDICATING DIFFERENTIAL GAGE.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

Materials/Parts: Three machine screws NSN 5305-00-054-6662.

Equipment Condition: Lid and panel assembly removed during troubleshooting.

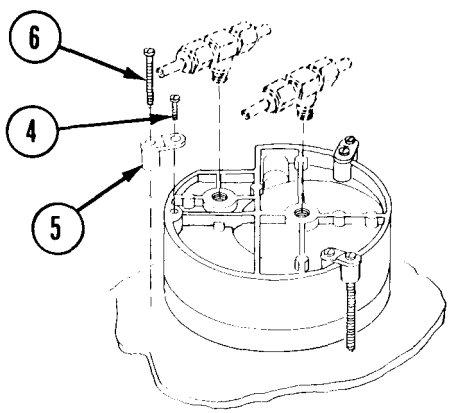
a. Removal.

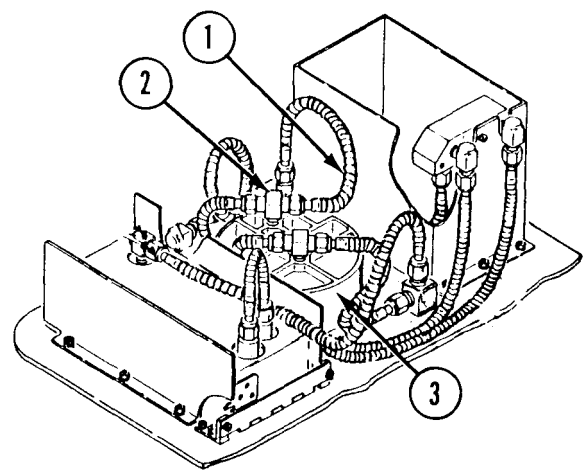
(1) Label and remove nonmetallic tubing (1) from two tee fittings (2).

(2) Remove two tee fittings (2) from PRESSURE-VACUUM GAGE (3).

(3) Remove three mounting screws (4) which secure three rim latches (5).

(4) Remove PRESSURE-VACUUM GAGE (3) through front of panel assembly.





b. Installation.

(1) Remove three machine screws (4) and three lugs (5). Install screws (6) into lugs approximately halfway.

(2) Install replacement PRESSURE-VACUUM GAGE (3) into front panel assembly.

(3) Secure gage with three lugs (5) and tighten three screws (4).

3-25 DIAL INDICATING DIFFERENTIAL GAGE.

(4) Adjust three screws (6) for a snug fit.

(5) Install two tee fittings (2) into back of gage (3).

(6) install all nonmetallic tubing (1) to tee fittings (2).

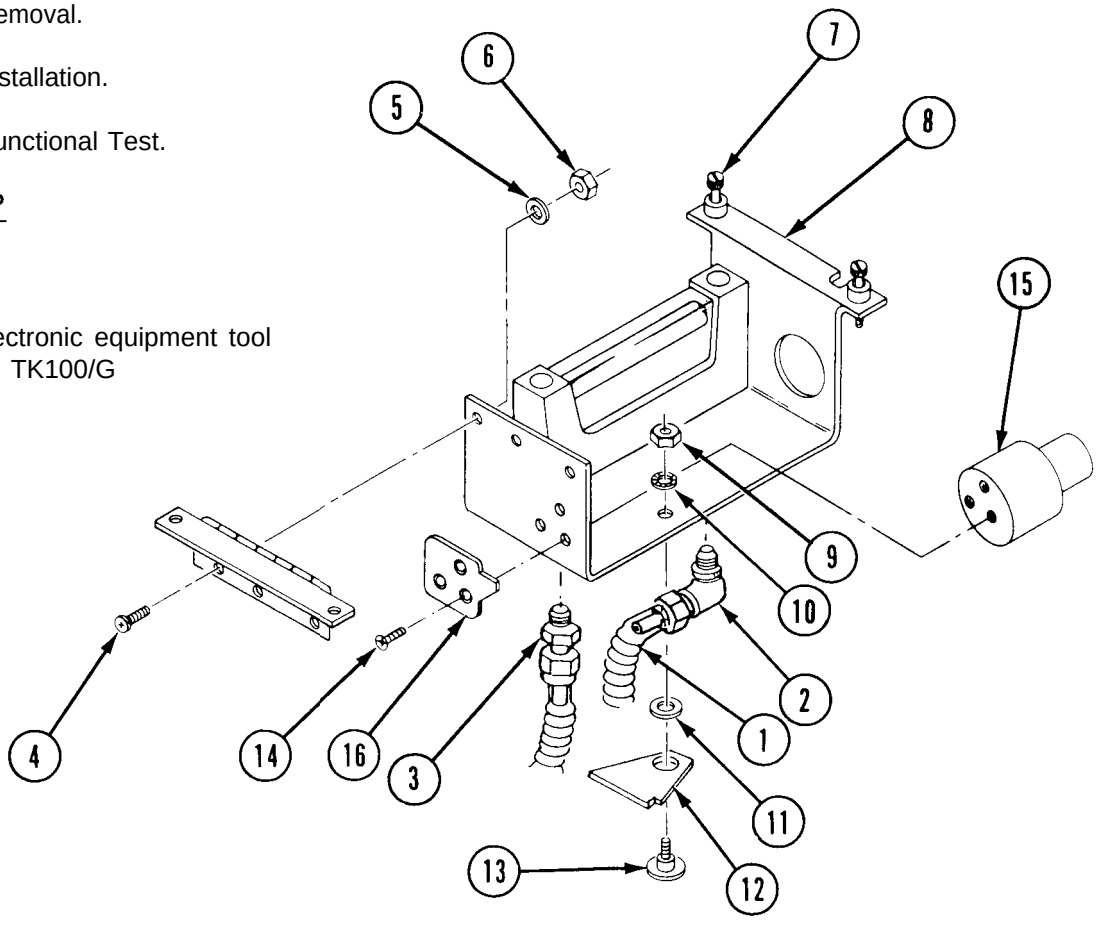
3-26 FLOWRATE METER AND BRACKET ASSEMBLY.

This task covers:

a. Removal.

b. Installation.

c. Functional Test.



INITIAL SETUP

Tools:

Electronic equipment tool kit TK100/G

a. Removal.

(1) Remove lid and panel assembly (Para 3-9b steps 1 and 8).

(2) Remove nonmetallic tubing assemblies (1).

(3) Remove elbow (2) and adapter (3).

(4) Remove three screws (4), lockwashers (5) and nuts (6).

(5) Unscrew two screws (7) and remove flowrate meter bracket assembly (8).

(6) Remove nut, (9), lockwasher (10), spring washer (11), bracket (12), and shaft (13).

(7) Remove three screws (14) and remove bushing (15) and stop (16).

3-26 FLOWRATE METER AND BRACKET ASSEMBLY.

b. Installation.

(1) Install bushing (15) and stop (16) with three screws (14).

(2) Install hinge spring bracket (12) with shaft (13) and secure shaft (13), springwasher (11), Iockwasher (10) with nut (9).

(3) Install flowrate meter bracket (8). Do noth tighten screws.

(4) Install three screws (7), Iockwashers (5) and nuts (6).

(5) Install adapter (3) and elbow (2).

(6) Install nonmetallic tubing assemblies (1).

(7) Perform Functional Test No. 9 (table 3-2).

(8) Install front panel (para 3-9c steps 4 thru 8 and 20).

3-27 HINGE SPRING BRACKET.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

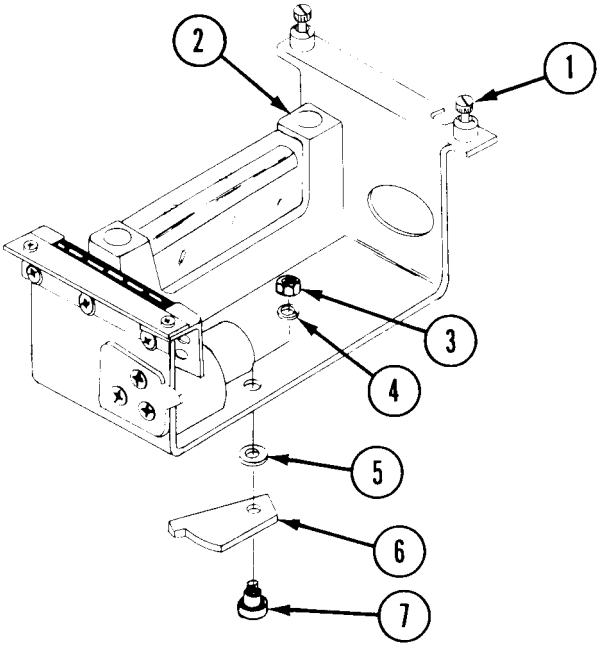
Electronic equipment tool
kit TK-105/G

a. Removal.

(1) Remove lid (para 3-11b steps 1 thru 3).

(2) Unscrew screws (1) and raise flowrate meter (2) to vertical position.

(3) Remove nut (3), Iockwasher (4), spring washer (5), bracket (6), and shaft (7).



b. Installation.

(1) Secure bracket (6) to flowrate meter assembly with shaft (7), spring washer (5), Iockwasher (4) and nut (3).

(2) Lower flowrate meter and secure with screws (1).

(3) Replace lid (para 3-11c step 20).

3-2-9 AMMETER

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:
Electronic equipment tool
kit TK-105/G

Equipment Condition: Lid and panel assembly removed during troubleshooting.

a. Removal.

(1) Remove two nuts (1), and flatwasher (2).

(2) Remove two wires (3), and (4).

(3) Remove three nuts (5) lockwashers (6) and screws (7).

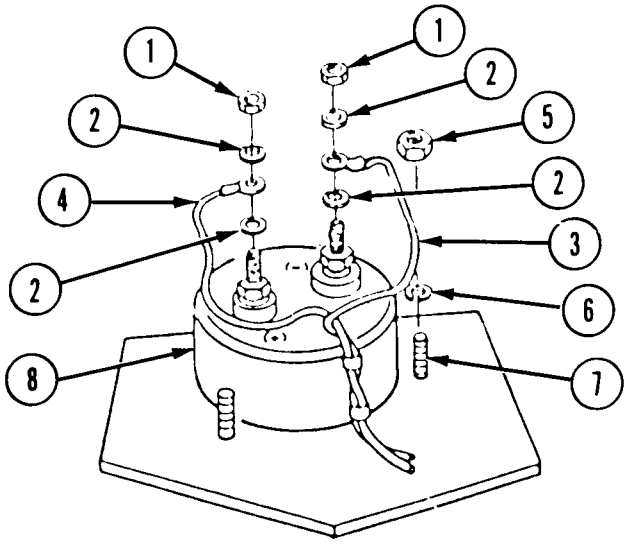
(4) Remove ammeter (8) through front of panel assembly.

b. Installation.

(1) Install ammeter (8) and secure with three screws (7), lockwashers (6) and nut (5).

(2) Reconnect white wire labeled 121 (4) to positive (+) meter post, and secure with flatwasher (2), and nut (1).

(3) Reconnect white wire labeled 122 (3) to other meter post and, secure with flatwasher (2), and nut (1).



3-2-9 LIGHT LENS AND INCANDESCENT LAMP

This task covers:

a. Removal.

b. Inspect.

c. Installation.

NOTE

This procedure applies to all lamps on the test set.

a. Removal.

(1) Remove lid (para 3-11b steps 1 and 3).

(2) Unscrew and remove lens (1) and incandescent lamp (2).

(3) Remove incandescent lamp (2) from lens (1).

b. Inspect

(1) Check light lens (1) and light indicator (3) threads for damage.

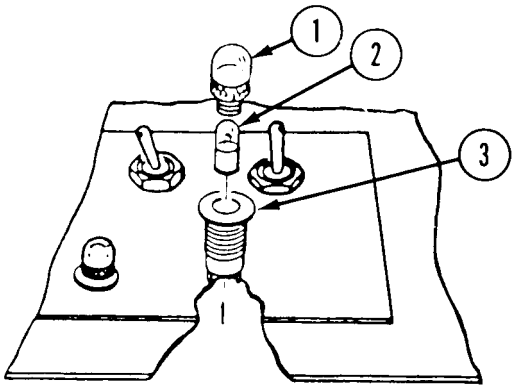
(2) Inspect lens (1) for damage.

c. Installation.

(1) Insert replacement incandescent lamp (2) into light lens (1).

(2) Screw light lens (1) into light indicator (3).

(3) Replace lid (para 3-11c step 30).



3-30 HOUSING INDICATOR.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electonic equipment tool
kit TK-100/G

NOTE
This procedure applies to the replacement of any housing indicator on the test set.

a. Removal

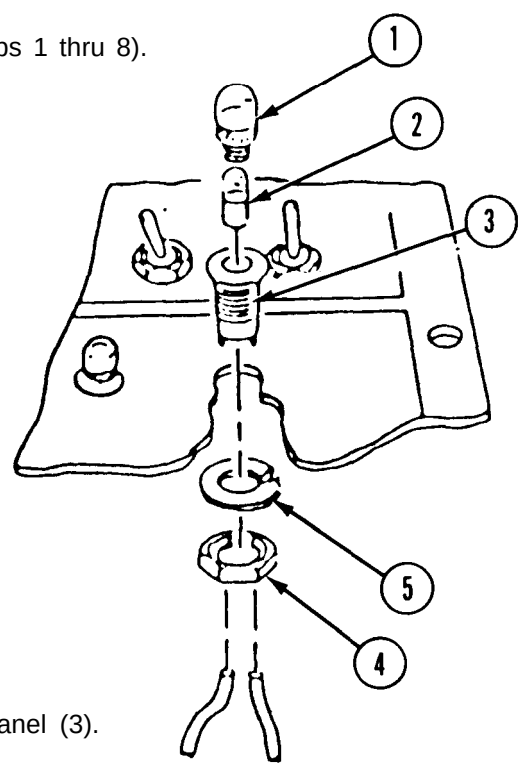
(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Remove lens (1) and incandescent lamp (2).

(3) Unsolder wires from housing indicator (3).

(4) Remove one nut (4) and lockwasher (5).

(5) Remove housing indicator (3).



b. Installation.

(1) Install replacement housing indicator into front panel (3).

(2) Install one nut (4) and lockwasher (5).

(3) Solder wires to housing indicator (3).

(4) Replace lens (1) and incandescent lamp (2).

(5) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-31 TOGGLE SWITCHES.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G

NOTE

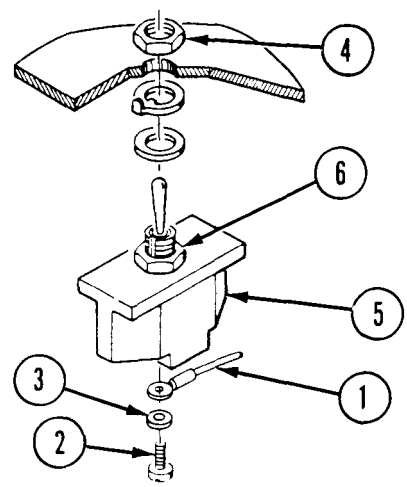
This procedure applies to all test set toggle switches.

a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Remove wires (1). If removing OFFSET INPUT switch, unscrew three screws (2), lockwashers (3) and remove circuit card assembly.

(3) Remove nut (4) and switch (5).



b. Installation.

(1) Remove nut (4).

(2) Adjust nut (6) until threads extend approx. 1/16 inch above panel assembly.

(3) Secure toggle switch (5) with nut (4).

(4) Using FO-2 as a guide, connect wires (1).

(5) If OFFSET INPUT switch was replaced, install circuit card assembly with three screws (2) and lockwashers (3).

(6) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-32 ROTARY SWITCH (ALARM TEST).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G

a. Removal.

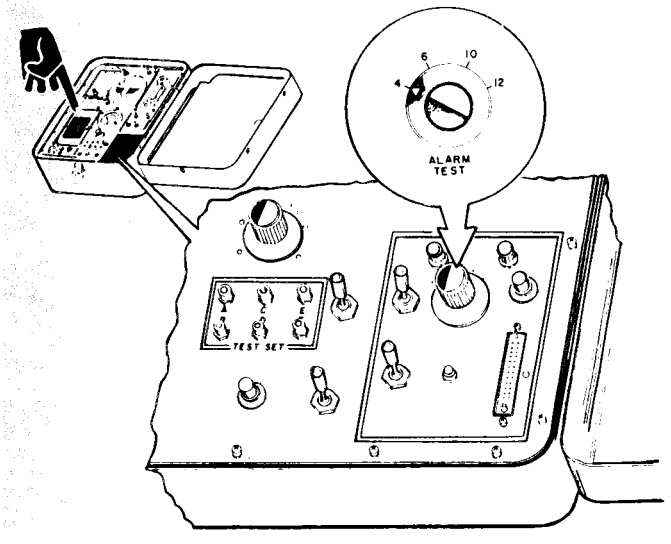
(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

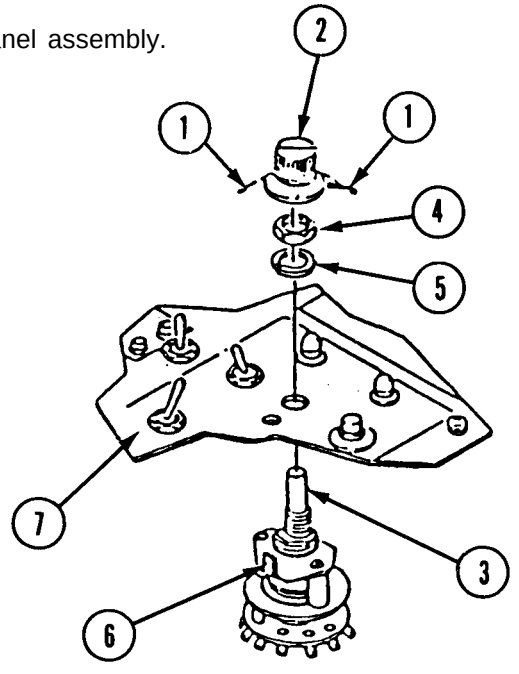
(2) Remove five wires.

(3) Loosen two setscrews (1) and remove knob (2) from shaft of ALARM TEST switch (3).

(4) Remove nut (4) and lockwasher (5).

(5) Remove rotary switch (3) from rear of panel assembly.





3-32 ROTARY SWITCH (ALARM TEST) (CONT).

b. Installation.

(1) Position key (6) to align with hole and seat rotary switch (3) in panel assembly (7).

(2) Secure rotary switch (3) with nut (4) and Iockwasher (5).

(3) Install knob (2).

(4) Tighten two setscrews (1).

(5) Rotate knob (2) counterclockwise until it stops.

(6) Loosen setscrews and set knob to position #4.

(7) Tighten both setscrews (1).

(8) Using FO-2 as a guide, connect five wires to rotary switch (3).

(9) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-33 PUSHBUTTON SWITCH.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool kit TK-100/G

NOTE

This procedure applies to all test set pushbutton switches.

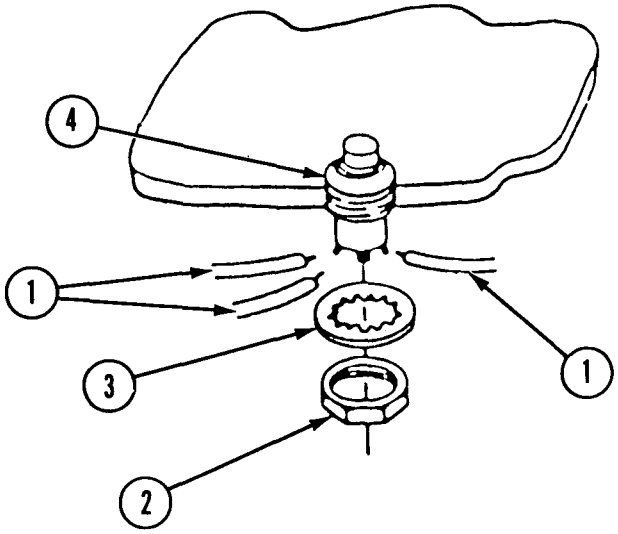
a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Remove wires (1).

(3) Remove nut (2) and lockwasher (3).

(4) Remove pushbutton switch (4).



b. Installation.

(1) Install pushbutton switch (4).

(2) Install lockwasher (3) and nut (2).

(3) Using FO-2 as a guide, connect wires (1).

(4) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-34 INDICATOR LIGHT (SNYC PULSE LAMP).

This task covers:

a. Removal.

b. Installation,

INITIAL SETUP

Tools:

Electonic equipment tool
kit TK-105/G

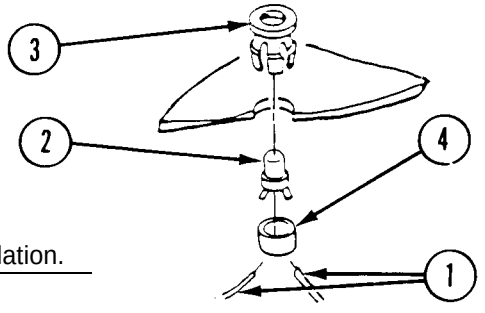
Equipment condition: Lid and panel assembly removed during troubleshooting. Materials/Parts: Heat shrinkable electrical sleeving insulation (item 3, app D).

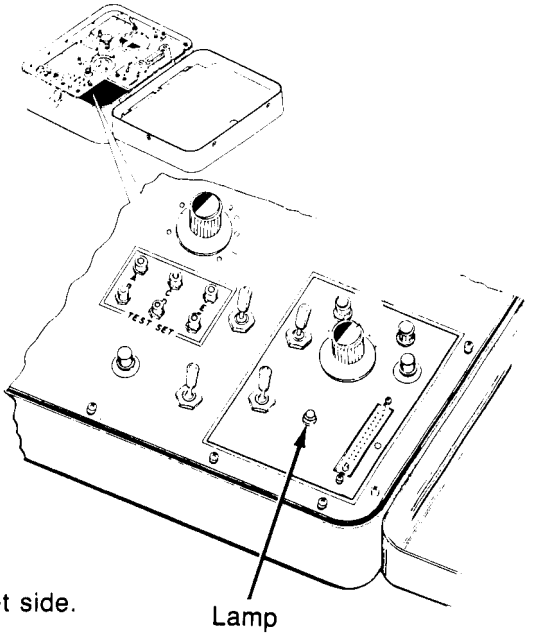
a. Removal.

(1) Cut two wires (1) Nos. 56 and 109.

(2) Remove collet (4) from lamp (2).

(3) Remove lamp (2) and collar (3).





b. Installation.

(1) Insert collar (3) into panel assembly from front side.

(2) Insert replacement lamp (2) into collar from rear of panel assembly.

(3) Secure with collet (4).

(4) Slide heat shrinkable electrical sleeving insulation (item 3, app D) over wires.

NOTE

Attach wire No. 109 to longest lead of replacement lamp.

(5) Solder wires (1) from replacement lamp to previously cut wires.

(6) Postion insulation and heat shrink.

3-35 CIRCUIT CARD ASSEMBLY.

This task covers:

a. Removal.

b. Installation.

Tools:

Electronic equipment tool
kit TK-105/G

INITIAL SETUP

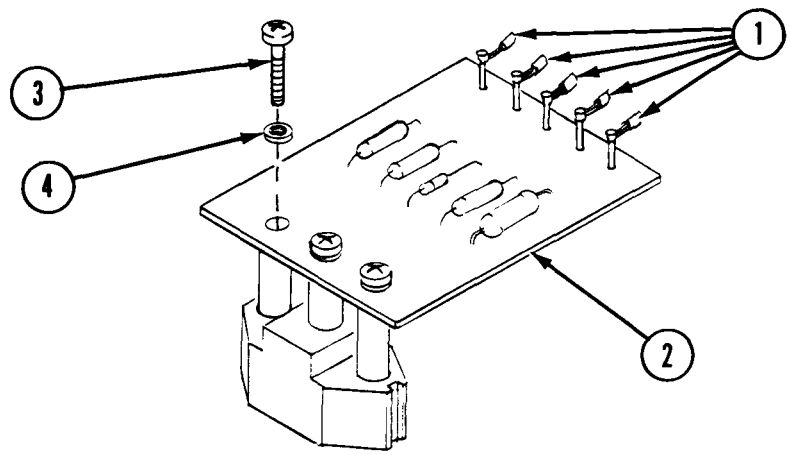
Equipment condition: Lid and front panel assembly removed druing troubleshooting.

a. Removal.

(1) Unsolder wires (1) from circuit card assembly (2).

(2) Remove three screws (3) and lockwasher (4).

(3) Remove circuit card assembly (2).



b. Installation.

(1) Install circuit card assembly (2) with lockwasher (4) and screws (3).

(2) Using FO-2 as a guide, connect wires (1) to circuit card assembly (2).

3-36 TIP JACK.

This task covers:

a. Removal.

B. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G and TK-105/G

A. Removal.

(1) Remove lid and panel assembly (para 3-11 b steps 1 thru 8).

(2) Remove three screws (1) and lockwashers (2) and circuit card assembly (3).

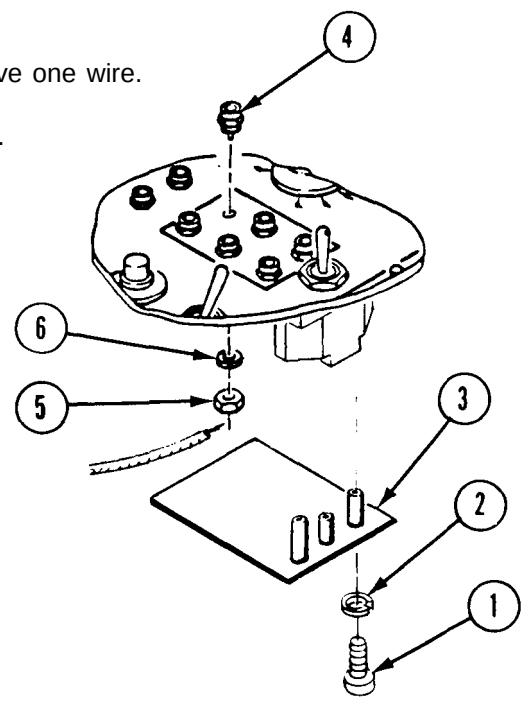
(3) Unsolder wire or wires from tip jack (4).

NOTE

Some tip jacks only have one wire.

(4) Remove one nut (5) and one lockwasher (6).

(5) Remove tip jack (4).



b. Installation.

(1) Insert tip jack (4).

(2) Secure with lockwasher (6) and nut (5).

(3) Soldler wire to tip jack (4).

(4) Replace circuit card assembly (3) and secure with three lockwashers (2) and screws (1).

(5) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-37. RECEPTACLE CONNECTOR.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equpment tool
Kit TK-105/G

a. Removal.

(1) Remove lid and panel assembly (para 3-11 b steps 1 thru 8).

(2) Remove four screws (1), nuts (2) and Iockwashers (3).

(3) Remove connector (4).

(4) Unsolder wires (5) from pin connections.

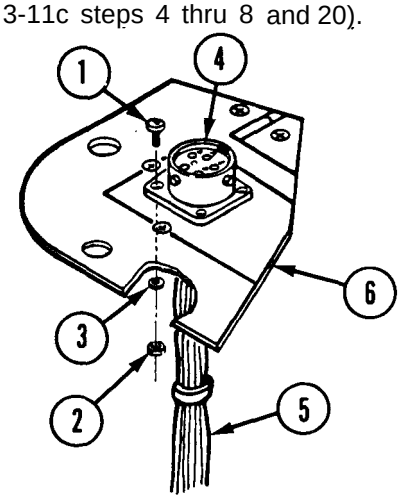
b. Installation.

(1) Using FO-2 as a guide, solder wires (5) to pin connectors.

(2) Position receptacle connector on panel assembly so that board key-slot is at the top of the panel assembly (6).

(3) Insert four screws (1) through panel assembly and recpetable connector; position ground lug on one screw. Install Iockwasher (3) and nuts (2) on screws (1) and tighten screws.

(4) Replace panel assembly and lid (para 3-11c steps 4 thru 8 and 20).



3-38 BINDING POST.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G

a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Unsolder wires from binding posts (1),

(3) Remove nut (2), Iockwasher (3), flat washer (4), and bottom insulator (5) from binding post (1).

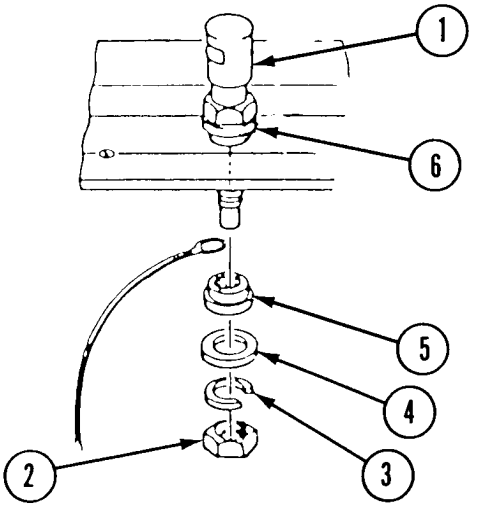
(4) Remove binding post (1) and top insulator (6).

b. Installation.

(1) Install binding post with top insulator (6) into front of panel and install bottom insulator (5), flat washer (4), Iockwasher (3), and nut (2) on binding post.

(2) Solder wires to binding post (1).

(3) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).



3-39 FUSEHOLDER.

This task covers;

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronics equipment tool
kit TK-100/G

Materials/Parts: Cartridge fuse part No. FO2-A-250V-2A

a. Removal

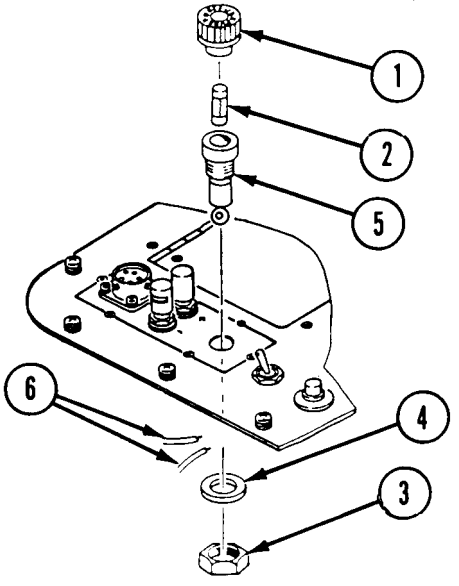
(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Remove fuseholder cap (1) and remove fuse (2).

(3) Remove nut (3) and lockwasher (4) and pull fuseholder (5) through panel assembly.

(4) Unsolder wires (6) from fuseholder (5).

(5) Remove lockwasher (4) and nut (3) from wires.



b. Installation.

(1) Slide nut (3) and lockwasher (4) onto wires (6) and pull wires through panel assembly.

(2) Using FO-2 as a guide, soldler wires (6) to fuseholder (5).

(3) Install lockwasher (4) and nut (3) on fuseholder (5).

(4) Install fuse (2) and fuseholdler cap (1).

(5) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-40 LINE FILTER (FL1).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G

Equipment conditon: Lid and panel assembly removed during troubleshooting.

a. Removal.

(1) Remove wire 137 from line filter (3).

(2) Remove nut (1), washer (2) and line filter (3) from case.

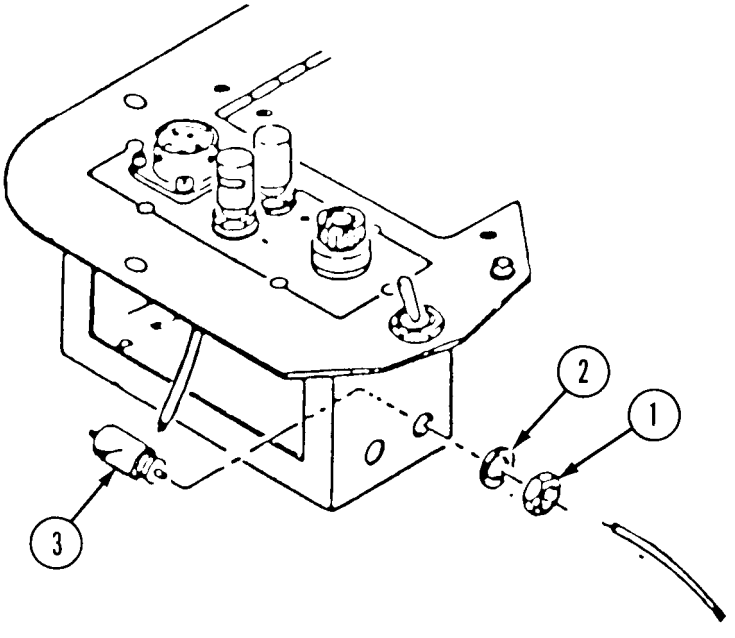
(3) Remove remaining wire 125 from line filter (3),

b. Installation.

(1) Solder wire no. 125 to line filter (3).

(2) Install and secure line filter (3) with washer (2) and nut (1).

(3) Solder wire no. 137 to line filter (3).



3-41 LINE FILTER (FL2).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G

Equipment conditon: Lid and panel assembly removed during troubleshooting.

a. Removal.

(1) Remove wires 91, 92 from line filter (3).

(2) Remove nut (1), washer (2) and line filter (3) from case.

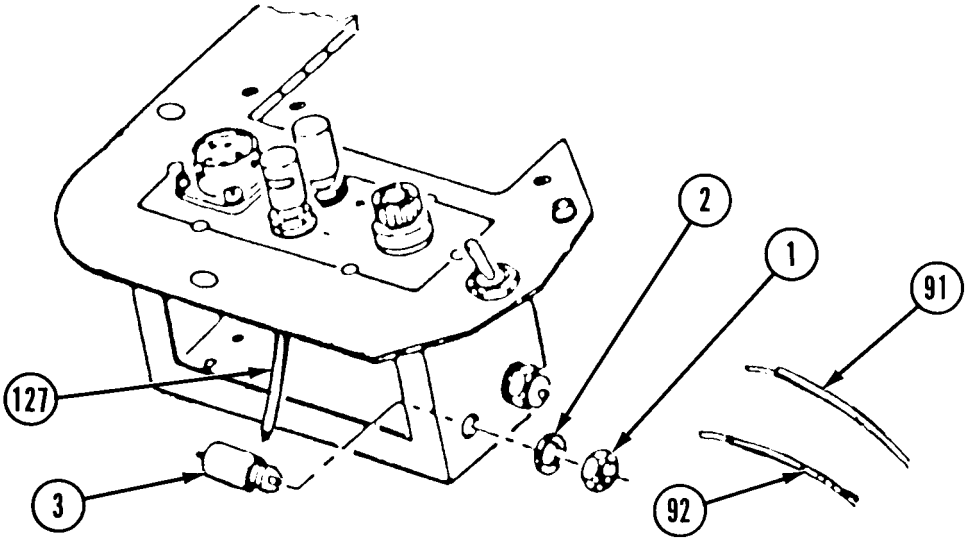
(3) Remove remaining wire 127 from line filter FL2.

b. Installation.

(1) Solder wire 127 to line filter FL2.

(2) Install and secure line filter (3) with washer (2) and nut (1).

(3) Solder wire no. 91 and 92 to line filter (1).



3-42 TERMINAL BOARD.

This task covers:

a. Removal

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool kit TK-105/G

NOTE

The following procedures apply to replacement of the two terminal boards on the test set.

a. Removal

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) If required, open CABLE STORAGE door for access to mounting hardware of TB2.

(3) Remove four screws (1), nuts (3), lockwashers (2).

(4) Remove terminal board (4).

(5) Remove wires from terminal board (4).

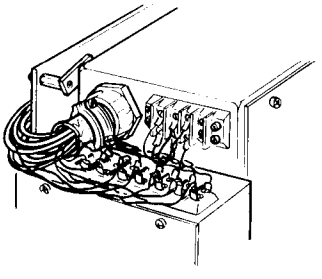
b. Installation.

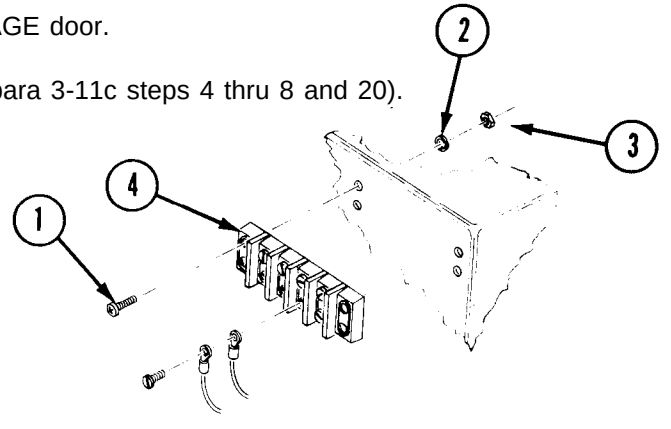
(1) Using FO-2 as a guide, install wires on terminal board (4).

(2) Install terminal board (4) on test set using four screws (1), lockwashers (2), and nuts (3).

(3) If opened, close CABLE STORAGE door.

(4) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).





3-43 CABLE COVER ASSEMBLY (CABLE STORAGE).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

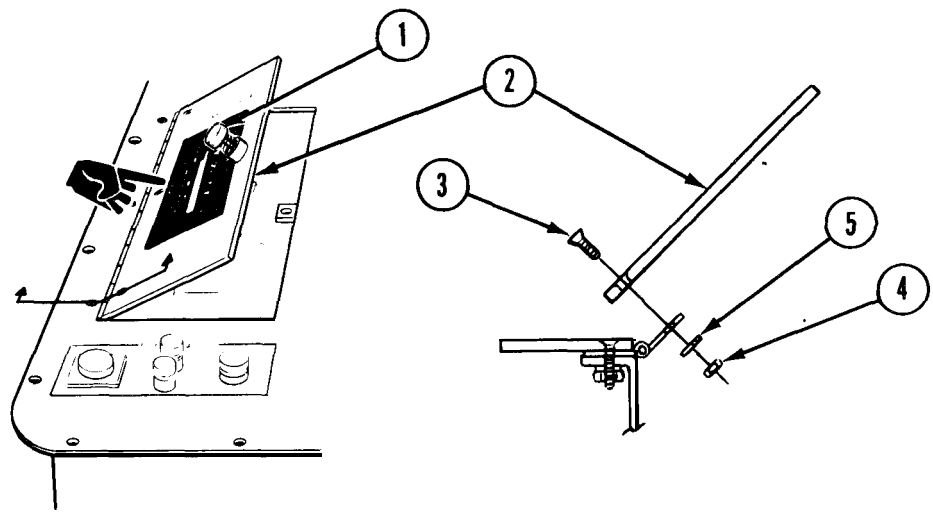
Electronic equipment tool
kit TK-105/G

a. Removal

(1) Remove lid (para 3-11b steps 1 thru 3).

(2) Unscrew screw (1) and open cable cover assembly (2).

(3) Remove three screws (3), nuts (4), and lockwashers (5).



b. Installation.

(1) install cable cover assembly (2) on hinge using three screws (3), lockwashers (5) and nuts (4).

(2) Close cable cover assembly (2) and secure with screw (1).

(3) Install lid (para 3-11c step 20).

3-44 BRACKET ASSEMBLY LATCH (CABLE STORAGE).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

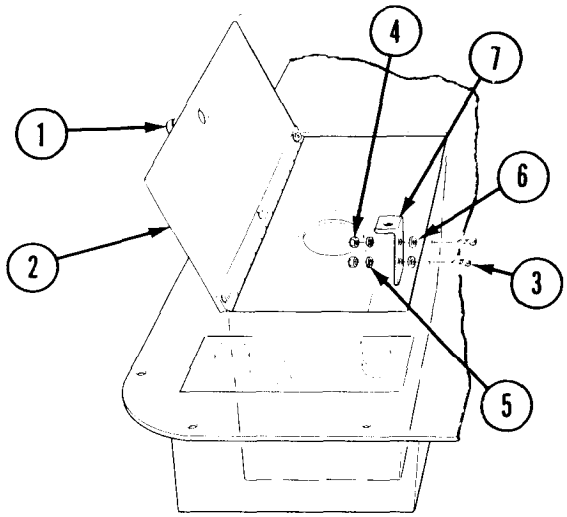
a. Removal

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Remove circuit card assembly (para 3-47a steps 2 and 3).

(3) Unscrew screw (1) and open cable cover assembly (2),

(4) Remove two screws (3), nuts (4), lockwashers (5), flatwashers (6), and bracket assembly latch (7).



b. Installation.

(1) Install two screws (3), flatwashers (6), bracket assembly latch (7), lockwashers (5), and nuts (4).

(2) Install circuit card assembly (para 3-47b steps 1 and 2).

(3) Close and secure cable cover assembly (2) with screw (1).

(4) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-45 TEMPERATURE SENSOR (INLET TEMP).

This task covers;

a. Removal.

b. Installation.

INITIAL SETUP

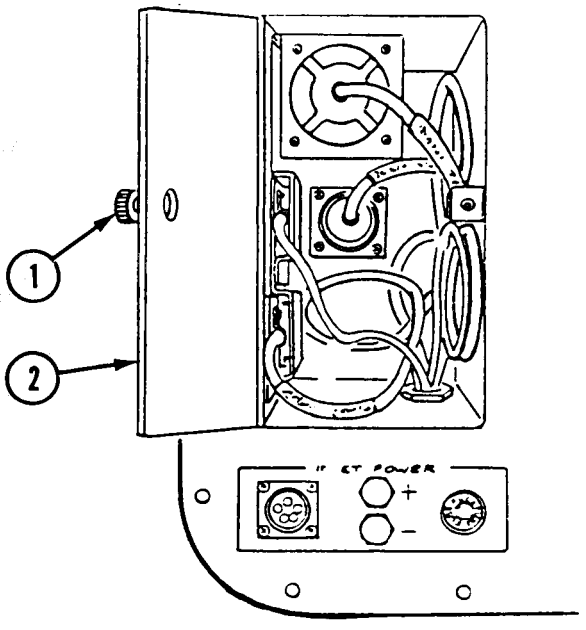
Tools:

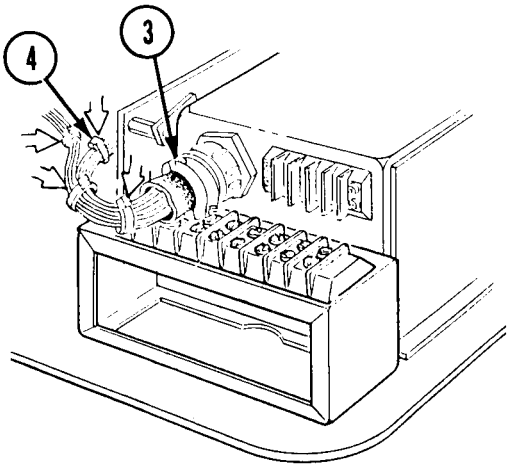
Electronic equipment tool
kit TK-100/G and TK-105/G

a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Unscrew screw (1) and open cable cover assembly (2).





CAUTION

TO PREVENT DAMAGE TO THE TEMPERATURE SENSOR TERMINAL LUGS AND RUBBER BUSHING USE CARE DURING REMOVAL AND INSTALLATION PROCEDURES.

(3) Loosen cable clamp screws (3).

(4) Cut wire ties (4).

3-45 TEMPERATURE SENSOR (INLET TEMP) (CONT).

(5) Using Figure FO-2 as a guide disconnect INLET TEMP label wires (5).

(6) Remove temperature sensor (6) from housing subassembly by turning collar counterclockwise.

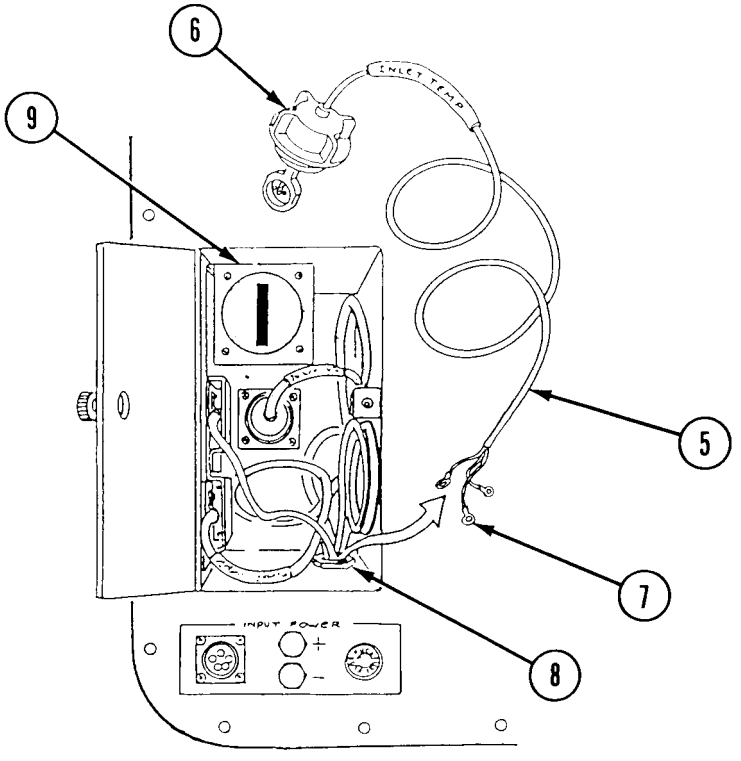
(7) Tie lacing and typing tape to terminals (7).

(8) Pull INLET TEMP cable (5) thru rubber bushing (8) from inside of storage compartment.

(9) Cut lacing and typing tape from terminals (7)

b. Installation

(1) Tie lacing and tying tape to new INLET TEMP terminals (7).



CAUTION

TO AVOID WIRING DAMAGE TAPE TERMINAL ENDS OF TEMPERATURE SENSOR CABLE WITH ELECTRICAL TAPE.

3-45 TEMPERATURE SENSOR (INLET TEMP).

(2) Install INLET TEMP cable (5) into housing subassembly (9) and secure by turning collar clockwise.

(3) Pull INLET TEMP cable (5) terminal lugs (7) through bushing (8), until the cable is long enough to attach terminal lugs to proper terminals.

(4) Cut tape from terminals (7).

(5) Using FO-2 as a guide connect wires removed in step a5.

(6) Tighten clamp screws (3) and tie wires with lacing and tying tape.

(7) Place all cable assemblies into CABLE STORAGE compartment and secure cable cover assembly with screw.

(8) Install panel assembly and lid. (para 3-11c steps 4 thru 8 and 20).

3-46 HOUSING SUBASSEMBLY.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

a. Removal.

(1) Remove lid (para 3-11b steps 1 thru 3).

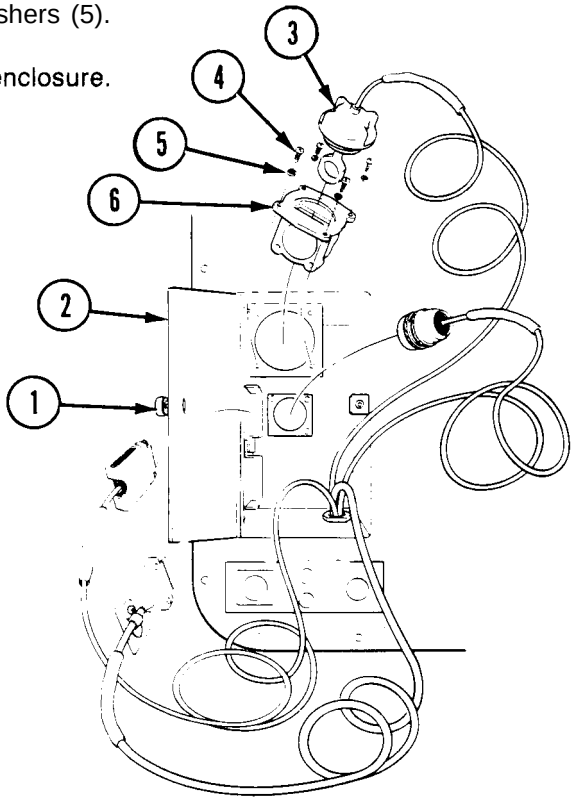
(2) Loosen screw (1) and open cable cover assembly (2).

(3) Remove paddle temperature assembly (3) from housing subassembly by turning collar counterclockwise.

(4) Remove remaining cables fro CABLE STORAGE compartment.

(5) Remove four screws (4) and lockwashers (5).

(6) Lift housing subassemlby (6) from enclosure.



3-46 HOUSING SUBASSEMBLY.

b. Installation.

(1) Install housing subassembly (6) and secure with four screws (4) and lockwashers (5).

(2) Insert temperature sensor (3) into housing subassembly (6) and secure by turning collar clockwise.

(3) Replace remaining cables into CABLE STORAGE compartment.

(5) Close lid (para 3-11c step 20).

3-47 CIRCUIT CARD ASSEMBLY.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool kit TK-105/G

Troubleshooting references: (para 3-7.3)

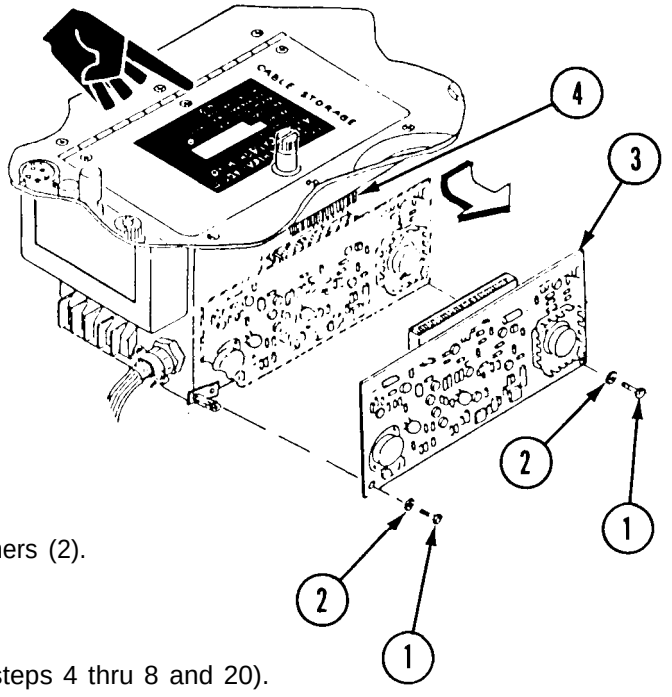
Equipment condition: Lid removed during functional testing.

a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Remove two screws (1) and lockwashers (2).

(3) Remove circuit card assembly (3) from connector (4).



b. Installation.

(1) Install circuit card assembly (3).

(2) Install two screws (1) with lockwashers (2).

(3) Perform Functional Test (table 3-2).

(4) Install panel assembly (para 3-11c steps 4 thru 8 and 20).

3-48 DUMMY CONNECTOR (DETECTOR POWER CABLE).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

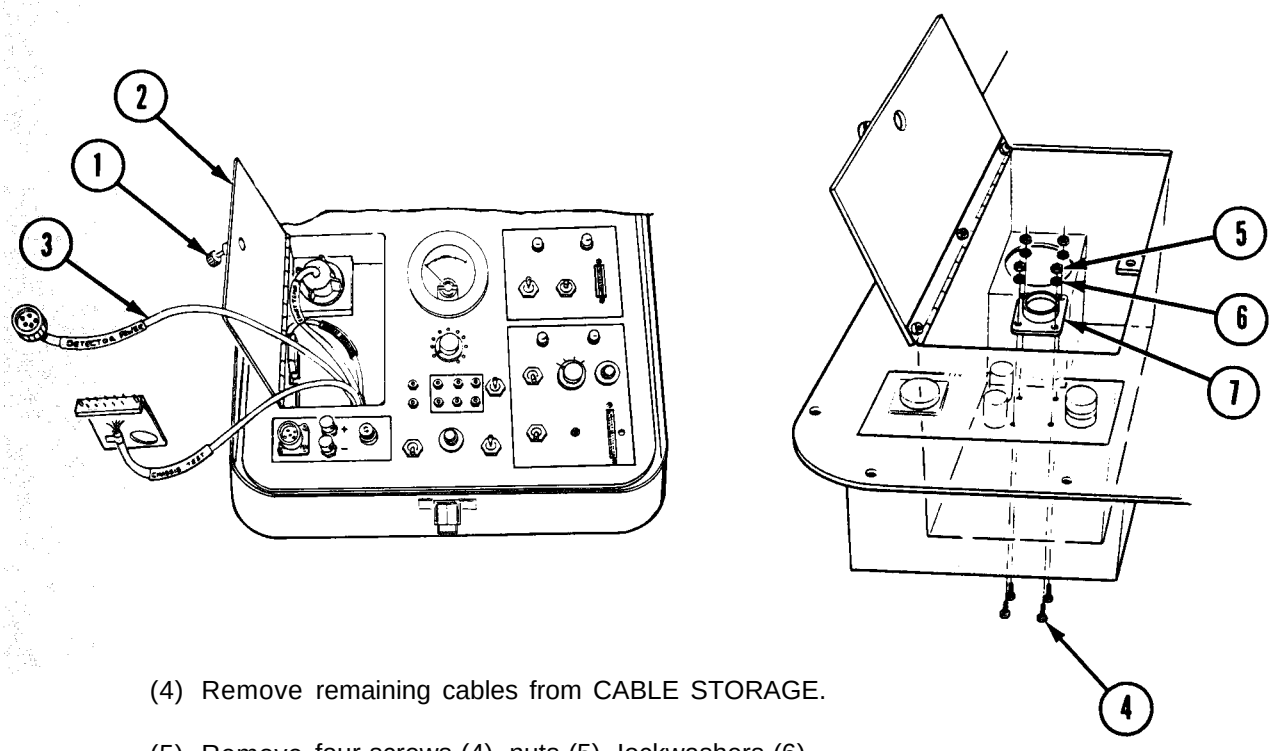
Electronic equipment tool
kit TK-105/G

a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Unscrew screw (1) and open cable cover assembly (2).

(3) Remove cable labeled detector power (3) from dummy connector (7).



(4) Remove remaining cables from CABLE STORAGE.

(5) Remove four screws (4), nuts (5), lockwashers (6).

(6) Remove dummy connector (7).

3-48 DUMMY CONNECTOR (DETECTOR POWER CABLE) (CONT).

b. Installation.

(1) Install dummy connector (7) using four screws (4), Iockwashers (6), nuts (5).

(2) Install DETECTOR POWER CABLE (3) on dummy connector (7).

(3) Put remaining cables in CABLE STORAGE.

(4) Close cable cover assembly and secure with screw (1).

(5) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-49 BRANCHED ELECTRICAL SPECIAL PURPOSE CABLE ASSEMBLY (PUMP POWER).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G and TK-105/G

a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Lossen cable clamp screws (1).

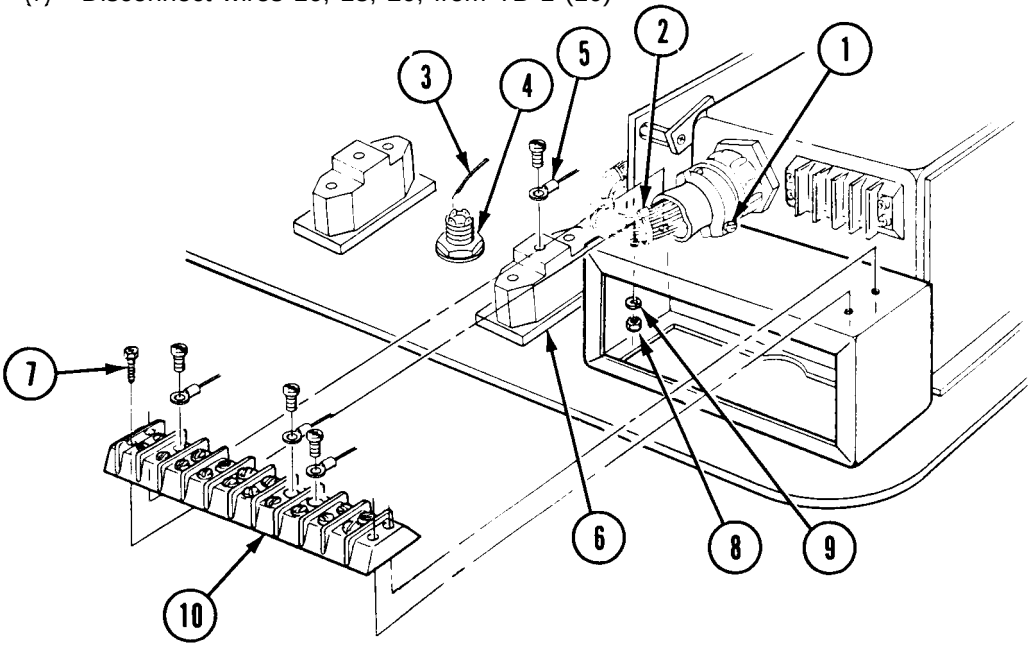
(3) Cut wire ties (2).

(4) Disconnect wire 17 (3) from S7 (4) and wire 19 (5) form S1 (6).

(5) Remove four screws (7), nuts (8) and lockwashers (9).

(6) Remove terminal board (10).

(7) Disconnect wires 16, 18, 20, from TB 1 (10)



3-49 BRANCHED ELECTRICAL SPECIAL PURPOSE CABLE ASSEMBLY (PUMP POWER) (CONT).

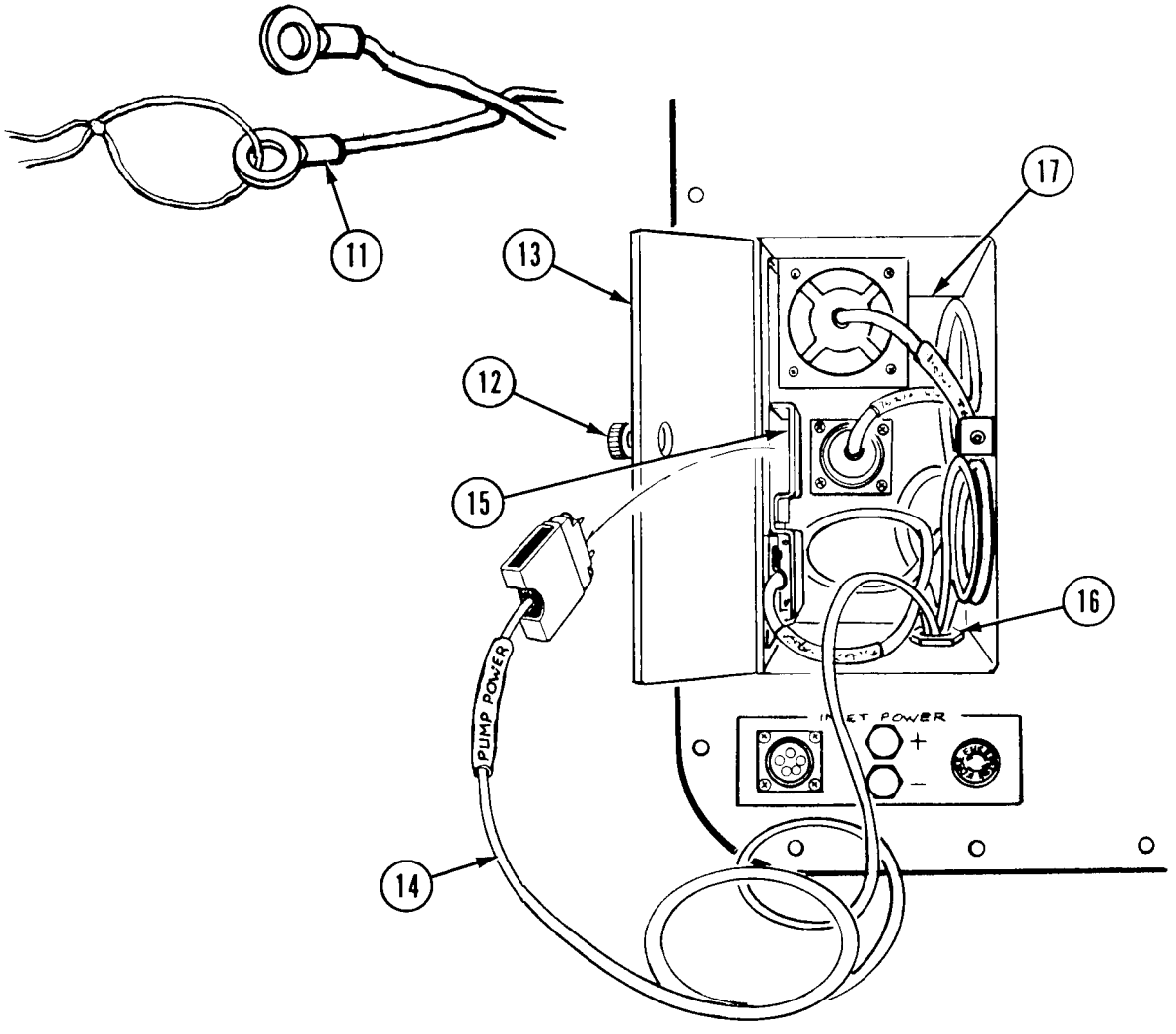
(8) Tie lacing and typing tape to one terminal (11)

(9) Unscrew screw (12) and open cable cover assembly (13).

(10) Remove cable labeled PUMP POWER (14) from bracket (15).

(11) Pull PUMP POWER cable through bushing (16) from inside of CABLE STORAGE compartment.

(12) Cut lacing and typing tape from terminal (11).



3-49 BRANCHED ELECTRICAL SPECIAL PURPOSE CABLE ASSEMBLY (PUMP POWER)

b. Installation.

(1) Tie lacing and tying tape to terminal (11) of new cable (14)

CAUTION

TO AVOID WIRING DAMAGE, TAPE TERMINAL ENDS OF PUMP POWER CABLE WITH ELECTRICAL TAPE.

(2) Pull PUMP POWER cable (14) through bushing (16) from outside of CABLE STORAGE compartment until cable is long enough to connect wires.

(3) Cut lacing and tying tape and remove electrical tape from terminal.

(4) Replace all cable assemblies into cable storage compartment (17) and secure cable cover assembly (13) with screw (12).

(5) Using Figure FO-2 as a guide connect wires removed in para a steps 4 and 7 above.

(6) install terminal board (10) using four screws (7), lockwashers (9) and nuts (8).

(7) Tie wires with lacing and tying tape.

(8) Tighten cable clamp screws (1).

(9) Install panel assembly and lid. (para 3-11c steps 4 thru 8 and 20).

3-50 BRANCHED ELECTRICAL SPECIAL PURPOSE CABLE ASSEMBLY (CHASSIS TEST).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G and TK-105/G

a. Removal

(1) Remove lid and panel assembly. (para 3-11b steps 1 thru 8).

(2) Loosen cable clamp screws (1).

(3) Cut wire ties.

(4) Remove four screws, (2), lockwashers (3) and nuts (4).

(5) Remove terminal board (5)

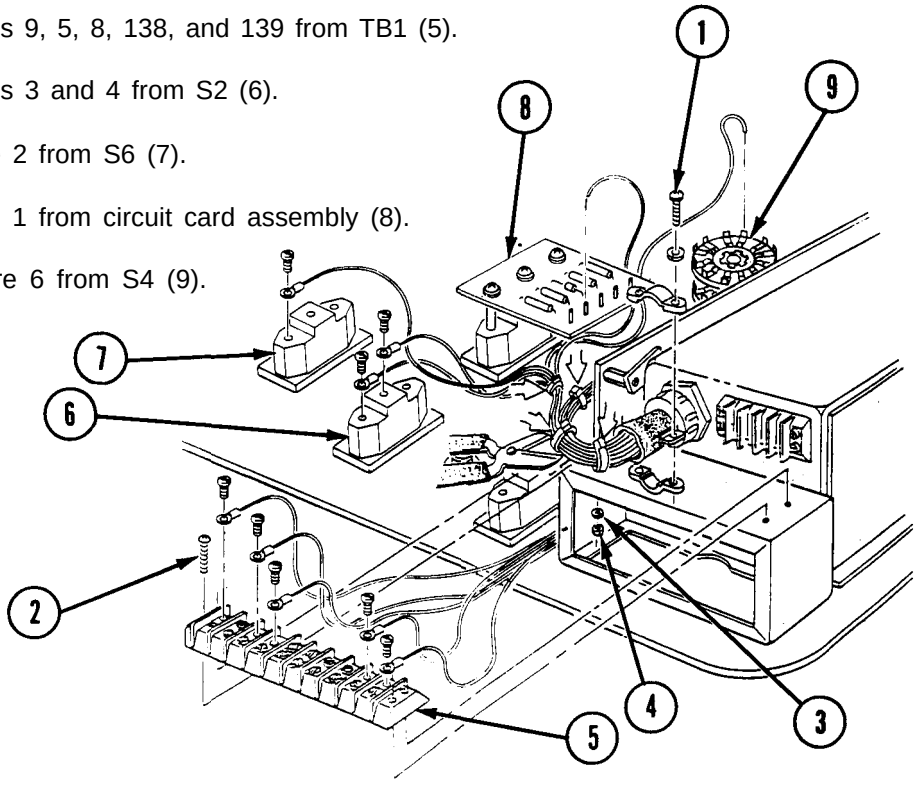
(6) Remove wires 9, 5, 8, 138, and 139 from TB1 (5).

(7) Remove wires 3 and 4 from S2 (6).

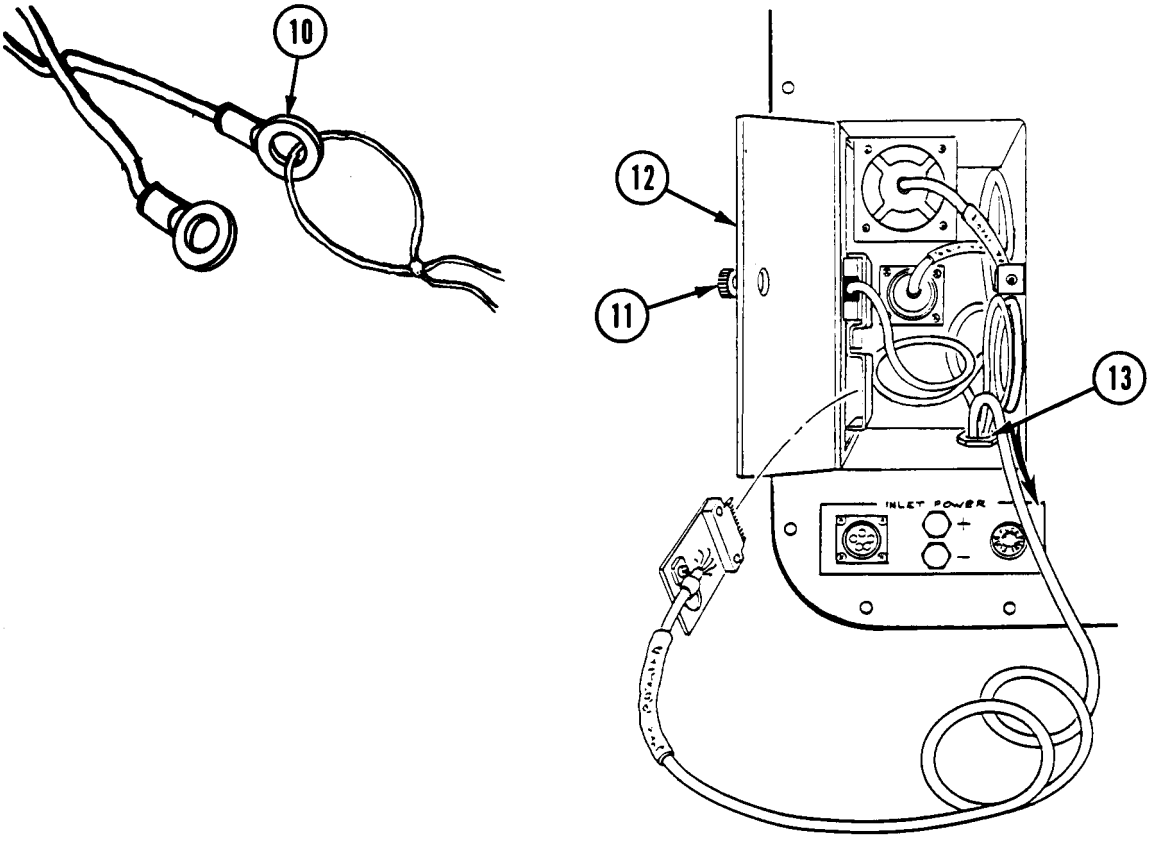
(8) Remove wire 2 from S6 (7).

(9) Remove wire 1 from circuit card assembly (8).

(10) Remove wire 6 from S4 (9).



(11) Tie lacing and tying tape to one terminal (10).



(12) Unscrew screw (11) and open cable cover assembly (12).

(13) Remove cable labeled CHASSIS TEST from bracket assembly.

(14) Pull CHASSIS TEST cable through bushing (13) from inside CABLE STORAGE compartment.

(15) Cut lacing and typing tape from terminal.

3-50 BRANCHED ELECTRICAL SPECIAL PURPOSE CABLE ASSEMBLY (CHASSIS TEST) (CONT)

b. Installation

(1) Tie lacing and typing tape to terminal (10) of new cable.

CAUTION

TO AVOID WIRING DAMAGE, TAPE TERMINAL ENDS OF CHASSIS TEST CABLE WITH ELECTRICAL TAPE.

(2) Pull CHASSIS TEST cable through bushing (13) from outside of CABLE STORAGE compartment until cable is long enough to connect wires.

(3) Cut lacing and tying tape and remove electrical tape from terminal.

(4) Replace all cable assemblies in CABLE STORAGE compartment and secure cable cover assembly (12) with screw (11).

(5) Using Figure FO-2 as a guide, connect wires removed in para a steps 6 thru 10.

(6) Install terminal board using four screws (2), Iockwashers (3) and nuts (4).

(7) Tie wires with lacing and tying tape.

(8) Tighten cable clamp screws (1).

(9) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-51 BRANCHED ELECTRICAL POWER CABLE ASSEMBLY (DETECTOR POWER).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

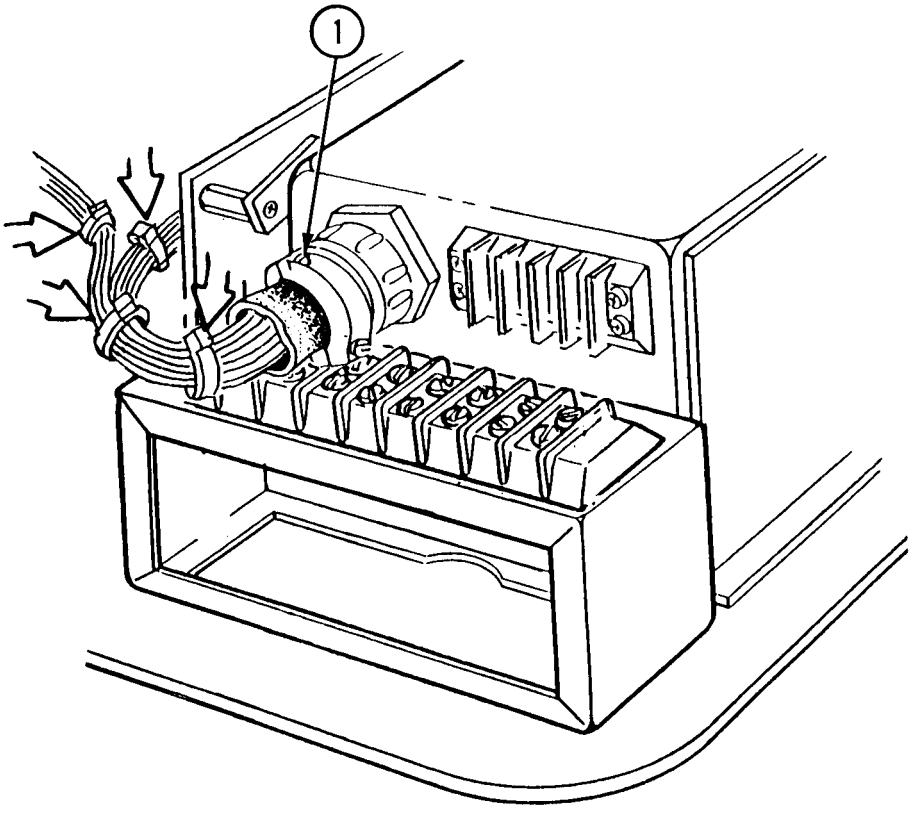
Electronic equipment tool
kit TK-100/G and TK-105/G

a. Removal

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Loosen cable clamp screws (1).

(3) Cut wire ties.



3-51 BRANCHED ELECTRICAL POWER CABLE ASSEMBLY (DETECTOR POWER) (CONT).

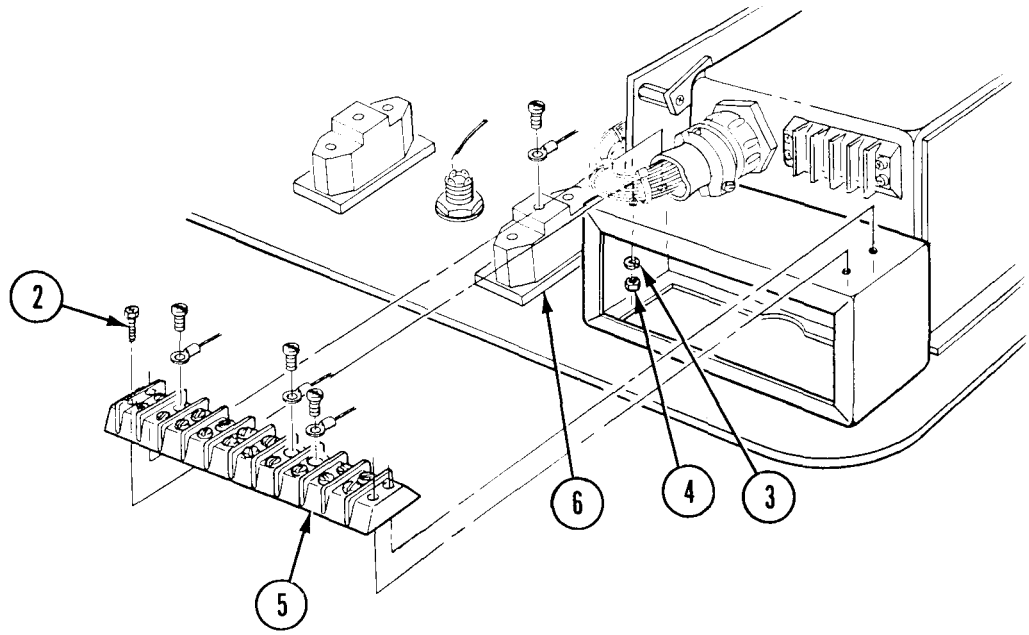
(4) Remove four screws (2), Iockwashers (3) and nuts (4).

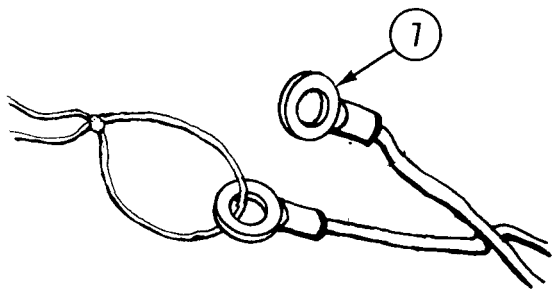
(5) Remove terminal board (5).

(6) Remove wires 11, 13, 14 and 15 from TB1 (5).

(7) Remove wire 12 from S1 (6).

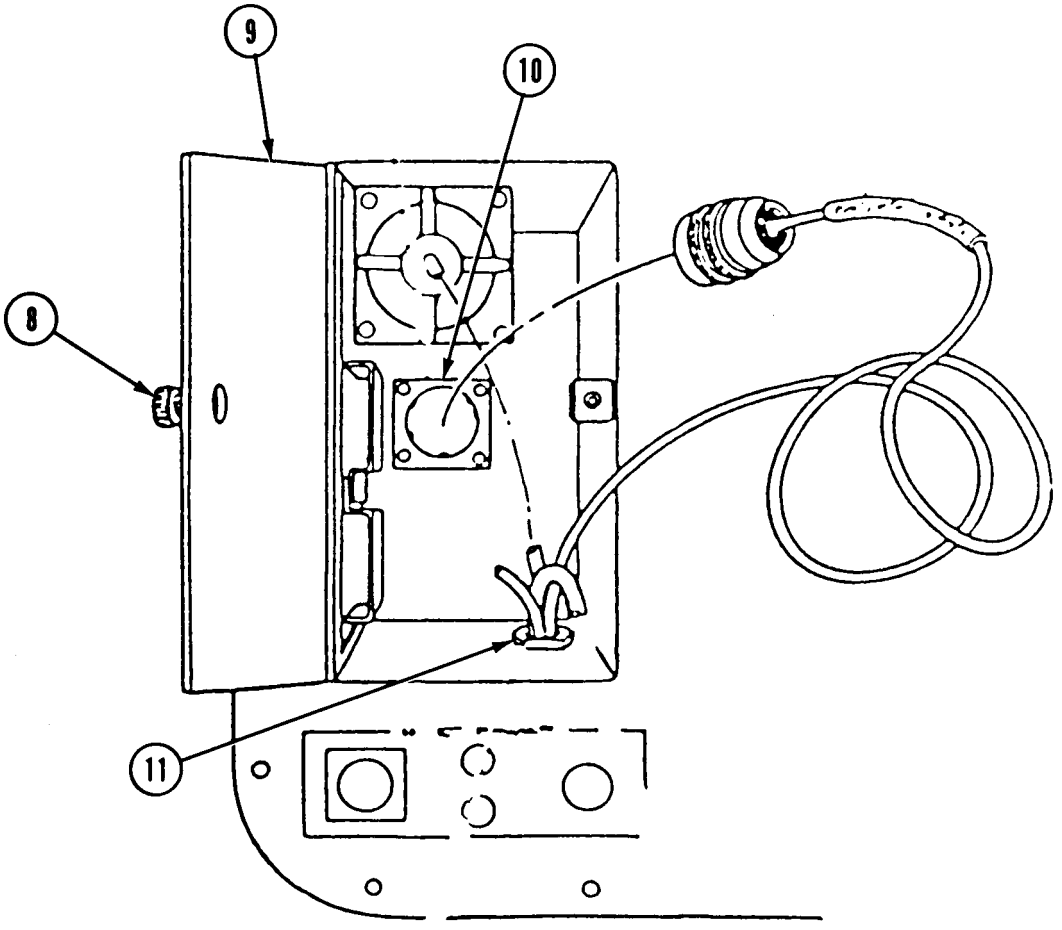
(8) Tie lacing and tying tape to one terminal (7).





3-51 BRANCHED Electrical POWER CABLE ASSEMBLY (DETECTOR POWER).

(9) Unscrew screw (8) and open cable cover assembly (9).



(10) Remove cable labeled DETECTOR POWER from dummy connector (10).

(11) Pull DETECTOR POWER cable through bushing (11) from inside CABLE STORAGE compartment.

(12) Cut lacing and tying tape from termial.

3-51 BRANCHED ELECTRICAL POWER CABLE ASSEMBLY (DETECTOR POWER) (CONT).

b. Installation.

(1) Tie lacing and tying tape to terminal (7) of new cable.

CAUTION

TO AVOID WIRING DAMAGE, TAPE TERMINAL ENDS OF DETECTOR POWER CABLE WITH ELECTRICAL TAPE.

(2) Pull DETECTOR POWER cable through bushing (11) from outside CABLE STORAGE compartment until cable is long enough to connect wires.

(3) Cut lacing and tying tape and remove electrical tape from terminal.

(4) Replace all cable assemblies into CABLE STORAGE compartment and secure cable cover assembly (9) with screw (8).

(5) Using Figure FO-2 as a guide connect wires removed in para a steps 6 and 7.

(6) Install terminal board (5) using four screws (2), Iockwashers (3), and nuts (4).

(7) Tie wires with lacing and tying tape.

(8) Tighten cable clamp screws (1).

(9) Install panel assembly and lid (para 3-11c steps 4 thru 8 and 20).

3-52 BRANCHED WIRING HARNESS.

This task covers:

a. Removal.

b. Installation.

c. Functional Test.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G and 105/G

Materials/Parts: Heat shrinkable electrical sleeving insulation (item 3, app D).

Equipment condition:

Lid and panel assembly removed during troubleshooting.

a. Removal.

(1) Remove circuit card assembly (para 3-47 a2 and 3).

(2) Using Figure FO-2 as a guide, disconnect branched wiring harness in the following sequence:

a. Remove two screws (1) flatwashers (2) nuts (3) and J3 Connector.

b. Remove four screws (4) lockwashers (5) nuts (6) and remove terminal board (7).

c. Remove all wires from TB1.

d. Remove all wires from TB2

e. Disconnect wire W6 (8) from rotary switch (S4) (13).

f. Loosen two setscrews (9) and remove knob (10).

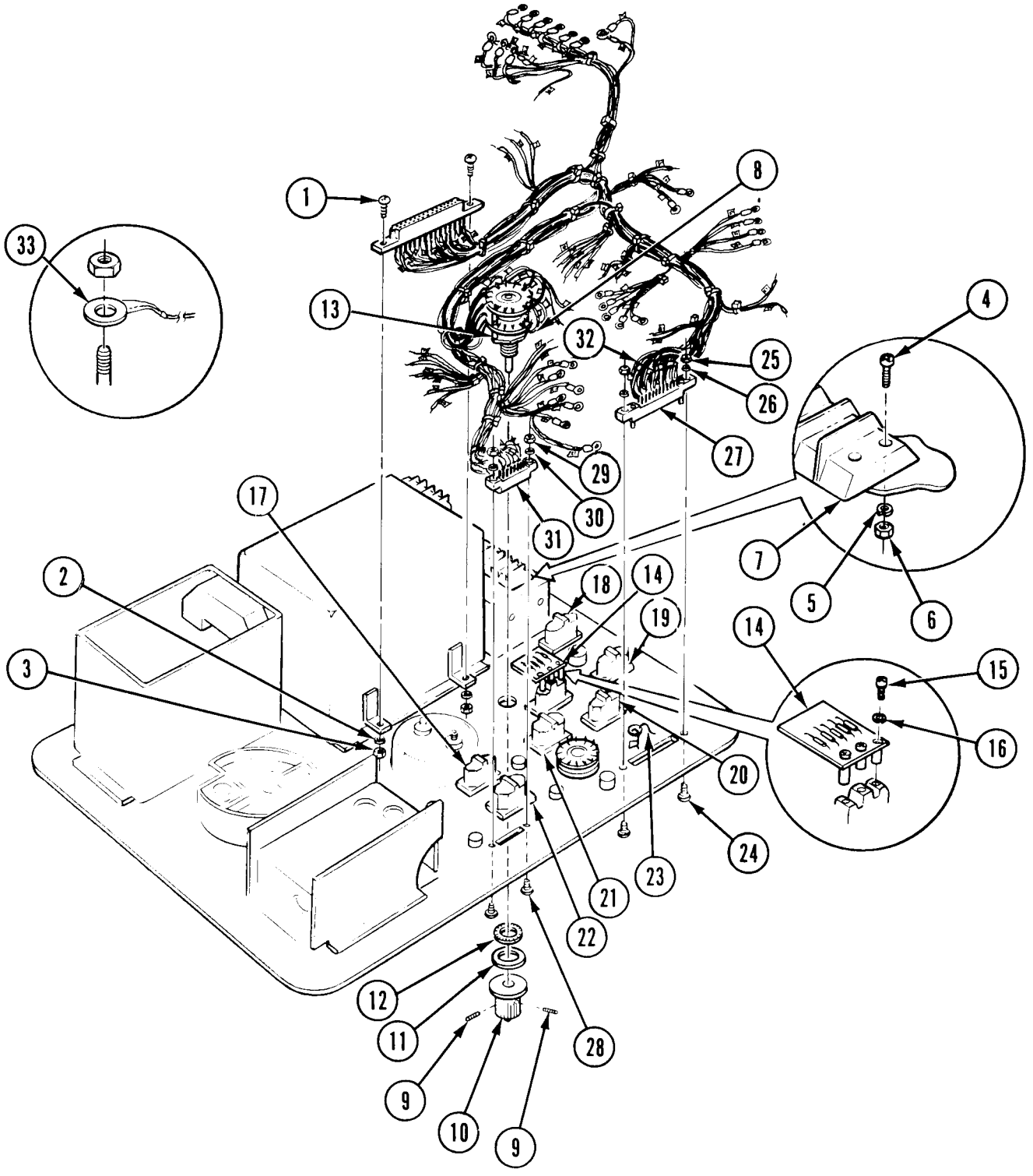
g. Remove nut (11) lockwasher (12) and rotary shaft switch (S4) (13).

h. Disconnect all wires from circuit card assembly (14).

i. Remove three screws (15), lockwashers (16) and circuit card assembly (14).

j. Disconnect all wires from toggle switches (17), (18), (19), (20), (21), and (22).

3-52 BRANCHED WIRING HARNESS (CONT).



3-52 BRANCHED WIRING HARNESS.

NOTE

Label one lead at SYNC PULSE lamp. SYNC PULSE lamp will not operate if wires are reversed during installation.

k. Label one lead at SYNC PULSE lamp (23) and cut wires.

l. Remove two screws (24), nuts (25), lockwashers (26), and connector J1 (27).

m. Remove two screws (28), nuts (29), lockwashers (30) and connector J4 (31).

n. Unsolder wires from E6 (32) and E7 (33).

NOTE

Retain lugs from installation of new branched wiring harness. Do not unsolder wire connected to TP10.

o. Unsolder remaining wires from panel assembly.

b. Installation.

(1) Using Figure FO-2 as a guide, connect branched wiring harness in the following sequence:

NOTE

Insure switch stops are in position illustrated.

a. Install rotary switch S4 (13) using lockwasher (12) and nut (11).

b. Install knob (10) on shaft.

c. Tighten two setscrews (9) and turn knob fully counterclockwise.

d. Loosen setscrews (9) and position knob pointer to INPUT VOLT.

e. Tighten setscrews (9).

f. Solder wire W6 (8) to S4 rotary switch (13).

g. Install connector J3 using two screws (1), flatwashers (2) and nuts (3).

3-52 BRANCHED WIRING HARNESS (CONT).

h. Solder all tinned tipped wires, except wires to be connected to circuit card asembly (14).

i. Install connector J4 (31) using two screws (28), lockwashers (30) and nuts (29).

NOTE

Be sure ground lug is installed on one mounting screw of connector J1.

j. Install connector J1 (27) using two screws (24), lockwashers (26) and nuts (25).

k. Connect wires to toggle switches (17), (18), (19), (20), (21), and (22).

l. Slide heat shrinkable sleeving insulation (item 3, app D) unto wires to be connected to the SYNC PULSE before soldering wires.

m Solder wires to SYNC PULSE lamp leads as labeled.

n. Install circuit card assembly (14) using three screws (15) and lockwashers (16).

o. Solder wires to circuit card assembly (14).

p. Connect wires to TB2.

q. Connect wires to TB1 (7).

r. Install TB1 with four screws (4), lockwashers (5) and nuts (6).

s. Install circuit card assembly. (Para 3-47b steps 1 and 2).

c. Functional Test.

a. Perform Functional Test (table 3-2).

3-53 BUTT HINGE (CABLE STORAGE COMPARTMENT).

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

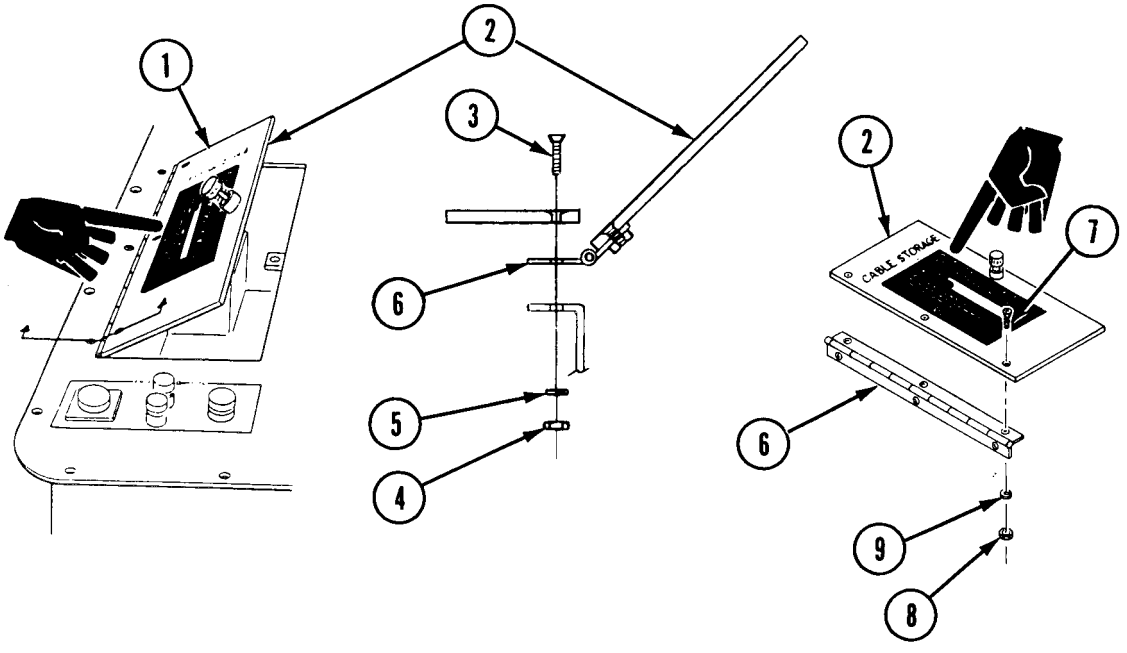
a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 thru 8).

(2) Unscrew screw (1) and open cable cover assembly (2).

(3) Remove three screws (3), nuts (4), lockwashers (5) and remove cable cover assembly (2) with hinge (6) attached.

(4) Remove three screws (7), nuts (8), lockwashers (9) and remove butt hinge (6) from cable cover assembly (2).



3-53 BUTT HINGE (CABLE STORAGE COMPARTMENT) (CONT).

b. Installation.

(1) Install cable cover assembly (2) onto hinge (6) using three screws (7), lockwashers (9) and nuts (8).

(2) Install butt hinge to panel assembly using three screws (3), lockwasher (9), and nuts (8).

(3) Close and secure cable cover assembly (2).

(4) Install front panel (para 3-11c steps 4 thru 8 and 20).

3-54 FLOWRATE METER.

This task covers;

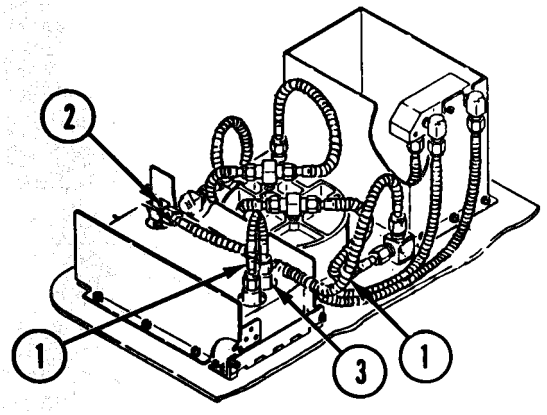
a. Removal.

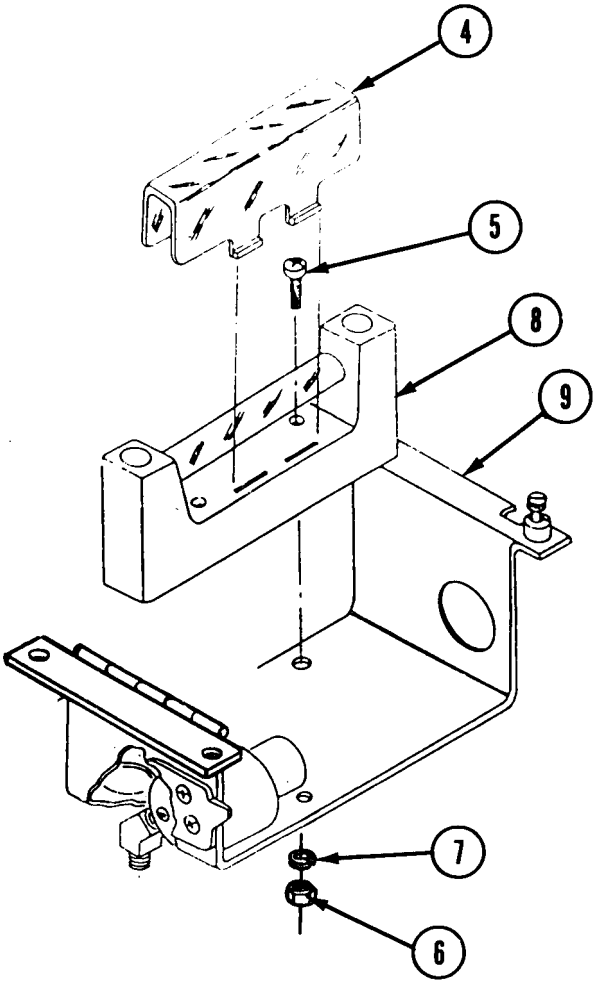
b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-100/G and TK-105/G





a. Removal.

(1) Remove lid and panel assembly. (para 3-11b steps 1 thru 8).

(2) Remove nonmetallic tubing assemblies (1).

(3) Remove elbow (2).

(4) Remove adapter (3).

(5) Squeeze and pull protective cover (4).

(6) Remove two screws (5), nuts (6) and washers (7) from flowrate meter (8) and remove flowrate meter from bracket (9).

3-54 FLOWRATE METER (CONT).

NOTE

Position flowrate meter so scale can be read from bottom to top.

b. Installation.

(1) Install flowrate meter (8) on bracket (9) and secure with screws (5), washers (7) and nuts (6).

(2) Install protective cover (4).

(3) Install elbow (2).

(4) Install adapter (3).

(5) Connect nonmetallic tubing assemblies (1).

(6) Perform Functional Test No. 9 (table 3-2).

3-55 BUTT HINGE ON FLOWRATE METER AND ASSEMBLY BRACKET.

This task covers:

a. Removal.

b. Installation.

INITIAL SETUP

Tools:

Electronic equipment tool
kit TK-105/G

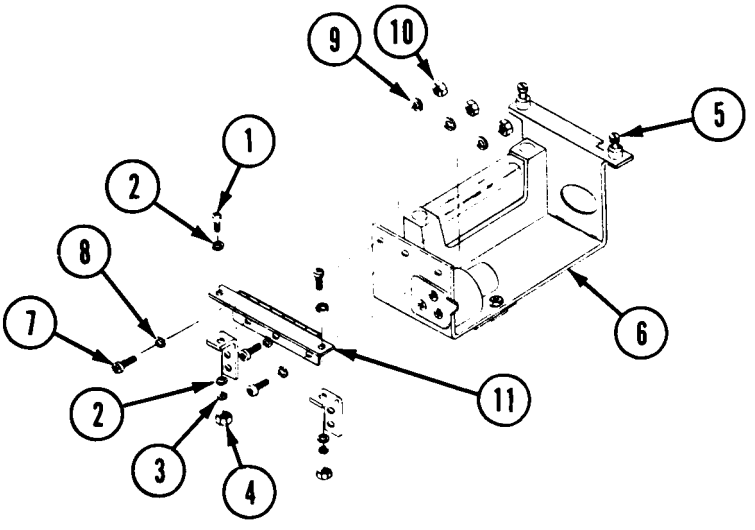
a. Removal.

(1) Remove lid and panel assembly (para 3-11b steps 1 and 6).

(2) Remove two screws (1), four flatwashers (2), lockwashers (3) and nuts (4).

(3) Unscrew two screws (5) and remove flowrate meter and bracket assembly (6).

(4) Remove three screws (7), flatwashers (8), lockwashers (9), nuts (10) and hinge (11).



b. Installation

(1) Install hinge using three screws (7), flatwashers (8), lockwashers (9) and nuts (10).

(2) Replace flowrate meter bracket (6) and secure with two screws (5).

(3) Secure hinge (11) with two screws (1), four flatwashers (2), lockwashers (3) and nuts (4).

(4) Replace panel assembly and lid (para 3-11c steps 4 thru 8 and step 20).

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

3-56 SECURITY PROCEDURES. The test set is a nonsensitive item and maybe stored or shipped using standard storage and transportation handling procedures.

3-57 PRESERVATION MATERIALS. No special preservation materials are required for storage or shipment of the test set.

3-58 TYPE OF STORAGE. This equipment will be placed in administrative storage (TM 740-90-1) where it can be readied for mission performance within 24 hours. The administrative storage site should protect the test set from the elements and allow access for visual inspection. No special storage facililities are needed.

APPENDIX A

REFERENCES

The following publications are related to information contained in this manual.

A-1 TECHNICAL MANUALS.

TM 43-0002-31	Destruction of Chemical Weapons and Defense Equipment to Prevent Enemy Use
TM 740-90-1	Administrative Storage of Equipment

A-2 DA PHAMPLETS.

DA PAM 738-750	The Army Maintenance Management System (TAMMS) As contained in maintenance management update.

A-3 COMMON TABLE OF ALLOWANCES.

CTA 50-970	Expendable/Durable Items (Except Medical, Class V, Repair Parts and Heraldic Items)
CTA 8-100	Army Medical Department Expendable/Durables items

A-4 FIELD MANUALS.

FM 21-11 (TEST)	First Aid for Soldiers
FM 21-2	Soldiers Manual of Common Tasks, Skill Level 1

A-5 TECHNICAL BULLETINS.

TB 43-180	Calibration and Repair Requirements for the Maintenance of Army Material
TB 3-6665-317-35 TO 33D5-6-7-3	Calibration Procedure for Ml 40 Chemical Agent Automatic Alarm, Test Set

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 at various maintenance levels under the standard Army Maintenance System concept.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

UNIT, which includes two subcolumns, C (operator/crew) and O (unit maintenance).

INTERMEDIATE, which includes two subcolumns F (Intermediate Direct Support) and H (Intermediate General Support).

DEPOT, which includes a D (Depot) subcolumn.

c. Section III lists the tools and test equipment (both special tools and common tool sets) 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. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

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

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. 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 3rd position code of the SMR code.

B-2. MAINTENANCE FUNCTIONS (CONT).

e. 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, module (component or assembly), end item, or system.

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 significant components, assemblies, subassemblies, and modules with the next higher assembly.

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

c. Column 3. Maintenance Function. Column (3) lists the functions to be performed on the item listed in Column (2).

d. Column 4. Maintenance Level. Column (4) specifies, by the listing of a work time figure in the appropriate subcolumn(s), the level 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 level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The symbol designations for the various maintenance categories are as follows:

C	Operator or crew
O	Unit maintenance
F	Intermediate direct suppport maintenance
H	Intermediate general support maintenance
D	Depot maintenance

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

e. Column 5. Tools and Equipment. Column 5 specifies, by code, those common tool sets and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6. Remarks. This column shall, when applicable, contain a letter code in alphabetical order, which shall be keyed to the remarks contained in Section IV.

SECTION II. MAINTENANCE ALLOCATION CHART
FOR
M140 CHEMICAL AGENT AUTOMATIC ALARM TEST SET

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP	(6) REMARKS
			UNIT		INTERMEDIATE		DEPOT		
			C	O	F	H	D		
00	M1 TEST SET	Inspect	0.1						
		Service			0.2				
		Replace			0.1				
		Repair			1.0			1,2	
01	GAGE MOUNTING PLATE ASSEMBLY	Replace			0.5				
		Repair			1.0				
02	PANEL ASSEMBLY	Inspect	0.1						
		Test			2.5			3 thru 8	
		Replace			0.3			2	
		Repair	0.1		8.0			1,2	A
0201	FLOWMETER AND BRACKET ASSEMBLY	Replace			0.2			1,2	
		Repair			1.0			1,2	

SECTION III. TOOLS AND TEST EQUIPMENT REQUIREMENTS FOR M140 CHEMICAL AGENT AUTOMATIC ALARM. TEST SET

(1) TOOL OR TEST EQUIPMENT REFERENCE CODE	(2) MAINTENANCE CATEGORY	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1	F	Electronic Equipment Tool Kit	5180-00-605-0079	TK-1
2	F	Electronic Equipment Tool Kit	5180-00-610-8177	TK-1
3	F	Multimeter	6625-00-553-0142 or 6665-01-139-2512 or equivalent	TS-352B/U AN/PSM 45
4	F	M10 Power Supply or M10A1 Power Supply	6665-00-854-2225 6665-01-093-2739	5-75-4727 5-15-8026
5	F	Stopwatch	6645-00-250-4680	GG-S-764
6	F	Variable Power Source 0-40 VDC 30 AMPS	6130-00-249-2748	HP-6268B
7	F	Test Lead (3 ea)	6625-01-112-1219	3784-24-2
8	F	Electrical Test Clip (3 ea)	5999-01-004-8490	3781 Black

SECTION IV. REMARKS

Reference Code	Remarks
A	The operator repair consists of removing the burned out cartridge fuse from the cartridge fuse holder, and replacing it with the on board spare.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1 SCOPE.

This appendix lists components of end item and basic issue items for the test set to help you, inventory items required for safe and efficient operation.

C-2 GENERAL.

The Components of End Item (including on-board spares) and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item.

(1) Components of end item. This listing is for informational purposes only and is not authority to requisition replacements. These items are part of the end item but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts, Illustrations are furnished to assist you in identifying the items.

(2) On-board spares. On-board spares are extra items identified as essential to be available at all times for operator/crew support of the end item. This list is for authorization of these items. On-board spares are illustrated in Appendix E of this manual.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the test set in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the test set during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items.

This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3 EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus. Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

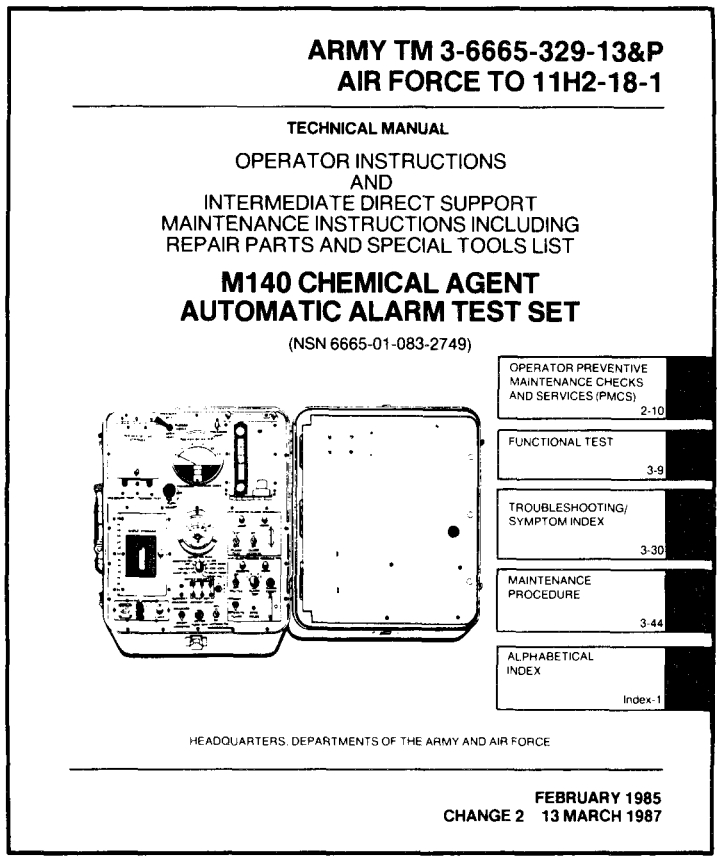
d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

e. Column (5) - Quantity Required (Qty Rqr) Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM

(1) Illus. Number	(2) National Stock Number	(3) Description FSCM and Part Number / Usable On Code	(4) U/M	(5) Qty Rqr
		COMPONENTS OF THE END ITEM (Not Applicable)		
	5920-00-280-4960	ON-BOARD SPARES Cartridge Fuse (81 FO2A250V2A	EA	1

SECTION III. BASIC ISSUE ITEMS



ARMY TM 3-6665-329-13&P
AIR FORCE TO 11H2-18-1

TECHNICAL MANUAL

OPERATOR INSTRUCTIONS
AND
INTERMEDIATE DIRECT SUPPORT
MAINTENANCE INSTRUCTIONS INCLUDING
REPAIR PARTS AND SPECIAL TOOLS LIST

M140 CHEMICAL AGENT
AUTOMATIC ALARM TEST SET

(NSN 6665-01-083-2749)

OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) 2-10
FUNCTIONAL TEST 3-9
TROUBLESHOOTING/ SYMPTOM INDEX 3-30
MAINTENANCE PROCEDURE 3-44
ALPHABETICAL INDEX Index-1

HEADQUARTERS, DEPARTMENTS OF THE ARMY AND AIR FORCE

FEBRUARY 1985
CHANGE 2 13 MARCH 1987

(1) Illus. Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1		Operator Instructions and Intermediate Direct Support Maintenance Instructions including repair parts and special tools list for M140 Chemical Agent Automatic Alarm Test Set. TM 3-6665-329-13&P TO 11H2-18-1		EA	1

APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1 SCOPE.

This appendix lists expendable/durable supplies and materials you will need to maintain the test set. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, expendable/durable items (except medical, class V repair parts, and heraldic items) or CTA 8-100, Army Medical Department expendable/durable items.

D-2 EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number is assigned an entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use rubber gloves, item 3, App D")

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the item, which is C - operator/crew.

c. Column (3) - National Stock Number. This is the national stock number assigned to the item, use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	U/M
1	F	6135-00-450-3528	DRY BATTERY, 36V BA3517/U	EA
2	F	8030-00-081-2335	SEALING, LOCKING AND RETAINING COMPOUND	OZ
3	F	5970-01-183-8046	HEAT SHRINKABLE ELECTRICAL SLEEVING INSULATION	IN
4	F	6810-00-223-2739	TECHNICAL ACETONE	OZ

APPENDIX E
INTERMEDIATE DIRECT SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

E-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 intermediate direct support maintenance of the test set. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools indicated by the Source, Maintenance and Recoverability (SMR) codes.

E-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 by item name in FIG. BULK at the end of the section. 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).

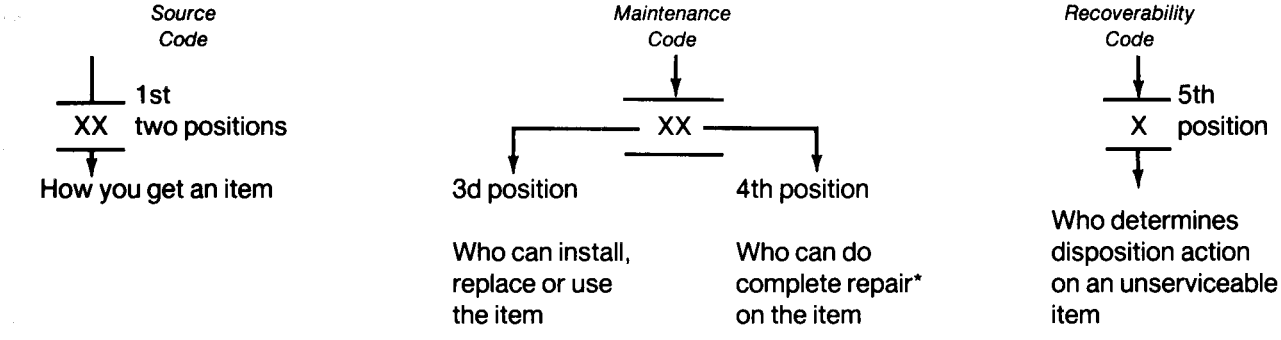
b. *Section III. Special Tools List.* Not applicable.

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.

E-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 level 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 follow:

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 level 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 level indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.
MO-(Made at unit/ AVUM Level) MF-(Made at Intermediate DS/ AVIM Level) MH-(Made at Intermediate 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 in 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.
AO-(Assembled by unit/AVUM Level) AF-(Assembled by Intermediate DS/ AVIM Level) AH-(Assembled by Intermediate GS Level) 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, maybe 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 tell 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 unit or aviation unit maintenance.

O - Unit or aviation unit level can remove, replace, and use the item.

F - Intermediate direct support or aviation intermediate level can remove, replace, and use the item.

H - Intermediate 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 you 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 - Unit or aviation unit is the lowest level that can do complete repair of the item.

F - Intermediate direct support or aviation intermediate is the lowest level that can do complete repair of the item.

H - Intermediate 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.
0	-	Reparable item. When uneconomically reparable, condemn and dispose of the item at unit or aviation unit level.
F	-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the intermediate direct support or aviation intermediate level.
H	-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the intermediate 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, specifications standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an 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 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.

E-4. EXPLANATION OF COLUMNS (SECTION IV).

a. *NATIONAL STOCK NUMBER (NSN) INDEX.*

(1) STOCK NUMBER column. This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN (i.e., 5385-01-574-1476).

NSN

NIIN

When using this 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 sections II and Ill.

(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.

E-5. SPECIAL INFORMATION.

a. *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 Il.

b. *Illustrations - Listing.* Only those parts coded in the third position of the SMR code are listed in the tabular listing; therefore, there may be a break in the item number sequence. Only illustrations containing intermediate direct support authorized items appear in this RPSTL.

E-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 functional group or subfunctional 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 E-4a(1)). The part numbers in the PART NUMBER INDEX are listed in ascending alphanumeric sequence (see E-4b). 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.

E-7. ABBREVIATIONS. Not applicable.

All data on pages E-6 through E-10 deleted.

E-3 EXPLANATION OF COLUMNS (SECTIONS II AND III).

(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.

E-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) sequence. The NIIN consists of the last nine digits of the NSN

NSN

(i.e., 5305-01-674-1467). When using this column to locate an item, ignore the first 4 digits of the NSN.

NIIN

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.

E-4 EXPLANATION OF COLUMNS (SECT. IV) (CONT).

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.

E-5 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 sub-assembly 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.

E-5 HOW TO LOCATE REPAIR PARTS.

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 E-4.a.) The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see E-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.

E-6 ABBREVIATIONS.

Abbreviations	Explanation
assy	assembly
dia	diameter
hex	hexagon
hd	head
l g	long
mtg	mounting
no.	number

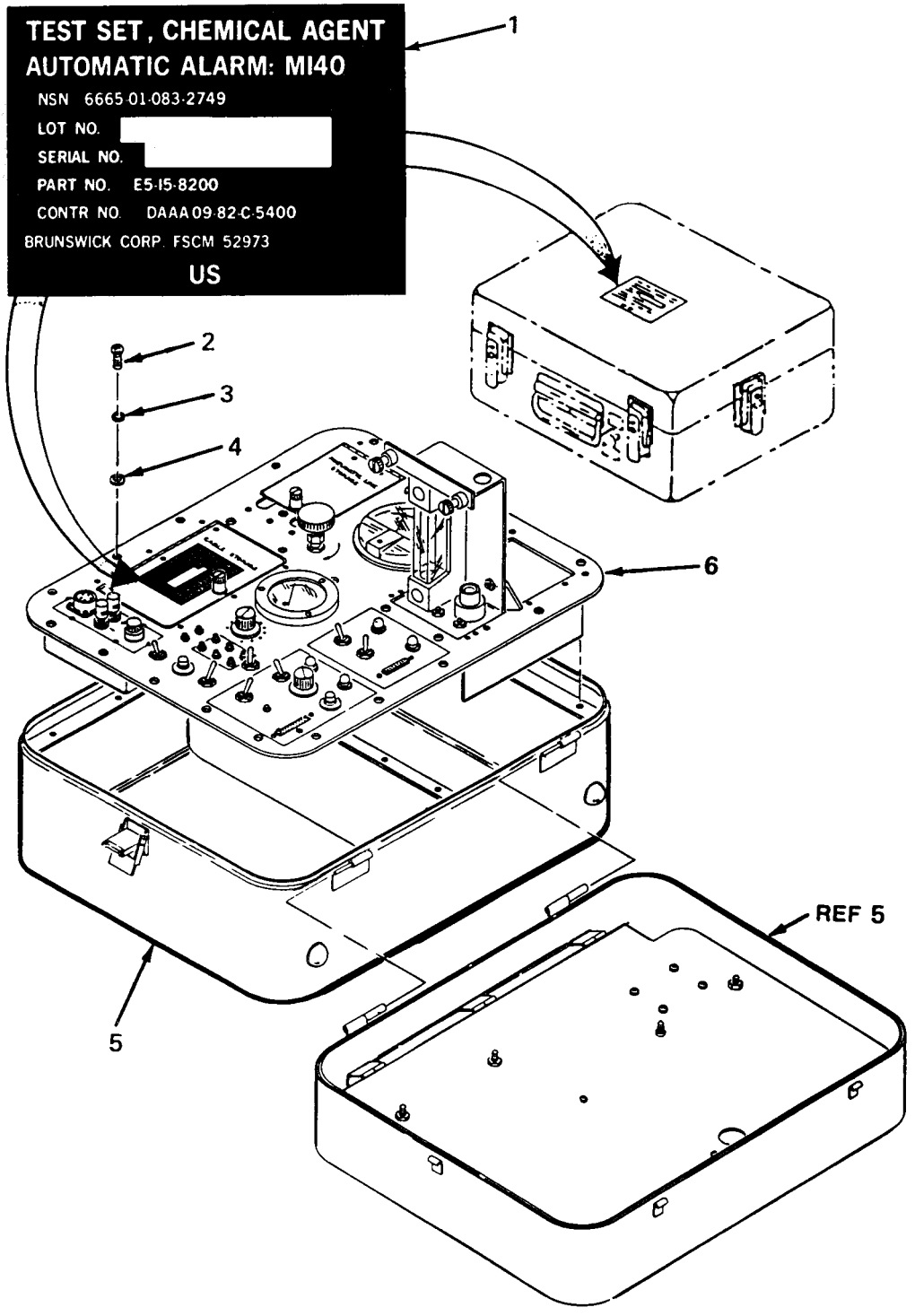


Figure 1, Group 00. M140 Chemical Agent Automatic Alarm Test Set (Sheet 1 of 2)

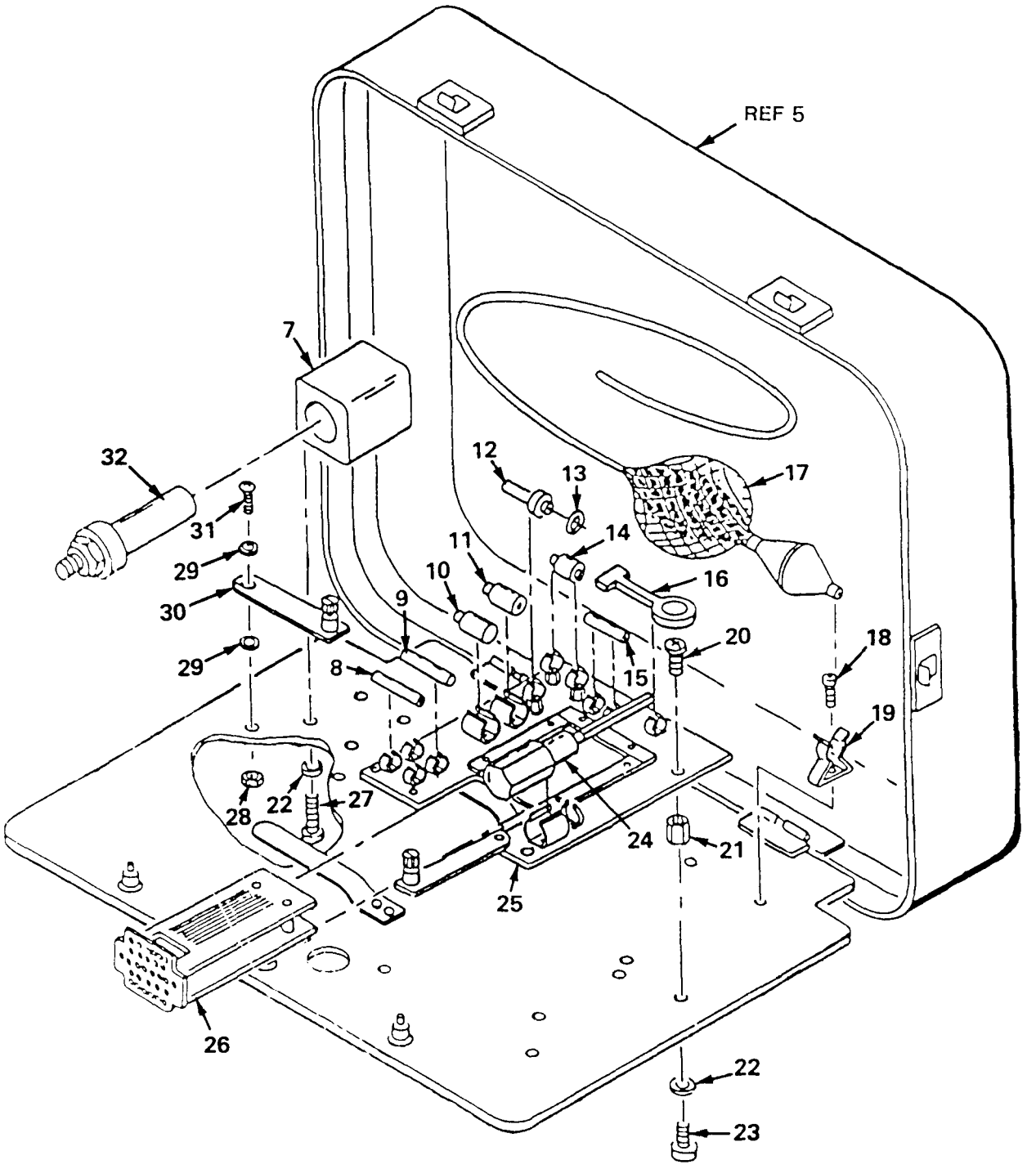


Figure 1, Group 00. M140 Chemical Agent Automatic Alarm Test Set (Sheet 2 of 2)

SECTION II. REPAIR PARTS LIST

	(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
					GROUP 00:ALARM, TEST SET, CHEMICAL AGENT AUTOMATIC FIGURE 1, CHEMICAL AGENT AUTOMATIC ALARM TEST SET M140 E5-15-8200	
	1	XDFZZ	81361	C5-15-8262	PLATE, IDENTIFICATION	2
	2	PAFZZ	96906	MS51958-63	SCREW, MACHINE	21
	3	PAFZZ	96906	MS35338-157	WASHER, LOCK	21
	4	PAFZZ	88044	AN960-10	WASHER, FLAT	21
	5	XDFZZ	81361	E5-15-8201	CASE, TEST SET	1
	6	XDFFF	81361	E5-15-8225	PANEL ASSEMBLY, TEST SET	1
	7	XAFZZ	81361	C5-15-8218	HOLDER ASSEMBLY,FILTER	1
	8	PAFZZ	81361	B5-15-8271	STOP,AIRFLOW	1
	9	PAFZZ	81361	B5-15-8215	TUBING, NONMETALLIC	1
	10	PAFZZ	81361	C5-15-8256	PLUG, CELL CAP	1
	11	PAFZZ	81361	B5-15-8288	PLUG, CAP ASSEMBLY	1
	12	PAFZZ	81361	C5-15-8090	ADAPTER, RAIN SHIELD	1
	13	PAFZZ	81349	M83248/1-014	PACKING, PREFORMED	1
	14	PAFZZ	81361	B5-15-8274	ADAPTER, METER	1
	15	PAFZZ	81349	F02-A-250V-2A	FUSE, CARTRIDGE	1
*	16	PAFZZ	81361	D5-15-8074-3	ADAPTER, INLET PORT	1
	17	PAFZZ	81361	D5-15-5423	BELLOWS AND PUMP	1
	18	PAFZZ	96906	MS51957-31	SCREW, MACHINE	2

SECTION II. REPAIR PARTS LIST

	(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
	19	PAFZZ	81361	C5-15-5542	CLIP, SPRING TENSION	2
	20	PAFZZ	96906	MS51957-26	SCREW, MACHINE	4
	21	PAFZZ	83330	8423	POST, ELECT-MECH	4
	22	PAFZZ	80205	NAS620C6	WASHER, FLAT	4
	23	PAFZZ	96906	MS24693-C24	SCREW, MACHINE	4
	24	PAFZZ	96508	LN23BP	WRENCH, BALL END, HEX	1
	25	PAFFF	81361	D5-15-8202	MTG PLATE ASSEMBLY, GAGE	1
	26	PAFZZ	81361	D5-15-8220	BOARD ASSEMBLY, EXTENDER	1
	27	PAFZZ	96906	MS51958-62	SCREW, MACHINE	4
	28	PAFZZ	96906	MS21044-C06	NUT, SELF-LOCKING, HEX	1
	29	PAFZZ	80205	NAS620C6L	WASHER, FLAT	2
	30	XDFZZ	81361	B5-15-8261	CLAMP ASSEMBLY	1
	31	PAFZZ	96906	MS51957-30	SCREW, MACHINE	1
*	32	PAFZA	81361	D5-15-8203	FILTER, GAS PARTICULATE	1

END OF FIGURE

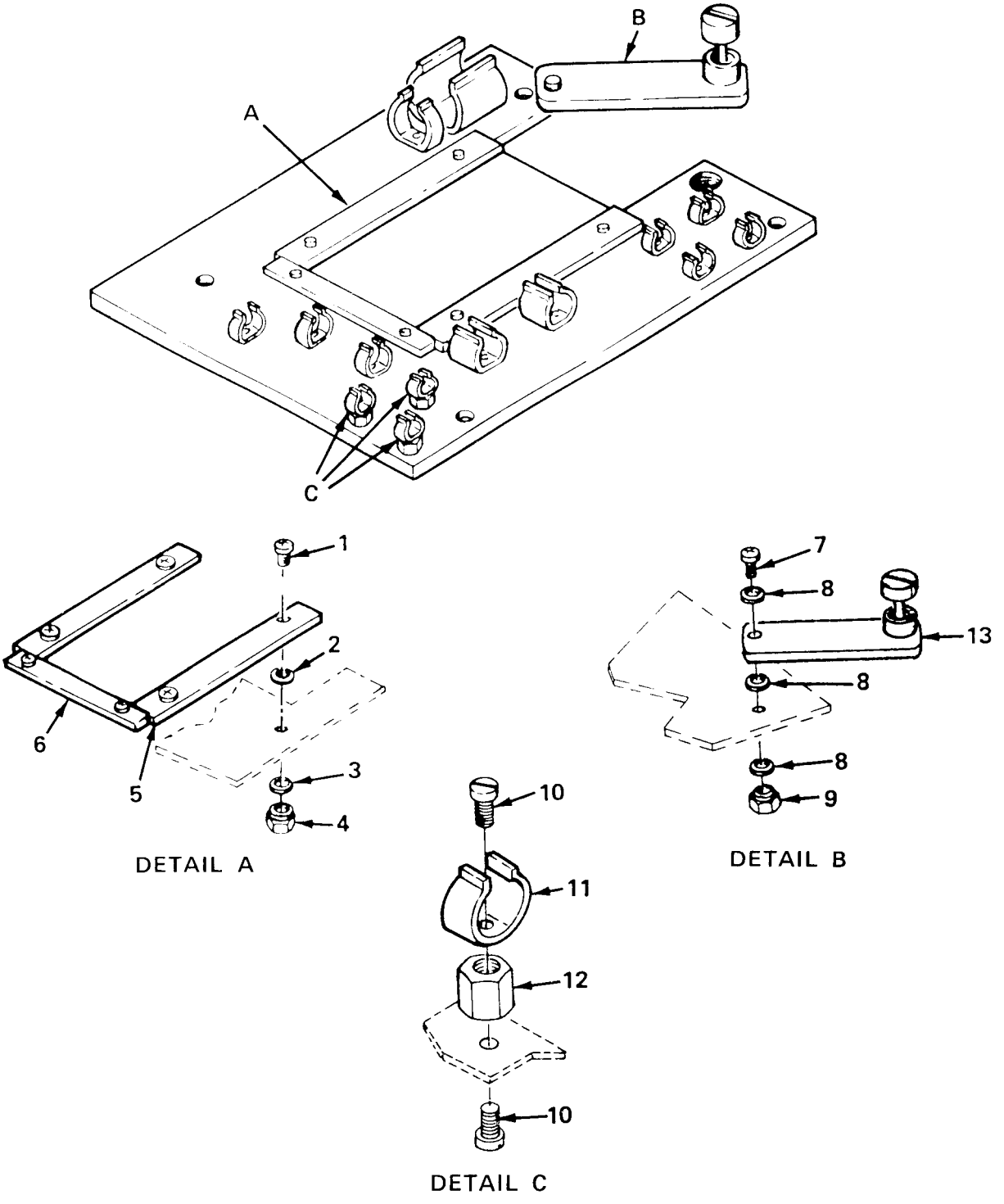


Figure 2, Group 01. Gage Mounting Plate Assembly

SECTION II. REPAIR PARTS LIST

	(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
					GROUP 01: PLATE ASSEMBLY, GAGE MOUNTING	
					FIGURE 2, GAGE MOUNTING PLATE ASSEMBLY	
					D5-15-8202	
	1	PAFZZ	96906	MS51957-16	SCREW, MACHINE	6
	2	PAFZZ	80205	NAS6204C4	WASHER, FLAT	6
	3	PAFZZ	96906	MS35338-135	WASHER, LOCK	6
	4	PAFZZ	96906	MS35649-244	NUT, PLAIN, HEX	6
	5	PAFZZ	81361	B5-15-8259	GUIDE	2
	6	PAFZZ	81361	B5-15-8260	STOP	1
	7	PAFZZ	96906	MS51957-30	SCREW, MACHINE	1
	8	PAFZZ	80205	NAS620C6L	WASHER, FLAT	3
	9	PAFZZ	96906	MS21044-C06	NUT, SELF-LOCKING, HEX	1
	10	PAFZZ	96906	MS51957-12	SCREW, MACHINE	6
*	11	PAFZZ	86928	4523-24-31-2-T	CLIP	3
	12	PAFZZ	83330	8402	SPACER	3
	13	XDFZZ	81361	B5-15-8261	CLAMP ASSEMBLY	1
					END OF FIGURE	

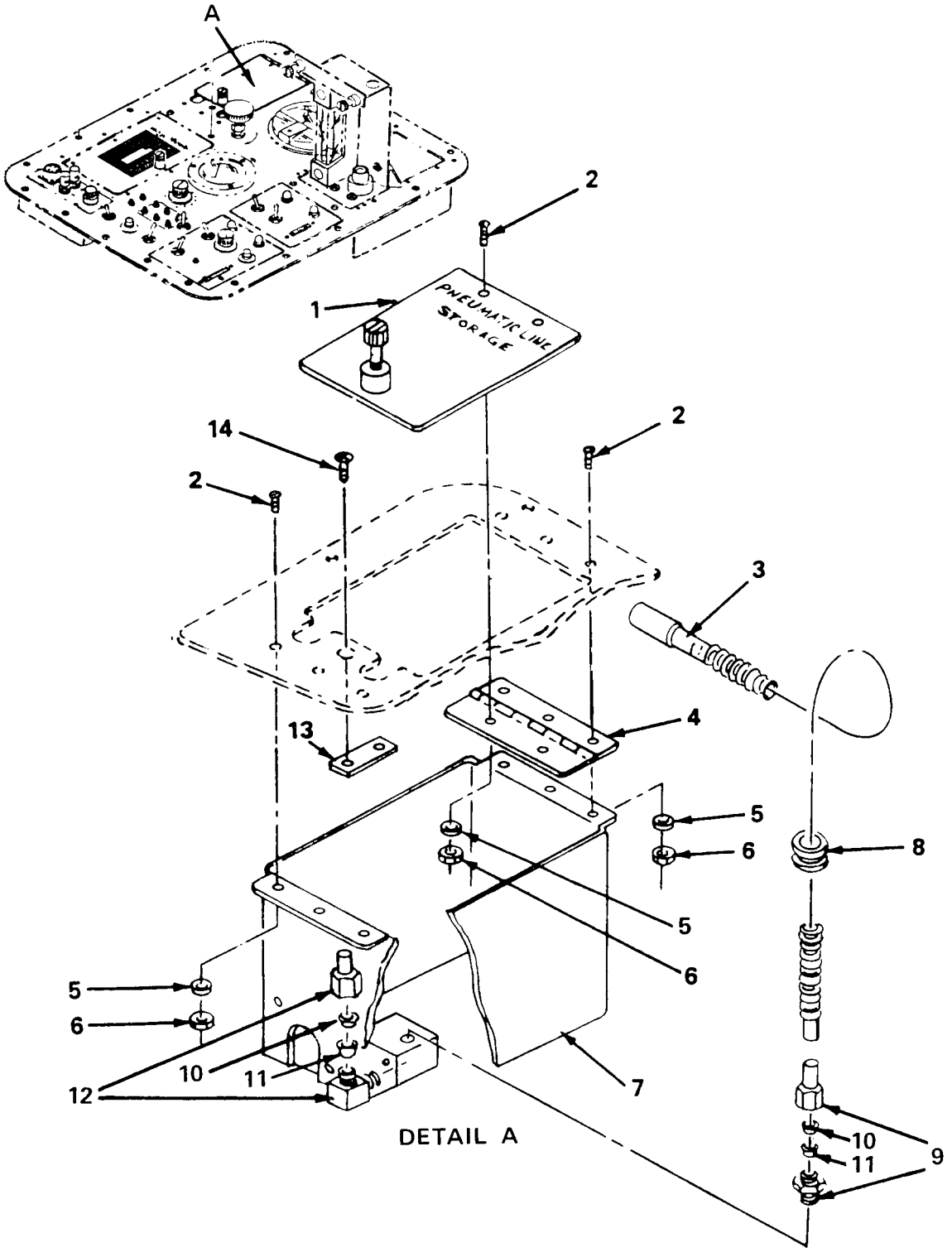


 Figure 3, Group 02. Test Set Panel Assembly (Sheet 1 of 7)

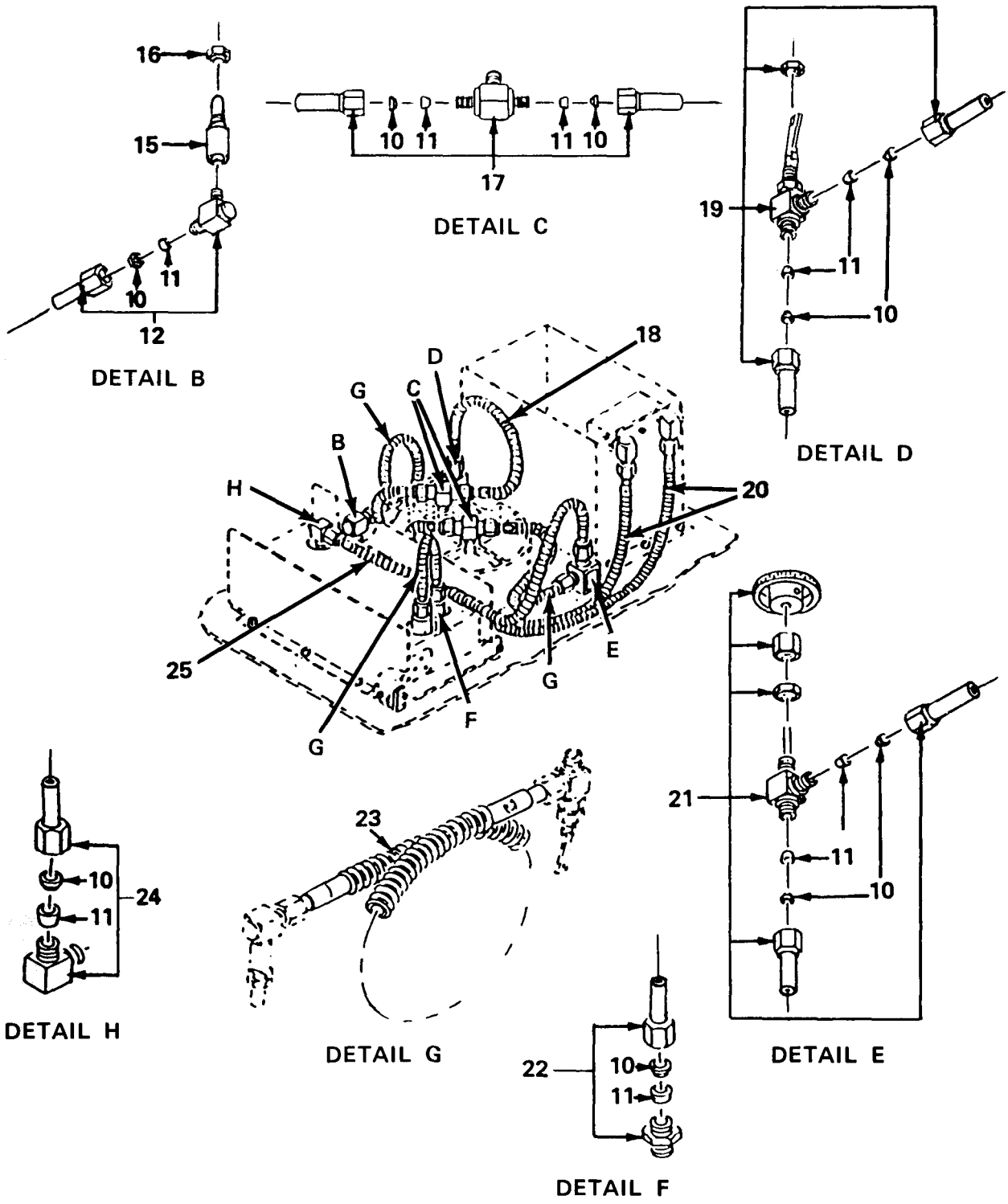


Figure 3, Group 02. Test Set Panel Assembly (Sheet 2 of 7)

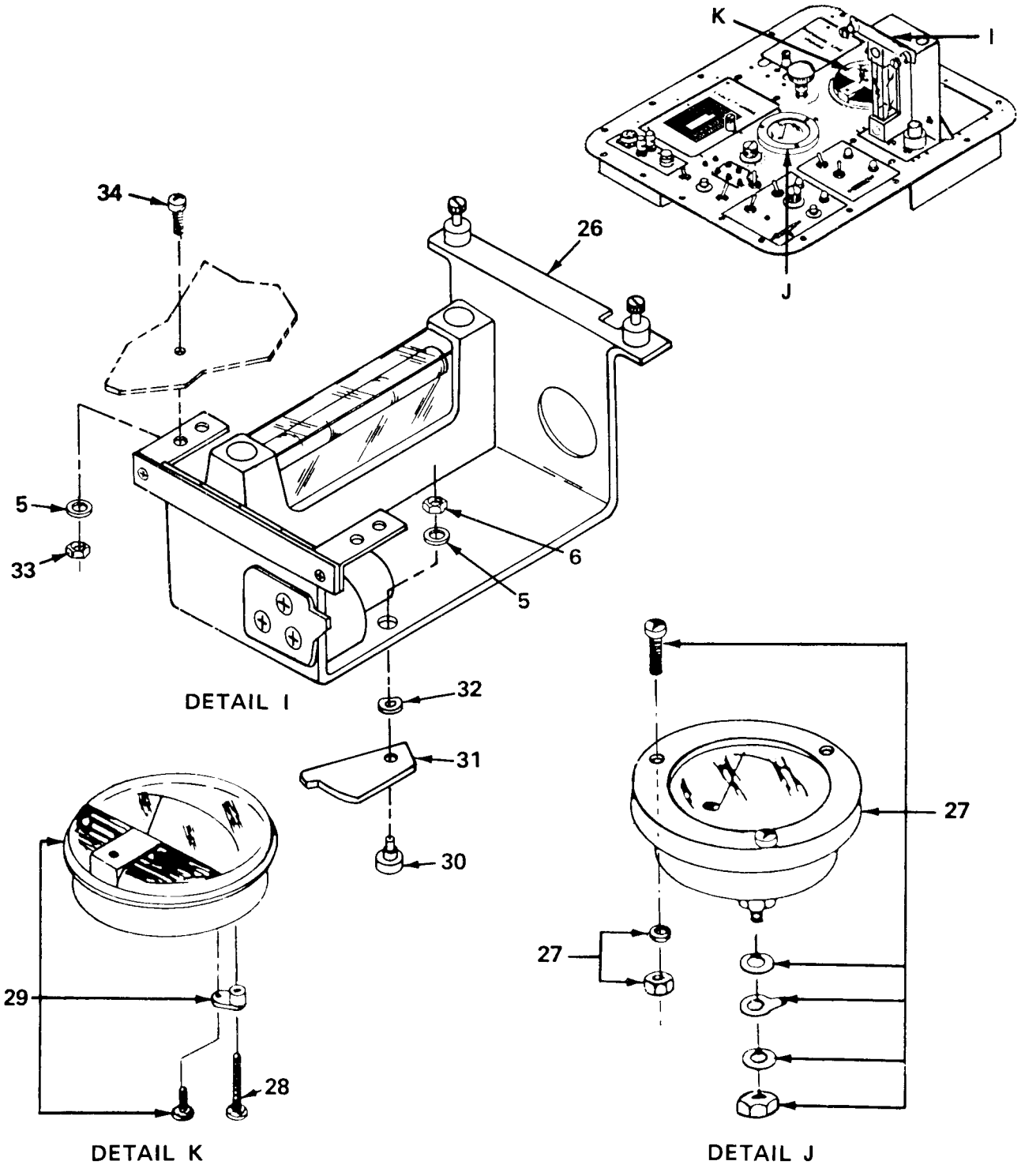


Figure 3, Group 02. Test Set Panel Assembly (Sheet 3 of 7)

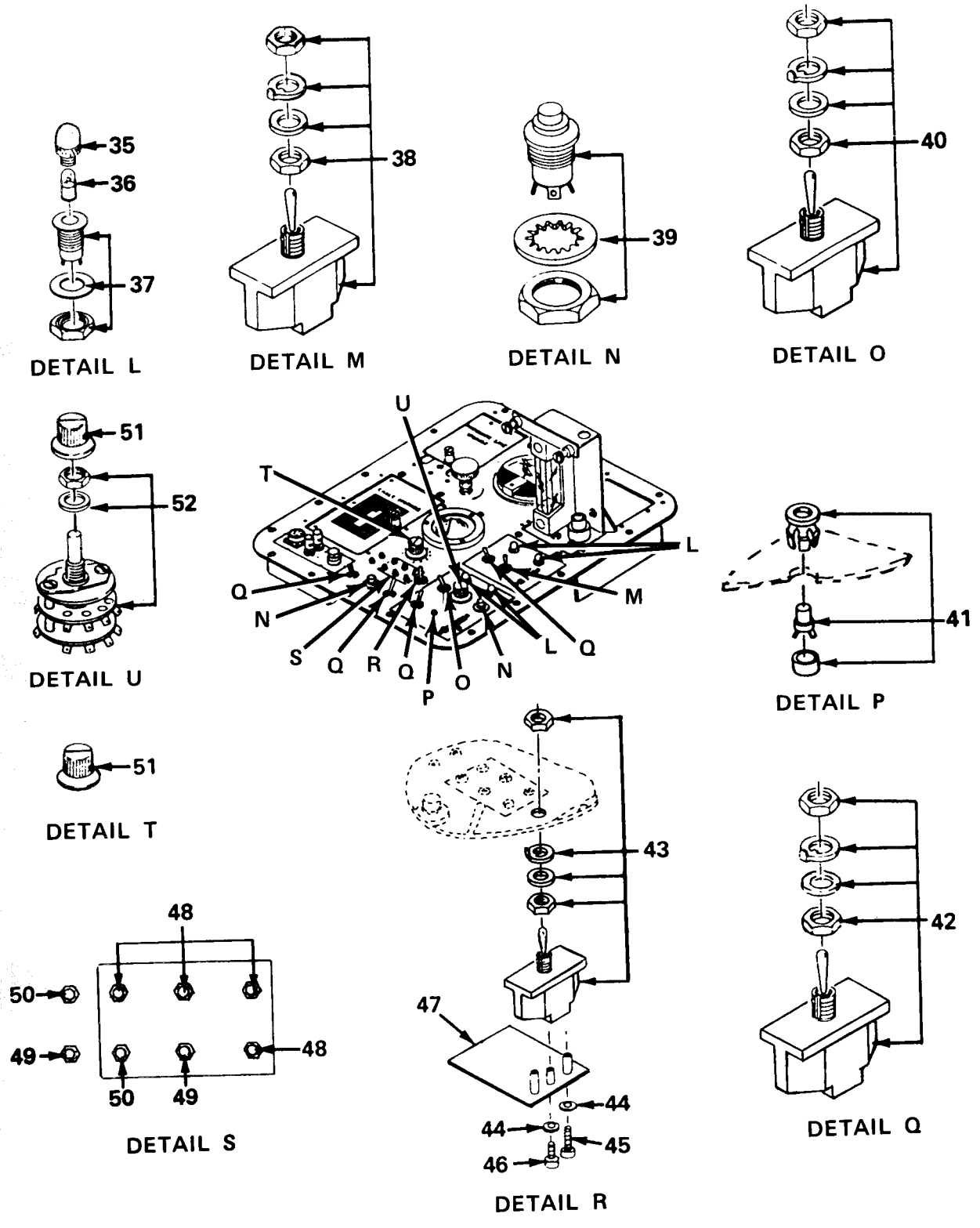


Figure 3, Group 02. Test Set Panel Assembly (Sheet 4 of 7)

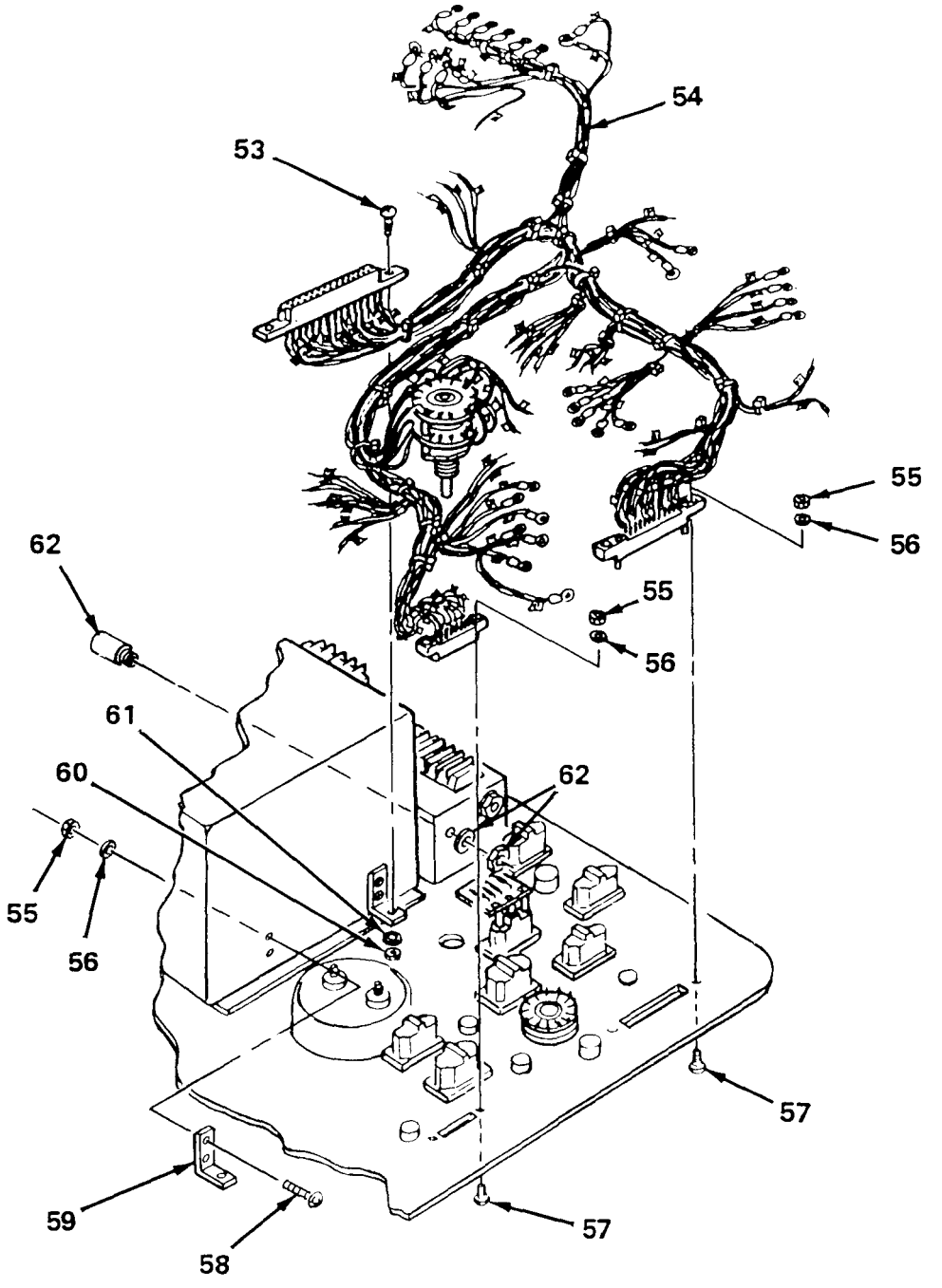


Figure 3, Group 02. Test Set Panel Assembly (Sheet 5 of 7)

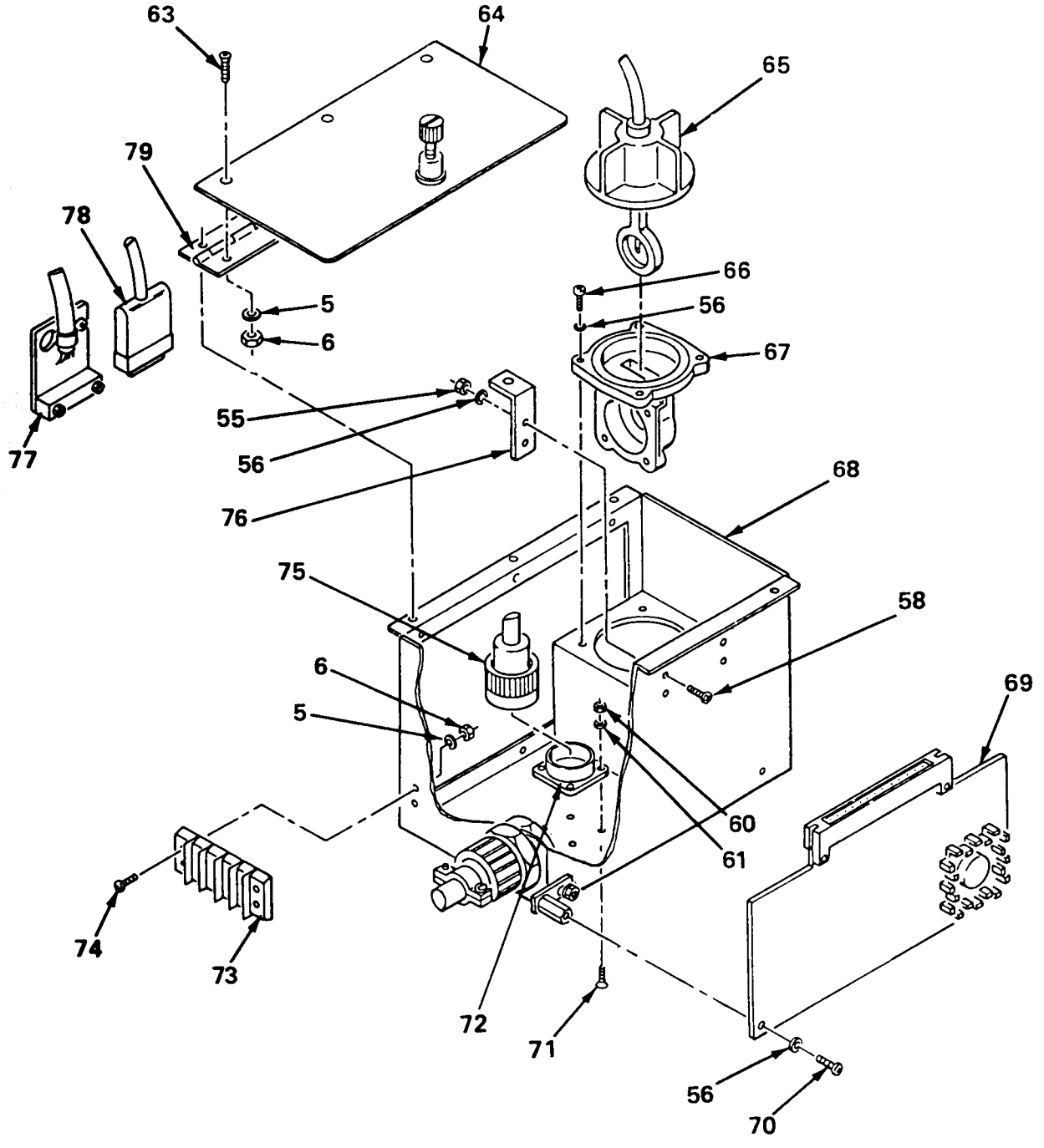


Figure 3, Group 02. Test Set Panel Assembly (Sheet 6 of 7)

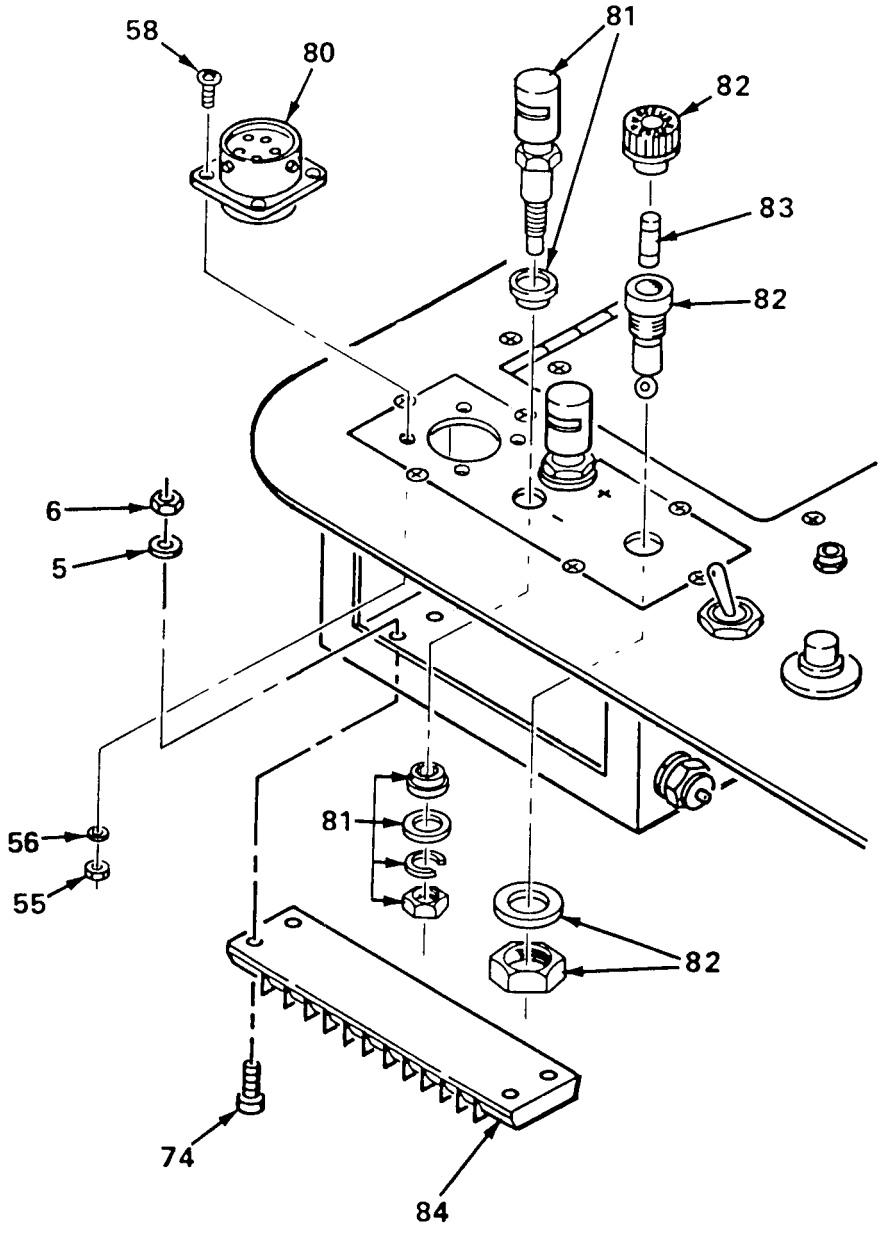


Figure 3, Group 02. Test Set Panel Assembly (Sheet 7 of 7)

SECTION II. REPAIR PARTS LIST

	(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
					GROUP 02: PANEL ASSEMBLY, TEST SET	
					FIGURE 3, TEST SET PANEL ASSEMBLY	
					E5-15-8225	
	1	XDFZZ	81361	C5-15-8232	COVER ASSY, PNEUMATIC LINE STORAGE	1
	2	PAFZZ	96906	MS24693-C27	SCREW, MACHINE	8
	3	PAFZZ	81361	B5-15-8217	TUBING ASSY, NONMETALLIC	2
	4	XDFZZ	81361	C5-15-5389	HINGE, BUTT	1
	5	PAFZZ	96906	MS35338-135	WASHER, LOCK	53
	6	PAFZZ	96906	MS35649-264	NUT, PLAIN, HEX	40
	7	XAFZZ	81361	D5-15-8268	ENCLOSURE, TUBE	1
	8	XDFZZ	96906	MS35489-40	GROMMET, NONMETALLIC	2
	9	PAFZZ	02570	SS-400-1-2	ADAPTER, STRAIGHT, PIPE TO TUBE	2
*	10	PAFZZ	02570	SS404-1	FERRULE, BACK, 0.250	16
*	11	PAFZZ	02570	SS403-1	FERRULE, FRONT, 0.250	16
	12	XAFZZ	02570	SS-400-2-2	ELBOW, PIPE TO TUBE	3
	13	XDFZZ	81361	C5-15-8248	LATCH	1
	14	PAFZZ	96906	MS24693-C269	SCREW, MACHINE	1
	15	XAFZZ	81361	C5-15-8231	BUSHING, TUBE	1
	16	PAFZZ	96906	MS25082-C22	NUT, PLAIN, HEX	1
	17	PAFZZ	02570	SS-400-3TTM	TEE, PIPE TO TUBE	2
	18	PAFZZ	81361	B5-15-8241-2	TUBING ASSY, NONMETALLIC	1
	19	PAFZZ	02570	SS-IGS4-A	VALVE, ANGLE	1

SECTION II. REPAIR PARTS LIST

	(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
	20	PAFZZ	81361	B5-15-8241-3	TUBING ASSY, NONMETALLIC	2
	21	PAFZZ	02570	SS-IRS4-A	VALVE, ANGLE	1
	22	PAFZZ	02570	SS-400-1-4	ADAPTER, STRAIGHT, PIPE TO TUBE	1
	23	PAFZZ	81361	B5-15-8241-1	TUBING ASSY, NONMETALLIC	3
	24	PAFZZ	02570	SS-400-2-4	ELBOW, PIPE TO TUBE	1
	25	PAFZZ	81361	B5-15-8241-5	TUBING ASSY, NONMETALLIC	1
	26	XDFFF	81361	D5-15-8239	FLOWMETER BRACKET ASSY	1
	27	PAFZZ	81361	D5-15-8229	AMMETER	1
	28	PAFZZ	96906	MS51957-38	SCREW, MACHINE	3
	29	PAFZZ	81361	D5-15-5424	GAGE, DIFFERENTIAL, DIAL INDICATING	1
	30	XDFZZ	81361	B5-15-5373	SHAFT, HINGE SPRING	1
	31	PAFZZ	81361	C5-15-5370	BRACKET, HINGE SPRING	1
	32	PAFZZ	81349	M12133/5-6P	WASHER, SPRING TENSION	1
	33	PAFZZ	96906	MS35649-244	NUT, PLAIN, HEX	4
	34	PAFZZ	96906	MS24693-C4	SCREW, MACHINE	4
	35	PAFZZ	81349	LC12YN2	LENS, INDICATOR	4
*	36	PAFZZ	92966	345	LAMP, INCANDESCENT	4
	37	PAFZZ	81349	LH73/1	HOUSING, INDICATOR	4
	38	PAFZZ	96906	MS24524-27	SWITCH, TOGGLE	1

SECTION II. REPAIR PARTS LIST

	(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
	39	PAFZZ	96906	MS25089-3C	SWITCH, PUSH	2
	40	PAFZZ	96906	MS24524-23	SWITCH, TOGGLE	1
*	41	PAFZZ	72619	521-9248	LIGHT, INDICATING, LED	1
	42	PAFZZ	96906	MS24523-22	SWITCH, TOGGLE	4
	43	PAFZZ	96906	MS24523-27	SWITCH, TOGGLE	1
	44	PAFZZ	96906	MS35338-98	WASHER, LOCK	3
	45	PAFZZ	96906	MS51957-34	SCREW, MACHINE	2
	46	PAFZZ	96906	MS51957-32	SCREW, MACHINE	1
	47	PAFZZ	81361	D5-15-12551	CIRCUIT CARD ASSY	1
	48	PAFZZ	81349	M39024/10-08	JACK, TIP (YELLOW)	5
	49	PAFZZ	81349	M39024/10-03	JACK, TIP (BLACK)	2
	50	PAFZZ	81349	M39024/10-02	JACK, TIP (RED)	1
	51	PAFZZ	96906	MS91528-1F2B	KNOB	2
	52	PAFZZ	81361	C5-15-12557	SWITCH, ROTARY	1
	53	PAFZZ	96906	MS51957-5	SCREW, MACHINE	2
	54	PAFZZ	81361	E5-15-8221	WIRING HARNESS, BRANCHED	1
	55	PAFZZ	96906	MS35649-244	NUT, HEX, PLAIN	22
	56	PAFZZ	96906	MS35338-135	WASHER, LOCK	4
	57	PAFZZ	96906	MS51957-18	SCREW, MACHINE	4

SECTION II. REPAIR PARTS LIST

(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
58	PAFZZ	96906	MS51957-15	SCREW, MACHINE	12
59	XDFZZ	81361	B5-15-8257	BRACKET, CONN, MTG	2
60	PAFZZ	96906	MS35649-224	NUT, PLAIN, HEX	6
61	PAFZZ	96906	MS35338-134	WASHER, LOCK	6
62	PAFZZ	81349	M15733/23-0060	FILTER, RF	2
63	PAFZZ	96906	MS51959-29	SCREW, MACHINE	3
64	XDFZZ	81361	D5-15-8240	COVER ASSY, CABLE STORAGE	1
65	PAFZZ	81361	D5-15-8246	SENSOR, TEMPERATURE (INLET TEMP)	1
66	PAFZZ	96906	MS51957-16	SCREW, MACHINE	4
67	XDFZZ	81361	D5-15-8208	HOUSING, SUBASSEMBLY	1
68	XAFZZ	81361	E5-15-8235	HOUSING, CABLE	1
69	PAFZZ	81361	D5-15-8251	CIRCUIT CARD ASSEMBLY	1
70	PAFZZ	96906	MS51957-13	SCREW, MACHINE	2
71	PAFZZ	96906	MS51859-3	SCREW, MACHINE	4
72	PAFZZ	96906	MS3115-14W	CONNECTOR, DUMMY	1
73	XDFZZ	81349	37TB4	TERMINAL BOARD (TB2)	1
74	PAFZZ	96906	MS51957-31	SCREW, MACHINE	8
75	PAFZZ	81361	D5-15-8243	CABLE ASSY, POWER, ELECTRICAL, BRANCHED (DETECTOR POWER)	1
76	XDFZZ	81361	B5-15-8263	LATCH, BRACKET ASSY	1
77	PAFZZ	81361	D5-15-8242	CABLE ASSY, SPECIAL PURPOSE ELECTRICAL, BRANCHED (CHASSIS TEST)	1

SECTION II. REPAIR PARTS LIST

(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
				CABLE ASSY, SPECIAL PURPOSE,	
78	PAFZZ	81361	D5-15-8244	ELECTRICAL, BRANCHED (PUMP POWER)	1
79	XDFZZ	81361	C5-15-5390	HINGE, BUTT	1
80	PAFZZ	96906	MS3112E-14-5S	CONNECTOR, RECEPTACLE	1
81	PAFZZ	81349	PB08NA01	POST, BINDING, ELECTRICAL	2
82	PAFZZ	81349	FHN26G1	FUSEHOLDER, EXTRACTOR	1
83	PAFZZ	81349	FO2-A-250V-2A	FUSE, 2 AMP	1
84	XDFZZ	81349	37TB10	TERMINAL BOARD (TB1)	1

END OF FIGURE

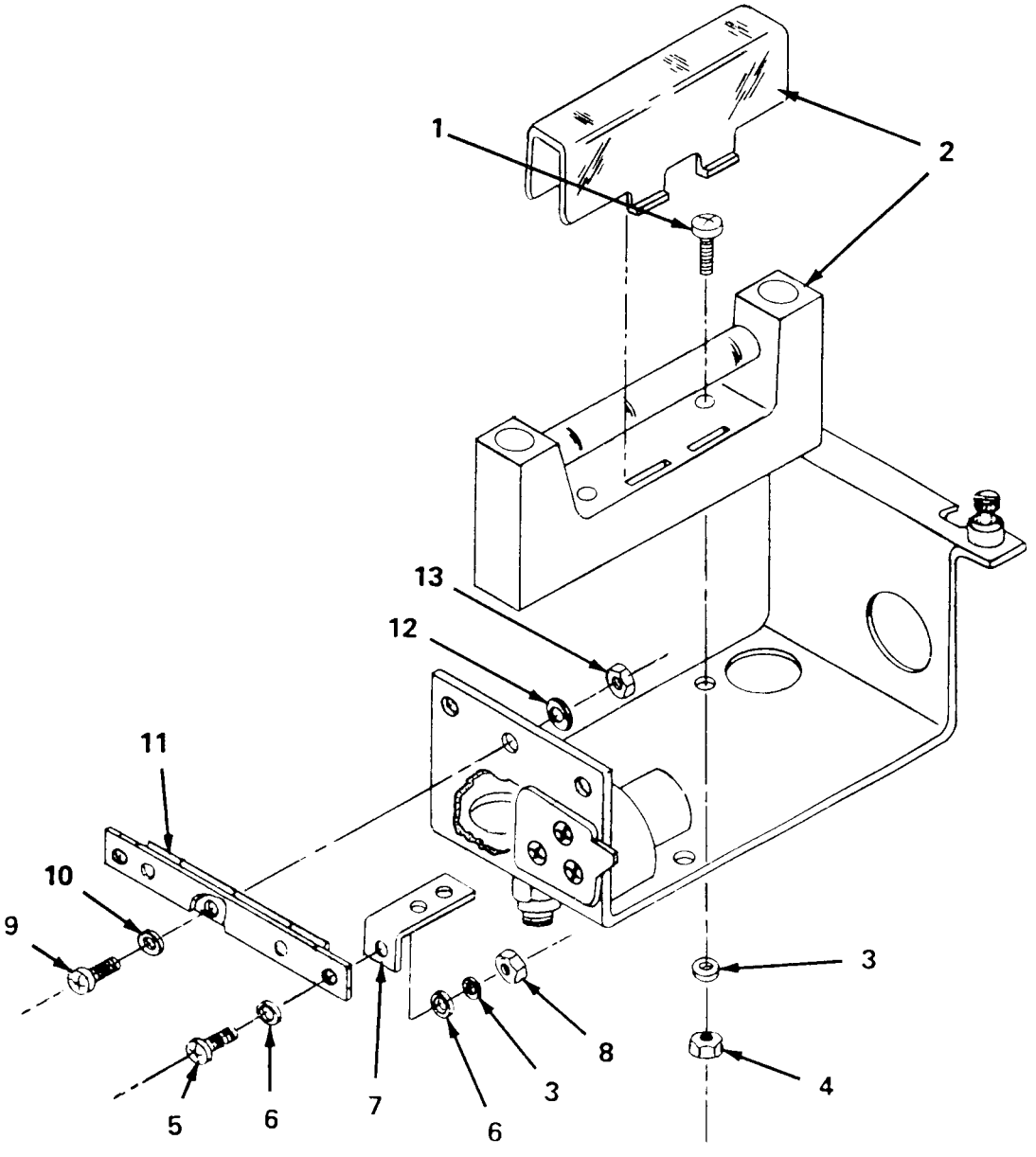


Figure 4, Group 0201. Flowmeter Bracket Assembly

SECTION II. REPAIR PARTS LIST

(1) ITEM NO.	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE	(6) QTY.
				GROUP 0201: BRACKET ASSY, FLOWMETER	
				FIGURE 4, FLOWMETER BRACKET ASSY	
				D5-15-8239	
1	PAFZZ	96906	MS51957-32	SCREW, MACHINE	2
2	PAFZZ	81361	D5-15-5435	METER, FLOWRATE	1
3	PAFZZ	96906	MS35338-136	WASHER, LOCK	4
4	PAFZZ	96906	MS35649-264	NUT, HEX, PLAIN	2
5	PAFZZ	96906	MS51957-28	SCREW, MACHINE	2
6	PAFZZ	88044	AN960-C6	WASHER, FLAT	4
7	XDFZZ	81361	B5-15-8247	BRACKET	2
8	PAFZZ	80205	NAS671-C6	NUT, HEX, PLAIN	2
9	PAFZZ	96906	MS51957-15	SCREW, MACHINE	3
10	PAFZZ	88044	AN960-C4	WASHER, FLAT	3
11	XDFZZ	81361	C5-15-8233	HINGE, BUTT	1
12	PAFZZ	96906	MS35338-135	WASHER, LOCK	3
13	PAFZZ	96906	MS35649-244	NUT, HEX, PLAIN	3
				END OF FIGURE	

SECTION IV. NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG. NO.	ITEM NO.	STOCK NUMBER	FIG. NO.	ITEM NO.
5310-00-054-0041	1	29	5930-00-501-1749	3	39
	2	8	5330-00-531-9514	4	6
5305-00-054-5639	3	53	5310-00-616-8660	4	8
5305-00-054-5646	2	10	5120-00-628-1457	1	24
5305-00-054-5647	3	70	5930-00-655-4241	3	40
5305-00-054-5649	3	58	5930-00-660-3947	3	38
	4	9	5355-00-680-1357	3	51
5305-00-054-5650	2	1	6240-00-683-0560	3	36
	3	66	5930-00-683-1628	3	42
5305-00-054-5652	3	57	5930-00-683-1633	3	43
5305-00-054-6650	1	20	4730-00-684-4065	3	9
5305-00-054-6652	4	5	5935-00-702-4199	3	50
5305-00-054-6654	1	31	5935-00-762-0312	3	49
	2	7	6665-00-762-4030	3	30
5305-00-054-6665	1	18			
	3	74	5935-00-768-4232	3	48
5305-00-054-6656	3	46	5310-00-773-7624	1	22
	4	1	5305-00-781-5662	3	14
5305-00-054-6658	3	45	6210-00-813-8265	3	37
5305-00-054-6662	3	28	5310-00-869-9576	1	3
5305-00-056-9961	3	34	6685-00-878-9212	3	29
5310-00-057-0573	2	2	6680-00-879-1181	4	2
5305-00-059-3658	1	27	5920-00-892-9311	3	82
5305-00-059-3659	1	2	5935-00-893-7952	3	80
4730-00-060-4037	3	17	5310-00-928-2690	3	61
5305-00-066-7326	1	23	5310-00-929-6395	4	3
5305-00-066-7328	3	2	5310-00-933-8118	2	3
6210-00-080-1048	3	35		3	5
5310-00-140-4894	3	71		3	56
				4	12
5330-00-166-0990	1	13	5310-00-934-9748	2	4
5310-00-167-0818	1	4		3	33
5310-00-184-8977	3	44		3	55
5325-00-185-0004	3	8		4	13
6665-00-228-0656	3	31	5310-00-934-9761	3	6
5310-00-231-9583	2	12		4	4
6665-00-237-7852	1	17	5940-00-937-5237	3	81
4730-00-239-0189	3	22	5310-00-938-2013	3	60
5920-00-280-4960	1	15	5310-00-982-6813	1	28
	3	83		2	9
			5940-00-983-6045	3	73
4820-00-462-1973	3	21	5940-00-983-6051	3	84
4730-00-490-6257	3	24			

SECTION IV. NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG. NO.	ITEM NO.
6610-00-994-0191	1	21
5310-01-006-5463	3	16
4730-01-052-0268	3	11
4730-01-052-0204	3	10
5915-01-056-3277	3	62
4820-01-057-7244	3	19
4730-01-073-8686	3	12
9905-01-113-0708	1	1
6665-01-113-0785	3	77
9330-01-113-8311	1	9
5340-01-114-1127	1	19
4240-01-114-8054	1	16
4240-01-115-1088	1	32
6665-01-115-3889	3	78
6665-01-115-5539	1	26
6665-01-115-9993	3	69
6665-01-116-4940	3	75
6685-01-117-3599	3	65
4720-01-121-0004	3	18
4720-01-121-0005	3	20
4720-01-121-0006	3	25
4720-01-121-0007	3	3
6665-01-122-0580	1	12
6665-01-122-0581	1	11
6665-01-122-0582	1	10
6665-01-122-0583	1	8
4720-01-122-4284	3	23
6625-01-124-0334	3	27
6665-01-133-4113	1	14
6665-01-135-9662	3	54
5310-01-141-6672	4	10
5980-01-144-0589	3	41
5999-01-206-4594	3	47
6665-01-209-5810	1	25
5935-01-214-0659	3	72
6665-01-216-7137	2	6
5930-01-223-7256	3	52
5340-01-225-6487	2	11
6665-01-231-7723	2	5

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
88044	AN960-C4	5310-01-141-6672	4	10
88044	AN960-C6	5330-00-531-9514	4	6
88044	AN960-10	5310-00-167-0818	1	4
81361	B5-15-5373	6665-00-762-4030	3	30
81361	B5-15-8215	9330-01-113-8311	1	9
81361	B5-15-8217	4720-01-121-0007	3	3
81361	B5-15-8241-1	4720-01-122-4284	3	23
81361	B5-15-8241-2	4720-01-121-0004	3	18
81361	B5-15-8241-3	4720-01-121-0005	3	20
81361	B5-15-8241-5	4720-01-121-0006	3	25
81361	B5-15-8247		4	7
81361	B5-15-8257		3	59
81361	B5-15-8259	6665-01-231-7723	2	5
81361	B5-15-8260	6665-01-216-7137	2	6
81361	B5-15-8261		1	30
			2	13
81361	B5-15-8263		3	76
81361	B5-15-8271	6665-01-122-0583	1	8
81361	B5-15-8274	6665-01-133-4113	1	14
81361	B5-15-8288	6665-01-122-0581	1	11
81361	C5-15-5370	6665-00-228-0656	3	31
81361	C5-15-5389		3	4
81361	C5-15-5390		3	79
81361	C5-15-5542	5340-01-114-1127	1	19
81361	C5-15-8090	6665-01-122-0580	1	12
81361	C5-15-8218		1	7
81361	C5-15-8231		3	15
81361	C5-15-8232		3	1
81361	C5-15-8233		4	11
81361	C5-15-8248		3	13
81361	C5-15-8256	6665-01-122-0582	1	10
81361	C5-15-8262	9905-01-113-0708	1	1
81361	C5-15-12557	5930-01-223-7256	3	52
81361	D5-15-5423	6665-00-237-7852	1	17
81361	D5-15-5424	6685-00-878-9212	3	29
81361	D5-15-5435	6680-00-879-1181	4	2
81361	D5-15-8074-3	4240-01-114-8054	1	16
81361	D5-15-8202	6665-01-209-5810	1	25
81361	D5-15-8203	4240-01-115-1088	1	32
81361	D5-15-8208		3	67
81361	D5-15-8220	6665-01-115-5539	1	26
81361	D5-15-8229	6625-01-124-0334	3	27
81361	D5-15-8239		3	26

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
81361	D5-15-8240	NSN APPLIED FOR	3	64
81361	D5-15-8242	6665-01-113-0785	3	77
81361	D5-15-8243	6665-01-116-4940	3	75
81361	D5-15-8244	6665-01-115-3889	3	78
81361	D5-15-8246	6685-01-117-3599	3	65
81361	D5-15-8251	6665-01-115-9993	3	69
81361	D5-15-8268		3	7
81361	D5-15-12551	5999-01-206-4594	3	47
81361	E5-15-8201		1	5
81361	E5-15-8221	6665-01-135-9662	3	54
81361	E5-15-8225		1	6
81361	E5-15-8235		3	68
81349	FHN26G1	5920-00-892-9311	3	82
81349	FO2-A-250V-2A	5920-00-280-4960	1	15
			3	83
81349	LC12YN2	6210-00-080-1048	3	35
81349	LH73/1	6210-00-813-8265	3	37
96508	LN23BP	5120-00-628-1457	1	24
96906	MS21044-C06	5310-00-982-6813	1	28
			2	9
96906	MS24523-22	5930-00-683-1628	3	42
96906	MS24523-27	5930-00-683-1633	3	43
96906	MS24524-23	5930-00-655-4241	3	40
96906	MS24524-27	5930-00-660-3947	3	38
96906	MS24693-C4	5305-00-056-9961	3	34
96906	MS24693-C24	5305-00-066-7326	1	23
96906	MS24693-C27	5305-00-066-7328	3	2
96906	MS24693-C269	5305-00-781-5662	3	14
96906	MS25082-C22	5310-01-006-5463	3	16
96906	MS25089-3C	5930-00-501-1749	3	39
96906	MS3112E-14-5S	5935-00-893-7952	3	80
96906	MS3115-14W	5935-01-214-0659	3	72
96906	MS35338-98	5310-00-184-8977	3	44
96906	MS35338-134	5310-00-928-2690	3	61
96906	MS35338-135	5310-00-933-8118	2	3
			3	5
			3	56
			4	12
96906	MS35338-136	5310-00-929-6395	4	3
96906	MS35338-157	5310-00-869-9576	1	3
96906	MS35489-40	5325-00-185-0004	3	8
96906	MS35649-224	5310-00-938-2013	3	60
96906	MS35649-244	5310-00-934-9748	2	4
			3	33
			3	55
			4	13

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS35649-264	5310-00-934-9761	3	6
			4	4
96906	MS51859-3	5310-00-140-4894	3	71
96906	MS51957-5	5305-00-054-5639	3	53
96906	MS51957-12	5305-00-054-5646	2	10
96906	MS51957-13	5305-00-054-5647	3	70
96906	MS51957-15	5305-00-054-5649	3	58
			4	9
96906	MS51957-16	5305-00-054-5650	2	1
			3	66
96906	MS51957-18	5305-00-054-5652	3	57
96906	MS51957-26	5305-00-054-6650	1	20
96906	MS51957-28	5305-00-054-6652	4	5
96906	MS51957-30	5305-00-054-6654	1	31
			2	7
96906	MS51957-31	5305-00-054-6655	1	18
			3	74
96906	MS51957-32	5305-00-054-6656	3	46
			4	1
96906	MS51957-34	5305-00-054-6658	3	45
96906	MS51957-38	5305-00-054-6662	3	28
96906	MS51958-62	5305-00-059-3658	1	27
96906	MS51958-63	5305-00-059-3659	1	2
96906	MS51959-29	5305-00-727-8832	3	63
96906	MS91528-1F2B	5355-00-680-1357	3	51
81349	M12133/5-6P	NSN APPLIED FOR	3	32
81349	M15733/23-0060	5915-01-056-3277	3	62
81349	M39024/10-02	5935-00-702-4199	3	50
81349	M39024/10-03	5935-00-762-0312	3	49
81349	M39024/10-08	5935-00-768-4232	3	48
81349	M83248/1-014	5330-00-166-0990	1	13
80205	NAS620C4	5310-00-057-0573	2	2
80205	NAS620C6	5310-00-773-7624	1	22
80205	NAS620C6L	5310-00-054-0041	1	29
			2	8
80205	NAS671C6	5310-00-616-8660	4	8
81349	PBO8NA01	5940-00-937-5237	3	81
02570	SS-1GS4-A	4820-01-057-7244	3	19
02570	SS-1RS4-A	4820-00-462-1973	3	21
02570	SS-400-1-2	4730-00-684-4065	3	9
02570	SS-400-1-4	4730-00-239-0189	3	22

PART NUMBER INDEX

FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
02570	SS-400-2-2	4730-01-073-8686	3	12
02570	SS-400-2-4	4730-00-490-6257	3	24
02570	SS-400-3TTM	4730-00-060-4037	3	17
02570	SS403-1	4730-01-052-0268	3	11
02570	SS404-1	4730-01-052-0204	3	10
92966	345	6240-00-683-0560	3	36
81349	37TB4	5940-00-983-6045	3	73
81349	37TB10	5940-00-983-6051	3	84
86928	4523-24-31-2-T	5340-01-225-6487	2	11
72619	521-9248	5980-01-144-0589	3	41
83330	8402	5310-00-231-9583	2	12
83330	8423	6610-00-994-0191	1	21

ALPHABETICAL INDEX

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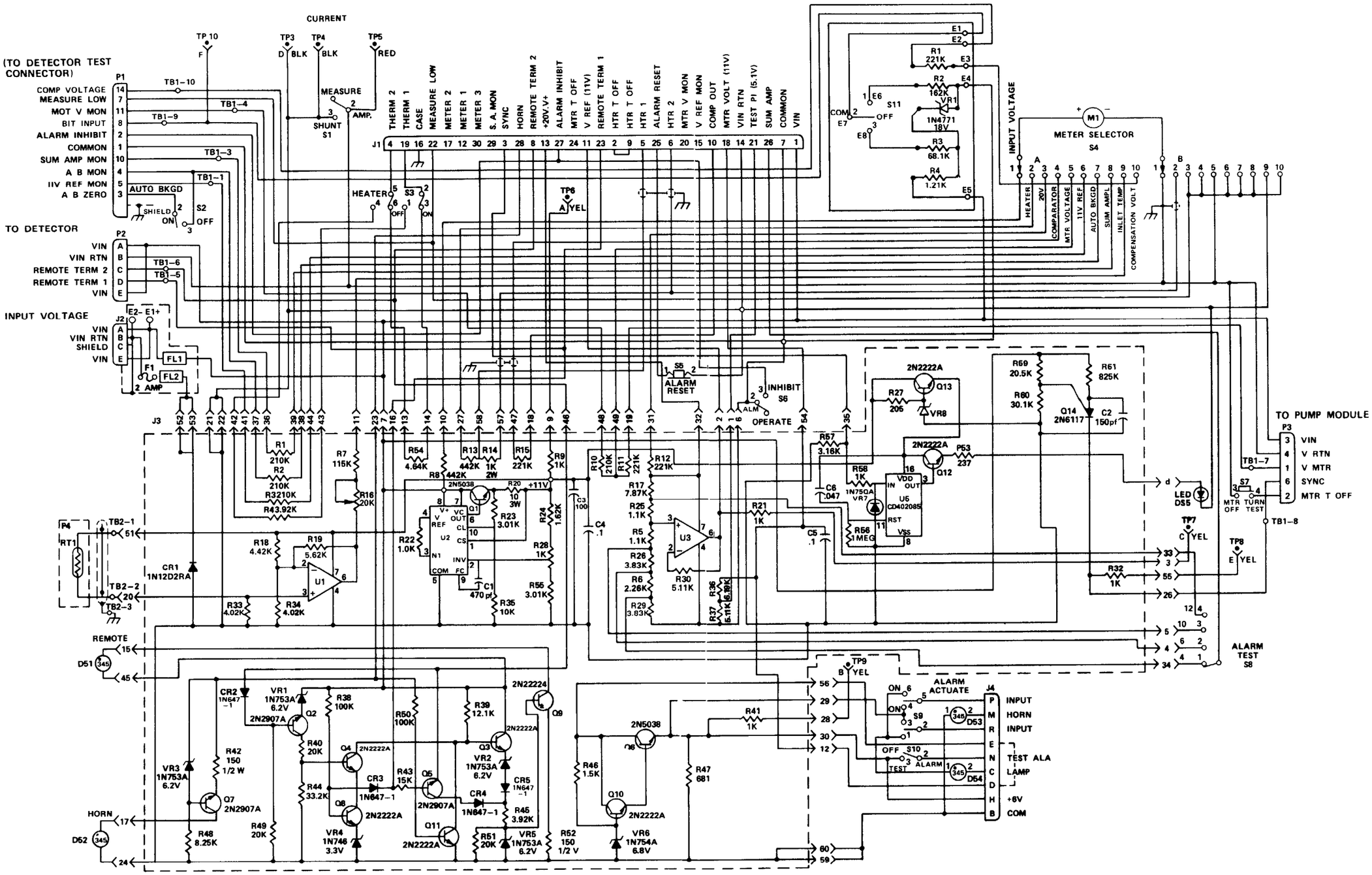

Figure FO-1 Wiring Diagram FP-1/(FP-2 Blank)

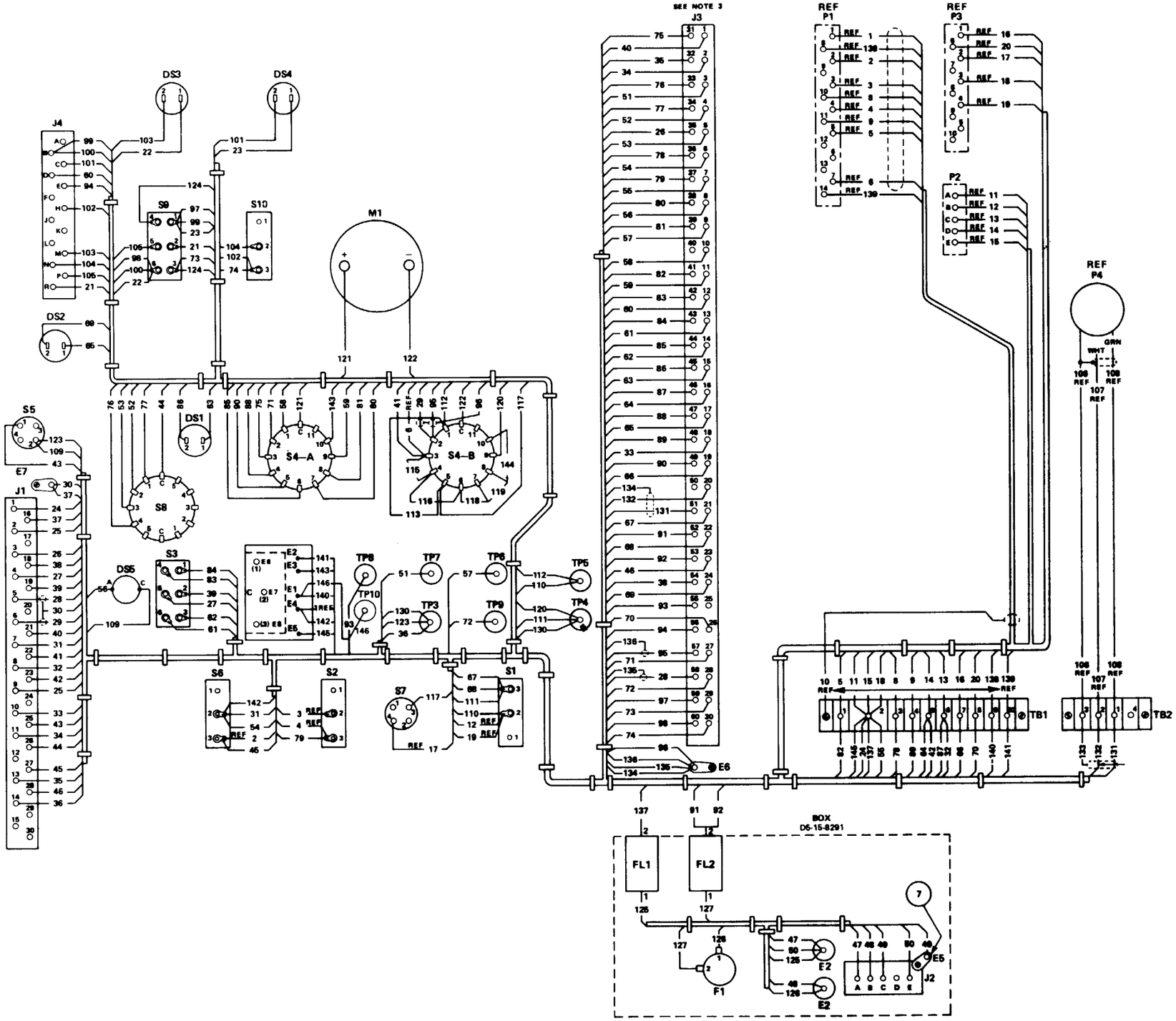

Figure FO-2 Electronic Module FP-3/(FP-4 Blank)

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
3 - 50	3 - 11			CONTRACT NUMBER ON I.D. LABEL ILLUSTRATION IS INCORRECT. SHOULD BE 6665 - 00 - 083 - 2749
3 - 17			3 - 2	STEP A. MULTIMETER SHOULD BE SET AT 200 VOLTS INSTEAD OF 50 VOLTS.
3 - 21			3 - 2	TEST 6: JUMPER WIRE IN ILLUSTRATION SHOULD RUN TO TEST SET POINT C. CHANGE POINT E TO POINT C.

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

B. Childs (S. SGT. 738 - xxxx)

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meter = 0.3937 Inch
1 Meter - 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Mile

WEIGHTS

1 Gram = 0.001 Kilogram = 1000 Milligrams = 0.035 Ounce
1 Kilogram = 1000 Grams = 2.2 Lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liter = 0.0338 Fluid Ounce
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inch
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Mile

CUBIC MEASURE

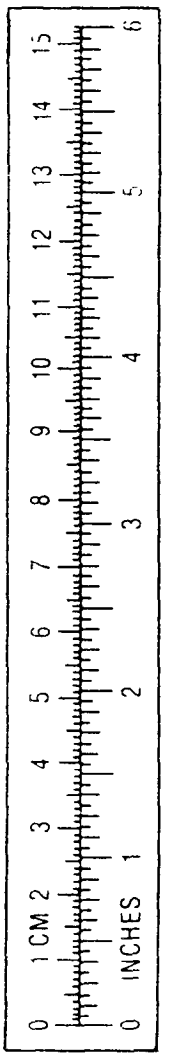
1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inch
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 (°C + 32) = °F

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Feet	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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