TM 3-6665-302-34

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL. SUPPORT MAINTENANCE MANUAL

DETECTOR UNIT,
CHEMICAL AGENT AUTOMATIC ALARM, M43
(NSN 6665-00-859-2201)

AND

ALARM UNIT,
CHEMICAL AGENT AUTOMATIC ALARM, M42
(NSN 6665-00-859-2215)

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HEADQUARTERS, DEPARTMENT OF THE ARMY

23 NOVEMBER 1973

WARNING

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CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *22 September 1976*

Direct Support and General Support Maintenance Manual
DETECTOR UNIT, CHEMICAL AGENT AUTOMATIC ALARM, M43 (NSN 666-00-8592201)

ALARM UNIT, CHEMICAL AGENT AUTOMATIC ALARM, M42 (NSN 6665-00-859-2215)

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1. Remove old pages and insert new pages as indicated below.
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A	A
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2-1 through 2-4 (blank)	2-1 through 2-4 (blank)
2-21 and 3-22	3-21
None	3-22.1 and 3-22.2 (blank)
A-1	A-l
None	DA Form 2028-2 (Test) (Sample)
*Figure 3-7	* Figure 3-7

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TECHNICAL MANUAL
NO. 3-6665-302-34

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *23 November 1973*

Direct Support and General Support Maintenance Manual

DETECTOR UNIT, CHEMICAL AGENT, AUTOMATIC ALARM, M43 (NSN 6665-00-859-2201) AND ALARM UNIT, CHEMICAL AGENT, AUTOMATIC ALARM, M42 (NSN 6665-00-859-2215)

Current as of June 1976

REPORTING OF ERRORS

You can impmrove this manual by recommending improvements using DA Form 2028-2 (T'est) located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

These instructions are for use by direct support and general support maintenance personnel. They apply to Detector Unit, Chemical Agent Automatic Alarm, M43 and Alarm Unit, Chemical Agent Automatic Alarm, M42. The M43 detector unit and M42 alarm unit are major components of the M8 and M1O through M18 chemical agent alarm systems.

1-2. Maintenance Forms and Records

Equipment maintenance forms and procedures for their use are prescribed in TM 38-750.

Section II. DESCRIPTION AND DATA

1-3. Description

TM 3-6665-225-12 contains general descriptions of the M43 detector unit and the M42 alarm unit.

1-4. Tabulated Data

a. TM 3-6665-225-12 contains the operating and performance characteristics as well as the dimensions and weights of the M43 detector unit and the M42 alarm unit.

b. Table 1-1 lists expendable consumable supplies and material required for the maintenance of this equipment.

Table 1-1 Consumable Supplies and Material

The supplies and material listed in this table are required for maintenance of this equipment and are authorized to be requisitioned by CTA 50-970, Expendable Items (Except: Medical Class V, Repair Parts and Heraldic Items).

Item	Description, Ref. No. FSCM	National stock number
1	Insulating compound, electrical: paste form, 12 oz tube RTV112 (01139)	5970-00-950-9856
2	Sealing compound: liquid form, yellow, 1 pt can MIL-S-22473 (81349)	8030-00-456-1038
3	Sealing compound: unpolymerized compound, liquid form, blue, 50 cc plastic bottle MIL-S-22473 (81349)	8030-00-964-7537
4	Sealing compound: liquid form, brown, 8 oz tube MIL-S-22473 (81349)	8030-00-952-2205
5	Seailing compound: silicon rubber, clear, w/separate catalyst, liquid form, 1 lb kit RTV615 (01139)	8030-00-485-9200
6	Coating kit, printed circuit board: 1lb kit TC3047AB (03171)	8030-00-965-7745
7	Primer: rubber SS4004 (01139)	8030-00-083-8403
8	Adhesive: synthetic rubber, paste form, 3 oz tube MIL-A-48106 (81349)	8030-00-843-0802
9	Adhesive: synthetic rubber, liquid form, 1 pt can MMMA1617 (81348)	8040-00-664-4318
10	Adhesive: silicone, paste form, 2 oz tube 1290772 (80064)	8040-00-945-0590

1-5. Reference Designations

The bottom case assembly is assigned reference designation 1A1, and the detector assembly is assigned reference designation 1A2. Components of the bottom case assembly are assigned 1A1 as a prefix to their reference designations. Components of the detector unit assembly are assigned 1A2 as a prefix to their reference designations.

a. Pump Assembly 1A2A1. Components of the pump assembly have their reference designations prefixed with 1A2A1.

b. Chassis Assembly 1A2A2. Components of the chassis assembly have their reference designations prefixed with 1A2A2.

c. *Cell Block Assembly 1A2A2A3.* Components of the cell block assembly have their reference designations prefixed with 1A2A2A3.

*d. Electronic Module Assembly 1A2A4. The elec*tronic module assembly has a reference designation of 1A2A4.

e. *Case Top Assembly 1A2A5.* Components of the case top assembly have their reference designations prefixed with 1A2A5.

CHAPTER 2

FUNCTIONING OF EQUIPMENT

Section I. M43 DETECTOR UNIT

2-1. Pneumatic System Operation (fig. 2-1).

Air is drawn into the M43 detector unit through the case top at the air inlet port and passes into the detector cell. Solution is pumped from the reservoir assembly by the pump assembly into the detector cell to form an air-solution mixture. The air-solution mixture is drawn from the detector cell into the solution reservoir assembly where the air and solution are separated. Air is pumped from the solution reservoir assembly and exhausted through the air outlet port. Solution is pumped from the solution reservoir assembly back into the detector cell.

2-2. Electrical Operation (fig. 2-2) .

a. The detector cell (1A2A2A3V1) detects very low concentrations of chemical agents in the forms of vapor or inhalable aerosols. Chemical agents increase the electrical output of the detector cell. This triggers the electronic module assembly (1A2A4) causing the horn (1A2A5A2) to sound. At the same time, voltage is removed

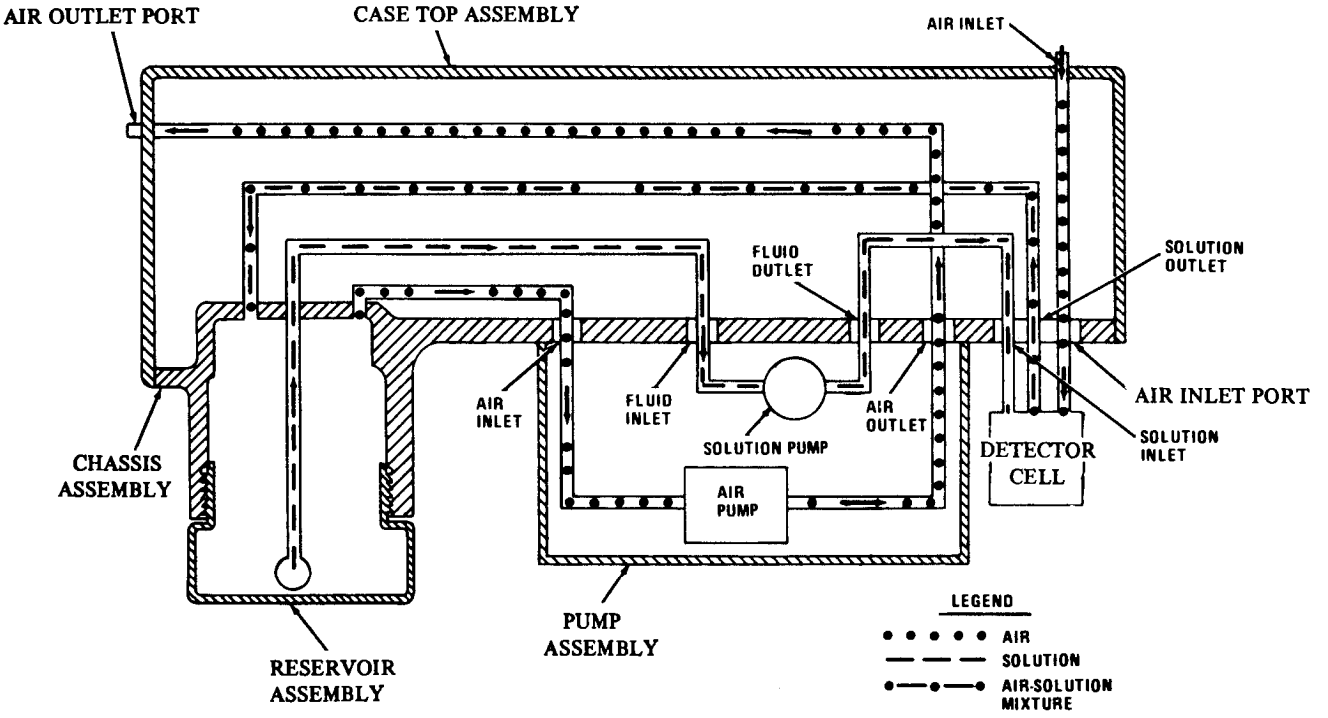


Figure 2-1. M43 detector unit pneumatic system block diagram

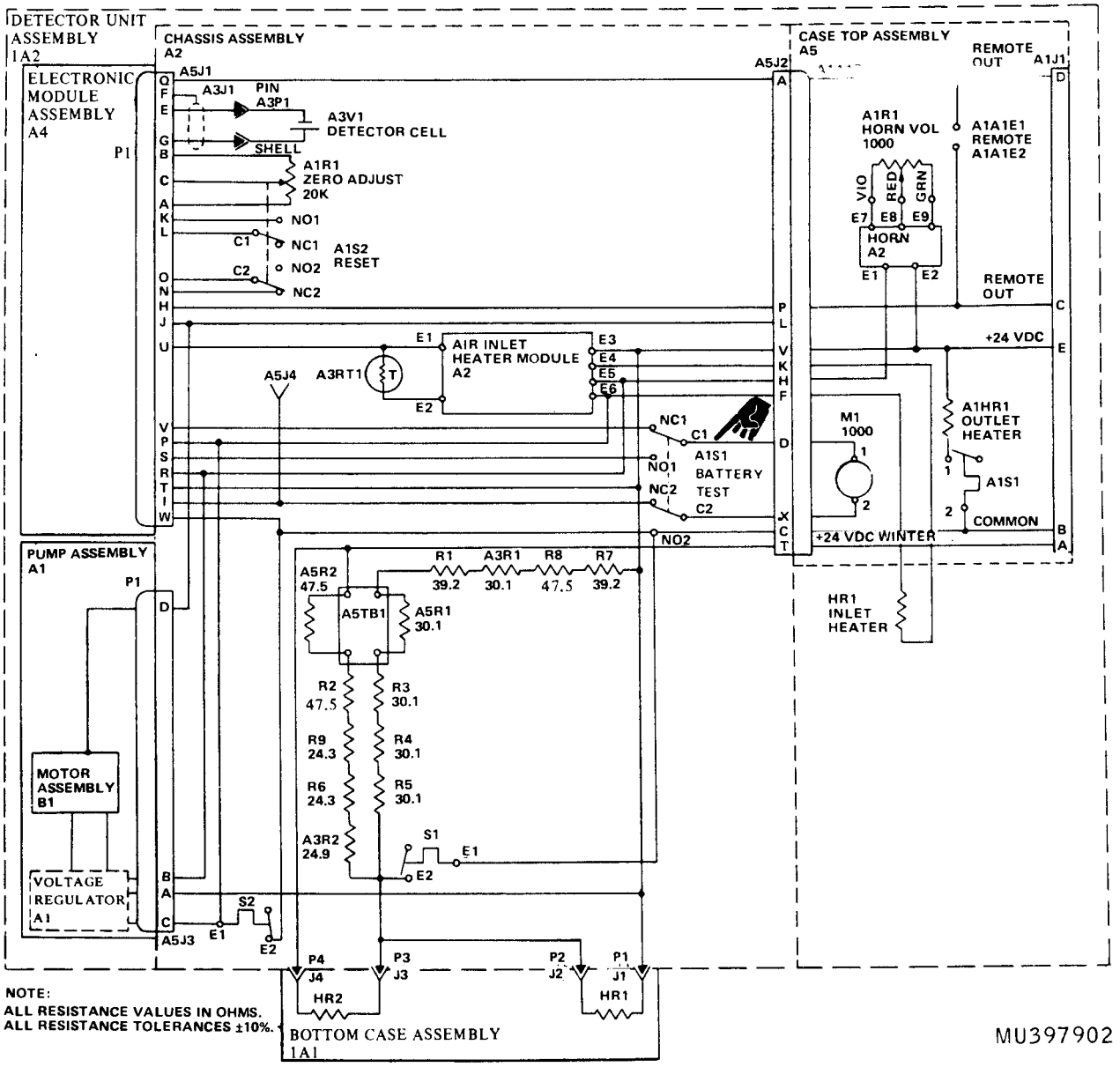


Figure 2-2. M43 detector unit schematic diagram.

from the pump assembly (1A2A1.) preventing further operation until the M43 detector unit is reset.

b. When there are no chemical agents in the atmosphere, motor (1A2A1B 1) operates continuously. Power is applied to voltage regulator (1A2A1A1) as long as the temperature within the M43 detector unit case keeps thermostatic switch (1A2A2S2) closed. When the M43 detector unit is first connected to a 24-volt dc power source and the temperature within the case is below 32° F., thermostatic switch (1A2A2S2) is open, and thermostatic switch (1A2A2S1) is closed applying power to heater (1A1HR1). When the temperature within the M43 detector unit reaches +40° F., thermostatic switch (1A2A2S2) closes, causing motor (1A2A1B1) to operate. Thermostatic switch (1A2A2S1) alternately opens and closes to maintain proper operating temperature. Resistors 1A2A2R5, 1A2A2R4, 1A2A2R3, 1A2A2A5R1, 1A2A2R1, 1A2A2A3R1, 1A2A2R8, and 1A2A2R7 are located in the detector unit assembly. This string of series resistors parallels heater (lA1HR1) and conducts whenever thermostatic switch (1A2A2S1) is closed. The power dissipated by the resistors warms the detector unit assembly. Series resistors 1A2A2A3R2, 1A2A2R6, 1A2A2R9, 1A2A2R2, and 1A2A2A5R2 parallel 1A1HR2. When 1A2A2S1 closes and an M253 wintcrization kit is connected, the resistors conduct, adding additional heat to the detector unit assembly.

c. Thermal resistor (1A2A2A3RT1) senses the air temperature and causes the air inlet heater assembly (1A2HR1) to operate when the ambient air temperature is +90° F. or lower. This action warms the air drawn into the M43 detector unit.

d. In temperatures of +32° F. and below, thermostatic switch (1A2A5A1S1) closes causing current to flow through heater 1A2A5A1HR1. The heater prevents icing at the AIR OUTLET PORT.

Section II. M42 ALARM UNIT

2-3. General

Whenever the horn on the M43 detector unit is triggered into operation, power is applied to the REMOTE binding posts on the M43 detector unit. If the M42 alarm unit (fig. 2-3) is connected to the REMOTE binding posts of the M43 detector unit, the M42 alarm unit will also be triggered into providing a warning.

2-4. Signal Application

The alarm signal from the M43 detector unit is applied through a pair of field wires to binding posts E1 and E2 marked TO DETECTOR. The signal is then applied to the M42 alarm unit circuit card that, in turn, triggers the loudspeaker (LS1) through switch (S1) and lights the ALARM RED indicator (DS1).

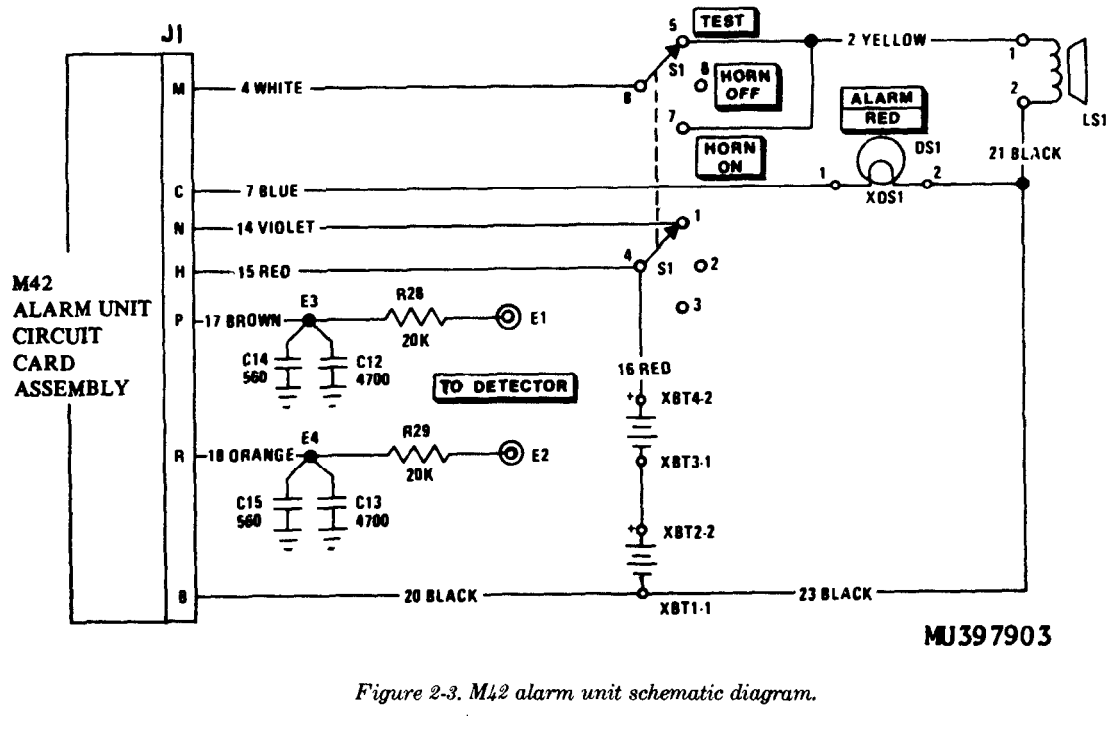


Figure 2-3. M42 alarm unit schematic diagram.

CHAPTER 3

DIRECT SUPPORT MAINTENANCE

Section I. GENERAL

3-1. Scope

This chapter describes the maintenance operations authorized to be performed by direct support maintenance personnel.

NOTE

Refer to TB SIG 222 for instructions regarding soldering techniques.

3-2. Special Tools and Equipment

Refer to TM 3–6665–225–12 for a list of tools and equipment required for maintenance.

3-3. Painting

Direct support maintenance personnel are authorized to spot paint all surfaces that are chipped, scratched, or scraped.

NOTE

Mask printed matter before painting.

Use green, lusterless enamel paint, shade number 34087 (Fed Std 595).

Section II. M43 DETECTOR UNIT TROUBLESHOOTING

3-4. General

This section provides instructions for troubleshooting the M43 detector unit at the direct support maintenance level.

a. Troubleshooting Illustrations. The following illustrations are provided as aids to troubleshooting and maintenance of the M43 detector unit,

(1) Figure 2-1 is a block diagram of the M43 detector unit pheumatic system.

(2) Figure 2-2 is a schematic diagram of the M43 detector unit assembly.

(3) Figure 3-1 is a wiring diagram of the M43 detector unit chassis assembly.

(4) Figure 3-2 is a schematic diagram of the M43 detector unit case top assembly.

b. Troubleshooting Charts. Figure 3-3 describes the use of troubleshooting charts, figures 3-4 through 3-15. The troubleshooting charts provide systematic procedures for isolating troubles in the M43 detector unit. The troubleshooting charts also provide systematic procedures for testing after repair.

c. M74 Test Set. Prepare the M74 test set for use by following the preliminary procedures in TM 3-6665-260-14. After using the M74 test set, perform the shutdown procedures in TM 3-6665-260-14.

3-5. M43 Detector Unit

NOTE

Once the detector unit assembly is removed from the bottom case assembly, do not reassemble the two assemblies until instructed to do so.

a. Prepare fresh solution and install reservoir assembly and fresh air filter in detector unit assembly (TM 3–6665–225–12).

b. Measure resistance between 1A1J3 and 1A1J4 (contacts in the bottom case assembly) (2, fig. 3–16). Resistance must be 38 to 48 ohms. Measure resistance between 1A1J1 and 1A1J2. Resistance must be 63 to 73 ohms.

c. Prepare M74 test set for use (TM 3-6665–260-14).

d. Install rainshield adapter in AIR INLET assembly (TM 3–6665-225–12). Set M43 detector unit AIR INLET to CLOSED. Attach VACUUM TEST tube of M74 test set to rain shield adapter. Remove M43 detector unit AIR OUTLET cap and 24 VDC INPUT cover. Press in and release crank.

e. Press in ZERO ADJUST knob, rotate fully clockwise, and release.

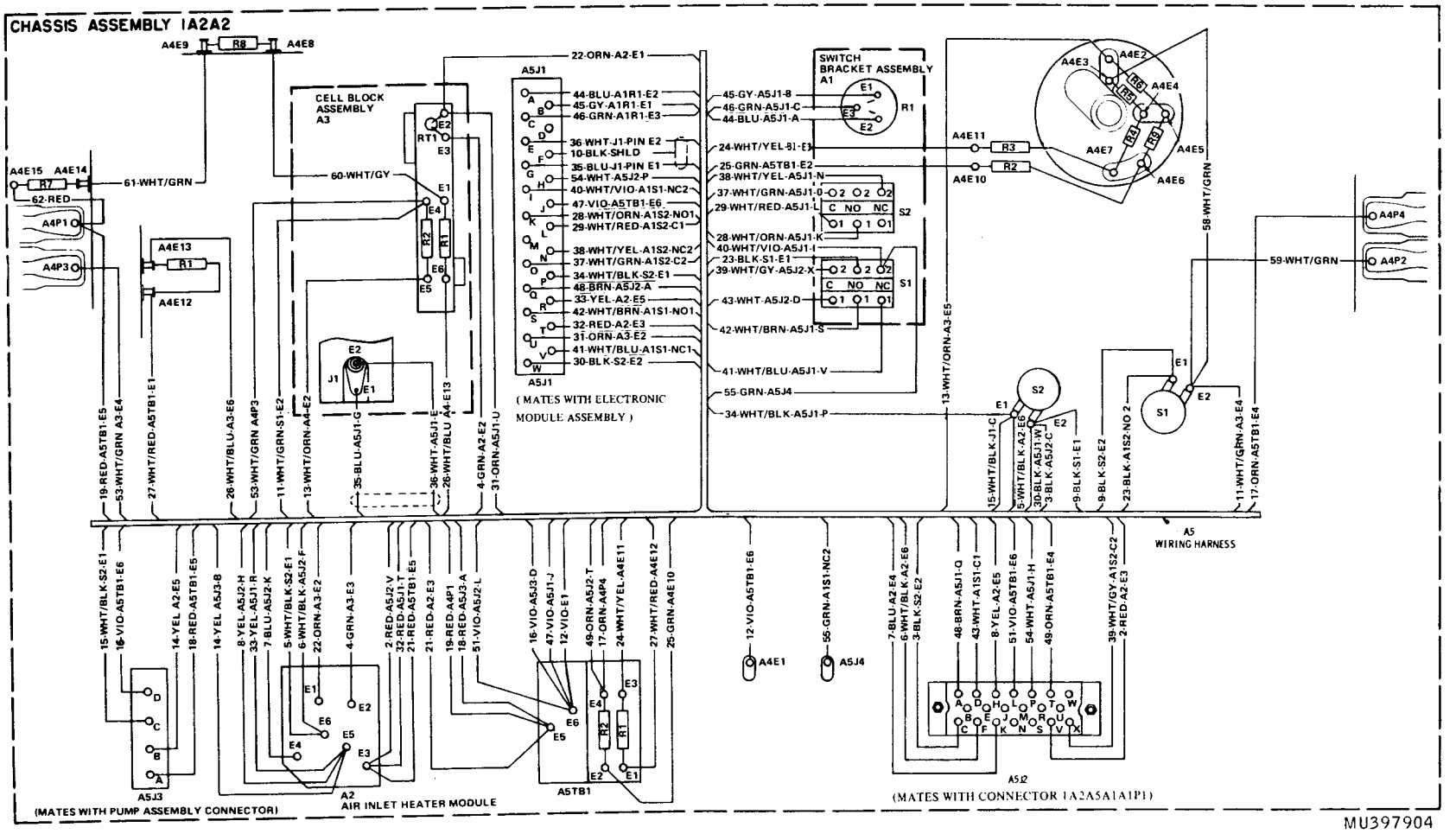


Figure 3–1. M43 detector unit wiring diagram.

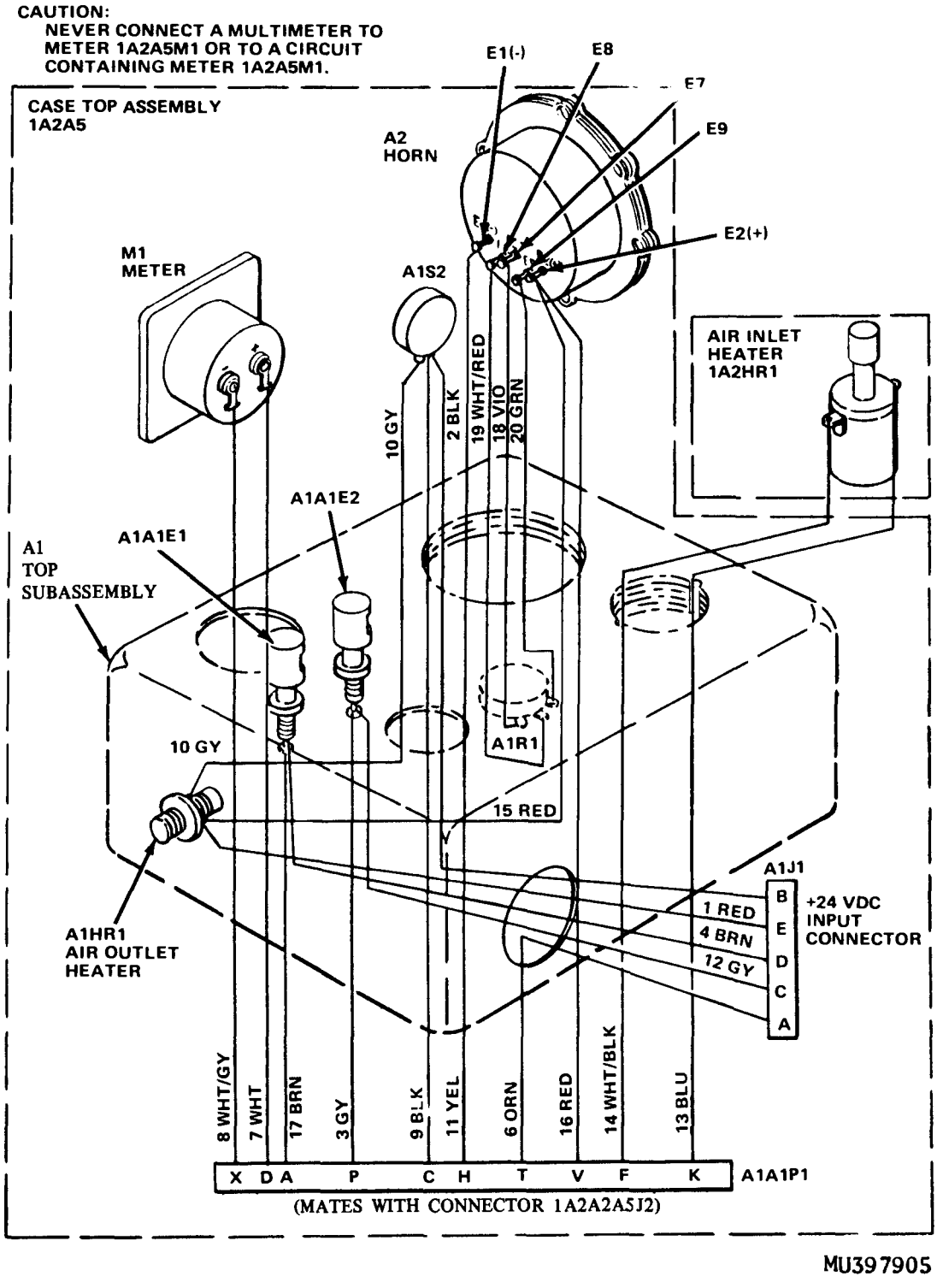


Figure 3-2. M43 detector unit schematic diagram.

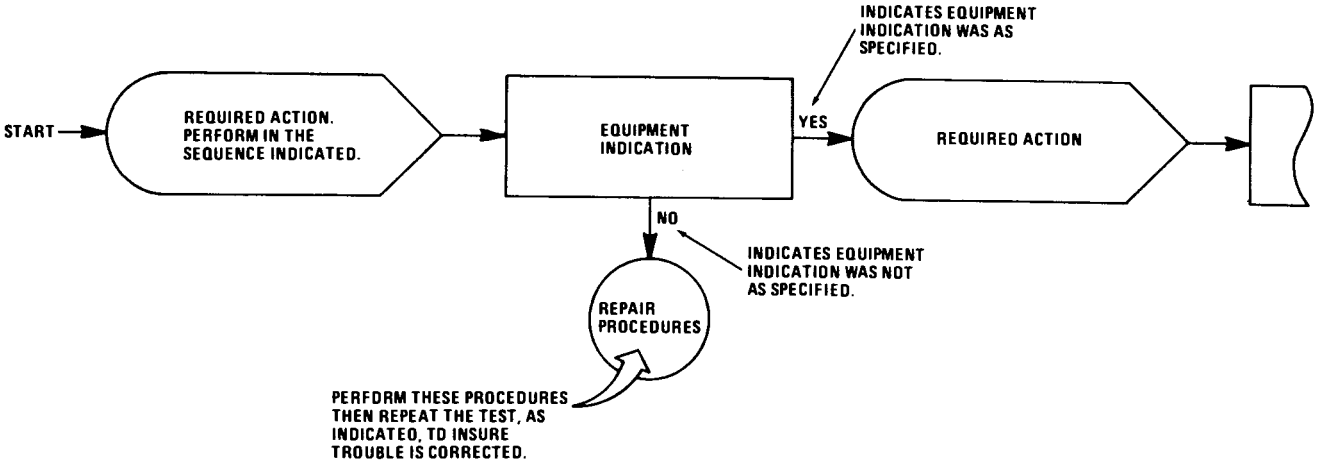


Figure 3-3. Flow chart procedures.

Figure 3-4. M43 detector unit troubleshooting chart.
(Located in back of manual)

Figure 3-5. Horn circuit troubleshooting chart.
(Located in back of manual)

Figure 3-6. Electronic module trouble shooting chart.
(Located in back of manual)

Figure 3-7. Pump assembly troubleshooting chart.
(Located in back of manual)

Figure 3-8. Meter circuit troubleshooting chart.
(Located in back of manual)

Figure 3-9. Motor control voltage circuit troubleshooting chart.
(Located in back of manual)

Figure 3-10. Reset circuit troubleshooting chart.
(Located in back of manual)

Figure 3-11. Inlet heater troubleshooting chart.
(Located in back of manual)

Figure 3-12. ①**.** Pneumatic system troubleshooting chart.
(Located in back of manual)

Figure 3-12. ②**.** Pneumatic system troubleshooting chart.
(Located in back of manual)

Figure 3-13. Cold temperature operation troubleshooting chart.
(Located in back of manual)

Figure 3-14. Flow rate meter troubleshooting chart.
(Located in back of manual)

Figure 3-15. Zero adjust circuit troubleshooting chart.
(Located in back of manual)

f. Adjust multimeter to 50-volt dc scale. Connect positive lead to REMOTE terminal nearest HORN-Battery TEST knob and negative lead to other REMOTE terminal.

(1) Set M74 test set AMMETER switch to SHUNT.

(2) Set METER SELECTOR switch to SUPPLY.

(3) Raise and secure M74 test set flow rate meter bracket in vertical position.

(4) Turn FLOW ADJUST valve and PRESSURE LOCK valve fully counterclockwise.

(5) Connect 24-volt dc power source to POWER connector or to POWER binding posts.

(6) Meter M1 must indicate between 24 and 36 volts.

(7) Perform procedure in M43 detector unit troubleshooting chart (fig. 3-4). After completion of repairs, repeat figure 3-4.

(8) Perform M74 test set shutdown procedures.

g. Electronic Module Assembly (1A2A4). Perform the following procedures to test the electronic module assembly.

(1) Prepare M74 test set for use (TM 3-6665-260-14).

(2) Connect 24-volt dc power source to the M74 test set.

(3) Set AMMETER switch to SHUNT position.

(4) Set METER SELECTOR switch to SUPPLY position. METER M1 must indicate between 26 and 36 volts.

(5) Position and hold AMP MODE switch to RESET for about 5 seconds; then release.

(6) Plug electronic module assembly into 1A2A4 TEST SOCKET.

(7) Set METER SELECTOR switch to AMP TEST position.

(8) Perform procedures in the electronic module assembly troubleshooting chart (fig. 3-6).

h. Pump Assembly (1A2A1). Perform the following procedures to test a pump assembly.

(1) Prepare the M74 test set for use (TM 3-6665-260-14).

(2) Remove cover from pump assembly (para 3-26a).

(3) Inspect for fluid in unit. Clean with distilled water if necessary.

(4) Inspect tubing and rollower, replace if necessary (para 3-28 and 3-34).

(5) Connect a 24-volt dc power source to the M74 test set.

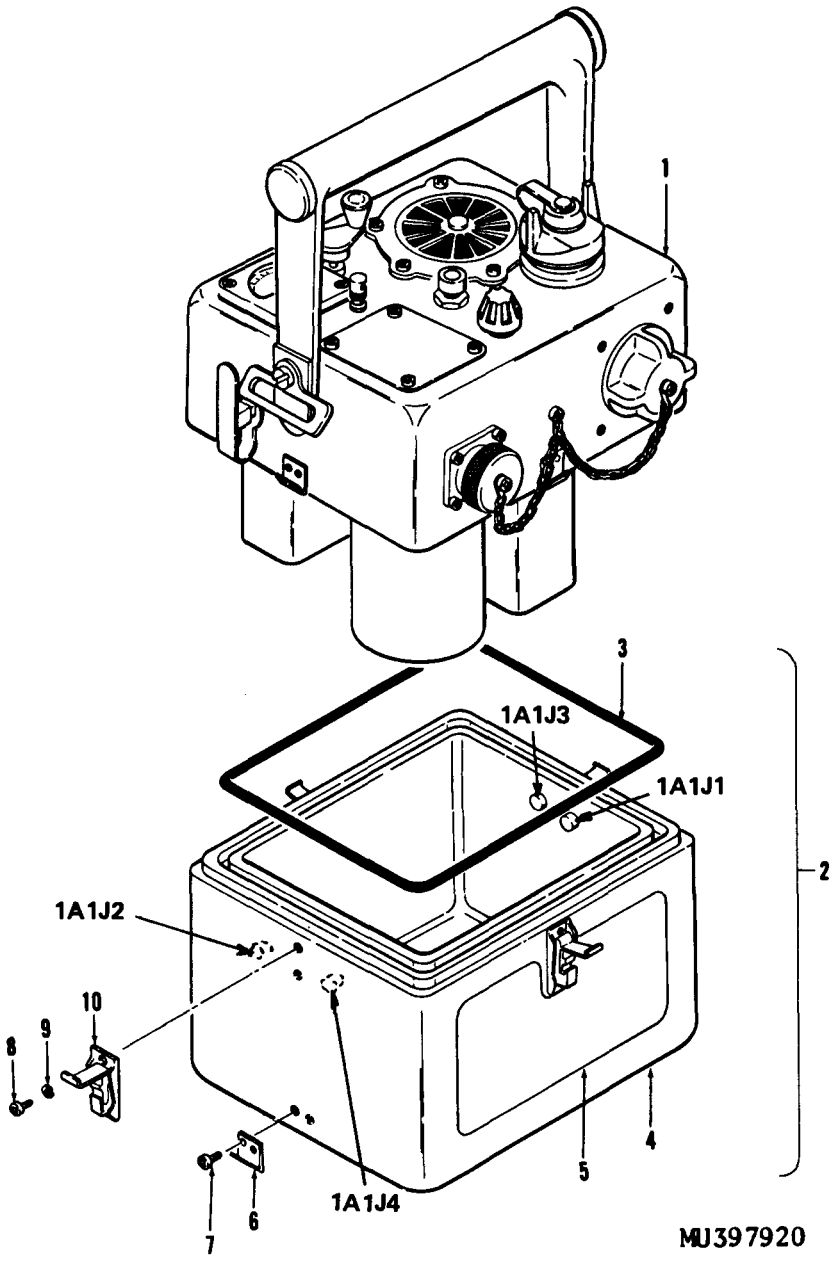
(6) Connect PRESSURE TEST tube (4, fig. 3-19) to pump assembly fluid inlet port (3).

(7) Turn M74 test set PRESSURE LOCK knob fully counterclockwise.

(8) Connect bellows and pump to PRESSURE PORT.

(9) Raise and secure M74 test set flow rate meter bracket in vertical position.

(10) Perform procedures in the pump assembly troubleshooting chart (fig. 3-7).



1 Detector unit assembly (1A2)
2 Bottom case assembly (1A1)
3 Seal
4 Bottom case
5 Instruction plate
6 Bottom catch
7 Screw
8 Screw
9 Lockwasher
10 Clamping catch

Figure 3-16. M43 Detector unit, exploded view.

(11) Perform M74 test set shutdown pro-edures (TM 3-6665-260-14).

i. Flow Rate Meter.

(1) Prepare the M74 test set for use (TM 3-665-260-14).

(2) Connect 24-volt dc power source to the M74 test set.

(3) Set METER SELECTOR switch to MOTOR VOLTAGE position.

(4) Turn FLOW ADJUST valve counter-clockwise.

(5) Turn VOLTAGE ADJUST control fully clockwise.

(6) Obtain an operative pump assembly.

(7) Connect M74 test set VACUUM TEST tubing to the air inlet port (2, fig. 3-19) of the pump assembly.

(8) Connect PUMP POWER cable to the pump assembly connector.

(9) Raise and secure M74 test set flow rate meter bracket in vertical position.

(10) Insert M43 detector unit flow rate meter into M74 test set port (turn clockwise).

(11) Perform procedures in the flow rate meter troubleshooting chart (fig. 3-14).

Section III. M43 DETECTOR UNIT BOTTOM CASE ASSEMBLY (1A1)

3-6. General

Direct support maintenance personnel are authorized to replace the M43 detector unit bottom case assembly or repair it by replacing the seal, catches, and instruction plate.

3-7. Removal

Release four catches (10, fig. 3-16) and separate detector unit assembly (1) from bottom case assembly (2).

3-8. Installation

Check that seal (3) is correctly seated in groove around the top of the bottom case assembly. Assemble detector unit assembly (1) to the bottom case (4) and secure four catches (10).

3-9. Seal

a. ***Removal.***

(1) Release four catches (10, fig. 3-16) and remove bottom case assembly (2).

(2) Using a blunt tool, such as a screwdriver, pry seal (3) from groove in bottom case (4) and scrape adhesive from groove.

b. Installation.

(1) Coat groove in bottom case with silicone rubber adhesive (item 8, table 1-1).

(2) Insert new seal (3) into groove and press firmly.

(3) Wipe excess adhesive from surface of seal.

(4) Cure adhesive according to manufacturer's instructions on the adhesive container.

(5) Assemble bottom case assembly (2) to detector unit assembly (1) and secure four catches (10) .

3-10. Clamping Catch (fig. 3-16).

a. Removal.

(1) Release four clamping catches (10) and remove bottom case assembly (2).

(2) Raise latch of catch (10) and remove two screws (8) and lockwashers (9).

b. Installation.

(1) Aline clamping catch over screw-insert holes in bottom case (4). Then attach two lockwashers (9) and screws (8). Tighten screws.

(2) Assembly bottom case assembly (2) to detector unit assembly (1) and secure four catches (10).

3-11. Bottom Catch *(fig. 3-16).*

a. Removal. Remove two screws (7). Remove bottom catch (6) from bottom case (4).

b. Installation. Aline bottom catch (6) over screw-insert holes in bottom case (4). Then attach and tighten screws (7).

3-12. Instruction Plate

NOTE

Do not remove old instruction plate (5, fig. 3-16).

a. Roughen surface of old instruction plate (5) and wipe surface with dry-cleaning solvent to remove loose scale, grime, or grease.

b. Remove protective backing from new instruction plate so that adhesive is exposed.

c. Position new instruction plate (5) over old instruction plate and press firmly in place.

Section IV. DETECTOR UNIT ASSEMBLY (1A2)

3-13. General

Direct support maintenance personnel are authorized to repair the M43 detector unit assembly by replacing a gasket on the rainshield assembly, a gasket on the flow rate meter, the hande and its attaching parts, the hand crank,

the detector cell bail, the AIR FILTER plug and preformed packing, the AIR INLET assembly, and heater assembly.

3-14. Rainshield Assembly Gasket (fig. 3-17)

a. Removal.

(1) Unscrew rainshield assembly (1) from handle (7).

(2) Pull adapter (5) from rainshield subassembly (2).

(3) Remove gasket (3) from threaded end of rainshield subassembly (2).

b. Installation.

(1) Install replacement gasket (3) on threaded end of rainshield subassembly (2).

(2) Insert adapter (5) in rainshield subassembly (2).

(3) Screw rainshield assembly (1) into handle (7).

3-15. Flow Rate Meter (fig. 3-17)

a. Removal.

(1) Unscrew flow rate meter (10) from handle (7).

(2) Unscrew meter adapter (12) and remove gasket (13) from flow rate meter (10).

b. Installation.

(1) Install gasket (13) on flow rate meter (l0).

(2) Screw meter adapter (12) into flow rate meter (10).

(3) Screw flow rate meter (10) into handle (7).

3-16. Handle (fig. 3-17)

a. Removal.

(1) Unscrew and remove rainshield assembly (1) and flow rate meter (10) from handle (7).

(2) Remove two screws (46) and two loops (47) from handle.

(3) Remove two screws (48) and spacers (49).

(4) Lift handle from case top assembly (45).

b. Installation.

(1) Position handle (7) on case top assembly (45).

(2) Coat threads of screws (46) and screws (47) with sealing compound (item 4, table 1-1).

(3) Position spacers (49) on handle, and install screws (48) through plate spacers and handle.

(4) Position loops (47) on spacers (49), and install screws (46) through loops (47), spacers (49), and handle (7).

(5) Screw rainshield assembly (1) and flow rate meter (10) into handle (7).

3-17. Crank fig. 3-17

a. Removal. Loosen setscrew (8) and remove crank (9) from shaft.

b. Installation. Position crank (9) on shaft, and tighten setscrew (8).

3-18. Cell Bail

a. Removal.

(1) Release four catches (10, fig. 3-16) and

1 Rainshield assembly
2 Rainshield subassembly
3 Gasket
4 Preformed packing
5 Adapter
6 Preformed packing
7 Handle
8 Setscrew
9 Crank
10 Flow rate meter
11 Gasket
12 Meter adapter
13 Gasket
14 Air intake assembly
15 Thumbscrew assembly
16 Leash
17 Plug
18 Preformed packing
19 Cover
20 Preformed packing
21 Housing
22 Washer
23 Spring
24 Washer
25 Retaining ring
26 Preformed packing
27 Preformed packing
28 Screw
29 Lockwasher
30 Heater assembly (1A2HR1)
31 Preformed packing
32 Plug
33 Screw
34 Screw
35 Pressure ring
35A Connector
36 Chassis assembly (1A2A2)
37 Detector cell (A2A3V1)
38 Bail
39 Screw
40 Electronic module (1A2A4)
41 Reservoir assembly
42 Screw
43 Washer
44 Pump assembly (1A2A1)
44A Shaft
44B Tubing
45 Case top assembly
46 Screw
47 Loop
48 Screw
49 Spacer
50 Screw and packing

Figure 3-17. Detector unit assembly, exploded view -Continued

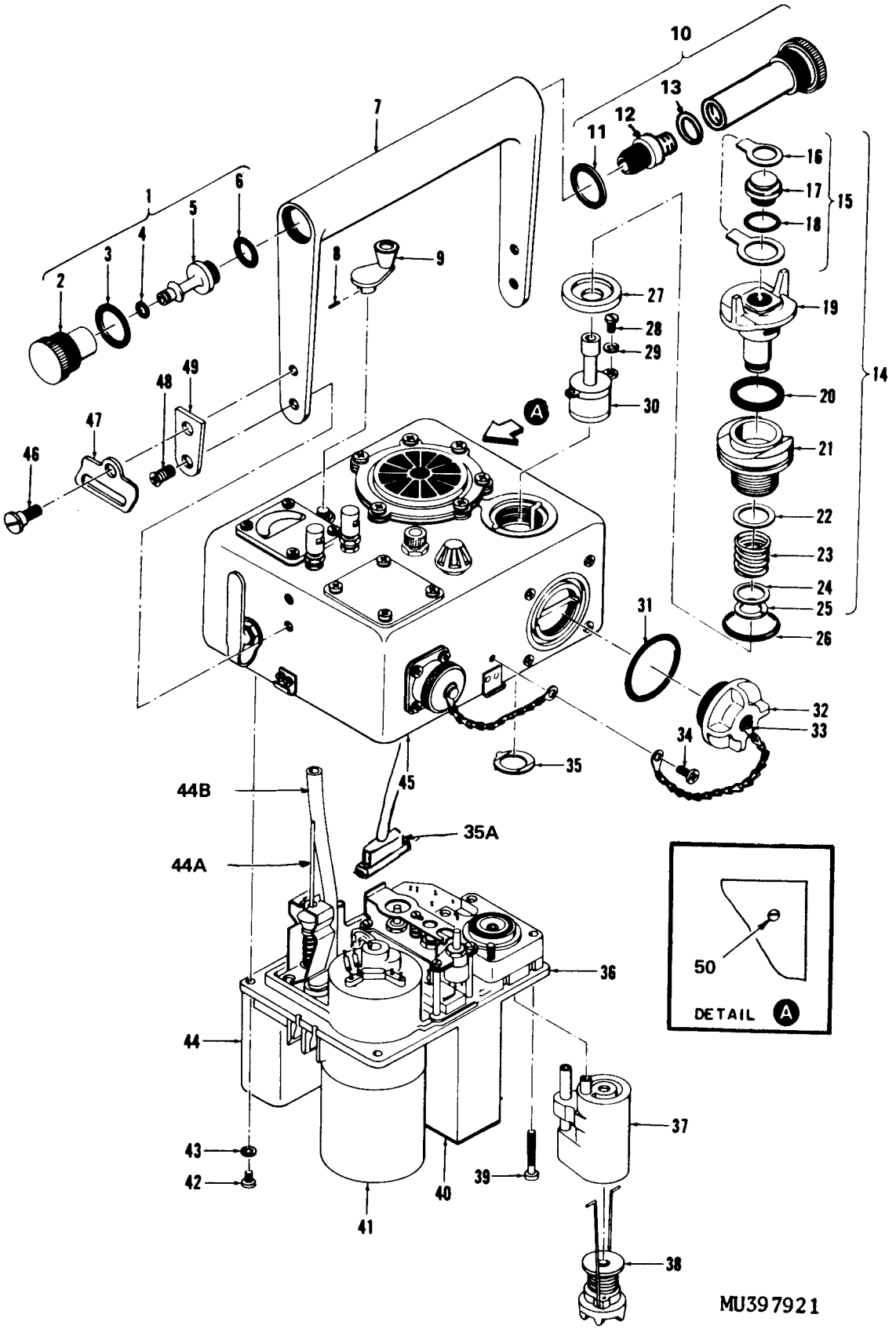


Figure 3-17. Detector unit assembly, exploded view.

separate bottom case assembly (2) from detector unit assembly (1).

(2) Turn lobed nut of bail (38, fig. 3-17) counterclockwise and swing bail away from detector cell (37).

CAUTION

Do not twist or exert excessive side motion to detector cell during removal, or detector cell ports may be broken and left in the chassis assembly.

(3) While rocking detector cell (37) gently, pull it directly from the chassis assembly (36).

(4) Pinch sides of L-shaped springs together and remove bail (38) from chassis assembly (36).

b. Installation.

(1) Pinch sides of V-shaped springs on replacement bail (38) together and insert the ends of the springs into the holes in the chassis assembly (36).

(2) Dampen the outside of the two detector cell ports with a few drops of water.

(3) Position the detector cell (37) so that its ports are alined with their corresponding fittings in the chassis assembly (36). Press detector cell into place in the chassis assembly.

(4) Center bail (38) on the bottom of detector cell (37) and turn lobed nut clockwise until it is fingertight.

(5) Replace detector unit assembly (1, fig. 3-16) in bottom case assembly (2) and secure four catches (10).

3-19. Air Filter Plug and Preformed Packing
(fig. 3-17)

a. Removal

(1) Remove screw (33) from plug (32) to disconnect chain.

(2) Unscrew plug (32) from case top assembly (45).

(3) Using a sharp tool, lift preformed packing (31) from groove in air filter port.

b. Installation.

(1) Press preformed packing (31) into groove in air filter port.

(2) Screw plug (32) into case top assembly (45).

(3) Apply sealing compound (item 4, table l–l) to threads of screw (33).

(4) Insert screw (33) through chain and secure to end of plug (32).

3-20. AIR INLET Assembly
(fig. 3-17)

a. Disassembly.

CAUTION

If pliers are needed to loosen air intake assembly (14), cover jaws of pliers with cloth or tape to avoid damage to the assembly.

(1) Unscrew air intake assembly (14) counterclockwise and lift from case top assembly (45).

(2) Using a sharp tool, lift preformed packing (26) from threaded end of housing (21).

(3) Remove thumbscrew assembly (15) from cover (19) by turning plug (17) counterclockwise. Remove leash (16) from cover (19) and plug (17).

(4) Remove preformed packing (18) from threaded end of plug (17).

(5) With air intake assembly (14) in closed position, remove retaining ring (25) from base of cover (19).

(6) Separate cover (19) from housing (21) using care to avoid loosing washer (22), spring (23), and washer (24).

(7) Remove preformed packing (20).

b. Assembly.

(1) Press replacement preformed packing (20) into cover (19).

(2) Place cover (19) into housing (21). While holding housing (21) upside down, place washer (22), spring (23), and washer (24) into the base of the intake housing.

(3) Secure cover (19) in place inside housing (21) with retaining ring (25).

(4) Place preformed packing (26) over threaded end of housing (21).

(5) Place preformed packing (18) over threaded end of plug (17).

(6) Attach large loop of leash (16) over top of cover (19). Secure plug (17) in cover (19). Attach small loop of leash (16) on plug (17).

(7) Screw air intake assembly (14) into case top assembly (45).

3-21. Air Inlet Heater Assembly (fig. 3-17)

a. *Removal.*

CAUTION

If pliers are needed to loosen air intake assembly (14), cover jaws of pliers with cloth or tape to avoid damage to the assembly.

(1) Unscrew air intake assembly (14) from case top assembly (45).

(2) Using long-nose pliers, remove preformed packing (27).

(3) Remove two screws (28) and lockwasher (29) from heater assembly (30).

(4) Remove heater assembly from case top assembly (45).

b. Installation.

(1) Insert replacement heater assembly into case top assembly (45) and aline the mounting tabs with the mounting holes in the bottom of the port.

(2) Secure with two lockwashers (29) and screws (28).

(3) Install replacement preformed packing (27) with tabs of packing in the keyways.

(4) Screw air intake assembly (14) into case top assembly (45).

3-22. Pressure Ring (fig. 3-17)

a. *Removal.*

(1) Loosen setscrew (8) and remove crank (9) from shaft (44A).

(2) Turn lobed nut of bail (38) counterclockwise and swing bail away from detector cell (37).

CAUTION

Do not twist or exert excessive side motion to detector cell or detector cell ports may break off in chassis.

(3) While rocking detector cell (37) gently, pull it directly from chassis (36).

(4) Remove three screws (42) and washers (43) from three corners of chassis (36).

(5) Unscrew four screws (39). Two will remain in chassis (36).

(6) Position detector assembly so that plug (32) is upward. Remove plug (32) and air filter.

(7) Carefully separate chassis assembly (36) from case top assembly (45) without disconnecting tubing (44B) or connector (2735A).

(8) Remove pressure ring (35).

b. Installation.

(1) Insert pressure ring (35), with tab centered at rear of air inlet housing in case top assembly (45). Install air filter.

(2) Position chassis assembly (36) in case top assembly (45). Be sure that tubing (44B) is positioned against rounded side of foam boss (half-moon shaped, raised foam piece) in case top assembly (45).

(3) Secure chassis assembly (36) to case top assembly (45) with screws (42), washers (43), and screws (39).

(4) Dampen outside of two detector cell ports with a few drops of water.

(5) Aline ports of detector cell (37) with corresponding fittings in chassis (36). Press detector cell into place in chassis (36).

(6) Center bail (38) on bottom of detector cell (37) and turn lobed nut clockwise until fingertight.

(7) Install crank (9) on shaft (44A) and secure with setscrew (8).

Section V. PUMP ASSEMBLY (1A2A11)

3-23. General

Direct support maintenance personnel are authorized to repair the M43 detector unit pump assembly by replacing the cover, springs, tubing, coupling, shoulder pin, tube guide, terminal lugs, head assembly voltage regulator, catches, and rollers. Test pump assembly after repairing (para 3-4 *b).*

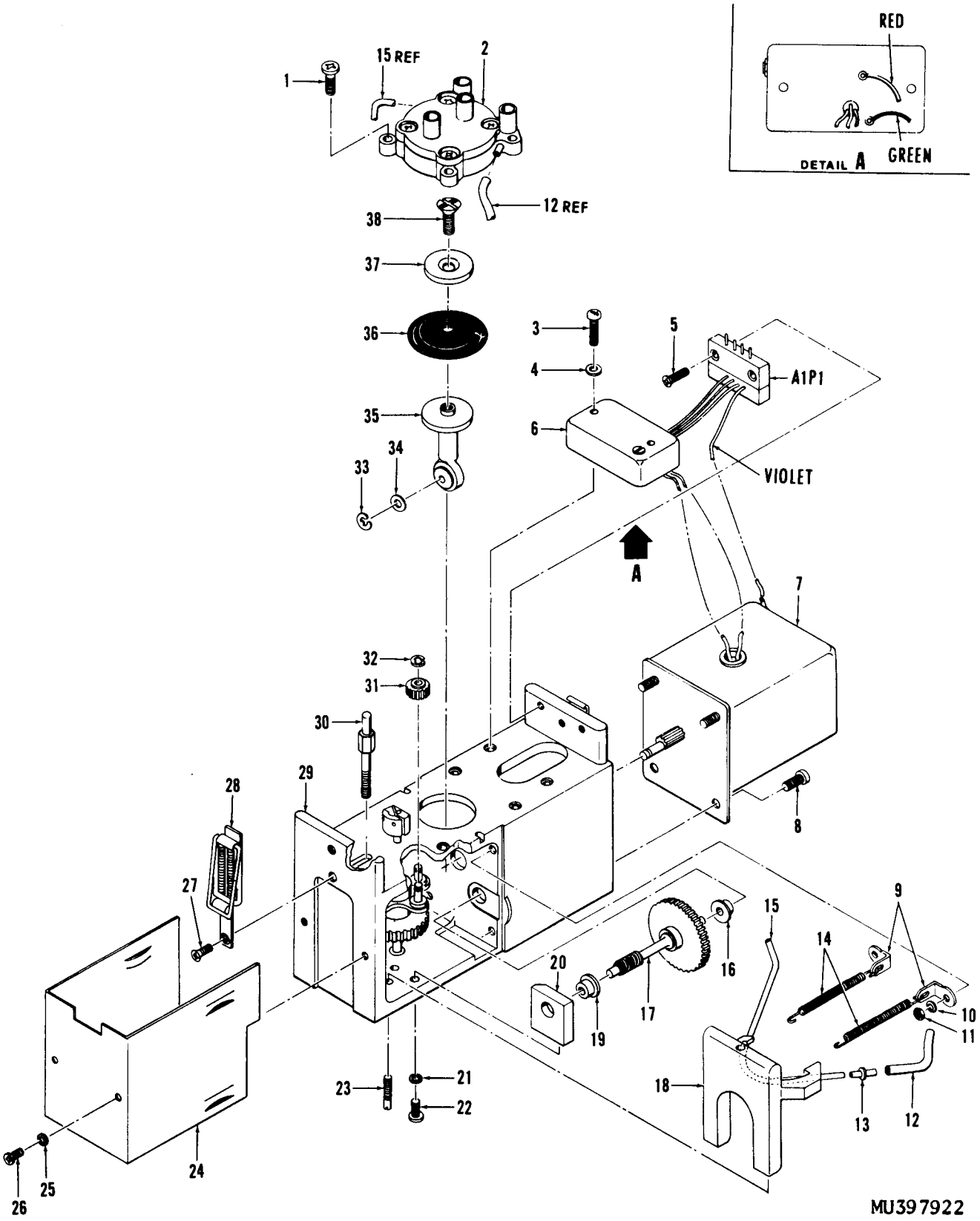
NOTE

Tubing (15, fig. 3-18) is replaced during schedule servicing of the M43 detector unit. Refer to paragraph 3-28 for replacement procedures.

3-24. Removal

a. Release four catches (10, fig. 3-16) and separate detector unit assembly (1) from bottom case assembly (2).

b. Release two catches (28, fig. 3-18) on opposite sides of pump assembly (44, fig. 3-17).



1 Screw
2 Head assembly
3 Screw
4 Washer
5 Screw
6 Voltage regulator (1A2A1A1)
7 Motor (1A2A1B1)
8 Screw
9 Terminal log

Figure 3-18. Pump assembly, exploded view.

10 Lockwasher
11 Nut
12 Tubing
13 Tube coupling
14 Spring
15 Tubing
16 Ball bearing
17 Gear assembly
18 Guide
19 Ball bearing
20 Pillow housing
21 Lockwasher
22 Screw
23 Pin
24 Cover
25 Lockwasher
26 Screw
27 Screw
28 Catch
29 Pump unit subassembly
30 Pin
31 Roller
32 Retaining ring
33 Retaining ring
34 Washer
35 Connecting rod assembly
36 Diaphragm
37 Washer
38 Screw

Figure 3-18. Pump assembly, exploded view -Continued

c. If necessary, rock pump assembly (44) slightly while pulling it directly away from chassis assembly (36).

3-25. Installation

a. Dampen the outside of four ports on top of pump assembly (44) with water.

b. Position pump assembly (44) so that its electrical connector and ports are alined with mating receptacles in the chassis assembly (36). Press pump assembly (44) into place in chassis assembly (36). Secure pump assembly in position with two catches (28, fig. 3-18).

c. Replace detector unit assembly (1, fig. 3–16) in bottom case assembly (2) and secure with four catches (10).

3-26. Cover
(fig. 3-18)

a. Removal

(1) Remove pump assembly from detector unit assembly (para 3-24).

(2) Remove two screws (26) and lockwashers (25) and slide cover (24) from pump unit subassembly (29).

b. Installation.

(1) Slide cover (24) over end of pump unit subassembly (29) until mounting holes are alined. Make sure that tubing (12 and 15) are in slots in pump until subassembly (29).

(2) Install two screws (26) and lockwasher (25). Tighten screws.

(3) Install pump assembly in detector unit assembly (para 3-25).

3-27. Springs

a. Test.

(1) Remove cover (para 3-26a).

(2) Position rollers (31, fig. 3-18) so that one roller is centered on guide (18) causing maximum tubing compression.

(3) Using figure 3–19 as a guide, connect spring rate scale extension (5) to shoulder pin (7).

(4) Connect M74 test set PRESSURE TEST tubing (4) to fluid inlet port (3).

(5) Connect bellows and pump to M74 test set PRESSURE PORT.

(6) Turn M74 test set PRESSURE LOCK valve fully counterclockwise.

(7) Alternately squeeze and release bulb of bellows and pump until M74 test set PRESSURE-VACUUM GAGE indicates 10 to 12 inches of water.

(8) Turn PRESSURE LOCK valve fully clockwise.

(9) Attach spring rate scale (6, fig. 3-19) to spring rate scale extension (5).

(10) Slowly move spring (6) in the direction of arrow (fig. 3-19) while observing PRESSURE-VACUUM GAGE.

(11) When pressure begins to decrease, spring rate scale must indicate 40 to 90 grams.

(12) If not, spring tension is incorrect. Replace springs (14, fig. 3-18) as described in paragraphs ***b*** and *c* below.

(13) Perform M74 test set shutdown procedures (TM 3-6665-260-14).

b. Removal.

(1) With cover (24, fig. 3-18) removed, disconnect end of springs (14) from guide (18).

(2) Disconnect springs (14) from terminal lugs (9).

c. Installation.

(1) Connect replacement springs (14) to terminal lugs (9).

(2) Connect other ends of springs to guide (18).

(3) Perform spring tension test *(a* above)

(4) Install cover (para 3-26b).

3-28. Tubing, Tubing Coupling, and Pin (fig. 3-18)

NOTE

During scheduled servicing of pump assembly, replace tubing (15) and test pump assembly (para 3-5 *b).*

a. Removal.

(1) Remove cover (para 3-26a).

(2) Detach tubing (12 and 15) from tube coupling (13).

(3) Hold pin (30) away from rollers (31) and slide tubing (15) out of guide (18).

(4) Remove other ends of tubing (12 or 15) from metal fittings in head assembly (2).

(5) Unscrew pin (30) counterclockwise from top of guide (18).

b. Installation.

(1) Screw pin (30) clockwise into top of guide (18).

(2) Slide one end of replacement tubing (15) over tube coupling (13). Slide end of tubing (12) over other end of tube coupling (13).

(3) Hold pin (30) away from rollers (31) and slide long tubing (15) through guide (18) starting at coupling (13) side of guide.

(4) Connect tubing (12 and 15) to metal fitting in head assembly (2). Slide tube coupling (13) into hole in guide (18).

(5) Install cover (para 3-26 *b).*

3-29. Tubing Guide

a. Removal.

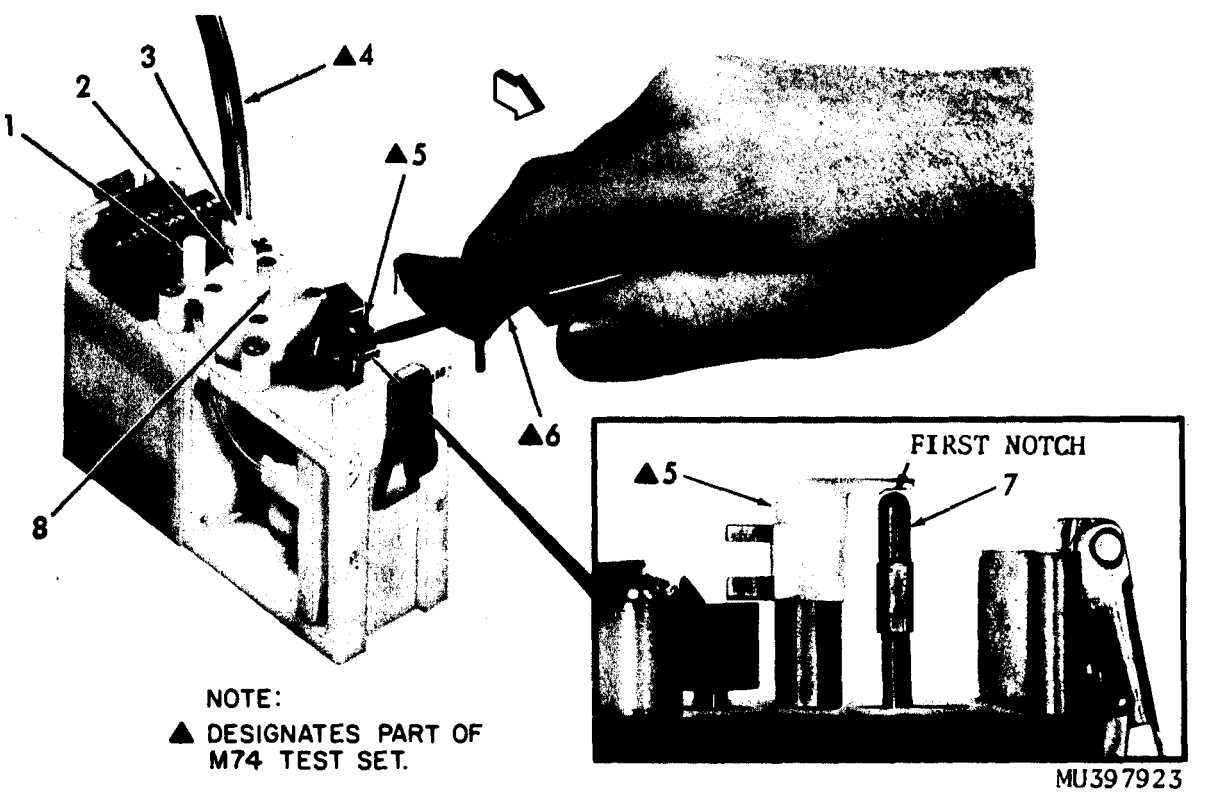
(1) Remove cover (para 3-26a).

(2) Remove end of tubing (15, fig. 3-18) from coupling (13) and head assembly (2).

(3) Hold pin (30) away from rollers (31) and remove tubing (15) from guide (18).

(4) Disconnect two springs (14) from guide (18).

(5) Unscrew and remove pin (30) from top of guide (18).



1 Fluid outlet port
2 Air inlet port
3 Fluid inlet port
4 PRESSURE TEST tube
5 Spring rate scale extension
6 Spring rate scale
7 Shoulder pin
8 Air outlet port

Figure 3-19. Measuring pump assembly spring tension and pin height.

(6) Unscrew two pins (23) from bottom of guide (18).

(7) Remove guide (18) from pump unit subassembly (29).

b. Installation.

(1) Position replacement guide (18) in pump unit subassembly (29).

(2) Screw replacement pins (23) through pump unit subassembly into bottom of guide (18).

(3) Start threads of pin (30) into top of guide (18).

(4) Place spring rate scale extension (5, fig. 3-19) on surface of pump unit subassembly as shown.

(5) Tighten shoulder pin (7) until it fits below first notch of spring rate scale extension, but not below second notch, as shown in figure 3-19.

(6) Insert tubing (15, fig. 3-18) through hole in guide (18). Route tubing between guide (18) and rollers (31).

(7) Attach ends of tubing (15) to tube coupling (13) and head assembly (2).

(8) Connect two springs (14) to guide (18).

(9) Install cover (para 3-26 *b).*

3-30. Terminal Lugs (fig. 3-18)

a. Removal.

(1) Remove cover (para *3-26a).*

(2) Disconnect springs (14) from terminal lugs (9).

(3) Remove nuts (11) and lockwashers (10) from terminal lugs (9).

(4) Remove terminal lugs (9) from pump unit subassembly (29).

b. Installation.

(1) Install terminal lugs (9) on upper screws of motor (7) in the pump unit subassembly (29).

(2) Attach Iockwasher (10) and nut (11) to each terminal lug (9). Tighten nuts (11).

(3) Connect springs (14) to terminal lugs (9).

(4) Install cover (para *3-26b).*

3-31. Head Assembly and Diaphragm

a. Removal.

(1) Remove cover (para 3-26a).

(2) Remove tubing (12 and 15) from head assembly (2).

(3) Remove four screws (1) and lift head assembly (2) away from pump unit subassembly (29).

(4) Remove screw (38), washer (37), and diaphragm (36) from top of connecting rod assembly (35).

b. Installation.

(1) Position diaphragm (36) against pump unit subassembly (29) with flat side of outside edge down.

(2) Place washer (37) in concave (cupped) side of diaphragm (36). Secure to connecting rod assembly (35) with screw (38).

(3) Position head assembly (2) with mounting holes alined with holes in top of pump unit subassembly (29).

(4) Install, but do not tighten, four screws (1).

(5) Perform alinement procedure *(c* below) .

(6) Attach tubing (12 and 15) to head assembly (2).

(7) Attach cover (para **3-26 *b).***

c. Alinement.

(1) Verify that four screws (5, fig. 3-20) are loose.

(2) Position air pump jig assembly (4) from M74 test set so that cutout fits over electrical connector (3).

(3) Adjust head assembly (1) so that ports (2) fit in holes in air pump jig assembly (4). Tighten screws (5).

(4) Remove air pump jig assembly (4) and secure it to the inner lid assembly of the M74 test set.

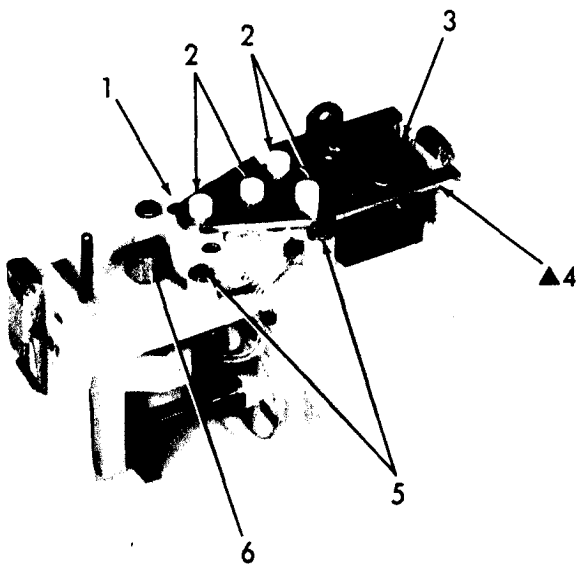
3-32. Voltage Regulator (1 A2A1 Al) (fig. 3-18)

a. Removal.

(1) Remove pump assembly from detector unit assembly (para 3-24).

(2) Remove two screws (3) and lockwashers (4).

(3) Tilt module of voltage regulator (6) until two terminals are exposed as shown in detail A.



NOTE:
▲ DESIGNATES PART OF M74 TEST SET.

MU397924

1 Head assembly
2 Ports
3 Electrical connector
4 Jig assembly
5 Screws
6 Vertical shaft

Figure 3-20. Aligning pump assembly.

(4) Unsolder red and green wires from terminals.

(5) Unsolder violet wire from terminal lug on motor (7).

(6) Remove two screws (5) from electrical connector 1A2A1P1.

(7) Remove voltage regulator (6) from pump unit subassembly (29).

b. Installation.

(1) Insert violet lead from electrical connector A1P1 through access hole in top of pump unit subassembly (29). Solder lead to lug on motor (7).

(2) Install and tighten two screws (5) through electrical connector A1P1 to pump unit subassembly (29).

(3) Using detail A as a guide, solder red and green leads from motor B1 (7) to terminals on bottom of replacement voltage regulator (6).

(4) Position voltage regulator (6) on pump unit subassembly (29) with mounting holes alined with holes in top of pump unit subassembly (29).

(5) Secure voltage regulator (6) to pump unit subassembly (29) with screws (3) and lockwashers (4).

(6) Install pump assembly in detector unit assembly (para 3-25).

3-33. Catches
(fig. 3-18)

a. Removal.

(1) Raise latch of catch (28) and remove screws (27).

(2) Remove catch (28) from pump unit subassembly (29).

b. Installation.

(1) Position replacement catch (28), with

latch raised, over mounting holes in pump unit subassembly (29).

(2) Install and tighten screws (27).

3-34. Rollers
(fig. 3-18)

a. Removal.

(1) Remove cover (para 3-26a).

(2) Disconnect springs (14) from terminal lugs (9).

(3) Remove retaining ring (32).

(4) Remove roller (31).

b. Installation.

(1) Install roller (31) on its shaft.

(2) Install retaining ring (32) in notch of roller shaft.

(3) Connect springs (14) to terminal lugs (9).

(4) Install cover (para 3-26b).

Section VI. CHASSIS ASSEMBLY (1A2A2)

3-35. General

Direct support maintenance personnel are authorized to repair the M43 detector unit chassis assembly by replacing tubing, the separator assembly, performed packing on the cell block assembly, fluid fittings, catches, and electrical contacts.

3-36. Removal

a. Release four catches (10, fig. 3-16) and separate detector unit assembly (1) from bottom case assembly (2).

WARNING

Solution in the reservoir assembly is an irritant. Avoid contact with eyes and mouth. Wash thoroughly with water.

b. Hold detector unit assembly (1) upright and unscrew reservoir assembly (41, fig. 3-17). Al1ow weight assembly to hang down.

CAUTION

Keep weight assembly free from dirt after removing reservoir.

NOTE

Discard solution in reservoir assembly in accordance with standing operating procedures. Save reservoir.

c. Screw empty reservoir assembly (41) into mounting hole in chassis (36).

d. Loosen setscrew (8) and remove crank (9) from its shaft.

e. Turn lobed nut of bail (38) counterclockwise and swing bail away from detector cell (37).

CAUTION

Do not twist or exert excessive side motion to detector cell or detector cell ports may break off in chassis assembly.

f. While rocking detector cell (37) gently, pull it directly from the chassis assembly (36).

g. Remove bail (para 3-18a(4)).

h. Unscrew plug (32, fig. 3-17). If air filter is not installed, insert air filter into AIR FILTER slot in case top assembly (45) with black side of filter material upward. Install and tighten plug (32) .

i. Remove three screws (42) and washers (43) from three corners of chassis assembly (36).

j. Unscrew four screws (39). Two will remain in chassis (36).

k. Slightly separate chassis assembly (36) from case top assembly (45). Disconnect tubing (17, fig. 3-21①) from heater assembly (33, fig. 3-22) .

1. Disconnect connector (27).

m. Remove case top assembly (45, fig. 3-17).

3-37. Installation

a. Connect connector (27, fig. 3-23) to 1A2A2A5J2 (fig. 3-22).

b. Hold tubing (17, fig. 3-21①) against tubing (20) and partially insert shaft assembly (67) into mating hole in case top assembly (45, fig. 3-17).

c. Connect tubing (17) to heater assembly (33, fig. 3-22).

d. Carefully insert chassis assembly (36, fig. 3-17) into case top assembly (45). Insure that wires are not pinched and tubing (17, fig. 3-21 ①.) is positioned against rounded side of foam boss (halfmoon shaped, raised foam piece) in case top assembly (45, fig. 3–17).

NOTE

Preface reference designations with 1A2A2.

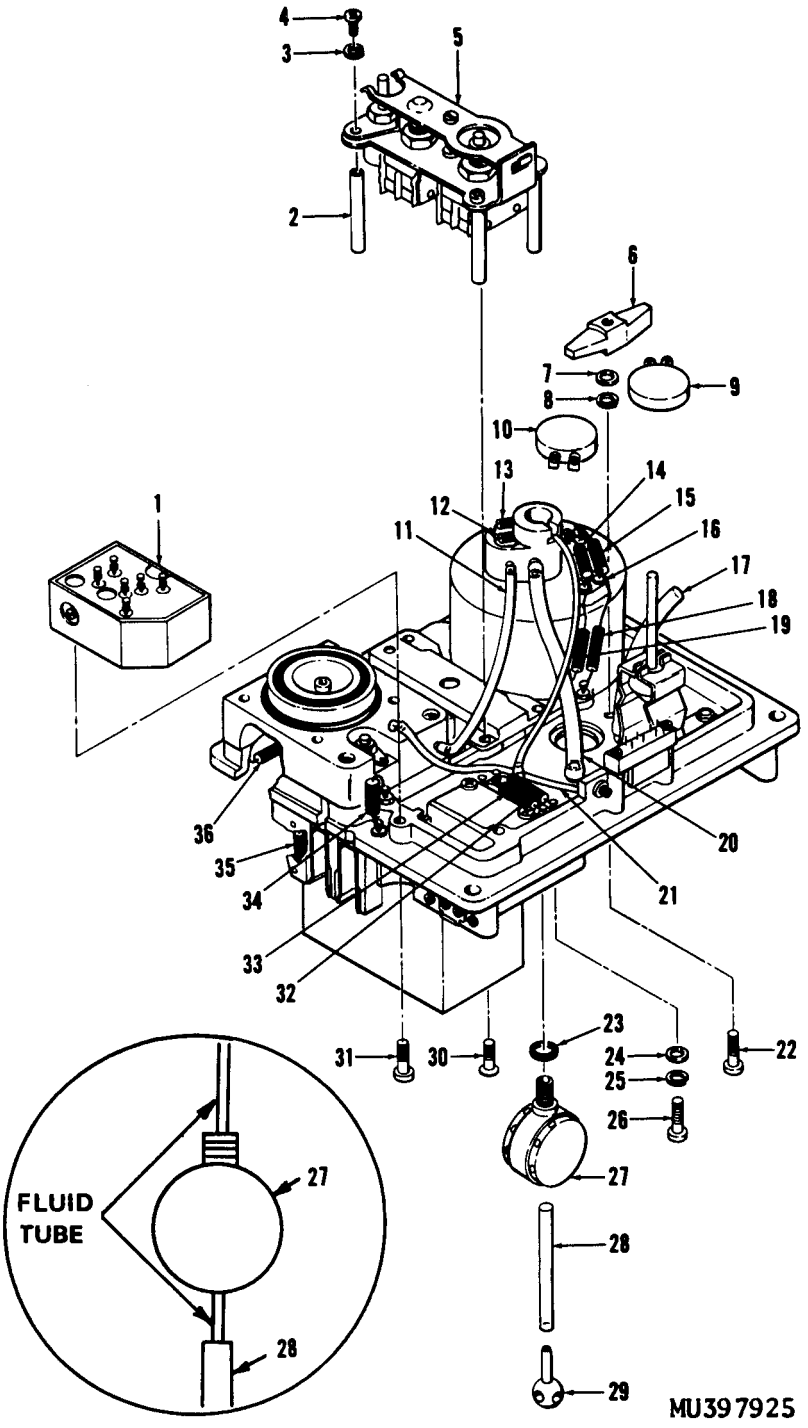


Figure 3-21 ①. Chassis assembly, exploded view.

1 Heater module
2 Post
3 Lockwasher
4 Screw
5 Switch assembly (A1)
6 Thermostat retaining bar
7 Washer
8 Lockwasher
9 Thermostatic switch (S1)
10 Thermostatic switch (S2)
11 Tubing
12 Resistor (R4)
13 Resistor (R5)
14 Resistor (R6)
15 Resistor (R9)
16 Tubing
17 Tubing
18 Resistor (R2)
19 Resistor (R3)
20 Tubing
21 Tubing
22 Screws
23 Gasket
24 Washer
25 Lockwasher
26 Screw
27 Separator
28 Tubing
29 Weight assembly
30 Screw
31 Screw
32 Resistor (A5R1)
33 Resistor (A5R2)
34 Resistor (R1)
35 Resistor (R7)
36 Resistor (R8)

Figure 3–21①. chassis assembly, exploded view -Continued

e. Turn assembly upside down and remove plug (32) and air filter.

f. Install four screws (39) in mounting holes below AIR INLET assembly (14).

g. Install three screws (42) and washers (43) through mounting holes in corners of chassis assembly (36).

h. Install air filter and tighten plug (32).

i. Install crank (9) and secure with setscrew (8).

j. Dampen outside of two detector cell ports with a few drops of water.

k. Position detector cell (37) so that its ports are alined with their corresponding fittings in chassis assembly (36). Press detector cell into place in chassis assembly.

l. Center bail (38) on bottom of detector cell (37) and turn lobed nut clockwise until fingertight.

m. Install pump assembly (para 3-25).

3-38. Tubing
(fig. 3-21①)

a. Removal

(1) Remove chassis assembly from case top assembly (para 3-36).

(2) Remove defective tubing (11, 16, 17, 20, or 21).

b. Installation.

(1) Attach replacement tubing (11, 16, 17, 20, or 21).

(2) Install chassis assembly in case top assembly (para 3-37).

3-39. Separator Assembly

a. Removal.

(1) Remove bottom case assembly (para 3-7).

WARNING

Solution in the reservoir assembly is an irritant. Avoid contact with eyes and mouth. Wash thoroughly with water.

(2) Hold detector assembly (1, fig. 3-16) upright, unscrew reservoir assembly (41, fig. 3-17). Allow weight assembly (29, fig. 3-21①) to hang down.

CAUTION

Keep weight assembly free from dirt after removing reservoir assembly.

NOTE

Discard solution in reservoir assembly in accordance with standing operating procedures.

(3) Remove tubing (28) and weight assembly (29) from fluid tube.

(4) Unscrew separator (27) (counterclockwise).

(5) Remove gasket (23) from separator (27).

(6) Using a lint-free cloth saturated in distilled or deionized water, wipe solution from mating threads in chassis assembly (56, fig. 3–21 ②).

b. Installation.

NOTE

Keep separator (27, fig. 3-21 ①), tubing (28), and weight assembly (29) clean to prevent contamination.

(1) Slip gasket (23) over threads on separator (27).

(2) Slide separator (27) over fluid tube centered in reservoir receptacle of chassis subassembly (50, fig. 3–21②). Screw separator (27, fig. 3-21 ①) clockwise onto the chassis subassembly until fingertight.

(3) Slip one end of tubing (28) over fitting of weight assembly (29).

NOTE

Preface reference designations with 1A2A2.

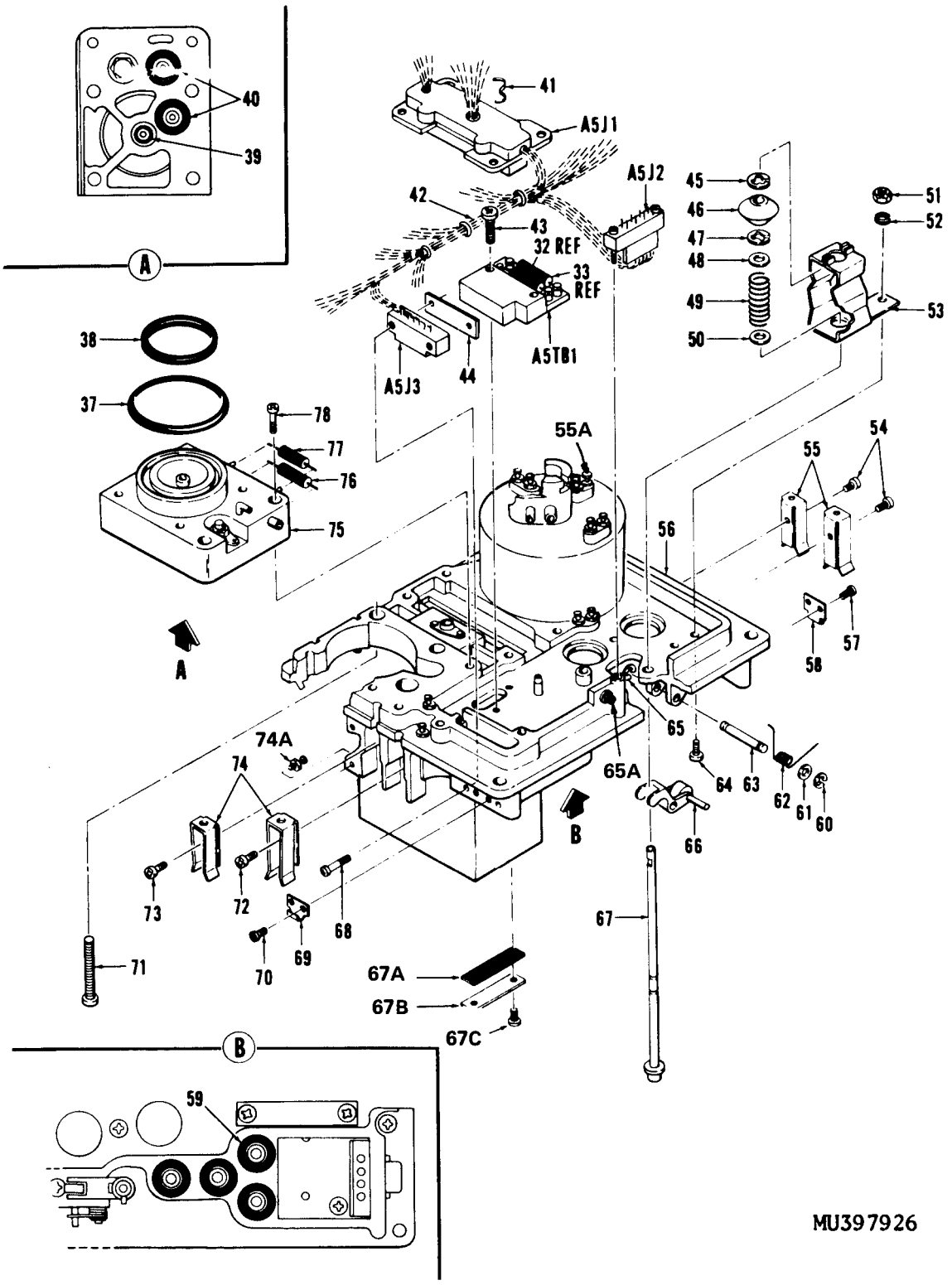


Figure 3-21②. Chassis assembly, exploded view.

37 Preformed packing
38 Preformed packing
39 Preformed packing
40 Fluid fitting
41 Strap
42 Branched wiring harness (A5)
43 Screw
44 Strip nut
45 Retaining ring
46 Detent
47 Retaining ring
48 Washer
49 Spring
50 Washer
51 Nut
52 Lockwasher
53 Clip
54 Screw
55 Contact
55A Terminal stud
56 Chassis subassembly (A4)
57 Screw
58 Catch
59 Fluid fitting
60 Retaining ring
61 Washer
62 Spring
63 Pin
64 Screw
65 Pin
65A Tip jack
66 Bellcrank assembly
67 Shaft assembly
67A Gasket
67B Plate
67C Screw
68 Screw
69 Catch
70 Screw
71 Screw
72 Screw
73 Screw
74 Contact
75 Cell block assembly (A3)
76 Resistor (A3R1)
77 Resistor (A3R2)
78 Screw

Figure 3-21② . Chassis assembly, exploded view - Continued

(4) Slip other end of tubing (28) over fluid tube until tubing end contacts separator (27).

(5) Install fresh reservoir assembly.

(6) Install bottom case assembly (para 3-8).

3-40. Cell Block Preformed Packing

(fig. 3-21②)

a. Removal.

(1) Remove chassis assembly from top case assembly (para 3-36).

(2) Remove preformed packing (37) from cell block assembly (75).

(3) Remove preformed packing (38) from cell block assembly (75).

(4) Remove preformed packing (39) from cell block assembly (75).

b. Installation.

(1) Insert preformed packing (38) around inner circular portion of cell block assembly (75).

(2) Install preformed packing (37) around outer circular portion of cell block assembly (75).

(3) Install preformed packing (39) on fluid fitting of cell block assembly.

(4) Install chassis assembly in case top assembly (para 3-37).

3-41. Fluid Fittings and Plate

(fig. 3-21②)

a. Removal.

(1) Remove pump assembly from detector unit assembly (para 3-24).

(2) Insert M74 test set fitting stopper into fluid fitting (40 or 59)

(3) Turn fitting stopper assembly counterclockwise until fluid fitting is free of threaded mounting hole. If fluid fitting will not turn, remove fitting stopper.

CAUTION

Being careful not to damage the molded threads on the chassis subassembly (56) or cell block assembly (75), grasp the fluid fitting (40 or 59) with needle-nose pliers and unscrew it.

(4) Remove fitting stopper assembly from fluid fitting.

(5) Remove screws (67 C), plate (67 B), and gasket (67A).

b. Installation.

(1) Insert fitting stopper assembly from M74 test set into fluid fitting (40 or 59).

(2) Moisten exterior threads of fluid fitting (40 or 59) with saliva.

(3) Insert fluid fitting into threaded mounting hole in chassis subassembly (56) or cell block assembly (75).

(4) Turn fitting stopper assembly clockwise until end of fluid fitting (40 or 59) is flush with surface of chassis subassembly (50) or cell block assembly (75). If fluid fitting cannot be installed using fitting stopper, remove fitting stopper. Insert eraser end of wooden pencil approximately halfway into fluid fitting. Turn fluid fitting clockwise until flush with surface. Remove pencil.

(5) Pull fitting stopper assembly from fluid fitting and return fitting stopper assembly to M74 test set.

(6) Install gasket (67A), plate (67B), and screws (67C).

(7) Install pump assembly in detector unit assembly (para 3-25).

3-42. Catches

(fig. 3-21②)

a. Removal.

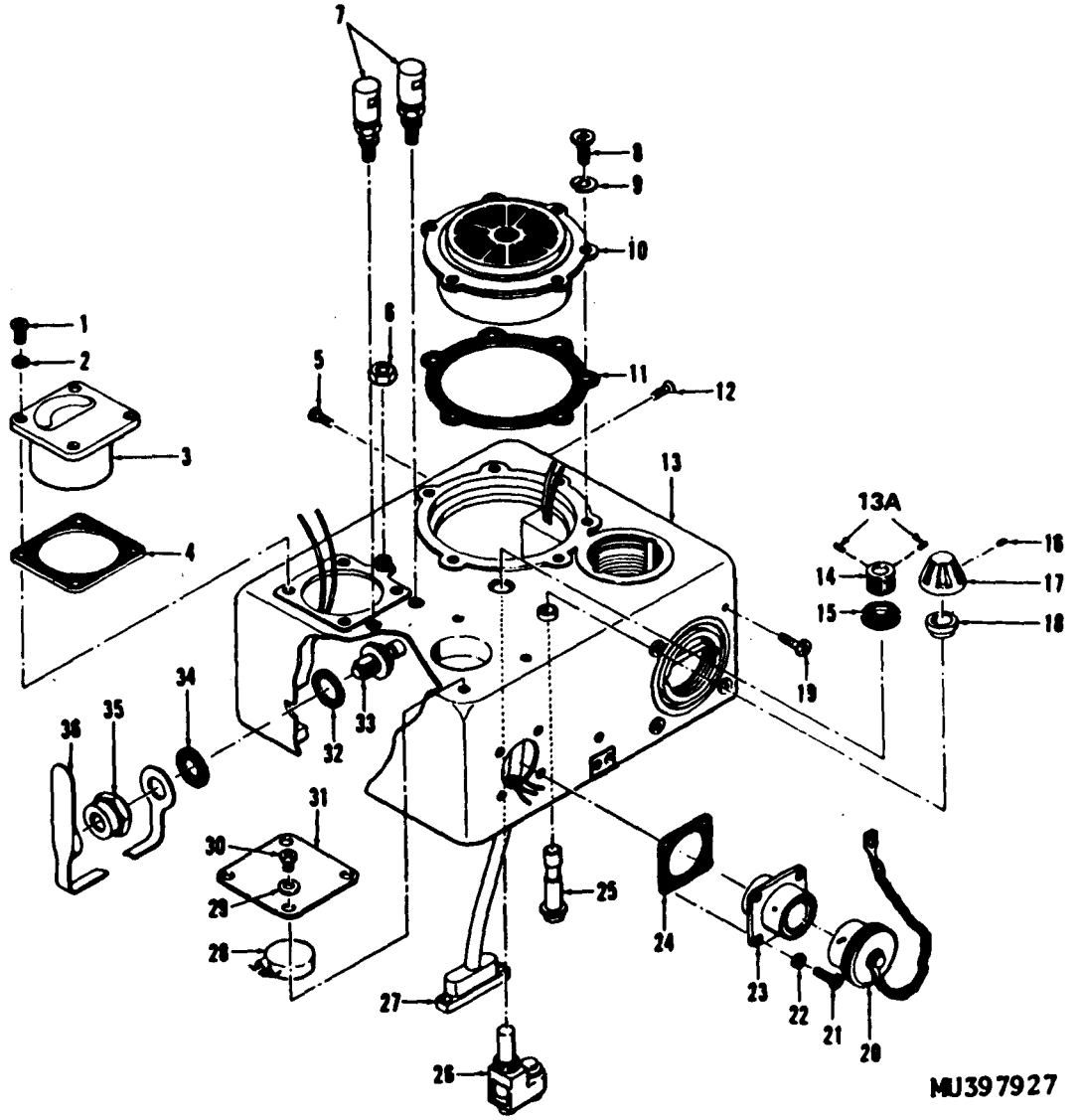
(1) Remove pump assembly from detector unit assembly (para 3-24).

(2) Remove two screws (57) to remove catch (58) and remove two screws (70) to remove catch (69).

b. Installation.

(1) Install catch (69) with two screws (70) and install catch (58) with two screws (57).

NOTE
Preface reference designation with 1A2A5.



1	Screw	13A	Setscrew	25	Plunger
2	Lockwasher	14	Knob	26	Housing assembly
3	Meter (M1)	15	Boot	27	Connector (A1A1P1)
4	Gasket	16	Setscrew	28	Switch (A1S2)
5	Screw	17	Knob	29	Lockwasher
6	Boot	18	Boot	30	Screw
7	Binding post (E1) (E2)	19	Screw	31	Identification plate
8	Screw	20	Cover	32	Preformed packing
9	Lockwasher	21	Screw	33	Heater assembly
10	Horn (A2)	22	Lockwasher	34	Gasket
11	Gasket	23	Connector (A1J1)	35	Nut
12	Screw	24	Gasket	36	Cap
13	Top subassembly (A1)				

Figure 3-22. Case top assembly, exploded view.

(2) Install pump assembly in detector unit assembly (para 3-25).

3-43. Contacts (fig. 3-21®)

a. ***Removal.***

(1) Separate detector unit assembly from bottom case assembly (para 3-7).

(2) Remove two screws (72 and 73 or 54) and pull defective contact (74 or 75) away from chassis subassembly (56).

(3) Unsolder wire from defective contact and remove contact.

b. Installation.

(1) Solder wire to contact (55 or 75).

(2) Coat solder joint with sealant from coating kit (item 6, table 1-1).

(3) Position contact against chassis subassembly (56) and secure with screw (54, 72, or 73).

(4) Attach bottom case assembly to detector unit assembly (para 3–8).

Section VII. CASE TOP ASSEMBLY (1A2A5)

3-44. General

Direct support maintenance personnel are authorized to repair the M43 detector case top assembly by replacing the horn and horn gasket, connector cover, meter, and meter gasket, identification plate, knobs, boots, plunger, binding posts, thermostatic switch, connector and connector gasket, heater assembly, and top assembly.

3-45. Connector Cover

a. Removal.

(1) remove screw (34, fig. 3–17) from case top assembly (45).

(2) Unscrew cover (20, fig. 3-22).

b. Installation.

(1) Screw replacement cover (20) onto connector (23).

(2) Apply sealing compound (item 3, table l-l) to thread of screw (34, fig. 3-17).

(3) Insert screw (34) through chain loops of plug (32) and chain of cover (20,fig. 3-22).

(4) Replace and tighten screw (34, fig. 3-17) in case top assembly (45).

3-46. Meter and Gasket (fig. 3-22)

a. Removal.

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

(2) Lift meter (3) clear of top assembly (13) and lay meter (3) on side to expose rear terminals.

(3) Tag and unsolder two wires from meter terminals. Remove meter (3) and gasket (4).

b. Installation.

(1) Position gasket (4) on case top assembly (13).

(2) Observing polarity, solder wires to meter terminals. Coat soldered joints with sealant from coating kit (item 6, table 1-1).

(3) Position meter (3) with meter face as shown in figure 3–22.

(4) Secure meter (3) with screws (1) and lockwashers (2).

347. Identification Plate (fig. 3-22)

a. Removal.

(1) Remove four screws (30) and lockwashers (29).

CAUTION

When using penknife or putty knife, do not damage switch A1S1 (28) located under identification plate (31).

(2) Life identification plate (31) from top assembly (13). If necessary, pry along edges of identification plate (31) to loosen it.

(3) Stamp identification plate with M43 detector unit lot number and serial number.

b. Installation

(1) Check that switch (28), embedded in cavity with adhesive, is not below or more than 1/32-inch above surface of top assembly (13).

(2) Position identification plate (31) over on case top assembly (13). Lettering must be readable when facing receptible (23).

(3) Secure identification plate (31) with four screws (30) and lockwashers (29).

348. Knobs, Boots, and Plunger

a. Removal.

(1) Loosen setscrew (8, fig. 3-17) and remove crank (9).

(2) Unscrew boot (6, fig. 3-22).

(3) Loosen setscrews (13A) and remove knob (14).

(4) Loosen setscrew (16) and remove knob (17).

(5) Separate chassis from case top assembly (para 3-36a through *f* and *i* through *m).*

(6) Unscrew boot (18) and remove plunger (25).

b. Installation.

(1) Screw boot (18) into top assembly (13).

(2) Insert plunger (25) through underside of top assembly (13) and through boot (18).

(3) Secure knob (17) to plunger (25) with setscrew (16).

(4) Install knob (14), coat setscrews (13A) with sealing compound (item 3, table 1–1), and secure knob (14) with setscrews (13A).

(5) Screw boot (6) into top assembly (13).

(6) Install chassis assembly into case top assembly (para 3-37a through *i).*

3-49. REMOTE Binding Post

a. Removal. Unscrew binding posts (7, fig. 3-22) from the case top assembly (13).

b. Installation. Screw binding post (7) into the top assembly (13).

3-50. Thermostatic Switch (fig. 3-22)

a. *Removal*

(1) Remove identification plate (para 3-49a).

(2) Carefully remove sealing compound from around switch (28) without damaging wires.

(3) Remove switch (28) from cavity in top assembly (13).

(4) Tag and unsolder three wires from switch (28).

b. Installation.

(1) Attach and solder tagged wires to terminals to switch (28).

(2) Coat solder connections with sealant from coating kit (item 6, table 1-1).

(3) Position switch (28) in cavity of case top assembly (13), with side stamped TEMP SIDE upward.

(4) Fill cavity around and under switch (28) with sealing compound (item 5, table l-l). Keep TEMP SIDE of switch clear of adhesive. Switch (28) must be flush or within 1/32 inch above top surface of top assembly (13).

(5) After sealing compound has cured (30 minutes at room temperature), install identification plate (31) (para *3-49 b).*

3-51. 24 VDC INPUT Connector and Gasket (fig. 3-22)

a. Removal.

(1) Unscrew cover (20) from connector (23).

(2) Remove screws (21) and lockwashers (22).

(3) Pull connector (23) from top assembly (13) so that wires are accessible.

(4) Tag and unsolder wires from rear of connector (23).

(5) Remove connector (23) and gasket (24).

b. Installation.

(1) Install gasket (24) with wires running through the center.

(2) Solder tagged wires to pins on rear of replacement connector (23).

(3) Coat soldered connections with sealant from coating kit (items 6, table l-l).

(4) With keyway of connector (23) up, aline gasket (24) and connector mounting holes with holes in top assembly (13).

(5) Secure with lockwashers (22) and screws (21).

(6) Screw cover (20) onto connector (23).

3-52. Heater Assembly (fig. 3-22)

a. Removal.

(1) Remove chassis assembly from case top

assembly (para 3-36a through *f* and *i* through *m).*

(2) Pull out on cap (36).

(3) Unscrew nut (35) and remove cap (36) and gasket (34).

(4) Unsolder wires from heater assembly 33).

(5) Remove heater assembly (33) and preformed packing (32).

b. Installation.

(1) Install preformed packing (32) on heater assembly (33).

(2) Insert heater assembly (33) through top assembly (13) from the inside.

(3) Using figure 3-2 as a guide, solder wires to terminals of heater assembly (33). Coat solder connections with sealant from coating kit (item 6,table 1–1).

(4) Install gasket (34), cap (36), and nut (35) unthreaded shaft of heater assembly (33).

(5) Tighten nut (35) and install cap (36) on AIR OUTLET port.

(6) Install chassis assembly in case top assembly (para *3-37a* through *f).*

3-53. Housing Assembly and Boot

a. Removal.

(1) Remove chassis assembly from case top assembly (para 3-36a through ~ and i through m).

(2) Loosen setscrews (13A, fig. 3-22) and remove knob (14).

(3) Unsolder wires from underside of housing assembly (26).

(4) Unscrew and remove boot (15).

(5) Remove housing assembly (26).

b. Installation.

(1) Position housing assembly (26) in top case assembly (13) and secure with boot (15).

(2) Replace knob (14). Coat setscrews (13A) with sealing compound (item 3, table 1-1) and secure knob (14) on shaft.

(3) Using figure 3-2 as a guide, connect and solder three wires to terminals of resistor A1R1 in housing assembly (26, fig. 3-22).

(4) Install chassis assembly in case top assembly (para *3-37a* through *i).*

3-54. Horn and Gasket (fig. 3-22)

a. Removal.

(1) Remove screws (8) and lockwashers (9).

(2) Lift horn (10) and gasket (11) from top subassembly (13).

(3) Tag and unsolder wires from horn terminals.

b. Installation.

(1) Apply silicone adhesive (item 10, table 1–1) to panel-side of gasket (11).

(2) Position gasket (11) on top subassembly (13).

(3) Attach and solder wires to terminals on horn (10).

(4) Coat solder connections with sealant from coating kit (item 6, table 1–1).

(5) Secure horn (10) with screws (8) and lockwashers (9).

3–55. Top Subassembly

a. Disassembly.

(1) Remove chassis assembly from case to assembly (para 3–36a through *f* and *i* through ***m).***

(2) Remove handle (para 3-16a).

(3) Remove air filter plug and preformed packing (para 3–29a).

(4) Remove air inlet assembly (para 3-20a).

(5) Remove air inlet heater assembly (para 3-2la).

(6) Remove pressure ring (para 3-22a).

(7) Remove connector cover (para 3-45a).

(8) Remove meter and gasket (para 3-46a).

(9) Remove identification plate (para 3-47a).

(10) Remove knobs, boots, and plunger (para 3-48a).

(11) Remove REMOTE binding posts (para 3–49a).

(12) Remove thermostatic switch (para 3-50a).

(13) Remove 24 VDC INPUT connector. and gasket (para 3-51a).

(14) Remove heater assembly (para 3-52a).

(15) Remove housing assembly and boot (para 3-53a).

(16) Remove horn and gasket (para 3-54a).

b. Reassembly.

(1) Install horn and gasket in top subassembly (para 3-54b).

(2) Install housing assembly and boot (para *3-53b).*

(3) Install heater assembly (para 3-52 *b).*

(4) Install 24 VDC INPUT connector and gasket (para 3–5lb).

(5) Install thermostatic switch (para 3-50 *b).*

(6) Install REMOTE binding posts (para 3-49 *b).*

(7) Install knobs, boots and plunger (para 4-48 *b).*

(8) Install identification plate (para 3-47 *b).*

(9) Install meter and gasket (para 3-46b).

(10) Install connector cover (para 3-45b).

(11) Install pressure ring (para 3-22b).

(12) Install air inlet heater assembly (para 3-21 *b).*

(13) Install air inlet assembly (para 3-20b).

(14) Install air filter plug and preformed packing (para 3-29b).

(15) Install handle (para 3-16 b).

(16) Install chassis assembly in case top assembly (para 3-27 *a* through *f).*

Section VIII. ELECTRONIC MODULE ASSEMBLY (Al2A4)

3-56. General

Direct support maintenance personnel are authorized to repair the electronic module assembly by replacing the turnlock fastener.

3-57. Disassembly
(fig. 3-23)

a. Remove electronic module assembly (TM 3-6665-225-12).

b. Remove retaining ring (2).

C. Slide fastener stud (4), shim (3), and pin (1) from module (5).

d. Remove shim (3) and pin (1).

3-58. Reassembly

a. Place shim (3) on fastener stud (4).

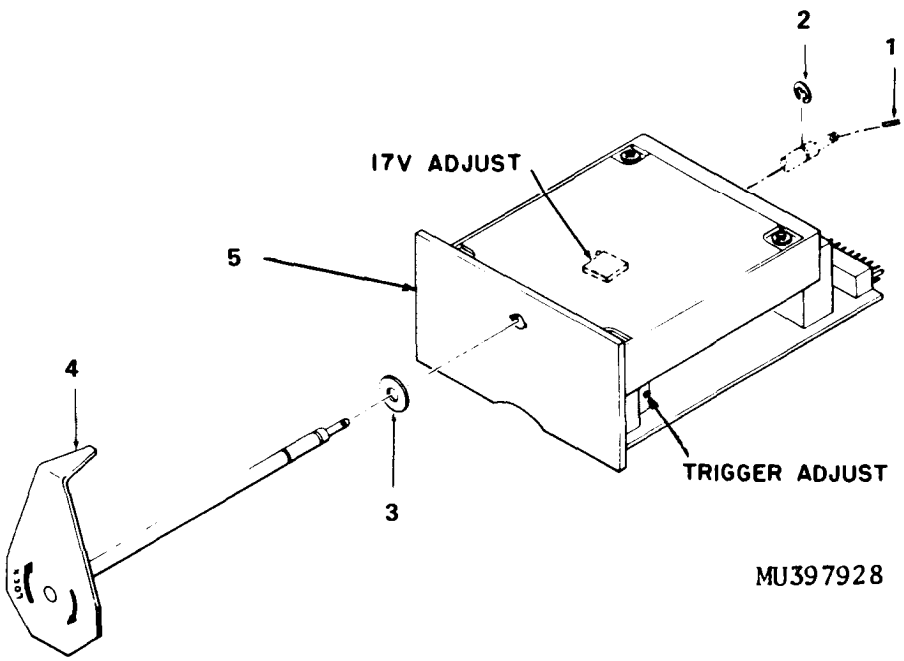
b. Center pin through tip of fastener stud (4).

c. Position fastener stud (4) as shown in figure 3-23 and slide it through holes in module (5).

d. Attach retaining ring (2).

e. Test electronic module assembly (para 3-5g).

f. Install electronic module assembly in case top assembly (TM 3-6665-225-12).



1 Pin
2 Retaining ring
3 Shim
4 Fastener stud
5 Module

Figure 3-23. Electronic module, exploded view.

Section IX. M42 ALARM UNIT TROUBLESHOOTING

3-59. General

This section provides instructions for troubleshooting the M42 alarm unit at the direct support maintenance level. Figure 2-3 is a schematic diagram of the M42 alarm unit.

3-60. Troubleshooting Procedures

a. Preliminary Procedures. Connect a power source to the M74 test set (TM 3-6665-260-14).

b. Troubleshooting Chart. Figure 3-3 describes the use of the M42 alarm unit troubleshooting chart (fig. 3-24). The trouble-shooting chart provides a systematic procedure for isolating troubles in the M42 alarm unit. The troubleshooting chart also provides systematic procedures for testing the M42 alarm unit after repair.

c. Troubleshooting Procedures. Perform the troubleshooting procedures in figure 3–24.

d. Shutdown Procedures. After using the M74 test set, perform the shutdown procedures described in TM 3–6665–260–14.

Figure 3–24. M42 alarm unit troubleshooting chart.
(Located in back of manual)

Section X. M42 ALARM UNIT

3-61. General

Direct support maintenance personnel are authorized to repair the M42 alarm unit by replacing the gasket, horn, grille, mounting plate, indicator light, circuit card assembly, binding posts, terminal board, switch, boot, branched

wiring harness, identification plate, and battery retainer assembly.

3-62. Disassembly

a. Loosen four screws (3, fig. 3–25) until they are free from housing (5).

b. Remove chassis assembly (1) from housing (5).

3-63. Assembly

a. Position chassis assembly (1, fig. 3–25) on housing (5).

b. Secure by tightening four screws (3).

3-64. Gasket

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Remove damaged gasket (30, fig. 3-26) and scrape adhesive from panel (37).

b. Installation.

(1) Secure gasket (30) to panel (37) with adhesive (item 9, table 1–1).

(2) Assemble M42 alarm unit (para 3-63).

3-65. Loudspeaker, Grille, and Mounting Plate (fig. 3-26)

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Tag and unsolder wires from loudspeaker (25, fig. 3-26) terminals.

CAUTION

Hold terminal lugs (26) when removing nuts (28) to prevent terminal lugs from turning and damaging capacitors (9).

(3) Hold nuts (28) and unscrew screws (27).

(4) Remove screws (19), grille (18), washers (17), packing (16), and mounting plate assembly (15) from panel (37).

(5) Remove loudspeaker (25) and washers (24).

b. Installation.

(1) Apply a thin coating of silicone adhesive (item 10, table 1-1) to underside of mounting plate assembly (15).

(2) Position grille mounting plate assembly (15) over mounting holes in top panel (37).

(3) Install packings (16), washers (17), grille (18), and screws (19).

(4) Hold screws (19) in position and turn assembly on its side.

(5) Install washers (24), loudspeaker (25), terminal lugs (26), lockwashers (27), and nuts (28).

(6) Hold nuts (28) and tighten screws (19), being careful not to let terminal lugs (26) turn.

(7) Solder tagged wires to loudspeaker (25) terminals.

(8) Coat soldered connections with sealant from coating kit (item 6, table 1-1).

(9) Assemble M42 alarm unit (para 3-63).

3-66. Indicator Light (fig. 3-26)

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Tag and unsolder wires from indicator light (4) terminals.

(3) Remove lens (6) and lamp (5) from indicator light (4).

(4) Hold body of indicator light (4) and unscrew nut (4B) securing it to the panel (37).

(5) Remove nut (4B), lockwasher (4A), and indicator light (4) body from panel (37).

b. Installation.

(1) Insert indicator light (4) body (with lockwasher (4A) and nut (4B) removed) through panel (37).

(2) Install lockwasher (4A) and nut (4B) on indicator light (4) body and tighten nut (4B).

(3) Solder tagged wires to indicator light (4) terminals. Coat soldered connections with sealant from coating kit (item 6, table 1-1).

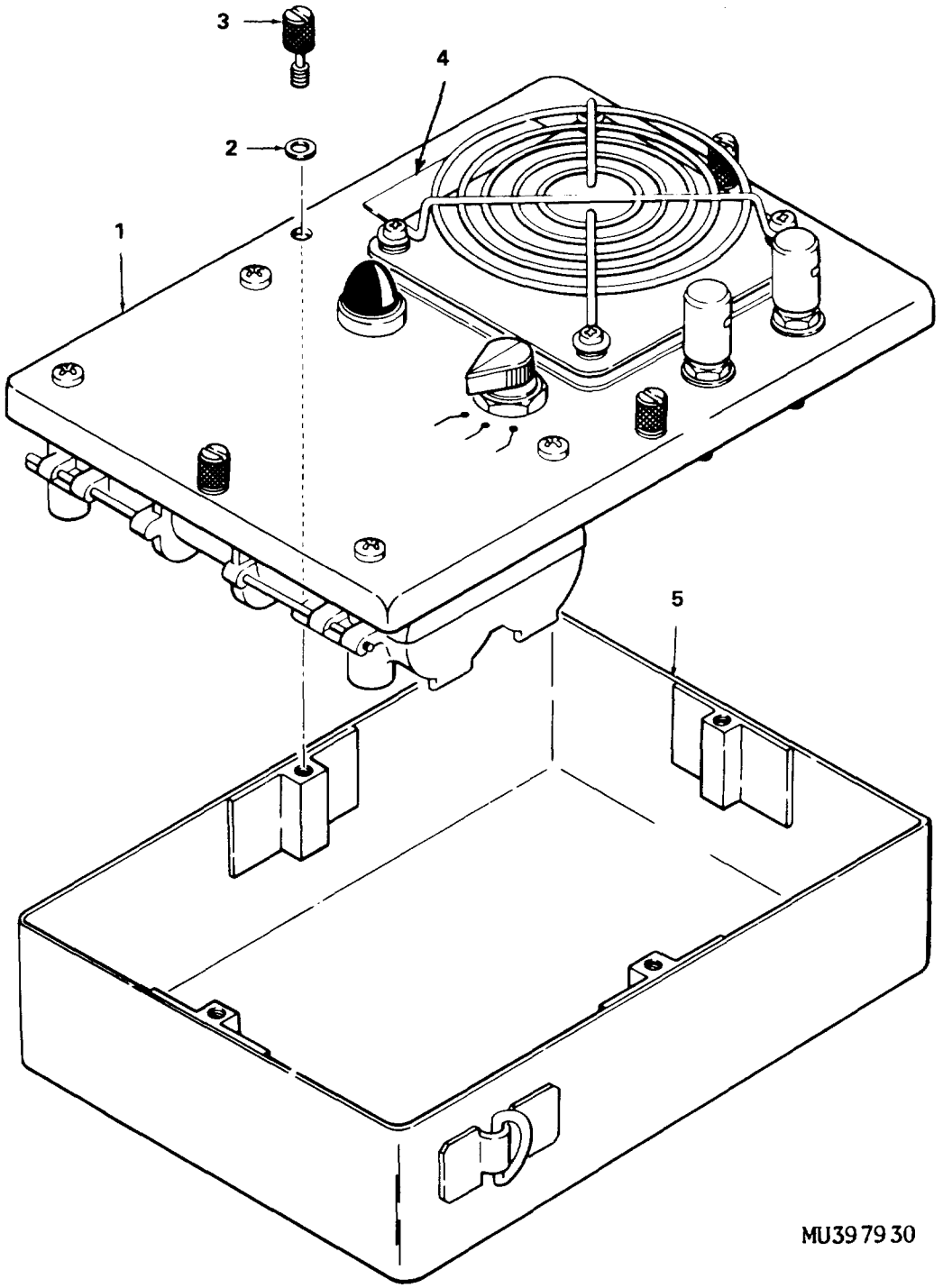
(4) Install lamp (5) and lens (6).

(5) Assemble M42 alarm unit (para 3-63).

3-67. Circuit Card Assembly (fig. 3-26)

a. Removal

(1) Disassemble M42 alarm unit (para 3-62).



1 Chassis assembly
2 Packing
3 Screw
4 Identification plate
5 Housing

Figure 3–25. M42 alarm unit, exploded view.

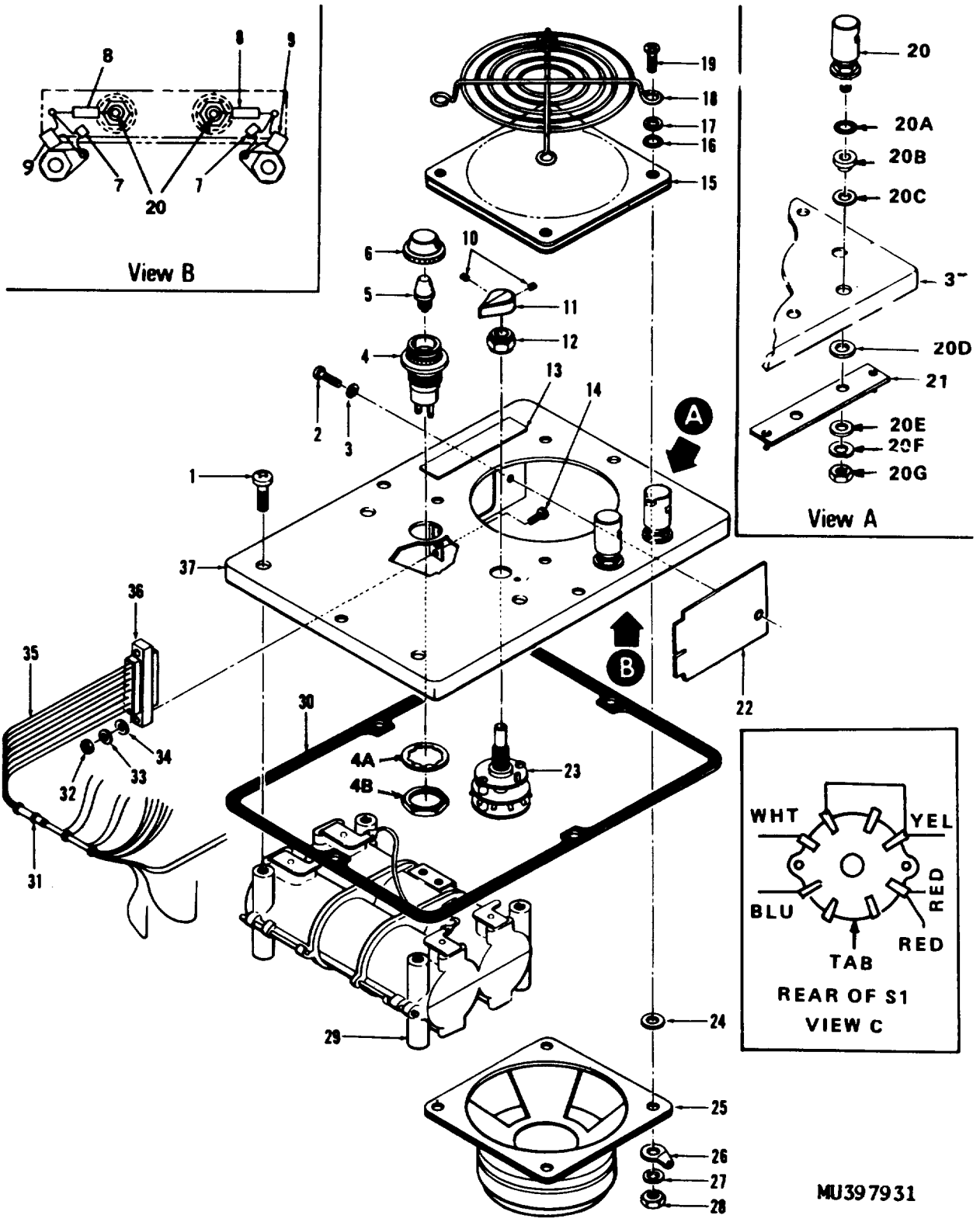


Figure 3-26. Panel assembly, exploded view.

1 Screw
2 Screw
3 Lockwasher
4 Indicator light (XDS1)
4A Lockwasher
4B Nut
5 Lamp (DS1)
6 Lens
7 Capacitor (C12, C13)
8 Resistor (R28, R29)
9 Capacitor (C14, C15)
10 Setscrews
11 Knob
12 Boot
13 Identification plate
14 Screw
15 Mounting plate assembly
16 Packing
17 Washer
18 Grille
19 Screw
20 Binding post (E3, E4)
20A Packing
20B Insulator
20C Washer
20D Washer
20E Washer
20F Lockwasher
20G Lockwasher
21 Terminal board
22 Circuit card assembly
23 Rotary switch
24 Washer
25 Loudspeaker
26 Terminal lug
27 Lockwasher
28 Nut
29 Battery retainer assembly
30 Gasket
31 Strap
32 Nut
33 Lockwasher
34 Washer
35 Branched wiring harness
36 Connector (J1)
37 Panel

Figure 3–26. Panel assembly, exploded view — Continued

(2) Remove screw (2, fig, 3-26) and lockwasher (3).

(3) Pull circuit card assembly (22) from connector (36).

b. Installation.

(1) Insert circuit card assembly (22) in connector (36) with component-side facing loudspeaker (25).

(2) Install screw (2) and lockwasher (3). Tighten screw (2).

(3) Assemble M42 alarm (para 3-63).

3-68. Binding Posts (fig. 3-26)

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Unsolder resistor (8) from bottom of binding post (20) (view B).

(3) Remove nut (20G), lockwasher (20F), and washer (20E).

(4) Remove binding post (20), packing (20A), insulator (20B), and washer (20C) from panel (37). Washer (20D) will fall free.

b. Installation.

(1) Position washer (20D) between terminal board (21) and panel (37).

(2) Install packing (20A), insulator (20B), and washer (20C) on binding post (20). Install binding post (20) through top of panel (37), washer (20D), and terminal board (21). Secure with lockwasher (20F) and nut (20G).

(3) Solder resistor (8) to bottom of binding post (20). Coat soldered connection with sealant from coating kit (item 6, table 1–1).

(4) Assemble M42 alarm unit (para 3-63).

3-69. Terminal Board (fig. 3-26)

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Unsolder capacitor (7 and 9) from terminal board (21).

(3) Unsolder resistors (8) from terminal board (2) and binding posts (20).

(4) Remove nut (20G), lockwasher (20F) and washer (20E). Washer (20D) and terminal board (21) will fall free.

b. Installation.

(1) Install washer (20D) axial terminal board (21) on ends of binding posts (20). Install washer (20E), lockwasher (20F), and secure with nut (20G).

(2) Connect resistors (8) between binding posts (20) and terminals of terminal board (21) as shown (view B).

(3) Connect and solder capacitors (7 and 9) as shown (view B).

(4) Coat all soldered connections with sealant from coating kit (item 6, table 1–1).

(5) Assemble M42 alarm unit (para 3-63).

3-70. Rotary Switch and Boot (fig. 3-26)

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Tag and unsolder wires from terminals of switch (23).

(3) Loosen setscrews (10) and remove knob (11).

(4) Unscrew and remove boot (12).

(5) Remove switch (23) from bottom of panel (37).

b. Installation.

(1) Position switch (23) with shaft and tab in mounting holes in panel (37).

(2) Install and tighten boot (12) on shaft of switch (23).

(3) Turn switch shaft to the fully clockwise position.

(4) Position knob (11) on switch shaft with knob pointer at HORN ON position on panel (37).

(5) Tighten setscrews (10).

(6) Connect and solder tagged wires to selector switch terminals (View C). Coat soldered connections with sealant from coating kit (item 6, table 1-1).

(7) Assemble M42 alarm unit (para 3–63).

3-71. Battery Retainer Assembly (fig. 3-26)

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Remove four batteries (TM 3-6665-225–12).

(3) Remove four screws (1).

(4) Separate battery retaining assembly (29) from panel (37) to expose soldered connections.

NOTE

Terminal reference designations XTB1-1 and XTB4–2 are molded on the exterior of the battery retainer assembly.

(5) Unsolder black wire from XTB1-1 terminal and red wire from XTB4-2 terminal. Remove battery retainer assembly (29).

b. Installation.

(1) Connect and solder red wire to XTB4-2 terminal and black wire to XTB1–1 terminal on battery retainer assembly (29).

(2) Secure battery retainer assembly (29) to panel (37) with screws (1).

(3) Install four batteries (TM 3-6665-25–12).

(4) Assemble M42 alarm unit (para 3-63).

3-72. Branched Wiring Harness

a. Removal.

(1) Disassemble M42 alarm unit (para 3-62).

(2) Separate battery retainer assembly (29, fig. 3–26) from panel (37) (para 3–71a).

(3) Remove circuit card assembly (para 3-67a).

(4) Unsolder wiring harness leads loudspeaker (25), terminals E3 and E4 on terminal board (21), switch (23), indicator light (4), and battery retainer assembly (29).

(5) Remove screws (14), washers (34), lockwashers (33), and nuts (32).

(6) Remove branched wiring harness (35).

b. Installation.

(1) Dress leads of branched wiring harness (35) near their respective terminals.

(2) Secure connector (36) to mounting bracket on panel (37) with screw (14), washer (34), lockwasher (33), and nut (32).

(3) Using the schematic diagram (fig. 2-3) connect and solder branched wiring harness (35) to components mounted on panel (37).

(4) Check continuity of wire connections. Coat soldered connections with sealant from coating kit (item 6, table 1–1).

(5) Install circuit card assembly (para 3-67b).

(6) Assemble M42 alarm unit (para 3-63).

3-73. Identification Plate

a. Pry identification plate (13) from panel (37).

b. Clean surface of panel (37) with a damp, clean cloth.

c. Stamp replacement identification plate with lot number and serial number.

d. Soak identification plate (13, fig. 3–26) in water for approximately 1 minute.

e. Remove protective backing from replacement identification plate.

f. Press identification plate (13) firmly on panel (37).

CHAPTER 4

GENERAL SUPPORT MAINTENANCE

Section I. M43 DETECTOR UNIT PUMP ASSEMBLY (1A2A1)

4-1. General

General support maintenance personnel are authorized to replace the connecting rod assembly and motor of the M43 detector unit pump assembly.

NOTE

Refer to TB SIG 222 for instructions regarding soldering techniques.

4-2. Connecting Rod Assembly (fig. 3-18)

a. Removal.

(1) Remove pump assembly (para 3-24) and cover (para 3–26a).

(2) Remove terminal lugs (para 3-30a).

(3) Remove head assembly (para 3-31a).

(4) Remove retaining ring (33) and washer (34).

(5) Remove screws (8, fig. 3-18).

(6) Pull motor (7) from pump unit subassembly (29) to free connecting rod assembly (35).

(7) Remove connecting rod assembly (35) and diaphragm (36) as an assembly.

(8) Remove screw (38), washer (37), and diaphragm (36).

b. Installation.

(1) Position diaphragm (36) on connecting rod assembly (35) with flat side of outside edge toward bearing.

(2) Secure washer (37) and diaphragm (36) to connecting rod assembly (35) with screw (38).

(3) Position connecting rod assembly (35) in pump unit subassembly (29) so that exposed bearing end is towards motor (7). Slide motor (7) into pump unit subassembly (29) so that its shaft is centered in the connecting rod assembly (35) bearing.

(4) Install screws (8).

(5) Install washer (34) and retaining ring (33) on shaft of motor (7)

(6) Install terminal lugs (para 30b).

(7) Center connecting rod assembly (35) and diaphragm (36) in hold in pump unit subassembly (29).

(8) Install and aline head assembly (para 3-31b(4) through (7) and 3–31c).

(9) Install cover (para 3-26b).

(10) Install pump assembly (para 3-25).

4-3. Motor

a. Removal.

(1) Remove pump assembly (para 3-24).

(2) Remove dust cover (para 3-26a).

(3) Partially remove voltage regulator (para 3–32a(2) through (5)).

(4) Remove retaining ring (33, fig. 3-18) and washer (34) from motor shaft.

(5) Remove terminal lugs (para 3-30a).

(6) Remove screws (8).

(7) Remove motor (7) from pump unit subassembly (29).

b. Installation.

(1) Hold violet wire clear of motor (7). Slide motor (7) into pump unit subassembly (29) until motor shaft passes through hole in connecting rod assembly (35).

(2) Pull red and green wires through oval slot in pump unit subassembly (29).

(3) Insure that gear on shaft of the motor (27) meshes with gear assembly (17).

NOTE

Some replacement motors (7) require #4–40 by 0.250-inch screws (8) for installation instead of the #4-40 by 0.188-inch screws originally used.

(4) Install and tighten screws (8) to secure motor (7) to pump unit subassembly (29).

(5) Replace terminal lugs (para 3-30b).

(6) Slide washer (34) over motor shaft.

(7) Install retaining ring (33).

(8) Install voltage regulator (para 32b).

4-4. Gear Assembly Ball Bearings (fig. 3-18)

a. Removal.

(1) Remove pump assembly (para 3-24).

(2) Remove cover (para 3-26a).

(3) Remove terminal lugs (para 3-30a).

(4) Remove pins (23).

(5) Remove screws (22) and lockwashers (21).

(6) Remove pillow housing (20) and bearing (19).

(7) Remove retaining ring (33) and washer (34).

(8) Remove screws (8) and slide motor partially from pump unit subassembly (29).

(9) Remove gear assembly (17).

(10) Pry ball bearing (16) from pump unit subassembly (29).

b. Installation.

(1) Press ball bearing (16) into pump unit subassembly (29).

(2) Press ball bearing (19) into pillow housing (20).

(3) Insert gear assembly (17) into ball bearing (16).

(4) Install pillow housing (20) so that ball bearing (19) slips over shaft end of gear assembly (17).

(5) Install two screws (22) and lockwashers (21). Do not tighten.

(6) Perform alinement procedures (c below).

(7) Position tube guide (18) over two mounting holes in bottom of pump unit subassembly (29). Screw pins (23) into bottom of tube guide (18).

(8) Tighten screws (8).

(9) Install washer (34) and retaining ring (33).

(10) Replace springs (14) on tube guide (18).

(11) Test springs (para 3-27a).

(12) Test pump assembly (fig. 3-7).

c. Alinement.

(1) Connect end play gage block and gage block assembly from M74 test set as shown in figure 4-1.

(2) Position gear assembly (2) and pillow housing (5) so that surfaces contact end play gage block (4) and gage block assembly (1).

(3) Tighten screws (22, fig. 3-18) and remove end play gage block and gage block assembly.

(4) Complete installation (b(7) through (12) above).

4-5. Pump Unit Subassembly

a. Disassembly.

(1) Remove gear assembly ball bearings (para 4-4a).

(2) Remove motor (para 4-3a).

(3) Remove connecting rod assembly (para 4–2a).

(4) Remove roller (para 3-34a).

(5) Remove catches (para 3-33a).

(6) Remove voltage regulator (para 3-32a).

(7) Remove tubing, coupling, and pin (para 3-28a).

(8) Remove screws (22, fig. 3-18), lockwashers (21), and guide (18).

b. Reassembly.

(1) Install gear assembly ball bearings (para 4-4b(1) through (7)).

(2) Insert violet lead from electrical connector (A1P1 (fig. 3–18)) through access hole in top of pump unit subassembly (29).

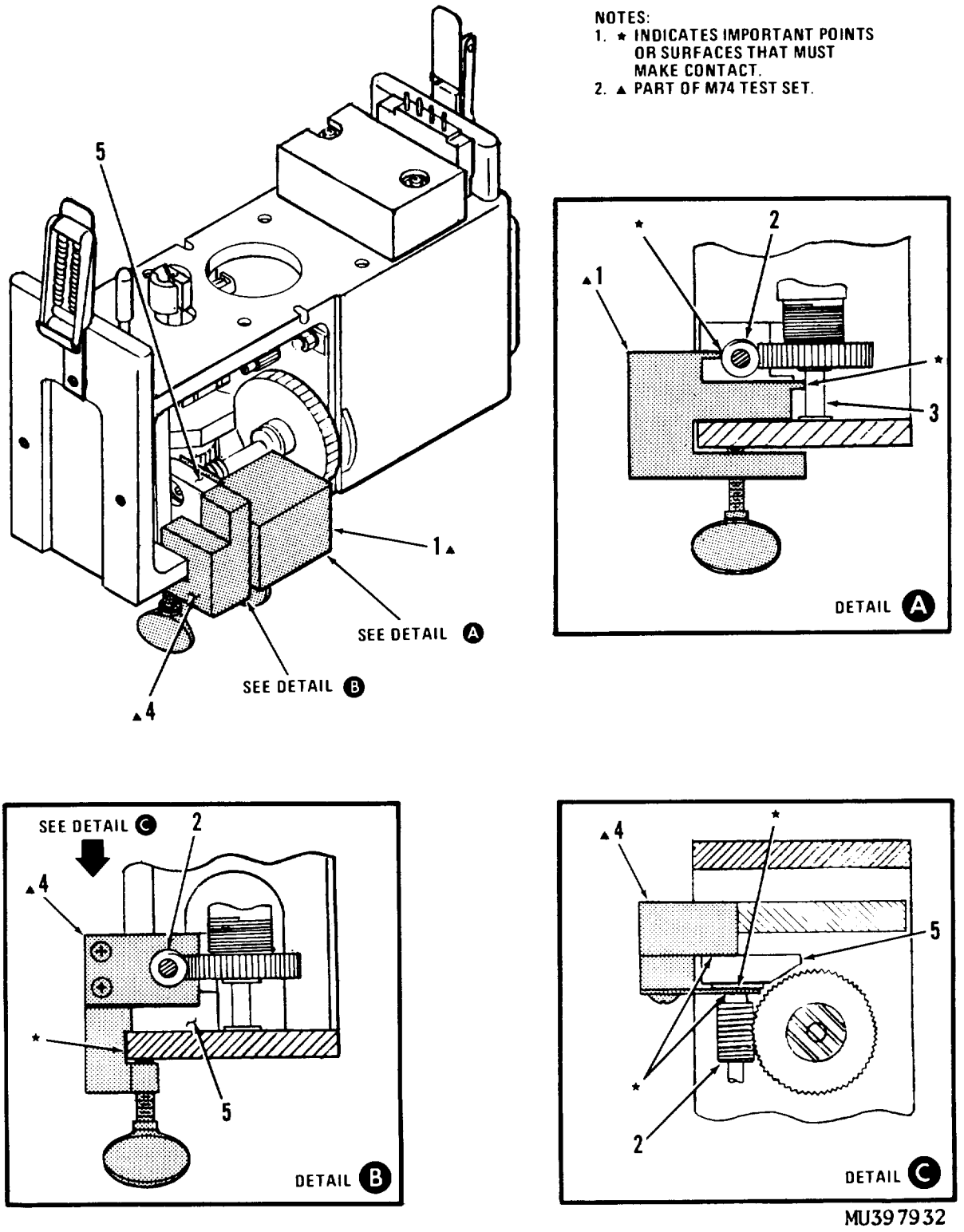
(3) Install and tighten two screws (5) through electrical connector A1P1 to pump unit subassembly (29).

(4) Install four rollers (31) on shafts and secure with retaining rings (32).

(5) Hold violet lead clear of motor (7). Slide motor (7) into pump unit subassembly (29). Pull red and green leads through oval slot.

(6) Using detail A as a guide, solder red and green leads from motor (7) to terminals on bottom of voltage regulator (6).

(7) Secure voltage regulator (6) to pump unit subassembly (29) with screws (3) and lockwashers (4).



1 Gage block assembly
2 Gear assembly
3 Shaft assembly
4 End play gage block.
5 Pillow housing

Figure 4-1. Gear assembly alinement.

(8) Install connecting red assembly (para 4-2b(1) through (8)).

(9) Install tubing coupling, and pin (para 3-28b(1) through (3)).

(10) Install catches (para 3-33b).

(11) Install cover (para 3-26b)

(12) Install pump assembly (para 3-25).

Section II. M43 DETECTOR UNIT CHASSIS ASSEMBLY (1A2A2)

4-6. General

General support maintenance personnel are authorized to replace heater circuit resistors, the thermal resistor, thermostatic switches, the cell block assembly, the air inlet heater module, shaft assembly, switch assembly, and the branched wiring harness.

CAUTION

Use minimum heat and force when unsoldering wires and components from terminals. If a terminal is dislodged, heat, with a soldering iron, gently press it back into its mounting hole, and allow it to cool.

4-7. Heater Circuit Resistors and Terminals

a. Removal.

(1) Remove chassis assembly (para 3-36).

(2) Using figures 2-2 and 3-1 as guides, check resistance values.

(3) Unsolder and remove defective resistor.

(4) Unscrew defective terminal stud (55A, fig. 3-21 U or drill out defective terminal stud (74A).

b. Istallation.

(1) Replace defective terminal studs (55A and 74A).

(2) Attach and solder resistor to its terminals.

(3) Test installation by resistance check.

(4) Coat soldered joints with sealant from coating kit (item 6, table 1–1).

(5) Install chassis assembly (para 3-37).

4-8. Thermal Resistor

a. Removal.

(1) Remove chassis assembly (para 3-36).

(2) Remove sealing compound from terminals (6, fig. 4–2).

(3) Unsolder thermal resistor (3) leads from cell block assembly (1) terminals (6).

(4) Pull thermal resistor (3) from cell block assembly (1) through the cavity top port (5).

(5) Remove remaining insulating compound from resistor mounting cavity using a No. 4 0 (or 3/32-inch) drill. Insert drill and rotate manually.

b. Installation.

(1) Install the thermal resistor (3), lead-end first, into the cavity top port (5). Adjust thermal resistor (3) downward in cavity until leads are about halfway through.

(2) Apply insulating compound (item 1, table 1–1) into top port of the resistor cavity. Fill cavity with insulating compound while adjusting thermal resistor (3) downward.

(3) Adjust thermal resistor (3) downward in cavity until sensor tip (2) is directly over air flow port (4) in the cell block assembly (1) and about 1/32-inch below the plastic top surface of the cell block assembly.

(4) Carefully seal thermal resistor cavity top port (5) with insulating compound (item 1, table 1–1). Recheck resistor position. Cure at room temperature for 24 hours.

(5) Dress leads of thermal resistor to proper length and solder to terminals (6).

(6) Coat soldered terminals and bare leads with sealant from coating kit (item 6, table 1-1).

(7) Install chassis assembly to case top assembly (para 3–37).

4-9. Thermostatic Switches

a. Removal.

(1) Remove chassis assembly (para 3-36).

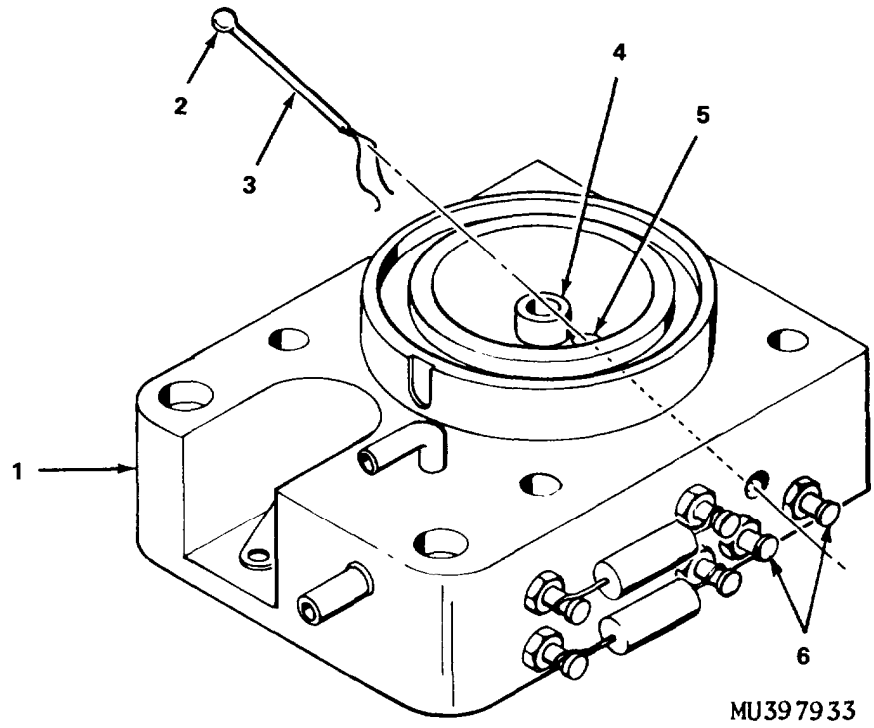
(2) Remove screw (22, fig. 3-2121).

(3) Remove thermostat retaining bar (6), washer (7), and lockwasher (8).

(4) Unsolder wires from thermostatic switch (9 or 10) terminals.

b. Instalation.

(1) Using an ohmmeter, check continuity



1 Cell block assembly (1A2A2A3)
2 Sensor tip
3 Themal resistor (1A2A2A3RT1)
4 Air flow port
5 Cavity top poty
6 Terminals

Figure 4-2. Thermal resistor replacement.

of replacement switches before installation. Switch (9) indicates an open circuit between terminals at 50° F. or greater. Switch (10) indicates a closed circuit between terminals at 42° F. or greater.

(2) Position switches with TEMP SIDE against chassis subassembly (56).

(3) Using fig. 3-1 as a guide solder wires to applicable switch terminals. Coat soldered connections with sealant from coating kit (item 6, table 1–1).

(4) Insert screw (22, fig. 3-21 ③) through chassis assembly and attach lockwasher (8), washer (7), and thermostat retaining bar (6). Tighten screw (22).

(5) Install chassis assembly to case top assembly (para 3-37).

4-10. Cell Block Assembly

a. Removal

(1) Remove chassis assembly (para 3-36).

(2) Disconnect tubing (11, fig. 3-21 ①) and tubing (21) from cell block assembly (75, fig. 3–21 ②).

(3) Remove preformed packings (37 and 38) from cell block assembly (75).

(4) Remove sealing compound from electrical connector of cell block assembly (75) until soldered connections are exposed.

(5) Remove screws (78 and 71).

(6) Pry cell block assembly (75) from chassis subassembly (56). Tilt cell block assembly (75) until terminals on side are accessible.

(7) Unsolder wires from terminals.

b. Installation.

(1) Insert preformed packing (38) around inner circular portion of cell block assembly (75).

(2) Insert preformed packing (37) around outer circular portion of cell block assembly (75).

(3) Install fluid fittings (40) in bottom of cellblock assembly (75) as follows:

(a) Insert fitting stopper assembly from M74 test set into fluid fitting (40).

(b) Dip fluid fitting (40) into distilled or deionized water.

(c) Insert fluid fitting (40) into threaded mounting hole on bottom of cell block assembly (75).

(d) Screw fitting stopper assembly clockwise until fluid fitting (40) is secure.

(e) Pull fitting stopper assembly from fluid fitting and return fitting stopper assembly to M74 test set.

(4) Solder wires to terminals on side of cell block assembly (75) and connect resistors (76 and 77). Coat soldered joints with sealant from coating kit (item 6, table 1–1).

(5) Coat mating surface of cell block assembly with silicone primer (item 7, table 1-1). Allow silicone primer to dry for approximately 1 hour before proceeding.

(6) Insert two screws (71) through bottom of chassis subassembly (56).

(7) Coat mating surface of chassis subassembly (56) with insulating compound (item 1, table 1–1). Immediately place cell block assembly (56) in position over two screws (71). Tighten screws (71) using temporarily installed nuts on each screw (71).

(8) Install and tighten two screws (78) in top of cell block assembly (56).

(9) Wipe off excess insulating compound.

(10) Dress and solder two wires to electrical connector on cell block assembly (56).

(11) Cover connector with sealant from coating kit (item 6, table 1–1). Cover wires and joints with sealant.

(12) Attach tubing (11 and 21, fig. 3-21 ①) to fittings on cell block assembly (75).

(13) Unscrew and remove nut from screws (71, fig. 3-21 ②) .

(14) Install chassis assembly to case top assembly (para 3-37).

4-11. Heater Module

a. Removal.

(1) Remove chassis assembly (para 3-36).

(2) Unsolder wires from terminals of heater module (1, fig. 3–21 ①).

(3) Remove screws (31) from bottom of chassis subassembly (56, fig. 3–21 ②).

(4) Remove heater module (1, fig. 3-21①).

b. Installation.

(1) Position heater module (1) on chassis subassembly (56).

(2) Coat threads of screws (31) with sealing compound (item 2, table 1–1). Install screws through bottom of chassis subassembly (56) and tighten screws.

(3) Using figure 3–2 as a guide, solder wires to terminals of heater module (1, fig. 3-21 ①).

(4) Coat soldered connections with sealant from coating kit (item 6, table 1-1).

(5) Install chassis assembly to case top assembly (para 3–37).

4-12. Shaft Assembly (fig. 3-21②)

a. Removal.

(1) Remove chassis assembly (para 3-36).

(2) Remove retaining rings (45 and 47).

(3) Remove shaft assembly (67), detent (46), washers (48 and 50), and spring (49).

(4) Remove retaining ring (65) from inside groove of pin (63).

(5) Withdraw pin (63) from chassis subassembly (56). Remove bellcrank assembly (66), spring (62), and washer (61).

(6) Unscrew screws (64) and remove nuts (51), lockwashers (52), clip (53), and retaining ring (60).

b. Installation.

(1) Position clip (53) on chassis subassembly (56) and insert screws (64) from bottom.

(2) Install lockwashers (52) and nuts (51) on screws (64) and tighten.

(3) Install retaining ring (60) on one end of pin (63). Slip washer (61) and spring (62) on pin (63).

(4) Position replacement bellcrank assembly (66) between shaft mounting holes. Insert pin (63) through mounting holes in chassis subassembly (56) and bellcrank (66). Install retaining ring (65) on inside groove of pin (63).

NOTE

The bent end of spring (62) fits into a hole in the chassis subassembly (56). The free end of spring (62) must be below pin on bellcrank assembly (66).

(5) Insert shaft assembly (67) through bottom of chassis subassembly (56). When shaft emerges in the clip (53), install washer (50), spring (49), and washer (48) on end of shaft assembly (67).

(6) Compress spring (49) with a small screwdriver, or other tool, and install retaining ring (47), detent (46), and retaining ring (45) on the end of the shaft assembly (67).

(7) Install chassis assembly in case top assembly (para 3–37).

4-13. Switch Assembly

a. Removal.

(1) Remove chassis assembly (para 3-36).

(2) Remove electronic module (TM 3-6665-225-12).

(3) Remove screws (4, fig. 3-21 ①) and washers (3).

(4) Unsolder wires from switches (6, fig. 4-3) and resistor (7).

NOTE

Preface all reference designations with 1A2A2A1.

b. Disassembly.

(1) Remove screw (1) and spring (3).

(2) Remove lever (2).

(3) Remove nut (6B), lockwasher (4), and washer (6A) to remove each switch (6 and 8).

(4) Loosen nut on resistor (7) and remove resistor (7) and stop (9) from bracket assembly (5).

c. Assembly.

(1) Loosen nut on resistor (7). Turn shaft of resistor (7) fully clockwise.

(2) Place resistor stop (9) on bracket assembly (5). Position resistor (7) in notch as shown in figure 4-3 with keying lugs engaging holes in bracket assembly (5) and with nut and lockwasher on top of stop (9).

(3) Tighten nut of resistor (7).

(4) Install switches (6 and 8) in bracket assembly (5) with tabs of washers (6A) in the holes of bracket assembly (5).

(5) Insert tang of lever (2) in slot of bracket assembly (5).

(6) Insert screw (1) through lever (2) and spring (3).

(7) Using figure 3-1 as a guide, solder wires to switches (6 and 8) and resistor (7).

(8) Coat soldered connection with sealant from coating kit (item 6, table 1-1).

(9) Tighten screw (1) until switch (8) closes (click). Loosen screw (1) slightly until switch opens (another click). Then loosen screw (1) one additional quarter turn.

d. Installation.

(1) Position switch assembly (5, fig. 3-21 ①) on posts (2).

(2) Loosely secure with screws (4) and lockwashers (3).

e. Alinement.

(1) Install gage assembly from M74 test set (TM 3-6665-260-14) as shown in figure 4–4.

(2) Aline switch assembly (2) so resistor shaft (3) is centered in gage assembly (5) hole.

(3) Tighten screws (1) to posts (4). Recheck alinement.

4-14. Branched Wiring Harness

NOTE

Potting or sealant must be removed from some areas before removal of components. Replace potting or sealant when replacement components are installed.

a. Removal

(1) Remove chassis assembly (para 3-36),

(2) Remove switch assembly (para 4-13a).

(3) Remove cell block assembly (para 4-10a).

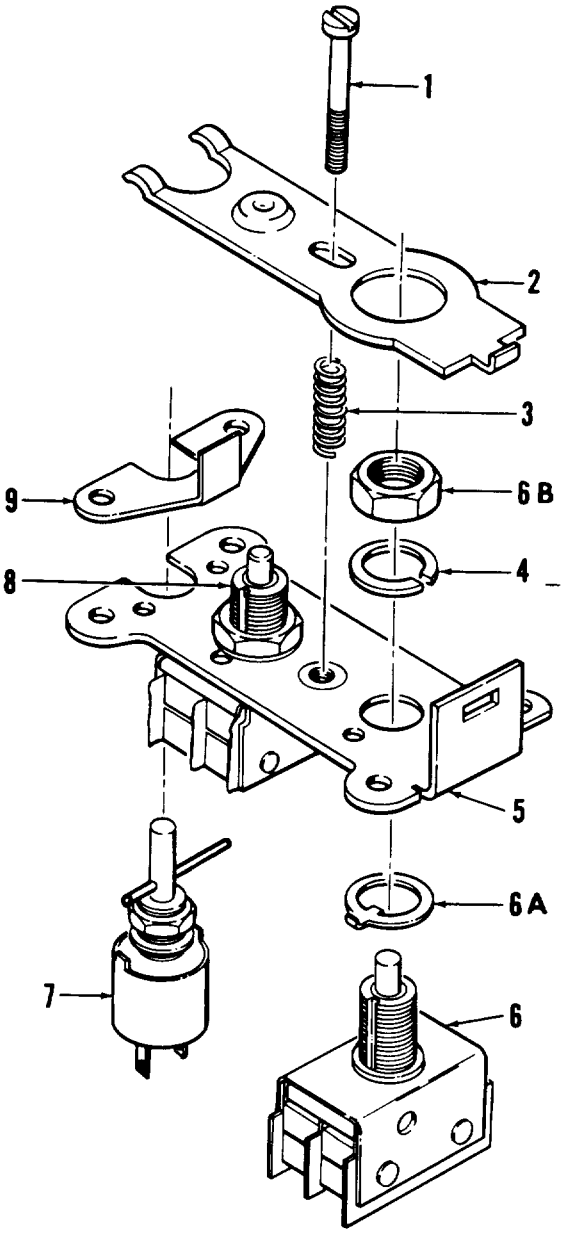
(4) Remove heater module (para 4-11a).

(5) Using figure 3-1 as a guide, unsolder wires from contacts marked A4P1, A4P3, and A4P4, and tip jack (65A, fig. 3-21 ③).

(6) Remove thermostatic switches S1 and S2 (para 4-9a).

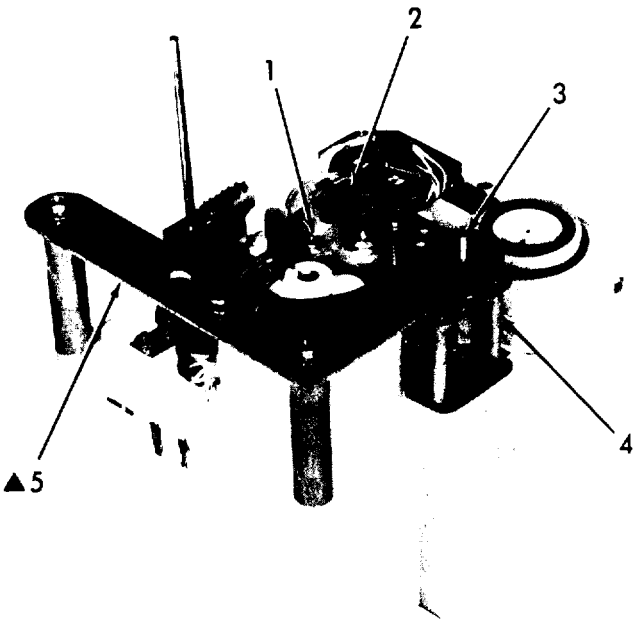
(7) Using figure 3-1 as a guide, locate and unsolder leads from terminals A4E1, A4E2, A4-E10, A4E11, A4E12, A4E13, and A5J4.

(8) Unscrew male and female retaining screws and remove connector A5J2 (fig. 3–21



1 Screw
2 Lever
3 Spring
4 Lockwasher
5 Bracket assembly
6 Switch (S1)
6A Washer
6B Nut
7 Resistor (R1)
8 Switch (S2)
9 Stop

Figure 4-3. Switch assembly, exploded view.



NOTE:
▲ DESIGNATES PART OF M74 TEST SET.
MU3979 35

1 Screw
2 Switch assembly
3 Resistor shaft
4 Post
5 Resistor shaft

Figure 4-4. Switch assembly alinement.

②) from chassis subassembly (56). (Connector A5J2 is part of branched wiring harness (42).)

(9) Remove screws (43) from terminal board A5TB1 (fig. 3-21).

(10) Remove screws (68) that secure connector A5J3 and strip nut (44) to chassis subassembly (56).

(11) Pry terminal board A5TB1 and connector A5J3 from chassis subassembly (56).

(12) Pull connector A5J1 from chassis subassembly (56).

(13) Remove branched wiring harness.

b. Installation. Use the wiring diagram (fig. 3-1) as a guide during installation of branched wiring harness (42, fig. 3–21 ②).

(1) Replace defective terminal studs (55A and 74A) and defective tip jack (65A).

(2) Press connector A5J1 into chassis subassembly (56).

(3) Insert screws (68) through chassis subassembly (56) and connector A5J3 and secure to strip nut (44).

(4) Secure terminal board A5TB1 with screws (43).

(5) Position connector A5J2 on chassis subassembly (56) with pin A nearest terminal board A5TB1. Insert female screw through hole nearest terminal board A5TB1. Insert male screw through other hole. Tighten screws.

(6) Solder leads to terminals A4E1, A4E2, A4E10, A4E11, A4E12, and A4E13, and to terminal A5J4.

(7) Install thermostatic switches (para 4-8b).

(8) Solder wires to contacts A4P1, A4P3, and A4P4 (para 3-43b) and tip jack (65A, fig. 3-21 ②).

(9) Install heater module (para 4-11b).

(10) Install cell block assembly (para 4-10b).

(11) Install switch assembly A1 (para 4-13).

(12) Check continuity using figures 3-1 and 3-2 as an aid.

(13) Install chassis assembly to case top assembly (para 3-37).

APPENDIX A
REFERENCES

CTA 50-970	Expendable Items (Except: Medical Class V, Repair Parts and Heraldic Items)
TM 3-6665-225-12	Operator's and Organizational Maintenance Manual: Alarm, Chemical Agent, Automatic: Portable, M8, M10 through M18
TM 3-6665-260-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Test Set, Chemical Agent Automatic Alarm: M74 (FSN 6665-854-4147)
TM 3-6665-302-20P	Organizational Maintenance Repair Parts and Special Tools List for Detector Unit, Chemical Agent Automatic Alarm, M43 (FSN 6665-859-2201); Alarm Unit, Chemical Agent Automatic Alarm, M42 (FSN 6665-859-2215)
TM 3-6665-302-34P	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Detector Unit, Chemical Agent Automatic Alarm, M43 (FSN 6665-859-2201); Alarm Unit, Chemical Agent Automatic Alarm, M42 (FSN 6665-859-2215)
TM 38-750	The Army Maintenance Management System (TAMMS).
TB SIG 222	Solder and Soldering.

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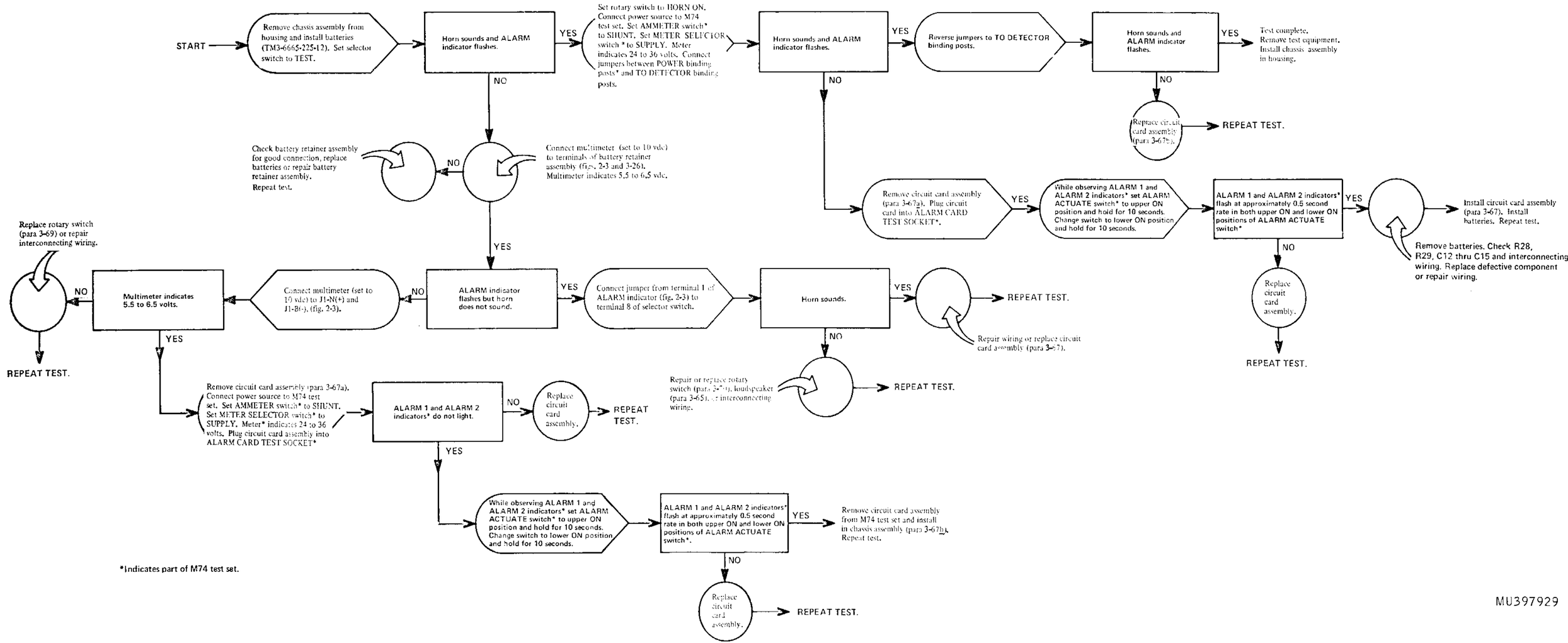

Figure 3-25. M42 alarm unit troubleshooting chart

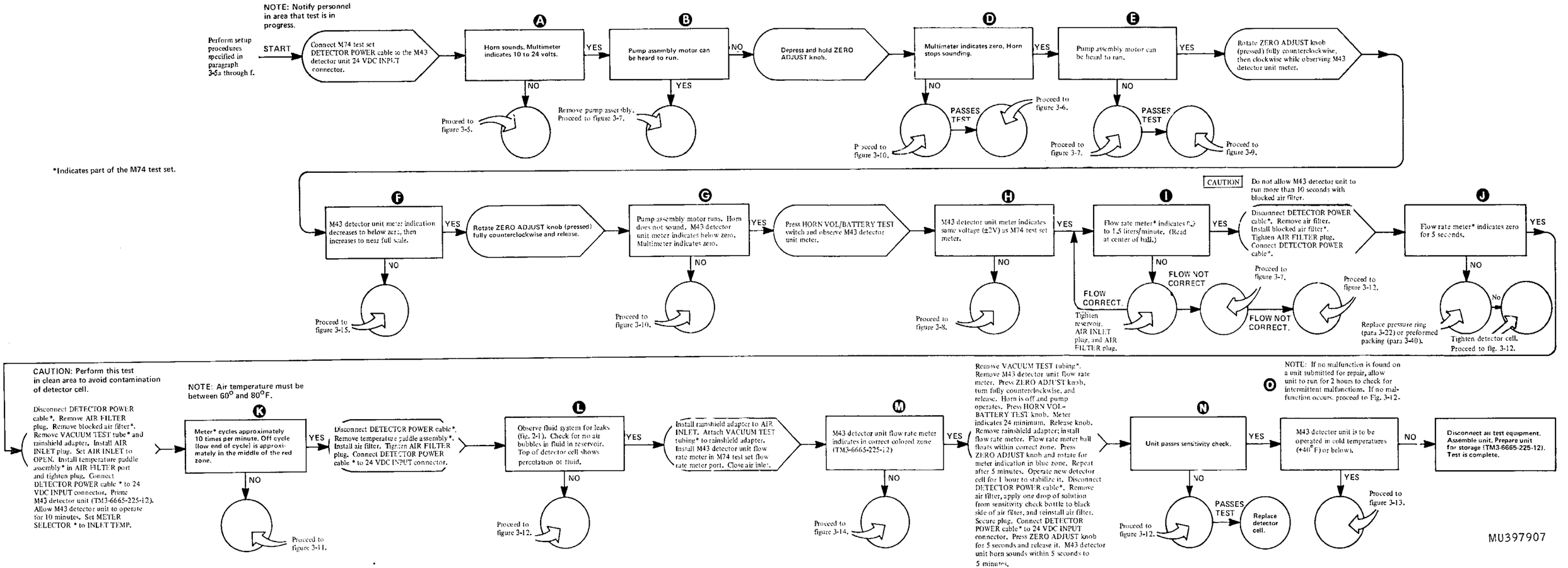

Figure 3-4. M43 detector unit troubleshooting chart.

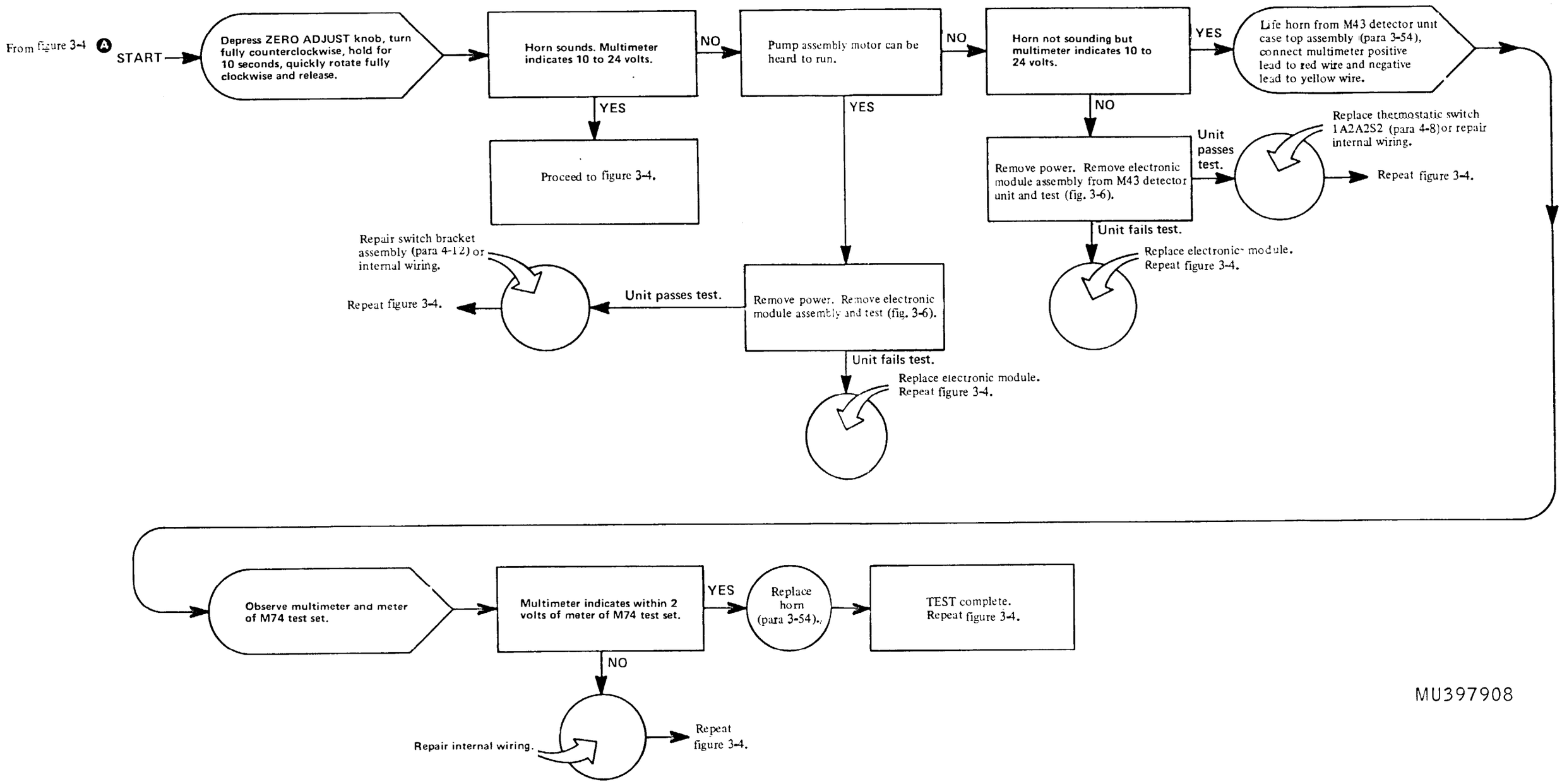

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Figure 3–5. Horn circuit troubleshooting chart.

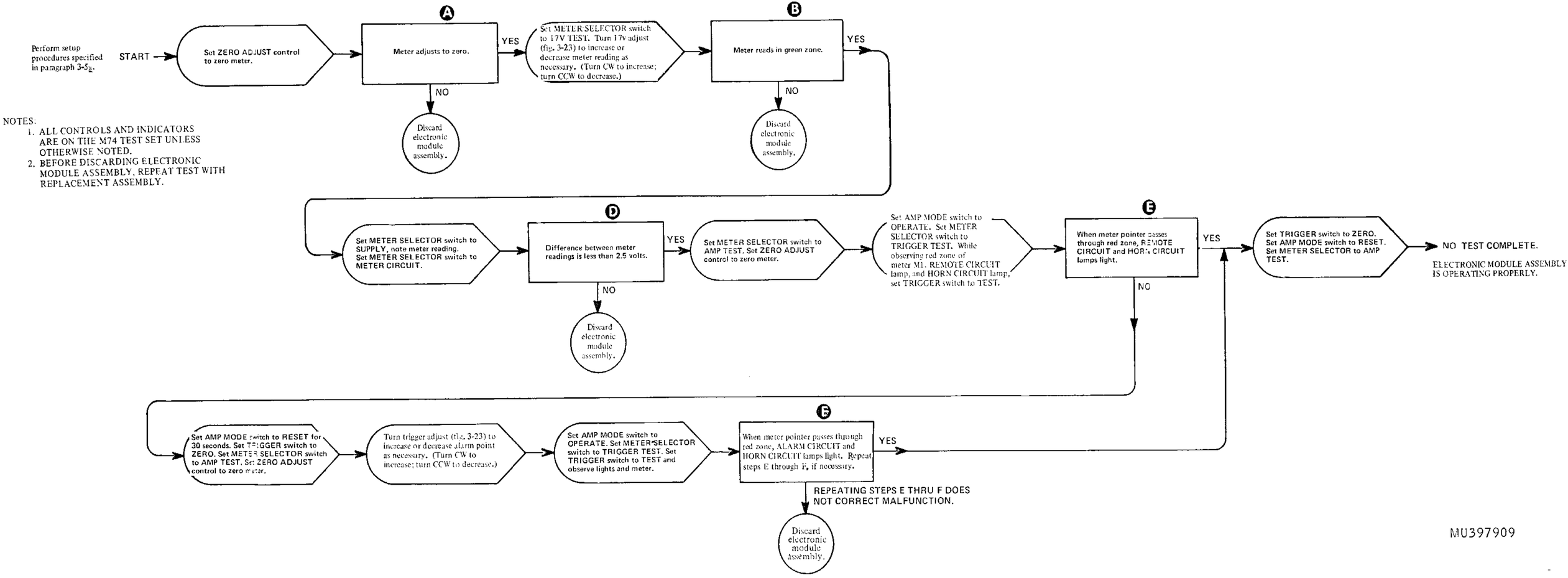


Figure 3-6. Electronic module troubleshooting chart

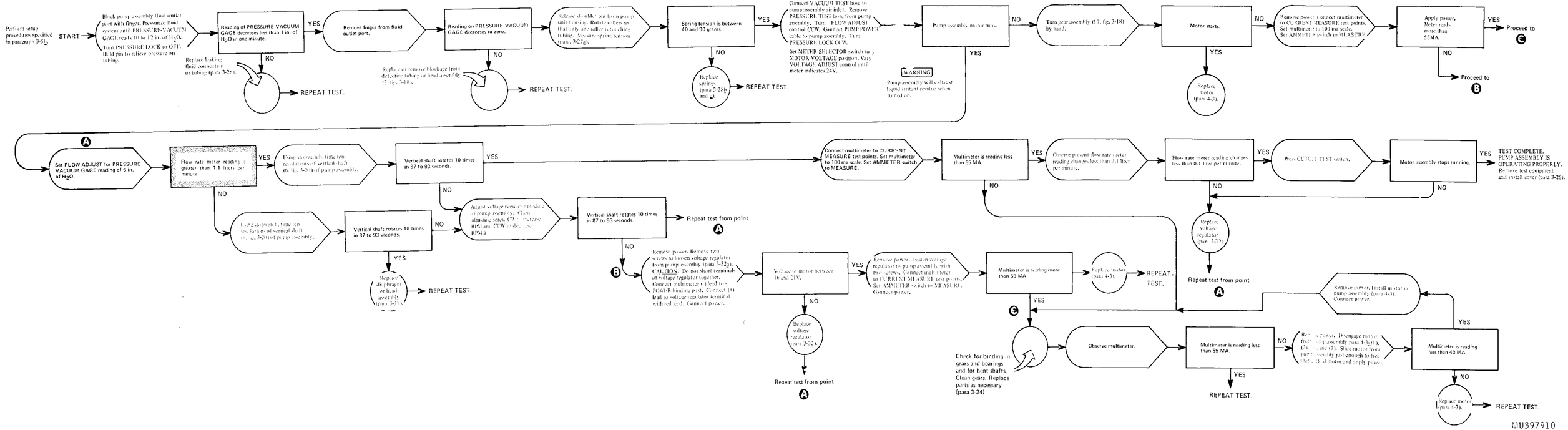
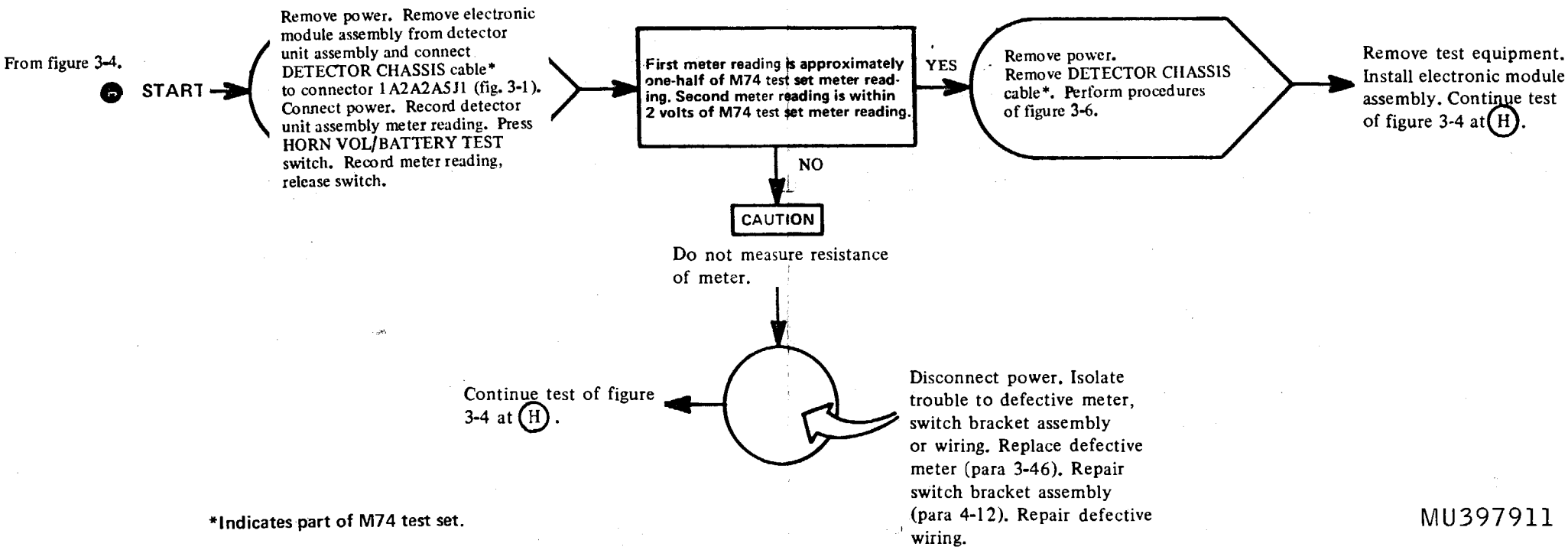


Figure 3-7. Pump assembly trouble shooting chart.



*Indicates part of M74 test set.

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Figure 3-8. Meter circuit troubleshooting chart.

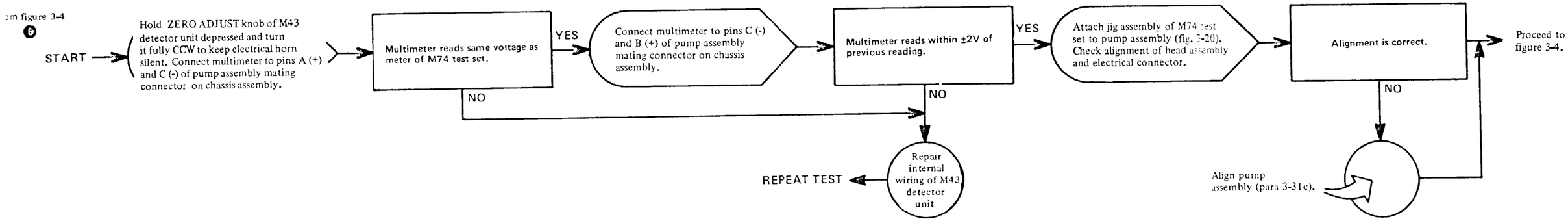


Figure 3-9. Motor control voltage circuit troubleshooting chart.

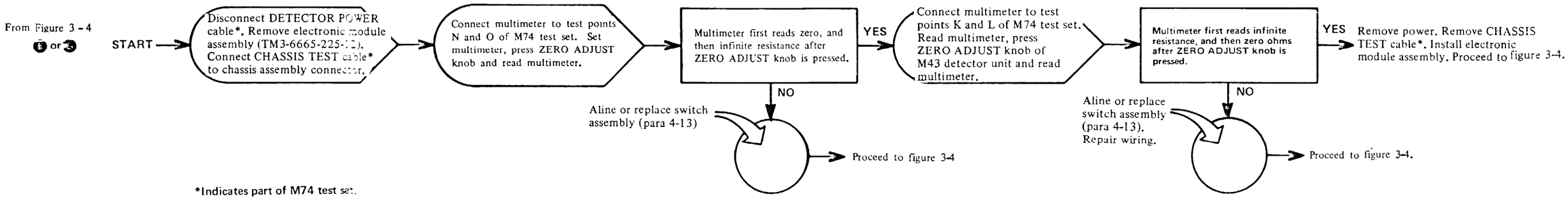


Figure 3–10. Reset circuit troubleshooting chart.

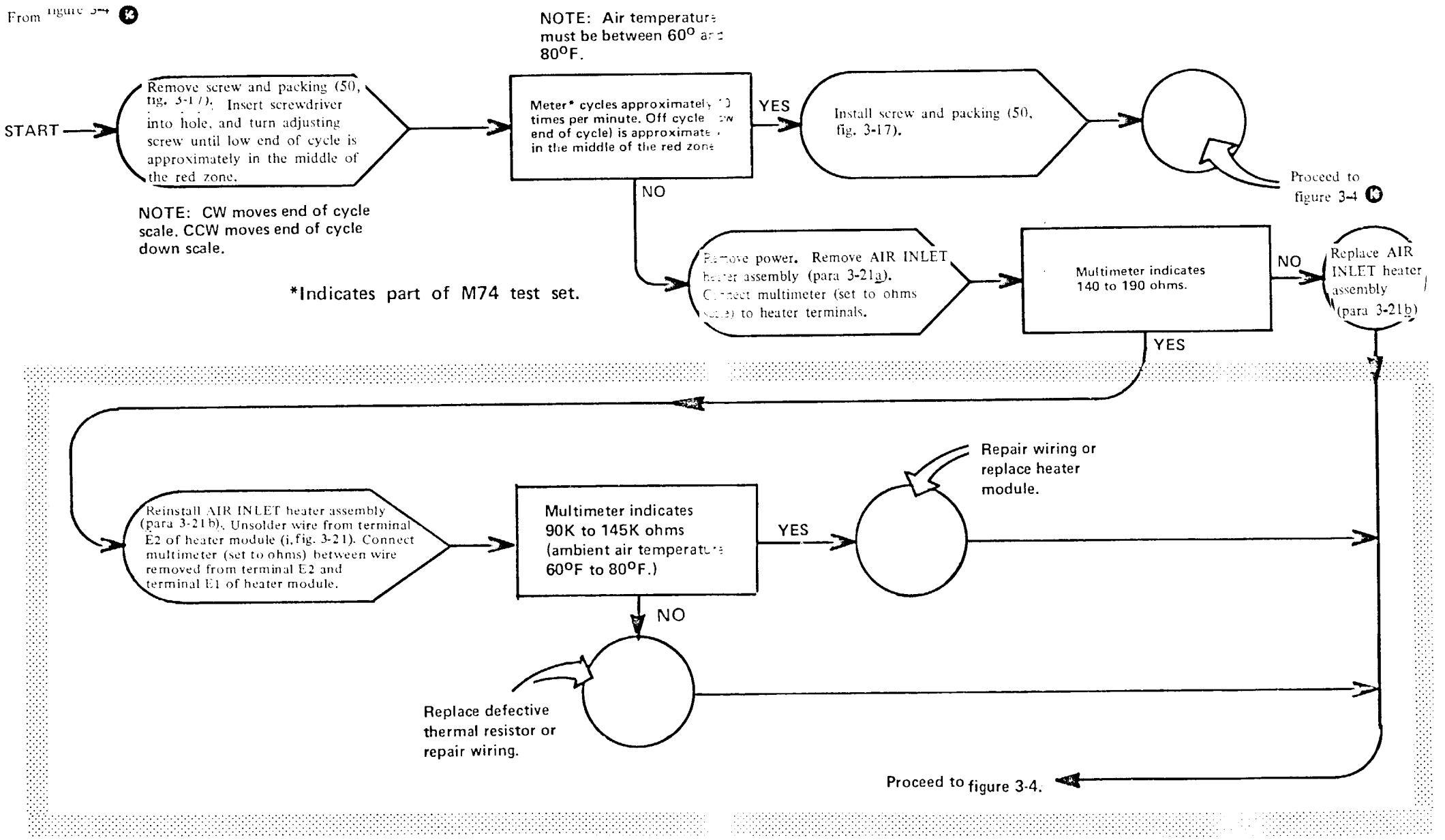


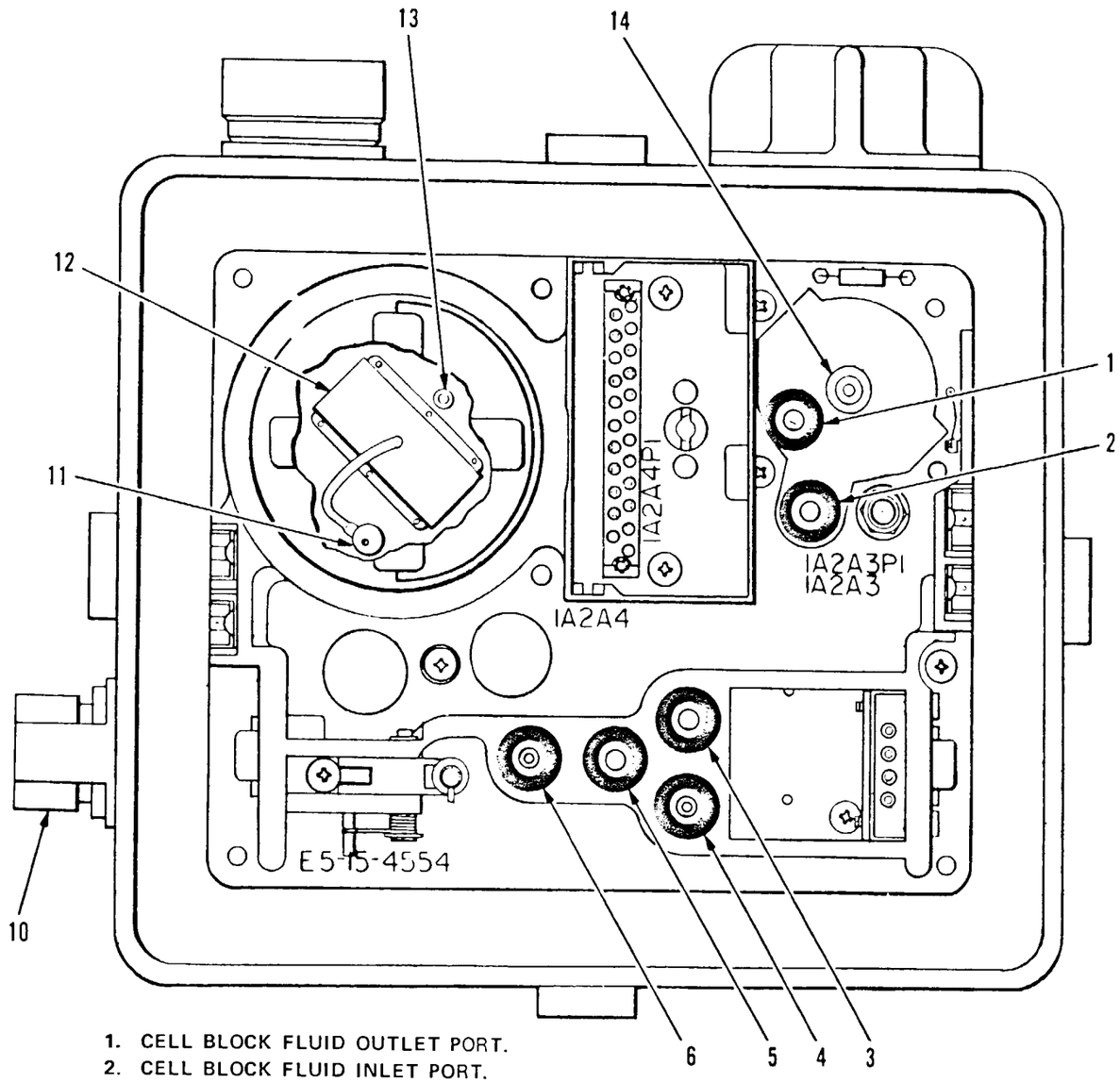
Figure 3-11. Inlet heater troubleshooting chart.

PRELIMINARY PROCEDURES FOR PNEUMATIC SYSTEM TROUBLESHOOTING

PURGE THE M43 DETECTOR UNIT PNEUMATIC SYSTEM AS FOLLOWS:

NOTE: Observe pneumatic tubing and lines for blockage while purging.

1. Remove test equipment from detector unit assembly (1, fig. 3-16).
2. Remove reservoir assembly (41, fig. 3-17). Keep weight assembly (29, fig. 3-21 (1)) and separator (27) free from dirt.
3. Remove pump assembly (para 3-24), detector cell, and air filter. Install and tighten plug (32, fig. 3-17).
4. Attach tubing adapter to bellows and pump (TM 3-6665-260-14).
5. Insert tubing adapter in pump air inlet port (5, fig. 3-12). and blow out line (alternately squeeze and release bulb of bellows and pump) until all liquid or bubbles are expelled from separator.
6. Remove tubing adapter and insert it in pump fluid outlet port (4) and blow out line until no more liquid or bubbles are released from the cell block fluid inlet port (2).
7. Remove tubing adapter and insert it in the cell block fluid outlet port (1) and blow out line until all liquid or bubbles are expelled from the inlet port of the reservoir mounting.
8. Remove the tubing adapter from the bellows and pump and from cell block fluid outlet port. Connect the bellows and pump to the detector cell solution inlet port (8).
9. Blow out the detector cell until clear.
10. Inspect ports for cracks or deformation.
11. Install and tighten an empty reservoir assembly.
12. Install detector cell and secure bail.



1. CELL BLOCK FLUID OUTLET PORT.
2. CELL BLOCK FLUID INLET PORT.
3. PUMP ASSEMBLY FLUID INLET PORT.
4. PUMP ASSEMBLY FLUID OUTLET PORT.
5. PUMP ASSEMBLY AIR INLET PORT.
6. PUMP ASSEMBLY AIR OUTLET PORT.
7. DETECTOR UNIT CELL SOLUTION OUTLET PORT.
8. DETECTOR UNIT CELL SOLUTION INLET PORT.
9. DETECTOR UNIT CELL AIR INLET PORT.
10. AIR OUTLET PORT.
11. WEIGHT ASSEMBLY.
12. SEPARATOR.
13. RESERVOIR INLET PORT.
14. CELL BLOCK AIR INLET PORT.

DETECTOR CELL

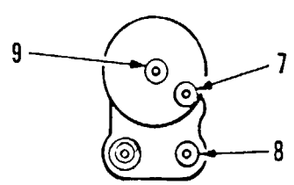


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Figure 3-12(1). Pneumatic system troubleshooting chart.

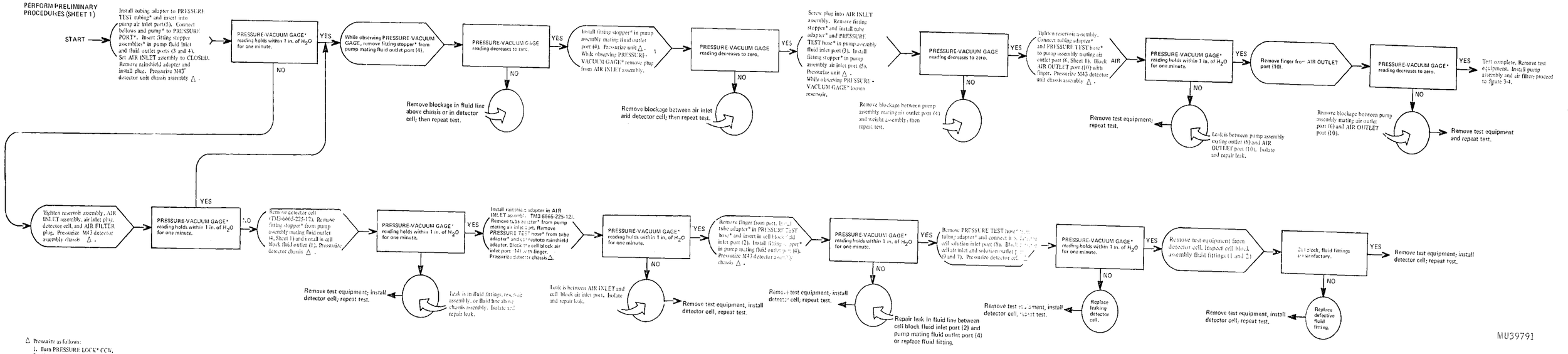
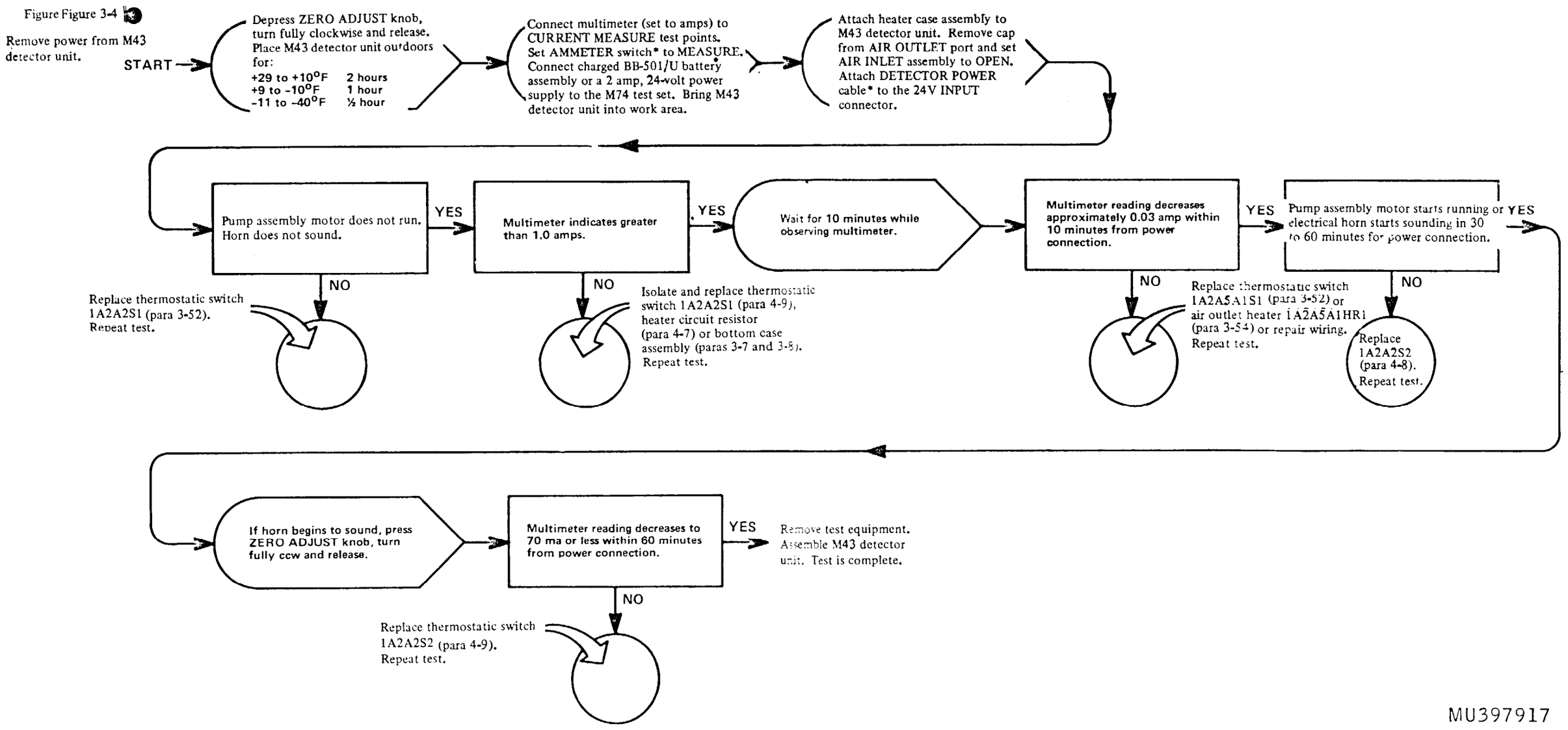


Figure 4-12.5. Pneumatic system troubleshooting chart.

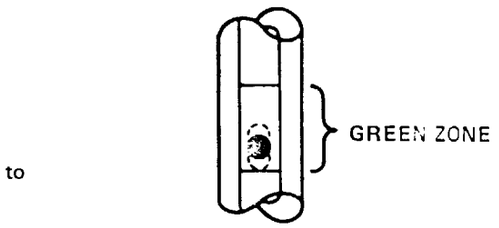
NOTE: THE FOLLOWING PROCEDURES ARE REQUIRED FOR OPERATION IN TEMPERATURES +40°F. OR LOWER.



*Indicates part of M74 test set.

Figure 3-13. Cold temperature operation troubleshooting chart.

NOTES: 1. ALL CONTROLS ARE ON M74 TEST SET.
2. BEFORE DISCARDING FLOW RATE METER, TEST WITH A REPLACEMENT FLOW RATE METER.



NOTE: If flow cannot be reduced to 1.0 liter per minute, use a lower voltage power source.

PERFORM PROCEDURES IN PARAGRAPH 3-5i.

START

Turn VOLTAGE ADJUST control until M74 test set flow rate meter indicates a flow of 1.0 liter per minute.

Ball of M43 detector unit flow rate meter is within two ball diameters above the bottom line of green zone.

YES

Turn VOLTAGE ADJUST control until the M74 test set flow rate meter indicates a flow of 1.3 liters per minute. Record PRESSURE VACUUM GAGE reading. Remove M43 detector unit flow rate meter by turning clockwise.

PRESSURE VACUUM GAGE reading changes 6 to 10 inches of H_2O when flow rate meter is removed.

YES

TEST IS COMPLETE. Remove M43 detector unit flow rate meter from M74 test set. Remove test equipment.

NO

Discard flow rate meter. (Note 2)

NO

HIGH

Discard flow rate meter. (Note 2)

LOW

Replace gasket (13, fig. 3-17).

Repeat test.

NO

Replace meter adapter (12, fig. 3-17).

Discard flow rate meter. (Note 2)

Repeat test.

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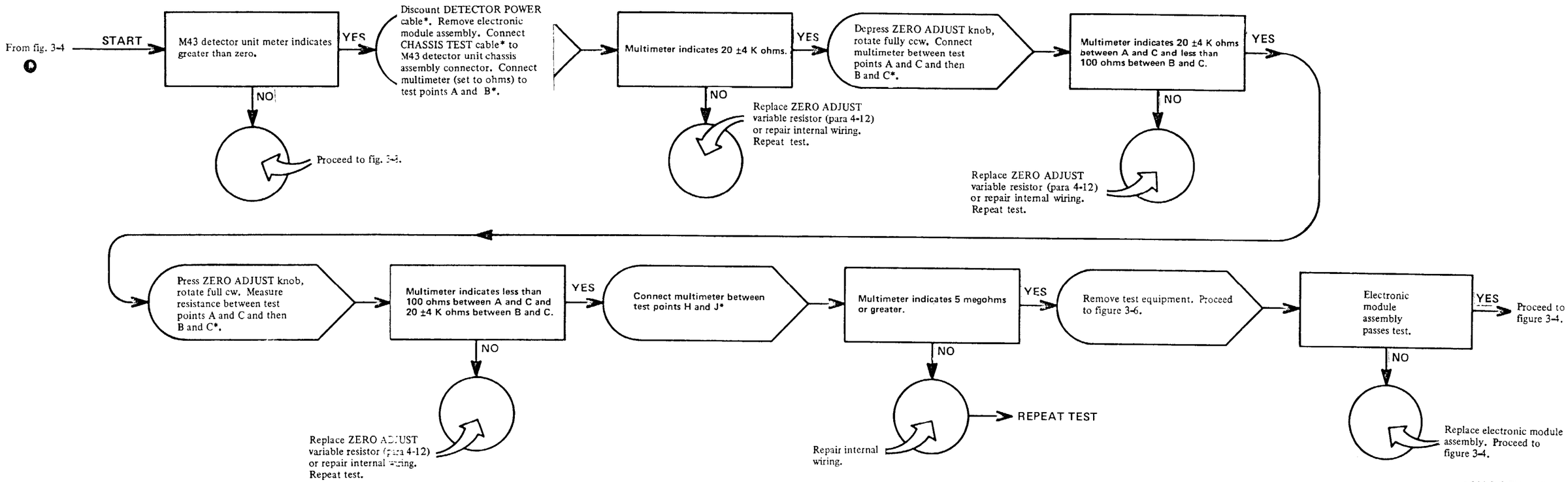
Figure 3-14. Flow rate meter troubleshooting chart.



*Indicates part of M74 test set.

Figure 3-15. Zero adjust circuit troubleshooting chart.

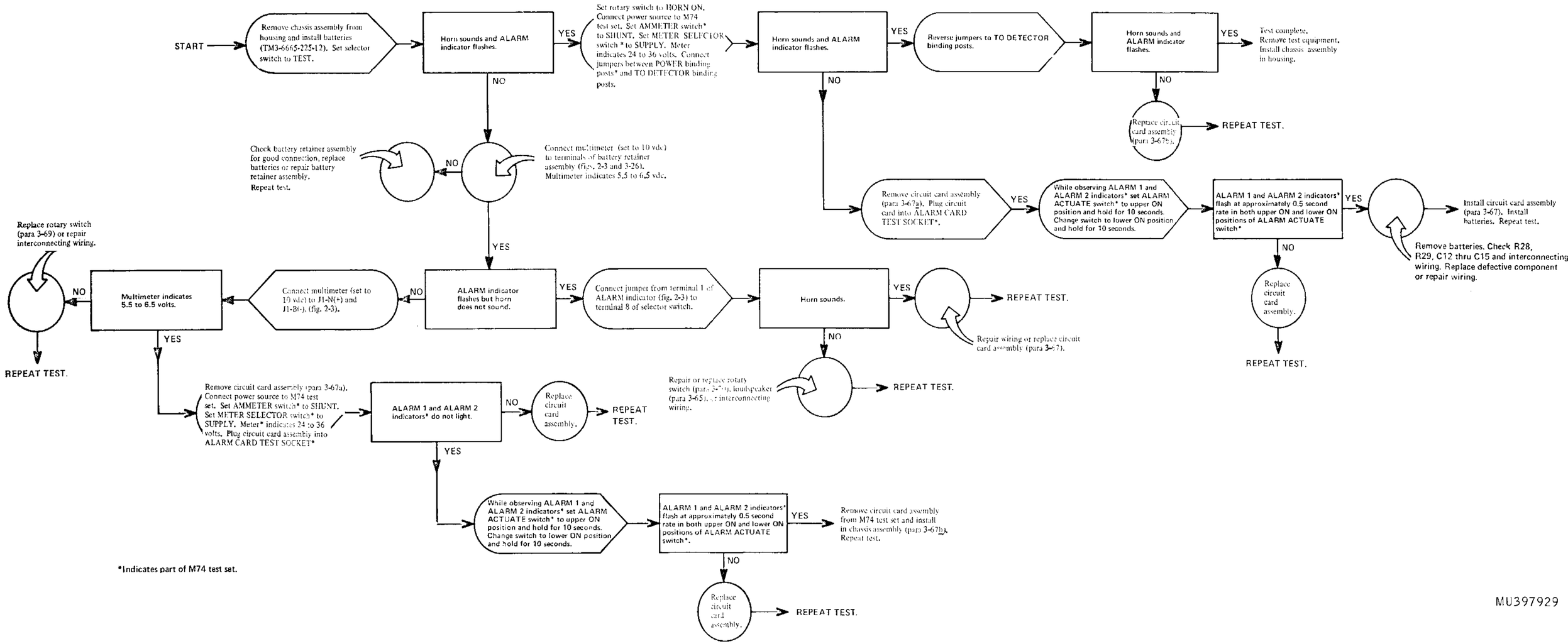


Figure 3-24. M42 alarm unit troubleshooting chart.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-28, (qty rqr block No. 51) Direct and General Support maintenance requirements for Detection and Warning Systems.

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TEAR ALONG DOTTED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

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HHB, 206 MI Bde
APO New York 09281

DATE 29 June 1976

PUBLICATION NUMBER	DATE	TITLE
TM 3-6665-302-34	23 Nov 73	M43 Detector Unit and M42 Alarm Unit

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
1-1			1-1	Change the NSN for item 3 to 8030-00[illegible]456-1039. REASON: Wrong stock number.
2-3	2-2d			In line 3, change "1A2A5A1S1" to read "1A2A5A1HR1." REASON: Wrong reference designation for the heater.

SAMPLE

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

I. M. WRIGHT, SFC, AV 999-1234

SIGN HERE: J. M. Wright

DA FORM 1 AUG 74 2028-2 (TEST)

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR MANUAL "FIND," MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CUT IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

PUBLICATION NUMBER	DATE	

BE EXACT...PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE:

CUT ALONG DOTTED LINE

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

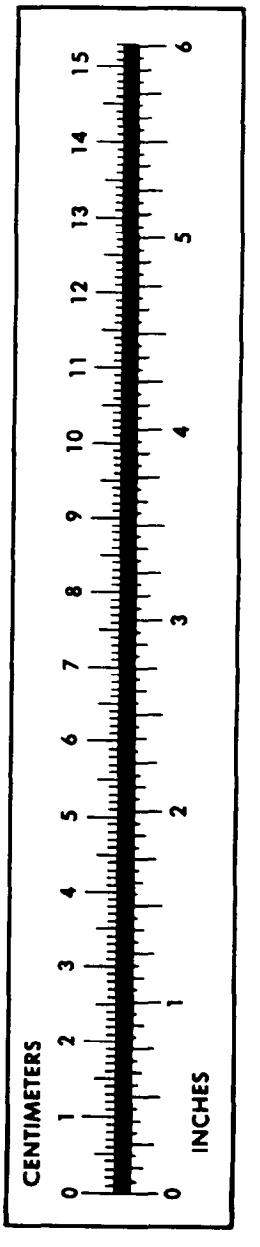
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

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
ıts	Liters	0.473
arts	Liters	0.946
allons	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 Yards	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
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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