

- 1 Upper door assembly 3 Air intake filter
2 Spring-loaded retainer 4 Personnel heater

Figure 2. Air intake filter—removal and installation.

a. Air Intake Filter.

(1) *Removal.*

- (a) Open the upper door assembly (fig. 2) of the personnel heater.

- (b) Remove the air intake filter.

- (2) *Cleaning and recharging.* Refer to TM 9-1400-250-15/3 for the cleaning and recharging procedures.

(3) *Installation.*

- (a) Install the air intake filter.

- (b) Close the upper door assembly.

b. Air Exhaust Filter.

(1) *Removal.*

- (a) Release the captive fasteners (fig. 3), and raise the air exhaust door.

- (b) Hold open the spring-loaded retainers, and remove the air exhaust filter.

- (2) *Cleaning and recharging.* Refer to TM 9-1400-250-15/3 for the cleaning and recharging procedures.

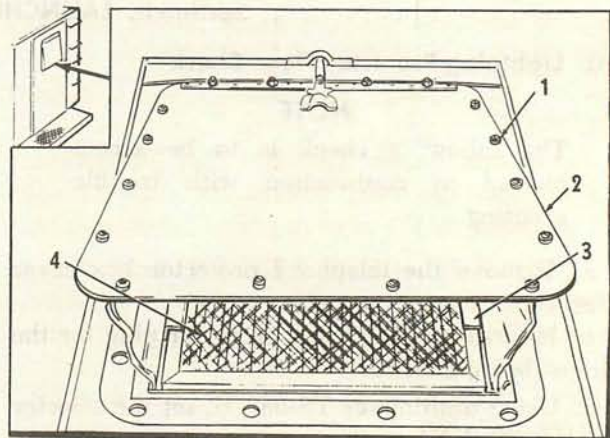
(3) *Installation.*

- (a) Hold open the spring-loaded retainers (fig. 3), and insert the air exhaust filter; release the retainers.

- (b) Secure the air exhaust door with the captive fasteners.

CAUTION

Do not leave the air exhaust door in the closed position except when preparing the launching control trailer for storage or travel.



- 1 Captive fasteners (12) 3 Spring-loaded retainer (2)
2 Air-exhaust door 4 Air exhaust filter

Figure 3. Air exhaust filter removal and installation.

Section III. LAUNCHING-SECTION SELECTOR

12. Manual and Automatic Gyro Preset
Alinement—AC Loop

Warning: Voltages dangerous to life are present inside the section selector when the plungers of the interlock switches are pulled out. Voltages are present on the contacts of power relay K3A and the line voltage panel when the section generator is operating.

a. Check that the launcher designator switch on the section control-indicator panel is set to NONE, and the MANUAL ORDERS-GYRO PRESET switch is set to MANUAL.

b. Release the captive fasteners (1, fig. 10) and open the section control-indicator panel.

c. Pull out the plunger of interlock switch S20D (11, fig. 4) to restore power.

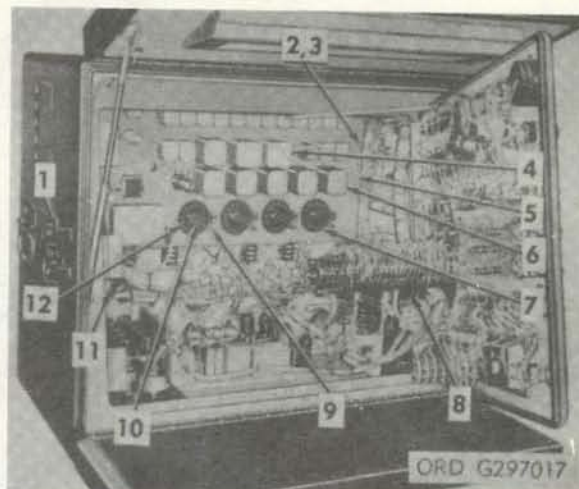
d. Adjust the GYRO PRESET knob on the section control-indicator panel for a reading of 0 mils on the GYRO PRESET dial.

Note. The following adjustment is typical for all resolvers.

e. Set multimeter TS-352/U for 50 volts ac and connect the leads across terminals R1 and R2 (3 and 7, fig. 5) of gyro preset resolver B2A.

f. Adjust the GYRO PRESET knob for a minimum voltage indication on the multimeter. Use the lower voltage scales on the multimeter to obtain an exact minimum. Check that the GYRO PRESET dial indicates between 6,375 and 25 mils. If the dial does not indicate between 6,375 and 25 mils, adjust gyro preset resolver B2A as prescribed in steps (1) through (8) below.

- (1) Loosen the three screws (5, fig. 5) and release gyro preset resolver B2A.
- (2) Adjust the GYRO PRESET knob for 0 mils on the GYRO PRESET dial and insure that it remains at 0 mils while performing steps (3) through (8) below.
- (3) Connect multimeter TS-352/U (set for 50 volts ac) leads across terminals S1 and R1 (8 and 3, fig. 5) of gyro preset resolver B2A.
- (4) Rotate the gyro preset resolver housing for a minimum voltage indication on the multimeter.

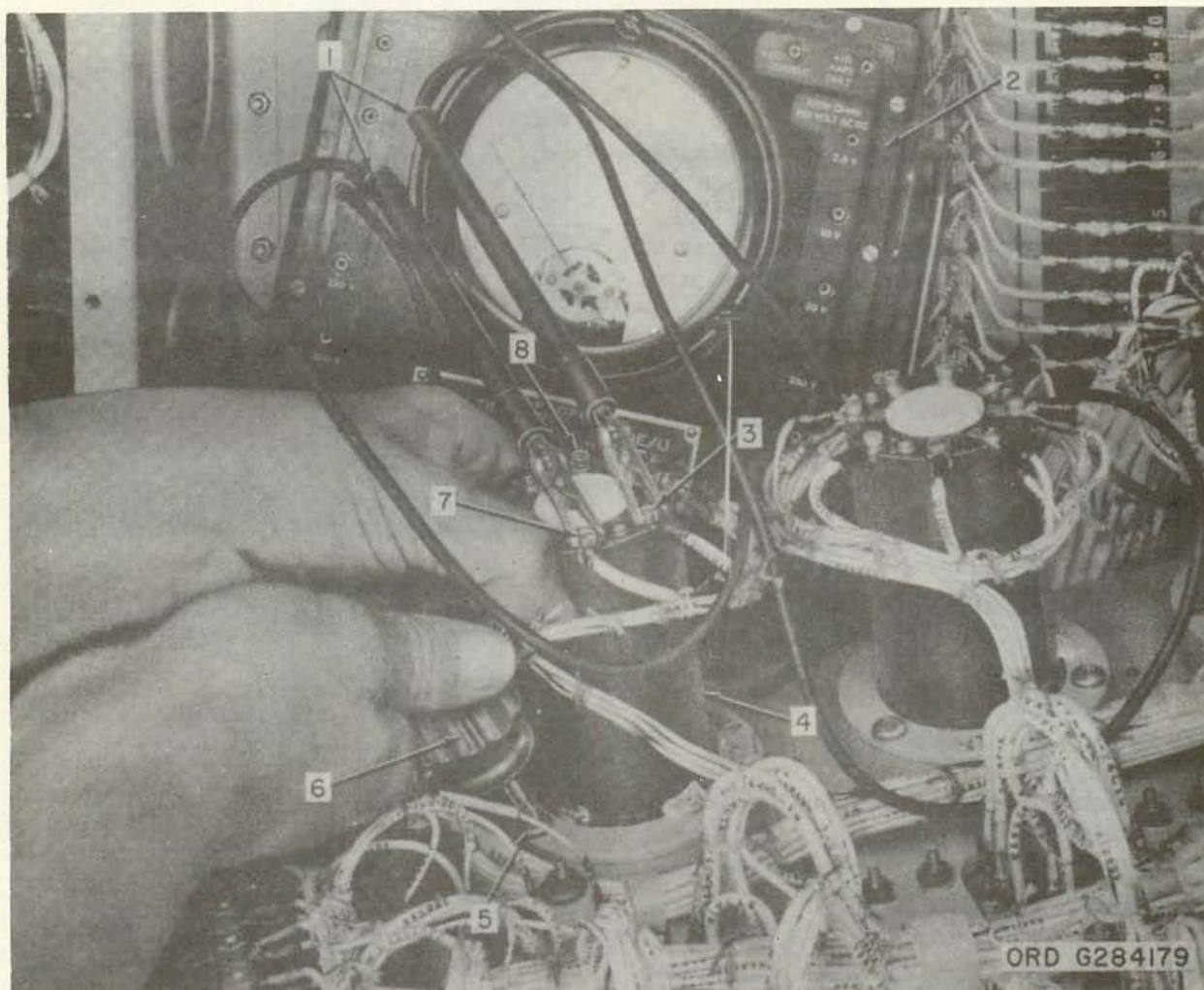


- 1—Catch (4)
- 2—No. 8-32 x 5/8 truss-hd screw (6)
- 3—0.174-in-id x 0.375-in-od fl washer (6)
- 4—Variable resistor R5A
- 5—Relay rack
- 6—Relay K2Q
- 7—LAUNCHER ORIENT RESOLVER (4)
- 8—Gyro preset resolver B2A
- 9—Dial lock (4)
- 10—Knob (4)
- 11—Interlock switch S20D
- 12—Dial (4)

Figure 4. Relay rack.

- (5) Rotate the gyro preset resolver housing approximately 45 degrees counter-clockwise as viewed from the end opposite the GYRO PRESET knob.
- (6) Connect multimeter TS-352/U (set for 50 volts ac) leads across terminals R1 and R2 of gyro preset resolver B2A.
- (7) Adjust the gyro preset resolver housing for a minimum voltage indication on the multimeter. Use the lower scales to find the exact minimum.
- (8) Tighten the three screws and secure the gyro preset resolver housing.

g. Adjust the GYRO PRESET knob from 0 to 5,600 mils in increments of 800 mils as indicated on the GYRO PRESET dial. Check that the indications of the A_G data converter dial (4, fig. 7) correspond to those on the GYRO PRESET dial. If the indications do not correspond, release the two catches (6, fig. 9) and open the door on the section simulator group.



1—Test leads
2—Multimeter TS-352/U
3—Terminal R1
4—Resolver housing

5—Screw (3)
6—Screwdriver
7—Terminal R2
8—Terminal S1

Figure 5. Resolver adjustment—typical.

Pull out the interlock switch (4, fig. 9). Adjust R25 (fig. 6) on the A_G converter servo amplifier until the A_G data converter dial indication is the same as the indication on the GYRO PRESET dial. If a correct indication cannot be obtained by adjusting R25, perform the procedures prescribed in steps (1) through (11) below.

- (1) Position R25 to its midposition.
- (2) Adjust the GYRO PRESET knob for an indication of 0 mils on the A_G data converter dial.

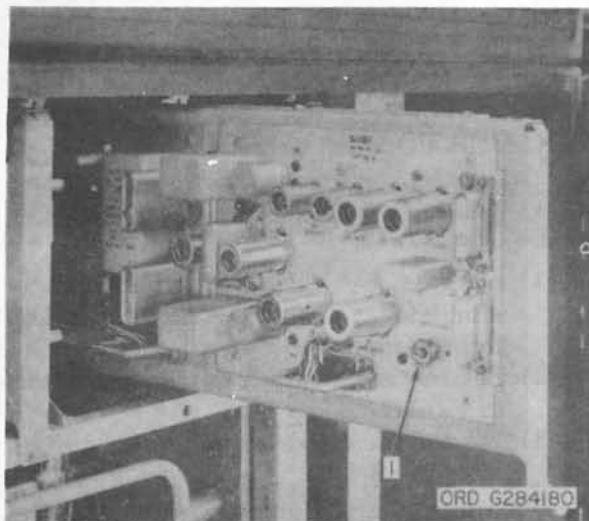
- (3) Loosen the two screws (2, fig. 7) and open the guide hole cover.
- (4) Remove the zero-set pin (1, fig. 7) and insert it through the guide hole into the tapered notch. If necessary, rock the GYRO PRESET knob to facilitate seating the zero-set pin.

Caution: To prevent the variable resistor coupling shaft screw from dropping into the data converter variable resistor, do not loosen the coupling screw more than two turns.

- (5) Remove the coupling wrench (fig. 8) from the mounting bracket; insert it in the zero-set pin mounting hole (fig. 7); and loosen the variable resistor shaft coupling screw.
- (6) Adjust the GYRO PRESET knob for an indication of 0 mils on the GYRO PRESET dial.
- (7) Tighten the variable resistor shaft coupling screw.
- (8) Replace the coupling wrench in the mounting bracket and the zero-set pin in the zero-set pin mounting hole.
- (9) Close the guide hole cover and secure it with two screws.
- (10) If the A_G data converter dial does not indicate exactly 0 mils, adjust R25 (fig. 6).
- (11) Close the simulator group door and fasten the catches.

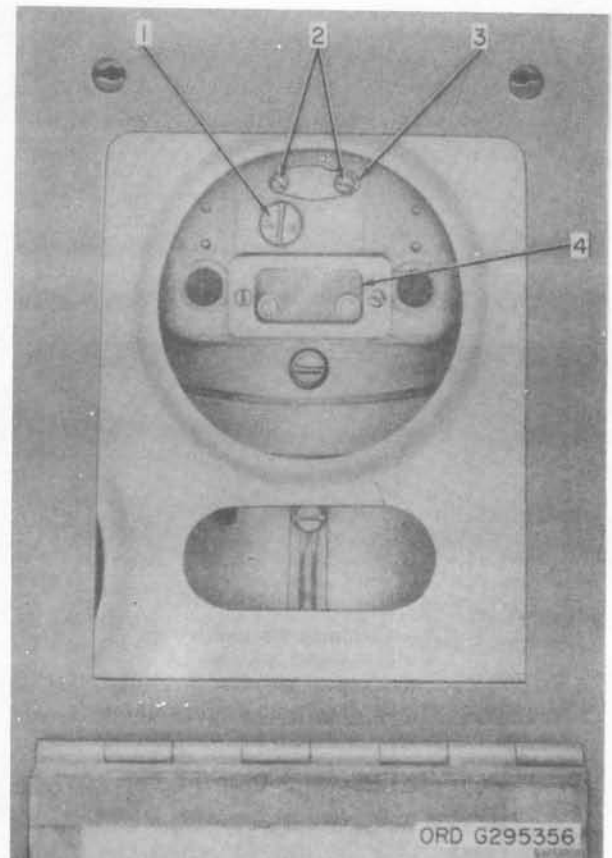
h. Adjust the LCHR 1 orient resolver knob (10, fig. 4) and the GYRO PRESET knob to the correct A_L . Set the launcher designator switch to 1. Check that the A_G data converter dial indicates between 6,375 and 25 mils. Repeat this procedure with the launcher designator switch set to 2, 3, and 4, and using the corresponding launcher orient resolver.

i. If the A_G data converter dial does not indicate between 6,375 and 25 mils for all positions of the launcher designator switch, adjust the



1—R25

Figure 6. A_G converter servo amplifier.



- 1—Zero-set pin and mounting hole
- 2—Screws
- 3—Guide hole cover
- 4— A_G data converter dial

Figure 7. A_G data converter zero adjustments.

appropriate orient resolver as prescribed in steps (1) through (3) below.

- (1) Loosen the dial lock (9, fig. 4) of the orient resolver.
- (2) Adjust the orient resolver knob (10, fig. 4) for an indication of 0 mils on the A_G data converter dial (fig. 7).
- (3) Tighten the dial lock. Check that the orient resolver dial (12, fig. 4) indicates $A_L \pm 50$ mils.

j. If the orient resolver dial does not indicate $A_L \pm 50$ mils, adjust the resolver as prescribed in steps (1) through (14) below.

- (1) Set the POWER switch on the section control-indicator panel to OFF.

Warning: Before proceeding with the following checks, remove the cable from J5B at the rear of the section



1—Coupling wrench
2—Mounting bracket

Figure 8. A_G data converter mounted tool.

control-indicator. Voltages dangerous to life are present on the contacts of relay K2Q (6, fig. 4) when the cable is connected to J5B and the section generator is operating.

- (2) Remove the screws and flat washers (2 and 3, fig. 4) and pull the relay rack forward.
- (3) Loosen the orient resolver dial lock (9, fig. 4).
- (4) Adjust the knob to the exact A_L .
- (5) Tighten the dial lock.
- (6) Connect the cable to J5B.
- (7) Set the POWER switch on the section control-indicator panel to ON.
- (8) Loosen the three screws (5, fig. 5) and release the resolver housing (4, fig. 5).
- (9) Adjust the housing for an indication of 0 mils on the A_G data converter dial.
- (10) Tighten the three screws that secure the resolver housing.
- (11) Set the POWER switch on the section control-indicator panel to OFF.
- (12) Disconnect the cable from J5B on the section control-indicator.
- (13) Install the relay rack.

(14) Connect the cable to J5B at the rear of the control-indicator.

k. Check that the orient resolver dials are set to the correct A_L .

l. Request the launching control console operator to set all switches and controls to the initial operating condition and select the section to be checked.

m. Establish communications with the computer operator to set up blue equipment status to establish the voice communication TECH and COMD loops.

n. Set the launcher designator switch to NONE.

o. Request that the computer operator transmit automatic A_G of 0; 800; 1,600; 2,400; 3,200; 4,000; 4,800; and 5,600 mils. Check that the A_G data converter dial indication at the section simulator group corresponds to the automatic A_G transmitted by the computer operator.

p. If the indication on the A_G data converter dial gives incorrect A_G for all eight transmitted signals, adjust R5A (4, fig. 4) for the required indication.

q. Secure the section control-indicator panel with three captive fasteners (1, fig. 10).

13. Manual Gyro-Preset System Alinement—DC Loop

Note. If the missile on the launcher contains a prime warhead, install the missile firing simulator assembly as prescribed in TM 9-1440-250-12/2.

a. Set the MANUAL ORDERS-GYRO PRESET switches to MANUAL and the appropriate LAUNCHER POWER switch to ON.

Note. If a missile firing simulator is installed, perform the procedures prescribed in steps (1) through (3) below.

- (1) Depress the ON push switch on the simulator. The POWER indicator light illuminates.
- (2) Set the APS switch on the simulator to NORMAL.
- (3) Set the MISSION switch on the simulator to SS-SA.

b. Depress the PREPARED switch for the appropriate launcher. Check that the red NOT PREPARED indicator light extinguishes, and the green PREPARED indicator light illuminates.

c. Set the MANUAL ORDERS-MISSILE switch to the type of warhead in the missile being checked, and set the MANUAL ORDERS-MISSION switch to SA. Check that the red DIFF indicator light extinguishes, and the green SAME indicator light illuminates.

d. Adjust the GYRO PRESET knob until the GYRO PRESET dial indicates the A_L angle for the appropriate launcher.

e. Set the launcher designator switch to 1, 2, 3, or 4, and depress the LAUNCHER DESIG switch. Check that the red LAUNCHER DESIG indicator light extinguishes and the green LAUNCHER DESIG indicator light illuminates.

(1) *Normal indication.* At section simulator group (SSG), A_G data converter dial indicates 0 ± 25 mils.

(2) *Corrective procedure.* At SCI, adjust LAUNCHER ORIENT RESOLVER knob to 0 for appropriate launcher. Adjust gyro preset knob for a 0 indication on GYRO PRESET dial. Adjust gyro preset knob for a 0 indication on GYRO PRESET dial. Adjust ZERO ADJUST variable resistor on A_G converter servo amplifier in SSG until A_G data converter dial indicates 0. At SCI, return LAUNCHER ORIENT RESOLVER dial to proper A_L angle.

f. At the SCI, adjust the GYRO PRESET knob until GYRO PRESET dial indicates from 0 to 5,600 in increments of 800 mils.

NOTE

A_G data converter dial readings correspond to those on GYRO PRESET dial, minus A_L setting, ± 25 mils.

g. Repeat steps d through f above for the remaining launchers in the section, omitting the corrective procedures in e, using the appropriate controls and indicators.

h. At the SCI, adjust the gyro preset knob until the A_G data converter dial indicates 0. Using a multimeter set to VDC, measure the following voltages at SCI terminals:

(1) *Normal indication.* 0 ± 0.3 from E1V-37 to E1AV-22; 0 ± 0.3 from E1V-35 to E1AV-23.

(2) *Corrective procedure.* Replace data converter.

i. At the SCI, set HEATER AND GYROS switch to ON.

(1) *Normal indication.* Slew meter returns to null.

(2) *Corrective procedure.* Replace gyro preset servo amplifier.

j. At the SCI, depress the SLEW switch, and hold for two complete operating cycles.

(1) *Normal indication.* Slew meter deflects first to the left then right. The rate of deflection left and right is equal.

(2) *Corrective procedure.* For uneven rate of deflection, check preset circuit for wiring errors.

k. At the SCI, set HEATER AND GYROS to OFF.

NOTE

Normal indication: Slew meter remains at null.

l. At the SCI, adjust the GYRO PRESET knob CW until the slew meter indicates maximum deflection to the right and left.

(1) *Normal indication.* The A_G data converter dial indicates 1600 ± 100 for maximum deflection to the right and 4800 ± 100 maximum deflection to the left.

(2) *Corrective procedure.* For reversed readings, check preset circuit for wiring errors.

(3) *Normal indication.* The slew meter deflects equally right and left. Verify meter deflection is 75% to 100% of full scale.

(4) *Corrective procedure.* Check preset circuit for continuity.

m. At the SCI, set the HEATER AND GYROS switch to ON.

NOTE

Normal indication: Slew meter returns to null.

n. At the SCI, adjust gyro preset knob until the A_G data converter dial indicates 4800.

o. At the SCI, set the HEATER AND GYROS to OFF.

NOTE

Normal indication: Slew meter remains at null.

p. At the SCI, adjust the GYRO PRESET knob CW until the slew meter indicates maximum deflection to the right and left.

(1) *Normal indication.* The A_G data converter dial indicates 0 ± 100 for maximum de-

deflection to the right and 3200 ± 100 for maximum deflection to the left.

(2) *Corrective procedure.* For reversed readings, check preset circuit for wiring errors.

(3) *Normal indication.* The slew meter deflects equally to the right and left. Verify meter deflection is 75% to 100% of full scale.

(4) *Corrective procedure.* Check preset circuit for continuity.

q. At the SCI, adjust the GYRO PRESET knob until the AG data converter dial indicates 0. Using a multimeter set to VDC, measure the following voltages at SCI terminals:

(1) *Normal indication.* 0 ± 1 V from E1V-36 to E1W-20. 0 ± 1 V from E1V-38 to E1W-20.

(2) *Corrective procedure.* Check preset circuit for continuity and leakage.

r. Return all switches and controls at the SCI and LCI, except MISSILE HEAT, to the shut-down condition.

14. HEAT MONITOR Indicator Lights Adjustment

WARNING

The section control-indicator contains voltages dangerous to life. Insure that the section generator or frequency converter is in the shut-down condition before starting repairs.

CAUTION

When performing the HEAT MONITOR indicator lights adjustment, do not twist the lens, or twist, shake, or pull the electrical leads.

NOTE

The key numbers shown in parentheses in a through d below refer to figure 10.

a. Release the captive fasteners (1), and open the section control-indicator panel.

b. Check that the electrical leads connected to the base of the lampholder (3D) are not broken or twisted.

c. If the electrical leads are broken, solder the leads to their correct terminal lug (3E). Refer to TM 9-1440-250-20/2 for the correct wiring connections.

Figure 9. (Deleted).

d. Adjust the lampholder for proper press-to-test indication as prescribed in steps (1) through (5) below.

WARNING

The section control-indicator contains voltages dangerous to life when the section generator or frequency converter is operating. Use extreme caution when performing the procedures prescribed below.

(1) Insure that the section generator or frequency converter is operating.

(2) Pull out the plunger (4) of the interlock switch to restore power.

(3) Loosen the locknut (3C).

(4) Adjust the front mounting nut (3B) in small increments until the correct indication is obtained when the PRESS-TO-TEST lens (3A) is depressed.

(5) Tighten the locknut (3C).

e. Connect a test lead between pin 13 of receptacle J1G and pin 40 of receptacle J72D.

f. Check that the HEAT MONITOR indicator light illuminates.

g. Remove the test lead.

h. Close and secure the section control-indicator panel.

15. Section Simulator Group Air Intake Filter Inspection and Maintenance

The filter used in the section simulator group is a permanent type. When the filter becomes dirty or clogged enough to restrict the flow of air, it must be cleaned and recharged. The normal service interval is monthly.

NOTE

The key numbers shown in parentheses in a through c below refer to figure 11.

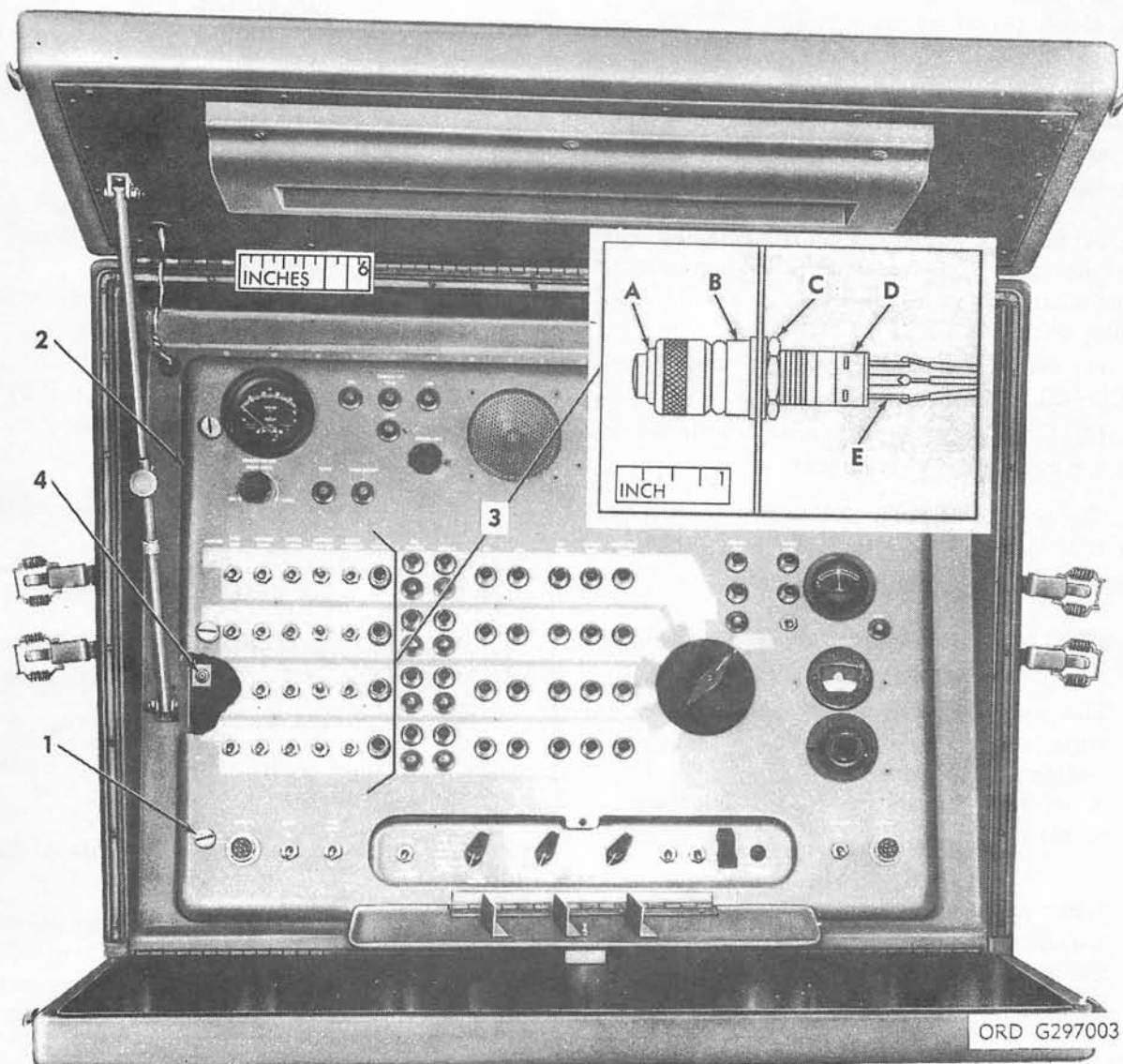
a. *Removal.*

(1) Release the catches (1), and swing the door assembly (2) open.

(2) Tilt the centrifugal fan (6), and remove the air intake filter (3).

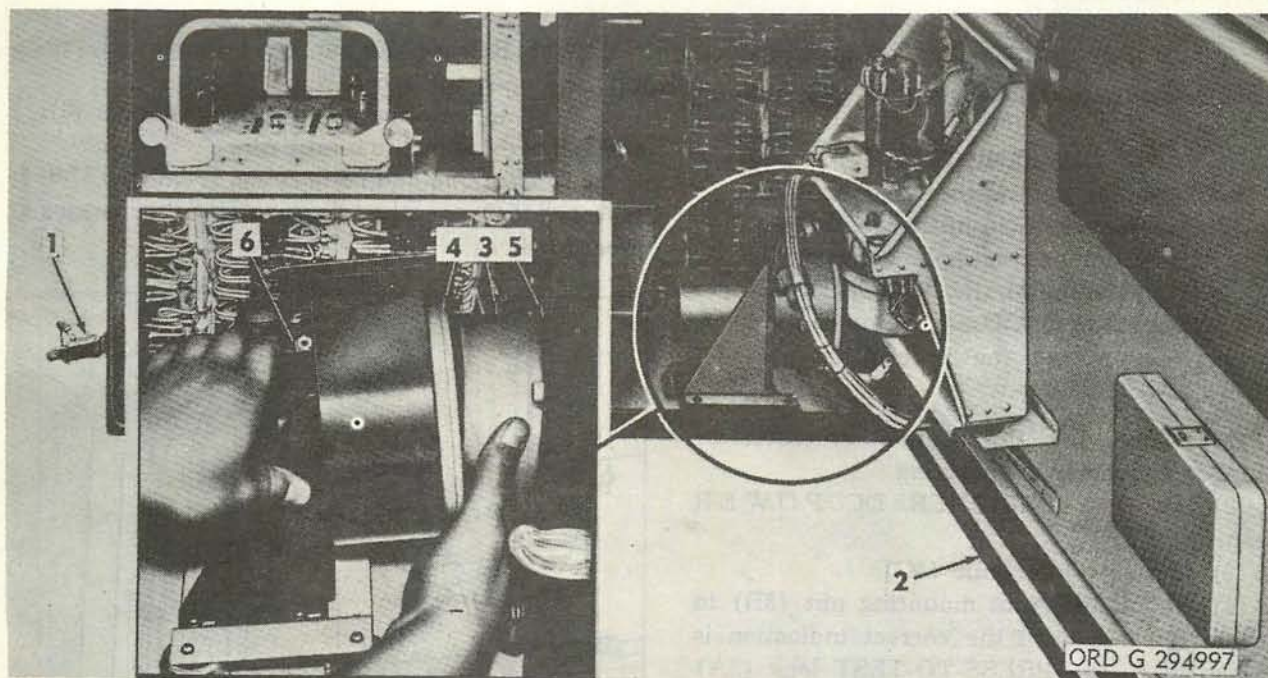
CAUTION

To prevent damage to the equipment, do not operate the section simulator group with the filter removed.



- 1 Captive fastener (3)
- 2 Section control-indicator panel
- 3 HEAT MONITOR indicator light (4)
- A PRESS-TO-TEST lens
- B Front mounting nut
- C Locknut
- D Lampholder
- E Terminal lug (3)
- 4 Plunger

Figure 10. HEAT MONITOR indicator lights—adjustment—typical.



- 1 Catch (2)
- 2 Door assembly
- 3 Air intake filter
- 4 Filter holder
- 5 Rubber seal
- 6 Centrifugal fan

Figure 11. Air-intake filter—removal and installation.

b. *Cleaning and Recharging.* Refer to TM 9-1400-250-15/3 for the cleaning and recharging procedures.

c. *Installation.*

(1) Tilt the centrifugal fan, and install the air intake filter (3).

(2) Release the fan, and insure that the filter rests against the rubber seal.

(3) Close the door assembly, and secure the catches.

Section IV. LAUNCHER CONTROL-INDICATOR

16. HEAT MONITOR Indicator Lights Adjustment

WARNING

The launcher control-indicator contains voltages dangerous to life. Insure that the section generator or frequency converter is in the shutdown condition before performing *a* through *c* below.

CAUTION

When performing the HEAT MONITOR indicator lights adjustment, do not twist the lens, or twist, shake, or pull the electrical leads.

a. Remove the launcher control-indicator panel.

NOTE

The key numbers shown in parentheses in *b* through *d* below refer to figure 10.

b. Check that the electrical leads connected to the base of the lampholder (3D) are not broken or twisted.

c. If the electrical leads are broken, solder the leads to their correct terminal lug (3E). Refer to TM 9-1440-250-20/2 for the correct wiring connections.

d. Adjust the lampholder for proper press-to-test indication as prescribed in steps (1) through (5) below.

WARNING

The launcher control-indicator contains voltages dangerous to life when the section generator or frequency converter is operating and the MAIN POWER BRKR switch is set to ON. Use extreme caution when performing the procedures prescribed below.

(1) Insure that the section generator or frequency converter is operating.

(2) Set the LAUNCHER DC POWER switch to OFF.

(3) Loosen the locknut (3C).

(4) Adjust the front mounting nut (3B) in small increments until the correct indication is obtained when the PRESS-TO-TEST lens (3A) is depressed.

(5) Tighten the locknut.

e. Connect a test lead between pin 13 of receptacle J1G and pin 40 of receptacle J72D.

NOTE

When checking the HEAT MONITOR indicator lights for the test station, connect the test leads to the corresponding pins previously used at the launcher.

f. Set the LAUNCHER DC POWER switch to ON, and check that the HEAT MONITOR indicator light illuminates.

g. Remove the test lead.

WARNING

Make sure the MAIN POWER BRKR switch is set to OFF before performing h below.

h. Install the launcher control-indicator panel.

17. Air Intake Filter and Air Exhaust Filter Inspection and Maintenance

The air intake filter and the air exhaust filter used in the launcher control-indicator are a permanent type. When the filters become dirty or clogged enough to restrict the flow of air, they must be cleaned and recharged. The normal service interval is monthly.

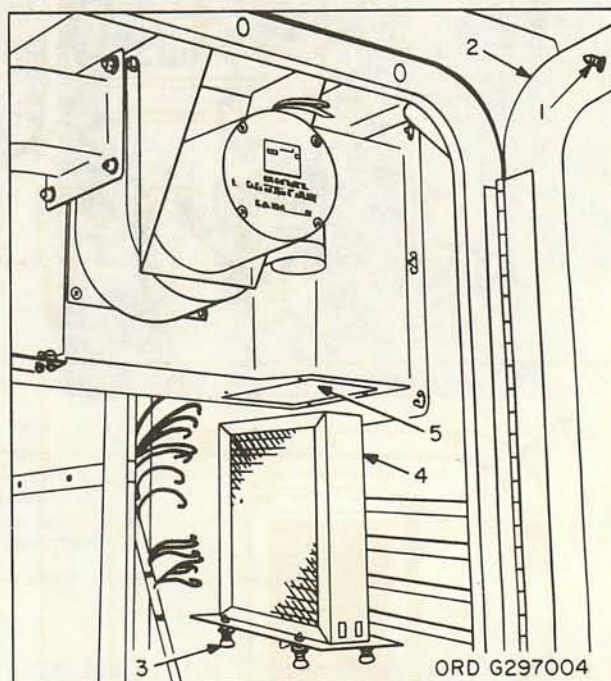
a. *Air Intake Filter.*

(1) *Removal.*

(a) Release the captive fasteners (1, fig. 12), and open the access door.

(b) Release the four captive fasteners (3), and remove the air intake filter.

(2) *Cleaning and recharging.* Refer to TM 9-1400-250-15/3 for the cleaning and recharging procedures.



- | | |
|--------------------|---------------------|
| 1 Captive fastener | 4 Air intake filter |
| 2 Access door | 5 Filter chamber |
| 3 Captive fastener | |

Figure 12. Air intake filter—removal and installation.

(3) *Installation.*

(a) Position the air intake filter in the filter chamber and secure.

(b) Close and secure the access door.

b. *Air Exhaust Filter.*

(1) *Removal.*

(a) Release the captive fasteners (1, fig. 13), and remove the access cover plate (2).

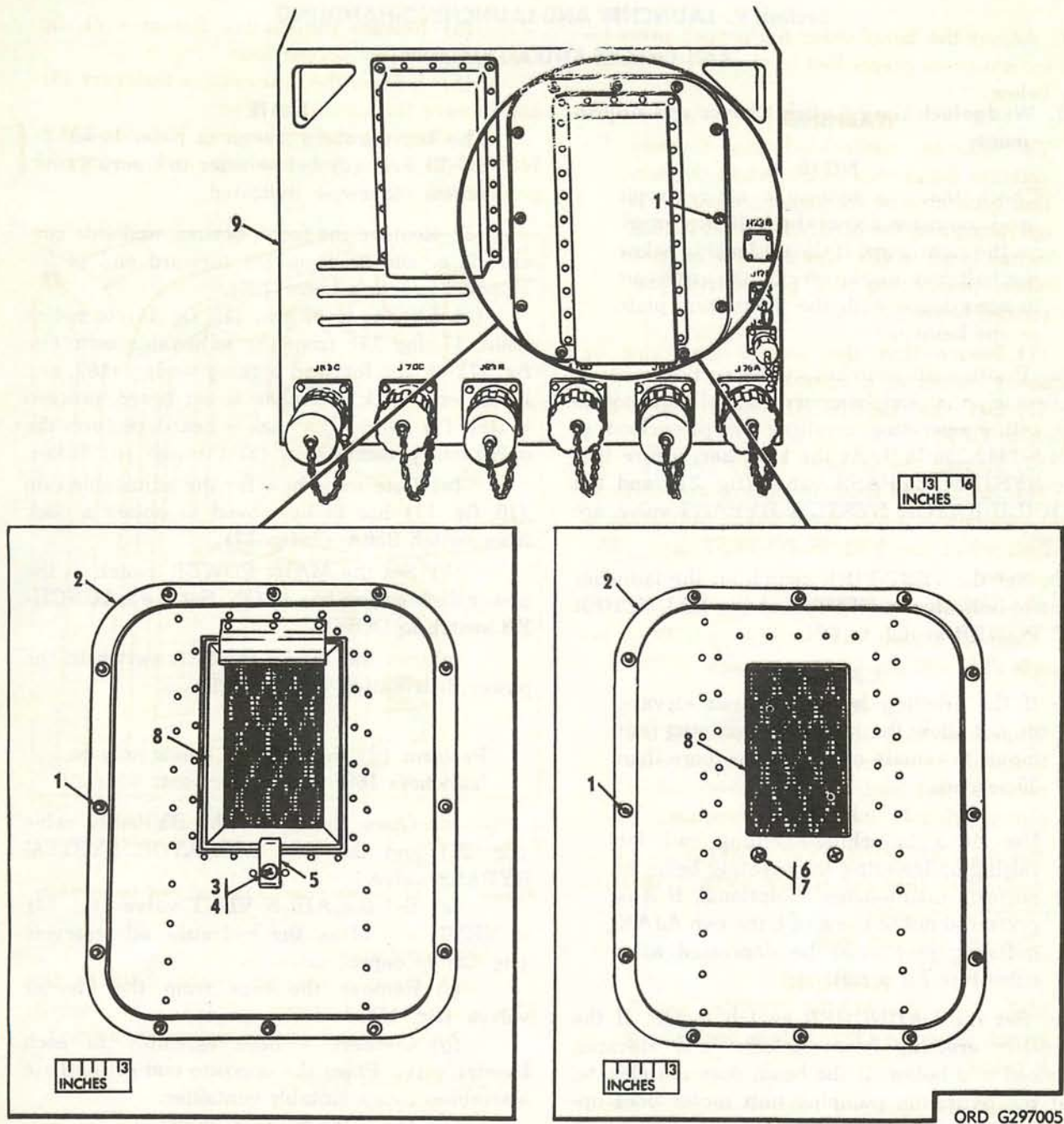
(b) Remove the air exhaust filter (8).

(2) *Cleaning and recharging.* Refer to TM 9-1400-250-15/3 for the cleaning and recharging procedures.

(3) *Installation.*

(a) Position and secure the air exhaust filter (8) in the access cover plate (2).

(b) Position and secure the access cover plate.



- 1—Captive fastener (12)
 2—Access cover plate
 3—1/4-28 x 1-1/8 truss-hd screw (1021 through 4084)
 4—1/4 fl washer (1021 through 4084)
 5—Retaining strap (1021 through 4084)

- 6—No. 10-32 x 1 pan-hd screw (4085 and subsequent)
 7—0.218-in-id x 0.437-in-od fl washer (4085 and subsequent)
 8—Air-exhaust filter
 9—Launcher control-indicator

Figure 13. Air-exhaust filter—removal and installation.