CHAPTER 4

OEAS OXYGEN CONCENTRATOR

TYPE GGU-7/A, P/N 3261009-0105

EFFECTIVITY: THIS CHAPTER IS TO BE USED ONLY WHEN USING MODIFIED TEST SETS, TTU-452A/E OR TTU-518A/E.

Section 4-1. Description

4-1. GENERAL.

4-2. The Oxygen Enriched Air System (OEAS) Oxygen Concentrator, Type GGU-7/A, P/N 3261009-0105 (figure 4-1), is manufactured by Litton Life Support, formerly Clifton Precision. The concentrator is designed to provide a supply of breathing oxygen for two aircrewmember's open loop breathing schedules up to 50,000 feet. Table 4-1 contains the leading particulars for the OEAS oxygen concentrator.

4-3. CONFIGURATION.

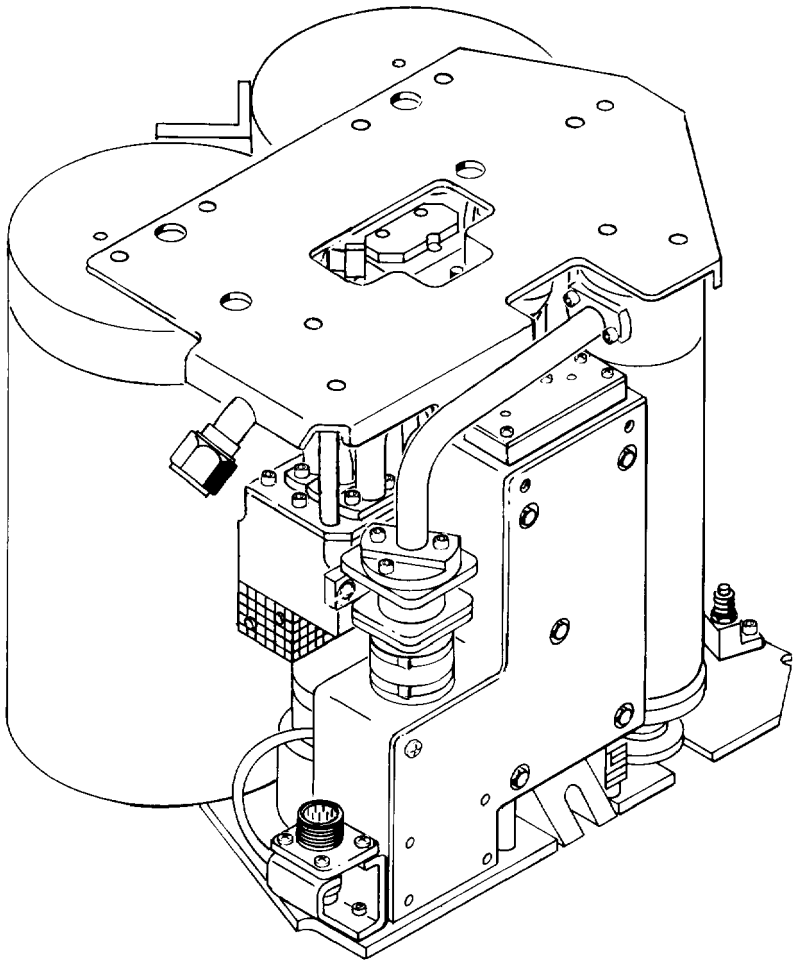
4-4. The OEAS oxygen concentrator consists of an electronics box, heater assembly, filter tube assembly, pressure reducer, pressure reducer, rotary control valve, two molecular sieve beds, and a plenum assembly.

4-5. FUNCTION.

4-6. The OEAS oxygen concentrator incorporates an electronics box (1) (figure 4-2) that operates the heater assembly (3) and rotary control valve (6). Aircraft bleed air passes into the inlet (2) of the heater assembly (3) where it is warmed, then flows through the 0.6 micron filter (4) to the pressure reducer (5). The pressure reducer (5) reduces bleed air inlet pressure to 30 to 37 psig. Bleed air then flows from the pressure reducer (5) to the rotary control valve (6). The rotary control valve opens a path for the bleed air to one of the two molecular sieve beds (7) and closes that bed's nitrogen exhaust port. At the same time, the other molecular sieve bed will be closed to inlet bleed air and open to nitrogen exhaust (8). Inlet bleed air flows from the rotary control valve (6) into the opened molecular sieve bed (7). Bleed air, once in the sieve bed, passes through the sieve bed zeolite filtering agent which absorbs the nitrogen and allows the oxygen enriched air to pass through the sieve bed to the check valve assembly (10). At the check valve assembly the oxygen enriched air will take two paths of flow. One path of flow will be through the check valve assembly (10) into plenum assembly (11) and out of the plenum assembly (11) to the aircraft oxygen system plumbing (12). The second path of flow will be through the purge orifice (9) to the sieve bed (7) that was closed to inlet bleed air. This flow of oxygen enriched air will purge the unused sieve bed (7) and ready it for use. When the rotary control valve (6) cycles, it will close the previously used sieve bed to inlet bleed air and reference the purged sieve bed to inlet bleed air.

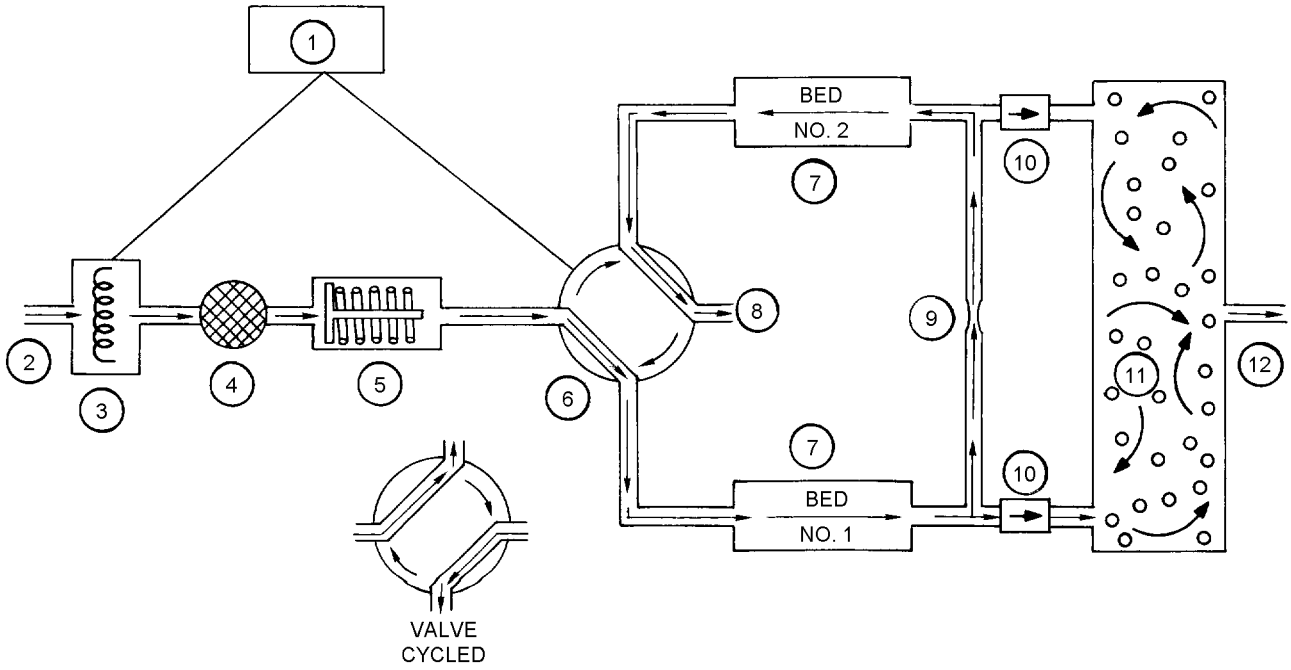
4-7. The heater assembly (3) consists of two heaters that are controlled by a thermistor probe in the air heater. Both or neither element may be activated depending on inlet air temperature.

4-8. The pressure reducer assembly (5) incorporates a relief valve which is set to relieve at 78.5 psig to prevent system overpressurization.



004001

Figure 4-1. OEAS Oxygen Concentrator, P/N 3261009-0105



1. ELECTRONICS BOX
2. BLEED AIR INLET
3. AIR HEATER
4. FILTER
5. PRESSURE REDUCER
6. ROTARY CONTROL VALVE
7. MOLECULAR SIEVE BED
8. EXHAUST
9. ORIFICE
10. CHECK VALVE
11. PLENUM
12. OUTPUT

004002

Figure 4-2. OEAS Oxygen Concentrator Schematic

Table 4-1. Leading Particulars

Type GGU-7/A	8 to 25 psig NORMAL, 250 psig (Max)
Mounting	Aircraft fuselage mounted
Voltage	28 Vdc, 22 amperes (max)
Heater	2 units
Filter	0.6 Micron
Inlet Pressure Range	8 to 25 psig nominal, 250 psig maximum
Pressure Reducer	30 to 37 psig
Relief Valve	78.5 psig relief setting
Rotary Valve	Two position
Sieve Beds	Two unit, molecular type
Plenum	Oxygen enriched air storage
Electronic Box	Power supply for heater and rotary valve
Operating Altitude Range	Sea level to 50,000 feet
Operating Temperature Range	-65°F to +160°F
Overall Dimensions:	
Length	12 1/2 inches
Width	12 1/2 inches
Height	10 1/4 inches
Weight	42.0 lbs (max)

4-9. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

4-10. Section 4-5, Illustrated Parts Breakdown, contains information on the OEAS oxygen concentrator, sub-assemblies and component parts. Figure and index numbers, reference numbers, description, units per assembly, usable on codes, and source, maintenance, and recoverability (SM&R) data are provided with the breakdown.

Section 4-2. Modifications

4-11. GENERAL.

4-12. The OEAS Oxygen Concentrator, Type GGU-7/A should be updated by comparing the configuration of the concentrator with the directives listed in Table 4-1A.

Section 4-3. Performance Test Sheet Preparation

4-13. GENERAL.

4-14. A Performance Test Sheet shall be prepared as shown in Figure 4-3 and shall be used to record test results. The Performance Test Sheet shown is a sample, but may be reproduced for local use.

Table 4-1A. OEAS Oxygen Concentrator, Type GGU-7/A Directives

Description of Modification	Application	Modification Code
Modification of the Vent Tube Assembly	GGU-7/A	676

Section 4-4. Maintenance

4-15. GENERAL.

4-16. This section contains the procedural steps for inspecting, testing, troubleshooting, disassembling, cleaning, repairing, assembling and adjusting the OEAS oxygen concentrator.

4-17. Procedural steps outlined in this section are listed under the inspection cycle in which they are required and in the sequence in which they normally occur.

NOTE

Upon completion of any maintenance action (e.g. inspection, repair, adjustment, modification, etc.) make necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

4-18. SERVICE LIFE.

NOTE

When replacing filter tube element during scheduled maintenance, the following new parts may have to be installed: water trap (P/N 1653300-1), seal (P/N 1646811-3), element seal nut (P/N 1631082-1), and thread adapter (P/N 1631076-1).

4-19. The filter tube element (figure 4-18) shall be replaced every 500 flight hours during Bench Test. The shroud assembly may also be replaced at this time, if necessary. Refer to Disassembly (paragraph 4-64) and Assembly (paragraph 4-81) for instructions.

4-20. INSPECTIONS.

4-21. OEAS oxygen concentrators which do not pass inspection and cannot be adjusted in the aircraft shall be removed and replaced with a Ready-For-Installation (RFI) OEAS oxygen concentrator. The replaced OEAS oxygen concentrator shall be forwarded to AIMD/MALS for Bench Test and Repair.

4-22. TURNAROUND/PREFLIGHT/POSTFLIGHT/TRANSFER INSPECTIONS. The Turnaround, Preflight, Postflight, or Transfer Inspections are performed in conjunction with the aircraft inspection requirements for the aircraft in which the OEAS oxygen concentrator is installed.

4-23. ACCEPTANCE/SPECIAL/DAILY INSPECTIONS. The Acceptance, Special, or Daily Inspections shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the OEAS oxygen concentrator is installed using applicable aircraft technical publications and maintenance requirement cards.

4-24. CALENDAR/PHASED/SDLM INSPECTIONS. The Calendar, Phased, or SDLM Inspections require removal of the OEAS oxygen concentrator from the aircraft. See applicable planned maintenance system (PMS) publications for specified intervals. In no case shall the interval exceed 500 flight hours. Upon removal from the aircraft, the concentrator shall be forwarded to AIMD/MALS for Inspection and Bench Test.

4-25. VISUAL INSPECTION. To perform a Visual Inspection of the OEAS oxygen concentrator, proceed as follows:

1. Inspect the OEAS oxygen concentrator for dents, corrosion, dirt, contamination, and other obvious damage.

2. Inspect electrical connections and wiring for good connection, breaks in wires, corrosion, and bent or missing pins.

3. Inspect all welded points for security of attachment and breaks in welding. Inspect rotary valve sieve tubes and vent tube for security of attachment and good condition.

4. Inspect shroud assembly for cuts, tears, and good condition.

5. Inspect insulation blanket for cuts, tears, and good conditions.

6. Inspect heater assembly insulation cover for burns, charring, and good condition.

7. Inspect all external screws, nuts, and fittings for good conditions and security of attachment.

8. Inspect name plate for legibility, security of attachment, and good condition.

CONCENTRATOR PERFORMANCE TEST SHEET
OXYGEN CONCENTRATOR
P/N 3261009-0105

DATE _____ CONCENTRATOR SERIAL NO. _____

TEST STAND SERIAL NO. _____

TEST STAND OPERATOR: _____

CDA _____

1. DISPLAY LAMP TEST:
   INITIAL READING OF MOTOR SOLENOID (M1) _____
   INITIAL READING OF HEATERS NO. 1 AND 2 (M2 AND M3) _____
   HEATER NO. 1 (M2) _____ HEATER NO. 2 (M3) _____
   CHECK IF DS2 AND/OR DS3 ILLUMINATE
   DS2 _____ DS3 _____

2. MOTOR HEATER SOLENOID CURRENT TEST
   READINGS FOR MOTOR SOLENOID (M1), HEATER NO. 1 (M2), AND HEATER NO. 2 (M3)
   MOTOR SOLENOID (M1) _____ (1.5 - 2.5 AMPS)
   HEATER NO. 1 (M2) _____ (0 OR 7 - 10 AMPS)
   HEATER NO. 2 (M3) _____ (0 OR 7 - 10 AMPS)

3. MOTER VALVE RPM TEST (11 - 13 CYCLES)
   NUMBER OF CYCLES DURING ONE MINUTE _____

4. PRESSURE REDUCER TEST (30 - 37 PSIG)
   READ AIR-OXY PRESSURE GAGE (G1) _____

5. INTERNAL LEAK TEST
   INITIAL READING AIR-OXY PRESSURE GAGE (G1) _____
   READING AFTER 1 MINUTE (G1)
   (MAXIMUM DECREASE AFTER 1 MINUTE IS 3 PSIG)
   READING AFTER 5 MINUTE (G1) _____
   (MAXIMUM DECREASE AFTER 5 MINUTE IS 15 PSIG)

6. OXYGEN FLOW/FILTER FLOW TEST
   FILTER FLOW TEST YES _____

   SET AIR-OXY PRESSURE GAGE (G1) TO 8 PSIG

V2	G1 READING	G1 ALLOWED (PSIG)	M4 READING	M4 ALLOWED (%)
HIGH		N/A		22
MEDIUM		3.0 - 8.0		25
LOW		4.0 - 8.0		31

SET AIR-OXY PRESSURE GAGE (G1) TO 25 PSIG

V2	G1 READING	G1 ALLOWED (PSIG)	M4 READING	M4 ALLOWED (%)
HIGH		16.0 - 25.0		41
MEDIUM		18.0 - 25.0		47
LOW		20.0 - 25.0		85

Figure 4-3. Performance Test Sheet (For TTU-452A/E Test Set)

CONCENTRATOR PERFORMANCE TEST SHEET
OXYGEN CONCENTRATOR
P/N 3261009-0105

DATE _____ CONCENTRATOR SERIAL NO. _____

TEST STAND SERIAL NO. _____

TEST STAND OPERATOR: _____

CDI _____

1. DISPLAY LAMP TEST:
   INITIAL READING OF MOTOR SOLENOID (M1) _____
   CHECK IF DS3, DS4, DS5 AND/OR DS6 ILLUMINATE
   DS3 _____ DS4 _____ DS5 _____ DS6 _____

2. MOTOR HEATER SOLENOID CURRENT TEST
   READINGS FOR MOTOR SOLENOID (M1)
   _____ (1.8 - 2.5 AMPS)

3. MOTOR VALVE RPM TEST (11 - 13 CYCLES)
   NUMBER OF CYCLES DURING ONE MINUTE _____

4. PRESSURE REDUCER TEST (30 - 37 PSIG)
   READ AIR-OXY PRESSURE GAGE (G1) _____

5. INTERNAL LEAK TEST
   INITIAL READING AIR-OXY PRESSURE GAGE (G1) _____
   READING AFTER 1 MINUTE (G1) _____
   (MAXIMUM DECREASE AFTER 1 MINUTE IS 3 PSIG)
   READING AFTER 5 MINUTE (G1) _____
   (MAXIMUM DECREASE AFTER 5 MINUTE IS 15 PSIG)

6. OXYGEN FLOW AND FILTER BLEED FLOW TEST
   FILTER FLOW TEST YES _____

   SET AIR-OXY PRESSURE GAGE (G1) TO 8 PSIG

V2	G1 READING	G1 ALLOWED (PSIG)	M3 READING	M3 ALLOWED (%)
HIGH		N/A		22
MEDIUM		2.4 - 8.0		25
LOW		3.0 - 8.0		31

SET AIR-OXY PRESSURE GAGE (G1) TO 25 PSIG

V2	G1 READING	G1 ALLOWED (PSIG)	M3 READING	M3 ALLOWED (%)
HIGH		12.4 - 25.0		41
MEDIUM		14.4 - 25.0		47
LOW		17.4 - 25.0		85

Figure 4-4. Performance Test Sheet (For TTU-518A/E Test Set)

4-26. BENCH TEST.

WARNING

When working with oxygen, make certain that clothing, tubing, fittings, and equipment are free of oil, grease, fuel, hydraulic fluid, or any combustible liquid. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

NOTE

When performing Bench Test, use Performance Test Sheet (figure 4-3 or 4-4) for recording readings and indications as they apply. Read the entire step before beginning to familiarize yourself with what needs to be recorded for step.

Tests are arranged so they proceed from one test to the next with a minimum of change of connections and valve positioning. Troubleshooting tables are provided in paragraph 4-62.

OEAS oxygen concentrators failing the Bench Test shall be repaired. The aviation life support systems division shall replace all defective component parts and make necessary adjustments to the OEAS oxygen concentrator.

4-27. Bench Test shall be performed on the OEAS oxygen concentrator prior to being placed in service and every 500 flight hours thereafter. The OEAS oxygen concentrator shall also be subjected to Bench Test if malfunction is suspected, and after repair or replacement of malfunctioning or damaged parts.

4-28. The Bench Test shall be performed using either OEAS Oxygen Concentrator Test Set Model TTU-452A/E (P/N 1779AS100-2) or Model TTU-518A/E (P/N 1779AS500-2) with or without OBOGS Adapter Assembly P/N 3248AS200-1. Refer to appropriate ground support equipment manual for identification of test set controls and indicators referred to in Bench Test.

4-29. Due to the complexity of the model TTU-452A/E and model TTU-518A/E test sets, it is essential that the operator become thoroughly familiar with the test set being used prior to performing the Bench Test. Refer to appropriate ground support equipment manual.

4-30. Unless otherwise specified in a specific test, the pressure applied and valve positioning shall remain unchanged.

4-31. BENCH TEST USING MODEL TTU-452A/E TEST SET ONLY.

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—

Support Equipment Required

Quantity	Description	Reference Number
1	Cable Assembly, Concentrator	3306265-1
1	Cable Assembly, Power Supply	3306284-1
1	Concentrator Test Set, Model TTU-452A/E	1779AS100-2 (CAGE 30003)
1	Filter Assembly, Inlet	1779AS581-1
1	Muffler Assembly	1779AS578-1
1	Hose Assembly, Inlet	3306273-1
1	Hose Assembly, Outlet	3306274-1
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent

4-32. Display Lamp Test. To perform the Display Lamp Test, proceed as follows:

WARNING

To prevent injury to personnel and damage to equipment, make certain when working with oxygen that clothing, work benches, tube fittings, tools, and test equipment are free of hydrocarbons (grease, fuel, hydraulic fluid, etc.) and any other combustible materials. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

CAUTION

Do not lift or carry the OEAS oxygen concentrator by the exhaust vent tube assembly of the rotary valve assembly. Damage to the OEAS oxygen concentrator will occur.

1. Ensure circuit breaker INSTM on (CB2) is reset (push in to reset).

2. Ensure 28 VDC ON circuit breaker (CB1) is OFF.

3. Ensure CONC ON/OFF switch (S1) is OFF.

4. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

5. Turn FLOW SELECT valve (V2) to LOW position.

6. Ensure OXY ANALYZER (V3) and CONC FLOW (V4) valves are closed.

7. Ensure AIR PRESSURE CONTROL (RG1) and FLOW PRESSURE CONTROL (RG2) are backed out counterclockwise until spring tension is released.

8. Ensure test panel vent (PV-1) located adjacent to flow pressure gage (G2) is not blocked or covered.

9. Remove all hoses, adapters, muffler, and filters from test set lid assembly.

NOTE

Index numbers refer to figure 4-5 unless otherwise stated.

10. Remove cap from concentrator test set AIR TO CONC fitting (J4) and connect inlet hose (P/N 3306273-1) to inlet fitting (1) of concentrator and AIR TO CONC fitting (J4) of test set.

11. Remove cap from concentrator test set OXY FROM CONC fitting (J3) and connect outlet hose (P/N 3306274-1) to outlet fitting (2) of concentrator and OXY FROM CONC fitting (J3) of test set.

CAUTION

Do not restrict exhaust flow from concentrator by any other means than the muffler assembly.

12. Connect muffler assembly to exhaust vent tube (3) of concentrator.

13. Uncap OXY EXHAUST port (J5) of test set.

14. Remove cap from concentrator test set filter port fitting (J1) and connect inlet filter assembly to filter port fitting (J1).

15. Connect a 90 to 120 psig regulated clean, dry air source capable of supplying 26 SCFM to the inlet filter assembly.

CAUTION

Do not connect 28 Vdc return and case ground together. Allow 28 Vdc to float.

16. Remove cap from concentrator test set 28 Vdc connector (J10) and connect power supply cable (P/N 3306284-1) to test set 28 Vdc connector (J10) and 28 Vdc power supply. The connector on the power supply end of the cable is an MS3106A16-11. Pin B is +28 Vdc (Pos) and Pin A is return (Neg). The connector shell is case ground.

17. Turn on power supply.

18. Turn 28 VDC ON circuit breaker (CB1) to ON (DS1 and DS3 lamps will illuminate).

19. Turn CONC ON switch (S1) to ON (DS2 lamp will illuminate, then turn CONC ON switch (S1) to OFF.

20. Remove cap from concentrator test set CONC POWER connector (J11) and connect concentrator cable assembly (P/N 3306265-1) test set CONC POWER connector (J11) and concentrator electrical connector (4).

21. Push display TEST (S2), CONC ON lamp (DS2) and RG4 HEATER lamp (DS3) shall illuminate. Release display TEST (S2).

22. Turn on shop air supply, INLET pressure gage (G3) should indicate 90 to 120 psig.

CAUTION

CONC ON switch (S1) power and RG1 AIR PRESSURE should be applied simultaneously or damage to concentrator rotary valve and air heater assembly could occur.

NOTE

Heaters will not be required if the air temperature is above 110°F. After concentrator warm-up has stabilized, either meter M2 or M3 should read zero. The other meter will cycle on and off. (It is possible for either heater to cycle during normal use.)

23. Set CONC ON switch (S1) to ON and record on a Performance Test Sheet the initial reading indicated on MOTOR SOLENOID indicator (M1) (initial reading 1.5

to 2.5 amps which decrease to a continuous reading of 1.5 to 2.5 amps). Also record the initial readings indicated on HEATER NO. 1 (M2) and HEATER NO. 2 (M3) indicators (readings of 7 to 10 amps should be indicated immediately when CONC ON switch (S1) is set to ON).

24. Record on Performance Test Sheet whether lamps (DS2) and (DS3) illuminate.

25. Adjust AIR PRESSURE CONTROL valve (RGI) clockwise until AIR-OXY PRESSURE gage (G1) reads 25 psig.

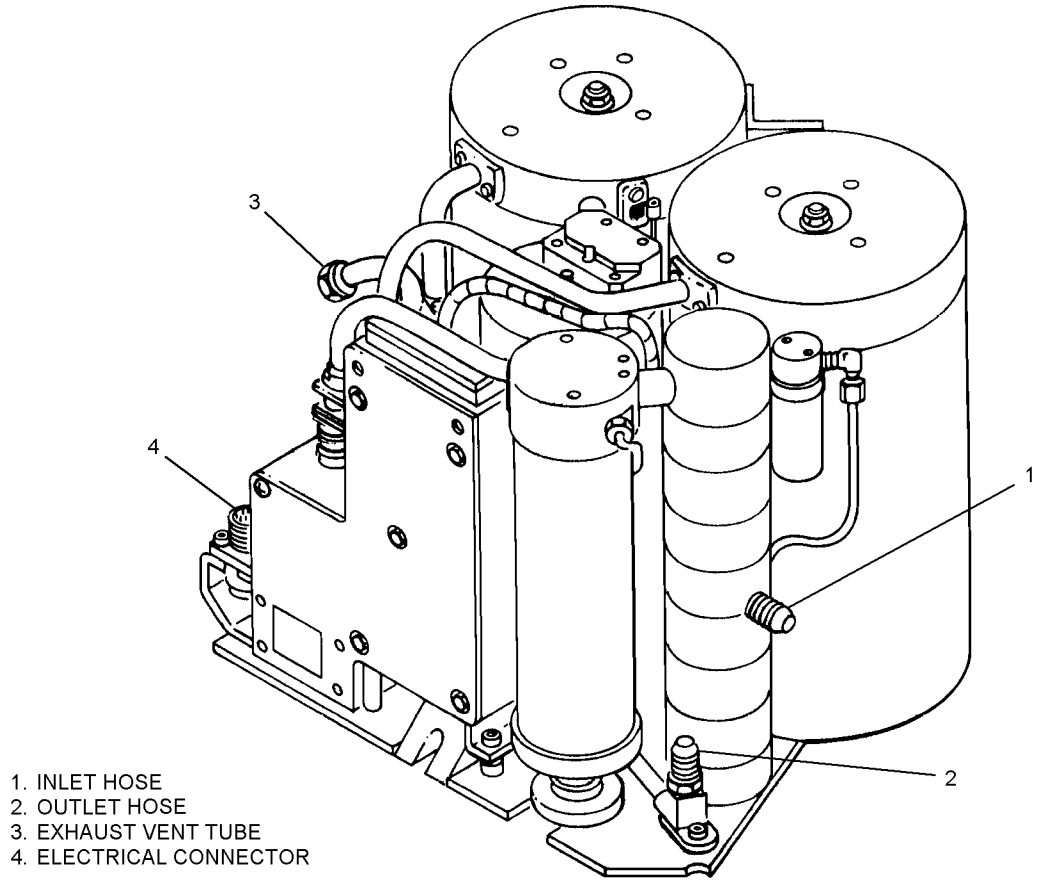
26. Open CONC FLOW valve (V4).

CAUTION

To prevent damage to FLOW PRESSURE gage (G2) during step 27, slowly open FLOW PRESSURE CONTROL valve (RG2) while observing movement of gage (G2) indicator.

27. Slowly adjust FLOW PRESSURE CONTROL valve (RG2) clockwise until FLOW PRESSURE gage (G2) indicates 30 inH_2O.

28. Leave all connections and valves unchanged and proceed to Motor Heater Solenoid Current Test (paragraph 4-33).



004005

Figure 4-5. OEAS Oxygen Concentrator Test Connections

4-33. Motor Heater Solenoid Current Test. To perform the Motor Heater Solenoid Current Test, proceed as follows:

NOTE

During step 1, meters M1, M2, and M3 should indicate as follows:

MOTOR SOLENOID (M1), 1.5 to 2.5 amps
HEATER NO. 1 (M2), 7 to 10 amps or momentary cycling
HEATER NO. 2 (M3), 7 to 10 amps or momentary cycling

1. Turn CONC ON switch (S1) to OFF then to ON, record reading from meters (M1), (M2), and (M3) on Performance Test Sheet.

2. If readings are within tolerance, proceed to Motor Valve RPM Test (paragraph 4-34). If readings are not within tolerance, refer to Troubleshooting (paragraph 4-62).

4-34. Motor Valve RPM Test. To perform the Motor Valve RPM Test, proceed as follows:

NOTE

When performing steps 1 and 2, the concentrator should cycle 11 to 13 times in one minute. The cycles will be indicated by a sudden rapid drop in pressure displayed on AIR-OXY PRESSURE gage (G1), followed by a return to normal pressure. Each pressure drop can be identified by exhaust air flowing through the muffler assembly attached to the concentrator exhaust port.

1. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position.

2. Count the number of pressure drops that occur during one minute, number of pressure drops shall be 11 to 13. Record number of pressure drops on Performance Test Sheet.

3. If number of pressure drops are within tolerance, proceed to Pressure Reducer Test (paragraph 4-35). If number of pressure drops are not within tolerance, refer to Troubleshooting (paragraph 4-62).

4-35. Pressure Reducer Test. To perform the Pressure Reducer Test, proceed as follows:

CAUTION

Ensure OXY from CONC valve (V4) is open prior to setting 30 inH_2O with FLOW PRESSURE CONTROL valve (RG2).

1. Slowly adjust FLOW PRESSURE CONTROL valve (RG2) until FLOW PRESSURE gage (G2) indicates 30 inH_2O.

2. Turn PRESSURE SELECT valve (V1) to the AIR TO CONC position.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until AIR-OXY PRESSURE gage (G1) indicates 60 $\pm$1 psig.

4. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position. AIR-OXY PRESSURE gage (G1) should indicate 30 to 37 psig during high pressure swing, record reading from AIR-OXY PRESSURE gage (G1) on Performance Test Sheet.

5. If reading from AIR-OXY PRESSURE gage (G1) is within tolerance, proceed to Internal Leakage Test (paragraph 4-36). If reading from AIR-OXY PRESSURE gage (G1) is not within tolerance, refer to Troubleshooting (paragraph 4-62).

4-36. Internal Leakage Test. To perform the Internal Leakage Test, proceed as follows:

1. Close OXY ANALYZER valve (V3) and CONC FLOW valve (V4).

2. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until 60 psig is indicated on AIR-OXY PRESSURE gage (G1).

4. Set CONC ON switch (S1) to OFF position.

5. Adjust AIR PRESSURE CONTROL valve (RG1) until 5 psig is indicated on AIR-OXY PRESSURE gage (G1).

6. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position and record initial reading from AIR-OXY PRESSURE gage (G1) on Performance Test Sheet.

NOTE

After taking initial reading in step 7, note time. After waiting one minute, note pressure on AIR-OXY PRESSURE gage (G1). Pressure drop shall not exceed 3 psig. If pressure drop exceeds 3 psig, continue the test for 5 minutes. If the pressure drop does not exceed 15 psig, the test is satisfactory.

7. Observe AIR-OXY PRESSURE gage (G1) for one minute; pressure drop shall not exceed 3 psig. Record reading on Performance Test Sheet. If pressure drop exceeds 3 psig, continue test for 5 minutes. Pressure drop shall not exceed 15 psig. Record reading on Performance Test Sheet.

8. Set CONC FLOW valve (V4) to OPEN position.

9. Set CONC ON switch (S1) to ON position.

10. If final reading for internal leakage test is within tolerance, proceed to Oxygen Flow and Air Filter Bleed Flow Test (paragraph 4-38). If final reading for Internal Leakage Test is not within tolerance, refer to Troubleshooting (paragraph 4-62).

NOTE

Monitor Test (paragraph 4-37) is performed daily in accordance with the applicable support equipment technical publication. Therefore, paragraph 4-37 need only be performed if the concentrator being tested fails the Oxygen Flow Test.

4-37. Monitor Test. In order to prevent unnecessary replacement of concentrator sieve beds, the Monitor Test is performed only if the concentrator fails the Oxygen Flow and Air Filter Bleed Flow Test (paragraph 4-38). To perform the Monitor Test, refer to the appropriate support equipment technical manual.

4-38. Oxygen Flow And Air Filter Bleed Flow Test. To perform the Oxygen Flow and Air Filter Bleed Flow Test, proceed as follows:

CAUTION

Ensure OXY EXHAUST port (J5) is not blocked.

NOTE

Ensure air filter assembly has been modified in accordance with paragraph 4-96.

1. Adjust air pressure control valve (RG1) until 25 psig is indicated on AIR-OXY PRESSURE gage (G1).

2. Record on Performance Test Sheet if air is bleeding through inlet filter assembly bleed orifice.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until 0 psig is indicated on AIR-OXY PRESSURE gage (G1).

4. Set CONC POWER switch (S1) to ON position.

5. Set OXY ANALYZER valve (V3) to OPEN position.

6. Set CONC FLOW valve (V4) to OPEN position.

7. Adjust AIR PRESSURE CONTROL valve (RG1) until 8 psig is indicated on AIR-OXY PRESSURE gage (G1).

8. Turn FLOW SELECT valve (V2) to HIGH position.

9. Adjust FLOW PRESSURE CONTROL valve (RG2) until 30 inH_2O is indicated on FLOW PRESSURE gage (G2).

10. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position, and adjust air pressure control valve (RG1) to 8 psi as indicated on AIR-OXY PRESSURE gage (G1).

11. Maintain 30 inH_2O as indicated on FLOW PRESSURE gage (G2). Allow reading on % OXYGEN (M4) to stabilize.

NOTE

When taking reading from AIR-OXY PRESSURE gage (G1), there will be a pressure swing; record both the low and high pressure indications on Performance Test Sheet.

12. Record readings from AIR-OXY PRESSURE gage (G1) and % OXYGEN meter (M4) on Performance Test Sheet. Readings shall meet the requirement listed on Performance Test Sheet.

13. Turn FLOW SELECT valve (V2) to MED position and repeat steps 9 through 12.

14. Turn FLOW SELECT valve (V2) to LOW position and repeat steps 9 through 12.

15. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

16. Adjust AIR PRESSURE CONTROL valve (RG1) until 25 psig is indicated on AIR-OXY PRESSURE gage (G1).

17. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position and repeat steps 8 through 14, with the following exception, pressure in step 10 shall be adjusted to 25 psig.

18. If readings are not within tolerance, refer to Troubleshooting (paragraph 4-62). If readings are within tolerance, secure from testing as follows:

19. Turn FLOW PRESSURE CONTROL valve (RG2) counterclockwise until spring tension is released.

20. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

21. Set CONC ON switch (S1) and 28 VDC circuit breaker (CB1) to OFF position.

22. Turn off 28 Vdc power supply.

23. Turn AIR PRESSURE CONTROL valve (RG1) counterclockwise until spring tension is released.

24. Set OXY ANALYZER valve (V3) and CONC FLOW valve (V4) to CLOSED position.

25. Shut off shop air supply.

26. Disconnect all hoses and cable assemblies, muffler, and inlet filter from test set and concentrator and install in lid of test set.

27. Reinstall all protective caps on test set and concentrator.

4-39. BENCH TEST USING MODEL TTU-452A/E TEST SET WITH OBOGS ADAPTER ASSEMBLY P/N 3248AS200-1.

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—

Support Equipment Required

Quantity	Description	Reference Number
1	Cable Assembly, Concentrator	3306265-1
1	Cable Assembly, Power Supply	3306284-1
1	Concentrator Test Set, Model TTU-452A/E	1779AS100-2 (CAGE 30003)

Support Equipment Required (Cont)

Quantity	Description	Reference Number
1	Filter Assembly, Inlet	1779AS581-1
1	Muffler Assembly	1779AS578-1
1	Hose Assembly, Inlet	3306273-1
1	Hose Assembly, Outlet	3306274-1
1	OBOGS Adapter Assembly	P/N 3248AS200-1
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent

4-40. Test Set Setup And Display Lamp Test. To set up the test set and check out its display lamps utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

WARNING

To prevent injury to personnel and damage to equipment, make certain when working with oxygen that clothing, work benches, tube fittings, tools and test equipment are free of hydrocarbons (grease, fuel, hydraulic fluid, etc) and any other combustible materials. Fire or explosion may result when even slight traces of combustible material are exposed to oxygen under pressure.

CAUTION

Do not lift or carry the oxygen concentrator by the exhaust vent metallic tube assembly. Damage to the oxygen concentrator will occur.

NOTE

Paragraphs 4-40 through 4-45 contain the procedural steps for testing of the GGU-7/A oxygen concentrator utilizing Model Test Set TTU-452A/E with the OBOGS ADAPTER Assembly part number (3248AS200-1) as a work around test fixture only.

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Ensure test set lid is removed and circuit breaker INSTM ON (CB2) is in the RESET position (pushed in).

2. Open OBOGS ADAPTER assembly box (7).

3. Turn on OBOGS Adapter Assembly valve (3).

4. Ensure circuit breakers 28 V DC ON (CB1) and CONC ON switch (S1) are OFF.

5. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position.

6. Turn FLOW SELECT valve (V2) to LOW position.

NOTE

OXY ANALYZER (V3) and CONC FLOW (V4) are toggle valves. They are closed when the black handle is parallel to the panel assembly. They are open when the black handle is perpendicular to the panel assembly.

7. Ensure OXY ANALYZER (V3) and CONC FLOW (V4) valves are in the closed position.

NOTE

AIR PRESSURE CONTROL valve (RG1) will not be used for testing during this procedure.

8. Ensure adjusting knob of AIR PRESSURE CONTROL (RG1) is turned counterclockwise four turns or until spring tension is released.

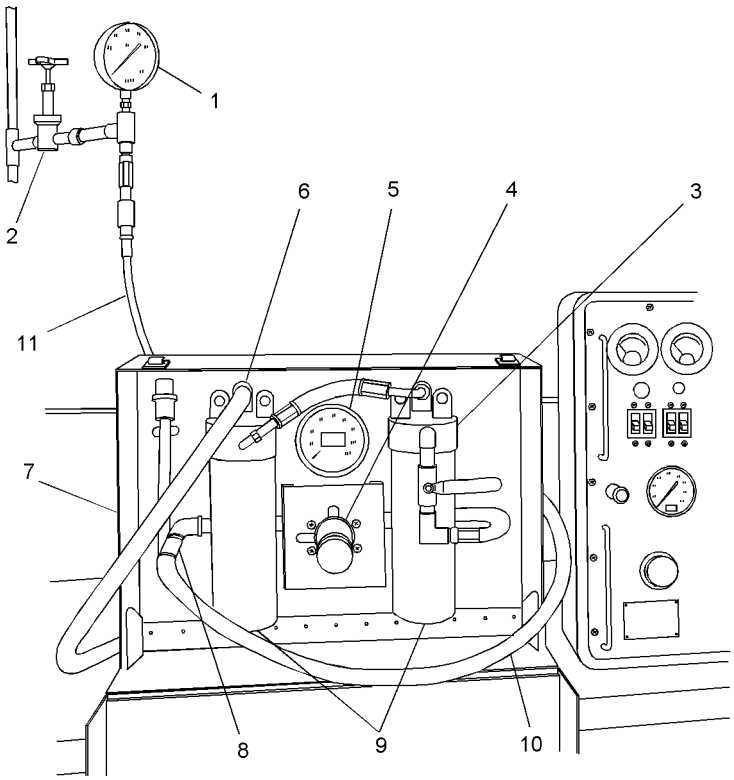
9. Ensure adjusting knob of FLOW PRESSURE CONTROL (RG2) is turned counterclockwise four turns or until spring tension is released.

10. Ensure test set panel vent located next to FLEW PRESSURE gage (G2) is not blocked or covered.

11. Remove all hoses, cables, adapters, filters, and muffler from lid of concentrator test set.

12. Remove cap assembly from concentrator OXY FROM CONC (J3).

13. Cap AIR TO CONC (J4) and FILTER PORT (J1).



004006

Figure 4-6. OBOGS Adapter Assembly

14. Remove protective shipping caps and connect one end of concentrator outlet hose assembly (P/N 3306274-1) to OXY FROM CONC fitting (J3) of test set. Connect other end of outlet hose to concentrator outlet fitting.

15. Remove protective shipping plugs and connect one end of OBOGS Adapter Assembly Outlet Hose Assembly (10) to OBOGS Adapter Assembly Outlet Port (8). Connect other end of OBOGS Adapter Assembly Outlet Hose (10) to concentrator inlet port.

CAUTION

Do not restrict exhaust flow from concentrator by any means other than the muffler assembly.

16. Connect muffler assembly (P/N 3306270-1 or 3306268-1) to concentrator vent tube.

17. Remove protective shipping cap from OXY EXHAUST port (JS) of test set.

18. Remove protective shipping caps from 28 V DC power supply cable assembly (P/N 3306284-1).

CAUTION

Do not connect 28 V DC return and case ground together. Allow 28 V DC to float.

NOTE

Power supply end of cable is (P/N MS3106A16-11P) (Pin B is 28 V DC and pin A is return negative). The connector shell is case ground.

19. Remove cap from test set 28 V DC connector (J10). Connect 28V DC cable (P/N 3306284-1) to 28 V DC connector (J10) and to 28 V DC power supply connector.

20. Turn on power supply.

WARNING

Hazardous voltages may be present on case of the test set if power plug and source are not connected to safety ground (green wire).

21. Set 28 V DC ON circuit breaker (CB1) to ON. Lamp (DS1), RG-4 HEATER lamp (DS3), and meter (M4) will illuminate.

22. Remove cap assembly from 28V CONC POWER (J11) on test set.

23. Remove protective shipping covers from concentrator cable assembly (P/N 3306265-1). Connect one end of cable to 28 V DC CONC POWER (J11) and connect the other end to the concentrator electrical connector.

NOTE

% OXYGEN meter (M4) will initially read 0.5% and should stabilize at approximately 20% or higher within 5 minutes.

24. Push Test Display button (S2). Lamp (DS2) and RG-4 HEATER lamp (DS3) shall illuminate and extinguish when (S2) is released.

25. Ensure that the adjusting knob of OBOGS Adapter Assembly Regulator (4) is turned counterclockwise four turns or until spring tension is released.

NOTE

AIMD intermediate level maintenance shops will require an ON/OFF valve (2) and a 0 to 160 psig gage (1) or suitable substitutes installed on shop air supply source prior to the OBOGS Adapter Assembly Inlet. (Figure 4-6) shall be used for orientation of assembly.

26. Connect OBOGS Adapter Assembly Hose (11) to OBOGS Adapter Assembly INLET Port (6). Connect the other end of OBOGS Adapter Assembly Hose (11) to shop air source.

27. Turn on shop air supply. Pressure will be indicated on Shop Air Supply gage (1). At no time during operation shall Shop Air Supply gage (1) fall below 75 psig during the high-pressure swing.

28. Open OBOGS Adapter Assembly Bleed Ports (9) 1/4 to 1/2 turn until a slight bleed is present.

NOTE

Heaters will not be required if the air temperature is above 110°F. After concentrator warm-up has stabilized, either meter M2 or M3 should read zero. The other meter will cycle on and off. (It is possible for either heater to cycle during normal use.)

29. Set CONC ON switch (S1) to ON and record on a Performance Test Sheet the initial reading indicated on MOTOR SOLENOID indicator (M1) (initial reading 1.5 to 2.5 amps). Also record the initial readings indicated on HEATER NO. 1 (M2) and HEATER NO. 2 (M3) indicators (readings of 7 to 10 amps should be indicated immediately when CONC ON switch is set to on).

30. Place CONC FLOW valve (V4) to the OPEN position.

31. Adjust OBOGS Adapter Assembly Regulator knob (4) until 25 psig is indicated on FLOW PRESSURE gage (G1) during high-pressure swing.

32. If readings are within tolerance, proceed to motor heater solenoid current test paragraph 4-41. If readings are not within tolerance, refer to paragraph 4-62, Troubleshooting.

4-41. Motor Heater Solenoid Current Test. To perform the motor heater solenoid current test utilizing the OBOGS Adapter Assembly PIN 3248AS200-1, proceed as follows:

NOTE

Meters M1, M2, and M3 should indicate as follows:
MOTOR SOLENOID (M1), 1.5 to 2.5 amps
HEATER NO. 1 (M2), 7 to 10 amps or monetary cycling
HEATER NO. 2 (M3), 7 to 10 amps or monetary cycling

1. Turn CONC ON switch (S1) to OFF then to ON, record reading from meters (M1), (M2), and (M3) on performance test sheet.

2. If readings are within tolerance, proceed to motor valve rpm test paragraph 4-42. If readings are not within tolerance, refer to paragraph 4-62, Troubleshooting.

4-42. Motor Valve RPM Test. To perform the motor valve rpm test utilizing the OBOGS Adapter Assembly PIN 3248AS200-1, proceed as follows:

NOTE

When performing steps 1 and 2, the concentrator should cycle 11 to 13 times in one minute. The cycles will be indicated by a sudden rapid drop in pressure displayed on AIR/OXY PRESSURE gage (G1), followed by a return to normal pressure per revolution. Each pressure drop can be identified by exhaust air flowing through the muffler assembly attached to concentrator exhaust port.

1. Ensure PRESSURE SELECT valve (V1) is in the OXY FROM CONC position.

2. Count the number of pressure drops that occur during one minute. The number of pressure drops shall be 11 to 13. Record number of pressure drops on performance test sheet.

3. If the numbers of pressure drops are within tolerance, proceed to pressure reducer test paragraph 4-43. If number of pressure drops are not within tolerance, refer to paragraph 4-62, Troubleshooting.

4-43. Pressure Reducer Test. To perform the pressure reducer test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

NOTE

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Ensure PRESSURE SELECT valve (V1) is in the OXY FROM CONC position.

2. Adjust OBOGS ADAPTER OBOGS Adapter Assembly Regulator knob (4) until OBOGS Adapter Assembly Gage (5) indicates 60 ±1 psig during high-pressure swing. AIR/OXYGEN PRESSURE gage (G1) should indicate 30 to 37 psig during high-pressure swing. Record reading from AIR/OXYGEN PRESSURE gage (G1) on performance test sheet.

3. If reading from AIR/OXYGEN PRESSURE gage (G1) is within tolerance, proceed to internal leakage test, paragraph 4-44. If reading from AIR/OXYGEN PRESSURE gage (G1) is not within tolerance, refer to paragraph 4-62, Troubleshooting.

4-44. Internal Leakage Test. To perform the internal leakage test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

NOTE

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Adjust OBOGS Adapter Assembly Regulator knob (4) until OBOGS Adapter Assembly Gage (5) indicates 60 ±1 psig during high-pressure swing.

2. Ensure PRESSURE SELECT valve (V1) is in the OXY FROM CONC position.

3. Close CONC FLOW valve (V4).

4. Adjust OBOGS Adapter Assembly Regulator knob (4) until 10 psig is indicated on OBOGS Adapter Assembly Gage (5).

5. Record initial reading from AIR-OXY Pressure Gage (G 1) on performance test.

NOTE

After taking initial reading in step 7, note time, and wait one minute then note pressure on AIR-OXY PRESSURE gage (G1). Pressure drop shall not exceed 3 psig. If pressure drop exceeds 3 psig, continue the test for 5 minutes pressure drop shall not exceed 15 psig. Record reading on performance test sheet.

6. Observe AIR-OXY PRESSURE gage (G1) for one minute, pressure drop shall not exceed 3 psig. Record reading on performance test sheet. If pressure drop exceeds 3 psig, continue test for 5 minutes. Pressure drop shall not exceed 15 psig. Record reading on performance test sheet.

7. Set CONC FLOW valve (V4) to OPEN position.

8. If final reading for internal leakage is within tolerance, proceed to oxygen flow and air filter bleed flow test paragraph 4-45. If final reading for internal leakage test is not within tolerance, refer to paragraph 4-62, Troubleshooting.

4-45. Oxygen Flow Test and Air Filter Bleed Flow Test. To perform the oxygen flow test/filter drain test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

CAUTION

Ensure OXY EXHAUST port (J5) is not blocked.

NOTE

While performing the oxygen flow test, ensure that while the concentrator is operating (CONC ON switch (S1) is On) that the reading on Air Supply gage (1) has a peak reading of 75 psig or higher on the high pressure swing. If the pressure reading falls below 75 psig on the high swing, the air supply, concentrator filter assembly or OBOGS adapter filter system is inadequate and does not meet the specified requirements.

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Adjust OBOGS Adapter Assembly Regulator knob (4) until 50 psig is indicated on OBOGS Adapter Assembly Gage (5).

2. Record on performance test sheet if air is bleeding through inlet filter assembly bleed orifice.

CAUTION

To prevent damage to FLOW PRESSURE gage (G2), slowly open FLOW PRESSURE CONTROL valve (RG2) while observing movement of gage (G2) indicator.

3. Adjust FLOW PRESSURE CONTROL valve (RG2) until 30 inH_2O indicated on FLOW PRESSURE gage (G2) on the high-pressure swing.

4. Adjust OBOGS Adapter Assembly Regulator knob (4) until 8 psig is indicated on AIR/OXY PRESSURE gage (G1) on the high-pressure swing.

5. Ensure CONC FLOW valve (V4) is in the OPEN position.

6. Set OXY ANALYZER valve (V3) to OPEN position.

7. Turn FLOW SELECT valve (V2) to HIGH position.

8. Adjust OBOGS Adapter Assembly Regulator knob (4) until to 8 psig as indicated on AIR/OXYGEN PRESSURE gage (G1) on the High Pressure Swing.

9. Maintain 30 inches of water at high-pressure swing as indicated on FLOW PRESSURE gage (G2) on the high-pressure swing. Allow reading on % OXYGEN meter (M4) to stabilize approximately 5 minutes.

NOTE

When taking reading from AIR/OXY PRESSURE gage (G1), there will be a pressure swing. Record both the low and high-pressure indications on the performance test sheet.

10. Record readings from on AIR-OXYGEN PRESSURE gage (G1) and reading from % OXYGEN meter (M4) on performance test sheet. Readings shall meet the requirement listed on performance test sheet.

11. Turn FLOW SELECT valve (V2) to MED position and repeat steps 8 through 10.

12. Turn FLOW SELECT valve (V2) to LOW position and repeat steps 8 through 10.

13. Adjust OBOGS Adapter Assembly Regulator knob (4) until 25 psig as indicated on AIR-OXYGEN PRESSURE gage (G1) on the High Pressure Swing and repeat steps 7 through 12.

14. Repeat steps 8 through 10, with the following exception, pressure in step 8 shall be adjusted to 25 psig.

15. If readings are not within tolerance, refer to paragraph 4-62 Troubleshooting. If readings are within tolerance, secure test set and OBOGS adapter assembly as follows.

16. Turn FLOW SELECT valve (V2) to LOW position.

17. Back off OBOGS Adapter Assembly Regulator knob (4) until a zero pressure reading is indicated on OBOGS Adapter Assembly Gage (5) and AIR-OXYGEN PRESSURE gage (G1).

18. Turn FLOW PRESSURE CONTROL valve (RG2) counterclockwise until spring tension is released.

19. Set CONC ON switch (S1) to OFF.

20. Set CONC FLOW valve (V4) and OXY ANALYZER valve (V3) to CLOSED.

21. Turn OBOGS Adapter Assembly Valve (3) to OFF position.

22. Shutoff Air Source Supply Valve (2). Open OBOGS Adapter Assembly Bleed Ports (9) until Air Source gage (1) bleeds to zero psig.

23. Close Bleed Ports (9).

24. Set 28 V DC ON circuit breaker (CB1) to OFF. Turn 28 V DC power supply to test set OFF.

25. Remove 28 V DC power cable from 28-volt power supply and test set connector (J10) and install cap on connector (J10).

26. Remove concentrator cable assembly from 28 V DC CONC POWER (J11) and concentrator electrical connector. Install cap on connector (J11).

27. Remove OBOGS Adapter Assembly Inlet Hose (11) from OBOGS Adapter Assembly Inlet Connection (6) and Shop Air Source.

28. Disconnect OBOGS Adapter Assembly Outlet Hose (10) from OBOGS Adapter Assembly Outlet Port (8) and concentrator inlet port.

29. Remove concentrator outlet hose assembly from concentrator outlet fitting (2) and OXY FROM CONC fitting (J3) of test set.

30. Remove muffler assembly from concentrator.

31. Install protective shipping caps on all removed components and store in lid of test set.

32. Ensure switches and valves are in the same position as in Display Lamp Test paragraph 4-40, steps 1 through 8.

33. Ensure that test set caps, cover, and screw assemblies are installed on their applicable fittings.

34. Stow all test set components in test set, place test set lid on test set case. Secure lid to case by using the 8 latches attached to lid

35. Stow all OBOGS Adapter Assembly hoses in box and secure box.

4-46. BENCH TEST USING MODEL TTU-518A/E TEST SET ONLY.

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	1779AS522-1
1	Cable Assembly, Concentrator	1779AS127-1
1	Cable Assembly, Power Supply	1779AS180-1
1	Concentrator Test Set, Model TTU-518A/E	1779AS500-2 (CAGE 30003)
1	Filter Assembly, Inlet	1779AS581-1
1	Hose Assembly, Inlet	1779AS133-1
1	Hose Assembly, Outlet	1779AS134-1
1	Muffler Assembly	1779AS578-1
1	Regulator, Pressure	283028-0001 (CAGE 9657) NIIN 01-101-8827 or Equivalent

4-47. Display Lamp Test. To perform the Display Lamp Test, proceed as follows:

WARNING

To prevent injury to personnel and damage to equipment, make certain when working with oxygen that clothing, work benches, tube fittings, tools, and test equipment are free of hydrocarbons (grease, fuel, hydraulic fluid, etc.) and any other combustible materials. Fire or explosion may result when even slight traces of combustible material come in contact with oxygen under pressure.

CAUTION

Do not lift or carry the OEAS oxygen concentrator by the exhaust vent tube assembly of the rotary valve assembly. Damage to the OEAS oxygen concentrator will occur.

1. Ensure circuit breaker INSTM on (CB3) is in the reset (push in to reset) position.

2. Ensure 28 VDC ON circuit breaker (CB1) and 115 VAC ON circuit breaker (CB2) are OFF.

3. Ensure CONC ON/OFF switch (S1) is OFF.

4. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

5. Turn FLOW SELECT valve (V2) to LOW position.

6. Ensure OXY ANALYZER (V3) and CONC FLOW (V4) valves are closed.

7. Ensure AIR PRESSURE CONTROL (RG1) and FLOW PRESSURE CONTROL (RG2) are backed out counterclockwise until spring tension is released.

8. Ensure test panel vent located adjacent to flow pressure gage (G2) is not blocked or covered.

9. Remove all hoses, adapters, muffler, and filters from test set lid assembly.

NOTE

Index numbers refer to figure 4-5 unless otherwise stated.

10. Remove cap from concentrator test set AIR TO CONC fitting (J4) and connect inlet hose (P/N 1779AS133-1) to inlet fitting (1) of concentrator and AIR TO CONC fitting (J4) of test set.

11. Remove cap from concentrator test set OXY FROM CONC fitting (J3) and connect outlet hose (P/N 1779AS134-1) and adapter (P/N 1779AS522-1) to outlet fitting (2) of concentrator and OXY FROM CONC fitting (J3) of test set.

CAUTION

Do not restrict exhaust flow from concentrator by any means other than the muffler assembly.

12. Connect muffler assembly to exhaust vent tube (3) of concentrator.

13. Uncap OXY EXHAUST port (J5) of test set.

14. Remove cap from concentrator test set filter pod fitting (J1) and connect inlet filter assembly to filter port fitting (J1).

15. Connect a 90 to 120 psig regulated clean, dry air source capable of supplying 26 SCFM to the inlet filter assembly.

CAUTION

Do not connect 28 Vdc return and case ground together; allow 28 Vdc to float.

16. Remove cap from concentrator test set 28 Vdc connector (J10) and connect power supply cable (P/N 1779AS180-1) to test set 28 Vdc connector (J10) and 28 Vdc power supply. The connector on power supply end of the cable is an MS3106A16-11P. Pin B is +28 Vdc (Pos) and Pin A is return (Neg). The connector shell is ground.

17. Remove cap from concentrator test set CONC POWER connector (J11) and connect concentrator cable assembly (P/N 1779AS127-1) test set CONC POWER connector (J11) and concentrator electrical connector (4).

18. Turn on power supply.

19. Turn 28 VDC ON circuit breaker (CB1) to ON. DS1 and DS3 lamps will illuminate. DS3 lamp will extinguish after 3 minutes indicating test set is ready for use.

20. Push display TEST (S2), RG4 HEATER lamp (DS3), Heater No. 1 (DS4), Heater No. 2 (DS5) and 115V Heater (DS6) shall illuminate. Release display TEST (S2). They shall extinguish. Record reading on Performance Test Sheet.

21. Turn on shop air supply, INLET pressure gage (G3) should indicate 90 to 120 psig.

22. Continue to paragraph 4-48.

4-48. Motor Heater Solenoid Current Test. To perform the Motor Heater Solenoid Current Test, proceed as follows:

NOTE

Heaters will not be required if the air temperature is above 110°F. After concentrator warmup has stabilized, either lamp DS4 or DS5 should be off. The other lamp will cycle on and off. (It is possible for either heater to cycle during normal use.)

CAUTION

CONC ON switch (S1) power and RG1 pressure should be applied as close together as possible. Damage to the concentrator may occur if RG1 pressure is applied to the concentrator prior to energizing the rotary valve motor. The rotary valve motor should not be energized for extended periods without air pressure applied to the concentrator.

1. Set CONC ON switch (S1) to on and adjust AIR PRESSURE CONTROL (RG1) until AIR-OXY PRESSURE gage (G1) reads 25 psig. 28V HEATER lamps (DS4 and DS5) one or both will illuminate and then extinguish. Ensure audible operation of concentrator rotary valve motor and observe 28V MOTOR meter (M1) for indication (1.8 to 2.5 amps). Record MOTOR meter (M1) reading on the Performance Test Sheet.

2. If readings are within tolerance, proceed to Motor Valve RPM Test, paragraph 4-49. If readings are not within tolerance, refer to Troubleshooting (paragraph 4-63).

4-49. Motor Valve RPM Test. To perform the Motor Valve RPM Test, proceed as follows:

NOTE

When performing steps 1 and 2, the concentrator should cycle 11 to 13 times in one minute. The cycles will be indicated by a sudden rapid drop in pressure displayed on AIR-OXY PRESSURE gage (G1), followed by a return to normal pressure. Each pressure drop can be identified by exhaust air flowing through the muffler assembly attached to the concentrator exhaust port.

1. Ensure PRESSURE SELECT valve (V1) is in the AIR TO CONC position.

2. Count the number of pressure drops that occur during one minute, number of pressure drops shall be 11 to 13. Record number of pressure drops on Performance Test Sheet.

3. If number of pressure drops are within tolerance, proceed to Pressure Reducer Test (paragraph 4-50). If number of pressure drops are not within tolerance, refer to Troubleshooting (paragraph 4-63).

4-50. Pressure Reducer Test. To perform the Pressure Reducer Test, proceed as follows:

1. Open CONC FLOW valve (V4).

CAUTION

To prevent damage to FLOW PRESSURE gage (G2) during step 2, slowly open FLOW PRESSURE CONTROL valve (RG2) while observing movement of FLOW PRESSURE gage (G2) indicator.

2. Slowly adjust FLOW PRESSURE CONTROL valve (RG2) until FLOW PRESSURE gage (G2) indicates 30 inH_2O.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until AIR-OXY PRESSURE gage (G1) indicates 60 ± 1 psig.

4. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position. AIR-OXY PRESSURE gage (G1) should indicate 30 to 37 psig during high pressure swing, record reading from AIR-OXY PRESSURE gage (G1) on Performance Test Sheet.

5. If reading from AIR-OXY PRESSURE gage (G1) is within tolerance, proceed to Internal Leakage Test (paragraph 4-51). If reading from AIR-OXY PRESSURE gage (G1) is not within tolerance, refer to Troubleshooting (paragraph 4-63).

4-51. Internal Leakage Test. To perform the Internal Leakage Test, proceed as follows:

1. Close OXY ANALYZER valve (V3) and CONC FLOW valve (V4).

2. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until 60 psig is indicated on AIR-OXY PRESSURE gage (G1).

4. Set CONC ON switch (S1) to OFF position.

5. Adjust AIR PRESSURE CONTROL valve (RG1) until 5 psig is indicated on AIR-OXY PRESSURE gage (G1).

6. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position and record initial reading from AIR-OXY PRESSURE gage (G1) on Performance Test Sheet.

NOTE

After taking initial reading in step 7, note time. After waiting one minute, note pressure on AIR-OXY PRESSURE gage (G1). Pressure drop shall not exceed 3 psig. If pressure drop exceeds 3 psig, continue the test for 5 minutes. If the pressure drop does not exceed 15 psig, the test is satisfactory.

7. Observe AIR-OXY PRESSURE gage (G1) for one minute; pressure drop shall not exceed 3 psig. Record reading on Performance Test Sheet. If pressure drop exceeds 3 psig, continue test for 5 minutes. Pressure drop shall not exceed 15 psig. Record reading on Performance Test Sheet.

8. Set CONC FLOW valve (V4) to OPEN position.

9. Set CONC ON switch (S1) to ON position.

10. If final reading for internal leakage test is within tolerance, proceed to Oxygen Flow and Air Filter Bleed Flow Test (paragraph 4-53). If final reading for Internal Leakage Test is not within tolerance, refer to Troubleshooting (paragraph 4-63).

NOTE

Monitor Test (paragraph 4-52) is performed daily in accordance with the applicable support equipment technical publication. Therefore, paragraph 4-52 need only be performed if the concentrator being tested fails the Oxygen Flow Test.

4-52. Monitor Test. In order to prevent unnecessary replacement of concentrator sieve beds, the Monitor Test is performed only if the concentrator fails the Oxygen Flow and Air Filter Bleed Flow Test (paragraph 4-53). To perform the Monitor Test, refer to the appropriate support equipment technical manual.

4-53. Oxygen Flow and Air Filter Bleed Flow Test. To perform the Oxygen Flow and Air Filter Bleed Flow Test, proceed as follows:

CAUTION

Ensure OXY EXHAUST port (J5) is not blocked.

NOTE

While performing oxygen flow test, ensure that while the concentrator is operating (CONC ON switch S1 to ON) the reading on INLET PRESSURE gage (G-3) does not fall below 90 psig. If the pressure reading does fall below 90 psig, the air supply or filter assembly is inadequate and does not meet specified requirements.

Ensure air filter assembly has been modified in accordance with paragraph 4-96.

1. Adjust air pressure control valve (RG1) until 25 psig is indicated on AIR-OXY PRESSURE gage (G1).

2. Record on Performance Test Sheet if air is bleeding through inlet filter assembly bleed orifice.

3. Adjust AIR PRESSURE CONTROL valve (RG1) until 0 psig is indicated on AIR-OXY PRESSURE gage (G1).

4. Ensure CONC POWER switch (S1) is in the ON position.

5. Set OXY ANALYZER valve (V3) to OPEN position.

6. Ensure CONC FLOW valve (V4) is in the OPEN position.

7. Adjust AIR PRESSURE CONTROL valve (RG1) until 8 psig is indicated on AIR-OXY PRESSURE gage (G1).

8. Turn FLOW SELECT valve (V2) to HIGH position.

9. Adjust FLOW PRESSURE CONTROL valve (RG2) until 30 inH_2O is indicated on FLOW PRESSURE gage (G2).

10. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position, and adjust air pressure control valve (RG1) to 8 psig as indicated on AIR-OXY PRESSURE gage (G1).

11. Maintain 30 in H_2O as indicated on FLOW PRESSURE gage (G2). Allow reading on % OXYGEN meter (M3) to stabilize.

NOTE

When taking reading from AIR-OXY PRESSURE gage (G1), there will be a pressure swing; record both the low and high pressure indications on Performance Test sheet.

12. Record readings from AIR-OXY PRESSURE gage (G1) and % OXYGEN meter (M3) on Performance Test Sheet. Readings shall meet the requirement listed on Performance Test Sheet.

13. Turn FLOW SELECT valve (V2) to MED position and repeat steps 9 through 12.

14. Turn FLOW SELECT valve (V2) to LOW position and repeat steps 9 through 12.

15. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

16. Adjust AIR PRESSURE CONTROL valve (RG1) until 25 psig is indicated on AIR-OXY PRESSURE gage (G1).

17. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position and repeat steps 8 through 14, with the following exception, pressure in step 10 shall be adjusted to 25 psig.

18. If readings are not within tolerance, refer to Troubleshooting (paragraph 4-63). If readings are within tolerance, secure from testing as follows:

19. Turn FLOW PRESSURE CONTROL valve (RG2) counterclockwise until spring tension is released.

20. Turn PRESSURE SELECT valve (V1) to AIR TO CONC position.

21. Set CONC ON switch (S1) and 28 VDC circuit breaker (CB1) to OFF position.

22. Turn off 28 Vdc power supply.

23. Turn AIR PRESSURE CONTROL valve (RG1) counterclockwise until spring tension is released.

24. Set OXY ANALYZER valve (V3) and CONC FLOW valve (V4) to CLOSED position.

25. Shut off shop air supply.

26. Disconnect all hoses and cable assemblies, muffler, and inlet filter from test set and concentrator and install in lid of test set.

27. Reinstall all protective caps on test set and concentrator.

4-54. BENCH TEST USING MODEL TTU-518A/E TEST SET WITH OBOGS ADAPTER ASSEMBLY P/N 3248AS200-1.

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter Assembly	1779AS522-1
1	Cable Assembly, Concentrator	1779AS127-1
1	Cable Assembly, Power Supply	1779AS180-1
1	Concentrator Test Set, Model TTU-518A/E	1779AS500-2 (CAGE 30003)
1	Filter Assembly, Inlet	1779AS581-1
1	Hose Assembly, Inlet	1779AS133-1
1	Hose Assembly, Outlet	1779AS134-1
1	Muffler Assembly	1779AS578-1
1	Regulator, Pressure	283028-0001 (CAGE 9657) NIIN 01-101-8827 or Equivalent

4-55. Display Lamp Test. To set up the test set and check out its display lamps utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

WARNING

To prevent injury to personnel and damage to equipment, make certain when working with oxygen that clothing, work benches, tube fittings, tools and test equipment are free of hydrocarbons (grease, fuel, hydraulic fluid, etc) and any other combustible materials. Fire or explosion may result when even slight traces of combustible material are exposed to oxygen under pressure.

CAUTION

Do not lift or carry the oxygen concentrator by the exhaust vent metallic tube assembly. Damage to the oxygen concentrator will occur.

NOTE

Paragraphs 4-55 through 4-60 contain the procedural steps for testing of the GGU-7/A oxygen concentrator utilizing Model Test Set TTU-518A/E with the OBOGS ADAPTER Assembly part number (3248AS200-1) as a work around test fixture only.

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Ensure test set lid is removed and circuit breaker INSTM ON (CB3) is in the RESET position (pushed in).

2. Open OBOGS ADAPTER assembly box (7).

3. Turn on OBOGS Adapter Assembly valve (3).

4. Ensure circuit breakers 28 V DC ON (CB1) and CONC ON switch (S1) are OFF.

5. Turn PRESSURE SELECT valve (V1) to OXY FROM CONC position.

6. Turn FLOW SELECT valve (V2) to LOW position.

NOTE

OXY ANALYZER (V3) and CONC FLOW (V4) are toggle valves. They are closed when the black handle is parallel to the panel assembly. They are open when the black handle is perpendicular to the panel assembly.

7. Ensure OXY ANALYZER (V3) and CONC FLOW (V4) valves are in the closed position.

NOTE

AIR PRESSURE CONTROL valve (RG1) will not be used for testing during this procedure.

8. Ensure adjusting knob of AIR PRESSURE CONTROL (RG1) is turned counterclockwise four turns or until spring tension is released.

9. Ensure adjusting knob of FLOW PRESSURE CONTROL (RG2) is turned counterclockwise four turns or until spring tension is released.

10. Ensure test set panel vent located next to FLOW PRESSURE gage (G2) is not blocked or covered.

11. Remove all hoses, cables, adapters, filters, and muffler from lid of concentrator test set.

12. Remove cap assembly from concentrator OXY FROM CONC (J3).

13. Cap AIR TO CONC (J4) and FILTER PORT (J1).

14. Remove protective shipping caps and connect one end of concentrator outlet hose assembly (P/N 1779AS134-1) to OXY FROM CONC fitting (J3) of test set. Connect other end of outlet hose to concentrator outlet fitting.

15. Remove protective shipping plugs and connect one end of OBOGS Adapter Assembly Outlet Hose Assembly (10) to OBOGS Adapter Assembly Outlet Port (8). Connect other end of OBOGS Adapter Assembly Outlet Hose (10) to concentrator inlet port.

CAUTION

Do not restrict exhaust flow from concentrator by any means other than the muffler assembly.

16. Connect muffler assembly (P/N 3306270-1 or 3306268-1) to concentrator vent tube.

17. Remove protective shipping cap from OXY EXHAUST port (JS) of test set.

18. Remove protective shipping caps from 28 V DC power supply cable assembly (P/N 1779AS108-1).

CAUTION

Do not connect 28 V DC return and case ground together. Allow 28 V DC to float.

NOTE

Power supply end of cable is (P/N MS3106A16-11P) (Pin B is 28 V DC and pin A is return negative). The connector shell is case ground.

19. Remove cap from test set 28 V DC connector (J10). Connect 28V DC cable (P/N 1779AS108-1) to 28 V DC connector (J10) and to 28 V DC power supply Connector.

20. Turn on power supply.

WARNING

Hazardous voltages may be present on case of the test set if power plug and source are not connected to safety ground (green wire).

21. Set 28 V DC ON circuit breaker (CB1) to ON. Lamp (DS1) and meter (M3) will illuminate. RG4 HEATER lamp (DS3) will illuminate then extinguish in approximately 3 minutes, indicating the monitor is operating within temperature limits.

22. Remove cap assembly from 28V CONC POWER (J11) on test set.

23. Remove protective shipping covers from concentrator cable assembly (P/N 1779AS127-1). Connect one end of cable to 28 V DC CONC POWER (J11) and connect the other end to the concentrator electrical connector.

NOTE

% OXYGEN meter (M3) will initially read 0.5% and should stabilize at approximately 20% or higher within 5 minutes.

24. Push Test Display button (S2). Lamps (DS3), (DS4), (DS5), and (DS6) shall illuminate and extinguish when (S2) is released.

25. Ensure that the adjusting knob of OBOGS Adapter Assembly Regulator (4) is turned counterclockwise four turns or until spring tension is released.

NOTE

AIMD intermediate level maintenance shops will require an ON/OFF valve (2) and a 0 to 160 psig gage (1) or suitable substitutes installed on shop air supply source prior to the OBOGS Adapter Assembly Inlet. (Figure 4-6) shall be used for orientation of assembly.

26. Connect OBOGS Adapter Assembly Hose (11) to OBOGS Adapter Assembly INLET Port (6). Connect the other end of OBOGS Adapter Assembly Hose (11) to shop air source.

27. Turn on shop air supply. Pressure will be indicated on Shop Air Supply gage (1). At no time during operation shall Shop Air Supply gage (1) fall below 75 psig during the high-pressure swing.

28. Open OBOGS Adapter Assembly Bleed Ports (9) 1/4 to 1/2 turn until a slight bleed is present.

NOTE

Heaters will not be required if the air temperature is above 110°F. After concentrator warm-up has stabilized, either meter M2 or M3 should read zero. The other meter will cycle on and off. (It is possible for either heater to cycle during normal use.)

29. Set CONC ON switch (S1) to ON and record on a Performance Test Sheet the initial reading indicated on MOTOR SOLENOID indicator (M1) (initial reading 1.5 to 2.5 amps which decrease to a continuous reading of 1.5 to 2.5 amps).

30. Place CONC FLOW valve (V4) to the OPEN position.

31. Adjust OBOGS Adapter Assembly Regulator knob (4) until 25 psig is indicated on FLOW PRESSURE gage (G1) during high-pressure swing.

32. If readings are within tolerance, proceed to motor heater solenoid current test, paragraph 4-56. If readings are not within tolerance, refer to paragraph 4-63, Troubleshooting.

4-56. Motor Heater Solenoid Current Test. To perform the motor heater solenoid test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

NOTE

Meters M1, M2, and M3 should indicate as follows:
MOTOR SOLENOID (M1), 1.5 to 2.5 amps
HEATER NO. 1 (M2), 7 to 10 amps or monetary cycling
HEATER NO. 2 (M3), 7 to 10 amps or monetary cycling

1. Turn CONC ON switch (S1) to OFF then to ON, record reading from meter (M1) on performance test sheet.

2. If readings are within tolerance proceed to motor valve rpm test paragraph 4-57. If readings are not within tolerance refer to paragraph 4-63, Troubleshooting.

4-57. Motor Valve RPM Test. To perform the motor valve rpm test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

NOTE

When performing steps 1 and 2, the concentrator should cycle 11 to 13 times in one minute. The cycles will be indicated by a sudden rapid drop in pressure displayed on AIR/OXY PRESSURE gage (G1), followed by a return to normal pressure per revolution. Each pressure drop can be identified by exhaust air flowing through the muffler assembly attached to concentrator exhaust port.

1. Ensure PRESSURE SELECT valve (V1) is in the OXY FROM CONC position.

2. Count the number of pressure drops that occur during one minute, The number of pressure drops shall be 11 to 13. Record number of pressure drops on performance test sheet.

3. If the numbers of pressure drops are within tolerance proceed to pressure reducer test paragraph 4-58. If number of pressure drops are not within tolerance refer to paragraph 4-63, Troubleshooting.

4-58. Pressure Reducer Test. To perform the pressure reducer test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

NOTE

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Ensure PRESSURE SELECT valve (V1) is in the OXY FROM CONC position.

2. Adjust OBOGS ADAPTER OBOGS Adapter Assembly Regulator knob (4) until OBOGS Adapter Assembly Gage (5) indicates 60 ±1 psig during high-pressure swing. AIR/OXYGEN PRESSURE gage (G1) should indicate 30 to 37 psig during high-pressure swing. Record reading from AIR/OXYGEN PRESSURE gage (G1) on performance test sheet.

3. If reading from AIR/OXYGEN PRESSURE gage (G1) is within tolerance, proceed to internal leakage test, paragraph 4-59. If reading from AIR/OXYGEN PRESSURE gage (G1) is not within tolerance, refer to paragraph 4-63, Troubleshooting.

4-59. Internal Leakage Test. To perform the internal leakage test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

NOTE

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Adjust OBOGS Adapter Assembly Regulator knob (4) until OBOGS Adapter Assembly Gage (5) indicates 60 ±1 psig during high-pressure swing.

2. Ensure PRESSURE SELECT valve (V1) is in the OXY FROM CONC position.

3. Close CONC FLOW valve (V4).

4. Adjust OBOGS Adapter Assembly Regulator knob (4) until 10 psig is indicated on OBOGS Adapter Assembly Gage (5).

5. Record initial reading from AIR-OXY Pressure Gage (G 1) on performance test sheet.

NOTE

After taking initial reading in step 7, note time, and wait one minute then note pressure on AIR-OXY PRESSURE gage (G1). Pressure drop shall not exceed 3 psig. If pressure drop exceeds 3 psig, continue the test for 5 minutes pressure drop shall not exceed 15 psig. Record reading on performance test sheet.

6. Observe AIR-OXY PRESSURE gage (G1) for one minute, pressure drop shall not exceed 3 psig. Record reading on performance test sheet. If pressure drop exceeds 3 psig, continue test for 5 minutes. Pressure drop shall not exceed 15 psig. Record reading on performance test sheet.

7. Set CONC FLOW valve (V4) to OPEN position.

8. If final reading for internal leakage is within tolerance, proceed to oxygen flow and air filter bleed flow test (paragraph 4-60). If final reading for internal leakage test is not within tolerance, refer to paragraph 4-63, Troubleshooting.

4-60. Oxygen Flow Test and Air Filter Bleed Flow Test. To perform the oxygen flow test/filter drain test utilizing the OBOGS Adapter Assembly P/N 3248AS200-1, proceed as follows:

CAUTION

Ensure OXY EXHAUST port (J5) is not blocked.

NOTE

While performing the oxygen flow test, ensure that while the concentrator is operating (CONC ON switch (S1) is On) that the reading on Air Supply gage (1) has a peak reading of 75 psig or higher on the high pressure swing. If the pressure reading falls below 75 psig on the high swing, the air supply, concentrator filter assembly or OBOGS adapter filter system is inadequate and does not meet the specified requirements.

Figure 4-6 will be used for all index numbers throughout this procedure unless otherwise noted.

1. Adjust OBOGS Adapter Assembly Regulator knob (4) until 50 psig is indicated on OBOGS Adapter Assembly Gage (5).

2. Record on performance test sheet if air is bleeding through inlet filter assembly bleed orifice.

CAUTION

To prevent damage to FLOW PRESSURE gage (G2), slowly open FLOW PRESSURE CONTROL valve (RG2) while observing movement of gage (G2) indicator.

3. Adjust FLOW PRESSURE CONTROL valve (RG2) until 30 inH_2O indicated on FLOW PRESSURE gage (G2) on the high-pressure swing.

4. Adjust OBOGS Adapter Assembly Regulator knob (4) until 8 psig is indicated on AIR/OXY PRESSURE gage (G1) on the high-pressure swing.

5. Ensure CONC FLOW valve (V4) is in the OPEN position.

6. Set OXY ANALYZER valve (V3) to OPEN position.

7. Turn FLOW SELECT valve (V2) to HIGH position.

8. Adjust OBOGS Adapter Assembly Regulator knob (4) until to 8 psig as indicated on AIR/OXYGEN PRESSURE gage (G1) on the High Pressure Swing.

9. Maintain 30 inH_2O at high-pressure swing as indicated on FLOW PRESSURE gage (G2) on the high-pressure swing. Allow reading on % OXYGEN meter (M3) to stabilize approximately 5 minutes.

NOTE

When taking reading from AIR/OXY PRESSURE gage (G1), there will be a pressure swing. Record both the low and high-pressure indications on the performance test sheet.

10. Record readings from on AIR-OXYGEN PRESSURE gage (G1) and reading from % OXYGEN meter (M3) on performance test sheet. Readings shall meet the requirement listed on performance test sheet.

11. Turn FLOW SELECT valve (V2) to MED position and repeat steps 8 through 10.

12. Turn FLOW SELECT valve (V2) to LOW position and repeat steps 8 through 10.

13. Adjust OBOGS Adapter Assembly Regulator knob (4) until 25 psig as indicated on AIR-OXYGEN PRESSURE gage (G1) on the High Pressure Swing and repeat steps 7 through 12.

14. Repeat steps 8 through 10, with the following exception, pressure in step 8 shall be adjusted to 25 psig.

15. If readings are not within tolerance, refer to paragraph 4-63, Troubleshooting. If readings are within tolerance, secure test set and OBOGS Adapter Assembly as follows.

16. Turn FLOW SELECT valve (V2) to LOW position.

17. Back off OBOGS Adapter Assembly Regulator knob (4) until a zero pressure reading is indicated on OBOGS Adapter Assembly Gage (5) and AIR-OXYGEN PRESSURE gage (G1).

18. Turn FLOW PRESSURE CONTROL valve (RG2) counterclockwise until spring tension is released.

19. Set CONC ON switch (S1) to OFF.

20. Set CONC FLOW valve (V4) and OXY ANALYZER valve (V3) to CLOSED.

21. Turn OBOGS Adapter Assembly Valve (3) to OFF position.

22. Shutoff Air Source Supply Valve (2). Open OBOGS Adapter Assembly Bleed Ports (9) until Air Source gage (1) bleeds to zero psig.

23. Close Bleed Ports (9).

24. Set 28 V DC ON circuit breaker (CB1) to OFF. Turn 28 V DC power supply to test set OFF.

25. Remove 28 V DC power cable from 28-volt power supply and test set connector (J10) and install cap on connector (J10).

26. Remove concentrator cable assembly from 28 V DC CONC POWER (J11) and concentrator electrical connector. Install cap on connector (J11).

27. Remove OBOGS Adapter Assembly Inlet Hose (11) from OBOGS Adapter Assembly Inlet Connection (6) and Shop Air Source.

28. Disconnect OBOGS Adapter Assembly Outlet Hose (10) from OBOGS Adapter Assembly Outlet Port (8) and concentrator inlet port.

29. Remove concentrator outlet hose assembly from concentrator outlet fitting (2) and OXY FROM CONC fitting (J3) of test set.

30. Remove muffler assembly from concentrator.

31. Install protective shipping caps on all removed components and store in lid of test set.

32. Ensure switches and valves are in the same position as in Display Lamp Test paragraph 4-47, steps 1 through 8.

33. Ensure that test set caps, cover, and screw assemblies are installed on their applicable fittings.

34. Stow all test set components in test set, place test set lid on test set case. Secure lid to case by using the 8 latches attached to lid

35. Stow all OBOGS Adapter Assembly hoses in box and secure box.

4-61. TROUBLESHOOTING.

4-62. TROUBLESHOOTING (MODEL TTU-452A/E TEST SET ONLY). Troubleshooting is prepared in a logical sequence. Due to the complex wiring and etc., each step will identify the type of test or inspection (with tolerances) to be performed with the expected end results. All tests and steps permit only two outcomes. Each item to be replaced is identified in replacement steps. After performing a repair task, recheck the operation of the concentrator component. If the malfunction is corrected, that is the end of the procedure; if not, proceed to the next step in the troubleshooting table or to the next troubleshooting table indicated. Use troubleshooting tables 4-2 through 4-17 as applicable. Once the malfunction has been corrected, return to Bench Test procedures and continue bench testing the concentrator. To troubleshoot the concentrator, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—
As Required	Compound, Cleaning, Oxygen, Type IIA	MIL-C-81302 NIIN 00-105-3084
As Required	Compound, Leak Detection, Type 1	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	Cable Assembly, Concentrator	3306265-1
1	Cable Assembly, Power Supply	3306284-1
1	Concentrator Test Set Model TTU-452A/E	1779AS100-2 (CAGE 30003)
1	Multimeter	Fluke 77/AN (CAGE 89536) or equivalent
1	Wire, Lead, Test	ALB24RED (CAGE 05276) NIIN 00-175-1418
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent

NOTE

When troubleshooting components which do not have electrical wiring or do not receive power through the electronics box assembly, performance of steps 1 through 7 is not necessary.

1. Turn off shop air supply and all power to test set.

2. Disconnect concentrator from test set, but do not remove test set 28 Vdc cable assemblies (P/N 3306284-1 or 3306265-1), since they will be needed for troubleshooting to isolate the malfunction.

NOTE

Index numbers in steps 3, 4, and 5, refer to figure 4-7.

3. Remove pressure reducer assembly (1) from concentrator by cutting tiedown straps (2), remove two screws (3) washers (4), two screws (5) washers (6) and performed packings (7) and (8).

4. Remove five screws (9) securing cover (10) to terminal strip (11). Cut and remove two tiedown straps (12).

CAUTION

Cover is secured to terminal strip with adhesive and may be difficult to remove. Pry cover off taking care not to damage or break electrical wiring or terminal cover.

5. Remove cover (10) from terminal strip (11).

NOTE

Tag all electrical leads prior to removing.

CAUTION

Electrical leads and attaching hardware of the terminal strip are installed and secured in place with a coating of RTV silicon adhesive. Use extreme care during disassembly.

6. Carefully remove RTV adhesive covering screws securing leads of three thermistor wires at terminals 1 and 2 (figure 4-8) and remove screws. Place blade of screwdriver flat under terminal lead and carefully press down and back until lead is free of terminal board. Repeat for all leads to be removed. Carefully remove remaining RTV adhesive.

7. Connect concentrator cable assembly (P/N 3306265-1) from test set to concentrator electrical connector (13, figure 4-7).

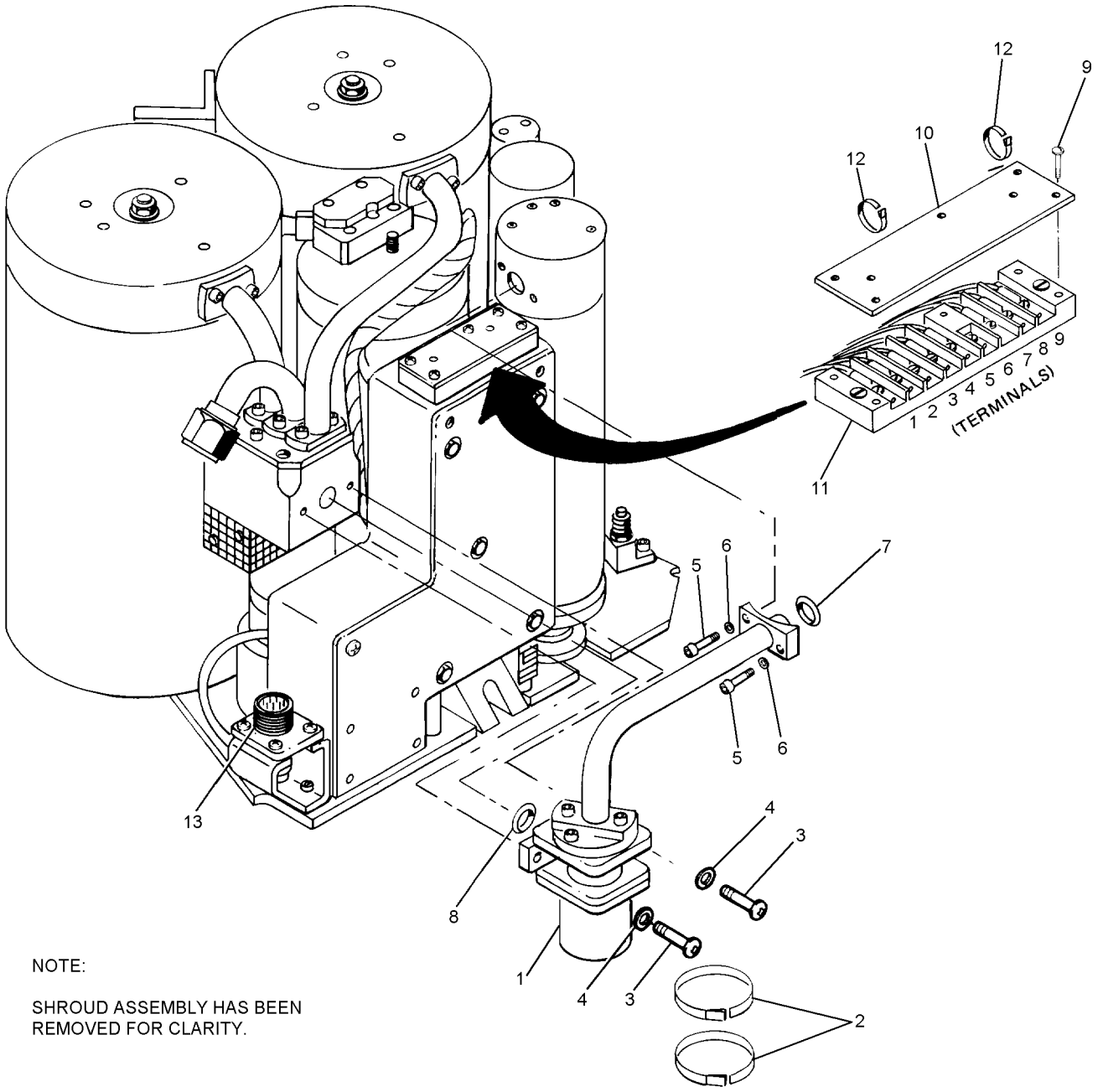
WARNING

Operating heater for more than one minute without air flowing through concentrator will cause heater and inlet fitting to become very hot and could cause severe burns when touched, or result in damage to the concentrator. Limit heater operation to time required to obtain reading then disable heater by turning CONC switch (S1) to OFF.

NOTE

Terminals 1, 2, and 3 limited current voltage with limited current. Connections may be made with concentrator and test set with power on without risk. Terminals 4 and 5 are 20 to 30 Vdc and terminals 7 and 9 are each less than 30 Vac. Terminal 8 can reach peak voltages of 90 Vac, which is not considered hazardous.

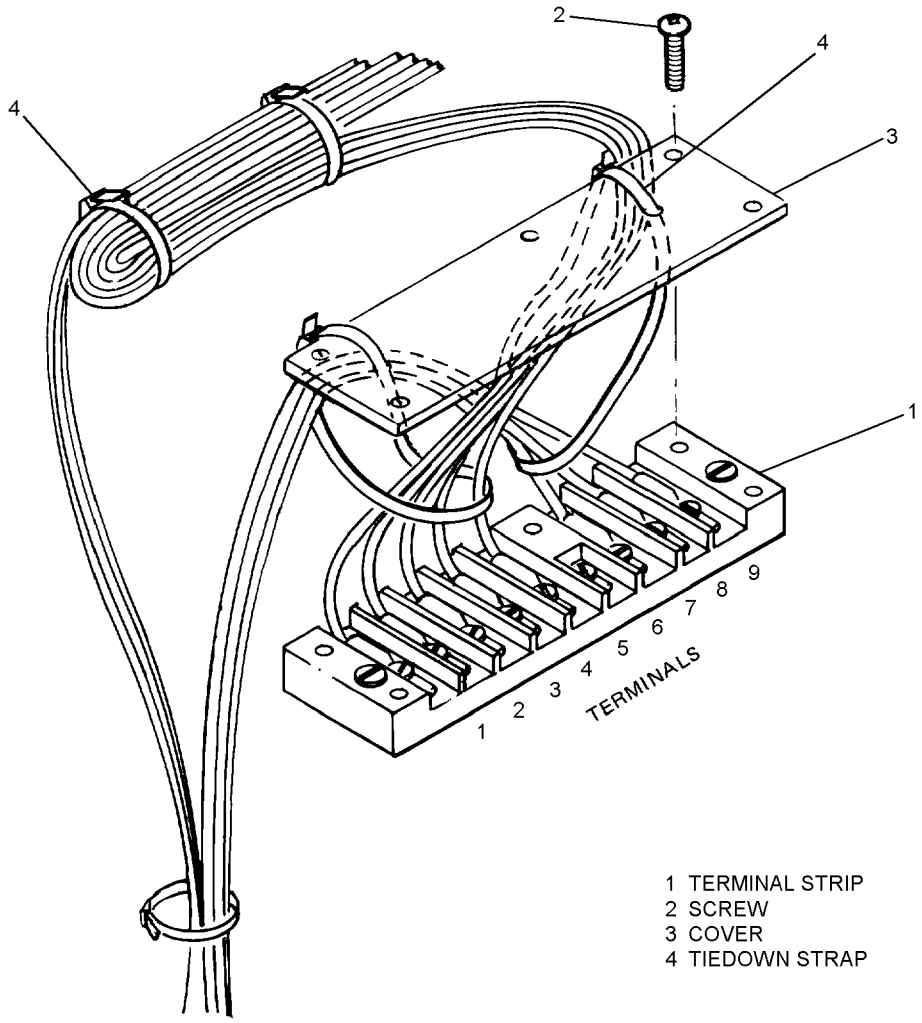
8. Troubleshooting the concentrator using troubleshooting tables 4-2 through 4-16 as applicable.

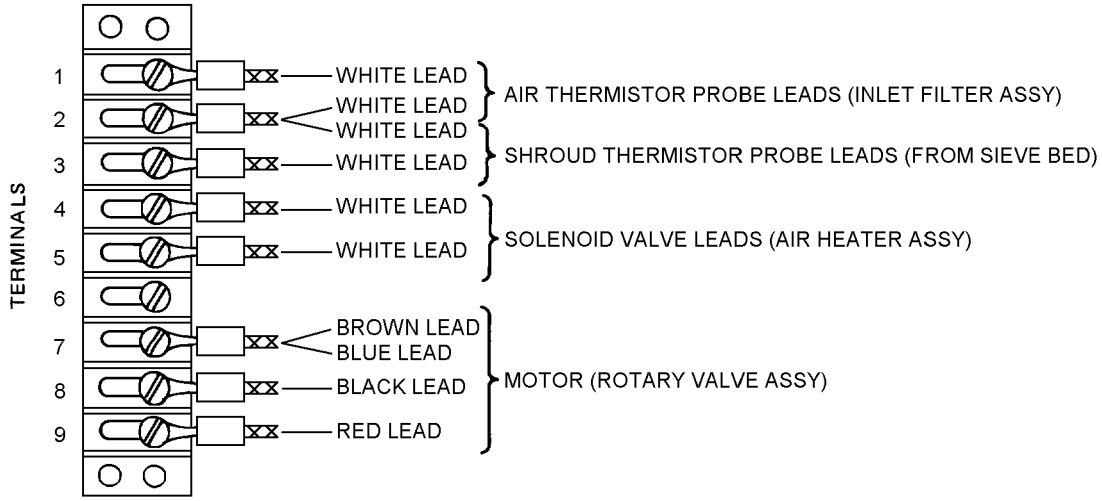


1. PRESSURE REDUCER ASSEMBLY
2. TIEDOWN STRAPS
3. SCREW
4. WASHER
5. SCREW
6. WASHER
7. PREFORMED PACKING
8. PREFORMED PACKING
9. SCREW
10. COVER
11. TERMINAL STRIP
12. TIEDOWN STRAP
13. RECEPTACLE CONNECTOR

004007

Figure 4-7. Troubleshooting Set-up





004008

Figure 4-8. Terminal Strip Wiring

4-63. TROUBLESHOOTING (MODEL TTU-518A/E TEST SET ONLY). Troubleshooting is prepared in a logical sequence. Due to the complex wiring and etc., each step will identify the type of test or inspection (with tolerances) to be performed with the expected end results. All tests and steps permit only two outcomes. Each item to be replaced is identified in replacement steps. After performing a repair task, recheck the operation of the concentrator component. If the malfunction is corrected, that is the end of the procedure; if not, proceed to the next step in the troubleshooting table or to the next troubleshooting table indicated. Use troubleshooting tables 4-3 through 4-17 as applicable. Once the malfunction has been corrected, return to Bench Test procedures and continue bench testing the concentrator. To troubleshoot the concentrator, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Air, Pressurized, Clean and Dry	—
As Required	Aviators Breathing Oxygen	MIL-O-27210
As Required	Compound, Cleaning, Oxygen, Type IIA	MIL-C-81302 NIIN 00-105-3084
As Required	Compound, Leak Detection, Type 1	MIL-L-25567

Support Equipment Required

Quantity	Description	Reference Number
1	Cable Assembly, Concentrator	1779AS127-1
1	Cable Assembly, Power Supply	1779AS180-1
1	Concentrator Test Set Model TTU-518A/E	1779AS500-2 (CAGE 30003)
1	Multimeter	Fluke 77/AN (CAGE 89536) or equivalent
1	Wire, Lead, Test	ALB24RED (CAGE 05276) NIIN 00-175-1418
1	Regulator, Pressure	283028-0001 (CAGE 99657) NIIN 01-101-8827 or equivalent

NOTE

When troubleshooting components which do not have electrical wiring or do not receive power through the electronics box assembly, performance of steps 1 through 7 is not necessary.

1. Turn off shop air supply and all power to test set.

2. Disconnect concentrator from test set, but do not remove test set 28 Vdc cable assemblies (P/Ns 1779AS180-1 or 1779AS127-1), since they will be needed for troubleshooting to isolate the malfunction.

NOTE

Index numbers in steps 3, 4, and 5, refer to figure 4-7.

3. Remove pressure reducer assembly (1) from concentrator by cutting tiedown straps (2), remove two screws (3) washers (4), two screws (5) washers (6) and performed packings (7) and (8).

4. Remove five screws (9) securing cover (10) to terminal strip (11). Cut and remove two tiedown straps (12).

CAUTION

Cover is secured to terminal strip with adhesive and may be difficult to remove. Pry cover off taking care not to damage or break electrical wiring or terminal cover.

5. Remove cover (10) from terminal strip (11).

NOTE

Tag all electrical leads prior to removing.

CAUTION

Electrical leads and attaching hardware of the terminal strip are installed and secured in place with a coating of RTV silicon adhesive. Use extreme care during disassembly.

6. Carefully remove RTV adhesive covering screws securing leads of three thermistor wires at terminals 1 and 2 (figure 4-8) and remove screws. Place blade of screwdriver flat under terminal lead and carefully press down and back until lead is free of terminal board. Repeat for all leads to be removed. Carefully remove remaining RTV adhesive.

7. Connect concentrator cable assembly (P/N 1779AS127-1) from test set to concentrator electrical connector (13, figure 4-7).

WARNING

Operating heater for more than one minute without air flowing through concentrator will cause heater and inlet fitting to become very hot and could cause severe burns when touched or result in damage to the concentrator. Limit heater operation to time required to obtain reading then disable heater by turning CONC switch (S1) to OFF.

NOTE

Terminals 1, 2, and 3 limited current voltage with limited current. Connections may be made with concentrator and test set with power on without risk. Terminals 4 and 5 are 20 to 30 Vdc and terminals 7 and 9 are each less than 30 Vac. Terminal 8 can reach peak voltages of 90 Vac, which is not considered hazardous.

8. Troubleshooting the concentrator using troubleshooting tables 4-2 through 4-17 as applicable.

Table 4-2. Troubleshooting (Heater No. 1 (M2) and Heater No. 2 (M3) (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
Test set meter (M2) and (M3) both indicate 7 to 10 amps and do not cycle on to off.	Thermistor (RT1) leads are open in circuit, electronics box has shorted output transistor or heater drive circuit.	Isolate and repair by performing steps below.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Turn on 28 Vdc POWER supply and set CONC circuit breaker (CB1) test set POWER to ON position.

2. Attach test lead wire (P/N ALB24RED) to terminals (1) and (2) of terminal strip (figure 4-8) and observe HEATER gages (M2) and (M3) of test set.

3. If jump across terminals (1) and (2) does not cause (M2) and (M3) to go to zero, replace electronics box.

4. If jump across terminals (1) and (2) causes (M2) and (M3) to go to zero, perform the following:

   a. Check thermistor (RT1) wires for broken wire, defective terminal connection or other open circuit using Fluke 77/AN multimeter.

   b. Normal resistance of the thermistor (RT1) is 6000 to 16,000 ohms depending on temperature. If reading on multimeter is between 6000 to 16,000 ohms, locate and repair defective wires.

   c. Reassemble concentrator and continue Bench Test.

Table 4-3. Troubleshooting (Heater No. 1 (DS4) and Heater No. 2 (DS5) (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
Test set meter (DS4) and (DS5) are both on and do not cycle on to off.	Thermistor RT1 leads are open in circuit, electronics box has shorted output transistor or heater drive circuit.	Isolate and repair by performing steps below.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Turn on 28 Vdc POWER supply and set CONC circuit breaker (CB1) test set POWER to ON position.

2. Attach test lead wire (P/N ALB24RED) to terminals (1) and (2) of terminal strip (figure 4-8) and observe HEATER gages (DS2) and (DS3) of test set.

3. If jump across terminals (1) and (2) does not cause (DS4) and (DS5) to go off, replace electronics box.

4. If jump across terminals (1) and (2) causes (DS4) and (DS5) to go off, perform the following:

   a. Check thermistor (RT1) wires for broken wire, defective terminal connection or other open circuit using Fluke 77/AN multimeter.

   b. Normal resistance of the thermistor (RT1) is 6000 to 16,000 ohms depending on temperature. If reading on multimeter is between 6000 to 16,000 ohms, locate and repair defective wires.

   c. Reassemble concentrator and continue Bench Test.

Table 4-4. Troubleshooting (Pressure Reducer (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
AIR-OXY PRESSURE gage (G1) indicates above 37 psig.	Pressure reducer set to high.	Replace pressure reducer.
AIR-OXY PRESSURE gage (G1) indicates below 30 psig.	Pressure reducer set to low.	Replace pressure reducer.
AIR-OXY PRESSURE gage (G1) indicates between 30 to 37 psig, but continues to creep slowly.	Pressure reducer leaking.	Replace pressure reducer.

Table 4-5. Troubleshooting (Pressure Reducer (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
OXY FROM CONC gage (G1) indicates above 37 psig.	Pressure reducer set to high.	Replace pressure reducer.
OXY FROM CONC gage (G1) indicates below 30 psig.	Pressure reducer set to low.	Replace pressure reducer.
OXY FROM CONC gage (G1) indicates between 30 to 37 psig, but continues to creep slowly.	Pressure reducer leaking.	Replace pressure reducer.

Table 4-6. Troubleshooting (Heater No. 1 (M2) and Heater No. 2 (M3) (Do Not Indicate 7 to 10 amps) (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
Test set meter (M2) and (M3) do not indicate 7 to 10 amps when 28 Vdc POWER is turned on.	Thermistor (RT1) is shorted, open circuits(s) in electronics box heater circuits/elements.	Isolate and repair by performing steps below.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Turn on 28 Vdc POWER supply and observe test set meters (M2) and (M3).

2. If both meters (M2) and (M3) indicate 7 to 10 amps; visually inspect thermistor (RT1) lead for worn insulation or bare wires which could cause a short across terminals 1 and 2. If wires can be repaired; repair wires, reassemble concentrator and continue Bench Test. If wires cannot be repaired; change electronics box, reassemble concentrator and continue Bench Test.

3. If both meters (M2) and (M3) do not indicate 7 to 10 amps, the electronics box is defective or the heater elements are open, perform the following:

   a. Gain access to the two pairs of heater wires (two each have blue tracer color/two each have green tracer color) that contain crimp splices connecting them to the electronic box.

   b. Cut the two pairs of heater wires close to the splices and check the dc resistance.

   c. Using Fluke 77/AN multimeter, measure the resistance between the two blue tracer wires, then measure the resistance between the two green tracer wires. If measured resistance is not approximately 3 ohms, replace heater assembly. If measure resistance is approximately 3 ohms, replace electronics box assembly.

4. Reassemble concentrator and continue Bench Test.

Table 4-7. Troubleshooting (Heater No. 1 (DS4) and Heater No. 2 (DS5) (Lamps Do Not Illuminate) (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
Test set lamp (DS4) and (DS5) do not illuminate when 28 Vdc POWER is turned on.	Thermistor (RT1) is shorted, open circuit(s) in electronics box heater circuits/elements.	Isolate and repair by performing steps below.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Turn on 28 Vdc POWER supply and observe test set lamps (DS4) and (DS5).

2. If both lamps (DS4) and (DS5) illuminate; visually inspect thermistor (RT1) lead for worn insulation or bare wires which could cause a short across terminals 1 and 2. If wires can be repaired; repair wires, reassemble concentrator and continue Bench Test. If wires cannot be repaired; change electronics box, reassemble concentrator and continue Bench Test.

3. If both lamps (DS4) and (DS5) do not illuminate, the electronics box is defective or the heater elements are open, perform the following:

   a. Gain access to the two pairs of heater wires (two each have blue tracer color/two each have green tracer color) that contain crimp splices connecting them to the electronic box.

   b. Cut the two pairs of heater wires close to the splices and check the dc resistance.

   c. Using Fluke 77/AN multimeter, measure the resistance between the two blue tracer wires, then measure the resistance between the two green tracer wires. If measured resistance is not approximately 3 ohms, replace heater assembly. If measured resistance is approximately 3 ohms, replace electronics box assembly.

4. Reassemble concentrator and continue Bench Test.

Table 4-8. Troubleshooting (Motor/Solenoid Meter (M1) (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
MOTOR/SOLENOID meter (M1) does not indicate 2.5 amps on initial turn on and then reduce to 1.8 after warm-up.	Shroud heater solenoid, temperature sensing thermistors, or electronics box has electrical failure. Temperature between molecular sieve beds is above 80°F.	Isolate and repair by performing steps below.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Disable heater circuits by connecting test lead wire from terminal 1 to terminal 2 on terminal strip.
2. Turn on 28 Vdc POWER supply to concentrator.
3. Turn CONC circuit breaker switch (CB1) to ON position and verify that air heaters have been disabled by observing that meters (M2) and (M3) remain at zero.
4. Disconnect the thermistor (RT2) lead from terminal 3 of the terminal strip.
   a. If the current on meter (M1) increases, the thermistor (RT2) or lead wires are shorted. Find the short and repair wires (if possible), reassemble concentrator and continue bench.
   b. If the current on meter (M1) does not increase or the wires in step 4a above are not repairable, go to step 5.
5. Install test lead wire between terminals 2 and 3 on terminal strip.
6. Using Fluke 77/AN multimeter, measure Vdc between terminals 5 and 6 on terminal strip. Terminal 6 will be negative.
7. If terminal 5 reading is not +24 to +34 Vdc relative to terminal 6, go to step 8.
8. Measure Vdc between terminal 6 and terminal 4.
9. If terminal 4 is not +24 to +34 Vdc relative to terminal 6, perform the following:
   a. Check solenoid valve leads for broken wires or defective terminals by measuring solenoid coil resistance using Fluke 77/AN multimeter. If resistance reading is not between 80 to 100 ohms, repair or replace solenoid valve, reassemble concentrator, and continue to Bench Test.
   b. If terminal 4 is +24 to +34 Vdc relative to terminal 6, or if resistance reading in step 4a. above is 80 to 100 ohms, go to step 10 below.
10. Remove test lead wire from terminals 2 and 3 of terminal strip.
    a. Measure Vdc between terminal 6 (negative) and terminal 4 (positive). If the voltage decreases to less than +2 Vdc, reassemble concentrator and continue to Bench Test.
    b. If the voltage does not decrease to less than +2 Vdc, replace electronics box, reassemble concentrator, and continue to Bench Test.

Table 4-9. Troubleshooting (Motor/Solenoid Meter (M1) (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
28 V MOTOR meter (M1) does not indicate 2.5 amps on initial turn on and then reduce to 1.8 amps after warm-up.	Shroud heater solenoid, temperature sensing thermistors, or electronics box has electrical failure. Temperature between molecular sieve beds is above 80°F.	Isolate and repair by performing steps below.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Disable heater circuits by connecting test lead wire from terminal 1 to terminal 2 on terminal strip.
2. Turn on 28 Vdc POWER supply to concentrator.
3. Turn 28 VDC ON circuit breaker switch (CB1) to ON position and verify that air heaters have been disabled by observing that lamps (DS4) and (DS5) remain off.
4. Disconnect the thermistor (RT2) lead from terminal 3 of the terminal strip.
   a. If the current on meter (M1) increases, the thermistor (RT2) or lead wires are shorted. Find the short and repair wires (if possible), reassemble concentrator and continue Bench Test.
   b. If the current on meter (M1) does not increase or the wires in step 4a above are not repairable, go to step 5.
5. Install test lead wire between terminals 2 and 3 on terminal strip.
6. Using Fluke 77/AN multimeter, measure Vdc between terminals 5 and 6 on terminal strip. Terminal 6 will be negative.
7. If terminal 5 reading is not +24 to +34 Vdc relative to terminal 6, go to step 8.
8. Measure Vdc between terminal 6 and terminal 4.
9. If terminal 4 is not +24 to +34 Vdc relative to terminal 6, perform the following:
   a. Check solenoid valve leads for broken wires or defective terminals by measuring solenoid coil resistance using Fluke 77/AN multimeter. If resistance reading is not between 80 to 100 ohms, repair or replace solenoid valve, reassemble concentrator, and continue to Bench Test.
   b. If terminal 4 is +24 to +34 Vdc relative to terminal 6, or if resistance reading in step 4a. above is 80 to 100 ohms, go to step 10 below.
10. Remove test lead wire from terminals 2 and 3 of terminal strip.
    a. Measure Vdc between terminal 6 (negative) and terminal 4 (positive). If the voltage decreases to less than +2 Vdc, reassemble concentrator and continue to Bench Test.
    b. If the voltage does not decrease to less than +2 Vdc, replace electronics box, reassemble concentrator, and continue to Bench Test.

Table 4-10. Troubleshooting (Heater No. 1 and Heater No. 2 (Meters M2 and M3) (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
Do not indicate 7 to 10 amps current on meters (M2) and (M3) and thermistor leads are not identified. To isolate trouble, identify thermistor leads, repair concentrator, perform the following steps:		

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Turn 28 Vdc POWER supply on.
2. Turn CONC circuit breaker (CB1) to ON position.
3. Set Fluke 77/AN multimeter to read 5000 to 20,000 ohms.
4. Connect Fluke 77/AN multimeter leads to terminals of a pair of thermistor leads and note resistance value. Then spray the thermistor with cleaning compound or a cool mist and note resistance valve when thermistor is cooled.
   a. If the resistance value reading increases when thermistor is cooled, tag leads 2 and 3 as shroud thermistor leads.
   b. If the resistance value reading does not increase when thermistor is cooled, repeat step 4 with the other pair of thermistor leads.

Table 4-11. Troubleshooting (Heater No. 1 and Heater No. 2 (Lamps DS4 and DS5) (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
Lamps (DS4) and (DS5) remain off and thermistor leads are not identified. To isolate trouble, identify thermistor leads, repair concentrator, perform the following steps:		

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

1. Turn 28 Vdc POWER supply on.
2. Turn 28 Vdc ON circuit breaker (CB1) to ON position.
3. Set Fluke 77/AN multimeter to read 5000 to 20,000 ohms.
4. Connect Fluke 77/AN multimeter leads to terminals of a pair of thermistor leads and note resistance value. Then spray the thermistor with cleaning compound or a cool mist and note resistance valve when thermistor is cooled.
   a. If the resistance value reading increases when thermistor is cooled, tag leads 2 and 3 as shroud thermistor leads.
   b. If the resistance value reading does not increase when thermistor is cooled, repeat step 4 with the other pair of thermistor leads.

Table 4-12. Troubleshooting (Rotary Valve (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
Rotary valve does not operate, no pressure cycles (high to low flow) at output of concentrator.	Voltage problem to rotary valve assembly and motor or electronics box has an open circuit. Resistance or rotary valve and motor or electronics box is not within 200 ohms.	Isolate and repair by performing steps below.

WARNING

Disable heater circuit by connecting test lead wire from terminal 1 to terminal 2. Observe meters (M2) and (M3) and ensure they remain at zero.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

Due to the complexity of the troubleshooting procedures for the rotary valve assembly the following yes/no check sheet is provided. When performing test, if the answer is yes/no, go to step indicated in the yes/no column.

	Procedures	Yes	No
1.	Turn on 28 Vdc power to concentrator and measure ac voltage between terminals 7 and 9. Is voltage 20 to 35 Vac?	2	4
2.	Measure and record ac voltage between terminals 7 and 8. Is voltage greater than 50 Vac?	3	7
3.	AC voltage is normal. Turn off power to test set, disconnect leads and continue Bench Test.	—	—
	NOTE Disconnect motor leads from terminals 7, 8, and 9 on terminal strip before continuing fault isolation.		
4.	Measure resistance between red and brown motor leads. Is resistance 0.2 to 0.4 ohms?	5	12
5.	Measure resistance between black and blue motor leads. Is resistance 3.0 to 3.2 ohms?	6	12

Table 4-12. Troubleshooting (Rotary Valve (Model TTU-452A/E Test Set)) (Cont)

Procedures	Yes	No
NOTE Brown and blue leads are connected together for the following step.		
6. Measure resistance between red and black motor leads. Is resistance 3.2 to 3.6 ohms or the sum of measurements from steps 4 and 5?	7	12
7. Measure dc resistance between terminals 8 and 9 on test terminal strip on electronics box assembly to determine if capacitor C9 is shorted. Is resistance greater than 200 K ohms?	8	13
8. Measure dc resistance between terminals 7 and 8 on test terminal strip on electronics box assembly to determine if power transistor is shorted or leaking.	—	—
9. Measure dc resistance between terminals 7 and 9 on test terminal strip on electronics box assembly to determine if power transistor is shorted or leaking.	—	—
a. Record resistance.	—	—
b. Turn on 28 Vdc to concentrator.	—	—
c. Is resistance greater than 200 K ohms with either polarity?	10	13
10. Do the following substeps to test electronic box assembly:	—	—
a. Connect power cable from concentrator to the test set.	—	—
b. Turn on 28 Vdc to concentrator.	—	—
c. Measure ac voltage between terminals 7 to 9 to test oscillator and power output stages.		
d. Is ac voltage 20 to 30 Vac?	11	13
11. Do the following substeps to test continuity of capacitor C9:	—	—
a. Measure ac voltage between terminals 7 and 8.	—	—
b. Is AC voltage 20 to 30 Vac?	12	13
12. Repair wires or replace rotary valve assembly. Continue Bench Test.	—	—
13. Replace electronics box assembly and both thermistor probe leads. Continue Bench Test.	—	—

Table 4-13. Troubleshooting (Rotary Valve (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
Rotary valve does not operate, no pressure cycles (high to low flow) at output of concentrator.	Voltage problem to rotary valve assembly and motor or electronics box has an open circuit. Resistance or rotary valve and motor or electronics box is not within 200 ohms.	Isolate and repair by performing steps below.

WARNING

Disable heater circuit by connecting test lead wire from terminal 1 to terminal 2. Observe lamps (DS4) and (DS5) and ensure they remain at zero.

NOTE

CONC ON/OFF switch (S1) must be in ON position in order to take readings. Place S1 in OFF position after readings are obtained.

Due to the complexity of the troubleshooting procedures for the rotary valve assembly, the following yes/no check sheet is provided. When performing test, if the answer is yes/no, go to step indicated in the yes/no column.

Procedures	Yes	No
1. Turn on 28 Vdc power to concentrator and measure ac voltage between terminals 7 and 9. Is voltage 20 to 35 Vac?	2	4
2. Measure and record ac voltage between terminals 7 and 8. Is voltage greater than 50 Vac?	3	7
3. AC voltage is normal. Turn off power to test set, disconnect leads and continue Bench Test.	—	—
NOTE Disconnect motor leads from terminals 7, 8, and 9 on terminal strip before continuing fault isolation.		
4. Measure resistance between red and brown motor leads. Is resistance 0.2 to 0.4 ohms?	5	12
5. Measure resistance between black and blue motor leads. Is resistance 3.0 to 3.2 ohms?	6	12

Table 4-13. Troubleshooting (Rotary Valve (Model TTU-518A/E Test Set)) (Cont)

Procedures	Yes	No
NOTE Brown and blue leads are connected together for the following step.		
6. Measure resistance between red and black motor leads. Is resistance 3.2 to 3.6 ohms or the sum of measurements from steps 4 and 5?	7	12
7. Measure dc resistance between terminals 8 and 9 on test terminal strip on electronics box assembly to determine if capacitor C9 is shorted. Is resistance greater than 200 K ohms?	8	13
8. Measure dc resistance between terminals 7 and 9 on test terminal strip on electronics box assembly to determine if power transistor is shorted or leaking.	—	—
9. Measure dc resistance between terminals 7 and 9 on test terminal strip on electronics box assembly to determine if power transistor is shorted or leaking.	—	—
a. Record resistance.	—	—
b. Reverse ohmmeter leads and take second reading.	—	—
c. Is resistance greater than 200 K ohms with either polarity?	10	13
10. Do the following substeps to test electronic box assembly:	—	—
a. Connect power cable from concentrator to the test set.	—	—
b. Turn on 28 Vdc to concentrator.	—	—
c. Measure ac voltage between terminals 7 to 9 to test oscillator and power output stages.		
d. Is ac voltage 20 to 30 Vac?	11	13
11. Do the following substeps to test continuity of capacitor C9.	—	—
a. Measure ac voltage between terminals 7 and 8.	—	—
b. Is AC voltage 20 to 30 Vac?	12	13
12. Repair wires or replace rotary valve assembly. Continue Bench Test.	—	—
13. Replace electronics box assembly and both thermistor probe leads. Continue Bench Test.	—	—

Table 4-14. Troubleshooting (Internal/External Leakage (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
Internal/external leakage exceed 3 psig per minute or 15 psig in 5 minutes.	Foreign material, dirt, loose screws, defective performed packing etc. Check valve assemblies defective.	Isolate and repair by performing steps below.

NOTE

Ensure all test set hose assemblies from test set to concentrator are properly attached and not leaking.

1. Using leak detection compound, inspect concentrator for external leakage as indicated by bubbles.

   a. If external leak is detected, visually inspect for foreign matter, defective component parts or other obvious damage; clean, repair, or replace component parts as necessary and continue Bench Test.

   b. If no external leak is detected and check valve assemblies were not replaced in step 1a; remove and replace check valve assemblies and continue Bench Test.

Table 4-15. Troubleshooting (Internal/External Leakage (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
Internal/external leakage exceed 3 psig per minute or 15 psig in 5 minutes.	Foreign material, dirt, loose screws, defective performed packing etc. Check valve assemblies defective.	Isolate and repair by performing steps below.

NOTE

Ensure all test set hose assemblies from test set to concentrator are properly attached and not leaking.

1. Using leak detection compound, inspect concentrator for external leakage as indicated by bubbles.

   a. If external leak is detected, visually inspect for foreign matter, defective component parts or other obvious damage; clean, repair, or replace component parts as necessary and continue Bench Test.

   b. If no external leak is detected and check valve assemblies were not replaced in step 1a; remove and replace check valve assemblies and continue Bench Test.

Table 4-16. Troubleshooting (Oxygen Flow Test (Model TTU-452A/E Test Set))

Trouble	Probable Cause	Remedy
Concentrator does not produce minimum required oxygen % during flow test or AIR-OXY PRESSURE gage (G1) readings do not fall within minimum and maximum allowable tolerances.	**NOTE** When Troubleshooting Oxygen Flow Test only, perform one probable cause and remedy at a time, then return to Bench Test to see if concentrator passes Oxygen Flow Test.	
	Oxygen monitor of test set not set properly or needs replacing.	Test monitor on test set or replace as required.
	Filter tube element dirty and clogged.	Replace filter tube element.
	Sieve beds contaminated.	Replace sieve beds.

Table 4-17. Troubleshooting (Oxygen Flow Test (Model TTU-518A/E Test Set))

Trouble	Probable Cause	Remedy
Concentrator does not produce minimum required oxygen % during flow test or AIR-OXY PRESSURE gage (G1) readings do not fall within minimum and maximum allowable tolerances.	**NOTE** When Troubleshooting Oxygen Flow Test only, perform one probable cause and remedy at a time, then return to Bench Test to see if concentrator passes Oxygen Flow Test.	
	Oxygen sensor of test set not set properly or needs replacing.	Reset sensor gain on test set or replace oxygen sensor.
	Filter tube element dirty and clogged.	Replace filter tube element.
	Sieve beds contaminated.	Replace sieve beds.

4-64. DISASSEMBLY.

4-65. Disassemble the OEAS oxygen concentrator using index numbers assigned to the figure referred to unless otherwise noted. Disassemble the OEAS oxygen concentrator only as far as required to correct any malfunction. Some components can be removed from the concentrator without first removing the mounting plate (3, figure 4-12) and stabilizer plate (2, figure 4-13).

CAUTION

All disassembly, inspection, repair, and assembly must be done on clean benches having good lighting and in an area provided with air conditioning or air filtering. Walls, floor, and ceiling should have a smooth finish and be painted with non-chalking paint which can be kept clean and dust free.

NOTE

It is desirable to keep all parts for each individual component separated. Make careful note of the location and quantity of all parts. Plastic partitioned boxes with covers or similar storage facilities should be used to keep the parts segregated and protected from dirt and moisture. Plastic bags are also useful for storing subassemblies and component parts after cleaning and inspection until ready for assembly.

4-66. SHROUD ASSEMBLY REMOVAL. To remove the Shroud Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealing	—
As Required	Tape, Pressure Sensitive	PPP-T-42

Support Equipment Required

Quantity	Description	Reference Number
1	Board, Peg	Fabricate IAW figure 4-9
9	Bolts, Cut-off	AN-5-24 NIIN 00-151-0917 Fabricate IAW figure 4-10
1	Heater, Gun Type	MIL-H-45193C (CAGE 891349) NIIN 00-561-1002

WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen equipment. Oil, even in minute quantity, coming in contact with oxygen can cause explosion or fire. Dust, lint, and fine metal particles are also dangerous.

NOTE

Index numbers refer to figure 4-11 unless otherwise noted.

1. Loosen nut (1) on diffuser tube (2) and disconnect tube (2) from solenoid valve (3). Tape nut (1) to top of tube (2) with pressure sensitive tape.

2. Remove screw (4), lockwasher (5) and flat washers (6) and (7) that secure outlet fitting (8) to mounting plate (9).

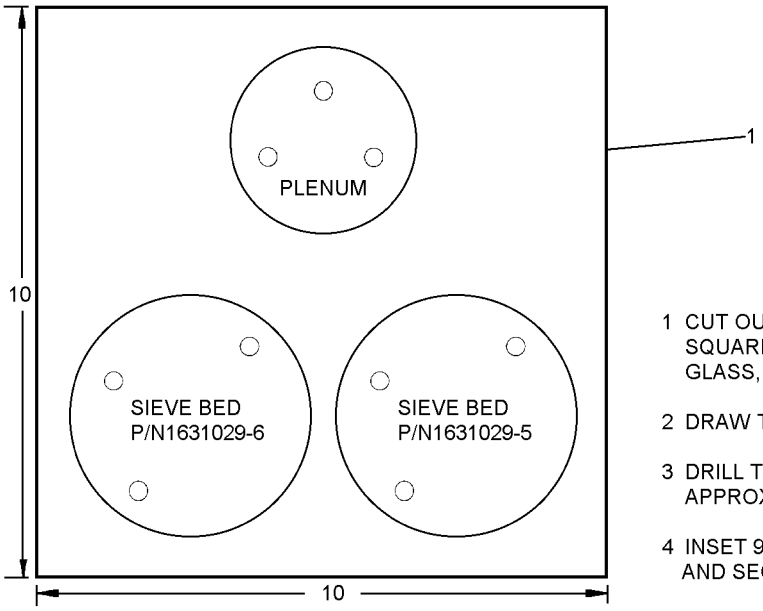
CAUTION

Use care when removing potting compound from electrical connector bracket so as not to damage wiring.

3. Remove four screws (10) and lockwashers (11) securing receptacle connector (12) to electrical connector bracket (13) and remove receptacle connector (12) from electrical connector bracket (13) by carefully removing potting compound.

4. Remove electrical connector bracket (13) from mounting plate (16) by removing two screws (14) and lockwashers (15).

5. Turn concentrator over so that mounting plate (16) is on top.



NOTE

1 CUT OUT A BOARD (1) APPROXIMATELY 10 INCHES SQUARE OUT OF SUITABLE MATERIAL (WOOD, PLEXI-GLASS, ETC.).

2 DRAW THREE CIRCLES AND LABELS AS SHOWN.

3 DRILL THREE HOLES (5/16" DIA) IN EACH CIRCLE IN APPROXIMATE LOCATIONS AS SHOWN.

4 INSET 9 BOLTS (APPROXIMATELY 2" LONG 1/4" DIA) AND SECURE WITH NUTS.

004009

Figure 4-9. Peg Board for Plenum and Sieve Bed Spacers

WARNING

When performing steps 6 through 10, it will be necessary to heat screws to facilitate easy removal. The heat gun can generate extreme heat that can cause severe burns.

CAUTION

Use correct size screwdrivers, wrench and other tools to prevent damage to screws, nuts and etc.

NOTE

Index numbers refer to figure 4-12 unless otherwise noted.

6. Remove three screws (1) and lockwashers (2) securing mounting plate (3) to rotary valve assembly (4).

7. Remove two screws (5), two screws (6) with spacers (19), and two screws (7) with spacers (20) securing mounting plate (3) to electronics box assembly (8). Remove two screws (34) from electronics box assembly (8).

NOTE

When performing step 8, remove one screw at a time and install cut-off bolt (figure 4-10) in the screw hole from which the screw was removed. This procedure will prevent height adjustment washers from moving out of position.

8. Remove nine screws (9) from mounting plate (3) and install nine cut-off bolts (figure 4-10) in their place.

9. Remove two screws (10) securing mounting plate (3) to inlet filter assembly (11).

10. Remove two screws (12) securing mounting plate (3) to air heater assembly (13).

NOTE

Nut plate (14) and two cushion straps (15) have been secured to base of air heater assembly (13) with sealing compound. Do not remove unless replacing air heater assembly.

When performing step 11, ensure height adjustment washers do not move.

11. Carefully lift mounting plate (3) with attached shroud assembly (31); then remove outlet fitting (33), mounting plate (3), and shroud assembly (31) from concentrator.

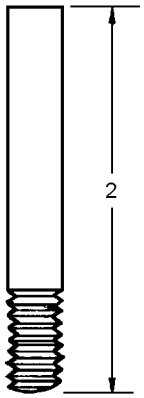


Figure 4-10. Cut-off Bolt for Disassembly and Assembly

NOTE

When performing step 12, place height adjustment washers on peg board (figure 4-9) in the same location on peg board as removed from two sieve beds and plenum assembly. During assembly, the height adjustment washers must be replaced in the same location.

12. Remove height adjustment washer (16) from top of two sieve beds (17) and plenum assembly (18) and place on peg board (figure 4-9) in same position as removed from sieve beds and plenum assembly.

13. Remove nine cut-off bolts (figure 4-10) from two sieve beds (17) and plenum assembly (18).

NOTE

Straps (24) and (26) and cushion straps (25) have been secured to electrical mount offset (23) with sealing compound. Do not remove unless replacement is necessary.

14. Remove electrical mount offset (23) from electronics box assembly (8) by removing two screws (21) and lockwashers (22).

15. Remove screws (27), lockwashers (28), and clamps (29) securing diffuser tube (30) to mounting plate (3).

16. Remove shroud assembly (31) from mounting plate (3).

17. Remove insulation blanket (32) from shroud assembly (31).

18. If replacement of shroud assembly (31) is necessary, remove identification plate from front of shroud assembly (31).

4-67. STABILIZER PLATE REMOVAL. To remove the Stabilizer Plate, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Heater, Gun Type	MIL-H-45193C (CAGE 81349) NIIN 00-561-1002

NOTE

Index numbers refer to figure 4-13 unless otherwise noted.

1. Place concentrator on work bench with stabilizer plate (2) facing up.

WARNING

When removing screws from stabilizer plate, it may be necessary to heat screws to facilitate easy removal. The heat gun can generate extreme heat that can cause severe burns.

2. Remove four screw (1) securing sieve beds (20) to stabilizer plate (2).

3. Remove two screws (1) securing spacer (7) and inlet filter assembly (8) to stabilizer plate (2).

4. Remove two screws (15) securing two spacers (14) and rotary valve assembly (13) to stabilizer plate (2).

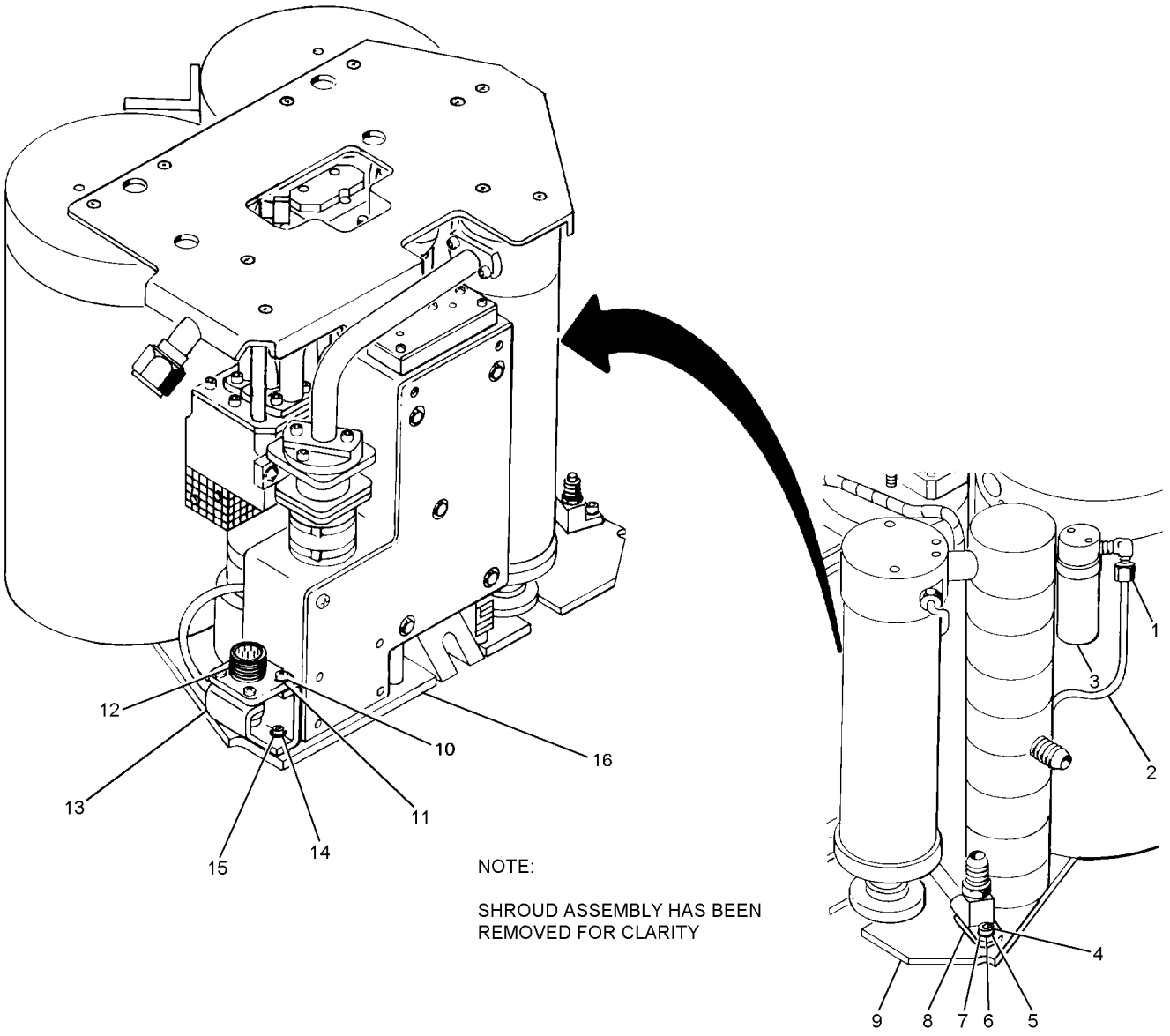
5. Remove self-locking nut (16) and flat washer (17) securing stabilizer plate to plenum assembly (21).

CAUTION

Use extreme care not to damage wiring leads to electronics box assembly.

6. Remove two screws (9) securing stabilizer plate (2) to electronics box assembly (12). Turn concentrator over slightly to allow two lockwashers (10) and flat washers (11) to fall out.

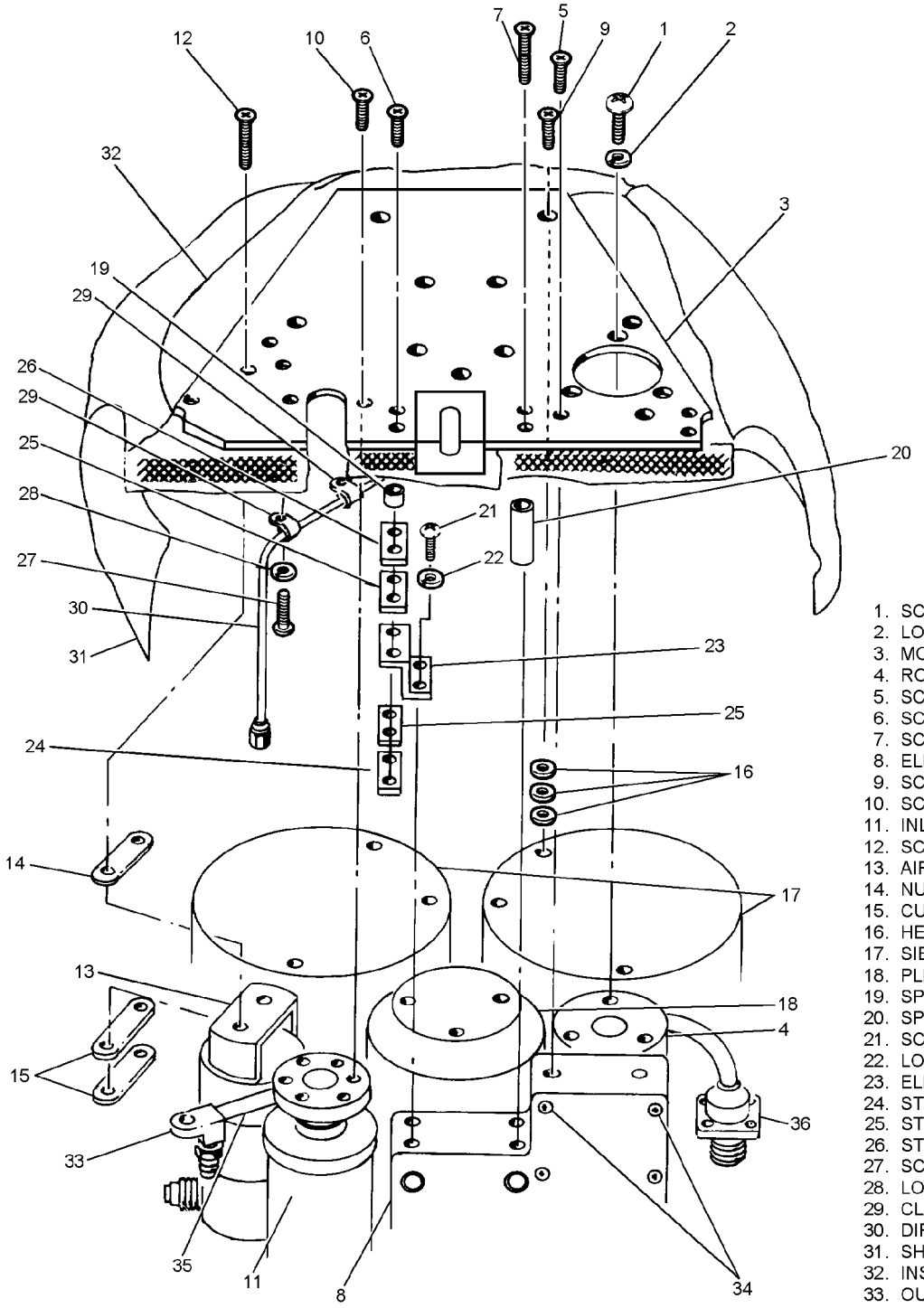
7. Remove two screws (3) securing stabilizer plate (2) to solenoid valve (5).



1. NUT
2. DIFFUSER TUBE
3. SOLENOID VALVE
4. SCREW
5. LOCKWASHER
6. WASHER
7. WASHER
8. OUTLET FITTING
9. MOUNTING PLATE
10. SCREWS
11. LOCKWASHERS
12. RECEPTACLE CONNECTOR
13. CONNECTOR BRACKET
14. SCREWS
15. LOCKWASHERS
16. MOUNTING PLATE

004011

Figure 4-11. Shroud Assembly Removal/Assembly



1. SCREW
2. LOCKWASHER
3. MOUNTING PLATE
4. ROTARY VALVE ASSEMBLY
5. SCREWS
6. SCREWS
7. SCREWS
8. ELECTRONICS BOX ASSEMBLY
9. SCREWS
10. SCREWS
11. INLET FILTER ASSEMBLY
12. SCREWS
13. AIR HEATER ASSEMBLY
14. NUT PLATE
15. CUSHION STRAPS
16. HEIGHT ADJUSTMENT WASHER
17. SIEVE BEDS
18. PLENUM ASSEMBLY
19. SPACERS
20. SPACERS
21. SCREW
22. LOCKWASHER
23. ELECTRICAL MOUNT OFFSET
24. STRAP
25. STRAP
26. STRAP
27. SCREWS
28. LOCKWASHERS
29. CLAMPS
30. DIFFUSER TUBE
31. SHROUD ASSEMBLY
32. INSULATION BLANKET
33. OUTLET FITTING ADAPTER
34. SCREWS
35. STRAIGHT ADAPTER
36. ELECTRICAL CONNECTOR

004012

Figure 4-12. Shroud Assembly/Mounting Plate Removal/Assembly

8. Remove stabilizer plate (2) from concentrator components.

9. Remove two spacers (4) from top of solenoid valve (5) and if necessary remove flat washer shims (6).

10. Remove spacer (7) from top of inlet filter assembly (8).

11. Remove two spacers (14) from top of rotary valve assembly (13).

12. Remove tube clamp (19) from plenum assembly (21).

13. Remove thread seal washer (18) from plenum assembly (21).

4-68. PRESSURE REDUCER ASSEMBLY REMOVAL. To remove the Pressure Reducer Assembly, proceed as follows:

NOTE

Index numbers refer to figure 4-14 unless otherwise noted.

1. Remove two panhead screws (1) and lockwashers (2) securing pressure reducer assembly (3) to inlet filter assembly (4).

2. Carefully cut and remove two tiedown straps (5).

3. Remove panhead screw (6), screw (8), and two lockwashers (7) securing pressure reducer (3) to rotary valve (10).

4. Remove pressure reducer assembly (3) from concentrator components.

5. Remove and discard preformed packing (9) from rotary valve assembly (10).

6. Remove and discard preformed packing (11) from inlet filter assembly (4).

4-69. ROTARY VALVE ASSEMBLY REMOVAL. To remove the Rotary Valve Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Pressure Sensitive	PPP-T-42

NOTE

Index numbers refer to figure 4-15 unless otherwise noted.

1. Carefully cut and remove two tiedown straps (1) from wire bundles.

CAUTION

Cover (3) is secured with adhesive and may be difficult to remove. Use extreme care when removing cover (3) from terminal strip (4).

2. Remove five screws (2) and carefully remove cover (3) from terminal strip (4).

CAUTION

Use extreme care when removing RTV adhesive from terminal strip (4) to prevent cutting wires.

3. Carefully remove RTV adhesive from terminal strip (4).

4. Remove three screws (5) and remove lead wires from terminals 7, 8, and 9 of terminal strip (4). Cut all tiedown straps securing wire bundles.

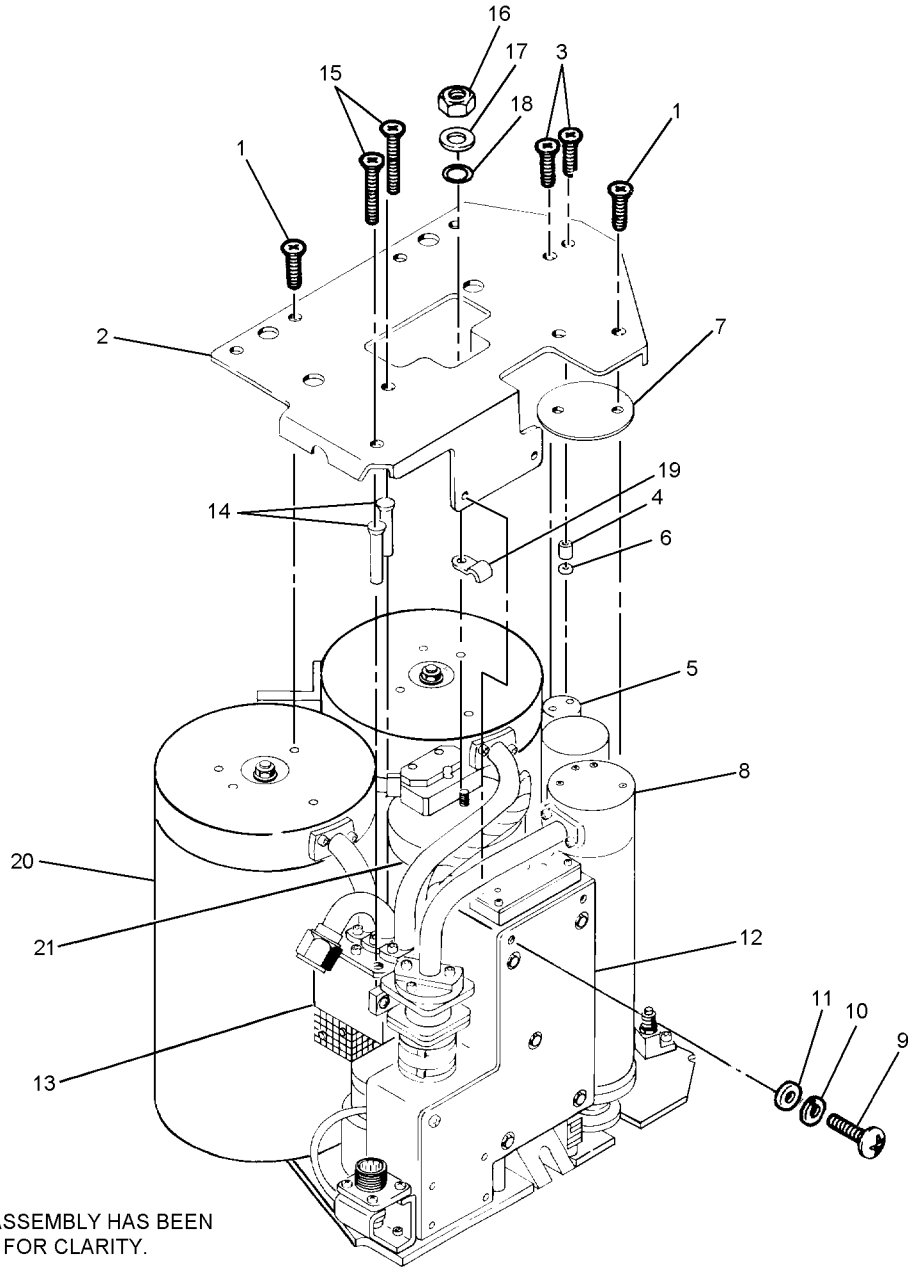
5. Remove four screws (6) and lockwashers (7) securing tube flanges (12) to sieve beds (8).

6. Remove rotary valve assembly (9) from concentrator component parts.

7. Remove and discard two preformed packings (10) (not shown) from two sieve bed (8) ports from which two rotary valve assembly (9) tube flanges (12) were removed.

8. Using pressure sensitive tape, tape two sieve bed (8) ports from which rotary valve assembly (9) tube flanges (12) were removed to prevent contaminants from entering sieve beds.

9. Remove vent tube (11) from rotary valve assembly (9) by removing two panhead screws and lock washers (not shown). Remove vent tube (11) and preformed packing (not shown) from rotary valve assembly (9).



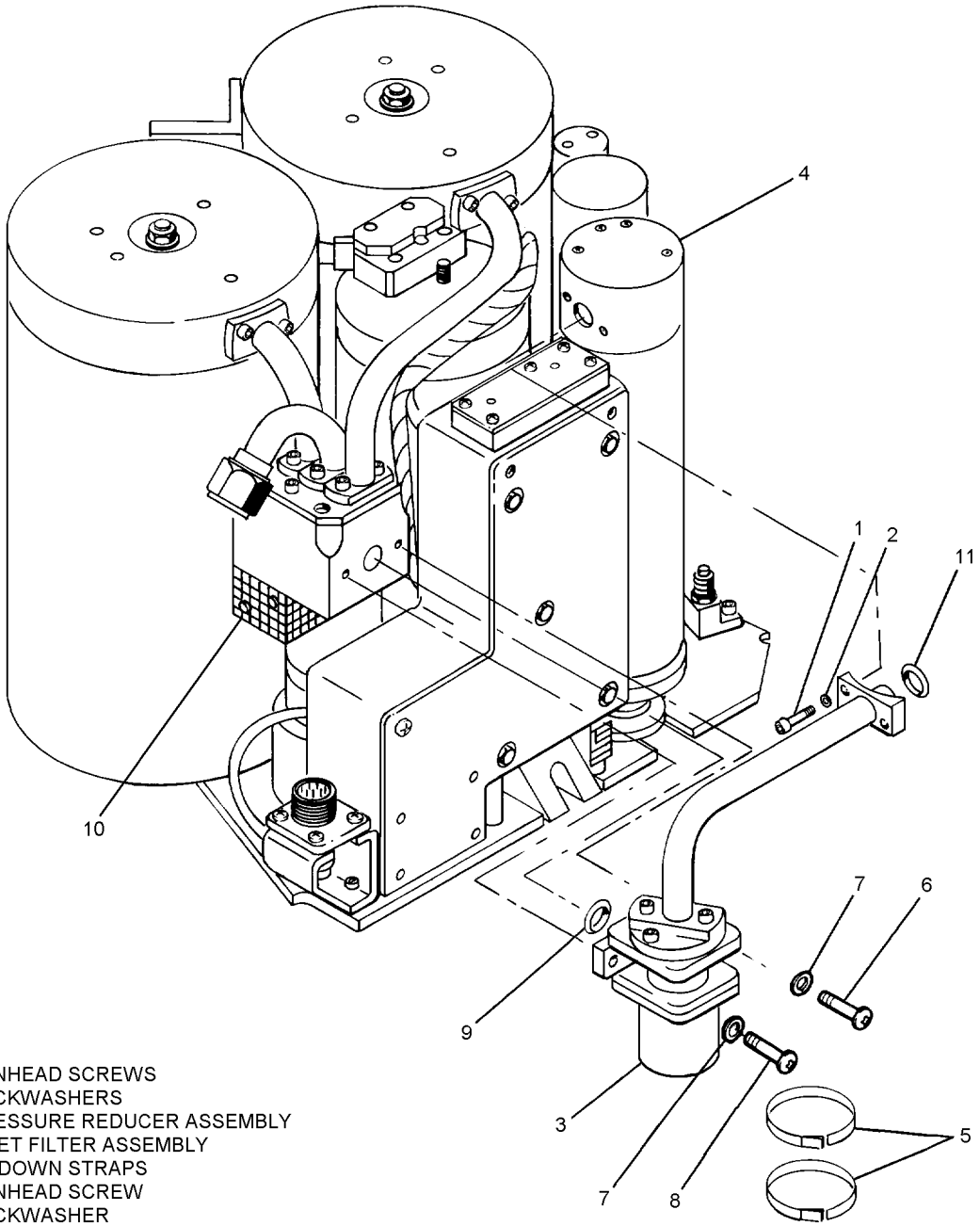
NOTE:

SHROUD ASSEMBLY HAS BEEN REMOVED FOR CLARITY.

1. SCREWS
2. STABILIZER PLATE
3. SCREWS
4. SPACERS
5. SOLENOID VALVE
6. FLAT WASHER SHIMS
7. SPACER
8. INLET FILTER ASSEMBLY
9. SCREWS
10. LOCKWASHERS
11. FLATWASHERS
12. ELECTRONIC BOX ASSEMBLY
13. ROTARY VALVE ASSEMBLY
14. SPACERS
15. SCREWS
16. SELF-LOCKING NUT
17. FLAT WASHER
18. THREAD SEAL WASHER
19. TUBE CLAMP
20. SIEVE BEDS
21. PLENUM ASSEMBLY

004013

Figure 4-13. Stabilizer Plate Removal/Assembly



1. PANHEAD SCREWS
2. LOCKWASHERS
3. PRESSURE REDUCER ASSEMBLY
4. INLET FILTER ASSEMBLY
5. TIEDOWN STRAPS
6. PANHEAD SCREW
7. LOCKWASHER
8. SCREW
9. PREFORMED PACKING
10. ROTARY VALVE
11. PREFORMED PACKING

004014

Figure 4-14. Pressure Reducer Assembly Removal/Assembly

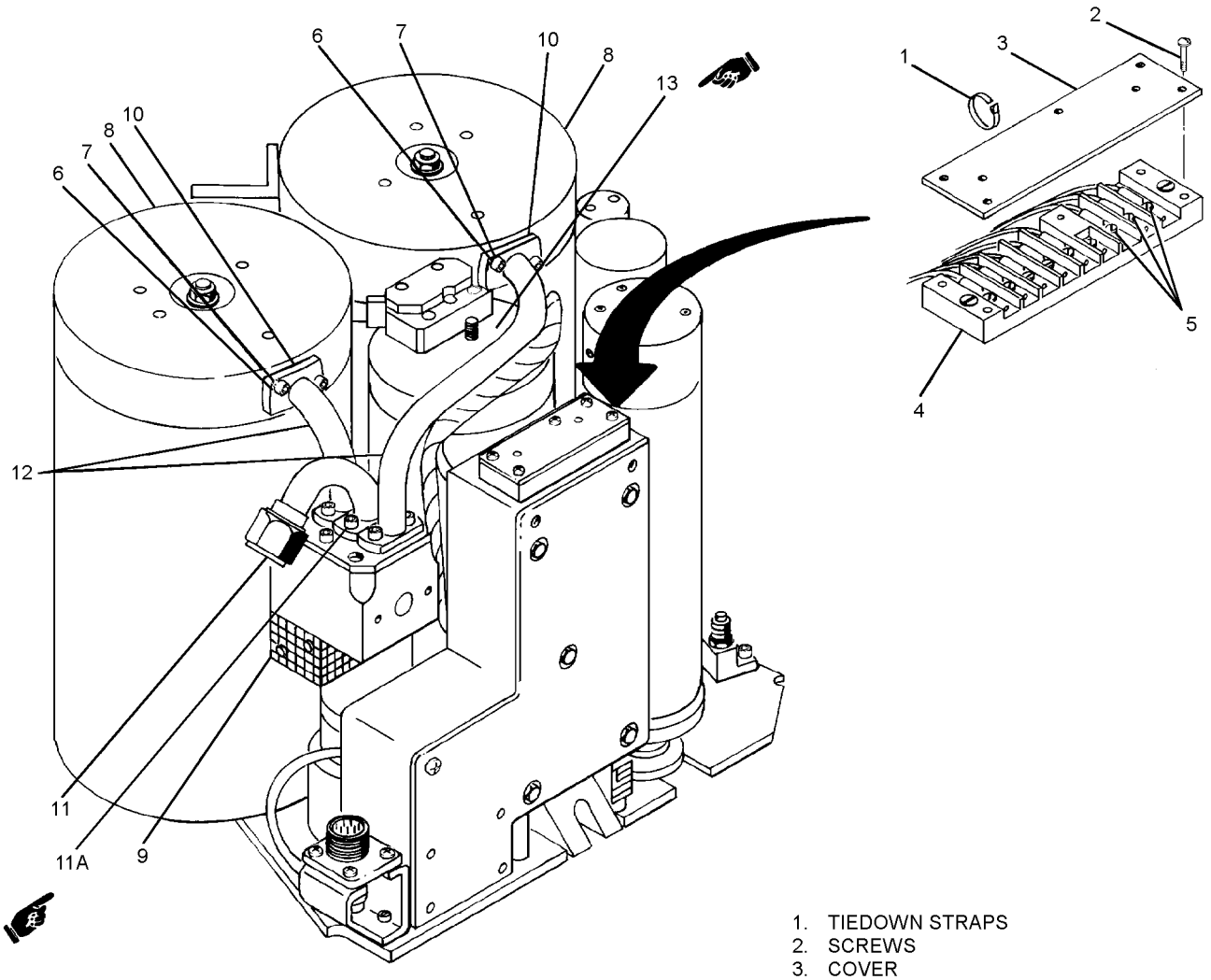


Figure 4-15. Rotary Valve Assembly Removal/Assembly

4-70. SOLENOID VALVE ASSEMBLY REMOVAL. To remove the Solenoid Valve Assembly, proceed as follows:

NOTE

Index numbers refer to figure 4-16 unless otherwise noted.

1. Ensure concentrator components are in upright position.

2. Remove five screws (5) to release leads from terminals 1, 2, 3, 4, and 5 of the terminal strip.

3. Remove two screw pins (9) securing inlet filter assembly (10) to air heater assembly (11) and separate the heater (11) and inlet filter assembly (10).

4. Remove and discard preformed packing (12) from air heater assembly (11).

5. Remove fitting and orifice assembly (13) from solenoid valve assembly (8).

6. Remove solenoid valve assembly (8) from air heater assembly (11) at fitting (14).

4-71. AIR HEATER REMOVAL. To remove the Air Heater Assembly, proceed as follows:

NOTE

Do not cut wires connecting air heater assembly and electronics box assembly unless replacement of either component is necessary.

Index numbers refer to figure 4-17 unless otherwise noted.

1. Lay air heater assembly (1) in a position to gain access to wires.

NOTE

If replacing air heater assembly with a new unit, remove nut plate (3) and cushion straps (4).

Tag any wire which does not have a corresponding color tracer.

2. Identify four wires from electronics box assembly and four wires from air heater assembly which have been crimped together with connectors (5). Tag all wires which do not have a corresponding color tracer.

3. Remove heat shrink tubing from around wire bundles and from each individual wire.

4. Remove teflon tape from four connectors (5).

5. Cut connectors (5) out of wires as shown in figure 4-17, leaving wire ends exposed.

6. Remove and discard preformed packing (not shown) from top of air heater that fits into inlet filter assembly.

4-72. INLET FILTER ASSEMBLY REMOVAL. To remove the Inlet Filter Assembly, proceed as follows:

NOTE

Index numbers refer to figure 4-18 unless otherwise noted.

1. Ensure inlet filter assembly (3) is in upright position.

CAUTION

Do not remove or damage thermistors when removing inlet filter assembly.

2. Rotate filter mount nut (4) approximately 3 turns to release tension on inlet filter assembly (3).

3. If not previously removed, remove two lead wires from terminals 1 and 2 on terminal strip (1) coming from inlet filter assembly (3).

4. Remove and discard preformed packing (7) from filter inlet housing (6).

5. Remove filter tube element (5) by performing the following:

CAUTION

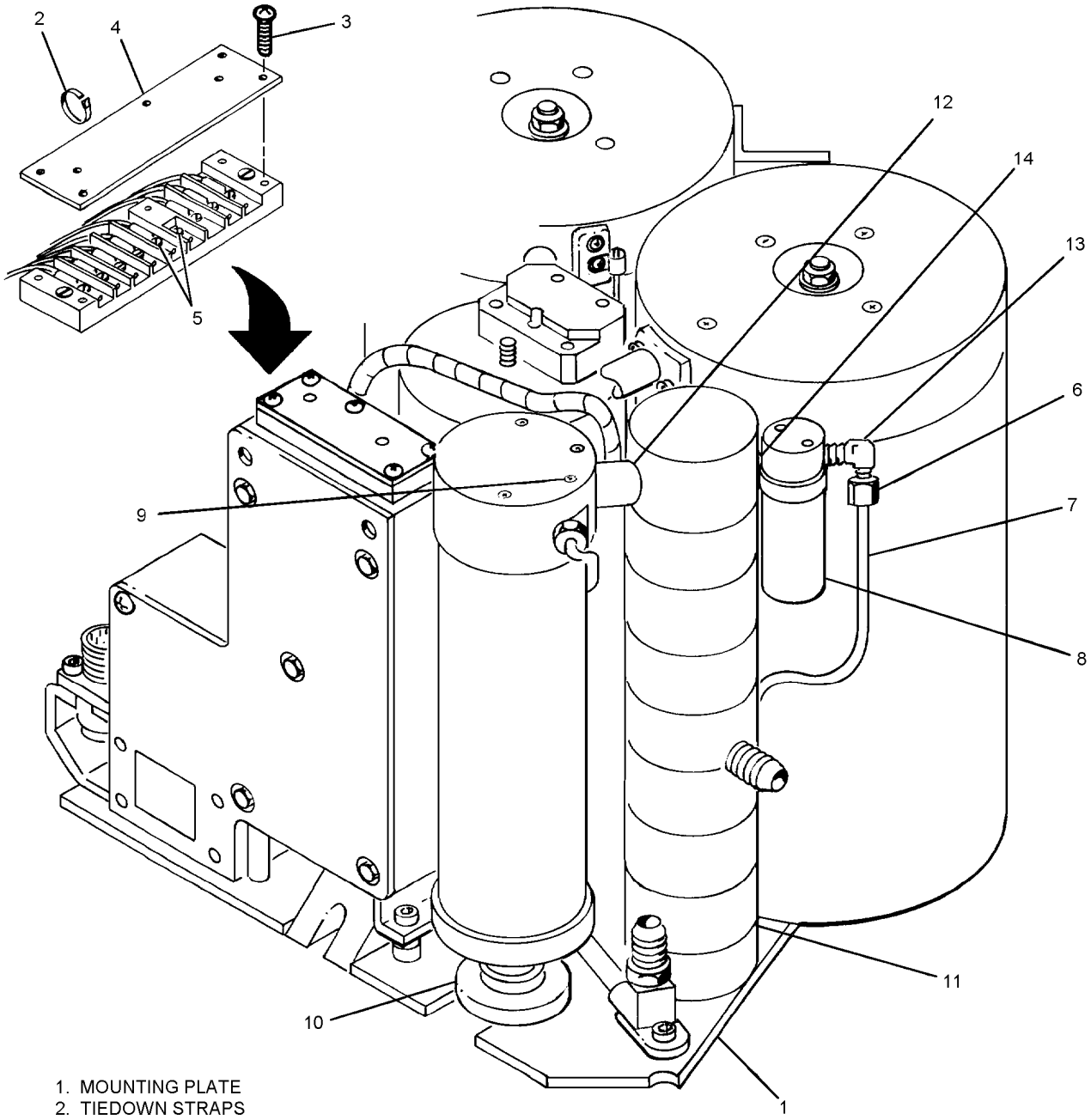
Do not scratch or gouge metal sealing surfaces.

a. Remove inlet filter sleeve (9) from filter inlet housing (6) by unscrewing filter mount screw nut (13).

b. If replacement of filter mount nut (4) is necessary, unscrew nut (4) from filter mount screw nut (13).

c. Remove inlet filter sleeve (9) from filter post screw (8) with attached parts.

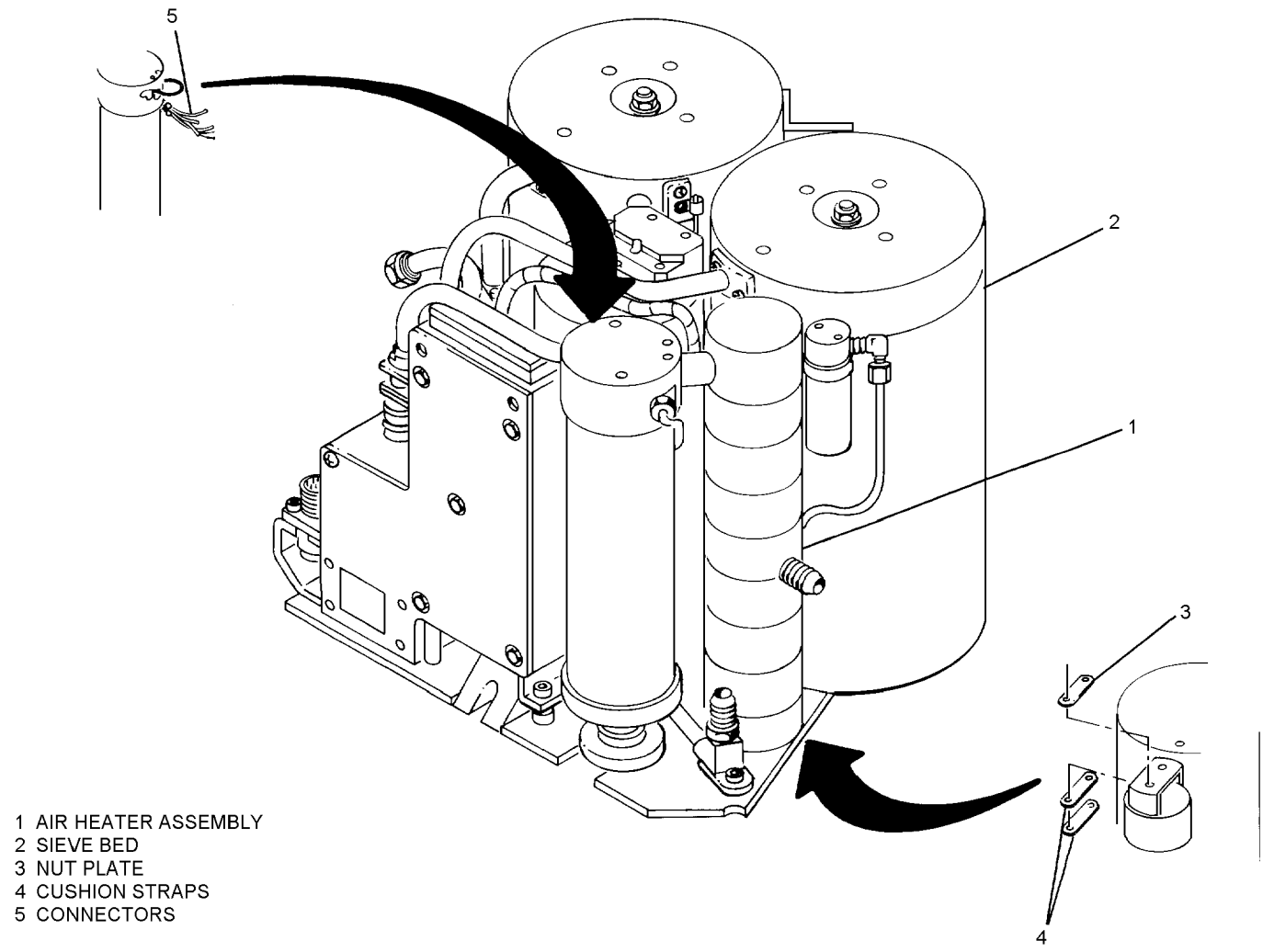
d. Remove water trap (4A), seal (4B), and filter tube element (5) from inlet filter sleeve (9).



1. MOUNTING PLATE
2. TIEDOWN STRAPS
3. SCREW
4. TERMINAL STRIP COVER
5. SCREWS
6. NUT
7. DIFFUSER TUBE
8. SOLENOID VALVE ASSEMBLY
9. SCREW PINS
10. INLET FILTER ASSEMBLY
11. AIR HEATER ASSEMBLY
12. PREFORMED PACKING
13. ORIFICE ASSEMBLY
14. FITTING

004016

Figure 4-16. Solenoid Valve Assemblies Removal/Assembly



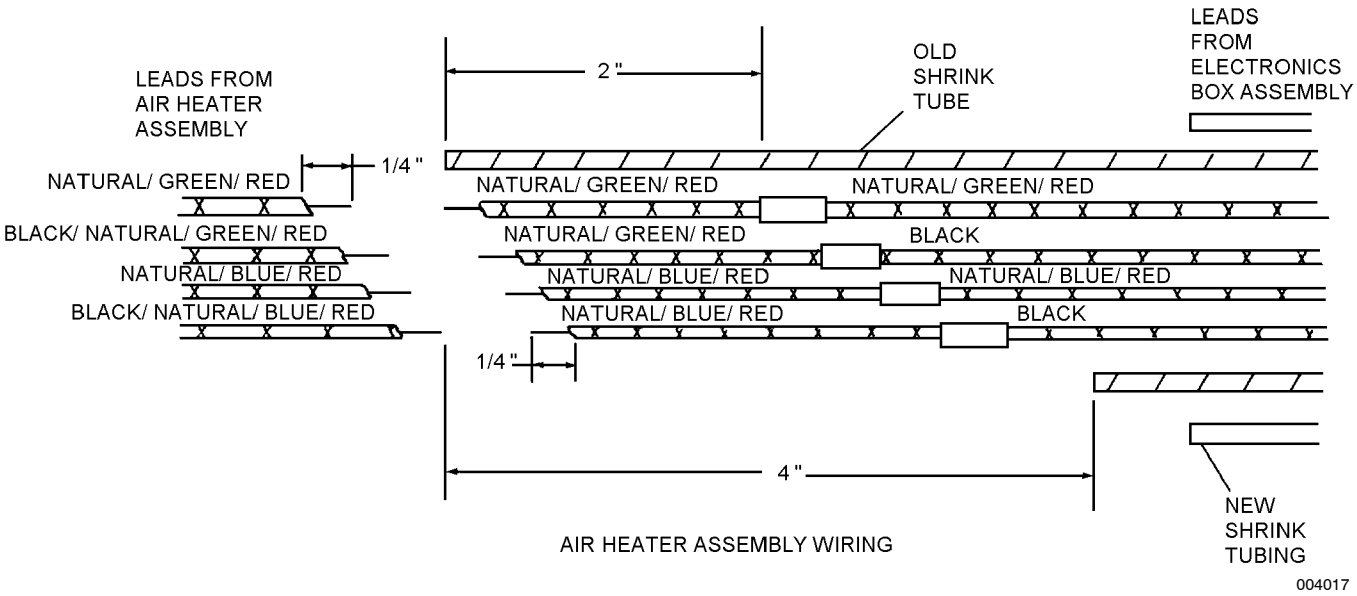
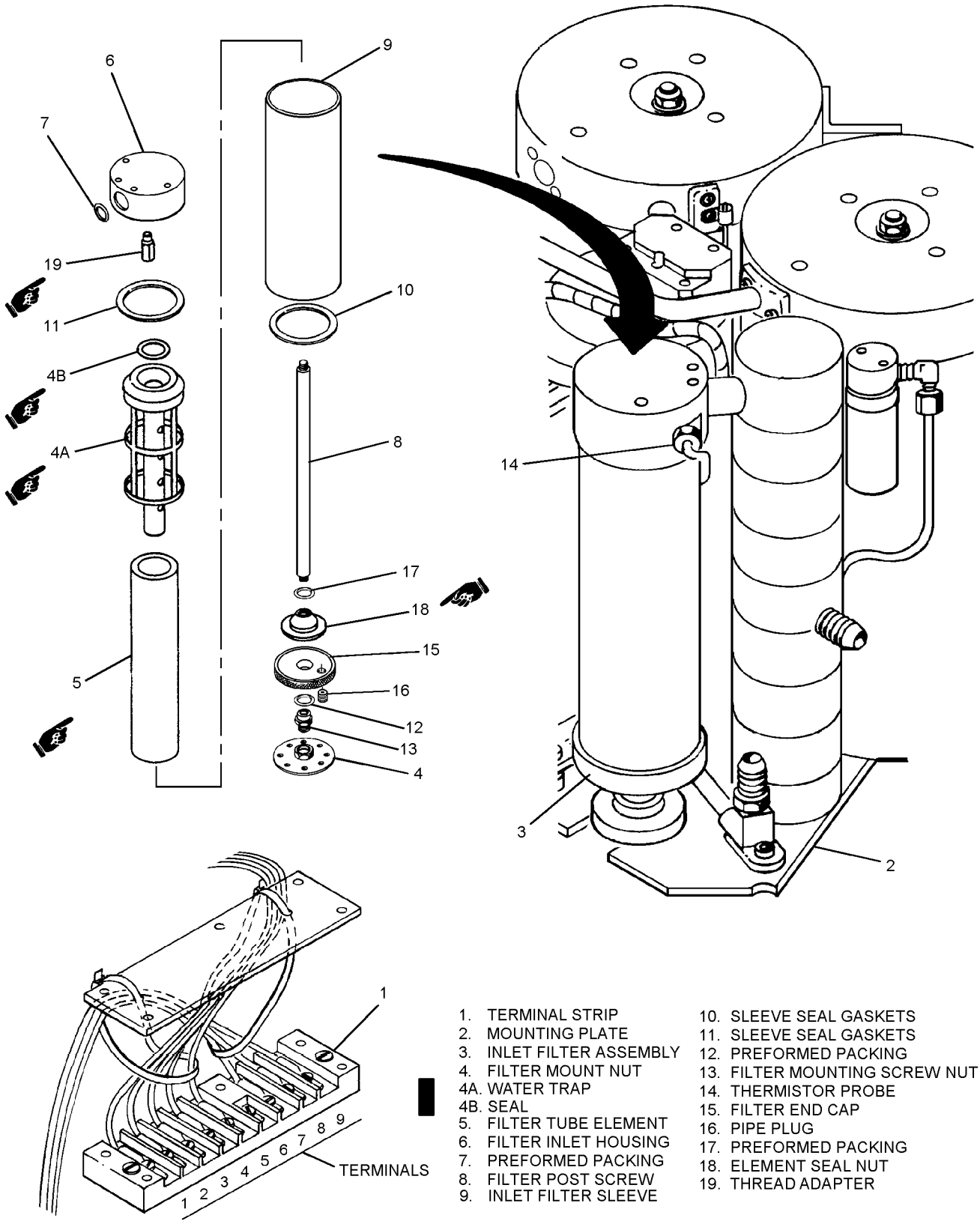


Figure 4-17. Air Heater Assembly Removal/Assembly



004018

Figure 4-18. Inlet Filter Assembly Removal/Assembly

e. Remove and discard filter tube element (5).

f. Remove and discard sleeve seal gaskets (10) and (11) and preformed packing (12).

4-73. ELECTRONICS BOX ASSEMBLY REMOVAL. To remove the Electronics Box Assembly, proceed as follows:

NOTE

Do not cut wires connecting air heater and electronics box assemblies unless replacement of either assembly is necessary.

The electronics box assembly, air temperature sensor and shroud thermistor probes are matched assemblies and must be replaced as a set.

1. If not previously removed, remove screw from terminal (3) and remove two lead wires from terminal strip (figure 4-19).

2. Lay electronics box assembly off to side.

4-74. SIEVE BEDS, PLENUM, AND CHECK VALVE REMOVAL. To remove the Sieve Beds, Plenum, and Check Valve, proceed as follows:

Materials Required

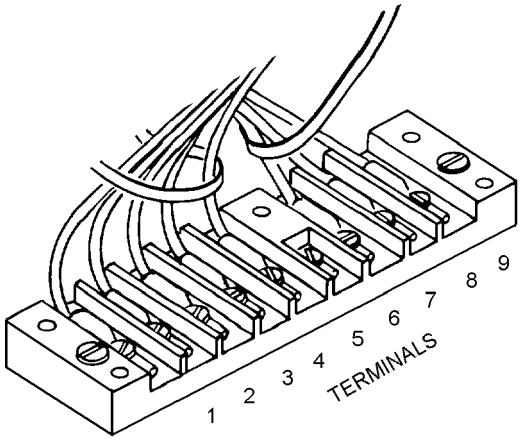
Quantity	Description	Reference Number
As Required	Tape, Pressure Sensitive	PPP-T-42

NOTE

Index numbers refer to figure 4-20 unless otherwise noted.

1. Remove check valve assembly (27) by performing the following:

a. Cut and remove tiedown straps (not shown) from two connector lock clips (5) and remove connector lock clips (5) from plenum sleeves (6).



004019

Figure 4-19. Terminal Strip

b. Retract two plenum sleeves (6) from sieve beds (7) and (8) by sliding plenum sleeves (6) into check valve assembly (27). This procedure will free check valve assembly (27) and plenum assembly (19) from two sieve beds (7) and (8).

c. Remove two plenum sleeves (6) from check valve assembly (27) and remove and discard two preformed packings (26).

d. Remove check valve cover (22) by removing five screws (20) and lockwashers (21). Remove and discard two preformed packings (24) and two preformed packings (25).

e. Carefully lift two check valves (23) out of plenum (19).

2. Separate sieve beds (7) and (8) by performing the following:

a. Remove and discard two preformed packings (9) from sieve beds (7) and (8) from which plenum sleeves (6) were removed.

b. Remove two screws (10) and lockwashers (11) securing L-bracket (12) to sieve beds (7) and (8) and remove L-bracket (12).

c. Remove shroud thermistor probe (4), loop clamp (3) and hangar strap (15) from sieve bed (7) by removing two screws (1) and (13) and lockwashers (2) and (14).

3. Place a piece of pressure sensitive tape over all open ports on plenum and two sieve beds to prevent contaminants from entering.

4-75. CLEANING OF DISASSEMBLED PARTS.

4-76. To clean the disassembled oxygen concentrator component parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Acetone	O-A-51
As Required	Bag, Plastic	MIL-B-117 (CAGE 81349)
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275
As Required	Toluene	TT-T-548 NIIN 00-281-2002
As Required	Xylene	TT-X-916 (CAGE 81348)

Support Equipment Required

Quantity	Description	Reference Number
1	Cleaning System, Energy, Sonic (Note 1)	SEC 1825

Notes: 1. If available (optional item)

WARNING

Do not use oil, or any material containing oil, in conjunction with oxygen equipment. Oil even in minute quantity, coming in contact with oxygen can cause explosion or fire. Dust, lint, and fine metal particles are also dangerous.

1. Clean all electrical contact points by lightly furbishing with a fine abrasive material.

2. Clean all metallic parts in accordance with Chapter 4, NAVAIR 13-1-6.4-1. Blow dry with oil-free water-pumped nitrogen.

CAUTION

Do not attempt to clean any silicone rubber or elastic parts that have become contaminated with oil or grease. All such parts shall be replaced.

3. Prior to installation, wash all silicone rubber parts in distilled water and blow dry with oil-free water pumped nitrogen.

4. Cleaned parts shall be sealed in plastic bags for storage. Also, bag all complete assemblies that are not immediately returned to service.

5. Remove old RTV adhesive by applying small amounts of xylene or toluene.

6. Remove old sealant from screws using small amounts of acetone.

4-77. INSPECTION OF DISASSEMBLED PARTS.

4-78. Carefully inspect the disassembled oxygen concentrator for cleanliness, irregular wear, and good condition using the following procedures and guidance.

1. Inspect all electrical wiring for cuts, breaks in insulation covering, and clean contact points; replace as necessary.

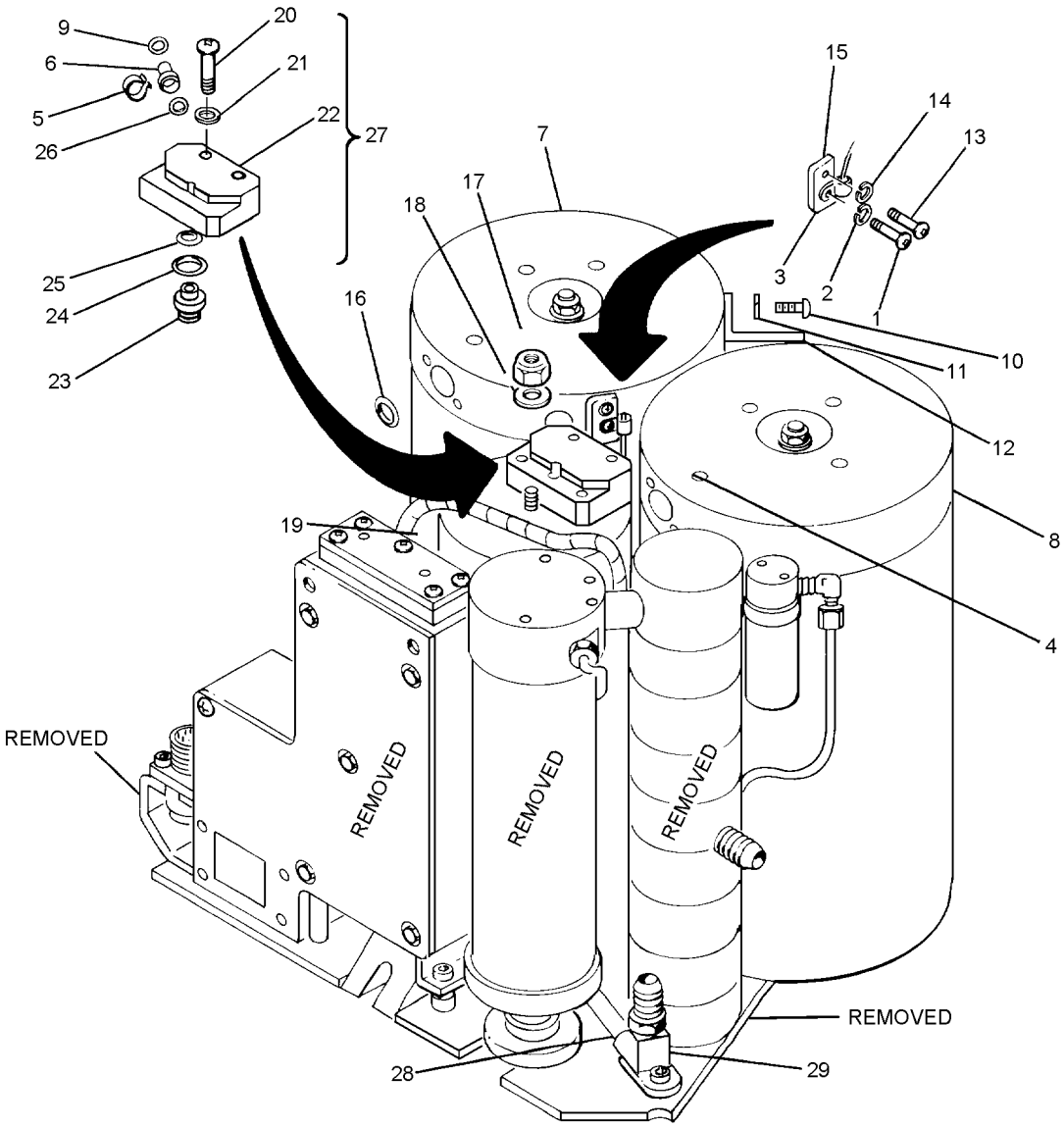
2. Inspect all screw for nicks, burrs, rounded screwdriver slots and other obvious damage; replace as necessary.

3. Inspect all metallic surfaces for corrosion, cleanliness, and other obvious damage; clean or replace parts as necessary.

4. Inspect sieve beds for tightness of self-sealing screw, nicks in sealing surfaces, stripped threads in screw holes, cleanliness; clean, replace or repair as necessary.

5. Inspect terminal board for cracks and breaks; replace if necessary.

6. Inspect electrical receptacle connector for bent pins, corrosion, and cleanliness; clean or replace as necessary.



1. SCREWS
2. LOCKWASHER
3. LOOP CLAMP
4. SHROUD THERMISTOR PROBE
5. CONNECTOR LOCK CLIPS
6. PLENUM SLEEVES
7. SIEVE BED
8. SIEVE BED
9. PREFORMED PACKINGS
10. SCREWS
11. LOCKWASHERS
12. L - BRACKET
13. SCREWS
14. LOCKWASHER
15. HANGAR STRAP
16. PREFORMED PACKING
17. SELF - LOCKING NUT
18. WASHER
19. PLENUM ASSEMBLY
20. SCREWS
21. LOCKWASHERS
22. CHECK VALVE COVER
23. CHECK VALVES
24. PREFORMED PACKINGS
25. PREFORMED PACKINGS
26. PREFORMED PACKINGS
27. CHECK VALVE ASSEMBLY
28. OUTLET FITTING ASSEMBLY
29. OUTLET FITTING

004020

Figure 4-20. Sieve Beds, Plenum, and Check Valve Removal/Assembly

7. Inspect shroud assembly and insulation blanket for cuts, tears, and other obvious damage; repair or replace as necessary.

8. Inspect diffuser tube for pin holes and good condition; replace as necessary.

9. Inspect rotary valve, pressure reducer, inlet filter, heater, electronics box, and plenum assemblies for good condition; replace if necessary.

10. Inspect stabilizer and mounting plates for corrosion, breaks, bends, and good condition; clean, repair or replace as necessary.

11. Inspect check valve assemblies for smooth seating surfaces, cleanliness, bent or distorted springs, and freedom of operation; replace as necessary.

4-79. REPAIR.

4-80. Repair of the oxygen concentrator is limited to patching of the shroud assembly, replacing defective component parts, minor repairs (small dents, scratches, abrasions, nicks, etc.) of tubing and replacement of electrical connectors and defective wiring. To make minor repairs, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive, Clear	DC3145
As Required	Lacquer-Cellulose Nitrate, Gloss Color 622, Jet Black	MIL-L-7178
As Required	Material, Shroud	1647003-1
As Required	Wool, Aluminum	—

1. Tubing assemblies with minor dents not causing flow restriction are considered serviceable. Small scratches, abrasions, and nicks can be smoothed with a burnishing tool or aluminum wool.

2. To avoid burnishing the same area more than once, each burnished area shall be identified by a painted band. Color and size of band are as follows:

a. Color bands shall be black in color and shall cover an area not less than 2 inches nor more than 3 inches in length.

3. Tubing nicked, abraded, or scratched in an area previously identified as burnished shall be condemned.

4. To repair the shroud assembly, proceed as follows:

a. Cut a piece of shroud material to the desired length and width.

b. Clean the effected area of shroud assembly.

c. Apply adhesive as per direction on container and apply patch to shroud assembly.

4-81. ASSEMBLY.

4-82. To reassemble the oxygen concentrator, proceed as follows:

NOTE

Coat all preformed packings with Krytox 240 AC prior to installing.

4-83. SIEVE BEDS, PLENUM, AND CHECK VALVES ASSEMBLIES. To assemble the Sieve Beds, Plenum, and Check Valves Assemblies, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive, Sealant, Silicone, RTV 3145	GS-06F-12702 NIIN 00-145-0020
As Required	High Purity Goop	MS-TL-PGT (CAGE 02570) NIIN 00-701-9641
As Required	Krytox 240 AC Lubricant	NIIN 00-961-8995 (CAGE 73925)
As Required	Tape, Pressure Sensitive	PPP-T-42

NOTE

Index numbers refer to figure 4-20 unless otherwise noted.

1. Remove pieces of pressure sensitive tape from sieve beds and plenum ports previously installed.

2. Position two sieve beds as shown in figure 4-20.

3. Loosely attach loop clamp (3) and hangar strap (15) to sieve bed (7) with two screws (1) and (13) and lockwashers (2) and (14).

4. Slide shroud thermistor probe (4) into loop clamp (3) from top side of loop clamp and tighten two screws (1) and (13). Apply RTV adhesive over shroud thermistor probe.

5. Attach L-bracket (12) to sieve beds (7) and (8) and secure with two screws (10) and lockwashers (11).

6. Apply Krytox 240 AC to two preformed packings (16) and insert two preformed packings (16) into sieve beds (7) and (8).

7. Apply high purity goop antiseize to pipe threads of outlet fitting assembly (28) with outlet fitting adapter (29) removed and screw into base of plenum (19) as shown in figure 4-20.

8. Apply Krytox 240 AC to two preformed packings (24) and two preformed packings (25). Install two preformed packings (24) into respective grooves in top of plenum (19). Install two preformed packings (25) into check valve cover (22).

9. Install two check valves (23) into plenum (19).

10. Apply Krytox 240 AC to two preformed packings (26) and install preformed packings (26) into check valve cover (22).

11. Apply Krytox 240 AC to two preformed packings (9) and install two preformed packings (9) into sieve beds (7) and (8).

12. Attach check valve cover (22) with two preformed packings (25) on plenum (19) over check valves (23) and secure with five screws (20) and lockwashers (21).

13. Slide long portion of two plenum sleeves (6) into check valve assembly (27).

14. Route shroud thermistor probe (4) from sieve bed (7) under check valve assembly plenum sleeves (6) and tape to sieve bed (8) with pressure sensitive tape.

15. Insert plenum sleeves (6) into sieve beds (7) and (8) and secure with two connector lock clips (5).

4-84. INLET FILTER ASSEMBLY. To assemble the Inlet Filter Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive Sealant, Silicone, RTV 3145	GS-06F-12702
As Required	Compound, Sealant	Loctite 271
As Required	Compound, Sealant	Loctite 290
As Required	Krytox 240 AC	NIIN 00-961-8995 (CAGE 73925)
As Required	Tape, Anti-seize	MIL-T-27730A

NOTE

Index numbers refer to figure 4-18 unless otherwise noted.

1. Install preformed packing (12) on filter mount screw nut (13) and screw filter mount screw nut (13) onto filter post screw (8).

2. Screw filter mount nut (4) onto filter mount screw nut (13).

3. Install seal gasket (10) into filter post screw (8).

4. Install filter sleeve (9) onto filter post screw (8).

5. Install filter tube element (5) into water trap (4A).

5A. Install water trap (4A), seal (4B), and filter tube element (5) into inlet filter sleeve (9).

6. Install seal gasket (11) on top of filter tube element (5).

7. Install preformed packing (7) into filter inlet housing (6).

8. Screw filter inlet housing (6) onto filter post screw (8) and tighten filter mount screw nut (13) and torque filter mount screw nut (13) to 100 ±10 in-lb.

9. If air temperature sensor thermistor probe (14) was removed, re-install as follows:

a. Wrap threads of air temperature sensor thermistor probe nut with anti-seize tape.

b. Screw air temperature sensor thermistor probe (14) into inlet filter assembly (3).

c. Apply RTV adhesive over temperature sensor thermistor probe nut.

10. If element seal nut (18) was removed, re-install as follows:

a. Apply Krytox 240 AC to preformed packing (17) and install in element seal nut (18).

b. Apply sealant compound (Loctite 271) to threads of element seal nut and install element seal nut and preformed packing (17) onto filter post screw (8). Torque element seal nut to 130 to 150 in-lb.

11. If thread adapter (19) was removed, apply sealant compound (Loctite 290) to threads of thread adapter (19) and install thread adapter on filter inlet housing (6). Torque thread adapter to 140 to 160 in-lb.

THIS PAGE INTENTIONALLY LEFT BLANK.

4-85. ELECTRONIC BOX AND AIR HEATER ASSEMBLY WIRING. To wire the Air Heater Assembly to the Electronics Box Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive, Cyanoacrylate, (Super Glue)	MIL-A-46050C NIIN 00-142-9193
	Compound, Sealant	MIL-S-22473GRA
As Required	Tape, Antiseize	MIL-T-27730A
64 inches	Tubing, Heat Shrink	1609568-11
16 inches	Tubing, Heat Shrink	1609568-2

Support Equipment Required

Quantity	Description	Reference Number
1	Tool, Crimping	3301094-6101 (CAGE 99251) NIIN 00-921-5771
1	Heater, Gun Type	—

NOTE

Refer to figure 4-17 when performing steps 1 through 4.

1. Remove old heat shrink tubing from bundle of wires.

CAUTION

Use extreme care not to cut through wiring when removing outer wire covering and stripping ends of wires for connecting.

2. Prepare wiring from air heater assembly as follows:

NOTE

Mark and tag leads for permanent identification.

a. Strip the end of the natural/green/red wire 1/4 inch for making connection.

b. Cut and remove 1/2 inch of outer casing of natural/green/red wire and strip end 1/4 inch.

c. Cut and remove 1 inch of outer casing of natural/blue/red wire and strip end 1/4 inch.

d. Cut and remove 1 1/2 inch of outer casing of natural/blue/red wire and strip end 1/4 inch.

e. Slide an 8-inch piece of new heat shrink tubing over bundled wires and slide heat shrink tubing to base of air heater assembly.

3. Prepare wiring from electronics box assembly as follows:

a. Measure wires 11 inches from grommet on electronics box and cut.

b. Strip each wire 1/4 inch on end.

c. Slide four 2-inch sections of new heat shrink tubing over individual wires and slide heat shrink tubing towards electronics box.

4. Splice wires from electronics box and air heater assembly as follows:

a. Match the two natural/blue/red wires (blue tracers) from air heater assembly to the two natural/blue/red wires (blue tracers) from electronics box.

b. Match the two natural/green/red wires (green tracers) from air heater assembly to the two natural/green/red wires (green tracers) from the electronics box assembly.

c. Using four connectors and crimping tool, splice matched wires in (a) and (b) above together.

WARNING

Heat gun can generate extreme heat that can cause severe burns.

d. Slide 2 inch piece of heat shrink tubing over each of the four crimped connectors and use heat gun to shrink tubing.

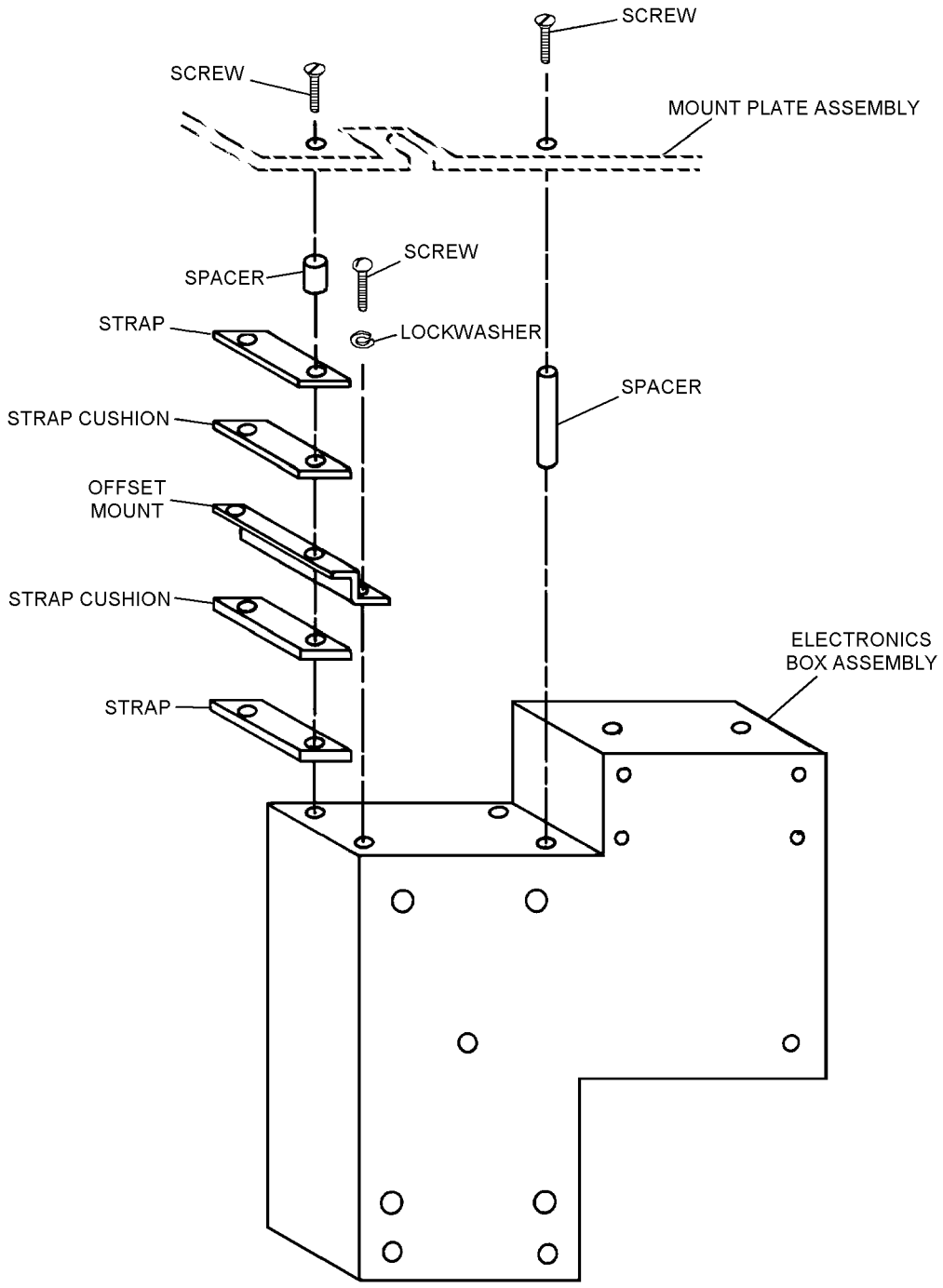
e. Slide an 8 inch piece of shrink tubing over the wires. Then, using heat shrink gun, shrink the tubing.

5. Attach electrical mounting offset to electronics box assembly as follows:

NOTE

Index numbers refer to figure 4-12 unless otherwise noted.

a. Using cyanoacrylate adhesive (super glue), secure strap (26) to cushion strap (25) and strap (24) to cushion strap (25).



004021

Figure 4-21. Securing Spacers to Electronics Box Assembly

b. Using super glue, secure strap (26) and cushion strap (25) and strap (24) and cushion strap (25) to electrical mounting offset (23) as shown.

c. Apply sealing compound to lower two threads of two screws (21) and secure electrical mounting offset to electronics box assembly (8) with two screws (21) and lockwashers (22).

d. Using a small amount of super glue, center and secure two small spacers (19) over two screws holes on electrical mounting offset (23) as shown in figure 4-21.

e. Using a small amount of super glue, center and secure two long spacers (20) over two screw holes in electronic box as shown in figure 4-21.

4-86. SOLENOID VALVE, AIR HEATER ASSEMBLY AND INLET FILTER ASSEMBLY. To assemble these components, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730A

NOTE

Index numbers refer to figure 4-22 unless otherwise noted.

1. Tape fitting on air heater assembly (2) where solenoid valve (1) attaches to air heater (2) with anti-seize tape.

2. Attach solenoid valve (1) to air heater assembly (2).

3. Tape pipe thread end of fitting and orifice assembly (3) with anti-seize tape and screw into solenoid valve (1).

4. Install preformed packing (4) onto first groove (7) of air heater (2).

NOTE

When attaching air heater assembly to inlet filter assembly, screw pins (6) shall slide into second groove (8) of air heater assembly (2).

5. Attach inlet filter assembly (5) to air heater assembly (2).

6. Insert two screw pins (6) into top of inlet filter assembly (5) and tighten.

4-87. SHROUD ASSEMBLY AND MOUNTING PLATE ASSEMBLY. To assemble the Shroud Assembly and Mounting Plate Assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealant	MIL-S-22473GRA

NOTE

Index numbers refer to figure 4-12 unless otherwise noted.

1. Position insulation blanket (32) inside of shroud assembly (31).

2. Position shroud assembly (31) and insulation blanket (32) on mounting plate (3).

3. Install two clamps (29) on diffuser tube (30).

4. Apply sealing compound to first two threads of two screws (27).

5. Position diffuser tube (30) on mounting plate (3) and secure with two screws (27) and lockwashers (28).

4-88. ROTARY VALVE ASSEMBLY TO SIEVE BEDS. To assemble Rotary Valve Assembly to Sieve Beds, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealant	MIL-S-22473GRA
1	Packing, Preformed	1602321-5
	-or-	
1	Packing, Preformed	AS3582-016
	-or-	
1	Packing, Preformed	MS28775-016
2	Screw	MS35265-13 NIIN 00-849-8072
2	Screw, Cap, Socket Head	56040-94-4 NIIN 00-958-9402
As Required	Wire, Safety, Corrosion Resistant Steel, 0.020	NIIN 00-221-2650

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 30 in-lb	TEC3A or equivalent
1	Wrench, Torque, 300 in-lb	TE25A or equivalent

NOTE

Index numbers refer to figure 4-15 unless otherwise noted. Pan head screws are no longer used to secure vent tube to the rotary valve assembly. Use screw P/N MS35265-13 or socket head cap screw P/N 56040-94-4. If vent tube preformed packing P/N 1602321-5 is not available, substitute with preformed packing P/N AS3582-016 or P/N MS28775-016.

1. Insert preformed packing (not shown) onto vent tube (11) flange and install vent tube (11) onto rotary valve (9).

CAUTION

Ensure strict compliance with procedures when performing step 2. Non-compliance could cause rotary valve vent tube (11) to loosen or crack.

2. Apply sealant compound (MIL-S-22473, Grade A) to lower two threads of two screws (11A) and secure vent tube (11) to rotary valve (9) with two screws (11A) and two lockwashers (not shown). Using torque wrench (TEC3A) or equivalent, torque screws (11A) to 10 ±0.5 in-lb.

3. Position concentrator with vent tube facing forward and to the left, safety wire two screws (11A) by routing 0.020 steel safety wire through screw (11A) closest to the plenum assembly (13) then around vent tube (11) and through outboard screw (11A).

4. Insert tube flanges (12) into sieve beds (8) and secure with four screws (6) and lockwasher (7).

4-89. ELECTRONIC BOX, PLENUM, SIEVE BEDS, ROTARY VALVE, INLET FILTER, AND AIR HEATER ASSEMBLIES TO MOUNTING PLATE.

To assemble these components to the Mounting Plate, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Heat Sink, Silicone	Dow Corning 340

Support Equipment Required

Quantity	Description	Reference Number
1	Board, Peg	Fabricate IAW figure 4-9
1	Wrench, Torque, 30 in-lb	TEC3A or equivalent
1	Wrench, Torque, 300 in-lb	TEC25A or equivalent

NOTE

Index numbers refer to figure 4-12 unless otherwise noted.

Apply sealing compound to lower two threads of all screws when installing screws.

1. Turn sieve beds (17), plenum (18), and rotary valve (4) over as shown.

2. Install nine cut-off bolts (figure 4-10) in two sieve beds (17) and plenum (18).

3. Remove height adjustment flat washers (16) from peg board and install on nine cut-off bolts in same location on sieve beds (17) and plenum (18) as removed from peg board.

4. Apply silicone heat sink compound to portion of rotary valve that touches mounting plate.

5. Position mounting plate (3), insulation blanket (32) and shroud assembly (31) onto sieve beds (17), plenum (18), and rotary valve (4). Install outlet fitting adapter (33) onto straight adapter (35) and align screw hole in adapter (33) with mounting plate (3).

CAUTION

Use care when performing step 6 not to disturb height adjustment washer (16) previously installed. When installing nine screws (9) do not tighten down all the way.

6. Remove one cut-off bolt at a time from two sieve beds (17) and plenum (18) and replace with one of nine screws (9).

7. Mount rotary valve assembly (4) to mounting plate (3) and secure with three screws (1) and lockwasher (2).

8. Apply silicone heat sink compound to flat portion of electronic box that comes in contact with mounting plate. Insert shroud assembly (31) into electronics box (8) and secure with two screws (34). Route electrical connector (36) through slit in shroud assembly (31). Secure electronic box (8) to mounting plate (3) with two screws (5) and two screws (6).

NOTE

If removed during disassembly, attach two cushion straps (15) and nut plate (14) to air heater assembly (13) and secure with sealing compound.

9. Attach diffuser tube (30) to 90° fitting on solenoid valve and tighten. Mount air heater assembly (13) to mounting plate (3) and secure with two screws (12).

10. Rotate mount nut on end of inlet filter assembly (11) until the two screw holes align with holes in mounting plate (3). Secure inlet filter assembly (11) to mounting plate (3) with two screws (10).

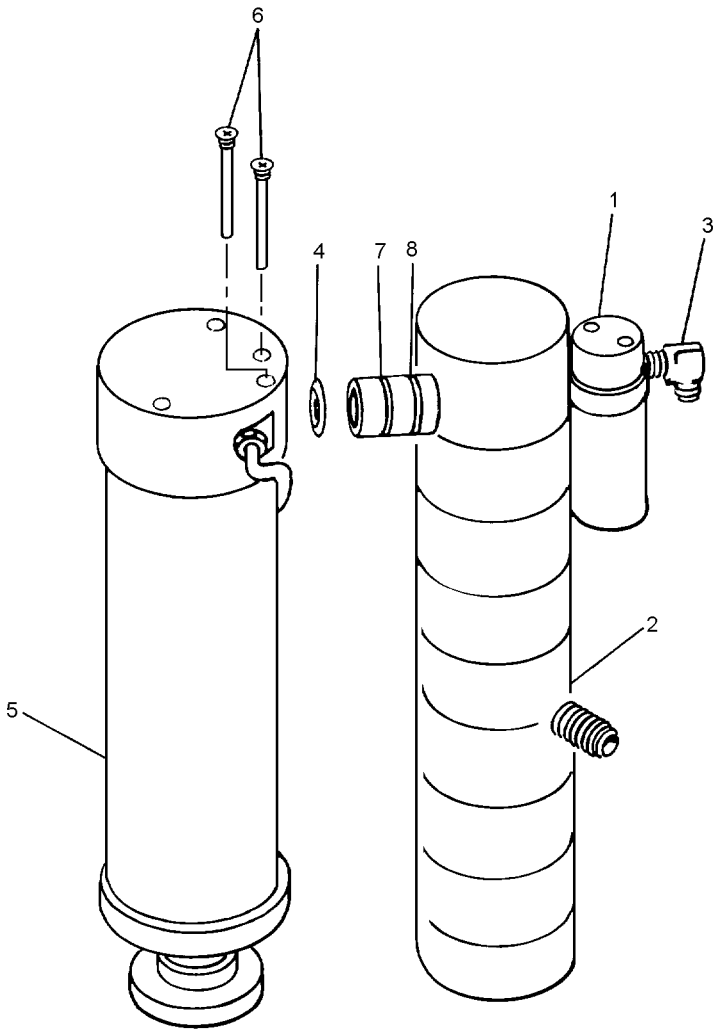
11. Using torque wrench (P/Ns TE25A, TEC3A or equivalent) as applicable, torque all screws as follows:

a. Air heater assembly two screws (12) 10 ±1 in-lb.

b. Inlet filter assembly two screws (10) 23 ±2 in-lb.

c. Sieve beds and plenum nine screws (9) 195 ±10 in-lb.

THIS PAGE INTENTIONALLY LEFT BLANK.



1. SOLENOID VALVE
2. AIR HEATER ASSEMBLY
3. ORIFICE ASSEMBLY
4. PREFORMED PACKING
5. INLET FILTER ASSEMBLY
6. SCREW PINS
7. AIR HEATER, FIRST GROOVE
8. AIR HEATER, SECOND GROOVE

004022

Figure 4-22. Solenoid Valve, Air Heater Assembly and Inlet Filter Assembly

d. Electronics box two screws (5) 30 ±2 in-lb, two screws (6) 3 ±1 in-lb, and two screws (7) 23 ±2 in-lb.

e. Rotary valve three screws (1) 16 ±2 in-lb.

12. Turn concentrator over so it is setting upright.

NOTE

Index numbers in steps 13, 14, and 15 refer to figure 4-11 unless otherwise noted.

13. Secure outlet fitting (8) to mounting plate (16) with screw (4), lockwasher (5) and flat washers (6) and (7).

14. Mount electrical connector bracket (13) to mounting plate (16) and secure with two screws (14) and lockwashers (15).

15. Attach receptacle connector (12) to electrical connector bracket (13) and secure with four screws (10) and lockwashers (11).

4-90. INSTALLATION OF ELECTRICAL WIRING TERMINAL LEADS ON TERMINAL STRIP. To install Electrical Wiring Terminal Leads on Terminal Strip, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Adhesive, Cyanoacrylate (Super Glue)	MIL-A-46050C
As Required	Adhesive Sealant, Silicone, RTV 3145	GS-06F-12702 NIIN 00-145-0020

Support Equipment Required

Quantity	Description	Reference Number
1	Tool, Installation	MS90387-1 NIIN 00-781-7891

NOTE

Refer to figure 4-8 for details of terminal strip configuration.

1. Ensure air temperature sensor thermistor probe is routed under and between filter and air heater assemblies. Connect one terminal lead of the air temperature sensor thermistor probe from the inlet filter assembly to the number one terminal on the terminal strip and secure with screw.

2. Connect remaining terminal lead of the air temperature sensor thermistor probe from inlet filter assembly and one terminal lead from shroud thermistor probe coming from sieve bed to number two terminal of terminal strip and secure with screw.

3. Connect remaining terminal lead from shroud thermistor probe coming from sieve bed to number three terminal of terminal strip and secure with screw.

4. Connect terminal leads for the solenoid valve to the number four and five terminal of terminal strip and secure with two screws.

NOTE

Number six terminal on terminal strip is not used.

5. Connect the brown and blue terminal leads for the rotary valve assembly to the number seven terminal of terminal strip and secure with screw.

6. Connect the black terminal lead for the rotary valve assembly to the number eight terminal of terminal strip and secure with screw.

7. Connect the red terminal lead for the rotary valve assembly to the number nine terminal of terminal strip and secure with screw.

8. Apply RTV silicone adhesive evenly over all wire leads and the terminal strip.

9. Route two small tiedown straps loosely around wires and through holes on cover (3) as shown in figure 4-8.

10. Attach cover (3) to terminal strip (l) and secure loosely with five screws (2). Tighten tiedown straps using installation tool. Tighten all five screws (2) evenly.

11. Secure shroud thermistor probe wire with a small tiedown strap to the check valve sleeve that goes into sieve bed (P/N 1630850-6).

12. Secure wires to the rotary valve tube flange with a large tiedown strap at the point where the tube flange is secured to sieve bed (P/N 1630850-6).

13. Secure wires for air temperature sensor thermistor probe at the inlet filter assembly with a small tiedown strap around air temperature sensor thermistor probe nut and wires.

14. Secure all wires together above the terminal block with six small tiedown straps.

15. Secure wire bundle completed in step 14 above to rotary valve tube flange that goes to sieve bed (P/N 1630850-6) with a large tiedown strap at a point just prior to curve in tube flange that goes to rotary valve.

16. Using two small tiedown straps, secure wires together just off terminal block in direction leading down side of electronics box assembly.

17. Secure wires together coming from base of rotary valve assembly and electrical connector with two small tiedown straps.

18. Using a small amount of cyanoacrylate adhesive (super glue), center and secure two spacers (14) (figure 4-13) over two screw holes in rotary valve (13) (figure 4-13) as shown.

4-91. STABILIZER PLATE ATTACHMENT. To attach Stabilizer Plate to the concentrator, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque, 30 in-lb	TEC3A or equivalent
1	Wrench, Torque, 300 in-lb	TE25A or equivalent

NOTE

Index numbers refer to figure 4-14 unless otherwise noted.

1. Attach thread seal washer (18) on threaded post of plenum assembly (21).

2. Position tube clamp (19) on threaded post of plenum assembly (21) and over rotary valve (13) tube flange.

3. Position spacer (7) on inlet filter assembly (8) and two spacers (4) on solenoid valve (5).

CAUTION

Use extreme care when positioning stabilizer plate between plenum and electronics box assemblies to prevent cutting electrical wiring.

4. Carefully position stabilizer plate (2) over concentrator components and between plenum assembly (21) and electronics box assembly (12).

5. Insert two screws (3) into stabilizer plate (2) and through two spacers (4) and tighten loosely.

6. Insert six screws (1) into two sieve beds (20) and inlet filter assembly (8) and tighten loosely.

7. Insert two screws (15) into stabilizer plate (2) through two spacers (14) and screw into rotary valve (21) loosely.

8. Install flat washer (17) on threaded post of plenum (21) and secure with nut (16).

9. Secure electronic box (12) to stabilizer plate (2) with two screws (9) and lock washer and flat washers (10) and (11).

10. Tighten all screws hand tight.

11. Using torque wrench (P/Ns TE25A, TEC3A or equivalent) as applicable, torque all screws as follows:

a. Rotary valve two screws (15) 28 ±2 in-lb.

b. Electronics box two screws (9) 28 ±2 in-lb.

c. Solenoid valve two screws (3) 28 ±3 in-lb.

d. Sieve beds and inlet filter assembly six screws (1) 75 ±5 in-lb.

e. Plenum self-locking nut (16) 80 ±5 in-lb.

4-92. PRESSURE REDUCER ASSEMBLY. To assemble the Pressure Reducer Assembly to the concentrator, proceed as follows:

NOTE

Install pressure reducer assembly after installation of stabilizer plate.

Index numbers refer to figure 4-14 unless otherwise noted.

1. Install preformed packing (11) on pressure reducer (3) tube flange.

2. Install preformed packing (9) on Pressure Reducer Assembly (3).

3. Insert pressure reducer tube flange into inlet filter assembly (4) and secure with two pan head screws (1) and lockwashers (2).

4. Secure wiring bundle to Pressure Reducer Assembly (3) with two large tiedown straps (5).

5. Secure Pressure Reducer Assembly (3) to rotate valve assembly (10) using two screws (6) and (8) and lockwashers (7).

4-93. SCHEDULED MAINTENANCE.

4-94. The filter tube element (5, figure 4-18) shall be replaced every 500 flight hours during bench test. The shroud assembly may also be replaced at this time if necessary. Refer to Disassembly (paragraphs 4-64) and Assembly (paragraphs 4-81) for instructions.

4-95. ROTARY VALVE ASSEMBLY REPAIR PROCEDURES. If the rotary valve assembly fails, forward it to the major contractor for overhaul. The contractor for rotary valve overhaul is:

Northrop Grumman
P.O. Box 4508
Hickory Grove Road
Davenport, IA.
52808-4508

4-96. REPLACEMENT OF INLET FILTER ASSEMBLY PARTS.

Materials Required

Quantity	Description	Reference Number
As Required	Tape, Anti-seize	MIL-T-27730A
As Required	Lacquer, Black	MIL-L-7178

Support Equipment Required

Quantity	Description	Reference Number
1	Drill Bit, 1/32 in.	—
1	Gage, Plug 0.015 to 0.025 in.	—
1	Brush, Wire	—

NOTE

If the serial number is RHZ097 or above, or has an SEU prefix, or if the inlet filter assembly is marked Part Number 1631030-2, or outer rim of filter end cap (15, figure 4-23) is marked with black lacquer, filter assembly modification is not required.

If the Serial Number is without an RHZ or SEU prefix, or is RHZ096 or below, or if the inlet filter assembly is Part Number 1631030-1, or filter end cap is not marked or filter element requires replacement, proceed as follows:

Index numbers refer to figure 4-18 unless otherwise noted.

1. Remove inlet filter assembly in accordance with paragraph 4-72.

2. Insert plug gage into drain hole of pipe plug (16) located in filter end cap (15); if plug gage can be inserted into drain hole, proceed to step 7. If plug gage cannot be inserted into drain hole, proceed to step 3.

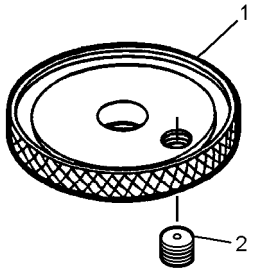
3. Remove filter post screw (8) from inlet filter housing (6).

4. Remove pipe plug (16) from filter end cap (15).

NOTE

If pipe plug (16) is P/N 1631919-1 (0.015 - 0.025 plug gage cannot be inserted into drain hole of pipe plug P/N 1631919-1), replace pipe plug P/N 1631919-1 with new pipe plug P/N 1631919-2. If pipe plug P/N 1631919-2 is not available, modify pipe plug P/N 1631919-1 by performing step 5. If pipe plug P/N 1631919-2 is available, proceed to step 6.

5. Remove white substance from pipe plug (16) using wire brush. Using drill with 1/32-inch drill bit, drill bleed port of pipe plug (16) to 1/32-inch size.



004023

Figure 4-23. Filter End Cap

6. Paint filter end cap (15) with black lacquer as shown by the cross-hatched shaded area in Figure 4-23.

7. Wrap pipe plug (P/N 1631919-2) (ISA) with anti-seize tape and install in filter end cap (15).

8. Install filter post screw (P/N 1631079-2) (8) into filter inlet housing (6).

9. Install inlet filter assembly in accordance with paragraph 4-84.

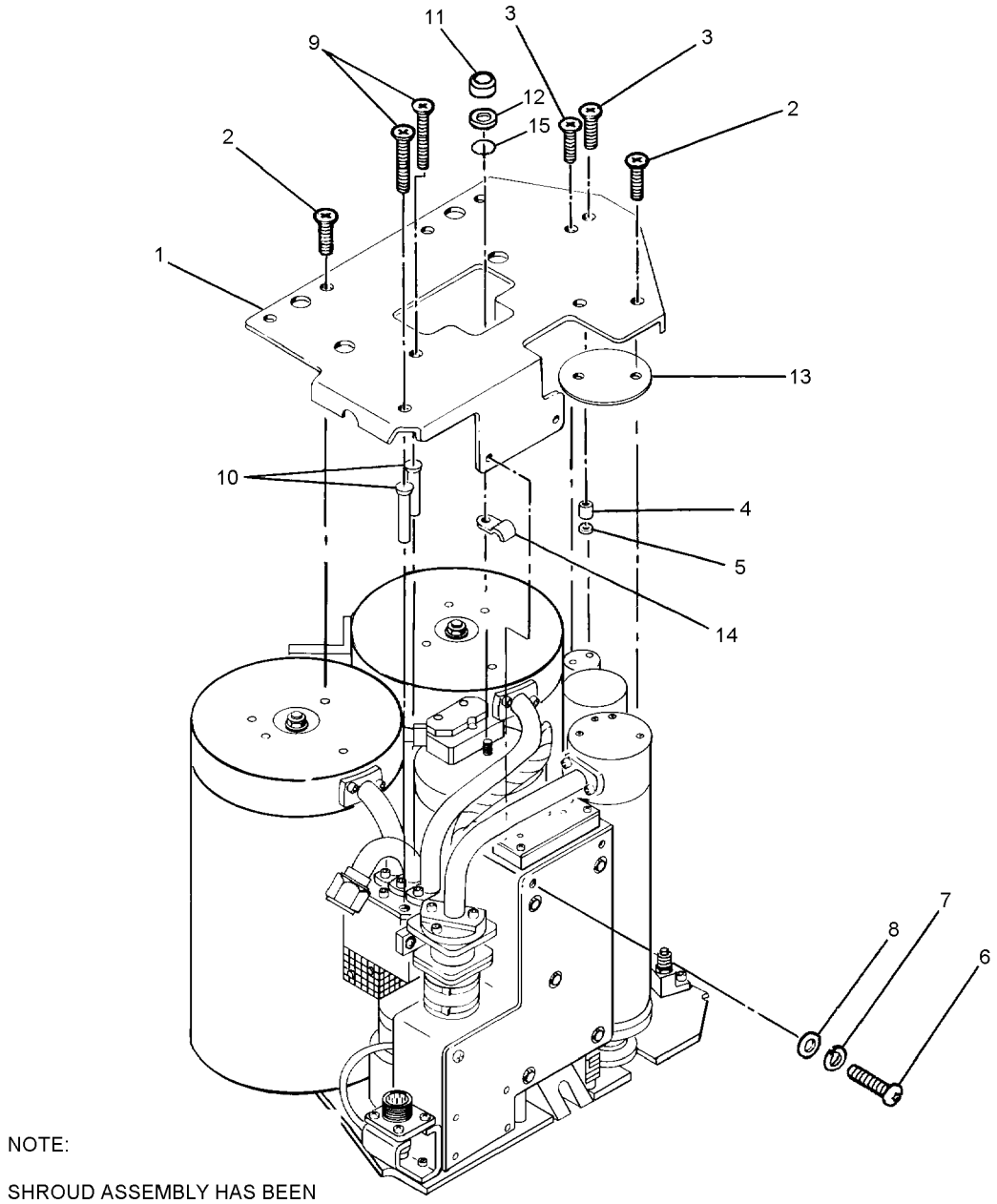
10. Perform Bench Test in accordance with paragraph 4-26.

Section 4-5. Illustrated Parts Breakdown

4-97. GENERAL.

4-98. This section lists and illustrates the assemblies and detail parts of the OEAS Oxygen Concentrator, Type GGU-7/A, P/N 3261009-0105 manufactured by Litton Life Support, formerly Clifton Precision (CAGE 99251).

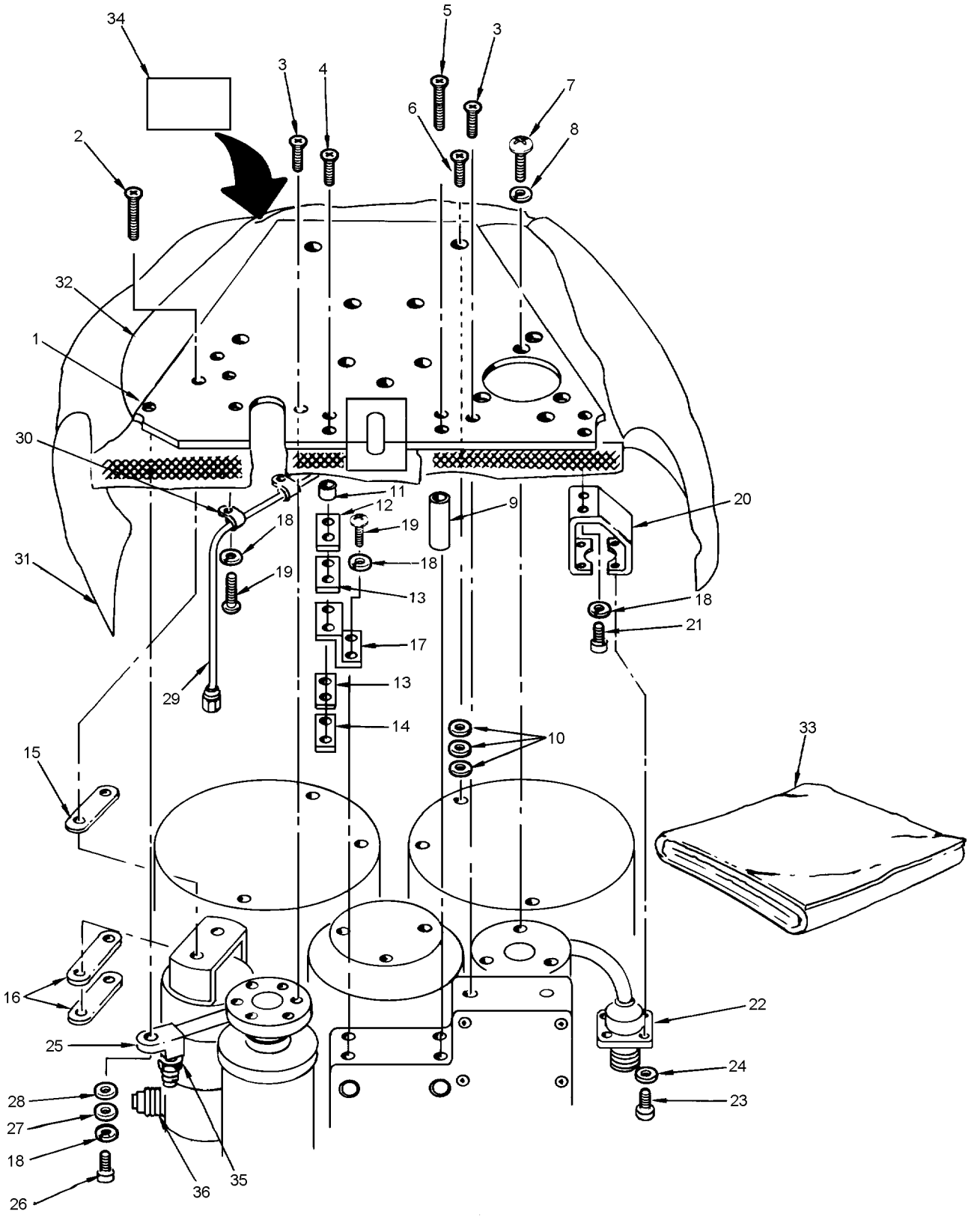
4-99. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.



004024

Figure 4-24. Stabilizer Plate

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-24	3261009-0105	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-7/A)	REF	
	1631000-1	. PLATE AND COMPONENT ASSEMBLY	REF	
-1	1631550-1	. . STABILIZER PLATE	1	
		(ATTACHING PARTS)		
-2	MS51960-84	. . SCREW, Machine	6	
-3	MS51959-46	. . SCREW, Machine	2	
-4	1631547-1	. . SPACER	2	
-5	AN960C10L	. . WASHER, Flat	AR	
-6	MS51958-60	. . SCREW, Machine	2	
-7	MS35338-138	. . WASHER, Lock	2	
	MS35338-157	. . WASHER, Lock (Alternate)	2	
-8	NAS620C10L	. . WASHER, Flat	2	
-9	MS51959-73	. . SCREW, Machine	2	
-10	1631546-1	. . SPACER	2	
-11	MS21043-5	. . NUT, Self-Locking	1	
-12	1603660-262	. . WASHER, Flat	1	
		---*---		
-13	1631886-1	. . SPACER	1	
-14	1631163-1	. . CLAMP, Tube	1	
-15	1630992-1	. . WASHER, Thread Seal	1	



004025

Figure 4-25. Shroud Assembly/Mounting Plate

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-25	3261009-0105	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-7/A)	REF	
	1631000-1	. PLATE AND COMPONENT ASSEMBLY	REF	
-1	1630985-3	. . MOUNTING PLATE (ATTACHING PARTS)	1	
-2	MS51960-67	. . SCREW, Machine	2	
-3	MS51960-65	. . SCREW, Machine	4	
-4	MS51960-69	. . SCREW	2	
-5	1632344-1	. . SCREW, Special	2	
-6	MS51960-100	. . SCREW	9	
-7	MS51957-45	. . SCREW	3	
-8	MS35338-156	. . WASHER, Lock	3	
	MS35338-137	. . WASHER, Lock (Alternate)	3	
-9	1631087-1	. . SPACER	2	
-10	1603660-262	. . WASHER, Flat	AR	
-11	1631087-4	. . SPACER	2	
-12	1632225-1	. . STRAP	1	
-13	1632226-1	. . STRAP, Cushion	2	
-14	1632225-2	. . STRAP	1	
-15	1632234-1	. . PLATE, Nut	1	
-16	1632227-1	. . STRAP, Cushion ---*---	2	
-17	1631154-1	. . OFFSET, Electrical Mount (ATTACHING PARTS)	1	
-18	MS35338-138	. . WASHER, Lock	11	
-19	MS51958-60	. . SCREW ---*---	4	
-20	1630853-1	. . BRACKET, Elect. Connector (ATTACHING PARTS)	1	
-21	NAS1351C3-5	. . SCREW ---*---	2	
-22	MS3102R18-9P	. . CONNECTOR, Receptacle (ATTACHING PARTS)	REF	
-23	NAS1352C04-5	. . SCREW	4	
-24	MS35338-135	. . WASHER, Lock	4	
	MS35338-157	. . WASHER, Lock (Alternate) ---*---	4	
-25	1632111-1	. . OUTLET FITTING ASSEMBLY (ATTACHING PARTS)	1	
-26	NAS1351C3-8	. . SCREW	1	
-27	AN960C10L	. . WASHER, Flat	AR	
-28	AN960C10L	. . WASHER, Flat ---*---	AR	
-29	1630995-1	. . TUBE, Diffuser (ATTACHING PARTS)	1	
-30	AN742D3	. . CLAMP ---*---	2	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-25-31	1631160-1	. . SHROUD ASSEMBLY	1	
-32	1631161-1	. . BLANKET, Insulation	1	
-33	1647003-1	. . SHROUD, Material, Repair	1	
-34	1619531-1	. . PLATE, Ident	1	
-35	AN816-5J	. . NIPPLE	1	
-36	812787-9	. . PROTECTIVE CAP	1	

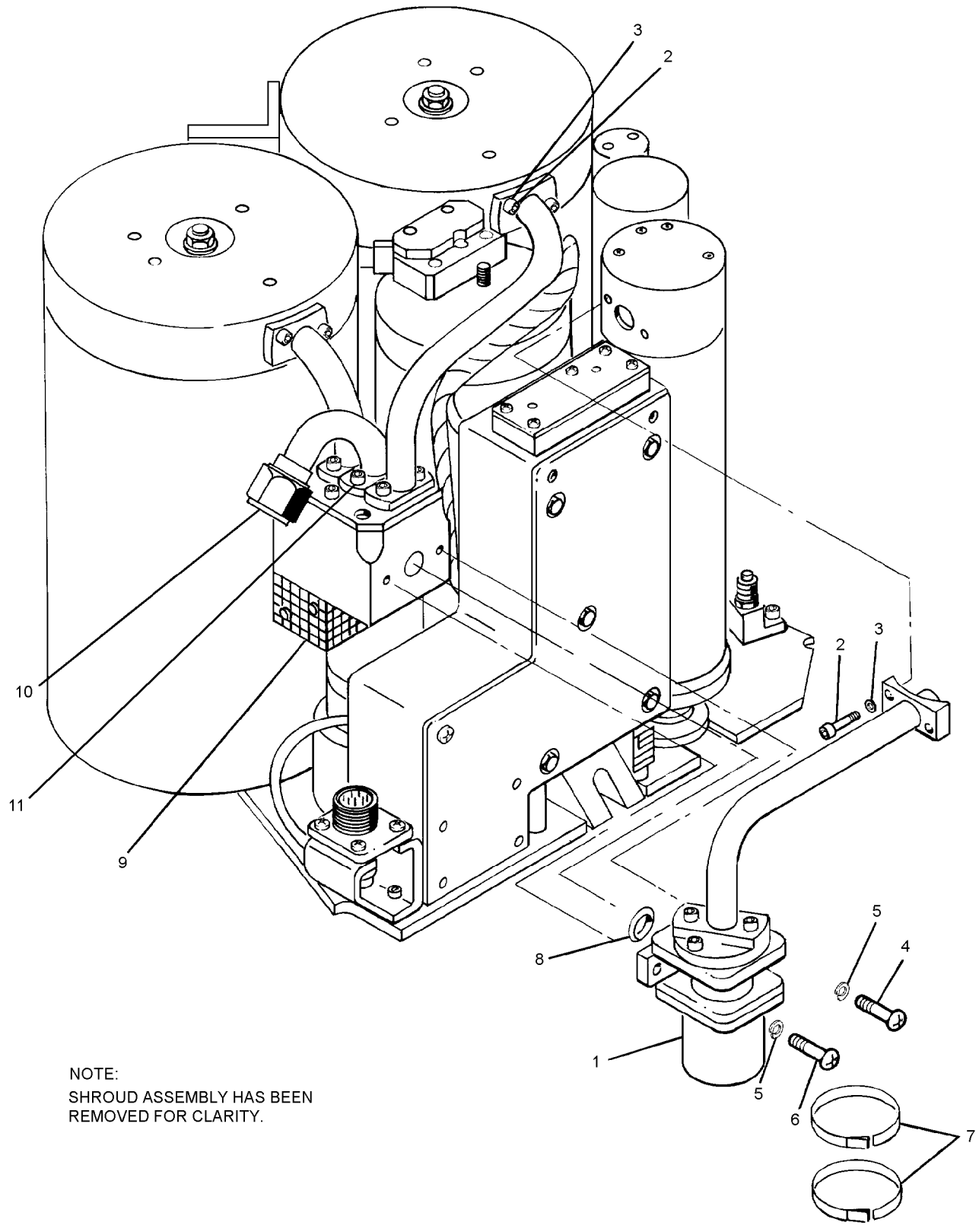
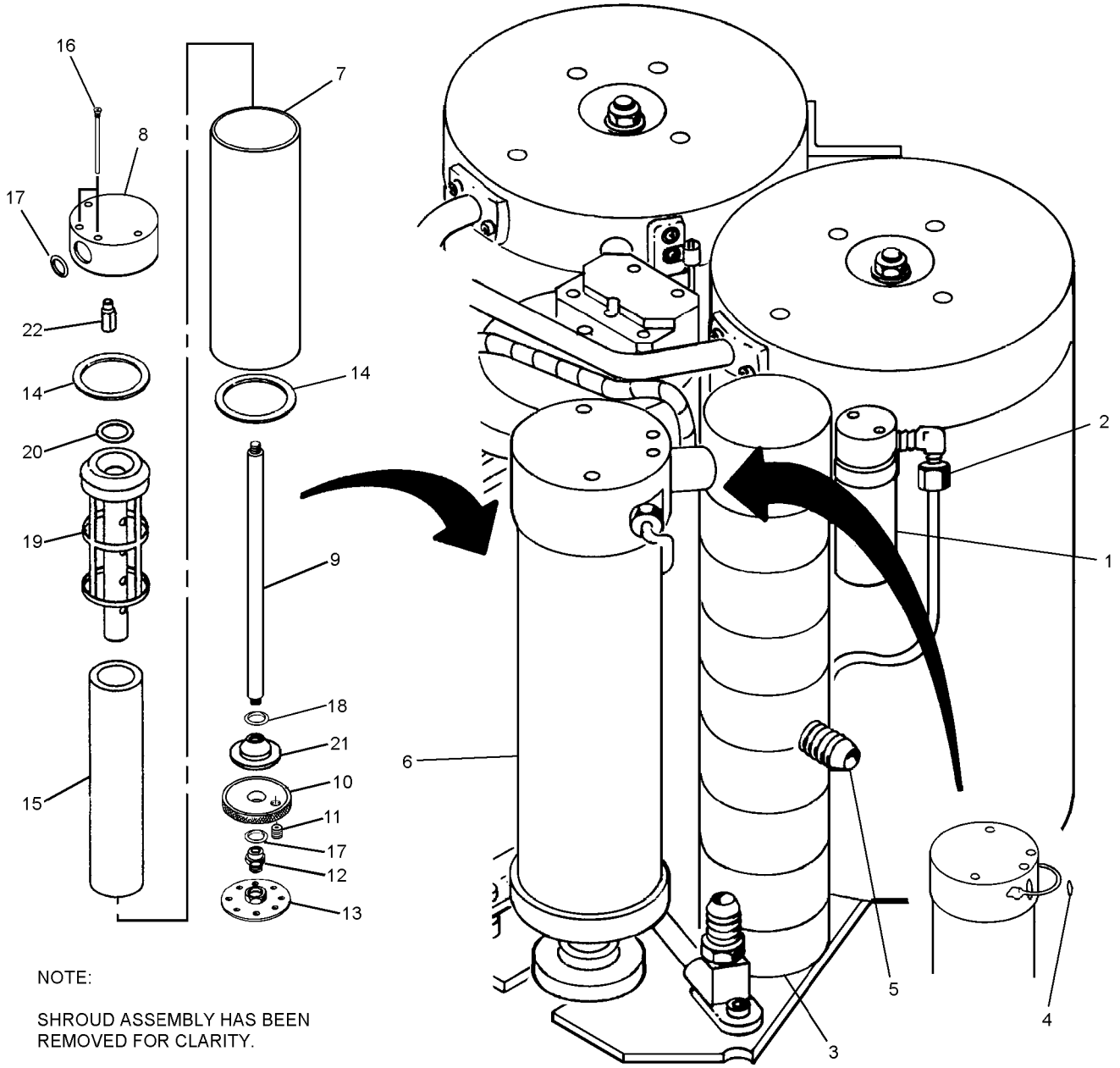


Figure 4-26. Pressure Reducer and Rotary Valve and Vent Tube Assemblies

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-26	3261009-0105	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-7/A)	REF	
	1631000-1	. PLATE AND COMPONENT ASSEMBLY	REF	
-1	1630840-1	. . PRESSURE REDUCER ASSEMBLY (ATTACHING PARTS)	1	
-2	NAS1352C04-5	. . SCREW, Panhead	8	
-3	MS35338-135	. . WASHER, Lock	8	
	MS35338-154	. . WASHER, Lock (Alternate)	8	
-4	MS51957-63	. . SCREW, Panhead	1	
-5	MS35338-138	. . WASHER, Lock	2	
	MS35338-157	. . WASHER, Lock (Alternate)	2	
-6	MS51957-66	. . SCREW ---*---	1	
-7	MS3367-2-9	. . STRAP, Tiedown	2	
-8	1602321-5	. . PACKING, Preformed	2	
	AS3582-016	. . PACKING, Preformed	1	
	MS28775-016	. . PACKING, Preformed	1	
-9	1630830-1	. . ROTARY VALVE ASSEMBLY	1	
-10	1630869-1	. . VENT TUBE	1	
-11	MS35265-13	. . SCREW	2	
	56040-94-4	. . SCREW, Cap, Socket Head	2	

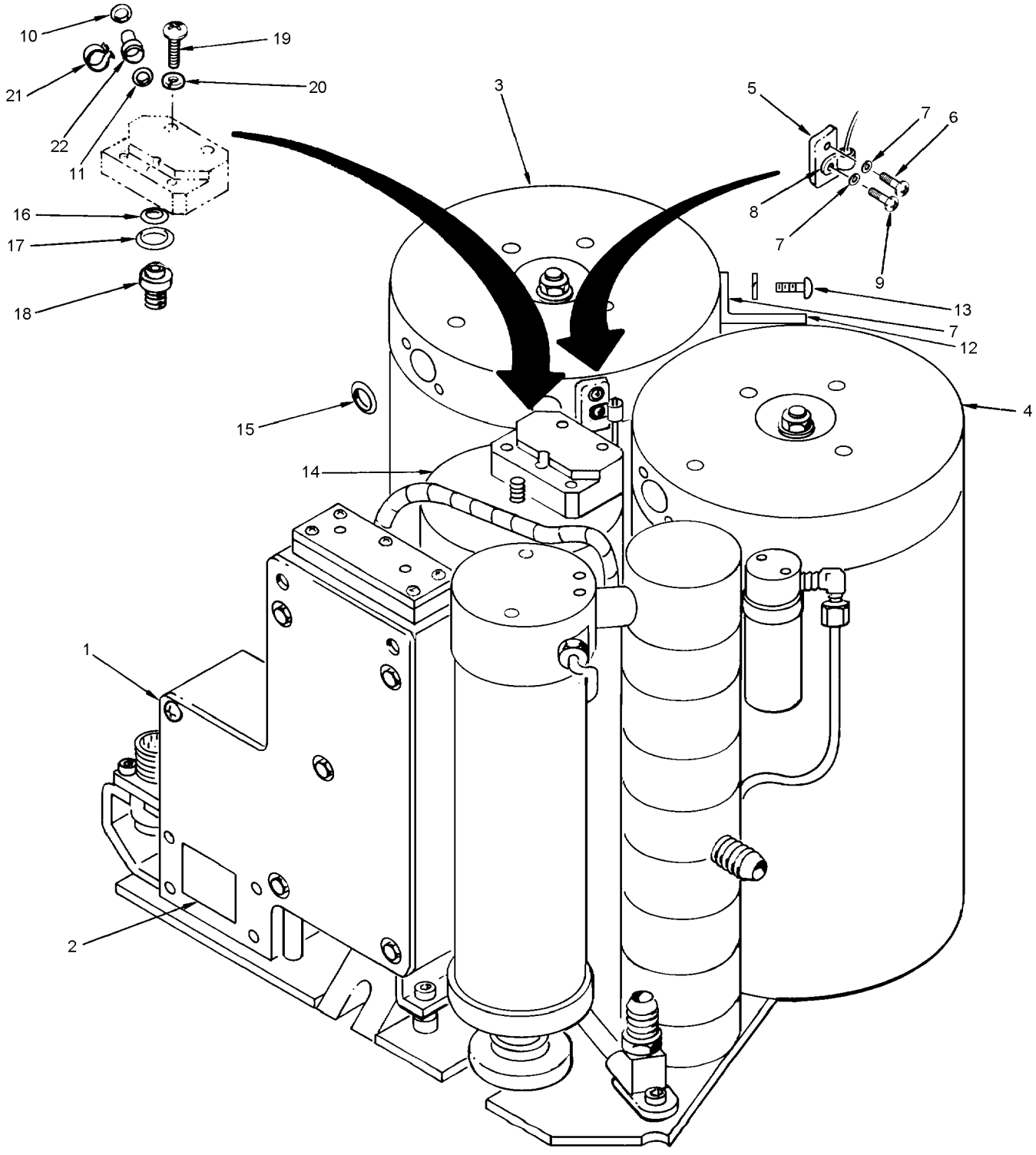


004027

Figure 4-27. Solenoid Valve, Air Heater Assembly and Inlet Filter Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-27	3261009-0105	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-7/A)	REF	
	1631000-1	. PLATE AND COMPONENT ASSEMBLY	REF	
-1	1631040-1	. . VALVE, Solenoid	1	
-2	1631167-1	. . FITTING AND ORIFICE ASSEMBLY	1	
-3	1632410-1	. . HEATER ASSEMBLY, Air	1	
-4	1631321-5	. . PACKING, Preformed	1	
-5	MS90376-14R	. . PROTECTIVE CAP	1	
-6	1657476-1	. . INLET FILTER ASSEMBLY	1	
-7	1631081-1	. . . SLEEVE, Inlet Filter	1	
-8	1631048-1	. . . HOUSING, Filter Inlet	1	
-9	1631079-2	. . . SCREW, Filter Post	1	
-10	1631074-1	. . . CAP, Filter End	1	
-11	1631919-2	. . . PIPE PLUG	1	
-12	1631077-2	. . . SCREW NUT, Filter Mount	1	
-13	1632185-1	. . . NUT, Filter Mount	1	
-14	1631075-2	. . . GASKET, Sleeve Seal	2	
-15	1643231-1	. . . ELEMENT, Filter Tube	1	
	100-25-DX	. . . ELEMENT, Filter Tube (Note 1)	1	
-16	1631049-1	. . . SCREW PINS	2	
-17	1602321-5	. . . PACKING, Performed	2	
-18	MS9068-012	. . . PACKING, Performed	1	
	AS3582-012	. . . PACKING, Preformed (Alternate)	1	
-19	1653300-1	. . . TRAP, Water	1	
-20	1646811-3	. . . SEAL	1	
-21	1631082-1	. . . NUT, Element Seal	1	
-22	1631076-1	. . . ADAPTER, Thread	1	

Notes: 1. Filter elements can also be ordered thru normal supply channels under NIIN 01-170-2554.



004028

Figure 4-28. Electronics Box Assembly, Sieve Beds and Plenum Assembly with Check Valves

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
4-28	3261009-0105	CONCENTRATOR, OXYGEN MOLECULAR SIEVE (GGU-7/A)	REF	
	1631000-1	. PLATE AND COMPONENT ASSEMBLY	REF	
-1	1631372-1	. . ELECTRONICS BOX ASSEMBLY	1	
-2	1644246-1	. . DECAL, Warning	1	
	1601373-1	. . BED ASSEMBLIES, Molecular Sieve (Note 1)	1	
-3	1630850-6	. . . BED, Molecular Sieve (Note 1)	1	
-4	1630850-5	. . . BED, Molecular Sieve (Note 1)	1	
-5	1631086-1	. . STRAP, Hangar (ATTACHING PARTS)	1	
-6	NAS1351C3-6	. . SCREW, Cap Socket	1	
-7	MS35338-138	. . WASHER, Lock	2	
	MS35338-157	. . WASHER, Lock (Alternate) ---*---	2	
-8	AN742D2	. . CLAMP, Loop (ATTACHING PARTS)	1	
-9	NAS1351C3-4	. . SCREW, Cap Socket ---*---	1	
-10	1602321-51	. . PACKING, Preformed	1	
-11	1602321-51	. . PACKING, Preformed	1	
-12	1631085-1	. . L-BRACKET (ATTACHING PARTS)	1	
-13	MS51958-62	. . SCREW ---*---	2	
-14	1630835-1	. . PLENUM ASSEMBLY	1	
-15	1602321-5	. . . PACKING, Preformed	2	
-16	1602321-5	. . . PACKING, Preformed	2	
-17	1602321-73	. . . PACKING, Preformed	2	
-18	1632137-1	. . . CHECK VALVE ASSEMBLY (ATTACHING PARTS)	2	
-19	MS51957-17	. . . SCREW	5	
-20	MS35333-70	. . . WASHER, Lock ---*---	5	
-21	1630839-1	. . CLIP, Connector Lock	2	
-22	1630838-1	. . CONNECTOR, Plenum Sleeve	2	

Notes: 1. Index number 3, P/N 1630850-6, and index number 4, P/N 1630850-5, can no longer be ordered individually; these parts must now be ordered as a set under P/N 1601373-1, NSN 1680-01-511-3170.

NUMERICAL INDEX

Part Number	Figure and Index No.	SM&R Code
AN742D2	4-28-8	PAGZZ
AN742D3	4-25-30	PAGZZ
AN816-5J	4-25-35	PAGZZ
AN960C10L	4-24-5	PAGZZ
	4-25-27	PAGZZ
	4-25-28	PAGZZ
AS3582-012	4-27-18	PAGZZ
AS3582-016	4-26-8	PAGZZ
MS21043-5	4-24-11	PAGZZ
MS28775-016	4-26-8	PAGZZ
MS3102R18-9P	4-25-22	
MS3367-2-9	4-26-7	PAGZZ
MS35265-13	4-26-11	PAGZZ
MS35333-70	4-28-20	PAGZZ
MS35338-135	4-25-24	PAGZZ
	4-26-3	PAGZZ
MS35338-137	4-25-8	PAGZZ
MS35338-138	4-24-7	PAGZZ
	4-25-18	PAGZZ
	4-26-5	PAGZZ
	4-28-7	PAGZZ
MS35338-154	4-26-3	PAGZZ
MS35338-156	4-25-8	PAGZZ
MS35338-157	4-24-7	PAGZZ
	4-25-24	PAGZZ
	4-26-5	PAGZZ
	4-28-7	PAGZZ
MS51957-17	4-28-19	PAGZZ
MS51957-45	4-25-7	PAGZZ
MS51957-63	4-26-4	PAGZZ
MS51957-66	4-26-6	PAGZZ
MS51958-60	4-24-6	PAGZZ
	4-25-19	PAGZZ
MS51958-62	4-28-13	PAGZZ
MS51959-46	4-24-3	PAGZZ
MS51959-73	4-24-9	PAGZZ
MS51960-100	4-25-6	PAGZZ
MS51960-65	4-25-3	PAGZZ
MS51960-67	4-25-2	PAGZZ
MS51960-69	4-25-4	PAGZZ
MS51960-84	4-24-2	PAGZZ
MS90376-14R	4-27-5	PAGZZ
MS9068-012	4-27-18	PAGZZ
NAS1351C3-4	4-28-9	PAGZZ
NAS1351C3-5	4-25-21	PAGZZ
NAS1351C3-6	4-28-6	PAGZZ
NAS1351C3-8	4-25-26	PAGZZ
NAS1352C04-5	4-25-23	PAGZZ
	4-26-2	PAGZZ
NAS620C10L	4-24-8	PAGZZ
100-25-DX	4-27-15	
1601373-1	4-28	PAOGD
1602321-5	4-26-8	PAGZZ
	4-27-17	PAGZZ
	4-28-15	PAGZZ
	4-28-16	PAGZZ
1602321-51	4-28-10	PAGZZ
	4-28-11	PAGZZ
1602321-73	4-28-17	PAGZZ
1603660-262	4-24-12	PAGZZ
	4-25-10	PAGZZ
1619531-1	4-25-34	PAGZZ
1630830-1	4-26-9	PAGDD
1630835-1	4-28-14	PAGZZ
1630838-1	4-28-22	PAGZZ
1630839-1	4-28-21	PAGZZ
1630840-1	4-26-1	PAGZZ
1630850-5	4-28-4	XAGDD
1630850-6	4-28-3	XAGDD
1630853-1	4-25-20	PAGZZ
1630869-1	4-26-10	
1630985-3	4-25-1	PAGZZ
1630992-1	4-24-15	PAGZZ
1630995-1	4-25-29	PAGZZ
1631000-1	4-24	PAGZZ
	4-25	
	4-26	
	4-27	
	4-28	
1631040-1	4-27-1	PAGZZ
1631048-1	4-27-8	PAGZZ
1631049-1	4-27-16	PAGZZ
1631074-1	4-27-10	PAGZZ
1631075-2	4-27-14	PAGZZ
1631076-1	4-27-22	XBGZZ
1631077-2	4-27-12	PAGZZ
1631079-2	4-27-9	PAGZZ
1631081-1	4-27-7	PAGZZ
1631082-1	4-27-21	XBGZZ
1631085-1	4-28-12	PAGZZ
1631086-1	4-28-5	PAGZZ
1631087-1	4-25-9	PAGZZ
1631087-4	4-25-11	PAGZZ
1631154-1	4-25-17	PAGZZ
1631160-1	4-25-31	PAGZZ
1631161-1	4-25-32	PAGZZ
1631163-1	4-24-14	PAGZZ
1631167-1	4-27-2	PAGZZ
1631321-5	4-27-4	PAGZZ
1631372-1	4-28-1	PAGDD
1631546-1	4-24-10	PAGZZ
1631547-1	4-24-4	PAGZZ
1631550-1	4-24-1	PAGZZ
1631886-1	4-24-13	PAGZZ
1631919-2	4-27-11	PAGZZ
1632111-1	4-25-25	PAGZZ
1632137-1	4-28-18	PAGZZ

NUMERICAL INDEX (Cont)

Part Number	Figure and Index No.	SM&R Code
1632185-1	4-27-13	PAGZZ
1632225-1	4-25-12	PAGZZ
1632225-2	4-25-14	PAGZZ
1632226-1	4-25-13	PAGZZ
1632227-1	4-25-16	PAGZZ
1632234-1	4-25-15	PAGZZ
1632344-1	4-25-5	PAGZZ
1632410-1	4-27-3	PAGZZ
1643231-1	4-27-15	PAGZZ
1644246-1	4-28-2	PAGZZ
1646811-3	4-27-20	PAGZZ
1647003-1	4-25-33	PAGZZ
1653300-1	4-27-19	PAGZZ
1657476-1	4-27-6	PAGGG
3261009-0105	4-24	PAGGG
	4-25	
	4-26	
	4-27	
	4-28	
56040-94-4	4-26-11	PAGZZ
812787-9	4-25-36	PAGZZ