CHAPTER 6

AIRCRAFT PANEL MOUNTED OXYGEN REGULATORS

TYPE MD-1, MD-2, CRU-52/A, CRU-54/A, CRU-55/A, CRU-57/A, AND CRU-72/A

Section 6-1. Description

6-1. GENERAL.

6-2. Aircraft Panel Mounted Oxygen Regulators, Type MD-1 (P/N 14950-7B), CRU-52/A (P/N 14950-26A), CRU-54/A (P/N 14950-27A), CRU-55/A (P/N 14950-28A) (figure 6-1), and CRU-57/A (P/N 14950-30A), Type MD-2 (P/N 14800-8B), CRU-72/A (P/N 14800-8C) (figure 6-2) are manufactured by Carleton Technology Inc, formerly Aro Corporation (CAGE 03990). They are designed to regulate breathing oxygen supplied to the aircrewmember during flight. Table 6-1 contains leading particulars for the regulators.

6-3. All controls and indicators necessary for indication of performance and operation of the regulator are located on an illuminated panel with the regulating components attached to the mounting plate and controls assembly.

NOTE

The equipment is identified by type, part number and description. Type designation only will be used as reference in this chapter.

6-4. The regulators are panel-mounted, automatic positive pressure diluter demand type regulators and are used in conjunction with a pressure breathing type oxygen mask. The regulators provide 100 percent oxygen, or an air/oxygen mixture at the correct ratio depending on altitude, to the user on demand. The regulators incorporate an emergency pressure control lever. During normal operation, the lever is set in the NORMAL position. A TEST MASK position is provided to test the oxygen supply function of the regulators at low altitudes, and at ground level. When in the EMERGENCY position the regulators deliver 100 percent oxygen to the user at a positive pressure. The EMERGENCY position is used when inadequate oxygen supply is suspected.

6-5. CONFIGURATION.

6-6. The regulators are supplied in two basic configurations: low pressure (50 to 500 psig operating pressure range), and high pressure (50 to 2000 psig operating range). Refer to table 6-1 for applicable models and part numbers.

6-7. FUNCTION.

6-8. Characteristics and performance for which the regulators are designed are described below. Letters in parentheses relate to letters circled in figure 6-3.

1. The following steps outline the functions of the Aircraft Panel Mounted Oxygen Regulators, utilize figure 6-3 to follow the path of flow. With the emergency pressure control lever (Q) in the normal position, manual dilution control lever (N) in the normal oxygen position, and inlet supply lever (B) in the off position. Supply oxygen enters through oxygen inlet (A) and is filtered and passes into the manifold inlet assembly, and will indicate on the oxygen supply pressure gage.

Table 6-1. Leading Particulars

MD-1	14950-7B	50 to 500 psig
CRU-52/A	149500-26A	50 to 500 psig
CRU-54/A	149500-27A	50 to 500 psig
CRU-55/A	149500-28A	50 to 500 psig
CRU-57/A	149500-30A	50 to 500 psig
MD-2	14800-8B	50 to 2000 psig
CRU-72/A	14800-8C	50 to 2000 psig

Voltage	28Vdc
Mounting	Panel
Operating Altitude Range:	
Normal Breathing	Up to 30,000 ft
Pressure Breathing Starts	At 30,000 ft
Air-Oxygen Mixture	Up to 32,000 ft
100% Oxygen Delivery Starts	At 32,000 ft
Visual Indicators	Pressure Gage and Flow Indicator on Front Panel
Regulator Controls:	
Diluter Lever	Selects NORMAL or 100% OXYGEN
Supply Lever	Opens and closes oxygen supply
Emergency Lever	For emergency, and ground test of mask
Overall Dimensions:	
Length	47/32 in
Width	5 3/4 in
Height	3 in
Weight	2.85 lb

2. Placing the inlet supply lever (B) in the ON position will allow oxygen to flow into the first stage reduction changer (C). The first-stage reduction chamber (C) is set to reduce the supply oxygen pressure to 32-35 psi. This is accomplished when inlet pressure compresses a bellows which in turn, by means of linkage, will cause an element to move to the inlet and manifold assembly and seat; stopping the flow of oxygen to (C) Chamber (C) is provided with a first-stage relief valve assembly (D): set to relieve at 55-60 psi. This safety feature is to protect the regulator from over pressures. With the regulator in a static flow condition, once oxygen enters chamber (C), it will also be present at the first-stage relief-valve (D) demand valve (E), and the safety pressure, pressure breather valve (V).

3. Demand valve assembly (E) is opened when there is a pressure differential across the inter demand diaphragm (W) which forces demand valve level (G) up. This pressure differential exists during the inhalation cycle by creating a reduction in pressure at outlet (H). The reduction in pressure at outlet (H) is sensed in the demand diaphragm chamber (J) through sensing port (K).

4. During periods of inhalation, the oxygen flow passes from the demand valve assembly (E) through a line at (L) to actuate the blinker assembly by passing through a sensing line indicated by this symbol ◓. At the same time, the oxygen passes through the Venturi assembly (L). The flow of oxygen mixes after it leaves (L) with ambient air, which enters the regulator through inlet port (M) because of the Venturi action creating a high velocity jet stream. The ambient air added to oxygen is controlled by manual diluter control lever (N), and by the diluter aneroid assembly (O), which automatically produces a 100 percent oxygen concentration at altitudes above 32,000 feet, because the diluter aneroid assembly (O) has expanded and seated stopping the flow of ambient air into the regulator.

5. Upon exhalation, a pressure build-up is sensed back through outlet (H), sensing port (K), and (J), which

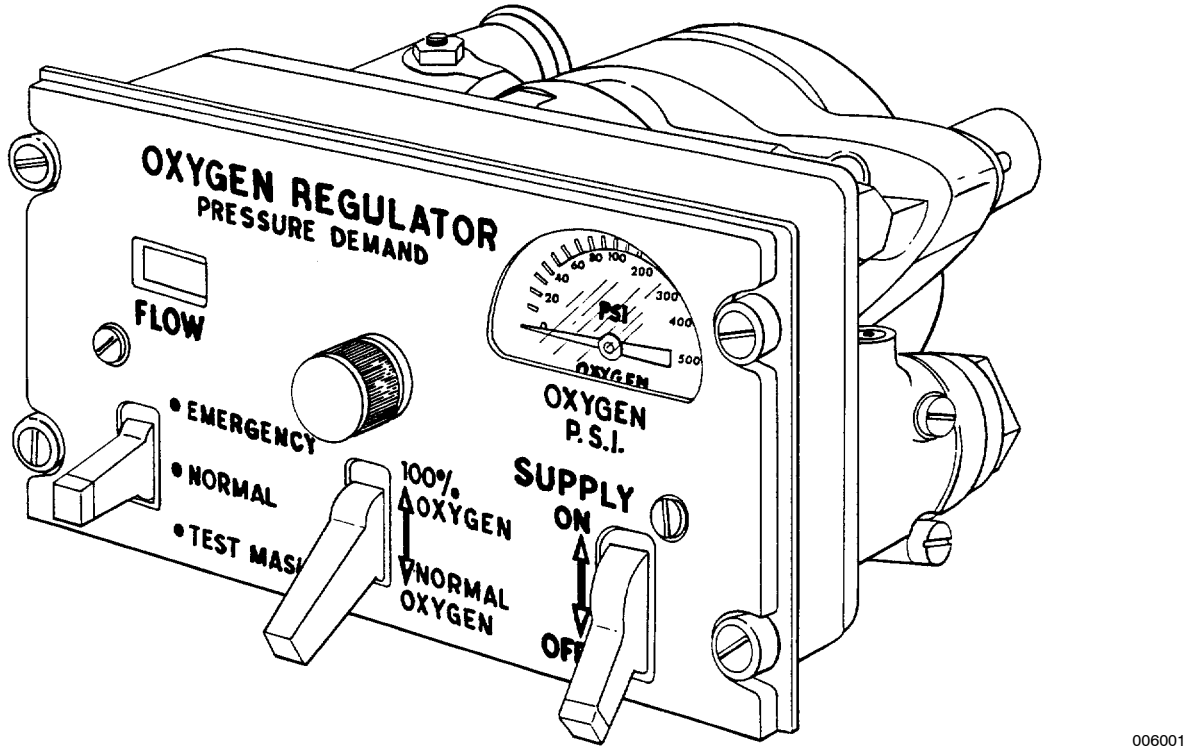

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Figure 6-1. Aircraft Panel Mounted Oxygen Regulator, Type MD-1, CRU-52/A, CRU-54/A, CRU-55/A, and CRU-57/A

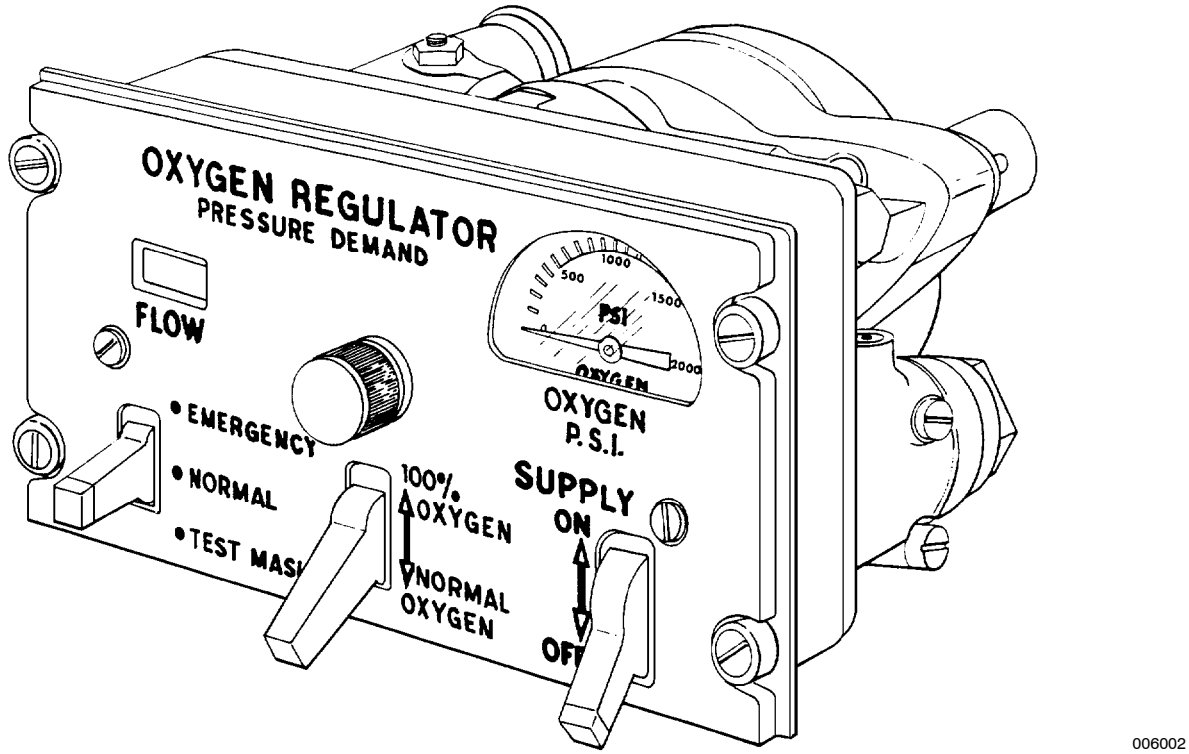

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Figure 6-2. Aircraft Panel Mounted Oxygen Regulator, Type MD-2, CRU-72/A

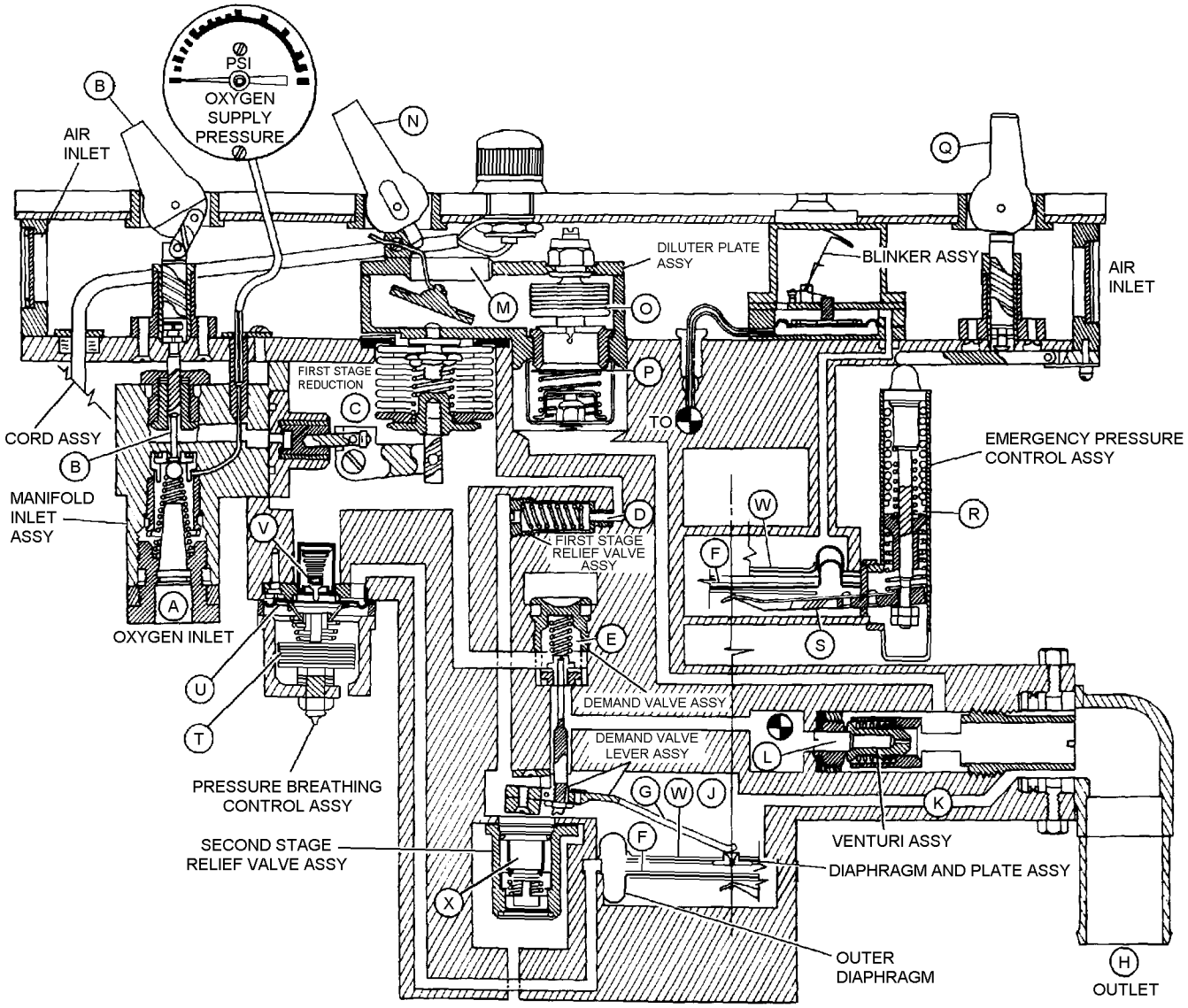

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Figure 6-3. Regulator Operation

will move inter diaphragm (W) away from demand valve lever (G) allowing demand valve (E) to seat. This pressure build-up will also close the blinker assembly. The aneroid check valve assembly (P) prevents the flow of oxygen out through inlet port (M).

6. Emergency pressure control lever (Q) applies force to emergency pressure control test spring (R), which mechanically loads the outer diaphragm (F) through control lever and center assembly (S). Mechanical loading of outer diaphragm (F) provides positive pressure at the regulator outlet (H). (2 to 4 inH_2O emergency position and 6 to 16 inH_2O in the test mask position).

7. Automatic safety pressure and pressure breathing at altitudes above 30,000 feet is provided through pneumatic actuation of aneroid assembly (T). This function begins at approximately 27,000 feet altitude. The force exerted on diaphragm assembly (U) by aneroid assembly (T) actuates the pressure breather valve assembly (V) allowing oxygen to flow to diaphragm and plate assembly (W). Diaphragm and plate assembly (W) is pressure loaded by this volume of oxygen in proportion to altitude actuating the demand valve lever assembly (G) to the extent that the positive pressure is built up at outlet (H) as the altitude is increased.

8. Additional safety is obtained through the inclusion of the second state relief valve assembly (X) in the regulator. It will vent 45 lpm at 40.7 inH_2O.

NOTE

When the manual diluter control lever is in the 100 percent position, the flow of oxygen is identical to normal flow, except that there will be no dilution of oxygen with ambient air.

6-9. SERVICE LIFE.

6-10. Oxygen regulators shall remain in service for as long as they function correctly and do not require excessive repair (exceeds 75% of original cost of regulator). All affected silicone rubber parts shall be replaced whenever a regulator is disassembled for repair.

6-11. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

6-12. Section 6-5, Illustrated Parts Breakdown, contains information on each assembly, subassembly, and component part of the regulators. The figure and index number, reference or part number, description, and units per assembly are provided with the breakdown.

Section 6-2. Modifications

6-13. GENERAL.

6-14. There are no authorized modifications to the oxygen regulators at this time.

Section 6-3. Performance Test Sheet Preparation

6-15. GENERAL.

6-16. Preparation of Oxygen Regulator Performance Test Sheets require that, through the use of various graphs, actual flows given in applicable directives and provided in this section be converted to indicated flows.

6-17. Flows provided in applicable directives are stated in liters per minute (lpm) and are not measurable by the manometers used in oxygen regulator test stands. The flows must be converted to inches of water pressure (inH_2O), the form of measurement which can be read on the test stand manometers.

NOTE

The various graphs supplied with each Oxygen System Components Test Stand, Model 1172AS100 and 1316AS100 are used in converting flows. The graphs supplied are not interchangeable between test stands.

6-18. The information provided in the tables in this section is to be recorded on the Performance Test Sheet (figure 6-4).

6-19. The Performance Test Sheet (figure 6-4) is a sample only, but may be reproduced for local use.

6-20. The following tests require conversion of flows from actual lpm to indicated inH_2O.

1. Second Stage Relief Valve Test.
2. Flow Suction Test.
3. Oxygen Ratio Test.
4. Safety Pressure/Pressure Breathing Test.
5. Blinker (Flow Indicator) Test.
6. Emergency Pressure Test.

6-21. REGULATOR PERFORMANCE TESTS.

6-22. SECOND STAGE RELIEF VALVE TEST. The second stage relief valve shall vent at least 45 lpm at a specified pressure. The actual 45 lpm flow must be converted to an indicated inH_2O flow by using the nitrogen (N_2) line of the Vent Flow Graph. Convert the actual flow as follows:

1. Locate the 45 lpm line on the bottom of the Vent Flow Graph, and trace the line up to where it intersects the N_2 line.
2. Trace the line on the graph where the lpm and N_2 lines intersect across the graph to the left hand column to determine indicated inH_2O.
3. Enter this information in the appropriate block on the Performance Test Sheet.

6-23. FLOW SUCTION TEST. The Flow Suction Test shall be performed at sea level with the diluter control lever in both the 100% OXYGEN and NORMAL OXYGEN position. Actual (lpm) flows are converted to indicated (inH_2O) flows by using the Sea Level Output Graph. The air line is used for NORMAL OXYGEN flows, and the N_2 line is used for 100% OXYGEN flows. Convert the actual flows as follows:

NOTE

Test Stand Input and Output Flow Graphs may vary in makeup, according to the activity performing the test stand calibration. Some test stands may have a single output graph and an input graph with various altitude lines, while others may have separate graphs for each altitude. Ensure specified graph is used.

1. Locate the desired lpm line (figure 6-4) at the bottom of the Sea Level Output Graph.
2. Trace selected lpm line up to where it intersects the air line (NORMAL indicated output) or N_2 line (100% indicated output).
3. Trace the line from point of intersection across the graph to the left hand column to determine indicated inH_2O.
4. Enter this figure in the appropriate block on the Performance Test Sheet.
5. Repeat steps 1 through 4 for all output flows (lpm) given in figure 6-4.

6-24. OXYGEN RATIO TEST. Actual flows and oxygen percentages (figure 6-4) used for the Oxygen Ratio Test must be converted to indicated flows and oxygen averages. All actual flows must be converted to indicated flows. The results of these computations shall be entered in the appropriate columns within the Oxygen Ratio Test portion of the Performance Test Sheet. To find average oxygen, indicated output, corrected indicated output, actual and indicated input flows, refer to paragraphs 6-25 through 6-31.

NOTE

Test Stand Input and Output Flow Graphs may vary in makeup, according to the activity performing the test stand calibration. Some test stands may have a single output graph and an input graph with various altitude lines, while others may have separate graphs for each altitude. Ensure specified graph is used.

6-25. Average Oxygen. These figures are provided, but are computed as follows. Average oxygen is found by adding the minimum and maximum oxygen percentages (figure 6-4) then dividing the sum by 2 (e.g., 6% + 45% = 51% ÷ 2 = 25.5%).

1. Enter the resulting figure, 25.5% in the appropriate block on the Performance Test Sheet.
2. Repeat this procedure for all minimum and maximum oxygen percentages given in figure 6-4.

REGULATOR PERFORMANCE TEST SHEET

ARO TYPES
MD-1, MD-2, CRU-52/A, CRU-54/A,
CRU-55/A, CRU-57/A, AND CRU-72/A

DATE _____ TYPE _____ SERIAL NO. _____

TEST STAND SERIAL NO. _____ TESTED BY _____ CDI _____

1. INWARD LEAKAGE TEST _____ 2. OUTLET LEAKAGE TEST _____
3. OXYGEN SUPPLY VALVE LEAKAGE TEST _____ 4. OVERALL LEAKAGE TEST _____
5. PRESSURE GAGE TEST: NOTE: TESTED AT AMBIENT TEMPERATURE OF 70°F.

LOW PRESSURE REGULATOR ONLY

PRESSURE GAGE (PSIG)	TOLERANCE PSIG	BEFORE TAP	AFTER TAP
50	±10		
100	±25		
500	±25		

HIGH PRESSURE REGULATORS ONLY

PRESSURE GAGE (PSIG)	TOLERANCE PSIG	BEFORE TAP	AFTER TAP
500	±50		
1000	±50		
1500	±50		

6. OUTWARD LEAKAGE TEST _____
7. RELIEF VALVE TEST
   a. VENTS 45 LPM _____ AT 40.7 inH_2O (3 INHg)
   b. LEAKAGE AT 17 INH_2O _____
8. FLOW SUCTION TEST

ALTITUDE	INLET PRESSURE (PSIG)	ACTUAL OUTPUT (LPM)	NORMAL		100 PERCENT		MAXIMUM SUCTION (INH_2O)
			INDICATED OUTPUT	READING	INDICATED OUTPUT	READING	
SEA LEVEL	50	30					-0.50
SEA LEVEL	150	50					-0.70
SEA LEVEL	150	85					-1.0

9. OXYGEN RATIO TEST (INLET PRESSURE 50 PSIG FOR LOW PRESSURE REGULATORS)
   (INLET PRESSURE 150 PSIG FOR HIGH PRESSURE REGULATORS)

ALTITUDE (1000 FT)	OXYGEN PERCENT		OUTPUT				INPUT				
	MIN	MAX	AVERAGE PERCENT	ACTUAL OUTPUT (LPM)	INDICATED OUTPUT (INH_2O)	CORRECTED INDICATED OUTPUT	ACT HI	ACT LOW	IND HI	IND LOW	READING
10	6	45	25.5	15			14.1	8.25			
10	6	60	33	85			79.9	34			
20	24	55	39.5	15			11.4	6.75			
20	24	80	52	85			64.6	17			
28	60	100	80	15			6	0		0	
28	60	100	80	85			34	0		0	
32	98	100	99	85			1.7	0		0	

10. ANEROID AIR VALVE CLOSURE TEST (28,000 TO 32,000 FEET) PERFORMED ONLY IF REGULATOR FAILS OXYGEN RATIO TEST _____

Figure 6-4. Performance Test Sheet (Sheet 1 of 2)

11. SAFETY PRESSURE/PRESSURE BREATHING TEST (INLET PRESSURE 50 PSIG FOR LOW PRESSURE REGULATORS)
(INLET PRESSURE 150 PSIG FOR HIGH PRESSURE REGULATORS)

ALTITUDE (1000 FT)	OUTPUT		PRESSURE (INH_2O)		
	ACTUAL (LPM)	INDICATED (INH_2O)	MINIMUM	READING	MAXIMUM
30	0	0	0.01		2.50
30	85		0.01		2.50
40	0	0	0.30		5.60
40	85		0.30		5.60
43	0	0	5.30		12.50
43	85		5.30		12.50
50	0	0	11.20		18.20
50	85		11.20		18.20

12. BLINKER (FLOW INDICATOR) TEST (INLET PRESSURE 50 PSIG FOR LOW PRESSURE REGULATORS)
(INLET PRESSURE 150 PSIG FOR HIGH PRESSURE REGULATORS)

ALTITUDE/ PRESSURE	DILUTER LEVER	OUTPUT		READING	BLINKER POSITION
		ACTUAL	INDICATED		
SEA LEVEL	NORMAL	20			FULLY OPEN
SEA LEVEL	100%	8			FULLY OPEN
17 INH_2O	100%	12			FULLY OPEN
17 INH_2O	100%	0	0		CLOSE IMMED

13. EMERGENCY PRESSURE TEST (INLET PRESSURE 50 PSIG FOR LOW PRESSURE REGULATORS)
(INLET PRESSURE 150 PSIG FOR HIGH PRESSURE REGULATORS)

OUTPUT		DILUTER LEVER	EMERGENCY LEVER	PRESSURE READING	TOLERANCE (INH_2O)
ACTUAL	INDICATED				
10 LPM		NORMAL	EMERGENCY		2.0 TO 4.0
80 LPM		100%	EMERGENCY		1.0 MIN.
10 LPM		100%	TEST MASK		6.0 TO 16.0

Notes: WITH ZERO FLOW, OUTLET PRESSURE SHALL NOT EXCEED 17.5 INH_2O WITH EMERGENCY PRESSURE CONTROL LEVER IN TEST MASK POSITION. WITH EMERGENCY PRESSURE CONTROL LEVER IN EMERGENCY POSITION, OUTLET PRESSURE SHALL NOT EXCEED 5.5 INH_2O.

14. REGULATOR OXYGEN PURGE: APPLY 500 PSIG TO LOW PRESSURE REGULATORS AND 500 PSIG TO HIGH PRESSURE REGULATORS, AVIATORS BREATHING OXYGEN AND FLOW 1 TO 3 MINUTES.

Figure 6-4. Performance Test Sheet (Sheet 2 of 2)

6-26. Indicated Output. To convert actual output flows (lpm) given in figure 6-4 to indicated output flows (inH_2O), proceed as follows:

1. Locate the desired actual output at the bottom of the Output Graph (figure 6-4).

2. Trace the selected line up to the point of intersection with the appropriate altitude air line.

3. Trace the line on the graph from where the desired lpm and altitude air lines intersect across the graph to the left hand column to determine indicated inH_2O.

4. Enter this figure in appropriate block on Performance Test Sheet.

NOTE

Flows at 28,000 and 32,000 feet are converted by using the next higher altitude air line or Output Graph (e.g., 30,000-foot Output Graph or 35,000-foot Output Graph).

5. Repeat steps 1 through 4 for all actual output flows given in figure 6-4.

6-27. Corrected Indicated Output. Corrected indicated output is indicated output with the required percentage of nitrogen added. To find corrected indicated output, proceed as follows:

NOTE

Use Oxygen/Air/Nitrogen Conversion Graph provided in NAVAIR 17-15BC-21 Technical Manual.

1. Locate the indicated output (inH_2O) at the bottom of the N_2 Conversion Graph.

2. Find the average oxygen percentage on the Performance Test Sheet corresponding to the selected indicated output.

NOTE

Select percentage line on N_2 Conversion Graph nearest to average oxygen figure selected from Average Oxygen column on Performance Test Sheet.

3. Follow the indicated output line selected on the N_2 Conversion Graph up to the appropriate N_2 percentage line.

4. Trace the line on the graph where the selected indicated output and N_2 percentage lines intersect across the left hand column to determine inH_2O.

5. Enter this figure in the appropriate block on the Performance Test Sheet.

6. Repeat steps 1 through 5 for all required indicated output flows.

6-28. Actual High Air. These figures are provided, but are computed as follows. Find the actual high air by subtracting the minimum oxygen percentage (figure 6-4) from 100%; multiply the result by the corresponding actual output (e.g., 100% - 6% = 94% x 15 lpm = 14.10 lpm).

1. Enter 14.10 lpm in the actual high air column on the Performance Test Sheet.

2. Repeat the procedure for all minimum oxygen percentages given in figure 6-4.

6-29. Actual Low Air. These figures are provided, but are computed as follows. Find the actual low air by subtracting the maximum oxygen percentage (figure 6-4) from 100%; multiply the result by the corresponding actual output (e.g., 100% - 45% = 55% x 15 lpm = 8.25 lpm).

1. Enter 8.25 lpm in the actual low air column on the Performance Test Sheet.

2. Repeat the procedure for all maximum oxygen percentages given in figure 6-4.

6-30. Indicated High Air (Input). To convert actual high air to indicated high air, proceed as follows:

1. Locate the actual input (lpm) at the bottom of the Test Stand Input Graph.

NOTE

Flows at 28,000 and 32,000 feet are converted by using the next higher altitude air line or Input Graph (e.g., 30,000-foot Input Graph or 35,000-foot Input Graph).

2. Trace the selected line up to where it intersects the appropriate altitude line.

3. Trace the line on the graph where the actual input and desired altitude lines intersect across the graph to the left hand column to determine indicated inH_2O.

4. Enter this figure in the appropriate block on the Performance Test Sheet.

5. Repeat steps 1 through 4 for all actual high air figures previously entered on Performance Test Sheet.

6-31. Indicated Low Air (Input). To convert actual low air to indicated low air, proceed as follows:

1. Locate the actual input (lpm) at the bottom of the Test Stand Input Graph.

2. Trace the selected line up to where it intersects the appropriate altitude line.

3. Trace the line on the graph where the actual input and desired altitude lines intersect across the graph to the left hand column to determine indicated inH_2O.

4. Enter this figure in the appropriate block on the Performance Test Sheet.

5. Repeat steps 1 through 4 for all actual low air figures previously entered on Performance Test Sheet.

6-32. SAFETY PRESSURE AND PRESSURE BREATHING TEST. Actual output flows (lpm) given in the Safety Pressure and Pressure Breathing Test section of the Performance Test Sheet must be converted to indicated output flows (inH_2O). To convert the flows, proceed as follows:

NOTE

Test Stand Input and Output Flow Graphs may vary in makeup, according to the activity performing the test stand calibration. Some test stands may have a single output graph and an input graph with various altitude lines, while others may have separate graphs for each altitude. Ensure specified graph is used.

1. Locate the desired actual output (figure 6-4) at the bottom of the test stand Output Graph.

2. Trace the selected line up to where it intersects the N_2 line, then across the graph to the left hand column to determine inH_2O.

3. Enter this figure in the appropriate block on the Performance Test Sheet.

NOTE

Flows at 43,000 feet are converted using the 45,000 foot N_2 line on the Output Graph, or the 45,000-foot Output Graph.

4. Repeat steps 1 through 4 for all actual flows given in Safety Pressure/Pressure Breathing Test section of figure 6-4.

6-33. BLINKER (FLOW INDICATOR) TEST. Actual flows (lpm) for the Blinker Test section of the Performance Test Sheet must be converted to indicated output flows (inH_2O). To convert the flows, refer to paragraphs 6-34 through 6-36.

6-34. Diluter Lever Normal Oxygen Position. Use the air line of the Sea Level Output Graph.

1. Locate the actual output (figure 6-4) at the bottom of the graph and trace the selected line up to the air line.

2. Trace the line from where the actual output and air lines intersect across the graph to the left hand column to determine indicated inH_2O.

3. Enter this figure in the appropriate block on the Performance Test Sheet.

6-35. Diluter Lever 100 Percent Oxygen Position (Sea Level). Use the N_2 line on the Sea Level Output Graph.

1. Locate actual output (lpm) (figure 6-4) at the bottom of the graph and trace the selected line up to the N_2 line.

2. Trace the line from where the actual output and N_2 lines intersect across the graph to the left hand column to determine indicated inH_2O.

3. Enter this figure in the appropriate block on the Performance Test Sheet.

6-36. DILUTER LEVER 100 PERCENT OXYGEN POSITION (17 inH_2O). Use the 50,000 foot N_2 line on the Output Graph.

1. Locate actual output (lpm) (figure 6-4) at the bottom of the Output Graph (or 50,000-foot Output Graph) and follow selected line up to the 50,000 foot N_2 line.

2. Trace the line from where the actual output and N_2 lines intersect across the graph to the left hand column to determine indicated inH_2O.

3. Enter this figure in the appropriate block on the Performance Test Sheet.

6-37. EMERGENCY PRESSURE TEST. Actual output flows (lpm) specified for the Emergency Pressure Test section of the Performance Test Sheet. Actual flows must be converted to indicated flows (inH_2O). To convert the flows, refer to paragraphs 6-38 and 6-39.

6-38. Diluter Lever Normal Oxygen Position. Use air line of Sea Level Output Graph.

1. Locate actual output (lpm) (figure 6-4) at bottom of Sea Level Output Graph and trace selected line up to air line.

2. Trace the line from where the actual output and air lines intersect across the graph to the left-hand column to determine indicated inH_2O.

3. Enter this figure in appropriate block on Performance Test Sheet.

6-39. Diluter Lever 100 Percent Oxygen Position. Use N_2 line of Sea Level Output Graph.

1. Locate actual output (lpm) (figure 6-4) at bottom of Sea Level Output Graph and trace selected line up to N_2 line.

2. Trace the line from where the actual output and N_2 lines intersect across the graph to the left-hand column to determine indicated inH_2O.

3. Enter this figure in appropriate block on Performance Test Sheet.

Section 6-4. Maintenance

6-40. GENERAL.

6-41. This section contains the procedural steps for inspecting, testing, troubleshooting, disassembly, cleaning, assembly and adjusting of Aircraft Panel Mounted Oxygen Regulators.

NOTE

The regulator shall be considered beyond economical repair when the cost of repair parts exceeds approximately 75% of the cost of the regulator.

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

6-42. Procedural steps outlined in this section are listed under the aircraft inspection cycle in which they are required, and in the sequence in which they normally occur.

6-43. Bench Tests shall be performed on Aircraft Panel Mounted Oxygen Regulators prior to being placed in service, and during the Phase/Calendar or SDLM (Standard Depot Level Maintenance) Inspection cycle of the aircraft in which installed. See applicable Planned Maintenance System (PMS) publications for specific intervals. In no case shall the interval exceed 448 days. The regulators shall also be subjected to a Bench Test if malfunction is suspected, and after repair or replacement of damaged parts. To ensure damage did not occur during extensive transportation and shipment (via commercial/U.S. Mail), all regulators shall be subjected to a Bench Test, when received from supply, prior to being placed in service.

6-44. Bench Tests shall be performed using Oxygen System Components Test Stand, Model 1172AS100 or 1316AS100. Refer to the appropriate Ground Support Equipment Manual for identification of test stand controls and indicators referred to in Bench Test.

6-45. Due to the complexity of the 1172AS100 and 1316AS100 test stand, it is essential that the operator become thoroughly familiar with the test stand prior to performing bench tests. Refer to appropriate ground support equipment manual.

6-46. INSPECTION.

6-47. TURNAROUND/PREFLIGHT/POSTFLIGHT/TRANSFER INSPECTIONS. The Turnaround/Preflight/Postflight/Transfer Inspections consist of a Visual Inspection performed in conjunction with the aircraft inspection requirements for the aircraft in which the regulators are installed. See table 6-2 for assistance in troubleshooting. To perform the inspection, visually inspect the following:

1. Electrical performance of panel light.

2. Legibility of all markings.

3. Plastic lighting plate for cracks and discoloration.

4. Low or improper reading on regulator pressure gage.

5. Emergency pressure control lever in NORMAL position.

6. Diluter control lever in 100% OXYGEN position.

7. Supply control lever in OFF position.

8. Regulator and surrounding area for freedom from dirt and hydrocarbons.

9. Delivery hose and connector for cuts, fraying, kinking, hydrocarbons and general condition.

6-48. If discrepancies are found or suspected, Maintenance Control shall be notified.

6-49. Regulators which do not pass inspection and cannot be repaired in the aircraft, shall be removed and replaced by Ready For Issue (RFI) regulators. Non-RFI regulators shall be forwarded to the nearest maintenance activity having repair capability.

6-50. ACCEPTANCE/SPECIAL/DAILY INSPECTIONS. The Acceptance/Special/Daily Inspections consist of a Visual Inspection followed by a Functional Test. These inspections and tests shall be performed in conjunction with the aircraft inspection requirements for the aircraft in which the regulators are installed. Refer to table 6-2 for assistance in troubleshooting. To perform the inspection, proceed as follows:

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.

6-51. Visually inspect the regulators in accordance with paragraph 6-47.

6-52. FUNCTIONAL TEST. To perform Functional Test proceed as follows:

1. Place supply valve control lever in ON position.

2. Place diluter control lever in NORMAL OXYGEN position.

3. Connect oxygen hose to quick-disconnect, place mask to face and inhale. Proper regulator operation will be indicated by flow indicator assembly showing white during inhalation and black during exhalation.

NOTE

While at ground level, the regulator will not normally supply oxygen from the supply system to the mask. The emergency pressure control lever must therefore be used in order to check out the oxygen supply function of the regulator at low altitudes. The emergency lever is spring loaded at the NORMAL position, and will return to NORMAL when released.

4. Hold emergency pressure control lever in TEST MASK position and observe flow indicator. Flow indicator should be white, indicating a flow through regulator.

6-53. Upon completion of Functional Test, secure regulator as follows:

1. Disconnect mask from supply hose.

2. Ensure emergency pressure control lever returns to NORMAL position.

3. Place diluter control lever in 100% position.

4. Place supply valve control lever in OFF position.

6-54. If discrepancies are found or suspected, Maintenance Control shall be notified.

6-55. Regulators which do not pass inspection and cannot be repaired in the aircraft, shall be removed and replaced by RFI regulators. Non-RFI regulators shall be forwarded to the nearest maintenance activity having repair capability.

6-56. CALENDAR/PHASED/SDLM INSPECTIONS. Calendar, Phased or SDLM Inspections require removal of the regulators from the aircraft. See applicable Planned Maintenance System (PMS) publications for specified intervals. In no case shall the interval exceed 448 days. Upon removal from the aircraft, regulators shall be subjected to a Visual Inspection and Bench Test.

Table 6-2. Troubleshooting (Daily, Preflight, Special, Turnaround, Transfer and Acceptance Inspections)

Trouble	Probable Cause	Remedy
Oxygen cylinder pressure gage fails to indicate proper pressure.	Defective gage.	Replace regulator.
	Blocked or leaking supply line.	Replace or clean supply line to regulator.
	Low cylinder pressure.	Refill.
	Defective manifold inlet assembly.	Replace regulator.
Oxygen not available at mask with proper pressure source to regulator and other than emergency setting on regulator.	Regulator controls improperly positioned.	Correct position of controls.
	Hose to mask is kinked.	Straighten hose and reposition outlet.
	Regulator not functioning properly.	Replace regulator.
Oxygen not available at mask with proper pressure source to regulator and regulator control set at EMERGENCY.	Kink or other malfunction between hose and mask.	Replace or readjust equipment as necessary.
	Faulty linkage from emergency pressure control lever.	Replace regulator.
Oxygen available at mask but flow is not indicated.	Defective blinker assembly.	Replace regulator.
Gage pressure drops when regulator is not in use.	Loose or leaking connections.	Tighten or replace connections as necessary.
	Defective manifold inlet assembly.	Replace regulator.
Panel light fails to light.	Burned out lamp.	Replace lamp.
	Faulty assembly.	Replace Regulator.
	Faulty electrical hookup to power source.	Repair electrical hookup.

6-57. Aircraft panel mounted regulators failing the bench test shall be repaired. SM&R codes define repairability of components and lowest level of maintenance authorized. Instructions can be found in the current issues of Naval Aviation Maintenance Program, OPNAVINST 4790.2 Series.

6-58. Visual Inspection. To visually inspect the regulator proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Lint-free, White	MIL-C-85043 (CAGE 81349)

1. Inspect regulator inlet and outlet for foreign objects, dirt, corrosion, bends dents, cracks, damaged threads and any other obvious damage.

2. Ensure that regulator inlet filter is properly installed.

3. Inspect regulator body for bends, dents, cracks, corrosion, condition and legibility of name plate, security of screws and fittings and other obvious damage.

4. Inspect regulator for contamination in the form of a black/gray residue caused by wear/vibration as follows:

NOTE

It has been determined that this form of contamination poses no threat to the aircrewmembers health.

a. Disassemble the emergency pressure control and diaphragm assembly of the regulator in accordance with paragraph 6-96.

b. Using a clean lint free cloth swab area around the emergency pressure control lever and center assembly (68, figure 6-12) for traces of contamination.

c. Thoroughly inspect emergency pressure control lever and center assembly (9, figure 6-16) for wear at the attachment of the center assembly to the control lever.

d. Inspect the outer diaphragm (73, figure 6-12) and diaphragm and plate assembly (75, figure 6-12) for evidence of wear/contamination.

e. Inspect the demand valve lever assembly (76, figure 6-12) for wear.

f. If no wear/contamination is found, assemble the diaphragm and plate assembly in accordance with paragraph 6-117 and perform Bench Test.

g. If wear/contamination is found, proceed with steps 4h through 4k.

h. Disassemble regulator in accordance with paragraphs 6-77.

i. Clean the disassembled parts in accordance with NAVAIR 13-1-6.4-1.

j. Replace worn or defective parts and assemble regulator in accordance with paragraph 6-101 through 6-117.

k. Perform Bench Test on assembled regulator.

6-59. BENCH TEST.

6-60. The Bench Test shall be performed using an Oxygen System Components Test Stand, Model 1172AS100 or 1316AS100, proceed as follows:

WARNING

Because of possible vacuum pump explosion, only water-pumped nitrogen, Type I, Class I, Grade B (Fed Spec BB-N-411) shall be used in testing oxygen regulators.

For oxygen test stands and purging equipment, use only nitrogen from gray cylinders marked NITROGEN OIL FREE in white letters. Two 3-inch wide black bands mark the tops of these cylinders. Do not use 3500 psig nitrogen cylinders. These cylinders cannot be certified contaminate free.

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended material/sediment is considered contaminated and shall be disposed of. Compound exhibiting peculiar odors such as acetone or alcohol is considered contaminated and shall be disposed of.

NOTE

Nitrogen supply cylinders utilized in testing oxygen components contain a maximum pressure of 1800 psig. For tests requiring pressures of 1800 psig, utilize highest available pressure, but in no case shall this pressure be less than 500 psig.

Tests are arranged so they proceed from one test to the next with a minimum of flow and altitude changes. Troubleshooting tables are provided following each test.

6-61. Unless otherwise specified in a specific test, the pressure applied, control lever settings, flows drawn, etc., shall be the same for the MD-1, MD-2, CRU-52/A, CRU-54/A, CRU-55/A, CRU-57/A, and CRU-72/A regulators.

WARNING

Ensure altitude chamber is configured in accordance with NAVAIR 17-15BC-21, WP003 00, Figure 3, sheets 2 thru 4 as applicable. Ensure High Pressure or Low Pressure Hose Assembly listed in NAVAIR 17-15BC-21, WP031 00, Figure 1 or Figure 2 is attached to N_2 Input Connection (18) or Tee Connection (28) in altitude chamber as applicable for the oxygen regulator being tested. Remove hose assembly not being used and cap connection (18) or (28) when not in use. For regulators requiring inlet pressures greater than 175 psig, the High Pressure Hose Assembly in NAVAIR 17-15BC-21, WP031 00, Figure 1 shall be used.

6-62. INWARD LEAKAGE TEST (TEST STAND MODEL 1172AS100 ONLY). To perform the Inward Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter	Fabricate IAW NAVAIR Dwg 1172AS136
1	Oxygen System Components Test Stand	1172AS100

1. Ensure test stand valves are closed, then open N_2 supply cylinder valve.

2. Place regulator supply control valve lever in the OFF position, and diluter control lever in the 100% OXYGEN position.

3. Ensure regulator emergency pressure control lever is in NORMAL position. Cap regulator inlet.

NOTE

Regulator shall be mounted on a horizontal plane in the test chamber.

4. Using adapter (NAVAIR Drawing No. 1172AS136), connect the regulator outlet to N_2 INPUT connection (18) in the altitude chamber.

5. Connect a line from LOW PRESS. connection (19) to REF. TAP (21) in altitude chamber. Plug rubber hose attached to piezometer (26) using piezometer plug supplied with the test stand.

WARNING

Ensure that no pressure is indicated on regulated HIGH PRESS. gage (10), regulated LOW PRESS. gage (11), and N_2 INPUT PRESS gage (27). Ensure LOW PRESS. REGULATOR (N) is not loaded. This will prevent N_2 supply cylinder pressure from passing on to INLET PRESS. ON/OFF valve (L), which could damage the test item, or cause injury to the test stand operator.

6. Turn INLET PRESS. ON/OFF valve (L) to the ON position.

CAUTION

Vacuum pump vent (54) must be opened one to two turns when operating vacuum pump. Refer to appropriate ground support equipment manual.

7. Turn vacuum pump on.

8. Turn PRESS. SELECTOR valve (D) to the H_2O position, and fully open LEAKAGE CONTROL valve (E).

9. Ensure LEAKAGE SELECTOR valve (F) is in HIGH RANGE position.

NOTE

Leakage rotameter (8) is calibrated with an applied pressure of 70 psig. The inward leakage test requires that a suction of 9.0 inH_2O be applied to the regulator outlet and the rotameter. This pressure difference (9.0 inH_2O vice 70 psig) creates a wide variance between actual leakage and indicated leakage. The maximum allowable leakage for the inward leakage test is 200 ccm. An actual leakage of 200 ccm will be displayed on HIGH RANGE LEAKAGE rotameter (8) as an indicated 740 ccm.

10. Slowly open OUTPUT valve (C) until 9 inH_2O suction is indicated on PRESS./SUCTION manometer

(4). Any leakage will be displayed on HIGH RANGE LEAKAGE rotameter (8). The maximum allowable indicated leakage is 740 ccm (actual 200 ccm). Record indicated leakage on the Performance Test Sheet.

11. Close OUTPUT valve (C) and LEAKAGE CONTROL valve (E). Turn vacuum pump OFF. Turn INLET PRESS. ON/OFF valve (L) to the OFF position.

12. Disconnect line from LOW PRESS. connection (19) and REF. TAP (21) in altitude chamber. Disconnect regulator outlet from N_2 INPUT connection (18). Remove plug from piezometer. Remove cap from regulator inlet and remove adapter (NAVAIR drawing no. 1172AS136) from regulator outlet.

13. If excessive leakage is indicated, locate probable cause, using troubleshooting chart, table 6-3.

6-63. INWARD LEAKAGE TEST (TEST STAND MODEL 1316AS100 ONLY). To perform the Inward Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1316AS100

1. Ensure all test stand valves and regulators are properly secured and open N_2 supply cylinder.

2. Place oxygen regulator supply control valve lever in the OFF position and diluter control lever in the 100% OXYGEN position.

3. Ensure oxygen regulator emergency pressure control lever is in NORMAL position and cap the regulator inlet.

4. Connect a line from 20 TO 200 LEAKAGE connection (20) to REF TAP and connection (21) in altitude chamber.

5. Connect regulator outlet to piezometer (26).

6. Turn on vacuum pump.

7. Turn PRESSURE SELECTOR valve (D) to H_2O position.

8. Place OVERBOARD ON/OFF valve (T) to ON position.

9. Slowly open INWARD LEAKAGE REF valve (P) until 9 inH_2O suction is indicated on pressure suction manometer (4).

10. Observe OVERBOARD LEAKAGE rotameter (6), maximum allowable leakage is 200 ccm. Record reading on Performance Test Sheet.

11. Close INWARD LEAKAGE REF valve (P) and place OVERBOARD ON/OFF valve (T) in the OFF position.

12. Disconnect line from 20 TO 200 LEAKAGE connection (20) and REF TAP and connection (21).

13. Disconnect regulator outlet from piezometer (26) and remove cap from regulator inlet.

14. If excessive leakage is indicated, locate probable cause using troubleshooting table 6-3.

6-64. OUTLET LEAKAGE TEST. To perform Outlet Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

Table 6-3. Troubleshooting (Inward Leakage Test)

Trouble	Probable Cause	Remedy
Note: Unless otherwise noted, index numbers in parentheses refer to figure 6-17.		
Diluter plate control housing and check valve assembly leaking.	Damaged diluter valve assembly (8).	Replace diluter valve assembly (8).
	Diluter housing gasket (14) leaking.	Tighten screws (2), or replace diluter housing gasket (14).
	Preformed packing (15) leaking.	Replace preformed packing (15).
	Diluter plate and seat assembly (13) damaged.	Replace diluter plate and seat assembly (13).
	Manual diluter valve lever (10) bent or binding.	Replace manual diluter valve lever (10).
Diluter valve control lever leaking.	Diluter valve control lever (12, figure 6-13) not adjusted properly.	Adjust diluter valve control lever (refer to paragraph 6-116).
Leakage from regulator outlet.	Preformed packing (128, figure 6-12) leaking.	Replace preformed packing (128, figure 6-12).
	Loose screws (126, 127, figure 6-12).	Tighten screws (126, 127, figure 6-12).
Leakage at relief valve.	Leakage past relief valve (8, figure 6-15), or relief valve seat (5) excessive.	Replace relief valve (8, figure 6-15) and seat (5).
Notes: Probable causes in table 6-9, Troubleshooting (Outward Leakage Test) could also cause excessive inward leakage.		

1. Place regulator supply valve control lever in ON position.

2. Ensure diluter control lever is in 100% OXYGEN position.

3. Ensure emergency pressure control lever is in NORMAL position.

NOTE

Regulator shall be mounted on a horizontal plane in the test chamber.

4. Connect regulator inlet to N_2 INPUT connection (18) in altitude chamber.

5. Using LOW PRESS. REGULATOR (N), apply 150 psig to the regulator inlet.

6. Slowly turn INLET PRESS. ON/OFF valve (L) to ON.

7. Activate emergency pressure control lever to allow a flow through the regulator. Return lever to NORMAL position.

8. Draw a film of leak detection compound across the regulator outlet. Film shall not advance more than 1/2 inch in 10 seconds. If film advance is more than allowable, repeat test three or four times. (Distension could be caused by difference in temperature between inside and outside of regulator.)

9. If film advance continues to be more than allowed, locate probable cause using troubleshooting chart, table 6-4.

10. Relieve pressure to regulator by backing out on LOW PRESS. REGULATOR (N).

Table 6-4. Troubleshooting (Outlet Leakage Test)

Trouble	Probable Cause	Remedy
Note: Unless otherwise noted, index numbers in parentheses refer to figure 6-12.		
Demand valve assembly leaking.	Damaged demand valve seat (108).	Replace seat (108).
	Damaged demand valve assembly (107).	Replace assembly (107).
	Damaged preformed packings (105) or (109).	Replace packing (105) or (109).
Emergency pressure control assembly loading.	Emergency pressure lever stem out of adjustment (4, figure 6-16).	Readjust elastic nut (5, figure 6-16) so that emergency pressure control assembly is not loading diaphragm.
Pressure breathing aneroid assembly.	Expanded aneroid (43).	Replace aneroid (43).
	Improperly adjusted aneroid.	Add or delete shims (44).
First stage reduction pressure.	Pressure too high.	Adjust to 32 to 35 psig (paragraph 6-115).
First stage regulator valve and lever assembly (92).	First stage regulator valve and lever assembly (92) out of adjustment.	Readjust until approx. 2 or 3 threads show (paragraph 6-115).
First stage relief valve.	Damaged relief valve seat (121).	Replace seat (121).
	Pressure too low.	Adjust to 55 to 60 psig (paragraph 6-116).
	Weak relief valve spring (119).	Replace spring (119).
	Damaged preformed packing (122).	Replace packing (122).

6-65. OXYGEN SUPPLY VALVE LEAKAGE TEST. To perform the Oxygen Supply Valve Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Place regulator oxygen supply valve lever in OFF position.

2. Place emergency pressure control lever in EMERGENCY position. Close altitude chamber door.

3. Turn INLET PRESS. ON/OFF valve (L) to on.

4. Using HIGH PRESS. REGULATOR (Q), apply pressure specified in table 6-5 to regulator inlet.

5. Draw a film of leak detection compound across regulator outlet fitting.

Table 6-5. Inlet Pressure (Oxygen Supply Valve Leakage Test)

TYPE	INLET PRESSURE (PSIG)
MD-1	500
MD-2	1800
CRU-52/A	500
CRU-54/A	500
CRU-55/A	500
CRU-57/A	500
CRU-72/A	1800

6. There is no allowable leakage. If leakage is noted, locate probable cause using troubleshooting chart, table 6-6.

7. Place emergency control lever in NORMAL position.

6-66. OVERALL LEAKAGE TEST. To perform the Overall Leakage Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

NOTE

Perform this test with diluter lever in 100% OXYGEN position, and then in the NORMAL OXYGEN position.

1. Place regulator oxygen supply valve lever in ON position, and emergency pressure control lever in NORMAL position.

2. Using test stand HIGH PRESS. REGULATOR (Q), apply pressure specified in table 6-7 to regulator inlet.

3. Turn INLET PRESS. ON/OFF valve (L) to OFF. Leave regulator oxygen supply valve lever in ON position.

4. Leakage will be indicated on the regulator pressure gage. Allowable leakage shall not exceed 60 psig over a 2-minute period.

Table 6-6. Troubleshooting (Oxygen Supply Valve Leakage Test)

Trouble	Probable Cause	Remedy
Note: Unless otherwise noted, index numbers in parentheses refer to figure 6-18.		
Loading of manifold inlet assembly.	Supply valve control stem (7, figure 6-13) out of adjustment.	Readjust supply valve control stem (7).
Leaking manifold inlet assembly.	Damaged ball (8).	Replace ball (8).
	Damaged supply valve seat (10).	Replace seat (10).
	Damaged supply valve seat retainer (9).	Replace retainer (9).
	Damaged preformed packings (4, 11, 14, 15, 20).	Replace damaged packing(s).

5. If allowable leakage is exceeded, locate probable cause using troubleshooting chart (table 6-8).

6. Turn HIGH PRESS. REGULATOR (Q) to VENT.

7. Bleed regulator by placing emergency pressure control lever in EMERGENCY position. Return lever to NORMAL.

8. Bleed test stand using SYSTEM BLEED valve (S).

6-67. REGULATOR PRESSURE GAGE SCALE AND ERROR TEST. To perform the Regulator Pressure Gage Scale and Error Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

CAUTION

LOW PRESS REGULATOR (N) can only be used when applying pressures below gage guard setting (165 to 175 psig) to an item under test. For pressures above gage guard setting, HIGH PRESS. REGULATOR (Q) must be used.

2. Using LOW PRESS. REGULATOR (N), slowly increase pressure to each test pressure 100 psig and below specified in figure 6-4.

NOTE

Regulator pressure gage readings must be recorded twice, once before and once after tapping regulator pressure gage.

3. Check tolerance by comparing regulator pressure gage reading with test stand INPUT PRESS. gage (27).

Table 6-7. Inlet Pressure (Overall Leakage Test)

TYPE	INLET PRESSURE (PSIG)
MD-1	500
MD-2	1800
CRU-52/A	500
CRU-54/A	500
CRU-55/A	500
CRU-57/A	500
CRU-72/A	1800

Table 6-8. Troubleshooting (Overall Leakage Test)

Trouble	Probable Cause	Remedy
Note: Unless otherwise noted, index numbers in parentheses refer to figure 6-12.		
Manifold inlet assembly leaking.	Loose manifold inlet adapter (3, figure 6-18).	Tighten or replace manifold inlet adapter (3).
	Damaged preformed packings (4, 11, 14, 15 or 20, figure 6-18).	Replace damaged packing(s).
	Loose manifold inlet assembly screws (98).	Tighten screws (98).
Pressure gage leaking.	Oxygen cylinder pressure gage assembly (33).	Replace pressure gage (33).
	Damaged preformed packing (36).	Replace packing (36).
	Loose screws (28).	Tighten screws (28).
First stage reduction chamber leaking.	Loose screws (90) on first stage cover plate (89).	Tighten screws (90).
	Damaged first stage gasket (91).	Replace gasket (91).
	Damaged first stage bellows gasket (96).	Replace gasket (96).
Pressure breather assembly leaking.	Loose screws (54).	Tighten screws (54).
	Damaged preformed packing (57).	Replace packing (57).
	Damaged pressure breather valve assembly (51).	Replace assembly (51).
Emergency pressure control assembly loading.	Emergency pressure control lever and center assembly (9, figure 6-16) loading diaphragrn and plate assembly (75).	Adjust emergency pressure control stem by tightening or loosening elastic nut (5, figure 6-16).
	Wrong size emergency pressure spring guide (12, figure 6-16).	Replace with shorter guide (12, figure 6-16).

4. Back out on LOW PRESS. REGULATOR (N).

5. Continue test for 500 psig pressure using HIGH PRESS. REGULATOR (Q).

6. Turn INLET PRESS. ON/OFF valve (L) off. Turn HIGH PRESS. REGULATOR (Q) to VENT.

7. Bleed test stand using SYSTEM BLEED valve (S). Bleed regulator using emergency pressure control lever.

6-68. OUTWARD LEAKAGE TEST. Perform the Outward Leakage Test as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

NOTE

During this test the relief valve shall not be covered. The allowable leakage through this valve at 17.0 inH_2O is included in the maximum allowable leakage, 0.12 lpm (120 ccm).

1. Place regulator supply valve control lever in OFF position, and diluter control lever in NORMAL OXYGEN position.

2. Connect regulator outlet to piezometer (26) in altitude chamber.

3. Connect a line from LOW PRESS. connection (19) to REF. TAP (21) in chamber.

4. Ensure test stand INLET PRESS. ON/OFF valve (L) to the OFF position.

5. Adjust LOW PRESS. REGULATOR (N) until 70 psig is indicated on REGULATED LOW PRESS. gage (11).

6. Turn PRESS. SELECTOR valve (D) to H_2O position, and slowly open LEAKAGE CONTROL valve (E) until 17.0 inH_2O is indicated on PRESS./SUCTION manometer (4).

NOTE

Maintain 17.0 inH_2O with LEAKAGE CONTROL valve (E) throughout test.

7. If no leakage is indicated on HIGH RANGE LEAKAGE rotameter (8), turn LEAKAGE SELECTOR valve (F) to low range position, and check for indication of leakage on LOW RANGE LEAKAGE rotameter (7). Allowable leakage is 0.12 lpm (120 ccm).

8. Switch LEAKAGE SELECTOR valve (F) to HIGH position, and close LEAKAGE CONTROL valve (E).

9. Repeat steps 6, 7 and 8 with diluter control lever in 100% OXYGEN position.

10. If leakage is excessive, locate probable cause using troubleshooting chart, table 6-9.

6-69. SECOND STAGE RELIEF VALVE TEST. To perform the Second Stage Relief Valve Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Turn PRESS. SELECTOR valve (D) to Hg position, and place FLOW SELECTOR valve (M) in SUIT SIMULATOR position on.

2. Ensure diluter control lever is in 100% OXYGEN position.

3. Using VENT PRESS. valve (H), slowly apply 3 inches of mercury (inHg) to the regulator outlet. Regulator relief valve shall be venting at least 45 lpm as indicated on VENT FLOW manometer (3).

4. Close VENT PRESS. valve (H) and bleed pressure down to 0 inHg using VENT AMBIENT valve (I).

5. Turn FLOW SELECTOR valve (M) to REGULATOR position. Close valve (I).

6. Slowly move PRESS. SELECTOR valve (D) to H_2O position.

7. Turn LEAKAGE SELECTOR valve (F) to LOW position.

8. Open LEAKAGE CONTROL valve (E). Apply and maintain 17.0 inH_2O to regulator outlet. Maximum allowable leakage is 0.12 lpm (120 ccm).

Table 6-9. Troubleshooting (Outward Leakage Test)

Trouble	Probable Cause	Remedy
Note: Unless otherwise noted, index numbers in parentheses refer to figure 6-17.		
Diluter plate control housing and check valve assembly leaking.	Damaged diluter plate control housing and check valve gasket (14) and preformed packings (15).	Replace gasket (14) and packing (15).
	Damaged air valve seat (23).	Replace diluter control housing (24).
	Damaged check valve disc (19).	Replace disc (19).
	Improperly adjusted diluter plate control housing and check valve assembly.	Adjust spring and screw adapter assembly (17).
	Loose screws (2).	Tighten screws (2).
Regulator outlet leaking.	Damaged preformed packings (128, figure 6-12).	Replace packings (128, figure 6-12).
	Damaged or loose outlet (124, figure 6-12).	Tighten, or replace outlet (124, figure 6-12).
Flow indicator leaking.	Damaged blinker diaphragm assembly (11, figure 6-14).	Replace blinker diaphragm assembly (11, figure 6-14).
	Damaged blinker tubing and base plate (12, figure 6-14).	Replace blinker tubing and base plate (12, figure 6-14).
	Loose screws (2, figure 6-14).	Tighten screws (2, figure 6-14).
Second stage relief valve leaking.	Out of adjustment.	Adjust spring retainer clockwise (3, figure 6-15).
	Weak second stage relief valve spring (4, figure 6-15).	Replace spring (4, figure 6-15).
	Loose housing screws (62, figure 6-12).	Tighten screws (62, figure 6-12).
	Damaged gasket (65, figure 6-12).	Replace gasket (65, figure 6-12).
	Damaged preformed packings (7, figure 6-15).	Replace packing (7, figure 6-15).
Outer diaphragm, diaphragm and plate assembly leaking.	Loose screws (71, figure 6-12).	Tighten screws (71, figure 6-12).
	Damaged outer diaphragm (73, figure 6-12).	Replace outer diaphragm (73, figure 6-12).
	Damaged diaphragm and plate assembly (75, figure 6-12).	Replace diaphragm and plate assembly (75, figure 6-12).

9. Close LEAKAGE CONTROL valve (E).

10. Back out on LOW PRESS. REGULATOR (N). Bleed pressure with SYSTEM BLEED valve (S).

11. Turn LEAKAGE SELECTOR valve (F) to HIGH RANGE position.

12. If excessive leakage is found, locate probable cause using troubleshooting chart (table 6-9). If relief valve does not vent, locate probable cause using troubleshooting chart, table 6-10.

6-70. FLOW SUCTION TEST. To perform the Flow Suction Test, proceed as follows:

1. Disconnect hose from LOW PRESS connection (19) and REF. TAP connection (21) in altitude chamber.

2. Turn vacuum pump ON.

3. Ensure PRESS. SELECTOR valve (D) is in the H_2O position.

4. Ensure regulator diluter control lever in 100% OXYGEN position.

5. Ensure INLET PRESS. ON/OFF valve (L) is ON.

6. Ensure regulator supply valve control lever in ON position.

7. Using LOW PRESS. REGULATOR (N), set the inlet pressure at each inlet pressure specified on Performance Test Sheet.

NOTE

Readings must be recorded with regulator diluter control lever in both NORMAL and 100% OXYGEN positions for each outlet flow specified on Performance Test Sheet.

8. Using OUTPUT valve (C), set flows specified in Performance Test Sheet on OUTPUT manometer (1). Suction values will be displayed on PRESS./SUCTION manometer (4). Record readings on Performance Test Sheet. Back out on LOW PRESS. REGULATOR (N). Bleed pressure with SYSTEM BLEED valve (S).

NOTE

When drawing flows with output valve (C) ensure inlet pressure is maintained.

With no suction on regulator (OUTPUT valve (C) closed), maximum flow through regulator shall not exceed 0.01 lpm. This will cause a slight rise in PRESS./SUCTION manometer (4).

9. Close OUTPUT valve (C).

10. If regulator fails the Flow Suction Test, locate probable cause using troubleshooting chart, table 6-11.

6-71. OXYGEN RATIO TEST. To perform the Oxygen Ratio Test, proceed as follows:

1. Ensure regulator supply valve control lever is in ON position, and diluter control lever is in NORMAL OXYGEN position.

2. Using LOW PRESS. REGULATOR (N), apply 50 psig to regulator inlet of low pressure regulators or 150 psig to regulator inlet of high pressure regulators.

Table 6-10. Troubleshooting (Second Stage Relief Valve Test)

Trouble	Probable Cause	Remedy
Second stage relief valve does not vent 45 lpm.	Out of adjustment.	Adjust spring retainer counterclockwise (3, figure 6-15).
	Second stage relief valve spring too strong (4, figure 6-15).	Replace spring (4, figure 6-15).
Second stage relief valve leaks excessively.	See table 6-9 for probable cause and remedy.	

CAUTION

Maintain 3.0 inH_20 on OUTPUT FLOW manometer (I) with OUTPUT valve (C) while ascending to altitude.

Slowly open VACUUM CONTROL valve (B) and observe PRESS./SUCTION manometer (4). If a rapid increase in pressure is indicated, close down on VACUUM CONTROL valve (B) until pressure stabilizes. This rapid increase of pressure shown on PRESS/SUCTION manometer (4) is caused by too fast a rate of climb in the altitude chamber.

3. Using VACUUM CONTROL valve (B) ascend to first test altitude shown on Performance Test Sheet.

4. Set output flows specified in Performance Test Sheet with OUTPUT valve (C) and stabilize altitude with INPUT valve (A).

5. Read INPUT manometer (2), and record readings on Performance Test Sheet.

6. Continue the test for each specified altitude and output flow shown on Performance Test Sheet.

7. Close OUTPUT valve (C) and INPUT valve (A). Descend to 27,000 feet using CHAMBER BLEED valve (K).

NOTE

If indicated input flows are not within limits, an Aneroid Closure Test must be performed.

8. If Oxygen Ratio Test was satisfactory, proceed to paragraph 6-73, Safety Pressure and Pressure Breathing Test.

6-72. ANEROID CLOSURE TEST. To perform the Aneroid Closure Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

Table 6-11. Troubleshooting (Flow Suction Test)

Trouble	Probable Cause	Remedy
First stage reduction chamber out of adjustment.	Low first stage pressure.	Reset to 32 to 35 psig (paragraph 6-115 and 6-116, and figure 6-8).
Demand valve lever assembly.	Vane mounting pin (77, figure 6-12) sticking.	Replace mounting pin (77, figure 6-12).
	Strong demand valve lever spring (106, figure 6-12).	Replace demand valve lever spring (106, figure 6-12).
	Demand valve lever (76, figure 6-12) bent, or improperly adjusted.	Replace, or adjust (paragraph 6-116).
Manifold inlet assembly.	Clogged inlet filter (1, figure 6-18).	Replace inlet filter (1, figure 6-18).
Venturi assembly.	Strong injector spring (3, figure 6-19).	Replace injector spring (3, figure 6-19).

NOTE

Aneroid Closure Test is performed only if regulator fails Oxygen Ratio Test.

1. Descend to 25,000 feet using CHAMBER BLEED valve (K).

2. Ensure inlet pressure is set at 50 psig for low pressure regulators and 150 psig for high pressure regulators.

3. Set up a flow of 3.0 inH_2O on OUTPUT FLOW manometer with OUTPUT valve (C).

4. Aneroid shall close between 28,000 and 32,000 feet, as indicated by no further advance in altitude on LOW RANGE ALTM. indicator (13).

5. Close OUTPUT valve (C) and descend to sea level using CHAMBER BLEED valve (K).

6. If regulator fails Aneroid Closure Test and/or Oxygen Ratio Test, locate probable cause using troubleshooting chart (table 6-12).

6-73. SAFETY PRESSURE AND PRESSURE BREATHING TEST. To perform the Safety Pressure and Pressure Breathing Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Using LOW PRESS. REGULATOR (N), apply 50 psig to regulator inlet of low pressure regulators or 150 psig to regulator inlet of high pressure regulators.

NOTE

If chamber altitude is not at 30,000 feet, adjust altitude. Use VACUUM CONTROL valve (B) to increase altitude, or CHAMBER BLEED VALVE (K) to decrease altitude.

2. Using OUTPUT valve (C), draw flows of 0 and 85 lpm through the regulator. Delivery pressure must be within limits shown on Regulator Performance Test Sheet.

Table 6-12. Troubleshooting (Oxygen Ratio/Aneroid Closure Tests)

Trouble	Probable Cause	Remedy
Note: Index numbers in parentheses refer to figure 6-17.		
Incorrect air/oxygen ratios for flows 40 lpm or less.	Low air.	Turn screw in spring and screw adapter assembly (17) counterclockwise.
	High air.	Turn screw in spring and screw adapter assembly (17) clockwise.
Incorrect air/oxygen ration for flows above 40 lpm.	Low air.	Install shorter shouldering screw (4).
	High air.	Install longer shouldering screw (4).
Aneroid closes below 28,000 feet.	Aneroid assembly (7) out of adjustment.	Turn aneroid assembly (7) counterclockwise.
Aneroid closes above 32,000 feet.	Aneroid assembly (7) out of adjustment.	Turn aneroid assembly (7) clockwise.

CAUTION

Maintain 3.0 inH_2O on OUTPUT FLOW manometer (1) with OUTPUT valve (C) while ascending to altitude.

NOTE

Reading for 0 lpm must also be recorded at each test altitude.

3. Repeat step 2 for each altitude shown on Performance Test Sheet.

4. Close OUTPUT valve (C) and descend to sea level using CHAMBER BLEED valve (K).

5. If Safety Pressure/Pressure Breathing flows are not within limits, locate probable cause using troubleshooting chart, table 6-13.

6-74. BLINKER ASSEMBLY TEST. To perform the Blinker Assembly Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Ensure diluter control lever is in NORMAL OXYGEN position.

2. Using LOW PRESS. REGULATOR (N), apply 50 psig to regulator inlet of low pressure regulators or 150 psig to regulator inlet of high pressure regulators.

3. Using OUTPUT valve (C), draw 20 lpm flow through regulator. Blinker must open fully.

4. Reduce output flow to 8 lpm flow and place diluter control lever in 100% OXYGEN position. Blinker must remain fully open.

5. Close OUTPUT valve (C). Blinker should close immediately.

6. Close altitude chamber door.

CAUTION

Maintain 3.0 inH_2O on OUTPUT FLOW manometer (1) with OUTPUT valve (C) while ascending to altitude.

7. Using VACUUM CONTROL valve (B), ascend in altitude until 17.0 inH_2O is indicated on PRESS./SUCTION manometer. (4).

8. Using OUTPUT valve (C), draw a 12 lpm flow through regulator. Blinker must open fully.

9. Close OUTPUT valve (C). Blinker should close immediately.

10. Descend to sea level using CHAMBER BLEED valve (K).

NOTE

See paragraph 6-109 and figure 6-7 for adjustment instructions.

11. Adjust (figure 6-7) or replace improperly functioning blinkers.

Table 6-13. Troubleshooting (Safety Pressure/Pressure Breathing Test)

Trouble	Probable Cause	Remedy
Note: Index numbers in parentheses refer to figure 6-12.		
Low safety pressure/pressure breathing 30,000 and 40,000 feet.	Damaged inner diaphragm (75).	Replace diaphragm (75).
	Diaphragm (75) blocking pressure breather port.	Install diaphragm (75) correctly.
	Aneroid shims (44) too thin.	Replace aneroid shims (44) with thicker ones.
	Spring (47) too weak.	Replace spring (47).
	Aneroid locknut (45) too short.	Replace aneroid locknut (45) with longer one.
	Pressure breather (valve (51) sticking or bent.	Replace pressure breather valve (51).
High safety pressure/pressure breathing 30,000 and 40,000 feet.	Aneroid shims (44) too thick.	Replace aneroid shims (44) with thinner ones.
	Aneroid screw (48) too thick.	Replace aneroid screw (48) with shorter one.
	Cocked aneroid (43).	Replace aneroid (43).
Low safety pressure/pressure breathing 43,000 and 50,000 feet.	Aneroid screw (48) too short.	Replace aneroid screw (48) with longer one.
High safety pressure/pressure breathing 43,000 and 50,000 feet.	Aneroid screw (48) too long.	Replace aneroid screw (48) with shorter one.
	Pressure breather valve (51) sticking in open position.	Replace pressure breather valve (51).

6-75. EMERGENCY PRESSURE TEST. To perform the Emergency Pressure Test, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

1. Ensure diluter control lever is in NORMAL OXYGEN position.

2. Using LOW PRESS. REGULATOR (N), apply 50 psig to regulator inlet of low pressure regulators or 150 psig to regulator inlet of high pressure regulators.

3. Open OUTPUT valve (C) and draw a 10 lpm flow through the regulator.

4. Place emergency control lever in EMERGENCY position. Pressure indicated on PRESS./SUCTION manometer (4) shall read 2.0 to 4.0 inH_2O.

NOTE

Ensure inlet pressure is maintained when performing step 5.

5. Adjust OUTPUT valve (C) to draw 80 lpm through regulator.

6. Place diluter control lever in 100% OXYGEN position. Pressure at outlet of regulator, as indicated on PRESS./SUCTION manometer (4), shall be no less than 1.0 inH_2O.

7. Close OUTPUT valve (C). With zero flow, outlet pressure shall not exceed 5.5 inH_2O.

8. Adjust output to 10 lpm flow. Hold emergency pressure control lever in TEST MASK position. Output flow, as indicated on PRESS./SUCTION manometer (4), shall be 6.0 to 16.0 inH_2O.

9. Close OUTPUT valve (C). With zero flow, outlet pressure shall not exceed 17.5 inH_2O. Release emergency pressure control lever.

NOTE

Adjust emergency pressure control lever stem (17, figure 6-12) to obtain 2.0 to 4.0 inH_2O at 10 lpm first, then compensate for excessive pressure drop at 80 lpm flow with elastic stop nut (5, figure 6-16).

10. If emergency pressure flows are not within tolerance, locate probable cause using troubleshooting chart, table 6-14.

11. Turn off VACUUM PUMP. Close N_2 supply cylinder valve. Using LOW PRESS. REGULATOR (N) and SYSTEM BLEED valve (S), relieve all pressure in the test stand. Secure all test stand valves.

6-76. REGULATOR OXYGEN PURGE. After completion of all tests, the regulator shall be purged with oxygen as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Aviator's Breathing Oxygen	MIL-O-27210, Type 1

WARNING

Do not use oxygen test stand to regulate the oxygen purge pressure.

1. Connect regulator inlet to a regulated source of aviator's breathing oxygen.

Table 6-14. Troubleshooting (Emergency Pressure Test)

Trouble	Probable Cause	Remedy
High emergency pressure at 10 lpm flow.	Emergency pressure control stem (17, figure 6-12) out of adjustment.	Turn emergency pressure control stem (17, figure 6-12) clockwise.
Low emergency pressure at 10 lpm flow.	Emergency pressure control stem (17, figure 6-12) out of adjustment.	Turn emergency pressure control stem (17, figure 6-12) counterclockwise.
Low emergency pressure at 80 lpm flow.	Elastic stop nut (5, figure 6-16) out of adjustment. Faulty venturi assembly (figure 6-19).	Adjust elastic stop nut (5, figure 6-13) counterclockwise. Replace venturi assembly (figure 6-19).
Low TEST MASK pressure.	Emergency pressure spring guide (12, figure 6-16) too short.	Install longer emergency pressure spring guide (12, figure 6-16).
High TEST MASK pressure.	Emergency pressure spring guide (12, figure 6-16) too long.	Install shorter emergency pressure spring guide (12, figure 6-16).

2. Apply 500 psig to regulator inlet on both low and high pressure regulators.

3. Position diluter lever in 100% position, supply lever in ON position, and emergency pressure control lever in the emergency position; allow oxygen to flow 1 to 3 minutes.

4. Shut off oxygen source and disconnect regulator.

NOTE

All equipment forwarded from the Organizational Level maintenance to the Intermediate and/or Depot Level, shall be accompanied by the appropriate form in accordance with OPNAVINST 4790.2 Series. The test stand operator and CDI shall sign the Performance Test Sheet, and the original or a copy shall be forwarded to the organizational custodian. Upon completion of the Bench Test and/or Calendar Inspection, the organizational custodian shall retain the appropriate forms in accordance with OPNAVINST 4790.2 Series.

6-77. DISASSEMBLY.

6-78. Disassemble the oxygen regulator using the index numbers assigned to figure 6-12, unless otherwise noted. Disassemble the regulator only as far as required to correct any malfunctions. Disassemble the regulator as follows:

CAUTION

All disassembly, inspection, repair and assembly must be done on 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 a non-chalking paint which can be kept clean and dust free. It is desirable to keep all parts for each individual regulator separated. Make careful note of the location and quantity of all shims, spacers and packings. 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.

6-79. PLASTIC LIGHTING PLATE. To remove the Plastic Lighting Plate, proceed as follows:

1. Remove light cap and spacer from light assembly (20, figure 6-13). Remove lamp (21, figure 6-13).

2. Remove screws (2), washers (3) and plastic lighting plate (1).

6-80. MOUNTING PLATE AND CONTROLS ASSEMBLY. To remove Mounting Plate and Controls Assembly, proceed as follows:

NOTE

Do not remove panel light electrical cord bushing (117) and panel light cord anchor plate (114) from electrical cable unless cable is damaged and must be replaced. If cable does not require removal, proceed to step 2.

1. Remove screws (115), washers (116), panel light cord anchor plate (114) and panel light electrical cord bushing (117).

2. Remove screws (6), washers (7) and mounting plate and controls assembly (5).

3. Remove emergency pressure control adjusting stem assembly (17).

6-81. EMERGENCY PRESSURE CONTROL GUARD AND BEAM AND FULCRUM ASSEMBLY. To remove the Emergency Pressure Control Guard and the Beam and Fulcrum Assembly, proceed as follows:

1. Remove screws (9), washers (10) and emergency pressure control guard (8).

2. Remove screw (12), washer (13), and beam and fulcrum assembly (11).

6-82. RETAINER SCREEN AND SHROUD ASSEMBLY. To remove the Retainer Screen and Shroud Assembly, remove screws (15) and washers (16); remove retainer screen and shroud assembly (14). Remove demand valve feed port plug (111), gasket (112), and preformed packing (113).

6-83. OXYGEN CYLINDER PRESSURE GAGE ASSEMBLY. To remove the Oxygen Cylinder Pressure Gage, proceed as follows:

1. Remove screws (28) and washers (29 and 32).

2. Gently work oxygen cylinder pressure gage assembly (33) from regulator body.

3. Remove preformed packing (36) from pressure gage tube.

6-84. BLINKER ASSEMBLY. To remove and disassemble the Blinker Assembly, proceed as follows:

1. Remove screws (24) and loosen and remove blinker tubing nut from regulator body, and lift blinker from regulator. Remove preformed packing (25) from regulator housing.

NOTE

Index numbers in steps 2, 3 and 4 refer to figure 6-14.

2. Remove screws (2), retainer plate (1), cover (3) and gasket (9).

3. Remove blinker pin (5), blinker spring (6) and blinker flag and lever assembly (4) from actuator guide (8).

4. Remove screw (7) from actuator guide (8), blinker actuator (10) and blinker diaphragm assembly (11) from blinker tubing and base plate assembly (12).

6-85. EMERGENCY PRESSURE CONTROL STEM GUIDE. To remove Emergency Pressure Control Stem Guide (58), remove screws (59).

6-86. PRESSURE BREATHING VALVE CONTROL ASSEMBLY. To remove and disassemble the Pressure Breathing Valve Control Assembly, proceed as follows:

CAUTION

Prior to removing pressure breathing aneroid housing (42), scribe housing to mark its position. Pressure breathing/safety pressure readings will be affected if rotated 180° from original position during reassembly.

1. Remove two screws (37) and washers (39), and remove pressure breathing aneroid housing (42) from regulator.

2. Remove nut (40), washer (41), aneroid assembly (43), shim (44) Allen screw (48), locknut (45), spring retainer (46) and safety pressure auto pressure breather spring (47).

3. Remove two screws (38), washers (39), pressure breather housing spacer (49) and diaphragm assembly (50).

6-87. PRESSURE BREATHER VALVE ASSEMBLY. To remove and disassemble the Pressure Breather Valve Assembly, proceed as follows:

1. Loosen three screws (54), lift pressure breather valve assembly (51) out of regulator housing. Remove three screws (54), plate (52), guide (53), actuating pin (55), shim (56) and preformed packing (57) from pressure breather valve (51).

6-88. DILUTER PLATE CONTROL HOUSING AND CHECK VALVE ASSEMBLY. To remove and disassemble the Diluter Plate Control Housing and Check Valve Assembly, proceed as follows:

CAUTION

When removing diluter plate control housing and check valve, apply a firm pressure to the assembly to prevent stripping of screws (86 and 85) or damage to the regulator housing. This is necessary because of spring tension applied by spring (88).

1. Remove screws (85 and 86) and washers (87). Lift out the diluter plate control housing and check valve assembly (84) and first stage regulating spring (88) from regulator housing.

NOTE

Index numbers in steps 2 through 6 refer to figure 6-17.

2. Remove screws (2), washers (3), diluter plate assembly (1) and diluter housing gasket (14) from diluter control housing (24).

NOTE

Retain screw (4). It is a selected part. Bench test may reveal need for a screw with shorter or longer shoulder.

3. Remove screw (4), throttling plate (5), spring washer (6) and aneroid assembly (7) from diluter plate and seat assembly (13).

4. Remove diluter lever clip (9), diluter valve assembly (8), retaining clip (11), bushing (12) and manual diluter valve lever (10) from diluter plate and seat assembly (13).

5. Remove aneroid check valve retainer assembly (16), spring and screw adapter assembly (17), aneroid check valve spring (18) and check valve disc (19) from diluter control housing (24).

6. Remove preformed packing (15), first stage adjusting lock nut (20), first stage adjusting nut (21), first stage adjusting screw (22) and check valve seat (23) from housing (24).

6-89. DEMAND VALVE ASSEMBLY. To remove the Demand Valve Assembly from the regulator housing, remove demand valve retaining screw (104), preformed packing (105), demand valve spring (106), demand valve assembly (107), demand valve seat (108), preformed packing (109) and demand valve pin (110).

6-90. MANIFOLD INLET ASSEMBLY. To remove and disassemble the Manifold Inlet Assembly, proceed as follows:

1. Remove screws (98) and washers (99).

2. Depress supply valve stem (12, figure 6-18) with blunt instrument and lift manifold inlet assembly (97, figure 6-12) from regulator housing. Remove preformed packing (100).

NOTE

Index numbers in steps 3 through 7 refer to figure 6-18.

3. Remove snap ring (2), oxygen filter (1), manifold inlet adapter (3), locking spacer (6), packing backup ring (5) and preformed packing (4).

4. Remove conical compression supply valve spring (7), and turn manifold so ball (8) falls from manifold.

5. Remove inlet supply valve seat retainer (9), valve seat (10) and preformed packing (11) from manifold.

6. Remove inlet valve retainer (18) inlet valve first stage seat (19) and preformed packing (20) from manifold.

7. Remove manifold seal retainer (13), preformed packing (14), packing retainer (16), preformed packing (15), packing retainer (16), manifold valve stem seal retainer (17) and supply valve stem (12) from manifold.

6-91. SUPPLY CONTROL STEM GUIDE. To remove Supply Control Stem Guide assembly (60), remove screws (61), and lift from regulator body.

6-92. FIRST STAGE BELLOWS ASSEMBLY. To remove and disassemble the First Stage Bellows Assembly, proceed as follows:

1. Remove screws (90), first stage cover plate (89) and first stage gasket (91) from regulator body.

2. Remove first stage lever pivot screw (93) and tension washer (94) from the first stage valve and lever assembly (92).

3. Lift first stage bellows assembly (95) from regulator body, and remove first stage bellows gasket (96).

6-93. SECOND STAGE RELIEF VALVE ASSEMBLY. To remove and disassemble the Second Stage Relief Valve Assembly, proceed as follows:

1. Remove screws (63) and washers (64).

2. Lift second stage relief valve assembly (62) from regulator housing and remove second stage relief valve gasket (65).

NOTE

Index numbers in steps 3 and 4 refer to figure 6-15.

3. Remove internal retainer ring (2), relief valve screen (1), spring retainer (3) and second stage relief valve spring (4) from second stage relief valve housing (10).

4. Remove second stage relief retaining ring (6), preformed packing (7), second stage relief valve seat (5), second stage relief valve (8) and second stage relief valve guide sleeve (9) from second stage relief valve housing (10).

6-94. REGULATOR OUTLET. To remove the Regulator Outlet, proceed as follows:

1. Remove nuts (125) and screws (126 and 127).

2. Remove regulator outlet (124), preformed packing (128) and venturi screen (129).

6-95. VENTURI ASSEMBLY. To remove and disassemble the Venturi Assembly proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Spanner, Piloted	QB-70750-9 (CAGE 55974) NIIN 00-302-6456

1. Using piloted spanner wrench, unscrew venturi assembly (130) from regulator housing.

2. Lift venturi assembly (130) and venturi nozzle gasket (131) from regulator housing.

NOTE

Index numbers in step 3 refer to figure 6-19.

3. Remove venturi seat (1) injector nozzle (2), injector spring (3) and damping spring (4) from venturi housing (5).

6-96. EMERGENCY PRESSURE CONTROL AND DIAPHRAGM ASSEMBLY. To remove and disassemble the Emergency Pressure Control and Diaphragm Assembly, proceed as follows:

1. Remove screws (71), washers (72), screw (69) and washers (70).

2. Remove emergency pressure control assembly (68), outer diaphragm (73), diaphragm spacer (74) and diaphragm and plate assembly (75) from regulator housing.

NOTE

Index numbers in steps 3 through 6 refer to figure 6-16.

3. Remove screws (2), washers (3) and emergency pressure housing control cap (1).

4. Remove elastic nut (5), emergency pressure swivel (6) and emergency pressure lever stem (4).

5. Remove emergency pressure control return spring (7), emergency pressure control test spring (8), screws (14) and washers (15).

6. Remove pin (10), emergency pressure control housing (16), emergency pressure control lever and center assembly (9), helical compression spring (11) and emergency pressure spring guide (12).

6-97. DEMAND VALVE LEVER ASSEMBLY. To remove the Demand Valve Lever Assembly, proceed as follows:

NOTE

Ensure lead counterweight has been removed from the demand valve lever after disassembly.

1. Remove screw (82), washer (83), remove vane mounting pin (77). Remove demand valve lever assembly (76) from demand valve fulcrum (81). Remove palnut (78) and screw (79) from demand valve lever (76) demand valve lever spring (80) will dropout. Remove demand valve lever (76) and fulcrum (81) from regulator.

NOTE

Demand valve lever spring (80) is used only on CRU-52/A, CRU-54/A, CRU-55/A, CRU-57/A, and CRU-72/A regulators.

2. Inspect the demand guide (133) while still installed in the demand valve chamber of the regulator housing for damage. Remove demand guide (133) only if it is damaged.

6-98. FIRST STAGE RELIEF VALVE ASSEMBLY. To disassemble the First Stage Relief Valve Assembly, remove relief valve spring retainer (118), relief valve spring (119), first stage relief valve assembly (120), relief valve seat (121) and preformed packing (122) from regulator body.

6-99. CLEANING.

6-100. To clean the disassembled oxygen regulator body and component parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
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

WARNING

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

1. Clean all metallic parts in accordance with NAVAIR 13-1-6.4-1.

CAUTION

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

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

3. After cleaning all internal surfaces, they shall be examined for cleanliness. Should further contamination be found, reclean the parts in accordance with step 1.

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

6-101. INSPECTION OF DISASSEMBLED REGULATOR.

6-102. Inspect the disassembled regulator body and component parts in accordance with table 6-15.

1. Make certain lamp (21, figure 6-13) is wired in accordance with figure 6-5.

6-103. REPAIR.

Materials Required

Quantity	Description	Reference Number
As Required	Lacquer, white	MIL-L-6805 (CAGE 81349)

6-104. Unless otherwise specified, all parts found to be damaged or defective shall be replaced. Defects on white painted surfaces may be touched-up using Lacquer.

6-105. ASSEMBLY.

6-106. Assembly of Aircraft Panel Mounted Regulators is essentially the reverse of disassembly. Tests are required on subassemblies as they are assembled into the regulator. Adjustment and calibration is also performed at time of assembly.

WARNING

Prior to use, inspect leak detection compound. Compound which is not clear and free from suspended material/sediment is considered contaminated and shall be disposed of. Compound exhibiting peculiar odors such as acetone or alcohol is considered contaminated and shall be disposed of.

CAUTION

Use extreme care in fitting precision parts to prevent damage. Ensure each component is dust and dirt-free.

NOTE

All silicone-rubber parts shall be discarded, and replaced with new items at time of assembly. They shall be washed in accordance with paragraph 6-100, step 2 prior to installation.

6-107. Assembly is effected in two separate operations; assembly of components into subassemblies (mounting plate and controls assembly, injector assembly, etc.), and assembly of the subassemblies into the regulator housing.

6-108. MOUNTING PLATE AND CONTROLS ASSEMBLY. Assemble the Mounting Plate and Controls Assembly (figure 6-13) as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Sealing	MIL-S-22473
As Required	Solder, Lead, Tin	QQ-S-571 (CAGE 81348)

NOTE

Unless otherwise noted, index numbers in this paragraph refer to figure 6-13.

1. If control lever pins (2, 3, and 13) have been removed, replace with new control lever pins and stake lightly in place.

2. If cord assembly (19) has been removed from light assembly (20) and terminal lug (22), solder new cord in place using solder and cover solder joint with sealing compound.

3. Do not attempt to reuse Dzus fasteners (23), if fasteners have been removed from the mounting plate assembly (18). Replace with new fasteners.

4. Do not install lamp (21) or cap (part of (20)) until plastic lighting plate (1, figure 6-12) has been installed.

5. Attachment to regulating housing shall be covered later in this section.

6-109. BLINKER ASSEMBLY. Assemble the Blinker Assembly (figure 6-14) as follows:

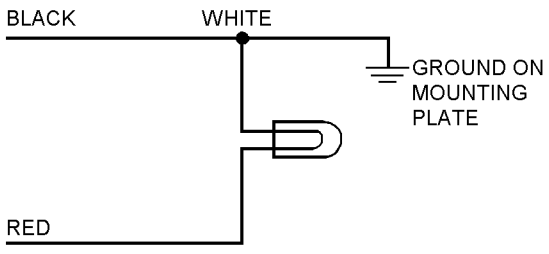

Figure 6-5. Wiring Diagram

1. Install screw (7) in actuator guide (8), leaving three threads visible (this setting should ensure blinker will meet blinker test requirements of paragraph 6-74).

2. Using blinker pin (5), attach blinker spring (6) and blinker flag and lever assembly (4) to actuator guide (8).

3. Place blinker diaphragm assembly (11), blinker actuator (10) and actuator guide (8) on blinker tubing and base plate assembly (12). Ensure screw holes are aligned.

4. Place gasket (9) on actuator guide (8). Notch in gasket must be aligned with hole in actuator guide.

5. Install cover (3) and retaining plate (1). Secure entire blinker assembly together with screws (2).

6. Preset blinker assembly to dimensions shown in figure 6-7.

7. After assembly of blinker in regulator, should blinker fail to pass the test in paragraph 6-74, adjust (figure 6-7) as follows:

a. If flag did not completely open at flow of 8 lpm, remove plastic cover (3), and rotate adjustment screw one turn clockwise.

b. If flag does not completely close when flow is reduced to zero (17 inH_2O), rotate adjustment screw one turn counterclockwise.

8. Installation into the regulator housing shall be covered later in this section.

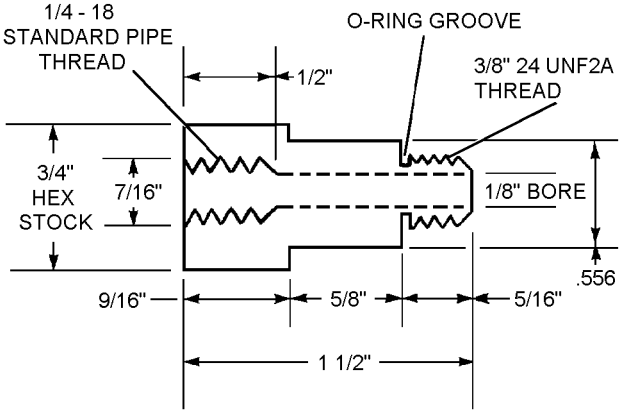

Figure 6-6. Brass Reducer Adapter

Table 6-15. Inspection of Disassembled Regulator Components

Part Nomenclature	Figure and Index No.	Inspect for	Remedy
Plate, Plastic, Lighting.	6-12-1	Cracks scratches and chipped paint.	Replace plastic lighting plastic if cracked, touch up paint as necessary.
Retainer Screen and Shroud Assembly.	6-12-14	Cracks in casting marred mating sufaces damaged screens and stripped threads in tapped holes.	Replace reatiner screen and shroud assembly if defective.
Pointer, Pressure Gage.	6-12-34	Distortion and chipped or dirty paint.	Replace pressure gage pointer if distorted, touh up paint as necessary.
Dial, Pressure Gage.	6-12-35	Distortion screatches and chipped or dirty paint.	Replace pressure gage dial if distorted or scratched, touch up paint as necessary.
Gage Assembly.	6-12-33	Free passage of air through tubing.	Replace gage assembly if tubing is blocked or kinked.
Aneroid Assembly.	6-12-43	Dents and uneven spacing of convolutions or expanded.	Replace aneroid assembly if defective.
Valve Assembly.	6-12-51	External defects.	Replace entire valve assembly if any parts are defective.
Screw.	6-12-93	Rounded surface of screw to be smooth and free of surface defects.	Replace screw if defective.
Bellows Assembly.	6-12-95	Dents in and uneven spacing of convolutions.	Replace bellows assembly if defective.
Seat, Valve, First Stage.	6-12-102	Surface of insert and face to be free of nicks and scratches.	Replace first stage valve seat if defective.
Seat, Demand Valve.	6-12-108	Nicks, scratches or burrs on raised edge of seat.	Replace demand valve seat if defective.
Valve Assembly, First Stage Relief.	6-12-120	Rounded edge of rubber insert to be free of surface defects.	Replace first stage relief valve if defective.
Seat, Relief Valve.	6-12-121	Seating surface to be free of nicks, scratches, or burrs.	Replace relief valve seat if defective.
Housing Assembly, Regulator and Demand Valve Bushing.	6-12-134	Cracks in casting stripped threads in tapped holes and marred mating surfaces.	Replace housing assembly if defective.
Follower, Diluter Lever.	6-13-16	Wear on ball tip.	Replace diluter lever follower if defective.

Table 6-15. Inspection of Disassembled Regulator Components (Cont)

Part Nomenclature	Figure and Index No.	Inspect for	Remedy
Mounting Plate Assembly, Regulator.	6-13-18	Condition of wiring; components of Dzus fasteners; bent panel.	Replace defective parts or entire mounting plate assembly if panel is bent.
Lamp.	6-13-21	Burned out condition by applying 28 Vdc.	Replace lamp if defective.
Blinker Tubing and Base Plate Assembly or kinked.	6-14-12	Free passage of air through tubing.	Replace blinker tubing and base plate assembly if tubing is blocked.
Flag and Lever Assembly, Blinker.	6-14-4	Chipped or dirty painted surface.	Touch up paint on flag and lever assembly as necessary.
Guide, Actuator.	6-14-8	Guide hole for excessive wear.	Replace actuator guide if worn.
Screen, Relief Valve.	6-15-1	Damage or distortion.	Replace relief valve screen if defective.
Seat, Second Stage Relief Valve.	6-15-5	Lapped face and inner and outer edges of set to be free of nicks, scratches or burrs.	Replace second stage relief valve seat if defective.
Valve, Second Stage Relief.	6-15-8	Lapped face to be free to nicks scratches or burrs.	Replace second stage relief valve if defective.
Stem, Emergency Pressure Lever.	6-16-4	All outside diameters for nicks, scratches or burrs.	Replace emergency pressure lever stem if defective.
Guide, Emergency Pressure Spring.	6-16-12	Large OD and bore must be free of nicks, scratches or burrs.	Replace emergency pressure spring guide if defective.
Housing, Emergency Pressure Control.	6-16-16	Inside diameter of be free of nicks, scratches or burrs.	Replace emergency pressure control housing if defective.
Plate, Throttling.	6-17-5	Valve seat surfaces to be free of scratches or nicks.	Replace throttling plate if defective.
Aneroid Assembly.	6-17-7	Dents in, uneven spacing of convolutions; face for nicks and scratches, also expanded.	Replace aneroid assembly if defective.
Plate and Seat Assembly, Diluter.	6-17-13	Seat for nicks and scratches.	Replace diluter plate and seat assembly if defective.
Disc, Check Valve.	6-17-19	Edges clean cut and surface flat and smooth.	Replace check valve disc if defective.
Housing, Dilute Control.	6-17-24	Seat for nicks and scratches.	Replace diluter control housing if defective.

Table 6-15. Inpsection of Disassembled Regulator Components (Cont)

Part Nomenclature	Figure and Index No.	Inspect for	Remedy
Ball.	6-18-8	Surface of insert to be flat and free of defects.	Replace ball if defective.
Seat, Supply Valve.	6-18-10	Raised edge of seat to be free of nicks, scratches or burrs.	Replace supply valve seat if defective.
Stem, Supply Valve.	6-18-12	Flattened end of stem to be smooth and flat, large OD to be polished.	Replace supply valve stem if defective.
Seat, First Stage Inlet Valve.	6-18-19	Raised edge of seat to be free of nicks, scratches or burrs.	Replace first stage inlet valve seat if defective.
Seat, Venturi.	6-19-1	Seating surface to be free of nicks, scratches of burrs.	Replace venturi seat if defective.
Nozzle, Injector.	6-19-2	Mating surfaces to be free of nicks or scratches.	Replace injector nozzle if defective.
Spring, Injector.	6-19-3	Deformation.	Replace injector spring.

6-110. SECOND STAGE RELIEF VALVE ASSEMBLY. Assemble the Second Stage Relief Valve (figure 6-15) as follows:

NOTE

Index numbers in this paragraph refer to figure 6-15.

1. Insert new preformed packing (7) into groove in second stage relief valve seat (5).

2. Install second stage relief valve (8) with lapped face toward second stage relief valve seat (5).

NOTE

Select applicable sleeve (9) for regulator. Consult USABLE ON CODE column of Parts List, figure 6-14.

3. Seat (5) and second stage relief valve guide sleeve (9) must be in a bottomed position in second stage relief valve housing (10) after seating second stage relief valve retaining ring (6).

4. Install spring retainer (3). Final position of retainer will be determined during post-assembly bench test.

5. Do not install relief valve screen (1) or retainer ring (2) until completion of post-assembly bench test.

6. Attachment to the regulator housing shall be covered later in this section.

6-111. EMERGENCY PRESSURE CONTROL ASSEMBLY. Assemble the Emergency Pressure Control Assembly (figure 6-16) as follows:

NOTE

Index numbers in this paragraph refer to figure 6-16.

1. Attach emergency pressure control housing (16) to second stage cover (13) with washers (15) and screws (14).

2. Install emergency pressure spring guide (12), helical compression spring (11) and emergency pressure control lever and center assembly (9) into emergency pressure control housing (16). Secure with pin (10).

3. Drop emergency pressure control test spring (8) into emergency pressure control housing (16).

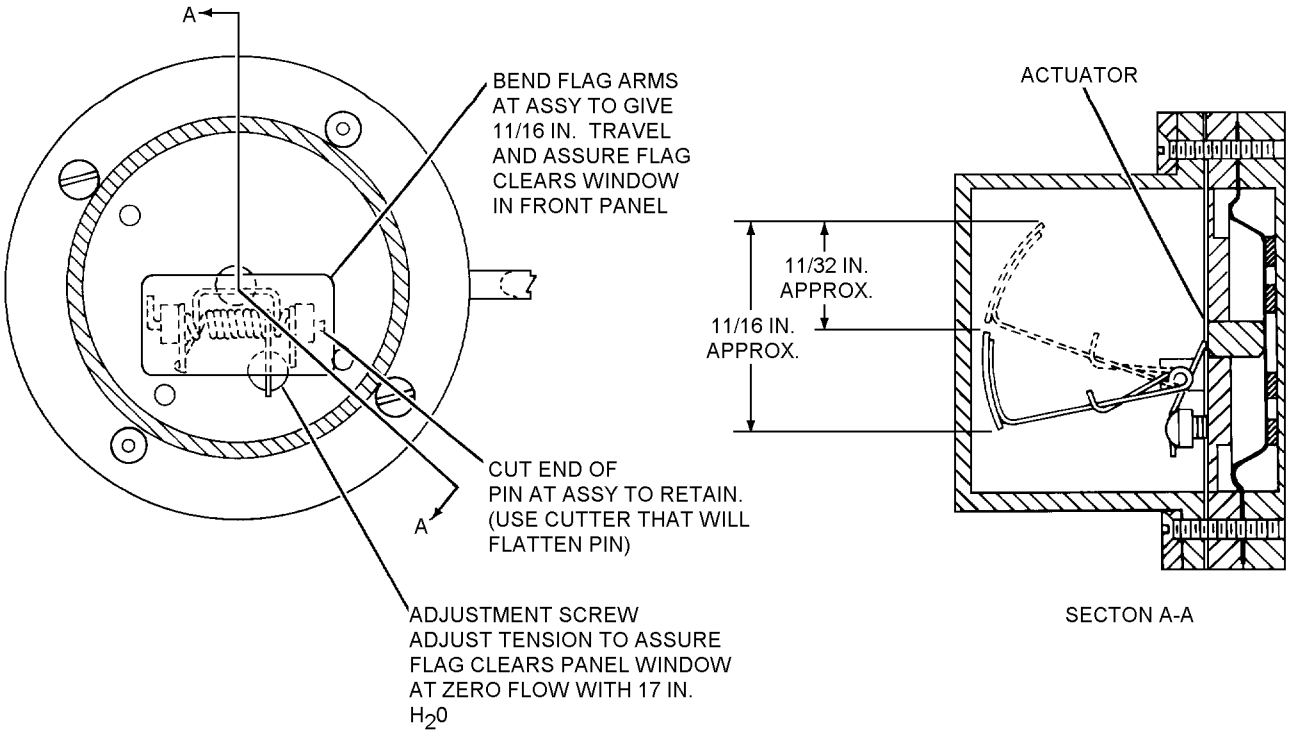

Figure 6-7. Blinker Assembly Adjustments

4. Install emergency pressure control return spring (7) into emergency pressure control housing (16) so that it slips over emergency pressure control test spring (8).

5. Install emergency pressure lever stem (4) into emergency pressure control housing (16). Secure in place with emergency pressure swivel (6) and elastic nut (5).

6. Do not install emergency pressure control housing cap (1), screw (2) and washer (3) until completion of post-assembly bench test.

7. Attachment to the regulator housing shall be covered later in this section.

6-112. DILUTER PLATE CONTROL HOUSING AND CHECK VALVE ASSEMBLY. Assemble the Diluter Plate Control Housing and Check Valve Assembly (figure 6-17) as follows:

NOTE

Index numbers in this paragraph refer to figure 6-17.

1. Install spring and screw adapter assembly (17), check valve spring (18) and check valve disc (19) into aneroid check valve retainer assembly (16).

2. Install check valve seat (23) and preformed packing (15) on diluter control housing (24). Attach aneroid check valve retainer assembly (16) to check valve seat (23).

3. Install first stage adjusting screw (22) in diluter control housing (24). Secure with first stage adjusting nut (21) and first stage adjusting locknut (20).

4. Install aneroid assembly (7) on diluter plate and seat assembly (13). Using same screw (4) removed during disassembly, attach spring washer (6) and throttling plate (5) to bottom of aneroid assembly (7). (Post assembly bench test may indicate need for a screw (4) with longer or shorter shoulder.)

5. Using diluter lever clip (9), attach diluter valve assembly (8) to manual diluter valve lever (10).

6. Install bushing (12) and retaining clip (11) on diluter plate and seat assembly (13). Insert manual diluter valve lever (10) through hole in diluter plate and seat assembly (13) so that is rests on bushing (12) and retaining clip (11).

7. During this step, ensure manual diluter lever (10) stays in position on retaining clip (11). Using washers (3) and screws (2), attach diluter plate and seat assembly (13) and gasket (14) to diluter control housing (24).

8. Attachment of this assembly to the regulator housing will be covered later in this section.

6-113. MANIFOLD INLET ASSEMBLY. Assemble the Manifold Inlet Assembly (figure 6-18) as follows:

NOTE

Index numbers in this paragraph refer to figure 6-18.

1. Assemble supply valve stem (12) into manifold valve stem seal retainer (17). Assemble new packing retainer (16) onto supply valve stem (12).

NOTE

Use only new preformed packings and packing retainers.

2. Assemble new preformed packing (15) onto supply valve stem (12), and slide second packing retainer (16) onto supply valve stem (12).

3. Place new preformed packing (14) on manifold seal retainer (13).

NOTE

Ensure proper inlet valve first stage seat (19, figure 6-18) is used. The high pressure regulator (MD-2 and CRU-72A) inlet valve first stage seat has a small hole in its center. The other regulators (MD-1, CRU-52/A, CRU-54/A, CRU-55/A, and CRU-57/A) have a larger hole in the center of inlet valve first stage seat.

4. Install assembled parts (12 through 17), plug (21), new preformed packing (20), inlet valve first stage seat (19), and inlet valve retainer (18) to inlet supply manifold (22).

5. Install new preformed packing (11), supply valve seat (10), and inlet supply valve retainer seat (9) into assembly (22).

6. Install oxygen filter (1) and snap ring (2) into manifold inlet adapter (3).

7. Install ball (8) and conical compressor spring (7) into assembly.

8. Assemble locking spacer (6), packing backup ring (5) and new preformed packing (4) to manifold inlet adapter (3). Install this assembly into inlet supply manifold (22).

9. Installation to regulator body will be covered later in this section.

6-114. VENTURI ASSEMBLY. Assemble the venturi assembly (figure 6-19) as follows:

CAUTION

Exercise care in handling venturi seat (1) and injector nozzle (2) to prevent mating surfaces from becoming scratched or nicked.

NOTE

Index numbers in this paragraph refer to figure 6-19.

1. Install damping spring (4), injector spring (3), injector nozzle (2) and venturi seat (1) into venturi housing (5).

2. Installation into the regulator housing will be covered later in this section.

6-115. ASSEMBLY OF INTERNAL PARTS INTO REGULATOR HOUSING. To assemble the internal parts into the regulator housing, attach the previously assembled components, and test or adjust the assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Krytox 240AC, Type III, Lubricant	MIL-G-27617 NIIN 00-961-8995

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Spanner, Piloted	QB-70750-9 (CAGE 55974) NIIN 00-302-6456

NOTE

Index numbers in the following paragraphs refer to figure 6-12 unless otherwise noted.

1. If demand valve guide (133) has been removed from regulator housing because of damage, press in new guide within 1/16 inch of adjacent surface of housing. Burnish inside diameter of guide to 0.1250 + 0.005, -0.000 in. Burnished hole to be perpendicular to the bottom of centerbored hole opposite end of guide with 0.005 in. total indicator reading.

2. Using piloted spanner wrench install new venturi nozzle gasket (131) and venturi assembly (130) into regulator body, then install venturi screen (129).

NOTE

The regulator outlet (124) must be pointing away from the regulator face.

3. Install new preformed packing (128) into groove on regulator outlet (124) and secure outlet to regulator body with screws (126, 127) and nuts (125).

NOTE

First stage relief valve will be adjusted later in assembly.

4. Install new preformed packing (122) into groove on relief valve seat (121) and install in regulator body. Install first stage relief valve assembly (120), relief valve spring (119) and relief valve spring retainer (118).

NOTE

Perform step 5 only if electrical cord was removed.

5. Install panel light electrical cord bushing (117) and panel light cord anchor plate (114). Secure with screws (115) and washers (116).

6. Install demand valve lever spring (80) if applicable.

NOTE

Demand valve lever spring (80) is used only on CRU-52/A, CRU-54/A, CRU-55/A, CRU-57/A, and CRU-72/A regulators.

Ensure lead counterweight has been removed from demand valve lever prior to assembly.

7. Place demand valve fulcrum (81) and demand valve lever (76) in regulator body. Tilt demand valve fulcrum (81) demand valve lever and insert vane mounting pin (77) through holes in assemblies.

NOTE

If palnut (78) and screw (79) were removed from demand valve lever assembly (76), thread screw into lever and tighten nut to a torque value of 1/4 pound-inch (minimum).

8. Place demand valve fulcrum (81) into regulator body, and secure with screw (82) and washer (83).

9. Install new preformed packing (105) on demand valve retaining screw (104). Insert demand valve pin (110), new preformed packing (109), demand valve seat (108), demand valve assembly (107) and demand valve spring (106). Install small end on demand assembly (107) into regulator body. Secure with retaining screw (104).

10. While looking through demand valve feed port, depress and release demand lever (76) several times while observing demand valve (107) moving off demand valve seat (108) and then seating again, to ensure proper alignment.

11. Attach supply control stem guide assembly (60) with screws (61).

12. Install grommet (101) into inlet valve retainer (18, figure 6-18).

13. Install new preformed packing (100) into counterbore in regulator body. Secure manifold inlet assembly (97) to body with screws (98) and washers (99).

14. Lubricate stud protruding from end of first stage regulator valve and lever assembly (92) with oxygen cleaning compound.

NOTE

Apply a light film of Krytox 240AC on screw (93) before assembly.

15. Insert stud protruding from end of first stage regulator valve and lever assembly (92) into grommet (101), pressing in as far as possible.

16. Screw stud on first stage regulator valve and lever assembly (92) into threaded opening in bellows, ensure approximately 2 to 3 threads remain showing (figure 6-8).

17. Install new first stage bellows gasket (96) on first stage bellows assembly (95), and place in recess of regulator body.

18. Secure first stage regulator valve and lever assembly in place with first stage lever pivot screw (93) and tension washer (94).

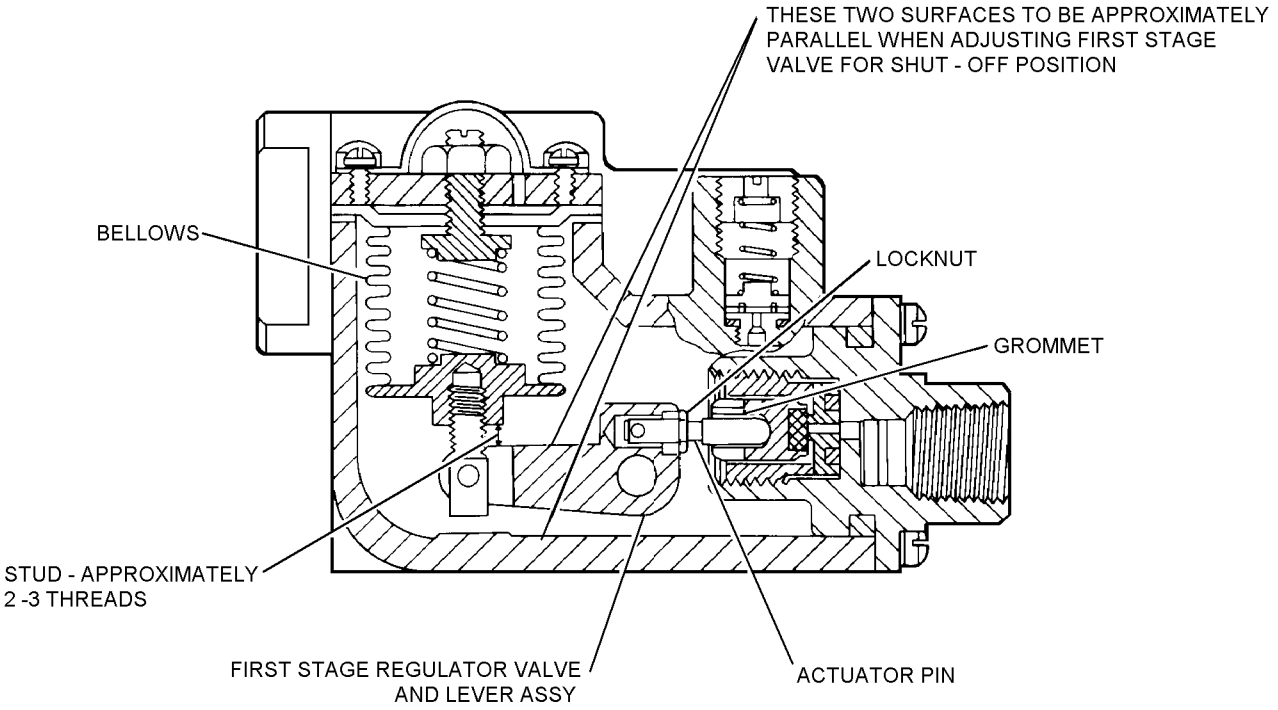

Figure 6-8. First Stage Relief Valve Adjustment

CAUTION

Crosspin in first stage valve and lever assembly (92) must engage slots in first stage valve seat assembly (102). First stage lever pivot screw (93) must be tight.

19. Install new first stage gasket (91) on first stage cover plate (89) and attach to regulator body with screws (90).

20. Place first stage regulating spring (88) into recess in first stage regulator bellows assembly (95). Align holes in bellows and gasket with screw holes in regulator body.

21. Place diluter plate control and check valve assembly (84) over first stage regulator bellows assembly (95), and secure in place with screws (85 and 86) and washers (87).

22. Attach emergency pressure control guide assembly (58) to regulator body with screws (59).

NOTE

If pressure breather valve assembly (51) was disassembled (paragraph 6-86), reassemble in reverse order.

23. Install new preformed packing (57) on pressure breather valve assembly (51) and install in regulator with screws (54), and new diaphragm assembly (50). Protruding ridge on diaphragm face up.

24. Install pressure breather housing spacer (49) with serrated side against diaphragm assembly (50), and secure to regulator body with screws (38), and washers (39). Long screws (37) go to top left and bottom right.

25. Install new preformed packing (25) and blinker assembly (23) to regulator body and secure with screws (24) and insert blinker tubing in threaded blinker port. Tighten blinker tubing nut.

NOTE

At this point, partially assembled regulator must be checked for leakage, and the demand valve lever and first stage relief valve adjusted.

6-116. LEAKAGE TEST AND ADJUSTMENTS. To test for leakage, and make adjustments to the partially assembled regulator, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Compound, Leak Detection, Type 1	MIL-L-25567
As Required	Compound, Sealing	MIL-S-224732
As Required	Nitrogen, Oil-free, Water Pumped, Type I, Class I, Grade B	Fed Spec BB-N-411 NIIN 00-985-7275

Support Equipment Required

Quantity	Description	Reference Number
1	Adapter	AN816-4J NIIN 00-689-4035
1	Adapter	AN816-4-4
1	Gage, Pressure, 0 to 160 psi	F340-1017-4 (CAGE 97413) NIIN 00-056-9546
1	Oxygen System Components Test Stand	1172AS100 or 1316AS100

NOTE

Salvage the tubing from a discarded pressure gage and pinch and silver solder the end of the tubing.

1. Install pinched-and-soldered pressure gage tubing and preformed packing (37) into pressure gage port.

CAUTION

Upon completion of tests and adjustments, remove metal strip from between regulator body and inlet manifold.

2. Install a thin strip of metal between the regulator body and manifold inlet assembly (97) so that it depresses the inlet manifold stem.

3. Attach adapter fixture to the 0 to 160 psi pressure gage, install 0 to 160 psi pressure gage, gasket (112), and preformed packing (113) into port normally occupied by demand valve feed port plug (111) (figure 6-9).

4. Install adapter (AN816-4J) into manifold inlet assembly (figure 6-9).

5. Ensure all test stand valves are secured and turn on N_2 supply cylinder.

6. Connect regulator inlet to N_2 input connection (18) in the altitude chamber.

7. Using low pressure regulator (N) apply 150 psig.

8. Turn inlet ON/OFF valve (L) to ON position, 0 to 160 psi pressure gage should indicate 32 to 35 psig. If pressure is not within limits adjust shutoff position of first stage regulator valve and lever assembly (figure 6-8).

9. Reduce supply pressure to 30 psig using system bleed valve (S) and apply leak detection compound to safety pressure/pressure breathing port (figure 6-10). Allowable leakage is 0.2 ccm (cubic centimeters) in 30 seconds. Any bubble distention at this port is excessive leakage, and requires inspection/adjustment or replacement of pressure breather valve assembly (51) (table 6-11).

NOTE

Demand valve lever should protrude slightly above regulator body.

10. Using LOW PRESS. REGULATOR (N) increase inlet pressure to 150 psig and check demand valve lever assembly (76) adjustment by sliding a straight edge across regulator body. Straight edge should actuate demand valve, producing a slight flow.

11. Demand valve height adjustment is made by turning the adjustment screw (79) clockwise to raise lever, and counterclockwise to lower lever (figure 6-10).

12. Fully depress demand valve lever. Pressure drop on 0 to 160 psi pressure gage shall not be more than 3 psig.

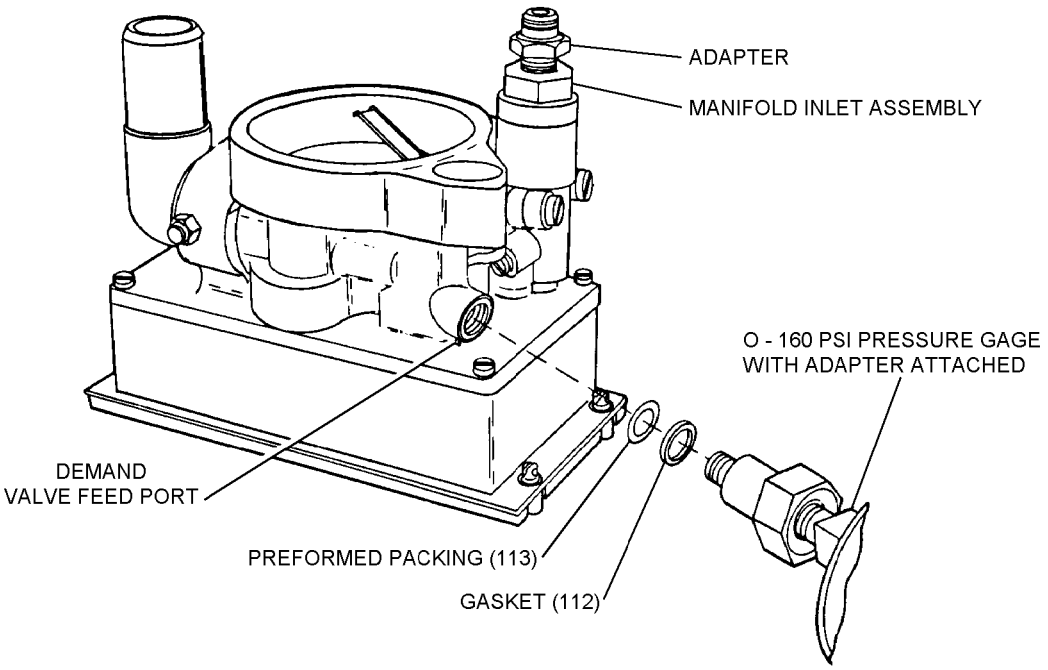

Figure 6-9. Attachment of 0-160 PSI Pressure Gage to Demand Valve Feed Port for Leakage and Adjustment Test

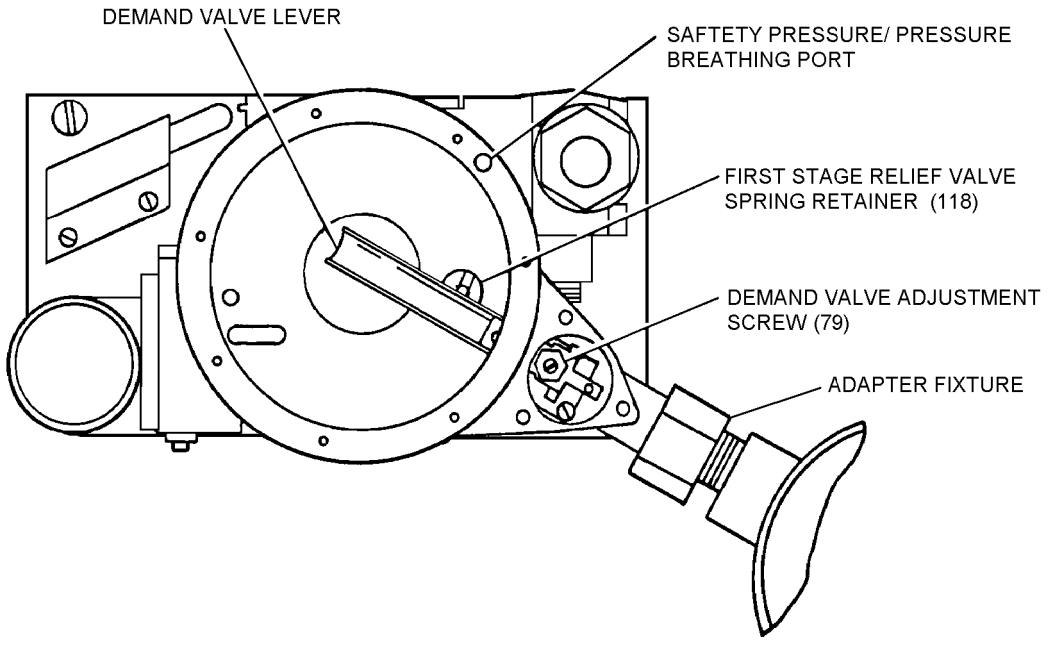

Figure 6-10. Attachment of Adapter Fixture to Regulator for Leakage and Adjustment Test.

13. Depress demand valve lever and release while observing blinker assembly. Blinker assembly should open when demand valve lever is depressed and close immediately when released. (Adjust in accordance with paragraph 6-109 and figure 6-7.)

14. Depress demand valve lever (76) to produce a flow, apply leak detection compound to blinker tubing nut and around base of blinker assembly, release demand lever (76). (If leakage is present, repair in accordance with paragraph 6-109 and figure 6-7.)

15. Apply leak detection compound to base of diluter plate control housing (84). If leakage is present replace gasket (96).

16. Apply leak detection compound to first stage cover plate (89). (If leakage is present repair in accordance with table 6-7.)

17. Apply leak detection compound to regulator outlet (124). (If leakage is present repair in accordance with table 6-3.)

18. Remove metal strip from between regulator body and manifold inlet assembly. Apply leak detection compound to the following areas (figure 6-11) (A), (C), (D), (E) and (F). If leakage is present locate probable cause using table 6-5 and repair manifold inlet assembly.

19. Turn inlet pressure ON/OFF valve (L) to OFF, back out on low pressure regulator (N), open system bleed valve (S) and bleed pressure from regulated low pressure gage (11), and close system bleed valve (S).

20. Disconnect regulator from N_2 input connection (18), remove 0 to 160 psi pressure gage from demand valve feed port.

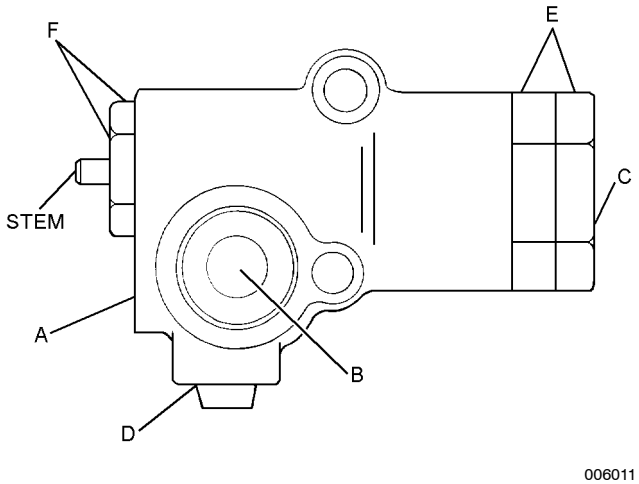

Figure 6-11. Test Areas, Manifold Inlet Assembly

21. Remove 0 to 160 psi pressure gage from adapter fixture.

22. Attach adapter (AN816-4-4) to adapter fixture and install adapter fixture, gasket (112), and preformed packing (113) into demand valve feed port (figure 6-10).

23. Connect regulator and adapter fixture to N_2 input connection (18), turn inlet pressure ON/OFF valve (L) to ON. Using LOW PRESS. REGULATOR (N) apply 60 psig to the regulator.

24. Adjust first stage relief valve spring retainer (118) so that first stage relief valve vents between 55 and 60 psig (figure 6-10). (Clockwise to relieve later, counterclockwise to relieve earlier).

25. Reduce pressure to 50 psig using system bleed valve (S) and apply leak detection compound to area around first stage relief valve spring retainer (118). There shall be no leakage.

26. Turn inlet pressure ON/OFF valve (L) to OFF.

27. Turn N_2 supply cylinder off and bleed pressure from test stand using LOW PRESS. REGULATOR (N) and system bleed valve (S). Secure all test stand valves.

28. Remove regulator from test stand, remove adapter fixture, gasket (112), and preformed packing (113) from demand valve feed port.

29. Apply sealing compound or equivalent, to the first stage relief valve spring retainer (118).

30. Install new gasket (112), new preformed packing (113), and demand valve feed port plug (111) into demand valve feed port.

6-117. COMPLETION OF ASSEMBLY. To complete assembly of the regulator, proceed as follows:

CAUTION

Consult Group Assembly Parts List (GAPL), section 6-5 for selection of correct diaphragm and plate assembly for regulator type.

NOTE

To aid in determining part placement and location the plastic lighting panel shall be considered the front of the regulator.

1. (Models CRU-52/A, CRU-54/A, CRU-55/A and CRU-57/A) Install new diaphragm and plate assembly

(75), with the protruding ridge facing away from front of regulator, diaphragm spacer (74), and new outer diaphragm (73), with protruding ridge facing away from front of regulator. Install emergency pressure control assembly (68). Secure with screws (71, 69) and washers (72, 70).

2. (Models MD-1, MD-2, and CRU-72/A) Install new diaphragm and plate assembly (75), with protruding edge facing in towards front of regulator, diaphragm spacer (74), and new outer diaphragm (73), protruding edge facing away from front of regulator. Install emergency pressure control assembly (68). Secure with screws (71, 69) and washers (72, 70).

CAUTION

Consult GAPL, section 6-5 for selection of correct second stage relief valve for regulator type.

3. Install new relief valve gasket (65) and second stage relief valve assembly (62). Secure with screws (63) and washers (64).

4. Install aneroid assembly (43) into pressure breathing aneroid housing (42) utilizing same quantity and thicknesses of shims (44) as removed. Secure aneroid in housing with nut (40) and washer (41).

5. Remove the two long screws (37) and washers (39).

6. Thread screw (48) into locknut (45), and install spring retainer (46) over screw (48). Install safety pressure auto pressure breather spring (47) so it rests on spring retainer (46).

7. Attach screw (48), locknut (45), spring (47), and spring retainer (46) to aneroid (43). Ensure screw (48) and locknut (45) are tight. Place pressure breathing aneroid housing (42) on diaphragm assembly and secure to regulator with long screws (37) and washers (39).

CAUTION

Consult GAPL, section 6-5 for correct pressure gage and bracket assembly for regulator type.

8. Install new preformed packing (36) cylinder pressure gage and bracket assembly, sleeve (27) and connector (26) into regulator body. Secure with screws (28) and washers (29, 32).

NOTE

If panel light electrical cord (19, figure 6-13) was removed, it must be installed prior to attaching retainer screen and shroud assembly.

9. Install retainer screen and shroud assembly (14) with screws (15) and washers (16).

10. Attach beam and fulcrum assembly (11) to regulator with screw (12) and washer (13).

11. Place emergency pressure control guard (8) over beam and fulcrum assembly (11) and secure with screws (9) and washers (10).

12. Install emergency pressure control adjusting stem assembly (17).

13. Install mounting plate and controls assembly (5) with screws (6) and washers (7).

14. Perform complete bench test. Refer to paragraph 6-59.

CAUTION

Exercise care in tightening screws to prevent chipping plastic plate.

15. Install plastic lighting plate (1) with screws (2) and washers (3).

16. Install emergency pressure control housing cap (1, figure 6-16) with screws (2, figure 6-16) and washers (3, figure 6-16).

NOTE

Index numbers in step 17 refer to figure 6-13 unless otherwise noted.

17. Place diluter control lever in NORMAL OXYGEN position. A slight amount of play (loose movement) should exist. If lever is too tight, or too loose, remove screw (4, figure 6-12), setscrew (14) and diluter lever spring (15). Turn screw (17) clockwise to increase, and counterclockwise to decrease movement. Reinstall diluter lever spring (15) and setscrew (14). Head of setscrew (14) should be approximately 1/8 inch below end of lever. Lock adjustment with screw (4, figure 6-12).

18. Install plug (103, figure 6-12), and sealing cap (123, figure 6-12).

19. Install relief valve screen (1, figure 6-15) and ring retainer (2, figure 6-15).

20. Make necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

Section 6-5. Illustrated Parts Breakdown

6-118. GENERAL.

6-119. This section lists and illustrates the assemblies and detail parts of the regulators listed below, and manufactured by Carleton Technologies Inc, formerly ARO Corporation, Bryan, Ohio, CAGE 03990.

Type	Part No.
MD-1	14950-7B
MD-2	14800-8B
CRU-72/A	14800-8C
CRU-52/A	14950-26A
CRU-54/A	14950-27A
CRU-55/A	14950-28A
CRU-57/A	14950-30A

6-120. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

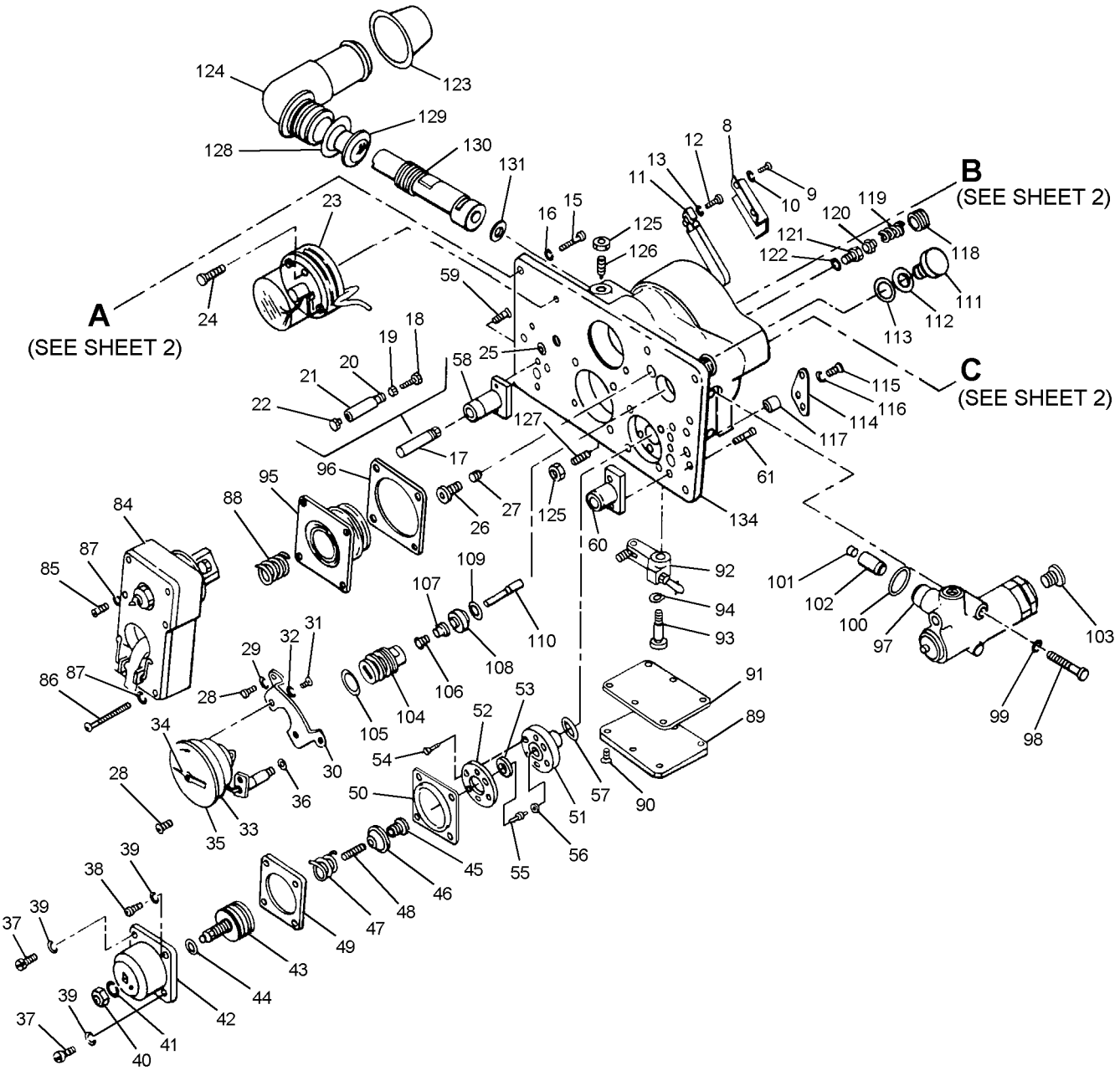

Figure 6-12. MD-1, MD-2, CRU-52/A, CRU-54/A, CRU-55/A, CRU-57/A, and CRU-72/A Panel Mounted Oxygen Regulators (Sheet 1 of 2)

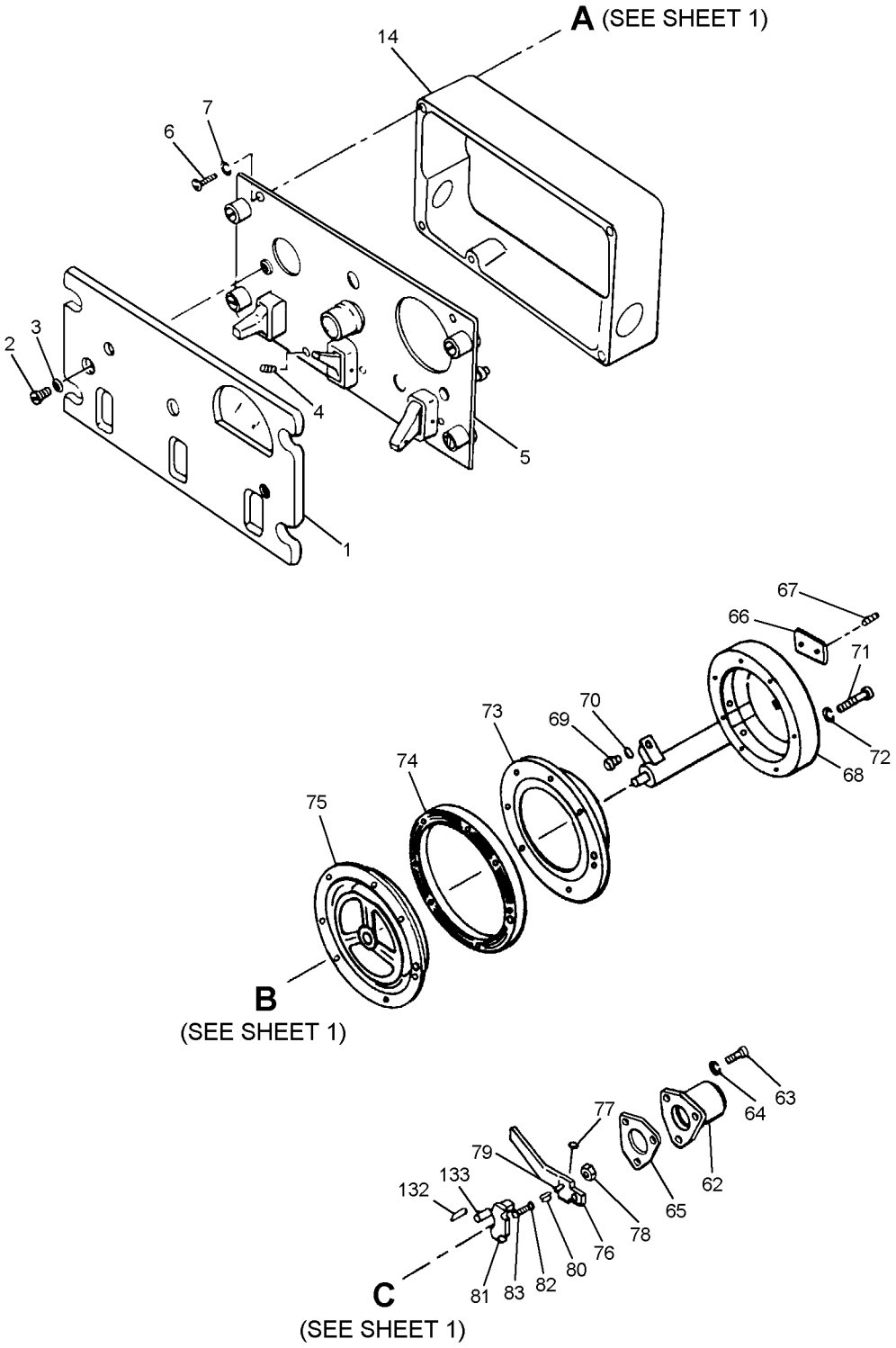

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Figure 6-12. MD-1, MD-2, CRU-52/A, CRU-54/A, CRU-55/A, CRU-57/A, and CRU-72/A Panel Mounted Oxygen Regulators (Sheet 2 of 2)

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-12	14950-7B	REGULATOR, Oxygen (Parts Kits Available)	1	A
	14800-8B	REGULATOR, Oxygen (Parts Kits Available)	1	B
	14800-8C	REGULATOR, Oxygen (Parts Kits Available)	1	C
	14950-26A	REGULATOR, Oxygen (Parts Kits Available)	1	D
	14950-27A	REGULATOR, Oxygen (Parts Kits Available)	1	E
	14950-28A	REGULATOR, Oxygen (Parts Kits Available)	1	F
	14950-30	REGULATOR, Oxygen (Parts Kits Available)	1	G
	14951-7B	. REGULATOR, Oxygen (General Assy Dwg)	REF	A
	14801-8B	. REGULATOR, Oxygen (General Assy Dwg)	REF	B
	14801-8C	. REGULATOR, Oxygen (General Assy Dwg)	REF	C
	14951-26A	. REGULATOR, Oxygen (General Assy Dwg)	REF	D
	14951-27A	. REGULATOR, Oxygen (General Assy Dwg)	REF	E
	14951-28A	. REGULATOR, Oxygen (General Assy Dwg)	REF	F
	14951-30	. REGULATOR, Oxygen (General Assy Dwg)	REF	G
-1	14807	. . PLATE, Plastic lighting	1	ABCDE
	19539	. . PLATE, Plastic lighting	1	FG
		(ATTACHING PARTS)		
-2	MS35265-25	. . SCREW (KD)	2	
-3	MS35333-37	. . WASHER (KD)	2	
		---*---		
-4	AS103CC832F2	. . SETSCREW (KD)	1	
-5	14805-7	. . MOUNTING PLATE AND CONTROLS	1	ABCD
		ASSY (figure 6-13 for BKDN)		
	14805-18	. . MOUNTING PLATE AND CONTROLS	1	E
		ASSY (figure 6-13 for BKDN)		
	14805-19	. . MOUNTING PLATE AND CONTROLS	1	F
		ASSY (figure 6-13 for BKDN)		
	14805-24	. . MOUNTING PLATE AND CONTROLS	1	G
		ASSY (figure 6-13 for BKDN)		
		(ATTACHING PARTS)		
-6	MS35206-228	. . SCREW (KD)	5	
-7	MS35338-41	. . WASHER (KD)	5	
		---*---		
-8	14986	. . GUARD, Emergency pressure control	1	
		(ATTACHING PARTS)		
-9	MS35206-213	. . SCREW (KD)	2	
-10	MS35338-40	. . WASHER (KD)	2	
		---*---		
-11	14842	. . BEAM AND FULCRUM ASSY	1	
		(ATTACHING PARTS)		
-12	MS35265-16	. . SCREW (KD)	1	
-13	MS35338-40	. . WASHER (KD)	1	
		---*---		
-14	14804	. . RETAINER SCREEN AND	1	
		SHROUD ASSY		
		(ATTACHING PARTS)		
-15	MS35265-30	. . SCREW (KD)	4	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-12-16	MS35338-41	. . WASHER (KD)	4	
		---*---		
-17	14836-1	. . STEM ASSY, Emergency pressure control adjusting	1	
-18	14839	. . . SCREW, Emergency pressure control adjusting	1	
-19	14853	. . . NUT, Adjustment lock	1	
-20	AS142CC4	. . . WASHER (KD)	1	
-21	14838-1	. . . STEM, Emergency pressure control	1	
-22	14837-1	. . . BEARING, Emergency pressure control stem	1	
-23	19626	. . BLINKER ASSY (figure 6-14 for BKDN) (ATTACHING PARTS)	1	
-24	19543-2	. . SCREW (KD)	2	
-25	149010-1	. . PACKING, Preformed (KC)	1	
-26	14827	. . CONNECTOR, 3/32 tubing (KD)	1	
-27	14826	. . SLEEVE, 3/32 tubing (KD)	1	
	17923	. . GAGE AND BRACKET ASSY, Oxygen cylinder pressure	1	ADEF
	16152	. . GAGE AND BRACKET ASSY, Oxygen cylinder pressure (ATTACHING PARTS)	1	BC
-28	MS35206-213	. . SCREW (KD)	3	
-29	MS35338-40	. . WASHER (KD)	3	
		---*---		
-30	14941	. . . BRACKET, Gage mounting (ATTACHING PARTS)	1	
-31	Y3-6-2C	. . . SCREW	2	
-32	MS35338-41	. . . WASHER (KD)	2	
		---*---		
-33	14953	. . . GAGE ASSY, Oxygen cylinder pressure	1	ADEF
	14938	. . . GAGE ASSY, Oxygen cylinder pressure	1	BC
-34	15750	. . . . POINTER	1	
-35	15749	. . . . DIAL, Face	1	ADEF
	15751	. . . . DIAL, Face	1	BC
-36	14945	. . PACKING, Preformed (KC)	1	
	17922	. . CONTROL ASSY, Pressure breathing valve (ATTACHING PARTS)	1	
-37	MS35265-16	. . SCREW (KD)	2	
-38	MS35265-14	. . SCREW (KD)	2	
-39	AS142CC4	. . WASHER (KD)	4	
		---*---		
-40	12249	. . . NUT (KD)	1	
-41	MS35333-39	. . . WASHER (KD)	1	
-42	14931	. . . HOUSING, Pressure breathing aneroid	1	
-43	17815	. . . ANEROID ASSY	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-12-44	17750-1	. . . SHIM, 0.002 inch thick (KD)	AR	
	17750-2	. . . SHIM, 0.003 inch thick (KD)	AR	CDEF
	17750-3	. . . SHIM, 0.005 inch thick (KD)	AR	CDFF
	17750-4	. . . SHIM, 0.010 inch thick (KD)	AR	
	17750-5	. . . SHIM, 0.020 inch thick	AR	CDEF
	17750-6	. . . SHIM, 0.155 inch thick (KD)	AR	
	17750-7	. . . SHIM, 0.100 inch thick	AR	CDEF
	17750-8	. . . SHIM, 0.050 inch thick	AR	CDEF
-45	#14954-1	. . . LOCKNUT, 0.109 inch long (KD)	1	
	#14954-2	. . . LOCKNUT, 0.127 inch long (KD)	1	
	#14954-3	. . . LOCKNUT, 0.144 inch long (KD)	1	
	#14954-4	. . . LOCKNUT, 0.162 inch long (KD)	1	
-46	14955	. . . RETAINER, Spring (KD)	1	
-47	14959	. . . SPRING, Safety pressure auto . . . . . pressure breather (KD)	1	
-48	#17621-1	. . . SCREW, Socket set 5/16 inch long (KD) . . .	1	
	#17621-2	. . . SCREW, Socket set 3/8 inch long (KD)	1	
	#17621-3	. . . SCREW, Socket set 7/16 inch long (KD) . . .	1	
	#17621-4	. . . SCREW, Socket set 1/2 inch long (KD)	1	CDEF
-49	14930	. . SPACER, Pressure breather housing	1	
-50	14944	. . DIAPHRAGM ASSY (KC)	1	
-51	14934	. . VALVE ASSY, Pressure breather	1	
-52	16210	. . . PLATE	1	
-53	16157	. . . GUIDE . . . . . (ATTACHING PARTS)	1	
-54	AS108CC348-5	. . . SCREW (KD) . . . . . ---*---	3	
-55	900212	. . . PIN, Actuating (KD)	1	
-56	#15959-1	. . . SHIM (KD)	1	
	#15959-2	. . . SHIM (KD)	1	
	#15959-3	. . . SHIM (KD)	1	
	#15959-4	. . . SHIM (KD)	1	
	#15959-5	. . . SHIM (KD)	1	
	#15959-6	. . . SHIM (KD)	1	AB
	#15959-7	. . . SHIM (KD)	1	AB
-57	15697	. . . PACKING, Preformed (KC)	1	
-58	14840-1	. . GUIDE ASSY, Emergency pressure . . . . . control stem (ATTACHING PARTS)	1	
-59	AS108CC440-7	. . SCREW (KD) . . . . . ---*---	2	
-60	14851-1	. . GUIDE ASSY, Supply control stem . . . . . (ATTACHING PARTS)	1	
-61	AS108CC440-7	. . SCREW (KD) . . . . . ---*---	2	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-12-62	14880	. . VALVE ASSY, Second stage relief ..... (figure 6-15 for BKDN)	1	AB
	14880-2	. . VALVE ASSY, Second stage relief ..... (figure 6-15 for BKDN) (ATTACHING PARTS)	1	CDEFG
-63	MS35265-13	. . SCREW (KD)	3	
-64	MS35338-40	. . WASHER (KD) ..... ---*---	3	
-65	14908	. . GASKET, Relief valve (KC)	1	
-66	19551	. . . PLATE, Identification	1	A
	19159	. . . PLATE, Identification	1	B
	19630	. . . PLATE, Identification	1	C
	19652	. . . PLATE, Identification	1	D
	19654	. . . PLATE, Identification	1	E
	19653	. . . PLATE, Identification	1	F
	19656	. . . PLATE, Identification ..... (ATTACHING PARTS)	1	G
-67	MS35206-201	. . . SCREW (KD) ..... ---*---	2	
-68	14866	. . CONTROL ASSY, Emergency pressure ..... (figure 6-16 for BKDN) (ATTACHING PARTS)	1	
-69	MS35265-13	. . SCREW (KD)	1	
-70	MS35338-40	. . WASHER (KD)	1	
-71	MS35265-10	. . SCREW (KD)	7	
-72	MS35338-39	. . WASHER (KD) ..... ---*---	7	
-73	14863	. . DIAPHRAGM, Outer (KC)	1	
-74	14865	. . SPACER, Diaphragm	1	
-75	19457	. . DIAPHRAGM AND PLATE ASSY (KC)	1	
-76	14975	. . LEVER ASSY, Demand valve ..... (ATTACHING PARTS)	1	
-77	16343	. . PIN, Vane mounting (KD) ..... ---*---	1	
-78	14562	. . PALNUT, (KD)	1	
-79	14978	. . SCREW (KD)	1	
-80	19571	. . SPRING, Demand valve lever (KD)	1	CDEFG
-81	14979	. . FULCRUM, Demand valve (KD) ..... (ATTACHING PARTS)	1	
-82	MS35206-203	. . SCREW (KD)	1	
-83	MS35333-35	. . WASHER (KD) ..... ---*---	1	
-84	14949-1	. . DILUTER PLATE CONTROL ..... HOUSING AND CHECK VALVE ASSY (figure 6-17 for BKDN) (ATTACHING PARTS)	1	
-85	MS35206-215	. . SCREW (KD)	4	
-86	MS35206-221	. . SCREW (KD)	2	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-12-87	MS35338-40	. . WASHER (KD)	4	
		---*---		
-88	14831-1	. . SPRING, First stage regulating (KD)	1	
-89	14903-1	. . PLATE, First stage cover	1	
		(ATTACHING PARTS)		
-90	AS108CC440-4	. . SCREW (KD)	6	
		---*---		
-91	14904-1	. . GASKET, First stage (KC)	1	
-92	14832	. . VALVE AND LEVER ASSY, First	1	
		stage regulator		
		(ATTACHING PARTS)		
-93	14958	. . SCREW, First stage lever pivot (KD)	1	
-94	14957	. . WASHER, Tension (KD)	1	
		---*---		
-95	14905	. . BELLOWS ASSY, First stage regulator	1	
-96	14907	. . GASKET, First stage bellows (KC)	1	
-97	14890-8	. . MANIFOLD INLET ASSY	1	ADEFG
		(figure 6-18 for BKDN)		
	14890-9	. . MANIFOLD INLET ASSY	1	BC
		(figure 6-18 for BKDN)		
		(ATTACHING PARTS)		
-98	MS35266-67	. . SCREW (KD)	2	
-99	MS35338-43	. . WASHER (KD)	2	
		---*---		
-100	14909-11	. . PACKING, Preformed (KC)	1	
-101	16695	. . GROMMET (KC)	1	
-102	14966-2	. . SEAT VALVE ASSY, First stage (KD)	1	
-103	13040-1	. . PLUG, Pipe 1/8 (KD)	1	
-104	14972	. . SCREW, Demand valve retaining	1	
-105	14909-9	. . PACKING, Preformed (KC)	1	
-106	16212	. . SPRING, Demand valve (KD)	1	
-107	15882	. . VALVE ASSY, Demand (KC)	1	
-108	14973	. . SEAT, Demand valve (KD)	1	
-109	14909-5	. . PACKING, Preformed (KC)	1	
-110	14982	. . PIN, Demand valve (KD)	1	
-111	14879	. . PLUG, Demand valve feed port (KD)	1	
-112	16664	. . GASKET (KC)	1	
-113	14909-5	. . PACKING, Preformed (KC)	1	
-114	14824	. . PLATE Panel light cord anchor	1	
		(ATTACHING PARTS)		
-115	MS35206-213	. . SCREW (KD)	2	
-116	MS35338-40	. . WASHER (KD)	2	
-117	14823	. . BUSHING, Panel light electrical cord (KC) . . .	1	
-118	9177	. . RETAINER, Relief valve spring (KD)	1	
-119	16381	. . SPRING, Relief valve (KD)	1	
-120	16379	. . VALVE ASSY, First stage relief (KC)	1	
-121	11221	. . SEAT, Relief valve (KD)	1	
-122	14909-2	. . PACKING, Preformed (KC)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-12-123	812097-1	. . CAP, Sealing (KD)	1	
-124	14932	. . OUTLET, Regulator	1	
		(ATTACHING PARTS)		
-125	MS35649-282	. . NUT (KD)	2	
-126	AS103CC832H6	. . SCREW (KD)	1	
-127	AS103CC832H8	. . SCREW (KD)	1	
		---*---		
-128	14825-19	. . PACKING, Preformed (KC)	1	
-129	16480	. . SCREEN, Venturi (KD)	1	
-130	11760	. . VENTURI ASSY (figure 6-19 for BKDN)	1	
-131	11761	. . GASKET, Venturi nozzle (KC)	1	
-132	14998	. . . PIN, FULCRUM POSITIONING	1	
-133	14981-2	. . . GUIDE, Demand valve (KD)	1	
-134	14803-1	. . REGULATOR HOUSING AND DEMAND . . .	1	
		VALVE BUSHING ASSY		
	19660	PARTS KIT (Cure Date)	1	
	19552	PARTS KIT (Major Overhaul)	1	

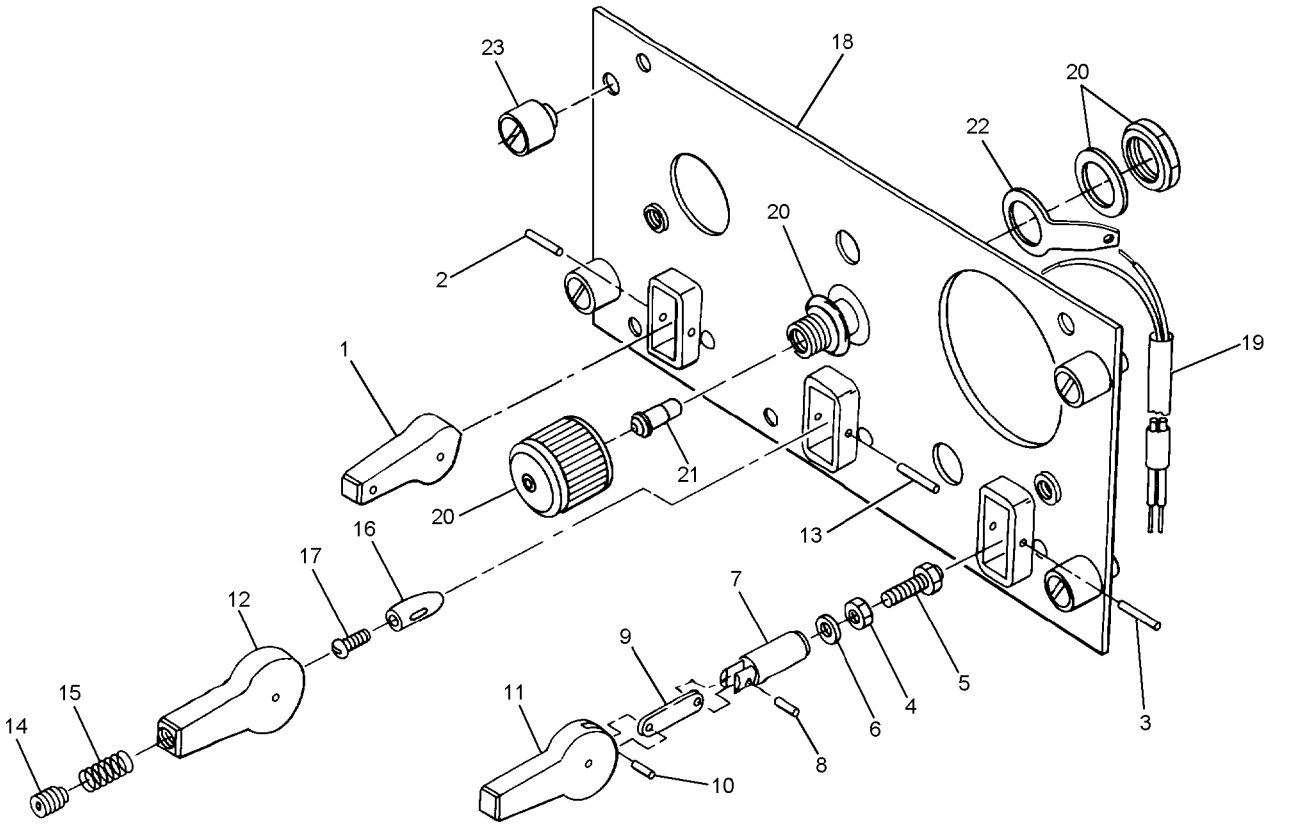

Figure 6-13. Mounting Plate and Controls Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-13	14805-7	MOUNTING PLATE AND CONTROLS ASSY . . . . (figure 6-12 for NHA)	REF	ABCD
	14805-18	MOUNTING PLATE AND CONTROLS ASSY . . . . (figure 6-12 for NHA)	REF	E
	14805-19	MOUNTING PLATE AND CONTROLS ASSY . . . . (figure 6-12 for NHA)	REF	F
	14805-24	MOUNTING PLATE AND CONTROLS ASSY . . . . (figure 6-12 for NHA)	REF	G
-1	14841-2	. LEVER, Emergency pressure control	1	
-2	14850	. PIN, Control lever (KD)	1	
	14852	. LEVER AND STEM ASSY, Supply valve control . . . . . (ATTACHING PARTS)	1	
-3	14850	. PIN, Control lever (KD) . . . . . ---*---	1	
-4	14853	. . NUT, Lock adjusting	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-13-5	14854	. . SCREW, Adjusting (KD)	1	
-6	AS142CC4	. . WASHER (KD)	1	
-7	14855	. . STEM, Supply valve control (ATTACHING PARTS)	1	
-8	14856	. . PIN, Stem, supply valve control ---*---	1	
-9	14858	. . LINK, Supply valve control (ATTACHING PARTS)	1	
-10	14857	. . PIN, Lever, supply valve control ---*---	1	
-11	14859	. . LEVER, Supply valve control	1	
-12	14849-1	. LEVER, Diluter valve control (ATTACHING PARTS)	1	
-13	14850	. PIN, Control lever (KD) ---*---	1	
-14	AS103CC832H6	. SCREW, Set (KD)	1	
-15	14847	. SPRING, Diluter lever follower (KD)	1	
-16	14848-3	. FOLLOWER ASSY, Diluter lever	1	
-17	AS105S080-4	. SCREW (KD)		
-18	14806	. REGULATOR MOUNTING PLATE ASSY	1	ABCD
	14806-12	. REGULATOR MOUNTING PLATE ASSY	1	E
	14806-13	. REGULATOR MOUNTING PLATE ASSY	1	F
	14806-16	. REGULATOR MOUNTING PLATE ASSY (Partial BKDN Follows)	1	G
-19	14809	. . CORD ASSY	1	
-20	MS25453-1	. . LIGHT ASSY	1	ABCDE
	19179-1	. . LIGHT ASSY	1	FG
-21	MS25237-327	. . LAMP (KD)	1	ABCDG
	MS25237-328	. . LAMP (KD)	1	EF
-22	742555-1	. . LUG, Terminal	1	
-23	19870	. . FASTENERS, DZUS	4	

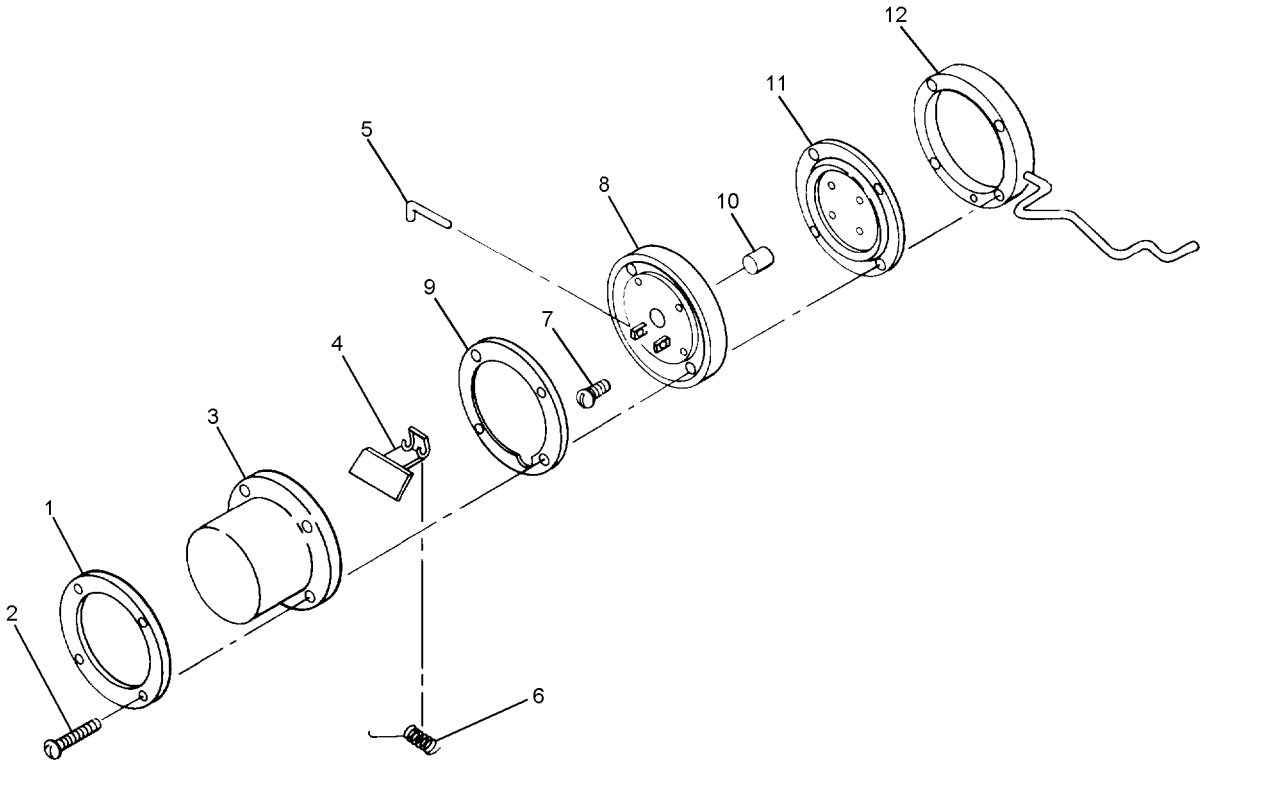

Figure 6-14. Blinker Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-14	19626	BLINKER ASSY . . . . . (figure 6-12 for NHA)	REF	
-1	19546	. RETAINER, Plate . . . . . (ATTACHING PARTS)	1	
-2	19543-1	. SCREW (KD) . . . . . ---*---	2	
-3	19618	. COVER	1	
-4	14819	. FLAG AND LEVER ASSY, Blinker . . . . . (ATTACHING PARTS)	1	
-5	14983	. PIN, Blinker (KD) . . . . . ---*---	1	
-6	14984	. SPRING, Blinker (KD)	1	
-7	MS35265-1	. SCREW	1	
-8	19616	. GUIDE, Actuator	1	
-9	19624	. GASKET (KC)	1	
-10	19623	. ACTUATOR, Blinker (KD)	1	
-11	14821	. DIAPHRAGM ASSY, Blinker (KC)	1	
-12	14987	. BLINKER TUBING AND BASE PLATE ASSY	1	

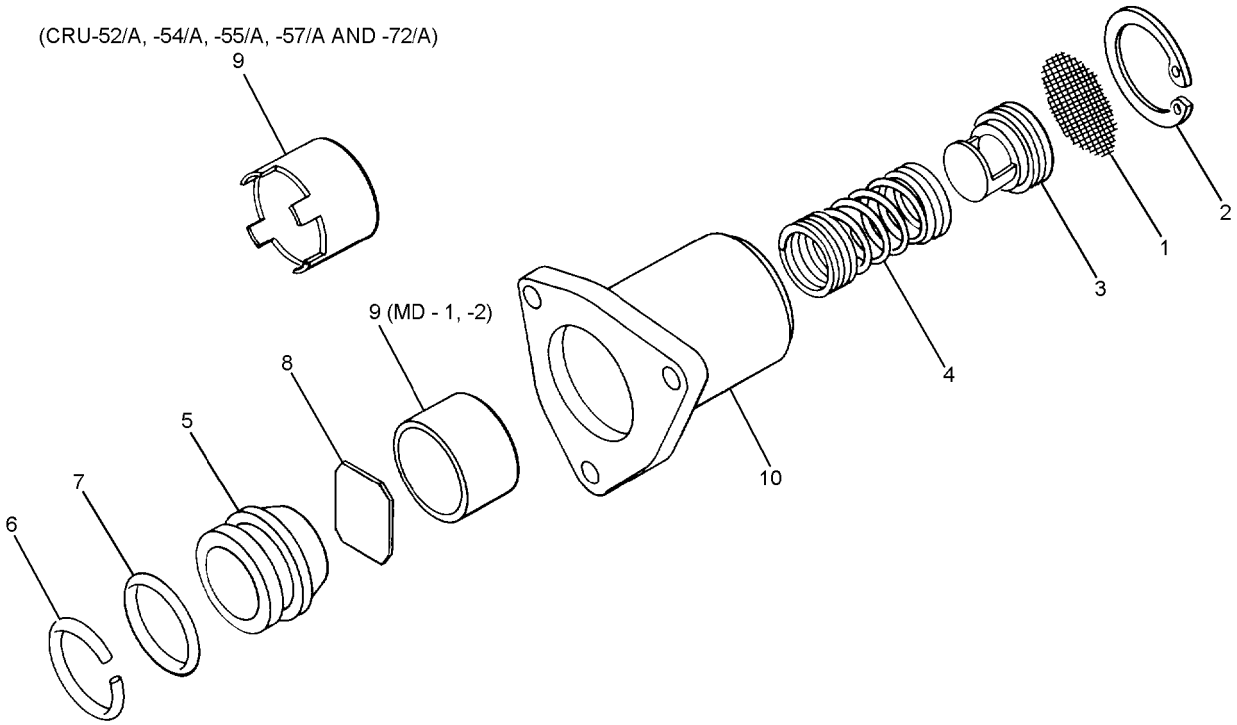

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Figure 6-15. Second Stage Relief Valve Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-15	14880	VALVE ASSY, Second stage relief . . . . . (figure 6-12 for NHA)	REF	AB
	14880-2	VALVE ASSY, Second stage relief . . . . . (figure 6-12 for NHA)	REF	CDEFG
-1	708760-1	. SCREEN, Relief valve (KD) . . . . . (ATTACHING PARTS)	1	
-2	92587-50	. RETAINER, Ring internal type (KD) . . . . . ---*---	1	
-3	708763-1	. RETAINER, Spring (KD)	1	
-4	14886	. SPRING, Second stage relief valve (KD)	1	
-5	14883	. SEAT, Second stage relief valve (KD)	1	AB
	19332	. SEAT, Second stage relief valve (KD) . . . . . (ATTACHING PARTS)	1	CDEFG
-6	14881	. RING, Retaining, second stage relief (KD) . . . . . ---*---	1	
-7	14909-7	. PACKING, Preformed (KC)	1	
-8	14885	. VALVE, Second stage relief (KD)	1	
-9	14884	. SLEEVE, Second stage relief valve . . . . . guide (KD)	1	AB
	19333	. SLEEVE, Second stage relief valve . . . . . guide (KD)	1	CDEFG
-10	14882	. HOUSING, Second stage relief valve	1	AB
	14882-1	. HOUSING, Second stage relief valve		CDEFG

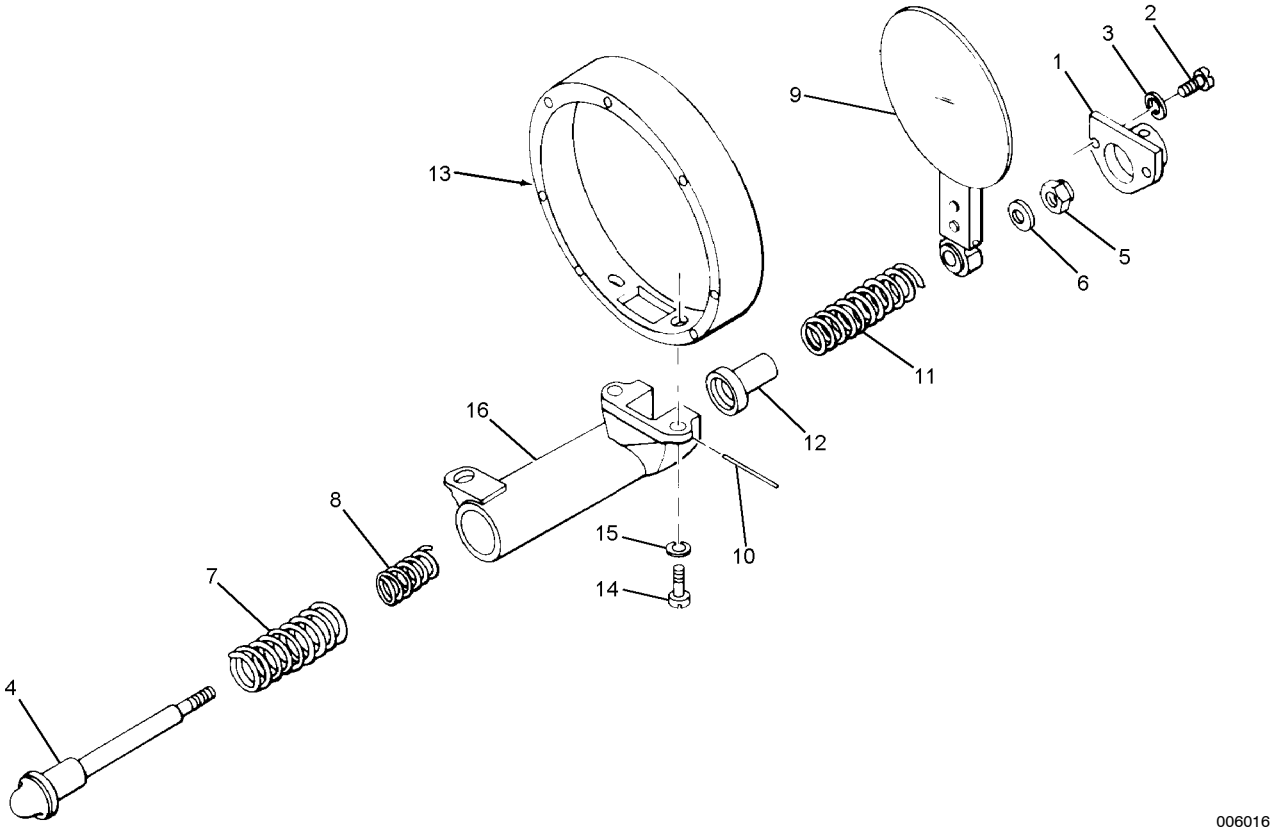
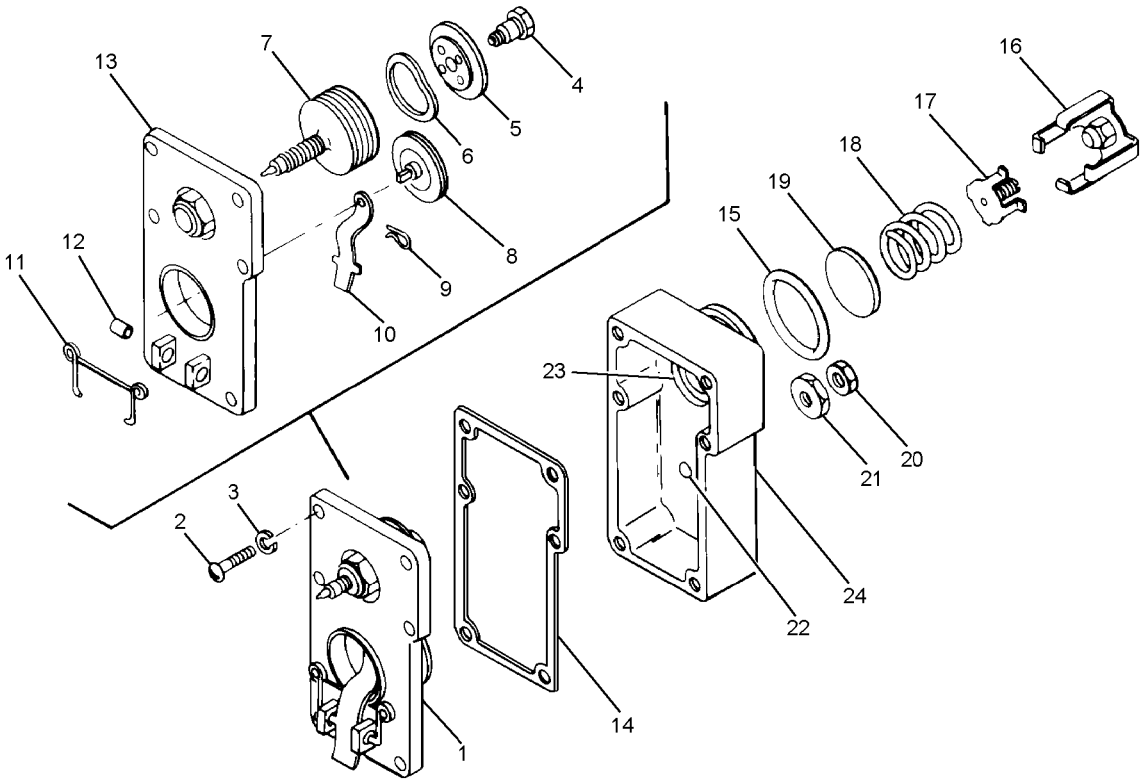


Figure 6-16. Emergency Pressure Control Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-16	14866	CONTROL ASSY, Emergency pressure . . . . . (figure 6-12 for NHA)	REF	
-1	14868	. CAP, Emergency pressure control . . . . . housing (KD) (ATTACHING PARTS)	1	
-2	MS35265-2	. SCREW (KD)	2	
-3	MS35338-39	. WASHER (KD) . . . . . ---*---	2	
-4	14875	. STEM, Emergency pressure lever (KD) . . . . . (ATTACHING PARTS)	1	
-5	16557	. NUT, Elastic (KD)	1	
-6	16479	. SWIVEL, Emergency pressure (KD) . . . . . ---*---	1	
-7	14878-1	. SPRING, Return emergency . . . . . pressure control (KD)	1	
-8	14877	. SPRING, Emergency pressure . . . . . control test (KD)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-16-9	14870	. CONTROL LEVER AND CENTER ASSY, Emergency pressure (ATTACHING PARTS)	1	
-10	14961	. PIN (KD) ---*---	1	
-11	14876	. SPRING, Helical compression emergency pressure (KD)	1	
-12	#14874-1	. GUIDE, Emergency pressure spring 0.500 inch long	1	
	#14874-2	. GUIDE, Emergency pressure spring 0.531 inch long	1	
	#14874-3	. GUIDE, Emergency pressure spring 0.546 inch long	1	
	#14874-4	. GUIDE, Emergency pressure spring 0.562 inch long	1	
	#14874-5	. GUIDE, Emergency pressure spring 0.578 inch long	1	
	#14874-6	. GUIDE, Emergency pressure spring 0.593 inch long	1	
	#14874-7	. GUIDE, Emergency pressure spring 0.662 inch long	1	
	#14874-8	. GUIDE, Emergency pressure spring 0.682 inch long	1	
	#14874-9	. GUIDE, Emergency pressure spring 0.702 inch long	1	
-13	14869	. COVER, Second stage (ATTACHING PARTS)	1	
-14	MS35265-13	. SCREW (KD)	2	
-15	MS35338-40	. WASHER (KD) ---*---	2	
-16	14867	. HOUSING, Emergency pressure control	1	



006017

Figure 6-17. Diluter Plate Control Housing and Check Valve Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-17	14949-1	DILUTER PLATE CONTROL HOUSING . . . . . AND CHECK VALVE ASSY (figure 6-12 for NHA)	REF	
-1	14912-1	. PLATE ASSY, Diluter . . . . . (ATTACHING PARTS)	1	
-2	MS35206-216	. SCREW (KD)	4	
-3	MS35338-40	. WASHER (KD) . . . . . ---*---	4	
-4	#16284-1	. . SCREW, 0.062 inch long shoulder (KD)	1	
	#16284-2	. . SCREW, 0.067 inch long shoulder (KD)	1	
	#16284-3	. . SCREW, 0.073 inch long shoulder (KD)	1	
	#16284-4	. . SCREW, 0.078 inch long shoulder (KD)	1	
-5	766097-1	. . PLATE, Throttling (KD)	1	
-6	PB50828-1	. . WASHER, Spring (KD)	1	
-7	758632-1	. . ANEROID ASSY	1	
-8	14917	. . DILUTER VALVE ASSY (KC) . . . . . (ATTACHING PARTS)	1	
-9	16478	. . CLIP, Diluter lever (KD) . . . . . ---*---	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-17-10	14918-1	. . LEVER, Valve manual diluter (KD)	1	
-11	14920	. . CLIP, Retaining (KD)	1	
-12	14919	. . BUSHING (KD)	2	
-13	14913	. . PLATE AND SEAT ASSY, Diluter	1	
-14	14921	. GASKET, Diluter housing (KC)	1	
-15	14825-21	. PACKING, Preformed (KC)	1	
-16	11707	. RETAINER ASSY, Aneroid check valve	1	
-17	14937	. ADAPTER ASSY, Spring and screw (KD)	1	
-18	11706	. SPRING, Aneroid check valve (KD)	1	
-19	11705	. DISC, Check valve (KD)	1	
	14935-1	. HOUSING ASSY, Diluter control	1	
-20	19014	. . NUT, Lock, first stage adjusting (KD)	1	
-21	14830	. . NUT, First stage adjusting (KD)	1	
-22	14926	. . SCREW, First stage adjusting	1	
-23	14923	. . SEAT, Check valve	1	
-24	14910	. . HOUSING, Diluter control	1	

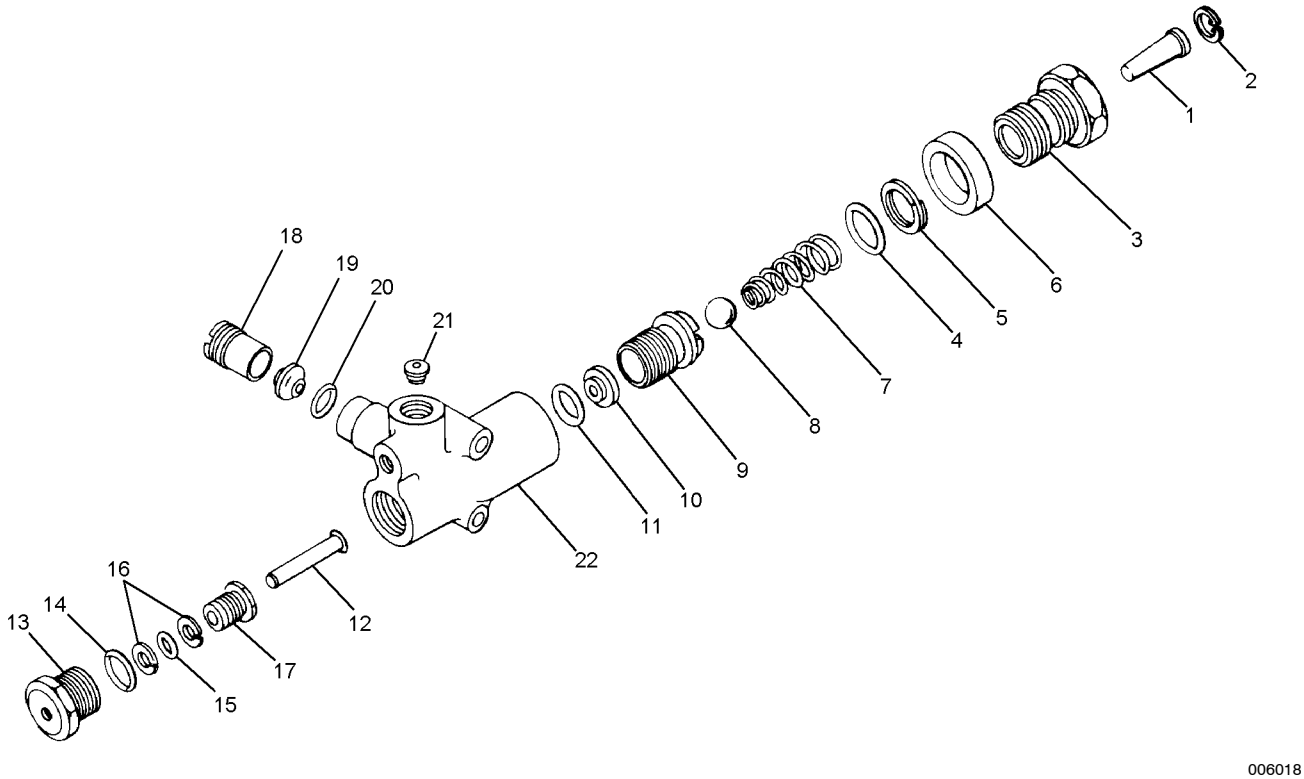
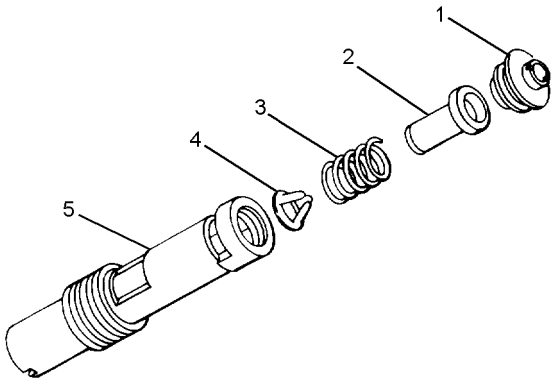


Figure 6-18. Manifold Inlet Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-18	14890-8	MANIFOLD INLET ASSY . . . . . (figure 6-12 for NHA)	REF	ADEF
	14890-9	MANIFOLD INLET ASSY . . . . . (figure 6-12 for NHA)	REF	BC
-1	14898	. FILTER, Oxygen (KD) . . . . . (ATTACHING PARTS)	1	
-2	0-521-72A	. RING, Snap (KD) . . . . . ---*---	1	
-3	14947	. ADAPTER, Manifold inlet	1	
-4	14909-11	. PACKING, Preformed (KC)	1	
-5	15746	. RING, Packing backup (KC)	1	
-6	14948	. SPACER, Locking (KD)	1	
-7	14899	. SPRING, Conical compression supply . . . . . valve (KD)	1	
-8	19755	. BALL (KD)	1	
-9	14900-1	. RETAINER, Inlet supply valve seat (KD)	1	
-10	19753	. SEAT, Supply valve (KD)	1	
-11	14909-5	. PACKING, Preformed (KC)	1	
-12	19754	. STEM, Supply valve (KD)	1	
-13	16798	. RETAINER, Manifold seal (KD)	1	
-14	14825-13	. PACKING, Preformed (KC)	1	

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-18-15	19157	. PACKING, Preformed (KC)	1	
-16	16795	. RETAINER, Packing (KC)	2	
-17	16796	. RETAINER, Manifold valve stem seal (KD)	1	
-18	15877	. RETAINER, Inlet valve (KD)	1	
-19	14902	. SEAT, Inlet valve first stage (KD)	1	BC
	16494	. SEAT, Inlet valve first stage (KD)	1	ADEFG
-20	14909-4	. PACKING, Preformed (KC)	1	
-21	AS140CBI	. PLUG (KD)	1	
-22	14893-2	. MANIFOLD, Inlet supply	1	



006019

Figure 6-19. Venturi Assembly

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
6-19	11760	VENTURI ASSY . . . . . (figure 6-12 for NHA)	REF	
-1	11795	. SEAT, Venturi (KD)	1	
-2	14943	. NOZZLE, Injector (KD)	1	
-3	PB54188-3	. SPRING, Injector (KD)	1	
-4	PB53042-1	. SPRING, Damping (KD)	1	
-5	11794	. HOUSING, Venturi	1	

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
#14874-1	6-16-12	PAOZZ
#14874-2	6-16-12	PAOZZ
#14874-3	6-16-12	
#14874-4	6-16-12	
#14874-5	6-16-12	
#14874-6	6-16-12	
#14874-7	6-16-12	
#14874-8	6-16-12	
#14874-9	6-16-12	PAGZZ
#14954-1	6-12-45	
#14954-2	6-12-45	
#14954-3	6-12-45	
#14954-4	6-12-45	
#15959-1	6-12-56	PAHZZ
#15959-2	6-12-56	
#15959-3	6-12-56	
#15959-4	6-12-56	
#15959-5	6-12-56	
#15959-6	6-12-56	
#15959-7	6-12-56	PAOZZ
#16284-1	6-17-4	
#16284-2	6-17-4	
#16284-3	6-17-4	
#16284-4	6-17-4	
#17621-1	6-12-48	
#17621-2	6-12-48	
#17621-3	6-12-48	
#17621-4	6-12-48	
AS103CC832F2	6-12-4	
AS103CC832H6	6-12-126	
	6-13-14	
AS103CC832H8	6-12-127	
AS105S080-4	6-13-17	
AS108CC348-5	6-12-54	
AS108CC440-4	6-12-90	
AS108CC440-7	6-12-59	
	6-12-61	
AS140CB1	6-18-21	
AS142CC4	6-12-20	
	6-12-39	
	6-13-6	
MS25237-327	6-13-21	PAOZZ
MS25237-328	6-13-21	PAOZZ
MS25453-1	6-13-20	PAOZZ
MS35206-201	6-12-67	
MS35206-203	6-12-82	PAOZZ
MS35206-213	6-12-9	PAOZZ
	6-12-28	
	6-12-115	
	6-16-14	
MS35206-215	6-12-85	PAOZZ
MS35206-216	6-17-2	PAOZZ
MS35206-221	6-12-86	PAOZZ
MS35206-228	6-12-6	PAOZZ
MS35265-1	6-14-7	PAGZZ
MS35265-2	6-16-2	PAOZZ
MS35265-10	6-12-71	PADZZ
MS35265-13	6-12-63	PAOZZ
	6-12-69	
MS35265-14	6-12-38	PAOZZ
MS35265-16	6-12-12	PAOZZ
	6-12-37	
MS35265-25	6-12-2	PAOZZ
MS35265-30	6-12-15	PAOZZ
MS35266-67	6-12-98	
MS35333-35	6-12-83	PAOZZ
MS35333-37	6-12-3	PAOZZ
MS35333-39	6-12-41	PAOZZ
	6-12-72	
	6-16-3	
MS35338-40	6-12-10	PAOOZ
	6-12-13	
	6-12-29	
	6-12-64	
	6-12-70	
	6-12-87	
	6-12-116	
	6-16-15	
	6-17-3	
MS35338-41	6-12-7	PAOZZ
	6-12-16	
	6-12-32	
MS35338-43	6-12-99	PAOZZ
MS35649-282	6-12-125	PAOZZ
O-521-72A	6-18-2	PAOZZ
PB50828-1	6-17-6	PAOZZ
PB53042-1	6-19-4	
PB54188-3	6-19-3	
Y3-6-2C	6-12-31	
11221	6-12-121	
11705	6-17-19	
11706	6-17-18	
11707	6-17-16	PAOZZ
11760	6-12-130	PAOZZ

NUMERICAL INDEX (Cont)

Part Number	Figure and Index Number	SM&R Code
	6-19	
11761	6-12-131	
11794	6-19-5	PAOZZ
11795	6-19-1	PAOZZ
12249	6-12-40	
13040-1	6-12-103	
14562	6-12-78	
14800-8B	6-12	PAOHD
14800-8C	6-12	PAOHD
14801-8B	6-12	
14801-8C	6-12	
14803-1	6-12-134	
14804	6-12-14	
14805-18	6-12-5	
	6-13	
14805-19	6-12-5	
	6-13	
14805-24	6-12-5	
	6-13	
14805-7	6-12-5	PAOZZ
	6-13	
14806	6-13-18	PAOZZ
14806-12	6-13-18	
14806-13	6-13-18	
14806-16	6-13-18	
14807	6-12-1	PAOZZ
14809	6-13-19	PAOZZ
14819	6-14-4	PAOZZ
14821	6-14-11	
14823	6-12-117	
14824	6-12-114	
14825-13	6-18-14	
14825-19	6-12-128	
14825-21	6-17-15	
14826	6-12-27	
14827	6-12-26	
14830	6-17-21	
14831-1	6-12-88	
14832	6-12-92	PAOZZ
14836-1	6-12-17	
14837-1	6-12-22	
14838-1	6-12-21	
14839	6-12-18	
14840-1	6-12-58	PAHZZ
14841-2	6-13-1	PAOZZ
14842	6-12-11	
14847	6-13-15	
14848-3	6-13-16	
14849-1	6-13-12	
14850	6-13-2	
	6-13-3	
	6-13-13	
14851-1	6-12-60	PAOZZ
14852	6-13-2	PAOZZ
14853	6-12-19	
	6-13-4	
14854	6-13-5	
14855	6-13-7	
14856	6-13-8	
14857	6-13-10	
14858	6-13-9	
14859	6-13-11	
14863	6-12-73	
14865	6-12-74	PAOZZ
14866	6-12-68	PAOZZ
	6-16-	
14867	6-16-16	
14868	6-16-1	PAOZZ
14869	6-16-13	PAOZZ
14870	6-16-9	PAOZZ
14875	6-16-4	PAOZZ
14876	6-16-11	
14877	6-16-8	
14878-1	6-16-7	
14879	6-12-111	
14880	6-12-62	
	6-15-	
14880-2	6-12-62	PAOZZ
	6-15-	
14881	6-15-6	
14882	6-15-10	
14882-1	6-15-10	PADZZ
14883	6-15-5	PAOZZ
14884	6-15-9	
14885	6-15-8	
14886	6-15-4	
14890-8	6-12-97	
	6-18-	
14890-9	6-12-97	
	6-18-	
14893-2	6-18-22	PADZZ
14898	6-18-1	
14899	6-18-7	
14900-1	6-18-9	

NUMERICAL INDEX (Cont)

Part Number	Figure and Index Number	SM&R Code
14902	6-18-19	PAOZZ
14903-1	6-12-89	PAOZZ
14904-1	6-12-91	
14905	6-12-95	PAOZZ
14907	6-12-96	
14908	6-12-65	PAGZZ
14909-1	6-12-25	
14909-11	6-12-100	
	6-18-4	
14909-2	6-12-122	
14909-4	6-18-20	
14909-5	6-12-109	
	6-12-113	
	6-18-11	
14909-7	6-15-7	
14909-9	6-12-105	
14910	6-17-24	
14912-1	6-17-1	
14913	6-17-13	PAOZZ
14917	6-17-8	
14918-1	6-17-10	PAOZZ
14919	6-17-12	
14920	6-17-11	
14921	6-17-14	
14923	6-17-23	
14926	6-17-22	
14930	6-12-49	
14931	6-12-42	
14932	6-12-124	PAOZZ
14934	6-12-51	PAOZZ
14935-1	6-17-19	PAOZZ
14937	6-17-17	
14938	6-12-33	PAGZZ
14941	6-12-30	
14943	6-19-2	PAOZZ
14944	6-12-50	
14945	6-12-36	
14947	6-18-3	PAOZZ
14948	6-18-6	
14949-1	6-12-84	
	6-17	
14950-26A	6-12	PAOHD
14950-27A	6-12	PAOGD
14950-28A	6-12	PAOGD
14950-30	6-12	PAHHD
14950-7B	6-12	PAHHD
14951-26A	6-12	
14951-27A	6-12	
14951-28A	6-12	
14951-30	6-12	
14951-7B	6-12	
14953	6-12-33	
14955	6-12-46	
14957	6-12-94	
14958	6-12-93	
14959	6-12-47	
14961	6-16-10	
14966-2	6-12-102	PAOZZ
14972	6-12-104	PAOZZ
14973	6-12-108	PAOZZ
14975	6-12-76	PAOZZ
14978	6-12-79	PAOZZ
14979	6-12-81	
14981-2	6-12-133	
14982	6-12-110	
14983	6-14-5	
14984	6-14-6	
14986	6-12-8	
14987	6-14-12	PAOZZ
14998	6-12-132	
15697	6-12-57	
15746	6-18-5	
15749	6-12-35	
15750	6-12-34	
15751	6-12-35	PAGZZ
15877	6-18-18	
15882	6-12-107	
16152	6-12-27	PAOZZ
16157	6-12-53	
16210	6-12-52	PAGZZ
16212	6-12-106	
16343	6-12-77	
16379	6-12-120	
16381	6-12-119	
16478	6-17-9	
16479	6-16-6	
16480	6-12-129	
16494	6-18-19	PAOZZ
16557	6-16-5	
16664	6-12-112	
16695	6-12-101	
16795	6-18-16	
16796	6-18-17	
16798	6-18-13	

NUMERICAL INDEX (Cont)

Part Number	Figure and Index Number	SM&R Code
17750-1	6-12-44	
17750-2	6-12-44	
17750-3	6-12-44	
17750-4	6-12-44	
17750-5	6-12-44	
17750-6	6-12-44	
17750-7	6-12-44	
17750-8	6-12-44	
17815	6-12-43	PADZZ
17922	6-12-36	PAOGZ
17923	6-12-27	PADZZ
19014	6-17-20	PAOZZ
19157	6-18-15	
19159	6-12-66	
19179-1	6-13-20	
19332	6-15-5	PAOZZ
19333	6-15-9	
19457	6-12-75	
19539	6-12-1	PAOZZ
19543-1	6-14-2	
19543-2	6-12-24	PAOZZ
19546	6-14-1	
19551	6-12-66	
19552	6-12-134	PAOZZ
19571	6-12-80	PAOZZ
19616	6-14-8	PADZZ
19618	6-14-3	PAOZZ
19623	6-14-10	
19624	6-14-9	
19626	6-12-23	PAOZZ
	6-14	
19630	6-12-66	
19652	6-12-66	
19653	6-12-66	
19654	6-12-66	
19656	6-12-66	
19660	6-12-134	PAOZZ
19753	6-18-10	
19754	6-18-12	
19755	6-18-8	PAOZZ
19870	6-13-23	
708760-1	6-15-1	
708763-1	6-15-3	PAOZZ
742555-1	6-13-22	PAOZZ
758632-1	6-17-7	PAOZZ
766097-1	6-17-5	PAOZZ
812097-1	6-12-123	
900212	6-12-55	
9177	6-12-118	
92587-50	6-15-2	PAOZZ