required at the Organizational and Intermediate levels is specified in the MRCs. Use only approved SAR/SCBA replacement parts.

4.4.2 Cleaning and Leak-Check Solutions.

[WARNING]

Accomplish all procedures in a clean environment. Contamination of the breathing air system could result in serious injury or death to personnel.

Refer to the PMS MRCs for cleaning and leak test solutions and requirements.

4.4.3 Lubricants. Use only the lubricants authorized on the MRCs. Apply lubricants sparingly.

4.4.4 O-rings and Seals. Visually inspect O-rings and seals. Avoid unnecessary disassembly which may cause undue wear. Do not use metal screwdrivers or picks to remove O-rings. Remove O-rings and other non-metallic seals or packings with fingers. If this cannot be easily done, use the appropriate tool, such as an O-ring removal tool. Upon inspecting O-rings or seals, they may be reinstalled if undamaged. Damaged O-rings and seals, however, should be cut and discarded.

4.5 SCHEDULED MAINTENANCE

The following paragraphs summarize scheduled maintenance requirements for the SAR/SCBA. Refer to the PMS for detailed requirements.

4.5.1 Quarterly Maintenance. Quarterly maintenance includes general cleaning and inspection of the PASP, RASP, and SCBA units. Inspections are performed to identify any damage which could affect operation of the equipment. In addition, system tightness tests are performed on the PASPs, and the SCBA units are leak tested. The equipment must also be operated at least once every quarter. The operational test must include all the PASP and SCBA units.

4.5.2 Annual Maintenance. Annual maintenance includes inspecting all HP and LP air hoses and fittings. As part of the inspection, the hydrostatic test data should be checked on the hose tag to identify hoses which need to be hydrostatically tested. In addition, the PASP regulator is tested and adjusted annually.

4.5.3 Eighteen-Month Maintenance. The HP and LP pressure gauges located on the PASP CPA must be calibrated every eighteen months.

4.5.4 Three-Year Maintenance. Air cylinders must be hydrostatically tested every three years. This includes both PASP/RASP air cylinders and the SCBA air cylinders. A list of facilities authorized to retest DOT cylinders is located on the DOT internet web page at http://hazmat.dot.gov/files/approvals/hydro/hydro_retesters.htm. The breathing apparatus must be flow tested every three years.

4.5.5 Six-Year Maintenance. Breathing apparatus must be overhauled every six years. Overhaul must be performed at an MSA authorized service facility. For the location of the nearest MSA authorized service facility, call 1-800-MSA-2222.
CHAPTER 5
TROUBLESHOOTING

5.1 INTRODUCTION.
This chapter contains the troubleshooting procedures and data to assist personnel in locating malfunctions after faulty operation of the Supplied Air Respirator (SAR) with the Self-Contained Breathing Apparatus (SCBA). The troubleshooting procedures are designed for the operator and the SCBA user. Table 5-1 displays potential problems and corrective actions.

5.2 GENERAL INSTRUCTIONS.
Troubleshooting is based on locating potential faults in the equipment and taking timely corrective action. In the event that serious problems arise during an operation, follow the emergency procedures in Chapter 2, Operation.

NOTE
The manual does not list all malfunctions or causes that may apply, nor all tests, inspections, or corrective actions. If a malfunction is not listed or is not remedied by the corrective actions, notify the supervisor. Also, complete and submit Technical Deficiency/Evaluation Report (TMDER) located at end of this manual.

Table 5-1. Troubleshooting Guidelines for the SAR/SCBA

<table>
<thead>
<tr>
<th>Symptom(s)</th>
<th>Probable Cause(s)</th>
<th>Corrective Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty breathing (lack of air supply)</td>
<td>a. Damaged hose</td>
<td>a. Repair/replace hose IAW MRC 5519 A-2R or Chapter 6</td>
</tr>
<tr>
<td></td>
<td>b. Twisted hose</td>
<td>b. Remove kinks</td>
</tr>
<tr>
<td></td>
<td>c. On-line HP air cylinder low on air</td>
<td>c. Shift to full air cylinder</td>
</tr>
<tr>
<td></td>
<td>d. PASP regulator improperly adjusted</td>
<td>d. Turn regulator knob CW until PASP LP gauge (ALP-G202) indicates 80 psig (nominal)</td>
</tr>
<tr>
<td></td>
<td>e. PASP in-line HP air filter clogged</td>
<td>e. Inspect IAW MRC 5519 R-2 and perform associated maintenance</td>
</tr>
<tr>
<td></td>
<td>f. SCBA first-stage regulator failed</td>
<td>f. Return to authorized maintenance facility for regulator replacement</td>
</tr>
<tr>
<td></td>
<td>g. SCBA MMR (second-stage) regulator failed</td>
<td>g. Return to authorized maintenance facility for repair/replacement</td>
</tr>
<tr>
<td>Breach of isolated environment, exposure to atmospheric contaminant (e.g., smell of fumes, irritation to eyes)</td>
<td>a. Facepiece leaks</td>
<td>a. Retighten harness straps or replace facepiece</td>
</tr>
<tr>
<td></td>
<td>b. Hose(s) leaks</td>
<td>b. Replace hose</td>
</tr>
<tr>
<td></td>
<td>c. Lens leaks</td>
<td>c. Replace lens and/or gasket IAW Chapter 6</td>
</tr>
<tr>
<td></td>
<td>d. SCBA speaking diaphragm leaks</td>
<td>d. Replace speaking diaphragm IAW Chapter 6</td>
</tr>
</tbody>
</table>

NOTE
Exit space. Remove SAR/SCBA and perform following corrective actions, as applicable:

a. Retighten harness straps or replace facepiece
b. Replace hose
c. Replace lens and/or gasket IAW Chapter 6
d. Replace speaking diaphragm IAW Chapter 6
### Table 5-1. Troubleshooting Guidelines for the SAR/SCBA - Continued

<table>
<thead>
<tr>
<th>Symptom(s)</th>
<th>Probable Cause(s)</th>
<th>Corrective Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breach of isolated environment, exposure to atmospheric contaminant (e.g., smell of fumes, irritation to eyes) - Continued</td>
<td>e. SCBA inhalation or exhalation valve leaks</td>
<td>e. Replace defective valve IAW Chapter 6</td>
</tr>
<tr>
<td></td>
<td>f. SCBA MMR (second-stage) leaks externally</td>
<td>f. Inspect O-ring. If defective, replace IAW Chapter 6. If leak continues, return to authorized maintenance facility for repair</td>
</tr>
<tr>
<td>Primary air supply cylinder valve (AHP-V201, AHP-V301, or AHP-V302) on PASP/RASP cylinder fails OPEN, SHUT, or in an intermediate position</td>
<td>Defective cylinder valve</td>
<td>Shift to a different HP air cylinder; repair or replace IAW Chapter 6</td>
</tr>
<tr>
<td>Three-way ball valve (AHP-V204) fails in CLOSED position or cannot be aligned with a charged HP air cylinder</td>
<td>Defective three-way ball valve</td>
<td>Activate SCBA and exit space; repair or replace valve IAW Chapter 6</td>
</tr>
<tr>
<td>HP/LP gauge (AHP-G201/ALP-G202) displays incorrect readings</td>
<td>Defective gauge</td>
<td>Activate SCBA and exit space; calibrate or replace gauge(s) IAW MRC 5519 18M-1R or Chapter 6</td>
</tr>
<tr>
<td>PASP regulator (AHP-V205) free flows; LP gauge (ALP-G202) pressure may be excessive, regulator may not control pressure, first-stage regulator in SCBA may relieve</td>
<td>Failed, contaminated, or defective regulator seat</td>
<td>Close three-way ball valve. Shift to SCBA and exit space; repair or replace PASP regulator IAW Chapter 6</td>
</tr>
<tr>
<td>PASP regulator (AHP-V205) control fails</td>
<td>Defective or loose knob</td>
<td>Activate SCBA and exit space; repair or replace knob</td>
</tr>
<tr>
<td>Rapid loss of air throughout PASP/ RASP subsystems</td>
<td>a. HP/LP hose assembly or PASP/ RASP air cylinder seal ruptures</td>
<td>In each case, activate SCBA and exit space, then:</td>
</tr>
<tr>
<td></td>
<td>b. PASP piping system or component rupture</td>
<td>a. Replace defective hose IAW Chapter 6. Return HP air cylinder to authorized maintenance facility for repair</td>
</tr>
<tr>
<td>Rapid loss of air from SCBA subsystem</td>
<td>a. HP/LP hose assembly or SCBA air cylinder O-ring ruptures</td>
<td>b. Replace defective piping or component IAW Chapter 6</td>
</tr>
<tr>
<td></td>
<td>b. SCBA air circuit component rupture, such as check valve</td>
<td>EXPEDITE EXITING SPACE:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Replace defective hose IAW Chapter 6. Return SCBA air cylinder to authorized repair facility if O-ring rupture is suspected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Replace defective piping or component IAW MRCs or Chapter 6. If not repairable, return to authorized maintenance facility, if appropriate</td>
</tr>
<tr>
<td>Symptom(s)</td>
<td>Probable Cause(s)</td>
<td>Corrective Action(s)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SCBA cylinder valve fails SHUT or OPEN</td>
<td>Defective SCBA cylinder valve</td>
<td>Return to authorized maintenance facility for cylinder valve replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXPEDITE EXITING SPACE if SCBA cylinder valve fails SHUT</td>
</tr>
<tr>
<td>SCBA regulator [(first-stage or MMR (second-stage)] has low-flow performance</td>
<td>a. Air cylinder valve not fully open, or pressure at wrong setting</td>
<td>a. Be sure air cylinder valve hand-wheel is fully open and that inlet pressure is between 60-80 psig</td>
</tr>
<tr>
<td></td>
<td>b. MMR (second-stage) inlet filter screen may be clogged</td>
<td>b. Return to authorized maintenance facility for repair</td>
</tr>
<tr>
<td></td>
<td>c. MMR (second-stage) may require adjustments</td>
<td>c. Return to authorized maintenance facility for repair</td>
</tr>
<tr>
<td>Air leaking at MMR (second-stage)</td>
<td>a. Inlet air hose swivel not fully engaged</td>
<td>a. Manually tighten swivel block</td>
</tr>
<tr>
<td></td>
<td>b. Inlet air hose swivel O-rings leaking</td>
<td>b. Replace IAW Chapter 6</td>
</tr>
<tr>
<td></td>
<td>c. Facepiece connection leaking</td>
<td>c. Rethread; if leak persists, return to authorized maintenance facility for repair</td>
</tr>
<tr>
<td>Air leaking at SCBA LP hose and/or fittings</td>
<td>a. Fitting is loose</td>
<td>a. Tighten fitting with wrenches</td>
</tr>
<tr>
<td></td>
<td>b. Hose is damaged</td>
<td>b. Disassemble fitting, apply new tape, reassemble IAW Chapter 6; or replace damaged part</td>
</tr>
<tr>
<td>Air leaking at CGA 346 nut on SCBA first-stage regulator</td>
<td>a. Loose nut</td>
<td>a. Tighten loose nut</td>
</tr>
<tr>
<td></td>
<td>b. Damaged or missing O-ring</td>
<td>b. Replace O-ring IAW with Chapter 6</td>
</tr>
<tr>
<td>Air leaking in SCBA HP hose and/or fittings</td>
<td>Connections are loose or seals are defective</td>
<td>Return to authorized maintenance facility for repair</td>
</tr>
<tr>
<td>Head harness strap is worn or broken</td>
<td>Excessive use, misuse, or improper storage</td>
<td>Replace harness IAW Chapter 6</td>
</tr>
<tr>
<td>Lens is damaged or hard to see through</td>
<td>Excessive use, misuse, or improper storage</td>
<td>Replace lens IAW Chapter 6</td>
</tr>
<tr>
<td>Speaking diaphragm O-ring leaks</td>
<td>a. Retainer ring is loose</td>
<td>a. Tighten retainer ring</td>
</tr>
<tr>
<td></td>
<td>b. O-ring is worn or missing</td>
<td>b. Replace O-ring IAW with Chapter 6</td>
</tr>
<tr>
<td>Exhalation valve does not seal</td>
<td>a. Dirty exhalation valve</td>
<td>a. Clean valve assembly IAW MRC 5519 M-1R</td>
</tr>
<tr>
<td></td>
<td>b. Worn exhalation valve assembly</td>
<td>b. Replace valve assembly IAW Chapter 6</td>
</tr>
</tbody>
</table>
CHAPTER 6
CORRECTIVE MAINTENANCE

6.1 INTRODUCTION.

The corrective maintenance information presented in this chapter includes actions and procedures required to restore the Supplied Air Respirator (SAR) with the Self-Contained Breathing Apparatus (SCBA) equipment to a fully operational condition. The chapter presents both general repair information and maintenance repair procedures to facilitate the repair and replacement of inoperative parts or assemblies. The repair procedures are provided for personnel working at the Organizational and Intermediate levels.

The corrective maintenance procedures identify the action to be accomplished; safety precautions to be observed; tools, parts, and materials required; and step-by-step instructions with supporting illustrations to accomplish the maintenance task.

To assist in evaluating failure rates, all failed parts shall be returned to: Commanding Officer, Code A53, Coastal Systems Station, Panama City, FL 32407-7001. Do not return parts that have worn out from normal use.

6.2 SAFETY REQUIREMENTS.

WARNING

Before performing corrective maintenance on the SAR/SCBA, maintenance personnel shall review and become thoroughly familiar with general safety notices and precautions listed in Safety Summary and this chapter. Repair or replacement procedures, along with corresponding warnings and cautions, shall also be read before performing corrective maintenance. Failure to follow safety precautions could cause serious injury or death.

Repair or replace worn or damaged parts with authorized replacement parts. Failure of SAR/SCBA during operations may cause serious injury or death to operators.

Accomplish maintenance procedures in a clean environment. Contamination of breathing air system may result in injury or death to SCBA user.

CAUTION

Before performing maintenance on SAR/SCBA, ensure that air supply has been shut OFF and all pressure has been vented (bled) from system. Accidental exposure to escaping HP air could cause injury or death to maintenance personnel.

Ensure O-rings in good condition are installed in SAR/SCBA. Failure of an O-ring in SAR/SCBA components could cause damage to equipment, operational abort, injury, or death to SAR/SCBA user.

Remove O-rings by hand or with O-ring removal tool. Take care not to damage O-rings during removal. Inspect all O-rings removed while performing maintenance. Ensure O-rings are checked for unacceptable deformation, cuts or nicks, embrittlement, or excessive stretch. Defective O-rings must be replaced. Lightly lubricate reusable or replacement PASP O-rings with silicone compound (MIL-S-8660) and SCBA O-rings with Christo-Lube® (MIL-G-27617E).

6.3 ADJUSTMENTS AND ALIGNMENTS.

6.3.1 Organizational Level. Adjustments or post-repair alignments are not applicable to the Organizational level.

6.3.2 Intermediate Level. The corrective maintenance performed on the repairable equipment at the Intermediate level requires the following adjustments and alignments:

a. Test stand verification of PASP/RASP HP air cylinder valve pressure indicator operation.

b. Calibration of PASP HP and LP gauges in the event no field calibration activity certification is maintained by the operational unit.

c. For the SCBA, no Intermediate-level maintenance is authorized unless the Intermediate Level Maintenance Activity (IMA) has been certified to perform SCBA maintenance by the equipment manufacturer.
### Table 6-1. Tool List

<table>
<thead>
<tr>
<th>Tool</th>
<th>Vendor</th>
<th>Part or Identifying No.</th>
<th>NSN</th>
<th>CAGE Code</th>
<th>SPMIG No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratchet handle, 3/8&quot; drive</td>
<td>Snap-on</td>
<td>FN720A</td>
<td>5120-01-335-0729</td>
<td>55719</td>
<td>0624</td>
</tr>
<tr>
<td>Extension, socket wrench 3/8&quot; sq. drive, 6&quot;</td>
<td>Snap-on</td>
<td>FXK6</td>
<td>5120-00-227-8107</td>
<td>55719</td>
<td>0407</td>
</tr>
<tr>
<td>Screwdriver, cross-tip, #2</td>
<td>K-D Tools</td>
<td>40-507</td>
<td>5120-01-344-6898</td>
<td>08292</td>
<td>-</td>
</tr>
<tr>
<td>Screwdriver, flat-tip, 1/8&quot;</td>
<td>GSA</td>
<td>GGG-S-121 TY1CL85T2</td>
<td>5120-00-236-2140</td>
<td>80244</td>
<td>1187</td>
</tr>
<tr>
<td>Socket, 1/2&quot; × 3/8&quot; drive</td>
<td>Snap-on</td>
<td>SF161</td>
<td>5120-01-335-0906</td>
<td>55719</td>
<td>3451</td>
</tr>
<tr>
<td>Socket, 9/16&quot; × 3/8&quot; drive</td>
<td>Snap-on</td>
<td>SF181</td>
<td>5120-01-335-0907</td>
<td>55719</td>
<td>3671</td>
</tr>
<tr>
<td>Wrench, Allen, 3/32&quot;</td>
<td>Snap-on</td>
<td>GAW3</td>
<td>5120-01-300-1172</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, adjustable, 8&quot;</td>
<td>Snap-on</td>
<td>AD8</td>
<td>5120-01-367-3392</td>
<td>55719</td>
<td>1463</td>
</tr>
<tr>
<td>Wrench, open-end, 11/32&quot;</td>
<td>Snap-on</td>
<td>OEX11A</td>
<td>5120-01-335-1231</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 3/8&quot;</td>
<td>Snap-on</td>
<td>OEX12A</td>
<td>5120-01-335-1232</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 7/16&quot; - 1/2&quot;</td>
<td>Snap-on</td>
<td>S1416</td>
<td>5120-00-187-7123</td>
<td>55719</td>
<td>3494</td>
</tr>
<tr>
<td>Wrench, open-end, 1/2&quot; - 9/16&quot; slim</td>
<td>Snap-on</td>
<td>LTA1618</td>
<td>5120-01-335-1204</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 5/8&quot; - 11/16&quot;</td>
<td>Snap-on</td>
<td>V02022</td>
<td>5120-01-335-1189</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 5/8&quot; - 11/16&quot; slim</td>
<td>Snap-on</td>
<td>LTA2022</td>
<td>5120-01-335-1205</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 3/4&quot; - 13/16&quot;</td>
<td>Snap-on</td>
<td>V02426</td>
<td>5120-01-335-1192</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 7/8&quot; - 15/16&quot;</td>
<td>Snap-on</td>
<td>V02820</td>
<td>5120-01-335-1215</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Wrench, open-end, 1&quot; - 15/16&quot; slim</td>
<td>Snap-on</td>
<td>LTA3032</td>
<td>5120-01-335-1207</td>
<td>55719</td>
<td>1763</td>
</tr>
<tr>
<td>Wrench, open-end, 1-1/2&quot;</td>
<td>Snap-on</td>
<td>OEX48</td>
<td>5120-00-277-8834</td>
<td>55719</td>
<td>2587</td>
</tr>
<tr>
<td>Wrench, open-end, 1-1/8&quot;</td>
<td>Snap-on</td>
<td>VO3638B</td>
<td>5120-01-335-1219</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>O-ring removal tool</td>
<td>Parker-Hannifin</td>
<td>887-200  EXKIT</td>
<td>5120-01-021-7381</td>
<td>02697</td>
<td>2077</td>
</tr>
<tr>
<td>Crowfoot, 11/16&quot;, 3/8&quot; drive</td>
<td>Snap-on</td>
<td>FC22A</td>
<td>5120-01-335-1154</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Crowfoot, 3/4&quot;</td>
<td>Snap-on</td>
<td>FC24A</td>
<td>5120-01-335-1155</td>
<td>55719</td>
<td>-</td>
</tr>
<tr>
<td>Tweezers, craftsman’s general purpose, fine-tip 4-1/2&quot;</td>
<td>Marshall-Swartchild</td>
<td>43110</td>
<td>5120-00-247-0867</td>
<td>58692</td>
<td>1411</td>
</tr>
</tbody>
</table>
### Table 6-2. Specialty Tools (Supplied with SAR/SCBA)

<table>
<thead>
<tr>
<th>Tool</th>
<th>Vendor</th>
<th>Part or Identifying No.</th>
<th>CAGE Code</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure-demand exhalation wrench (spanner wrench)</td>
<td>MSA</td>
<td>461828</td>
<td>55799</td>
<td>Unscrew retaining ring for SCBA speaking diaphragm and exhalation valve retaining nut</td>
</tr>
<tr>
<td>Quick detachable plug, 1/4” NPT (male QD with female thread)</td>
<td>Foster Mfg. Co., Inc.</td>
<td>11-3B</td>
<td>14127</td>
<td>MRCs 5519 A-1R, R-2</td>
</tr>
<tr>
<td>Polypropylene tube connector, straight</td>
<td>AIN Plastics</td>
<td>Z19724</td>
<td>0DFJ8</td>
<td>MRCs 5519 M-1R</td>
</tr>
</tbody>
</table>

### Table 6-3. Consumable Supplies

<table>
<thead>
<tr>
<th>Description</th>
<th>NSN</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leak-test solution, MIL-L-25567</td>
<td>6850-00-186-2963</td>
<td>Leak diagnostic test, HP air hose tightness test, 8-oz. bottle</td>
</tr>
<tr>
<td>Silicone compound, MIL-S-8660</td>
<td>6850-00-880-7616</td>
<td>PASP O-ring replacement, 2-oz. tube</td>
</tr>
<tr>
<td>Tape, Teflon®</td>
<td>8030-00-889-3534</td>
<td>LP QD replacement, HP air hose assembly nipple replacement</td>
</tr>
<tr>
<td>Christo-Lube® lubricant, MIL-G-27617E</td>
<td>9150-01-441-9016</td>
<td>SCBA O-ring lubricant, 2-oz. tube</td>
</tr>
</tbody>
</table>
6.5 PASP CORRECTIVE MAINTENANCE.

The PASP consists of an HP air cylinder assembly, control panel assembly (CPA), and HP air hose assembly mounted in a welded aluminum case. Unless otherwise noted, corrective maintenance of the PASP is limited to removal and replacement of failed components.

6.5.1 HP Air Cylinder Assembly Repairs. Refer to Chapter 8 for HP air cylinder inspection criteria and repair information.

Minor repairs to the overwrap on an HP air cylinder must be performed by an IMA or other activity that can both accomplish such repairs and hydrostatically test the repaired cylinders.

Minor repairs to cylinder overwrapping must be performed using any commercial, room-temperature cure, two-component epoxy resin system. Loose fibers should be trimmed away before coating affected area with resin. After resin applied to damaged area cures, the repaired cylinder must be hydrostatically tested before being returned to service. Flaw sites must be observed for lifting or peeling of the repaired overwrap that may have occurred during hydrostatic testing. If such lifting or peeling occurs after properly repairing and testing the composite cylinder, the cylinder must be rejected.

6.5.2 Control Panel Assembly (CPA).

6.5.2.1 Control Panel Assembly (CPA) Removal and Replacement (Figure 6-1).


(1) Ratchet handle, 3/8” drive
(2) Screwdriver, cross-tip, #2
(3) Socket, 9/16”
(4) Wrench, open-end, 3/8”
(5) Parts: See Chapter 7 for part numbers and CAGE codes

b. CPA Removal.

(1) Place the PASP in an upright position. Remove HP air cylinder, if installed, as follows: Using a 3/8” ratchet and 9/16” socket, remove two 3/8” cap screws (1); remove mounting plate (2), pad (3), and spacers (4) attached to U-brace (5). Remove cylinder (6).

(2) Using a #2 cross-tip screwdriver, remove six panel retaining screws (7) and spacer screw (8). Hold CPA firmly and remove bracket screw (9). CPA will slide down and rest at bottom of PASP case assembly. Ensure HP air hose assemblies are disconnected and routed through top of PASP case assembly.

(3) Turn three-way ball valve (AHP-V204) handle toward either HP SUPPLY position so handle is parallel to front of CPA.

(4) Lift CPA by grasping three-way ball valve (AHP-V204) (11) with one hand. With other hand, hold regulator handle (12) and lift CPA until bottom clears the PASP case assembly. Pull on regulator handle and slide CPA out of front of weldment, bottom first, turning CPA as required to clear adhesively affixed clamp (10). Set weldment aside and place CPA on work table.

c. CPA Replacement.

(1) Loosen stiffener by untightening screw (14) on back of PASP to ensure spacer tube (13) wobbles slightly.

(2) Turn three-way ball valve (AHP-V204) handle toward either HP SUPPLY position so handle is parallel to front of CPA.

(3) Holding CPA as in Step b.(2), route HP air hose assemblies up through front of weldment; reach through top of weldment and grasp three-way ball valve (AHP-V204) (11), holding regulator handle (12) with other hand.

(4) Pull CPA into PASP case assembly, turning it as required to clear clamp (10), and loosely install top bracket (10-24 1/2”) screw (9).

(5) Install stiffener (10-24 3/8”) screw (8), reaching into the PASP case assembly and aligning screw to stiffener as necessary. Do not tighten screw.

(6) Install six (10-24 1/2”) screws (7); do not tighten screws.

(7) Tighten three bracket screws (9), stiffener screws (8) and spacer screw (14), and six panel screws (7).

(8) Ensure three-way ball valve (AHP-V204) is in the CLOSE position.

(9) Reattach left HP air hose to the adhesively affixed hose clamp.

(10) Ensure U-brace (5) is tight. If required, replace PASP air cylinder (6). Install spacers (4), pad (3), and mounting plate (2); tighten two 3/8” cap screws (1) with 3/8” drive ratchet and 9/16” socket.
Figure 6-1. Exploded View of PASP
6.5.2.2 System Tightness Test (Figure 6-2).

None

b. System Tightness Test.

(1) Test may be performed with CPA installed in PASP case assembly or laying on bench. Refer to paragraph 6.5.2.1 to remove CPA from weldment.

(2) Connect a PASP HP air hose assembly (1) to HP air cylinder (2). It is not necessary to connect two cylinders unless both hose assemblies or three-way ball valve has been replaced or loosened. The cylinder must be fully charged to 4,500 psig. The tightness test procedure requires each HP air hose assembly to be tested, so a portion of the procedure below is repeated to permit testing each hose.

(3) Ensure HP air cylinder valve ((AHP-V201) (3), (AHP-V301) (4), or (AHP-V302) (5)) is shut.

(4) Align the following PASP valves as follows:
   (a) Three-way ball valve (AHP-V204) (6): closed
   (b) HP gauge isolation valve (AHP-V206) (7): ensure open
   (c) LP gauge isolation valve (ALP-V207) (8): ensure open
   (d) Regulator valve (AHP-V205) (9): fully CCW

(5) Slowly open HP air cylinder valve ((AHP-V201) (3), (AHP-V301) (4), or (AHP-V302) (5)) on fully charged HP air cylinder (2).

(6) Slowly position three-way ball valve (AHP-V204) (6) toward pressurized HP air cylinder.

(7) Adjust regulator (AHP-V205) (9) CW until LP gauge (ALP-G202) (11) reads 80 psig. Shut HP air cylinder valve ((AHP-V201) (3), (AHP-V301) (4), or (AHP-V302) (5)).

(8) Note HP gauge (AHP-G201) (10) reading.

(9) Wait 10 minutes.

(10) Note pressure on HP and LP gauges ((AHP-G201) (10) and (ALP-G202) (11)).

(11) If no difference between initial reading and 10 minute reading exists, the test is completed and the system is not leaking (a leak could cause the LP gauge to increase). If there is a difference in readings, perform leak diagnostic test IAW paragraph 6.5.2.3.

(12) Bleed down HP air hose assembly (1) using bleed valve (AHP-V202) (12) or (AHP-V203) (13).

(13) Disconnect HP air hose assembly (1) from HP air cylinder valve and connect second hose assembly to cylinder valve. Repeat Steps b.(5) through b.(11).

(14) Bleed down PASP using bleed valve ((AHP-V202) (12) or (AHP-V203) (13)).

(15) Position three-way ball valve (AHP-V204) (6) to shut position.

(16) Set regulator (AHP-V205) (9) fully CCW.

NOTE
Leave gauge isolation valves ((AHP-V206) (7) and (ALP-V207) (8)) open.

6.5.2.3 Leak Diagnostic Test.

Leak-test solution, MIL-L-25567

b. Leak Diagnostic Test.

(1) Remove CPA IAW para 6.5.2.1, if not already removed.

(2) With CPA face down, perform system tightness test in paragraph 6.5.2.2 until leak is detected by applying leak-test solution on all joints and looking for bubbles at leak sites.

(3) When leak detected, perform applicable portions of maintenance procedure for closest major component to correct leak.
Figure 6-2. System Tightness Test (RASP is Optional)
6.5.2.4 Three-Way Ball Valve (AHP-V204) Removal and Replacement (Figure 6-3).


(1) Wrench, Allen, 3/32"
(2) Wrench, open-end, 5/8"
(3) Wrench, open-end, 11/16"
(4) Wrench, open-end, 3/4"
(5) Wrench, open-end, 15/16"
(6) Two wrenches, open-end, 1"
(7) Parts: See Chapter 7 for part numbers and CAGE codes
(8) Silicone compound, MIL-S-8660

b. Three-Way Ball Valve Removal.

(1) Remove CPA IAW paragraph 6.5.2.1.
(2) Place CPA face down with three-way ball valve (1) facing the front of work table.
(3) Holding connector (4) with 15/16" open-end wrench, loosen tubing (5) nut with 1" wrench.
(4) Holding connector (6) with 15/16" wrench, loosen tubing (5) nut with 1" wrench. Remove tubing (5). Remove both O-rings (7, 8). Remove HP air hose assembly wire rope lanyards (17).
(5) Using 11/16" wrench, remove HP air hose assemblies (2). Remove both O-rings (3).
(6) Hold valve body with 1" wrench and remove filter (9) using 1" wrench. Leave connector (4) attached. Remove O-ring (10).
(7) Using 3/4" wrench, loosen both elbow (11) retaining nuts.
(8) Using 3/32" Allen wrench, remove set screw (12) in end of three-way ball valve handle (13); remove handle by pulling straight off stem.
(9) Loosen valve mounting nut (14) with 1" wrench; remove valve. Retain spacers (15).
(10) Remove both elbows (11) from valve. Remove both O-rings (16).

b. Three-Way Ball Valve Replacement.

(1) Install O-rings (16) on elbows (11). Install elbows on valve as follows: screw completely into valve body; back off elbows until openings are parallel with valve stem. Hold each elbow (11) with 5/8" wrench and tighten elbow nuts with 3/4" wrench, maintaining elbows in proper orientation to valve stem.
(2) Install spacer(s) (15) on valve; position valve stem so that handle set screw hole is perpendicular to the wide part of the valve.
(3) Install valve (1) so that stop pin on top of valve is on the left side of the CPA as viewed from the front.
(4) Install valve mounting nut (14) and tighten with 1" wrench. Ensure valve body is parallel with edge of control panel, and elbows are centered in control panel holes.
(5) Install O-ring (10) on filter (9). Install filter into valve body hand-tight. Hold valve body with 1" wrench and tighten filter with 1" wrench.
(6) Feed wire rope lanyard (17) from each HP air hose assembly (2) through the control panel elbow holes. Place each loop around connector (4).
(7) Install new O-rings (3) on elbows (11).
(8) Install HP air hoses (2) on elbows (11); tighten using 11/16" wrench.
(9) Install O-rings (7, 8) on connectors (4, 6). Carefully fit tube (5) between connectors (4, 6) and hand-tighten two tube nuts. Hold nuts on tubes while holding connectors.
(10) Install valve handle (13) with handle lever pointing up (away from "HP SUPPLY"). Install set screw (12) and tighten with 3/32" Allen wrench.
(11) Perform system tightness test IAW paragraph 6.5.2.2.
(12) Reinstall CPA IAW paragraph 6.5.2.1.
Figure 6-3. Three-Way Ball Valve (AHP-V204)
6.5.2.5 Filter Assembly (F-022) Removal and Replacement (Figure 6-4).


(1) Wrench, open-end, 15/16”
(2) Two wrenches, open-end, 1”
(3) Parts: See Chapter 7 for part numbers and CAGE codes
(4) Silicone compound, MIL-S-8660

b. Filter Removal.

(1) Remove CPA IAW paragraph 6.5.2.1. Place CPA face down on work table.
(2) Holding connector (1) with 15/16” wrench, loosen tube (2) upper nut with 1” wrench.
(3) Holding connector (3) with 15/16” wrench, loosen tube (2) lower nut with 1” wrench.
(4) Remove tube (2); remove O-rings (4, 5). Remove HP air hose assembly wire rope lanyards from around connector (1).
(5) Holding filter (6) with 1” wrench, loosen connector (1). Remove connector and remove O-ring (7).
(6) Holding body of three-way ball valve (8) with 1” wrench, loosen filter (6) with 1” wrench. Remove filter. Remove O-ring (9).

c. Filter Replacement.

(1) Carefully install O-ring (9) on filter (6).
(2) Screw filter into three-way ball valve (8) body; hand-tighten.
(3) Holding three-way ball valve (8) with 1” wrench, tighten filter (6) with 1” wrench.
(4) Install O-ring (7) on connector (1); screw connector into filter (6); hand-tighten.
(5) Holding filter (6) with 1” wrench; tighten connector (1) with 15/16” wrench.
(6) Check to ensure lower connector (3) is tight using a 15/16” wrench.
(7) Place HP air hose assembly wire rope lanyards around connector (1).

Figure 6-4. Filter Assembly (F-022)
6.5.2.6 HP Gauge (AHP-G201) or LP Gauge (ALP-G202) Removal and Replacement (Figure 6-5).


(1) Wrench, open-end, 11/32"
(2) Wrench, open-end, 9/16"
(3) Wrench, open-end, 11/16"
(4) Parts: See Chapter 7 for part numbers and CAGE codes
(5) Silicone compound, MIL-S-8660

b. Gauge Removal.

(1) Remove CPA IAW paragraph 6.5.2.1. Place CPA face down on work table.

(2) Holding gauge (1) connection fitting with 9/16" wrench, loosen coupling assembly (2) upper nut with 11/16" wrench. Slide coupling nut away from gauge fitting.

(3) Place hand beneath CPA and hold HP gauge in place.

(4) Loosen both gauge nuts (3) with 11/32" wrench.

(5) Remove nuts (3) and gauge bracket (4).

(6) Lift CPA by three-way ball valve and remove gauge through front of CPA.

(7) Remove and retain gauge spacer (5).

(8) Remove O-ring (6).

c. Gauge Replacement.

NOTE

Ensure gauge to be installed has been calibrated and that calibration sticker reflects 18-month periodicity.

(1) Install O-ring (6) on coupling assembly (2).

(2) Install gauge spacer (5) on gauge (1). Remove protective cap (if any) from gauge connection fitting.

(3) Lift CPA by three-way ball valve and place gauge (1) through hole in CPA. Orient gauge so that connection fitting is toward coupling assembly (2). Maintain gauge orientation while performing Steps (4) and (5).

(4) Install bracket (4); install and hand-tighten both nuts (3).

(5) Ensure coupling assembly (2) lower nut is tight using 11/16" wrench.

(6) Ensure gauge fitting connection is pressed firmly against upper surface of coupling face. Screw coupling assembly (2) upper nut onto gauge (1); hand-tighten.

(7) Hold gauge (1) connection fitting with 9/16" wrench; tighten coupling assembly (2) upper nut with 11/16" wrench.

(8) Tighten nuts (3) with 11/32" wrench until threaded stud is even with top of nut. Do not over-tighten.

(9) Perform system tightness test IAW paragraph 6.5.2.2 and observe proper gauge operation.

(10) Reinstall CPA IAW paragraph 6.5.2.1.
Figure 6-5. HP Gauge (AHP-G201) or LP Gauge (ALP-G202)
6.5.2.7 **HP Gauge Isolation Valve (AHP-V206) or LP Gauge Isolation Valve (ALP-V207) Removal and Replacement (Figure 6-6).**

a. **Tools, Parts, Materials, and Test Equipment.**

1. Wrench, adjustable, 8"
2. Wrench, open-end, 9/16"
3. Wrench, open-end, 5/8"
4. Wrench, open-end, 11/16"
5. Wrench, open-end, 3/4"
6. Parts: See Chapter 7 for part numbers and CAGE Codes
7. Silicone compound, MIL-S-8660

b. **HP/LP Gauge Isolation Valve Removal.**

1. Remove CPA IAW paragraph 6.5.2.1. Place CPA face down on work table.
2. Remove isolation valve cap (4) with 9/16" wrench, holding the valve knob nut (2) with 5/8" wrench.
3. Turn valve (1) fully CCW.
4. Loosen valve knob nut (2) with 5/8" wrench; remove nut and valve knob (3).
5. Remove lanyard with cap (4).
6. Loosen valve lock washer nut (5) using 3/4" wrench; remove lock washer nut (5) and lock washer (6).
7. Using 11/16" wrench, loosen union assembly (7) lower nut and tube (8) upper nut.
8. Remove valve (1). Remove spacer (9).
9. Remove both O-rings (10).

c. **HP/LP Gauge Isolation Valve Replacement.**

1. Install spacer (9) on valve (1); observe direction of arrow on valve. Arrow should point up toward valve. (AHP-G201 or ALP-G202).
2. Install both O-rings (10). Then carefully install valve in CPA. Hand-tighten union assembly (7) lower nut and tube (8) upper nut.
3. Install lock washer (6) and lock washer nut (5).
4. Hold valve (1) to maintain proper orientation while tightening valve lock washer nut (5) with 3/4" wrench.
5. Tighten union assembly (7) lower nut and tube (8) upper nut with 11/16" wrench.
6. Install valve cap lanyard with valve cap (4) over valve stem.
7. Install valve knob (3) with smooth portion of handle facing toward CPA.
8. Install valve knob nut (2) with recessed portion of nut toward handle; hand-tighten.
9. Ensure valve (1) turned fully CCW.
10. Holding knob (3) with 8" adjustable wrench, tighten valve knob nut (2) with 5/8" wrench.
11. Install valve cap (4); hand-tighten.

**NOTE**

In Step (12) below, do not attempt to hold valve knob nut (2) with wrench, as it may loosen.

12. Holding valve knob (3) with 8" adjustable wrench, tighten cap (4) with 9/16" wrench. Do not over-tighten. Cap is equipped with an internal seating surface that can be damaged by over-tightening.
13. Reinstall CPA IAW paragraph 6.5.2.1.
14. Perform system tightness test IAW paragraph 6.5.2.2, modified as follows:
   a. Skip Step b.(13).
   b. After conducting Step 14, place gauge isolation valve in the fully shut position (fully CCW) and repressurize PASP by slowly opening cylinder valve ((AHP-V201) (3), (AHP-V301) (4), or (AHP-V302) (5)) on charged HP air cylinder (2). Gauge (AHP-G201 or ALP-G202) should read 0 psig.

**NOTE**

If gauge registers any pressure, valve may leak.

15. Slowly open gauge isolation valve, and conduct Steps b.(14) through b.(17).
Figure 6-6. HP Gauge Isolation Valve (AHP-V206) or LP Gauge Isolation Valve (ALP-V207)