This manual supersedes S6220-EM-MMO-010 dated 1 JUN 2000.

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</tr>
<tr>
<td>Number</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>1-1</td>
<td>E-BAC Specifications</td>
<td>1-6</td>
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<td>1-2</td>
<td>Equipment and Accessories Supplied</td>
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<td>1-3</td>
<td>Reference Publications Not Supplied</td>
<td>1-8</td>
</tr>
<tr>
<td>2-1</td>
<td>E-BAC Compressor Block Controls and Indicators</td>
<td>2-2</td>
</tr>
<tr>
<td>2-2</td>
<td>Yanmar Diesel Engine Controls and Indicators</td>
<td>2-4</td>
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<tr>
<td>2-3</td>
<td>Fill Hose Assembly Controls and Indicators</td>
<td>2-5</td>
</tr>
<tr>
<td>5-1</td>
<td>Troubleshooting Guidelines</td>
<td>5-1</td>
</tr>
<tr>
<td>6-1</td>
<td>Tools Required</td>
<td>6-2</td>
</tr>
<tr>
<td>7-1</td>
<td>Air Intake Filter Assembly Parts List</td>
<td>7-3</td>
</tr>
<tr>
<td>7-2</td>
<td>Drive System Assembly Parts List</td>
<td>7-5</td>
</tr>
<tr>
<td>7-3</td>
<td>Pressure Maintaining Valve Assembly Parts List</td>
<td>7-7</td>
</tr>
<tr>
<td>7-4</td>
<td>P1 Purification Chamber Assembly Parts List</td>
<td>7-9</td>
</tr>
<tr>
<td>7-5</td>
<td>CO/H2O Indicator Housing Assembly Parts List</td>
<td>7-11</td>
</tr>
<tr>
<td>7-6</td>
<td>Intermediate Separator Assembly Parts List</td>
<td>7-13</td>
</tr>
<tr>
<td>7-7</td>
<td>Final Separator Assembly Parts List</td>
<td>7-15</td>
</tr>
<tr>
<td>7-8</td>
<td>E-BAC Frame Assembly Parts List</td>
<td>7-17</td>
</tr>
<tr>
<td>7-9</td>
<td>E-BAC/SS Frame Assembly Parts List</td>
<td>7-19</td>
</tr>
<tr>
<td>7-10</td>
<td>E-BAC/SS Unit Cover Parts List</td>
<td>7-21</td>
</tr>
<tr>
<td>7-11</td>
<td>Accessories Parts List</td>
<td>7-23</td>
</tr>
<tr>
<td>7-12</td>
<td>Yanmar Diesel Engine Replacement Parts List</td>
<td>7-25</td>
</tr>
<tr>
<td>7-13</td>
<td>List of Manufacturers</td>
<td>7-26</td>
</tr>
</tbody>
</table>
FOREWORD

This technical manual contains procedures for operation and maintenance of the Emergency Breathing Air Compressor (E-BAC). The information in this manual is presented in seven chapters and one appendix, as follows:

• Chapter 1 - Introduction and Safety Precautions
• Chapter 2 - Operation
• Chapter 3 - Functional Description
• Chapter 4 - Scheduled Maintenance
• Chapter 5 - Troubleshooting
• Chapter 6 - Corrective Maintenance
• Chapter 7 - Illustrated Parts Breakdown
• Appendix A - Installing and Removing Enclosure Base and Casters

Ships, training activities, supply points, depots, Naval Shipyards, and Supervisors of Shipbuilding are requested to arrange for the maximum practical use and evaluation of NAVSEA technical manuals. Reporting of errors, omissions, inconsistencies, and suggestions for improving this manual is encouraged, using NAVSEA Technical Manual Deficiency/Evaluation Report (TMDER). Submit TMDER via the Naval Systems Data Support Activity web site at https://nsds2.phdnswc.navy.mil/tmder/tmder-generate.asp. All feedback comments will be thoroughly investigated and originators will be advised of resulting action.

Should the need arise, the In-Service Engineering Agent (ISEA) may be contacted at Commanding Officer, Attn: Code S14, Naval Surface Warfare Center Panama City, 110 Vernon Avenue, Panama City, FL 32407-7001. The Damage Control Web site is another reference tool the ISEA provides for Damage Control personnel. This Web site provides Navy messages, tips, technical manuals, and other helpful information on Damage Control equipment and can be accessed at http://www.dcfp.navy.mil.

Distribution of this manual and subsequent changes are automatic to all authorized users. Additional copies are available from the U. S. Army Media Distribution Center, 1655 Woodson Road, St. Louis MO 63114-6128. To change the number of copies authorized on automatic distribution, address request to: Commanding Officer, Attn: Code A15 Bldg. 79, Naval Surface Warfare Center, Panama City, 110 Vernon Avenue, Panama City, FL 32407-7001.

ABBREVIATIONS AND ACRONYMS

3-M Maintenance and Material Management

A

APL Allowance Parts List

C

CAGE Commercial and Government Entity

CGA Compressed Gas Association

CO Carbon Monoxide

E

E-BAC Emergency Breathing Air Compressor
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEDLOG</td>
<td>Federal Logistics Record</td>
</tr>
<tr>
<td>IAW</td>
<td>In Accordance With</td>
</tr>
<tr>
<td>IPB</td>
<td>Illustrated Parts Breakdown</td>
</tr>
<tr>
<td>ISEA</td>
<td>In-Service Engineering Agent</td>
</tr>
<tr>
<td>MDS</td>
<td>Maintenance Data Sheet</td>
</tr>
<tr>
<td>MIL-STD</td>
<td>Military Standard</td>
</tr>
<tr>
<td>MIP</td>
<td>Maintenance Index Page</td>
</tr>
<tr>
<td>MM</td>
<td>millimeter</td>
</tr>
<tr>
<td>MRC</td>
<td>Maintenance Requirement Card</td>
</tr>
<tr>
<td>NAVOSHA</td>
<td>Navy Occupational Safety and Health</td>
</tr>
<tr>
<td>NAVSEA</td>
<td>Naval Sea Systems Command</td>
</tr>
<tr>
<td>NO</td>
<td>Number</td>
</tr>
<tr>
<td>OPNAV</td>
<td>Office of the Chief of Naval Operations</td>
</tr>
<tr>
<td>OPNAVINST</td>
<td>Office of the Chief of Naval Operations Instruction</td>
</tr>
<tr>
<td>PMS</td>
<td>Planned Maintenance System</td>
</tr>
<tr>
<td>QTY</td>
<td>Quantity</td>
</tr>
<tr>
<td>REF</td>
<td>Reference</td>
</tr>
<tr>
<td>SCBA</td>
<td>Self-Contained Breathing Apparatus</td>
</tr>
<tr>
<td>SCFM</td>
<td>Standard Cubic Feet Per Minute</td>
</tr>
<tr>
<td>TMDER</td>
<td>Technical Manual Deficiency/Evaluation Report</td>
</tr>
<tr>
<td>USN</td>
<td>United States Navy</td>
</tr>
</tbody>
</table>
SAFETY SUMMARY

GENERAL SAFETY NOTICES.

The following general safety notices supplement specific warnings and cautions appearing in this manual. All general safety notices and specific warnings and cautions must be understood and applied during all Emergency Breathing Air Compressor (E-BAC) operation and maintenance functions. Should situations arise that are not covered in the general or specific safety precautions, the commanding officer, or other authority, will issue orders as deemed necessary to cover the specific situation. In addition, refer to Office of the Chief of Naval Operations Instruction (OPNAVINST) 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Vol I/II/III or OPNAVINST 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual for any situation not covered in the general or specific safety precautions.

WARNINGS, CAUTIONS, NOTES.

The warnings, cautions, and notes appearing throughout this technical manual must be followed to prevent hazards to personnel and damage to equipment. The following notations define warnings, cautions, and notes as they are used in the text of this manual:

**WARNING**

Warnings highlight an essential operating or maintenance procedure, practice, condition, or statement, which, if not strictly observed, could result in injury to, or death of, personnel.

**CAUTION**

Cautions refer to an operating or maintenance procedure, practice, condition, or statement, which, if not strictly observed, could result in damage to, or destruction of, equipment, loss of mission effectiveness, or long-term health hazards to personnel.

**NOTE**

Notes refer to an operating or maintenance procedure, practice, condition, or statement that is essential, but not of a known hazardous nature.
CHAPTER 1
INTRODUCTION AND SAFETY PRECAUTIONS

1.1 INTRODUCTION.

1.1.1 Purpose. The purpose of this manual is to provide the information and procedures necessary to install, operate, troubleshoot, and maintain the Emergency Breathing Air Compressor (E-BAC). References to additional publications are given if auxiliary manuals exist or lengthy procedures are required.

1.1.2 Scope. Information in this manual is presented in seven chapters and one appendix as follows:

• Chapter 1, Introduction and Safety Precautions, presents a system description and specifications; safety precautions; reference data and publications; lists of equipment, accessories, and documents supplied with each system; instructions on returning E-BAC to depot for repair or overhaul.
• Chapter 2, Operation, provides a description of E-BAC controls and indicators and detailed instructions on E-BAC setup, operating, disassembly, and stowage procedures.
• Chapter 3, Functional Description, provides a detailed description of the function of each major component of the E-BAC.
• Chapter 4, Scheduled Maintenance, provides information required to perform scheduled and general maintenance on the E-BAC.
• Chapter 5, Troubleshooting, provides tables to isolate E-BAC malfunctions and direct the user to related maintenance procedures.
• Chapter 6, Corrective Maintenance, provides procedures required to perform corrective maintenance on the E-BAC.
• Chapter 7, Illustrated Parts Breakdown, contains exploded views of E-BAC major components and corresponding parts lists.
• Appendix A, Installing and Removing Enclosure Base and Casters, provides instructions on attaching and removing the enclosure base.

1.2 SYSTEM DESCRIPTIONS.

1.2.1 E-BAC. The E-BAC (Figure 1-1 and Figure 1-2) is the C-D/DV/NAVY air compressor manufactured by Bauer Compressors and is used to recharge SCBA cylinder assemblies with breathing-quality air (Grade D as defined by Compressed Gas Association [CGA] publication G-7.1, Commodity Specification for Air, 1997 edition). The E-BAC consists of an air-cooled three-stage, three-cylinder compressor block powered by a Yanmar diesel engine. The engine and compressor block are mounted horizontally in a lightweight tubular frame for portability.

The E-BAC consists of the following assemblies:

• Yanmar diesel engine
• Compressor block
• P1 purification system
• Fill hose assemblies.
Refer to Chapter 3 for a complete functional description of the system.

1.2.2 **E-BAC/SS.** Bauer Compressors has updated the design of the E-BAC which now includes a cover with an integrated frame and base plate. The cover, tubular frame, base plate, latches, fasteners, and casters are stainless steel; collapsible aluminum handles have been added to the frame and the belt guard is smaller and made of aluminum. The engine and compressor have been marinized (special coating) to resist corrosion. The updated C-D/DV/NAVY/SS is referred to as E-BAC/SS and is shown in Figure 1-3, Figure 1-4, and Figure 1-5.
Figure 1-3. E-BAC/SS - Front.

Figure 1-4. E-BAC/SS - Rear.
1.2.3 Identification. The E-BAC compressor block number is located in the upper right corner of the identification label (1, Figure 1-6) on the compressor frame. Identification labels may vary between E-BAC models. The block number is broken down as follows:

**Figure 1-6. Identification Label.**

1.2.3.1 First Position. The first position in the block number will contain either a digit or a letter indicating the year of manufacture. For compressors built up through the year 1999, the first position will be a number that corresponds with the last digit of the year. For example, a compressor built in 1998 will have an 8 in the first position of its block number.

For compressors built in 2000 and beyond, the first position will be a letter; compressors built in 2000 will have the letter A in the first position of the block number. The letter D in the first position in the label above indicates that the compressor was manufactured in 2003.
1.2.3.2 **Second Position.** The second position in the block number consists of digits that denote the order off the manufacturing line in a given year. The second position in the label above contains 0728; indicating that this compressor was the 728th compressor manufactured in 2003.

1.2.3.3 **Third Position.** The third position in the block number indicates the modification number. This represents the number of changes to the compressor since it was originally designed. The third position in the label above contains 07 indicating that this compressor was manufactured using the 7th modification.

1.2.4 **Compliance.** The E-BAC complies with CGA G-7.1 Grade D, *Commodity Specification for Air*, 1997 edition.

1.3 **SPECIFICATIONS.**

Table 1-1 lists E-BAC specifications.
### Table 1-1. E-BAC Specifications

<table>
<thead>
<tr>
<th>Component</th>
<th>Characteristic</th>
<th>Specifications (all weights, diameters, and lengths are approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compressor Block</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Stages</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Number of Cylinders</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>1st Stage Intermediate Pressure</td>
<td></td>
<td>90 psig - 95 psig (6.2 bar - 6.5 bar)</td>
</tr>
<tr>
<td>1st Stage Safety Relief Valve Set Point</td>
<td></td>
<td>116 psig ± 6 psig (8 bar ± .4 bar)</td>
</tr>
<tr>
<td>2nd Stage Intermediate Pressure</td>
<td></td>
<td>640 - 680 psig (44.1 - 46.9 bar)</td>
</tr>
<tr>
<td>2nd Stage Safety Relief Valve Set Point</td>
<td></td>
<td>725 psig ± 36 psig (50 bar ± 2.4 bar)</td>
</tr>
<tr>
<td>3rd Stage Maximum Operating Pressure</td>
<td></td>
<td>4,950 psig (345 bar)</td>
</tr>
<tr>
<td>3rd Stage Safety Relief Valve Set Point</td>
<td></td>
<td>4,950 psig ± 250 psig (344.7 bar ± 17.2 bar)</td>
</tr>
<tr>
<td>Direction of flywheel rotation when facing flywheel</td>
<td></td>
<td>Counterclockwise</td>
</tr>
<tr>
<td>Compressor Speed</td>
<td></td>
<td>1,250 RPM</td>
</tr>
<tr>
<td>Oil Capacity</td>
<td></td>
<td>1.5 quarts</td>
</tr>
<tr>
<td>Oil Pressure</td>
<td></td>
<td>710 ± 50 psig</td>
</tr>
<tr>
<td>Recommended Oil</td>
<td></td>
<td>MIL-L-17331, SYM TEP-2190</td>
</tr>
<tr>
<td><strong>Diesel Engine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Capacity</td>
<td></td>
<td>0.92 gallon (3.5 liters)</td>
</tr>
<tr>
<td>Fuel Type</td>
<td></td>
<td>Diesel grade 1-D, 2-D; JP-5³ and JP-8³</td>
</tr>
<tr>
<td>Oil Capacity</td>
<td></td>
<td>1.16 quarts (1.1 liters)</td>
</tr>
<tr>
<td>Recommended Oil</td>
<td></td>
<td>MIL-L-2104,SYM OE-30 or MIL-L-9000</td>
</tr>
<tr>
<td>Maximum Run Time</td>
<td></td>
<td>70 minutes</td>
</tr>
<tr>
<td>Horsepower</td>
<td></td>
<td>6 HP</td>
</tr>
<tr>
<td>Speed</td>
<td></td>
<td>3,600 RPM</td>
</tr>
<tr>
<td>Cylinders</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Table 1-1. E-BAC Specifications - Continued.

<table>
<thead>
<tr>
<th>Component</th>
<th>Characteristic</th>
<th>Specifications (all weights, diameters, and lengths are approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtration System</td>
<td>Purification Cartridge Processing Capability</td>
<td>15,000 cubic feet</td>
</tr>
<tr>
<td></td>
<td>Carbon Monoxide and (CO/H₂O) Indicator</td>
<td>CO: Indicator will change from tan to dark brown to indicate high CO level in system. H₂O: Indicator will change from blue to pink to indicate high moisture level in system.</td>
</tr>
<tr>
<td>Fill Hose Assemblies</td>
<td>Number Supplied</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Length of Each</td>
<td>Approximately 6 feet</td>
</tr>
<tr>
<td></td>
<td>Fitting</td>
<td>CGA 347</td>
</tr>
<tr>
<td></td>
<td>Pressure Gauge</td>
<td>0-5,000 psig</td>
</tr>
<tr>
<td></td>
<td>Fill Hose Safety Relief Valve</td>
<td>4,950 psig ± 250 psig</td>
</tr>
</tbody>
</table>

1 Based on recharging an 80 cubic foot tank from 500 to 3,000 psig
2 Based on standard air inlet conditions of 68 °F with 37% relative humidity at 14.7 psi (absolute).
3 JP-5 and JP-8 can be used in an emergency but will diminish output horsepower by approximately 15% and can cause premature wear on fuel injection components.

1.4 SAFETY PRECAUTIONS.

Personnel using the E-BAC shall comply with the safety instructions listed in paragraph 1.4.2 and with the safety precautions presented in this manual. Operation and maintenance procedures require the use of high-pressure air, therefore it is important that safety precautions be understood and followed by all personnel during operation and maintenance of the E-BAC.

1.4.1 Standard Safety Precautions.  The E-BAC shall be used only after personnel have been properly instructed in its operation. Personnel must use the equipment in accordance with (IAW) posted instructions, labels, and limitations. Personnel must be thoroughly familiar with all safety practices and understand the potential hazards associated with the E-BAC before operating or maintaining the equipment.

1.4.2 General Safety Instructions.  Standard operational and maintenance safety precautions contained in the following documents apply to the E-BAC:
   • Forces afloat must comply with the Office of the Chief of Naval Operations Instruction (OPNAVINST) 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Vol I/II/III.
   • Shore activities must comply with OPNAVINST 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual.

1.4.3 Special Precautions.  The warnings, cautions, and notes appearing throughout this technical manual must be followed to prevent injury to personnel and damage to equipment.

1.5 EQUIPMENT AND ACCESSORIES SUPPLIED.

Table 1-2 provides a listing of the equipment and accessories that are supplied with each E-BAC or E-BAC/SS.
### Table 1-2. Equipment and Accessories Supplied

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Item</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emergency Breathing Air Compressor</td>
<td>C-D/DV/NAVY or C-D/DV/NAVY/SS</td>
</tr>
<tr>
<td>1</td>
<td>Cover, Hard; with enclosure base and four locking casters - optional</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cover, Soft - optional</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Compressor Oil, 1 quart bottles</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Tool Kit Pouch, containing:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dual screwdriver bit, with slotted and Phillips heads on either end,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with handle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open-end Wrenches, 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve Insertion/Removal Tool</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve Head Insertion/Removal Tool</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Reinforced Air Intake Hose</td>
<td>HOS-00163</td>
</tr>
<tr>
<td>1</td>
<td>Air Intake Pre-filter</td>
<td>014539</td>
</tr>
<tr>
<td>1</td>
<td>Purification Filter Chamber Cap Wrench</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>P1 Purification Filter Cartridges</td>
<td>058821A</td>
</tr>
<tr>
<td>1</td>
<td>CO/H₂O Indicator Elements</td>
<td>ELM-0056</td>
</tr>
<tr>
<td>1</td>
<td>Delivery Inspection Record Sheet</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Inspection Certificate</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bauer Warranty Documentation and Warranty Registration Material</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Bauer Commercial Manual (on CD)</td>
<td>MNL-0237 (E-BAC) or MNL-0411(E-BAC/SS)</td>
</tr>
<tr>
<td>1</td>
<td>Yanmar Commercial Manual (on CD)</td>
<td>ENG-0045 (provided by Bauer)</td>
</tr>
<tr>
<td>1</td>
<td>Material Safety Data Sheet</td>
<td></td>
</tr>
</tbody>
</table>

1.6 **REFERENCE PUBLICATIONS NOT SUPPLIED.**

Table 1-3 lists reference publications that are not supplied with the E-BAC.

### Table 1-3. Reference Publications Not Supplied

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Publication Number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowance Parts List (APL) for Compressor</td>
<td>061000005</td>
<td>Parts provisioning</td>
</tr>
<tr>
<td>APL for Compressor Unit</td>
<td>06A990004</td>
<td>Parts provisioning</td>
</tr>
<tr>
<td>APL for Yanmar Diesel Engine</td>
<td>668880096</td>
<td>Parts provisioning</td>
</tr>
<tr>
<td>APL for Stainless Steel Compressor Unit</td>
<td>06A060007</td>
<td>Parts provisioning</td>
</tr>
<tr>
<td>Cleaning of Shipboard Compressed Air Systems</td>
<td>Military Standard (MIL-STD-1622)</td>
<td>Component cleaning</td>
</tr>
</tbody>
</table>
### Table 1-3. Reference Publications Not Supplied - Continued.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Publication Number</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrology and Calibration Program</td>
<td>NAVSEA 4734.1</td>
<td>Calibration and maintenance of gauges</td>
</tr>
<tr>
<td>Navy Occupational Safety and Health (NAVOSH) Program Manual</td>
<td>OPNAVINST 5100.23</td>
<td>Operation and maintenance safety</td>
</tr>
<tr>
<td>NAVOSH Program Manual for Forces Afloat, Vol I/II/III</td>
<td>OPNAVINST 5100.19</td>
<td>Operation and maintenance safety</td>
</tr>
<tr>
<td>Planned Maintenance System for E-BAC</td>
<td>Maintenance Index Page 5519/017</td>
<td>Maintenance requirements and schedule</td>
</tr>
<tr>
<td>Self-Contained Breathing Apparatus Scott® Air-Pak® 4.5</td>
<td>S6220-EN-MMO-010</td>
<td>Operation and maintenance manual</td>
</tr>
<tr>
<td>Ships’ Maintenance and Material Management (3-M) Manual</td>
<td>OPNAVINST 4790.4 (Series)</td>
<td>Failure analysis reporting</td>
</tr>
</tbody>
</table>

The Damage Control web site is another reference tool the ISEA provides for Damage Control personnel. This web site provides Navy messages, tips, technical manuals, and other helpful information on Damage Control equipment and can be accessed at http://www.dcfp.navy.mil.

### 1.7 RETURNING TO DEPOT.

Before returning an E-BAC to the depot for repair, contact the Bauer Compressor, Inc. Service Department for a Return Authorization (RA) Number or local distributor information. For proper tracking of the returned item, record the RA number on all pertinent shipping documents.

Contact the Bauer Compressor, Inc. Service Department at the following numbers and e-mail address:

Phone: (757) 855-6006
Fax: (757) 857-1041
Email: customerservice@bauercomp.com

When sending items for service, provide a detailed description of the service to be performed along with the name, unit, and daytime phone number of the contact person, the shipping address, and the purchase order and/or billing information. The Bauer Compressor, Inc. Service Department will provide an estimate of repair costs and will obtain authorization before repair work begins.

**NOTE**

The depot cannot return items to an FPO address.

### 1.7.1 Shipping Instructions.

After receiving an RA, use best commercial practices to package the E-BAC for shipping. Ship per instructions received from Bauer Compressor, Inc.
CHAPTER 2
OPERATION

2.1 INTRODUCTION.
This chapter contains the following information:
• A description and illustrations of the controls, indicators, and mechanisms of the Emergency Breathing Air Compressor (E-BAC).
• Operational use procedures providing initial setup, operation, and disassembly.

2.2 CONTROLS AND INDICATORS.
The controls and indicators for the E-BAC compressor block are described in Table 2-1 and illustrated in Figure 2-1 and Figure 2-2. The controls and indicators for the Yanmar diesel engine are described in Table 2-2 and illustrated in Figure 2-3 and Figure 2-4. The controls and indicators for the fill hose assembly are described in Table 2-3 and illustrated in Figure 2-5. The following information is provided in each table:
• Figure Reference Number (Ref. No.) - identifies corresponding callout
• Nomenclature - item name
• Function - provides brief description of function of item
• Normal Operating Condition - position of item during operational use.
### Table 2-1. E-BAC Compressor Block Controls and Indicators

<table>
<thead>
<tr>
<th>Figure Ref. No.</th>
<th>Nomenclature</th>
<th>Function</th>
<th>Normal Operating Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2-1</td>
<td>Hourmeter (not present on E-BAC/SS)</td>
<td>Accumulates total operating hours but is activated by any type of vibration.</td>
<td>Visible</td>
</tr>
<tr>
<td>Figure 2-2, 1</td>
<td>Oil Pressure Regulator and Sight Glass</td>
<td>Confirms oil flow. Check sight glass upon startup and especially after oil changes.</td>
<td>No visible bubbles</td>
</tr>
<tr>
<td>Figure 2-2, 2</td>
<td>Oil Filler Cap and Dipstick</td>
<td>Indicates oil level in compressor block; cap and dipstick are red in color.</td>
<td>Inserted</td>
</tr>
<tr>
<td>Figure 2-2, 3</td>
<td>Final Separator Condensate Drain Valve</td>
<td>Allows accumulated moisture and oil to drain from system; should be opened every 15 minutes during operational use.</td>
<td>Closed</td>
</tr>
<tr>
<td>Figure 2-2, 4</td>
<td>Intermediate Separator Condensate Drain Valve</td>
<td>Allows accumulated moisture and oil to drain from system; should be opened every 15 minutes during operational use.</td>
<td>Closed</td>
</tr>
<tr>
<td>Figure 2-2, 5</td>
<td>P1 Bleed Valve</td>
<td>Releases air from P1 purification chamber. Only opened when replacing purification cartridge.</td>
<td>Closed</td>
</tr>
<tr>
<td>Figure 2-2, 6</td>
<td>Carbon Monoxide (CO) and Moisture (H₂O) Indicator</td>
<td>Provides visual confirmation when CO or H₂O exceeds specified limits. CO will turn indicator dark brown; H₂O will turn indicator pink.</td>
<td>CO - Light Tan; H₂O - Blue</td>
</tr>
</tbody>
</table>

*Figure 2-1. Hourmeter.*
Figure 2-2. E-BAC Compressor Block Controls and Indicators.
Table 2-2. Yanmar Diesel Engine Controls and Indicators

<table>
<thead>
<tr>
<th>Figure Ref. No.</th>
<th>Nomenclature</th>
<th>Function</th>
<th>Normal Operating Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2-3, 1</td>
<td>Fuel Tank Sight Glass</td>
<td>Provides visual confirmation of amount of fuel in tank</td>
<td>Visible</td>
</tr>
<tr>
<td>Figure 2-3, 2</td>
<td>Fuel Valve</td>
<td>Allows fuel to flow into engine</td>
<td>Open (6 o’clock position)</td>
</tr>
<tr>
<td>Figure 2-3, 3</td>
<td>START/STOP Control Knob</td>
<td>Allows motor to run at factory preset speed</td>
<td>START</td>
</tr>
<tr>
<td>Figure 2-4, 4</td>
<td>Recoil Starter Rope</td>
<td>Starts engine</td>
<td>Retracted</td>
</tr>
<tr>
<td>Figure 2-4, 5</td>
<td>Cold Start Plug</td>
<td>Oil can be added here when starting engine in extreme cold or after extended period of non-use</td>
<td>Inserted</td>
</tr>
<tr>
<td>Figure 2-4, 6</td>
<td>Decompression Lever</td>
<td>Relieves pressure inside cylinder before startup</td>
<td>Up (Released)</td>
</tr>
</tbody>
</table>

Figure 2-3. Yanmar Diesel Engine Controls and Indicators.

Figure 2-4. Yanmar Diesel Engine Controls and Indicators-Continued.
**Table 2-3. Fill Hose Assembly Controls and Indicators**

<table>
<thead>
<tr>
<th>Figure Ref. No.</th>
<th>Nomenclature</th>
<th>Function</th>
<th>Normal Operating Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2-5, 1</td>
<td>Pressure Gauge</td>
<td>Indicates pressure of compressed air in attached SCBA cylinder assembly</td>
<td>Visible</td>
</tr>
<tr>
<td>Figure 2-5, 2</td>
<td>Fill Hose Shutoff Valve</td>
<td>Allows air to flow from E-BAC to SCBA cylinder assembly</td>
<td>Open (during charging)</td>
</tr>
<tr>
<td>Figure 2-5, 3</td>
<td>Fill Hose Bleed Valve</td>
<td>Releases pressure in hose after charging</td>
<td>Closed</td>
</tr>
</tbody>
</table>

**Figure 2-5. Fill Hose Assembly Controls and Indicators.**
2.3 OPERATING PROCEDURES.

Paragraphs 2.3.1 through 2.3.4 address general information, initial setup and break-in, operational use, shutdown and stowage procedures.

2.3.1 General.

2.3.1.1 Ventilation.

**WARNING**

Before using the E-BAC to recharge SCBA cylinders, ensure that an air sample has been taken within the last three months.

E-BAC operational use must be performed topside. Failure to comply could cause serious personal injury or death from asphyxiation.

a. Heat is generated during operational use and must be vented away for air-cooled compressors such as E-BAC to function properly. Exhaust fumes are also generated by the diesel engine and are a health hazard if inhaled. Set up E-BAC topside and forward of ship’s stack to provide proper heat and exhaust ventilation.

**WARNING**

Do not place the filter end of the pre-filter assembly on the deck since exhaust gases, particularly CO, are heavier than air and collect near the ground. Failure to observe this warning could result in serious personal injury or death.

Ensure intake air does not contain exhaust fumes. Exhaust fumes will contaminate air in SCBA cylinder and could result in serious personal injury or death.

**CAUTION**

Ensure intake air does not contain flammable vapors. Flammable vapors could combust inside E-BAC causing an internal fire.

b. Ensure E-BAC pre-filter has access to fresh air that does not contain exhaust fumes or flammable vapors. Always place pre-filter upwind of E-BAC. Exhaust fumes could contaminate compressed air in SCBA cylinders which could cause serious personal injury or death. Flammable vapors could combust and cause a fire inside the E-BAC.

2.3.1.2 Inclination.

**CAUTION**

Inclination of the E-BAC must not exceed 10° in any direction. This value is only valid if, when the E-BAC is on a level surface, the compressor oil level does not exceed the upper mark on the oil dipstick or the level mark on the oil level sight glass. Operating the E-BAC at an incline of greater than 10° may cause equipment damage.

The floor/site must be level and capable of supporting the weight of the E-BAC. If incline of E-BAC exceeds 10° in any direction, shim to less than 10°. This value is only valid if, when E-BAC is on a level surface, the compressor oil level does not exceed the upper mark on the oil dipstick or the level mark on the oil level sight glass. Operating the E-BAC at an incline greater than 10° may cause equipment damage.
2.3.2 Initial Setup and Break-In. If E-BAC received is not tagged indicating that break-in procedures have already been completed, the following procedures shall be performed prior to the initial use of E-BAC for SCBA cylinder charging operations.

a. Remove shipping material from around E-BAC.

b. **E-BAC/SS only.** Remove stainless steel cover by disengaging four stainless steel latches (1, Figure 2-6) securing cover to frame. To disengage latch, lift up on top metal lever by placing finger in recessed section.

![Figure 2-6. Stainless Steel Latches.](image)

NOTE

Some parts and accessories may have become wedged in hard-to-reach places during shipping.

c. Inspect compressor thoroughly, ensuring the parts and accessories listed in Table 1-2 have been included. Note that some parts and accessories may have become wedged in hard-to-reach places not immediately apparent.

d. If any parts or accessories are missing, contact Bauer Compressors using contact information in paragraph 1.7. Specify model C-D/DV/NAVY or C-D/DV/NAVY/SS, as applicable.

e. **E-BAC only.** If E-BAC was supplied with separate cover and enclosure base, refer to Appendix A for instructions on attaching E-BAC to base.

f. Visually inspect drive belt to ensure it is in place and not loose. Remove associated tags.

![CAUTION](image)

Do not overfill E-BAC with oil. Failure to comply may cause equipment damage.

g. Visually check compressor oil dipstick to verify amount of oil in crankcase. Remove dipstick, wipe with clean, lint-free rag and reinsert, fully threading in to obtain proper oil level reading. Remove dipstick and ensure oil level is within minimum and maximum indents (Figure 2-7) on dipstick. If oil level is incorrect, add or remove oil in accordance with (IAW) appropriate Maintenance Requirement Card (MRC). Remove associated tags.
h. Check engine oil level. Remove dipstick (Figure 2-8), wipe with clean, lint-free rag and reinsert, fully threading in to obtain proper oil level reading. Remove dipstick and ensure oil level is within minimum and maximum markings on dipstick. If oil level is incorrect, add or remove oil IAW appropriate MRC. Remove associated tags.

Figure 2-7. Dipstick Indents.

i. Check engine fuel level. Observe sight glass (1, Figure 2-9) on side of fuel tank and fill tank with fuel, using only fuel listed in Table 1-1. Remove associated tags.

Figure 2-8. Engine Oil Dipstick.

NOTE
The diesel engine will run for approximately 70 minutes when beginning with a full fuel tank.
j. Perform the following steps to install new P1 purification filter cartridge:

\[\text{CAUTION}\]

If P1 purification chamber cap wrench is not available, exercise caution if using a large screwdriver or breaker bar to remove purification chamber cap. Tools other than P1 purification chamber cap wrench may damage cap.

(1) Use P1 purification chamber cap wrench (Figure 2-10)(Bauer P/N: WRH-0005) to remove purification chamber cap by turning wrench counterclockwise (CCW) on cap. If P1 purification chamber cap wrench is not available, exercise caution if using a large screwdriver or breaker bar to remove purification chamber cap. Tools other than P1 purification chamber cap wrench may damage cap.

Figure 2-9. Fuel Tank Sight Glass.

Figure 2-10. P1 Purification Chamber Cap Wrench.
WARNING

Avoid handling sides of purification filter cartridge with hands, use C-ring handle on top of cartridge. Dirt and oil from hands may contaminate air inside SCBA cylinder which may lead to serious personal injury or death.

(2) To install new P1 purification cartridge, perform the following:
   (a) Remove new purification cartridge from cardboard tube and inner foil wrapper.
   (b) Remove dust cap from purification cartridge nipple.
   (c) Place purification cartridge into chamber and push down firmly with fingers to seat cartridge. A snap is felt when cartridge seats properly.

(3) Ensure P1 bleed valve is closed.
(4) Ensure O-rings on purification chamber cap are lubricated.
(5) Re-seal purification chamber cap onto purification chamber. Remove associated tags.

k. If fill hose assemblies are not attached to tee on pressure maintaining valve, install fill hose assemblies IAW procedures in paragraph 6.6.8.c for E-BAC and paragraph 6.6.9.c for E-BAC/SS. Remove associated tags.

l. Install the pre-filter and air inlet hose IAW procedures in paragraph 6.6.21.c. Remove associated tags.

m. Close P1 bleed valve (1, Figure 2-11) and condensate drain valves (2 and 3) by turning CW.

n. Close fill hose bleed valve (1, Figure 2-12) and shutoff valve (2) on both fill hose assemblies by turning CW.

Figure 2-11. P1 Bleed Valve and Condensate Drain Valves.
o. Start E-BAC IAW procedures in paragraph 2.3.3.1.
p. Run E-BAC for one hour, ensuring condensate drain valves are opened every 15 minutes during the hour.
q. After one hour, shut down E-BAC IAW procedures in paragraph 2.3.3.3 and refuel.
r. Restart E-BAC IAW procedures in paragraph 2.3.3.1 and run for one hour, ensuring condensate drain valves are opened every 15 minutes during the hour.
s. After second hour, shut down E-BAC IAW procedures in paragraph 2.3.3.3 and check all fluid levels, replenishing as needed.
t. Record E-BAC running time in operating log book.

**WARNING**

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

u. Open P1 bleed valve to allow air from purification chamber to be released.
v. Install new P1 purification filter cartridge IAW procedures in paragraph 2.3.2.j.
w. Install new CO/H2O indicator elements into the CO/H2O indicator element housing.
x. Restart E-BAC/SS IAW procedures in paragraph 2.3.3.1 and run until 3rd stage safety valve lifts.

**WARNING**

Before using E-BAC to recharge SCBA cylinders, ensure an air sample has been taken. Air must meet Compressed Gas Association G-7.1 requirements (1997 edition) for Grade D air in addition to a maximum moisture level of 20 mg/m³ (dew point = -65 °F). Air that does not meet these requirements may cause serious personal injury or death.

y. Perform an air sample test IAW with appropriate MRC. Air sample must meet Compressed Gas Association G-7.1 requirements (1997 edition) for Grade D air in addition to a maximum moisture level of 20 mg/m³ (dew point = -65 °F).
z. Shut down E-BAC IAW procedures in paragraph 2.3.3.3.
aa. If problems are encountered with initial setup and break-in, the In-Service Engineering Agent may be contacted at Commanding Officer, Attn: Code S14, Naval Surface Warfare Center Panama City, 110 Vernon Avenue, Panama City, FL 32407-7001.

2.3.3 Operation.

2.3.3.1 E-BAC Start-up.

**WARNING**

Wear eye and hearing protection when operating the E-BAC. Failure to comply may cause serious personal injury.

**NOTE**

Record E-BAC actual start and stop times in operating log book. The hourmeter will advance with any vibration so it is not an accurate measure of accumulated operating hours.

a. Visually inspect CO/H₂O indicator. Indicator should be blue (1, Figure 2-13) and light tan or yellow (2) indicating that there is no CO or H₂O present in system.

![Figure 2-13. CO/H₂O Indicator.](image)

b. Visually inspect drive belt to ensure it is in place and does not appear loose.

**CAUTION**

Do not overfill E-BAC with oil. Failure to comply may cause equipment damage.

c. Visually check compressor oil dipstick to verify amount of oil in crankcase. Remove dipstick, wipe with clean, lint-free rag and reinset, fully threading in to obtain proper oil level reading. Remove dipstick and ensure oil level is within minimum and maximum indents (Figure 2-14) on dipstick. If oil level is incorrect, add or remove oil in accordance with (IAW) appropriate Maintenance Requirement Card (MRC).
d. Check engine oil level. Remove dipstick (Figure 2-15), wipe with clean, lint-free rag and reinsert, fully threading in to obtain proper oil level reading. Remove dipstick and ensure oil level is within minimum and maximum markings on dipstick. If oil level is incorrect, add or remove oil IAW appropriate MRC.

![Figure 2-14. Dipstick Indents.](image)

**NOTE**

The diesel engine will run for approximately 70 minutes when beginning with a full fuel tank.

e. Check engine fuel level. Observe sight glass (1, Figure 2-16) on side of fuel tank and fill tank with fuel, using only fuel listed in Table 1-1.

![Figure 2-15. Engine Oil Dipstick.](image)
f. Visually inspect fill hose, fill hose connections, fill hose threads, and pressure gauge for damage. If damaged, repair or replace entire fill hose assembly.

g. Ensure pressure gauge calibration on fill hose assemblies and relief valves are current. If not current, follow procedures in appropriate MRC.

**WARNING**

It is imperative that atmospheric air being drawn into pre-filter is as free of contaminants as possible. Ensure pre-filter is above and upwind of diesel exhaust pipe. Contaminated air in SCBA cylinders may cause serious personal injury or death.

h. Position pre-filter six feet above ground and seven feet upwind of diesel exhaust pipe. Verify there is adequate cooling air flow for compressor unit.

i. Ensure P1 bleed valve (1, Figure 2-17), intermediate separator condensate drain valve (2), and final separator condensate drain valve (3) are closed by turning CW.
Figure 2-17. P1 Bleed Valve and Condensate Drain Valves.
j. Ensure fill hose bleed valve (1, Figure 2-18) and shutoff valve (2) on both fill hose assemblies are closed by turning fully CW.

![Figure 2-18. Fill Hose Assembly Bleed Valve and Shutoff Valve.](image)

k. Open fuel valve (1, Figure 2-19) on diesel engine by turning valve CW 1/4 turn to O (open) position. Start procedure is also shown on side of fuel tank.

![Figure 2-19. Fuel Valve in Open Position and START/STOP Control Knob.](image)

l. Lift up on START/STOP control lock lever (3) and loosen START/STOP control knob (2) enough to move it to START position. Once in START position, tighten knob and release control lock lever.

**CAUTION**

The next step must be completed prior to starting the diesel engine. Failure to comply may result in damage to recoil starter.
NOTE

There is no eyebolt on frame of E-BAC/SS.

m. Slowly pull recoil starter handle (1, Figure 2-20) straight out from eyebolt on frame until resistance from starter is felt; then slowly return handle to eyebolt.

n. Push down on decompression lever (1, Figure 2-21) ensuring that lever stays in down position. This relieves internal engine pressure and allows engine to start in unloaded state.
Do not use excessive force when starting engine. Using excessive force when pulling recoil starter handle may damage internal components of recoil starter.

o. Quickly pull recoil starter handle out to its full length. Repeat steps m through o as many times as necessary to start engine. Do not use excessive force when starting engine. Using excessive force when pulling recoil starter handle may damage internal components of recoil starter.

NOTE
A loud knocking noise will be heard until final stage pressure is equalized. If excessive knocking occurs, or lasts longer than 10 seconds, shut down compressor.

p. A loud knocking noise will be heard until final stage pressure is equalized. If excessive knocking occurs, or lasts longer than 10 seconds, shut down E-BAC and contact manufacturer IAW paragraph 1.7 for instructions on returning to depot for repair.

q. Ensure compressor flywheel is rotating counterclockwise (CCW). If not, shut down E-BAC and restart. If flywheel continues to rotate CCW, shut down E-BAC and contact manufacturer IAW paragraph 1.7 for instructions on returning to depot for repair.

r. Allow compressor to build pressure until 3rd stage safety valve (1, Figure 2-22) lifts. This confirms that the system is fully pressurized and has no leaks.

Figure 2-21. Decompression Lever.
s. If 3rd stage safety valve does not lift, place hand at weep hole (1, Figure 2-23) on P1 purification chamber and feel for air flow. Weep hole is located on check valve side of P1 purification chamber, about 2 inches from bottom. If air flow is felt, purification cartridge is not properly seated. Refer to paragraph 2.3.1.2.j for procedure on installing purification cartridge.

Figure 2-23. P1 Purification Chamber Weep Hole.
2.3.3.2 **SCBA Cylinder Assembly Air Charging Procedure.**

**WARNING**

Inspect each SCBA cylinder before connecting to fill hose assembly. SCBA cylinders with cracks, chips, dents, defects, or deformities must not be refilled. Charging a damaged cylinder could cause cylinder to explode causing serious personal injury or death.

a. Inspect each SCBA cylinder before connecting to fill hose assembly. SCBA cylinders with cracks, chips, dents, defects, or deformities must not be refilled. Charging a damaged cylinder could cause cylinder to explode causing serious personal injury or death. For SCBA cylinder inspection checklist, refer to NAVSEA S6220-EN-MMO-010, Appendix C.

**WARNING**

E-BAC is equipped with two fill hose assemblies connected to tee on pressure maintaining valve. Ensure fill hose shutoff valve on fill hose assembly not being used is closed by turning clockwise (CW). Failure to comply could cause serious personal injury or equipment damage.

b. Connect fill hose assembly (3, Figure 2-24) to SCBA cylinder (1).

![Figure 2-24. Fill Hose Assembly Attached to SCBA Cylinder.](image)

c. Ensure fill hose shutoff valve (6) and bleed valve (4) are closed by turning both fully CW.

d. Open SCBA cylinder valve (2) fully by turning fully CCW and backing off 1/4 turn.

**NOTE**

Pressure gauge on fill hose assembly will indicate SCBA cylinder charging pressure during charging. Charging time to fill an SCBA cylinder is 15-18 minutes maximum.
e. Fully open (CCW) fill hose shutoff valve (6) on fill hose assembly.

f. Observe pressure gauge (2). Close (CW) fill hose shutoff valve (6) when pressure gauge indicates 4,500 psig.

g. Fully close (CW) SCBA cylinder valve (2).

**WARNING**

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

h. Slowly open (CCW) fill hose bleed valve (4) until air flow stops (2-3 seconds). Close (CW) fill hose bleed valve.

i. Disconnect SCBA cylinder from fill hose assembly.

**CAUTION**

Do not open P1 bleed valve. P1 bleed valve maintains pressure on purification cartridge. Relieving pressure on cartridge shortens life of cartridge.

**NOTE**

The intermediate separator condensate drain valve and the final separator condensate drain valve must be opened and drained after every 15 minutes of operation.

j. Open (CCW) intermediate separator condensate drain valve (2, Figure 2-25) and final separator condensate drain valve (3) every 15 minutes during E-BAC operation. Close valves when drainage is complete. Do not open P1 bleed valve (1).
Figure 2-25. P1 Bleed Valve and Condensate Drain Valves.

k. Ensure P1 bleed valve (1) is closed. Verify by feel that no air is leaking from condensate drain valves.

l. If additional SCBA cylinders need to be filled, return to paragraph 2.3.3.2 for SCBA cylinder air charging procedures.

m. If charging session has been completed, proceed to paragraph 2.3.3.3 for E-BAC shutdown procedures.
2.3.3.3 **F-BAC Shut-Down.**

**CAUTION**

If the engine keeps running after the START/STOP control knob is placed at the “STOP” position, stop the engine by closing the fuel valve (“S” position). Do not stop the engine with the decompression lever. Stopping the engine with the decompression lever may cause equipment damage.

a. Turn off diesel engine by loosening slightly START/STOP control knob (2, Figure 2-26) and move knob to STOP position, moving START/STOP control lock lever (3) if necessary. Retighten knob.

![Figure 2-26. Fuel Valve, START/STOP Control Knob, and Lock Lever.](image)

b. Close fuel valve (1) by turning valve CCW 1/4 turn to S (stop) position.

**WARNING**

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

**CAUTION**

Do not open P1 bleed valve. P1 bleed valve maintains pressure on purification cartridge. Relieving pressure on cartridge shortens life of cartridge.

c. Pull recoil handle until resistance is felt, then return recoil handle to resting point. This action closes compressor valves and helps prevent rust.
d. Open (CCW) intermediate separator condensate drain valve (2, Figure 2-25) final separator condensate drain valve (3) to relieve any remaining pressure and drain any remaining moisture from system. Do not open P1 bleed valve (1).

e. Close intermediate separator condensate drain valve and final separator condensate drain valve.

f. Connect fill hose assembly (3, Figure 2-27) to SCBA cylinder.

g. Ensure SCBA cylinder shutoff valve (2) is closed (CW) and fill hose assembly bleed valve (4) is closed (CW).

h. Open (CCW) fill hose shutoff valve (6) fully.

**WARNING**

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

i. Slowly open (CCW) fill hose bleed valve (4) until air flow stops and pressure is vented. Close (CW) bleed valve.

j. Close (CW) fill hose shutoff valve (6).

k. Disconnect fill hose assembly (3) from SCBA cylinder.

**NOTE**

To prevent the need for long-term stowage of E-BAC, operate the system monthly.

2.3.4 **Stowage.**

a. Neatly coil fill hose assemblies and connect to couplings on base of E-BAC frame.
CAUTION

Allow diesel engine exhaust muffler and pipe to cool before stowing E-BAC. Ensure inlet hose and pre-filter do not touch diesel engine exhaust muffler or pipe. Hot muffler and pipe will melt and damage air inlet hose.

b. Neatly coil air inlet hose and place inside E-BAC frame.
c. Place cover over E-BAC and secure with latches.
d. Move covered E-BAC to designated stowage area and secure with tie-downs.
e. Record in operating log book the number of hours E-BAC was in operation.
 CHAPTER 3
FUNCTIONAL DESCRIPTION

3.1 INTRODUCTION.
This chapter defines the functions of the major equipment groups of the Emergency Breathing Air Compressor (E-BAC). These descriptions provide personnel with a basic understanding of how each component operates to achieve the desired result.

3.2 DESCRIPTION.
The E-BAC (Figure 3-1) is used by shipboard damage control and firefighting personnel to charge Self-Contained Breathing Apparatus (SCBA) cylinders to 4,500 psig with Grade D breathing-quality air as defined by Compressed Gas Association (CGA) G-7.1, Commodity Specification for Air, 1997 edition. The E-BAC is a three-stage, three-cylinder, air-cooled, oil-lubricated reciprocating air compressor and consists of four major components: compressor block, P1 filter system, fill hose assembly, and Yanmar diesel engine.

3.2.1 Compressor Block. Atmospheric air is drawn into the compressor block through a pre-filter and an intake filter. The air is compressed as it passes through three cylinders, or stages. Between the first and second stage, the compressed air is cooled by an intercooler. Between the second and third stage, after the compressed air exits a second intercooler, the air passes through the intermediate separator where moisture is removed. As the fully compressed air exits the third cylinder, it enters the aftercooler which is cooled by the fanwheel. From the aftercooler, the compressed air enters the final separator where any remaining moisture is removed before entering the P1 purification filter system. The P1 purification system removes any impurities in the compressed air. The first and second stages in the compressor block are splash-lubricated by the third stage’s force-feed lubrication system. This lubrication system must be operated in a level position (less than 10° incline). The paragraphs below give a brief description of how air flows through the compressor during operational use.

Figure 3-1. E-BAC.
3.2.1.1 **Pre-Filter.** Atmospheric air is drawn through a plastic pre-filter (1, Figure 3-2) which prevents large particles and debris from entering the intake filter (3). It is connected to the air intake filter by a 7 foot long air inlet hose (2).

![Pre-filter, Air Inlet Hose, and Air Intake.](image)

3.2.1.2 **Intake Filter.** Air is drawn through the intake filter (3, Figure 3-3) which removes particulates as small as 10 microns before entering the 1st stage cylinder.
3.2.1.3 **1st Stage Cylinder.** The 1st stage cylinder (4), receives the uncompressed air from the intake filter and compresses it to 90-95 psig. The air then enters the 1st stage intercooler.

3.2.1.4 **1st Stage Intercooler.** The 1st stage intercooler (7) is coiled tubing. Compressed air from the 1st stage cylinder is cooled as it flows through the coiled tubing and remains pressurized. The 1st stage safety relief valve (5), set at 116 psig (±6 psig) relieves excess pressure should over-pressurization occur within the 1st stage of compression. This safety relief valve is located on top of the 2nd stage cylinder.

3.2.1.5 **2nd Stage Cylinder.** The cooled, compressed air from the 1st stage intercooler enters the 2nd stage cylinder (6) and is further compressed to 640-680 psig.

3.2.1.6 **2nd Stage Intercooler.** The 2nd stage intercooler (9) is coiled tubing. The compressed air from the 2nd stage cylinder is cooled as it flows through the 2nd stage intercooler and remains pressurized when entering the intermediate separator. The 2nd stage safety relief valve (2), set at 725 psig (±36 psig) relieves excess pressure should over-pressurization occur and is located on top of the intermediate separator.

3.2.1.7 **Intermediate Separator.** The intermediate separator (10) is a moisture separator. The compressed air from the 2nd stage intercooler enters the intermediate separator where moisture is removed. To prevent equipment damage, the condensate drain on the bottom of the intermediate separator (8) must be opened for a few (4-6) seconds after every 15 minutes of E-BAC operation.

3.2.1.8 **3rd Stage Cylinder.** The compressed air enters the 3rd stage cylinder (1) where it will be compressed to 4,500 psig.

3.2.1.9 **Aftercooler.** The aftercooler is fan-cooled coiled tubing which cools the compressed air as it flows from the 3rd stage cylinder to the final separator. The 3rd stage safety valve (1, Figure 3-4), set at 4,950 psig (± 250 psig) controls the pressure throughout the 3rd stage of compression and is located on the top of the final separator housing.
3.2.1.10 **Final Separator.** The final separator (2) removes any remaining moisture and oil from the compressed air. To prevent equipment damage, the condensate drain on the bottom of the final separator (3) must be opened for a few (4-6) seconds after every 15 minutes of E-BAC operation.

3.2.1.11 **P1 Filter System.** The P1 filter system (9) consists of a purification cartridge which contains a 3-layer purification system. A top layer of catalyst, a middle layer of activated carbon, and a bottom layer of molecular sieve; each layer is separated by a sponge filter. This system removes any impurities. Routine maintenance of the P1 filter system is imperative to ensure proper purification of the compressed air so contaminants do not enter SCBA cylinders during charging.

3.2.1.11.1 **P1 Bleed Valve.** The P1 bleed valve (7) is positioned after the compressed air leaves the purification chamber and just before the CO/H₂O indicator. This valve is opened only when changing the purification cartridge.

3.2.1.11.2 **Check Valves.** A check valve (6) between the final separator and the P1 filter system ensures air does not travel back to the separator. A second check valve (5) just before the pressure maintaining valve (4) ensures no compressed air leaks backwards into the purification chamber.

3.2.1.12 **Carbon Monoxide (CO) and Moisture (H₂O) Indicator.** The CO/H₂O indicator (8) is located just after the compressed air exits the P1 purification chamber. It provides a visual alert if the compressed air is contaminated with CO and/or H₂O. If CO exceeds acceptable levels in the compressed air, the CO portion of indicator element will change in color from tan to dark brown. If H₂O content exceeds acceptable levels in the compressed air, the H₂O portion of indicator element will change from blue to pink.

3.2.1.13 **Pressure Maintaining Valve.** The pressure maintaining valve (4) is factory-set at 2,175 psig. This valve will not release air to the fill hose assembly if back pressure is less than 2,175 psig.
3.2.1.14 **Fill Hose Assemblies.** The E-BAC is equipped with two fill hose assemblies so that two SCBA cylinders can be charged simultaneously. Each fill hose assembly consists of a CGA 347 fitting (1, Figure 3-5), pressure gauge (2), shutoff valve (3), safety relief valve (4), and bleed valve (5).

**Figure 3-5. Fill Hose Assembly.**

3.2.2 **Yanmar Diesel Engine.** The E-BAC is powered by an air-cooled, 4-cycle, single-cylinder, 6 HP, 3,600 rpm Yanmar diesel engine (Figure 3-6). It drives the compressor using a flywheel and sheave that also cools the compressor. It has .92 gallon fuel capacity that provides up to 70 minutes running time.
3.2.3 System Enclosures.

3.2.3.1 E-BAC Enclosure and Base. The E-BAC is mounted onto a lightweight tubular frame with collapsible handles for portability. The E-BAC and frame itself are mounted on a wheeled platform with steel cover (Figure 3-7) that latches securely to protect the system from the elements. The E-BAC cover and enclosure base are not attached by the manufacturer, they are attached by the receiving command.

3.2.3.2 E-BAC/SS Cover. The E-BAC/SS is built with the tubular frame integrated into a wheeled stainless steel base to which a cover (Figure 3-8) is attached with stainless steel latches. The cover is provided by and attached by the manufacturer.
Figure 3-8. E-BAC/SS Cover.
CHAPTER 4
SCHEDULED MAINTENANCE

WARNING

Omission or negligent performance of prescribed maintenance procedures for this equipment could result in equipment failure and serious personal injury or death.

4.1 INTRODUCTION.

Proper scheduling and performance of preventive maintenance actions reduces equipment failures and ensures efficient performance of the Emergency Breathing Air Compressor (E-BAC). This chapter outlines safety requirements, defines the maintenance concept, references the E-BAC Planned Maintenance System (PMS), discusses reporting requirements, and provides general maintenance instructions relating to both scheduled and unscheduled (corrective) maintenance actions.

4.2 SCOPE.

The preventive maintenance requirements for the E-BAC are addressed in this chapter to assist supervisors and maintenance personnel in planning, scheduling, and documenting maintenance actions. The information in this chapter supplements the E-BAC PMS (paragraph 4.5) and is presented in the following sequence:

- Safety Requirements
- Maintenance Concepts
- PMS
- United States Navy (USN) Maintenance and Material Management (3-M) System Coverage and Problem Reporting
- General Maintenance Instructions.

4.3 SAFETY REQUIREMENTS.


4.4 MAINTENANCE CONCEPTS.

The E-BAC maintenance concept is based on the USN PMS, which classifies maintenance into two categories: scheduled and unscheduled.

4.4.1 Scheduled Maintenance. Scheduled maintenance primarily involves actions required to ensure reliable system operation and includes such actions as inspection, cleaning, lubrication, leak testing, and operational testing. Scheduled maintenance requirements are provided in the E-BAC PMS (see paragraph 4.5).

4.4.2 Unscheduled Maintenance. Unscheduled (corrective) maintenance includes actions required to locate equipment faults and to correct failures or performance degradations. Unscheduled maintenance actions include troubleshooting and parts replacements and are performed by maintenance technicians who are adequately trained in the appropriate service requirements. Unscheduled maintenance is covered in Chapter 5, Troubleshooting, and in Chapter 6, Corrective Maintenance.

4.5 PLANNED MAINTENANCE SYSTEM.

MRCs are indexed and referenced on Maintenance Index Page (MIP) 5519/017, Emergency Breathing Air Compressor. MIP 5519/017 provides a summary of the maintenance actions found on the MRCs, along with periodicity codes, personnel requirements, man-hours, and any related maintenance.
4.6 USN MAINTENANCE AND MATERIAL MANAGEMENT (3-M) SYSTEM COVERAGE AND PROBLEM REPORTING.

The provisions of the OPNAVINST 4790.4 series, Ships’ Maintenance and Material Management (3-M) Manual, apply to the E-BAC. Accordingly, any problems or need for corrective maintenance arising from performance of the maintenance actions contained in the E-BAC MRCs should be properly reported using OPNAV Form 4790/2K to ensure timely and accurate Maintenance Data System (MDS) documentation of E-BAC performance in the Fleet. In addition to Fleet requirements, MDS input from Fleet units is used by the In-Service Engineering Agent (ISEA) to identify and correct problems within the system itself or the related documentation and provisioning, including Coordinated Shipboard Allowance List (COSAL) support. The ISEA may be contacted at Commanding Officer, Naval Surface Warfare Center Panama City, Attn: Code S14, 110 Vernon Avenue, Panama City, FL 32408-7001.

4.7 GENERAL MAINTENANCE INSTRUCTIONS.

**WARNING**

If in doubt about the serviceability of a part, replace it immediately. Worn or damaged parts shall be replaced with authorized replacement parts only. Component failure during operations may result in serious personal injury or death.

Do not use trisodium phosphate for cleaning aluminum components. Use may result in equipment failure and may result in serious personal injury or death.

Do not disassemble components or loosen or tighten fittings while the system is pressurized. Prior to performing maintenance, ensure high-pressure air supply has been shut down and all pressure has been bled from the system. Exposure to escaping high-pressure air may result in serious personal injury or death.

4.7.1 Equipment Disassembly and Parts Replacement. Disassemble the equipment only to the extent necessary to perform the required maintenance action. Ensure all air is bled from the system and that proper tag-out procedures are performed prior to conducting maintenance.

If any component fails inspection or testing, replace the worn or damaged part with authorized replacement parts only (see parts lists in Chapter 7). Approved general cleaning procedures and lubricants are listed in the following paragraphs. All the tools, parts, and materials used for maintenance are listed on the individual MRCs and are identified by their Standard PMS Materials Identification Guide (SPMIG) numbers.

**WARNING**

Cleanliness is imperative in handling and maintaining the E-BAC. All tools and parts must be kept free of oil, grease, rust, or other contamination. Contamination of the breathing air system could result in serious personal injury or death.

Use of other than recommended cleaning agents may result in equipment failure and serious personal injury or death.

4.7.2 General Cleaning Procedure. Clean is defined as free of all loose scale, rust, grit, filings, dirt, oil, grease, and other foreign substances when viewed by the unaided eye. It is vitally important to keep the work area and parts clean during maintenance of breathing air systems and equipment.

4.7.3 Lubricants. Only use lubricants authorized on appropriate MRCs. Apply lubricants sparingly.

4.7.3.1 Greases. Only use greases authorized on appropriate MRCs. Apply greases sparingly.

4.7.3.2 Oil. Add or remove oil in accordance with (IAW) appropriate MRC. The oil strainer on the diesel engine of the must removed and cleaned IAW with appropriate MRC. The procedure to remove the diesel engine oil strainer on the E-BAC/SS follows:
4.7.3.2.1 **Diesel Engine Oil Strainer Removal and Installation (E-BAC/SS only).**

a. **Tools, Parts, and Materials.**
   (1) Wrench, 3/8 inch
   (2) Wrenches, 1/2 inch (2)
   (3) Rags

b. **Removal.**
   (1) Drain oil from diesel engine IAW appropriate MRC.

   ![CAUTION]

   **CAUTION**
   Bolt will bind against oil strainer when removing. Use caution when removing bolt to avoid damage to components.

   (2) Using 1/2 inch wrenches, loosen and remove nut (6, Figure 4-1) and bolt (3) securing shims (4) and upper rubber vibration absorber (5) to engine mount and engine belt adjustment mount. Hold one wrench on nut while turning other wrench on bolt CCW to loosen and remove.

   ![Figure 4-1. Bolt, Shims, and Rubber Vibration Absorbers.]

   (3) Once bolt, shims, and upper rubber vibration absorber are removed, use 3/8 inch wrench to loosen (CCW) and remove bolt (2) securing diesel engine oil strainer (1).

   (4) Remove oil strainer by hand by turning strainer CCW to loosen and then remove by pulling straight out.

   (5) Clean oil strainer IAW appropriate MRC. Use rags to remove any oil that drained from diesel engine onto E-BAC/SS base plate.

c. **Installation.**
   (1) Reinsert cleaned diesel engine oil strainer into engine and secure, turning by hand CW until snug.

   (2) Reinsert bolt securing diesel engine oil strainer into hole and secure with 3/8 inch wrench, turning CW until snug.
(3) Realign shims and upper rubber vibration absorber with holes in lower shims and lower rubber vibration absorber. Thread bolt through all shims and rubber vibration absorbers that secure to engine mount and engine belt adjustment mount.

(4) Use 1/2 inch wrench to hold nut in place while turning other 1/2 wrench on bolt CW to secure. Tighten until snug.

4.7.4 O-Ring Removal and Installation. If possible, visually inspect O-rings without removing them to avoid unnecessary disassembly that may cause undue wear.

4.7.4.1 Inspection. Exposed O-rings which are not required to be removed shall be visually inspected for damage and replaced if necessary.

**CAUTION**

To avoid damage to O-ring groove, remove O-rings using fingers only or the appropriate tool from an O-ring extractor kit.

4.7.4.2 Removal. If an O-ring cannot be removed with fingers, use an O-ring installation/removal tool. Scratching the O-ring groove may cause leakage or premature seal failure. Unless otherwise directed, all removed O-rings shall be cut and discarded.

4.7.4.3 Installation. Strict cleanliness and proper lubrication are essential during O-ring installation. Ensure new O-rings are of the proper size and material. To ensure correct installation, observe the following:

   a. Visually inspect new O-rings for deformities or compression set, hardening or brittleness, nicks or cuts, pits or blisters, or any other signs of damage. Cut and discard damaged O-rings and obtain new O-rings for replacement.

   b. Ensure parts are clean throughout the installation procedure. Dirt, chips, or foreign particles in O-ring grooves can cause leakage or damage to O-rings.

   c. Lubricate O-rings before assembly. Use only approved lubricants for O-rings. Apply lubricant sparingly; excess lubricant can foul other components.

   d. Do not overstretch O-rings during installation. To avoid O-ring damage, stretch only as needed for proper installation.

   e. Ensure O-rings are not twisted in groove as twisting occurs easily during replacement of large O-rings with relatively small cross-sectional diameters.

   f. Do not force O-rings over corners, threads, splines, ports, or other sharp edges. Use thimble, support, cone, or other device to prevent O-rings from contacting sharp edges of parts.
CHAPTER 5
TROUBLESHOOTING

5.1 INTRODUCTION.

This chapter contains the troubleshooting procedures and data necessary to assist personnel in locating the source of equipment malfunction or performance degradation in Emergency Breathing Air Compressor (E-BAC). Table 5-1 presents symptoms that may occur during operation of the E-BAC and suggests possible causes and actions that should correct the problem. Removal and installation procedures not covered by Maintenance Requirement Cards (MRCs) are provided in Chapter 6.

5.2 GENERAL TROUBLESHOOTING INSTRUCTIONS.

Troubleshooting is based on locating potential faults in the equipment and taking timely corrective action. This manual cannot possibly list all malfunctions that may occur nor all causes, tests, inspections, or corrective actions that may apply. If a malfunction is not listed or is not remedied by the suggested corrective action(s), notify the supervisor.

Table 5-1. Troubleshooting Guidelines

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause(s)</th>
<th>Corrective Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-BAC will not begin running.</td>
<td>a. Low fuel in diesel engine tank.</td>
<td>a. Ensure diesel engine fuel tank is filled by checking sight glass for fuel level.</td>
</tr>
<tr>
<td></td>
<td>b. Fuel valve not opened.</td>
<td>b. Ensure fuel valve is in open position (6 o’clock position).</td>
</tr>
<tr>
<td></td>
<td>d. Faulty recoil starter mechanism or recoil starter rope.</td>
<td>d. Replace starter mechanism and/or rope IAW procedures in paragraph 6.6.25.</td>
</tr>
<tr>
<td>Pressure not building up in system during operation or excessive charging times (greater than 20 minutes per cylinder assembly).</td>
<td>a. Condensate drain valves open.</td>
<td>a. Close (CW) condensate drain valves.</td>
</tr>
<tr>
<td></td>
<td>c. P1 purification cartridge not installed/seated properly.</td>
<td>c. Re-seat P1 purification cartridge IAW paragraph 2.3.1.2.j.</td>
</tr>
<tr>
<td></td>
<td>e. Clogged intake filter.</td>
<td>e. Replace intake filter IAW appropriate MRC.</td>
</tr>
<tr>
<td></td>
<td>f. Defective final pressure safety relief valve.</td>
<td>f. Replace final safety pressure valve IAW appropriate MRC.</td>
</tr>
<tr>
<td></td>
<td>g. Worn floating piston (more likely after 5 years of use).</td>
<td>g. Return E-BAC for depot-level repair IAW paragraph 1.7.</td>
</tr>
</tbody>
</table>
Table 5-1. Troubleshooting Guidelines - Continued.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause(s)</th>
<th>Corrective Action(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st and/or 2nd safety relief valve lifting.</td>
<td>a. If there is air flow through fill hose assembly, then defective relief valve.</td>
<td>a. Replace defective safety relief valve IAW appropriate MRC.</td>
</tr>
<tr>
<td></td>
<td>b. If there is no air flow through fill hose assembly, then internal compressor block component failure.</td>
<td>b. Return E-BAC for depot-level repair IAW paragraph 1.7.</td>
</tr>
<tr>
<td>Condensate is tan in color (air is contaminated with compressor block oil).</td>
<td>a. Oil is over-filled.</td>
<td>a. Drain excess oil IAW appropriate MRC.</td>
</tr>
<tr>
<td></td>
<td>b. Compressor operation while at an incline in excess of 10° in any direction.</td>
<td>b. Shim E-BAC so incline is less than 10° in any direction.</td>
</tr>
<tr>
<td>Overheating is observed (paint peeling, smoke, compressor frame is hot to touch, etc.).</td>
<td>a. Clogged intake filter.</td>
<td>a. Replace intake filter IAW appropriate MRC.</td>
</tr>
<tr>
<td></td>
<td>b. Low or no oil in compressor block.</td>
<td>b. Add oil IAW appropriate MRC.</td>
</tr>
<tr>
<td>Knocking noise heard for more than 10 seconds after start-up.</td>
<td>Free-floating piston not seating properly.</td>
<td>Return E-BAC for depot-level repair IAW paragraph 1.7.</td>
</tr>
</tbody>
</table>
CHAPTER 6  
CORRECTIVE MAINTENANCE

6.1 INTRODUCTION.

6.1.1 **Scope.** The corrective maintenance information presented in this chapter includes the actions and procedures required to restore the Emergency Breathing Air Compressor (E-BAC) to a fully operable condition. This chapter provides general maintenance information and specific maintenance procedures to assist maintenance personnel in the removal and replacement of inoperative parts or assemblies. The corrective maintenance procedures identify maintenance actions; provide safety precautions; list tools, parts, and materials; and present step-by-step instructions with supporting illustrations. The corrective maintenance procedures in this chapter are provided for qualified maintenance personnel working at the organizational level. Where maintenance procedures differ between the E-BAC and the Stainless Steel Emergency Breathing Air Compressor (E-BAC/SS), separate procedures are provided immediately following the procedure for the E-BAC.

The procedures included in this chapter are prescribed in the interest of safety and optimum service life of the equipment. Components requiring corrective maintenance beyond the limits described in this document must be returned to the depot in accordance with (IAW) paragraph 1.7 for repair or overhaul.

The information in the remainder of this chapter is arranged in the following sequence:

- General Maintenance Information
- Test Equipment and Tools
- Materials
- General Maintenance Procedures
- E-BAC and E-BAC/SS Corrective Maintenance.

6.1.2 **Safety Requirements.** Before performing corrective maintenance on the E-BAC, maintenance personnel shall review and become thoroughly familiar with the general safety notices and precautions listed in the Safety Summary. Replacement procedures, along with the associated warnings and cautions, shall be read in full before beginning corrective maintenance.

**CAUTION**

If in doubt about the serviceability of a part, replace it immediately. Worn or damaged parts shall be replaced with authorized replacement parts only. Failure to comply may result in equipment damage.

6.2 General maintenance information.

6.2.1 **Maintenance Parts.** Only approved replacement parts listed in Chapter 7 shall be used on the E-BAC.

6.2.2 **Related Maintenance.** Related corrective maintenance actions may include inspection, removal, and replacement of O-rings, as well as inspection of component parts. O-ring inspection, removal, and replacement procedures are provided in paragraph 4.7.4. Ensure cleanliness of the system is maintained at all times IAW the requirements in paragraph 4.7.2.

6.3 **Test Equipment and Tools.**

No special test equipment is required for corrective maintenance on the E-BAC. Table 6-1 lists the tools used in this chapter.
Table 6-1. Tools Required.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Sizes (all sizes in inches where applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Ratchet, 3/8 inch and adapter for small socket sizes</td>
<td>5/16, 7/16, 11/16 regular depth sockets; 7/16 deep socket</td>
</tr>
<tr>
<td>Hex Key (Allen Wrench)</td>
<td>5/16</td>
</tr>
<tr>
<td>Wrenches</td>
<td>3/8, 7/16, 1/2, 9/16, 5/8, 9/16, 11/16, 3/4, 7/8, 1 (two required)</td>
</tr>
<tr>
<td>Needle Nosed Pliers</td>
<td></td>
</tr>
<tr>
<td>P1 Purification Filter Cap Wrench</td>
<td></td>
</tr>
<tr>
<td>Ruler</td>
<td></td>
</tr>
</tbody>
</table>

6.4 **MATERIALS.**

The materials used in this chapter are as follows:
- Anti-seize tape MIL-T-27730 (Teflon tape)
- Rags

6.5 **GENERAL MAINTENANCE PROCEDURES.**

6.5.1 **System Cleanliness.** Keep the system clean by blowing low-pressure compressed air over all surfaces of the fanwheel, cylinders, intercoolers, and aftercooler. This removes dust, dirt, and grit and helps keep the system from overheating.

6.6 **CORRECTIVE MAINTENANCE.**

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air. Do not open P1 bleed valve.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

**CAUTION**

Disassembly of E-BAC components beyond the procedures described in this manual shall not be performed. Additional disassembly may cause component failure.

**NOTE**

Where maintenance procedures differ between E-BAC and E-BAC/SS, both are given and are marked accordingly. All others refer to both E-BAC and E-BAC/SS.
6.6.1 Outer Belt Guard Removal and Installation (E-BAC only).

   (1) Drive ratchet, 3/8 inch
   (2) Socket, 7/16 inch

b. Removal.
   (1) Ensure diesel engine is shut down and START/STOP control knob is in STOP position.
   (2) Using drive ratchet with 7/16 inch socket, loosen (CCW) and remove six bolts (three on each side), lock washers and flat washers from inner belt guard square nuts that (1, Figure 6-1) secure outer belt guard.

   ![Figure 6-1. Inner Belt Guard Square Nut Locations.](image)

   (3) Remove outer belt guard and set aside along with bolts and washers.

c. Installation.
   (1) Attach outer belt guard to inner belt guard, aligning square nuts mounted on outer belt guard with square nuts mounted on inner belt guard (1, Figure 6-1).

   **NOTE**
   Thread bolts with washers into belt guard on one side at a time, this ensures proper alignment of bolts and nuts on remaining side.

   (2) Place flat washer then lock washer onto bolts and thread three of the six bolts set aside in paragraph 6.6.1.b.(3) into square nuts on one side of outer and inner belt guards.

   (3) Place flat washer then lock washer onto bolts and thread remaining three bolts into square nuts on other side of outer and inner belt guards.

   (4) Using drive ratchet with 7/16 inch socket, tighten all bolts (CW) until snug.

6.6.2 Outer Belt Guard Removal and Installation (E-BAC/SS only).

   (1) Drive ratchet, 3/8 inch with adapter for small socket sizes
   (2) Socket, 5/16 inch
   (3) Wrench, 3/8 inch
b. **Removal.**
   1. Ensure diesel engine is shut down and START/STOP control knob is in STOP position.
   2. Remove nine bolts (2, Figure 6-2) and nuts with washers that secure outer belt guard to cowling by holding 3/8 inch wrench on inside nut while turning 5/16 inch socket on drive ratchet CCW to loosen and remove bolts. The top two bolts (1) are longer.

![Figure 6-2. Locations of Bolts Securing Outer Belt Guard to Cowling.](image)

   (3) Remove belt guard and set aside with all nuts, bolts, and washers.

c. **Installation.**
   1. Set outer belt guard in place, aligning holes on belt guard with holes in cowling.
   2. Attach outer belt guard to cowling by first reinstalling two longer bolts (1). Slide washer onto bolt, then insert bolt into hole. Slide another washer onto protruding end of bolt and secure with nut.
   3. Tighten bolts and nuts using 3/8 inch wrench on nut to hold in place while turning drive ratchet with 5/16 inch socket CW until snug.
   4. Reinstall remaining nine bolts (2), by sliding washers onto bolts, inserting bolts into holes, then sliding second washer onto protruding end of bolt and securing with nuts. Tighten all bolts and nuts using 3/8 inch wrench on nut to hold in place while turning drive ratchet with 5/16 inch socket CW until snug.

### 6.6.3 V-Belt Tension Adjustment (E-BAC only).

a. **Tools, Parts, and Materials.**
   1. Drive ratchet, 3/8 inch
   2. Socket, 7/16 inch

b. **Adjustment.**
   1. Ensure diesel engine is shut down and START/STOP control knob is in STOP position.
   2. Remove outer belt guard in accordance with (IAW) procedures in paragraph 6.6.1.b.
   3. Adjust engine position by turning belt tension wing nut (1, Figure 6-3) on engine base until the v-belt deflection is approximately 3/8 inch as illustrated in Figure 6-4.
Figure 6-3. Belt Tension Wing Nut.

Figure 6-4. Typical V-Belt Deflection.

WARNING

The belt guard is off when performing the next step; personnel should exercise extreme caution. Failure to comply could result in serious personal injury or death.

(4) Operate E-BAC IAW paragraph 2.3.3.1 for 5 minutes. Keep well away from moving belt as serious personal injury or death could result.
(5) Shut down E-BAC IAW paragraph 2.3.3.3.
(6) Check for v-belt deflection of approximately 3/8 inch as illustrated in Figure 6-4.
(7) If further adjustment is required, repeat procedures in step (3) until proper deflection is obtained.
(8) Reattach outer belt guard IAW procedures in paragraph 6.6.1.c.

6.6.4 V-Belt Tension Adjustment (E-BAC/SS only).

   (1) Wrench, 9/16 inch
   (2) Ruler

b. Adjustment.
   (1) Ensure diesel engine is shut down and START/STOP control knob is in STOP position.
   (2) Remove outer belt guard IAW procedures in paragraph 6.6.2.b.
   (3) Using 9/16 inch wrench, loosen but do not remove four nylon hex nuts that secure engine base plate to frame. Two nuts are located in front of engine (1, Figure 6-5) and two nuts are located between engine and belt guard (1, Figure 6-6).

![Figure 6-5. Two Nylon Hex Nuts in Front of Engine.](image-url)
Figure 6-6. Two Nylon Hex Nuts Between Engine and Belt Guard.

**WARNING**

The belt guard is off when performing the next steps; personnel should exercise extreme caution. Failure to comply could result in serious personal injury or death.

(4) Start E-BAC/SS IAW procedures in paragraph 2.3.3.1. Keep well away from moving belt as serious personal injury or death could result.

(5) Adjust engine position by turning jacking bolts of tensioning assembly (1, Figure 6-7) with 9/16 inch wrench. Turn each jacking bolt one turn at a time.

Figure 6-7. Jacking Bolts of Tensioning Assembly.

(6) Ensure engine base plate is parallel to frame by using ruler to measure distance between base plate edge and edge of frame support. Take measurements (2) near each jacking bolt.
(7) Repeat steps (5) and (6) until belt runs smoothly without wobbling.
(8) Shut down E-BAC/SS IAW paragraph 2.3.3.3.
(9) Using 9/16 inch wrench, tighten four nylon hex nuts that secure engine base plate to frame.
(10) Reattach outer belt guard IAW procedures in paragraph 6.6.2.c.

6.6.5 **V-Belt Removal and Installation (E-BAC only).**

a. **Tools, Parts, and Materials.**
   (1) V-belt
   (2) Drive ratchet, 3/8 inch
   (3) Socket, 7/16 inch

b. **Removal.**
   (1) Ensure diesel engine is shut down and START/STOP control knob in STOP position.
   (2) Begin v-belt removal by removing outer belt guard IAW procedures in paragraph 6.6.1.b.
   (3) Turn belt tension wing nut (1, Figure 6-8) CCW to remove. Remove washers (2) and spring (3) and set aside with wing nut.

![Figure 6-8. Belt Tension Wing Nut.](image)

**NOTE**

The following steps require two people.
(4) One person lifts diesel engine by its base plate until enough v-belt slack is created for another person to remove v-belt.

(5) Remove v-belt from sheave and flywheel.

(6) Person lifting diesel engine slowly lowers engine to resting point.

c. **Installation.**

(1) Inspect v-belt for cracks, scuffing, or other damage. If damage is noted, install new v-belt.

**NOTE**

The following steps require two people.

(2) One person lifts diesel engine up by its base plate as far as possible. This action brings sheave close enough to flywheel for another person to install v-belt on flywheel and sheave.

(3) Install v-belt on flywheel and sheave.

(4) Person lifting diesel engine slowly returns engine to resting point.

(5) Locate wing nut, spring, and washers removed in step (3) above and reinstall starting with bottom washer, spring, top washer, then wing nut.

(6) Check that the v-belt has deflection of approximately 3/8 inch as shown in Figure 6-9.

![Figure 6-9. Typical V-Belt Deflection.](image)

(7) Reattach belt guard IAW procedures in paragraph 6.6.1.c.

### 6.6.6 V-Belt Removal and Installation (E-BAC/SS only).

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

(1) Wrench, 9/16 inch

(2) V-belt

b. **Removal.**

(1) Ensure diesel engine is shut down and START/STOP control knob is in STOP position.

(2) Remove outer belt guard IAW procedures in paragraph 6.6.2.b.
(3) Using 9/16 inch wrench, loosen but do not remove four nylon hex nuts that secure engine base plate to frame. Two nuts are located in front of engine (1, Figure 6-10) and two nuts are located between engine and belt guard (1, Figure 6-11).

Figure 6-10. Two Nylon Hex Nuts in Front of Engine.

Figure 6-11. Two Nylon Hex Nuts Between Engine and Belt Guard.

(4) Adjust engine position by turning jacking bolts of tensioning assembly CCW (1, Figure 6-12) with 9/16 inch wrench until enough slack has been created in v-belt to remove from sheave and flywheel. Turn each jacking bolt an equal number of turns to keep engine base plate parallel with frame support. Measure distance (2) with ruler.
(5) Remove v-belt from sheave and flywheel.

c. **Installation.**
   
   (1) Install v-belt onto flywheel and sheave.
   
   (2) Using 9/16 inch wrench, turn jacking bolts of tensioning assembly CW to slowly create tension on the v-belt.
   
   (3) Adjust v-belt to proper deflection IAW procedures in paragraph 6.6.4.b.

6.6.7 **Sheave Removal and Installation.**

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

   (1) Wrench, 7/16 inch
   
   (2) Sheave

b. **Removal.**

   (1) Remove outer belt guard IAW procedures in paragraph 6.6.1.b for E-BAC or paragraph 6.6.2.b for E-BAC/SS.
   
   (2) Remove v-belt IAW procedures in paragraph 6.6.5.b for E-BAC or paragraph 6.6.6.b for E-BAC/SS.
   
   (3) Using 7/16 inch wrench, turn CCW to loosen and remove two bolts (4, Figure 6-13) and lock washers securing sheave bushing (3) to sheave (2). Set lock washers aside.
(4) Using two bolts removed in previous step, thread into holes (1) in sheave bushing. This action separates the sheave bushing from the sheave. Keep turning bolts CW until sheave bushing comes free.

(5) Remove sheave bushing by pulling it off shaft.

(6) Remove sheave by pulling it off shaft.

(7) Remove bolts from holes in sheave, using 7/16 inch wrench.

c. **Installation.**

(1) Place new sheave onto shaft.

(2) Push sheave bushing onto shaft, aligning key (5) on shaft with notch in sheave bushing and threaded holes in sheave are aligned with unthreaded holes in sheave bushing. Push sheave bushing onto shaft until sheave bushing edge is flush with shaft edge.

(3) Place lock washers removed in 6.6.7.b.(3) onto bolts and thread bolts (4) into unthreaded holes in sheave bushing that align with threaded holes in sheave.

(4) Using 7/16 inch wrench, tighten bolts until snug.

(5) Reinstall v-belt IAW procedures in paragraph 6.6.3.c.

(6) Ensure that v-belt is aligned in a straight line from flywheel to sheave. If adjustment is required, loosen or tighten bolts (4) as necessary.

(7) Perform v-belt adjustments IAW procedures in paragraph 6.6.3.b for E-BAC or paragraph 6.6.4.b for E-BAC/SS.

(8) Reattach outer belt guard IAW procedures in paragraph 6.6.1.c for E-BAC or paragraph 6.6.2.c for E-BAC/SS.
6.6.8 Fill Hose Assemblies Removal and Installation (E-BAC only).

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

a. **Tools, Parts, and Materials.**
   (1) Wrench, 5/8 inch
   (2) Wrench, 9/16 inch
   (3) Anti-seize tape MIL-T-27730 (Teflon tape)
   (4) Fill Hose Assembly

b. **Removal.**

   **NOTE**

   To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

   (1) Unscrew (CCW) CGA fittings on fill hoses from stowage couplings. (4, Figure 6-14), if attached.

   ![Figure 6-14. Fill Hoses Connected to Tee on Pressure Maintaining Valve.](image)

   (2) Use 9/16 inch wrench on nipple fittings (3,) to hold in place while using 5/8 inch wrench to loosen (CCW) and disconnect fill hose connections (2) from tee (5) connected to pressure maintaining valve (1).

   (3) Use 9/16 inch wrench on nipple fittings (3) to loosen (CCW) and remove from tee (5).
c. Installation.

(1) Thoroughly clean male and female threads of fill hose connections (2), nipples (3) and tee (5), removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.

(2) Wrap anti-seize (Teflon) tape around male threads in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.

(3) Using 9/16 inch wrench, attach nipple fittings (3) CW to tee (5), turning wrench CW until snug.

(4) While using 9/16 inch wrench on nipple fittings (3) to keep from turning, use 5/8 inch wrench to attach fill hose connections (2) CW to nipple fittings, turning wrench CW until snug.

(5) Coil hoses and screw (CW) CGA fitting of fill hoses onto stowage couplings carefully, taking care not to damage threads.

6.6.9 Fill Hose Assemblies Removal and Installation (E-BAC/SS only).

WARNING
E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.


(1) Wrench, 5/8 inch

(2) Fill Hose Assembly

b. Removal.

NOTE
To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

(1) Unscrew (CCW) CGA fittings of fill hoses from stowage couplings (4, Figure 6-15).
Figure 6-15. E-BAC/SS Fill Hose Connections.

(2) Use 5/8 inch wrench on fill hose connections (2) to loosen (CCW) and disconnect from elbow fittings (3) on tee (5) connected to pressure maintaining valve (1).

c. **Installation.**
(1) Place fill hose connections onto elbow fitting and fasten by hand, turning CW.
(2) Use 5/8 inch wrench on fill hose connections (2) to tighten (CW) until snug.
(3) Coil hoses and screw (CW) CGA fitting of fill hoses onto stowage couplings carefully, taking care not to damage threads.

6.6.10 **Intermediate Separator and Final Separator Condensate Drain Valves Removal and Installation.**

**WARNING**

E-BAC or E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

a. **Tools, Parts, and Materials.**
(1) Wrench, 11/16 inch
(2) Intermediate separator condensate drain valve assembly
(3) Final separator condensate drain valve assembly

b. **Removal.**

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.
(1) Pull Tygon® tubing (2, Figure 6-16) off drain valves.

![Figure 6-16. Drain Valves and Tygon® Tubing.](image)

(2) Using 11/16 inch wrench on drain valves (1) above manual knob, turn CW to loosen and remove.

c. Installation.

(1) Attach drain valve to bottom of separator, turning in CCW direction. Tighten with 11/16 inch wrench until snug.

(2) Attach Tygon® tubing to drain valve.

### 6.6.11 Pressure Maintaining Valve and Check Valve Removal and Installation

**WARNING**

E-BAC or E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.


(1) Anti-seize tape MIL-T-27730 (Teflon tape)

(2) Wrench, 7/16 inch

(3) Wrench, 11/16 inch

(4) Wrench, 5/8 inch

(5) Drive ratchet, 3/8 inch
(6) Socket, 7/16 inch
(7) Vise
(8) Rags
(9) Check Valve
(10) Pressure Maintaining Valve

b. **Pressure Maintaining Valve Removal.**

**NOTE**
To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

(1) Remove fill hoses from tee on pressure maintaining valve IAW procedures in paragraph 6.6.8.b for E-BAC or paragraph 6.6.9.b for E-BAC/SS.

**NOTE**
Before attempting to remove line connecting into check valve and pressure maintaining valve, first loosen other end of connection coming from CO/H₂O indicator. This facilitates moving the line when disconnecting it.

(2) Using 11/16 inch wrench, loosen (CCW) flare (1, Figure 6-17) on top of connection to CO/H₂O indicator. This will allow the line going to the pressure maintaining valve to be moved as needed.

![Figure 6-17. Flare On Top of CO/H₂O Indicator.](image)

(3) Use 5/8 inch wrench (1, Figure 6-18) to hold nipple fitting while using 11/16 inch wrench (2) to loosen (CCW) and disconnect flare fitting from nipple fitting.
(4) Using 5/8 inch wrench, loosen (CCW) and remove nipple fitting from check valve fitting.

(5) **(E-BAC only)** Remove E-BAC frame from enclosure base plate. Refer to Appendix A, paragraph A.2.c for instructions on removing E-BAC from base plate.

(6) Once E-BAC has been removed from enclosure base plate, place on wooden blocks or other suitable shim material at least 6 inches off the deck to facilitate the following maintenance procedures.

(7) Use 7/16 inch wrench to prevent nuts (1, Figure 6-19) that secure the pressure maintaining valve underneath E-BAC frame from turning.

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*Figure 6-18. Using Wrenches on Flare and Nipple Fittings.*

*Figure 6-19. Two Nuts Underneath E-BAC Frame Securing Pressure Maintaining Valve.*
(8) Using drive ratchet and 7/16 inch socket, loosen (CCW) and remove two bolts (1, Figure 6-20) connecting pressure maintaining valve to E-BAC frame. Ensure that nuts and washers underneath E-BAC frame are set aside.

Figure 6-20. Bolts Securing Pressure Maintaining Valve.

(9) Lift pressure maintaining valve with check valve attached up and off E-BAC frame.

c. Pressure Maintaining Valve Check Valve Removal.

(1) Remove pressure maintaining valve IAW procedures in paragraph 6.6.10.b.

**CAUTION**

Use rags to wrap vise jaws when removing check valve from pressure maintaining valve. Failure to comply may cause equipment damage.

(2) Place pressure maintaining valve in vise with jaws wrapped with rags and close vise until pressure maintaining valve is secure.

(3) Using 1 inch wrench on check valve, turn CCW to remove.

d. Pressure Maintaining Valve Check Valve Installation.

(1) Thoroughly clean male and female threads of check valve, pressure maintaining valve, nipple fitting, and tee, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.

(2) Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.

**CAUTION**

Use rags to wrap vise jaws when removing check valve from pressure maintaining valve. Failure to comply may cause equipment damage.

(3) Place pressure maintaining valve in vise with jaws wrapped in rags and close vise until pressure maintaining valve is secure.

(4) Use 1 inch wrench on check valve to fasten to pressure maintaining valve. Turn CW until snug.
e. **Pressure Maintaining Valve Installation.**

1. Ensure check valve is installed on pressure maintaining valve. If not, follow procedures in paragraph 6.6.6.d to install check valve.

2. **(E-BAC only)** E-BAC must be disconnected from enclosure base plate. If connected, follow procedures in Appendix A, paragraph A.2.c to remove E-BAC from enclosure base plate.

3. Once E-BAC has been removed from enclosure base plate, place on wooden blocks or other suitable shim material at least 6 inches off the deck to facilitate the following maintenance procedures.

4. Align pressure maintaining valve over holes in E-BAC frame. Place two bolts with washers through holes in pressure maintaining valve. Hold in place with 7/16 inch wrench.

5. From underneath the E-BAC frame, place washers and two nuts on the protruding bolts. Secure nuts and washers to bolts with drive ratchet and 7/16 inch socket, turning CW until snug.

6. Use 5/8 inch wrench to connect nipple fitting to check valve fitting, turning CW until aligned and snug.

7. Reconnect line coming from CO/H₂O indicator and tighten both flare fittings on each end, turning CW with 11/16 inch wrench until snug.

8. Reattach fill hose assemblies IAW procedures in paragraph 6.6.8.c for E-BAC or paragraph 6.6.9.c for E-BAC/SS.

### 6.6.12 P1 Purification Chamber Check Valve Removal and Installation.

**WARNING**

E-BAC or E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves and P1 bleed valve to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

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

1. Wrench, 5/8 inch
2. Wrench, 3/4 inch
3. Wrench, 1 inch
4. Anti-seize tape MIL-T-27730 (Teflon tape)
5. Check Valve

b. **Removal.**

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

1. Unscrew (CCW) CGA fittings on fill hoses from stowage couplings.
2. Loosen flare fitting (1, Figure 6-21) on the line coming from the final separator using 5/8 inch, wrench, turning CW.
(3) Loosen fully flare fitting (1, **Figure 6-22**) on line going into check valve by using 5/8 inch wrench, turning CCW. Line coming from final separator can now be turned out of the way.

(4) Using 1 inch wrench to hold check valve (3), use 3/4 inch wrench to loosen and remove flare fitting (2), turning CCW.

(5) Use 1 inch wrench on aluminum fitting (4) below check valve (3) to loosen then remove by turning CCW.

c. **Installation.**

(1) Thoroughly clean male and female threads of flare fitting, check valve and elbow connection, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.
(2) Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.

(3) Use 1 inch wrench to fasten aluminum check valve fitting (4) and check valve (3) to elbow. Turn fitting CW until snug.

(4) Ensure check valve is firmly attached to aluminum fitting by using 1 inch wrench to hold check valve fitting (4) in place. Turn check valve CW with 1 inch wrench until snug.

(5) Use 1 inch wrench to hold check valve (3) in place while using 3/4 inch wrench to fasten flare fitting (2) to check valve. Turn flare fitting CW until snug.

(6) Position line from final separator to check valve over flare fitting (2) and firmly seat.

(7) Use 3/4 inch wrench to hold flare fitting (2) in place while using 5/8 inch wrench to fasten flare fitting from final separator to flare fitting on check valve. Turn CW until snug.

(8) Using 5/8 inch wrench tighten connection to final separator, turning CCW until snug.

(9) Coil hoses and screw (CW) CGA fitting of fill hoses onto stowage couplings carefully, taking care not to damage threads.

6.6.13 CO/H2O Indicator Housing Removal and Installation (E-BAC only).

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves and P1 bleed valve to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

a. **Tools, Parts, and Materials.**
   (1) Wrench, 9/16 inch
   (2) Wrench, 5/8 inch
   (3) Wrench, 7/8 inch
   (4) CO/H2O Indicator Housing
   (5) Vise
   (6) Anti-seize tape MIL-T-27730 (Teflon tape)

b. **Removal.**
   (1) Use 5/8 inch wrench to loosen (CCW) and remove flare fitting (1, Figure 6-23) on line going to pressure maintaining valve.
(2) Unscrew CO/H₂O indicator cap (2) by hand, turning CCW. Ensure spring inside is retrieved and set both aside.

(3) Use 7/8 inch wrench (1, Figure 6-24) on P1 bleed valve to hold in place. Use 9/16 inch wrench (2) on fitting below CO/H₂O housing turning CCW to loosen and remove from P1 bleed valve.

(4) Place spring inside CO/H₂O indicator housing and replace cover, turning CW until hand tight.
CAUTION

Place flat sides of fitting in vise and not threads to avoid damage to fitting.

(5) Place fitting on CO/H₂O indicator housing in vise, ensuring it is held securely. Refer to Figure 6-25.

![Figure 6-25. CO/H₂O Indicator Housing Fitting in Vise.](image)

(6) Use 5/8 inch or 9/16 inch wrench to loosen (CCW) remove the fitting not in vise jaws.

**CAUTION**

Use rags to wrap CO/H₂O indicator housing. Failure to comply may cause equipment damage.

(7) Remove fitting from vise and place rags around CO/H₂O indicator housing.
(8) Place CO/H₂O indicator housing in vise, ensuring it is held securely.
(9) Use 5/8 inch or 9/16 inch wrench to remove remaining fitting.
c. **Installation.**

1. Thoroughly clean male and female threads of housing, fittings, and P1 bleed valve, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.

2. Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.

   **CAUTION**

   Use rags to wrap CO/H₂O indicator housing. Failure to comply may cause equipment damage.

3. Place rags around CO/H₂O indicator housing and place in vise, ensuring it is held securely.

4. Attach one of the fittings to the CO/H₂O indicator housing, using 5/8 inch or 9/16 inch wrench and turning CW until snug.

   **CAUTION**

   Place flat sides of fitting in vise and not threads to avoid damage to fitting.

5. Remove CO/H₂O indicator housing from vise and place fitting just attached to housing in vise. Secure in vise.

6. Attach other fitting to CO/H₂O indicator housing, using 5/8 inch or 9/16 inch wrench and turning CW until snug.

7. Remove CO/H₂O indicator housing from vise.

8. Unscrew the cover of the CO/H₂O indicator housing and set aside.

9. Use 7/8 inch wrench on P1 bleed valve to hold in place. Use 9/16 inch wrench on fitting below CO/H₂O housing (1, **Figure 6-27**) to fasten to P1 bleed valve, turning CW until snug.
(10) Place line going to pressure maintaining valve into top fitting on check valve, and secure with flare nut using 5/8 inch wrench, turning CW until snug.

**6.6.14 CO/H\textsubscript{2}O Indicator Housing Removal and Installation (E-BAC/SS only).**

**WARNING**

E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves and P1 bleed valve to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

a. **Tools, Parts, and Materials.**
   - (1) Wrench, 1/2 inch
   - (2) Wrench, 5/8 inch
   - (3) Wrench, 7/8 inch
   - (4) CO/H\textsubscript{2}O Indicator Housing
   - (5) Vise
   - (6) Rags

b. **Removal.**
   - (1) Remove P1 purification chamber IAW procedures in paragraph 6.6.18.b.
(2) Using 5/8 inch wrench, remove fitting (1) from CO/H₂O indicator housing (2) by turning wrench CCW.

![Figure 6-28. CO/H₂O Indicator Housing and Fitting.](image1)

(3) While using 7/8 inch wrench (2, Figure 6-29) to hold adapter in place, use 1/2 inch wrench (1) on elbow, turning CCW to loosen and remove P1 bleed valve and CO/H₂O indicator housing together.

![Figure 6-29. Using Wrenches to Remove P1 Bleed Valve and CO/H₂O Indicator Housing.](image2)
Use rags to wrap CO/H₂O indicator housing. Failure to comply may cause equipment damage.

(4) Place CO/H₂O indicator housing in vise, using protective material such as rags wrapped around housing to avoid damage.

(5) Use 1/2 inch wrench to loosen (CCW) and remove elbow fitting connecting CO/H₂O indicator housing to P1 bleed valve.

c. Installation.

(1) Thoroughly clean male and female threads of housing and fittings, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.

(2) Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.

(3) Place protective material around CO/H₂O indicator housing in vise, ensuring it is held securely.

(4) Use 1/2 inch wrench to attach elbow fitting that connects to P1 bleed valve. Turn elbow fitting CW with wrench until snug.

(5) Remove CO/H₂O indicator housing with P1 bleed valve attached from vise.

(6) While using 7/8 inch wrench (2, Figure 6-30) to hold adapter on P1 purification chamber in place, use 1/2 inch wrench (1) on elbow, turning CW to fasten P1 bleed valve to P1 purification chamber. Tighten until snug.

Figure 6-30. Using Wrenches to Attach P1 Bleed Valve and CO/H₂O Indicator Housing.
6.6.15 P1 Bleed Valve Removal and Installation (E-BAC only).

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves and P1 bleed valve to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

a. **Tools, Parts, and Materials.**
   
   (1) Wrench, 1/2 inch  
   (2) Wrench, 9/16 inch  
   (3) Wrench, 7/8 inch  
   (4) P1 Purification Chamber Cap Wrench  
   (5) P1 Bleed Valve  
   (6) Anti-seize tape MIL-T-27730 (Teflon tape)

b. **Removal.**
   
   (1) Remove CO/H₂O indicator housing IAW procedures in paragraph 6.6.13.b.  
   (2) Using a 9/16 inch wrench to hold nut (3, Figure 6-31) in place, loosen bolt slightly (2) by turning CCW using slotted screwdriver.

![Figure 6-31. Nut and Bolt Securing Unistrut Brace.](image_url)
(3) Using P1 purification filter cap wrench (2, Figure 6-32), rotate the P1 purification chamber (1) CCW so that the P1 bleed valve (3) is positioned toward the front of the compressor frame.

![Figure 6-32. Using P1 Purification Filter Cap Wrench to Rotate P1 Purification Chamber.](image)

**CAUTION**

Ensure P1 bleed valve knob is fully closed before attempting to remove bleed valve from elbow. Use extreme care when turning bleed valve as valve knob will bind against P1 purification chamber but will pass if moved slowly. Failure to comply will result in equipment damage.

(4) Ensure P1 bleed valve knob is fully closed before attempting this step as knob will bind against P1 purification chamber. Using 7/8 inch wrench (2, Figure 6-33) on flat sides of P1 bleed valve (1), turn CCW slowly to loosen and remove from elbow connection.
c. **Installation.**

(1) Thoroughly clean male and female threads of elbow fitting and P1 bleed valve, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.

(2) Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.

**CAUTION**

Ensure P1 bleed valve knob is fully closed before attempting to fasten bleed valve to elbow. Use extreme care when turning bleed valve as valve knob will bind against P1 purification chamber but will pass if moved slowly. Failure to comply will result in equipment damage.

(3) Ensure P1 bleed valve knob is fully closed before attempting this step as knob will bind against P1 purification chamber. Using 7/8 inch wrench (2, Figure 6-34) on flat sides of P1 bleed valve (1), turn CW slowly to fasten to elbow fitting.
Figure 6-34. Attaching P1 Bleed Valve.

(4) Reattach CO/H₂O indicator housing IAW procedures in paragraph 6.6.13.c.

6.6.16 P1 Bleed Valve Removal and Installation (E-BAC/SS only).

WARNING
E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves and P1 bleed valve to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

NOTE
To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

   (1) Wrench, 1/2 inch
   (2) P1 Bleed Valve
   (3) Vise

b. Removal.
   (1) Remove P1 purification chamber from E-BAC/SS IAW procedures in paragraph 6.6.18.b.
   (2) Remove CO/H₂O indicator housing and P1 bleed valve from P1 purification chamber IAW procedures in paragraph 6.6.15.b.
   (3) Place P1 bleed valve in vise, ensuring it is held securely.
   (4) Use 1/2 inch wrench (1, Figure 6-35) to loosen (CCW) and remove elbow fittings (2) on either side of P1 bleed valve.
c. **Installation.**

1. Thoroughly clean male and female threads of elbow fittings and P1 bleed valve, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.
2. Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.
3. Place P1 bleed valve in vise, ensuring it is held securely.
4. Using 1/2 inch wrench, attach elbow fitting to P1 bleed valve, turning CW until snug.
5. Re-position P1 bleed valve in vise and using 1/2 inch wrench, attach elbow fitting with CO/H2O indicator housing attached. Turn elbow fitting CW until snug.
6. Remove P1 bleed valve from vise and reattach to P1 purification chamber IAW procedures in paragraph 6.6.14.c.
7. Reinstall P1 purification chamber onto E-BAC/SS base IAW procedures in paragraph 6.6.18.c.

### 6.6.17 P1 Purification Chamber Removal and Installation (E-BAC only).

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves and P1 bleed valve to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.
a. **Tools, Parts, and Materials.**
   
   (1) Wrench, 1/2 inch  
   (2) Wrench, 9/16 inch  
   (3) Wrench, 7/8 inch  
   (4) Drive ratchet, 3/8 inch  
   (5) Socket, 11/16 inch  
   (6) Slotted screwdriver, large blade  
   (7) O-rings, 2  
   (8) P1 Purification Chamber  
   (9) P1 Purification Chamber Cap Wrench  

b. **Removal.**
   
   (1) E-BAC must be disconnected from enclosure base plate. If connected, follow procedures in Appendix A, paragraph A.2.e to remove E-BAC from enclosure base plate.  
   (2) Once E-BAC has been removed from enclosure base plate, place on wooden blocks or other suitable shim material at least 6 inches off the deck to facilitate removal procedures.  
   (3) Open P1 bleed valve (6, **Figure 6-36**) to release pressure from within P1 purification chamber.  

![Figure 6-36. P1 Purification Chamber Connections and Bleed Valve.](image)

(4) Remove P1 purification chamber check valve (1) IAW procedures in paragraph 6.6.11.b.  
(5) Remove CO/H₂O indicator housing (7) IAW procedures in paragraph 6.6.13.b.  
(7) Using 7/8 inch wrench (1, **Figure 6-37**), turn CCW to loosen and remove adapter fittings on either side of P1 purification chamber.
(8) Place adapter fitting (2, Figure 6-38) in vise and use 1/2 inch wrench to loosen (CCW) and remove elbow connection (1).

(9) Using a drive ratchet and 11/16 inch socket, turn CCW to loosen and remove bolt (1, Figure 6-39) that is located underneath E-BAC frame.
(10) Using slotted screwdriver to hold bolt (2, Figure 6-40) in place, loosen nut (3) by turning 9/16 inch wrench CCW. This opens unistrut brace (1) allowing P1 purification chamber to be removed.

Figure 6-39. Bolt Located Underneath Frame.

Figure 6-40. Nut and Bolt Securing Unistrut Brace.

c. **Installation.**

(1) Thoroughly clean male and female threads of all fittings, P1 bleed valve, and P1 purification chamber, removing all previously applied anti-seize (Teflon) tape. Do not allow tape particles to enter the valves.

(2) Wrap anti-seize (Teflon) tape around male threads of all connections in a spiral CCW direction, starting at the second or third thread. Encircle the threads three times.
(3) If unistrut brace has been removed from or fallen from filter mount, reattach by inserting notched ends (1, Figure 6-41) into filter mount (2).

![Figure 6-41. Notched Ends of Unistrut Brace in Filter Mount.](image)

(4) From underneath E-BAC frame, insert bolt that secures P1 purification chamber to frame and hold bolt in place.

(5) Place P1 purification chamber inside unistrut brace and lower until chamber’s bolt hole is aligned over bolt. Fasten bolt with drive ratchet and 11/16 inch socket, turning CW until snug.

(6) Close unistrut brace (1, Figure 6-42) around P1 purification chamber and secure by threading bolt (2) through holes in brace. Place washer on end of bolt and thread nut (3) onto bolt. Do not tighten completely.
(7) Lubricate adapter O-ring lightly. Insert one O-ring into each opening (labeled IN and OUT) at bottom of P1 purification chamber.

(8) Using a 7/8 inch wrench, reconnect adapters on either side of P1 purification chamber. Fasten by turning wrench CW until snug.

**NOTE**

Ensure elbow fitting opening is pointing straight up when fastening is completed. Failure to comply will result in being unable to connect other components.

(9) Using a 1/2 inch wrench, reconnect elbow fittings on either side of P1 purification chamber. Fasten by turning wrench CW until snug, ensuring fitting opening is pointing straight up when tightening is completed.


(11) Attach CO/H₂O indicator IAW procedures in paragraph 6.6.13.c, but do not fully attach flare nut connecting the line to pressure maintaining valve.

(12) Attach P1 purification chamber check valve IAW procedures in paragraph 6.6.11.c, but do not fully attach flare nut connecting the line from final separator.

(13) Check that CO/H₂O indicator (2, Figure 6-43) and P1 purification check valve (4) are in proper alignment with connecting lines (1 and 3).
(14) Secure unistrut brace (1, Figure 6-44) around P1 purification chamber by using slotted screwdriver on bolt (2) to hold in place while turning 9/16 wrench on nut (3) CW until snug.

Figure 6-44. Nut and Bolt Securing Unistrut Brace.
(15) Reattach E-BAC frame to enclosure base plate IAW procedures in Appendix A, paragraph A.2.b.

6.6.18 P1 Purification Chamber Removal and Installation (E-BAC/SS only).

WARNING

E-BAC/SS must be shut down and system bled prior to conducting corrective maintenance. Open condensate drain valves to vent any trapped air. Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

NOTE

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

   (1) Wrench, 5/8 inch
   (2) Wrench, 7/16 inch
   (3) Drive ratchet, 3/8 inch
   (4) Socket, 11/16 inch
   (5) P1 Purification Chamber Cap Wrench
   (6) P1 Purification Chamber

b. Removal.
   (1) Using 5/8 inch wrench (1, Figure 6-45), loosen (CCW) and remove flare fitting on line (2) connecting CO/H$_2$O indicator housing to the pressure maintaining valve.

Figure 6-45. Removing Flare Fitting on Line from CO/H$_2$O Indicator Housing.
(2) Using 5/8 inch wrench (1, Figure 6-46) loosen and remove flare fitting on line (2) going from CO/H₂O indicator housing to pressure maintaining valve. Set line aside.

Figure 6-46. Removing Flare Fitting on Line to Pressure Maintaining Valve.

(3) Using 5/8 inch wrench, loosen (CCW) and remove flare fitting on line going into P1 check valve.

(4) Using 5/8 inch wrench, loosen (CCW) but do not remove flare fitting on connection at final separator (1, Figure 6-47). This will enable the line (2) to be moved as needed to facilitate maintenance.
(5) Using 7/16 inch wrench, loosen and remove front nut (4) and washer on brace securing P1 purification chamber to filter mount. Brace (1, Figure 6-48) will swing free from P1 purification chamber.
(6) Using 7/16 inch socket on drive ratchet, loosen and remove two bolts (1, Figure 6-49) and washers underneath E-BAC/SS base that secure P1 purification chamber.

Figure 6-49. Bolts Underneath E-BAC/SS Base.

(7) Remove P1 purification chamber check valve IAW procedures in paragraph 6.6.12.b.
(8) Remove P1 purification chamber bleed valve and CO/H₂O indicator housing IAW procedures in paragraph 6.6.14.b.

c. **Installation.**

(1) If not previously installed, install P1 purification chamber bleed valve and CO/H₂O indicator housing IAW procedures in paragraph 6.6.14.c.
(2) If not previously installed, install P1 purification chamber check valve IAW procedures in paragraph 6.6.12.c.
(3) Set P1 purification chamber (1, Figure 6-50) in place against filter mount (2) and thread brace bolt through hole in filter mount. Thread washer and nut (3) onto bolt but do not fully tighten.
Figure 6-50. Brace Bolt in Place with Washer and Nut.

(4) Using 5/8 inch wrench, connect the line (2, Figure 6-51) from the final separator to the P1 check valve, turning flare fittings (1 and 3) on both ends of line CW until snug.
(5) Using 5/8 inch wrench (1, Figure 6-52 and Figure 6-53), connect the line (2) from the CO/H₂O indicator housing to the pressure maintaining valve, turning flare fittings on both ends of line CW until snug.
(6) Using 11/16 inch socket on drive ratchet underneath E-BAC/SS base, fasten bolts (1, Figure 6-54) and washers to corresponding threaded holes in P1 purification chamber. Tighten bolts, turning CW until snug.

(7) Using 7/16 inch wrench, tighten nut on brace bolt, turning CW until snug.
6.6.19 **Intermediate Separator Removal and Installation.**

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

a. **Tools, Parts, and Materials.**
   
   (1) Wrench, 1/2 inch  
   (2) Wrench, 11/16 inch  
   (3) Wrench, 3/4 inch  
   (4) Drive ratchet, 3/8 inch with 3 inch extension  
   (5) Socket, 1/2 inch  

b. **Removal.**

   **NOTE**

   To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.

   (1) Unscrew (CCW) CGA fittings on fill hoses from stowage couplings.  
   (2) Remove Tygon® tubing from drain on bottom of intermediate separator.  

   **NOTE**

   When loosening or removing lines going to or coming from intermediate separator, hold wrench on nipple fitting while turning flare fitting.

   (3) While holding nipple fitting (1, *Figure 6-55*) in place with 11/16 inch wrench, use 3/4 inch wrench to loosen (CCW) flare fitting (2) on line at 3rd stage cylinder. This will facilitate removing intermediate separator.
(4) On line coming from 2nd stage intercooler and into side of intermediate separator (1, Figure 6-56), hold nipple fitting (3) in place with 11/16 inch wrench and use 3/4 inch wrench to loosen (CCW) flare fitting (2). Pull line away from intermediate separator.

(5) On line going to 3rd stage cylinder from top of intermediate separator (4), hold nipple fitting (6) in place with 11/16 inch wrench and use 3/4 inch wrench to loosen flare fitting (5).

**CAUTION**

Two people are needed for the following step; one to hold intermediate separator while another loosens the bolts on the clamp securing the intermediate separator to the frame. Failure to comply will cause equipment damage.
(6) Have another person hold intermediate separator (1, Figure 6-57) to prevent it from falling. Use 3/4 inch drive ratchet with 1/2 inch socket to loosen (turning CCW) bolts (3) securing the clamp that holds the intermediate separator in place. Use 1/2 inch wrench on other side of filter mount (2) to keep nuts from turning when loosening bolts.

![Figure 6-57. Bolts Securing Intermediate Separator Clamp.](image)

(7) When bolts have been loosened enough to permit removing the intermediate separator, disconnect it from 2nd stage intercooler, then lift it up and away from compressor block. Ensure the condensate drain valve is not damaged when removing intermediate separator.

c. Installation.

![CAUTION]

Two people are needed for the following step; one to hold intermediate separator while another secures it to the frame. Failure to comply will cause equipment damage.

(1) Have one person carefully place intermediate separator inside clamp, positioned so that the lines connecting it with the 2nd stage aftercooler and the 3rd stage cylinder are in alignment.

(2) With the 1/2 inch wrench holding the nut on the inside of the compressor frame, turn 3/4 inch drive ratchet with 1/2 inch socket attached CW to tighten the clamp around the intermediate separator just enough to keep it from falling but still capable of being adjusted to ensure proper alignment with connecting lines.

(3) Connect to the side of intermediate separator the line coming from the 2nd stage intercooler (1, Figure 6-58). Fasten the flare fitting (2) to the nipple fitting (3), turning CW until hand-tight.
Figure 6-58. Flare Fittings and Nipple Fittings on Intermediate Separator.

(4) Connect the line going to the 3rd stage cylinder (4) onto the intermediate separator. Fasten the flare fitting (5) to the nipple fitting (6), turning CW until hand-tight.

(5) While using 11/16 inch wrench to keep nipple fittings from turning, use 3/4 inch wrench and turn flare fittings on both connections CW. Tighten until snug.

(6) Attach Tygon® tubing to drain on bottom of intermediate separator.

(7) With the 1/2 inch wrench holding the nut on the back side of the filter mount, turn 1/2 inch drive ratchet CW to tighten the clamp around the intermediate separator. Tighten until snug.

(8) Coil hoses and screw (CW) CGA fitting of fill hoses onto stowage couplings carefully, taking care not to damage threads.

6.6.20 Final Separator Removal and Installation.

**WARNING**

E-BAC must be shut down and system bled prior to conducting corrective maintenance. Open only condensate drain valves to vent any trapped air.

Before venting high-pressure air, ensure all personnel stand clear to avoid serious personal injury or death from flying debris. Operator shall announce BLEEDING DOWN to warn nearby personnel. Operator must wear protective eyewear and hearing protection to prevent serious personal injury.

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

(1) Wrench, 5/8 inch

(2) Wrench, 3/4 inch

(3) Drive ratchet with deep socket, 7/16 inch

b. **Removal.**

**NOTE**

To maintain system cleanliness, cover all open lines and connections with plastic bags sealed with tape or rubber bands if line or connection will remain open after maintenance is completed.
(1) Unscrew (CCW) CGA fittings on fill hoses from stowage couplings.
(2) Remove Tygon® tubing from drain on bottom of final separator.
(3) While using 3/4 inch wrench to hold check valve in place, use 5/8 inch wrench to loosen (CCW) flare fitting (6, Figure 6-59) connecting to nipple fitting on P1 purification chamber check valve.

Figure 6-59. Flare Fitting Connections for Final Separator.

(4) Use 5/8 inch wrench to loosen (CCW) flare fitting (5) on line coming from aftercooler.
(5) Use 5/8 inch wrench to loosen (CW) flare fitting (1) on final separator. This line is going to P1 purification chamber check valve. Pull line off nipple fitting from final separator.
(6) Use 5/8 inch wrench to loosen (CCW) flare fitting (2) on final separator. This line is coming from aftercooler. Pull line off nipple fitting from final separator.

CAUTION
Two people are needed for the following steps; one to hold final separator while another loosens the nuts on the U-bolt which secures it to the frame. Failure to comply will cause equipment damage.

(7) Have one person hold the final separator so it does not fall. Using a 3/8 inch drive ratchet with 7/16 inch deep socket, loosen the nuts (3 and 4) on the U-bolt by turning CCW.
(8) When the U-bolt has been sufficiently loosened, person holding separator shall lift it up carefully out and away from frame mount.

c. Installation.

CAUTION
Two people are needed for the following steps; one to hold final separator while another tightens the nuts on the U-bolt which secures it to the frame. Failure to comply will cause equipment damage.
(1) Have one person hold the final separator inside the U-bolt, with the final separator positioned so that the lines connecting it with the aftercooler and P1 purification chamber check valve are aligned.

(2) Tighten the connections on lines to the final separator hand-tight.

(3) Using a drive ratchet with 7/16 inch deep socket, tighten the nuts (3 and 4) on the U-bolt holding final separator by turning CW until snug.

(4) Using a 5/8 inch wrench, reattach flare fitting (1) connecting line to P1 purification chamber check valve. Turn CCW until snug.

(5) Using a 5/8 inch wrench, reattach flare fitting (2) connecting line from aftercooler. Turn CW until snug.

(6) Using a 5/8 inch wrench, reattach flare fitting (5) connecting line from aftercooler. Turn CW until snug.

(7) While using a 3/4 inch on check valve to hold in place, use a 5/8 inch wrench to reattach flare fitting (6) connecting line to P1 purification chamber check valve. Turn CW until snug.

(8) Reattach Tygon® tubing to drain on bottom of final separator.

6.6.21 **Air Inlet Hose Assembly Removal and Installation.**

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

(1) Screwdriver, slotted or Phillips

(2) Air Inlet Hose Assembly

b. **Removal.**

(1) Using screwdriver, loosen hose clamp (1, Figure 6-60) that secures air inlet hose (2) to intake filter (3) by turning CCW.
(2) When sufficient slack is present in hose clamp, pull hose off air intake filter.
(3) If necessary to remove pre-filter (3, Figure 6-61) at other end of inlet hose (1), loosen hose clamp (2) by turning screwdriver CCW.
c. **Installation.**

1. If pre-filter is not already installed on air inlet hose, first put hose clamp (2) around one end of air inlet hose (1). Do not tighten.
2. Push open end of pre-filter (3) onto air inlet hose at same end as clamp installed in previous step. Ensure pre-filter is on hose as far as it will go.
3. Secure pre-filter on air inlet hose by positioning hose clamp (2) at base of pre-filter and tighten clamp by turning bolt CW with screwdriver. Tighten until snug.
4. Place hose clamp (2, Figure 6-62) around other end of air inlet hose. Do not tighten.
5. Push other end of air inlet hose onto air intake filter housing as far as it will go.
6. Secure air inlet hose (3) on air intake filter by moving clamp (3) to base of intake filter and tighten clamp (1) with screwdriver, turning CW until snug.
6.6.22 Air Intake Filter Housing Removal and Installation.

   (1) Screwdriver, slotted or Phillips
   (2) Air Intake Filter Housing

b. Removal.
   (1) Remove air inlet filter hose IAW procedures in paragraph 6.6.18.b.
   (2) By turning screwdriver CCW, loosen clamp (2, Figure 6-63) that secures intake filter housing (3) to 1st stage cylinder valve (1). Set clamp and hardware aside.

   ![](image)

   Figure 6-63. Air Intake Filter and Clamp.

   (3) Pull intake filter housing (3) off first stage cylinder valve (1).

c. Installation.
   (1) Put clamp (2) around neck of intake filter housing (3).
   (2) Push intake filter housing (3) onto 1st stage cylinder valve (1), ensuring that it is fully seated on the valve opening.
   (3) Tighten clamp (2) using a screwdriver, turning CW until snug.
   (4) Reattach air inlet hose IAW procedures in paragraph 6.6.18.c.

6.6.23 Venting the Compressor Oil Pump.

   **NOTE**
   The following procedure should be performed when no oil is visible or bubbles are present in oil level sight glass. This condition may occur after maintenance or repair work has been done.

   (1) Wrench, 9/16 inch
   (2) Rags

b. Venting the Oil Pump.
   (1) Ensure compressor and diesel engine are shut down.
(2) Remove belt guard IAW procedure in paragraph 6.6.1.b for E-BAC or paragraph 6.6.2.b for E-BAC/SS.

(3) Vent the crankcase by turning black plastic screw cap (1, Figure 6-64) on plastic crankcase vent feedback line (2) CCW until loose. Pull line off cylinder head.

![Figure 6-64. Crankcase Vent Feedback Line and Screw Cap.](image)

(4) Using 9/16 inch wrench, loosen (CW) and remove tube nut (1, Figure 6-65) and tube (2) from oil pump fitting on bottom of compressor block. Place rags under fitting to catch oil.
(5) Rotate compressor fanwheel (1, Figure 6-66) CCW by hand until bubble-free oil emerges from oil pump fitting. This should only take a few seconds.

(6) When bubble-free oil is observed, reattach tube and tube nut to oil pump fitting. Secure with 9/16 inch wrench, turning CCW until snug.
(7) Reattach crankcase vent feedback line by pushing line onto fitting on cylinder head. Secure by reattaching screw cap and turning CW by hand until snug.

(8) Reattach belt guard IAW procedures in paragraph 6.6.1.c for E-BAC or paragraph 6.6.2.c for E-BAC/SS.

6.6.24 Freeing Stuck Fuel Injector Piston in Yanmar Diesel Engine.

   (1) Wrench, 11/16 inch
   (2) Drive ratchet, with 3/8 inch socket and 4 inch extension
   (3) Needle-nose pliers

b. Removal.
   (1) Remove low-pressure fuel supply line (1, Figure 6-67) at injector pump (2).

   (2) Using 11/16 inch wrench, remove (CCW) rigid fuel line (5) at injector pump (2).
   (3) Using 3/8 inch socket with drive ratchet and 4 inch extension, remove (CCW) three nuts (4) on injector pump; on bottom nut, also remove cover plate (3).
   (4) Remove fuel injector pump (1, Figure 6-68).
c. **Freeing Stuck Piston.**

   (1) Ensure shutoff valve (1, Figure 6-69) on fuel injector pump is open by sliding to the right.

   (2) Reattach rigid fuel supply line and low-pressure fuel supply line to injector pump.

   (3) As fuel is flowing, free piston by firmly pressing injector pump spring on a flat, hard surface several times as shown in Figure 6-70.
Figure 6-70. Freeing Injector Pump Piston.

(4) Disconnect rigid fuel supply line and low-pressure fuel supply line from injector pump.

d. Replacement.

(1) Put injector pump into engine, ensuring shutoff valve is positioned between the guides as shown in Figure 6-71.

Figure 6-71. Correct Placement of Shutoff Valve.

(2) Using 3/8 inch socket with drive ratchet and 4 inch extension, replace two upper nuts and tighten, turning CW until snug.

(3) While looking through cover plate opening, activate Engine Speed Lever to ensure fuel shutoff valve is positioned correctly between the guides. Using the Engine Speed Lever, position the fuel shutoff valve so that it is aligned with the center mark as shown in Figure 6-72.
Figure 6-72. Aligning Fuel Shutoff Valve with Center Mark.

(4) Using 3/8 inch socket with drive ratchet and 4 inch extension, reattach bottom nut and cover plate, turning nut CW until snug.

(5) Using 11/16 inch wrench, reattach rigid fuel line at injector pump, turning CW until snug.

(6) Reattach low-pressure fuel supply line at injector pump.

6.6.25 **Recoil Starter Assembly and Cord Removal and Installation.**

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

(1) Wrench, 3/8 inch
(2) Recoil Starter
(3) Starter Rope

b. **Removal.**

(1) Note position of recoil starter (1, Figure 6-73) in relation to the engine.

Figure 6-73. Recoil Starter Assembly.
NOTE

Only three of four recoil starter assembly bolts are shown in above photograph.

(2) While supporting the recoil starter assembly (1), use 3/8 inch wrench to remove the four bolts (2) that mount the assembly to the engine. Move recoil starter assembly out and away from engine.

(3) **(E-BAC only)** Push recoil starter rope through handle so knot is exposed. Untie knot and remove handle from rope.

(4) If starter mechanism is faulty, obtain a new starter mechanism and rope assembly. Proceed to replacement steps in paragraph 6.6.25.c.(6).

(5) If only starter rope is being replaced, place starter mechanism on a suitable working surface with inside of starter mechanism facing up.

**WARNING**

Do not remove the center screw in recoil starter mechanism. The flywheel mechanism is spring-loaded and, if released, can cause serious personal injury.

**NOTE**

Two people are needed to perform the following procedures.

(6) Pull starter rope (1, Figure 6-74) until it is fully extended. Have another person hold flywheel in place after rope is fully extended.

![Figure 6-74. Aligning Rope Access.](image)

(7) Align flywheel assembly rope access opening with opening in starter mechanism housing.

(8) Remove damaged starter rope by cutting the rope or untying the knot at the flywheel end.

c. **Replacement.**

**NOTE**

If starter rope is frayed or completely missing, turn flywheel CCW approximately 6 or 7 times prior to installation. This puts necessary spring tension on the spring to recoil the rope after pulling it.

(1) Feed loose end of new rope (1, Figure 6-75) through the rope guide on the housing and through the opening in the flywheel.
(2) Tie one overhand knot (2, Figure 6-76) in the end of the rope, leaving a 1/2 inch of rope after the knot. Push the knot and the 1/2 inch of rope into the small rectangular area on the flywheel. Ensure it does not catch after the starter mechanism replacement.

(3) Pull the rope taut so there is no slack between flywheel and housing.

(4) Slowly allow the spring action to recoil the new rope onto the flywheel. There should be no slack in the rope and the starter rope handle should be snug against the housing as shown in Figure 6-77.
Figure 6-77. Recoil Replacement Rope.

(5) If rope handle does not fit snug against the handle, remove the rope and further tighten flywheel spring by increasing the number of CCW turns prior to installing the new rope. Usually one more turn will increase spring tension sufficiently.

(6) Place recoil starter (1, Figure 6-73) on engine in same position as before (9 o’clock position).

(7) Align mounting holes and insert all four mounting bolts (2). After all four bolts are in place, tighten each using 3/8 inch wrench and turning CW until snug.

(8) Slowly pull starter rope (3) to ensure proper operation.

(9) (E-BAC only) Push starter rope through handle so knot is exposed. Thread rope through eyebolt on E-BAC frame and slide rope handle onto rope. Leave enough rope to re-tie knot.

(10) (E-BAC only) Re-tie knot securely and pull rope back into handle. Rope handle should be snug against E-BAC frame eyebolt.
CHAPTER 7
ILLUSTRATED PARTS BREAKDOWN

7.1 INTRODUCTION.
This chapter provides the Illustrated Parts Breakdown (IPB) for the Emergency Breathing Air Compressor (E-BAC). Each assembly or component has an exploded or cutaway view of the item and a corresponding table listing the parts and information necessary for ordering.

7.2 PARTS LISTS AND ILLUSTRATIONS.
Figure 7-1 through Figure 7-12 provide parts lists for principal E-BAC components. Table column headings are as follows:
- FIGURE - ITEM NO.: Indicates the figure and item numbers relating to part location on the corresponding illustration.
- CAGE: Identifies the Commercial and Government Entity (CAGE) code for the part manufacturer.
- PART NO.: The Federal Logistics Record (FEDLOG) part number is provided, which is the manufacturer’s part number.
- DESCRIPTION: Contains the item nomenclature and pertinent descriptive data about the part.
- QTY: Indicates the quantity required per assembly.
Figure 7-1. Air Intake Filter Assembly.
Table 7-1. Air Intake Filter Assembly Parts List

<table>
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<th>FIGURE 7-1 ITEM NO.</th>
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<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<td>012771</td>
<td>Intake Filter Cover</td>
<td>1</td>
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<td>3</td>
<td>57328</td>
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<td>Compression Spring</td>
<td>1</td>
</tr>
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<td>O-ring</td>
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<td>Pre-filter</td>
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<tr>
<td>11</td>
<td>57328</td>
<td>CMP-0025</td>
<td>Worm Gear Hose Clamp</td>
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<td>12</td>
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<td>HOS-00163</td>
<td>Reinforced Flexible Tube</td>
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Figure 7-2. Drive System Assembly.
### Table 7-2. Drive System Assembly Parts List

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<th>FIGURE 7-2 ITEM NO.</th>
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<tbody>
<tr>
<td>1</td>
<td>57328</td>
<td>BET-0013</td>
<td>V-belt (cannot be purchased separately but can be bought referencing GSA contract # GS-07F-9711G KIT-0071)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>57328</td>
<td>SHE-0142</td>
<td>Pulley Sheave</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>57328</td>
<td>BUS-0011</td>
<td>Pulley Sheave Bushing</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>57328</td>
<td>WAS-0033</td>
<td>Lock Washers</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>57328</td>
<td>SCR-0011</td>
<td>Hex Head Cap Screws (1/4-20 x 3/4 inch)</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>57328</td>
<td>KEY-0012</td>
<td>Key Way (1/4 square x 2 inches long)</td>
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Figure 7-3. Pressure Maintaining Valve Assembly.
Table 7-3. Pressure Maintaining Valve Assembly Parts List

<table>
<thead>
<tr>
<th>FIGURE 7-3 ITEM NO.</th>
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<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>1</td>
<td>57328</td>
<td>VAL-0053</td>
<td>Pressure Maintaining Valve</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>57328</td>
<td>WAS-0017SS</td>
<td>Washers, 1/4 inch</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>57328</td>
<td>NUT-0005SS</td>
<td>Nylon Hex Nuts, 1/4 inch</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>57328</td>
<td>CON-0039SS</td>
<td>Nipple Fitting</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>57328</td>
<td>TEE-0014SS</td>
<td>Tee Connection</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>57328</td>
<td>VAL-0007</td>
<td>Check Valve (with aluminum fitting)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>57328</td>
<td>SCR–0073SS</td>
<td>Hex Bolts, 1/4 inch</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>57328</td>
<td>ELL-0031SS</td>
<td>Elbow Nipple Fitting (E-BAC/SS only)</td>
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Figure 7-4. P1 Purification Chamber Assembly.
### Table 7-4. P1 Purification Chamber Assembly Parts List

<table>
<thead>
<tr>
<th>FIGURE 7-4 ITEM NO.</th>
<th>CAGE</th>
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<th>DESCRIPTION</th>
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<td>1</td>
<td>57328</td>
<td>080143</td>
<td>P1 Purification Chamber Assembly</td>
<td>1</td>
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<td>2</td>
<td>57328</td>
<td>012293</td>
<td>Tool Post Screws</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>57328</td>
<td>061237</td>
<td>Cover Plate</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>57328</td>
<td>080147</td>
<td>Filter Head (available only with complete assembly)</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>57328</td>
<td>N04736</td>
<td>Back-up Ring</td>
<td>2</td>
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<tr>
<td>6</td>
<td>57328</td>
<td>N04735</td>
<td>O-ring</td>
<td>2</td>
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<tr>
<td>7</td>
<td>57328</td>
<td>080146</td>
<td>Filter Housing (available only with complete assembly)</td>
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<tr>
<td>8</td>
<td>57328</td>
<td>058821A</td>
<td>P1 Purifier Cartridge</td>
<td>1</td>
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<td>9</td>
<td>57328</td>
<td>080148</td>
<td>Filter Bottom (available only with complete assembly)</td>
<td>1</td>
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<tr>
<td>10</td>
<td>57328</td>
<td>N04499</td>
<td>Gasket</td>
<td>2</td>
</tr>
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<td>11</td>
<td>57328</td>
<td>ADP-0020SS</td>
<td>Adapter</td>
<td>2</td>
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<td>12</td>
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<td>065126</td>
<td>P1 Bleed Valve</td>
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<tr>
<td>13</td>
<td>57328</td>
<td>ELL-0058SS</td>
<td>Elbow Fitting, 1/4 NPT</td>
<td>2</td>
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<tr>
<td>14</td>
<td>57328</td>
<td>WAS-0030SS</td>
<td>Lock Washer (two required for E-BAC/SS)</td>
<td>1</td>
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<tr>
<td>15</td>
<td>57328</td>
<td>SCR-0116SS</td>
<td>Hex Head Bolt 11/16 inch (two required for E-BAC/SS, along with Flat Washers WAS-0031SS)</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>57328</td>
<td>VAL-0007</td>
<td>Check Valve (with aluminum fitting)</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
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<td>CMP-0004AL</td>
<td>Clamp Assembly, with 9/16 inch nut and bolt (E-BAC only)</td>
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<td></td>
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<td>CMP-0002</td>
<td>Brace Assembly, with 7/16 inch nuts and washers (E-BAC/SS only)</td>
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Figure 7-5. CO/H$_2$O Indicator Housing Assembly.
Table 7-5. CO/H₂O Indicator Housing Assembly Parts List

<table>
<thead>
<tr>
<th>FIGURE 7-5</th>
<th>CAGE NO.</th>
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<td></td>
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<tr>
<td>1</td>
<td>57328</td>
<td>IND-0015</td>
<td>CO/H₂O Indicator Assembly; consists of:</td>
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<td>2</td>
<td>57328</td>
<td>ELM-0056</td>
<td>Indicator Element (includes CO and H₂O detection strips)</td>
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<td>3</td>
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<td>RNG-0105</td>
<td>O-ring</td>
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<td>4</td>
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<td>CON-0078SS</td>
<td>Fitting</td>
<td>1</td>
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<tr>
<td>5</td>
<td>57328</td>
<td>CON-0017SS</td>
<td>Fitting, Hex Nipple</td>
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<tr>
<td>6</td>
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<td>ELL-0058SS</td>
<td>Elbow Fitting, (E-BAC/SS only)</td>
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Figure 7-6. Intermediate Separator Assembly.
### Table 7-6. Intermediate Separator Assembly Parts List

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<tr>
<th>FIGURE 7-6 ITEM NO.</th>
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<td>013758</td>
<td>Intermediate Separator Assembly</td>
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<td>57328</td>
<td>N20341</td>
<td>Male Connector</td>
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<td>57328</td>
<td>011656</td>
<td>Safety Valve</td>
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<td>4479</td>
<td>Gasket</td>
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<td>N20237</td>
<td>Male Connector</td>
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<td>57328</td>
<td>N7430</td>
<td>Gland Nut</td>
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<td>57328</td>
<td>N4530</td>
<td>Plug</td>
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<td>8</td>
<td>57328</td>
<td>013930</td>
<td>Filter Head</td>
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<td>57328</td>
<td>N03356</td>
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<td>012784</td>
<td>Vortex Plate</td>
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<td>57328</td>
<td>012785</td>
<td>Baffle Cone</td>
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<td>N02726</td>
<td>Sintered Metal Filter</td>
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<td>012786</td>
<td>Center Screw</td>
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</tr>
<tr>
<td>14</td>
<td>57328</td>
<td>011430</td>
<td>Manual Condensate Drain</td>
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<td>57328</td>
<td>013937</td>
<td>Threaded Collar</td>
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<td>N89</td>
<td>Hex Head Bolt</td>
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<td>N58</td>
<td>Washer</td>
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<td>19</td>
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<td>14368</td>
<td>Clamp</td>
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<td>Washer</td>
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<td>N4051</td>
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<td>N3459</td>
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Figure 7-7. Final Separator Assembly.
### Table 7-7. Final Separator Assembly Parts List

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<td>090058</td>
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<td>011523</td>
<td>Safety Valve</td>
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<td>57328</td>
<td>N04499</td>
<td>Gasket</td>
<td>1</td>
</tr>
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<td>4</td>
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<td>SCR-0136</td>
<td>Socket Head Cap Screw</td>
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<td>57328</td>
<td>064013</td>
<td>Flange Adapter</td>
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<td>6</td>
<td>57328</td>
<td>N04882</td>
<td>O-ring</td>
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<tr>
<td>7</td>
<td>57328</td>
<td>016399</td>
<td>Flange Elbow Assembly; consists of:</td>
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<td>063998</td>
<td>Flange Adapter</td>
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<td>063997</td>
<td>Flange Elbow</td>
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<td>SCR-0133</td>
<td>Socket Head Cap Screw</td>
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<td>N01316</td>
<td>Gasket</td>
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<td>CON-0016SS</td>
<td>Male Connector</td>
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<td>57328</td>
<td>WAS-0021</td>
<td>Washer</td>
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<td>14</td>
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<td>N00084</td>
<td>Self-Locking Hex Nut</td>
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<td>011430</td>
<td>Manual Condensate Drain Valve</td>
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<td>16</td>
<td>57328</td>
<td>N/A</td>
<td>Separator Housing Bottom (part of assembly, not sold separately)</td>
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<tr>
<td>17</td>
<td>57328</td>
<td>N04586</td>
<td>O-ring</td>
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<td>18</td>
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<td>058165</td>
<td>U-bolt</td>
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<td>19</td>
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<td>Filter Element</td>
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<td>N15133</td>
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<td>22</td>
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<td>N16875</td>
<td>Plug</td>
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<td>23</td>
<td>57328</td>
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<td>Separator Housing Top (part of assembly, not sold separately)</td>
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Figure 7-8. E-BAC Frame Assembly.
Table 7-8. E-BAC Frame Assembly Parts List

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<th>QTY</th>
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<td>GRD-0241</td>
<td>Belt Guard</td>
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<td>2</td>
<td>57328</td>
<td>FRM-0194</td>
<td>Compressor Frame</td>
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<td>57328</td>
<td>BRC-0055</td>
<td>Frame Cross-Brace</td>
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<tr>
<td>4</td>
<td>57328</td>
<td>BLT-0026</td>
<td>U-bolt</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>57328</td>
<td>WHE-0015</td>
<td>Swivel Caster Wheel</td>
<td>4</td>
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<td>6</td>
<td>57328</td>
<td>SUP-0151</td>
<td>Purifier Chamber Support</td>
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<td>7</td>
<td>57328</td>
<td>BRK-0024</td>
<td>Hourmeter Bracket</td>
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<td>8</td>
<td>57328</td>
<td>VIB-0021</td>
<td>Vibration Isolator</td>
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<td>9</td>
<td>57328</td>
<td>BAS-0079</td>
<td>Engine Base</td>
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<td>10</td>
<td>57328</td>
<td>END-0011</td>
<td>Jaw Type Turnbuckle Assembly</td>
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<td>57328</td>
<td>WAS-0040</td>
<td>Flat Washer</td>
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<td>57328</td>
<td>SPG-0003</td>
<td>Compression Spring</td>
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<td>57328</td>
<td>NUT-0154</td>
<td>Wing Nut</td>
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<td>14</td>
<td>57328</td>
<td>HAN-0048</td>
<td>Lifting Handle</td>
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<td>14</td>
<td>57328</td>
<td>PIN-0033</td>
<td>Spring Pin, 5/16 inch diameter</td>
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<tr>
<td>14</td>
<td>57328</td>
<td>PIN-0034</td>
<td>Spring Pin, 3/16 inch diameter</td>
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<td>15</td>
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<td>HAN-0036</td>
<td>Lifting Handle Set (requires 4 each BUS-0109)</td>
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<td>BUS-0101</td>
<td>Handle Bushing</td>
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<td>16</td>
<td>57328</td>
<td>SCR-0072</td>
<td>Hex Head Bolts (1/4-20 x 5/8 inch long)</td>
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</table>
Figure 7-9. E-BAC/SS Frame Assembly.
Table 7-9. E-BAC/SS Frame Assembly Parts List

<table>
<thead>
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<th>FIGURE 7-8 ITEM NO.</th>
<th>CAGE</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<td>SCR-0370SS</td>
<td>Bolt</td>
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<td>WAS-0065SS</td>
<td>Washer</td>
<td>22</td>
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<td>3</td>
<td>57328</td>
<td>CMP-0117</td>
<td>Clamp</td>
<td>2</td>
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<td>4</td>
<td>57328</td>
<td>NUT-0124SS</td>
<td>Nylon Hex Nut</td>
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<td>SCR-0251SS</td>
<td>Bolt</td>
<td>9</td>
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<td>57328</td>
<td>GRD-0526</td>
<td>Guard, Back Belt</td>
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<td>GRD-0525</td>
<td>Guard, Belt</td>
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<td>57328</td>
<td>FRM-0311</td>
<td>Compressor Frame</td>
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<td>NUT-0116SS</td>
<td>Nylon Hex Nut</td>
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<td>Carriage Bolt</td>
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<td>Purifier Chamber Support</td>
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<td>MTS-0441</td>
<td>Mount, Engine Belt Adjust</td>
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<td>HAN-0048/NAVY</td>
<td>Lifting Handle</td>
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<td>VIB-0037</td>
<td>Vibration Eliminator</td>
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<td>SPC-0115</td>
<td>Spacer, Vibration Isolator</td>
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<td>BLK-0180</td>
<td>Block, Engine Adjusting</td>
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<td>SCR-0251SS</td>
<td>Hex Head Cap Screw</td>
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<td>not shown</td>
<td>57328</td>
<td>WAS-0057SS</td>
<td>Washer, Split Lock</td>
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<td>WAS-0065SS</td>
<td>Washer</td>
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<td>31</td>
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<td>NUT-0003SS</td>
<td>Nut, Hex</td>
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<td>57328</td>
<td>SCR-0094SS</td>
<td>Hex Head Cap Screw</td>
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Figure 7-10. E-BAC/SS Unit Cover.
Table 7-10. E-BAC/SS Unit Cover Parts List

<table>
<thead>
<tr>
<th>FIGURE 7-9 ITEM NO.</th>
<th>CAGE NO.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tr>
<td>1</td>
<td>57328</td>
<td>ENC-0212</td>
<td>Enclosure, C-D/DV/NAVY/SS</td>
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<tr>
<td>2</td>
<td>57328</td>
<td>LCH-0063</td>
<td>Latch, Draw</td>
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Figure 7-11. Accessories.
<table>
<thead>
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<th>ITEM NO.</th>
<th>CAGE PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tr>
<td>1</td>
<td>57328 C-D/DV/NAVY/FH</td>
<td>Fill Hose Assembly (complete assembly)</td>
<td>2</td>
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<td>2</td>
<td>57328 WRH-0005</td>
<td>Purifier Cap Wrench</td>
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Figure 7-12. Yanmar Diesel Engine Replacement Parts.
Table 7-12. Yanmar Diesel Engine Replacement Parts List

<table>
<thead>
<tr>
<th>FIGURE 7-10 ITEM NO.</th>
<th>CAGE</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tr>
<td>1</td>
<td>0AK42</td>
<td>714880-76820</td>
<td>Recoil Starter Assembly</td>
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<tr>
<td>2</td>
<td>0AK42</td>
<td>160810–76630</td>
<td>Recoil Starter Rope</td>
<td>1</td>
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<tr>
<td>3</td>
<td>0AK42</td>
<td>114250–35110</td>
<td>Strainer, Lube Oil</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>0AK42</td>
<td>26106–060162</td>
<td>Lock Bolt</td>
<td>1</td>
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<tr>
<td>5</td>
<td>0AK42</td>
<td>24341–000224</td>
<td>O-ring (included with lube oil strainer)</td>
<td>1</td>
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<td>6</td>
<td>0AK42</td>
<td>114650–12590</td>
<td>Air Cleaner Element</td>
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<td>7</td>
<td>0AK42</td>
<td>114650–12520</td>
<td>Air Cleaner Cover</td>
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<td>8</td>
<td>0AK42</td>
<td>114650–12560</td>
<td>Seal Washer</td>
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<td>9</td>
<td>0AK42</td>
<td>114650–12550</td>
<td>Wing Nut</td>
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<td>10</td>
<td>0AK42</td>
<td>160725–78350</td>
<td>START/STOP Control Knob</td>
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</table>
7.3 **LIST OF MANUFACTURERS.**

Table 7-13 below lists the manufacturers and their Commercial and Government Entity (CAGE) Codes for all of the parts listed in Chapter 7.

*Table 7-13. List of Manufacturers*

<table>
<thead>
<tr>
<th>CAGE Code</th>
<th>Manufacturer</th>
<th>Address</th>
<th>Phone</th>
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<tbody>
<tr>
<td>0AK42</td>
<td>Yanmar Diesel America Corporation</td>
<td>951 Corporate Grove Drive</td>
<td>(800) 966-7685</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Buffalo Grove IL 60089-4508</td>
<td></td>
</tr>
<tr>
<td>57328</td>
<td>Bauer Compressors, Inc.</td>
<td>1328 Azalea Garden Road</td>
<td>(757) 855-6006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Norfolk VA 23502-1944</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX A
(E-BAC ONLY) INSTALLING AND REMOVING ENCLOSURE BASE AND CASTERS

A.1 INTRODUCTION.
The Emergency Breathing Air Compressor (E-BAC) may be supplied with a separate enclosure, base, and four casters. This appendix provides instruction on attaching the E-BAC frame to the enclosure base. Removal instructions are supplied in the event that the pressure maintaining valve or P1 purification chamber need to be replaced.

A.2 INSTALLING AND REMOVING ENCLOSURE BASE.

   (1) Casters with nuts and washers, (4)
   (2) Drive ratchet
   (3) Socket, 3/4 inch
   (4) Enclosure, base, and four locking casters
   (5) Wooden blocks or other shimming material

   NOTE
   The following procedures should be performed only when ship is in calm seas or inport.

b. Installation.
   (1) If fill hose assemblies are attached, remove them in accordance with (IAW) procedures in paragraph 6.6.8.b.

   NOTE
   Place wooden blocks (or other shim material) underneath base plate so that the plate is at least 4 1/4 inches from the deck. This facilitates installing casters.

   (2) Place base plate on wooden blocks or other shim material so that the base plate is at least 4 1/4 inches from the deck. Position base plate so that holes for casters are on the outside of the blocks.

   WARNING
   Casters on bottom of E-BAC must be locked so that they cannot roll during assembly. Failure to comply may cause serious personal injury and/or equipment damage.

   (3) Lock casters so the wheels cannot turn.
   (4) Position casters underneath base plate so that caster bolts (1, Figure A-1) protrude through pre-drilled holes in base plate.
WARNING

The following steps shall be performed with five persons; four for lifting the E-BAC and another to align and position it correctly over enclosure base plate. Failure to comply may cause serious personal injury and/or equipment damage.

(5) Position one person on each handle of E-BAC and lift it simultaneously up and over top of wheeled base.

(6) Slowly lower onto base, with fifth person maneuvering E-BAC so that caster bolts go through the holes in E-BAC frame.

(7) Place one washer on each of the four caster bolts.

(8) To tighten caster bolt underneath diesel engine base plate, first loosen and remove belt tensioning wing nut (1, Figure A-2), washers (2), and spring (3).
To fully tighten caster bolt underneath diesel engine, engine base plate must be lifted to its maximum height and then shimmed so it does not fall. Failure to comply will cause serious personal injury.

(9) Lift engine base plate to its maximum height and use wooden blocks or shims to hold securely in place.
(10) Place nut on caster bolt beneath diesel engine base plate and secure with 3/4 inch drive ratchet until snug.
(11) Have one person hold onto diesel engine base plate and have another person remove shim material. Lower diesel engine slowly to its resting point.
(12) Reattach washer, spring, washer and belt tensioning wing nut as shown in Figure A-2.
(13) Place one washer and nut on each of the three remaining caster bolts and secure with 3/4 inch socket until snug.
(14) Adjust v-belt tension IAW procedures in paragraph 6.6.3.b.
(15) Reattach fill hose assemblies IAW procedures in paragraph 6.6.8.c.
(16) Place cover over E-BAC and use latches to fasten cover to enclosure base plate.

Figure A-2. Belt Tensioning Wing Nut, Washers, and Spring.
(17) If applicable, unlock casters to roll E-BAC to designated storage area. Re-lock casters and secure E-BAC with tie-downs.

c. **Removal.**

**NOTE**

The following procedure must be performed whenever the pressure maintaining valve or P1 purification chamber needs to be removed or replaced.

The following procedures should be performed only when ship is in calm seas or inport.

(1) Remove cover from E-BAC.
(2) Remove fill hose assemblies IAW procedures in paragraph 6.6.8.b.
(3) To loosen and remove caster bolt underneath diesel engine base plate, first loosen and remove belt tensioning wing nut (1, Figure A-3), washers (2), and spring (3).

![Figure A-3. Belt Tensioning Wing Nut, Washers, and Spring.](image)

**WARNING**

To remove caster bolt underneath diesel engine, engine base plate must be lifted to its maximum height and then shimmed so it does not fall. Failure to comply will cause serious personal injury.
(4) Lift engine base plate to its maximum height and use wooden blocks or shims to hold securely in place.

(5) Remove caster bolt beneath diesel engine base plate using 3/4 inch drive ratchet.

(6) Have one person hold onto diesel engine base plate and have another person remove shim material. Lower diesel engine slowly to its resting point.

(7) Reattach washer, spring, washer, and belt tensioning wing nut as shown in Figure A-3.

(8) Loosen and remove nuts and washer on each of the three remaining caster bolts using 3/4 inch drive ratchet.

**WARNING**

The following steps shall be performed with five persons; four for lifting the E-BAC and another to steady base plate as E-BAC is removed. Failure to comply may cause serious personal injury and/or equipment damage.

(9) Position one person on each handle of E-BAC and lift it simultaneously up and off enclosure base plate.

(10) Place wooden blocks (or other shim material) underneath E-BAC so that it is at least 6 inches above the deck. This facilitates maintenance procedures requiring access underneath E-BAC.