BAUER COMPRESSORS

Instruction Manual and Replacement Parts List

Breathing Air Compressor Unit

K 18.1 Truck Module

November 5, 2019 1st Edition, Rev. 1 Chg. 0 MNL-131817

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WARNING

This Instruction Manual and Replacement Parts List contains safety information and instructions for the K 18.1 Truck Module.
You must read, understand and follow all safety precautions and instructions.

Editions, Revisions and Changes

- An Edition is the original or a complete rewriting of the entire Manual.
- A Revision occurs whenever a complete Section or Appendix is rewritten or added.
- A Change occurs when individual pages, drawings or tables are changed.

1st Edition; March 1, 2012

Rev	Chg	Date	Notes	Auth
0	1	May 22, 2014	Added P43 SII Purification & Converted to Mod 8 Block	SS
0	2	Apr. 2, 2015	Changed to MNR-0073	SS
0	3	May 15, 2015	Added P43 S II Purification	SS
0	4	Oct. 1, 2018	Updated ACD	SS
0	5	Aug. 27, 2019	Converted to Mod 9 Block	SS
1	0	Nov. 5, 2019	Converted to B-drains, ASY-1267, MNR-0062 & MNR-0134	SS

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CHAPTER 1: INTRODUCTION

1.1 How To Use This Manual

This manual contains the operating and maintenance instructions for the Bauer Compressors, Inc. products listed on the front cover.

All instructions in this manual should be observed and carried out as written to prevent damage or premature wear to the product or the equipment served by it.

If your unit is equipped with nonstandard accessories and or options, supplemental information is normally included in other documentation; i.e. OEM Manuals or additional Bauer Manuals.

While every effort is made to ensure the accuracy of the information contained in this manual, Bauer Compressors, Inc. will not, under any circumstances be held accountable for any inaccuracies or the consequences thereof.

1.1.1 Manual Safety Notices

Important instructions concerning the endangerment of personnel, technical safety or operator safety will be specially emphasized in this manual by placing the information in the following types of safety notices.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This is limited to the most extreme situations.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

NOTE advise of technical requirements that require particular attention by the operator or the maintenance technician for proper maintenance and utilization of the equipment.

1.2 How to Use the Replacement Parts List

- A lozenge ♦ in the Item Number column indicates the part number for a complete assembly.
- a dagger (†) in the Qty column with or without an ellipse (…) in the Part Number column means the part is illustrated for assembly purposes only and is not available for sale as an individual component. This part can be obtained by ordering the complete assembly.
- AR in the Qty column means that the item is cut or manufactured to the size which the customer specifies.
- A dash (—) in the Item Number column indicates that there is more than one part number applicable to the preceding Item Number.
- The letters in the columns labeled Kit indicate the number of operating hours when the part is to be replaced; a = replaced every 1,000 hours, b = replaced every 2,000 hours and c= replaced every 4,000 hours.
- NS in the Item Number column indicates the part is not illustrated but is available.

When placing an order for spare parts, please provide the following information to ensure delivery of the correct parts. The model number, date of manufacture and serial number can be found of the compressor unit identification plate on the compressor unit frame.

Information		Example
Model Number		UN 4i 25
Serial Number		196156
Date of Manufacture		02/2017
Part Number		VAL-0169
Part Description		Valve
Part Quantity Required		1

Figure 1-1 Compressor Identification Label

WARNING

The use of repair parts other than those included in the Bauer Replacement Parts Lists may create unsafe conditions over which Bauer has no control. Such unsafe conditions can lead to accidents that may be life-threatening, cause substantial bodily injury, and/or result in damage to the equipment. Therefore, Bauer Compressors, Inc. can bear no responsibility for equipment in which unapproved repair parts are installed.

1.3 How to Use the Appendix

Information contained in the Appendix to this manual includes the following.

- The safety instructions applicable to this product. They must be read, understood and complied with prior to operating the product.
- The instructions for installing this product. They must be read, understood and complied with prior to operating the product.
- Reproducible Forms
- Reference Data
  - Torque Values
  - Torque Sequence
  - Conversion Formulas
  - Approved Lubricants
  - Glossary of Abbreviations & Acronyms
- Additional Documents

1.4 Specifications

1.4.1 IK 18.1 Truck Module

Medium	air
Charging Rate	25.2 scfm (713.5 l/min)[1]
Free Air Delivery	21.0 scfm (594.5 l/min)[2]
Inlet pressure	atmospheric
Operating pressure, max.	6,000 psig (420 bar)
Ambient temperature range	40 - 115 °F (5 - 45 °C)
Weight	approx. 3,250 lbs. (1,463 kgs.)

1.4.2 Compressor Block

IK18.1 II	Mod. 9
No. of stages	5
No. of cylinders	4
Cylinder bore, 1st stage	5.92 in. (130 mm)
Cylinder bore, 2nd stage	3.465/2.367 in. (88/60 mm)
Cylinder bore, 3rd stage	1.26 in. (32 mm)
Cylinder bore, 4th stage	0.709 in. (18 mm)
Cylinder bore, 5th stage	0.394 in. (10 mm)
Piston Stroke	1.969 in. (50 mm)
Intermediate pressure, 1st stage	45 - 60 psig (3 - 4 bar)
Safety valve setting, 1st stage	85 psig (6.0 bar)
Intermediate pressure, 2nd stage	195 - 225 psig (13.5 - 15.5 bar)
Safety valve setting, 2nd stage	350 psig (24 bar)
Intermediate pressure, 3rd stage	625 - 640 psig (43 - 44 bar)
Safety valve setting, 3rd stage	1,160 psig (80 bar)
Intermediate pressure, 4th stage	1,930 - 2,145 psig (133 - 148 bar)
Safety valve setting, 4th stage	2,610 psig (180 bar)
Direction of rotation when facing flywheel	CCW
Oil capacity	6 1/3 qts.(6 liters.)
Oil Pressure	60 - 85 psig (4 - 6 bar)
Recommended oil (Synthetic)	BAUER OIL-0024
Maximum Inclination	20° in all directions

1.4.3 Compressor Drive

Voltage	Frequency	Phase	Power	RPM	Type	BAUER PN
208 - 460	60Hz	3Φ	20 Hp	3,600	ODP	MTR-0362

1.4.4 Purification System Applicability

The K 18.1 Truck Module is equipped with the Bauer P5 or P43 Purification System with Securus II® Electronic Moisture Monitoring System.

1. Based on recharging an 80 cubic foot tank from 500 to 3000 PSIG
2. Referenced to standard inlet conditions of 68°F and 36% humidity at 14.70 psia.

CHAPTER 2: OPERATING INSTRUCTIONS; TOUCHSCREEN MONITOR

The following instructions apply to units that use MNR-0062 touchscreen operator interface. This monitor has a 7” color screen and uses a windows operating system.

Figure 2-1 MNR-0062

The electrical panel assembly & PLC will provide logical control and safety shutdowns for the compressor equipment. All necessary time delays, counters, shutdowns, sequencing and safety features are incorporated into a proprietary software program permanently saved into PLC memory. The software program is based on the pressure and use of the compressor. The operator uses the touchscreen interface to communicate with the PLC which is located within the electrical enclosure.

2.1 Emergency Stop Button

A normally closed switch when pulled out, when the E-Stop button is pressed in, it disconnects the main power source, turning off the compressor, draining the ACD system and stopping air delivery to the consuming devices. This button is to be used in case of emergency. Normal operational stops should be accomplished using the operator interface.

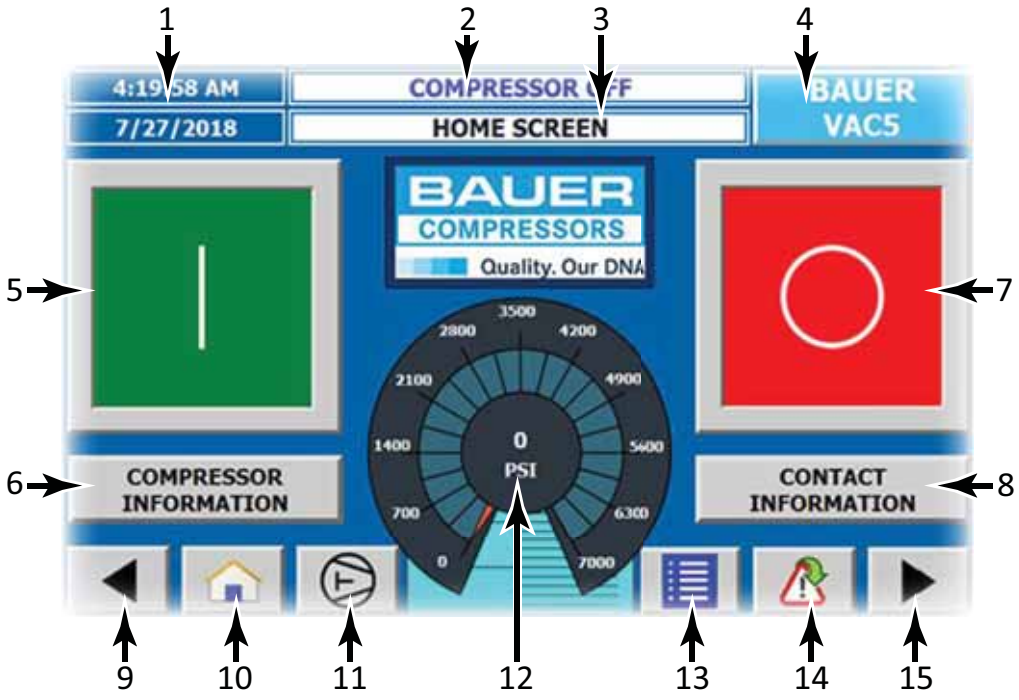
2.2 Operator Interface

The operator interface is a 7 inch, color, touchscreen operation monitor. The operator interface is the input/output device for normal operation of the compressor unit. The compressor system is ready and able to operate after the emergency stop switch is pulled out.

2.2.1 Run Screen

The initial screen after startup allows control and monitoring of the compressor unit. The buttons at the bottom of the screen stay there for easy navigation on most other screens.

Figure 2-2 Run Screen



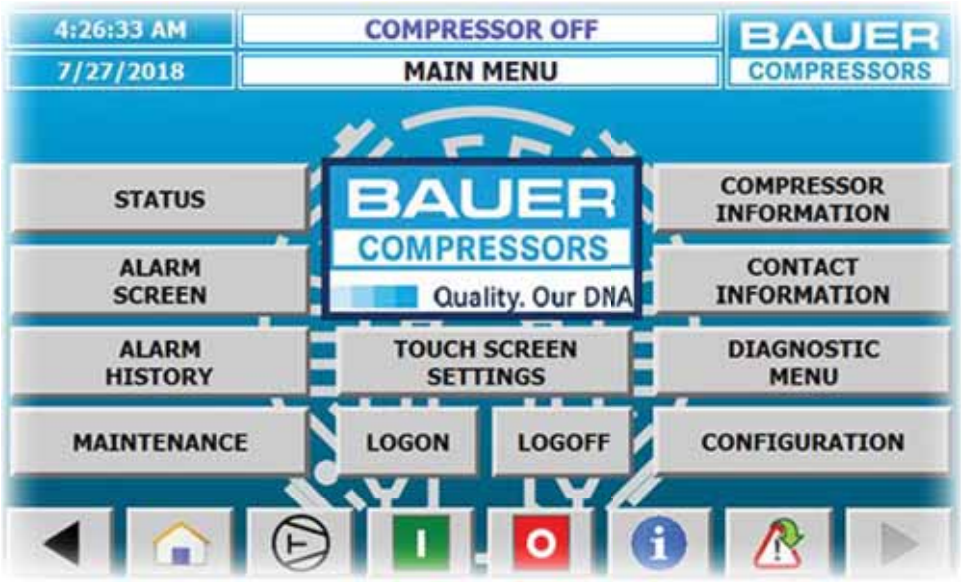
1. Current Time and Date	9. Last Screen Button
2. Compressor Status	10. Home Button
3. Location in Program	11. Status Button
4. Compressor Name	12. Final Pressure
5. Start Button	13. Main Menu Button
6. Compressor Information Button	14. Reset Alarm Button
7. OFF Button	15. Next Page Button
8. Contact Information Button	

1. The current time and date are displayed in this location. This can be adjusted at the tools page by an authorized agent.
2. The compressor status displays whether the compressor is OFF, ON or in an ALARM status.
3. The current location in the program.
4. The compressor's name is displayed here.
5. The Start button turns the compressor ON
6. This button takes the user to the compressor info screen.
7. The OFF button turns the compressor off.
8. The contact information button displays the contact information for maintenance and repairs.
9. The last screen button takes the user to the last screen displayed
10. The home screen button returns the user to the Run Screen.

11. The Status button takes the user to the status screen.
12. The Final Pressure display shows the final pressure on the graphic gauge.
13. The Main Menu button takes the user to the main menu.
14. he Reset Alarm Button resets the alarm. This is to be used once whatever caused the alarm status has been corrected.
15. The Next Page button takes the user to the next page if there is one.

2.2.2 Main Menu Screen

Figure 2-3 Main Menu Screen

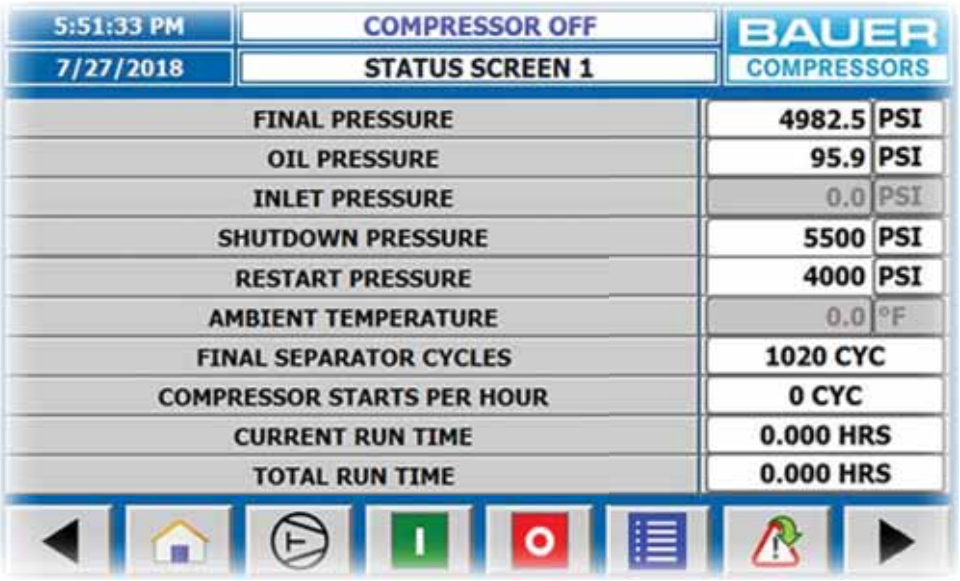


The main menu screen is the screen used to navigate to the other sections of the program. All of the optional screens can be viewed but critical changes can only be made by user levels 2 & 3. Critical changes control the functions of the compressor. This feature is added to prevent unintentional changes to the unit's functions.

2.2.2.1 Status

The status button takes the user to the status screen. The status screen allows the user to view various pressures, temperatures and other statistics which directly affect the units operation.

Figure 2-4 Status Screen #1



2.2.2.2 Alarm Screen

This button displays the current alarms. The alarm situation must be addressed before the alarm will be sent to the alarms history.

2.2.2.3 Alarms History

This button displays the history of alarms. It displays the time, date, status, and description of the alarm.

2.2.2.4 Maintenance

The maintenance screen displays the total run hours and time until the next maintenance is due. Also the user can look at the maintenance charts to see what maintenance is due when.

2.2.2.5 Log On / Log Off

The log on button takes the user to the login screen. The default option is Operator. This is shown with the hand holding the key under the “Operator” button. No password is needed to operate the compressor at this user level. At this user level the operator can operate the unit and explore all the other menu screens but cannot change parameters or configuration settings. Level 1 allows the operator to operate the compressor and may change some of the compressor parameters and configuration settings. Factory level can operate the compressor and also is allowed to change the parameters and configuration settings.

To change the user level press the “Level 1” or “Factory Level” button. A Log on screen will pop up. Press the center of the Log on screen and a qwerty keyboard will be displayed. Enter the password, then press the enter button. The Log on screen will now appear with the password entered as asterisks. Press the OK button and you are now logged in. The icon of the hand holding the key will appear beneath the authorized level button.

The Log Off button logs off the current user.

2.2.2.6 Computer Information

This screen displays the program number, serial number, compressor block model and the modem IP address.

2.2.2.7 Contact

Pressing the contact button displays contact information for maintenance and assistance for your unit. It can only be edited by users “Level 1” and “Factory Level”.

2.2.2.8 Diagnostic Menu

This screen is used for maintenance purposes to insure the PC’s inputs and outputs are working correctly.

2.2.2.9 Configuration

The configuration screen is used to tell the PLC what sensors to look for, and give readouts for. This is set at the factory and normally shouldn’t be changed unless a sensor is added or removed.

Figure 2-5 Configuration Screen #1

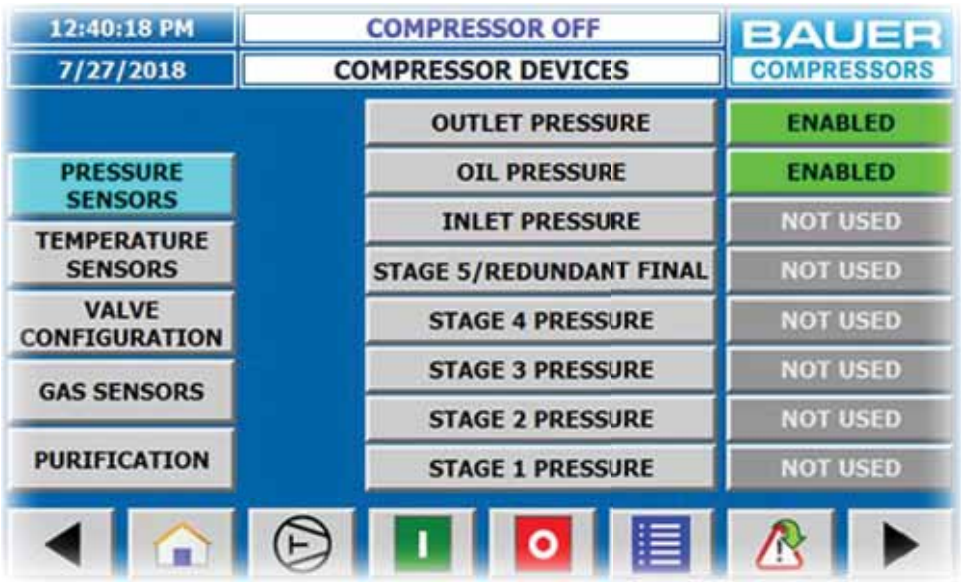


Table 2-1: Maintenance Interval Tasks

Every Year or 500 Hours for Breathing Air Compressors; Every Year or 1,000 Hours for Industrial Compressors
Clean Separators, Empty Condensate Tank
Exchange Intake Filter
Perform Leak Test and Visual Inspection
Electrical Terminals must be Tightened at Each Maintenance
Change Gaskets, Seals and O-Rings Included in Maintenance Kit
Check Pressure Vessels, Record Number of Load Cycles
Check Settings for Pressure Switches and Pressure Relief Valves
Check Pressure Maintaining Valves, Adjust as Needed
Change Final Separator Filters
Change Filter / Dryer Cartridges as Needed
Check V-Belts and Fanwheel/ Fan Blades
Check Piston & Sleeve Assembly of Final Stage
Check Function of Automatic Condensate Drain
Change Oil and Oil Filter
Check Pressure and Suction Valves
Check Tightness of Safety Valves
Check Intermediate Pressures and Oil Pressure
Function Test, Final Inspection, Test Run
Every 2 Years or 1,000 Hours for Breathing Air Compressors; Every 2 Years or 2,000 Hours for Industrial Compressors
Change all Pressure and Suction Valves
Test or Replace Safety Valves
Change Piston & Sleeve Assembly of Final Stage

Table 2-1: Maintenance Interval Tasks (Continued)

Every 4 Years or 2,000 Hours for Breathing Air Compressors; Every 4 Years or 4,000 Hours for Industrial Compressors
Check Temperature Sensors, Replace if Required
Change Fan Belts (if applicable)
Check cylinders, pistons and piston rings
Replace Drive Belt(s)

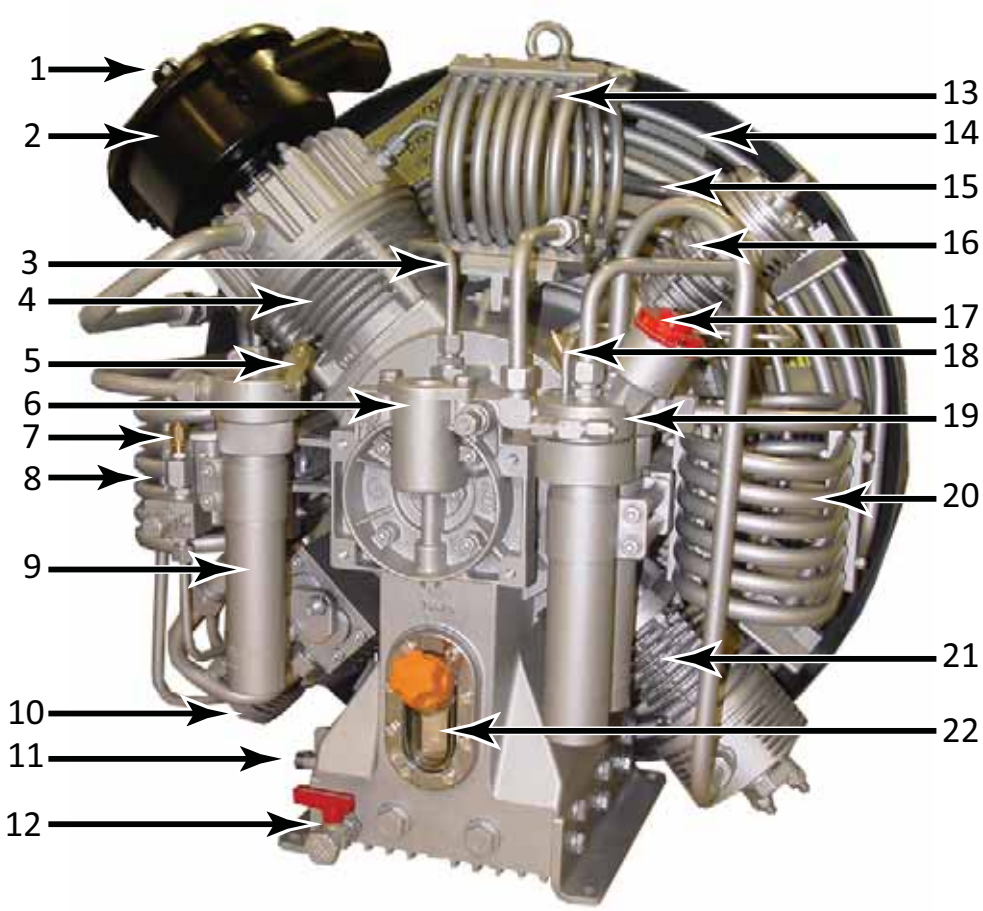
CHAPTER 3: IK 18.1 II COMPRESSOR BLOCK

3.1 Description

The IK18.1 II compressor is used to compress air up to 6,000 psi. This compressor is a four cylinder, five stage air cooled, oil lubricated reciprocating compressor. The 4th stage cylinder is lubricated by means of the forced feed lubrication system, while the other cylinders are splash lubricated. The cylinders are arranged 90° apart, with the 1st and 2nd stage, and the 3rd and 4th stage opposite each other. This compressor block is particularly suitable for continuous operation because of their rugged design and corrosion resistant interstage filter and cooler assemblies.

3.1.1 Component Location

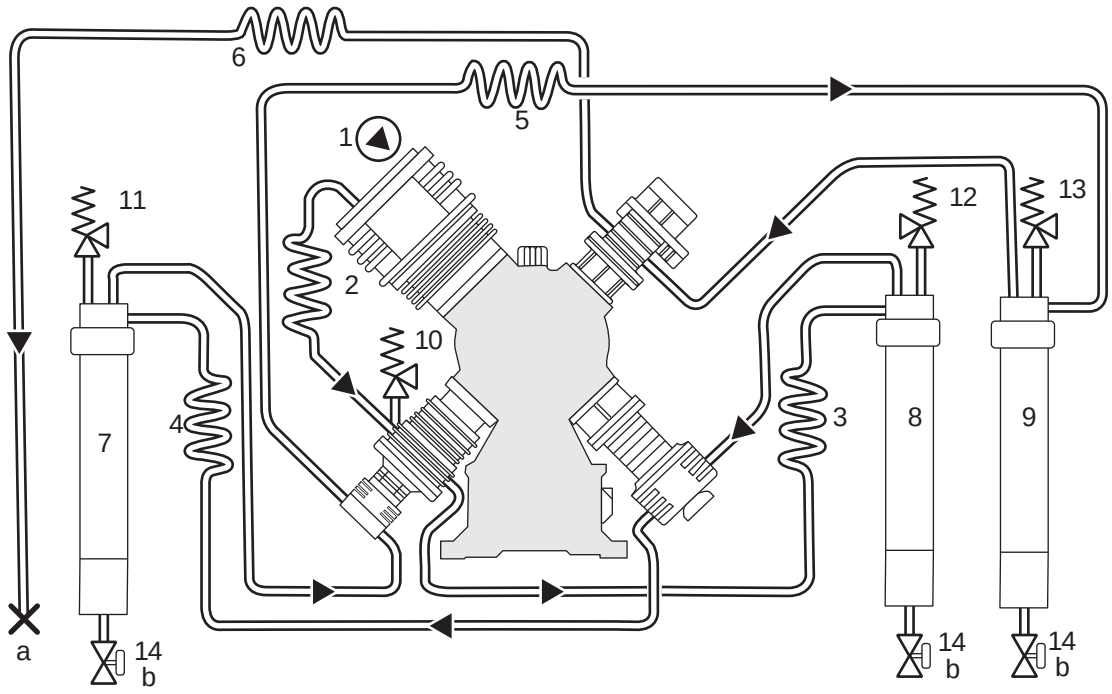
Figure 3-1 Compressor Block (Front View)



1. Service Indicator	9. 3rd Stage Separator	16. 5th Stage Cylinder
2. Intake Filter	10. 2nd/4th Stage Cylinder	17. 4th Stage Safety Valve
3. Crankcase Vent	11. Compressed Air Outlet	18. 2nd Stage Safety Valve
4. 1st Stage Cylinder	12. Oil Drain	19. 4th Stage Separator
5. 3rd Stage Safety Valve	13. 4th Stage Intercooler	20. 2nd Stage Intercooler
6. Oil Pump Housing	14. 1st Stage Intercooler	21. 3rd Stage Cylinder
7. 1st Stage Safety Valve	15. 5th Stage Aftercooler	22. Oil Filler with Sight Glass
8. 3rd Stage Intercooler		

3.1.2 Air Flow Diagram

Figure 3-2 Five Stage Compressor Air Flow



1. Intake filter	8. 2nd stage Separator
2. Intercooler 1st stage	9. 4th stage Separator
3. Intercooler 2nd stage	10. Pressure Safety Valve, 1st stage
4. Intercooler 3rd stage	11. Pressure Safety Valve, 3rd stage
5. Intercooler 4th stage	12. Pressure Safety Valve, 2nd stage
6. Aftercooler	13. Pressure Safety Valve, 4th stage
7. 3rd stage Separator	14. Manual condensate drain valves
a. Air outlet	b. Condensate drain outlet

3.1.3 Lubrication System

3.1.3.1 Description.

The compressor is provided with forced-feed lubrication. The oil pressure is produced by a low revving gear pump. The oil pressure is between 44 psi and 87 psi (3 to 6 bar).

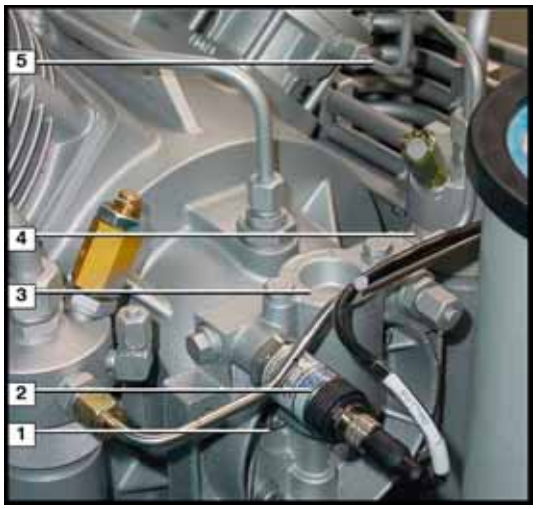
CAUTION

This oil pump must be operated in the correct direction of rotation, other wise no oil pressure will be built up and the compressor may be damaged.

(See Figure 3-3) The oil pump (1) is coupled to and driven by the crankshaft. It pumps oil from the crankcase through an oil filter (3) and the oil pressure regulating valve (4) to the 4th stage cylinder. The oil is then distributed by the guide piston of the 4th stage and lubricates all the moving parts of the com-

pressor block. The oil pressure sensor (2) allows mounting for an optional oil pressure gauge or electronic pressure monitoring.

Figure 3-3 Lubrication Oil System



1. Oil Pump Housing	4. Oil Pressure Regulating Valve
2. Oil Pressure Sensor	5. Injection Line to Final Stage
3. Oil Filter Housing	

Figure 3-4 Oil Sight Gauge

3.1.3.2 Oil Level Check

Check the oil level at the oil filler sight gauge on the compressor block every day before putting the compressor into operation. Oil level must never be below the minimum mark molded into the sight gauge as this will cause severe damage due to lack of lubrication. Overfilling is prevented by the design of the filler neck; i.e. oil should be filled right to the edge of the opening.

3.1.3.3 Oil Change Interval

The synthetic oil should be changed every 2,000 operating hours or biennially, whichever is reached first.

3.1.3.4 Oil Capacity

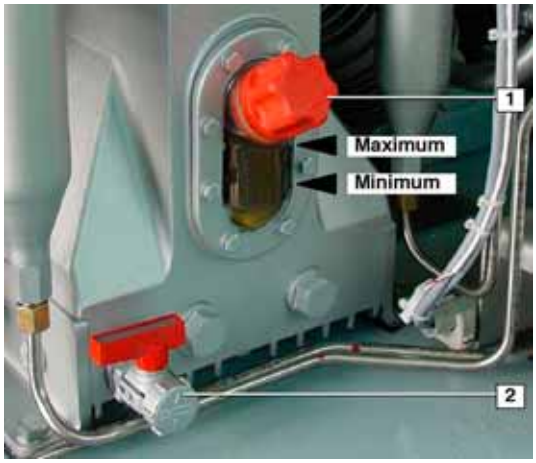
The oil capacity is approximately 6.5 quarts (6.0 liters). The amount of oil between the minimum and maximum marks is approximately 1.7 quarts (1.6 liters).

3.1.3.5 Oil Change

CAUTION

Replace the oil filter at every oil change, otherwise when the filter becomes clogged a bypass valve opens and the oil circulates without being filtered.

Figure 3-5 Oil Sight Gauge & Drain



1. Oil Fill Cap
2. Oil Drain Valve

Figure 3-6 Removing the Oil Filter Cover

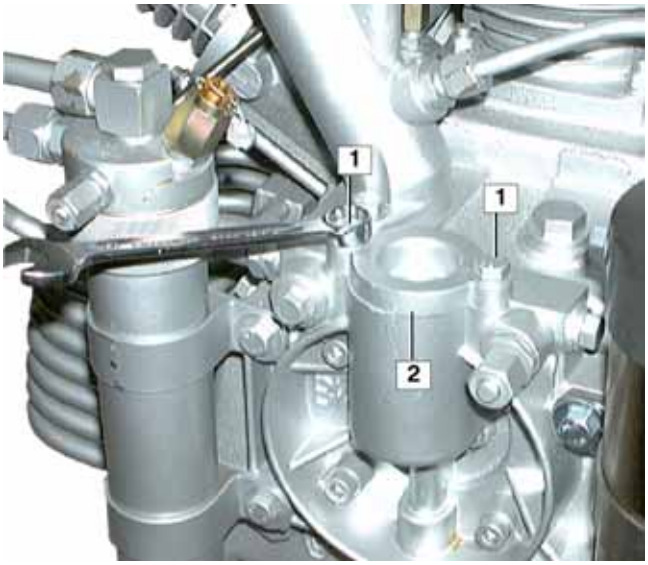
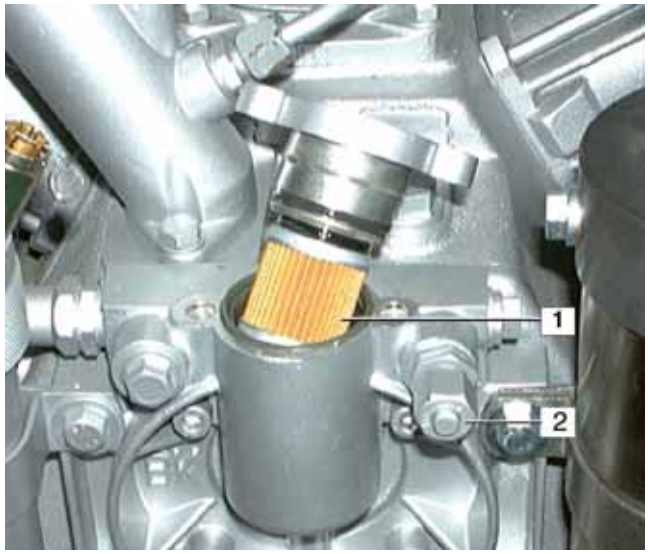


Figure 3-7 Replacing the Oil Filter



1. Run the compressor until it is warm.
2. Remove cap from Oil Filler Sight Gauge.
3. (See Figure 3-5) Drain the Oil into a suitable container by opening the Oil Drain Valve (2)
4. After oil has stopped draining, close Oil Drain Valve.
5. (See Figure 3-6) Remove two bolts (1) with a 13 mm wrench. Remove cover (2).
6. (See Figure 3-7) Remove the Oil Filter (1) from the rubber gasket at the cover.
7. Mount a new filter element and replace and fasten cover.

8. Fill new oil through filler neck to the Maximum mark on the Oil Fill Sight Gauge.
9. Pour oil in slowly, wait until the level settles then replace cap in the Oil Fill Sight Gauge.
10. Return the unit to operation.

3.1.3.6 Venting the Oil Pump

CAUTION

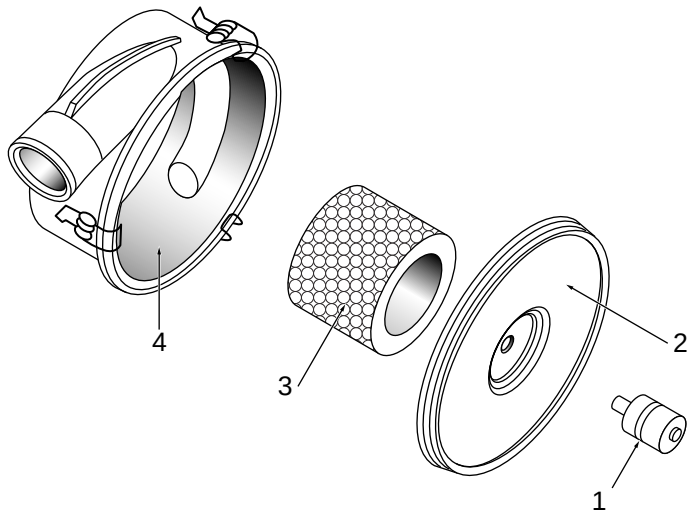
To avoid damage after maintenance the following measures should be strictly adhered to.

(See Figure 3-7). If after the start of the compressor no oil pressure builds up, venting the oil pump may be necessary, especially after maintenance and repair work. It may also be necessary if the unit has been operated in the wrong direction of rotation.

1. With the unit running, open the condensate drain valves.
2. Open Oil Pump Vent Plug (2) and wait until oil comes out bubble free.
3. Replace Oil Vent Plug.

3.1.4 Intake Filter

Figure 3-8 Intake Filter



1. Service Indicator	3. Filter Element
2. Cover	4. Filter Housing

3.1.4.1 Description

(See Figure 3-8). A dry micronic filter is used to filter intake air in breathing air units. Nitrogen compressors use a separate inlet regulation system.

3.1.4.2 Maintenance

The vacuum in the intake filter is monitored by the Service Indicator (1). When the preset vacuum pressure is reached the indicator changes to red and the Filter Element (3) should be replaced as follows.

1. Open clips on Filter Housing (4) and remove Cover (2).
2. Remove the Filter Element (3).
3. Clean the inside of the Filter Housing with a damp cloth. Take care to prevent any dust from entering the intake manifold.
4. Replace the Filter Element (3).
5. Mount the Cover (1) and fasten with the clips.
6. Reset the Service Indicator (1) by pressing the button.

WARNING

The rapid de-pressurizing and re-pressurizing of an interstage separator during condensate draining subjects it to metallurgical stresses. To prevent catastrophic failure with the possibility of damage, injury or death the interstage separator must be replaced after 85,000 load cycles. A load cycle equals one de-pressurization- repressurization. The Bauer recommended frequency of condensate draining is every fifteen minutes and is a balance between maximizing the life of the separator chamber and maintaining the quality of the delivered air.

3.1.5 Interstage Separators

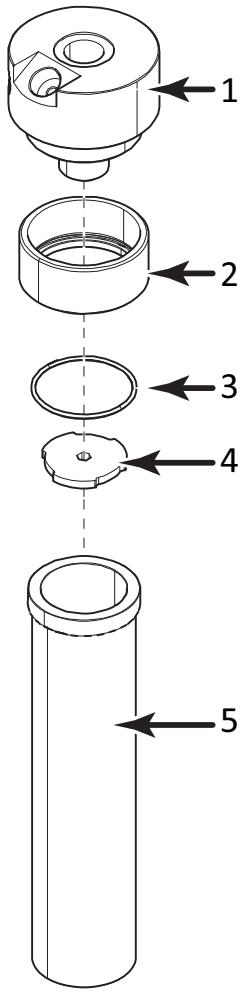
3.1.5.1 Description

Three interstage separators are mounted on the compressor, one after the 2nd stage and another after 3rd stage and the last after the 4th stage. These separators are designed to remove oil and water which accumulates due to the cooling of the air after the compression process. Separation is achieved by means of centrifugal action. In the 2nd stage separator the design of the filter head provides this action. In the 3rd and 4th stage separators the centrifugal action is provided by a vortex plate additionally a sintered metal filter is provided to remove dirt contamination.

3.1.5.2 Maintenance

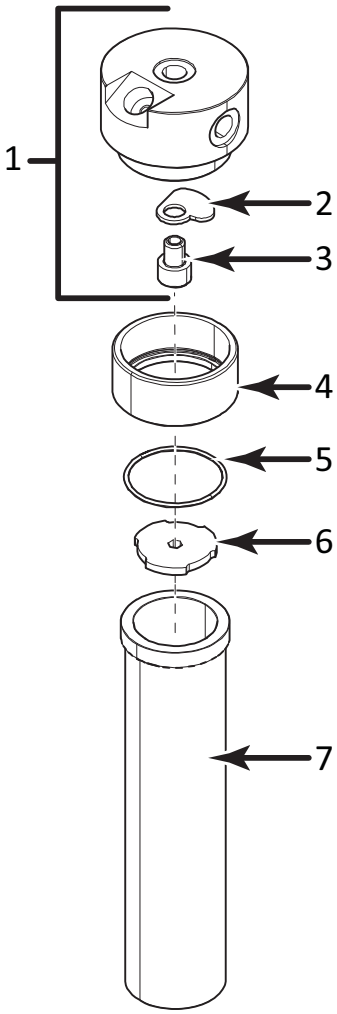
The interstage Separators require no maintenance.

Figure 3-9 2nd Stage Interstage Separator



1. Separator Head	4. Center Insert
2. Knurled Nut	5. Separator Body
3. O-ring	

Figure 3-10 3rd & 4th Stage Interstage Separator



1. Separator Head	5. O-ring
2. Plate	6. Center Insert
3. Hollow Screw	7. Separator Body
4. Knurled Nut	

3.1.6 Compressor Valves and Valve Heads

3.1.6.1 Functional Description

The valve heads of the individual stages form the upper part of the cylinders. The inlet and pressure valves are fitted inside the valve heads.

When the piston moves downwards, the resultant vacuum in the piston cylinder opens the inlet valve. When the piston moves upwards, the inlet valve is closed and the pressure valve opened by the pressure created in the compression process. See Figure 3-12.

The Intake and Pressure Valve of the 1st Stage are combined in a Plate Valve under the Valve Head. See Figure 3-11.

Figure 3-11 1st Stage Valve Function

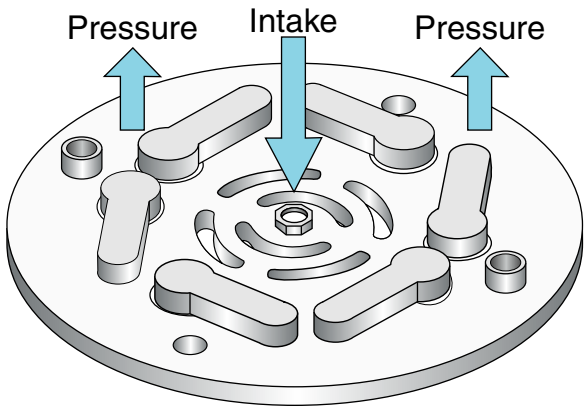
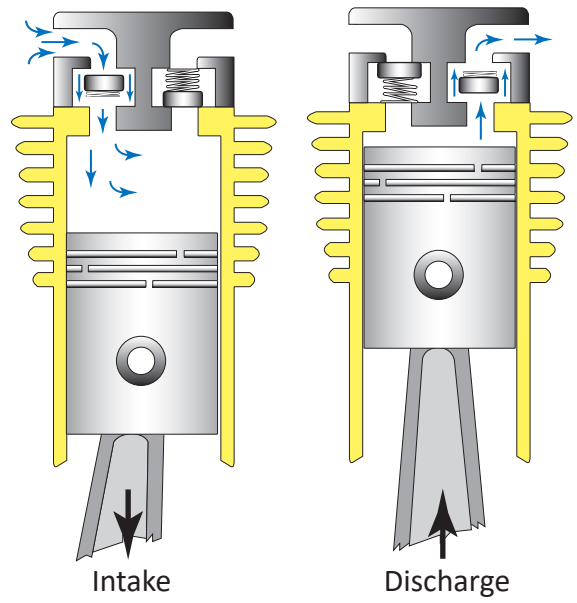


Figure 3-12 Valve Function



3.1.6.2 Initial Operational Check of the Valves

After roughly half an hour of operation, the valves should be checked. The outlet piping should be hot if the valves are operating properly. Note that the inlet line to the valve heads should be warm to the touch.

WARNING

Do not touch the outlet piping with bare hands, use a thermometer.

3.1.6.3 General Instructions for Changing the Valves

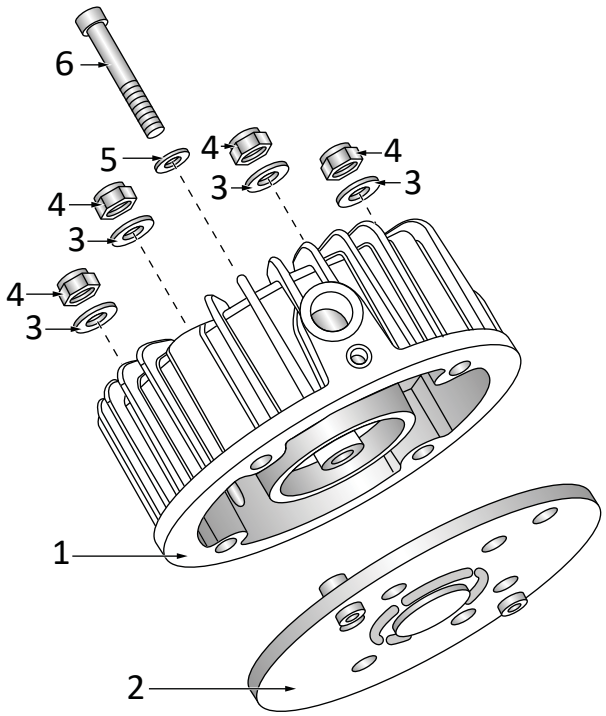
Please observe the following instructions for valve maintenance:

1. Always replace valves as a complete set.
2. Carefully clean dirty valves. Never use a sharp tool for this purpose. Soak the valves in Varsol and clean with a soft brush.

3. Check the individual components for excessive wear. If the valve seat or valve discs are dented, replace the valves.
4. Check the valve space in the valve heads for dirt, and clean if necessary.
5. Use only satisfactory gaskets and O-rings during reassembly.
6. Observe the correct sequence when reassembling.
7. After finishing all maintenance work on the valves, turn the compressor manually using the fly-wheel and check whether all items have been correctly installed.
8. 30 minutes after restarting the compressor, stop the unit, let it cool down to ambient temperature, and re-tighten valve studs and cap nuts. Otherwise the gasket set may cause a leak.
9. Remove and check the valves every 1000 operating hours.
10. Replace the valves every 2000 operating hours to avoid fatigue failure.
11. Use an assembly tool (Bauer P/N: 011365) for all work on valve heads (See Figure 3-18).

3.1.6.4 Changing the 1st Stage Valves.
See Figure 3-13

Figure 3-13 1st Stage Valve and Head



3.1.6.4.1 Removal Procedure.

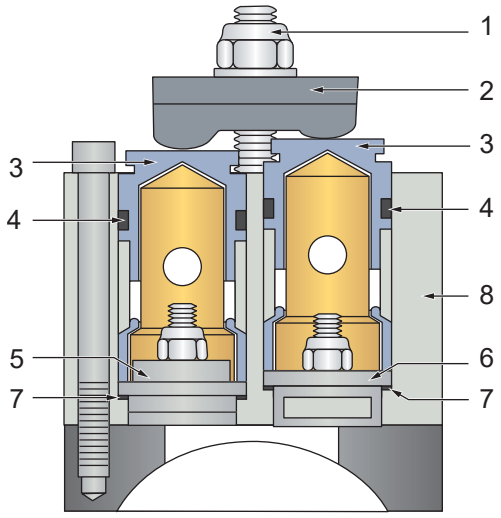
1. Unscrew and remove cap nuts (4) and washers (3).
2. Remove Valve Head Assembly (1) from studs in cylinder.
3. Remove Valve (2) and unscrew and remove center screw (6) and washer (5).

3.1.6.4.2 Installation Procedure

1. Fasten new Valve (2) with center screw (6) and washer (5).
2. Place assembled Valve Head (1) on studs in the cylinder.
3. Install washers (3) and cap nuts (4) and tighten to the torque value listed in the Appendix.

3.1.6.5 Changing the 2nd Stage Valves

Figure 3-14 2nd Valve Head and Valves



1. Hex Nut	4. O-ring	7. Valve Gasket
2. Cap Holder	5. Discharge Valve	8. Valve Head
3. Valve Caps	6. Inlet Valve	

3.1.6.5.1 Removal Procedure
See Figure 3-14

1. Unscrew and remove Hex Nut (1).
2. Remove Cap Holder (2).
3. Insert two screwdrivers into the Extraction Grooves of the Valve Caps (3) and lift out the Valve Caps with O-Rings (5).
4. Check and replace O-Rings if required.
5. Take out Valves (6 & 9).
6. Check the Valve Gaskets (7) and replace if required.

3.1.6.5.2 Installation Procedure

1. Fit valves(6 & 9) with gaskets (7) and replace.
2. Fit valve caps (3) with O-Rings (5) and replace.
3. Replace cap holder (2) in the proper position.

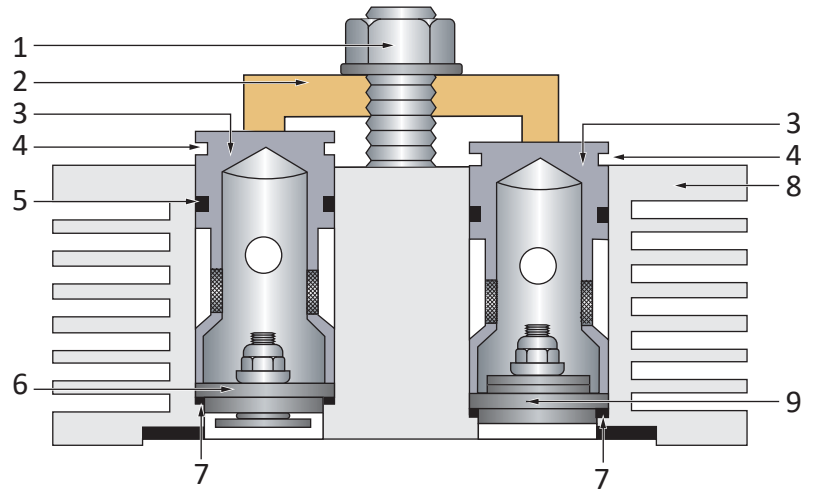
CAUTION

The valve cap for the inlet valve protrudes 0.98 in (2.5 mm) out of the valve head more than the valve cap for the discharge valve. The cap holder is designed accordingly.

4. Screw on hex nut (1) and tighten with a torque wrench to the torque value listed in the Appendix.

3.1.6.6 Changing the 3rd Stage Valves
See Figure 3-14

Figure 3-15 3rd Stage Valve Head and Valves



1. Hex Nut	4. Extraction Groove	7. Valve Gaskets
2. Cap Holder	5. O-Rings	8. Valve Head
3. Valve Caps	6. Inlet Valve	9. Discharge Valve

3.1.6.6.1 Removal Procedure

1. Unscrew and remove hex nut (1).
2. Remove cap holder (2).
3. Insert two screwdrivers into the extraction grooves (4) of the valve caps (3) and lift out the valve caps with O-Rings (5).
4. Check and replace O-Rings if required.
5. Take out valves (6 & 9).
6. Check the valve gaskets (7) and replace if required.

3.1.6.6.2 Installation Procedure

1. Fit valves(6 & 9) with gaskets (7) and replace.
2. Fit valve caps (3) with O-Rings (5) and replace.

3. Replace cap holder (2) in the proper position.

CAUTION

The valve cap for the inlet valve protrudes 0.98 in (2.5 mm) out of the valve head more than the valve cap for the discharge valve. The cap holder is designed accordingly.

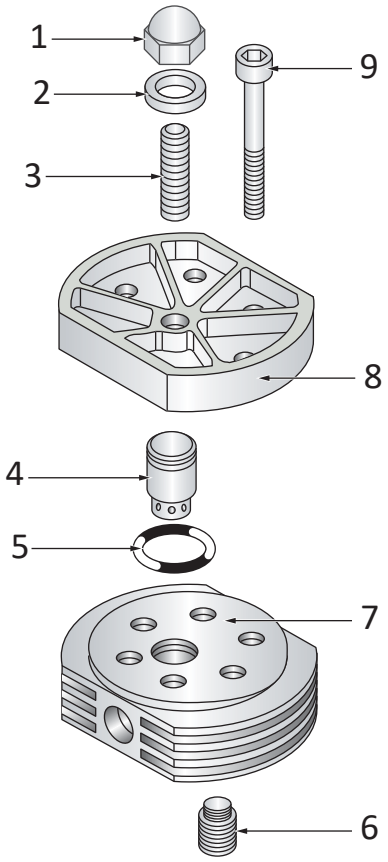
4. Screw on hex nut (1) and tighten with a torque wrench to the torque value listed in the Appendix.

3.1.6.7 Changing the 4th/5th Stage Valves.

CAUTION

Always change the intake and discharge valves of the 4th stage at the same time.

Figure 3-16 4th/5th Stage Valve and Head

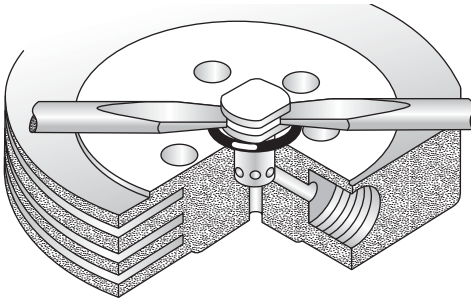


1. Acorn Nut	4. Discharge Valve	7. Valve Head
2. Gasket	5. O-ring	8. Valve Cover
3. Stud	6. Inlet Valve	9. Allen Screw

3.1.6.7.1 Discharge Valve Removal Procedure
See Figure 3-16

1. Remove piping connected to the Valve Head.
2. Remove Acorn Nut (1) and unscrew Stud (3) three or four turns.
3. Remove the Socket Head Screws (9) and remove the Valve Cover (8).
4. Loosen the Discharge Valve (5) first by turning it with a 13 mm wrench on the flat surfaces.
5. Put two screwdrivers into the groove of the Discharge Valve body. See Figure 3-17.
6. Lift out Discharge Valve together with the O-ring (4).

Figure 3-17 Discharge Valve Removal



3.1.6.7.2 Discharge Valve Installation Procedure

1. Check condition of O-ring (4) and replace if necessary
2. Put O-ring (4) into Valve Head (7).
3. Insert Discharge Valve (5) into Valve Head (7).
4. Put on Valve Cover (8).
5. Screw in Socket Head Screws (9) and tighten with a torque wrench.
6. Tighten Stud (3) and replace Gasket (2).
7. Tighten Acorn Nut (1) with a torque wrench to the value listed in the Appendix.

3.1.6.7.3 Inlet Valve Removal and Installation

Figure 3-18 Assembly Tool

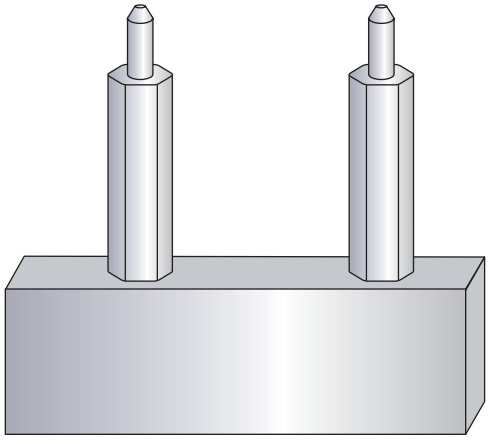
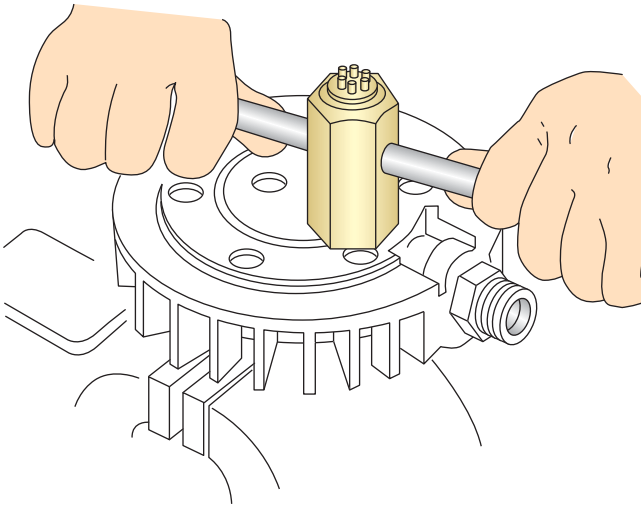


Figure 3-19 Using Special Tool



1. If the assembly tool shown in Figure 3-18 is unavailable, place two 8 mm diameter metal pins of any length in the holes of the Valve Head (7) and secure them in a vise with the Inlet Valve (6) facing up.
2. Unscrew the Inlet Valve (6) from the Valve Head (7) using the special valve tool. See Figure 3-19.

CAUTION

Avoid damaging the special tool or the valve when using the tool, ensure that it is pushed firmly and properly into the sockets in the valve so that it will not tilt when it is turned.

3.1.7 Repair and Troubleshooting

3.1.7.1 Repair

Repair work can be carried out on the compressor block to a certain extent but a certain level of experience and skill is necessary. It should be noted however that no repair should be carried out on the crankshaft nor on the bearings and safety valves are not repaired but always replaced.

3.1.7.2 Troubleshooting

Trouble	Cause	Remedy
No oil pressure	1. Low oil level 2. Air trapped in oil pump. 3. Compressor rotates in the wrong direction	1. Check oil level 2. Vent Oil Pump 3. Reverse two of the three phase leads at the switch box.
Oil foam in crankcase	1. Last stage piston worn 2. Last stage pressure valve defective	1. Operate compressor with final stage valve head removed. If oil flows continuously out of cylinder, replace piston and sleeve. 2. Replace last stage valves.
Compressor output insufficient	1. Condensate drain valves or fittings leaking. 2. Premature opening of final safety valve. 3. Piston rings worn 4. Excessive piston clearance 5. Pipes leaking	1. Tighten and reseal. 2. Clean and adjust final safety valve. 3. Replace 4. Replace 5. Tighten
Safety valves between stages releasing pressure	1. Interstage pressure too high 2. Valves not closing properly	1. Service and clean valves. 2. Service and clean valves.
Compressor running too hot.	1. Insufficient supply of cooling air 2. Intake or outlet valve not closing properly 3. Wrong direction of rotation.	1. Check location for adequate ventilation 2. Check and clean valves, replace as necessary 3. Check arrow on compressor and correct accordingly.
Oil residue in delivered air	1. Improper maintenance of filters, purifier cartridge saturated.	1. Service filters, change purifier cartridge.
Compressor rotates in the wrong direction	Electrical phases not connected properly	Reverse two of the three phase leads at the switch box. Do NOT change the leads at the motor terminal.

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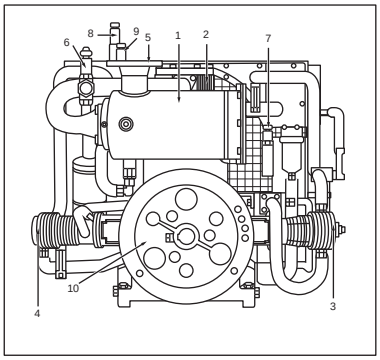
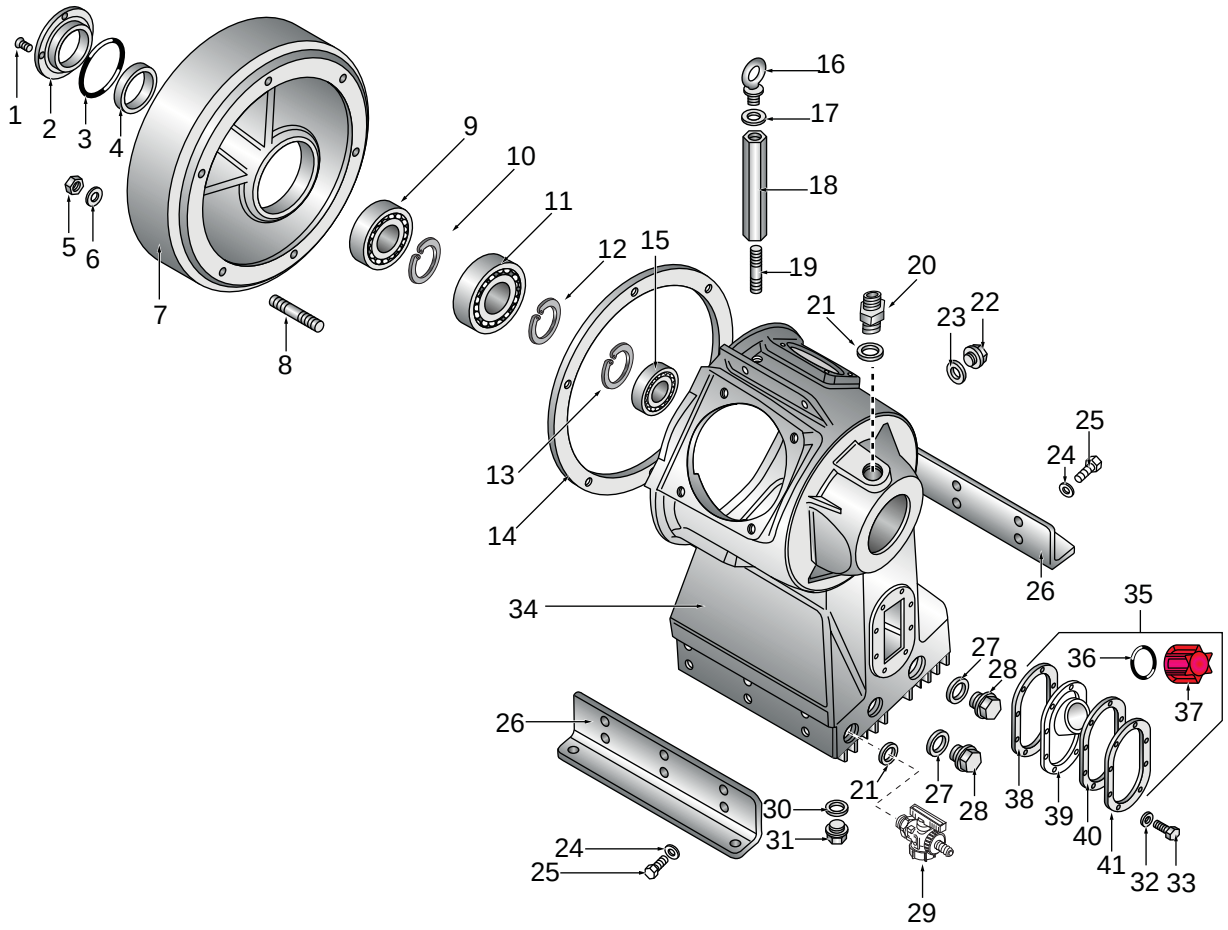


3.1.8 Replacement Parts List

Figure 3-20 Crankcase Assembly

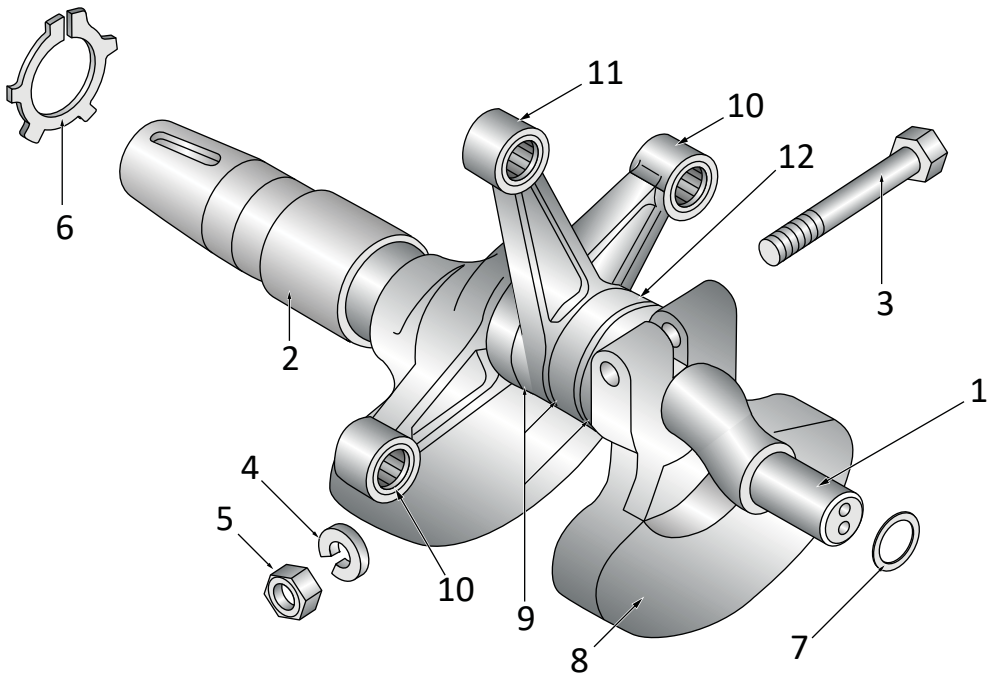


Item	Qty	Part No.	Description	Notes
♦	1	78577	Crankcase Assembly	
1	4	N20649	Screw	
2	1	68586	Cover Plate	
3	1	N15093	O-ring	
4	1	N26281	Shaft Seal	
5	6	N370	Self Locking Hex Nut	
6	6	N58	Washer	
7	1	78897	Bearing Cover	
8	6	N3138	Stud	
9	1	N18303	Roller Bearing	
10	1	N3810	Circlip	
11	1	N18304	Roller Bearing	
12	1	N18432	Circlip	
13	1	N2635	Circlip	

Figure 3-20 (cont.) Crankcase Assembly

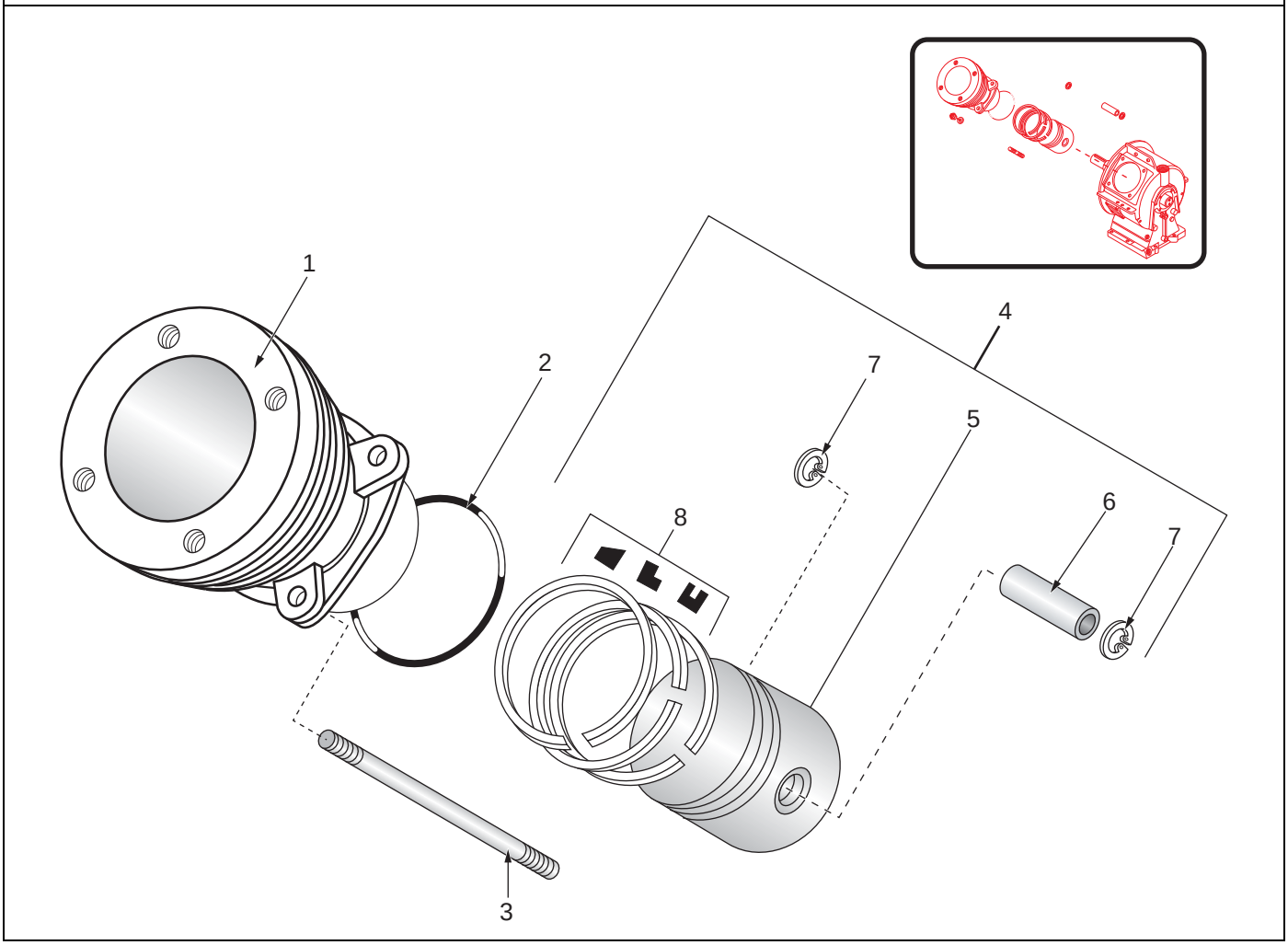
Item	Qty	Part No.	Description	Notes
14	1	3177	Gasket	
15	1	N2638	Roller Bearing	
16	1	N4467	Eye Bolt	
17	1	1492	Washer	
18	1	79225	Hexagonal Spacer	
19	1	N4150	Stud	
20	1	80197	Reducer	
21	2	N293	Gasket	
22	1	N204	Plug	
23	1	N1314	Gasket	
24	12	N16	Washer	
25	12	N312	Hex Head Screw	
26	2	78571	Bracket	
27	2	N4261	Gasket	
28	2	N2796	Plug	
29	1	N25638	Ball Valve	oil drain
30	1	N1316	Gasket	
31	1	N4570	Plug	
32	8	N102	Washer	
33	8	N19497	Hex Screw	
34	1	78578	Crankcase	
35	1	78810	Oil Sight Gauge Assembly	Items 36 - 41
36	1	N15412	O-ring	
37	1	80225	Plug	
38	1	78808	Gasket	
39	1	78569	Oil Fill	
40	1	80647	Steel Plate	
41	1	78570	Steel Plate	

Figure 3-21 Complete Crankshaft Assembly



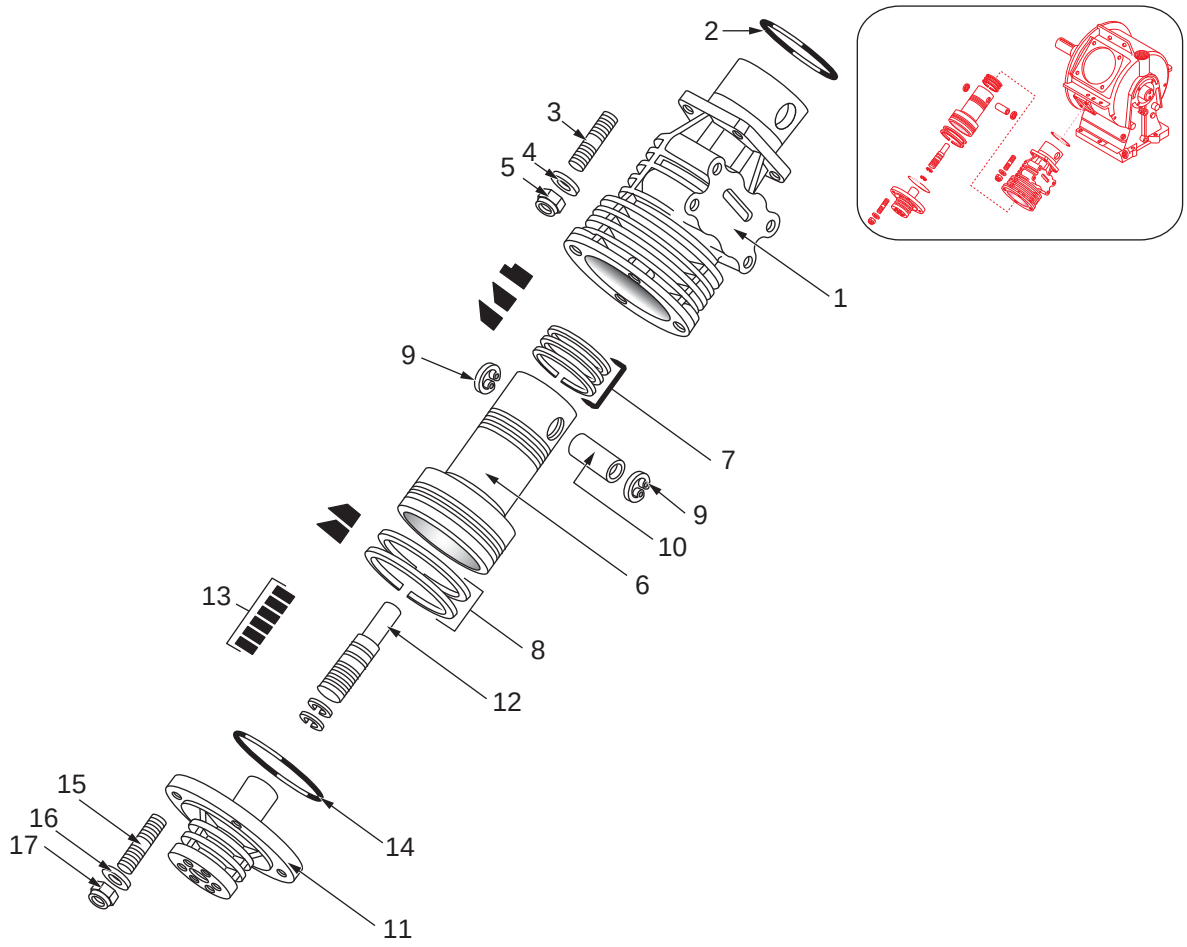
Item	Qty	Part No.	Description	Notes
♦	1	161929	Crankshaft Assembly	
1	1	78936	Crankshaft	
2	1	68587	Bushing	
3	1	N4366	Dowel Screw	
4	1	N108	Spring Washer	
5	1	N2765	Hex Nut	
6	1	N18310	Circlip	
7	1	N423	Circlip	
8	†	…	Counterweight	Available only with 161929
9	3	4220	Spacers	
10	†	…	Piston Rod Assembly	Available only with 161929
11	†	…	Piston Rod Assembly	Available only with 161929
12	†	…	Piston Rod Assembly	Available only with 161929

Figure 3-22 1st Stage Piston and Cylinder



Item	Qty	Part No.	Description	Notes
♦	1	79420	1st Stage Piston and Cylinder Assembly	
1	1	79017	Cylinder	
2	1	N2621	O-ring	
3	4	N26036	Stud	
4	1	79720	Piston Assembly	#5 - 8
5	1	79719	Piston	130 mm
6	1	N2930	Piston Pin	
7	2	N484	Circlip	
8	1	N2963	Piston Ring Set	

Figure 3-23 2nd & 4th Stage Piston and Cylinder

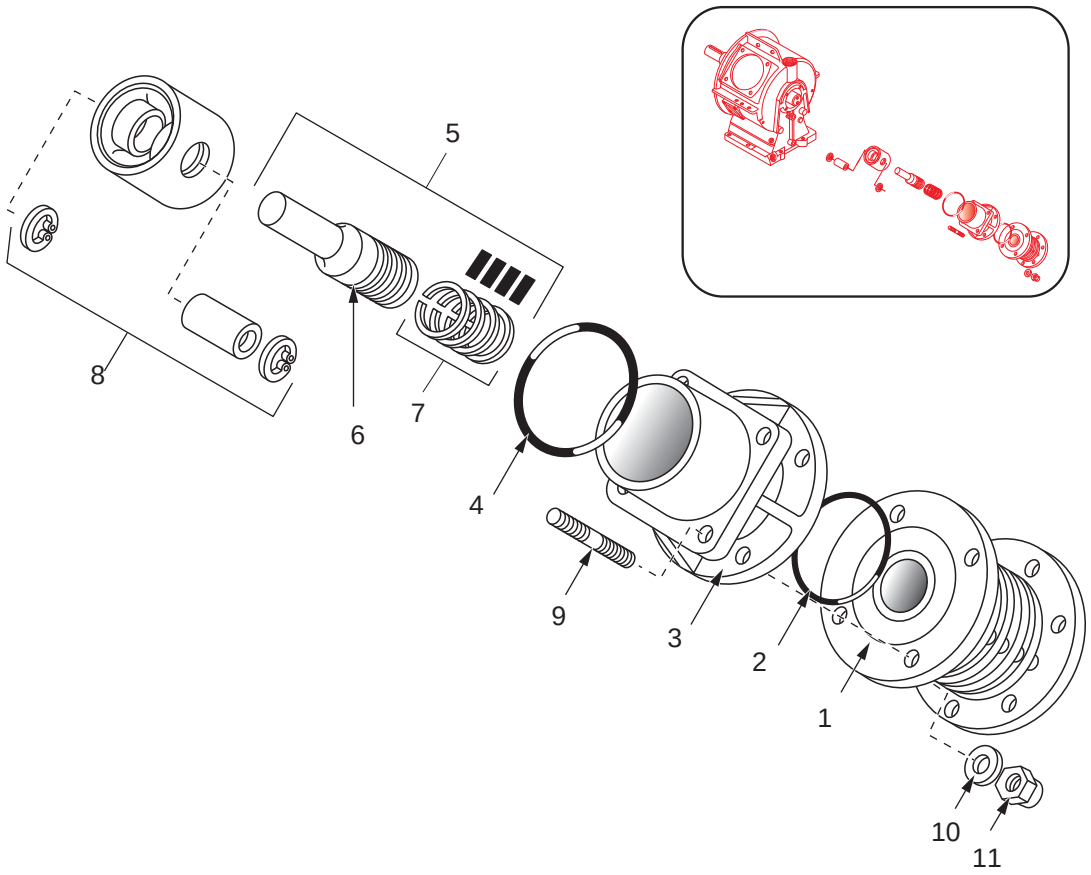


Item	Qty	Part No.	Description	Notes
♦	1	127813	2nd Stage Cylinder Assembly	Items 1 - 10
1	1	127812	Cylinder	
2	1	N3731	O-ring	
3	4	N215	Stud	
4	4	N58	Washer	
5	4	N370	Self Locking Hex Nut	
♦	1	127779	Stepped Piston Assembly	Items 6 - 10
6	1	127778	Stepped Piston	88/66 mm
7	1	N3162	Piston Ring Set	
8	1	N34414	Piston Ring Set	
9	2	N1665	Circlip	
10	1	N15409	Piston Pin	
♦	1	161335	4th Stage Cylinder Assembly	Items 11 - 17
11	1	161316	Cylinder	
♦	1	078338	4th Stage Piston Assembly	Items 12 & 13

Figure 3-23 (cont.) 2nd and 4th Stage Piston and Cylinder

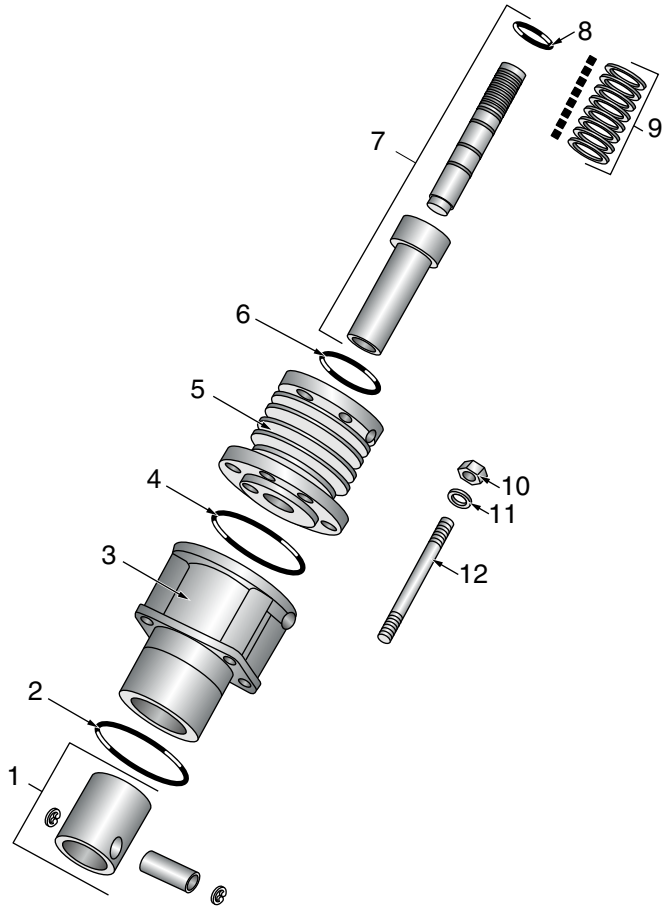
Item	Qty	Part No.	Description	Notes
12	1	78337	Piston	
13	1	N35556	Piston Ring Set	
14	1	N29082	O-ring	
15	4	N215	Stud	
16	4	N58	Washer	
17	4	N370	Self Locking Hex Nut	

Figure 3-24 3rd Stage Piston and Cylinder



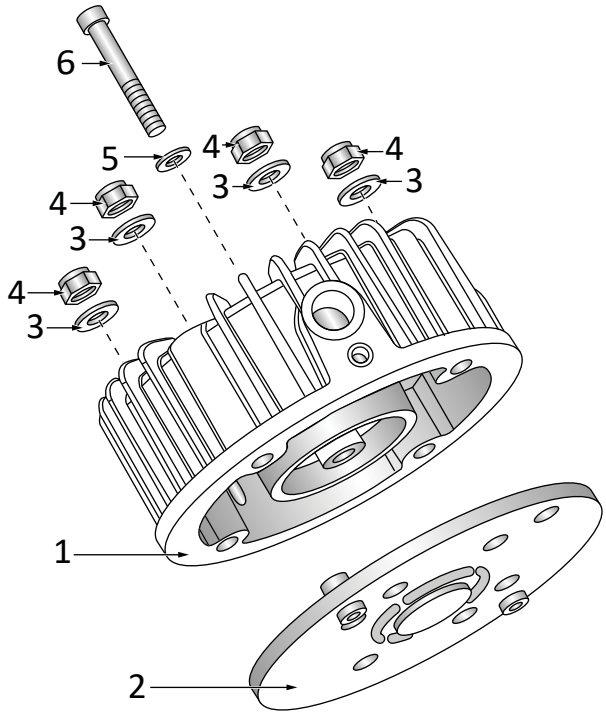
Item	Qty	Part No.	Description	Notes
♦	1	068595	3rd Stage Piston and Cylinder Assembly	
1	1	67061	Cylinder	
2	1	N7063	O-ring	
3	1	82295	Guide Cylinder	
4	1	N3731	O-ring	
5	1	070013	Piston Assembly	Items 6 and 7
6	1	N4378	Piston	
7	1	N16313	Piston Ring Set	
8	1	070070	Guide Piston Assembly	
9	4	N17462	Stud	
10	4	N58	Washer	
11	4	N370	Self Locking Hex Nut	

Figure 3-25 5th Stage Cylinder and Piston



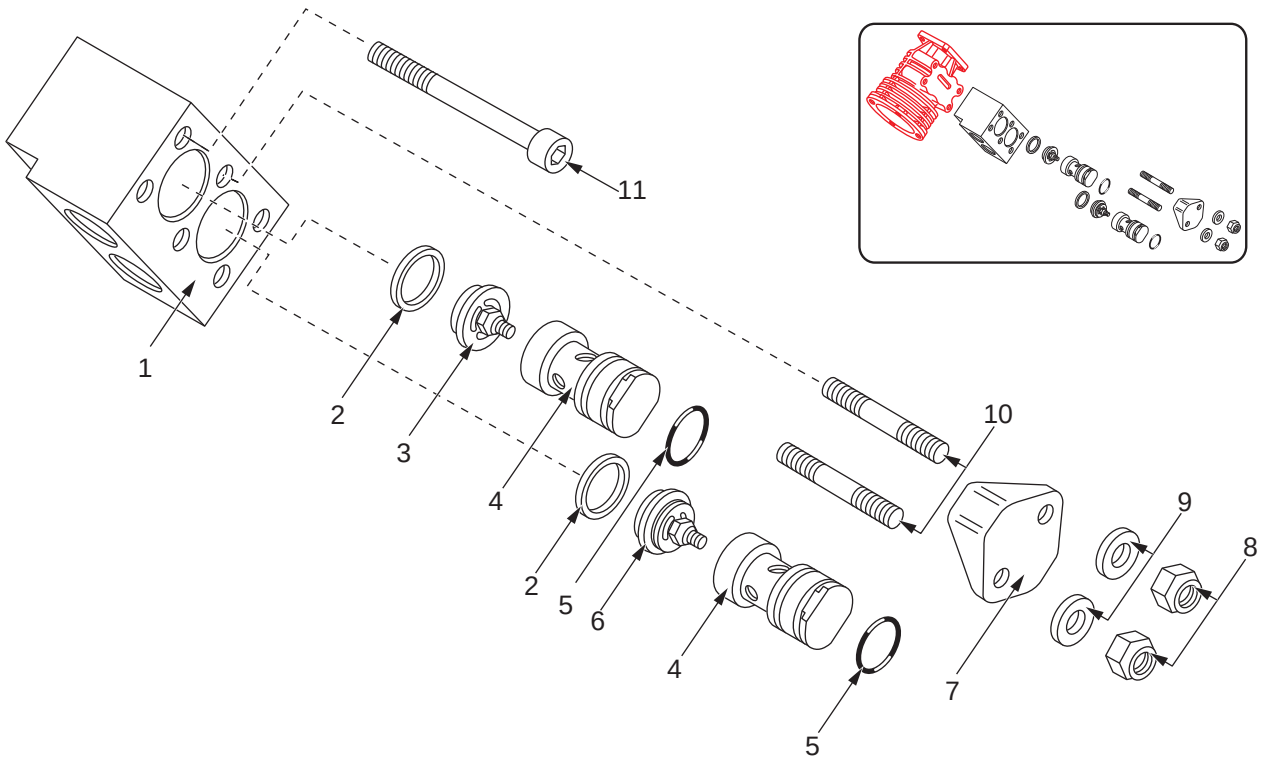
Item	Qty	Part No.	Description	Notes
♦	1	161926	5th Stage Piston & Cylinder Assembly	
1	1	070070	Guide Piston Assembly	
2	1	N3731	O-ring	
3	1	82295	Guide Cylinder	
4	1	N7063	O-ring	
5	1	82480	Cylinder	
6	1	N4868	O-ring	
7	1	79185	Piston And Sleeve Assembly	Items 8 & 9
8	1	N23755	O-ring	
9	1	N26412	Piston Ring Set	
10	4	N370	Self Locking Hex Nut	
11	4	N58	Washer	
12	4	N17462	Stud	

Figure 3-26 1st Stage Valve Head



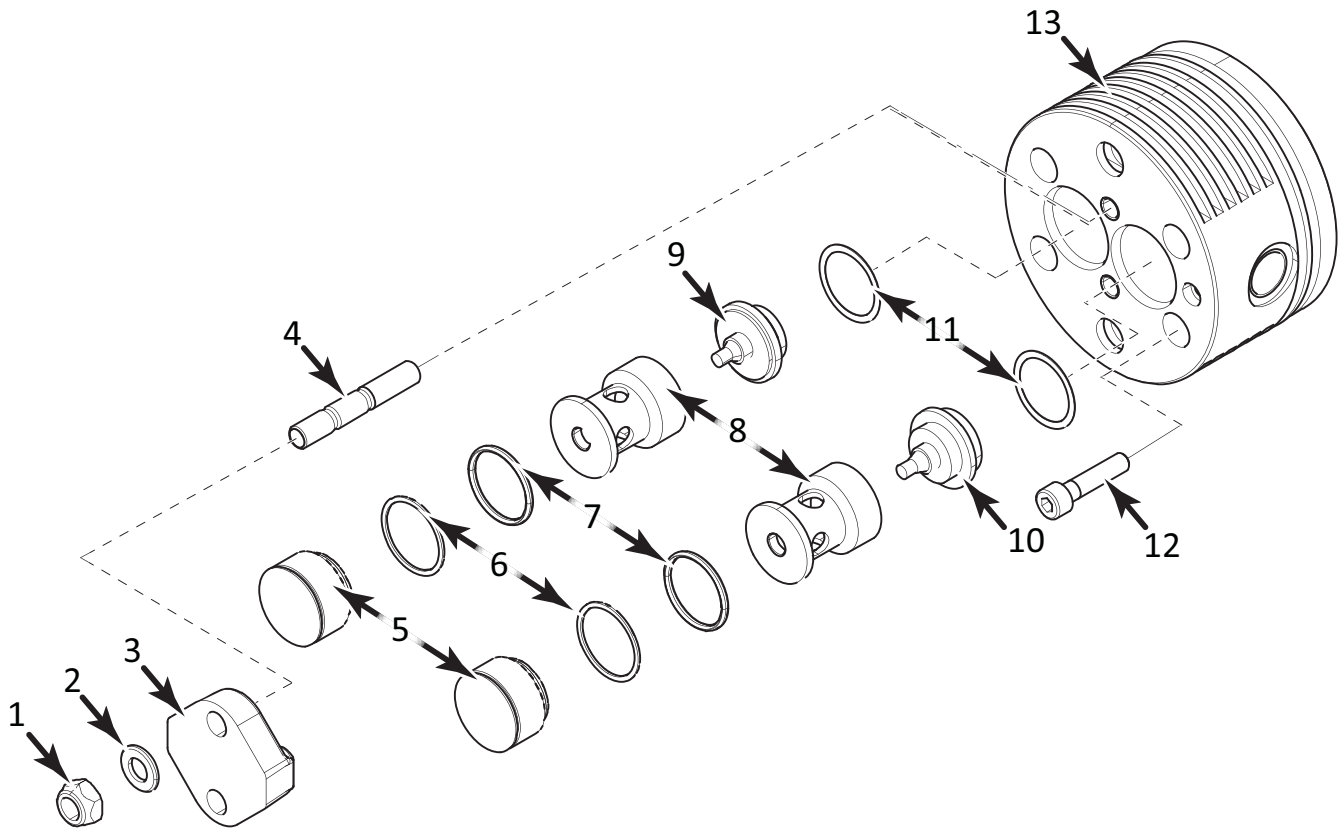
Item	Qty	Part No.	Description	Notes
♦	1	79680	1st Stage Valve Head Assembly	
1	†	…	1st Stage Valve Head	
2	1	N26029	Plate Valve	
3	4	N16	Washer	
4	4	N644	Self Locking Hex Nut	
5	1	N58	Washer	
6	1	N150	Allen Screw	

Figure 3-27 2nd Stage Valve Head



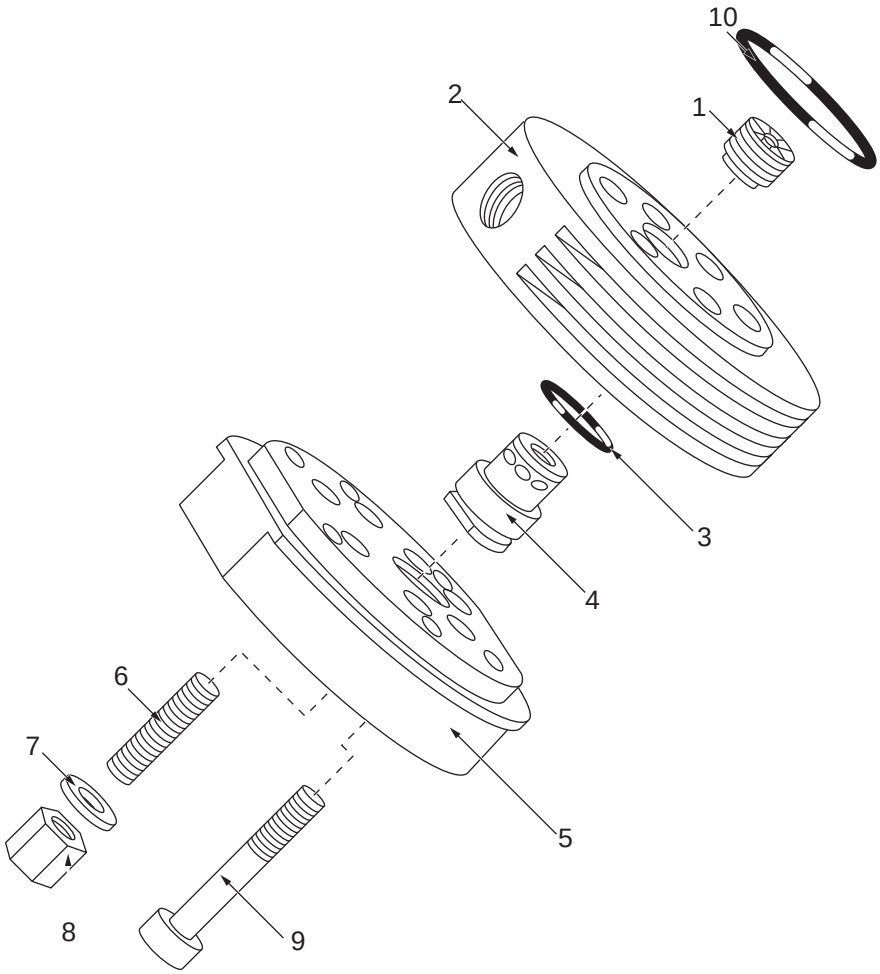
Item	Qty	Part No.	Description	Notes
♦	1	068601	2nd Stage Valve Head Assembly	
1	1	68491	Valve Head	
2	2	56668	Gasket	
3	1	N4067	Intake Valve	
4	2	56183	Valve Cap	
5	2	N3997	O-ring	
6	1	N4068	Pressure Valve	
7	1	62924	Press Pad	
8	2	N3474	Self Locking Hex Nut	
9	2	N16	Washer	
10	2	N4190	Stud	
11	4	N354	Allen Screw	

Figure 3-28 3rd Stage Valve Head



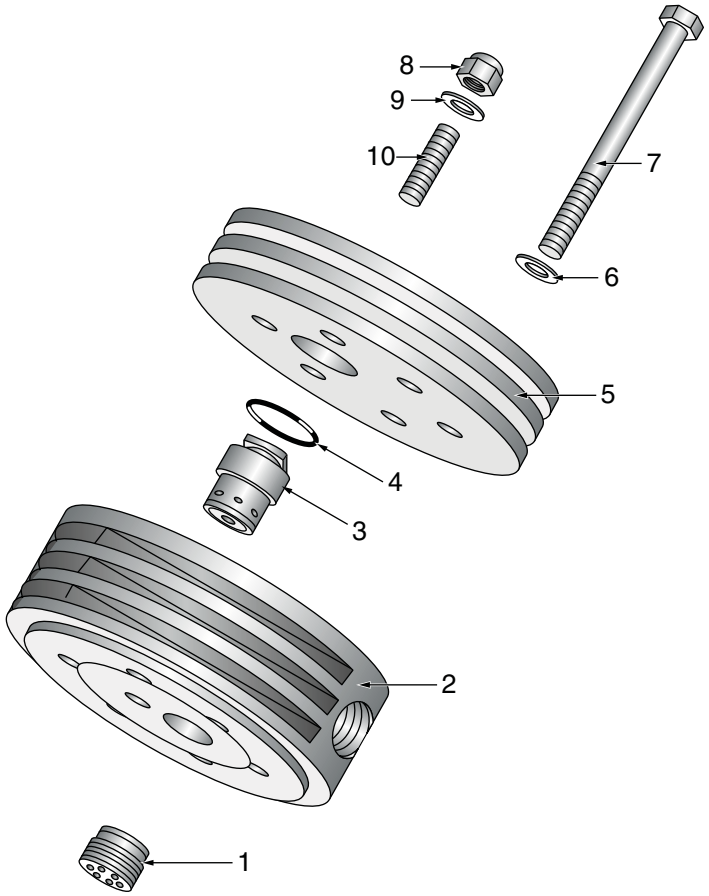
Item	Qty	Part No.	Description	Notes
♦	1	068602	3rd Stage Valve Head Assembly	
1	2	N3474	Self Locking Hex Nut	
2	2	N16	Washer	
3	1	62924	Pressure Pad	
4	2	N4190	Stud	
5	2	127366	Valve Cap Upper	
6	2	N34134	O-ring	
7	2	N34135	Back-up Ring	
8	2	56183	Valve Cap Lower	
9	1	N15273	Intake Valve	
10	1	N15274	Pressure Valve	
11	2	56668	Gasket	
12	1	60583	Valve Head	
13	6	N503	Allen Screw	

Figure 3-29 4th Stage Valve Head



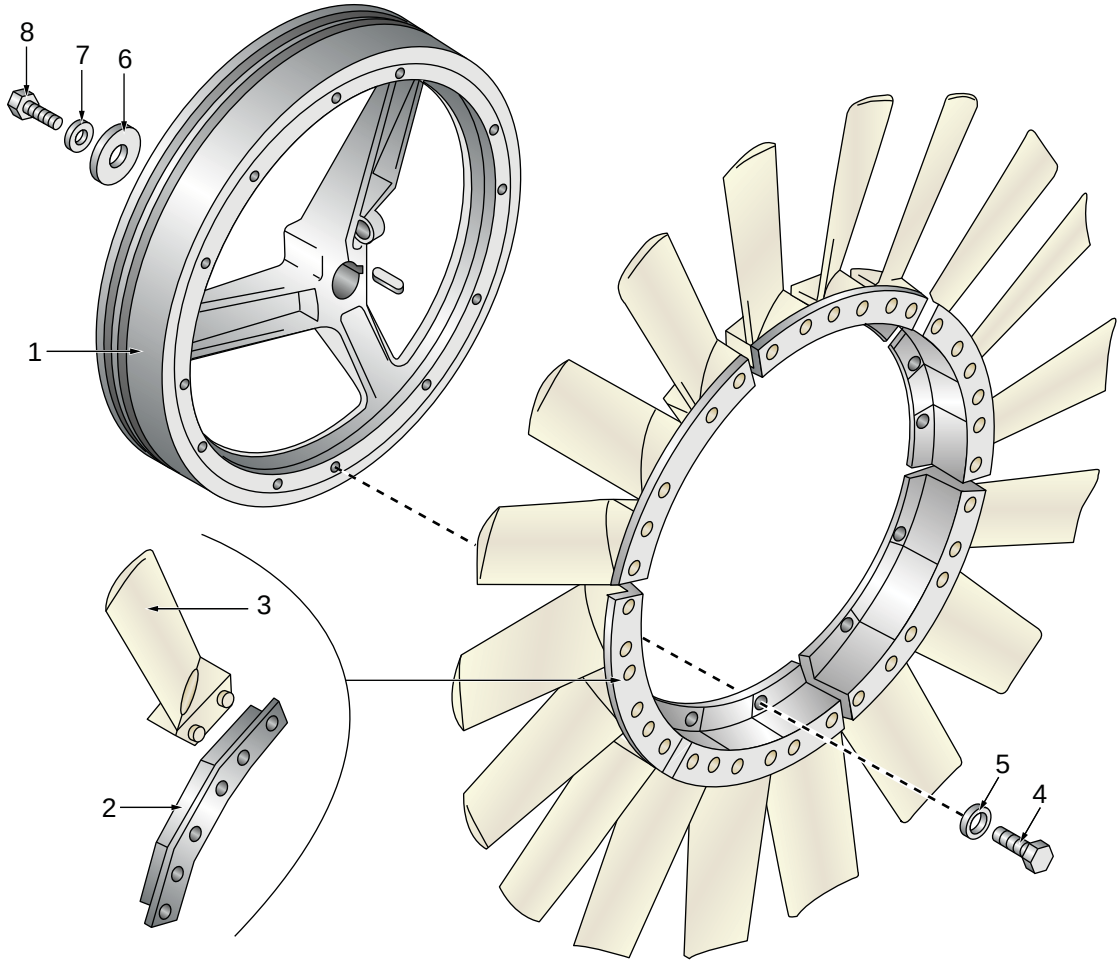
Item	Qty	Part No.	Description	Notes
♦	1	071621	**4th Stage Valve Head Assembly**	Items 1-10
♦	1	073629	**Valve Head Assembly**	Items 1-8
1	1	07790	Intake Valve	
2	1	65191	Valve Head	
3	1	N2789	O-ring	
4	1	014121	Pressure Valve	
5	1	14118	Valve Head Cover	
6	1	71065	Stud	
7	1	N3625	Gasket	
8	1	N3623	Nut	
9	6	N19554	Allen Screw	
10	1	N3860	O-ring	

Figure 3-30 5th Stage Valve Head



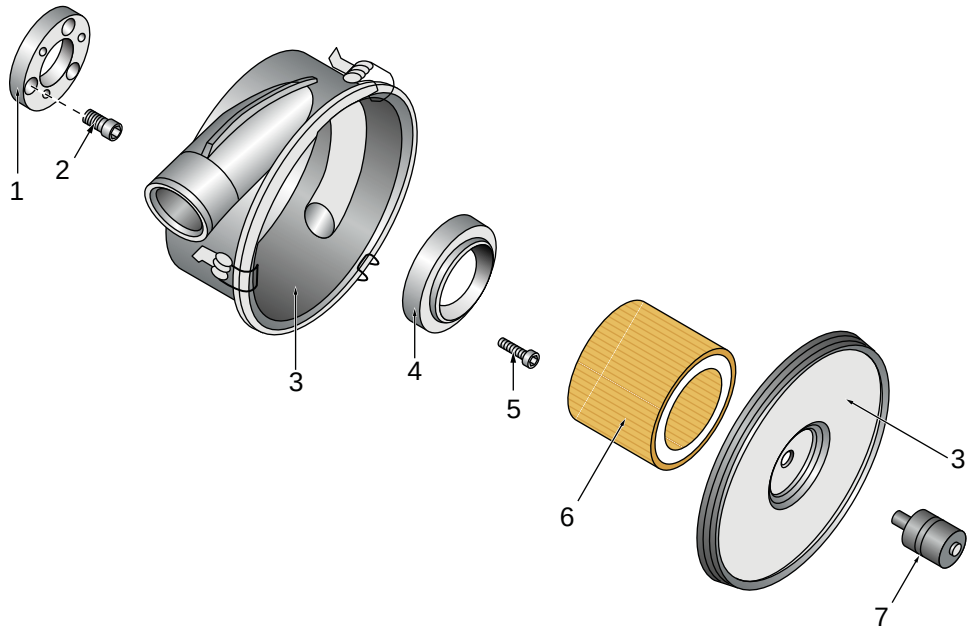
Item	Qty	Part No.	Description	Notes
♦	1	082096	5th Stage Valve Head Assembly	
1	1	081409	Intake Valve	
2	1	082087	Valve Head	
3	1	014121	Discharge Valve	Includes Item 4
4	1	N2789	O-ring	
5	1	082086	Valve Head Cover	
6	6	N58	Washer	
7	6	N17730	Hex Head Bolt	
8	1	88609	Acorn Nut	
9	1	N3625	Gasket	
10	1	N124608	Stud	

Figure 3-31 Flywheel Drive Assembly



Item	Qty	Part No.	DescriptionNotes
♦	1	161475	Flywheel Drive AssemblyBanded
1	1	129360-RA L9010	V-belt Pulley
2	6	128837	Fan Blade Support
3	18	79239	Blade, Fan CCW
4	36	N19508	Hex Head ScrewM6 x 16
5	36	WAS-0029	Washer, Split Lock6 mm
6	1	68646	Washer
7	1	WAS-0002	Washer, Split Lock
8	1	N19523	Hex Head Cap Screw

Figure 3-32 Intake Filter Assembly



Item	Qty	Part No.	Description	Notes
♦	1	079706	Intake Filter Assembly	
1	1	79679	Manifold, Air Intake	
2	3	N171	Socket Head Cap Screw	
3	1	88797	Housing, Intake Filter	
4	1	79464	Flange	
5	3	N19535	Allen Screw	
6	1	N25886	Element, Intake Filter	
7	1	N2221	Indicator, Maintenance	

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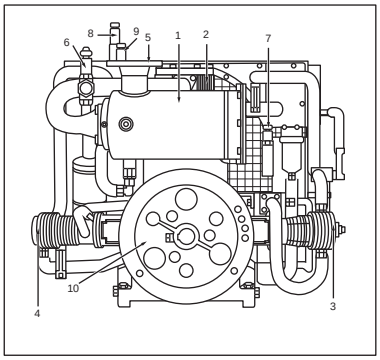
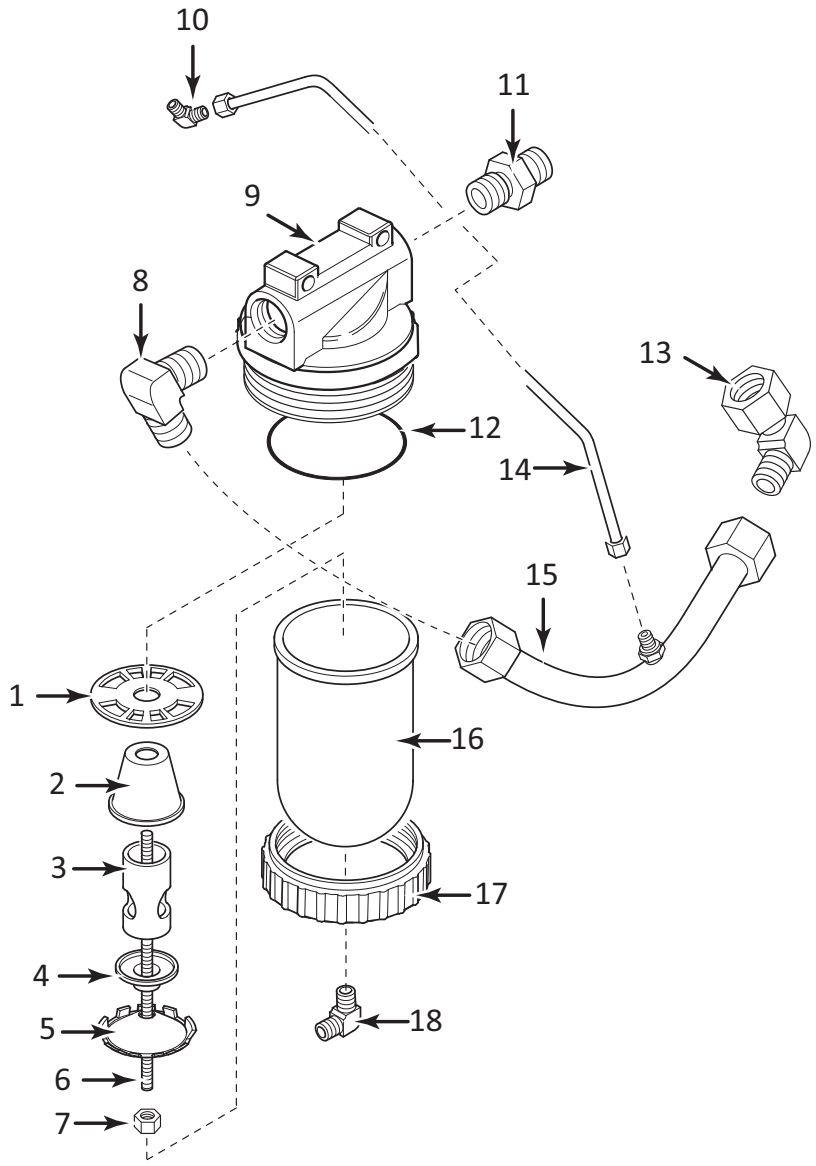


Figure 3-33 1st Stage Interfilter *(Optional)*

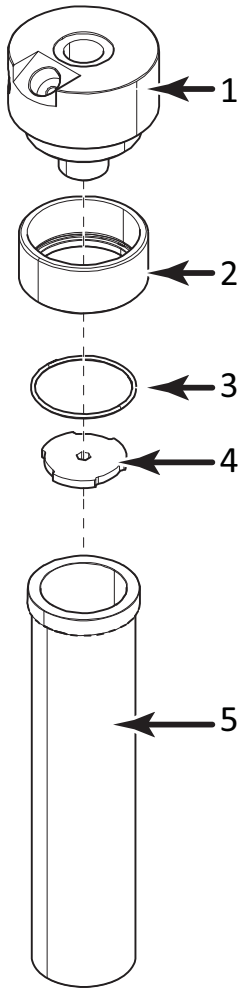


Item	Qty	Part No.	Description	Notes
♦	1	160918	1st Stage Interfilter Assembly	
1	1	N2484	Distributing Plate	
2	1	N2483	Baffle Funnel	
3	1	61751	Tube	
4	1	N2480	Baffle Plate	
5	1	N2479	Baffle Washer	
6	1	N3677	Stud	
7	1	N1042	Hex Nut, Self Locking	
8	1	N20304	Screwed Socket, Elbow	

Figure 3-33 (cont.) 1st Stage Interfilter *(Optional)*

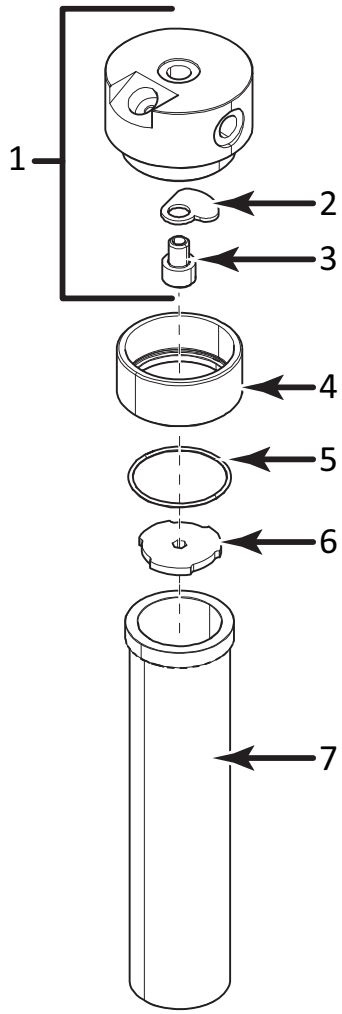
Item	Qty	Part No.	Description	Notes
9	1	80261	Interfilter	includes #1-7, 12, 16 & 17
10	1	N20058	Screwed Socket, Elbow	
11	1	N20075	Straight Male Socket	
12	1	N19122	O-ring	
13	1	N20485	Adjustable Screwed Socket	
14	1	83505	Connecting Tube Assembly	
15	1	83503	Connecting Tube Assembly	
16	1	N22966	Separator	
17	1	N3511	Screw Cap	
18	1	N20207	Screwed Socket, Elbow	

Figure 3-34 2nd Stage Interstage Separator



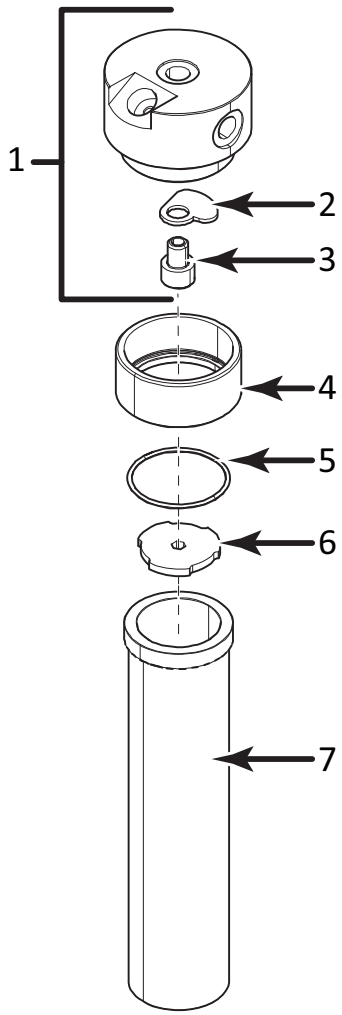
Item		Qty	Part No.	Description	Notes
♦		1	172775	2nd Stage Interstage Separator	
1	…	1	060601	Filter Head	
2	…	1	13937	Collar, Threaded Knurled	
3	…	1	N3556	O-ring	
4	…	1	161781	Insert	
5	…	1	—	Filter Housing	
NS	…	1	81810	Safety Valve	24 bar

Figure 3-35 3rd Stage Interstage Separator



Item	Qty	Part No.	Description	Notes
♦	1	172778	3rd Stage interstage Separator	
1	…	1	81150	Separator Head Assembly
2	…	1	81148	Plate
3	…	1	81643	Hollow Screw
4	…	1	13937	Knurled Ring
5	a..	1	N3556	O-ring
6	…	1	161781	Inset Assembly
7	…	1	—	Separator Housing
NS	…	1	12886	Safety Valve 80 bar

Figure 3-36 4th Stage Interstage Separator



Item	Qty	Part No.	Description	Notes
♦	1	172781	3rd Stage interstage Separator	
1	…	1	81776	Separator Head Assembly
2	…	1	81148	Plate
3	…	1	81643	Hollow Screw
4	…	1	69173	Knurled Ring
5	a..	1	N3556	O-ring
6	…	1	166062	Inset Assembly
7	…	1	—	Separator Housing
NS	…	1	65410-180	Safety Valve 180 bar

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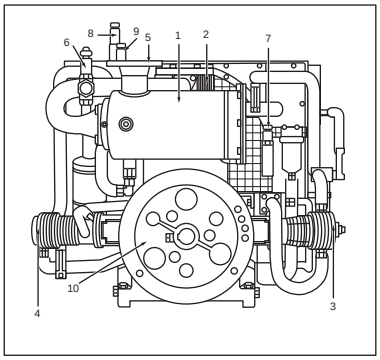
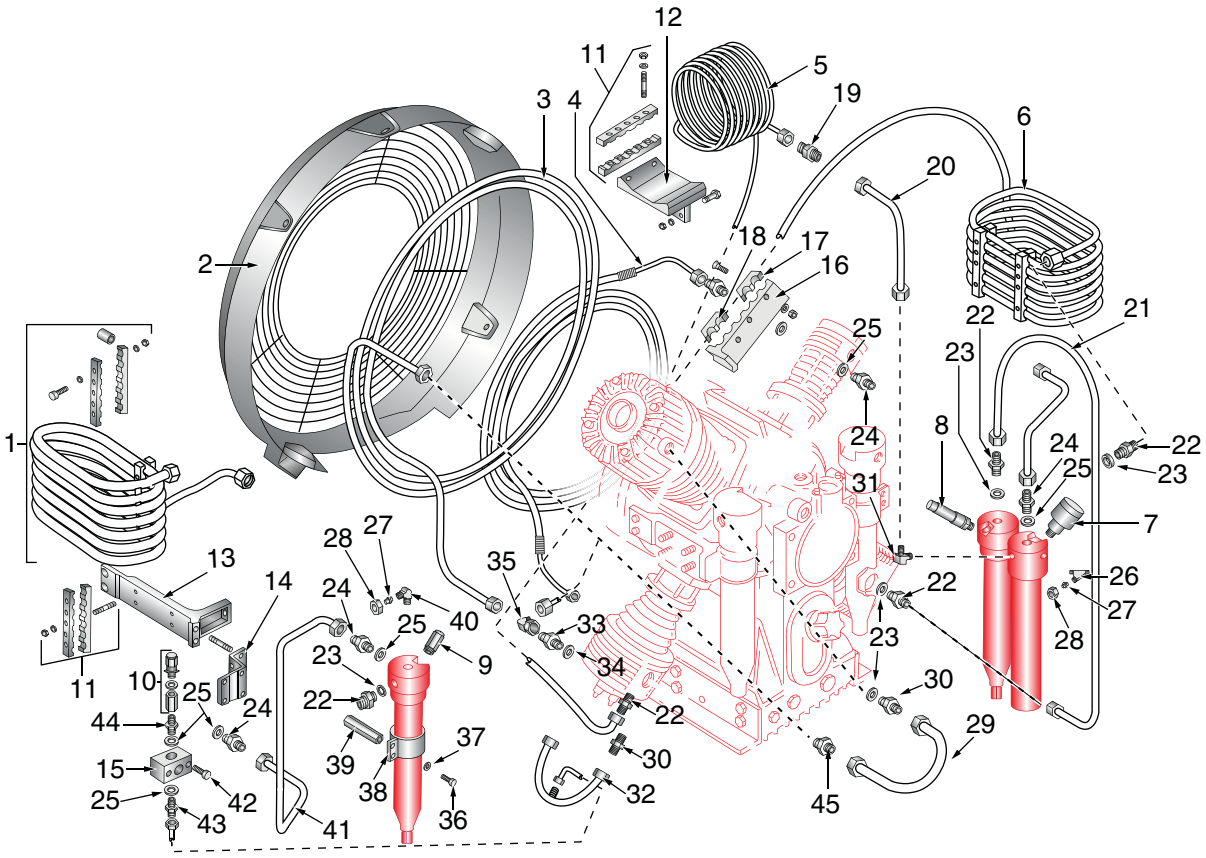


Figure 3-37 Cooling System Assembly

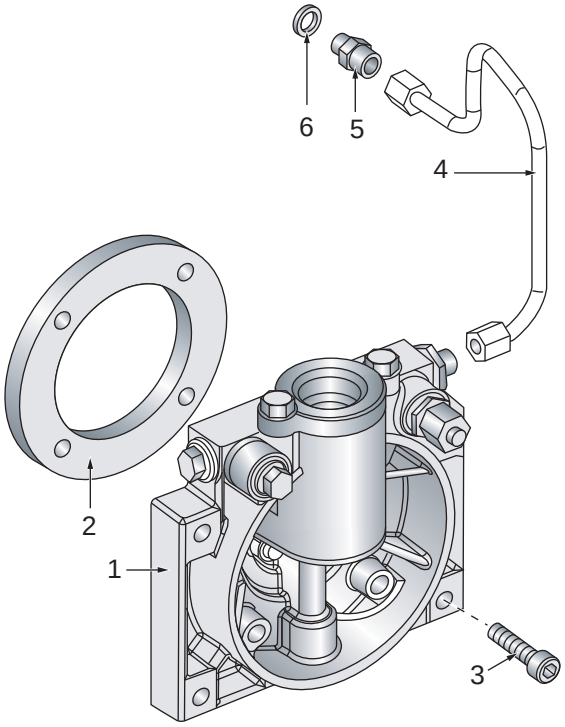


Item	Qty	Part No.	Description	Notes
♦	1	79916	Cooling System Assembly	
1	1	79961	3rd Stage Intercooler	
2	1	060709	Fan Screen	
3	1	79967	1st stage Intercooler	
4	1	79936	Aftercooler	
5	1	79963	4th Stage Intercooler	
6	1	79957	2nd Stage Intercooler	
7	1	065410-180	Safety Valve, 4th Stage	180 bar
8	1	081810	Safety Valve, 2nd Stage	24 bar
9	1	012886	Safety Valve, 3rd Stage	80 bar
10	1	083274	Safety Valve, 1st Stage	6 bar
11	4	…	Bracket Assembly	each consisting of:
—	2	62773	Bracket	
—	2	N3494	Stud	
—	2	N102	Washer	
—	2	N1042	Self Locking Hex Nut	
12	1	68889	Bracket	

Figure 3-37 (cont.) Cooling System Assembly

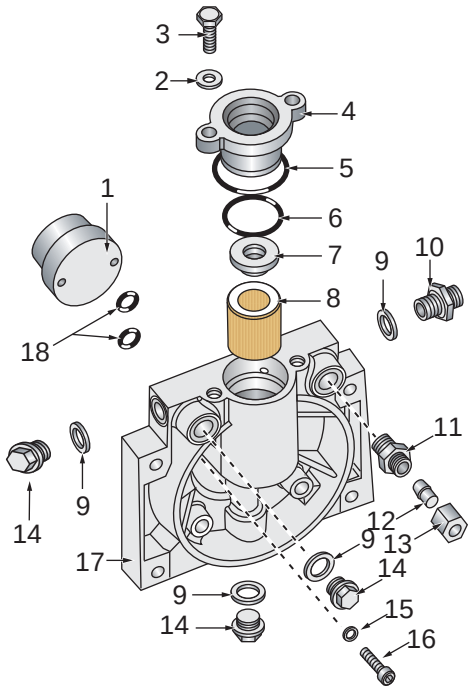
Item	Qty	Part No.	Description	Notes
13	2	60751	Mounting	
14	1	60716	Mounting	
15	1	60717	Support	
16	4	79637	Bracket	
17	3	71195-M	Clamp	
18	9	60694-M	Clamp	
19	1	N20310	Connector	
20	1	81240	Connecting Tube	
21	1	070079	Connecting Tube	
22	5	N20231	Straight Male Coupling	
23	5	N293	Gasket	
24	4	N20059	Fitting	
25	6	N1316	Gasket	
26	1	N20008	Tee Coupling	
27	2	N4530	Plug	
28	2	N7430	Screw Cap	
29	1	79919	Connecting Tube	
30	1	N20060	Connector	
31	1	N22719	Elbow	
32	1	070043	Connecting Tube	
33	1	71598	Connector	
34	1	56983	Gasket	
35	1	N20200	Elbow	
36	4	N171	Allen Screw	
37	8	N58	Washer	
38	3	57070	Tube Clamp	
39	4	69046	Hex Stud	
40	1	N20003	Elbow	
41	1	070080	Connecting Tube	
42	2	N724	Allen Screw	
43	1	N20014	Connector	
44	1	N20201	Connector	
45	1	N20312	Straight Male Connector	

Figure 3-38 Lubricating System Assembly



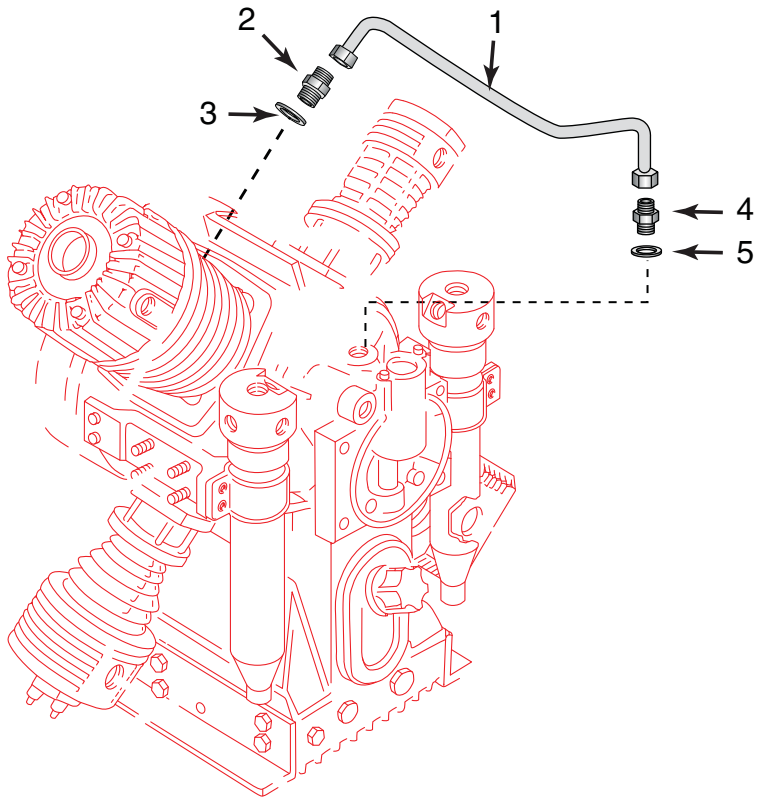
Item	Qty	Part No.	Description	Notes
♦	1	84381	Lubricating System Assembly	
1	1	080345	Lubricating System	See next Figure
2	1	78421	Gasket	
3	4	N123	Socket Head Screw	
4	1	84382	Connecting Tube Assembly	
5	1	N20002	Connector	
6	1	N4501	Gasket	

Figure 3-39 Lubricating System



Item	Qty	Part No.	Description	Notes
♦	1	080345	Lubricating System	
1	1	N24585	Gear Pump	
2	2	N58	Washer	
3	2	N19506	Hex Head Screw	
4	1	77885	Oil Filter Cover	
5	1	N04058	O-ring	
6	1	N25327	O-ring	
7	1	77774	Rubber Gasket	
8	1	N25326	Filter Element	
9	4	N1316	Gasket	
10	1	81050	Regulating Valve	
11	1	N20065	Straight Male Connector	
12	1	N16309	Plug	
13	1	N1049	Screw Cap	
14	3	N52	Plug	
15	2	N2889	Gasket	
16	2	N634	Socket Head Screw	
17	1	077878	Oil Pump Case	
18	2	N3489	O-ring	

Figure 3-40 Crankcase Venting



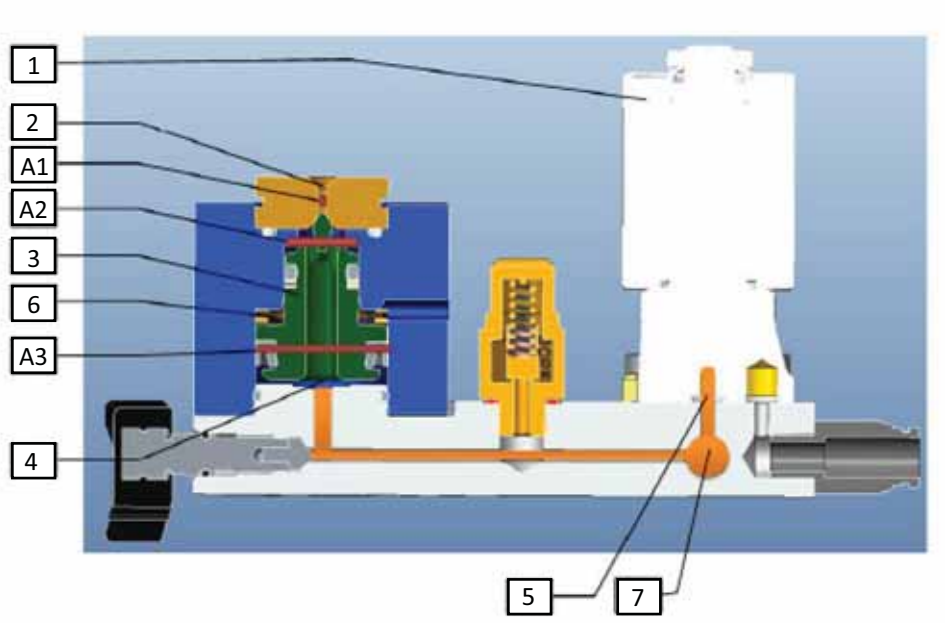
Item	Qty	Part No.	Description	Notes
♦	1	128426-KD	Crankcase Vent Assembly	
1	1	078918	Connecting Tube Assembly	
2	1	N20188	Male Connector	
3	1	N842	Gasket	
4	1	N20014	Male Connector	
5	1	N1316	Gasket	

CHAPTER 4: B-DRAIN

4.1 Description

The B-drain system is intended for condensate drainage in conjunction with intermediate separators, final separators and filter systems which are specifically designed for this purpose. The condensate drain valve is the centerpiece of the B-drain system and works as follows:

Figure 4-41 Drain Valve



The condensate drain valve acts as a pressure regulator (See Figure 4-41), i.e. a high operating pressure of up to 7,975 psi in the condensate separator (2) is reduced to a lower pilot pressure (7) of 29 - 130 psi.

The solenoid (1) is closed during operation and opened for condensate drainage and when switching the compressor off. When the compressor is started (system depressurized), the piston (3) is at the base of the container (4) (lower dead-point position). As a result, the condensate drain valve is open. The solenoid (1) is closed.

As the compressor pressure builds, the pilot pressure beneath the piston (4) also builds. This results in the piston (3) being pushed up due to the area ratio and the condensate drain valve closing.

To drain the condensate, the solenoid (1) is opened (open with zero current). This causes the pilot pressure (7) to drop and the piston (3) is pushed down due to the operating pressure on the area A1 and the spring force (6). The condensate now flows over the piston (3) and through the solenoid out of the condensate drain valve. There is a metering valve (5) in the solenoid (1) which brings about an increase in the pilot pressure. This pilot pressure closes the piston (3) to the point where a balance of forces is achieved. To a large extent, the outflow pressure of the condensate or the compressed air is degenerated by the operating pressure.

At the end of the condensate drainage process (time-controlled), the solenoid (1) is closed again. This causes the pilot pressure (5) to build until the condensate drain valve is closed.

According to this somewhat simplified description, the pilot pressure upon drainage and closing should be the same. This is not the case, as other influences such as friction, flow forces, impurities in the seat, tolerances mean that the pilot pressure upon closing is always higher than the pilot pressure when the condensate is drained.

Increased pilot pressure indicates that there are defects in the valve seat or valve piston in the form of furrows or nicks or there is dirt at the sealing point between the valve seat and valve piston. Differences in the shape and position of the valve seat and valve piston, caused by tolerances, can lead to leaks if the valve seat and valve piston do not fit together sufficiently. If the valve seat (2) is not properly sealed off by the valve piston (3), compressed air from the separator flows continuously into the condensate drain valve. This causes a constant increase in the pilot pressure (5) if the solenoid is closed, which could , in theory, climb to the operating pressure of the separator (2). For safety reasons, a safety valve was integrated into the lower section of the condensate drain valve for the oil and water separators, which limits the pilot pressure to a maximum 725 psi. The condensate drain valve for intermediate separators is manufactured without a safety valve. The bursting pressure of the solenoid and the condensate drain valve is higher than 2,900 psi.

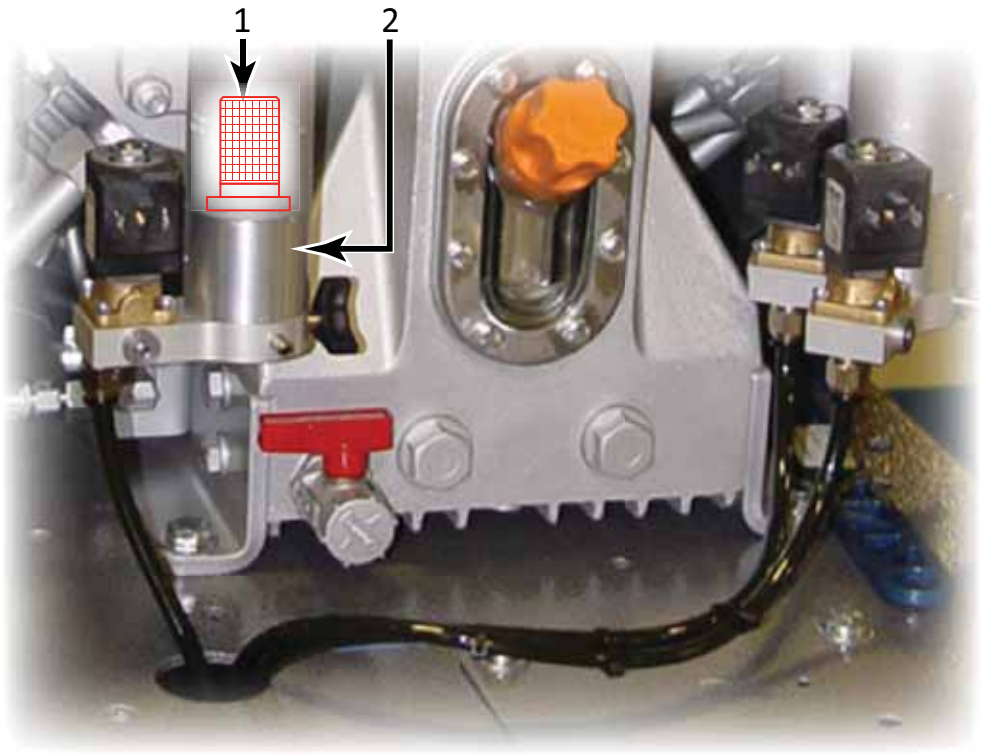
The solenoid valves are equipped with a pressure relief function, i.e. if the pilot pressure is higher than 290 psi, the seal seat on the solenoid is pushed open and condensate or air can leak into the condensate canister. If the pilot pressure returns to below 290 psi, the seal seat seals off the valve seat again. Only solenoid s with the pressure relief function described above may be used for the B-drain system because conventional solenoids become permanently jammed if the permitted pilot pressure is exceeded and can no longer be relieved or vented.

WARNING

Only solenoid valves with pressure relief function may be used for the B-drain system.

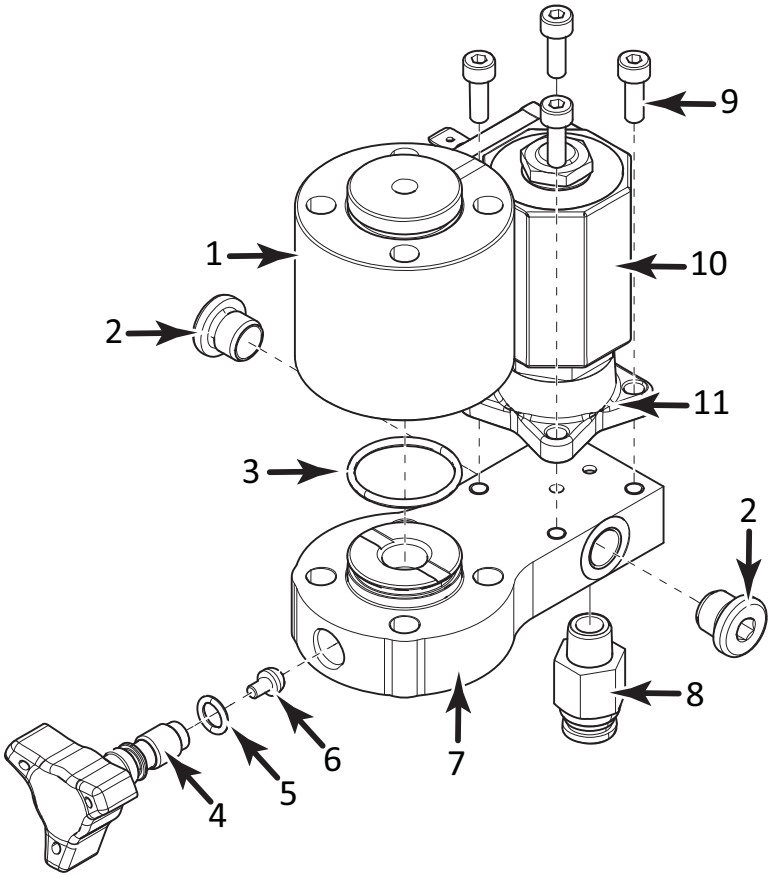
4.1.1 Replacement Parts List

Figure 4-42 ACD System



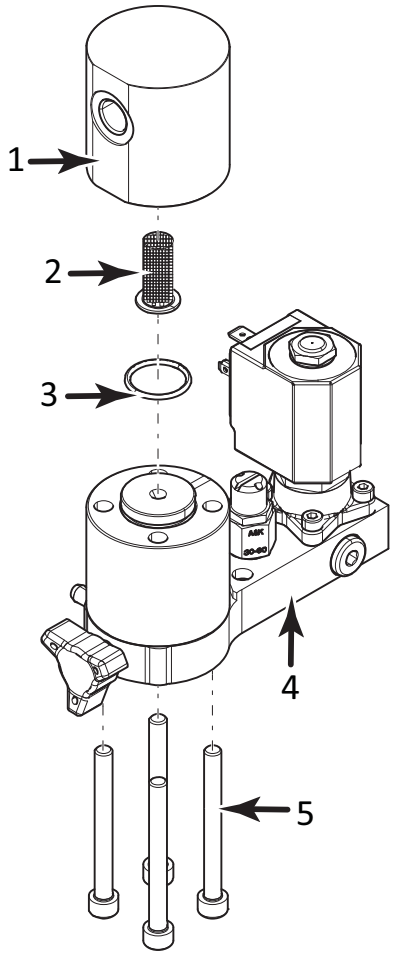
Item	Qty	Part No.	Description	Notes
♦	3	165408	B-Drain Assembly	
1	1	166088	Sieve	
2	1	172813	Condensate Drain Valve	See Figure 4-43

Figure 4-43 Condensate Drain Valve



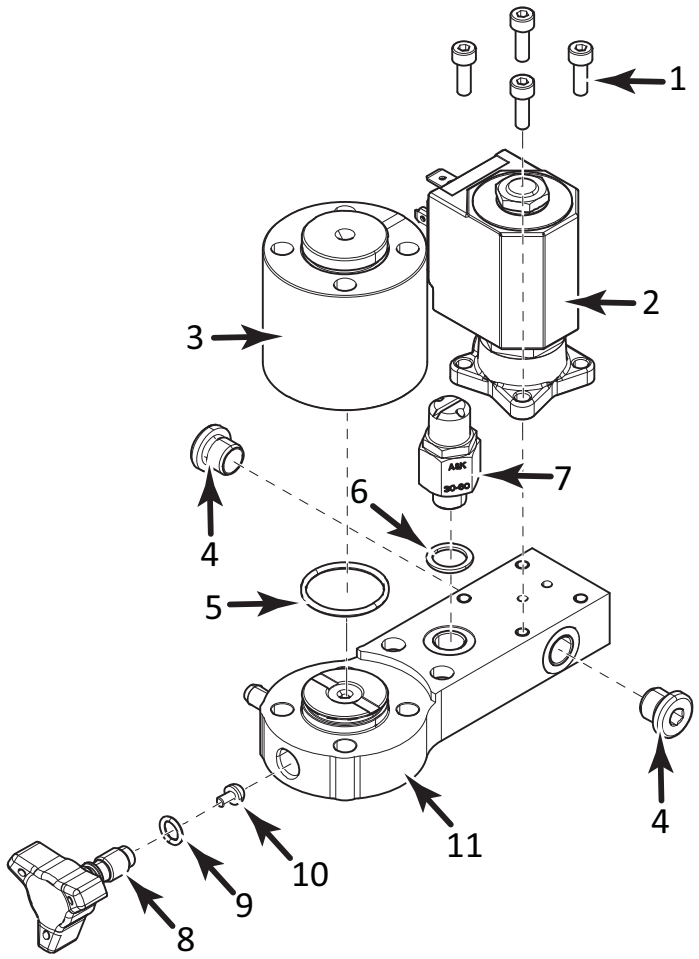
#	KIT	Qty	Part No.	Description	Notes
♦		1	172813	Condensate Drain Valve Assembly	
1	…	1	166085	Drain Valve	
2	…	2	N16504	Threaded Plug	
3	…	1	N32554	O-ring	
4	…	1	121020	Tommy Screw	
5	…	1	N16554	O-ring	
6	…	1	121015	Seal	
7	…	1	165748	Lower Section	
8	…	1	N37927	Threaded Plug	
9	…	4	N17970	Allen Screws	
10	…	1	165440-24VDC	Magnetic Coil	
11	…	1	165440	Solenoid	

Figure 4-44 Final Separator Drain Assembly



Item	Qty	Part No.	Description	Notes
♦	1	165787	Separator Drain Assembly	
1	1	167281	Upper Body	
2	1	168636	Sieve	
3	1	N2507	O-ring	
4	1	172824	Condensate Drain Valve	See Figure 4-45
5	4	N19541	Allen Screws	

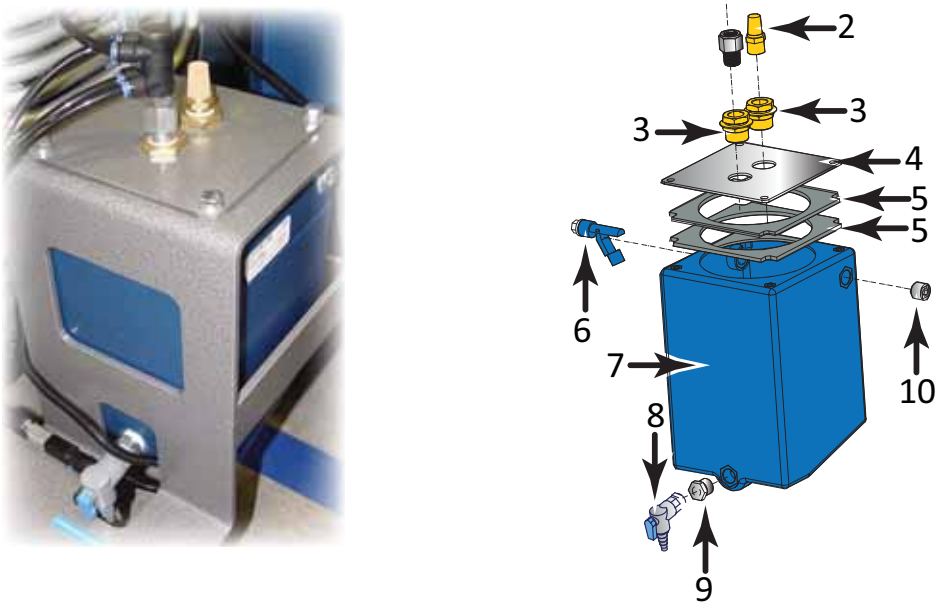
Figure 4-45 Final Separator Condensate Drain Valve



Item	Qty	Part No.	DescriptionNotes
♦	1	172824	Condensate Drain
1	4	N17970	Allen Screws
2	1	165440-24VDC	Magnetic Coil
3	1	166085	Condensate Valve
4	2	N16504	Threaded Plug
5	1	N32554	O-ring
6	1	N1052	Sealing Ring
7	1	N38033	Safety Valve
8	1	121020	Tommy Screw
9	1	N16554	O-ring
10	1	121015	Seal
11	1	165750	Lower Section

4.1.2 Condensate Collector Replacement Parts List

Figure 4-46 Condensate Tank



Item	Qty	Part No.	Description	Notes
♦	1	ASY-4023	Condensate Tank Assembly	
1	1	MFD-0130	Drain Hose Manifold	
2	1	MUF-0007	Exhaust Muffler	
3	2	CON-0360	Connector	
4	1	PLT-0473	Cover Plate	
5	2	GKT-0078	Gasket	
6	1	SWT-0265	Float Switch	
7	1	TNK-0092	Condensate Tank	
8	1	VAL-0437	Manual Drain Valve	
9	1	RED-0067	Reducer	
10	1	PLU-0198	Plug	

4.1.3 Trouble shooting

Trouble	Cause			Remedy
Inadequate Drainage; more than 2 ounces of condensate drained during ACD check.	1. Solenoid opening time or cycle time incorrectly set 2. Solenoid not opening completely 3. Solenoid defective 4. Continuous voltage in solenoid 5. condensate hose clogged			1. Check opening time and cycle time and reset as needed. 2. Check, clean, or replace 3. Check replace as needed 4. Check control unit and timer 5. Clean out hose with compressed air or replace
Very little air/condensate escaping.	Drain valve sieve dirty			Remove clean and replace
Operating pressure is not reached or drain valve is dripping	Solenoid leaky	Pilot pressure above 217 psi	Valve seat defective	Remove, disassemble, clean valve, replace seat
			Valve piston stiff	Remove, disassemble, clean valve, check mobility of piston in the valve body. Replace piston if needed
			Valve piston surface damaged	Replace valve piston
		Solenoid is dirty		Clean, replace if needed
		Seat of solenoid is damaged		Replace solenoid
	Solenoid does not close	Solenoid is defective		Replace solenoid
		Solenoid receives no voltage		Check power supply and restore
	Drain valve/solenoid hos is leaky			Check hose, ensure it is seated correctly in connection; replace hose and/or plug connections if necessary

CHAPTER 5: PURIFICATION SYSTEM

5.1 Introduction

The purpose of all Bauer breathing air purification systems is to remove carbon monoxide, oil, water, taste and odor from the compressed air stream before final delivery.

The purpose of all Bauer industrial air purification systems is to remove oil and water from the compressed air stream before final delivery.

WARNING

Industrial air Purification System cartridges do not remove Carbon Monoxide and must not be used in breathing air applications.

The quality of air produced by the compressor is directly related to the quality and temperature of the air taken in by the unit. Intake air should as close as possible to 50 °F (10 °C) and cleanest available and as dry as possible. Bauer compressors normally add approximately 18 °F (10 °C) to the intake air temperature. The purification cartridges perform their best at approximately 68 °F (20 °C). Adequate ventilation enhances the quality and life of the purification cartridges.

5.1.1 General Purification System Procedures

1. Keep an accurate record of operating hours to ensure exact attention to maintenance intervals
2. Change all cartridges before reactivating a compressor unit that has been out of service more than three months. Leave cartridges in the unit as long as it is out of service.
3. While out of service keep all condensate drain valves closed. Maintain a pressure of 700 - 1,100 psi (50 to 80 bar) within the system to prevent moisture from entering the compressor and purification system.

5.1.2 Chamber Safety Bore

The chambers in all Bauer purification systems are designed to prevent pressurization if the cartridge is missing, not seated properly or damaged (Figure 5-1 & Figure 5-2). Without a cartridge properly in place the safety bore is not sealed, the air escapes into the atmosphere, no pressure can be built up and thus it is ensured that unfiltered air is not supplied to the consuming device. If air is escaping from the safety bore remove and check cartridge. If necessary replace the cartridge or O-rings.

Figure 5-1 Cartridge Safety Venting

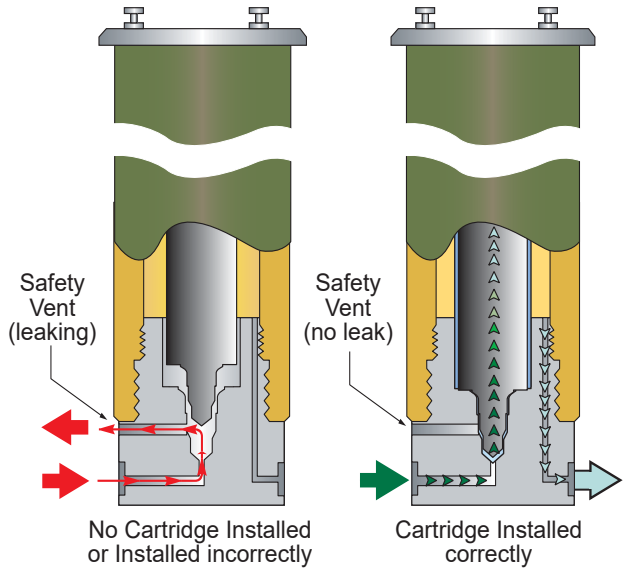
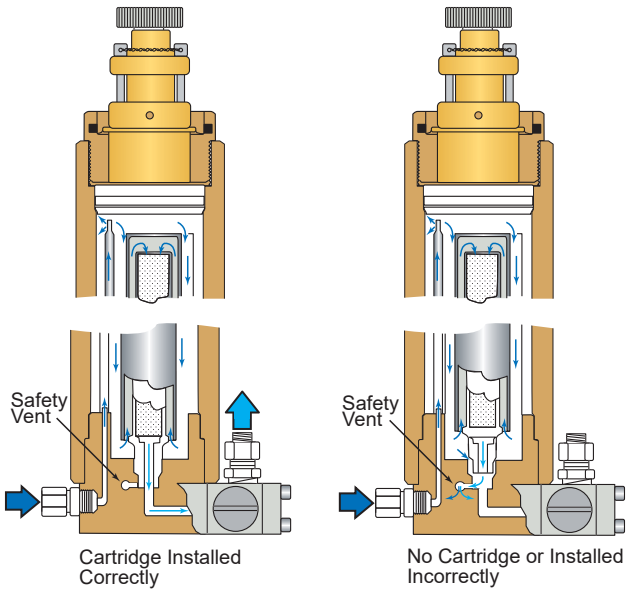


Figure 5-2 P0 & P31 Safety Venting



5.1.3 Manual Condensate Drainage

The condensate must be drained from the oil and water separator (final separator) before changing any cartridge, before beginning each filling procedure and in the absence of an Automatic Condensate Drain (ACD) system, every fifteen minutes during the operating procedure. This is done by slowly opening the manual condensate drain valves. They are opened approximately 1/3 of a turn to the left and held open until the condensate is completely drained. The condensate drain valves close by spring pressure but if necessary may be tightened by hand to ensure they are completely tightened.

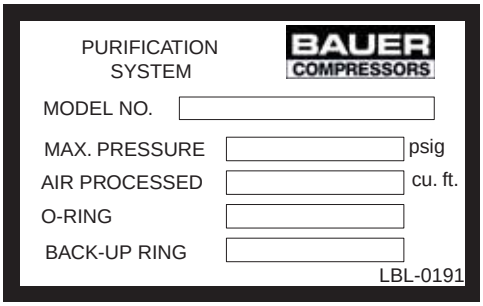
5.1.4 Model, Serial Number and Part Number Identification

5.1.4.1 Compressor Data Plate

The model number, date of manufacture and serial number can be found on the compressor unit identification plate in the main electrical enclosure and frame.

Figure 5-3 Purification System Data Plates (typical)

Purification System



Cartridge Installation

5.1.4.2 Purification System Data Plate

Refer to the compressor unit purification system data plate (Figure 5-3) on the compressor front to determine your purification system model and specifications.

5.1.4.3 Cartridge Installation Data Plate

The function performed by each chamber in the purification system is determined by the type of cartridge installed in that chamber. Refer to the cartridge installation data plate on the chamber to determine the purpose and part number of the cartridge installed in that chamber. (Figure 5-3).

5.1.5 Purification System Configurations

Purification System	Number and Type of Cartridges			Processing Capacity
	Dryer	Purification	Securus®	cubic ft $(ft)^3$
P0	Combined			3,200
P1	…	1	…	15,000
P2	…	1	…	40,000
P2 with Securus®	…	…	1	67,000
P4	1	1	…	60,000
P5	1	1	…	90,000
P5 with Securus®	1	…	1	150,000
P10	2	1		140,000
P10 with Securus®	2	…	1	230,000
P12[a]	1	1		420,000
P14 [a]	2	1		650,000
P31	Combined			11,760
P41	…	1		28,700
P41 with Securus®	…	…	1	47,000
P42	1	1	…	64,000
P42 with Securus®	1	…	1	107,000
P43	2	1	…	100,000
P43 with Securus®	2	…	1	164,000
P81	1	1		124,000
P81 with Securus®	1	...	1	198,000

a. P12 and P14 have the Securus® Electronic Moisture Monitor System as standard equipment.

5.1.6 Industrial Purification System Configurations

Purification System	Number and Type of Cartridges			Processing Capacity
	Dryer	Purification	Securus®	cubic ft (ft)[See Chapter 53]
P0	Combined			3,200
P1	…	1	…	15,000
P2	…	1	…	40,000
IP2 with Securus®	…	…	1	67,000
P4	1	1	…	60,000
P5	1	1	…	90,000
IP5 with Securus®	1	…	1	150,000
P10	2	1		140,000
IP10 with Securus®	2	…	1	230,000
P31	Combined			11,760
IP41 with Securus®	…	…	1	47,000
IP42 with Securus®	1	…	1	107,000
IP43 with Securus®	2	…	1	164,000

5.1.7 Cartridge Operating Life

NOTICE

Cartridge life is dependent on temperature and humidity variables. Heat and humidity lessen the cartridge life, requiring more frequent replacements.

Every Bauer purification system is designed to process a certain volume of air/gas before the cartridges require replacement. By using special test equipment that measures the quality of air/gas at the outlet any quality reduction may be detected. However as most compressor owners do not have this test equipment the recommended method of determining cartridge operating life is to maintain a written record of the volume of air/gas processed by the purification system.

Each Bauer compressor block is rated to produce a standard volume of air per minute and by using this number and the air processing capability of the purification system it is possible to calculate the maximum operating hours before the cartridges need to be replaced. See Paragraph 5.1.7.1 for the method of determining this figure.

The ambient air temperature and its ability to cool the compressor will effect the operating life of the cartridge. See Paragraph 5.1.7.2 for the method of calculating this adjustment factor.

The optimum place to measure the temperature is at the inlet to the final separator as this best reflects the temperature of the air as it enters the chambers. Experience has shown that this temperature is approximately 18 °F (10 °C) above the ambient temperature. Therefore for the purpose of calculating cartridge operating life use the Ambient air Temperature plus 18 °F.

A form titled air Purification Cartridge Operating Hours is found in Paragraph 5.1.8.1 and in the Appendices. It is used for recording the ambient temperature, operating time and adjustment factor. It is suggested that it be copied, placed in a protective folder and kept with the unit to record the adjusted operating hours. An example of how this form is used is shown in Figure 5-5.

5.1.7.1 Calculating the Maximum Cartridge Operating Hours

1. From the purification system data plate (See Figure 5-3) on the purification chamber determine the air Processed (cu.ft.)
2. From the paragraph titled Compressor Specifications in the instruction manual for your compressor unit determine the Charging Rate in SCFM of your compressor.
3. Divide the air Processed by the Charging Rate to obtain the Maximum Operating Time in minutes
4. Divide the Maximum Operating Time in minutes by 60 to obtain the Maximum Operating Hours.
5. Record the answer on the air Purification Cartridge Operating Hours form.

5.1.7.2 Calculating the Adjusted Cartridge Operating Hours

1. Using the air Purification Cartridge Operating Hours form record the Date, Operating Hours and Ambient air Temperature plus 18 °F.
2. Using either the graph or the chart in Figure 5-4 determine the Correction Factor.
3. Divide the Operating Hours by the Correction Factor and record it under the column labeled Today.
4. Add the hours recorded in Today to the previous Total and record it as the current Total.
5. When the Total approaches the Maximum Operating Hours replace the Cartridges.

5.1.8 Chambers

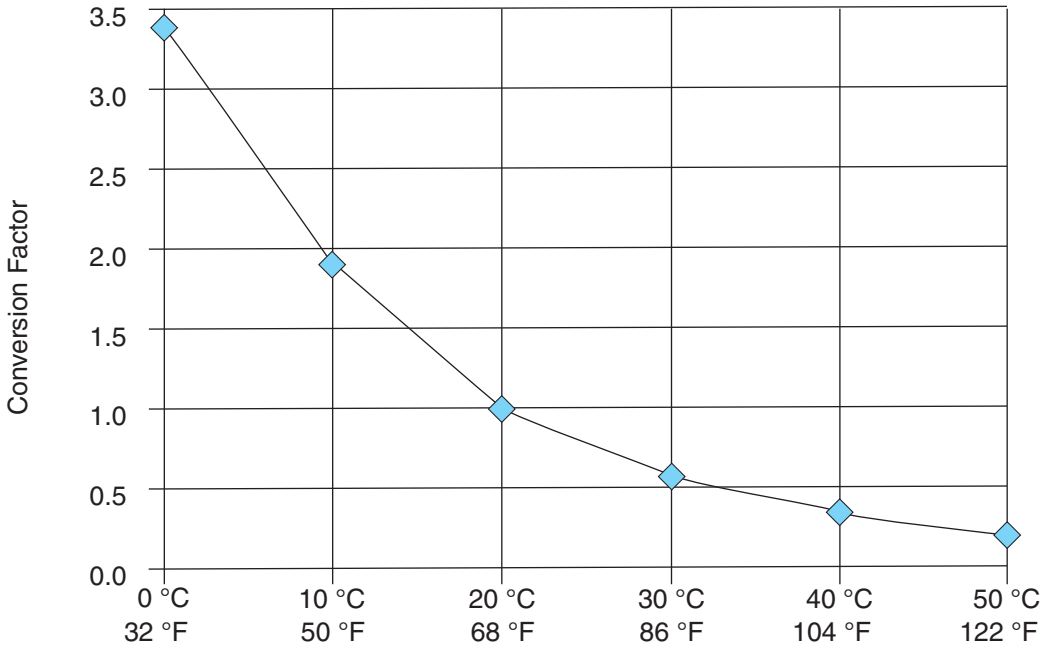
If consistent evidence shows that the maximum admissible number of load cycles has not yet been reached after five (5) years, BAUER Compressors recommends a visual inspection of the inner and outer sides of the pressure vessel.

If consistent evidence shows the maximum admissible number of load cycles has not yet been reached after ten (10) years A hydrostatic pressure test shall be executed. If the test is passed the chamber can be placed back in use for five (5) years. At the maximum number of load cycles or at fifteen (15) years the chambers must be replaced.

WARNING

All aluminum purification chambers must be replaced after 15 years of use.

Figure 5-4 Correction Factor for Cartridge Operating Hours



°C [(°F - 32) x 5/9]	°F [°C x 9/5 +32]	Correction Factor
50	122	0.21
40	104	0.34
30	86	0.58
20	68	1.00
10	50	1.81
0	32	3.44

Figure 5-5 Example Record of Adjusted Operating Hours

Date	Operating Hours	Ambient Temp. during Compression +18 °F	Correction Factor	Adjusted Cartridge Hours	
				Today	Total
10/19/04	*8*	*92°F (33 °C)*	*0.5*	*16.00* (Op hrs / Corr. factor)	*16.00*
11/01/04	*4*	*45°F (7.2 °C)*	*2.25*	*1.78*	(Total hrs +Today hrs) *17.78*

5.1.8.1 Purification Cartridge Operating Hours Form

Date	Operating hours	Ambient temp. + 18°F during compression	Correction factor	Adjusted cartridge hours	
				Today	Total

5.2 1P5S Securus II® Purification System

5.2.1 P5S Securus II® Purification System Major Components

The P5S Securus II® Purification System major components are an Oil and Water Separator, a Dryer Chamber and a Securus II® Purification Chamber. Figure 5-6 shows the functional interconnection of all the components.

Figure 5-6 P5S Securus II® Purification System

1. Oil and Water Separator	5. Securus® Transmitter	8. Pressure Maintaining Valve
2. Condensate Drain	6. Securus® Chamber	9. Check Valves
3. Safety Valve	7. Pressure Sensor	10. Bleed Valve
4. Dryer Chamber		11. Pressure Gauges

5.3 Component Description

5.3.1 Oil and Water Separator

WARNING

The rapid de-pressurizing and re-pressurizing of the oil and water separator during condensate draining subjects it to metallurgical stresses. To prevent catastrophic failure with the possibility of damage, injury or death the oil and water separator (P/N 079416) must be replaced after a predetermined number of cycles.
One load cycle equals one pressurization plus one de-pressurization.

Units operating between 3,000 and 5,000 psi = 130,000 load cycles (32,500 hours of operation)
Units operating between 5,000 and 6,000 psi = 55,000 load cycles (13,750 hours of operation)

The Bauer recommended frequency of condensate draining is every fifteen minutes and is a balance between maximizing the life of the separator chamber and maintaining the quality of the delivered air.

The air leaving the final stage is cooled in the aftercooler to approximately 20 - 25 °F (10 -15 °C) above ambient temperature and then enters the oil and water separator. The oil and water separator works by means of a sintered metal filter which separates liquid oil and water particles from the compressed air.

Figure 5-7 Oil and Water Separator Labels

5.3.2 Chamber

Each chamber is made up of an anodized aluminum housing and a filtering cartridge. There are two general types of filtering cartridges, drying or purifying. The cartridge type is determined by the ingredients packed in the cartridge. The chamber is named after the type of cartridge it contains, i.e. dryer chamber or purification chamber.

5.3.3 Cartridge

5.3.3.1 Cartridge Construction

The cartridge casing, top and bottom are aluminum and are packed with one or more of the following.

1. A catalyst to convert carbon monoxide to carbon dioxide.

2. Activated carbon which absorbs oil vapors effecting taste and odor.
3. Molecular sieve to absorb oil and water.

5.3.3.2 Cartridge Handling

1. Never open the protective packaging a cartridge comes in prior to its actual use. The highly sensitive filter materials will absorb moisture from the atmosphere becoming saturated and useless.
2. Used cartridges must be disposed of in accordance with local regulations.

5.3.4 Condensate Drain Valve

A manually operated valve used for maintenance and before start-up to drain the condensed liquids from the coalescing oil and water separator.

5.3.5 Check Valves

Valves allowing compressed air to flow in only one direction. One is used to maintain pressure in the chamber when the compressor is not operating. The other check valve prevents back-flow from filled storage cylinders or tanks.

5.3.6 Bleed Valve

A manually operated valve used to release the pressure in the chamber before maintenance.

5.3.7 Pressure Maintaining Valve

The pressure maintaining valve ensures that pressure is built up in the system from the start of delivery, thus achieving constant optimum purification. It also assures proper working conditions for the final stage of compression.

5.3.8 Safety Valve

The safety valve is located on the coalescing oil and water separator and acts as the safety valve for the final stage of the compressor.

5.3.9 Securus II® Electronic Moisture Monitor System

The Securus II® Electronic Moisture Monitor System warns the operator in advance of expiration of the life of the cartridges. The Securus II® Transmitter receives signals concerning the condition of the drying agent inside the Securus® cartridge from the attached sensors and supplies the appropriate control signals whenever the preset threshold values have been reached.

5.3.9.1 Securus® Cartridge

The Securus® Cartridge is packed with a catalyst which converts carbon monoxide to carbon dioxide, activated carbon which absorbs oil vapors, molecular sieve which absorbs oil and water and the sensor components of the Securus II® Electronic Moisture Monitor System.

5.3.9.2 Securus II® Transmitter

The Securus II® Transmitter relays the operating condition of the Securus II® Electronic Moisture Monitor System to the operator control interface. The Securus II® issues a warning when the Securus® cartridge is approaching saturation, to warn the user to prepare to change the Securus® cartridge. Once the Securus® cartridge has reached total saturation the Securus II® monitor will issue an alarm condition to the operator interface and shut down the unit. Once the Securus® cartridge is replaced the compressor unit can be restarted.

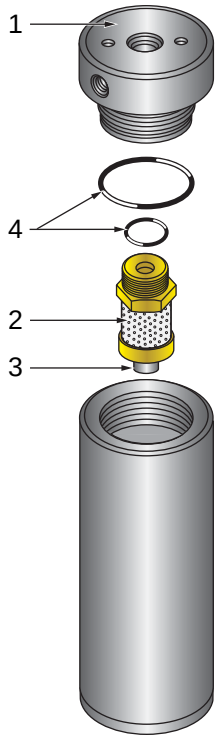
5.4 Maintenance

5.4.1 Oil and Water Separator

To remove the sintered metal filter proceed as follows: (See Figure 5-8). Disconnect the power and shut off the inlet supply line if applicable.

1. De-pressurize the system by means of the bleed valve.
2. Remove the tubes connected to the side of the filter head (1).
3. Unscrew and remove the filter head.
4. Unscrew the sintered metal filter (2) from the filter head.
5. Remove the center screw (3) to remove the sintered metal filter.
6. Clean the sintered metal filter using hot soapy water. Blow dry with compressed air.
7. After cleaning the element, record the number of operating hours to ensure exact attention to the maintenance intervals.
8. Lubricate the threads and O-rings as well as the threaded part of the sintered metal filter with petroleum jelly. Apply sparingly.
9. Dry the inside of the filter housing with a clean cloth and check for corrosion before reinstalling the sintered metal filter.
10. In the event you discover corrosion, replace the corroded parts with new Bauer parts.
11. Reinstall the sintered metal filter assembly and filter head.
12. Replace all removed tubes, close all valves and check for leaks

Figure 5-8 Oil and Water Separator



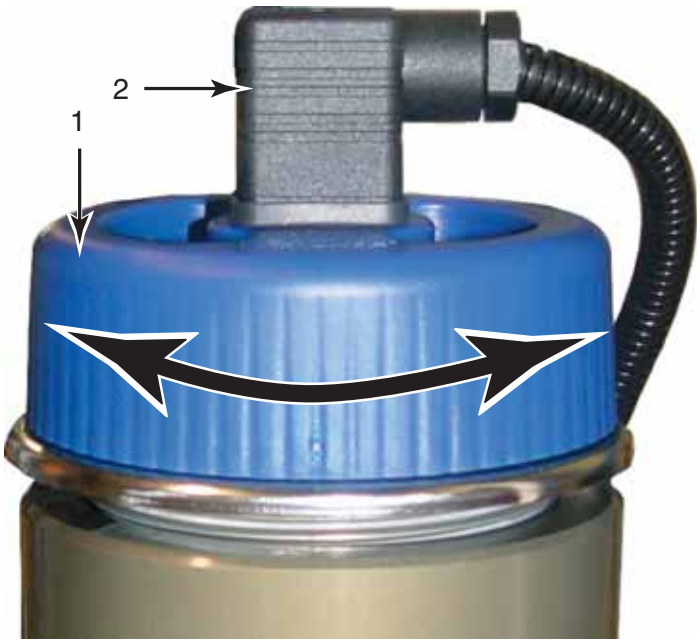
1. Filter Head	3. Center Screw
2. Sintered Metal Filter	4. O -rings

Figure 5-9 Sintered Metal Filter Assembly

1. Threaded Insert	4. Outer Filter
2. Filter Bottom	5. Filter Head
3. Inner Filter	

5.4.1.1 Removal of the Securus II® Transmitter.

Figure 5-10 Removal of the Securus II® Transmitter



1. Securus II® Transmitter	2. DIN Connector

The Securus II® Transmitter is removed and replaced by rotating the blue plastic Securus II® Transmitter approximately ½ turn. It is not necessary to disconnect or remove the DIN Connector.

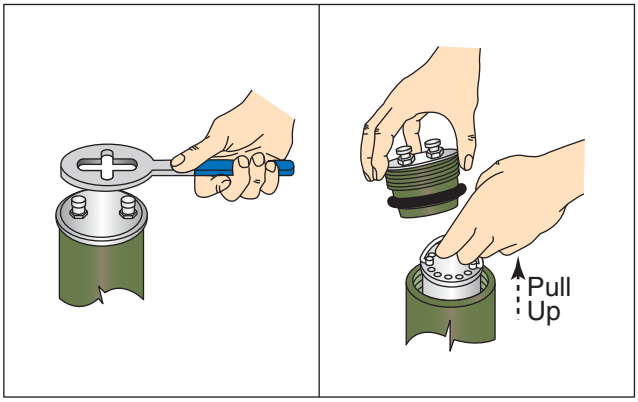
NOTICE

If the DIN Connector is removed, ensure that it is replaced in exactly the same position, otherwise electrical damage to the unit may occur.

5.4.2 Cartridge Replacement

To change the purification cartridge, proceed as follows. (See Figure 5-11)

Figure 5-11 Cartridge Replacement



1. Disconnect the power and shut off the inlet supply line, if applicable.
2. De-pressurize the system by means of the bleed valve.
3. If the chamber is part of the Securus II® Moisture Monitor System, remove the Securus II® Transmitter. See Paragraph 5.4.1.1.
4. Unscrew the chamber head using the special wrench supplied.
5. Pull out the cartridge using the lifting ring on top of the cartridge.
6. Dry the inside of the chamber with a clean cloth and check for corrosion.
7. Replace all corroded parts with new Bauer parts.
8. Remove the shipping covering and the protective cap from the bottom of the cartridge.
9. Lubricate the O-rings with white petroleum jelly. Apply sparingly.
10. Install the new cartridge. Be sure the cartridge snaps into place.
11. Reinstall the chamber head.
12. Close the bleed valve, restore the power and reconnect the inlet supply line, if applicable.

5.4.2.1 Leaking at the Safety Bore

1. Remove the cartridge following the steps in Paragraph 5.4.2.

NOTICE

If air is detected bleeding out from the bottom of the chamber, the cartridge has not been installed properly or is missing. Follow the instructions in Paragraph 5.4.2.1

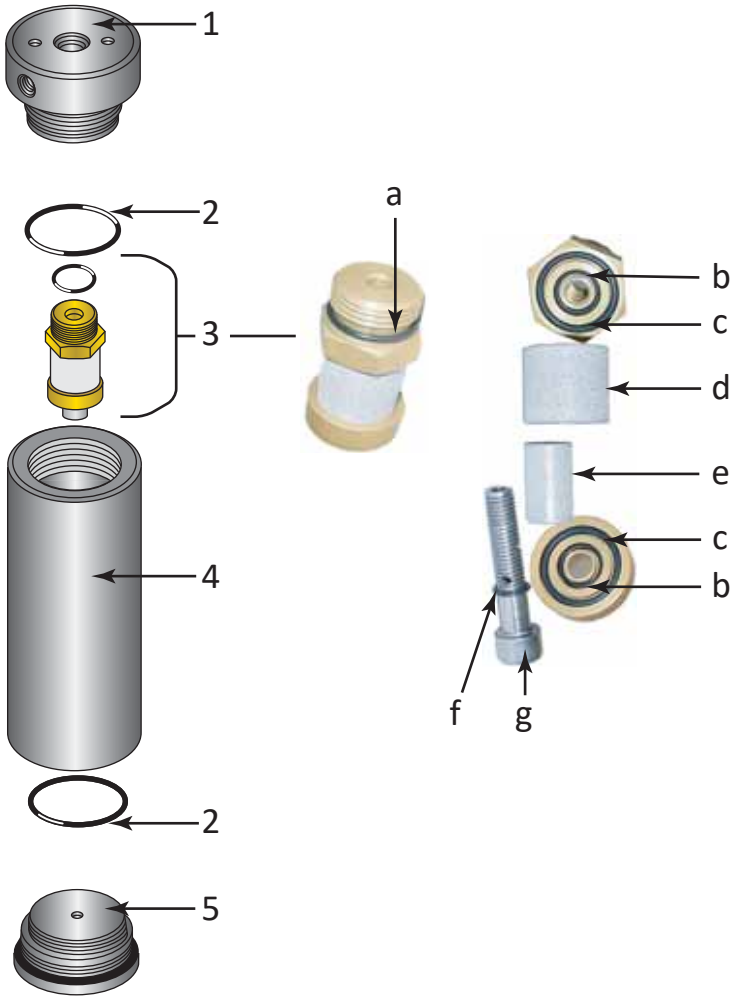
2. Install cartridge if missing.
3. Remove cartridge and inspect O-rings.
4. Replace O-rings if necessary.
5. Ensure protective caps and devices have all been removed.
6. Replace cartridge following steps 8. to 11. in Paragraph 5.4.2

5.5 Replacement Parts List

Figure 5-12 P5 Purification System Parts List

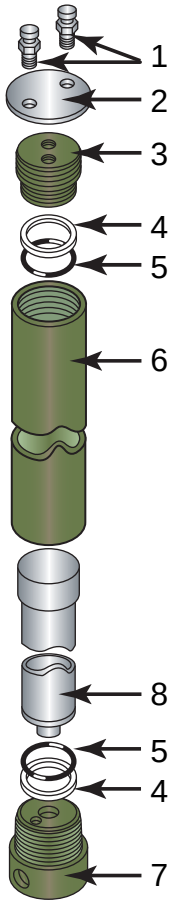
Item	Qty	Part No.	Description	Notes
1	1	079416	Oil and Water Separator	See Figure 5-13
2		—	—	
3	1	VAL-0169	Safety Valve	
4	1	080144	27” Dryer Chamber	See Figure 5-14
5	1	MNR-0042	Securus II® Transmitter	24 VDC
6	1	080145	Securus® Chamber	See Figure 5-15
7	1	SEN-XXXX	Pressure Sensor	Requested Final Pressure determines P/N
8	1	VAL-0053	Pressure Maintaining Valve	
9	2	VAL-0590	Check Valves	
10	1	VAL-0377	Bleed Valve	
11	2	GAG-0009	Pressure Gauge, 0 - 7,500 psi	*1 gauge stock, 2nd is optional*

Figure 5-13 Oil and Water Separator Parts List



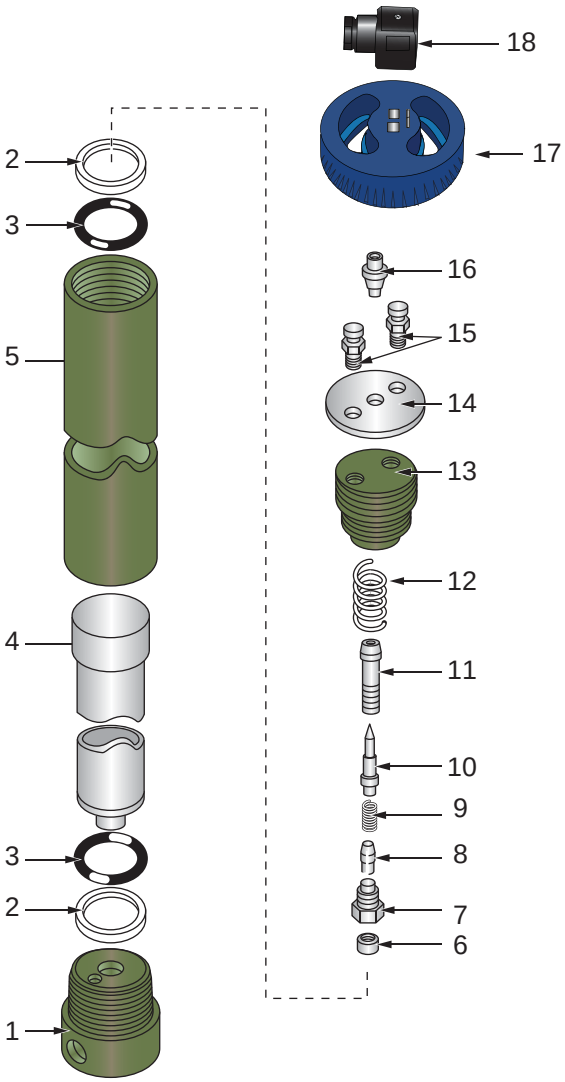
Item	Qty	Part No.	Description	Notes
♦	1	079416	Oil and Water Separator Assembly	
1	†	…	Separator Head	Available only with 079416
2	2	N04586	O-Ring	
3	1	061860	Sintered Metal Filter	
3a	1	N15133	O-Ring	
3b	2	N04496	O-Ring, small	
3c	2	N04385	O-Ring, large	
3d	1	061858	Sleeve Element, large	
3e	1	061859	Sleeve Element, small	
3f	1	N07091	O-Ring	
3g	1	061857	Screw	
4	†	…	Separator Housing	Available only with 079416
5	†	…	Bottom Plug	Available only with 079416

Figure 5-14 27” Chamber Assembly Parts List



Item	Qty	Part No.	Description	Notes
♦	2	80144	Chamber Assembly	27”
1	2	012293	Tool Post Screw	
2	1	061237	Cover Plate	
3	†	…	Filter Head	Available only with 80144
4	2	N04736	Back-up Ring	
5	2	N04735	O-ring	
6	†	…	Filter Housing	Available only with 80144
7	†	…	Filter Bottom	Available only with 80144
8	1	058825	Dryer Cartridge	MS

Figure 5-15 Securus II® Electronic Moisture Monitor System Parts List



Item	Qty	Part No.	Description	Notes
♦	1	80145	Securus® Chamber Assembly	Replaces 1 P/N 80144 in P5S
1	†	…	Bottom Plug	Available only with 80145
2	2	N04736	Backup Ring	
3	2	N04735	O-ring	
4	1	060037	Securus® Cartridge	
5	†	…	Filter Body	Available only with 80145
6	1	059855	Nut	
7	1	059852	Drawback Screw	
8	1	059854	Loose Pin	
9	1	060062	Compression Spring	
10	1	059853	Fixed Pin	

Figure 5-15 (cont.) Securus II® Electronic Moisture Monitor System Parts List

Item	Qty	Part No.	Description	Notes
11	1	059851	Bolt	
12	1	002181	Compression Spring	
13	†	…	Filter Head	Available only with 80145
14	1	060135	Cover Plate	
15	2	012293	Tool Post Screw	
16	1	059850	Socket, RF type	
17	1	MNR-0042	Securus II® Transmitter	24 VDC
18	1	CON-0319	Securus II® Connector	

5.6 P 43 Purification System

5.6.1 Major Components

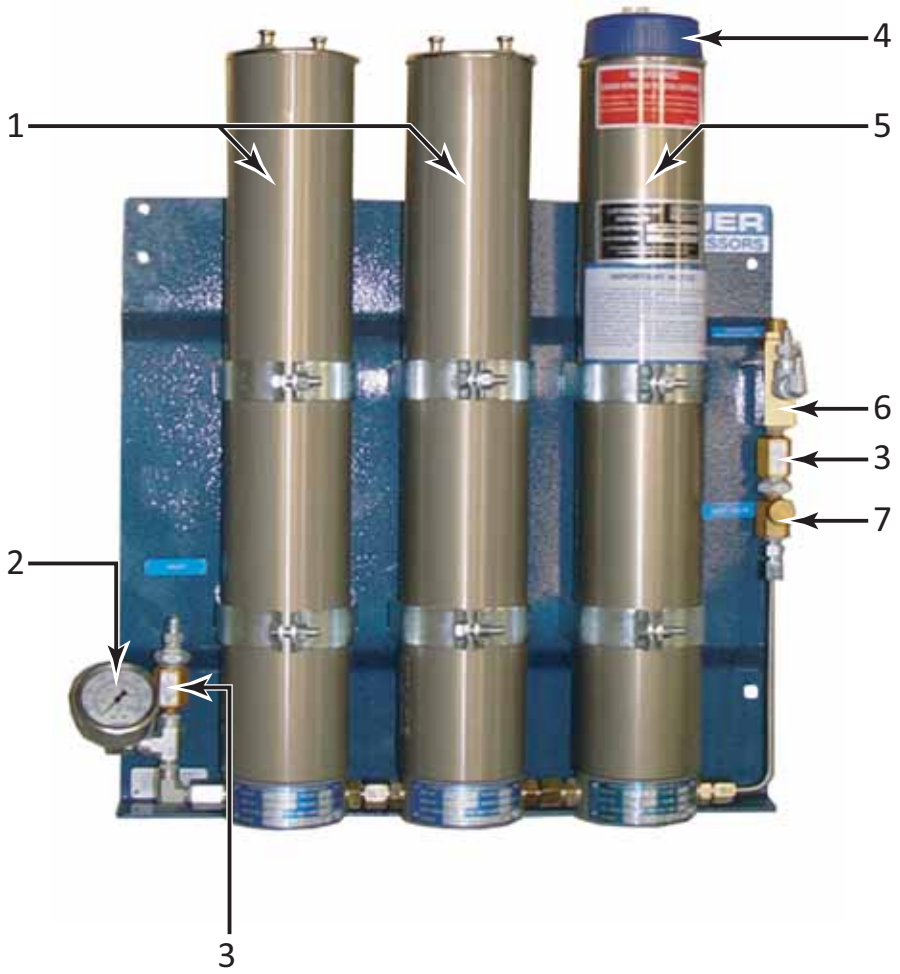
The P 43 S II purification system major components are two dryer chambers and a Securus moisture monitoring chamber. Figure 5-16 shows the functional interconnection of all the components.

5.6.2 Configuration Options

Some Bauer Compressors have the P 43 purification system as an option rather than a standard item, therefore, this chapter may not apply to your unit.

The P 43 purification system is also available with the Securus II® electronic moisture monitor system as a factory installed upgrade. This option replaces the standard purification chamber with a Securus II® purification chamber. A Securus® transmitter and associated wiring are also added. If this option was not purchased, portions of this chapter about the Securus® electronic moisture monitor system do not apply.

Figure 5-16 P 43 S II Purification System



1. Dryer Chambers	4. Securus Transmitter	6. Pressure Maintaining Valve
2. Pressure Gauge	5. Purification Chamber or Securus Chamber	7. Bleed Valve
3. Check Valves		

5.6.3 Component Description

5.6.3.1 Oil and Water Separator

WARNING

The rapid de-pressurizing and re-pressurizing of the oil and water separator during condensate draining subjects it to metallurgical stresses. To prevent catastrophic failure with the possibility of damage, injury or death the oil and water separator (P/N 079416) must be replaced after a predetermined number of cycles.

One load cycle equals one pressurization plus one de-pressurization.

Units operating between 3,000 and 5,000 psi =130,000 load cycles (32,500 hours of operation)
Units operating between 5,000 and 6,000 psi = 55,000 load cycles (13,750 hours of operation)

The Bauer recommended frequency of condensate draining is every fifteen minutes and is a balance between maximizing the life of the separator chamber and maintaining the quality of the delivered air.

The oil water separator is sometimes a part of the compressor assembly. It may be attached to the purification panel in front of the dryer chambers.

The air leaving the final stage is cooled in the aftercooler to approximately 20 - 25 °F (10 -15 °C) above ambient temperature and then enters the oil and water separator. The oil and water separator works by means of a sintered metal filter which separates liquid oil and water particles from the compressed air.

Figure 5-17 Oil and Water Separator

Figure 5-18 Oil and Water Separator Labels

5.6.3.2 Chamber

Each chamber is made up of an anodized aluminum housing and a filtering cartridge. There are two general types of filtering cartridges, drying or purifying. The cartridge type is determined by the ingredients packed in the cartridge. The chamber is named after the type of cartridge it contains, i.e. dryer chamber or purification chamber.

5.6.3.3 Cartridge Construction

The cartridge casing, top and bottom are aluminum and are packed with one or more of the following.

1. A catalyst to convert carbon monoxide to carbon dioxide.
2. Activated carbon which absorbs oil vapors effecting taste and odor.
3. Molecular sieve to absorb oil and water.

5.6.3.4 Cartridge Handling

4. Never open the protective packaging a cartridge comes in prior to its actual use. The highly sensitive filter materials will absorb moisture from the atmosphere becoming saturated and useless.
5. Used cartridges must be disposed of in accordance with local regulations.

5.6.3.5 Check Valves

Valves allowing compressed air to flow in only one direction. One is used to maintain pressure in the chamber when the compressor is not operating. The other check valve prevents back-flow from filled storage cylinders or tanks.

5.6.3.6 Bleed Valve

A manually operated valve used to release the pressure in the chamber before maintenance.

5.6.3.7 Pressure Maintaining Valve

The pressure maintaining valve ensures that pressure is built up in the system from the start of delivery, thus achieving constant optimum purification. It also assures proper working conditions for the final stage of compression.

5.6.3.8 Safety Valve

The safety valve is located on the top of the oil and water separator and acts as the safety valve for the final stage of the compressor.

5.6.4 Securus II® Electronic Moisture Monitor System

The Securus II® Electronic Moisture Monitor System warns the operator in advance of expiration of the life of the cartridges. The Securus II® Transmitter receives signals concerning the condition of the drying agent inside the Securus® cartridge from the attached sensors and supplies the appropriate control signals whenever the preset threshold values have been reached.

5.6.4.1 Securus® Cartridge

The Securus® Cartridge is packed with a catalyst which converts carbon monoxide to carbon dioxide, activated carbon which absorbs oil vapors, molecular sieve which absorbs oil and water and the sensor components of the Securus II® Electronic Moisture Monitor System.

5.6.4.2 Securus II® Transmitter

The Securus II® Transmitter relays the operating condition of the Securus II® Electronic Moisture Monitor System to the operator control interface. The Securus II® issues a warning when the Securus® cartridge is approaching saturation, to warn the user to prepare to change the Securus® cartridge. Once the Securus® cartridge has reached total saturation the Securus II® monitor will issue an alarm condition to the operator interface and shut down the unit. Once the Securus® cartridge is replaced the compressor unit can be restarted.

5.6.5 Maintenance

5.6.5.1 Oil and Water Separator

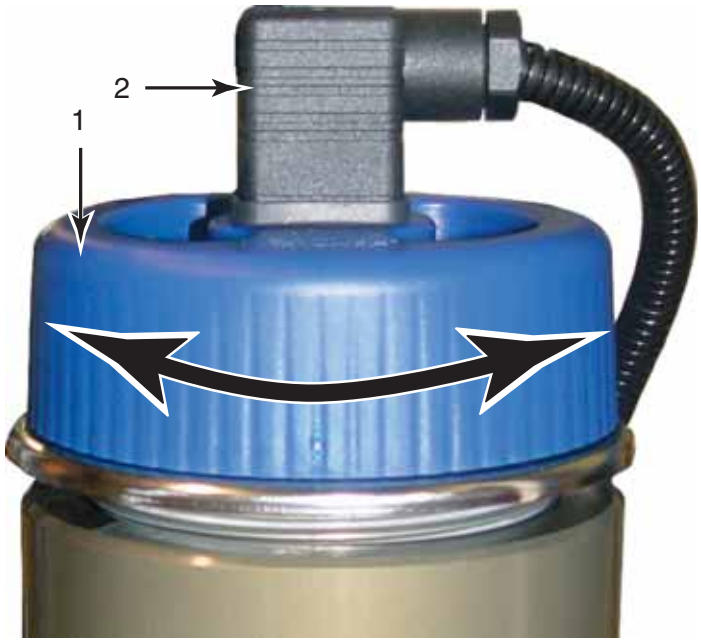
To remove the sintered metal filter proceed as follows: (See Figure 5-20). Disconnect the power and shut off the inlet supply line if applicable.

1. De-pressurize the system by means of the bleed valve.
2. Remove the tubes connected to the side of the filter head (1).
3. Unscrew and remove the filter head.
4. Unscrew the sintered metal filter (2) from the filter head.
5. Remove the center screw (3) to remove the sintered metal filter.
6. Clean the sintered metal filter using hot soapy water. Blow dry with compressed air.
7. After cleaning the element, record the number of operating hours to ensure exact attention to the maintenance intervals.
8. Lubricate the threads and O-rings as well as the threaded part of the sintered metal filter with petroleum jelly. Apply sparingly.
9. Dry the inside of the filter housing with a clean cloth and check for corrosion before reinstalling the sintered metal filter.

10. In the event you discover corrosion, replace the corroded parts with new Bauer parts.
11. Reinstall the sintered metal filter assembly and filter head.
12. Replace all removed tubes, close all valves and check for leaks.

5.6.5.2 Removal of the Securus II® Transmitter.

Figure 5-19 Removal of the Securus II® Transmitter



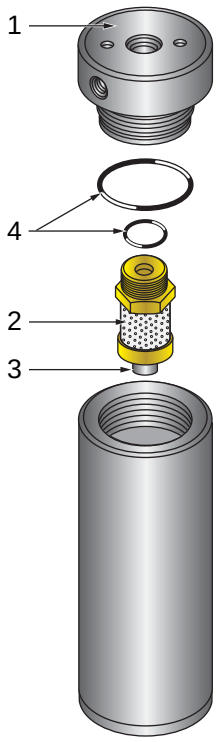
1. Securus II® Transmitter	2. DIN Connector

The Securus II® Transmitter is removed and replaced by rotating the blue plastic Securus II® Transmitter approximately ½ turn. It is not necessary to disconnect or remove the DIN Connector.

NOTICE

If the DIN Connector is removed, ensure that it is replaced in exactly the same position, otherwise electrical damage to the unit may occur.

Figure 5-20 Oil and Water Separator



1. Filter Head	3. Center Screw
2. Sintered Metal Filter	4. O -rings

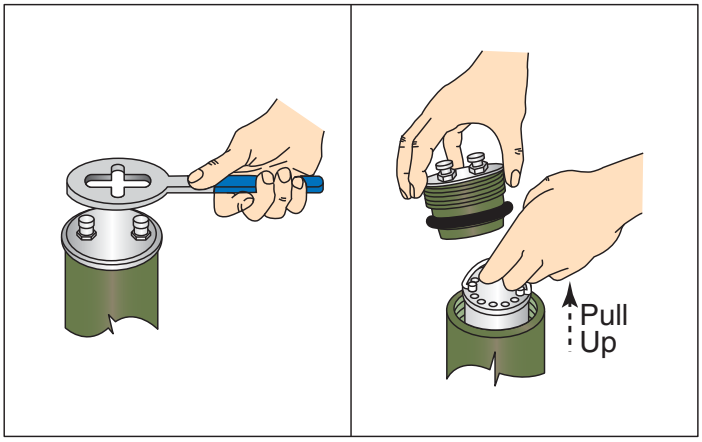
Figure 5-21 Sintered Metal Filter Assembly

1. Threaded Insert	4. Outer Filter
2. Filter Bottom	5. Filter Head
3. Inner Filter	

5.6.5.3 Cartridge Replacement

To change the purification cartridge, proceed as follows. (See Figure 5-22)

Figure 5-22 Cartridge Replacement



1. Disconnect the power and shut off the inlet supply line, if applicable.
2. De-pressurize the system by means of the bleed valve.

3. Unscrew the chamber head using the special wrench supplied.
4. Pull out the cartridge using the lifting ring on top of the cartridge.
5. Dry the inside of the chamber with a clean cloth and check for corrosion.
6. Replace all corroded parts with new Bauer parts.
7. Remove the shipping covering and the protective cap from the bottom of the cartridge.
8. Lubricate the O-rings with white petroleum jelly. Apply sparingly.
9. Install the new cartridge. Be sure the cartridge snaps into place.
10. Reinstall the chamber head.
11. Close the bleed valve, restore the power and reconnect the inlet supply line, if applicable.

NOTICE

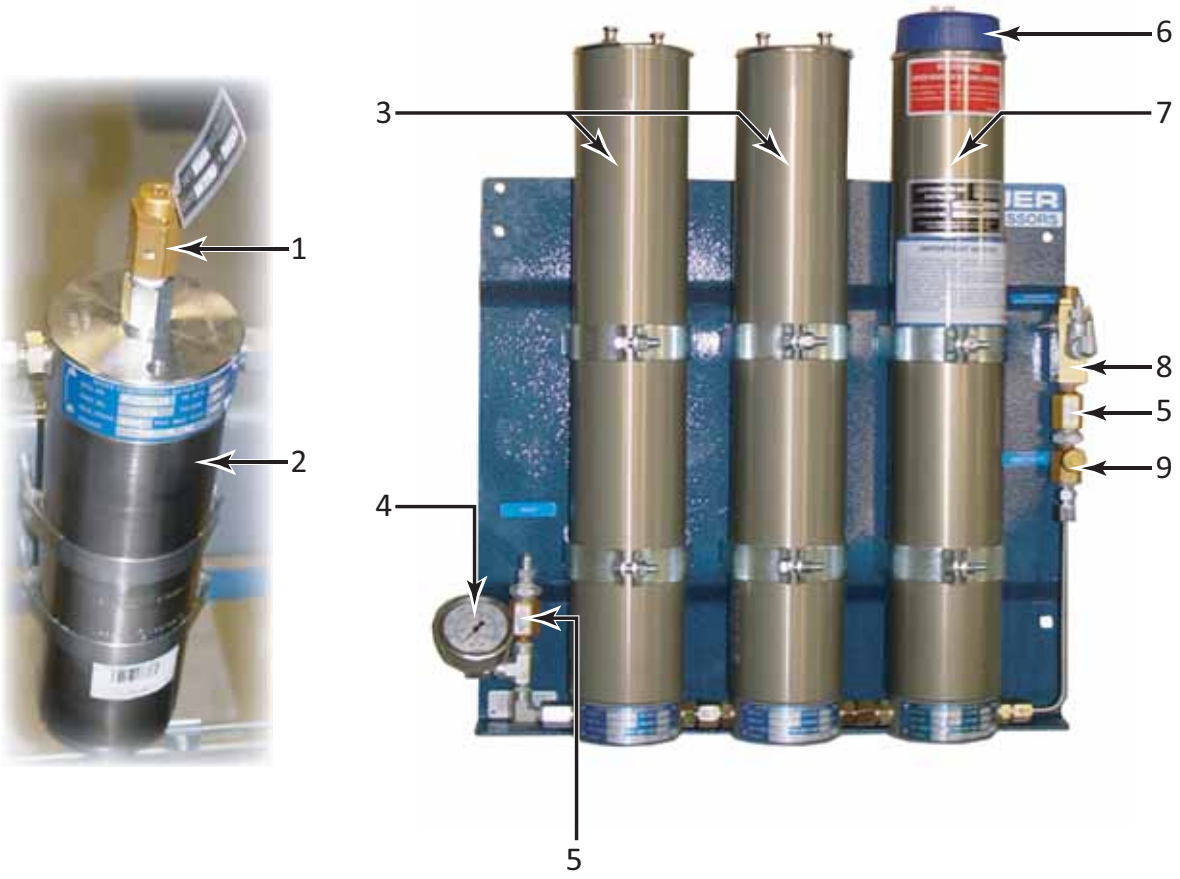
If air is detected bleeding out from the bottom of the chamber, the cartridge has not been installed properly or is missing. Follow the instructions in Paragraph 5.6.5.4.

5.6.5.4 Leaking at the Safety Bore

1. Remove the cartridge following steps 1. to 4. in Paragraph 5.6.5.3.
2. Install cartridge if missing.
3. Remove cartridge and inspect O-rings.
4. Replace O-rings if necessary.
5. Ensure protective caps and devices have all been removed.
6. Replace cartridge following steps 8. to 11. in Paragraph 5.6.5.3

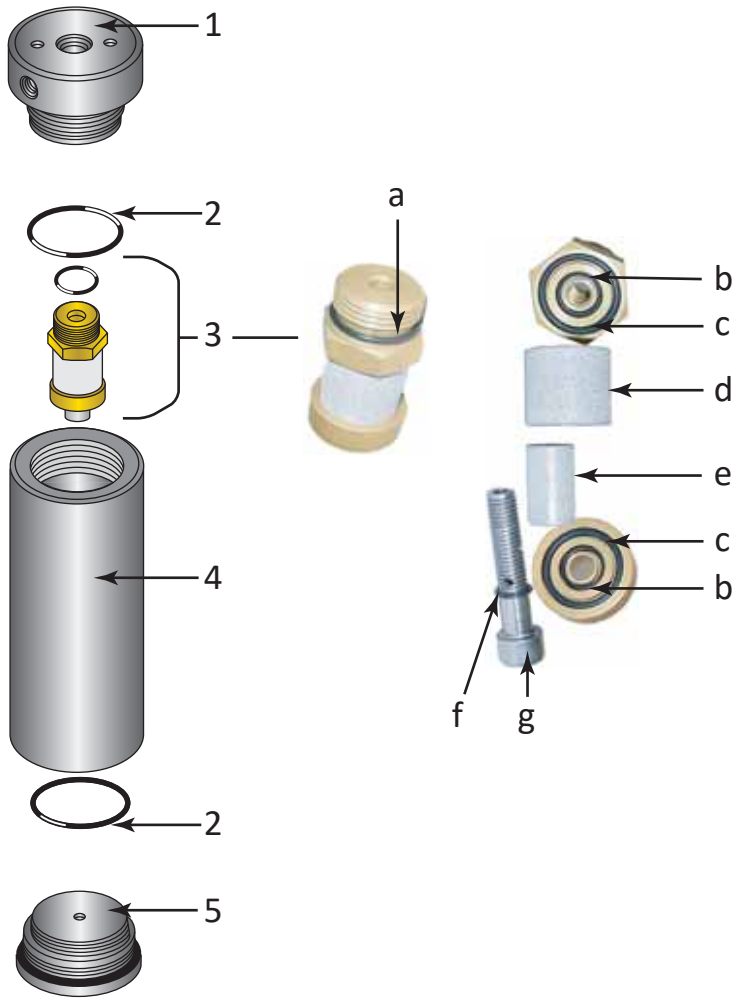
5.6.6 Replacement Parts List

Figure 5-23 P43 Purification Systems Parts List



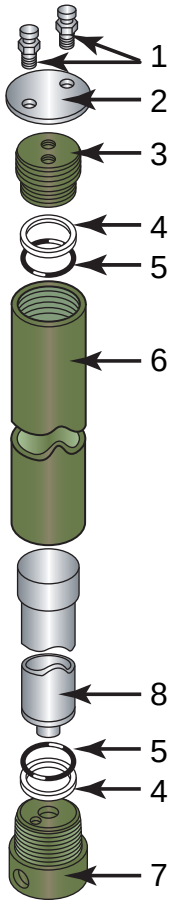
Item	Qty	Part No.	Description	Notes
1	1	VAL-0169	Safety Valve	
2	1	079416	Oil and Water Separator	See Figure 5-24
3	2	082135	20” Dryer Chamber	See Figure 5-25
4	1	GAG-0009W	Pressure Gauge	
5	2	VAL-0007	Check Valves	
6	1	MNR-0042	Securus II Monitor / Transmitter	
7	1	082135	20” Purification Chamber	See Figure 5-25
or	1	082136	20” Securus® Purification Chamber	See Figure 5-26
8	1	VAL-0053	Pressure Maintaining Valve	
9	1	VAL-0377	Bleed Valve	

Figure 5-24 Oil and Water Separator Parts List



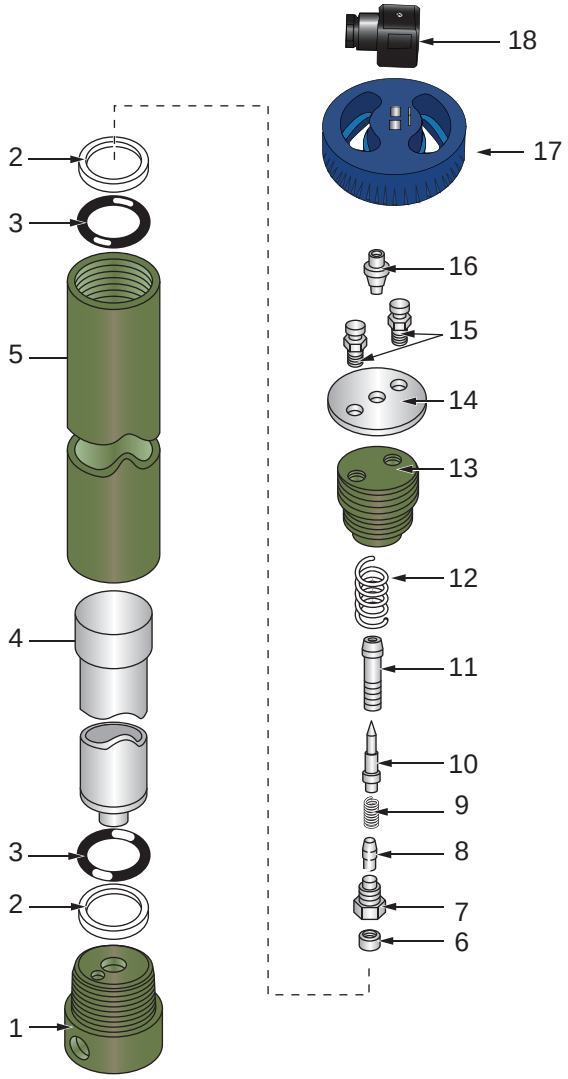
Item	Qty	Part No.	Description	Notes
♦	1	079416	Oil and Water Separator Assembly	
1	†	—	Separator Head	Available only with 079416
2	2	N04586	O-Ring	
3	1	061860	Sintered Metal Filter	
3a	1	N15133	O-Ring	
3b	2	N04496	O-Ring, small	
3c	2	N04385	O-Ring, large	
3d	1	061858	Sleeve Element, large	
3e	1	061859	Sleeve Element, small	
3f	1	N07091	O-Ring	
3g	1	061857	Screw	
4	†	—	Separator Housing	Available only with 079416
5	†	—	Bottom Plug	Available only with 079416

Figure 5-25 Dryer / Purification Chamber Assembly Parts List



Item	Qty	Part No.	Description	Notes
♦	2	082135	Chamber Assembly	
1	2	012293	Tool Post Screw	
2	1	061237	Cover Plate	
3	†	—	Filter Head	Available only with 082135
4	2	N04736	Back-up Ring	
5	2	N04735	O-ring	
6	†	—	Filter Housing	Available only with 082135
7	†	—	Filter Bottom	Available only with 082135
8	1	062504	Dryer Cartridge	MS
or	1	067224	Purification Cartridge	MS/AC/HP

Figure 5-26 Securus II® Moisture Monitor Parts List



Item	Qty	Part No.	Description	Notes
♦	1	082136	Securus® Chamber Assembly	
1	†	—	Bottom Plug	Available only with 082136
2	2	N04736	Backup Ring	
3	2	N04735	O-ring	
4	1	061687	Securus® Cartridge	
5	†	—	Filter Body	Available only with 082136
6	1	059855	Nut	
7	1	059852	Drawback Screw	
8	1	059854	Loose Pin	
9	1	060062	Compression Spring	
10	1	059853	Fixed Pin	

Figure 5-26 (cont.) Securus II® Moisture Monitor Parts List

Item	Qty	Part No.	Description	Notes
11	1	059851	Bolt	
12	1	002181	Compression Spring	
13	†	—	Filter Head	Available only with 082136
14	1	06135	Cover Plate	
15	2	012293	Tool Post Screw	
16	1	059850	Socket, RF type	
17	1	MNR-0042	Securus II® Transmitter	24 VDC
18	1	CON-0319	Securus II® Connector	

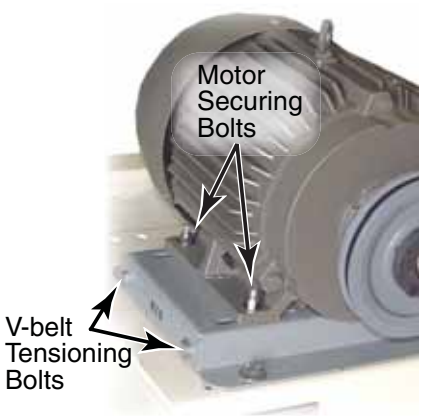
CHAPTER 6: COMPRESSOR DRIVE SYSTEM

6.1 Description, Horizontal Sliding

The compressor is powered by the drive motor or engine through a V-belt. The direction of rotation, as seen facing the flywheel, is counterclockwise. Observe the arrow on the compressor block below.

Figure 6-1 Horizontal Drive (typical)

Figure 6-2 Motor Base



The electric motor is secured on a sliding base. To obtain the correct belt tension loosen the 4 motor bolts (1). There are two bolts on the opposite side of the motor, not shown in picture. Slide the motor away from the compressor until only 3/8” belt deflection is obtained (2). Then tighten the 4 motor bolts and recheck belt deflection.

6.2 Maintenance of the V-belt and Sheave

6.2.1 Checking the Sheave.

Before a new drive belt is installed, the condition of the sheave should be checked. A dirty or rusty sheave impairs the drive’s efficiency and abrades the cover of the belt, which results in premature failure. A worn sheave shortens belt life as much as 50%. If the groove is worn to the point where the belt bottoms, slippage may result and the belt may burn. If the side wall is “dished out,” the bottom shoulder ruins the belt prematurely by wearing off the bottom corners.

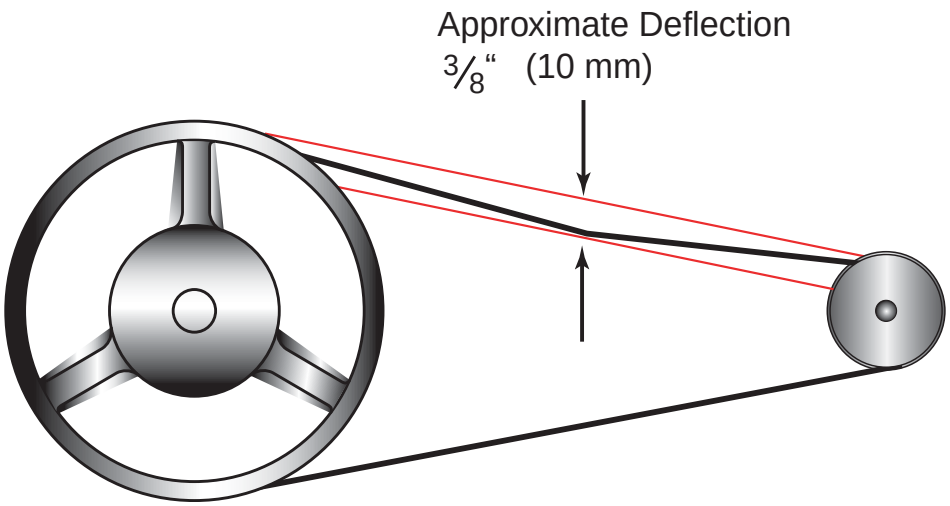
6.2.2 Checking the V-belt

Inspect the V-belt regularly for damage and wear. Replace if necessary.

6.2.3 V-belt tension

V-belt tension is adjusted by sliding the motor or engine until pressing down on the V-belt between the sheaves results in an approximate deflection of 3/8” (10 mm). (See Figure 6-3).

Figure 6-3 V-belt Deflection



6.3 Maintenance of the Drive Motor/Engine

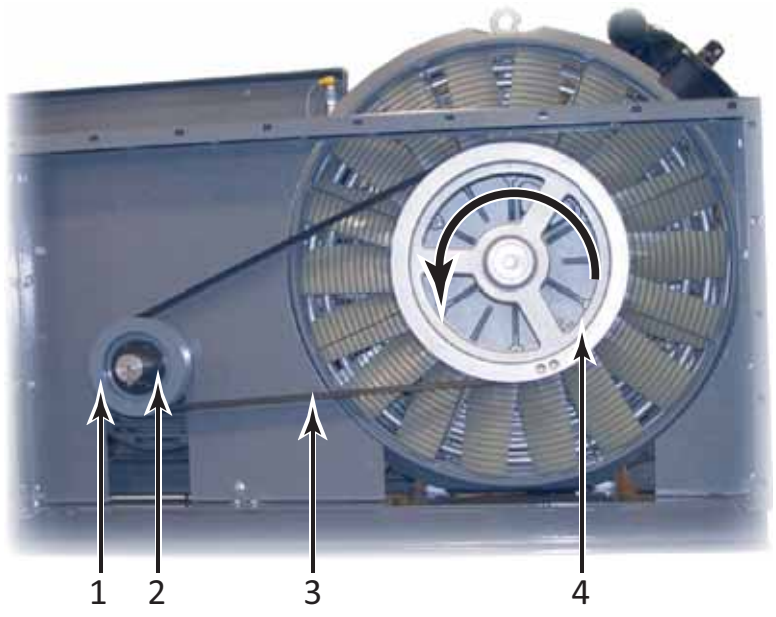
For maintenance of the electric motor or gas/diesel engine refer to the OEM manual, if included, or see an instruction plate attached to the motor. If maintenance instructions are shown for the motor, they supersede these general instructions.

WARNING

Always disconnect the electrical power before working on the motor.

6.4 Replacement Parts List

Figure 6-4 Horizontal Drive



Item	Qty	Part No.	Description	Notes
♦			**IK 18.1 Truck Module**	
1	1	SHE-0241	Sheave	
2	1	BUS-0020	Bushing	
3	2	BET-0020	V-belt	
4	1	IK 18.1 II	Compressor Block	
N.S.	1	MTR-0362	Electric Motor	20 Hp, 3Φ
N.S.	1	BAS-0028	Sliding Motor Base	

CHAPTER 7: ELECTRICAL PANEL, ASY-1267

7.1 Overview

These instructions apply to units that use Electrical Panel, ASY-1267 and Operator Interface MNR-0062.

Figure 7-1 ASY-1267 & MNR-0062

The Electrical Panel provides logical control and safety shutdowns for the compressor equipment. All necessary time delays, counters, shutdowns, sequencing and safety features are incorporated into a proprietary software program permanently saved into PLC memory. The software program used in this Electrical Panel is based on the pressure and use of the compressor.

The input/output device for normal operation of the compressor unit is the operator interface, MNR-0062. In an emergency the compressor is shutdown with the E-stop push button.

7.2 Electrical Panel

This electrical panel is designed for use with 10, 15, 20 or 30 horsepower electric motors. It is also designed for supply voltages from 208 VAC to 460 VAC, single or three phase and 50Hz or 60 Hz. All supply voltage options are not available with each horsepower rating.

The basic panel components consist of a programmable logic controller (PLC), soft starter, fuses, terminal strips for internal wiring and connectors for attachment to wire harnesses. The panel is built to match the horsepower, voltage, phase and frequency of the customer's requirements.

7.2.1 Wiring Diagram

The wiring diagram for your specific compressor unit is stored inside the electrical panel. If a wiring diagram for your machine is not found inside the electrical panel, then please call Bauer Compressors product support group for a replacement. Please have the serial number of the compressor available; it is written on a label (See Figure 7-2) inside the Electrical Panel door.

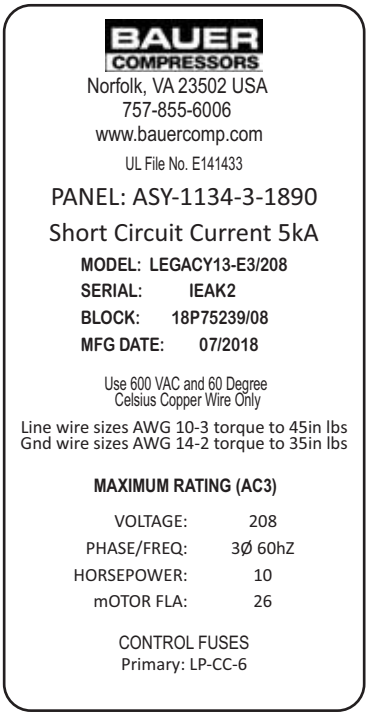
7.2.2 Electrical Panel Interior Access

The interior of the Electrical Panel is accessed by using a coin or screwdriver to turn the latch on the front of the Electrical Panel.

7.3 AC Power Requirements

The Electrical Panel must be supplied with electricity of the correct voltage, phase, and frequency to ensure proper operation. Wiring and conduit selection must be in accordance with all national, state and local codes. The customer is responsible for providing a means of disconnection from the power source and protection from instantaneous short circuit. The Electrical Panel voltage and phase are displayed on the exterior of the Electrical Panel as well as being written on a label (See Figure 7-2) on the inside of the Electrical Panel door. In this example shown, the panel is wired for 208 volt, three phase, serial number IEAK2.

Figure 7-2 Electrical Panel Label



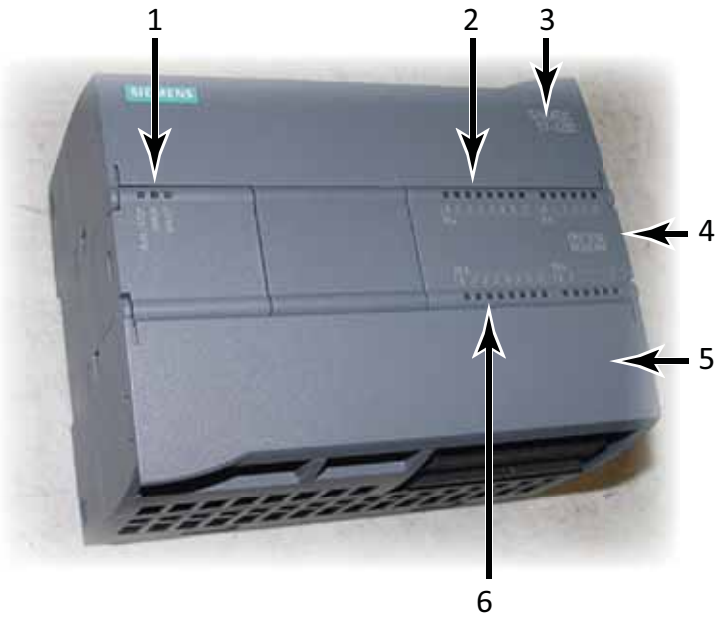
The panel assembly number is important to know when referencing the replacement parts list. The above label's panel assembly number is ASY-1134-3-1890. That means the assembly is ASY-1134. The 3 means the panel is wired for 3 phase, and the 1890 means the unit is wired to handle 18 - 90 Amps.

7.4 Electrical Panel Components

7.4.1 Programmable Logic Controller (PLC)

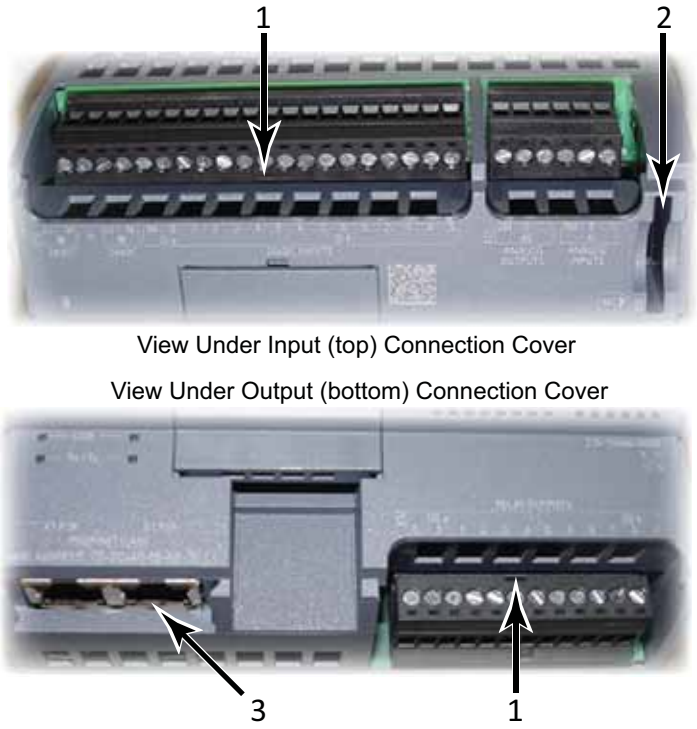
The PLC is 26 I/O and 24 VDC. The data stored in RAM is protected for 100 hours, in event of a power loss.

Figure 7-3 PLC, CNT-0195



1. Status LEDs
2. Output LEDs
3. Output Connections Cover
4. Expansion Access Door
5. Input Connections Cover
6. Input LEDs

Figure 7-4 Connector Block Removal



1. Notch in the Terminal Block
2. Memory Card Slot
3. Network Connection

7.4.1.1 Replacing the PLC

Replacing the PLC does not require removal of any wiring as the connections are made with push in Connector Blocks. To replace the PLC proceed as follows.

1. Turn off unit and disconnect from main power supply.
2. Lift the input connections cover. See Figure 7-3.
3. Insert a small flat bladed screwdriver in the notch in the back center of the terminal block. Gently pry the terminal block loose. See Figure 7-4.
4. Repeat Steps 2 and 3 for the to the terminal block on the output side of the PLC.
5. Unclip the PLC from the DIN rail by using a small flat bladed screwdriver to pull the DIN rail clip out until the PLC is free.
6. The terminal blocks are replaced by pushing them gently down onto corresponding pins until they click into place.
7. Restore power and operate the unit.

7.4.1.2 Installing a New Program

The PLC program can be updated in two ways. If a Bauer technician is on-site, they will connect directly to the PLC using a notebook computer. Another method to install a new program is to use an external memory card. The memory card would be programmed at the Bauer factory and shipped either to the customer or to a authorized distributor.

7.4.1.3 Installing a Memory Card

To install or replace a memory card proceed as follows:

1. Turn off unit and disconnect from main power supply.
2. The memory card is keyed to fit only one way and requires minimal force to insert it.
3. Push the memory card into the slot until it snaps into place.
4. If the memory card is being retained in the PLC, restore power to the unit and operate as normal.
5. If the memory card is for a software update and is to be returned to Bauer or a distributor continue as follows.
6. Restore power to the unit.
7. After the software has initialized and the run screen is displayed, shutdown the unit and disconnect from the main power source.
8. Restore power to the unit again. After the software has initialized a second time and the run screen is displayed, shutdown the unit and disconnect from the main power source.
9. Remove the memory card and close the protective cover.
10. Restore power and operate the unit.

7.4.2 Hour Meter

The panel is equipped with an Hourmeter. The hour meter is not resettable and used to monitor the run hours of the compressor. It is powered by 120 VAC.

Figure 7-5 Hour Meter

7.4.3 Soft Starter.

See Figure 7-6. The Eaton S811 soft starter is rated at 32 - 105 amps. Its size will be based on the voltage and motor horsepower. The soft starter programming is set at the factory.

Figure 7-6 Soft Starter

7.4.4 Power Supply

The Power Supply is a 24 Volt DC, 10 Amp Power Supply used to provide power to the communications modules and operator interface, SPL-0088. It is not standard in all models.

Figure 7-7 Power Supply

7.5 Alarms

The following paragraphs describe the warning and alarm conditions that are monitored and controlled by the Electrical Panel.

7.5.1 Final Separator Warning

The high pressure-breathing compressor is equipped with a final separator. This is a stainless steel vessel, approximately 3¾ inch diameter, located on the purification panel. To prevent fatigue failure of this vessel, the PLC program monitors the pressurization and de-pressurization cycles of this separator and will first issue a Warning, and then later an Alarm function.

The program is set up for a 90% warning and a 100% shutdown alarm for this counter feature. The program would be configured to reflect the following values when it is built.

Table 7-1: Final Separator Warning and Shutdown Cycle Count

Maximum Compressor Pressure	Warning	Shutdown
5,000 psi	117,000 cycles	130,000 cycles
6,000 psi	49,500 cycles	55,000 cycles

When the warning is displayed, the unit will still continue to function properly, but will prompt the operator to contact Bauer Compressors to make arrangements to replace the separator. When the Alarm level has been achieved, the compressor will no longer function, and will require the replacement of the separator. When this is accomplished, the unit can be reactivated by making adjustments to the PLC software. Please contact Bauer Product Support for detailed instructions.

WARNING

Do not attempt to override this Separator Shutdown. This feature is provided to protect operating personnel from injury or death.

7.5.2 Securus® Electronic Moisture Monitor System

The compressor purification system may be equipped with an optional Securus II® Electronic Moisture Monitor System. The Securus II® Electronic Moisture Monitor System warns the operator in advance of expiration of the life of the cartridges. The Securus II® Transmitter receives signals concerning the condition of the drying agent inside the Securus® cartridge from the attached sensors and supplies the appropriate control signals whenever the preset threshold values have been reached.

7.5.2.1 Securus® Cartridge

The Securus® Cartridge is packed with a catalyst which converts carbon monoxide to carbon dioxide, activated carbon which absorbs oil vapors, molecular sieve which absorbs oil and water and the sensor components of the Securus II® Electronic Moisture Monitor System.

7.5.2.2 Securus II® Transmitter

See Figure 7-8. The Securus II® Transmitter relays the operating condition of the Securus II® Electronic Moisture Monitor System to the Operator Interface. The Securus II® issues a warning when the Securus® cartridge is approaching saturation, to warn the user to prepare to change the Securus® cartridge. On a Securus® Warning condition, the compressor will run normally and the warning will be shown on the Operator Interface. Once the Securus® cartridge has reached total saturation the Securus II® Transmitter will issue an alarm condition to the Operator Interface and shut down the unit. Once the Securus II® cartridge is replaced it is possible to restart the compressor. The Securus II® Transmitter is removed and replaced by rotating the blue plastic Securus II® Transmitter approximately ½ turn. It is not necessary to disconnect or remove the DIN Connector.

Figure 7-8 Securus II® Transmitter

NOTICE

If the DIN Connector is removed, ensure that it is replaced in exactly the same position, otherwise electrical damage to the unit may occur.

7.5.3 Compressor High Temperature

See Figure 7-9. The compressor high temperature switch is mounted on the high pressure compressor block, on the third, fourth or fifth stage head, depending on model. Under normal operating conditions, the switch is closed. On a high temperature condition, the compressor will shutdown and the alarm will be displayed on the Operator Interface.

Figure 7-9 High Temperature Switch

Figure 7-10 Pressure Sensor (Typical)

7.5.4 Compressor Low Oil Pressure

See Figure 7-10. The compressor Oil Pressure Sensor is located on the back of the compressor block, mounted with the oil pressure gauge. During start-up of the compressor, the oil pressure sensor is bypassed for a time period set in the program by **OIL PRESS TD** parameter. This allows the oil pressure to stabilize at operating pressure before the an alarm is sensed. After this initial time period, should the compressor lose oil pressure, the Oil Pressure Sensor will cause the alarm to be displayed on the Operator Interface.

7.5.5 Compressor Overrun Timer

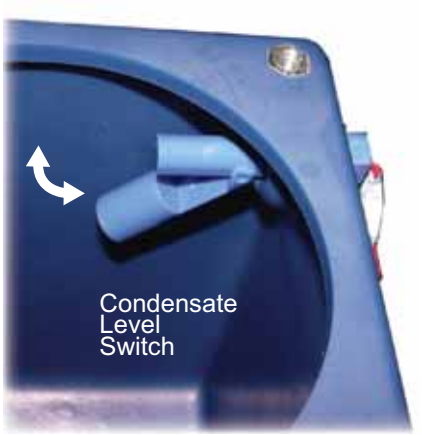
The compressor has an timer, where if the compressor runs continuously for a number of hours set by the **OVERRUNTIMER** parameter, the compressor will shutdown, and the alarm will be displayed on the Operator Interface. This is done to secure the equipment if it were to be started and left unattended.

7.5.6 Condensate Fault

See Figure 7-11. The compressor condensate level switch is located in the condensate collection tank, below the Automatic Condensate Drain separator. The switch is N.O., Normally Open, and is connected to the PLC. Refer to wiring diagram for additional information. As the condensate tank fills up the Condensate Level Float Switch rises until it closes. At this time the compressor will shutdown and

the alarm will be displayed on the Operator Interface. The operator should drain the condensate from the tank and resume operation of the equipment.

Figure 7-11 Condensate Level Float Switch



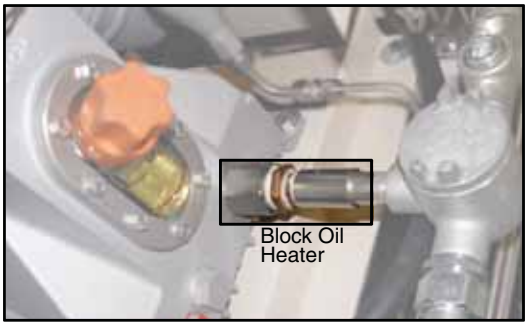
NOTICE

The compressor condensate contains some oil, and accordingly, should be disposed of in accordance with state and local regulations.

7.6 Compressor Block Heater

This unit may be equipped with an optional block heater for the compressor crankcase if requested at time of order. This heater operates when the unit is powered on and the block temperature is below 40 °F. It warms the oil in the crankcase body keeping the oil within its optimum temperature range.

Figure 7-12 Compressor Block Heater (HTR-0112)



7.7 PLC Inputs and Outputs

All PLC inputs are 24 VDC. The power supply physically exists inside the PLC. All PLC outputs are of a relay type, and are powered through the control transformer supplying 120 VAC single phase to the various loads. Please refer to the wiring diagram provided with each unit for the as built specifications.

Table 7-2: PLC Inputs

I0.0	Securus II® Monitor Alarm
I0.1	Overload Relay
I0.2	Temperature Switch
I0.3	CO Monitor Alarm
I0.4	Condensate Alarm
I0.5	
I0.6	
I0.7	Seccant Monitor Alarm
I1.0	High Inlet Pressure Switch[1]
I1.1	Low Inlet Pressure Switch[a]
I1.2	
I1.3	
I1.4	
I1.5	

Table 7-3: PLC Outputs

Q0.0	Motor Contactor
Q0.1	ACD 1
Q0.2	ACD Final
Q0.3	Audible Alarm
Q0.4	ACD 2
Q0.5	ACD 3
Q0.6	
Q0.7	ACD 4 or Inlet Solenoid
Q1.0	Unloader Solenoid Valve
Q1.1	Panel Light

1. Applies only to compressors for mediums other than air

7.7.1 Analog Inputs to the PLC.

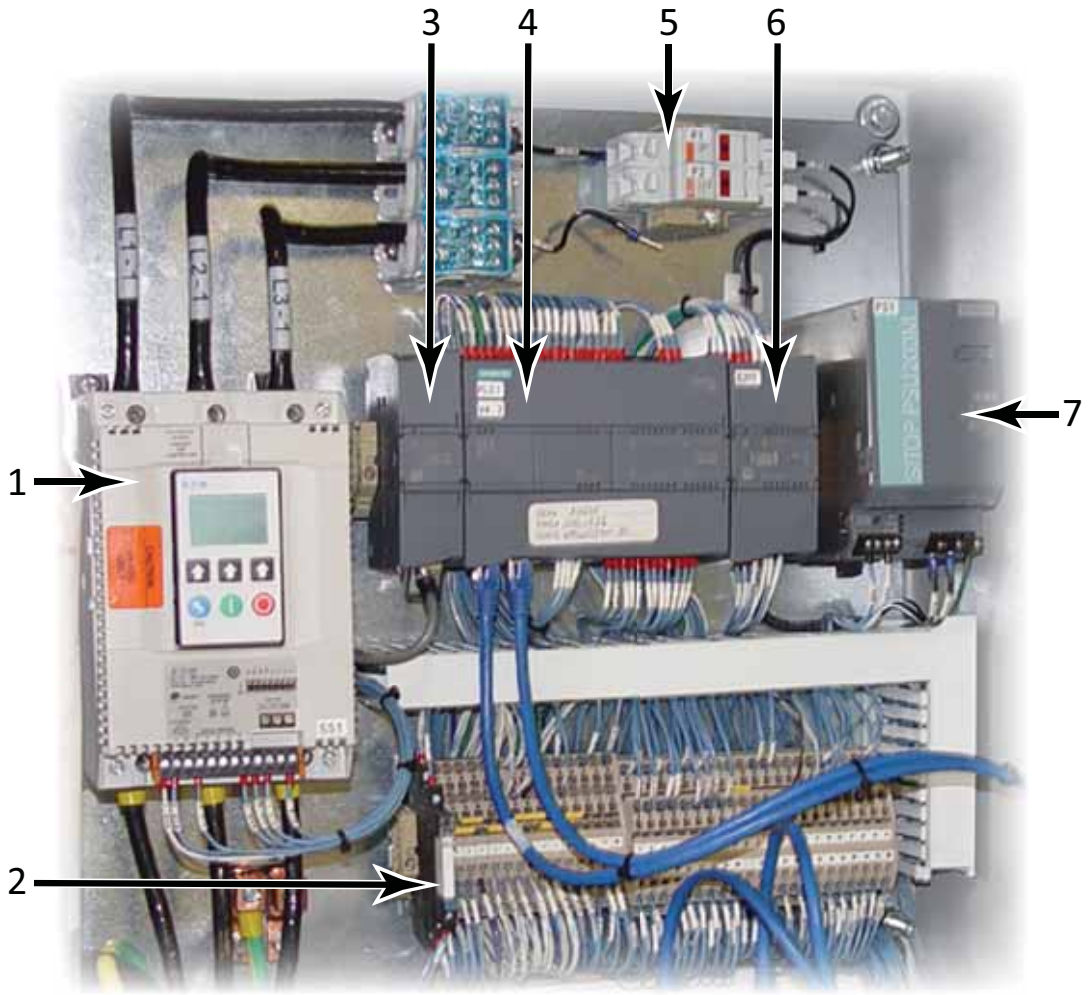
The Air Pressure Switch and the Oil Pressure Switch are connected in parallel and provide their input to the PLC through PLC Input Terminal M.

7.8 Replacement Parts List

Figure 7-13 Control Pane

Item	Qty	Part No.	Description	Notes
1	1	MNR-0062	Touch Screen Control Panel	HMI
2	1	SWT-0412	Emergency Stop Switch	

Figure 7-14 ASY-1267, Interior



Item	Qty	Part No.	Description	Notes
♦	1	ASY-1267	Electrical PanelInterior View	
1	1	SRT-0330	Motor Starter	3 Phase, 32 - 105 Amps
2	1	RLY-0218	Circuit Relay, RV8H	6 mm interface, 24 VDC
3	1	CNT-0124	Comm Module	*Siemens RS485*
4	1	CNT-0195	PLC	*Siemens S7-1200, 1215C*
5	1	HOL-0136	Fuse Holder	2 Pole, 30 Amp, 600 Volt
with	2	FUS-0166	Fuse, Time Delay	6 Amp
6	1	CNT-0111	Expansion Module	8 Channel, Analog In
7	1	SPL-0088	Power Supply	24 VDC, 10 Amp

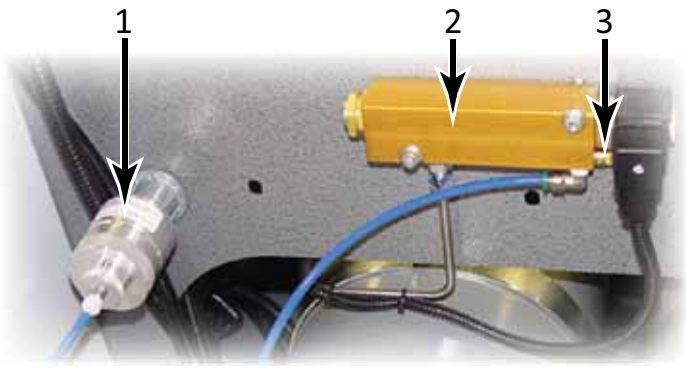
CHAPTER 8: BAUER GAS-TEK MONITORS

8.1 Description

The gas monitors are a factory installed option which may have been ordered with your unit.

The oxygen (O), carbon monoxide (CO), and carbon dioxide (CO_2) monitors sample the gas as it leaves the unit. The hydrogen sulfide (H_2S) monitor samples the ambient air. The O, CO, and H_2S monitors use an electrochemical sensor element to detect the targeted gas. The CO_2 monitor uses an infrared sensor to detect the CO_2

Figure 8-1 Regulator & Monitors



1. CO Monitor
2. Regulator
3. Safety Valve

8.2 Operation

The Bauer Gas-TeK monitors work automatically when enabled on the “Gas Sensors” portion of the program. The regulator reduces the pressurized air/gas to levels the monitors can use. When any of the sensors detect the set concentration of gas it activates an alarm condition and shuts down the compressor unit. Once the gas concentration has returned below the acceptable limit, the monitor will allow the unit to be restarted.

Assemble KIT-0439 before attempting to calibrate the sensor. To assemble the kit, attach one end of the clear hose to the regulator. Attach the white plastic adapter to the other end of the clear hose. When zeroing or calibrating the clear regulator hose should be attached to the sensor in place of the blue hose which connects the sensor to the regulator. Zero the sensor first using the zero test gas. After pressing the sensor button on the main menu of the touch screen follow the on screen instructions to zero the sensor. Once the sensor is zeroed it can be calibrated using the 20 ppm CO gas. Again follow the steps as presented on the touch screen to calibrate the sensor.

Figure 8-2 Basic Calibration Kit & Test Gases

1. Calibrating Regulator (Kit-0439)	2. 20 ppm carbon monoxide test Gas	3. Zero Test Gas

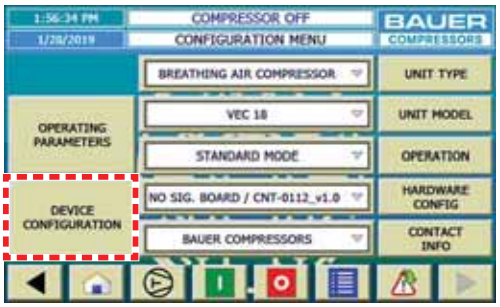
8.3 Calibration

National Fire Protection Association (NFPA) require gas monitors to be calibrated on a 30-day cycle. For non-NFPA applications, local, State and corporate codes must be referenced. BAUER recommends that gas monitors be calibrated on a quarterly cycle.

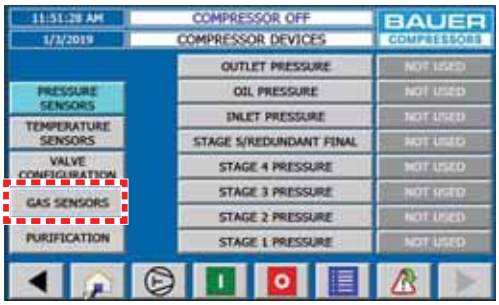
Calibration is recommended quarterly or if the effectiveness of the sensor is in question. Before attempting to calibrate, ensure you have plenty of zero test gas and 20 ppm CO test gas. To calibrate any of the sensors, follow the steps below:

1. From the main menu press the CONFIGURATION button.

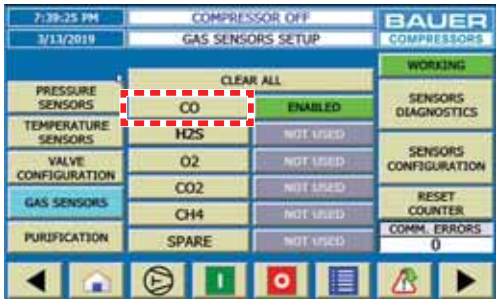
2. On the CONFIGURATION window press the DEVICE CONFIGURATION button.



3. On the DEVICE CONFIGURATION window press the GAS SENSORS button.

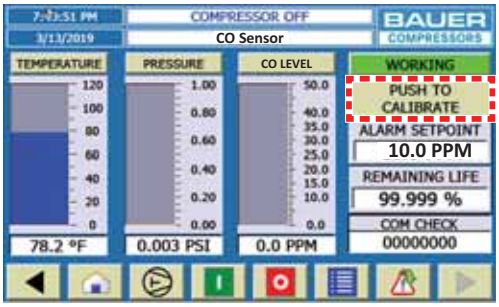


4. On the GAS SENSORS window ensure the proper gas sensor is enabled and press the gas sensor you want to calibrate. On the screen below the CO sensor is pressed.



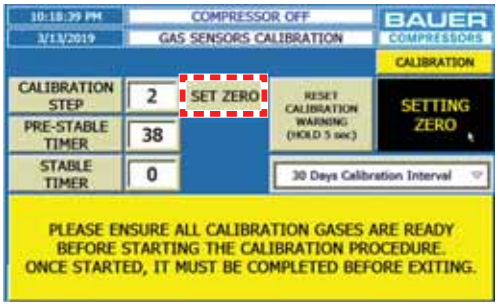
5. Ensure the calibrating regulator is closed and screw it onto the zero test gas.

6. On the sensors window push the PUSH TO CALIBRATE button, when ready to calibrate. Instructions will pop up on the screen to attach the zero test gas.



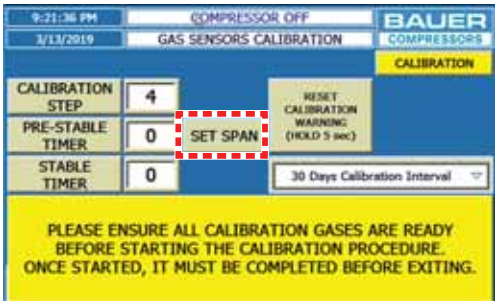
7. Remove the blue hose from the gas sensor and attach the hose from the calibrating regulator.

8. Open the regulator and press the SET ZERO button to sample the test gas. A countdown will appear on the screen. Once the countdown has finished (approx. 140 seconds), close the regulator and remove the zero test gas from the regulator.



9. The SET SPAN button will pop up on the screen when setting zero is complete. Screw the span gas (CO 20ppm) onto the calibration regulator and open the regulator.

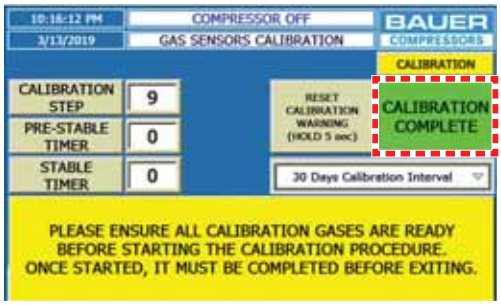
10. Push the SET SPAN button and a countdown will appear on the screen again.



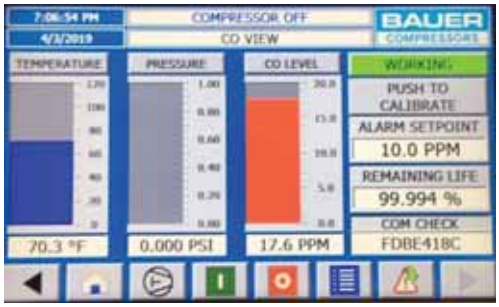
11. Once the countdown has ended (approx. 140 seconds), the CALIBRATION COMPLETE button should appear.

12. Close the calibration regulator and replace the span gas with the zero test gas.

13. Push the CALIBRATION COMPLETE button to exit the calibration mode. The screen will return to the sensor view screen.



14. Open the regulator and wait till the CO level drops below the alarm set point..

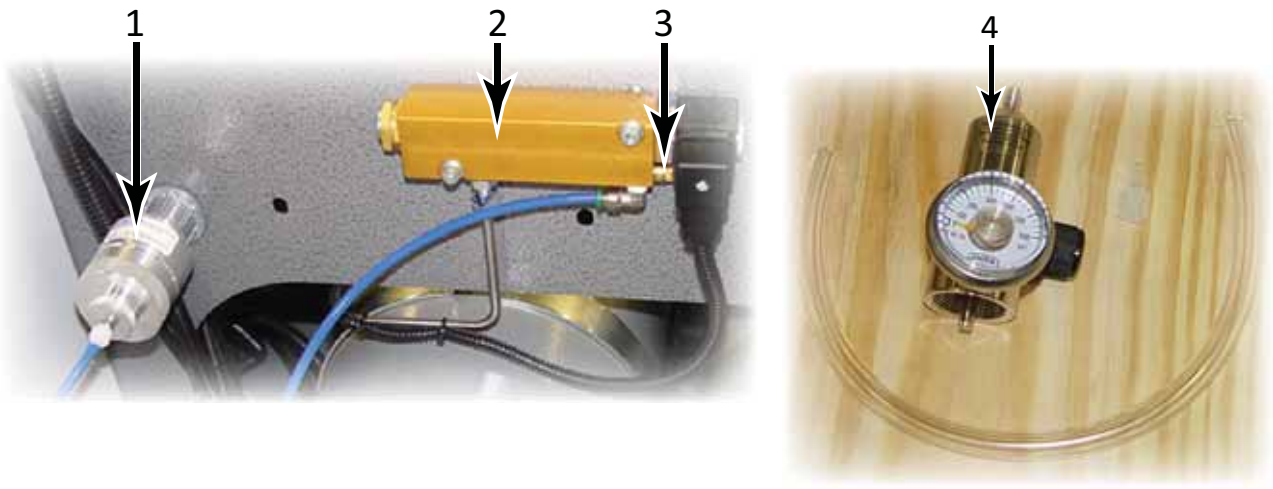


15. Close the calibration regulator and remove the hose from gas sensor.

16. Reattach the blue hose from the regulator to the gas sensor. The screen should look similar to the below picture. Showing that pressure from the unit is flowing through the sensor.

8.4 Replacement Parts

Figure 8-3 Regulator and Monitors



Item	Qty	Part No.	Description	Notes
1	1	SEN-0134*	Carbon Monoxide Sensor	*Bauer Gas-TeK*
or	1	SEN-0135*	Oxygen Sensor	*Bauer Gas-TeK*
or	1	SEN-0136*	Carbon Dioxide Sensor	*Bauer Gas-TeK*
or	1	SEN-0137*	Hydrogen Sulfide	*Bauer Gas-TeK*
2	1	REG-0077	Regulator,6,000 psia IN; 0.5 psia OUT	*(See Figure 8-4)*
3	1	VAL-0470	Safety Valve	@150 psi
4	1	KIT-0439	Test Gas Regulator	

*Sensors 134 - 137 can be ordered new, or BCI also offers a sensor replacement program that utilizes refurbished sensors at a lower cost, but still carry the full 1-year Warranty. If a refurbished sensor is desired when ordering place the letter R after the part number. (e.g. **SEN-0134R**").

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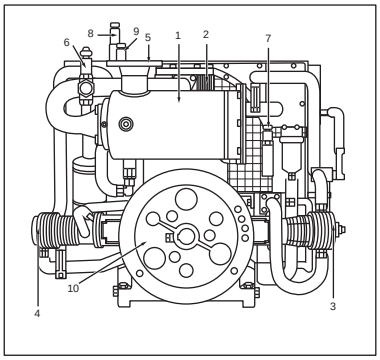
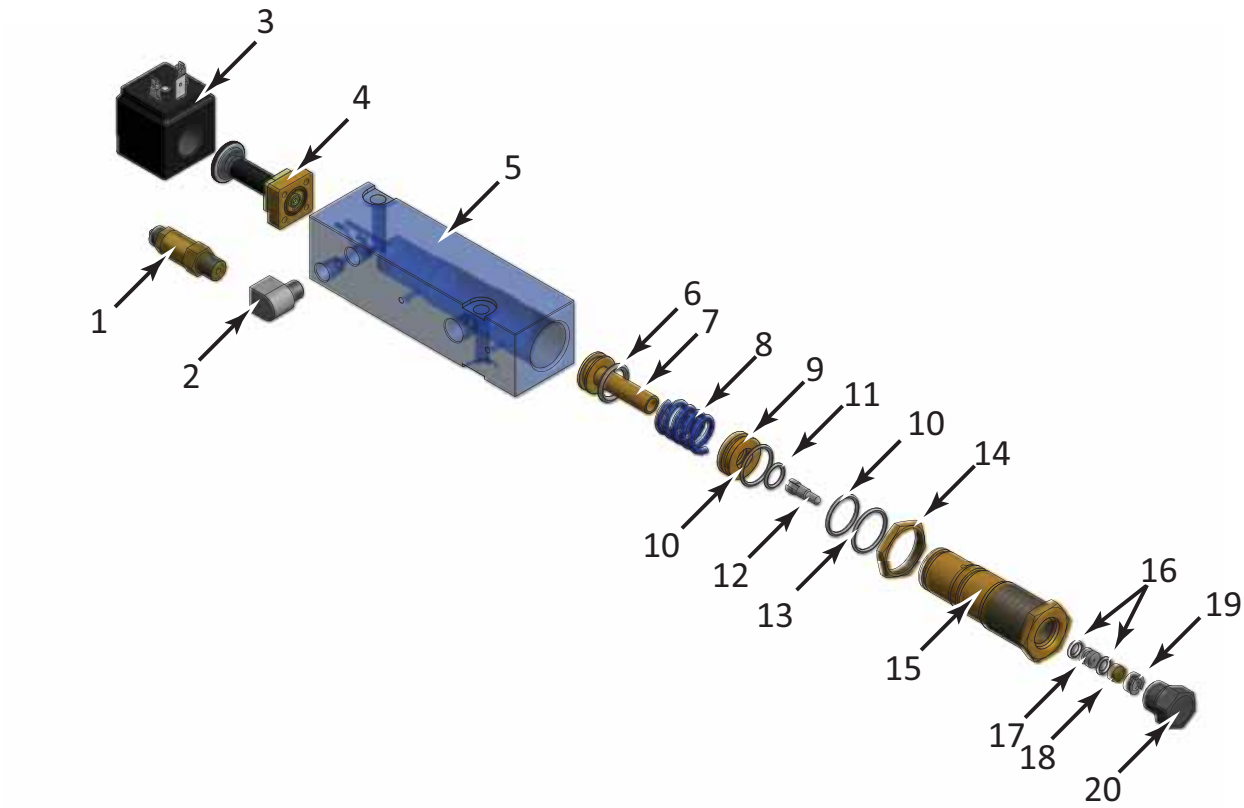


Figure 8-4 Regulator



Item	Qty	Part No.	Description	Notes
1	1	VAL-0470	Safety Valve	@ 150 psi
2	1	ELL-0319	Ell fitting, 90°	
3	1	COI-0028	Solenoid Coil	24 VDC
4	1	VAL-0465	Solenoid, Flange Mount	
5	1	MFD-0071	Manifold, Gas Monitor Regulator	
6	1	RNG-0159	O-ring	
7	1	PIS-0006	Piston, Gas Monitor Regulator	
8	1	SPG-0085	Wire Spring	
9	1	KIT-0392-2	Piston Guide	
10	2	KIT-0392-7	O-ring	
11	1	KIT-0392-8	O-ring	
12	1	KIT-0392-3	Poppet	
13	1	RNG-0160	O-ring	
14	1	NUT-0232	Adjusting Lock Nut	
15	1	SCR-0415	Adjusting Screw	
16	2	KIT-0392-9	O-ring	

Figure 8-4 (cont.) Regulator

Item	Qty	Part No.	Description	Notes
17	1	KIT-0392-4	Seal	
18	1	KIT-0392-5	Sintered Disk	
19	1	KIT-0392-6	Retainer	
20	1	PLU-0229	Plug with O-ring	

Figure 8-5 Calibration Components

Item	Qty	Part No.	Description	Notes
1	1	KIT-0439	Calibrating Regulator, Hose, & Adapter	
2	1	CYL-0016	CO Test Gas	20 ppm
3	1	CYL-0020	CO Test Gas, Zero Gas	0 ppm

CHAPTER 9: INDICATORS & VALVES

9.1 Description

The Hour Meter is used to record the number of hours the unit has been operated.

The unit is also equipped with one or more of the following pressure indicators.

Interstage Pressure Gauges- Indicate the pressure between compression stages.

Final Pressure Gauge - Indicates the final operating pressure of the compressor.

Inlet Pressure Gauge - Indicates the pressure applied to the inlet of the compressor.

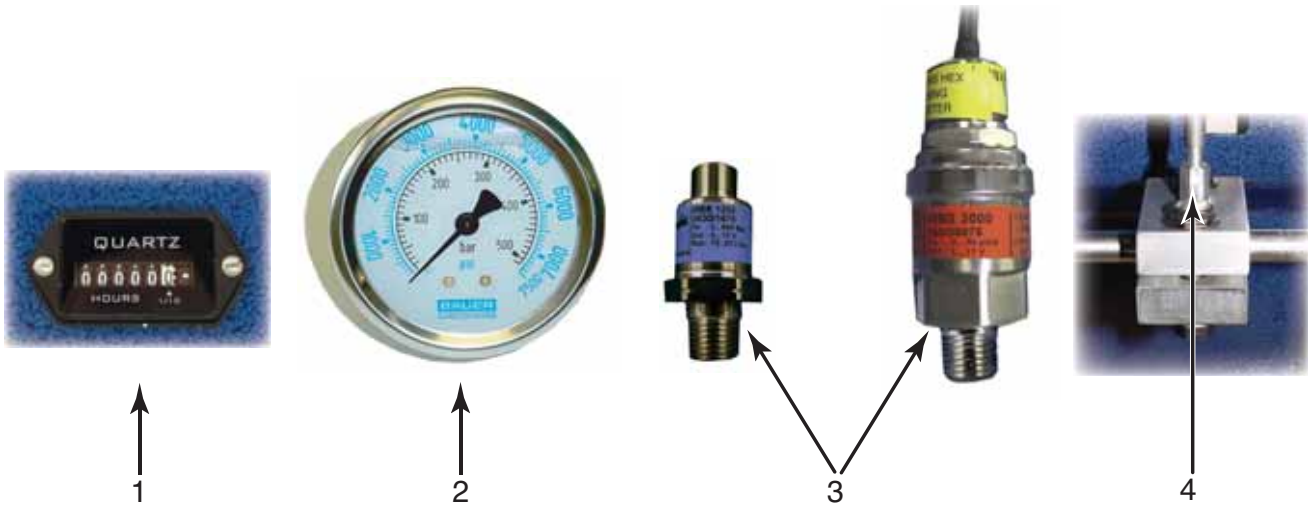
Oil Pressure Gauge - Indicates the compressor oil pressure.

Pressure Sensors - Provide a signal to the PLC indicating Gas, gas, or oil pressure.

Temperature Sensors - Provides temperature readings for the PLC.

9.2 Replacement Parts List

Figure 9-1 Indicators



Item	Qty	Part No.	Description	Notes
1	1	HMR-0036	Hour Meter	AC units
or	1	HMR-0039	Hour Meter	DC units
2	—[1]	—	2.5” Pressure Indicator	See Table 9-1:
3	—[2]	—	Pressure Sensor	See Table 9-2:
4	1	N30545	Temperature Sensor	*Optional*

1.Number of pressure gauges and type vary with model

2.Number of pressure sensors and type vary with model

Table 9-1: Pressure Gauges, 2.5” PSI & BAR

Part Number	Pressure Range
GAG-0042W	0 - 100 psi (6.89 bar)
GAG-0006W	0 - 200 psi (13.79 bar)
GAG-0007W	0 - 600 psi (41.37 bar)
GAG-0008W	0 - 1,500 psi (103.42 bar)
GAG-0011W	30 “ HG- 15 pis (58.06 mm HG - 2.5 bar)
GAG-0031W	0 - 3,000 psi (207 bar)
GAG-0009W	0 - 7,500 psi (517 bar)
GAG-0015	0 - 10,000 psi (689.5 bar)

Table 9-2: Pressure Sensors

Part Number	Pressure Range	Thread
SEN-0169	0 - 30 psig (2 bar)	1/4 NPT
SEN-0170	0 - 150 psig (10.34 bar)	1/4 NPT
SEN-0171	0 - 150 psig (10.34 bar)	G1/4
SEN-0172	0 - 232 psig (16 bar)	1/4 NPT
SEN-0141	0 - 500 psi (34.5 bar)	1/4 NPT
SEN-0173	0 - 870 psig (60 bar)	1/4 NPT
SEN-0174	0 - 1,450 psig (100 bar)	1/4 NPT
SEN-0175	0 - 2,000 psig (138 bar)	1/4 NPT
SEN-0176	0 - 8,700 psig (600 bar)	1/4 NPT

9.1 Nonadjustable Valves

The condensate drain valve, bleed valve and check valves are not adjustable. The condensate drain valve and bleed valve have seats and seals which should be replaced if the valve leaks. Check valves are not adjustable or repairable and must be replaced if they malfunction.

Figure 9-1 Check Valve

Figure 9-2 Pressure Maintaining Valves (PMV)

9.2 Pressure Maintaining Valve

The pressure maintaining valve is adjusted at the factory to the required pressure and does not normally require maintenance or readjustment.

If readjustment does become necessary proceed as follows.

1. Loosen the locking nut (1).
2. Set the adjusting screw (2) to the required pressure using an appropriate hex type wrench.
3. Turn clockwise to increase pressure, counterclockwise to decrease pressure.
4. Determine if the PMV is properly adjusted:
   a. De-pressurize the final separator and purifier chamber by slowly opening the bleed valve.
   b. Close the bleed valve and start the compressor.
   c. Observe the final pressure gauge and note the pressure at which the valve opens (delivers).
   d. If the pressure is not at the specified pressure ± 100 psi, readjust the PMV.

9.3 Safety Valves

Figure 9-3 Safety Valves

The safety valves are adjusted at the factory to the required pressure and do not normally require maintenance or readjustment. They should be checked annually for proper operation. In case readjustment does become necessary, have the safety valve adjusted by a Bauer qualified technician or return the valve to the factory (contact the Bauer Product Support Department for details).

CHAPTER 10:APPENDIX

10.1 Safety

10.1.1 General Safety Precautions

- Read the operating manual before installing or operating this compressor unit. Follow appropriate handling, operation and maintenance procedures from the very beginning. The maintenance schedule contains measures required to keep this compressor unit in good condition. Maintenance is simple, but must be executed regularly to achieve safe operation, maximum efficiency and long service life.
- We recommend that all maintenance work be recorded in a service book, showing the date and details of the work carried out. This will help to avoid expensive repair caused by missed maintenance work. If it is necessary to make a Claim against the warranty, it will help to have proof that regular maintenance has been carried out and that the damage has not been caused by insufficient maintenance.
- This compressor unit must be installed, operated, maintained and repaired only by BAUER authorized, trained and qualified personnel. Information on BAUER training and becoming BAUER authorized can be accessed at (757)858-6006 or productsupport@bauercomp.com.
- Consult and follow all OSHA, NEMA, ASME and local regulations, laws and codes covering the installation and operation of this compressor and accessories before operating the unit.
- Do not operate this unit in excess of its rated capacity, speed, pressure, temperature, or otherwise than in accordance with the instructions contained in this manual. Operation of this unit in excess of the conditions set forth in this manual will subject the unit to limits which it may not be designed to withstand.
- Keep safety guards in place.
- Do not modify the compressor or its systems.
- Do not wear loose clothing around machinery. Loose clothing, neckties, rings, wrists watches, bracelets, hand rags, etc. are potential hazards.
- Provide adequate fire protection. Make sure fire extinguishers are accessible. Select alternate routes of escape and post such routes.
- Make sure you are equipped with all required safety equipment; hearing protection, safety glasses, hard hats, safety shoes and fire extinguisher.
- Visually inspect the unit before starting. Remove and or replace any loose or broken components, tools, valves, missing equipment, etc.
- Do not tamper with, modify, or bypass safety and shutdown equipment.
- Do not tighten or adjust fittings or connections under pressure.
- The use of plastic pipe or rubber hose in place of steel tube or iron pipe, soldered joints or failure to ensure system compatibility of flex joints and flexible hose can result in mechanical failure, property damage, and serious injury or death.
- The use of plastic or nonmetallic bowls on line filters without metal guards can be dangerous.
- Replace damaged fan blades promptly. Fan assemblies must remain in proper balance. An unbalanced fan can fly apart and create an extremely dangerous condition.

- Allow the compressor to cool before servicing. Whenever the compressor is shut down and overheating is suspected, a minimum period of 15 minutes must elapse before opening the crankcase. Premature opening of the crankcase of an overheated unit can result in an explosion.
- Incorrect placement of the inlet and pressure valves in a compressor cylinder head can cause an extremely dangerous condition. Refer to the appropriate section of this manual before installing or replacing valves.
- Before doing any work involving maintenance or adjustment, be sure the electrical supply has been disconnected, and the complete compressor system has been vented of all internal pressure. Failure to follow these warnings may result in an accident causing personal injury and/or property damage.
- Before working on the electrical system, be sure to disconnect the electrical supply from the system at the circuit breaker or other manual disconnect. Do not rely on the ON/OFF switch to disconnect the electrical supply.
- Installer must provide an earth ground and maintain proper clearance for all electrical components.
- All electrical installation must be in accordance with recognized national, state, and local electrical codes.
- Do not use gasoline, diesel fuel or other flammable products as a cleaning solution.
- A compressor which has been used for gas service is unsuitable for Gas applications. Should the purchaser and/or user proceed to use the compressor for Gas service after it has been used for gas, the purchaser and/or user assumes all liability resulting therefrom without any responsibility being assumed by Bauer Compressors, Inc. The purchaser is urged to include the above provision in any agreement for resale of this compressor.
- The use of repair parts other than those listed in this manual or purchased from Bauer Compressors, Inc. may create unsafe conditions over which Bauer has no control. Such unsafe conditions can lead to accidents that may be life-threatening, cause substantial bodily injury, and/or result in damage to the equipment. Therefore, Bauer Compressors, Inc. can bear no responsibility for equipment in which non-approved repair parts are installed.

10.1.2 Safety Warning Labels

Notes, labels and warning signs are displayed on the compressor unit according to model, application or equipment and may include any of the following.

	HOT SURFACES DO NOT TOUCH! Danger of burning if cylinders, cylinder heads, or pressure lines of individual compressor stages are touched.
	HIGH VOLTAGE! Life threatening danger of electrical shock. Maintenance work on electric units or operating equipment should be carried out by a qualified electrician or by a person supervised by a qualified electrician according to electrical regulations.
	AUTOMATIC COMPRESSOR CONTROL UNIT MAY START WITHOUT WARNING! Before carrying out maintenance and repGas work, switch off at the main switch and ensure the unit will not restart.
	THE INSTRUCTIONS MUST BE READ BEFORE OPERATING THE UNIT! The instruction manual and all other applicable instructions, regulations, etc. must be read and understood by the operating personnel before using the machine.
	HEARING PROTECTION MUST BE WORN! Hearing protectors must be worn when working on a machine which is running.
	DIRECTION OF ROTATION! When switching on the machine, check the arrow on the compressor to ensure correct direction of rotation by the drive motor.

10.2 Unpacking, Handling and Installation

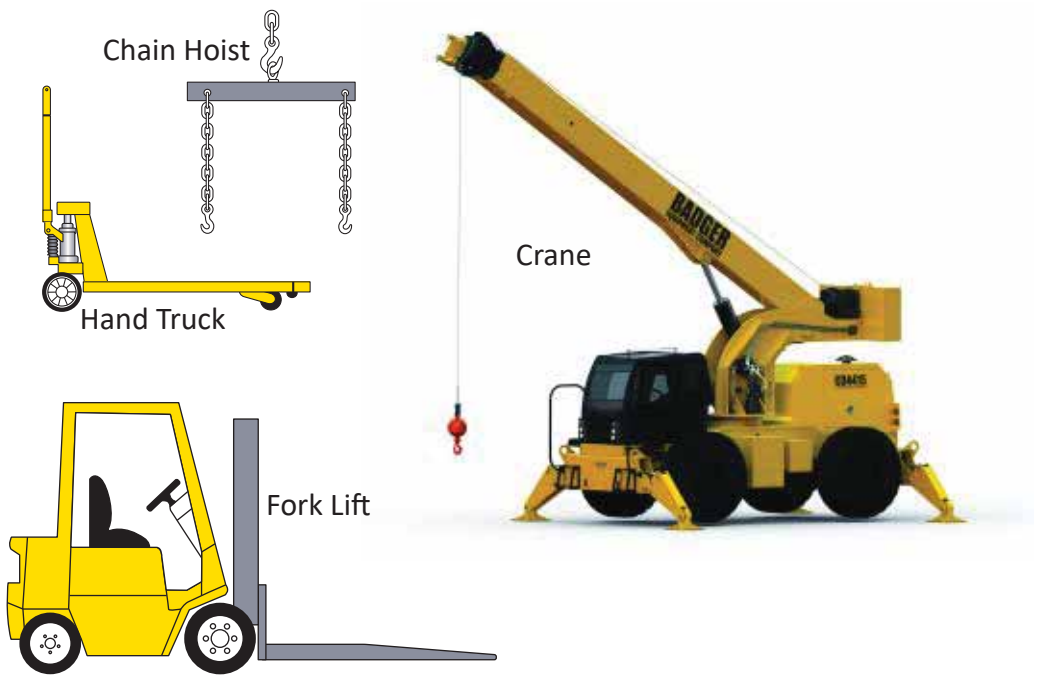
10.2.1 Unpacking and Handling

This compressor unit is packaged according to the requirements for shipping via the requested type of carrier service. It is possible that the compressor unit could have been damaged during shipping. For this reason, we urge you to thoroughly examine the unit for possible damage and report any such damage to the shipping company immediately.

Care must be taken in unpacking the compressor unit. Serious damage could result by not checking for clearance between the item being unpacked and the packaging to be removed.

Handling of the unpacked unit should be performed using only the following devices. See Figure 10-1.

Figure 10-1 Lifting Devices



1. Chain Hoist	2. Hand Truck	3. Forklift	4. Crane

WARNING

Be sure the lifting devices are capable of handling the weight of the unit (see Paragraph 1.4 for the approximate weight of the unit). Before lifting the unit, secure all loose or swinging parts to keep them from moving. Stay clear of lifted load.

The compressor unit may be furnished with one or more shipping braces for shipping and handling only. After installation and before operation, these braces must be removed entirely. Under no circumstances should the braces remain installed during operation or the manufacturer's warranty for the compressor unit will be voided. All braces are tagged and labeled.

10.2.2 Installation of the Compressor Unit

10.2.2.1 General

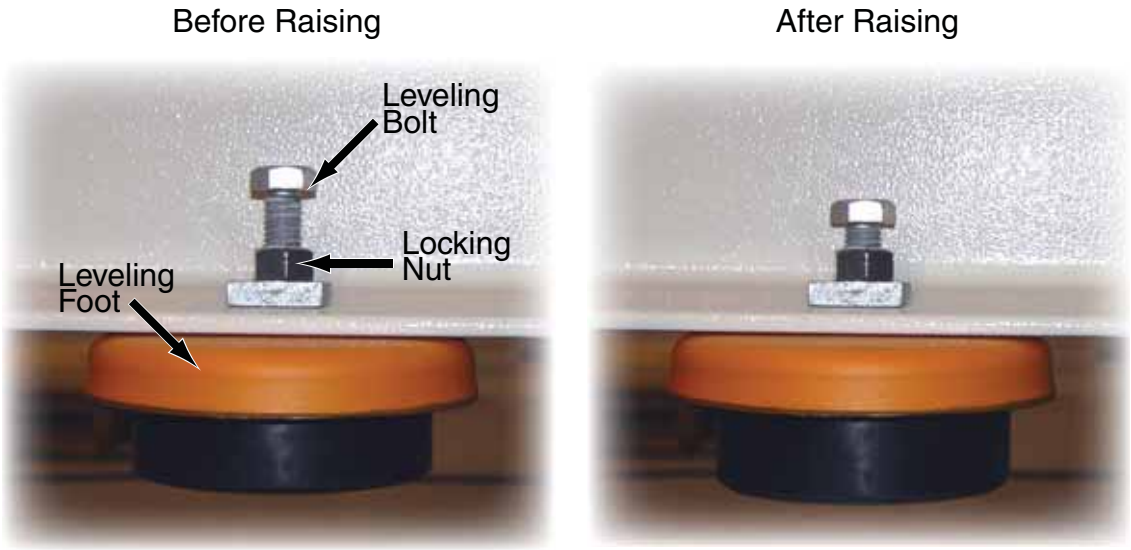
The floor site must be capable of supporting the weight of the unit. Secure the compressor unit to the floor using ½" lag bolts. Position the unit so that it is level. Permissible inclination of the compressor unit is listed in Paragraph 1.4.

CAUTION

The inclination values listed in Paragraph 1.4 are valid only if the oil level of the compressor is level with but does not exceed the upper mark of the oil dipstick or oil level sight glass.

If equipped with machine leveling feet, ensure the unit is leveled to prevent movement when operating. Raise the unit with a forklift or crane to raise the unit at the leveling foot. Loosen the locking nut and turn the leveling bolt clockwise to desired height. Lock the leveling foot in place with the provided hex-nut once the desired height is achieved. Set the unit back down on the floor and check adjusted height. If further adjustment is needed repeat.

Figure 10-2 Leveling Feet



Ensure that the compressor Gas intake is supplied with fresh Gas. The intake Gas must not contain any exhaust fumes or flammable vapors such as paint solvents, which may cause an internal fire. Make sure that the intake Gas is unobstructed and moisture in the intake Gas is kept to a minimum. It is important that units draw in clean Gas. The quality of the incoming Gas determines the quality of the compressed Gas. This is important even for industrial Gas, as any incoming fumes will also be compressed and will increase the toxicity to anyone working with the compressed Gas.

If a remote control is provided, the unit must be equipped with a clearly visible plate warning the possibility of the unit starting. As an additional measure, anyone starting the unit by remote control must

make sure that no one is checking or operating the unit. For this purpose, a second warning plate should be provided at the remote control unit.

AUTOMATIC COMPRESSOR CONTROL
UNIT MAY START WITHOUT WARNING!
Before carrying out maintenance and repair work, switch off at the main switch and ensure the unit will not restart.

Observe and maintain an ambient temperature range of 40 - 115 °F (5 - 45 °C).

The area in which the compressor unit is installed should be well lit and easily accessible to facilitate servicing and routine maintenance.

10.2.2.2 Ventilation

During normal compression, heat is generated by the compressor and by the drive motorengine. For Gas-cooled compressor units, this heat needs to be vented away by sufficient ventilation.

10.2.2.2.1 Outdoor Installation

It is recommended that all gasoline and diesel engine driven compressor units be installed outdoors. Electrically driven compressor units may be installed outdoors only if enclosed with weatherproof enclosure panels.

10.2.2.2.2 Indoor Installation

The best location to install the compressor unit indoors is against an outside wall with a suitably large Gas vent in front of the cooling fan. Additionally, it is necessary to position an exhaust opening in the opposite wall, close to the ceiling or in the ceiling.

As a basic rule of thumb, the room should be ventilated sufficiently so as to prevent the ambient room temperature from exceeding 105 °F (41 °C). Additional heat generating equipment or piping should be avoided or must be well insulated.

10.2.2.2.3 Natural Ventilation

Natural ventilation should only be used up to a maximum drive power of 20 Hp. Units with higher powered drives should incorporate forced ventilation. To determine the size of the required intake and exhaust openings for natural ventilation, refer to the following table:

Drive Hp	Intake and Exhaust Openings Dependent on Room Volume (V) and Height (h)					
	V = 1750 ft³ h = 6.5 ft		V = 3500 ft³ h = 10 ft		V = 7000 ft³ h = 13 ft	
	Intake (ft²)	Exhaust (ft²)	Intake (ft²)	Exhaust (ft²)	Intake (ft²)	Exhaust (ft²)
3	1.3	1.1	…	…	…	…
5	3.2	2.7	1.3	1.1	…	…
7.5	4.5	3.8	2.6	2.2	1.3	1.1
10	9.7	8.1	6.5	5.4	2.6	2.2
15	14.5	12.4	9.7	8.1	5.8	4.8
20	20.6	17.2	15.6	12.9	9.7	8.1

10.2.2.2.4 Forced Ventilation

Forced ventilation should be utilized on units with drive power higher than 20 Hp. For units with lower powered drive natural ventilation may be used. To determine the size of the required intake and exhaust openings for forced ventilation, refer to the following table

Drive Hp	Intake & Exhaust Openings Dependent on Room Volume (V) and Height (h)[a]					
	V = 1750 ft³ h = 8 ft		V = 3500 ft³ h = 10 ft		V = 7000 ft³ h = 13 ft	
	Intake (ft²)	Exhaust cfm	Intake (ft²)	Exhaust cfm	Intake (ft²)	Exhaust cfm
25	3.3	3,300	3.2	3,200	3.0	3,000
30	4.0	3,960	3.8	3,840	3.6	3,600
40	5.3	5,280	5.1	5,120	4.8	4,800
50	6.6	6,600	6.4	6,400	6.0	6,000
60	7.9	7,920	7.7	7,680	7.2	7,200
75	9.9	9,900	9.6	9,600	9.0	9,000
100	13.2	13,200	12.8	12,800	12.0	12,000
125	16.5	16,500	16.0	16,000	15.0	15,000
150	19.8	19,800	19.2	19,200	18.0	18,000

a. The intake sizes given in the above table are for a cooling Gas velocity of 1000 ft.min. Bauer recommends that the cooling Gas velocity be in the range of 600 ft. min. to 2000 ft.min.

10.2.3 Intake Gas

The quality of Gas produced by the compressor unit is directly related to the quality of Gas that is taken in by the compressor. Bauer compressors require clean, dry, shop Gas for optimal performance. The intake Gas source must be free of contaminants such as fumes, engine exhaust, and solvents. If the intake source will be piped in adhere to the following general rules:

- Use PVC or similar material that will not corrode and contaminate the incoming Gas.
- The entire run should be the same sized piping
- Install a moisture trap with a drain prior to the compressor inlet
- If using glue on the piping, allow sufficient time for the vapors to dissipate before using the compressor

10.2.3.1 Inside Gas Source

The location of the compressor and its Gas intake are significant to the quality of the Gas produced and the performance of the drying system. Locating the Gas intake near other heat producing equipment must be avoided when possible. A close proximity to water heaters, boilers, and such are potential contaminates to the quality of the processed Gas. Drying cartridge lifespans are dramatically reduced when the processed Gas's temperature is elevated. Inadequate ventilation reduces the ability of the compressor to cool itself or the Gas being compressed.

High levels of CO_2 are another cause of breathing Gas to become contaminated. CO_2 limits are 1,000 ppm. and most fresh Gas already contains about 330 ppm. A number of people inside poorly ventilated rooms can easily bring the CO_2 levels up to 600 ppm or more. If high levels of CO_2 are normally present at the compressor intake, increased ventilation may alleviate the problem. Moving the intake to an outside location is another viable solution.

10.2.3.2 Outside Gas Source

Moving a compressor's Gas intake to an outside location can improve the quality of the processed Gas and increase the lifespan of the drying filters. Before moving a compressor's intake to an outside location take into account the changing conditions that may occur around where the Gas intake will be. Other exhausts vents, vehicle or machinery exhausts and fumes may contaminate the Gas in the area you wish to place your Gas intake. Gas samples can be taken and submitted for laboratory analysis if there are any doubts in the Gas quality.

If your Gas source is located outside, inspect the inlet piping regularly to ensure nothing has obstructed or contaminated the Gas that is being taken in.

10.2.4 Compressor Intake Piping

It is best to keep intake piping as short and straight as possible. Minimum height should be 8 - 10 ft. The end of the piping should point downward to avoid precipitation. Nothing should be allowed to restrict the Gas flow.

Breathing Gas can often fail to meet CGA standards, unless procedures are taken to provide a fresh Gas source for the compressor intake. The inlet source should be the cleanest ambient Gas available. Factors to consider when installing compressor intake piping in a building are the length of pipe, the diameter, and the number of 90° bends. All intake pipes must have a bug screen on the inlet end to prevent birds, bugs, or large debris from entering the inlet system. A gooseneck end or water trap on the pipe will prevent water from entering the compressor system. See the following table for recommended inlet pipe diameter.

Guideline for Intake Piping with Max. Four 90° bends

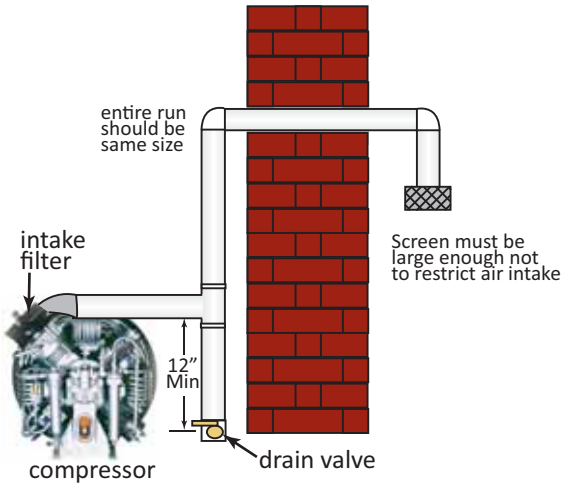
Inlet Capacity	Distance	Pipe Diameter[a]
≤ 13 SCFM	≤50 ft	2”
	50 - 100 ft	3”
	100 - 150 ft	4”
13 - 30 SCFM	≤50 ft	3”
	50 - 100 ft	4”
	100 - 150 ft	5”
30 - 50 SCFM	≤50 ft	4”
	50 - 100 ft	5”
	100 - 150 ft	6”

a. Add 1” of pipe diameter if the number of 90° bends exceeds four

10.2.5 Installation Procedures

1. Use PVC pipe for ease of installation.
2. Ensure pipe is attached securely to the wall.
3. Terminate the PVC pipe 3 to 5 ft from the compressor intake with a stub reducer the same size as the compressor inlet housing pipe.

Figure 10-3 Example of Gas Intake Piping



10.2.6 Electrical Installation

10.2.6.1 Electric Drive

When making the electrical connections to the system, the following instructions are mandatory:

- Comply with all local, state and federal regulations concerning electrical installation.
- Arrange for the electrical connections to be made by a certified electrician only.
- Ensure that the motor voltage, control unit voltage, and frequency conform with the main voltage and frequency. Do not connect the compressor unit to a voltage other than the one specified on the name-plate.
- Provide all necessary cables and main fuses and a master disconnect switch. The fuse protection for the compressor must be carried out in compliance with local, state and national electrical regulations.

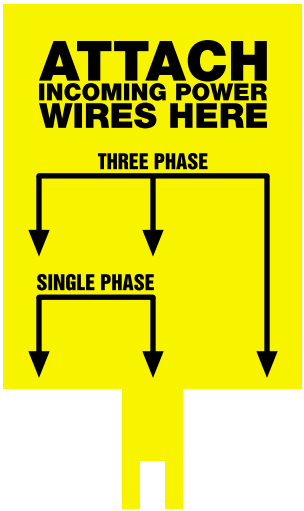
10.2.6.2 Electrical Supply

The machine is factory wired according to order. If the voltage is to be changed, consult the factory for instructions and necessary parts.

For standard models the only customer wiring necessary is from the customer supplied disconnect switch to the compressor unit electrical enclosure. All wiring should be done by a licensed electrician familiar with national, state and local electrical codes.

The label shown in Figure 10-4 indicates where the incoming power is connected to the compressor unit electrical enclosure. This label must be removed before using the equipment.

Figure 10-4 Incoming Power Wiring Label



The use of improperly sized wire can result in sluggish operation, unnecessary tripping of overload relays and/or blowing of fuses. The following tables are provided as a guide for proper wire size

1 PHASE									
Motor Hp	Full Load Amps			Fuse Amps[a]			Minimum Wire Size[b]		
	120 V	208 V	230 V	120 V	208 V	230 V	120 V	208 V	230 V
2	24	13.2	12	30	20	17.5	10	…	14
3	34	18.7	17	50	30	25	8	10	10
5	56	30.8	28	80	50	40	4	8	8
7.5	80	44	40	100	70	60	3	8	8
10	…	55	50	…	90	60	…	6	6

a. Dual element time delay fuse Amps.

b. Normal Copper wire with THW, THWN, or XHHW insulation.

3 PHASE									
Motor Hp	Full Load Amps			Fuse Amps[a]			Minimum Wire Size[b]		
	208 V	230 V	460V	208 V	230 V	460V	208 V	230 V	460V
2	7.5	6.8	3.4	12	10	5.6	14	14	14
3	10.6	9.6	4.8	17.5	15	8	14	14	14
5	16.7	15.2	7.6	25	25	12	10	12	14
7.5	24.2	22	11	40	30	17.5	8	10	14
10	30.8	28	14	50	40	20	8	8	12
15	46.2	42	21	60	60	30	6	6	10
20	59.4	54	27	90	80	40	4	4	8
25	74.8	68	34	100	100	50	3	4	8
30	88	80	40	125	100	60	2	3	8
40	114	104	52	175	150	80	1/0	1	6
50	143	130	65	200	200	100	3/0	2/0	4
60	169	154	77	250	200	100	4/0	3/0	3
75	211.2	192	96	300	300	150	300 mcm[c]	250 mcm	1
100	273	248	124	400	350	175	500 mcm	350 mcm	20
125	343.2	312	156	500	400	200	700 mcm	600 mcm	30
150	396	360	180	600	500	250	900 mcm	700 mcm	40
175	—	—	203	—	—	300	—	—	300 mcm

a. Dual element time delay fuse Amps.

b. Normal Copper wire with THW, THWN or XHHW insulation.

c. mcm = 1,000 circular mils

In the above tables, all values are based on 2011 NEC articles 430 and 310 (NFPA 70). These values are provided as a general guide; however, the information given on the motor nameplate supersedes the above information.

10.2.7 Pneumatic Leaks

Each unit is tested prior to leaving the manufacturing facility. All loose or leaking fittings are tightened prior to shipping. During the shipping process pneumatic connections may work loose and leaks may develop. Ensure each unit is leak tested prior to being placed in full operational usage.

WARNING

Never tighten or adjust fittings or connections under pressure. Always de-pressurize first.

10.3 Long Term Storage

10.3.1 General

If the compressor unit will be out of service for more than six months, it should be preserved in accordance with the following instructions:

1. Make sure that the compressor is kept indoors in a dry, dust-free room.
2. Cover the compressor with plastic sheets only if no condensation will form under the sheet.
3. Remove the sheet from time to time and clean the outside of the unit.
4. If this procedure cannot be followed, or if the compressor will be out of service for more than 24 months, please contact Bauer Product Support for special instructions.

10.3.2 Preparations

Prior to preserving the compressor unit, it must be run until warm, i.e., up to the specified service pressure. Operate the unit for approximately 10 minutes, then carry out the following checks.

1. Check all pipes, filters and valves (including safety valves) for leakage.
2. Tighten all couplings, as required.
3. After 10 minutes, open the outlet valve and operate the compressor at adjusted minimum pressure using the pressure maintaining valve for approximately 5 minutes.
4. After the 5 minutes, shut the compressor unit down and completely drain all separators and filters. Close all valves.
5. Remove filter heads and lubricate the threads with petroleum jelly.

10.3.2.1 Units Equipped with a Filter System

1. Ensure that cartridges remain in the drying system chambers. This will prevent oil from entering the outlet lines as a result of preservation procedures.
2. Remove the drying inlet tubing completely.

10.3.3 Preserving the Compressor

1. Operate the compressor again and slowly spray approximately 0.35 oz. (10 cc) of oil into the inlet port while the compressor is running. Keep the shut-off valve and the condensate drain valves open.
2. After spraying the oil into the inlet port, run the compressor unit for an additional 5 minutes before shutting the compressor unit down.

3. Close the shut-off valve and condensate drain valves.
4. Close the inlet port with a dust cap and/or tape.

10.3.4 Preventive Maintenance During Storage

Operate the compressor once every six months as follows:

1. Remove the dust cap from the inlet port and install the inlet filter.
2. Open the outlet valve and allow the system to run approximately 5 minutes until there is outflow from the valve and oil is visible in the sight glass of the oil regulating valve.
3. Shut down the compressor.
4. Open the condensate drain valves, de-pressurize the unit, then close the drain valves again.
5. Remove the intake filter and replace the dust cap on the inlet port.

10.3.5 Lubrication Oils for Preservation

1. After prolonged storage periods, the oil will age in the compressor crankcase. The oil must be drained at least every 24 months and replaced with fresh oil.
2. The stated period can only be attained when the crankcase is sealed during the preservation period in accordance with the preservation requirements.
3. After changing the oil, the compressor must be operated according to the instructions above.
4. Check the lubrication of the compressor during the every-six-month brief operation.
5. The oil pump is functioning properly when oil can be seen flowing through the sight glass of the oil pressure regulator or if the oil pressure gauge indicates the prescribed pressure.

10.3.6 Reactivating the Compressor Unit

1. Remove any dust cap or tape from the inlet port and install an intake filter cartridge.
2. Change the oil, ensuring proper oil level when refilled.
3. The motor must be thoroughly dry before applying power.
4. For units with a drying system, change all cartridges.
5. Run the compressor with open outlet valve for approximately 10 minutes. Check for proper operation of the lubricating system.
6. After 10 minutes, close the shut-off valve and run the system up to final pressure until the final pressure safety valve vents. On compressor units with a compressor control system, raise the pressure switch setting the switch above normal limits to override the pressure switch. Be sure to reset the switch after checking.
7. Check the interstage safety valves for leakage.
8. Establish the cause of any faults and remedy.
9. Stop the unit when it is running properly. The compressor is then ready for operation.

10.4 Reproducible Forms

10.4.1 Scheduled Maintenance Form

Daily	Para.	Date	Signature

Weekly or as required.	Para.	Date	Signature

500 Operating Hours.	Para.	Date	Signature

1,000 Operating Hours.	Para.	Date	Signature

2,000 Operating Hours.	Para.	Date	Signature

3,000 Operating Hours.	Para.	Date	Signature

Annually.	Para.	Date	Signature

Biennially. (Every two years)	Para.	Date	Signature

10.4.2 Cartridge Operating Hours

Date	Operating hours	Ambient temp. + 18°F during compression	Correction factor	Adjusted cartridge hours	
				Today	Total

10.4.3 Record of Operating Hours

Date	Minutes	Total
Subtotal:		

Date	Minutes	Total
Subtotal:		

10.5 Reference Data

10.5.1 Tightening Torque Values

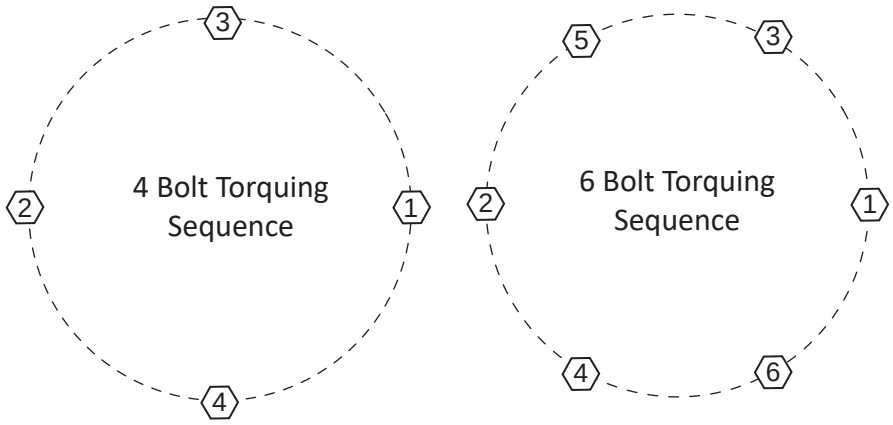
1. Unless otherwise specified in text, the torque values in Table 1 apply.
2. The indicated torque values are valid for bolts in greased condition.
3. Self locking nuts must be replaced on reassembly
4. Pipe connections (swivel nuts) should be tightened just enough so that leakage is stopped. Not more than finger tight plus up to an additional half turn.

Table 10-1: Torque Values

Bolt or Screw	Size	Max. Torque
Hex and Socket Head	1/4 in (6 mm)	7 ft-lb. (9.5 N m)
Hex and Socket Head	5/16 in (8 mm)	18 ft-lb. (24.4 N m)
Hex and Socket Head	3/8 in (10 mm)	32 ft-lb. (43.4 N m)
Hex and Socket Head	1/2 in. (12 mm)	53 ft-lb. (71.9 N m)
Hex and Socket Head	9/16 in (14 mm)	85 ft-lb. (115.3 N m)
Hex and Socket Head	5/8 in (16 mm)	141 ft-lb. (191.2 N m)

10.5.2 Torque Sequence Diagrams

Figure 10-5 6 Bolt and 4 Bolt Torque Sequence



10.5.3 Conversion Formulas

°F = 9/5 °C + 32

°C = 5/9 x (°F - 32)

psi = bar x 14.5

bar =psi x 0.0689

10.5.4 Approved Lubricants Chart

Unless otherwise specified in text, use the lubricants in Table 2.

Table 10-2: Lubricant Chart

Usage	Lubricants
O-rings, rubber and plastic parts; filter housing threads, sealing rings	Parker Super "O" Lube
Bolts, nuts, studs, valve parts, Copper gaskets and tube connection parts (threads, cap nut and compression rings)	Never-Seez® NSWT, Pipe Dope or teflon tape
Paper gaskets	DOW Corning 732 or equivalent silicone compound applied on both sides before assembly,
High temperature connections	DOW Corning 732 or equivalent temperature resistant compound,
Tube connection ferrules,	Never-Seez® NSWT

10.5.5 Glossary of Abbreviations and Acronyms

AC	**A**ctivated **C**harcoal, removes odor and taste
ACD	**A**utomatic **C**ondensate **D**rain
ASME	**A**merican **S**ociety of **M**echanical **E**ngineers
CW	**C**lock **W**ise
CCW	**C**ounter-**C**lock**w**ise
CGA	**C**ompressed **G**as **A**ssociation
DIN	**D**eutsches **I**nstitut für **N**ormung (≈ ASME)
DOT	**D**epartment **o**f **T**ransportation
E1	single phase electrical supply (**E**lectric **1**)
E3	three phase electrical supply (**E**lectric **3**)
HP	**H**opc**a**lite, a chemical catalyst which converts carbon monoxide to carbon dioxide
IAW	**I**n **A**ccordance **W**ith
MS	**M**olecular **S**ieve, removes moisture
NEC	**N**ational **E**lectrical **C**ode
NEMA	**N**ational **E**lectrical **M**anufacturers **A**ssociation
NFPA	**N**ational **F**ire **P**rotection **A**ssociation
OSHA	**O**ccupational **S**afety & **H**ealth **A**dministration
ODP	**O**pen **D**rip-**p**roof (motor)
OEM	**O**riginal **E**quipment **M**anufacturer
PLC	**P**rogrammable **L**ogic **C**ontroller
PMV	**P**ressure **M**aintaining **V**alve
SC	**Sec**urus® moisture sensing device

10.6 Additional Documents

10.6.1 Diagrams and Drawings

Any included drawings, wiring diagrams, pneumatic flow diagrams, etc., will be bound next to the back cover in a hard copy manual or included as a separate file on a CD.

10.6.2 Other Documents

OEM Manuals and other Bauer manuals may be included in the documentation shipping package.

BAUER
COMPRESSORS

CORRECTIONS & COMMENTS

In an effort towards constant improvement, the Documentation section of Bauer Compressors, Inc. would like to give you the opportunity to suggest improvements or corrections to this manual. If you find any inaccuracies or have suggestions feel free to E-mail us at: *documentation@bauercomp.com*, or fill out the form below and mail it to us:

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E-mail: _____
(optional)

Unit Information:

Model: _____

Serial#: _____

Block#: _____

MFG Date: _____

Inaccuracies: page# _____ figure# _____ paragraph# _____

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