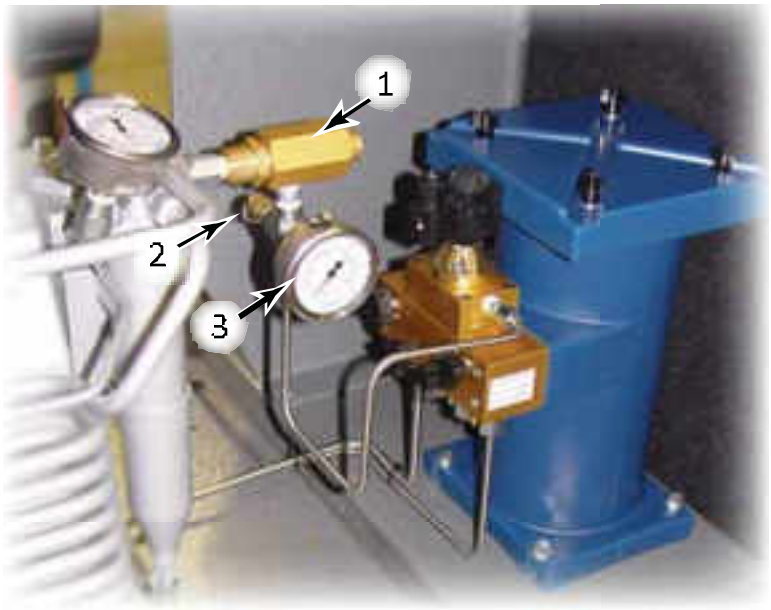
Figure 3-49 Regulator Assembly [a]



a.Only used with IK 120 II block

Item	Qty	Part No.	Description	Notes
1	1	REG-0043	Pressure Regulator	6,000 psi IN; 0 - 250 psi OUT
2	1	VAL-0017	Safety Valve	225 psi
3	1	GAG-0028W	Pressure Gauge	0 - 300 psi

3.3.2 Trouble shooting

Trouble	Cause	Remedy
Solenoid does not drain.	1. Solenoid receives no electrical signal 2. Plunger of drain valve sticking	1. Check connections, timer. Replace if necessary. 2. Clean or replace valve.
Condensate Drain Valve does not drain.	1. Solenoid does not depressurize drain valve. 2. No control medium available. 3. Solenoid sticking. 4. Drain valve sticking in open position	1. Check solenoid, replace if necessary 2. Check supply lines 3. Clean or replace 4. Clean or replace

CHAPTER 4: PURIFICATION SYSTEM

4.1 Introduction

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

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

WARNING

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

The quality of gas produced by the compressor is directly related to the quality and temperature of the gas taken in by the unit. Intake gas 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 gas temperature. The purification cartridges perform their best at approximately 68 °F (20 °C). Adequate ventilation enhances the quality and life of the purification cartridges.

4.1.1 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.

4.1.2 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 4-1 & Figure 4-2). Without a cartridge properly in place the safety bore is not sealed, the Gas escapes into the atmosphere, no pressure can be built up and thus it is ensured that unfiltered Gas is not supplied to the consuming device. If Gas is escaping from the safety bore remove and check cartridge. If necessary replace the cartridge or O-rings.

Figure 4-1 Cartridge Safety Venting

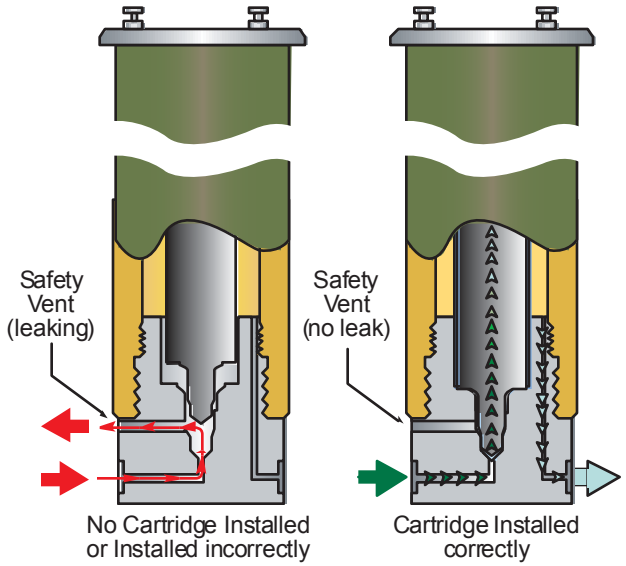
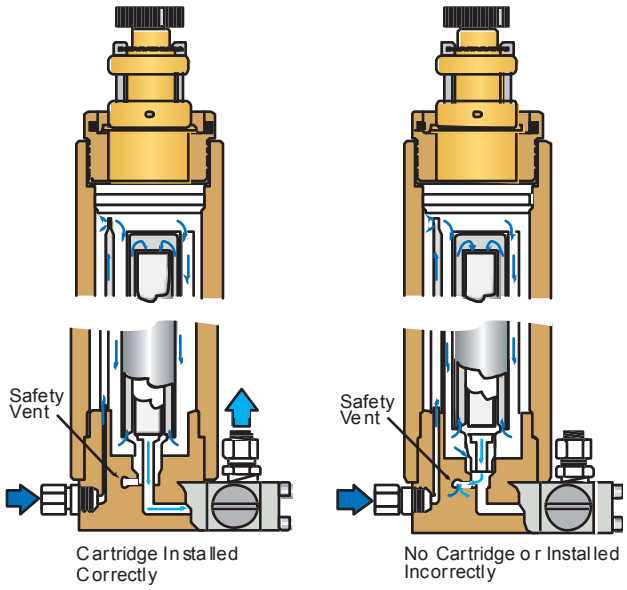


Figure 4-2 P0 & P31 Safety Venting



4.1.3 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.

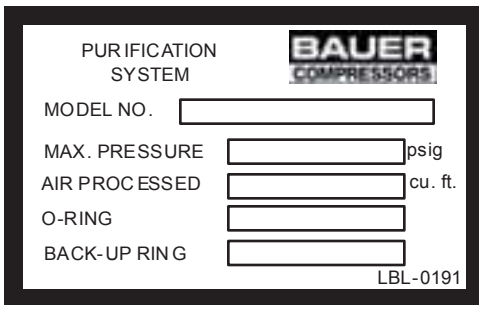
4.1.4 Model, Serial Number and Part Number Identification

4.1.4.1 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 4-3 Purification System Data Plates (typical)

Purification System



Cartridge Installation

4.1.4.2 Purification System Data Plate

Refer to the compressor unit purification system data plate (Figure 4-3) on the compressor front to determine your purification system model and specifications.

4.1.4.3 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 4-3).

4.1.5 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.

4.1.6 Industrial 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
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

4.1.7 Cartridge Operating Life

Every Bauer purification system is designed to process a certain volume of Gas/gas before the cartridges require replacement. By using special test equipment that measures the quality of Gas/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 Gas/gas processed by the purification system.

Each Bauer compressor block is rated to produce a standard volume of Gas per minute and by using this number and the Gas processing capability of the purification system it is possible to calculate the maximum operating hours before the cartridges need to be replaced. See Paragraph 4.1.7.1 for the method of determining this figure.

The ambient Gas temperature and its ability to cool the compressor will effect the operating life of the cartridge. See Paragraph 4.1.7.2 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 Gas 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 Gas Temperature plus 18 °F.

A form titled Gas Purification Cartridge Operating Hours is found in Paragraph 4.1.7.3 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 4-5.

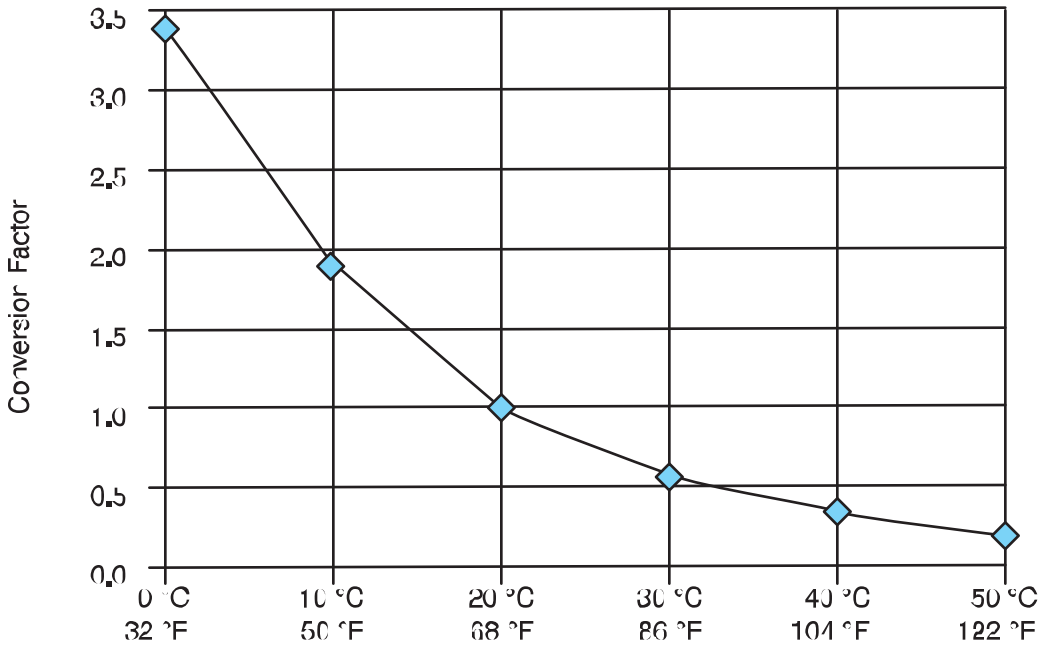
4.1.7.1 Calculating the Maximum Cartridge Operating Hours

1. From the purification system data plate (See Figure 4-3) on the purification chamber determine the Gas 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 Gas 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 Gas Purification Cartridge Operating Hours form.

4.1.7.2 Calculating the Adjusted Cartridge Operating Hours

1. Using the Gas Purification Cartridge Operating Hours form record the Date, Operating Hours and Ambient Gas Temperature plus 18 °F.
2. Using either the graph or the chart in Figure 4-4 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.

Figure 4-4 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	3.14

Figure 4-5 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*

4.1.7.3 Purification Cartridge Operating Hours Form

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

4.2 1P5S Securus II® Purification System

4.2.1 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 4-6 shows the functional interconnection of all the components.

Figure 4-6 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

4.3 Component Description

4.3.1 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 4-7 Oil and Water Separator Labels

4.3.2 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.

4.3.3 Cartridge

4.3.3.1 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.

4.3.3.2 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.

4.3.4 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.

4.3.5 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.

4.3.6 Bleed Valve

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

4.3.7 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.

4.3.8 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.

4.3.9 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.

4.3.9.1 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.

4.3.9.2 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.

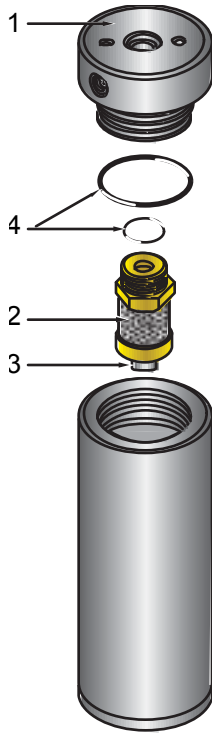
4.4 Maintenance

4.4.1 Oil and Water Separator

To remove the sintered metal filter proceed as follows: (See Figure 4-8). 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 4-8 Oil and Water Separator



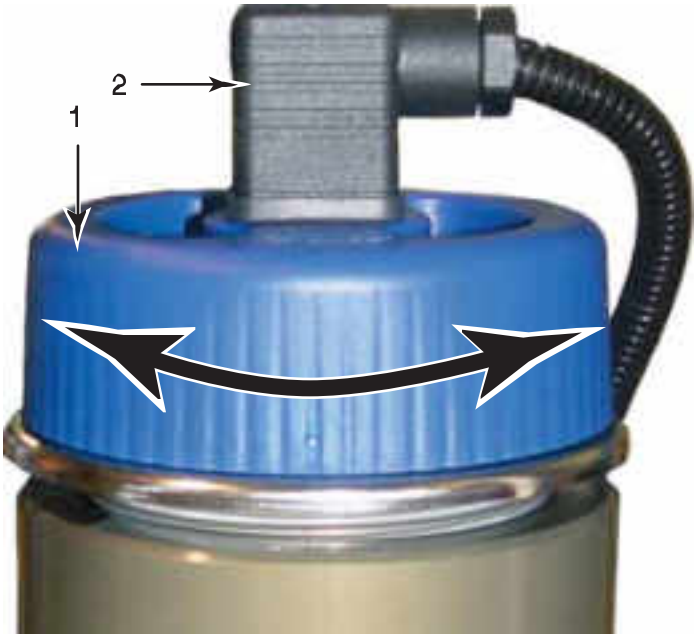
1. Filter Head	3. Center Screw
2. Sintered Metal Filter	4. O -rings

Figure 4-9 Sintered Metal Filter Assembly

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

4.4.1.1 Removal of the Securus II® Transmitter.

Figure 4-10 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.

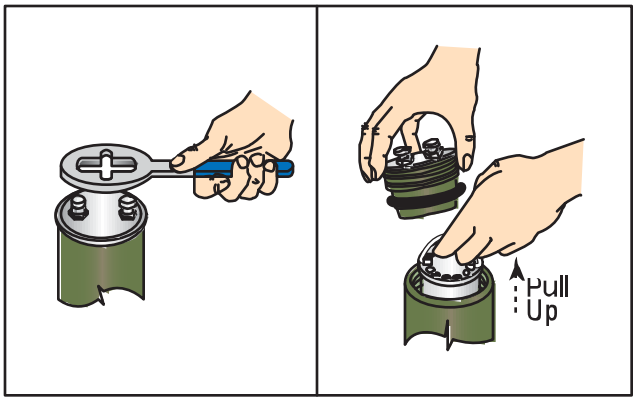
NOTICE

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

4.4.2 Cartridge Replacement

To change the purification cartridge, proceed as follows. (See Figure 4-11)

Figure 4-11 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 4.4.1.1.
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.

4.4.2.1 Leaking at the Safety Bore

1. Remove the cartridge following the steps in Paragraph 4.4.2.

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 4.4.2.1

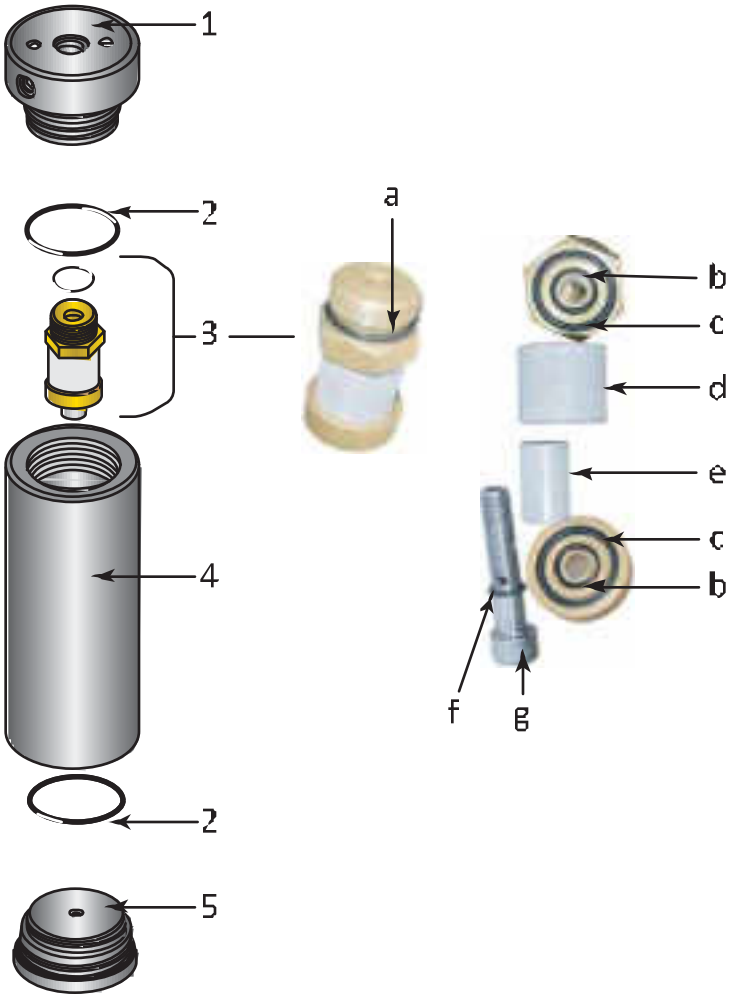
2. Install cartridge if missing.
3. Remove cartridge and inspect O-rings.
4. Replace O-rings if necessary.
5. Ensure protective caps and devices have all been removed.
6. Replace cartridge following steps 8. to 11. in Paragraph 4.4.2

4.5 Replacement Parts List

Figure 4-12 P5 Purification System Parts List

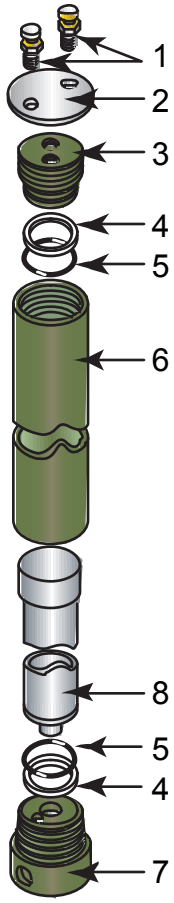
Item	Qty	Part No.	Description	Notes
1	1	079416	Oil and Water Separator	See Figure 4-13
2		—	—	
3	1	VAL-0169	Safety Valve	
4	1	080144	27" Dryer Chamber	See Figure 4-14
5	1	MNR-0012	Securus II+ Transmitter	24 VDC
6	1	080145	Securus® Chamber	See Figure 4-15
7	1	SEN-XXXX	Pressure Sensor	Requested Final Pressure 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 4-13 Oil and Water Separator Parts List



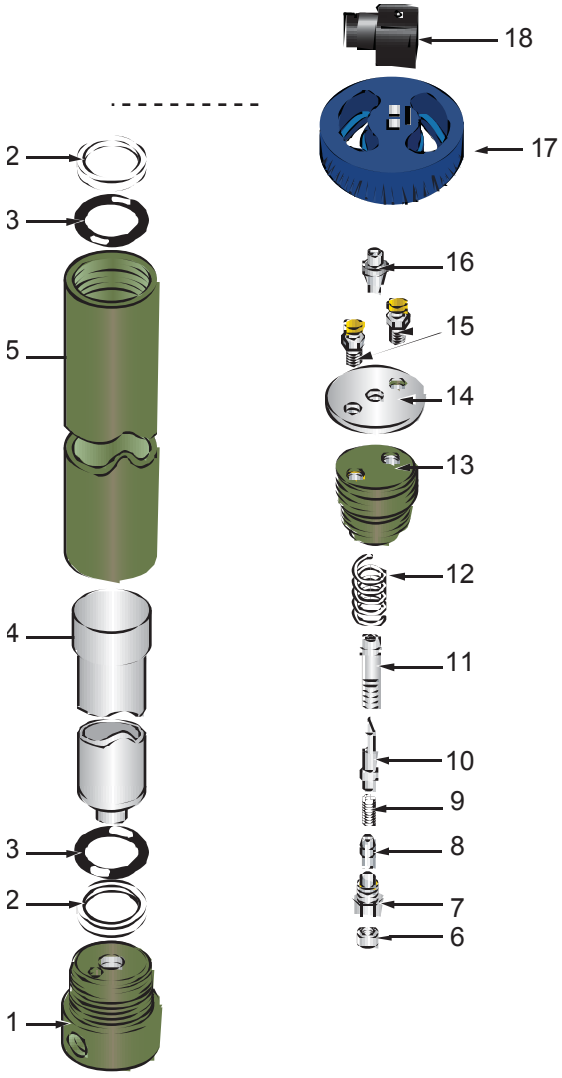
Item	Qty	Part No.	Description	Notes
♦	1	079416	Oil and Water Separator Assembly	
1	†	…	Separator Head	Available only with 079416
2	2	N04586	O-Ring	
3	1	061860	Sintered Metal Filter	
3a	1	N15133	O-Ring	
3b	2	N04496	O-Ring, small	
3c	2	N04385	O-Ring, large	
3d	1	061858	Sleeve Element, large	
3e	1	061859	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 4-14 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 4-15 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 4-15 (cont.) Securus II® Electronic Moisture Monitor System Parts List

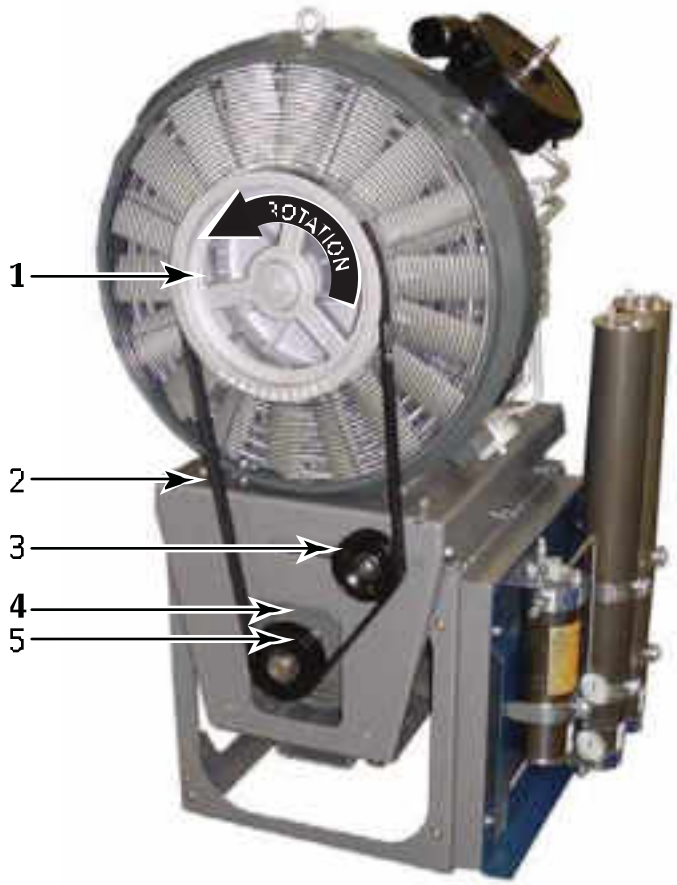
Item	Qty	Part No.	Description	Notes
11	1	059851	Bolt	
12	1	002181	Compression Spring	
13	+	…	Filter Head	Available only with 80145
14	1	060135	Cover Plate	
15	2	012293	Tool Post Screw	
16	1	059850	Socket, RF type	
17	1	MNR-0042	Securus II® Transmitter	24 VDC
18	1	CON-0319	Securus II® Connector	

CHAPTER 5: COMPRESSOR DRIVE; UNICUS 4I

5.1 Vertical Compressor Drive

The compressor is driven by the drive motor through a V-belt. The direction of rotation, as seen facing the flywheel, is counterclockwise. Observe the arrow on the compressor block. Check the V-belt regularly for damage and wear. See Paragraph 5.2.2. Replace if necessary.

Figure 5-1 Vertical Drive with Idler (typical)



1. Compressor Flywheel	5. Electric Motor
2. V-belt	6. V-belt Sheave
3. Idler Sheave (pulley)	7. Sheave Bushing
4. Spring Tension Idler	

5.2 Maintenance of the V-belt and Sheaves

5.2.1 Check The Sheaves.

Before a new set of drive belts are installed, the condition of the sheaves should be checked. Dirty or rusty sheaves impair the drive's efficiency and abrade the cover of the belts, which results in premature failure. Worn sheaves shorten belt life as much as 50%. If the grooves are worn to the point where the belt bottoms, slippage may result and the belts may burn. If the side walls are "dished out," the bottom shoulder ruins the belt prematurely by wearing off the bottom corners.

5.2.2 Check the V-belt

Check the V-belt regularly for damage and wear. Replace if necessary. To adjust the V-belt tension first loosen the tensioning sheave block using TOO-0120. V-belt tension is adjusted with the tensioning bolt. Once the tension is correct retighten the tensioning sheave block.

Figure 5-2 Tensioning 1

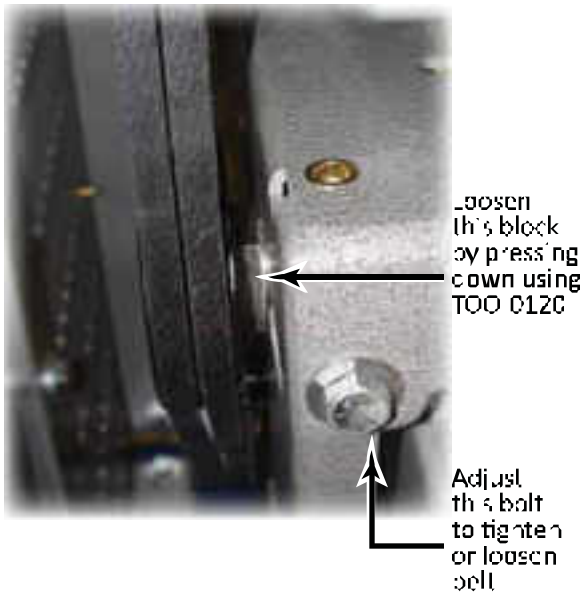
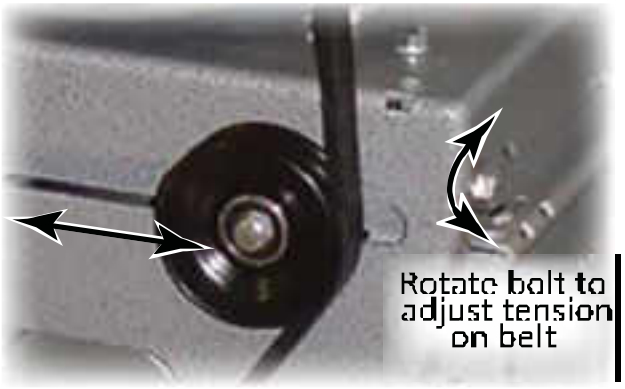


Figure 5-3 Tensioning 2



5.2.3 Replacing the Belt

To replace the belt use a ratchet or wrench to rotate the tensioning bolt to create slack in the belt. The belt should be slack enough to pull off of the flywheel and motor's sheave. Replace with the correct replacement belt and tighten the tensioning bolt, making the belt tight.

NOTICE

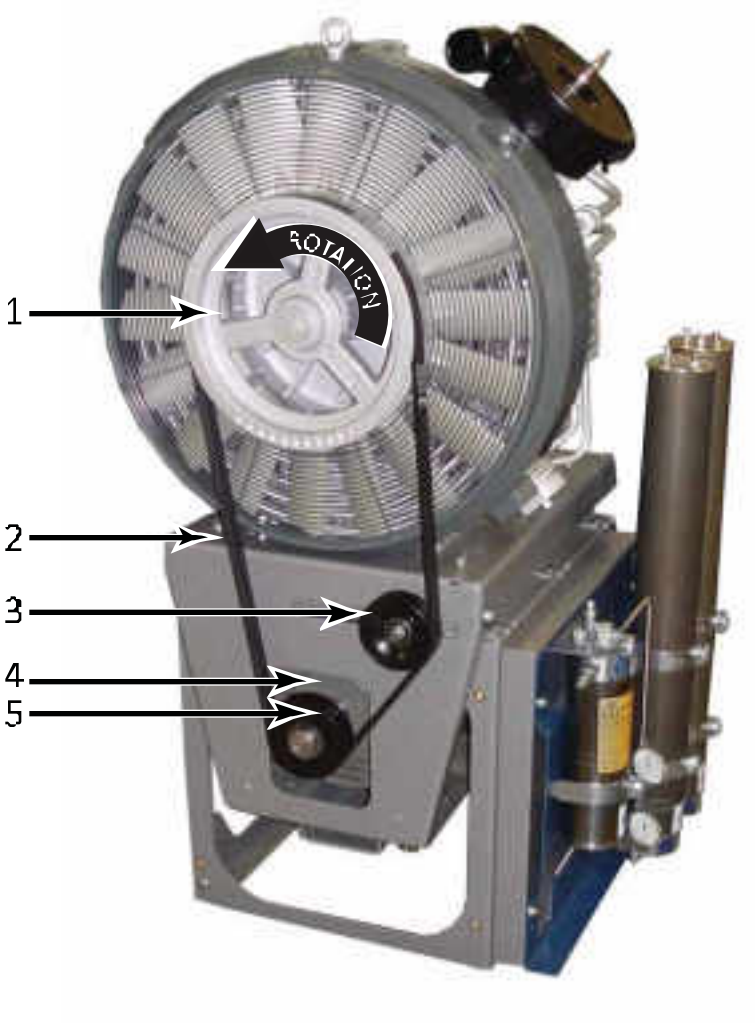
Ensure the belt is tightened enough to maintain friction on the flywheel and sheave.

5.2.4 Replacing the Sheave

A gear puller can be used to remove the sheave and sheave bushing from the motor's drive shaft. Ensure the drive shaft is clean then slide the new sheave onto the drive shaft. Bolt the sheave bushing onto the sheave then tap the feathered key into the key slot. Ensure the feathered key is snug with both the shaft and sheave. There should no play once the key is in place. The feathered key should run the entire length of the bushing and sheave key slots.

5.3 Replacement Part List

Figure 5-4 UNICUS 4i, Vertical Drive with Idler



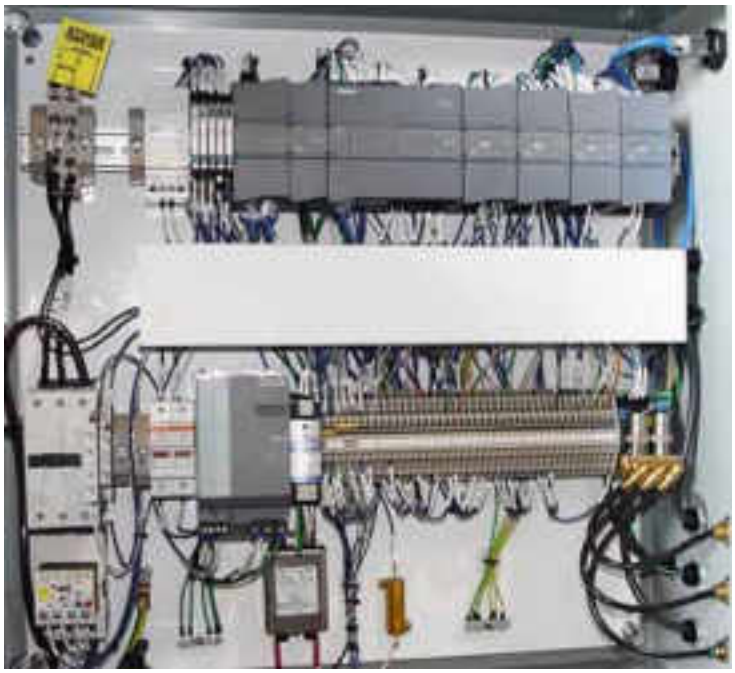
Item	Qty	Part No.	Description	Notes
♦			**UNICUS 4i - 25**	
1	1	IK 18.1 II	Compressor Block	
2	2	BET-0309	V-belt	
3	1	PLY-0012	Pulley, V-belt	
4	1	MTR-0065	Electric Motor	20 Hp, 3 Phase
5	1	SHV-0359	Sheave	2 groove
with	1	BUS-0191	Sheave Bushing	

CHAPTER 6: ELECTRICAL PANEL, ASY-1191

6.1 Overview

The following instructions apply to units that use Electrical Panel, ASY-1191

Figure 6-1 ASY-1191



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.

6.2 Electrical Panel

This Electrical Panel is designed for supply voltages from 208 VAC to 460 VAC, single or three phase and 50 Hz 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), Starter, Power Transformer, Fuses, Hour Meter, 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.

6.2.1 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 6-2) inside the Electrical Panel door.

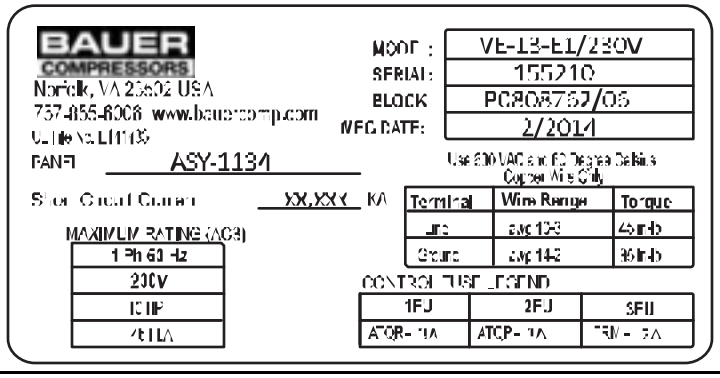
6.2.2 Electrical Panel Interior Access

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.

6.3 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 6-2) on the inside of the Electrical Panel door. In this example shown, the panel is wired for 230 volt, single phase, serial number 155210.

Figure 6-2 Electrical Panel Label

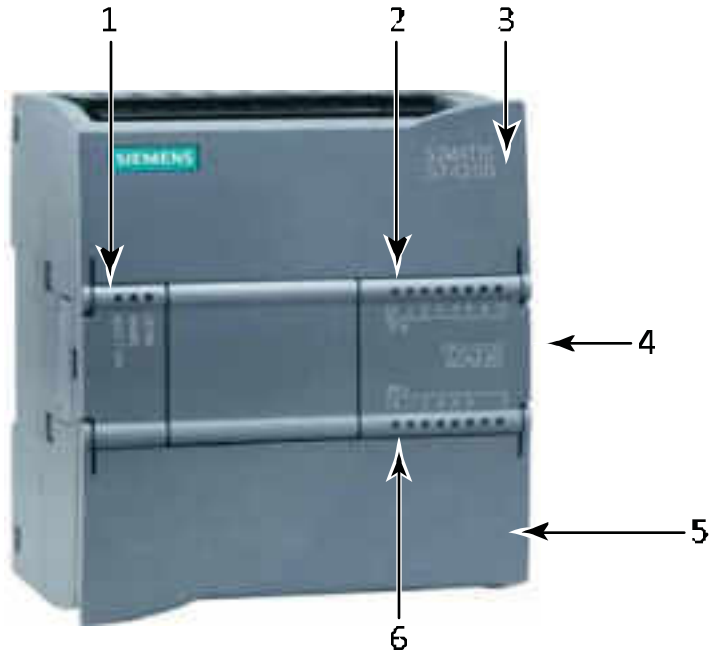


6.4 Electrical Panel Components

6.4.1 Programmable Logic Controller (PLC)

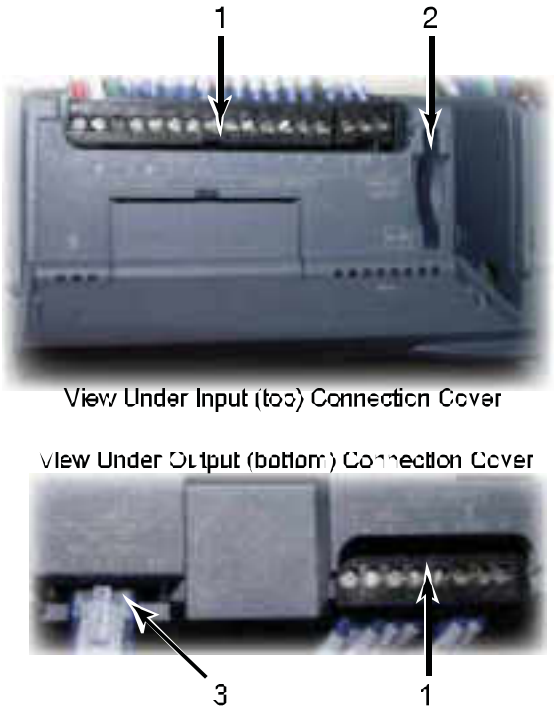
The PLC is 24 I/O and 120 VAC. The data stored in RAM is protected for 100 hours, in event of a power loss.

Figure 6-3 PLC, CNT-0104



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

Figure 6-4 Connector Block Removal



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

6.4.1.1 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 6-3.
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 6-4.
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.

6.4.1.2 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.

6.4.1.3 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.

6.4.2 Hour Meter

The panel is equipped with an hour meter. The hour meter is not resetrable and used to monitor the run hours of the compressor. .

Figure 6-5 Hour Meter

6.4.3 Motor Starter.

See Figure 6-6. the XTC Contactor features a mechanically linked contacts. Auxiliary contacts are cross-stamped, which provide multi-point reliability in low current, low voltage applications.

6.4.4 Overload Relay

See Figure 6-7.The overload relay provides thermal overload protection and its size will be based on the voltage and motor horsepower. The dial is set to the Full Load Amperage (FLA) of the electric motor at the factory. If the Overload Relay is replaced set the dial to the FLA listed on the motor nameplate or the label inside the Electrical Panel. The Overload Relay plugs into the Motor Starter.

Figure 6-6 Motor Starter (typical)

Figure 6-7 Overload Relay (typical)

6.4.5 Power Supply

The Power Supply is a 24 Volt, 10 Amp Power Supply used to provide power to the communications modules and operator interface, SPL-0088..

Figure 6-8 Power Supply

6.5 Alarms

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

6.5.1 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 6-1: 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.

6.5.2 Compressor High Temperature

See Figure 6-9. 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 6-9 High Temperature Switch

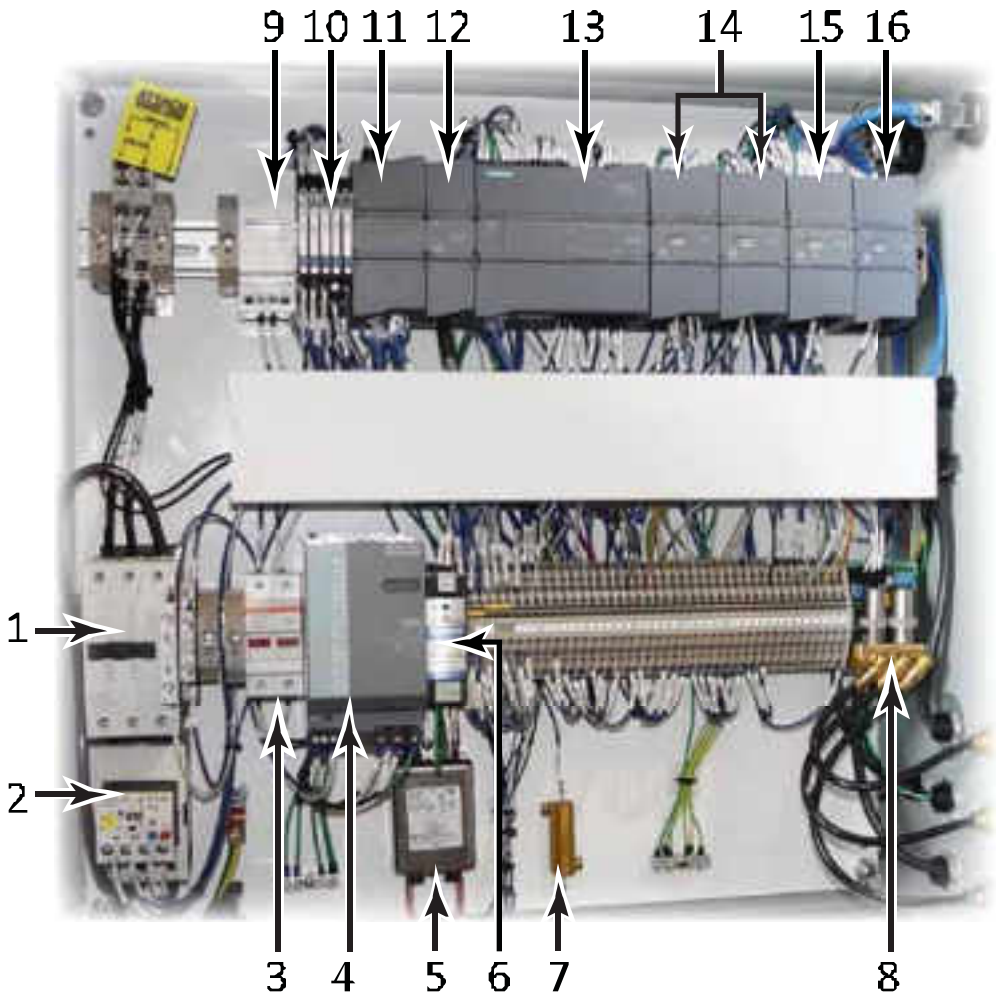
Figure 6-10 Pressure Sensor (Typical)

6.5.3 Compressor Low Oil Pressure

See Figure 6-10. 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.

6.6 Replacement Parts List

Figure 6-11 Electrical Panel, Interior



Item	Qty	Part No.	Description	Notes
♦	1	ASY-1191	Electrical Panel	Interior View
1	1	SRT-0317	Starter	65 Amps
2	1	RLY-0244	Overload Relay, Adjustable	32 - 65 Amp
3	1	HOL-0081	Fuse Holder, 2 Pole	30 Amp, 600 Volt
with	2	FUS-0166	Fuse, Time Delay	Class CC, 6 Amp
4	1	SPL-0088	Power Supply	10 amp, 24 VDC
5	1	FLTR-0213	Line Noise Filter	AC
6	1	SPL-0108	DC to DC Converter	18 - 75 amp, 12 VDC to 24 VDC
7	1	SUR-0017	Surge Protector	50 W, 200 ohm
8	1	VAL-0365	Proportional Valve	mm1
9	1	HMR-0042	Hour Meter	10 - 27 VDC
10	5	RLY-0218	RV8H Series 6mm Interface	6 Amp, 24 VDC

Figure 6-11 (cont.) Electrical Panel, Interior

Item	Qty	Part No.	Description	Notes
11	1	CNT-0102	Ethernet Switch	
12	1	CNT-0124	Communications Module	
13	1	CNT-0104	Siemens, CPU S7-1200	DC DC RLY, 1214C
14	2	CNT-0111	Analog Expansion Module	8 channel IN
15	1	CNT-0134	Digital Output Module	
16	1	CNT-0132	Analog Expansion Module	4 channel OUT

CHAPTER 7: RFID OPTION

7.1 Description

The UNICUS 4i may be supplied with the Radio Frequency Identification (RFID) option. The RFID option allows the user to affix RFID tags to the cylinders to be filled using the Unicus 4i. The RFID tag is imprinted with a serial number and a record is maintained each time the bottle is filled. The RFID tag maintains a database of when the bottle was filled, by which badge number, and to what pressure. .

NOTICE

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

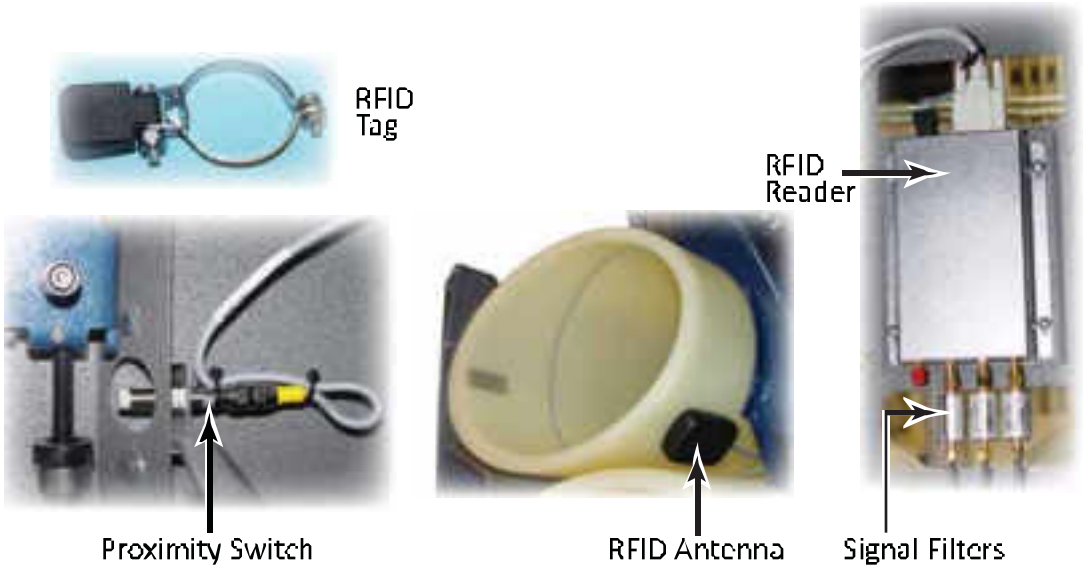
This product meets the applicable FCC Part 15 rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To limit RF exposure, please ensure 4 inches (10 cm) of separation from the transmitter antennas at all times.

7.2 Components

The RFID system consists of; the RFID tags (on each cylinder), an antenna for each filling position, a proximity switch, 3 signal filters, and a RFID Reader.

Figure 7-1 Components

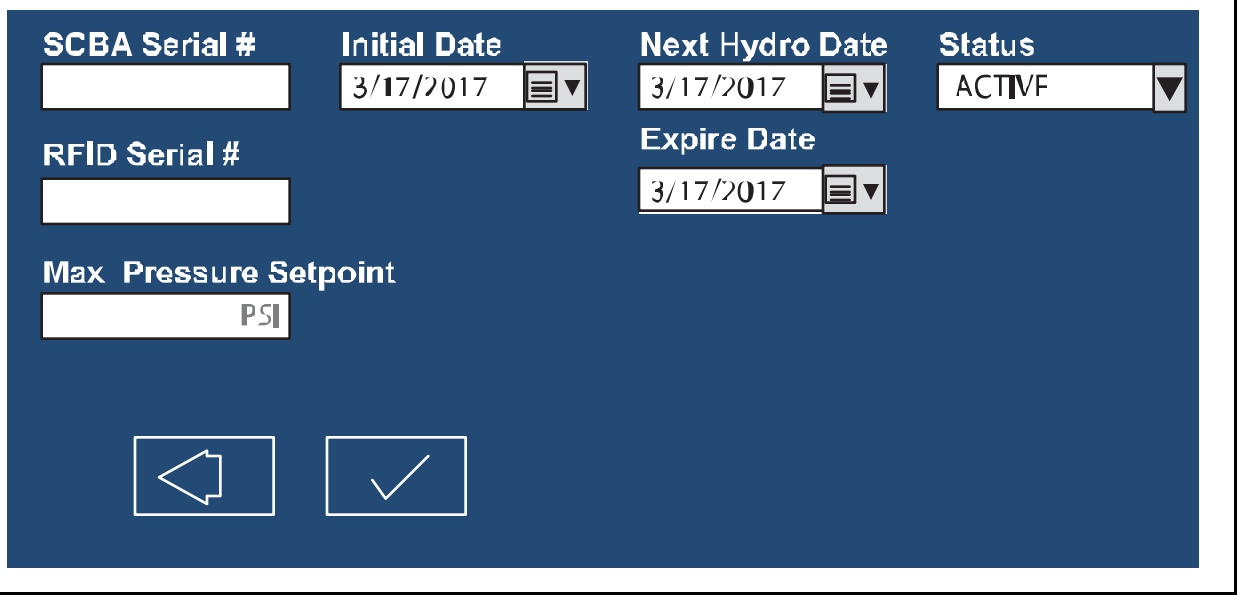


7.3 Functions

7.3.1 Assigning the Cylinder

Attach the RFID tags securely to each cylinder. Additional tags can be ordered in lots of 25. Place a cylinder with the RFID tag attached into the first position in the CFS. Someone with administrator privileges must log into the touch screen program (see operations instructions chapter). Once the administrator has logged in they need to press the CYLINDERS button on the main menu page. On the Cylinders screen press the ADD NEW button (See Figure 7-2). On the add new cylinder screen The administrator needs to enter the SCBA Serial number, the serial number they want to assign to the RFID tag, and the maximum pressure set point of the cylinder. The Initial Date, Next Hydro Date, and Expire Date will self fill with the present date. To change the date press the icon to the right of the box and enter the correct date. STATUS can be left as Active or changed to Expired by use of the drop down box. Press the check mark when all entries are completed. The above steps must be completed for each cylinder and RFID tag.

Figure 7-2 Add New Cylinder

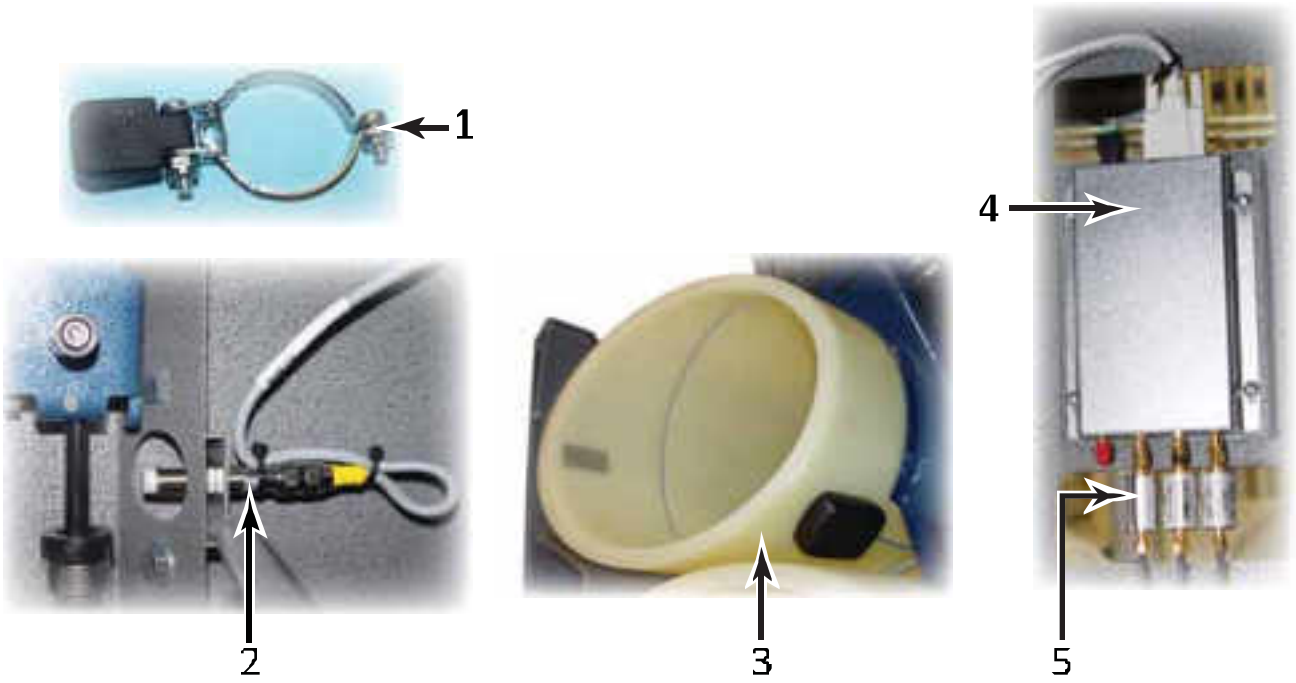


7.3.2 Filling the Cylinder with RFID Option

After the RFID tag has been serialized, anytime the cylinder is placed into the CFS of a Unicus 4i with the RFID option and the CFS door is closed (verified by the proximity switch), the RFID reader will read the tag. When the user goes to the fill cylinder screen the cylinder's information will already be filled in. The cylinder can be filled normally (see the Chapter 2). Once the cylinder is filled a record is kept in the PLC and written to the RFID tag. This allows the reports feature in the PLC to later recall the information and allows the information to be read off a cylinder from different RFID readers..

7.4 Replacement Parts List

Figure 7-3 RFID Assembly



Item	Qty	Part No.	Description	Notes
1	1	KIT-0557	RFID Tag	25 tags per kit
2	1	SEN-0158	Proximity Switch	
3	3	ASY-8067	RFID Holder Assembly	replaces HOL-124 in CFS assembly
4	1	CNT-0192	RFID Reader Writer	
5	3	FLR-0211	Signal Filter	

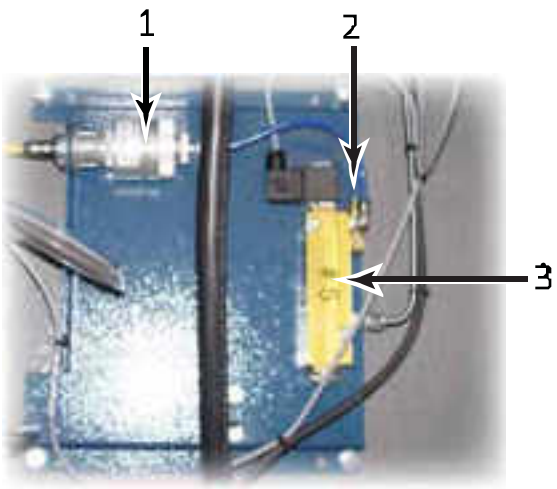
CHAPTER 8: ENMET GAS MONITORS

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. Safety Valve
3. Regulator

8.2 Operation

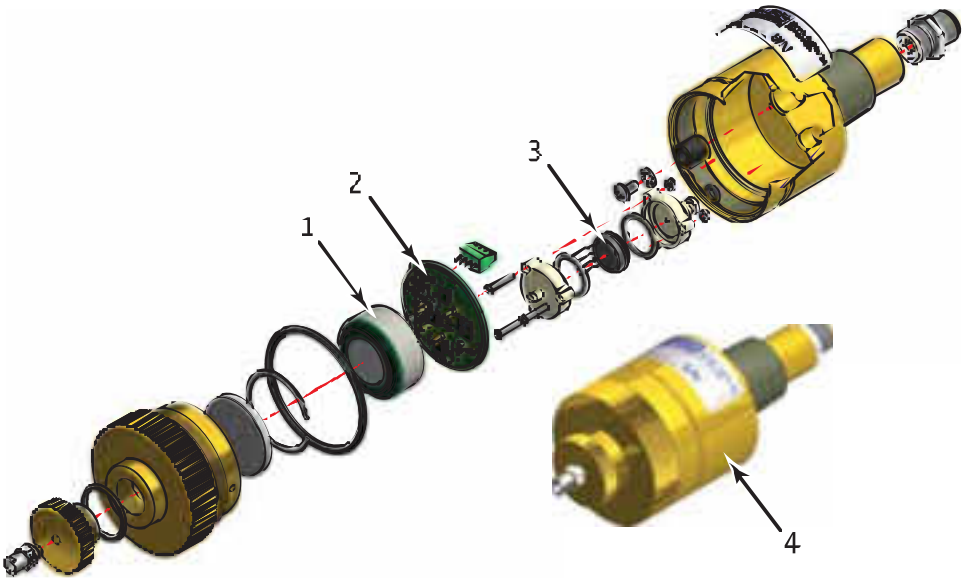
The Enmet monitors work automatically when enabled on the "Gas Sensors" portion of the program. The regulator reduces the pressurized air/gas to levels the monitors can use. When any of the sensors detect the set concentration of gas it activates an alarm condition and shuts down the compressor unit. 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)	1. 20 ppm Carbon Monoxide Test Gas	2. Zero Test Gas

Figure 8-3 Enmet Monitors



1. Sensor Cell
2. Circuit Board
3. Pressure Sensor
4. Gas Monitor

8.3 Calibration

Calibration is recommended quarterly or if the effectiveness of the sensor is in question. To calibrate any of the sensors, press the "Gas Sensors" button on the main menu of the touch screen monitor. The screen will walk the operator through each step to calibrate each monitor. The instructions refer to the "span gas" this is the target gas for whichever monitor you want to calibrate.

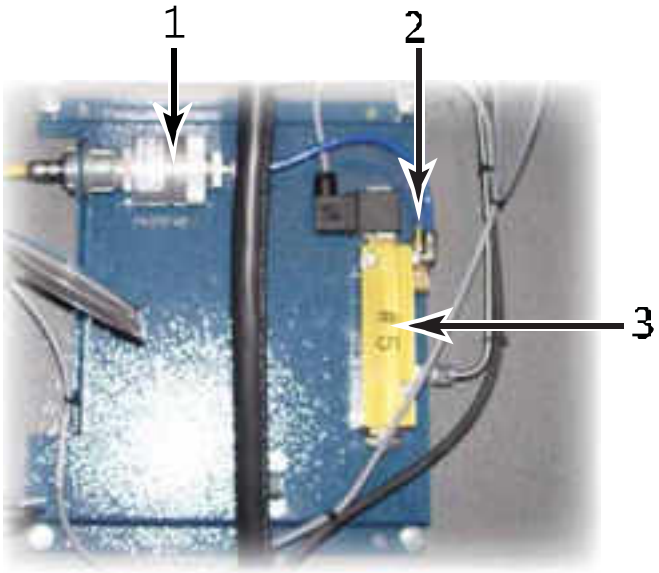
8.4 Sensor Replacement

Sensor elements should be replaced when they can no longer be calibrated. For sensor replacement follow the below steps:

1. Turn off power to the monitor.
2. Unscrew the monitor housing cover and remove sensor.
3. Place the new sensor onto the sensor printed circuit board.
4. Reassemble the monitor housing.
5. Turn on the monitor.
6. After new sensor has been installed, allow the sensor to stabilize for 24 hours.
7. Calibrate the monitor.

8.5 Replacement Parts

Figure 8-4 Regulator and Monitors



Item	Qty	Part No.	Description	Notes
1	1	SEN-0134	CO Monitor	
2	1	VAL-0609	Safety Valve	90 psi
3	1	REG-0077	Gas Monitor Regulator	6,000 psia IN; 0.5 psia OUT

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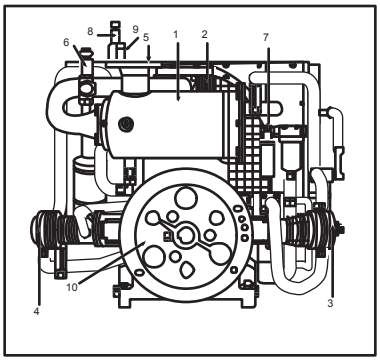
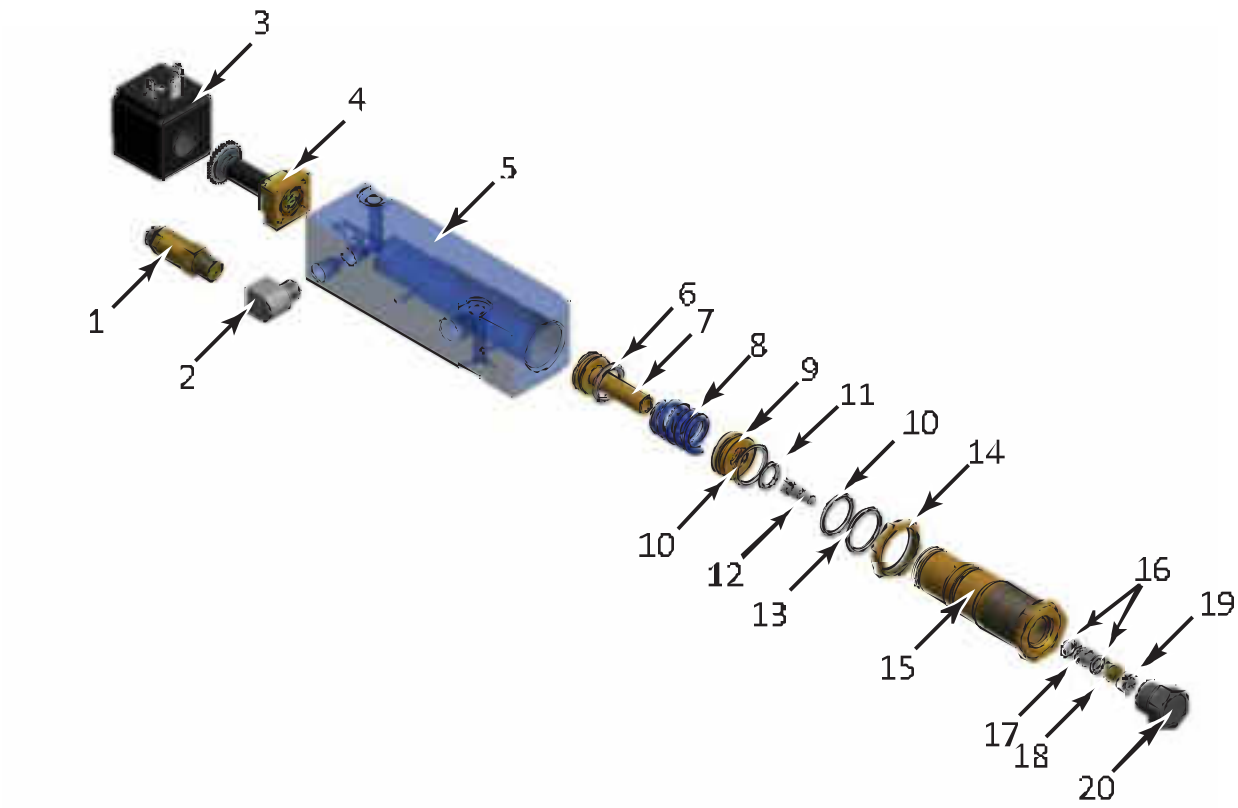


Figure 8-5 Regulator

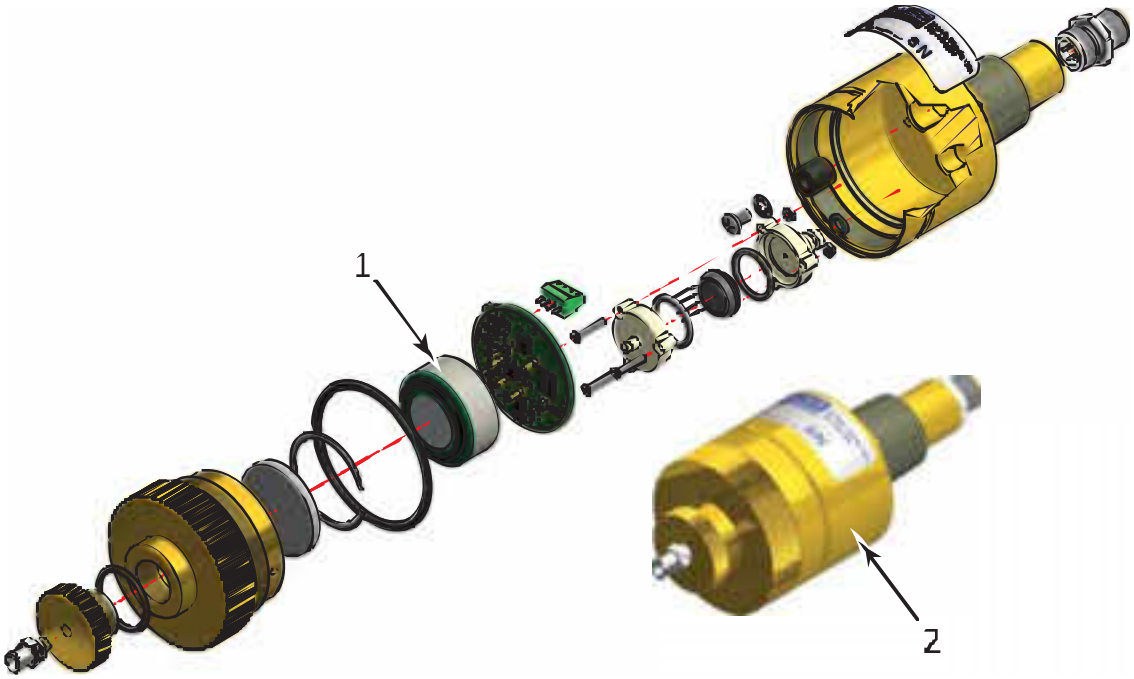


Item	Qty	Part No.	Description	Notes
1	1	VAL-0470	Safety Valve	@ 150 psi
2	1	ELL-0319	Ell Fitting, 90°	
3	1	COI-0028	Solenoid Coil	24 VDC
4	1	VAL-0465	Solenoid, Flange Mount	
5	1	MFD-0071	Manifold, Gas Monitor Regulator	
6	1	RNG-0159	O-ring	
7	1	PIS-0006	Piston, Gas Monitor Regulator	
8	1	SPG-0085	Wire 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 8-5 (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 8-6 Monitors & Replacement Parts



Item	Qty	Part No.	Description	Notes
1	1	SEN-0085	Carbon Monoxide Sensor Cell	for use in SEN-0134
1	1	SEN-0086	Oxygen Sensor Cell	for use in SEN-0135
1	1	SEN-0087	Carbon Dioxide Sensor Cell	for use in SEN-0136
1	1	SEN-0088	Hydrogen Sulfide Sensor Cell	for use in SEN-0137
2	1	SEN-0134	Carbon Monoxide Monitor	replaces SEN-0095*
2	1	SEN-0135	Oxygen Monitor	replaces SEN-0096*
2	1	SEN-0136	Carbon Dioxide Monitor	replaces SEN-0097*
2	1	SEN-0137	Hydrogen Sulfide Monitor	replaces SEN-0101*

* SEN-0095 — SEN-0097, and SEN-0101 are Brass Colored
SEN-0134 — SEN-0137 are Silver Colored

Figure 8-7 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