



HIGH-PRESSURE OIL-FREE AIR & GAS  
COMPRESSORS AND GENERATORS

**MAN-2PS2B-HH208-PCI**

**Operating Instructions  
For RIX Industries Model  
2PS2B-HH208  
Modified for PCI**

**2 Stage, Oil-Less  
Air Cooled  
Oxygen Compressor**

This manual, including information and products referenced herein, to be provided by Seller ("Products") are subject to U.S. export control laws and will not be resold, re-exported, or retransferred, directly or indirectly, to any person in violation of U.S. Export Administration Regulations.

## Revision History

Revision	Date	By	Pages Revised	Brief Description
-				Initial Release
A	11/04/16	KA	3-4, 7-3, 7-12	Updated wiring schematic, gauge manifold, and O2 clean parts
B	08/29/18	AM/IC B	All	Major content and formatting change
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F	08/03/23	AV	Sections 4.9 and 6.10-6.14	Addition of Sections 6.10-6.12, Revised Parts List Table, Changed all references of A45-110 to 45-110, Added bearing plate screw torque to Section 6.14; ECO-013422
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H	03/26/24	AV	Parts List	New P/Ns for Beltguard Front Cover and Lower Guard; ECO-013941
J	01/09/25	JR	Parts List, Drawings, Sections 6.4, 6.7, 6.9	Minor updates to parts list. Added section 4.11. All drawings updated; ECO-014570.
K	09/04/25	JR	Revision History	Revision Catch-Up; ECO-014570
L	11/17/25	JR	Parts List, Figure 6	Hardware Updated; ECO-015112

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## Parts, Service & Technical Support

**Manufacturer:** RIX Industries  
4900 Industrial Way  
Benicia, California 94510 USA  
Phone: 707-747-5900  
Fax: 707-747-9200  
Parts Fax: 707-748-0398  
[www.rixindustries.com/request-spare-parts/](http://www.rixindustries.com/request-spare-parts/)

Parts Dept. Hours: 6:30-15:30 PST

**Compressor model and serial number must be provided with all inquiries.**

<u>Compressor Model Type</u>	<u>Serial Number</u> (Record the serial number of your unit here)
2PS2B-HH208-PCI	

**Note:** Parts recommended for routine service are indicated in the parts lists. The customer is advised to maintain these parts at their facility or procure them in advance as lead times and availability can vary. RIX also offers service and overhaul kits to support other scheduled maintenance requirements.

RIX is an AS9100C:ISO9001-2008 registered company. All compressors are designed and manufactured in accordance with the requirements of the AS9100C:ISO9001-2008 quality system ensuring the highest quality products.

## Safety Precautions

**Safety precautions are necessary for the protection of personnel and equipment. Prior to any attempt to install, operate, maintain, troubleshoot or repair any part of the compressor, all warnings and cautions included here and/or appearing throughout this manual should be thoroughly reviewed and understood.**

### **Danger**

This symbol means if the danger is not avoided, it will cause death, serious bodily injury, or severe damage to the machine.

1. Before working on the compressor, all internal pressure must be relieved and compressor must be isolated or disconnected from all external pressure sources.
2. All electrical components associated with this equipment shall be installed and grounded in accordance with applicable codes and regulations.
3. Before working on electrical equipment, take steps to ensure system is de-energized and will remain so while work is in progress. All circuits not known to be DEAD must be considered LIVE and dangerous at all times.

### **Warning**

This symbol means if the warning is not heeded, it can cause death, bodily injury, or damage to the machine.

4. Do not operate unit if safety guards are removed, damaged, or modified.
5. Do not reset relief valves for any pressure higher than as specified in this manual.
6. Do not make any unauthorized alteration to equipment.

### **Caution**

This symbol means if precaution is not taken, it may cause bodily injury or damage to the machine.

7. Do not touch cylinder heads or discharge gas lines from the heads up to the heat exchanger inlets. These are hot and can cause serious burns.

# Oxygen Compatibility Requirements



To prevent **FIRE, SERIOUS INJURY or DEATH**, it is the User's responsibility to ensure that all oxygen wetted parts used in the compressor are cleaned for oxygen service prior to installation.

Oxygen compression equipment has very stringent requirements due to the hazards inherent in the compression process. Cleaning and handling must be in accordance with Compressed Gas Association publication **CGA G-4.1**, Cleaning Equipment for Oxygen Service. [www.cganet.com](http://www.cganet.com). Any work to be done on the compressor where the gas stream may be exposed must be done in accordance with CGA procedures. RIX recommends that all maintenance be performed by qualified personnel with full knowledge of oxygen equipment handling procedures and the potential hazards of contamination. RIX further recommends returning the compressor package to RIX Industries or RIX-approved service center when servicing or repairing this compressor package.

All gas plumbing and storage systems connected to the compressor must be oxygen clean, constructed of oxygen compatible materials, and designed to safely handle the operating and design pressures as defined in the registration page of this manual. Use only oxygen compatible O-ring grease, such as RIX P/N 45-1007, and either Viton or Teflon O-rings in gas piping areas.

Factory cleaned oxygen parts are denoted by an "X" prefix at the beginning of the part number. It is the User's responsibility to maintain the cleanliness of factory cleaned parts and any existing portions of the gas stream that may be exposed during installation or maintenance.

After any maintenance in which the gas stream of the unit becomes exposed, User should perform an O<sub>2</sub> burn-in, see **Section 3.3**. During this time personnel should be separated from the compressor.

## Compressor Warranty

### **RIX Industries warrants this compressor as follows:**

**A. (Field Service/Overhaul) Exclusive of normal wearing parts** - Seller warrants that its work when performed and services when rendered will meet all specific requirements, if any, of this agreement, and will be done in a good and workmanlike manner. Seller warrants its work for a period of 90 days from completion of the work and all claims for defective work must be made in writing immediately upon discovery and in any event within 90 days from date of completion thereof by Seller. Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall at its option either (i) repair Buyer's equipment at the original F.O.B. point of delivery, (ii) refund an equitable portion of the contract price, (iii) furnish F.O.B. Seller's facility or other point of shipment any necessary repaired or replacement parts or, (iv) in the case of service, re-perform the service.

**B. (Parts/Material and New Equipment) Exclusive of normal wearing parts** - Seller warrants that any parts manufactured by Seller and delivered hereunder will be free from defects in material and workmanship. Seller warrants its parts for a period of twelve (12) months from operation and all claims for defective parts under this warranty must be made in writing immediately upon discovery, and in any event, within eighteen (18) months from shipment of the applicable item, whichever shall first occur. Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall at its option either repair or replace its part at the original F.O.B. point of delivery. Defective items must be held for Seller's inspection and returned to the original F.O.B. point upon request.

**C.** With respect to parts not manufactured or services not performed by Seller, Seller assigns to Buyer whatever warranty Seller receives from the Supplier of such parts or services. However, Seller agrees to be Buyer's primary contact on all warranty claims.

**D.** The foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE SHALL APPLY.

**E.** Seller makes no performance warranty and the effects of corrosion, erosion and normal wear and tear are specifically excluded from Seller's warranty.

**F.** Seller will not be liable to Buyer for any loss or injury to persons or property (including the machinery which is the object of the work) caused in whole or part by (1) the acts of buyer or its agents, (2) failure to observe Seller's instructions, or (3) failure or malfunctioning of anything not furnished by Seller.

**G.** The preceding paragraphs set for the exclusive remedies for warranty claims, and upon the expiration of the warranty period, all such liability shall terminate.

**H.** Normal Wearing parts are defined, but not limited to the following: Seals, Gaskets, O-rings, piston rings and riders, bulbs, fuses, and anti-corrosion devices such as zincs. RIX Industries reserves the right to evaluate these items for material workmanship and defects on a case by case basis.

**I.** FOB Destination Service Items are limited to the Continental United States (CONUS). Service outside the CONUS is at the discretion of the seller, and or at buyer's expense.

# Compressor Specifications

This document is valid for the RIX Compressors:  
2PS2B-HH208-PCI serial numbers 15028 and above

**Warning**

This equipment is designed only for the specific application noted on this page. It is the user's responsibility to ensure the compressor meets the below stated operating conditions. Deviation from these standards may result in damage to the compressor and/or operator injury or death.

## Design Specifications

Cylinder Size(s):	1.25", & .5"
Stroke:	2"
Speed:	~440 RPM
Drive Motor Power:	1.5 HP

## Gas Input

Gas to be compressed:	Oxygen, Clean and Dry
Suction Pressure Range:	30-70 psig
Suction Temperature Range:	60-100°F

## Gas Output

Min. Flow Rate:	128 SCFH* (60 LPM) @70 psig & 70°F
Max. Discharge Pressure:	2250 psig

## Operating Environment

Ambient Temperature:	-13°F to 120°F
Max. Humidity:	98%

## Electrical Supply

Voltage:	230 VAC
Frequency:	60 Hz
Phase:	3
Amperage:	7 amps max

## Safety Equipment & Accessories

Relief Valve	Pressure Switches
Check Valve	Back Pressure Regulator
Solenoid Valve	Gas Filters

\*STP conditions: 32°F and 14.696 psia

# Chapter 1 - Compressor Overview

## 1.1 Introduction

This manual is intended to provide all necessary information and documentation pertinent to the installation, operation, and maintenance of the RIX Model 2PS2B-HH208-PCI compressor. Be sure all operators of this compressor package read and understand the entire manual prior to installation, operation, and/or servicing.

All servicing shall be performed only by trained and qualified personnel.

## 1.2 General Description

The 2PS2-HH208-PCI is a 2 stage, 2 cylinder, oil-free and air-cooled compressor package, belt driven by an electric motor. The compressor is approximately 16 inches wide by 19 inches long by 29 inches high and weighs approximately 160 pounds, see Figures 1 and 2. The compressor has been designed for the compression of the subject gas at the pressures and flow rate indicated on the **Compressor Specifications** page of this manual. The flow rate will vary with the suction pressure, temperature, and compressor condition. A depiction of the flow path can be found in Figure 3.



Pneumatic energy hazard. Unit is designed to compress and store high pressure gas. When pneumatic energy is released in an uncontrolled manner, individuals may be crushed or struck by moving machinery, equipment, or other items. If maintenance is attempted on a pressured line without isolating the line and relieving pressure, the sudden release of pressure can propel fittings or rupture lines or vessels. Ensure unit is depressurized and locked out prior to performing any maintenance.

## 1.3 Safety Devices

Over pressure relief valves are provided on each stage to prevent over-pressurization in the event of a valve or seal failure. Suction and discharge pressure switches allow the compressor to run automatically. A solenoid valve at suction and check valve at discharge are also used to operate the unit automatically and prevent backflow.

## 1.4 Cooling

Due to the heat generated during compression it is necessary to cool both the compression cylinders and the compressed gas. The heat generated is removed from the gas stream through passive cooling while fans pull air over the compression cylinders and heads. For proper cooling, adequate ventilation must be supplied at the compressor site. Ambient cooling air should be less than the maximum ambient conditions stated in **Compressor Specifications**; cooler air is desirable as it will increase compressor component life.

## 1.5 Lubrication

This compressor is designed to safely compress the subject gas without cylinder oil lubrication. Piston rings are Teflon based. Since oil is not used in the compressor, the compressor will not contaminate the compressed gas, however it is the responsibility of the user to ensure that clean, dry gas is supplied to the compressor intake at all times.

**Note:** A small amount of inert piston ring dust will pass into the gas stream but is filtered out by the inline gas filters.

## Chapter 2 - Installation

### 2.1 Mounting

The compressor package should be firmly bolted down on a rigid foundation using all attachment holes in the base to minimize vibration. Allowed movement will increase vibration which can cause component damage. Ensure that the beltguard is securely attached.

### 2.2 Gas Plumbing

The compressor requires an adequate supply of clean, dry oxygen in accordance with the **Compressor Specifications** page.

**Danger**

To prevent **FIRE, SERIOUS INJURY, and/or DEATH**, it is the user's responsibility to ensure that all gas wetted parts of this RIX oxygen compressor and user system are clean for oxygen service prior to operation. Any work to be done on the compressor and user system must be performed in accordance with safe oxygen handling/cleaning procedures CGA G-4.1.

Plumbing to the suction must be the same diameter or larger than the compressor package suction connection to ensure that the required flow can pass without significant pressure drop. Connect the compressor discharge to a high-pressure manifold, plumbing, or fill whip. All plumbing and components downstream of the unit must be rated for pressures at least 1.5 times greater than the discharge relief valve setting. Discharge plumbing must be sized to pass the design flow at the lowest expected back pressure applied by the user's downstream plumbing.

**Caution**

RIX recommends using hard lines to connect to compressor. If flexible lines are used, buyer is responsible to secure those lines to prevent whipping in case of breakage.

A solenoid valve on the suction side and a check valve on the discharge side of the compressor prevent the loss of oxygen to the atmosphere from the compressor while it is off or in standby.

**Note:** The piston rings are designed to seal in dynamic use and may not seal well when the compressor is not running.

Provisions must be in place to relieve all internal pressure and be able to isolate the compressor from all external pressure sources to ensure that the unit can be safely disassembled for maintenance. Inspect all compression fittings and tighten as necessary. Ensure all process lines are free from contamination.

### Caution

Units with a positive suction pressure must have a safety valve on the suction line to protect against excessive intake pressure. The valve capacity must match the potential capacity of the user's gas source. Factory installed relief valves are sized to match the compressor design flow rate only.

## 2.3 Electrical Connections

Connect the compressor package to a source of grounded AC power. Required electrical supply is defined in **Compressor Specifications**. The user is responsible for ensuring their compliance with local electrical codes. See Figure 4 for wiring details.

## 2.4 Storage

If the compressor is taken out of service, provisions should be made to protect against corrosion. At a minimum, gas suction and discharge lines should be capped and belt tension relieved. After an extended storage of, or if stored without climate control, roll the flywheel by hand to check the bearings. The wrist pin needle bearing should be greased with (RIX P/N 45-110). Compressor heads and valves should also be removed and inspected for corrosion. Relief valves should be rebuilt or replaced.

### DANGER



Do not install ball valves in either suction or discharge plumbing. If closed quickly, these valves can cause fire and/or explosion.

## Chapter 3 - Start-Up & Systems Check

### 3.1 Pre-Startup System Inspections

Prior to putting the unit into service, perform the following inspections.

1. Visually inspect the entire compressor system for obvious damage to wiring, plumbing, and external components. Fix any issues that arise during inspection.
2. Ensure that any safety guards are securely attached.
3. Ensure that any removable covers on switches are securely tightened.
4. Inspect all compression fittings and tighten as necessary.
5. Ensure that the design capacity of gas at the correct pressure is available at the compressor suction.

### 3.2 Control System

The 2PS2B-HH208-PCI has no control system. The compressor is designed for automatic start and stop operation when installed into the PCI oxygen generation system.

### 3.3 O<sub>2</sub> Burn-In Procedure

This procedure should be followed at initial start-up and anytime the compressor or associated plumbing is disassembled and exposed to the atmosphere. All components must be oxygen clean before proceeding.

1. Pressurize the system with clean, dry nitrogen or with a clean, dry nitrogen/oxygen mixture not exceeding 30% oxygen.
2. Run compressor at conditions stated in **Compressor Specifications**, using a closed loop if necessary.
3. Slowly inject oxygen into the inlet while venting the compressor discharge until the unit is running on pure oxygen. This step should take at least 30 minutes. This will allow any organic materials left in the system to safely oxidize.

### 3.4 Start-Up

After performing the pre-startup system inspection, start the unit. When starting the compressor for the first time or after servicing check for leaks in the plumbing, see **Section 4.8** for recommended leak check procedure. After correcting any leaks in the system, restart the unit and measure gas pressures. RIX installs pressure gauges at the suction, interstage, and discharge ports to help monitor performance.

Allow the unit to run until it automatically shuts off. If the compressor package fails to shut off when the discharge pressure set point is reached, manually shut down the unit immediately and inspect the pressure switch and related wiring. Consult **Section 3.5** for factory settings.

Test all other shutdown devices and control logic as applicable. All elements of the pressure control system and safety shutdowns should be tested before the system is put into full operation.

### 3.5 Normal Operating Conditions

The discharge pressure will increase based on back pressure from user downstream piping. The interstage pressure should approach normal levels as the final stage comes up to its final setting. Gas temperatures will also rise in conjunction with the stage pressures. If interstage pressure does not reach normal levels or exceed normal levels, which may lift relief valves, see **Chapter 5 - Troubleshooting**.

The following table shows typical operating conditions, actual values may vary.

Stage	Pressure (psig)	Temperature Before Cooling (°F)	Temperature After Cooling (°F)
Suction	30-70	60-100	N/A
1 <sup>st</sup> Stage	350-550	280-360	100-140
Discharge	1500-2250	180-240	110-150

#### Caution

Temperatures in excess of 170°F can cause burns if touched. The compression cylinders, heads, and process plumbing near the discharge port of either head can reach these temperatures.

It is recommended that a log be kept, noting operating conditions of your unit and maintenance done at hours of compressor operation. If values do not fall near the above ranges, or vary from your historical values, see **Chapter 5 - Troubleshooting** for corrective action.

### 3.6 Safety Device Settings

The following table shows factory set safety device settings.

Device	Stage	Set Point (psig)	Function
Relief Valve	Suction	75	Relieve excess pressure build up
	1 <sup>st</sup> Stage	700	
	Discharge	2500	
Pressure Switch	Suction	30 Falling	Shutoff
	Discharge	2250 Rising	

## Chapter 4 - Routine Inspection & Scheduled Maintenance

### 4.1 Introduction

The purpose of this chapter is to provide the user with the routine inspection and scheduled maintenance information required to ensure a long service life of the 2PS2B-HH208-PCI. RIX recommends documenting and tracking service history using the service log in the appendix of this manual.

Oxygen compression equipment has very stringent requirements due to the hazards inherent in the compression process. RIX recommends that only properly trained and qualified personnel work on this equipment. RIX further recommends returning the compressor package to RIX Industries or RIX-approved service center when servicing or repairing this compressor package.

Factory cleaned oxygen parts are denoted by an “X” prefix at the beginning of the part number. It is the User’s responsibility to maintain the cleanliness of factory cleaned parts and any existing portions of the gas stream that may be exposed during installation or maintenance.

**Danger**

To prevent **FIRE, SERIOUS INJURY, and/or DEATH**, it is the user’s responsibility to ensure that all gas wetted parts of this RIX oxygen compressor and user system are clean for oxygen service prior to operation. Any work to be done on the compressor and user system must be performed in accordance with safe oxygen handling/cleaning procedures CGA G-4.1.

### 4.2 Routine Inspection

1. Visually inspect the system for obvious damage or leakage. Fix any issues that are found.
2. Check pressures and temperatures against normal operation.
3. Check cooling air flow. Verify cooling fans blow air over the heads.
4. Inspect for loose fittings or components. Fix any issues that are found.
5. Inspect for unusual noises or vibrations.

### 4.3 Scheduled Maintenance

Use the table below to plan for machine servicing and parts procurement. Environmental conditions may cause intervals to vary.

Section	Operation	Time Interval	
		2000 hours	4000 hours
4.4	Gas Filters	*	
4.5	Compressor Valves		*

Section	Operation	Time Interval	
		2000 hours	4000 hours
4.6	Pressure Relief Valves		*
4.7	Drive Belts	*	
4.8	Gas Piping Leak Check	*	
4.9	Bearing Inspection	*	
4.10	1 <sup>st</sup> Stage Piston Rings	*	
4.10	2 <sup>nd</sup> Stage Piston Rings	*	
4.11	Wrist Pin Lubrication	*	



Before performing any maintenance, the compressor power supply should be locked **Out of Service** to prevent starting which could cause injury to personnel or damage to the equipment. Relieve all internal pressure and allow piping to cool before repair.

#### 4.4 Gas Filters

Filters should be cleaned or replaced every 2000 hours or if a significant drop in pressure or flow is observed. Failure to clean the filter may result in improper operation of the compressor valves. If filters are wetted during servicing thoroughly dry filter mesh before reinstalling.

#### 4.5 Compressor Valves

The valves should be inspected, cleaned, and if necessary replaced every 4000 hours or if pressures vary from normal, noise is detected, or an abnormally high temperatures are observed. Buyer should establish reference data for use in troubleshooting by taking gauge readings when the compressor is running under normal operating conditions. A leaking valve, either suction or discharge, will usually be indicated by higher than normal pressure on the preceding stage, or in the case of the first stage, a loss in flow along with low interstage pressures. This can be caused by wear, breakage, warping of the reeds, or fouling due to particulates. Severe leakage will cause heating of the suction pipe just prior to the cylinder head.

#### 4.6 Pressure Relief Valves

Every 4000 hours the relief valves should be removed from the compressor, inspected for cleanliness, and tested for correct set-point. If a valve fails to lift at its rated pressure, it must be readjusted or replaced. A valve with a small leak can be detected while on the compressor by placing a balloon over the outlet.

#### 4.7 Drive Belts

Belt tension and alignment should be checked every 2000 hours or if slipping occurs. Proper belt tension and alignment will help increase the life of the compressor. Too little tension will allow

slippage, causing rapid belt and sheave wear. Too much tension will lead to excessive belt and bearing wear. In general the proper adjustment will be the lowest tension at which the belt won't slip or squeal. Improper adjustment will shorten belt life. Misalignment of pulleys will severely shorten belt life, cause noise, and in severe cases do other damage to equipment. Proper belt tension on the 2PS2B-HH208-PCI should allow 1/2"-3/4" deflection with 10 lbf applied at mid-span of the belt. New belts often require retightening after initial 24-48 hours of use.

## 4.8 Gas Piping Leak Check

After maintenance or every 2000 hours of operation, all assembly joints should be examined for leaks. Leak testing requires that the unit be pressurized, and therefore running or recently run. Any gaskets and O-rings needed for repair should kept be on hand.

A soapy solution in a squirt bottle is one method of locating leaks. This test is simplified if the compressor is allowed to cool, then restarted immediately prior to running the leak test, since the hot discharge pipes can boil away the soap solution making detection of leaks difficult or impossible.

### Warning

Do not use a flammable solution for leak testing. Hot discharge lines can produce painful burns. Wear safety glasses at all times.

Observe for the formation of bubbles. Large leaks may blow the solution away as it is applied, and therefore must be detected by sound, being careful of hot gases and piping. O-ring joints normally cannot be corrected by additional tightening, in most cases a new O-ring is required. Always inspect O-ring sealing surfaces for defects. Insure the proper durometer (hardness) O-ring is used.

**Note:** See "O-ring Installation & Material Information" in the appendix for more information about O-rings.

## 4.9 Bearing Inspection

Every 2000 hours the main crankcase bearing, connecting rod ball bearing, and connecting rod needle bearing should be inspected to verify adequate lubrication and smooth rotation. Failure of bearings could cause further damage to the compressor, if problems are found in the bearings contact RIX for replacement instructions.

## 4.10 Piston Rings

Ring life will vary with discharge pressure, operating environment, and frequency of start/stop cycles. A low ambient temperature will increase ring life. Frequent start/stop cycles will reduce ring life. If possible, allow downstream pressure to drop as low as possible before restarting compressor. For maximum ring life, pistons should not be removed from cylinders prior to ring replacement.

As the rings wear their ability to seal is diminished. Excessive wear will result in lower compressor capacity, more frequent compressor operation and unnecessary wear on other components. With

extreme wear the compressor will not be able to compress to the design pressure. There is also risk of damaging the cylinder liners if the rings wear out completely.

Excess piston to cylinder clearance, caused by wear to cylinder liners, will significantly decrease ring life. Cylinder bores should be observed for wear at ring change-outs and measured for wear if ring life has significantly decreased. It is a good practice to measure the diameter and surface finish of the cylinder bores whenever the cylinders are removed or when ring life drops from normal. Maximum wear will normally occur 1/3 to 1/2 way down the bore. A bore gauge is the best way to measure wear. Check diameter at several depths for wash-boarding. See **Section 6.10** for wear limits. The desired cylinder surface is a 16-20 RMS crosshatch. Surface roughness is needed to allow engraining of Teflon in the bore, a smoother bore will reduce ring life.

## **4.11 Wrist Pin Lubrication**

### **Filling the Dispenser**

Unscrew the container tube from the dispenser head. Fill the container tube with half a tube of Krytox PFPE lubricant, ensuring to remove air pockets by applying fluid gradually. Loosely screw the dispenser head back on. Take a flathead screwdriver and insert it through the bottom keyhole of the container tube. Apply pressure into the container to push out the remaining air. Once lubricant begins to ooze through the bleeder slot exit, fully tighten the dispenser head onto the container tube. Press on the spring-loaded plunger until lubricant is dispensed from the tip. The dispenser is now ready to use.

### **Lubricating the Wrist Pin**

Ensure the machine is completely powered off. Remove the plug (RIX P/N 044854-01) from the center of the fan cover (RIX P/N044853-01). Take the Krytox Dispenser (RIX P/N 044832-01) and insert the dispensing tip through the plug hole until it hits the check valve of the grease fitting (RIX P/N 044784-01). Press on the dispenser towards the grease fitting to ensure the check valve inside the fitting is released. To deliver Krytox to the wrist pin (RIX P/N 044783-01), firmly press on the spring-loaded plunger of the dispenser until a tangible click is felt. Repeat 5 times. Wipe away any excess grease from the area and re-plug the fan cover with the original plug.

## Chapter 5 – Troubleshooting

### 5.1 Compressor Symptoms

It is recommended that a log be kept noting operating pressures and maintenance done at hours of compressor operation. Abnormal compressor conditions can be evaluated more quickly and accurately by looking at interstage pressures. Variation of the interstage pressure indicates a problem condition such as worn piston rings, leaking valves, or piping leaks. Use the table below to aid in determining the cause of any problems with the compressor and the necessary corrective action.

**Note:** Leaking valves may be the result of inactivity in which case operating the unit at reduced back pressure for 30 minutes may clear the problem. If required, operate the unit at reduced suction pressure which will reduce interstage pressures.

**Caution**

Operating the compressor with reduced suction pressure will increase temperatures. This can lead to overheating the final stage or cause banging of floating pistons creating the potential for severe damage. Closely monitor the compressor if attempting to operate at suction pressure less than that stated in **Compressor Specifications**.

Item	Symptom	Probable Causes	Corrective Action
1	Compressor will not start	The discharge pressure is above the pressure switch setting	No action required
		The suction pressure is below the pressure switch setting	Adjust supply pressure to range stated in <b>Compressor Specifications</b>
		The Hand/Auto/Off switch is in the off position	Move switch to “Hand” or “Auto”
		The overload tripped	See item 7
		The power source is not supplying power	Investigate power supply source
2	Compressor stops running before system pressure is reached	The discharge pressure switch is set too low	Adjust pressure switch set point
		The overload tripped	See item 7
		The power source stopped supplying power	Investigate power supply source
		The compressor has seized	Inspect compressor internal components
3	Compressor fails to shut off at design discharge pressure	The discharge pressure switch is set too high	Adjust pressure switch set point
		Discharge pressure switch has failed	Replace pressure switch

Item	Symptom	Probable Causes	Corrective Action
4	Compressor does not reach design flow or pressure	System plumbing is leaking	Check system for leaks
		Supply pressure is too low	Adjust supply pressure to range stated in <b>Compressor Specifications</b>
		Lack of back pressure in user's downstream piping	If downstream should be pressurized, look for leaks in downstream system. If downstream should not be pressurized, no problem.
		Restricted suction filter or piping	Clean filter and upstream piping
		Belt is loose	Inspect and tighten belt to proper tension
		Excessive piston to head clearance	Measure and adjust piston clearance
		Piston rings are worn	Replace piston rings
5	High pressures	1 <sup>st</sup> stage valve has failed	Replace 1 <sup>st</sup> stage valve
		2 <sup>nd</sup> stage valve has failed	Replace 2 <sup>nd</sup> stage valve
6	Relief valve opens	Restricted discharge filter or piping	Clean filter and downstream piping
		High pressures were reached	See item 5
		Relief valve is set too low	Adjust relief valve set point
7	Overload tripped	Relief valve has failed	Replace relief valve
		May be a spurious trip	Clear fault and press reset on motor controller. If problem persists continue to item 8
8	Overload trips repeatedly	Electrical supply is incorrectly sized	Ensure electrical supply meets requirements given in <b>Compressor Specifications</b>
		There is a short or break in the electrical circuit	Inspect wiring and system components
		Bearing failure is imminent	Inspect bearings and replace if necessary
		Internal motor failure	Contact a motor service center
9	Compressor is vibrating excessively	Crackcase mounting bolts are loose	Tighten crankcase mounting bolts
		Motor mounting bolts are loose	Tighten motor mounting bolts
		Piston clearances not properly adjusted	Measure and adjust piston clearance
		Mechanical failure internal to the compressor	Inspect compressor internal components

<b>Item</b>	<b>Symptom</b>	<b>Probable Causes</b>	<b>Corrective Action</b>
10	High Temperatures	Low suction pressure to compressor	Adjust supply pressure to range stated in <b>Compressor Specifications</b>
		Fans are inoperative	Repair or replace fans
		High ambient temperature	Insure ambient temperature is within design limits
		Compressor valves have failed	Replace compressor valves
11	Loud metallic knocking	Piston is hitting valve	Measure and adjust piston clearance
		Connecting rod needle bearing is worn	Replace connecting rod needle bearing
12	Clacking noise from cylinder head	Compressor valve is worn or broken	Replace compressor valve
13	Flat, slapping noise when compressor starts and stops	Rider rings are worn	Replace rider rings
		Piston and/or cylinder are worn	Inspect piston and cylinder for wear, replace if necessary

# Chapter 6 - Corrective Maintenance

## 6.1 Introduction

This chapter provides instructions for adjustments and repairs to the compressor. Scheduled maintenance and general information is covered in **Chapter 4**. Where special tools are required they are called out in the applicable paragraph. When installing new O-rings lightly lubricate them with oxygen compatible grease (RIX P/N 45-1007). This chapter is divided into two sections: **Section I - Adjustments and Alignments**, and **Section II - Repair**.



Before performing any maintenance, the compressor power supply should be locked **Out of Service** to prevent starting which could cause injury to personnel or damage to the equipment. Relieve all internal pressure and allow piping to cool before repair.

## Section I – Adjustments & Alignments

### 6.2 Piston Clearance Adjustment

Piston clearance is critical, insufficient clearance will result in the piston hitting the head and may result in damage to the machine. Piston clearances are factory set and should not need adjustment unless one or more of the following parts are replaced: cylinder, piston, connecting rod, crankshaft, and/or crankcase. Replacing soft goods (O-rings, gaskets, piston rings, etc.) does not require adjustment of piston clearance.

#### 6.2.1 1<sup>st</sup> Stage Piston Adjustment

To adjust the 1<sup>st</sup> stage piston clearance follow the instructions below:

1. Remove the 1<sup>st</sup> stage head per **Section 6.6**.
2. Hold the cylinder firmly in place and rotate the crankshaft to bottom dead center.
3. Measure the clearance between the piston and the top of the cylinder. Proper clearance is .011”-.015”.
4. Add or remove shims to achieve proper clearance.
5. Reinstall the 1<sup>st</sup> stage head per **Section 6.6**.

#### 6.2.2 2<sup>nd</sup> Stage Piston Adjustment

To adjust the 2<sup>nd</sup> stage piston clearance follow the instructions below:

1. Remove the 2<sup>nd</sup> stage head per **Section 6.6**.

2. Hold the cylinder firmly in place and rotate the crankshaft to top dead center.
3. Measure the clearance between the piston and the top of the cylinder liner. Proper clearance is .012”-.016”.
4. Screw or unscrew the guide cylinder to achieve proper clearance.
5. Reinstall the 2<sup>nd</sup> stage head per **Section 6.6**.

## **Section II - Repair**

### **6.3 Cylinder Heads**

Cylinder heads do not require scheduled maintenance but are commonly removed to perform other required maintenance.

To remove the head follow the instructions below:

1. Relieve pressure from both cylinders and allow compressor to cool.
2. Disconnect the gas system piping from the head being removed.
3. Remove the nuts and washers from the head.
4. Discard used O-rings.

To reinstall the head follow the instructions below:

1. Install new O-rings.
2. Orient the head on the cylinder and install over the studs.
3. Tighten to 15 ft-lbs in 2-3 ft-lb increments using a cross sequence.
4. Reconnect the gas system piping.

### **6.4 Compressor Valves**

A leaking valve, either suction or discharge, will usually be indicated by a loss in flow along with low discharge pressure. This valve leakage is usually caused by wear, breakage, warping of the reeds, or fouling due to particulates which prevent the valve from fully closing. Severe leakage will cause over-heating of the suction pipe just prior to the cylinder head.

When valves are removed, they should be inspected for damage and/or wear. Inspect the reeds for wear, cracking, or warping. Examine valve seat for wear or damage. A uniform imprint of the reed indicates the valve is sealing normally, while radial lines or streaks extending outward indicate leakage. Clean or replace parts as required. Valve seats may be reconditioned on a lapping plate using a fine lapping compound or 600 grit sandpaper, moving in a figure 8 motion over the

sandpaper until it has a mirror finish. Spring pins in 2<sup>nd</sup> stage compressor valve plate should be removed before reconditioning the 2<sup>nd</sup> stage valve seat via lapping.

To remove and disassemble both the 1<sup>st</sup> and 2<sup>nd</sup> stage compressor valves follow the instructions below:

1. Remove the head per **Section 6.6** and move to a flat, clean surface.
2. Separate all components and discard the used O-rings. Note: a soft punch may be used to aid with disassembly by removing the plug at the top of head and pushing through the now open port.

To reinstall the 1<sup>st</sup> stage compressor valve, reference **Figure 6** and follow the instructions below:

1. Install the discharge reed and O-ring in the 1<sup>st</sup> stage head valve pocket.
2. Install the valve seat into the 1<sup>st</sup> stage head valve pocket, pushing down squarely to engage the O-ring properly.
3. Install the suction reed and final O-ring in the 1<sup>st</sup> stage head valve pocket.
4. Install the head per **Section 6.6**.

To reinstall the 2<sup>nd</sup> stage compressor valve, reference **Figure 4** and follow the instructions below:

1. Replace the old alignment dowel pins (PN 17-758) with 2 new ones. Place one pin into the alignment hole in the 2<sup>nd</sup> stage cylinder head.
2. Install the valve spacer to the 2<sup>nd</sup> stage cylinder head.
3. Install the discharge reed onto the 2<sup>nd</sup> stage valve seat, aligned with the dowel pin. Ensure the free end of the reed flap will sit over the 4 through holes on the valve seat. A thin, translucent film of oxygen-compatible grease can be used between the reed and valve seat to keep components together during installation. Installing the reed upside down will result in improper valve operation.
4. Install O-ring in the 2<sup>nd</sup> stage head valve pocket.
5. Install the valve seat into the 2<sup>nd</sup> stage head valve pocket and pushing down squarely to engage the O-ring properly. Assure the side of the valve seat with the cutout is facing away from the cylinder head and toward the floating piston.
6. Install the suction reed, aligned with the dowel pin. Ensure the free end of the reed flap will sit over the 4 blind holes on the valve seat. Installing the reed upside down will result in improper valve operation.
7. Install valve stop and final O-ring in the 2<sup>nd</sup> stage valve pocket.
8. Install the head per **Section 6.6**.

## 6.5 Cylinders

There is no regular maintenance required for the compression cylinders, however the cylinders must be removed to access the piston rings. Cylinder bores should be measured for wear at ring change-outs as excess piston to cylinder clearance, caused by wear to cylinder liners, will significantly decrease ring life. It is a good practice to measure the diameter and surface finish of the cylinder bores whenever the cylinders are removed. Maximum wear will normally occur 1/3 to 1/2 way down the bore. Check diameter at several depths for wash-boarding. See **Section 6.10** for wear limits. The desired cylinder surface is a 16-20 RMS crosshatch.

To remove the compression cylinders follow the instructions below:

1. Remove the head per **Section 6.6**.
2. Slide the cylinder off the piston. Pull in a vertical direction to limit side stress applied to piston during removal. If removing the 2<sup>nd</sup> stage the piston may remain in the cylinder during removal, take care not to let the piston fall out the bottom of the cylinder.

To reinstall the compression cylinders follow the instructions below:

1. Carefully compress the piston rings by hand.
2. Slide the cylinder over the piston, ensuring that the rings do not extrude out.
3. Seat the cylinder against the crankcase.
4. Install the head per **Section 6.6**.

## 6.6 Piston Ring Replacement

To deliver oil-less gas RIX uses non-lubricated compression rings with O-ring expanders behind them. During piston ring replacements both the compression rings and expanders should be replaced. Rider rings are used on the 1<sup>st</sup> stage piston, 2<sup>nd</sup> stage piston, and 2<sup>nd</sup> stage piston rod to keep the pistons centered and prevent metal to metal contact. The rider rings should also be replaced during ring replacements.

To replace the piston rings follow the instructions below:

1. Remove the compression cylinders per **Section 6.8**.
2. Remove and discard the used compression rings, expanders and rider rings. An O-ring pick (P/N 88-5812) is helpful for removing used rings.
3. Clean the ring grooves.
4. Install new rider rings.
5. Install new expanders.

6. Install new compression rings by carefully spreading the ring along the spiral cut and wrapping the ring into the groove.
7. Compress the rings by hand to ensure all compression rings fit completely in the grooves and compression ring tails do not stick out past the ring groove.
8. Reinstall the compression cylinder per **Section 6.8**.
9. Rotate the flywheel by hand several times to ensure all parts are free.

## 6.7 Piston Assembly

The 1st stage piston assembly is installed with the connecting rod and retaining cap. This assembly must be removed to service the connecting rod and all bearings.

To remove the 1st stage piston assembly, reference **Figure 2** and use the following procedure:

1. Remove both heads and cylinders per **Sections 6.3** and **6.5**.
2. Rotate flywheel to position the 1<sup>st</sup> stage piston at top dead center.
3. Remove hex screw on bearing plate.
4. Gently slide assembly outward by pulling connecting rod off crankshaft, allowing neck of piston to pass through slot in crankcase. Move assembly to a clean surface for further disassembly.
5. With a pair of snap ring pliers, remove the snap rings from the wrist pin grooves.
6. Remove the wrist pin by pushing it through the needle bearing from one side of the piston to the other, which may require a press.
7. Remove the connecting rod.
8. Clean and inspect piston, wrist pin, and bearings for wear or damage. Wear must be within the tolerance specified in **Section 6.10**.

To reinstall the 1st stage piston assembly:

1. Press the needle bearing into the small end of the connecting rod. Note: Be sure to press the stamped end of the bearing (with identification markings).
2. Screw on 1 grease fitting (RIX P/N 044784-01) onto the wrist pin.
3. Assemble the connecting rod into the piston assembly by pushing the grease fitting side of the wrist pin through the bore in the rod, through the needle bearing, and then back through the other side of the bore in the rod.

4. Reinstall snap rings into their grooves.
5. Screw on the 2nd grease fitting onto the wrist pin.
6. Install the piston assembly on the compressor crankshaft.
7. Install bearing plate and hex screw to fully secure the assembly to the crankshaft. Hex screw must be secured with a small amount of Loctite 7471 Primer/Activator and 272 Threadlocker (RIX P/N's: 35-8595 & 35-10440) and torqued to 180 in-lbs.
8. Reinstall cylinders and heads per **Sections 6.3** and **6.5**

## 6.8 Main Bearings

The crankshaft is supported in the crankcase by two main radial ball bearings.

To remove the main bearings, reference **Figure 5** and follow the instructions below:

1. Remove heads, cylinders, and piston assembly per **Sections 6.6, 6.8** and **6.10**.
2. Remove flywheel.
3. Bend locking tab on lock washer and remove bearing nut.
4. Heat bearing housing (piston side) and push out crank. Flywheel side bearing will remain in housing.
5. Remove the flywheel side bearing by either method below:
  - a. \*Use Bearing Removal Tool (RIX P/N 043686-01) to remove the bearing from the outboard side. When installing the Bearing Removal Tool, ensure the tool is installed with the feet securely on the flats of the bearing housing. Apply tension to the bearing removal tool by torquing the drive-nut after the tool jaws are seated on the bottom edge of the inner race of the bearing. Heat may be applied evenly around the bearing housing to break the Retaining Compound bond. Recommend heating the bearing housing no higher than 225°F. Once the bearing begins to move, continue applying torque to the drive-nut to remove the bearing. Note: A ¾ crows-foot style wrench, or similar, may be useful for torquing the drive-nut of the Bearing Removal Tool.
  - b. Use a suitable fixture to push the bearing out from the inboard side. Heat may be applied evenly around the bearing housing to break the Retaining Compound bond. Recommend heating the bearing housing no higher than 225°F.

\*Bearing Removal Tool (RIX P/N 043686-01) can also be used to remove the piston side bearing.
6. Remove residual Bearing Retainer from bearing housing by applying \*\*Rust-Oleum Aircraft Paint Remover Spray (RIX P/N 043688-01), or similar aluminum-safe solvent, to the

bearing housing. Apply liberally and allow to soak until the residual has softened. Once softened, remove residual with steel wool or lint-free rags. Some light scraping may be required, be careful not to scratch the bearing housing if doing so. Iterate this process, as needed, until all residual Bearing Retaining Compound can be removed from the bearing housing.

\*\*Rust-Oleum Aircraft Paint Remover Spray (RIX P/N 043688-01) only available for purchase through RIX domestically (United States).

To install new main bearings:

1. Slide new main bearing onto the crankshaft. Verify that the bearing is pressed up against the shoulder on the crankshaft.
2. Install crankshaft and piston side bearing into crankcase. Heating may be required.
3. Apply Loctite 7471 Primer/Activator (RIX P/N 35-8595) to OD surface of flywheel side bearing and ID surface of the bearing housing. Allow activator to dry for 3-5 minutes. Apply continuous bead of Loctite 680 Bearing Retaining Compound (RIX P/N 043588-01) around the OD surface of the flywheel side bearing and the ID surface of the bearing housing.
4. Install the flywheel side bearing by sliding the bearing over the keyed end of the crankshaft until a few threads are accessible. Install a new lock washer followed by the bearing nut. Screw the bearing nut onto available threads by hand then continue turning by wrench until it is torqued to 50 ft-lbs. Bend the lock washer tab to secure the bearing nut.
5. Wipe away excess Bearing Retaining Compound using a lint-free rag. Do not allow excess to enter the bearing. Allow 24-hours for the Bearing Retaining Compound to cure while the compressor is in the upright position. Do not install the flywheel bushing, flywheel, or belt during this 24-hour cure period. Do not handle machine by crankshaft during this cure period.
6. Reinstall piston assemblies, cylinders, and heads per **Sections 6.10, 6.8 and 6.6**. It is okay to install these components during the 24-hour cure period.

## 6.9 Connecting Rod Bearings

The connecting rod is aluminum, with a closed eye at the upper (larger) and lower ends (smaller). The smaller closed eye houses a needle bearing that fits around the wrist pin. The larger closed eye houses a ball bearing that fits around the crankshaft. These bearing are supplied with RIX grease packed for life with Krytox (RIX P/N 45-1007) grease and **should be routinely inspected every 2000 hours maximum**. Note: it is critical to use this high-load, high temperature grease for the connecting rod bearings. Bearing life will be significantly shortened if this grease is not used and may result in rod breakage or other significant damage.

To replace the Connecting Rod Bearings:

1. Remove the piston assembly and wrist pin per **Section 6.7**.
2. Remove the connecting rod from the piston assembly.
3. Remove the bearing plate from the ball bearing (larger closed eye). Jacking screws may need to be used to detach the bearing plate.
4. Press the needle bearing out of the small end of the connecting rod (smaller closed eye).
5. Note: the large end connecting rod ball bearing was installed with a shrink-fit. Therefore, to remove the ball bearing, the assembly should first be heated to 300° F and pressed lightly. This will allow the ball bearing to slide out of its housing.
6. To install a new ball bearing, first heat the connecting rod to 300° F. Once heated, lay the large end of the connecting rod on a flat surface, then slide the ball bearing into the bore and allow to cool for final fitment.
7. Reinstall the needle bearing, wrist pin, snap rings, and piston assembly **Per Section 6.7**.

## 6.10 Clearances & Tolerances

Part	Nominal Dimension (in)	Wear Limit (in)
1 <sup>st</sup> Stage Cylinder	Ø1.250	+0.003 Diametric
1 <sup>st</sup> Stage Piston	Ø1.210	-0.005 Diametric
2 <sup>nd</sup> Stage Cylinder	Ø.500	+0.003 Diametric
2 <sup>nd</sup> Stage Piston	Ø.497	-0.005 Diametric
1 <sup>st</sup> Stage Piston Rider Rings	.116 Thickness	-.010
2 <sup>nd</sup> Stage Piston Rider Rings	.056 Thickness	-.005
2 <sup>nd</sup> Stage Piston Rod Rider Ring	.056 Thickness	-.005
1 <sup>st</sup> Stage Compression Rings	.125 Thickness	-.085 or if blow-by occurs
2 <sup>nd</sup> Stage Compression Rings	.065 Thickness	-.040 or if blow-by occurs
1 <sup>st</sup> Stage Valve Reeds	.025 Thickness	-.002 or if significant pitting occurs
2 <sup>nd</sup> Stage Valve Reeds	.010 Thickness	-.002 or if significant pitting occurs
Valve Seats	-	Significant pitting, streaking, or other signs of wear
Bearings	-	Rough running or by inspection
Wrist Pin	Ø.5000	-.0005

## 6.11 Wrench Torques

The actual torque requirement of a fastener will vary depending on the component design, thread depth, lubrication and other factors. If either the tapped hole or fastener (cap screw, stud or nut) is stainless steel, the lower stainless torque figure should be used (with exception of 17-4PH which is rated similar to Grade 5 steel).

**Note:** A magnet can be helpful to determine if a fastener is steel or stainless. 18-8 and 300 series SS are slightly magnetic; 17-4 is strongly magnetic – similar to carbon steel.

### Caution

Values below are based on lubricated threads. Since fastener materials vary (carbon-steel vs. SS), and since user may replace or inadvertently swap a fastener with one of a different material, it is user responsibility to confirm the material during reassembly and use the proper torque value.

Component	Bolt Size	Torque [ft-lbs]
Crankcase Cover Bolt	1/4-20	8
Heat Exchanger Clamps	#10-32	6
1 <sup>st</sup> Stage Cylinder Head Nuts	5/16-24	15
2 <sup>nd</sup> Stage Cylinder Head Nuts	5/16-24	15
2 <sup>nd</sup> Stage Cylinder Retainer Nuts	5/16-24	15
Compressor Mounting Bolts	1/2-20	50

<b>Component</b>	<b>Bolt Size</b>	<b>Torque [ft-lbs]</b>
Flywheel Bushing*	3/8-16	25*
Motor Mounting Bolts	5/16-18	11
Bearing Plate Screw	5/16-24	15
Motor Shaft Set Screw	5/16-18	11

\*Dry torque, **DO NOT USE LUBRICANT** on flywheel bushing

**Note:** 1 ft-lb = 1.356 NM

## Appendix

1. Compressor Parts List
2. Figure 1: Compressor Cross Section, Fastener Detail
3. Figure 2: Compressor Cross Section, Pump Detail
4. Figure 3: 1st Stage Valve Detail
5. Figure 4: 2nd Stage Valve Detail
6. Figure 5: Exterior Fastener Detail
7. Figure 6: Motor and Control Box Mounting
8. Figure 7: Suction Plumbing Detail
9. Figure 8: Interstage Plumbing Detail
10. Figure 9: Final Discharge Plumbing Detail
11. Figure 10: Cooling Fan Sub-Assembly Detail
12. Figure 11: Belt Installation Detail
13. Figure 12: Guard Mounting Detail
14. Figure 13: Control Box Detail, 1 of 2
15. Figure 14: Control Box Detail, 2 of 2
16. Figure 15: Electrical Schematic
17. Figure 17: Flow Schematic
18. Interface Drawing
19. A5089: O-ring Installation & Material Information
20. Pressure Switch Maintenance Instructions
21. Declaration of Conformity
22. Service Log

## Compressor Parts List; Reference Figures 1-12

Position Number	Part number	Quantity	Description	*
	61-164	2 Each	WIRE, ELECTRICAL	
2	7-B5625	1 Each	CONNECTING ROD	
3	38-A7547	1 Each	BEARING PLATE	
4	X1-B5770	1 Each	CYLINDER, SPOOL/GUIDE	
5	1-B6931	1 Each	CYLINDER, COMPRESSION	
6	X1-D2574	1 Each	CYLINDER, COMPRESSION	
7	X15-B5840	1 Each	REED VALVE, SUCT.	1
9	31-10	2 Each	SNAP RING, INTERNAL	
10	X2-C2429	1 Each	HEAD, CYLINDER	
11	X123-030-5	2 Each	O-RING	3
12	X15-B5831	1 Each	VALVE SEAT	
13	X15-B5878	1 Each	REED VALVE, DISCH	1
14	105-C1993-35	6 Each	STUD,	
15	53-4503	13 Each	NUT, HEX	
16	20-1009	20 Each	WASHER, FLAT SAE	
17	X18-C1791-10G	2 Each	RING, PISTON, 1 1/4 DIA,	2
18	X123-313-5	2 Each	O-RING	2
19	X18-B2117-2G	2 Each	RING, RIDER, 1 1/4 DIA,	2
20	X54P-4P50NSS	2 Each	PLUG, ST THD, HEX HEAD	
21	X123-904-3	2 Each	O-RING, TEFLON	3
22	31-B7617	1 Each	RETAINER RING	
23	X15-A4151	1 Each	VALVE PART	
24	X123-018-5-95	3 Each	O-RING, VITON, 95 DURO	4
25	X15-B2706	2 Each	REED VALVE	
28	X2-B7618-1	1 Each	HEAD, 2ND STAGE	
29	40-A8463	1 Each	BRACKET,	
30	X508-B5928	1 Each	PISTON, COMPRESSION,	
31	X18-A2750-5G	1 Each	RING, RIDER, 1/2 DIA,	1
32	X18-C1791-4G	8 Each	RING, PISTON, 1/2 DIA,	8
33	X18-A2750-3G	2 Each	RING, RIDER, 1/2 DIA,	2
34	X123-011-5	8 Each	O-RING, VITON	8
35	X18-C1147-14-1G	1 Each	RING, RIDER, 1 3/4 DIA,	1
36	X15-A10130	1 Each	VALVE SPACER	
38	34-746	1 Each	SCREW, FLAT HD, ALLEN	

Position Number	Part number	Quantity	Description	*
Compressor Parts List continued; ref Figures 1 -12				
39	22-A7797	AS REQ'D	SHIM	5
40	X10-B11412	1 Each	MANIFOLD, 2PS	
41	20-1003	24 Each	WASHER, FLAT SAE	
42	32-4136	14 Each	BOLT, HEX HEAD,	
43	X10-A7946	1 Each	MANIFOLD, SUCTION 2PS	
44	32-1134	4 Each	BOLT, HEX HEAD,	
45	X10-A7947	1 Each	MANIFOLD, DISCHARGE 2PS	
46	38-C2384-1	1 Each	COVER PLATE, C'CASE	
48	156-153	2 Each	GUARD, FAN	
49	32-1156	7 Each	BOLT, HEX HEAD,	
50	34-6261	16 Each	SCREW, PAN HEAD, PHILLIPS	
52	515-816	3 Each	RELIEF VALVE	
53	24-158	1 Each	SPRING, COIL	
54	24-157	1 Each	SPRING, COIL	
55	24-161	1 Each	SPRING, COIL	
56	X74-401	3 Each	GAUGE SNUBBER	
57	X54P-1/4CDSS	3 Each	PIPE ELBOW, STREET	
58	X60-824	1 Each	GAUGE, PRESSURE	
59	X60-826	1 Each	GAUGE, PRESSURE	
60	X60-828	1 Each	GAUGE, PRESSURE	
62	91-A4423-1	1 Each	KEY, SQUARE,	
63	11-100SK	1 Each	BUSHING, SK SERIES,	
64	36-15521	1 Each	FLYWHEEL, 6J140-SK	
65	41-520J6	1 Each	BELT, J-SECTION,	1
69	53-4098	2 Each	NUT, HEX	
70	34-1002	5 Each	SCREW, SHEET METAL	
71	X54P-44FBUSS	4 Each	CONNECTOR, MALE	
72	X54P-1/4MROSS	2 Each	PIPE TEE, MALE RUN	
73	X54P-44CBUSS	3 Each	ELBOW, MALE, 1/4 TUBE TO	
74	X55-D2621-6	1 Each	LINE, FILTER INLET	
75	XA77-505	2 Each	FILTER	2
76	X55-D2621-5	1 Each	LINE, 2ND STG INLET	
77	X54P-4CBUSS	1 Each	ELBOW, MALE, 1/4 TUBE TO	

Position Number	Part number	Quantity	Description	*
Compressor Parts List continued; ref Figures 1 -12				
78	X54P-1/4FFSS	1 Each	PIPE NIPPLE	
79	X040977-01	1 Each	CHECK VALVE, 1/4" MNPT,	
80	X76-705	1 Each	PRESSURE SWITCH	
81	X54P-1/4MMOSS	1 Each	PIPE TEE, FEMALE	
82	X54P-1/4HHPB	1 Each	PIPE PLUG, HOLLOW HEX	
83	X76-704	1 Each	PRESSURE SWITCH	
84	X54P-6FBUSS	2 Each	CONNECTOR, MALE	
85	X116-464	1 Each	REGULATOR, BACK PRESSURE	
86	X54P-44SBUSS	1 Each	MALE BRANCH TEE	
87	X55-D2621-3	1 Each	LINE, 2ND STG GAUGE	
88	X455-D2621-7	1 Each	TUBE LINE	
89	X55-D2621	1 Each	LINE, 2ND STG COOLING	
90	X55-D2621-1	1 Each	LINE, 1ST STG COOLING	
91	40-B5871-1	4 Each	BRACKET	
92	40-B5871	2 Each	BRACKET,	
93	32-1056	4 Each	BOLT, SOCKET HEAD	
94	53-4087	4 Each	NUT, LOCK	
95	X55-D2621-2	1 Each	LINE, INLET PR. GAUGE	
96	X55-D2621-4	1 Each	LINE, 1ST STG INLET	
97	62-422	1 Each	LABEL, DECAL	
98	62-21031	1 Each	LABEL	
99	62-A7514	1 Each	LABEL, DECAL	
102	62-403	1 Each	LABEL, DECAL	
105	181-728	1 Each	BALL BEARING	
106	X181-7	1 Each	NEEDLE BEARING, SPECIAL,	
108	041167-01	1 Each	CRANKCASE, 2PS,	
109	181-26	1 Each	BALL BEARING, DEEP GROOVE	
110	181-604	1 Each	BALL BEARING, DEEP GROOVE	
111	5-C2381	1 Each	CRANKSHAFT	
112	53-610	1 Each	NUT, LOCK	
113	20-606	1 Each	WASHER, LOCKING	
114	042316-01	1 Each	MOTOR, 208/230/460 VAC, 1 ½ HP	
116	32-1148	3 Each	BOLT, FLAT HEAD	
118	138-8256	1 Each	FITTING, NONMET 1/2" 90EL	
119	32-4129	4 Each	BOLT, HEX HEAD,	
120	40-A7802	1 Each	BRACKET,	

Position Number	Part number	Quantity	Description	*
Compressor Parts List continued; ref Figures 1 -12				
122	20-4867	4 Each	WASHER, LOCKING	
123	61-8251	1.1 Foot	CONDUIT, NONMET PVC 1/2"	
125	20-1013	1 Each	WASHER, CONDUIT,	
126	3-B5774	1 Each	PISTON ROD, SS	
127	20-691	1 Each	WASHER FLAT ½ NOM	
128	53-71	1 Each	NUT, JAM	
129	3-D2974	1 Each	PISTON ROD	
130	8-D2974	1 Each	PISTON, COMPRESSION	
131	42-112	2 Each	FAN, 115 VAC, 50/60Hz	
132	041299-01	1 Each	ELECTRICAL BOX,	
133	20-12877	4 Each	WASHER	
134	33-22809	4 Each	BOLT, SHCS, 1/4-20, 5/8 L	
135	455-A10621	1 Each	LINE, 1 <sup>ST</sup> STG, SOLENOID TO SUCTION	
136	315-239	1 Each	SOLENOID VALVE, ¼"	
137	54P-6FNUSS	1 Each	CAP, TUBE	
138	138-449	1 Each	ELECTRICAL CONNECTOR	
139	62-A7507	1 Each	LABEL, DECAL	
140	62-A7507-1	1 Each	LABEL, DECAL	
142	044854-01	1 Each	PANEL PLUG, SNAP-IN, 1"	
143	044784-01	2 Each	GREASE FITTING 10-32	
144	044853-01	1 Each	COVER PLATE, C'CASE	
145	044783-01	1 Each	WRIST PIN, .50 DIA, GREASEABLE	
146	044834-03	1 Each	2PS, LOWER GUARD	
147	044834-01	1 Each	2PS, BELTGUARD, BACK COVER	
148	044834-02	1 Each	2PS, BELTGUARD, FRONT COVER	
149	044932-01	1 Each	LABEL, NAMEPLATE, BLANK	
150	045106-01	1 Each	SPACER, 2P FLYWHEEL COVER BRACKET	
151	32-4125	1 Each	BOLT, HEX HEAD	
153	15-B3570	1 Each	VALVE SEAT	
154	17-758	1 Each	PIN, DOWEL	
155	40-27590	1 Each	BRACKET, ELECTRICAL BOX, 2PS	
200	35-8595	AS REQ'D	LOCTITE 7471, PRIMER/ACTIVATOR	
201	35-10440	AS REQ'D	LOCTITE 272, THREADLOCKER	
202	043588-01	AS REQ'D	LOCTITE 680, RETAINING COMPOUND	
203	35-21699	AS REQ'D	3M 08061, PLASTIC AND EMBLEM ADHESIVE	

## Additional Parts Available

Part number	Description	Comment
A7-B5625	CONNECTING ROD ASSEMBLY	REPLACEMENT FOR ITEMS 2, 105 & 106
XA508-A7783	FLOATING PISTON ASSEMBLY	REPLACEMENT FOR ITEMS 30, 32, 33 & 34
204-2PS	SPARES KIT	RINGS, VALVES & OTHER SOFT GOODS
204-2PS-8K	MAINTENANCE KIT	8 THOUSAND HOUR MAINTENANCE KIT
X77-505	FILTER ELEMENT	REPLACEMENT ELEMENT FOR ITEM 75

## Electrical Box Parts List; Reference Figures 13-14

Position Number	Part number	Quantity	Description	*
401	041298-01	1 Each	ENCLOSURE, ELECTRICAL	
402	158-B11166	1 Each	PANEL, ELECTRICAL	
403	113-10156	1 Each	HOUR METER	
404	138-B10534	1 Each	DIN RAIL, 6" LONG	
405	138-606	3 Each	ELECTRICAL FITTING	
406	138-8220	3 Each	TERMINAL END ANCHOR	
407	138-8226	2 Each	END COVER FOR UK 5 N	
408	138-8227	15 Each	TERMINAL BLK 1 LVL, GREY	
409	138-8247	1 Each	GROUND BLOCK FOR POWER	
411	138-9546	1 Each	RECEPTICAL, ELECTRICAL, 1	
412	32-4161	2 Each	BOLT, PAN HEAD	
414	138-449	2 Each	ELECTRICAL CONNECTOR	
415	138-960	2 Each	CENTER BRIDGE	
416	20-1013	3 Each	WASHER, CONDUIT	

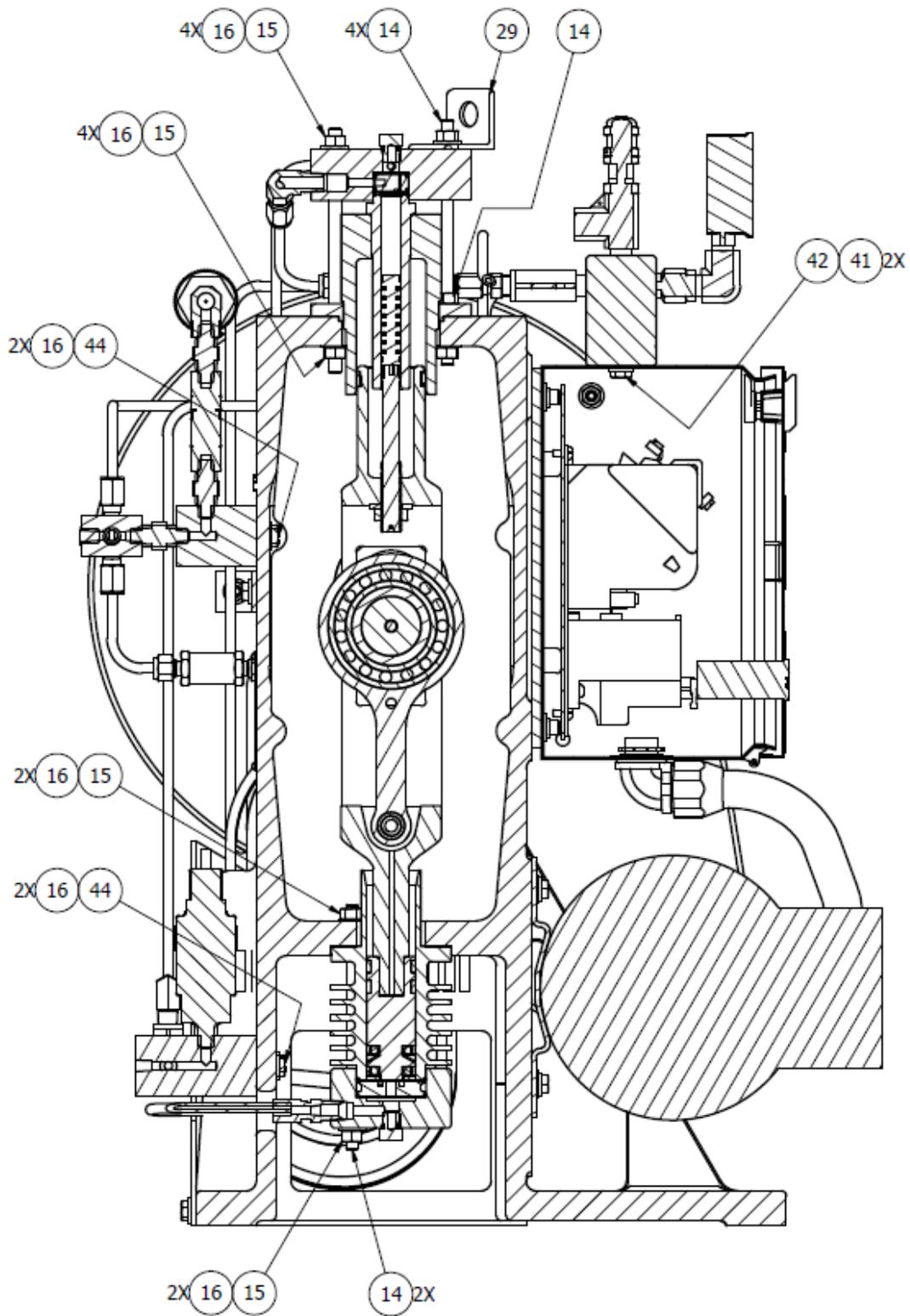


FIGURE 1: COMPRESSOR CROSS SECTION, FASTENER DETAIL

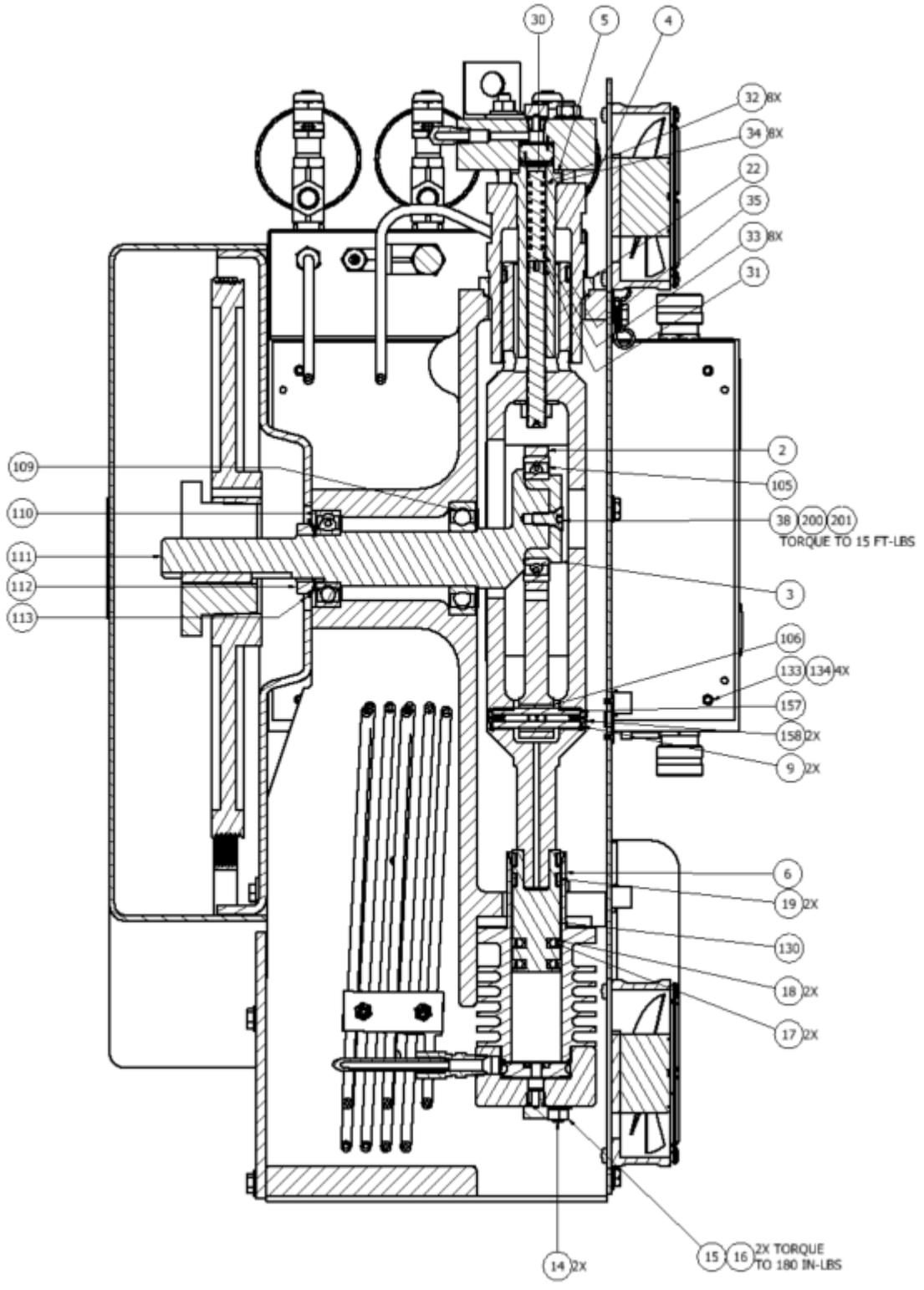


FIGURE 2: COMPRESSOR CROSS SECTION, PUMP DETAIL

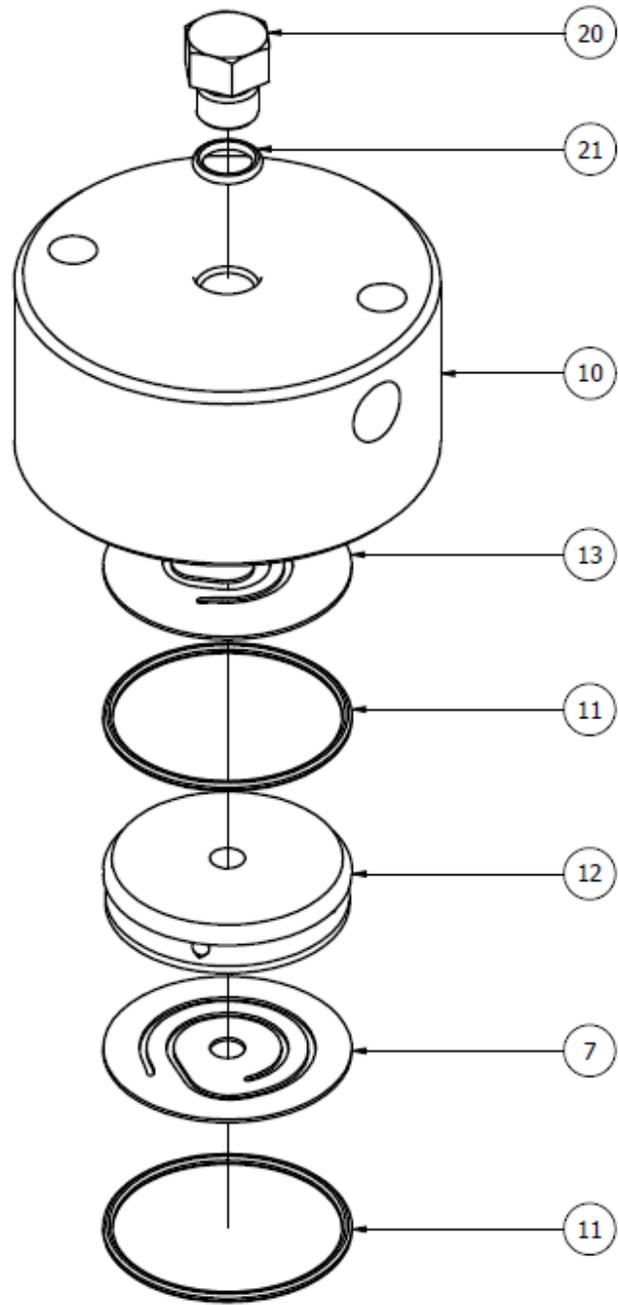


FIGURE 3: 1<sup>ST</sup> STAGE VALVE DETAIL

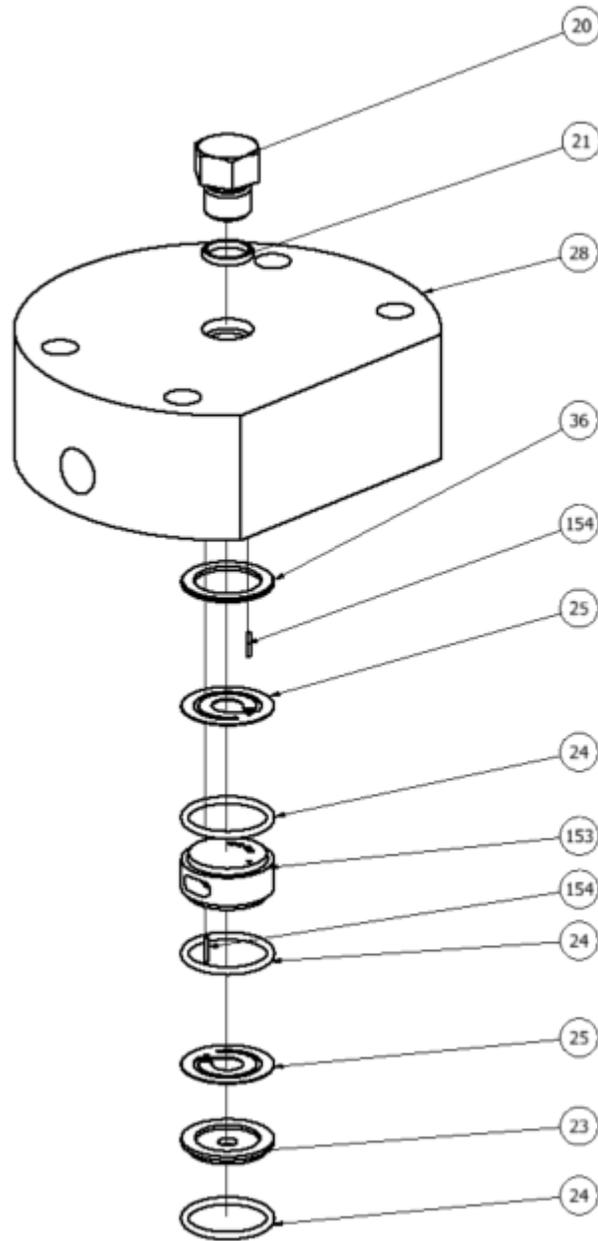
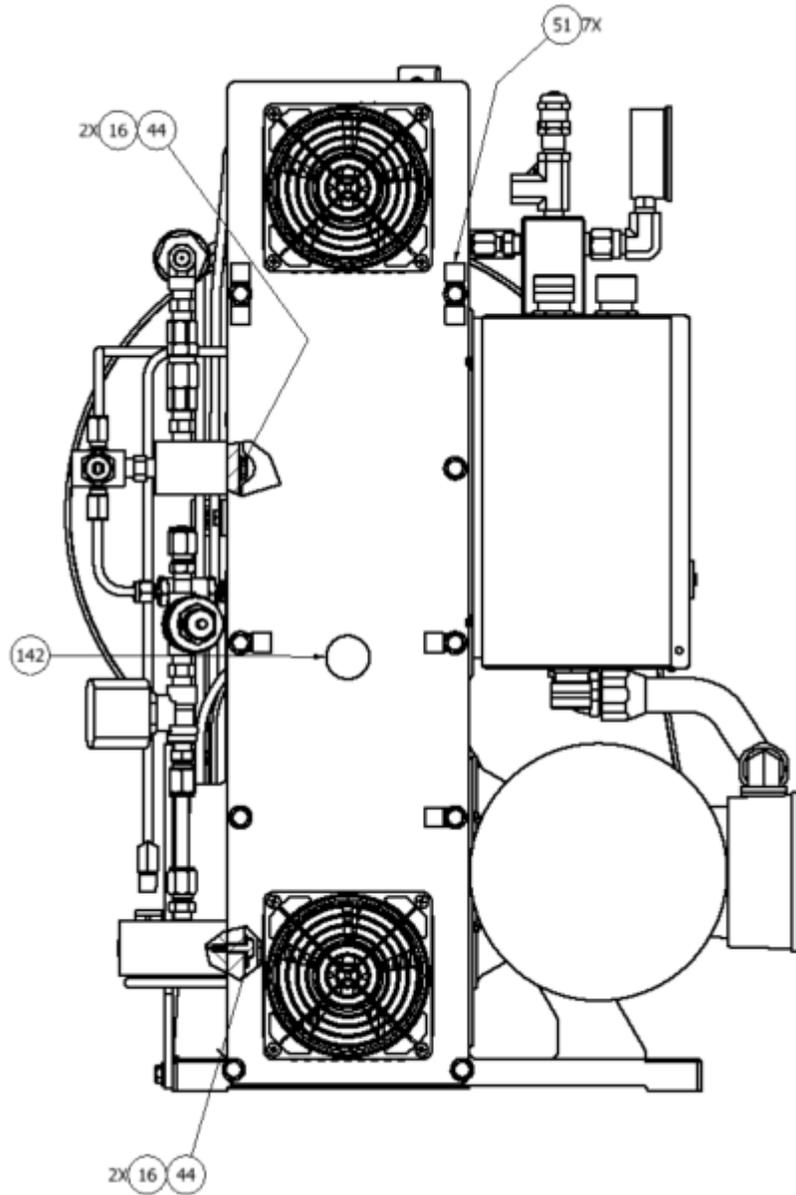


FIGURE 4: 2<sup>ND</sup> STAGE VALVE DETAIL



S

FIGURE 5: EXTERIOR FASTENER DETAIL

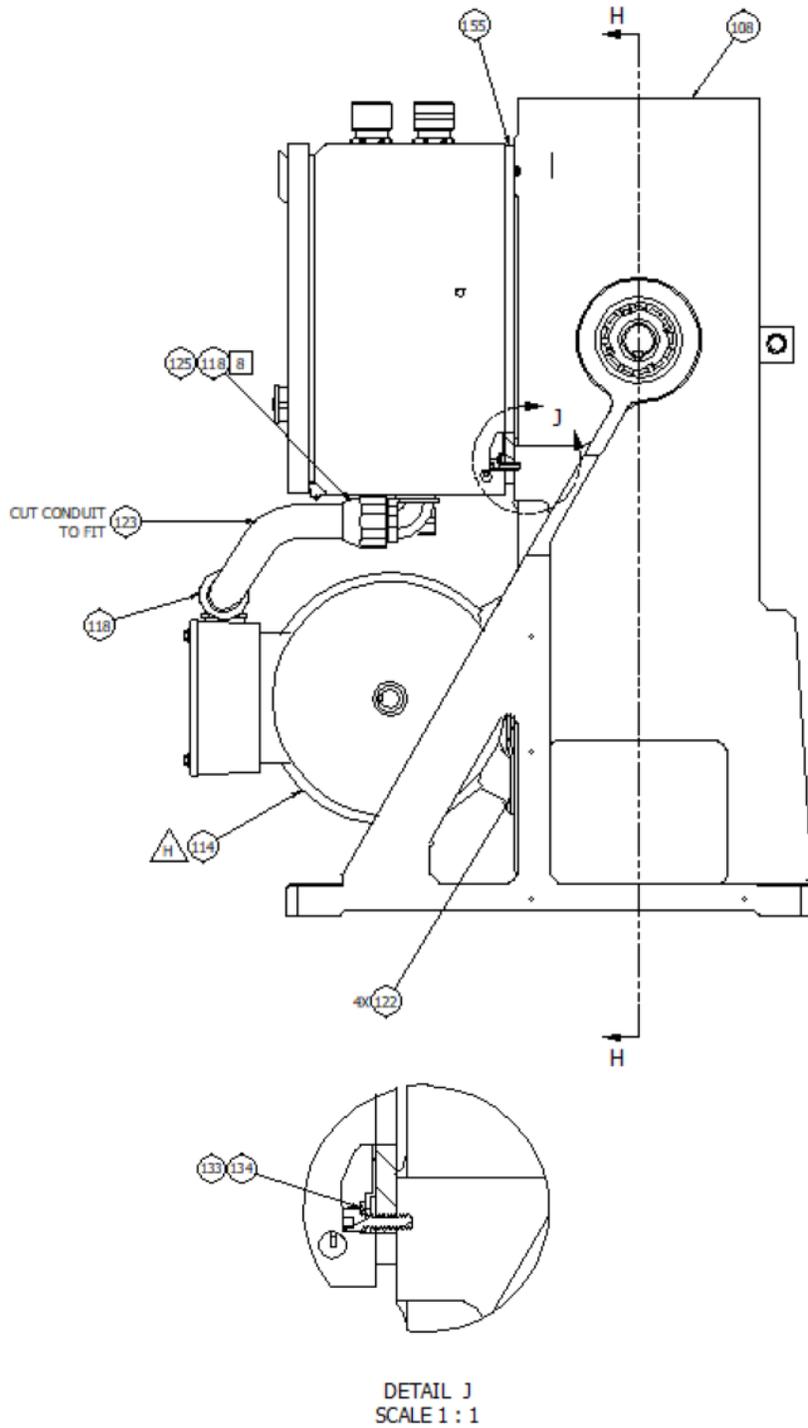


FIGURE 6: MOTOR AND CONTROL BOX MOUNTING

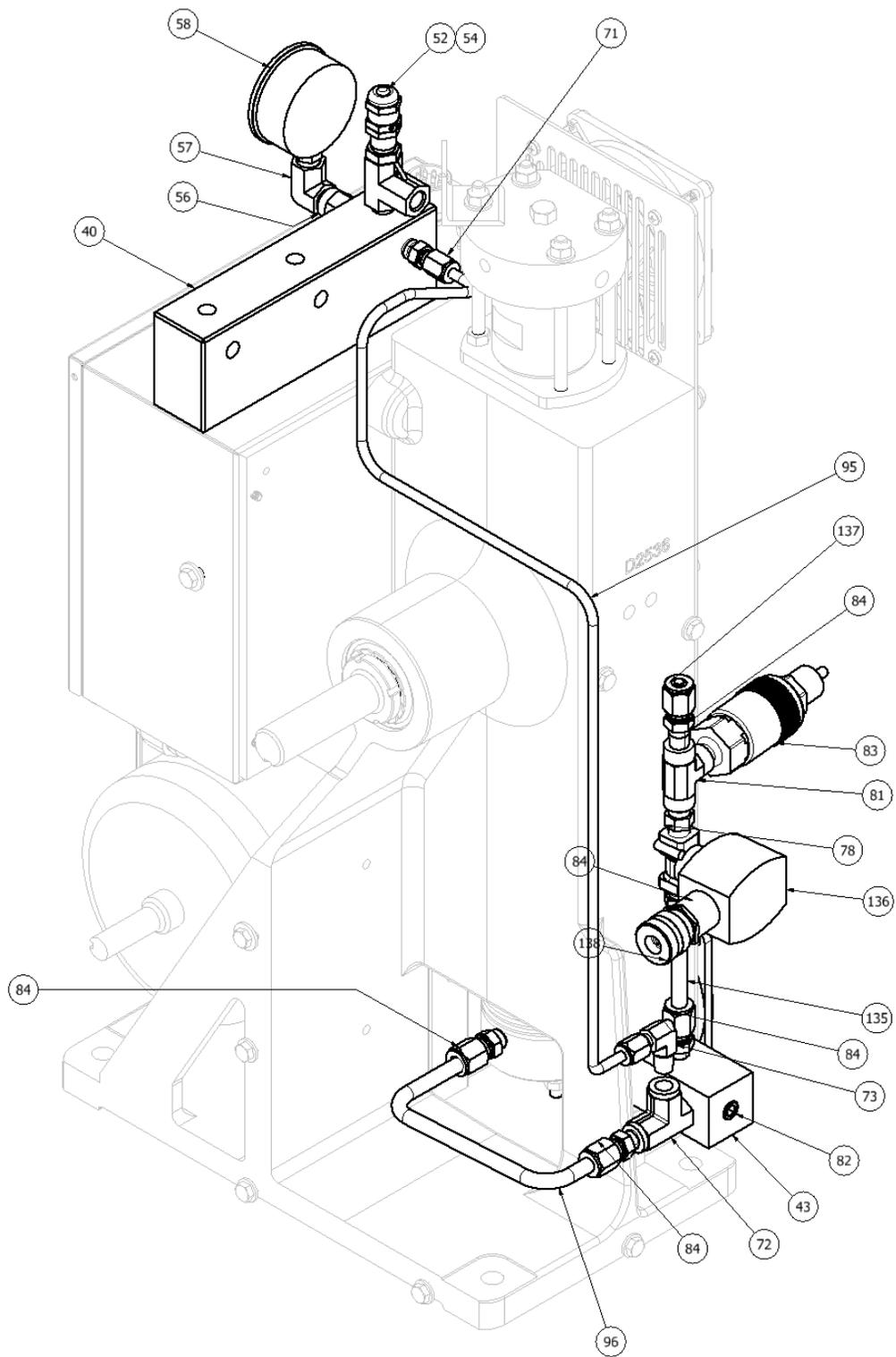


FIGURE 7: SUCTION PLUMBING DETAIL

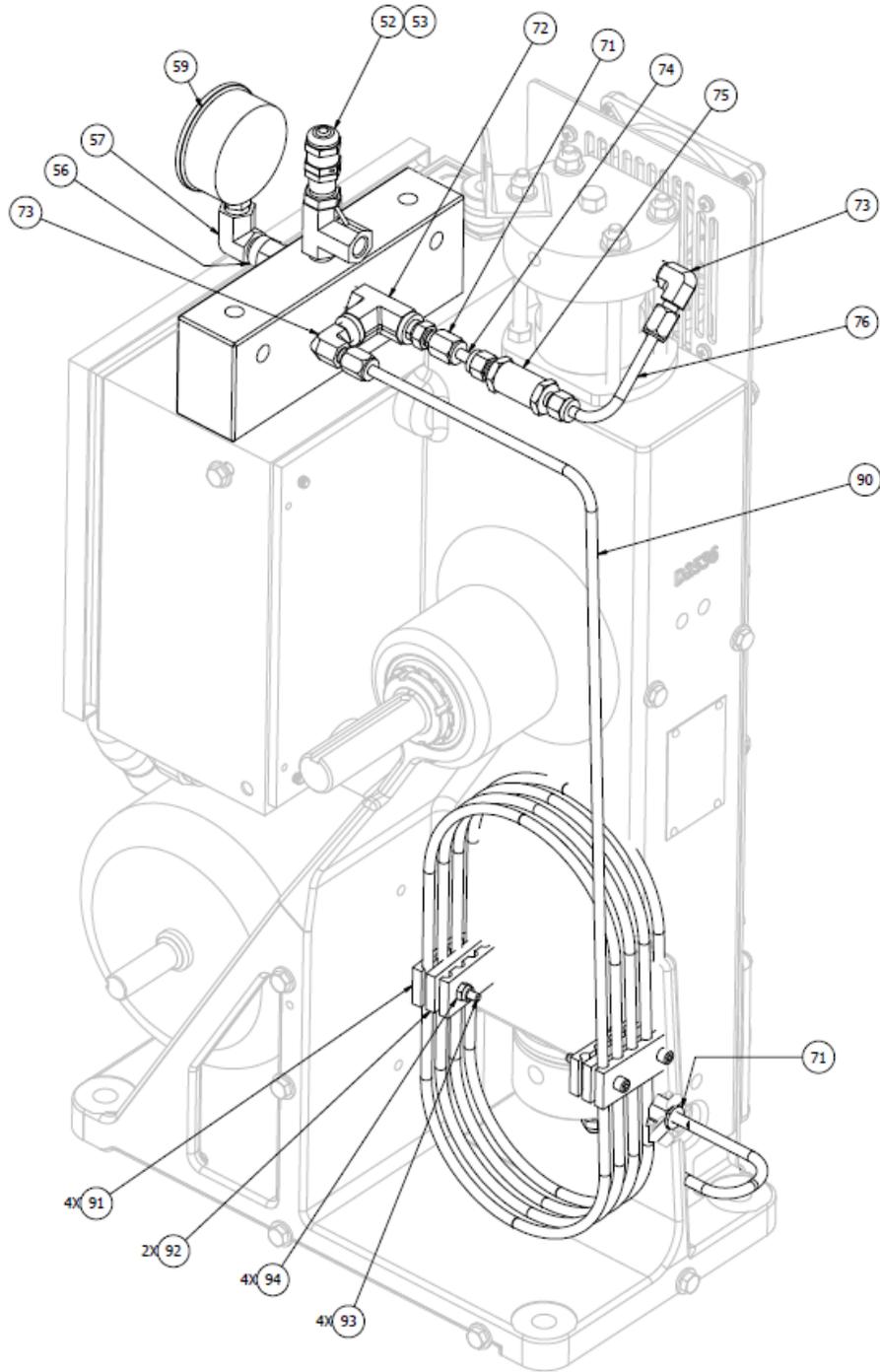


FIGURE 8: INTERSTAGE PLUMBING DETAIL

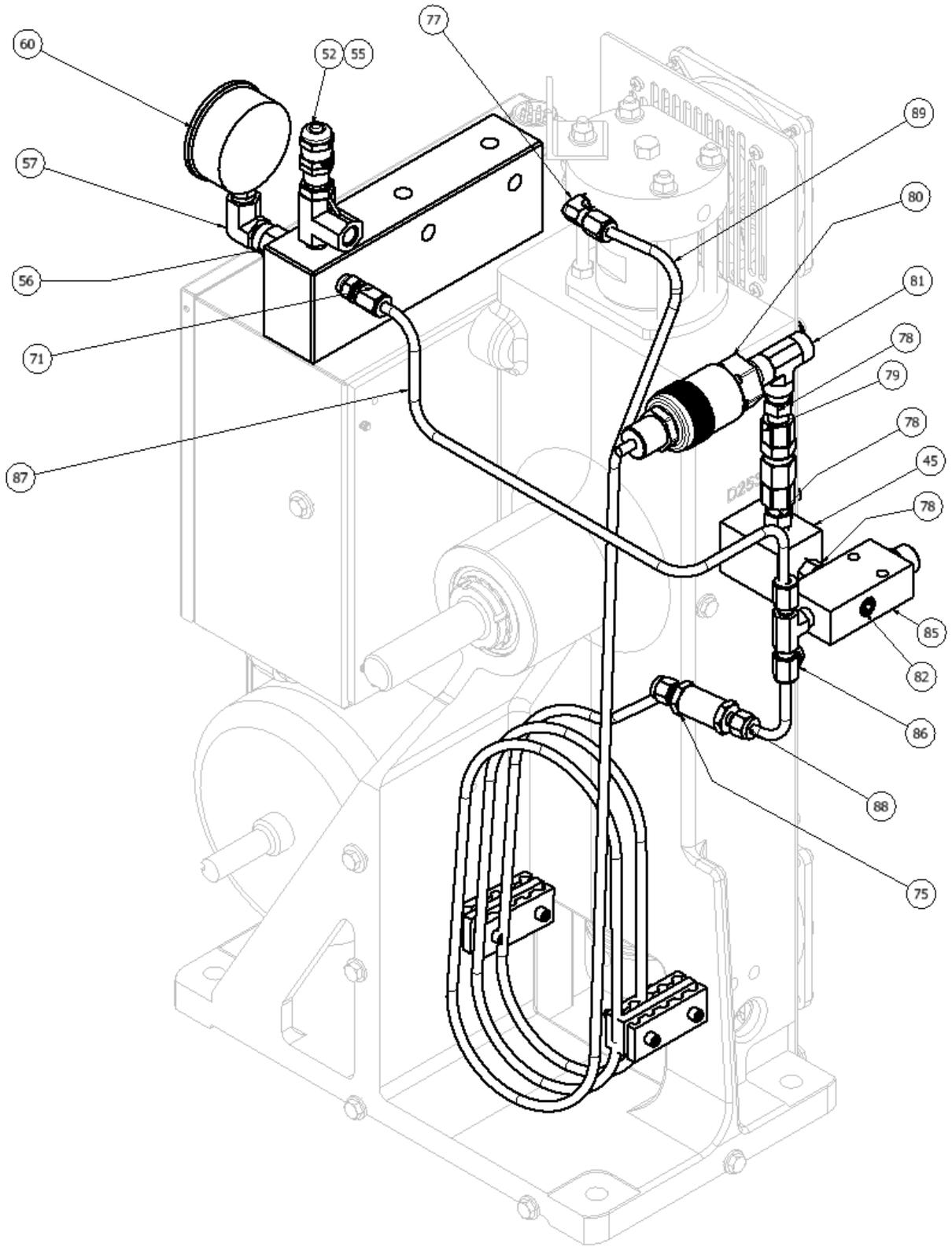


FIGURE 9: FINAL DISCHARGE PLUMBING DETAIL

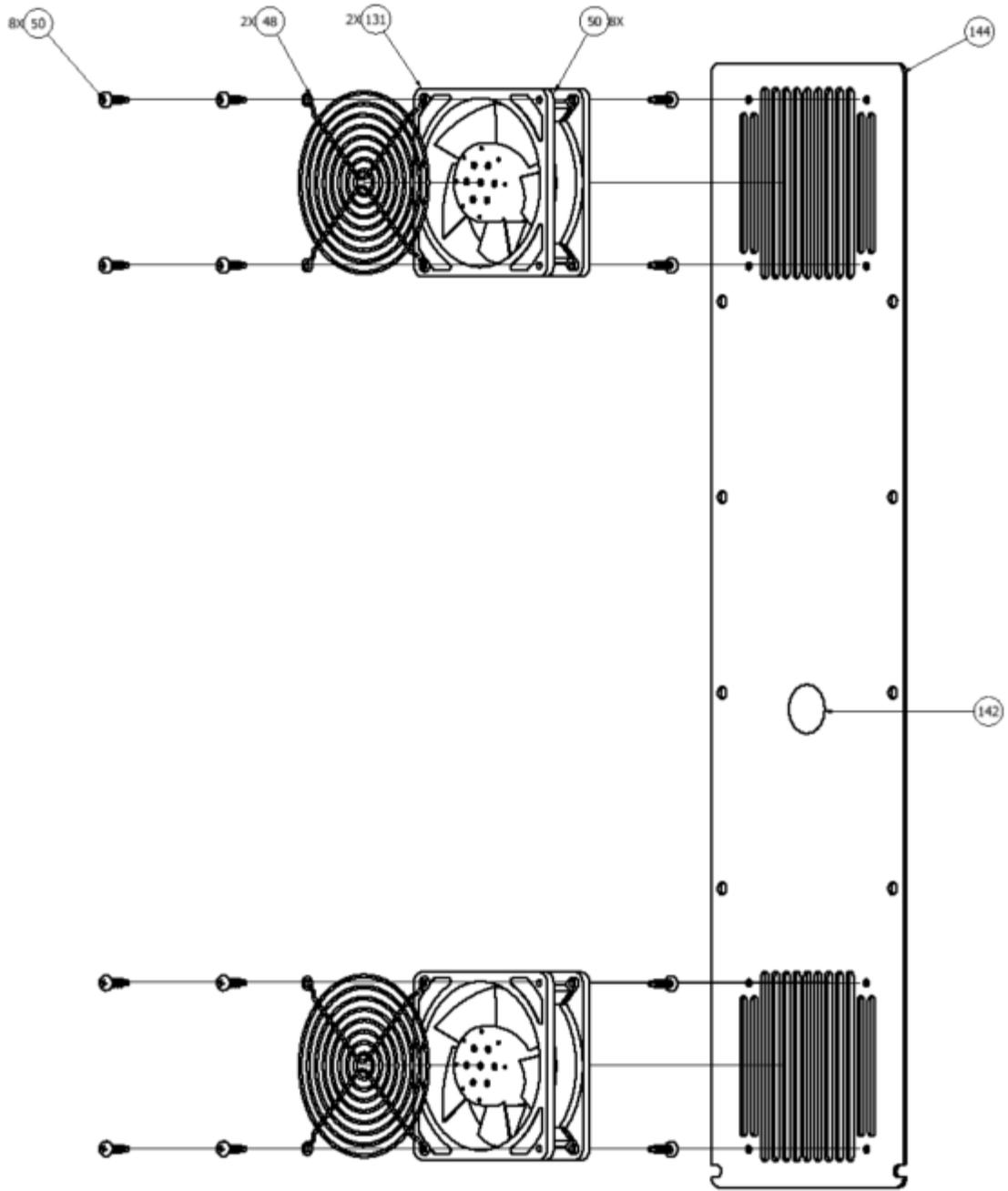


FIGURE 10: COOLING FAN SUB-ASSEMBLY DETAIL

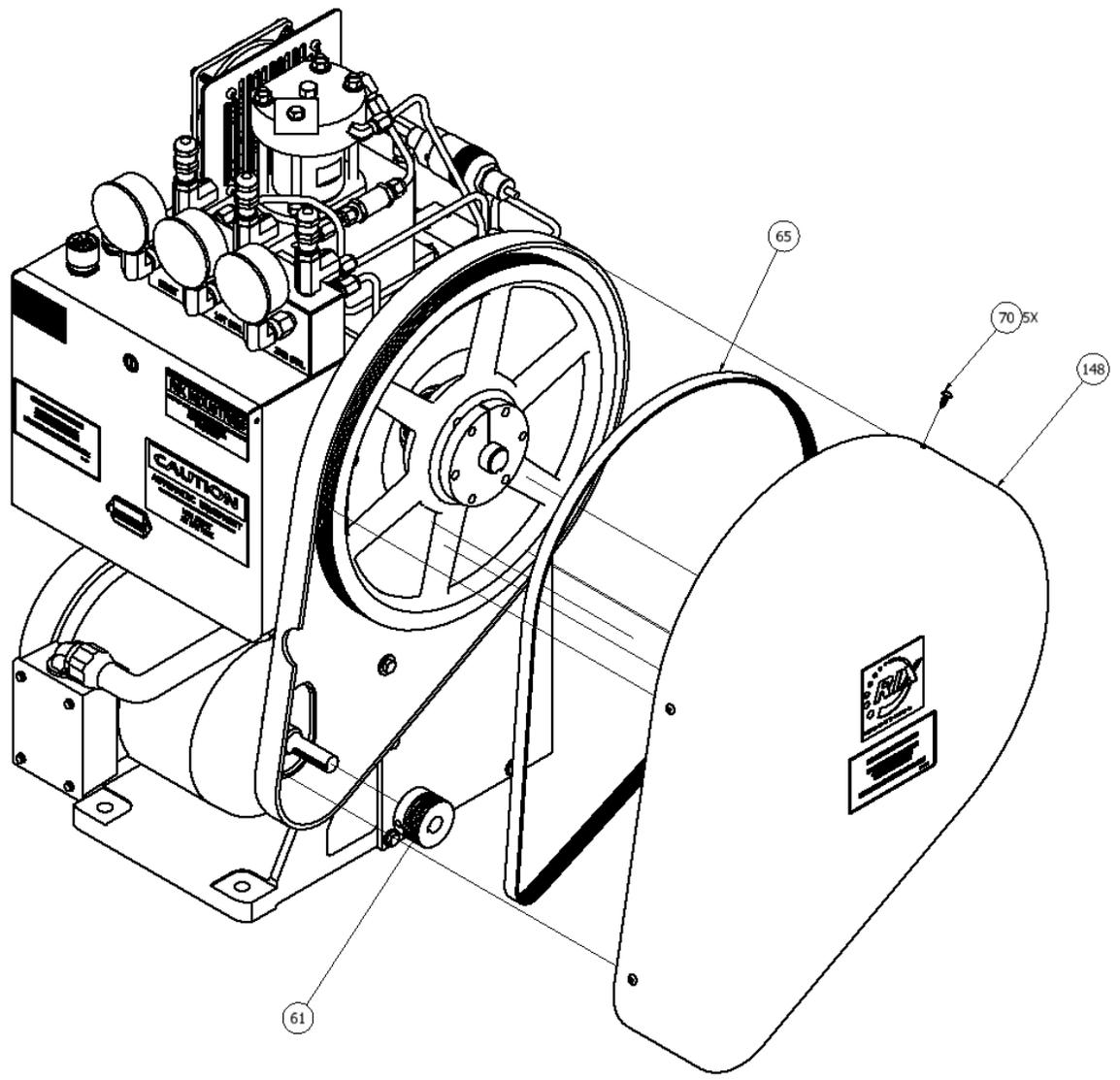


FIGURE 11: BELT INSTALLATION DETAIL



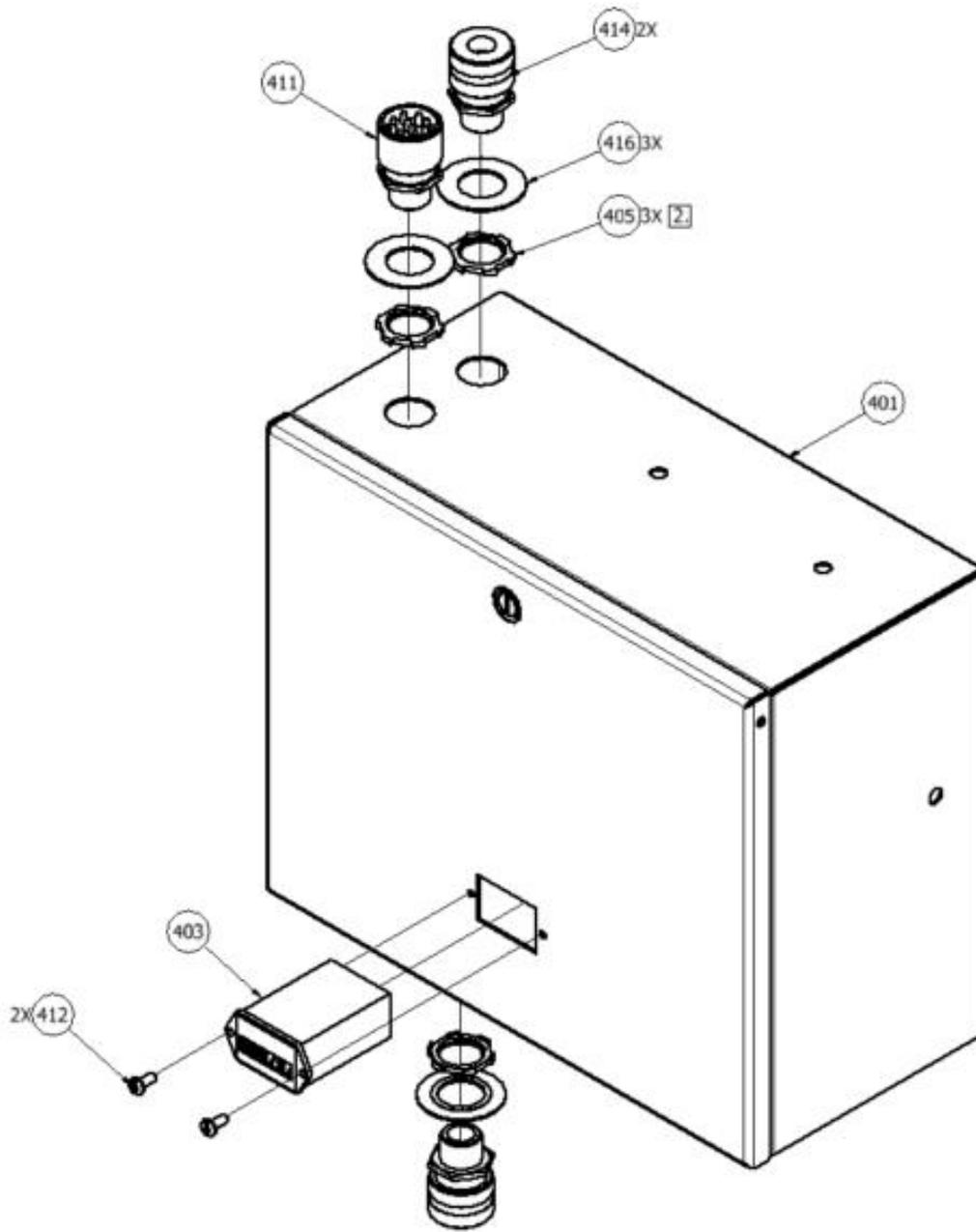


FIGURE 13: CONTROL BOX DETAIL, 1 OF 2

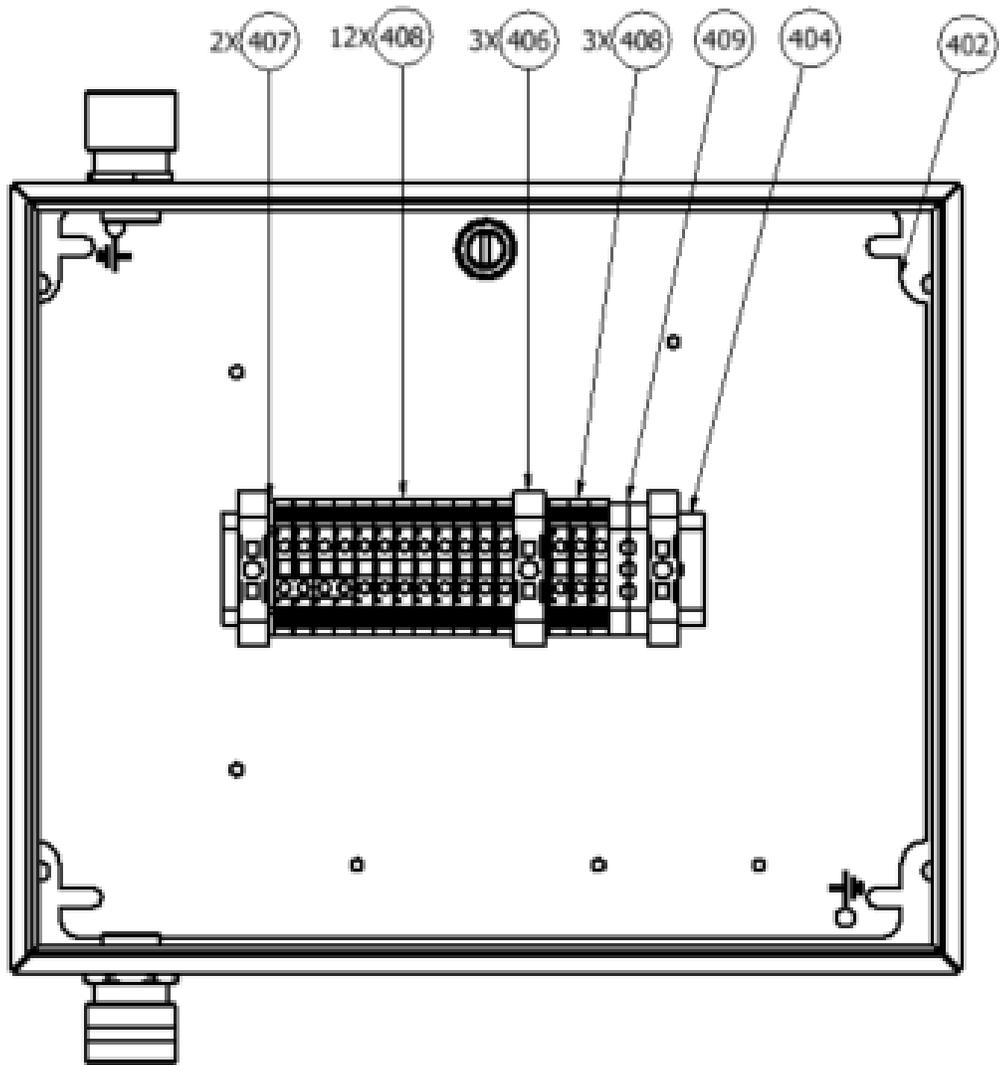
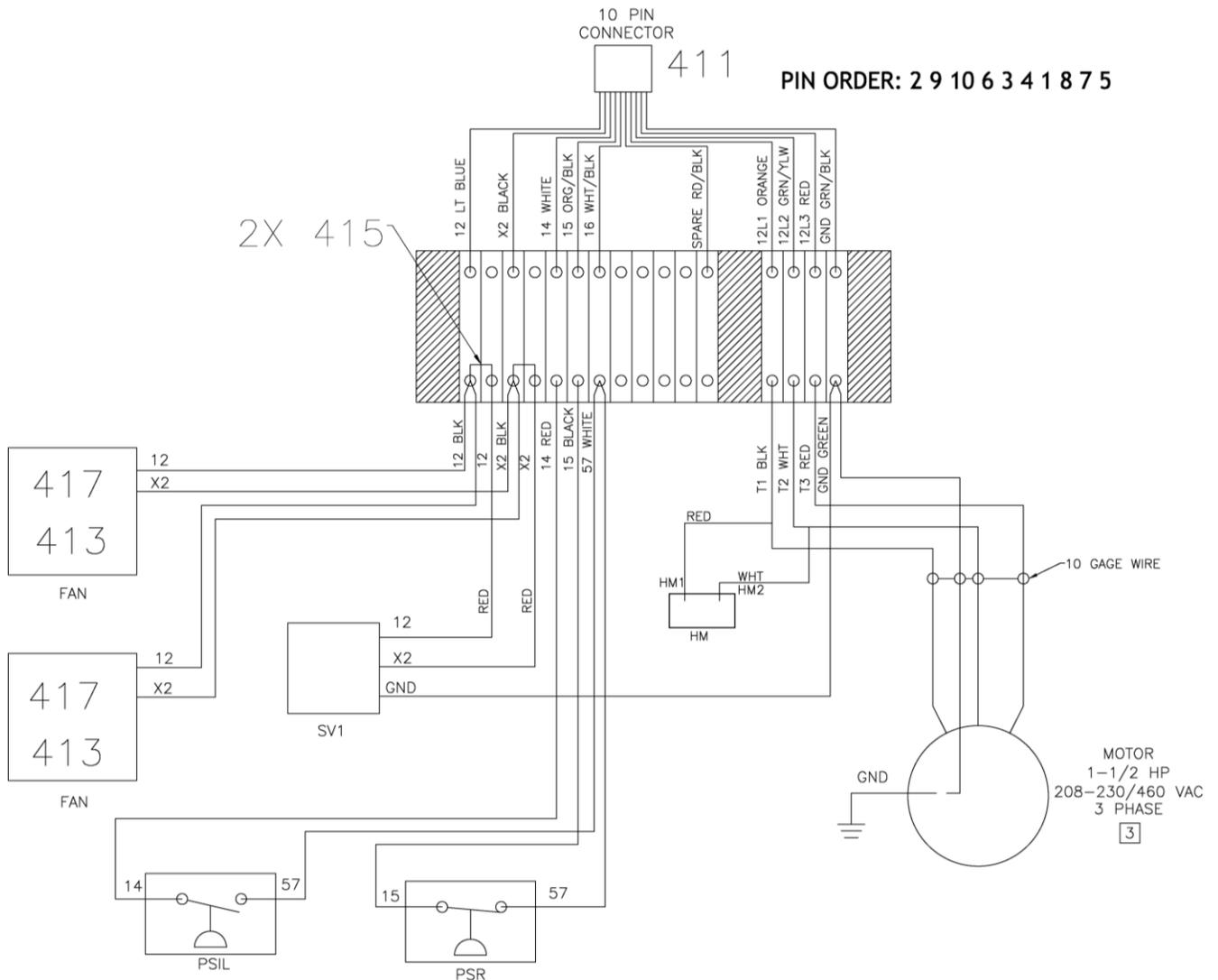
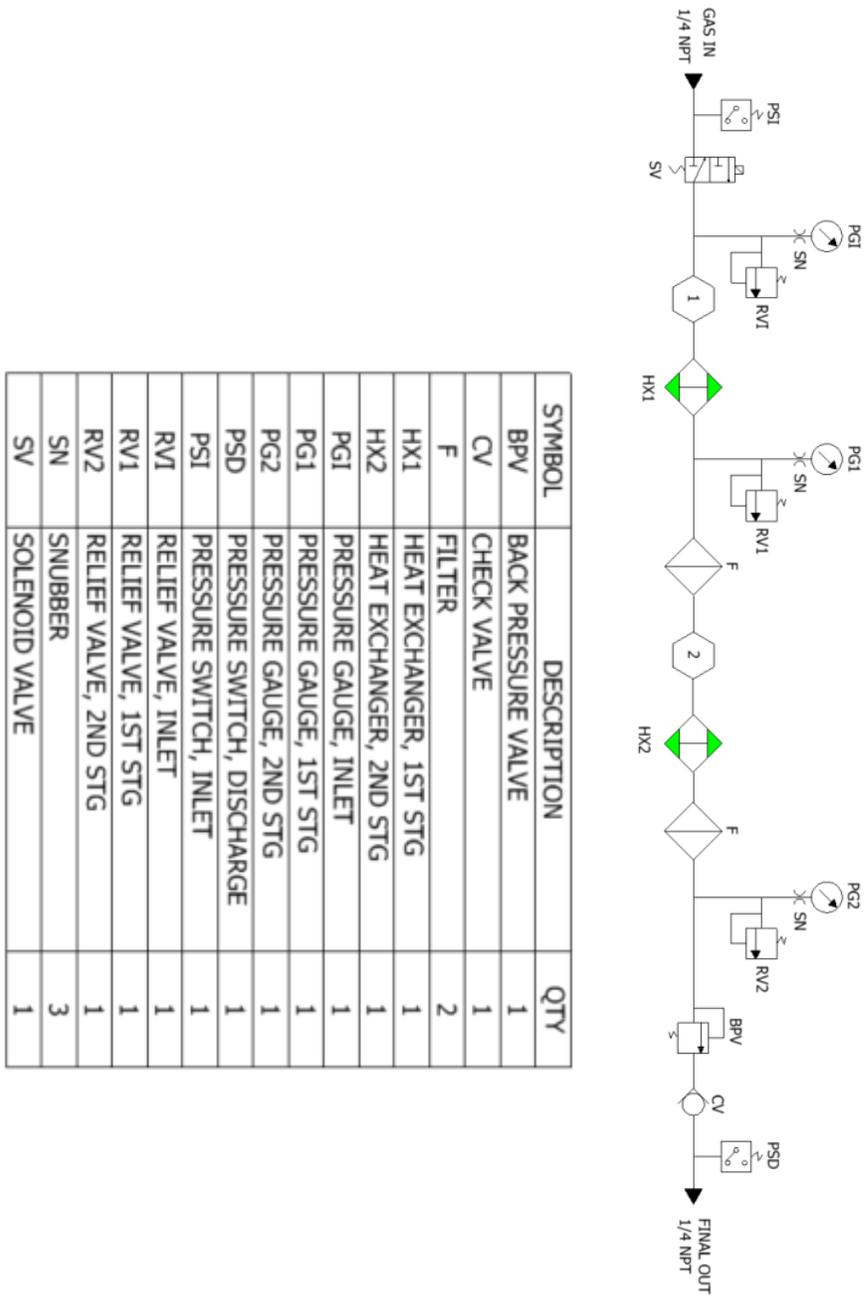


FIGURE 14: CONTROL BOX DETAIL, 2 OF 2



**Figure 15: Wiring detail**



SYMBOL	DESCRIPTION	QTY
BPV	BACK PRESSURE VALVE	1
CV	CHECK VALVE	1
F	FILTER	2
HX1	HEAT EXCHANGER, 1ST STG	1
HX2	HEAT EXCHANGER, 2ND STG	1
PG1	PRESSURE GAUGE, INLET	1
PG1	PRESSURE GAUGE, 1ST STG	1
PG2	PRESSURE GAUGE, 2ND STG	1
PSD	PRESSURE SWITCH, DISCHARGE	1
PSI	PRESSURE SWITCH, INLET	1
RV1	RELIEF VALVE, INLET	1
RV1	RELIEF VALVE, 1ST STG	1
RV2	RELIEF VALVE, 2ND STG	1
SN	SNUBBER	3
SV	SOLENOID VALVE	1

FIGURE 16: FLOW SCHEMATIC