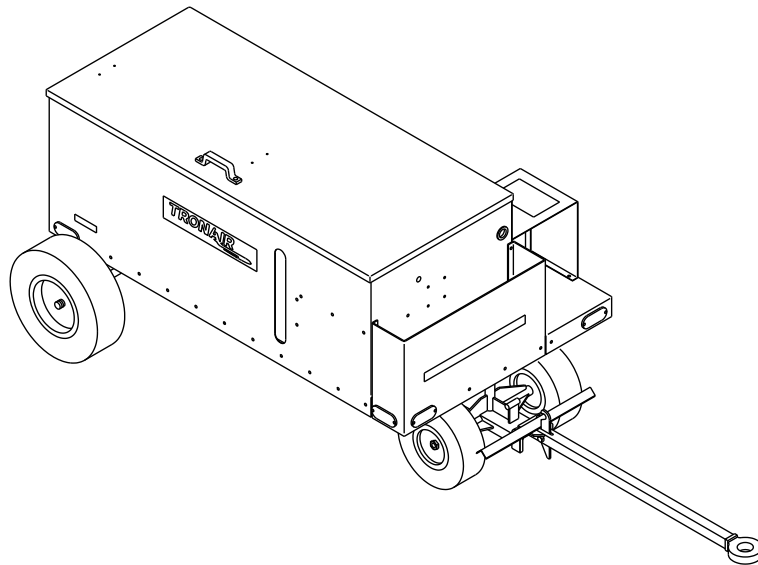




Operation & Service Manual



Model: 06-5025-1512 Reservoir Servicing Unit

06/2002 - AC - Rev. 02

Includes Illustrated Parts List

Tronair, Inc.

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**Model: 06-5025-1512
Reservoir Servicing Unit**

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**Model: 06-5025-1512
Reservoir Servicing Unit**

This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur.

1.0 GENERAL DESCRIPTION

The Tronair Reservoir Service Unit is a compact unit primarily designed to provide a source of clean fluid for filling reservoirs. **It is not intended to perform any pressure testing tasks.**

2.0 SPECIFICATIONS

Fluid: MIL-H-5606/83282
Maximum Pressure: 100 psi (6.9 bar)
Filter: 2 Micron
Dimensions: 50 in (127 cm) Wide
73 in (185.4 cm) Long
50 in (127 cm) High
Weight: 390 lbs (176.9 kg)
Pump Displacement: 5.0 gpm (18.9 lpm) @ 90 psi (6.2 bar) Displacement will decrease with increase of back pressure.

3.0 FEATURES

- 15 ft (4.6 m) output hose
- 2 micron main filter with 15 micron inline filter at end of hose
- Adjustable Pressure Regulator
- 68 gal (257.4 lt) Fluid Reservoir
- Hose Compartment
- Pneumatic Tires
- Parking Brake
- Easy Loading of Nitrogen Bottle
- Pneumatic Pump driven by 230 cubic foot (6.5 cubic centimeters) Nitrogen Bottle (Customer Supplied)

4.0 OPTIONS

- Option 06: Nitrogen Service
- Option 07: Reservoir Filling (See Page 12)
- Option 08: Shop Air (See Page 13)
- Option 09: Output Hose with Wand (See Page 14)

5.0 PREPARATION FOR USE



CAUTION!

Maximum towing speed is 10 mph (16.1 kph).

Only use the type of fluid for which the unit is designed. Using other fluids will cause contamination and seal deterioration.

The unit is shipped fully assembled, and only the following steps are required to make it operational:

1. Install standard 230 cubic foot (6.5 cubic centimeters) Nitrogen bottle onto unit. (See section 6.0 Nitrogen Bottle Installation and **Figure 1** on following page.)
2. Fill 68 gal (257.4 lt) fluid tank with desired mineral based hydraulic fluid.

Model: 06-5025-1512
Reservoir Servicing Unit

6.0 NITROGEN BOTTLE INSTALLATION

1. Position Nitrogen bottle in front of bottle clamp.
2. Position bottle stop away from bottle clamp.
3. Rotate bottle clamp to vertical position and clamp securely around standard 230 cubic foot (6.5 cubic centimeters) Nitrogen bottle.
4. Rotate bottle to horizontal position on bottle supports.
5. Relieve clamp pressure and slide Nitrogen bottle toward front of cart until bottle rests against the front stop. Rotate bottle until output valve is in line with cart Nitrogen input line.
6. Re-secure bottle clamp and rotate rear bottle stop behind bottle.

NOTE: Due to minor variations in Nitrogen bottle lengths, it may be necessary to adjust the location of the rear bottle stop. The stop has slotted holes, and can be adjusted simply by loosening mounting bolts and re-tightening them after adjusting.

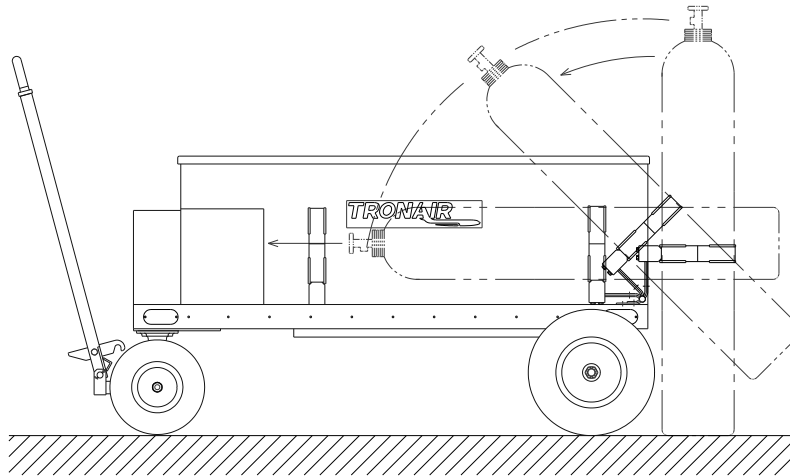


FIGURE 1 - Nitrogen Bottle Installation

7.0 OPERATION

Aircraft Fill Procedure:

1. If the unit is equipped with the reservoir filling option (Option 07 - See Page 12), make sure the selector valve is turned to the "Fill Aircraft Reservoir" position prior to servicing aircraft.
2. Connect output hose to aircraft reservoir.
3. Open Nitrogen bottle valve, or connect shop air if unit has the shop air option (Option 08 - See Page 13).
4. Set regulated Nitrogen pressure to pneumatic pump. DO NOT exceed 100 psi (6.9 bars) maximum.
5. Open output valve at aircraft end of output hose to fill the aircraft reservoir.
6. Close output valve when aircraft reservoir is full.
7. Close Nitrogen supply valve.
8. Slowly disconnect output hose and remove from aircraft reservoir.

Model: 06-5025-1512
Reservoir Servicing Unit

8.0 MAINTENANCE

General: Maintain 45 to 50 psi (3.1 to 3.4 bar) tire pressure and grease wheel bearings quarterly.

8.1 FILTERS

The 2 micron hydraulic fluid filter is non-bypass. This means if the filter becomes clogged, no fluid will pass through it to the output hose. If this happens, service the filter. **DO NOT increase the input pressure as damage to components could result.**

8.2 SERVICE

The main filter is replaceable and should be serviced annually or as necessary based on existing operating environment.

8.3 TROUBLE SHOOTING

See applicable component Appendix.

9.0 OPTION 06 NITROGEN SERVICE

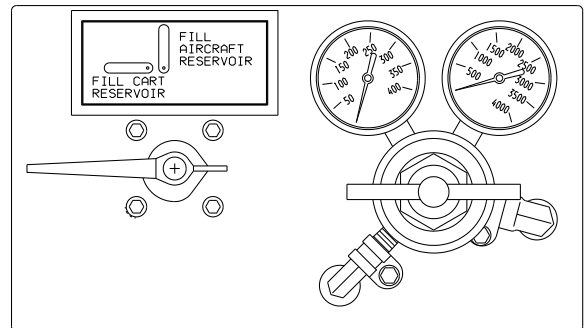
The Nitrogen Service Option (Option 06) allows the Nitrogen bottle aboard the cart to be used to provide regulated bottle pressure (maximum 250 psi/17.2 bar) for external customer applications. This is accomplished by diverting the flow of Nitrogen away from the pneumatic pump through an external hose assembly.

10.0 OPTION 07 RESERVOIR FILLING

The Reservoir Filling Option (Option 07) allows the cart to pump hydraulic fluid into the 68 gal (257.4 lt)reservoir. A four-way valve assembly controls the direction of fluid flow (into the reservoir or out of the reservoir). Also, a bung fitting pickup tube assembly is included with this option for convenience.

Reservoir Filling Procedure:

1. Remove bung fitting assembly from underside of lid.
2. Remove dust cap on the end of the 120 in (304.8 cm) long hose connected to the selector valve and install the bung fitting assembly to hose.
3. Secure the bung fitting assembly into container of desired clean hydraulic fluid.
4. Close ball valve at aircraft end of output hose.
5. Turn selector valve on cart to "Fill Cart Reservoir". (See **Figure 2**.)
6. Open Nitrogen bottle valve/connect (Option 08 - See Page 13) shop air.
7. Set regulated input pressure to pneumatic pump. **DO NOT** exceed 100 psi (6.9 bars) maximum.
8. Decrease input pressure regulator as reservoir becomes filled.
9. Close Nitrogen bottle valve and disconnect or shut off supply shop air.
10. Remove bung fitting assembly from hydraulic fluid source and wipe clean.
11. Replace bung fitting assembly to holder under the lid.



SELECTOR VALVE IN "FILL CART RESERVOIR" POSITION

FIGURE 2

**Model: 06-5025-1512
Reservoir Servicing Unit**

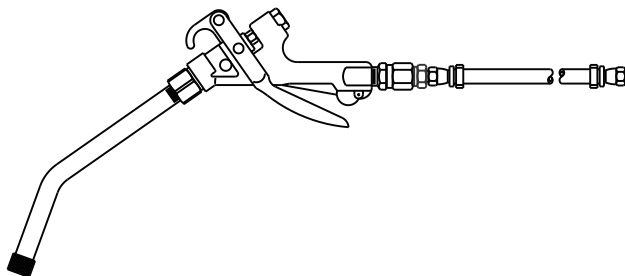
11.0 OPTION 08 SHOP AIR

The shop air option (Option 08) allows the unit to be powered by customer supplied shop air instead of the on-board Nitrogen bottle. A quick disconnect air fitting is provided on the unit with this option for connecting shop air to the cart. A check valve assembly assures proper flow of the air through the regulator and, ultimately through the pneumatic pump. With this option, both the shop air and/or Nitrogen can be used interchangeably.

NOTE: *Both options, the Nitrogen Service (Option 06) and the Shop Air (Option 08), cannot be installed onto the same cart. Only one of these two options can be installed on a cart at one time.*

12.0 OPTION 09 OUTPUT HOSE WITH WAND

The optional output hose with wand (Option 09) is a special output hose with a pistol trigger.



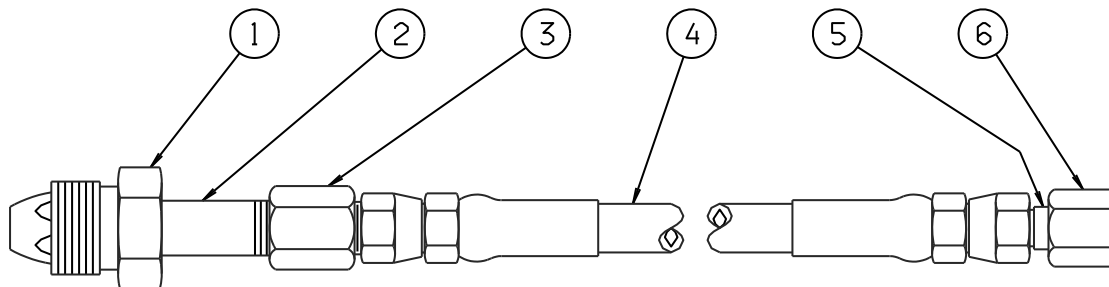
When using this hose assembly, simply depress the trigger to start flow of fluid, and release trigger to stop flow.

Parts List Index

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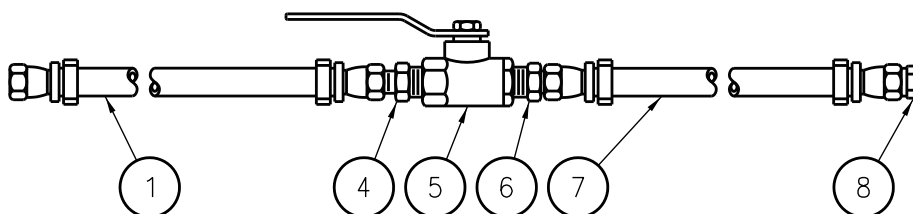
Z-2853 Input Hose Assembly

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	PC-1001	Nut.....	1
2.....	PC-1000	Nipple, Inlet.....	1
3.....	N-2010-04-S.....	Connector, Female.....	1
4.....	TF-1043-01*40.0	Assembly, Hose (#4 MB, 40" long)	1
5.....	N-2020-01-S.....	Reducer, Tube End	1
6.....	N-2000-05-S.....	Nut, #6 JIC x 37°	1

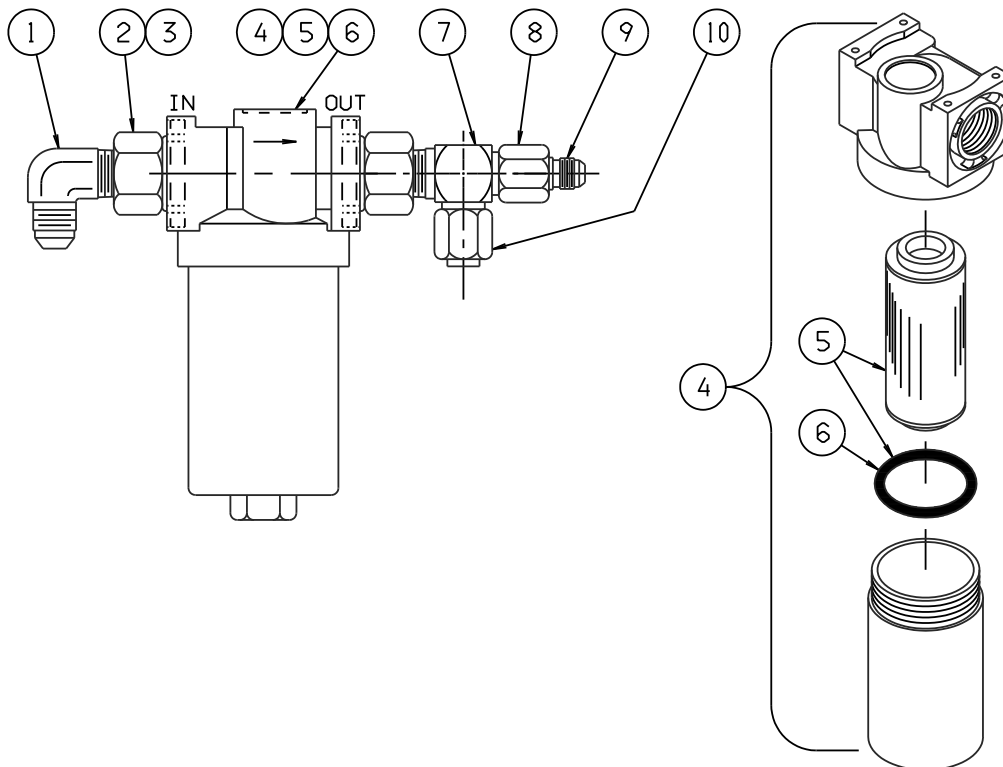
Z-2854 Output Hose Assembly



ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	TF-1084-01*180	Assembly, Hose (180" long)	1
4.....	N-2009-11-S.....	Connector, Male	1
5.....	HC-1425-02.....	Valve, Ball.....	1
6.....	N-2009-10-S.....	Connector, Male	1
7.....	TF-1084-01*25.0	Assembly, Hose (25" long)	1
8.....	N-2014-05-S.....	Plug	1

Z-2843 Filter Assembly

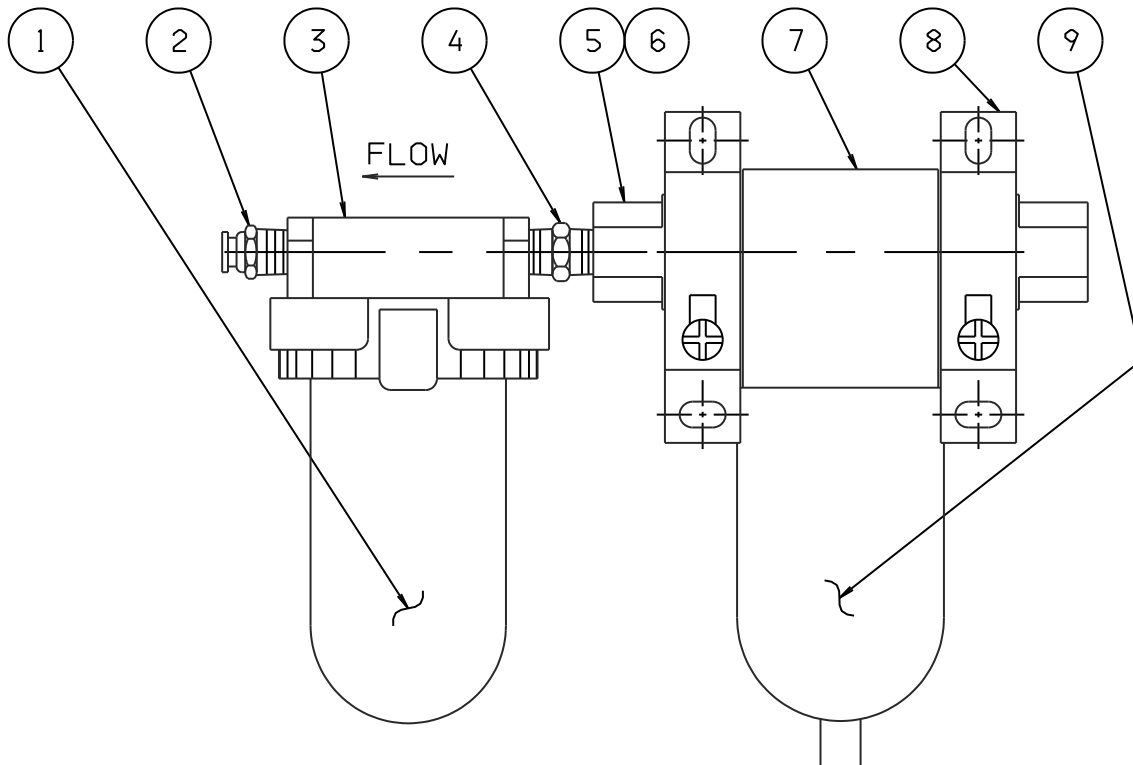
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	N-2005-14-S	Elbow, Male	1
2	N-2202-09-S	Adaptor, Female Pipe	2
3	HC-2014-912	O-ring, Series 3	2
4	HC-1481	Assembly, Filter (MB)	1
5	HC-1482	Element, Filter	1
6	HC-2007-143	O-ring, Series 2	1
7	N-2017-14-S	Tee, Male Run	1
8	N-2000-06-S	Nut, #8 JIC x 37°	1
9	N-2020-03-S	Reducer, Tube End	1
10	N-2008-06-S	Cap, 1/2	1

Z-2839 Desiccant Filter Assembly

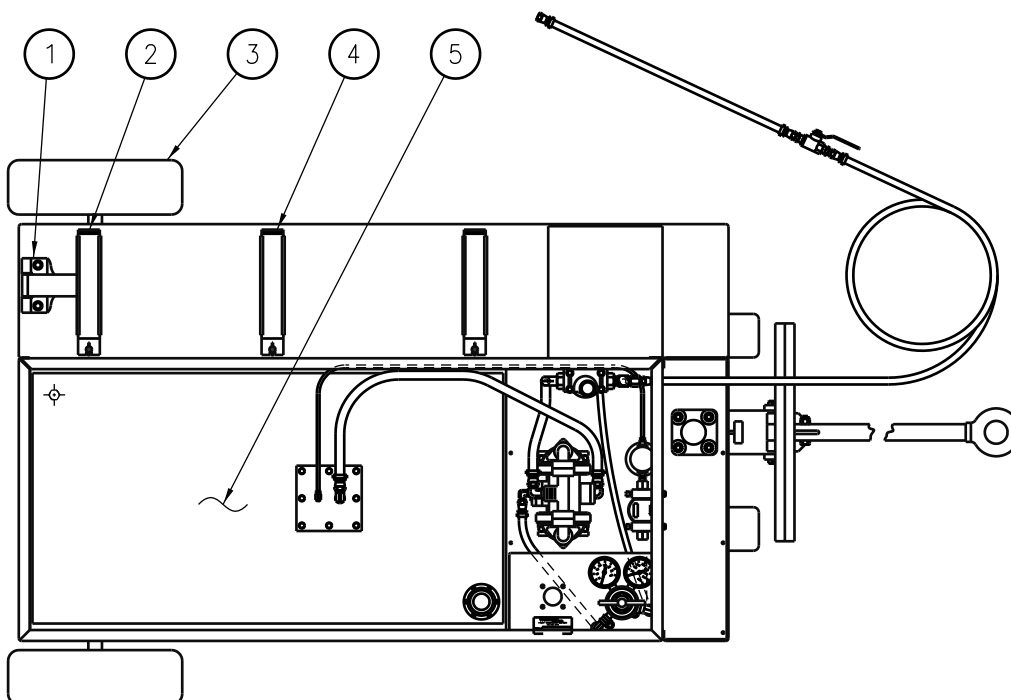
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	PC-1056	Desiccant, (3) 1/4 lb bags.....	Ref.
2.....	N-2443-07	Connector, Male	1
3.....	PC-1053	Dryer, Desiccant.....	1
4.....	N-2203-04-B.....	Nipple, Pipe	Ref.
5.....	PC-1055	Block, End (Set of 2)	1
6.....	HC-2007-021.....	O-ring, Viton	2
7.....	PC-1052	Filter, Air	1
8.....	PC-1054	Bracket, Mount	2
9.....	PC-1059	Element, Filter	Ref.

Parts List

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



REPLACEMENT PARTS

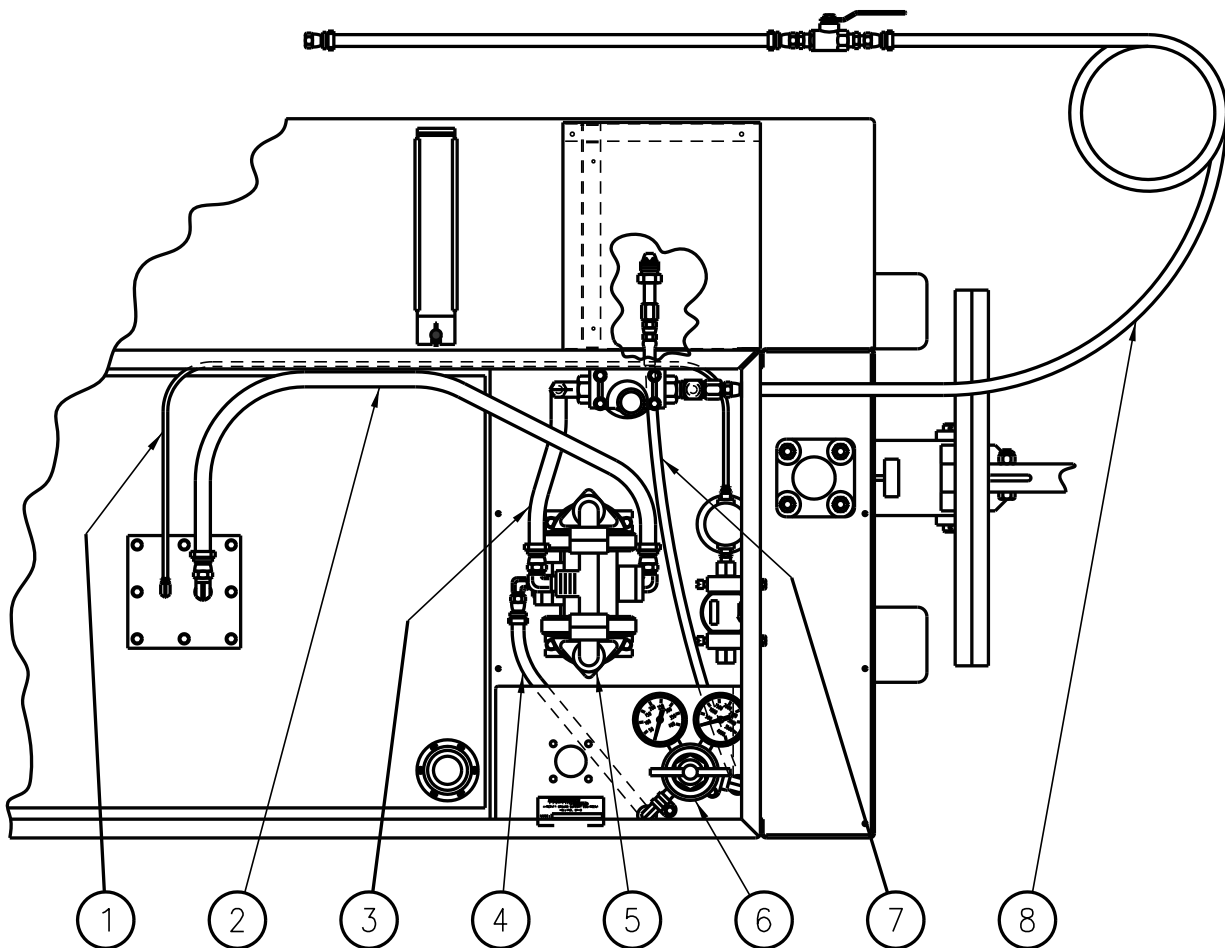
ITEM	PART NUMBER	DESCRIPTION	QTY
2	Z-1217	Assembly, Wheel Tire and Bearing	2

REPLACEMENT KITS

ITEM	PART NUMBER	DESCRIPTION	QTY
1	K-3212	Kit, Hinge Replacement; consists of:	
	G-1100-107514	Bolt, Hex Head, Grade 5 3/8-24 x 1" long	3
	G-1202-1075	Stopnut, 3/8-24 Elastic	3
	G-1250-1070N	Flatwasher, 3/8 Narrow	6
	Z-4640	Assembly, Bottle Clamp	1
3	K-3213	Kit, Bottle Clamp Replacement; consists of:	
	G-1100-106520	Bolt, Hex Head, Grade 5 5/16-24 x 2" long	2
	G-1202-1065	Stopnut, 5/16 Elastic	2
	G-1250-1060N	Flatwasher, 5/16 Narrow	1
	H-2359	Clamp, Bottle	1
4	K-2368	Kit, 68 Gallon Tank Replacement; consists of:	
	G-1432-23	Wellnut, 1/2-20 x 1.051" long	8
	H-1946	Tank, Machined RSU	1

Parts List

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	TF-1012*48.0	Hose, 1/4" Polyethylene (48" long).....	1
2.....	TF-1084-02*60.0	Assembly, Hose (#8 Mineral Base, 60" long).....	1
3.....	TF-1084-02*20.0	Assembly, Hose (#8 Mineral Based, 20" long).....	1
4.....	TF-1084-02*12.0	Assembly, Hose (#8 Mineral Based, 12" long).....	1
5.....	Z-5586.....	Assembly, Pump (Pump: H-2660).....	1
6.....	Z-2846.....	Assembly, Regulator	1
7.....	Z-2853.....	Assembly, Input Hose (See Page 5).....	1
8.....	Z-2854.....	Assembly, Output Hose (See Page 5).....	1
<i>Not Shown</i>	N-2052-06	Expander, Tube.....	1
<i>Not Shown</i>	HK-3709	Kit, Pump Seal Repair (for Pump H-2660)	
<i>Not Shown</i>	HK-3710	Kit, Air End Repair (for Pump H-2660)	

Parts List

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

Reference Illustration on Page 11.

REPLACEMENT PARTS

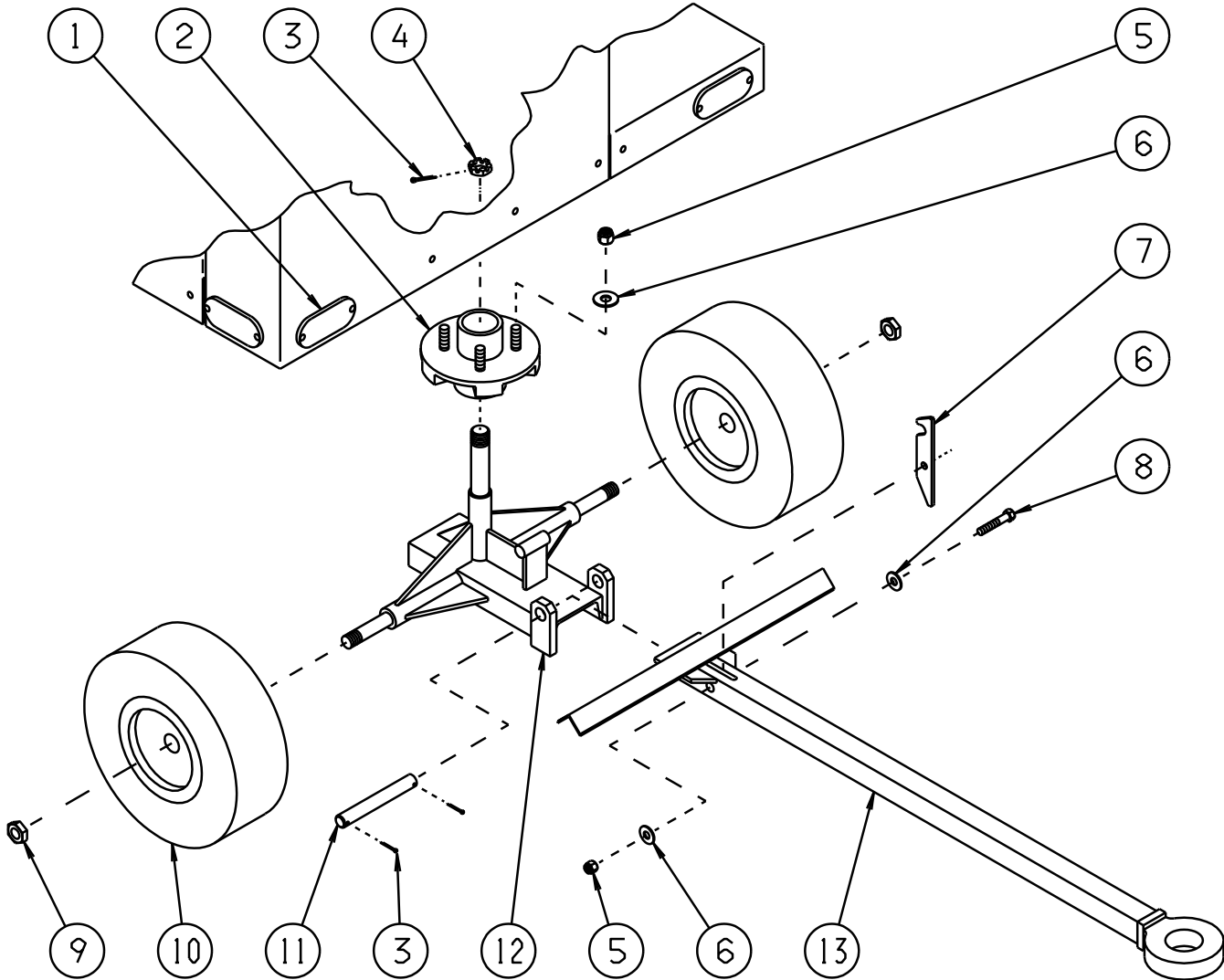
ITEM	PART NUMBER	DESCRIPTION	QTY
12.....	Z-4878-01.....	Weldment, Steering Axle.....	1
13.....	Z-4876-01.....	Weldment, Tongue.....	1

REPLACEMENT KITS

ITEM	PART NUMBER	DESCRIPTION	QTY
	K-1249	Kit, Pin Replacement; consists of:	
3.....	G-1301-03.....	Pin, 1/8 x 1-1/2" long Cotter.....	2
11.....	R-1122.....	Pin.....	1
	K-1255	Kit, Hub Replacement; consists of:	
2.....	H-1335.....	Hub, Idler.....	1
3.....	G-1301-03.....	Pin, 1/8 x 1-1/2" long Cotter.....	1
4.....	G-1230-01.....	Nut, Axle (1"-14 UNS Thread).....	1
5.....	G-1202-1095.....	Stopnut, 1/2-20 Elastic.....	4
6.....	G-1250-1090N.....	Flatwasher, 1/2 Narrow.....	4
	K-1320	Kit, Lever Replacement; consists of:	
5.....	G-1202-1095.....	Stopnut, 1/2-20 Elastic.....	1
6.....	G-1250-1090N.....	Flatwasher, 1/2 Narrow.....	2
7.....	J-1626.....	Lever.....	1
8.....	G-1100-109522.....	Bolt, Hex Head, Grade 5, 1/2-20 x 2-1/4" long.....	1
	K-2084	Kit, Tire Replacement; consists of:	
9.....	G-1203-1115.....	Stopnut, 3/4-16 Elastic.....	1
10.....	U-1041.....	Wheel, Pneumatic.....	1
	K-2086	Kit, Red Reflector Replacement; consists of:	
Ref. Only.....	H-1427-01.....	Reflector, Red.....	1
Includes:.....	G-1352-17.....	Rivet.....	2
	K-2087	Kit, Amber Reflector Replacement; consists of:	
1.....	H-1427-02.....	Reflector, Amber.....	1
Includes:.....	G-1352-17.....	Rivet.....	2

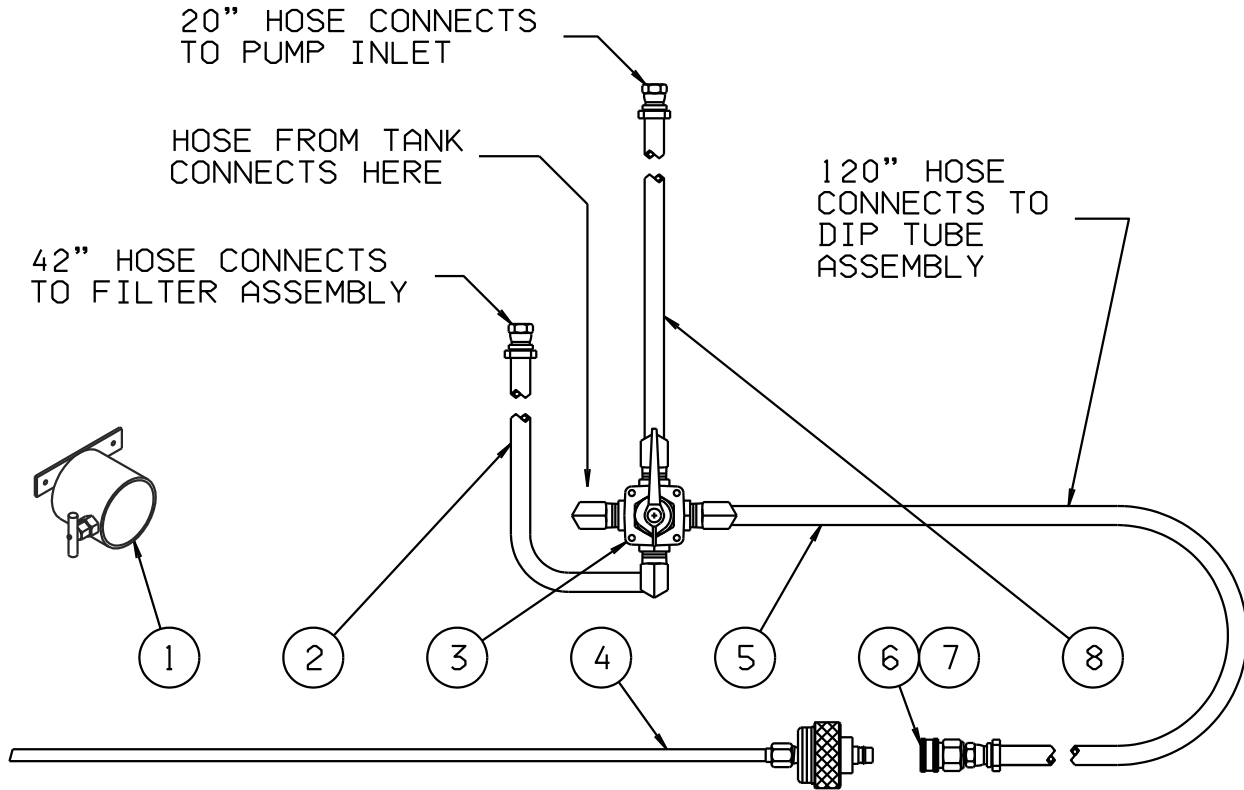
Parts List Illustration

Reference Parts List on Page 10.



Option 07 Reservoir Filling

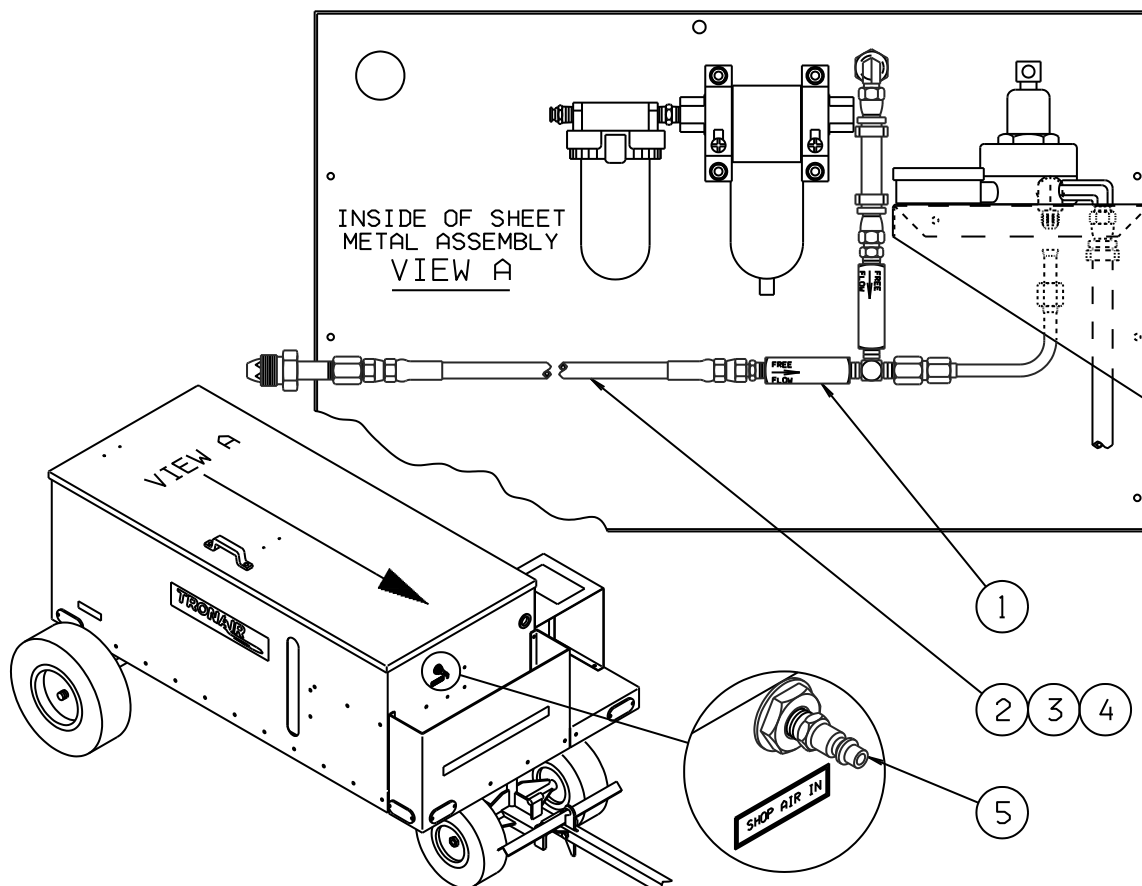
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-2851	Assembly, Tube Mount	1
4	Z-2163-03	Assembly, Bung, Fitting (Viton)	1
	Z-2842	Assembly, Selector Valve; consists of:	
2	TF-1084-02*42.0	-Assembly, Hose (#8 MB, 42" long)	1
3	HC-1074	-Valve, Selector	1
6	N-2539-0808	-Coupling, Q.D. x 37° JIC Male Viton	1
7	N-2540-02	-Plug, Dust	1
5	TF-1084-02*120	-Assembly, Hose (#8 MB, 120" long)	1
8	TF-1084-02*20.0	-Assembly, Hose (#8 MB, 20" long)	1
Not Shown	H-1511	-Wrap, Tie	1
Ref. Only	N-2005-15-S	-Elbow, Male	4

Option 08 Z-2844 Check Valve Assembly

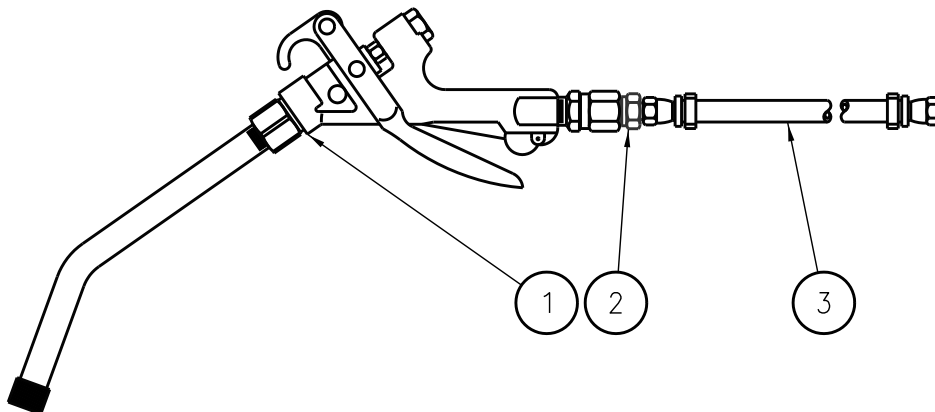
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1.....	HC-1080.....	Valve, Check.....	2
2.....	TF-1043-01*22.0.....	Assembly, Hose (#4 MB, 22" long).....	1
3.....	PC-1000.....	Nipple, Inlet.....	1
4.....	PC-1001.....	Nut.....	1
5.....	PC-1058.....	Fitting, Air Plug.....	1
Ref. Only.....	N-2005-08-S.....	Elbow, Male.....	1
Ref. Only.....	N-2009-04-S.....	Connector, Male.....	1
Ref. Only.....	N-2009-08-S.....	Connector, Male.....	1
Ref. Only.....	N-2010-04-S.....	Connector, Female.....	1
Ref. Only.....	N-2010-07-S.....	Connector, Female.....	1
Ref. Only.....	N-2211-04-S.....	Tee, Male Pipe.....	1
Ref. Only.....	N-2218-13.....	Connector, Anchor.....	1

Option 09 Z-2850 Output Hose Assembly

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	HC-1635	Valve, Control	1
2	N-2009-11-S	Connector, Male	1
3	TF-1084-01*300	Assembly, Hose, 300" long	1



APPENDIX I

**Instrument
Certification
Notice**



Instrument Certification Notice

The gauge Certificates of Calibration supplied for the gauge(s) on this unit contain the calibration data for the actual instrument calibrated, along with the calibration date of the **STANDARD** used to perform the calibration check.

The due date for re-calibration of the instrument should be based upon the date the instrument was placed in service in your facility. Re-calibration should be done on a periodic basis as dictated by the end user's quality system or other overriding requirements.

Note that Tronair, Inc. does not supply certificates of calibration on flow meters or pyrometers unless requested at the time of placed order. These instruments are considered reference indicators only and are not critical to the test(s) being performed on the aircraft.

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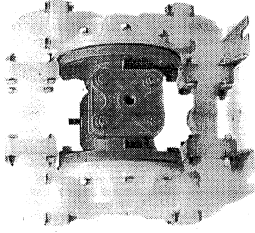
APPENDIX II

Lincoln Pump Service & Operating Manual

SERVICE & OPERATING MANUAL



**Models 85626, 85622, 85623
1/2" Air-Powered Diaphragm Pump**



CE

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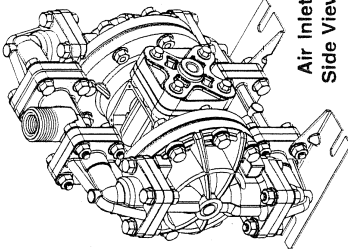


Models 85626, 85622, 85623

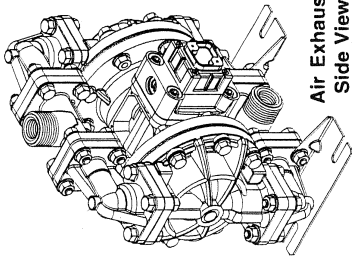
**Air-Powered
Double-Diaphragm Pump**

ENGINEERING, PERFORMANCE
& CONSTRUCTION DATA

U.S. Patent #
5,996,627; 6,241,487
Other U.S. Patents
Applied for



Air Inlet
Side View



Air Exhaust
Side View

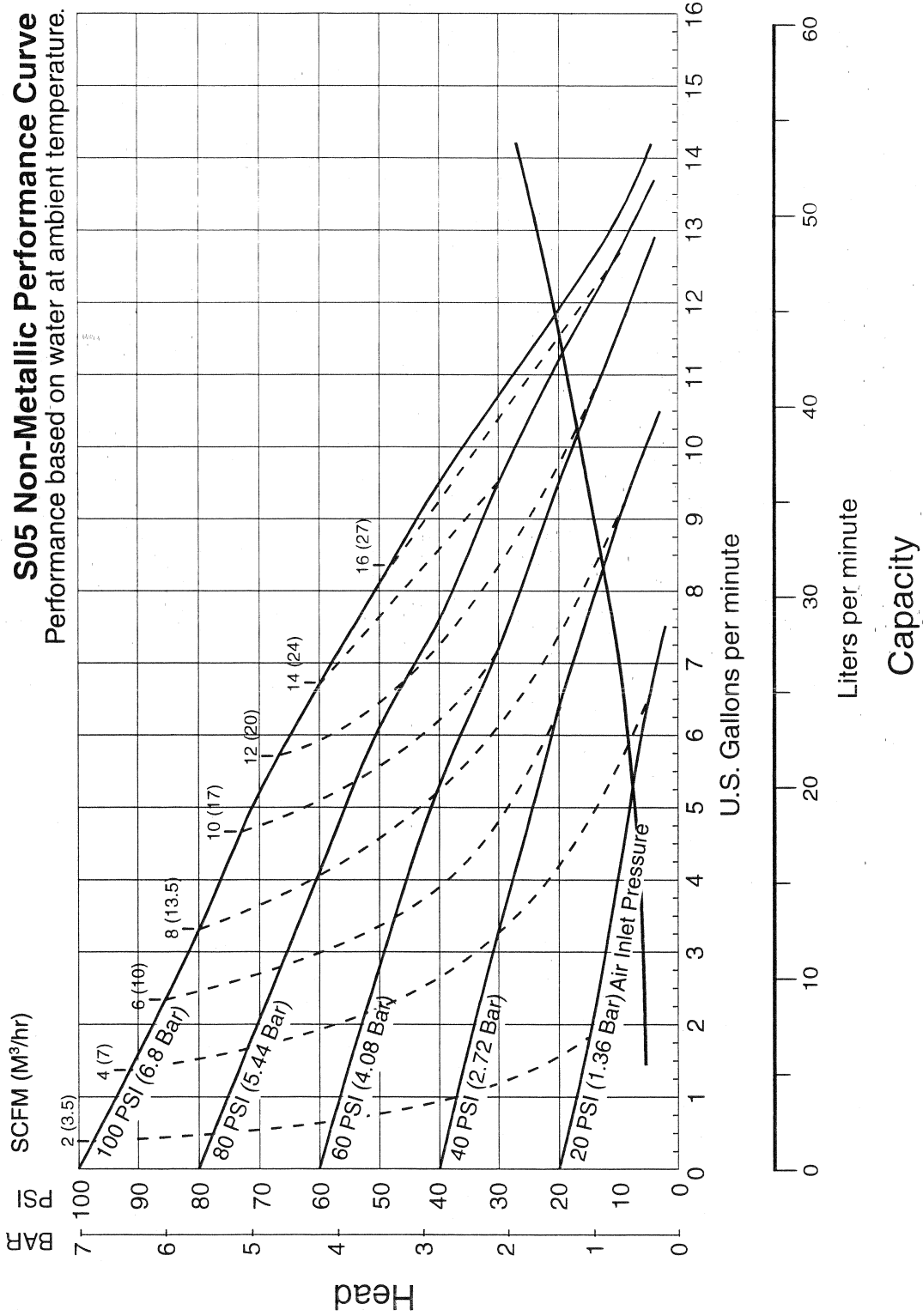
INTAKE/DISCHARGE PIPE SIZE 1/2" NPT (Internal) or 1/2" BSPT (Tapered) 1" NPT (External) or 1" BSPT (Tapered)	CAPACITY 0 to 14 gallons per minute (0 to 52 liters per minute)	AIR VALVE No-tube, no-stall design	SOLIDS-HANDLING Up to .125 in. (3mm)	HEADS UP TO 100 psi or 231 ft. of water (7 Kg/cm ² or 70 meters)	DISPLACEMENT/STROKE .026 Gallon / .098 liter
CAUTION! Operating temperature limitations are as follows:					
MATERIALS					
Operating Temperatures					
			Maximum*	Minimum*	Optimum**
Buna: General purpose, oil-resistant. Shows good solvent, oil, water and hydraulic fluid resistance. Should not be used with highly polar solvents like acetone and MEK, ozone, chlorinated hydrocarbons and nitro hydrocarbons.					
Conductive Acetal:					
Nylon:					
PVDF:					
Virgin PTFE: Chemically inert, virtually impervious. Very few chemicals are known to react chemically with PTFE- molten alkali metals, turbulent liquid or gaseous fluorine and a few fluoro-chemicals such as chlorine trifluoride or oxygen difluoride which readily liberate free fluorine at elevated temperatures.					
Polyurethane: High tensile material with excellent abrasion resistance. A general purpose material with excellent resistance to most oils.					
Polpropylene:					
Santoprene®: Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.					
			190° F 88° C	-10° F -23° C	50° to 140° F 10° to 60° C
			180° F 82° C	-20° F -28° C	
			120° F 48° C	32° F 0° C	
			200° F 93° C	10° F -13° C	50° to 212° F 10° to 100° C
			212° F 100° C	-35° F -37° C	50° to 212° F 24° to 100° C
			210° F 99° C	-40° F -40° C	-40° to 210° F -40° to 99° C
			150° F 65° C	40° F 5° C	
			212° F 100° C	-10° F -23° C	50° to 212° F 10° to 100° C

*Definite reduction in service life.
**Minimal reduction in service life at ends of range.

For specific applications, always consult "Chemical Resistance Chart" Technical Bulletin

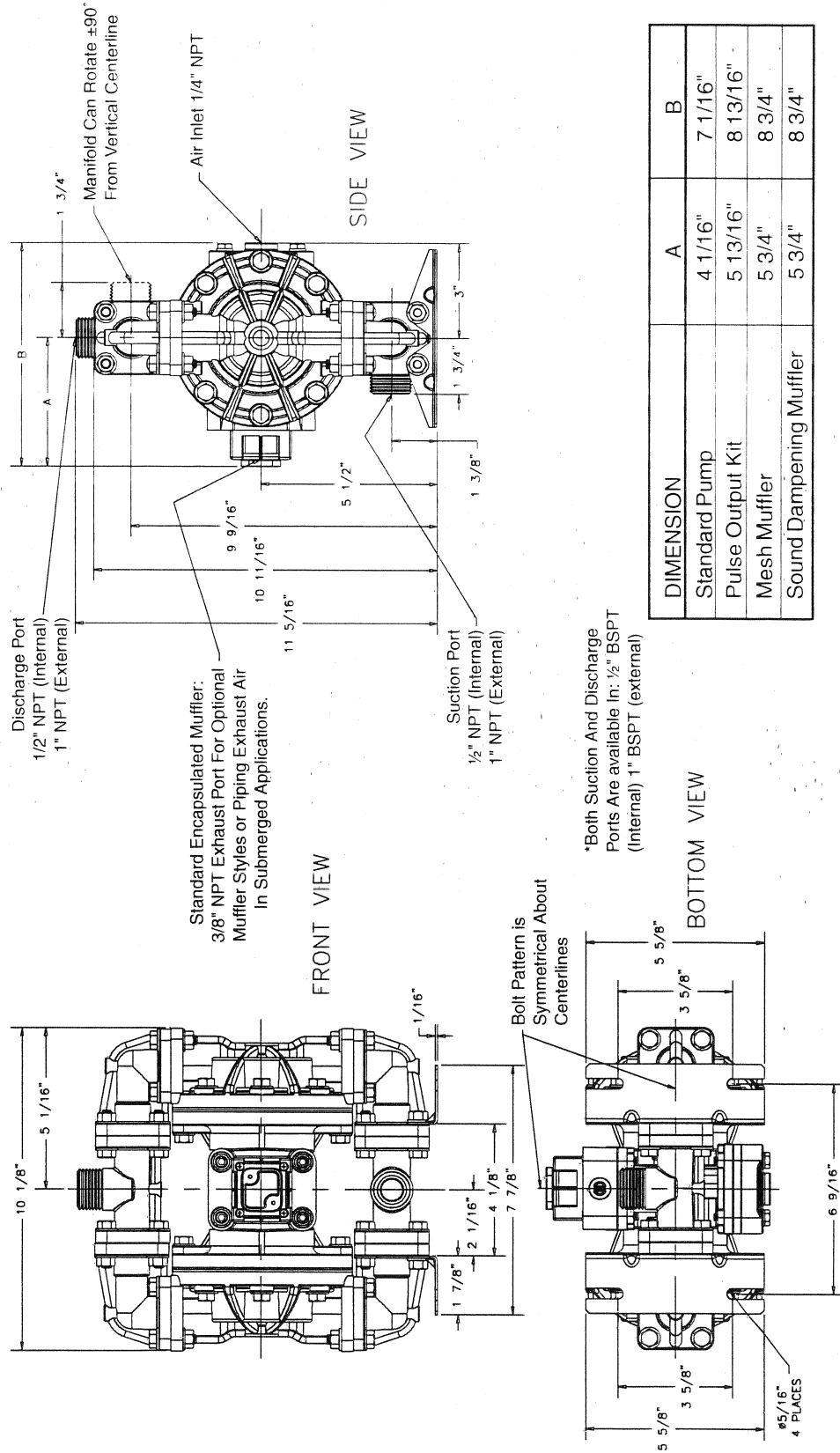
Lincoln pumps are designed to be powered only by compressed air.

Performance Curve



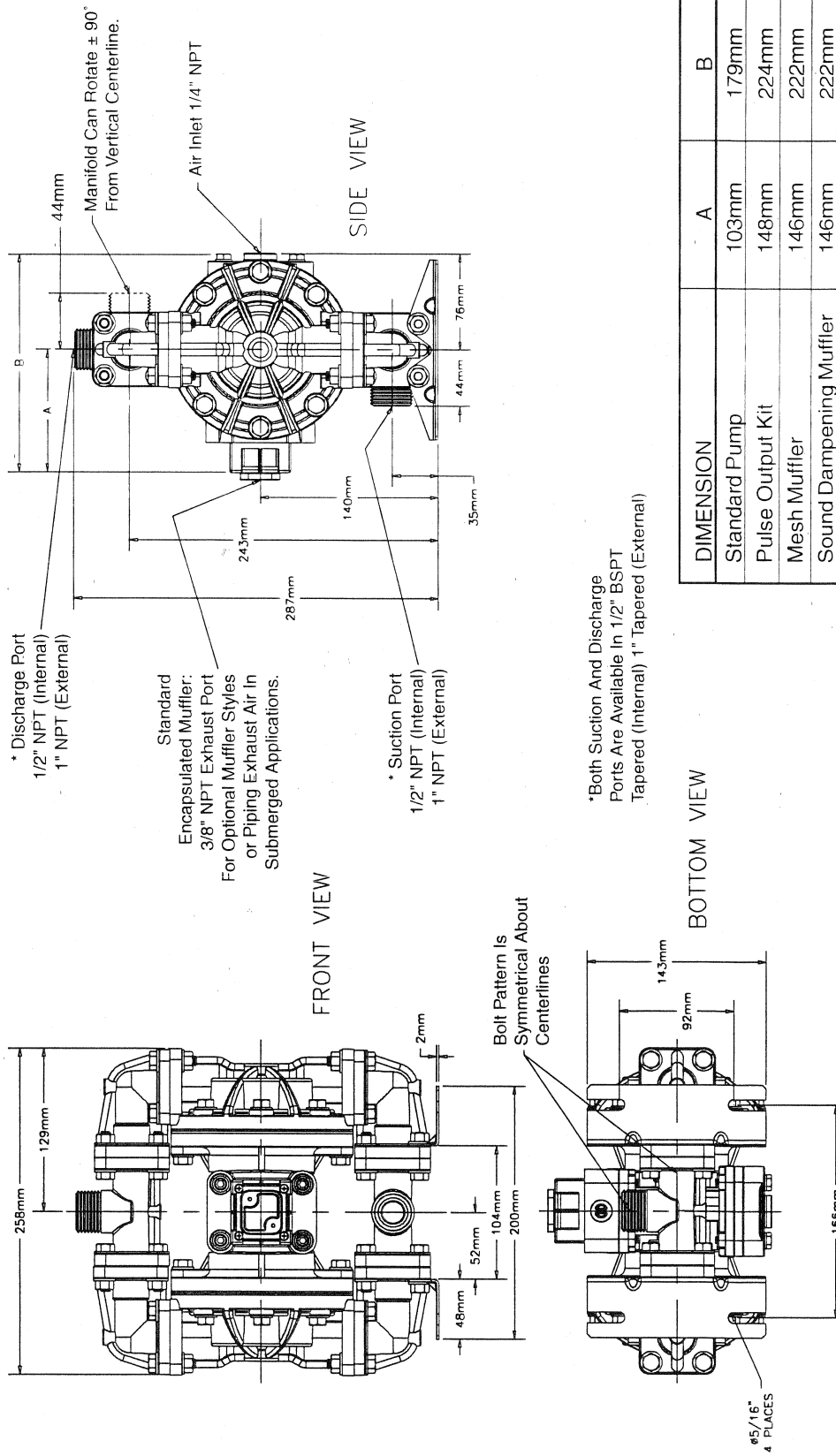
Dimensions:

Dimensions in Inches
Dimensional tolerance: $\pm 1/8"$



Metric Dimensions:

Dimensions in millimeters
Dimensional tolerance: ±3mm



PRINCIPLE OF PUMP OPERATION

This ball type check valve pump is powered by compressed air and is a 1:1 ratio design. The inner side of one diaphragm chamber is alternately pressurized while simultaneously exhausting the other inner chamber. This causes the diaphragms, which are connected by a common rod secured by plates to the centers of the diaphragms, to move in a reciprocating action. (As one diaphragm performs the discharge stroke the other diaphragm is pulled to perform the suction stroke in the opposite chamber.) Air pressure is applied over the entire inner surface of the diaphragm while liquid is discharged from the opposite side of the diaphragm. The diaphragm operates in a balanced condition during the discharge stroke which allows the pump to be operated at discharge heads over 200 feet (61 meters) of water.

For maximum diaphragm life, keep the pump as close to the liquid being pumped as possible. Positive suction head in excess of 10 feet of liquid (3.048 meters) may require a back pressure regulating device to maximize diaphragm life.

Alternate pressurizing and exhausting of the diaphragm chamber is performed by an externally mounted, pilot operated, four way spool type air distribution valve. When the spool shifts to one end of the valve body, inlet pressure is applied to one diaphragm chamber and the other diaphragm chamber exhausts. When the spool

shifts to the opposite end of the valve body, the pressure to the chambers is reversed. The air distribution valve spool is moved by a internal pilot valve which alternately pressurizes one end of the air distribution valve spool while exhausting the other end. The pilot valve is shifted at each end of the diaphragm stroke when an actuator plunger is contacted by the diaphragm plate. This actuator plunger then pushes the end of the pilot valve spool into position to activate the air distribution valve.

The chambers are connected with manifolds with a suction and discharge check valve for each chamber, maintaining flow in one direction through the pump.

INSTALLATION AND START-UP

Locate the pump as close to the product being pumped as possible. Keep the suction line length and number of fittings to a minimum. Do not reduce the suction line diameter.

For installations of rigid piping, short sections of flexible hose should be installed between the pump and the piping. The flexible hose reduces vibration and strain to the pumping system. A Warren Rupp Tranquilizer® surge suppressor is recommended to further reduce pulsation in flow.

AIR SUPPLY

Air supply pressure cannot exceed 125 psi (8.6 bar). Connect the pump air inlet to an air supply of sufficient capacity and pressure required for desired performance. When the air

supply line is solid piping, use a short length of flexible hose not less than 1/2" (13mm) in diameter between the pump and the piping to reduce strain to the piping. The weight of the air supply line, regulators and filters must be supported by some means other than the air inlet cap. Failure to provide support for the piping may result in damage to the pump. A pressure regulating valve should be installed to insure air supply pressure does not exceed recommended limits.

AIR VALVE LUBRICATION

The air distribution valve and the pilot valve are designed to operate WITHOUT lubrication. This is the preferred mode of operation. There may be instances of personal preference or poor quality air supplies when lubrication of the compressed air supply is required. The pump air system will operate with properly lubricated compressed air supply. Proper lubrication requires the use of an air line lubricator (available from Warren Rupp) set to deliver one drop of SAE 10 non-detergent oil for every 20 SCFM (9.4 liters/sec.) of air the pump consumes at the point of operation. Consult the pump's published Performance Curve to determine this.

AIR LINE MOISTURE

Water in the compressed air supply can create problems such as icing or freezing of the exhaust air, causing the pump to cycle erratically or stop operating. Water in the air supply can be reduced by using a point-of-use air dryer

to supplement the user's air drying equipment. This device removes water from the compressed air supply and alleviates the icing or freezing problems.

AIR INLET AND PRIMING

To start the pump, open the air valve approximately 1/2" to 3/4" turn. After the pump primes, the air valve can be opened to increase air flow as desired. If opening the valve increases cycling rate, but does not increase the rate of flow, cavitation has occurred. The valve should be closed slightly to obtain the most efficient air flow to pump flow ratio.

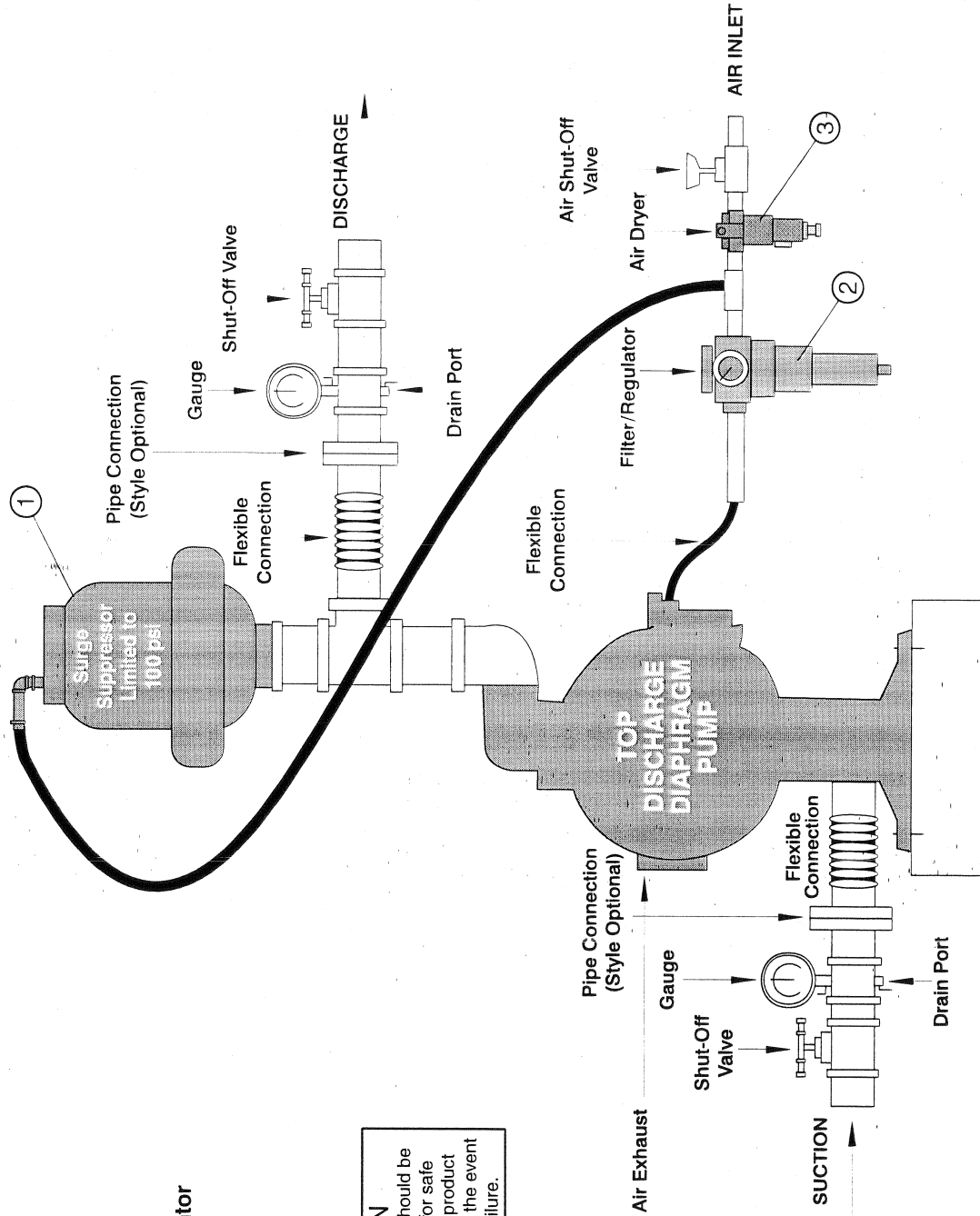
BETWEEN USES

When the pump is used for materials that tend to settle out or solidify when not in motion, the pump should be flushed after each use to prevent damage. (Product remaining in the pump between uses could dry out or settle out. This could cause problems with the diaphragms and check valves at restart.) In freezing temperatures the pump must be completely drained between uses in all cases.

Available from
Warren Rupp

- ① DA05 Surge Suppressor
- ② 020-049-000 Filter/Regulator
- ③ 020-049-001 Lubricator

CAUTION
The air exhaust should be piped to an area for safe disposition of the product being pumped, in the event of a diaphragm failure.



TROUBLESHOOTING

Possible Symptoms:

- Pump will not cycle.
- Pump cycles, but produces no flow.
- Pump cycles, but flow rate is unsatisfactory.
- Pump cycle seems unbalanced.
- Pump cycle seems to produce excessive vibration.

What to Check: Excessive suction lift in system.

Corrective Action: For lifts exceeding 20 feet (6 meters), filling the pumping chambers with liquid will prime the pump in most cases.

What to Check: Excessive flooded suction in system.

Corrective Action: For flooded conditions exceeding 10 feet (3 meters) of liquid, install a back pressure device.

What to Check: System head exceeds air supply pressure.

Corrective Action: Increase the inlet air pressure to the pump. Most diaphragm pumps are designed for 1:1 pressure ratio at zero flow.

What to Check: Air supply pressure or volume exceeds system head.

Corrective Action: Decrease inlet air pressure and volume to the pump as calculated on the published PERFORMANCE CURVE. Pump is cavitating the fluid by fast cycling.

What to Check: Undersized suction line.
Corrective Action: Meet or exceed pump connection recommendations shown on the DIMENSIONAL DRAWING.

What to Check: Restricted or undersized air line.

Corrective Action: Install a larger air line and connection. Refer to air inlet recommendations shown in your pump's SERVICE MANUAL.

What to Check: Check ESADS, the Externally Serviceable Air Distribution System of the pump.

Corrective Action: Disassemble and inspect the main air distribution valve; pilot valve and pilot valve actuators. Refer to the parts drawing and air valve section of the SERVICE MANUAL. Check for clogged discharge or closed valve before reassembly.

What to Check: Rigid pipe connections to pump.

Corrective Action: Install flexible connectors and a Warren Rupp Tranquilizer® Surge Suppressor.

What to Check: Blocked air exhaust muffler.

Corrective Action: Remove muffler screen, clean or de-ice and reinstall. Refer to the Air Exhaust section of your pump SERVICE MANUAL.

What to Check: Pumped fluid in air exhaust muffler.

Corrective Action: Disassemble pump chambers. Inspect for diaphragm rupture or loose diaphragm plate assembly. Refer to the Diaphragm Replacement section of your pump SERVICE MANUAL.

What to Check: Suction side air leakage or air in product.

Corrective Action: Visually inspect all suction side gaskets and pipe connections.

What to Check: Obstructed check valve.

Corrective Action: Disassemble the wet end of the pump and manually dislodge obstruction in the check valve pocket. Refer to the Check Valve section of the pump SERVICE MANUAL for disassembly instructions.

What to Check: Worn or misaligned check valve or check valve seat.

Corrective Action: Inspect check valves and seats for wear and proper seating. Replace if necessary. Refer to Check Valve section of the pump SERVICE MANUAL for disassembly instructions.

What to Check: Blocked suction line.

Corrective Action: Remove or flush obstruction. Check and clear all suction screens and strainers.

What to Check: Blocked discharge line.
Corrective Action: Check for obstruction or closed discharge line valves.

What to Check: Blocked pumping chamber.

Corrective Action: Disassemble and inspect the wetted chambers of the pump. Remove or flush any obstructions. Refer to the pump SERVICE MANUAL for disassembly instructions.

What to Check: Entrained air or vapor lock in one or both pumping chambers.

Corrective Action: Purge chambers through tapped chamber vent plugs, PURGING THE CHAMBERS OF AIR CAN BE DANGEROUS! Contact the Technical Services Department before performing this procedure. Any model with top-ported discharge will reduce or eliminate problems with entrained air.

If your pump continues to perform below your expectations, contact your local Distributor or factory Technical Services Group for a service evaluation.

Recycling

Many components of Non-Metallic AODD pumps are made of recyclable materials (see chart on page 10 for material specifications). We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed.

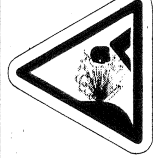
Important Safety Information



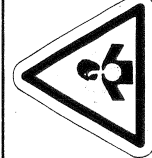
IMPORTANT
Read these safety warnings and instructions in this manual completely, before installation and start-up of the pump. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.



CAUTION
Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Re-torque loose fasteners to prevent leakage. Follow recommended torques stated in this manual.



WARNING
Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. The discharge line may be pressurized and must be bled of its pressure.



WARNING
In the event of diaphragm rupture, pumped material may enter the air end of the pump, and be discharged into the atmosphere. If pumping a product which is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe disposition.



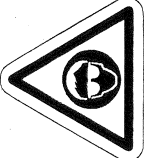
WARNING
Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded.



WARNING
This pump is pressurized internally with air pressure during operation. Always make certain that all bolting is in good condition and that all of the correct bolting is reinstalled during assembly.



WARNING
When used for toxic or aggressive fluids, the pump should always be flushed clean prior to disassembly.



WARNING
Before doing any maintenance on the pump, be certain all pressure is completely vented from the pump, suction, discharge, piping, and all other openings and connections. Be certain the air supply is locked out or made non-operational, so that it cannot be started while work is being done on the pump. Be certain that approved eye protection and protective clothing are worn all times in the vicinity of the pump. Failure to follow these recommendations may result in serious injury or death.



WARNING
Airborne particles and loud noise hazards. Wear ear and eye protection.

Material Codes

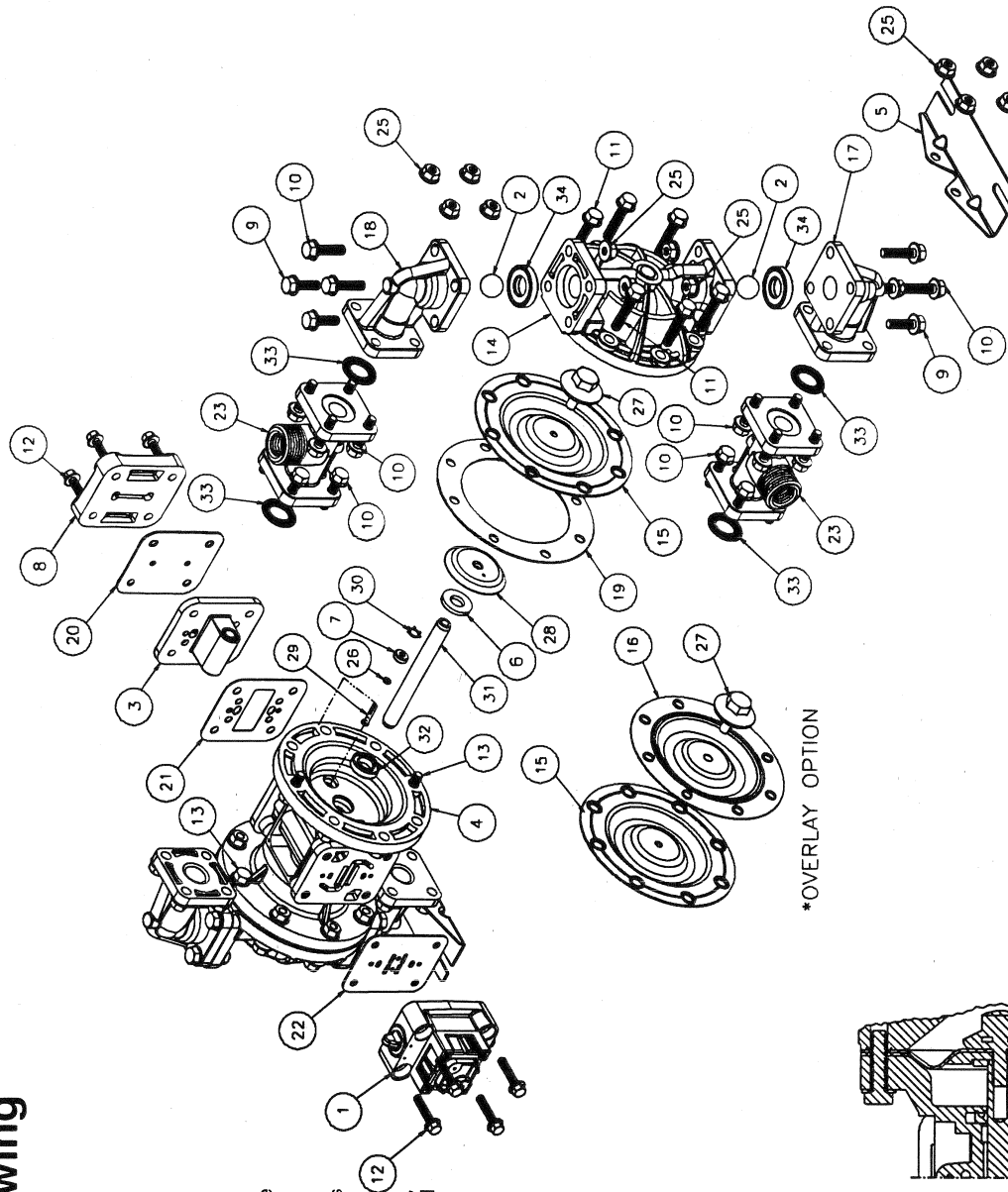
The Last 3 Digits of Part Number

000 Assembly, sub-assembly; and some purchased items	175 Die Cast Zinc	375 Fluorinated Nitrile	610 PTFE Encapsulated Silicon
010 Cast Iron	180 Copper Alloy	378 High Density Polypropylene	611 PTFE Encapsulated Viton
012 Powder Metal	305 Carbon Steel, Black Epoxy Coated	405 Cellulose Fibre	632 Neoprene/Hytrel
015 Ductile Iron	306 Carbon Steel, Black PTFE Coated	408 Cork and Neoprene	633 Viton/PTFE
020 Ferritic Malleable Iron	307 Aluminum, Black Epoxy Coated	425 Compressed Fibre	634 EPDM/PTFE
025 Music Wire	308 Stainless Steel, Black PTFE Coated	426 Blue Gard	635 Neoprene/PTFE
080 Carbon Steel, AISI B-1112	309 Aluminum, Black PTFE Coated	440 Vegetable Fibre	637 PTFE, Viton/PTFE
100 Alloy 20	310 Kynar Coated	465 Fibre	638 PTFE, Hytrel/PTFE
110 Alloy Type 316 Stainless Steel	330 Zinc Plated Steel	500 Delrin 500	639 Santoprene®/EPDM
111 Alloy Type 317 Stainless Steel	331 Chrome Plated Steel	501 Delrin 570	644 Santoprene®/PTFE
112 Alloy "C" (Hastelloy equivalent)	332 Aluminum, Electroless Nickel Plated	502 Conductive Acetal, ESD-800	656 Santoprene Diaphragm and Check Balls/EPDM Seats
113 Alloy Type 316 Stainless Steel (Electro Polished)	333 Carbon Steel, Electroless Nickel Plated	503 Conductive Acetal, Glass-Filled	661 EPDM/Santoprene
114 303 Stainless Steel (Hand Polished)	335 Galvanized Steel	505 Acrylic Resin Plastic	
115 302/304 Stainless Steel	336 Zinc Plated Yellow Brass	506 Delrin 150	
117 440-C Stainless Steel (Martensitic)	337 Silver Plated Steel	520 Injection Molded PVDF Natural color	
120 416 Stainless Steel (Wrought Martensitic)	340 Nickel Plated	540 Nylon	
123 410 Stainless Steel (Wrought Martensitic)	342 Filled Nylon	541 Nylon	Delrin, Viton and Hytrel are registered trademarks of E.I. DuPont.
148 Hardcoat Anodized Aluminum	353 Geolast; Color: Black	542 Nylon	Nylon is a registered trademark of Garlock, Inc.
149 2024-T4 Aluminum	354 Injection Molded #203-40 Santoprene- Duro 40D +/-5; Color: RED	544 Nylon Injection Molded	Nylatron is a registered trademark of Polymer Corp.
150 6061-T6 Aluminum	355 Thermal Plastic	550 Polyethylene	Santoprene is a registered trademark of Monsanto Corp.
151 6063-T6 Aluminum	356 Hytrel	551 Glass Filled Polypropylene	Rulon II is a registered trademark of Dixon Industries Corp.
152 2024-T4 Aluminum (2023-T351)	357 Injection Molded Polyurethane	552 Unfilled Polypropylene	Hastelloy-C is a registered trademark of Cabot Corp.
154 Almag 35 Aluminum	358 Urethane Rubber (Some Applications) (Compression Mold)	553 Unfilled Polypropylene	Ryton is a registered trademark of Phillips Chemical Co.
155 356-T6 Aluminum	359 Urethane Rubber	555 Polyvinyl Chloride	Valox is a registered trademark of General Electric Co.
156 356-T6 Aluminum	360 Buna-N Rubber. Color coded: RED	556 Black Vinyl	
157 Die Cast Aluminum Alloy #380	361 Buna-N	570 Rulon II	
158 Aluminum Alloy SR-319	363 Viton (Fluorel). Color coded: YELLOW	580 Ryton	
159 Anodized Aluminum	364 E.P.D.M. Rubber. Color coded: BLUE	590 Valox	
162 Brass, Yellow, Screw Machine Stock	365 Neoprene Rubber. Color coded: GREEN	591 Nylatron G-S	
165 Cast Bronze, 85-5-5-5	366 Food Grade Nitrile	592 Nylatron NSB	
166 Bronze, SAE 660	368 Food Grade EPDM	600 PTFE (virgin material)	
170 Bronze, Bearing Type, Oil Impregnated	370 Butyl Rubber. Color coded: BROWN	601 PTFE (Bronze and moly filled)	
	371 Phlithane (Tuftane)	602 Filled PTFE	
	374 Carboxylated Nitrile	603 Blue Gylon	
		604 PTFE	
		607 Envelon	
		606 PTFE	

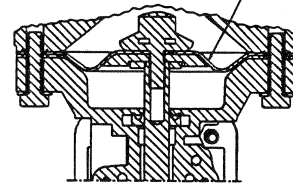
Composite Repair Parts Drawing

Available Service And Conversion Kits

- Updated TBA **AIR END KIT**
Seals, O-ring, Gaskets, Retaining Rings, Air Valve Assembly and Pilot Valve Assembly
- 271871 **WET END KIT**
Buna Diaphragms, Buna Check Balls, PTFE Seats and PTFE Seals
- 271873 **WET END KIT**
Santoprene Diaphragms Nitrile Spacer Gaskets, Santoprene Check Balls, PTFE Seats and PTFE Seals
- 271872 **WET END KIT**
Santoprene Diaphragms, PTFE Overlay Diaphragm, PTFE Check Balls, PTFE Seats and PTFE Seals



*OVERLAY OPTION



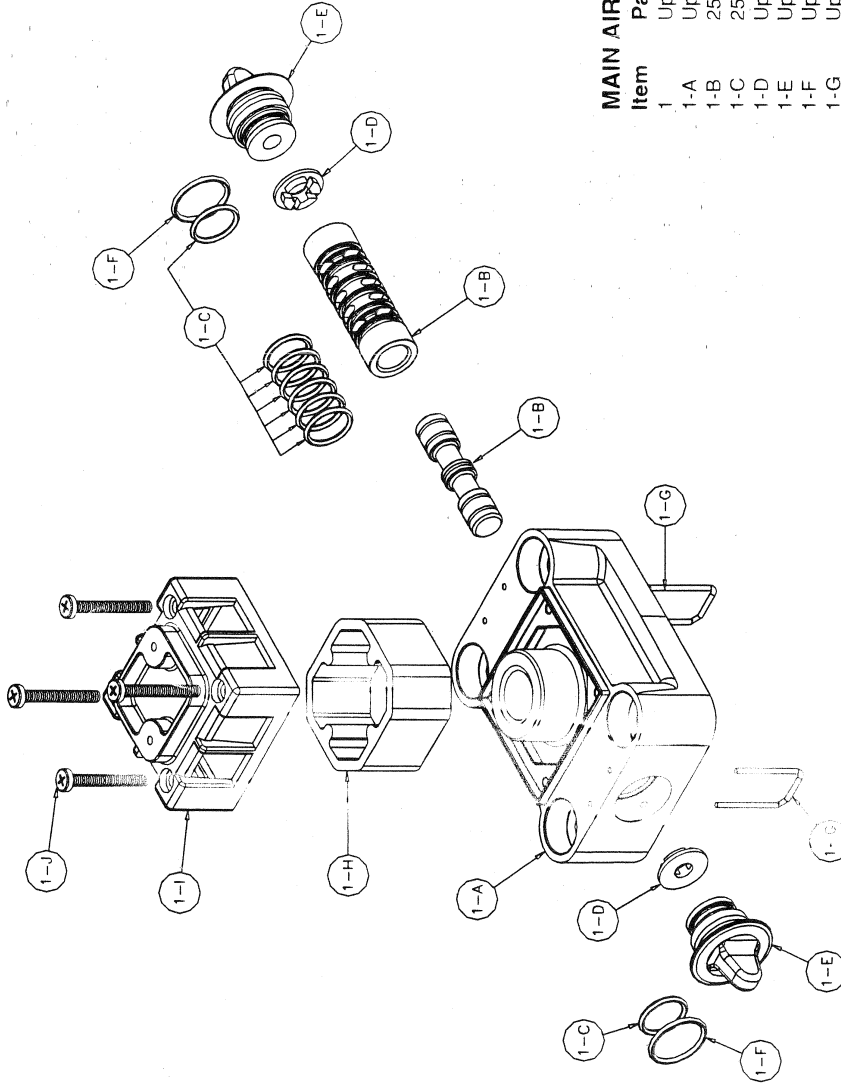
DIAPHRAGM CONFIGURATION DETAIL

NOTE TO ASSEMBLY FOR BOTH CONFIGURATIONS SHOWN ABOVE ARE TO BE INSTALLED WITH CONVOLUTIONS FACING TOWARDS CENTER OF PUMP

Composite Repair Parts List

ITEM	DESCRIPTION	QTY	MODEL 85623	MODEL 85622	MODEL 85626
1	Air Valve Assembly	1	Updated TBA	Updated TBA	Updated TBA
2	Ball, Check	4	252896 PTFE	252895 Santoprene	272208
3	Pilot Valve Assembly	1	252897	252897	252897
4	Intermediate Assembly	1	271986	271986	271986
5	Bracket, Mounting	2	271996	271996	271996
6	Bumper, Diaphragm	2	252900	252900	252900
7	Bushing, Plunger	2	252901	252901	252901
8	Cap, Air Inlet	1	271987	271987	271987
9	Capscrew, Flanged 5/16-18 x 1.00	8	271988	271988	271988
10	Capscrew, Flanged 5/16-18 x 1.25	24	271989	271989	271989
11	Capscrew, Flanged 5/16-18 x 1.50	12	271990	271990	271990
12	Capscrew, Flanged 1/4-20 x 1.25	8	271991	271991	271991
13	Capscrew, Flanged 5-16-18 x .88	4	271992	271992	271992
14	Chamber, Outer	2	271985	271985	271985
15	Diaphragm	2	252907	252907	271865
16	Diaphragm, Overlay	2	252908		
17	Elbow, Suction	2	252909	252909	252909
18	Elbow, Discharge	2	271994	271994	271994
19	Gasket, Spacer	2	252910	252910	252910
20	Gasket, Air Inlet	1	252911	252911	252911
21	Gasket, Pilot Valve	1	252912	252912	252912
22	Gasket, Air Valve	1	252913	252913	252913
23	Manifold	2	252914	252914	252914
25	Nut, Hex 5/16-13"	36	271993	271993	271993
26	O-Ring	2	240655	240655	240655
27	Plate, Outer Diaphragm	2	240768	240768	240768
28	Plate, Inner Diaphragm	2	252917	252917	252917
29	Plunger, Actuator	2	252918	252918	252918
30	Ring, Retaining	2	240717	240717	240717
31	Rod, Diaphragm	1	252920	252920	252920
32	Seal, Diaphragm Rod	2	252921	252921	252921
33	Seal, Manifold	4	252922	252922	252922
34	Seat, Check Valve	4	271995	271995	271995

Air Distribution Valve Assembly Drawing



MAIN AIR VALVE ASSEMBLY PARTS LIST

Item	Part Number	Description	Qty
1	Updated TBA	Air Valve Assembly	1
1-A	Updated TBA	Body, Air Valve	1
1-B	252929	Sleeve and Spool Set	1
1-C	252927	O-Ring	8
1-D	Updated TBA	Bumper	2
1-E	Updated TBA	End Cap	2
1-F	Updated TBA	O-Ring	2
1-G	Updated TBA	End Cap Retainer	2
1-H	Updated TBA	Muffler	1
1-I	252931	Muffler Cap	1
1-J	252932	Self-Tapping Screw	4

AIR DISTRIBUTION VALVE SERVICING

To service the air valve first shut off the compressed air, bleed pressure from the pump, and disconnect the air supply line from the pump.

Step #1: See COMPOSITE REPAIR PARTS DRAWING.

Using a 3/8" wrench or socket, remove the four hex flanged capscrews (item 12). Remove the air valve assembly from the pump.

Step #2: Disassembly of the air distribution valve.

To access the internal air valve components first remove the two end cap retainers (item 1-G) by inserting a small flat screwdriver into the two slotted grooves on the valve body and gently lifting the retainers out.

Next remove the two end caps (item 1-E) by grasping the pull tab with finger and thumb or pliers and tugging. Inspect the two o-rings (items 1-C and 1-F) on each end cap for wear or cuts. Replace the o-rings if necessary.

Remove the two bumpers (items 1-D) and inspect for wear or damage. Be careful not to scratch or damage the outer diameter of the spool. Wipe spool with a soft cloth and inspect for scratches or wear.

Remove the spool (part of item 1-B) from the sleeve. Be careful not to scratch or damage the outer diameter of the spool. Wipe the spool with a soft clean cloth and inspect for scratches or abrasive wear.

Inspect the inner diameter of the sleeve (part of item 1-B) for dirt, scratches, or other contaminants. Remove the sleeve if needed and replace with a new sleeve and spool set (item 1-B). **Note:** The sleeve and spool set is match-ground to a specified clearance. Sleeves and spools cannot be interchanged.

Step #3: Reassembly of the air distribution valve.

Install one bumper (item 1-D) and one end cap with o-rings (items 1-E, 1-C, and 1-F) into one end of the air valve body (item 1-A). Insert one end cap retainer (item 1-G) into the two smaller holes, align with groove in the end cap, and push until the closed end of the retainer is below the flat surface of the valve body.

Remove the new sleeve and spool set (item 1-B) from the plastic bag. Carefully remove the spool from the sleeve. Install the six o-rings (item 1-C) into the six grooves on the sleeve. Apply a light coating of grease to the o-rings before installing the sleeve into the valve body, align the slots in the sleeve with the slots in the valve body. Insert the spool into the sleeve. Be careful not to scratch or damage the spool during installation. Push the spool in until touches the bumper on the opposite end.

Install the remaining bumper, end cap with o-rings, and retainer.

Fasten the air valve assembly (item 1) and gasket (item 22) to the pump, using the four hex flanged capscrews (item 12).

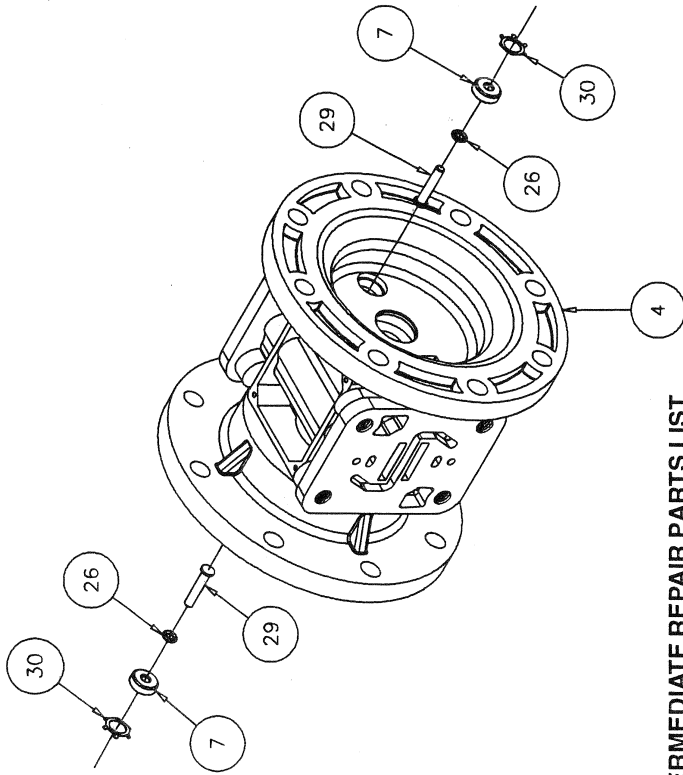
Connect the compressed air line to the pump. The pump is now ready for operation.



IMPORTANT

Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

Intermediate Assembly Drawing



INTERMEDIATE REPAIR PARTS LIST

Item	Part Number	Description	Qty
4	271986	Bracket, Intermediate	1
7	252901	Bushing, Plunger	2
26	240655	O-Ring	2
29	252918	Plunger, Actuator	2
30	240717	Ring, Retaining*	2

*Note: It is recommended that when plunger components are serviced, new retaining rings be installed.

Intermediate Assembly Servicing

ACTUATOR PLUNGER SERVICING

To service the actuator plunger first shut off the compressed air supply, bleed the pressure from the pump, and disconnect the air supply line from the pump.

Step #1: See PUMP ASSEMBLY DRAWING.

Using a 3/8" wrench or socket, remove the four cap screws (items 12). Remove the air inlet cap (item 8) and air inlet gasket (item 20). The pilot valve assembly (item 3) can now be removed.

Step #2: Servicing the actuator plungers.

See PUMP ASSEMBLY DRAWING. The actuator plungers (items 29) can be reached through the stem cavity of the pilot valve in the intermediate bracket (item 4). To service bushings, o-rings and retaining rings, see Intermediate Drawing.

Remove the plungers (items 29) from the bushings (item 7) in each end of the intermediate cavity. Inspect for wear or damage. Replace plunger as needed. Apply a light coating of grease to each o-ring and re-install the plungers in to the bushings. Push the plungers in as far as they will go.

Step #3: Re-install the pilot valve assembly into the intermediate assembly.

Be careful to align the ends of the stem between the plungers when inserting the stem of the pilot valve into the cavity of the intermediate.

Re-install the gasket (item 20), air inlet cap (item 8) and cap screws (items 12).


Connect the air supply to the pump. The pump is now ready for operation.

PLUNGER BUSHING, O-RING, AND RETAINING RING SERVICING

To service the plunger bushing components first remove the two retaining rings (items 30) using a small flat screwdriver. *Note: It is recommended that new retaining rings be installed.

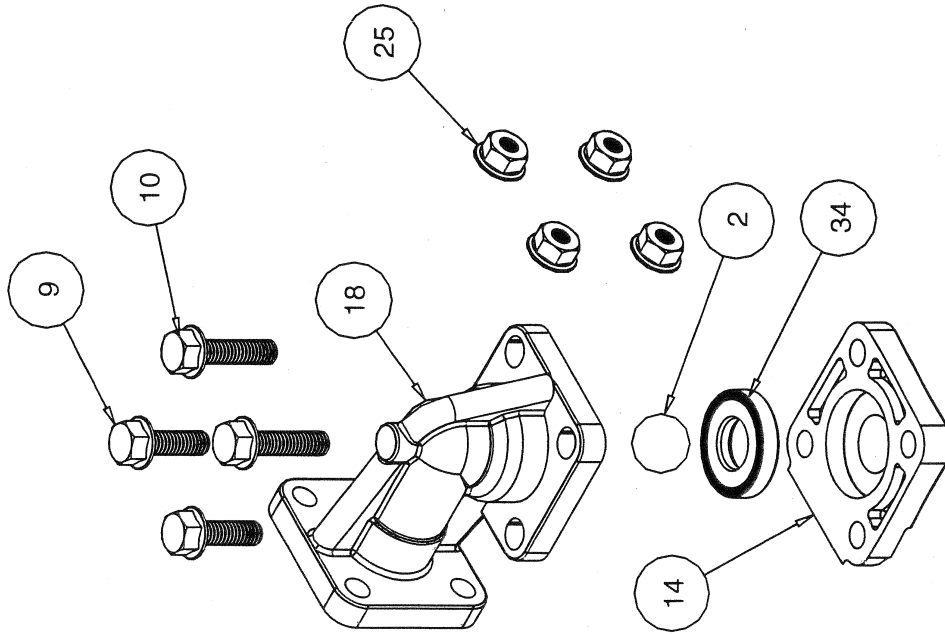
Next remove the two plunger bushings (items 7). Inspect the bushings for wear or scratches. Replace the bushings as necessary.

Inspect the two o-rings (26) for cuts and/or wear.



IMPORTANT
Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

Check Ball Valve Drawing



MODULAR CHECK BALL VALVE SERVICING

Before servicing the check valves, first shut off the suction line and then the discharge line to the pump. Next, shut off the compressed air supply, bleed air pressure from the pump, and disconnect the air supply line from the pump. Drain any remaining fluid from the pump. The pump can now be removed for service.

To access the modular check valve, remove the elbows (items 17 and 18 from pump composite repair parts drawing). Use a 1/2" wrench or socket to remove the fasteners. Once the elbows are removed, the modular check valves can be seen in the cavities of the outer chamber (items 14).

Inspect the check balls (items 2) for wear, abrasion, or cuts on the spherical surface. The check valve seats (items 34) should be inspected for cuts, abrasive wear, or embedded material on the surfaces of both the external and internal chamfers. The spherical surface of the check balls must seat flush to the surface of the inner chamfer on the check valve seats for the pump to operate to peak efficiency. Replace any worn or damaged parts as necessary.

RE-ASSEMBLE THE CHECK VALVE

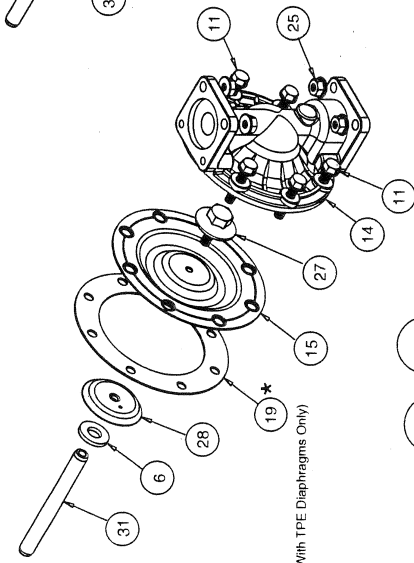
Place a check ball (item 2) in the ball cage of either the discharge elbow or the outer chamber. Install a check valve seat in the counter on each end of the chamber. Refasten the elbows to the chamber.

IMPORTANT

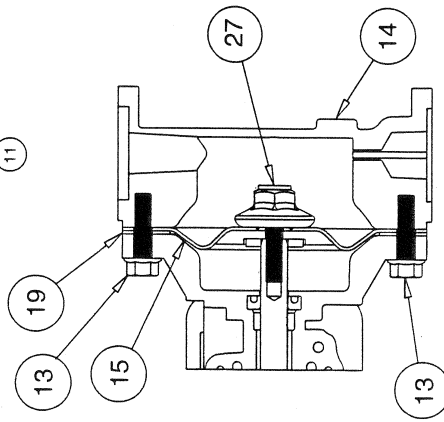


Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

Diaphragm Service Drawing

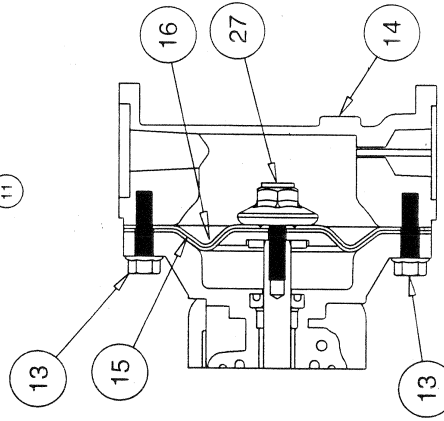
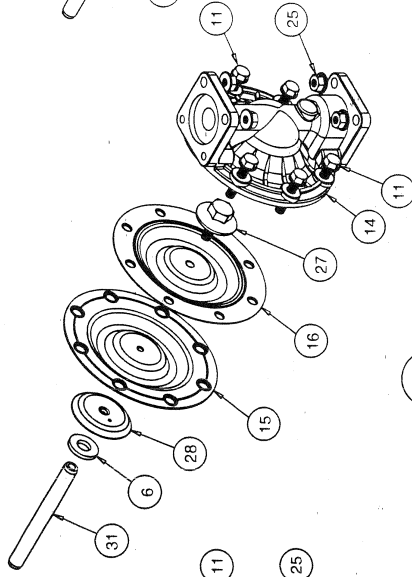


★ (Use With TPE Diaphragms Only)



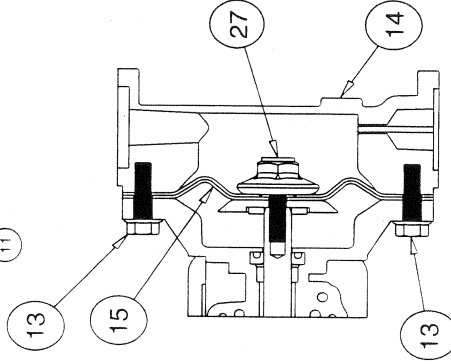
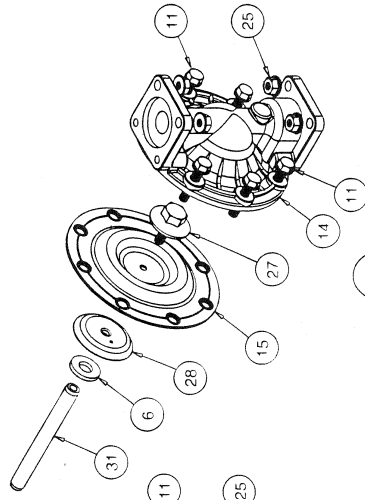
Diaphragm Orientation
Install diaphragm and spacer
as shown above.

**Diaphragm Service Drawing,
with Overlay**



Diaphragm Orientation
Install diaphragm and overlay
as shown above.

**Diaphragm Service Drawing
with uniRupp®**



Diaphragm Orientation
Install diaphragm (286-095-650 only)
as shown above.

DIAPHRAGM SERVICING

To service the diaphragms first shut off the suction, then shut off the discharge lines to the pump. Shut off the compressed air supply, bleed the pressure from the pump, and disconnect the air supply line from the pump. Drain any remaining liquid from the pump.

Step #1: See the pump composite repair parts drawing, and the diaphragm servicing illustration.

Using a 1/2" wrench or socket, remove the 16 capscrews (items 9 & 10), and flanged nuts that fasten the elbows (items 17 and 18) to the outer chambers (items 14). Remove the elbows with the manifolds and spacers attached.

Step #2: Removing the outer chambers.

Using a 1/2" wrench or socket, remove the 16 capscrews (items 11 and 13), and flanged nuts that fasten the outer chambers, diaphragms, and intermediate (item 4) together.

Step #3: Removing the diaphragm assemblies.

Use a 3/4" (19mm) wrench or six pointed socket to remove the diaphragm assemblies (outer plate, diaphragm, and inner plate) from the diaphragm rod (item 31) by turning counterclockwise.

Insert a 6-32 set screw into the smaller tapped hole in the inner diaphragm plate (item 28). Insert the protruding stud and the 6-32 fastener loosely into a vise. Use a 3/4" wrench or socket to remove the outer diaphragm

plate (item 27) by turning counterclockwise. Inspect the diaphragm (item 15) for cuts, punctures, abrasive wear or chemical attack. Replace the diaphragms if necessary.

Step #4: Installing the diaphragms.
Push the threaded stud of the outer diaphragm plate through the center hole of the diaphragm. Thread the inner plate clockwise onto the stud. Insert the loose assembly with the above 6-32 fastener back into the vise. Use a torque wrench to tighten the diaphragm assembly together to 90 in lbs. (10.17 Newton meters) 120 in lbs. Santoprene (13.56 Newton meters). Allow a minimum of 15 minutes to elapse after torquing, then re-torque the assembly to compensate for stress relaxation in the clamped assembly.

Step #5: Installing the diaphragm assemblies to the pump.

Make sure the bumper (item 6) is installed over the diaphragm rod.

Thread the stud of the one diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 31) until the inner diaphragm plate is flush to the end of the rod. Insert rod into pump.

Align the bolt holes in the diaphragm with the bolt pattern in the intermediate (item 4).

Fasten the outer chamber (item 14) to the pump, using the capscrews (items 11 and 13) and flanged nuts.

On the opposite side of the pump, pull the diaphragm rod out as far as

possible. Make sure the bumper (item 6) is installed over the diaphragm rod.

Thread the stud of the remaining diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 31) as far as possible and still allow for alignment of the bolt holes in the diaphragm with the bolt pattern in the inner chamber. Install diaphragms with convolutions facing towards center of pump. See sectional view on previous page.

Fasten the remaining outer chamber (item 14) to the pump, using the capscrews (items 11 and 13) and flanged nuts.

Step #6: Re-install the elbow/spacer/manifold assemblies to the pump, using the capscrews (items 9 & 10) and flanged nuts.

The pump is now ready to be re-installed, connected and returned to operation.

OVERLAY DIAPHRAGM SERVICING

The overlay diaphragm (item 16) is designed to fit snugly over the exterior of the standard TPE diaphragm (item 15).

uniRupp® DIAPHRAGM SERVICING

Follow the same procedures described for the standard diaphragm for removal and installation. **Note:** The uniRupp diaphragm is installed in the direction as shown in the lower right illustration above.



IMPORTANT

Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

PUMPING HAZARDOUS LIQUIDS

When a diaphragm fails, the pumped liquid or fumes enter the air end of the pump. Fumes are exhausted into the surrounding environment. When pumping hazardous or toxic materials, the exhaust air must be piped to an appropriate area for safe disposal. See illustration #1 at right.

This pump can be submerged if the pump materials of construction are compatible with the liquid being pumped. The air exhaust must be piped above the liquid level. See illustration #2 at right. Piping used for the air exhaust must not be smaller than 1" (2.54 cm) diameter. Reducing the pipe size will restrict air flow and reduce pump performance. When the pumped product source is at a higher level than the pump (flooded suction condition), pipe the exhaust higher than the product source to prevent siphoning spills. See illustration #3 at right.

CONVERTING THE PUMP FOR PIPING THE EXHAUST AIR

The following steps are necessary to convert the pump to pipe the exhaust air away from the pump.

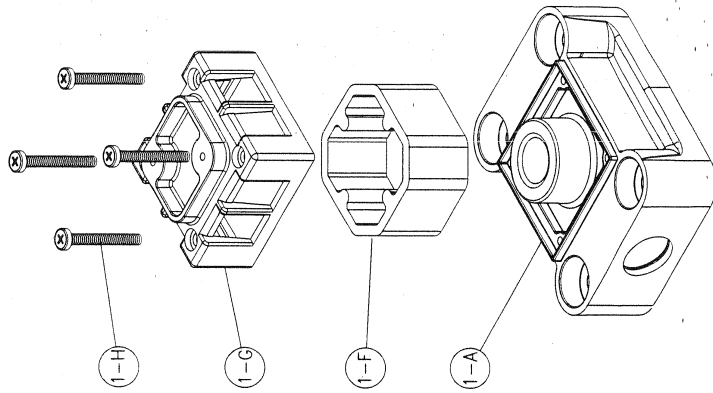
Use a #8 Torx or flat screwdriver to remove the four self-tapping screws (item 1-J) (Plastic Valves). Use a Phillips screwdriver to remove four machine screws (item 1-I) (Aluminum Valves).

Remove the muffler cap and muffler. The air distribution valve body has 1" NPT threads for installation of alternate mesh or sound dampening mufflers or piped exhaust.

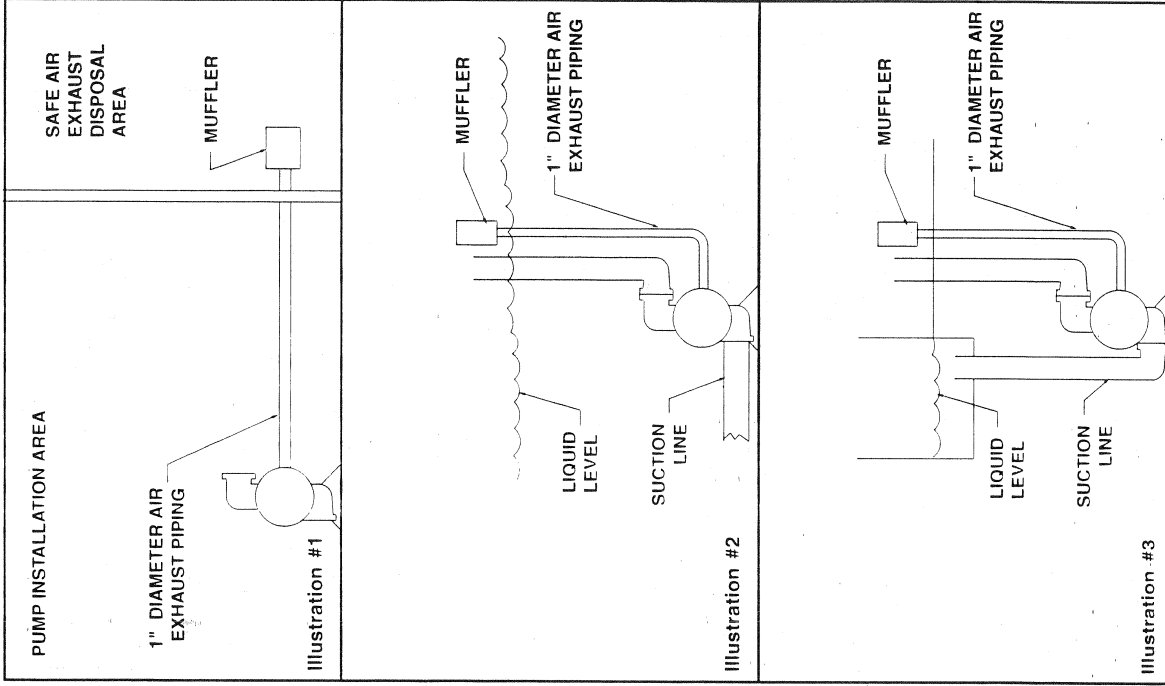
IMPORTANT INSTALLATION NOTE:

The manufacturer recommends installing a flexible hose or connection between the pump and any rigid plumbing. This reduces stresses on the molded plastic threads of the air exhaust port. Failure to do so may result in damage to the air distribution valve body.

Any piping or hose connected to the pump's air exhaust port must be physically supported. Failure to support these connections could also result in damage to the air distribution valve body.



CONVERTED EXHAUST ILLUSTRATION





APPENDIX III

**Harris
Instruction Manual**

HARRIS

Instruction Manual Manuel d' Instruction Manual de Instruccion

Industrial Single Stage & Multi-Stage® Compressed Gas Regulators
Reguladores Industriales de Gas Comprimido de Una Etapa y de Etapas Múltiples®
Détendeur industriel de gaz comprimé à un étage et à plusieurs étages®

IMPORTANT

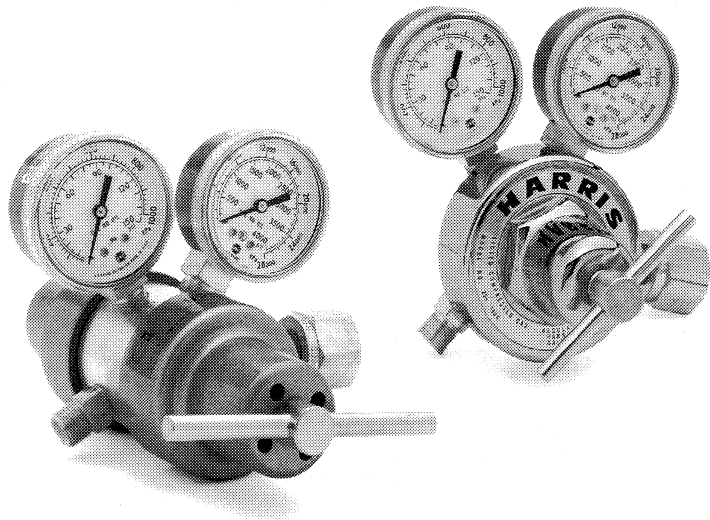
For your own safety, read these instructions. Failure to do so could lead to serious injury.

IMPORTANT

Pour votre propre sécurité, veuillez à lire ces instructions. Omettre de les lire peut entraîner des blessures graves.

IMPORTANTE

Por su propia seguridad lea estas instrucciones. El no seguir estas instrucciones podría resultar en lesiones severas.



Introduction

These instructions are for experienced operators. It is essential that you keep your equipment free of oils, greases, and flammable materials. For further information, refer to the following publications:

AWS C-4.2-78 "Operator Manual for Oxy-Fuel Gas Cutting" American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126

ANSI Z49.1 "Safety in Welding and Cutting" American National Standards Institute, 1430 Broadway, New York, NY 10018

Compressed Gas Association (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- **Safety Bulletin SB-8** - "Use of Oxy-Fuel Gas Welding and Cutting Apparatus"
- **Pamphlet E-1** - "Standard Connections for Regulator Outlets"
- **CGA Standard V-1** - "Compressed Cylinder Valve Inlet and Outlet Connections"

Description

Note: Each type of regulator is designed and assembled for specific gases and for definite inlet and delivery pressure ranges.

Multi-Stage Regulators

Multi-stage regulators are two regulators in series using a common body. The first stage (high pressure) reduces the inlet pressure approximately 90% and is preset at the factory. The second stage (low pressure) is adjustable to the desired delivery pressure.

Single-Stage Regulator

A cylinder regulator reduces the cylinder pressure to the delivery pressure and maintains a constant pressure to assure an accurate flow rate.

Pipeline Regulator

A pipeline regulator operates from a source of lower pressure, usually 200 PSI or less; and normally has only one gauge, which indicates the outlet pressure. Pipeline regulators must not be used on or with high pressure gas cylinders.

Gaugeless Regulators

Gaugeless regulators are used where rough use and gauge damage are a problem. The cylinder (inlet)

pressure is shown by the piston-type indicator. The delivery pressure is set by the adjusting knob and shown by the calibrations marked on the bonnet.

Clockwise rotation of the adjusting knob (or key) increases the delivery pressure. Counterclockwise rotation decreases the delivery pressure.

The regulator inlet connections are designed for the gas to be used in accordance with CGA Standard V-11. The threaded outlet connections are 9/16"-18 male CGA Standard O22 (R.H.) and O23 (L.H.) (formerly Class B)2. Fuel gas threads are left hand.

1 CGA Standard V-1 "Compressed Gas Cylinder Valve Inlet and Outlet Connections"

2 CGA Pamphlet E-1 "Standard Connections for Regulator Outlets"

Safety Instructions

1. Handle cylinder with care. Chain or otherwise secure cylinders to a permanent fixture. Take care when moving. To transport cylinders (except when in cylinder carts), remove regulators and replace with valve cap. Never use any cylinder in other than an upright position.
2. Use "good housekeeping" in work areas. Keep sparks and flame away from combustibles. Prepare your work area before welding or cutting.
3. Do not oil or grease equipment. The equipment does not require lubrication. Oil or grease is easily ignited and burns violently with oxygen.
4. "Crack" cylinder valve before installing regulator. Open valve slightly and then close. This will clear valve of dust or dirt which may be carried to the regulator and cause damage or accident. Do not discharge flow of gas at any person or flammable material.
5. Be sure all connections are tight. Don't force connections. Never test for leaks with a flame. Use a soapy water solution to check for leaks.
6. Use recommended pressure settings. Improper pressures are wasteful. Extreme pressure build up in regulators is a warning they need repair.
7. Do not work with damaged or leaking equipment. Use soapy water when checking for leaks. Do not use frayed or damaged hose.
8. Handle equipment with care. Its continued good service and your safety depend upon it.

9. Keep work area well ventilated. Flammable materials burn violently in an oxygen atmosphere. Flames and glowing materials (tobacco smoking) must be avoided.
10. When working with acetylene, never use at pressures over 15 PSIG (Pounds Per Square Inch Gauge).
11. DO NOT FORCE connectors and threads. The differences are intentional for the various gases.

NOTE: SAVE THESE INSTRUCTIONS

Set-Up Instructions

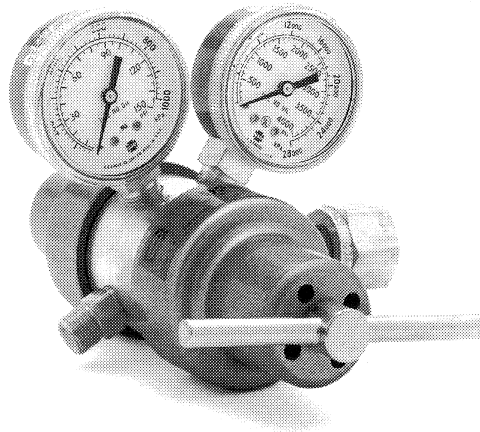
1. Secure gas cylinder in a vertical position; valve end up.
2. Remove cylinder valve cap.
3. Open cylinder valve momentarily to blow out any dust and dirt. Do not discharge flow of gas at any person, flames or flammable material.
4. Attach regulator to cylinder using proper CGA connection.
5. Properly connect equipment to outlet connection of regulator.

6. Close off all valves downstream of the regulator.
7. Turn the pressure adjusting knob (or key) counterclockwise until it feels free. The regulator outlet is now closed.
8. Slowly open the supply valve. When full inlet pressure is indicated, open line valve or non-flammable cylinder valve wide. Fuel gas cylinder valves should not be opened more than one turn. Hand wheels or valve wrenches should be kept on the valve to permit quick emergency shutdown.
9. Slowly turn the regulator adjusting knob (or key) clockwise to obtain the desired delivery pressure.
10. Tests for gas leakage should be made at this time. Use a soapy water solution at all connections and check for bubbles. Tighten connections as required and wipe off the soap solution.

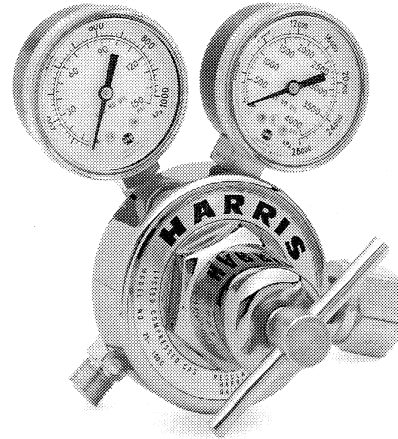
Functional Test of Regulator

An internal leak may be detected as follows:

1. Close the regulator by turning the adjusting key counterclockwise.
2. Close cylinder valve.



Multi-Stage™ Regulator



Single Stage Regulator

3. Drain downstream line.
4. The low pressure gauge will indicate zero. The cylinder (high pressure) gauge will read full pressure. Any pressure drop will indicate leakage. Repair before use, or replace with a properly functioning unit.
5. A gauge should read zero when all the pressure is removed. If it does not, it may be damaged. Locate and correct the cause of the damage and replace the gauge.

Shutdown

1. Close downstream valves.
2. Close supply valve on the cylinder or line.
3. Bleed off gases - oxygen first, then close downstream valves.
4. Turn pressure adjusting key counterclockwise until free.
5. Remove regulator from cylinder.

Maintenance Instructions

1. When not in use, store the regulator in a clean and safe place.
2. Inspect and test at least every 6 months after first use.
3. Have only qualified repairmen service, test and clean the regulator.
4. The gauge lenses are made of Lexan¹. Use only soapy water to clean, then wipe dry using soft cloths. **DO NOT USE SOLVENTS.**
5. Use thread sealants that are compatible with the gas being used.

1A General Electric Polycarbonate

Repair

Have only qualified repairmen service, test and clean the equipment.

Extra Copies

Extra copies of these instructions are available. Call your distributor or contact Harris Calorific.

Introduction

Les consignes suivantes sont à l'attention des utilisateurs expérimentés. Il est essentiel que vous conserviez votre équipement exempt d'huile, de graisse ou de tout élément inflammable. Pour de plus amples informations, veuillez consulter les ouvrages suivants :

AWS C-4.2-78 « Operator Manual for Oxy-Fuel Gas Cutting » (Manuel de l'opérateur pour l'oxycoupage) - American Welding Society, 550 N.W. LeJeune Rd., Miami, Florida, 33126

ANSI Z49.1 - « Safety in Welding and Cutting » (Sécurité en soudage et découpage) - American National Standards Institute, 1430 Broadway, New York, NY 10018

Compressed Gas Association (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- **Safety Bulletin SB-8** - « Use of Oxy-Fuel Gas Welding and Cutting Apparatus » (Utilisation de matériel d'oxycoupage et de soudage aux gaz)

- **Brochure CGA E-1** - « Standard Connections for Regulator Outlets » (Raccords standards pour sorties de détendeurs)

- **Norme CGA V-1** - « Compressed Cylinder Valve Inlet and Outlet Connections » (Raccords d'entrée et de sortie pour robinets de bouteilles de gaz comprimé)

Description

REMARQUE : Chaque type de détendeur est conçu et assemblé pour des gaz définis ainsi que pour des amplitudes précises de pressions d'alimentation et de détente.

Détendeurs à plusieurs étages

Les détendeurs à plusieurs étages sont faits de deux détendeurs en série montés sur un même corps. Le premier étage (haute pression) réduit la pression d'alimentation d'approximativement 90% et est réglé en usine. Le deuxième étage (basse pression) est réglable selon le niveau de pression désiré.

Détendeur à un étage

Un détendeur réduit la pression d'alimentation à la pression de détente et maintient une pression constante afin d'assurer un débit précis.

Détendeur de canalisation

Un détendeur de canalisation fonctionne à partir d'une source de faible pression, généralement inférieure ou

égale à 200 PSI (livres par pouce carré) et ne dispose normalement que d'une jauge indiquant le niveau de pression de détente. Les détendeurs de canalisation ne doivent pas être utilisés sur ou en combinaison avec des bouteilles de gaz à haute pression.

Détendeurs sans jauge

Les détendeurs sans jauge sont utilisés dans les cas où une utilisation brutale et les dégâts qu'elle inflige aux jauges représente un problème. La pression d'alimentation (en amont) est indiquée par le témoin à pistons. La pression de détente est établie en réglant le bouton poignée. Elle est indiquée par l'étalement figurant sur le capuchon.

Une rotation du bouton poignée (ou clef) dans le sens des aiguilles d'une montre augmente la pression de détente. Sa rotation dans le sens inverse des aiguilles d'une montre diminue la pression de détente.

Les arrivées de gaz du détendeur sont conçues pour les gaz qu'il est prescrit d'utiliser conformément à la Norme V-1 de la CGA. Les raccords de détente filetés sont de 9/16 " - 18 mâles Norme CGA O22 (R.H.) et O23 (L.H.) (anciennement Classe B) . Les filets de gaz de combustion sont inversés.

Consignes de sécurité

1. Manipulez la bouteille avec soin. Enchaînez ou assurez l'ancrage des bouteilles à un élément fixe. Déplacez avec précaution. Lors du transport des bouteilles (exception faite des chariots à bouteilles), ôtez les détendeurs et remplacez-les par des chapeaux de valve. Utilisez toujours les bouteilles en position verticale.
2. Veillez à ce que les zones de travail soient en bon ordre et en bon état d'entretien. Protégez les combustibles de toute étincelle ou flamme. Préparez votre zone de travail avant de souder ou de découper.
3. Ne huilez pas et ne graissez pas le matériel. Ce matériel ne nécessite aucune lubrification. Huile et graisse prennent feu rapidement et flambent violemment au contact de l'oxygène.
4. Entrouvrez le robinet de la bouteille avant d'installer le détendeur. Ouvrez le robinet légèrement et fermez-le aussitôt. Cette opération débarrassera le robinet des poussières ou saletés qui pourraient être acheminées jusqu'au détendeur et causer ainsi dégâts et accidents. Ne dirigez pas le

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débit de gaz vers une personne ou un objet incandescent.

5. Assurez-vous que tous les raccords sont bien serrés. Ne forcez pas le serrage de ces raccords. Ne recherchez jamais les fuites à l'aide d'une flamme. Utilisez une solution savonneuse pour détecter les fuites éventuelles.
6. Utilisez les réglages de pression recommandés. Les pressions incorrectes sont sources de gaspillages. Des accumulations de pressions extrêmes dans les détendeurs indiquent que leur réparation s'impose.
7. Ne travaillez pas avec un équipement endommagé ou non étanche. Utilisez de l'eau savonneuse pour détecter les fuites éventuelles. N'utilisez pas de tuyaux éraillés ou endommagés.
8. Manipulez le matériel avec soin. Sa longévité et votre sécurité en dépendent.
9. Assurez-vous de la bonne ventilation de la zone de travail. Les éléments inflammables flambent violemment dans une atmosphère oxygénée.

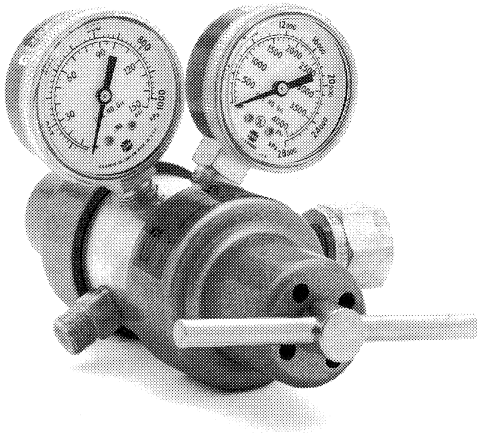
Flammes et objets incandescents (tabac en combustion) doivent être proscrits.

10. Lors de travaux avec de l'acétylène, n'opérez pas à des pressions supérieures à 15 PSIG (Livres par pouce carré/jauge).
11. Ne forcez pas les raccords et filets. Les différences sont spécifiques à chaque gaz.

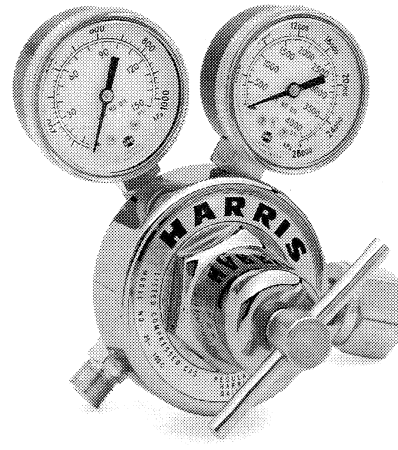
REMARQUE: CONSERVEZ CES CONSIGNES

Consignes d'installation

1. Assurez la position verticale de la bouteille de gaz; le robinet au sommet.
2. Ôtez le chapeau de valve de la bouteille.
3. Ouvrez brièvement la valve de la bouteille afin de chasser poussières et saletés éventuelles. Ne dirigez pas le débit de gaz vers une personne, une flamme ou une matière inflammable.
4. Attachez le détendeur à la bouteille au moyen du raccord CGA approprié.
5. Raccordez correctement le matériel au raccord de détente du détendeur.



Détendeur de gaz comprimé à plusieurs étages.



Détendeur de gaz comprimé à un étage

6. Fermez tous les robinets en aval du détendeur.
 7. Tournez le bouton poignée (ou clef) de réglage de pression dans le sens inverse des aiguilles d'une montre jusqu'à ce qu'il tourne librement. La sortie du détendeur est actuellement fermée.
 8. Ouvrez lentement le robinet d'admission. Lorsque la pleine pression d'admission est indiquée, ouvrez à fond le robinet du conduit ou de la bouteille ininflammable. Les robinets de la bouteille de gaz combustible ne devraient pas être ouverts au-delà d'un tour. Des volants de manœuvre ou des clés de robinet devraient être maintenus sur le robinet pour permettre de le fermer rapidement en cas d'urgence.
 9. Tournez lentement le bouton poignée (ou clef) de réglage du détendeur dans le sens des aiguilles d'une montre pour obtenir le débit de sortie souhaité.
 10. La détection de fuites devrait être effectuée à ce moment. Utilisez une solution d'eau savonneuse sur tous les raccords et voyez si des bulles apparaissent. Resserrez les raccords au besoin et essuyez la solution de savon.
3. Purgez les gaz - l'oxygène en premier - avant de fermer les robinets en aval.
 4. Tournez la clef de réglage de pression dans le sens contraire des aiguilles d'une montre jusqu'à ce qu'elle tourne librement.
 5. Ôtez le détendeur de la bouteille.

Consignes d'entretien

1. Lorsque le détendeur n'est pas utilisé, conservez-le dans un endroit propre et sûr.
2. Inspectez et vérifiez au moins tous les 6 mois après la première utilisation.
3. Ne faites appel qu'à des techniciens qualifiés pour entretenir, tester et nettoyer le détendeur.
4. Le verre des jauge est fait de Lexan. Ne le nettoyez qu'au moyen d'eau savonneuse avant de l'essuyer convenablement avec un chiffon doux. N'UTILISEZ PAS DE SOLVANTS.
5. N'utilisez que des agents d'étanchéité de raccord compatibles avec les gaz utilisés.

Réparation

Ne faites appel qu'à des techniciens qualifiés pour entretenir, tester et nettoyer ce matériel.

Copies supplémentaires

Des exemplaires supplémentaires de ces consignes sont disponibles. Appelez votre distributeur ou contactez Harris Calorific.

FAITES EN SORTE QUE CHAQUE OPÉRATEUR LISE ET COMPRENNE CES CONSIGNES. OMETTRE DE SUIVRE CES CONSIGNES PEUT ENTRAÎNER DES BLESSURES CORPORELLES GRAVES.

Essai de fonctionnement du détendeur

Un fuite interne peut être détectée de la manière suivante:

1. Fermez le détendeur en tournant la clef de réglage dans le sens inverse des aiguilles d'une montre.
2. Fermez le robinet de la bouteille.
3. Purgez les conduits en aval.
4. La jauge de basse pression indiquera zéro. La jauge de la bouteille (haute pression) indiquera pleine pression. Toute chute de pression signifiera une fuite. Réparez avant usage ou remplacez par une unité en bon état de marche.
5. Toute jauge devrait indiquer zéro lorsque toute la pression est évacuée. Si tel n'est pas le cas, il est possible qu'elle soit endommagée. Localisez et corrigez la cause de ces dégâts et remplacez la jauge.

Fermeture

1. Fermez les robinets en aval.
2. Fermez le robinet d'alimentation sur la bouteille ou le conduit.

Introducción

Estas instrucciones son para operadores con experiencia. Es importante que mantenga su equipo limpio; sin aceites, grasas ni otros materiales inflamables. Para mayor información, refiérase a las publicaciones siguientes:

AWS C-4.2-78 "Manual del Operador para Cortaduras con Oxígeno-Gas combustible" - Sociedad Americana de Soldadores, 550 N.W. Le-Jeune Rd., Miami, Florida, 33126

ANSI Z49.1 - "Seguridad en Soldaduras y Cortaduras" - Instituto Americano de Estándares Nacionales, 1430 Broadway, Nueva York, NY 10018.

Asociación de Gas Comprimido (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- **Boletín de Seguridad SB-8** - "Uso de Equipo para Soldadura y Cortadura con Oxígeno-Gas combustible".
- **Folleto E-1** - "Conexiones Estándares para Salidas de Reguladores".
- **CGA Estándar V-1** - "Conexiones de Entradas y Salidas de Válvula del Cilindro de Gas Comprimido".

Descripción

NOTA: Los reguladores están diseñados y ensamblados, según su tipo, para gases específicos y para límites definidos de presión de entrega y de entrada.

Reguladores de Etapas Múltiples

Los reguladores de etapas múltiples son dos reguladores en serie usando un cuerpo común. La primera etapa (presión alta) reduce la presión de entrada en aproximadamente 90% y es pre-ajustada en la fábrica. La segunda etapa (presión baja) se ajusta a la presión de entrega deseada.

Reguladores de Una Etapa

Un regulador de cilindro reduce la presión del cilindro a la presión de entrega y mantiene una presión constante para asegurar un gasto de flujo exacto.

Reguladores de Gasoducto

Un regulador de gasoducto funciona desde una fuente de presión baja, comúnmente de 200 PSI o menos y normalmente sólo tiene un manómetro que indica la presión de salida. Los reguladores de gasoductos no deben usarse sobre ni con cilindros de gas de presión alta.

Reguladores Sin Manómetro

Los reguladores sin manómetro son utilizados cuando el uso de manómetros no es conveniente ya que pueden dañarse fácilmente. La presión del cilindro (de entrada) se muestra por medio del indicador de tipo de pistón. La presión de entrega se ajusta por medio de la manija y se muestra por medio de las calibraciones marcadas en el casquete.

La presión de entrega aumenta al girar la manija de ajuste (o llave) en el sentido de rotación de las manecillas del reloj. La presión de entrega disminuye al girar la manija de ajuste en el sentido de rotación contrario al de las manecillas del reloj.

Las conexiones de entrada del regulador han sido diseñadas de acuerdo al gas a ser usado, según el CGA Estándar V-11. Las conexiones roscadas de la salida son de 9/16" - 1B macho CGA estándar O22 (a la derecha) y O23 (a la izquierda) (anteriormente clase B)2. Las roscas del gas combustible son a la izquierda.

- 1 CGA Estándar V-1 "Conexiones de Entradas y Salidas de Válvula del Cilindro de Gas Comprimido".
- 2 CGA Folleto E-1 "Conexiones Estándares para Salidas de Reguladores".

Instrucciones de Seguridad

1. Manipule el cilindro con cuidado. Coloque una cadena alrededor de los cilindros o asegúrelos a un accesorio permanente. Tenga cuidado al moverlos. Cuando transporte cilindros (excepto cuando sea en un carro para cilindros), quite los reguladores y reemplácelos por tapas de válvulas. Los cilindros deben usarse solamente en posición vertical.
2. Practique sus "Hábitos de Limpieza" en las áreas de trabajo. Mantenga chispas y llamas alejadas de los combustibles. Antes de comenzar a soldar o cortar prepare el área de trabajo.
3. No engrase ni aceite el equipo. El equipo no necesita de lubricación. El aceite y la grasa son inflamables y se encienden violentamente con el oxígeno.
4. Antes de instalar el regulador, "abra" la válvula del cilindro. Abra la válvula lentamente y luego ciérrala. Esto limpiará la válvula de polvo o suciedad que pueda haber llegado al regulador y que pueda causar cualquier daño o accidente. No descargue el flujo de gas en una persona o material inflamable.

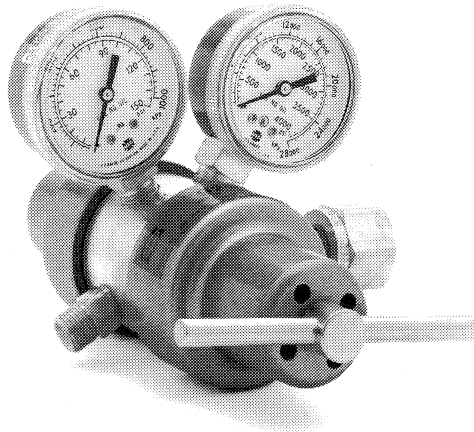
5. Asegúrese que todas las conexiones estén apretadas. No fuerce las conexiones. Nunca use llama para revisar si hay fugas de gas. Use una solución de agua con jabón para revisar si hay alguna fuga de gas.
6. Use los ajustes de presión recomendados. Las presiones inapropiadas causan gastos innecesarios. El aumento en extremo de la presión en los reguladores indica que deben ser reparados.
7. No trabaje con equipo dañado o que tenga fugas. Use agua jabonosa para revisar si hay fugas. No use mangueras raídas o estropeadas.
8. Manipule el equipo con cuidado. El servicio continuo adecuado y su seguridad dependen de ello.
9. Mantenga el área de trabajo bien ventilada. Los materiales inflamables se encienden violentamente en una atmósfera de oxígeno. Deben evitarse las llamas y los materiales incandescentes (fumar).
10. Cuando trabaje con acetileno, nunca lo use a presiones mayores de 15 PSIG (Libras sobre pulgadas cuadradas leídas en el manómetro).

11. No fuerce los conectores ni las roscas. Las diferencias son intencionales para los diversos gases.

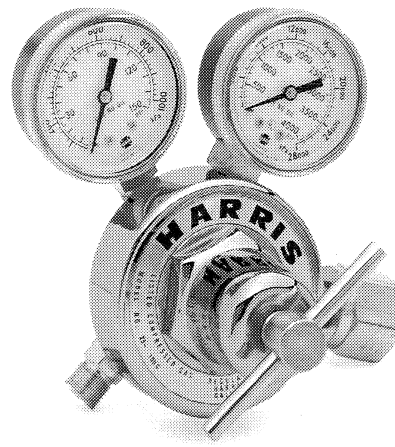
NOTA: GUARDE ESTAS INSTRUCCIONES

Instrucciones para la Instalación

1. Asegure el cilindro del gas en posición vertical; el extremo de la válvula hacia arriba.
2. Quite la tapa de la válvula del cilindro.
3. Abra, por un momento, la válvula del cilindro para permitir escapar cualquier partícula de polvo o suciedad. No descargue el flujo de gas sobre una persona, llamas o material inflamable.
4. Coloque el regulador en el cilindro utilizando la conexión recomendada por CGA.
5. Conecte apropiadamente el equipo a la conexión de salida del regulador.
6. Cierre todas las válvulas corriente abajo del regulador.
7. Gire la manija de ajuste de presión (o llave) en el sentido de rotación contrario al de las manecillas del reloj hasta que la manija se sienta libre. La sali



Regulador de Gas Comprimido de Etapas Múltiples



Regulador de Gas Comprimido de Una Etapa

da del regulador está ahora cerrada.

8. Abra lentamente la válvula de suministro. Cuando se indique que la presión de entrada está al máximo, abra ampliamente la válvula del conducto o la válvula del cilindro no-inflamable. Las válvulas del cilindro de gas combustible no deben abrirse más de una vuelta. Los volantes o llaves para válvula deben mantenerse en la válvula para permitir su cierre inmediato en caso de emergencia.
9. Gire lentamente la manija (o llave) de ajuste del regulador en el sentido de rotación de las manecillas del reloj para obtener la presión de entrega deseada.
10. La inspección para averiguar si hay o no fugas de gas debe realizarse en este momento. Aplique una solución de agua y jabón en todas las conexiones y vea si hay burbujas. Apriete las conexiones apropiadamente y seque la solución jabonosa.

Prueba Funcional del Regulador

Una fuga interna puede ser descubierta de la siguiente manera:

1. Cierre el regulador girando la llave de ajuste en el sentido de rotación contrario al de las manecillas del reloj.
2. Cierre la válvula del cilindro.
3. Purgue el conducto de corriente abajo.
4. El manómetro de presión baja debe indicar cero. El manómetro del cilindro (de presión alta) indicará que la presión está al máximo. Cualquier caída de presión indicará que hay fuga de gas. Repare antes de usar, o reemplace por un equipo que funcione apropiadamente.
5. Cuando no hay presión, el manómetro debe indicar cero. Si no marca cero, podría estar averiado. Encuentre y corrija la causa de la avería y reemplace el manómetro.

Suspensión del Trabajo

1. Cierre las válvulas de corriente hacia abajo.
2. Cierre la válvula de suministro en el cilindro o el conducto.
3. Purgue los gases, comenzando por el oxígeno, luego cierre las válvulas de corriente hacia abajo.
4. Gire la llave de ajuste de presión en el sentido de rotación contrario al de las manecillas del reloj,

hasta que esté libre.

5. Quite el regulador del cilindro.

Instrucciones de Mantenimiento

1. Cuando no use el regulador guárdelo en un lugar limpio y seguro.
2. Inspeccione y pruebe el regulador por lo menos cada 6 meses después de usarlo por primera vez.
3. El servicio de mantenimiento, las pruebas y la limpieza del regulador debe asignarlo solamente a personas calificadas para ello.
4. Los lentes del manómetro son elaborados de Lexán¹. Para limpiarlos use solamente agua y abón, luego séquelos con un paño suave. NO USE SOLVENTES.
5. Use selladores para rosca que sean compatibles con el gas que se esté usando.

1 Policarbonato de la General Electric.

Reparación

El servicio de mantenimiento, las pruebas y la limpieza del regulador debe asignarlo solamente a personas calificadas para ello.

Copias Extras

Si necesita copias extras de estas instrucciones, llame a su distribuidor o comuníquese con la división Harris Calorific.

ASEGURESE QUE TODO OPERADOR LEA Y ENTIENDA ESTAS INSTRUCCIONES. NO SEGUIR ESTAS INSTRUCCIONES PODRIA RESULTAR EN LESIONES PERSONALES SEVERAS.