

SERVICE & OPERATING MANUAL

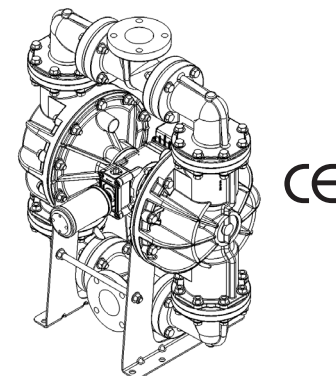
Original Instructions



Model RS30 Non-Metallic Energy Saving Technology Design Level 1

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Cautions - Read Operating and Safety Precautions First



! IMPORTANT

Before installation and start-up of the pump read these safety warnings and instructions in this manual completely. 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.



! CAUTION

Pump not designed, tested or certified to be powered by compressed natural gas. Powering the pump with natural gas will void the warranty.



! 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. (See page 30)



! WARNING

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



! WARNING

Use safe practices when lifting



! 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 at 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.



! 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.

Recycling

Warren Rupp is committed to protecting the environment and preventing pollution for the benefit of our employees, as well as local and global communities, now and in the future.

Many components of SANDPIPER® Metallic AODD pumps are made of recyclable materials (see chart on page 32 for material specifications). We encourage pump users to recycle worn out parts and pumps whenever possible. Follow all applicable guidelines if hazardous material has been pumped.



Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. The WEEE marking applies only to countries within the European Union (EU) and Norway. Appliances are labeled in accordance with European Directive 2002/96/EC. Contact your local waste recovery agency for a designated collection facility in your area.



None of the equipment supplied within the AirVantage unit either use or exceed the amounts stated above hazardous substances. A signed declaration from our supplier of the electronic/electrical portion of the AirVantage unit will be held on file stating their adherence to the RoHS, 2002/95/EC regulation.

**WARREN
RUPP, INC.**

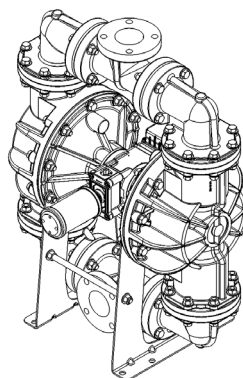
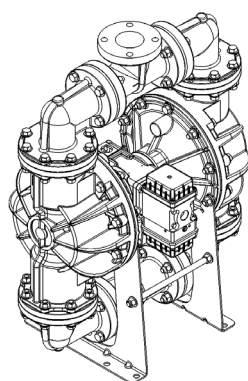


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Total Quality. Assured.

ISO 9001 Certified
ISO 14001 Certified

IMEX
FLUID & METERING



SANDPIPER®
A WARREN RUPP, INC. BRAND

RS30 Non-Metallic
Energy Saving Technology
Design Level 1
Ball Valve
Air Operated
Double Diaphragm Pump

ENGINEERING, PERFORMANCE
& CONSTRUCTION DATA

INTAKE/DISCHARGE PIPE SIZE	CAPACITY	AIR VALVE	SOLIDS-HANDLING	HEADS UP TO	DISPLACEMENT/STROKE
3" ANSI Flange or 80mm DIN Flange	0 to 238 US gallons per minute (0 to 901 liters per minute)	No-lube, no-stall design	Up to .71 in. (18mm)	100 psi or 231 ft. of water (7 bar or 70 meters)	.9 US gallon / 3.41 liter

⚠ CAUTION! *Maximum Operating Temperature Limit is 180°F for Polypropylene and 250°F for PVDF Models.*

Materials

	Temperature Limits	
	Maximum	Minimum
Santoprene®: Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.	275°F 88°C	-40°F -40°C
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.	350°F 177°C	-35°F -37°C
Polypropylene	180°F 82°C	32°F 0°C
PVDF	250°F 121°C	0°F -18°C

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

CAUTION: Nonmetallic pumps and plastic components are not UV stabilized. Ultraviolet radiation can damage these parts and negatively affect material properties. Do not expose to UV light for extended periods of time.

SANDPIPER® pumps are designed to be powered only by compressed air.

Maximum and Minimum Temperatures are the limits for which these materials can be operated. Temperatures coupled with pressure affect the longevity of diaphragm pump components. Maximum life should not be expected at the extreme limits of the temperature ranges.

Explanation of Pump Nomenclature

RS30 Non-Metallic · Design Level 1· Ball Valve

MODEL	Pump Brand	Pump Size	Check Valve Type	Design Level	Wetted Material	Diaphragm/ Check Valve Materials	Check Valve Seat	Non-Wetted Material Options	Porting Options	Pump Style	Pump Options	Kit Options	Shipping Weight lbs. (kg)
RS30B2P1PQAAS00.	S	30	B	2	P	1	P	Q	A	A	S	00.	231 (105)
RS30B2P2PQAAS00.	S	30	B	2	P	2	P	Q	A	A	S	00.	231 (105)
RS30B2K1KQAAS00.	S	30	B	2	K	1	K	Q	A	A	S	00.	315 (143)
RS30B2K2KQAAS00.	S	30	B	2	K	2	K	Q	A	A	S	00.	315 (143)

Pump Brand

RS= SANDPIPER®

Pump Size

30= 3"

Check Valve Type

B= Ball

Design Level

2= Design Level 2

Wetted Material

K= PVDF

P= Polypropylene

Diaphragm Check Valve Materials

1= Santoprene/Santoprene

2= PTFE-Santoprene Backup/PTFE

Check Valve Seat

K= PVDF

P= Polypropylene

U= Polyurethane/ Polyurethane

Non-Wetted Material Options

A= Painted Aluminum

J= Painted Aluminum PTFE

Q=Epoxy Coated Aluminum

Porting Options

A= ANSI Flange

D= DIN Flange

7= Dual Porting (ANSI)

8= Top Dual Porting (ANSI)

9= Bottom Dual Porting (ANSI)

Pump Options

S= Self-Contained Electrical

Generation with High Flow

Metal Muffler

Pump Style

A = Anodized Aluminum Air

Saving Valve

Kit Options

00.= None

P0.= 10-30VDC Pulse Output Kit

P1.= Intrinsically-Safe

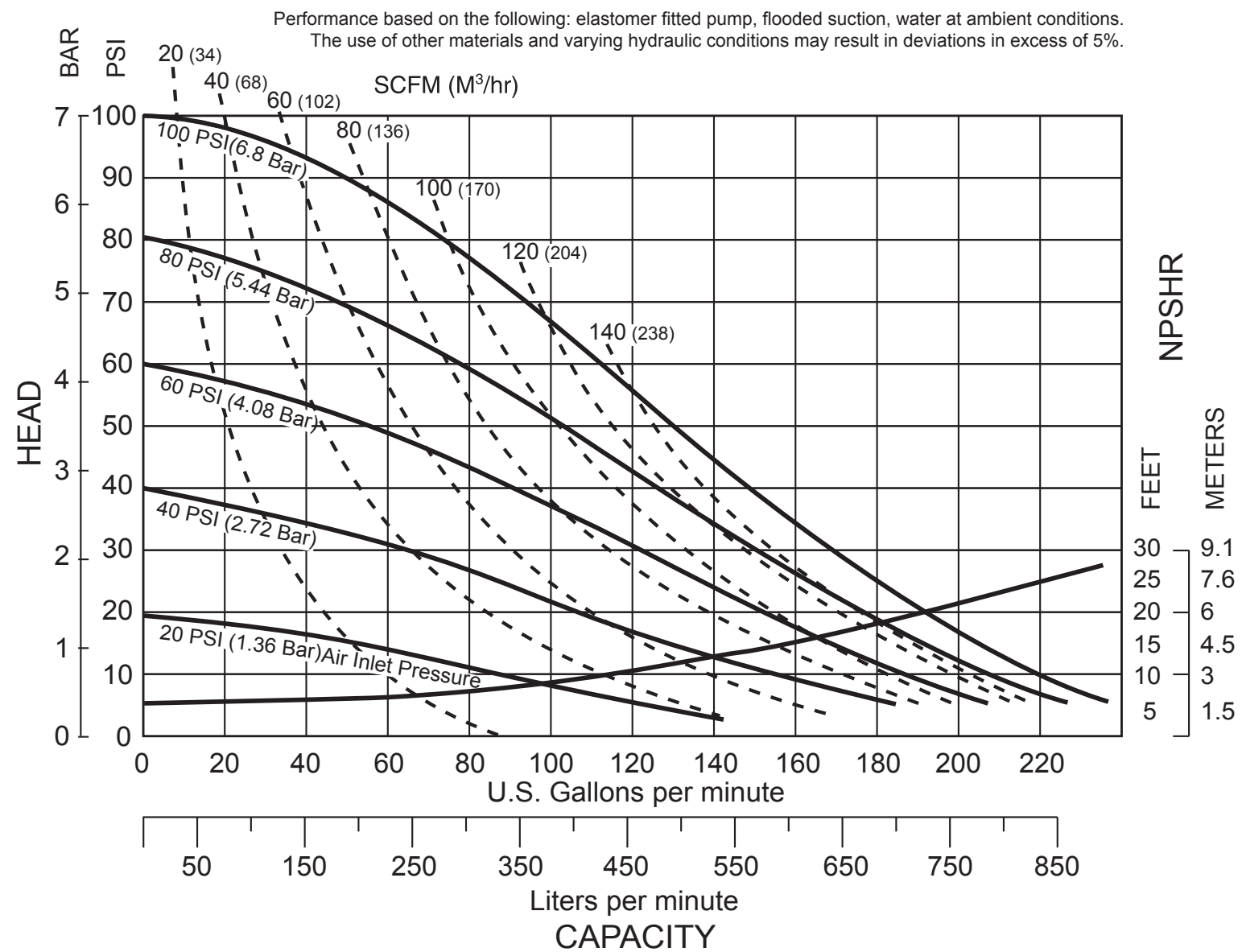
5-30VDC, 110/120VAC,

220/240VAC Pulse Output Kit

P2.= 110/120 or 220/240VAC

Pulse Output Kit

Performance Curve, Model RS30 Non-Metallic Design Level 1



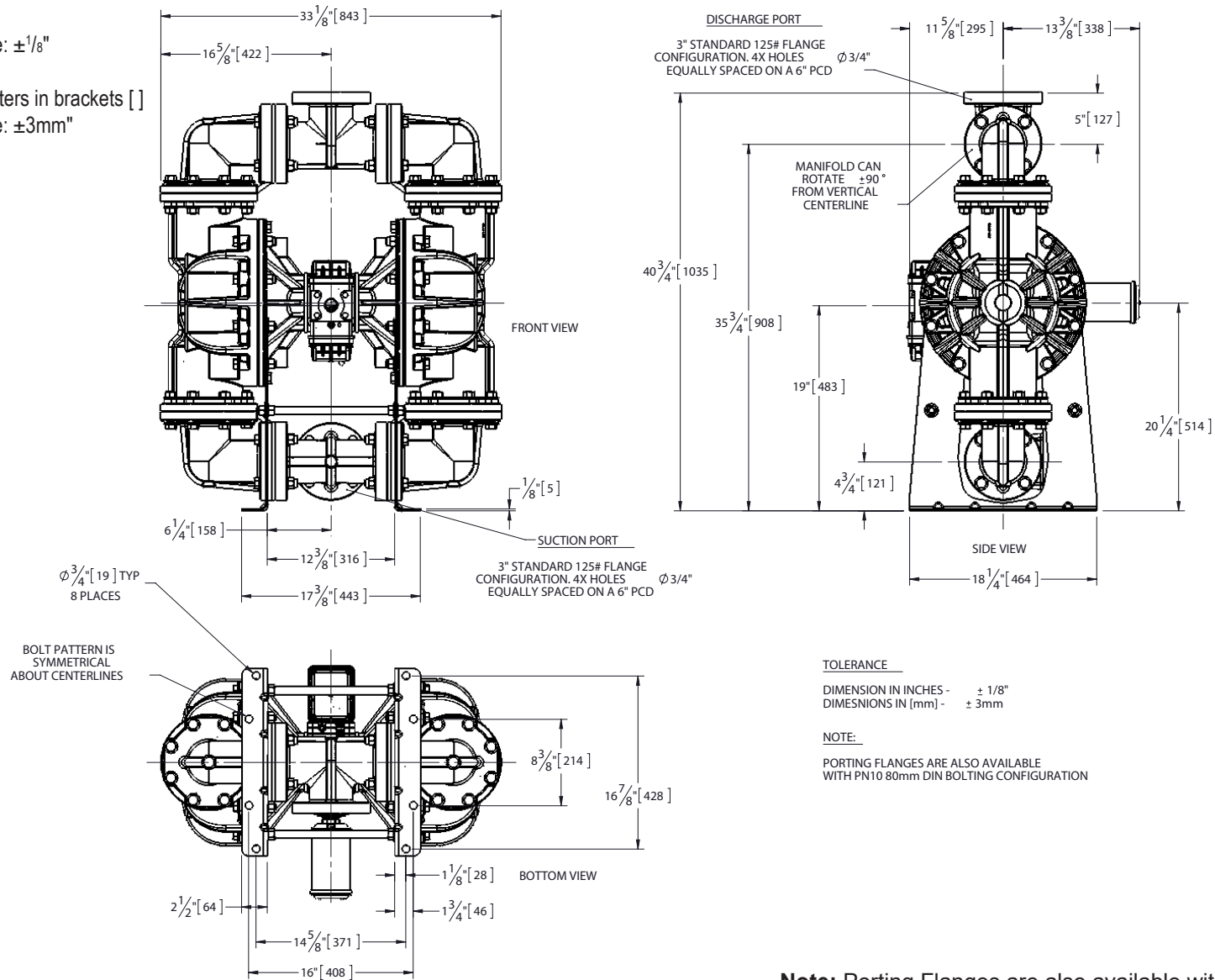
Dimensions: RS30 Non-Metallic

Dimensions in Inches

Dimensional tolerance: $\pm 1/8"$

Dimensions in millimeters in brackets []

Dimensional tolerance: $\pm 3\text{mm}$



Note: Porting Flanges are also available with PN10 80mm DIN bolting configuration.

Important Installation Information

Use of the standard AODD Installation Guide is recommended for pumps fitted with AirVantage technology. Install shut-off valves on both the suction and discharge of the pump. (This will help limit the amount of product that enters the center section of the pump in the event of a diaphragm failure.) Using shut-off valves in conjunction with a drain port also provides a means of allowing the lines to be drained when maintenance needs to be conducted.

When the supply liquid level is above the air inlet of the pump, and a diaphragm fails, the pumped liquid or fumes can enter the air end through the point of failure. When a diaphragm failure is detected, it is best to close the shut-off valves and bleed the lines of product. This will limit the ability of the material being pumped to enter the AirVantage. Failure to do so may result in damage to the AirVantage and air distribution components.

If a diaphragm failure has been detected in pumps fitted with AirVantage, the following procedure for shut-down must be used:

1. Close the suction shut-off valve (this will limit any new product from entering the pump)
2. Close the discharge shut-off valve (this will stop any product from reentering the pump)
3. Close the air supply shut-off valve
4. Drain the discharge line
5. Drain the suction line
6. Perform maintenance

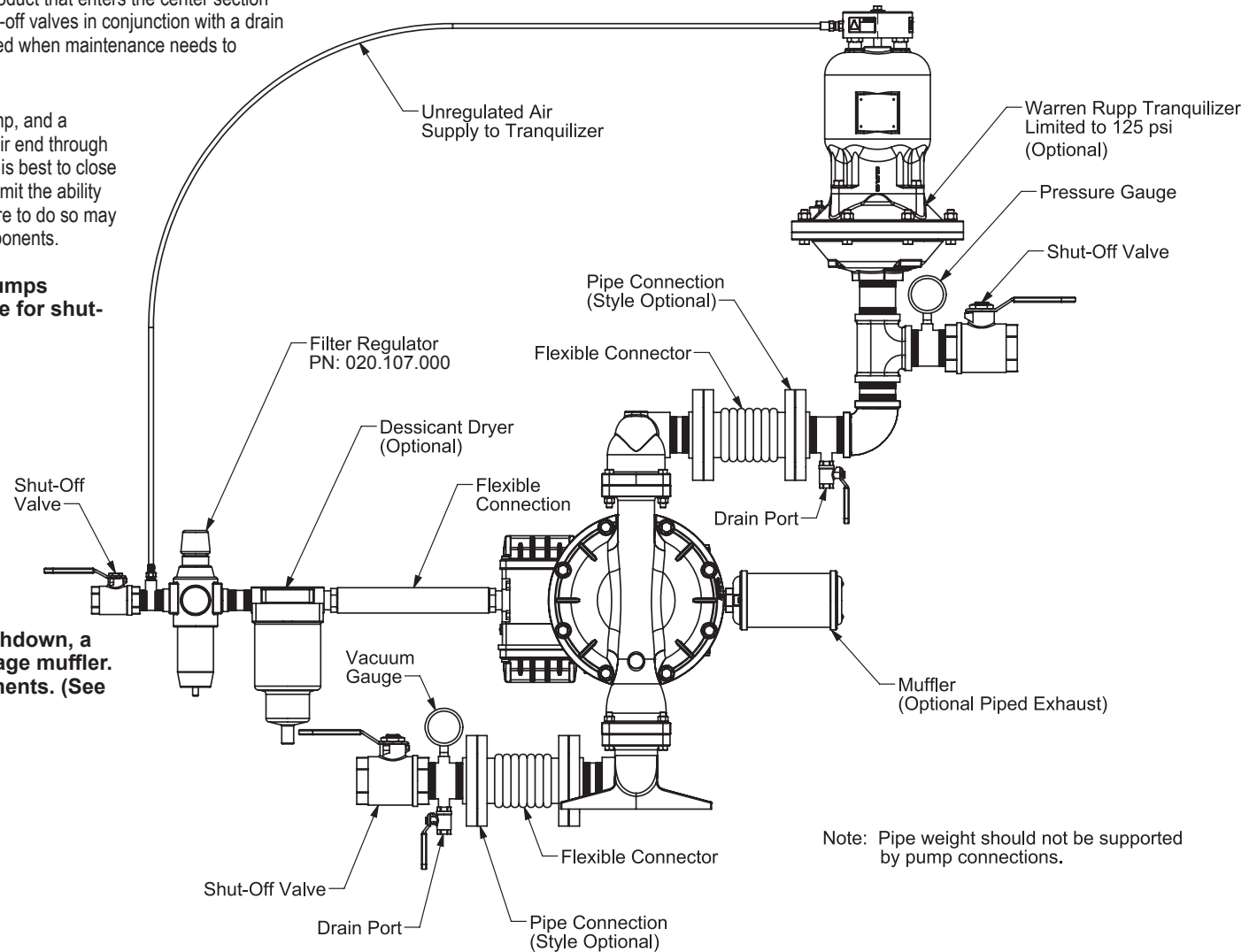
Caution: When performing a direct spray washdown, a plug must be installed in place of the AirVantage muffler. Failure to do so may damage internal components. (See page 23)



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.

Suggested Installation Guide



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 surge suppressor is recommended to further reduce pulsation in flow.

AIR SUPPLY

Air supply pressure cannot exceed 100 psi (7 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 ½" (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 ½ to ¾ 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.

PUMP TROUBLESHOOTING

⚠ CAUTION! WHENEVER TROUBLESHOOTING OR PERFORMING ANY REPAIRS ON ANY WARREN RUPP, INC. EQUIPMENT, ALWAYS REMOVE THE AIR SUPPLY LINE TO THE PUMP AND WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT.

PUMP WILL NOT CYCLE

What to Check: • The system head exceeds the air supply pressure to the pump.

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

What to Check: • Check ESADS+, including pilot valve assembly and main air valve assembly.

Corrective Action: • Disassemble and inspect the main air distribution valve, pilot valve, and pilot valve actuator pins. Check for scores, wear, or damaged o-rings. Replace parts as necessary. Refer to the exploded view drawing and air valve section (P.18 & 20).

What to Check: • Blocked discharge line.

Corrective Action: • Check for obstruction or closed discharge line.

What to Check: • Blocked pumping chamber.

Corrective Action: • Disassemble and inspect wetted chambers of the pump. Remove or flush any obstructions. Refer to page 14 for disassembly.

PUMP CYCLES, BUT WILL NOT FLOW OR FLOW RATE IS UNSATISFACTORY

What to Check: • Restricted or undersized air line.

Corrective Action: • Make sure there are no obstructions or restrictions in the air inlet to the pump. Install proper size air line and/or air line equipment. Refer to air supply section (p.7) air inlet plumbing recommendations.

What to Check: • Restricted or undersized suction piping.

Corrective Action: • Make sure there are no obstructions or restrictions in the suction line or related suction components such as screens or strainers. Install the proper size suction line and/or equipment. It is recommended that any suction line components and pipe size be at least the same size as the suction line thread size to the pump. Though best results will always be realized if the line size of the suction line is increased by one size. Refer to the installation section (p.5) for recommended suction plumbing recommendations.

What to Check: • Blocked air exhaust muffler.

Corrective Action: • Remove muffler, clean or de-ice and reinstall.

What to Check: • Excessive Suction Lift.

Corrective Action: • For lifts exceeding 20 feet (6 meters), filling the pump chambers with liquid will prime the pump in most cases. If not, place pump closer to fluid level.

What to Check: • Suction line cavitation.

Corrective Action: • If no obstructions are in the suction line of the pump, decrease the inlet air pressure and/or volume to the pump. This will slow down the diaphragm speed and reduce the cavitation.

What to Check: • Partially blocked exhaust muffler.

Corrective Action: • Remove muffler and make sure that some of the material being pumped has not migrated into the muffler element. If it has, replace the element or clean it and reinstall. If product has made it to the muffler, then the diaphragm assembly will need to be inspected. Refer to the Diaphragm Replacement section (p.15).

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

Corrective Action: • Visually inspect all suction side gaskets, seals, as well as pipe and pipe connections.

PUMP CYCLE SEEMS UNBALANCED OR PRODUCES EXCESSIVE VIBRATION

What to Check: • Excessive flooded suction in system.

Corrective Action: • Check height of fluid above pump. For flooded conditions, exceeding 10 feet (3 meters) of liquid, install a back pressure device in the exhaust side of the pump.

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

Corrective Action: • Disassemble the wet end of the pump and inspect check valves and seats for wear and proper seating. Replace them if necessary. Refer to the Check Valve section (p.15) for disassembly instructions.

What to Check: • Obstructed check valves.

Corrective Action: • Disassemble the wet end of the pump and look for obstructions that may prevent the check valve from seating on the seat. Look for damage on the valve and the seat. Replace them as necessary. Refer to the Check Valve section for disassembly (p.15).

What to Check: • Rigid pipe connections.

Corrective Action: • Install flexible pipe isolators or expansion joints between the plumbing and the pump.

What to Check: • Pulsation in the discharge line.

Corrective Action: • Excessive pulsation in the discharge line may be corrected by installing a Warren Rupp Tranquilizer Surge Suppressor.

AirVantage Troubleshooting

⚠ Caution! Whenever troubleshooting or performing any repairs on any Warren Rupp, Inc. equipment, always remove air supply line to the pump and wear proper personal protective equipment.

LED OUTPUT FOR AirVantage UNIT

<u>STATE</u>	<u>LED OUTPUT</u>
Startup/Settle/Deadhead	Solid
Standby/Low Flow	1 Second ON / 1 Second OFF
Learn Mode	0.1 Seconds ON / 0.1 Seconds OFF
Seek/Optimize	1 Second ON / 0.1 Seconds OFF
Steady State/Air Savings	OFF / ON in rhythm with Cycle Rate of Pump

AirVantage LED DOES NOT LIGHT UP AT ALL

What to Check:

- Make sure power switch on the control module is turned on, (depressed to the left)
- Make sure air is being supplied to pump or make sure 110 VAC unit has power being supplied to it

Corrective Action:

- Cycle power switch off/on
- Unplug patch cable and cycle power switch off/on
- Consult Factory After Sales Support team

AirVantage LED LIGHTS UP AND STAYS ON SOLID

What to Check:

- Make sure patch cable is plugged in and locked

Corrective Action:

- Consult Factory After Sales Support team

VALVE FIRES ONCE AND IMMEDIATELY RESETS

Corrective Action:

- Consult Factory After Sales Support team

VALVE LED NEVER LEAVES SEEK MODE - AirVantage LED PULSING IN TIME TO PUMP, BUT VALVE NOT ACTUATING AND THE PUMP IS NOT SAVING AIR

Corrective Action:

- Consult Factory After Sales Support team

UNEXPECTED OPERATING CONDITION (AIR SAVINGS OR FLOW RATE)

What to Check:

- Check for varying environmental pumping conditions (changing head or suction)
- Check ice buildup in exhaust area
- Inspect sleeve and spool set for damage

Corrective Action:

- Consult Factory After Sales Support team

PUMP CYCLING IS UNSTABLE OR ERRATIC

What to Check:

- Run pump without AirVantage and check pump operation
- Make sure pump has correct sleeve and spool set installed
- Make sure patch cable plug is connected and locked
- Make sure power wire connectors are tight

Corrective Action:

- Consult Factory After Sales Support team

PUMP RUNNING SLOWLY

What to Check:

- Run pump without AirVantage and check operation
- Cycle the power off/on to the control module to reset controller
- Check ice buildup in exhaust area
- Inspect sleeve and spool set for damage

Corrective Action:

- Consult Factory After Sales Support team
- Cycle the power switch on the control module off/on

AirVantage Troubleshooting Continued

AirVantage RESETS AND ENTERS LEARN MODE TOO FREQUENTLY

What to Check:

- Check for excessive varying environmental pumping conditions (changing head or suction)
- Check ice buildup in exhaust area
- Inspect sleeve and spool set for damage
- Make sure patch cable plug is connected and locked

Corrective Action:

- Consult Factory After Sales Support Team

PUMP STALLS, RESETS, LEARNS, SEEKS AND REPEATS

What to Check:

- Make sure patch cable plug is connected and locked
- Check ice buildup in exhaust area

Corrective Action:

- Consult Factory After Sales Support Team

PUMP MOVES OUT OF STEADY STATE AND NEVER ATTEMPTS TO RELEARN (LED ON)

What to Check:

- Make sure patch cable plug is connected and locked
- Cycle the power off/on to the control module

Corrective Action:

- Consult Factory After Sales Support Team
- Cycle the power switch on the control module off/on

WHAT TO DO IN THE EVENT OF A DIAPHRAGM FAILURE

If a diaphragm failure has been detected in pumps fitted with AirVantage, see page 5 for shut-down procedure.

What to Check:

- Has product migrated to the sensor?

Corrective Action:

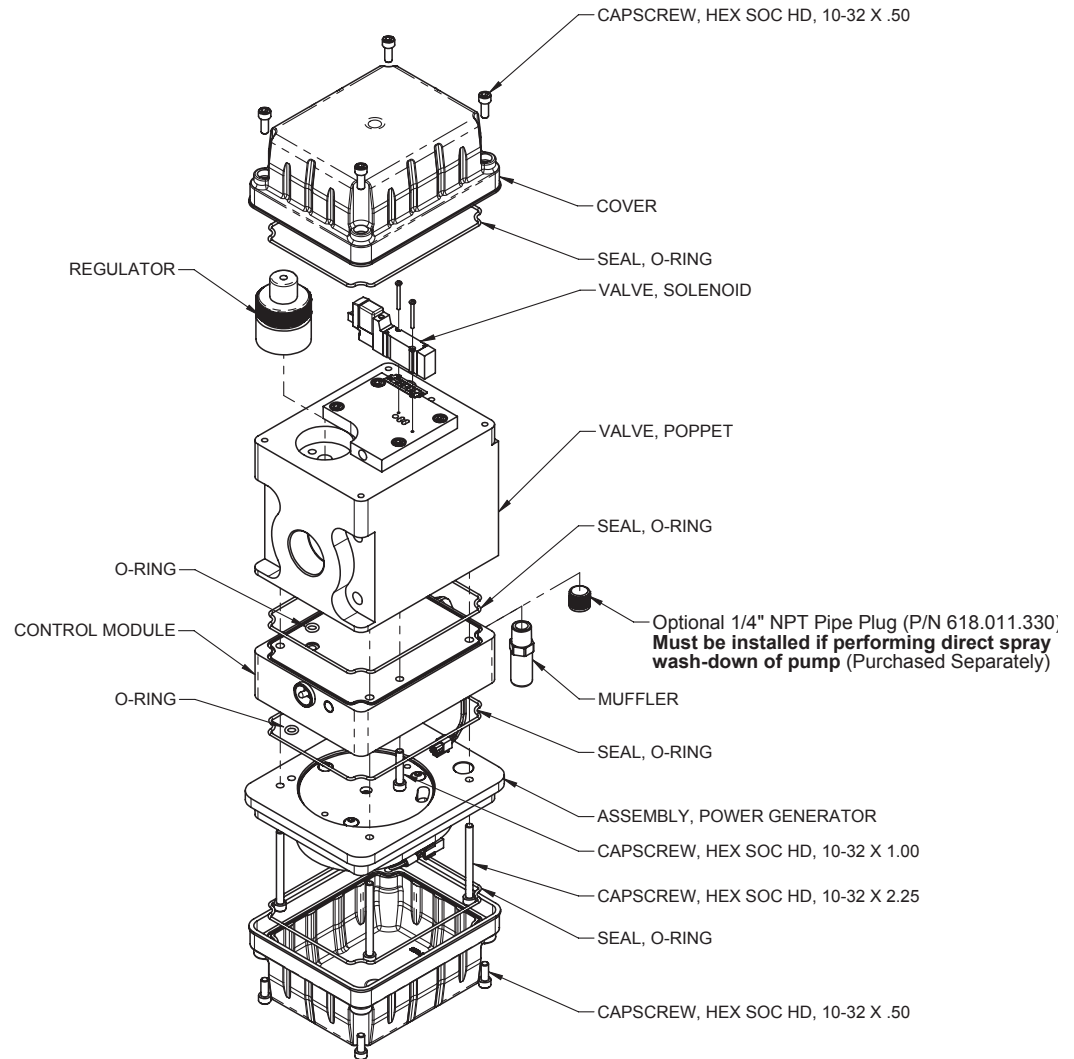
If the sensor has been submerged in product, the sensor will need to be replaced. Consult the AirVantage servicing section of the manual for detailed instructions.

What to Check:

- Has product contaminated the poppet valve?

Correct Action:

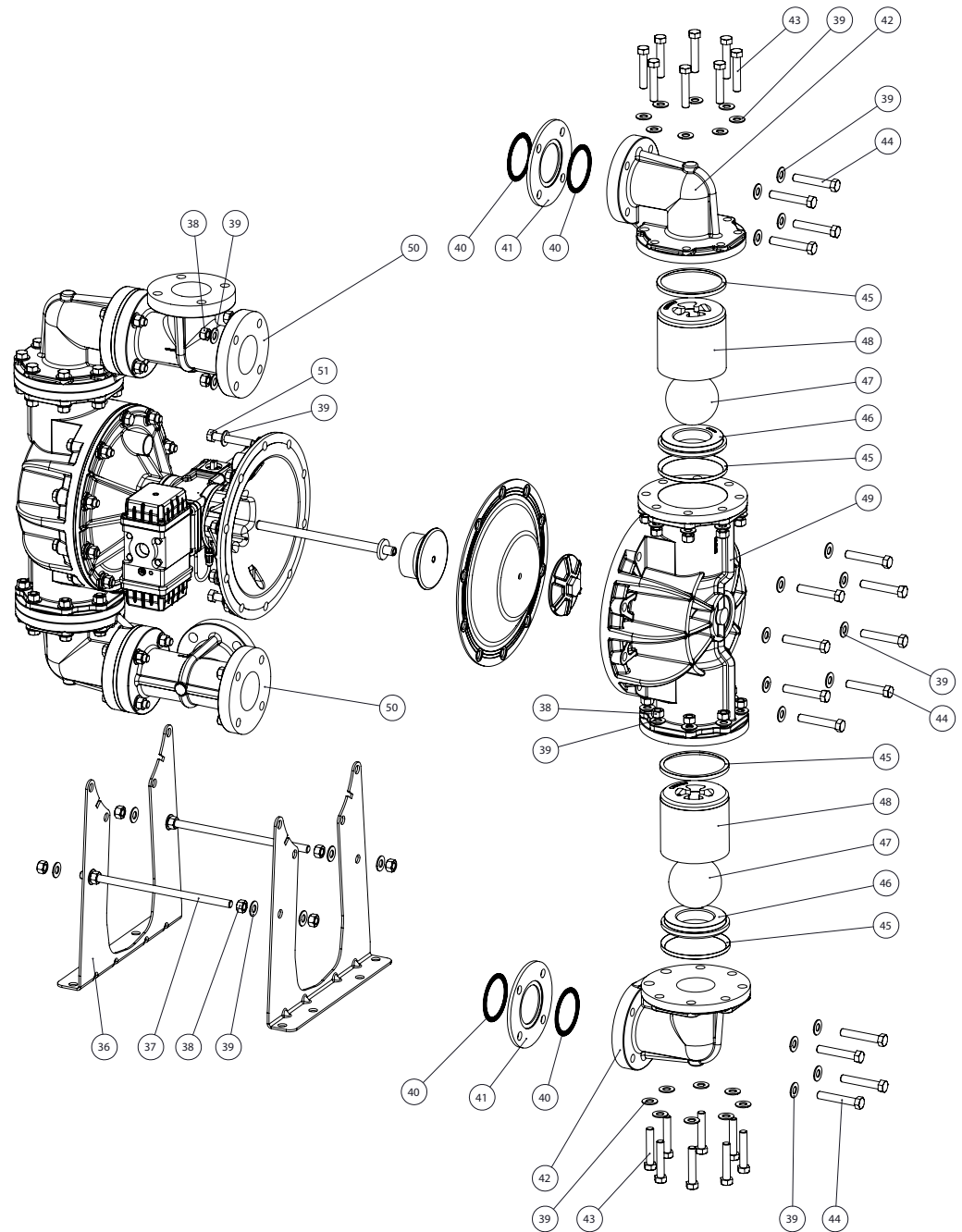
If a significant amount of product has made it into the poppet valve, then the unit will need to be disassembled for inspection. Consult the AirVantage servicing section (p.23).



Composite Repair Parts Drawing

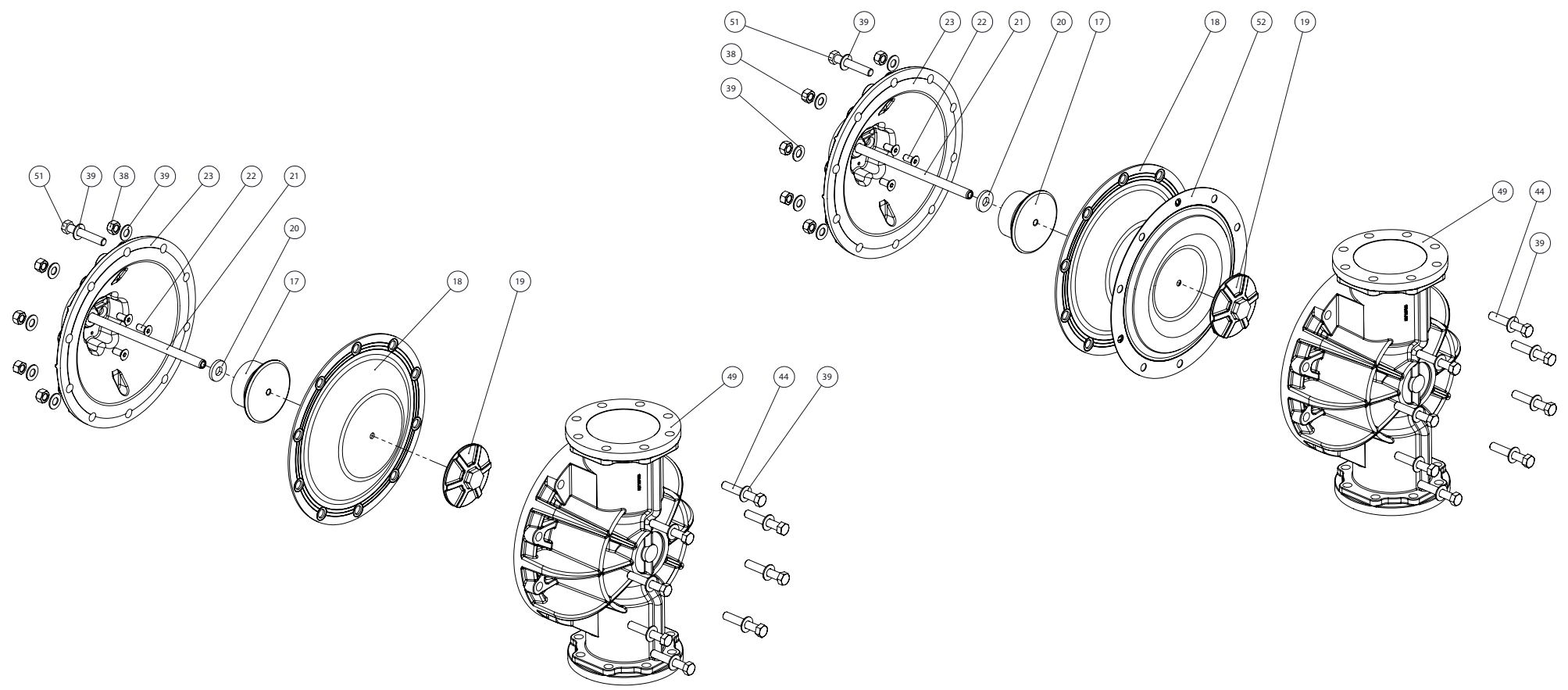
AVAILABLE SERVICE AND CONVERSION KITS

- 476.328.000 AIR END KIT**
Seals, O-rings, Gaskets, Retaining Rings, Air Valve Assembly and Pilot Valve Assembly
- 476.329.000 AIR END KIT (for Stroke Indicator Option)**
Seals, O-rings, Gaskets, Retaining Rings, Air Valve Assembly and Pilot Valve Assembly
- 476.140.354 Wet End Kit**
Santoprene Diaphragms, Santoprene Balls and PTFE Seats
- 476.140.654 Wet End Kit**
Santoprene Diaphragms, PTFE Overlay Diaphragms, PTFE Balls and PTFE Seats
- 476.384.000 SENSOR KIT**
(Sensor, Probe Tips and O-rings)
- 476.271.000 POPPET VALVE KIT**
(Poppet Valve Assembly, O-ring)
- 476.272.000 POPPET VALVE ASSEMBLY KIT**
(Poppet Valve Assembly, O-ring, Regulator and Pilot Valve)
- 476.273.000 COVER KIT**
(Enclosures, Hardware and O-rings)
- 476.274.000 CONTROL MODULE KIT (Power Gen AirVantage Only)**
(Control Module Assembly, Gaskets, Hardware and O-rings)
- 476.278.000 POWER GEN KIT (Power Gen AirVantage Only)**
(Power Gen, Gasket, Hardware and O-ring)
- 476.280.000 SEAL KIT**
O-rings and Gaskets
- 476.283.000 PROBE TIP KIT**
(Probe Tips and O-rings)
- 475.XXX.000 MIDSECTION UPGRADE KIT – Consult Factory**
(Replaces S30 Non-Metallic Midsection with AirVantage Components)



Diaphragm Service Drawing, Non-Overlay

Diaphragm Service Drawing, with Overlay



Composite Repair Parts List

ITEM	PART NUMBER	DESCRIPTION	QTY				
1	031.141.000	Air Valve Assembly (See Exploded View for Details)	1	34	360.119.360	Gasket, Inner Chamber	1
	031.141.002	Air Valve Assembly w/PTFE Coated Hardware	1	35	196.210.156	Chamber, Inner	1
2	032.065.000	Assy.AirVantage (See Exploded View for Details)	1		196.210.307	Chamber, Inner	1
3	095.123.000	Pilot Valve Assembly	1		196.210.309	Chamber, Inner	1
4	170.122.115	Capscrew, Hex HD (5/16-18 x 5 Stainless)	4	36	196.210.332	Chamber, Inner	1
	170.122.330	Capscrew, Hex HD (5/16-18 x 5 Zinc Plated Steel)	4		115.133.080	Bracket, Mounting	2
5	560.011.360	O.Ring, Adaptor Plate	2		115.133.305	Bracket, Mounting	2
6	171.095.115	Capscrew, Soc HD (3/8-16 x 1.25 Stainless)	4		115.133.306	Bracket, Mounting	2
	171.095.330	Capscrew, Soc HD (3/8-16 x 1.25 Zinc Plated Steel)	4	37	115.133.333	Bracket, Mounting	2
7	612.249.150	Adaptor, Air Inlet	1		685.052.115	Rod, Support	2
	612.249.307	Adaptor, Air Inlet	1	38	685.052.308	Rod, Support	2
	612.249.309	Adaptor, Air Inlet	1		545.009.110	Nut, Hex (5/8 Stainless)	72
	612.249.332	Adaptor, Air Inlet	1	39	545.009.308	Nut, Hex (5/8 Stainless Black PTFE Coated)	72
8	360.123.360	Gasket, Air Inlet	1		901.047.115	Washer, Flat (5/8" Stainless)	140
9	360.092.360	Gasket, Pilot Valve	1	40	901.047.308	Washer, Flat (5/8" Stainless Black PTFE Coated)	140
10	920.027.000	Wire, Patch	1	41	720.039.600	Seal, Manifold Spacer	8
11	008.022.150	Adaptor	1		770.055.520	Spacer, Manifold	4
12	620.017.115	Plunger, Actuator	2		770.055.552	Spacer, Manifold	4
13	560.001.360	O.Ring	2		770.059.520	Spacer, Manifold (PTFE Overlays Only)	4
14	135.032.506	Bushing, Plunger	2	42	770.059.552	Spacer, Manifold (PTFE Overlays Only)	4
15	560.201.360	O.Ring, Probe Tip	2		312.103.520	Elbow	4
16	846.001.167	Tip, AirVantage Probe	2	43	312.103.552	Elbow	4
17	612.162.150	Assembly, Inner Diaphragm Plate	2		170.111.115	Capscrew, Hex HD (5/8-11 x 3.25 Stainless)	4
18	286.077.354	Diaphragm	2	44	170.111.308	Capscrew, Hex HD (5/8-11 x 3.25 Stainless Black PTFE Coated)	4
	286.077.357	Diaphragm	2		170.112.115	Capscrew, Hex HD (5/8-11 x 3.75 Stainless)	32
19	612.161.520	Assembly, Outer Diaphragm Plate	2	45	170.112.308	Capscrew, Hex HD (5/8-11 x 3.75 Stainless Black PTFE Coated)	32
20	132.019.360	Bumper, Diaphragm	2	46	720.043.600	Seal, Check Valve Assembly	8
21	685.051.120	Rod, Diaphragm	1		722.076.520	Seat, Check Valve	4
22	171.004.115	Capscrew, Soc HD (1/2.13 x 1.25 Stainless)	6	47	722.076.552	Seat, Check Valve	4
23	196.211.156	Chamber, Inner RH	1		050.039.354	Ball, Check	4
	196.211.307	Chamber, Inner RH	1		050.039.357	Ball, Check	4
	196.211.309	Chamber, Inner RH	1	48	050.039.600	Ball, Check	4
	196.211.332	Chamber, Inner RH	1		670.047.520	Retainer, Ball	4
24	360.118.360	Gasket, Inner Chamber RH	1	49	670.047.552	Retainer, Ball	4
25	360.120.000	Foam, Sensor, EST	2	50	196.151.520	Chamber, Outer	2
26	560.033.360	O.Ring, Sensor Bushing	2		518.133.520	Manifold	2
27	724.009.000	Sensor Assembly, AirVantage	1		518.133.520E	Manifold, 80mm DIN	2
28	720.010.375	Seal, Diaphragm Rod	2		518.133.552	Manifold	2
29	530.038.000	Muffler	1	51	518.133.552E	Manifold, 80mm DIN	2
30	171.053.115	Capscrew, Soc HD (3/8-16 X 2.75 Stainless)	4		170.017.115	Capscrew, Hex HD (5/8-11 x 1.75 Stainless)	4
	171.053.308	Capscrew, Soc HD (3/8-16 X 2.75 Stainless Black PTFE Coated)	4	52	170.017.308	Capscrew, Hex HD (5/8-11 x 1.75 Stainless Black PTFE Coated)	4
31	901.048.115	Washer, Flat (3/8" Stainless)	8	53	286.078.600	Diaphragm, Overlay	2
	901.048.330	Washer, Flat (3/8" Zinc Plated Steel)	8		560.200.360	O-Ring	2
32	360.093.360	Gasket, Main Air Valve	1	54	894.015.000	Check Valve Assmebly	1
33	114.034.307	Intermediate Assembly	1	55	171.100.115	Capscrew, Soc HD (5/16-18 x 2.5)	4
					NOT SHOWN		
					535-069-000	Nameplate	1

DIAPHRAGM AND CHECK VALVE SERVICING

- To service the diaphragms, first shut off and bleed the air being supplied to the pump. For safety purposes the air supply line should be disconnected from the pump.
- Then shut off the suction and discharge lines to the pump.
- Bleed the pressure from the pump suction and discharge lines and remove the lines from the pump.
- Drain any remaining liquid from the pump.
- During the servicing of the diaphragms, consult the "Composite Repair Parts Drawing" (p.10 and 11).

Step #1: Removing the Manifolds

- Using a 9/16" wrench or socket, remove the 16 cap-screws, hex-nuts, and lockwashers that fasten the manifolds to the outer chambers.
- Remove the manifolds.

Step #2: Inspect Check Valve Components

- Inspect the four check balls for wear, abrasion or cuts on the spherical surface. Also inspect the four check valve seats for cuts, abrasive wear or embedded material around the area where the ball contacts the seat.
- For maximum pump performance and efficiency, the surface of the ball must seal against the seat without any gaps.
- Replace worn or damaged parts as necessary. Consult the "Composite Repair Parts Drawing" for part numbers and quantities.

Step #3: Removing the Outer Chambers

- Using an 11/16" and a 5/8" wrench or socket, remove the 16 cap-screws, and hexnuts that fasten the outer chambers, diaphragms, and inner chambers.

Step #4: Removing the Diaphragm Assemblies

- Once the outer chambers are removed, use a 1-1/16" (27mm) wrench or six-pointed socket to remove the diaphragm assemblies (outer plate, diaphragm, and inner plate) from the diaphragm rod by turning counterclockwise.
- **"AirVantage CAUTION"** – When diaphragm assemblies are removed, watch for the brass probe tips located on the end of the sensor rod. There is one brass probe tip and one o-ring per side. Inspect the probe tips and o-rings for wear. For every diaphragm service, these parts should be replaced and are available in kit form. Consult the "Composite Repair Parts Drawing" for part numbers and quantities.
- The diaphragm connecting rod will usually stay with one of the diaphragm assemblies. Install the rod in a vise fitted with soft jaws and loosen the diaphragm assembly from the rod. Take care not to scar the surface of the rod.
- Insert a 1/4-20 capscrew or set screw into the smaller tapped hole in the inner diaphragm plate.
- Insert the protruding stud and the 1/4-20 fastener loosely into a vise. Use the 1-1/16" wrench or socket to remove the outer diaphragm plate by turning counter-clockwise.

Step #5: Inspect Diaphragms, Diaphragm Connecting Rod, U-cup Seals and Bumpers

- Inspect the diaphragms for cuts and/or punctures in the flexing area. Even the smallest hole or crack can allow product to get to the air side of the pump. If there is product noticed on the air side of the diaphragm, there is a good possibility the diaphragm needs to be replaced.
- **"AirVantage CAUTION"** – If product is observed on the air side of the diaphragm, refer to the "AirVantage Servicing" section of the service manual.
- Abrasive wear of the diaphragm needs to be inspected at the point where the diaphragm contacts the outer chamber or where the diaphragm plates contacts the diaphragm. Chemical attack of a diaphragm will usually result in swelling or deformity. Replace the diaphragms if necessary. Inspect the diaphragm connecting rod for scars, nicks or any imperfection that could cause damage to the u-cup seal. Inspect the u-cup seal for imperfections on the sealing lip. Inspect the bumpers for damage on the face.

Replace components as necessary. Consult the "Composite Repair Parts Drawing" for part numbers and quantities.

Step #6: Assemble 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 1/4-20 fastener back into the vise. Use a torque wrench and 1-1/16" socket (27 mm) to tighten the diaphragm assembly together to 480 in.-lbs. (54.23 Newton meters).
- Allow a torqued assembly to set for 15-minutes. This will allow the diaphragm to relax. Re-torque the assembly to compensate for stress relaxation in the clamped assembly.

Step #7: Installing the Diaphragm Assemblies to the Pump

- Make sure the bumper 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 until the inner diaphragm plate is flush to the end of the rod.
- **"AirVantage CAUTION"** – With the pump lying on one inner chamber, pull the sensor rod UP the full length of its stroke. Insert the brass probe tip and o-ring into the sensor rod. Insert rod and diaphragm assembly into pump, taking care not to damage the u-cup seal. Make sure the diaphragm plate contacts the brass probe tip and stays in contact with it. This will help make sure the probe tip does not fall out during reassembly.
- Align the bolt holes in the diaphragm with the bolt pattern in the inner chamber. Fasten the outer chamber to the pump, using the cap screws, and hex nuts, but do not tighten. Flip the pump over so that it is now setting on the outer chamber. Pull the diaphragm rod out as far as possible. Make sure the bumper is installed over the diaphragm rod.
- **"AirVantage CAUTION"** – Install the second brass probe tip and o-ring on the sensor rod.
- Thread the stud of the remaining diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 21) until the diaphragm plate contacts the end surface of the diaphragm rod. If the bolt holes in the diaphragm do not line up with the inner chamber, use a 1-1/16" (27 mm) socket or wrench to tighten the assembly until they line up.
- Fasten the remaining outer chamber to the pump, using the cap screws and hex nuts, and once again, do not tighten at this point. Tip the pump 90° and set it on a flat surface with the discharge side of the chambers down. This will allow the outer chambers to be aligned with each other. Tighten the sixteen fasteners. Make sure to use a cross tightening pattern to ensure an even sealing on the diaphragm.

Step #8: Re-install the Check Valve Components and Manifolds

- While the pump is setting on the discharge side, insert the check balls and seats on the suction side of the pump. Make sure the seats fit within the counter bore of the chambers. The suction manifold can now be installed, using the eight cap screws, hex nuts and lock washers.
- Flip the pump 180° and install the seats and check balls on the discharge side.
- Now the discharge manifold can be installed and fastened using the remaining cap screws, hex nuts, and lock washers.

OVERLAY DIAPHRAGM SERVICING

The overlay diaphragm is a PTFE diaphragm that fits over the exterior of the diaphragm. The PTFE diaphragm is used to protect the standard diaphragm from the chemicals being pumped. Repeat step #6 when diaphragms need to be serviced.



! IMPORTANT

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this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

MODULAR CHECK 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 42 from pump composite repair parts drawing). Use a $\frac{9}{16}$ " 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 49).

Next remove the check valve seal (item 45). Inspect the seal for cuts or pinched areas. Replace seal as needed.

Disassemble the component parts of each modular check valve. Inspect the check valve retainer (item 42) for cuts, abrasive wear, or embedded materials. Replace as needed.

Inspect the check balls (items 47) for wear, abrasion, or cuts on the spherical surface. The check valve seats (items 46) 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.

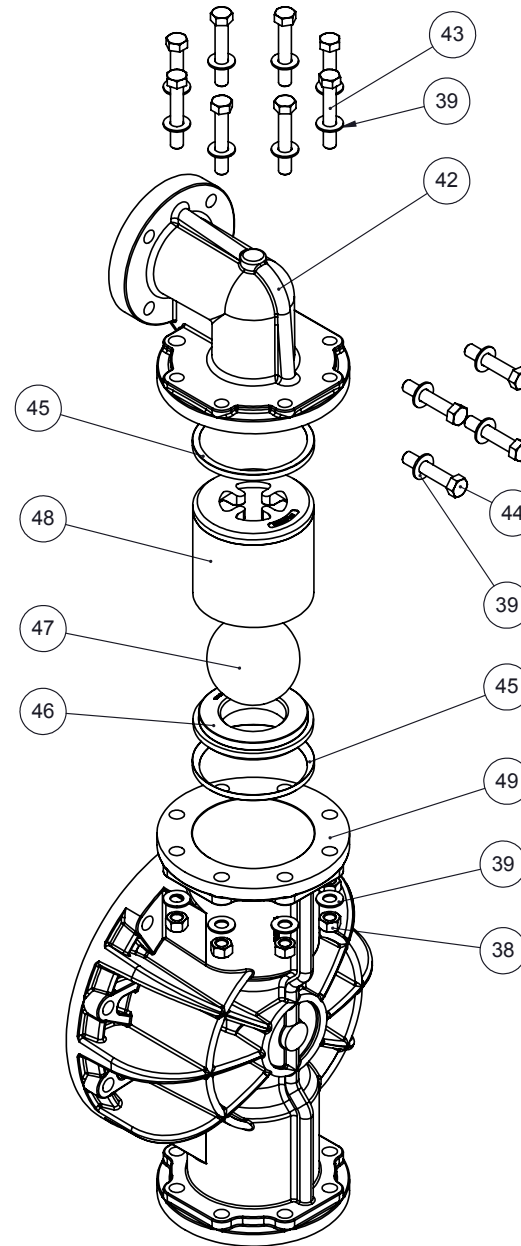
Remove the remaining check valve seal (item 45). Inspect the seal for cuts or pinched areas. Replace seal as needed.

Re-assemble the modular check valve. The seat should fit snugly into the retainer.

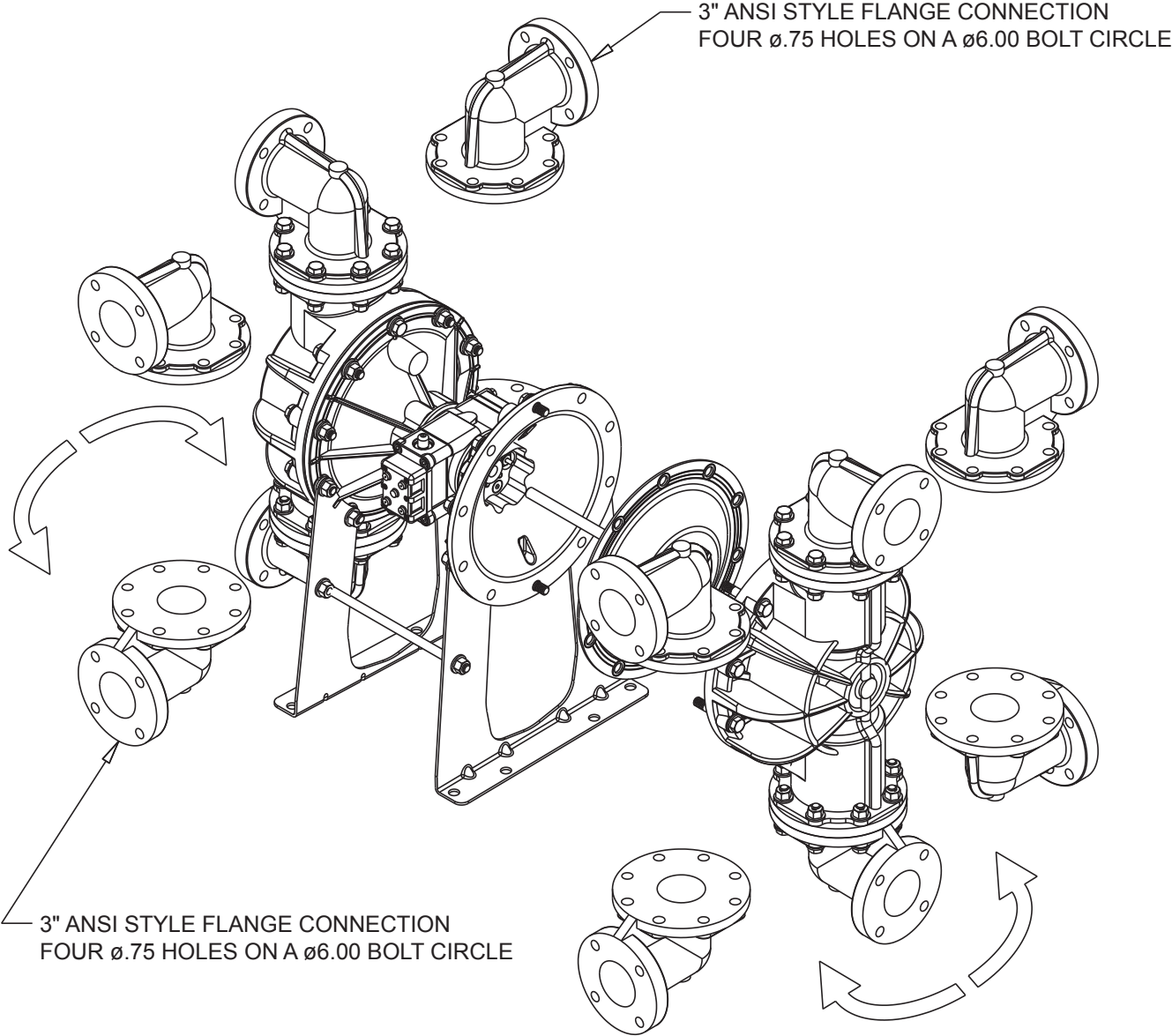
Place a check valve seal (item 45) into the cavity of the outer chamber (item 49). Make sure the chamfer side of the seal faces out. Insert the modular check valve into the outer chamber with the retainer facing up. Install a check valve seal (item 45). Make sure the chamfer side of the seal faces the chamfer on the check valve seat or retainer.

The pump can now be reassembled, reconnected and returned to operation.

Modular Check Valve Drawing



Dual Port Option Drawing



DUAL PORTING OPTIONS

Several dual porting options are possible. The pump can be converted to a dual port arrangement on both the suction and the discharge ends. The porting can be configured to a single suction and a dual discharge. The porting can be changed to a dual suction and a single discharge.

The above changes are possible because the porting flange of the elbows (items 42) are designed to mate with standard 125# ANSI style 4-bolt, 3" pipe flanges.

Dual porting of both suction and discharge ends of the pump

Converting the pump from the standard single suction and discharge porting configuration to dual porting at each end is easy. Simply remove the manifold seals, spacers, and manifolds (items 50, 40, and 61 from pump assembly drawing) from the pump.

The discharge and suction elbows can be rotated at 90° increments (see arrows and optional positioning in the Dual Porting Drawing.

Single porting of the suction and dual porting of the pump discharge

To convert the pump from the standard single suction and single discharge porting configuration to a dual discharge porting arrangement remove the only the discharge manifolds, spacers, and manifold seals. Position the discharge elbows in the desired direction at 90° increments. (See arrows and optional positioning in the Dual Porting Drawing.)

Dual porting of the suction and single porting of the pump discharge

To convert the pump from the standard single suction and single discharge porting configuration to a dual suction porting arrangement remove the only the suction (bottom) manifolds, spacers, and manifold seals.

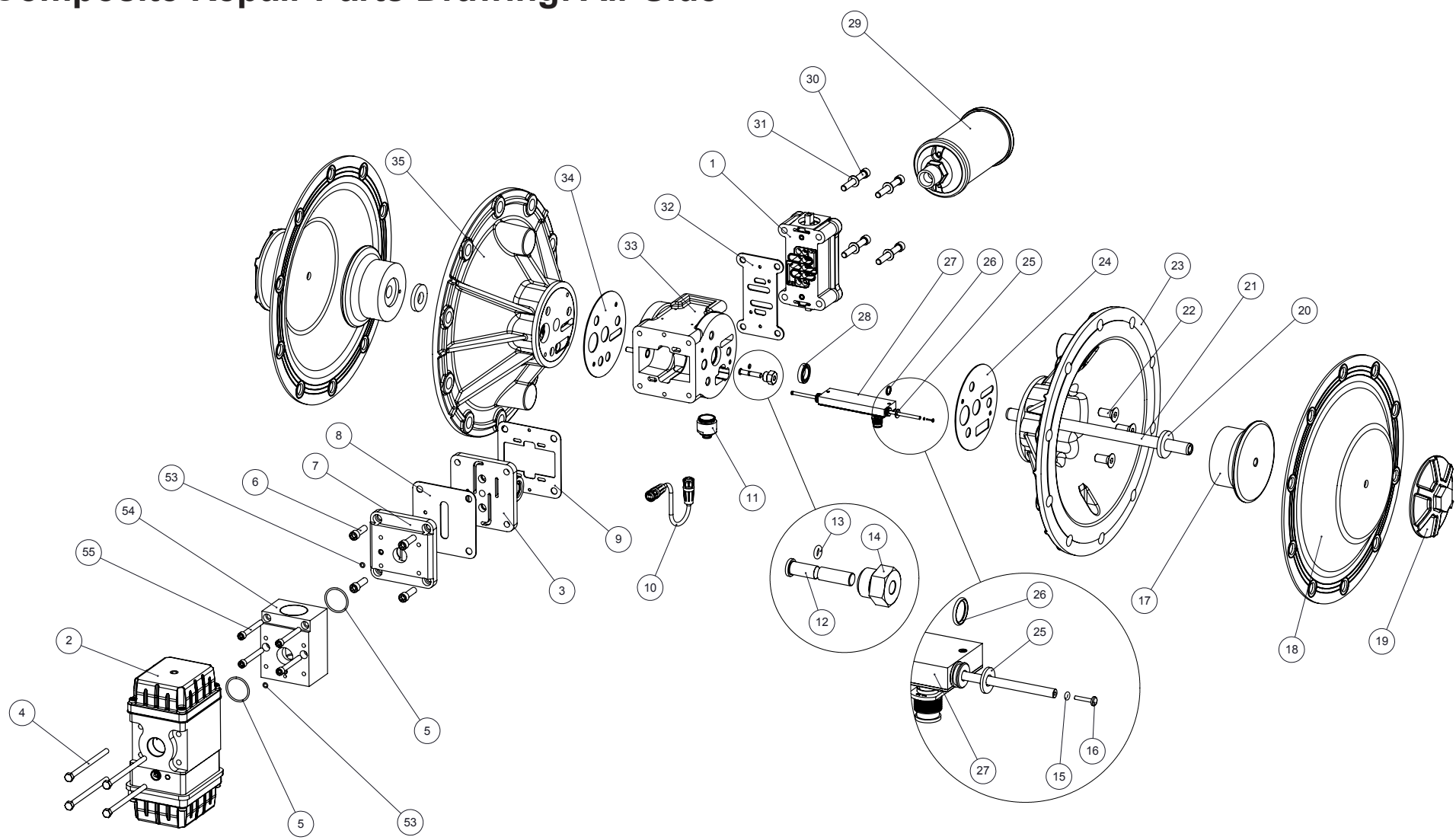
Position the suction elbows in the desired direction at 90° increments. (See arrows and optional positioning in the Dual Porting Drawing.)



! IMPORTANT

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Composite Repair Parts Drawing: Air Side



Note: Refer to Composite Parts
List on page 12 for part numbers

INTERMEDIATE AND AirVantage SENSOR SERVICING

- To service the intermediate and AirVantage sensor, first shut off and bleed the air being supplied to the pump. For safety purposes, the air supply line should be disconnected from the pump. Shut off both the suction and discharge lines to the pump. Consult the "Composite Repair Parts Drawing".

Step #1: Remove the Patch Cable

- Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

- Use a ½" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, set the unit down on the plastic cover located on the bottom.

Step #3: Remove the Manifolds, Chambers, and Diaphragms (See Diaphragm Servicing Section)

Step #4: Remove the Diaphragm Assemblies

- Refer to the "Diaphragm Servicing" section of the manual to remove diaphragm assembly from the pump.
- **"AirVantage CAUTION"** – When the diaphragm assembly is removed, watch for the brass probe tips located on the end of the sensor rod. There is one brass probe tip and one o-ring per side. Inspect the probe tips and o-rings for wear. For every diaphragm service, these parts should be replaced and are available in kit form. Consult the "Composite Repair Parts Drawing" for part numbers and quantities.

Step #5: Remove the Inner Chambers

- Use a ¼" hex key wrench and remove the four flat head socket cap screws on each inner chamber. These bolts have been assembled using blue thread locker, so they may be difficult to remove. The inner chambers and gaskets can now be removed.
- **"AirVantage CAUTION"** – Remove the inner chamber from the intermediate with caution, taking care not to damage the sensor. Inspect the gaskets and u-cup seals under each inner chamber and replace them as necessary.

Step #6: Accessing the Actuator Plunger Bushings and O-rings

- The actuator plunger pin bushings and o-rings can now be accessed. If it is determined that these parts need to be replaced, use a small screwdriver and remove the retaining rings.
- **NOTE:** It is recommended that new retaining rings be installed after disassembly. The bushing and o-ring can now be removed and inspected.

Step #7: Accessing the AirVantage Sensor

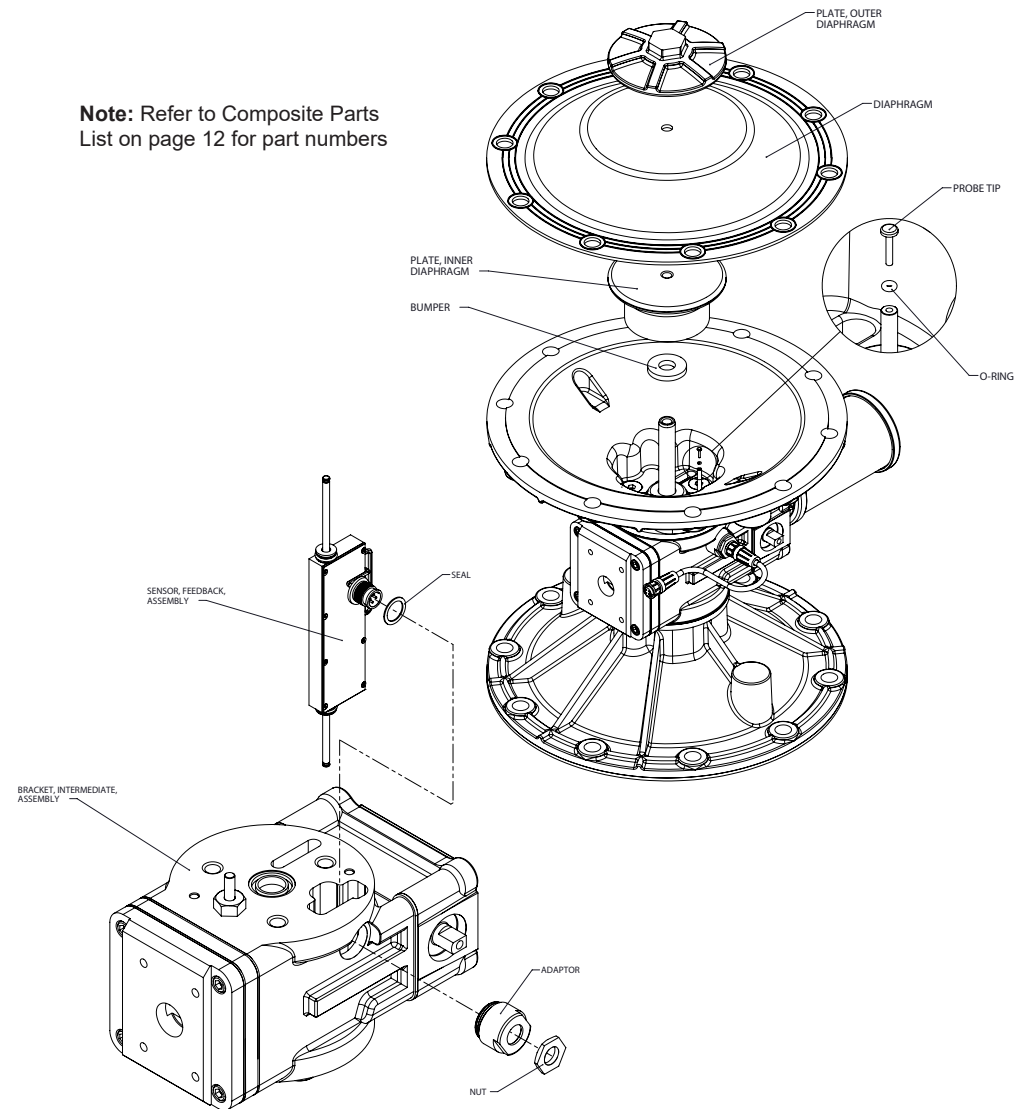
- If the sensor needs to be replaced, use a 13/16" socket and remove the plastic nut securing the connector to the intermediate. Slide the connector out of the hole, taking care not to lose/misplace the gasket on the connector.
- The sensor can now be removed from the intermediate assembly.

Step #8: Reinstallation

- Slide the new sensor assembly in the intermediate.
- **"AirVantage CAUTION"** – Make sure the cable assembly fits into the groove machined in the intermediate. Failure to do so may damage the cable during assembly.

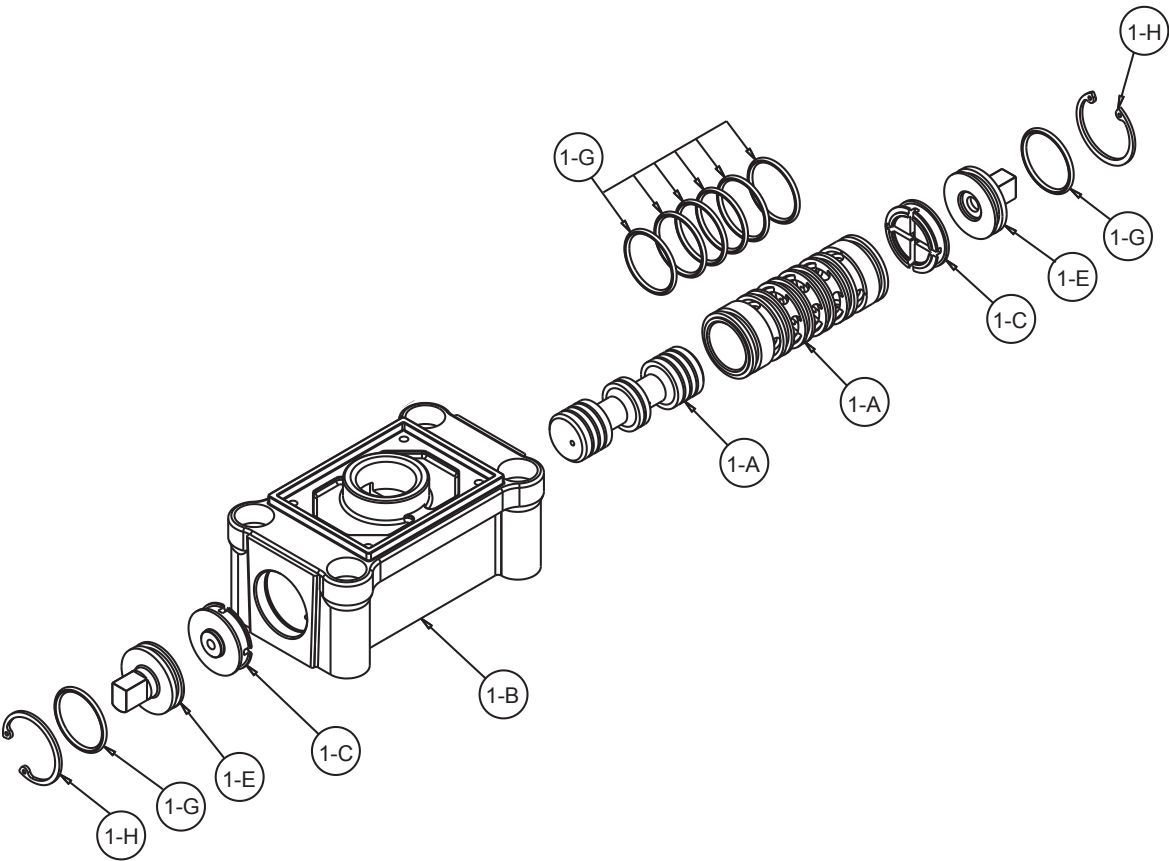
- Feed the connector through the hole in the intermediate, making sure the gasket is on the connector before installation. The flat edge on the connector should line up with the inside of the intermediate. Install the nut and hand tighten it using a 13/16" socket.
- The inner chambers and gaskets can now be reinstalled. Use blue thread locker on the inner chamber bolts and torque them to 300 in-lbs.
- Refer to the "Diaphragm Servicing" section of the manual to finish the diaphragm installation procedure.

Note: Refer to Composite Parts List on page 12 for part numbers



Air Distribution Valve Assembly Drawing

RS30-Non-Metallic Design Level 1



MAIN AIR VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	031.140.000	Main Air Valve Assembly	1
1-A	031.139.000	Spool Assembly	1
1-B	095.094.551	Body, Air Valve	1
1-C	132.029.552	Bumper	2
1-E	165.115.552	Cap, End	2
1-G	560.020.360	O-Ring	8
1-H	675.044.115	Ring, Retaining	2

AIR DISTRIBUTION VALVE SERVICING

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

STEP #1: See Composite Repair and Parts Drawing.

Using a $\frac{5}{16}$ " Allen wrench, remove the four hex socket capscrews (item 30) and four flat washers (item 31). Remove the air valve assembly from the pump.

Remove and inspect gasket (item 32) for cracks or damage. Replace gasket if needed.

STEP #2: Disassembly of the air valve.

To access the internal air valve components first remove the two retaining rings (item 1-H) from each end of the air valve assembly using clip ring pliers.

Next remove the two end caps (item 1-E). Inspect the o-rings (item 1-G) for cuts or wear. Replace the o-rings if necessary.

Remove the two bumpers (item 1-C). Inspect the bumpers for cuts, wear or abrasion. Replace if necessary.

Remove the spool (part of item 1-A) from the sleeve. 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.

Inspect the inner diameter of the sleeve (part of item 1-A) for dirt, scratches, or other contaminants. Remove the sleeve if needed and replace both the sleeve and spool with a new sleeve and spool set (item 1-A).

STEP #3: Reassembly of the air valve.

Install one end cap (item 1-E) with an o-ring (item 1-G) and one bumper (item 1-C) into one end of the air valve body (item 1-B). Install one retaining ring (item 1-H) into the groove on the same end.

Remove the new sleeve and spool set (item 1-A) from the plastic bag. Carefully remove the spool from the sleeve. Install the six o-rings (item 1-G) 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 (item 1-B), 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 it touches the bumper on the opposite end.

Install the remaining bumper, end cap with o-ring, and retaining ring.

Fasten the air valve assembly (item 1) and gasket (item 32) to the pump.

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.

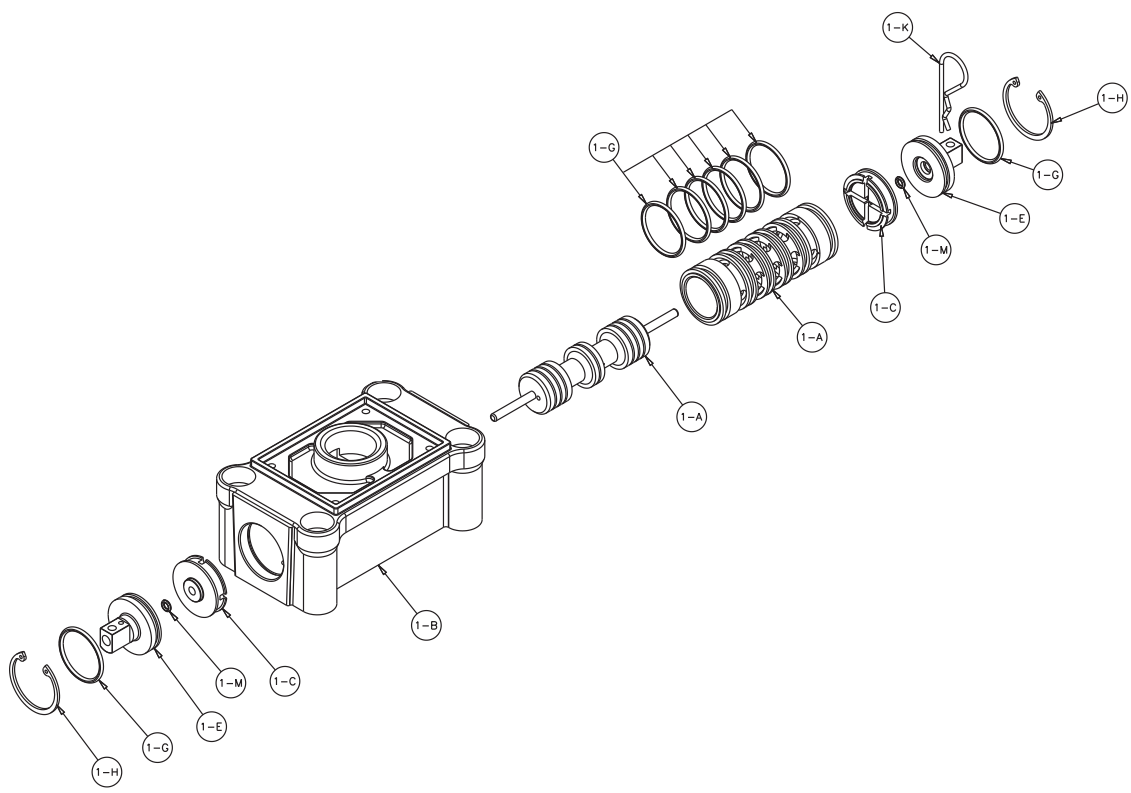
Air Valve Assembly Drawing with Stroke Indicator Option

RS30 Non-Metallic Design Level 1

Note: Stroke Indicator is standard on Spill Containment models

PILOT VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	031.146.000	Air Valve Assembly	1
1-A	031.143.000	Sleeve and Spool Set w/Pins	1
1-B	095.094.551	Body, Air Valve	1
1-C	132.029.552	Bumper	2
1-E	165.098.147	Cap, End	2
1-G	560.020.360	O-Ring	8
1-H	675.044.115	Ring, Retaining	2
1-K	210.008.330	Clip, Safety	1
1-M	560.029.360	O-Ring	2



AIR DISTRIBUTION VALVE WITH STROKE INDICATOR OPTION SERVICING

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

STEP #1: See Composite Repair and Parts Drawing.

Using a $\frac{5}{16}$ " Allen wrench, remove the four hex socket capscrews (item 30) and four flat washers (item 31). Remove the air valve assembly from the pump.

Remove and inspect gasket (item 32) for cracks or damage. Replace gasket if needed.

STEP #2: Disassembly of the air valve.

To access the internal air valve components first remove the two retaining rings (item 1-H) from each end of the air valve assembly using clip ring pliers.

Next remove the two end caps (item 1-E). Inspect the o-rings (item 1-G) for cuts or wear. Replace the o-rings if necessary.

Remove the two bumpers (item 1-C). Inspect the bumper for cuts, wear or abrasions. Replace if necessary.

Remove the spool (part of item 1-C) from the sleeve. 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.

Inspect the inner diameter of the sleeve (part of item 1-A) for dirt, scratches, or other contaminants. Remove the sleeve if needed and replace both the sleeve and spool with a new sleeve and spool set (item 1-A).

STEP #3: Reassembly of the air valve.

Install one bumper (item 1-C) and one end cap (item 1-E) with an o-ring (item 1-G) into one end of the air valve body (item 1-B). Install one retaining ring (item 1-H) into the groove on the same end. Insert the safety clip (item 1-K) through the small unthreaded hole in the end cap.

Remove the new sleeve and spool set (item 1-A) from the plastic bag. Carefully remove the spool from the sleeve. Install the six o-rings (item 1-G) 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 (item 1-B), 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 the pin touches the safety clip on the opposite end.

Install the remaining bumper, end cap with o-ring, and retaining ring.

Fasten the air valve assembly (item 1) and gasket (item 32) to the pump.

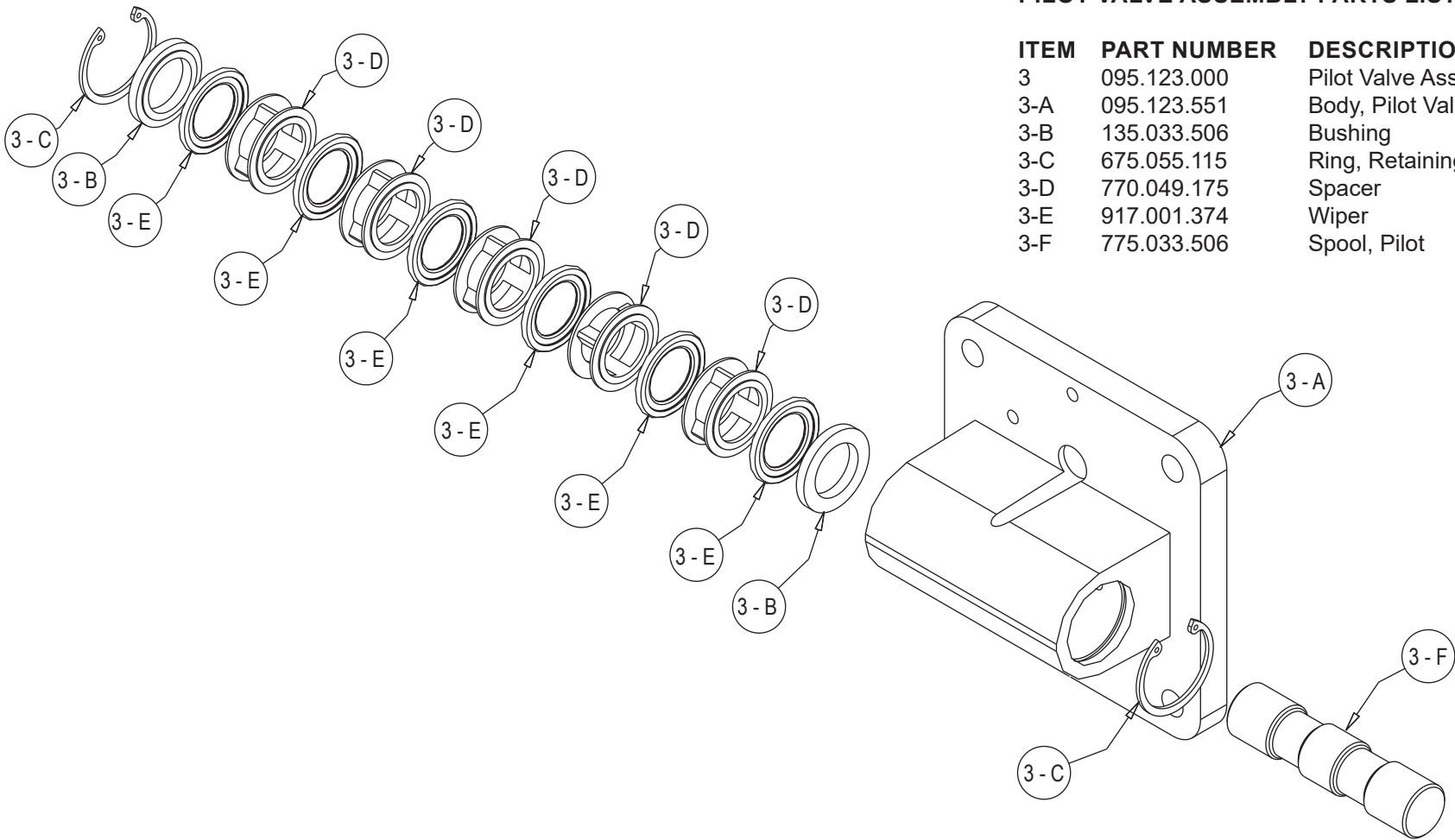
Connect the compressed air line to the pump. The pump is now ready for operation.



IMPORTANT

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Pilot Valve Assembly Drawing



PILOT VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
3	095.123.000	Pilot Valve Assembly	1
3-A	095.123.551	Body, Pilot Valve	1
3-B	135.033.506	Bushing	2
3-C	675.055.115	Ring, Retaining	2
3-D	770.049.175	Spacer	5
3-E	917.001.374	Wiper	6
3-F	775.033.506	Spool, Pilot	1

PILOT VALVE SERVICING

To service the pilot valve first shut off the compressed air supply, bleed the pressure from the pump, and disconnect the air supply line from the pump. Insert the safety clip (item 1-F from Air Distribution Valve assembly drawing) into the smaller unthreaded holes in the end cap (item 1-E from air distribution valve assembly drawing).

Step #1: Remove the Patch Cable

Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

Use a 1/2" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, carefully set the unit down on the plastic cover located on the bottom.

Step #3: See PUMP ASSEMBLY DRAWING.

Using a 1/4" hex key, remove the four socket capscrews (55) along with the Check Valve assembly (54), and O-Rings (5) & (53).

Using a 9/16" wrench or socket, remove the four capscrews (items 6).

Remove the air inlet cap (item 7) and air inlet gasket (item 8). The pilot valve assembly (item 3) can now be removed for inspection or service.

Step #4: Disassembly of the pilot valve.

Remove the pilot valve spool (item 3-F). Wipe clean, and inspect for dirt, scratches or wear. Replace the spool if necessary.

Remove the two retaining rings (items 3-C) from each end of the pilot valve body using clip ring pliers.

Remove the two pilot valve bushings (items 3-B), five spacers (items 3-D), and six spool wipers (items 3-E) by pushing gently from other end of the pilot valve body. Inspect the wipers for cuts and/or wear. Replace any wipers as necessary.

Step #5: Re-assembly of the pilot valve.

First install a spiral retaining ring to one end of the pilot valve body. Install one bushing making sure the step side faces toward the wiper. Apply a light coating of grease to the outside diameter of each wiper. Next, gently push in the wipers and spacers until they are against the installed retaining ring in the opposite end of the pilot valve body. Install the remaining bushing making sure the step side faces the wiper. Install the remaining retaining ring using clip ring pliers.

Apply a light coating of grease to the inner diameter of each wiper. Also apply a light coating of grease to the

outer diameter of the pilot valve spool and gently push the spool through each wiper.

Step #6: Inspect the actuator plungers.

See PUMP ASSEMBLY DRAWING.

The actuator plungers (items 12) can be reached through the stem cavity of the pilot valve in the intermediate assembly (item 33).

Remove the plungers (items 12) from the bushings (item 14) in each end of the cavity. Inspect the installed o-ring (items 13) for cuts and/or wear. Replace the o-rings if necessary. 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 #7: 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 8), air inlet cap (item 7), capscrews and washers (items 6).

Re-install the check valve assembly (54), o-rings (5) & (53) using capscrews (55). Using the 5/16-18 x 5 bolts, re-assemble the AirVantage unit and re-connect the patch cable (10).

Connect the air supply to the pump. Remove the safety clip (item 1-F) from the end cap (item 1-E). 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.

Pulse Output Kit Drawing

PULSE OUTPUT KIT OPTION

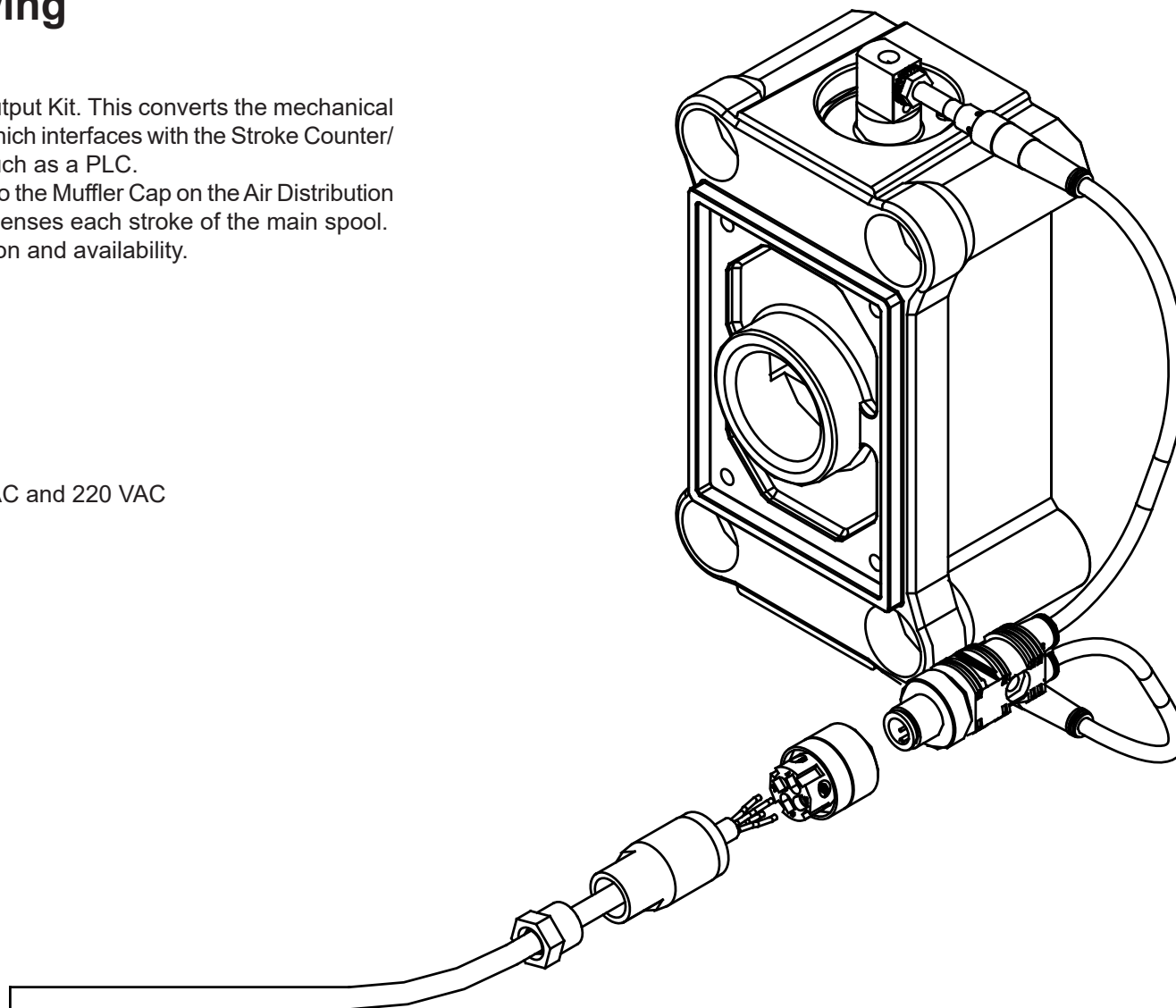
This pump can be fitted with a Pulse Output Kit. This converts the mechanical strokes of the pump to an electrical signal which interfaces with the Stroke Counter/ Batch Controller or user control devices such as a PLC.

The Pulse Output Kits mount directly onto the Muffler Cap on the Air Distribution Valve Assembly or onto the air valve and senses each stroke of the main spool.

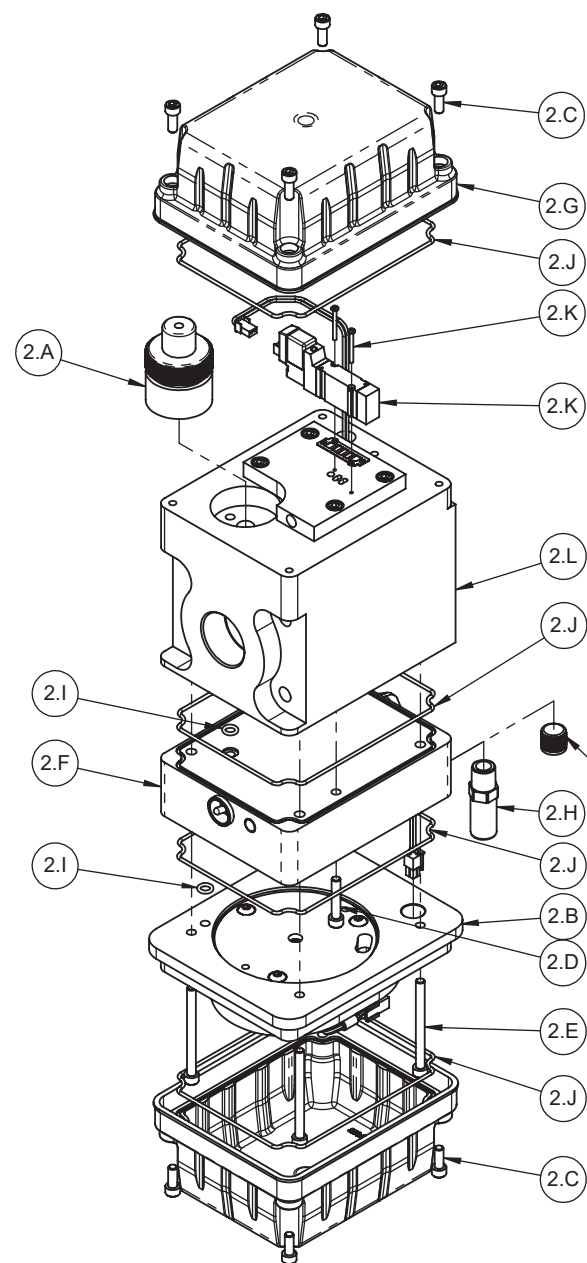
Consult the factory for further information and availability.

Pulse Output Kits

475.244.001	10-30 VDC
475.244.002	110/220 VAC
475.244.003	10-30VDC, 110VAC and 220 VAC



Composite Repair Parts Drawing: AirVantage Unit



AirVantage Composite Parts List

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2.A	020.069.000	REGULATOR	1
2.B	031.199.000	POWER GENERATION MODULE	1
2.C	171.079.115	CAPSCREW, HEX SOC HD, 10-32 X .50	8
2.D	171.080.115	CAPSCREW, HEX SOC HD, 10-32 X 1.00	2
2.E	171.081.115	CAPSCREW, HEX SOC HD, 10-32 X 2.25	4
2.F	249.029.000	CONTROL MODULE	1
2.G	258.018.551	COVER	2
2.H	530.044.000	MUFFLER	1
2.I	560.200.360	O-RING	2
2.J	720.071.360	SEAL, O-RING	4
2.K	765.004.000	VALVE, SOLENOID	1
2.L	893.106.000	VALVE, POPPET	1

Optional 1/4" NPT Pipe Plug (P/N 618.011.330)
**Must be installed if performing direct spray
wash-down of pump** (Purchased Separately)

AirVantage Servicing - Pilot Valve and Pressure Regulator

Pilot Valve and Pressure Regulator

To service the pilot valve or the pressure regulator, first shut off and bleed the air being supplied to the pump. For safety purposes the air supply line should be disconnected from the pump. Then shut off the suction and discharge lines to the pump. Bleed the pressure from the pump suction and discharge lines and remove the lines from the pump. During the servicing of the AirVantage, consult the "AirVantage Composite Repair Parts Drawing".

Step #1: Remove the Patch Cable

- Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

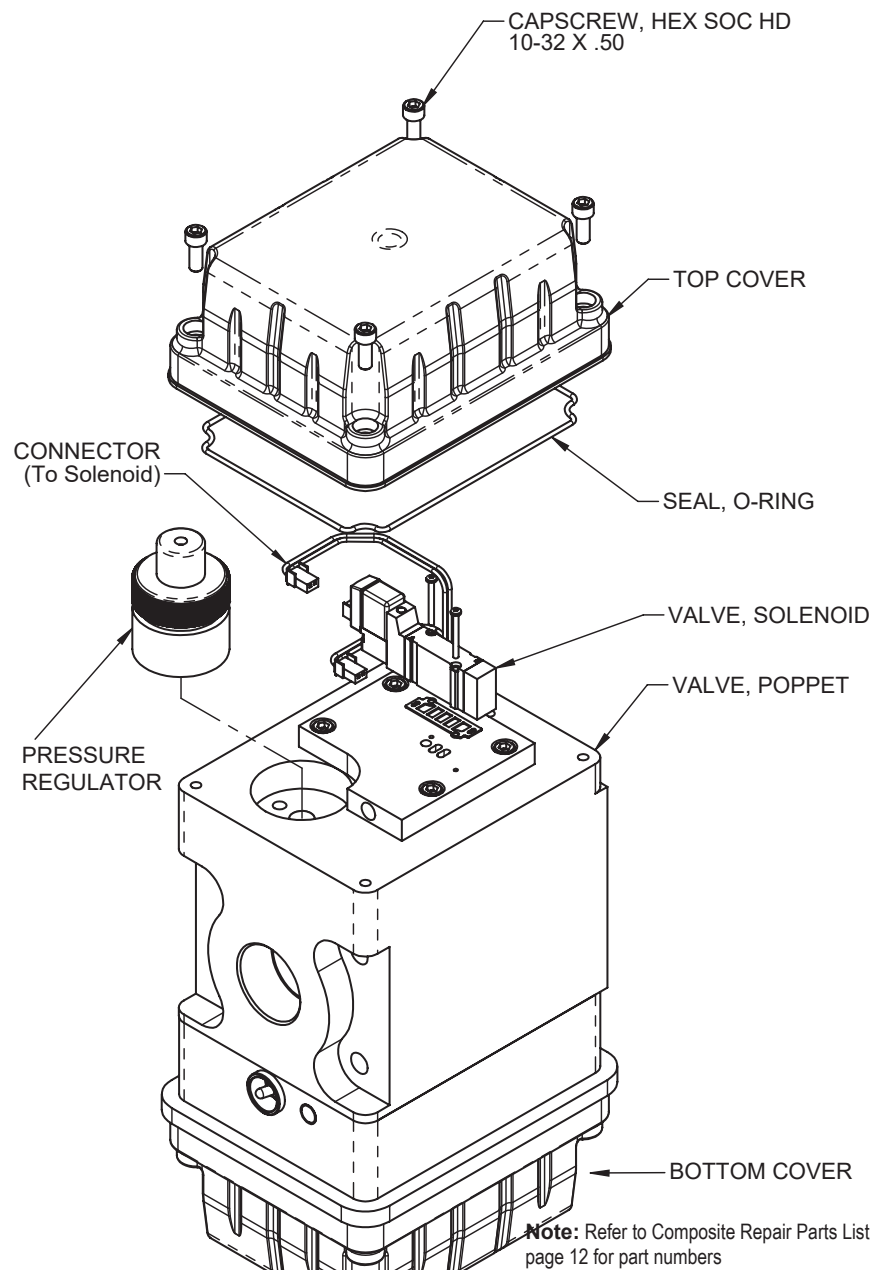
- Use a 1/2" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, set the unit down on the plastic cover located on the bottom. Inspect the o-ring between the poppet valve and the adapter plate for damage.

Step #3: Access the Pilot Valve and Pressure Regulator

- Use a 5/32 hex-key wrench and remove the four 10-32 x .50 socket head cap screws securing the top cover on. Lift the cover off, exposing the pilot valve and pressure regulator. There is a molded o-ring seal located on the underside of the cap. Make sure the o-ring stays located within the groove.
- If the pilot valve needs to be replaced, unplug the connector attached to it. Use a miniature 4-way Phillips screwdriver and remove the two screws holding the pilot valve to the plate. The valve and gasket can now be removed and/replaced. When reinstalling the pilot valve, tighten the screws to snug with a miniature 4-way Phillips screwdriver.
- "AirVantage CAUTION"** – Be sure to reattach the connector to the pilot valve.
- If the pressure regulator needs to be replaced, use slip-joint pliers to unscrew the regulator from the body by turning it in a counterclockwise direction.
- "AirVantage CAUTION"** – Do not loosen or tighten the regulator by turning the knurled portion of the unit. Place the slip-joint pliers on the smooth area underneath the knurled area of the regulator.

Step #4: Reinstallation

- Reinstall the top cover, making sure the o-ring seal is still in the groove. Tighten the four 10-32 screws.
- Reinstall the AirVantage using the four 5/16-18 x 5 cap screws and torque to 90 in-lbs.
- "AirVantage CAUTION"** – Be sure to reattach the patch cable connector that connects the AirVantage module to the intermediate.



AirVantage Servicing - Power Generation Module

To service the power generation module, first shut off and bleed the air being supplied to the pump. For safety purposes the air supply line should be disconnected from the pump. Then shut off the suction and discharge lines to the pump. Bleed the pressure from the pump suction and discharge lines and remove the lines from the pump. During the servicing of the AirVantage, consult the "AirVantage Composite Repair Parts Drawing".

Step #1: Remove the Patch Cable

- Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

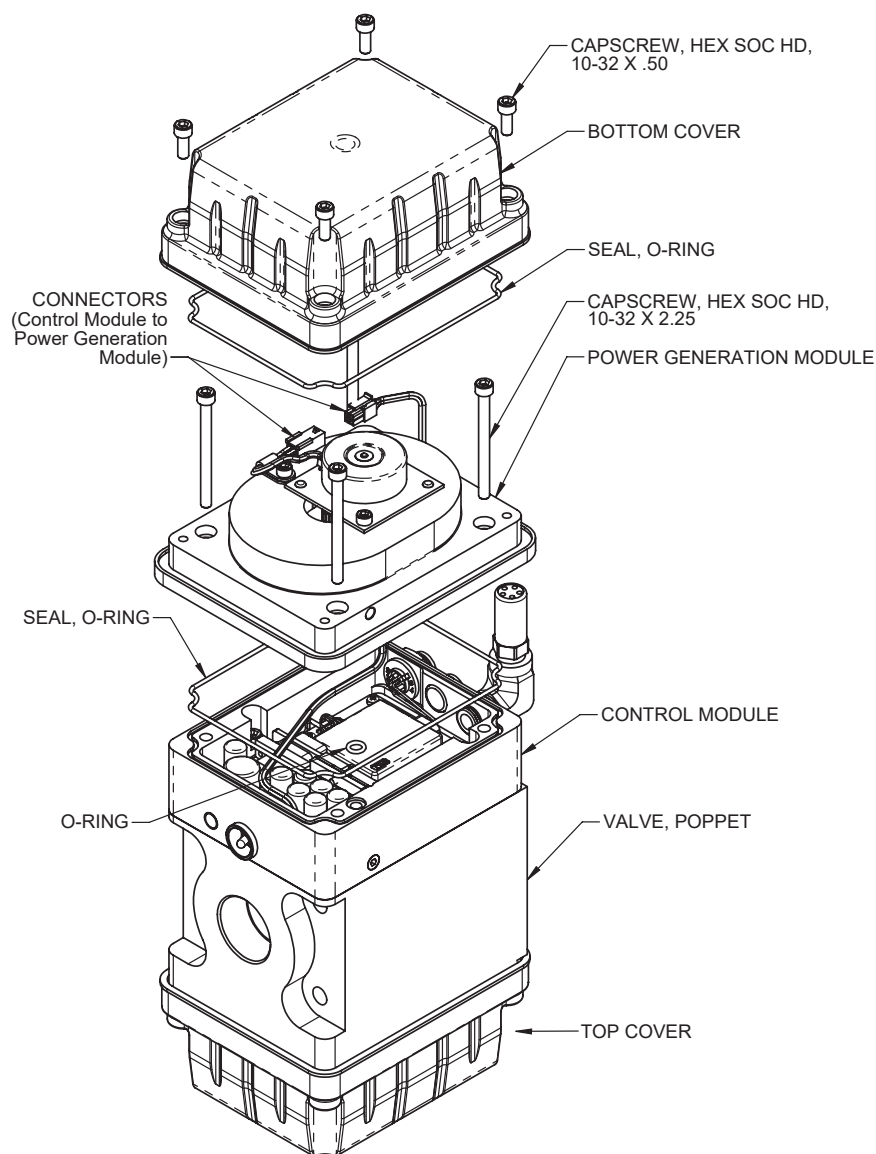
- Use a ½" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, set the unit down on the plastic cover located on the top of the unit. Inspect the o-ring between the poppet valve and the adapter plate for damage.

Step #3: Access the Power Generation Module

- Use a 5/32 hex-key wrench and loosen the four 10-32 x .50 socket head cap screws
- securing the bottom cover. Lift the bottom cover off, exposing the power generation module. There is a molded o-ring seal located on the underside of the cap. Make sure the o-ring stays located within the groove.
- If the power generation module needs to be replaced, unplug the connector that connects the power generator to the control board. Use a 5/32 hex-key wrench to loosen the four 10-32 x 2 ¼ socket head cap screws. The power generation module should now be loose. Carefully lift the power generation module off the rest of the assembly, making sure that the control board wire and connector slips through the hole in the power generation case.
- "AirVantage CAUTION" - Take caution not to loosen the o-ring that seals between the components.**

Step #4: Reinstallation

- When reinstalling the new module make sure to feed the control module wire through the hole in the power generation case. Install the four 10-32 x 2 ¼ socket head cap screws and tighten to 60 in-lbs.
- "AirVantage CAUTION" – Be sure to reattach the connector from the power generator to the control board.**
- Reinstall the bottom cover, making sure the o-ring seal is still in the groove. Tighten the four 10-32 x .50 socket head cap screws to 30 in-lbs.
- Reinstall the top cover, making sure the o-ring seal is still in the groove. Tighten the four 10-32 screws. Reinstall the AirVantage using the four 5/16-18 x 5 cap screws and torque to 90 in-lbs.
- "AirVantage CAUTION" – Be sure to reattach the patch cable connector that connects the AirVantage module to the intermediate.**



Note: Refer to Composite Repair Parts List on page 12 for part numbers

AirVantage Servicing - Control Module

To service the control module, first shut off and bleed the air being supplied to the pump. For safety purposes the air supply line should be disconnected from the pump. Then shut off the suction and discharge lines to the pump. Bleed the pressure from the pump suction and discharge lines and remove the lines from the pump. During the servicing of the AirVantage, consult the "AirVantage Composite Repair Parts Drawing".

Step #1: Remove the Patch Cable

- Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

- Use a ½" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, set the unit down on the plastic cover located on the bottom. Inspect the o-ring between the poppet valve and the adapter plate for damage.

Step #3: Access the Pilot Valve

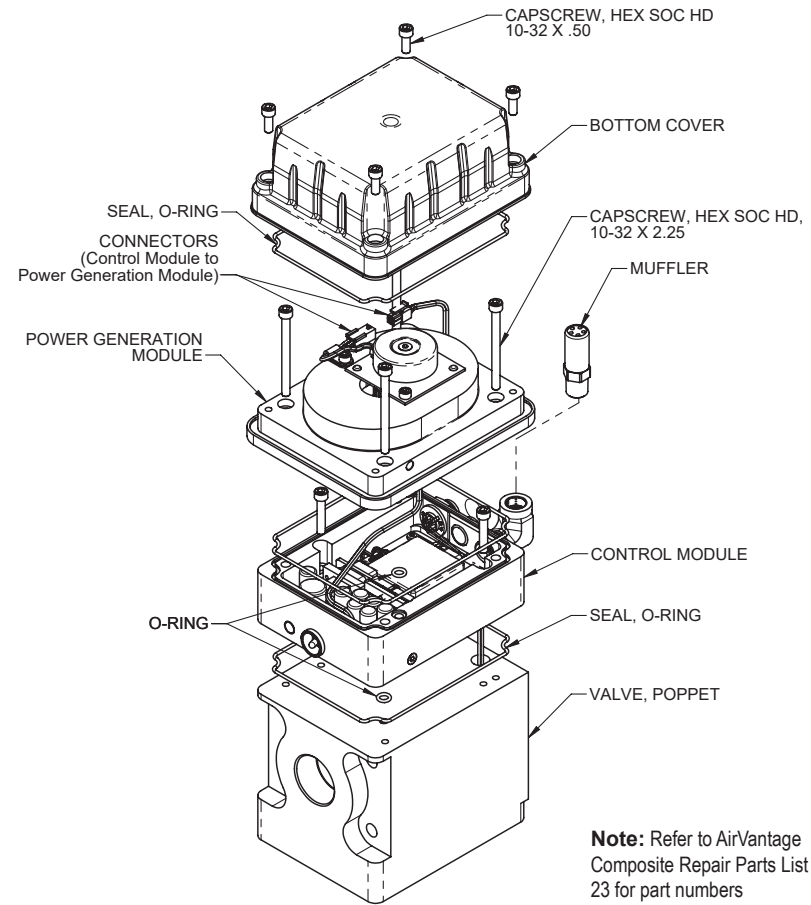
- Use a 5/32 hex-key wrench and loosen the four 10-32 x .50 socket head cap screws
- securing the top cover on. Lift the cover off, exposing the pilot valve. There is a molded o-ring seal located on the underside of the cap. Make sure the o-ring stays located within the groove. The connector will need to be removed from the pilot valve. Once the plug has been removed, feed the wire assembly into the hole in the valve body to the point where the connector just enters the valve body. Reinstall the top cover and loosely reinstall the bolts. The connector will eventually need to be reconnected.

Step #4: Access the Control Module

- Use a 5/32 hex-key wrench and loosen the four 10-32 x .50 socket head cap screws
- securing the bottom cover on. Lift the bottom cover off, exposing the power generation module. There is a molded o-ring seal located on the underside of the cap. Make sure the o-ring stays located within the groove.
- Unplug the connector that connects the power generator to the control board. Use a 5/32 hex-key wrench to loosen the four 10-32 x 2 ¼ socket head cap screws. The power generation module should now be loose. Carefully lift the power generation module off the rest of the assembly, making sure that the control board wire and connector slips through the hole in the power generation case.
- "AirVantage CAUTION" - Take caution not to lose the o-ring seals between the components.**
- If the control module needs to be replaced, use a 5/32 hex-key wrench and loosen the two 10-32 x 1.00 socket head cap screws holding the control module to the poppet assembly. The control module should now be loose. Carefully lift the control module off the poppet assembly, making sure that the pilot valve connector wire slips through the hole in the poppet valve assembly.
- "AirVantage CAUTION" - Take caution not to loosen the o-ring that seals between the components.**

Step #5: Reinstalling

- When reinstalling the new control module, make sure to feed the pilot valve connector wire through the hole in the poppet valve assembly. Install the two 10-32 x 1.00 socket head cap screws and tighten to 30 in-lbs.
- Reinstall the power generation module. Make sure to feed the control module wire through the hole in the power generation case. Install the four 10-32 x 2 ¼ socket head cap screws and tighten to 60 in-lbs.
- "AirVantage CAUTION" – Be sure to reattach the connector from the power generator to the control board.**
- Reinstall the top cover, making sure the o-ring seal is still in the groove. Tighten the four 10-32 screws. Reinstall the AirVantage using the four 5/16-18 x 5 cap screws and torque to 90 in-lbs.
- "AirVantage CAUTION" – Be sure to reattach the patch cable connector that connects the AirVantage module to the intermediate.**



AirVantage Servicing - Sensor Assembly

To service the control module, first shut off and bleed the air being supplied to the pump. For safety purposes the air supply line should be disconnected from the pump. Then shut off the suction and discharge lines to the pump. Bleed the pressure from the pump suction and discharge lines and remove the lines from the pump. During the servicing of the AirVantage, consult the "AirVantage Composite Repair Parts Drawing".

Step #1: Remove the Patch Cable

- Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

- Use a ½" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, set the unit down on the plastic cover located on the bottom. Inspect the o-ring between the poppet valve and the adapter plate for damage.

Step #3: Diaphragm Disassembly

- Refer to the "Diaphragm Servicing" section (p.13) of the manual to remove diaphragm assembly from the pump.
- "AirVantage CAUTION"** – When the diaphragm assembly is removed, watch for the brass probe tips located on the end of the sensor rod. There is one brass probe tip and one o-ring per side. Inspect the probe tips and o-rings for wear. For every diaphragm service, these parts should be replaced and are available in kit form. Consult the "Composite Repair Parts Drawing" for part numbers and quantities.

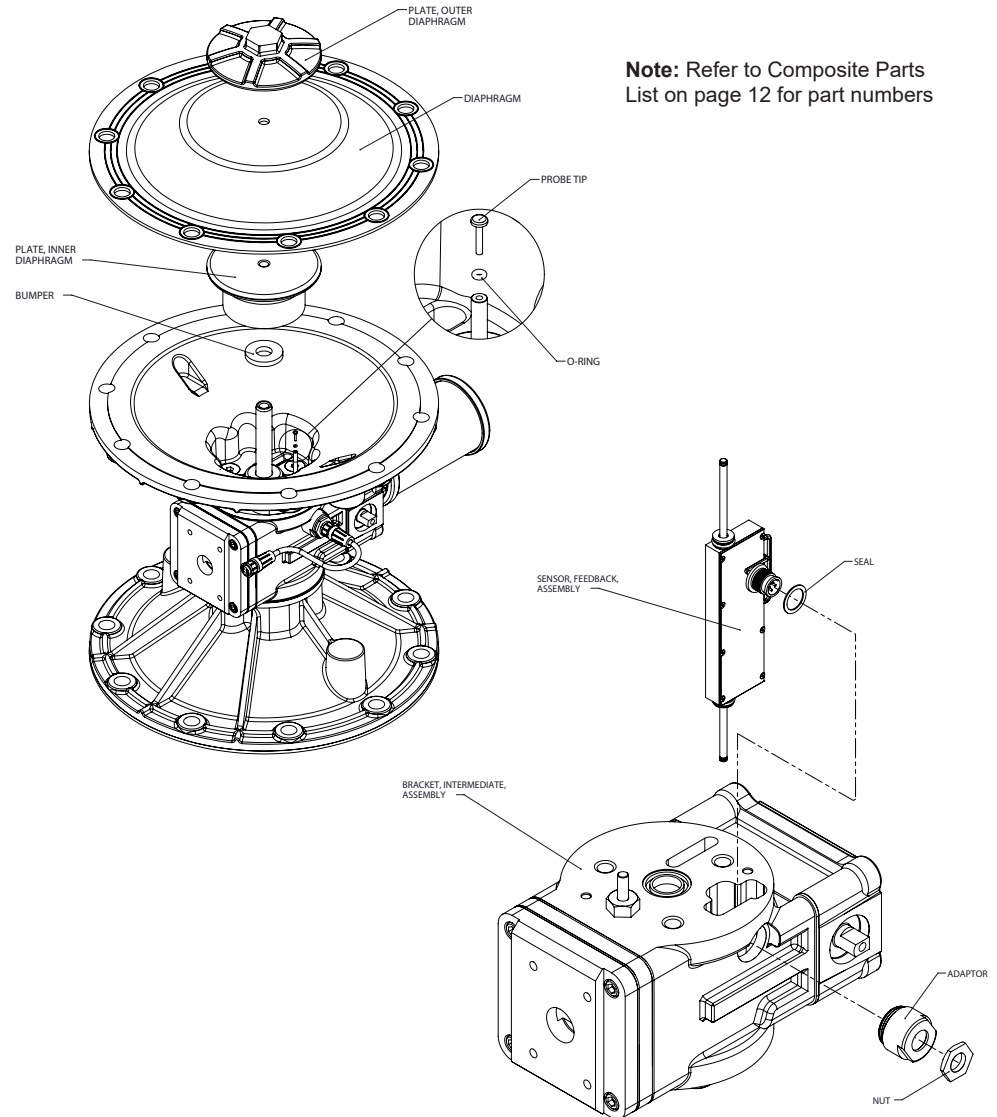
Step #4: Accessing the Sensor Assembly

- Use a ¼" hex key wrench and remove the four, flat head socket cap screws on each inner chamber. These bolts have been assembled using blue thread locker, so they may be difficult to remove. The inner chambers and gaskets can now be removed.
- "AirVantage CAUTION"** – Remove the inner chamber from the intermediate with caution, taking care not to damage the sensor.
- If the sensor needs to be replaced, use a 13/16" socket and remove the plastic nut holding the connector to the intermediate. Slide the connector out of the hole.
- The sensor can now be removed from the intermediate assembly.

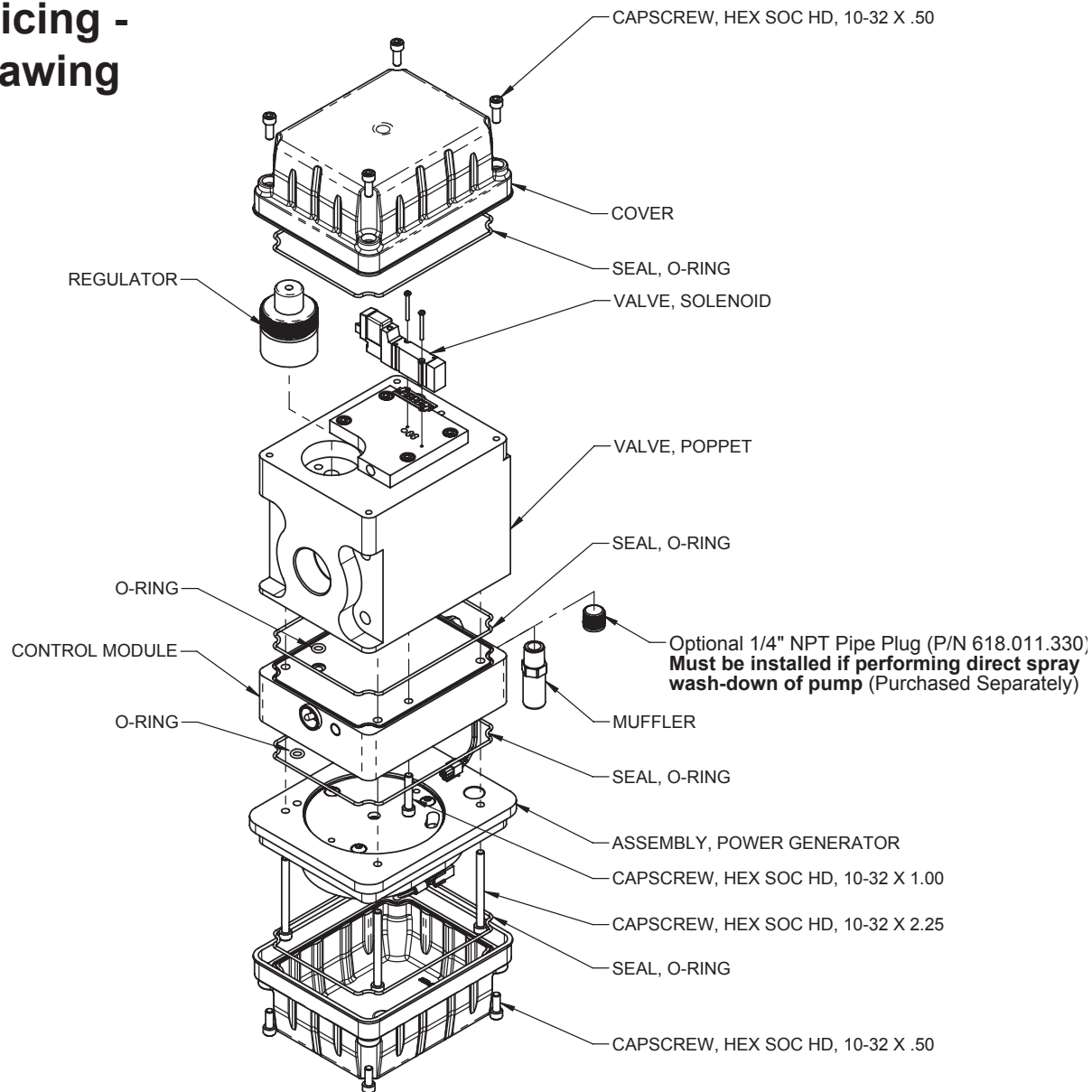
Step #5: Reinstallation

- Slide the new sensor assembly in the intermediate.
- "AirVantage CAUTION"** – Make sure the cable assembly fits into the groove machined in the intermediate. Failure to do so may damage the cable during assembly.
- Feed the connector through the hole in the intermediate and install the plastic nut. Hand tighten the nut using a 13/16" socket. Make sure the gasket is to the inside of the intermediate.
- The inner chambers and gaskets can now be reinstalled. Use blue thread locker on the inner chamber bolts and torque them to 300 in-lbs.
- Refer to the "Diaphragm Servicing" section of the manual to finish the diaphragm installation procedure.

Note: Refer to Composite Parts List on page 12 for part numbers



AirVantage Servicing - Poppet Valve Drawing



Note: Refer to AirVantage Composite Repair Parts
List on page 26 for part numbers

AirVantage Servicing - Poppet Valve

Step #1: Remove the Patch Cable

- Twist the ribbed portion of the patch cable connector in a counterclockwise direction, until it unthreads from the connector. The cable can either be removed from the intermediate or from the control module.

Step #2: Remove the AirVantage from the Pump

- Use a ½" socket and remove the four 5/16-18 x 5 cap screws that hold the AirVantage to the pump. Be sure to support the weight of the AirVantage while removing the last cap screw. After the AirVantage is removed from the pump, set the unit down on the plastic cover located on the bottom. Inspect the o-ring between the poppet valve and the adapter plate for damage.

Step #3: Access the Pilot Valve and Pressure Regulator

- Use a 5/32 hex-key wrench and loosen the four 10-32 x .50 socket head cap screws securing the top cover on. Lift the cover off, exposing the pilot valve and pressure regulator. There is a molded o-ring seal located on the underside of the cap. Make sure the o-ring stays located within the groove.
- Unplug the connector attached to it. Use a miniature 4-way Phillips screwdriver and remove the two screws securing the pilot valve to the plate. The valve and gasket can now be removed and/or replaced.
- Use slip-joint pliers to unscrew the regulator from the body by turning it in a counterclockwise direction.
- **"AirVantage CAUTION" – Do not loosen or tighten the regulator by turning the knurled portion of the unit. Place the slip-joint pliers on the smooth area underneath the knurled area of the regulator. Reinstall the top cover and loosely reinstall the bolts. Turn the assembly over and let it now rest on the top cover.**

Step #4: Access the Power Generation Module

- Use a 5/32 hex-key wrench and remove the four 10-32 x .50 socket head cap screws securing the bottom cover on. Lift the bottom cover off, exposing the power generation module. There is a molded o-ring seal located on the underside of the cap. Make sure the o-ring stays located within the groove.
- Unplug the connector that connects the power generator to the control board. Use a 5/32 hex-key wrench to loosen the four 10-32 x 2 ¼ socket head cap screws. The power generation module should now be loose. Carefully lift the power generation module off the rest of the assembly, making sure that the control board wire and connector slips through the hole in the power generation case.

Step #5: Access the Control Module

- Use a 5/32 hex-key wrench and loosen the two 10-32 x 1.00 socket head cap screws securing the control module to the poppet assembly. The control module should now be loose. Carefully lift the control module off the poppet assembly, making sure that the pilot valve connector wire slips through the hole in the poppet valve assembly.
- The Poppet valve assembly can now be replaced.

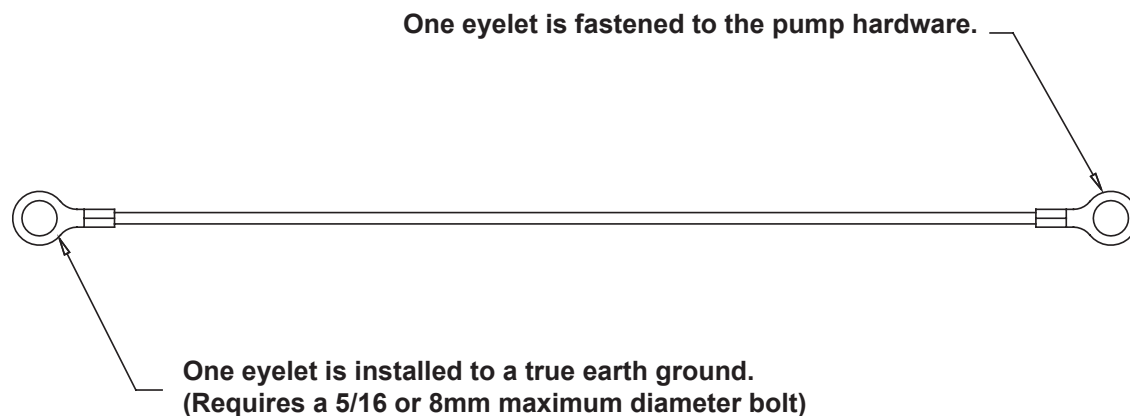
Step #6: Reinstallation

- Install the control module on the poppet valve assembly. Make sure to feed the pilot valve connector wire through the hole in the poppet valve assembly. Install the two 10-32 x 1.00 socket head cap screws and tighten to 30 in-lbs.
- Install the power generation module onto the control module. Make sure to feed the control module wire through the hole in the power generation case. Install the four 10-32 x 2 ¼ socket head cap screws and tighten to 60 in-lbs.
- **"AirVantage CAUTION" – Be sure to reattach the connector from the power generator to the control board.**
- Install the bottom cover, making sure the o-ring seal is still in the groove. Tighten the four 10-32 screws. The unit can now be turned over and set on the bottom cover.
- Install the pilot valve, tighten the screws snug with a miniature 4-way Phillips screwdriver.
- **"AirVantage CAUTION" – Be sure to reattach the connector to the pilot valve.**
- **"AirVantage CAUTION" – Be sure to reattach the patch cable connector that connects the AirVantage module to the intermediate.**
- If the pressure regulator needs to be replaced, use slip-joint pliers to unscrew the regulator from the body by turning it in a counterclockwise direction.
- **"AirVantage CAUTION" – Do not loosen or tighten the regulator by turning the knurled portion of the unit. Place the slip-joint pliers on the smooth area underneath the knurled area of the regulator.**

Step #4: Reinstallation

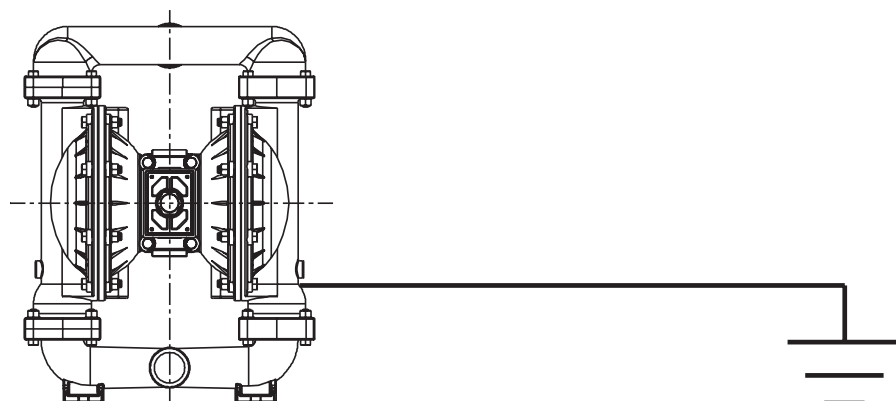
- Reinstall the top cover, making sure the o-ring seal is still in the groove. Tighten the four 10-32 screws.
- Reinstall the AirVantage using the four 5/16-18 x 5 cap screws and torque to 90 in-lbs.
- **"AirVantage CAUTION" – Be sure to reattach the patch cable connector that connects the AirVantage module to the intermediate.**
- **Refer to Page 29 for Illustration**

Grounding The Pump



This 8 foot long (244 centimeters) Ground Strap, part number 920-025-000, can be ordered as a service item.

To reduce the risk of static electrical sparking, this pump must be grounded. Check the local electrical code for detailed grounding instruction and the type of equipment required.



	! WARNING
	<i>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.</i>

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.
- 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 #2 at right.

CONVERTING THE PUMP FOR PIPING THE EXHAUST AIR

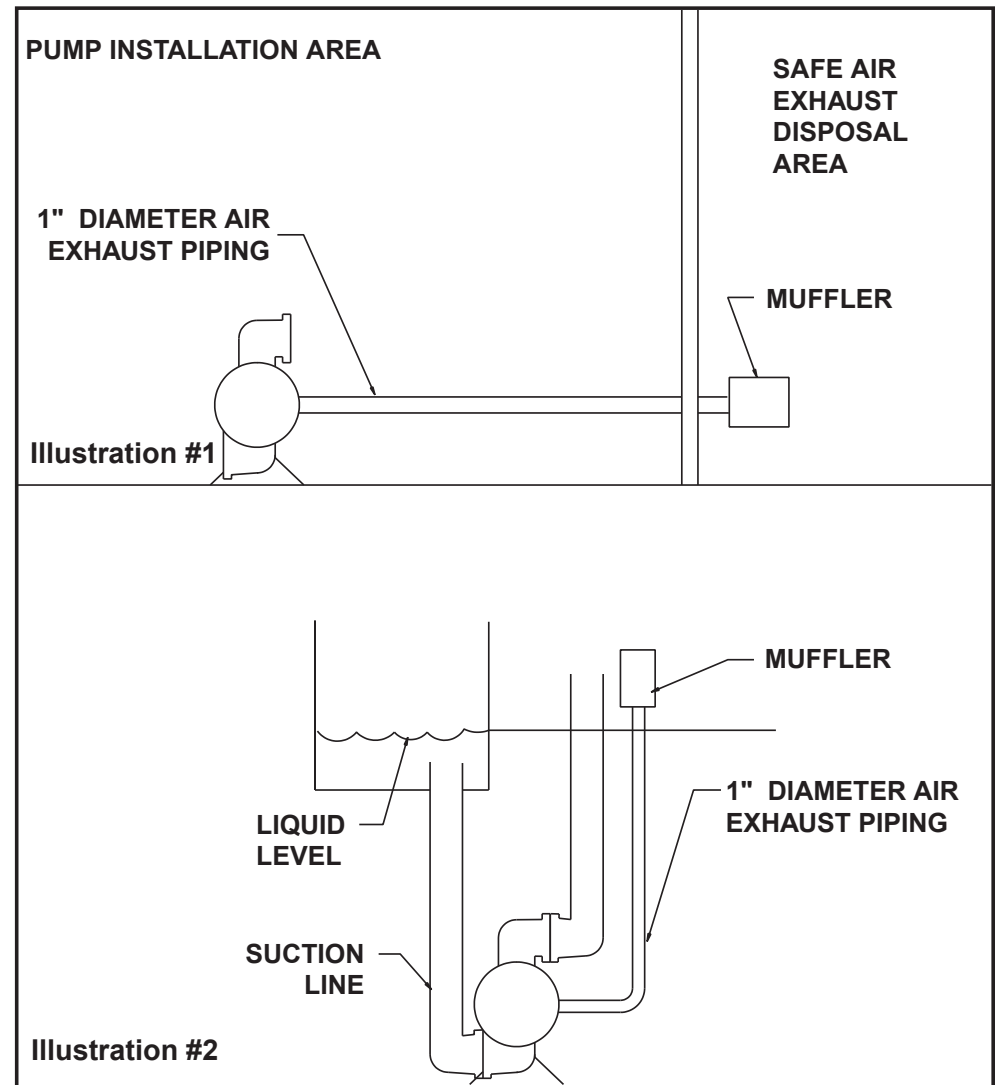
- The following steps are necessary to convert the pump to pipe the exhaust air away from the pump.
- Remove the muffler. The air distribution valve has 1" NPT threads for piped exhaust.

IMPORTANT INSTALLATION NOTE:

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



CONVERTED EXHAUST ILLUSTRATION



MATERIAL CODES

THE LAST 3 DIGITS OF PART NUMBER

000	Assembly, sub-assembly; and some purchased items	306	Carbon Steel, Black PTFE Coated	374	Carboxylated Nitrile	604	PTFE
010	Cast Iron	307	Aluminum, Black Epoxy Coated	375	Fluorinated Nitrile	606	PTFE
012	Powered Metal	308	Stainless Steel, Black PTFE Coated	378	High Density Polypropylene	607	Envelon
015	Ductile Iron	309	Aluminum, Black PTFE Coated	379	Conductive Nitrile	608	Conductive PTFE
020	Ferritic Malleable Iron	310	PVDF Coated	405	Cellulose Fibre	610	PTFE Encapsulated Silicon
025	Music Wire	313	Aluminum, White Epoxy Coated	408	Cork and Neoprene	611	PTFE Encapsulated FKM
080	Carbon Steel, AISI B-1112	330	Zinc Plated Steel	425	Compressed Fibre	632	Neoprene/Hytrel
100	Alloy 20	331	Chrome Plated Steel	426	Blue Gard	633	FKM/PTFE
110	Alloy Type 316 Stainless Steel	332	Aluminum, Electroless Nickel Plated	440	Vegetable Fibre	634	EPDM/PTFE
111	Alloy Type 316 Stainless Steel (Electro Polished)	333	Carbon Steel, Electroless Nickel Plated	465	Fibre	635	Neoprene/PTFE
112	Alloy C	335	Galvanized Steel	500	Delrin 500	637	PTFE, FKM/PTFE
113	Alloy Type 316 Stainless Steel (Hand Polished)	336	Zinc Plated Yellow Brass	501	Delrin 570	638	PTFE, Hytrel/PTFE
114	303 Stainless Steel	337	Silver Plated Steel	502	Conductive Acetal, ESD-800	639	Nitrile/TFE
115	302/304 Stainless Steel	340	Nickel Plated	503	Conductive Acetal, Glass-Filled	643	Santoprene®/EPDM
117	440-C Stainless Steel (Martensitic)	342	Filled Nylon	505	Acrylic Resin Plastic	644	Santoprene®/PTFE
120	416 Stainless Steel (Wrought Martensitic)	351	Food Grade Santoprene	506	Delrin 150	656	Santoprene Diaphragm and Check Balls/EPDM Seats
123	410 Stainless Steel (Wrought Martensitic)	353	Geolast; Color: Black	520	Injection Molded PVDF Natural color	661	EPDM/Santoprene
148	Hardcoat Anodized Aluminum	354	Injection Molded #203-40 Santoprene- Duro 40D +/-5; Color: RED	540	Nylon	666	FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals
149	2024-T4 Aluminum	355	Thermal Plastic	541	Nylon	668	PTFE, FDA Santoprene/PTFE
150	6061-T6 Aluminum	356	Hytrel	542	Nylon		
151	6063-T6 Aluminum	357	Injection Molded Polyurethane	544	Nylon Injection Molded		Delrin and Hytrel are registered tradenames of E.I. DuPont.
152	2024-T4 Aluminum (2023-T351)	358	Urethane Rubber (Some Applications) (Compression Mold)	550	Polyethylene		Gylon is a registered tradename of Garlock, Inc.
154	Almag 35 Aluminum	359	Urethane Rubber	551	Glass Filled Polypropylene		Nylatron is a registered tradename of Polymer Corp.
155	356-T6 Aluminum	360	Nitrile Rubber Color coded: RED	552	Unfilled Polypropylene		Santoprene is a registered tradename of Exxon Mobil Corp.
156	356-T6 Aluminum	361	Nitrile	553	Unfilled Polypropylene		Rulon II is a registered tradename of Dixon Industries Corp.
157	Die Cast Aluminum Alloy #380	363	FKM (Fluorocarbon). Color coded: YELLOW	555	Polyvinyl Chloride		Ryton is a registered tradename of Phillips Chemical Co.
158	Aluminum Alloy SR-319	364	E.P.D.M. Rubber. Color coded: BLUE	556	Black Vinyl		Valox is a registered tradename of General Electric Co.
159	Anodized Aluminum	365	Neoprene Rubber. Color coded: GREEN	557	Unfilled Conductive Polypropylene		PortaPump, Tranquilizer and SludgeMaster are registered tradenames of Warren Rupp, Inc.
162	Brass, Yellow, Screw Machine Stock	366	Food Grade Nitrile	558	Conductive HDPE		
165	Cast Bronze, 85-5-5-5	368	Food Grade EPDM	559	Glass-Filled Conductive Polypropylene		
166	Bronze, SAE 660	370	Butyl Rubber Color coded: BROWN	570	Rulon II		
170	Bronze, Bearing Type, Oil Impregnated	371	Phlthane (Tuftane)	580	Ryton		
175	Die Cast Zinc			590	Valox		
180	Copper Alloy			591	Nylatron G-S		
305	Carbon Steel, Black Epoxy Coated			592	Nylatron NSB		
				600	PTFE (virgin material) Tetrafluorocarbon (TFE)		
				601	PTFE (Bronze and moly filled)		
				602	Filled PTFE		
				603	Blue Gylon		

**WARREN
RUPP, INC.**

Declaration of Conformity

**Manufacturer: Warren Rupp, Inc., 800 N. Main Street
Mansfield, Ohio, 44902 USA**

**Certifies that Air-Operated Double Diaphragm Pump Series: HDB, HDF, M Non-Metallic,
S Non-Metallic, M Metallic, S Metallic, T Series, G Series, U Series, EH and SH High Pressure,
RS Series, W Series, SMA and SPA Submersibles, and Tranquilizer Surge Suppressors comply with
the European Community Directive 2006/42/EC on Machinery, according to Annex VIII.
This product has used Harmonized Standard EN809:1998+A1:2009, Pumps and Pump Units
for Liquids - Common Safety Requirements, to verify conformance.**

David Roseberry
Signature of authorized person

David Roseberry
Printed name of authorized person

Revision Level: F

October 20, 2005
Date of issue

Engineering Manager
Title

August 23, 2012
Date of revision

DEX
FLUID & MECHANICAL

CE