WARREN RUPP®

IDEX CORPORATION

SERVICE AND OPERATING MANUAL

SandPIPER® Models EB3-M/EB4-M/EB80M

Type 2

PRINCIPLE OF PUMP OPERATION

The SandPIPER pump is powered by compressed air which alternately pressurizes the inner sides of the two diaphragm chambers while simultaneously exhausting the opposite inner chambers causing the diaphragms, which are connected by a shaft, to move endwise. Since air pressure is applied over the entire surface of the diaphragm which is forcing liquid to be discharged by its other side, the diaphragm is operating under a balanced condition during the discharge stroke. This allows the unit to be operated at discharge heads over 200 feet (61 meters) of water head.

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 is at one end of the valve body, inlet air pressure is connected to one diaphragm chamber and the other diaphragm chamber is connected to the exhaust. When the spool is removed to the opposite end of the valve body, the porting of chambers is reversed. The air distribution valve spool is moved from one end position to the other in the valve body by means of an internal pilot valve which alternately pressurizes the ends of the air distribution valve spool while simultaneously exhausting the other ends. The pilot valve is positively shifted at each end of the diaphragm stroke by the diaphragm plate's coming in contact with the end of the pilot valve spool and pushing it into position for shifting of the air distribution valve. The chambers are manifolded together with a suction and discharge check valve for each chamber to maintain flow in one direction through the pump.

INSTALLATION PROCEDURES

Position the pump as close as possible to the source of the liquid to be pumped. Avoid long or undersize suction lines and use the minimum number of fittings.

For permanent installation involving rigid piping, install short flexible sections of hose between the pump and piping. This reduces strains and permits easier removal of the pump for service when required. **At time of installation, inspect all external gasketed fasteners for looseness caused by gasket creep. Tighten loose fittings securely to prevent leakage.**

AIR SUPPLY

Do not connect the unit to an air supply in excess of 125 PSI (8.61 bars). Install a shutoff valve in the air supply line to permit removal of the unit for servicing. When connecting an air supply of rigid piping, mount a section of flexible line to the pump to eliminate piping strain. In permanent installations, an air line filter is recommended. **The weight of the air supply line and of the filter must be supported by some means other than the air valve cap. Failure to provide support may result in damage to the pump.**

AIR INLET & PRIMING

Your SandPIPER pump has been tested prior to shipment and is ready for use as received. It is completely self-priming and no initial filling with fluid is required.

If the unit is to be totally submerged, the air exhaust must be piped above liquid level to prevent the liquid and foreign material from entering the air distribution valve mechanism.

Open the inlet air valve at least one turn to allow sufficient cycling rate for the pump to prime (30 to 60 cycles per minute). After pumping starts, adjust the inlet air valve for the desired pumping capacity. When further opening of the inlet air valve increases cycling rate without increasing the flow rate, the pump is being starved of liquid due to suction limitations. Further opening of the air inlet valve will waste compressed air.

⚠ 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.

⚠ HAZARD WARNING ⚠

POSSIBLE EXPLOSION HAZARD can result if 1, 1, 1,-Trichloroethane, Methylene Chloride or other Halogenated Hydrocarbon solvents are used in pressurized fluid systems having Aluminum or Galvanized wetted parts. Death, serious bodily injury and/or property damage could result. Consult with the factory if you have questions concerning Halogenated Hydrocarbon solvents.

⚠ DANGER ⚠

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.

⚠ CAUTION ⚠

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.

⚠ CAUTION ⚠

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

Set the inlet air valve for lowest cycling rate that does not decrease flow rate for most efficient operation.

A NOTE ABOUT AIR VALVE LUBRICATION

The SandPiper pump's pilot valve and main air valve assemblies 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 supplies. Proper lubrication of the compressed air supply would entail the use of an air line lubricator set to deliver one drop of 10 wt., non-detergent oil for every 20 SCFM of air the pump consumed at its point of operation. Consult the pump's published Performance Curve to determine this.

It is important to remember to inspect the sleeve and spool set routinely. It should move back and forth freely. This is most important when the air supply is lubricated. If a lubricator is used, oil accumulation will, over time, collect any debris from the compressed air. This can prevent the pump from operating properly.

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. This can be addressed by using a point of use air dryer to supplement a plant's air drying equipment. This device will remove excess water from the compressed air supply and alleviate the icing or freezing problem.

ESADS: EXTERNALLY SERVICEABLE AIR DISTRIBUTION SYSTEM

Please refer to the exploded view drawing and parts list in the Service Manual supplied with your pump. If you need replacement or additional copies, contact your local Warren Rupp Distributor, or the Warren Rupp factory Literature Department at the number shown below. To receive the correct manual, you must specify the MODEL and TYPE information found on the name plate of the pump.

MODELS WITH 1" SUCTION/DISCHARGE OR LARGER, AND METAL CENTER SECTIONS:

The main air valve sleeve and spool set is located in the valve body mounted on the pump with four hex head capscrews. The valve body assembly is removed from the pump by removing these four hex head capscrews.

With the valve body assembly off the pump, access to the sleeve and spool set is made by removing four hex head capscrews (each end) on the end caps of the valve body assembly. With the end caps removed, slide the spool back and forth in the sleeve. The spool is closely sized to the sleeve and must move freely to allow for proper pump operation. An accumulation of oil, dirt or other contaminants from the pump's air supply, or from a failed diaphragm, may prevent the spool from moving freely. This can cause the spool to stick in a position that prevents the pump from operating. If this is the case, the sleeve and spool set should be removed from the valve body for cleaning and further inspection.

Remove the spool from the sleeve. Using an arbor press or bench vise (with an improvised mandrel), press the sleeve from the valve body. Take care not to damage the sleeve. At this point, inspect the o-rings on the sleeve for nicks, tears or abrasions. Damage of this sort could happen during assembly or servicing. A sheared or cut o-ring can allow the pump's compressed air supply to leak or bypass within the air valve assembly, causing the pump to leak compressed air from the pump air exhaust or not cycle properly. This is most noticeable at pump dead head or high discharge pressure conditions. Replace any of these o-rings as required or set up a routine, preventive maintenance schedule to do so on a regular basis. This practice should include cleaning the spool and sleeve components with a safety solvent or equivalent, inspecting for signs of wear or damage, and replacing worn components.

To re-install the sleeve and spool set, lightly lubricate the o-rings on the sleeve with an o-ring assembly lubricant or lightweight oil (such as 10 wt. air line lubricant). Press the set into the valve body easily, without shearing the o-rings. Re-install one end cap, gasket and bumper on the valve body. Using the arbor press or bench vise that was used in disassembly, press the sleeve back into the valve body. You may have to clean

⚠ 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.

⚠ BEFORE OPERATION ⚠

Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Retorque loose fasteners to prevent leakage. Follow recommended torques stated in the card attached to the new pump.

⚠ DANGER ⚠

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.

the surfaces of the valve body where the end caps mount. Material may remain from the old gasket. Old material not cleaned from this area may cause air leakage after reassembly. Take care that the bumper stays in place allowing the sleeve to press in all the way. Reinstall the spool the opposite end cap, gasket and bumper on the valve body. After inspecting and cleaning the gasket surfaces on the valve body and intermediate, reinstall the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern.

PILOT VALVE ACTUATOR

The bushings for the pilot valve actuators are threaded into the intermediate bracket from the outside. The plunger may be removed for inspection or replacement from the inside by removing the air distribution valve body and the pilot valve body from the pump. The plungers should be visible through the intermediate from the top. Depending on their position, you may find it necessary to use a fine piece of wire to pull them out. Under rare circumstances, it may become necessary to replace the o-ring seal.

When reinserting an externally serviceable pilot valve, push both plungers out of the path of the pilot valve. This will prevent damage to the plungers and pilot valve.

Service Note: If a problem arises with the pilot valve, it is usually corrected by replacing only o-rings. Always grease the spool prior to inserting into the sleeve. If the sleeve is removed from the body, reinsertion must be from the same side it was removed from, the chamfered side. Again, grease the o-rings so that it slides into the body. Make sure the retaining ring has securely been inserted around the sleeve.

AIR EXHAUST

If a diaphragm fails, the pumped liquid or fumes can enter the air end of the pump, and be exhausted into the atmosphere. When pumping hazardous or toxic materials, pipe the exhaust to an appropriate area for safe disposition.

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

Freezing or icing-up of the air exhaust can occur under certain temperature and humidity conditions. Use of an air dryer unit should eliminate most icing problems.

BETWEEN USES

When the pump is used for materials that tend to settle out or transform from liquid to solid form, care must be taken after each use or during idle time to remove them and flush the pump as required to prevent damage.

In freezing temperatures the pump must be completely drained when idle. This model must be tilted to allow the liquid from the chambers to run out of the discharge port.

CHECK VALVE SERVICING

Need for inspection or service is usually indicated by poor priming, unstable cycling, reduced performance or the pump's cycling but not pumping.

DIAPHRAGM SERVICING

Remove the twelve bolts (six each side) securing the manifold assemblies to the outer chambers. Remove the eight bolts securing the outer chamber to the inner chamber. Remove the diaphragm assembly (outer plate, diaphragm, inner plate) by turning the assembly counterclockwise using a $1^1/_8$" (3.17 cm) wrench on the outer plate lugs. To disassemble the diaphragm assemblies, screw into the inner plates two threaded pins, place the pins in a vise and turn the outer plate counterclockwise using the $1^1/_8$" wrench. The interior components consisting of shaft seals, sleeve bearings and bearing retainers are now accessible for service.

Procedures for reassembling the diaphragms are the reverse of the above. The diaphragms must be installed with their natural bulge to the outside, toward the outer

⚠ CAUTION ⚠

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 disposal.

diaphragm plate. Install the inner plate with the flat face against the diaphragm.

After all components are in position in a vise and hand tight, tighten with a wrench to approximately 50 ft. lbs. (67.79 Newton meters) torque. After both diaphragm assemblies have been assembled, thread one assembly into the shaft (hold the shaft near the middle in a vise with soft jaws, to protect the finish). Install this sub assembly into the pump and secure by placing the outer chamber on the end with the diaphragm. This holds the assembly in place while the opposite side is installed. Torque the last diaphragm assembly to 40 ft. lbs. (54.23 Newton meters). This final torquing will lock the diaphragm assemblies together. Place the remaining outer chamber on the open end and loosely tighten the bolts. Replace the manifold assemblies to square the flanges before final tightening of the remaining bolts. Alternating for progressive tightening, the eight capscrews that secure outer chamber to inner chamber.

TROUBLESHOOTING

1. Pump will not cycle

A. Check to make sure the unit has enough pressure to operate and that the air inlet valve is open.

B. Check the discharge line to insure that the discharge line is neither closed nor blocked.

C. If the spool in the air distribution valve is not shifting, check the main spool. It must slide freely.

D. Excessive air leakage in the pump can prevent cycling. This condition will be evident. Air leakage into the discharge line indicates a ruptured diaphragm. Air leakage from the exhaust port indicates leakage in the air distribution valve. See further service instructions.

E. Blockage in the liquid chamber can impede movement of diaphragm.

2. Pump cycles but will not pump

A. Suction side of pump pulling in air. Check the suction line for air leaks and be sure that the end of the suction line is submerged. Check flange bolting. Check valve flanges and manifold to chamber flange joints.

B. Make certain the suction line or strainer is not plugged. Restriction at the suction is indicated by a high vacuum reading when a vacuum gauge is installed in the suction line.

C. Check valves may not be seating properly. To check, remove the suction line and cover the suction port with your hand. If the unit does not pull a good suction (vacuum), the check valves should be inspected for proper seating.

D. Static suction lift may be too high. Priming can be improved by elevating the suction and discharge lines higher than the check valves and pouring liquid into the unit through the suction inlet. When priming at high suction lifts or with long suction lines operate the pump at maximum cycle rate.

3. Low performance

A. Capacity is reduced as the discharge pressure increases, as indicated on the performance curve. Performance capability varies with available inlet air supply. Check air pressure at the pump inlet when the pump is operating to make certain that adequate air supply is maintained.

B. Check vacuum at the pump suction. Capacity is reduced as vacuum increases. Reduced flow rate due to starved suction will be evident when cycle rate can be varied without change in capacity. This condition will be more prevalent when pumping viscous liquids. When pumping thick, heavy materials the suction line must be kept as large in diameter and as short as possible, to keep suction loss minimal.

C. Low flow rate and slow cycling rate indicate restricted flow through the discharge line. Low flow rate and fast cycling rate indicate restriction in the suction line or air leakage into suction.

D. Unstable cycling indicates improper check valve seating on one chamber. This condition is confirmed when unstable cycling repeats consistently on alternate exhausts. Cycling that is not consistently unstable may indicate partial exhaust restriction due to freezing and thawing of exhaust air. Use of an anti-freeze lubricant in an air line lubricator should solve this problem.

For more information, consult the Warren Rupp Industrial Troubleshooting Guide.

⚠ IMPORTANT ⚠

Before pump operation, all external gasketed fasteners must be inspected for looseness caused by gasket creep after leaving the factory. Retorque loose fasteners to insure against leakage. Follow recommended torques where called out. (A card is attached to each new pump stating this fact.)

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.

WARRANTY

This unit is guaranteed for a period of five years against defective material and workmanship.

RECOMMENDED WARREN RUPP ACCESSORIES TO MAXIMIZE PUMP PERFORMANCE:

- **Tranquilizer® Surge Suppressor: For nearly pulse-free flow.**
- **Warren Rupp Filter/Regulator: For modular installation and service convenience.**
- **Warren Rupp Speed Control: For manual or programmable process control. Manual adjustment or 4-20mA reception.**

For more detailed information on these accessories, contact your local Warren Rupp Factory-Authorized Distributor, or Warren Rupp corporate headquarters.

REPAIR PARTS LIST and DRAWING

SandPIPER® Models EB3-M/EB4-M/EB80M

Type 2

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	070-006-170	Bearing, Sleeve	2
2	114-002-010	Bracket, Intermediate	1
	114-002-156	Bracket, Intermediate	1
3	**720-004-360**	**Seal, U-Cup**	**2**
4	**135-008-000**	**Bushing, Threaded, with o-ring**	**2**
5	**620-004-114**	**Plunger, Actuator**	**2**
6	**095-073-000**	**Pilot Valve Body Assy.**[1]	**1**
6-A	**095-070-551**	**Pilot Valve Body**	**1**
6-B	**755-025-000**	**Sleeve with o-ring**	**1**
6-C	**560-033-360**	**O-Ring (Sleeve)**	**4**
6-D	**775-026-000**	**Spool with o-ring**	**1**
6-E	**560-023-360**	**O-Ring (Spool)**	**2**
6-F	**675-037-080**	**Retaining Ring**	**1**
7	**360-041-425**	**Gasket, Valve Body**	**1**
8	**560-001-360**	**O-Ring**	**2**
9	095-043-010	Body, Valve	1
	095-043-156	Body, Valve	1
10	**132-014-358**	**Bumper, Valve Spool**	**2**
11	165-011-010	Cap, End	2
	165-011-157	Cap, End	2
12	**360-048-425**	**Gasket, Valve Body**	**1**
13	**360-010-425**	**Gasket, End Cap**	**2**
14	**560-020-360**	**O-Ring**	**6**
15	**031-018-000**	**Sleeve & Spool Set**	**1**
16	170-032-330	Capscrew, Hex Head	8
17	170-045-330	Capscrew, Hex Head	4
18	**132-002-360**	**Bumper, Diaphragm**	**2**
19	196-100-015	Chamber, Inner	2
20	**132-022-360**	**Bumper**	**2**
21	**560-022-360**	**O-Ring**	**2**
22	**685-041-120**	**Rod, Diaphragm**	**1**
24	170-024-330	Capscrew, Hex Head	8
25	530-008-000	Muffler, Exhaust	1
26	900-006-330	Washer, Lock	8
27	545-008-330	Nut, Hex	16
28	900-003-330	Washer, Lock	32
29	612-124-010	Plate, Inner Diaphragm	2
30	**286-098-365**	**Diaphragm**	**2**
	286-098-354	Diaphragm	2
	286-098-360	Diaphragm	2
	286-098-363	Diaphragm	2
	286-098-364	Diaphragm	2
31	722-041-110	Seat, Valve [2]	4
	722-041-080	Seat, Valve [2]	4
	722-041-365	Seat, Valve	4
	722-041-360	Seat, Valve	4
	722-041-363	Seat, Valve	4
	722-041-364	Seat, Valve	4
	722-041-600	Seat, Valve	4
31-1	560-008-611	O-Ring	8
	560-008-360	O-Ring (Use with metal seat only)	8

[1] Available in kit form. Order P/N 031-055-000 which also includes Items 5, 7, 12, & 20.

[2] Discharge Side only — when pump is used in a filterpress system requires 4 O-Rings (P/N 560-008-XXX) to be used with seats.

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most Warren Rupp distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

MATERIAL CODES
The Last 3 Digits of Part Number

000... Assembly, sub-assembly; and some purchased items
010... Cast Iron
015... Ductile Iron
025... Music Wire
080... Carbon Steel, AISI B-1112
110... Alloy Type 316 Stainless Steel
112... Alloy "C"
114... 303 Stainless Steel
115... 301/302/304 Stainless Steel
120... 416 Stainless Steel (Wrought Martensitic)
148... Hardcoat Anodized Aluminum
150... 6061-T6 Aluminum
151... 6063-T6 Aluminum
154... Almag 35 Aluminum
155 or 156...356-T6 Aluminum
157... Die Cast Aluminum Alloy #380
159... Anodized Aluminum
162... Brass, Yellow, Screw Machine Stock
170... Bronze, Bearing Type, Oil Impregnated
180... Copper Alloy
330... Plated Steel
331... Chrome Plated Steel
332... Electroless Nickel Plated
335... Galvanized Steel
354... Injection Molded #203-40 Santoprene — Duro 40D +/-5; Color: RED
356... Hytrel
357... Rupplon (Urethane Rubber)
360... Buna-N Rubber. Color coded: RED
363... Viton (Fluorel). Color coded: YELLOW
364... E.P.D.M. Rubber. Color coded: BLUE
365... Neoprene Rubber. Color coded: GREEN
366... Food Grade Nitrile. Color coded: WHITE
375... Fluorinated Nitrile
405... Cellulose Fibre
408... Cork and Neoprene
425... Compressed Fibre
440... Vegetable Fibre
500... Delrin 500
501... Delrin 570
520... Injection Molded PVDF, Natural Color, Food Grade/USDA Acceptable
540... Nylon
550... Polyethylene
551... Polypropylene
555... PVC (Polyvinyl Chloride)
580... Ryton
600... Teflon (virgin material) Tetrafluoroethylene (TFE)
603... Blue Gylon
604... Teflon — Diaphragm
610... Encapsulated Silicon
611... Teflon Encapsulated Viton

Delrin, Teflon, Hytrel, and Viton are registered tradenames of E.I. DuPont.

Gylon is a registered tradename of Garlock, Inc.

Warren Rupp, Rupplon and SandPIPER are registered tradenames of Warren Rupp, Inc.

Ryton is a registered tradename of Phillips Chemical Company.

Loctite is a registered tradename of Loctite Corporation.

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
32	**050-014-365**	**Ball, Check Valve**	**4**
	050-014-354	Ball, Check Valve	4
	050-014-360	Ball, Check Valve	4
	050-014-364	Ball, Check Valve	4
	050-015-600	Ball, Check Valve	4
36	518-034-010	Manifold, Suction (ANSI)	1
	518-034-010E	Manifold, Suction (DIN) (EB80M)	1
	518-034-110	Manifold, Suction (ANSI)	1
	518-034-110E	Manifold, Suction (DIN) (EB80M)	1
	518-034-112	Manifold, Suction (ANSI)	1
	518-034-112E	Manifold, Suction (DIN) (EB80M)	1
	518-034-156	Manifold, Suction (ANSI)	1
	518-034-156E	Manifold, Suction (DIN) (EB80M)	1
37	518-035-010	Manifold, Discharge (ANSI)	1
	518-035-010E	Manifold, Discharge (DIN) (EB80M)	1
	518-035-110	Manifold, Discharge (ANSI)	1
	518-035-110E	Manifold, Discharge (DIN) (EB80M)	1
	518-035-112	Manifold, Discharge (ANSI)	1
	518-035-112E	Manifold, Discharge (DIN) (EB80M)	1
	518-035-156	Manifold, Discharge (ANSI)	1
	518-035-156E	Manifold, Discharge (DIN) (EB80M)	1
38	170-055-330	Capscrew, Hex Head	12
39	326-002-080	Mounting Foot	2
40	286-098-604	Overlay Diaphragm	2
41	170-034-330	Capscrew, Hex Head	4
42	807-046-330	Stud	2
43	196-052-010	Chamber, Outer	2
	196-052-110	Chamber, Outer	2
	196-052-156	Chamber, Outer	2
44	612-090-010	Plate, Outer Diaphragm Assembly	2
	612-090-110	Plate, Outer Diaphragm Assembly	2
	612-090-156	Plate, Outer Diaphragm Assembly	2
51	618-003-330	Plug, Pipe	2
	618-003-110	Plug, Pipe	2
52	170-082-330	Capscrew, Hex Head	16
Not Shown:			
	031-021-010	Main Air Valve Assembly (Inc. Items 9, 10, 11, 13, 14, 15, 16)	1
	031-021-156	Main Air Valve Assembly (Inc. Items 9, 10, 11, 13, 14, 15, 16)	1
EB4-M:			
41	170-066-330	Capscrew, Hex Hd.	4
45	770-018-080	Spacer, Foot	2
46	334-037-010	Flange, Adapter	2
47	807-005-330	Stud	8
48	900-007-330	Washer, Lock	8
49	545-009-330	Nut, Hex	8
50	360-036-426	Gasket, Flange	2

476-102-000 **AIR END KIT**
Seals, Gaskets, air Valve Sleeve and Spool, Pilot Valve Assembly

476-047-360 **WETTED END KIT**
Buna Diaphragms, Check Balls and Seats

476-047-363 **WETTED END KIT**
Viton Diaphragms and Seats, Teflon Check Balls

476-047-364 **WETTED END KIT**
EPDM Diaphragms, Check Balls and Seats

476-047-365 **WETTED END KIT**
Neoprene Diaphragms, Check Balls and Seats

476-047-635 **WETTED END KIT**
Neoprene Backup Diaphragms, Teflon Overlay Diaphragms, Check Balls and Seats

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most Warren Rupp distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

MATERIAL CODES
The Last 3 Digits of Part Number

000... Assembly, sub-assembly; and some purchased items
010... Cast Iron
015... Ductile Iron
025... Music Wire
080... Carbon Steel, AISI B-1112
110... Alloy Type 316 Stainless Steel
112... Alloy "C"
114... 303 Stainless Steel
115... 301/302/304 Stainless Steel
120... 416 Stainless Steel (Wrought Martensitic)
148... Hardcoat Anodized Aluminum
150... 6061-T6 Aluminum
151... 6063-T6 Aluminum
154... Almag 35 Aluminum
155 or 156...356-T6 Aluminum
157... Die Cast Aluminum Alloy #380
159... Anodized Aluminum
162... Brass, Yellow, Screw Machine Stock
170... Bronze, Bearing Type, Oil Impregnated
180... Copper Alloy
330... Plated Steel
331... Chrome Plated Steel
332... Electroless Nickel Plated
335... Galvanized Steel
354... Injection Molded #203-40 Santoprene — Duro 40D +/-5; Color: RED
356... Hytrel
357... Rupplon (Urethane Rubber)
360... Buna-N Rubber. Color coded: RED
363... Viton (Fluorel). Color coded: YELLOW
364... E.P.D.M. Rubber. Color coded: BLUE
365... Neoprene Rubber. Color coded: GREEN
366... Food Grade Nitrile. Color coded: WHITE
375... Fluorinated Nitrile
405... Cellulose Fibre
408... Cork and Neoprene
425... Compressed Fibre
440... Vegetable Fibre
500... Delrin 500
501... Delrin 570
520... Injection Molded PVDF, Natural Color, Food Grade/USDA Acceptable
540... Nylon
550... Polyethylene
551... Polypropylene
555... PVC (Polyvinyl Chloride)
580... Ryton
600... Teflon (virgin material) Tetrafluoroethylene (TFE)
603... Blue Gylon
604... Teflon — Diaphragm
610... Encapsulated Silicon
611... Teflon Encapsulated Viton

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Ryton is a registered tradename of Phillips Chemical Company.

Loctite is a registered tradename of Loctite Corporation.

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