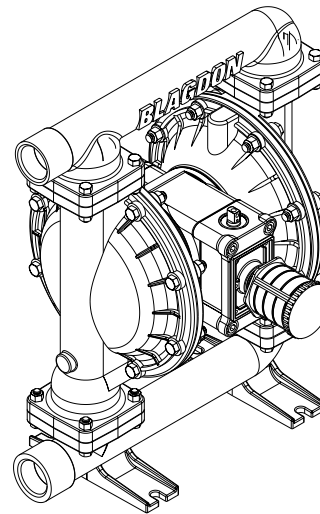


# DATA SHEET, SERVICE & OPERATING MANUAL

## **B40**

### **Air Operated Double Diaphragm Pump**

**Aluminium, Cast Iron & Stainless  
Steel Series**



**P.H.A.** sas

14 Z.A. LES PIBOULES  
84300 LES TAILLADES  
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# MATERIAL CODES

## The Last 3 Digits of Part Number

000 ..... Assembly, sub-assembly;  
and some purchased items

010 ..... Cast Iron

012 ..... Powered Metal

015 ..... Ductile Iron

020 ..... Ferritic Malleable Iron

025 ..... Music Wire

080 ..... Carbon Steel, AISI B-1112

100 ..... Alloy 20

110 ..... Alloy Type 316 Stainless Steel

111 ..... Alloy Type 316 Stainless Steel  
(Electro Polished)

112 ..... Alloy "C" (Hastelloy equivalent)

113 ..... Alloy Type 316 Stainless Steel  
(Hand Polished)

114 ..... 303 Stainless Steel

115 ..... 302/304 Stainless Steel

117 ..... 440-C Stainless Steel (Martensitic)

120 ..... 416 Stainless Steel  
(Wrought Martensitic)

123 ..... 410 Stainless Steel (Wrought Martensitic)

148 ..... Hardcoat Anodized Aluminium

149 ..... 2024-T4 Aluminium

150 ..... 6061-T6 Aluminium

151 ..... 6063-T6 Aluminium

152 ..... 2024-T4 Aluminium (2023-T351)

154 ..... Almag 35 Aluminium

155 ..... 356-T6 Aluminium

156 ..... 356-T6 Aluminium

157 ..... Die Cast Aluminium Alloy #380

158 ..... Aluminium Alloy SR-319

159 ..... Anodized Aluminium

162 ..... Brass, Yellow, Screw Machine Stock

165 ..... Cast Bronze, 85-5-5-5

166 ..... Bronze, SAE 660

170 ..... Bronze, Bearing Type,  
Oil Impregnated

175 ..... Die Cast Zinc

180 ..... Copper Alloy

305 ..... Carbon Steel, Gray Epoxy Coated

306 ..... Carbon Steel, Black PTFE Coated

307 ..... Aluminium, Gray Epoxy Coated

308 ..... Stainless Steel, Black PTFE Coated

309 ..... Aluminium, Black PTFE Coated

310 ..... Kynar Coated

330 ..... Zinc Plated Steel

331 ..... Chrome Plated Steel

332 ..... Aluminium, Electroless Nickel Plated

333 ..... Carbon Steel, Electroless  
Nickel Plated

335 ..... Galvanized Steel

336 ..... Zinc Plated Yellow Brass

337 ..... Silver Plated Steel

340 ..... Nickel Plated

342 ..... Filled Nylon

353 ..... Geolast; Color: Black

354 ..... Injection Molded #203-40 Santoprene- Duro 40D +/-5;  
Color: RED

355 ..... Thermal Plastic

356 ..... Hytrel

357 ..... Injection Molded Polyurethane

358 ..... (Urethane Rubber) (Compression Mold)

359 ..... Urethane Rubber

360 ..... Buna-N Rubber. Color coded: RED

361 ..... Buna-N

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

368 ..... Food Grade EPDM

370 ..... Butyl Rubber. Color coded: BROWN

371 ..... Phlithane (Tuftane)

374 ..... Carboxylated Nitrile

375 ..... Fluorinated Nitrile

378 ..... High Density Polypropylene

405 ..... Cellulose Fibre

408 ..... Cork and Neoprene

425 ..... Compressed Fibre

426 ..... Blue Gard

440 ..... Vegetable Fibre

465 ..... Fibre

500 ..... Delrin 500

501 ..... Delrin 570

502 ..... Conductive Acetal, ESD-800

503 ..... Conductive Acetal, Glass-Filled

505 ..... Acrylic Resin Plastic

506 ..... Delrin 150

520 ..... Injection Molded PVDF Natural color

540 ..... Nylon

541 ..... Nylon

542 ..... Nylon

544 ..... Nylon Injection Molded

550 ..... Polyethylene

551 ..... Glass Filled Polypropylene

552 ..... Unfilled Polypropylene

553 ..... Unfilled Polypropylene

555 ..... Polyvinyl Chloride

556 ..... Black Vinyl

570 ..... Rulon II

580 ..... Rytan

590 ..... Valox

591 ..... Nylatron G-S

592 ..... Nylatron NSB

600 ..... PTFE (virgin material)  
Tetrafluorocarbon (TFE)

601 ..... PTFE (Bronze and moly filled)

602 ..... Filled PTFE

603 ..... Blue Gylon

604 ..... PTFE

607 ..... Envelon

606 ..... PTFE

610 ..... PTFE Encapsulated Silicon

611 ..... PTFE Encapsulated Viton

632 ..... Neoprene/Hytrel

633 ..... Viton/PTFE

634 ..... EPDM/PTFE

635 ..... Neoprene/PTFE

637 ..... PTFE, Viton/PTFE

638 ..... PTFE, Hytrel/PTFE

639 ..... Buna-N/TFE

643 ..... Santoprene®/EPDM

644 ..... Santoprene®/PTFE

656 ..... Santoprene Diaphragm and  
Check Balls/EPDM Seats

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

Gylon is a registered tradename of Garlock, Inc.

Nylatron is a registered tradename of  
Polymer Corp.

Santoprene is a registered tradename of Monsanto Corp.

Rulon II is a registered tradename of  
Dixon Industries Corp.

Hastelloy-C is a registered tradename of Cabot Corp.

Rytan is a registered tradename of  
Phillips Chemical Co.

Valox is a registered tradename of  
General Electric Co.

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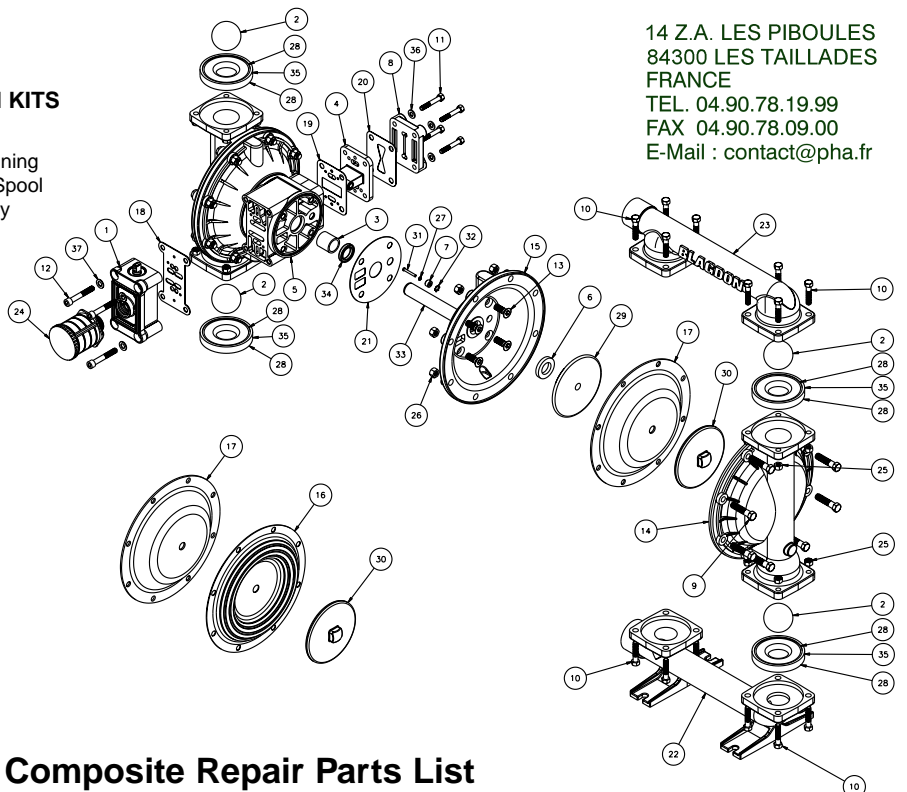
# Composite Repair Parts Drawing

## AVAILABLE SERVICE AND CONVERSION KITS

- B476-169-000 AIR END KIT**  
Seals, O-ring, Gaskets, Retaining Rings, Air Valve Sleeve and Spool Set, and Pilot Valve Assembly
- B476-196-360 WET END KIT**  
Buna Diaphragms, Balls, and Seats.
- B476-196-656 WET END KIT**  
Santoprene Diaphragms and Balls, EPDM Seats.
- B476-196-365 WET END KIT**  
Neoprene Diaphragms, Balls, and Seats.
- B476-196-633 WET END KIT**  
Viton Diaphragms, PTFE Balls, and Seats.
- B476-196-635 WET END KIT**  
Neoprene Diaphragms, PTFE Overlay, Balls, and Seats.

## HARDWARE KITS

- B475-200-330** Zinc Plated Capscrews, Washers, and Hex Nuts

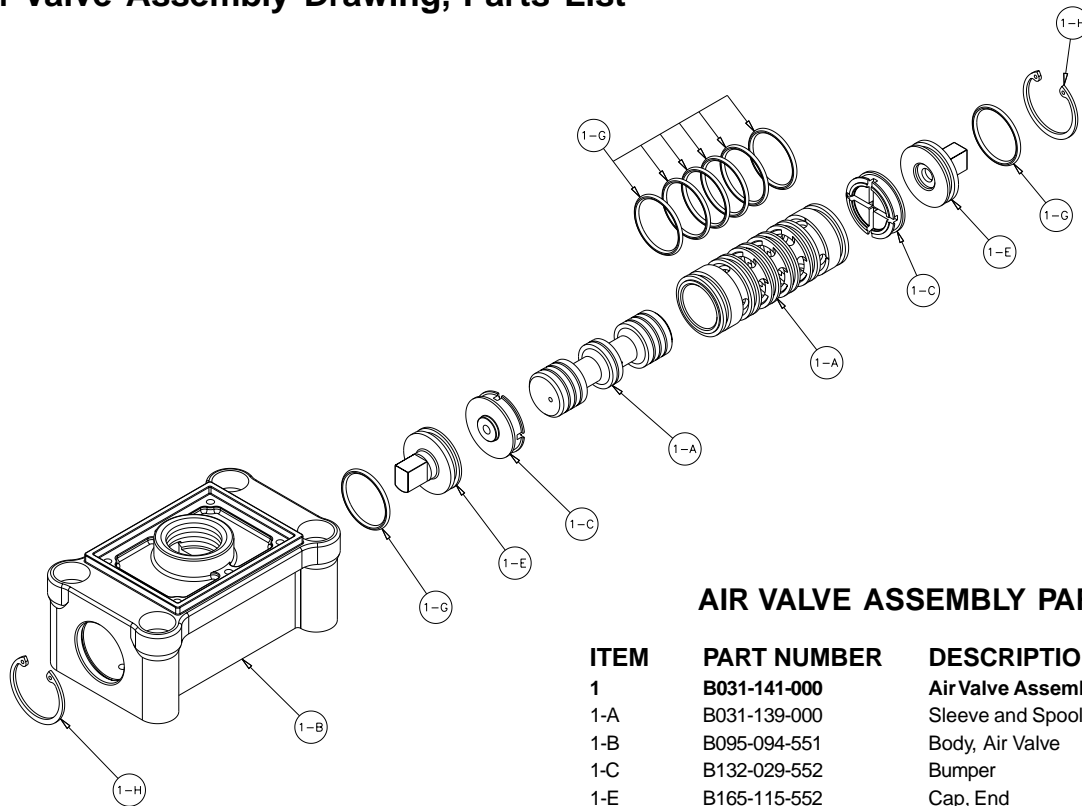


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## Composite Repair Parts List

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1	B031-140-000	Air Valve Assembly	1	17	B286-103-600	Diaphragm, Overlay	2
	B031-141-000	Air Valve Assembly	1	18	B360-093-360	Gasket, Air Valve	1
	B031-146-000	Air Valve Assembly	1	19	B360-103-425	Gasket, Pilot Valve	1
	B031-147-000	Air Valve Assembly	1	20	B360-104-425	Gasket, Air Inlet	1
2	B050-005-354	Ball, Check	4	21	B360-105-425	Gasket, Inner Chamber	2
	B050-005-360	Ball, Check	4	22	B518-161-010E	Manifold, Suction 1½" BSP (Parallel)	1
	B050-005-363	Ball, Check	4		B518-161-110E	Manifold, Suction 1½" BSP (Parallel)	1
	B050-005-364	Ball, Check	4		B518-161-156E	Manifold, Suction 1½" BSP (Parallel)	1
	B050-005-365	Ball, Check	4	23	B518-162-010E	Manifold, Discharge 1½" BSP (Parallel)	1
	B050-010-600	Ball, Check	4		B518-162-110E	Manifold, Discharge 1½" BSP (Parallel)	1
3	B070-006-170	Bushing	2		B518-162-156E	Manifold, Discharge 1½" BSP (Parallel)	1
4	B095-096-000	Pilot Valve Assembly	1	24	B530-010-000	Silencer	1
5	B114-024-157	Intermediate, Bracket	1				
	B114-024-010	Intermediate, Bracket	1				
6	B132-035-360	Bumper, Diaphragm	2	27	B560-001-360	O-Ring	2
7	B135-034-506	Bushing, Plunger	2	28	B560-084-360	Seal (O-Ring) (see item 34)	8
8	B165-118-157E	Cap, Air Inlet Assembly 3/4" BSP (Parallel)	1		B560-084-363	Seal (O-Ring) (see item 34)	8
	B165-118-010E	Cap, Air Inlet Assembly 3/4" BSP (Parallel)	1		B560-084-364	Seal (O-Ring) (see item 34)	8
					B720-061-600	Seal (see item 34)	8
				29	B612-039-157	Plate, Outer Diaphragm	2
					B612-039-010	Plate, Outer Diaphragm	2
					B612-097-110	Plate, Outer Diaphragm	2
12	B171-053-115	Capscrew, Soc Hd 3/8-16 X 2.50	4	30	B612-195-157	Plate, Inner Diaphragm	2
	B171-053-330	Capscrew, Soc Hd 3/8-16 X 2.50	4		B612-195-082	Plate, Inner Diaphragm	2
13	B171-059-115	Capscrew, Soc Hd 7/16-14 X 1.25	8	31	B620-020-115	Plunger, Actuator	2
	B171-059-330	Capscrew, Soc Hd 7/16-14 X 1.25	8	32	B675-042-115	Ring, Retaining	2
14	B196-169-156	Chamber, Outer	2	33	B685-059-120	Rod, Diaphragm	1
	B196-169-010	Chamber, Outer	2	34	B720-004-360	Seal, Diaphragm Rod	2
	B196-169-110	Chamber, Outer	2	35	B722-091-550	Seat, Check Ball	4
15	B196-170-156	Chamber, Inner	2		B722-091-080	Seat, Check Ball	4
	B196-170-010	Chamber, Inner	2		B722-091-110	Seat, Check Ball	4
16	B286-103-354	Diaphragm	2		B722-091-150	Seat, Check Ball	4
	B286-103-360	Diaphragm	2		B722-091-600	Seat, Check Ball	4
	B286-103-363	Diaphragm	2	36	B901-038-115	5/16 Flat Washer	4
	B286-103-364	Diaphragm	2		B901-038-330	5/16 Flat Washer	4
	B286-103-365	Diaphragm	2	37	B901-038-115	3/8 Flat Washer	4
					B901-048-330	3/8 Flat Washer	4

## Air Valve Assembly Drawing, Parts List



### AIR VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	B031-141-000	Air Valve Assembly	1
1-A	B031-139-000	Sleeve and Spool Set	1
1-B	B095-094-551	Body, Air Valve	1
1-C	B132-029-552	Bumper	2
1-E	B165-115-552	Cap, End	2
1-G	B560-020-360	O-Ring	8
1-H	B675-044-115	Ring, Retaining	2

### AIR DISTRIBUTION VALVE SERVICING

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

**STEP #1:** See COMPOSITE REPAIR PARTS DRAWING.

Using a 5/16" Allen wrench, remove the four hex socket capscrews (item 12) and four flat washers (item 37). Remove the air valve assembly from the pump.

Remove and inspect gasket (item 18) 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 (items 1-C). Inspect for cuts, wear, or abrasion. Replace bumpers 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 with a new sleeve and spool set (item 1-A).

**STEP #3:** Reassembly of the air valve.

Install one bumper (item 1-C) 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.

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 18) 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.*

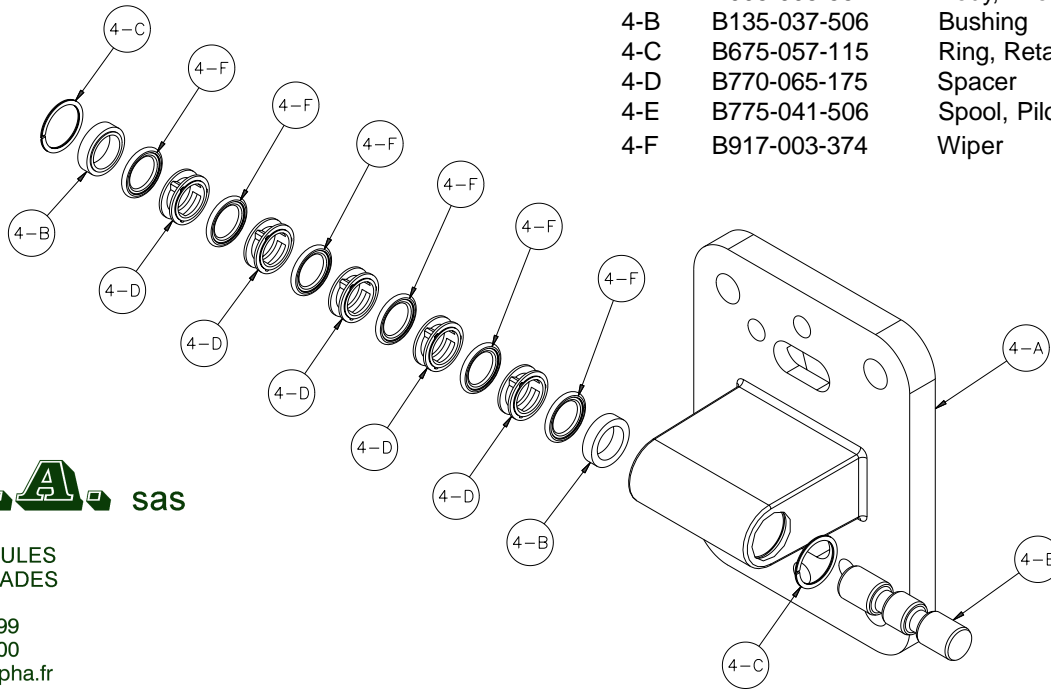
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# Pilot Valve Assembly Drawing

# PILOT VALVE ASSEMBLY PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
4	B095-096-000	Pilot Valve Assembly	1
4-A	B095-095-551	Body, Pilot Valve	1
4-B	B135-037-506	Bushing	2
4-C	B675-057-115	Ring, Retaining	2
4-D	B770-065-175	Spacer	5
4-E	B775-041-506	Spool, Pilot	1
4-F	B917-003-374	Wiper	6



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## 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.

**Step #1:** See PUMP ASSEMBLY DRAWING.

Using a 1/2" wrench or socket, remove the four capscrews (items 11) and four flat washers (items 36). Remove the air inlet cap (item 8) and air inlet gasket (item 20). The pilot valve assembly (item 4) can now be removed for inspection or service.

**Step #2:** Disassembly of the pilot valve.

Remove the pilot valve spool (item 4-E). Wipe clean, and inspect for dirt, scratches or wear. Replace the spool if necessary.

Remove the two retaining rings (items 4-C) from each end of the pilot valve body.

Remove the two pilot valve bushings (items 4-B), five spacers (items 4-D), and six spool wipers (items 4-F) 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 #3:** Re-assembly of the pilot valve.

First install a retaining ring to one end of the pilot valve. 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 and bushing 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.

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 #4:** Inspect the actuator plungers.

See ILLUSTRATION AT RIGHT. The actuator plungers (items 31) can be reached through the pilot valve cavity in the intermediate assembly (item 5).

Remove the plungers (item 31) from the bushings (item 7) in each end of the cavity. Inspect the installed o-ring (items 27) 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.

To remove the bushings (item 7), first remove the retaining rings (item 32) by using a flat screwdriver. NOTE: It is recommended that new retaining rings be installed.

**Step #5:** Re-install the pilot valve assembly into the intermediate assembly.

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

Re-install the gasket (item 20), air inlet cap (item 8), capscrews and washers (items 11 and 36).

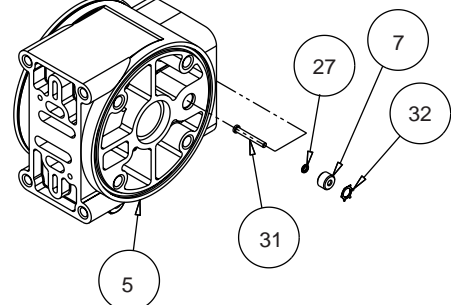
Connect the air supply to the pump. The pump is now ready for operation.



## IMPORTANT!

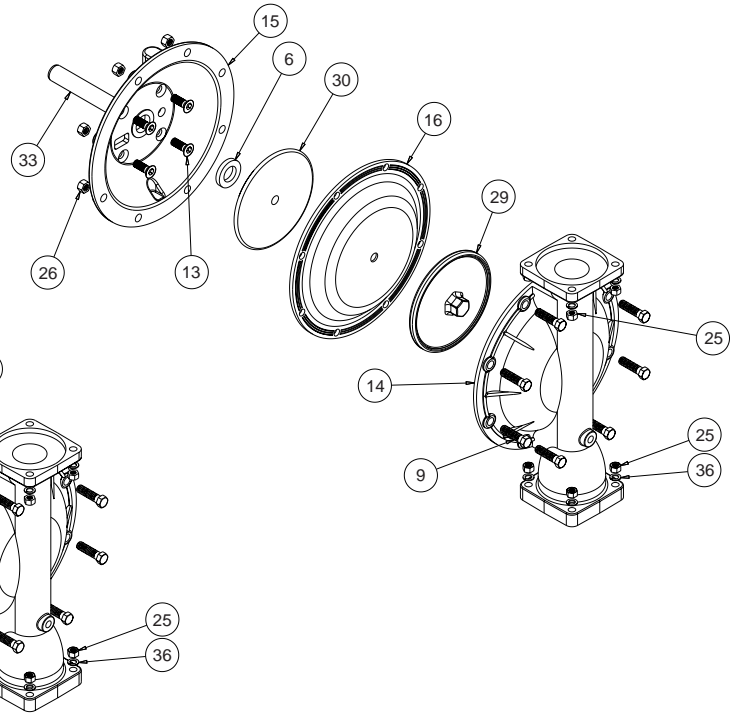
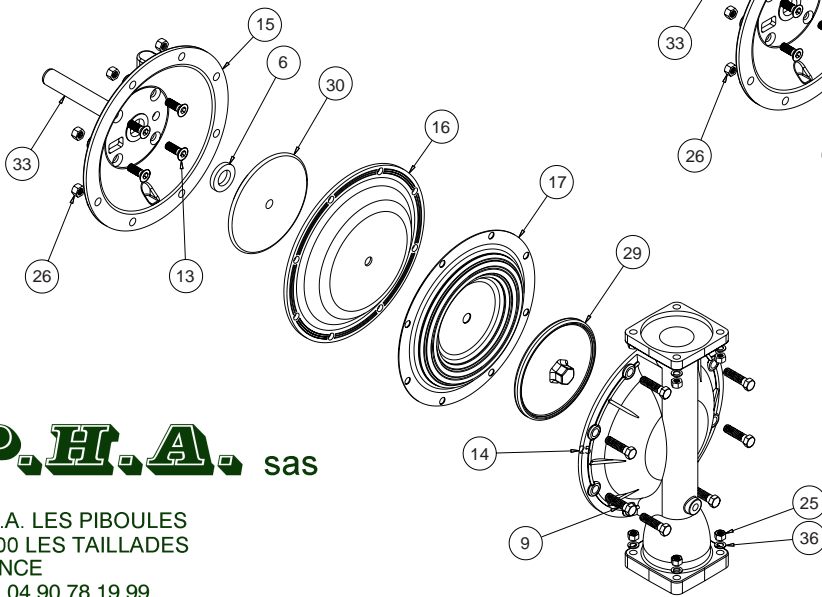
*Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.*

## ACTUATOR PLUNGER SERVICING



## Diaphragm Service Drawing, with Overlay

## Diaphragm Service Drawing, Non-Overlay



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### DIAPHRAGM SERVICING

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

**Step #1:** See the pump assembly drawing, and the diaphragm servicing illustration.

Using a  $11/16$ " and a  $5/8$ " wrench or socket, remove the 16 capscrews (item 10), hex nuts and lockwashers that fasten the manifolds (items 22 & 23) to the outer chambers (items 14).

**Step #2:** Removing the outer chambers.

Using a  $3/4$ " wrench or socket, remove the 16 capscrews (items 9), and hex nuts that fasten the outer chambers, diaphragms, and inner chambers (items 15) together.

**Step #3:** Removing the diaphragm assemblies.

Use a  $11/16$ " (27mm) wrench or six pointed socket to remove the diaphragm assemblies (outer plate, diaphragm, and inner plate) from the diaphragm rod (item 33) by turning

anti-clockwise.

Insert a 1/4-20 capscrew or set screw into the smaller tapped hole in the inner diaphragm plate (item 30). Insert the protruding stud and the 1/4-20 fastener loosely into a vice. Use a  $11/16$ " wrench or socket to remove the outer diaphragm plate (item 29) by turning anti-clockwise. Inspect the diaphragm (item 17) for cuts, punctures, abrasive wear or chemical attack. Replace the diaphragms if necessary.

**Step #4:** Installing the diaphragms.

Push the threaded stud of the outer diaphragm plate through the centre 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 vice. Use a torque wrench to tighten the diaphragm assembly together to 50 ft. lbs. (67.79 Newton metres). Allow a minimum of 15 minutes to elapse after torquing, then re-torque the assembly to compensate for stress relaxation in the clamped assembly.

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

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

Thread the stud of the one diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 33) until the inner diaphragm plate is flush to the end of the rod. Insert rod into pump.

Align the bolt holes in the diaphragm with the bolt pattern in the inner chamber (item 15).

Fasten the outer chamber (item 14) to the pump, using the capscrews (items 9), and hex nuts.

On the opposite side of the pump, pull the diaphragm rod out as far as possible. Make sure the bumper (item 6) is installed over the diaphragm rod.

Thread the stud of the remaining diaphragm assembly clockwise into the tapped hole at the end of the diaphragm rod (item 33) as far as possible and still allow for alignment of the bolt holes in the diaphragm with the bolt pattern in the inner chamber (item 15).

Fasten the remaining outer chamber (item 14) to the pump, using the capscrews (items 9), and hex nuts.

**Step #6:** Re-install the manifolds to the pump, using the capscrews (items 10), hex nuts, and

lockwashers.

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

### OVERLAY DIAPHRAGM SERVICING

The overlay diaphragm (item 17) is designed to fit over the exterior of the standard TPE diaphragm (item 16).

The molded directional arrows on the overlay diaphragm must point vertically.

Follow the same procedures described for the standard diaphragm for removal and installation.