



INSTRUCTION MANUAL

KABI Air Operated Double Diaphragm Pumps

Congratulations on purchase of this World Class Air Operated Double Diaphragm Pump !



Double Diaphragm Pumps are driven by Compressed Air, designed for use in applications requiring large volume transfer in a very short time. These pumps can transfer contaminated media & are good at cleaning out pits or liquids that can be a mix of several products like oil, water and antifreeze all mixed together.

- Handles a wide variety of fluids with high solids content: No close fitting or rotating parts so liquid with high solids content can be easily pumped.
- Self Priming: The pump design (incorporating internal check valves) allows for high suction lift even at dry start-up and with heavier fluids.
- Ability to run dry: No close fittings or sliding parts are at risk—the pump can run dry without damage.
- Variable flow rate and discharge pressure: Pumps will run at any setting within their operating range simply by adjusting the air inlet pressure and system conditions. One pump can fit a broad spectrum of applications.
- Portable/Simple Installation: Pumps transport easily to the application site. Simply connect your air supply line and liquid lines; the pump is ready to perform. There are no complex controls to install and operate.
- Dead Head: Because the discharge pressure can never exceed air inlet pressure, the discharge line can be closed with no damage or wear. The pump will simply slow down and stop.
- Explosion Proof: As Pumps are operated by compressed air, therefore, they are intrinsically safe.
- Submersible: If external components are compatible – KABI pumps can be submerged in the liquid by simply running the exhaust line above the liquid level.
- Pumping efficiency remains constant: There are no rotors, gears, or pistons, which wear over time and lead to the gradual decline in performance/flow rate.

Diaphragm pumps however do not produce pressure as they have a 1:1 operation & cannot be used with a flow meter. The standard pump configuration is also not suitable for use with flammable media (Gasoline)

All pump Models are designed for use with an Inlet Air Pressure of 20 – 100 PSI (1.40 to 6.89 BAR). Air Inlet on all pump models is threaded ¼" NPT (F)

KABI AODD pumps are available in a choice of 2 Body materials:

Aluminum: Best for use with general liquids such as Oils. Not recommended for use with abrasive & corrosive liquids

www.kabi.dk

Polypropylene: Suited for Chemical applications. Not recommended for use with Petroleum based media

Aluminum Body pumps come with a Hytrel® Diaphragm as opposed to BUNA-N commonly used by most other manufacturers. Hytrel® has similar properties to BUNA-N, but offers a much longer life & can be used at much higher temperatures.

Polypropylene Body pumps come with a choice of following Diaphragms

Santoprene® (TPO): Best for use with Abrasives, Acids, Caustics etc.

Teflon® (PTFE): Chemically most inert for use with highly aggressive liquids such as solvents etc.

SPECIFICATIONS

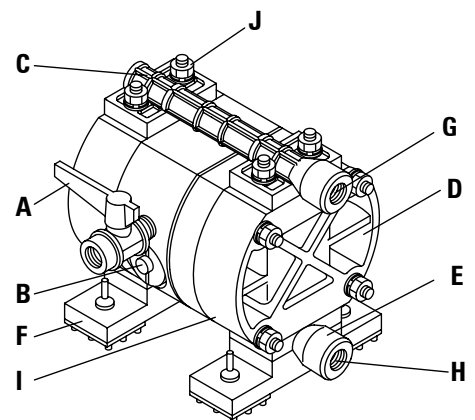
CAT NR.	60810	60801	60811	60802	60803
Size	1/4"	1/2"	1/2"	3/4"	1"
Casing	Polypropylene	Aluminium	Polypropylene	Aluminium	Aluminium
Diaphragm	PTFE	Hytrel®	PTFE	Hytrel®	Hytrel®
Flow rate	0 - 11 LPM (0 - 2.90 GPM)	0 - 50 LPM (0 - 13.22 GPM)	0 - 45 LPM (0 - 11.90 GPM)	0 - 110 LPM (0 - 29.1 GPM)	0 - 110 LPM (0 - 29.1 GPM)
Pump Inlet/ Outlet NPT (F)	1/4"	1/2"	1/2"	3/4"	1"
Air Exhaust NPT(F)	3/8"	3/8"	3/8"	3/4"	3/4"
Max Particle Size	N/A	1/32" (1 mm)	N/A	1/16" (2.0 mm)	1/16" (2.0 mm)
Suction Lift (DRY)	5-feet	5-feet	8-feet	18-feet	18-feet
Max Air Consumption	250 LPM (8.83 CFM)	450 LPM (15.9 CFM)	350 LPM (12.4 CFM)	1200 LPM (42.4 CFM)	1200 LPM (42.4 CFM)
Wetted Components	Polypropylene, PTFE	Aluminium, PA, Stainless steel, Hytrel®	Polypropylene, PTFE	Aluminium, Stainless steel Hytrel®	Aluminium, Stainless steel, Hytrel®
Valve Ball Material	PTFE (Flat type)	Hytrel®	PTFE (Flat type)	Hytrel®	Hytrel®
Air Motor	Ryton®	Aluminium	Ryton®	Aluminium	Aluminium
Maximum Liquid Temperature	60°C (140°F)	80°C (176°F)	60°C (140°F)	80°C (176°F)	80°C (176°F)

1. NAMES OF PARTS AND MATERIALS

1.1 60810 PP & PTFE

- | | |
|-----------------|----------------------------|
| A. Air Valve | F. Pump Base |
| B. Reset Button | G. Discharge Port |
| C. Out Manifold | H. Intake Port |
| D. Out Chamber | I. Lift Point |
| E. In Manifold | J. Ground Connection Point |

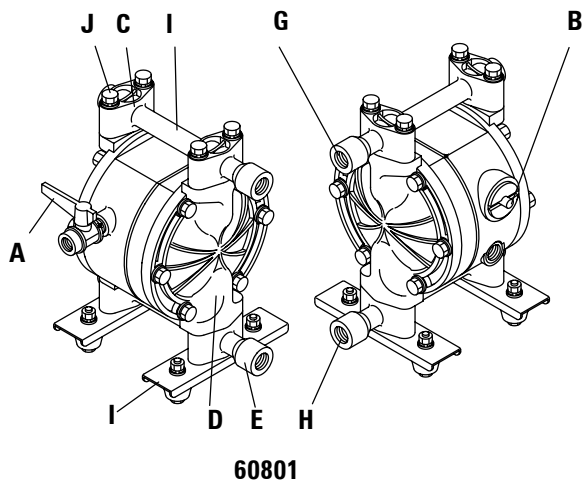
PART NO.	60810
Switching Portion	PPS
Fluid contact Portion	PPG
Diaphragm	PTFE
Flat Valve	PTFE
O Ring	PTFE
Valve Seat	PPG
Center Disk	PPG (SUS304)



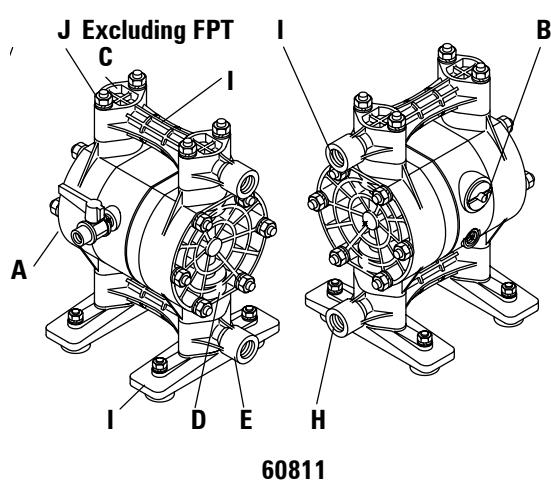
60810

1.2 60801

- | | |
|-----------------|----------------------------|
| A. Air Valve | F. Pump Base |
| B. Reset Button | G. Discharge Port |
| C. Out Manifold | H. Intake Port |
| D. Out Chamber | I. Lift Point |
| E. In Manifold | J. Ground Connection Point |



60801



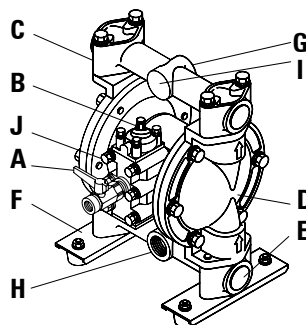
60811

PART NO.	60801	60811
Housing	Aluminium	Polypropylene
Switching Portion	PPS	PPS
Fluid contact Portion	ADC12	PPG (PVDF)
Diaphragm	TPEE	PTFE
Ball/O ring	TPEE/NBR	PTFE
Valve Seat	A5056	PPG (PVDF)
Center Disk	A5056	PPF (SUS304) {PVDF(SUS304)}
Flat Valve		PTFE

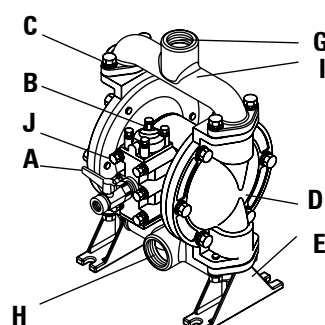
1.3 60802 & 60803

- | | |
|-----------------|----------------------------|
| A. Air Valve | F. Pump Base |
| B. Reset Button | G. Discharge Port |
| C. Out Manifold | H. Intake Port |
| D. Out Chamber | I. Lift Point |
| E. In Manifold | J. Ground Connection Point |

PART NO.	60802 & 60803
Switching Portion	ADC12
Fluid contact Portion	ADC 12 [ADC12, AC2A, SGP] {ADC 12, AC4C-T6}
Diaphragm	TPEE
Ball/O Ring	PTFE/NBR
Valve Seat	SMS1025
Center Disk	SUS316

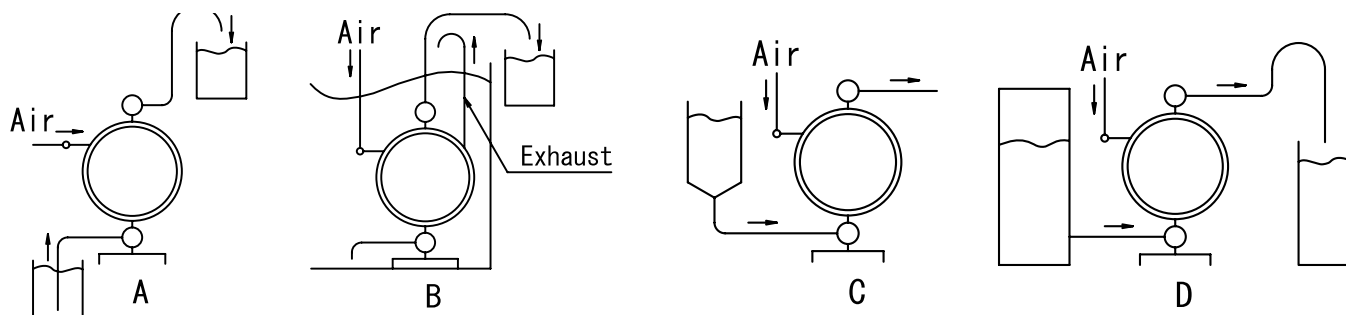


60802



60803

2. INSTALLATION



- A. Pump can be placed over the liquid source.
- B. Pump can be submerged completely in the liquid source.
- C. Pump inlet can also be placed below the liquid source.
- D. Pump can be used to empty one source and fill another source at the same time

2.1 Installing the pump

1. Decide where the pump should be installed and secure a suitable space.
2. Remove the pump from the package and install it in the designated location.
3. When fixing the pump in place, use the cushions on the pump base, and secure the pump by tightening the tied-down bolts a little at a time.

NOTE:

- Try to keep the suction lift as short as possible.
- Remember to provide sufficient space around the pump for maintenance.
- The direction of the fluid intake port and the discharge port can be switched opposite from each other by unscrewing the inlet or outlet manifold and then screwing it again in the opposite direction.
- In the event of diaphragm failure the exhaust from pump may contain some sludge.
- When operating the pump where it would have an impact on the environment, the exhaust should be directed to a place where there will be no environmental impact.

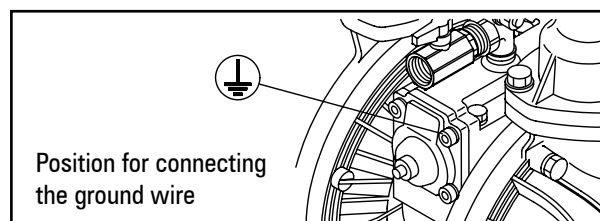
NOTE:

Solenoid Operation

When air line operation is to be controlled by a solenoid valve, a three way type is recommended. A three-way solenoid valve allows any trapped air to bleed off, in turn improving pump performance.

2.2 Connecting the ground wire

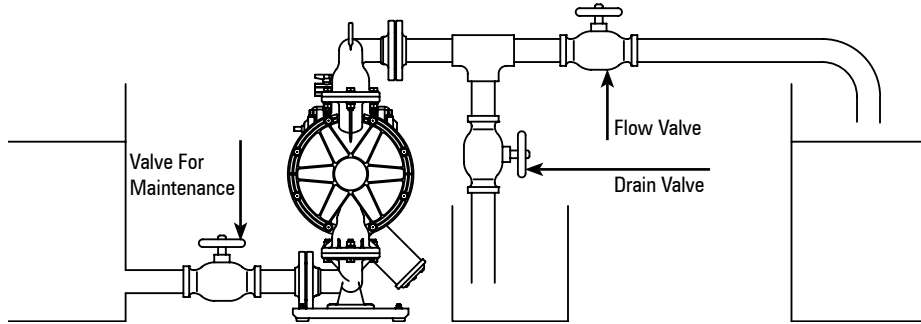
1. When installing the pump, be sure to connect the ground wire at the specified position. For the specified position for connecting the ground wire, see [1. Names of parts and materials].
2. Also connect ground wires to peripheral equipment and piping.
3. Use 2.0 mm ground wires (minimum 2 in number).



3. CONNECTION

3.1 Connecting fluid piping

1. Connect a flow valve and a drain valve to the fluid discharge port of the pump.
2. Connect a valve for maintenance to the fluid suction intake port of the pump.
3. Connect a hose to the valve on the suction-port side and the valve of the discharge-port side of the pump.
4. Connect a hose on the suction-side intake and the discharge-port side to the respective vessels.



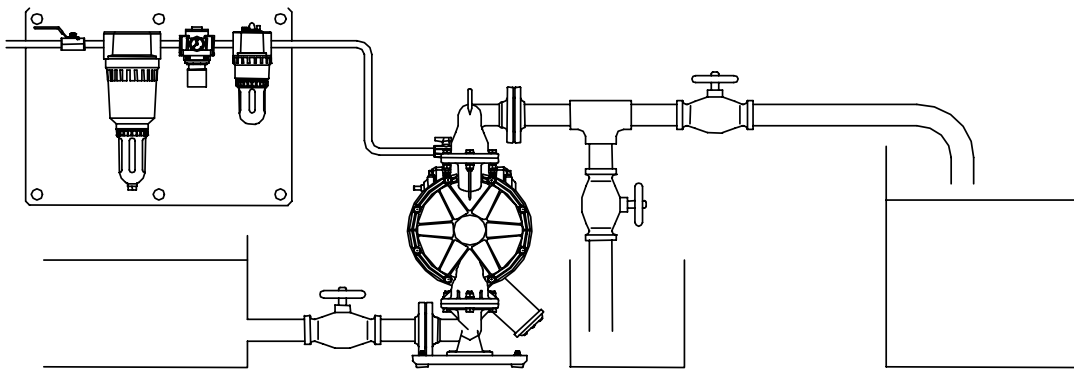
⚠ CAUTION

1. Use a flexible hose to absorb pump vibration.
2. Use a hose of same diameter or larger diameter than the pump's ports. If you use a hose of smaller diameter, the pump's performance will be adversely affected, and it may even malfunction.
3. When pumping a fluid that contains slurry, verify that the particle size is below the slurry limitation (See Page 2 Specifications). If it exceeds the limitation of slurries indicated in the main specifications, attach a strainer to the pump to stop larger particles. Otherwise, such particles may cause the pump to malfunction.

3.2 Connecting air piping

! WARNING

Before starting work, make sure that the air compressor is shut off.



1. Connect an air valve, air filter, regulator and if necessary lubricator (hereinafter called the "peripheral equipment") to hose which is connected to compressor.
2. Install these peripheral items supported by brackets near the pump.
3. Connect the hose from the peripheral equipment to the air valve of the pump's supply port.

4. OPERATION

4.1 Method of operation

1. Start the air compressor.
2. Open the air valve in front of each piece of peripheral equipment, and adjust the supply air pressure with a regulator to within the permissible range.
3. Open the flow valve on the discharge side.
4. Press the RESET button, and then slowly open the air valve of the pump.
5. First, verify that fluid is flowing inside the piping and is being pumped to the discharge side, and then fully open the air valve.
6. Again adjust the supply air pressure with a regulator to within the permissible range.
7. Shutdown the pump by cutting off the air supply.

5. TROUBLESHOOTING

PROBLEM	CORRECTIVE SOLUTION
Pump does not run	
The exhaust port (silencer) of pump is clogged with sludge.	Check and clean the exhaust port and silencer.
Air is not supplied.	Start the compressor, and open the air valve and air regulator.
The supply air pressure is low.	Check the compressor and the configuration of air piping.
Air leaks from connection parts.	Check the connection parts and tightness of bolts.
Air piping or peripheral equipment is clogged with sludge.	Check and clean the air piping.
The flow valve on the discharge side is not open.	Open the flow valve on the discharge side.
The spool stopped in neutral position.	Press the RESET button.
The fluid piping is clogged with sludge.	Check and clean the fluid piping.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
Pump runs, but fluid does not come out	
The suction lift or discharge head is long.	Confirm the piping configuration and shorten the length.
The discharge-side fluid piping (including the strainer) is clogged with sludge.	Check and clean the fluid piping.
The valve on the suction side is not open.	Open the valve on the suction side.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
The ball and valve seat are worn out or damaged.	Disassemble the manifold, check and replace parts.
Flow (Discharge Volume) decreased	
The supply air pressure is low.	Check the compressor and configuration of air piping.
Air piping or peripheral equipment is clogged with sludge.	Check and clean the air piping.
The discharge-side flow valve opens differently.	Adjust the discharge-side flow valve.
Air is taken in together with fluid.	Replenish fluid and check the configuration of the suction-side piping.
Cavitation* occurs.	Adjust the supply air pressure and discharge pressure, and shorten the suction lift.
Chattering** occurs.	Adjust the supply air pressure and discharge pressure. Reduce inlet flow valve to adjusting liquid pressure and volume.
Icing*** on air-switching portion.	Eliminate ice from air-switching valve and check and clean the air filter. Use external exhaust hose to control exhaust air speed.
The fluid piping (including the strainer) is clogged with sludge.	Check and clean the fluid piping and strainer.
The exhaust port (silencer) of the pump is clogged with sludge.	Check and clean the exhaust port and silencer.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
Liquid leakage from exhaust port (silencer)	
The diaphragm is damaged.	Disassemble and check the pump and replace the diaphragm.

The fastening nuts for the center disk are loose.	Disassemble and check the pump. Tighten the nuts.
High air consumption during operation	
The seal ring and sleeve are worn out.	Disassemble the air-switch portion, check and clean. Replace parts as necessary.
Irregular noise	
The supply air pressure too high.	Adjust the supply air pressure.
The spool oscillates, and occur ball chattering.	Adjust the supply air pressure and discharge pressure. Reduce inlet flow valve to adjusting liquid pressure and volume.
The pump is clogged with sludge with particles of larger than the permissible diameter.	Disassemble the casing, check and clean.
Irregular vibration	
The supply air pressure is too high.	Adjust the supply air pressure.
The spool oscillates, and occur ball chattering.	Adjust the supply air pressure and exhaust pressure.
Connection parts and pump mounting are loose.	Check each connection part and tighten the bolts.

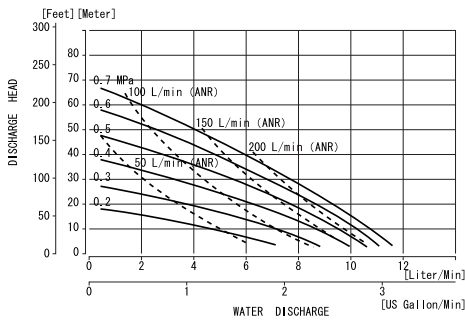
***Cavitation:** It is the formation of air bubbles in a flowing liquid caused because of the pressure drop.

****Chattering:** It is the noise that comes at high flows of liquid or air.

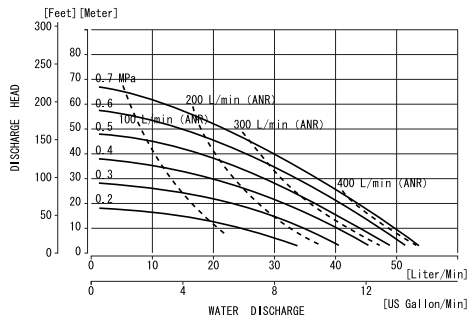
*****Icing:** It is the formation of ice on the switch.

6. PERFORMANCE CURVE

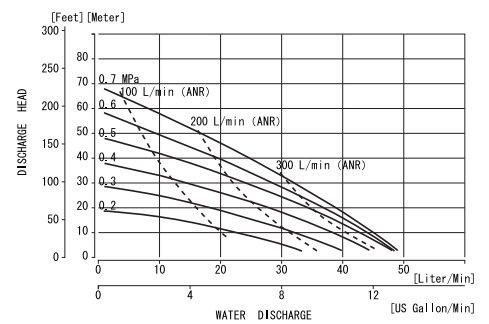
60810



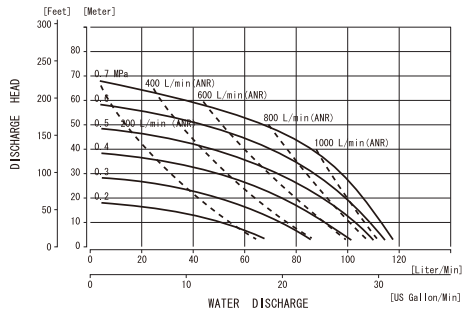
60801



60811



60802 & 60803

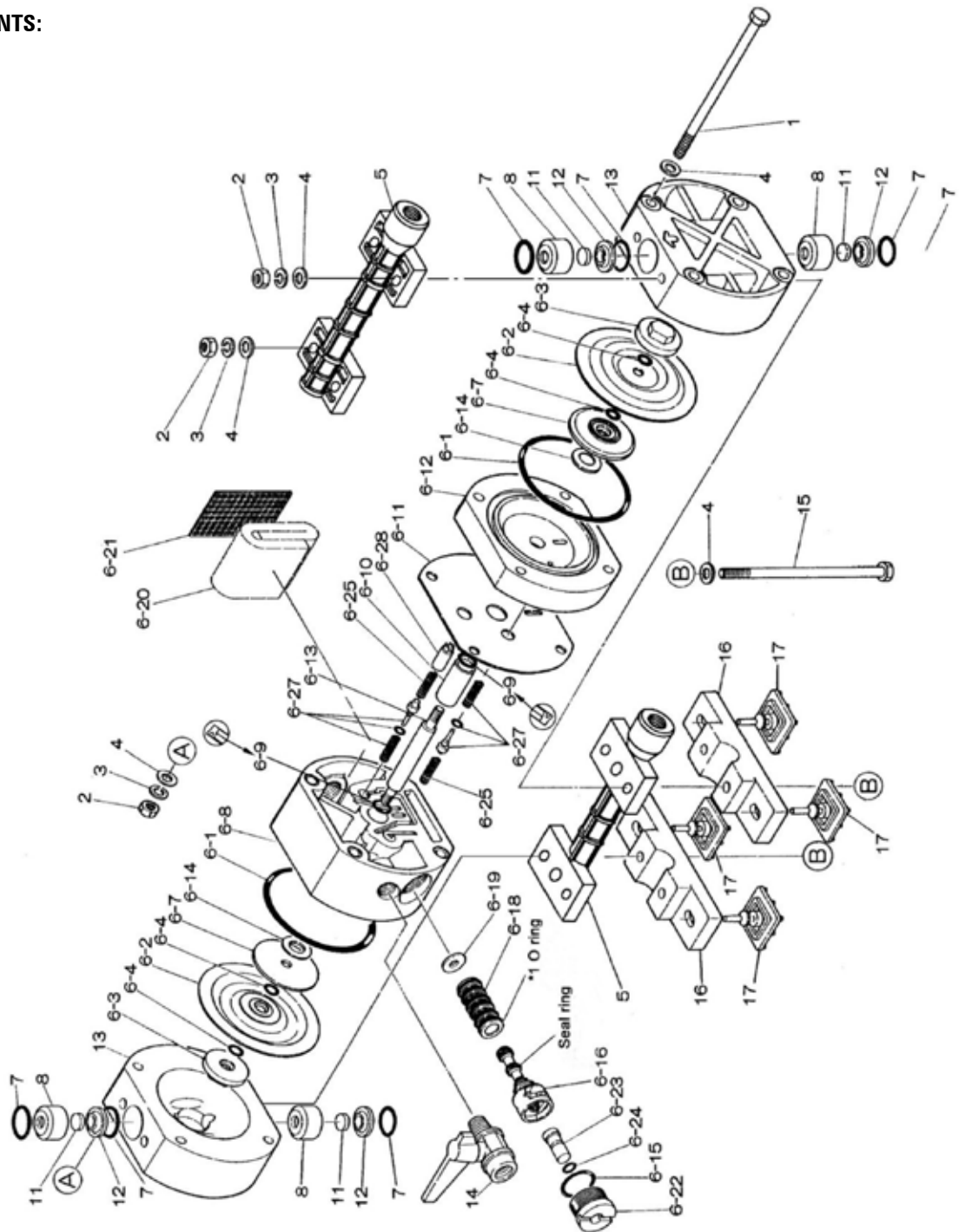


7. EXPLODED VIEW AND PARTS LIST

7.1 60810

WETTED COMPONENTS:

Polypropylene, PTFE



Reference No.	Description	Parts Component
1	BOLT	4
2	NUT	8
3	SPRING LOCK WASHER	8
4	PLAIN WASHER	16
5	MANIFOLD	2
6	BODY ASSEMBLY	1

7	O RING	6
8	VALVE STOPPER	4
11	FLAT VALVE	4
12	VALVE SEAT	4
13	OUT CHAMBER	2
14	BALL VALVE	1
15	BOLT	4
16	BASE	2
17	CUSHION	4

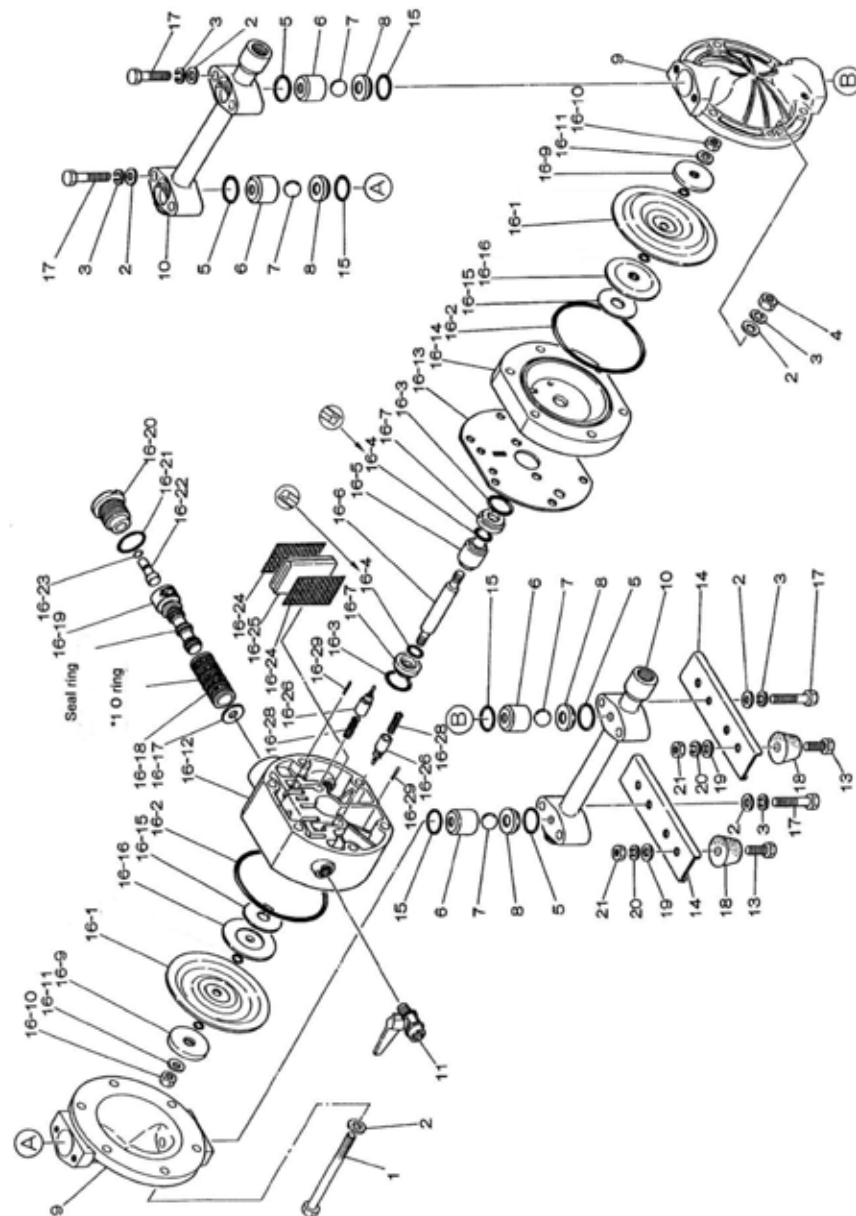
BODY ASSEMBLY

Reference No.	Description	Parts Component
6-1	O RING	2
6-2	DIAPHRAGM	2
6-3	CENTER DISK	2
6-4	O RING	4
6-7	CENTER DISK	2
6-8	BODY	1
6-9	PACKING	2
6-10	BUSHING	1
6-11	GASKET	1
6-12	BODY B	1
6-13	CENTER ROD	1
6-14	CUSHION	2
6-15	O RING	1
6-16	NUT	1
	C SPRING	2
	SPOOL	1
	SEAL RING	5
	SPRING HOLDER	1
	BLOCK	1
	CUSHION	1
6-18	SLEEVE	1
6-19	O RING	6
6-20	SILENCER	1
6-21	MESH	1
6-22	CAP	1
6-23	RESET BUTTON	1
6-24	O RING	1
6-25	SPRING	2
6-27	SPRING	2
	PILOT VALVE	2
	PACKING	2
6-28	STOPPER	1

7.2 60801

WETTED COMPONENTS:

Hytrell



Reference No.	Description	Parts Component
1	BOLT	6
2	PLAIN WASHER	20
3	SPRING LOCK WASHER	14
4	NUT	16
5	O RING	6
6	VALVE STOPPER	4
7	BALL	4
8	VALVE SEAT	4
9	OUT CHAMBER	4
10	O RING	2
	CAP	2
	MANIFOLD	2
11	BALL VALVE	1
13	BOLT	4
14	BASE	2

15	O RING	4
16	BODY ASSEMBLY	1
17	BOLT	8
18	CUSHION	4
19	PLAIN WASHER	4
20	SPRING LOCK WASHER	4
21	NUT	4

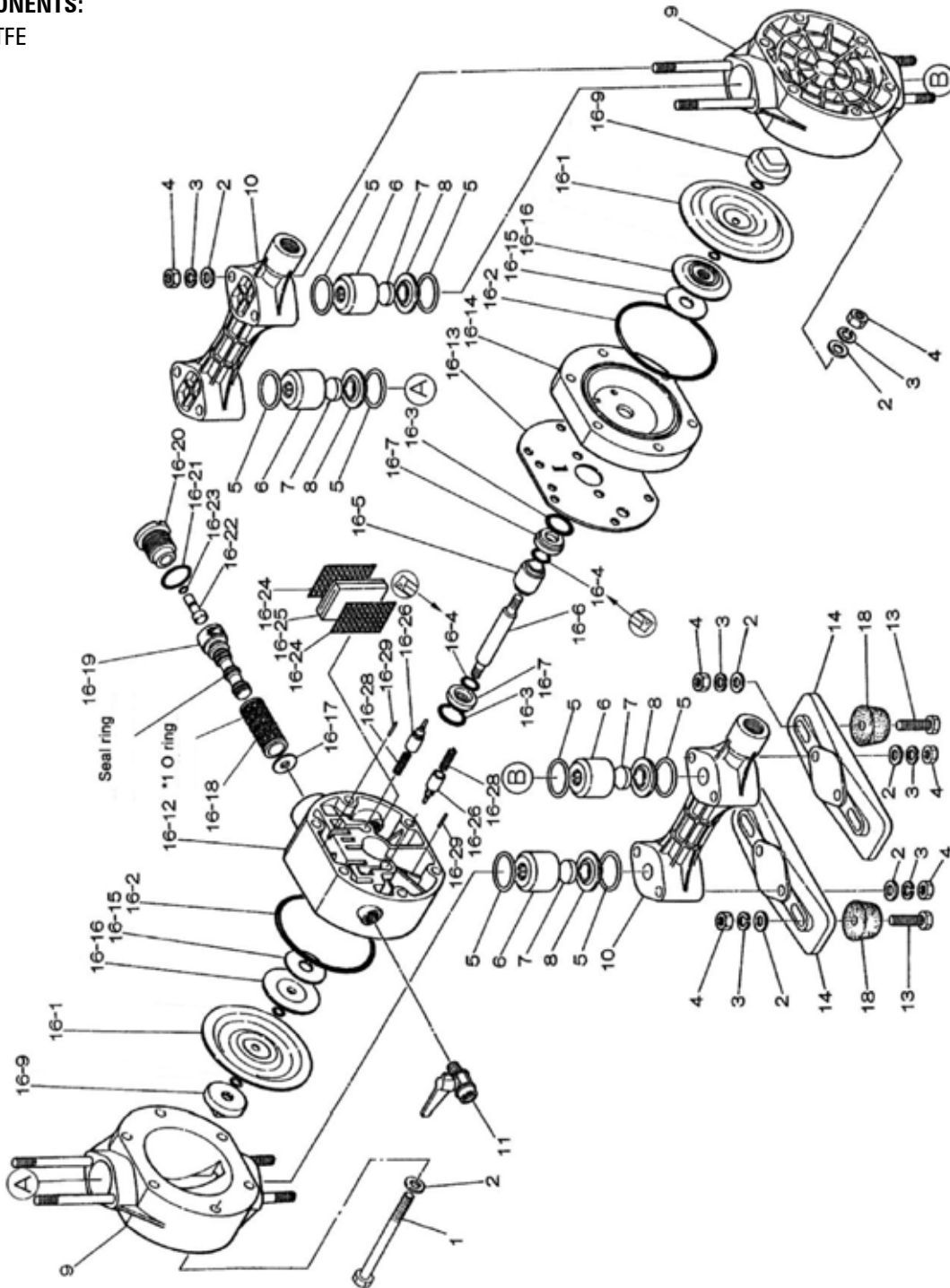
BODY ASSEMBLY

Reference No.	Description	Parts Component
16-1	DIAPHRAGM	2
16-2	O RING	2
16-3	O RING	2
16-4	PACKING	2
16-5	GUIDE	1
16-6	CENTER ROD	1
16-7	BUSHING	2
16-9	CENTER DISK	2
16-10	NUT	2
16-11	CONED DISK SPRING	2
16-12	BODY A	1
16-13	GASKET	1
16-14	BODY B	1
16-15	CUSHION	2
16-16	CENTER DISK	2
16-17,16-19	CUSHION	2
16-18	O RING	6
	SLEEVE	1
16-19	NUT	1
	SPOOL	1
	C SPRING	2
	SEAL RING	5
	SPRING HOLDER	1
	BLOCK	1
16-20	CAP	1
16-21	O RING	1
16-22	RESET BUTTON	1
16-23	O RING	1
16-24	MESH	2
16-25	SILENCER	1
16-26	PILOT VALVE ASSEMBLY	2
16-28	SPRING	2
16-29	SPRING PIN	2

7.3 60811

WETTED COMPONENTS:

Polypropylene, PTFE



Reference No.	Description	Parts Component
1	BOLT	6
2	PLAIN WASHER	24
3	SPRING LOCK WASHER	18
4	NUT	18
5	O RING	8
6	VALVE STOPPER	4
7	FLAT VALVE	4

8	VALVE SEAT	4
9	OUT CHAMBER	2
10	MANIFOLD	2
11	BALL VALVE	1
13	BOLT	4
14	BASE	2
16	BODY ASSEMBLY	1
18	CUSHION	4

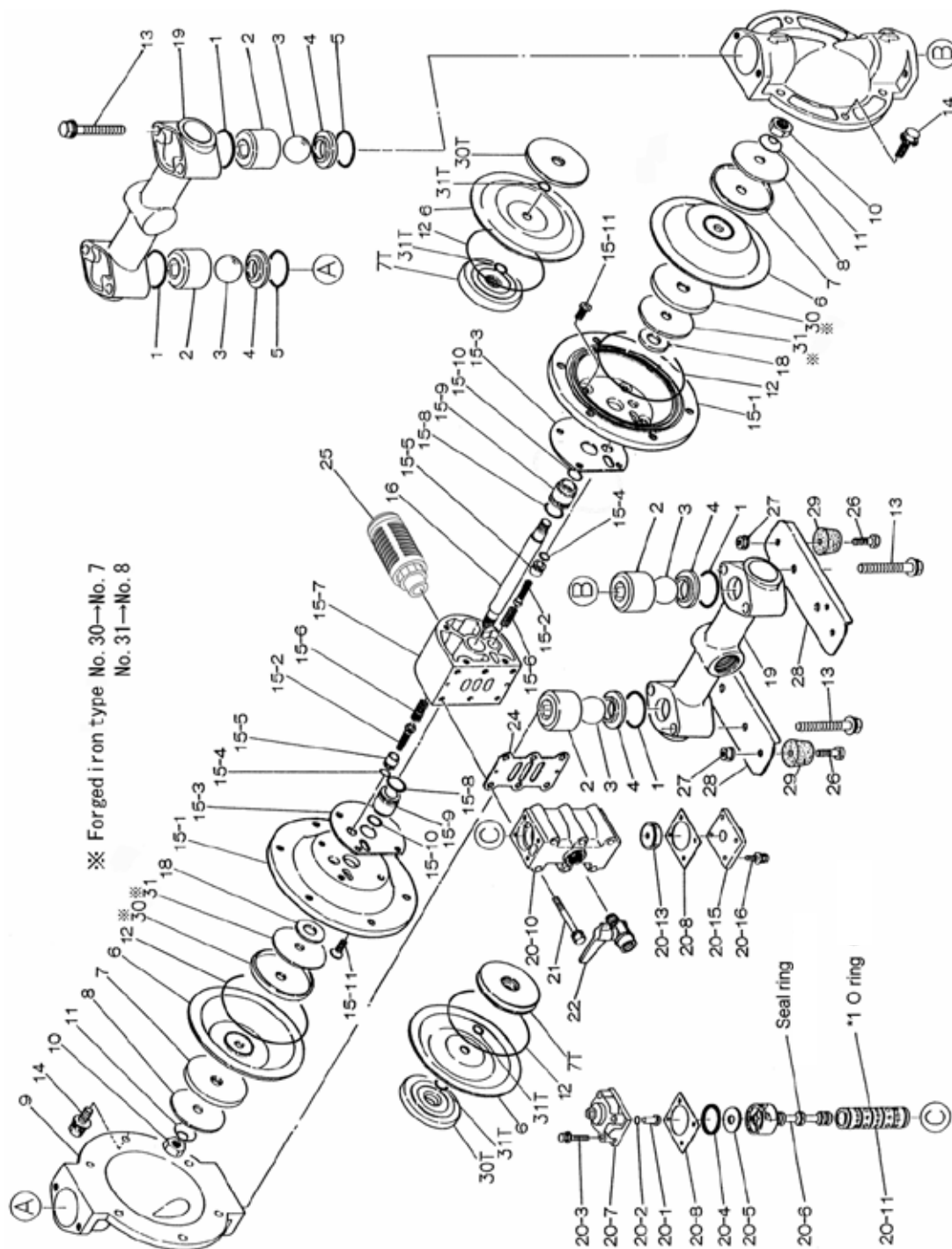
BODY ASSEMBLY

Reference No.	Description	Parts Component
16-1	DIAPHRAGM	2
16-2	O RING	2
16-3	O RING	2
16-4	PACKING	2
16-5	GUIDE	1
16-6	CENTER ROD	1
16-7	BUSHING	2
16-9	O RING	4
16-10	CENTER DISK	2
16-12	BODY A	1
16-13	GASKET	1
16-14	BODY B	1
16-15	CUSHION	2
16-16	CENTER DISK	2
16-17,16-19	CUSHION	2
16-18	O RING	6
	SLEEVE	1
16-19	NUT	1
	SPOOL	1
	C SPRING	2
	SEAL RING	5
	SPRING HOLDER	1
	BLOCK	1
16-20	CAP	1
16-21	O RING	1
16-22	RESET BUTTON	1
16-23	O RING	1
16-24	MESH	2
16-25	SILENCER	1
16-26	PILOT VALVE ASSEMBLY	2
16-28	SPRING	2
16-29	SPRING PIN	2

7.6 60802 & 60803

WETTED COMPONENTS:

Aluminium, Hytrel



Reference No.	Description	Parts Component
1	O RING	4
2	BALL GUIDE 20AL	4
3	BALL	4
4	VALVE SEAT 20AL	4
5	O RING 34.5 MM X 3M B	2
6	DIAPHRAGM 20H	2
7	CENTER DISK 20R	2

8	WASHER 20 R	2
9	AIR CHAMBER 20AL	2
10	NUT SS M14 X 1.5	2
11	CONED DISK SPRING M14	2
12	O RING	2
13	BOLT (M8X1. 25X60 SS400)	8
14	BOLT (M8X1. 25X30 SS400)	12
15	BODY	1
15-1	AIR CHAMBER	2
15-2	PILOT VALVE ASSY 20/25	2
15-3	GASKET 20/25	2
15-4	O RING 11MM X 2.5MM B	2
15-5	PILOT VALVE SEAT 20/25	2
15-6	SPRING 20/25	2
15-7	BODY (AL) NDP-20/25	1
15-8	O RING 23.3MM X 2.4MM	2
15-9	THROAT BEARING 20/25 N	2
15-10	V-PACKING 20/25	2
15-11	BOLT FLAT HD W/ WASHE	8
16	CENTER ROD 20	1
18	CUSHION 20/25	2
19	MANIFOLD ASSY	2
20	VALVE ASSY	1
20-1	RESET BUTTON 20/25	1
20-2	O RING 7.5MM X 2.0MM	1
20-3	BOLT M6 FT ZINC W/WAS	4
20-4	PACKING 20/25	1
20-5	WASHER	1
20-6	C SPOOL ASSY	1
20-7	CAP A 20/25 METAL	1
20-8	GASKET 20/25	2
20-10	VALVE BODY	1
20-11	SLEEVE ASSY	1
20-13	CUSHION 20/25	1
20-15	CAP B 20/25 METAL	1
20-16	BOLT M6 FT ZINC W/WAS	4
21	BOLT M8 PT ZINC W/WAS	6
22	BALL VALVE 1/4"	1
24	GASKET 20/25	1
25	MUFFLER 20/25PP NEW	1
26	BOLT M8 X1.25 X 22 HEX FT	4
27	NUT W/FLANGE M8 X 1.2	4
28	BASE 20 METAL	2
29	FOOT RUBBER 15PP, 20/25	4
30	CENTER DISK	2
31	WASHER	2

8. REPAIR PARTS LIST

8.1 60810 (Exploded View on Page 8)

Reference No.	Description	Qty.
	60810 (LIQUID END)	
6-2	DIAPHRAGM (PTFE)	2
11	FLAT PLATE (PTFE)	4
12	FLAT PLATE SEAT (PPG)	4
6-4	O-RING (PTFE)	4
7	O-RING (PTFE)	6
	60810 (AIR MOTOR RESEAL)	
6-1	O-RING (NBR)	2
6-9	Y-PACKING	2
6-11	GASKET (TPEE)	1
6-14	CUSHION (PA)	2
6-15	O-RING (NBR)	1
6-16	C-SPOOL ASSY	1
6-19	CUSHION (PA)	1
6-20	SILENCER (PE)	1
6-24	O-RING (NBR)	1
6-25	SPRING (SS)	2
6-27	PILOT ASSY	2

8.2 60801 (Exploded View on Page 10)

	60801 (LIQUID END)	
16-1	DIAPHRAGM (TPEE)	2
7	BALL (NBR)	4
5	O-RING (NBR)	4
15	O-RING (NBR)	4
	60801 (AIR MOTOR RESEAL)	
16-2	O-RING (NBR)	2
16-3	O-RING (NBR)	2
16-4	Y-PACKING	2
16-15	CUSHION (PA)	2
16-17	CUSHION (NBR)	1
16-19	C-SPOOL ASSY	1
16-21	O-RING (NBR)	1
16-23	O-RING (NBR)	1
16-25	SILENCER (PE)	1
16-26	PILOT ASSY	2
16-28	SPRING (SS)	2

8.3 60811 (Exploded View on Page 12)

Reference No.	Description	Qty.
	60811 (LIQUID END)	
16-1	DIAPHRAGM (PTFE)	2
7	FLAT PLATE (PTFE)	4
8	FLAT PLATE SEAT (PPG)	4
5	O-RING (PTFE)	8
16-8	O-RING (PTFE)	4
	60811 (AIR MOTOR RESEAL)	
16-2	O-RING (NBR)	2
16-3	O-RING (NBR)	2
16-4	Y-PACKING	2
16-15	CUSHION (PA)	2
16-17	CUSHION (NBR)	1
16-19	C-SPOOL ASSY	1
16-21	O-RING (NBR)	1
16-25	SILENCER (PE)	1
16-26	PILOT ASSY	2
16-28	SPRING (SS)	2
16-23	O-RING (NBR)	1

8.6 60802 & 60803 (Exploded View on Page 14)

	60802 & 60803 (LIQUID END)	
6	DIAPHRAGM (TPEE)	2
3	BALL (NBR)	4
5	O-RING (NBR)	4
12	O-RING (NBR)	2
1	O-RING (NBR)	4
	60802 & 60803 (AIR MOTOR RESEAL)	
20-13	CUSHION (NBR)	2
24	GASKET (NBR)	1
15-2	PILOT ASSY	2
15-3	GASKET (NBR)	2
15-4	O-RING (NBR)	2
15-5	PILOT SEAT (POM)	2
15-6	SPRING (SS)	2
15-8	O-RING (NBR)	2
15-9	SLEEVE (MC NYLON)	2
15-10	PACKING (NBR)	2
20-2	O-RING (NBR)	1
20-4	PACKING (NBR)	1
20-6	C-SPOOL ASSY	1
20-8	GASKET (NBR)	2
25	SILENCER	1

KABI A/S

Kokkedalsvej 29
DK-2970 Hoersholm
Denmark

E-mail: kabi@kabi.dk

Tlf. / Phone: +45 4576 0242

Telefax: +45 4576 4468

WWW.KABI.DK