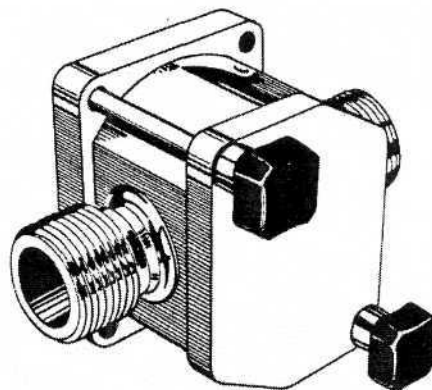




Series M

Stainless Steel Gear Pumps

Operating Manual



Represented By:

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EC DECLARATION OF INCORPORATION

We hereby declare that the following machinery is intended for installation into a machine or to be assembled with other machines into a machine. It must **not** be put into service until the machinery into which it is incorporated has been declared in conformity with the provisions of the Machinery Directive 89/392/EEC, amendments 91/368/EEC, 93/44/EEC, 93/68/EEC.

Machine Description Gear Pump(s)

Type/Size _____

Serial Number _____

This machinery has been designed and manufactured in accordance with the following transposed harmonised European Standards:-

EN292 Parts 1 and 2 : 1991 Safety of Machinery - Basic Concepts, general principles
for design.

EN294 : 1992 Safety distances to prevent danger zones being reached by the upper
limbs.

ISO9001: 2000 Quality Management System.

Conforms to Directive 90/128/EEC Plastic Materials and Articles in contact with Foodstuffs

A technical construction file for this machinery is retained at the above address.

Signed  Date _____
(Authorised Person)

Name P. SWEET Position QUALITY MANAGER

Alfa Laval Eastbourne, Alfa Laval Ltd

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EC DECLARATION OF CONFORMITY

We hereby declare that the following machinery conforms to the machinery directive 89/392/EEC as amended by 91/368/EEC, 93/44/EEC and 93/68/EEC and to the following other relevant directives. The machinery has been designed and manufactured in accordance with the transposed harmonised European standards; European and national standards as listed:

Machine Description Gear Pump(s) - Motorised

Type/Size _____ Serial Number _____

Other Applicable Directive Electrical Equipment Low Voltage Directive 73/23/EEC

Plastic Materials and Articles in contact with Foodstuffs Directive 90/128/EEC

Applicable Standards/Specifications _____

EN292 Parts 1 and 2 : 1991 Safety of Machinery - Basic concepts, general principles for design.

EN294 : 1992 Safety distances to prevent danger zones being reached by the upper limbs.

EN60204 Part 1 : 1993 Safety of Machinery - Electrical equipment of machines - specification for general requirements.

BS5304 : 1988 Code of Practice for Safety of Machinery.

ISO 9001 : 2000 Quality Management System .

A technical construction file for this machinery is retained at the above address.

Signed  Date _____
(Authorised Person)

Name P. SWEET Position QUALITY MANAGER



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1.0 General

1.1 Pump Limits of Application or Use

This range of pumps has been designed for pumping a full range of semi-solids, for transfer, dosing and sampling in the food, chemical and associated industries.

Pressures of up to 7 bar, speeds to 1360rpm and temperatures to 100°C can be obtained on this range of pumps depending on type/size. These conditions cannot always be obtained simultaneously. The model type/size will be shown on the nameplate positioned on the pump.

The pump/pump unit will have been selected for the pump users specific application when known and the pump serial number will relate to this.

If the user has not specified the pumping application or needs to change it, it is important to confirm that the materials of construction and product seals are compatible with the pumping application and that adequate NPSH is available.

For specific guidelines contact your supplier quoting :- pump model/size, serial number and system details (e.g. product, pressure, flow rate).

Where the application requires the pump should be mounted with ports vertical to ensure self draining e.g. food media.

1.2 Pump Duty Conditions

The pump should only be used for the duty for which it has been specified. The operating pressure, speed and temperature limits have been selected at the time of order and **must not** be exceeded for the pump. These details are stated on the original documentation and if not available may be obtained from your supplier quoting :- pump model and serial number.

1.3 Noise Levels

Depending upon the pumping system and duty conditions the pump noise levels may vary. The sound pressure level measurement stated is given for typical pumps/pump units at maximum pressures/speeds. The results being taken on water at ambient temperature:-

Recorded sound pressure level :- 75 dB(A).

Note :- Readings taken in accordance with ISO3746.

1.4 Utility Requirements

Electrical Supply :-

This pump may be supplied bare shaft or coupled to a drive unit for which a drive unit/electrical supply will be required.

Operating Manual

1.5 Safety Precautions

All warnings in this manual are summarised on this page.

Pay special attention to the instructions below so that severe personal injury or damage to the pump can be avoided.

Personnel performing installation, operation and maintenance of the pump must have the relevant experience required.

Warning Signs :



General safety instructions are preceded by this symbol.



Electrical safety instructions are preceded by this symbol.



Take great care when using caustic agents.

Installation



: **Always** observe the technical data.



: The pump **must** be electrically connected by authorised personnel. (See the motor instructions supplied with the drive unit).



: **Never** start in the wrong direction of rotation with liquid in the pump.



: **Never** put your hands or fingers inside the port connections

Operation



: **Always** observe the technical data.



: **Never** touch the pump or the pipelines when pumping hot liquids or when sterilising.



: **Never** stand on the pump or pipelines.



: **Never** run the pump with both the suction side and the pressure side blocked.



: **Always** handle toxic and acidic liquids with great care.



: **Never** put your hands or fingers inside the port connections.

Maintenance



: **Always** observe the technical data.



: **Always** disconnect the pump from the drive unit and power supply when servicing the pump.



: The pump must **never** be hot when servicing it.



: The pump and pipelines must **never** be pressurised when servicing the pump.



: **Never** put your hands or fingers inside the port connections.

Study this manual carefully

1.6 Health and Safety Information

Potential Safety Hazards

The following section gives information on handling, storage and disposal of parts and materials used in the pumps which may be considered hazardous to health.

Please pass this information on to your Safety Officer, he may need it to comply with Health and Safety, and COSHH regulations.

Electric motors - the pump may have an electric motor fitted, ensure that the relevant fire equipment is available.

The information contained here is brief.

General First Aid

If potentially hazardous substances are accidentally inhaled, or skin or eyes contaminated, then the following basic precautions should be taken

Inhalation - Remove to fresh air

Skin - Wash with soap and water

Eyes - Flush with water, seek medical attention

In all cases, if symptoms persist, seek medical attention.

Material	Use	Major Hazard
SILICON SEALANT	GEARBOX SEAL RETAINERS, REAR COVER, GENERAL SEALANT.	RELEASES VAPOUR AT ROOM TEMPERATURE.
SEALANT (RED HERMETITE)	GEARBOX SEAL RETAINERS, REAR COVER, GENERAL SEALANT.	RELEASES VAPOUR AT ROOM TEMPERATURE, HIGHLY FLAMMABLE, TREAT AS FIRE HAZARD.
ANTI-SEIZE COMPOUNDS	BEARINGS	APPLIED FROM AEROSOL. RELEASES VAPOUR. DISPOSE OF CONTAINER AS IF PRESSURISED.
ADHESIVES (E.G. PERMABOND)	BEARING NUTS, ADJUSTMENT NUTS.	RELEASES VAPOUR AT ROOM TEMPERATURE.
OIL AND GREASE	OIL - GENERAL LUBRICATION GREASE - PRODUCT SEALS, TIMING GEARS, GENERAL LUBRICATION.	SKIN AND EYE IRRITANT.
PLASTIC COMPOUNDS (PTFE, POLYPROPYLENE, PVC)	PTFE - 'O' RINGS, LIP SEALS, GLAND PACKING. POLYPROPYLENE - GLAND GUARDS. PVC - GLAND GUARDS.	RELEASES FUMES WHEN HEATED.
ELASTOMERIC COMPOUNDS (EP, VITON, NITRILE, NEOPRENE)	ALL - 'O' RINGS, LIP SEALS. NITRILE, POLYURETHANE - ROTORS (KNOWN AS RUBBER AND URETHANE).	RELEASES FUMES WHEN HEATED.
ARAMID FIBRE	GLAND PACKING.	EMMITS HARMFUL DUST. RELEASES FUMES WHEN HEATED.
PAINT	EXTERNAL PUMP SURFACES.	RELEASES DUST AND FUMES IF MACHINED. TREAT AS A FIRE HAZARD.

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2.0 Unpacking, Handling and Storage

2.1 Documents

To avoid any problems, on receipt of your pump always use the following procedure:-

1. Check the delivery note against the goods received.
2. Check if the pump has been delivered with an electric motor that the motor instructions are available.

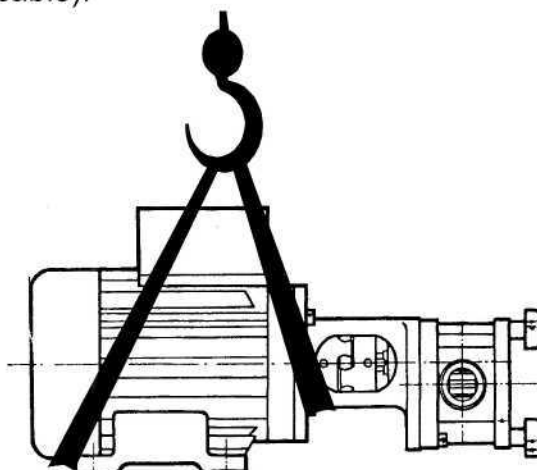
2.2 Unpacking

Care must be taken when unpacking the pump, and the following stages must be completed:-

1. Inspect the packing for any possible signs of damage in transit.
2. Carefully remove the packing away from the pump.
3. Inspect the pump for any visible signs of damage.
4. Clean away the packing from the pump port connections.
5. Ensure that any additional equipment such as seal flushing pipework is not damaged.

2.3 Handling

Refer to the pump weights guide, prior to using any lifting gear. Use the correct lifting straps for the pump weight (or pump and drive if applicable).



2.4 Pump Storage

After receipt and inspection if the pump is not to be installed immediately the pump should be repacked and placed in suitable storage. The following points should be noted:-

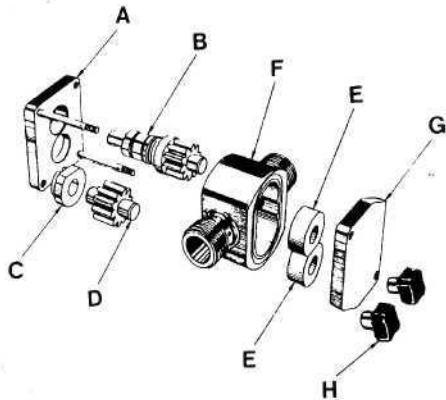
1. Plastic or gasket type port covers should be left in place.
2. Pumps received wrapped with corrosion inhibiting treatment material should be rewrapped.
3. A clean, dry storage free from vibration location should be selected. When a moist dusty atmosphere must be used for storage, further protect the pump or unit with a moisture repellent cover until it is to be installed.
4. Rotate pump/pump unit by hand, weekly to prevent bearing damage.
5. All associated ancillary equipment should be treated similarly.

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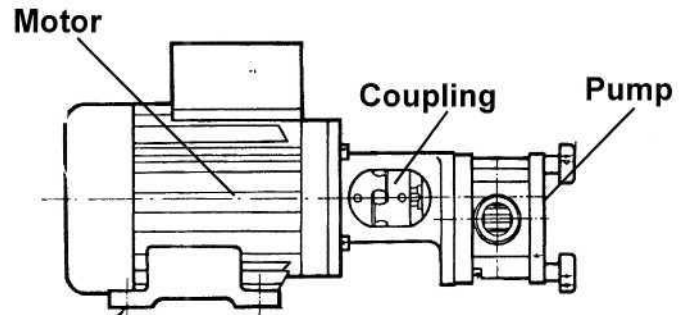
3.0 Description of Pump or Pump Unit

3.1 General Pump Description

The pump supplied is a positive displacement pump, which may be supplied with or without a drive unit (see below). The drawing below indicates various parts of the pump.



A - Back plate	E - Front bushes
B - Drive shaft assembly	F - Body
C - Rear bush (lay shaft)	G - Front cover
D - Lay shaft	H - Hand nuts



Pump with Drive Unit

3.2 Working Principle

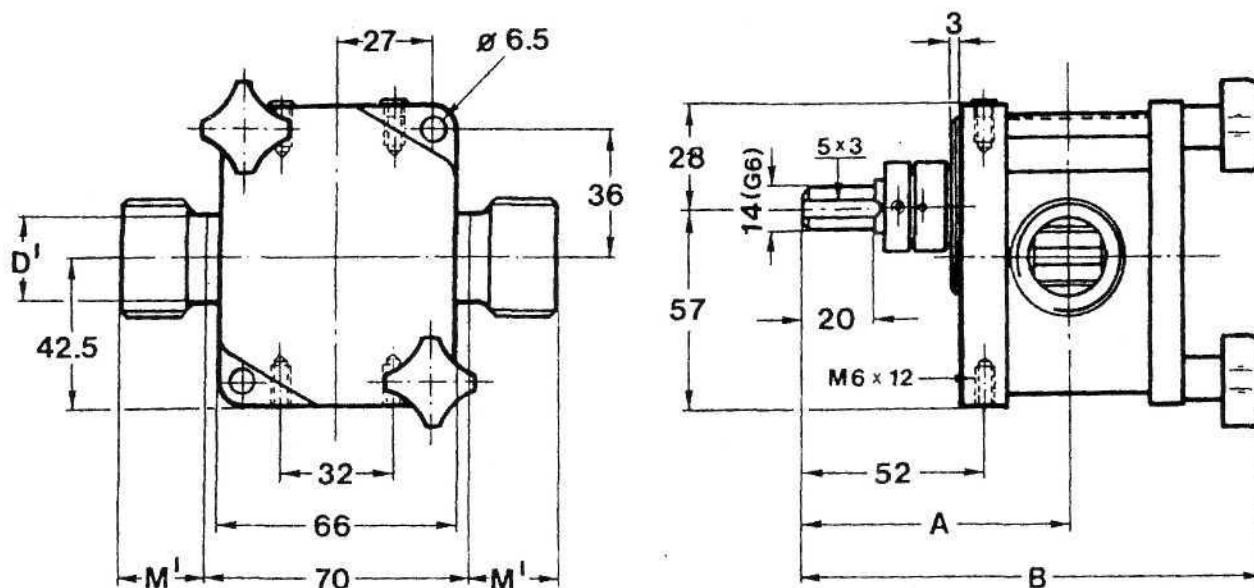
The pumps are of the positive displacement rotary type. The volume at the inlet increases when the gears rotate and the product is drawn into the pump. It is then transported in the space between the gears and the periphery of the body to the discharge side. The volume between the gears is reduced here and the product is forced out through the outlet.

The gears operate without metallic contact with the casing.



3.3 Pump Dimensions

Dimensions (mm)



Models	A	B
M2-000S	75.5	132
M2-000M	75.5	132
M2-000L	89	159

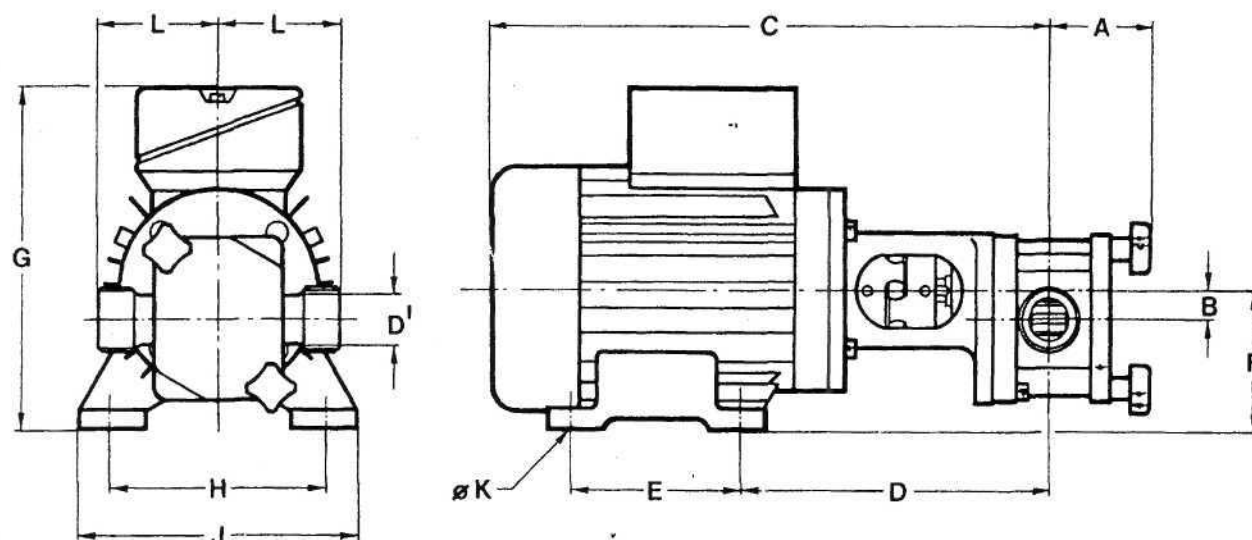
Port connections on all models

Size D'	ACME/BSP TAPER/NPT	Dimensions M' ISO/SMS/RJT/CLAMP/BSP	DIN	BSP FEMALE
25 (1")	25	27	30	-
13 (½")	-	-	-	20

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3.4 Pump and Drive Dimensions

Dimensions (mm)



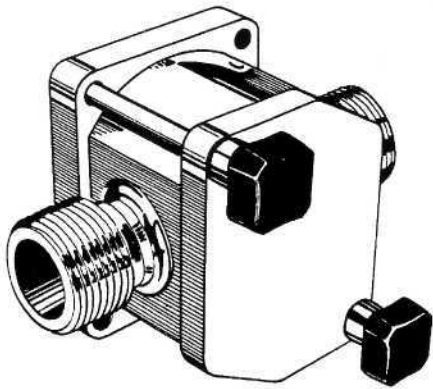
Pump head can be positioned at 90° intervals.

Models	A	B	Size 71 flange motor								Size 80 flange motor							
			C	D	E	F	G	H	J	K	C	D	E	F	G	H	J	K
M2-000S	57	14.7	292	161	90	71	175	112	138	8	335	176	100	80	191	125	168	10
M2-000M	57	14.7	292	161	90	71	175	112	138	8	335	176	100	80	191	125	168	10
M2-000L	67.5	14.7	303	172	90	71	175	112	138	8	346	187	100	80	191	125	168	10

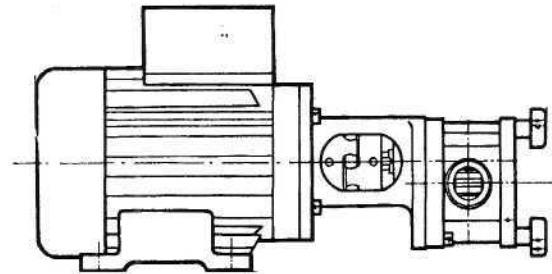
Port Connections

Size D'	ACME/BSP TAPER/NPT	Dimension L ISO/SMS/RJT/CLAMP/BSP	DIN	BSP FEMALE
25 (1")	60	62	65	-
13 (½")	-	-	-	55

3.5 Pump and Pump Unit Weights



BARESHAF T PUMP



**PUMP UNIT - PUMP COMPLETE WITH
DRIVE UNIT**

PUMP MODEL	BARESHAF T PUMP KG	MOTOR FRAME	PUMP WITH DRIVE UNIT KG
M2-000S	2.0	71	9.70
M2-000M	2.2		9.90
M2-000L	2.8		10.50
M2-000S	2.9	80	13.60
M2-000M	2.2		13.80
M2-000L	2.8		14.40

The above weights are for guidance only and will vary depending upon the specification of the pump and drive unit.

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3.6 Pump Displacement and Capacities

The following table details the pump capacities for the pump models. This figure will change depending upon speed, pressure, temperature and product being pumped.

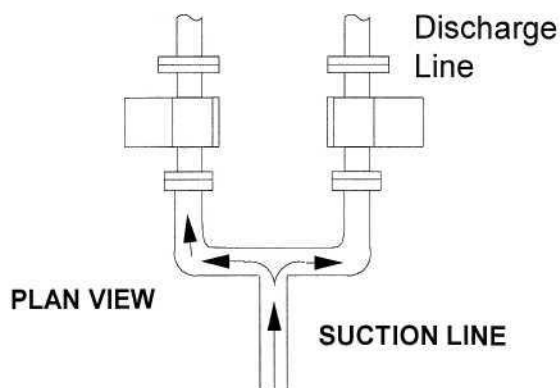
PUMP MODEL	SPEED (RPM)	DISPLACEMENT LITRES/HOUR (Product 65cst)
M2-000S	690	250
	900	325
	1360	485
M2-000M	690	400
	900	525
	1360	780
M2-000L	690	770
	900	1000
	1360	1500

4.0 System Design and Installation

4.1 System Design Advice

When designing the pumping system :-

- DO** - confirm with the supplier the Net Positive Suction Head (NPSH) requirements for the system, as this is crucial for ensuring the smooth operation of the pump and preventing cavitation.
- DO** - avoid suction lifts and manifold/common suction lines for two pumps running in parallel, as this may cause vibration or cavitation.



- DO** - protect the pump against blockage from hard solid objects e.g. nuts, bolts etc. Also protect the pump from accidental operation against a closed valve by using one of the following methods :- relief valves, pressure switch, current monitoring device.

- DO** - fit suction and discharge pressure gauges to monitor pressures for diagnostic purposes.
- DO** - install non-return valve to prevent turbining when high pressures are applied to the pump whilst it is not in use. Valves are also recommended if two pumps are to be used on manifold/common discharge lines.
- DO** - provide a hose cleaning facility to assist maintenance, ensuring the drive unit meets the specification for hose cleaning.
- DO NOT-** subject the pump to rapid temperature changes during C.I.P. (Cleaning in Place) procedures. **PUMP SEIZURE CAN RESULT FROM THERMAL SHOCK.** The differential pressure across the pump should be near zero when cleaning. A suitable by-pass is recommended.

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4.2 Pump and Base Foundations

Depending on your requirements the pump and drive (if supplied) may arrive mounted on a baseplate. Our standard baseplates have pre-drilled fixing holes to accept base retaining bolts.

To provide a permanent, rigid support for securing the pump unit a foundation is required, this will also absorb vibration, strain or shock on the pumping unit.

Foundation Size

The foundation should be approximately 150mm longer and wider than the mounting base of the unit. The depth of the foundation should be proportional to the size of the pump unit.

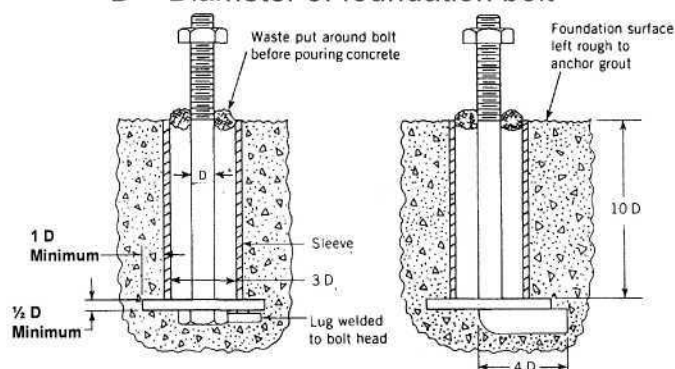
Bolt Location Dimensions

The location and sizes of the relevant bolting down holes can be provided on a certified drawing from your supplier.

Typical Foundation Bolts

The drawing below shows two methods for foundation bolt retaining. The sleeve allows for 'slight' lateral movement of the bolts after the foundation is poured. Use rag or paper to prevent the concrete from entering the sleeve while the foundation is poured. A minimum of 14 days is required to allow the airing of the concrete prior to operation.

D = Diameter of foundation bolt



4.3 Installation

Before the pump is installed it is advisable to consider the following:

Always - Ensure that the mounting surface is flat to avoid distortion of the pump and drive unit.

Always - Allow at least one metre for pump access/maintenance all around the pump.

Electrical Supply - Ensure that there is an adequate electrical supply close to the pump drive unit. This should be compatible with the electric motor selected.

4.4 Pipework

All pipework **MUST** be supported. The pump **MUST NOT** be allowed to support any of the pipework weight.

Remember - Pipework supports must also support the weight of the product being pumped.

Always :-

Have - Short straight suction lines to reduce friction losses in the pipework thereby improving the NPSH available.

Avoid - Bends, tees and any restraints close to either suction or discharge side of pump. Use long radius bends wherever possible.

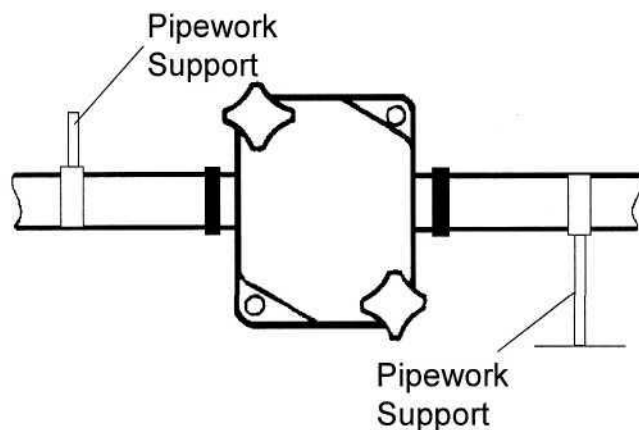
Provide - Isolating valves on each side of the pump to isolate the pump when necessary.

Keep -

Pipework horizontal where applicable to reduce air locks. Include eccentric reducers on suction lines.

Check -

Coupling alignment during installation to highlight pipework alignment/support problems.



5.0 Start Up, Shut Down and Cleaning in Place

5.1 Pump Start Up Check List

YES

NO

1. Has the pipework system been flushed through to purge welding slag and any other hard solids.
2. Have all the **obstructions** been removed from the pipework or pump?
3. Are the pump **connections** and pipework joints **tight** and **leak-free**?
4. Are the pipework **valves open**?
5. Are **all safety guards** in place?
6. Start then stop the pump, is the product **flowing** in the correct **direction**?
7. Are the pump **speed/pressure** settings below the pump maximum limitations?
8. Is the location of the **'stop'** button clear?

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ALL ANSWERS SHOULD BE YES BEFORE PROCEEDING

**IF THERE ARE ANY PUMPING PROBLEMS
REFER TO THE FAULT FINDING CHART**

5.2 Pump Shut Down Procedure

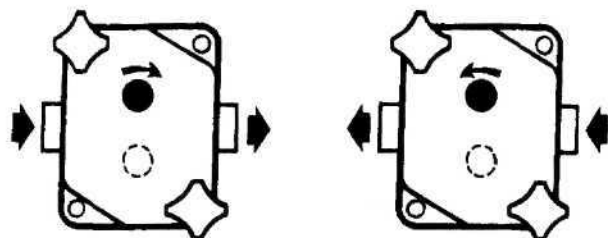
1. Turn the pump off.
2. Isolate the pump/drive unit from all power and control supplies.
3. Close the pipework valves to isolate the pump.
4. If the pump is to be dismantled refer to the dismantling section.

5.4 Cleaning

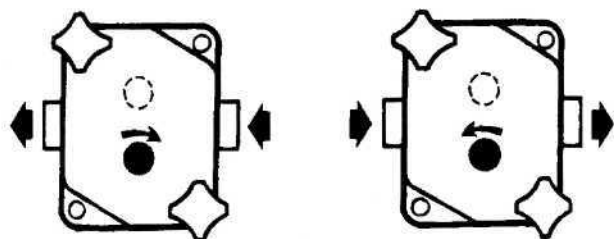
This pump is not used for C.I.P. (cleaning in place) and should be manually cleaned.

5.3 Direction of Rotation

The direction of flow is dictated by the direction of rotation of the drive shaft. Reversing the direction of rotation will reverse the flow direction. Top and bottom shaft drive pumps have opposite flow directions as illustrated.



TOP SHAFT DRIVE



BOTTOM SHAFT DRIVE

◄ ► = Direction of flow

Operating Manual

6.0 Maintenance and Inspection

6.1 Maintenance Schedule

It is advisable to install pressure gauges either side of pump so that any problems within the pump/pipework will be highlighted.

YOUR WEEKLY SCHEDULE SHOULD INCLUDE:

- CHECKING THE **MECHANICAL SEALS** FOR LEAKAGE AND REPLACING AS NECESSARY.
- CHECK **PUMPING PRESSURES**.
- CHECK THE **RUBBER JOINTS**. IF THESE DO NOT SEAL IT MAY BE THAT THE ELASTOMER IS INCOMPATIBLE WITH THE PRODUCT CAUSING SWELLING OF THE 'O' RING. CHANGE THE 'O' RING MATERIAL.

6.2 Recommended Spare Parts

The following table details the recommended spare parts which should be retained within your maintenance stock.

Part Description	Quantity
Gear/Shaft Assembly	2
Bush	2
Joint Ring	2
Product Seals	2

7.0 Disassembly

7.1 Before Dismantling the Pump

Before starting to dismantle the pump

ALWAYS:-



Isolate -

pump/drive unit from all power and control supplies.



Close -

pipework valves to isolate the pump



Purge -

the pump and system if any noxious products have been pumped.



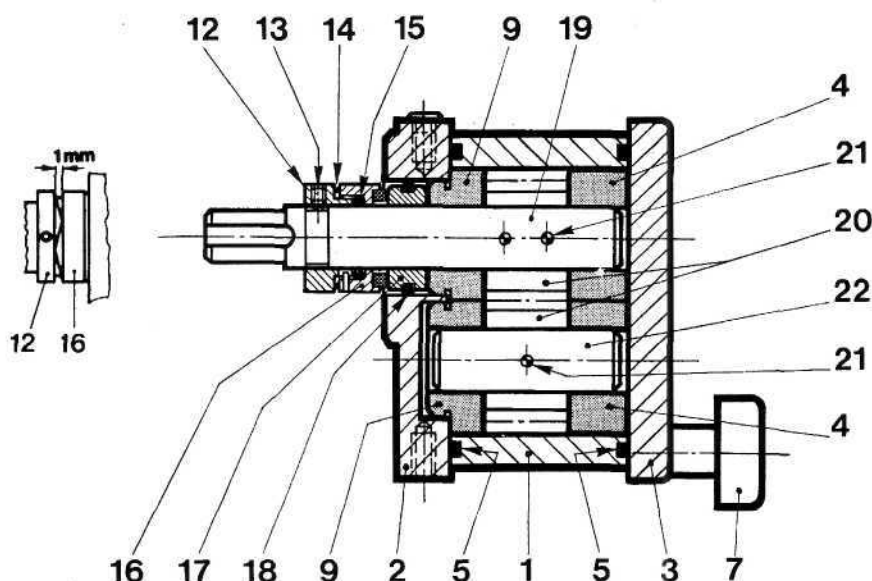
Disconnect -

the pump from the drive unit.

**READ THIS SECTION FIRST BEFORE
CONTINUING TO DISMANTLE THE PUMP**

Operating Manual

7.2 Dismantling the Pump



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Body	13	Screw
2	Back plate	14	Wave Spring
3	Cover	15	O-ring - EPDM
4	Bush - front	16	Rotary seal ring
5	Joint ring - EPDM	17	Static seat
6	Stud	18	O-ring - EPDM
7	Nut - quick release	19	Drive shaft/stainless gear
8	Plug (not shown)	20	Gear - stainless steel
9	Bush - rear	21	Pin
12	Spring retainer	22	Lay shaft

Dismantling Pump - All Models

(See back page for fold out drawing).

1. Disconnect the pipe connections from body (1).
2. Release coupling on drive shaft (19).
3. Unscrew hand nuts (7) and remove front cover (3). **Do not lever off!**
4. Remove body (1) together with 'O'-rings (5) at back and front.
NOTE : Front bushes (4) may stay in the body. These may be pushed out by hand.
5. Remove lay shaft (22) with gear (20).
6. Remove the drive shaft assembly complete with rear bush (9), gear (20) and the seal assembly.
7. Remove lay shaft rear bush 9 from back plate (2).
8. Loosen seal retaining screws (13) and remove the seal assembly and rear bush (9) from the drive shaft.
9. Remove the drive shaft 19.
NOTE : The back plate (2) can remain fixed to the motor (or other mounting) whilst the dismantling is carried out.

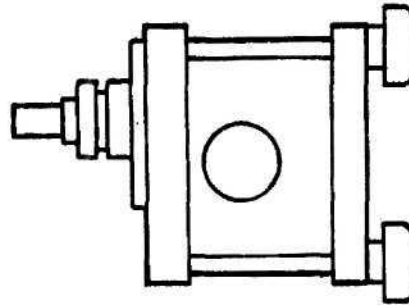
8.0 Assembly

8.1 Assembling the Pump

(See back page for fold out drawing)

1. Assemble drive shaft assembly
 - a) Slide rear bush (9) onto the shaft with the smaller diameter away from the gear face.
 - b) Fit 'O' ring (18) onto stationary seal ring (17).
 - c) Slide stationary seal ring (17) onto the shaft. Make sure that the dogs on the seal ring fit into the slots in rear bush (9).
 - d) Fit 'O' ring (15) in the rotary seal ring (16).
 - e) Slide rotary seal ring (16) onto spring retainer (12).
 - f) Fit wave spring (14) onto spring retainer (12).
 - g) Slide spring retainer (12) onto the shaft and compress. There should be a gap of approximately 1 mm (0.039") between rotary seal ring (16) and spring retainer (12).
 - h) Tighten retaining screws (13) in the grooves on the shaft.
2. Fit one rear bush (9) into the blind bore in back plate (2), with the flat side on centre line between the bores.
3. Press, by hand, the drive shaft assembly into (through) the bore in back plate (2). Make sure that the flats on bushes (9) mate.
4. Slide lay shaft (22), with gear, into position in back plate (2). Both ends of the shaft are identical.

5. Fit 'O' rings (5) to both ends of body (1).
6. Slide body (1) over the gears and locate it on the rear bushes.
NOTE : The connections are not in the centre of the body. See below.



7. Fit the front bushes (4) onto the shafts. Make sure that the flats mate.
8. Fit front cover (3) and tighten evenly with hand nuts (7). **Do not overtighten.**
9. Rotate the drive shaft to check for free rotation (using the coupling 30).
10. Fit coupling half (30) to the drive shaft.

9.0 Faults, Causes and Remedies

No Discharge	Under Capacity	Irregular Discharge	Prime lost after starting	Pump stalls when starting	Pump overheats	Motor overheats	Excessive power absorbed	Noise & vibration	Pump element wear	Excessive gland seal wear	Product loss through gland	Seizure	CAUSES	REMEDIES
*													1	Reverse motor.
*													2	Expel gas from supply line and pumping chamber and introduce liquid.
*	*	*	*					*					3	Increase supply line diameter. Increase suction head. Simplify supply line configuration and reduce length. Reduce speed.
	*	*	*					*					4	Decrease product temperature - check effect of increased viscosity on available and permitted power inputs.
*	*	*	*					*					5	Remake pipework joints. Adjust or repack gland.
	*	*	*					*					6	Expel gas from supply line and pumping chamber and introduce liquid.
*	*	*	*					*					7	Raise product level. Lower outlet position. Increase submergence of supply line.
								*					8	Service fittings.
	*	*	*			*	*	*					9	Decrease pump speed. Increase product temperature.
	*	*	*					*					10	Increase pump speed. Decrease product temperature.
					*			*				*	11	Cool the product pumping chamber.
				*		*	*	*					12	Heat the product pumping chamber. (Check with pump maker).
			*	*		*	*	*				*	13	Clean the system. Fit strainer to supply line.
	*	*	*	*		*	*	*				*	14	Check for obstructions. Service system and revise to prevent problem recurring. Simplify delivery line.
					*	*	*	*				*	15	Slacken and re-adjust gland.
	*	*	*					*					16	Adjust gland. See not on packed glands under "Installation and Maintenance" heading.
								*				*	17	Check that fluid flows freely into gland. Increase flow rate.
	*	*	*			*	*	*					18	Decrease pump speed.
						*	*	*				*	19	Increase pump speed.
	*	*	*			*	*	*				*	20	Check alignment of pipes. Fit flexible pipes or expansion fittings. Support pipework.
					*	*	*	*					21	Re-tension to maker's recommendations.
					*	*	*	*				*	22	Check flange alignment and adjust mountings accordingly.
					*	*	*	*				*	23	Fit lock washers to slack fasteners and re-tighten.
				*		*	*	*				*	24	Refer to pump maker for advice and replacement parts.
					*	*	*	*				*	25	Refer to pump maker for advice and replacement parts.
				*		*	*	*				*	26	Refer to pump maker's instructions.
*	*	*	*			*	*	*				*	27	Check rated and duty pressures. Refer to pump maker.
	*	*	*		*			*					28	Fit new components.
	*	*	*			*	*	*				*	29	Check pressure setting and re-adjust if necessary. Examine and clean sealing surfaces. Replace worn parts.
	*	*	*					*				*	30	Check for wear sealing surfaces, guides etc. replace as necessary.
								*				*	31	Re-adjust spring compression. Valve should lift about 10% above duty pressure.

DIAGNOSIS WILL BE GREATLY ASSISTED BY TAKING ON-STREAM PRESSURE READINGS AT THE PUMP'S INLET AND OUTLET PORTS

10.0 Technical Data

10.1 Pump Information Chart

The following table details technical data regarding the pump range, for further details contact your supplier.

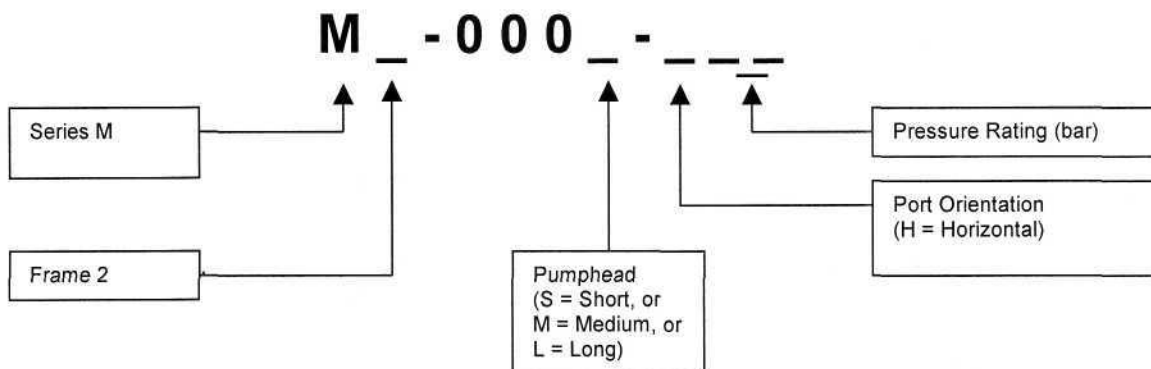
Performance

(At 65 CsT) (Maximum 50,000 cSt, contact supplier for maximum speed recommendations).

		O BAR			2 BAR			4 BAR			6 BAR			7 BAR		
MODEL	RPM	L/H	kW	MOTOR FRAME	L/H	kW	MOTOR FRAME	L/H	kW	MOTOR FRAME	L/H	kW	MOTOR FRAME	L/H	kW	MOTOR FRAME
M2-000S	690	250	0.12	71	225	0.12	71	195	0.12	71	160	0.12	71	145	0.12	71
	900	325	0.18	71	295	0.18	71	255	0.18	71	210	0.18	71	190	0.25	71
	1360	485	0.25	71	440	0.25	71	380	0.25	71						
M2-000M	690	400	0.12	71	390	0.12	71	370	0.12	71	358	0.18	80	345	0.18	80
	900	525	0.18	71	515	0.18	71	490	0.18	71	470	0.25	71	455	0.25	71
	1360	780	0.25	71	770	0.25	71	735	0.25	71						
M2-000L	690	770	0.12	71	735	0.12	71	690	0.18	80						
	900	1000	0.18	71	960	0.18	71	900	0.25	71						
	1360	1500	0.25	71	1440	0.25	71									

Suitable for mounting to foot/Flange 'C' motor.
Intermediate speeds available.

10.2 Designation System



Operating Manual

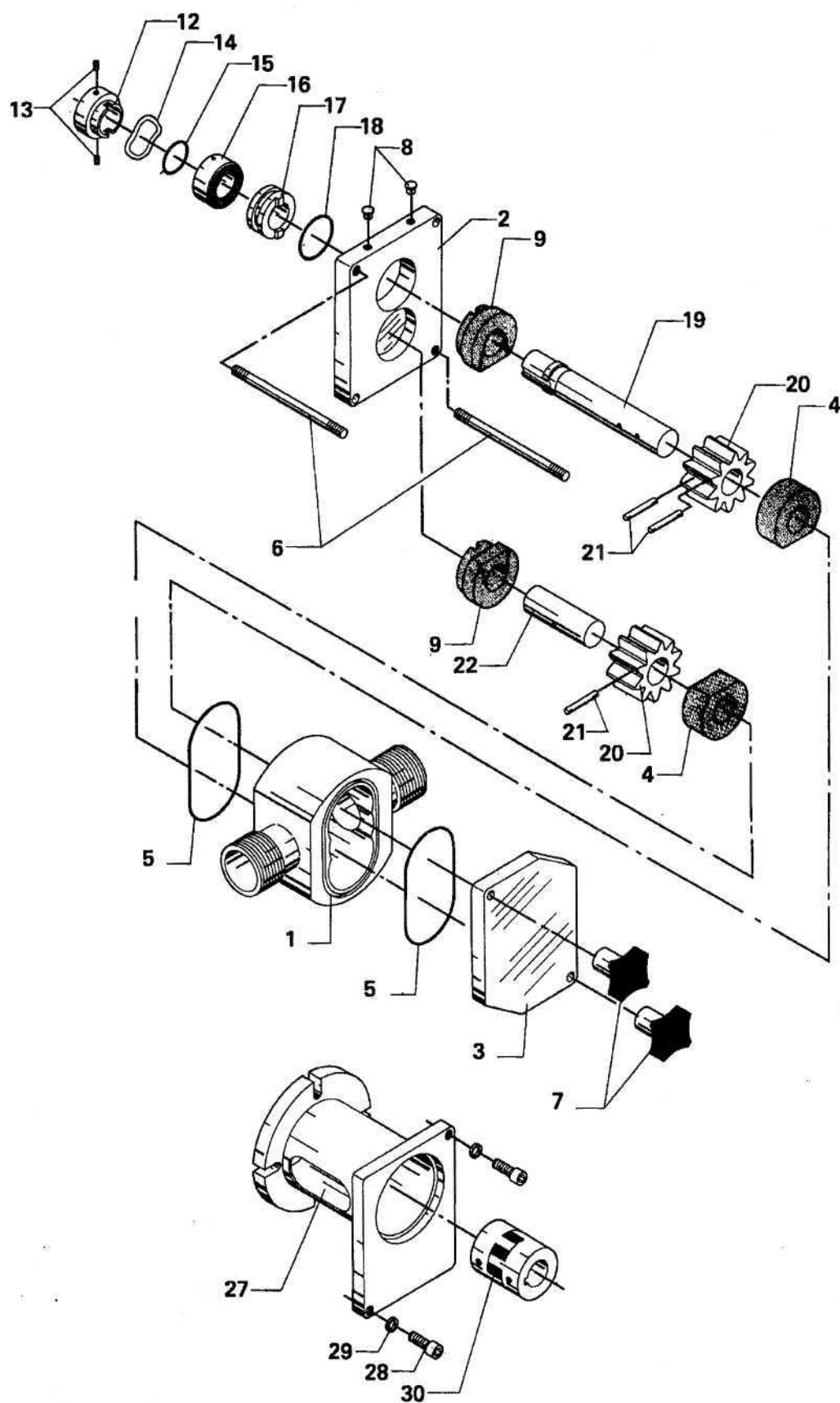
11.0 Exploded Pump Drawing and Parts List

11.1 Pumps M2

Pos	Qty*	Denomination	M2-000S	M2-000M	M2-000L
Standard Parts					
1	1	Body	On Application	On Application	On Application
2	1	Back plate	31499-0678-1	31499-0678-1	31499-0678-1
3	1	Cover	31499-0621-1	31499-0621-1	31499-0621-1
4	2	Bush - front	31499-0625-1	31499-0626-1	31499-0625-1
5	2	Joint ring - EPDM	1555-141	1555-141	1555-141
6	2	Stud	31499-5605-1	31499-5605-1	31499-5606-1
7	2	Nut - quick release	31490-0216-3	31490-0216-3	31490-0216-3
8	2	Plug	31499-5904-4	31499-5904-4	31499-5904-4
9	2	Bush - rear	31499-0627-1	31499-0628-1	31499-0627-1
12	1	Spring retainer	31499-0042-1	31499-0042-1	31499-0042-1
13	2	Screw	6010-001	6010-001	6010-001
	1	Shaft seal assy - EPDM (Pos14 to 18)	31499-0037-5	31499-0037-5	31499-0037-5
14	1	Wave spring	31499-0043-1	31499-0043-1	31499-0043-1
15	1	O-ring - EPDM	1555-113	1555-113	1555-113
16	1	Rotary seal ring - carbon	31499-0045-2	31499-0045-2	31499-0045-2
17	1	Static seat - stainless steel	31499-0637-5	31499-0637-5	31499-0637-5
18	1	O-ring - EPDM	1555-118	1555-118	1555-118
	1	Drive shaft/stainless gear assy 60 degC (pos 19 to 21)	31499-0673-2	31499-0674-2	31499-0675-2
	1	Drive shaft/stainless gear assy 100 degC (pos 19 to 21)	31499-0673-8	31499-0674-8	31499-0675-8
	1	Lay shaft/stainless gear assy 60 degC (pos 20 to 22)	31499-0634-2	31499-0028-2	31499-0635-2
	1	Lay shaft/stainless gear assy 100 degC (pos 20 to 22)	31499-0634-8	31499-0028-8	31499-0635-8
Optional Parts					
5	2	Joint ring - Nitrile	1550-141	1550-141	1550-141
	2	Joint ring - Viton	1551-141	1551-141	1551-141
	1	Shaft seal assy - Nitrile (pos 14 to 18)	31499-0037-1	31499-0037-1	31499-0037-1
	1	Shaft seal assy - Viton	31499-0037-2	31499-0037-2	31499-0037-2
	1	Shaft seal assy sil. carbide - EPDM	31499-0871-5	31499-0871-5	31499-0871-5
	1	Shaft seal assy sil. carbide - Nitrile	31499-0871-1	31499-0871-1	31499-0871-1
	1	Shaft seal assy sil. carbide - Viton	31499-0871-2	31499-0871-2	31499-0871-2
15	1	O-ring - Nitrile	1550-113	1550-113	1550-113
	1	O-ring - Viton	1551-113	1551-113	1551-113
16	1	Rotary seat sil. carbide	31499-0045-4	31499-0045-4	31499-0045-4
17	1	Static seat sil. carbide	31499-0637-3	31499-0637-3	31499-0637-3
18	1	O-ring - Nitrile	1550-118	1550-118	1550-118
	1	O-ring - Viton	1551-118	1551-118	1551-118
27	1	Flange bracket - D71	J31499-0660-1	J31499-0660-1	J31499-0660-1
	1	Flange bracket - D80	J31499-0661-1	J31499-0661-1	J31499-0661-1
28	2	Screw	5990-011	5990-011	5990-011
29	2	Washer	6400-046	6400-046	6400-046
30	1	Coupling assy - D71	K31499-0662-1	K31499-0662-1	K31499-0662-1
	1	Coupling assy - D80	K31499-0663-1	K31499-0663-1	K31499-0663-1

*Quantity per pump

Recommended spare parts : Shaft seal assy (pos 14 to 18) and pos 4, 5, 9 and 13



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