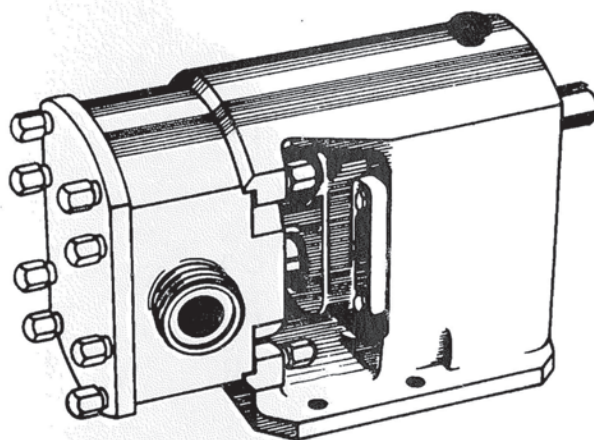


INSTRUCTION
MANUAL

ROTARY LOBE PUMPS GHP RANGE 600



IM 70709-US1 S
9607

G&H RESERVES THE RIGHT
TO MINOR CHANGES IN
DESIGN AND FUNCTION

Introduction

Thank you for purchasing a G&H product.

This manual has been provided to instruct you how to operate and service this product correctly and safely. Be sure to follow all directions and instructions; failure to do so could result in personal injury or equipment damage.

This manual should be considered part of this product and should remain with it at all times for reference. (If you sell it, please be sure to include this manual with it).

Warranty is provided as part of G&H Products Corp.'s commitment to our customers who operate and maintain their equipment as this manual dictates. Failure to do so may result in loss of warranty.

Where defects appear on the product during the warranty period, G&H Products Corp. will back the product and correct the problem. Should the equipment be modified or not kept in the manner prescribed within this manual, the warranty will become null and void.

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Contents

1.0 General	Page No
1.1 Pump Limits of Application or Use	1
1.2 Duty Conditions	1
1.3 Noise Levels	1
1.4 Utility Requirements	1
1.5 Safety Precautions	2
1.6 Health and Safety Information	3
 2.0 Unpacking, Handling and Storage	
2.1 Documents	4
2.2 Unpacking	4
2.3 Handling	4
2.4 Pump Storage	5
 3.0 Description of Pump or Pump Unit	
3.1 General Pump Description	6
3.2 Principle of Operation	6
3.3 Pressure Relief Valve	7
3.4 Pump Dimensions	8
3.5 Pump Equipment Dimensions	9
3.6 Pump and Pump Unit Weights	10
3.7 Pump Displacement and Capacities	11
 4.0 System Design and Installation	
4.1 System Design Advice	12
4.2 Pump and Base Foundations	13
4.3 Installation	13
4.4 Coupling Misalignment	14
4.5 Pulley Belt Tension Adjustment	15
4.6 Pipework	16
 5.0 Commissioning	
5.1 Recommended Lubricants	17
5.2 Lubricating the Pump	17
5.3 Flushed Seal Arrangements	18
5.4 Connecting the Flush	18
5.5 Flushing Pipework Layout	19
5.6 Flushed Seal Housing Connections	20
5.7 Flushing Fluid	20
5.8 Flushing Pressure and Flow Rate	20



Contents

Page No

5.9	Adjusting the Relief Valve	21
5.10	Relief Valve Air Operation	22
5.11	Checking the Air Operation of the Relief Valve	23
5.12	Steam Jackets and Saddles	24
6.0	Start up, Shut Down and Cleaning in Place	
6.1	Start up Checklist	25
6.2	Pump Shut Down Procedure	26
6.3	Direction of Rotation	26
6.4	Cleaning in Place (CIP)	27
7.0	Maintenance and Inspection	
7.1	Maintenance and Schedule	28
7.2	Recommended Spare Parts	28
7.3	Maintenance Tools	28
8.0	Disassembly	
8.1	Before Disassembling the Pump	29
8.2	Disassembly of Pump Head and Replacing Shaft Seals	30
8.3	Front Oil Seals	31
8.4	Assembly of Shaft Seals	31
8.5	Tape Bearings - 'X' Models	32
8.6	Disassembly of Gear Housing Assembly	33
8.7	Disassembly of Cartridge Assembly	34
9.0	Assembly	
9.1	Re-assembly of Cartridge Assembly	35
9.2	Re-assembly of Gear Housing Assembly	37
9.3	Adjustment of Stainless Steel Multilobe Rotor Clearances	38
9.4	Adjustment of Stainless Steel Trilobe Rotor Clearances	39
10.0	Pinned and Flushed Externally Mounted Mechanical Seal	
10.1	Flushed Mechanical Seal	40
10.2	Disassembly and Assembly	40
10.3	Flushed Mechanical Seal Parts List	41
10.4	Pinned Mechanical Seal Parts List	42



Contents

	Page No
11.0 Faults, Causes and Remedies	43
12.0 Technical Data	
12.1 Pump Information	44
12.2 Designation System	44
12.3 Torque Specification Chart	45
13.0 Exploded Pump Drawing and Parts List	46
Information	49
1. Notes	49
2. User feedback	



1.0 General

1.1 Pump Limits of Application or Use

This range of pumps has been designed for pumping a variety of media, homogeneous liquids and liquids with particles, and solids in suspension.

Pressures of up to 94 PSI, speeds to 1000rpm and temperatures to 302°F can be obtained on this range of pumps depending on type/size. These conditions cannot always be obtained simultaneously. The pump model/size will be shown on the nameplate positioned on the pump.

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 size, serial number and system details (e.g. product, pressure, flow rate).

Important :- Where the application requires the pump should be side mounted to ensure self draining e.g. food media. This must be requested at the time of order, as the pump build specification will change.

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 condition 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 :- 85 dB(A) :
(Ref 20µ Pa)

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.

Water Supply :-

Additional water supplies may be required if the pump is fitted with a product seal flushing arrangement. Consult your supplier for flush fluids compatible with products pumped.

Steam Supply :-

A supply of steam will be required if heating saddles and jackets are fitted.



Rotary Lobe Pumps - GHP Range

1.5 Safety Precautions

All warnings in this manual are summarized 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 authorized 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 sterilizing.



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



: **Never** run the pump with 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.

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, they may need it to comply with Health and Safety, and OSHA 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

MATERIAL	USE	MAJOR HAZARD
SILICON SEALANT	GEARBOX SEAL RETAINERS, REAR COVER, GENERAL SEALANT.	RELEASES VAPOUR AT ROOM TEMPERATURE.
LIQUID GASKET SEALANT	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 GUARD. PVC - GLAND GUARDS.	RELEASES FUMES WHEN HEATED.
ELASTOMERIC COMPOUNDS (EP, FLUORINATED RUBBER (FPM), 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.

2.0 Unpacking, Handling and Storage

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

2.1 Documents

1. Check the packing list 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

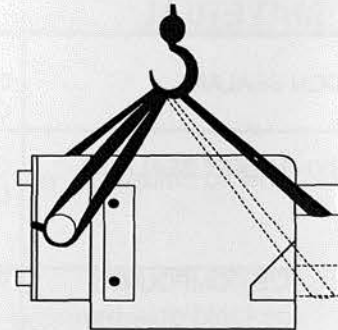
Refer to the pump weights guide, prior to using any lifting gear. Use the correct lifting straps for the pump weight (or pump and drive if applicable).

The following details show how the pump should be lifted .

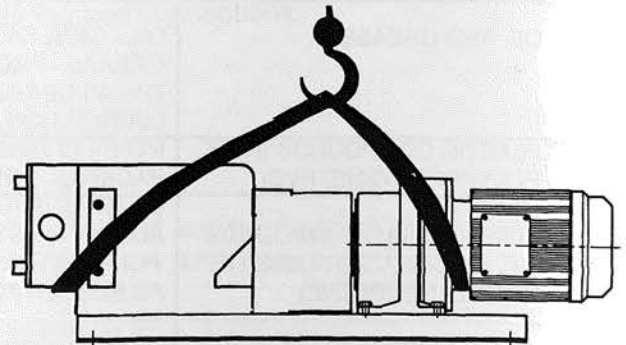
Bareshaft Pump - The slings should be wrapped around the ports across the front of the pump and the drive shaft.

Pump with Drive Unit - The slings should be positioned around the pump rotorcase and under the motor.

Note : To stop the slings slipping, always cross the slings on the lifting hook.



BARESHAF PUMP



PUMP WITH DRIVE UNIT

2.4 Pump Storage

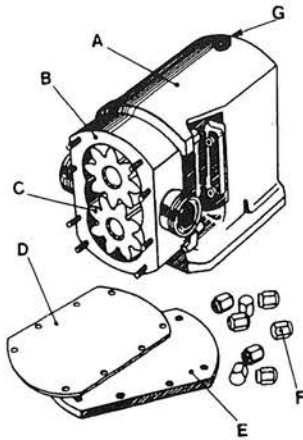
After receipt and inspection if the pump is not to be installed immediately the pump should be repacked and placed in suitable storage. The following points should be noted:-

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.

3.0 Description of Pump or Pump Unit

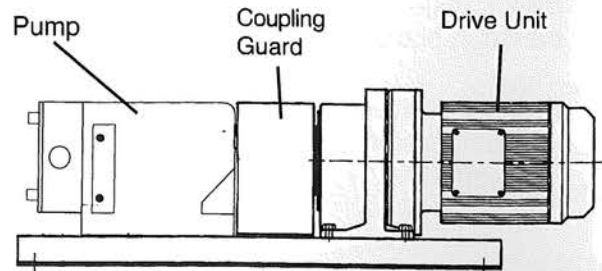
3.1 General Pump Description

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 - Gear Housing
- B - Rotor case
- C - Rotors
- D - PTFE (Teflon) cover joint
- E - Front cover (std)
- F - Dome nuts
- G - Oil filler plug

BARESHAFT PUMPS

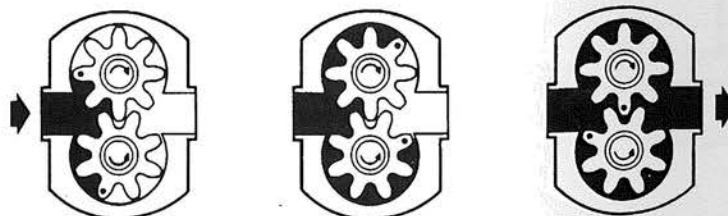


Pump with Drive Unit

3.2 Principle of Operation

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.

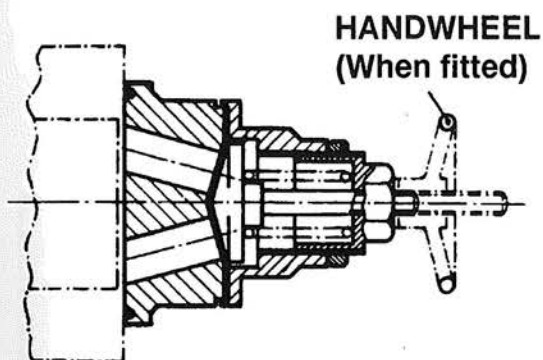


3.3 Pressure Relief Valves

Internal Pressure Relief Valve

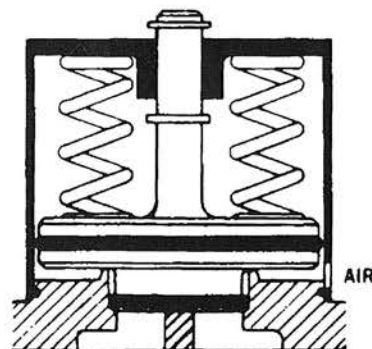
A relief valve, built into the front cover, is available. It can be used regardless of the direction of rotation.

A relief valve with an extended stem is available. It has a handwheel for manual lifting of the valve head. Rotate the handwheel clockwise for opening.



Piston Pressure Relief Valve

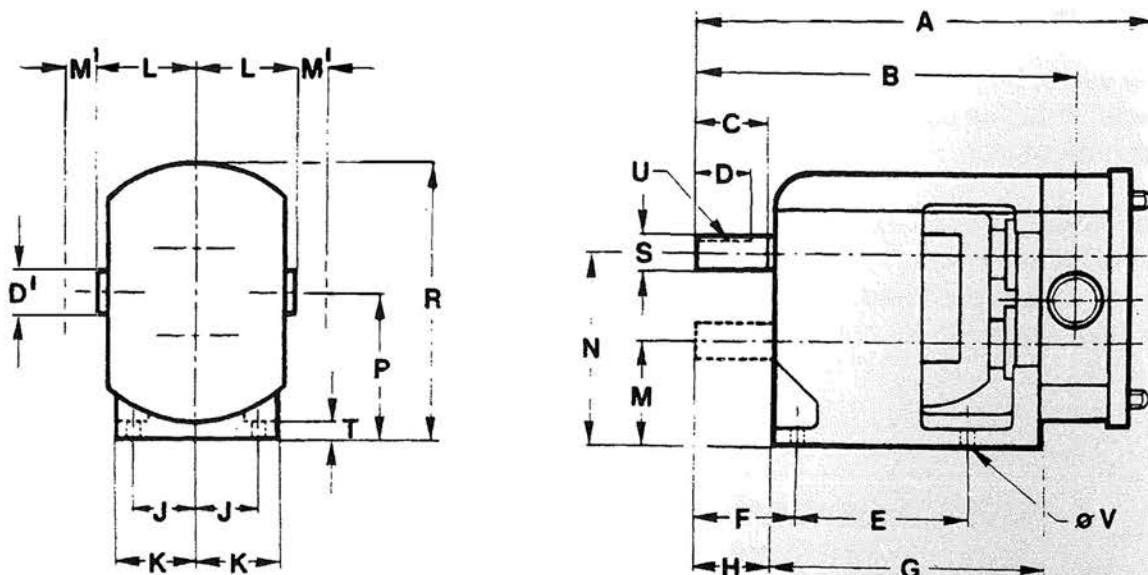
The piston relief valve is also available for fitting to the pump. See below.



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3.4 Pump Dimensions



Dimensions INCH

MODELS	DIA INCH (MM)	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S (mm)	T (mm)	U (mm)	V
601	1" (25)	10 ⁷ / ₁₆	8 ¹⁵ / ₃₂	1 ³ / ₈	1	1 ¹⁵ / ₁₆	4 ¹ / ₈	6 ¹ / ₄	1 ¹ / ₂	2 ¹ / ₁₆	2 ³ / ₄	2 ¹ / ₈	2 ³ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	6 ¹¹ / ₁₆	20	3 ³ / ₈	6 x 3.5	3 ³ / ₈
601X	1" (25)	10 ⁵ / ₈	8 ¹⁵ / ₃₂	1 ³ / ₈	1	1 ¹⁵ / ₁₆	4 ¹ / ₈	6 ¹ / ₄	1 ¹ / ₂	2 ¹ / ₁₆	2 ³ / ₄	2 ¹ / ₈	2 ³ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	6 ¹¹ / ₁₆	20	3 ³ / ₈	6 x 3.5	3 ³ / ₈
610	1" (25)	11 ¹ / ₃₂	8 ²³ / ₃₂	1 ³ / ₈	1	1 ¹⁵ / ₁₆	4 ¹ / ₈	6 ¹ / ₄	1 ¹ / ₂	2 ¹ / ₁₆	2 ³ / ₄	2 ¹ / ₈	2 ³ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	6 ¹¹ / ₁₆	20	3 ³ / ₈	6 x 3.5	3 ³ / ₈
610X	1" (25)	11 ⁷ / ₃₂	8 ²³ / ₃₂	1 ³ / ₈	1	1 ¹⁵ / ₁₆	4 ¹ / ₈	6 ¹ / ₄	1 ¹ / ₂	2 ¹ / ₁₆	2 ³ / ₄	2 ¹ / ₈	2 ³ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	6 ¹¹ / ₁₆	20	3 ³ / ₈	6 x 3.5	3 ³ / ₈
615	1 1/2" (38)	11 ¹ / ₃₂	8 ²³ / ₃₂	1 ³ / ₈	1 1/2	1 ¹⁵ / ₁₆	4 ¹ / ₈	6 ¹ / ₄	1 1/2	2 ¹ / ₁₆	2 ³ / ₄	2 ¹ / ₈	2 ³ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	6 ¹¹ / ₁₆	20	3 ³ / ₈	6 x 3.5	3 ³ / ₈
615X	1 1/2" (38)	11 ⁷ / ₃₂	8 ²³ / ₃₂	1 ³ / ₈	1 1/2	1 ¹⁵ / ₁₆	4 ¹ / ₈	6 ¹ / ₄	1 1/2	2 ¹ / ₁₆	2 ³ / ₄	2 ¹ / ₈	2 ³ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	6 ¹¹ / ₁₆	20	3 ³ / ₈	6 x 3.5	3 ³ / ₈

Port Connections

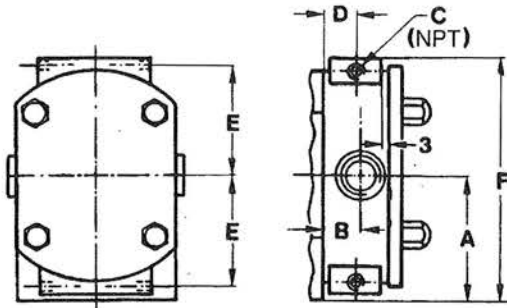
SIZE D'	MODELS	RJT/SMS/ACME/NPT	ISO MALE	DIN 11851	NPT TAPER	DIMENSION M' FLANGED
25 (1")	601	1	7/8	1 3/16	2	2 7/16
	610	1	7/8	1 3/16	2	2 7/16
38 (1 1/2)	615	1	7/8	1 3/16	2	2 7/16

The above dimensions are for guidance and should not be used for installation purposes. Certified dimensions are available upon request.

3.5 Pump Equipment Dimensions

Heating saddle

Available on all models and on pumps fitted with relief valves.

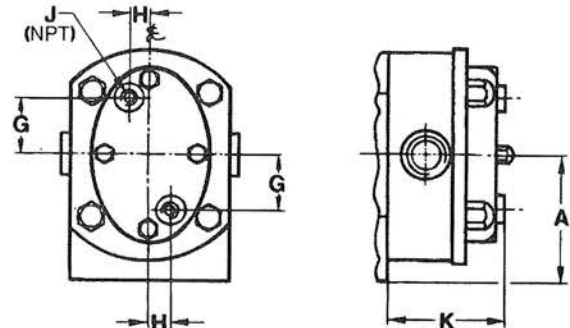


Max pressure 55 PSI

Dim (inch)	Models	
	600	610
A	3 1/4	3 1/4
B	7/8	1 5/16
C	1/8	1/8
D	1 1/8	1 7/16
E	2 3/4	2 3/4
F	6 1/2	6 1/2

Heating Jacket

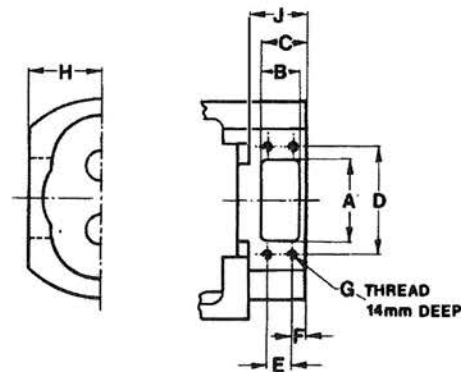
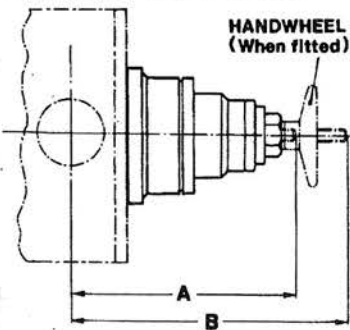
Available on standard models excluding 'X' types and pumps fitted with relief valves.



Max pressure 55 PSI

Dim (inch)	Models	
	600	610
A	3 1/4	3 1/4
G	1 5/8	1 5/8
H	on cl	on cl
J NPT	1/4	1/4
K	2 3/8	2 15/16

Pressure Relief Valve

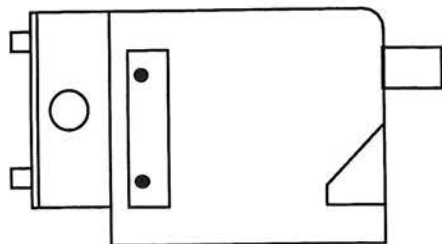


Note : The piston relief valve increases the pump length by approx 100mm.

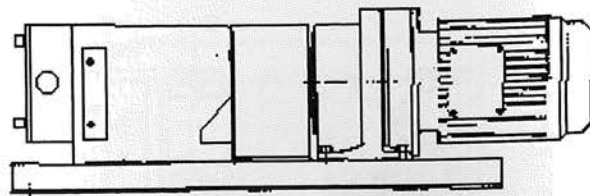
Models	Dim (inch)	
	A	B
600	5 5/16	6 1/2
600X	4 3/4	5 7/8
610	6 1/8	7 1/4
610X	5 1/2	6 5/8

Model	Dim (inch)								
	A	B	C	D	E	F	G	H	J
600	2 ³ / ₁₆	³ / ₄	1 ¹ / ₄	3	1	³ / ₈	M6	1 ¹⁵ / ₁₆	³ / ₄
601	2 ¹³ / ₁₆	1 ¹ / ₈	1 ¹ / ₂	3 ¹ / ₂	1 ⁵ / ₁₆	⁵ / ₁₆	M6	1 ¹⁵ / ₁₆	1 ¹ / ₈

3.6 Pump and Pump Unit Weights



BARESHAF PUMP



PUMP UNIT - PUMP COMPLETE WITH DRIVE UNIT

PUMP MODEL	BARESHAF PUMP lbs	PUMP WITH DRIVE UNIT lbs
600	27	137
600X	29	139
610	31	141
610X	33	143

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



3.7 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.

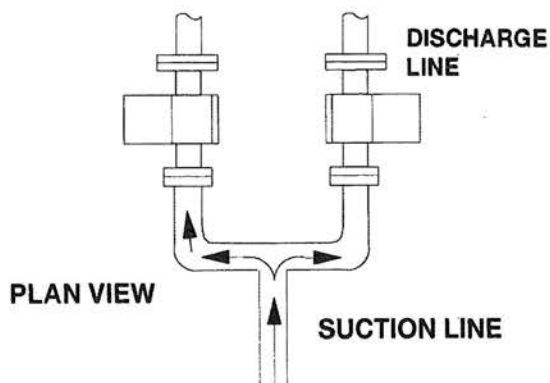
PUMP MODEL	DISPLACEMENT GAL/100 REV.	MAXIMUM SPEED (RPM)	MAXIMUM CAPACITY AT MAXIMUM SPEED GPM
600	1.06	1000	47
600X	1.06	1000	47
610	1.85	1000	82
610X	1.85	1000	82
600T	1.41	1000	103.4
610T	2.12	1000	155.75

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 turbinning 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** - make the necessary piping arrangements if flushing is required for the seal or if steam is required for heating jackets.
- 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.

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 (pump complete with drive and baseplate). For example, a large pump unit foundation depth should be at least 20 times the diameter of the foundation bolts.

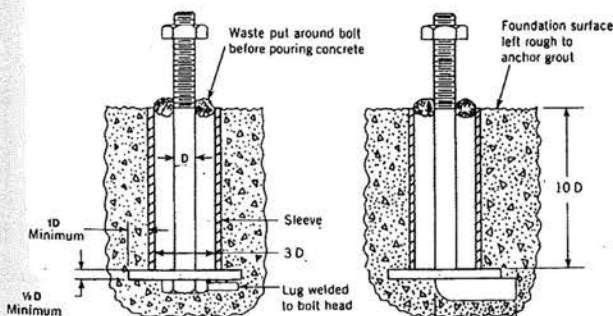
Bolt Location Dimensions

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

Typical Foundation

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 curing of the concrete prior to operation.

D = Diameter of foundation bolt

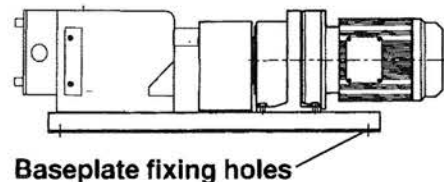


4.3 Installation

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 baseplate. This will cause pump/motor shaft misalignment and pump/motor unit damage.

CHECK - pump shaft to motor shaft alignment once the baseplate has been secured and adjusted as necessary.



NOTE : Always allow at least one metre for pump access/maintenance all around the pump.

WEIGHT - Consider the weight of the pump, drive and lifting gear requirements.

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.



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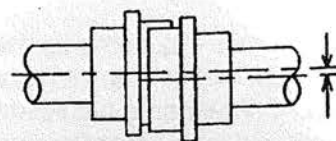
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4.4 Coupling Misalignment

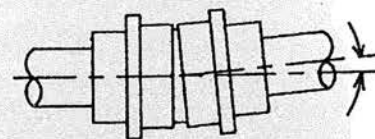
When installing the pump and drive unit, it is **essential** to ensure that the coupling is **not** twisted during installation. The main cause of misalignment is by fitting the baseplate to an uneven surface.

Check the maximum angular and parallel allowable misalignments for the couplings before operating the pump.

PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT



COUPLING TYPE	RECOMMENDED MAXIMUM PARALLEL MISALIGNMENT		MAXIMUM ANGULAR MISALIGNMENT
	SIZE	MM	DEGREES
DAVID BROWN NYLICON FLEXIBLE	1	0.2	$\pm 1.5^\circ$ (PER GEAR IN MESH)
	2	0.3	
	3	0.4	
WILLIAM KENYON FLEXILOK	FL63	0.25	0.75°
	FL80		
	FL112	0.3	1.0°
	FL125	0.4	
	FL160	0.5	
FENAFLEX FLEXIBLE TYRES	F40	1.1	4°
	F50	1.3	
	F60	1.6	
	F70	1.9	
	F80	2.1	
	F90	2.4	

NOTE : The above table indicates the common coupling types used on the pump ranges. Details for other coupling types will be available on request.

4.5 Pulley Belt Tension Adjustment

An incorrectly tensioned belt will cause belt slip and short belt life. **An excessively tensioned belt will overload both belts and bearings.** ALWAYS USE A BELT TENSION GAUGE FOR SETTING UP.

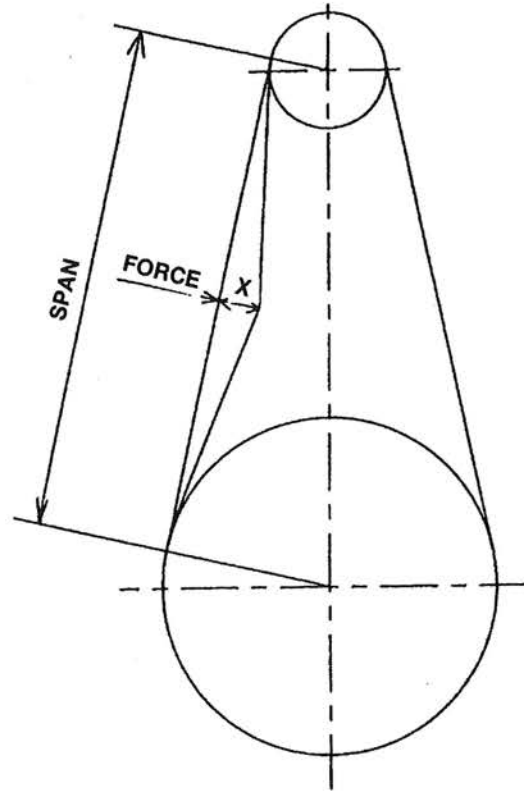
ISOLATE the drive unit and pump from all power and control supplies before attempting to work on adjusting the belts.

1. Measure the span length.
2. Calculate the required deflection: ('x')
100mm span length = 1mm deflection
therefore :
400mm span length = 4mm deflection
3. Refer to the table for recommended minimum and maximum deflection force for small pulley diameter range.

To convert Newtons to **pounds force** multiply by 0.2248.

To convert Newtons to **kilogrammes force** multiply by 0.1020.

4. Use a belt tension gauge with the figures to determine the belt adjustment required.
5. Belt tension adjustment is achieved by adjusting the nuts on the pedestal frame.
6. Finally check that all nuts are re-tightened and the belts can move 'freely' by hand (depending upon pump size and system design).



BELT SECTION	SMALL PULLEY DIAMETER RANGE	RECOMMENDED DEFLECTION FORCE NEWTONS	
	MM	MIN	MAX
XPZ SPZ	56	7	11
	60-63	8	13
	67-71	9	14
	75-80	10	15
	85-95	11	16
	100-125	13	19
	132-180	16	24
XPA SPA	80-125	18	27
	132-200	22	31

Note : The above table indicates the common pulley types used on the pump ranges. Details for other pulley types will be available on request.

4.6 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.

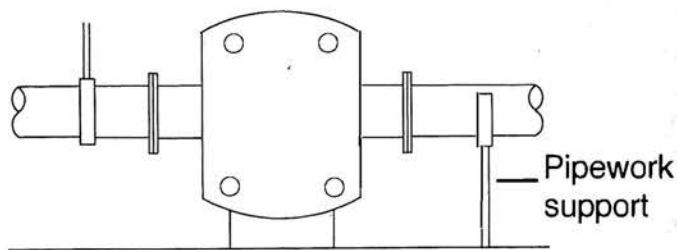
Provide - Isolating valves on each side of the pump to isolate the pump when necessary.

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 Commissioning

5.1 Recommended Lubricants

The pump will **NOT** be supplied prefilled with oil therefore the table below must be used to select a recommended oil.

5.2 Lubricating the Pump

Changing the Oil :-

The pump will **NOT** be supplied oil filled.

First change - After 150 hours of operation.

Next changes - Every 3000 hours of operation.

Only use the oil/grease types recommended by your supplier.

Oil Filling -

Fill with oil through the filler plug to the level indicated in the sight glass.

Make	Grade	
	300°F 23°F	23°F -4°F
Shell Macoma	R220	R68
BP Energol	GRXP220	GRXP68
Castrol Apha	LS220	LS68
Esso Spartan	EP220	EP68
Mobil Compound	DD	AA
GULF EP Lubricant	HD220	HD68
Texaco Meropa	220	68



5.3 Flushed Seal Arrangements

A flushed seal arrangement is fitted in order to cool the seal area.

It is **important** that:-

- The flush is correctly **connected**. (See overleaf).
- A **suitable** flushing **fluid** is used.
- The fluid is **supplied** at the **correct pressure** and **flow** rate.
- The flush is **turned on** at the **same time/ prior to starting** the pump, and turned off at the same time after stopping the pump.

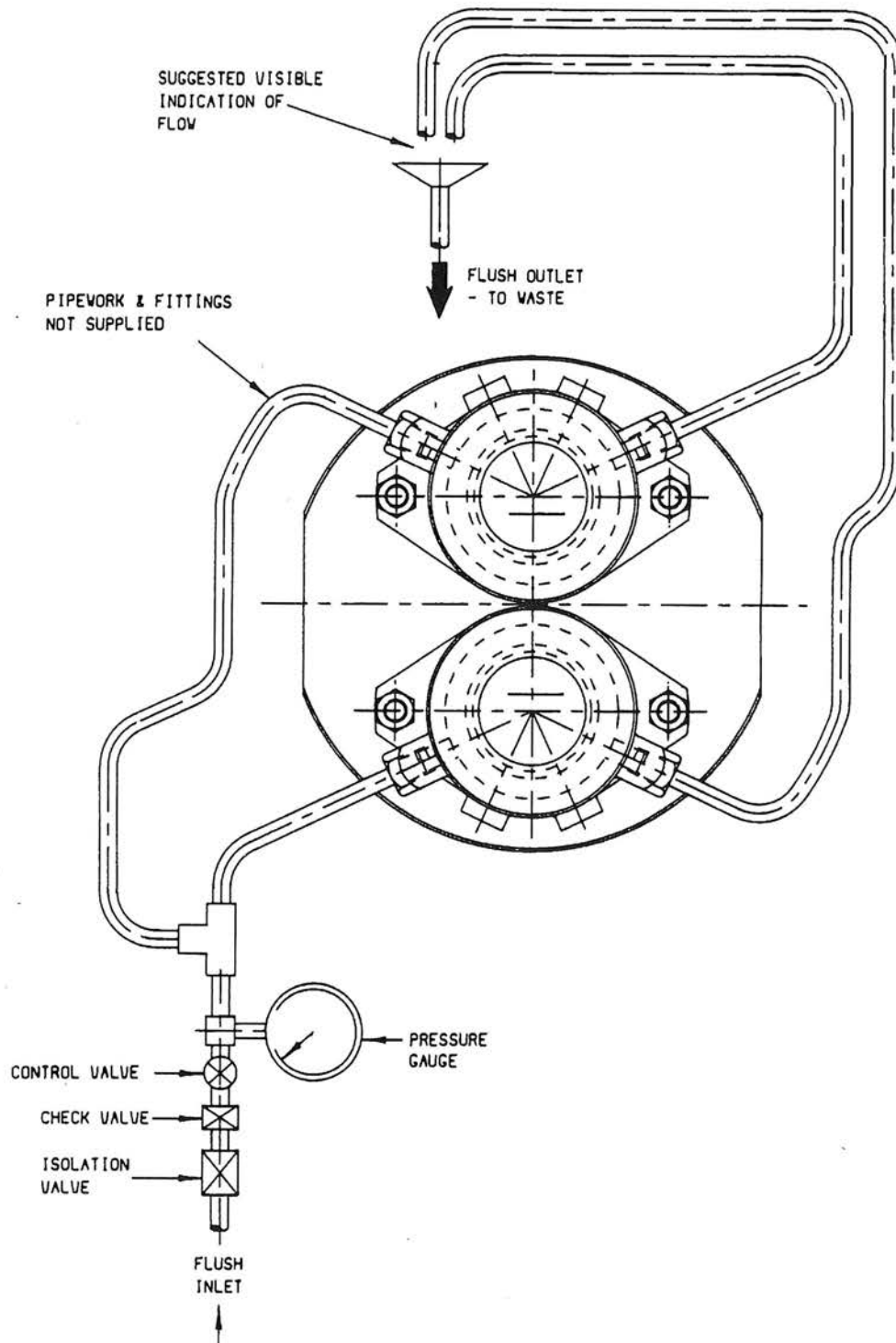
5.4 Connecting the Flush

The following equipment is **strongly recommended** when using a flushing system.

- **control valve** and **pressure gauge**, to enable the correct flushing pressure to be obtained and monitored. (A constant flow valve can be used).
- **isolation valve** and **check valve**, so that the flush can be turned off, and to stop any unwanted substances flowing in the wrong direction.
- A method of visibly indicating flushing fluid flow e.g. using a **tun dish**.

5.5 Flushing Pipework Layout

This arrangement is for **single mechanical seals**.



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5.6 Flushed Seal Housing Connections

The seal housing flushing connections are $\frac{1}{8}$ " NPT.

5.7 Flushing Fluid

The choice of flushing fluid is dependant upon the pumping media and duty conditions i.e. pressure and temperatures. Usually water is used for cooling or flushing water soluble products. For advice on selecting a suitable flushing fluid please contact your supplier.

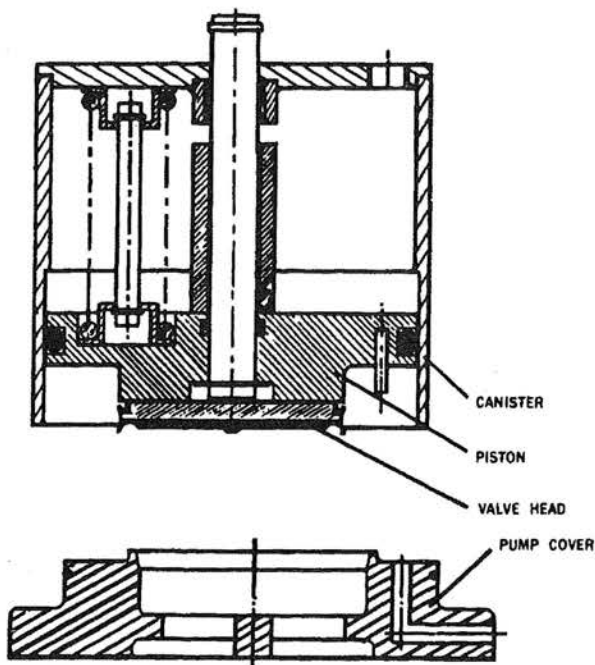
5.8 Flushing Pressure and Flow Rate

Single Mechanical Seal - 7 PSI maximum. Any further increase in pressure will result in lip seal failure.

For guidance the pressure at the seal is approximately $\frac{2}{3}$ of the pumping pressure.

The flushing **flow rate** must be adequate to ensure that the temperature limitation of the seals is not exceeded. Contact your supplier for further information on the recommended flow rate of the product seal fitted.

5.11 Valve Disassembly and Assembly



Assembly

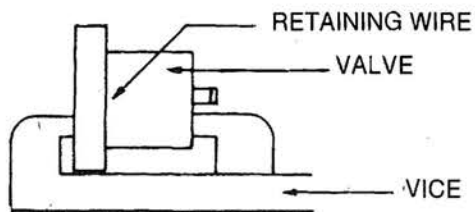
Reverse above procedure ensuring locating pin is engaged in hole.

It is important that when fitting springs they are equally spaced to ensure even loading of the piston. When fitting only one or five springs the spare spring pocket left vacant should be adjacent to the bar of the valve head.

Replace retaining wire using pliers in 30mm steps.

Disassembly

To remove cannister assembly from pump cover compress assembly either by applying lever lift or clamping in a vice.



Pull out retaining wire located at bottom of cannister assembly.

Release clamp - cannister assembly can now be removed.

To remove valve head slide sideways from locating groove.

To fit reverse procedure and centralise valve head.

To disassemble cannister assembly remove circlip(s) at top of cannister and withdraw piston with springs (if fitted).



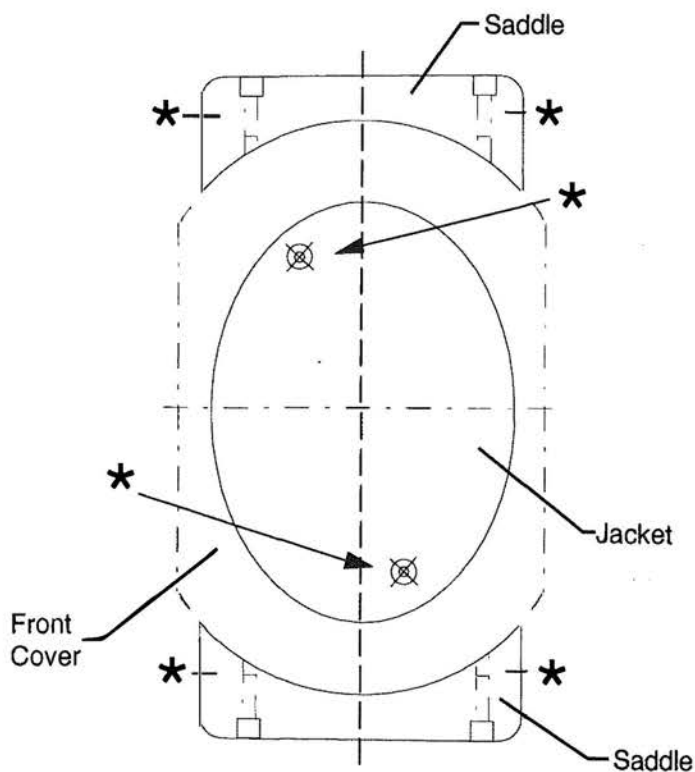
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5.12 Steam Jackets and Saddles

Careful attention should be taken when piping up and connecting to steam jackets and saddles. (see below)

If new steam jackets and saddles are being fitted use Hermite instant gasket (or equivalent).



* Connection for steam, hot/cold fluid entry and exit.



Prior to operation a hydrostatic test should be completed on the new steam jackets and saddles. Pumps supplied are hydrostatically tested at the time of manufacture. If they have to be replaced for any reason it is recommended for safety that this test be carried out before use.

Hydrostatic test pressure (water) : 90 PSI
Maximum working pressure : 55 PSI

6.0 Start up, Shut Down and Cleaning in Place

6.1 Pump Start-up Checklist	YES	NO
1. Has the pipework system been flushed through to purge welding slag and any other hard solids?	<input type="checkbox"/>	<input type="checkbox"/>
2. Have all obstructions been removed from the pipework or pump?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are the pump connections and pipework joints tight and leak-free ?	<input type="checkbox"/>	<input type="checkbox"/>
4. Is there lubrication in the pump and drive unit?	<input type="checkbox"/>	<input type="checkbox"/>
5. If your product seals require flushing has the flushing supply been fitted?	<input type="checkbox"/>	<input type="checkbox"/>
6. Are the pipework valves open ?	<input type="checkbox"/>	<input type="checkbox"/>
7. Are all safety guards in place?	<input type="checkbox"/>	<input type="checkbox"/>
8. Start then stop the pump, is the product flowing in the correct direction ?	<input type="checkbox"/>	<input type="checkbox"/>
9. Are the pump speed/pressure settings below the pump maximum limitations?	<input type="checkbox"/>	<input type="checkbox"/>
10. Is the location of the ' stop ' button clear?	<input type="checkbox"/>	<input type="checkbox"/>

All Answers should be 'Yes' before proceeding

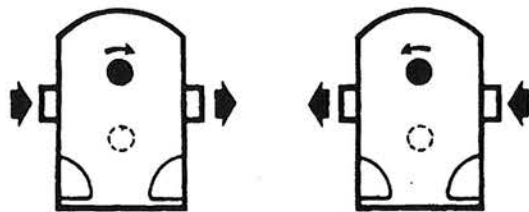
If there are any pumping problems refer to the Trouble shooting Chart

6.2 Pump Shut Down Procedure

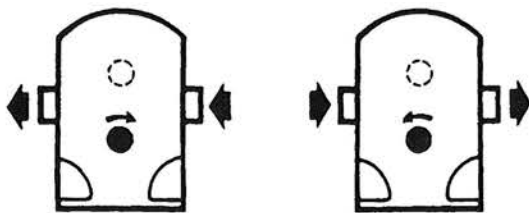
1. Turn the pump off.
2. Isolate the pump/drive unit from all power and control supplies.
3. Close the pipework valves to isolate the pump.
4. If the pump is to be disassembled refer to the disassembly section.

6.3 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

NOTE!

View is Product end of Pump.

8.0 Disassembly

8.1 Before Disassembly the Pump

Before starting to disassemble 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 -

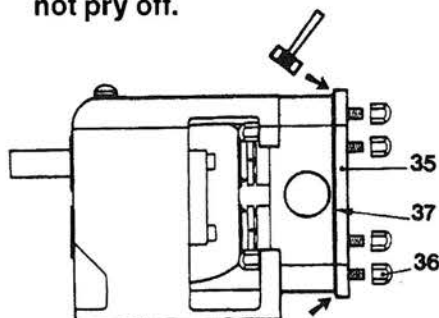
the pump from the drive unit.

**Read this Section first before Continuing
to Disassemble the Pump**

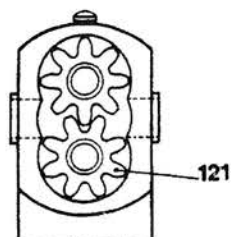
8.2 Disassembly of Pump Head and Replacing Shaft Seals

Disassembly

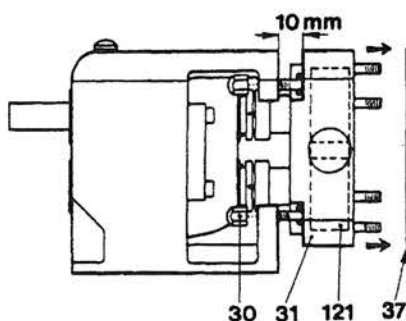
1. Disconnect the pipe connections from the rotorcase.
2. Unscrew dome nuts 36 and remove front cover 35. If stuck, loosen with soft mallet at overlap at top and bottom. **Do not pry off.**



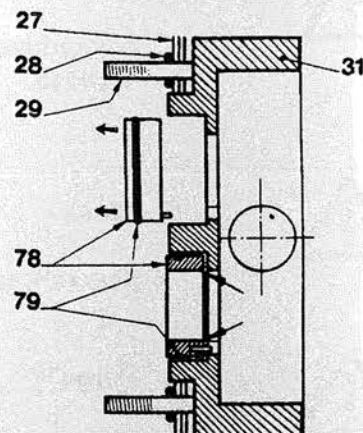
3. Remove PTFE (Teflon) cover joint 3. This is reversible for reuse.



4. Remove rotors 121. Do not pry from behind if they fit tight on the shaft. Remove rotorcase nuts 30 and tap rotorcase 31 10mm (0,40") forwards. This will release the rotors.
Note : If seal plates are fitted, these must be released first.

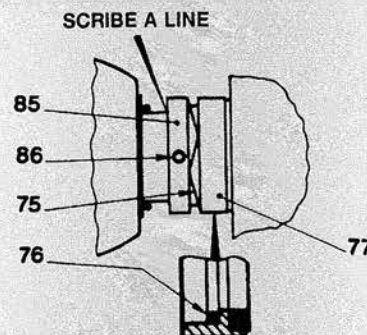


5. Remove rotorcase 31. Make sure that arch shims 27 at top and bottom are retained by 'O' ring 28 on studs 29 at the back of the rotorcase.
Note : Release seal housings first, if fitted.



Note : If the seals are to be reused ensure that they are marked top and bottom.

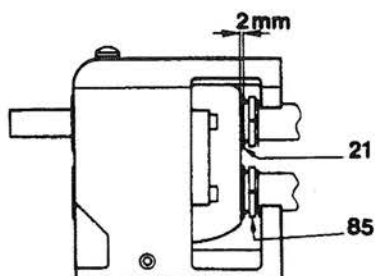
6. Remove stationary seal rings 78 and 'O' rings 79 out of the rotorcase **by hand**.
Note : For flushed, internal and other special seals, see separate section for procedure.
7. Pull rotating seal rings 77, 'O' rings 76 and springs 75 off the shaft. Retainers 85 remain on the shaft.



8.3 Front Oil Seals

At this stage front oil seals 21 are accessible and can be replaced. To remove drive pointed tool (i.e. screw driver) into oil seal and pry out. Ensure shafts are not damaged. To remove from shaft, spring retainers 85 must first be loosened and taken off (note position for resetting).

When replacing oil seal leave a 2mm (0,1") edge when the oil seal is replaced.



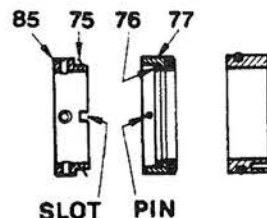
8.4 Assembly of Shaft Seal

If spring retainers 85 have been removed, replace them to the scribed line.

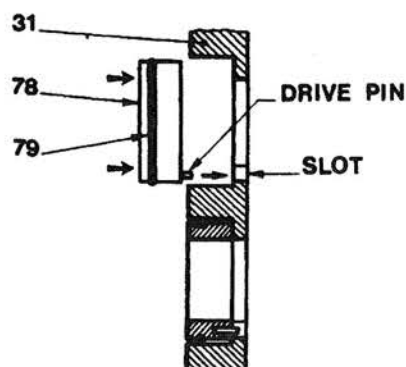
HANDLE ALL SEAL COMPONENTS WITH CARE. REMOVE THE PROTECTIVE COVER FROM NEW SEAL FACES. CLEAN THE FACES TO REMOVE ALL OIL OR GREASE. USE A NON-DEPOSITING TYPE OF CLEANING AGENT.

If lubricating of 'O' rings is necessary, use only silicone grease. Ensure that no grease is transferred to the seal faces.

1. Place springs 75 on (in) retainer 85.
2. Push rotary seal rings 77 with 'O' ring 76 on to shafts and retainers 85. Make sure that pins inside the rings fit into slots on the retainers.



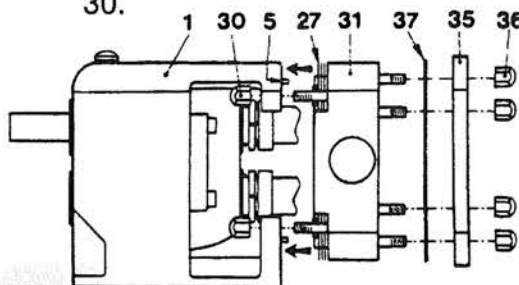
3. Fit 'O' rings 79 and stationary seal rings 78 in rotorcase 31. Ensure drive pins are correctly aligned with slot in the rotorcase.



4. Fit rotorcase 31 on gear housing 1. Make sure that shims 27 are still on the studs.
TAKE CARE NOT TO DAMAGE THE SEALS.

Check that rotorcase dowels 5 are positioned correctly.

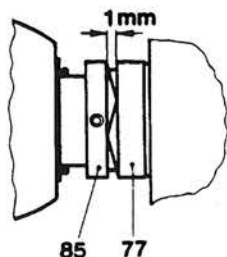
5. Tighten the rotorcase firmly with nuts 30.



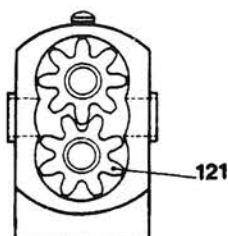
8.4 Assembly of Shaft Seal (Contd)

6. The seals should return to the original setting but check that there is a gap of approximately 1mm (0,039") between rotating seal ring 77 and spring retainer 85.

Rotate shafts to check free movement.



7. Replace rotors 121. (Recess at back).



8. Replace PTFE (Teflon) cover joint 37, (not HyFlo-pumps) and front cover 35. (HyFlo pumps: ensure that 'O' ring 34 in cover 35 is correctly positioned). Tighten evenly with dome nuts 36. Recheck after a few hours operation.

PTFE (Teflon) cover 'O' ring, require reforming by immersion in very hot water.

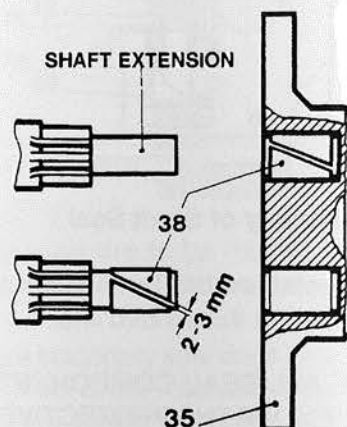
Rotate shafts to check free movement.

9. Connect inlet and outlet pipes.

8.5 Tape Bearings - 'X' Models

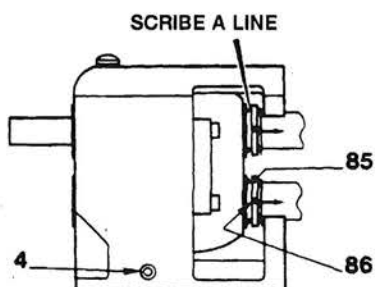
These models have the shafts extended into cover. The shafts are supported in PTFE (Teflon) tape bearings located in cover 35.

When replacing the tape bearings 38, first wrap them round the shaft to preform them. Check the size of the gap. Fit the tap bearings in the cover and make sure that they are correctly located in the recess.

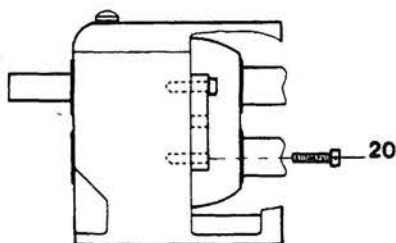


8.6 Disassembly of Gear Housing Assembly

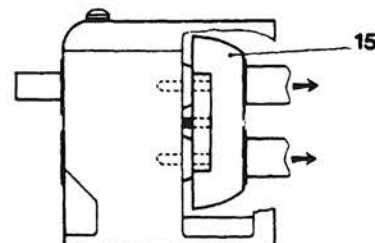
1. Disassemble pump head and shaft seals according to "DISASSEMBLY OF PUMP HEAD AND REPLACING SHAFT SEALS". **Note** : If pump has Top or Bottom drive shaft!
2. Drain oil through drain plug 4.
3. Remove spring retainers 85 by loosening set screws 86. First scribe a line on the shaft behind the retainer for repositioning.



4. Remove the four screws 20 which hold the cartridge assembly

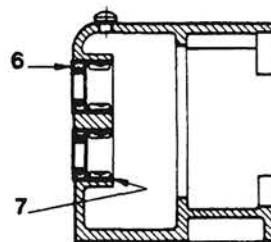


5. Remove the cartridge assembly by gently tapping it through the gear housing.



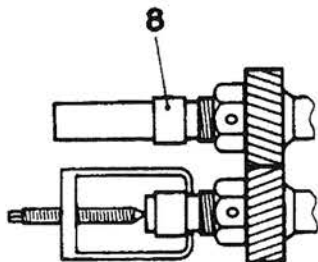
6. Rear outer races 7, caged rollers and the oil seals 6 will remain in the gear housing. They can be removed with a press.

INSPECT THE BEARINGS IN THE CARTRIDGE ASSEMBLY. THEY SHOULD HOLD THE SHAFTS RIGIDLY IN POSITION. ALSO CHECK TIMING GEARS 11 FOR BACK-LASH.

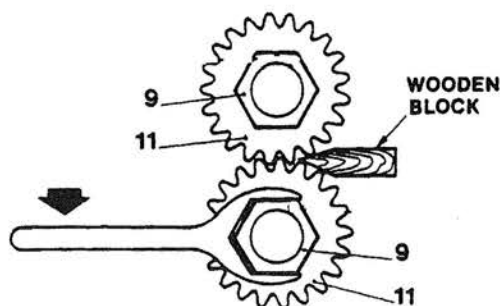


8.7 Disassembly of Cartridge Assembly

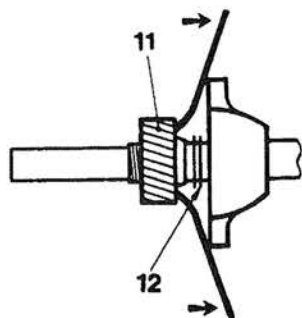
1. Pull out inner races 8. **Mark** the position for replacement !



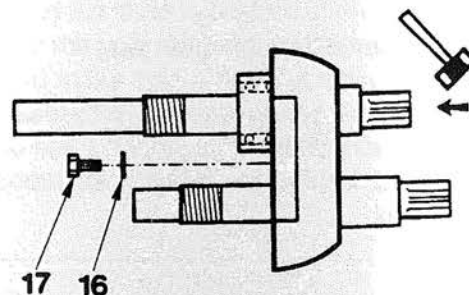
2. Loosen grub screws in shaft nut 9. Loosen and remove the shaft nut. Use a **wooden** block between timing gears 11 in order to prevent rotation.



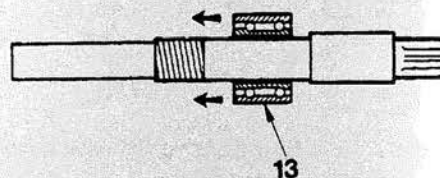
3. Remove gears 11, using **soft** metal levers. Mark the gears to assist re-assembly and also shimming 12 behind the gears. Remove the keys from the shaft.



4. Remove screws 17 and bearing retainer plates 16. Tap out the shafts with a **soft** mallet. This will also remove one complete bearing.



5. Remove bearings 13 from the shafts by means of a hand press.

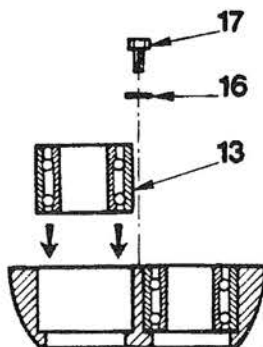


Note : The bearing housing must be marked for drive and lay shafts otherwise the rotors will not set up in the rotorcase.

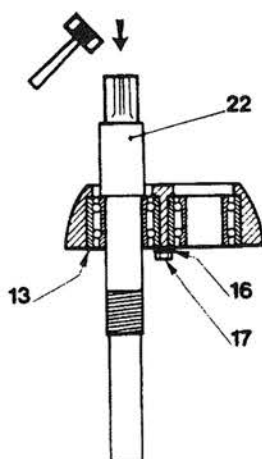
9.0 Assembly

9.1 Re-assembly of Cartridge Assembly

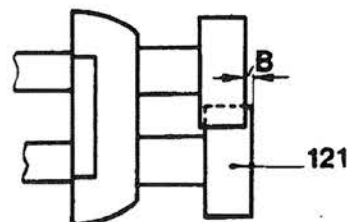
1. Press the bearings 13 into the housing, hard to the shoulder. Fit the two retaining plates 16 and screws 17.



2. Tap shafts 22 into bearing 13, threaded end first (support on the races). Take care not to strain retaining plates 16 and 17.

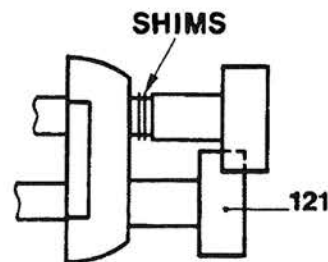


3. Fit rotors 121 on the shafts. Check alignment of front faces and measure difference 'B'.



4. If adjustment is required, press out the shaft 10 mm (0.040") and insert split shimming to measurement 'B'

Press the shaft back into position, taking care not to strain bearing plates 16 and screws 17 - check that alignment is now correct.

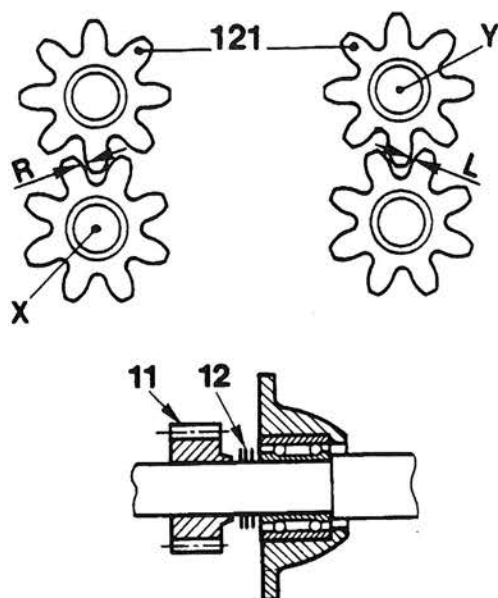


5. Replace keys 24 and 25 in the shafts. Ensure tight fit. Fitting gears 11 using the original shimming between gear face and inner race.

9.1 Re-assembly of Cartridge Assembly (Con't)

6. Fit shaft nuts 9 behind gears 11. Check that rotors 121 rotate freely.

Correct any error by adding split shims 12 between gear face and bearing race as follows.



To increase 'R' add shims to shaft 'X'.
To increase 'L' add shims to shaft 'Y'.

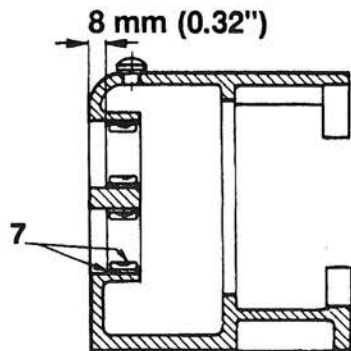
7. Fully tighten shaft nuts 9 and nut grub screws. Press rear inner bearing races 8 onto the shafts in original position and oil seals 21 in bearing housing 15 leaving a 2mm proud.

Note : Check shafts for damage where the oil seal will run.

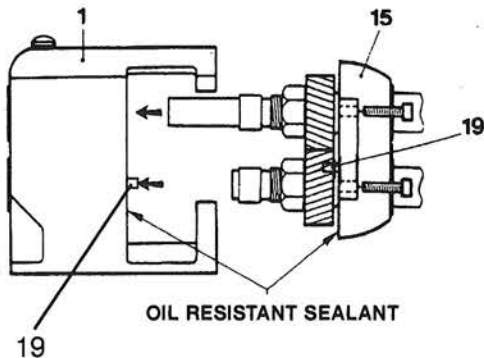
MODELS	600	600
'R' or 'L' increase	0.003" (0.075 mm)	0.003" (0.075 mm)
Shimming required	0.010" (0.25 mm)	0.010" (0.25 mm)

9.2 Re-assembly of Gear Housing Assembly

1. Press rear bearing outer races 7 in to the gear housing.

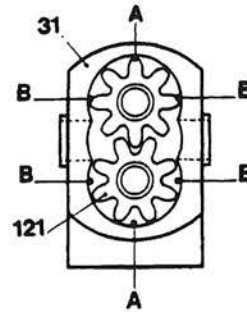
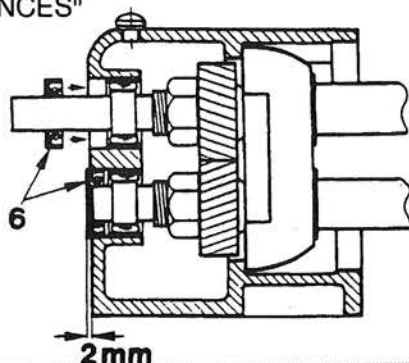


2. Coat the mating faces of bearing housing 15 and gear housing 1 with oil resistant sealant and screw in position, using original dowel pins 19. Make sure that the drive shaft is in the original position.
3. Fit oil seals 6. Do not damage the lips.



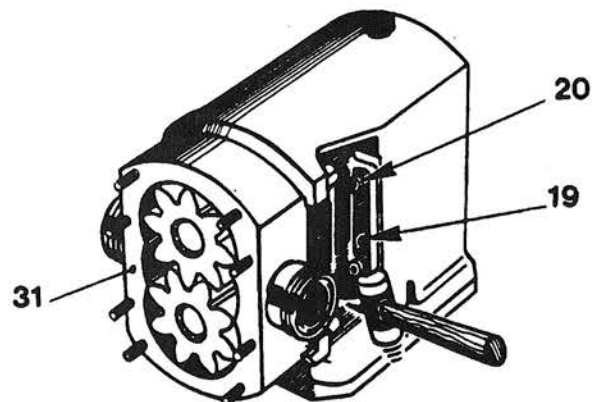
4. Fit rotor case 31 and rotors 121. Check that rotor tip clearances to casing are correct for points A and B by rotating shafts.

See under "ADJUSTMENT OF ROTOR CLEARANCES"



5. If any adjustment is required, remove the two dowel pins 19 between gear housing and bearing housing.
6. Re-assemble with bearing housing screws 20 lightly tightened.
7. Re-set rotor to casing clearances by tapping the bearing housing to the correct position. Then fully tighten screws 20.15. Remove rotor case 31 and rotors. Ream the dowel pin holes to fit oversize pins.

Standard	5/16"
Oversize	9 mm or 11/32"



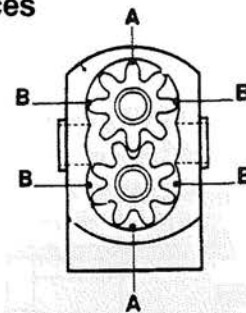
8. Refit pump head and shaft seals as in previous instruction under "DISASSEMBLY OF PUMP HEAD AND REPLACING SHAFT SEALS"

Note : Do not overtighten the PTFE joint plate and front cover

9. Refill with correct oil. See under "MAINTENANCE".
10. Check free rotation.

9.3 Adjustment of Stainless Steel Multilobe Clearances

The pumps are manufactured with close running clearances which must be maintained. These vary according to model size, operating temperature and rotor form according to the table below.



STANDARD STAINLESS STEEL ROTORS							
Models	Class	A TOP/BOTTOM CLEARANCE		B RADIAL CLEARANCE		FRONT CLEARANCE	
		Inch	mm	Inch	mm	Inch	mm
600	A	0.003	0.08	0.006	0.15	0.001	0.02
		0.005	0.13	0.008	0.20	0.002	0.05
	B	0.005	0.13	0.007	0.18	0.002	0.05
		0.007	0.18	0.009	0.23	0.003	0.08
	C	0.006	0.15	0.008	0.20	0.003	0.08
		0.008	0.20	0.010	0.25	0.004	0.10
	D	0.006	0.15	0.009	0.23	0.003	0.08
		0.008	0.20	0.011	0.28	0.004	0.10
610/ 615	A	0.005	0.13	0.007	0.18	0.002	0.05
		0.007	0.18	0.009	0.23	0.003	0.08
	B	0.006	0.15	0.009	0.23	0.003	0.08
		0.008	0.20	0.011	0.28	0.004	0.10
	C	0.007	0.18	0.010	0.25	0.004	0.10
		0.009	0.23	0.012	0.30	0.005	0.13
	D	0.008	0.20	0.010	0.25	0.005	0.13
		0.010	0.25	0.012	0.30	0.006	0.15

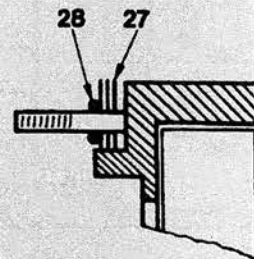
Class Temperature range

A	70 - 160°F	(20 - 70°C)
B	160 - 212°F	(70 - 100°C)
C	212 - 265°F	(100 - 130°C)
D	265 - 300°F	(130 - 150°C)

ARCH SHIMS COLOUR CODING

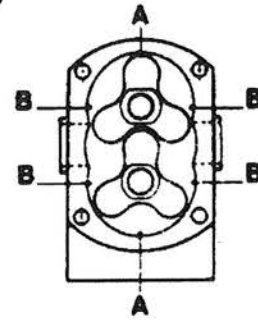
0.001" (0.025mm)	= Purple
0.015" (0.037mm)	= Red
0.002" (0.050mm)	= Blue
0.010" (0.254mm)	= Clear
0.010" (0.254mm)	= White

Adjustment is made by adding or removing arch shims 27, located between the back face of rotor case and the gear housing, top and bottom. Refit retaining 'O' ring 28 on the studs.



9.4 Adjustment of Stainless Steel Trilobe Rotor Clearances

The pumps are manufactured with close running clearances which must be maintained. These vary according to model size, operating temperature and rotor form according to the table below.



STAINLESS STEEL TRILOBE ROTORS							
Models	Class	A TOP/BOTTOM CLEARANCE		B RADIAL CLEARANCE		FRONT CLEARANCE	
		Inch	mm	Inch	mm	Inch	mm
600	A	0.003	0.08	0.006	0.15	0.002	0.05
		0.006	0.15	0.008	0.20	0.003	0.08
	B	0.004	0.10	0.007	0.18	0.003	0.08
		0.007	0.18	0.009	0.23	0.004	0.10
	C	0.006	0.15	0.008	0.20	0.004	0.10
		0.008	0.20	0.010	0.25	0.006	0.15
	D	0.006	0.15	0.009	0.23	0.004	0.10
		0.009	0.23	0.011	0.28	0.006	0.15
615	A	0.004	0.10	0.007	0.18	0.002	0.05
		0.007	0.18	0.009	0.23	0.003	0.08
	B	0.006	0.15	0.008	0.20	0.004	0.10
		0.008	0.20	0.010	0.25	0.006	0.15
	C	0.007	0.18	0.009	0.23	0.005	0.13
		0.009	0.23	0.011	0.28	0.007	0.18
	D	0.007	0.18	0.010	0.25	0.006	0.15
		0.010	0.25	0.012	0.30	0.008	0.20

10.0 Pinned and Flushed Externally Mounted Mechanical Seal

10.1 Flushed Mechanical Seal

The flushed mechanical seal consists of a standard mechanical seal with a seal housing in two parts and a lipseal.

10.2 Disassembly and Assembly

The procedure is the same as for the standard seal, with the exception of the seal housings and the spring retainers. Disassembly and assembly of the latter are described below.

IMPORTANT !

FULLY LOOSEN SEAL HOUSING 87 BEFORE REMOVING THE ROTOR CASE.

Disassembly

1. Pull rotating seal rings 77, 'O' rings 76 and springs 75 off the shafts. Remove spring retainers 85 by loosening lock screws 86 (scribe a line, see below).

First scribe a line in front of the retainer 85, so that the new parts can easily be fitted in the correct positions.*

2. Remove the seal housings from the shafts and 'O' rings 88 and 99. Also remove lipseals 95 from the seal housings, should the seals need replacing.

Assembly

1. Place 'O' rings 88 and 99 in their grooves in the seal housings.

Fit lip seals 95 in the seal housings.

Note : Only when fitting **new** lip seals

KNOCK THE LIP SEALS INTO POSITION BY MEANS OF A SUITABLE TOOL, E.G. A PIECE OF PIPE. DO NOT DAMAGE THE SEALS.

Note : NO SPRINGS SHOULD BE FITTED IN LIP SEALS

* If the seals are correctly positioned. The distance between spring retainer 85 and rotating seal ring 77 should be approx. 1mm. The line can also be scribed during assembly according to the dimensions in the table under item 3.

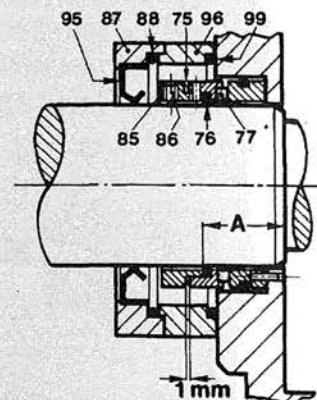
3. Scribe a line according to the Table below (unless a line was scribed during disassembly).

PUMP MODEL	A (See Fig 1)
600/610	26.5mm

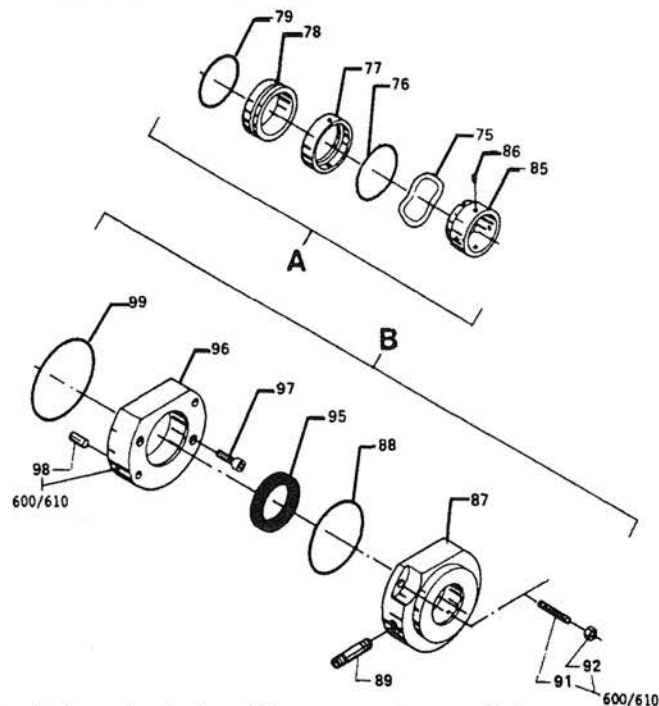
Place seal housings 87 and spring retainers 85 on the shafts.

Note : Place the fronts of the retainers on the scribed lines and tighten them with lock screws 86.

4. Tighten studs 91 in the rotor case (600/610)
5. Tighten front seal housings 96 to the rotor case.
6. Fit the rotor case on the gear housing and tighten it properly.
7. Tighten back seal housings 87 to the front housings.
8. Check the distance (approx 1mm) between spring retainer 85 and rotating



10.3 Flushed Mechanical Seal Parts List

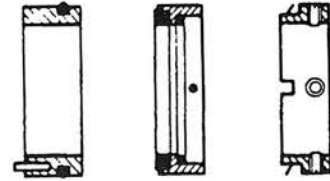
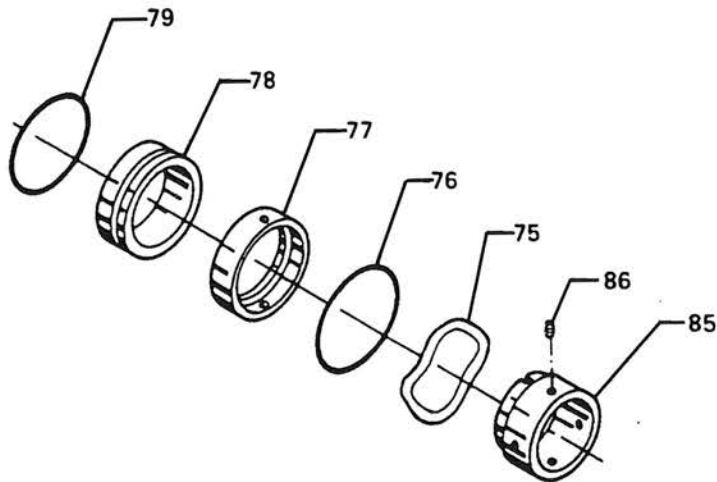


A = Standard mechanical seal (see separate parts list)
B = Extra parts for flushed seal (see below)

POS.	QTY	DESCRIPTION
85	1	Spring Retainer
86	4	Screw
87	1	Housing
88	1	O ring, EPDM(std)
	1	O-ring, nitrile
	1*	O-ring, FPM
	1	O-ring, PTFE
89	2	Flushing tube
91	2	Stud
92	2	Nut
95	1	Lipseal, nitrile(std)
	1*	Lipseal, FPM
96	1	Housing
98	2	Dowel pin
99	1	O-ring, EPDM(std)
	1	O-ring, Nitrile
	1*	O-ring, FPM
	1	O-ring, PTFE

* used for aseptic, flushed seal

10.4 Pinned Mechanical Seal Parts List



Size 600

POS.	QTY	DESCRIPTION
	1	Shaft seal complete (Pos. 75-79)
75	1	Wave spring
76	1	O-ring
77	1	Rotary seal ring - carbon
78	1	Static seat - stainless steel
79	1	O-ring

Alternative seal rings

77	1	Rotary seal ring-silicon carbide
78	1	Static seat-silicon carbide

Other seal parts

85	1	Spring retainer
86	4	Screw

11.0 Faults, Causes and Remedies

No Discharge	Under Capacity	Irregular Discharge	Prime lost after starting	Pump seals when starting	Pump overhauls	Motor overhauls	Excessive power absorbed	Noise & vibration	Pump element wear	Excessive gland seal wear	Product loss through gland	Seizure	CAUSES	REMEDIES
*													1 Incorrect direction of rotation.	Reverse motor.
*													2 Pump un-primed.	Expel gas from supply line and pumping chamber and introduce liquid.
*	*	*	*	*	*	*	*	*	*	*	*	*	3 Insufficient NPSH available.	Increase supply line diameter. Increase suction head. Simplify supply line configuration and reduce length. Reduce speed.
*	*	*	*	*	*	*	*	*	*	*	*	*	4 Product vapourising in supply line.	Decrease product temperature - check effect of increased viscosity on available and permitted power inputs.
*	*	*	*	*	*	*	*	*	*	*	*	*	5 Air entering supply line.	Remove pipework joints. Adjust or replace gland.
*	*	*	*	*	*	*	*	*	*	*	*	*	6 Gas in supply line.	Expel gas from supply line and pumping chamber and introduce liquid.
*	*	*	*	*	*	*	*	*	*	*	*	*	7 Insufficient head above supply vessel outlet.	Raise product level. Lower outlet position. Increase submergence of supply line.
*	*	*	*	*	*	*	*	*	*	*	*	*	8 Foot valve strainer obstructed or blocked.	Service fittings.
*	*	*	*	*	*	*	*	*	*	*	*	*	9 Product viscosity above rated figure.	Decrease pump speed. Increase product temperature.
*	*	*	*	*	*	*	*	*	*	*	*	*	10 Product viscosity below rated figure.	Increase pump speed. Decrease product temperature.
*	*	*	*	*	*	*	*	*	*	*	*	*	11 Product temperature above rated figure.	Cool the product pumping chamber.
*	*	*	*	*	*	*	*	*	*	*	*	*	12 Product temperature below rated figure.	Heat the product pumping chamber. (Check with pump maker).
*	*	*	*	*	*	*	*	*	*	*	*	*	13 Unexpected solids in product.	Clean the system. Fit strainer to supply line.
*	*	*	*	*	*	*	*	*	*	*	*	*	14 Delivery pressure above rated figure.	Check for obstructions. Service system and revise to prevent problem recurring. Simplify delivery line.
*	*	*	*	*	*	*	*	*	*	*	*	*	15 Gland over-tightened.	Loosen and re-adjust gland.
*	*	*	*	*	*	*	*	*	*	*	*	*	16 Gland under-tightened.	Adjust gland. See note on packed glands under "Installation and Maintenance" heading.
*	*	*	*	*	*	*	*	*	*	*	*	*	17 Gland fluting inadequate.	Check that fluid flows freely into gland. Increase flow rate.
*	*	*	*	*	*	*	*	*	*	*	*	*	18 Pump speed above rated figure.	Decrease pump speed.
*	*	*	*	*	*	*	*	*	*	*	*	*	19 Pump speed below rated figure.	Increase pump speed.
*	*	*	*	*	*	*	*	*	*	*	*	*	20 Rotocases strained by pipework.	Check alignment of pipes. Fit flexible pipes or expansion fittings. Support pipework.
*	*	*	*	*	*	*	*	*	*	*	*	*	21 Bolt drive slipping.	Re-tension to maker's recommendations.
*	*	*	*	*	*	*	*	*	*	*	*	*	22 Flexible coupling misaligned.	Check flange alignment and adjust mountings accordingly.
*	*	*	*	*	*	*	*	*	*	*	*	*	23 Insecure pump driver mountings.	Fit lock washers to slack fasteners and re-tighten.
*	*	*	*	*	*	*	*	*	*	*	*	*	24 Shaft bearing wear or failure.	Refer to pump maker for advice and replacement parts.
*	*	*	*	*	*	*	*	*	*	*	*	*	25 Worn un-synchronised timing gears.	Refer to pump maker for advice and replacement parts.
*	*	*	*	*	*	*	*	*	*	*	*	*	26 Gearcase oil quantity incorrect.	Refer to pump maker's instructions.
*	*	*	*	*	*	*	*	*	*	*	*	*	27 Metal to metal contact of pumping element.	Check rated and duty pressures. Refer to pump maker.
*	*	*	*	*	*	*	*	*	*	*	*	*	28 Worn pumping element.	Fit new components.
*	*	*	*	*	*	*	*	*	*	*	*	*	29 Front cover relief valve leakage.	Check pressure setting and re-adjust if necessary. Examine and clean seating surfaces. Replace worn parts.
*	*	*	*	*	*	*	*	*	*	*	*	*	30 Relief valve chattering.	Check for wear seating surfaces, gaskets etc - replace as necessary.
*	*	*	*	*	*	*	*	*	*	*	*	*	31 Relief valve incorrectly set.	Readjust spring compression. Valve should fit about 10% above duty pressure.

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

12.0 Technical Data

12.1 Pump Information

	Models	600	610
Max flow rate (GPM)	All	10	18
Max pressure kPa (bar)	Std 'X'	80 PSI (5.5) 120 PSI (8)	60 PSI (4) 100 PSI (5.5)
Max speed (r/min)	Std 'X'	1000 1000	1000 1000
Max pressure at max speed kPa (bar)	Std 'X'	29 (2) 43 (3)	22 (1.5) 29 (2)
Max speed at max pressure (r/min)	Std 'X'	600 600	600 600

12.2 Designation System

Type	Size	Connection size	Optional
GHP	60	1 (1" - 25mm)	
	61	0 (1" - 25mm) 5 (1½" - 38mm)	'X' = Medium pressure series pump (pump with PTFE (teflon) - tape bearings in front cover)

Example :

GHP 61 5 X

Example denotes 615 medium pressure pump with 1½" (38mm) connections.


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12.3 Torque Specification Chart

RECOMMENDED TORQUE SETTINGS IN NM (KPM)

PART DESCRIPTION	TORQUE ft lbs
Front cover nut 36	6
Rotor case nut 30	6
Bearing housing screw 20	7 1/2
Shaft nut 9	258

S = Spanner A = Hex. socket screw	
Part Description	size mm
Front cover nut 36	10 S
Rotor case nut 30	10 S
Spring retainer screw 86	2.5 A
Seal plate retaining screw	5 A
Bearing housing screw 20	5 A
Bearing retaining plate screw 17	13 S
Shaft nut 9	43 S


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13.0 Exploded Pump Drawing

POS.	QTY	DESCRIPTION
1	1	Gear housing - aluminium (std)
	1	Gear housing - cast iron
2	1	Filler plug ¼ NPT
	2	Filler plug ½ NPT
3	1	Oil level glass - screw fit
4	1	Drain plug
5	2	Dowel
6	2	Oil seal - Nitrile
	2	Oil seal -FPM
7	2	Bearing - outer
8	2	Bearing - inner
	2	Bearing assy (Pos.7 & 8) Rear
9	2	Nut
10	2	Screw
11	2	Timing gear
12	1	Shim set
13	2	Bearing, Front
15	1	Bearing housing
16	2	Bearing retainer
17	2	Bolt
19	2	Dowel - size 1
	2	Dowel - size 2
20	4	Screw
21	2	Oil seal - Nitrile (Std)
	2	Oil seal -FPM
22	1	Drive shaft (600) - mech seal
	1	Drive shaft (610) - mech seal
	1	Drive shaft (600) - packed seal
	1	Drive shaft (610) - packed seal



POS.	QTY	DESCRIPTION
23	1	Lay shaft (600), mech seal
	1	Lay shaft (610), mech seal
	1	Lay shaft (600), packed seal
	2	Lay shaft (610), packed seal
24	1	Key
25	2	Key
26	2	Thrower ring - EPDM (Std)
	2	Thrower ring - Nitrile
	2	Thrower ring - FPM
	2	Thrower ring - PTFE
27	1	Shim set
28	2	Retaining ring - EPDM (std)
	1	Retaining ring - FPM
29	4	Stud
30	4	Nut
31	1	Rotorcase
32	8	Stud
35	1	Front cover
	1	Front cover - heating jacket
36	8	Nut
	8	Nut - quick release
37	1	Joint plate (not Hyflo-pumps)
38	2	Strip bearing

Recommended spare parts : pos. 6, 7, 8, 12, 27, 37, 38 and shaft seals.

Bilobe Rotors

Pos.	Qty	DESCRIPTION
120	2	Rotor - stainless steel 158°F
	2	Rotor - stainless steel 212°F
	2	Rotor - stainless steel 266°F
	2	Rotor - stainless steel 302°F

Multilobe Rotors

121	2	Rotor - stainless steel 158°F
	2	Rotor - stainless steel 212°F
	2	Rotor - stainless steel 266°F
	2	Rotor - stainless steel 302°F

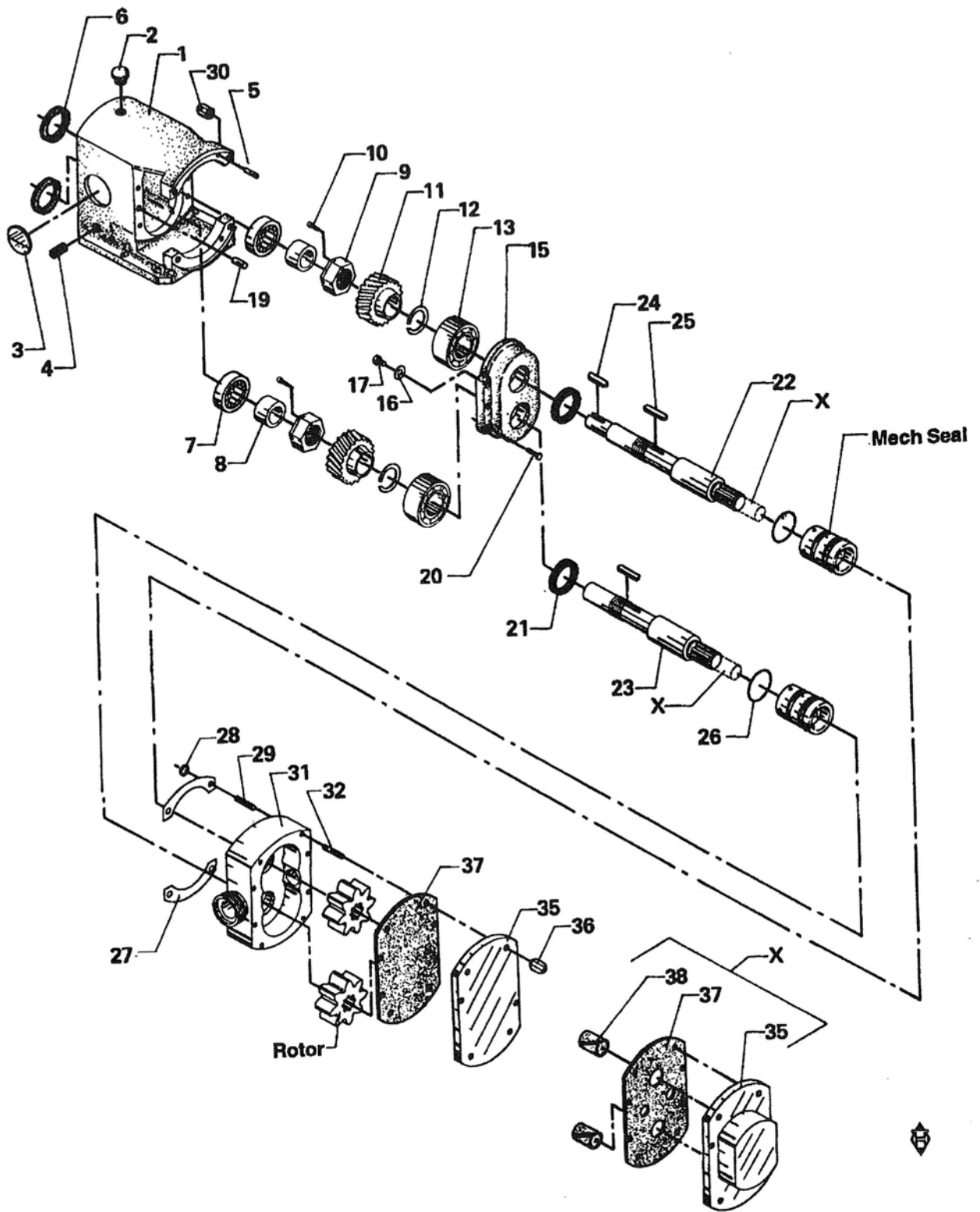
Trilobe Rotors

	2	Rotor - stainless steel 158°F
	2	Rotor - stainless steel 212°F
	2	Rotor - stainless steel 266°F
	2	Rotor - stainless steel 302°F


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Rotary Lobe Pumps - GHP Range



- Please see below.

1. Notes

[illegible]