English

Installation, Operation and Maintenance Instructions

Wine Pump Variant

NOV Mono®

MPA578/3

One Company, Unlimited Solutions

Contents

1. INSTALLATION

1.1 Installation and Safety Recommendations

In common with other items of process plant a pump must be installed correctly to ensure satisfactory and safe operation. The pump must also be maintained to a suitable standard. Following these recommendations will ensure that the safety of personnel and satisfactory operation of the pump is achieved.

1.2.1 General

When handling harmful or objectionable materials, adequate ventilation must be provided in order to disperse dangerous concentrations of vapours. It is recommended that wherever possible, Mono pumps should be installed with provision for adequate lighting, thus ensuring that effective maintenance can be carried out in satisfactory conditions. With certain product materials, a hosing down facility with adequate draining will simplify maintenance and prolong the life of pump components.

1.2.1 Handling

During installation and maintenance, attention must be paid to the safe handling of all items. Where a pump or its components weigh in excess of 20 kg (45lb) it is recommended that suitable lifting tackle should be used to ensure that personal injury or damage to components does not occur.

For safe handling of both bareshaft pumps and pump units (pump / gearbox / motor etc.) ideally slings should be used. The position of the slings will depend upon the specific pump / unit construction and should be carried out by personnel with the relevant experience to ensure that the pump is not damaged and injury to personnel does not occur.

If eye bolts do exist then these should only be used for lifting the individual components for which they are supplied.

1.3.2 Storage

Short Term Storage

Where a pump has to be stored for 6 months or less then the following steps are advised:

1. Store pump inside wherever possible or if this is not feasible then provide protective covering. Do not allow moisture to collect around the pump.

2. Remove the drain plug, if fitted. Any inspection plates fitted should also be removed to ensure that the suction housing can drain and dry completely.

3. See Manufacturers' Instructions for motor / gearbox / drive instructions for storage procedures.

Long Term Storage

If the pump is to be kept in storage for more than six months then in addition to the above the following procedures should be carried out regularly (every 2 - 3 weeks if possible).

1. If practicable rotate the pump at least three quarters of one revolution to avoid the rotor setting in the stator.

2. Note, however, that the pump is not to be rotated for more than two revolutions each time because damage could be caused to the rotor / stator elements.

IMMEDIATELY PRIOR TO INSTALLATION AND STARTING.

Before installing the pump please ensure that all plugs and inspection plates are replaced and that excess grease / oil is removed from the stuffing box.

1.4 Electrical

Electrical connection should only be made using equipment suitable for both rating and environment. Where any doubts exist regarding the suitability of equipment, Mono Pumps should be consulted before proceeding. Normally the Mono Winepump should be installed with a frequency controller. Earthing points will be provided on electric drives (if supplied) and it is essential that these are correctly connected. When the motor is being wired and checked for rotation, the start / stop sequence must be instantaneous to prevent dry running or pressurising upstream equipment **(Check direction arrow on pump nameplate).** The electrical installation should include appropriate isolating equipment to ensure that the pump unit is safe to work on.

1.5 Relief Valves / Over Pressurisation /

Non-Return Valves

1. It is recommended that a suitable safety device is installed on the discharge side of the pump to prevent over-pressurisation of the system.

2. It is also recommended that a non-return valve is installed on the discharge side of the pump to prevent reverse flow through the system.

When both are installed it is advised that the relief valve is positioned closer to the pump than the non-return valve.

IMPORTANT

The pump must never run against a closed inlet or outlet valve, as this could result in mechanical failure.

1.6 General Safety

GREAT CARE MUST BE TAKEN TO PROTECT ALL ELECTRICAL EQUIPMENT FROM SPLASHING WHEN HOSING DOWN. WHERE MONO PUMPS, HAVE SUPPLIED A BARESHAFT PUMP THE ONUS IS ON THE USER TO FIT ADEQUATE GUARDS IN COMPLIANCE WITH THE RELEVANT REGULATIONS.

All nuts and bolts, securing flanges and base mounting fixtures must be checked for tightness before operation. To reduce vibration, the pump must be correctly aligned with the drive unit, and all guards must be securely fixed in position. When commissioning the plant, all joints in the system must be checked thoroughly for leakage. If, when starting, the pump does not appear to operate correctly, the plant must be shut down immediately and the cause of the malfunction established before operations are recommenced. It is recommended that depending upon plant system operation, either a combined vacuum and pressure gauge, or a vacuum gauge only be fitted to the pump inlet port, and a pressure gauge fitted to the outlet port, these will then continuously monitor the pump operating conditions.

1.7 Duty Conditions

Pumps should only be installed on duties for which Mono Pumps have specified the materials of construction, flow rates, pressure, temperature, speed etc. Where dangerous materials are to be pumped, consideration must be given to the safe discharge from relief valves, gland drains etc.

IF THE DUTY SHOULD BE CHANGED MONO PUMPS SHOULD BE CONTACTED AND THEIR RECOMMENDATIONS SOUGHT IN THE INTEREST OF APPLICATION, SAFETY OF PLANT, EFFICIENCY AND PUMP LIFE.

2. START-UP PROCEDURE

Pumps must be filled with liquid before starting. The initial filling is not for priming purposes, but to provide the necessary lubrication of the stator until the pump primes itself.

When the pump is stopped, sufficient liquid will normally be trapped in the rotor / stator assembly to provide lubrication upon restarting. If, however, the pump has been left standing for an appreciable time, moved to a new location, or has been dismantled and reassembled, it must be refilled with liquid and given a few turns before starting. The pump is normally somewhat stiff to turn by hand owing to the close rotor / stator fit. However, this stiffness disappears when the pump is running normally against pressure.

2.1 Dry Running

NEVER RUN THE PUMP IN A DRY CONDITION EVEN FOR A FEW REVOLUTIONS OR THE STATOR WILL BE DAMAGED IMMEDIATELY. CONTINUAL DRY RUNNING COULD PRODUCE SOME HARMFUL OR DAMAGING EFFECTS.

2.2 Lubrication

Pumps fitted with bearings should be inspected periodically to see if grease replenishment is necessary and if so, grease should be added until the chambers at the ends of the bearing spacer are approximately one third full.

Periodic bearing inspection is necessary to maintain optimum bearing performance. The most expedient time to inspect is during periods of regular scheduled equipment downtime - for routine maintenance or for any other reason.

Under tropical or other arduous conditions, however, a more frequent examination may be necessary. It is therefore advisable to establish a correct maintenance schedule for periodic inspection.

Shell Alvania RL2 Grease or its equivalent must be used for replenishment.

2.3 Pump Units

Where a pump unit is dismantled and reassembled consideration must be given to ensure that where appropriate the following steps are covered.

1. Correct alignment of pump / gearbox.
2. Use appropriate couplings and bushes.
3. Use of appropriate belts and pulleys correctly tensioned.

2.4 Pumps for Food Use

CLEANING PRIOR TO OPERATION

When a pump has been supplied for a food application it is important to ensure that the pump is clean prior to initial operation of the pump. Therefore, it is important that a clean-in-place treatment is executed on the pump at the following times.

1. When the pump is first commissioned for use.
2. When any spare components are fitted into the wetted area of the pump.

A recommended CIP procedure is as follows:

1. 2.5% W/V sodium hydroxide for 20 minutes at 8^0 C.
2. Towns water for 20 minutes at 80 C.
3. 2.0% V/V nitric acid for 20 minutes at 80 C.
4. Towns water for 20 minutes at 80 C.

The four stages constitute one cycle and we recommend that this cycle is used to clean the pump before use on food.

Once the pump has been commissioned the cleaning process will depend upon the application. The user must therefore ensure that their cleaning procedures are suitable for the duty for which the pump has been purchased.

2.5 Maintenance of Wearing Components

2.5.1 Rotor and Stator

The wear rate on these components is dependent on many factors, such as product abrasivity, speed, pressure etc.

When pump performance has reduced to an unacceptable level one or possibly both items will need replacing.

2.5.2 Coupling Rod Joints

Regular maintenance and lubrication will maximise life of the joints.

Replacement of one or both joint assemblies and possibly the coupling rod maybe necessary when wear is apparent.

It is essential to replace all the joint items with genuine Mono parts to ensure maximum life.

3. ASSEMBLY AND DISMANTLING

Sections 4 and 5 contain steps to dismantle and reassemble the pump. All fastenings must be tightened securely and when identified the appropriate torque figures should be used.

3.1 Mechanical Seal Instruction

The Mono wine specification pump has a mechanical seal as standard. The seal is suitable for suction or discharge on gland applications. The seal is a DIN 24960, John Crane 502, single spring, elastomeric bellows mechanical seal.

3.1.1 Mechanical Seal Removal

The mechanical seal is located in the gland section of the pump. The sequence for removal of the seal is as follows:

- Slide thrower (42A) back to reveal shaft pin.
- Remove shaft pin (28A).
- Loosen bolts holding the suction chamber (23A) to the body (01A).
- Remove entire suction chamber, stator and rotating parts assembly from the pump body.
- Remove mechanical seal from shaft with a twisting motion, it may be necessary to lubricate the shaft with vegetable oil.
- Inspect the mechanical seal and shaft for signs of uneven or excessive wear and replace if necessary.

3.2.1. Mechanical Seal Assembly Instruction

- Before the mechanical seal can be fitted to the pump, the assembly of the bearing housing and the shaft / coupling rod must be complete.
- Using vegetable oil on the rubber boot, lightly press the stationary face of the mechanical seal into the gland section (08A). The ceramic face should face out.
- Place the gland section into the pump body as shown in Figure A.
- Measure dimension 'A'. The measurement is from the face of the mechanical seal to the side of the pinhole in the bearing shaft (32B).
- By taking the distance measured as 'A' and adding the specified set length of the mechanical seal (see table) the position of the abutment ring can be determined.

Seal Type S	Set Length
John Crane 502 45mm (L3)	32mm
John Crane 502 55mm (L3)	34mm
John Crane Type 502 65mm (L3)	39.0mm

- **B = A + Set Length**
- Tighten the abutment ring (66A) as shown in Figure B at a distance 'B' back from the shaft pinhole.

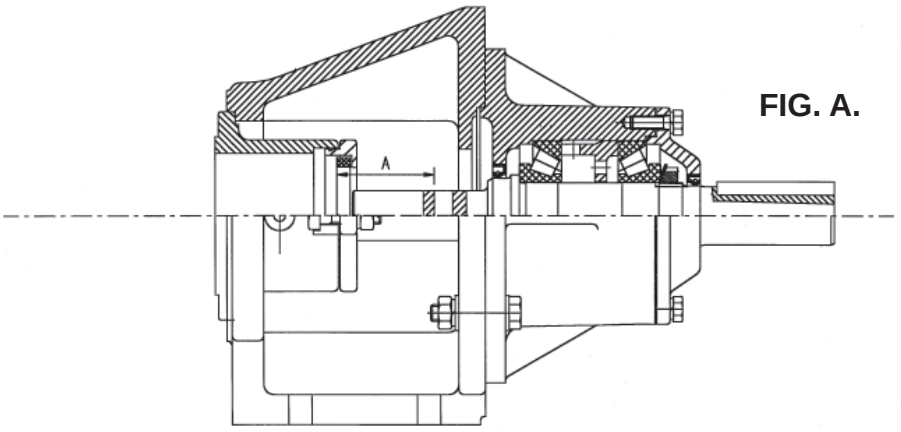


FIG. A.

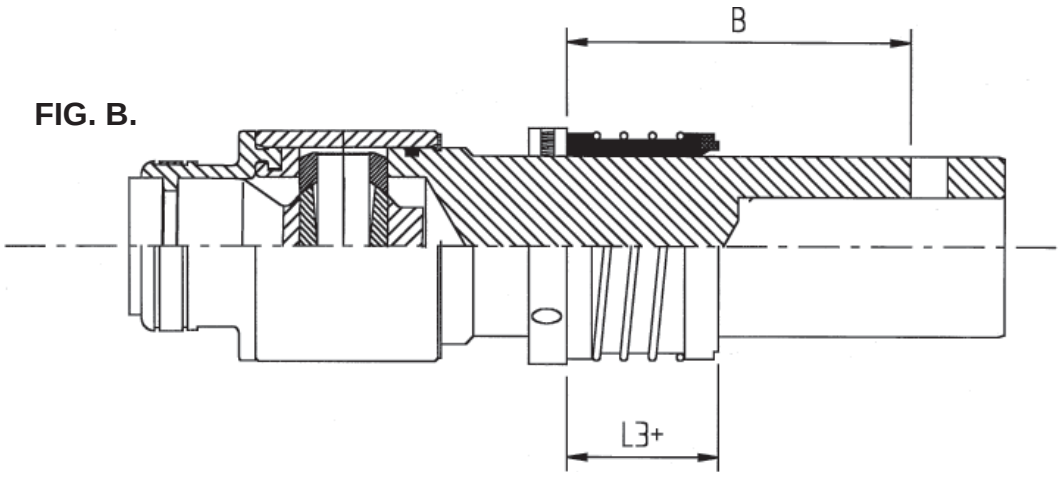


FIG. B.

- Using vegetable oil on the rubber boot, gently slide the rotating face of the mechanical seal onto the shaft, the carbon face should face away from the abutment ring.
- Place the gland and thrower on the shaft and slide the complete assembly together as shown in Figure C.

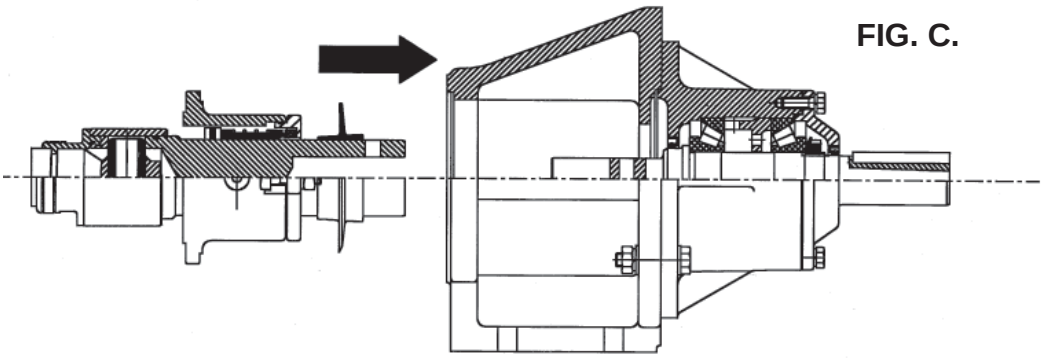


FIG. C.

- Replace the shaft pin (29B) and slide thrower such that it covers the shaft-pin. The finished assembly is shown in Figure D.

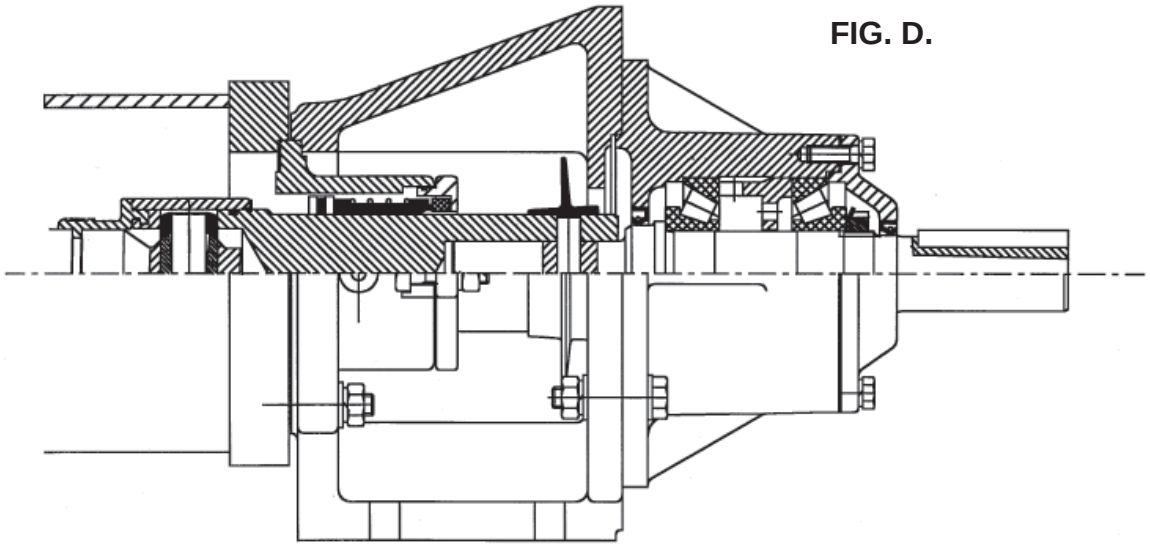


FIG. D.

3.3 Use of items not approved or manufactured by Mono Pumps

The pump and its components have been designed to ensure that the pump will operate safely within the guidelines covered by the legislation. As a consequence Mono Pumps have declared the machine safe to use for the duty specified as defined by the Declaration of Incorporation or Conformity that is issued with this Instruction Manual.

The use of replacement items that are not approved by or manufactured by Mono Pumps may affect the safe operation of the pump and it may therefore become a safety hazard to both operators and other equipment. In these instances the Declaration provided will, therefore become invalid.

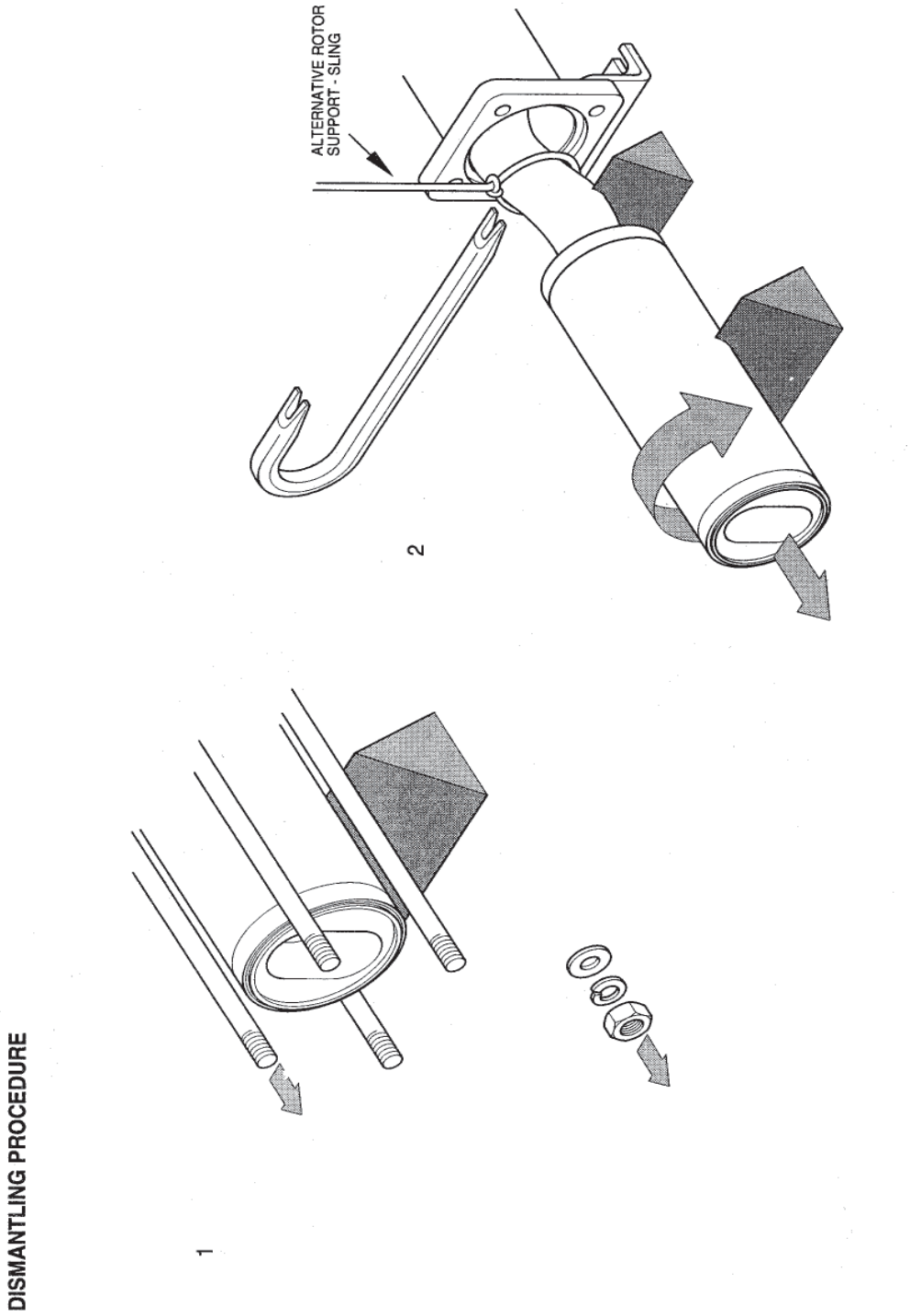
The guarantee referenced in the Terms and Conditions of Sale will also be invalidated if replacement items are used that are not approved by or manufactured by Mono Pumps.

Diagnostic Chart

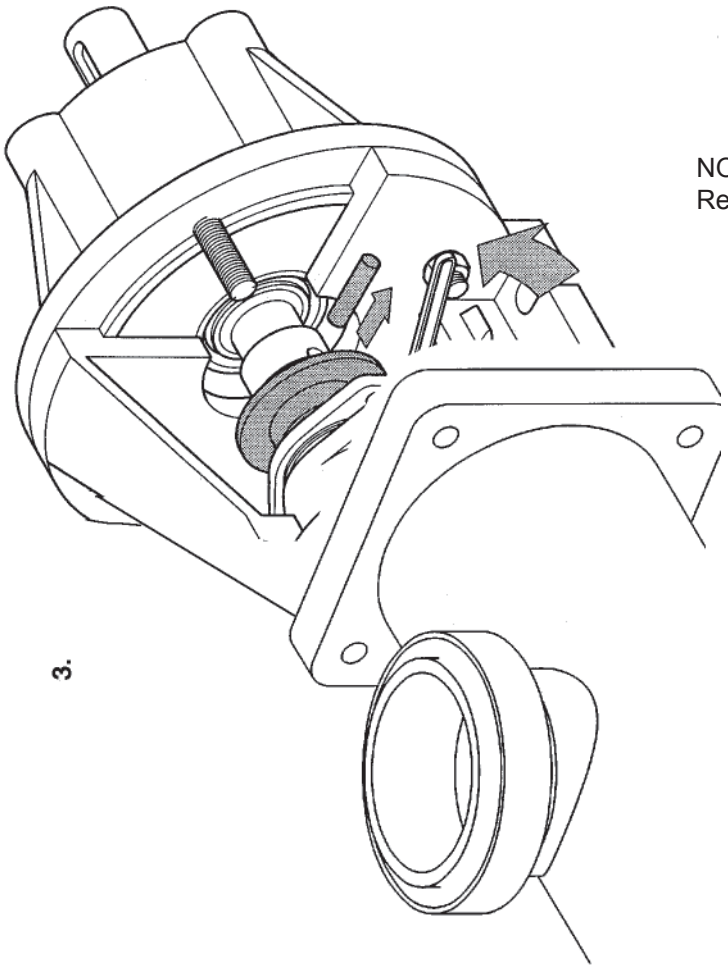
SYMPTOMS		POSSIBLE CAUSES
1.	No discharge	1, 2, 3, 4, 26, 28, 29
2.	Loss of capacity	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 16, 17, 21, 22, 23, 29
3.	Irregular discharge	3, 4, 5, 6, 7, 8, 13, 15, 29
4.	Priming lost after start	3, 4, 5, 6, 7, 8, 13, 15
5.	Pump stalls at start up	8, 11, 24
6.	Pump overheats	8, 9, 11, 12, 18, 20
7.	Motor overheats	8, 11, 12, 15, 18, 20
8.	Excessive power absorbed by pump	8, 11, 12, 15, 18, 20
9.	Noise and vibration	3, 4, 5, 6, 7, 8, 9, 11, 13, 15, 18, 19, 20, 22, 23, 27, 31
10.	Pump element wear	9, 11
11.	Excessive gland or seal wear	12, 14, 25, 30
12.	Gland leakage	13, 14
13.	Seizure	9, 11, 12, 20

LIST OF CAUSES		REMEDIAL ACTIONS	
1.	Incorrect direction of rotation	1.	Reverse motor
2.	Pump unprimed	2.	Bleed system of air / gas
3.	Insufficient NPSH available	3.	Increase suction head or reduce speed / temp
4.	Product vaporising in supply line	4.	Increase NPSH available (see 3 above)
5.	Air entering supply line	5.	Check pipe joints / gland adjustment
6.	Insufficient head above supply vessel outlet	6.	Raise vessel / increase pipe size
7.	Footvalve / strainer obstructed or blocked	7.	Clean out suction line / valves
8.	Product viscosity above rated figure	8.	Decrease pump speed / increase temp.
9.	Product temp above rated figure	9.	Cool the product
10.	Product viscosity below rated figure	10.	Increase pump speed / reduce temp.
11.	Delivery pressure above rated figure	11.	Check for blockages in delivery line
12.	Gland over tight	12.	Adjust gland see O & M instructions
13.	Gland under tight	13.	Adjust gland see O & M instructions
14.	Gland flushing inadequate	14.	Check fluid flows freely into gland
15.	Pump speed above rated figure	15.	Decrease pump speed
16.	Pump speed below rated figure	16.	Increase pump speed
17.	Belt drive slipping	17.	Re-tension belts
18.	Coupling misaligned	18.	Check and adjust alignment
19.	Insecure pump / drive mounting	19.	Check and tighten all pump mountings
20.	Shaft bearing wear / failure	20.	Replace bearings
21.	Worn pump element	21.	Fit new parts
22.	Relief valve chatter	22.	Check condition of valve / renew
23.	RV incorrectly set	23.	Readjust spring compression
24.	Low voltage	24.	Check voltage / wiring sizes
25.	Product entering packing area	25.	Check packing condition and type
26.	Drive train breakage	26.	Check and replace broken components
27.	Negative or very low delivery head	27.	Close delivery valve slightly
28.	Discharge blocked / valve closed	28.	Reverse pump / relieve pressure / clear blockages
29.	Stator turning	29.	Replace worn parts / tighten up stator bolts
30.	Stuffing box "eats" packing	30.	Check for worn shaft and replace
31.	Vee belts	31.	Check and adjust tension or replace

Dismantling



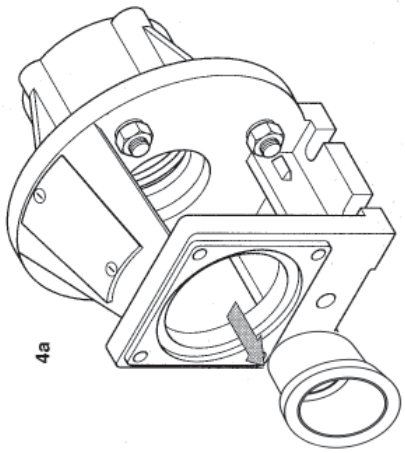
Dismantling

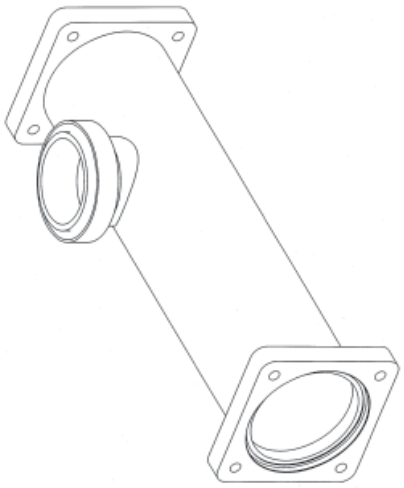


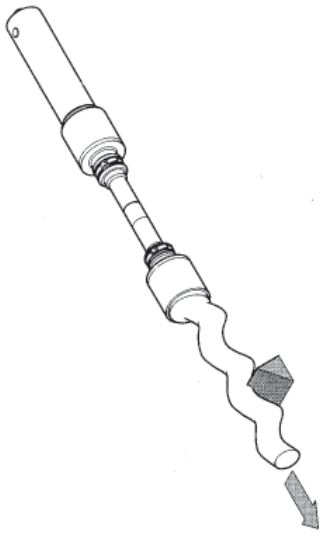
3.

NOTE:
Remove shaft pin.

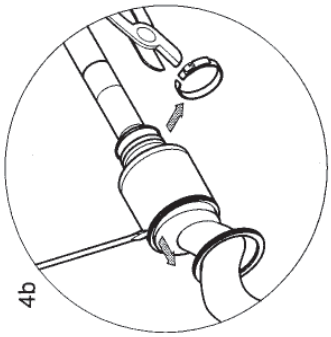
Dismantling

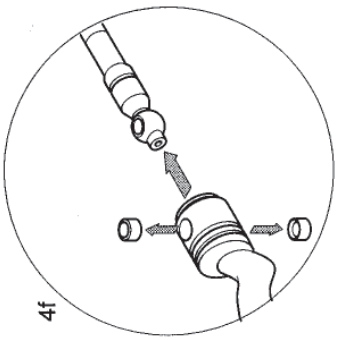


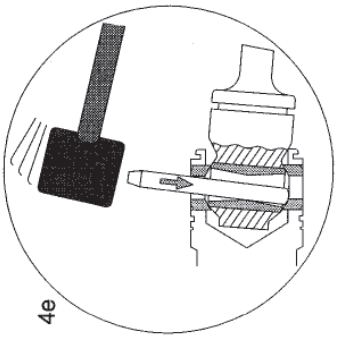


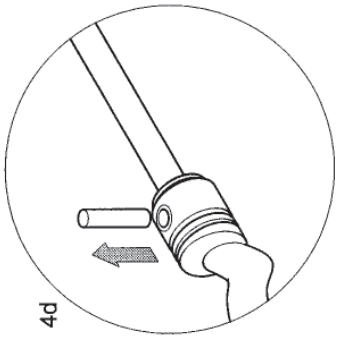


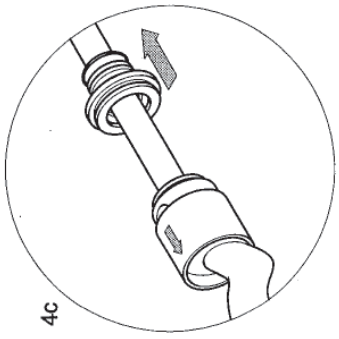
Dismantling







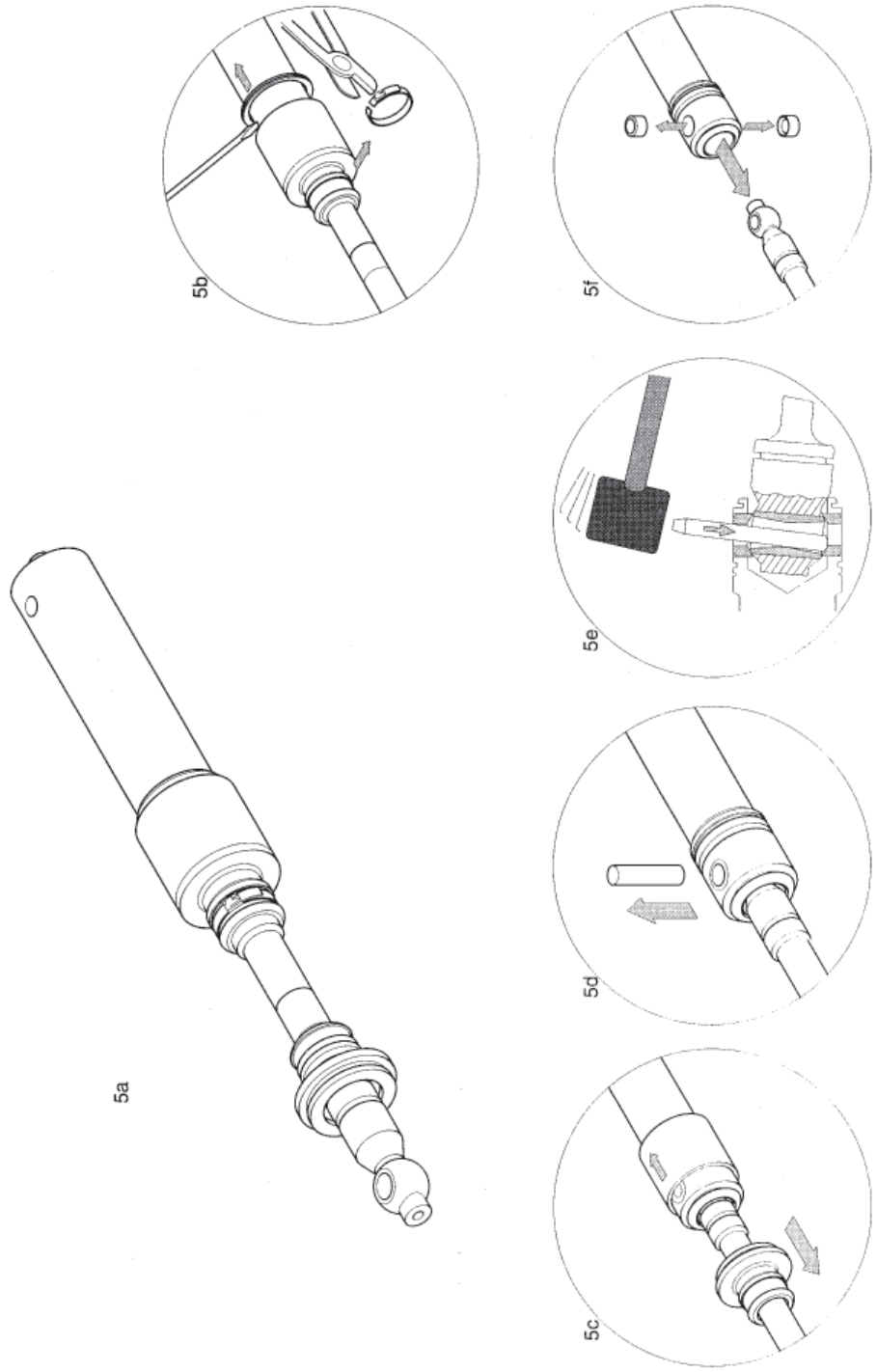




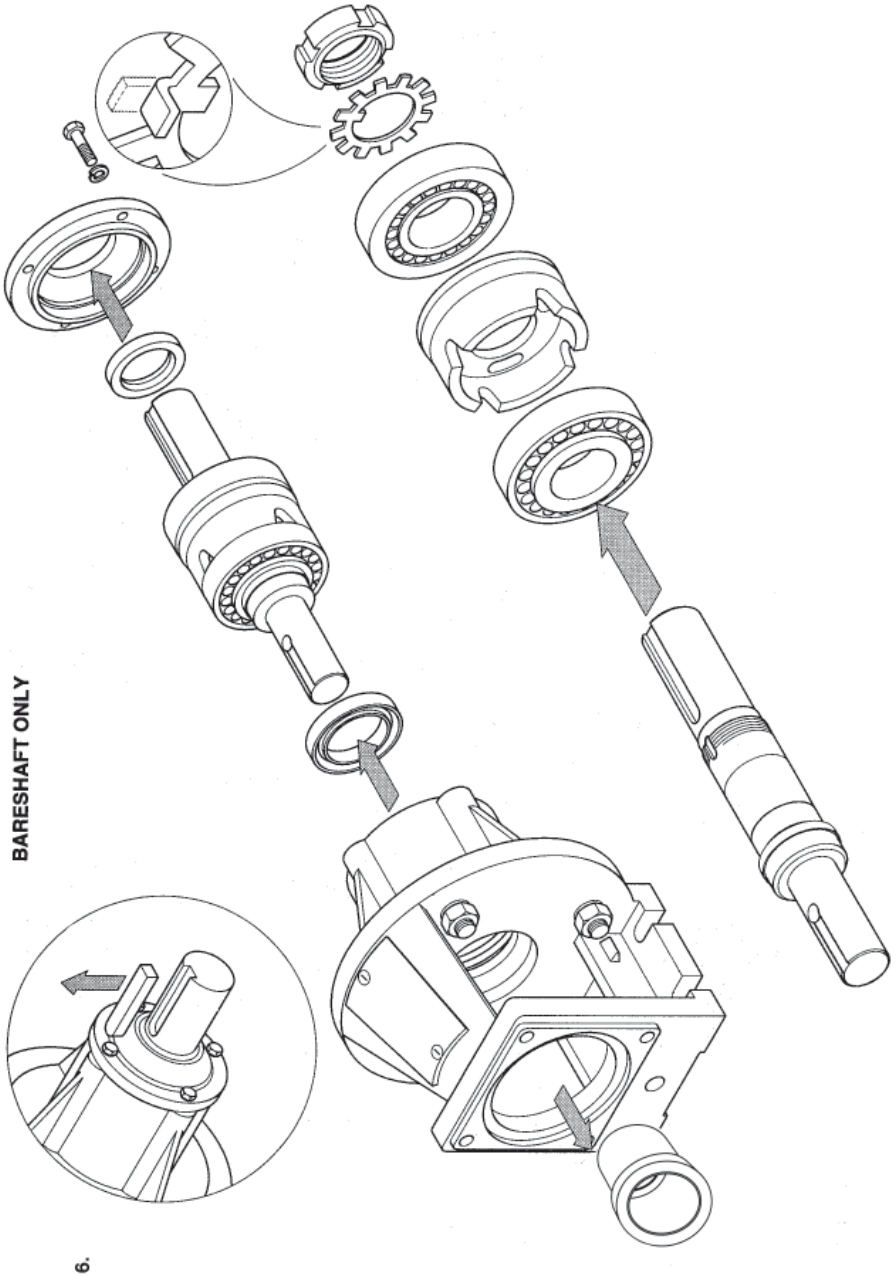
NOV Mono®

One Company, Unlimited Solutions

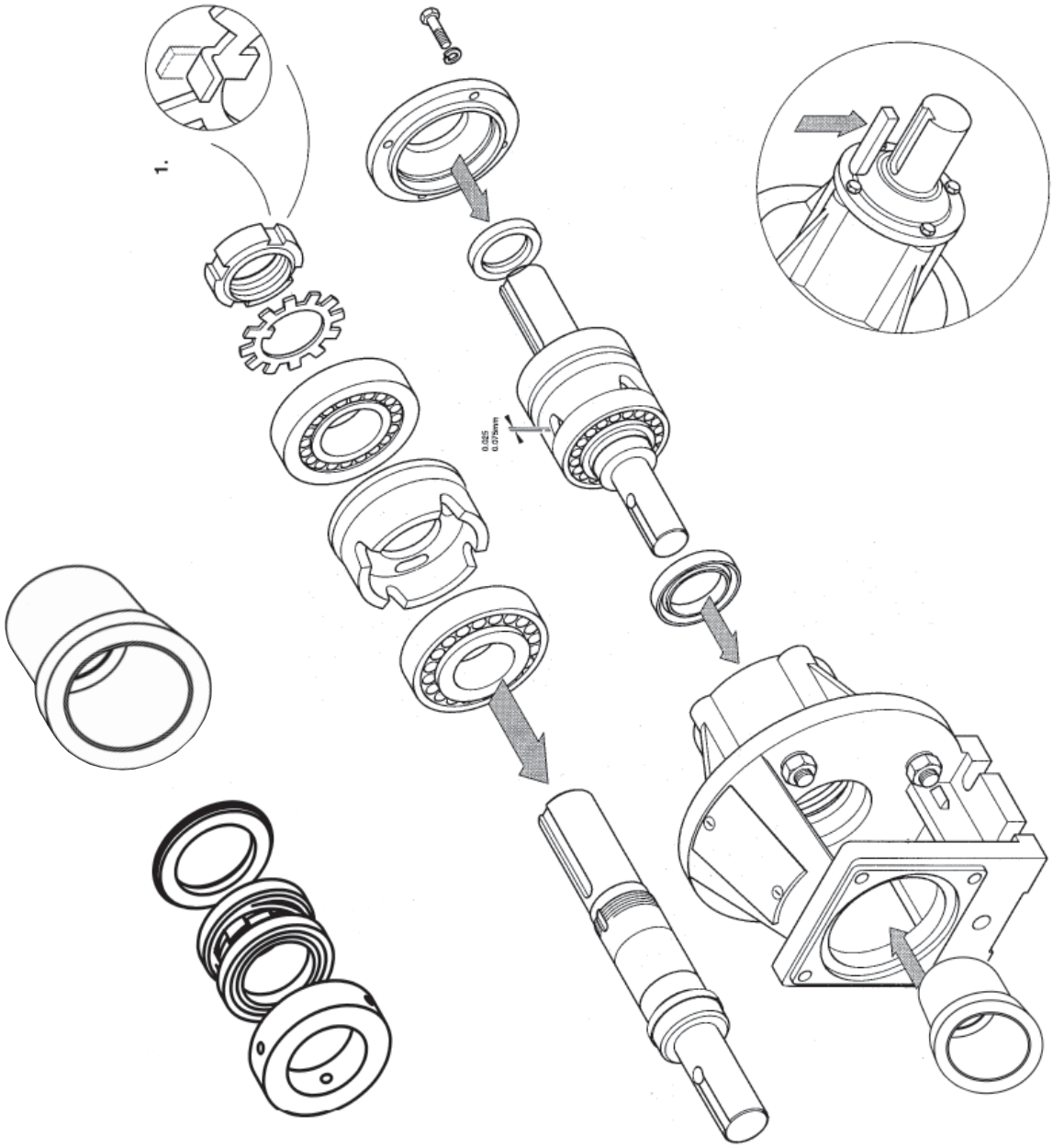
Dismantling



Dismantling



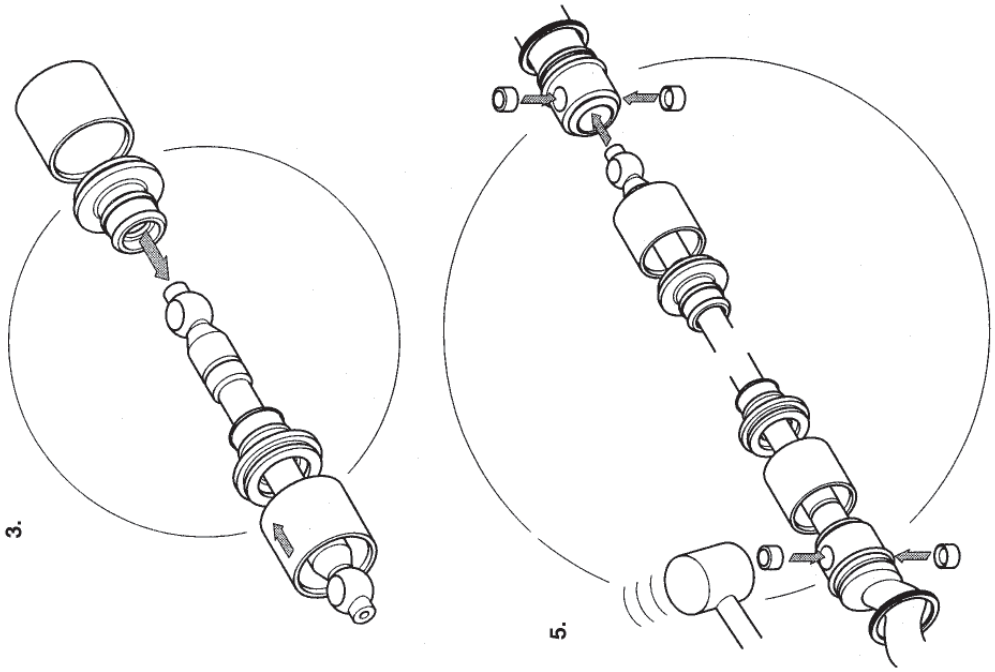
Re Assembly

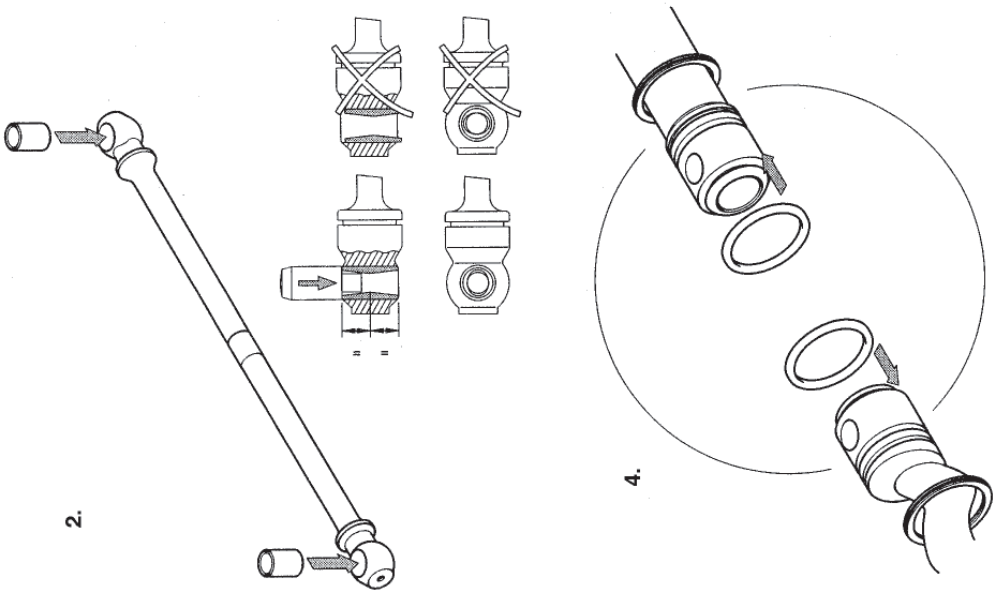


NOV Mono®

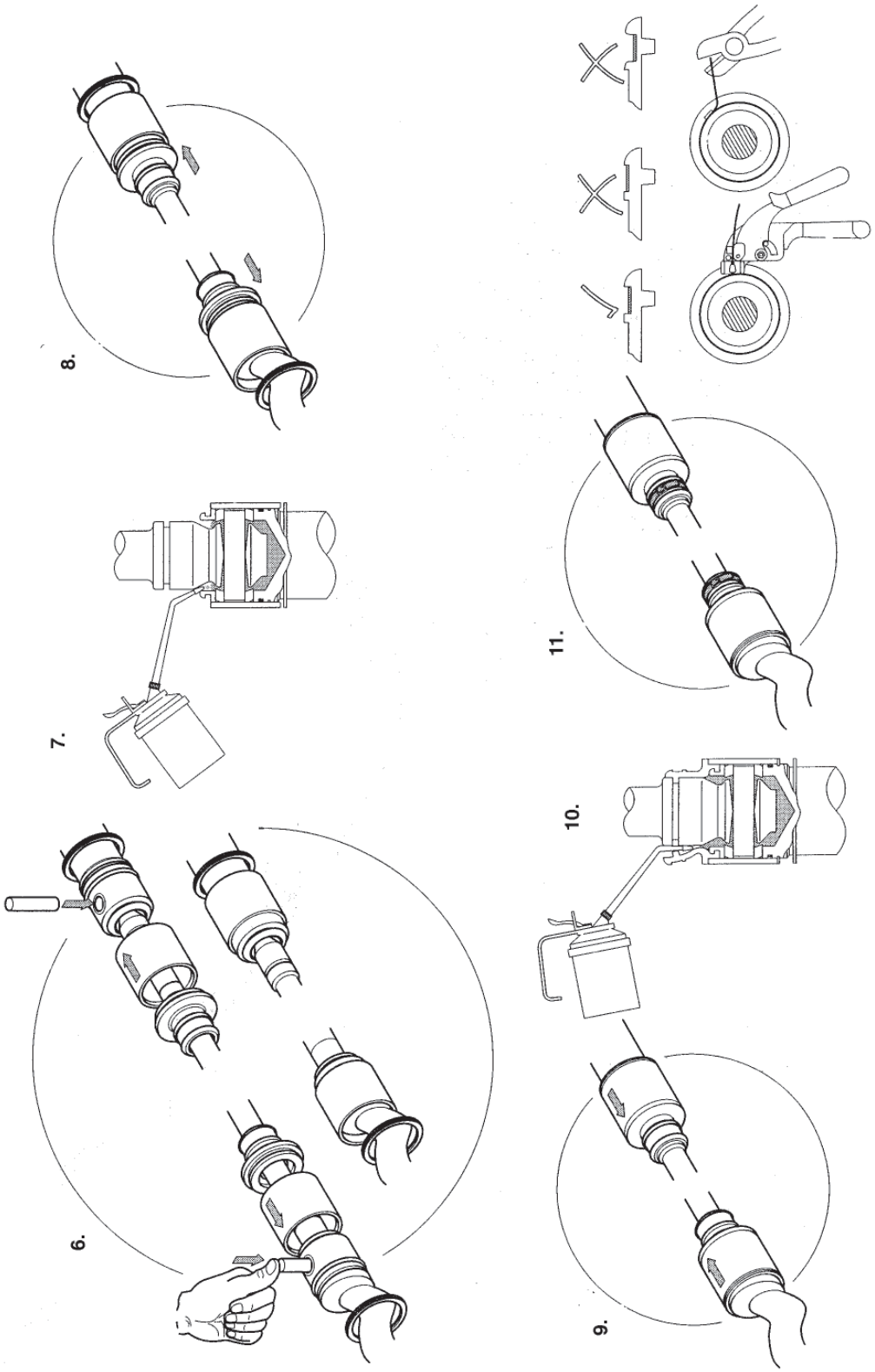
One Company, Unlimited Solutions

Re Assembly

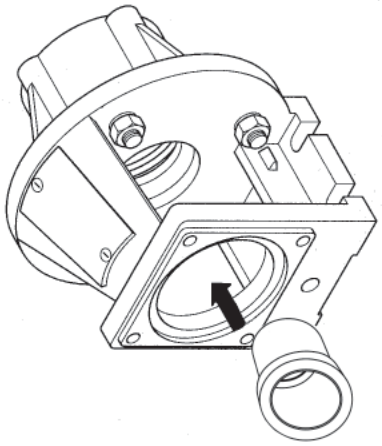


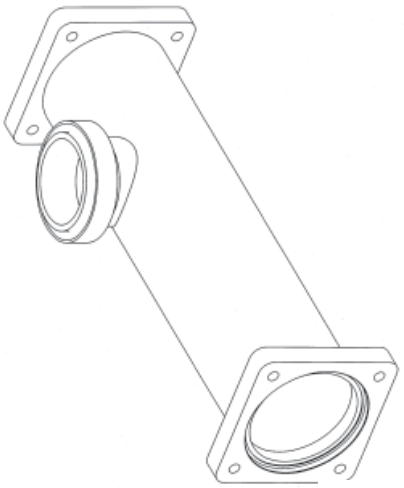


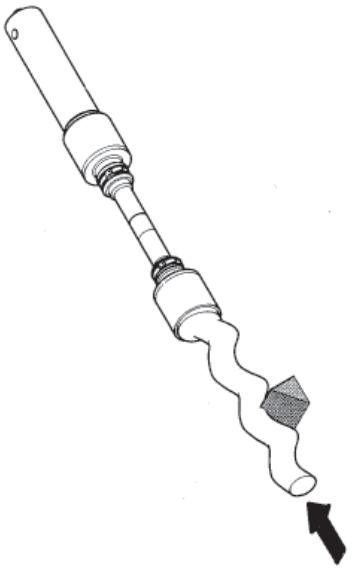
Re Assembly



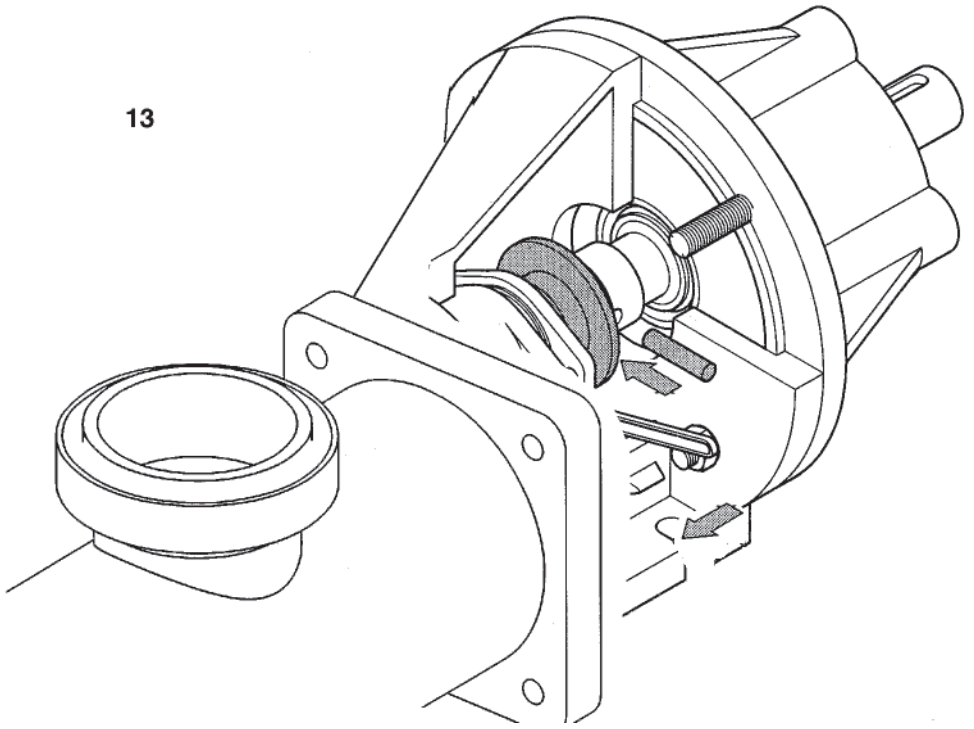
Re Assembly



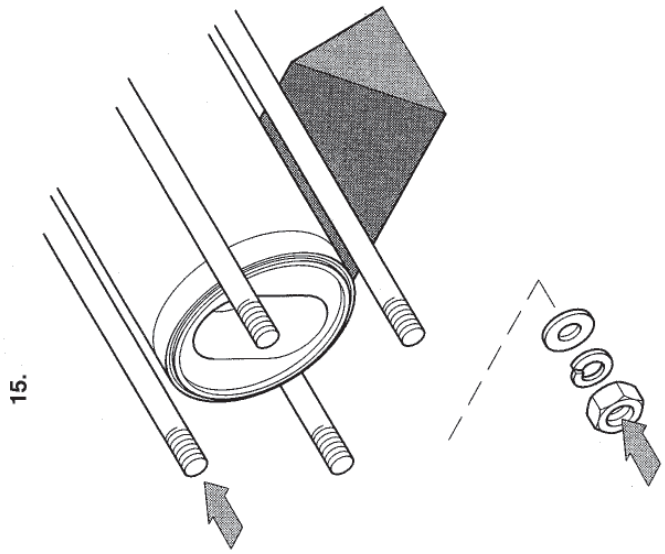


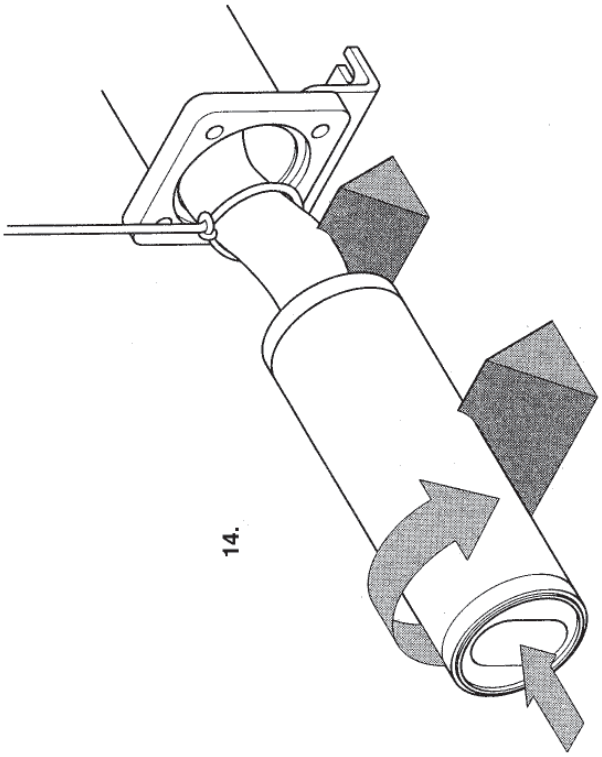


Re Assembly



Re Assembly



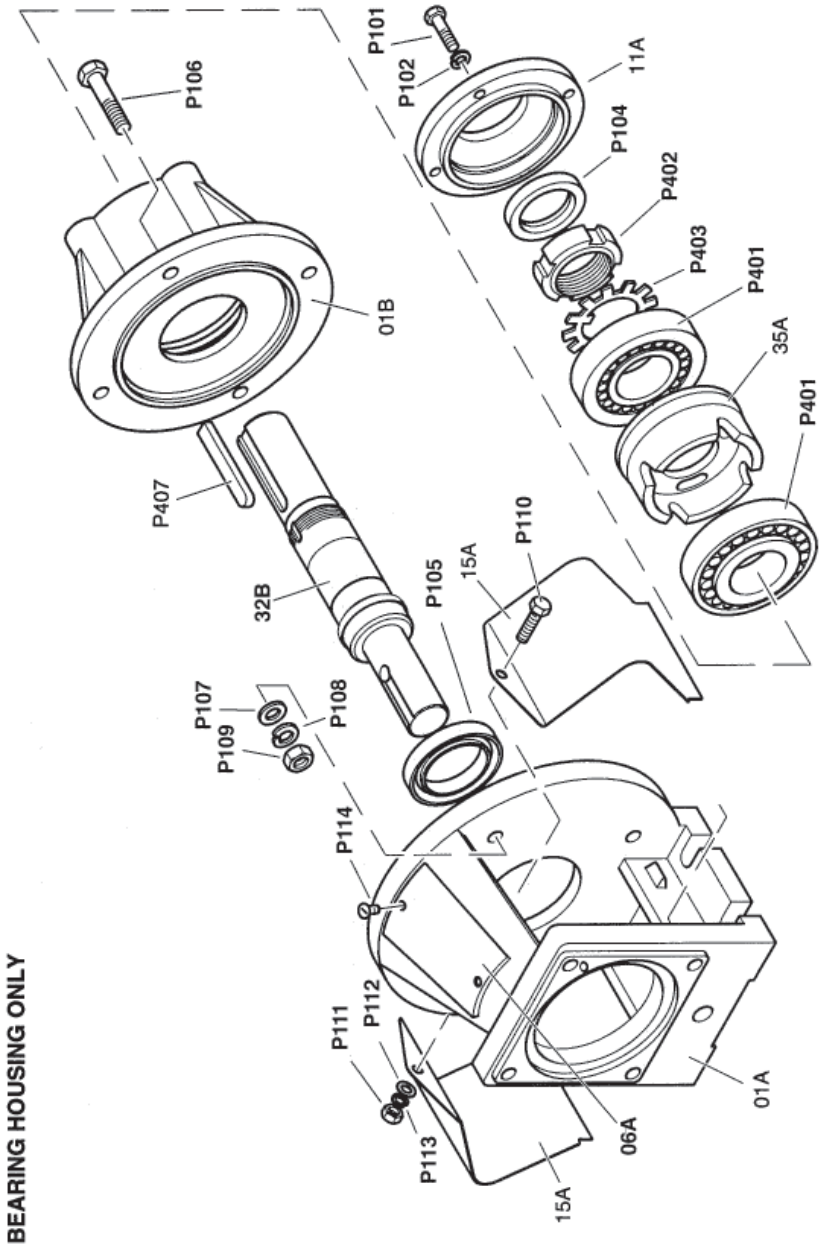


Part Reference Numbers

PART DESCRIPTION	ITEM NO.	QTY.
Body	01A	1
Bearing Housing	01B	1
Nameplate	06A	1
Mechanical Seal	10A	1
Bearing Cover	11A	1
Thrower Guard	15A	2
Gasket	20A	1
Stator	22A	1
Suction Chamber	23A	1
End Cover	24A	1
Rotor	25A	1
Coupling Rod	26A	1
Coupling Rod Bush	27A	2
Rotor/Shaft Bush	27B	4
Seal Cover	28A	2
Coupling Rod Pin	29A	2
Shaft Pin	29B	1
Shaft	32A	1
Drive Shaft	32B	1
Bearing Spacer	35A	1
Thrower	42A	1
Foot	62A	2
Gland Section	65A	1
Abutment Ring	66A	1
Sleeve	75A	2
Tiebar	95A	4

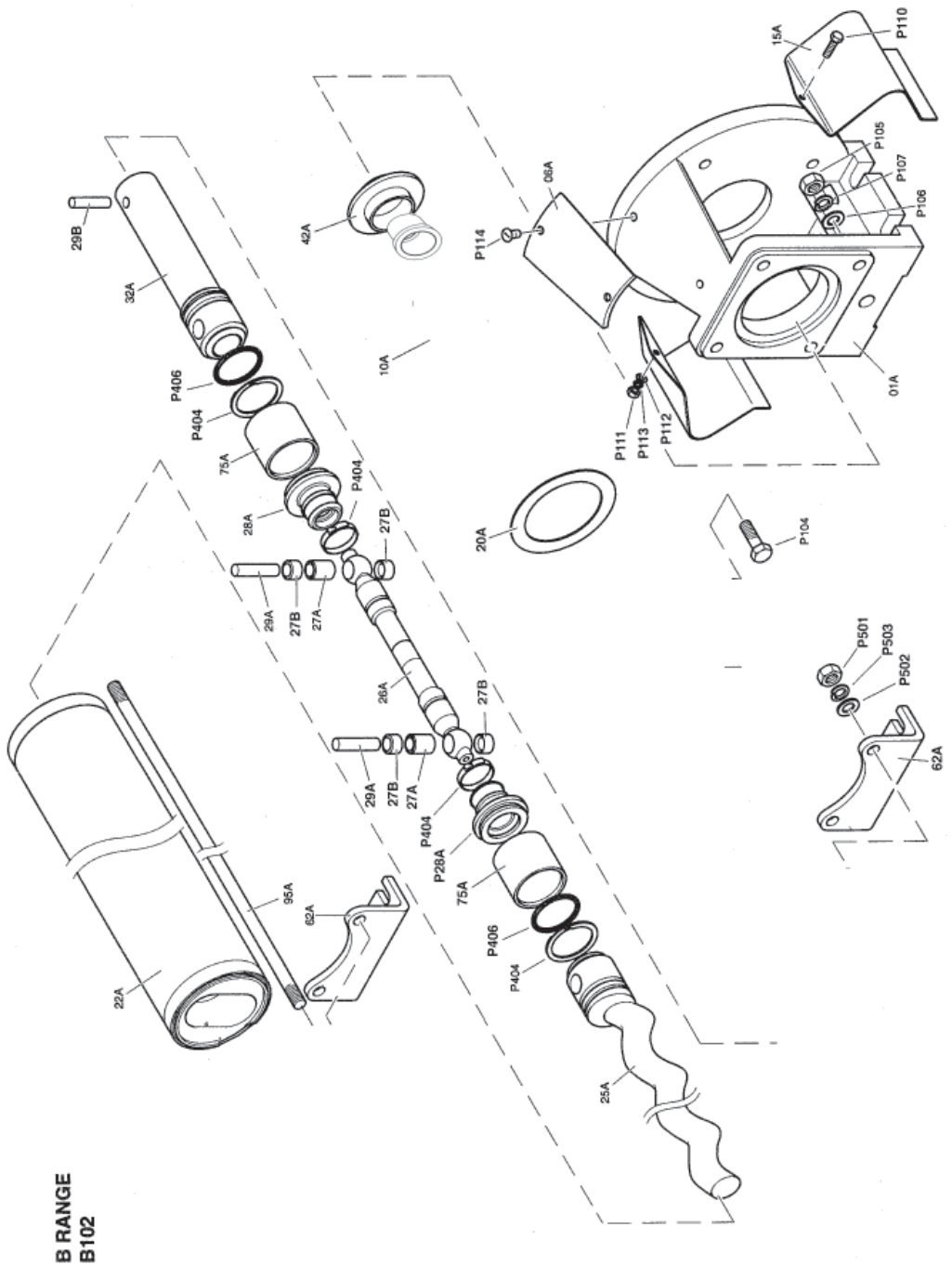
PART DESCRIPTION	ITEM NO.	QTY.
Hex Screw	P101	4
Flat Washer	P102	4
Spring Washer	P103	4
Lipseal (Drive End)	P104	1
Lipseal (Pump End)	P105	1
Hex Screw	P106	4
Flat Washer	P107	8
Spring Washer	P108	4
Hex Nut	P109	4
Screw	P110	1
Nut	P111	1
Washer	P112	1
Spring Washer	P113	1
Drivescrew	P114	4
SOC. Set Screw	P205	3
Taper Bearing	P401	2
Sefco Locknut	P402	1
Sefco Lockwasher	P403	1
Spiral Retaining Ring	P404	2
Tie-Seal Cover	P405	2
Seal Ring (Shaft)	P406	2
Rect. Parallel Key	P407	1
Hex Nut	P501	8
Flat Washer	P502	8
Spring Washer	P503	8

Exploded View



One Company, Unlimited Solutions

Exploded View



Torque Tightening Table

PUMP SIZE	BODY/SUCTION CHAMBER Nm			STATOR TIE BARS Nm
	P526	P105	P530	P506, P503
B041		11		11
B051		11		11
B05K		21		11
B061		21		24
B06K		21		24
B07K		36		24
NOTE: Torque tolerances are +/-5% of stated nominal figures.				

Lubrication

TABLE 1 - COUPLING ROD JOINT LUBRICATION CHART						
LUBRICATION	**B041**	**B051**	**B05K**	**B061**	**B06K**	**B07K**
Kluber Syntheso D460 EP oil	R	R	R	R	R	R
Mobil gear oil SHC 320	SA	SA	SA	SA	SA	SA
Mobilith SHC 007 semi-fluid grease	SA	SA	SA	SA	SA	-
Kluberoil 4UHI 460	F	F	F	F	F	F
Capacity required	15	15	15	30	30	40

R = Recommended
SA = Suitable Alternative
F = Food Applications only

RECOMMENDED SERVICE INTERVALS

1. Inspect and lubricate every 3000 operating hours.
2. If further advice is required relating to service intervals for specific arduous applications please contact Mono Pumps.

Warranty

1. Pumps manufactured by Mono Pumps (Australia) Pty Ltd are covered by warranty for a period of twelve months from installation.

2. Mono Pumps will make good by repair, or at their option, the replacement of faulty parts under warranty, providing always that:

- The equipment was correctly installed and properly used in accordance with Mono Pumps Installation and Operating Instructions and accepted codes of good engineering practice.
- Any claim under warranty arises solely from faulty design, material or workmanship.
- Repairs are carried out with the written approval of Mono Pumps (Australia) Pty Ltd who may choose to carry out the repair themselves or at their option nominate an approved repairer for the purpose.
- All costs other than the direct repair costs are borne by the purchaser.

3. Auxilliary equipment not of Mono Pumps manufacture but supplied by Mono Pumps as part of a package will be protected by the original manufacturers warranty. Mono Pumps warranty is limited to that extent.

4. Mono Pumps warranty does not cover any of the following:

- Claims for third party liability for damage caused by the failure of any of the company's products.
- Damage caused by abnormal operating conditions, war, violence, storm cataclysm or any other force.
- Damage caused by the equipment being used for an application for which the product is not recommended.

5. The decision of Mono Pumps in relation to any claims or disputes over warranty is final.

6. The warranty is in lieu of all other warranties and conditions expressed or implied, written or oral, statutory or otherwise, which are hereby negated and excluded.

7. This express warranty does not exclude any conditions of warranty implied by the Trade Practices Act 1974 or separate State laws and is in addition to any other right that the original purchasers or any subsequent purchaser may have at law.

The equipment covered by this warranty is supplied under the conditions detailed in Mono Pumps (Aust) Pty Ltd "Conditions of sale" which should be read in conjunction with the statements herein.

In the case of claim please contact your Authorised Mono Pumps Dealer or contact Mono Pumps (Australia) Pty Ltd direct with details.

Europe

Mono Pumps Ltd, Martin Street, Audenshaw
Manchester, M34 5JA, England
T. +44 161 339 9000
E. info@mono-pumps.com

D.M.I EST, 56, rue du Pont
88300 Rebeuville, France
T. +33 3 29 94 26 88
E. dmi-est@dmi-est.fr

Americas

Monoflo Inc., 10529 Fisher Road
Houston, Texas 77041, USA
T. +1 713 980 8400
E. monoflo@nov.com

Monoflo S.A., Ing Huergo 2239
(1842) Monte Grande
Pcia. de Buenos Aires, Argentina
T. +54 11 4290 9940/50
E. info.monoflo@nov.com.ar

Monoflo Canada, 6010 – 53rd Ave
Alberta, Lloydminster
T9V2T2, Canada
T: + 1 780 875 5584
E: info.monoflo@nov.com

Asia

Mono Pumps Ltd, Building 5,
Madong Industrial Park, 1250 Sicheng Rd
Malu Town, Jiading District, Shanghai 201801
T. +86 21 3990 4588
E. monoshanghai@nov.com

Australasia

Mono Pumps (Australia) Pty Ltd
338-348 Lower Dandenong Road
Mordialloc, Victoria 3195, Australia
T. 1800 333 138
E. ozsales@mono-pumps.com

Mono Pumps (New Zealand) Ltd
35-41 Fremlin Place, Avondale
Auckland, 1026, New Zealand
T. +64 9 829 0333
E. info@mono-pumps.co.nz

Melbourne	T.	03 9580 5211	F.	03 9580 6659
Sydney	T.	02 8536 0900	F.	02 9542 3649
Brisbane	T.	07 3350 4582	F.	07 3350 3750
Adelaide	T.	08 8447 8333	F.	08 8447 8373
Perth	T.	08 9303 0444	F.	08 9303 4430
Darwin	T.	08 8931 3300	F.	08 8931 3200
Kalgoorlie	T.	08 9022 4880	F.	08 9022 3660
Christchurch NZ	T.	+64 3 341 8379	F.	+64 3 341 8486

www.monopumps.com

One Company, Unlimited Solutions