

AnchorZipJet-5

Operator Manual

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WARRANTY POLICY

Tritech International Limited herein after referred to as **TIL**

TIL warrants that at the time of shipment all products shall be free from defects in material and workmanship and suitable for the purpose specified in the product literature.

The unit/system warranty commences immediately from the date of customer acceptance and runs for a period of 365 days. Customer acceptance will always be deemed to have occurred within 72 hours of delivery.

Note: Any customer acceptance testing (if applicable) must be performed at either TIL premises or at one of their approved distributors unless mutually agreed in writing prior to despatch.

Conditions:

These include, but are not limited to, the following:

- 1 The warranty is only deemed to be valid if the equipment was sold through TIL or one of its approved distributors.
- 2 The equipment must have been installed and commissioned in strict accordance with approved technical standards and specifications and for the purpose that the system was designed.
- 3 The warranty is not transferable, except or as applies to Purchaser first then to client.
- 4 TIL must be notified immediately (in writing) of any suspected defect and if advised by TIL, the equipment subject to the defect shall be returned by the customer to TIL, via a suitable mode of transportation and shall be freight paid.
- 5 The warranty does not apply to defects that have been caused by failure to follow the recommended installation or maintenance procedures. Or defects resulting from normal wear & tear, incorrect operation, fire, water ingress, lightning damage or fluctuations in vehicles supply voltages, or from any other circumstances that may arise after delivery that is outwith the control of TIL.
(**Note:** The warranty does not apply in the event where a defect has been caused by isolation incompatibilities.)
- 6 The warranty does not cover the transportation of personnel and per diem allowances relating to any repair or replacement.
- 7 The warranty does not cover any direct, indirect, punitive, special consequential damages or any damages whatsoever arising out of or connected with misuse of this product.
- 8 Any equipment or parts returned under warranty provisions will be returned to the customer freight prepaid by TIL
- 9 The warranty shall become invalid if the customer attempts to repair or modify the equipment without appropriate written authority being first received from TIL.
- 10 TIL retains the sole right to accept or reject any warranty claim.
- 11 Each product is carefully examined and checked before it is shipped. It should therefore be visually and operationally checked as soon as it is received. If it is damaged in anyway, a claim should be filed with the courier and TIL notified of the damage.

Note: TIL reserve the right to change specifications at any time without notice and without any obligation to incorporate new features in instruments previously sold.

Note: If the instrument is not covered by warranty, or if it is determined that the fault is caused by misuse, repair will be billed to the customer, and an estimate submitted for customer approval before the commencement of repairs.

F167.1

SAFETY STATEMENTS & CE MARKING

The installation of the pump is fully the responsibility of the user. It is powered by high pressure hydraulics and contains moving parts. Full consideration has been given to the requirements for CE marking and the relevant safety information is contained within this manual. Since the pump as supplied as a subsystem and its safe use is installation specific, actual compliance is the responsibility of the installer. It must be operated in accordance with the following instruction manual.. Failure to follow the recommendations of this manual may lead to safety hazards or equipment failure.



Danger!

Throughout the manual certain safety related comments and requirements that could lead to injury or loss of life will be highlighted to the operator by indications in the margin identified as opposite.



Caution!

Throughout the manual certain safety related comments and requirements that could result in damage to the product or other property will be highlighted to the operator by indications in the margin identified as opposite.

TECHNICAL SUPPORT

Contact your local agent or Tritech International Ltd

	Mail	<i>Tritech International Ltd.</i> Peregrine Road, Westhill Business Park, Westhill, Aberdeen, AB32 6JL, UK
	Telephone	++44 (0)1224 744111
	Fax	++44 (0)1224 741771
	Email	support@tritech.co.uk
	Web	www.tritech.co.uk

An out-of-hours emergency number is available by calling the above telephone number

If you have cause to use our Technical Support service, please ensure that you have the following details at hand **prior** to calling:

- System Serial Number (if applicable)
- Fault Description
- Any remedial action implemented
- Software Revision (if applicable)

Due to the expansion of equipment capabilities and the fact that new sub-modules are continually being introduced, this manual cannot detail every aspect of the operation.

INTRODUCTION

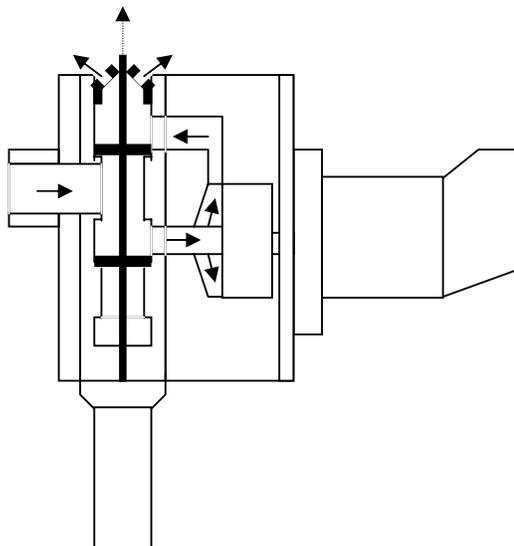
The new **AnchorZip-05** has been developed from the highly successful **ZipPump** and **ZipJet** range of products.

The pump has been specifically designed to be used for installation and extraction of suction anchors and piles. It incorporates a hydraulic motor powering a highly efficient centrifugal impeller. The water flow to and from the impeller is controlled by a reversing valve which allows water to be drawn from or exhausted to the anchor connection port. The reversing valve is operated by a powerful hydraulic actuator.

PRINCIPLES OF OPERATION

The motive pump is a centrifugal impeller driven by an F11-5 Volvo hydraulic motor. The water flow to the centre of the impeller and from periphery is taken via a bi-directional valve to a 1 ½" BSPP port for connection to the suction anchor. The valve contains two discs mounted on a spindle operated via a hydraulic actuator. Moving the spindle positions the disc onto valve seats in the valve block to either connect the water inlet to the centre of the impeller when in suction mode or to the periphery of the impeller when in blowing mode.

Depending on the hydraulic supply available the unit can provide dead head pressure differentials of up to 6 bar and water flows of up to 40 m³/hr.



Pump with valve in suction position.

INSTALLATION.



Do not power up the pump or hydraulic valve actuators until all hoses are properly connected to the pump.

There is a serious risk of injury to fingers if inserted into the water port.

If the user wishes to power up the motor or actuator before the installation is complete it is his responsibility to ensure that suitable safety measures are in place to prevent injury.

Mechanical Installation

The pump may be mounted in any orientation on the vehicle. The main stainless steel central plate has 4 mounting points for 12mm bolts– one at each corner .

Connection to Anchor

A 1 ½ “ BSPP port is provided for the connection to the anchor. It is recommended that the interconnection is kept as short as possible with a minimum of 38mm internal bore to avoid significant pressure drops along the hose during operation. Flow restrictions can drastically increase the duration of an anchor installation.

Anchor Port Filter

If it is anticipated that any large debris may be drawn through the pump during suction operations it is recommended that a filter mesh is used to exclude the larger particles .

Mesh types

Both rectangular and circular aperture suction screens may be used.

Square mesh	max. 3mm aperture
Circular perforations	max. 4mm dia
Total free flow area	min 0.005m ²

Hydraulic Installation.

Hydraulic oil

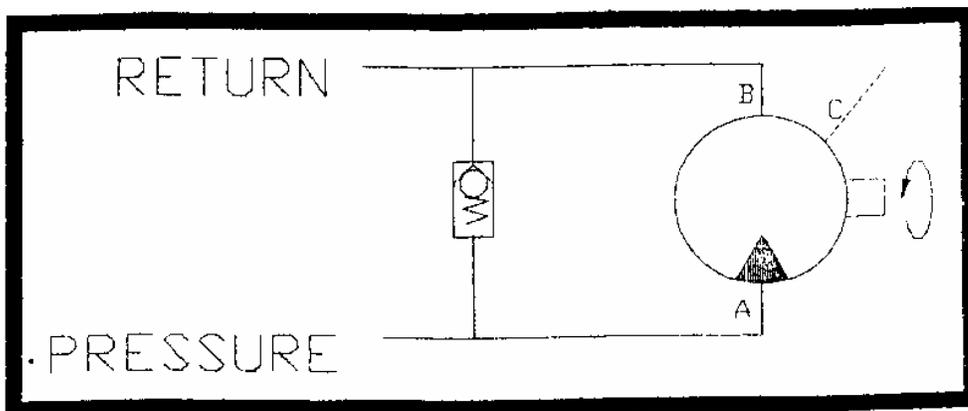
The pump should be operated using a premium grade mineral based hydraulic oil of ISO VG 22 to 32.

Filtration

The hydraulic system filtration must be to a minimum of 10um absolute standard. A 10um nominal standard is regarded as inadequate.

The recommended filtration is UN elements produced by Pall Industrial Hydraulics Ltd. or equivalent products.

Hydraulic Hook-up



The pump is configured for correct rotation when the hydraulic supply is connected to the "A" port of the Volvo motor and the return line to the "B" port.



It is not permissible to common up the drain line with return flow lines.

It is strongly recommended that self sealing quick disconnects are not used on the drain line. Use of such fittings is at the users risk. If such a connection is used then it is mandatory to ensure that it has been fully and correctly fitted prior to starting the motor. Failure to do so may result in pressurisation of the motor casing which could explosively burst under system hydraulic pressure with considerable risk of personal injury.

To avoid shock loading the motor when the supply is stopped it is essential to provide the check valve shown. This will allow the motor to run down steadily rather than coming to an abrupt stop.

Specification for check valve.

1/2" check valve, cracking pressure 0.5 bar.

Recommended valve

Integrated Hydraulics FPR-1/22-0.5

Hydraulic fittings.

The following fittings are supplied as standard:-

Motor A&B ports	No 8 JIC male
Motor case drain	No 4 JIC male

If it is desired to change these for any reason then the motor port threads are

Motor A&B ports	1/2" BSP parallel
Motor case drain	1/4" BSP parallel

Safety Note



Danger!

Never use the same size fitting for pressure hoses and the case drain. If this is done there is a significant risk of incorrect hook-up causing pressure to be applied to the motor case which could cause the case to burst explosively with high risk of personal injury.

Required hydraulic flow

For the Volvo F11-5 motor

The vehicle hydraulic system should be capable of supplying a minimum 30l/min at 195 bar to the motor ports. Less than this will adversely affect performance.

At this hydraulic flow rate the pump will achieve approximately 2 Bar differential pressure at dead head. See performance curve at the end of this manual for more details.

The maximum permissible flow is 45l/min at 240bar.

Achieving these flows in an unloaded condition is no guarantee that the supply can actually be met in the working condition.

It is recommended that the installation be checked using a hydraulic flowmeter equipped with a loading valve which can simulate the motor running under load.

Testing In Air



Under no circumstances must the flow be allowed to exceed 70l/mi when testing in air. There is no back pressure on the impeller to control its speed and many vehicle hydraulic systems are capable of higher deliveries when there are no thrusters running. Over speeding the motor can cause catastrophic failure.

To avoid excessive wear and the possibility of ceasing the impeller and body, the unit should not be run for extended periods out of the water (More than 30 seconds). This is especially true when the unit is new. Absence of water around the plastic removes the natural cooling mechanism and may result in the moving parts becoming misshapen due to heat.

Reverse valve.

An independent control is required for the reverse valve actuator.

The actuator can be connected to any standard three position 4 way solenoid valve. Pilot operated check valves can be advantageous, but a closed centre spool valve is adequate..

The minimum supply pressure for reliable operation is 110bar.

The actuators are rated for working pressures of up to 240bar.

Actuator connection fittings

The actuators are supplied with No 4 JIC male fittings.

Hydraulic motor shaft seals

Volvo produce two seals.

"N" type coloured blue and

"H" type coloured red.

The "H" type is a high pressure seal and fitted as standard on the ZIPJet Ultra.



Replacement of seals with anything other than a genuine Volvo seal (or Tritech supplied seal) will invalidate warranty

MAINTENANCE



Danger!

Do not power up the pump or hydraulic valve actuators until all hoses are properly connected to the pump.

There is a serious risk of injury to fingers if inserted in either the power water intake or the pump delivery port.

If the user wishes to power up the motor or actuator before the installation is complete it is his responsibility to ensure that suitable guards or other safety measures are in place to prevent injury.

The pump is designed for low maintenance operation.

The main materials are stainless steel and wear resistant polymer plastics.

The only internal moving parts that may need maintenance are

- The power pump impeller

- The hydraulic motor

- The reverse valve spool components

Basic maintenance procedures

Pre- dive

Visual check for external damage

- Check hoses are secure

- Check mountings are secure

In-active time

If the vehicle will be in-active for more than 48 hours or at demob

Run a fresh water hose into the anchor port for a few minutes, then spin the hydraulic motor for about 15 seconds (taking care not to allow it to over speed).

Storage

If the pump is removed from the vehicle, then the hydraulic ports should be blanked off with metal caps and the unit washed out with fresh water.

Leave the actuator valves in their retracted position.

Visually inspect the leading edges of the power pump impeller for damage and erosion.

Basic fault finding

Poor performance

Check that the reverse valve is opening and shutting fully.

Check that the suction hose reinforcement is intact and that there is no sign of the hose collapsing under suction.

Remove the anchor connection hose from the pump and check that it is not obstructed by any foreign material.

Check that the hydraulic motor runs freely without excessive noise or vibration.

Check the pressure and Return lines are connected to the correct motor ports.

Check that the hydraulic flow meets the specification.

Dismantling

Tools and materials

The following tools are required to work on the pump.

Set of metric Allen keys

Dead blow hammer

3 jaw puller

Loctite - "Studlock" for reassembly

Removal of hydraulic motor and power pump impeller

Disconnect all hydraulic hoses from the motor and fit caps to the ports

Remove the 2 bolts holding the motor to the pump.

Remove the motor/impeller assembly.

Remove the retaining set screw and end-cap from the end of the motor shaft

Using a suitable 3 jaw puller remove the impeller from the motor shaft

Removal of the reversing valve

Disconnect all hoses and remove the pump from the vehicle.

Remove the 4 M12 bolts from the cover plate.

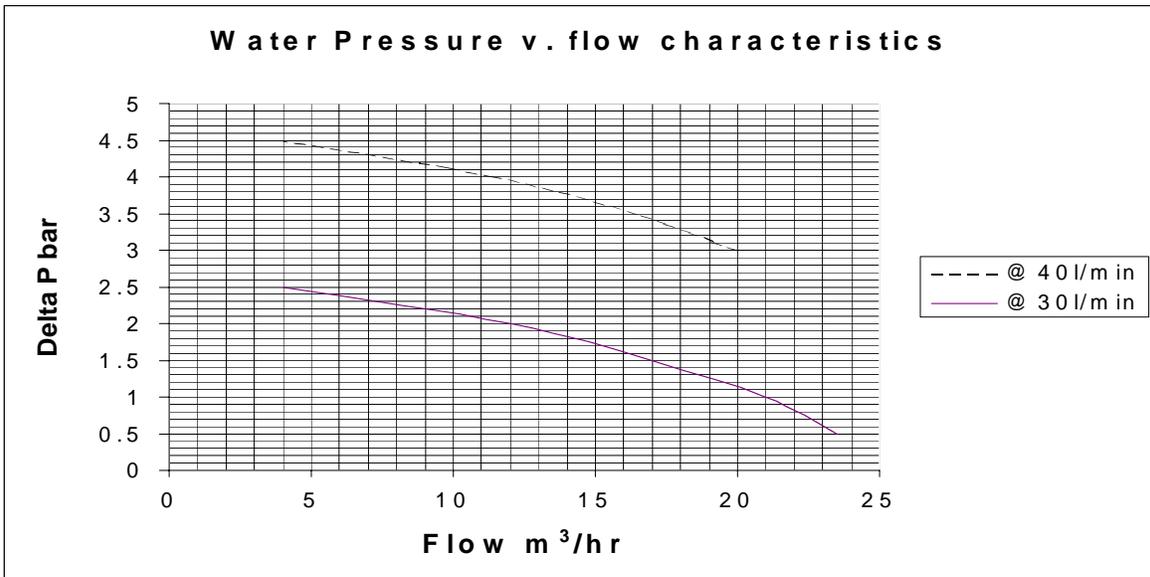
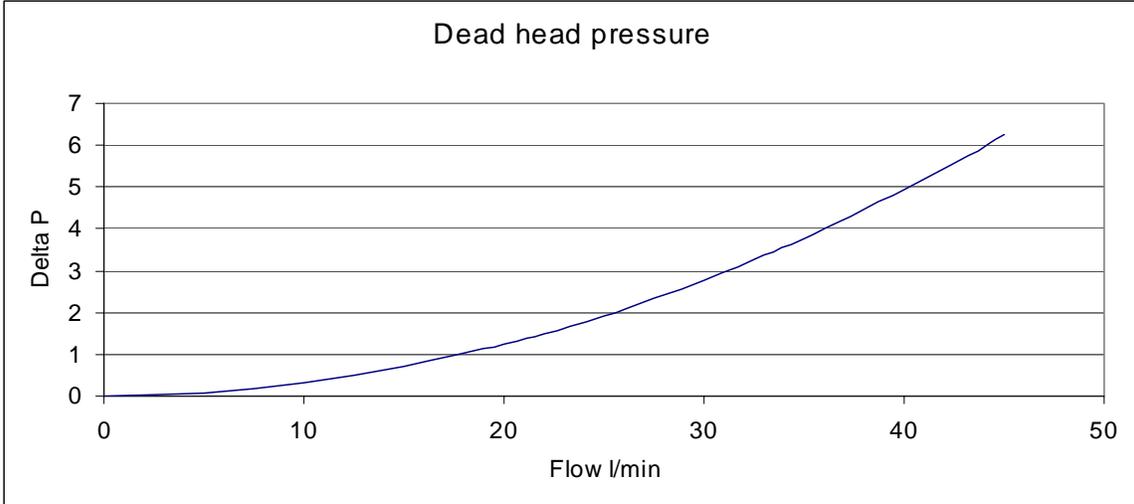
Remove the front cover plate and reversing valve from the pump assembly.

Full details of assembly and set up of the actuator and valve are given in the Appendix.

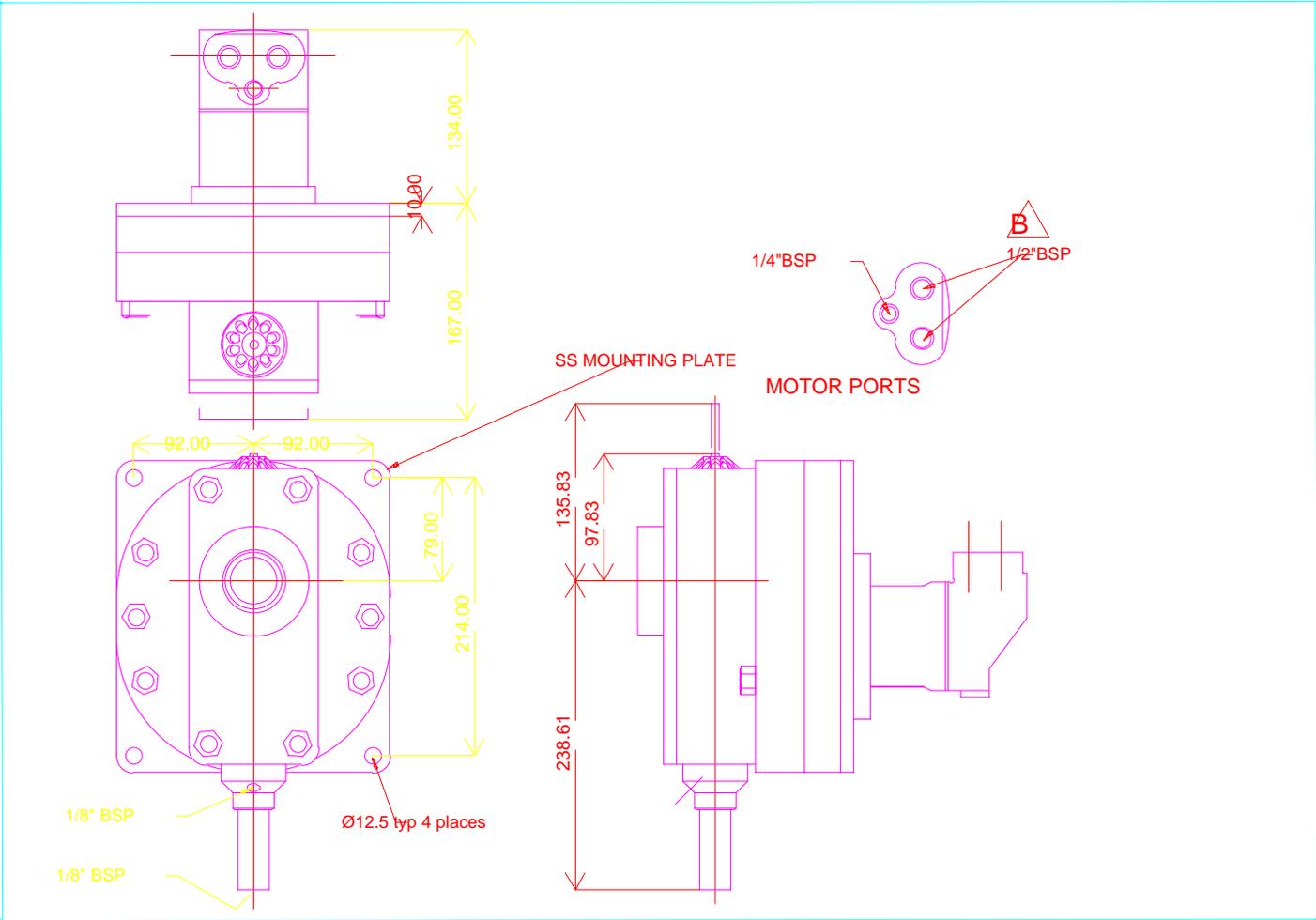
Reassembly

Reassembly is the reverse of the above procedures

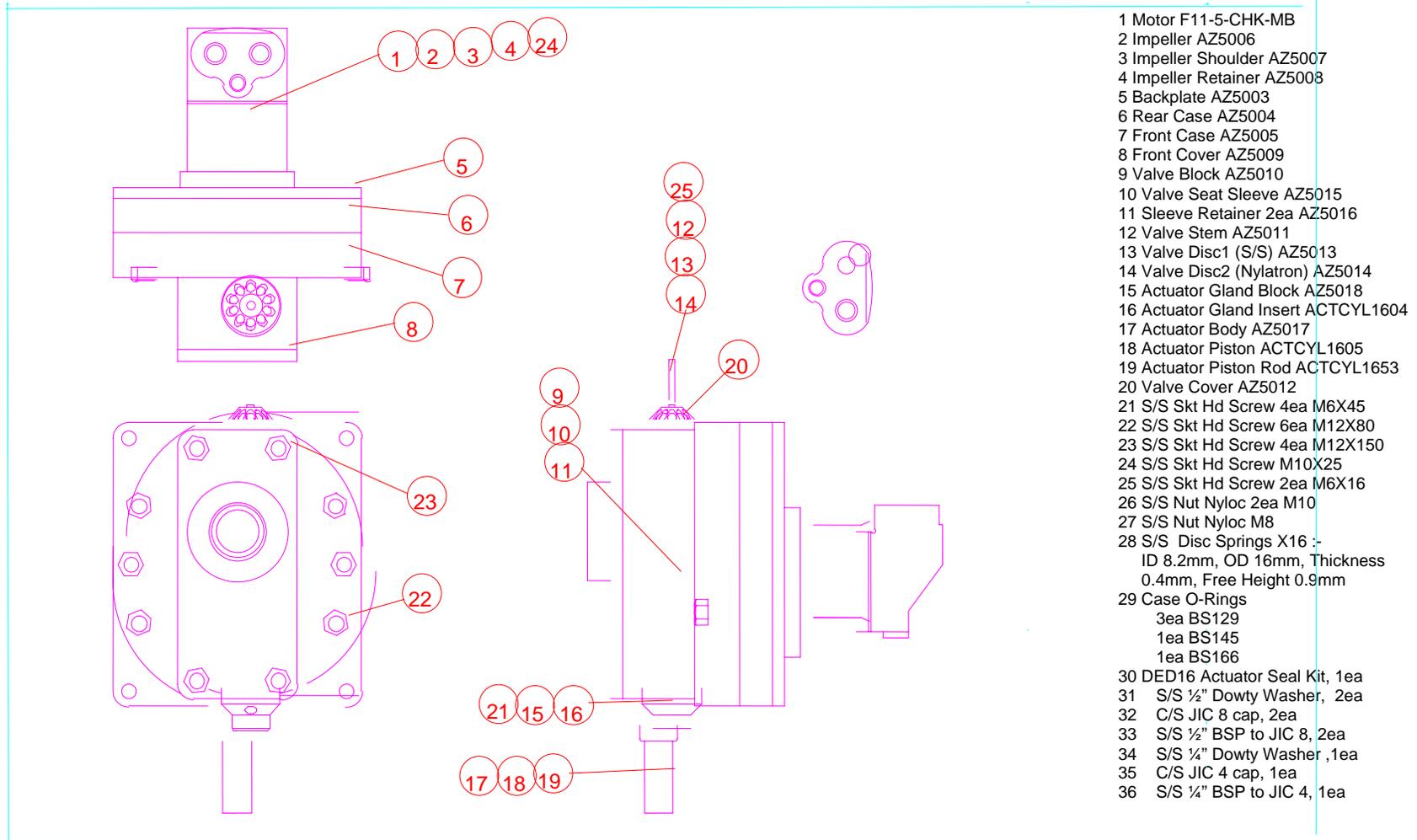
TYPICAL PUMP PERFORMANCE



GA DRAWING & DIMENSIONS



ITEMISED PARTS



APPENDIX

Assembly Notes

Assembly and setting up the reversing valve.

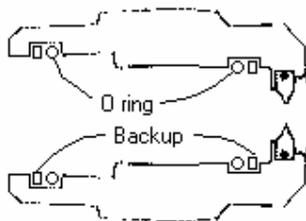
1. The Actuator.

1.a. Gland body.

Fit the wiper seal (GT5670-2066-001), into the gland body. This requires firsts removing the spring from around the seal and putting the spring into the gland housing first. The seal itself should be softened by placing in very hot water, then twisted into a spiral and fed into the gland body over the spring.

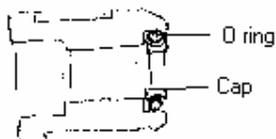


Next fit the two 'O' ring seals (GT5670-2069-001, GT5670-2071-001) with their back up washers as shown.



1.b. Gland insert

Fit the cap seal into the gland insert as shown.



1.c. Piston and piston rod assembly.

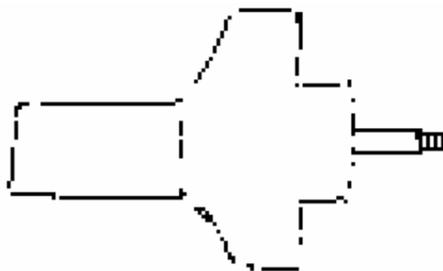
Note that both ends of the piston rod are threaded, but one end has a short section of reduced diameter with no thread. This is the end to which the piston is fitted. After a trial fit, the piston should be removed and refitted using Loctite 270 on the threads. The piston seal (GT5670-2066-001) should then be fitted. First the 'O' ring is fitted and then the cap is stretched over.

If possible the cap should be stretched first by sliding onto a tapered rod from both directions and then slid onto the piston on top of the 'O' ring. At first the cap will appear badly distorted, but it should be then slid into the cylinder body and left for about 1/2 hour and it will return to its correct shape.



1.d. Completing the actuator

The gland insert can now be pushed into the gland body with the wiper seal outermost, and the piston rod pushed through the gland. The cylinder body is slid onto the piston and then screwed into the gland body to complete the assembly. Ensure that the rod can be fully extended and retracted and the fit the 1/8 NPT fittings and test the actuator hydraulically to ensure smooth operation and no leaks.



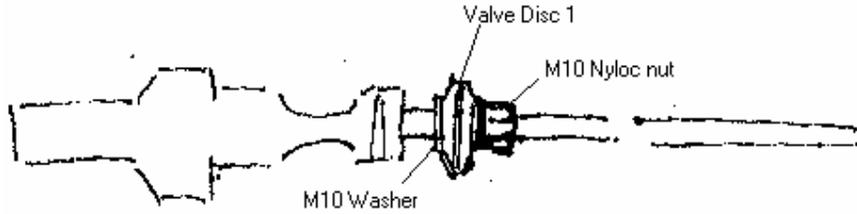
2. Screw the valve stem onto the actuator and secure using Loctite 270.



3. Fit an 'O' ring (BS 129) to the stainless steel valve seat and slide this on to the face of the actuator.

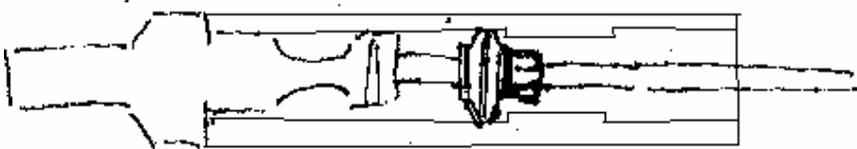


4. Extend the actuator and fit an M10 stainless steel washer and stainless steel valve disc 1 as shown , securing with an M10 Nyloc nut.



5. Retract the rod into the cylinder and ensure that the disc goes hard against the valve seat sleeve. If not remove the washer and try again.

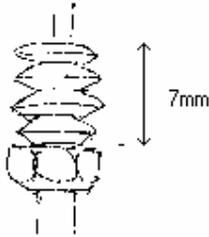
Next fully extend the rod and slide the whole assembly into the valve body. Ensure that the disc reaches the first seating shoulder in the valve body and slightly retracts the actuator (by about 0.5mm) If not it may be necessary to increase the actuator stroke and reshim the position of disc 1 by changing the washers. The actuator stroke may be increased by unscrewing the actuator cylinder body and carefully filing a small amount off the end of the piston rod where it protrudes through the piston.



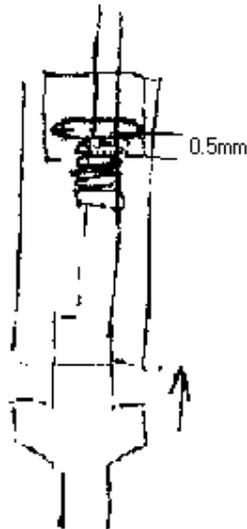
6. Once the positioning of disc 1 is satisfactory the assembly is removed from the valve block and another M10 Nyloc nut fitted with the nylon insert towards disc 1 as shown. (It is easier to first run the nut onto an M10 bolt to cut a thread in the Nylon.) The nut should be adjusted such that the flat face is just level with the shoulder on the valve stem.



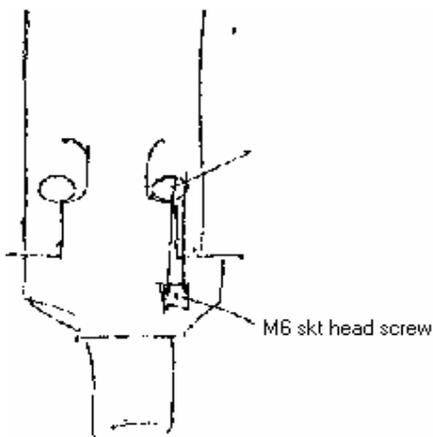
7. Put 4 pairs of dome springs onto the valve stem as shown. The stack height should be approximately 7mm.



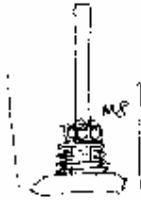
8. With the valve stem fully retracted push the stem, sleeve seat and actuator assembly into the valve block then drop valve disc 2 onto the stem. When doing this care should be taken to make sure that the sleeve seat aligns correctly inside the valve block allowing the bronze retainers to be fitted (step 9). Ensure that the actuator is fully retracted. Valve disc 2 should be about 0.5 mm clear of its seating shoulder.



9. The actuator and sleeve seat can now be secured in the valve block using the two bronze retainers and four M6x45 socket head screws.



10. Complete the assembly of valve disc 2 by adding a further 4 pairs of dome spring washers and an M8 Nyloc nut. The nut should be run down to just make contact then tightened by a further two turns.



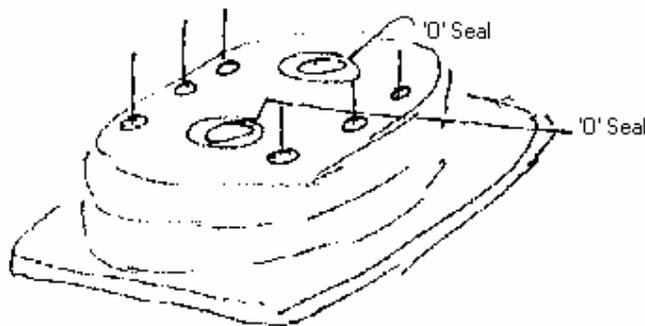
11. Fully extend the actuator and then fit the valve cover. This should be run down to just contact the valve disc then tightened a further 1/2 turn. The seating of disc 2 should be finally checked for both the extended and retracted positions and then a few drops of Loctite 270 run onto the threads of the cover in the upright position and left for several hours to set.

Assembly of the pump.

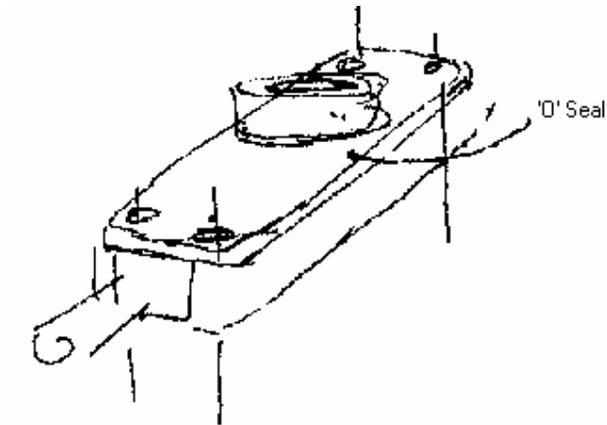
1. Engage the rear case on the stainless steel backplate.



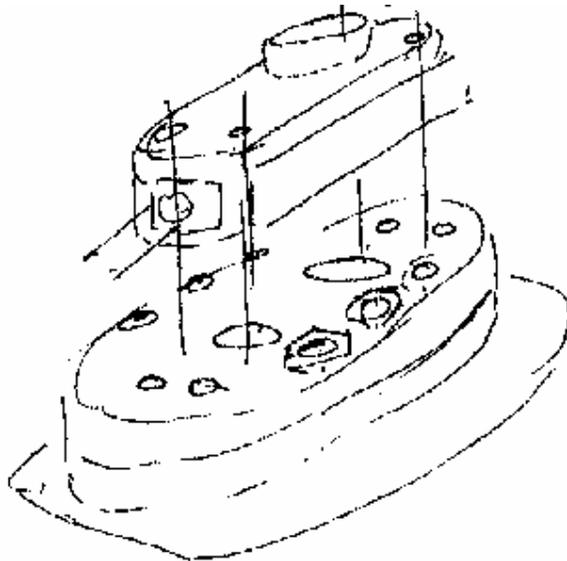
2. Fit the 166 'O' ring to the rear case.
3. Engage the front case onto the rear case.
5. Fit 6 M12x80 screws to secure the case sections to the backplate.



5. Fit 129 'O' ring seals to the two ports.
6. Fit 145 'O' Seal to the front cover and line up with the valve block, and insert 4 M12x150 screws.



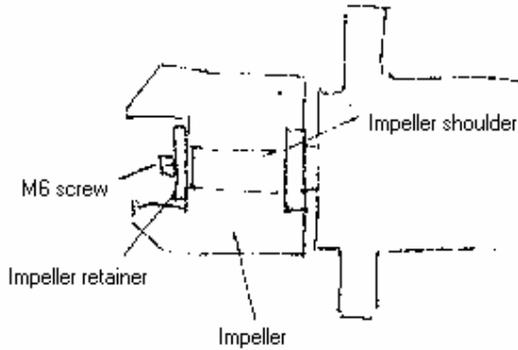
7. Fit the valve block to the pump case ensuring that the ports line up, and tighten the M12 screws.



8. Tighten all M12 screws to 20 ft.lbs. torque.

Motor Assembly.

1. Fit the impeller shoulder washer, the impeller itself, the impeller retainer to the Volvo motor shaft and then an M6x16 socket head screw using Loctite 270. The screw should be tightened to secure the impeller on the shaft.



2. Fit the motor into the back plate and secure with 2 M10x25 socket head screws. For a new impeller the blades may just interfere with the pump case. If this happens the motor may be run in by slackening the two M10 screws and slowly retightening with the motor running. A squealing noise and some smoke is acceptable during this operation.