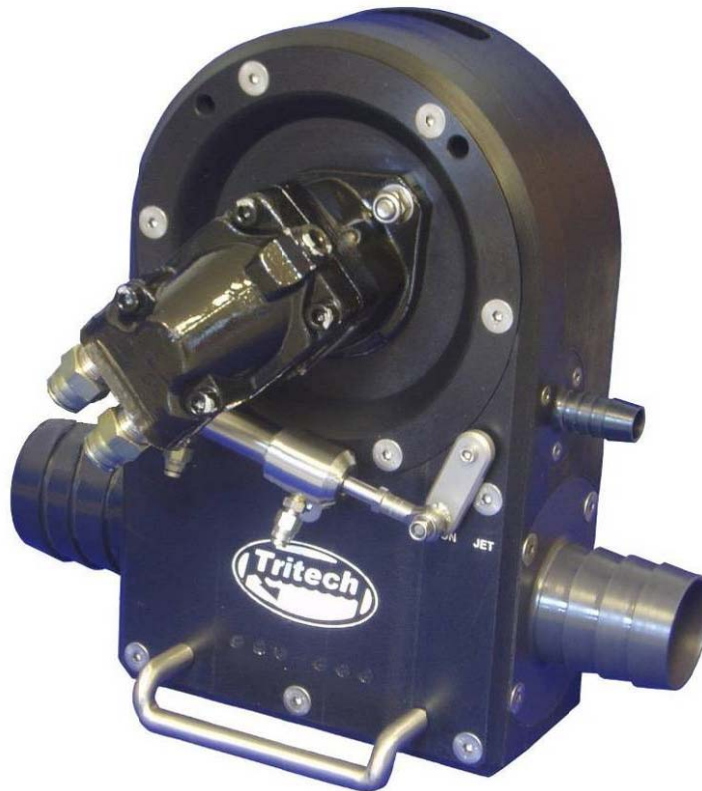


Please read this manual carefully before setting-up and using your unit

Tritech Super ZipJet Operators 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 **Super ZipJet** has been developed from the highly successful **Zip Pump** and **ZipJet** range of products.

The integrated eductor based excavation system is designed to pump mud, sand, gravel, drill cuttings, shale etc. without risk of blockage. A heavy-duty cylinder reverses the flow at the nozzle to eject any object, which may be causing an obstruction. A second cylinder operates a diverter valve to provide a powerful direct jet to break up heavy and cohesive seabed mud and sand prior to excavation.

Key new features include:-

- Improved efficiency
- Separately compensated seal void to minimise ROV hydraulic oil contamination
- Easy seal change and maintenance
- Improved mountings
- Lift handle and stabiliser foot
- Suction and jetting nozzles aligned
- Optional feed water filter
- Optional integrated suction and jetting nozzles
- Modular pump core for ease of maintenance

Outline Specification

Hydraulic Input

Pressure: 150 to 220 Bar (2200 to 3200 psi)

Flow: 45 to 60 litres / min (12 to 16 USgpm)

Jetting Performance (Typical) 1000 litres / min @ 2 Bar (264 USgpm)

Suction Performance (Typical)

Suction Flow: 500 - 1000 litres / min (132 - 264 USgpm)

Solids Removal Rate: 5 - 10 tonnes / hour (184 - 368 lb/min)

Nozzle and Hose Dimensions

Jetting Hose: 1" BSP Hose barb

Jet Nozzle Diameter: 20 mm (0.8 inches)

Discharge Hose Diameter: 100 mm (4 inches)

Suction Hose Diameter: 75 mm (3 inches)

Weights and Materials

Weight in Air: 25 kg (55 lb)

Weight in Water: 11 kg (24 lb)

Materials

Nylacast, UHMWPE

Maximum Bolt Torques Metric (Imp)

| | | |
|--------------------------------------|-------|-------------|
| M12 Motor Bolts | 15 Nm | (11 lbf.ft) |
| M10 Case, Motor Plate & Nozzle Bolts | 8 Nm | (6 lbf.ft) |
| M6 Jetting Nozzle Bolts | 4 Nm | (3 lbf.ft) |

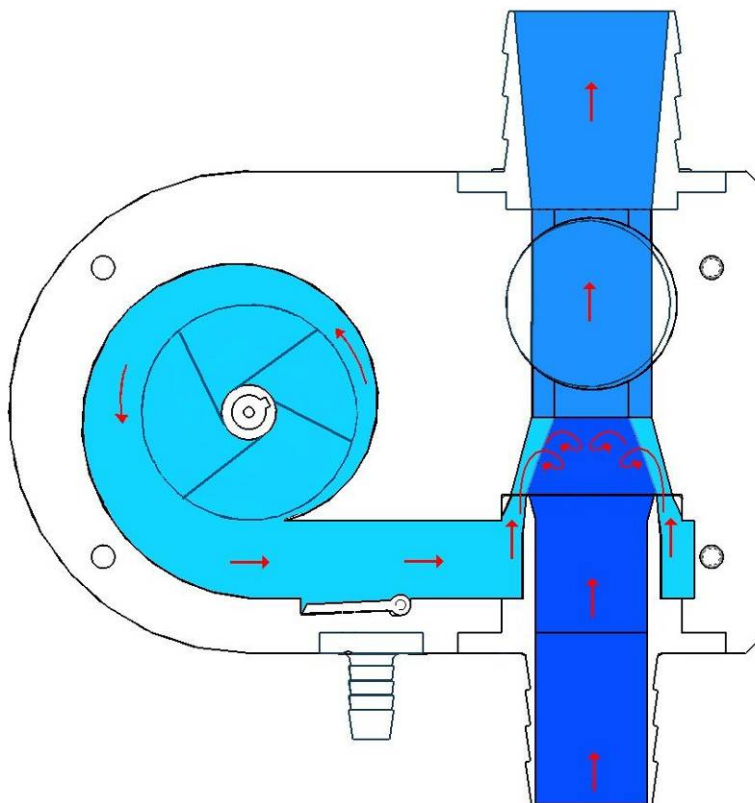
Principles of Operation

Suction Operation

The Super ZipJet pump is based on the principles of the annular eductor pump. It has a monobloc configuration in which the eductor pump and power pump are contained within a common body.

The power for the eductor section of the pump is provided by a stream of clean water driven by the centrifugal impeller.

Clean water is drawn into the inlet, passes through the impeller of the power pump and is then injected into the main suction stream via the annular eductor nozzle.



The main suction stream can contain a heavy concentration of sand, mud, gravel and drilling debris.

The pump has a retro flush valve just behind the eductor. When this is closed (operating cylinder extended) the power fluid is then directed to the suction nozzle. This feature can be used to clear a blocked suction nozzle or to complete a deburial operation by blowing away the last sand and mud from around an object.

The optimum performance will be obtained with the nozzle pushed deep into the debris and agitated gently. Where a great deal of debris is encountered it will be necessary to keep withdrawing the nozzle.

Jetting Operation

The body of the pump contains a diverter vane. The purpose of the vane is to switch the flow of the power pump water between the suction eductor and the jetting outlet.

The diverter should be operated fully in one direction or the other: attempting to share the flow between the eductor and the jet nozzle by using a mid position will result in inefficient performance from both. The diverter is set for suction when the cylinder is retracted and for jetting with the cylinder extended

Installation



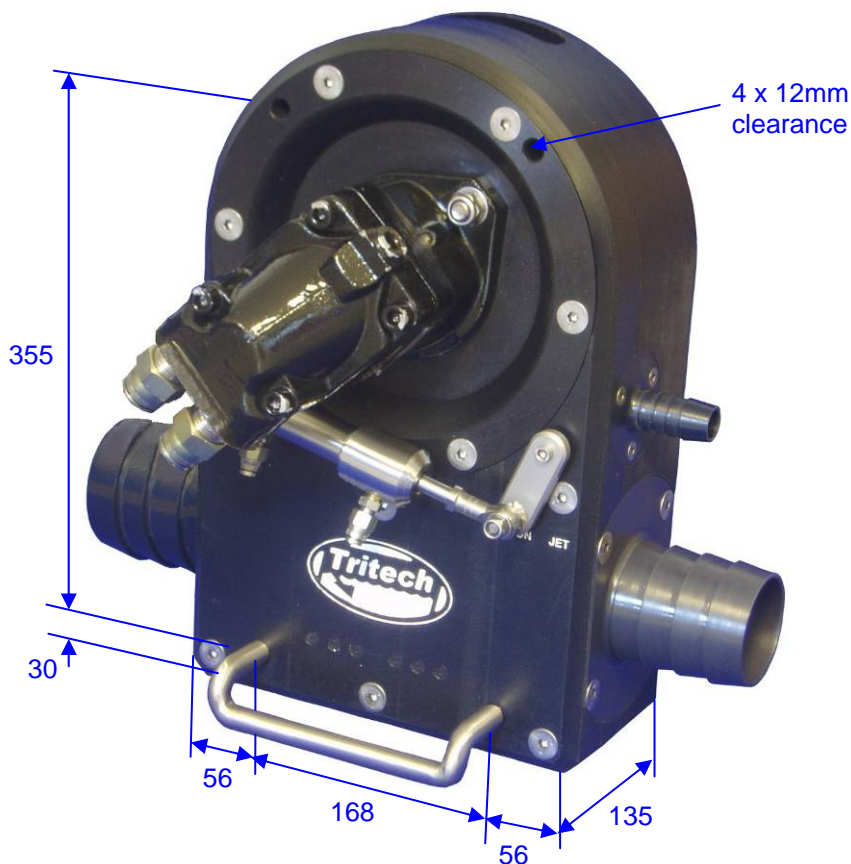
Danger! Do not power up the pump or hydraulic valve actuators until all hoses are properly connected to the pump.

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 actuators before the installation is complete it is his responsibility to ensure that suitable guards or other safety measures are in place to prevent injury.

Mechanical Installation

The pump may be mounted in any orientation on the vehicle. There are four mounting holes each with 12mm diameter clearance. Two of these are occupied by the stabiliser foot, which may either be removed or used itself as a mounting. If desired a second stabiliser bar may be fitted in the alternative hole set.



The pump should not be mounted using the motor or hose nozzles as attachment points.

Water Hose Installation.

Hoses

| | |
|------------------------|---------------------------------|
| Clean water inlet hose | 100mm ID |
| Dredge suction hose | 75mm ID |
| Discharge hose | 100mm ID |
| Recommended hose type | Kanaline AW Hydrasun Arizona |

Kanaline AW has plastic reinforcement and a semi-transparent wall, which assists visual inspection for damage and blockages. Being all plastic it is light in water. Alternative makes of suction and discharge hose may be used provided that they have a smooth internal bore.

If the above hose types are unavailable then the hose can be any crush resistant PVC coil strengthened hose.

Layflat style hoses **are not** recommended for discharge.

Fittings

Use standard Kanaline fittings or heavy-duty worm drive clips. Use of heavy-duty two bolt clamps will result in damage to the hose connections on the pump unit.

| | |
|-----------------------|---------------------------------|
| Jet hose | 25mm ID |
| Recommended hose type | Kanaline AW Hydrasun Arizona |

Clean Suction intake screen

It is recommended that a Tritech supplied suction strainer be used with the pump. If the user supplies their own strainer, then it **must** meet the following specifications.

Both rectangular and circular aperture suction screens may be used.

| | | |
|-----------------------|------|---------------------|
| Square mesh | max. | 4mm aperture |
| Circular perforations | max. | 6mm diameter |
| Total free flow area | min | 0.016m ² |

The pump should not be operated in any circumstances without a suction screen.

Dredge Suction Nozzle

If the user wishes to make up special nozzles the following specification should be met to optimise performance.

Suction nozzles should be designed with a nozzle cross-section area of approximately 40cm².

Smaller nozzles may be used for special tasks but material removal rates will be reduced. Larger nozzles are of no benefit and will reduce performance.

A nozzle guard should be fitted that will pass a maximum of a 40mm dia sphere or 35mm sided cube. The pump can pass single objects of a larger size, but if the pump takes in a stream of objects of larger size than blockages can occur by bridging.

Jet Nozzle.

The user may make up jet nozzles as required.

The recommended sizes are 14 - 19 mm diameter or an equivalent area.

The optimum size will need to be determined by trial because the water output from the power pump will vary depending on the oil pressure and flow available from the ROV's hydraulic system.

Hydraulic Installation

Hydraulic oil

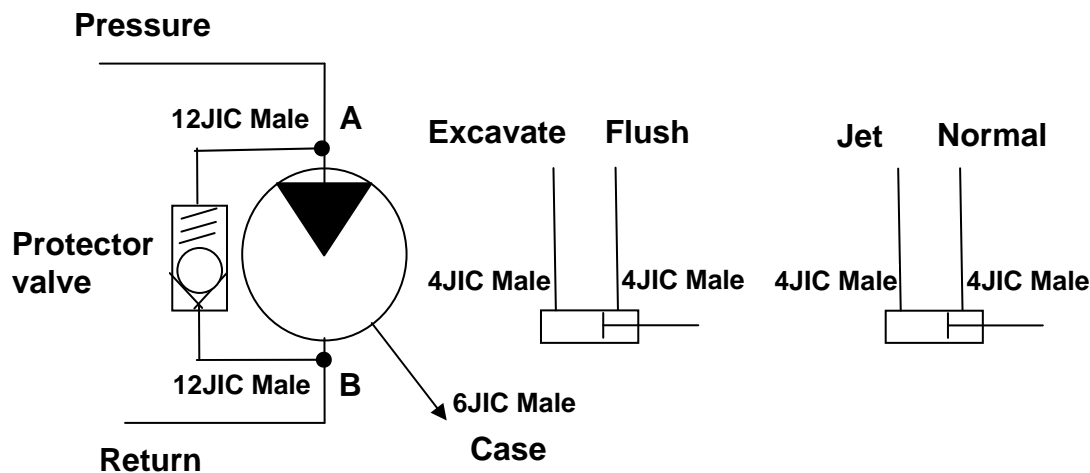
The pump should be operated using a premium grade mineral based hydraulic oil of ISO VG 22 to 32.

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 mandatory that the drain connection from the motor back to tank is a minimum of 3/8" bore. The drain line should return straight to tank without restriction. It is permissible to connect the drain line back into a larger bore drain manifold, which has been correctly sized to accommodate all drains attached to it.



Danger! 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 user's 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.

The Super ZipJet pumps are factory fitted with the Tritech Volvo Protector to avoid shock loading the motor when the supply is stopped.. If for any reason this valve is removed it is essential to provide a functionally equivalent check valve. This will allow the motor to run down steadily rather than coming to an abrupt stop.

Check Valve Specification

Normal TIL Volvo Protector Assembly, Part No. TI-3002-00-000

Alternative recommended valve
Integrated Hydraulics FPR-1/22-0.5 (cracking pressure 0.5 bar)

Hydraulic Fittings.

The following fittings are supplied as standard: -

| | |
|------------------|----------------|
| Motor A&B ports | No 12 JIC male |
| Motor case drain | No 6 JIC male |



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 F11-10 motor the vehicle hydraulic system should be capable of supplying a minimum 50l/min at 195 bar to the motor ports. Less than this will adversely affect performance.

The maximum permissible flow is 65l/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 flow meter equipped with a loading valve which can simulate the motor running under load.

In order to avoid pressure losses it is mandatory that a minimum of 1/2" bore pipe work or hoses is used on the flow and return lines to the motor. 3/4" or larger is recommended.

Testing In Air

**Caution!**

Under no circumstances must the flow be allowed to exceed 70l/min when testing in air. There is no backpressure on the impeller to control its speed and many vehicle hydraulic systems are capable of higher deliveries when there are no thrusters running. Motor over-speed 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.

Retro-flush valve and diverter actuators

Two independent controls are required, one for each actuator.

The actuators 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. If either actuator is not used then they must be filled with oil and securely capped. This is particularly important for the diverter, which could easily be pulled open severely reducing efficiency.

Actuator specification

| | |
|--|---------------|
| Minimum supply pressure for reliable operation | 110bar |
| Maximum working pressure | 240bar |
| Connection fittings | No 4 JIC male |

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 Super Zip Jet.

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

Seal compensator

The Super ZipJet has a separately compensated seal void. This is grease filled and has its own miniature compensator. On installation the compensator level should be checked. The stem has an indicator groove showing when it is full. If necessary gently apply grease via the grease nipple provided until the groove just shows or grease relieves from the overflow.



Caution!

Only pump the grease very slowly. The overflow passages are very small and pumping grease too quickly may build excessive pressure in front of the motor face.

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 actuators 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 and shaft seal
- The retro-flush valve spool
- The diverter valve vane
- Impeller water seal

The eductor set may need replacement after prolonged use with extremely abrasive materials or if aggressive chemicals have been encountered.

Basic Maintenance Procedures

Pre- dive

Visual check for external damage:

Check the level of the seal compensator and recharge with grease if necessary

Check hoses are secure

Check mountings are secure

Check clean water suction strainer is in place and clear

Note: If the vehicle is inactive for more than 48 hours run fresh water into the clean water suction strainer for a few minutes, and then spin the hydraulic motor for about 15 seconds (taking care not to allow it to overspeed).

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.

Up to four blades may have leading edge damage of 5mm width and 4 mm depth before replacement becomes essential.

Note: If the majority of leading edges are eroded more than 3.5mm back from the bore of the inlet nozzle then consideration should be given to replacing the impeller.

Basic fault finding

Poor performance

Check that the clean water suction strainer is clear and that there are no blockages in the hose.

Check that the retro-flush valve is opening fully.

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

Check that the discharge hose is not damaged or kinked.

Remove the clean water suction hose from the pump and check that the face of the impeller is not obstructed by material like rope fibre or shreds of plastic bags.

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

Check that the hydraulic flow meets the specification.

Dismantling

Tools and materials

The following tools are required to work on the pump.

- 13 & 19mm socket
- 4, 5, 6 & 8mm Allen key
- Anti-Seize Compound
- Grease Gun
- Torque Wrench
- Loctite - "Studlock" Medium Strength for reassembly
- Silicon Grease
- 3 Jaw Puller

Removal of hydraulic motor, power pump impeller and impeller seal replacement

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

Remove the 6 bolts holding the motor mounting plate to the pump (this will include removing the jetting actuator retaining bolt for access.)

Remove the mounting plate/motor/impeller assembly. This also provides access to the impeller seal.

Remove the four countersunk setscrews securing the impeller to the boss. (these will be tight since they are retained by Loctite) Remove the impeller.

Remove the retaining setscrew and end-cap from the end of the motor shaft

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

Removal of the retro-flush valve

This requires splitting the pump casing.

Disconnect all hoses and remove the pump from the vehicle.

Remove the motor assembly as above

Remove the valve core arm by releasing the two securing bolts.

Remove the 6 remaining case bolts and the 11 bolts on the hose nozzles and separate the casing.

The valve core is now free for removal

Removal of the diverter valve vane

This also requires splitting the pump case.

Proceed as above as far as separating the case sections

Remove the Diverter valve cam by releasing the M6 SKT CAP screw

The diverter arm can now be removed from the case.

Reassembly

Reassembly is the reverse of the procedures above, but with particular attention to the following.

Hydraulic Motor and Impeller

Fit the Impeller seal, with the lip facing away from the motor side as shown in Diag 1.0, into the centre spigot and press down until outer lip meets the shoulder. Place the seal retaining ring on top ensuring it is centred correctly as shown in Diag 1.1

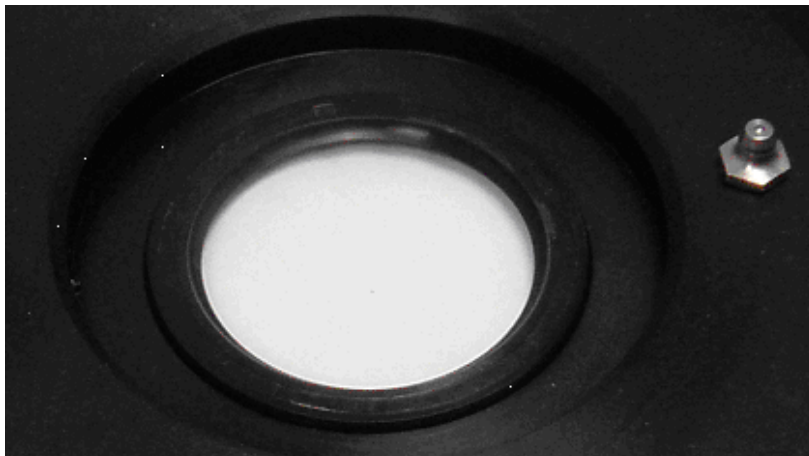


Diagram 1.0

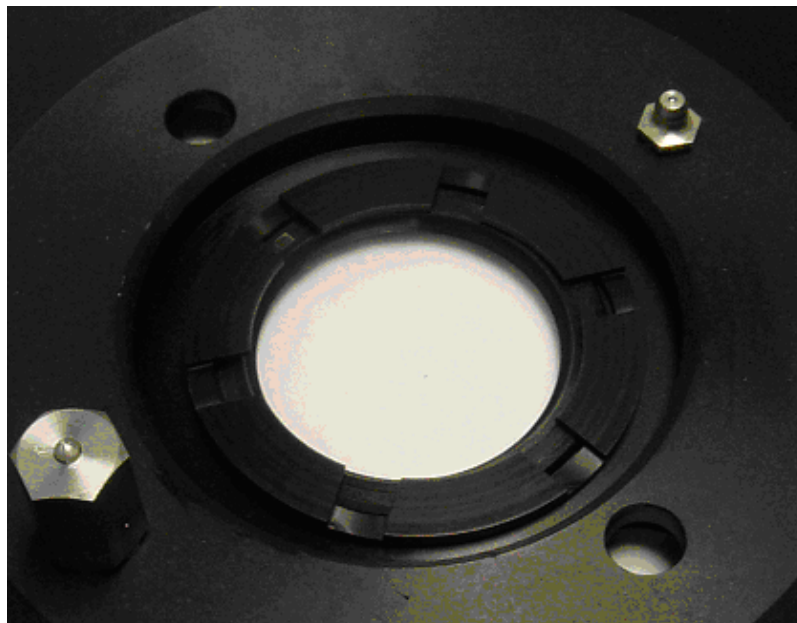


Diagram 1.1

Place the ID100 x 2mm o-ring onto the motor and apply some silicon grease around the surface. Mount the motor on the motor mount disk and secure. (see Diag 1.2)

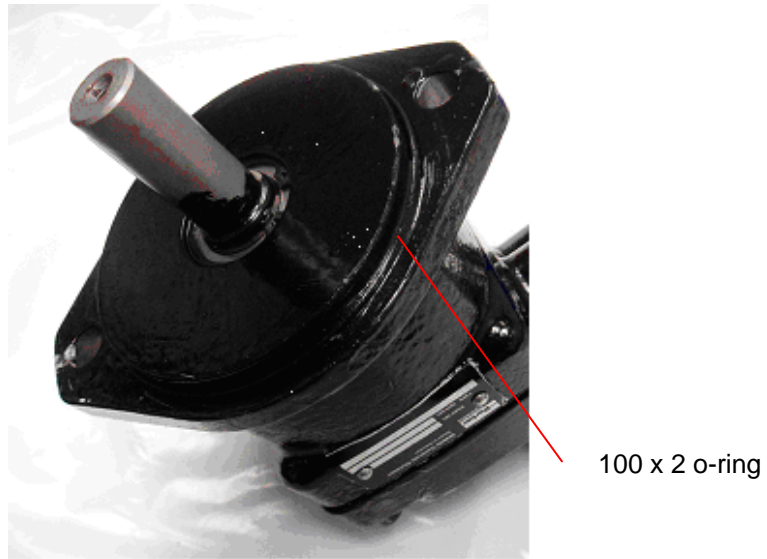


Diagram 1.2

Apply some anti-seize grease to the motor shaft before fitting the impeller. Press the impeller boss onto the shaft right up to the shoulder

Place the ID20 x 3.5mm o-ring over the top of the motor shaft and assemble the retainer onto the shaft end and secure the setscrew using a small quantity of Loctite.

Replace the impeller on the boss and secure the four countersunk screws with Loctite.

Slowly fill motor face cavity with grease until the compensator piston shows fill mark and grease flows out of relief port (see Diag 1.3)

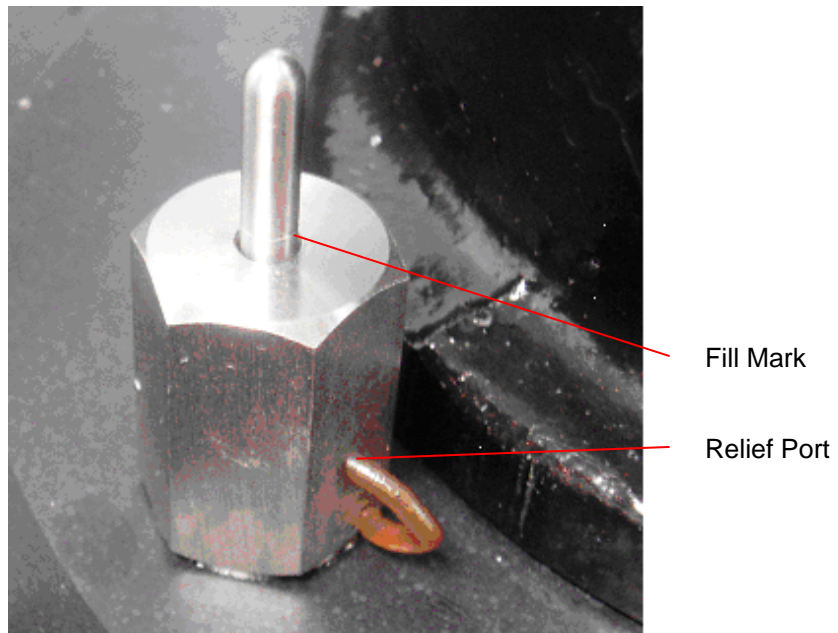


Diagram 1.3

Retro-flush core

Check that the core is a loose fit in the case body, and that it is clear of dirt.

Place the case halves together and assemble as directed.

Fit the retro flush valve cam to the valve and place a small amount of Loctite under the screw heads and tighten in place. Fit the actuator with the valve fully open and the cam pointing across the pump body.

Diverter valve Vane

Adjust the cylinder end bearing to align with the actuator-mounting nut. Lock the setting using the locknut, and a small amount of Loctite.

Place the case halves together and assemble as directed.

Fit the actuator arm such that the valve is open and the arm points to the suction point. Attach the actuator to the arm using the supplied M8 nut and washer.

Case assembly

Place the case halves together and insert the hose barbs. Secure all screws in place using a small amount of loctite under the cap heads and tighten in place.

Refit motor assembly and secure all screws in place using a small amount of loctite under the cap heads and tighten in place.

DO NOT OVERTIGHTEN CASE SCREWS

| Maximum Bolt Torques | Metric | (Imp) |
|--------------------------------------|---------------|--------------|
| M12 Motor Bolts | 15 Nm | (11 lbf.ft) |
| M10 Case, Motor Plate & Nozzle Bolts | 8 Nm | (6 lbf.ft) |
| M6 Jetting Nozzle Bolts | 4 Nm | (3 lbf.ft) |

Tritech Volvo Protector.

The Super ZipJet pumps are factory fitted with the Tritech Volvo Protector.

Note: The BSP Volvo ports are no longer available with the Tritech Volvo Protector fitted.

The Volvo Protector Assembly

Part No.3002-00-000, comprises: -

- 1 off Motor Protector Block, 316 S/S, Part No.3002-01-001
- 2 off ¾"-14 BSP Male to 12 JIC Male Connector, 316 S/S, Part No.3002-00-002
- 1 off 3/8"-19 BSP Male to 6 JIC Male Connector, 316 S/S, Part No.3002-01-003
- 1 off High Carbon Chrome Alloy Ball Bearing, Part No.90100-10
- 1 off 6P50 Hex Plug c/w Seal, 316 S/S, Part No.89401
- 2 off 12 JIC Female Cap, C/S, Part No.89202
- 1 off 6 JIC Female Cap, C/S, Part No.89201
- 1 off 3/8" Self-Centre Dowty, 316 Ring, Part No.89300
- 2 off ¼" Self-Centre Dowty, 316 Ring, Part No.89301
- 1 off O-ring 20mm X 2mm, Part No. TI-BSI-0200-20NI70
- 2 off O-ring 32mm X 2mm, Part No. TI-BSI-0320-20NI70
- 1 off Compression Spring, 316 S/S, Part No.D21770

The procedure to fit a Tritech Volvo Protector is as follows:

Remove any existing port fittings from the F11 – 10 Volvo motor. Ensure that the top face of the F11 – 10 Volvo motor is free from any debris i.e. paint, dirt and grit etc. Clean and degrease surface.

Place the three Dowty washers onto their respective hydraulic fittings. Place the motor protector over the fittings and position the other three O-rings as shown below in Diagram 2.



Diagram 2.

Once the fittings have been inserted and tightened, blanking caps should then be fitted. The motor protector assembly is fitted to the motor as shown in Diagram 3.

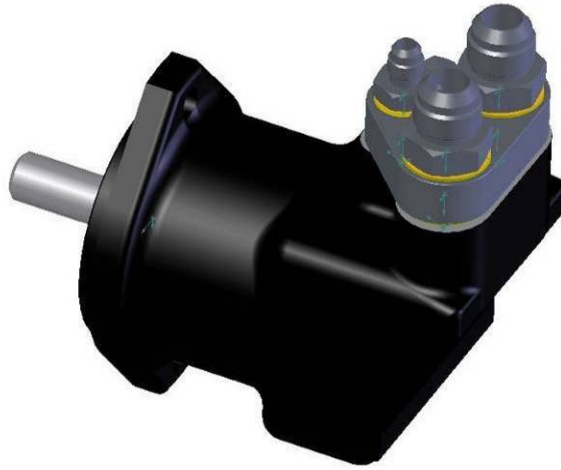
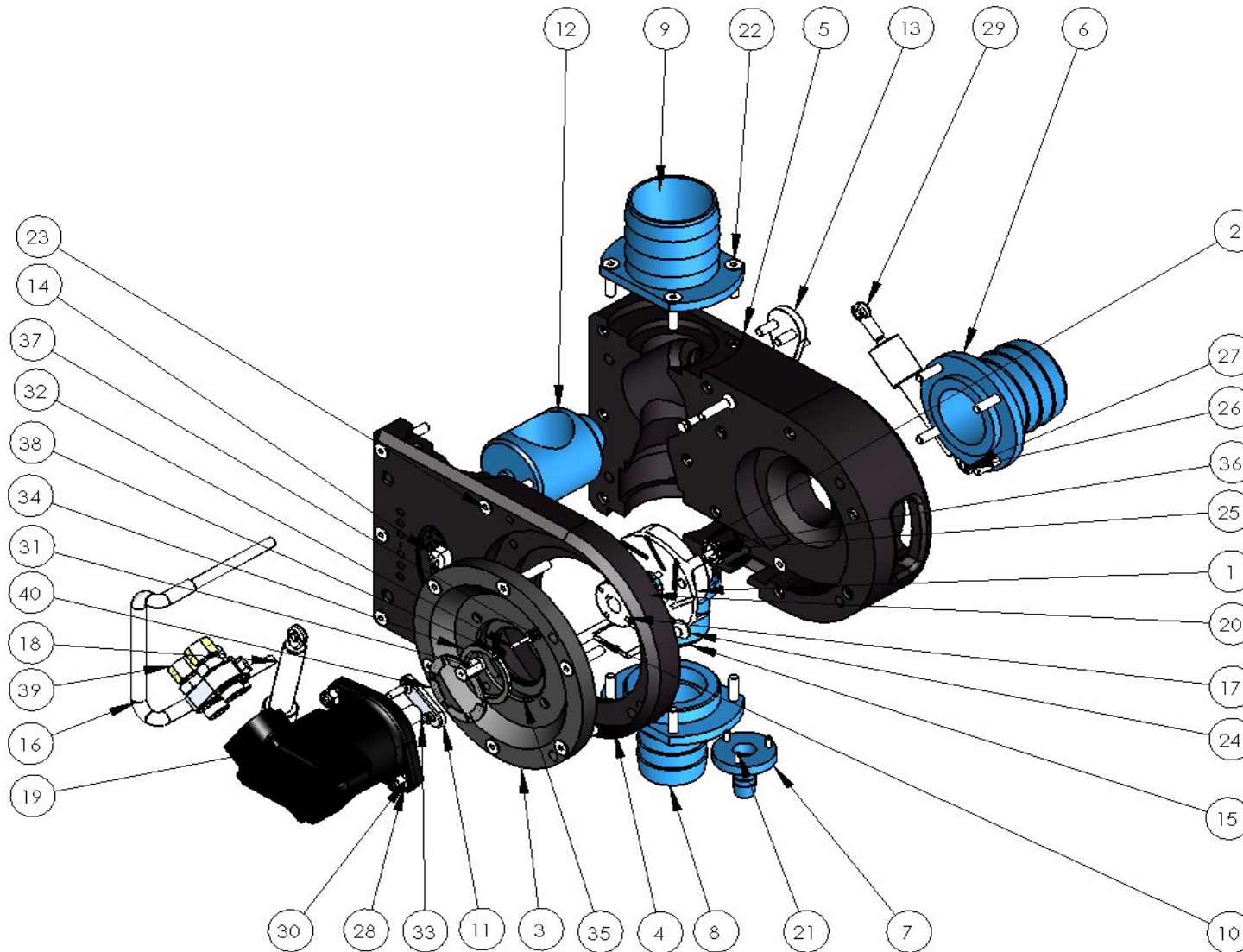


Diagram 3.

PARTS LIST & EXPLODED DIAGRAMS



| NO | TIL PART NUMBER | DESCRIPTION | QTY. |
|--------|----------------------|-------------------------------|------|
| 1 | TI-SZJU-3000-05-001 | 5 Vane Impeller | 1 |
| 2 | TI-SZJU-3000-02-002 | Impeller Retainer | 1 |
| 3 | TI-SZJU-3000-06-003 | Motor Mount | 1 |
| 4 | TI-SZJU-3000-03-004 | Motor Side Case | 1 |
| 5 | TI-SZJU-3000-03-005 | Inlet Side Case | 1 |
| 6 | TI-SZJU-3000-00-006 | Clean Water Inlet Nozzle | 1 |
| 7 | TI-SZJU-3000-01-007 | Jetting Nozzle | 1 |
| 8 | TI-SZJU-3000-03-008 | Eductor Inlet Nozzle | 1 |
| 9 | TI-SZJU-3000-01-009 | Evacuation Nozzle | 1 |
| 10 | TI-SZJU-3000-01-010 | Jetting Valve | 1 |
| 11 | TI-SZJU-3000-01-011 | Jetting Valve Cam | 1 |
| 12 | TI-SZJU-3000-00-013 | Reverse Flush Valve | 1 |
| 13 | TI-SZJU-3000-02-014 | Reverse Flush Cam | 1 |
| 14 | TI-SZJU-3000-00-016 | Actuator Swivel Mount | 2 |
| 15 | TI-SZJU-3000-01-034 | Eductor | 1 |
| 16 | TI-SZJU-3000-01-035 | Base Stand | 1 |
| 17 | TI-SZJU-3000-00-036 | Zip Pump Impeller | 1 |
| 18 | DED16-50 | D16 - 50 PENCYL ACTUATOR | 2 |
| 19 | DEF11-10MBC HK.99098 | VOLVO F11-10 | 1 |
| 20 | DEZJ89510-M6-16 | M6 x 16 CSK SKT | 4 |
| 21 | DEZJ89510-M6-25 | M6 x 25 CSK SKT | 3 |
| 22 | DEZJ89510-M10-25 | M10 x 45 CSK SKT | 13 |
| 23 | DEZJ89510-M10-55 | M10 x 75 CSK SKT | 13 |
| 24 | DEZJ89510-M12-40 | M12 x 40 CSK SKT | 2 |
| 25 | DEZJ89530-M6-20 | M6 x 20 SKT CAP | 2 |
| 26 | DEZJ89550-M8-20 | M8 x 20 HEX | 2 |
| 27 | DEZJ89710-M8 | M8 Washer | 4 |
| 28 | DEZJ89710-M12 | M12 Washer | 2 |
| 29 | DEZJ89620-M8 | M8 NYLOCK NUT | 2 |
| 30 | DEZJ89620-M12 | M12 NYLOCK NUT | 2 |
| 31 | TI-SZJU-3000-01-037 | Compensator Case | 1 |
| 32 | TI-SZJU-3000-01-038 | Compensator Piston | 1 |
| 33 | DEZ89 450 | 1/8 NPT Grease Nipple | 1 |
| 34 | TI-R-SS-58-75-5 | DIN 3760 R Seal ID 58 OD75 W5 | 1 |
| 35 | TI-BSI-1000-20NI70 | O-Ring ID100 XS2.0 | 1 |
| 36 | TI-BSI-0200-35NI70 | O-Ring ID20 XS3.5 | 1 |
| 37 | TI-BSI-0110-10NI70 | O-Ring ID11 XS1.0 | 1 |
| 38 | TI-C0360-026-1000-S | C0360-026-1000-S Spring | 1 |
| 39 | TI-SZJU-3002-02-000 | SZJ Motor Protector Assembly | 1 |
| 40 | TI-SZJU-3000-01-039 | Impeller Seal Retainer | 1 |
| Spares | TI-SZJU-10-SHG | Actuator Seal Kit | 1 |