

Janus

Water Pack Information Sheets

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 - Step 3 - Filter Condition & Protection
 - Step 4 - Control Valve
 - Installation Information
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Unit 30
The Boulevard Factory Est.
Hull
HU3 4AY
United Kingdom
Phone: +44 (0) 1482 595000
Fax: +44 (0) 1482 214895
Email: sales@waterhydraulics.co.uk

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Issue 7.09

www.waterhydraulics.co.uk

**The
Water
Hydraulics**
Co. Ltd.

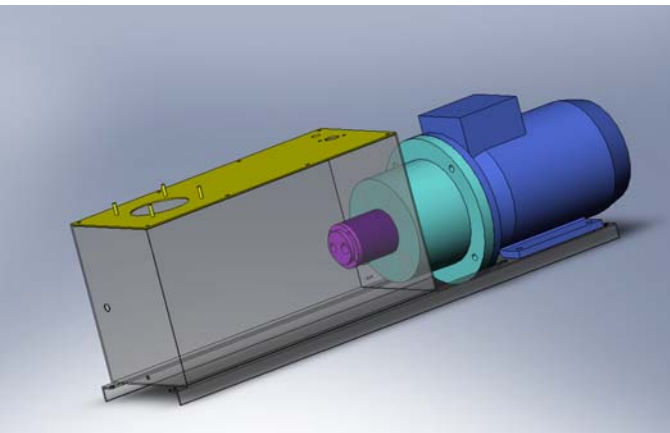
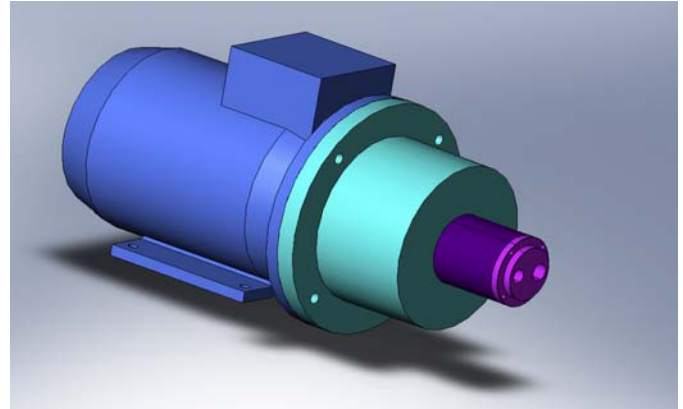
PICK A WATER PACK

A system for producing bespoke power units from a range of standard components has been developed. The building blocks give maximum flexibility to the systems designer without incurring high manufacture costs. By using kits of parts that can be stocked individually minimising stock holding a specific solution can be produced in very short lead time. **MAXIMUM FLEXIBILITY WITH MINIMUM COST.**

Follow the following steps to build your bespoke system

Step 1– Pressure and Flow

Establish the pressure and flow requirement for your system then from table 1 record the code of the corresponding motor pump assembly

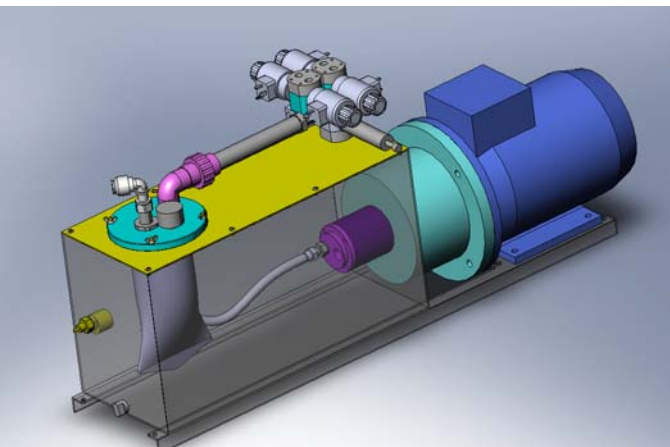
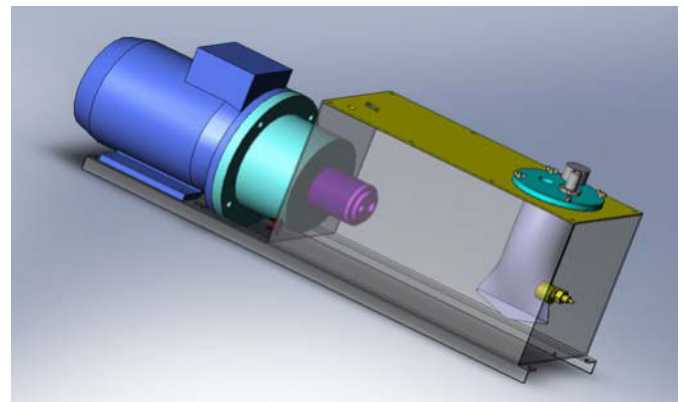


Step 2– Reservoir

Select a reservoir size and material of construction. 316 Stainless Steel and Polyethylene tanks are available as standard. Special sizes are also available. See table 2 for options

Step 3– Filter Condition & Protection

A filter must be included with the power unit. It has 2 purposes to filter the new incoming water and also all fluid returning to the tank from the system. The assembly can be supplied with gauge or switches to advise of element condition. Manual or automatic fill valve options are available. Temperature and level Safety switches can also be added.



Step 4– Control Valves

A minimum valve requirement for a power unit is the system relief valve but valves up to 4 functions can be added with the use of the TWHC manifold range. The Janus directional Valves can offer unload, 3/2, 4/2 and 4/3 configurations with manual, pilot and solenoid actuation as standard.

Step 1 Pump and Motor Selection

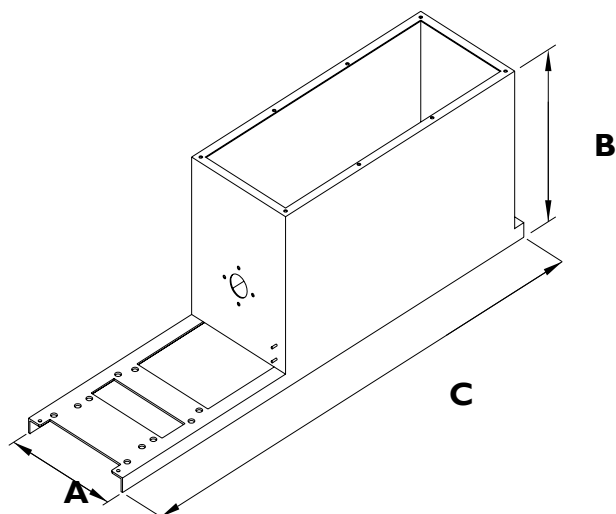
From the table select a combination that will satisfy the pressure and flow requirement-record the code number
Example Pump assembly to produce 90 bar pressure with a flow rate of 6 l/min Code number P6-060-M09

Pump	Displacement (cc/rev)	10	20	40	60	80	100	120	140	160
P1	0.8 (1.2 L/min @ 1500rpm) PC.100.0.8.W	1.1 L/Min 0.12kW 63 Frame	1.0 L/Min 0.12kW 63 Frame	0.9 L/Min 0.12kW 63 Frame	0.8 L/Min 0.18kW 63 Frame	0.7 L/Min 0.18kW 63 Frame	0.6 L/Min 0.25kW 71 Frame			
		P1-008-M01			P1-008-M02		P1-008-M03			
	1.2 (1.8 L/min @ 1500rpm) PC.100.1.2.W	1.7 L/Min 0.12kW 63 Frame	1.6 L/Min 0.12kW 63 Frame	1.5 L/Min 0.18kW 63 Frame	1.4 L/Min 0.25kW 71 Frame	1.2 L/Min 0.37kW 71 Frame	1.1 L/Min 0.37kW 71 Frame			
		P1-012-M01		P1-012-M02	P1-012-M03	P1-012-M04				
P6	3.3 (4.95 L/min @ 1500rpm) PC.160.3.3.W	4.8 L/Min 0.37kW 71 Frame	4.7 L/Min 0.37kW 71 Frame	4.5 L/Min 0.55kW 80 Frame	4.3 L/Min 0.75kW 80 Frame	4.1 L/Min 0.75kW 80 Frame	3.9 L/Min 1.1kW 90S Frame			
		P6-033-M04		P6-033-M05	P6-033-M06		P6-033-M07			
	4.6 (6.9 L/min @ 1500rpm) PC.160.4.6.W	6.7 L/Min 0.37kW 71 Frame	6.6 L/Min 0.37kW 71 Frame	6.4 L/Min 0.55kW 80 Frame	6.1 L/Min 1.1kW 90S Frame	5.9 L/Min 1.1kW 90S Frame	5.7 L/Min 1.5kW 90L Frame	5.5 L/Min 2.2kW 100L Frame	5.2 L/Min 2.2kW 100L Frame	5.0 L/Min 2.2kW 100L Frame
		P6-046-M04		P6-046-M05	P6-046-M07		P6-046-M08	P6-046-M09		
P15	12.5 (18.75 L/min @ 1500rpm) PC.160.12.W	8.8 L/Min 0.37kW 71 Frame	8.6 L/Min 0.55kW 80 Frame	8.2 L/Min 1.1kW 90S Frame	7.9 L/Min 1.1kW 90S Frame	7.5 L/Min 1.5kW 90L Frame	7.2 L/Min 2.2kW 100L Frame	6.8 L/Min 2.2kW 100L Frame	6.5 L/Min 3kW 100L Frame	6.1 L/Min 3kW 100L Frame
		P6-060-M04		P6-060-M05	P6-060-M07		P6-060-M08		P6-060-M09	
	15 (22.5 L/min @ 1500rpm) PC.160.15.W	18.4 L/Min 0.55kW 80 Frame	18.2 L/Min 0.75kW 80 Frame	17.6 L/Min 1.5kW 90L Frame	17.1 L/Min 2.2kW 100L Frame	16.5 L/Min 3kW 100L Frame	16 L/Min 4kW 112M Frame	15.5 L/Min 5.5kW 132S Frame	14.9 L/Min 5.5kW 132S Frame	14.4 L/Min 7.5kW 132M Frame
		P15-012-M05	P15-012-M06	P15-012-M08	P15-012-M09	P15-012-M10	P15-012-M11	P15-012-M12		P15-012-M13
P15	15 (22.5 L/min @ 1500rpm) PC.160.15.W	22.1 L/Min 0.55kW 80 Frame	21.8 L/Min 1.5kW 90L Frame	21.1 L/Min 2.2kW 100L Frame	20.5 L/Min 3kW 100L Frame	19.8 L/Min 4kW 112M Frame	19.2 L/Min 5.5kW 132S Frame	18.5 L/Min 5.5kW 132S Frame	17.8 L/Min 7.5kW 132M Frame	17.2 L/Min 7.5kW 132M Frame
		P15-015-M05		P15-015-M08	P15-015-M09	P15-015-M10	P15-015-M11		P15-015-M12	
	19 (28.5 L/min @ 1500rpm) PC.160.19.W	28 L/Min 0.55kW 80 Frame	27.6 L/Min 1.5kW 90L Frame	26.8 L/Min 2.2kW 100L Frame	26 L/Min 4kW 112M Frame	25.1 L/Min 5.5kW 132S Frame	24.3 L/Min 5.5kW 132S Frame	23.5 L/Min 7.5kW 132M Frame	22.7 L/Min 7.5kW 132M Frame	21.8 L/Min 11kW 160M Frame
		P15-019-M05	P15-019-M08	P15-019-M09	P15-019-M11	P15-019-M12		P15-019-M13		P15-019-M14

Step 2– Reservoir

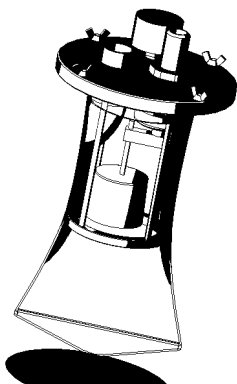
Reservoirs are available in 316 stainless steel (prefix S) or plastic (Prefix P). Once you have selected the correct capacity add the code to your motor pump code. Note the motor mounting holes are specific for electric motor frame size, the pump motor assembly code is required for selection if ordered as a kit.

Assembly code example: 18L stainless reservoir to the motor pump assembly selected **P6-060-M09-S18**

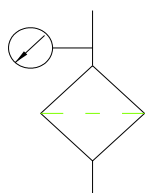


Pump	Code	Volume L	A	B	C
P1	P05 S05	5	120	220	300
P6	P10 S10	10	200	300	750
	P18 S18	18	200	300	870
	P24 S24	24	220	300	870
P15	P55 S55	55	350	550	1050
	P90 S90	90	350	550	1350

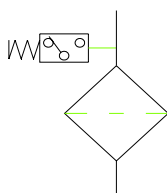
Step 3– Filter Condition & Protection



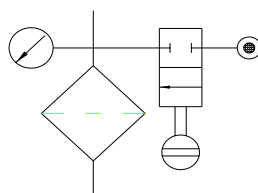
The use of filtration is always advised. However there are a number of optional filtration, tank filling and safety switches that can be selected. The next digit in the code system specify the filter variants.



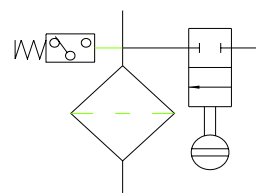
1 Filter and Gauge



2 Filter and Switch



3 Filter, Gauge and
Fill Valve



4 Filter, Switch and
Fill Valve

The following digit specifies the protection switch, “**T**” temperature switch 50°C, “**L**” low water level cut out and “**B**” for both. If safety switches are not required add “**X**”. If secondary tank return lines are require a Tee can be added to the return between manifold and filter assembly to ensure all return water is filtered.

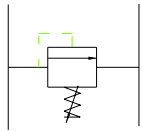
Example taking the previous example and add a filter with filter condition switch and fill valve. Also selecting both temperature and level switches the code would be **P6-060-M09-S18-4B**

Step 4– Control Valves

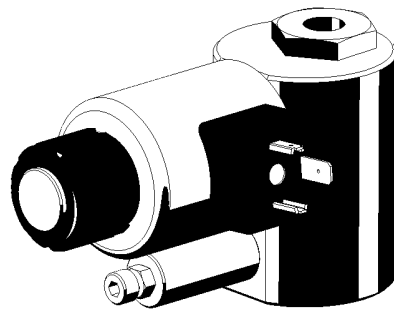
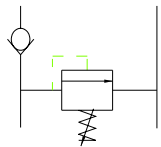
To complete the circuit requirements the valve assembly has been configured to offer maximum flexibility for the system designer without the need for expensive and time consuming pipe work. The bolt on manifold arrangement can offer up to 4 station operation from a single block. The range offers Unload, 3/2, 4/2 and 4/3 valves with actuation by solenoid, hand, air, water or oil pilot including electronic proportional control options as standard. See Janus Directional Valve data sheet for further information.

The DN3 range of control can be applied up to 10 l/min and 160 bar. C01, 2 and 3 circuits are produce with a single manifold arrangement. C04,5, 6 & 7 are all produced with the DN6 range of valves up to a maximum flow rate of 30 l/min

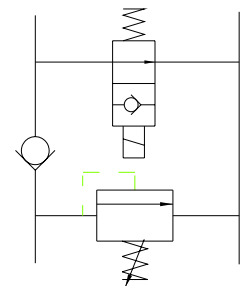
C01 Relief Valve



C02 Relief & Check

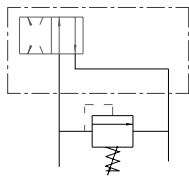


C03 Relief, Check & Unload

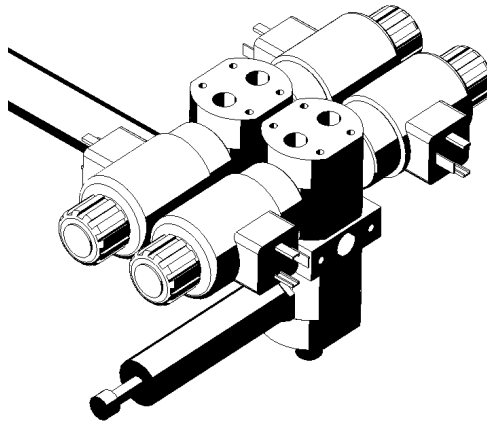
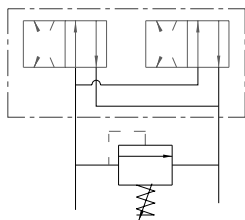


Select the “M” version of directional and relief valve when using manifolds. Order directional valves separately

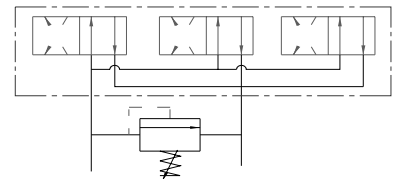
C04 Relief 1 Station Manifold



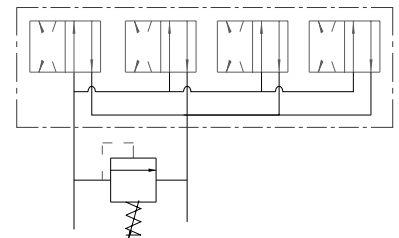
C05 Relief 2 Station Manifold



C06 Relief 3 Station Manifold



C07 Relief 4 Station Manifold



Final Code, add a relief valve with a 2 station manifold for mounting 2 off. 4 port 3 position 24V Dc solenoid operated spring return directional control valves with closed P, A,B&T joined at centre

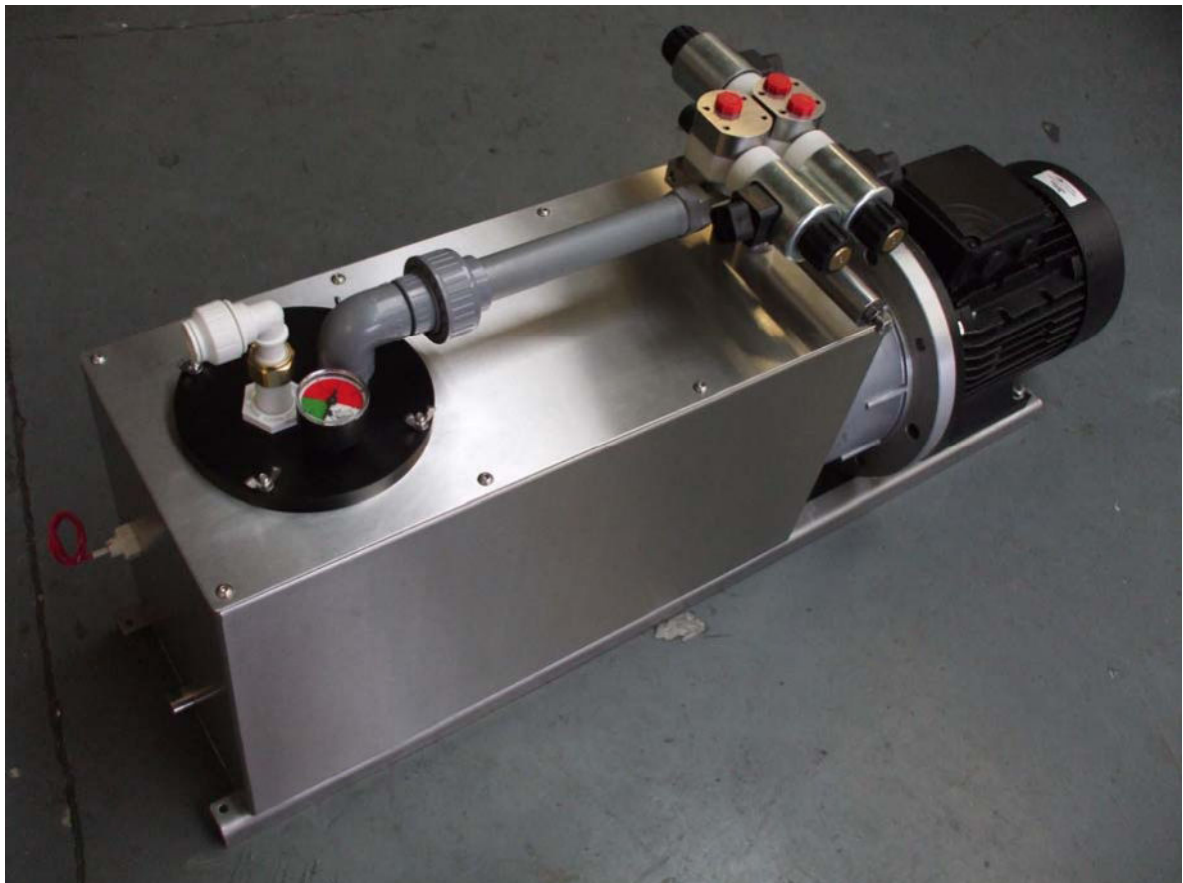
Part number **P6-060-M09-S18-4B-C05**. (The 2 directional valves code **2M06BBSW**)

Issue 7.09

Unit 30, The Boulevard Factory Est., Hull HU3 4AY. Tel: 44 (0)1482 595000 Fax: 44 (0)1482 214895 Email: sales@waterhydraulics.co.uk

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P6 POWERPACK INSTALLATION & OPERATING INSTRUCTIONS

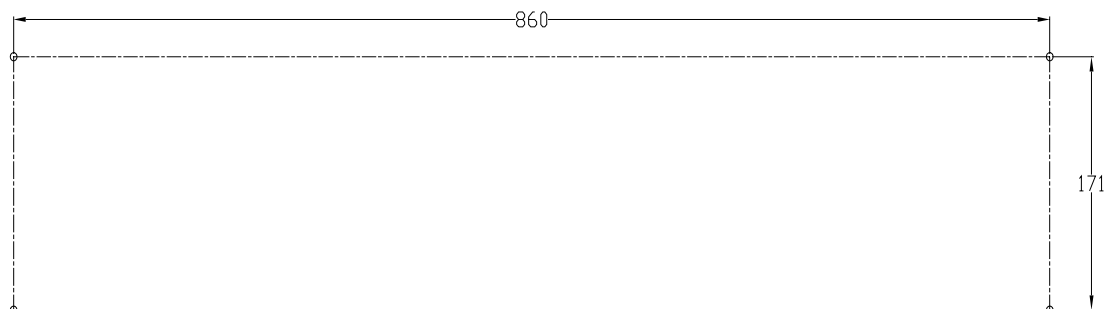
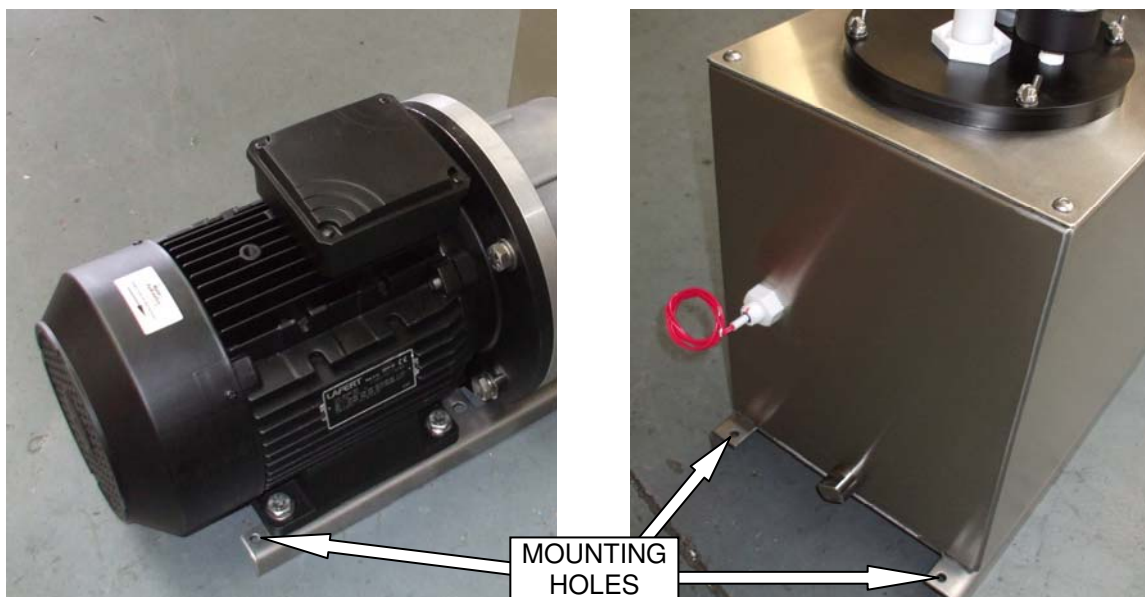


SAFETY

Read and understand these instructions fully before operating the Water Hydraulics Powerpack. This Powerpack operates at pressures up to 160 bar. Ensure that all system components are correctly pressure rated, and that all threaded fittings are fully tightened before operating the Powerpack. High pressure water jets can be extremely dangerous. Before conducting any maintenance or modifications to the system ensure that the electrical supply has been isolated and that any residual pressure has been dissipated from the system.

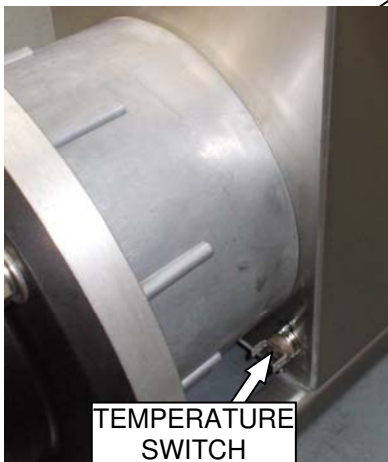
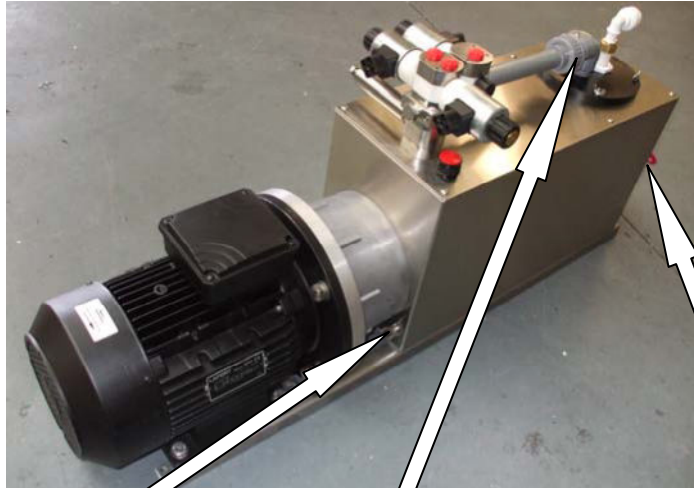
MOUNTING

4 X Ø5.5 mounting holes are provided on the base of the Powerpack for mounting – the dimensions of the hole centres are shown below. When mounting the Powerpack ensure that it is level within $\pm 5^\circ$, and that all 4 corners are fully supported.



ELECTRICAL CONNECTIONS

Electrical connections to the Powerpack should only be carried out by a suitably qualified electrician. The Powerpack should be connected to the mains electrical power supply (typically 3-phase 400V 50Hz) via a 3-pole isolating switch.



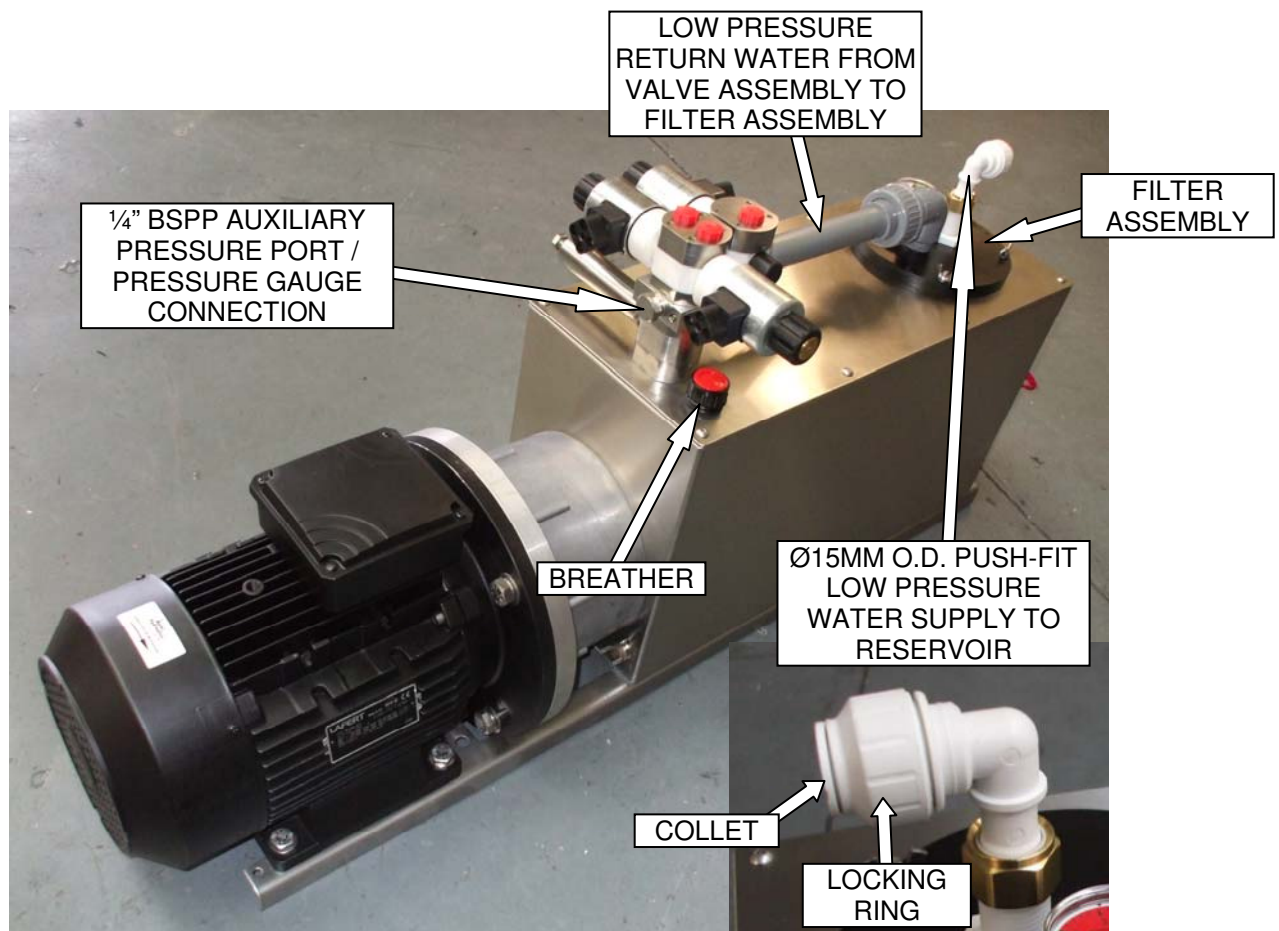
The low-voltage (typically 24VDC) control circuit for the motor should be connected in series with the Temperature Switch, Pressure Switch (if fitted) & Float Switch (all switches are normally closed – see datasheets starting on page 9) in order to prevent operation of the pump when any of the following conditions prevails: IF the Reservoir water level drops below a safe level OR the system water temperature exceeds 50°C (maximum system temperature) OR the pressure in the filter reaches 2bar (when pressure switch is fitted).

CAUTION – Before the Powerpack is operated continuously for the first time the electrical connection to the motor should be checked to ensure that the direction of rotation is correct (an arrow on the motor shows correct direction of rotation). Once all hydraulic connections have been made, and the system has been filled with water then the Powerpack can be operated for no longer than 2 seconds whilst observing the direction of rotation of the motor cooling fan (the motor cooling fan cowl can be removed temporarily to make observation of the fan easier).

HYDRAULIC CONNECTIONS

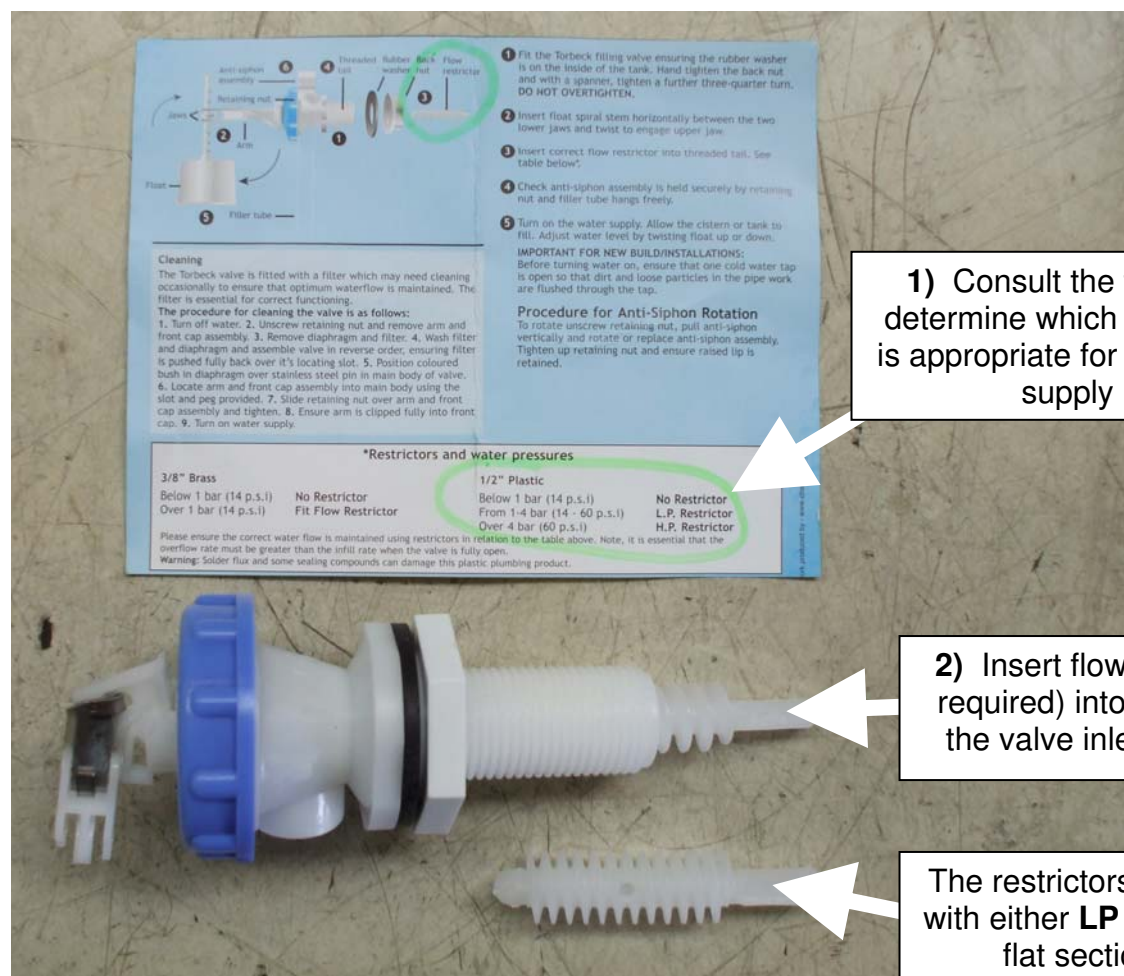
Connect the Powerpack to the water supply and hydraulic equipment as shown in the diagram below. For high pressure hydraulic connections to any valves / assemblies mounted to the Powerpack Lid (such as the valve assembly shown below) please refer to the specific documentation delivered with the Powerpack. All pipework and fittings must be correctly rated and of non-corrosive construction e.g. Stainless Steel / Polymers. If in doubt contact Water Hydraulics for advice.

All of the stainless steel threaded hydraulic connections are of the BSPP (PARALLEL) type and should be used with high pressure face sealing washers. DO NOT USE TAPERED FITTINGS. Ensure that any burrs and sharp edges are removed from all connecting pipework. All system components should be thoroughly degreased and flushed before attempting to operate the hydraulic system.



FLOAT VALVE RESTRICTOR

It may be necessary to fit a flow restrictor into the inlet of the Float Valve depending upon the pressure of the incoming water



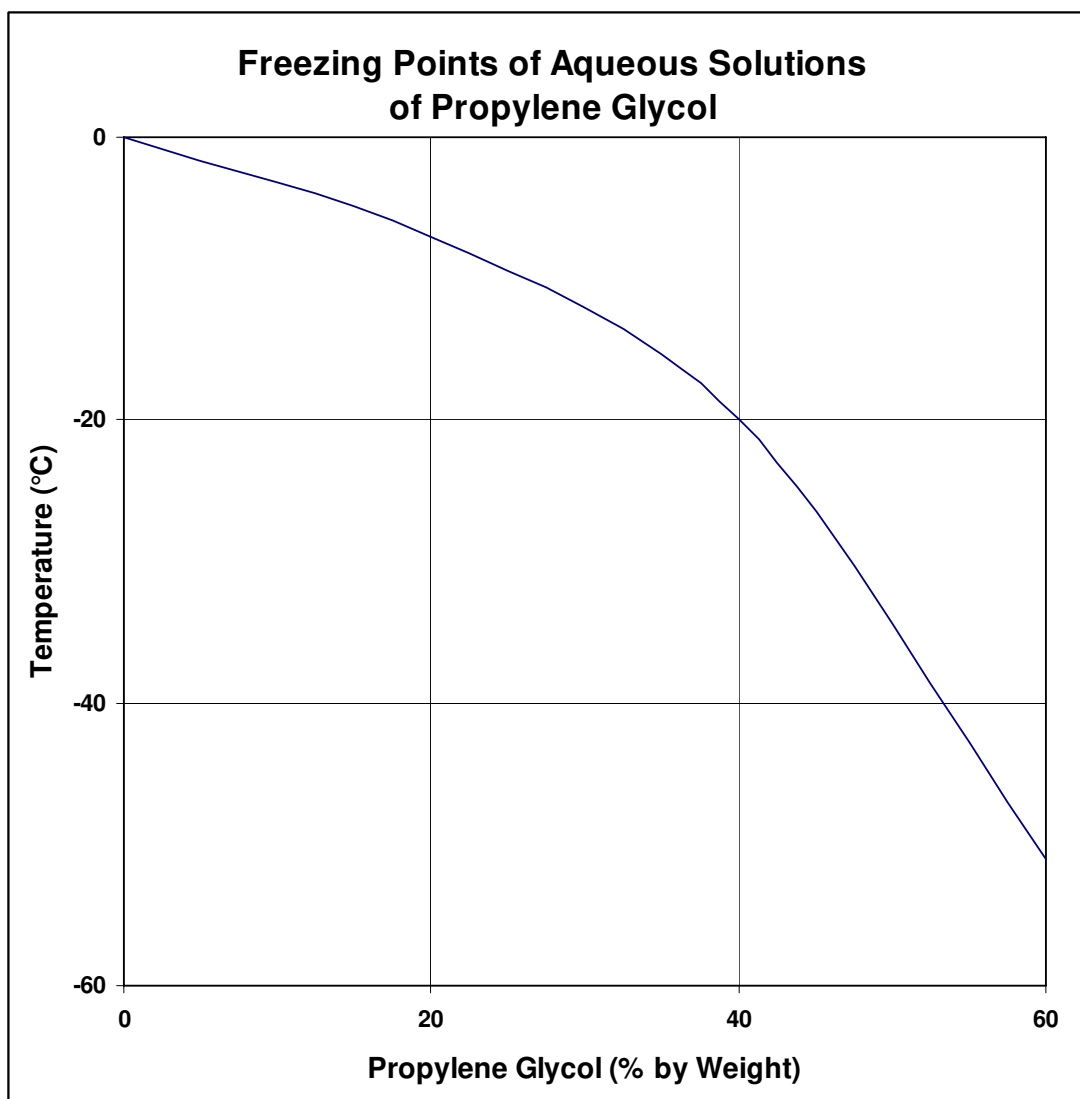
COMMISSIONING

- Fill the Powerpack Reservoir through the Float Valve to ensure that only filtered water enters the system - **DO NOT BYPASS THE FILTER.**
- Refer to the section headed 'CAUTION' on page 3 to ensure correct rotation of the Motor.
- Check that all threaded connections are fully tightened
- Operate the Powerpack and all functions whilst venting the system if necessary where air may be trapped before checking for leaks.
- Change the bag filter after an initial running-in period of 2 hours of full system operation.

ANTI-FREEZE

A percentage of anti-freeze should be added to the water in the system where it may experience sub-zero temperatures. Propylene Glycol can be added to the system without modification in the proportions shown below. Alternative more viscous solutions usually require pump / motor configurations to be modified depending upon the type of additive and the level of concentration - contact Water Hydraulics for advice.

RESERVOIR CAPACITY	VOLUME OF ANTI-FREEZE TO BE ADDED (LITRES)		
(LITRES)	0°C add 3%	-5°C add 15%	-20°C add 40%
5	0.15	0.75	2
10	0.3	1.5	4
20	0.6	3	8
50	1.5	7.5	20
100	3	15	40



OPERATION

For the connection & operation of hydraulic systems / assemblies connected to this Powerpack please refer to the specific documentation relating to the project assembly & individual valve operating instructions delivered with the Powerpack.

MAINTAINACE

Each hydraulic unit has been performance checked to customer specification before delivery. It should require no further adjustment other than connecting the driven hydraulic equipment and filling / supplying with CLEAN WATER (Use water of drinking water quality conforming to the EEC-directive 80/778/EEC or consult TWHC if unsure of water quality).

DISASSEMBLY of the unit in the field IS NOT RECOMMENDED.

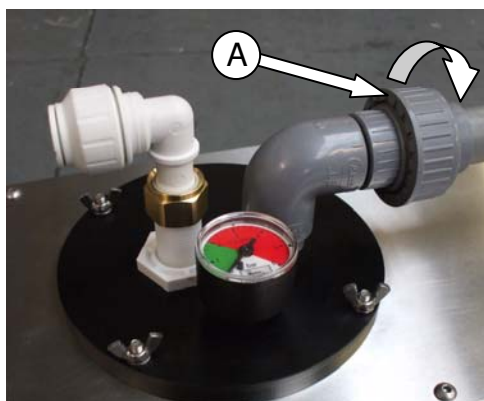
Satisfactory performance of the components used is dependent on precision machining and on factory assembly with special equipment.

A spare polypropylene felt bag filter is supplied with the Powerpack. The bag filter should be changed after an initial running-in period of 2 hours of full system operation, after which the filter should be changed when the needle enters the red section on the Filter Clogging Indicator OR when the optional Pressure Switch becomes open circuit due to the pressure inside the filter assembly exceeding 2 bar.



TO CHANGE THE BAG FILTER

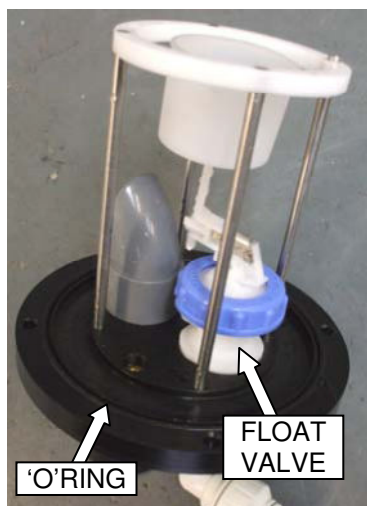
Switch off the Powerpack and isolate the electrical supply. Slacken the Locking Ring on the Ø15mm push-fit elbow, and push the collet towards the fitting (page 4) to release the low pressure water feed pipe. Slacken the Return Union by holding the elbow on the Filter Assembly and rotating the knurled Nut (A) anti-clockwise until it becomes loose on the return pipe.



Remove the 4 x M5 wing nuts at the top of the Filter Assembly and withdraw the assembly from the Reservoir Lid.



Remove and inspect the 'O'ring in the Filter Lid. If the 'O'ring is damaged it should be replaced with a new Ø3 section x Ø124 I.D. NBR (Nitrile Rubber) 'O'ring. Remove & discard the contaminated Bag Filter from the Reservoir Lid.



Fit a new Bag Filter to the Filter Assembly. Ensure that the Reservoir Lid is clean where the 'O'Ring will sit before inserting the Filter Assembly back into the opening in the Filter Lid. Replace the 4 x M5 wing nuts at the top of the Filter Assembly (leaving them loose). Re-assemble the Return Union and fully tighten the Knurled Nut before also fully tightening the 4 x M5 wing nuts at the top of the Filter Assembly. Replace the low pressure water feed pipe.

DRAINING THE RESERVOIR

Switch off the Powerpack and isolate the electrical supply. Release any pressure in the hydraulic system & isolate the incoming water supply to the Reservoir.



Loosen the Drain Plug at the base of the Reservoir by turning it in an anti-clockwise direction. Remove the plug in order to allow the water to drain completely from the Reservoir. Remove and inspect the 'O'ring in the Drain Plug. If the 'O'ring is damaged it should be replaced with a new Ø3.5 section x Ø12 I.D. NBR (Nitrile Rubber) 'O'ring. Ensure that the area where the 'O'Ring will sit is clean before re-fitting the drain plug to the Reservoir. Care should be taken not over-tighten the Drain Plug when refitting it, tightening by hand should be adequate.

STORAGE

If the Powerpack is to be stored long-term or if it is subject to long periods of inactivity (greater than 3 months) and it cannot be guaranteed that the Powerpack will not be subject to sub-zero temperatures, then a percentage of anti-freeze should be added to the water in the system, and the system functions should be operated fully for at least 10 minutes to ensure an even concentration.

Temperature Switch Datasheet

* * * * T23 SPECIFICATION(1) (S P S T) * * * *

Operation Temperature : One Fixed Point In The Range Of 50 °C To 205 °C

Temperature Tolerance : Operating Temperature $\pm 5\text{ }^{\circ}\text{C}$ ($\pm 3\text{ }^{\circ}\text{C}$ Available
Or Appointed Temperature Tolerance By Customers.)
Reset Temperature $\pm 6\text{ }^{\circ}\text{C}$ ($\pm 4\text{ }^{\circ}\text{C}$ Available Or
Appointed Temperature Tolerance By Customers)

Differential(Difference Between On Point And Off Point)
: Normal 10 °C — 30 °C

Heat Resistivity : 240 °C

* * * * * ELECTRICAL * * * * *

Electrical Rating 15A 125V AC (Resistive Load)
10A 250V AC (Resistive Load)
15A 250V AC (Resistive Load)

Contact Resistance 50m Ω Or Less

Dielectric Strength AC 1000V For One Minutes Or More Between
Non-Live Metal Parts And Terminals

Insulation Resistance : 100M Ω Or More Between The Non-Live Metal
Parts And Terminals.

Operating Life 100K Cycles (Class II VDE)
10K Cycles (15A 250V AC estimated life)

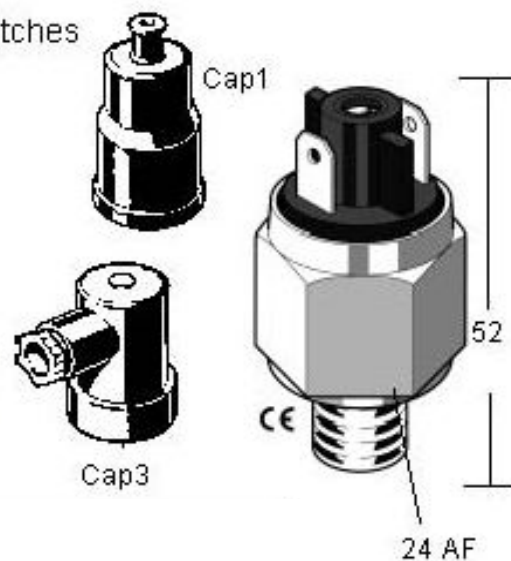
Pressure Switch Datasheet

Miniature pressure switch

PMN

Diaphragm or Piston type pressure switches

- 0,1 to 300 bar ranges
- Over-pressure proof up to 600 bar
- N/O or N/C contacts
- 1/4" push-on terminals (screw optional)
- Gold contacts option
- Choice of body material
- Vacuum switch option see



Switch Electrical Rating

24Vdc/0.5A (res) 0.2A (ind)
48Vdc/0.5A (res) 0.2A (ind)

Tightening Torque

5 Kgm

Float Switch Datasheet

Level switch - side entry

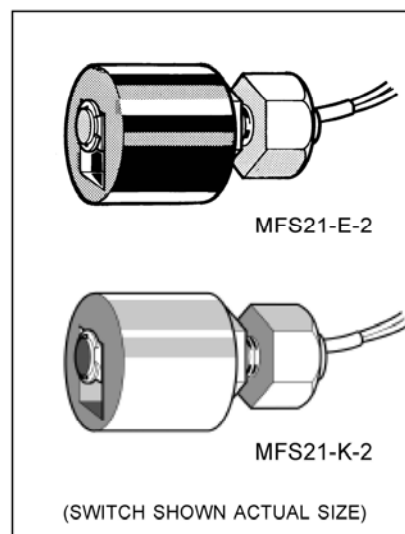
MFS21-E & K

FEATURES

- Nitrile float (MFS21-E-2)
- Polypropylene float (MFS21-K-2)
- Stainless steel circlip
- Polyacetal stem
- N/O or N/C contact
- 1/4" BSP thread with nut
- 30cm flying leads

OPTIONS

- Polypropylene circlip
- All S/Steel



Maximum Voltage 240Vac

Reed Switch Rating 66Va

Maximum Current 0.5A

For service and spare parts contact: -

The Water Hydraulics Co. Ltd.
Unit 30, The Boulevard Factory Estate,
Hull
East Yorkshire HU3 4AY
United Kingdom
Tel: (+44) 01482 595000
Fax: (+44) 01482 214895
Email: sales@waterhydraulics.co.uk
Web: www.waterhydraulics.co.uk

