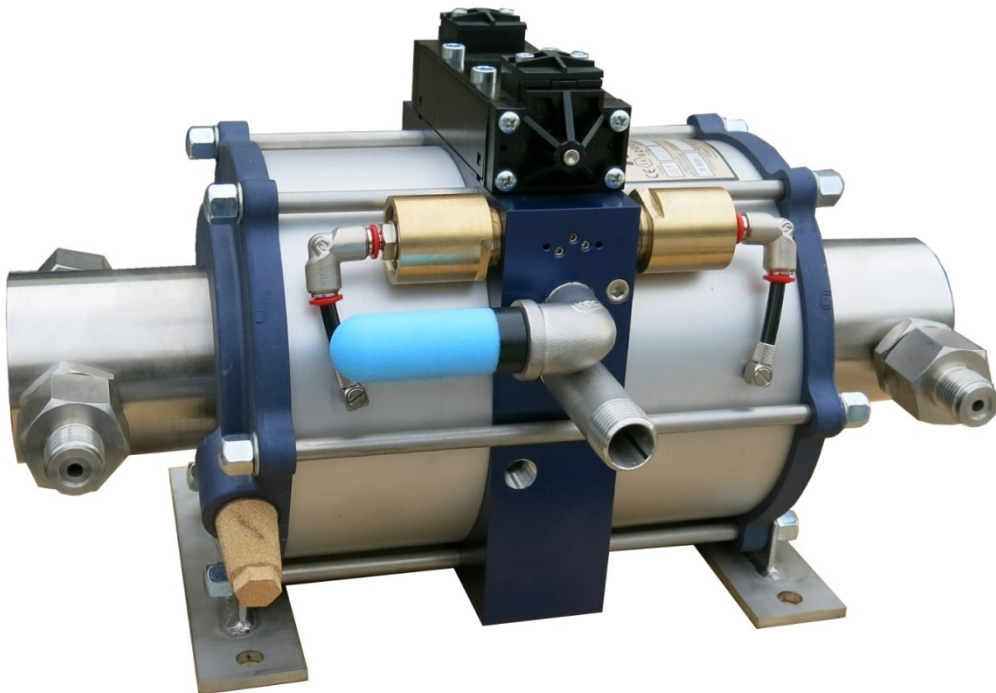


HPS

Hydraulic Pneumatic Services Ltd

Trojan Type 'MDR'
Double Acting Air Powered Pump
(Remote Pilot Version)
Operating and Maintenance Instructions



THE Trojan TYPE 'MDR'

DESCRIPTION This unit is a reciprocating piston pump that is powered by compressed air. It basically consists of a pneumatic piston and hydraulic rams which are linked to a four way air valve which causes the pump to reciprocate. Inlet and outlet non-return valves fitted to the hydraulic cylinders turn the displacement of the ram into a pumping action. The area of the piston is greater than that of the rams and this difference in area is the pump ratio.

If the hydraulic outlet is blocked off completely, say during pressure testing of a component, then the hydraulic pressure within the system will be the driving air pressure multiplied by the pump ratio. (Eg. a 2 Bar air pressure in a pump of ratio 25:1 will give a 50 Bar hydraulic pressure, less a small amount due to friction.)

This version of the pump, the Type 'MDR' has a separate air feed to the pilot valve. The reason for this is that it allows the main pump motor to run at a lower air pressure than standard so increasing the pressure range of the pump.

The pilot should be fed with a separate regulated air supply at around 3-4 bar.

The air inlet to the pump is fed with a regulated compressed air supply and operated as described but it will be possible to run at lower air drive pressures than with the standard version.

The pilot air pressure might need to be adjusted down for very low operating pressures and up for high pressures. The best setting will be found by trial and error.

INSTALLATION The pump will operate in any position, and can either be used free standing or bolted down.

An air line regulated to 3-4 bar is connected to the 1/4" BSP female Pilot air inlet of the pump.

An air line is connected to the main 1/2" BSP air inlet connection. An air pressure regulator will give control of the hydraulic outlet pressure.

An air filter should be included in the air line and though not essential the life of the pump will be extended by the use of an air lubricator. If using dried air a lubricator must be used.

The hydraulic fluid is connected to the inlet non-return valves (see direction of flow arrows on the assembly drawing).

Including a suitably sized strainer in the inlet pipework will prevent expensive damage from possible contaminants.

It is always advisable for the fluid reservoir to be higher than the pump.

The hydraulic outlet non-return valves are connected to the high pressure hydraulic system.

PIPEWORK The size of the pipework should be comparable to the size of the threads on the non-return valves. The pressure rating and type of pipe should be suited to the particular application. All pipework should be checked that it is clean and free from burrs before connecting to the pump.

OPERATION

The air pressure applied to the pump must never exceed 8 bar.

The pump is started by turning on the air pressure.

If using for the first time, or if it is suspected that air has got into the hydraulic side of the pump it must first be primed to remove any air out of the system by allowing the pump to run with the hydraulic outlet unrestricted until all air has been expelled.

Do not allow the pump to run for long periods with no liquid passing through it as this will cause the main seal to overheat and fail.

The pump can be stopped at any time by turning the air supply off, or it will eventually stall itself when the hydraulic test pressure set by the air pressure regulator is reached; in this state no further air will be used until the hydraulic pressure drops and the pump automatically re-starts.

MAINTENANCE To keep the pump in good condition it is only necessary to ensure that it is fed with a clean and filtered air supply, and the liquid fed into the pump is free of any contaminants that could cause wear. Though not essential, fitting an air lubricator will extend the service interval of the pump but if one is fitted it is important that it is kept filled.

SERVICING

To Change the Hydraulic Seal.

- a) Disconnect the air supply to the from the pump!
- b) Remove the banjo fittings (item 6) from the cylinders. Remove the six tie rods (items 3 & 10). The two high pressure ends of the pump can now be pulled away from the centre body. On ratios 1:38 and lower the main hydraulic seal is held on the end of the ram by a screw (item 38) and washer. Higher ratios use a lock-ring (item 44) with two peg spanner holes to retain the seal in the hydraulic cylinder. During re-assemble all sliding surfaces should be lubricated with a general purpose grease.

To change the Air Piston and Centre Body seals

- a) Remove the Hydraulic Ends as detailed above and carefully slide the Air Cylinders (item 2) off the Air Pistons (item 29). The Air Piston O' Rings can now be changed.
- b) Unscrew the two Hydraulic Rams (item 43) by using the Tommy bar holes ratios 4.4:1 to 38:1, or the peg spanner holes in higher ratio pumps. Be very careful not to damage the running surface of the rams. Only one Ram needs to be removed and the two halves can be separated and removed from the Centre Body. The Connecting Rod U' Rings can now be changed (item 27). During re-assemble all sliding surfaces should be lubricated with a general purpose grease.

Servicing the Air Valve and Pilot Valve.

When changing the seals in these valves great care should be taken to ensure all parts are re-assembled in the correct order. During re-assemble all sliding surfaces should be lubricated with a general purpose grease.

To Service the Non-Return (Check) Valves.

a) Disconnect the air supply from the pump!

b) Unscrew the Non-Return Valves (items 36 & 37) from the pump. Grip the wider part of the Valve, the Seat (item 1) in a sturdy vice using soft jaws to protect the valve from damage. Using a large spanner unscrew the Valve Body (item 2) and separate the two halves of the Valve.

During reassembly place the Body of the Valve (item 2) with the open end upwards in a vice. Insert the Guide (item 6), Spring, (item 4) wide end against the Guide, Poppet (item 5) into position then place the Seal Retainer (item 7) fitted with a new O' Ring on top of the Poppet, be sure this is the correct way round. (Note:- Ratios 249:1 & 390:1 have the Seal Ring (item 3) placed directly into the Seat of the Valve (item 1).

Apply anti-seize grease to the threads and carefully lower the Seat (item 1) into position and screw the two parts together.

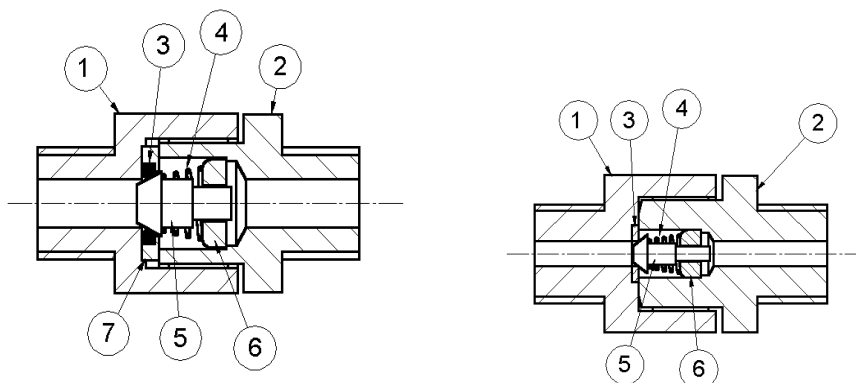
Grip the Valve in a vice as before and tighten fully.

1" & 3/4" BSP 440 Nm, 1/2" BSP ratios 4.4:1 to 159:1 237 Nm,
Ratio 256:1 339 Nm, ratio 400:1 372 Nm.

IMPORTANT

Before refitting the Non-Return Valves to the pump you need to seat the Poppets onto the seals. A suitably sized rod. is inserted through the Body (item 2) and pushed firmly against the end of the Poppet forcing it onto the Seal.

The INLET valve has the NARROW hexagon against the pump body, the OUTLET valve has the WIDE hexagon against the pump body.



RATIOS 4.4:1 TO 159:1

RATIOS 256:1 & 400:1

NON RETURN VALVES

FREEZING ! Care must be taken in extremely cold conditions to prevent the risk of freezing, if water is being used as the hydraulic medium.

SPARES When ordering spare parts it is essential to quote the pump type and ratio and if possible the serial number. This information will be found on a label fixed to the pump.

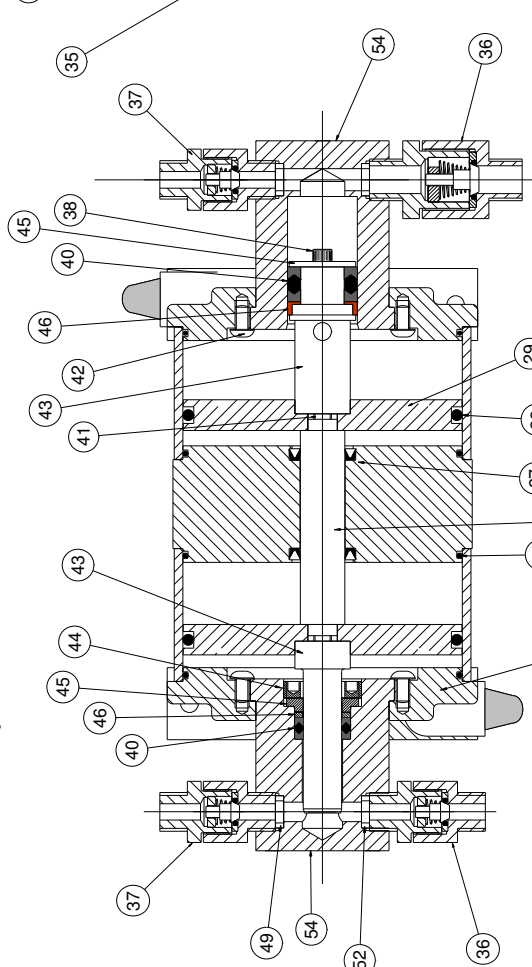
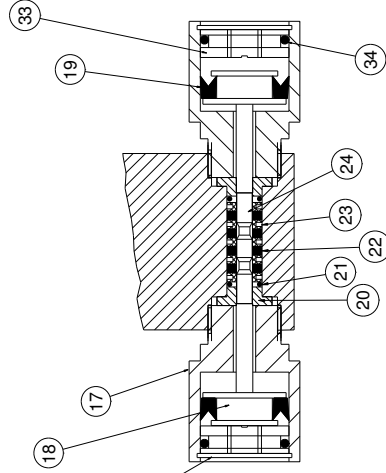
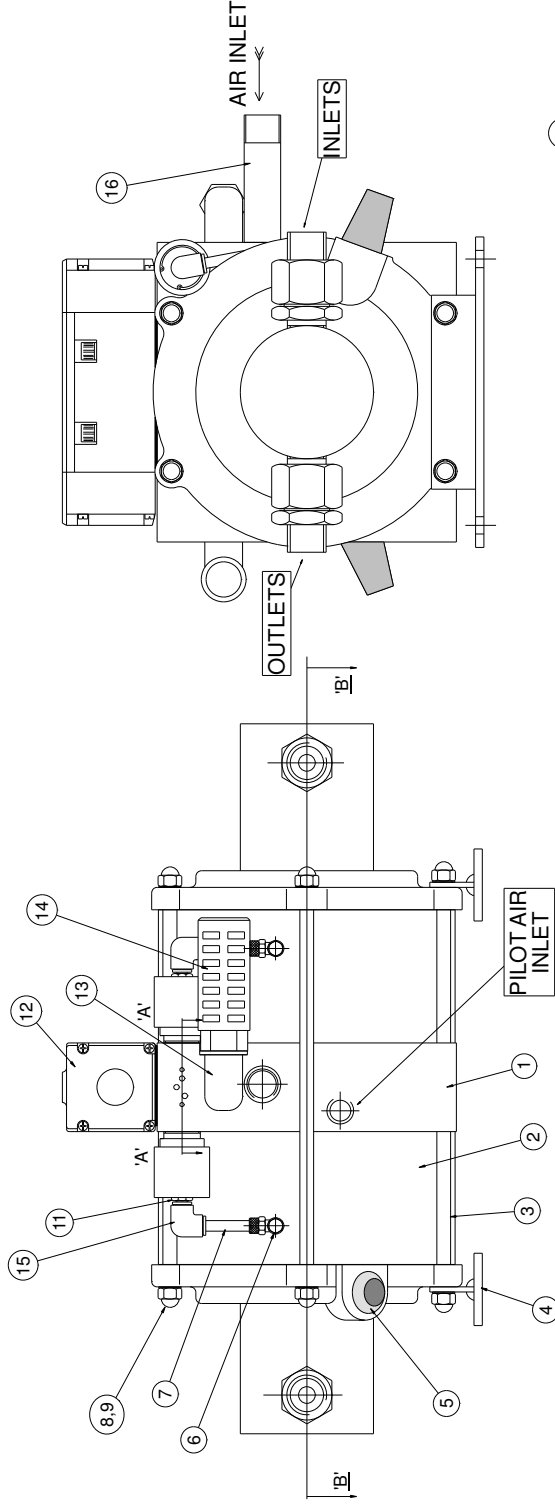
Pressure Equipment Directive 2014/68/EU Categories:-

Ratios 4.3:1 to 51:1 SEP
Ratios 77:1 & 111:1 SEP (Group 2 liquids only)
Ratios 155:1 to 390:1 Category I (Group 2 liquids only)

ATEX  II 2G Ex h IIC T5 Gb
II 2D Ex h IIIC T 100°C Db

Pumps and spares are all available from:-

Hydraulic Pneumatic Services Ltd, Unit 17, King Street Trading Estate
Middlewich
Cheshire UK Tel: +44 (0)1606 835725
CW10 9LF www.trojanpumps.com



RAM AND SEAL DETAILS
FOR RATIO 1:33 AND BELOW

SECTION 'A-A'

RAM AND SEAL DETAILS
FOR RATIO 1:53 AND ABOVE

60			
59			
58			
57			
56			
55			
54	HYDRAULIC CYLINDER	2	
53	END COVER	2	
52	INLET PORT WASHER	2	
51			
50			
49	OUTLET PORT WASHER	2	
48			
47			
46	ANTI-EXTRUSION RING	2	
45	BACK UP RING	2	
44	LOCK RING	2	
43	RAM	2	
42	SCREW	8	
41	CONNECTING STUD	2	
40	SEAL ASSEMBLY	2	
39			
38	SCREW	2	
37	OUTLET N.R. VALVE	2	
36	INLET N.R. VALVE	2	
35	CIRCLIP	2	
34	O' RING	2	
33	END CAP	2	
32	LABEL	1	
31	PLUG, 1/8"	2	
30	PLUG, M4	8	
29	AIR PISTON	2	
28	O' RING	2	
27	U' RING	2	
26	CONNECTING ROD	1	
25	O' RING	4	
24	SPOOL	1	
23	CAGE	5	
22	SEAL RING	4	
21	O' RING	2	
20	LOCATING DISC	2	
19	U' RING	2	
18	PISTON	2	
17	CYLINDER	2	
16	AIR CONNECTOR	1	
15	ELBOW	2	
14	EXHAUST SILENCER	2	
13	ELBOW <small>(LOW GASKET & O-RINGS)</small>	1	
12	AIR VALVE	2	
11	STEM ADAPTOR	4	
10	TIE ROD (SHORT)	2	
9	WASHER	12	
8	DOME NUT	12	
7	SIGNAL HOSE	2	
6	BANJO	2	
5	VENT SILENCER	2	
4	FOOT	2	
3	TIE ROD (LONG)	2	
2	AIR CYLINDER	2	
1	CENTRE BODY	1	
ITEM	DESCRIPTION		QTY.

DRG. No. **10151**

The DOUBLE ACTING **Trojan** Type 'MDR'

TITLE:

SCALE: 1:1
 DRAWN: [] CHECKED: []
 DESIGNED: []
 PROJECT: []

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