



Hydraulic Pneumatic Services Ltd

Trojan Type 'M'
(Including Type 'MR')
Air Powered Pump
Operating and Maintenance Instructions



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

THE Trojan TYPE 'M'

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

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

An air line is connected to the air inlet of the pump. **Not exceeding 8 bar.**

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. An air pressure regulator will give control of the hydraulic outlet pressure. If using dried air a lubricator must be used.

The hydraulic fluid is connected to the inlet non-return valve (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 valve is 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 contaminates 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.

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.

Pumps and spares are all available from:-

Hydraulic Pneumatic Services Ltd, Unit 17, King Street Trading Estate, Middlewich, Cheshire UK, CW10 9LF

Tel: +44 (0)1606 835725

www.trojanpumps.com

SERVICING

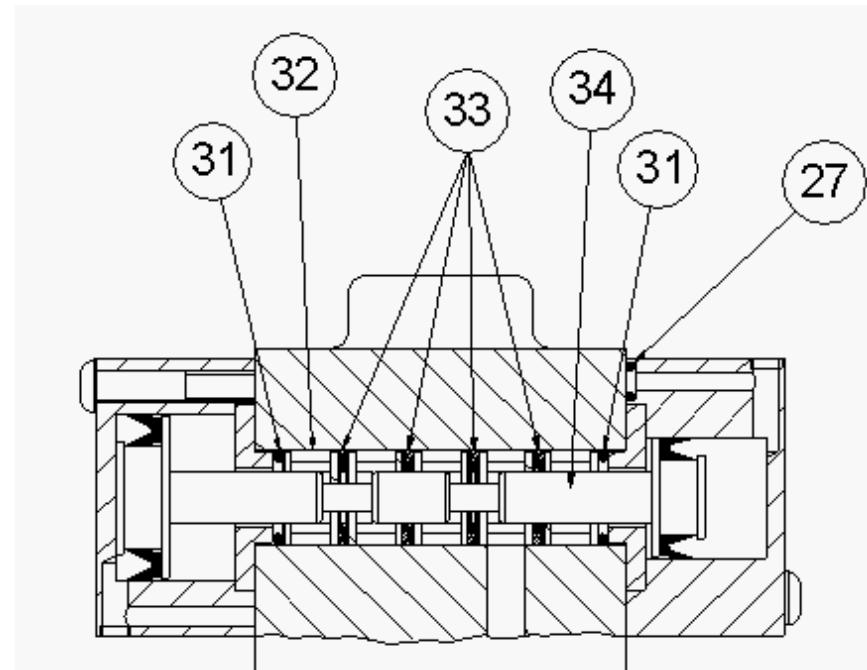
To Change the Hydraulic Seal and Air Piston O' Ring.

- a) Disconnect the air supply from the pump!
- b) Unscrew the retaining nuts on the two air elbows (item 7), remove the four retaining bolts (item 40). The two halves of the pump can now be pulled apart. Remove the air cylinder (item 8) by sliding it off the air piston (item 6) and pull the piston assembly along with the hydraulic ram (item 47) out of the pump. On ratios 1:38 and lower the main hydraulic seal is held on the end of the ram by a screw (item 51) and washer. Higher ratios use a retaining-ring (item 45) with two peg spanner holes to retain the seal in the hydraulic cylinder. This should be unscrewed using a suitable Pin Type Face Spanner
During re-assemble all sliding surfaces should be lubricated with a general purpose grease except for the hydraulic Ram item 47 on the 400:1 pump which should be lubricated with oil.

Servicing the air change over valve.

- a) Disconnect the air supply from the pump!
- b) Separate the two halves of the pump as described above.
Remove the pilot bush retaining circlip (item 4) and carefully pull the bush from the housing. The main air valve is dismantled by removing the end caps (items 20 & 29) and sliding the internal seals etc. out.
The end caps will retain the pistons which should also be pulled out and examined. Make careful note as to the order in which the various components are fitted. The two end caps are designed in such a way that it is impossible to fit them incorrectly. The return end cap is fitted with a small O' Ring (item 25) to seal the pilot hole, the other end cap has no O' Ring. This is correct and no attempt should be made to seal this hole.

During re-assemble all sliding surfaces should be lubricated with a general purpose grease.

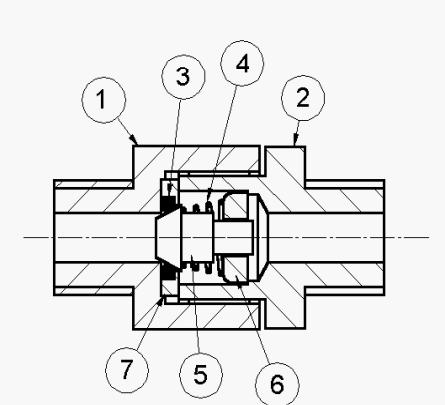


AIR CHANGE OVER VALVE

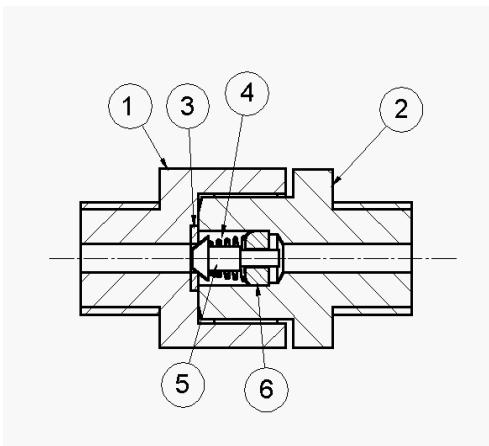
- 27 O' Ring
- 31 O' Ring
- 32 Cage
- 33 Sealing Ring
- 34 Valve Spool

SERVICING

To Service the Non-Return (Check) Valves.



NON RETURN VALVE FITTED TO RATIOS 1:4.4 - 1:159



NON RETURN VALVE FITTED TO RATIO 1:256 & 1:400

- Disconnect the air supply from the pump!
- Unscrew the Non-Return Valves (items 60 & 61) 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 256:1 & 400:1 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.

Pressure Equipment Directive 2014/68/EU Categories:-

- Ratios 4.4:1 to 53:1 SEP
- Ratios 79:1 & 114:1 SEP (Group 2 liquids only)
- Ratios 159:1 to 400:1 Category I (Group 2 liquids only)

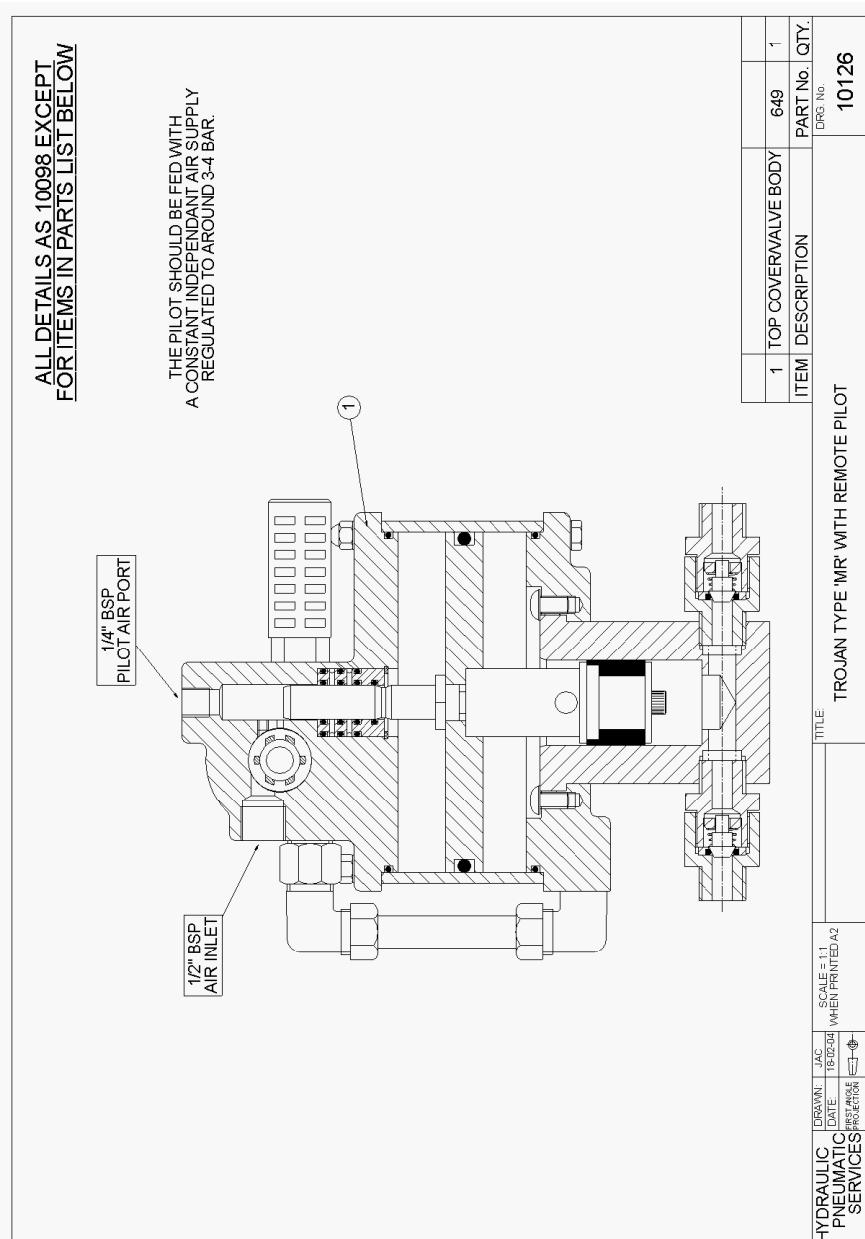
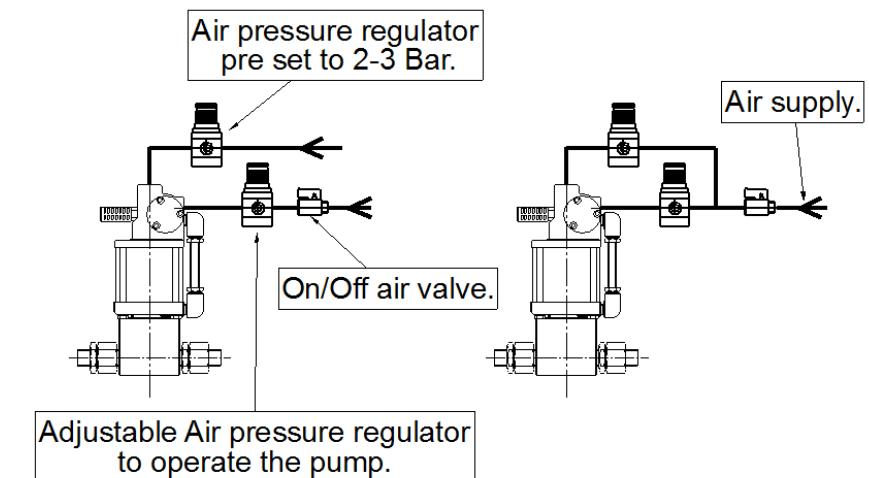
REMOTE PILOT VERSION OF PUMP, Type 'MR'
(Assembly No. 10126)

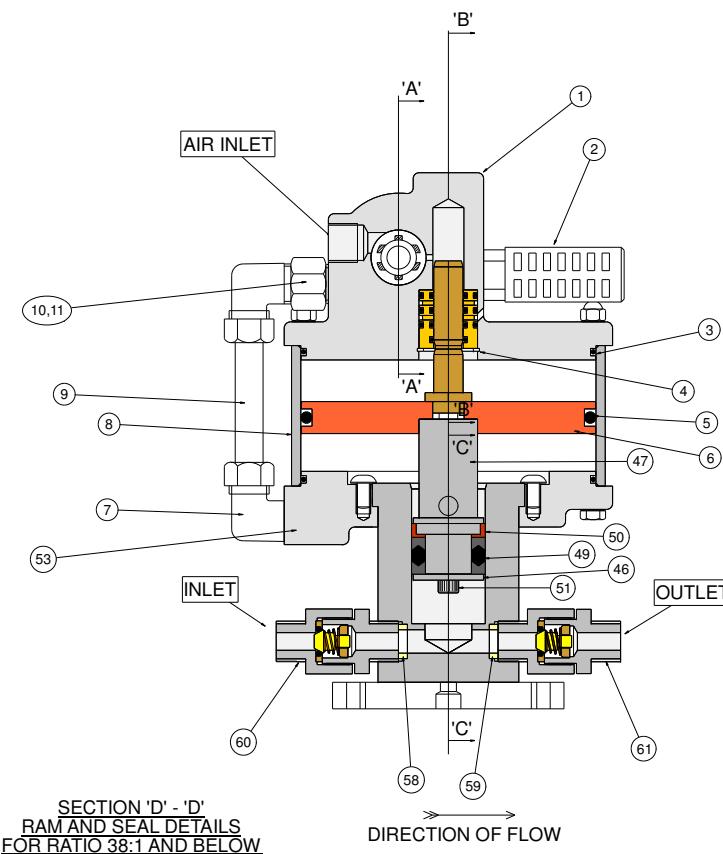
This version of the pump has a separate air feed to the pilot valve. The reason for this is that it allows the main pump motor to run at a lower air pressure than standard so increasing the pressure range of the pump.

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

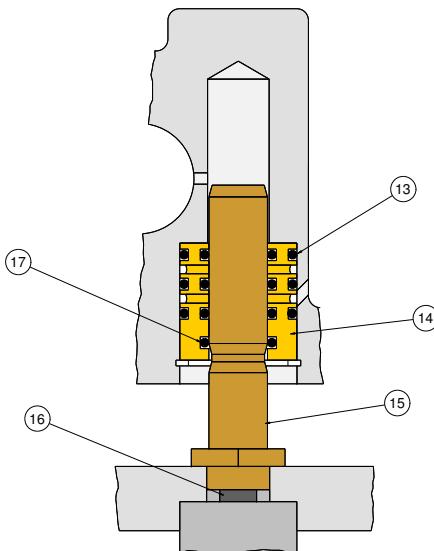
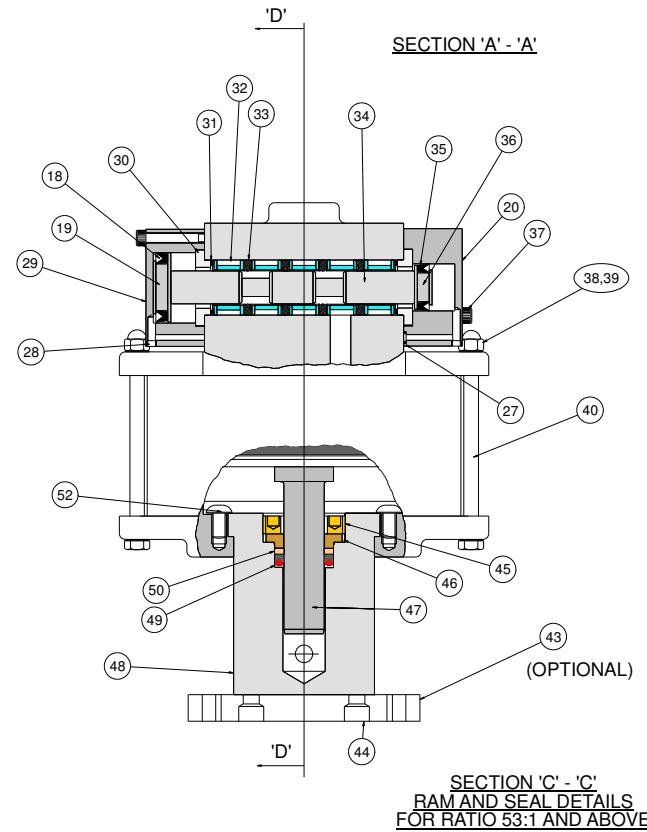
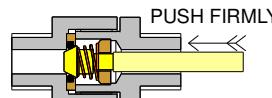
The air inlet to the pump is fed with a regulated compressed air supply and operated as described at the beginning of this manual but it will be possible to run at lower air drive pressures than with the standard version.

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 alternatives:-





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
and pushed firmly against the end of the poppet
forcing it onto the Seal.



66		
65		
64		
63		
62		
61	OUTLET N.R. VALVE	1
60	INLET N.R. VALVE	1
59	OUTLET PORT WASHER	1
58	INLET PORT WASHER	1
57		
56		
55		
54		
53	BOTTOM COVER	1
52	SCREW	4
51	SCREW	1
50	ANTI-EXTRUSION RING	1
49	HYDRAULIC SEAL	1
48	HYDRAULIC CYLINDER	1
47	RAM	1
46	BACK UP RING	1
45	LOCK RING	1
44	SCREW (WITH ITEM 43)	2
43	BASE (OPTIONAL)	1
42	RIVET	4
41	LABEL	1
40	BOLT	6
39	WASHER	12
38	DOME NUT	6
37	SCREW	6
36	RETURN PISTON	1
35	U' RING	1
34	MAIN VALVE SPOOL	1
33	SEALING RING	4
32	CAGE	5
31	O' RING	2
30	LOCATING DISC	2
29	END CAP, SIGNAL	1
28	PLUG	2
27	O' RING	1
26		
25		
24		
23		
22		
21		
20	END CAP, RETURN	1
19	SIGNAL PISTON	1
18	U' RING	1
17	O' RING	4
16	CONNECTING STUD	1
15	PILOT SHAFT	1
14	BUSH	1
13	O' RING	3
12		
11	WASHER	1
10	ADAPTOR	1
9	AIR PIPE	1
8	AIR CYLINDER	1
7	ELBOW	2
6	PISTON	1
5	O' RING	1
4	CIRCLIP	1
3	O' RING	2
2	SILENCER	2
1	TOP COVER/VALVE BODY	1
ITEM	DESCRIPTION	QTY.

ISSUE 2 : 11-8-04

DRG No:
10098/2