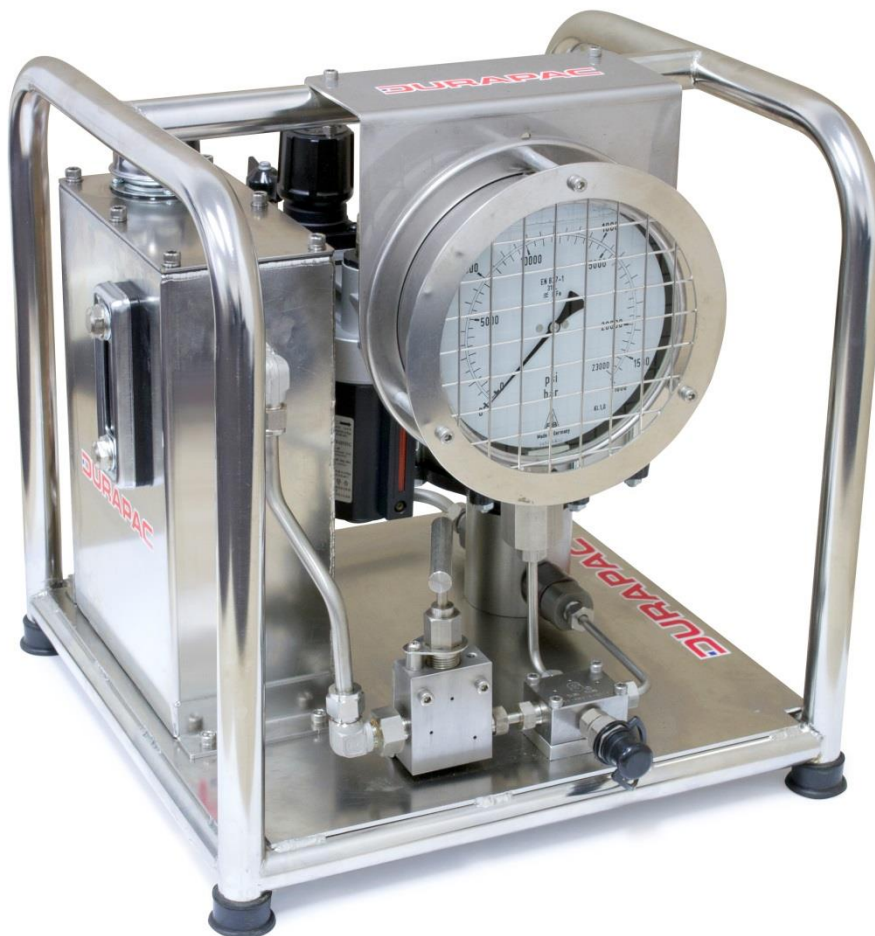


DURAPAC
ENGINEERED FOR RELIABILITY

Instruction Manual

Bolt Tensioning Power Units
Model – PAMH1514



Maximum Operating Pressure – 1,500 bar



This is a safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid injury or death

1.0 Product Information

DURAPAC – Air Hydraulic Power Units are engineered to meet Industrial Standards for Performance and Safety. The PAMH1514 model is a light weight, single acting power unit designed for bolt tensioning applications utilising DURAPAC DBT Series Bolt Tensioners at 1,500 bar and air is the preferred power source.

- Liquid filled pressure gauge – range is 0-1,600 bar / 0-23,000 psi
- Sight glass incorporating a temperature gauge
- Stainless steel base and frame resists corrosion and allows for easy handling
- Oil outlet fitted with a ¼” DBT116M quick release nipple
- Pressure release valve
- Filter, regulator & lubricator with gauge are supplied on the air inlet
- Stainless steel reservoir with 5.6 litres of usable oil
- Reservoir On/Off valve

Special skill, knowledge and training may be required for a specific task and the product may not be suitable for all jobs. The user must ultimately make the decision regarding suitability of the product for any given task and assume the responsibility of safety for all in the work area. Contact a Durapac representative if you are unsure of your power unit’s suitability for a particular application.

2.0 Receiving Instructions

It is recommended prior to use that an inspection be done by qualified personnel and that any missing or damaged parts, decals, warning/safety labels or signs are replaced with Durapac authorised replacement parts only. Any power unit that appears to be damaged in any way, is worn, leaking or operates abnormally should be removed from service immediately until such time as repairs can be made. Any power unit that has been or suspected to have been subject to a shock load should be removed from service immediately until inspected by a Durapac authorised service centre. Owners and operators of this equipment should be aware that the use and subsequent repair of this equipment may require specialised training and knowledge.

3.0 Safety

Save these instructions. For your safety, read and understand the information contained within. The owner and operator should have an understanding of this product and safe operating procedures before attempting to use this product. Instructions and safety information should be conveyed in the operator's native language before use of this product is authorised. Make certain that the operator thoroughly understands the inherent dangers associated with the use and misuse of the product. If any doubt exists as to the safe and proper use of this product as outlined in this factory authorised manual, remove from service immediately.



DANGER:

- To avoid personal injury keep hands and feet away from work area during operation

- **Do NOT** handle pressurised hoses. Escaping oil under pressure can penetrate the skin causing serious injury. If oil is injected under the skin, see a doctor immediately
- Stay clear of loads supported by hydraulics. A cylinder, when used as a load lifting device, should never be used as a load holding device. After the load has been raised or lowered, it must always be supported mechanically

**WARNING:**

- The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system
- Always wear appropriate personal protective equipment (PPE) when operating hydraulic equipment. The operator must take precaution against injury due to failure of the tool or work piece(s)
- **Do NOT** hold or stand directly in line with any hydraulic connections while pressurising
- **Do NOT** attempt to disconnect hydraulic connections under pressure. Release all line pressure before disconnecting hoses
- All personnel must be clear before lowering load or depressurising the system
- **Do NOT** attempt to lift a load weighing more than the capacity of the cylinder

**IMPORTANT:**

- If at any stage, the safety related decals become hard to read, these must be replaced
- Minimum age of the operator must be 18 years. The operator must have read and understood all instructions, safety issues, cautions and warnings before starting to operate the equipment. The operator is responsible for this activity towards other persons
- **Do NOT** lift hydraulic equipment by the hoses or couplers. Use the carrying handle or other means of safe transport
- Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Durapac authorised service centre in your area. To protect your warranty, use only high quality hydraulic oil

**CAUTION:**

- **KEEP HYDRAULIC EQUIPMENT AWAY FROM FLAMES AND HEAT.** Hydraulic oil can ignite and burn. Excessive heat will soften packings and seals, resulting in oil leaks. Heat also weakens hose materials and packings. For optimum performance do not expose equipment to temperatures of 65°C (150°F) or higher. Protect all equipment from weld spatter
- No alteration should be made to this device

3.1 Hydraulic Power Units

- **Do** use a gauge or other load measuring instrument to verify load
- **Do NOT** exceed the rated capacity of the power unit or any equipment in the system. Burst hazard exists if connection pressure exceeds rated pressure

- **Do NOT** operate the system with bent or damaged couplers or damaged threads
- **Do NOT** subject the power unit and its components to shock loads
- Use only Durapac approved accessories and components
- **Do NOT** connect to an application which can return more oil to the reservoir than the power unit reservoir can hold
- **Do NOT** connect the power unit to a hydraulic system that is powered by another pump

3.2 Hydraulic Hoses & Oil Transmission Lines

- Avoid short runs of straight line tubing. Straight line runs do not provide for expansion and contraction due to pressure and/or temperature changes
- Reduce stress in tube lines. Long tubing runs should be supported by brackets or clips. Before operating the power unit, connections should be tightened securely and leak-free. Over tightening can cause premature thread failure or high pressure fittings to burst
- Should a hydraulic hose ever rupture, burst or need to be disconnected, immediately shut off the power unit and release all pressure. Never attempt to grasp a leaking pressurised hose with your hands. The force of escaping hydraulic oil can inflict injury
- **Do NOT** subject the hose to potential hazard such as fire, sharp objects, extreme heat or cold or heavy impact
- **Do NOT** allow the hose to kink, twist, curl, crush, cut or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for wear
- Hose material and coupler seals must be compatible with the hydraulic oil used. Hoses also must not come in contact with corrosive materials such as battery acid, creosote-impregnated objects and wet paint. Never paint a coupler or hose

FAILURE TO HEED THESE WARNINGS MAY RESULT IN PERSONAL INJURY AS WELL AS PROPERTY DAMAGE.

4.0 Installation

⚠ IMPORTANT: To extend the life of your power unit, the air compressor should have a filter, regulator and lubricator system that will provide clean, lubricated air to the power unit. Contact a Durapac representative for the necessary accessories

4.1 Familiarise yourself with the specifications and illustrations in this owner’s manual. Know your power unit, its limitations and how it operates before attempting to use. Refer to the specification chart below or if in doubt, contact a Durapac representative.

Model Number	Used with Cylinder	Pressure Rating (bar)	Compression Ratio	Oil Flow (cm ³ /stroke)	Air Pressure Range (bar)	Air Consumption (Lpm)	Oil Port Thread	Oil Capacity (L)	Dry Weight (kg)
PAMH1514	S/A	1,500	1:310	1.2	5-7	793	G 1/4"	5.6	25

- 4.2 **Air Connection** - connect suitable air supply to air input port. Air input port is designed to fit the popular 1/4" NPT air nipple. Ensure that your air source can dedicate 7.8 cfm @ 5-7 bar to each power unit being operated.
- 4.3 Check all system fittings and connections to be sure they are tight and leak free.
- 4.4 Check oil level in reservoir before operating the power unit.
- 4.5 **Bleeding Air from the Hydraulic Oil Circuit** – Air can accumulate in the hydraulic system during the initial setup or after prolonged use, causing the cylinder to respond slowly or in an unstable manner. Should removal of air from power unit be required, please follow the steps in 6.2 – Bleeding Air from the Hydraulic Oil Circuit in the Maintenance Section.

5.0 Operation



IMPORTANT:

- Always monitor pressure, load or position using suitable equipment. Correct application position can only be determined by the operator of the equipment
- **Never** set the relief valve to a higher pressure than the maximum rated pressure of the power unit. Higher settings may result in equipment damage and/or personal injury
- **Do NOT** remove the relief valve
- The air pressure regulator will stop the power unit when it reaches its maximum working pressure
- **Do NOT** operate a power unit that is disconnected from the application. If operated in this condition, the hose and connections will become pressurised. This increases the chance of a burst hazard. Damage may also occur to the power unit and its components

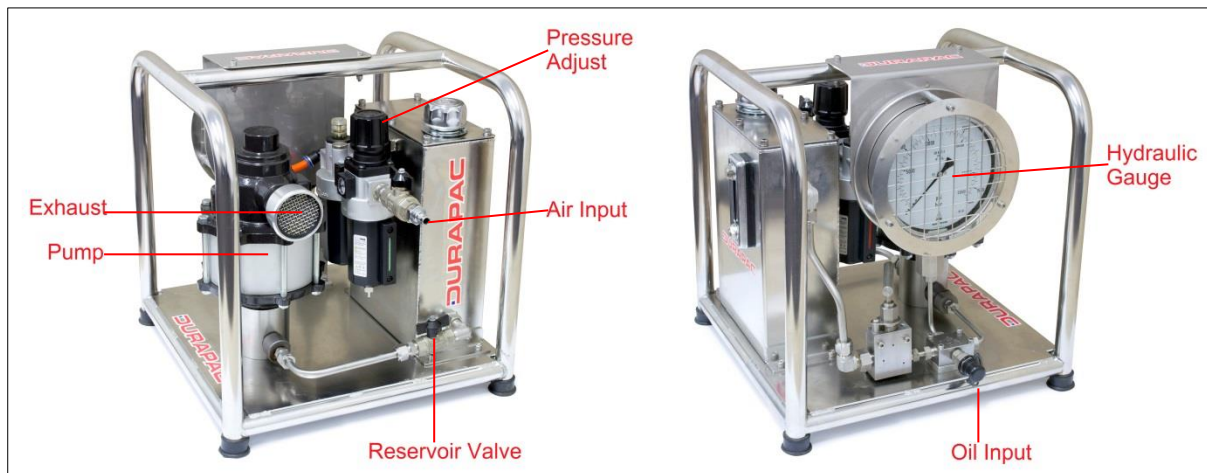
5.1 Before Using the Power Unit

- 5.1.1 Check all system fittings and connections to be sure they are tight and leak free.
- 5.1.2 Ensure the power unit's Reservoir Valve is in an open position (see Fig. 1).
- 5.1.3 Turn the power unit's Release Valve to an open position (see Fig. 2).

5.2 Power Unit Operation

- 5.2.1 Connect the main air supply to the power unit's Air Input (see Fig. 1).
- 5.2.2 Slowly open the Air Input. The power unit will begin working. Note - no pressure will be generated because the pressure Release Valve is open so the oil will just circulate through the system and back into the reservoir.
- 5.2.3 Before adjusting the pressure on the air regulator, ensure the "Pressure Adjust" is in the up position.
- 5.2.4 Turn the adjustment knob on the air regulator and use the Hydraulic Gauge to monitor pressure. Reduce the air pressure to zero bar/psi to slow and eventually stop the power unit.

- 5.2.5 Fully close the pressure Release Valve. Note – as this is done a small amount of pressure will be generated on the Hydraulic Gauge before the power unit stops.
- 5.2.6 Slowly increase the air supply pressure by turning the adjustment knob, the Hydraulic Gauge will indicate a higher pressure as more air is allowed into the pump unit. Stop the air adjustment when the Hydraulic Gauge indicates the desired tensioning pressure.
- 5.2.7 Stop the power unit by closing the Air Input and slowly opening the Release Valve. The Hydraulic Gauge will fall to zero.
- 5.2.8 Lock the air regulator by moving the “Pressure Adjust” knob to the down position.
- 5.2.9 The power unit is now ready for the tensioning operation.



Figures 1 & 2 – PAMH1514 Components

6.0 Maintenance




IMPORTANT:

- Check oil level regularly
- Use only good quality hydraulic oil. **Do NOT** use brake fluid, transmission fluid, turbine oil, motor oil, alcohol, glycerine etc. Use of anything other than good quality hydraulic oil will void warranty and damage the power unit, hose, and application. We recommend Durapac Hydraulic Oil or equivalent
- Equipment must only be serviced by a qualified hydraulic technician. For repair service, contact your local Durapac authorised service centre
- Damage to hydraulic hoses may not be detected during visual inspections. For this reason, Durapac recommends that hydraulic hoses be replaced on a regular basis
- Tighten connections as needed. Use non-hardening pipe thread compound when servicing connections

Dirt, sand, etc. will quickly ruin any hydraulic system. Ensure that couplings are clean and free of foreign matter. After each use, clean couplings and attach dust caps.

Maintenance is required when wear or leakage is noticed. Periodically inspect all components to detect any problem that may require service and maintenance.

6.1 Adding Hydraulic Oil

 **WARNING:** Always add oil with cylinders fully retracted (or extended, if pull cylinders) or the system will contain more oil than the reservoir can hold

- 6.1.1 Depressurise and disconnect hydraulic hose from application/cylinder.
- 6.1.2 With the power unit in its upright position, remove the plug located on the top plate of the reservoir.
- 6.1.3 Use a small funnel fill the reservoir to the top of the sight glass located on the side of the reservoir.
- 6.1.4 Bleed air from system if necessary.
- 6.1.5 Wipe up any spilled oil and reinstall the reservoir cap.

6.2 Bleeding Air from the Hydraulic Oil Circuit

- 6.2.1 Repeat Steps 6.1.1 to 6.1.3 (above), if required.
- 6.2.2 Invert the cylinder and place at a lower level than the power unit reservoir.
- 6.2.3 Extend and retract the cylinder several times (taking care not to over extend the piston) without putting a load on the system. Air will be released into the power unit reservoir.
- 6.2.4 Recheck oil level after removing air.

6.3 Changing Hydraulic Oil

 For best results, change oil once a year or every 300 hours of use

- 6.3.1 Repeat Steps 6.1.1 to 6.1.2 (above).
- 6.3.2 Pour used oil into a sealable container.
- 6.3.3 Repeat Steps 6.1.3 to 6.1.5 (above).
- 6.3.4 Dispose of oil in accordance with local regulations.

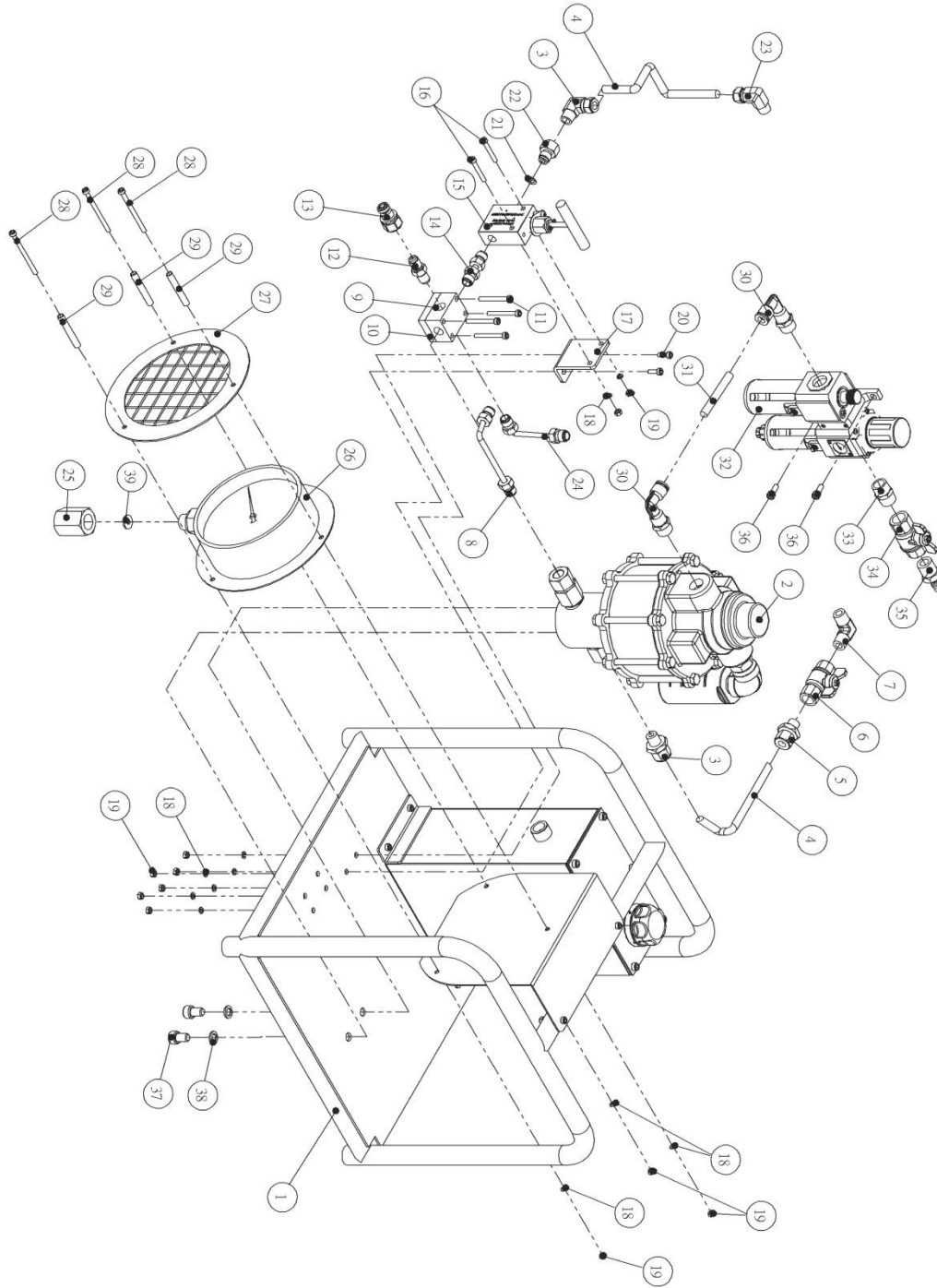
6.4 Storage

- 6.4.1 When not in use, depressurise and disconnect the hydraulic power unit from the application.
- 6.4.2 Wipe clean thoroughly and store in a clean, dry environment. Avoid temperature extremes.
- 6.4.3 Shield power unit with a protective cover.

7.0 Troubleshooting

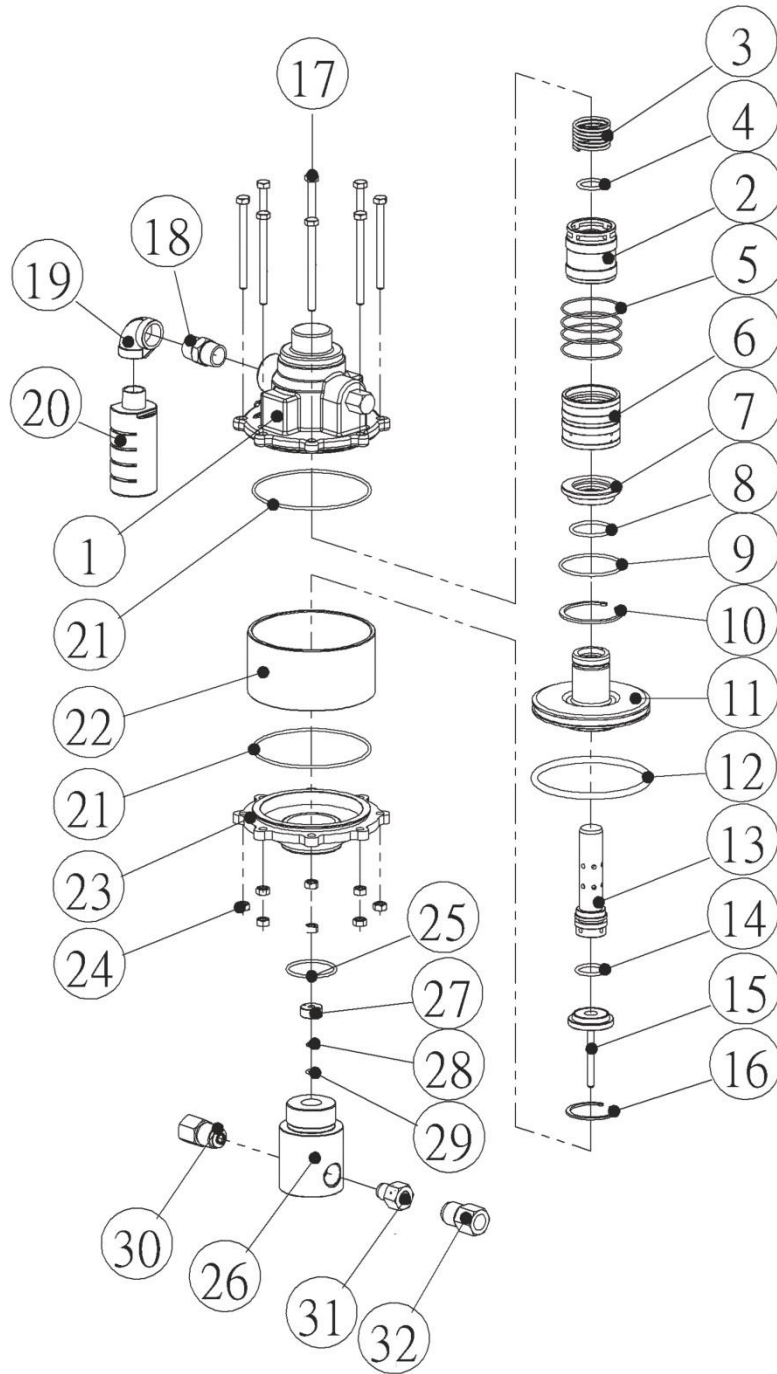
Problem	Cause	Solution
Pump loses pressure	Leaking system components	<ul style="list-style-type: none"> • Repair or replace as necessary
Pump not delivering oil	Low oil level in reservoir	<ul style="list-style-type: none"> • Check oil level
	Worn seats	<ul style="list-style-type: none"> • Repair seats • Replace pump body
Pump does not reach rated capacity	Low oil level in reservoir	<ul style="list-style-type: none"> • Check oil level
	Leaking system components	<ul style="list-style-type: none"> • Repair or replace as necessary
	Oil leaking past inlet or outlet checks	<ul style="list-style-type: none"> • Repair inlet or outlet checks • Replace high pressure piston seal
Cylinder piston will not extend	Loose couplers	<ul style="list-style-type: none"> • Tighten couplers
	Low oil level in pump reservoir	<ul style="list-style-type: none"> • Fill and bleed the system
	Leaking cylinder seals	<ul style="list-style-type: none"> • Replace worn seals. Look for excessive contamination or wear
Cylinder piston extends only partially	Low oil level in pump reservoir	<ul style="list-style-type: none"> • Fill and bleed the system
	Load above capacity of system	<ul style="list-style-type: none"> • Use correct equipment
Cylinder piston extends slower than normal	Loose couplers	<ul style="list-style-type: none"> • Tighten couplers
	Restricted hydraulic line or fitting	<ul style="list-style-type: none"> • Clean and replace if damaged
	Pump not operating correctly	<ul style="list-style-type: none"> • Check pump's operating instructions • Repair or replace as necessary
	Low oil level in pump reservoir	<ul style="list-style-type: none"> • Fill and bleed the system
Cylinder does not hold pressure	Leaky connection	<ul style="list-style-type: none"> • Clean, reseal with thread sealant, and tighten connection
	Leaking cylinder seals	<ul style="list-style-type: none"> • Replace worn seals • Look for excessive contamination or wear • Replace contaminated oil
	Pump or valve not operating correctly	<ul style="list-style-type: none"> • Repair or replace as necessary
Cylinder will not retract or retracts slower than normal	Closed pump release valve	<ul style="list-style-type: none"> • Open pump release valve
	Loose couplers	<ul style="list-style-type: none"> • Tighten couplers
	Blocked hydraulic lines	<ul style="list-style-type: none"> • Clean and flush lines
	Weak or broken retraction springs	<ul style="list-style-type: none"> • Send to a Durapac authorised service centre for repair
	Internally damaged cylinder	<ul style="list-style-type: none"> • Send to a Durapac authorised service centre for repair
	Pump reservoir too full	<ul style="list-style-type: none"> • Drain oil to correct level

8.0 Parts Breakdown and List



Item	Description	Part No.	Qty	Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	Frame	ZAM1747	1	14	HP tube	ZAM1760	1	27	Gauge protector	ZAM1772	1
2	Pump	ZAM1748	1	15	Needle valve	ZAM1761	1	28	Bolt	ZAM1773	3
3	1/4" steel connection	ZAM1749	1	16	Bolt	ZAM1762	2	29	Tube	ZAM1774	3
4	Steel tube	ZAM1750	2	17	Needle valve fixplate	ZAM1763	1	30	Elbow	ZAM1775	2
5	3/8" steel connection	ZAM1751	1	18	Spring washer	ZAM1764	11	31	Nylon tube	ZAM1776	1
6	3/8" wing valve	ZAM1752	1	19	Nut	ZAM1714	11	32	Air unit	ZAM1777	1
7	Elbow-male	ZAM1753	1	20	Bolt	ZAM1765	2	33	1/2" coupling	ZAM1698	1
8	HP outlet tube	ZAM1754	1	21	Washer	ZAM1766	1	34	1/2" wing valve	ZAM1699	1
9	HP adaptor	ZAM1755	1	22	Needle valve adaptor	ZAM1767	1	35	1/2" air coupler-male	ZAM1700	1
10	Adaptor pedestal	ZAM1756	1	23	Steel elbow	ZAM1768	1	36	Bolt	ZAM1778	2
11	Bolt	ZAM1757	4	24	HP tube	ZAM1769	1	37	Bolt	ZAM1706	2
12	Adaptor	ZAM1758	1	25	Gauge adaptor	ZAM1770	1	38	Spring washer	ZAM1705	2
13	Coupler-male	ZAM1759	1	26	Pressure gauge	ZAM1771	1	39	Washer	ZAM1779	1

8.1 Pump Breakdown and Parts List



Item	Description	Part No.	Qty	Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	Upper pump housing	ZAM1716	1	12	O-ring*	ZAM1727	1	23	Lower pump housing	ZAM1738	1
2	Aluminium piston	ZAM1717	1	13	Piston	ZAM1728	1	24	Nut	ZAM1739	8
3	Spring	ZAM1718	1	14	O-ring*	ZAM1729	1	25	O-ring*	ZAM1740	1
4	O-ring*	ZAM1719	1	15	Hydraulic piston	ZAM1780	1	26	Pump seat	ZAM1781	1
5	O-ring*	ZAM1720	4	16	C type ring	ZAM1731	1	27	Nut	ZAM1782	1
6	Aluminium bush	ZAM1721	1	17	Bolt	ZAM1732	8	28	Back-up ring*	ZAM1783	1
7	Aluminium cap	ZAM1722	1	18	Nipple	ZAM1733	1	29	O-ring*	ZAM1784	1
8	O-ring*	ZAM1723	1	19	Elbow	ZAM1734	1	30	Input bolt assembly	ZAM1785	1
9	O-ring*	ZAM1724	1	20	Silencer	ZAM1735	1	31	Output connector	ZAM1786	1
10	C type ring	ZAM1725	1	21	O-ring*	ZAM1736	2	32	Output bolt assembly	ZAM1787	1
11	Air piston	ZAM1726	1	22	Aluminium barrel	ZAM1737	1		Repair kit	ZAM1788	1

Items marked with a * are contained within a standard Repair Kit.
 Serial, model and part numbers need to be quoted when ordering parts.