DURAPAC
ENGINEERED FOR RELIABILITY

Instruction Manual

100 Ton Hydraulic Puller
Model – DHP-100E

Maximum Operating Pressure – 700 bar

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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 – Hydraulic Pullers are engineered to meet Industrial Standards for Performance and Safety. The DHP-100E model uses a double acting hydraulic system for holding, opening & closing jaws, always providing a safe and secure grip. They also feature the following:

- Flow metering system provides constant lowering speed
- Single acting, spring return, 100-ton capacity cylinder
- Easy jaw head adjusting system prevents puller jaws from sliding
- Puller can be assembled in 2 or 3 jaw configurations
- Puller can be adjusted 5 degrees up or down of puller centreline for precise positioning
- Castors provide easy cart movement
- Includes 220 Volt single phase electric power unit
- Includes four extensions

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 puller'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 puller 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 puller 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 understand 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 fluid can ignite and burn. Excessive heat will soften packings and seals, resulting in fluid 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 Pullers

- Align the puller, the puller jaw and pushing adapter set-up on the same centreline as the part being removed. Failure to align the parts correctly can result in a dangerous operating situation because of the high hydraulic pressure used. Self-centring models can be aligned on the centreline after the pullers fully engaged with the part
- Stand behind and to one side of the puller when applying pressure

- Before applying pressure, wrap the work in a safety blanket/ sheath to protect from injury caused by flying parts should a part ever break

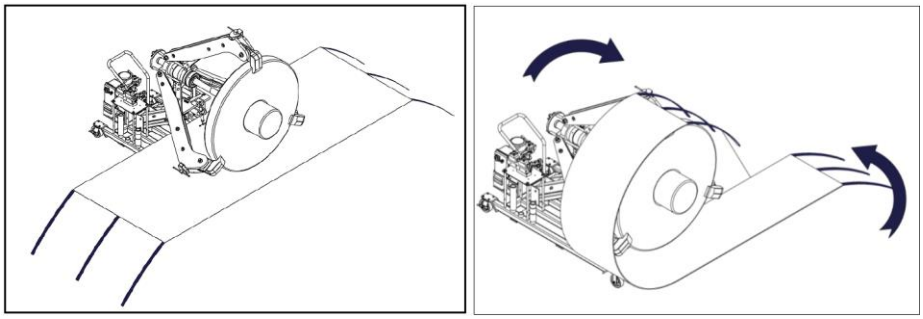


Figure 1 – Wrap in Safety Sheath for Protection

- Apply force gradually
- Always support the object being pulled
- **Do NOT** heat the part to be removed. When the puller comes in contact with the part, heating can result in damage to components of the puller
- Ensure puller jaws are fully engaged with the workpiece being pulled
- **Do NOT** overload equipment. Overloading can cause equipment failure and possible personal injury. **Do** use a gauge or other load measuring instrument to verify load
- **Do NOT** overextend the puller
- Only operate within the limits of the pullers' rated stroke. Do not try to pull objects that are beyond 952 mm thickness at the maximum opening of 1,500 mm or require the jaws to be opened to more than 1,500 mm
- **Do NOT** use the puller to support, carry and/or transport the workpiece being pulled
- **Never** pressurise uncoupled couplers. Only use hydraulic equipment in a coupled system
- Use only Durapac approved accessories and components

3.2 Hydraulic Hoses & Fluid 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 pump, 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 pump and release all pressure. Never attempt to grasp a leaking pressurised hose with your hands. The force of escaping hydraulic fluid 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 fluid 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 fluid 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:** Always secure threaded port connections with high grade, non-hardening pipe thread sealant. Teflon tape can be used if only one layer of tape is used and it is applied carefully, two threads back, to prevent the tape from being introduced into hydraulic system, which could cause jamming of precision-fit parts

4.1 Familiarise yourself with the specifications and illustrations in this owner's manual. Know your puller, 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	Capacity (ton)	Reach Max. (mm)	Range of Spread		Stroke (mm)	Electric Pump	Weight (kg)
			Min. (mm)	Max. (mm)			
DHP-100E	100	1,220	300	1,500	270	1.12 kW 220 V - 50/60 Hz	1,189

4.2 Make hydraulic connections.

⚠ **IMPORTANT:** Fully hand-tighten all couplers. Loose coupler connections will block the flow of oil between the pump and the puller

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 pump.

4.5 Remove air from the system – Position the puller so that the piston rod is pointed down and the cylinder is lower than the pump. Advance and retract the cylinder several times, avoiding pressure build-up. Air removal is complete when the cylinder motion is smooth.

5.0 Operation

Note - This puller has a 2/3-way combination puller head. The 3-way combination should be used when job space allows, as three jaws give a more secure grip and more even pulling force.

5.1 Setting up the Puller

5.1.1 Select the proper size and capacity of the puller needed for the job. This is determined by measuring the 'reach' and the 'spread' of the part to be pulled. Refer to the table in 4.1.

5.1.2 Connect the electric hydraulic pump to a suitable power outlet. Ensure the relief handle remains in the original locked position.

5.2 Adjusting Trolley Height/Puller Alignment

5.2.1 Use the control panel as shown in Figure 2 to adjust the trolley's vertical alignment. The centreline of the work piece must be on the same centreline as the puller head.

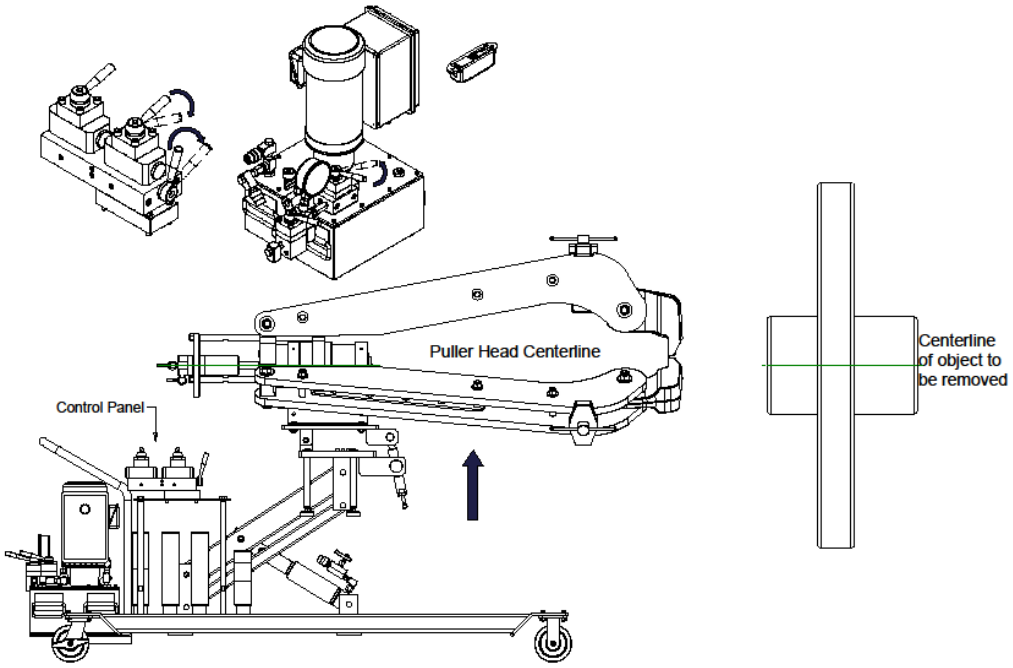


Figure 2 – Puller Alignment

5.2.2 Align the puller horizontally and vertically as close as possible to the same centreline as the object to be pulled.

5.2.3 Switch the control panel valve handles as shown in Figure 3 and press the button on the remote switch to open the jaws enough to fit over the work.

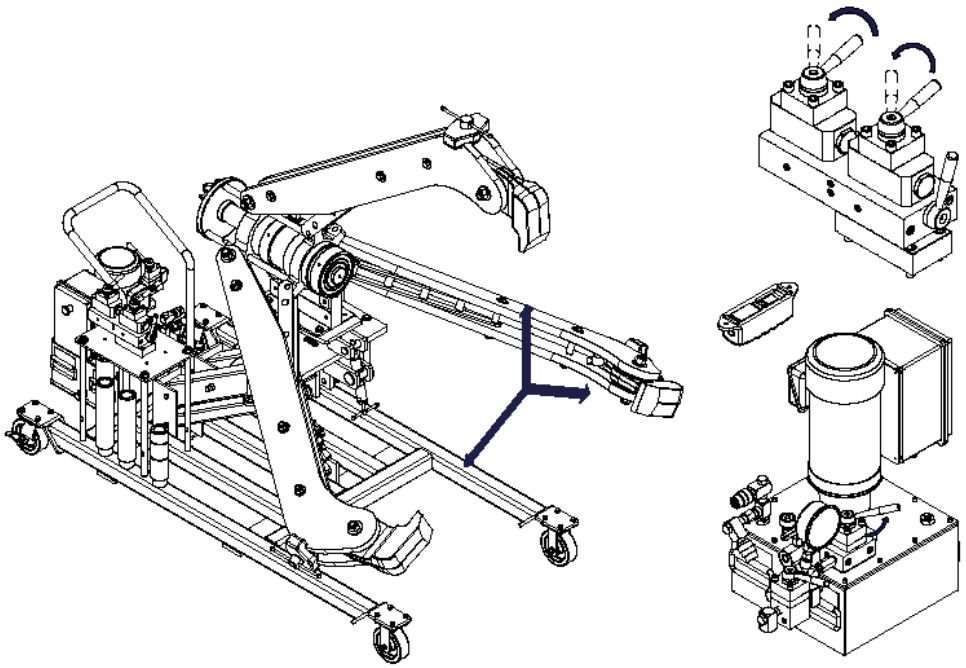


Figure 3 – Adjusting Puller Arms

5.2.4 Rotate the round handle under the puller in a clockwise direction when angled down and in a counterclockwise direction when angled up to ensure the puller head is on the same centreline as the object to be pulled (see Figure 4).

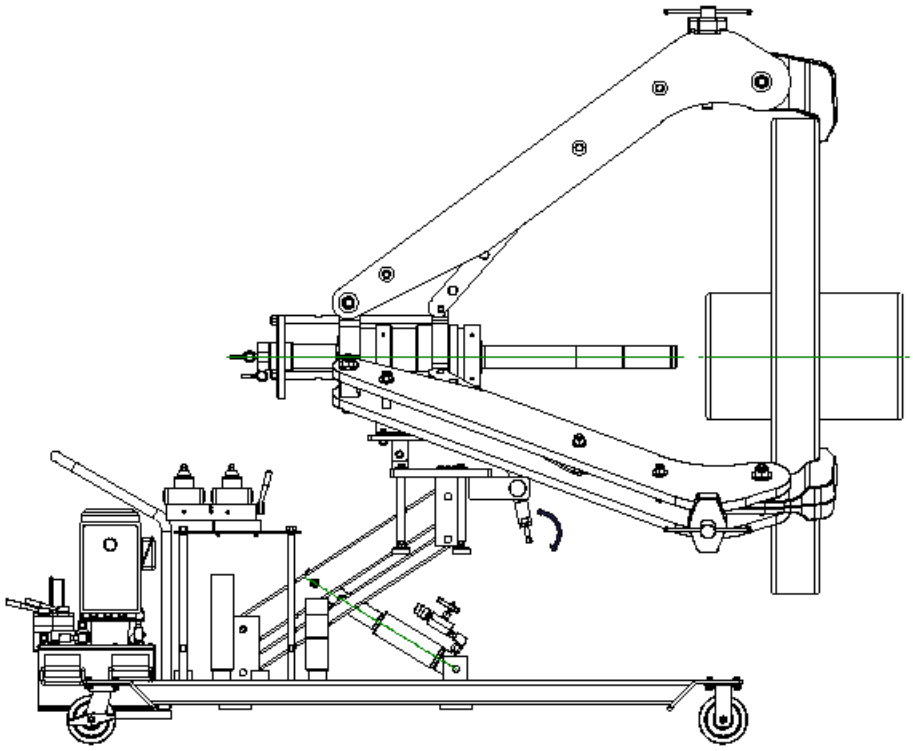


Figure 4 – Adjusting Puller Head

5.2.5 Switch the control panel as shown in Figure 5-1 to tightly close the jaws around the part to be pulled.

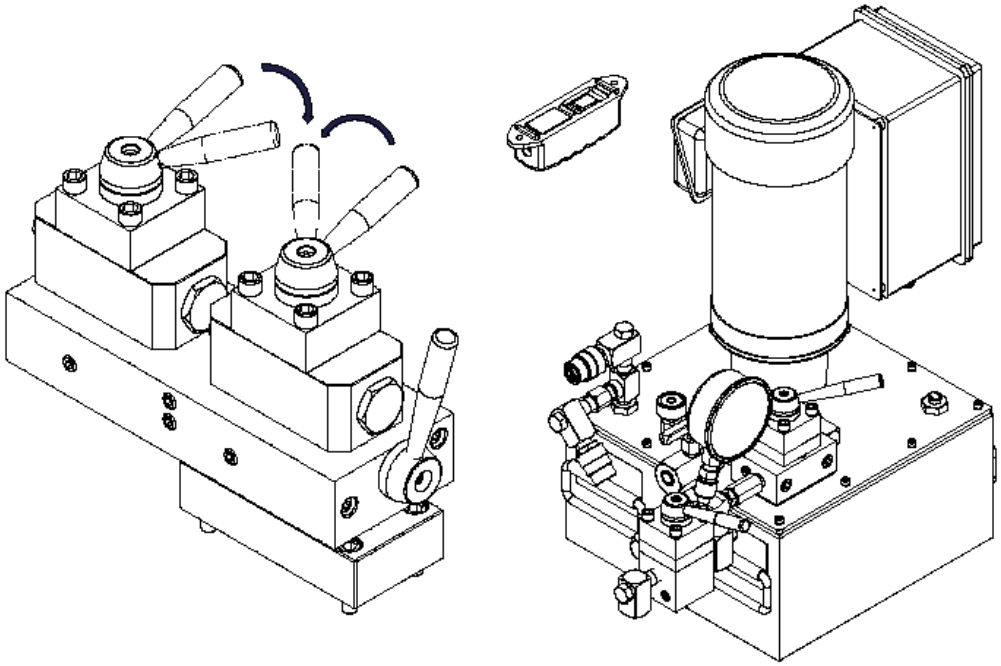


Figure 5-1 – Closing Puller Jaws

5.2.6 Ensure the jaws are fully engaged and secure (see Figure 5-2).

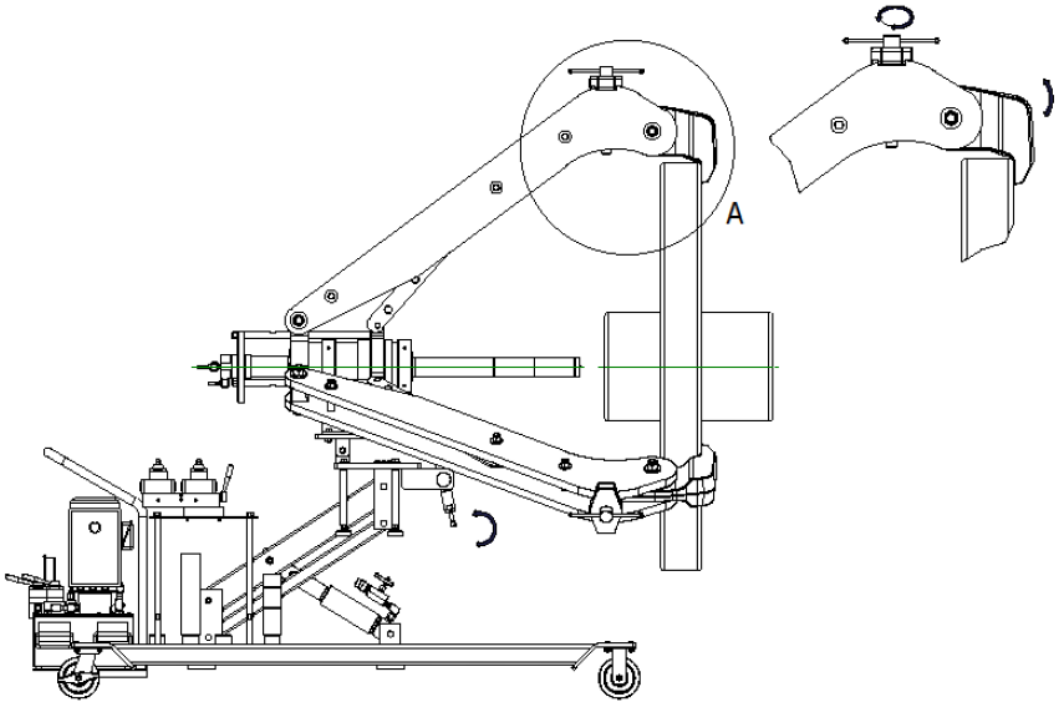


Figure 5-2 – Fully Engaged Jaws

5.2.7 Add as many adaptors as practical to the forcing cylinder (see Figure 6).

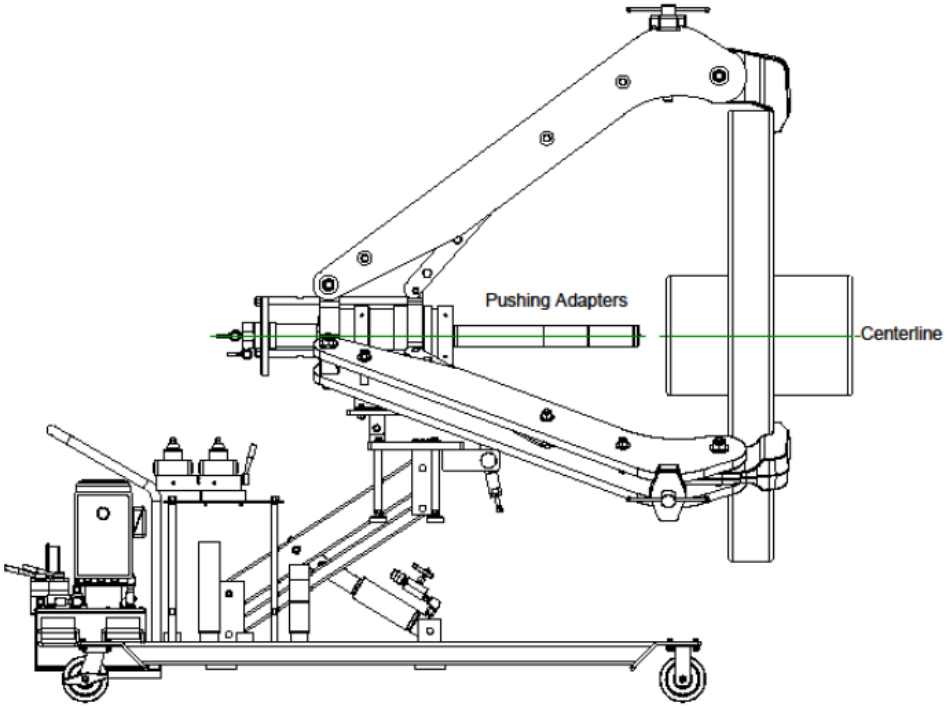


Figure 6 – Adding Adaptors

5.2.8 Once the puller is aligned, press the button on the remote switch to advance the forcing cylinder toward the object, stopping just just as the cylinder head touches the shaft (see Figure 7).

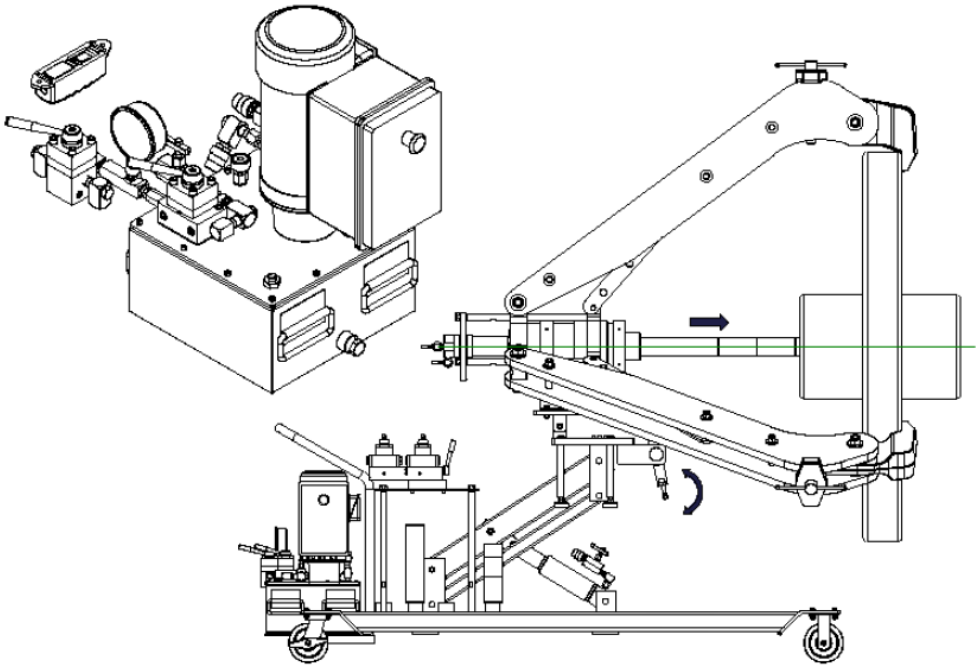


Figure 7 – Advancing the Forcing Cylinder

5.2.9 When the cylinder head contacts the shaft, release the button and inspect the puller and workpiece for proper alignment.

5.2.10 Ensure a support is attached to the work that is to be pulled.

5.3 Operating the Puller

5.3.1 Stand behind and to one side of the puller. Continue with pulling job by pressing the button on the remote switch (see Figure 8).

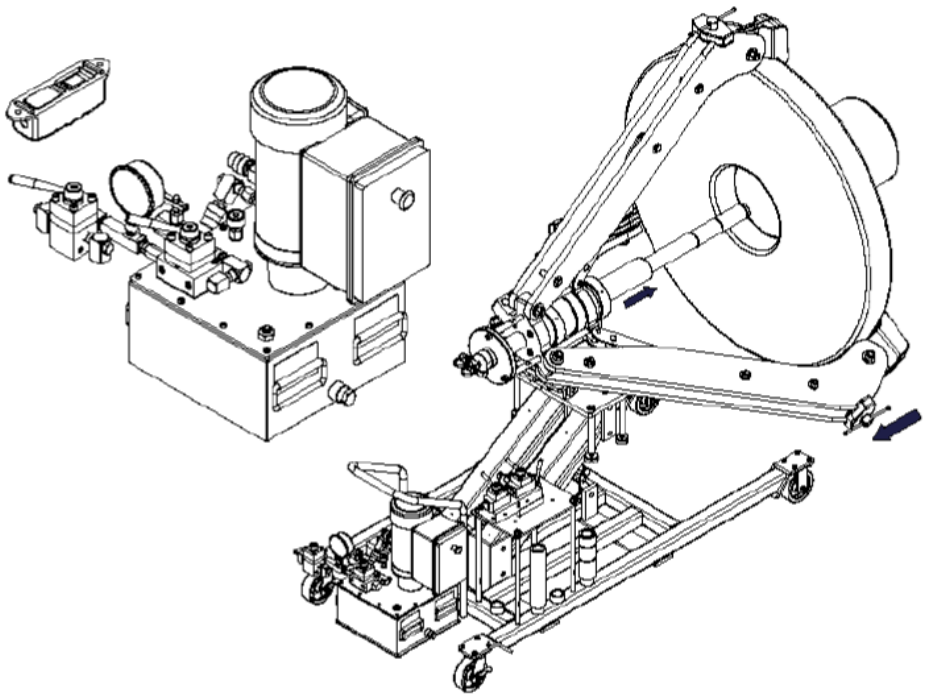


Figure 8 – Operating the Puller

5.3.2 If the full stroke has been reached but the object has not been pulled completely, press the retract button on the remote switch to retract the cylinder. Another adaptor may be added while maintaining the gripping action of the jaws on the object.

5.3.3 Switch the control panel as shown in Figure 9 to retract the cylinder.

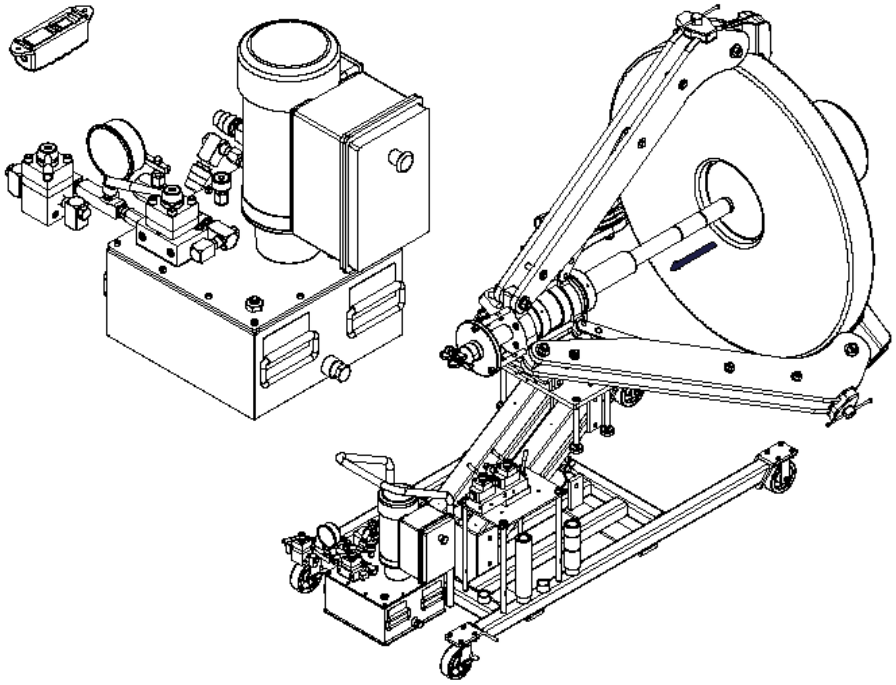


Figure 9 – Retracting the Cylinder Piston

5.3.4 Switch the control panel as shown in Figure 10 to open the jaws.

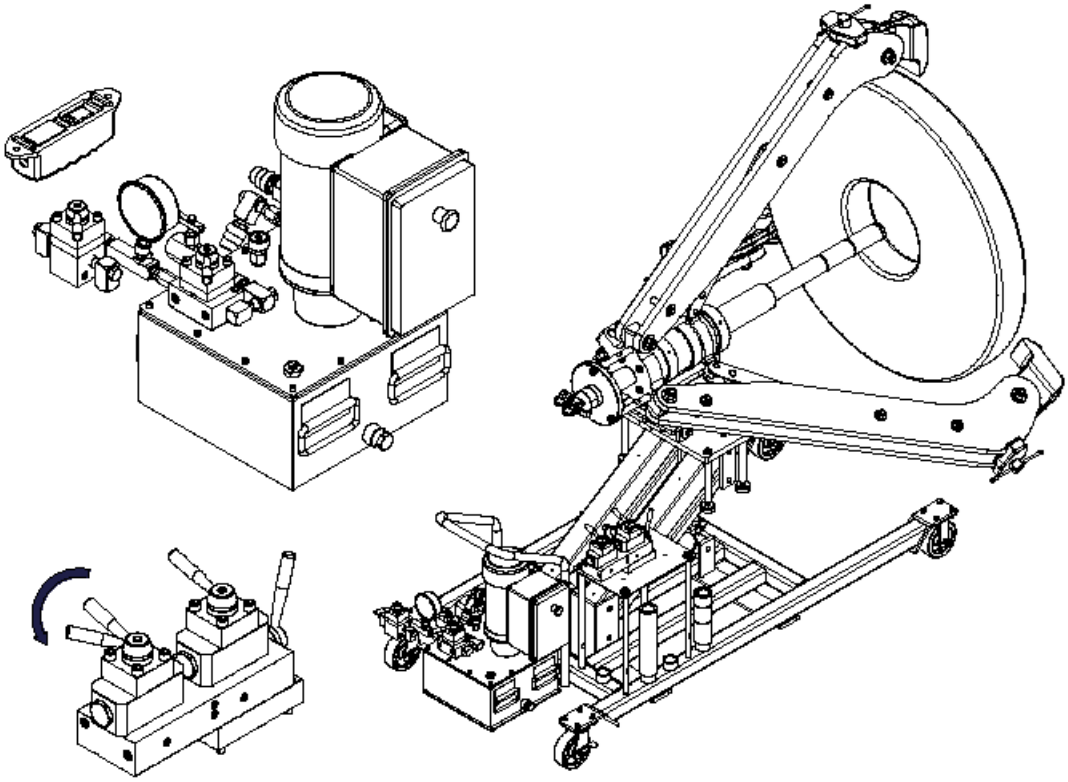


Figure 10 – Opening the Jaws

5.4 Conversion of 3-Jaw Puller to 2-Jaw Puller

Note - The 3-way combination is always followed whenever the job space allows for it because three jaws give a more secure grip and more even pulling force

Remove two sets of jaw and straps located on either side, away from the two symmetrical sections. Reassemble one set of jaw and straps on the other symmetrical section on the crosshead.

6.0 Maintenance

IMPORTANT:

- Use only good quality hydraulic fluid. **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 pump, 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
- 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 Check for loose connections and leaks.

6.2 Replace damaged parts immediately.

6.3 Do not exceed oil temperature above 60^{o}C.

6.4 Keep all hydraulic components clean.

6.5 Use dust caps when puller is disconnected from the hose. Keep entire puller clean to prolong puller life.

6.6 Wipe thoroughly clean and store puller in the carry case (provided). Avoid temperature extremes.

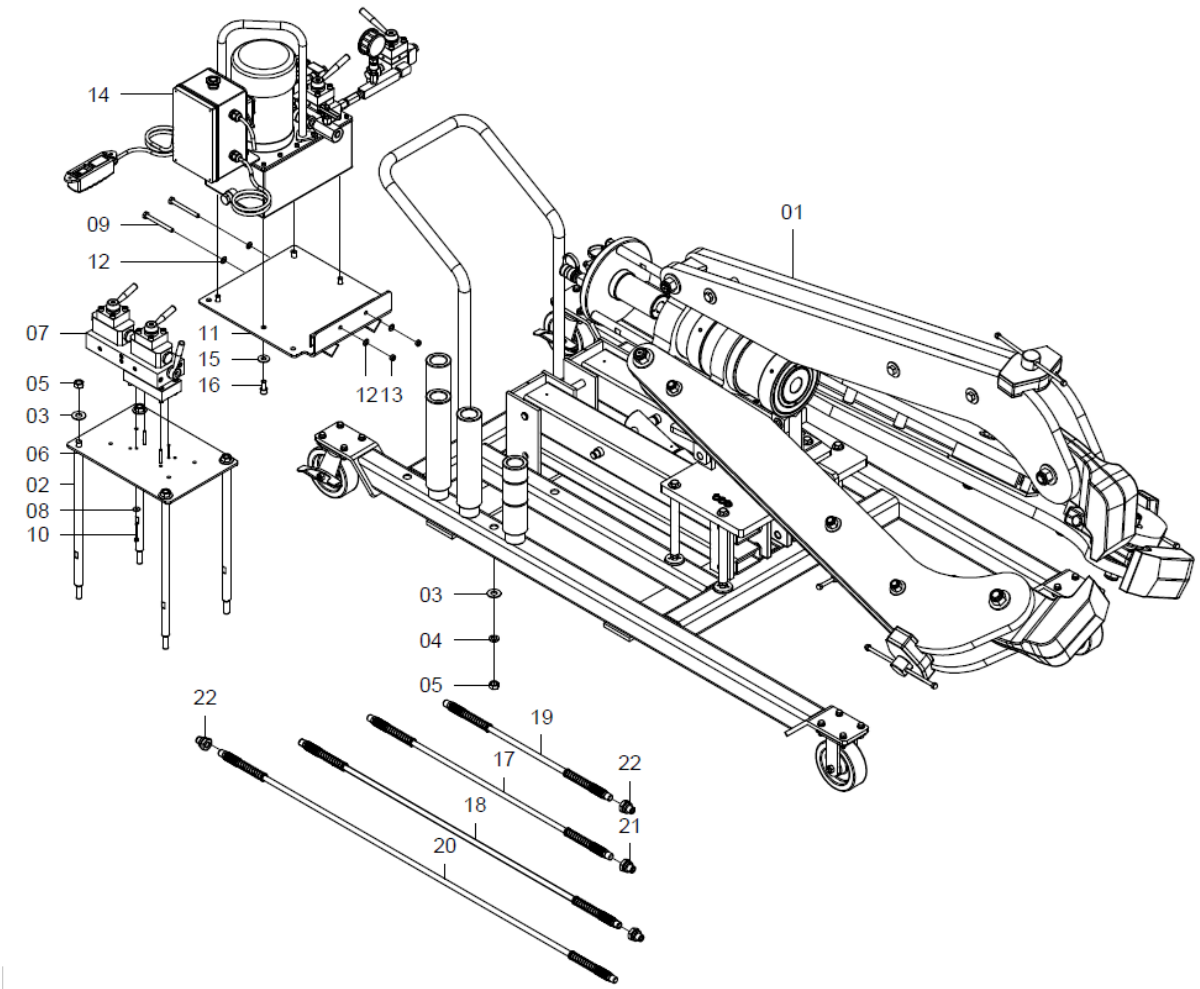
6.7 Change hydraulic oil in your system as recommended in the pump instruction sheet.

7.0 Troubleshooting

Problem	Cause	Solution
Cylinder moves but does not maintain pressure	Leaking connection	• Clean, reseal with thread sealant and tighten connection
	Leaking cylinder seals	• Replace worn seals • Check for excessive contamination or wear • Replace contaminated fluid as necessary
	Malfunctioning pump/valve	• Repair or replace as necessary
Cylinder leaks hydraulic fluid	Worn or damaged seals	• Replace worn seals • Check for excessive contamination or wear • Replace contaminated fluid as necessary
	Loose connections	• Clean, reseal with thread sealant and tighten connection
Cylinder will not retract or retracts slower than normal	Closed pump release valve	• Open pump release valve
	Loose couplers	• Tighten couplers
	Blocked hydraulic lines	• Clean and flush lines
	Weak or broken retraction springs	• Send to a Durapac authorised service centre for repair
	Internally damaged cylinder	• Send to a Durapac authorised service centre for repair
	Pump reservoir too full	• Drain hydraulic fluid to correct level
Erratic Action	Air in system or pump cavitation	• Add fluid, bleed air and check for leaks
	External leakage	• Replace worn packings • Check for excessive contamination fluid as necessary • Replace contaminated fluid as necessary
	Sticking or binding cylinder	• Check for dirt or leaks • Check for bent, misaligned, worn parts or defective packings
Cylinder does not move	Loose couplers	• Tighten couplers
	Faulty coupler	• Verify that female coupler is not locked up (ball wedged into seat) • Replace both male and female couplers
	Improper valve position	• Close release valve or shift to new position
	Low or no hydraulic fluid in pump reservoir	• Fill and bleed the system
	Air-locked pump	• Add fluid, bleed air and check for leaks
	Load is above the capacity of the system	• Use the correct equipment

Problem	Cause	Solution
Cylinder extends only partially	Low or no hydraulic fluid in pump reservoir	• Fill and bleed the system
	Load is above the capacity of the system	• Use the correct equipment
	Sticking or binding cylinder	• Check for dirt or leaks • Check for bent, misaligned, worn parts or defective packings
Cylinder moves slower than normal	Loose couplers	• Tighten couplers
	Restricted hydraulic line or fitting	• Clean • Replace if damaged
	Low fluid level in pump reservoir	• Fill and bleed the system
	Leaking cylinder seals	• Replace worn seals • Check for excessive contamination or wear • Replace contaminated fluid as necessary

8.0 Parts Breakdown and List

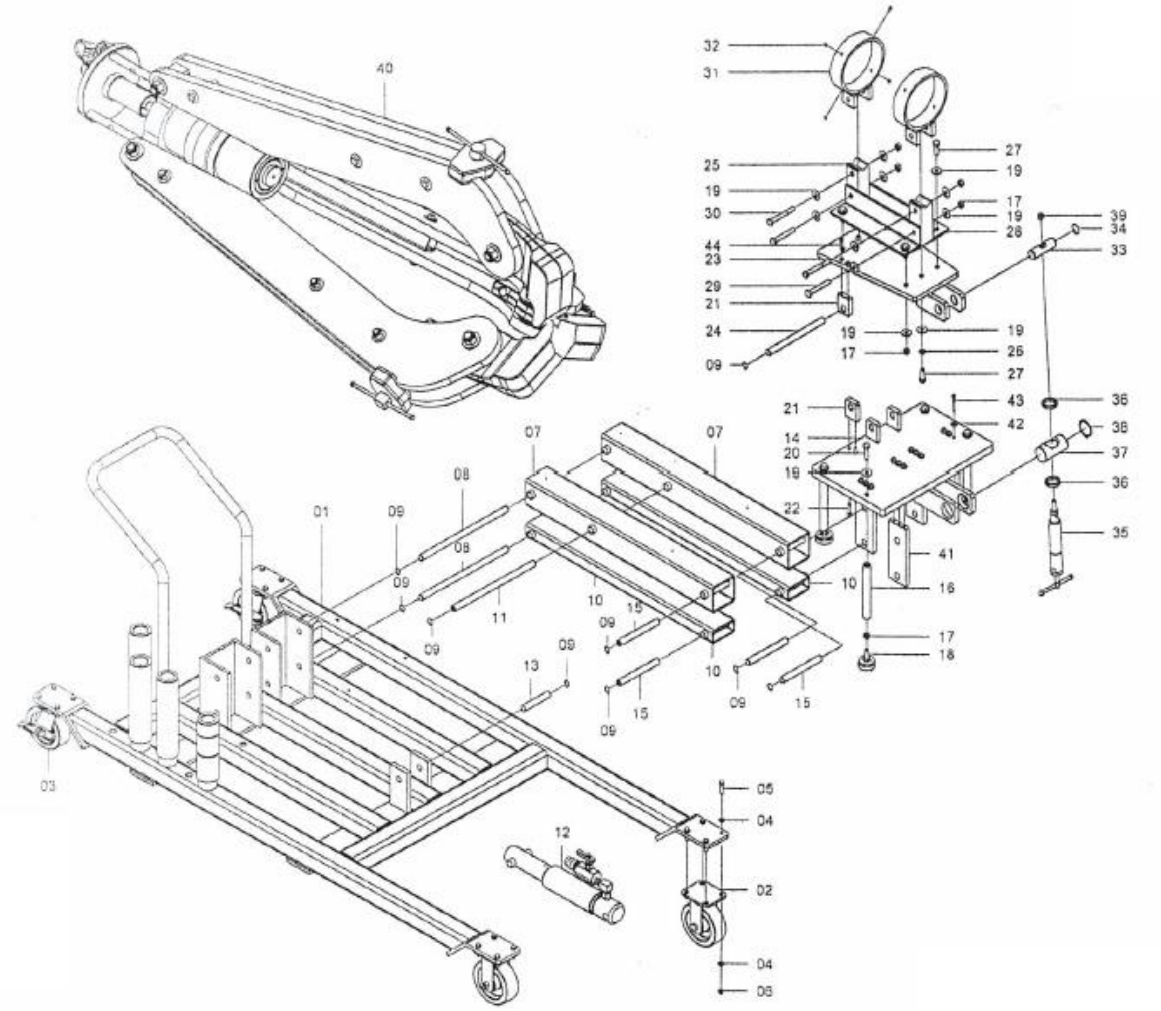


Item	Description	Part No.	Qty
1	Puller & trolley	ZAL1693	1
2	Supports	ZAL1473	4
3	Washer	ZAL1697	8
4	Spring washer	ZAL1712	4
5	Nut	ZAL1757	8
6	Fixing for power unit	ZAL1758	1
7	Control Panel	ZAL1759	1
8	Washer	ZAL1550	4
9	Screw	ZAL1760	2
10	Screw	ZAL1761	4
11	Bracket	ZAL1762	1

Item	Description	Part No.	Qty
12	Washer	ZAL1763	4
13	Nut	ZAL1484	2
14	Electric power unit	PEM-1114-RB	1
15	Washer	ZAL1764	4
16	Cap screw	ZAL1765	4
17	Hose - 1 mtr	ZAL1766	2
18	Hose - 1.2 mtr	ZAL1767	3
19	Hose - 0.6 mtr	ZAL1768	1
20	Hose - 1.5 mtr	ZAL1769	1
21	Quick coupler	ZAL2065	4
22	Coupler	ZAL2182	2

* see following pages for further breakdown

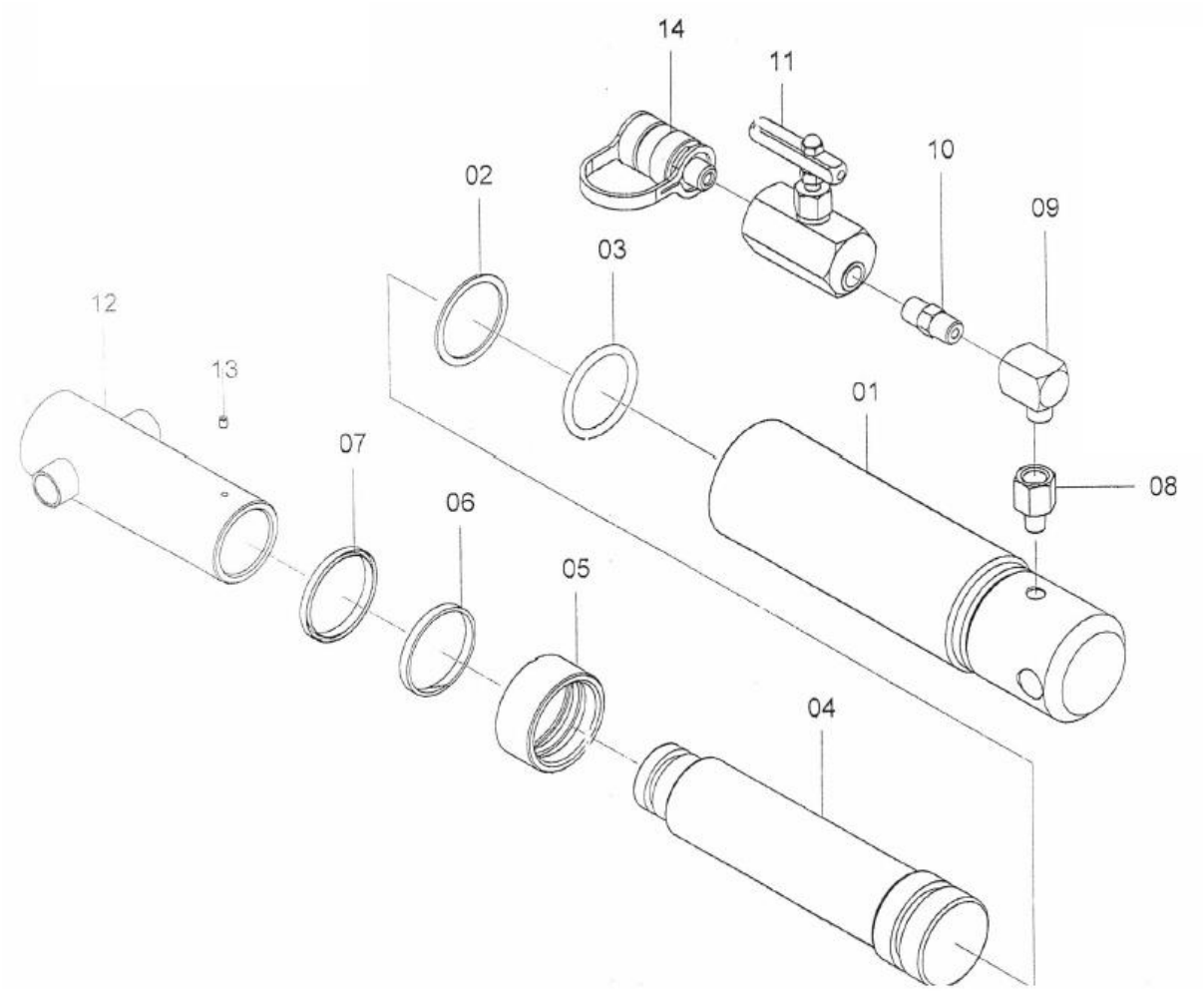
8.1 ZAL1693 - Puller and Trolley Assembly



Item	Description	Part No.	Qty
1	Trolley	ZAL1771	1
2	6" wheel	ZAL1772	2
3	6" locking wheel	ZAL1773	2
4	Washer	ZAL1763	32
5	Screw	ZAL1774	16
6	Nut	ZAL1484	16
7	Elevator arm A	ZAL1775	2
8	Pin	ZAL1776	2
9	Retaining ring	ZAL1777	18
10	Elevator arm B	ZAL1778	2
11	Pin	ZAL1779	1
12	Lifting cylinder	ZAL1780	1
13	Pin	ZAL1781	1
14	Saddle base	ZAL1782	1
15	Pin	ZAL1783	4
16	Adjustable screw arm	ZAL1784	4
17	Nut	ZAL1785	12
18	Adjustable screw arm	ZAL1786	4
19	Washer	ZAL1764	22
20	Screw	ZAL1787	4
21	Angle fixing block	ZAL1788	5
22	Screw	ZAL1789	6

Item	Description	Part No.	Qty
23	Saddle plate	ZAL1790	1
24	Pin	ZAL1791	1
25	Ring support	ZAL1792	2
26	Spring washer	ZAL1793	2
27	Screw	ZAL1794	6
28	L shape fitting	ZAL1795	2
29	Screw	ZAL1796	2
30	Screw	ZAL1797	2
31	Cylinder fixing ring	ZAL1798	2
32	Screw	ZAL1284	8
33	Saddle plate trunnion	ZAL1799	1
34	Retaining ring	ZAL1328	2
35	Grease type pump	ZAL1800	1
36	Fixing ring	ZAL1801	2
37	Saddle base trunnion	ZAL1802	1
38	Retaining ring	ZAL1803	2
39	Hex nut	ZAL1804	1
40	100 ton puller	ZAL1805	1
41	Saddle base foot	ZAL1806	4
42	Washer	ZAL1807	12
43	Screw	ZAL1808	12
44	Screw	ZAL1809	4

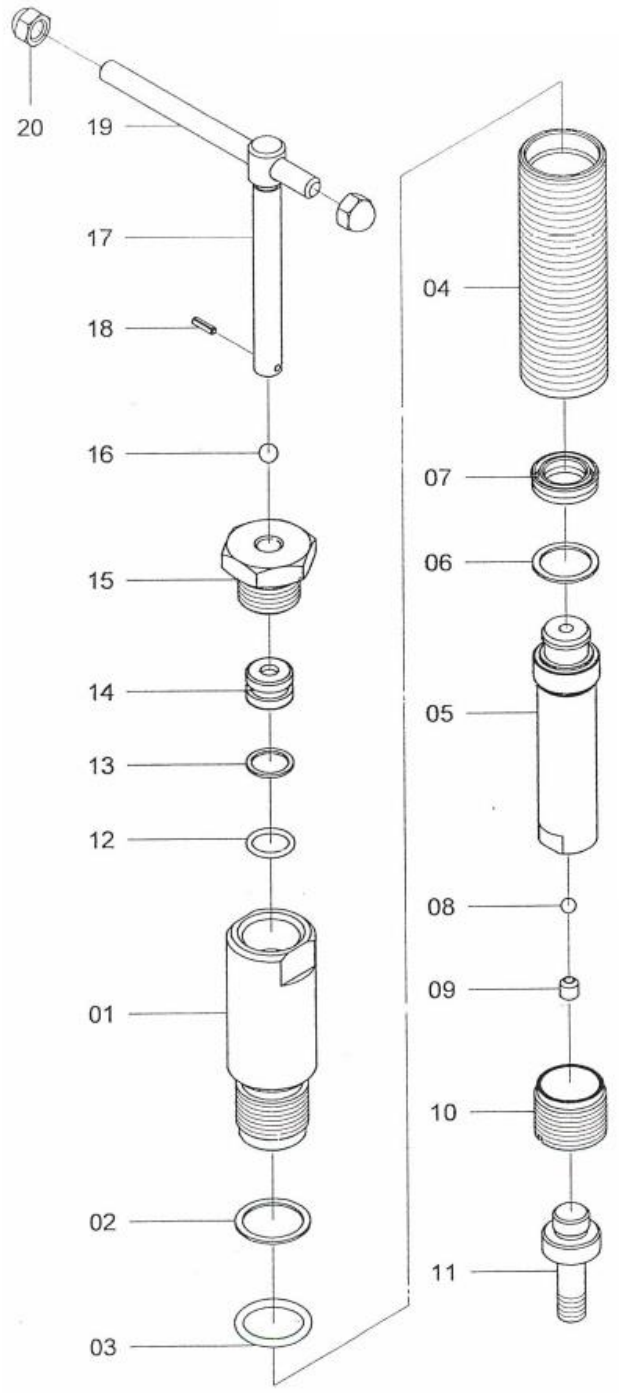
8.1.1 ZAL1780 – Lifting Cylinder Assembly



Item	Description	Part No.	Qty
1	Cylinder base	ZAL1906	1
2	Back-up ring	ZAL1907	1
3	O-ring	ZAL1908	1
4	Piston rod	ZAL1909	1
5	Fasten nut	ZAL1910	1
6	Split ring	ZAL1911	1
7	Wiper	ZAL1912	1

Item	Description	Part No.	Qty
8	Adaptor	ZAL1905	1
9	Elbow	ZAL1913	1
10	Hexagon nipple	ZAL1914	1
11	Needle valve	ZAL1915	1
12	Connection tube	ZAL1916	1
13	Screw	ZAL1289	1
14	Quick coupler	ZAL1917	1

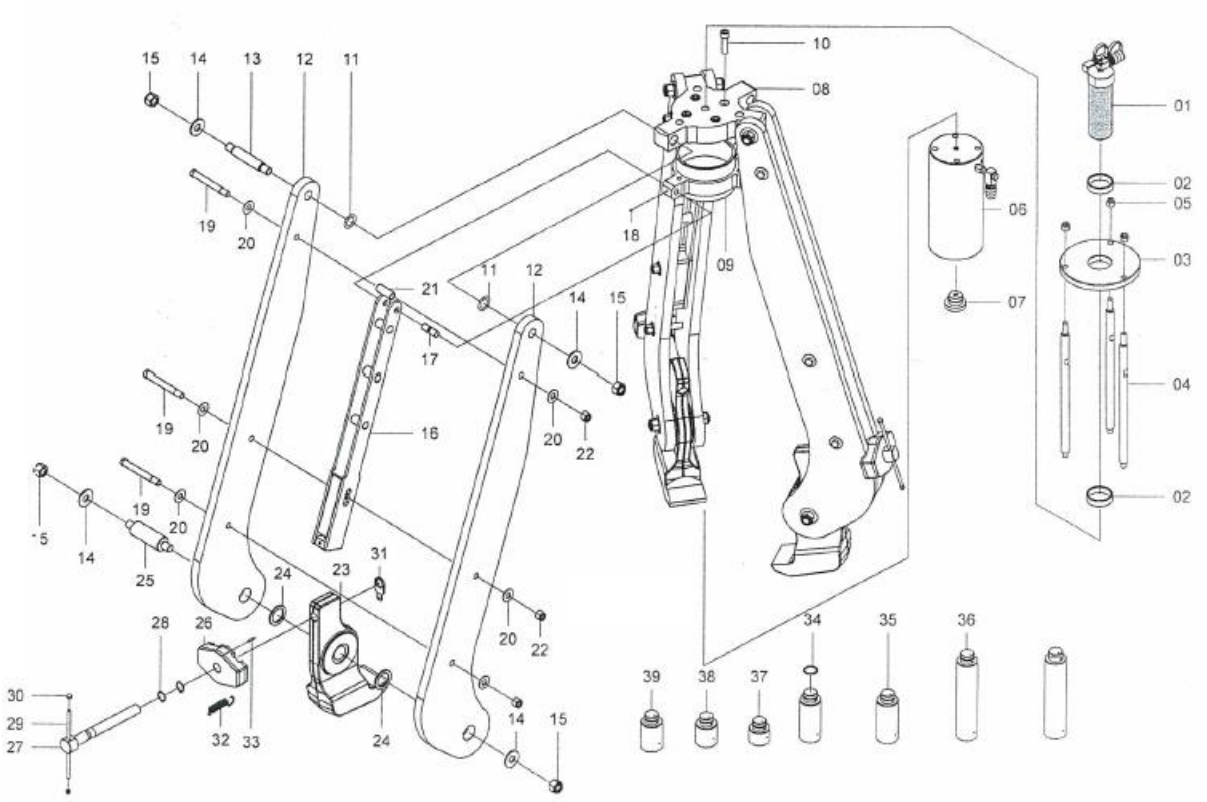
8.1.2 ZAL1800 – Grease Type Pump Assembly



Item	Description	Part No.	Qty
1	Cylinder upper seat	ZAL1918	1
2	Back-up ring	ZAL1919	1
3	O-ring	ZAL1920	1
4	Cylinder base	ZAL1921	1
5	Piston rod	ZAL1922	1
6	Back-up ring	ZAL1635	1
7	U-cup seal	ZAL1636	1
8	Steel ball	ZAL1366	1
9	Screw	ZAL1284	1
10	Fasten nut	ZAL1923	1

Item	Description	Part No.	Qty
11	Piston rod connector	ZAL1924	1
12	O-ring	ZAL1925	1
13	Back-up ring	ZAL1900	1
14	Pump piston	ZAL1926	1
15	Driving rod seat	ZAL1927	1
16	Steel ball	ZAL1368	1
17	Driving rod	ZAL1928	1
18	Spring pin	ZAL1929	1
19	Handle rod	ZAL1930	1
20	Nut	ZAL1413	2

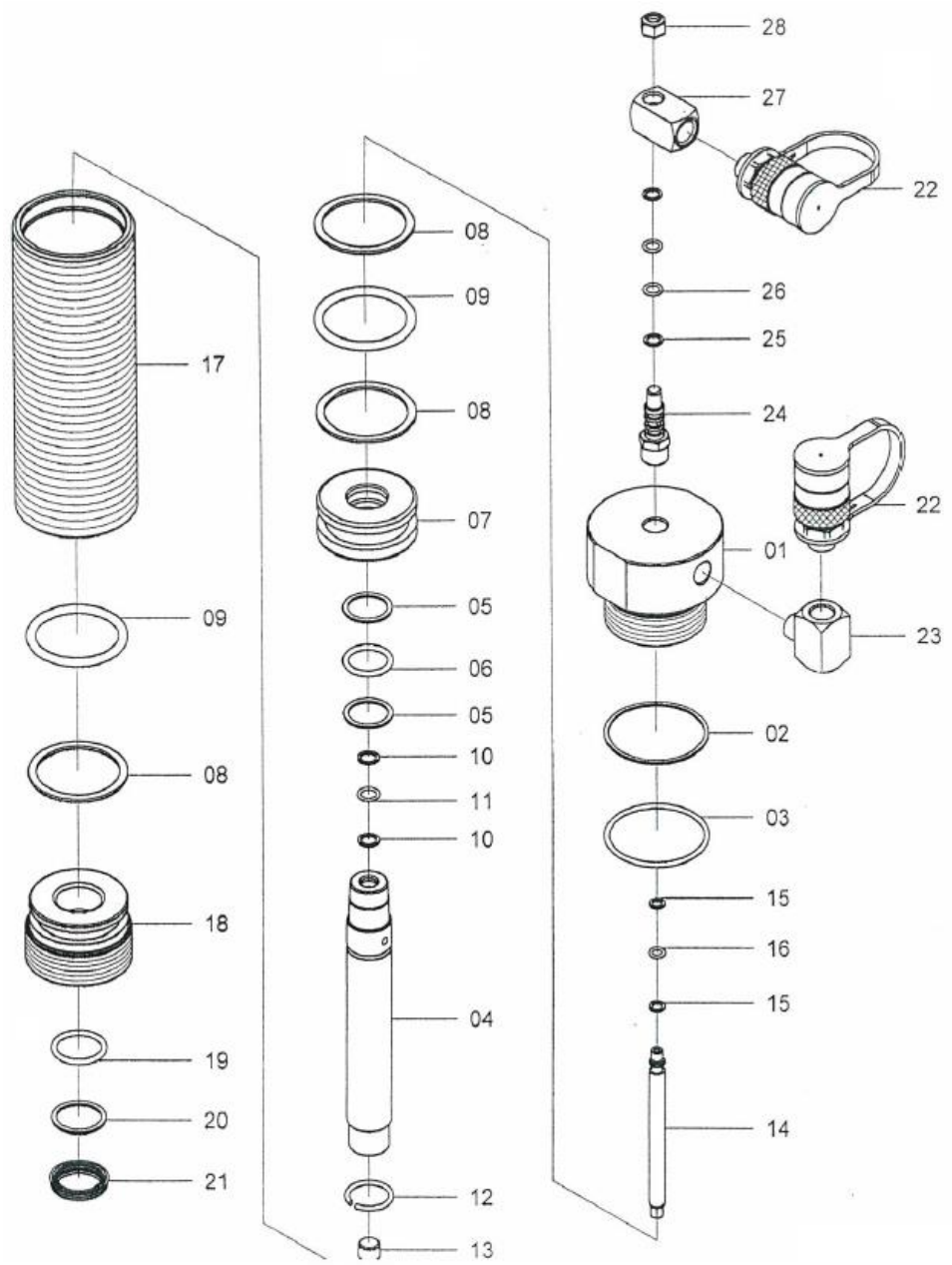
8.1.3 ZAL1805 – 100 Ton Puller Assembly



Item	Description	Part No.	Qty
1	Double acting cylinder	ZAL1810	1
2	Fixed ring	ZAL11811	2
3	Fixed plate	ZAL11812	1
4	Support shaft	ZAL11813	3
5	Anti-loosen nut	ZAL1298	3
6	Single acting spring return cyl.	ZAL1814	1
7	Removable cone assembly	ZAL1815	1
8	2/3-way puller crosshead	ZAL1816	1
9	2/3-way sliding socket	ZAL1817	1
10	Cap screw	ZAL1818	4
11	Washer	ZAL1819	6
12	Puller jaw	ZAL1820	6
13	Jaw screw	ZAL1821	3
14	Washer	ZAL1822	12
15	Anti-loosen nut	ZAL1823	12
16	Puller jaw strap	ZAL1824	3
17	Pin	ZAL1825	3
18	Screw	ZAL1826	3
19	Screw	ZAL1827	9
20	Washer	ZAL1828	18

Item	Description	Part No.	Qty
21	Bushing	ZAL1829	3
22	Anti-loosen nut	ZAL1830	9
23	Jaw head	ZAL1831	3
24	Bushing	ZAL1832	6
25	Jaw head screw	ZAL1833	3
26	Adjusting block	ZAL1834	3
27	Driving screw	ZAL1835	3
28	Retaining ring	ZAL1836	6
29	Handle rod	ZAL1837	3
30	Nut	ZAL1413	6
31	Jaw head spring plate	ZAL1838	3
32	Jaw head spring	ZAL1839	3
33	Spring pin	ZAL1840	3
34	O-ring	ZAL1618	7
35	Extension bar A	ZAL1841	2
36	Extension bar B	ZAL1842	2
37	Extension bar C	ZAL1843	1
38	Extension bar D	ZAL1844	1
39	Extension bar E	ZAL1845	1

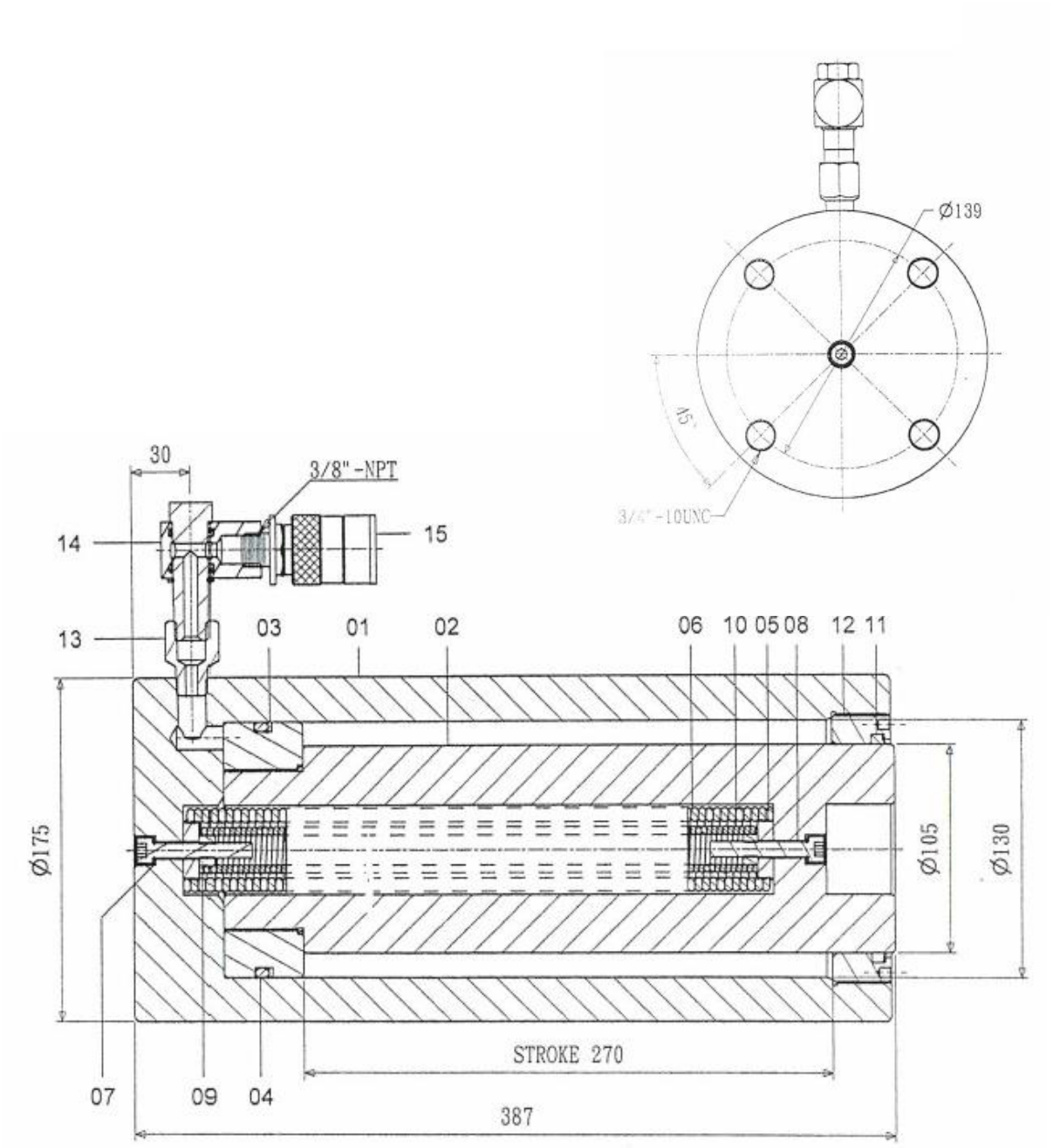
8.1.3.1 ZAL1810 – Double Acting Cylinder



Item	Description	Part No.	Qty
1	Cylinder base	ZAL1931	1
2	Back-up ring	ZAL1932	1
3	O-ring	ZAL1933	1
4	Piston rod	ZAL1511	1
5	Back-up ring	ZAL1512	2
6	O-ring	ZAL1513	1
7	Brass bushing	ZAL1934	1
8	Back-up ring	ZAL1907	3
9	O-ring	ZAL1908	2
10	Back-up ring	ZAL1515	2
11	O-ring	ZAL1516	1
12	Spring ring	ZAL1519	1
13	Screw	ZAL1297	1
14	Main piston	ZAL1520	1

Item	Description	Part No.	Qty
15	Back-up ring	ZAL1521	2
16	O-ring	ZAL1522	1
17	Cylinder base	ZAL1935	1
18	Fasten nut	ZAL1936	1
19	O-ring	ZAL1277	1
20	Back-up ring	ZAL1225	1
21	Wiper	ZAL1214	1
22	Quick coupler	ZAL1917	2
23	Elbow	ZAL1913	1
24	Oil pressure valve ass'y	ZAL1565	1
25	Back-up ring	ZAL1218	2
26	O-ring	ZAL1274	2
27	Coupler body	ZAL1566	1
28	Anti-loosen nut	ZAL1567	1

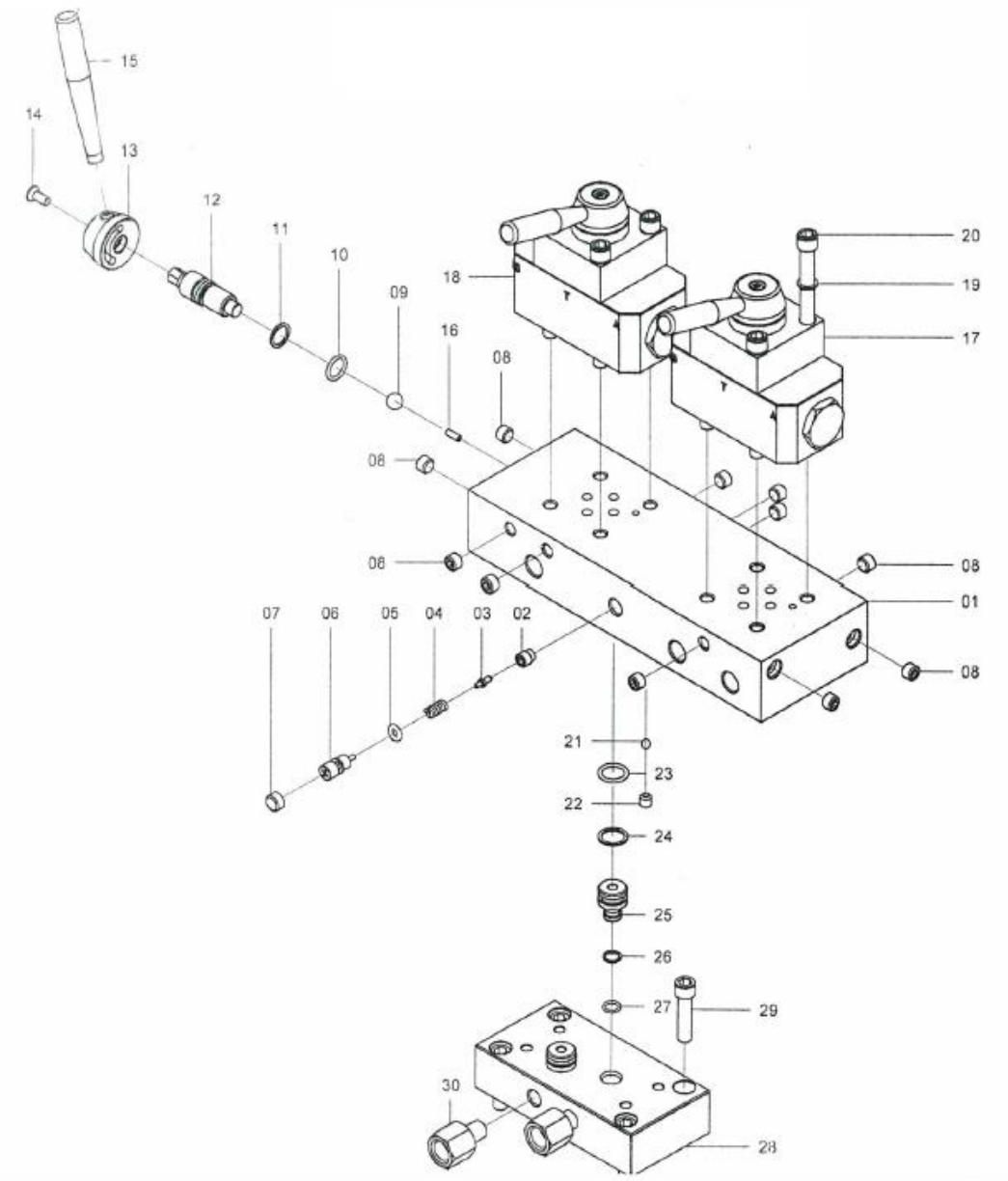
8.1.3.2 ZAL1814 – Single Acting Spring Return Cylinder



Item	Description	Part No.	Qty
1	Cylinder base	ZAL1937	1
2	Piston rod	ZAL1938	1
3	Back-up ring	ZAL1939	1
4	O-ring	ZAL1940	1
5	Spring lock	ZAL1941	2
6	Spring	ZAL1942	1
7	Gasket seal	ZAL1943	2

Item	Description	Part No.	Qty
8	Screw	ZAL1808	2
9	Spring lock	ZAL1944	2
10	Spring	ZAL1945	1
11	Wiper	ZAL1946	1
12	Fasten nut	ZAL1947	1
13	Adaptor	ZAL1948	1
14	High flow swivel connector	ZAL1949	1
15	Quick coupler	ZAL1917	1

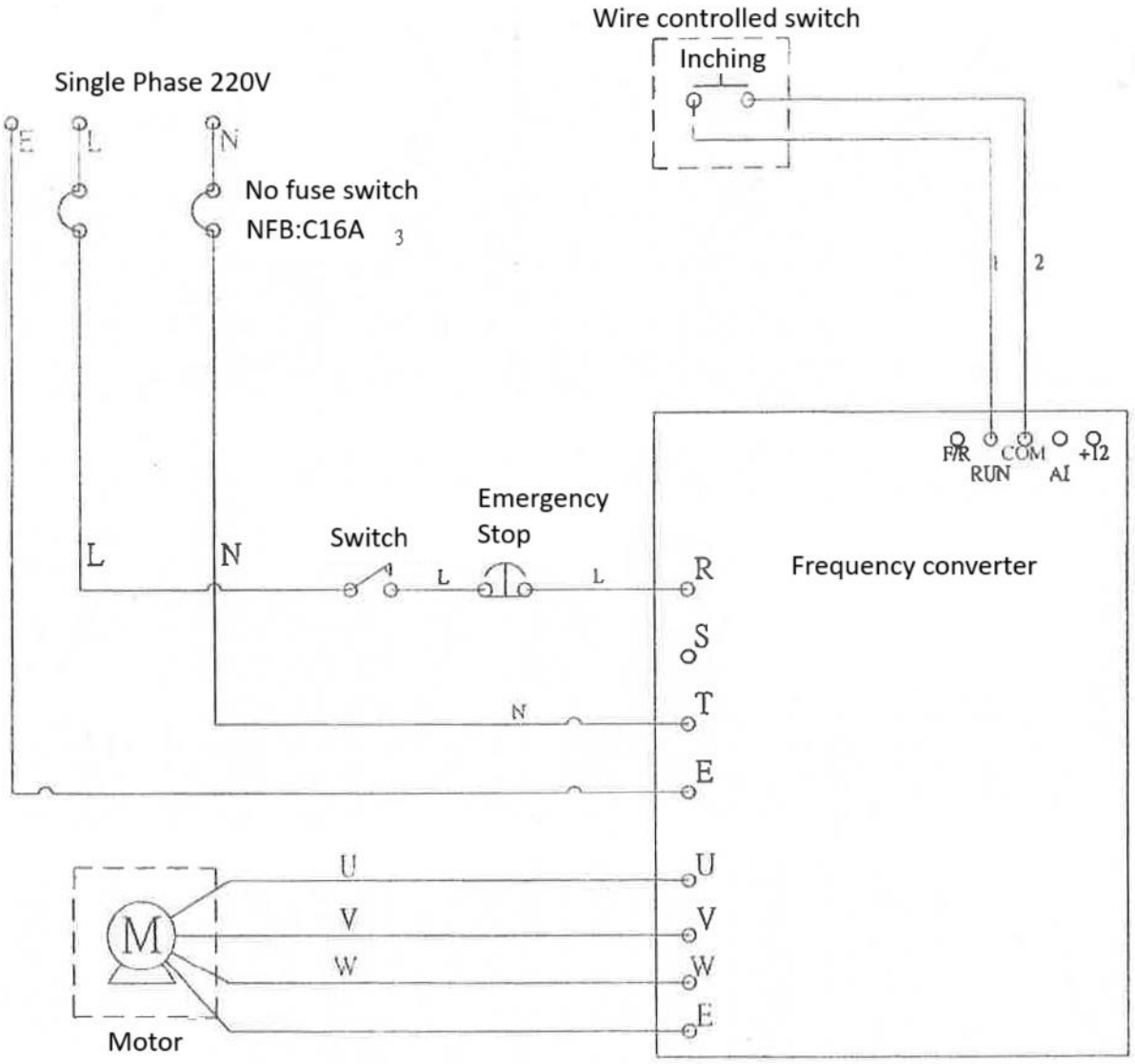
8.2 ZAL1759 – Control Panel Assembly



Item	Description	Part No.	Qty
1	Connecting block	ZAL1891	1
2	Cone seat	ZAL1153	1
3	Cone	ZAL1152	1
4	High pressure spring	ZAL1361	1
5	O-ring	ZAL1210	1
6	Overload cover screw	ZAL1315	1
7	Cap	ZAL1041	1
8	Screw	ZAL1303	11
9	Steel ball	ZAL1892	1
10	O-ring	ZAL1233	1
11	Back-up ring	ZAL1893	1
12	Release valve screw	ZAL1894	1
13	Switch base	ZAL1895	1
14	Screw	ZAL1319	1
15	Handle	ZAL1160	1

Item	Description	Part No.	Qty
16	Spring pin	ZAL1896	1
17	Directional control valve	ZAL1897	1
18	Directional control valve	ZAL1898	1
19	Copper washer	ZAL1357	8
20	Screw	ZAL1899	8
21	Steel ball	ZAL1366	1
22	Screw	ZAL1284	1
23	O-ring	ZAL1229	2
24	Back-up ring	ZAL1900	2
25	Link tube	ZAL1901	2
26	Back-up ring	ZAL1902	2
27	O-ring	ZAL1251	2
28	Valve body	ZAL1903	1
29	Cap screw	ZAL1904	4
30	Adaptor	ZAL1905	2

9.0 Electric Schematic



9.0 Hydraulic System Connection