

DURAPAC

ENGINEERED FOR RELIABILITY

Instruction Manual

Single Acting, Collar Thread, Hydraulic
Cylinders – RG Series



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 Cylinders are engineered to meet ANSI/ASME B30.1 Standards for Performance and Safety. The RG-Series is a general purpose spring return cylinder designed for use in production, maintenance and fabrication applications.

All RG Series cylinders feature a hard chrome cylinder bore and piston rod for maximum corrosion-resistance. When combined with the bronze overlay on the piston bearing area and low-friction surface treatment on the gland nut, this cylinder is suitable for demanding applications. Cylinder body mounting threads and base mounting holes are included on most models. Optional TSX tilt saddles are available for all models from RG-102 to RG-10010.

- Hardened grooved saddle to prevent piston rod damage (except RG-101)
- Optional tilt saddles available
- Gland nut with low friction coating withstands full dead end loading
- Hard chrome plated piston rod for maximum corrosion-resistance and cylinder life
- Bronze overlay on piston bearing area reduces side load induced damage and extends cylinder life
- Piston rod threads and base mounting holes permit easy fixture
- Hard chrome plated bore for maximum corrosion-resistance and cylinder life
- Piston rod wiper reduces contaminants
- Return springs are sized to ensure efficient piston rod return and maximum spring life
- Powder coated finish enhances appearance and reduces corrosion
- Parker industry standard high flow coupling for compatibility

Note – Durapac offers a range of piston and base attachments to suit the RG Series cylinders.

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 cylinder'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 cylinder 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 cylinder 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 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 Cylinders

- **Do NOT** overload equipment. Overloading can cause equipment failure and possible personal injury
- This device is not suitable for use as a support device! As the system load is lifted, use blocking and cribbing to guard against a falling load
- **BE SURE SETUP IS STABLE BEFORE LIFTING LOAD.** Cylinders should be placed on a flat surface that can support the load. Where applicable, use a cylinder base for added stability. Do not weld or otherwise modify the cylinder to attach a base or other support
- Avoid situations where loads are not directly centred on the cylinder piston. Off-centre loads produce considerable strain on cylinder and pistons. In addition, the load may slip or fall, causing potentially dangerous results
- Distribute the load evenly across the entire saddle surface. **Always** use a saddle to protect the piston (if one is provided)
- **USE ONLY RIGID PIECES TO HOLD LOAD.** Carefully select steel or wood blocks that are capable of supporting the load. Never use a hydraulic cylinder as a shim or spacer in any lifting or pressing application
- **Never** pressurise uncoupled couplers. Only use hydraulic equipment in a coupled system

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

- ⚠ WARNING:** When hoisting the cylinder, use **all** of the eye bolts. Failure to do so could cause the cylinder to drop unexpectedly. Lifting straps must be at a 45 degree or greater angle from horizontal. See Figure 1 (below)

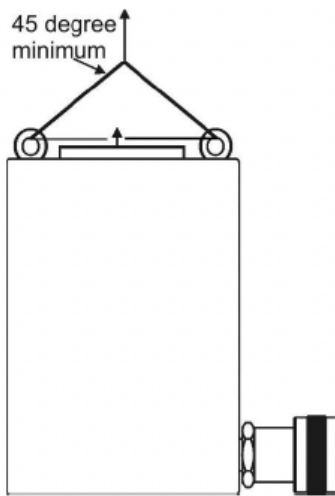


Figure 1 – Hoisting Cylinder

- ⚠ 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
- ⚠ CAUTION:** DO NOT allow the piston rod to rotate when installing adaptors. Damage to the spring may prevent piston rod retraction
- 4.1 Know your cylinder, its limitations and how it operates before attempting to use. If in doubt, contact Durapac.
 - 4.2 Make hydraulic connections; use a pump release valve or a 3-way valve and one hose for a single-acting cylinder.
 - ⚠ IMPORTANT:** Fully hand-tighten all couplers. Loose coupler connections will block the flow of oil between the pump and the cylinder
 - 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 cylinder 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.

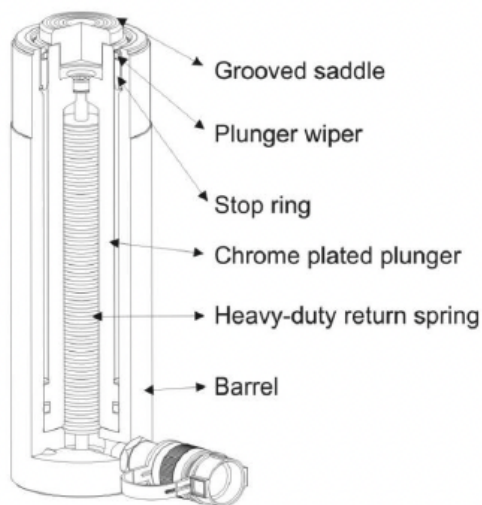


Figure 2 – RG Series Sectional Drawing

5.0 Operation



IMPORTANT:

- Always use a flat, hard surface as a cylinder support plate
- Collar threads are rated for the full capacity of the cylinder when fully engaged in attachments
- Cylinder gland nut/stop ring is designed to take the full load, to reduce cylinder wear, use less than the full stroke where possible

For complete operating instructions refer to the instruction sheet included with each pump.

5.1 Advancing and retracting the cylinder

The RG Series cylinders are a spring return cylinder and the speed of retraction is affected by the length of the hose and other restrictions in the line.

Shift the valve on the pump to the advance position and run the pump to advance the cylinder. To retract the cylinder, shift the valve to the retract position.

5.2 Side Load

Eliminate the presence of side load forces when using high tonnage cylinders. Side load can occur through:

- 5.2.1 An eccentric load on the piston rod.
- 5.2.2 A horizontal load on a structure.
- 5.2.3 A structure and/or cylinder misalignment.

5.2.4 Non synchronised lifting actions

5.2.5 Non stable cylinder base support.

To reduce cylinder offset loading, optional tilt saddles are available. Always use grease underneath swivel saddles.

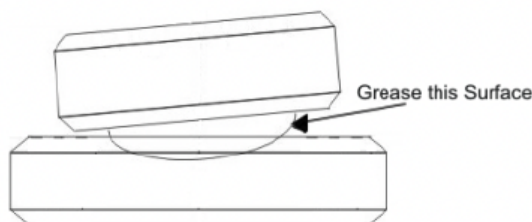


Figure 3 – Tilt Saddle.

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 cylinder 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.

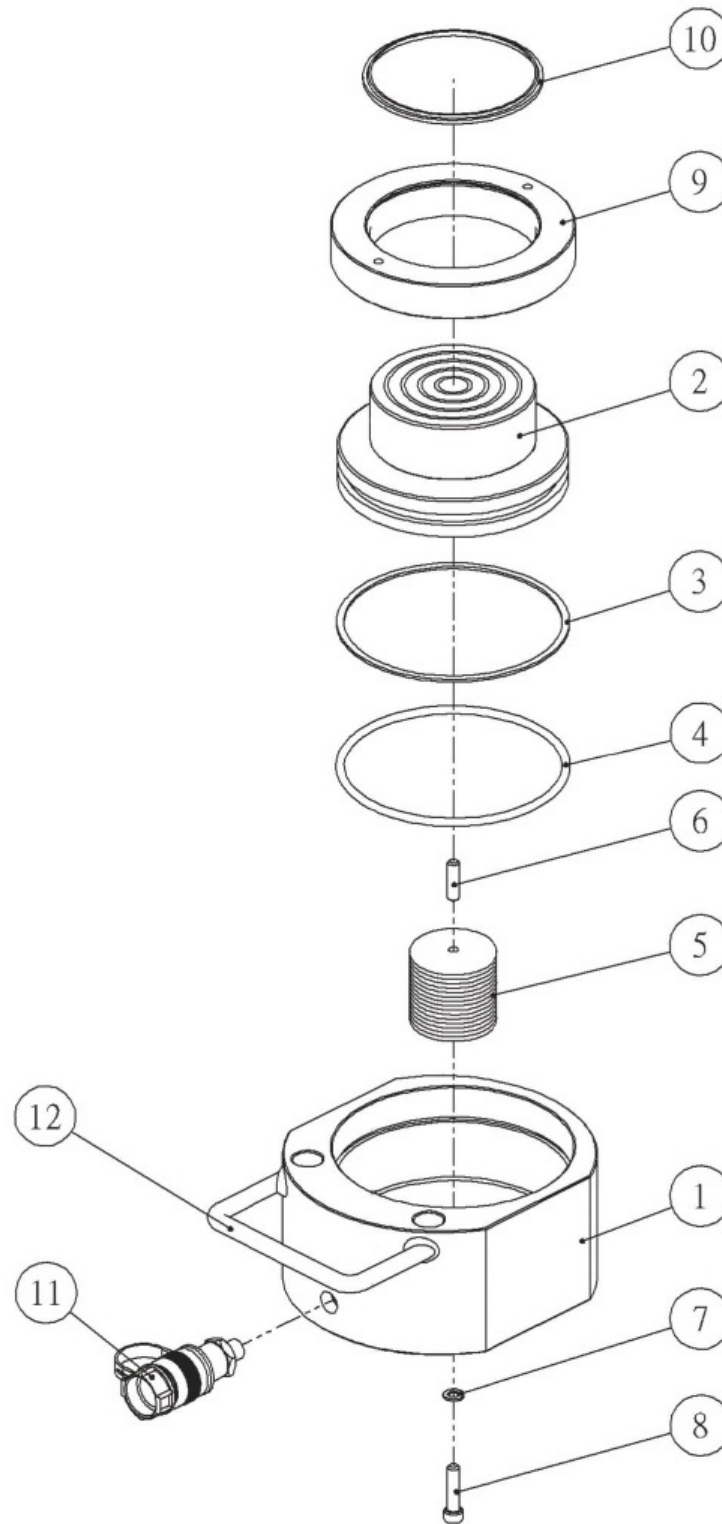
Maintenance is required when wear or leakage is noticed. Periodically inspect all components to detect any problem that may require service and maintenance.

- 6.1 Check for loose connections and leaks.
- 6.2 Replace damaged parts immediately.
- 6.3 Do not exceed oil temperature above 60°C.
- 6.4 Keep all hydraulic components clean.
- 6.5 Use dust caps when cylinder is disconnected from the hose. Keep entire cylinder clean to prolong cylinder life.
- 6.6 Wipe thoroughly clean and store cylinders upright (to prevent seal distortion) in a clean, dry environment. Avoid temperature extremes.
- 6.7 Change hydraulic oil in your system as recommended in the pump instruction sheet.

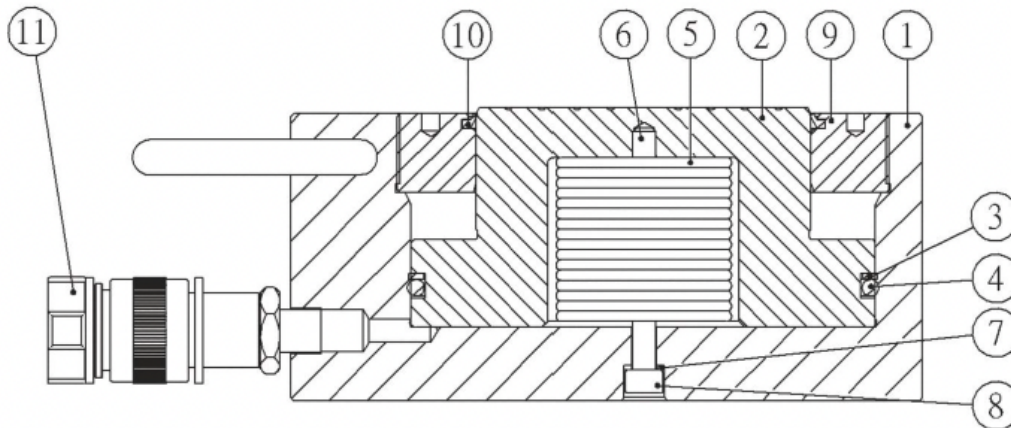
7.0 Troubleshooting

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	- Check pump or valve operating instructions - 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	Prime pump according to pump operating instructions
	Pump not operating	Check pump's operating instructions
	Load is above the capacity of the system	Use the correct equipment
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

Problem	Cause	Solution
	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
	Pump not operating correctly	• Check pump's operating instructions • Repair or replace as necessary
	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

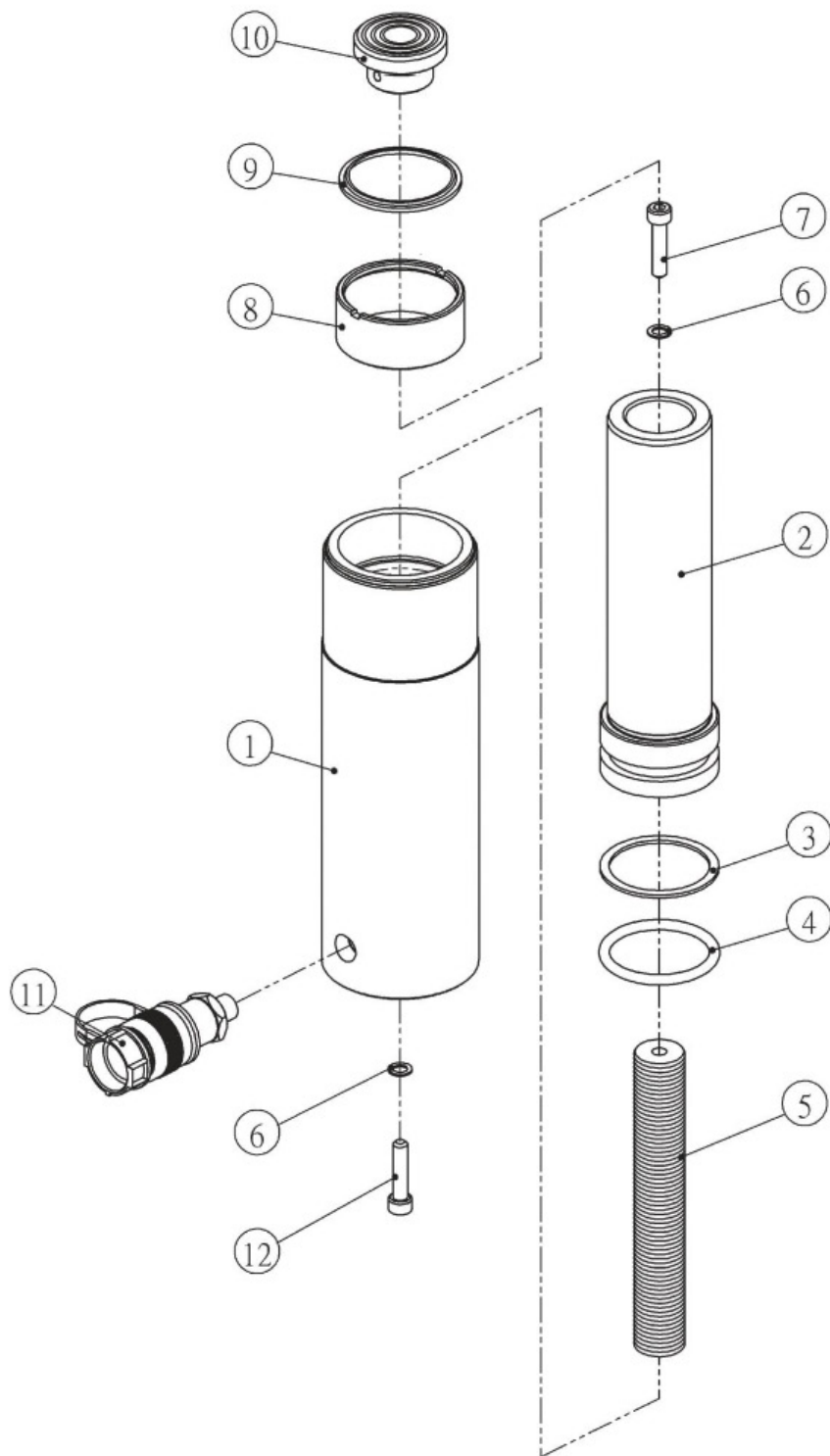
8.0 Parts Breakdown and List**8.1 Parts Breakdown - RG-50**

8.1.1 Cross Section - RG-50

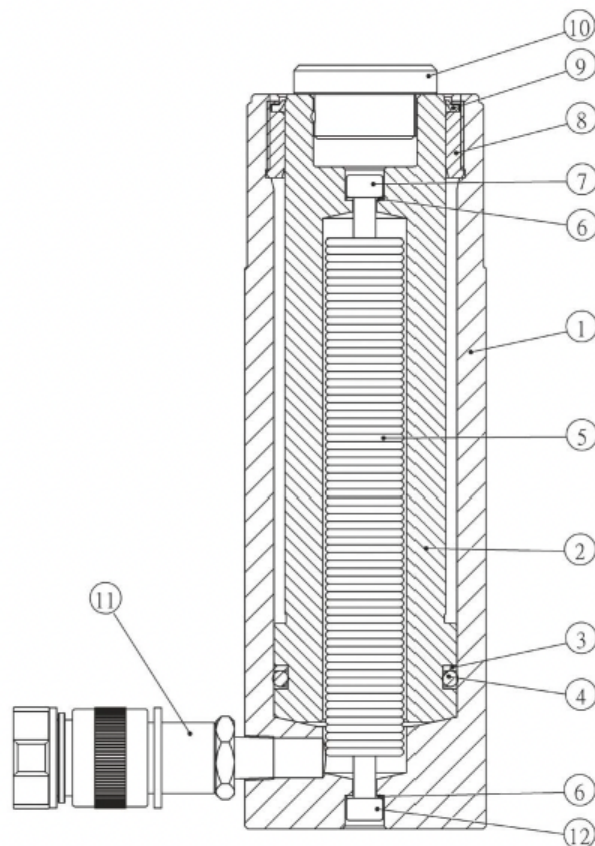


8.1.2 Parts Listing - RG-50

Parts Listing - RG-50			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2103	1
2	Piston rod	ZAM2104	1
3	Back-up ring*	ZAM2105	1
4	O-ring*	ZAM2106	1
5	Spring component	ZAM2107	1
6	Bolt	ZAM2108	1
7	Washer*	ZAM2109	1
8	Bolt*	ZAM2110	1
9	Stop ring	ZAM1806	1
10	Wipers*	ZAM1556	1
11	Coupler (set)	CR-6	1
12	Handle	-	-
	Seal Kit	ZAM1095	1

8.2 Parts Breakdown – 5, 10, 15 & 25 Ton Models (excluding RG-50)

8.2.1 Cross Section - 5, 10, 15 & 25 Ton Models (excluding RG-50)



8.2.2 Parts Listing - 5, 10, 15 & 25 Ton Models (excluding RG-50)

Parts Listing - RG-51				Parts Listing - RG-53			
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	Cylinder	ZAM2112	1	1	Cylinder	ZAM2119	1
2	Piston rod	ZAM2113	1	2	Piston rod	ZAM2120	1
3	Back-up ring*	ZAM2114	1	3	Back-up ring*	ZAM2114	1
4	O-ring*	ZAM2115	1	4	O-ring*	ZAM2115	1
5	Spring component	ZAM2116	1	5	Spring component	ZAM2121	1
6	Washer*	ZAM2109	2	6	Washer*	ZAM2109	2
7	Bolt*	ZAM2117	1	7	Bolt*	ZAM1894	1
8	Stop ring	ZAM2118	1	8	Stop ring	ZAM2118	1
9	Wipers*	ZAM1556	1	9	Wipers*	ZAM1556	1
10	Load cap	ZAM1116	1	10	Load cap	ZAM1116	1
11	Coupler (set)	CR-6	1	11	Coupler (set)	CR-6	1
12	Bolt*	ZAM2117	1	12	Bolt*	ZAM1894	1
	Thread cap (not shown)	ZAM1230	1		Thread cap (not shown)	ZAM1230	1
	Seal Kit	ZAM1096	1		Seal Kit	ZAM1038	1

Parts Listing - RG-55			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2122	1
2	Piston rod	ZAM2123	1
3	Back-up ring*	ZAM2124	1
4	O-ring*	ZAM2115	1
5	Spring component	ZAM2125	1
6	Washer*	ZAM2109	2
7	Bolt*	ZAM1894	1
8	Stop ring	ZAM2118	1
9	Wipers*	ZAM1556	1
10	Load cap	ZAM1116	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1894	1
	Thread cap (not shown)	ZAM1230	1
	Seal Kit	ZAM1038	1

Parts Listing - RG-57			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2126	1
2	Piston rod	ZAM2127	1
3	Back-up ring*	ZAM2124	1
4	O-ring*	ZAM2115	1
5	Spring component	ZAM2128	1
6	Washer*	ZAM2109	2
7	Bolt*	ZAM1894	1
8	Stop ring	ZAM2118	1
9	Wipers*	ZAM1556	1
10	Load cap	ZAM1116	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1894	1
	Thread cap (not shown)	ZAM1230	1
	Seal Kit	ZAM1038	1

Parts Listing - RG-59			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2129	1
2	Piston rod	ZAM2130	1
3	Back-up ring*	ZAM2124	1
4	O-ring*	ZAM2115	1
5	Spring component	ZAM2131	1
6	Washer*	ZAM2109	2
7	Bolt*	ZAM1894	1
8	Stop ring	ZAM2118	1
9	Wipers*	ZAM1556	1
10	Load cap	ZAM1116	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1894	1
	Thread cap (not shown)	ZAM1230	1
	Seal Kit	ZAM1038	1

Parts Listing - RG-101			
Item	Description	Part No.	Qty
1	Cylinder	ZAM1799	1
2	Piston rod	ZAM1800	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM1802	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1804	1
8	Stop-ring	ZAM1805	1
9	Wipers*	ZAM1806	1
10	Load cap	-	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-102			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2132	1
2	Piston rod	ZAM2133	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM2134	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1836	1
8	Stop-ring	ZAM1805	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1836	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-104			
Item	Description	Part No.	Qty
1	Cylinder	ZAM1808	1
2	Piston rod	ZAM1809	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM1143	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1805	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-106			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2135	1
2	Piston rod	ZAM2136	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM2137	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2138	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-108			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2139	1
2	Piston rod	ZAM2140	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM2141	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2138	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-1010			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2142	1
2	Piston rod	ZAM1229	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM1827	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2138	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-1012			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2144	1
2	Piston rod	ZAM2145	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM2146	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2138	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-1014			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2147	1
2	Piston rod	ZAM2148	1
3	Back-up ring*	ZAM1421	1
4	O-ring*	ZAM1801	1
5	Spring component	ZAM2149	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2138	1
9	Wipers*	ZAM1806	1
10	Load cap	ZAM1117	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1231	1
	Seal Kit	ZAM1033	1

Parts Listing - RG-151			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2150	1
2	Piston rod	ZAM2151	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2154	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2155	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-152			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2156	1
2	Piston rod	ZAM2157	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2143	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2155	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-154			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2158	1
2	Piston rod	ZAM2159	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2160	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2155	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-156			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2161	1
2	Piston rod	ZAM2162	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2163	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2164	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-158			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2165	1
2	Piston rod	ZAM2166	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2167	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2164	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-1510			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2168	1
2	Piston rod	ZAM2169	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2170	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2164	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-1512			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2171	1
2	Piston rod	ZAM2172	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2173	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2164	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-1514			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2174	1
2	Piston rod	ZAM1367	1
3	Back-up ring*	ZAM2152	1
4	O-ring*	ZAM2153	1
5	Spring component	ZAM2175	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2164	1
9	Wipers*	ZAM2000	1
10	Load cap	ZAM1118	1
10a	Optional Tilt Saddle	TSX-10	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1232	1
	Seal Kit	ZAM1035	1

Parts Listing - RG-251			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2176	1
2	Piston rod	ZAM2177	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2178	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

Parts Listing - RG-252			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2180	1
2	Piston rod	ZAM2181	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2182	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

Parts Listing - RG-254			
Item	Description	Part No.	Qty
1	Cylinder	ZAM1811	1
2	Piston rod	ZAM1812	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM1813	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

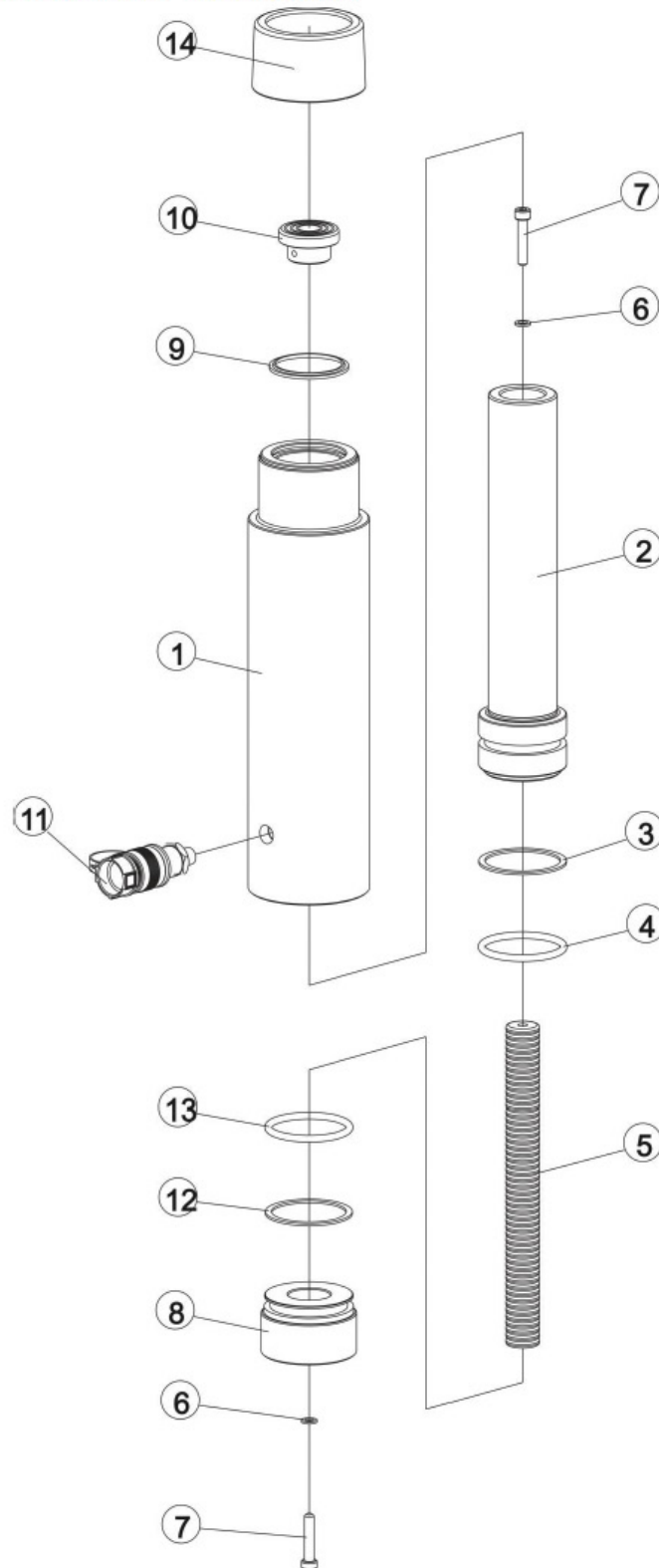
Parts Listing - RG-256			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2094	1
2	Piston rod	ZAM2095	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2096	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

Parts Listing - RG-258			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2183	1
2	Piston rod	ZAM2184	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2185	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

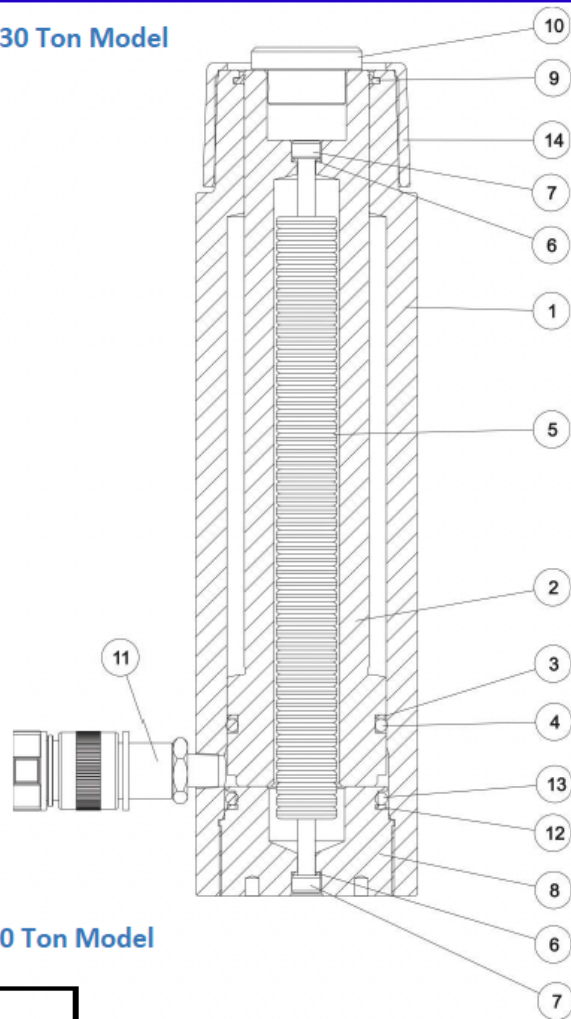
Parts Listing - RG-2510			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2186	1
2	Piston rod	ZAM2187	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2188	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

Parts Listing - RG-2512			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2189	1
2	Piston rod	ZAM2190	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2191	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

Parts Listing - RG-2514			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2192	1
2	Piston rod	ZAM1365	1
3	Back-up ring*	ZAM1440	1
4	O-ring*	ZAM1441	1
5	Spring component	ZAM2193	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM1814	1
9	Wipers*	ZAM2179	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1036	1

8.3 Parts Breakdown - 30 Ton Model

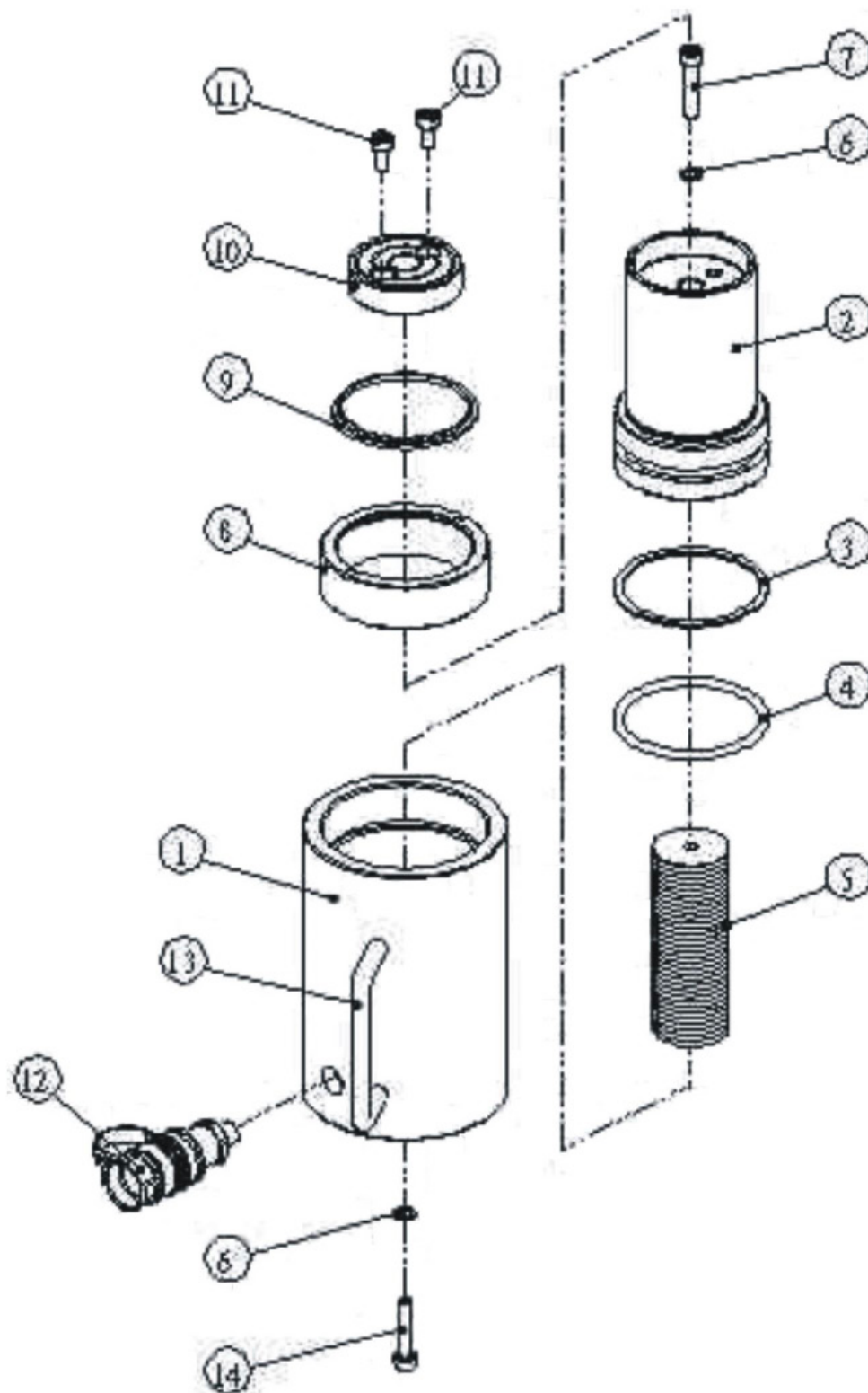
8.3.1 Cross Section - 30 Ton Model



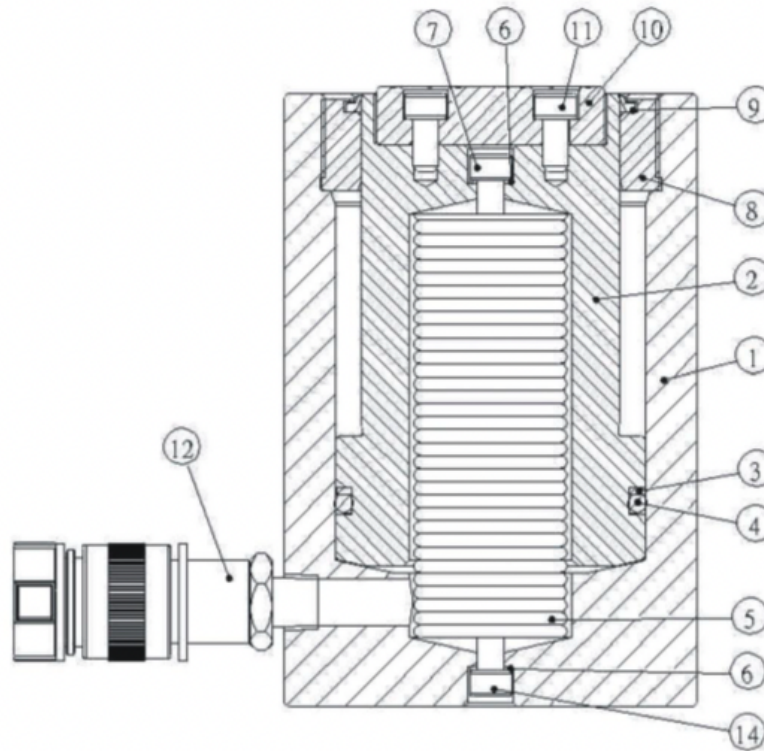
8.3.2 Parts Listing - 30 Ton Model

Parts Listing - RG-308			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2097	1
2	Piston rod	ZAM2098	1
3	Back-up ring*	ZAM1386	1
4	O-ring*	ZAM1433	1
5	Spring component	ZAM2188	1
6	Washer*	ZAM1766	2
7	Bolt*	ZAM1824	2
8	Stop-ring	ZAM2100	1
9	Wipers*	ZAM1815	1
10	Load cap	ZAM1119	1
10a	Optional Tilt Saddle	TSX-50	1
11	Coupler (set)	CR-6	1
12	Back-up ring*	ZAM2101	1
13	O-ring	ZAM2102	1
	Thread cap (not shown)	ZAM1233	1
	Seal Kit	ZAM1037	1

8.4 Parts Breakdown – 50, 75, 100 Ton Models



8.4.1 Cross Section - 50, 75, 100 Ton Models



8.4.2 Parts Listing - 50, 75, 100 Ton Models

Parts Listing - RG-502				Parts Listing - RG-504			
Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	Cylinder	ZAM2056	1	1	Cylinder	ZAM2062	1
2	Piston rod	ZAM2057	1	2	Piston rod	ZAM2063	1
3	Back-up ring*	ZAM1448	1	3	Back-up ring*	ZAM1448	1
4	O-ring*	ZAM1449	1	4	O-ring*	ZAM1449	1
5	Spring component	ZAM2058	1	5	Spring component	ZAM2064	1
6	Washer*	ZAM1803	2	6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1	7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2059	1	8	Stop-ring	ZAM2059	1
9	Wipers*	ZAM1450	1	9	Wipers*	ZAM1450	1
10	Load cap	ZAM2060	1	10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1	10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM2061	2	11	Bolt*	ZAM2061	2
12	Coupler (set)	CR-6	1	12	Coupler (set)	CR-6	1
13	Handle	-	0	13	Handle	ZAM2065	1
14	Bolt*	ZAM1807	1	14	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1234	1		Thread cap (not shown)	ZAM1234	1
	Seal Kit	ZAM1039	1		Seal Kit	ZAM1039	1

Parts Listing - RG-506			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2066	1
2	Piston rod	ZAM2067	1
3	Back-up ring*	ZAM1448	1
4	O-ring*	ZAM1449	1
5	Spring component	ZAM2068	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2059	1
9	Wipers*	ZAM1450	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM2061	2
12	Coupler (set)	CR-6	1
13	Handle	ZAM2065	1
14	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1234	1
	Seal Kit	ZAM1039	1

Parts Listing - RG-5013			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2069	1
2	Piston rod	ZAM2070	1
3	Back-up ring*	ZAM1448	1
4	O-ring*	ZAM1449	1
5	Spring component	ZAM2071	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM2072	1
8	Stop-ring	ZAM2059	1
9	Wipers*	ZAM1450	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM2061	2
12	Coupler (set)	CR-6	1
13	Handle (eye bolt)	ZAM1456	1
14	Bolt*	ZAM2072	1
	Thread cap (not shown)	ZAM1234	1
	Seal Kit	ZAM1039	1

Parts Listing - RG-756			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2073	1
2	Piston rod	ZAM2074	1
3	Back-up ring*	ZAM1461	1
4	O-ring*	ZAM1462	1
5	Spring component	ZAM2075	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM2072	1
8	Stop-ring	ZAM2076	1
9	Wipers*	ZAM2077	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM2061	2
12	Coupler (set)	CR-6	1
13	Handle (eye bolt)	ZAM1470	1
14	Bolt*	ZAM2072	1
	Thread cap (not shown)	ZAM1235	1
	Seal Kit	ZAM1040	1

Parts Listing - RG-7513			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2078	1
2	Piston rod	ZAM2079	1
3	Back-up ring*	ZAM1461	1
4	O-ring*	ZAM1462	1
5	Spring component	ZAM2080	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM2072	1
8	Stop-ring	ZAM2076	1
9	Wipers*	ZAM2077	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM2061	2
12	Coupler (set)	CR-6	1
13	Handle (eye bolt)	ZAM1470	1
14	Bolt*	ZAM2072	1
	Thread cap (not shown)	ZAM1235	1
	Seal Kit	ZAM1040	1

Parts Listing - RG-1004			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2081	1
2	Piston rod	ZAM2082	1
3	Back-up ring*	ZAM1475	1
4	O-ring*	ZAM1476	1
5	Spring component	ZAM2083	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM1807	1
8	Stop-ring	ZAM2084	1
9	Wipers*	ZAM2085	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM2061	2
12	Coupler (set)	CR-6	1
13	Handle	ZAM1227	1
14	Bolt*	ZAM1807	1
	Thread cap (not shown)	ZAM1236	1
	Seal Kit	ZAM1034	1

Parts Listing - RG-1006			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2086	1
2	Piston rod	ZAM2087	1
3	Back-up ring*	ZAM1475	1
4	O-ring*	ZAM1476	1
5	Spring component	ZAM2053	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM2088	1
8	Stop-ring	ZAM2054	1
9	Wipers*	ZAM2085	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM1831	2
12	Coupler (set)	CR-6	1
13	Handle (eye bolt)	ZAM1482	1
14	Bolt*	ZAM1141	1
	Thread cap (not shown)	ZAM1236	1
	Seal Kit	ZAM1034	1

Parts Listing - RG-1008			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2086	1
2	Piston rod	ZAM2089	1
3	Back-up ring*	ZAM1475	1
4	O-ring*	ZAM1476	1
5	Spring component	ZAM2053	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM2088	1
8	Stop-ring	ZAM2054	1
9	Wipers*	ZAM2085	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM1831	2
12	Coupler (set)	CR-6	1
13	Handle (eye bolt)	ZAM1482	1
14	Bolt*	ZAM1141	1
	Thread cap (not shown)	ZAM1236	1
	Seal Kit	ZAM1034	1

Parts Listing - RG-10010			
Item	Description	Part No.	Qty
1	Cylinder	ZAM2090	1
2	Piston rod	ZAM2091	1
3	Back-up ring*	ZAM1475	1
4	O-ring*	ZAM1476	1
5	Spring component	ZAM2092	1
6	Washer*	ZAM1803	2
7	Bolt*	ZAM2088	1
8	Stop-ring	ZAM2054	1
9	Wipers*	ZAM2085	1
10	Load cap	ZAM2060	1
10a	Optional Tilt Saddle	TSX-100	1
11	Bolt*	ZAM1831	2
12	Coupler (set)	CR-6	1
13	Handle (eye bolt)	ZAM1482	1
14	Bolt*	ZAM1141	1
	Thread cap (not shown)	ZAM1236	1
	Seal Kit	ZAM1034	1

Items marked with a * are contained within a standard seal kit.
 Serial number, model and part number need to be quoted when ordering parts.