

Grapple Cylinder

MAJOR REPAIR, MAINTENANCE & TESTING

GENERAL MAINTENANCE & REPAIR RECOMMENDATIONS

Maintenance periods should be scheduled in accordance with frequency of use and working environment of the cylinder. All cylinders must be visually inspected for wear and given an "in system" operating performance and leakage test at least once a year. If these visual observations indicate cylinder repair is required, the cylinder must be removed, repaired and tested.

MAJOR REPAIR & MAINTENANCE INSTRUCTION

Always drain the pressure from a hydraulic system before performing any service work. Disconnect hydraulic lines from head and cap ports of cylinder. Completely disassemble the cylinder using the exploded and assembly views as reference. No special tools are required except internal snap ring pliers. The piston rod assembly consisting of rod, piston and head cushion bushing (where used) are torqued and secured at the factory and are not to be disassembled (cylinders built prior to 1985 utilized piston nut, ref. item 18). After disassembling the cylinder, wash all metal parts in a non-flammable solvent. Rinse each part thoroughly and blow dry with a low pressure air jet. Arrange the parts on a clean surface. Examine each part carefully. Replace all rubber parts and other worn or damaged parts. The use of REPAIR KITS is strongly recommended. Particular attention should be given to the rod bearing (5a) since cylinder leakage can result from a worn bearing. A scored or rough rod bearing might damage the piston rod and, subsequently, the rod packing. Rod cartridge kits are available with or without the rod bearing. An excellent feature of the PRESSUREMASTER Hydraulic Cylinder is easy replacement of the rod cartridge (5) without loosening the tie rods. On most cylinders with bore sizes from 1-1/2" - 6 inches, remove the screws and washers (1 & 2) and retainer plate (4a). For all cylinders with bore sizes 7 through 14 inches, remove screws (3) and retainer plate (4b). The rod cartridge is easily removed from the cylinder head. To facilitate removal, a screwdriver can be used to pry in the external groove.

REASSEMBLY

The procedure for reassembly is essentially the reverse of disassembly. However, the following exceptions should be noted: Lubricate inside diameter of cylinder tube and piston rod with Hydraulic Fluid used in cylinder application. SEALS: Lubricate all seals with Hydraulic Fluid used in cylinder application. The hydraulic fluid specified for use in the cylinder is the only lubricant to be used in assembly. In reassembling the cylinder, use the exploded and assembly views as reference. Be careful not to cut or damage the rod packing and seals. The tie rod threads should be well lubricated to allow tightening the nuts evenly for proper pre-stressing. To avoid twisting of the tie rods during tightening, hold with vise grip or clamp. To assure equal pre-stressing of tie rods, first turn on nuts even and snug to align assembly, then the nuts are to be tightened alternately. For proper tie rod pre-stressing, they should be torqued as recommended.

The specific torque value is determined by the diameter of the tie rod. For lubricated tie-rod threads, these torque values are:

CYLINDER BORE SIZE	TIE-ROD DIAMETER	TORQUE-LUBRICATED POUNDS-FOOT
1-1/2"	3/8"	19
2" & 2-1/2"	1/2"	45
3-1/4", 4"	5/8"	90
5"	7/8"	255
6"	1"	360
7"	1-1/8"	450
8"	1-1/4"	750
10"	1" (uses 12)	360
12"	1" (uses 16)	360
14"	1" (uses 20)	360

TESTING

After the cylinder has been completely reassembled, it should be tested, either on a test bench or in the regular installation.

TEST PROCEDURES (see maximum psi/bore)

The cylinder should be tested for cushioning, travel and leakage.

A. Cushioning (if applicable)

1. Turn both cushioning screws clockwise all the way in.
2. Cycle cylinder a few times by alternating supply pressure to head & cap ports.
3. Apply supply pressure to the head port. Rod should retract, decelerate and may stop before completion of stroke.
4. Apply supply pressure to the cap port. Rod should extend, decelerate and may stop before completion of stroke.

B. Travel and Leakage

1. Turn the cushioning screws counterclockwise one (1) full turn.
2. Apply supply pressure to the head port. Rod should retract smoothly without binding. Cylinder should retract, have less cushioning and make full stroke + or - .062". Check leakage at cap port, no leakage permitted. Check leakage around rod seal. No leakage permitted.
3. Apply supply pressure to the cap port. Rod should extend smoothly without binding. Cylinder should extend, have less cushioning and make full stroke + or - .062". Check leakage at head port, no leakage permitted.
4. Return piston rod to retract position by applying supply pressure to head port. Remove supply pressure and install cylinder in service if satisfactory.

CUSHION ADJUSTMENT

Turn the needle valve clockwise to increase the amount of cushioning and counter-clockwise to decrease cushioning. To obtain the most effective cushioning, final adjustment must be made while the cylinder is operating under normal conditions at normal operating pressure.

