

INSTALLATION AND SERVICE INSTRUCTIONS

FORM IASI-0486
SUPERCEDES IASI-0186

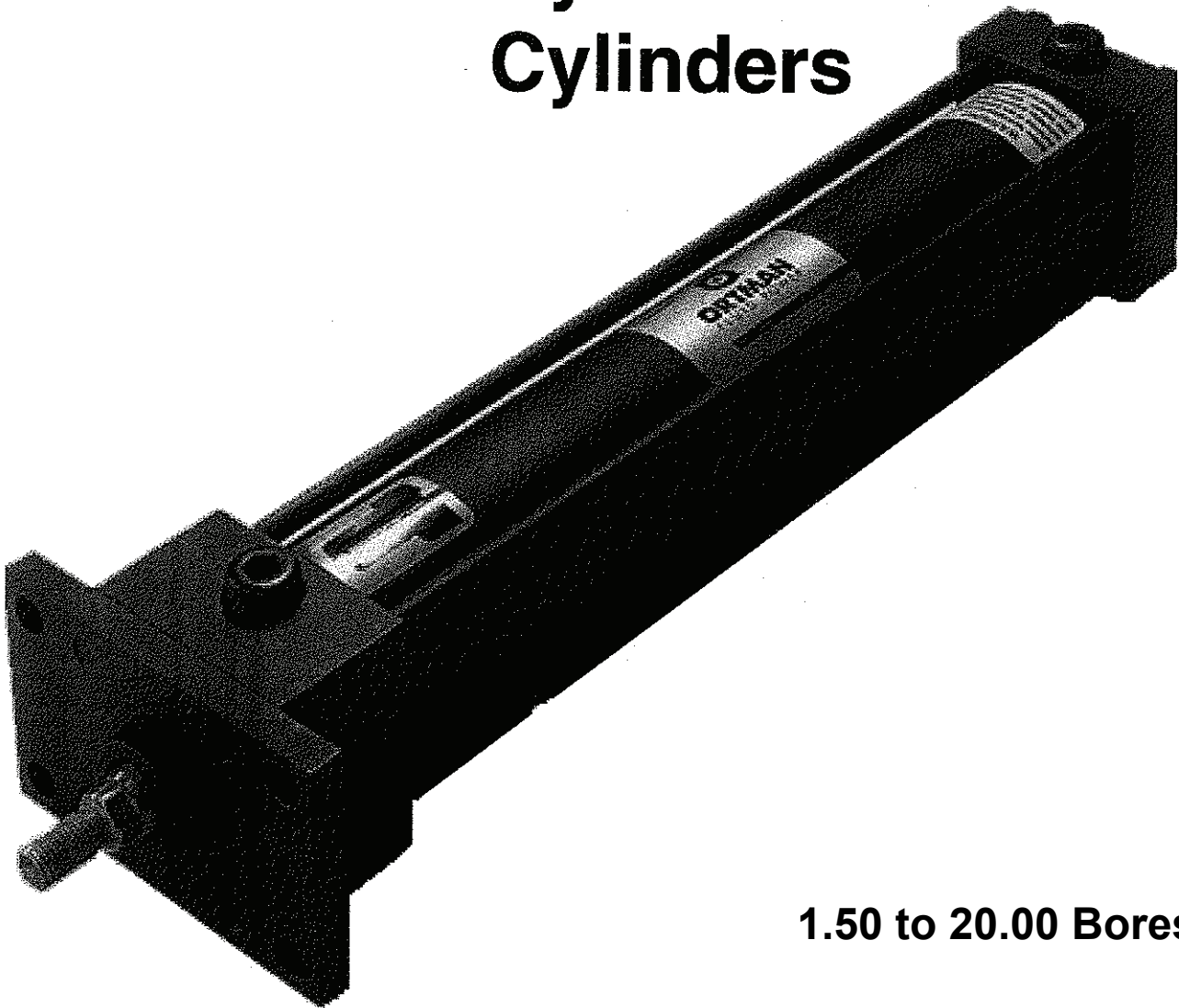
NOTICE

**DISASSEMBLY OF THIS
PRODUCT WILL VOID
WARRANTY**

ORTMAN

Series "7L"

Pressure Rated Hydraulic Cylinders



1.50 to 20.00 Bores

WARNING

**READ INSTALLATION
SERVICE INSTRUCTIONS
AND GENERAL PARTS
BREAKDOWN
BEFORE INSTALLATION,
OPERATION OR SERVICING**

CAUTION

**CHECK MAXIMUM
OPERATING PRESSURE ON
CYLINDER WARNING TAG
BEFORE APPLYING
PRESSURE TO CYLINDER.
EXCEEDING PRESSURE
RATING AS SHOWN ON THE
SERIAL NUMBER TAG OF
THE CYLINDER MAY CAUSE
FAILURE WHICH WILL
ENDANGER EQUIPMENT
AND PERSONNEL.**



Ortman Fluid Power

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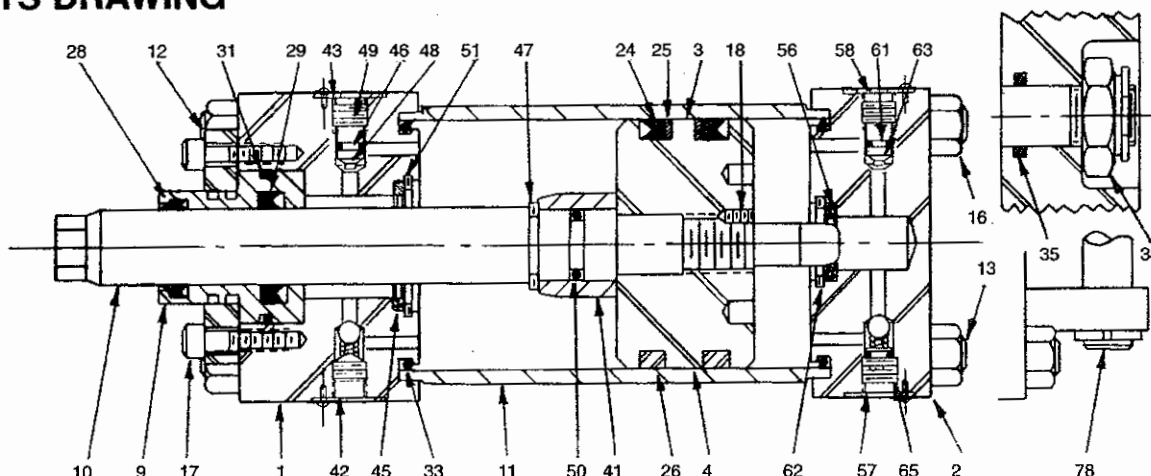
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GENERAL PARTS BREAKDOWN INSTALLATION AND SERVICE INSTRUCTIONS FOR SERIES 7L CYLINDER

PARTS DRAWING



PARTS

				USE			
ITEM	PART NAME	ITEM	PART NAME	ITEM	PART NAME	ITEMS	CYLINDER
	1 H'd End Cover	28	Rod Wiper	57	Cap Ball Chk	1-33	Non-Cush
	2 Cap End Cover	29	Rod Pkg-Poly U-Cup	58	Cap Cush Screw	1-51	Cush H'd End
	3 Piston-Block Vee	31	Cart O-Ring	61	Cap Cush Adj Screw	1-33 &	
(2)	4 Piston-SCR	33	End Cover O-Ring	62	Cap Cush Ret. Ring	56-65	Cush Cap End
	9. Rod Bearing	41	H'd End Cush Nose	63	Cap Cush Screw O-Ring	1-65	Cush Both Ends
10	Piston Rod	42	H'd Ball Chk Screw	65	Cap Ball Chk Screw		
11	Tube	43	H'd Cush Screw	(1) 78	Clevis Pin Assy		
12	Cart Ret Plate	45	H'd Cush Ring				
13	Tie Rod	46	H'd Cush Screw O-Ring				
16	Tie Rod Nut	47	Cush Nose Ret. Ring				
17	Cart Ret Plt Screw	48	H'd Cush Adj Screw		FOR 7LR ONLY: ITEM 38 - PISTON RET NUT		
18	Piston Lockscrew	50	Cush Nose O-Ring		35 - PISTON SEAL O-RING		
24	Piston Pkg-Block Vee	51	H'd Cush Ret Ring	(1)	FOR CLEVIS MOUNTED CYLINDERS ONLY		
(2)	25 Piston Pkg N-Ext Ring	56	Cap Cush Ring	(2)	ALL EXCEPT 10.00 THRU 14.00 BORES		
(2)	26 SCR Piston Pkg			(3)	ALL EXCEPT 1.5, 2.0, 2.5 BORES WITH LARGEST RODS		
				(4)	FOR .62 ROD ONLY		

KITS

SEAL KITS ARE STOCKED BY OUR DISTRIBUTORS AND AT THE FACTORY

ROD DIA.	CYLINDER BORE	RG ROD GLAND KIT INCLUDES KIT RS	RS ROD SEAL KIT
5/8	1 1/2-2 1/2	RG003530010	RS003540010
1	1 1/2	RG007530020	RS007540020
1	2-5	RG003530020	RS003540020
1 1/8	2	RG007530030	RS007540030
1 1/8	2 1/2-8	RG003530030	RS003540030
1 1/8	2 1/2	RG007530040	RS007540040
1 3/8	3 1/2-10	RG003530040	RS003540040
2	3 1/2-12	RG003530050	RS003540050
2 1/2	4-14	RG003530060	RS003540060
3	5-14	RG003530070	RS003540070
3 1/2	5-14	RG003530080	RS003540080
4	6-14	RG003530090	RS003540090
4 1/2	8-14	RG003530100	RS003540100
5	8-14	RG003530110	RS003540110
5 1/2	8-14	RG003530120	RS003540120

- ORDERING INFORMATION**
- Order standard Seal Kits by the appropriate number listed in the table.
 - When ordering Viton Seal Kits change last digit to a one (1).

Example: RG003530011
RS003530011
TS777512001

CYL. BORE	TS TUBE SEAL KIT BLOCK VEE PISTON	TS TUBE SEAL KIT SCR PISTON
1 1/2	TS777512000	TS777510000
2	TS787512000	TS787510000
2 1/2	TS797512000	TS797510000
3 1/2	TS817512000	TS817510000
4	TS837512000	TS837510000
5	TS847512000	TS847510000
6	TS857512000	TS857510000
8	TS877512000	TS877510000

KIT NAME	KIT TYPE	ITEM NUMBER
ROD SEAL	RS	28,29,31
ROD GLAND	RG	9,28,29,31
TUBE SEAL (BV)	TS	24(2),25(2),33(2)
TUBE SEAL (RING)	TS	33(2)

INSTALLATION AND SERVICE INSTRUCTIONS

7L CYLINDER

1. **GENERAL:** The parts drawing on Page 2 shows a complete listing of parts and is applicable to all standard Series 7L hydraulic cylinders, (1½ thru 8.00 bores only.) (For kits on 10 thru 14 inch bores contact your nearest Distributor). This parts drawing, when used in conjunction with the listed parts and kits, should facilitate the ordering of any replacement parts or kits by specifying: (1) cylinder serial number, as it appears on the name plate; and (2) Item number and part name or kit type and name.

2. **INSTALLATION OF CYLINDER:** Standard cylinders are furnished with seals compatible with petroleum base fluids. These seals work best within the temperature range of -40°F to 200°F. For fluids other than petroleum base, different seal material may have been used. (Contact your nearest Distributor.) (Reference Series 7LT (High Temperature), 7LW (Water), and 7LG (Water Glycol)).

For the cylinder to perform well, it must be properly installed. Alignment of the cylinder with load is most important. Forcing rod, clevis pins, or mounting bolts into position indicates that the cylinder is not properly aligned, and permanent damage may result from such installation.

Protective port covers should not be removed before installing piping as dirt or other foreign particles may enter the cylinder. All pipe and fittings must be clean before making final connections.

3. PROCEDURE FOR REPLACEMENT OF ROD SEALS AND CARTRIDGE:

- A. Disconnect cylinder and drain oil from head end port. (**This is a must.**)
- B. In cases of circular cartridge retainer (12) remove socket head screws (17).
In cases of square retainer (12) remove tie rod nuts (16). (See cylinder bore/rod combinations using square retainers, Page 4.)
- C. Remove circular or square retainer.
- D. Remove rod bearing cartridge (9) from head (1). To facilitate removal, a screwdriver can be used to pry in the external groove.
- E. Remove rod wiper (28), rod seal (29), rod cartridge o-ring (31).
- F. Re-assemble the cartridge with corresponding replacement parts, cleaning all parts thoroughly. Swelling, shrinking, wear, nicks, cuts, and indentations are all signs of defective seals. Such seals should be replaced.
- G. Prior to installation, all rubber parts must be well coated with lubricant. Place the cartridge with the new replacement parts on the rod end, and use a twisting motion in starting it onto the rod.
- H. Guide the cartridge over the rod and carefully insert it into the head end cover (1), replace cartridge retainer plate (12) and screws (17). Tighten the screws with a hexagon key. In tightening the socket head screws for circular retainers use the following torque:

SCREW SIZE-NO.	10-32	.25-28	.31-24
TORQUE (FT. LBS.)	6	15	30

- I. Square retainer (re-installation). See tie rod torque, Page 4.

4. PROCEDURE FOR REPACKING CYLINDERS:

- A. Disconnect cylinder and drain oil from head and cap end ports.
- B. Remove the tie rod nuts (16) and tie rods (13).
- C. Remove cap end (2) and then head end (1). The rod bearing cartridge (9) and cartridge retainer plate (12) will come off with the head.
- D. Remove piston and rod assembly from tube (11).
- E. Remove cartridge retainer plate screws (17) and rod bearing cartridge (9) from head end (1).
- F. To disassemble cap and cover (2):
- (1) Remove end cover o-ring (33).
 - (2) Remove ball check screw (58), spring (61), ball (63), and o-ring (65).
 - (3) Remove cushion adj. needle (57) and o-ring (65). (**See caution notes on page 4.**)
 - (4) Remove cush. bushing retaining ring (62), and cush. ring (56).
- G. To disassemble head end cover (1):
- (1) Remove end cover o-ring (33).
 - (2) Remove ball check screw (43), spring (46), ball (48), and o-ring (49).
 - (3) Remove cush. adj. needle (42) and o-ring (49). (**See caution notes on page 4.**)
 - (4) Remove cush. retaining ring (51) and cush. ring (45).
- H. To disassemble piston rod (10), clamp in soft jaws, remove piston lockscrew item (18), and proceed as follows:

CAUTION

CAUTION

Pistons are also retained to the piston rod with "Loctite"® retaining compound, RC - 40.

Head (approximately 500°F for 30 minutes) must be applied to the piston in order to remove the piston from the rod.
*Registered trademark, Loctite Corporation.

NOTE: The piston and rod assembly should not require disassembly unless replacement of pistons (3) or (4), the piston rod (10), or head end cushion nose (41) is required.

- (1) Remove piston packing (24), piston packing non-extrusion rings (25) or piston packing rings (26) as applicable.
- (2) Heat piston to required temperature.
- (3) The piston (3) or (4) is threaded onto the piston rod (10) and can be removed once the loctited assembly has broken loose. Use the pin spanner holes provided in the rear face of the piston.
- (4) Remove head end cushion nose (41) and cushion nose o-ring (50), as applicable.

5. **CLEANING:** Clean all parts thoroughly. The packings and seals in this cylinder are compatible with hydraulic oils, air, water and neutral fluids. The cleaning agent must also be compatible to avoid damage to packings and seals. Whenever a particular lubricant is specified for a particular installation, do not deviate from the specification without checking for compatibility.

ONLY GENUINE ORTMAN FLUID POWER REPLACEMENT PARTS
ARE TO BE USED IN THIS PRODUCT.

6. INSPECTION:

- Inspect all packings and seals for swelling, shrinking, wear, nicks, cuts and indentations. Discard all damaged packings and seals.
- Check and inspect bore of tube for scratches, excessive wear, and any other defect that might damage piston packing or cause piston bypass.
- Inspect piston rod for signs of wear, nicks, dents, scratches, or anything that may damage rod packing or rod bearing. Excessive wear on one side of piston rod or rod bearing usually indicates misalignment in installation and should be corrected.
- Inspect all remaining items for evidence of damage or wear. In most cases, a little polishing of the various parts will restore them to like-new condition.

7. REPLACEMENT: Replace all damaged packings, seals, and rod wipers.

8. REASSEMBLY: The procedure for reassembly is essentially the reverse of disassembly. However, the following exceptions and considerations should be noted:

- All O-rings should be well coated with lubricant after they are installed in their respective grooves and prior to reassembly with the mating part. Care must be taken when assembling O-rings and packings that they are not damaged, as this will cause leakage.
- Tie rod threads and nut bearing faces 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 the 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:
- On later designs of the cylinder where the cushion adjustment needle is retained, it is necessary to upset the material in a minimum of two (2) places adjacent to the hole after reinstalling the cushion adjustment screw. This operation is necessary to prevent disengagement of the threads and blow out of the cushion adjusting screw.

CYLINDER BORE	1½	2-2½	3¼-4	5-6	8	10-12	14
TORQUE FT. LB.	11	16	29	60	120	180	374

9. TESTING:

- After the cylinder has been completely reassembled, it should be tested, either on a test bench or in the regular installation. Watch for the following as the cylinder is cycled at operating pressure.
 - Rod gland leakage.
 - Leakage at end cover o-rings.
 - Leakage at cushion adjusting needle.
 - Leakage at ball check plug.
- Final adjustment of cushion adjusting needle must be made after cylinder is installed in system, as applicable.

NOTE: If cylinders are to be stored for prolonged periods, contact Ortman Fluid Power for instructions.

CAUTION

Cushion Adjustment Valve (Identified with C.A. on End Covers)

Cushion adjustment valve is provided for controlling cushioning effect of the cylinder.

It contains a safety feature in that backing off of the screws, leakage will occur prior to thread disengagement. On later designs the cushion adjusting screws were retained to prevent thread disengagement. Do not continue to turn the cushion adjusting screw if leakage or resistance to turning occurs to prevent the possibility of blow out.

Ball Check Screw (identified with B.C. on End Covers) is not adjustable.

10. CYLINDERS WITH THE FOLLOWING BORE/ROD COMBINATIONS HAVE NON-BOLTED SQUARE RETAINERS. CARTRIDGE REMOVAL REQUIRES REMOVAL OF THE TIE ROD NUTS/TIE RODS:

A. All mounts:

- 1.50" bore with 1.00" rod
- 2.00" bore with 1.00" and 1.38" rods
- 2.50" bore with 1.38" and 1.75" rods
- 3.25" bore with 2.00" rod

B. Additional Bore/Rod Combinations in "B" and "BB" Mounting Styles Only:

- 1.50" and 2.00" bores with .62" rod
- 2.50" bore with 1.00" rod
- 3.25" bore with 1.38" and 1.75" rods
- 4.00" bore with 1.75", 2.00" and 2.50" rods
- 5.00" bore with 2.50", 3.00", and 3.50" rods
- 6.00" bore with 4.00" rod

11. REMOVABILITY OF ROD CARTRIDGE IN STYLE "CC"-FOOT MOUNT:

Foot lugs interfere with cartridge removal in the following sizes:

- 1.5" bore with .62" and 1.00" rods
- 2.0" bore with 1.00" and 1.38" rods
- 2.5" bore with 1.38" and 1.75" rods
- 3.25" bore with 1.38", 1.75" and 2.00" rods
- 4.00" bore with 1.75", 2.00" and 2.50" rods
- 5.00" bore with 2.50", 3.00" and 3.50" rods
- 6.00" bore with 3.00", 3.50" and 4.00" rods

The following bore-rod combinations are not available in Style CC Mount:

- 8" bore with 4.50", 5.00" and 5.50" rods
- 10" bore with 5.50" rod

WARRANTY—Seller warrants that any product of its manufacture, which upon examination is found by a Seller's representative to be defective in either workmanship or material under normal use and service, will, at Seller's option, be repaired or replaced free of charge including lowest transportation charges but not cost of installation or removal or have the purchase price refunded, provided that SELLER receives written claim specifying the defect within two (2) years or 4,000 hours of use in normal service applications, whichever arrives first after Seller ships the product. Modified or special products shall be subject to special written warranty depending on application of products. In no event shall Seller be liable for any claims, whether arising from breach of contract of warranty or claims of negligence or negligent manufacture, in excess of the purchase price. ALL OTHER WARRANTIES EXPRESSED AND IMPLIED INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR USE ARE HEREBY DISCLAIMED. The foregoing expresses all of Seller's obligations and liabilities with respect to the quality of items furnished by it and it shall under no circumstances be liable for consequential, collateral or special losses or damages.

"This information should be used as a guide for your consideration, investigation and verification. This information does not constitute a warranty or representation and we assume no legal responsibility or obligation with respect thereto, and the use to which such information may be put."

NOTE: This product is not to be modified in any fashion without prior written approval from Ortman Fluid Power, or an authorized representative thereof.