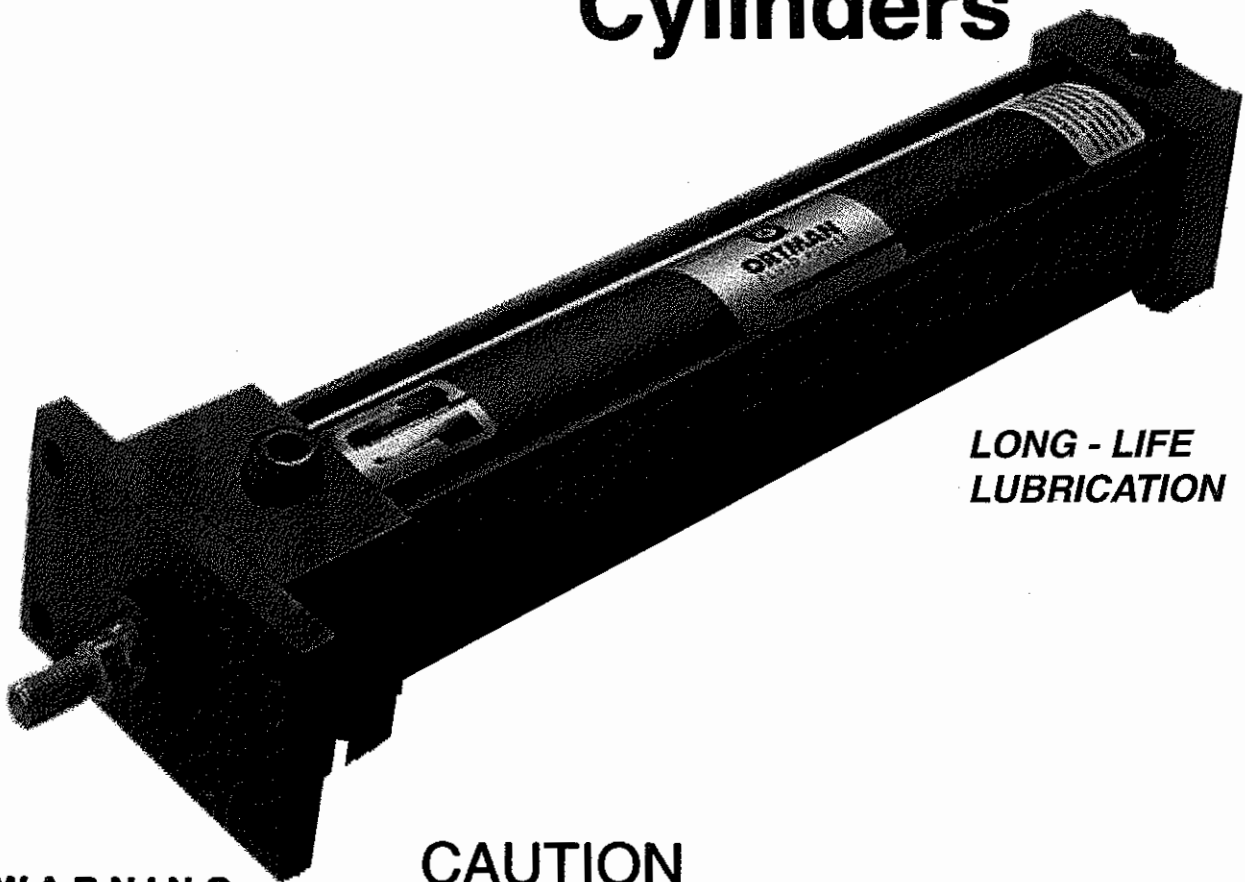


INSTALLATION AND SERVICE INSTRUCTIONS

NOTICE
DISASSEMBLY OF THIS
PRODUCT WILL VOID
WARRANTY

ORTMAN Series "7K" Air Cylinders

FORM 1AS1-0386
SUPERCEDES 115-800104



**LONG - LIFE
LUBRICATION**

WARNING

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

CAUTION

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

1.50 to 20.00 Bores



Ortman Fluid Power

1400 N. 30th Street, Suite 20

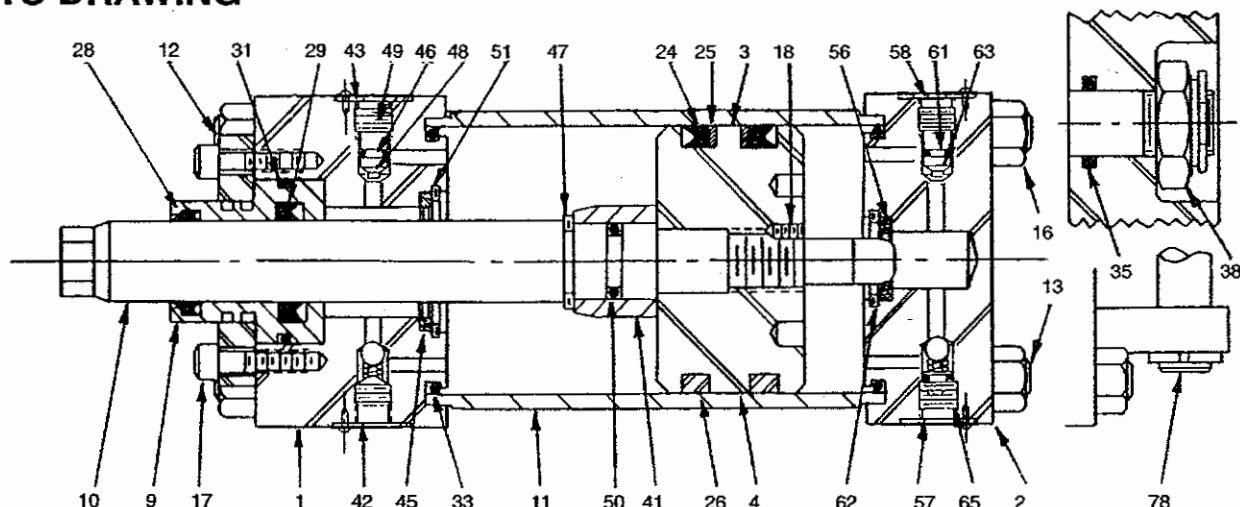
Quincy IL 62301

(844) 759-4922

sales@ortmanfp.com

FOR SERIES 7K CYLINDER

PARTS DRAWING



PARTS

| ITEM | PART NAME | ITEM | PART NAME | ITEM | PART NAME | USE | 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 | 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 | | | | |
| 18 | Piston Lockscrew | 50 | Cush Nose O-Ring | | | | |
| 24 | Piston Pkg-Block Vee | 51 | H'd Cush Ret Ring | | | | |
| (2) | 25 Piston Pkg N-Ext Ring | 56 | Cap Cush Ring | | | | |
| (2) | 26 SCR Piston Pkg | | | | | | |

- (1) FOR CLEVIS MOUNT CYLINDERS ONLY
 (2) ALL EXCEPT 10"-20" BORES
 (3) ALL EXCEPT 1.5, 2.0, 2.5 BORES WITH LARGEST RODS
 (4) FOR RODS UP TO 3" DIA. EXCEPT 1.5, 2.0, & 2.5 BORES WITH LARGEST RODS
 (5) FOR .62 ROD ONLY
 (6) ONLY FOR 3.5 THRU 5.5 RODS
 (7) END COVER GASKET 10"-12"-14"-16"-18" WITH FILAMENT WOUND TUBES

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 1/4 | 2 | RG007530030 | RS007540030 |
| 1 1/4 | 2 1/2-8 | RG003530030 | RS003540030 |
| 1 1/4 | 2 1/2 | RG007530040 | RS007540040 |
| 1 3/4 | 3 1/4-10 | RG003530040 | RS003540040 |
| 2 | 3 1/4-12 | RG003530050 | RS003540050 |
| 2 1/4 | 4-14 | RG003530060 | RS003540060 |
| 3 | 5-14 | RG003530070 | RS003540070 |
| 3 1/4 | 5-16 | RG003530080 | RS003540080 |
| 4 | 6-20 | RG003530090 | RS003540090 |
| 4 1/4 | 8-20 | RG003530100 | RS003540100 |
| 5 | 8-20 | RG003530110 | RS003540110 |
| 5 1/4 | 8-20 | RG003530120 | RS003540120 |

- ORDERING INFORMATION
 1. Order standard Seal Kits by the appropriate number listed in the table.
 2. When ordering Viton Seal Kits change last digit to a five (5).

Example: RG003530015
 RS003540015
 TS777512005

| CYL. BORE | TS TUBE SEAL KIT |
|-----------|------------------|
| 1 1/2 | TS777512000 |
| 2 | TS787512000 |
| 2 1/2 | TS797512000 |
| 3 1/4 | TS817512000 |
| 4 | TS837512000 |
| 5 | TS847512000 |
| 6 | TS857512000 |
| 8 | TS877512000 |

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

INSTALLATION AND SERVICE INSTRUCTIONS

7K CYLINDERS

1. **GENERAL:** The parts drawing on Page 2 shows a complete listing of parts and is applicable to all standard series 7K air cylinders, (1 1/2 thru 8.00 bores only.) (For kits on 10 thru 20 inch bores contact your nearest Distributor). This parts drawing when used in conjunction with the parts listed 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; (2) Item number and part name or kit type and name.

2. **INSTALLATION OF CYLINDER:** The seals and packings furnished as standard in air cylinders operate most satisfactorily within the temperature range of -40°F to 200°F. Baffles are recommended to shield cylinder from heat, whenever practical. For unusually high or low temperatures, different seal materials may have been used. (Contact your nearest Distributor.) (Reference Series 7KT (High temperature.))

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 air lines from head and cap ports of cylinder.
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 retainer 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), 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 and 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. | 10-12 | 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 CYLINDER:**

- A. Disconnect air lines from head and cap ports of cylinder.
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 end cover (2):
(1) Remove end cover o-ring/gasket (33).
(2) Remove ball check screw (58), spring (61), ball (63), and o-ring (65).
(3) Remove cush. adj. needle (57) and o-ring (65).
(4) Remove cush. retaining ring (62), and cush. seal (66).
G. To disassemble head end cover (1):
(1) Remove end cover o-ring/gasket (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).
(4) Remove cush. retaining ring (51) and cush. ring (45) or cush. seal (52).

- H. To disassemble piston rod (10), clamp in soft jaws, remove piston lock screw 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 piston (3), the piston rod (10), or head end cushion nose (41) is required.

- (1) Remove piston packing (24), piston packing non-extrusion rings (25).
(2) Heat piston to required temperature.
(3) The piston (3) 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 cush. nose o-ring (50), as applicable.

NOTE: Cylinders with .625 diameter piston rods have a cushion nose retaining ring (47). If cylinder is so equipped, this ring should be removed for inspection.

5. **CLEANING:** Clean all parts thoroughly. The packings and seals in this cylinder are compatible with hydraulic oils, air, 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.

6. **INSPECTION:**

- (1) Inspect all packings and seals for swelling, shrinkage, wear, nicks, cuts and indentations. Discard all damaged packings and seals.
(2) Check and inspect bore of tube for scratches, excessive wear, and any other defect that might damage piston packing or cause piston bypass.
(3) 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.
(4) 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:

- (1) 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.
(2) 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:

Only genuine Ortman Fluid Power replacement parts are to be used in this product.

- (3) 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 the blow out of the cushion adjusting screw.

| | CYL TUBE MATERIAL | CYLINDER BORE | | | | | | | | | | |
|---------|-----------------------------|---------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 1½ | 2-2½ | 3¼-4 | 5-6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| TORQUE | STEEL BRASS | 11 | 16 | 29 | 60 | 120 | 148 | | 217 | 220 | | 300 |
| FT. LB. | FIL WOUND FIBER GLASS | - | - | - | - | - | 80 | 100 | 135 | 145 | 165 | - |

9. TESTING:

- (1) 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 pressures.
 - A. Rod gland leakage.
 - B. Leakage at end cover "O" rings.
 - C. Leakage at cushion adjusting needle.
 - D. Leakage at ball check plug.
- (2) Final adjustment of cushion adjusting needle must be made after cylinder is installed in system as applicable.

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:

- 1.50" bore with .62" and 1.00" rods
- 2.00" bore with 1.00" and 1.38" rods
- 2.50" 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
- 16-20" bore all rods

12. LUBRICATION, ASSEMBLY PRE-LUBE:

Series 7K Air Cylinders are pre-lubricated at initial assembly. During the re-packing of an air cylinder, pre-lubrication should be re-applied to prevent seal damage and obtain maximum life. Lubricant is applied to the rod seals, piston packings, and liberally to the tube bore as outlined below:

- (A) Brass or Steel tubes - "Long Life Lubricant" is applied to all cylinders with brass or steel tubes. When ordering seal kits, also specify "Long Life Lubricant", OFF part number A-147 in 1 oz. tubes.
- (B) Filament Wound (Fiberglass) tubes - In cylinders with filament wound (fiberglass) tubes (see para. 8 for reference bore sizes) use of Lubriplate R, Grade 630 AAA, is recommended. (Registered trademark Fiske Brothers Refining Co.) Do not use OFF "Long Life Lubricant A-147."

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

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

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 or 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.

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