

# INSTALLATION AND SERVICE INSTRUCTIONS

## NOTICE

**DISASSEMBLY OF  
THIS PRODUCT  
WILL VOID  
WARRANTY**

# ORTMAN

## Series "101" Air/Hydraulic Cylinders

FORM 101-IASI-0786  
SUPERCEDES 101-800106



### WARNING

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

## CAUTION

**CHECK MAXIMUM  
OPERATING PRESSURE ON CYLIN-  
DER END CAP STAMPING BEFORE  
APPLYING PRESSURE TO CYLINDER.  
EXCEEDING PRESSURE RATING AS  
SHOWN ON THE SERIAL NUMBER  
STAMPING ON THE CYLINDER MAY  
CAUSE FAILURE WHICH WILL ENDAN-  
GER EQUIPMENT AND PERSONNEL.**

**1.50 to 20.00 Bores**

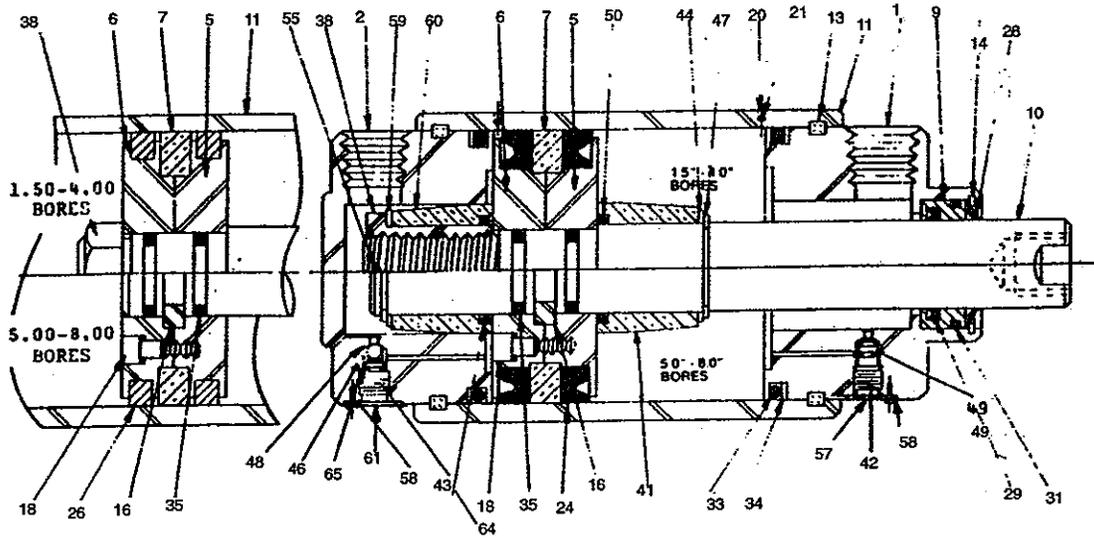


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# GENERAL PARTS BREAKDOWN INSTALLATION AND SERVICE INSTRUCTIONS FOR SERIES 101K and 101L CYLINDERS

## PARTS DRAWING



## PARTS

ITEM	PART NAME	ITEM	PART NAME	ITEM	PART NAME	USE ITEMS	CYLINDERS
1	Head End Cover	26	Piston Pkg. (SCR)	47	H'D Cush. Ret. Ring	1-38	Non-Cush.
2	Cap End Cover	28	Rod Scraper	(6)48	Ball Ch'k Ball	1-50	Cush. H'D End
5	Piston Plate (Fwd.)	29	Rod Packing	(6)49	Cush. Handle O-Ring	1-38 &	
6	Piston Plate (Rear)	31	Cart. O-Ring	50	H'D Cush. O-Ring	55-65	Cush. Cap End
7	Piston Bearing	33	End Cover O-Ring	55	Cap Cush. Nut Lock Pin	1-65	Cush. Both Ends
9	Rod Bearing	(3)34	End Cover Non-Ext. Ring	(6)57	Cush. Adj. Screw		
10	Piston Rod	35	Piston Seal O-Ring	(6)58	Cover Retainer		
11	Tube	(4)38	Piston Ret. Nut	59	Cap Cush. Shim	(1)(2)	5.00-8.00 Bores Only
13	Internal Key	(5)38	Cap Cush. Nut	60	Cap Cush. Nose	(3)	Heavy Duty Cyl's Only
14	Rod Gland Ret. Ring	41	H'D Cush. Nose	(6)61	Ball Check	(4)	Non-Cush. Cyl's Only
(1)16	Driver Ring	(6)42	Cush. Adj. Handle	(1)62	Cap Cush. Ret. Ring	(5)	Cush. Cap & Cush. Both
(2)18	Piston Cap Screws	(6)43	Ball Check Plug	(6)63	Cap Ball Check Ball		Ends Cyl's Only
20	Bleeder Screw	44	H'D Cush. Shim	64	Cap Cush. O-Ring	(6)	Not used 1.50 bore
21	Bleeder Ball	(6)46	Ball Check Spring	(6)65	Ball Check O-Ring		
24	Piston Pkg. (U-Cup)						

\*NOTE: On cylinders after serial number 202580, M824736 and W810109 the ball check screw is located in place on all bores thru 3.50"

## KITS Seal kits are stocked by our distributors, the factory.

ROD DIA.	RG ROD GLAND KIT INCLUDES KIT RS	RS ROD SEAL KIT
3/4	RG001530160	RS001540160
1	RG001530020	RS001540020
1 1/4	RG001530170	RS001540170
1 1/2	RG001530180	RS001540180
1 3/4	RG001530040	RS001540040
2 1/4	RG001530190	RS001540190

### ORDERING INFORMATION

- Order standard Seal Kits 101K and 101L by the appropriate numbers listed in the tables.
- When ordering Viton Seal Kits:
  - 101L change last digit to a one (1).  
Example: RG001530161 TS2715120L1
  - 101K change last digit to a five (5).  
Example: RG001530165 TS2715120K5

KIT NAME	KIT TYPE	ITEM NUMBERS
ROD SEAL KIT	RS	14, 28, 29, 31
ROD GLAND KIT	RG	9, 14, 28, 29, 31

CYL. BORE	TS TUBE SEAL KIT (LIGHT DUTY AIR/HYD.)			TS TUBE SEAL KIT (HEAVY DUTY AIR/HYD.)	
	TUBE SEAL KIT U-CUP PISTON AIR. CYL.	TUBE SEAL KIT U-CUP PISTON HYD. CYL.	TUBE SEAL KIT RING TYPE PISTON HYD. CYL.	TUBE SEAL KIT U-CUP PISTON AIR/HYD. CYL.	TUBE SEAL KIT RING TYPE PISTON HYD. CYL.
1 1/2	TS2715120K0	TS2715120L0	TS2715100L0	TS2715120H0	TS2715100H0
2	TS2815120K0	TS2815120L0	TS2815100L0	TS2815120H0	TS2815100H0
2 1/2	TS2915120K0	TS2915120L0	TS2915100L0	TS2915120H0	TS2915100H0
3	TS3015120K0	TS3015120L0	TS3015100L0	TS3015120H0	TS3015100H0
3 1/2	TS3215120K0	TS3215120L0	TS3215100L0	TS3215120H0	TS3215100H0
4	TS3315120K0	TS3315120L0	TS3315100L0	TS3315120H0	TS3315100H0
5	TS3415120K0	TS3415120L0	TS3415100L0	TS3415120H0	TS3415100H0
6	TS3515120K0	TS3515120L0	TS3515100L0	TS3515120H0	TS3515100H0
8	TS3715120K0	TS3715120L0	TS3715100L0	TS3715120H0	TS3715100H0

KIT NAME	KIT TYPE	ITEM NUMBERS
TUBE SEAL (U-CUP AIR)	TS	13, 18*, 24 (2), 33 (2), 35 (2)
TUBE SEAL (U-CUP HYD.)	TS	13, 18*, 24 (2), 33 (2), 35 (2)
TUBE SEAL (RING HYD.)	TS	13, 33 (2)

\*USED ONLY ON 5.0-8.0 BORES (8 REQUIRED)

KIT NAME	KIT TYPE	ITEM NUMBERS
TUBE SEAL (U-CUP AIR/HYD.)	TS	13, 18*, 24 (2), 33 (2), 34 (2), 35 (2)
TUBE SEAL (KING HYD.)	TS	13, 33 (2), 34 (2)

# INSTALLATION AND SERVICE INSTRUCTIONS FOR SERIES 101K AND 101L CYLINDERS

1. **GENERAL:** The parts drawing illustrated gives a complete listing of parts and is applicable to the standard Series 101K Air / 101L Hydraulic cylinders. This parts drawing, when used in conjunction with the parts/kits listed, should facilitate the ordering of replacement parts/kits by specifying part name/kit type required.
2. **INSTALLATION OF CYLINDER:** The seals and packings furnished as standard in the air/hydraulic cylinders operate most satisfactorily within the temperature range of -40° F to 200° F.  
For unusually high or low temperatures, or fluids other than petroleum base, different seal materials may have been used. (Reference 101KT [High Temperature], 101LT [High Temperature], 101LW [Water], and 101LG [Water Glycol]).  
For the cylinder to perform well, it must be properly installed. Alignment of the cylinder with the load is most important. Forcing rod, clevis pin, 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 installation as dirt and 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 BEARINGS:** The rod seal, bearing, cartridge O-ring, and wiper may be removed from the cylinder without disturbing the rest of the cylinder assembly.
  - (I) Disconnect air/hydraulic lines from cylinder end cover ports and drain as applicable.
  - (II) Remove rod gland retaining ring (14).
  - (III) With both ports open, push piston rod (10) all the way in; block the head port, and with a jerking motion pull the rod out. Repeat until rod scraper (28), and bearing (9), with cartridge O-ring (31) and rod packing (29), come out of the head housing.
  - (IV) Any defective parts should be replaced.
  - (V) Reassemble with the replacement parts, cleaning them thoroughly.
  - (VI) Prior to installation, rubber parts must be well coated with a compatible lubricant.
  - (VII) Carefully guide the rod bearing and packing assembly onto the rod with a twisting motion and insert it into the head end cover. Replace scraper (28) and retaining ring (14).
4. **PROCEDURE FOR REPACKING CYLINDERS:** An eighteen- to twenty-four inch length of standard pipe of the same thread as the end cover port is required to facilitate end cover removal.
  - (I) Disconnect air/hydraulic lines from the head and cap end ports of cylinder.
  - (II) Remove any mountings from the head/end cap of the cylinder.
  - (III) Clamp cylinder tube to prevent tube rotation, with slot in tube up, being careful not to squeeze or dent tube.
  - (IV) Thread clean pipe into port of head end cover (1) or cap end cover (2) to remove end cover, by rotating either end cover in a counter-clockwise direction until beveled edge of internal key (13) appears at the milled opening in the tube (11). Insert a screwdriver under this beveled edge to start the internal key through the opening and continue to turn end cover counter-clockwise until internal key is removed.
  - (V) Carefully pull end covers from tube using a slightly rotary motion.
  - (VI) To disassemble cap end cover (2):
    - A. Remove end cover O-ring (33) and as required, non-ext. ring (34).
    - B. Remove ball check plug (58), spring (61), and ball (63).
    - C. Remove cush. adj. needle (57) and O-ring (65).
    - (VII) To disassemble head end cover (1):
      - A. Remove rod gland retaining ring (14), rod scraper (28), and bearing (9), with cartridge O-ring (31) and rod packing (29) from housing bore.
      - B. Remove end cover O-ring (33) and, as required, non-ext. ring (34).
      - C. Remove ball check plug (43), spring (46) and ball (48).
    - (VIII) To disassemble piston rod (10) from tube (11), carefully push piston rod assembly to extreme end, as cylinder would be when fully retracted, to obtain access to rear of piston.  
  
NOTE: Piston disassembly is required in all cases to remove piston rod and pistons (5) and (6) from tube except when SCR piston packing (26) is installed.
      - A. 1.50 through 4.00 inch bores — non-cushioned:
        - (1) Remove piston retaining nut (38), rear piston plate (6), and one piston packing U-cup (24).NOTE: At this point carefully push remaining piston assembly on through and out of tube (11) in the retracted movement direction.  
Pistons with SCR packing (26) can be removed, as noted above, without piston disassembly, by carefully pushing piston and piston rod assembly through the tube until removal is obtained.
        - (2) Continue by removing piston support bearing (7), piston packing U-cup (24), forward piston plate (5), and piston seal O-rings (35).
      - B. 5.00 through 8.00 inch bores — non-cushioned:
        - (1) Remove piston cap screws (18), rear piston plate (6), and one piston packing U-cup (24). Remove piston rod from tube (11) per note above.
        - (2) Remove piston support bearing (7), driver ring (16), piston packing U-cup (24), forward piston plate (5), and piston seal O-rings (35).
      - C. 1.50 through 4.00 inch bores—cushioned both ends:
        - (1) Remove cap cush. nut lock pin (55), cap cush. nut (38), cap cush. shim (59), cap cush. nose (60), cap cush. O-ring (64), rear piston plate (6), and one piston packing U-cup (24).NOTE: At this point carefully push remaining piston assembly on through and out of tube (11) in retracted movement direction.
        - (2) Continue by removing piston support bearing (7), piston packing U-cup (24), forward piston plate (5), piston seal O-rings (35), head cush. O-ring (50), head cush. nose (41), head cush. shim (44), and head cush. ret. ring (47).
      - D. 5.00 through 8.00 inch bores—cushioned both ends:
        - (1) Remove cap cush. ret. ring (62), cap cush. shim (59), cap cush. nose (60), cap cush. O-ring (64), piston cap screws (18), rear piston plate (6), and one piston packing U-cup (24). Remove piston rod from tube (11) per note above.
        - (2) Remove piston support bearing (7), driver ring (16), piston packing U-cup (24), forward piston plate (5), piston seal O-rings (35), head cush. O-ring (50), head cush. nose (41), head cush. shim (44), and head cush. ret. ring (47).NOTE: Removal of piston rod components for cushioned cap end cushioned head end cylinders is a relative combination of non-cushioned and cushioned both end procedures.

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

**CLEANING:** Clean all parts thoroughly. The packings and seals are compatible with hydraulic oils, air and neutral fluids. The cleaning agent must also be compatible to avoid packing and seal damage.

CYLINDER BORE				
1.5 & 2.0	2.5 & 3.0	3.5 & 4.0	5.0 & 6.0	8.0
TORQUE (FT. LBS.)				
30	99	200	65	160

6. **INSPECTION:**

- (I) Inspect all packings and seals for swelling, shrinking, wear, nicks, cuts and indentations. Discard all damaged packings and seals.
- (II) Inspect bore of tube for excessive wear and any other defect that might damage piston packing or cause piston by-pass.
- (III) Inspect piston rod for signs of wear or any defect that may damage rod packing or rod bearing. Excessive wear on one side of piston rod or rod bearing usually indicates misalignment in the installation and should be corrected.
- (IV) 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 cylinder components.

8. **REASSEMBLY:** The procedure for reassembly is essentially the reverse of disassembly. The following should also be completed at reassembly:

- (I) All seals should be well coated with a compatible lubricant before and after they are installed in their respective grooves and prior to reassembly with the mating part.
- (II) In assembly, care must be taken not to damage the seals, as this will cause leaking.
- (III) Proper torque is required for the piston retaining nut (38), (1.50 through 4.00 inch bores)/piston cap screws (18), (5.00 through 8.00 inch bores).

NOTE: Lubricate all threads prior to installation.

9. **TESTING:**

- (I) After the cylinder has been completely reassembled, it should be tested, either on a test bench or in the installation. Watch for the following as the cylinder is cycled at normal operating pressure:
  - A. Rod gland leakage
  - B. Leakage at end cover seals
  - C. Leakage at cushioning needles and ball checks

10. **PRESSURE RATING:**

- (I) **LIGHT DUTY**  
(Models: a,b,c,d,e,f,g)  
AIR: 150 PSI  
HYDRAULIC: 500 PSI
- (II) **HEAVY DUTY**  
(Models: ah, bh, ch, dh, eh, fh, gh)  
AIR: 500 PSI  
HYDRAULIC: 1500 PSI

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

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

**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 upon 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 OR 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.

**NOTE: DISASSEMBLY OF THIS PRODUCT VOIDS WARRANTY**

"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."