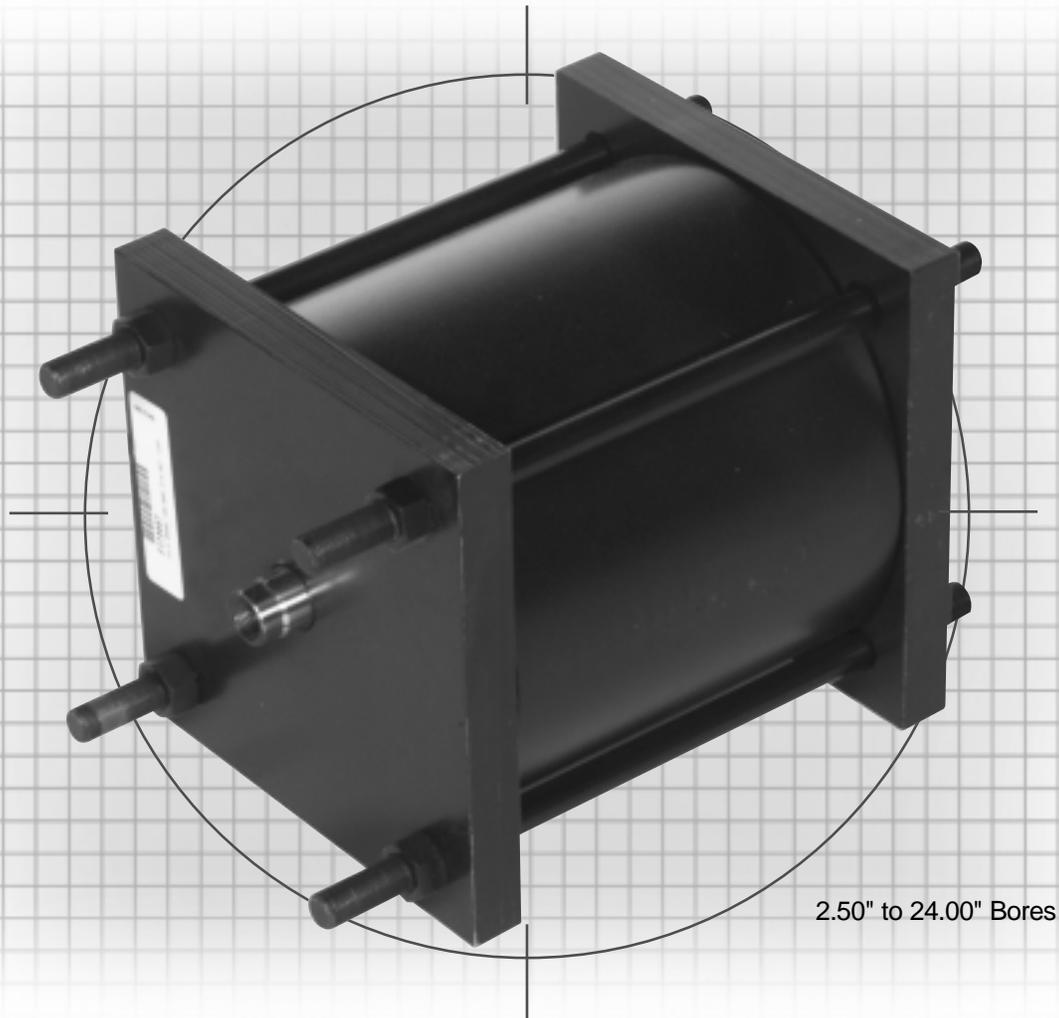


INSTALLATION AND MAINTENANCE INSTRUCTIONS**FABRI-VALVE®
Series "FA" Air Cylinders**

CAUTION: CHECK MAXIMUM OPERATING PRESSURE STAMPED ON CYLINDER END COVER BEFORE APPLYING PRESSURE TO CYLINDER. EXCEEDING THE PRESSURE RATING STAMPED ON THE CYLINDER MAY CAUSE FAILURE WHICH MAY ENDANGER PERSONNEL AND/OR EQUIPMENT.

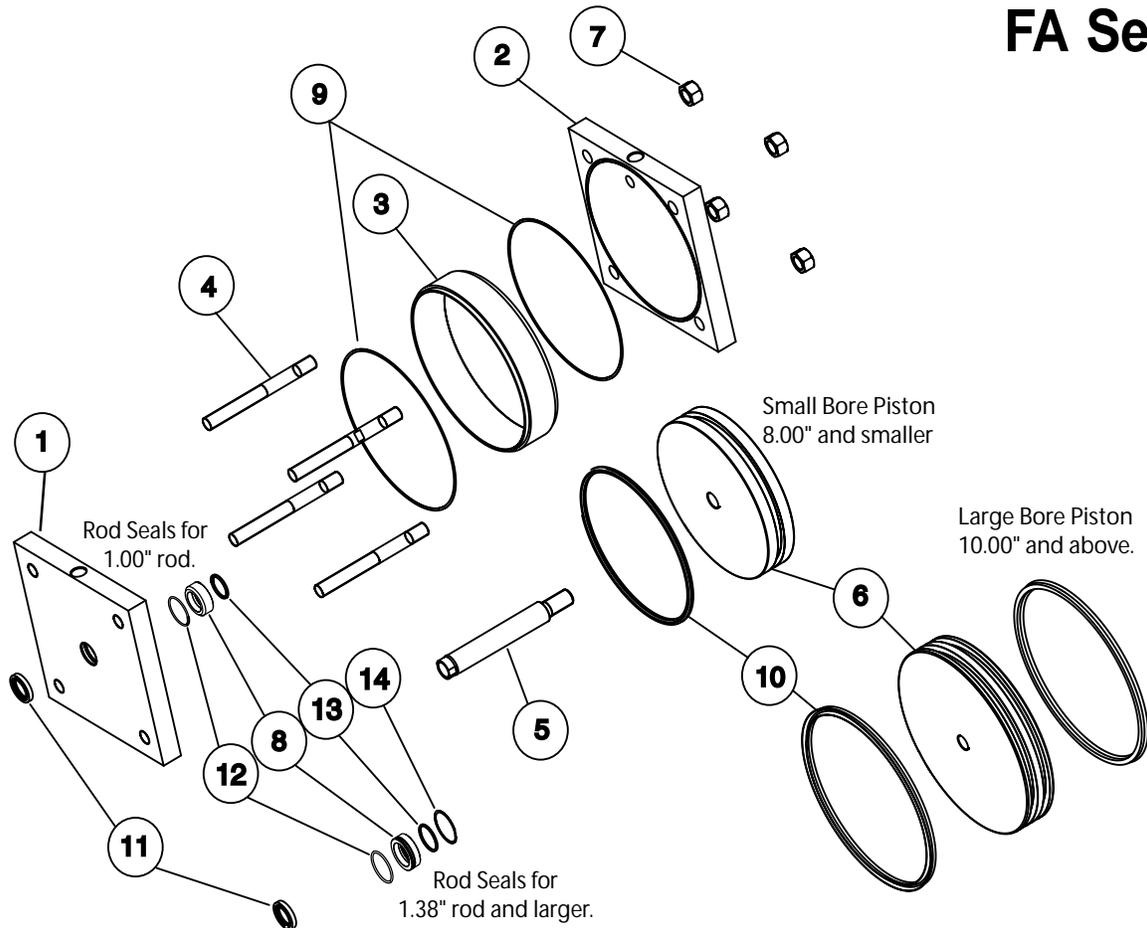
WARNING: READ INSTALLATION SERVICE INSTRUCTIONS AND GENERAL PARTS BREAKDOWN BEFORE INSTALLATION, OPERATION OR SERVICING.

NOTICE: DISASSEMBLY OF THIS PRODUCT WILL VOID WARRANTY

INSTALLATION AND MAINTENANCE INSTRUCTIONS

PARTS & REPAIR KITS

FA Series



PART IDENTIFICATION

Hard Parts

1. Head End Cover
2. Cap End Cover
3. Tube
4. Tie Rods
5. Piston Rod
6. Piston
7. Tie Rod Nuts
8. Rod Bearing

Soft Seals

9. Tube Gaskets
10. Piston Seals
11. Rod Wiper
12. Rod Bearing O-ring
13. Rod Seal
14. Retaining Ring

FA Actuator Repair Kits

Cylinder Bore		Piston Rod Diameter		Seal Material		Repair Kits Contain the Following Item Numbers
Inches	(mm)	Inches	(mm)	Buna-N	Viton®	
2.5	(63.5)	1	(25.4)	174001	174021	#10, #11, #12, #13, #14
3.25	(82.6)	1	(25.4)	174002	174022	#10, #11, #12, #13, #14
4	(101.6)	1	(25.4)	174003	174023	#10, #11, #12, #13, #14
5	(127)	1	(25.4)	174004	174024	#10, #11, #12, #13, #14
6	(152.4)	1	(25.4)	174005	174025	#10, #11, #12, #13, #14
7	(177.8)	1	(25.4)	174006	174026	#10, #11, #12, #13, #14
8	(203.2)	1	(25.4)	174007	174027	#10, #11, #12, #13, #14
10	(254)	1	(25.4)	174008	174028	#10, #11, #12, #13, #14
12	(304.8)	1.38	(35.1)	174009	174029	#10, #11, #12, #13, #14, #15
14	(355.6)	1.38	(35.1)	174010	174030	#10, #11, #12, #13, #14, #15
16	(406.4)	1.75	(44.5)	174011	174031	#10, #11, #12, #13, #14, #15
18	(457.2)	2	(50.8)	174012	174032	#10, #11, #12, #13, #14, #15
20	(508)	2	(50.8)	174013	174033	#10, #11, #12, #13, #14, #15
22	(558.8)	3	(76.2)	174014	174034	#10, #11, #12, #13, #14, #15
24	(609.6)	3.5	(88.9)	174015	174035	#10, #11, #12, #13, #14, #15

Viton® is a trademark of DuPont Dow Elastomers.

INSTALLATION AND MAINTENANCE INSTRUCTIONS

1. GENERAL: The parts drawing on Page 2 shows a complete listing of parts and is applicable to all standard series FA air cylinders (2.50" through 24.00" bores only). 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:

- A. Cylinder serial number or the Fabri-Valve Part Number, as it appears dot peened on the back of the cap end cover below the port.
- B. Item number and part name or kit type and name.

2. INSTALLATION OF CYLINDER: The seals and packing of standard air cylinders operate within the temperature range of -40°F (-40°C) to 200°F (93°C). 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).

For the cylinder to perform well, it must be properly installed. Alignment of the cylinder with load is most important. Forcing the rod 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 REPACKING CYLINDER:

- A. Disconnect air lines from head and cap ports of cylinder.
- B. Remove the tie rod nuts (7) and tie rods (4).
- C. Remove cap end (2) and then head end (1). The rod bearing (8) will come off with the head.
- D. Remove piston and rod assembly from tube (3).
- E. To disassemble cap end cover (2) remove end cover gasket (9).
- F. To disassemble head end cover (1):
 - 1. Remove end cover gasket (9).
 - 2. 12.00"-24.00" bore sizes remove cartridge retainer ring (14) and rod bearing (8) from head end (1).
NOTE: 2.50"-10.00" rod bearings (8) are press fit – DO NOT REMOVE.
 - 3. Remove rod seal (13). 12.00"-24.00" bore sizes remove the rod bearing "O" ring.
 - 4. Remove rod wiper (11) from the head end cover.

4. CLEANING: Clean all parts thoroughly. The packing 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 packing and seals. Whenever a particular lubricant is specified for a particular installation, do not deviate from the specification, without checking for compatibility.

5. INSPECTION

- A. Inspect all packing and seals for swelling, shrinkage, wear, nicks, cuts, and indentations. Discard all damaged packing and seals.
- B. Check and inspect bore of tube for scratches, excessive wear, and any other defect that might damage piston packing or cause piston bypass.
- C. 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.
- D. 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.

6. REPLACEMENT: Replace all damaged packing seals, and rod wipers.

7. LUBRICATION: Series FA Air Cylinders are pre-lubricated during initial assembly. During the repacking 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:

NOTE: Standard 2.5"- 8" bore actuators have steel tubing and standard 10"- 24" bore actuators have composite or fiberglass tubing. The interior finish of the steel tubing is silver metallic and the interior finish of the fiberglass tubing is shiny black.

- A. Steel tubes – Lubricant is applied to all cylinders with brass or steel tubes. When ordering seal kits, also specify "Magnalube-G" lubricant, in 1 oz. tubes.
- B. Filament Wound (Fiberglass) tubes – In cylinders with filament wound (fiberglass) tubes use of Lubiplate R, Grade 630 AAA or equivalent, is recommended. (Registered trademark Fiske Brothers Refining Co.). Do not use Magnalube-G lubricant.

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

- A. 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 packing that they are not damaged, as this will cause leakage.
- B. 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 (See "FA Series Tie Rod Torque Reference" table below).

9. PISTON-ROD

NOTE: The piston-rod assembly should not require disassembly unless replacement of piston (6) or the piston rod (5) is required.

- A. To disassemble piston-rod:
 - 1. Remove piston seal (10)
 - 2. Clamp in soft jaws
 - 3. Heat piston-rod connection to required temperature
NOTE: Pistons (6) are threaded onto the piston rod (5) and the assembly is retained with Loctite RC-640. Heat the piston-rod connection to 300°F (149°C)–500°F (260°C) until piston-rod connection is loose.
 - 4. Use a strap wrench to remove the piston (6), which is threaded onto the piston rod (5).
- B. To Re-Assemble piston-rod:
 - 1. Apply Loctite RC-640 to the piston rod (5) threads and thread the piston (6) onto the piston rod.
 - 2. Stake piston and rod threads in two locations to assure the piston is locked in place.

10. 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 pressures.

- A. Rod gland leakage.
- B. Leakage at the end cover "O" rings.

NOTE: This product is not to be modified in any fashion without prior written approval from ITT.

NOTE: If cylinders are to be stored for prolonged periods, contact ITT for instructions.

Tie Rod Torque

Tube Material	Cylinder Bore Size (Inches)														
	2.5	3.25	4	5	6	7	8	10	12	14	16	18	20	22	24
Steel lb-ft (Nm)	16 (21.7)	29 (39.3)	29 (39.3)	60 (81.3)	60 (81.3)	100 (135.6)	120 (162.7)	148 (200.7)	148 (200.7)	217 (294.2)	220 (298.3)	240 (325.4)	300 (406.8)	375 (508.4)	410 (555.9)
Fiberglass lb-ft (Nm)	N/A							80 (108.5)	100 (135.6)	135 (183)	145 (196.6)	165 (223.7)	195 (264.4)	225 (305.1)	266 (360.7)

INSTALLATION AND MAINTENANCE INSTRUCTIONS

FA SERIES WARRANTY

Seller warrants for one year from the date of shipment Seller's manufactured products to the extent that Seller will replace those having defects in material or workmanship when used for the purpose and in the manner which Seller recommends. If Seller's examination shall disclose to its satisfaction that the products are defective, and an adjustment is required, the amount of such adjustment shall not exceed the net sales price of the defective products only and no allowance will be made for labor or expense of repairing or replacing defective products or workmanship or damage resulting from the same. Seller warrants the products which it sells of other manufacturers to the extent of the warranties of their respective makers. Where engineering design or fabrication work is supplied, Buyer's acceptance of Seller's design or of delivery of work shall relieve Seller of all further obligation, other than as expressed in Seller's product warranty. THIS IS SELLER'S SOLE WARRANTY. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED. AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED SELLER'S AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED FROM THIS WARRANTY. Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its engineering designs or products. This warranty shall not apply to any products or parts of products which (a) have been repaired or altered outside of Seller's factory, in any manner; or (b) have been subjected to misuse, negligence or accidents; or (c) have been used in a manner contrary to Seller's instructions or recommendations. Seller shall not be responsible for design errors due to inaccurate or incomplete information supplied by Buyer or its representatives.

SELLER'S LIABILITY: Seller will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind, whether based upon warranty (except for the obligation accepted by Seller under "Warranty" above), contract or negligence, arising in connection with the design, manufacture, sale, use or repair of the products or of the engineering designs supplied to Buyer.