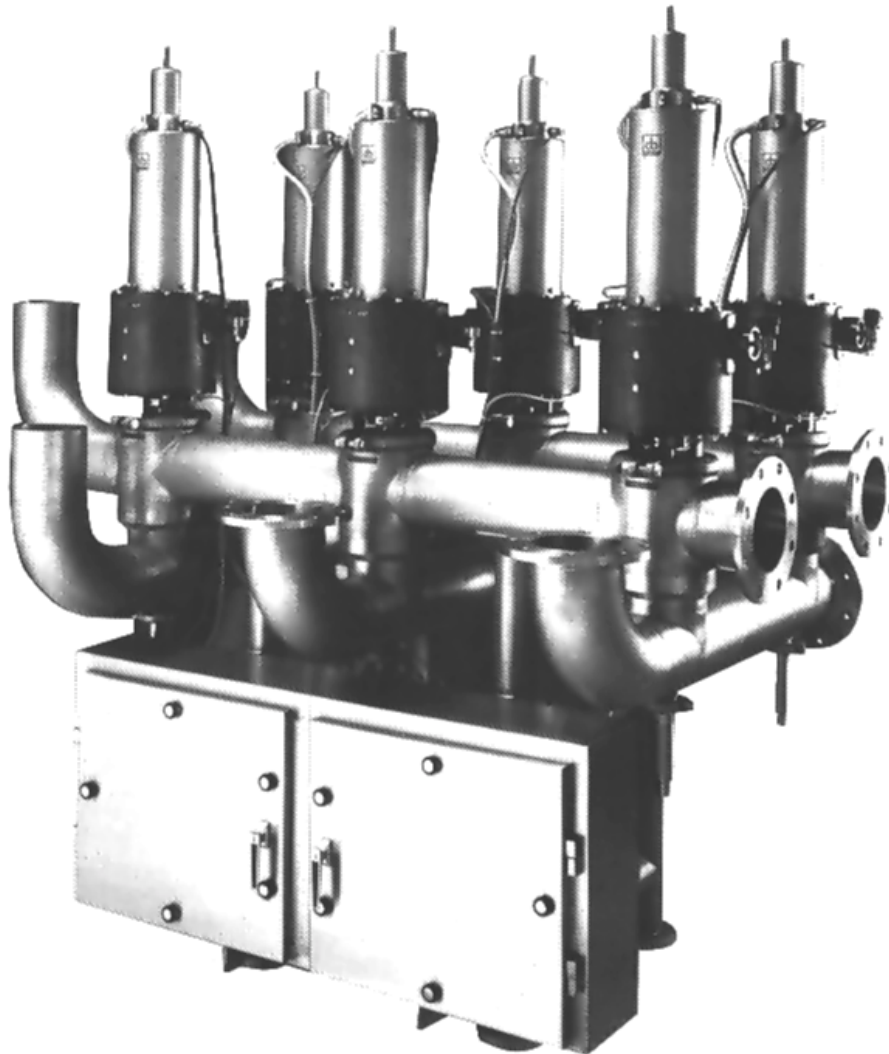




**Waukesha
Cherry-Burrell**

Read and understand this manual prior to installing, operating or maintaining this valve.



Cherry-Burrell SENTINEL III VALVES

Schedule 5 Pipe Size
MODEL 2", 3", 4", 6"

INSTALLATION
OPERATION
MAINTENANCE
& PARTS LISTS



SAFETY

Warnings, cautions and notes are contained in this manual. To avoid serious injury and/or possible damage to equipment, pay attention to these messages.

WARNING Hazards or unsafe practices which COULD result in severe personal injury or death and how to avoid it.

CAUTION Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

NOTE Important information pertaining directly to the subject.
(Information to be aware of when completing the task.)

WARNING
To avoid electrocution, ALL electrical should be done by a registered Electrician, following Industry Safety Standards.
All power must be OFF and LOCKED OUT during installation.

WARNING
TO PREVENT POSSIBLE INJURY FROM UNEXPECTED VALVE OPERATION, DISCONNECT AND EXHAUST ALL UTILITIES BEFORE MAKING REPAIRS OR ADJUSTMENTS.

CAUTION
To avoid possible injury; SHUT OFF and LOCK OUT all power; relieve system pressure before servicing.

REPLACEMENT LABEL

 **WARNING**
KEEP FINGERS OUT OF PORTS

REPLACEMENT LABEL

Read and understand this manual prior to installing, operating or maintaining this valve.

WAUKESHA CHERRY-BURRELL WARRANTY

Seller warrants its products to be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. This warranty shall not apply to products which require repair or replacement due to normal wear and tear or to products which are subjected to accident, misuse or improper maintenance. This warranty extends only to the original Buyer. Products manufactured by others but furnished by Seller are exempted from this warranty and are limited to the original manufacturer's warranty.

Seller's sole obligation under this warranty shall be to repair or replace any products that Seller determines, in its discretion, to be defective. Seller reserves the right either to inspect the products in the field or to request their prepaid return to Seller. Seller shall not be responsible for any transportation charges, duty, taxes, freight, labor or other costs. The cost of removing and/or installing products which have been repaired or replaced shall be at Buyer's expense. Seller expressly disclaims all other warranties, express or implied, including without limitation any warranty of merchantability of fitness for a particular purpose. The foregoing sets forth Seller's entire and exclusive liability, and Buyer's exclusive and sole remedy, for any claim of damages in connection with the sale of products. In no event shall Seller be liable for any special consequential incidental or indirect damages (including without limitation attorneys' fees and expenses), nor shall Seller be liable for any loss of profit or material arising out of or relating to the sale or operation of the products based on contract, tort (including negligence), strict liability or otherwise.

GENERAL INFORMATION

SHIPPING DAMAGE

Inspect your shipment immediately. If damage is found, note it on the drivers copy (packing slip) and request the driver to ask the Inspector to call. You are responsible for initiating shipping damage claims.

HIDDEN DAMAGE OR WARRANTY CLAIM

If during installation, you discover damage, contact the Shipper immediately and ask for an Inspector to call. Notify your Distributor of the problem. In warranty claims you must have a returned goods authorization from the manufacturer before any returns will be accepted. Your Distributor will help you with a warranty problem. (See WARRANTY.)

ORDERING /RETURNING PARTS

See page 29 for complete information on ordering and returning parts.

MANUAL FORMAT

This manual is laid out in sections. Each section addresses a specific subject. Familiarize yourself with the subjects by scanning through the manual. Whether installing, operating, troubleshooting, maintaining or ordering parts, read through that section and follow instructions.

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INTRODUCTION

Cherry-Burrell Sentinel III double block and vent valves by WAUKESHA CHERRY-BURRELL protect product integrity and prevent flow intermix in fluid operations.

Sentinel III valves have two basic positions:

- OPEN - The valve receives product and routes flow in desired direction.
- CLOSED - The valve blocks product flow.

(Valve can also function as a tank outlet valve.)

PRODUCT FEATURES

Sentinel III valve design eliminates interior valve body clutter. There is no joint in the valve body to cause alignment or sanitation problems. The stem easily removes for inexpensive seat ring replacement. Sentinel III Valves have visual indicators and dual limit switch position indicators for easy flow monitoring. A proximity switch that detects the upper-seat locking cam position is installed on the valve.

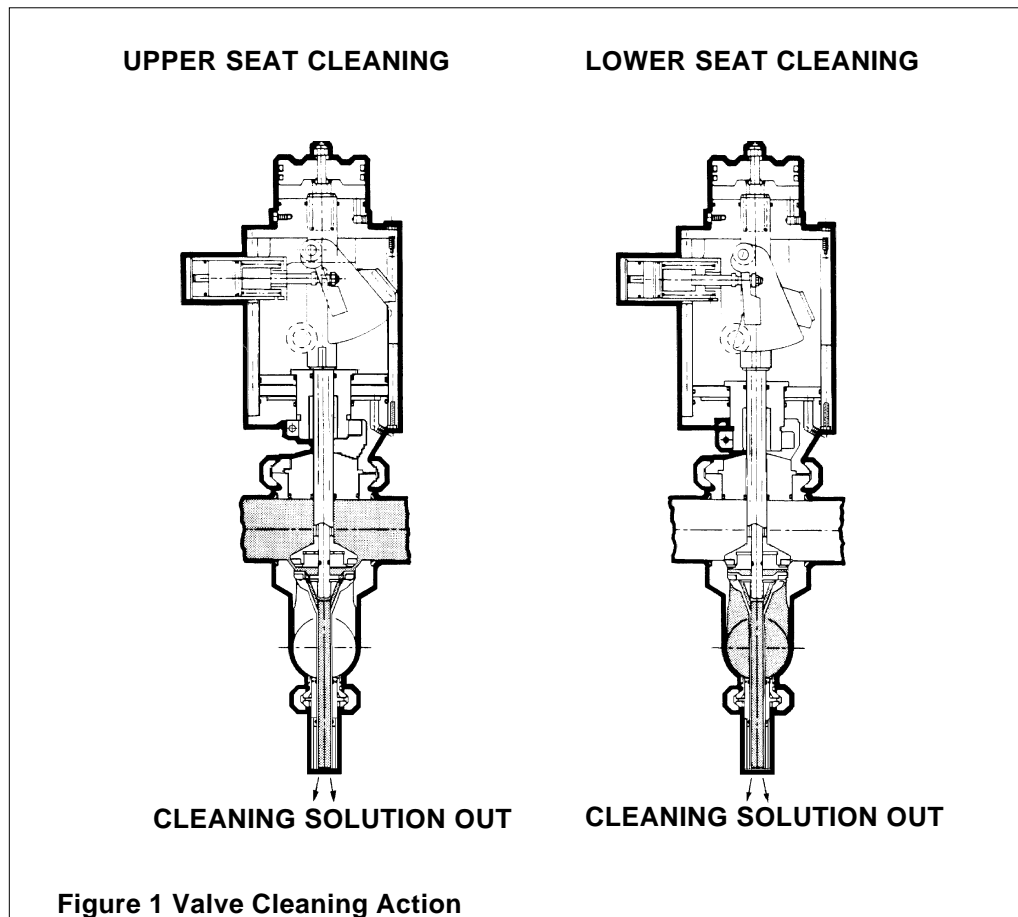
FUNCTIONS

Each valve has an exclusive upper-seat, positive-locking cam hold-down. The hold-down protects the upper line from lower-line contamination. The cam prevents contamination that could result from an over-pressure condition or when the lower seat strokes for cleaning.

A single actuator, with three pistons, lifts the valve fully open. The actuator also independently lifts both upper and lower seats and locks the upper-seat cam hold-down. Three or four independent air signals, dependent on air assist requirements, are needed to actuate the valve.

Incorporated in automatic valve manifolds, the Sentinel III permits CIP cleaning of each line separately while product continues to flow in parallel line. This is accomplished by lifting upper and lower seats independently, (allowing valve seat and vent area cleaning). (Figure 1)

This valve conforms to 3A Sanitary Standards in design, material and fabrication.



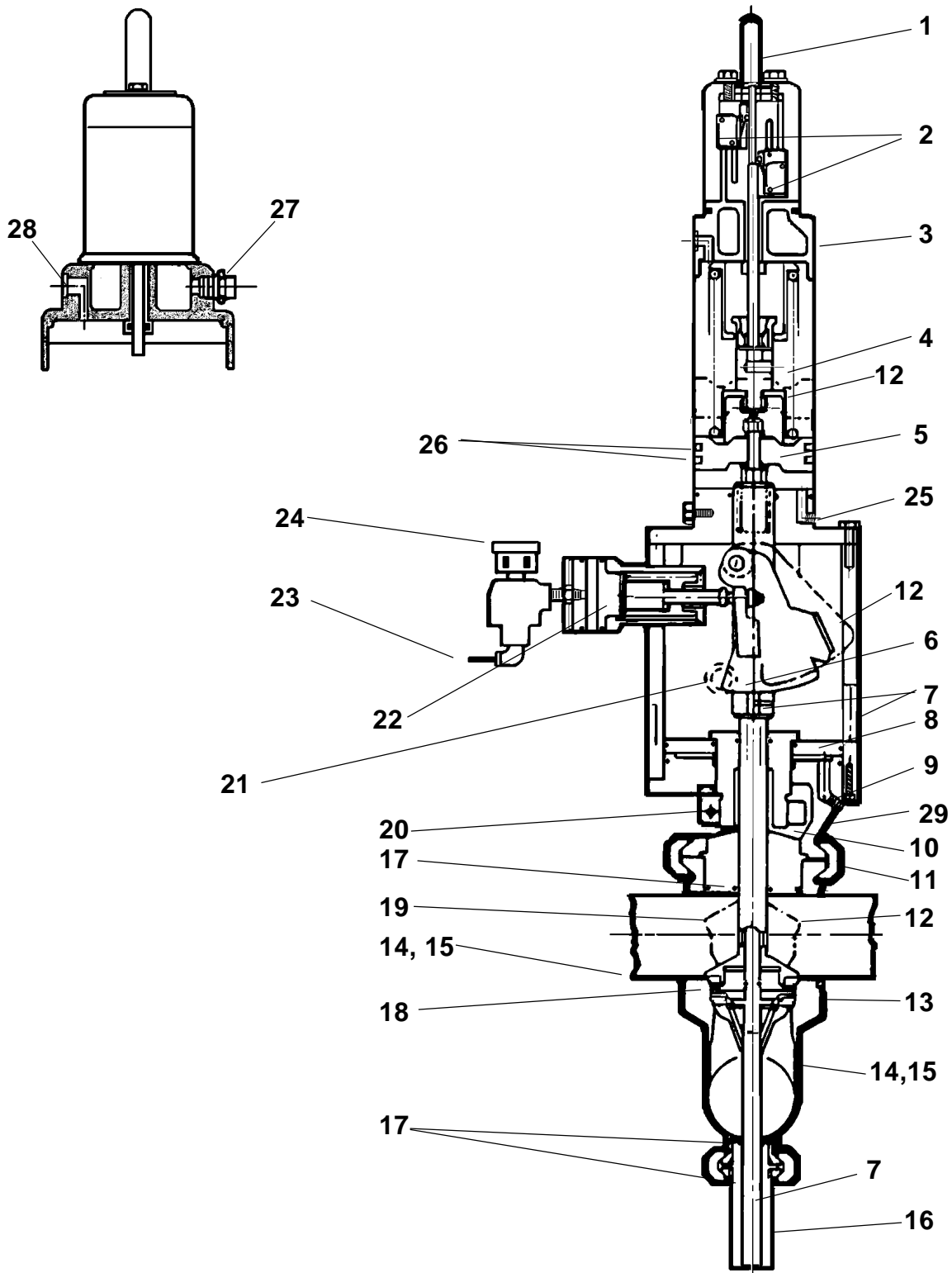


Figure 2 Features and Parts Identification

MAJOR PARTS / FEATURES

Features and major parts of Sentinel III valves shown in Figure 2 are:

1. Visual position indicator.
2. Limit switches for positive valve position indication.
3. Electrical port for optional proximity switch wiring.
4. Fail-safe Cherry-Burrell Sentinel III valves have positive piston action provided by an actuator spring. In event of air failure, the valve closes and the cam locks the valve.
5. Primary/lower seat piston.
6. Upper seat locking cam.
7. Leak detector.
8. Upper seat piston.
9. Air pressure raises the upper seat (**maximum 75 psi**).
10. Open-yoke design prevents product leakage into the actuator.
11. Rigid actuator-to-valve assembly with an I-clamp interlock connection assures positive alignment.
12. Full open position.
13. One-piece body eliminates alignment problems and simplifies sanitation. Bodies are available in combinations of tees and/or crosses, and may be oriented in any position from parallel to perpendicular.
14. Butt-weld, I-clamp, and corrosion-weight flanges are available.
15. Complete stainless steel valve design, available in polished or glass-bead blast finish.
16. Lower stem guide.
17. O-Ring stem seals are FDA approved.
18. Cherry-Burrell's seat rings are economically field-replaceable. The rings provide positive seal and sanitary design that permits CIP cleaning.
19. Open valve position automatically closes the vent region.
20. Upper seat stroke adjusting nut.
21. Proximity switch to detect cam position (locked/unlocked).
22. Cam cylinder piston.
23. Air pressure unlocks the cam (**maximum 75 psi**).
24. Quick-exhaust valve/silencer.
25. Air pressure fully opens the valve or raises lower seat (**maximum 75 psi**).
26. Double piston U-cups positively seal against air pressure and higher product pressures with air boost.
27. Electrical port for limit switch wiring.
28. Air assist port for higher product pressure seal (**maximum 75 psi**).
29. Safety shield prevents access to moving parts.

CONVERSIONS

Conversion between Sentinel I and III is possible without disturbing valve bodies, connecting piping, or sacrifice of flow efficiency. This is possible because Sentinel III parts with independent lifting feature interchange with standard Sentinel I parts.

INSTALLATION

Information to aid Installation

Table 1. Sentinel III Flow and Pressure Data

Flow Coefficient (Cv.) for Configuration		2-Inch Size 4-Inch Actuator	3-Inch Size 4-Inch Actuator	4-Inch Size 5-Inch Actuator	6-Inch Size 6-Inch Actuator
Straight Through	Upper	187	315	967	2400
	Lower	200	325	932	3920
Upper to Lower	90° Orientation	54	100	243	354
	Parallel Orientation	67	116	306	611
Lower to Upper	90° Orientation	56	115	300	575
	Parallel Orientation	70	119	297	626
Holding Capability (lower body pressure)	Without Air Assist	102 psi	25 psi	36 psi	25 psi
	With 40 psi Assist	258 psi	108 psi	97 psi	76 psi
	With 70 psi Assist	375 psi	149 psi	144 psi	113 psi
Opening Capability (upper body pressure)	With 60 psi Supply	43 psi	40 psi	27 psi	24 psi
	With 75 psi Supply	77 psi	62 psi	46 psi	38 psi

FLOW COEFFICIENT FORMULA

Formula for water and other products with a specific gravity equal to 1.0:

$$Cv = \frac{Q}{\sqrt{\Delta P}}$$

Formula for products with other specific gravity:

$$Cv = \frac{Q}{\sqrt{\Delta P/SG}}$$

Q = GPM (Flow rate in gallons per minute)

SG= Specific Gravity of product

ΔP= Pressure drop across valve in psi (Inlet pressure minus outlet pressure)

INSTALLATION Dimension (Table 2) and Weight (Table 3) Information

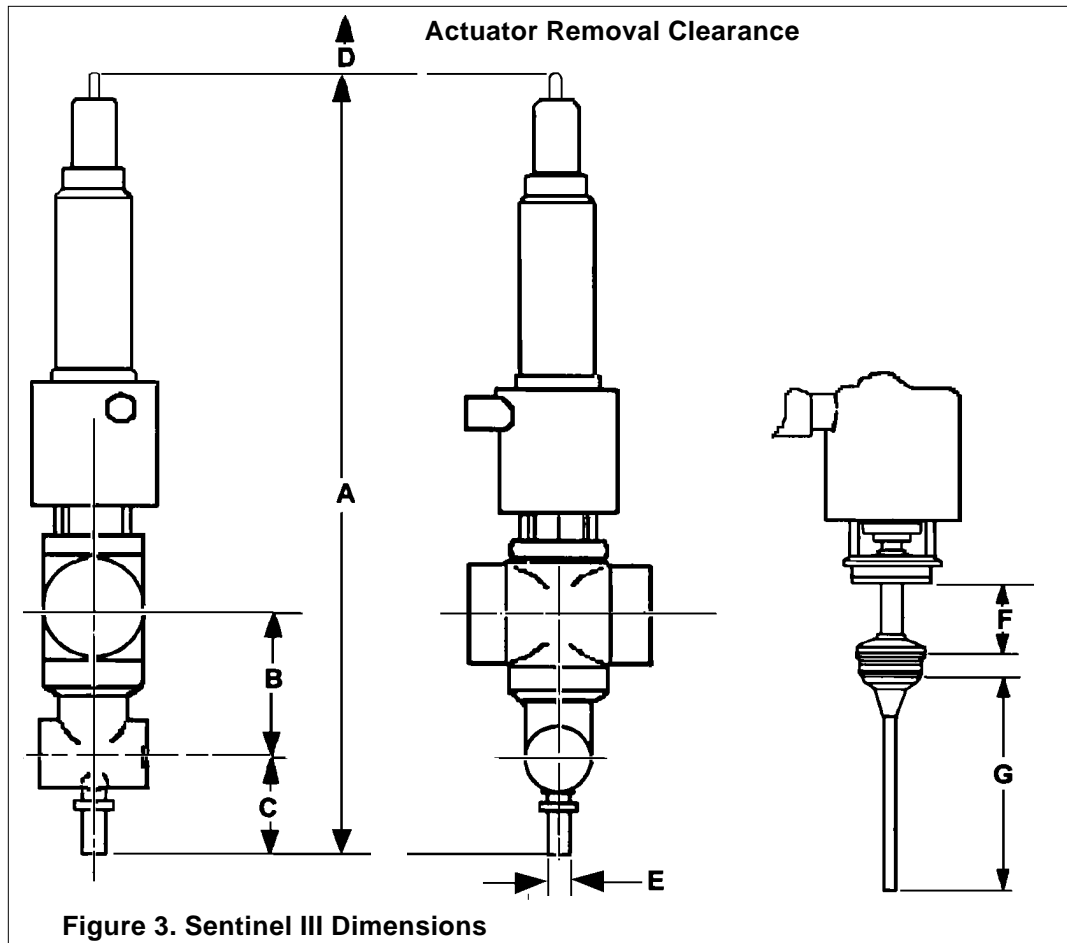


Figure 3. Sentinel III Dimensions

SIZE	A	B	C	D	E	F	G
2X2	40	4-1/16	3-7/8	10-1/8	1	3	6-3/8
2X4	42-1/16	5-1/8	4-15/16	12-1/4	1	3	8-1/2
3X2	41-1/16	4-5/8	3-7/8	11 -1/4	1	4-1/8	6-3/8
4X2	42-1/16	5-1/8	3-7/8	12-1/4	1	5-1/8	6-3/8
6X2	44-1/8	6-1/4	3-7/8	14-5/16	1	7-1/4	6-3/8
2X3	41-1/16	4-5/8	4-9/16	11-1/4	1	3	7-1/2
3X3	44-7/8	6	6-1/8	15	1-1/8	4-1/16	9-3/8
3X4	45-7/8	6-1/2	6-5/8	16	1-1/8	4-1/16	10-3/8
3X6	48	7-9/16	7-11/16	18-1/8	1-1/8	4-1/16	12-1/2
4X3	45-7/8	6-1/2	6-1/8	16	1-1/8	5-1/16	9-3/8
6X3	48	7-9/16	9-1/4	18-1/8	1-1/8	7-3/16	9-3/8
4X4	52-1/2	8-1/2	8	19-3/4	1-1/2	4-15/16	13
4X6	54-5/8	9-9/16	9-1/16	21-7/8	1-1/2	4-15/16	15-1/8
6X4	54-5/8	9-9/16	8	21-7/8	1-1/2	7-1/16	13
6X6	61-1/4	10-1/4	11	25-1/2	2	6-3/4	16-11/16

All dimensions in inches F and G are Schedule 5 pipe size dimensions

SIZE	2"	3"	4"	6"
COMPLETE VALVE WEIGHT	60 LB	75 LB	125 LB	200 LB
ACTUATOR ONLY WEIGHT	50 LB	60 LB	100 LB	150 LB

95-03001

INSTALLATION

AIR AND ELECTRICAL CONNECTIONS

NOTE

1. **Maximum operating pressure is 75 psi**

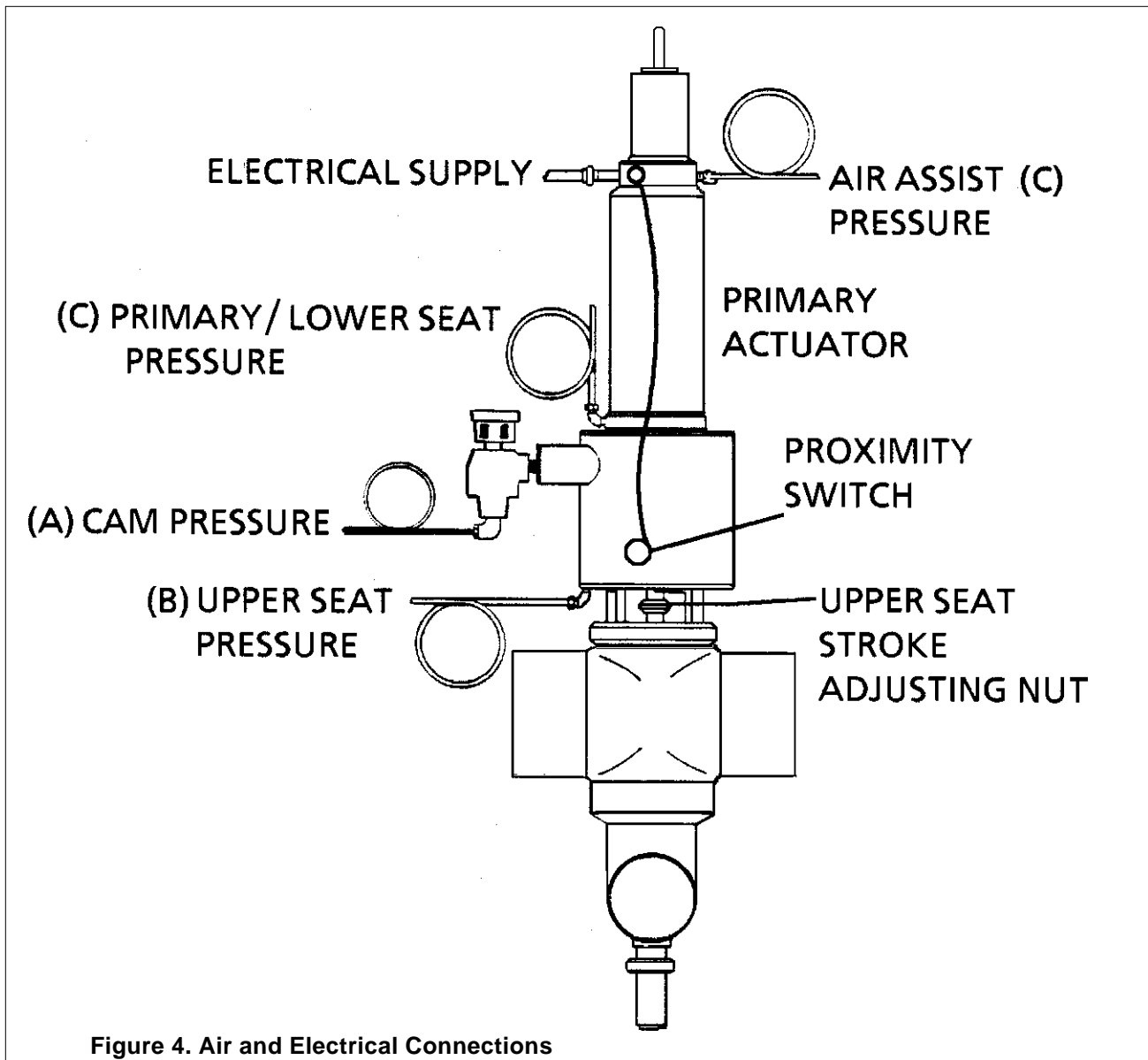
2. All air fittings are 1/8-27 FPT.

3. The electrical part(s) are Brad Harrison:

Proximity switch - 3-pin male connector #40909SS

Limit Switches - 5-pin male connector #41310SS

NOTE: For optimum operation of the valve, locate solenoid cabinet 20 to 30 feet from the valve, with a maximum of 50 feet.



OPERATION GUIDELINES

To operate or clean the valve, you must follow and confirm each step in the order listed.

Valve Fully Open (Refer to Figure 4)

1. Energize cam solenoid (A).
2. Confirm the signal loss from the proximity switch (cam unlocked).
3. Energize primary/lower-seat solenoid (C).
4. Confirm valve fully open (lower limit switch open, upper limit switch closed, actuator rod visible in indicator tube).

Valve Fully Closed (Refer to Figure 4)

1. De-energize primary/lower-seat solenoid (C).
2. Confirm valve fully closed (lower limit switch closed).
3. De-energize cam solenoid (A).
4. Confirm cam locked (proximity switch signal).

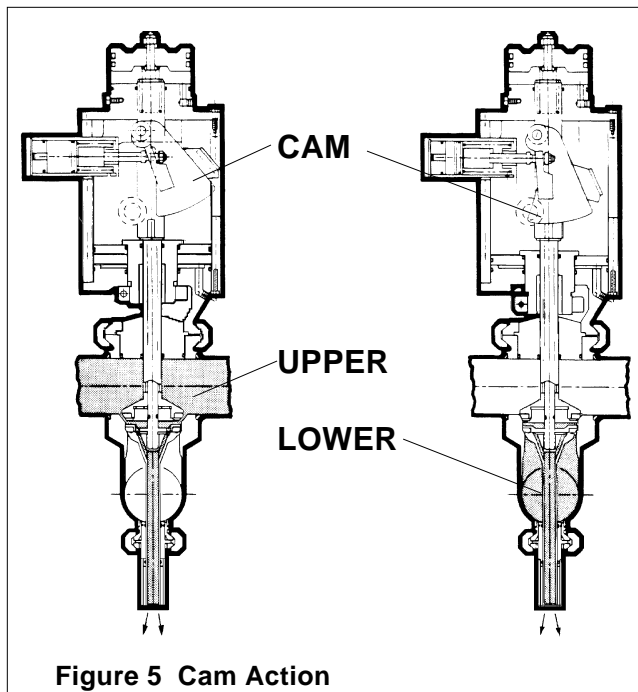


Figure 5 Cam Action

Lower-Seat Cleaning

1. Be sure the cam is locked (solenoid (A) is de-energized). (Figure 5) Observe proximity switch signal.
2. Energize primary/lower-seat solenoid (C).
3. Confirm lower seat movement by the opening of the lower limit switch.
4. Wait five seconds before proceeding.
5. De-energize the solenoid (C).
6. Confirm lower seat movement by the lower limit switch closing.
7. Wait five seconds before proceeding.
8. Repeat steps 1 through 6 as required for additional cleaning.

Upper Seat Cleaning

1. Energize cam solenoid (A) to unlock cam. (Figure 5)
2. Confirm loss of the signal from the proximity switch. (Cam unlocked)
3. Energize upper seat cleaning solenoid (B).
4. Wait five seconds before proceeding.
5. De-energize solenoid (B).
6. Wait ten seconds before proceeding.
7. Repeat steps 4 through 6 as required.
8. De-energize solenoid (A).
9. Confirm the cam is locked (proximity switch).

(See page 24 for limit switch wiring and adjustment)

MAINTENANCE

Perform routine inspections frequently. If leakage occurs, see TROUBLESHOOTING on page 26.

See page 27-28 for operational and electrical problems.

Maintain an adequate stock of replacement parts and kits. (See page 29)

NOTE: Setup specific inspection and servicing schedules to maintain valve efficiency and avoid unexpected and costly shutdowns.

CLEANING

Clean-in-place (CIP) methods work well for installed Sentinel III valves without disassembly, subject to specific requirements of individual customers and sanitary engineers. Check local chemical suppliers for the most effective CIP cleaning agents and procedures. Read "Care of Stainless Steel" for general information and cleaning precautions.

LUBRICATION

No lubrication is required other than noted in the disassembly and assembly procedures.

(Use Dow Corning #4 Silicone Grease on seals and O-rings)

ANTI-SEIZE

Apply anti-seize to the curved cam surfaces of shiny-surfaced cams only. Cams with dull or black surfaces are TEFLON® impregnated and do not require lubrication. Also use on Bellville washers and threaded stem parts.

Recommended anti-seize:

Liqui-Molly "NV Grease"

The Lockrey Company, Inc.

Pennsauken, NJ 08109

ALUMINUM COATING MAINTENANCE

Some Sentinel III valves have black, epoxy-coated, non-product contact parts. These aluminum parts minimize cost and weight. Periodical valve maintenance may scuff or chip the coated surface and reduce corrosion protection. Coat scuffs or chips with a two-part epoxy before returning the valve to service.

Recommended epoxy:

Aquapon Polyamide-Epoxy Ready-Mixed Color

Component A: #97-2 Black Pigment

Component B: #97-98, Clear Catalyst

Available from:

Pittsburgh Paints PPG Industries, Inc.

One PPG Place Pittsburgh, PA 15272

(412) 434-3131

(Follow the manufacturer's instructions for surface preparation and application.)

CARE OF STAINLESS STEEL

Note: Corrosion resistance is greatest when a layer of oxide film is formed on the surface of stainless steel. If this film is disturbed or destroyed, stainless steel becomes much less resistant to corrosion.

Important procedures for maintaining corrosion-resistant qualities and identifying corrosion types.

CHECK all **electrical** devices connected to the equipment for stray currents caused by improper grounding, damaged insulation, or other defects.

Corrosion: Pitting often occurs when stray currents come in contact with moist stainless steel.

RINSE EQUIPMENT immediately after use with warm water. Continue rinsing until the rinse water is clear. Clean the equipment (manual or CIP) as soon as possible after rinsing.

Corrosion: Discoloration, deposits, pitting. Product deposits often cause pitting beneath the particles.

USE CLEANING CHEMICALS AS SPECIFIED by the manufacturer. Do not use excessive concentrations, temperatures, or exposure times.

Corrosion: Pitting, discoloration, stress cracks. Permanent damage often occurs from excessive chemical concentrations, temperatures, or exposure times.

INSPECT JOINTS IN PIPELINES regularly. Be sure all connections are tight fitting without binding.

Corrosion: (Crevice corrosion) Small crevices caused by improperly seated gaskets will promote crevice corrosion. Stainless steel under stress will develop stress cracking especially in the presence of bactericides containing chlorine.

Regularly inspect equipment for surface corrosion (i.e. pitting, deposits, stress cracks, etc). If deposit or color corrosion is detected, remove it immediately using mild scouring powder and detergents. Rinse thoroughly and allow to air dry. Review production and cleaning procedures to determine the cause.

Note: If corrosion is not removed, the protective film cannot be restored and corrosion will continue at an accelerated rate.

MAINTENANCE

VALVE DISASSEMBLY AND ASSEMBLY PROCEDURES

WARNING

High Pressure between actuator and body can cause serious injury. Cycle valve to OPEN before removing clamp.

Prior to servicing valve, have all necessary O-rings, seat rings and lubrication ready to complete the job. Fixture Assemblies for servicing the upper and lower stem are required. (See Table 4 at bottom of page for proper fixture for your valve.)

NOTE: Upper seat stroke is factory-set. Adjustment is required after servicing. Refer to "Upper Seat Stroke Adjusting" Procedure on page 23.

VALVE REMOVAL FOR SERVICE (See Figure 6)

All product should be drained from the valve body.

1. Apply air to the cam cylinder, then to the primary lower seat cylinder. (Visual indicator will show valve OPEN.)
2. Remove bolts from clamp holding actuator to pipeline (manifold). Remove clamp.
3. Release air from primary lower seat cylinder and cam cylinder. (Valve will rise slightly).
4. **Disconnect all air and electrical attachments.**
5. Use a hoist and harness or chain to carefully lift valve out of pipeline. (Lifting lugs are at top of valve)

Transport valve to maintenance area and place in a suitable support stand such as shown in figure 7.

CAUTION

ACTUATOR WEIGHT	2"	3"	4"	6"
	50 Lbs	60 Lbs	100 Lbs	150 Lbs

Be prepared to handle it carefully and safely.

Table 4. ASSEMBLY FIXTURES

SIZE	2"	3"	4"	6"
LOWER STEM	7122689	7028328	7028113	7028118
UPPER STEM	7122688	7028349	7028112	7028112

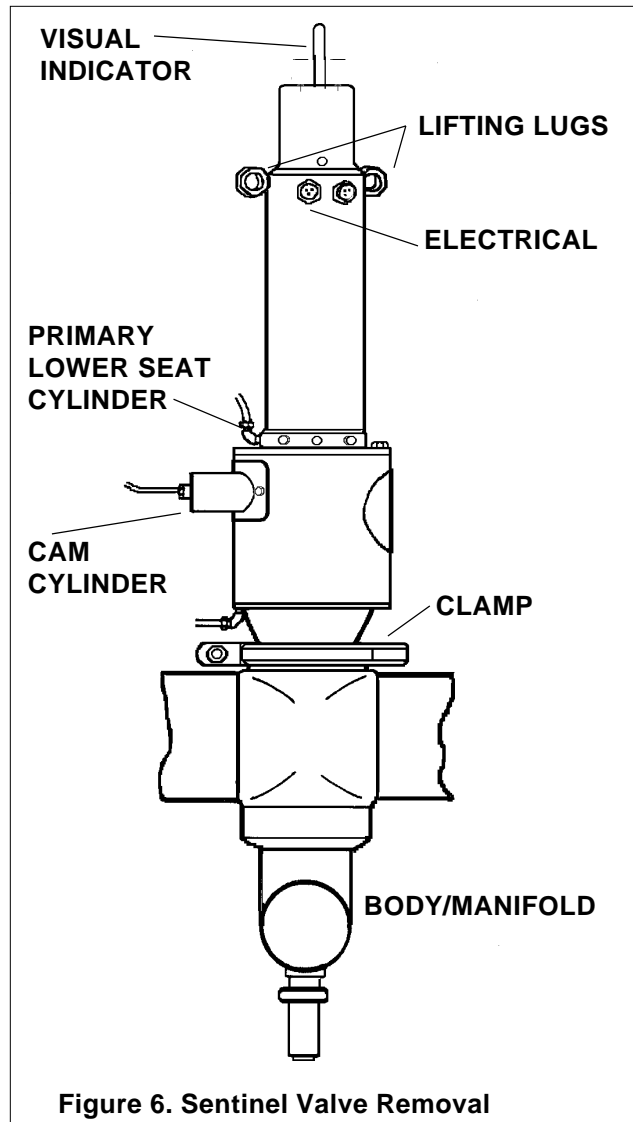


Figure 6. Sentinel Valve Removal

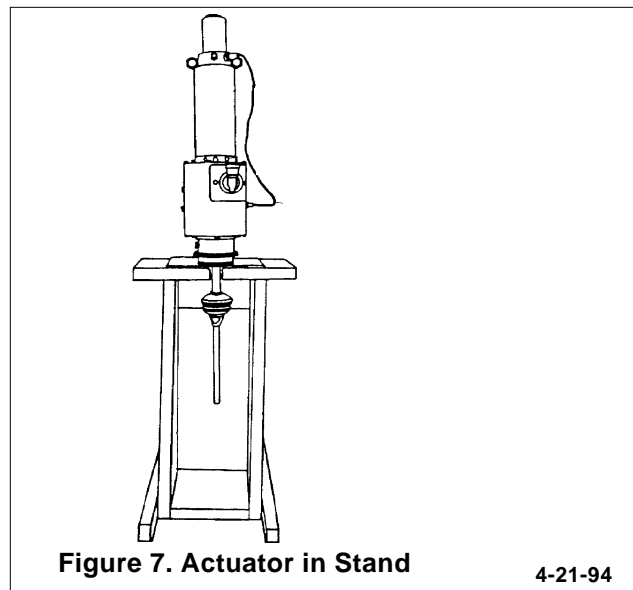


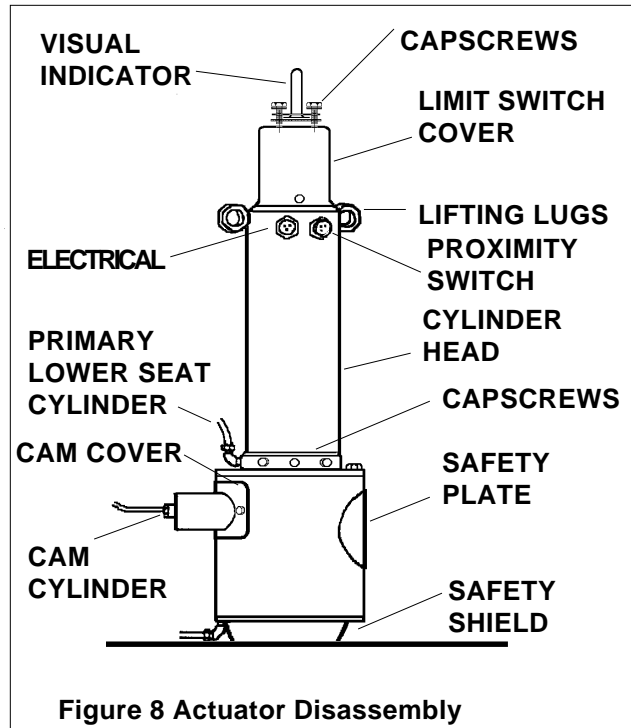
Figure 7. Actuator in Stand

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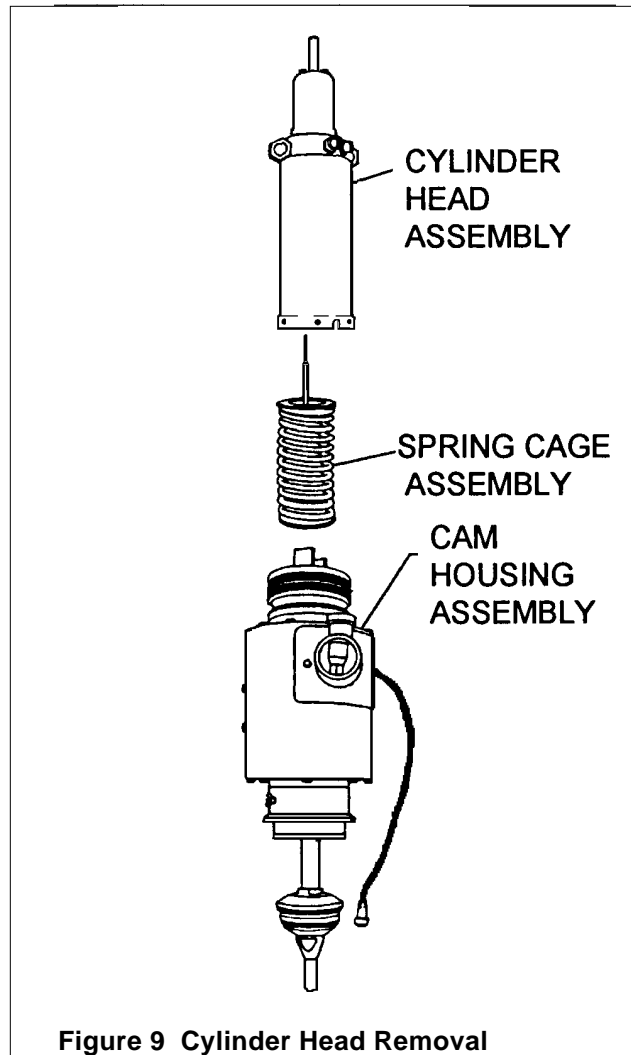
MAINTENANCE

Removing Stem Assemblies for complete refurbishing (See Figure 8)

1. Remove the two capscrews, seal washers, plate, visual indicator tube and gasket from the top of the limit switch cover; remove the cover.
2. Remove the two capscrews from the cam housing safety plate; remove plate.
3. Remove capscrews from the cam cylinder cover : remove cover and gasket. (*Observe relationship of opening, cover and gasket.*)
4. Remove adjusting collar safety shield (*wing nut*). (*Remove the top proximity wire connector.*)



5. Remove capscrews from cylinder head. Tap under lifting lugs with mallet to help remove cylinder head. (Figure 9)
6. Lift off spring cage assembly.

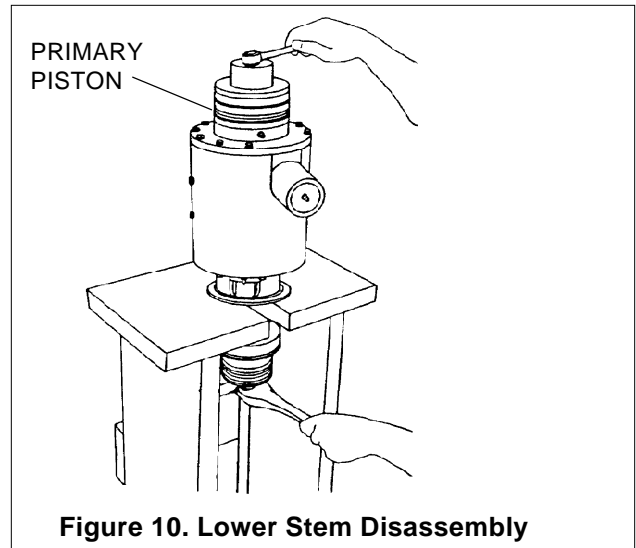


MAINTENANCE

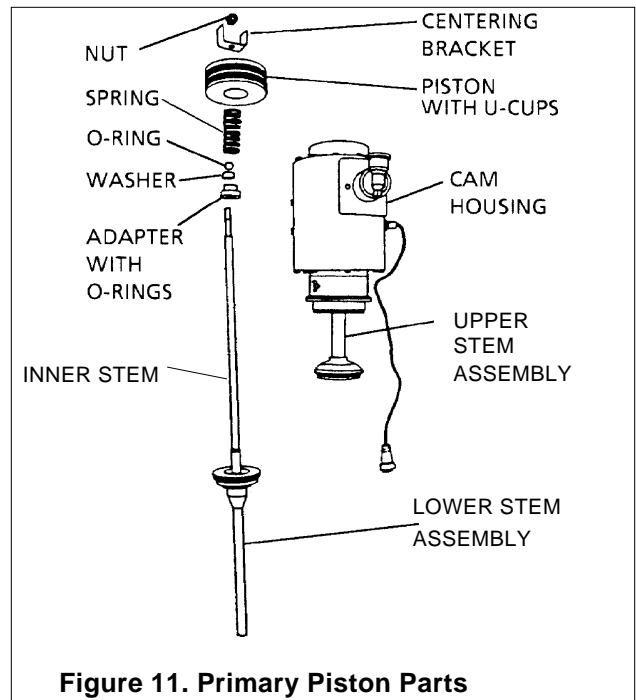
- To remove the primary piston from lower stem assembly, use a wrenches on the bottom stem flats and the retainer nut on top.(Figure 10)

NOTE: When the retainer nut has been fully loosened, spring pressure will cause the primary piston to push up.
(Maintain support on lower stem assembly, as it will drop when the retainer nut has been fully removed.)

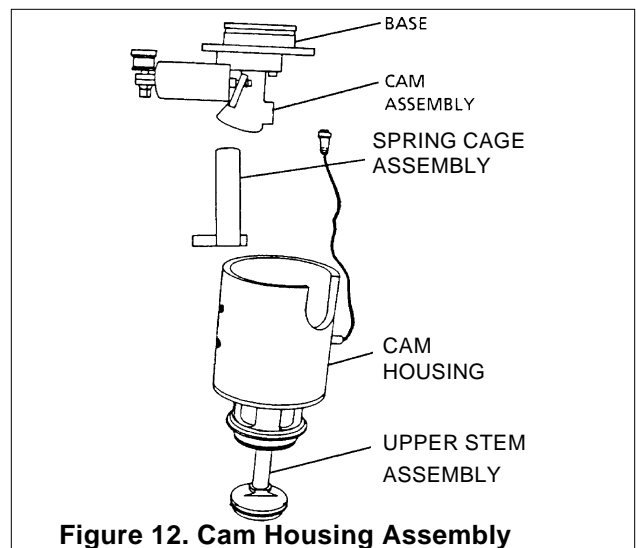
- Carefully lower the stem assembly to the floor.



- Lift and remove the primary piston, the spring, O-ring, washer and adapter. (Figure 11)



- Remove capscrews on top of the cam housing and lift the cam assembly out of the housing. (Cam assembly is one piece.) (Figure 12)



11. To remove the upper stem assembly, reach into the housing and while lifting slightly on the stem assembly, remove the split lock ring from the upper stem assembly. Stem can be lowered down onto lower stem assembly. (Figure 13)
12. Lift off the cam housing assembly, set it on a bench.
13. Lift off the yoke plug.
14. Now take the lower stem assembly out of the stand and slide the upper stem assembly off the inner stem.

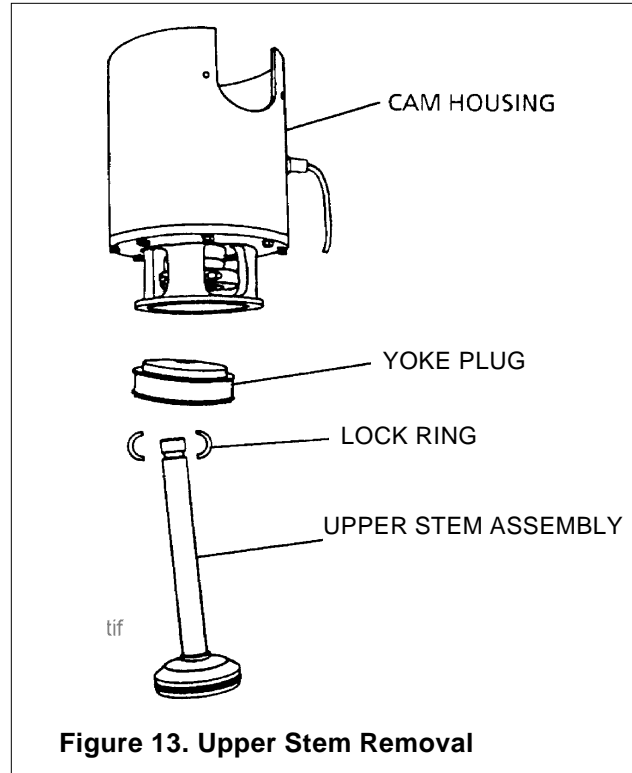


Figure 13. Upper Stem Removal

Table 4. ASSEMBLY FIXTURES

SIZE	2"	3"	4"	6"
LOWER STEM	7122689	7028328	7028113	7028118
UPPER STEM	7122688	7028349	7028112	7028112

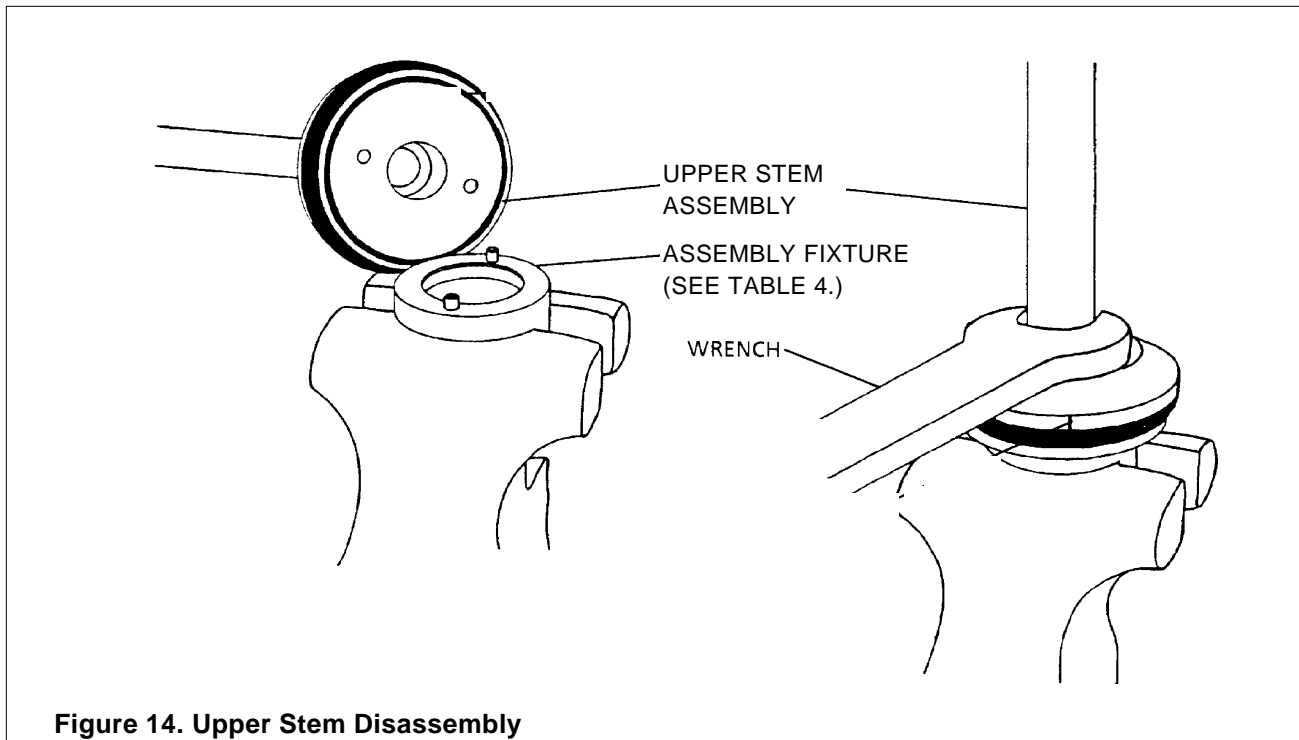


Figure 14. Upper Stem Disassembly

UPPER STEM SERVICE (Figure 14)

1. Place upper stem assembly fixture in vise. Place stem over dowel pins on fixture.
2. Hold stem in place and loosen with a wrench on the stem flats. Turn counterclockwise and lift stem off retaining nut.

UPPER STEM
(Figure 15)

3. Turn stem over and remove seat ring.
4. Remove the Bellville washer, ring, tri-ring and stem gasket from the retaining nut.
(Discard tri-ring and gasket.)

NOTE: 2" does not have stem gasket.
Clean all metal parts.

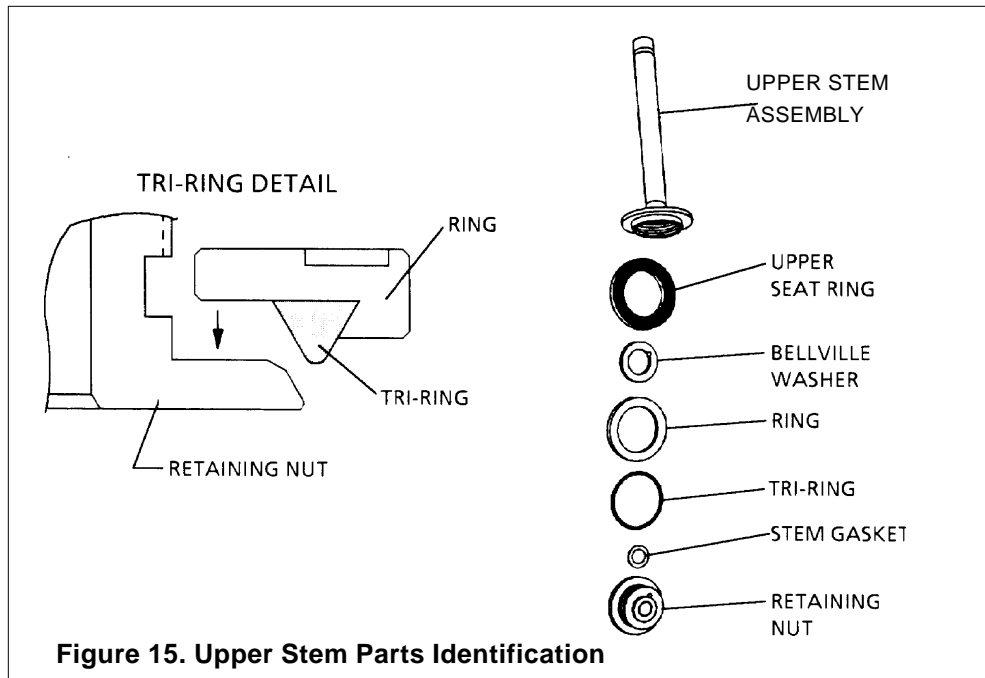


Figure 15. Upper Stem Parts Identification

Lubricant: Dow Corning #4 Silicone Grease
Anti-seize: Liqui-Molly "NV Grease"

5. Place stem back on retainer nut and hand tighten. Scribe match marks on retaining nut and stem for assembly purposes.(Figure 16)
6. Lubricate new tri-ring; place it in ring and set down over retaining nut. (Figure 15)
7. Apply anti-seize to Bellville washer surfaces and nut threads.
8. Place the Bellville washer on the retaining nut (curved edge up), matching the locating pin to the hole in the washer.
10. Replace the stem gasket on the retaining nut. (2" does not use stem gasket.)
11. Install new seat ring on outer stem. (Do Not lubricate to install.)
12. Screw stem on retaining nut and hand tighten, then back off 1-1/2 turns.
13. Re-tighten to match marks. Check tri-ring for proper fit.

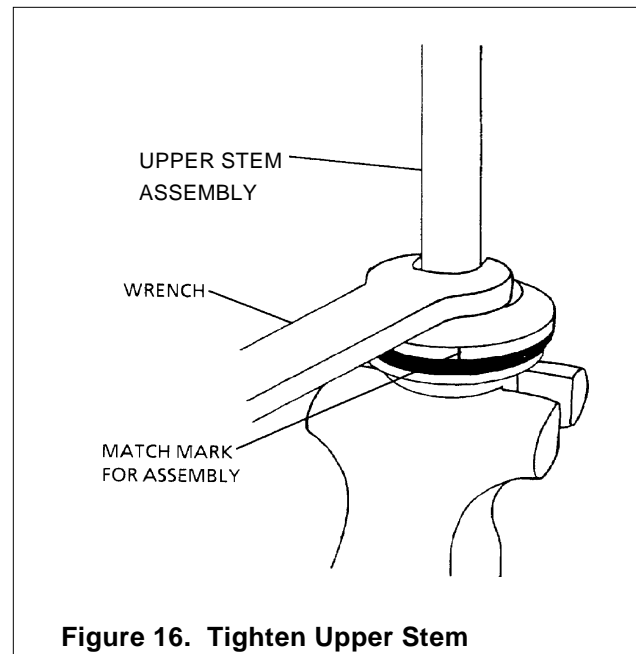


Figure 16. Tighten Upper Stem

LOWER STEM SERVICE Figure 17

1. Place lower stem fixture in vise.
2. Invert lower stem assembly and slide down through fixture and align on the dowel pins.
3. Remove lower stem by turning counterclockwise with a wrench on the flats. (Figure 18)
4. Remove the Bellville washer. (Figure 19)
5. Remove and discard the seat ring.
6. Remove (lift) the inner stem from the fixture.
7. Remove the small O-ring from the inner stem and discard.

Clean all metal parts.

8. Thread the inner stem onto the lower stem assembly and hand tighten. Scribe match marks on the stems for assembly purposes. (Figure 18)
9. Remove the inner stem from the lower stem.
10. Apply anti-seize to the Bellville washer surfaces and the stem threads. (Figure 19)
11. Place the Bellville washer on the lower stem
12. Place a new seat ring on the inner stem.
13. Thread the inner stem onto the lower stem assembly and hand tighten.
14. Invert the stem assembly onto the fixture over the dowel pins. Tighten to match marks.
15. Remove the assembly. Lubricate and install a small O-ring onto the inner stem.

Slide the upper stem assembly over the inner stem. This completes disassembly and maintenance of the stems.

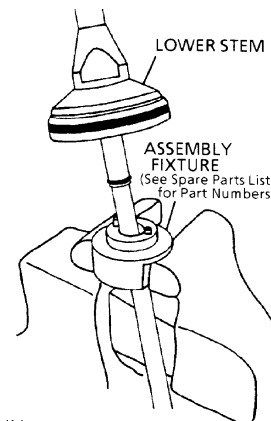


Figure 17. Lower Stem Disassembly

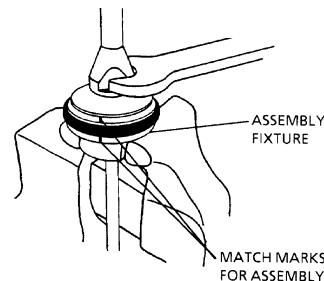


Figure 18. Lower Stem Match Marks

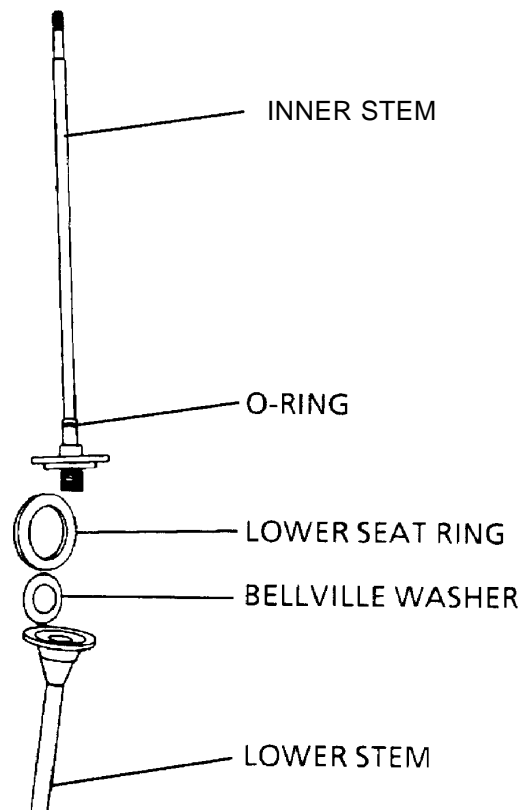


Figure 19. Lower Stem Parts Identification

VALVE SERVICE and ASSEMBLY (Figure 20)

1. Turn the cam housing over to remove the upper seat piston and yoke.
2. Remove the collar safety shield(thumbscrew).
3. Remove the capscrews from the bottom of the cam housing. (*Mark location of air inlet.*)
4. Lay the housing on its side and use a mallet to carefully tap the upper seat/yoke assembly out of the housing.
5. Turn the upper seat/yoke assembly upside down and remove the retaining ring. Loosen the setscrew in the collar; unscrew the collar and remove it.
6. Slide the upper seat piston out of the yoke.
7. Remove the piston retainer from the piston. Lubricate and replace the internal O-ring in the upper seat retainer and internal and external O-rings in the upper seat piston.
8. Lubricate and replace the internal and the external O-rings in the yoke.
4" ONLY- Lubricate and replace the external an internal O-rings in the yoke and in the upper seat piston .
9. Place upper seat piston in yoke and screw collar onto threaded end. Back off 1-1/2 turns. (*Do Not tighten at this time.*)
10. Attach snap ring to end of piston retainer.
11. Apply lubrication to the inside of the cam housing. (*Housing should be upside down.*) Invert the upper seat piston assembly and insert it in the cam housing. Use the mallet to tap piston/yoke down until it is flush against the top of the housing.
12. Align air inlet with mark. Replace the capscrews on the bottom of the cylinder housing and secure.

YOKE PLUG (Figure 21)

1. Lubricate and replace the internal and the external O-rings in the plug.
2. Place the plug over the top of the upper/lower stem assembly and insert the assembly into the work stand.
3. Turn the cam housing assembly over and place onto plug in stand.
4. Lift the upper stem assembly and replace the split rings to hold it in place.(Figure 13, Page 18)

CAM ASSEMBLY (Figure 21)

1. Remove the spring cage guide from the cam assembly base. Lubricate and replace the internal and external O-rings in the guide.
2. Turn the cam assembly on its side. Lubricate and replace the O-rings (*internal and external*) in the base.

With cam assembly upright, lubricate the entire outside of the cage guide assembly and place it back into the cam assembly. (Figure 21)

3. Lubricate the rounded surfaces of the cams with anti-seize. (See page 14) Now place the base cam assembly onto the cam housing assembly.

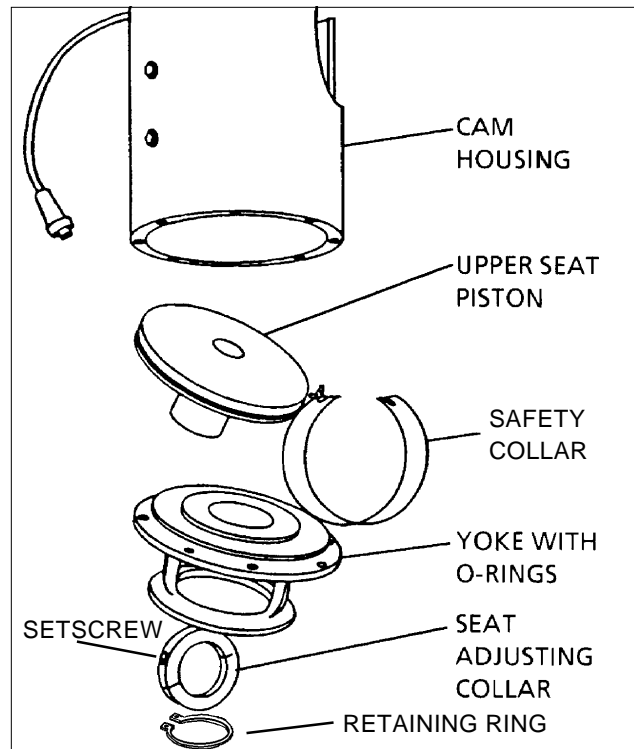


Figure 20. Upper Seat Assembly (4" shown)

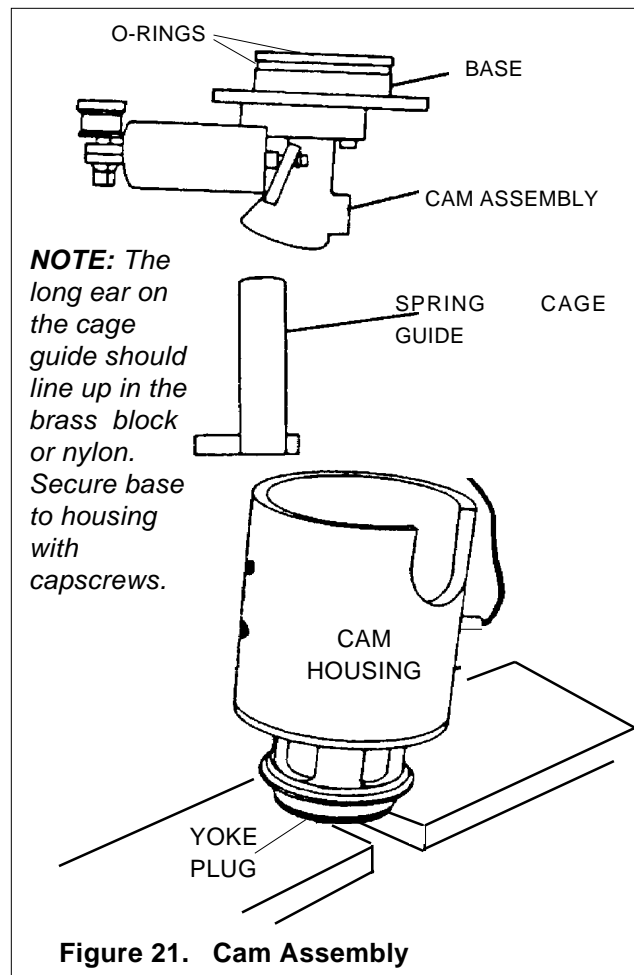


Figure 21. Cam Assembly

PRIMARY PISTON ASSEMBLY (Figure 22)

1. Lubricate and replace the U-cups in the primary piston.
2. Replace and lubricate the O-rings in the adapter. (Internal at top and external at bottom)
3. Raise the stem assembly a few inches to expose the threaded end of the inner stem.
4. Place the adapter into the bore of the top spring cage guide.
5. Place the washer, O-ring and small spring over threaded end.
6. Lubricate U-cups and place piston and centering bracket over rod. Press down and thread retaining nut on.
7. Place wrenches on the lower stem flat and on the retaining nut. Tighten securely.

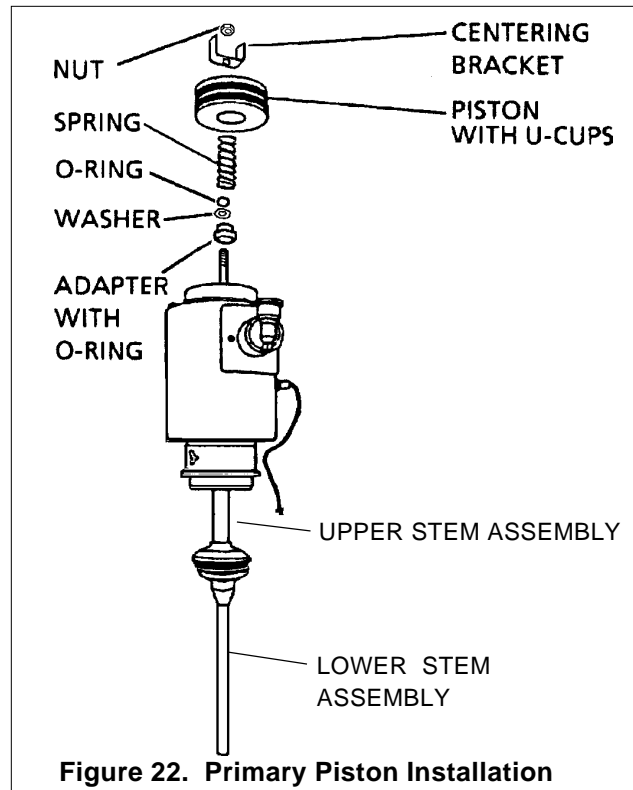


Figure 22. Primary Piston Installation

FINAL ASSEMBLY (Figure 23)

1. Place the spring cage over the top of the primary piston
2. Lubricate the inside of the cylinder head and place it over the spring cage assembly. (*Note the alignment of holes for fittings and air supplies.*) Tap down on top of cylinder head to align. Insert and tighten capscrews securely.
3. Place the safety cover over the cam opening in the housing and secure with the capscrews.
4. Place the cam cylinder cover plate and gasket over the cam cylinder on the housing and secure with capscrews.
5. Attach the proximity wire connector to the cylinder head.
6. Inspect O-ring at top of cylinder head; replace if necessary.

Do Not add collar safety shield yet.

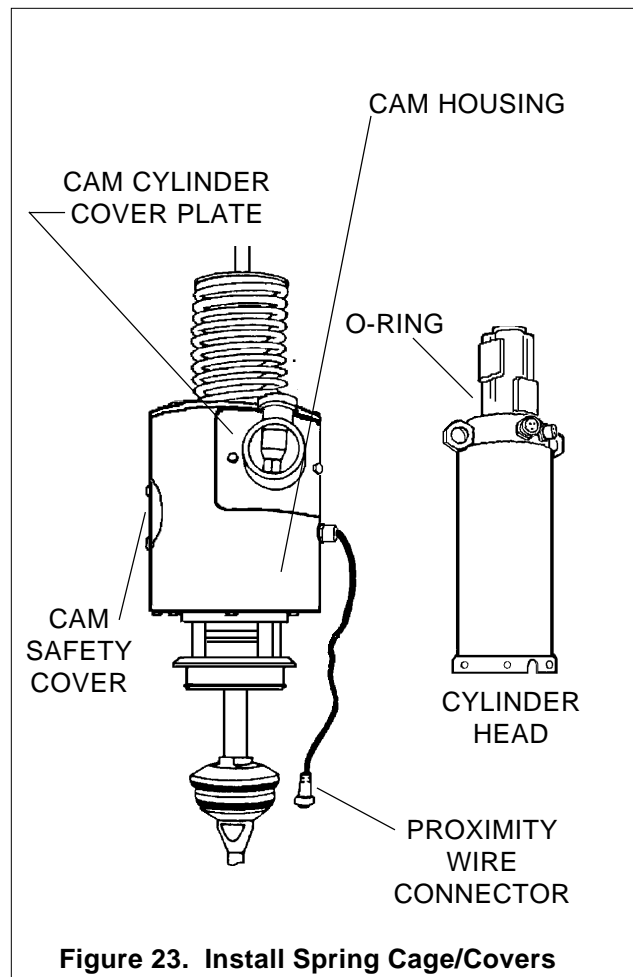


Figure 23. Install Spring Cage/Covers

INSTALL VALVE (Figure 24)

1. Replace limit switch cover, gasket, visual indicator tube, plate, seal washers and two capscrews. (*Inspect seal washers and replace if rubber is worn.*)
2. Reconnect air and electrical lines. Apply air to cam cylinder, then to primary cylinder. Valve is now in OPEN position
3. Lower valve slowly into body and make sure lower stem enters lower guide.
4. Re-attach clamp and tighten bolts.

Upper Seat Stroke Adjusting Procedure

Adjust the actuator each time you install it in the pipeline.

CAUTION

Air must be connected during this adjustment.

1. Pressurize the cam cylinder, followed by the primary lower seat cylinder to cycle the valve fully open.
2. Remove pressure from the primary/lower cylinder then the cam cylinder to close the valve.
3. Pressurize the cam cylinder followed by the upper seat cylinder to cycle the upper seat open.
4. Remove the pressure from the upper-seat cylinder to close the upper seat.
5. Raise the upper seat adjusting collar by hand until it contacts the yoke bottom.
6. Loosen the collar 1-1/2 turns for 2, 3, and 4-inch valves and 1 turn for 6-inch valves.
7. Tighten the setscrew and replace the collar safety shield.
8. Close the cam cylinder. (Remove air)

Lower Guide Assembly O-Ring Replacement

1. Shut off and disconnect all air and power prior to servicing.
2. Drain all product from pipeline/s.
3. Remove the lower guide clamp (Figure 25)
4. Remove the guide and washer.
5. Lubricate and replace the O-Rings.
6. Assemble lower guide and secure with clamp.

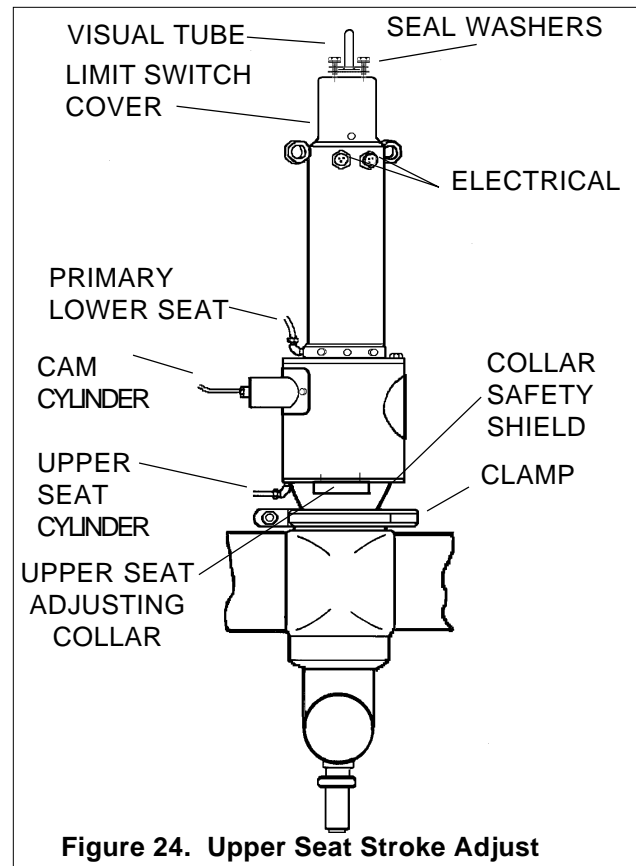


Figure 24. Upper Seat Stroke Adjust

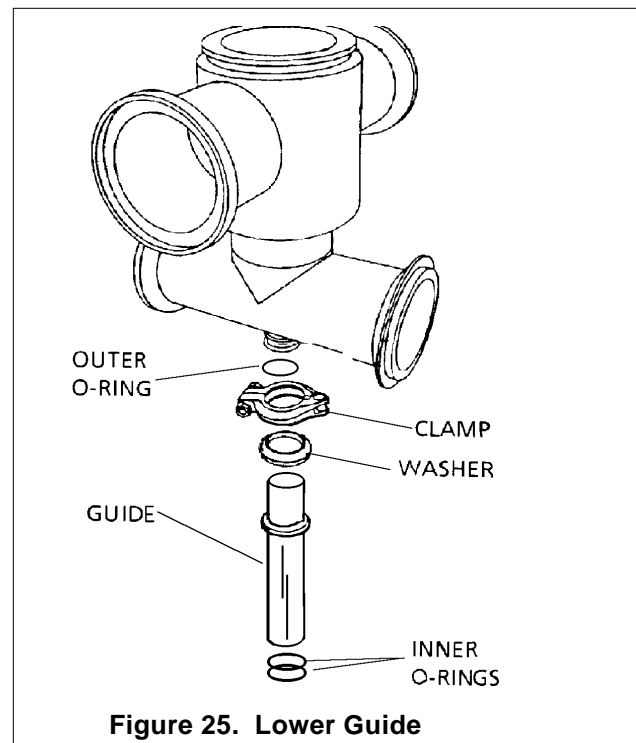


Figure 25. Lower Guide

WARNING

TO AVOID ELECTROCUTION OR SERIOUS INJURY, DISCONNECT ALL ELECTRICAL AND AIR SUPPLIES BEFORE REMOVING LIMIT SWITCH COVER AND SERVICING LIMIT SWITCHES.

LIMIT SWITCH ASSEMBLY MAINTENANCE

Prior to removing the switch cover:

1. Turn OFF and disconnect all electrical power and air supplies.
2. Unplug the 5-wire power cable from the electrical port.

To Replace Either Upper Seat Switch No. 2 or Lower Seat Switch No. 1 (Figure 26)

Remove the capscrews and switch cover for all limit switch service procedures.

1. Pull the wire clips straight off the switch terminals.
2. To remove switch, remove the two round head screws from the switch body.
3. Install the new switch(es) and tighten the screws.

To Set the Limit Switches.

- A. When the lower seat is stroked for cleaning, the rod extends and the chamfer's crest activates the roller on Switch No.1. This causes the normally "closed" contact to open.(Figure 26)
 - B. When the valve is stroked (OPEN), the rod extends to the top position and Switch No.2 closes.
 - C. If side-to-side switch adjustment is necessary, loosen the screws that hold the switch blocks. Adjust the switch then tighten the screws.
5. Push the wire connectors onto the switch terminals. (Refer to the wire color coding on page 25.)

NOTE: When you install a new switch, always check positioning for correct operation. See Figure 26. The actuator must be assembled to the body to set the limit switches.

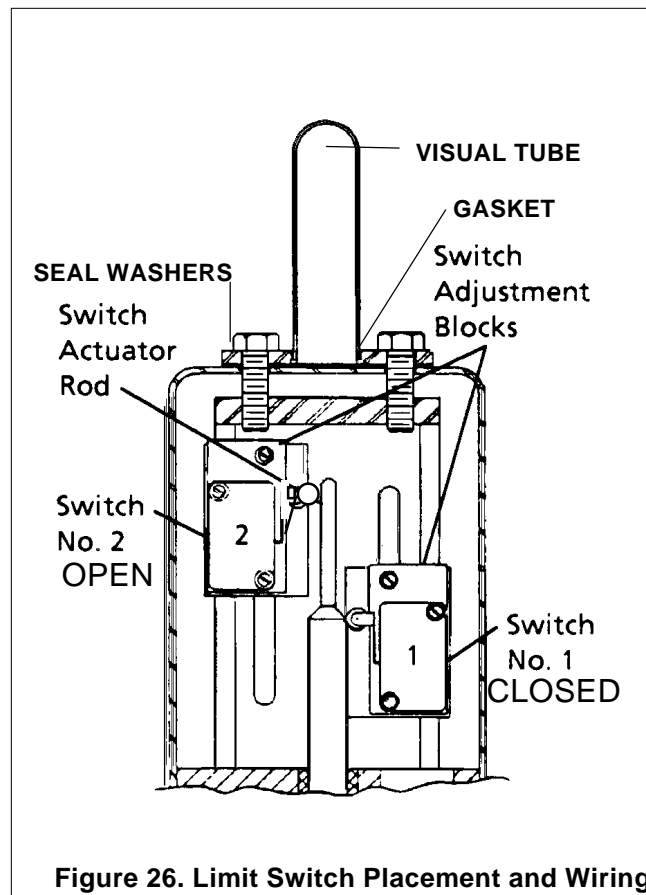


Figure 26. Limit Switch Placement and Wiring

PROXIMITY SWITCH (Figure 27)

NOTE: BOTTOM OUT THE PROXIMITY SWITCH AGAINST THE CAM. BACK OUT ONE (1) TURN AND SECURE WITH THE LOCKNUT.

NC=NORMALLY CLOSED
NO=NORMALLY OPEN

WHT=WHITE
GRN=GREEN
ORG=ORANGE
BRN=BROWN
BLU=BLUE
BLK=BLACK
GRD=GROUND

SWITCH ASSEMBLY

The proximity switch is supplied to sense the **upper seat locking cam** position. Properly adjusted, the switch indicates if the cam is unlocked or locked.

(Unlocked position is for full OPEN or upper seat cleaning modes.)

(Locked position is for normally-closed or lower-seat cleaning modes.)

The switch option can be either factory or field-installed.

WARNING
TO AVOID ELECTROCUTION OR SERIOUS INJURY, DISCONNECT ALL ELECTRICAL AND AIR SUPPLIES BEFORE SERVICING PROXIMITY SWITCH.

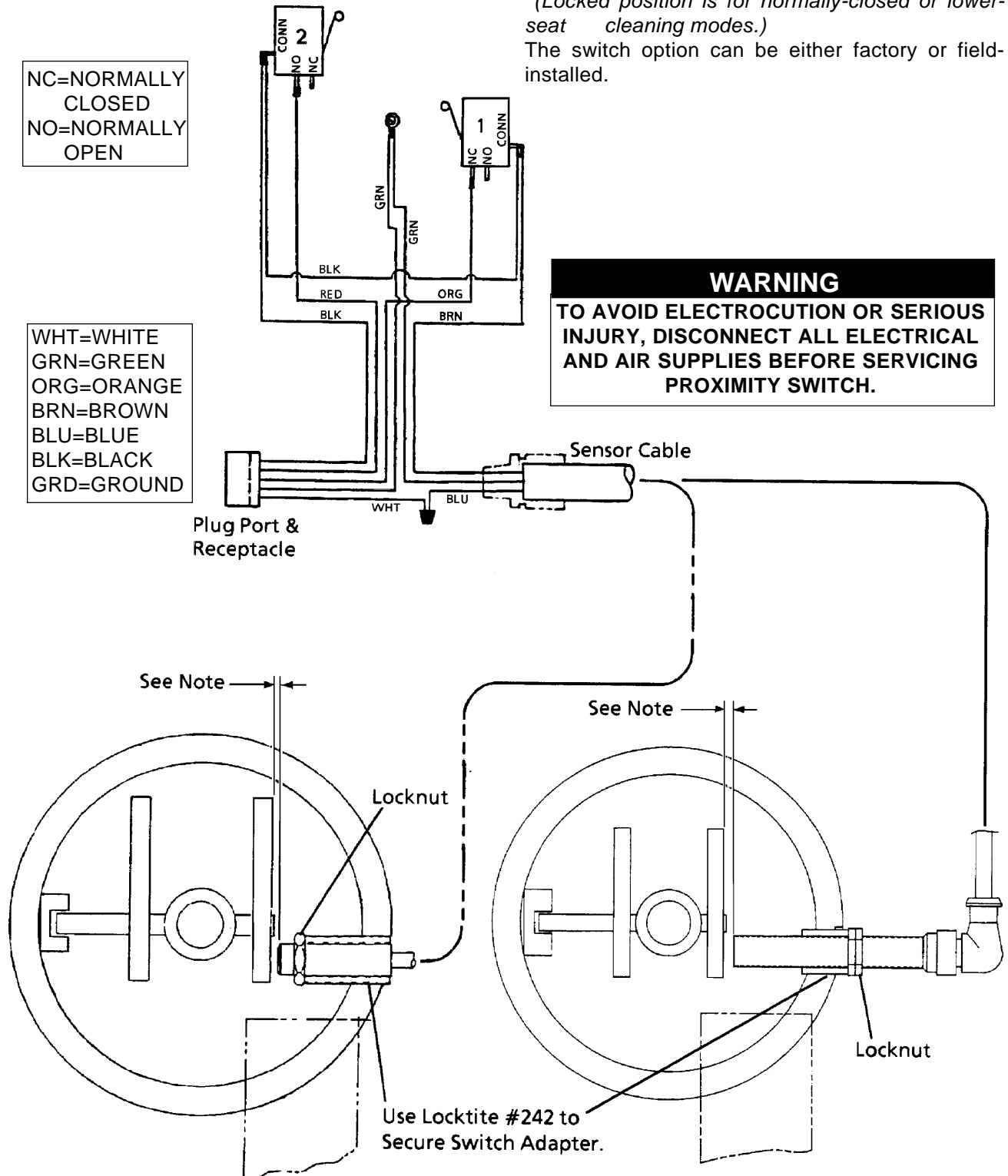


Figure 27. Proximity Switch Adjustment and Wiring

TROUBLESHOOTING

The following Sentinel III Valve Troubleshooting Guide contains suggested actions for corrective maintenance. Each problem has its Possible Cause and corresponding Suggested Action.

WARNING

TO PREVENT POSSIBLE INJURY FROM UNEXPECTED VALVE OPERATION, DISCONNECT AND EXHAUST ALL UTILITIES BEFORE MAKING REPAIRS OR ADJUSTMENTS.

IMPORTANT

Before diagnosing the valve as requiring corrective maintenance, please review the **Operation Guidelines on page 13** of this manual to verify that the proper sequencing and timing steps are being utilized to insure the correct valve response for the desired operating mode.

Sentinel III Valve Troubleshooting Guide

PROBLEM	POSSIBLE CAUSES	SUGGESTED ACTION
LEAKAGE Leaks inside drain tube with valve closed.	<ol style="list-style-type: none"> 1. Lower guide internal O-ring failure. 2. Upper or lower seat ring failure. 3. Insufficient "boost" air. 4. Debris trapped under seats. 5. Upper seat failed to close. 	<ol style="list-style-type: none"> 1. Replace valve assembly O-rings Page 23. 2. Replace actuator assembly lower seat ring Page 20 and/ or upper seat ring Page 19. 3. Refer to the Flow and Pressure Data Table 1. on Page 10. 4. Inspect the valve body seat. 5. Refer to "Operation Guidelines" on Page 13; Valve Closing Sequence. Inspect inner and upper stems (and related items) for galling and burrs.
Leaks inside drain tube with valve open .	<ol style="list-style-type: none"> 1. Upper to lower seat tri-ring failure. 2. Lower guide internal O-ring failure. 	<ol style="list-style-type: none"> 1. Replace actuator assembly tri- ring Page 19. 2. Replace valve assembly O-ring Page 23.
Leaks outside drain tube or lower guide weep hole.	Lower guide O-ring failure. (<i>Internal or external</i>)	Replace valve assembly O-ring Page 23.
Leaks around the yoke.	<ol style="list-style-type: none"> 1. Internal plug O-ring failure. 2. External plug O-ring failure. 	<ol style="list-style-type: none"> 1. Replace internal plug O-ring Page 21. 2. Replace external plug assembly O-ring Page 21.
Leaks from weep hole on spring cage guide or upper seat piston cylinder.	<ol style="list-style-type: none"> 1. Inner stem O-ring failure. 2. Upper seat failed to close. 	<ol style="list-style-type: none"> 1. Replace actuator assembly O-ring Page 20. 2. Refer to "Operation Guidelines" on Page 13; Valve Closing Sequence. Inspect inner and upper stems (and related items) for galling and burrs.

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
OPERATION		
Valve fails to open.	<ol style="list-style-type: none"> 1. Cam not unlocked. 2. Insufficient air pressure. 3. Too much upper line pressure. 4. Boost air not bled off. 	<ol style="list-style-type: none"> 1. Refer to "Operation Guidelines on Page 13. 2. Refer to "Operation Guidelines" on Page 13. 3. Refer to Pressure Data Table on Page 10. 4. Refer to "Operation Guidelines on Page 13.
Valve fails to close.	<ol style="list-style-type: none"> 1. Lower line pressure too high. 2. Debris trapped under seats. 3. Primary air not exhausting. 4. Upper seat pressurized 5. Inner/upper stem binding. 	<ol style="list-style-type: none"> 1. Refer to Pressure Data Table, Page 10. 2. Inspect actuator seat. 3. Refer to "Operation Guidelines" on Page 13. 4. Refer to "Operation Guidelines" on Page 13. 5. Inspect actuator stems and related parts for galling and burrs.
Cam fails to unlock.	<ol style="list-style-type: none"> 1. Signal delays improperly set. 2. Insufficient air pressure. 3. Cam/lug surfaces galled. 	<ol style="list-style-type: none"> 1. Refer to "Operation Guidelines" on Page 13. 2. Use 3" booster. Refer to "Cam Piston and Cylinders" Page 45. 3. Replace cam with a coated cam. Maintain good lubrication.
Cam fails to lock.	<ol style="list-style-type: none"> 1. Cam cylinder pressurized. 2. Debris trapped under the seat. 	<ol style="list-style-type: none"> 1. Refer to "Operation Guidelines on Page 13. 2. Inspect actuator seats.
Upper seat fails to open.	<ol style="list-style-type: none"> 1. Cam not unlocked. 2. Insufficient air pressure. 3. High upper line pressure. 4. Upper seat collar needs adjustment. 	<ol style="list-style-type: none"> 1. Refer to "Operation Guidelines on Page 13. 2. Refer to "Operation Guidelines on Page 13. 3. Refer to Pressure Data Table on Page 10. 4. Refer to "Upper Seat Stroke Adjusting Procedure" Page 23.
Upper seat fails to return.	<ol style="list-style-type: none"> 1. Upper seat cylinder pressurized. 2. Inner/upper stem binding. 3. Debris trapped under seat. 	<ol style="list-style-type: none"> 1. Refer to "Operation Guidelines on Page 13. 2. Inspect actuator stems and related parts for galling and burrs. 3. Inspect actuator seat.
Valve rocking side to side or lifting when closing.	<ol style="list-style-type: none"> 1. Loose clamp. 	<ol style="list-style-type: none"> 1. Tighten clamp.

Sentinel III Valve Troubleshooting Guide - continued

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
ELECTRICAL		
No proximity switch signal.	<ol style="list-style-type: none"> 1. Proximity switch not adjusted. 2. Proximity switch/valve wiring. 3. Cam failed to lock. 4. Bad switch. 	1-4. Refer to "Proximity Switch Assembly" Page 25.
No lower seat cleaning or valve closed signal.	<ol style="list-style-type: none"> 1. Lower limit switch not adjusted. 2. Valve wiring loose. 3. Bad switch. 	1. - 2. - 3. Refer to "Limit Switch Assembly Maintenance" Page 24.
No valve open signal.	<ol style="list-style-type: none"> 1. Upper limit switch not adjusted. 2. Valve wiring loose 3. Bad switch 	1.- 2. - 3. Refer to "Limit Switch Assembly Maintenance" Page 24.
Moisture in limit switch housing.	<ol style="list-style-type: none"> 1. Broken visual indicator tube. 2. Limit switch housing top concave. 3. Missing or damaged gasket 4. Missing or damaged seal washers. 5. Still contains excessive moisture 	<ol style="list-style-type: none"> 1. Replace tube Page 23-24. 2. Press out flush or slightly convex. 3. Replace gasket. Page 23-24. 4. Replace seal washers. Page 23-24. 5. Blow out all excessive moisture <u>with low pressure air.</u>

PARTS LISTS *ILLUSTRATED

SEAL KITS 30	*2" ACTUATOR ASSEMBLY 36-37
SERVICE NOTES 31	*3" ACTUATOR ASSEMBLY 38-39
SPARE PARTS 2" VALVE 32	*4" ACTUATOR ASSEMBLY 40-41
SPARE PARTS 3" VALVE 32	*6" ACTUATOR ASSEMBLY 42-43
SPARE PARTS 4" VALVE 33	*CAM PISTON/CYLINDERS 44-45
SPARE PARTS 6" VALVE 33	CAM PISTON/CYLINDER DIMENSIONS 44-45
VALVE DESIGN CHANGES 34	*PROXIMITY SWITCH 46-47
*VALVE ASSEMBLY/LOWER GUIDE 35	PROXIMITY SWITCH WIRING 46

HOW TO ORDER PARTS

By Phone

Telephone your repair parts or fittings order to your Distributor.

To speed your order and avoid delays, please have your **equipment model** and **serial number** and the **part numbers** from the parts list before you call your Distributor.

If you do not know your Distributors number, call Waukesha Cherry-Burrell Customer Service at:

Phone: **800-252-5200 or 414-728-4900**

Fax: **800-252-5045 or 414-728-4904**

Your call will be directed to a specialist who can provide you with Distributor information for your area.

How to Return Parts

Parts may be returned for credit, subject to the conditions of our return goods policy. To obtain authorization to return a part, contact the your Distributor.

Please give the following information:

- Invoice number and date
- Quantity
- Part Number (from parts list)
- Exact reason for return

Your Distributor will provide a Return Goods Authorization. *(Returns will not be accepted without advance authorization.)*

DISTRIBUTOR: _____

PHONE: _____

PRODUCT NAME/MODEL: _____
PRODUCT SERIAL NUMBER: _____
DATE OF PURCHASE: _____
INVOICE NUMBER: _____
INVOICE DATE: _____

SEAL KITS

2" SIZE ACTUATORS Kit Number 7123767

For Valves: 2x2 2X3 2X4 2X6 3X2 4X2 6X2		
PART NO.	QTY	DESCRIPTION
N70018	1	O-RING, 018 FDA NTRILE/BUNA
N70110	1	O-RING, 110 FDA NITRILE/BUNA
070112	1	O-RING, 112 FDA NITRILE/BUNA
N10220	1	O-RING, 220 FDA NITRILE/BUNA
N70231	1	O-RING, 231 PDA NITRILE/BUNA
N10240	1	O-RING, 240 FDA NITRILE/BUNA
N70261	2	O-RING, 261 FDA NITRILE/BUNA
N70230	2	O-RING, 230 FDA NITRILE/BUNA
57-15	2	U-CUP, BUNA
7123756	2	O-RING, 213 **FKM V680-70
7123746	2	O-RING, 012 **FKM V680-70
7123759	1	O-RING, 228 **FKM V680-70
7123733	1	SEAT RING, UPPER, **FKM
7028587	1	SEAT RING, LOWER, TEFLON®
7123763	1	2" TRI-RING, **FKM V680-70

4" ACTUATORS Kit Number 7123769

For Valves: 4X4 4X6 6X6		
PART NO.	QTY	DESCRIPTION
N70110	1	O-RING, 110 FDA NITRILE/BUNA
N70112	1	O-RING 112 FDA NITRILE/BUNA
N70224	1	O-RING, 224 FDA NITRILE/BUNA
N70231	1	O-RING, 231 FDA NITRILE/BUNA
N70248	1	O-RING, 248 FDA NITRILE/BUNA
N70261	2	O-RING, 261 FDA NITRILE/BUNA
57-13	2	U-CUP, BUNA
N70230	1	O-RING, 230 FDA NITRILE/BUNA
7123757	2	O-RING, 217 **FKM V680-70
7123751	1	O-RING, 113 **FKM V680-70
N70114	2	O-RING, 114 FDA NITRILE/BUNA
N70122	1	O-RING, 122 FDA NITRILE/BUNA
7123761	1	O-RING, 347**FKM V680-70
7123737	1	SEAT RING, UPPER, **FKM
7027618	1	SEAT RING, LOWER TEFLON®
1120689	1	4" STEM GASKET **FKM
7123765	1	4" TRI-RING V680-70

3" SIZE ACTUATORS Kit Number 7123768

For Valves. 3X3 3X4 3X6 4X3 6X3		
PART NO.	QTY	DESCRIPTION
N70018	1	O-RING, 018 FDA NITRILE/BUNA
N70110	1	O-RING, 110 FDA NITRILE/BUNA
N70112	1	O-RING, 112 EDA NITRILE/BUNA
N70220	1	O-RING, 220 FDA NITRILE/BUNA
N70231	1	O-RING, 231 PDA NITRILE/BUNA
N70240	1	O-BING 240 FDA NITRILE/BUNA
N70261	2	O-RING, 261 FDA NITRILE/BUNA
N70230	2	O-RING 230 FDA NITRILE/BUNA
57-15	2	U-CUP, BUNA
7123756	3	O-RING, 213 **FKM V680-70
7123746	2	O-RING, 012 **FKM V680-70
7123760	1	O-RING, 234 **FKM V680-70
7123735	1	SEAT RING UPPER, **FKM
7027813	1	SEAT RING LOWER, TEFLON®
7120688	1	3" STEM GASKET **FKM
7123764	1	3" TRI-RING **FKM V680-70

6" SIZE ACTUATORS Kit Number 7123770

For 6" Valve		
PART NO.	QTY	DESCRIPTION
N70110	1	O-RING, 018 FDA NITRILE/BUNA
N70224	1	O-RING, 224 FDA NITRILE/BUNA
N10231	1	O-RING, 231 FDA NITRILE/BUNA
N70254	1	O-RING 254 FDA NITRILE/BUNA
N70230	2	O-RING, 230 FDA NITRILE/BUNA
N70116	1	O-RING, 116 FDA NITRILE/BUNA
N70114	1	O-RING, 114 FDA NITRILE/BUNA
N70122	1	O-RING, 122 FDA NITRILE/BUNA
N70269	2	O-RING, 269 FDA NITRILE/BUNA
7123758	2	O-RING, 219 **FKM V680-70
7123762	1	O-RING, 433 **FKM V680-70
7123754	1	O-RING, 116 **FKM V680-70
7025323	2	U-CUP, BUNA
7025324	1	WIPER, FELT
7123739	1	SEAT RING, UPPER, **FKM
7025360	1	SEAT RING, LOWER, TEFLON®
7120690	1	6" SEAT GASKET
7123766	1	6" TRI-RING, **FKM V680-70

**FKM = Fluoroelastomer
(Fluoroelastomer is similar to VITON®)

NOTE: Kits do not include seals for the lower guide and the cam cylinder.
Consult PARTS LIST on page 35 for lower guide and page 44, 45 for cam cylinder.

SERVICE NOTES

RECOMMENDED SPARE PARTS

The recommended spare parts list suggests parts to stock for each size Sentinel III valve. A supply of on hand parts reduces down time and speeds repair.

Spare Parts for 2x2, 2x4, 3x2, 4x2, and 6x2 Valves

PART NUMBER	QTY PER VALVE	DESCRIPTION
7122689	-	ASSEMBLY FIXTURE, LOWER STEM
7122688	-	ASSEMBLY FIXTURE, UPPER STEM
7123733	1	* SEAT RING, UPPER, **FKM W/ INS
7028587	1	* SEAT RING, LOWER, TEFLON®
7123763	1	* TRI-RING, **FKM V680-70
7123759	1	* O-RING, 228 **FKM V680-70
7123756	3	* O-RING, 213 **FKM V680-70
N70230	2	* O-RING 230 FDA NITRILE/BUNA
N70261	2	* O-RING 261 FDA NITRILE/BUNA
N70220	1	* O-RING 220 FDA NITRILE/BUNA
N70240	1	* O-RING 240 FDA NITRILE/BUNA
7123746	2	* O-RING 012 **FKM V680-70
N70231	1	* O-RING 231 FDA NITRILE/BUNA
N70110	1	* O-RING 110 FDA NITRILE/BUNA
7027821	1	RETAINER NUT 3/8-24 18-8 NE
5512434	1	PORT PLUG AND RECEPTACLE
5512407	2	MICROSWITCH
7026710	1	VISUAL INDICATOR TUBE
7026709	1	VISUAL INDICATOR GASKET
5560525	1	QUICK DUMP VALVE
43-158	1	RETAINING RING EXT 2.5" 18-8
7123752	2	SEAL GUIDE O-RING 114 **FKM V680-70
7123747	1	SEAL GUIDE O-RING 020 **FKM V680-70
7028611	1	SEAL GUIDE WITH 1" SKIRT
7027806	1	CENTERING WASHER, SEAL GUIDE
7123767	-	2" ACTUATOR SEAL KIT
0322223	1	CLAMP 13 IU 1.5" 304
0324223	1	CLAMP 13 IU 2.5" 304
N70112	1	* O-RING 112 FDA NITRILE/BUNA
N70018	1	* O-RING 018 FDA NITRILE/BUNA
57-15	2	* U-CUP BUNA
36-98(*)	1	LOCKING NUT, HEX 5/16-18 18-8
N70232	2	O-RING 232 FDA NITRILE/BUNA
43-159(*)	1	RETAINING RING INT 3.0" 18-8
5541560	2	SEAL WASHER #600-430-1/4
43-160(*)	1	RETAINING RING EXT
N70104	1	O-RING 104 FDA NITRILE/BUNA
7122164	1	PIGTAIL CONNECTOR, 3-PIN
7123022	1	QUICK DISCONNECT, PROXIMITY SWITCH
7028553(*)	2	ELASTIC STOP NUT DBV2 2.0
N70224	2	O-RING 224 FDA NITRILE/BUNA
43-161	1	RETAINING RING INT 2.0" 18-8
7121231	1	GASKET, CAM HOUSING 4.0"
7122120	1	GASKET, CAM COVER #56

* = PART OF SEAL KIT

(*) Dependent on the Sentinel Valve age, refer to the "Cam Piston/Cylinders" Section or contact Waukesha Cherry Burrell to determine which items are required.

Spare Parts for 3x3, 4x3, and 6x3 Valves

PART NUMBER	QTY PER VALVE	DESCRIPTION
7028328	-	ASSEMBLY FIXTURE, LOWER STEM
7028349	-	ASSEMBLY FIXTURE, UPPER STEM
7123735	1	* SEAT RING, UPPER, *FKM W/INS
7027813	1	* SEAT RING, LOWER, TEFLON®
7123764	1	* TRI-RING, *FKM V680-70
7123760	1	* O-RING 234 *FKM V680-70
7123756	2	* O-RING 213 *FKM V680-70
N70230	2	* O-RING 230 FDA NITRILE/BUNA
N70261	2	* O-RING 261 FDA NITRILE/BUNA
N70224	2	* O-RING 224 FDA NITRILE/BUNA
N70220	1	* O-RING 220 FDA NITRILE/BUNA
N70240	1	* O-RING 240 FDA NITRILE/BUNA
7123746	2	* O-RING 012 *FKM V680-70
N70231	1	* O-RING 231 FDA NITRILE/BUNA
N70110	1	* O-RING 110 FDA NITRILE/BUNA
7027821	1	ELASTIC STOP NUT
7028553(*)	1	ELASTIC STOP NUT
5512434	1	STRAIGHT MALE RECEPTACLE 12"
5512407	2	LIMIT SWITCH
7026710	1	VISUAL INDICATOR TUBE
7026709	1	VISUAL INDICATOR GASKET
5560525	1	QUICK DUMP VALVE
43-161	1	RETAINING RING INT 2.0" 18-8
43-159	1	RETAINING RING
7123753	2	SEAL GUIDE O-RING 115 *FKM V680-70
7123748	1	SEAL GUIDE O-RING 022 *FKM V680-70
7028335	1	SEAL GUIDE WITH 1.125" SKIRT
7027806	1	CENTERING WASHER, SEAL GUIDE
7123768	-	3" ACTUATOR SEAL KIT
0322223	1	CLAMP 13 IU 1.5" 304
0326223	1	CLAMP 13 IU 4.0" 304
N70112	1	* O-RING 112 FDA NITRILE/BUNA
N70018	1	* O-RING 018 FDA NITRILE/BUNA
7120688	1	* STEM GASKET
7121231	1	CAM HOUSING GASKET
57-15	2	* U-CUP BUNA
7122164	1	PIGTAIL CONNECTOR, 3-PIN
36-98	1	LOCKING NUT HEX 5/16-18 18-8
N70232	2	O-RING 232 FDA NITRILE/BUNA
N70104	1	O-RING, 104 FDA NITRILE/BUNA
7123022	1	QUICK DISCONNECT, PROXIMITY SWITCH
43-160	1	SNAP RING
5541560	2	SEAL WASHER
7122120	1	GASKET, CAM COVER H56

* = PART OF SEAL KIT

**FKM = Fluoroelastomer
(Fluoroelastomer is similar to VITON®)

RECOMMENDED SPARE PARTS

Spare Parts for 4x4, 4x6, 6 and 6x4 Valves

PART NUMBER	QTY PER VALVE	DESCRIPTION
7028113	-	ASSEMBLY FIXTURE, LOWER STEM
7028112	-	ASSEMBLY FIXTURE, UPPER STEM
7123737	1	* SEAT RING, UPPER,**FKM W/INS
7027618	1	* SEAT RING, LOWER,TEFLON®
7123765	1	* TRI-RING,**FKM V680-70
7123751	1	* O-RING 113 **FKM V680-70
7123757	2	* O-RING 217 **FKM V680-70
7123761	1	* O-RING 347 **FKM V680-70
N70230	1	* O-RING 230 FDA NITRILE/BUNA
N70261	2	* O-RING 261 FDA NITRILE/BUNA
N70224	3	* O-RING 224 FDA NITIRLE/BUNA
N70248	1	* O-RING 248 FDA NITRILE/BUNA
57-13	2	* U-CUP
N70110	1	* O-RING 110 FDA NITRILE/BUNA
7027641	1	LOCKING HEX NUT 5/16-18 18-8
N70232	1	O-RING 104 FDA NITRILE/BUNA
5512434	1	PORT PLUG & RECEPTACLE
7028553(*)	1	ELASTIC STOP NUT
N70112	1	* O-RING 112 FDA NITRILE/BUNA
N70231	1	* O-RING 122 FDA NITRILE/BUNA
5512407	2	LIMIT SWITCH
7026710	1	VISUAL INDICATOR TUBE
7029172	1	SEAL GUIDE WITH 1.5" SKIRT
7029173	1	CENTERING WASHER, SEAL GUIDE
7123769	-	4" ACTUATOR SEAL KIT
0526223	1	CLAMP 13 IU-5 4.0" SCH5
0322223	1	CLAMP 13 IU1.5" 304
7026709	1	VISUAL INDICATOR GASKET
7123755	2	O-RING
7123749	1	O-RING
5560525	1	QUICK DUMP VALVE
43-161	1	RETAINING RING INT 2.0" 18-8
7120689	1	* STEM GASKET 4"
7121231	1	CAM HOUSING GASKET
N70122	1	* O-RING 112 FDA NITRILE/BUNA
N70114	1	* O-RING
7122164	1	3 POLE STRAIGHT RECEPTACLE
43 - 159	1	RETAINING RING INT 3.0" 18-8
36 -98	1	LOCKING NUT HEX 5/16-18 18-8
N70232	2	O-RING 232 NITRILE BUNA
N70104	1	O-RING 104 FDA NITRILE/BUNA
5541560	2	SEAL WASHER
43 - 160	1	RETAINING RING EXT 2.125"
7123022	1	QUICK DISCONNECT, PROXIMITY SWITCH
7122120	1	GASKET, CAM COVER H56

* = PART OF SEAL KIT

* Dependent on the Sentinel Valve age, refer to the "Cam Piston/Cylinders" Section or contact Waukesha Cherry-Burrell to determine which items are required.

PART NUMBER	QTY PER VALVE	DESCRIPTION
7028118	-	ASSEMBLY FIXTURE, LOWER STEM
7028112	-	ASSEMBLY FIXTURE, UPPER STEM
7123739	1	* SEAT RING, UPPER, *FKM W/INS
7025360	1	* SEAT RING, LOWER, TEFLON®
7123766	1	* TRI-RING, *FKM V680-70
7123758	1*	O-RING 219 *FKM V680-70
7123754	2*	O-RING 116 *FKM V680-70
N70230	2*	O-RING 230 FDA NITRILE/BUNA
N70269	2*	O-RING 269 FDA NITRILE/BUNA
N70224	3*	O-RING 224 FDA NITRILE/BUNA
N70254	1*	O-RING 254 FDA NITRILE/BUNA
7123762	1*	O-RING 433 *FKM V680-70
N70231	1*	O-RING 231 FDA NITIRLE/BUNA
N70110	1*	O-RING 110 FDA NITRILE/BUNA
36-111	1	RETAINER NUT 5/8-11
5512434	1	PORT PLUG & RECEPTACLE
5512407	2	MICRO SWITCH
7026710	1	VISUAL INDICATOR TUBE
7026709	1	VISUAL INDICATOR GASKET
5560525	1	VALVE QUICK EXHAUST
43-161	1	RETAINING RING INT 2" 18-8
7123757	2	SEAL GUIDE O-RING 217 *FKM V680-70
7123750	1	SEAL GUIDE O-RING 031 *FKM V680-70
7029177	1	SEAL GUIDE W/2" SKIRT
7029176	1	SEAL GUIDE CENTERING WASHER
7123770	-	*FKM SEAL KIT
0323223	1	CLAMP 13 IU 2" CLAMP 304
3020507	1	CLAMP 13 IU 6" CLAMP 304
N70114	1	* O-RING 114 FDA NITRILE/BUNA
N70122	1	* O-RING 122 FDA NITRILE/BUNA
7025323	1	* U-CUP 6" ACTUATOR, BUNA
7120690	1	* STEM GASKET
36-98	1	LOCKING NUT HEX 5/16-8 18-8
N70232	2	O-RING 232 FDA NITRILE/BUNA
43-159	1	RETAINING RING INT. 3"
5541560	1	SEAL WASHER 600-430-1/4
43-160	1	RETAINING RING EXT. 2.125"
N70104	1	O-RING 104 FDA NITRILE/BUNA
7122164	1	PIGTAIL CONNECTOR, 3-PIN
7123022	1	QUICK DISCONNECT, PROXIMITY SWITCH
7028553	2	ELASTIC STOP NUT DBV2 2.0
N70116	2	* O-RING 116 FDA NITRILE/BUNA
7121232	1	GASKET, COVER
7122120	1	GASKET, CAM COVER H56
43-158	1	RETAINING RING EXT. 2.5"
7025324	1	WIPER, FELT

* = PART OF SEAL KIT

**FKM = Fluoroelastomer
(Fluoroelastomer is similar to VITON®)

SENTINEL III VALVE DESIGN CHANGES

Due to recent design changes incorporating the large cam pistons, part numbers for the valve less body (actuator mechanism) have changed. Following is a cross reference between the old and new design.

Valve Less Body Cross Reference

VALVE DESCRIPTION	OLD PART NUMBER	NEW PART NUMBER
2X3 Sentinel III	none	7123519
2x2 Sentinel III	none	7123156
2x4 Sentinel III	none	7123161
3x2 Sentinel III	none	7123129
4x2 Sentinel III	none	7123162
6x2 Sentinel III	none	7123130
3x3 Sentinel III	7120080	7122905
3x4 Sentinel III	7121825	7122907
3x6 Sentinel III	7122404	7122908
4x3 Sentinel III	7121376	7122906
6x3 Sentinel III	none	7123393
4x4 Sentinel III	7029209	7122909
4x6 Sentinel III	7029210	7122910
6x4 Sentinel III	7029211	7122911
6x6 Sentinel III	7029212	7122912

SENTINEL III 2" VALVE ASSEMBLY

Item	Part Number	Qty.	Description
1	See Note	1	Valve Complete Less Body
2	0324223	1	131U Clamp
3		1	Body Assembly (Part of Manifold Weldment)
4	0322223	1	131U Clamp
5	7028611	1	Seal Guide
6	7123747	1	O-ring
7	7123752	2	O-ring
8	7027806	1	Washer

SENTINEL III 3" VALVE ASSEMBLY

Item	Part Number	Qty.	Description
1	See Note	1	Valve Complete Less Body
2	0326223	1	131U Clamp
3		1	Body Assembly (Part of Manifold Weldment)
4	0322223	1	131U Clamp
5	7028335	1	Seal Guide
6	7123748	1	O-ring
7	7123753	2	O-ring
8	7027806	1	Washer

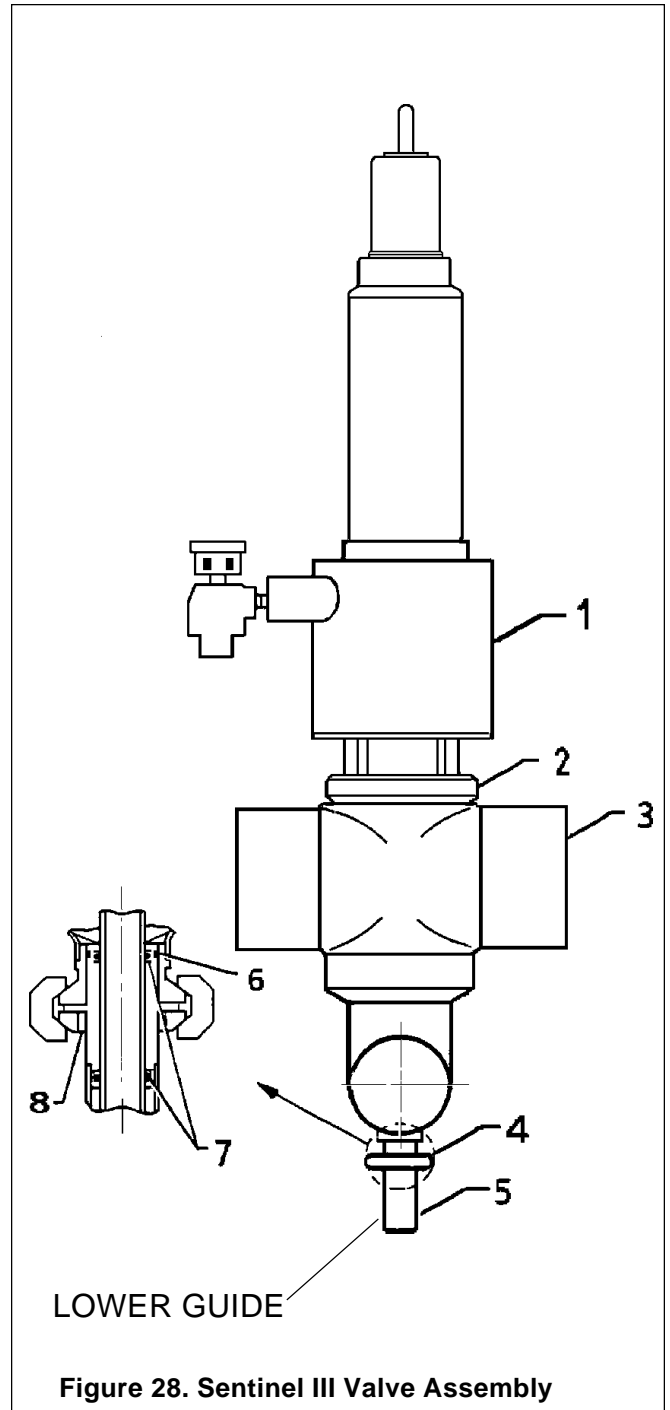
SENTINEL III 4" VALVE ASSEMBLY

Item	Part Number	Qty.	Description
1	See Note	1	Valve Complete Less Body
2	0526223	1	131U Clamp
3		1	Body Assembly (Part of Manifold Weldment)
4	0322223	1	131U Clamp
5	7029172	1	Seal Guide
6	7123749	1	O-ring
7	7123755	2	O-ring
8	7029173	1	Washer

SENTINEL III 6" VALVE ASSEMBLY

Item	Part Number	Qty.	Description
1	See Note	1	Valve Complete Less Body
2	3020507	1	131U Clamp
3		1	Body Assembly (Part of Manifold Weldment)
4	0323223	1	131U Clamp
5	7029177	1	Seal Guide
6	7123750	1	O-ring
7	7123757	2	O-ring
8	7029176	1	Washer

PARTS LIST (Includes Lower Guide)



NOTE: Contact WAUKESHA CHERRY-BURRELL for Part Number Due to Variations in Finish.

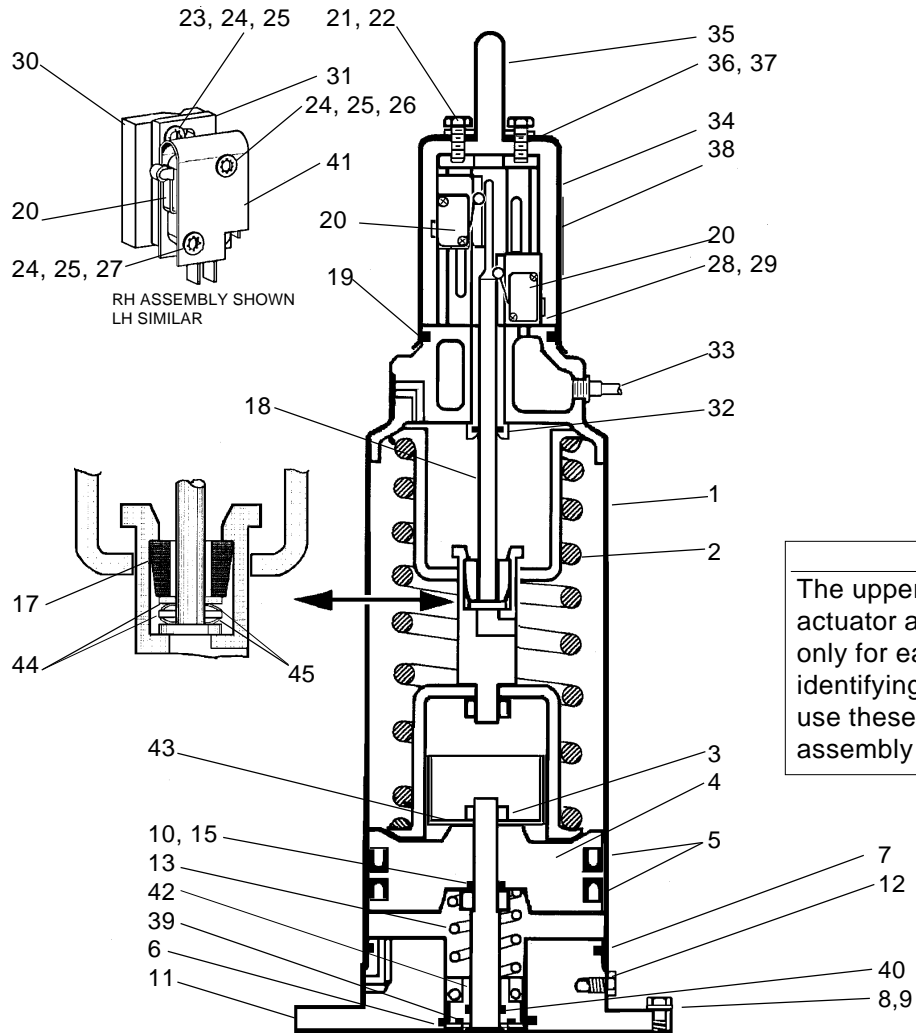
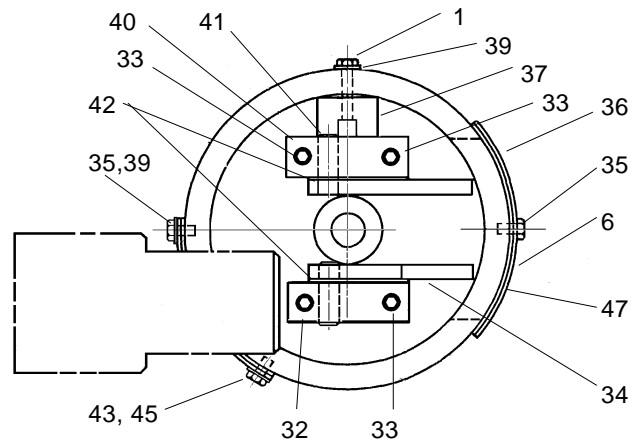


Figure 29. 2" Upper Actuator Assembly

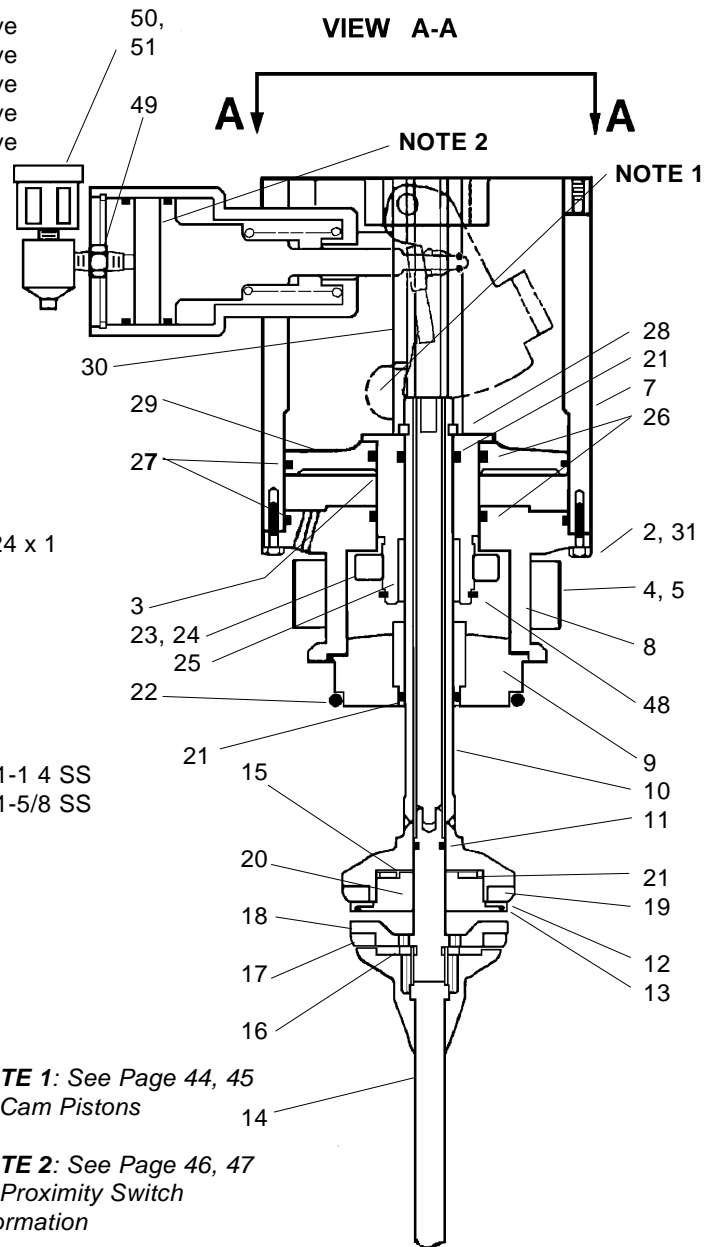
Item	Part No.	Qty.	Description
1	7028581	1	Cylinder Assembly
2	7028600	1	Spring Cage Assembly
3	7027821	1	Nut
4	7027820	1	Piston
5	57-15	2	U-cup
6	N70220	1	O-Ring
7	N70240	1	O-Ring
8	30-102	10	Capscrew, 1/420 x 1-1/4 SS
9	43-144	10	Washer, 1/4 SS
10	7123746	1	O-Ring
11	7028793	1	Base
12	30-68	6	Capscrew, 1/420 x 3/8 SS
13	5901106	1	Spring
14			
15	7028555	1	Washer
16			
17	7123404	1	Bumper
18	7027831	1	Limit switch Rod
19	N70231	1	O-Ring
20	5512407	2	Limit switch
21	30-58	2	Capscrew, 1/420 x 3/4 SS
22	5541560	2	Seal Washer
23	30-199	2	Machine Screw, 4-40 x 3/8 SS

Item	Part No.	Qty.	Description
24	43-162	6	Washer, Lock Ext. SS
25	43-125	6	Washer, Flat SS
26	30-69	2	Machine Screw, 4-40 x 5/8 SS
27	30-200	2	Machine Screw, 4-40 x 7/8
28	43-26	2	Washer, #8 SS
29	30-143	2	Machine Screw 8-32 x 1/2 SS
30	3024810	2	Switch Adjusting Block
31	3024532	2	Mounting Plate
32	N70110	1	O-Ring
33	5512434	1	Port Plug & Receptacle
34	7026707	1	Switch Assembly Cover
35	7026710	1	Visual Indicator Tube
36	7026708	1	Visual Indicator Plate
37	7026709	1	Visual Indicator Gasket
38	5902473	1	Actuator Label
39	N70018	1	O-Ring
40	N70112	1	O-Ring
41	7120453	2	Insulating Shield
42	7120693	1	Adapter
43	7122146	1	Centering Bracket
44	43-154	2	Washer, 3/8 Narrow SS
45	7123382	2	Spring Washer

Item	Part No.	Qty.	Description
1	30-102	2	Capscrew, 1/4-20 x 1-1/2
2	43-144	8	Washer, 1/4
3	43-158	1	Retaining Ring, External
4	7122676	1	Safety Shield
5	7120107	1	Caution Tag
6	7120108	1	Caution Tag
7	7028919	1	Cam Housing Cylinder
8	7123976	1	Yoke
9	7122675	1	Yoke Plug
10	7123155	1	Upper Seat Stem for 2x2 Valve
	7123155	1	Upper Seat Stem for 2x4 Valve
	7123123	1	Upper Seat Stem for 3x2 Valve
	7123160	1	Upper Seat Stem for 4x2 Valve
	7123124	1	Upper Seat Stem for 6x2 Valve
11	7123746	1	O-ring
12	7122677	1	Retaining Ring
13	7123763	1	Tri-ring
14	7123122	1	Lower Drain Stem for 2x2 Valve
	7123159	1	Lower Drain Stem for 2x4 Valve
	7123122	1	Lower Drain Stem for 3x2 Valve
	7123122	1	Lower Drain Stem for 4x2 Valve
	7123122	1	Lower Drain Stem for 6x2 Valve
15	43-16	1	Lockwasher, 1/2 SS
16	43-28	1	Lockwasher, 3/8 SS
17	7123734	1	Lower Seat Ring
18	7123153	1	Inner Stem for 2x2 Valve
	7123153	1	Inner Stem for 2x4 Valve
	7123125	1	Inner Stem for 3x2 Valve
	7123158	1	Inner Stem for 4x2 Valve
	7123126	1	Inner Stem for 6x2 Valve
19	7123733	1	Upper Seat Ring
20	7122679	1	Retaining Nut
21	7123756	3	O-Ring
22	7123759	1	O-Ring
23	7027973	1	Upper Seat Adjusting Nut
24	30-268	1	Socket Head Capscrew, 5/16-24 x 1
25	7028788	1	Bearing Retainer
26	N70230	2	O-Ring
27	N70261	2	O-Ring
28	7028368	1	Split Retaining Ring
29	7028261	1	Piston, Upper Seat
30	7028792	1	Cage Assembly
31	30-93	8	Capscrew, 1/4-20 x 1
32	30-266	1	Capscrew, Shoulder 3/8-16 x 1-1 4 SS
33	30-267	3	Capscrew, Shoulder 3/8-16 x 1-5/8 SS
34	7029220	1	Cam
35	30-62	4	Capscrew, 1/4-20 x 1/2 SS
36	7028708	1	Cover
37	7028761	1	Guide Block
38			
39	43-27	4	Washer, 1/4 SS
40	7028765	1	Pivot Block
41	30-362	2	Dowel Pin, 1/2 x 1-1/2 SS
42	7028554	2	Bearing Washer
43	7029198	1	Cover Plate
44			
45	7121231	1	Gasket
46			
47	7122120	1	Cam Cover Gasket
48	43-160	1	Snap Ring
49	5552640	1	Nipple, 1/8 NPT
50	5560525	1	Valve, Quick Dump Exhaust
51	5901868	1	Air Muffler



VIEW A-A



NOTE 1: See Page 44, 45 for Cam Pistons

NOTE 2: See Page 46, 47 for Proximity Switch Information

Figure 30. 2" Lower Actuator Assembly

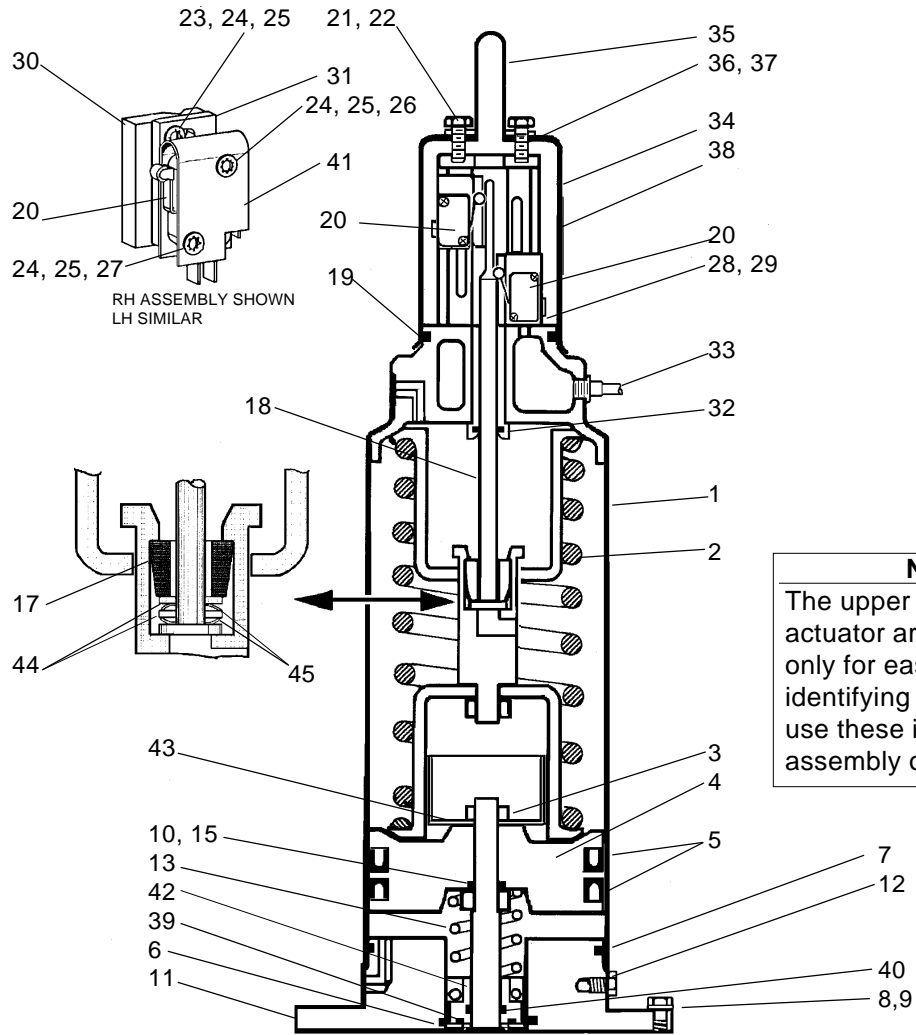
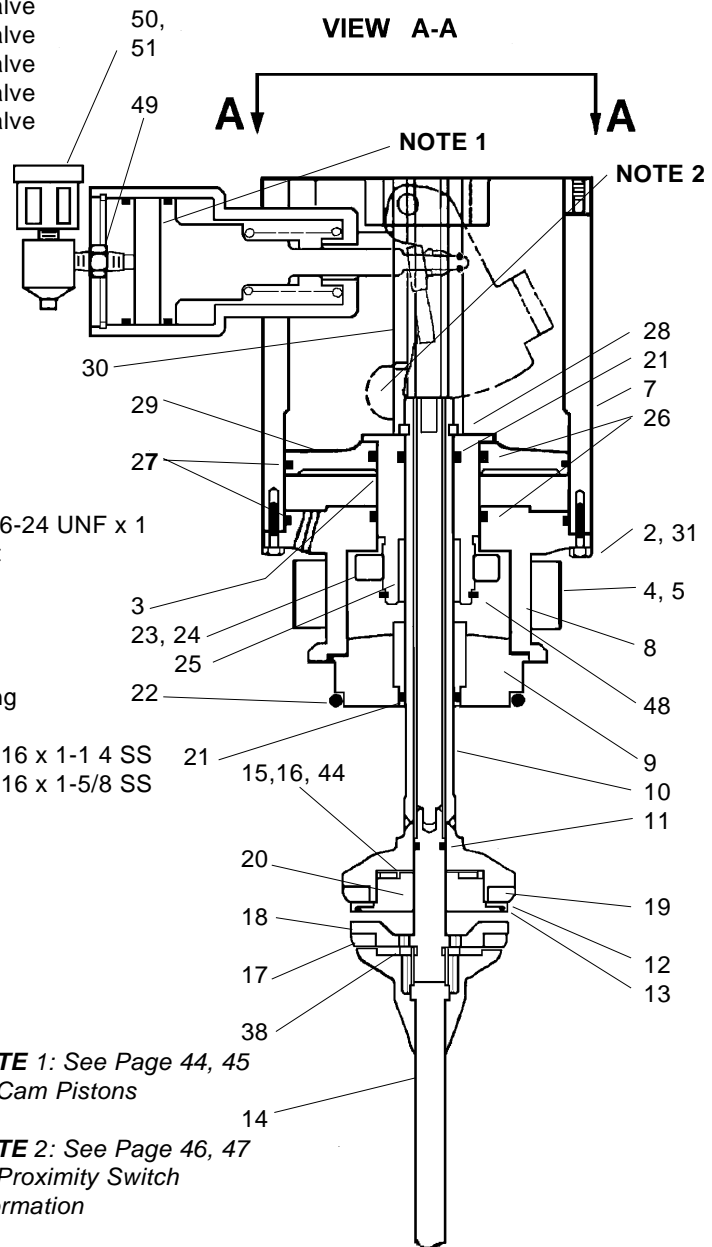
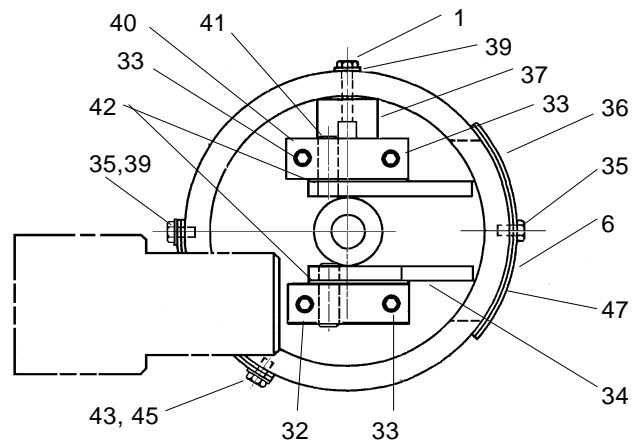


Figure 31. 3" Upper Actuator Assembly

Item	Part No.	Qty.	Description	Item	Part No.	Qty.	Description
1	7028920	1	Cylinder Assembly	24	43-162	6	Washer, Lock Ext. SS
2	7027822	1	Spring Cage Assembly	25	43-125	6	Washer, Flat SS
3	7027821	1	Retainer Nut	26	30-69	2	Machine Screw, 4-40 x 5/8 SS
4	7027820	1	Piston	27	30-200	2	Machine Screw, 4-40 x 7/8
5	57-15	2	U-cup	28	43-26	2	Washer, #8 SS
6	N70220	1	O-Ring	29	30-143	2	Machine Screw 8-32 x 1/2 SS
7	N70240	1	O-Ring	30	3024810	2	Switch Adjusting Block
8	30-102	10	Capscrew, 1/4-20 x 1-1/4 SS	31	3024532	2	Mounting Plate
9	43-144	10	Washer, 1/4 SS	32	N70110	1	O-Ring
10	7123746	1	O-Ring	33	5512434	1	Port Plug & Receptacle
11	7028793	1	Base	34	7026707	1	Switch Assembly Cover
12	30-68	6	Capscrew, 1/4-20 x 3/8 SS	35	7026710	1	Visual Indicator Tube
13	5901106	1	Spring	36	7026708	1	Visual Indicator Plate
14				37	7026709	1	Visual Indicator Gasket
15	7028555	1	Washer	38	5902473	1	Actuator Label
16				39	N70018	1	O-Ring
17	7123404	1	Bumper	40	N70112	1	O-Ring
18	7027831	1	Limit Switch Rod	41	7120453	2	Insulating Shield
19	N70231	1	O-Ring	42	7120693	1	Adapter
20	5512407	2	Limit Switch	43	7122146	1	Centering Bracket
21	30-58	2	Capscrew, 1/4-20 x 3/4 SS	44	43-154	2	Washer, 3/8 Narrow SS
22	5541560	2	Seal Washer	45	7123382	2	Spring Washer
23	30-199	2	Machine Screw, 4-40 x 3/8 SS				

Item	Part No.	Qty.	Description
1	30-102	2	Capscrew, 1/4-20 x 1-1/2
2	43-144	8	Washer, 1/4
3	43-158	1	Retaining Ring, External
4	7120135	1	Safety Shield
5	7120107	1	Caution Tag
6	7120108	1	Caution Tag
7	7028919	1	Cam Housing Cylinder
8	7123977	1	Yoke
9	7028363	1	Yoke Plug
10	7120079	1	Upper Seat Stem for 3x3 Valve
	7120079	1	Upper Seat Stem for 3x4 Valve
	7120079	1	Upper Seat Stem for 3x6 Valve
	7121378	1	Upper Seat Stem for 4x3 Valve
	7123391	1	Upper Seat Stem for 6x3 Valve
11	7123746	1	O-Ring
12	7028916	1	Retaining Ring
13	7123764	1	Tri-ring
14	7120078	1	Lower Drain Stem for 3x3 Valve
	7121823	1	Lower Drain Stem for 3x4 Valve
	7122411	1	Lower Drain Stem for 3x6 Valve
	7120078	1	Lower Drain Stem for 4x3 Valve
	7120078	1	Lower Drain Stem for 6x3 Valve
15	7026184	1	Bellville Washer
16	30-363	1	Dowell Pin
17	7027813	1	Lower Seat Ring
18	7120072	1	Inner Stem for 3x3 Valve
	7120072	1	Inner Stem for 3x4 Valve
	7120072	1	Inner Stem for 3x6 Valve
	7121377	1	Inner Stem for 4x3 Valve
	7123392	1	Inner Stem for 6x3 Valve
19	7123735	1	Upper Seat Ring
20	7028917	1	Retaining Nut
21	7123756	2	O-Ring
22	7123760	1	O-Ring
23	7027973	1	Upper Seat Adjusting Nut
24	30-268	1	Capscrew, Socket Head, 5/16-24 UNF x 1
25	7028788	1	Piston Retainer , Upper Seat
26	N70230	2	O-Ring
27	N70261	2	O-Ring
28	7028368	1	Lock Ring, Split
29	7028261	1	Piston , Upper Seat
30	7028792	1	Cage Assembly, Guide Spring
31	30-93	8	Capscrew, 1/4-20 x 1
32	30-266	1	Capscrew, Socket Head 3/8-16 x 1-1 4 SS
33	30-267	3	Capscrew, Socket Head 3/8-16 x 1-5/8 SS
34	7029220	1	Cam
35	30-62	4	Capscrew, 1/4-20 x 1/2 SS
36	7028708	1	Cover
37	7028761	1	Guide Block
38	43-33	1	Lock Washer
39	43-27	4	Washer, 1/4 SS
40	7028765	1	Pivot Block
41	30-362	2	Dowel Pin, 1/2 x 1-1/2 SS
42	7028554	2	Bearing Washer
43	7029198	1	Cover
44	7120688	1	Stem Gasket
45	7121231	1	Gasket
46			
47	7122120	1	Cam Cover Gasket
48	43-160	1	Snap Ring
49	5552640	1	Nipple, 1/8 NPT
50	5560525	1	Quick Dump Exhaust Valve
51	5901868	1	Air Muffler



NOTE 1: See Page 44, 45 for Cam Pistons

NOTE 2: See Page 46, 47 for Proximity Switch Information

Figure 32. 3" Lower Actuator Assembly

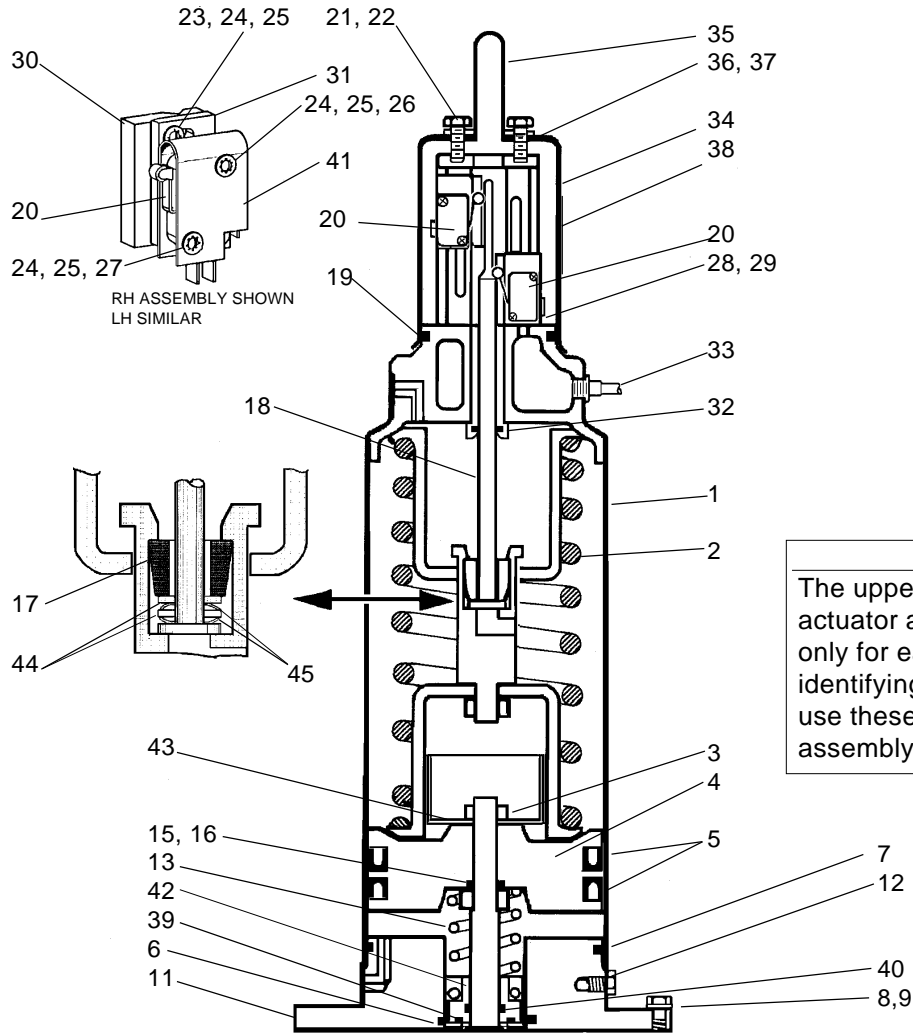
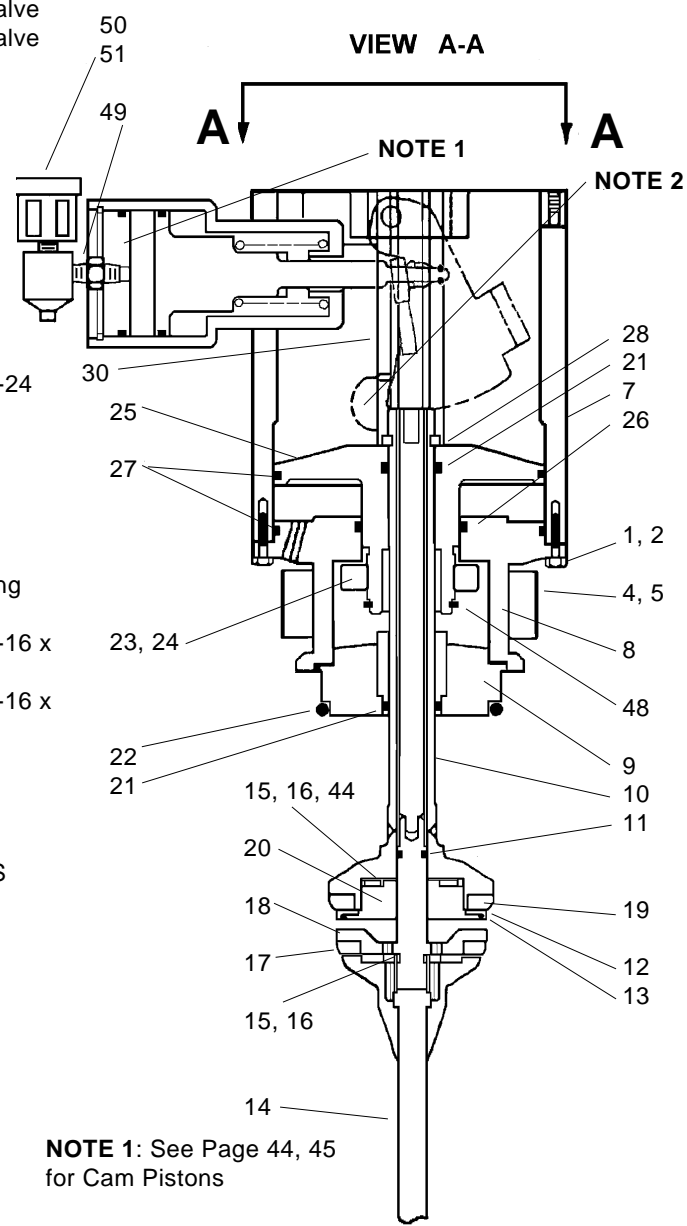
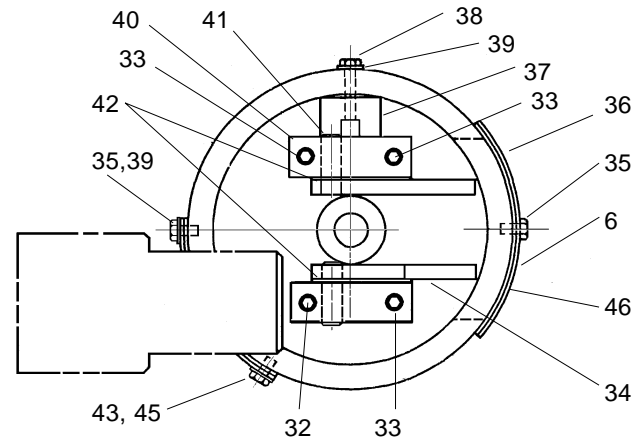


Figure 33. 4" UPPER ACTUATOR ASSEMBLY

Item	Part No.	Qty.	Description	Item	Part No.	Qty.	Description
1	7028926	1	Cylinder Assembly	24	43-162	6	Washer, Lock Ext. SS
2	7027635	1	Spring Cage Assembly	25	43-125	6	Washer, Flat SS
3	7027641	1	Nut	26	30-69	2	Machine Screw, 4-40 x 5/8 SS
4	7027628	1	Piston	27	30-200	2	Machine Screw, 4-40 x 7/8
5	57-13	2	U-cup Packing	28	43-26	2	Washer, #8 SS
6	N70224	1	O-Ring	29	30-143	2	Machine Screw- 8-32 x 1/2 SS
7	N70248	1	O-Ring	30	3024810	2	Switch Adjusting Block
8	30-210	10	Capscrew, 1/4-20 x 1-1/4 SS	31	3024532	2	Mounting Plate
9	43-144	10	Washer, 1/4 Narrow SS	32	N70110	1	O-Ring
10				33	5512434	1	Port Plug & Receptacle
11	7028951	1	Base	34	7026707	1	Switch Assembly Cover
12	30-68	6	Capscrew, 1/4-20 x 3/8 SS	35	7026710	1	Visual Indicator Tube
13	7027998	1	Spring	36	7026708	1	Visual Indicator Plate
14				37	7026709	1	Visual Indicator Gasket
15	7029955	1	Washer	38	5902473	1	Actuator Label
16	N70112	1	O-Ring	39	N70122	1	O-Ring
17	7123404	1	Bumper	40	N70114	1	O-Ring
18	7027639	1	Limit Switch Rod	41	7120453	2	Insulating Shield
19	N70231	1	O-Ring	42	7120694	1	Adapter
20	5512407	2	Limit Switch	43	7122147	1	Centering Bracket
21	30-58	2	Capscrew, 1/4-20 x 3/4 SS	44	43-154	2	Washer, 3/8 Narrow SS
22	5541560	2	Seal Washer	45	7123382	2	Spring Washer
23	30-199	2	Machine Screw, 4-40 x 3/8 SS				

Item	Part No.	Qty.	Description
1	30-210	8	Capscrew, 1/4-20 x 1-1/2
2	43-144	8	Washer, 1/4
3			
4	7120109	1	Safety Shield
5	7120107	1	Caution Label
6	7120108	1	Caution Label
7	7028919	1	Cam Housing Cylinder
8	7123741	1	Yoke
9	7028258	1	Yoke Plug
10	7028930	1	Upper Seat Stem for 4x4 Valve
	7028930	1	Upper Seat Stem for 4x6 Valve
	7028942	1	Upper Seat Stem for 6x4 Valve
11	7123751	1	O-Ring
12	7028838	1	Retaining Ring
13	7123765	1	Tri-ring
14	7027616	1	Lower Drain Stem for 4x4 Valve
	7029208	1	Lower Drain Stem for 4x6 Valve
	7027616	1	Lower Drain Stem for 6x4 Valve
15	7025678	2	Bellville Washer
16	30-363	2	Dowell Pin
17	7027618	1	Lower Seat Ring
18	7028928	1	Inner Stem for 4x4 Valve
	7028928	1	Inner Stem for 4x6 Valve
	7028944	1	Inner Stem for 6x4 Valve
19	7123737	1	Upper Seat Ring
20	7028839	1	Retaining Nut
21	7123757	2	O-Ring
22	7123761	1	O-Ring
23	7027973	1	Upper Seat Adjusting Nut
24	30-268	1	Socket Head Capscrew, /16-24 UNF x 1
25	7029196	1	Upper Seat Piston
26	N70230	1	O-Ring
27	N70261	2	O-Ring
28	7027974	1	Lock Ring, Split
29			
30	7028763	1	Cage Assembly, Guide Spring
31			
32	30-182	1	Capscrew, Socket Head 3/8-16 x 1-1/2 SS
33	30-269	3	Capscrew, Socket Head 3/8-16 x 1-3/4 SS
34	7029220	1	Cam
35	30-62	4	Capscrew, 1/4-20 x 1/2 SS
36	7028708	1	Cover Plate
37	7028761	1	Guide Block
38	30-102	2	Capscrew, 1/4-20 x 1-1/4 SS
39	43-27	4	Washer, 1/4 SS
40	7028765	1	Pivot Block
41	30-362	2	Dowel Pin, 1/2 x1-1/2 SS
42	7028554	2	Bearing Washer
43	7029198	1	Cover Plate
44	7120689	1	Stem Gasket
45	7121231	1	Gasket
46	7122120	1	Cam Cover Gasket
47			Pipe Plug 1/4 or 1/2 NPT
48	43-160	1	Snap Ring
49	5552640	1	Nipple, 1/8 NPT 7/16
50	5560525	1	Valve, Quick Dump Exhaust
51	5901868	1	Air Muffler



NOTE 1: See Page 44, 45 for Cam Pistons

NOTE 2: See Page 46, 47 for Proximity Switch Information

Figure 34. 4" Lower Actuator Assembly 3-14-96

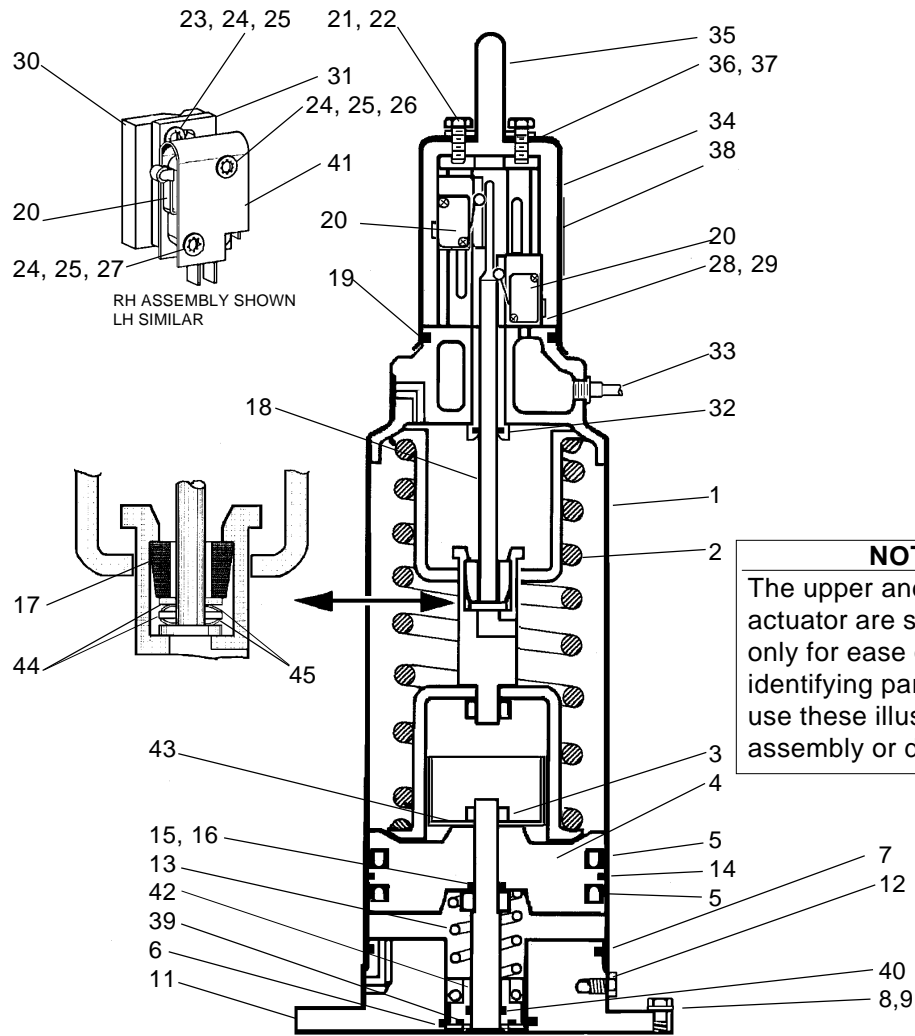
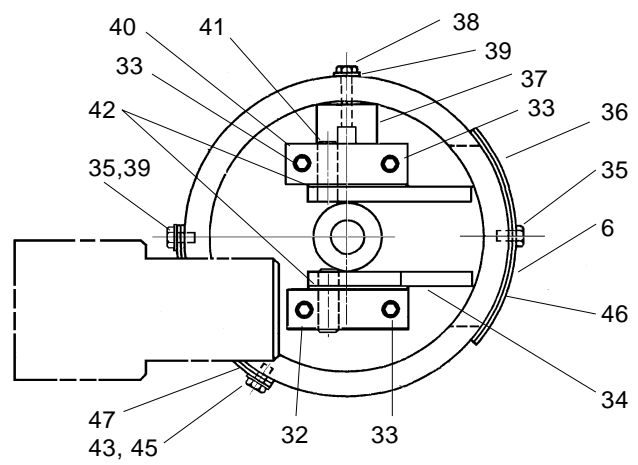


Figure 35. 6" Upper Actuator Assembly

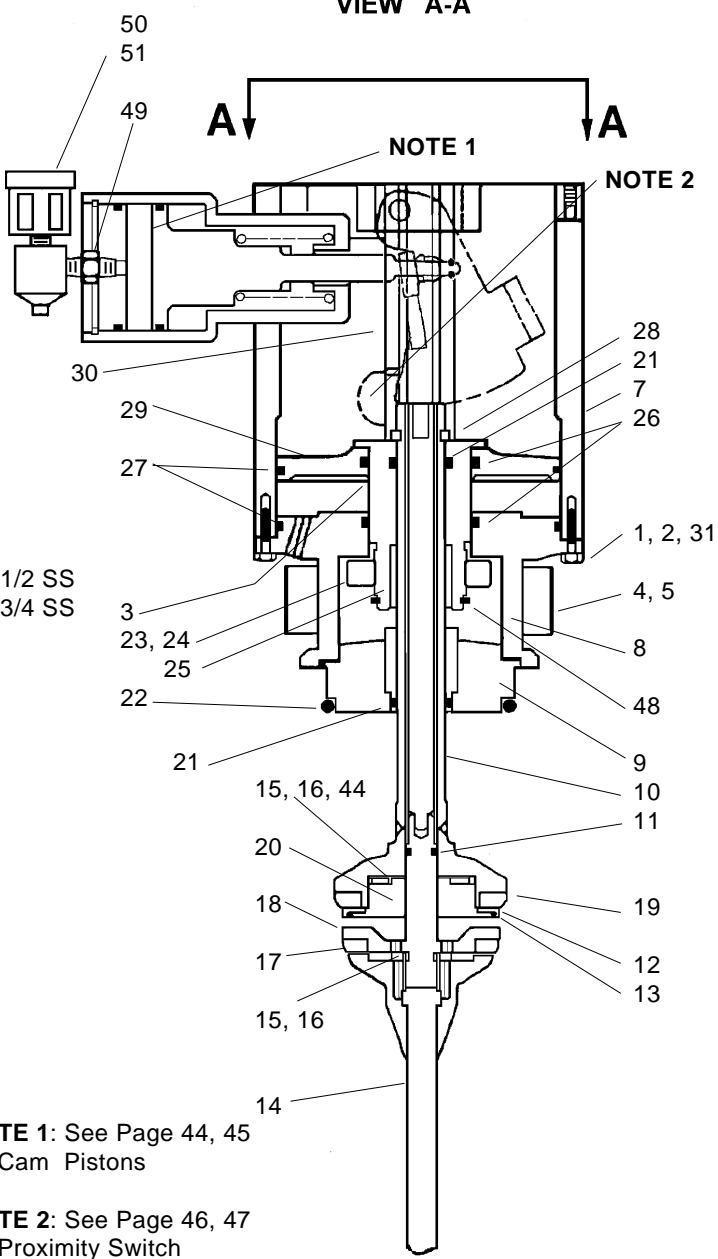
Item	Part No.	Qty.	Description
1	7027664	1	Cylinder Assembly
2	7027944	1	Spring Cage Assembly
3	7027695	1	Nut
4	7027693	1	Piston
5	7025323	2	U-cup Packing
6	N70224	1	O-Ring
7	N70254	1	O-Ring
8	30-60	10	Capscrew, 3/8-16x 1-1/4 SS
9	43-154	10	Washer, 3/8 SS
10			
11	7028967	1	Base
12	30-361	6	Capscrew, 3/8-16 x 5/8 SS
13	7027998	1	Spring
14	7025324	1	Felt Wiper
15	7027694	1	Washer
16	N70114	1	O-Ring
17	7123404	1	Bumper
18	7027704	1	Limit Switch Rod
19	N70231	1	O-Ring
20	5512407	2	Limit Switch
21	30-58	2	Capscrew, 1/4-20 x 3/4 SS
22	5541560	2	Seal Washer
23	30-99	2	Machine Screw, 4-40 x 3/8 SS

Item	Part No.	Qty.	Description
24	43-162	6	Washer, Lock Ext. SS
25	43-125	6	Washer, Flat SS
26	30-69	2	Machine Screw, 4-40 x 5/8 SS
27	30-200	2	Machine Screw, 4-40 x 7/8
28	43-26	2	Washer, #8 SS
29	30-143	2	Machine Screw- 8-32 x 1/2 SS
30	3024810	2	Switch Adjusting Block
31	3024532	2	Mounting Plate
32	N70110	1	O-Ring
33	5512434	1	Port Plug & Receptacle
34	7026707	1	Switch Assembly Cover
35	7026710	1	Visual Indicator Tube
36	7026708	1	Visual Indicator Plate
37	7026709	1	Visual Indicator Gasket
38	5902473	1	Actuator Label
39	N70122	1	O-Ring
40	N70116	1	O-Ring
41	7120453	2	Insulating Shield
42	7120695	1	Adapter
43	7122148	1	Centering Bracket
44	43-154	2	Washer, 3/8 Narrow SS
45	7123382	2	Spring Washer

Item	Part No.	Qty.	Description
1	30-60	8	Capscrew, 3/8-16 x 1-1/4
2	43-154	8	Washer, 3/8 Narrow
3	43-158	1	Retaining Ring, External
4	7120110	1	Safety Shield
5	7120107	1	Caution Label
6	7120108	1	Caution Label
7	7028966	1	Cam Housing Cylinder
8	7123974	1	Yoke
9	7028306	1	Yoke Plug
10	7028955	1	Upper Seat Stem
11	7123754	1	O-Ring
12	7028960	1	Retaining Ring
13	7123766	1	Tri-ring
14	7027674	1	Lower Drain Stem
15	7025678	2	Bellville Washer
16	30-363	2	Dowell Pin
17	7025360	1	Lower Seat Ring
18	7028956	1	Inner Stem
19	7123739	1	Upper Seat Ring
20	7028959	1	Retaining Nut
21	7123758	2	O-Ring
22	7123762	1	O-Ring
23	7027973	1	Upper Seat Adjusting Nut
24	30-268	1	Socket Head Capscrew, 5/16-24 UNF x 1
25	7028964	1	Piston Retainer, Upper Seat
26	N70230	2	O-Ring
27	N70269	2	O-Ring
28	7028297	1	Lock Ring, Split
29	7028963	1	Piston, Upper Seat
30	7028952	1	Cage Assembly, Guide Spring
31	43-28	6	Lockwasher, 3/8 Medium
32	30-182	1	Capscrew, Shoulder 3/8-16 x 1-1/2 SS
33	30-269	3	Capscrew, Shoulder 3/8-16 x 1-3/4 SS
34	7029220	1	Cam
35	30-62	4	Capscrew, 1/4-20 x 1/2 SS
36	7028958	1	Cover Plate
37	7028761	1	Guide Block
38	30-102	2	Capscrew, 1/4-20 x 1-1/4
39	43-27	4	Washer, 1/4 Reg. SS
40	7028765	1	Pivot Block
41	30-362	2	Dowel Pin, 1/2 x 1-1/2 SS
42	7028554	2	Bearing Washer
43	7029168	1	Cover Plate
44	7120690	1	Stem Gasket
45			Gasket
46	7121232	1	Gasket
47	7122120	1	Cam Cover Gasket
48	43-160	1	Snap Ring
49	5552640	1	Nipple, 1/8 NPT 7/16
50	5560525	1	Valve, Quick Dump Exhaust
51	5901868	1	Air Muffler



VIEW A-A

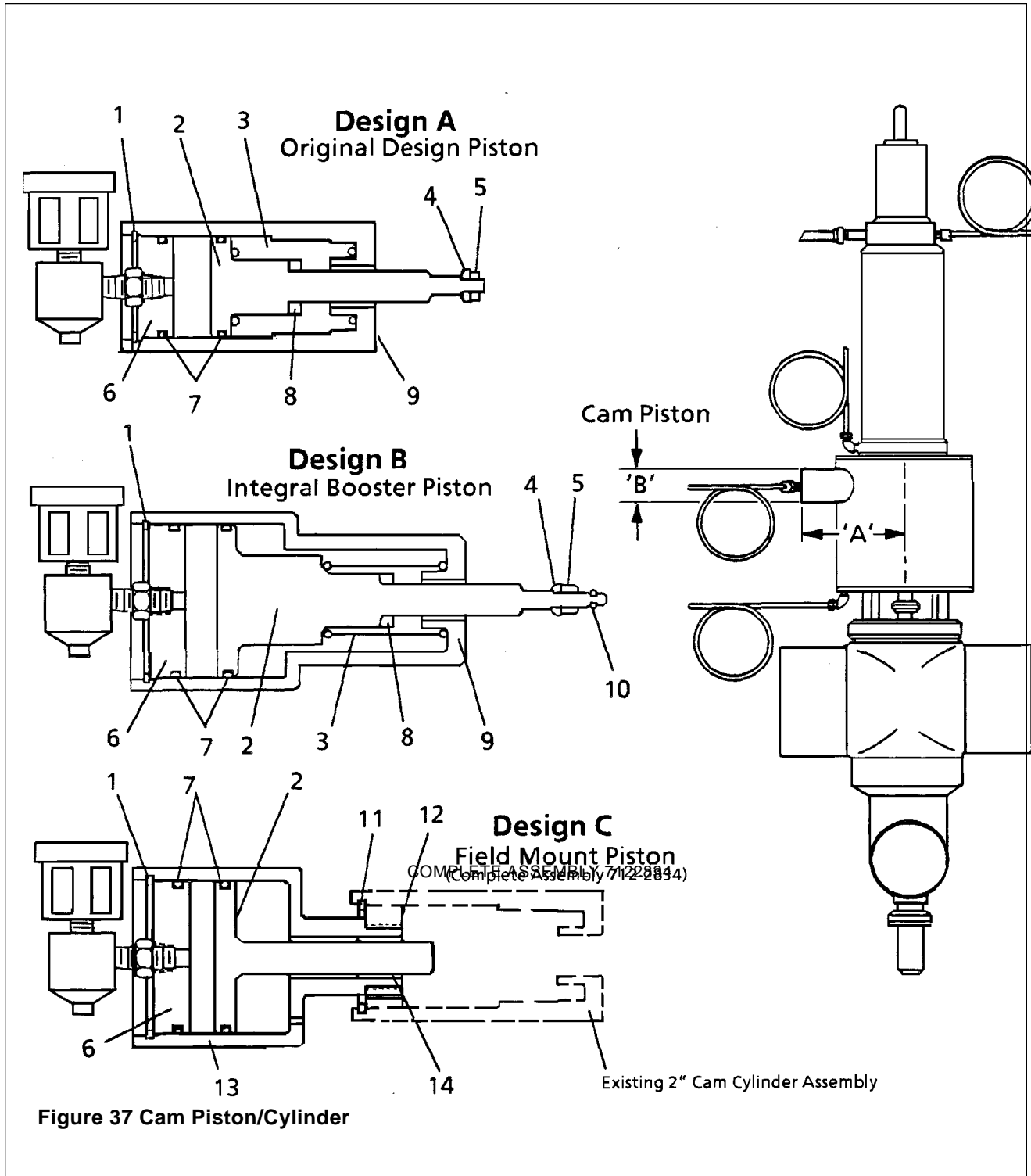


NOTE 1: See Page 44, 45 for Cam Pistons

NOTE 2: See Page 46, 47 for Proximity Switch Information

Figure 36. 6" Lower Actuator Assembly

CAM PISTON/CYLINDERS



CAM PISTON/CYLINDERS

Item No.	Description	DESIGN A	DESIGN B		DESIGN C
			2", 3", 4"	6"	
1	Snap Ring	43-161	43-159	43-159	43-159
2	Piston	7123786	7122868	7122869	7122830
3	Spring	7028745	7028745	7028745	
4	Bearing Washer	7028835	7122865	7122865	
5	Lock Nut	7028553	36-98	36-98	
6	Cap	7028764	7122832	7122832	7122832
7	O-Ring	N70224	N70232	N70232	N70232
8	Bumper	7028769	7028769	7028769	
9	Cylinder	7028760	7122870	7122871	
10	O-Ring	N70104	N70104	N70104	
11	Snap Ring				43-161
12	Cap				7122833
13	Cylinder				7122831
14	Bushing				7028693

Dimension	Design A	Design B	Design B	Design C
		2", 3", 4"	6"	
* 'A'	6-5/8"	8-1/4"	9-3/8"	10-7/8 "
'B'	2-9/16	3-1/2	3- 1/2 '	3-1/2

*Add approximately 2" for the quick exhaust valve/muffler.

Table 5. Cam Piston/Cylinders

PROXIMITY SWITCH

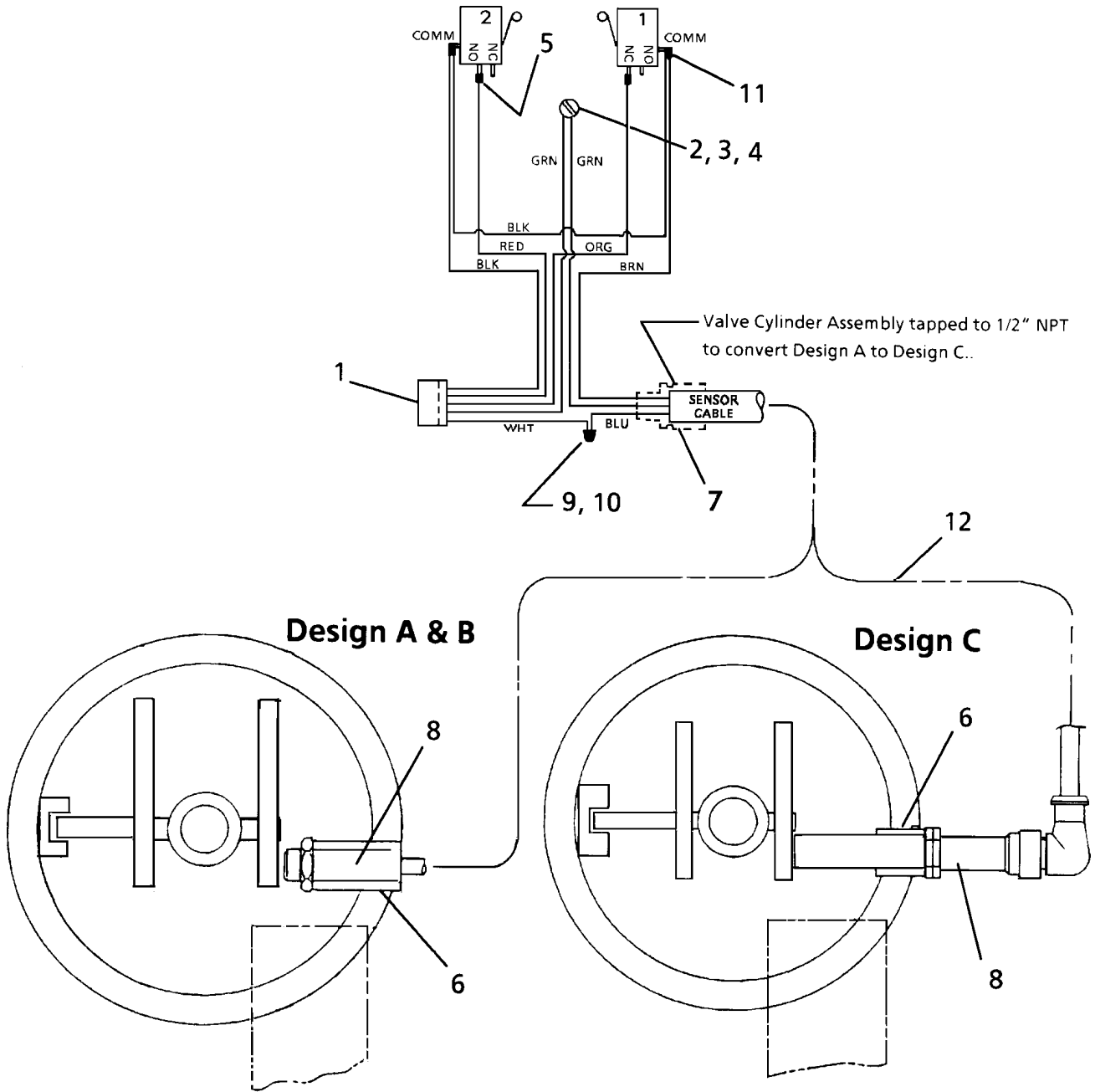


Figure 38. Proximity Switch Wiring

**PROXIMITY SWITCH
TABLE 6.**

Item No.	Qty.	Description	Design A	Design B	Design C
1	1	Plug Port & Receptacle	5512434	5512434	5512434
2	1	Wire Terminal	5510146	5510146	5510146
3	1	Machine Screw - 6-32 x 3/8	30-184	30-184	30-184
4	1	Lockwasher	43-163	43-163	43-163
5	2	Terminal Flag	5512421	5512421	5512421
6	1	Switch Adapter (3" & 4" Valves)	7120781	7120781	7123048
6	1	Switch Adapter (6" Valves)	7120782	7120782	7123048
7	1	Strain Relief/Pigtail	5513113	7122164	7122164
8	1	Proximity Switch	7120780 N/A	7122165 N/A	7123022
9	1	Wire Nut	5511000	5511000	5511000
10	1	Wire Sleeve	7098794	7098794	7098794
11	2	Terminal Flag	5512422	5512422	5512422
12	1	Cable (3" Valve)			7123019
12	1	Cable (4" Valve)			7123020
12	1	Cable (6" Valve)			7123021

**N/A-Not Available. These switches are discontinued.
Designs A and B should be converted to Design C if
the switch needs to be replaced.**



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