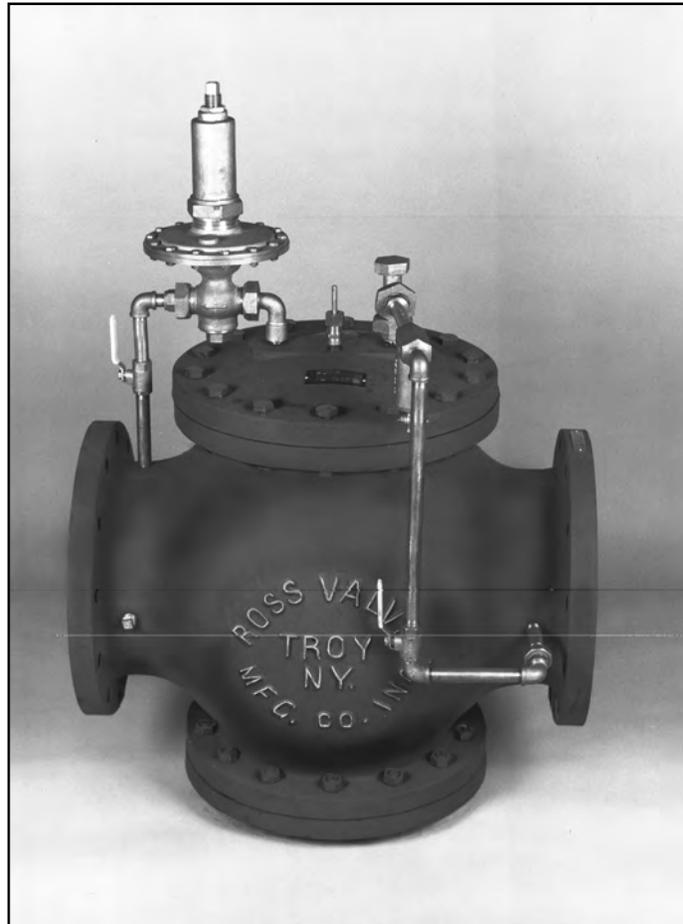


# SINGLE ACTING ALTITUDE VALVE

## INSTRUCTIONS

Installation - Operation - Inspection - Maintenance



**4" - 36" ROSS MODEL - 40AWR  
THROTTLING, SINGLE ACTING ALTITUDE VALVE**

Globe Flat Seat Style

**ROSS VALVE Mfg. Co., Inc.**

PO BOX 595, TROY, NY 12181 - PHONE 518/274-0961 - FAX 518/274-0210

## INSTALLATION / START-UP (ROSS PISTON VALVE – GLOBE OR ANGLE STYLE)

### Shipment:

Prior to shipment, each valve is thoroughly tested and pre-adjusted at the factory to the expected field conditions. Any visible damage to the crate or packaging should be immediately brought to the attention of the shipping company and documented with photographs.

Depending upon the valve size, external controls may be attached or in a separate box. The inlet of the main valve is identified with a metal tag. When controls are shipped separately, connections are tagged.

### Storage:

If it is necessary to store the valve before installation, it should be protected from the elements. Inside storage is recommended. If this is not possible, the valve should be protected from dirt, heat, freezing, and direct sunlight.

### Installation:

1. Carefully remove all shipping materials and check the valve for any other foreign objects.
2. If possible, flush the line before inserting the valve.
3. The valve is tagged with a model and serial number. It is recommended that the serial number be noted in your records as this will be requested by the factory when any technical support or parts replacement is required. **Valve serial number: L\_\_\_\_\_.**
4. Place the valve in line with the flange marked "INLET" facing the high pressure or supply line.  
CAUTION: Do not obstruct the vent hole in the center of the bottom cap (#16 for Globe Body valves) or in the differential cylinder bracket (#27 for Angle Body valves). Allow enough clearance above the valve for removal of the stem assembly.
5. If external piping and controls are not attached to the valve when shipped, connect couplings identified with tags that are numbered. The arrow on the pilot valve body points in the direction of flow through the pilot valve. Flow is always away from the top cap of the main valve. The indicator rod (#20) shows the position of the main stem.
6. Attach gauge cocks to the back side of the valve.
7. Complete any necessary wiring on solenoid valves (if applicable).

### Start-Up:

1. Close the isolation valves (#18) in the control piping.
2. Open the main line gate valve (if installed) on the discharge/downstream side of the valve.
3. *Slowly* open the main line gate valve (if installed) on the inlet/upstream side of the valve.
4. Open the isolation valves (#18) in the control piping.
5. Loosening the union of the control piping on the top cap side of the speed control valve will help bleed air and give a positive indication when the operating chamber is full. It may be necessary to apply pressure to the valve indicator rod (if provided) with a wrench handle or block of wood until the valve operating chamber is pressurized.
6. No lubrication or adjustment to the valve is required or recommended. The valve has been thoroughly tested at the factory and set to the expected field conditions.

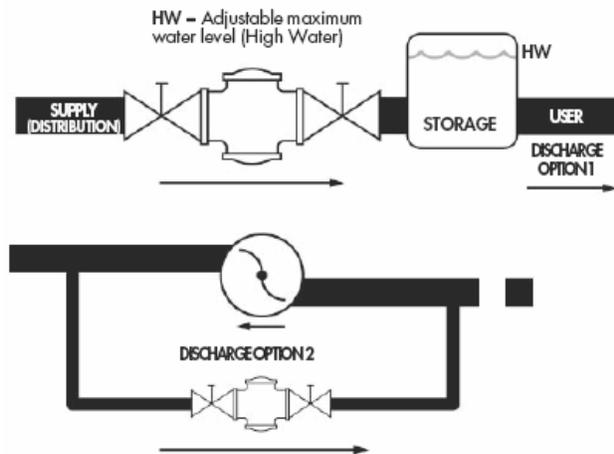
# SINGLE ACTING ALTITUDE VALVE

**Purpose:** Prevent overflow in low ground storage

**Model Number:** 40AWR

## Basic Applications

1. Prevent overflow of a ground storage tank or basin.
2. Dissipate a high system pressure as it enters a low head storage.
3. Prevent supply side pressure from dropping too quickly.



The maximum level is adjustable.

**If:** Water is drawn out of storage, causing storage pressure to fall below supply pressure

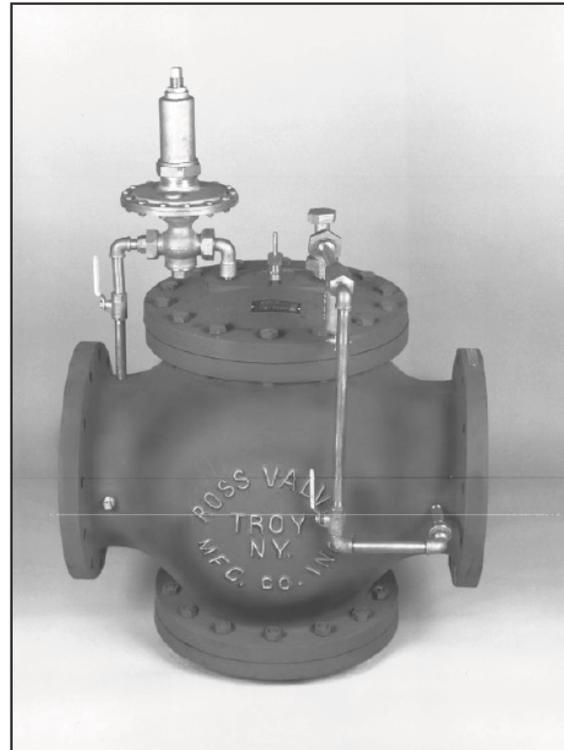
**Ross Main Valve will:** Open wider to discharge more water from supply to storage.

**If:** Level (pressure) in the tank reaches a maximum setting

**Ross Main Valve will:** Full close to prevent flow from supply into storage.

## Caution

**DON'T USE ON ELEVATED TANKS** (except in special circumstances). A differential pressure is required across the valve for proper operation.



Ross engineers customize the basic 40AWR to accommodate individual needs.

**Sizes:** 4" - 48"

**Type:** Throttling

**Primarily Controlled By:**

Hydraulic pressure

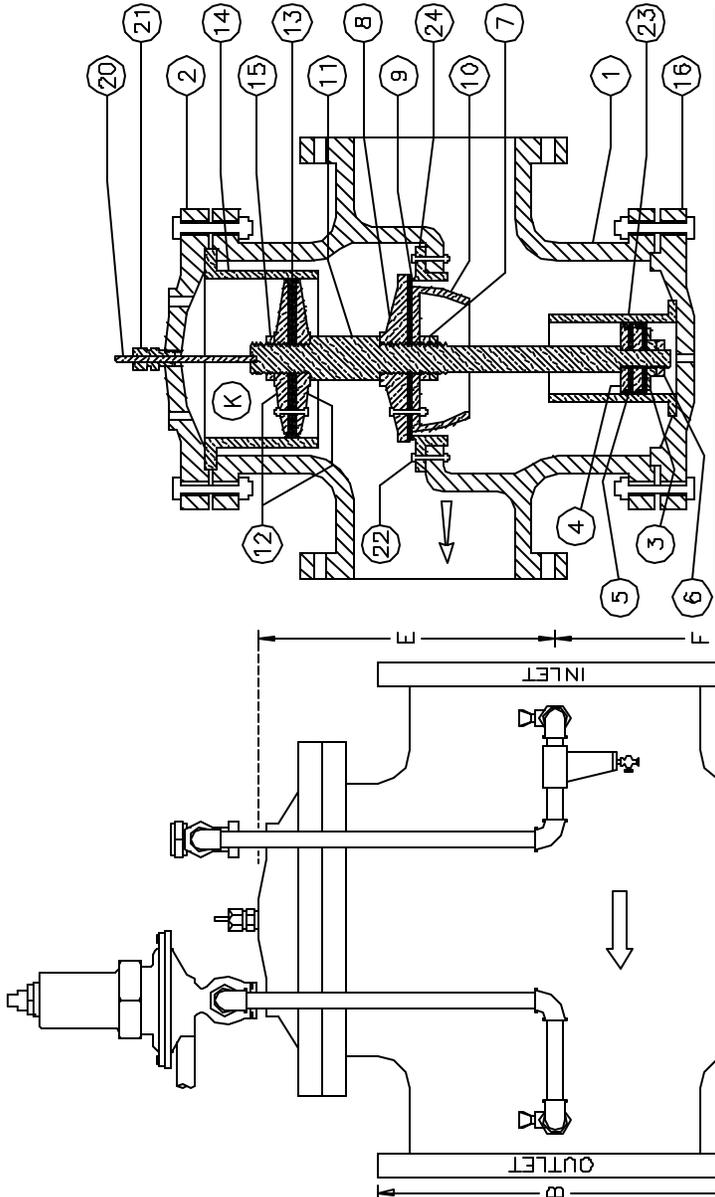
**Located:** In line leading to low ground storage or low tank head

**Purpose:** To prevent low ground storage from overflowing

**Inlet Pressure:** Maximum: 300 psi

**Inlet Pressure:** Minimum: 5 psi

**Construction:** Body: 4" - 36" - Cast iron (semi-steel) with bronze trim



| PART | DESCRIPTION                     | QTY. | MATERIAL         |
|------|---------------------------------|------|------------------|
| 1    | VALVE SHELL                     | 1    | CAST IRON        |
| 2    | TOP CAP                         | 1    | CAST IRON        |
| 3    | BOTTOM STEM GUIDE NUT           | 1    | BRONZE           |
| 4    | BOTTOM CUP FOLLOWERS (SET OF 2) | 1    | BRONZE           |
| 5    | PISTON CUP PACKING              | 2    | LEATHER          |
| 6    | BOTTOM STEM LOCK NUT            | 1    | BRONZE           |
| 7    | STEM NUT                        | 1    | BRONZE           |
| 8    | SEAT DISC                       | 1    | BRONZE           |
| 9    | SEAT PACKING                    | 1    | POLYURETHANE     |
| 10   | SEAT PACKING SUPPORT            | 1    | BRONZE           |
| 11   | STEM                            | 1    | BRONZE           |
| 12   | MAIN CUP PLATES (SET OF 2)      | 1    | BRONZE           |
| 13   | MAIN CUP PACKING                | 2    | LEATHER          |
| 14   | MAIN BUSHING                    | 1    | BRONZE           |
| 15   | TOP STEM NUT                    | 1    | BRONZE           |
| 16   | BOTTOM CAP                      | 1    | CAST IRON        |
| 17   | NEEDLE VALVE                    | 1    | BRONZE           |
| 18   | ISOLATION VALVE                 | 2    | BRONZE           |
| 19   | PILOT VALVE                     | 1    | BRONZE           |
| 20   | INDICATOR ROD                   | 1    | BRONZE           |
| 21   | INDICATOR STUFFING BOX          | 1    | BRONZE           |
| 22   | BOLTS & NUTS (SEAT RING)        | VARY | BRONZE           |
| 23   | BOTTOM CAP CYLINDER             | 1    | BRONZE           |
| 24   | SEAT RING                       | 1    | BRONZE           |
| 25   | STRAINER                        | 1    | BRONZE/STAINLESS |
|      | BOLTS & NUTS (TOP & BOTTOM CAP) | VARY | STEEL            |
|      | BOLTS & NUTS (CUP PLATES)       | VARY | BRONZE           |
|      | BOLTS & NUTS (SEAT DISC)        | VARY | BRONZE           |
|      | BOLTS (BOTTOM CAP CYLINDER)     | VARY | BRONZE           |
|      | INDICATOR ROD PACKING (SET)     | 1    | TEFLON           |
|      | COVER & MAIN BUSHING GASKETS    | 3    | COMPOSITION      |
|      | STEM GASKETS                    | 3    | COMPOSITION      |

| VALVE SIZE (IN) | ANSI B16.1 CLASS | SHIPPING WEIGHT (LBS) | DIMENSIONS (INCHES) |        |        | E&F    |
|-----------------|------------------|-----------------------|---------------------|--------|--------|--------|
|                 |                  |                       | A                   | B      | C&D    |        |
| 4               | 125              | 235                   | 14                  | 9      | 4-3/4  | 7      |
|                 | 250              | 275                   | 14-5/8              | 10     | 4-3/4  | 7      |
| 6               | 125              | 375                   | 17-3/4              | 11     | 6-5/8  | 9      |
|                 | 250              | 430                   | 17-3/4              | 12-1/2 | 6-5/8  | 9      |
| 8               | 125              | 690                   | 24                  | 13-1/2 | 8-3/4  | 12-1/2 |
|                 | 250              | 750                   | 24-13/16            | 15     | 8-3/4  | 12-1/2 |
| 10              | 125              | 920                   | 24-7/8              | 16     | 10     | 14-1/4 |
|                 | 250              | 1000                  | 26-1/4              | 17-1/2 | 10     | 14-1/4 |
| 12              | 125              | 1375                  | 30                  | 19     | 12     | 15-1/2 |
|                 | 250              | 1475                  | 31-1/2              | 20-1/2 | 12     | 15-1/2 |
| 14              | 125              | 1770                  | 34-1/4              | 21     | 14     | 18     |
|                 | 250              | 1850                  | 35-3/4              | 23     | 14     | 18     |
| 16              | 125              | 2400                  | 37-7/8              | 23-1/2 | 15     | 21-1/2 |
|                 | 250              | 2600                  | 39-1/4              | 25-1/2 | 15     | 21-1/2 |
| 18              | 125              | 3300                  | 41-7/8              | 25     | 18-3/8 | 24     |
|                 | 250              | 3500                  | 41-7/8              | 28     | 18-3/8 | 24     |
| 20              | 125              | 3550                  | 42-3/8              | 27-1/2 | 18-3/8 | 24     |
|                 | 250              | 3800                  | 42-3/8              | 30-1/2 | 18-3/8 | 24     |
| 24              | 125              | 5200                  | 47                  | 32     | 20     | 25     |
|                 | 250              | 5500                  | 47                  | 36     | 20     | 25     |
| 30              | 125              | 9800                  | 63-3/4              | 38-3/4 | 26-1/4 | 34     |
|                 | 250              | 10800                 | 63-1/16             | 43     | 26-1/4 | 34     |
| 36              | 125              | 11800                 | 65                  | 46     | 26-1/4 | 34     |
|                 | 250              | 12800                 | 65                  | 50     | 26-1/4 | 34     |

**ROSSE VALVE Mfg. Co., Inc.**  
 6 OAKWOOD AVENUE - TROY, NEW YORK, 12180 - TEL. (518) 274 0981  
 POST OFFICE BOX 595 - TROY, NEW YORK, 12181 - FAX (518) 274 0210  
 WEBSITE: www.rossevalve.com - E-MAIL: sales@rossevalve.com

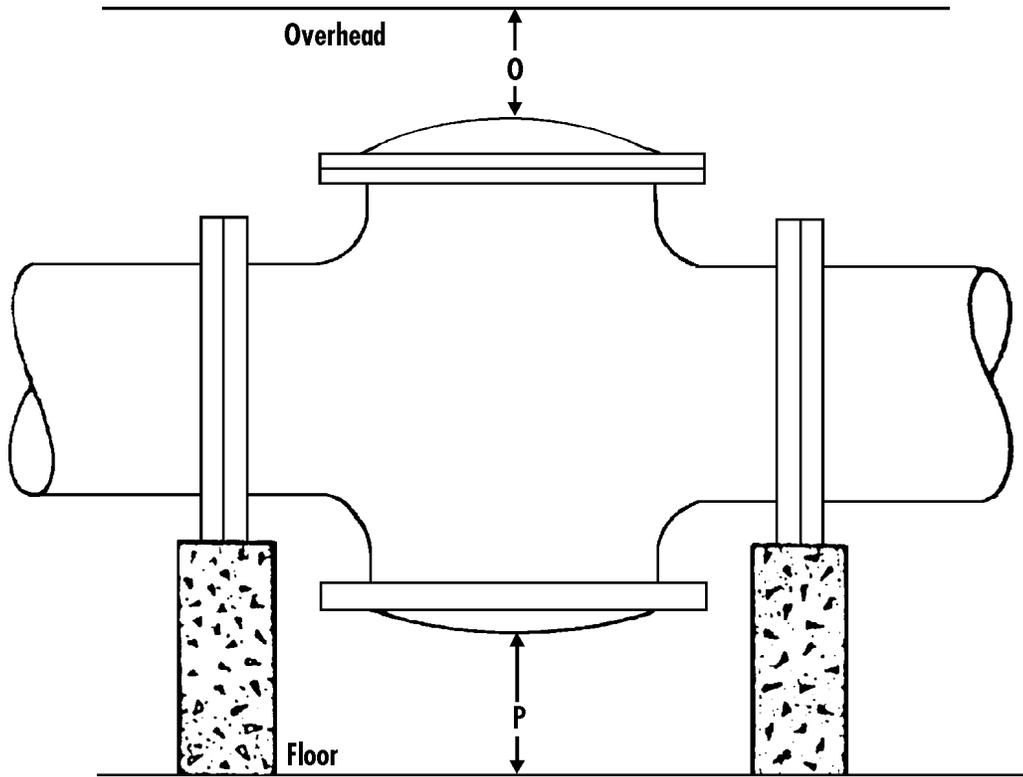
DRAWING 40AWR GLOBE BODY 4" - 36" NO. SCALE FIGURE 22 DATE 8-27-01 RJC

Model 40AWR  
 THROTTLING SINGLE ACTING ALTITUDE VALVE

# DIMENSIONS

Globe Body Minimum Clearances

Piston Valve Sizes: 4" - 36"



| Size (Inches) | 4"    | 6"    | 8"    | 10" | 12" | 14" | 16" | 18" | 20" | 24" | 30" | 36" |
|---------------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| O             | 14    | 16    | 18    | 21  | 23  | 28  | 28  | 33  | 33  | 36  | 43  | 46  |
| P             | 4 1/2 | 5 1/2 | 6 1/2 | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   |

## Note

1. Dimension "O" is clearance for removal of the top cap and piston for repacking the main valve. Additional working space for the convenience of the service man should be considered above as well as around the valve.
2. Dimension "P" as listed is the desirable clearance under the valve for removal of the STANDARD bottom cap. This dimension may be reduced to 1 inch for all valves on special applications.

## Note

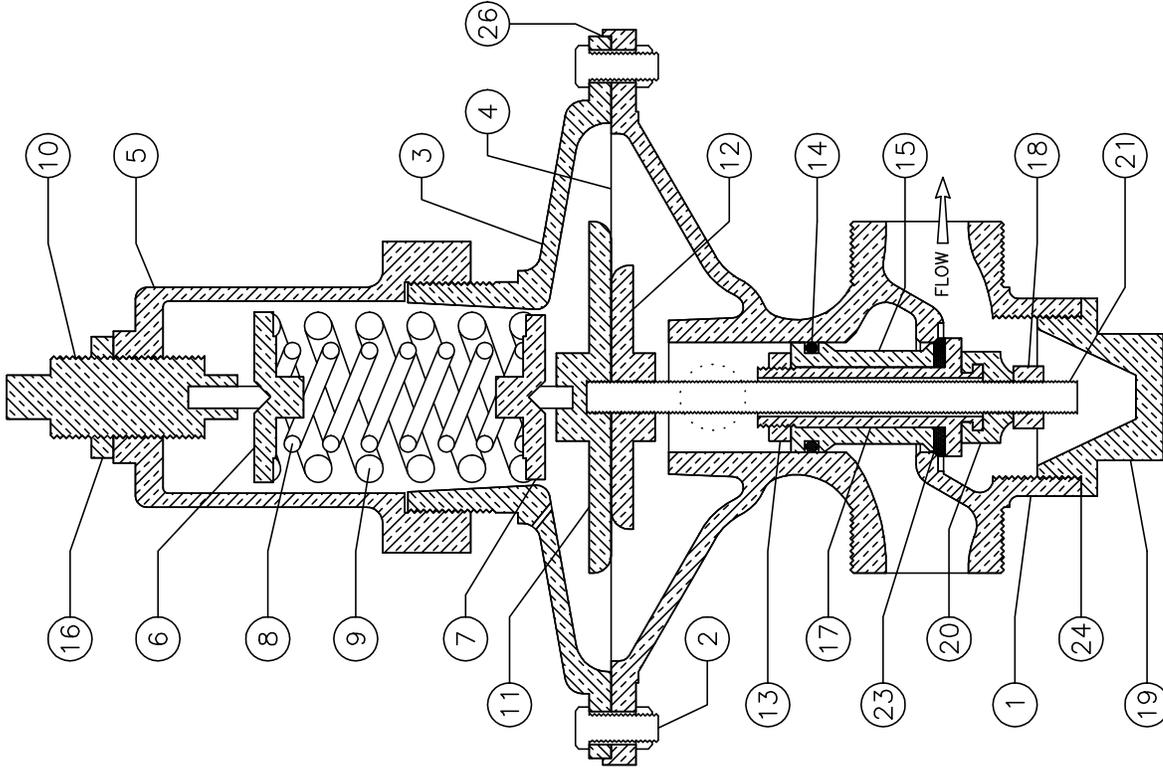
- A. **Do not obstruct vent hole located at the center of the bottom cap.**
- B. Consideration should be given for installation of valves 14" or larger under manhole in the roof of the valve vault or for additional clearance above the valve since a mechanical hoist will probably be required for removal of the piston. An eye bolt or hook cast in the cover slab over the center of the valve is useful.
- C. If clearance under the valve is limited, dimensions "O" and "P" can be modified. Consult the factory concerning special applications.

The purpose of a pilot valve is to control the opening and closing of the main valve by trapping or releasing water from the main valve's "operating chamber" ("K" - the chamber above the main valve piston). The **Model 40AWR Altitude Pilot Valve** uses this logic in order to maintain a constant pressure (water elevation) downstream of the main valve.

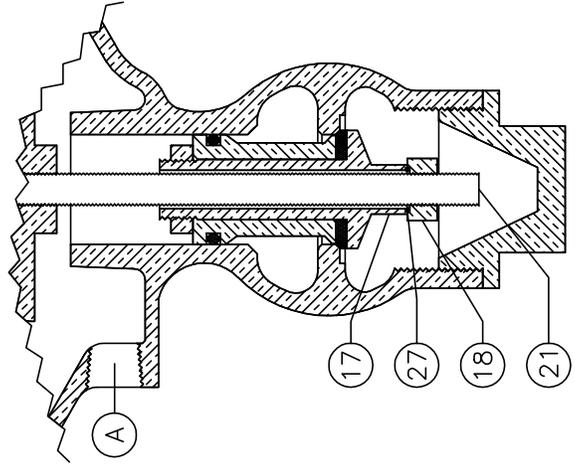
The pilot valve operates by creating a pressure balance across the diaphragms (4). Pressure above the diaphragms is set by the adjusting screw (10) acting on the adjusting springs (8 & 9). Pressure beneath the diaphragms is exerted hydraulically in one of two manners:

- 1 - A sensing port through the valve stem (17) to the outlet throat of the pilot valve, or
  - 2 - A separate sensing port directly under the diaphragms, to a remote outlet pressure source.
- When the pilot valve senses a low outlet pressure, the force of the springs (8 & 9) causes the entire stem assembly to move down. This pushes the seat packing (23) away from the seat, allowing water to escape from the main valve operating chamber. This causes the piston of the main valve to open, resulting in an increase in the downstream pressure (or water elevation in the tank/reservoir).

Once the downstream pressure rises above the setting of the springs (8 & 9), the hydraulic force overcomes the spring force and the stem assembly is pushed upwards. This causes the pilot seat to seal off, trapping water in the main valve operating chamber (with water still entering through the inlet line). This causes the piston of the main valve to close, resulting in a decrease in the outlet pressure (water elevation). This opening and closing sequence (commonly referred to as "throttling") is continuously taking place in order to maintain the pressure (altitude) setting of the pilot valve.



NOTE (A)  
 STATIC SENSING CONNECTION UNDER DIAPHRAGM(S) TO BE PIPED TO A REMOTE OUTLET PRESSURE SOURCE, WHEN REQUIRED.



|   |                     |                     |
|---|---------------------|---------------------|
| <b>ROSS VALVE Mfg. Co., Inc.</b>  |                     | FILE: P40AWR        |
| 6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961 |                     |                     |
| NO SCALE  | DRAWING 40AWR PILOT |                     |
| DATE 6-1-64   | 1030-AA             | REVISED 9-22-99 S.M |
| MODEL 40AWR PILOT VALVE<br>ALTITUDE   |                     |                     |

| PART | DESCRIPTION                | QTY  | MATERIAL     |
|------|----------------------------|------|--------------|
| 1    | SHELL                      | 1    | BRONZE       |
| 2    | BOLTS & NUTS               | VARY | BRONZE       |
| 3    | DIAPHRAGM COVER            | 1    | BRONZE       |
| *4   | DIAPHRAGM(S)               | VARY | BRONZE       |
| 5    | SPRING CHAMBER             | 1    | BRONZE       |
| 6    | TOP SPRING WASHER          | 1    | BRONZE       |
| 7    | BOTTOM SPRING WASHER       | 1    | BRONZE       |
| 8    | INNER SPRING               | 1    | STEEL        |
| 9    | OUTER SPRING               | 1    | STEEL        |
| 10   | ADJUSTING SCREW            | 1    | BRONZE       |
| 11   | DIAPHRAGM BUTTON           | 1    | BRONZE       |
| 12   | DIAPHRAGM NUT/SUPPORT      | 1    | BRONZE       |
| 13   | LOCK NUT - VALVE STEM      | 1    | BRONZE       |
| *14  | O-RING - THIMBLE           | 1    | BUNA-N       |
| 15   | THIMBLE                    | 1    | BRONZE       |
| 16   | LOCK NUT - ADJUSTING SCREW | 1    | BRONZE       |
| 17   | VALVE STEM                 | 1    | BRONZE       |
| 18   | LOCK NUT - DIAPHRAGM STEM  | 1    | BRONZE       |
| 19   | BOTTOM CAP                 | 1    | BRONZE       |
| 20   | LINK NUT                   | 1    | BRONZE       |
| 21   | DIAPHRAGM STEM             | 1    | BRONZE       |
| *23  | SEAT PACKING               | 1    | STAINLESS    |
| *24  | GASKET - BOTTOM CAP        | 1    | POLYURETHANE |
| *26  | GASKET - DIAPHRAGM         | 1    | COMPOSITION  |
| 27   | O-RING - LOCK NUT          | 1    | COMPOSITION  |

\*INCLUDED IN STANDARD REPAIR KIT

# STRAINER

Model Number: 5F-2

**Sizes:** ½" – 1"

**Located:** On any external piping

**Purpose:** To protect external piping and control devices from fouling or damage from foreign particles

**Screen:** Cylindrical Dutch weave stainless steel wire mesh

**Piping Connection:** Standard pipe thread

## Operation

1. Water enters the cylindrical screen (#2) from the top and passes out through the sides of the cylinder.
2. Any particle too large to pass through .012 inch openings gets trapped in the cylinder, where, unless there is unusual turbulence, they settle at the bottom.

## Recommendation

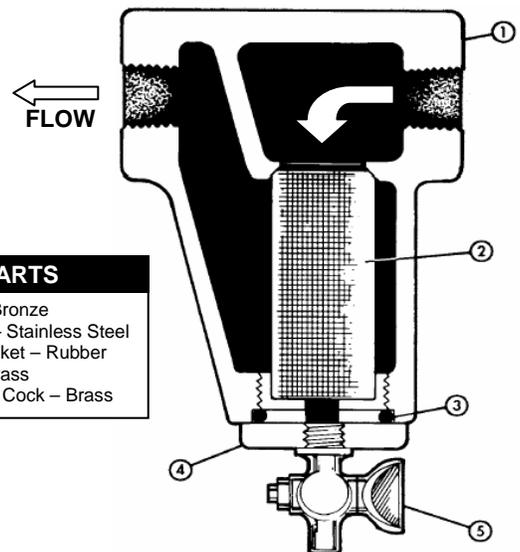
1. Strainer should be "blown down" frequently to remove collected foreign material from the sediment chamber.
2. Strainer screen should be removed occasionally for inspection and thorough cleaning.

## Note

1. To clean without shutting down the line, open the flush cock (#5) in the bottom cap (#4) for several seconds.
2. To remove the screen (#2), which requires shutting down the line, unscrew the bottom cap assembly (#5).

## Option

Two strainers installed in parallel (with the appropriate isolation valves) to permit uninterrupted service while cleaning.



### PARTS

1. Body – Bronze
2. Screen – Stainless Steel
3. Cap Gasket – Rubber
4. Cap – Brass
5. Flushing Cock – Brass

# NEEDLE VALVE

**Sizes:** One size fits all piston valves

**Primarily Controlled By:** Manually Adjusted

**Located:** On external control circuit of the main valve

**Purpose:** To limit flow in and out of the operating chamber

**Standard Shipped Adjustment:**

**Course Needle:** 5/6 to 2 turns off the seat

**Fine Needle:** Based on individual specifications

## Operation

The simple construction reliably limits maximum flow through the external piping, depending on the position of the adjustable stem/needle (#4) relative to the seat.

1. When the needle (#4) is adjusted counter-clockwise to a raised position,
  - a. More water can pass through the needle valve.
  - b. Water enters (leaves) the operating chamber more quickly.
  - c. The main valve piston moves up and down more quickly.
2. When the needle (#4) is adjusted clockwise to a lowered position,
  - a. Less water can pass through the needle valve.
  - b. Water enters (leaves) the operating chamber more slowly.
  - c. The main valve piston moves up and down more slowly.

## Adjustment

To adjust needle valve, which can be done without shutting down the main valve:

1. Remove the hex cap (#2) and lock (#1).
2. With a screw driver;
  - a. Turn the needle (#4) counter-clockwise to raise it
  - b. Turn the needle (#4) clockwise to lower it
3. Once the optimum position is determined, no further adjustment of the needle should be required.

## Note

It is advisable to occasionally remove the cap (#2) and lock (#1) and change the position of the needle (#4) momentarily to insure against gradual plugging.

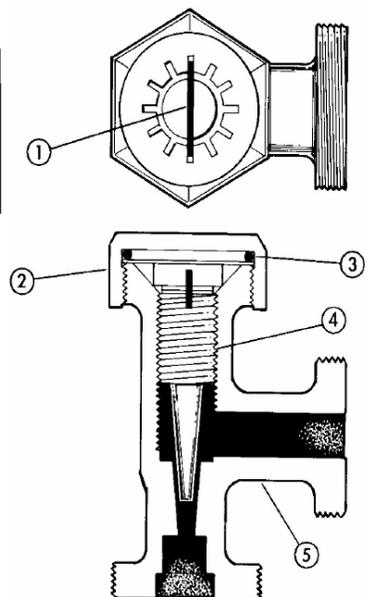
## Option

Two separate needle valves on one main valve – Provides independent control of opening and closing speeds.

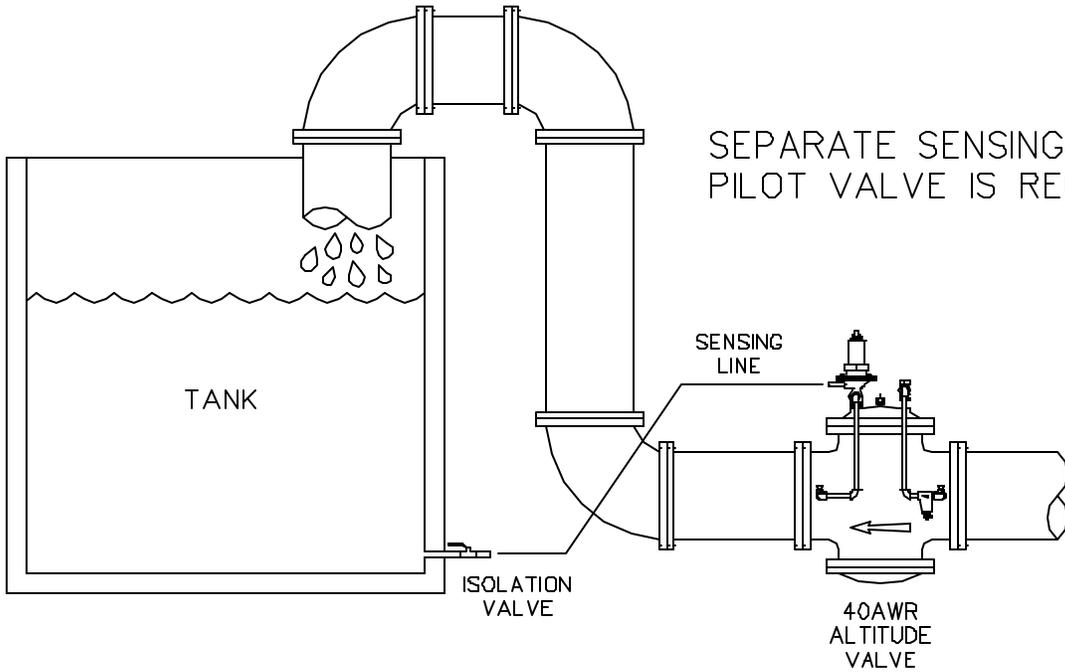


### PARTS

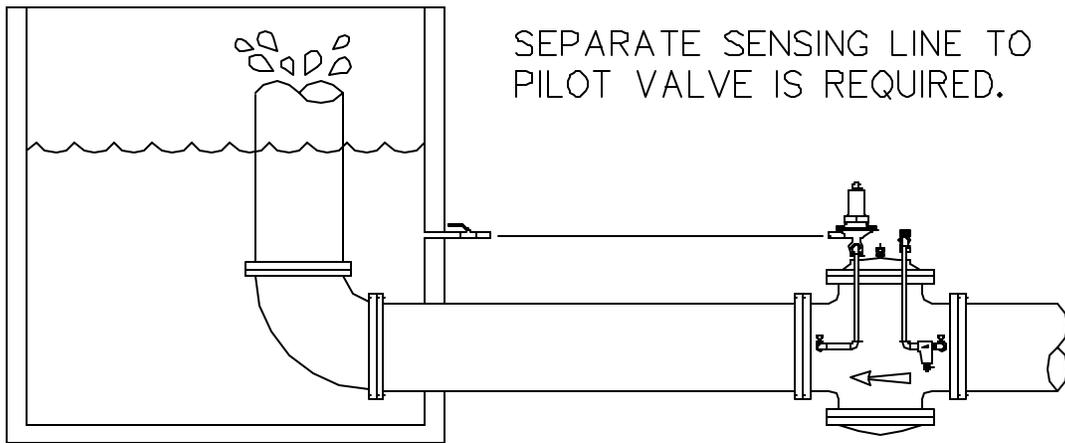
1. Lock – Brass
2. Cap – Bronze
3. Cap Gasket – Rubber
4. Needle – Brass
5. Body – Bronze



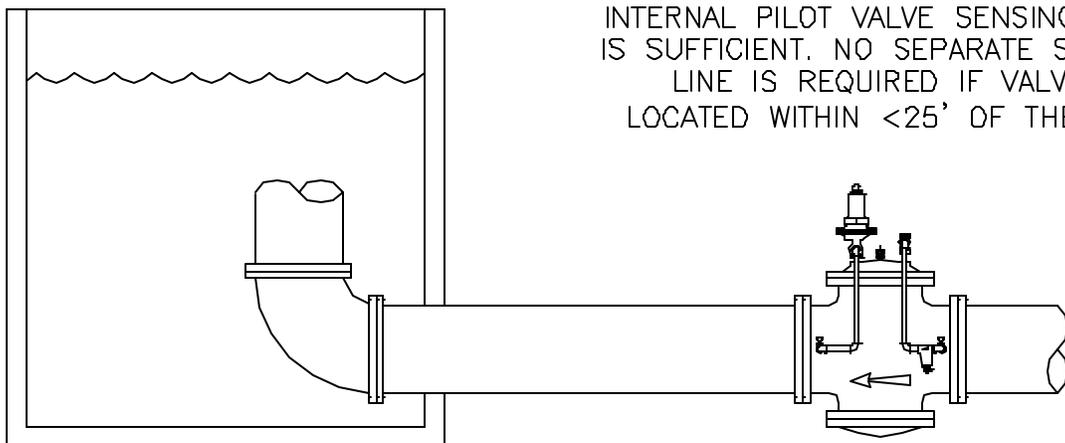
1



2



3



|   |                       |
|---|-----------------------|
| <b>ROSS VALVE Mfg. Co., Inc.</b>  |                       |
| 5 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0951 |                       |
| NO SCALE  | DRAWING 40AWR INSTALL |
| DATE 12-5-97  | REVISED               |
| MODEL 40AWR ALTITUDE VALVE<br>INSTALLATION OPTIONS                            |                       |

FILE: SCH40AVR

## ROSS GLOBE VALVE

### PREVENTIVE MAINTENANCE

Intervals of inspection vary from valve to valve. Type of valve, quality of water being handled, rates of flow, operating pressures, and past maintenance practices all have a bearing on the length of service between overhauls.

So some recommendation may guide the operator, we suggest periodic inspections in order to check for proper valve operating pressures, as well as any visual leaks. Should the operator encounter any external leakage, or find any abnormalities in the operating pressures resulting from the operation of the valve, the valve should be scheduled for service.

#### **EVERY TWO (2) MONTHS:**

1. Flush the strainer via the flushing cock.
2. Flush the needle valve by turning then needle *clockwise* ½ turn, *counter-clockwise* 2 turns, then *clockwise* 1-1/2 turns to original setting.
3. Visually inspect for leaks around the indicator rod, bottom cap/differential vent hole, or pilot valves (hydraulic & /or solenoid).
4. Inspect drain line connection.

#### **EVERY FOUR (4) MONTHS:**

1. Remove and inspect strainer screen.
2. Remove and inspect needle valve, being sure to take note of the needle position away from the seat (number of turns).
3. Same visual inspection as above.

**Important:** Condition of the main valve packing can be accurately gauged by observing the leakage through the bottom vent hole "C". Negligible leakage usually indicates serviceable packing.

**Lubrication:** None Required.

**Spare Parts:** None required, recommended, or supplied unless specified. Under normal operating conditions, no spare parts would be necessary within five (5) years of service. The standard repair kit for Ross valves are in stock at the factory, and available for immediate shipment upon receipt of order with valve serial number (located on metal tag pinned to the top cap of the main valve).

**ROSS GLOBE VALVE**  
**INSPECTION - SERVICE RECORD**

VALVE LOCATION/I.D. \_\_\_\_\_

SIZE \_\_\_\_\_ MODEL \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

VALVE - OPEN ~ CLOSED ~ INDICATOR ROD EXPOSED \_\_\_ INCHES ABOVE STUFFING BOX CAP

MAIN VALVE OPERATED MANUALLY YES ~ ... NO ~

OPERATING PRESSURES - INLET (SUPPLY) \_\_\_\_\_ OUTLET (DOWNSTREAM) \_\_\_\_\_

EXTERNAL LEAKS ..... NONE ..... SLIGHT ..... MAJOR

..... INDICATOR STUFFING BOX ..... ~ ..... ~ ..... ~

..... BOTTOM CAP VENT HOLE ..... ~ ..... ~ ..... ~

..... DIAPHRAGM VENT-HYDRAULIC PILOT ..... ~ ..... ~ ..... ~

..... SOLENOID PILOT EXHAUST PORT ..... ~ ..... ~ ..... ~

OTHER CONDITIONS \_\_\_\_\_

STRAINER FLUSHED ..... YES ~ ..... NO ~

..... SCREEN EXAMINED . YES ~ ..... NO ~ ..... CLEANED ONLY ~

..... SCREEN CONDITION GOOD ~ ..... POOR ~ ..... INSTALLED NEW SCREEN ~

NEEDLE VALVE(S) (EXAMINE NEEDLE & SEAT FOR WEAR)

..... OPENING CONTROL . CLEANED ~ ..... ADJUSTED ~ ..... SET POINT \_\_\_\_\_

..... CLOSING CONTROL ..... CLEANED ~ ..... ADJUSTED ~ ..... SET POINT \_\_\_\_\_

HYDRAULIC PILOT ADJUSTED ..... NO ~ ..... YES ~ ..... \_\_\_\_\_ TURNS

..... CLOCKWISE ~ .. COUNTER-CLOCKWISE ~ ..... SET POINT \_\_\_\_\_

..... REBUILT ..... AT FACTORY DATE \_\_\_\_\_ . IN FIELD DATE \_\_\_\_\_

..... NEW HYDRAULIC PILOT REPLACEMENT ..... DATE \_\_\_\_\_

SOLENOID - COIL TESTED ..... NO ~ ..... YES ~ ..... REPLACED ~

..... SEATS - INSPECT & CLEAN \_\_\_\_\_

..... REBUILT ..... AT FACTORY DATE \_\_\_\_\_ . IN FIELD DATE \_\_\_\_\_

..... NEW SOLENOID REPLACEMENT ..... DATE \_\_\_\_\_

MAIN VALVE INTERNAL CONDITION -

..... MAIN CYLINDER (14) \_\_\_\_\_

..... BOTTOM CAP CYLINDER (23) \_\_\_\_\_

..... SEAT DISC/SUPPORT/RING \_\_\_\_\_

..... BODY TAP CONNECTIONS \_\_\_\_\_

..... MAIN VALVE REPACKED \_\_\_\_\_ DATE \_\_\_\_\_

ACTION RECOMMENDED \_\_\_\_\_

REPORT BY \_\_\_\_\_ DATE \_\_\_\_\_

# TROUBLESHOOTING - Globe Body Valves

The following troubleshooting procedure is designed to isolate the main valve from its controls, in order to determine the cause of malfunction. By controlling the pressure of the operating chamber, one can simulate pilot control and determine if the main valve is operational, despite the response of the pilot.

**CAUTION:** Before manually opening or closing the valve substantially, the effects on the inlet and outlet system pressures must be considered. To test valve response, it is usually sufficient to momentarily perform the following manual tests:

## **To manually close the main valve...**

- @ Pressurize the operating chamber by slowly closing the isolation valve in series with the pilot valve.
- @ Water from the inlet side of the main valve should still enter the operating chamber through the strainer and needle valve, causing the operating chamber to fill.
- @ This should force the piston down, causing the valve to close.

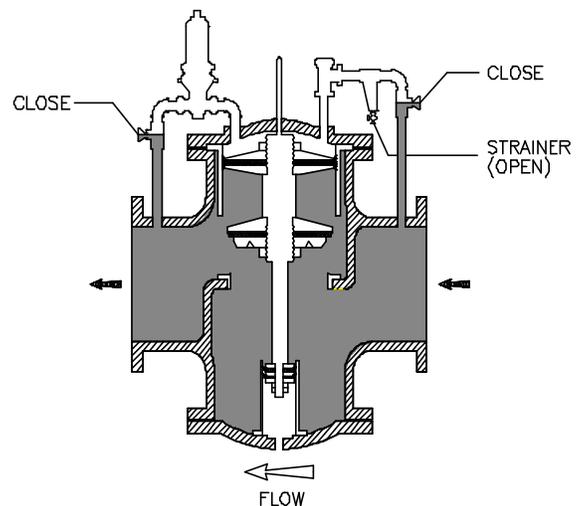
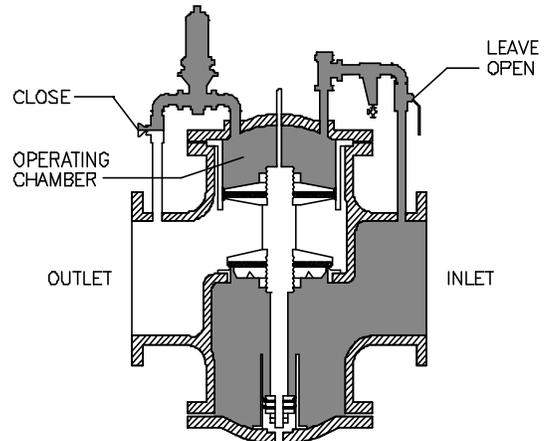
If the main valve fails to close and continues to pass water, it may indicate the following:

- @ Worn packings - Part Numbers 5 (piston cup packings), 9 (seat packing), and 13 (main cup packings).
- @ Fouled or incorrectly set needle valve - Needle should be free of debris and adjusted between 3/4 to 1-1/2 turns from full closed position.
- @ Plugged Strainer Screen - Screen should be free of debris.
- @ Mechanical blockage within valve body.

## **To manually open the main valve...**

- @ De-pressurize the operating chamber by slowly closing both isolation valves in the control piping, then opening the strainer flush cock.
- @ This should prevent any additional water from entering the operating chamber, and allow it to drain.
- @ The force of the inlet pressure should force the piston up, causing the valve to open.

If the main valve fails to open, it may indicate worn main cup packings (part number 13).



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If the main valve does not respond to manual operation, it usually indicates that the packings need to be replaced. Typically, the condition of the packings can be accurately gauged by observing the leakage through the vent hole in the bottom cap of the main valve. Negligible leakage usually indicates that the packings are serviceable.

If the main valve does respond consistently to manual operation with a steady stroke of the piston, it may indicate the external controls need adjustment or repair.

## REPAIR INSTRUCTIONS - GLOBE BODY VALVES

When entering a valve pit to inspect a valve, all regulations regarding Confined Space Entry should be observed.

So some recommendation may guide the operator, we suggest periodic inspections in order to check for proper valve operating pressures as well as any visual leaks. Should the operator encounter any external leakage or find any abnormalities in the operating pressures which appear to be caused by the valve, the valve should be scheduled for service.

A reliable indication of internal packing condition can be obtained by observing any leakage from the vent hole in the center of the bottom cap. When leakage becomes significant, packing replacement should be made. As a general statement, the overall average life of a set of packings is 7 to 10 years. This may vary considerably because of specific operating conditions.

After observing pressures and inspecting for external leakage, the flush cock on the strainer should be opened momentarily to remove accumulated material. The needle valve cap should be removed and the needle closed 1/2 turn, opened 1 full turn, and then closed 1/2 turn to its original position.

### STEPS FOR INTERNAL REPAIRS:

All repairs and parts replacement may be made without removing the valve from the line. Internal repairs are made by removing the top cap of the valve. All internals are accessible through the top.

Shut inlet main line isolation valve, then shut outlet main line isolation valve. Open gauge cocks to de-pressurize the valve.

Remove indicator rod by inserting a nail through hole and unscrewing. Do not pull through stuffing box. Then remove top cap bolts and top cap. Be careful not to bend indicator rod.

In 8" and larger valves, withdraw piston by either removing two 3/8" bronze bolts in top stem nut and installing lifting device (horseshoe shaped piece of steel with two holes) over nut; or by looping a cable or nylon rope around these bolts. **Be sure lifting device is secure before removing piston.** In 4" and 6" valves, a threaded eyebolt should be screwed in the indicator rod hole.

Inspect both main bushing (Part No. 14) and bottom cylinder (Part No. 23) for mineral build-up or scoring. Smooth with emery or replace if necessary. Inspect seat ring for damage. Repair as necessary.

Secure main piston on a pipe threading stand (or lay piston on floor on rags or a similar cushioning material). Loosen top stem nut (Part No. 15) which holds the cup plate assembly. Remove cup plate bolts, nuts and copper washers on 8" cups and larger. Replace the leather cups (one faces up, one faces down). Re-install with new packings in the reverse order as outlined above.

**Caution** - The clamping bolts should be tight so that the packings are held securely and no leak occurs. Do not over-tighten so that the packing is deformed, however. All cup packings are impregnated with lubricants so that no external lubrication is necessary or desirable.

To replace the seat packing, it is necessary to determine if the valve is constructed with a "sliding" or a "flat" type seat. The sliding type seat has the seal or seat packing clamped in the valve body underneath the iron wall that separates the inlet and outlet valve chambers. It consists of a flanged packing held in place by a split bronze seat support ring. The lip of the packing "looks down" and care should be taken that the packing is concentric with the valve bore before the clamping bolts are tightened. In the "flat" type seat, the seat packing is located on the valve piston, where it is clamped between two plates and held by a stem nut (Part No. 7). Removal of this nut allows the plates to be separated and the packing replaced.

Replacement of the bottom cups (Part No. 5) is accomplished by removing the bottom stem lock nut (Part No. 6) and the flanged bottom guide nut (Part No. 3). Install the seals with the lip of both cups "looking up". Again, when re-assembling, be careful not to over tighten so that the cups are deformed.

Re-insert the piston being careful not to crimp the lower main cup when it enters the main bushing. The piston should move freely and drop of its own weight.

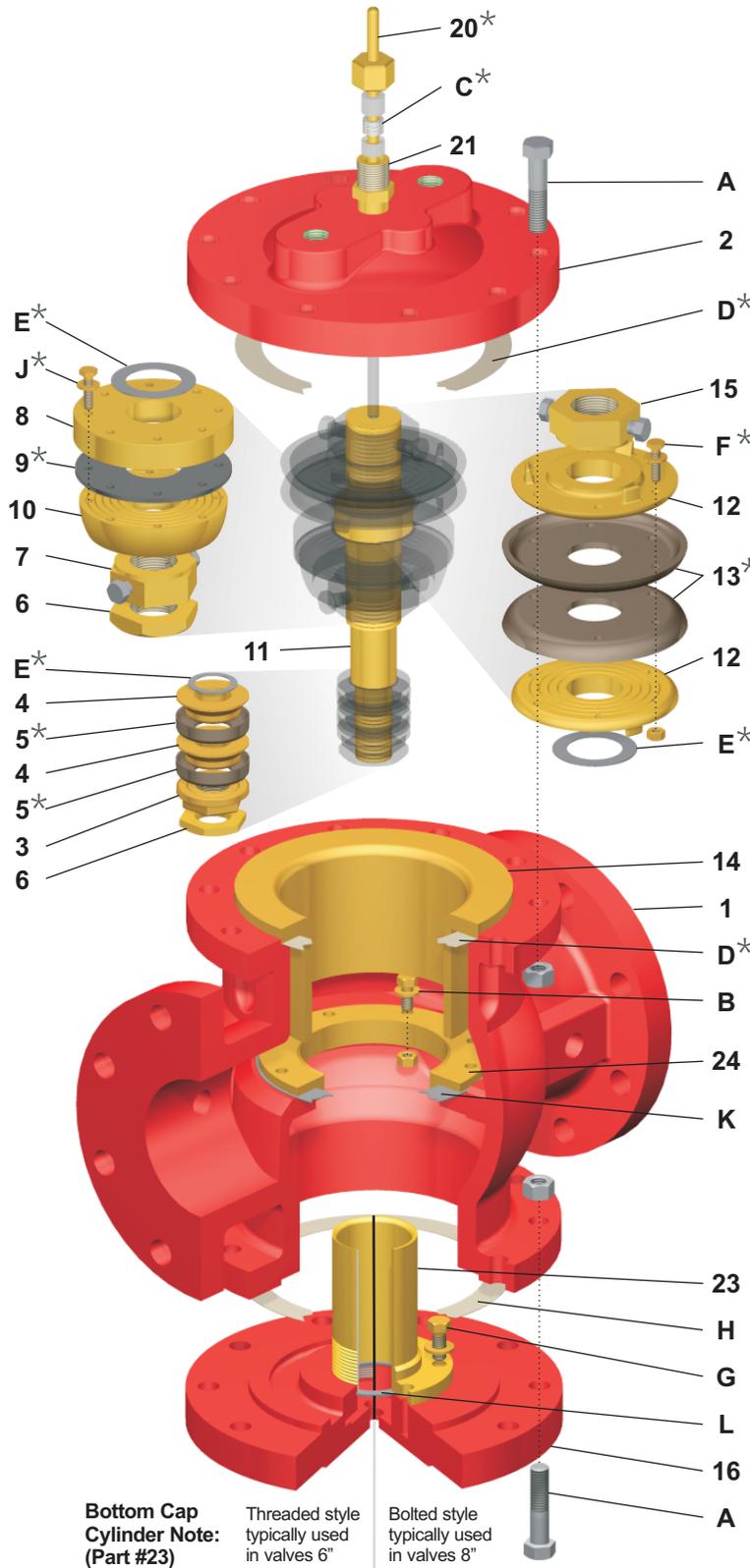
Replace the top cap and control piping (being sure to thread in the indicator rod), then restore water pressure. Be sure to open the discharge isolation valve first so that high inlet pressure is not trapped against a closed outlet valve.

All replaceable packings and gaskets are stock items and may be ordered as a repair kit for valve serial number \_\_\_\_\_. They are available for regular UPS delivery or next day service.

All spare parts are available from: Ross Valve Mfg. Co., Inc., 6 Oakwood Avenue, Troy, New York, 12180  
Phone: (518) 274-0961, Fax: (518) 274-0210

## STANDARD VALVE ASSEMBLY

VALVE TYPE: PISTON  
BODY STYLE: GLOBE  
SEAT TYPE: FLAT PARABOLIC



**Bottom Cap Cylinder Note:**  
(Part #23)  
Threaded style typically used in valves 6" and smaller  
Bolted style typically used in valves 8" and larger

| PART | DESCRIPTION                      | QTY   |
|------|----------------------------------|-------|
| 1    | SHELL                            | 1     |
| 2    | TOP CAP                          | 1     |
| 3    | BOTTOM STEM GUIDE NUT            | 1     |
| 4    | PISTON CUP FOLLOWERS             | 1 SET |
| 5*   | PISTON CUP PACKING               | 2     |
| 6    | BOTTOM STEM LOCK NUT             | 2     |
| 7    | STEM NUT W/ SET SCREWS           | 1     |
| 8    | SEAT DISC                        | 1     |
| 9*   | SEAT PACKING                     | 1     |
| 10   | SEAT PACKING SUPPORT             | 1     |
| 11   | STEM                             | 1     |
| 12   | MAIN CUP PLATES                  | 1 SET |
| 13*  | MAIN CUP PACKING                 | 2     |
| 14   | MAIN BUSHING                     | 1     |
| 15   | UPPER STEM NUT W/ SET SCREWS     | 1     |
| 16   | BOTTOM CAP                       | 1     |
| 20*  | INDICATOR ROD                    | 1     |
| 21   | INDICATOR STUFFING BOX           | 1     |
| 23   | BOTTOM CAP CYLINDER              | 1     |
| 24   | SEAT RING                        | 1     |
| A    | BOLT & NUT - TOP & BOTTOM CAP    | VARY  |
| B    | BOLT, NUT & WASHER - SEAT RING   | VARY  |
| C*   | PACKING - INDICATOR STUFFING BOX | 1 SET |
| D*   | GASKET - TOP CAP & MAIN BUSHING  | 2     |
| E*   | GASKET - STEM                    | 3     |
| F    | BOLT, NUT & WASHER* - CUP PLATES | VARY  |
| G    | BOLT & WASHER - BOTTOM CAP CYL.  | VARY  |
| H    | GASKET - BOTTOM CAP              | 1     |
| J    | BOLT, NUT & WASHER* - SEAT DISC  | VARY  |
| K    | GASKET - SEAT RING               | 1     |
| L    | GASKET - BOTTOM CAP CYLINDER     | 1     |

\* INCLUDED IN MAIN VALVE REPAIR KIT ALONG WITH STRAINER SCREEN AND CAP GASKET (NOT SHOWN)