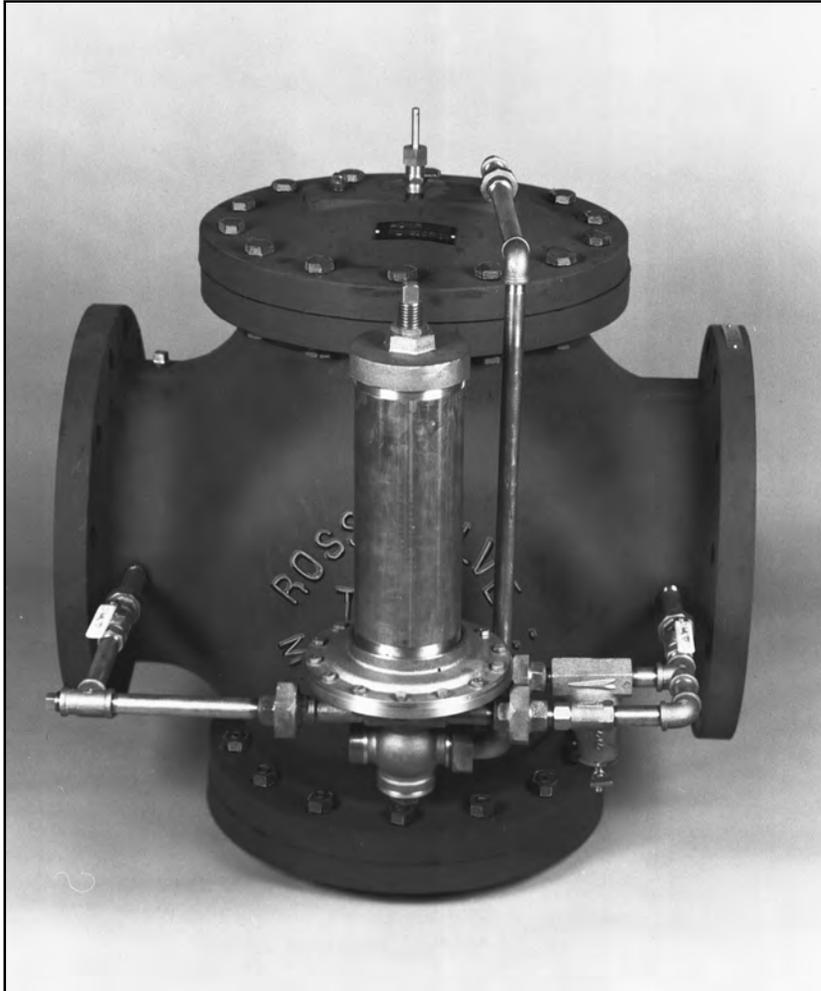


DOUBLE ACTING ALTITUDE VALVE

INSTRUCTIONS

Installation - Operation - Inspection - Maintenance



4" - 36" ROSS MODEL - 40DAWR
Double 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

**ROSS DOUBLE ACTING ALTITUDE VALVE
MODEL 40DAWR
INSTALLATION**

The **DOUBLE ACTING** or two-way valve (installed in a line which is both supply and discharge) permits flow into and discharge from tank, reservoir or basin. It automatically closes to prevent overflow and opens for reversal of flow when head in distribution is less than static head of water in tank.

The stem of this valve has no throttling action because it assumes only two positions, wide open and closed. However, with the tank full or nearly so and with negligible system demand, the valve may assume an intermediate position until either a definite filling or emptying trend occurs.

SHIPMENT:

The valve is tagged with all necessary identification marks before shipment. Each valve is thoroughly tested and pre-adjusted at the factory to expected field conditions.

STORAGE:

If 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. If extended storage is anticipated, the valve should be placed with the piston in the vertical plane (all valves are shipped in this orientation).

MAIN VALVE INSTALLATION:

1. Check inside of the valve for wooden shipping blocks, or other foreign material.
2. If possible, flush line before inserting valve.
3. Place valve in line with flange marked "tank side" towards the tank or basin; and flange marked "inlet" toward the distribution or supply source.
4. If external piping and controls are not attached to valve when shipped, connect unions identified with numbered tags.
5. Attach 1/4" gauge cocks to body taps on back side of valve.

CAUTION: Do not obstruct the vent hole in center of bottom cap (16) of globe body, or in differential cylinder bracket (27) of angle body.

6. Allow enough clearance above the valve for piston removal.

STARTING OPERATION:

1. Fill tank by means of by-pass gate valve (if there is a by-pass).
2. Open the main line gate valve (if installed) on the tank (downstream) side of the valve. This prevents trapping high inlet pressure under the pilot diaphragm.
3. Open main line gate valve (if installed) on the inlet side of the valve *slowly*.
4. Open isolation ball valves (18) in control piping and the main valve will close.

Note: This procedure will protect the external controls from fouling with the initial passage of water which may carry sediment.

To increase the maximum water elevation, turn the pilot valve adjusting screw clock-wise; and to lower the water elevation, turn adjusting screw counter-clock-wise. For most elevated tank pressures one full turn of the adjusting screw will change the operating point approximately 7 feet. For low basin and ground storage pressures, one turn changes the operating point approximately 2 feet.

ROSS VALVE MFG. CO., INC., TROY, NY 12180 · PHONE 518/274-0961 · FAX 518/274-021

DOUBLE ACTING ALTITUDE VALVE

Purpose: Prevent storage overflow/ Enable two way flow

Model Number: 40DAWR

Sizes: 4" - 48"

Type: Nonthrottling

Primarily Controlled By:

Hydraulic pressure

Located: In line between distribution (supply/user) and storage

Purpose: To prevent exceeding a maximum preset storage pressure/Let water flow through the same line from storage to user

Band: Fixed within 9" - 4'

Inlet Pressure: Maximum: 300 psi

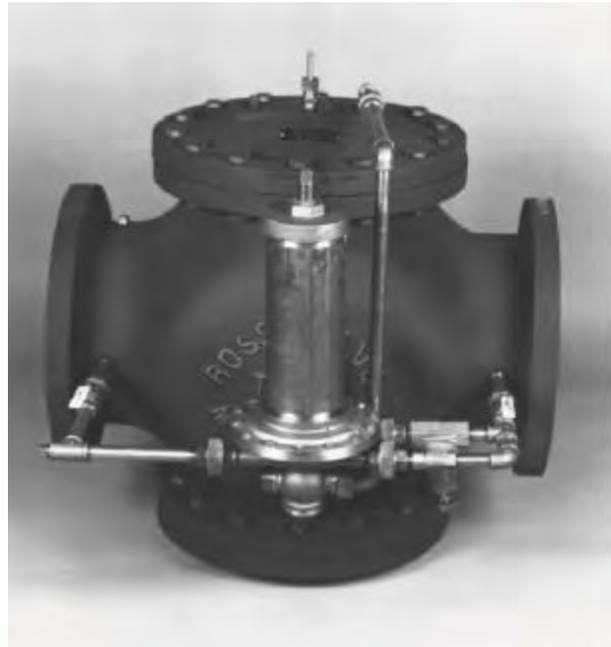
Inlet Pressure: Minimum: 5 psi

Construction: Body: 4" - 36" - Cast iron (semi-steel) with bronze trim
40" - 48" - Ductile iron, with bronze/ stainless steel trim

Control Devices:

Strainer: Model 5F-2

Pilot: Altitude: Model 40DAWR



Basic Application

1. Prevent overflow of an elevated tank, stand pipe or basin.
2. Let water flow into storage and back to distribution through the same line.

The minimum water level is preset at the factory to be a constant distance below the maximum level no matter what maximum is set. The maximum is adjustable.

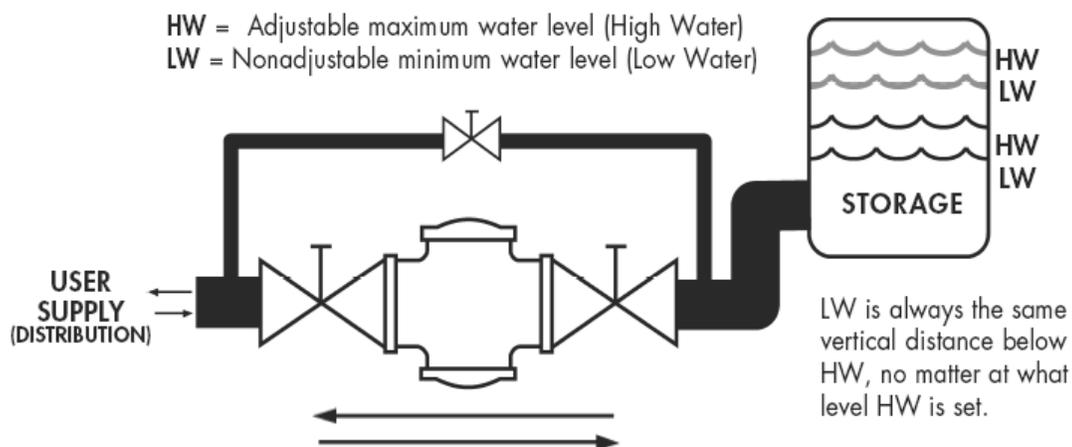
If: Level in the tank reaches the maximum setting
Ross Main Valve will: Full close to prevent flow from supply into storage.

If: Enough water is discharged from storage to reduce the level (pressure) in the tank to the minimum setting

Ross Main Valve will: Full open to let water flow from supply to storage.

If: Pressure from storage to the user drops below storage pressure

Ross Main Valve will: Full open to let water flow back from storage to the user.



GENERAL OPERATION OF A ROSS VALVE (Models 30AWR and 40DAWR)

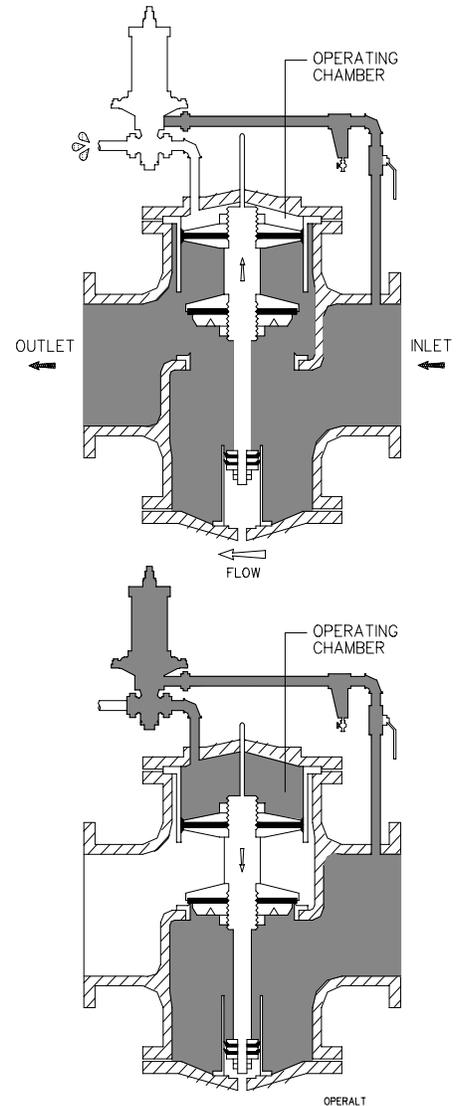
All Ross Valves operate with the same basic hydraulic principles and are composed of two essential parts: the main valve (through which the main flow of water passes), and a control device (which is piped externally on the main valve).

The control device is varied to suit the specific type of operation desired. In this case, it is a hydraulically actuated, non-throttling pilot valve. As always, the basic function is to control the pressure in the "operating chamber" (the area above the large piston in the main valve).

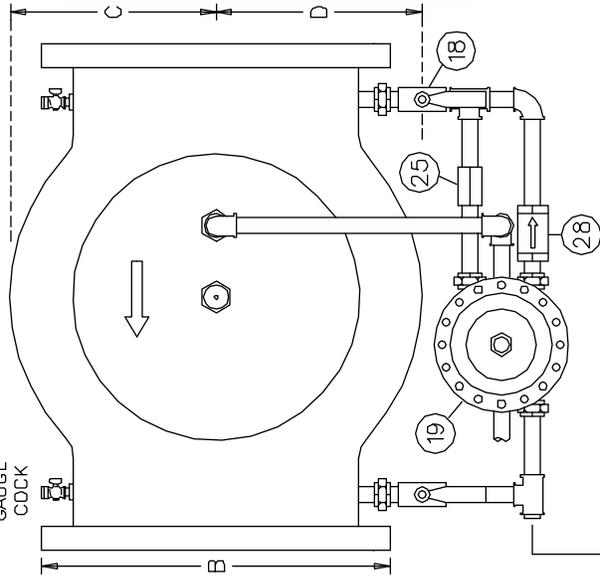
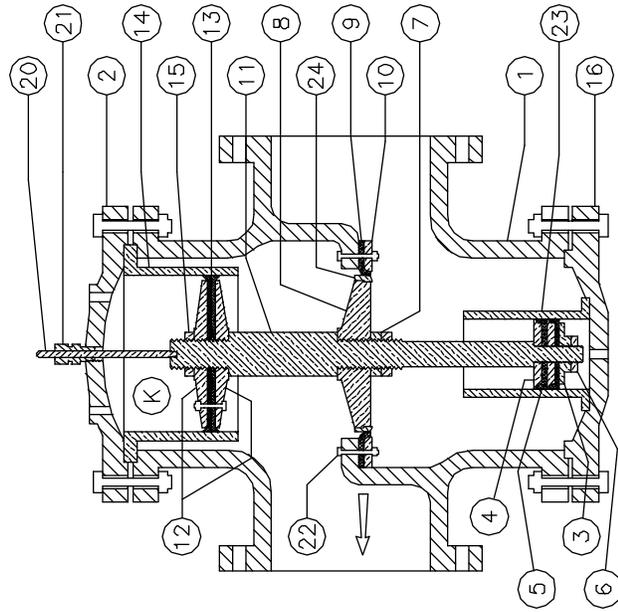
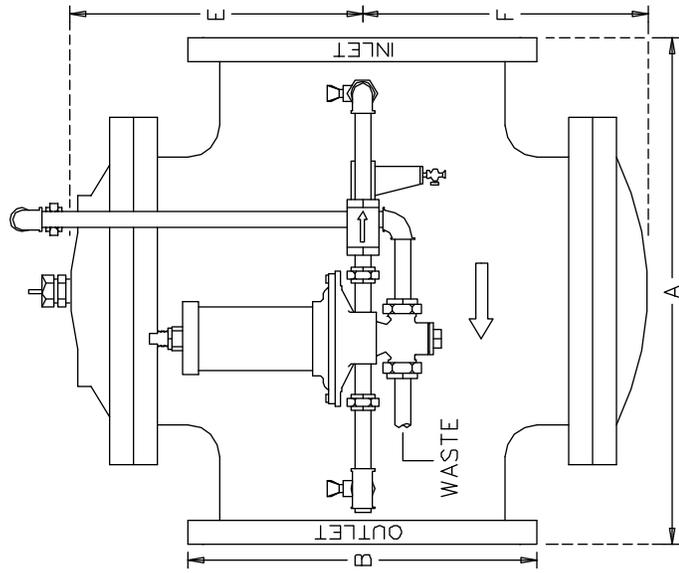
The main valve, no matter what its function, is of the same fundamental design. A stem, which carries a seat disc between a large and a small piston, is free to move along the axis of the cylinders. This movement corresponds to the opening and closing of the valve, as follows:

Opening - When the operating chamber is emptied (through a pilot valve, for example), the line pressure acts on the exposed areas of the stem and produces a net upward hydraulic force. This force lifts the stem assembly (including the seat disc), and allows water to flow unrestricted through the valve.

Closing - When the setting on the pilot valve becomes satisfied (upon indication of a full tank, for example), its internal porting exposes the operating chamber to inlet pressure. As the pressure in the operating chamber builds up, the stem assembly is forced to move down into its seat, preventing flow through the valve.



These are the basic principles used in all of our valves.



VALVE SIZE (IN)	ANSI B.16 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

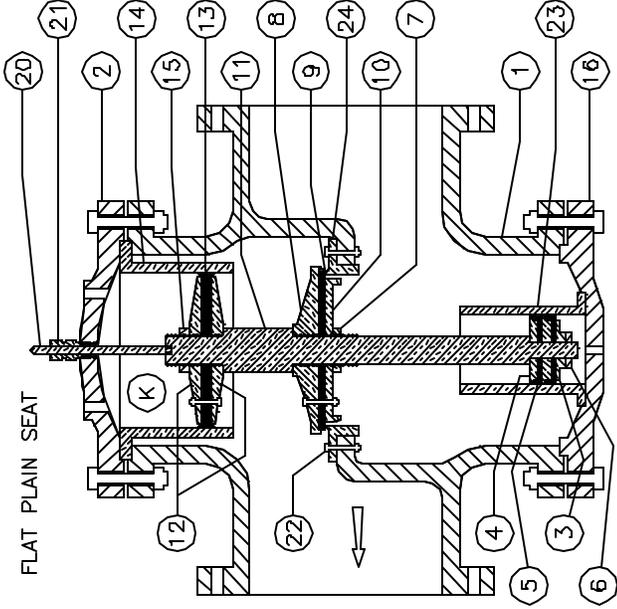
PART	DESCRIPTION	QTY.	MATERIAL
1	VALVE SHELL	1	CAST IRON
2	TOP CAP	1	CAST IRON
3	BOTTOM STEM GUIDE NUT	1	BRONZE
4	BOTTOM CUP FOLLOWERS (SET OF 2)	1	BRONZE
5	PISTON CUP PACKING	2	LEATHER
6	BOTTOM STEM LOCK NUT	1	BRONZE
7	STEM NUT	1	BRONZE
8	SEAT DISC/CORE	1	BRONZE
9	SEAT PACKING	1	LEATHER
10	SEAT PACKING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

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 WEBSITE: www.rossvalve.com - E-MAIL: sales@rossvalve.com

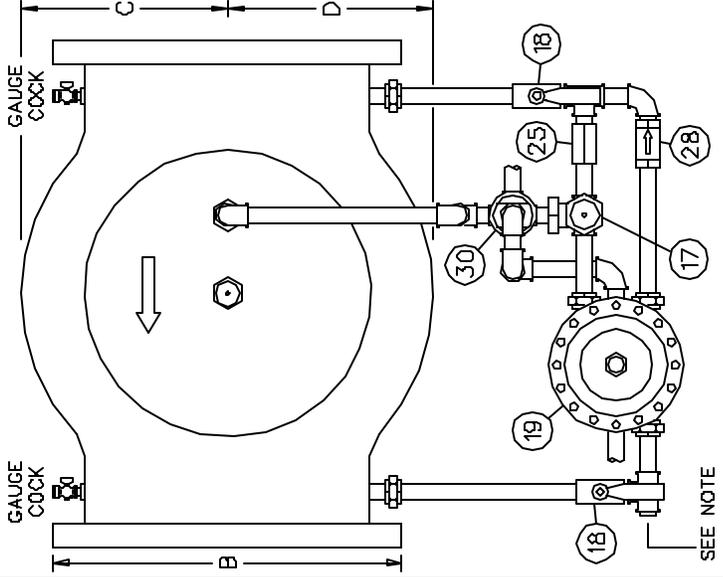
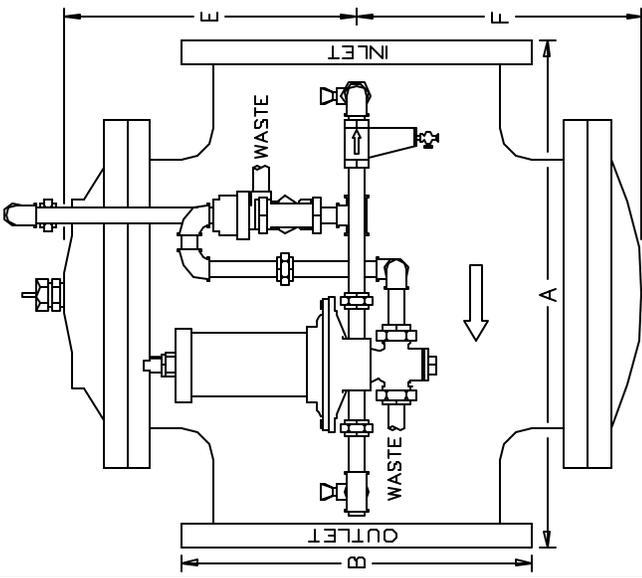
DRAWING	40DAWR	DATE	9/6/00 RJC
GLOBE BODY	4" - 14"	NO SCALE	FIGURE 33

Model 40DAWR
 DOUBLE ACTING ALTITUDE VALVE

OPTION: WHEN THE VALVE IS NOT ADJACENT TO THE TANK RISER, REMOVE THE PLUG IN THE "TEE" AND PIPE TO RISER FOR TRUE STATIC HEAD. THIS CHANGE REQUIRES THAT THE ISOLATION VALVE ON THE CONTROL PIPING OUTLET SIDE BE CLOSED.



FLAT PLAIN SEAT



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	REMLINE 25
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/TEFLON
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 - ALTITUDE	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/TEFLON
24	SEAT RING	1	BRONZE
25	STRAINER	1	BRONZE/STAINLESS
28	CHECK VALVE	1	BRONZE
28	CHECK VALVE	1	BRONZE
	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 B.16 CLASS	SHIPPING WEIGHT (LBS)	DIMENSIONS (INCHES)			E&F
			A	B	C&D	
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	13000	63-3/4	38-3/4	26-1/4	34
	250	13500	65-1/16	43	26-1/4	34
36	125	16000	65	46	26-1/4	34
	250	18700	65	50	26-1/4	34

NOTE: WHEN THE VALVE IS NOT ADJACENT TO THE TANK RISER, REMOVE THE PLUG IN THE "TEE" AND PIPE TO RISER FOR TRUE STATIC HEAD. THIS CHANGE REQUIRES THAT THE ISOLATION VALVE ON THE CONTROL PIPING OUTLET SIDE BE CLOSED.

ROSS VALVE Mfg. Co., Inc.
 6 OAKWOOD AVENUE - TROY, NEW YORK, 12180 - TEL. (518) 274 0981
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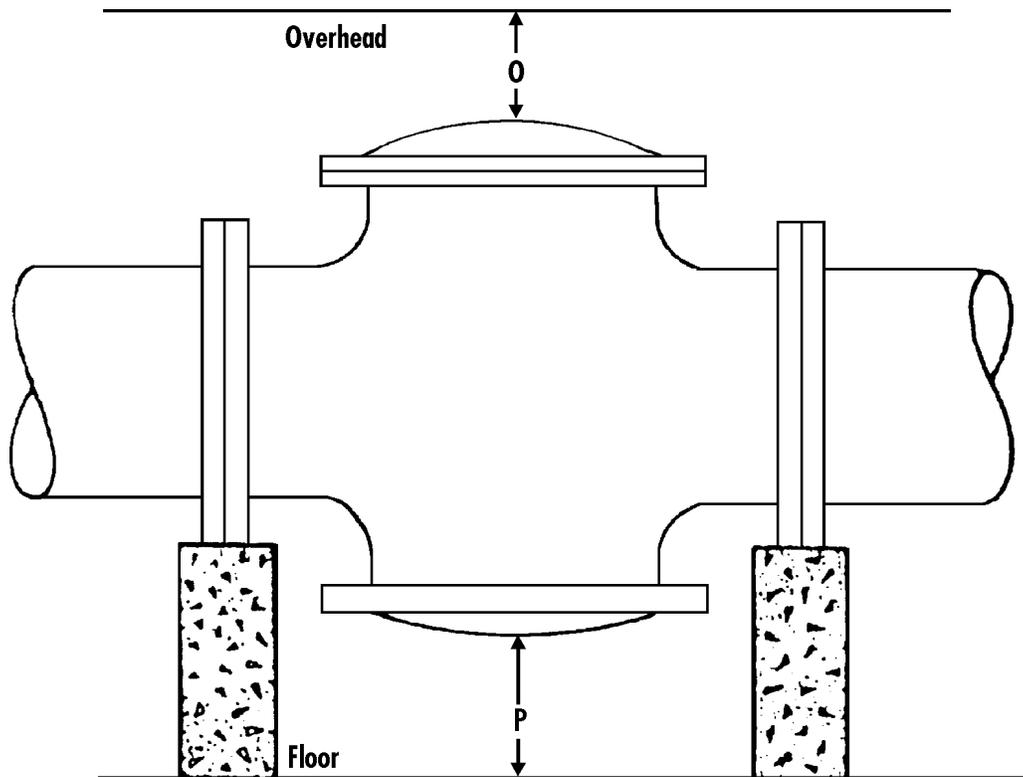
DRAWING 40DAWR-F-N_16-36 DATE 3-20-01 TJS
 GLOBE BODY 16" - 36" NO. SCALE FIGURE 33

Model 40DAWR
 DOUBLE ACTING ALTITUDE VALVE

DIMENSIONS

Globe Body Minimum Clearances

Piston Valve Sizes: 4" - 36"



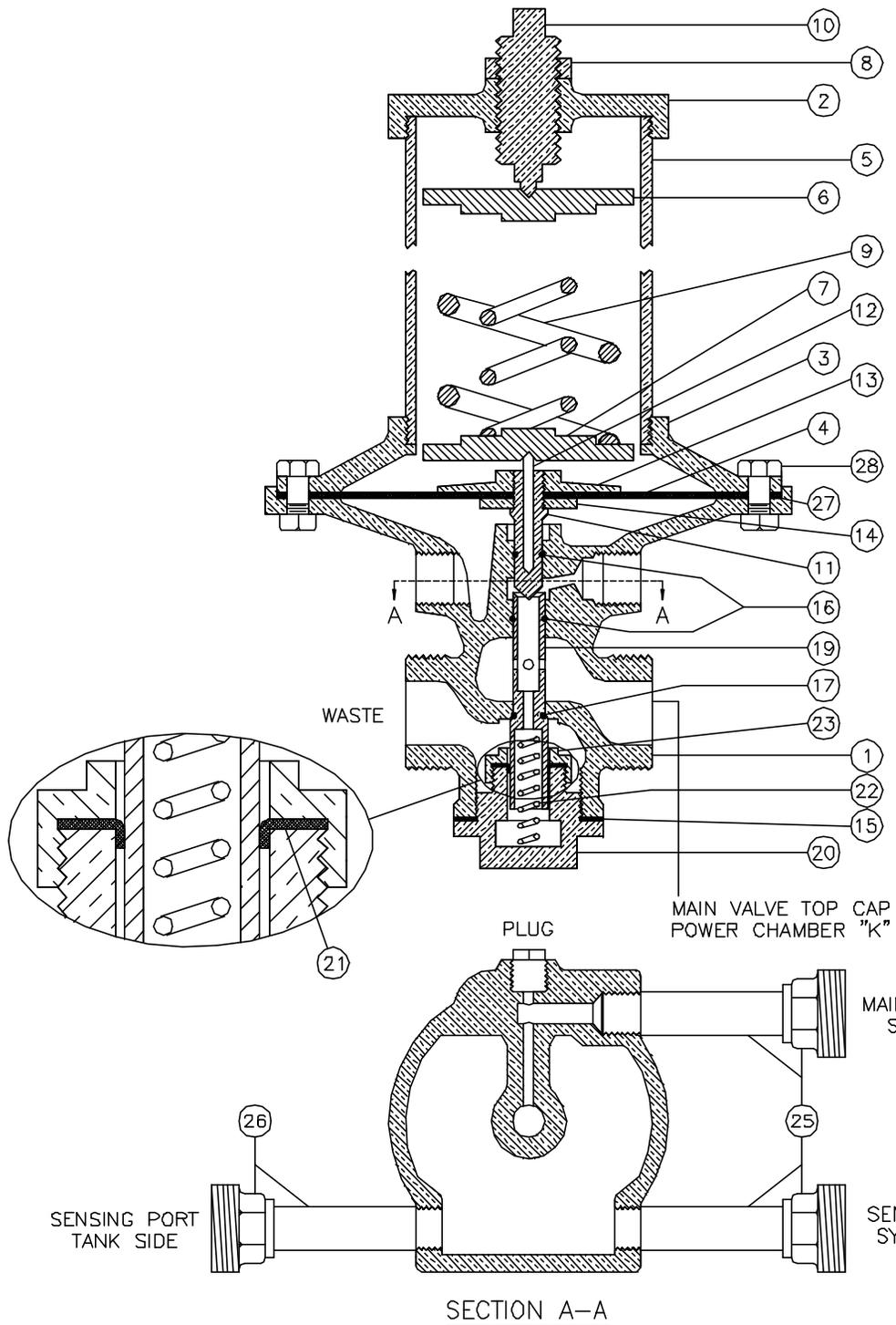
Size(Inches)	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
O	14	16	18	21	23	28	28	33	33	36	43	46
P	4 1/2	5 1/2	6 1/2	1	1	1	1	1	1	1	1	1

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.



PART NO.	DESCRIPTION	QTY	MATERIAL
1	SHELL	1	BRONZE
2	SPRING CHAMBER TOP	1	BRONZE
3	DIAPHRAGM COVER	1	BRONZE
4	DIAPHRAGM(S)	VARY	BRONZE/NEOPRENE
5	SPRING CHAMBER	1	BRONZE
6	TOP SPRING WASHER	1	BRONZE/CAST IRON
7	BOTTOM SPRING WASHER	1	BRONZE/CAST IRON
8	LOCK NUT	1	BRONZE
9	SPRING(S)	VARY	STEEL
10	ADJUSTING SCREW	1	BRONZE
11	UPPER STEM	1	STAINLESS
12	CENTERING PIN	1	STAINLESS
13	DIAPHRAGM NUT	1	BRONZE
14	DIAPHRAGM BUTTON	1	BRONZE
15	BOTTOM CAP GASKET	1	COMPOSITION
16	O-RING - STEM PACKINGS	2	BUNA-N 70
17	O-RING - SEAT PACKING	1	BUNA-N 90
19	LOWER STEM	1	DELTRIN
20	BOTTOM CAP	1	BRONZE
21	LOWER PACKING	1	LEATHER
22	BOTTOM SPRING	1	BRONZE
23	LOWER PACKING NUT	1	BRONZE
* 24	DIAPHRAGM EXTENSION	VARY	BRONZE
25	TAILPIECES (ADAPTER & NIPPLE)	2	BRONZE
26	TAILPIECE (ORIFICE & NIPPLE)	1	BRONZE
27	GASKET - DIAPHRAGM	1	COMPOSITION
28	BOLTS & NUTS - DIAPHRAGM COVER	14	BRONZE
* 29	BOLTS - DIAPHRAGM EXTENSION	VARY	BRONZE
* 30	SEAT RING	OPTION	STAINLESS

* NOT SHOWN

OPERATION: WHEN HIGH WATER IN TANK, RESERVOIR OR BASIN IS REACHED, WATER LEVEL PRESSURE IS COMMUNICATED TO THE UNDERSIDE OF PILOT DIAPHRAGM AND OVERCOMES LOADING ON THE SPRING(S). THIS OPENS THE SEAT BETWEEN UPPER AND LOWER STEMS TO INTRODUCE WATER FROM THE SUPPLY SIDE OF MAIN VALVE TO POWER CHAMBER "K" ABOVE THE PISTON OF MAIN ALTITUDE VALVE FOR CLOSURE.

WHEN WATER LEVEL IN TANK RECEDES, OR WHEN SUPPLY PRESSURE BECOMES LESS THAN TANK HEAD, SPRING LOADING OVERCOMES WATER LEVEL PRESSURE UNDER DIAPHRAGM. THIS OPENS THE LOWER SEAT ON THE LOWER STEM OF PILOT TO PERMIT FLOW FROM MAIN VALVE POWER CHAMBER "K" ABOVE PISTON TO WASTE, THUS OPENING MAIN VALVE.

NOTE: DIAPHRAGM ASSEMBLY AND SPRING CHAMBER ASSEMBLY, INCLUDING SPRING(S), VARIES DEPENDING UPON OPERATING PRESSURE RANGE.

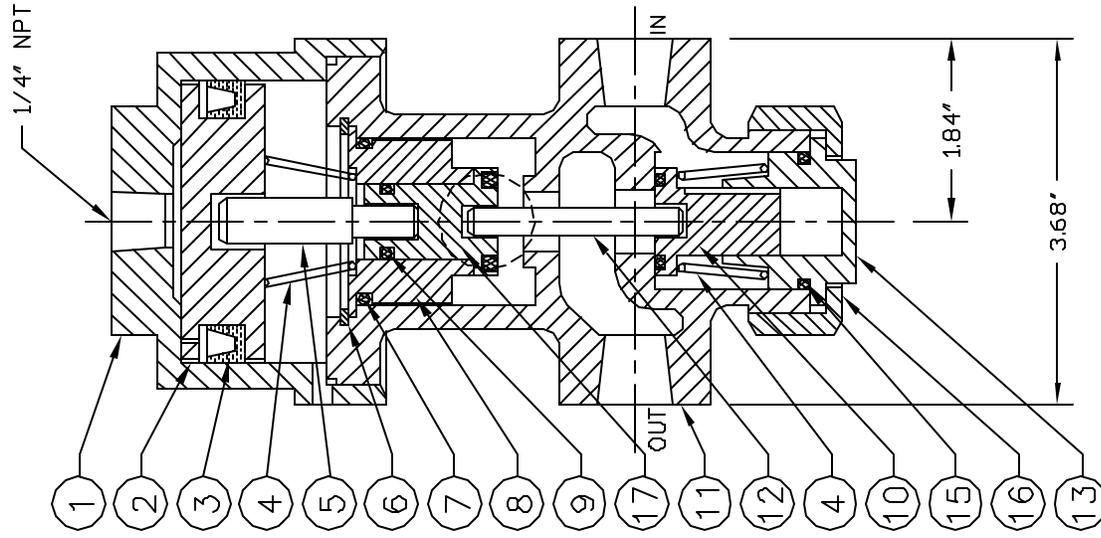
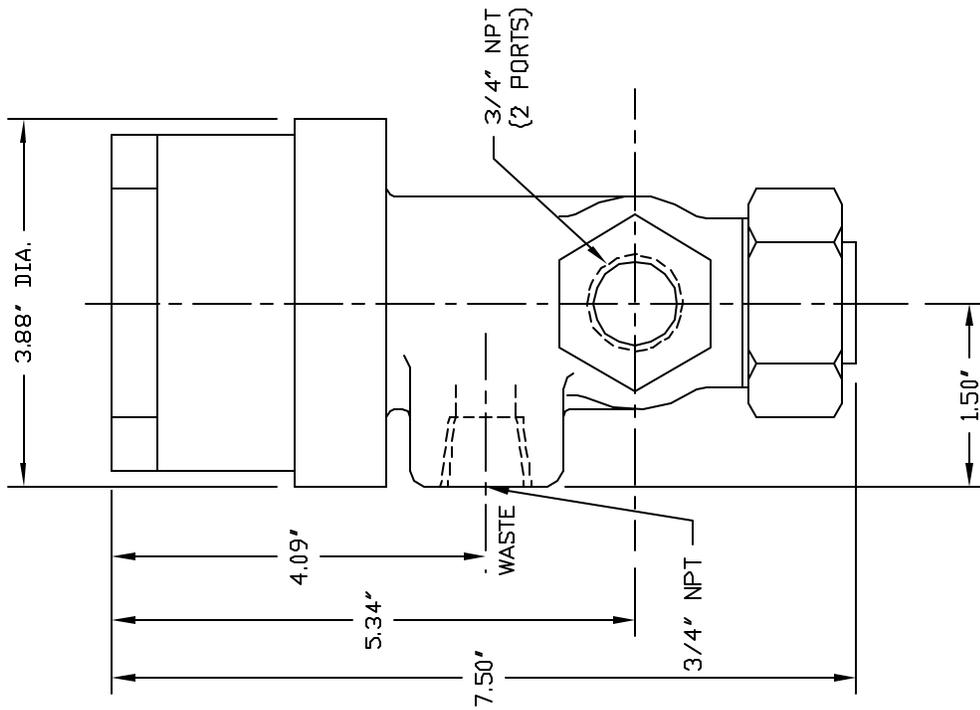
ROSS VALVE Mfg. Co., Inc.

6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961

NO SCALE DRAWING 40DAWR PILOT (.08)
 DATE 2-28-61 3104C REVISED 10-26-00 DMB

MODEL 40DAWR PILOT VALVE (.08)
 DOUBLE ACTING ALTITUDE

FILE: PLT40DAWR08



PART	DESCRIPTION	QTY.
1	PILOT CAP	1
2	PILOT PISTON	1
*3	U-CUP, BUNA	1
*4	SPRING, PILOT	2
5	PIN, PILOT	1
6	RING, RETAINER N5000-150	1
*7	O-RING, BUNA	1
8	GUIDE, POPPET	1
*9	O-RING, BUNA	1
*10	POPPET ASSEMBLY, MILLED W/ O-RING	1
11	BODY	1
12	PIN, ACTUATOR 0.250 X 1.875	1
13	GUIDE, POPPET	1
*15	O-RING, BUNA	1
16	NUT, HEX, 1 7/16-12	1
*17	POPPET ASSEMBLY	1

OPERATING PRESSURE 500 PSI MAX
PILOT RATIO 1D:1

* INCLUDED IN REPAIR KIT (GREASE TUBE ALSO
SUPPLIED IN STANDARD REPAIR KIT)

ROSS VALVE Mfg. Co., Inc.

6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961

NO SCALE DRAWING LEXAIR 333412
DATE 2-14-91 REVISED 1-10-01 TJS

LEXAIR 3/4" MODEL 333412
3-WAY AUXILIARY PILOT VALVE

FILE: 333412

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

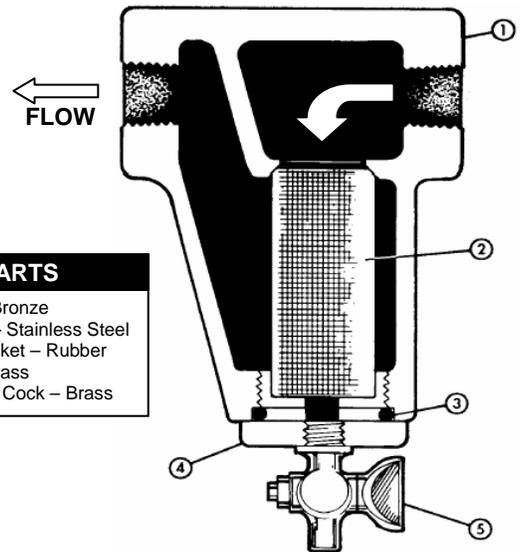
1. Strainer should be "blown down" frequently to remove collected foreign material from the sediment chamber.
2. Strainer screen should be removed occasionally for inspection and thorough cleaning.

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:

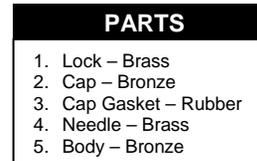
1. Remove the hex cap (#2) and lock (#1).
2. With a screw driver;
 - a. Turn the needle (#4) counter-clockwise to raise it
 - b. Turn the needle (#4) clockwise to lower it
3. Once the optimum position is determined, no further adjustment of the needle should be required.

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.

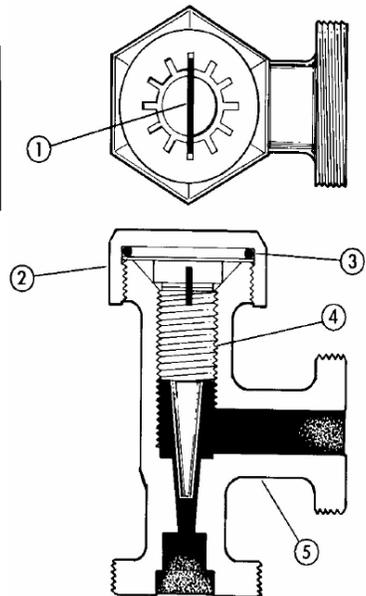
Option

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



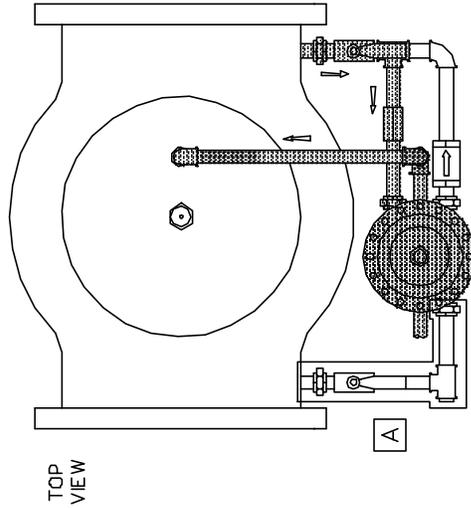
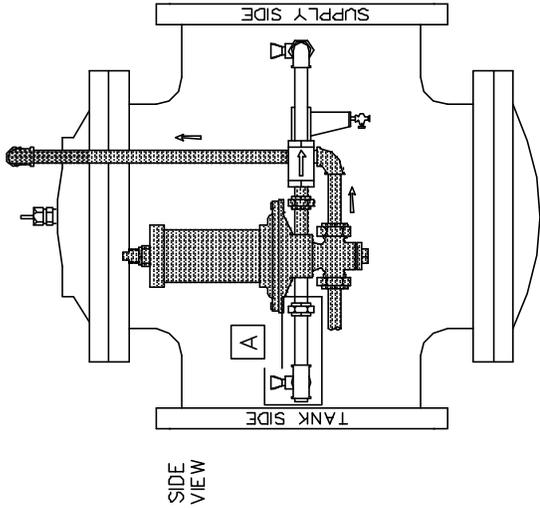
PARTS

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



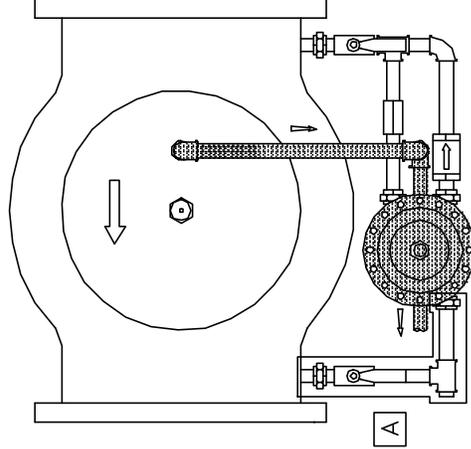
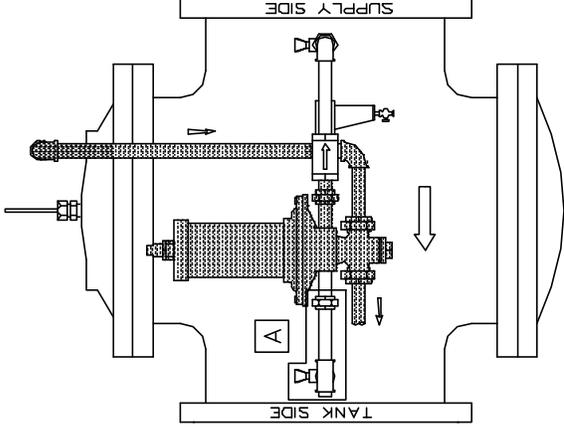
**TANK FULL
MAIN VALVE CLOSED**

SENSES TANK PRESSURE/LEVEL AT **A**



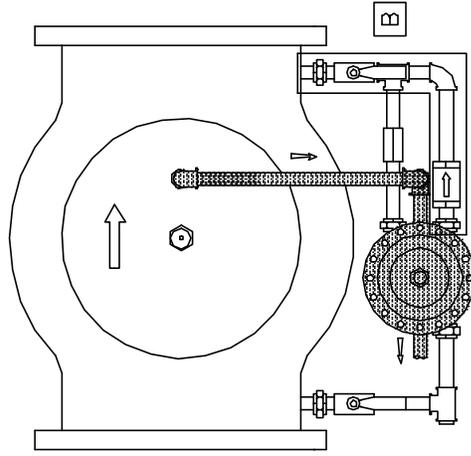
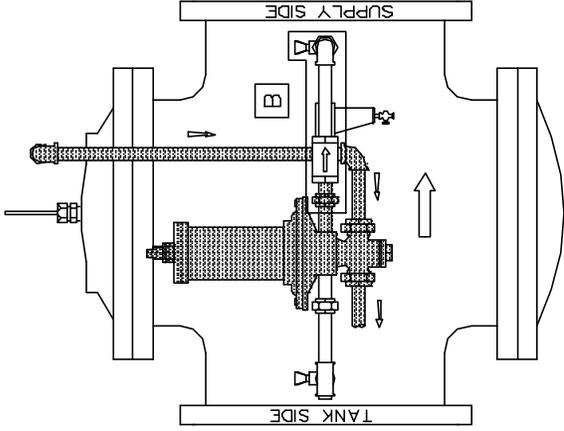
**TANK LOW
MAIN VALVE OPEN**

SENSES TANK PRESSURE/LEVEL AT **A**



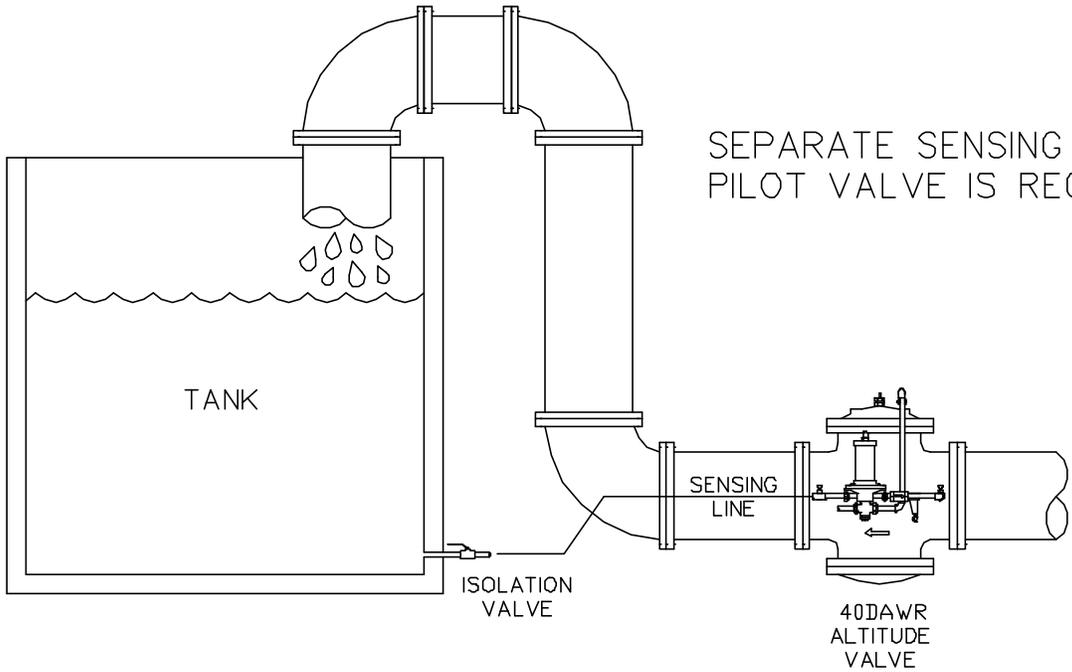
**SYSTEM LOW
MAIN VALVE OPEN**

SENSES SYSTEM PRESSURE AT **A**



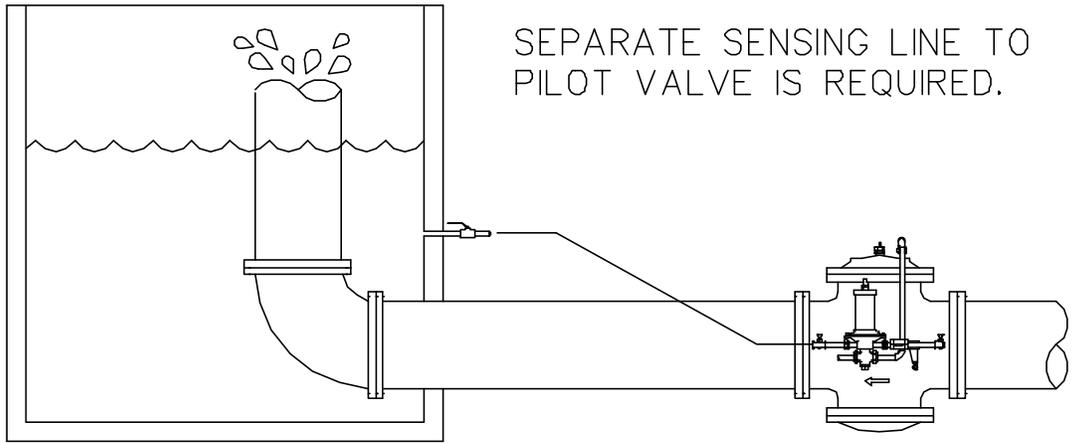
ROSS VALVE Mfg. Co., Inc.	
6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961	
NO SCALE	DRAWING 40DAWR SCHEMATIC
DATE 3-18-97	REVISED 9-23-99 S.M
MODEL 40DAWR FIGURE 33 DOUBLE ACTING ALTITUDE VALVE OPERATING SCHEMATIC	
FILE: SC40DAWR	

1



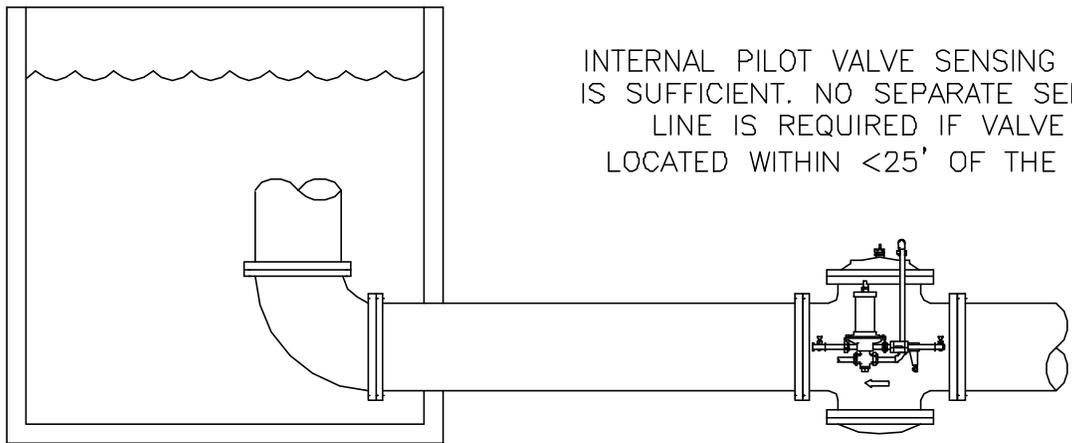
SEPARATE SENSING LINE TO PILOT VALVE IS REQUIRED.

2



SEPARATE SENSING LINE TO PILOT VALVE IS REQUIRED.

3



INTERNAL PILOT VALVE SENSING PORT IS SUFFICIENT. NO SEPARATE SENSING LINE IS REQUIRED IF VALVE IS LOCATED WITHIN <25' OF THE TANK.

ROSS VALVE Mfg. Co. Inc.
 6 DAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274 0961

NO SCALE	DRAWING 40DAWR INSTALL
DATE 2-3-99	REVISED

MODEL 40DAWR ALTITUDE VALVE
 INSTALLATION OPTIONS

FILE: SCH40DAWR

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 _____

TROUBLE SHOOTING - ALTITUDE VALVES

The first step in trouble shooting is to determine if the problem is related to the controls or to the main valve. Therefore, we must isolate the controls from the main valve.

Observe indicator rod - is valve open or closed? When closed, approximately 1-1/4" of indicator rod shows above packing nut on stuffing box. (Most failures are in the open position.) Observe any external leakage from pilot waste port. The only time water should discharge is when the valve is moving from the closed to the open position. All other times there should be no waste. If the valve is closed and waste occurs, the lower seat on the pilot is fouled or damaged. If the valve is open, the upper pilot seat could be fouled or damaged OR the main cup plate assembly inside the main valve could be leaking.

Close both ball valves in the control piping. If the leak stops, then the lower pilot seat is leaking. If the leak continues, separate the union at the top cap and see if water comes from the top cap connection.

If no external leakage is evident, separate the union where the pilot pipe enters the top cap. If there is no water at the union, turn the adjusting screw on the pilot counterclockwise (out) SLOWLY until a trickle of water comes out the pilot pipe. The pilot is now adjusted to close the valve at the water level presently in the tank. Reconnect the union and tighten, and the main piston should slowly close. If no movement occurs after several minutes (pinch the indicator rod where it enters the stuffing box packing nut to feel slight movement), check to see if the vent hole in the center of the bottom cap is plugged. This will prevent the piston from moving. If no movement towards the closed position occurs, and pressure is available at the top cap union, the main piston seals may not be working and the valve should be disassembled. If the valve closes part way and stops, it usually means a foreign object is blocking the main piston, or the main cups have lost their seal - usually due to a wear spot in the main cylinder (main bushing).

Again, valve disassembly is required.

TROUBLE SHOOTING GUIDE

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

If there is constant waste from the pilot exhaust when the valve is closed, the lower seat on the Pilot Valve is scored or fouled (see A-2 below). If there is constant waste from the pilot exhaust when the valve is open, disconnect the union where the control pipe enters the top cap. If the leakage originates in the main valve (through the cup plate bolts, or past the lower (Part No. 13) Main Cup, it will be obvious. If the pilot continues to waste water, it indicates a defective pilot valve. Return the pilot to the factory for repairs.

A. When valve does not close, resulting in overflow of tank.

First check to see if there is pressure in valve top cap (see adjustment - Page 4).

- Cause 1. Incorrect adjustment of the pilot.
Correction: Turn adjusting screw on pilot valve *counter-clockwise* until valve closes (See adjustment page 4).
- Cause 2. Pilot stem and seats are fouled (noted by continual waste from pilot).
Correction: Flush pilot while main valve is open. Close isolation valves in the outer control piping. Remove cap (Part No. 20) at the bottom of the pilot. Remove stem (Part No. 19) and clean thoroughly. Before replacing, flush body of pilot by opening the control piping isolation valve nearest inlet flange of Main Valve. If scoring or damage to either the Ball Seat at the top of the stem or the Beveled Seat in the center is evident, the pilot should be returned to the factory for repair. Temporary relief may be obtained by lapping the damaged seats with lapping compound.
- Cause 3. Excessive leakage around Indicator Rod.
Correction: Replace stuffing box packing and indicator rod.

B. When valve will not fill tank or remains closed.

Check to see if a minimum of 5 PSI line pressure is shown at system side body tap

- Cause 1. Incorrect adjustment of the pilot.
Correction: Turn adjusting screw on pilot valve *clockwise* until valve opens (See adjustment page 4).
- Cause 2. Leakage into chamber "K" because of worn main cup leathers (Part No. 13) or loose bolts in their assembly (noted by continual waste from pilot).
Correction: Leakage past worn main cup leather or loose bolts may be detected while main valve is open, by opening coupling connection at top of main valve.
- Cause 3. Leakage into chamber "K" because seat of upper stem in pilot is fouled or pilot packing leaks.
Correction: Flush pilot - close isolation valves "G" and "GG", remove bottom cap of pilot, withdraw lower stem (Part No. 19) and crack the isolation valve "GG" nearest inlet flange of main valve - examine and clean lower stem and replace with care.
- Cause 4. Stretched diaphragm.
Correction: Replace.
- Cause 5. Worn packing in pilot.
Correction: Replace.
- Cause 6. Fouled or leaking Swing Check Valve (Part No. 27).
Correction: Close control piping isolation valves, remove pilot, open system side control piping isolation valve to observe leak. Clean or replace check valve.
- Cause 7. Leaking Check Valve in control piping.
Correction: Clean or replace.

C. Hunting or partial opening of main stem.

- Cause 1. Fictitious static head of water elevation due to head loss is sensed by the diaphragm of pilot from discharge side of valve. This is usually caused by an appreciable run of pipe (or several fittings) between the valve and tank basin. This condition is especially evident when the system pressure exceeds the tank head by 20 PSI or more when the valve is closed.
Correction: Close tank side control piping isolation valve and pipe separate sensing line from Tee (after removing plug) to riser of elevated tank or stand-pipe, or some point where the true static tank head is available.
- Cause 2. Fictitious static head communicates to diaphragm of pilot from distribution or supply side of valve.
Correction: Look for line surges or partially closed gate valve on distribution or supply side of valve.
- Cause 3. In certain systems where the demand is very small, or where the demand is being supplied primarily by other sources, it is normal for the valve to open only partially.
Correction: This condition may be tested by opening a hydrant near the valve on the system side.

D. Tank overflows, but the valve position indicator shows the valve is closed

- Cause 1. Worn seat packing (Part No. 9).
Correction: Replace all internal main valve packing (Part No.'s 5, 9 and 13). Order as a repair kit for valve serial number _____.
- Cause 2. Worn seat disc (Part No. 8 and 24).
Correction: Replace.

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.

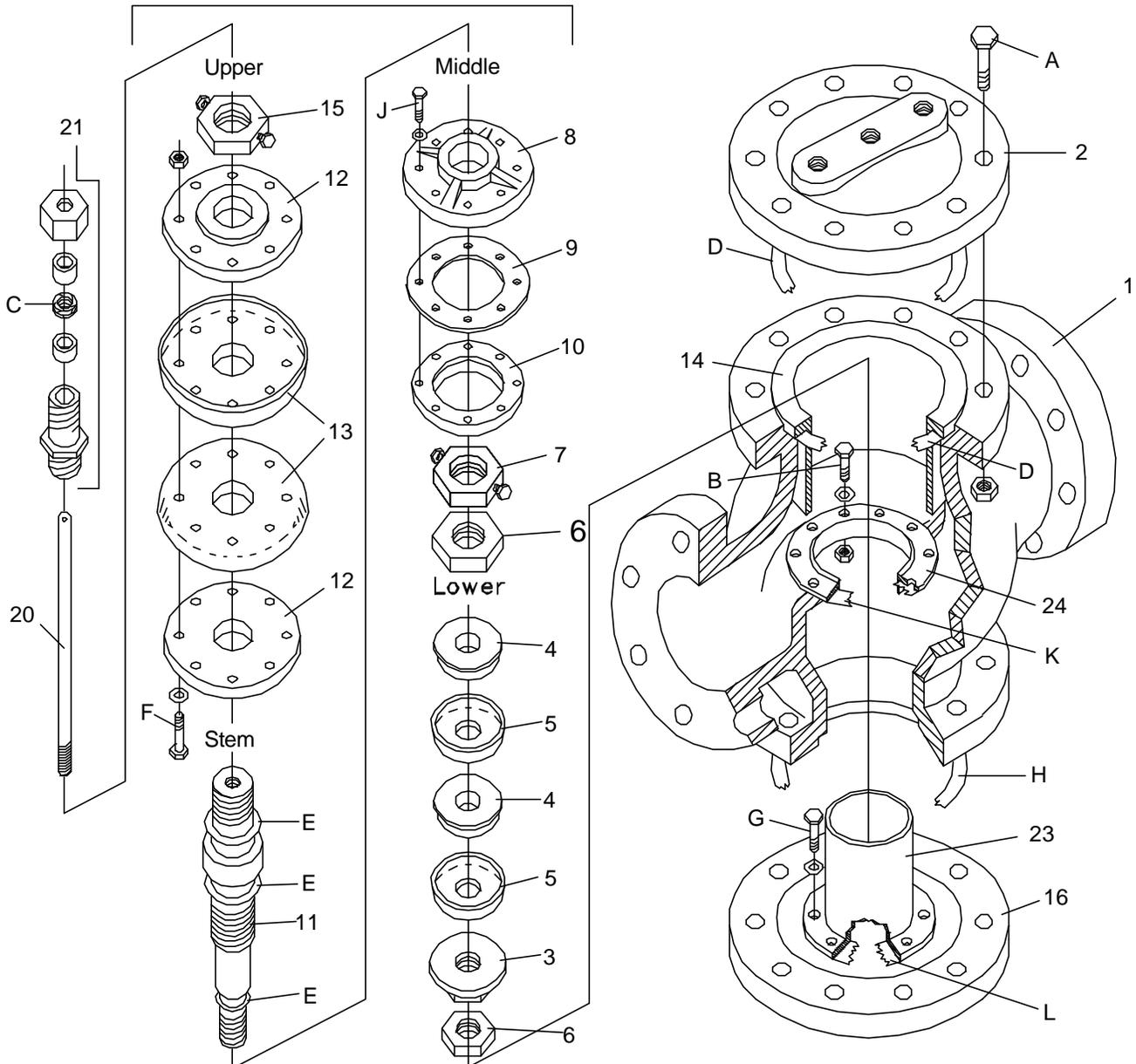
All spare parts are available from: Ross Valve Mfg. Co., Inc., 6 Oakwood Avenue, Troy, New York, 12180
Phone: (518) 274-0961, Fax: (518) 274-0210

ROSS VALVE Mfg. Co., Inc.

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GLOBE VALVE & PISTON ASSEMBLY
WITH FLAT SEAT & PLAIN PACKING SUPPORT

Piston Assembly



PART	DESCRIPTION	QUANTITY
1	SHELL	1
2	TOP CAP	1
3	BOTTOM STEM GUIDE NUT	1
4	PISTON CUP FOLLOWERS (SET OF 2)	1
*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 (SET OF 2)	1
*13	MAIN CUP PACKING	2
14	MAIN BUSHING	1
15	UPPER STEM NUT W/ SET SCREWS	1
16	BOTTOM CAP	1

PART	DESCRIPTION	QUANTITY
*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 CYLINDER	VARY
H	GASKET - BOTTOM CAP	1
J	BOLT, NUT & WASHER - SEAT DISC	VARY
K	GASKET - SEAT RING	1
L	GASKET - BOTTOM CAP CYLINDER	1

* INDICATES WHICH ITEMS COME IN THE STANDARD VALVE REPAIR KIT.