

SUBMITTAL NOTES

PROJECT: _____

Ross Model 50RWR-A – Pilot Operated Surge Relief Valve with Hydraulic Anticipation

Size: _____ inch / mm

Every Ross Valve shall be hydrostatically tested for body integrity and tight seating at the factory prior to shipment. Field operating conditions are simulated, and the controls are adjusted for proper operation. In order to design and test each valve under operating conditions similar to those in the field, please complete / confirm the following:

- Inlet (supply) pressure _____ psi
- Valve relieves to [] Atmosphere / Drain [] Pump Suction at _____ psi

The Ross Globe Body Style Valve can be installed in any position. In order to properly design the valve and orient the controls, please confirm the physical layout of the installation. (** Designates standard valve orientation.)

Valve inlet & outlet (flow) : [] Horizontal ** or [] Vertical
 Valve piston axis : [] Vertical ** or [] Horizontal [] Horizontal

The valve shall be furnished with:

- ANSI B16.1 Class 250 cast iron body & cap, with: [] Class 125 flanges [] Class 250 flanges
- Internal metal parts - Bronze construction
- Ross Model 50RWR Hydraulic Pressure Relief Pilot Valve (part #19).
 Initial Setting (typically 15-20% above normal inlet pressure): _____ psi.
- **A Feature:** Surge Control (Hydraulic Trigger).
 Ross Model 40WR Hydraulic Pilot Valve (part #30) used for Low Pressure Anticipation.
 Initial Setting (typically 20-25% below normal inlet pressure): _____ psi.
- Ross Model 5F2 Strainer (part #25) with Stainless Steel Filter Element and Blow-Off
- Ross Standard Coarse-Thread Needle Valve (part #17)
- Isolation valves: 0.5" Ball Valves, Bronze/Stainless Steel (part #18)
- Position Indicator, Bronze (part #20)
- Red brass pipe fittings and rigid control piping
- Tapped ports with gauge cocks on inlet & outlet (gauges by others)
- PAINTING: Ferrous surfaces of valve shall be coated with ANSI/NSF Standard 61 Certified Epoxy (Tnemec Series FC20)
 - Meets the performance requirements of AWWA D102 Inside System No. 1.
- Operation & Maintenance Manual (shipped with the valve).
- [] Other (Code / Description) _____ / _____

(Please list any additional features that are required. A representative may need to contact you for any relevant operating data.)

The valve will be constructed with materials and options stated on this notes page & cut view drawing & quote only, any changes or adders will be reviewed by Ross Valve Mfg. Co., Inc. with possible additional charges to quoted valve pricing. All information following the cut view drawing is for general information. Any special submittal requirements will be an additional charge to purchaser. The Ross Valve Mfg. Co., Inc. reserves the right to modify valve construction which will result in equal or superior performance to existing designs. These modifications may be made at any time and at the sole discretion of the manufacturer.

RELIEF VALVE

Purpose: Control pressure in main line

Model Number: 50RWR

Sizes: 4" - 48"

Type: Throttling

Primarily Controlled By:

Hydraulic pressure

Located: In tee connection

Purpose: To prevent excessive pressure in the main line

Inlet Pressure: Maximum: 300 psi

Inlet Pressure: Minimum: 5 psi

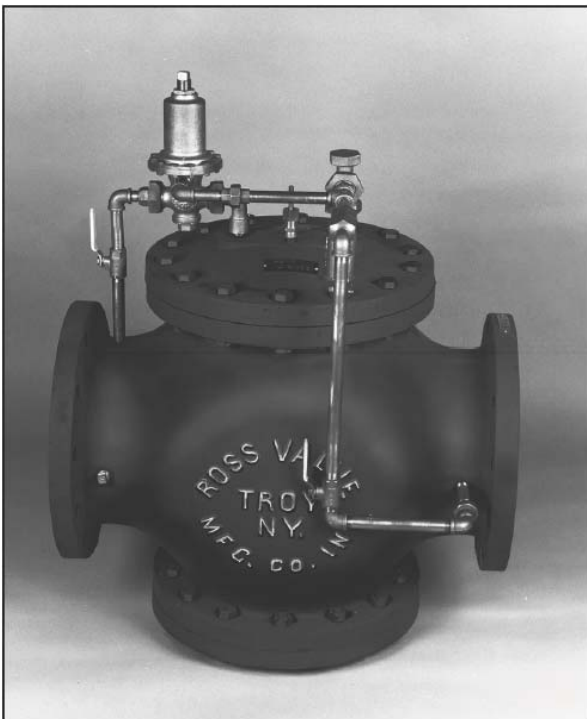
Construction: Body: 4" - 36" - Cast iron (semi-steel) with bronze trim
40" - 48" - Ductile iron, with bronze/stainless steel trim

Control Devices:

Strainer: Model 5F-2

Valves: Needle

Pilot: Relief/Back Pressure Sustaining:
Model 50RWR



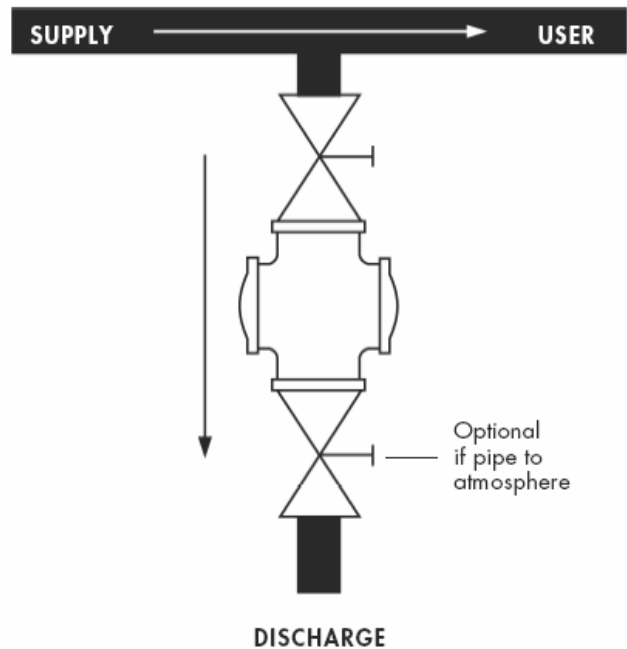
Options

1. Angle body design (90 degree)

Basic Application

Protect lines against excessive pressure that may be caused by:

1. Rapid or erroneous closing of a valve or hydrant.
2. Failure of a pressure reducing station.
3. Starting and stopping a pump equipped with a slow type check valve.
4. Reduced demand in a closed loop pumped system.
5. Power Failure.



If: Pressure in the supply/user line exceeds a preset acceptable pressure

Ross Main Valve will: Discharge a sufficient amount of water to reduce pressure to the preset level.

If: Pressure in the supply/user line drops to the preset pilot valve setting

Ross Main Valve will: Close.

RELIEF VALVE

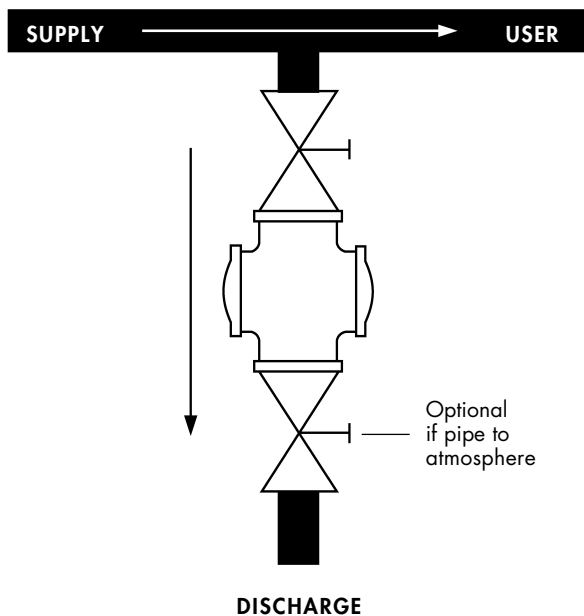
Basic Applications

Customized Features

Basic Applications

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Ross Main Valve will: Close.

A - Surge Control

Primarily Controlled By: Hydraulic pressure (mainline)

Located: Along external piping of the relief valve

Purpose: To anticipate and minimize pressure waves

SYSTEM COMPONENTS:

Accumulator Drum: Sized according to need

Drain Orifice

Valves: *Ball:* Speed Control

Pilot: Low pressure "anticipating"

BASIC APPLICATION: Start relief valve open on a low pressure wave before the shock wave reaches the station.

CUSTOMIZED CONTROL UNIT: Added to the relief valve external piping circuit to provide additional control over pressure in the operating chamber are:

1. External piping that extends from the operating chamber to the accumulator drum.
2. Accumulator - Collects water from the operating chamber and lets it slowly "bleed" out.
3. Drain orifice - Causes water to slowly "bleed" out of the accumulator.
4. Ball valve - Limits flow from the operating chamber into the accumulator.

OPERATION: Because the surge control feature anticipates the surge, it automatically readies the valve in advance to react, thereby maintaining an acceptable pressure within the main line.

1. When line pressure falls, it activates the following cycle.
 - a. When pressure drops to the low pressure valve setting, the valve opens and causes water to flow from the operating chamber into the accumulator where it "bleeds" out at a much slower rate than the water entering.
 - b. Main line water, encountering decreased resistance, pushes the piston up, opening the main valve.
 - c. Main valve remains open until the accumulator fills up and no more water can be transferred. (The accumulator is sized to insure the valve remains open until the high pressure wave has been relieved through the open valve.)
2. When line pressure exceeds the relief valve setting,
 - a. The relief valve pilot overrides all other functions, causing the main valve to act like a standard relief valve.
3. When main line pressure has returned to "normal",
 - a. Water remaining in the accumulator continues to discharge into the atmosphere until the accumulator is empty.
 - b. The main valve acts like a basic relief valve.

CAUTION: It is important not to oversize valves because they usually go wide open.



P.O. BOX 595, TROY, NEW YORK 12181
TEL 518 274 0961 - FAX 518 274 0210
WWW.ROSSVALVE.COM

IMPORTANT

To ensure proper operation of this relief valve, the controls of the valve must always be supplied with a positive pressure source. This positive pressure source is particularly important for installations where the relief or surge control valve is discharging to atmosphere or near atmospheric pressures.

Low pressure conditions typically associated with a relief valve occur when the valve opens during start-up, test, or during a high pressure surge. Adequate testing should be performed on this valve and system to assure a low pressure condition will not occur during a surge condition.

The system should be tested with the relief valve open. Supply pressure to the control piping should not fall below approximately **20 psi**. With the valve open and discharging water, the valve should be able to close automatically as water is reintroduced into the controls. If the valve does not close, the controls should be piped to a positive pressure source.

If a low pressure condition exists, the contractor or user should run a separate source of water pressure to the controls of the valve. A separate pressure source can typically be obtained from a header or similar location in the system where the line pressure is stable throughout the operation of the relief valve.

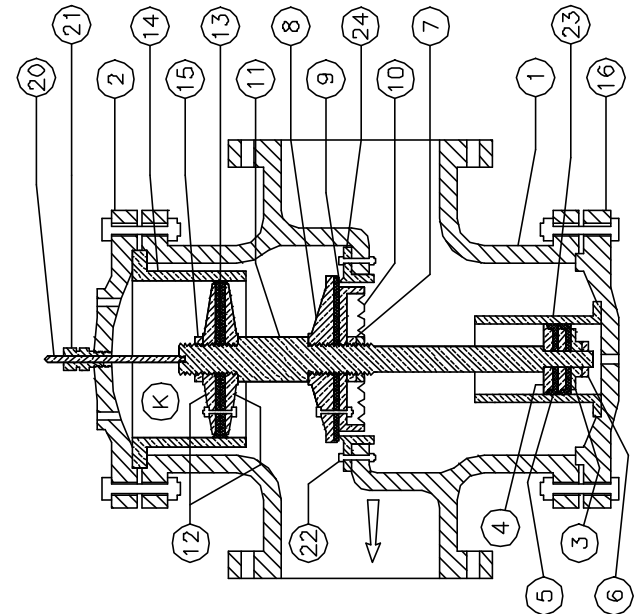
ROSS VALVE MFG. CO., INC.



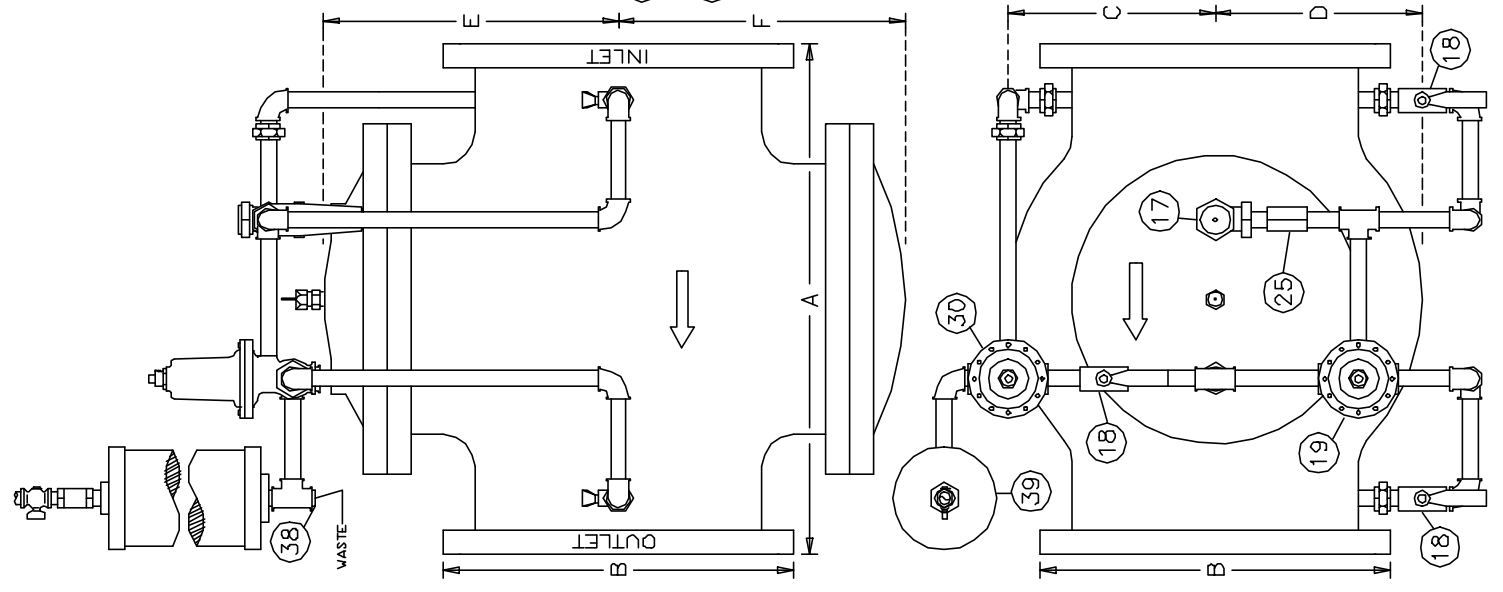
PART	DESCRIPTION	QTY.	MATERIAL
1	VALVE SHELL	1	CAST IRON
2	TOP CAP	1	CAST IRON
3	BOTTOM STEM GUIDE NUT	1	BRONZE
4	BOTTOM CUP FOLLOWERS (SET OF 2)	2	BRONZE
5	PISTON CUP PACKING	2	LEATHER
6	BOTTOM STEM LOCK NUT	1	BRONZE
7	STEM NUT	1	BRONZE
8	SEAT DISC	1	BRONZE
9	SEAT PACKING	1	POLYURETHANE
10	SEAT PACKING SUPPORT	1	BRONZE
11	STEM	1	BRONZE
12	MAIN CUP PLATES (SET OF 2)	2	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	3	BRONZE
19	PILOT VALVE - HIGH PRESSURE	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
30	PILOT VALVE - LOW PRESSURE	1	BRONZE
38	ORFICE	1	BRONZE
39	CONTROL TANK	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

ROSS VALVE Mfg. Co., Inc.
 6 OAKWOOD AVENUE - TROY, NEW YORK, 12180 - TEL. (518) 274 0961
 POST OFFICE BOX 595 - TROY, NEW YORK, 12181 - FAX (518) 274 0210
 WEBSITE: www.rossvalve.com - E-MAIL: sales@rossvalve.com

DRAWING 50RWR-A DATE 5/15/00 RJC
 GLOBE BODY 4" - 36" NO SCALE FIGURE 37A
 Model 50RWR-A
 SURGE CONTROL VALVE
 WITH HYDRAULIC ACTUATION



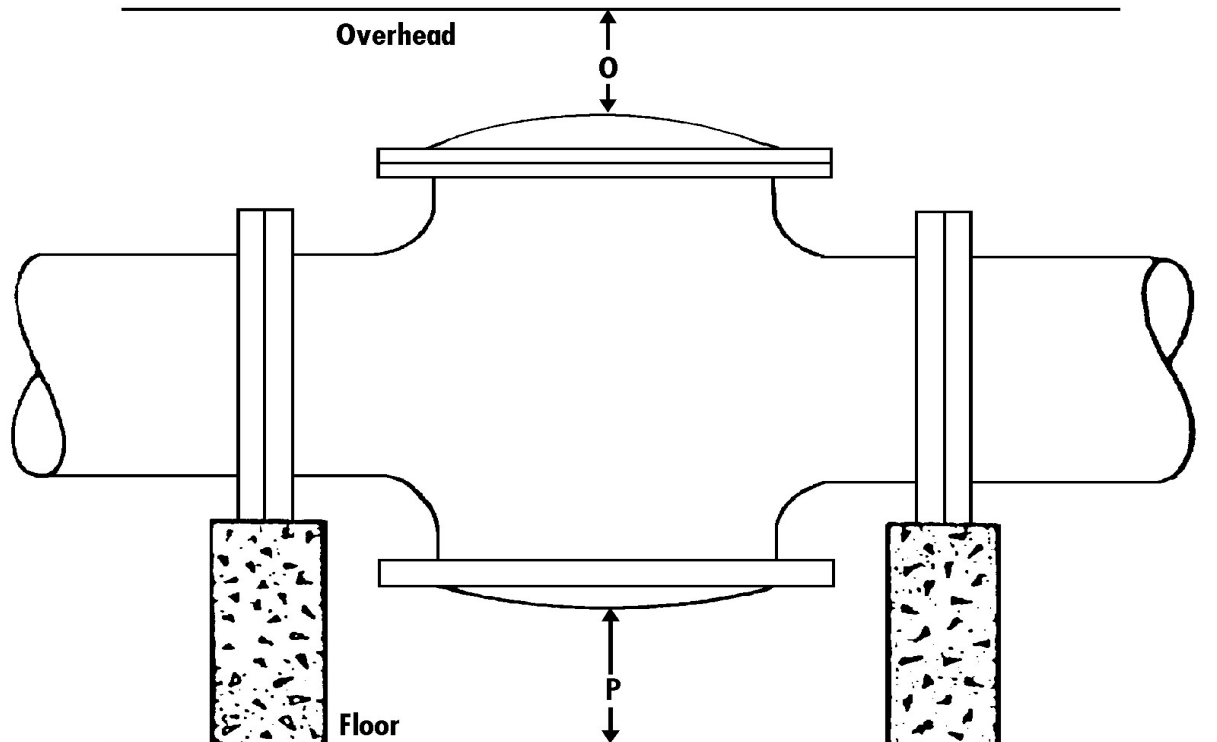
VALVE SIZE (IN)	ANSI B.16.1 CLASS	SHIPPING WEIGHT (LBS)	DIMENSIONS (INCHES)			E&F
			A	B	C&D	
4	125	235	14	9	4-3/4	7
	250	275	14-5/8	10	4-3/4	7
6	125	375	17-3/4	11	6-5/8	9
	250	430	17-3/4	12-1/2	6-5/8	9
8	125	690	24	13-1/2	8-3/4	12-1/2
	250	750	24-13/16	15	8-3/4	12-1/2
10	125	920	24-7/8	16	10	14-1/4
	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	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



DIMENSIONS

Globe Body Minimum Clearances

Piston Valve Sizes: 4" - 48"



Size (Inches)	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"
O	14	16	18	21	23	28	28	33	33	36	43	46	54	60
P	4 1/2	5 1/2	6 1/2	1	1	1	1	1	1	1	1	1	1	1

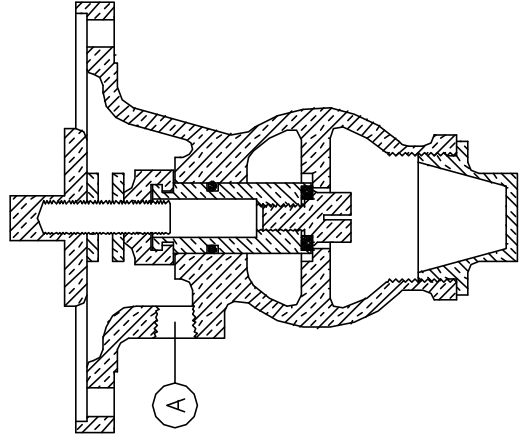
Note

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.

VIEW FROM PILOT INLET



A - STATIC SENSING CONNECTION UNDER DIAPHRAGM TO REMOTE INLET PRESSURE SOURCE

PART	DESCRIPTION	QTY.	MATERIAL
2	ADJUSTING SCREW	1	BRONZE
3	LOCK NUT	1	BRONZE
4	SPRING CHAMBER	1	BRONZE
5	TOP SPRING WASHER	1	BRONZE
6	SPRING(S)	VARY	STEEL
7	BOTTOM SPRING WASHER	1	BRONZE
8	DIAPHRAGM BUTTON	1	BRONZE
*9	DIAPHRAGM(S)	VARY	BRONZE
10	DIAPHRAGM COVER	1	BRONZE
11	BOLT & NUT - DIAPHRAGM COVER	VARY	BRONZE
12	PILOT STEM	1	BRONZE
*13	O-RING - PILOT STEM	1	BUNA-N
14	DIAPHRAGM STEM	1	STAINLESS
15	SHELL	1	BRONZE
16	BOTTOM CAP	1	BRONZE
17	LOCK NUTS - DIAPHRAGM STEM	2	BRONZE
18	LINK NUT	1	BRONZE
*19	SEAT PACKING	1	POLYURETHANE
20	SEAT FOLLOWER & WASHER	1	BRONZE
*22	GASKET - BOTTOM CAP	1	COMPOSITION
*23	GASKET - DIAPHRAGM	1	COMPOSITION

*INCLUDED IN STANDARD REPAIR KIT

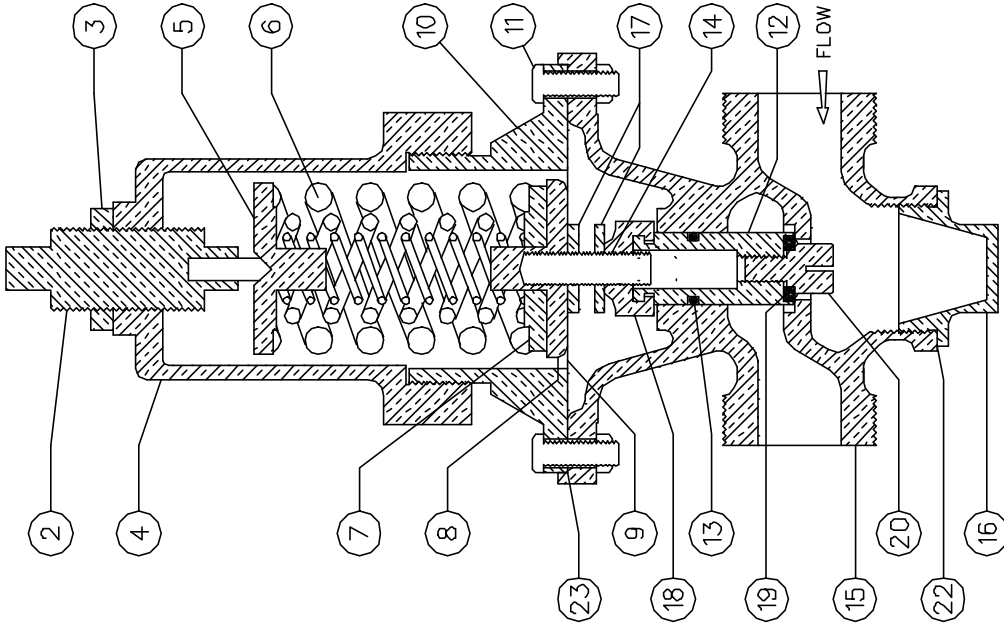
The purpose of a pilot valve is to control the opening and closing of the main valve by trapping or releasing water from the main valve's "operating chamber" ("K" - the chamber above the main valve piston). The **Model 50RWR Relief or Back Pressure Sustaining Pilot Valve** uses this logic in order to control pressure upstream of the main valve.

The pilot valve operates by creating a pressure balance across the diaphragms (#9). Pressure above the diaphragms is set by the adjusting screw (#2) acting on the springs (#6). Pressure beneath the diaphragms is exerted hydraulically via a separate sensing port directly under the diaphragms, from a remote inlet pressure source.

When the pilot valve senses a low inlet pressure, the force of the springs (#6) causes the diaphragms (#9) and entire stem assembly to move down. This pushes the pilot seat packing (#19) into the seat, trapping water in the main valve operating chamber. This causes the piston of the main valve to close, resulting in an increase in the upstream pressure.

Once the upstream pressure rises above the setting of the springs (#6), the hydraulic force overcomes the spring force and the stem assembly is pulled upwards by the attached diaphragms (#9). This causes the pilot seat packing (#19) to come off of its seat, releasing water from the main valve operating chamber. This causes the piston of the main valve to open, resulting in a decrease in the inlet pressure.

This opening and closing sequence (commonly referred to as "throttling") is continuously taking place in order to control the inlet pressure of the main valve.



FILE: P50RWR	
ROSS VALVE Mfg. Co., Inc.	
6 OAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274-0961	
NO SCALE	DRAWING 50RWR PILOT
DATE 10-1-81	REVISED 6-30-99 S.M
MODEL 50RWR PILOT VALVE RELIEF OR BACK PRESSURE SUSTAINING	

PART	DESCRIPTION	QTY.	MATERIAL
3	REGULATING SCREW	1	BRONZE
4	LOCK NUT	1	BRONZE
5	SPRING CHAMBER	1	BRONZE
6	TOP SPRING WASHER	1	BRONZE
7	SPRING(S)	VARY	STEEL
8	BOTTOM SPRING WASH (OPT.)	1	BRONZE
9	DIAPHRAGM BUTTON	1	BRONZE
10	DIAPHRAGM(S)	VARY	BRONZE *
11	BOLTS & NUTS - CHAMBER	VARY	BRONZE
12	DIAPHRAGM NUT	1	BRONZE
13	STEM NUT	1	BRONZE
14	O-RING - THIMBLE	1	BUNA-N *
15	THIMBLE	1	BRONZE
16	SEAT PACKING	1	POLYURETHANE *
17	VALVE SHELL	1	BRONZE
18	VALVE STEM	1	BRONZE
19	LINK NUT	1	BRONZE
20	LOCK NUT	1	BRONZE
21	BOTTOM CAP	1	BRONZE
22	STEM - DIAPHRAGM	1	STAINLESS STEEL
23	GASKET - BOTTOM CAP	1	COMPOSITION *
24	GASKET - DIAPHRAGM	1	COMPOSITION *
25	O-RING - LOCKNUT	1	BUNA-N

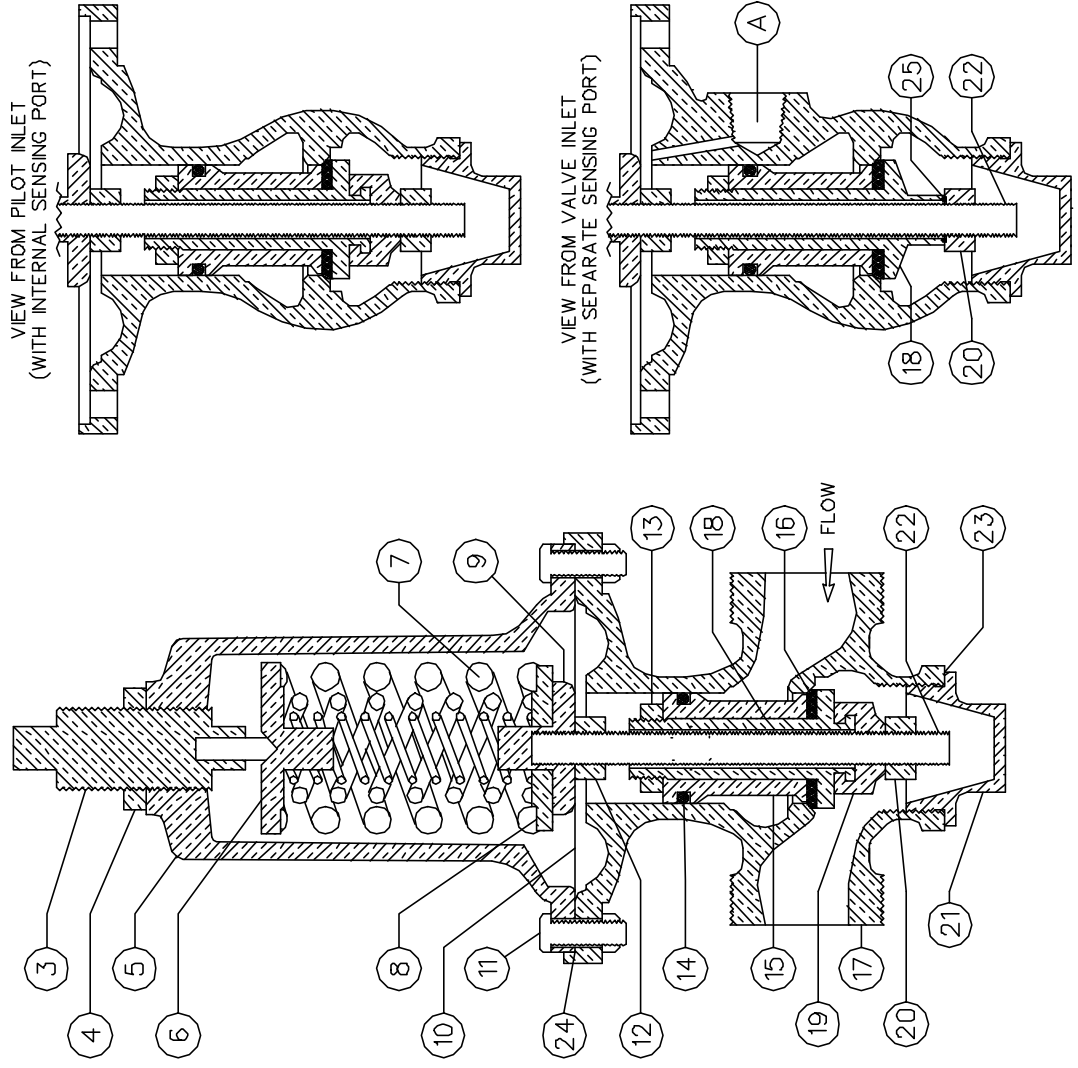
* - THESE PARTS ARE SUPPLIED IN A STANDARD REPAIR KIT

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 40WR Pressure Reducing Pilot Valve** uses this logic in order to maintain a constant pressure downstream of the main valve.

The pilot valve operates by creating a pressure balance across the diaphragms (#10). Pressure above the diaphragms is set by the regulating screw (#3) acting on the adjusting springs (#7). Pressure beneath the diaphragms is exerted hydraulically in one of two manners:

- 1 - A sensing port through the stem (#18) to the outlet throat of the pilot valve, or
- 2 - A separate sensing port directly under the diaphragms, from a remote outlet pressure source.

When the pilot valve senses a low outlet pressure, the force of the springs (#7) causes the entire stem assembly to move down. This pushes the seat packing (#16) away from the seat, allowing water to escape increase in the downstream pressure. Once the downstream pressure rises above the setting of the springs (#7), 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. This opening and closing sequence (commonly referred to as "throttling") is continuously taking place in order to maintain a constant outlet pressure.



A - STATIC SENSING CONNECTION UNDER DIAPHRAGM TO REMOTE OUTLET PRESSURE SOURCE

ROSS VALVE Mfg. Co., Inc.	
6 DAKWOOD AVENUE - P.O. BOX 595 - TROY, NEW YORK, 12181 - TEL. (518) 274-0961	
NO SCALE	DRAWING 40WR PILOT
DATE 4-2-63	REVISED 9-24-99 S.M.
MODEL 40WR PILOT VALVE	
PRESSURE REDUCING	

FILE: P40WR

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

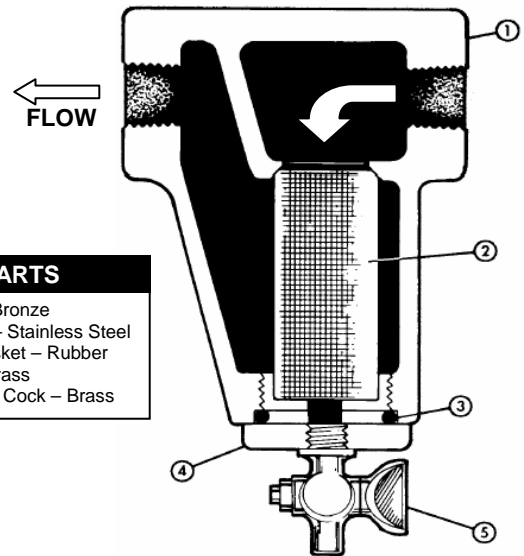
1. Strainer should be "blown down" frequently to remove collected foreign material from the sediment chamber.
2. Strainer screen should be removed occasionally for inspection and thorough cleaning.

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:

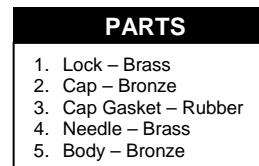
1. Remove the hex cap (#2) and lock (#1).
2. With a screw driver;
 - a. Turn the needle (#4) counter-clockwise to raise it
 - b. Turn the needle (#4) clockwise to lower it
3. Once the optimum position is determined, no further adjustment of the needle should be required.

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

