

Relief or Back Pressure Sustaining Valve

INSTRUCTIONS

Installation - Operation - Inspection - Maintenance



_____” ROSS MODEL - 23RWR
Relief or Back Pressure Sustaining Valve

Serial #S _____

ROSS VALVE Mfg. Co., Inc.

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ROSS MODEL 23RWR –PRESSURE RELIEF / BACK PRESSURE SUSTAINING VALVE

INSTRUCTIONS

SHIPMENT:

When received, the valve, depending upon size, may have external controls attached, or as a two piece shipment with main valve body on skids and external controls in a separate box. The inlet of main valve is identified with a metal tag. When controls are shipped separately, connections are tagged.

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.

MAIN VALVE INSTALLATION:

1. Check inside of the valve for shipping blocks or other foreign material.
2. Flush main before installing, if possible, and close any 1/4" and 1/2" isolation valves in external controls (optional) for the first passage of water through the main valve.
3. Place valve in line with flange marked "Inlet" facing high pressure or supply line.
4. If optional external piping and controls were provided, but not attached to valve when shipped, connect couplings identified with tags which are numbered. Pet cocks are provided for attaching gauges to back side of valve. Optional Indicator Rod (#20) shows position of main stem.

Caution: Allow enough clearance above valve for stem assembly removal.

STARTING OPERATION:

1. Close 1/4" or 1/2" isolation valve in control piping (if provided).
2. Open the main line isolation valve on the discharge side of the valve (downstream).
3. Slowly open main line isolation valve on the high pressure of inlet side to the valve.
4. Open 1/4" or 1/2" isolation valve in control piping (if provided).

Loosening the union of the optional control piping on the top cap side of the Needle (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 optional valve indicator rod with a wrench handle or block of wood until the valve operating chamber is pressurized.

BACK PRESSURE SUSTAINING/ RELIEF VALVE

Purpose: Maintain inlet pressure/ Control pressure in main line

Model No: 23RWR

Sizes: 1 1/2" - 3"

Type: Direct Acting Throttling

Primarily Controlled By:

Hydraulic pressure

Located:

Back Pressure Sustaining: In line

Relief: In tee connection

Purpose:

Back Pressure Sustaining: To prevent inlet pressure from falling below a preset minimum

Relief: To prevent excessive pressure in the main line

External Piping: None

Ends: Flanged or screwed

Inlet Pressure: Maximum: 300 psi

Inlet Pressure: Minimum: 5 psi

Class: 125 ANSI for inlet pressures to 180 psi
250 ANSI for inlet pressures to 300 psi

Fluid: Cold water service

Construction: Cast iron body, bronze cover, pilot, piston and internal trim

Control Valves: None

Options

1. All bronze body
2. Stainless steel trim



Ross engineers customize the basic 23RWR to accommodate individual needs.

Customized Features

Any one or a selection of features can be added to the basic back pressure sustaining/relief valve.

Code

PR - Pressure Reducing Pilot Valve (Only when 23RWR is used on line as a back pressure sustaining valve.)

SC or **SO** - Solenoid Pilot Valve: 2 Way

SG or **SF** - Solenoid Pilot Valve: 3 Way

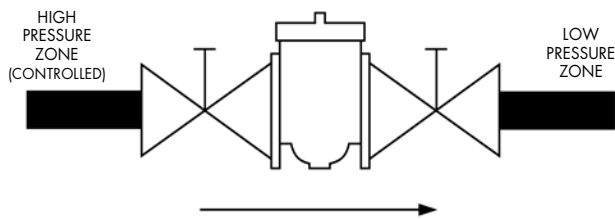
BP - External Back Pressure Sustaining/Relief Pilot Valve

BACK PRESSURE SUSTAINING/ RELIEF VALVE

Model Number: 23RWR

Basic Applications: Back Pressure Sustaining

1. Permit a higher pressure zone to reinforce the lower pressure zone without lowering the high zone pressure.
2. Prevent over pumping in the event of a line break or excessive demand.
3. Prevent a pump from lowering the suction pressure below a safe minimum.



If: User's demand increases enough to reduce the pressure from the supply into the Ross Valve (upstream pressure)

Ross Main Valve will: Throttle to pass only the amount of water to user that will sustain an acceptable preset level.

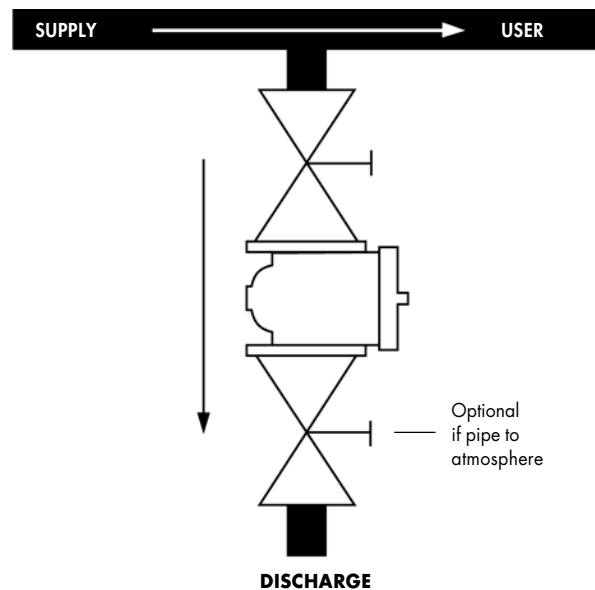
If: Supply pressure falls below the preset level

Ross Main Valve will: Close.

Basic Application: Relief

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.

BACK PRESSURE SUSTAINING/ RELIEF VALVE

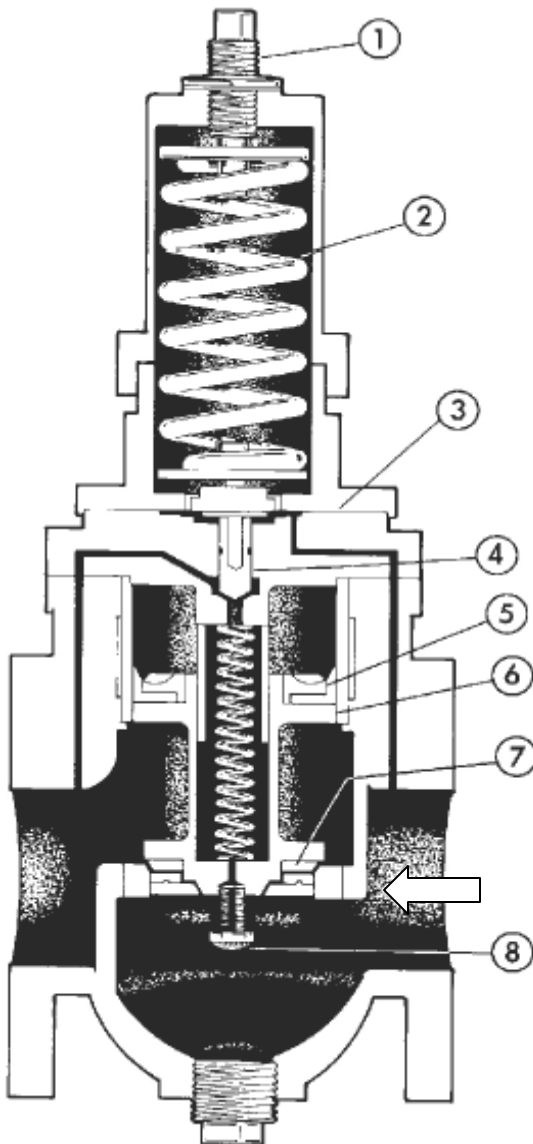
Operation

Model No: 23RWR

Control Unit

Piston movement is accurately controlled by pressure exerted by the incoming pressure exerted on an operating chamber above the main piston, and the balance between an adjustable spring load above a diaphragm and a small reservoir underneath.

1. Into/Out of the Operating Chamber
 - a. A hollow piston stem with a strainer on bottom - Introduces some inlet water into the operating chamber above the main piston.
 - b. Narrow channel - Leads water to the discharge side.
2. Into/Out of a small reservoir under the diaphragm
 - a. Narrow channel on inlet side of the valve - Communicates incoming pressure.



Operation

This high capacity valve offers accurate maintenance of upstream pressure or reliably keeps line pressure within preset limits, depending on where it is located.

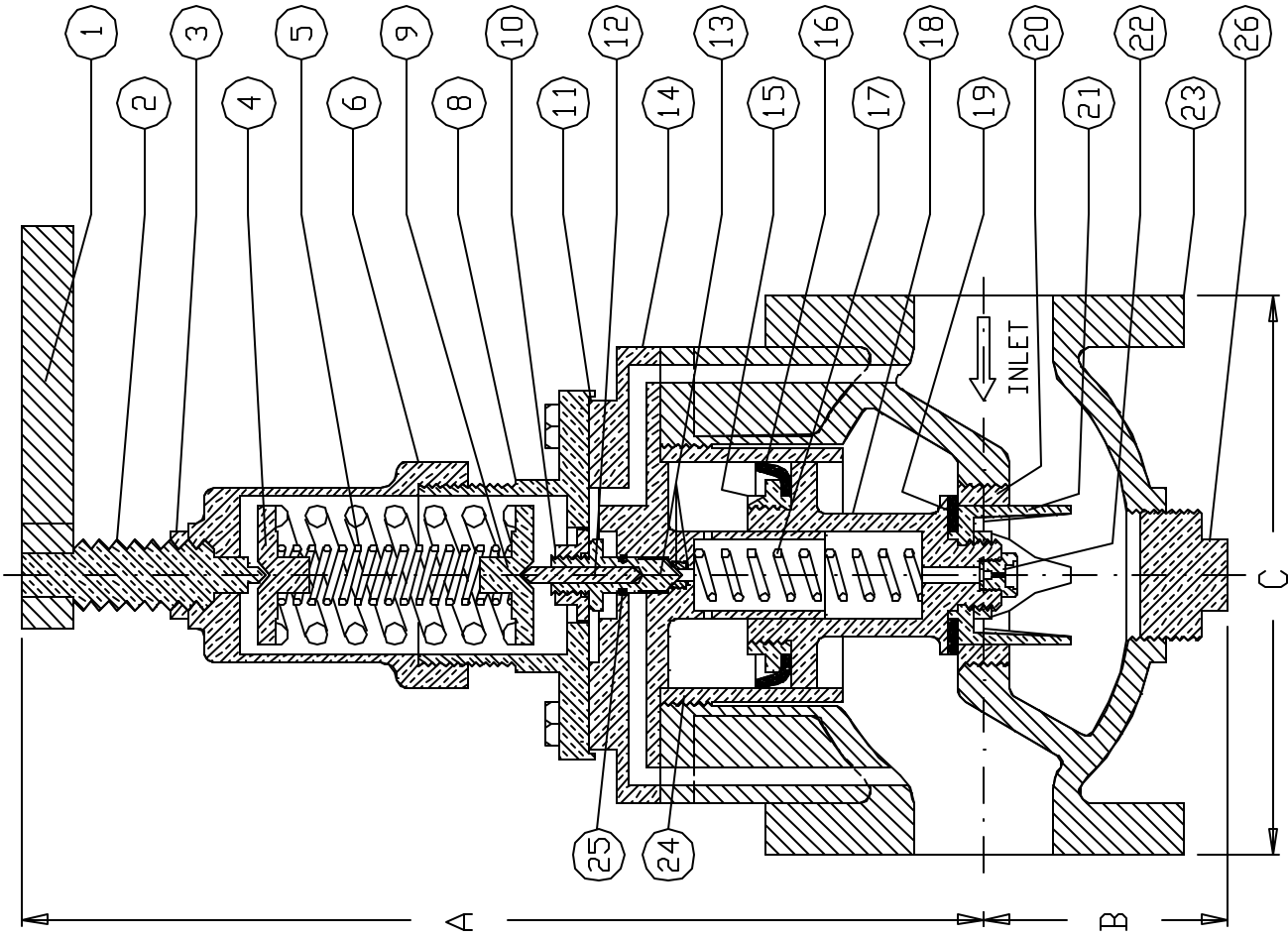
1. When upstream (supply) or line pressure increases, the
 - a. Pressure exerted through the channel to the reservoir under the diaphragm increases, causing the pilot seat to open.
 - b. Water bleeds out of the reservoir reducing pressure above the piston.
 - c. Pressure exerted up against the piston stem leading into the operating chamber increases.
 - d. Piston stem is lifted off its seat decreasing pressure above the diaphragm.
 - e. Inlet hydraulic pressure lifts the piston, opening the valve.
2. When upstream (supply) or line pressure decreases,
 - a. Decreased incoming water pressure is sensed by the reservoir under the diaphragm.
 - b. Springload pressure above the diaphragm, exceeding the pressure below, expands, closing the pilot seat.
 - c. Water gets trapped in the operating chamber, exerting downward pressure on the piston.
 - d. Valve gradually closes.

To Adjust the Preset Pressure

1. Turn the screw clockwise to increase the compression on the springs and require a higher pressure to open the valve.
2. Turn the screw counter-clockwise to decrease the setting.

PARTS

- 1 Adjusting Screw
- 2 Adjusting Spring
- 3 Diaphragm
- 4 Pilot Stem
- 5 Cup Packing
- 6 Main Piston
- 7 Seat Packing
- 8 Strainer Orifice



PART NO.	DESCRIPTION	QTY	MATERIAL
1	ADJUSTING HANDLE	1	BRONZE
2	ADJUSTING SCREW	1	BRONZE
3	LOCK NUT	1	BRONZE
4	TOP SPRING WASHER	1	BRONZE
5	ADJUSTING SPRINGS	1	STEEL
6	SPRING CHAMBER	1	BRONZE
8	DIAPHRAGM COVER	1	BRONZE
9	BOTTOM SPRING WASHER	1	BRONZE
10	DIAPHRAGM BUTTON	1	BRONZE
11	DIAPHRAGM	1	BRONZE
12	PILOT PIN	1	STAINLESS
13	PILOT STEM/SEAT/O-RING	1 SET	420SS/BUNA-N
14	DIAPHRAGM PLATE	1	BRONZE
15	CUP FOLLOWER	1	BRONZE
16	CUP PACKING	1	LEATHER
17	SPRING	1	BRONZE
18	STEM	1	BRONZE
19	SEAT PACKING	1	COMPOSITION
20	SEAT RING	1	STAINLESS
21	SEAT PACKING SUPPORT	1	BRONZE
22	STRAINER/DRIFICE	1	STAINLESS
23	SHELL	1	BRONZE
24	CYLINDER LINER	1	COMPOSITE
25	O-RING - PILOT	1	BUNA-N
26	BOTTOM PLUG	1	BRONZE

SIZE	ANSI CLASS	SHIPPING WEIGHT (LBS)	DIMENSIONS (INCHES)		
			A	B	C
1-1/2	125	35	11-1/2	3-1/4	7-5/8
	250	42	11-1/2	3-1/4	8-1/8
	NPT	30	11-1/2	3-1/4	8-3/8
2	125	55	13	3-1/2	8
	250	65	13	3-1/2	8-3/8
	NPT	50	13	3-1/2	8
2-1/2	125	75	14	4-1/2	9-1/4
	250	85	14	4-1/2	9-1/8
	NPT	70	14	4-1/2	9-1/4
3	125	80	14	4-1/2	9-1/4
	250	90	14	4-1/2	9-1/8
	NPT	75	14	4-1/2	9-1/4

ROSS VALVE Mfg. Co. Inc.
 6 OAKWOOD AVENUE - P. O. BOX 595 - TROY, NEW YORK 12181
 NO SCALE DRAWING 23RWR-STEL
 DATE 3-3-58 30020 REVISED 1-17-03
 MODEL 23RWR
 RELIEF & BACK PRESSURE SUSTAINING VALVE

ROSS MODEL 23RWR RELIEF VALVE DIRECT ACTING WITH INTERNAL PILOT

INSTRUCTIONS

DESIGN

Model 23RWR is an iron body, bronze trimmed, internal pilot operated, globe body Relief Valve, capable of handling large quantities of water while maintaining close pressure tolerance. The valve is self-contained, and easily adjusted through various pressure ranges from 30 PSI to 600 PSI.

The 'controlled' pressure enters through the valve inlet. This pressure enters the bottom of the free floating piston through a strainer and an orifice, and passes into the power chamber area above the main piston. Assuming the pilot seat is closed, the pressure in the power chamber becomes equal to the incoming pressure, and a hydraulic seating force is developed due to area differentials on the piston. The incoming pressure is also communicated to the small reservoir under the diaphragm through the port on the side of the valve opposite the outlet branch. As long as the springload above the diaphragm exceeds the upward force of the inlet pressure acting under the diaphragm, the pilot seat will remain closed. This in turn keeps the main piston closed.

When the pressure under the diaphragm exceeds the spring loading, the diaphragms lift the pilot stem off its seat. Since the flow into the power chamber is restricted by the orifice at the bottom of the main stem, opening of the pilot seat results in a decrease in pressure above the piston. This allows the incoming pressure to lift the valve piston and relieve itself through the side outlet.

ADJUSTMENT

Adjust is made by turning the adjusting screw on the top of the valve. Turning the screw *clockwise* increases the compression on the springs, and requires a higher pressure to open the valve. *Counter-clockwise* decreases the setting.

MAINTENANCE

The best possible maintenance the valves can experience is occasional operation. This keeps the packings soft and pliable, and keeps the valves flushed out. If the valves have been idle for a long period of time (or if an extended period of disuse is anticipated), the valve piston should be removed, and a light coat of grease applied to the cup leather after it has been 'worked' in the hand.

REPAIRS

When repairs are required, it may be necessary to replace any or all of the parts identified on Drawing No. 30020; as diaphragm (11), cup packing (16), seat packing (19), strainer/orifice (22), and O-ring (25). In addition, the seat on the pilot valve (13) may require lapping with fine valve grinding compound to restore a tight seal.

**ROSS MODEL 23RWR RELIEF VALVE
DIRECT ACTING WITH INTERNAL PILOT**

TROUBLESHOOTING

1. When valve does not close:

A. Incorrect adjustment: turn adjusting *counter-clockwise* until valve closes.

B. Fouled strainer/orifice:

Remove and clean.

C. Stick or stones lodged under seat:

Dismantle and clean.

D. Internal leakage in main valve by cup leather:

Disassemble and repack valve.

2. Valve will not open:

A. Incorrect adjustment of valve:

Turn adjusting screw *counter-clockwise* until valve opens.

**ROSS MODEL 23RWR RELIEF VALVE
DIRECT ACTING WITH INTERNAL PILOT**

INTERNAL REPAIRS

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

1. Shut inlet main line isolation valve.
2. Shut outlet main line isolation valve.
3. De-pressurize valve.
4. Release spring pressure and remove spring chamber (6).
5. Remove top cap bolts and top cap.
6. Withdraw piston.
7. Inspect cylinder liner for scoring. May be smoothed with fine wet emery. Inspect seat ring for damage.
8. Secure main piston. Loosen cup follower and remove. Replace cup packing. Remove seat follower. Replace seat packing.
9. Remove strainer/orifice and clean or replace. The cup is impregnated with lubricants so no external lubrication is necessary.
10. Reinsert stem and replace top plate and pilot assembly.
11. Restore water pressure by opening the discharge isolation valve first, so that high inlet pressure is not trapped against closed outlet valve.
12. Open inlet isolation valve *slowly*.