

## **WW-730**

# **Pressure Sustaining/Relief Control Valve**

**Installation**

**Operation**

**& Maintenance**

## 1. DESCRIPTION

The Model 730 Pressure Relief / Sustaining Valve is an automatic control valve designed to sustain a minimum upstream backpressure or relieve excess pressure. It is a pilot controlled, hydraulically operated, diaphragm actuated globe valve in either the oblique (Y) or angle pattern design. Valve differential pressure powers the diaphragm actuator open or closed. The lower control chamber is connected through a fixed orifice to the downstream pressure, which serves to cushion the closing of the valve. The upper control chamber, which operates on a two-way control principle, has varying pressure produced by the regulating pilot and the pilot's internal upstream restriction needle valve.

## 2. PRINCIPAL OF OPERATION

The pressure-regulating pilot senses upstream pressure and modulates open or closed. This varies the pressure in the upper control chamber causing the main valve to throttle thus maintaining constant upstream pressure. When the upstream pressure rises above the pilot setting the pilot opens, pressure in the upper control chamber decreases and the main valve modulates open to relieve upstream pressure and maintain pilot setting. Should the upstream pressure fall below the pilot setting the pilot closes, pressure in the upper chamber increases and the main valve throttles closed to maintain the preset pilot setting. The pressure relief/sustaining pilot has an adjusting screw to preset the desired upstream pressure and an internal needle valve to control the closing speed. For easy identification the pressure relief/sustaining pilot is stamped with the number #3 or #3PB on the side of the pilot body.

## 3. INSTALLATION

1. Allow enough room around the valve assembly for any adjustments and future maintenance/disassembly work.
2. Thoroughly flush the pipeline to remove any dirt, scale, debris, etc. Failure to do this may result in the valve being inoperable.
3. Isolation valves A and B should be installed upstream and downstream of the sustaining valve to allow for future maintenance operations. Isolation valve B may be omitted in pressure relief applications.
4. Install the sustaining valve in the pipeline or the relief valve in a tee off the pipeline with the flow arrow on the valve body casting in the proper direction. Use the lifting eye provided on the main valve cover for raising and lowering the valve. For best performance, install the valve horizontally with the cover up. Ensure that the valve is positioned so that the actuator assembly can be easily removed for future maintenance.
5. After installation, carefully inspect/correct any damaged accessories, piping, tubing, or fittings.

## 4. IN LINE STATIC TEST

### 4.1. Open Valve Static Test

Close cock valves 1 and 2 to isolate the pilot control system. This prevents dirt from entering into the control loop.

Remove the cover plug 3 on the main valve actuator.

**CAUTION:** This will allow the valve to open fully. Ensure that this will not cause system damage.

Inspect and correct any leaks at the flange connections, fittings etc.

Replace the cover plug 3.

### 4.1. Closed Valve Static Test

Close cock valve 2 and open cock valve 1.

Vent any trapped air in the main valve cover by loosening the tube fitting at the highest point on the cover. This will trap the main valve in a closed position while the upstream pipeline is pressurized.

Check the valve cover and diaphragm area for leaks, and tighten the actuator bolts if necessary.

## 5. START-UP OPERATION

NOTE: Ensure upstream pressure is available by starting a pump and opening upstream gate valve (A). Create the required valve operating set pressure at the main valve inlet. Use a system pressure gauge or the optional gauge (25) supplied with the valve

1. Close the main valve by turning the adjusting screw on the pressure sustaining pilot (#3, #3PB) clockwise (CW) as far as possible.
2. Ensure cock valves 1 and 2 and downstream gate valve B are open.
3. The needle valve (21 or 5) is factory set open between one and one-and-a-half turns. Turn the needle valve clockwise (CW) to reduce the closing rate speed of the main valve or counterclockwise (CCW) to increase it.
4. Slowly turn the adjusting screw on the pressure sustaining pilot (#3, #3PB) counterclockwise (CCW) until the main valve begins to open. Valve opening may be indicated by a slight drop in gauge pressure. Tighten the locknut on the adjusting screw.
5. Check valve operation by increasing and decreasing system pressure. The pressure sustaining valve should open and close in response. Readjust the pilot by turning the adjusting screw.

## 6. PREVENTATIVE MAINTENANCE SCHEDULE

The following procedure suggestions are a maintenance guide. These procedure suggestions will vary depending on the type of fluid and operation conditions.

<i><b>Description</b></i>	<i><b>Norm</b></i>
Clean filter	Annually
Seat inspection	Annually
Seal inspection	Biannually or longer
Indicator Stem freedom of rotation	Annually
Valve freedom of movement	Annually
Sealing	Annually
Needle valve operation	Annually
Pressure gauge	Semi Annually
Cavitation damage	Annually
Inspect and/or replace diaphragm heavy duty	3 year
Inspect and/or replace diaphragm light duty	5 year

## 7. FIELD MAINTENANCE INSTRUCTIONS

Bermad valves require no lubrication, no packing tightening, and require a minimum of maintenance. A periodic inspection schedule should be established to determine how the flow, the erosion, the dissolved minerals and the suspended particles are affecting the valve.

**VALVE OVERHAUL.** After about three years of operation, replacement of important parts and diaphragm is recommended. Remove the actuator, clean the valve body from sediments, clean the control tubing entry holes, install a new diaphragm and other Elastomers.

**FILTER CLEANING.** The filter used in the valve is a Y pattern filter. The filter should be cleaned manually every time the valve is opened for internal inspection.



## 8. PART LIST

Bermad has a convenient and easy to use Ordering Guide for valve spare-parts and control system components. (See attached pages with spare part list and illustrated parts breakdown). Bermad Company has a complete inventory of parts. Shipment on any part is made the same day the order is received.

Stocking distributors in many regions also have an inventory of parts. Contact your local representative.

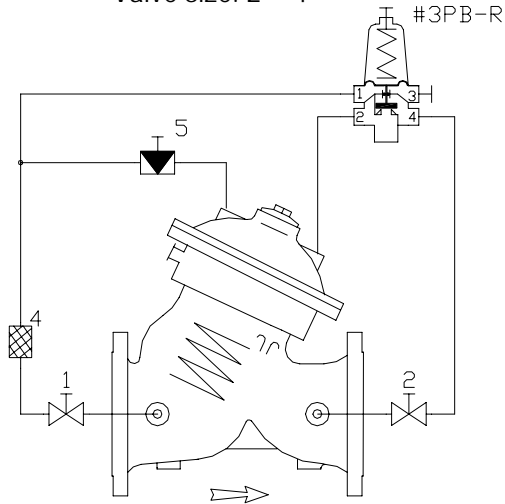
It is not recommended to store spare rubber parts for long periods (e.g. years). Rubber in improper storage conditions can harden, have ozone cracking, grow mold bloom and heat aging. Order new rubber parts when required.

## 9. TROUBLE-SHOOTING

Symptom	Probable Cause	Action
Valve fails to open	Excessive sustaining pilot (#3, #3PB) spring compression.	Turn the adjusting screw CCW on pilot (9) until the main valve opens.
	Needle valve (21 or 5) opening too wide.	Reduce needle valve opening.
	Insufficient inlet pressure	Check/create inlet pressure.
	Cock valve (2) closed	Open cock valve (2).
Valve fails to close.	Filter (4) blocked	Remove filter cap and screen to clean.
	Needle valve (21) plugged or closed	Open or adjust needle valve (21).
	Cock valve (1) closed.	Open cock valve (1).
	Debris trapped in main valve	Remove and inspect actuator assembly. Check seat and disc seal. Refer to I.O.M. model 700/705.
	Diaphragm in main valve is leaking	Test for leakage. Close cock valves (1 and 2) and remove plug (3) on the main valve cover. If a continuous flow exists, the diaphragm is damaged or loose. <b>Caution:</b> This test will cause the valve to go fully open Close downstream gate valve B or omit this test if this may cause system damage
Valve fails to regulate	Needle valve (21 or 5) not properly adjusted.	Factory set at 1 or 1½ open. Adjust.
	Air trapped in main valve cover	Loosen cover tube fitting at the highest point, allow the air to escape and re-tighten.

## 10. CONTROL LOOP DIAGRAM

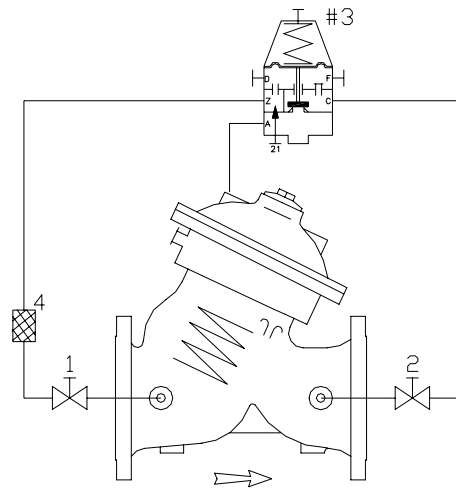
Valve size: 2" - 4"



### PARTS LIST

- 1 2W Cock Valve
- 2 2W Cock Valve
- 4 Control Filter
- 5 Needle Valve
- #3PB-R 2W PB PS Pilot R Sensing

Valve size: 6" - 12"



### PARTS LIST

- 1 2W Cock Valve
- 2 2W Cock Valve
- 4 Control Filter
- #3 2W P.S. Pilot