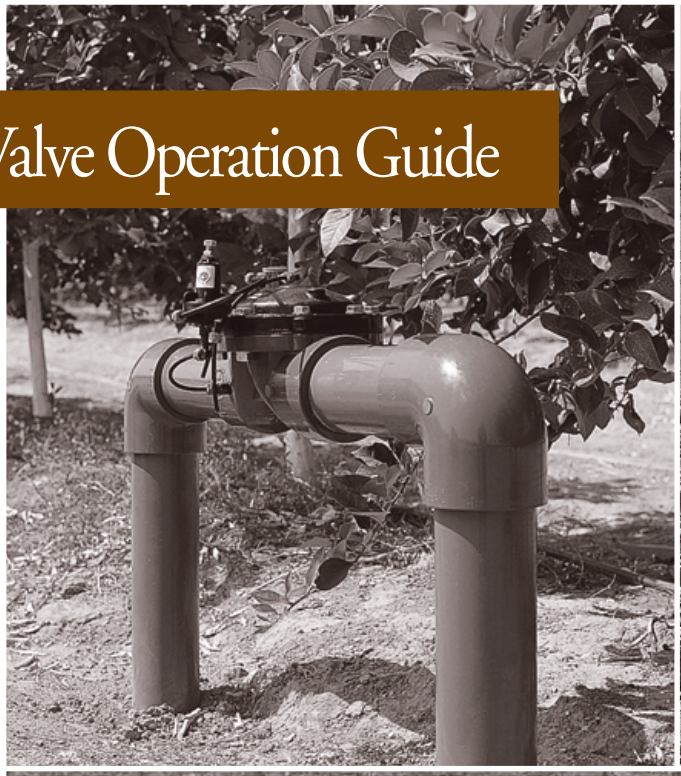
NETAFIM

Valve Operation Guide

Structural Simplicity and Superior Hydraulic Performance



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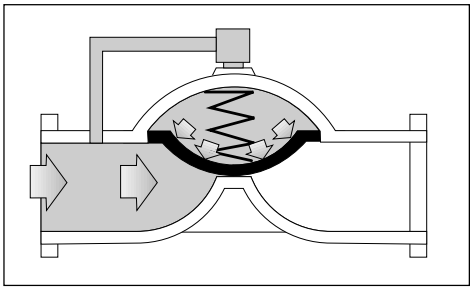
BASIC VALVES

OPERATION OF BASIC VALVES

DIRECT-SEALING DIAPHRAGM

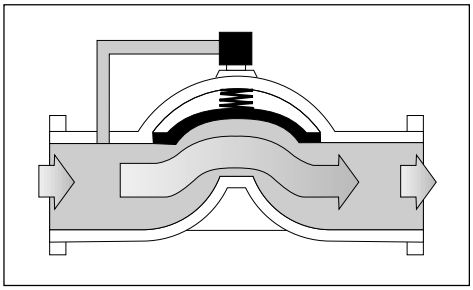
The direct-sealing diaphragm valves are operated by pipeline pressure or by air pressure (which equal to the pipeline pressure). The reinforced rubber diaphragm seals the water passage when the line pressure reaches the valve's control chamber. Relieving the pressure from the control chamber causes the valve to open.



CLOSED VALVE
Upstream pressure covers twice the surface area in bonnet, valve closes

REINFORCED RUBBER DIAPHRAGM

The valves only moving part is its diaphragm. A spring located above the diaphragm ensures "valve closure" regardless of pressure level and flow conditions.



OPEN VALVE
Opening Port releases pressure from inside bonnet.

BASIC VALVES and DEFINITIONS

HYDRAULICS

Properties of water used in practical designs

Specific weight: 0.036 lb/in^3

Kinematic viscosity: 10.76 ft^2/sec

Static Pressure: the column of water stored in a tank with relation to a relative surface, or the potential energy in a pipe line

Dynamic Pressure: the energy gradient that cause a flow of water

Flow Rate: the amount of water passing through a nozzle within a period of time

Flow in an open discharge equation:

$$Q = \frac{V \times D^2}{0.409}$$

Where: Q = gpm

V = feet/sec

D = Diameter (ID) inch

0.409 = Unit conversion factor

Valve pressure loss: the pressure differential across a valve caused by friction

Where: Q = gpm $\quad \Delta P = \left(\frac{Q}{Cv}\right)^2$

Cv = Flow factor (Flow of water (gpm) @ 1 psi loss, Temperature @ T=72° Farenheit

WHAT IS A CONTROL VALVE

Control (regulating) valves are semi-automatic directional devices, which control flow and/or pressure in a water supply network. The valves are pre-set to the required operating parameters, requiring minimal adjustments by the operator.

OPERATING PRESSURES FOR VALVES

The standard valves are divided into three pressure categories:

- Medium pressure models (up to 230 Psi)
- High Pressure models (up to 350 Psi)
- Plastic valves (up to 150 psi)

OPENING PRESSURES OF VALVES

Check to ensure that the Upstream Dynamic Pressure is not below the Minimal Opening Pressure of the valve, this can cause the valve not to open or to open partially. A partially open valve will cause a higher head-loss - using special low pressure diaphragms will solve this problem.

OPERATING VELOCITIES FOR VALVES

These valves may be used at very high flow velocities due to the shape of the valve body, which is almost turbulence free. The valves may be operated in the fully open position at 23-24 feet/sec. velocity without noise, shuddering or cavitation damage.

MEDIA CONTROLLED BY VALVES

The valve is very suitable for controlling slurries, untreated sewage water, water with high sand content as well as the normal types of media controlled by these types of valves. This is due to the design of the valve, which has no shaft, bearings, seals or discs in the water passage.

CONTROL MEDIA FOR VALVES

The valve can be controlled by an external source such as air or clean water in cases where the media is very dirty or abrasive.

When a very high reducing ratio is required, you may consider using:

- Two valves in sequence (inline).
- A fixed orifice within the pipe to reduce the regulation ratio of the valve to the recommended 3:1 ratio. This solution is only possible when the flow is at a constant level.

Special attention should be given to maintain the operating pressures within the specified limits.

PRESSURE LOSSES WITH VALVES

As the water passes through the valve in an almost straight line, the head-loss created by the valve is very low. Consequently, the Automatic Control Valve has a very high CV Equation factor. This allows extremely high flow velocities, in many cases a smaller valve can be used instead of a larger valve of a different model. This is not detrimental to the system and is more economical.

The head-loss on a valve fitted with a 3 Way Control System (positioning) is less than a valve fitted with a 2 Way Control System.

CAVITATION POTENTIAL WITH VALVES

The valves unique structure make them very resistant to cavitation. However, it is not recommended to exceed a 3:1 ratio of Upstream/ Downstream pressures.

When higher regulation ratios are required (up to 5:1), it is recommended to use cast bronze or non-metal (nylon/PVC) valves.

Note: Pressure Relief valves and Level Control valves whose downstream pressure is virtually zero, will create destructive cavitation levels. Therefore, the use of bronze valves or a proper orifice plate is essential for long-life of the main valve. This condition occurs in all brands of valves. Please consult Netafim USA's engineers for further information.

GENERAL INFORMATION ABOUT VALVES

In-line self-flushing filters, ensuring clog-free operation of the control devices, are a standard feature on all control valves.

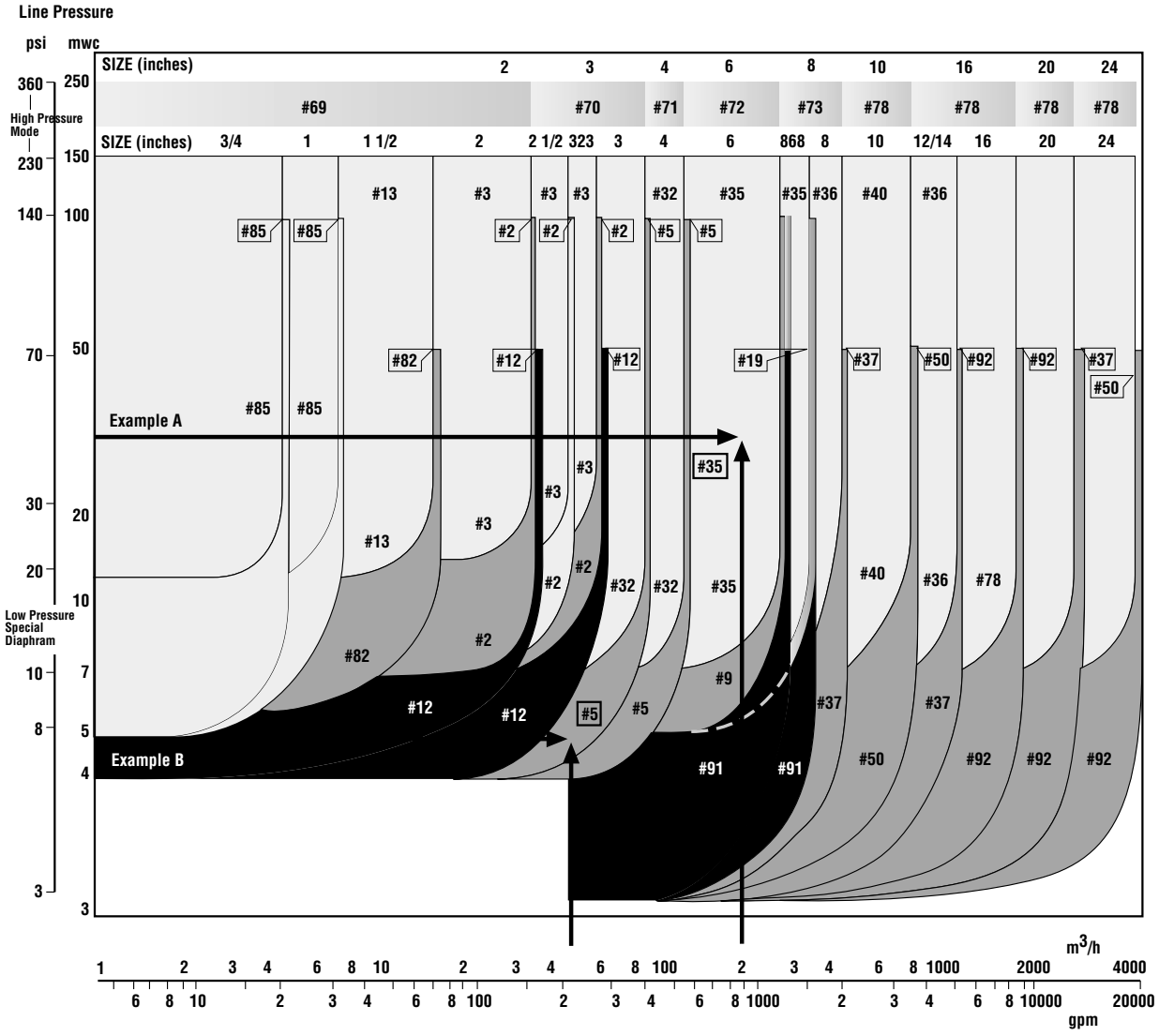
Manual override (3-Way Selectors) can be added to Three Way (Positioning) valves only.

Netafim USA's broad range of specialized control valves allows us to design a solution to almost any control system, no matter how complicated. Please note, we have not included our complete line of valves in this presentation. If a control system is not here, please contact your distributor or Netafim USA's Customer Service Department. We will design a tailor made control valve for your system if one is not currently available.

BASIC METAL VALVES

Size & Diaphragm Selection Guide

This graph provides a guide (based on flow rate and line pressure factors) for selecting the proper valve, pressure rating, size, and diaphragm type.



HOW TO USE THE GRAPH:

1. Locate the Flow Rate on the horizontal axis and draw a line upwards.
2. Locate the Line Pressure on the vertical axis and draw a line to the right.
3. The point of intersection of the two lines (see examples A+B) defines the size of the valve (horizontal white section on top). A suitable diaphragm is represented by the GRAY area (standard diaphragm).

CHARCOAL and BLACK areas represent special low pressure diaphragms.
Serial numbers of the respective diaphragms are marked in squares on the upper and lower limit lines of each size area.

EXAMPLE A: Flow Rate 200 m^3/h (900 gpm), Line Pressure 30m (45 psi): 6" Valve, Standard Diaphragm.

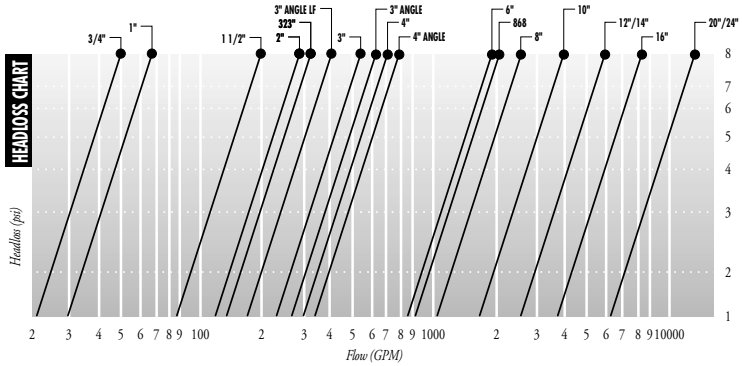
EXAMPLE B: Flow Rate 50 m^3/h (220 gpm), Line Pressure 5m (8psi): 3" Valve, Special Diaphragm No. 5.

AVAILABLE MODELS

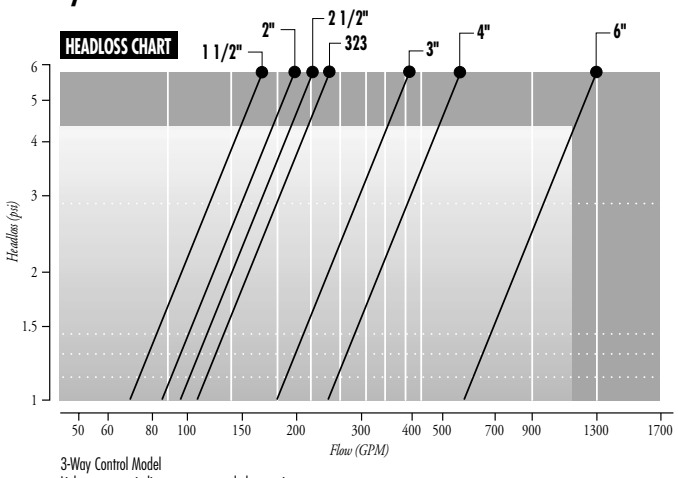
CONNECTION	Threaded	Threaded	Flanged	Grooved	Flanged	Threaded	Threaded	Threaded/ Flanged	Threaded	Slip
MATERIAL	Cast Iron	Bronze	Cast & Ductile	Cast Iron	Cast Iron	GRP*	Cast Iron	Bronze/Iron	PVC	PVC
AVAILABLE SIZES 3/4"	●	●				●				
1"	●	●				●				
1 1/2"	●	●		●		●		●		
2"	●	●	●	●		●		●		
2 1/2"	●	●				●		●		
323	●	●		●		●	●	●		
3"								●	●	●
4"			●	●	●			●		●
6"			●	●				●		●
868			●							
8"			●							
10"			●							
12"			●							
14"			●							
16"			●							
20"			●							
24"			●							

*Glass Reinforced Polyamide

Iron and Bronze Valves

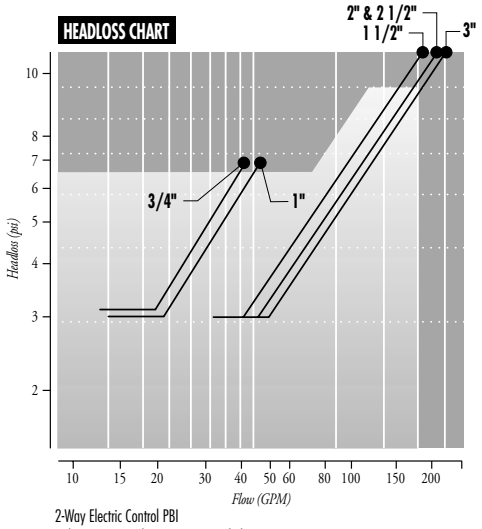


Nylon and PVC Valves



3-Way Control Model
Light gray area indicates recommended operating range.

2-Way Electric Control PBI Valves



2-Way Electric Control PBI
Light gray area indicates recommended operating range.

PLASTIC VALVES

DESCRIPTION OF OPERATION

- The direct-sealing diaphragm valves are operated by line pressure or by air pressure (which is equal to the line pressure).
- The reinforced rubber diaphragm seals the water passage when line pressure reaches the valve's control chamber.
- Relieving the pressure from the control chamber, to the atmosphere or to downstream, causes the valve to open.
- The valve's only moving component is its diaphragm; no shaft, seals, or bearings are located within the water passage.
- The valve is made of sturdy, high-quality materials. It is produced in a number of structuraly different versions (throttling, built-in solenoid operator, etc.), with a wide range of control functions (manual activation, pressure control, etc.).

ADVANTAGES

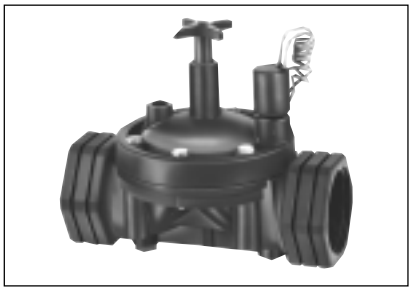
- Structural simplicity
- Superb hydraulic performance
- Reliable control of corrosive liquids
- Lightweight, cost-saving
- Minimum maintenance - maximum dependability
- Simple to install with slip or threaded PVC connections
- Suitable for subsurface installations - requires less fittings

APPLICATIONS

- Irrigation System
- Underground installation with controls at the surface
  - Mechanical damage
  - Weather protected
  - Saves fittings & installation costs
- Industrial usage with corrosive fluids
- Sewage systems
- Landscape and Greenhouse applications

PVC Threaded

PVC Slip

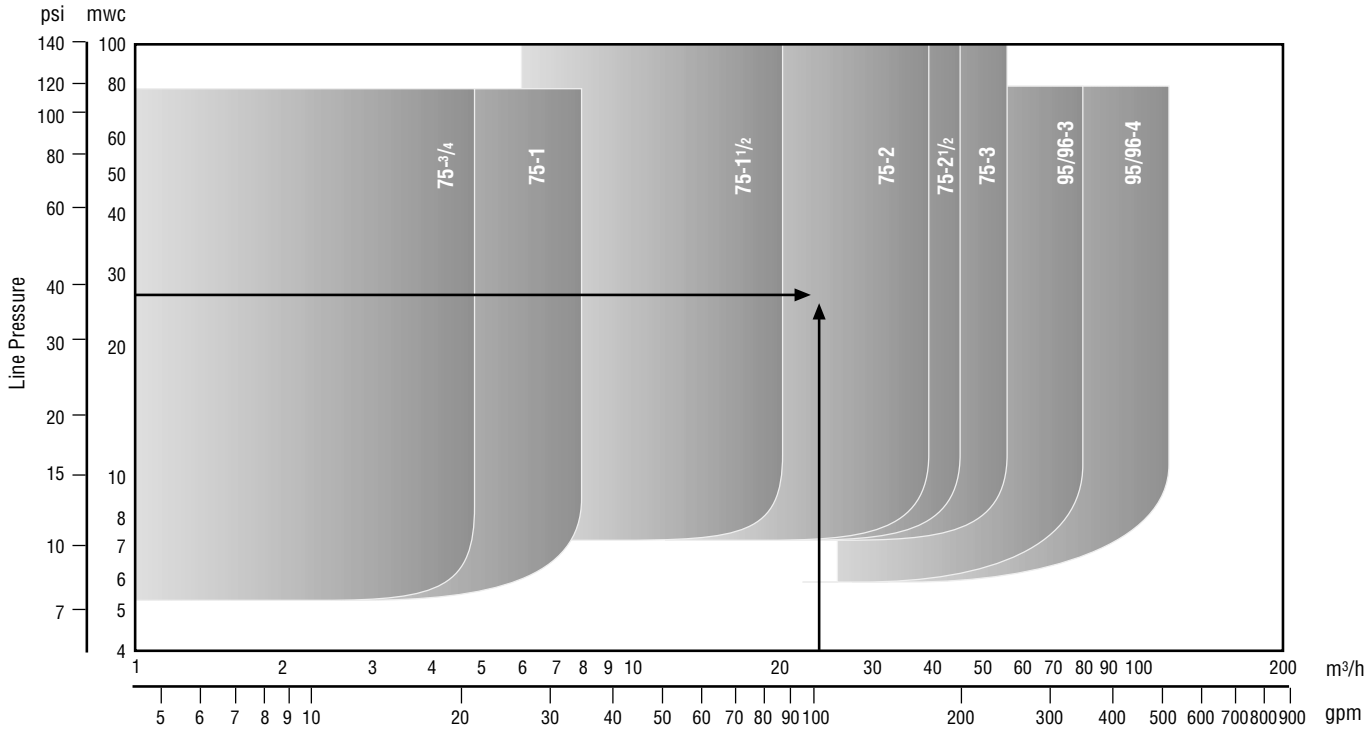


Reinforced Nylon Throttling Electric 2-W

6" PVC Valve

SIZE SELECTION GUIDE

This graph provides a guide, based on flow rate and pressure, for the proper selection of valve size.



HOW TO USE THE GRAPH:

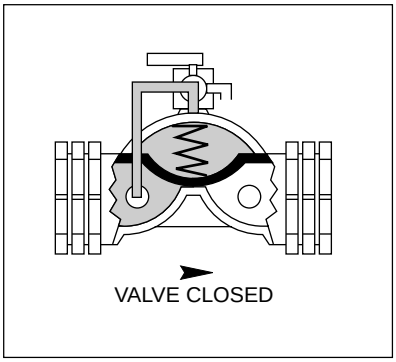
1. Locate the flow rate on the horizontal axis and draw a line upwards.

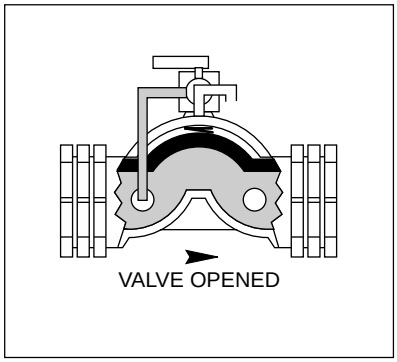
2. Locate the line pressure on the vertical axis and draw a line to the right.

Example: line pressure 28m (40 psi), flow rate 23 m³/h (100 gpm), appropriate valve = model 75-2"

3-WAY CONTROL

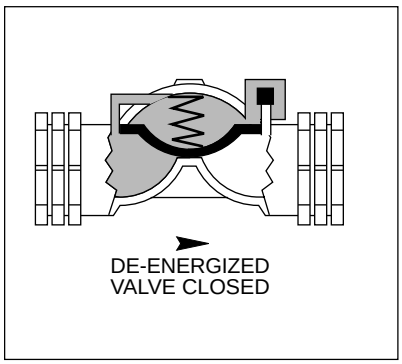
This control device admits pressure into the control chamber, closing the valve, or relieves pressure to the atmosphere, opening the valve.

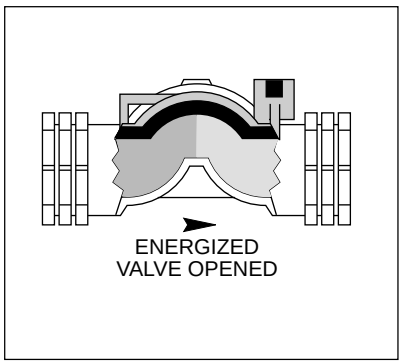




2-WAY ELECTRIC CONTROL

A solenoid operator plugs the control chamber outlet. A permanent connection from the upstream to the control chamber ensures line pressure in the chamber resulting in valve closure. Energizing the solenoid operator causes the control chamber to drain downstream, opening the valve.





ASSEMBLY AND INSTALLATION

THREADED VALVE

- Use a Teflon tape or teflon sealer compound on the adapter and tighten by hand. Use a wrench to tighten the adapter another half revolution. **Note:** Overtightening may cause damage to the valve body.

SOCKET OR "SLIP" VALVE WITH PVC PIPE

- Use the same procedure as when applying cementing PVC pipes. Mark the pipe first, then apply glue to the socket of the valve and the PVC pipe. Insert the pipe until reaching the mark and rotate a quarter-turn forward and aft. Hold the joint in place until the cement hardens.

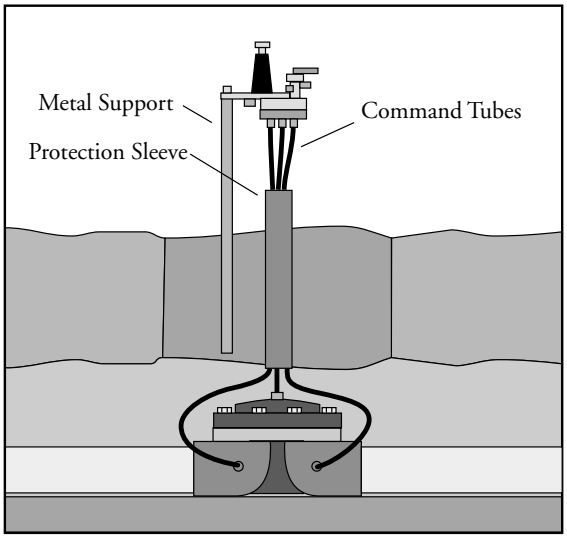
INSTALLATION ABOVE GROUND

- When installed in a manifold above ground: keep the manifold short, no support will be needed. For longer spans, a firm support under the horizontal pipes is recommended for 3" and 4" valves. Install the valve with the bonnet exposed to the sun. For 6" valves install the valve with bonnet horizontally, side by side.

INSTALLATION UNDERGROUND

- For underground installations, use trust blocks where needed, allow sufficient space and keep the area around the valve free from rough objects and stones.

  Cover the valve with clean soil. A 24" cover is recommended to protect the valve from heavy equipment.
- The controls for the valve, such as the pilot, 3-way valve, can be installed above ground. Mark the control tubing by color or number and place a protective poly or pvc tubing around the control tubing.



PRESSURE TESTING

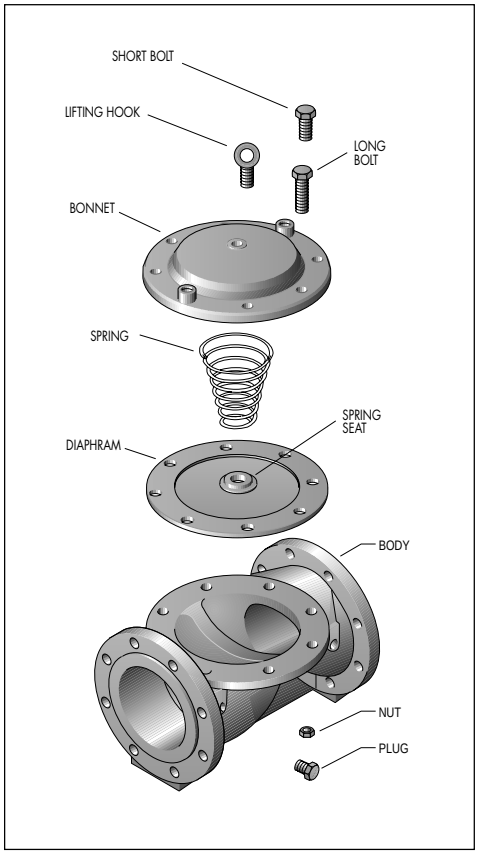
- Partially fill the trench around the valve.
- Charge the system and check for leaks. **Note:** Do not exceed the pressure rating of the valve (150 psi).

DIAPHRAGM REPLACEMENT

- Loosen bolts, remove old diaphragm and insert new one.
- Tighten the bolts, applying even pressure in a diagonal pattern, until the diaphragm is firmly pressed between the body and the bonnet. Do not over tighten.
- If there is leakage between the bonnet and valve body, tighten the nuts a little more.

Models:

- 3" Threaded
- 3" Solvent Weld
- 4" Solvent Weld
- 6" Solvent Weld



Components	Materials
Bolt long	Coated steel
Bolt short	Coated steel
Washer	Coated steel
Bonnet	Reinforced
Spring	SST 302
Spring seat	Coated Steel
Diaphragm	Natural rubber
Body	PVC

BACKFLUSHING CONTROL VALVES

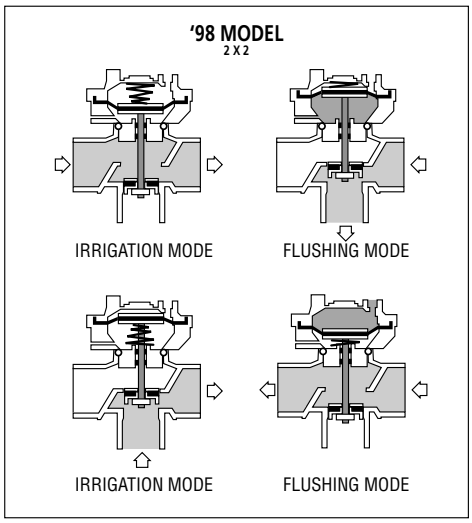
DESCRIPTION

The selector valve, is activated by pipeline pressure. The valve can be set in one of two positions:

- Irrigation mode allowing flow from the inlet manifold into the filter.
- Flushing mode closing the filter inlet and opening the flush outlet, resulting in flow reversal in the filter.

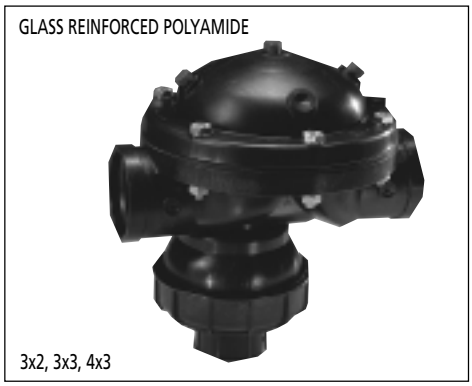
The valve is activated by a large rubber diaphragm, requiring minimum activation pressure.

The valve can be operated automatically (using solenoid valve activation) or manually, (using a 3-way selector valve).



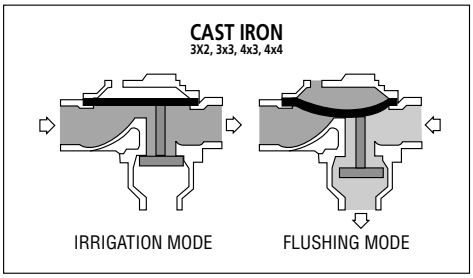
ADVANTAGES

- Structural simplicity
- Superb hydraulic performance
- Frictionless position exchange
- High reliability
- Corrosion-resistant materials



MATERIAL SPECIFICATIONS

PART	'91-'98 & CAST IRON MODELS	MODEL 58P
Body:	3x2, 4x3 Cast Iron, 2x2 Bronze	Reinforced Polyamide
Bonnet:	3x2, 4x3 Cast Iron	Reinforced Polyamide
Shaft:	SST	SST
Diaphragm:	Natural Rubber	Natural Rubber
Spring:	(2x2 only): SST	SST
Seal:	Natural Rubber	Natural Rubber
Nut:	SST	Brass
Seal Housing, Disc:	Brass	N/A
Flushing Outlet (2x2):	Brass	N/A
O-Ring	N/A	E.P.D.M. Rubber



Connections

Flanges: ISO PN 16, ANSI Class 125 (others on request)
Threads: Female ISO (BSP), ANSI (NPT)
Victaulic
Control Bores: 1/4" NPT

BACKFLUSH VALVES

3", 4" Plaslite, 2" Bronze

DESCRIPTION

Backflush valves are 3-way hydraulically operated diaphragm valves used in filtration applications with media and disc filters. The PLASLITE is a noncorrosive valve using an innovative design in the backflush mechanism eliminating maintenance. The bronze backflush valve can also be easily maintained by virtue of its design.

BACKFLUSH VALVES ADVANTAGES

- Lightweight, accessible (using a union at the flush port)
- Stainless steel flexible mechanism ensures reliable operation and sealing
- Operates and seals at low pressures
- Good friction loss characteristics

3" AND 4" PLASLITE ADVANTAGES

- Corrosive resistant backflush valve
- Reliable backflush mechanism with flexible shaft
- Pressure range from 10 -140 psi
- Frictionless position exchange

APPLICATIONS

- Media filters 36" and 48"
- Disc filters 4" V-batteries
- Star Disc-Kleen filters

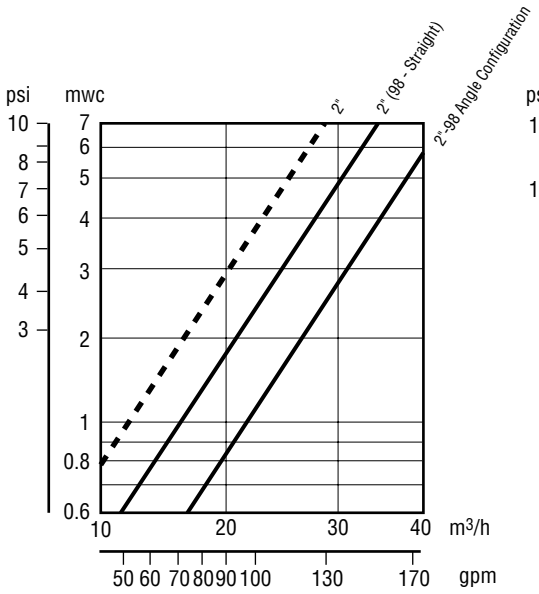
2" BRONZE ADVANTAGES

- Structural Simplicity
- Easy to Service
- Excellent hydraulic performance

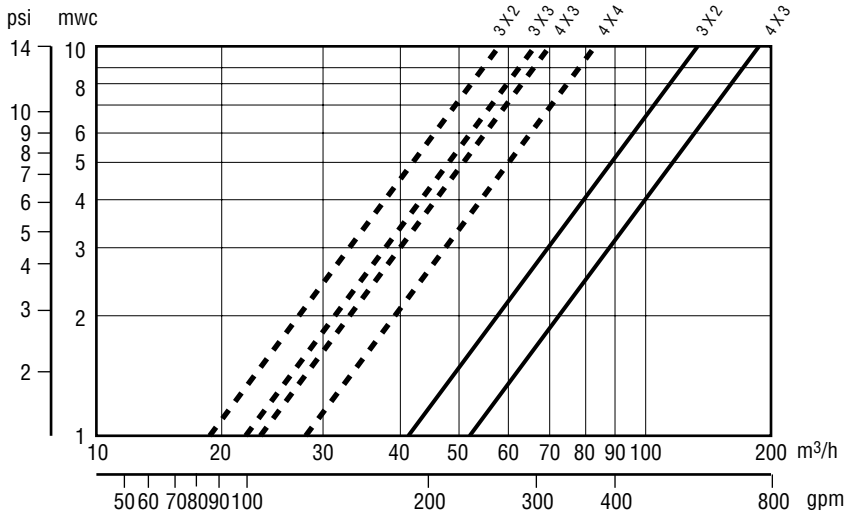
APPLICATIONS

- 4" Plaslite: 48" media filters, Galaxy Multi-Spine Disc Filters
- 3" Plaslite: 30", 36" media filters and 3" automatic disc filter batteries
- 2" Bronze (98 Model) 16", 20" and 24" media filters and 2" Disc-Kleen batteries

2" Models



3" and 4" Models



IRRIGATION MODE ——————— FLUSHING MODE - - - - - - - - - - - - -

PRESSURE RATING 100 mwc (140) psi). MINIMUM OPERATING PRESSURE 7 mwc (10 psi)

BACKFLUSH VALVES

2" Plaslite (98 Model)

DESCRIPTION OF OPERATION

During filtering, the backflush valve is in open position allowing the water to flow from the inlet manifold through the main passage of the valve. The inlet water pressure pushes the diaphragm up and keeps the seal of the flush port closed.

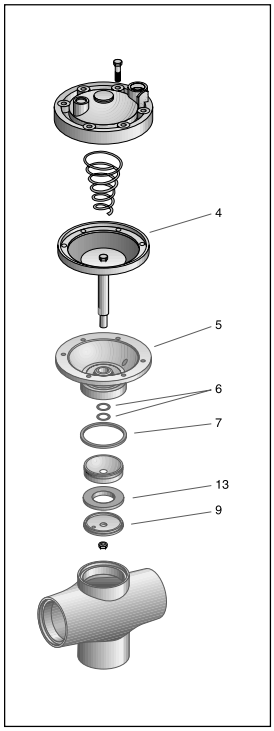
BACKFLUSH

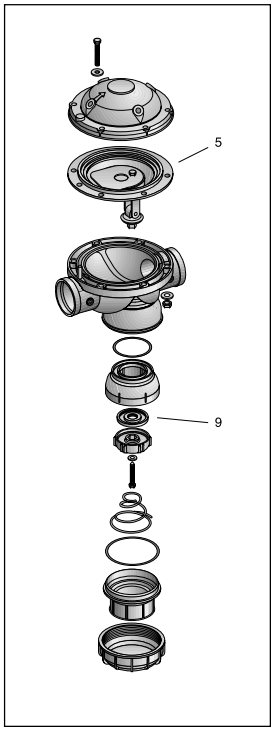
- When the solenoid is energized water pressure enters the control chamber of the valve causing the valve stem assembly and seal to change position.
- The inlet to the valve is sealed and the outlet port is connected with the flush port allowing the filter to backflush. When the solenoid is de-energized the diaphragm stem assembly returns to the filtering (open) position. A spring behind the seal ensures positive closure of the back flush port at very low pressures.

TECHNICAL SPECIFICATIONS AND MATERIALS

PLASLITE		2" MODEL 98
Connections:	4x4x4 Grooved 3x3x3 Grooved	2 GR* x 2 TH x 2 TH
Materials:		
Body:	Reinforced polyamide	Bronze
Bonnet:	Reinforced polyamide	Plastic
Shaft:	Stainless Steel	Stainless steel
Diaphragm seal:	Natural rubber	Natural rubber

*Grooved adapter attached.





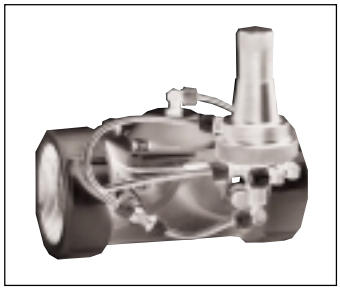
AUTOMATIC CONTROL VALVES

AUTOMATIC CONTROL VALVES

DESCRIPTION

An automatic control valve is a combination of:

- A basic valve
- A pilot valve, one or more
- A solenoid pilot valve (on electrically activated valves)
- Control tubes and fittings
- A filter for activation water
- Other accessories (relays, check valves, needle valves, etc.)



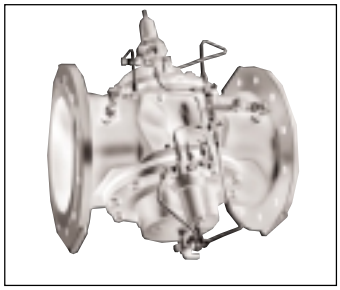
Flow Rate Control Valve

Each one of the listed control valves is designed to perform a special hydraulic control function.

The pilot valve and other devices are selected to serve this function.

These valves are self-contained and include all the components needed for accurate, dependable, long-life operation.

Unlisted combinations of control functions are supplied on request.

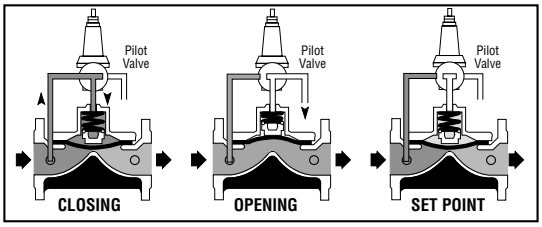


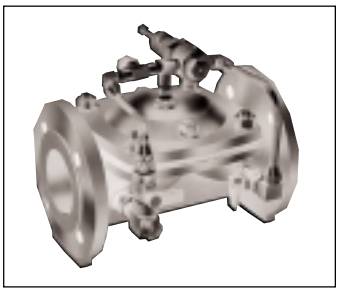
Pressure Reducing Sustaining

TWO CONTROL MODES ARE SUPPLIED

THREE-WAY MODE ("3-WAY")

The pilot valve is a selector, activated manually, electrically, or hydraulically. It vents the main valve control chamber to the atmosphere, permitting full opening.

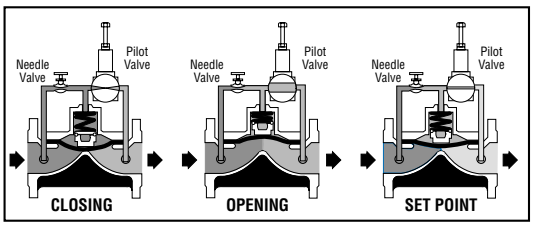


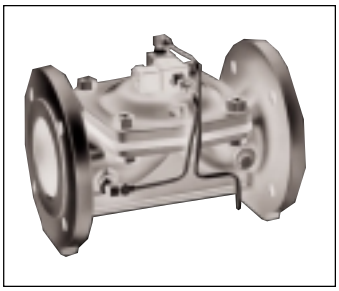


Pressure Reducing 3" 2-Way

TWO-WAY MODE ("2-WAY")

The pilot valve is a modulating, hydraulically-operated type, venting the main valve control chamber to downstream, allowing only partial opening. This control model is selected when permanent pressure loss is tolerated.





Electric 4"

CONTROL SYSTEM CHARACTERISTICS

Two control concepts are used

Two control systems are used on valves: Three-way Control and Two-way Control.

THREE-WAY CONTROL (POSITIONING) SYSTEMS

The three-way control device is a selector pilot (activated electrically, manually or by the pipeline pressure) which admits the control media into the control chamber to close the valve, or to relieve the media from the control chamber to open the main valve.

This control principle allows for full opening of the main valve when operating conditions require the valve to be fully open.

Three-Way Control is used for:

- On-Off Control valves
- Regulating valves which need to operate with low pressure differential
- Dirty water and sewage water
- All nylon/PVC valve models

TWO-WAY CONTROL SYSTEMS

With a two-way control system, the upstream side of the valve is connected by a control tube to the control chamber and to the downstream side of the valve.

Two flow restrictors, one (normally a needle valve) assembled upstream of the control chamber and the other (a pilot valve) assembled on the downstream side, modulate in response to the pipeline pressure. The relative opening of both restrictors dictates the position of the main valve.

This type of control principal provides very accurate and sensitive regulation but creates considerable pressure loss even if no regulation is needed.

Two-Way Control is used when:

- Minimal pressure differential at all operating conditions allow it
- Sensitive (fast response) regulation is required

Note: Two-Way Control should not be used if the network media is very dirty or abrasive.

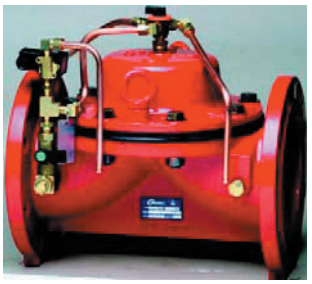
AUTOMATIC CONTROL FUNCTIONS

MANUAL ON-OFF VALVE (M)

Equipped with a 3-way manual selector valve, permits the selection of the "open" or "closed" position of the main valve.

Control Devices: 3-way valve

Available: On all 3-way controlled valves

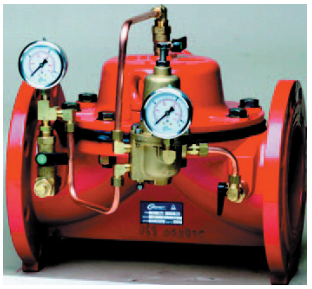


ELECTRIC CONTROL VALVES (EL)

A 3-way solenoid valve, activated by an electric current or electric pulse, opening or closing the main valve. *"Normally closed"* position of the main valve is standard. *"Normally open"* position is optional. Electric activation can be added to most control valves on request.

Control Devices: Sizes 3/4" - 6" - Solenoid Valve
Sizes 8" - 24" - Solenoid Valve + Accelerator Relay

Available: On all models

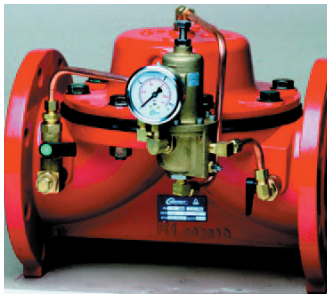


PRESSURE REDUCING VALVE (PR)

The valve maintains a preset downstream pressure, regardless of upstream pressure or flow rate fluctuation. The main valve is controlled by a 3-way pilot valve (permitting full opening when downstream pressure drops below the set-point) or by a 2-way pilot valve (creating a pressure differential in any condition).

Control Devices: 29100, 29110, 31300 Pilot Valves (3-Way)
29400, 68400, 68600 Pilot Valves (2-Way)

Available: On all models



PRESSURE SUSTAINING / RELIEF VALVE (PS)

The valve maintains upstream (inlet) pressure, regardless of flow rate variations. The valve will be in the "closed" position if the inlet pressure drops below the set-point. It fully opens when upstream pressure exceeds the set-point.

Control Devices: 29110, 29200, 31300 Pilot Valves (3-Way)
68500, 68700 Pilot Valves (2-Way)

Available: On all models

QUICK RELIEF SAFETY VALVE (QR)

The valve opens instantly when the pressure in the pipeline exceeds the safe level, thus relieving excess pressure in the network. When pressure returns to normal, the valve closes slowly, at an adjustable pace.

Control Devices: 68200, 66300 Pilot Valves

Available: On models: Cast Iron, Cast Bronze 2"- 24"

HYDRAULIC REMOTE CONTROL VALVE (RC)

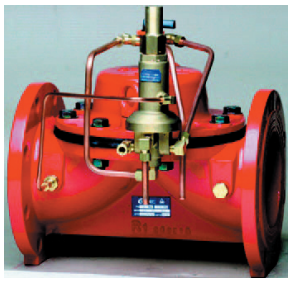
An hydraulic relay opens or closes the valve (on which it is assembled), in response to a pressure command, carried by a control tube from a remote control center. The relay permits:

- Quick response to the "open" and "closed" command
- The conversion of a valve form "normally-open" to "normally closed"
- Overcoming elevation differences

Control Devices: 29200 Pilot Valve, "Galit" Relays, 66200 Relay, Shuttle Valve

Available: On all models, excluding electric valves

FLOW RATE CONTROL VALVE (FR)

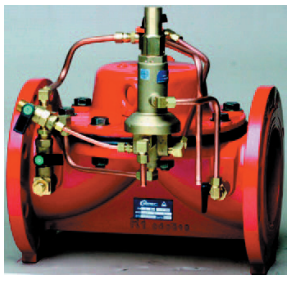


The valve limits the flow rate in the network to a preset level, regardless of inlet pressure variations. The valve fully opens when the flow rate drops below the set-point.

Control Devices: 29300, 76200 Differential Pilot Valves

Available: On models: All models 2"- 24"

EXCESSIVE FLOW SHUT-OFF VALVE (FE) - A VARIATION OF THE FLOW RATE CONTROL

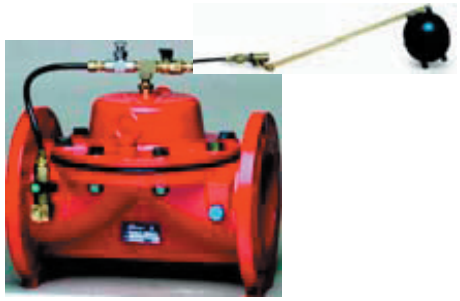


The valve closes drip-tight when the flow rate exceeds the preset maximum (due, for example, to pipe rupture).

Control Devices: 29300, 76200 Differential Pilot Valves

Available: On models: On models: All models 2"- 24"

MODULATING FLOAT CONTROL VALVE (FL)

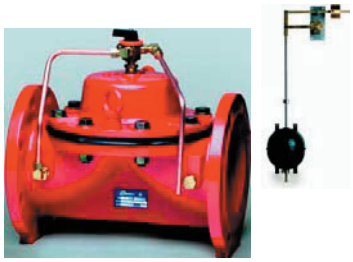


The main valve is controlled by a 1/2" float valve, located in the tank or reservoir at the required maximum water level. The valve maintains a constant maximum level.

Control Devices: 70300 (Plastic), 70400 (Metal) Float Pilots

Available: On all models

DIFFERENTIAL FLOAT CONTROL VALVE (DI/FL)



A float valve controls the main valve, closing it when the water reaches the maximum level, and opening it when the water drops to its preset minimum level. The differential between maximum and minimum levels is adjustable.

Control Devices: 70500 Differential Float Valve

Available: On all models

ALTITUDE CONTROL VALVE (AL)

The main valve is controlled by a highly-sensitive pilot which is located outside the tank. The pilot opens or closes the valve in response to the static pressure of the water. The difference between maximum and minimum levels, may be adjusted on the pilot.

Control Devices: 70110 Pilot Valves

Available: On all models

PUMP CONTROL VALVE (BC)

The valve eliminates damaging surges caused by pump "start-up" and "shut-off." The electrically activated valve opens gradually on pump "start-up", and closes slowly before the pump is switched off. The valve operates as a non-slam check valve, preventing reverse flow.

Control Devices: Solenoid Valve, 66200 Relay, Limit Switch

Available: On models: Cast Iron

TWO-STAGE OPENING VALVE (TO)

The valve prevents surges, caused by the fast filling of drained pipeline. It restricts the flow rate until the network is full. The valve fully opens when downstream pressure reaches the duty point.

Control Devices: 68500, 66300, 29200 Pilot Valves

Available: On all models

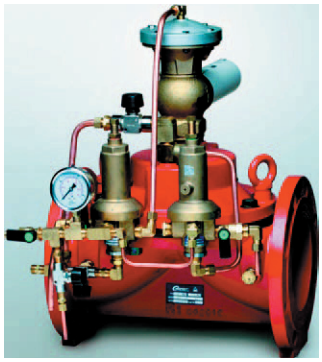
DEEP WELL CONTROL VALVE (DW)

The valve eliminates surges caused by "start-up" and "shut-off" of vertical or submersible pumps. It is a relief valve, assembled on the T-junction of the main pipeline. When the pump starts, the valve closes slowly, increasing the network pressure gradually. Before pump "shut-off" the valve opens slowly, reducing network pressure gradually.

Control Devices: Solenoid Valve, 66200 Relay, Limit Switch

Available: On models: Cast Iron, Cast Bronze

SURGE-ANTICIPATING VALVE (RE)



The valve protects the pumping system from water hammer, caused by sudden pump halting (due, for example, to power failure). The valve is a relief valve, assembled on the T-junction of the main pipeline. The valve opens instantly when the pump stops, relieving the returning high pressure wave. The valve closes slowly, once the pressure returns to static level. It functions also as a quick-relief safety valve.

Control Devices: 66300 Pilot Valve

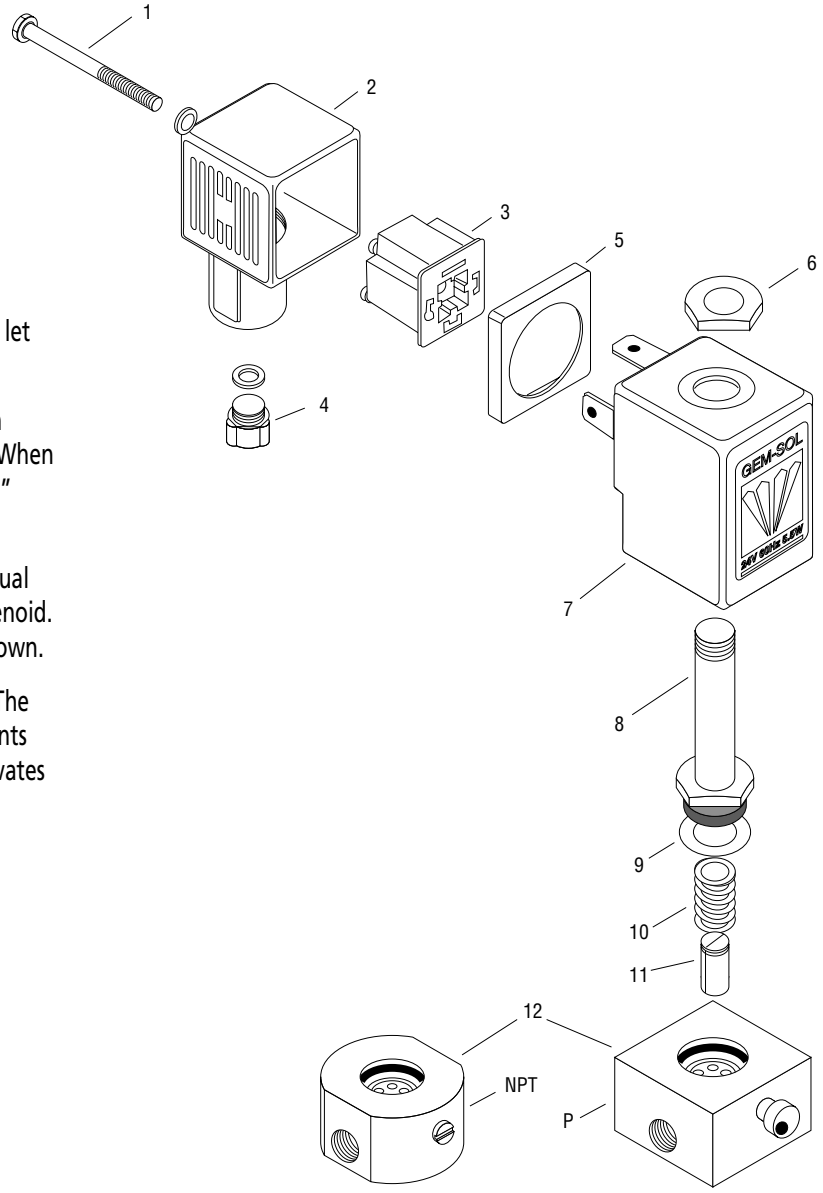
Available: On models: Cast Iron, Cast Bronze 3" - 24"

BACCARA SOLENOID COMPONENTS

and Electric Hook-up

ASSEMBLY INSTRUCTIONS

1. Loosen bolt (1).
2. Pull hub assembly off.
3. Push (3) out with screwdriver through access port (remove 4).
4. Connect wires to (1) and (2).
5. Reassemble, the hub can be turned 90 degrees to let port (4) face sideways.
6. If no conduit tubing is used, seal opening (4) with silicone, to avoid dirt or moisture from entering. When using conduit, remove the adapter to connect 1/2" conduit. **Note:** Brass solenoids use (3/8") adapter.
7. The base of the stainless steel solenoid has a manual override; a screwdriver is used to activate the solenoid. **Off position**: the little mark on the slot points down.
8. The brass solenoid base has a knob with a mark. The solenoid is deactivated when the mark or dot points down. Turning the knob or screw 90 degrees activates the solenoid.

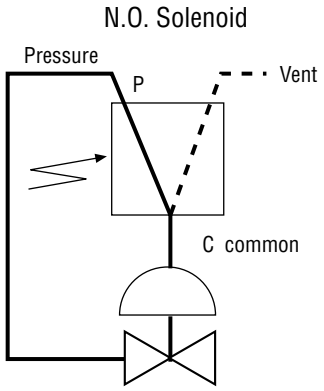


LIST OF PARTS					
1.	Bolt	5.	Rubber	9.	Seal
2.	Junction box	6.	Coil, sleeve nut	10.	Spring
3.	Junction	7.	Coil hub (or wire lead)	11.	Plunger
4.	Adapter 3/8" w/seal	8.	Sleeve	12.	Body or base

SOLENOID VALVES

Options and Specifications

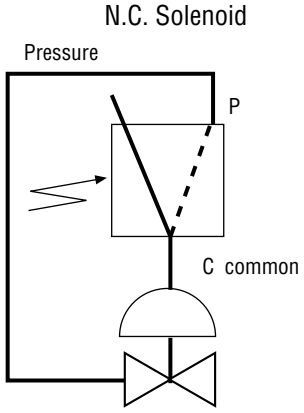
Solenoid valves are operated by a coil. When an electrical signal is received, a magnetic field is created that pulls a plunger up. This allows water to flow through the orifices in the solenoid.



NORMALLY OPEN POSITION

The solenoid is called normally open when the water passage from the pressure port to the common port, connected to the control chamber of the valve, is open with the solenoid de-energized. This is the case for field or zone valves; they are kept closed and when the solenoid is energized the valve opens. The opposite is true for a 'normally closed' solenoid.

In most cases a Normally Open (N.O.) solenoid corresponds with a normally closed valve and vice versa.



2-WAY SOLENOIDS

Solenoids are available in 2-way and 3-way configurations. The 2-way solenoid is a coil that fits into a base of the valve bonnet. When the solenoid is activated, the water from the bonnet flows downstream. There is a continuous flow from upstream to downstream over the diaphragm of the valve. The orifice upstream of the control chamber is smaller than the one downstream so the valve stays open, resulting in minimal loss.

The valve can never be in a fully open position, the head loss is bigger than when a 3-Way solenoid is used.

It is not recommended to use a 2-way solenoid in dirty water conditions.

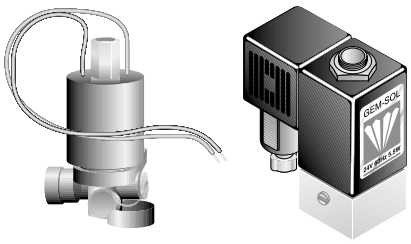
3-WAY SOLENOIDS – PRODUCT SELECTION, CONSIDERATIONS and APPLICATIONS

Address the following subjects for a 3 -way solenoid:

- Material
- Electrical characteristics: inrush current , voltage, etc.
- Mechanical , orifice size and pressure rating

SOLENOIDS

Specifications



Valve Function	Valve Body	Maximum Pressure	Orifice	Watts	Inrush	Holding
N.O. - 24VAC	Plastic	140 psi	1.85mm	2.2w	.13A	.13A
N.C. - 24VAC	Plastic	140 psi	1.85mm	2.2w	.13A	.13A
N.O. - 24VAC	Stainless Steel	220 psi	1.6mm	5.5w	.660A	.50A
N.O. - 120VAC	Stainless Steel	220 psi	1.6mm	8w	.220A	.13A
N.O. - 12VDC	Stainless Steel	220 psi	1.6mm	10w	.830A	.830A
N.C. - 24VAC	Stainless Steel	220 psi	1.6mm	5.5w	.660A	.50A
N.C. - 12VDC	Stainless Steel	220 psi	1.6mm	10w	.830A	.830A
N.C. - 24VAC	Brass	120 psi	2.4mm	8w	1.08A	.660A
N.C. - 12VDC	Brass	120 psi	2.0mm	10w	.830A	.830A
N.C. - 12VDCL	Brass Latch	140 psi	2.0mm	---	---	---

ELECTRIC VALVES - WIRE SIZING FOR AC/DC SOLENOIDS ONLY

(Excludes Latching)

The table below represents the standard American Wire Gauge sizes and the corresponding resistance in Ohms per 1000 ft.

AWG #	18	16	14	12	10	8	6	4
Ohms p/m.ft.	6.40	4.02	2.52	1.59	1.00	0.63	0.40	0.25

The following formula is used to calculate the wire size:

Ra = Resistance of the wire in Ohms per 1000 ft.
AVL = Allowable Voltage Loss
L = Length from the controller to the valve(s).
I inr = Inrush current of the solenoid.

$$Ra = \frac{AVL \times 1000}{\mathbf{L \times 2 \times I\,inr}}$$

The allowable voltage loss for the solenoids can be found in the table below: +/- 10 % of the nominal voltage as long as the operation pressure is within the specifications of the solenoid. The voltage output of the controller is usually 26 Volt depending on how many valves are operated at the same time. A typical AVL w/ 26.4 V output is +/- 10% of 24V, or 4.8V.

Note: The inrush current depends on the power consumption or wattage of the solenoid.

Solenoid	Power	Inrush	Holding	Orifice	Max Pressure
Netafim-3w	2.2W	0.29A	0.14A	1.8 mm	140 psi
Baccara-3w	5.5W	0.72A	0.42A	2.0 mm	90 psi
Baccara-3w	8.0W	1.08A	0.60A	1.6 mm	220 psi

Calculation: Using 5.5w stainless steel solenoid:
Inrush = 0.72A
Distance from controller to valve is 2,000ft.
The allowable voltage is 4.8V.

Using the above formula: $Ra = \frac{4.8 \times 1000}{2000 \times 2 \times .72} = 1.66$ ohms

The resistance of the wire chosen from the above table must be equal or lower than the calculated value. The wire gauge should be # 12 with 1.59 Ohms/mft. It is possible to use a different gauge for the hot and common wire; the resistance will be the average of the two wires used.

The inrush current has to be multiplied by the number of valves operated at the same time. Each segment must be calculated. Distances vary and multiple valves are operating.

The controller has a maximum Amperage output that should not be exceeded.

HYDRAULIC REMOTE CONTROL

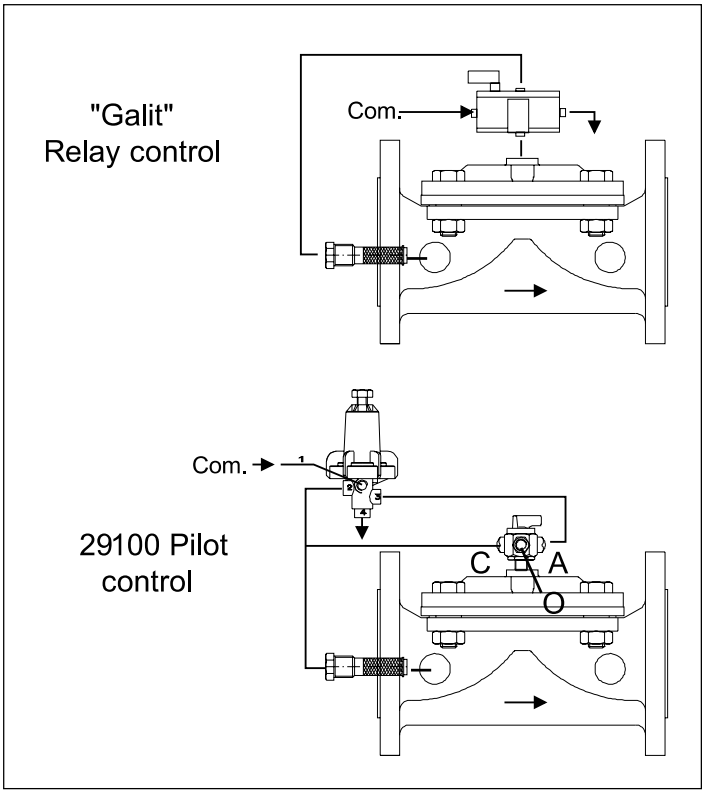
Principles and assembly schemes

1. GENERAL

The hydraulic remote control of "Gal" type valve is made in order to enable operating all the valves in the irrigation project from a central control point, mostly (but not necessarily) from the pump site.
The control is executed by manual or automatic (electronic) means located in the control center, that send "open" or "close" commands to the valves.
This publication does not refer to the various aspects of control means selection but rather considers the "command" as pressure applied to or relieved from the start point of the control tube, regardless of the device used to do it.

2. REMOTE CONTROLLED VALVE

A hydraulic relay should be added to the basic hydraulic valve, in order to enable opening and closure of the valve by the local pressure. The relay is activated by increasing or decreasing the pressure in the control tube - which is done much faster than transporting all the water of the valve's control chamber long distance to the control center, through small diameter tube.
Netafim valves use the "Galit" relays. It is equipped with manual activation device allowing local operation of the valve.



REMOTE CONTROL VALVE

3. Control Center

Manual center (see drawing #2)

The Manual Center consists of:

- 3-way selector valves
- Model SY3
- Shift (a group of valves operating simultaneously)

3-WAY VALVE

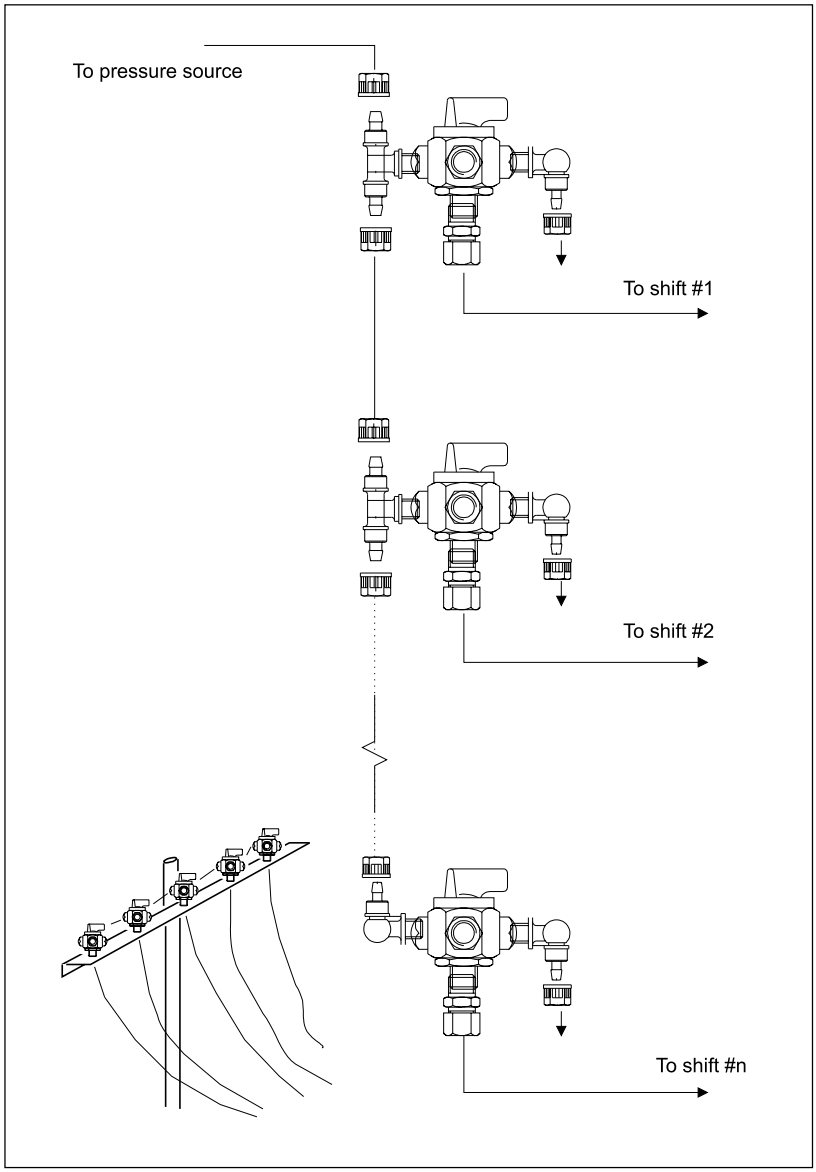
Each 3-way valve is connected, at one of its selected ports, to the main line pressure.

The common port (the bottom one) is connected to a 6mm command tube leading to the relevant group of field valves.

The knob of the 3-way valve allows selection between the pressure port and the venting port.

The third port is unused, reserved for connection of automatic control device in the future.

The 3-w selector valves should be assembled on a common bracket, each one marked clearly by its shift number.

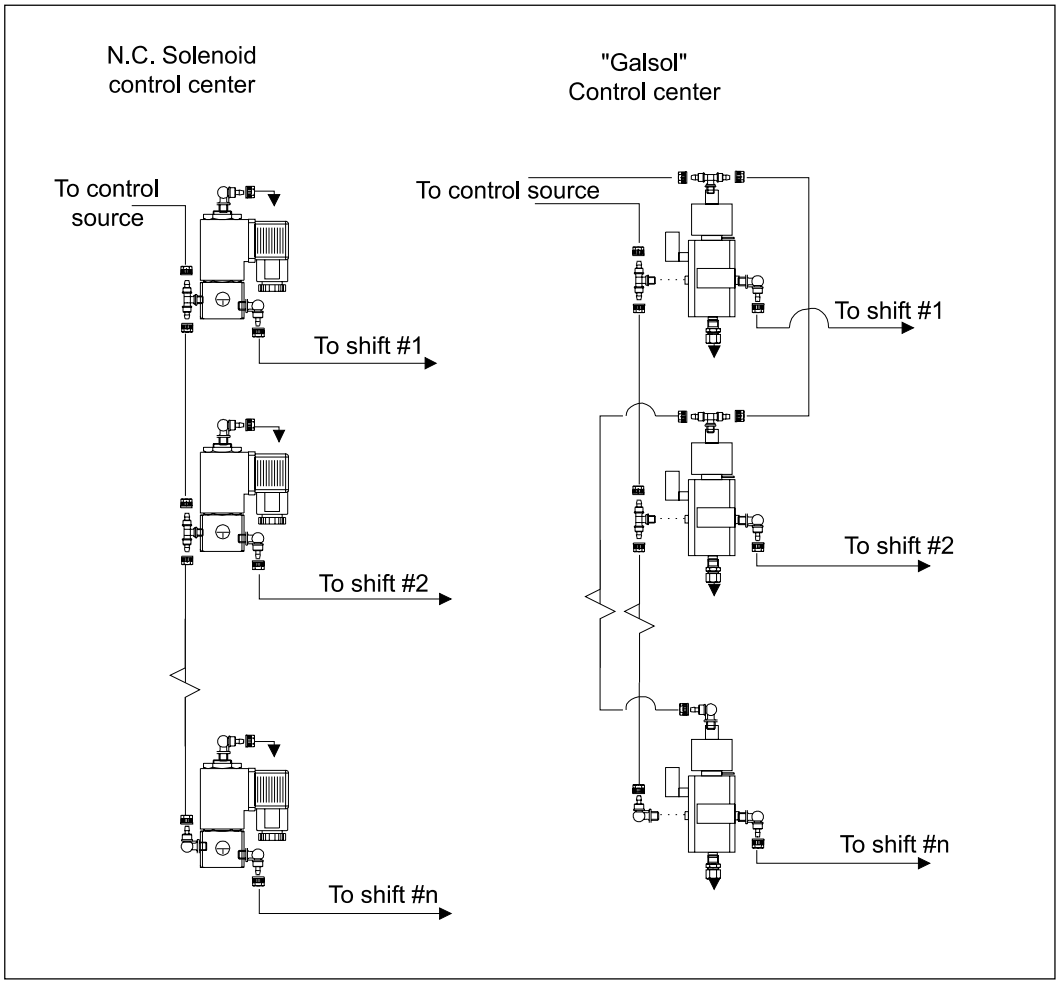


3.2 AUTOMATIC CENTER

The device selecting between pressurized control tube and relieved tube is activated by electric command.

The device can be a solenoid valve or the "Galsol" relay. The latter has larger passages than the normally used solenoids so it is less sensitive to clogging, and creates faster response of the controlled valves.

Any type of solenoid, selected for this function, must be equipped with a manual override to enable operating the system in case of electric malfunction.



4. CONNECTING FIELD VALVES TO THE CENTER

4.1 A 6mm tube should connect all valves operating simultaneously to one control device (manual or automatic). There is no advantage to larger diameter, unless the valves are located fairly near to the center, the relay is deleted so the control water volume must be transported to the valve from the center.

Using 8mm tube in relay control increases the cost unnecessarily and delays valve response.

4.2 It is recommended to connect all valves operating in the same shift and located in short distance from each other by "chain connection" as described in the drawing.

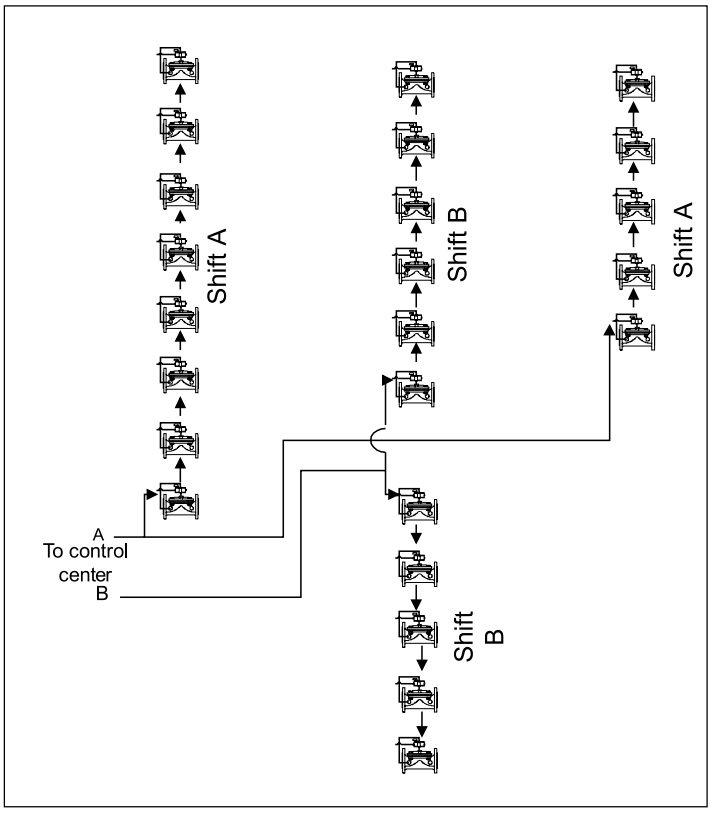
The first valve's relay is connected to the center. The command port of the valve outlet is connected to the relay of the next valve and so on.

Definition: On "open" command, first valve is open. The next one will open only when the network of the first valve has been filled and its pressure rises.

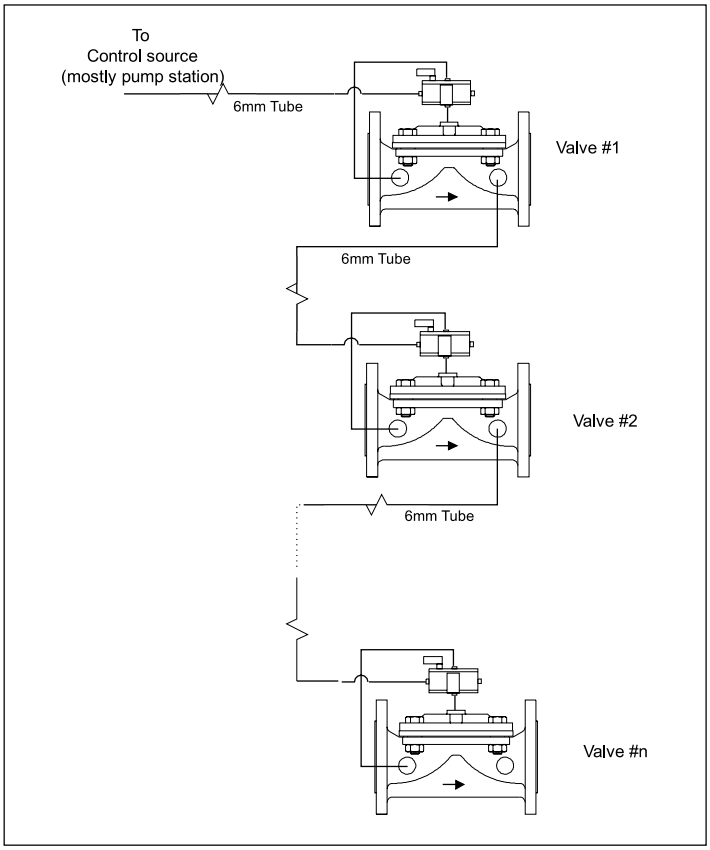
The sequence of events is reversed at "close" command - the first valve closes, then the second, etc.

This procedure prevents drop of pressure due to increased flow through the initial stage of network filling. It makes the changeover between shifts smoother, with less pressure fluctuation.

It is possible, however, to connect all the relays directly to the tube leading to the center. If this option is selected, all the valves may get the command at the same time.



CHAIN CONNECTION



CONNECTING FIELD VALVES

5. ELEVATION DIFFERENCE BETWEEN CONTROL CENTER AND FIELD VALVES

5.1 Center **higher** than the valves: a spring should be added to the relay, in order to compensate for the static pressure existing in the control tube at the valve site, while it is relieved at the control center.

Use a spring selection table of the specific relay in order to determine the proper spring. In case of very large election difference (more than 25m) it is advisable to use the 29100 mini-pilot as a relay (see Remote Control Valve drawing).

5.2 Center **lower** than the valves: Draining of the control tubes and entry of air into them will cause excessive delay of valve response. It is possible to avoid it by connecting a short tube to the venting port of the control device. The other end of this tube is inserted into a water bottle. Air entry is prevented.

6. DESIGN OF HYDRAULIC CONTROL

6.1 Define the groups of valves connected together in the same shift.

6.2 Draw the shortest route of the control tube leading to the valves and groups of valves, considering the physical obstacles (roads, pipelines, etc.).

6.3 Check elevations and select springs. Mark the selected spring (green, white, etc.) on the map, at the specific valve location.

6.4 Calculate total quantity of tubes; add some 15% as safety margin.

6.5 Define type of central control (Manual / Automatic).

7. INSTALLATION OF CONTROL TUBES

7.1 Underground installation is preferred.

In case the remote control is designed at the initial stages of the project design, laying the command tubes in the main pipe trenches is advisable. Otherwise, bury the tubes in a depth, which prevents damage by tractor implements, heavy machinery crossing, etc.

It is recommended to lay the tubes beside roads, windbreakers, etc. even if it increases the total length.

Prevent stretching, stress of tubes, kinking, stone damage.

At a specific point, beside controlled valve or even at other points along the tube route, create a "check point" where the tube is extended above ground for pressure test in case of possible malfunction in the future. This practice may prevent the need of replacement of total length of tube as it enables finding of the damaged section.

Such checkpoints must be marked clearly to prevent accidental damage by machinery.

7.2 Above ground installation.

Do not lay the tubes uncovered on the ground as it calls for inevitable damage, sooner or later. Hang the tubes on a wire, suspended on poles at proper height, so they will not be in a way of passing workers, and trucks.

7.3 Mark both ends of an installed tube by a tag with the name or number of the controlled valve/ group. Large number of controlled valves require many tubes assembled at the same route, and the marking may prevent a lot of hassle and mistaken connections. It is recommended to purchase "coded tubes", marked by various colored lines, which help considerably in proper connections.

PRESSURE REDUCING VALVES

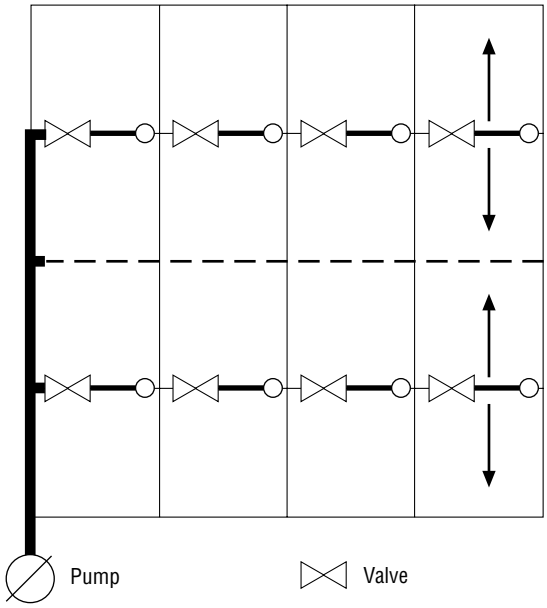
Valve Design
in different field conditions

I. APPLICATION EXAMPLE - VINEYARD

Conditions: Regular conditions with stable upstream pressure

Vineyard drip system with set pressure conditions that remain fairly constant. 160 acre block with a pressure reducing valve for every 20 acres: Q=200 gpm

Inlet pressure 25-40, required downstream pressure in the 20 psi range.



A. DESIGN CONSIDERATIONS

- Type of valve: material, configuration
- Size
- Selection of valve diaphragm and spring in the pilot

B. PRODUCT SELECTIONS

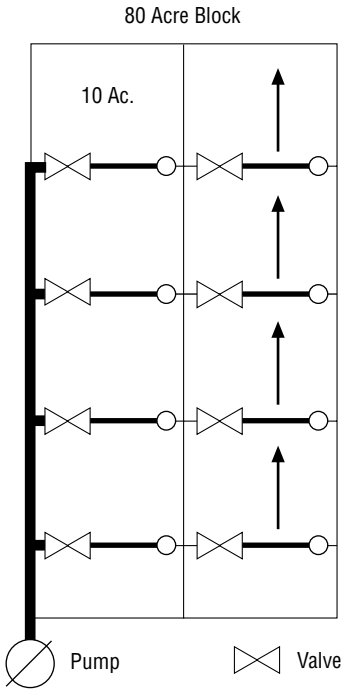
- Selection of material: bronze, iron or plastic
- Size: 2" or 323 with LP diaphragm
- Pilot spring: Yellow

II. APPLICATION EXAMPLE - ROW CROP

Conditions: a high pressure reducing ratio and cavitation.

Row crop application: 80 acre block with 4-20 acre zones, but sometimes one valve is operated by itself. Each 10-acre is controlled by a valve 300 gpm, normal system flow is 600 gpm at 30 psi.

Cavitation: when the water pressure drops below the vapor pressure, bubbles form in the restriction area. Downstream, when the pressure recuperates, the bubbles collapse, causing damage to the valve body ("pitting").



A. DESIGN CONSIDERATIONS

- Valve requirement PREL
- Inlet pressure 30-50 psi
- Required downstream pressure: 10 psi

B. PRODUCT SELECTIONS

- Type of valve, configuration
- Size and diaphragm choice (note our recommendation in the price list)
- Pilot and spring selection
- Solenoid selection

II. APPLICATION EXAMPLE ROW CROP (continued)

Considerations: A 300 gpm flow requires a 3" size valve. The pressure range makes the PVC valve a logical choice unless an angle configuration is preferred. The above example presents one problem: when only one valve operates the inlet pressure increases to 50 psi. This creates a 5:1 reducing ratio which causes cavitation. How often will this condition occur?

Solution: Use a PVC valve with plastic solenoid. The pilot spring should be yellow.

III. APPLICATION EXAMPLE - 3" VALVE with SPRINKLER

Discuss similar situation as above but the same valves are also used for sprinklers during germination of crop. The inlet pressure is always 60 psi.

Solution:

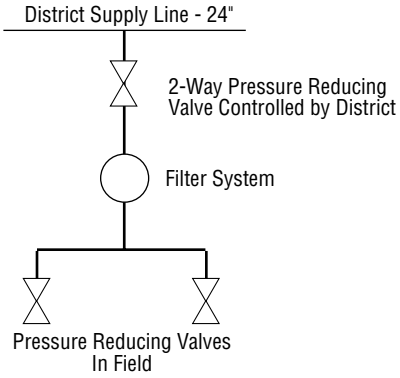
a. Use two pressure reducing valves, one located at the pump and one in the field. When sprinklers are used, valves can be fully open.

b. Use fixed orifice for drip valve to drop pressure from 60 to 30 psi.

IV. APPLICATION EXAMPLE - FLUCTUATING UPSTREAM PRESSURE

Conditions with fluctuating upstream pressures, use two PR valves in series. Water supply is a pressurized pipeline 24' with varying upstream pressures during the season from 60-100 psi.
Required system flow 1200 gpm, required pressure at filters: 35 psi.
There are also pressure reducing valves in the field.

Considerations: 'Hunting' and solutions to this problem.



- Hunting is the continuous readjusting of the valves to find the right pressure setting.
- The use of two 3-way controlled valves and short distances between the valves aggrevates the problem. Controlling the discharge out of the ventport of the pilot may help.
- Longer distances between the valves and using a 2-way PR valve on the mainline valve will usually solve the problem.

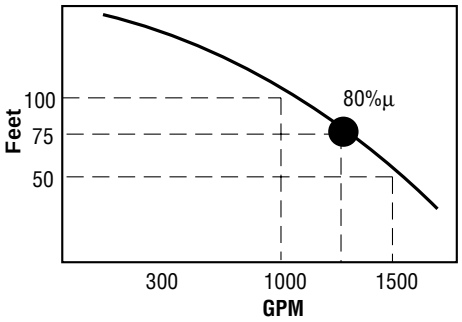
VALVES

Pressure Sustaining, Pressure Relief Sustaining, Sustaining Relief, Sustaining Quick-Reacting Relief, Surge Anticipating

PRESSURE SUSTAINING VALVES
Maintains a preset pressure level upstream of the valve.

It's position is in the mainline. The size has to fit the maximum flow rate in the system.

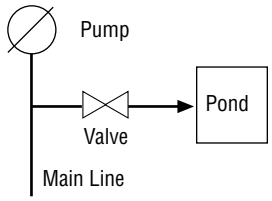
Application: Pump control valve, lets the pump work in a desired range so that it doesn't overload. If the pump curve is flatter, other solutions can be found. A flow rate control valve can be chosen.



System normally operating at 100' of head and 1000 gpm, over 1500 gpm motor draws too many amps. Set pressure sustains level at 75 ft., pumping 1300 gpm.

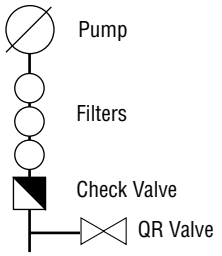
SUSTAINING RELIEF VALVE
Installed in a T-configuration off the mainline to sustain a certain level of pressure in the mainline. The water is returned to the well or reservoir. For this application it is important to consider the following design criteria:

- The valve should be sized according to the estimated by-pass flow rate.
- It can be operated for considerable length of time (not a quick-reacting relief).
- The drop of pressure through the valve may exceed the reduction ratio. Consider installing an orifice or a gate valve on the discharge side and/or keep the discharge line relatively small to create friction (back pressure).
- Put valve at end of discharge line: There is no cavitation when the downstream pressure cannot build up.

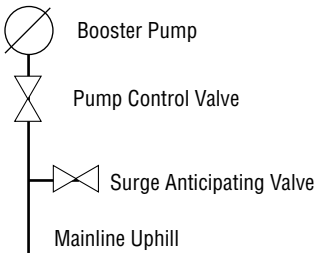


SUSTAINING QUICK-REACTING RELIEF VALVE
Designed to protect the components used in the system from too high a pressure.

- Opens quickly, closes slowly and operates for short duration of time.
- Designed for high flow rate: up to 50 ft/s.
- Use bronze when possible.
- Discharge line should be large enough so that the flow is not restricted.
- Pilot has two positions: Open or Closed and has a 10 psi tolerance at e.g. 170 psi.



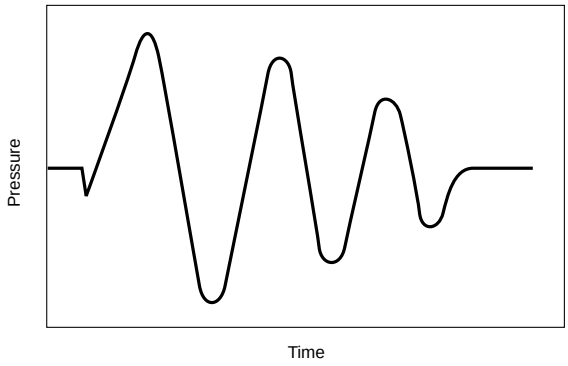
SURGE ANTICIPATING VALVE
Used in combination with the quick-reacting relief feature. Installed in a T-configuration off the mainline, the valve is used to protect the mainline against water hammer e.g. when power failure occurs. The valve is equipped with a pilot which allows the valve to open when a low pressure (wave) is sensed. The returning high pressure wave can then be released. Valve closes slowly.



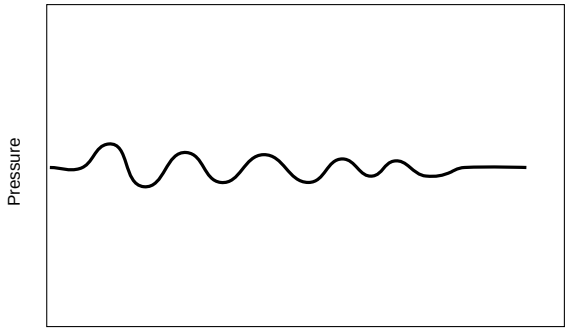
OPERATION SEQUENCE

1. Pump starts first.
2. Solenoid on valve is energized e.g. 2 minutes later.
3. The solenoid is connected to a relay, which allows a bigger passage to bleed the water from the bonnet.
4. A needle valve can be used to regulate the opening speed.
5. When system stops, the solenoid of the valve is first de-energized.
6. A position indicating rod on the valve with a limit switch signal, the pump when the valve is closed and pump shuts off.
   - Some turbine pumps cannot operate against a closed valve, it may damage the impellers!
   - Pump shuts off, a reverse flow is stopped by a check valve feature on the valve.
   - To protect the mainline against this sudden closure (water hammer), a surge anticipating valve also called a deep well control valve is installed in a T-configuration to the mainline. The valve has 2 pilots with one set at low pressure. The valve opens quickly when the water is still going (low pressure wave) and will still be open when the high pressure wave returns. Valve closes slowly.
   - The second pilot acts as a QR to protect against too high a pressure. At start up this valve may dump excessive sand.
   - Two-stage opening valve is used to fill the mainline slowly, only when pressurized valve opens fully. This feature also prevents the electric motor from overloading.

Uncontrolled Closure



Controlled Closure



OPERATING INSTRUCTIONS / TROUBLESHOOTING GUIDE

ELECTRIC VALVE
Normally Closed

Operating Instructions for 1" - 6" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and heavy duty solvent for the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The common port of the solenoid (a) base, (c), is connected to the bonnet of the valve.The top port, not marked, is the pressure port for Normally Open (N.O.) solenoids (Closed valves) and the port marked (v) at the base is the vent port.

  Note: A Normally Open valve uses a Normally Closed (N.C.) solenoid (a). The connections to the vent (v) and pressure port will be reversed!

- Start the pump or open the main valve. If the solenoid (a) is not energized, the valve closes. (N.C. Valve)

- When the solenoid (a) is energized the water in the control chamber will vent through the solenoid (a) and the valve opens.

- The manual override of the solenoid (a) should be in the auto position.

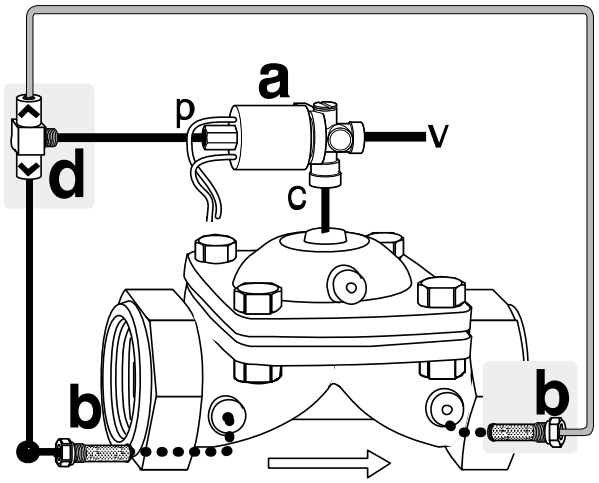
- If the selector tee option is installed and the downstream connection (b) is connected, when the system shuts off and the downstream pressure is higher than the upstream, the valve will operate as a non-slam check valve.

MAINTENANCE

Keep the valve clear from weeds and dirt.

WINTERIZING

Drain the valve by disconnecting the tube at the upstream port of the valve and at any other location where water can be trapped.



Components	Part Numbers
a. Solenoid	61NET
b. Filter	61SF25P
d. Selector Tee for check valve (option)	61SV1/8BR

TROUBLESHOOTING

A solenoid converts an electric signal into a hydraulic command.
Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
		Thickness of diaphragm.	*Change to low pressure diaphragm.*
	Solenoid (a), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (a), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Solenoid (a) continuously discharges water when valve is in the OPEN position.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (a), incorrect position of the manual override.	*Slot to be horizontal with arrow pointing down.*	*Change position.*
	Solenoid (a), plugged.	*Disassemble from valve. No water from port (c).*	*Take apart and clean.*
	Clogged filter (b).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*

ELECTRIC VALVE
Normally Closed

Operating Instructions for 6" - 8" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

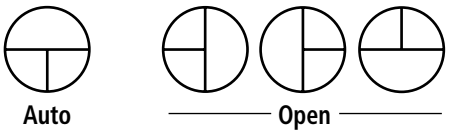
- The common port of the solenoid (a) base, (A), is connected to the bonnet of the valve. The top port, not marked,is the pressure port for Normally Open (N.O.) solenoids on Normally Closed (N.C.) valves and the port marked (P) at the base is the vent port.

  Note: A Normally Open valve uses a Normally Closed solenoid. The connections to the vent, not marked, and pressure port will be reversed!

- Start the pump or open the main valve; if the solenoid (a) is not energized the valve closes.

- When the solenoid (a) is energized the water in the control chamber will vent through the solenoid (a) and the valve opens.

- The manual override of the solenoid (a) should be in the Auto position.



- If the check valve option (e) is installed, when the system shuts off and the downstream pressure is higher than the upstream, the valve can operate as a non-slam check valve.

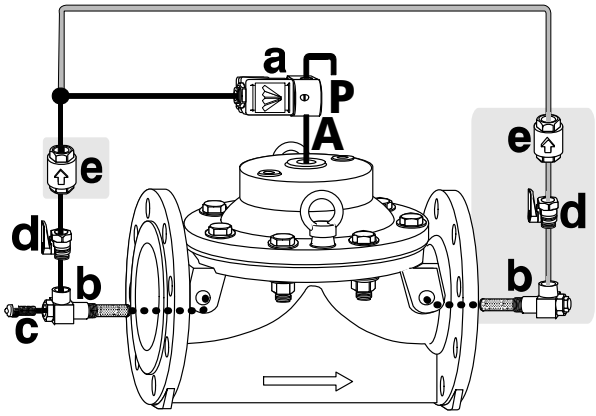
- The wire connection to the solenoid (a) with 1/2" hub is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt..

WINTERIZING

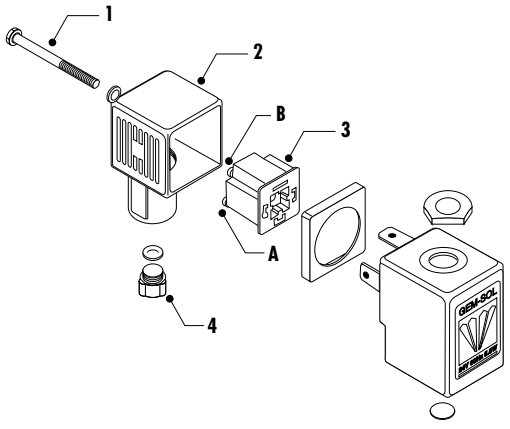
Drain the valve by disconnecting the tube at the upstream port of the valve and at any other location where water can be trapped.



Components	Part Numbers
a. Solenoid (For N.C. valve)	61BSO-024-H
b. Filter	61SF5
c. Shrader Valve	61APS1/8
d. Ball Valves	61SBV25
e. Check Valve (option)	61CV50

SOLENOID ELECTRICAL WIRE HOOK-UP

- Loosen bolt (1). Pull hub assembly off.
- Remove (4) and push terminal (3) out with a screwdriver through access port.
- Connect wires to A and B of the terminal block (3). For DCL solenoids, connect negative (black) to A. If no conduit is used, first put the wires through the 1/2" x 1/4" reducer.
- Re-assemble the hub and seal for the access port (4).



TROUBLESHOOTING

A solenoid converts an electric signal into a hydraulic command.
Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
		Thickness of diaphragm.	*Change to low pressure diaphragm.*
	Solenoid (a), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (a), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Solenoid (a) continuously discharges water when valve is open.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (a), incorrect position of the manual override.	*Slot to be horizontal with arrow pointing down.*	*Change position.*
	Solenoid (a), plugged.	*Disassemble from valve. No water from port (c).*	*Take apart and clean.*
	Clogged filter (b).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*

ELECTRIC VALVE
With Relay Normally Closed

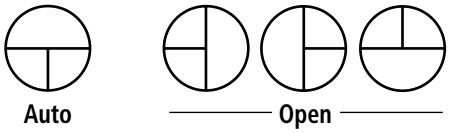
Operating Instructions for 8"- 16" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The common port of the solenoid base, (A) is connected to the sensing port (1) of relay (a).
- When the solenoid (c) is energized it causes the plunger in the relay (a) to switch position and port (3) is connected with port (4), allowing the valve to open.
- The opening and closing pace of the valve is adjusted with needle valves (f2) and (f1). A long mainline requires a longer opening and closing time and a two stage opening may be necessary.
- With a Normally Open (N.O.) valve, the connections to port # 4 and # 2 of the relay (a) are reversed.
- The manual override of the solenoid (c) should be in the Auto position, the little arrow pointing down.



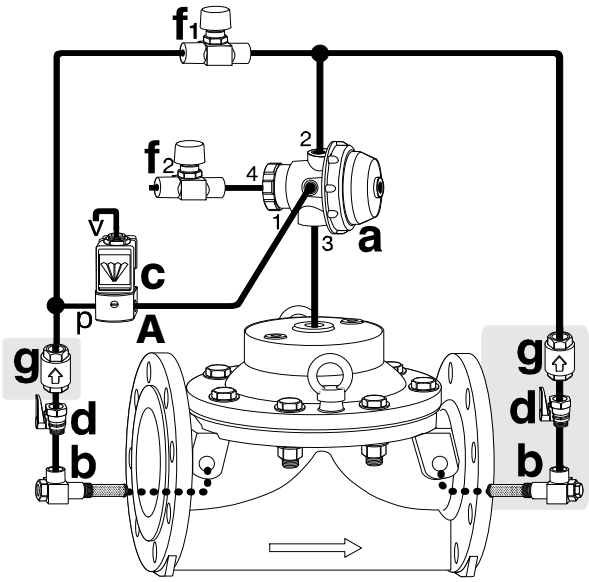
- If the check valve option (g) is installed, when the system shuts off and the downstream pressure is higher than the upstream, the valve can operate as a non-slam check valve.
- Connection of the wires to the solenoid (c) with 1/2" hub is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt.

WINTERIZING

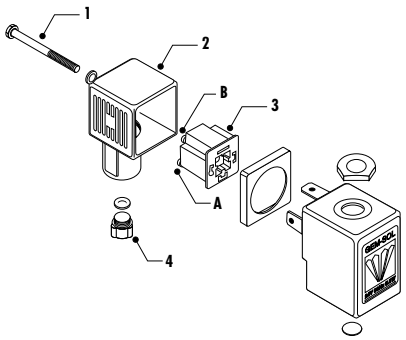
Drain the valve by disconnecting the tube at the upstream port of the valve and at any other location where water can be trapped. Open the needle valves (f1, f2).



Components	Part Numbers
a. Relay	61PIL66200
b. Filter	61SF5
c. Solenoid	61BSHC-024-H
d. Ball Valves	61SBV25
f. Needle Valves	61NV1/4
g. Check Valves (option)	61CV50

SOLENOID ELECTRICAL WIRE HOOK-UP

- Loosen bolt (1). Pull hub assembly off.
- Remove (4) and push terminal (3) out with a screwdriver through access port.
- Connect wires to A and B of the terminal block (3). For DCL solenoids, connect negative (black) to A. If no conduit is used, first put the wires through the 1/2" x 1/4" reducer.
- Re-assemble the hub and seal for the access port (4).



TROUBLESHOOTING

A solenoid converts an electric signal into a hydraulic command. The relay has large passages to allow faster opening/closing of large valves and is not susceptible to clogging. Note: Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
		Thickness of diaphragm.	*Change to low pressure diaphragm.*
	Needle valve (f2) closed.	*Open fully.*	*Readjust.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Relay (a) does not close.	*Pressure too low, need 20 psi.*	*Increase pressure.*
Valve does not close	*Punctured diaphragm.*	*Water keeps flowing from port #4 of the relay (a), when valve is open.*	*Replace diaphragm. Refer to I.D.#.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (c), is clogged.	*Disconnect tube at #1 of relay (a). No water comes from port (c).*	*Clean.*
	Solenoid (c), incorrect position of the manual override.	*Slot to be horizontal with arrow pointing down.*	*Change position.*
	Clogged filter (b).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*
	Needle valve (f1).	*Closed or dirty.*	*Open fully, readjust.*
			Clean or replace.

MANUAL ELECTRIC VALVE
Normally Closed

Operating Instructions for 1" - 6" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and heavy duty solvent for the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open and the C-port to manually close the valve. A neutral position, not facing any of the ports, locks the water in the bonnet and can keep the valve in a throttled position.

FOR ELECTRIC OPTION

The common port of the solenoid base (c), not marked, is connected to the A-port of the 3-way selector (a). The top port (p) is the pressure port for Normally Open (N.O.) solenoids on Normally Closed (N.C.) valves. The port marked nPt at the base is the vent port (v).

Note: A Normally Open valve uses a Normally Closed solenoid. For N.O. valves, the connections to the vent (v) and pressure (p) ports will be reversed!

- Start the pump or open the main valve. The valve will close.
- When the solenoid (c) is energized, the water in the bonnet will vent through the solenoid and the valve opens. The manual override of the solenoid (c) should be in the off position.

MAINTENANCE

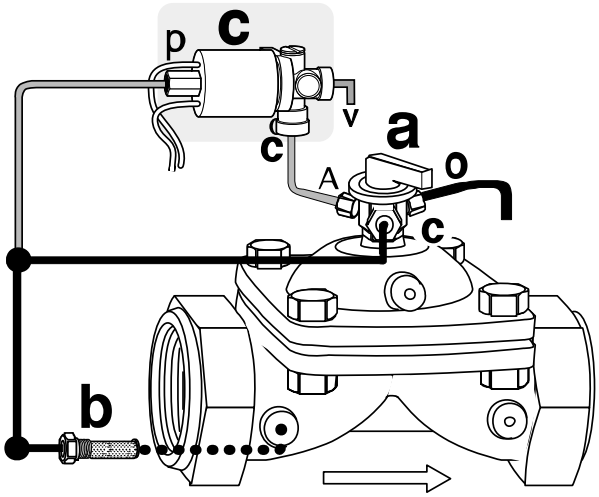
Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tube at the upstream port of the valve and at any other location where water can be trapped.



Components	Part Numbers
a. 3-way Selector	61SV21/4M
b. Filter	61SF25P
c. Solenoid	61NET

TROUBLESHOOTING

A solenoid converts an electric signal into a hydraulic command.
Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data. Check thickness of diaphragm.*	*Increase upstream pressure. Change to LP diaphragm.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to port O, water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced water flow, noisy.*	*Dismantle, clean and reassemble.*
	Clogged solenoid (c).	*Disconnect at A port, no water from tube.*	*Clean solenoid (c).*
	Solenoid (c), incorrect position of manual override.	*Slot to be horizontal with arrow or dot pointing down.*	*Change position.*
	Clogged filter (b).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*

REMOTE CONTROL VALVE

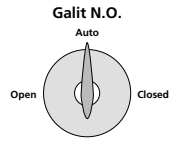
Operating Instructions for 1"- 4" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and heavy duty solvent for the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The manual override on the Galit must be in the Auto position.



- The Galit (c) requires a Normally Closed (N.C.) solenoid at the control panel.
- Connect the remote control line, 8 mm to the (1) port of the Galit (c) after bleeding all the air.
- When the solenoid (e) is energized, water in the hydraulic tube pressurizes and closes the Galit (c), draining the water from the bonnet through the vent port (4) and the valve opens.
- Depressurizing the hydraulic tubing connects the (3) port with the (2) port and the bonnet, closing the valve.
- The signal line at the Galit (c), when depressurized, should not have more than 4 psi of static pressure. The Galit (c) should not be lower than 9 ft in elevation compared to the solenoid (e) at the control panel. If at a lower level, see the spring selection chart below.

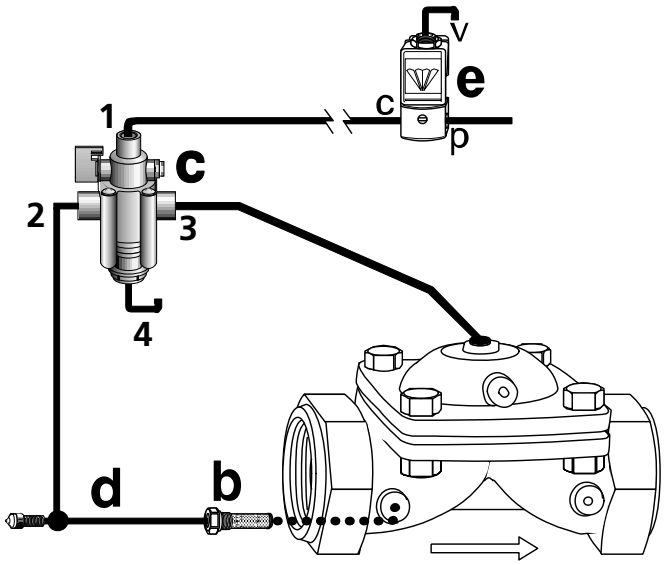
MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the upstream pressure periodically, use a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tube at the access port of the valve and at (1) port of the Galit (c).



Components	Part Numbers
a. 3-way Selector	62SV21/4M
b. Filter	61SF25P
c. Shastomit	61SHASO
d. Shrader Valve	61APS1/8
e. Solenoid	61BSC-024-H

Sping Color	N.O. Valve	N.C. Valve
Yellow	16' to 32'	16' to 32'
Green	32' to 45'	32' to 49'
White	45' to 55'	49' to 65'
Red	55' to 72'	65' to 82'

TROUBLESHOOTING

A Galit is a relay, installed on the valve, activated by a remote hydraulic signal from the control panel using a N.C. solenoid and 8mm tubing. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The Galit manual override is in the Closed position.*	*Verify knob position.*	*Turn to Auto position.*
	Ports are clogged.	*Turn Galit manual override to Open or Auto, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data. Thickness of diaphragm.*	*Increase upstream pressure. Change to LP diaphragm.*
	Solenoid (e), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (e), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	No signal or low pressure at (1) port of Galit (c).	*Need N.C. solenoid.*	*Increase pressure.*
		Verify connections on ports.	*Correct or clean.*
		If green spring was used.	*Change to yellow spring.*
	Broken or damaged control tubing.	*Leaks in the tubing.*	*Repair and bleed air.*
	Faulty Galit (c).	*Dirt inside.*	*Take apart and clean.*
Valve does not close	*Punctured diaphragm.*	*Turn Galit manual override to port Open or Auto, water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced water flow, noisy.*	*Dismantle, clean and reassemble.*
	Galit (c) not returning to open position.	*Signal line not draining due to static pressure.*	*Disconnect tube at (1) port measure pressure.*
		Dirt inside.	*Take apart and clean.*
		Yellow spring is too weak.	*Replace or change to green spring.*

REMOTE CONTROL VALVE

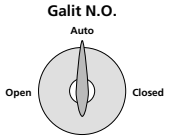
Operating Instructions for 6"- 10" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The manual override on the Galit must be in the Auto position.



- The Galit (c) requires a Normally Closed (N.C.) solenoid at the control panel.
- Connect the remote control line, 8 mm to the (1) port of the Galit (c) after bleeding all the air.
- When the solenoid (f) is energized, water in the hydraulic tube pressurizes and closes the Galit (c), draining the water from the bonnet through the vent port (4) and the valve opens.
- Depressurizing the hydraulic tubing connects the (3) port with the (2) port and the bonnet, closing the valve.
- The signal line at the Galit (c), when depressurized, should not have more than 4 psi of static pressure. The Galit (c) should not be lower than 9 ft in elevation compared to the solenoid (f) at the control panel. If at a lower level, see the spring selection chart below.

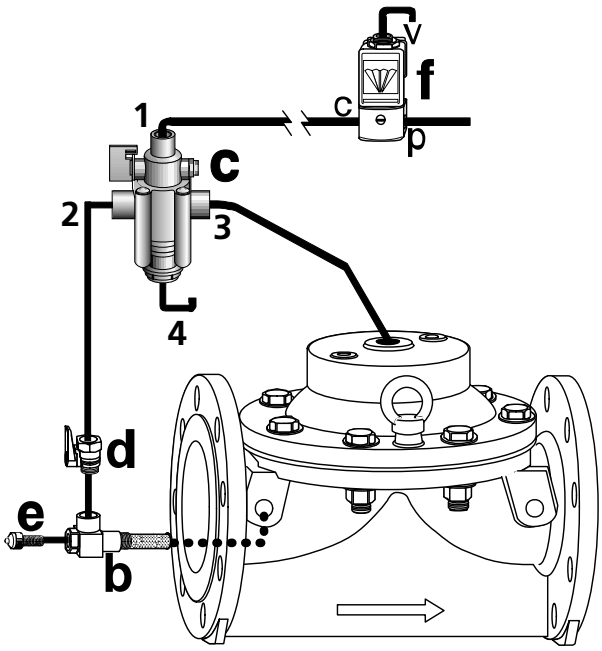
MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the upstream pressure periodically, use a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tube at the access port of the valve and at (1) port of the Galit (c).



Components	Part Numbers
a. 3-way Selector	62SV41/4M
b. Filter	61SF5
c. Galit	61GALIT
d. Ball Valve	61SBV25
e. Shrader Valve	61APS1/8
f. Solenoid	61BSC-024-H

Sping Color	N.O. Valve	N.C. Valve
Yellow	16' to 32'	16' to 32'
Green	32' to 45'	32' to 49'
White	45' to 55'	49' to 65'
Red	55' to 72'	65' to 82'

TROUBLESHOOTING

A Galit is a relay, installed on the valve, activated by a remote hydraulic signal from the control panel using a N.C. solenoid and 8mm tubing. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The Galit manual override is in the Closed position.*	*Verify knob position.*	*Turn to Auto position.*
	Ports are clogged.	*Turn Galit manual override to Open or Auto, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data. Check thickness of diaphragm.*	*Increase upstream pressure. Change to LP diaphragm.*
	Solenoid (f), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (f), faulty coil.	*Voltage okay but no click.*	*Change coil.*
	No signal or low pressure at (1) of Galit (c).	*Need N.C. solenoid (f).*	*Increase pressure.*
		Verify connections on ports.	*Correct or clean.*
		If green spring was used.	*Change to yellow spring.*
	Broken or damaged control tubing.	*Leaks in the tubing.*	*Repair.*
	Faulty Galit (c).	*Dirt inside.*	*Take apart and clean.*
Valve does not close	*Punctured diaphragm.*	*Turn Galit manual override to port Open water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Galit (c) not returning to open position.	*Signal line not draining due to static pressure.*	*Disconnect tube at (1) port and measure pressure.*
		Dirt inside.	*Take apart and clean.*
		Yellow spring is too weak.	*Replace or change to green spring.*

PRESSURE REDUCING VALVE 3-Way

Operating Instructions for 1" - 4" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and heavy duty solvent for the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

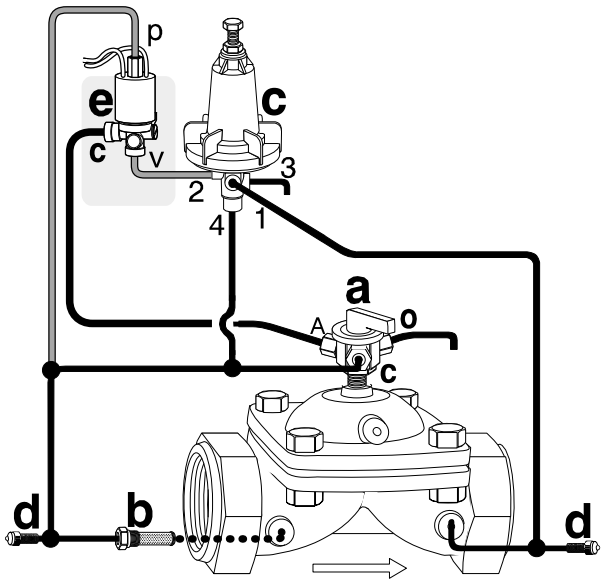
The 3-way selector (a) must be in the A-position. The O-port is used to manually open and the C-port to close the valve. A neutral position, not facing any of the ports, locks the water in the bonnet, used in case the pilot (c) malfunctions.

Note: The O-port is plugged when the pilot (c) has a yellow spring, to avoid accidental opening causing high pressure downstream. The pilot (c) has a colored ring on the top identifying the spring inside.

- Loosen the lock nut and the adjustment bolt on pilot (c).
- Start the pump or main valve. Valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (c) slowly until downstream pressure reaches the desired level.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (c).

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (e) 90 degrees and follow the above steps.
- After making the adjustments, turn the override to the original position.



Components	Part Numbers
a. 3-way Selector	61SV21/4M
b. Filter	61SF25P
c. Pilot-Black	61PIL29100
d. Shrader Valve	61APS1/8
e. Solenoid (option)	61NET

MAINTENANCE

Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubes at the access ports of the valve and at any other location where water can be trapped.

TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower downstream pressure. A solenoid converts an electric signal into a hydraulic command. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data. Check thickness of diaphragm.*	*Increase upstream pressure. Change to LP diaphragm.*
	Solenoid (e), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Faulty pilot (c).	*Disconnect tube at port A. Water keeps flowing out.*	*Repair or replace.*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to port O, water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced water flow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (e) is clogged.	*Disconnect tube at A port, no water comes out.*	*Clean solenoid (e).*
	Solenoid (e) incorrect position of manual override.	*Slot to be horizontal with arrow or dot pointing down.*	*Change position.*
Valve does not regulate	*Incorrect connections.*	*Compare with schematic.*	*Change accordingly.*
	Wrong spring in pilot (c).	*Check data, yellow spring 7-35 psi downstream.*	*Change to green spring14-70 psi.*
	Inlet pressure too low.	*Measure, check design.*	*Increase pressure.*
	Clogged filter (b).	*Disconnect tube upstream, no firm stream.*	*Clean or replace.*
	Faulty pilot (c).	*Disconnect tube at port 2, no water coming out.*	*Clean pilot or replace.*
Unstable performance	*Valve has low pressure diaphragm.*	*Noisy, chattering, high pressure differential. Check diaphragm I.D.*	*Use high pressure diaphragm.*
	Low flow or high pressure differential.	*Valve is surging.*	*Install dripper or needle valve at vent port (3) and/or port A.*

PRESSURE REDUCING VALVE 3-Way

Operating Instructions for 6" - 12" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

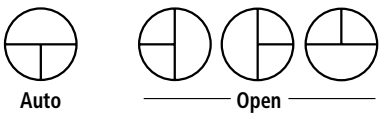
The 3-way selector (a) must be in the A-position. The O-port is used to manually open and the C-port to close the valve. A neutral position, not facing any of the ports locks the water in the bonnet, used in case the pilot (c) malfunctions.

The isolation ball valves (d) at the access ports of the valve must be open.

- Loosen the lock nut and the adjustment bolt on pilot (c).
- Start the pump or main valve. Valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (c) slowly until downstream pressure reaches the desired level.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (c).

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (f) 90 degrees and follow the above steps.



- After making the adjustments, turn the override to the original position.

MAINTENANCE

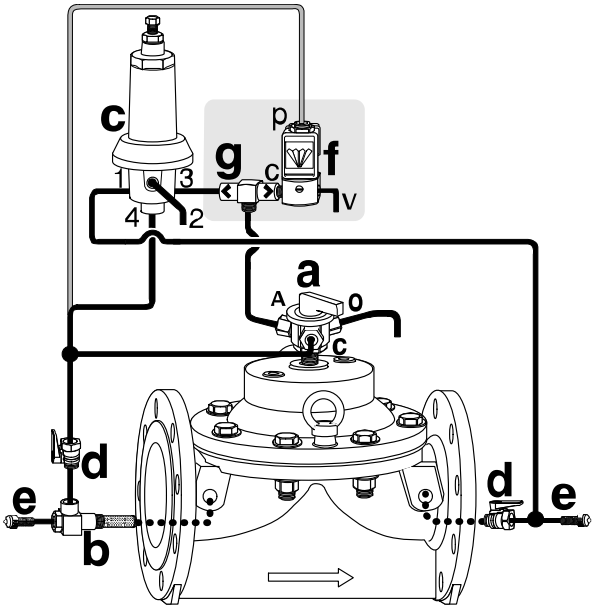
Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

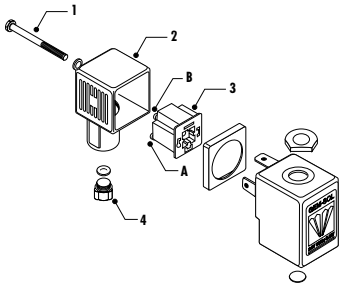
Drain the valve by disconnecting the tube at the upstream port of the valve and at any other location where water can be trapped.



Components	Part Numbers
a. 3-way Selector	61SV41/4M
b. Filter	61SF5
c. Pilot-Brass	61PIL31300
d. Ball Valves	61SBV25
e. Shrader Valve	61APS1/8
f. Solenoid (option)	61BS(H)O-024-H
g. Selector Tee (option)	61SV1/4BR

SOLENOID ELECTRICAL WIRE HOOK-UP

- Loosen bolt (1). Pull hub assembly off.
- Remove (4) and push terminal (3) out with a screwdriver through access port.
- Connect wires to A and B of the terminal block (3). For DCL solenoids, connect negative (black) to A. If no conduit is used, first put the wires through the 1/2" x 1/4" reducer.
- Re-assemble the hub and seal for the access port (4).



TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower downstream pressure. A solenoid converts an electric signal into a hydraulic command. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data. Check thickness of diaphragm.*	*Increase upstream pressure. Change to LP diaphragm.*
	Solenoid (e), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Faulty pilot (c).	*Disconnect tube at port A. Water keeps flowing out.*	*Repair or replace.*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to port O, water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced water flow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (e) is clogged.	*Disconnect tube at A port, no water comes out.*	*Clean solenoid (e).*
	Solenoid (e) incorrect position of manual override.	*Slot to be horizontal with arrow or dot pointing down.*	*Change position.*
Valve does not regulate	*Incorrect connections.*	*Compare with schematic.*	*Change accordingly.*
	Wrong spring in pilot (c).	*Check data, yellow spring 7-35 psi downstream.*	*Change to green spring14-70 psi.*
	Inlet pressure too low.	*Measure, check design.*	*Increase pressure.*
	Clogged filter (b).	*Disconnect tube upstream, no firm stream.*	*Clean or replace.*
	Faulty pilot (c).	*Disconnect tube at port 2, no water coming out.*	*Clean pilot or replace.*
Unstable performance	*Valve has low pressure diaphragm.*	*Noisy, chattering, high pressure differential. Check diaphragm I.D.*	*Use high pressure diaphragm.*
	Low flow or high pressure differential.	*Valve is surging.*	*Install dripper or needle valve at vent port (3) and/or port A.*

PRESSURE REDUCING SUSTAINING VALVE 3-Way

Operating Instructions for 6", 8", and 10" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open and the C-port to close the valve. A neutral position, not facing any of the ports, locks the water in the bonnet, used in case the pilots (c, g) malfunctions.

Note: The pilots (c, g) have a colored ring on the top identifying the spring inside.

- Loosen the lock nut and tighten the adjustment bolt of both pilots (c) and (g).
- Start the pump or open main valve. Valve remains closed or opens slightly maintaining a high upstream pressure.
- Loosen the bolt of pilot (c) slowly until upstream pressure reaches the desired level.
- Loosen the bolt of pilot (g) slowly until the downstream reaches the required pressure level.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on both pilots (c, g).

MAINTENANCE

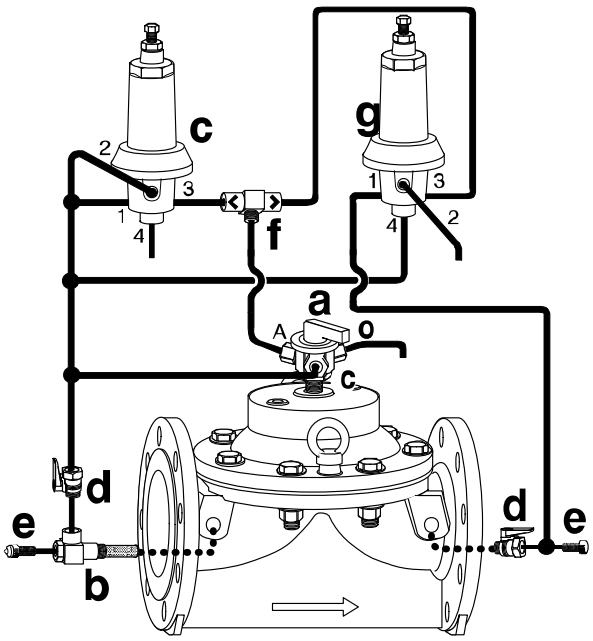
Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the correct setting of the pilots (c, g) periodically with a quality liquid filled gauge and shrader valve adapter, by measuring the up and downstream pressure.

WINTERIZING

Drain the valve by disconnecting the tubes at the access ports of the valve and any other location where water can be trapped.



Components	Part Numbers
a. 3-way Selector	62SV41/4M
b. Filter	61SF5
c. Sustaining Pilot-Blue	61PIL31300
d. Ball Valve	61SBV25
e. Shrader Valve	61APS1/8
f. Pressure Selector Tee	61SV1/4BR
g. Reducing Pilot-Black	61PIL31300

TROUBLESHOOTING

A pressure sustaining pilot maintains a minimum upstream pressure. A pressure reducing pilot reduces a certain inlet pressure to a lower constant downstream pressure. A solenoid converts an electric signal into a hydraulic command. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water flowing.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Faulty pilot (c).	*Disconnect tube at selector tee (f). Tubes keep venting water.*	*Repair or replace.*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to port O, water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced water flow, noisy.*	*Dismantle, clean and reassemble.*
	Selector Tee (f) stuck.	*Disconnect both sides.*	*Clean.*
Valve does not regulate	*Incorrect connections.*	*Compare with schematic.*	*Change accordingly.*
	Wrong spring in pilot (e).	*Check data, yellow spring 7-35 psi downstream.*	*Change to green spring 14-70 psi.*
	Inlet pressure too low.	*Measure, check design.*	*Increase pressure.*
	Clogged filter (b).	*Disconnect tube upstream, no firm stream.*	*Clean or replace.*
	Faulty pilot (g).	*Disconnect tube at port 3, no water coming out.*	*Clean pilot (g) or replace.*
Unstable performance	*Pilot set points are too close together, causing interference.*	*Set points of pilots (c, g) to be a minimum of 10 psi apart.*	*Change accordingly.*
	Low flow or high pressure differential.	*Valve is surging.*	*Install needle valve between Tee (f) and A port of 3-way selector (a).*

PRESSURE REDUCING VALVE
3-Way QUICK-REACTING

Operating Instructions for 6" - 12" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (c) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENT

- The isolation ball valves (d) at the access ports of the valve must be open.
- Loosen the lock nut and the adjustment bolt on pilot (b).
- Tighten the bolt on pilot (a).
- Start the pump or main valve. Valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (b) slowly until downstream pressure reaches the desired level.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (b).
- Loosen the bolt on pilot (a) until the downstream pressure starts to decrease and tighten the bolt about two turns. The set point of the bolt on pilot (a) should be 10 psi higher than the one on pilot (b).

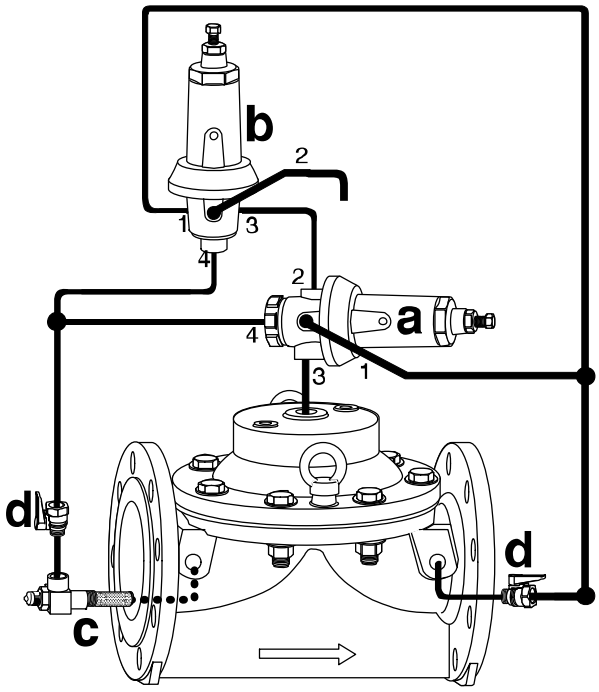
MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tube at the access ports of the valve and at other locations where water can be trapped.



Components	Part Numbers
a. Pilot Quick-Reacting	61PIL66300-R
b. Pilot-Brass	61PIL31300
c. Filter	61SF5
d. Ball Valves	61SBV25
e. Shrader Valve	61APS1/8

TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower constant downstream pressure. The quick reacting pilot closes the valve fast when the pressure exceeds its set point. Note: Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*Incorrect pilot (b) connections.*	*Compare to diagram.*	*Make corrections.*
Valve does not close	*Punctured diaphragm.*	*Pilots (a, b) do not regulate.*	*Replace diaphragm* *Refer to I.D. #.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
Valve does not regulate	*Incorrect connections.*	*Compare with schematic.*	*Change accordingly.*
	Wrong spring in pilot (b).	*Check data, yellow spring 7-30psi downstream.*	*Change to green spring 14-100 psi or red spring 30-190 psi.*
	Inlet pressure too low.	*Measure, check design.*	*Increase pressure.*
	Clogged filter (c).	*Disconnect tube upstream., no firm stream.*	*Clean or replace.*
	Faulty pilot (b).	*Disconnect tube at port-3, no water coming out.*	*Clean pilot (b) or replace.*

PRESSURE REDUCING REMOTE CONTROL VALVE

Operating Instructions for 1"- 12" Valves

INSTALLATION

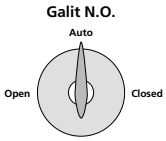
- The valve can be installed in any position, but flow direction should match the engraved arrow on the bonnet.
- Connect port (1) of the Galit relay (b) to the control center by a PE command tube, 6 mm size is preferred.
- Drain the air from the command tube - air in the tube will cause delay in activation of the relay.

ADJUSTMENTS

- Turn the adjusting bolt (1) of the Pilot (a) in a counter-clockwise direction all the way.
- Start the pump or open the main valve of the network.
- Turn the adjusting bolt (1) of the Pilot (a) in a clockwise direction until the downstream pressure reaches the required set point.
- Elevation difference between the controller and the valve may require inserting a spring in the Galit (b) to overcome the static pressure in the control tube.

MAINTENANCE

For Normally Closed Valves - Turn the handle of the relay to the "C", closed position for manual opening. The valve will perform as a Pressure Reducer at this position.



For Normally Open Valves - Turn the handle of the relay to the "O", open position for manual opening. The valve will perform as a Pressure Reducer at this position.

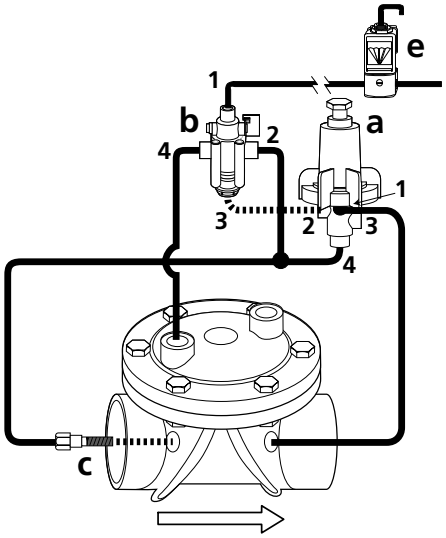
Return the handle to the "A", auto position for normal remote control of the valve.

WINTERIZING

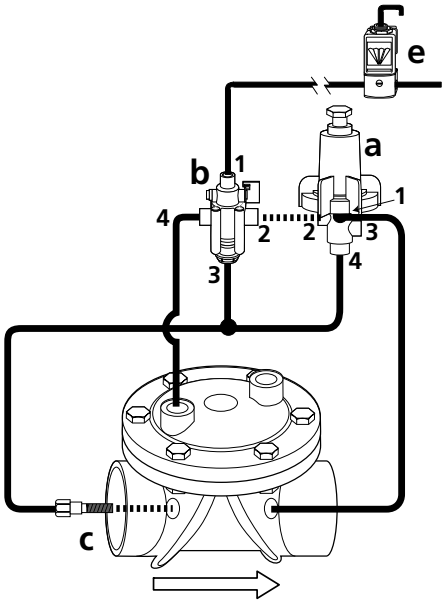
Check and clean the in-line filter as water quality dictates. Unless the water is very dirty, this service should not be done more than once in a few months.

Watch the valve performance by checking the downstream pressure gauge periodically.

Normally Closed Valve



Normally Open Valve



Components	Part Numbers
a. Pilot (sizes 1" to 4") Pilot (sizes 6" to 12") b. Galit c. Filter	61PIL29100 61PIL31300 61GALIT 61SF25P

TROUBLESHOOTING

A Galit is a relay, installed on the valve, activated by a remote hydraulic signal from the control panel using a N.C. solenoid and 6mm tubing. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The Galit manual override is in the Closed position.*	*Verify knob position.*	*Turn to Auto position.*
	Ports are clogged.	*Turn Galit manual override to Open or Auto, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data. Thickness of diaphragm.*	*Increase upstream pressure. Change to LP diaphragm.*
	Solenoid (e), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (e), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	No signal or low pressure at (1) port of Galit (b).	*Need N.C. solenoid.*	*Increase pressure.*
		Verify connections on ports.	*Correct or clean.*
		If green spring was used.	*Change to yellow spring.*
	Broken or damaged control tubing.	*Leaks in the tubing.*	*Repair and bleed air.*
	Faulty Galit (b).	*Dirt inside.*	*Take apart and clean.*
Valve does not close	*Punctured diaphragm.*	*Turn Galit manual override to port Open or Auto, water flows constantly.*	*Replace diaphragm. Refer to I.D. number.*
	Foreign substance on sealing seat.	*Reduced water flow, noisy.*	*Dismantle, clean and reassemble.*
	Galit (b) not returning to open position.	*Signal line not draining due to static pressure.*	*Disconnect tube at (1) port measure pressure.*
		Dirt inside.	*Take apart and clean.*
		Yellow spring is too weak.	*Replace or change to green spring.*
Valve does not regulate	*Incorrect connections.*	*Compare with schematic.*	*Change accordingly.*
	Wrong spring in pilot (c).	*Check data, yellow spring 7-35 psi downstream.*	*Change to green spring14-70 psi.*
	Inlet pressure too low.	*Measure, check design.*	*Increase pressure.*
	Clogged filter (b).	*Disconnect tube upstream, no firm stream.*	*Clean or replace.*
	Faulty pilot (c).	*Disconnect tube at port 2, no water coming out.*	*Clean pilot or replace.*
Unstable performance	*Valve has low pressure diaphragm.*	*Noisy, chattering, high pressure differential. Check diaphragm I.D.*	*Use high pressure diaphragm.*
	Low flow or high pressure differential.	*Valve is surging.*	*Install dripper or needle valve at vent port (3).*

PRESSURE SUSTAINING VALVE 3-Way

Operating Instructions for 1" - 4" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and heavy duty solvent for the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open the valve and the C-port to close the valve. A neutral position, not facing any of the ports locks the water in the bonnet, used in case the pilot (c) malfunctions.

- Loosen the lock nut and tighten the adjustment bolt on pilot (c).
- Start the pump or open the main valve. The valve remains closed or opens slightly while the upstream pressure maintains a high level.
- Loosen the bolt on pilot (c) until the upstream pressure reaches the minimum required level.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (c).

THE ELECTRIC OPTION

- Turn the manual override of the solenoid (e) 90-degrees and follow the above steps.

MAINTENANCE

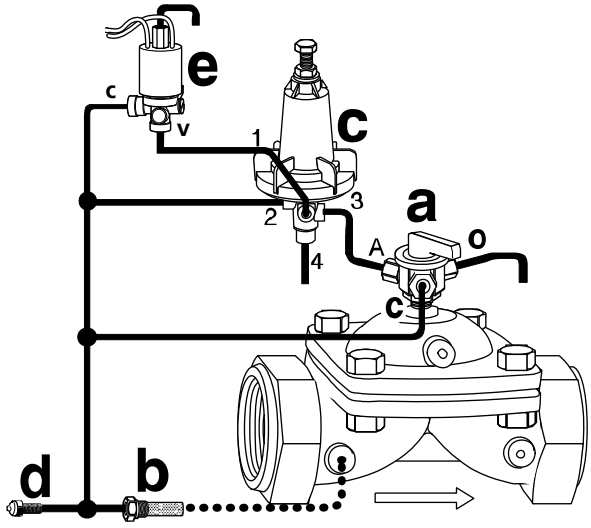
Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the upstream pressure periodically with a quality liquid filled gauge and a shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubing from the access ports of the valve and at other locations where water can be trapped.



Components	Part Numbers
a. 3-way Selector	61SV21/4M
b. Filter	61SF25P
c. Pilot	61PIL29/200-
d. Shrader Valve	61APS1/8
e. Solenoid (option)	61NETNC

TROUBLESHOOTING

A sustaining valve maintains a preset pressure level at the upstream side of the valve.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (c) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water.*	*Dismantle and clean.*
	Low upstream pressure.	*Design data, pump curve.*	*Increase pressure.*
	Solenoid (e) incorrect connection.	*Verify port connections, top is drain port.*	*Correct.*
	Plugged.	*Disconnect tube, check flow.*	*Clean.*
	Solenoid (e), no current.	*Check voltage and coil*	*Correct voltage, change coil.*
	Faulty pilot (c).	*Pressure too high. Disconnect tube at A. Water flows out of tube.*	*Correct.* *Repair or replace pilot (c).*
Valve does not close	*Punctured diaphragm*	*Turn 3-way selector (a) to O, water flows continuously.*	*Change diaphragm, check I.D.# on the lip.*
	Foreign substance on sealing seat.	*Water leaking from outlet or noise can be heard.*	*Remove bonnet, clean seat and reassemble.*
	3-way selector (a) on -O.	*Verify knob position.*	*Turn to A.*
	Solenoid (e) override in wrong position.	*Slot to be horizontal with arrow pointing down.*	*Turn to right position.*
Unstable regulation	*Valve with low pressure diaphragm.*	*Noisy, chattering.*	*Replace with high pressure diaphragm.*
	Incorrect pilot (c) connections.	*Compare with schematic.*	*Correct.*
	Clogged or faulty pilot (c).	*No water flow from port (3). Extreme bolt adjustments are needed to modify pressure.*	*Clean or replace pilot (c).*
	Low flow or high pressure differential.	*Valve is surging.*	*Install needle valve between A port and port 3 of pilot (c).*

PRESSURE SUSTAINING VALVE 3-Way

Operating Instructions for 6", 8" and 10" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open the valve and the C-port to close the valve. A neutral position, not facing any of the ports locks the water in the bonnet, used in case the pilot (c) malfunctions.

- Loosen the lock nut and tighten the adjustment bolt on pilot (c).
- Start the pump or open the main valve. The valve remains closed or opens slightly while the upstream pressure maintains a high level.
- Loosen the bolt on pilot (c) until the upstream pressure reaches the minimum required level.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (c).

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (f) 90-degrees and follow the above steps.
- After the adjustment, turn the override to the original position. The wire connection to the solenoid (f) with 1/2" hub is described on the attached diagram.

MAINTENANCE

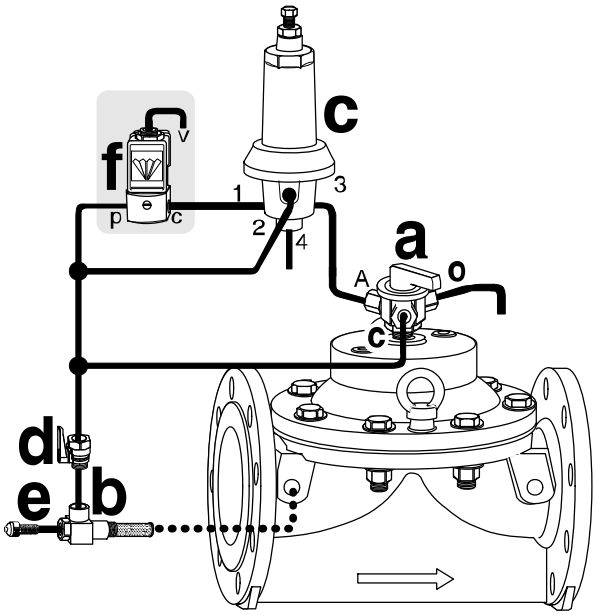
Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the upstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubing from the access ports of the valve and at any other location where water can be trapped.



Components	Part Numbers
a. 3-way Selector	61SV41/4M
b. Filter	61SF5
c. Pilot	61PIL31300-G
d. Ball Valve	62SBV25
e. Shrader Valve	61APS1/8
f. Solenoid (option)	61BSHC-024-H

TROUBLESHOOTING

A sustaining valve maintains a preset pressure level at the upstream side of the valve. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water flowing.*	*Dismantle and clean.*
	Low upstream pressure.	*Design data, pump curve.*	*Increase upstream pressure.*
	Incorrect solenoid (f), connection.	*Verify port connections, top is drain port.*	*Correct.*
	Plugged.	*Disconnect tube, check flow.*	*Clean.*
	Solenoid (f), no current.	*Check voltage and coil.*	*Correct, change coil.*
	Faulty pilot (c).	*Pressure is too high.*	*Make necessary adjustments.*
		Disconnect tube at A, water flows out of tube.	*Repair or replace pilot (c).*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to O, water flows continuously.*	*Change diaphragm, check I.D. #.*
	Foreign substance on sealing seat.	*Water leaking from outlet or noise can be heard.*	*Remove bonnet, clean seat and re-assemble.*
	3-way selector (a) set on O.	*Verify knob position.*	*Turn to A.*
	Solenoid (f) override in wrong position.	*Slot to be horizontal with arrow pointing down.*	*Turn to correct position.*
Unstable performance	*Valve has low pressure diaphragm.*	*Noisy, chattering.*	*Replace with high pressure diaphragm.*
	Incorrect pilot (c) connnections.	*Compare with schematic.*	*Correct accordingly.*
	Clogged or faulty pilot (c).	*No water flow from port (3).*	*Clean or replace pilot (c). Adjust bolts to modify pressure.*
	Low flow or high pressure differential.	*Valve is surging.*	*Install needle valve between A port and port #3 of pilot (c).*

PRESSURE SUSTAINING VALVE Normally Open

Operating Instructions for 1" - 4" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and a heavy duty solvent for the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open the valve and the C-port to close the valve. A neutral position, not facing any of the ports locks the water in the bonnet, used in case the pilot (c) malfunctions.

Note: The valve is normaly open and only sustains pressure when the filters backflush. The solenoid (e) is connected to the master valve of the backflush controller.

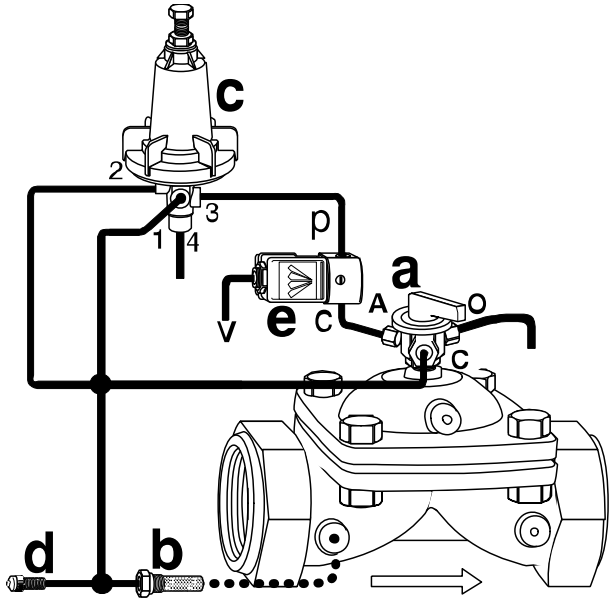
- Loosen the lock nut and tighten the adjustment bolt on pilot (c).
- Start the pump or open the main valve and perform a backflush cycle with the controller.
- The valve remains closed or opens slightly while the upstream pressure maintains a high level.
- Loosen the bolt on pilot (c) until the upstream pressure reaches the minimum required level to backwash the filter.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (c).
- If the manual override screw on the solenoid (e) was used, turn it to the original position. The connection of the wires to the solenoid (e) is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the upstream pressure periodically, using a quality liquid filled gauge.



Components	Part Numbers
a. 3-way Selector	61SV21/4M
b. Filter	61SF25P
c. Pilot-Blue	61PIL29200-G
d. Shrader Valve	61APS1/8
e. Solenoid	61BSC-024-H

WINTERIZING

Drain the valve by disconnecting the tubing from the access ports of the valve and at any other location where water can be trapped.

TROUBLESHOOTING

A normally open sustaining valve maintains a preset pressure level at the upstream side of the valve during the backflush cycle of the filters. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water flowing.*	*Dismantle and clean.*
	Low upstream pressure.	*Design data, pump curve.*	*Increase upstream pressure.*
	Solenoid (e), incorrect connection.	*Verify port connections, top is drain port.*	*Change accordingly.*
	Plugged.	*Check flow at the vent port.*	*Clean.*
Valve does not sustain pressure	*Punctured diaphragm.*	*Turn 3-way selector (a) to O, water flows continuously.*	*Change diaphragm, check I.D. #.*
	3-way selector (a) on O.	*Verify knob position.*	*Turn to A position.*
	Solenoid (e) override in wrong position.	*Slot to be horizontal with arrow pointing down.*	*Turn to right position.*
	Solenoid (e), no current.	*Measure output at controller.*	*Consult manual.*
	Solenoid (e), faulty coil.	*Check at coil, no click.*	*Replace.*
	Clogged.	*Disconnect tube at A, no water flow.*	*Clean solenoid (e).*
	Incorrect pilot (c) connections.	*Compare with schematic.*	*Correct accordingly.*
	Clogged or faulty pilot (c).	*No water flow from part (3).*	*Clean or replace pilot (c). Adjust bolt to change pressure.*

PRESSURE SUSTAINING VALVE Normally Open

Operating Instructions for 6" and 868 Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open the valve and the C-port to close the valve. A neutral position, not facing any of the ports locks the water in the bonnet, used in case the pilot (c) malfunctions.

Note: The valve is normally open and only sustains pressure when the filters backflush. The solenoid (e) is connected to the master valve of the backflush controller.

- Loosen the lock nut and tighten the adjustment bolt on pilot (c).
- Start the pump or open the main valve and perform a backflush cycle with the controller.
- The valve remains closed or opens slightly while the upstream pressure maintains a high level.
- Loosen the bolt on pilot (c) until the upstream pressure reaches the minimum required level to backwash the filter.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (c).

If the manual override screw on the solenoid (e) was used, turn it to the original position. The connection of the wires to the solenoid (e) is described on the attached diagram.

MAINTENANCE

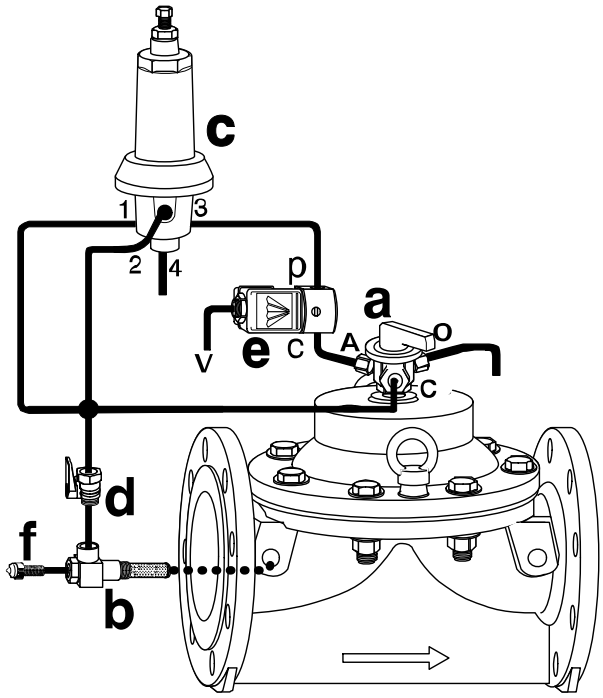
Keep the valve clear from weeds and dirt.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

Verify the upstream pressure periodically, use a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubing from the access ports of the valve and at any other location where water can be trapped.



Components	Part Numbers
a. 3-way Selector	62SV41/4M
b. Filter	61SF5
c. Pilot	61PIL31300-G
d. Ball Valve	62SBV25
e. Solenoid	61BSC-024-H
f. Shrader Valve	61APS1/8

TROUBLESHOOTING

A normally open sustaining valve maintains a preset pressure level at the upstream side of the valve during the backflush cycle of the filters. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water flowing.*	*Dismantle and clean.*
	Low upstream pressure.	*Design data, pump curve.*	*Increase upstream pressure.*
	Solenoid (e), incorrect connection.	*Verify port connections, top is drain port.*	*Change accordingly.*
	Plugged.	*Check flow at the vent port.*	*Clean.*
Valve does not sustain pressure	*Punctured diaphragm.*	*Turn 3-way selector (a) to O, water flows continuously.*	*Change diaphragm, check I.D. #.*
	3-way selector (a) on O.	*Verify knob position.*	*Turn to A.*
	Solenoid (e) override in wrong position.	*Slot to be horizontal with arrow pointing down.*	*Turn to right position.*
	Solenoid (e), no current.	*Measure output at controller.*	*Consult manual.*
	Solenoid (e), faulty coil.	*Check at coil, no click.*	*Replace.*
	Clogged.	*Disconnect tube at A, no water flow.*	*Clean.*
	Incorrect pilot (c) connections.	*Compare with schematic.*	*Correct accordingly.*
	Clogged or faulty pilot (c).	*No water flow from part (3).*	*Clean or replace pilot (c). Adjust bolt to change pressure.*

PRESSURE SUSTAINING VALVE Normally Open

Operating Instructions for 8", 10" and 12" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The filter (d) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- Bolts of flanged valves should be tightened in a diagonal sequence.

OPERATION

Note: The valve is normally open (N.O.) and only sustains pressure when the filters backflush. The solenoid N.C. is hooked up to the master valve of the backflush controller.

- Loosen the lock nut and tighten the adjustment bolt on pilot (a).
- Start the pump or open the main valve and perform a backflush cycle with the controller.
- The valve remains closed or opens slightly while the upstream pressure maintains a high level.
- Loosen the bolt on pilot (a) until the upstream pressure reaches about 50 psi.
- Tighten the lock nut on the pilot (a).

  If the manual override screw on the solenoid (c) was used, turn it to the original position. The wire connection to the solenoid (c) is described on the attached diagram.

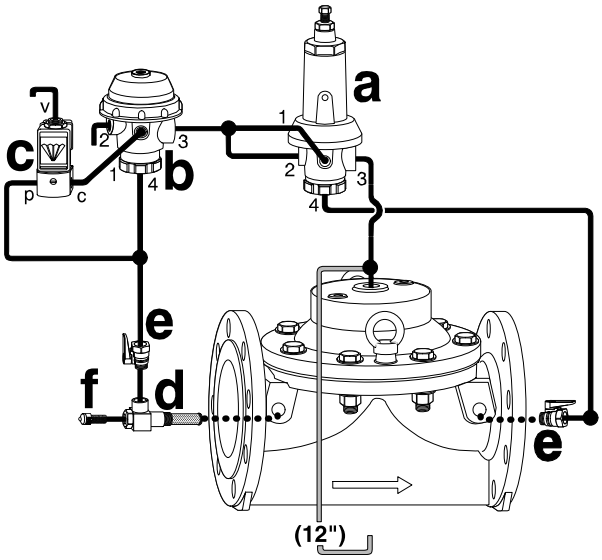
MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the upstream pressure periodically with a quality liquid filled gauge and shrader value adapter.

WINTERIZING

Drain the valve by disconnecting the tubing from the access port of the valve and any other locations where water can be trapped.



Components	Part Numbers
a. Pilot	61PIL66300-G
b. Relay	61PIL66200
c. Solenoid	61BSHC-024-H
d. Filter	61SF5
e. Ball Valves	62SBV25
f. Shrader Valve	61APS1/8

TROUBLESHOOTING

A normally open sustaining valve maintains a preset pressure level at the upstream side of the valve during the backflush cycle of the filters. Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open fully	*Low upstream pressure.*	*Design data, pump curve.*	*Increase upstream pressure.*
	Solenoid (c) override in wrong position.	*Slot to be horizontal with arrow pointing down.*	*Turn to correct position.*
Valve does not sustain pressure	*Punctured diaphragm.*	*Water keeps flowing from port (2) of relay (b).*	*Change diaphragm, check I.D. #.*
	Solenoid (c) no current.	*Measure output at controller.*	*Consult controller manual.*
	Solenoid (c), faulty coil.	*Check at coil, no click.*	*Replace.*
	Clogged.	*Disconnect tube at port #1 of relay (b), no water flow.*	*Clean.*
	Incorrect pilot (a) connections.	*Compare with schematic.*	*Correct accordingly.*
	Relay (b).	*Needs minimum of 20 psi upstream presssure to operate. Port on bonnet should be open.*	*Clear port.*

TWO-STAGE OPENING VALVE

Operating Instructions for 2"- 4" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Use primer and a heavy duty solvent to install the socket style PVC valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open the valve and the C-port to close the valve. A neutral position, not facing any of the ports locks the water in the bonnet.

- Loosen the lock nut and tighten the adjustment bolt on pilot (c).
- Start the pump or open the main valve. The valve remains closed or opens slightly while the upstream pressure maintains a high level.
- Loosen the bolt on pilot (c) until the upstream pressure reaches a pressure level that produces the desired flow rate to fill the pipeline. The pilot (c) should be set at about 2/3 of the operating pressure.
- The pilot (c) measures the pressure in the bonnet which is approximately the average of the upstream and downstream pressure. **A higher pressure setting increases the filling time.**

MAINTENANCE

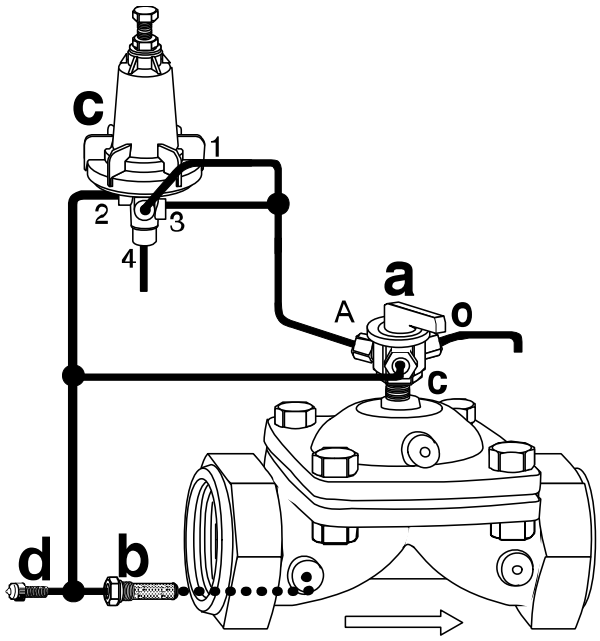
Keep the valve clear from weeds and dirt.

Verify the the proper filling time of the pipeline and adjust the pilot (c) setting if necessary.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

WINTERIZING

Drain the valve by disconnecting the tubing from shrader valve (d).



Components	Part Numbers
a. 3-way Selector	62SV21/4M
b. Filter	61SF25P
c. Pilot	61PIL29200-G
d. Shrader Valve	61APS1/8

TROUBLESHOOTING

A two-stage opening valve maintains a preset pressure level in the bonnet until the mainline is full and the pressure builds up.

Problem	Cause	Check	Remedy
Valve does not open	*3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water.*	*Dismantle and clean.*
	Low upstream pressure.	*Design data, pump curve.*	*Increase pressure.*
	Faulty pilot (c).	*Check connections.* *Clogged or dirty.*	*Correct.* *Take apart, clean.*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to O water flows continuously.*	*Change diaphragm.* *Check I.D.# on lip.*
	Foreign substance on sealing seat.	*Water leaking from outlet or noise can be heard.*	*Remove bonnet, clean seat and reassemble.*
	3-way selector (a) is in the O	*Verify knob position.*	*Turn to A position.*

QUICK PRESSURE RELIEF VALVE

Operating Instructions for 2" Valves

INSTALLATION

- The valve is installed on a Tee-junction in the pipe network.
- The discharge side of the valve is usually kept in a horizontal position.
- A gate valve can be installed upstream of the valve to isolate the valve from the network.
- Do not connect a pipe downstream of this valve unless sized correctly (70% of normal flow).
- Filter (b) is installed at the upstream side of the valve.
- Use five layers of teflon tape.

ADJUSTMENTS

- Tighten the adjustment bolt of the pilot (a).
- Operate the system at the maximum expected pressure.
- Loosen the adjustment bolt of the pilot (a) until the valve starts to open, then tighten the bolt about 2 turns. The pilot (a) is now set about 5-10 psi higher than the maximum operating pressure. Tighten the lock nut.
- Needle bolt (c), non-adjustable, will cause the valve to close slowly.

MAINTENANCE

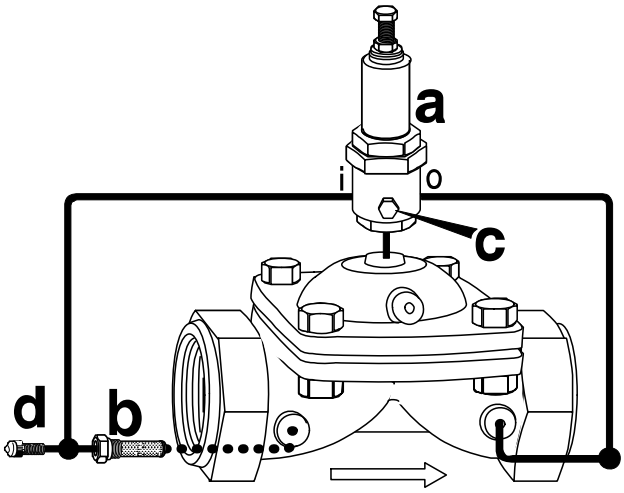
The valve should be activated once a year to ensure proper functioning and to clean the upstream side of possible dirt build up.

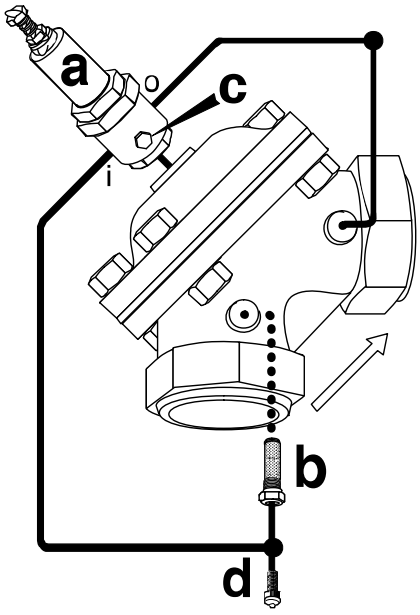
The proper pressure setting should be checked.

Needle bolt (c) and filter (b) should be cleaned once a year.

WINTERIZING

Drain the valve by disconnecting the tube at the upstream side or drain the mainline.





Components	Part Numbers
a. Pilot (Quick Reacting)	61PIL68200-G
b. Filter	61SF25SB
c. Needle Bolt with Orifice	——
d. Shrader Valve	61APS1/8

TROUBLESHOOTING

A quick relief valve opens suddenly and fully to relieve excess pressure from the pipe network to protect the system components. The quick reacting pilot opens the valve when the pressure exceeds its set point, protecting system components.

Problem	Cause	Check	Remedy
Valve does not open	*Wrong adjustment.*	*Verify upstream pressure.*	*Loosen adjustment bolt on pilot (a).*
Valve does not close or leaks	*Pilot (a) incorrectly adjusted.*	*Verify upstream pressure.*	*Tighten bolt on pilot (a).*
	Punctured diaphragm.	*Continuous flow at discharge.*	*Replace diaphragm, 61 DIA 2-HP.*
	Foreign substance on the sealing seat.	*Dismantle bonnet and inspect.*	*Remove, clean or replace.*
	Needle bolt (c) clogged.	*Valve stays open.*	*Clean, re-install and tighten completely.*

QUICK PRESSURE RELIEF VALVE

Operating Instructions for 3" and 4" Valves

INSTALLATION

- The valve is installed on a Tee-junction in the pipe network.
- A gate valve can be installed upstream of the valve to isolate the valve from the network.
- Do not connect a pipe downstream of this valve unless sized correctly (70% of normal flow).
- The arrow on the bonnet should match the flow direction.
- Filter (b) is installled at the upstream side of the valve.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- Loosen the lock nut and tighten the adjustment bolt of pilot (a).
- Open the ball valves (c).
- Operate the system at the maximum expected pressure.
- Loosen the adjustment bolt of pilot (a) until the valve starts to open, then tighten the bolt about two (2) turns. The pilot (a) is now set about 5-10 psi higher than the maximum operating pressure. Tighten the lock nut.
- Open the needle valve (d) 1-2 turns, to ensure that the valve will close slowly.

MAINTENANCE

Keep the valve clear from weeds and dirt.

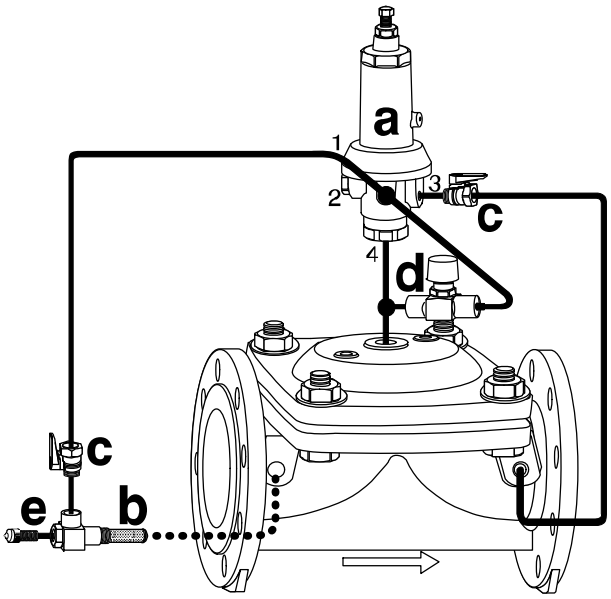
The valve should be activated once a year to ensure proper functioning.

The needle valve (d) should be fully opened once a year and be re-set.

Clean the filter (b) once a year.

WINTERIZING

Drain the valve by disconnecting the tube at the upstream side or drain the mainline.



Components	Part Numbers
a. Pilot (Quick Reacting)	61PIL66300-R
b. Filter	61SF5
c. Ball Valves	61SBV1/2
d. Needle Valve	61NV1/4
e. Shrader Valve	61APS1/8

TROUBLESHOOTING

A quick relief valve opens suddenly and fully to relieve excess pressure from the pipe network to protect the system components. The quick reacting pilot opens the valve when the pressure exceeds its set point, protecting system components.

Problem	Cause	Check	Remedy
Valve does not open	*Wrong adjustment.*	*Verify upstream pressure.*	*Loosen adjustment bolt on pilot (a).*
	Ball valves (c) closed.	*Verify position.*	*Open ball valves (c).*
Valve opens partially	*Needle valve (d) wide open.*	*Close (d) fully.*	*Open 1-2 turns.*
Valve does not close or leaks	*Pilot (a) adjusted incorrectly.*	*Verify upstream pressure.*	*Tighten bolt on pilot (a).*
	Punctured diaphragm.	*Continuous flow at discharge.*	*Replace diaphragm.*
	Foreign substance on the sealing seat.	*Dismantle bonnet and inspect.*	*Remove, clean or replace.*
	Needle valve (d) plugged.	*Water discharges continuously.*	*Open (d) fully and readjust to 1-2 turns open.*

QUICK PRESSURE RELIEF VALVE

Operating Instructions for 6" and 10" Valves

INSTALLATION

- The valve is installed on a Tee-junction in the pipe network.
- A manual valve should be installed upstream of the valve to isolate the valve from the network.
- Do not connect a pipe downstream of this valve unless sized correctly (70% of normal flow).
- The arrow on the bonnet should match the flow direction.
- Filter (b) is installled at the upstream side of the valve.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- Loosen the lock nut and tighten the adjustment bolt of pilot (a).
- Open the ball valves (c).
- Operate the system at the maximum expected pressure.
- Loosen the adjustment bolt of pilot (a) until the valve starts to open, then tighten the bolt about 1-2 turns. The pilot (a) is now set 5-10psi higher than the maximum operating pressure. Tighten the lock nut.
- Open the needle valve (d) 1-2 turns to ensure that the valve will close slowly.

MAINTENANCE

Keep the valve clear from weeds and dirt.

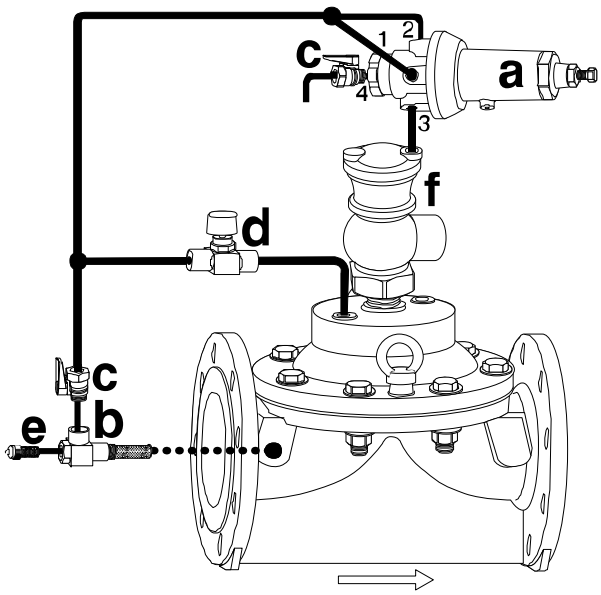
Activate the valve periodically and readjust the pilot (a) if necessary.

Open the needle valve (d) fully and readjust.

Clean the filter (b) once a year.

WINTERIZING

Drain the valve by disconnecting the tube at the upstream side or drain the mainline.



Components	Part Numbers
a. Pilot (Quick Reacting)	61PIL66300-R
b. Filter	61SF5
c. Ball Valves	61SBV1/2
d. Needle Valve	61NV1/4
e. Shrader Valve	61APS1/8
f. 2" Relay	

TROUBLESHOOTING

A quick relief valve opens suddenly and fully to relieve excess pressure from the pipe network to protect the system components. The 2" relay insures fast and full opening of the valve. The quick reacting pilot opens the valve when the pressure exceeds its set point, protecting system components.

Problem	Cause	Check	Remedy
Valve does not open	*Wrong adjustment.*	*Verify upstream pressure.*	*Loosen bolt on pilot (a).*
	Ball valves (c) closed.	*Verify position.*	*Open ball valves (c).*
Valve opens partially	*Needle valve (d) wide open.*	*Close (d) fully.*	*Open 1-2 turns.*
Valve does not close or leaks	*Pilot (a) incorrectly adjusted.*	*Verify upstream pressure.*	*Tighten bolt on pilot (a).*
	Punctured diaphragm.	*Continuous flow at discharge.*	*Replace diaphragm, check I.D. # on the lip.*
	Foreign substance on the sealing seat.	*Dismantle bonnet, inspect.*	*Remove, clean or replace.*
	Needle valve (d) plugged or closed.	*Water discharges continuously.*	*Open (d) fully and readjust 1-2 turns open.*
		Dirt on the sealing seat.	*Activate valve and or clean.*

SURGE ANTICIPATING & QUICK RELIEF VALVE

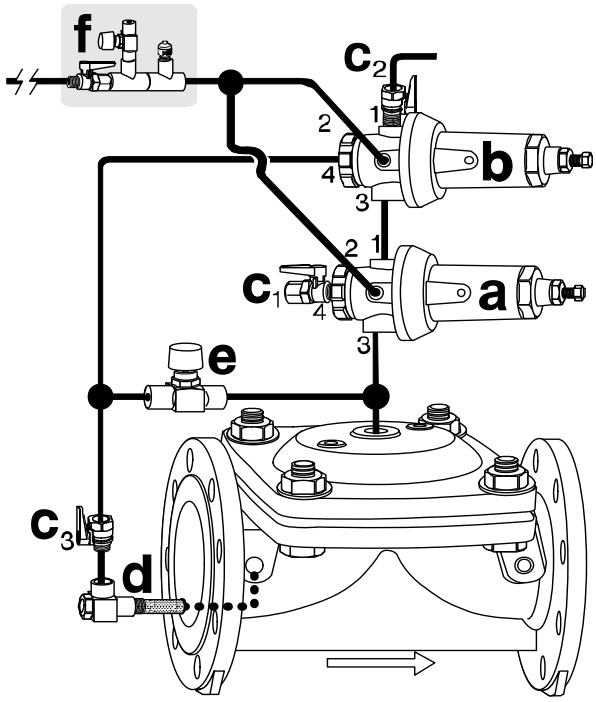
Operating Instructions for 3"- 4" Valves

INSTALLATION

- The valve is installed on a Tee-junction in the mainline. A gate valve should be installed upstream of the valve to isolate the valve from the network.
- Do not connect a pipe downstream of this valve unless sized correctly (70% of normal flow).
- Use 3/8" for sensor tubing from the mainline to the simulation unit (f).
- The arrow on the bonnet should match the flow direction.
- Filter (d) is installed at the upstream side of the valve.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- Loosen the lock nut and tighten the adjustment bolt of pilot (a).
- Tigthen the adjustment bolt of pilot (b) only half way.
- Close the ball valves (c1,c2) on the pilots (a) and (b).
- Operate the system at normal operating pressure. Open (c1) and loosen the bolt on pilot (a) until water starts to drip from (c1). Tighten until dripping stops and add 1-2 turns. Pilot (a) is now set, tighten the lock nut.
- The simulation unit (f) can be used to adjust the pilot (b) to the proper pressure setting. Open ball valve at (f) and ball valve (c2). The opening pressure of the valve should be about 2/3 of the static pressure. Line pressure fills the sensing line. Close ball valve at (f), now open needle valve at (f) slowly until the pressure drops to the desired set point, measure at the shrader valve. Adjust the pilot (b) to this pressure, water will drip from (c2) and the valve will start to open. Tighten the lock nut and open ball valve at (f), the valve is set.
- Use needle valve (e) to adjust the closing speed of the valve.



Components	Part Numbers
a. Pilot QR High Pressure	61PIL66300-R
b. Pilot QR Low Pressure	61PIL66300-Y
c. Ball Valves	62SBV1/2
d. Filter	61SF5
e. Needle Valve	61NV1/4
f. Low Pressure Simulation Unit	——

MAINTENANCE

Keep the valve clear from weeds and dirt.

Check the proper setting of the pilots and adjust (a, b) if necessary.

Open the needle valve (e) completely close and open about 2 turns.

WINTERIZING

Drain the valve by opening all the ball valves (c) and the needle valve (e).

TROUBLESHOOTING

A surge anticipating valve opens when a power failure occurs preventing damage from water hammer.
The quick reacting pilot opens the valve when the pressure exceeds its set point, protecting system components.

Problem	Cause	Check	Remedy
Valve does not open at LOW pressure	*Wrong adjustment.*	*Verify upstream pressure. Simulation unit (f).*	*Loosen bolt on pilot (b).*
	Ball valve closed at simulation unit (f) or C2.	*Verify position.*	*Open valves at (f) and C2.*
Valve opens partially	*Needle valve (e) wide open.*	*Close (e) fully.*	*Open 1-2 turns.*
Valve does not close or leaks	*Pilot (a) incorrectly adjusted.*	*Verify upstream pressure.*	*Tighten bolt on pilot (a).*
	Punctured diaphragm.	*Continuous flow at discharge.*	*Replace diaphragm. Check I.D.# on lip.*
	Foreign substance on sealing seat.	*Operate valve. Dismantle bonnet and inspect.*	*Dirt flushes out. Remove, clean or replace.*
	Needle valve (e) plugged.	*Water discharges continuously.*	*Open (e) fully and readjust 1-2 turns open.*
	Filter (d) clogged.	*Disconnect tube at ball valve (c3), no firm stream.*	*Clean filter (d) with system off.*

SURGE ANTICIPATING & QUICK RELIEF VALVE

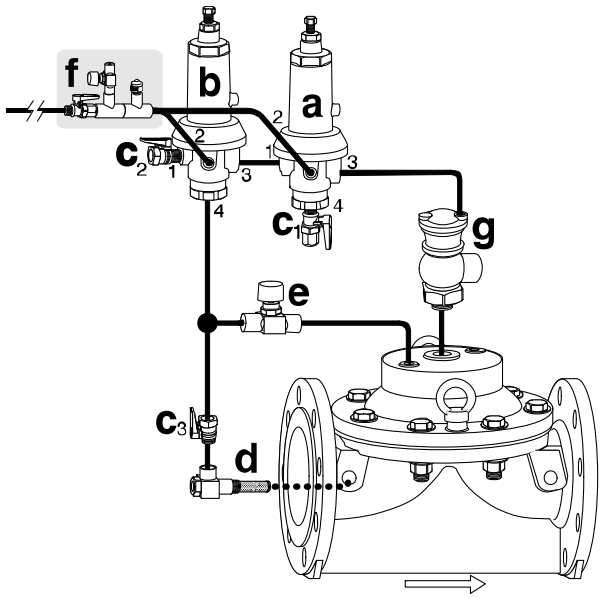
Operating Instructions for 6"- 10" Valves

INSTALLATION

- The valve is installed on a Tee-junction in the main line. A manual valve should be installed upstream of the valve to isolate the valve from the network.
- Do not connect a pipe downstream of this valve unless sized correctly (70% of normal flow).
- Use 3/8" for sensor tubing from the mainline to the simulation unit.
- The arrow on the bonnet should match the flow direction.
- Filter (d) is installled at the upstream side of the valve.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- Loosen the lock nut and tighten the adjustment bolt of pilot (a).
- Tigthen the adjustment bolt of pilot (b) only half way.
- Close the ball valves (c1, c2) on the pilots (a) and (b).
- Operate the system at normal operating pressure. Open (c1) and loosen the bolt on pilot (a) until water starts to drip from (c1). Tighten until dripping stops and add 1-2 turns. Pilot (a) is now set, tighten the lock nut.
- The simulation unit (f) can be used to adjust the pilot (b) to the proper pressure setting. Open ball valve at (f) and ball valve (c2). The opening pressure of the valve should be about 2/3 of the static pressure. Line pressure fills the sensing line. Close ball valve at (f), now open needle valve at (f) slowly until the pressure drops to the desired setpoint, measure at the shrader valve. Adjust the pilot (b) to this pressure, water will drip from (c2) and the valve will start to open. Tighten the lock nut and open ball valve at (f), the valve is set.
- Use needle valve (e) to adjust the closing speed of the valve.



Components	Part Numbers
a. Pilot QR High Pressure	61PIL66300-R
b. Pilot QR Low Pressure	61PIL66300-Y
c. Ball Valves	62SBV1/2
d. Filter	61SF5
e. Needle Valve	61NV1/4
f. Low Pressure Simulation Unit	——
g. 2" Relay	——

MAINTENANCE

Keep the valve clear from weeds and dirt.

Activate the valve periodically and readjust the pilots (a, b) if necessary.

Open the needle valve fully and readjust.

WINTERIZING

Drain the valve by opening all the ball valves (c) and the needle valve (e).

TROUBLESHOOTING

A Surge Anticipating valve opens when a power failure occurs preventing damage from water hammer.
The Quick Reacting pilot opens the valve when the pressure exceeds its set point, protecting system components.

Problem	Cause	Check	Remedy
Valve does not open at LOW pressure	*Wrong adjustment.*	*Verify upstream pressure at simulation unit (f).*	*Loosen bolt on pilot (b).*
	Ball valve closed at simulation unit (f) or C2.	*Verify position.*	*Open valves at (f) and C2.*
Valve opens partially	*Needle valve (e) wide open.*	*Close fully.*	*Open 1-2 turns.*
Valve does not close or leaks	*Pilot (c) incorrectly adjusted.*	*Verify upstream pressure.*	*Tighten bolt on pilot (a).*
	Punctured diaphragm.	*Continuous flow at discharge.*	*Replace diaphragm. Check I.D.# on lip.*
	Foreign substance on the sealing seat.	*Operate valve. Dismantle bonnet and inspect.*	*Dirt flushes out. Remove, clean or replace.*
	Needle valve (e) plugged closed.	*Water discharges continuously.*	*Open (e) fully and readjust 1-2 turns open.*
	Filter (d) clogged.	*Disconnect tube at ball valve (c3), no firm stream.*	*Clean filter (d) with system off.*
	Relay (g) leaks.	*Dirt on the sealing seat.*	*Activate valve or clean.*

PRESSURE REDUCING VALVE 2-Way

Operating Instructions for 2"- 868 Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (d) must be open. Closure of the downstream ball valve (d) closes the valve manually.
- The pilot (a) has a colored ring on the top identifying the spring inside.
- Open the needle valve (f) 1- 2 turns.
- Loosen the lock nut and the adjustment bolt on pilot (a).
- Start the pump or main valve. Valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (a) slowly until downstream pressure reaches the desired level.
- The valve's response time is adjusted with the needle valve (f). Closing will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments, and tighten the lock nut on the pilot (a).

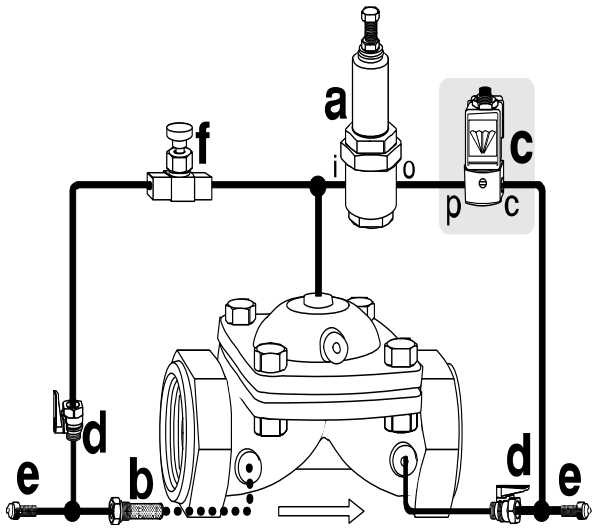
FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (c) 90 degrees and follow the above steps. The solenoid (c), is a 2-way solenoid with a large orifice.
- After making the adjustments, turn the override to the original position. The wire connection to the solenoid (c) with 1/2" hub is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the downstream pressure periodically, with a quality liquid filled gauge and shrader valve adapter.



Components	Part Numbers
a. Pilot 2-way	61PIL68400-G
b. Filter	61SF25BR or SF5
c. Solenoid (option)	61BSC2.4-024-H
d. Ball Valves	62SBV25
e. Shrader Valve	61APS1/8
f. Needle Valve	61NVSS25

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (d) and opening both.

TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower constant downstream pressure.
The solenoid converts an electric signal into a hydraulic signal.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (d) is closed.*	*Verify position.*	*Open downstream valve (d).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Close downstream ball valve (d), valve remains open.*	*Replace diaphragm. Refer to I.D.#.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (c) incorrect position of the manual override.	*Slot on the base to be in a horizontal position with arrow pointing down.*	*Change position.*
	Pilot (a) faulty, no flow conditions.	*Unscrew pilot's (a) bottom seat, dismantle seal and check it.*	*Replace seal.*
	High downstream pressure.	*Verify position.*	*Open upstream ball valve (d).*
	Ball valve (d) upstream is closed.	*Check position.*	*Open 1-2 turns.*
Unstable performance	*Needle valve (f) is closed.*	*Regular setting 1-2 turns open.*	*Open or close slightly.*
	Incorrect needle valve (f) setting.	*Measure, check design.*	*Increase pressure.*
	Inlet pressure too low.	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*

PRESSURE REDUCING VALVE 2-Way

Operating Instructions for 8", 10" and 12" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (d) must be open. Closure of the downstream valve (d) closes the valve manually.
- The pilot (a) uses a yellow spring with a range from 8-170 psi (downstream pressure setting).
- Open the needle valve (f) fully.
- Loosen the lock nut and the adjustment bolt on pilot (a).
- Start the pump or main valve. The valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (a) slowly until downstream pressure reaches the desired level.
- The valve's response time is adjusted with the needle valve (f). Closing (f) will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (a).

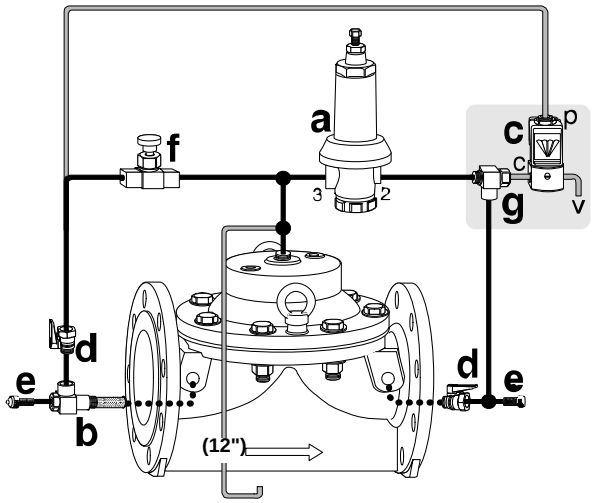
FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (c) 90 degrees and follow the above steps.
- After making the adjustments turn the override to the original position. The wire connection to the solenoid (c) with 1/2" hub is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the downstream pressure periodically, with a quality liquid filled gauge and shrader valve adapter.



Components	Part Numbers
a. Pilot 2-way	61PIL68600-Y
b. Filter	61SF5
c. Solenoid (option)	61BSHO-024-H
d. Ball Valves	62SBV25
e. Shrader Valve	61APS1/8
f. Needle Valve	61NVSS25
g. Relay (option)	61PIL66400

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (d) and open both.

TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower constant downstream pressure. The solenoid converts an electric signal into a hydraulic signal. The relay creates a larger passage and is controlled by the solenoid.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (d) is closed.*	*Verify position.*	*Open downstream valve (d).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Close downstream ball valve (d), valve remains open.*	*Replace diaphragm. Refer to I.D.#.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (c), incorrect position of the manual override.	*Slot on the base to be in a horizontal position with arrow pointing down.*	*Change position.*
	Pilot (a) faulty, no flow conditions, High downstream pressure.	*Unscrew pilot's (a) bottom seat, dismantle seal and check it.*	*Replace seal.*
		Verify position.	*Open upstream ball valve (d).*
	Upstream ball valve (d) is closed.	*Check position.*	*Open almost fully.*
Unstable performance	*Needle valve (f) is closed.*	*Regular setting almost open.*	*Open or close slightly.*
	Incorrect needle valve (f) setting.	*Measure, check design.*	*Increase pressure.*
	Inlet pressure too low.	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*

PRESSURE REDUCING/ CHECK VALVE 2-Way

Operating Instructions for 2"- 868 Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (d) must be open. Closure of the downstream valve (d) closes the valve manually.
- The pilot (a) has a colored ring on the top identifying the spring inside.
- Open the needle valve (f) 1- 2 turns.
- Loosen the lock nut and the adjustment bolt on pilot (a).
- Start the pump or main valve. Valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (a) slowly until downstream pressure reaches the desired level.
- The valve's response time is adjusted with the needle valve (f). Closing will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (a).
- When downstream pressure is higher than the upstream the valve operates as a non-slam check valve.

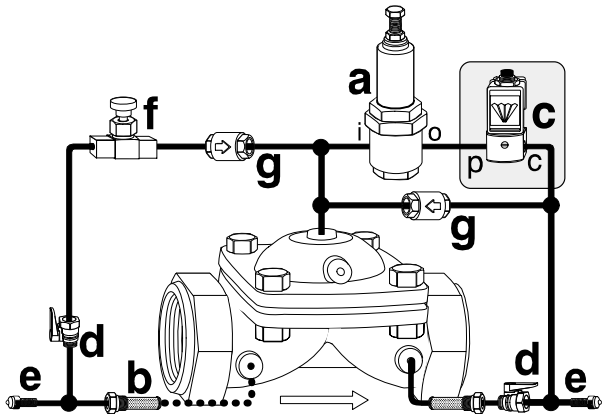
MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (d) and open both.



Components	Part Numbers
a. Pilot 2-way	61PIL68400-G
b. Filter	61SF25BR or SF5
c. Solenoid (option)	61BBC2.4-024-H
d. Ball Valves	61SBV25
e. Shrader Valves	61APS1/8
f. Needle Valve st.steel	61NVSS25
g. Check Valves	61CV50

TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower constant downstream pressure.
The solenoid converts an electric signal into a hydraulic signal.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (d) is closed.*	*Verify position.*	*Open downstream valve (d).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (c), incorrect voltage.	*Measure ±10% of nominal voltage.*	*Repair.*
		Damaged wires.	*Replace.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Close downstream ball valve (d), valve remains open.*	*Replace diaphragm. Refer to I.D.#*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Pilot (a) faulty, no flow conditions,	*Unscrew pilot's (a) bottom seat, dismantle seal and check it.*	*Replace seal.*
	High downstream pressure.	*Verify position.*	*Open upstream ball valve (d).*
	Upstream ball valve (d) is closed.	*Check position.*	*Open 1-2 turns.*
	Needle valve (f) is closed.	*Verify proper function.*	*Clean or replace.*
	Faulty check valves (g).	*Regular setting 1-2 turns open.*	*Open or close slightly.*
Unstable performance	*Incorrect needle valve (f) setting.*	*Measure, check design.*	*Increase pressure.*
	Inlet pressure too low.	*Disconnect tube upstream No firm stream.*	*Clean or replace.*

PRESSURE REDUCING CHECK VALVE 2-Way

Operating Instructions for 8", 10" and 12" Valves

INSTALLATION

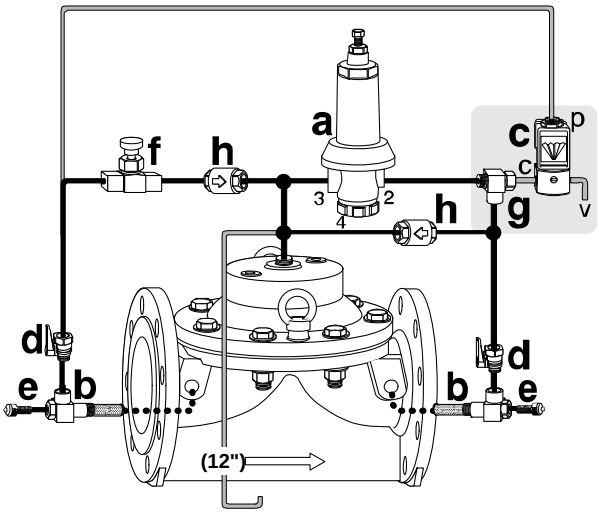
- The arrow on the bonnet should match the flow direction.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (d) must be open. Closure of the downstream valve (d) closes the valve manually.
- The pilot (a) uses a yellow spring with a range from 8-170 psi (downstream pressure setting).
- Open the needle valve (f) fully.
- Loosen the lock nut and the adjustment bolt on pilot (a).
- Start the pump or main valve. The valve opens and downstream pressure is kept at a low level.
- Tighten the bolt of pilot (a) slowly till downstream pressure reaches the desired level.
- The valve's response time is adjusted with the needle valve (f). Closing needle valve (f) will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (a).
- If the downstream pressure is higher than the upstream, the valve operates as a non slam check valve.

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (c) 90 degrees and follow the above steps.
- After making the adjustments turn the override to the original position. Connection of the wires to the solenoid (c) with 1/2" hub is described on the attached diagram.



Components	Part Numbers
a. Pilot 2-way	61PIL68600-Y
b. Filter	61SF5
c. Solenoid (option)	61BSHO-024-H
d. Ball Valves	62SBV25
e. Shrader Valves	61APS1/8
f. Needle Valve st.steel	61NVSS25
g. Relay (option)	61PIL66400
h. Check Valves	61CV50

MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (d) and open both.

Disconnect downstream check valve (h) to vent control chamber.

TROUBLESHOOTING

A pressure reducing valve reduces a certain inlet pressure to a lower constant downstream pressure. The solenoid converts an electric signal into a hydraulic signal. The relay creates a larger passage and is controlled by the solenoid.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (d) is closed.*	*Verify position.*	*Open downstream ball valve (d).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (c), incorrect voltage.	*Measure ±10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Close ball valve (d), downstream valve remains open.*	*Replace.* *Refer to I.D.#*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and re-assemble.*
	Solenoid (c), incorrect position of the manual override.	*Slot on the base to be horizontal with arrow pointing down.*	*Change position.*
	Pilot (a) faulty, no flow conditions, *High downstream pressure.*	*Unscrew pilot's bottom seat, dismantle seal and check.*	*Replace seal.*
	Upstream ball valve (d) is closed.	*Verify position.*	*Open upstream ball valve (d).*
	Needle valve (f) is closed.	*Check position.*	*Open almost fully.*
		Verify proper function.	*Clean or replace.*
Unstable performance	*Faulty check valves (h).*	*Regular setting almost open.*	*Open or close slightly.*
	Incorrect needle valve (f) setting.	*Measure, check design.*	*Increase pressure.*
	Inlet pressure too low.	*Disconnect tube upstream* *No firm stream.*	*Clean or replace.*

PRESSURE REDUCING SUSTAINING VALVE 2-Way

Operating Instructions for 2" - 868 Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (c) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (e) must be open. Closure of the downstream valve (e) closes the valve manually.
- The pilots (a, b) have a colored ring at the top identifying the spring inside.
- Open the needle valve (f) 1- 2 turns.
- Loosen the lock nut and tighten the bolts on both pilots (a) and (b).
- Start the pump. Valve stays closed or opens slightly maintaining a high upstream pressure. Loosen the bolt of pilot (a) slowly until upstream pressure reaches the desired level.
- Loosen the bolt of pilot (b) until the required downstream pressure is reached.
- The valve's response time is adjusted with the needle valve (f). Closing will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nuts on the pilots.

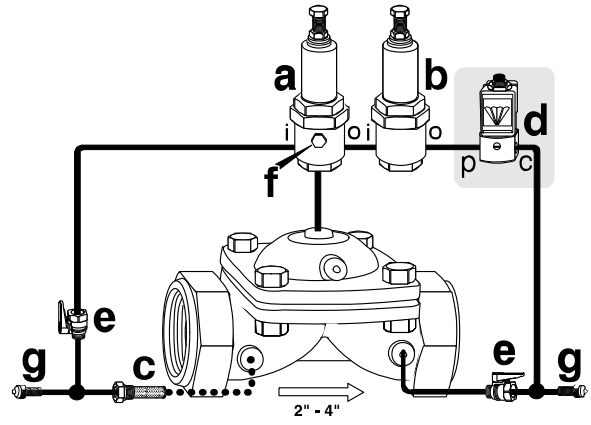
FOR ELECTRIC OPTION

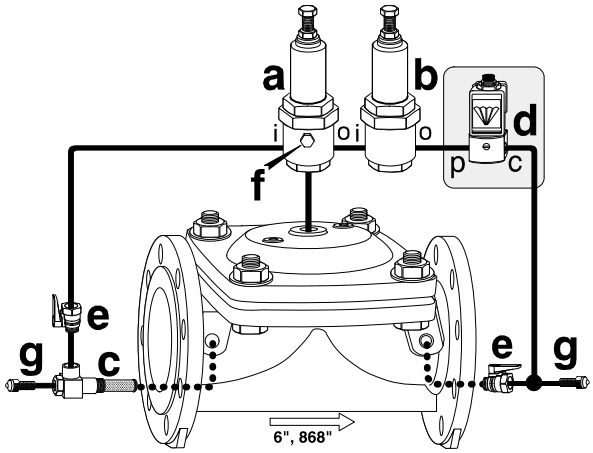
- Turn the manual override of the solenoid (d) 90 degrees and follow the above steps.
- After making the adjustments, turn the override to the original position. Connection of the wires to the solenoid (d) with 1/2" hub is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the up and downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.





Components	Part Numbers
a. Pilot PS-2way	61PIL68500-G
b. Pilot PR-2way	61PIL68400-G
c. Filter	61SF25BR or SF5
d. Solenoid (option)	61BSC2.4-024-H
e. Ball Valves	62SBV25
f. Needle Valve on Pilot (a)	
g. Shrader Valves	61APS1/8

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (e) and open both.

TROUBLESHOOTING

A pressure sustaining pilot maintains a minimum preset upstream pressure. A pressure reducing valve reduces a certain inlet pressure to a constant lower downstream pressure. The solenoid converts an electric signal into a hydraulic signal.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (e) is closed.*	*Verify position.*	*Open ball valve (e).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (d), incorrect voltage.	*Measure ±10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (d), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Pilot (a) set point too high.	*Verify design data.*	*Loosen bolt.*
Valve does not close	*Punctured diaphragm.*	*Close downstream ball valve (e). Valve remains open.*	*Replace diaphragm. Refer to I.D.#*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (d), incorrect position of the manual override.	*Slot to be horizontal with the arrow pointing down.*	*Change position.*
	Pilot (b) faulty, no flow conditions,	*Unscrew pilot's (b) bottom seat, dismantle seal and check it.*	*Replace seal.*
	High downstream pressure.	*Verify position.*	*Open upstream ball valve (e).*
	Upstream ball valve (e) is closed.	*Check position.*	*Open 1-2 turns.*
	Needle valve (f) is closed.	*Regular setting 1-2 turns open.*	*Open or close slightly.*
Unstable performance	*Incorrect needle valve (f) setting.*	*Measure, check design.*	*Increase pressure.*
	Inlet pressure too low.	*Disconnect tube upstream No firm stream.*	*Clean or replace.*

PRESSURE REDUCING SUSTAINING VALVE 2-Way

Operating Instructions for 8", 10" and 12" Valves

INSTALLATION

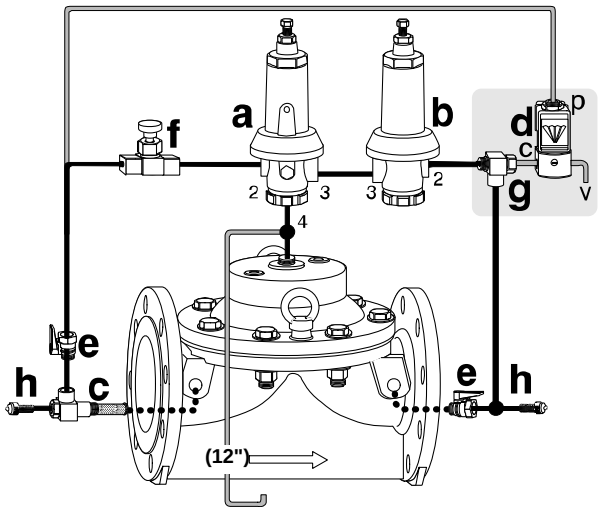
- The arrow on the bonnet should match the flow direction.
- Filter (c) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (e) must be open. Closure of the downstream valve (e) closes the valve manually.
- The pilots (a and b) have a colored ring at the top identifying the spring inside. Pilot (b) has a yellow spring 14-170 psi (downstream pressure setting).
- Open the needle valve (f) almost fully.
- Loosen the lock nut and tighten the bolts on both pilots (a) and (b).
- Start the pump. Valve stays closed or opens slightly maintaining a high upstream pressure.
- Loosen the bolt of pilot (a) slowly until upstream pressure reaches the desired level.
- Loosen the bolt of pilot (b) until the required downstream pressure is reached.
- The valve's response time is adjusted with the needle valve (f). Closing will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nuts on the pilots (a, b).

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (d) 90 degrees and follow the above steps.
- After making the adjustments, turn the override to the original position. Connection of the wires to the solenoid (d) with 1/2" hub is described on the attached diagram.



Components	Part Numbers
a. Pilot PS-2way	61PIL68700-G
b. Pilot PR-2way	61PIL68600-Y
c. Filter	61SF5
d. Solenoid (option)	61BSHO-024-H
e. Ball Valves	62SBV25
f. Needle Valve st.steel	61NVSS25
g. Relay (option)	61PIL66400
h. Shrader Valves	61APS1/8

MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the up and downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (e) and open both.

TROUBLESHOOTING

A pressure sustaining pilot maintains a minimum preset upstream pressure. A pressure reducing pilot reduces a certain inlet pressure to a constant lower downstream pressure. The solenoid converts an electric signal into a hydraulic signal. The relay creates larger water passages.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (e) is closed.*	*Verify position.*	*Open ball valve (e).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (d), incorrect voltage.	*Measure ±10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (d), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Pilot (a) set point too high.	*Verify design data.*	*Loosen bolt.*
Valve does not close	*Punctured diaphragm.*	*Close downstream valve (e). Valve remains open.*	*Replace diaphragm. Refer to I.D.#*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (d), incorrect position of the manual override.	*Slot in a horizontal position with arrow pointing down.*	*Change position.*
	Pilot (b) faulty, no flow conditions.	*Unscrew pilot's (b) bottom seat, dismantle seal and check it.*	*Replace seal.*
	High downstream pressure.	*Check design data.*	*Tighten bolt.*
	Pilot (a) set too low.	*Verify position.*	*Open upstream ball valve (e).*
	Upstream ball valve (e) is closed.	*Check position.*	*Re-adjust.*
Unstable performance	*Needle valve (f) is closed.*	*Regular setting almost open.*	*Open or close slightly.*
	Incorrect needle valve (f) setting.	*Measure, check design.*	*Increase pressure.*
	Inlet pressure too low.	*Disconnect tube upstream No firm stream.*	*Clean or replace.*

PRESSURE SUSTAINING VALVE 2-Way

Operating Instructions for 2"- 868 Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (d) must be open. Closure of the downstream ball valve (d) closes the valve manually.
- The pilot (a) has a colored ring on the top identifying the spring inside.
- Open the needle valve (f) 1-2 turns.
- Loosen the lock nut and tighten the adjustment bolt on pilot (a).
- Start the pump. The valve stays closed or opens slightly maintaining a high upstream pressure.
- Loosen the bolt of pilot (a) slowly until upstream pressure reaches the desired level.
- The valve's response time is adjusted with the needle valve (f). Closing needle valve (f) will slow it down an opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (a).

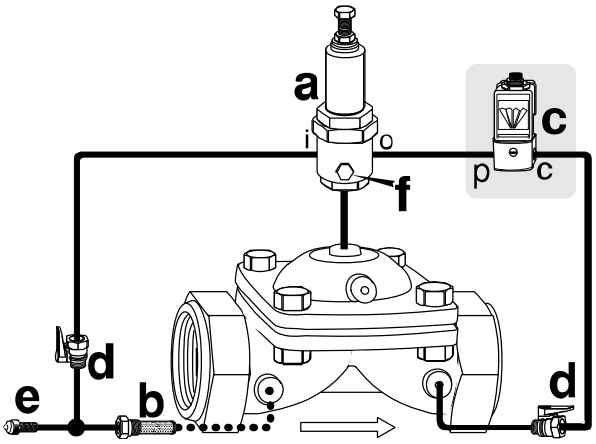
FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (c) 90 degrees and follow the above steps.
- After making the adjustments turn the override to the original position. Connection of the wires to the solenoid (c) with 1/2" hub is described on the attached diagram.

MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the upstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.



Components	Part Numbers
a. Pilot 2-way	61PIL68500-G
b. Filter	61SF25BR or SF5
c. Solenoid (option)	61BSC2.4-024-H
d. Ball Valves	61SBV25
e. Shrader Valve	61APS1/8
f. Needle Valve on Pilot	

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (d) and open both.

Operate the solenoid (c) periodically in the off season to prevent sticking.

TROUBLESHOOTING

A pressure sustaining valve maintains a minimum preset pressure upstream.
The solenoid converts an electric signal into a hydraulic signal.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (d) is closed.*	*Verify position.*	*Open valve (d).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% of nominal voltage.*	*Repair.*
	Solenoid (c), faulty coil.	*Damaged wires.* *Voltage okay, but no click.*	*Change coil.*
	Pilot (a), set point too high.	*Verify design data.*	*Loosen bolt on top.*
Valve does not close	*Punctured diaphragm.*	*Close downstream valve (d).* *Valve remains open.*	*Replace diaphragm.* *Refer to I.D.#.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and re-assemble.*
	Solenoid (c), incorrect position of the manual override.	*Slot to be horizontal with arrow pointing down.*	*Change position.*
	Pilot (a), valve does not close.	*Set point too low.*	*Tighten bolt.*
	Upstream ball valve (d) closed.	*Verify position.*	*Open valve (d).*
	Needle valve (f) is closed.	*Check position.*	*Open 1-2 turns.*
Unstable performance	*Incorrect needle valve (f) setting.*	*Regular setting open 1-2 turns.*	*Open or close slightly.*
	Clogged filter (b).	*Disconnect tube upstream* *No firm stream.*	*Clean or replace.*

PRESSURE SUSTAINING VALVE 2-Way

Operating Instructions for 8", 10" and 12" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filter (b) is installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Bolts of flanged valves should be tightened in a diagonal sequence.

ADJUSTMENTS

- The ball valves (d) must be open. Closure of the downstream ball valve (d) closes the valve manually.
- Open the needle valve (f) almost fully.
- Tighten the lock nut and the adjustment bolt on pilot (a).
- Start the pump. The valve stays closed or opens slightly maintaining ahigh upstream pressure.
- Loosen the bolt of pilot (a) slowly until upstream pressure reaches the desired level.
- The valve's response time is adjusted with the needle valve (f). Closing needle valve (f) will slow it down and opening (f) will increase the valve's response.
- Wait until pressure stabilizes, make final adjustments and tighten the lock nut on the pilot (a).

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (c) 90 degrees and follow the above steps.
- After making the adjustments turn the override to the original position. Connection of the wires to the solenoid (c) with 1/2" hub is described on the attached diagram.

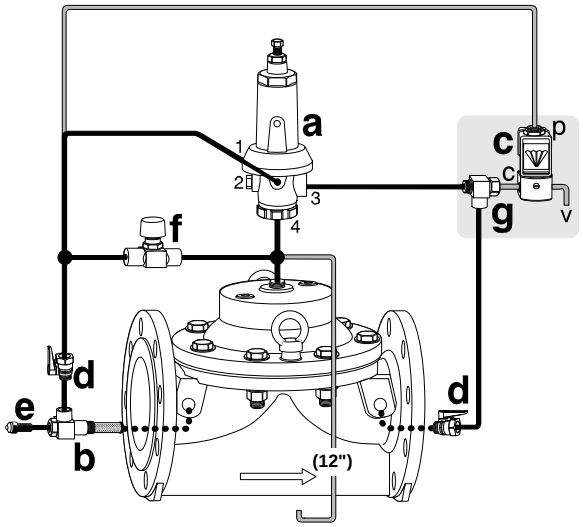
MAINTENANCE

Keep the valve clear from weeds and dirt.

Verify the downstream pressure periodically with a quality liquid filled gauge and shrader valve adapter.

WINTERIZING

Drain the valve by disconnecting the tubes at ball valves (d) and open both. Open needle valve (f).



Components	Part Numbers
a. Pilot 2-way	61PIL68700-G
b. Filter	61SF5
c. Solenoid (option)	61BSHO-024-H
d. Ball Valves	61SBV25
e. Shrader Valve	61APS1/8
f. Needle Valve	61NVSS25
g. Relay (option)	61PIL66400

TROUBLESHOOTING

A pressure sustaining valve maintains a minimum preset pressure upstream. The solenoid converts an electric signal into a hydraulic signal. The relay creates a larger passage and is activated by the solenoid.

Problem	Cause	Check	Remedy
Valve does not open	*Downstream ball valve (d) is closed.*	*Verify position.*	*Open downstream ball valve (d).*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% of nominal voltage.*	*Repair.*
		Damaged wires.	*Replace.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Pilot (a) set point too high.	*Verify design data.*	*Loosen bolt on pilot (a).*
Valve does not close	*Punctured diaphragm.*	*Close downstream ball valve (d) valve remains open.*	*Replace diaphragm. Refer to I.D.#*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (c), incorrect position of the manual override.	*Slot in a horizontal position with arrow pointing down.*	*Change position.*
	Pilot (a) faulty, no flow conditions,	*Unscrew pilot's (a) bottom seat, dismantle seal and check it.*	*Replace seal.*
	High downstream pressure.	*Verify position.*	*Open upstream ball valve (d).*
	Upstream ball valve (d) is closed.	*Check position.*	*Open almost fully.*
Unstable performance	*Needle valve (f) is closed.*	*Regular setting almost open.*	*Open or close slightly.*
	Incorrect needle valve (f) setting.	*Disconnect tube upstream No firm stream.*	*Clean or replace.*

BOOSTER PUMP CONTROL VALVE

Operating Instructions for 2", 3" and 4" with Check Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The valve can be installed in any position at the discharge side of the pump.
- Use five layers of teflon tape for threaded valves.
- Bolts on flanged valves need to be tightened in a diagonal sequence.
- Connect the limit switch (a) to the control panel. Connection should be open with the switch pressed by the position indicator. (See electric schematic on reverse side.)
- Connect the solenoid (c) AFTER the adjustment phase is completed.

ADJUSTMENTS

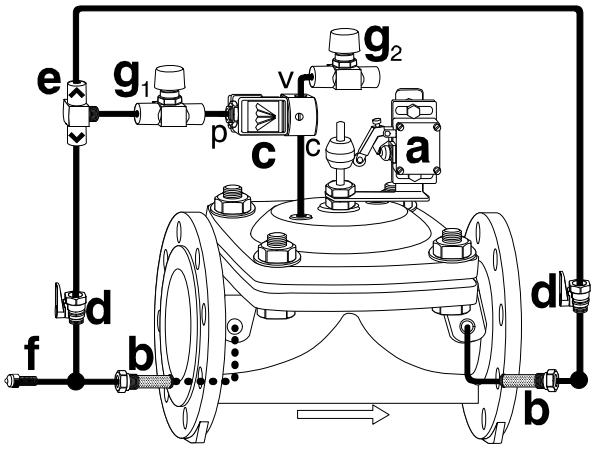
- Check that ball valves (d) are open.
- Manual override of the solenoid (c) is in the OFF position.
- Needle valves (g1,g2) are open 1- 2 turns.
- Start the pump. The valve will be open until the control chamber is full. Pump shuts off.
- Re-start the pump and turn the manual override screw of the solenoid (c) 90 degrees, valve opens.
- Turn the manual screw to the auto position and adjust the limit switch (a) to be pressed when the valve is closed. The pump should shut off.
- Connect the solenoid (c) wires according to the electric schematic (de-energized when pump is off).
- Adjust the opening speed (g2) and closing speed of the valve (g1) according to the length of mainline.
- When the downstream pressure is higher than the upstream pressure the valve operates as a non-slam check valve.

MAINTENANCE

Keep the valve clear from weeds and dirt.
Check the opening of needle valves (g1, g2) and also the location of the position indicator periodically.

WINTERIZING

Drain the mainline and/or valve by disconnecting the tubes at ball valves (d). Open the needle valves (g1 and g2).

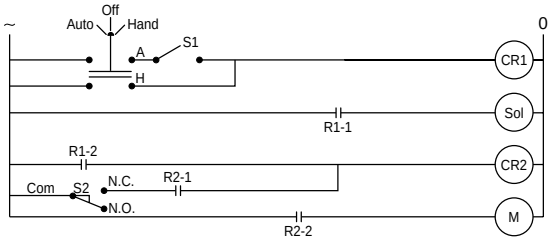


Components	Part Numbers
a. Limit Switch Assy. w/Position Ind. Assy.	61LS, 61lB
b. Filter	61SF25BR
c. Solenoid	61BSHO-024-H
d. Ball Valves	62SBV25
e. Selector Tee	62SV1/8BR
f. Shrader Valve	61APS1/8
g. Needle Valves	61NV1/4

TROUBLESHOOTING

A booster pump control valve is designed to prevent pressure surges caused by the start and shut-off procedures of electric booster pumps. The valve also has a check valve feature.

ELECTRIC SCHEMATIC:



S1 - Remote Start Switch
S2 - Limit Switch (Assembled on Valve)
Sol - N.C. Solenoid (Assembled on Valve)
M - Motor Contactor

Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
	Needle valve (g2).	*Is closed or dirty.*	*Open fully, re-adjust.*
	Solenoid (c), incorrect voltage.	*Measure ± 10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (c), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Water keeps flowing from vent port of solenoid (c) when valve is in the OPEN position!*	*Replace diaphragm. Refer to I.D.#.*
	Solenoid (c), is clogged.	*Disconnect tube at the valve bonnet, no water flow.*	*Clean.*
	Solenoid (c), incorrect position of the manual override.	*Slot to be horizontal with arrow or dot pointing down.*	*Change position.*
	Selector Tee (e), ball stuck.	*Disconnect tube, check ball.*	*Move ball and or clean.*
	Clogged filter (b).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*
	Needle valve (g1).	*Closed or dirty.*	*Open fully, readjust.*
Pump does not shut off	*Position indicator or limit switch (a).*	*Wrong position, arm not pressed.*	*Adjust.*
	Wrong wire hook-up.	*Check electric schematic.*	*Correct in pump panel.*

BOOSTER PUMP CONTROL VALVE

Operating Instructions for 6" and Larger Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The valve can be installed in any position at the discharge side of the pump.
- Bolts on flanged valves need to be tightened in a diagonal sequence.
- Connect the limit switch (c) to the control panel. Connection should be open with the switch pressed by the position indicator. (See schematic on reverse side.)
- Connect the solenoid (b) AFTER the adjustment phase is completed.

ADJUSTMENTS

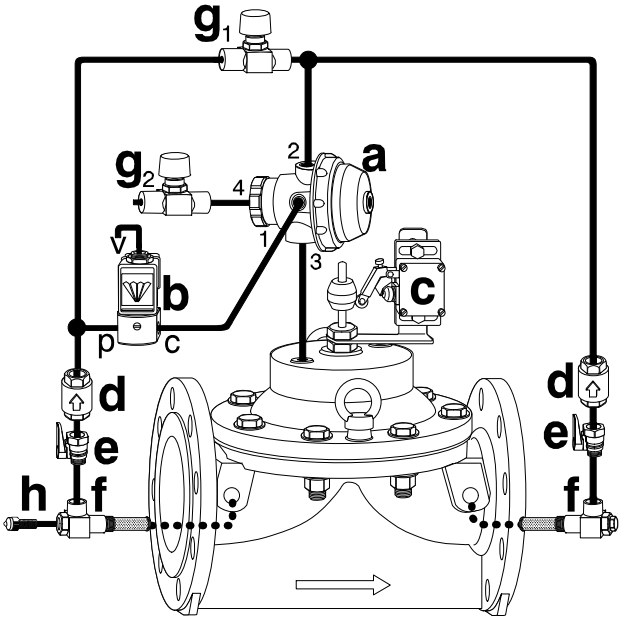
- Check that ball valves (e) are open.
- Manual override of the solenoid (b) is in the OFF position.
- Needle valves (g1, g2) are open 1-2 turns.
- Start the pump. The valve will be open until the control chamber is full. Pump shuts off.
- Re-start the pump and turn the manual override of the solenoid (b) 90 degrees; valve opens.
- Turn the manual override of solenoid (b) to the auto position and adjust the limit switch (c) to be pressed when the valve is closed. The pump should shut off.
- Connect the solenoid (b) wires according to the electric schematic (de-energized when pump is off).
- Adjust the opening speed (g2) and closing speed of the valve (g1) according to the length of mainline.
- When the downstream pressure is higher than the upstream, the valve will operate as a non-slam check valve.

MAINTENANCE

Keep the valve clear from weeds and dirt.
Check the opening of needle valve (g1, g2) and also the location of the position indicator periodically.

WINTERIZING

Drain the mainline and/or valve by disconnecting the tubes at check valves (d) and at other locations where water can be trapped. Open the needle valves (g1, g2).

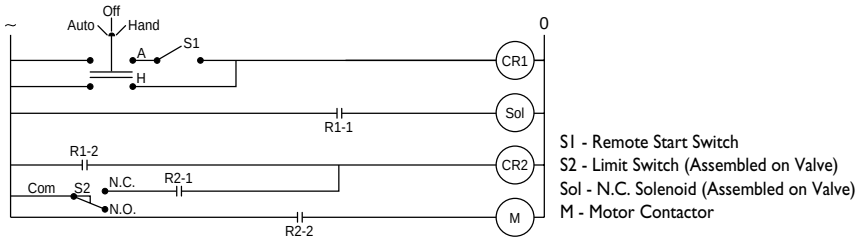


Components	Part Numbers
a. Relay	61PIL66200
b. Solenoid	61BSHC-024-H
c. Limit Switch Assy. w/Position Ind. Assy.	61LS, 61LB
d. Check Valves	61CV50
e. Ball Valves	62SBV25
f. Filter	61SF5
g. Needle Valves	61NV1/4
h. Shrader Valve	61APS1/8

TROUBLESHOOTING

A booster pump control valve is designed to prevent pressure surges caused by the start and shut-off procedures of electric booster pumps. The valve also has a check valve feature. Note: Diaphragm I.D. number can be found on the lip of the diaphragm.

ELECTRIC SCHEMATIC:



Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
	Needle valve (g2).	*Closed or dirty.*	*Open fully, re-adjust.*
	Solenoid (b), incorrect voltage.	*Measure ± 10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (b), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Relay (a) does not close.	*Pressure too low, need 20 psi.*	*Increase pressure.*
Valve does not close	*Punctured diaphragm.*	*Water keeps flowing from needle valve (g) when valve is in OPEN position.*	*Replace diaphragm. Refer to I.D.#.*
	Solenoid (b) is clogged.	*Disconnect tube at #1 of relay (a). No water from port (c).*	*Clean.*
	Solenoid (b), incorrect position of the manual override.	*Slot should be horizontal with arrow or dot pointing down.*	*Change position.*
	Clogged filter (f).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*
	Needle valves (g1).	*Closed or dirty.*	*Open fully, readjust.*
	Faulty check valves (d).	*Verify proper function.*	*Clean or replace.*
Pump does not shut off	*Position indicator or limit switch.*	*Wrong position.*	*Adjust.*
	Wrong wire hook-up.	*Check electric schematic.*	*Correct in pump panel.*

BOOSTER PUMP CONTROL & PRESSURE REDUCING VALVE 3-Way

With Check Valve for 6" and Larger Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- The valve can be installed in any position at the discharge side of the pump.
- Bolts on flanged valves need to be tightened in a diagonal sequence.
- Connect the limit switch (c) to the control panel (see electric schematic on reverse side). Connection should be open with the switch pressed by the position indicator.
- Connect the solenoid (b) AFTER the adjustment phase is completed.
- Adjustment bolt on the pilot (h) should be loosened.

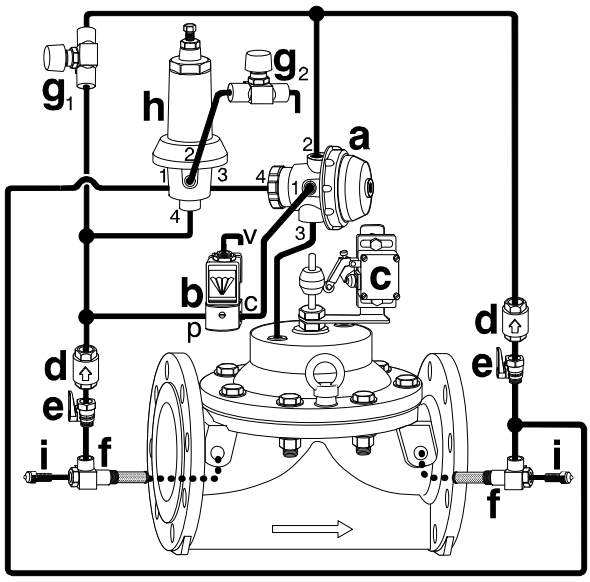
ADJUSTMENTS

- Check that ball valves (e) are open.
- Manual override on the solenoid (b) is in the OFF position.
- Needle valve (g1, g2) are open about 2 turns.
- Start the pump, valve will be open until the control chamber is full. Pump shuts off.
- Re-start the pump and turn the manual override of the solenoid (b) 90 degrees; valve opens and mainline fills.
- Tighten the bolt on top of pilot (h) until the downstream pressure reaches the desired level.
- Turn the manual override to the auto position and adjust the limit switch (c) to be pressed when the valve is closed. The pump should shut off.
- Connect the solenoid (b) wires according to the electric schematic (de-energized when pump is off).
- Adjust the opening speed (g2) and closing speed of the valve (g1) according to the length of the mainline, changing the velocity slowly.
- When the downstream pressure is higher than the upstream, the valve will operate as a non-slam check valve.

MAINTENANCE

Keep the valve clear from weeds and dirt.
Check the setting of needle valves (g1, g2), the location of the position indicator and the setting of the pilot (h) periodically.

Check the downstream pressure setting.



Components	Part Numbers
a. Relay	61PIL66200
b. Solenoid	61BSHC-024-H
c. Limit Switch Assy. w/Position Ind. Assy.	61LS, 61LB
d. Check Valves	61CV50
e. Ball Valves	62SBV25
f. Filter	61SF5
g. Needle Valves	61NV1/4
h. Pilot-Brass	61PIL31300-G
i. Shrader Valve	61APS1/8

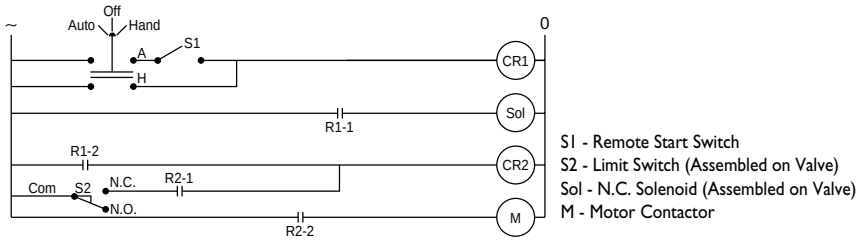
WINTERIZING

Drain the mainline and/or valve by disconnecting the tubes at check valves (d) and at other locations where water can be trapped. Open the needle valves (g1, g2).

TROUBLESHOOTING

A booster pump control valve is designed to prevent pressure surges caused by the start and shut-off procedures of electric booster pumps. The valve also has a check valve feature. Note: Diaphragm I.D. number can be found on the lip of the diaphragm.

ELECTRIC SCHEMATIC:



Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
	Needle valve (g2).	*Closed or dirty.*	*Open fully, re-adjust.*
	Solenoid (b), incorrect voltage.	*Measure ± 10% of nominal voltage.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (b), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Relay (a) does not close.	*Pressure too low, need 20 psi.*	*Increase pressure.*
Valve does not close	*Punctured diaphragm.*	*Water keeps flowing from needle valve (g) when valve is in OPEN position.*	*Replace diaphragm. Refer to I.D.#.*
	Solenoid (b) is clogged.	*Disconnect tube at #1 of relay (a). No water from port (c).*	*Clean.*
	Solenoid (b), incorrect position of the manual override.	*Slot should be horizontal with arrow or dot pointing down.*	*Change position.*
	Clogged filter (f).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*
	Needle valves (g1).	*Closed or dirty.*	*Open fully, readjust.*
	Faulty check valves (d).	*Verify proper function.*	*Clean or replace.*
Pump does not shut off	*Position indicator or limit switch.*	*Wrong position.*	*Adjust.*
	Wrong wire hook-up.	*Check electric schematic.*	*Correct in pump panel.*

BOOSTER PUMP CONTROL & TWO STAGE OPENING VALVE

Operating Instructions for 6" and Larger Valves

INSTALLATION

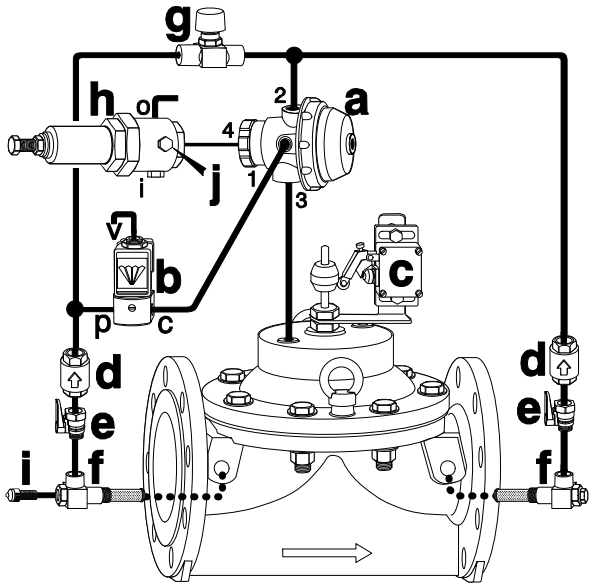
- The arrow on the bonnet should match the flow direction.
- The valve can be installed in any position at the discharge side of the pump.
- Bolts of flanged valves should be tightened in a diagonal sequence.
- Connect the limit switch (c) to the control panel (see electric schematic on reverse side). Connection should be open with the switch pressed by the position indicator.
- Connect the solenoid (b) AFTER the adjustment phase is completed.
- Adjustment bolt on top of the pilot (h) should be tightened.

ADJUSTMENTS

- Check that ball valves (e) are open.
- Manual override on the solenoid (b) is in the OFF position.
- Pilot needle valve (j) open and needle valve (g) about 2 turns open.
- Start the pump, valve will be open until the control chamber is full. Pump shuts off.
- Re-start the pump and turn the manual override of the solenoid (b) 90 degrees, valve opens.
- Loosen the bolt on top of the pilot (h) until water starts flowing and the upstream pressure is at a level that produces the desired flow to fill the pipeline. (Pilot needle valve (j), with no function, is open).
- Turn the manual override of solenoid (b) to the auto position and adjust the limit switch (c) to be pressed when the valve is closed. The pump should shut off.
- Connect the solenoid (b) wires according to the electric schematic (de-energized when pump is off).
- Adjust the closing speed of the valve with needle valve (g).
- When the downstream pressure is higher than the upstream, the valve will operate as a non-slam check valve.

MAINTENANCE

Keep the valve clear from weeds and dirt.
Check the opening of needle valve (g), the location of the position indicator and the setting of pilot (h) periodically.



Components	Part Numbers
a. Relay	61PIL66200
b. Solenoid	61BSHC-024-H
c. Limit Switch Assy. w/Position Ind. Assy.	61LS, 61LB
d. Check Valves	61CV50
e. Ball Valves	62SBV25
f. Filter	61SF5
g. Needle Valve	61NV1/4
h. Pilot (2-stage)	61PIL68500
i. Shrader Valve	61APS1/8
j. Pilot Needle Valve	

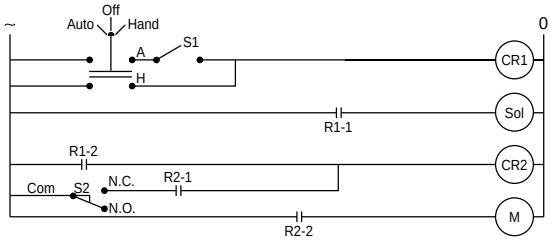
WINTERIZING

Drain the mainline and/or valve by disconnecting the tubes at check valves (d) and at other locations where water can be trapped. Open the needle valve (g).

TROUBLESHOOTING

A booster pump control valve is designed to prevent pressure surges caused by the start and shut-off procedures of electric booster pumps. The valve also has a check valve feature.
The two-stage opening pilot controls the filling pace of the pipeline.

ELECTRIC SCHEMATIC:



S1 - Remote Start Switch
S2 - Limit Switch (Assembled on Valve)
Sol - N.C. Solenoid (Assembled on Valve)
M - Motor Contactor

Problem	Cause	Check	Remedy
Valve does not open	*Pressure is too low.*	*Compare with design data.*	*Increase upstream pressure.*
	Pilot needle valve (j).	*Closed or dirty.*	*Open almost fully.*
	Solenoid (b), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
	Solenoid (b), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
	Relay does not close.	*Pressure too low, need 20 psi.*	*Increase pressure.*
Valve does not close	*Punctured diaphragm.*	*Water keeps flowing from port O of pilot (h), when valve is in the OPEN position.*	*Replace diaphragm. Refer to I.D.#.*
	Solenoid (b) is clogged.	*Disconnect tube at #1 of relay (a). No water from port (c).*	*Clean.*
	Solenoid (b), incorrect position of the manual override.	*Slot to be horizontal with arrow pointing down.*	*Change position.*
	Clogged filter (f).	*Disconnect tube upstream. No firm stream.*	*Clean or replace.*
	Needle valve (g).	*Closed or dirty.*	*Open fully, readjust.*
	Faulty check valves (d).	*Verify proper functioning.*	*Clean or replace.*
Pump does not shut off	*Position indicator or limit switch (c)*	*Wrong position.*	*Readjust.*
	Wrong wire hook-up.	*Check electric schematic.*	*Correct in pump panel.*
Filling pace too fast	*Pilot (h).*	*Bolt on top too loose.*	*Tighten to get higher upstream pressure.*

FLOW RATE CONTROL VALVE

Operating Instructions for 1"- 4" Valves

INSTALLATION

- The arrow on the bonnet should match the flow direction.
- Filters (b1, b2) are installed at the upstream side of the valve.
- The valve can be installed in any position.
- If below ground level, use a valve box to protect it.
- Use five layers of teflon tape for all threaded valves.
- Drill and tap a 1/4" hole on the pipe or PVC fitting upstream of the orifice plate and install a 6mm tube from that port to port #1 of pilot (c).

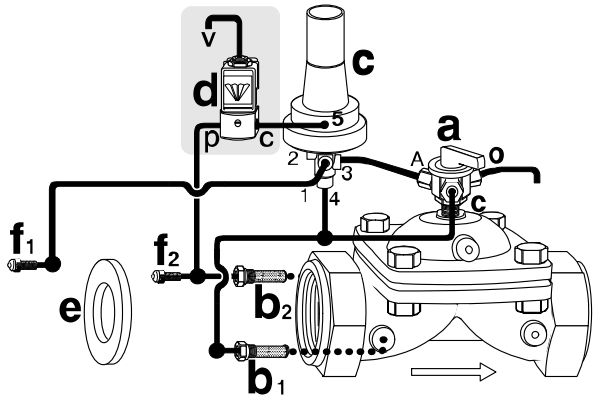
ADJUSTMENTS

The 3-way selector (a) must be in the A-position. The O-port is used to manually open and the C-port to close the valve. A neutral position, not facing any of the ports, locks the water in the bonnet, used in case the pilot (c) malfunctions.

- The headloss through the orifice for a certain flow rate is based on about 4 psi. The pilot's (c) spring range is 2-9 psi and allows 40% increase and 15 % reduction of the specified flow rate.
- Start the pump or main valve.
- Unscrew the cap on top of the pilot (c). Tightening the bolt will increase the flow rate and loosening will decrease the flowrate. The pressure differential can be checked at shrader valves (f1, f2). Make adjustments turning the bolt 1/2 a turn at the time.
- Tigthen the lock nut and also the cap on top of the pilot (c).
- For flow control of the backflush of a media filter, we recommend that the upstream water (b1) is taken from the filter of the hydraulic assembly, so that the pilot (c) is not contaminated.

FOR ELECTRIC OPTION

- Turn the manual override of the solenoid (d) 90 degrees and follow the above steps.
- After making the adjustments turn the override to the original position. Connection of the wires to the solenoid (d) with 1/2" hub is described on the attached diagram.



Components	Part Numbers
a. 3-way Selector	62SV21/4M
b. Filters	61SF25BR
c. Pilot Differential	61PIL29300
d. Solenoid (option)	61BSC-024-H
e. Orifice Plate (size in inch):	
f. Shrader Valves	61APS1/8

MAINTENANCE

Keep the valve clear from weeds and dirt.

Check the flow rate or pressure differential periodically and adjust the setting of the pilot (c) if necessary.

Turn the handle of the 3-way selector (a) periodically to prevent sticking.

WINTERIZING

Drain the valve by disconnecting the tubes at the access ports of the valve and at other locations where water can be trapped.

TROUBLESHOOTING

A flow rate control valve delivers a constant flow by maintaining a preset pressure differential across an orifice.
The solenoid converts an electric signal to a hydraulic command.
Note: Diaphragm I.D. number can be found on the lip of the diaphragm.

Problem	Cause	Check	Remedy
Valve does not open	*The 3-way selector (a) is in the C position.*	*Verify knob position.*	*Turn to A position.*
	Ports are clogged.	*Turn 3-way selector (a) to O or A, no water.*	*Dismantle and clean.*
	Pressure is too low.	*Compare with design data.*	*Increase upstream pressure.*
		Thickness of diaphragm.	*Change to LP diaphragm.*
	Solenoid (d), incorrect voltage.	*Measure ± 10% of nominal voltage. Check wire sizing.*	*Correct.*
		Damaged wires.	*Repair.*
	Solenoid (d), faulty coil.	*Voltage okay, but no click.*	*Change coil.*
Valve does not close	*Punctured diaphragm.*	*Turn 3-way selector (a) to port O water flows constantly.*	*Replace diaphragm. Refer to I.D.#.*
	Pilot (c), incorrect connection.	*Check connections on port (1) and (5), reversed.*	*Correct.*
	Foreign substance on sealing seat.	*Reduced waterflow, noisy.*	*Dismantle, clean and reassemble.*
	Solenoid (d), incorrect position of the manual override.	*Slot to be horizontal with arrow pointing down.*	*Change position.*
Incorrect flow	*Pilot (d) incorrectly adjusted.*	*Check bolt on pilot (c).*	*Readjust.*
		Check filter (b).	*Clean.*
	Faulty pilot (c).	*Verify if dirty.*	*Clean.*
Unstable performance	*Valve opens or closes too much.*	*Surging.*	*Install dripper or needle valve at port (2) of pilot (c).*

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