

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

**Figures 6600-D, 6600-U, Drawing B-1161
Figures 6700-D, 6700-U, Drawing B-1045
2½” to 20” Pilot-Operated
Surge Relief Valves for Water**

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WARNING: Cancer and Reproductive Harm – www.Prop65Warnings.ca.gov

INSTALLATION, OPERATION and MAINTENANCE

Figures 6600-D, 6600-U, 6700-D, and 6700-U Pilot Operated Surge Relief Valve

INTRODUCTION

This manual provides information to install, operate and maintain GA Industries pilot-operated surge relief valves to ensure a long service life. The valve is ruggedly constructed to provide many decades of dependable service with minimal maintenance.

CAUTION

The valve is NOT recommended for use with toxic, corrosive, or flammable fluids.

The Shop Order (SO) Number, Figure Number, size and pressure rating are stamped on a nameplate attached to the valve. Please refer to the SO number when ordering parts.

DESCRIPTION OF OPERATION

The surge relief valve protects systems from excessive pressure caused by the sudden stoppage of pumping or valve closure.

The valve consists of a differential piston main valve and a pilot system, pre-piped and factory installed on the main valve. The main valve consists of just one moving part – the piston – with the top of the piston being larger than the bottom. System pressure applied to the bottom of the piston provides an opening force. When system pressure is simultaneously applied to the larger area on top of the piston, a greater closing force produced. Thus, applying system pressure to the top of the piston closes the valve while exhausting it from the top allows system pressure to lift the piston and open the valve.

The pilot system consists of a relief pilot, closing speed needle valve, wye strainer and pilot isolating valves. The relief pilot is normally closed but opens when the pressure rises above its set pressure, as determined by the compression of its adjusting spring.

When the pilot is closed, system pressure is applied to the top of the piston through the closing speed needle valve holding the main valve closed. When the pilot opens it quickly exhausts the pressure on top of the piston allowing system pressure to lift the piston and open the valve.

It's not necessary for the surge relief valve to open fully. It will open only as far as necessary to discharge water out of the system at the rate needed to limit a further rise in pressure.

The pilot closes when pressure subsides below its set pressure allowing pressure to build on top of the piston to close the main valve. The main valve's closing speed is determined by the rate at which water flows onto the piston through the needle valve.

RECEIVING AND STORAGE

Inspect the valve upon receipt for damage during shipment. Carefully unload all valves to the ground without dropping.

Valves should remain in a clean, dry and weather protected area until installed. After completion of shop testing the valve is drained of the test water but a small residual amount could remain so the valve should be protected from freezing during storage.

INSTALLATION

Figure Numbers suffixed with "D" indicate the valve has ANSI Class 125 flanged connections, Figure Numbers suffixed with "U" indicate the valve has ANSI Class 250 flanged connections.

GA Industries differential piston globe body main valves have the inlet and outlet connections in line while angle body main valves have the inlet and outlet connections 90 degrees apart.

Install the valve in the proper flow direction noting the "INLET" tag on the valve.

The valve is configured to be installed in the orientation specified by the engineer. Consult the drawings of record to verify the valve is installed in the proper orientation.

Prior to installation ensure all debris, packing material or other foreign material has been removed from both ports.

If installed outdoors, below ground in a vault or in an unheated area, adequate freeze protection must be provided.

Adequate isolating valves should be installed between the valve and the pipeline or system to facilitate maintenance.

The valve should be installed with sufficient clearance to permit maintenance and removal of internal components.

The valve is not designed to support adjacent equipment, piping loads should not be imposed on the valve and large valves should be properly supported. Ensure mating flanges are square and parallel to the valve flanges before tightening flange bolts.

Flat-faced flanged valves should be mated with flat-faced flanges and full-face gaskets. If ring gaskets are used the bolt material shall be ASTM A307 Grade B (or equivalent). Higher strength bolting should only be used with full-face gaskets.

Lower heavy valves using slings or chains around the valve body and/or the lifting eyes. **DO NOT LIFT BY THE EXTERNAL PILOT PIPING.** Lubricate the bolts or studs and insert around flange. Lightly tighten bolts until gaps are eliminated. Torque bolts in an alternating pattern in graduated steps. If leakage occurs wait 24 hours and re-torque the bolts but do not compress the gasket more than 50% or exceed bolt maximum torque rating.

START-UP

The valve generally does not require any calibration or adjustment prior to start-up. The relief pressure is factory set at the pressure specified by the engineer and indicated on the tag affixed to the pilot.

Refer to Page 4 for the location of components.

The closing speed needle valve should be initially opened. approximately 1/4 turn from closed. Close the needle valve completely then turn the handwheel 1/4 turn counterclockwise.

All other stop valves must be fully open.

NOTE: If the valve is being installed in an orientation that the main valve's bolted cover is not parallel to the floor, it's recommended the main valve's piston be filled with water before installation. This can be done by removing an unused pipe plug from the valve's cover and filling the valve through a funnel. Replace the pipe plug before installing the valve.

After the valve has been installed, slowly open the inlet isolating valve to introduce pressure to the relief valve. Air in the valve and pilot system should be bled before putting the valve into service. Loosen a pipe union at a high point in the pilot system so air can escape. Tighten the union after all the air has been vented.

Loosen the pipe plug in the relief pilot on the opposite side from where the impulse line is connected to bleed air. Tighten when the air had been purged.

The surge relief valve is set to open at a pressure higher than the "normal" system pressure. If desired to verify the valve is set to open at the proper pressure, it will be necessary to throttle a valve in the pump discharge downstream of the relief valve to raise the pumping pressure until the valve opens.

With the pump running, slowly throttle the discharge valve and monitor the pressure (installing a pressure gauge in the plugged port on the relief pilot is helpful) while pressing a finger where the indicator rod protrudes to feel when the main valve opens. Verify the valve opens at the correct pressure.

Refer to below if adjustment is required and repeat the above steps to confirm.

When the test is complete fully open the discharge valve.

A small and/or intermittent discharge of water from the side vent tube is normal and has no effect on the valve's operation.

ADJUSTING THE PRESSURE SETTING

The pressure at which the valve opens can be field adjusted within the range of the pilot's installed spring.

If the required pressure setting is higher than the installed spring's maximum setting, the spring must be changed.

Turning the pilot handwheel clockwise raises the opening pressure, turning it counterclockwise lowers the opening pressure.

Standard GA Industries Figures 6600-D/-U and 6700-D/-U in sizes 2½" to 10" can be supplied with either a 5-inch or 7-inch pilot, as measured by the outside diameter of the pilot. Larger sizes are supplied only with 7-inch pilots.

Valve Sizes 2½" to 10" with 5-inch Pilot

SPRING COLOR	MAX SETTING	WIRE DIAMETER	CHANGE PER FULL TURN
White	20 PSI	0.250"	0.64 PSI
Green	45 PSI	0.313"	1.7 PSI
Black	110 PSI	0.375"	4.5 PSI
Red	155 PSI	0.438"	9.1 PSI
Yellow	250 PSI	0.500"	18.6 PSI
Blue	330 PSI	0.563"	36.0 PSI

Valve Sizes 2½” to 10” with 7-inch Pilot

SPRING COLOR	MAX SETTING	WIRE DIAMETER	CHANGE PER FULL TURN
Yellow	10 PSI	0.219”	0.25 PSI
Green	20 PSI	0.250”	0.50 PSI
Black	30 PSI	0.313”	1.2 PSI
White	50 PSI	0.375”	2.3 PSI
Red	100 PSI	0.500”	7.2 PSI
Blue	125 PSI	0.563”	11.0 PSI

Valve Sizes 12” to 16”

SPRING COLOR	MAX SETTING	WIRE DIAMETER	CHANGE PER FULL TURN
Yellow	10 PSI	0.219”	0.50 PSI
Green	20 PSI	0.250”	0.55 PSI
Black	35 PSI	0.313”	1.3 PSI
White	55 PSI	0.375”	2.5 PSI
Red	110 PSI	0.500”	8.0 PSI
Blue	125 PSI	0.563”	12.0 PSI

Valve Sizes 18” and 20”

SPRING COLOR	MAX SETTING	WIRE DIAMETER	CHANGE PER FULL TURN
Yellow	12 PSI	0.219”	1.2 PSI
Green	25 PSI	0.250”	0.6 PSI
Black	40 PSI	0.313”	1.4 PSI
White	60 PSI	0.375”	2.8 PSI
Red	125 PSI	0.500”	9.0 PSI
Blue	153 PSI	0.563”	13.0 PSI

PREVENTATIVE MAINTENANCE

No routine lubrication or adjustments are needed. The valve should be visually inspected once a month for the first 3 to 6 months after initial start-up to check for leaks and the wye-strainer should be flushed of collected debris.

Flushing the wye-strainer can be facilitated by installing a small ball or gate valve in place of the pipe plug in the bottom of the wye-strainer. Opening the valve while there is pressure in the system will “blow off” collected debris.

After the initial period, once every three (3) months the strainer should be flushed of collected debris as described above. Visually inspect for leaks around the indicator rod, side vent tube or pilot vent hole. If leakage is detected, see **TROUBLESHOOTING** to resolve.

WARNING

Personal injury may occur if the valve is disassembled while pressurized. Before attempting disassembly, follow appropriate lockout/tag out procedures to prevent accidental pressurization.

Once a year the valve should be isolated, depressurized and the wye-strainer screen removed and cleaned. At the same time the closing speed needle valve should be inspected. First, note the number of turns required to close it fully. Remove the needle valve bonnet and needle and inspect the needle for wear. Replace if needed. Clear needle valve seat of collected debris and reinstall the bonnet and needle. Open to the noted position.

TROUBLESHOOTING

SYMPTOM or PROBLEM	SOLUTION
Main valve will not open	
<ul style="list-style-type: none"> Water cannot exhaust from top of piston 	Check status of stop valves and electrical connection to solenoids (if any) in external pilot piping
<ul style="list-style-type: none"> Insufficient inlet pressure 	Ensure inlet isolating valve is open and there is at least 5 to 10 PSI inlet pressure present. Small sizes require 10 PSI, minimum decreases with size.
<ul style="list-style-type: none"> Vent tube blocked 	Ensure vent tube is open to atmosphere
<ul style="list-style-type: none"> Indicator rod packing too tight 	Turn indicator gland counterclockwise in quarter turn increments
Main valve will not close	
<ul style="list-style-type: none"> Inlet pressure cannot be applied to top of piston 	Check status of stop valves and electrical connection to solenoids (if any) in external pilot piping
<ul style="list-style-type: none"> Wye-strainer clogged 	Flush strainer or remove screen to clear debris
Leakage through main valve when closed	
<ul style="list-style-type: none"> Debris in valve 	Remove debris, inspect for damage
<ul style="list-style-type: none"> Worn or damaged seat ring 	Inspect, replace (See Repair Instructions)
Excessive leakage through vent tube (slight or intermittent leakage is normal)	
<ul style="list-style-type: none"> Worn piston and/or liner seals 	Replace (See Repair Instructions)
<ul style="list-style-type: none"> Vent tube loose or its threaded connection to liner not sealed 	Tighten and/or apply thread sealant. (See Repair Instructions)
Excessive leakage past indicator rod (slight or intermittent leakage is normal)	
<ul style="list-style-type: none"> Indicator packing worn or not sufficiently compressed 	Turn indicator gland clockwise one quarter to one half turn. DO NOT OVERTIGHTEN. If leakage does not stop, replace indicator packing.

REPAIR INSTRUCTIONS

Instructions for the inspection, troubleshooting and repair of the main valves utilized in the GA Industries Figure 6600-D/-U and 6700-D/-U surge relief valves are provided in the following publications:

2½" to 10" – IOM-DPMV2.5-10-040721

12" to 20" – IOM-DPMV12-20-041221

Instructions for the inspection, troubleshooting and repair of the relief pilots utilized in the GA Industries Figure 6600-D/-U and 6700-D/-U surge relief valves are provided in the following publication:

2½" to 20" – IOM-667-041221

REPLACEMENT PARTS

Genuine replacement parts are available from your local GA Industries representative or from the factory:

VAG USA, LLC

234 Clay Avenue

Mars, PA 16046 USA

Telephone: 724-776-1020

Fax: 724-776-1254

E-mail: quotes-ga@vag-group.com

Please have the nameplate data available when ordering parts.

WARRANTY:

The Warranty for GA Industries valves is included in our Terms and Conditions which can be found here:

<https://gaindustries.com/terms>

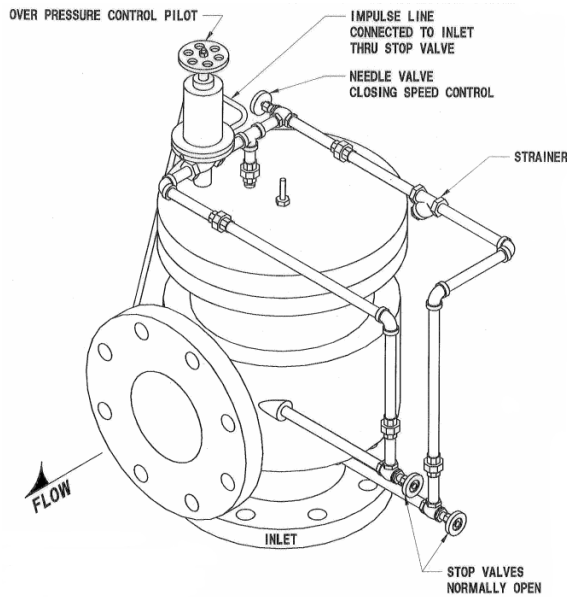


Figure 6600-D and 6600-U Angle Body

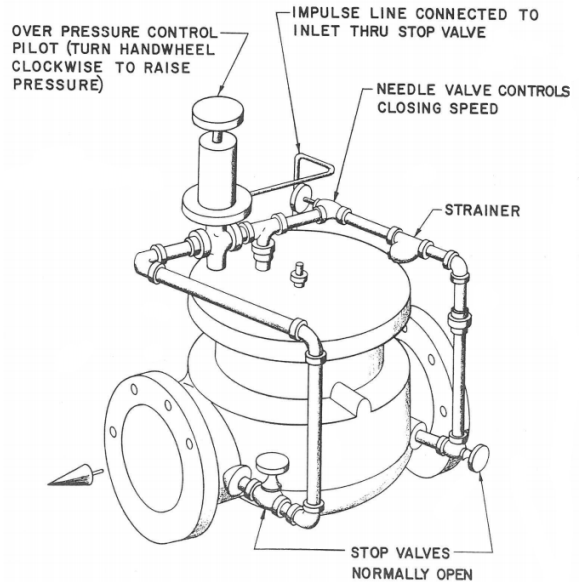


Figure 6700-D and 6700-U Globe Body