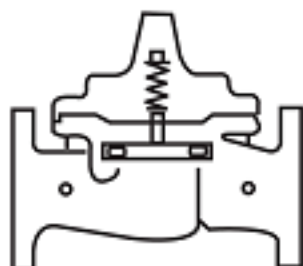

CLA-VAL

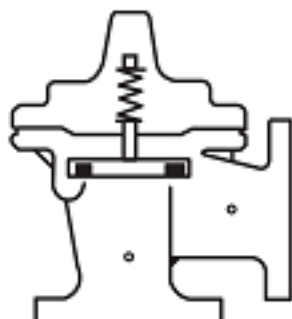
AUTOMATIC CONTROL VALVES

90-21

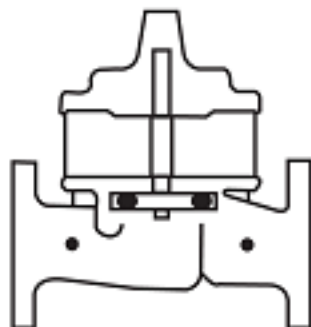
Place this manual with personnel responsible
for maintenance of this valve



Installation



Operation



Maintenance





MODEL

INSTALLATION / OPERATION / MAINTENANCE

90G-21/90A-21 UL

UL Listed Pilot-Operated Pressure Control

The Cla-Val 90-21 Pressure Reducing Valve is a pilot-operated regulator, capable of holding downstream pressure to a predetermined pressure.

1. **SPECIAL NOTE:** For system protection, on valve sizes 1-1/2" thru 8" a UL Listed minimum 1/2" pressure relief valve shall be installed downstream (system side) of the 90-21 Pressure Reducing Valve. For valve sizes 10" and 12" a UL Listed 3" or larger relief valve shall be installed downstream side of the 90-21. Adequate drainage of the relief valve discharge must be provided. The relief valve should be set above the "no flow" or "dead end" shutoff pressure which is at 2 to 8 psi higher than the 90-21 set pressure for 1-1/2" thru 8" valve sizes and 2 psi for 10" and 12" valve sizes.

2. Allow sufficient room around the valve assembly to make adjustments and for disassembly.

3. It is recommended that isolation valves be installed on both ends of the 90-21 valve to facilitate isolating the valve for start-up, testing and preventative maintenance.

4. **BEFORE THE VALVE IS INSTALLED, PIPE LINES SHOULD BE FLUSHED OF ALL CHIPS, SCALE, AND FOREIGN MATTER.**

5. Place the 90-21 valve in line with flow through the valve in the direction indicated on the nameplate. Check all fittings and hardware for proper makeup and that no apparent damage is evident.

6. Cla-Val valves operate with maximum efficiency when mounted in horizontal piping with the cover UP; however, other positions are acceptable. Due to size and weight of cover and internal components of six inch and larger valves, installation with the cover up is advisable. This makes periodic inspection of internal parts readily accessible.

7. Installation, testing, inspection and maintenance shall be in accordance with NFPA 13, 14 and 25.

Start-Up and Adjustment

1. Upon initial start-up and after any valve servicing, it is necessary to follow these steps.

2. Prior to pressurizing the valve make sure the necessary gauges to measure pressure are installed. Gauges should be installed upstream (inlet) and downstream (outlet) of the valve. Unused ports on main valve body can be used for this purpose.

CAUTION: During start-up and test procedures a large volume of water may be discharged downstream. Check to make sure that the downstream venting is adequate to prevent damage to personnel and equipment.

3. Close upstream and downstream isolation valves.

4. Slowly open the upstream isolation valve enough to allow the valve and pilot control system to fill with liquid.

5. Bleed air from the main valve (1) cover and pilot system by slightly loosening fittings or plugs at all high points until a steady flow of water is observed retighten. It may be necessary to do this more than once.

6. Open fully the upstream isolation valve.

7. Slowly open the downstream isolation valve part way to establish a low flow rate.

There must be liquid flowing through the valve during pressure adjustments.

Optimum valve performance occurs when pressure setting is done with flow rate as low as practical.

8. Adjust the CRD Control (3) to desired pressure. To change pressure setting, turn the adjusting screw in (clockwise) to increase outlet pressure. Turn the adjusting screw out (counterclockwise) to decrease outlet pressure. The pressure should change approximately 27 psi per turn. Only slight changes in adjustment should be made to avoid damage to equipment. When the desired setting has been made, tighten jam nut and replace cover.

Valve Size	Minimum Differential Pressure
1-1/2"	20 psid
2" - 8"	20 psid
10"	20 psid
12"	20 psid

9. To fine tune the operation of the main valve, an oscillation control device is included but may not be necessary. Adjust screw clockwise/counterclockwise until system pressures stabilize.

10. For 1-1/2" thru 8" 90-21 Pressure Reducing Valves the downstream pressure relief control recommended set point is 2-8 psi above the CRD (3) set point. For 10" and 12" 90-21 Pressure Reducing Valves the set point is 2 psi above the CRD (3) set point. The relief valve for the 10" and 12" 90-21 shall be installed a recommended minimum 6 pipe diameters downstream of the 90-21

11. Pressure ratings of components installed downstream of the Model 90-21 pilot operated pressure control valve shall not be exceeded.

12. Valves shall be tested after installation in accordance with NFPA 13 or NFPA 14 or both NFPA 13 and 14, whichever is applicable, and tested periodically thereafter in accordance with NFPA 25.

Maintenance

1. The Cla-Val 90-21 Pressure Reducing Valve requires no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the fluid handled is affecting the efficiency of the valve. Minimum of once per year.

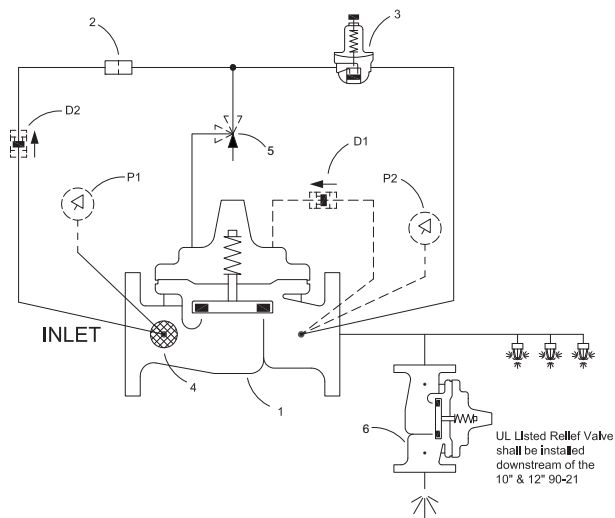
2. When servicing the pilot control system, use care to prevent damage. If it is necessary to remove fittings or components, be sure they are kept clean and replaced exactly as they were.

3. Repair and maintenance procedures of the Cla-Val Hytrol Main Valve and pilot control components are included in a more detailed IOM manual. It can be downloaded from our web site (www.cla-val.com) or obtained by contacting a Cla-Val Regional Sales Office.

4. **When ordering parts always refer to the catalog number and stock number on the valve nameplate.**

SYMPTOM	PROBABLE CAUSE	REMEDY
Main valve fails to open	No pressure at valve inlet	Check inlet pressure
	Main valve diaphragm assembly inoperative	Disassemble, clean and polish stem, replace defective parts
	Pilot Valve (CRD) not opening: 1. No. spring compression 2. Damaged spring 3. Spring guide not in place 4. Yoke dragging on inlet nozzle	1. Tighten adjusting screw 2. Disassemble and replace 3. Assemble properly. 4. Assemble properly
Main valve fails to close	Foreign matter between disc and seat or worn disc. Scale on stem or Diaphragm ruptured Flow Clean Strainer plugged	Disassemble main valve, remove matter, clean parts and replace defective parts Remove and clean or replace
	Pilot Valve (CRD) remain open: 1. Spring compressed solid 2. Mechanical obstruction 3. Worn disc 4. Yoke dragging on inlet nozzle 5. Diaphragm damaged or loose diaphragm nut. Leakage from vent hole in cover	1. Back off adjusting screw 2. Disassemble and remove obstruction 3. Disassemble remove and replace disc retainer assembly 4. Assemble properly 5. Disassemble. replace diaphragm and/or tighten nut
Fails to Regulate	Air in main valve cover and/or tubing	Loosen top cover plug and fittings and bleed air
	Pilot Valve (CRD) yoke dragging on inlet nozzle	Assemble properly

90-21 UL SCHEMATIC



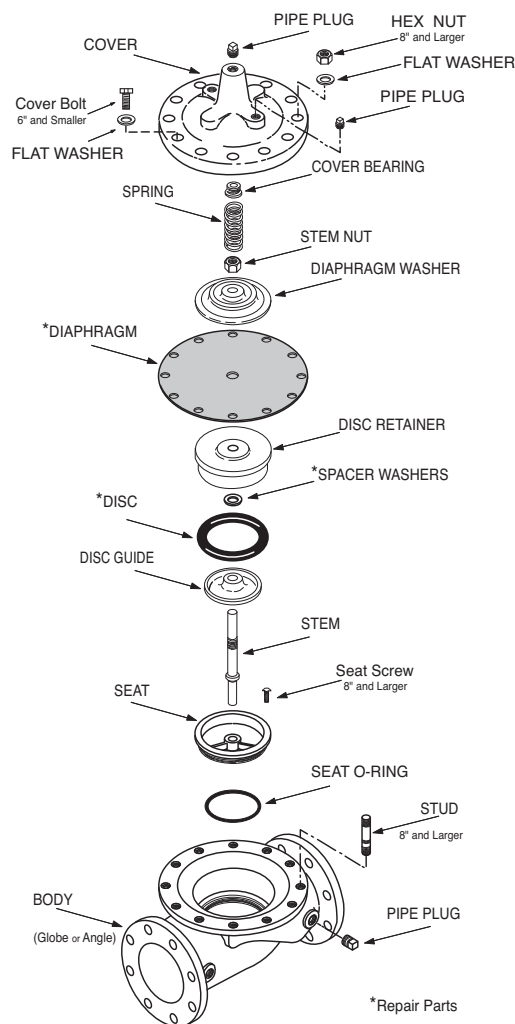
BASIC COMPONENTS

- 1 100-01 Hytrol (Main Valve)
- 2 X58C Restriction Fitting
- 3 CRD Pressure Reducing Control
- 4 X46A Flow Clean Strainer
- 5 CV Flow Control (opening)
- 6 Relief Valve

OPTIONAL FEATURES

- P X141 Pressure Gauge
- D CDC Check Valve

HYTROL MAIN VALVE (1)



CV

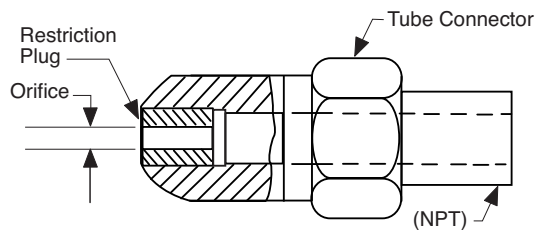


P1 & P2

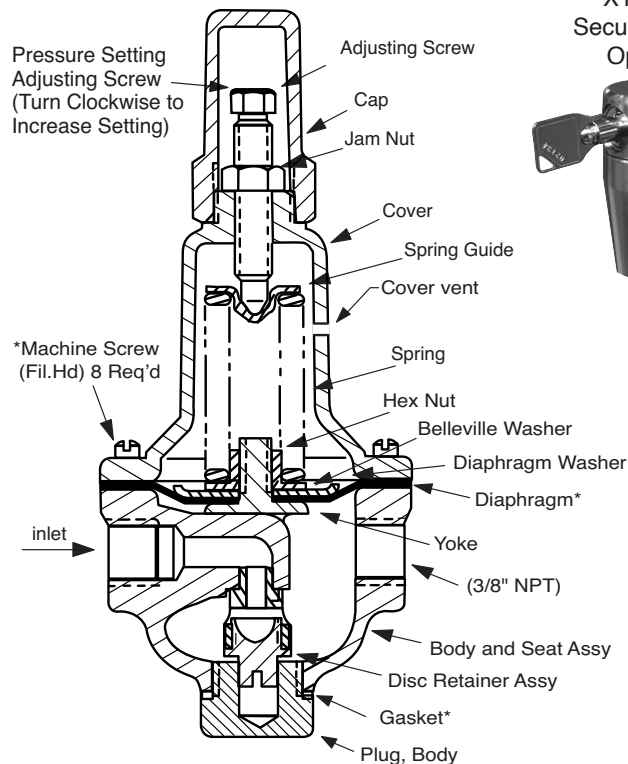


X58C (2)

X58C (2)



CRD (3)



X140-1 Security Cap Option



Minimum Recommended Flow When Setting Pressure

Valve Size (inch)	Min. Flow (GPM)	Max. Intended Flow (GPM)
1-1/2	40	110
2	45	196
2-1/2	50	306
3	57	441
4	100	783
6	220	1763
8	450	2700
10	620	4896*
12	880	7050*

*Maximum obtainable flow for UL LLC Operational testing was 1600 gpm for the 10" Valve and 1200 gpm for the 12" Valve

*SUGGESTED REPAIR PARTS



X46A (4)

For a more detailed IOM Manual go to www.cla-val.com or contact a Cla-Val Regional Sales Office.

CLA-VAL

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N-90-21 UL (R-03/2022b)



MODEL

100-01 UL

Hytrol Valve

For Model 90-21 UL Listed Pressure Reducing Valve

Description

The Model 100-01 Hytrol Valve is the main valve for the Cla-Val Model 90-21 Pressure Reducing Control Valve. It is a hydraulically operated, diaphragm-actuated, globe or angle pattern valve.

This valve consists of three major components; body, diaphragm assembly, and cover. The diaphragm assembly is the only moving part. The diaphragm assembly uses a diaphragm of nylon fabric bonded with synthetic rubber. A synthetic rubber disc, contained on three and one half sides by a disc retainer and disc guide, forms a seal with the valve seat when pressure is applied above the diaphragm. The diaphragm assembly forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.



Troubleshooting

The following trouble shooting information deals strictly with the "Hytrol Valve." This assumes that everything but the main valve itself has been completely isolated, i.e., each part of the control system is hydraulically blocked from the Hydro valve. All troubleshooting is possible without removing the valve from the line or removing the cover.

The Hytrol valve has only one moving part (the diaphragm and disc assembly). So, there are only three major types of problems to be considered:

First: Valve is stuck - that is the diaphragm assembly is not free to move through a full stroke either from open to close or vice versa.

Second: Valve is free to move and can't close because of a worn out diaphragm.

Third: Valve leaks even though it is free to move, and the diaphragm isn't leaking.

SERVICE SUGGESTIONS

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to close	Lack of cover chamber pressure	Check upstream pressure, X46 or tubing for obstruction.
	Diaphragm damaged. (See Diaphragm Check, Steps 1-3)	Replace diaphragm
	Corrosion or excessive scale build up on valve stem. (See Freedom of Movement Check, Step 4.)	Clean and polish stem Inspect and replace any damaged or badly eroded part.
	Mechanical obstruction. Object lodged in valve. (See Freedom of Movement Check, Step 4.)	Remove obstruction.
Fails to open	Worn Disc (See Tight Seating Check, Step 4.)	Replace disc.
	Closed upstream and/or downstream isolation valves in main line.	Open Valves
	Insufficient line pressure.	Check pressure.
	Corrosion or excessive scale build up on valve stem. (See Freedom of Movement Check Step 4)	Clean and polish stem Inspect and replace damaged or badly eroded part.

Diaphragm Check (#1)

1. Shut off pressure to the 90-21 valve by slowly closing upstream and downstream isolation valves.

CAUTION: The valve cannot be serviced under pressure. Where there are no isolation valves, It will be necessary to deactivate the system.

2. Disconnect or close all pilot control lines to the valve cover and leave only one fitting in highest point of cover open to atmosphere.

3. With the cover vented to atmosphere, slowly open upstream isolation valve to allow some pressure into the valve body. Observe the open cover tapping for signs of continuous flow. It is not necessary to fully open isolating valve. Volume in cover chamber capacity chart will be displaced as valve moves to open position. Allow sufficient time for diaphragm assembly to shift positions. If there is no continuous flow, you can be quite certain the diaphragm is sound and the diaphragm assembly is tight. If the fluid appears to flow continuously

Freedom of Movement Check (#2)

4. Determining the Valve's freedom of movement can be done after all pressure is removed from the valve.

After closing inlet and outlet isolation valves and bleeding pressure for the valve, check that the cover chamber and the body are temporarily vented to atmosphere. Insert fabricated tool into threaded hole in top of valve stem, and lift the diaphragm assembly manually. The tool is fabricated from rod that is threaded on one end to fit valve stem and has a "T" bar handle of some kind on the other end for easy gripping. (See chart in step 4 of "Disassembly" Section.)

STEM TRAVEL (Fully Open to Fully Closed)			
Valve Size (inches)		Travel (inches)	
Inches	MM	Inches	MM
1 1/4	32	0.4	10
1 1/2	40	0.4	10
2	50	0.6	15
2 1/2	65	0.7	18
3	80	0.8	20
4	100	1.1	28
6	150	1.7	43
8	200	2.3	58
10	250	2.8	71
12	300	3.4	86

Preventative Maintenance

Cla-Val Hytrol valves require no lubrication or packing and a minimum of maintenance. However, a periodic inspection schedule should be established to determine how the operating conditions of the system are effecting the valve. The effect of these actions must be determined by inspection.

Disassembly

Inspection or maintenance can be accomplished without removing the valve from the line.

1. Close upstream and downstream isolation valves to shut off all pressure to the valve.

WARNING: Maintenance personnel can be injured and equipment damaged if disassembly is attempted with pressure in the system.

2. Loosen tube fittings to remove pressure form the valve body and cover chamber. After pressure had been released from the

this is a good reason to believe the diaphragm is either damaged or it is loose on the stem. In either case, this is sufficient cause to remove the valve cover and investigate the leakage. (See "Maintenance" Section for procedure.)

COVER CHAMBER CAPACITY
(Liquid Volume displaced when valve opens)

Valve size (inches)	Displacement	
	Gallons	Liters
1 1/4	.02	.07
1 1/2	.02	.07
2	.03	.12
2 1/2	.04	.16
3	.08	.30
4	.17	.64
6	.53	2.0
8	1.26	4.8
10	2.51	9.5
12	4.00	15.1

Place marks on this diaphragm assembly lifting tool when the valve is closed and when manually positioned open. The distance between the two marks should be approximately the stem travel shown in the chart.

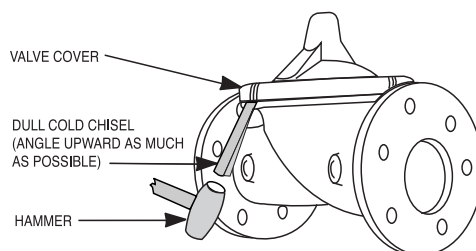
If the stroke is different than that shown, there is a good reason to believe something is mechanically restricting the stroke of the valve. The cover must be removed, and the obstruction located and removed. The stem should also be checked for scale build-up. (See "Maintenance" Section for procedure.)

Freedom of Movement Check (#2)

5. Test for seat leakage by applying inlet pressure to the cover of the valve, wait until it closes, and then close the isolation valve downstream of the Hytrol valve. Install a pressure gauge between the two closed valves. Watch the pressure gauge. If the pressure begins to climb, then either the isolation valve is permitting pressure to creep back, or the Hytrol valve is allowing pressure to go through it. Usually the pressure at the Hytrol valve inlet will be higher than on the isolation valve discharge, so if the pressure goes up to the inlet pressure, you can be sure the Hytrol valve is leaking. If it goes up to the pressure on the isolation valve discharge, the Hytrol valve is holding tight, and it was just the isolation valve leaking.

valve use care to remove the controls and tubing. Note and sketch position of tubing and controls for reassembly. The schematic on the E-90-21 sheet can be used as a guide when reassembling pilot system.

3. Remove cover nuts and remove cover. If the valve has been in service for any length of time, chances are the cover will have to be loosened by driving upward along the edge of the cover with a dull cold chisel.



100-01 UL

When block and tackle or a power hoist is to be used to lift valve cover, insert proper size eye bolt in place of the center cover plug. On 8", 10" and 12" valves only, there are 4 holds where jacking screws maybe inserted to break cover loose from the body and then 4 eye bolts may be inserted for lifting purposes. **Pull cover straight up** to keep from damaging the integral seat bearing and stem.

COVER CENTER PLUG SIZE

Valve Size	Thread Size (NPT)
1 1/4" - 1 1/2"	1/4"
2" - 3"	1/2"
4" - 6"	3/4"
8" - 10"	1"
12"	1 1/4"

4. Remove the diaphragm and disc assembly from the valve body. With smaller valves this can be accomplished by hand, **pulling straight up on the stem so as not to damage the seat bearing**. On large valves, an eye bolt of proper size can be installed in the stem and the diaphragm assembly can be then lifted with a block and tackle or power hoist. Take care not to damage the stem or bearings. The valve won't work if these are damaged.

VALVE STEM THREAD SIZE

Valve Size	Thread Size (UNF Internal)
1 1/4" - 2 1/2"	10 - 32
3" - 4"	1/4 - 28
6" - 12"	3/8 - 24

5. The next item to remove is the stem nut. Examine the stem threads above the nut for signs of mineral deposits or corrosion. If the threads are not clean, use a wire brush to remove as much of the residue as possible. Attach a good fitting wrench to the nut and give it a sharp "rap" rather than a steady pull. Usually several blows are sufficient to loosen the nut for further removal. On the smaller valves, the entire diaphragm assembly can be held by the stem in a vise **equipped with soft brass jaws** before removing the stem nut.

The use of a pipe wrench or a vise without soft brass jaws scars the fine finish on the stem. No amount of careful dressing can restore the stem to its original condition. Damage to the finish of the stem can cause the stem to bind in the bearings and the valve will not open or close.

6. After the stem nut has been removed, the diaphragm assembly breaks down into its component parts. Removal of the disc from the disc retainer can be a problem if the valve has been in service for a long time. Using two screwdrivers inserted along the outside edge of the disc usually will accomplish its removal. Care should be taken to preserve the spacer washers in water, particularly if no new ones are available for re-assembly.

Reassembly

1. Reassembly is the reverse of the disassembly procedure. If a new disc has been installed, it may require a different number of spacer washers to obtain the right amount of "grip" on the disc. When the diaphragm assembly has been tightened to a point where the diaphragm cannot be twisted, the disc should be compressed very slightly by the disc guide. Excessive compression should be avoided. Use just enough spacer washers to hold it firmly.

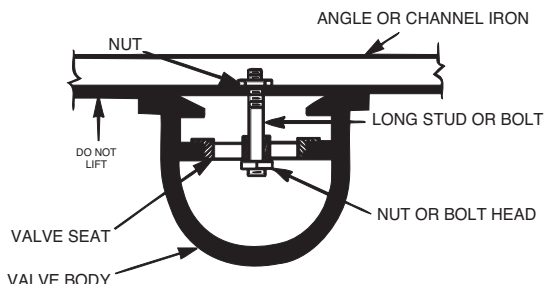
2. Make sure the stem nut is made up very tight. Attach a good fitting wrench to the nut and give it a sharp "rap" rather than a steady pull. Usually several blows are sufficient to tighten the nut for final tightening. Failure to do so could allow the diaphragm to pull loose and tear when subjected to pressure.

3. Carefully install the diaphragm assembly by lowering the stem through the seat bearing. Take care not to damage the stem or bearing. Line up the diaphragm holes with the stud or bolt holes on the body. On larger valves with studs, it may be necessary

7. The only part left in the valve body is the seat which ordinarily does not require removal. Careful cleaning and polishing of inside and outside surfaces with 400 wet/dry sandpaper will usually restore the seat's sharp edge. If, however, it is badly worn and replacement is necessary, it can be easily removed.

Seats in valve sizes 1 1/4" through 6" are threaded into the valve body. They can be removed with accessory X109 Seat Removing Tool available from the factory. On 8" and larger valves, the seat is held in place by socket head screws. If upon removal of the screws the seat cannot be lifted out, it will be necessary to use a piece of angle or channel iron with a hole drilled in the center. Place it across the body so a long stud can be inserted through the center hole in the seat and the hole in the angle iron. By tightening the nut a uniform upward force is exerted on the seat for removal.

NOTE: Do not lift up on the end of the angle iron as this may force the integral bearing out of alignment, causing the stem to bind.



Lime Deposits

One of the easiest ways to remove lime deposits from the valve stem is to dip it in a 5-percent muriatic acid solution just long enough for the deposit to dissolve. This will remove most of the common types of deposits. **CAUTION: USE EXTREME CARE WHEN HANDLING ACID, RINSE PARTS IN WATER BEFORE HANDLING.** If the deposit is not removed by acid, the a fine grit (400) wet or dry paper can be used with water.

Inspection of Parts

After the valve has been disassembled, each part should be examined carefully for signs of wear, corrosion, or any other abnormal conditions. Usually, it is a good idea to replace the rubber parts (diaphragm and disc) unless they are free of signs of wear. Any other parts which appear doubtful should be replaced.

to hold the diaphragm assembly up while stretching the diaphragm over the studs.

4. Put spring in place and replace cover. Make sure diaphragm is laying smooth under cover.

5. Tighten cover nuts firmly using a cross-over pattern until all nuts are tight.

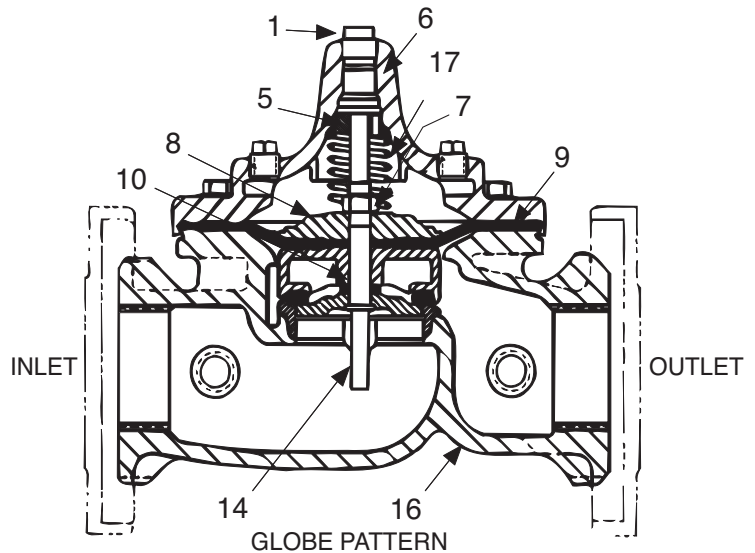
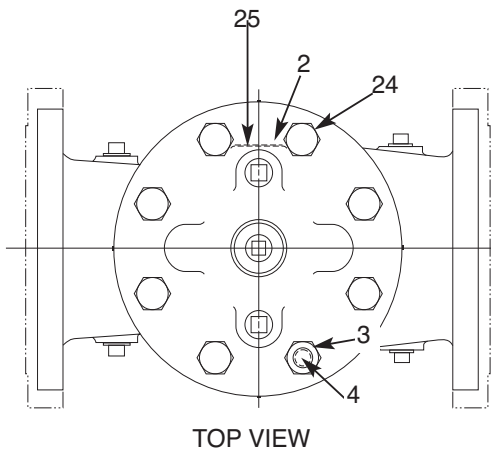
Test Procedure After Valve Assembly

1. Check the diaphragm assembly for freedom of movement by inserting a rod into the threaded hole in the top of the valve stem and lifting the diaphragm assembly manually. The diaphragm assembly should move freely without any signs of sticking or grabbing. (See "Freedom of Movement Check" section.

2. Re-install the pilot system and tubing exactly as it was prior to removal.

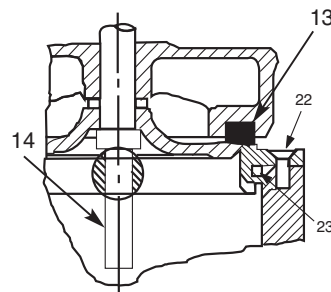
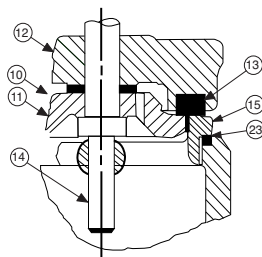
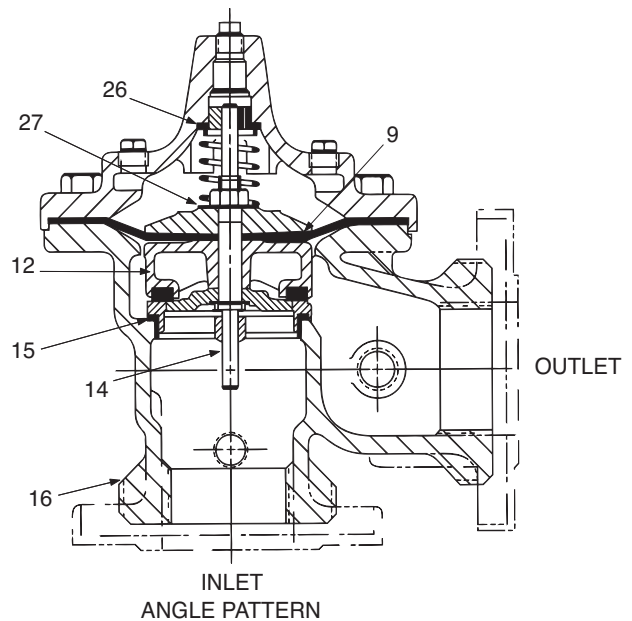
3. Follow steps under "Start-Up and Adjustment" Section in N-90-21 UL Sheet.

100-01 UL



PARTS LIST

Item	Description
1.	Pipe Plug
2.	Drive Screws (for nameplate)
3.	Hex Nut (8" and larger)
4.	Stud (8" and larger)
5.	Cover Bearing
6.	Cover
7.	Stem Nut
8.	Diaphragm Washer
9.	Diaphragm
10.	Spacer Washers
11.	Disc Guide
12.	Disc Retainer
13.	Disc
14.	Stem
15.	Seat
16.	Body
17.	Spring
22.	Socket Head Screws (8" and larger)
23.	Seat O-Ring
24.	Hex Head Bolt (1 1/4" thru 6")
25.	Nameplate
26.	Upper Spring Washer (Epoxy coated valves only)
27.	Lower Spring Washer (Epoxy coated valves only)
28.	Cover Bearing Housing (16" only)
29.	Cover O-Ring (16" only)
30.	Hex Bolt (16" only)
31.	Pipe Cap (16" only)



When ordering please specify: All nameplate data, Description, Item number



—MODEL—

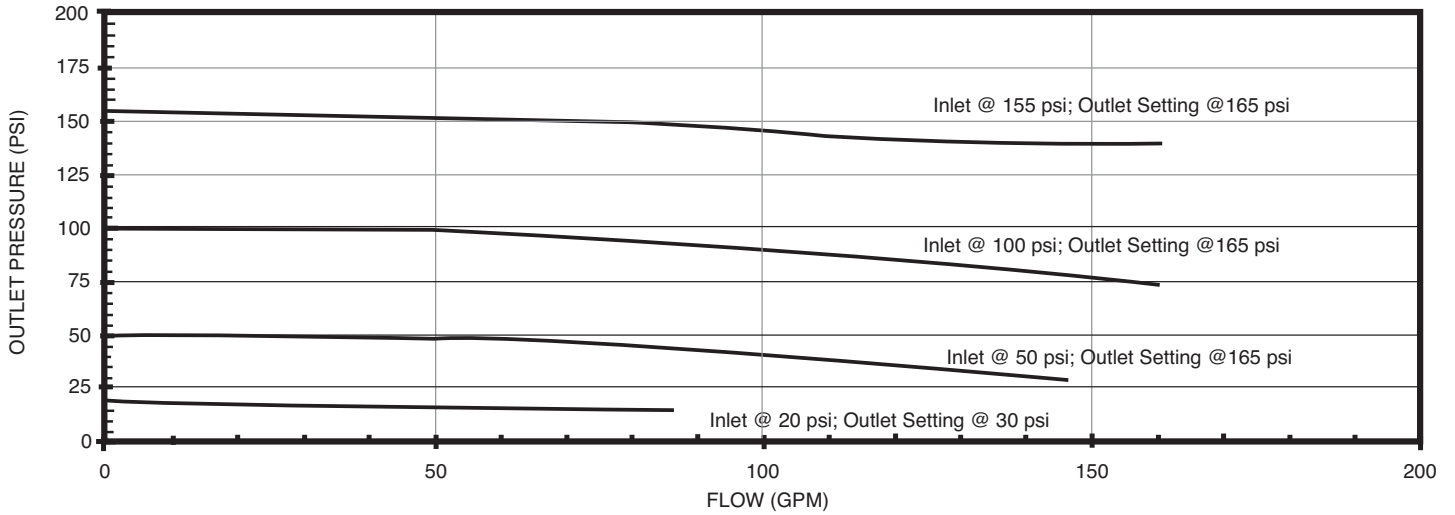
90-21/690-21 UL

**Performance Characteristics of UL listed
90-21 Pressure Reducing Valves**

VALVE SIZE	TEST DESCRIPTION	UL TEST RESULTS
1-1/2" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS; RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 80 GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 30 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW RANGED BETWEEN 40 TO 45 PSI WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW WAS 175 PSI
1-1/2" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS; RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 80 GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 30 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW RANGED BETWEEN 38 TO 41 PSI WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW WAS 175 PSI
2" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 125GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 30 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW RANGED BETWEEN 40 TO 45 PSI WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW WAS 175 PSI
3" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 275 GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 30 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW RANGED BETWEEN 35 TO 38 PSI WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW WAS 175 PSI
4" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS; RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 500 GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 30 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW RANGED BETWEEN 37 TO 42 PSI WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW WAS 172 PSI
6" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS; RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 700 GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 30 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW RANGED BETWEEN 35 TO 40 PSI WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW WAS 170 PSI
8" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS; RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 700 GPM & IS REDUCED UNTIL FLOW IS ZERO	WITH OUTLET PRESSURE CONTROL SETPOINT AT 29 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE IS EQUAL TO AN ACCEPTABLE PLUS OR MINUS 10% WITH OUTLET PRESSURE CONTROL SETPOINT AT 165 PSI & INLET PRESSURE AT 300 PSI, THE RECORDED OUTLET PRESSURE AT ZERO FLOW IS EQUAL TO AN ACCEPTABLE PLUS OR MINUS 15 PSI OF SETPOINT.
10" & 12" GLOBE	DEAD-END SHUT-OFF CHARACTERISTICS; RECORD OUTLET PRESSURE AT ZERO FLOW WHEN FLOW STARTS AT 800 GPM & IS REDUCED UNTIL FLOW IS ZERO.	WITH OUTLET PRESSURE CONTROL SETPOINT FROM 30 PSI TO 175 PSI & INLET PRESSURES FROM 75 TO 300 PSI, THE RECORDED OUTLET PRESSURE IS EQUAL TO AN ACCEPTABLE PLUS OR MINUS 10% OF SETPOINT. WITH OUTLET PRESSURE CONTROL SETPOINT AT 175 PSI & INLET PRESSURE AT 300 PSI THE RECORDED OUTLET AT ZERO FLOW IS EQUAL TO AN ACCEPTABLE PLUS OR MINUS 15 PSI OF SETPOINT.

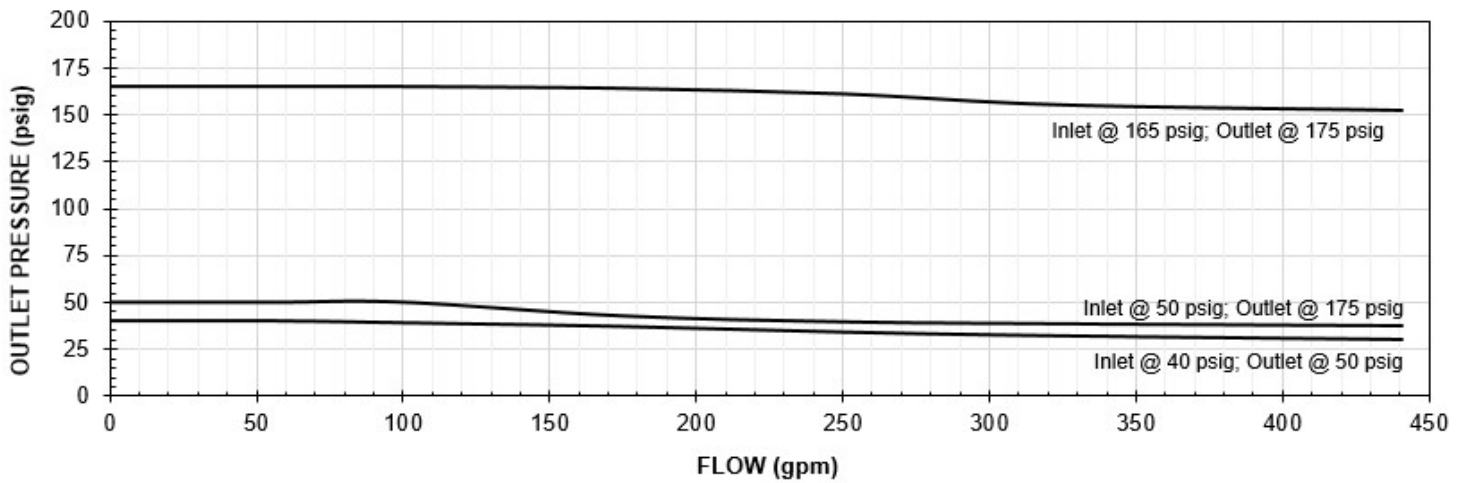
1-1/2" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



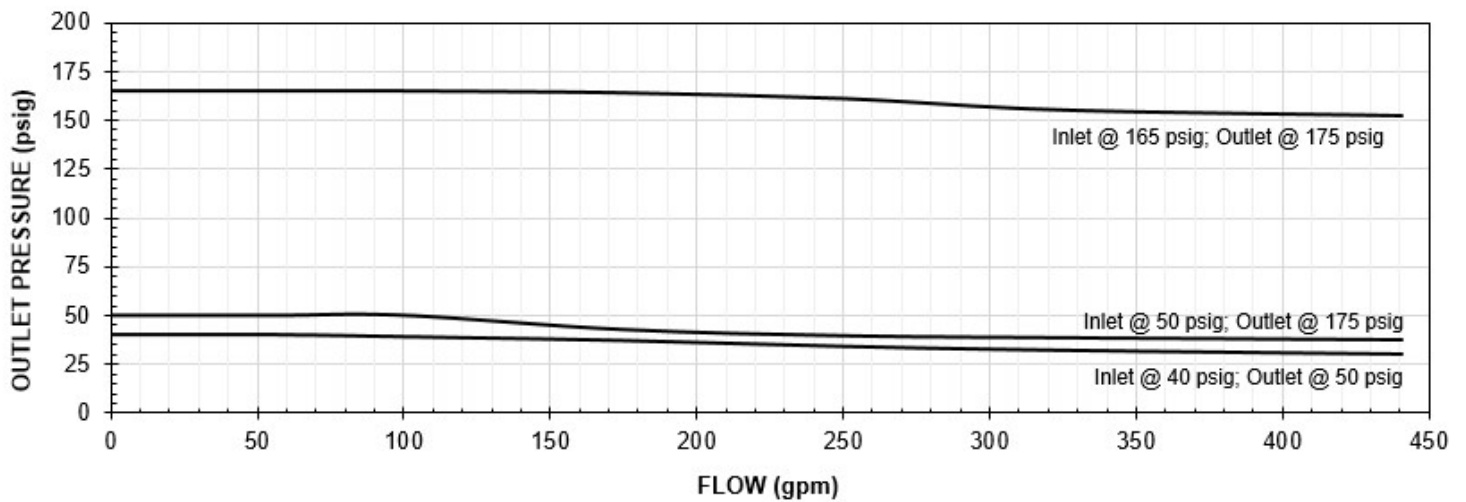
2" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



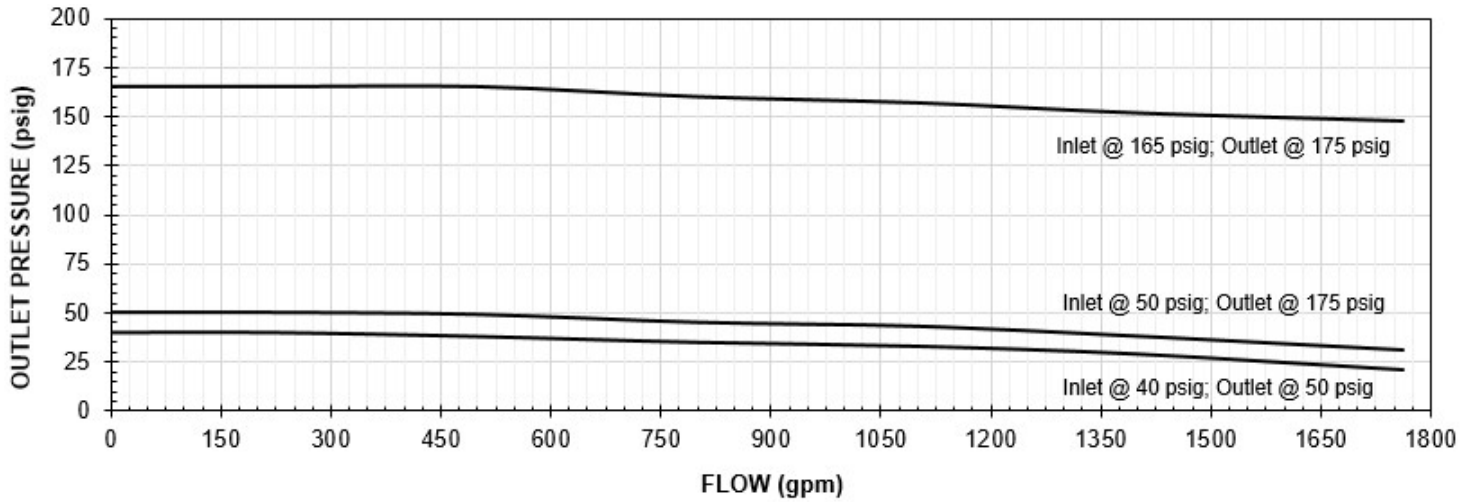
3" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



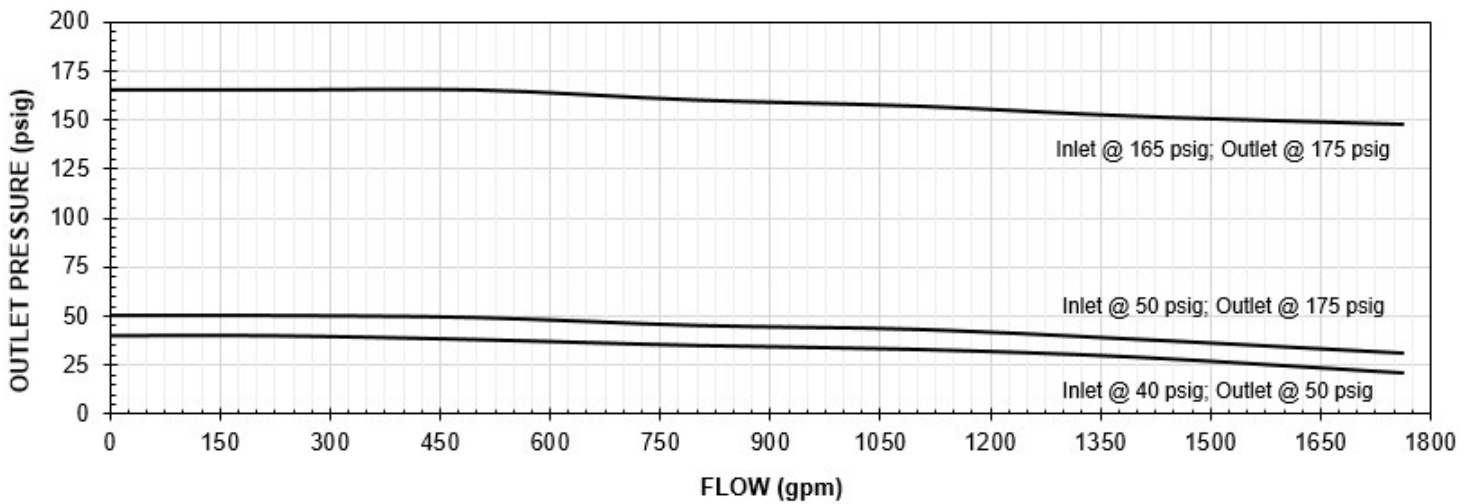
4" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



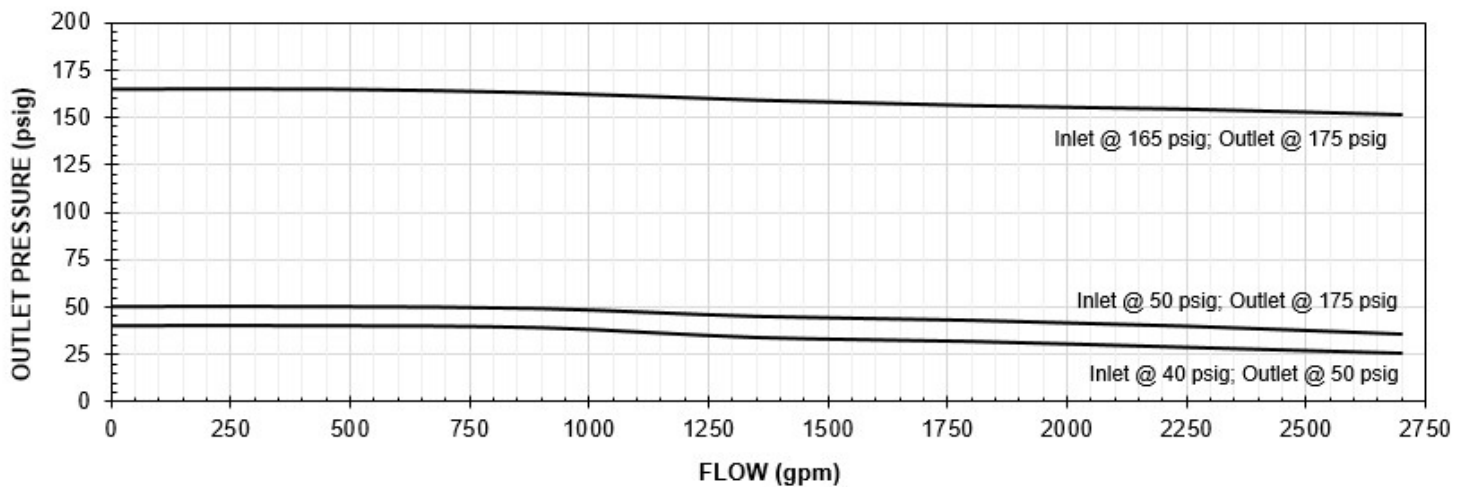
6" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



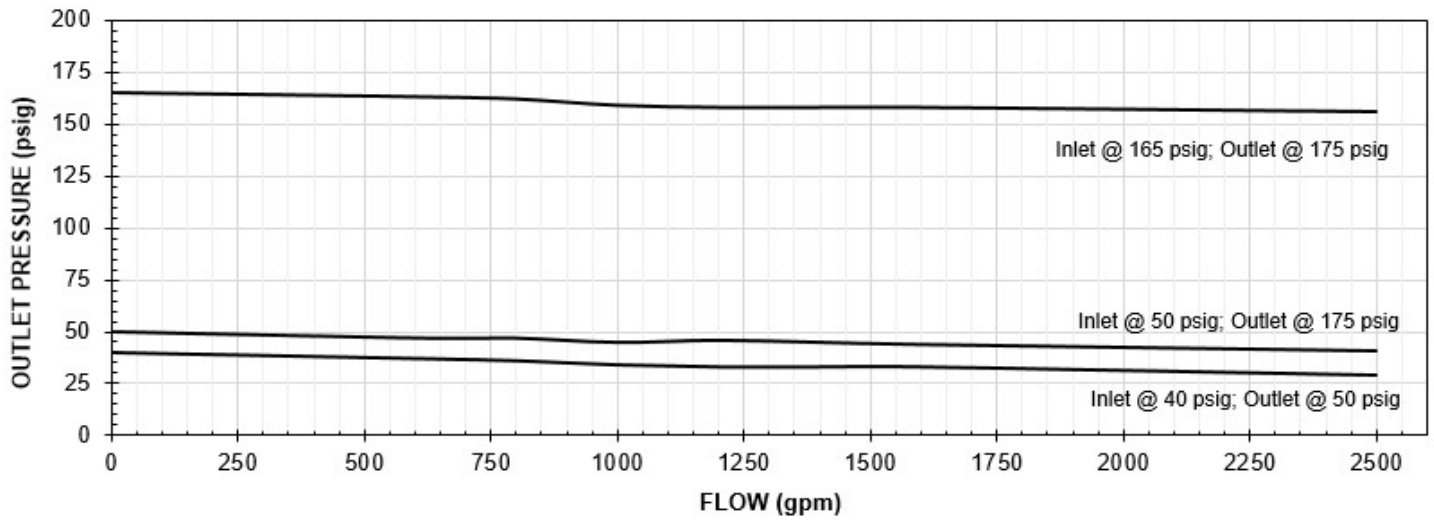
8" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



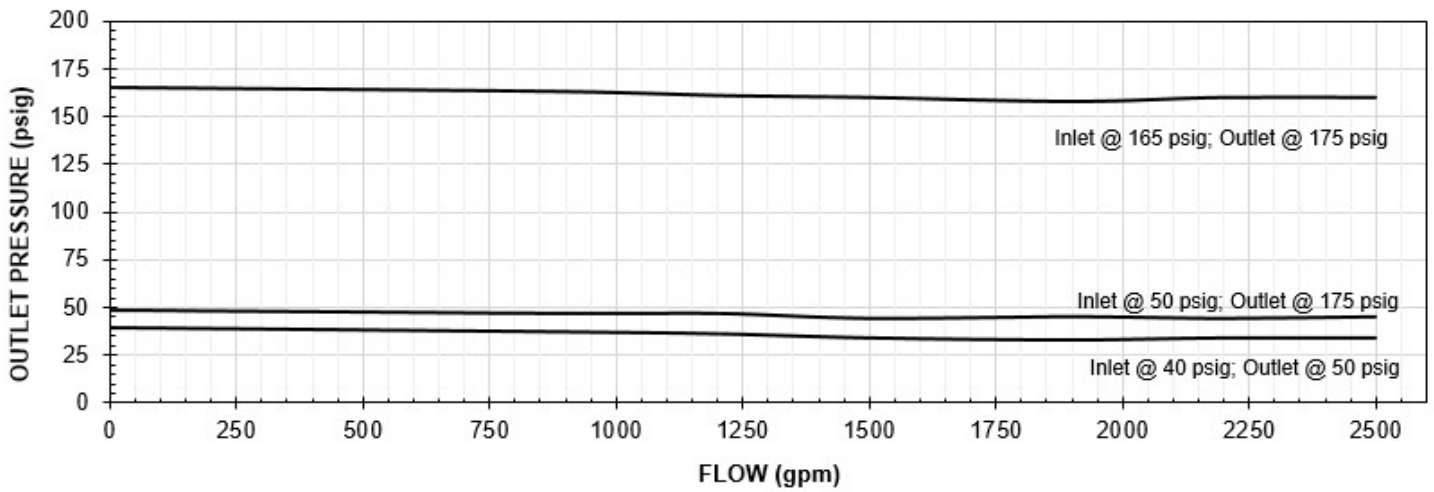
10" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT



12" 90G-21

OBSERVED FLOW RATE WHEN INLET PRESSURE
DROPS BELOW OUTLET PRESSURE SET POINT





—MODEL— **CRD**

Pressure Reducing Control



DESCRIPTION

The Cla-Val Model CRD Pressure Reducing Control automatically reduces a higher inlet pressure to a lower outlet pressure. It is a direct acting, spring loaded, diaphragm type control that operates hydraulically or pneumatically. It may be used as a self-contained valve or as a pilot control for a Cla-Val main valve. It will hold a constant downstream pressure within very close pressure limits.

OPERATION

The CRD Pressure Reducing Control is normally held open by the force of the compression spring above the diaphragm; and delivery pressure acts on the underside of the diaphragm. Flow through the valve responds to changes in downstream demand to maintain a pressure.

INSTALLATION

The CRD Pressure Reducing Control may be installed in any position. There is one inlet port and two outlets, for either straight or angle installation. The second outlet port can be used for a gage connection. A flow arrow is marked on the body casting.

ADJUSTMENT PROCEDURE

The CRD Pressure Reducing Control can be adjusted to provide a delivery pressure range as specified on the nameplate. Pressure adjustment is made by turning the adjustment screw to vary the spring pressure on the diaphragm. The greater the compression on the spring the higher the pressure setting.

1. Turn the adjustment screw in (clockwise) to increase delivery pressure.
2. Turn the adjustment screw out (counter-clockwise) to decrease the delivery pressure.
3. When pressure adjustment is completed tighten jam nut on adjusting screw and replace protective cap.
4. When this control is used, as a pilot control on a Cla-Val main valve, the adjustment should be made under flowing conditions. The flow rate is not critical, but generally should be somewhat lower than normal in order to provide an inlet pressure several psi higher than the desired setting

The approximate minimum flow rates given in the table are for the main valve on which the CRD is installed.

Valve Size	1 1/4" -3"	4"-8"	10"-16"
Minimum Flow GPM	1-2	4-15	35-95

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to open when delivery pressure lowers		Tighten adjusting screw
	Damaged spring	Disassemble and replace
	Spring guide (8) is not in place	Assemble properly
	Yoke dragging on inlet nozzle	Disassemble and reassemble properly (refer to Reassembly)
Fails to close when delivery pressure rises	Spring compressed solid	Back off adjusting screw
	Mechanical obstruction	Disassemble and reassemble properly (refer to Reassembly)
	Worn disc	Disassemble remove and replace disc retainer assembly
	Yoke dragging on inlet nozzle	Disassemble and reassemble properly (refer to Reassembly)
Leakage from cover vent hole	Damaged diaphragm	Disassemble and replace
	Loose diaphragm nut	Remove cover and tighten nut

MAINTENANCE

Disassembly

To disassemble follow the sequence of the item numbers assigned to parts in the sectional illustration.

Reassembly

Reassembly is the reverse of disassembly. Caution must be taken to avoid having the yoke (17) drag on the inlet nozzle of the body (18). Follow this procedure:

1. Place yoke (17) in body and screw the disc retainer assembly (16) until it bottoms.
2. Install gasket (14) and spring (19) for 2-30 and 2-6.5 psi range onto plug (13) and fasten into body. Disc retainer must enter guide hole in plug as it is assembled. Screw the plug in by hand. Use wrench to tighten only.
3. Place diaphragm (12) diaphragm washer (11) and Belleville washer (20) on yoke. Screw on hex nut (10).
4. Hold the diaphragm so that the screw holes in the diaphragm and body align. Tighten diaphragm nut with a wrench. At the final tightening release the diaphragm and permit it to rotate 5° to 10°. The diaphragm holes should now be properly aligned with the body holes.

To check for proper alignment proceed as follows:

Rotate diaphragm clockwise and counterclockwise as far as possible. Diaphragm screw holes should rotate equal distance on either side of body screw holes $\pm 1/8"$.

Repeat assembly procedure until diaphragm and yoke are properly aligned. There must be no contact between yoke and body nozzle during its normal movement. To simulate this movement hold body and diaphragm holes aligned. Move yoke to open and closed positions. There must be no evidence of contact or dragging.

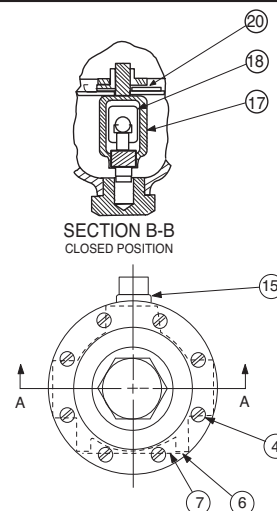
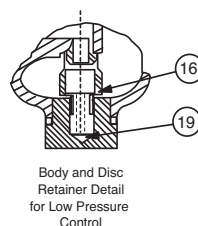
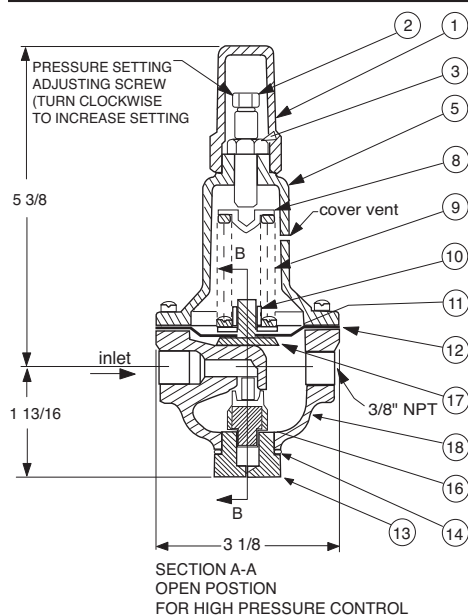
5. Install spring (9) with spring guide (8).
6. Install cover (5), adjusting screw (2) and nut (3), then cap (1).



CRD

Pressure Reducing Control

(Bronze Body with 303SS Trim)



Item	Description	Material	Part Number
1	Cap	PL	67628J
2	Adjusting Screw	BRS	7188201D
3	Jam Nut (3/8-16)	SS	6780106J
4*	Machine Screw (Fil.Hd.) 8 Req'd	303	6757821B
5	Cover	BRS	C2544K
6	Nameplate Screw	SS	67999D
7	Nameplate	BRS	C0022001G
8	Spring Guide	302	71881H
9	Spring (15-75 psi)	CHR/VAN	71884B
	Spring (2 - 6.5 psi)	SS	82575C
	Spring (2 - 30 psi)	SS	81594E
	Spring (20 - 105 psi)	316	20632101E
	Spring (30 - 300 psi)	CHR/VAN	71885J
10	Hex Nut	303	71883D
11	Diaphragm Washer	302	71891G
12*	Diaphragm	NBR	C6936D
13	Plug, Body	BRS	V5653A
14*	Gasket	Fiber	40174F
15	Plug	BRS	6766003F
16*	Disc Retainer Assy. (2 - 30 psi)	SS/Rub	C8348K
	Disc Retainer Assy. (15 - 75 psi)	SS/Rub	37133G
	Disc Retainer Assy. (20 - 105 psi)	SS/Rub	37133G
	Disc Retainer Assy. (30 - 300 psi)	SS/Rub	37133G
17	Yoke	VBZ	V6951H
18	Body & 1/4" Seat Assy	BR/SS	8339702G
19*	Bucking Spring (2 - 6.5 psi)(2 - 30psi)	302	V0558G
20	Belleville Washer	STL	7055007E
*	Repair Kit (No Bucking Spring)	Buna®-N	9170003K
*	Repair Kit (with Bucking Spring)	Buna®-N	9170002B

*SUGGESTED REPAIR PARTS

Size (inch)	Stock Number	Adjustment Range	
		psi	Ft of Water
3/8	7194307A	2 - 6.5	4.5 - 15
3/8	7194308J	2 - 30	4.5 - 69
3/8	7194303K	15 - 75	35 - 173
3/8	7194311C	20 - 105	46 - 242
3/8	7194304H	30 - 300	69 - 692
Factory Set Pressure		PSI per Turn*	
	2 - 6.5 set @ 3.5 psi	.61	
	2 - 30 set @ 10 psi	3.0	
	15 - 75 set @ 20 psi	9.0	
	20 - 105 set @ 60 psi	12.0	
	30 - 300 set @ 60 psi	27.0	

*Approximate-Final Adjustment should be with a pressure gauge and with flow.

When ordering parts specify:

- All nameplate data
- Item Description
- Item number



— MODEL — **X46**

Flow Clean Strainer



X46A Straight



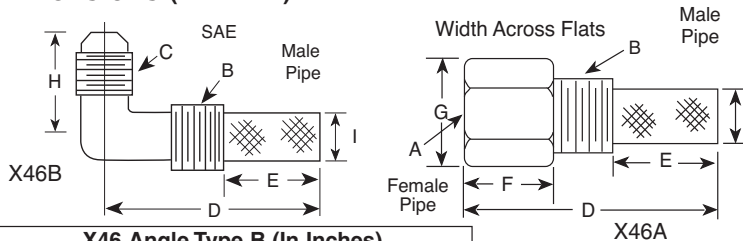
X46B Angle

- Self Scrubbing Cleaning Action
- Straight Type or Angle Type

The Cla-Val Model X46 Strainer is designed to prevent passage of foreign particles larger than .015". It is especially effective against such contaminant as algae, mud, scale, wood pulp, moss, and root fibers. There is a model for every Cla-Val. valve.

The X46 Flow Clean strainer operates on a velocity principle utilizing the circular "air foil" section to make it self cleaning. Impingement of particles is on the "leading edge" only. The low pressure area on the downstream side of the screen prevents foreign particles from clogging the screen. There is also a scouring action, due to eddy currents, which keeps most of the screen area clean.

Dimensions (In Inches)



X46 Angle Type B (In Inches)

B(NPT)	C(SAE)	D	E	H	I
1/8	1/4	1-3/8	5/8	7/8	1/4
1/4	1/4	1-3/4	3/4	1	3/8
3/8	1/4	2	7/8	1	1/2
3/8	3/8	1-7/8	7/8	1	1/2
1/2	3/8	2-3/8	1	1-1/4	5/8

**When Ordering,
Please Specify:**

- Catalog Number X46
- Straight Type or Angle Type
- Size Inserted Into and Size Connection
- Materials

X46A Straight Type A (In Inches)

A (NPT)	B (NPT)	D	E	F	G	I
1/8	1/8	1-3/4	3/4	1/2	1/2	1/4
1/4	1/4	2-1/4	1	3/4	3/4	3/8
3/8	3/8	2-1/2	1	7/8	7/8	1/2
3/8	1/2	2-1/2	1-1/4	1/2	7/8	3/4
1/2	1/2	3	1-1/4	1	1-1/8	3/4
3/8	3/4	3-3/8	2	1/2	1	7/8
3/4	3/4	4	2	1	1-1/2	7/8
3/8	1	4-1/4	2-3/4	1/2	1-3/8	7/8
1	1	4-1/2	2-3/4	1-1/4	1-3/4	7/8
1/2	1	4-1/4	2-3/4	1/2	1-3/8	7/8

INSTALLATION

The strainer is designed for use in conjunction with a Cla-Val Main Valve, but can be installed in any piping system where there is a moving fluid stream to keep it clean. When it is used with the Cla-Val Valve, it is threaded into the upstream body port provided for it on the side of the valve. It projects through the side of the Main Valve into the flow stream. All liquid shunted to the pilot control system and to the cover chamber of the Main Valve passes through the X46 Flow Clean Strainer.

INSPECTION

Inspect internal and external threads for damage or evidence of cross-threading. Check inner and outer screens for clogging, embedded foreign particles, breaks, cracks, corrosion, fatigue, and other signs of damage.

DISASSEMBLY

Do not attempt to remove the screens from the strainer housing.

CLEANING

After inspection, cleaning of the X46 can begin. Water service usually will produce mineral or lime deposits on metal parts in contact with water. These deposits can be cleaned by dipping X46 in a 5-percent muriatic acid solution just long enough for deposit to dissolve. This will remove most of the common types of deposits.

Caution: use extreme care when handling acid. If the deposit is not removed by acid, then a fine grit (400) wet or dry sandpaper can be used with water. Rinse parts in water before handling. An appropriate solvent can clean parts used in fueling service. Dry with compressed air or a clean, lint-free cloth. Protect from damage and dust until reassembled.

REPLACEMENT

If there is any sign of damage, or if there is the slightest doubt that the Model X46 Flow Clean Strainer may not afford completely satisfactory operation, replace it. Use Inspection steps as a guide. Neither inner screen, outer screen, nor housing is furnished as a replacement part. Replace Model X46 Flow Clean Strainer as a complete unit.

When ordering replacement Flow-Clean Strainers, it is important to determine pipe size of the tapped hole into which the strainer will be inserted (refer to column A or F), and the size of the external connection (refer to column B or G).



90-21 UL

Product Identification

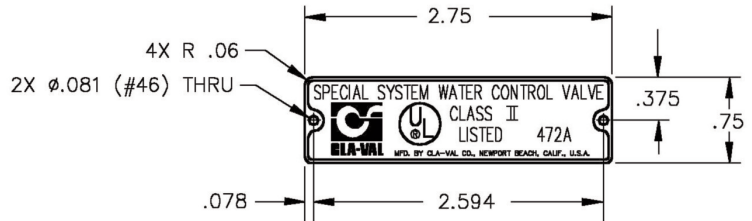
How to Order

Proper Identification

For ordering repair kits, replacement parts, or for inquiries concerning valve operation it is important to properly identify Cla-Val products already in service. Include all nameplate data with your inquiry. Pertinent product data includes valve function, size, material, pressure rating, end details, type of pilot controls used and control adjustment ranges.

Identification Plate

For product identification, cast in body markings are supplemented by the identification plate illustrated on this page. The plate is mounted in the most practical position. **It is extremely important that this identification plate is not painted over, removed, or in any other way rendered illegible.**



Specify when Ordering

- Model Number
- Adjustment Range (As Applicable)
- Valve Size
- Optional Features
- Pressure Class

How To Order

There are many valves and controls manufactured by Cla-Val that are not listed due to the sheer volume. For information not listed, please contact your local Cla-Val representative.

Unless Otherwise Specified

- X46A Strainer is included.
- CK2 Isolation Valves is included in price on 6" and larger valve sizes.

Limited Warranty

Automatic valves and controls as manufactured by Cla-Val are warranted for one year from date of shipment against manufacturing defects in material and workmanship which develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by Cla-Val.

We will repair or replace defective material, free of charge, which is returned to our factory, transportation charges prepaid, provided that, after inspection, the material is found to have been defective at time of shipment. This warranty is expressly conditioned on the purchaser's giving Cla-Val immediate written notice upon discovery of the defect.

Components used by Cla-Val but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

This warranty shall not apply if the product has been altered or repaired by others, and Cla-Val shall make no allowance or credit for such repairs or alterations unless authorized in writing by Cla-Val.

Terms Of Sale

ACCEPTANCE OF ORDERS

All orders are subject to acceptance by our main office at Newport Beach, California.

CREDIT TERMS

Credit terms are net thirty (30) days from date of invoice.

PURCHASE ORDER FORMS

Orders submitted on customer's own purchase order forms will be accepted only with the express understanding that no statements, clauses, or conditions contained in said order form will be binding on the Seller if they in any way modify the Seller's own terms and conditions of sales.

PRODUCT CHANGES

The right is reserved to make changes in pattern, design or materials when deemed necessary, without prior notice.

PRICES

All prices are F.O.B. Newport Beach, California, unless expressly stated otherwise on our acknowledgement of the order. Prices are subject to change without notice. The prices at which any order is accepted are subject to adjustment to the Seller's price in effect at the time of shipment. Prices do not include sales, excise, municipal, state or any other Government taxes. Minimum order charge \$75.00.

RESPONSIBILITY

We will not be responsible for delays resulting from strikes, accidents, negligence of carriers, or other causes beyond our control. Also, we will not be liable for any unauthorized product alterations or charges accruing there from.

Disclaimer Of Warranties And Limitations Of Liability

The foregoing warranty is exclusive and in lieu of all other warranties and representations, whether expressed, implied, oral or written, including but not limited to any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

Cla-Val shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product. Cla-Val shall not be liable for any damages or charges for labor or expense in making repairs or adjustments to the product. Cla-Val shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services. No representative of Cla-Val may change any of the foregoing or assume any additional liability or responsibility in connection with the product. The liability of Cla-Val is limited to material replacements F.O.B. Newport Beach, California.

Risk

All goods are shipped at the risk of the purchaser after they have been delivered by us to the carrier. Claims for error, shortages, etc., must be made upon receipt of goods.

EXPORT SHIPMENTS

Export shipments are subject to an additional charge for export packing.

RETURNED GOODS

1. Customers must obtain written approval from Cla-Val prior to returning any material.
2. Cla-Val reserves the right to refuse the return of any products.
3. Products more than six (6) months old cannot be returned for credit.
4. Specially produced, non-standard models cannot be returned for credit.
5. Rubber goods cannot be returned for credit, unless as part of an unopened repair kit which is less than six months old.
6. Goods authorized for return are subject to a 35% (\$75 minimum) restocking charge and a service charge for inspection, reconditioning, replacement of rubber parts, retesting and repackaging as required.
7. Authorized returned goods must be packaged and shipped prepaid to Cla-Val., 1701 Placentia Avenue, Costa Mesa, California 92627-4475.



CLA-VAL

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New Zealand
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www.cla-valpacific.com
E-mail: info@cla-valpacific.com



—MODEL— REPAIR KITS

Model 100-01 Hytrol Main Valve

BUNA-N MATERIAL				
	RUBBER KIT	REPAIR KIT	REBUILD ASSEMBLY	STUD & NUT KIT
	STOCK NO.	STOCK NO.	STOCK NO.	STOCK NO.
3/8"	9169801K		21176614B	21176633J
1/2"	9169802H	21176602F	21176615A	21176634H
3/4"	9169802H	21176602F	21176615A	21176634H
1" Non-Guided	9169803F	21176601G	21176616K	21176636F
1"	9169804D	21176603E	21176617J	21176636F
1 1/4"	9169804D	21176603E	21176617J	21176636F
1 1/2"	9169804D	21176603E	21176617J	21176636F
2"	9169805A	21176608K	21176618H	21176637E
2 1/2"	9169811J	21176609J	21176619G	21176638D
3"	9169812G	21176604D	21176620D	21176639C
4"	9169813E	21176605C	21176621C	21176640K
6"	9169815K	21176606B	21176622B	21176641J
8"	9817901D	21176607A	21176623A	21176642H
10"	9817902B	21176610F	21176624K	21176643G
12"	9817903K	21176611E	21176625J	21176644F
14"	9817904H	21176612D	21176626H	21176645E
16"	9817905E	21176613C	21176627G	21176645E

Model 100-20 Hytrol Main Valve

BUNA-N MATERIAL				
	RUBBER KIT	REPAIR KIT	REBUILD ASSEMBLY	STUD & NUT KIT
	STOCK NO.	STOCK NO.	STOCK NO.	STOCK NO.
3"	9169805A	21176608K	21176618H	21176637E
4"	9169812G	21176604D	21176620D	21176639C
6"	9169813E	21176605C	21176621C	21176640K
8"	9169815K	21176606B	21176622B	21176641J
10"	9817901D	21176607A	21176623A	21176642H
12"	9817902B	21176610F	21176624K	21176643G
14"	9817903K	21176611E	21176625J	21176644F
16"	9817903K	21176611E	21176625J	21176644F

Consult factory for larger sizes

Rubber Kit Includes: Diaphragm, Disc, Spacer Washers

Repair Kit Includes: Diaphragm, Disc, Spacer Washers, Epoxy Coated Disc Retainer, Epoxy Coated Diaphragm Washer, Protective Washer

Rebuild Assembly Includes: Diaphragm, Disc, Spacer Washers, Epoxy Coated Disc Retainer, Epoxy Coated Diaphragm Washer, Protective Washer, Stainless Steel Bolts & Washers (6" & Below), Stainless Steel Studs, Nuts, & Washers (8" & Above), Stem, Stem Nut, Disc Guide, Standard Cover Spring, Cover Washer

Stud & Nut Kit Includes: Stainless Steel Bolts & Washers (6" & Below), Stainless Steel Studs, Nuts, & Washers (8" & Above)

Repair Kits for 100-02/100-21 Powertrol and 100-03/100-22 Powercheck Main Valves**For:** Powertrol and Powercheck Main Valves—150 Pressure Class Only**Includes:** Diaphragm, Disc (or Disc Assembly) and O-rings and full set of spare Spacer Washers.

Valve Size	Kit Stock Number 100-02	Valve Size	Kit Stock Number	
			100-02 & 100-03	100-21 & 100-22
3/8"	9169901H	2 1/2"	9169910J	N/A
1/2" & 3/4"	9169902F	3"	9169911G	9169905J
1"	9169903D	4"	9169912E	9169911G
1 1/4" & 1 1/2"	9169904B	6"	9169913C	9169912E
2"	9169905J	8"	99116G	9169913C
		10"	9169939H	99116G
		12"	9169937B	9169939H

Larger Sizes: Consult Factory.

Repair Kits for 100-04/100-23 Hy-Check Main Valves**For:** Hy-Check Main Valves—150 Pressure Class Only**Includes:** Diaphragm, Disc and O-Rings and full set of spare Spacer Washers.

Valve Size	Kit Stock Number		Valve Size	Kit Stock Number	
	100-04	100-23		100-04	100-23
4"	20210901B	N/A	12"	20210905H	20210904J
6"	20210902A	20210901B	14"	20210906G	N/A
8"	20210903K	20210902A	16"	20210907F	20210905H
10"	20210904J	20210903K	20"	N/A	20210907F
			24"	N/A	20210907F

Larger Sizes: Consult Factory.

Repair Kits for Pilot Control Valves (In Standard Materials Only)**Includes:** Diaphragm, Disc (or Disc Assembly), O-Rings, Gaskets or spare Screws as appropriate.

BUNA-N® (Standard Material)				VITON (For KB Controls)	
Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number	Pilot Control	Kit Stock Number
CDB	9170006C	CFM-9	12223E	CDB-KB	9170012A
CDB-30	9170023H	CRA (w/bucking spring)	9170001D	CRA-KB	N/A
CDB-31	9170024F	CRD (w/bucking spring)	9170002B	CRD-KB (w/bucking spring)	9170008J
CDB-7	9170017K	CRD (no bucking spring)	9170003K	CRL-KB	9170013J
CDH-2	18225D	CRD-18	20275401K	CDHS-2BKB	9170010E
CDHS-2	44607A	CRD-22	98923G	CDHS-2FKB	9170011C
CDHS-2B	9170004H	CRL (55F, 55L)	9170007A	CDHS-18KB (no bucking spring)	9170009G
CDHS-2F	9170005E	CRL60/55L-60	9170033G	102C-KB	1726202D
CDHS-3C-A2	24657K	CRL60/55L60 1"	9170042H		
CDHS-8A	2666901A	CRL-4A	43413E		
CDHS-18	9170003K	CRL-5 (55B)	65755B		
CDS-4	9170014G	CRL-5A (55G)	20666E		
CDS-5	14200A	CRL-18	20309801C		
CDS-6	20119301A	Universal CRL	9170041K		
CDS-6A	20349401C	CV	9170019F		
CFCM-M1	1222301C	X105L (O-ring)	00951E	Buna-N®	
CFM-2	12223E	102B-1	1502201F		
CFM-7	1263901K	102C-2	1726201F		
CFM-7A	1263901K	102C-3	1726201F		
				CRD Disc Ret. (Solid)	C5256H
				CRD Disc Ret. (Spring)	C5255K

Repair Assemblies (In Standard Materials Only)

Control	Description	Stock Number
CF1-C1	Pilot Assembly Only	89541H
CF1-CI	Complete Float Control less Ball and Rod	89016A
CFC2-C1	Disc, Distributor and Seals	2674701E
CSM 11-A2-2	Mechanical Parts Assembly	97544B
CSM 11-A2-2	Pilot Assembly Only	18053K
33A 1"	Complete Internal Assembly and Seal	2036030B
33A 2"	Complete Internal Assembly and Seal	2040830J

When ordering, please give complete nameplate data of the valve and/or control being repaired. MINIMUM ORDER CHARGE APPLIES

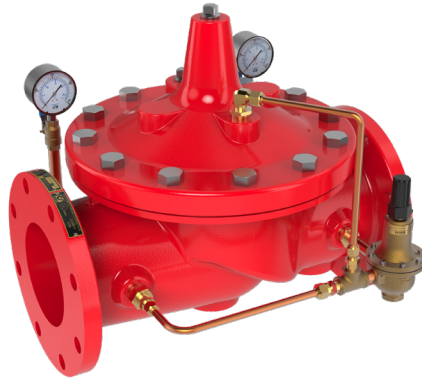
CLA-VAL1701 Placentia Ave • Costa Mesa CA 92627 Phone: 949-722-4800 • Fax: 949-548-5441 • E-mail: info@cla-val.com • www.cla-val.com
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N-RK (R-04/2019)



MODELS **90G-21**
90A-21

Fire Protection Pressure Reducing Valves



- **UL & ULC Listed**
- **Globe or Angle Pattern**
- **Proven Reliable Design**
- **In Line Service**
- **Grooved Ends (1-1/2" - 8")**

Cla-Val 90-21 Pressure Reducing Valves are indispensable in any fire protection system. Available in globe (90G-21) and angle patterns (90A-21), our diaphragm actuated design is proven to be highly reliable and easy to maintain. Our 90-21 valves feature a full range of adjustments and variety of material options.

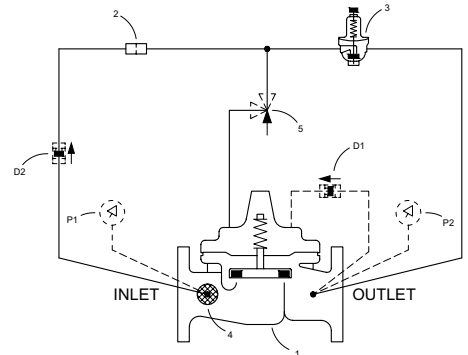
Special System Water Control Valves – Class II
UL Product Category VLMT – File No. Ex 2534

Function

Cla-Val 90G-21 (globe) and 90A-21 (angle) Pressure Reducing Valves automatically reduce a higher inlet pressure to a steady lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. The valves pilot control system is very sensitive to slight downstream pressure fluctuations, and will automatically modulate to maintain the desired pressure setting. The downstream pressure can be set over a wide range by turning the adjustment screw clockwise (increase pressure) or counter clockwise (decrease pressure) on the CRD pilot control. The adjustment screw is protected by a screw-on cover, which can be sealed to discourage tampering.

Schematic Diagram

Item	Description
1	100-01 Hytrol Main Valve
2	X58C Restriction Assembly
3	CRD Pressure Reducing Control
4	X46A Flow Clean Strainer
5	CV Flow Control (opening)
D	Check Valve Option
P	Gauge Option

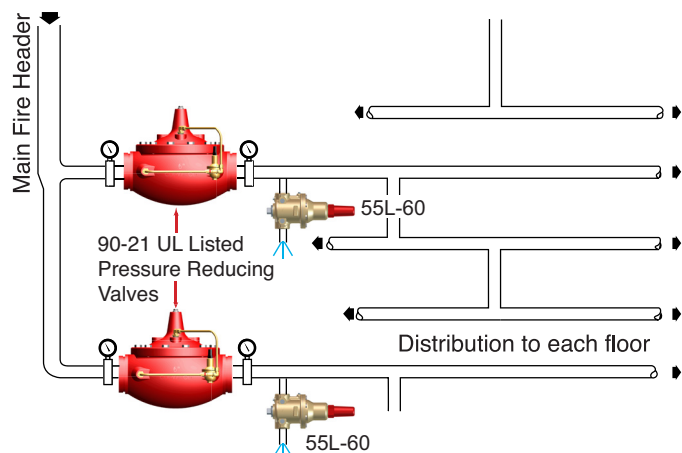


Typical Application

Underwriters Laboratories requires the installation of pressure gauges upstream and downstream of the Pressure Reducing Valve.

A relief valve of not less than 1/2 inch in size must also be installed on the downstream side of the pressure control valve. Adequate drainage for the relief valve discharge must be provided.

The valve may be installed in either vertical or horizontal positions.



Dimensions

Valve Size (Inches)	1 1/2	2	2 1/2	3	4	6	8	10	12
A Threaded	7.25	9.38	11.00	12.50	—	—	—	—	—
AA 150 ANSI	8.50	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00
AAA 300 ANSI	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50
AAAA Grooved End	8.50	9.00	11.00	12.50	15.00	20.00	25.38	—	—
B	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75
BB Grooved End	2.00	2.50	2.88	3.12	4.25	6.00	7.56	—	—
C Max.	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88
CC Max. Grooved End	4.75	5.75	6.88	7.25	9.31	12.12	14.62	—	—
E Threaded	3.25	4.75	5.50	6.25	—	—	—	—	—
EE 150 ANSI	4.00	4.75	5.50	6.00	7.50	10.00	12.69	14.88	17.00
EEE 300 ANSI	4.25	5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75
EEEE Grooved End	—	4.75	—	6.00	7.50	—	—	—	—
F Threaded	1.88	3.25	4.00	4.50	—	—	—	—	—
FF 150 ANSI	4.00	3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75
FFF 300 ANSI	4.25	3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50
FFFF Grooved End	—	3.25	—	4.25	5.00	—	—	—	—
Y	9	9	10	11	12	20	22	24	26
Z	9	9	10	11	12	20	22	24	26

Valve Size (mm)	40	50	65	80	100	150	200	250	300
A Threaded	184	238	279	318	—	—	—	—	—
AA 150 ANSI	216	238	279	305	381	508	645	756	864
AAA 300 ANSI	229	254	295	337	397	533	670	790	902
AAAA Grooved End	216	228	279	318	381	508	645	—	—
B	29	38	43	52	81	110	135	235	273
BB Grooved End	52	64	73	79	108	152	192	—	—
C Max.	140	165	192	208	270	340	406	435	530
CC Max. Grooved End	120	146	175	184	236	308	371	—	—
E Threaded	83	121	140	159	—	—	—	—	—
EE 150 ANSI	102	121	140	152	191	254	322	378	432
EEE 300 ANSI	108	127	149	162	200	267	337	395	451
EEEE Grooved End	—	121	—	152	191	—	—	—	—
F Threaded	48	83	102	114	—	—	—	—	—
FF 150 ANSI	102	83	102	102	127	152	203	219	349
FFF 300 ANSI	102	89	110	111	135	165	216	236	368
FFFF Grooved End	—	83	—	108	127	—	—	—	—
Y	229	229	254	280	305	508	559	610	661
Z	229	229	254	280	305	508	559	610	661

Selection Guidelines

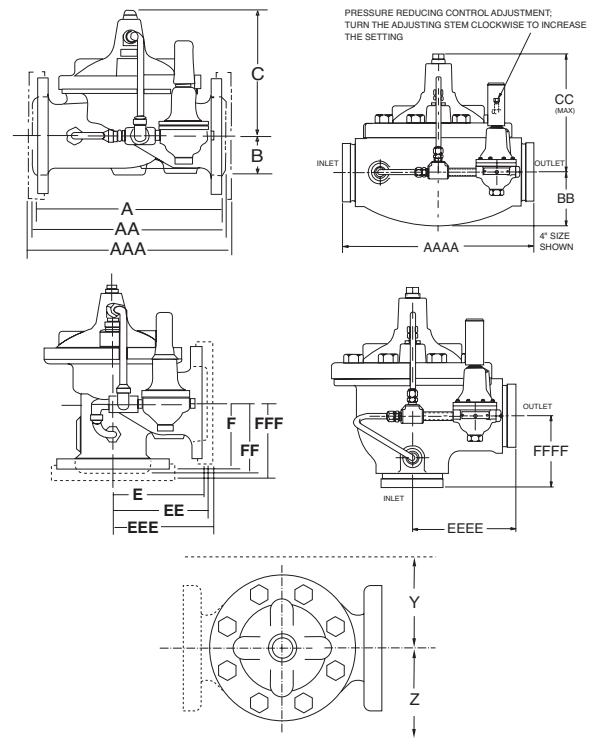
Flow Capacity Table Flow Rate (GPM of Water)

Valve Size	Maximum
1 1/2"	110
2"	196
2 1/2"	306
3"	441
4"	783
6"	1763
8"	3133
10"	4896
12"	7050

Optional UL Listed Materials for Seawater and Severe Service Applications:

- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)

Note: (1) Minimum Pressure Differential decreases as flow rates decrease.
(2) All sizes are designed to meet minimum flow of system components.



End Details	150 and 300 ANSI B16.42
Pressure Ratings	Class 150 - 250 psi Max. Class 300 - 300 psi Max
Standard Materials	Main Valve Body & Cover: Ductile Iron ASTM A536 Grade 65-45-12 Standard Main Valve Trim: Stainless Steel Seat Stainless Steel Stem Standard Pilot Control System: Cast Bronze with Stainless Steel Trim
Pressure Adjustment Ranges	Size UL / ULC 1-1/2" 50-175 2" 30-165 8"- 12" 50-175

Minimum Pressure Differential (at Max Flow) 1-1/2" - 12" 20 psid

Temperature Range Water to 180°F Maximum

The pressure rating of the components installed downstream of the valve shall not be exceeded.

When Ordering, Specify:

- Model Number 90-21
- Size
- Globe or Angle Pattern
- Main Valve Body and Cover Material
- Threaded, Flanged or Grooved
- Pressure Class

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