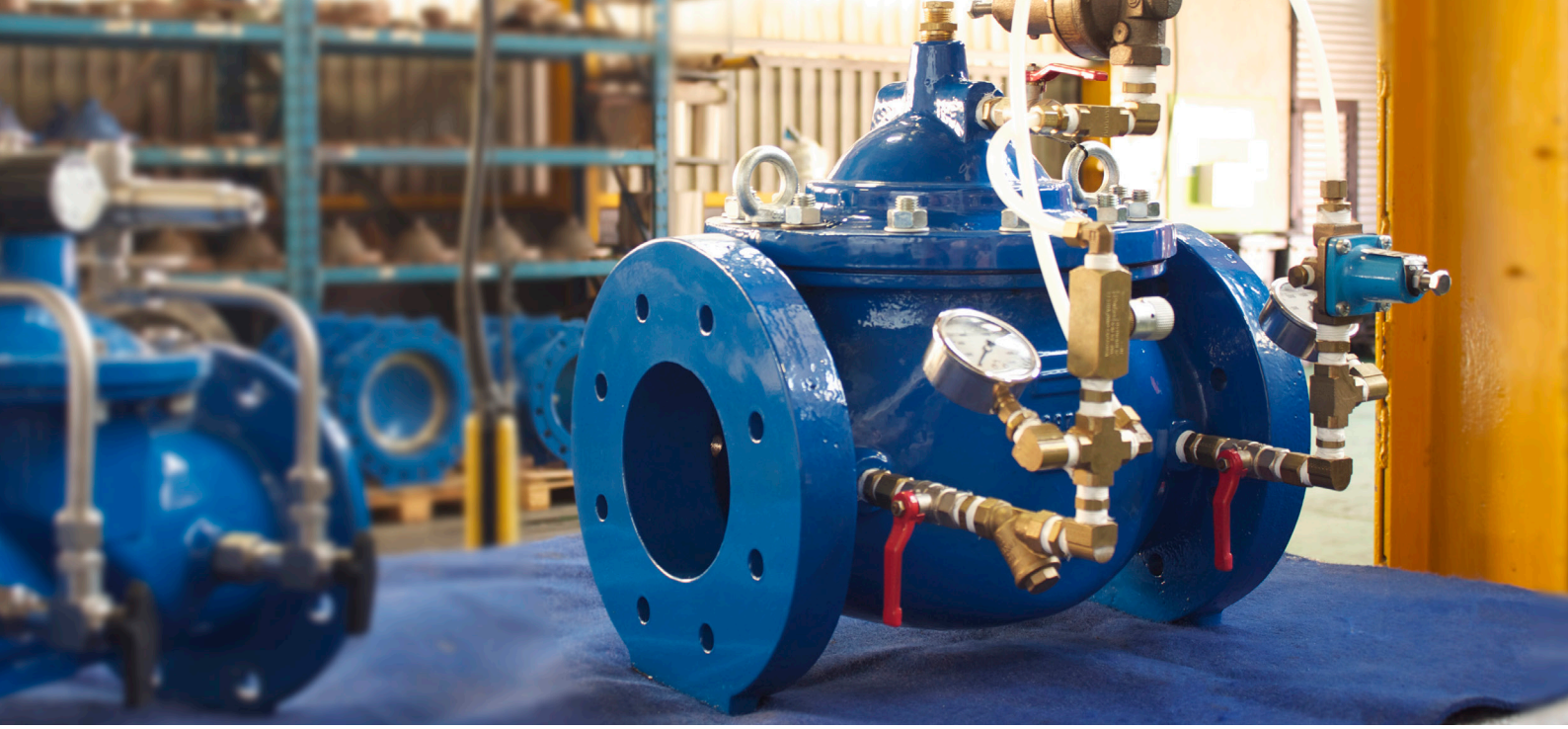
AVK SOUTHERN AFRICA | THE ART OF FLOW CONTROL

BAKER CONTROL VALVES

PREMIER VALVES

Member of the AVK group



INTRODUCTION

THE BAKER CONTROL VALVE HAS PLAYED A SIGNIFICANT ROLE IN THE WATER AND MINING INDUSTRIES SINCE 1975.

For more than 40 years, Baker Control Valves have offered a technical competitive advantage to the market by providing a 4:1 pressure reduction ratio. Similar control valves offered in the market only have a 3:1 ratio. The Baker Control Valve, which is part of the Premier Valves product range, can operate at low pressures, improving the life span and maintenance of the valve and consequently reducing costs.

Premier Valves is recognised for the manufacture and supply of a broad range of valve products in South Africa for over 50 years. We are proud to offer the Baker Control Valve as a locally manufactured product, which is fully compliant with the legal requirements of 70% local content.

In addition to offering a proudly South African product, the Baker Control Valve features include

- A full- bore valve port , resulting in greater flow capacities
- A “quad” seal” which provides a bubble tight closure
- A PN25 design pressure rated Valve as our Standard Valve, manufactured in ductile iron SG40.

The product is available from sizes DN50 to DN600 and in Pressure Ratings of up to PN40.

BCV
BAKER CONTROL VALVE

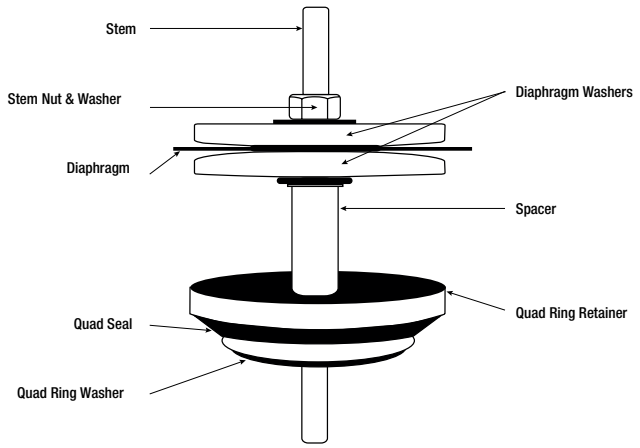
There are many factors that need to be considered when selecting and sizing the right control valve. Due to the technical nature of the Baker product, our technical team is readily available to assist. Training is provided at our in-house training facility, called The Academy, where customers, distributors and agents are welcome to share in the theoretical knowledge and practical interaction with our flow lab.

FEATURES

FUSION BONDED EPOXY PROLONGS LIFE

This coating is applied under rigorous preparation and application standards. It is non-porous, improving the flow co-efficiency of the valve and effectively sealing the casting from interaction with the controlled liquid. The coating also protects the valve from environmental attack. The finish prevents mineral build-up and rust (a major factor in control valve failure), simplifies maintenance and prolongs the life of the valve.

Standard coating thickness: 250 microns.
Other coatings available on request.



DIAPHRAGM/STEM ASSEMBLY

SUPERIOR PERFORMANCE

The design and innovative features incorporated into every Baker Automatic Control valve means consistent, dependable, high performance, positive control and long life.

EFFICIENT DESIGN

The main valve is diaphragm actuated, hydraulically operated. It consists of only four major components. The body and cover plus interior seat and diaphragm/stem assembly, which is the only moving part in the main valve.

VARIABLE VOLUME COVER CHAMBER

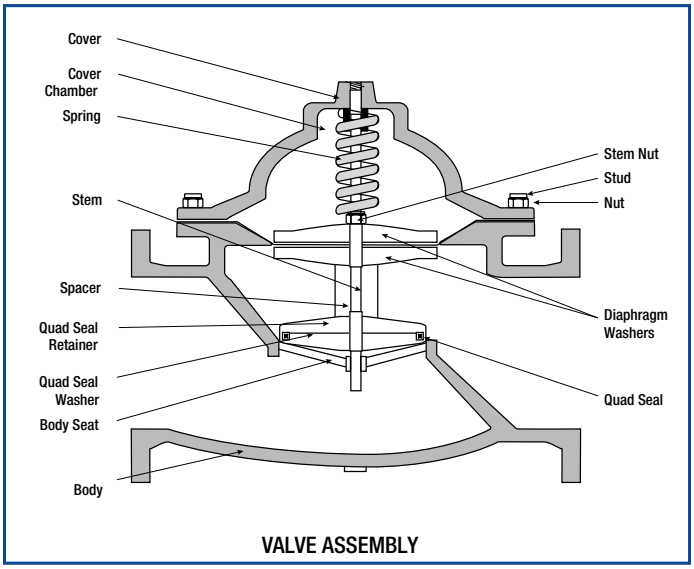
A synthetic rubber/nylon diaphragm, of reinforced Buna N materials, is assembled between the valve body and cover. This creates a sealed chamber into which line fluid and pressure is introduced. Varying the amount of pressure accurately positions the stem assembly to open, close or modulate the valve as required.

PRECISE ALIGNMENT AND STABLE THROTTLING

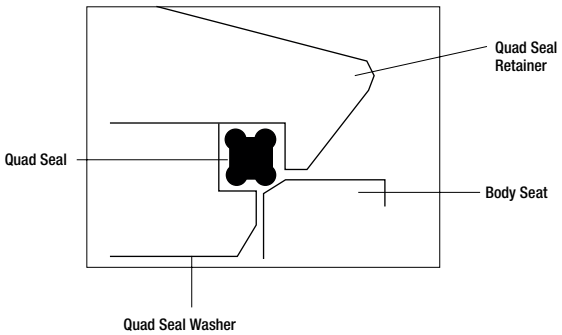
A cover bearing and integral seat bearing guides the stem assembly for precise alignment with the seat. Coupled with the quad seal retainer plate, this alignment assures progressive opening/closing flows, stable throttling, low friction operation and positive closure.

DRIP TIGHT SEAL

Baker leads the automatic valve industry by being the first to incorporate the dynamic quad seal. The seat is retained on three ½ sides and is completely out of the flow path. It provides positive closure while eliminating the need to “bite” into the seal, adding years to the valve’s life. Each quad seal has two usable sides. The Quad Seal has been in use for many years and has reduced maintenance by a considerable amount.



VALVE ASSEMBLY



OPERATION

SYSTEM OF OPERATION

The Baker hydraulic control valve system is based on a robust, reliable, hydraulically operated, diaphragm actuated valve with which various controls may be incorporated, either singly or in combination with each other, to provide any conceivable operation that may be required for regulating the flow of water.

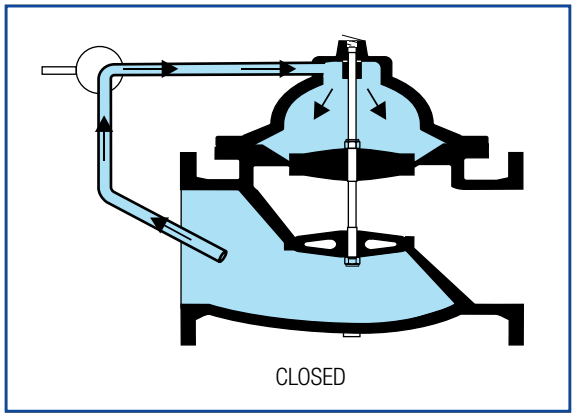
PILOTS

Up to 1500 combinations of pilot arrangements are available and these are affected by the use of the following basic functions:

Function 10	Float level control
Function 12	Differential relief control
Function 13	Solenoid control
Function 14	Rate-of-flow control
Function 15	Pressure reducing control (integrally sensed)
Function 15-1	Pressure reducing control (remotely sensed)
Function 16	Pressure sustaining/relief control
Function 22	Accelerator control (with an integral orifice)
Function 22-1	Accelerator control
Function 27	Altitude level control

These functions may be supplemented by the use of the following accessories:

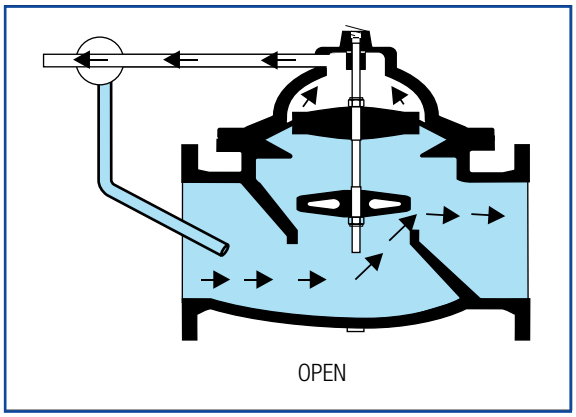
Function 50	Valve position indicators
Function 51	Limit switches
Function 60	Flow clean strainers
Function 60-1	“Y” pattern strainers



CLOSED

VALVE CLOSED - VALVE IN FULLY CLOSED POSITION

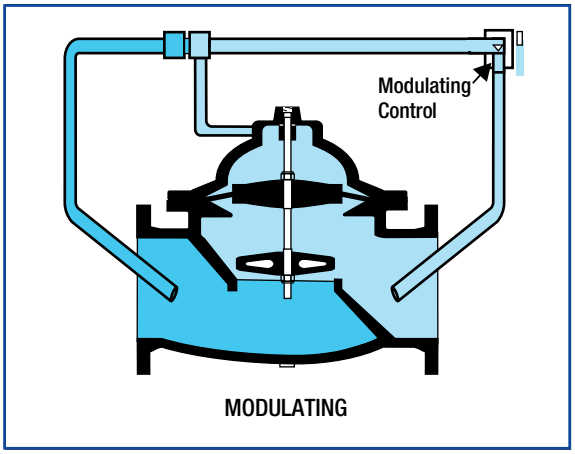
The valve closes when pressure is directed into the valve cover chamber above the diaphragm. An independent operating supply may be used if its pressure is equal to, or greater than the pressure at the valve inlet.



OPEN

VALVE OPEN - VALVE IN FULLY OPENED POSITION

The valve opens fully when there is no pressure in the cover chamber and at least 50 kPa line pressure at the valve inlet.



MODULATING

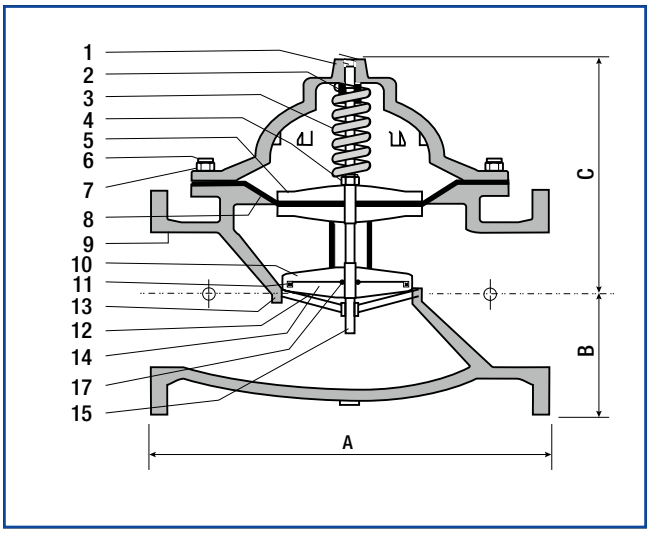
VALVE MODULATING - VALVE IN MODULATING CONTROL

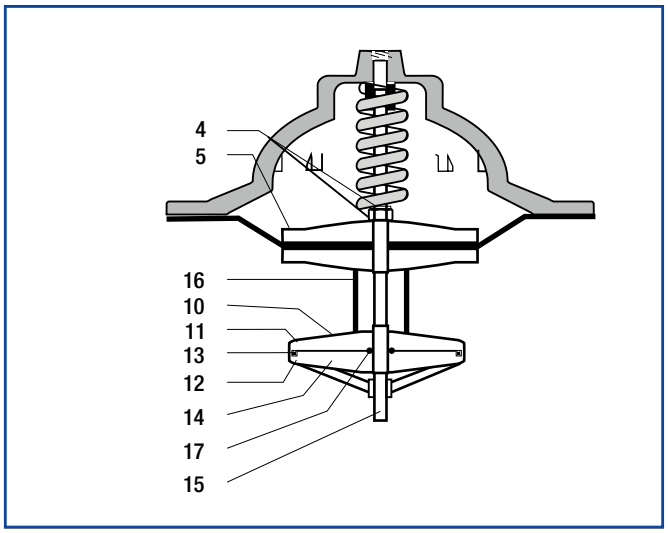
Modulating action can be obtained by installing a control system to the basic valve. Various controls are available to modulate and compensate for pressure, flow rate, or liquid level changes.

CONTROL VALVES

Standard Rating SG Iron Construction: 25Bar
High Pressure Rating Steel Construction: 40Bar
Temperature:

- BunaN 85ºC
- Viton 150ºC





Dimensions (mm)				
Size	A	B	C	Mass (Kg)
50	216	83	137	10
80	286	105	168	28
100	359	127	219	44
150	454	159	305	89
200	584	191	400	182
250	791	222	476	320
300	902	260	524	500
350	1029	324	568	723
400	1105	394	660	1025
450	1105	420	660	1250
500	1250	500	822	1610
600*	1250	500	822	1610

Available In Standard Flange Drilling
BS 4504 T10, T16, T25
BS 10 TD, TE, TF
ANSI 150, 300

Hydraulic Control Pilots
Bodies: Brass-ASTM B584 / Alloy / C84400
Internals: Stainless Steel - AISI 303
Elastomers: Buna N (Nitrile)
(Other materials available ie. Stainless Bodies)

Accessories
Such as a position indicator, high lift assembly, flow limiting devices etc. are normally brass but available in Stainless steel.

Dimensions (mm)		
1	Cover S.G.	420/12
2	Bearing	Phosphor Bronze
3	Spring	Stainless Steel
4	Stem nut	Stainless Steel/Galvanised Nyloc
5	Diaphragm washer	S.G.420/12 or Bronze
6	Stud	Grade 8.8 Galv
7	Stud nut	Grade 8.8 Galv
8	**Diaphragm	Buna N
9	Body	S.G.420/12
10	Quad ring retainer	S.G.420/12 or Bronze
11	**Quad ring seal	Nitrile Rubber
12	Seat	Stainless Steel
13	Gasket	Silicone
14	Quad ring washer	Stainless Steel
15	Stem	Stainless Steel
16	Spacer	(150-400mm) S.G.420/12
17	**O'ring	Nitrile Rubber
**Recommended Spares		

Standard Items With Hook Up

- 3 x Isolating cocks
- Brass fittings and nylon tubing
- 'Y' Strainer
- 2 x Pressure gauges for Pressure Control Valves

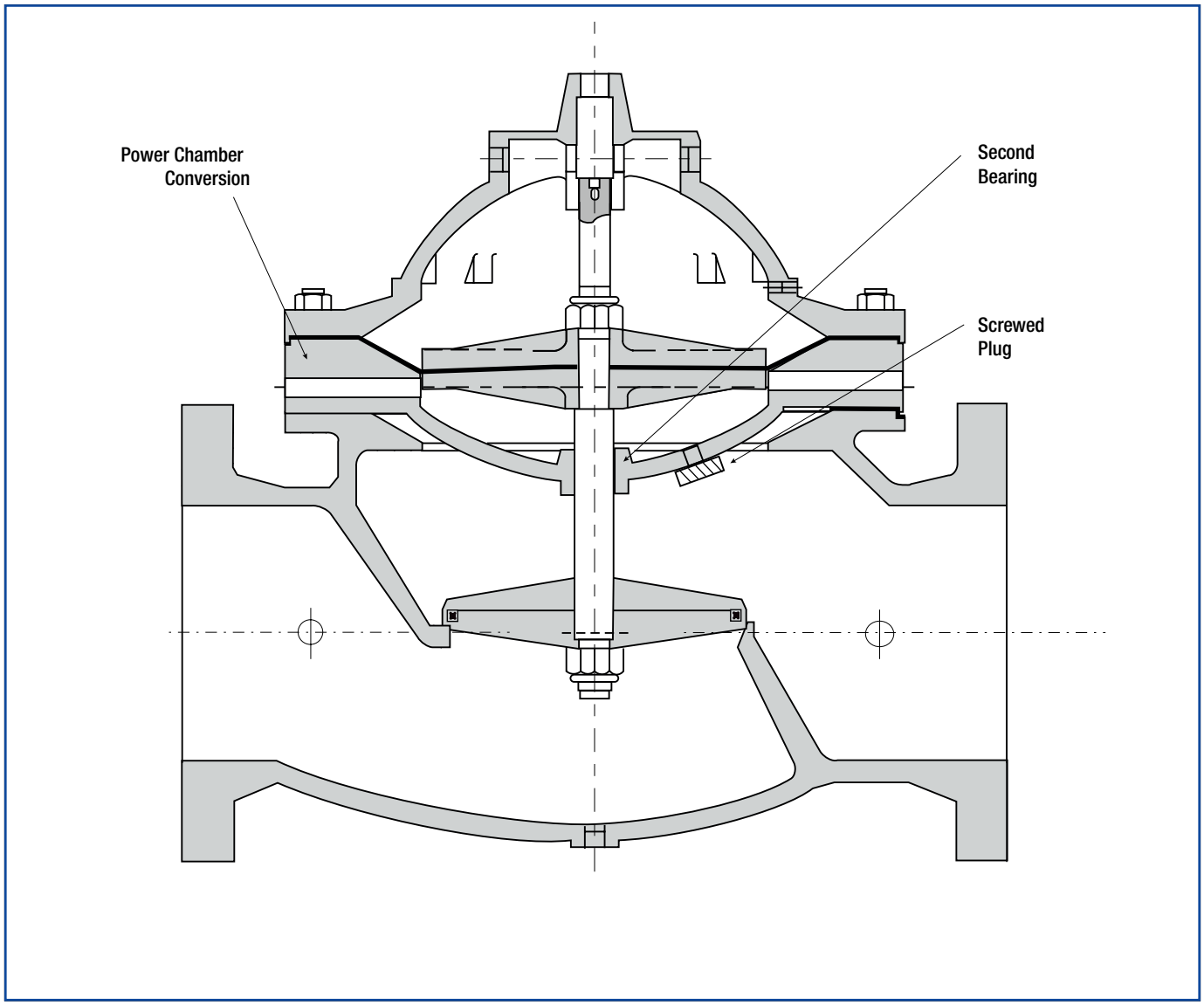
CONTROL VALVES

POWER CHAMBER HYDRAULIC CONTROL VALVE (AVAILABLE AS OPTIONAL FEATURE)

POWER CHAMBER FEATURE ON/OFF

Although this can be used for modulating control, the most common use for the power chamber is to permit the valve to open when the supply pressure is low. The valve bias spring is omitted in this arrangement and it is essential that the valve is supplied with slow closing speed control to prevent water hammer. The most usual applications for the Power Chamber are in Level control when residual pressure is very low and in Pump Control to ensure the valve fully opens and minimises energy consumption.

Supply pressure is fed both under the valve seat and under the diaphragm via a 3-way pilot to the lower diaphragm chamber. This provides relatively large valve opening forces even at low pressure. To close, the supply pressure is switched to the upper diaphragm chamber. A secondary advantage of the Power Chamber is that the diaphragm is protected from damage caused by particles in the flow stream.



The CV value of the Power Chamber Valve is slightly larger than the standard valve because the seat no longer has an integral bearing.

LEVEL CONTROL OVERVIEW

The Baker valve can be used to control Water Level in Reservoirs and Tanks in a variety of different ways depending on many factors such as Pressure and Flow conditions and configurations of the installation. A logical way to classify the different methods to control level is by On-off or Modulation. Within both groups an almost unlimited combination of other functions can be added such as Pressure Sustaining, Rate of Flow control, Solenoid override etc, which makes the Baker Control valve very versatile. In both groups the choice can be made to install the valve as a top-of-reservoir valve mounted inside (or outside) the reservoir, or as a bottom entry with the valve mounted on the bottom of the reservoir. Please note that a stilling well should be installed with the float pilot if water turbulence could affect the operation. The stilling well can be an appropriate diameter plastic pipe (normally 200mm).

HYDRAULIC CONDITIONS

In order for Level control valves to operate effectively and provide long trouble-free life, flow and pressure conditions have to be investigated. Two pressure conditions can create problems such as:

HIGH PRESSURE

Dam (or reservoir) control valves have always been susceptible to two potential problems caused by high pressure conditions which can be overcome if one is aware of what the problems are.

CAVITATION

Most control valves can handle a pressure drop ratio of no more than 3:1, because of the unique features the Baker control valve, the valve can handle a 4:1 pressure drop ratio. Even so in a Level control application if one assumes a back pressure of 1 bar from the head of the reservoir downstream of the valve, the valve can only effectively cope with 4 bar upstream in order to provide a long life.

HIGH FLOW RATES

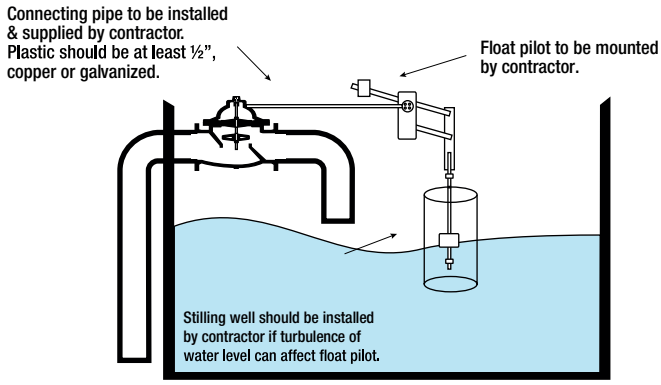
If a level control valve is allowed to go fully open and dynamic head is above 1.5bar, a flow rate far beyond the recommended can occur which can cause further damage. In both of the above situations the extent of the valve's life will be determined by the level of the upstream pressure. If the discharge into the dam is free with the valve installed at the end of the line, the problem is not as severe because cavitation will occur outside the valve, but one still has the high velocity problem.

Our recommendations for these installations.

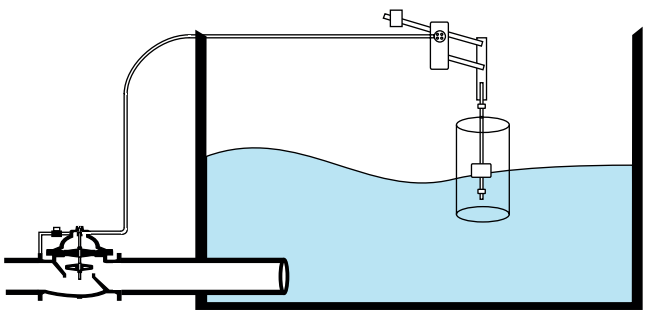
- **Upstream Dynamic head between 5 and 10 bar**
  Install a Flow control pilot on the Baker Level Control Valve to limit flow rate to an acceptable level and install an orifice plate downstream of the valve to provide an artificial back pressure. The valve will still experience cavitation during the opening and closing cycles, but as long as the cycles are not too frequent and closing and opening speed is not too long, the above recommendations should ensure a reasonable valve life.
- **Upstream Dynamic head over 10 bar**
  Install a Flow control pilot on the Baker Level Valve and install an additional Pressure Reducing valve upstream of the Level control valve. The Pressure Reducing valve can either be a pilot operated Baker valve or a Premier Ratio Reducing valve which operates without a pilot and can handle pressure drops of up to 5:1.

LOW PRESSURE

Flowing line pressure should be 50kPa or more to ensure that sufficient head is available to open the valve fully. This assumes there is no pressure in the control chamber. The other factor to be aware of is that with the valve at the bottom of the reservoir and the float pilot at the top, the static head in the control tubing is the minimum pressure which can be achieved in the control chamber with the normal pilot hook-up. A "rule of thumb" which can be used to check this condition is as follows: The flowing line pressure in PSI should be greater than or equal to the vertical distance in feet between the valve and the float pilot.



Typical Level Control Valve Installation with valve and pilot mounted in the tank.



Typical Installation with valve mounted at the bottom of the reservoir.

CONTROL VALVES

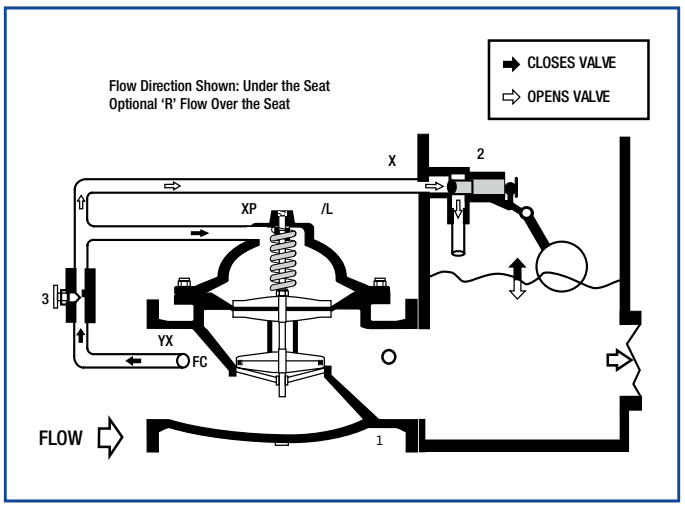


FIG B110-10
Float Control - Modulating (Constant Level)

The FIG B110-10 maintains a constant level in storage tanks and reservoirs. Valve controlled flow into the tank is proportional to discharge flow, keeping the tank full.

NOTE:
The modulating float control FIG B110-10, is remote mounted unless specified valve mounted. A stilling well around the float should be installed if the liquid surface is subject to turbulence, ripples or wind.

QUICK SIZING: Valve size same as fill line or one size smaller if discharge line is smaller than the fill. Match size/capacity to discharge requirements.

VALVE FUNCTION
- Maintains a constant liquid level in a tank.
- Remote mounted pilot is sensitive to slight changes in level and controls main valve:

- Opens when level drops
- Closes when level rises

COMPONENTS
1. Main Valve
2. Fig. 10-11 Modulating Float Control
3. Needle Valve - Adj. Closing Speed

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y -Y Strainer
- P - Position Indicator
- FC - Flo-Clean Strainer
- L - Limit Switch

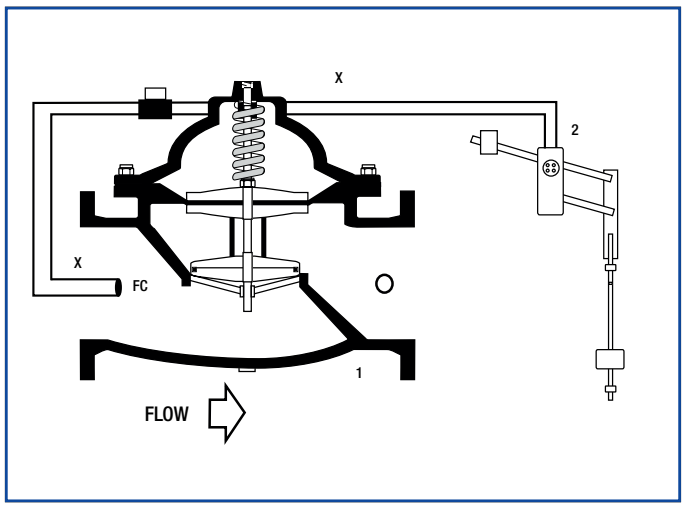


FIG B110-14
Float Control-On/Off (Open/Close) Adj. Hi/Lo Levels

The FIG B110-14 opens fully when the level reaches the preset low point and shuts off drip tight when the high level is reached. The on/off ball valve pilot is equipped with a vertical rod which allows the float to rise and drop to the adjustable upper and lower stops.

NOTE:
The pilot is remote mounted unless it is specified valve mounted. Standard equipped with brass rods and plastic floats. Stainless steel rods and floats are available. Provide a stilling well around the float if a liquid surface is subject to turbulence, ripples or wind.

SPECIFY: Valve mounted pilot is required and valve discharge horizontal or vertical.

QUICK SIZING: Valve size same as fill line or one size smaller.

VALVE FUNCTION
- Valve opens when float reaches lower level stop (adjustable)
- Valve closes when float reaches upper level stop (adjustable)

- Opens when level drops
- Closes when level rises

COMPONENTS
1. Main Valve
2. Fig. 10-13 Float Pilot
3. Level Adjustment Stops
   3A - Upper Level
   3B - Lower Level

ACCESSORIES
Located as indicated
Included as marked
Large size valves may require and accelerates a Pilot.

- X - Isolation Cocks
- Y -Y Strainer
- FC - Flo-Clean Strainer
- L - Limit Switch

BAKER **CONTROL** VALVE

ALTITUDE

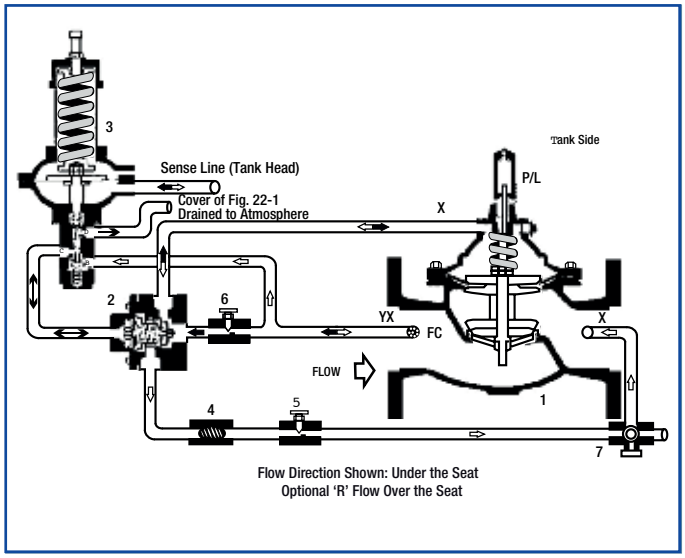


FIG B127-1
Altitude Valve - Two Way Flows (Tank Fill & Discharge)

Provides automatic filling of elevated tanks or reservoirs. Supply pressure must be greater than static head pressure. When the altitude control senses a drop in level below the predetermined set-point, the valve opens to fill the tank. The valve opens for tank discharge when tank head pressure is greater than valve inlet pressure.

NOTE:
Adjustment ranges:
1.5m - 6m
3m - 22m
15m - 60m

QUICK SIZING: Valve size, line size or one size smaller.

POINTS TO CONSIDER: Tank discharge flow requires a valve inlet (system pressure) to be 13 kPa less than tank head pressure.

VALVE FUNCTION
- Tank fill
- Opens when reservoir level drops below pilot setting (adjustable)
- Closes when reservoir level reaches pilot setting
- Tank Discharge
- Opens when valve inlet / system pressure is below tank head

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y -Y Strainer
- FC - Flo-Clean Stainer
- L - Limit Switch

COMPONENTS
1. Main Valve
2. Fig. 22-1 Accelerator Control for sizes larger than 150mm.
3. Fig. 27 Altitude Control
4. Check Valve
5. Needle Valve - Adj. Opening Speed
6. Needle Valve - Adj. Closing Speed
7. 3-Way Ball Valve

P - Position Indicator

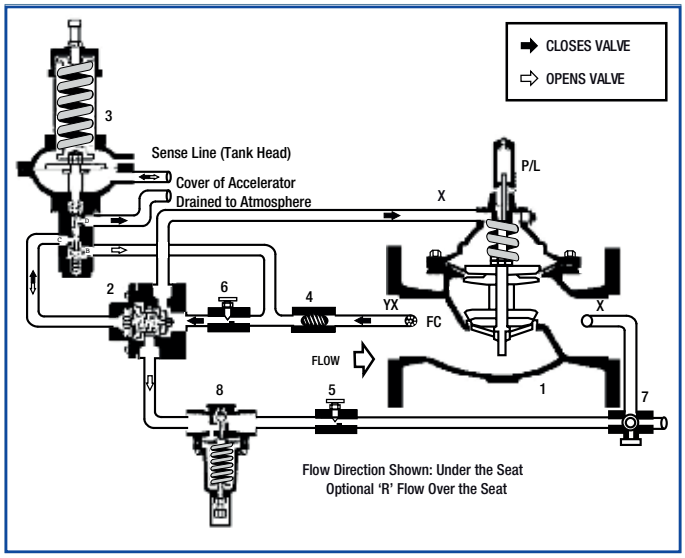


FIG B127-2
Altitude Valve - Pressure Reducing

Provides automatic filling of elevated tanks or reservoirs. When the altitude control senses a drop in level below the predetermined set-point, the valve opens to fill the tank. Supply pressure must be greater than static head pressure. Discharge of the tank is by a separate line.

NOTE:
Adjustable ranges:
1.5m - 6m
3m - 22m
15m - 60m

QUICK SIZING: Valve size, line size or one size smaller.

VALVE FUNCTION
- Closes when reservoir level reaches pilot setting
- Opens approximately 300mm lower.

ACCESSORIES
Located as indicated
Included as marked

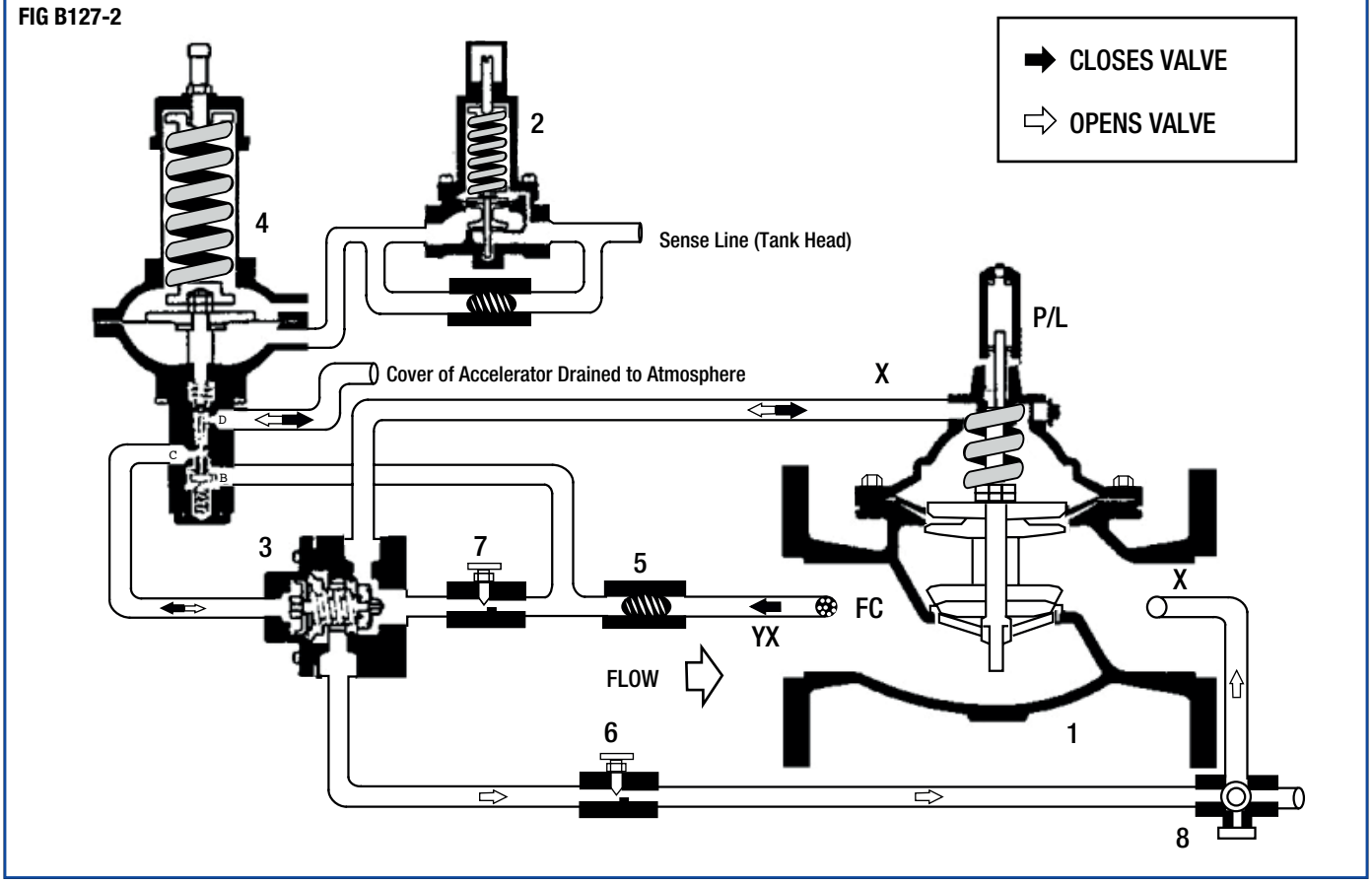
- X - Isolation Cocks
- Y -Y Strainer (Eliminates Flo-Clean)
- L - Limit Switch

COMPONENTS
1. Main Valve
2. Fig. 22-1 Accelerator Control for sizes larger than 150mm.
3. Fig. 27 Altitude Control
4. Check Valve
5. Needle Valve - Adj. Opening Speed
6. Needle Valve - Adj. Closing Speed
7. 3-Way Ball Valve
8. 263AP Pilot

P - Position Indicator
FC - Flo-Clean Strainer

ALTITUDE

FIG B127-2



Altitude Valve - One Way Flow (Tank Fill)

Delayed Opening For Adjustable Tank Draw-Down
Provides automatic filling of elevated tanks or reservoirs. Supply pressure must be greater than static head pressure. Discharge of the tank is by a separate line. On lowering of tank level the altitude control is prevented from sensing the drop until a predetermined point at which time the altitude control opens the valve filling the tank to the specific level.

NOTE:
Adjustable range:
1.5m - 6m
3m - 22m
15m - 60m

Adjustment range delayed level drop: 0.6m - 4.5m

QUICK SIZING: Valve size, line size or one size smaller.

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drops at required flow
- Refer to Engineering Data - Pressure Drop Chart
- Inlet pressure vs. Tank height to fill

VALVE FUNCTION

- Opens when reservoir level drops below point setting
- (Adjustable to allow for calculated drop in tank level before opening)
- Closes when reservoir level reaches pilot setting

COMPONENTS

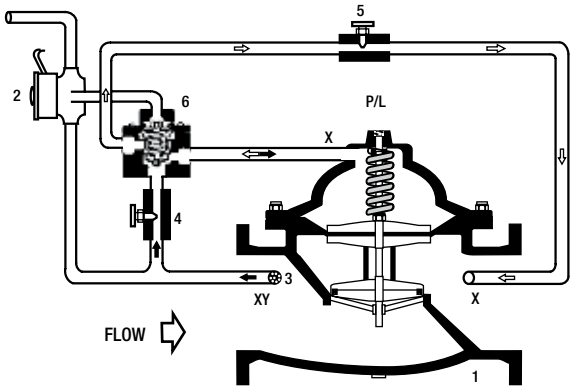
1. Main Valve
2. Fig. 12 - Delayed Opening Control
3. Fig. 22-1 - Accelerator Control
4. Fig. 27 Altitude Control P - Fig. 50 Position Indicator
5. Check Valve FC - Flo-Clean Strainer
6. Needle Valve - Adj. Opening Speed
7. Needle Valve - Adj. Closing Speed
8. 3-Way Ball Valve

ACCESSORIES

Located as indicated
Included as marked

- X - Isolation Cocks
- Y -Y Strainer
- L - Limit Switch

SOLENOID CONTROL VALVES



Flow Direction Shown: Under the Seat
Optional 'R' Flow Over the Seat: 113-6R/113-6R: Angle

FIG B113-6
Solenoid On/Off (Open/Close)

This configuration has an accelerator pilot to speed up valve reaction time if required. A 3-way solenoid and auxiliary 3-port accelerator cause the main valve to open fully or close drip-tight depending upon the actuation position of the solenoid, energized to open/energized to close. The high capacity accelerator assures quick valve response to the solenoid signal regardless of the main valve size. The valve may be remotely operated by timers, relays, probes or any triggering device to the solenoid.

NOTE:
Energized to open valve.
Optional: energized to close valve.
At time of order, advise factory actual system working pressure for correct solenoid selection.
110-220 VAC, 50-60 Hz standard
Optional: specify voltage required.
Enclosure General Purpose (NEMA 1,2,3,3S,4,4X)
Optional: explosion proof (NEMA 3,3S,4,4X,6,6P,7,9)
Manual operator standard
Standard with adjustable opening and closing speed.

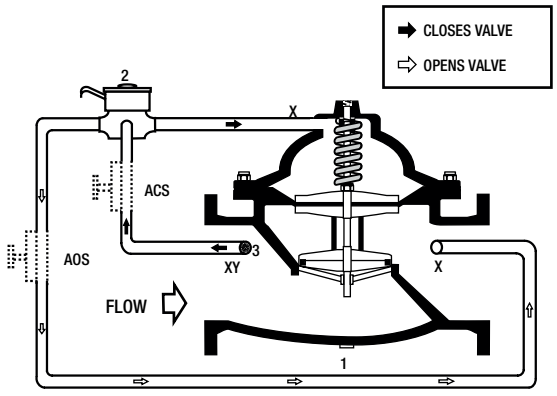
QUICK SIZING: Valve size, line size or one size smaller.

POINTS TO CONSIDER:
- Refer to Engineering Data-Flow Capacity Chart
- Pressures drop at required flow
- Refer to Engineering Data-Pressure Drop Chart

VALVE FUNCTION
- Electrically operated on/off (open/close) control valves
- High capacity control for fast response
- Water application-to atmosphere.
- Fuel application-piped to valve outlets.
- Drains cover of accelerators.

COMPONENTS
1. Main Valve
2. 3-Way Solenoid
3. Flo-Clean Strainer
4. Needle Valve - Adj. Closing Speed
5. Needle Valve - Adj. Opening Speed
6. Accelerator Control

- X - Isolation Cocks
- Y -Y Strainer (Eliminates Flo-Clean)
- ACS - Adj. Closing Speed
- AOS - Adj. Opening Speed



Flow Direction Shown: Under the Seat
Optional 'R' Flow Over the Seat: 113-12R/113-12R: Angle

FIG B113-12
Solenoid On/Off (Open/Close)

Operated by a 3-way solenoid, the main valve opens fully or closed drip-tight depending upon the actuation position of the solenoid, energized to open/energized to close. The valve may be remotely operated by timers, relays, probes or any triggered device to the solenoid. The valve can be operated with 2 x 2-way solenoids for modulating control from a PLC.

NOTE:
Energized to open valve.
Optional: energized to close valve.
At time of order, advise our factory manager of your system working pressure for correct solenoid selection.
110-220 VAC, 50-60 Hz standard
Optional: specify voltage required.
Enclosure General Purpose (NEMA 1,2,3,3S,4,4X)
Optional: explosion proof (NEMA 3,3S,4,4X,6,6P,9)
Manual operator standard
Optional: Opening and/or closing speed.

QUICK SIZING: Valve size, line size or one size smaller.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart
- Pressures drop at required flow
- Refer to Engineering Data - Pressure Drop Chart

VALVE FUNCTION
- Electrically operated on/off (open/ close) control valves

COMPONENTS
1. Main Valve
2. 3-Way Solenoid
3. Flo-Clean Strainer

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y -Y Strainer (Eliminates Flo-Clean)
- ACS - Adj. Closing Speed
- AOS - Adj. Opening Speed

PUMP CONTROL

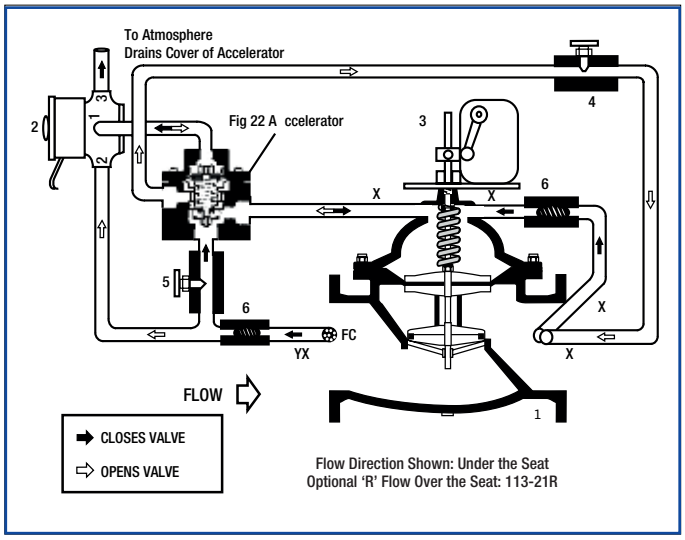


FIG B113-21
Booster Pump Control (Valves 200mm And Larger)

A solenoid operated pump control for controlled opening and closing on a pump start-up and shut down. Equipped with hydraulic check features to close valve on pressure reversal. Valve and pump operation are interlocked by a limit switch assembly.

NOTE:
Energized to open valve.
At time of order, advise factory actual system working pressure for correct solenoid selection.
110-120 VAC, 50-60 Hz standard
Optional: specify voltage required.
Solenoid enclosure NEMA 1,2,3,3S,4,4X
Optional: explosion proof NEMA 3,3,S,4,4X,6,6P,7,9
Manual operator standard
Limit switch enclosure general purposes
Optional: explosion proof.
Standard with adjustable opening and closing speed.

QUICK SIZING: Valve size same as line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart
- Pressures drop at required flow
- Refer to Engineering Data - Pressure Drop Chart

VALVE FUNCTION
- Opens at a controlled rate on pump start-up (adjustable)
- Closes at a controlled rate on pump shut-off (adjustable)
- Valve and pump are electrically
- interlocked so that power is shut-off when the valve is in near closed position
- Check feature closes valve when discharge pressure exceeds inlet Pressure (Power failure or pump failure)

COMPONENTS
1. Main Valve - Adj. Closing Speed
2. 3-Way Solenoid
3. Fig. 51 Limit Switch FC - Flow Clean Strainer
4. Needle Valve - Adj. Opening Speed
5. Needle Valve
6. Check Valve

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- FC - Flo-Cleaner Strainer
- Y - Y Strainer

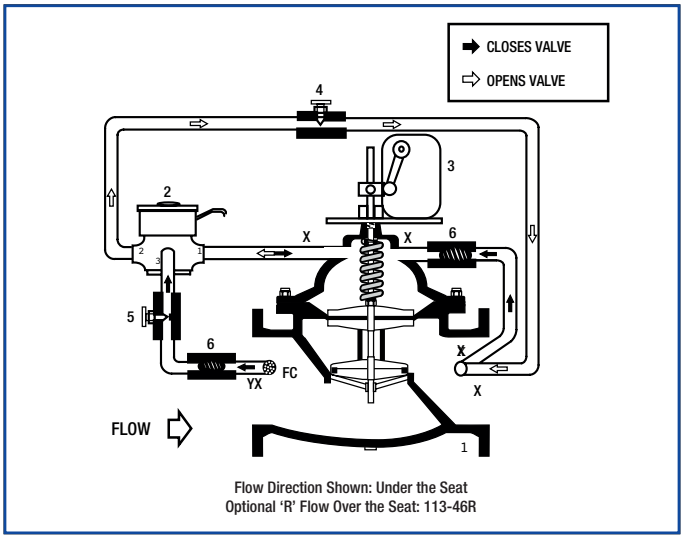


FIG B113-46
Booster Pump Control (Valves 150mm and smaller)

A solenoid operated pump control for controlled opening and closing on a pump start-up and shut down. Equipped with hydraulic check features to close valve on pressure reversal and shut-off pumps in an event of pump failure. Valve and pump operations are interlocked by a limit switch assembly.

NOTE:
Energized to open valve.
At time of order, advise factory actual system working pressure for correct solenoid selection.
110-120 VAC, 50-60 Hz standard
Optional: specify voltage required.
Solenoid enclosure NEMA 1,2,3,3S,4,4X
Optional: explosion proof NEMA 3,3S,4,4X,6,6P,7,9
Manual operator standard
Limit switch enclosure general purposes
Optional: explosion proof.
Standard with adjustable opening and closing speed.

QUICK SIZING: Valve size same as line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart
- Pressures drop at required flow
- Refer to Engineering Data - Pressure Drop Chart

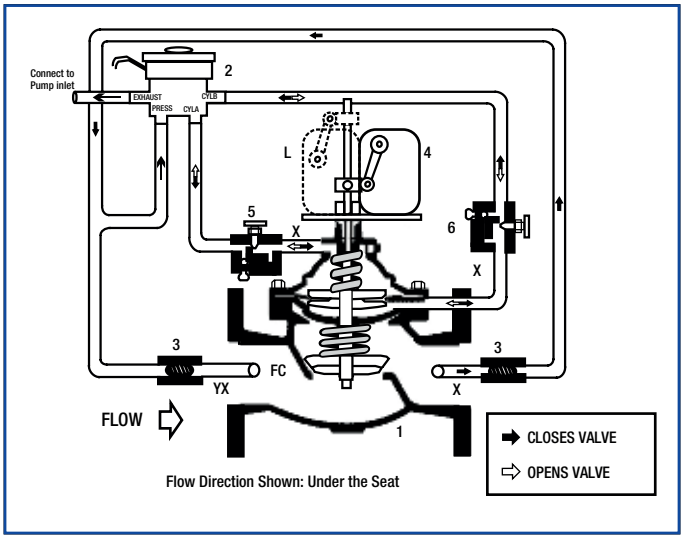
VALVE FUNCTION
- Opens at a controlled rate on the pump start-up (adjustable)
- Closes at a controlled rate on pump shut-off (adjustable)
- Valve and pumps are electrically interlocked so that power is shut-off when the valve is in near closed position

COMPONENTS
1. Main Valve
2. 3-Way Solenoid
3. Fig. 51 Limit Switch FC - Flow Clean Strainer
4. Speed
5. Needle Valve - Adj. Closing Speed
6. Check Valve

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y -Y Strainer (Eliminates Flo-Clean)

PUMP CONTROL



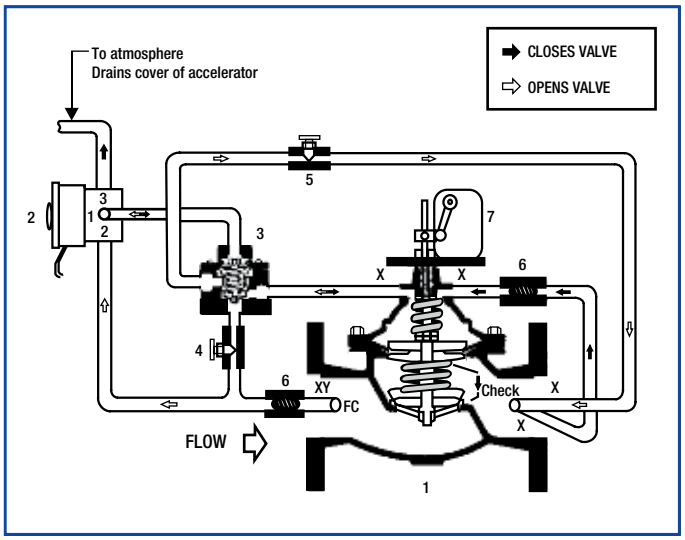


FIG B513-5
Booster Pump Control / Dual Chamber / Lift Check

A solenoid operated pump control for controlled opening and closing on a pump start-up and shut down. Built on the dual chamber Baker 518 main valve. Equipped with mechanical liftcheck features to close valve the moment flow stops, preventing pressure reversal. Valve and pump operations are interlocked by a limit switch assembly.

NOTE:
Energized to open valve.
110-220 VAC, 50-60 Hz standard
Optional: specify voltage required.
Solenoid enclosure NEMA 1,2,3,3S,4,4X
Optional: explosion proof NEMA 3,3,S,4,4X,6,6P,7,9
Manual operator standard
Limit switch enclosure general purposes
Optional: explosion proof.
Standard with adjustable opening and closing speed.

QUICK SIZING: Valve size same as line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart
- Pressures drop at required flow
- Refer to Engineering Data - Pressure Drop Chart

VALVE FUNCTION
- Opens at a controlled rate on the pump start-up (adjustable)
- A Upper Chamber connected to solenoid exhaust port
- B Lower Chamber connected to valve inlet port (supply port)
- Closes at a controlled rate on pump shutoff (adjustable)
- A Upper Chamber connected to valve inlet port (pressure port)
- B Lower Chamber connected to solenoid exhaust port
- Valve and pumps are electrically interlocked so that power is shut-off when the valve is in near closed position (adjustable with a limit switch)
- Mechanical lift-check provides quick closure of the valve to prevent reverse flow

COMPONENTS
1. Main Valve W/Mechanical Lift-Check
2. 4-Way Solenoid
3. Check Valve
4. Fig. 51 Limit Switch
5. Flow-Control - Adj. Opening Speed
6. Flow-Control - Adj. Closing Speed

- FC - Flo-Cleaner Strainer
- Y - Y Strainer
- X - Isolation Cocks
- L - Second Limit Switch

ACCESSORIES
Located as indicated
Included as marked

FIG B413-21
Booster Pump Control / Mechanical Lift Check

A solenoid operated pump control for controlled opening and closing on a pump start-up and shut down. Equipped with hydraulic check features to close valve on pressure reversal and shut-off pump in an event of pump failure. Valve and pump operations are Interlocked by a limit switch assembly.

NOTE:
Energized to open valve.
At time of order, advise factory actual system working pressure for correct solenoid selection.
110-220 VAC, 50-60 Hz standard
Optional: specify voltage required.
Solenoid enclosure NEMA 1,2,3,3S,4,4X
Optional: explosion proof NEMA 3,3S,4,4X,6,6P,7,9
Manual operator standard
Limit switch enclosure general purposes
Optional: explosion proof.
Standard with adjustable opening and closing speed.

QUICK SIZING: Valve size same as line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart
- Pressures drop at required flow
- Refer to Engineering Data - Pressure Drop Chart

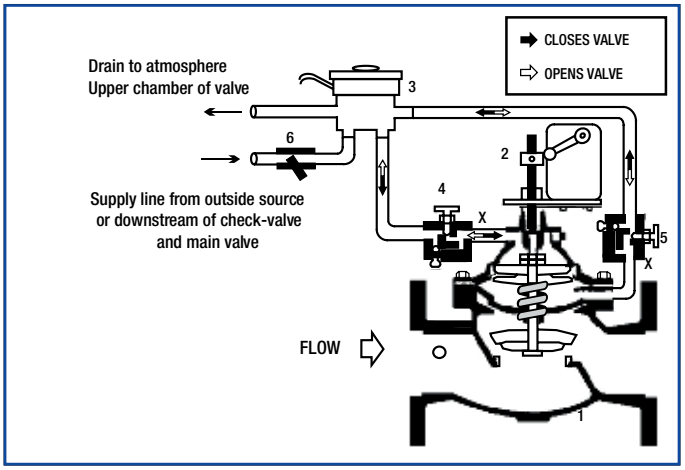
VALVE FUNCTION
- Opens at a controlled rate on the pump start-up (adjustable)
- Closes at a controlled rate on pump shut-off (adjustable)
- Valve and pumps are electrically interlocked so that power is shut-off when the valve is in near closed position
- Mechanical lift-check provides
- quick closure of the valve to prevent reverse flow

ACCESSORIES
Located as indicated
Included as marked

COMPONENTS
1. Main Valve Opening Speed
2. 3-Way Solenoid
3. Fig. 22-1 Accelerator Control
4. Needle Valve - Adj. Closing Speed
5. Needle Valve - Adj.
6. Check Valve
7. Fig. 51 Limit Switch

- X - Isolation Cocks
- Y - Y Strainer
- FC - Flo-Cleaner Strainer

PUMP CONTROL



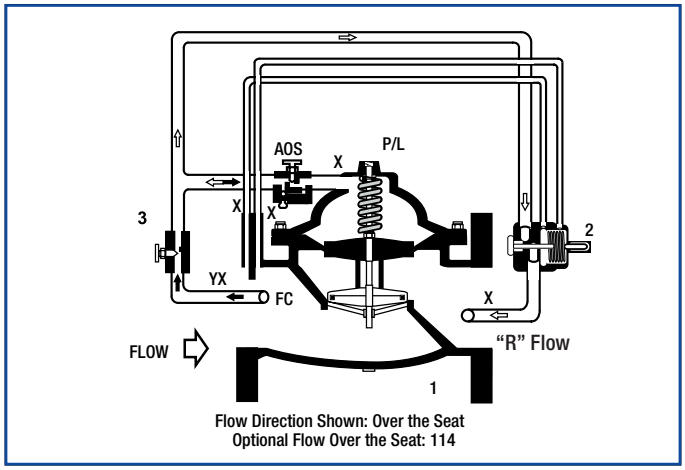


FIG B513-6
Deep Well Pump Control

The FIG B513-6 pump control valve starts in an open position during the pump start-up, purging the deep well of air and debris to atmosphere. Controlled closing of the valve, opens the mainline check valve, gradually increasing line pressure. The valve reopens during shut down cycles to gradually decrease line pressure and prevent shock. Valve and pump operations are interlocked by a limit switch assembly.

NOTE:
Energized to close valve.
110-220 VAC, 50-60 Hz standard.
Optional: specify voltage required.
Solenoid enclosure NEMA 1,2,3,3S,4,4X
Optional: explosion proof NEMA 3,3S,4,4X,6,6P,7,9
Manual operator standard
Limit switch enclosure general purposes
Optional: explosion proof
Standard with adjustable opening and closing speed.

QUICK SIZING: Valve size one to two sizes smaller than main line

POINTS TO CONSIDER:

- Refer to Engineering Data - Flow Capacity Chart
- The deep well pump valve must be sized so it relieves to atmosphere pump discharge pressure in excess of the normal system static pressure. This is necessary to prevent premature opening of the main line check valve.
- Refer to Engineering Data - Pressure Drop Chart. If flow velocity exceeds 15 metres per second use next valve size.
- Pressure drop at required flow.
- Refer to Engineering Data - Pressure Drop Chart

VALVE FUNCTION

- Discharge deep well air and debris by being in an open position on the pump start-up.
- Closes at a controlled rate (adjustable)
- Eliminating surges when pumping into main line (works in conjunction with controlled opening check valves in main line)
- Opens at a controlled rate (adjustable) eliminating surges upon pump shut-off
- Valve and pumps are electrically interlocked so pump power is shutoff when valve is in a near full open position (adjustable)

COMPONENTS

1. Main Valve
2. Figure 51 Limit Switch
3. 4-Way Solenoid
4. Flow Control - Adj. Opening Speed
5. Flow Control - Adj. Closing Speed
6. Y-Strainer

- X - Isolation Cocks

ACCESSORIES
Located as indicated
Included as marked

FIG B114
Rate Of Flow

"R" Indicates flow over the seat (failed closed) Maintains a constant flow rate, adjustable, regardless of fluctuations in line pressure. The rate of flow pilot senses the differential pressures across a thin edged orifice plate mounted in the valve inlet flange. It responds to changes in pressure and modulates the main valve to maintain the desired flow.

NOTE:
Desired flow rates at time of order.
FIG 114R: Flow over the seat (fail closed)
FIG 114: Flow under the seat (fail open)

Additional combination functions:
114-1R Rate of Flow / Solenoid On-Off
114-2R Rate of Flow / Pressure Reducing
114-8R Rate of Flow / Pressure Sustaining

QUICK SIZING: Stay within parameters of a capacity chart (below)

POINTS TO CONSIDER:

- Orifice plate sized per application and per your acceptable pressure

VALVE FUNCTION

- Limits flow rate to a constant preset
- maximum (adjustable)

COMPONENTS

1. Main Valve
2. ROF Pilot
3. Needle Valve - Adj. Closing Speed
4. Orifice Plate

ACCESSORIES
Located as indicated
Included as marked

- AOS - Adj. Opening Speed
- X - Isolation Cocks
- Y - Y Strainer
- FC - Flo-Clean Strainer
- P - Position Indicator
- L - Limit Switch

Valve size - mm	Minimum Flow Rate Litre/ Second	Maximum Flow Rate Litre/ Second
50	1	14
80	2	30
100	3	50
150	6	115
200	12	200
250	19	310
300	25	440
350	31	550
400	53	700
450	72	955
500	110	1400
600	190	1700

PRESSURE REDUCING VALVE

SERIES 236 AP - PILOT

FUNCTION

The control is a diaphragm actuated pressure reducing valve, which is normally in an open position due to the force of the spring setting above the diaphragm. The valve moves automatically toward the seat (modulates) when the downstream pressure exceeds the adjustable spring setting, thus controlling the pressure to the desired set point.

START-UP/ADJUSTMENT

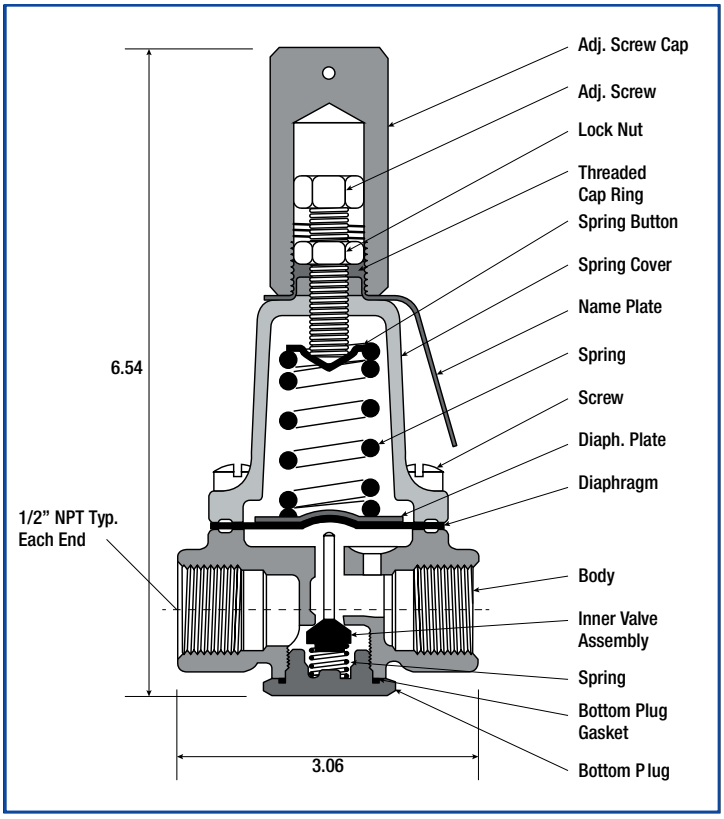
Pressure adjustment is made by turning the adjusting screw clockwise to increase the pressure and counterclockwise to decrease the setting.

SPECIFICATIONS

Size: 1/2”
Temperature range: 50ºC
Materials:

- Cover - Epoxy Coated Aluminum
- Body - Brass
- Rubber Parts and Diaphragm - Buna-N
- Stem - Stainless steel

Spring Range - 0-30, 20-175 PSI



PRESSURE REDUCING VALVES

FIG B115
PRESSURE REDUCING

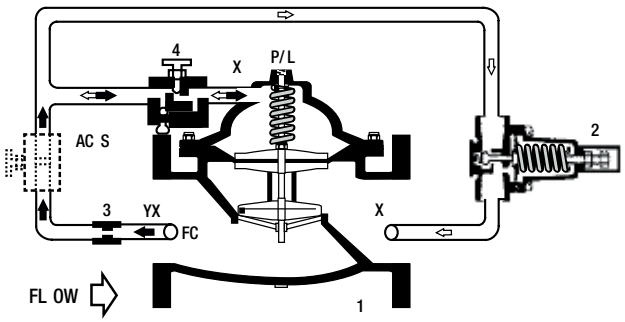
Automatically reduces a higher pressure to a constant lower outlet pressure regardless of changing flow rate and / or varying inlet pressure. Refer to FIG B115-7 for dead-end systems and / or systems using high demand, on-off equipment.

NOTE:
Adjustment range:
Standard: 20-1190 kPa
Optional: 0-638 kPa
100-2040 kPa
(Stainless steel control)

QUICK SIZING: Valve size one size smaller than line.

POINTS TO CONSIDER:

- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or cavitation charts



Flow Direction Shown: Under the Seat
Optional ‘R ’ Flow O ver the Seat: 115-3R

VALVE FUNCTION

- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)

COMPONENTS

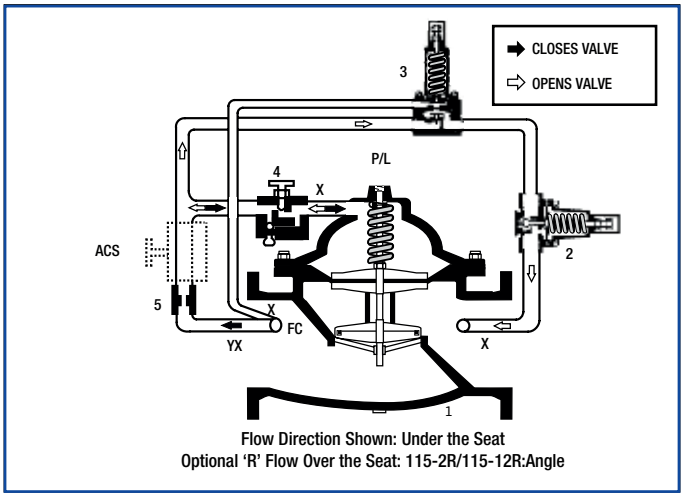
1. Main Valve
2. 263 Reducing Pilot
3. Fixed Orifice
4. Flow Control - Adj. Opening Speed

ACCESSORIES

Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- P - Position Indicator
- FC - Flo-Clean Strainer
- L - Limit Switch
- AOS - Adjustable Opening Speed

PRESSURE REDUCING VALVES



Flow Direction Shown: Under the Seat
Optional 'R' Flow Over the Seat: 115-2R/115-12R:Angle

FIG B115-2
Pressure Reducing / Sustaining

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a pressure sustaining control which prevents the upstream pressure from dropping below a preset minimum.

NOTE:
Downstream Pressure Adjustment range:
Standard: 20-1190 kPa
Optional: 0-204 kPa
100-2040 kPa
(Stainless steel control)
Upstream Pressure Adjustment range:
Standard: 20-1360 kPa
Optional: 0-204 kPa
100-2040 kPa
Additional Combinations:
115-11 Reducing/Sustaining/Check
115-32 Reducing/Sustaining/Solenoid

QUICK SIZING: Valve size one size smaller than line.

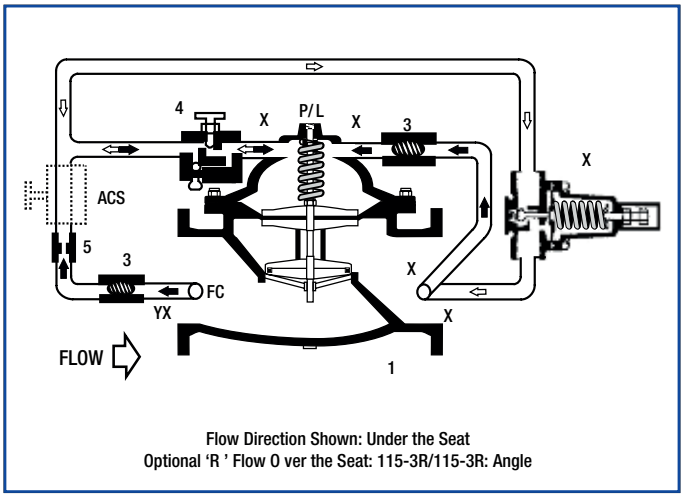
POINTS TO CONSIDER:
- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or cavitation chart.

VALVE FUNCTION
- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)
- Prevents upstream pressure from dropping below a preset minimum (adjustable)

COMPONENTS
1. Main Valve
2. 263 Pressure Reducing Control
3. Pv20 Sustaining Control
4. Flow Control - Adj. Opening Speed
5. Fixed Orifice

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- FC - Flo-Clean Strainer
- P - Position Indicator
- ACS - Adjustable Closing Speed



Flow Direction Shown: Under the Seat
Optional 'R ' Flow O ver the Seat: 115-3R/115-3R: Angle

FIG B115-3
Pressure Reducing / Check

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a pressure sustaining control which prevents the upstream pressure from dropping below a preset minimum.
Equipped with Check feature to prevent reverse flow if upstream pressure is lower than downstream pressure.

NOTE:
Adjustment range:
Standard: 20-1190 kPa
Optional: 0-204 kPa
100-2040 kPa
(Stainless steel control)

QUICK SIZING: Valve size one size smaller than line.

POINTS TO CONSIDER:
- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or Cavitation Chart

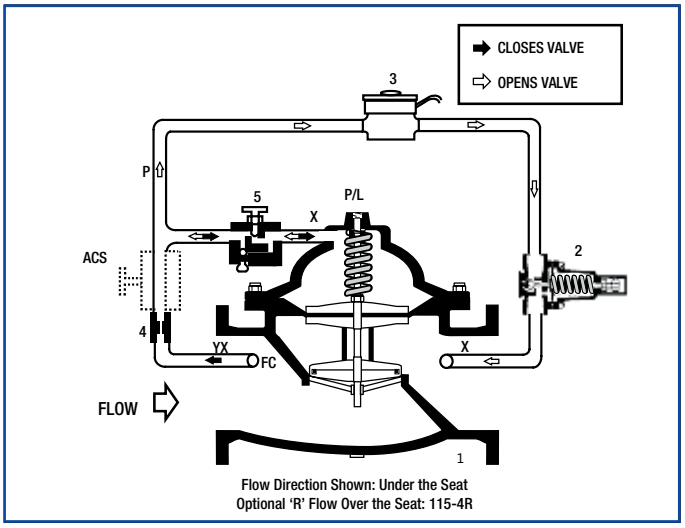
VALVE FUNCTION
- Reduces higher inlet pressure to constant lower outlet pressure (adjustable)
- Close when outlet-downstream pressure exceeds inlet/upstream pressure.

COMPONENTS
1. Main Valve
2. Reducing Control
3. Check Valve
4. Flow Control - Adj. Opening Speed
5. Fixed Orifice

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- FC - Flo-Clean Strainer
- P - Position Indicator
- ACS - Adjustable Closing Speed

PRESSURE REDUCING



Flow Direction Shown: Under the Seat
Optional 'R' Flow Over the Seat: 115-4R

FIG B115-4
Pressure Reducing / Solenoid On-Off

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure.

NOTE:
Adjustment range:
Standard: 20-1190 kPa
Optional: 0-204 kPa
100-2040 kPa
(Uses stainless steel pilot)
Solenoid max W.P.:
At time of order, advise factory actual system working pressure for correct solenoid selection.
(Consult the factory if more than 1020 kPa)
Enclosure NEMA 1,2,3,3S,4,4X
Optional: Explosion proof NEMA 3,3S,4,4X,6,6P,7,9
Additional Combinations:
115-5 Pressure Reducing / Solenoid / Check

SPECIFY: Energized to open or energized to close main valve.

QUICK SIZING: Valve size one size smaller than line.

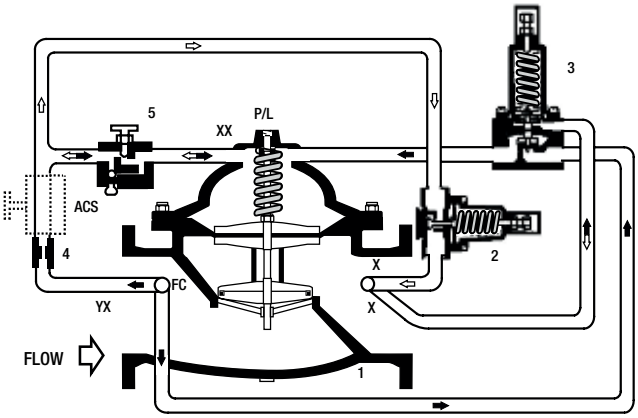
POINTS TO CONSIDER:
- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - cavitation chart

VALVE FUNCTION
- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)
- Electrical on-off override of reducing function

COMPONENTS
1. Main Valve
2. 263 Pressure Reducing Control
3. 2-Way Solenoid
4. Fixed Orifice
5. Flow Control - Adj. Opening Speed

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- FC - Flo-Clean Strainer
- P - Position Indicator
- ACS - Adjustable Closing Speed



Flow Direction Shown: Under the Seat
Optional 'R' Flow Over the Seat: 115-7R

FIG B115-7
Pressure Reducing / Surge

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Should flow rate decrease rapidly a pressure controlled surge pilot closed the valve to prevent downstream pressure build-up. Excellent in dead-end systems and/or systems using high demand, on-off equipment.

NOTE:
Adjustment range:
Standard: 20-1190 kPa
Optional: 0-204 kPa
100-2040 kPa
(Uses stainless steel pilot)
Additional Combinations:
115-43 Reducing/Surge/Sustaining
115-50 Reducing/Surge/Check

QUICK SIZING: Valve size one size smaller than line.

POINTS TO CONSIDER:
- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - cavitation chart

VALVE FUNCTION
- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)
- Closes quickly when outlet exceeds set point of surge control (adjustable)

COMPONENTS
1. Main Valve
2. 263 Pressure Reducing Control
3. PV20C Pressure Surge Control
4. Fixed Orifice
5. Flow Control - Adj. Opening Speed

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- FC - Flo-Clean Strainer
- P - Position Indicator
- ACS - Adjustable Closing Speed

PRESSURE RELIEF/SUSTAINING

FIG B115-74
Pressure Reducing / Low Flow By-Pass Valve

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a low flow bypass feature which automatically by passes the main valve pressure function for low flow conditions.
See sizing data on Page 25 for sizing parallel installations.

COMPONENTS

1. Main Valve
2. Low Flow By-Pass Control
   - Valves 80mm & larger
   - 115 Pressure Reducing Control
   - Valves 50mm & smaller
   - 263 Pressure Reducing Control
3. 263 Pressure Reducing Control
4. Fixed Orifice
5. Flow Control - Adj. Opening Speed

ACCESSORIES

Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y-Strainer
- FC - Flo-Clean Strainer
- P - Position
- L - Limit Switch
- ACS - Adjustable Closing Speed

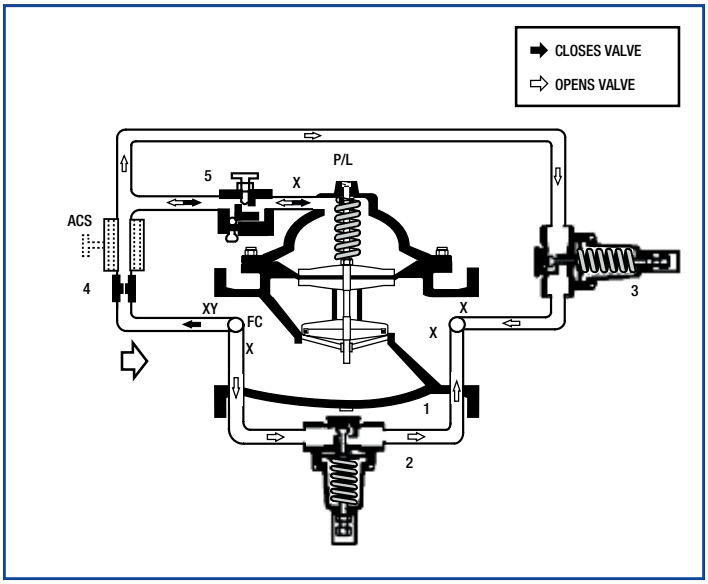


FIG PV 20C - PILOT
DIRECT RELIEF CONTROL

FUNCTION

- Normally closed position, opens when pressure reaches set-point.

FEATURES

- Responsive
- Selectable spring ranges to allow for accurate, easy to adjust pressure setting.
- Large diaphragm area
- ½" ports.
- Large seat area.
- Ease of Maintenance
- Can be serviced without removal from line.
- Replacement of elastomer parts is usually maximum required servicing.

OPERATION

The PV20C is a normally closed, diaphragm actuated, spring loaded, direct acting regulator. The pressure set point is adjustable within the spring range. Up stream pressure is sensed under the diaphragm. As upstream pressure increases, the diaphragm pushes against the spring. The pilot stem/seat is pulled toward the open position, increasing flow through the pilot. As upstream pressure decreases under the diaphragm, the spring pushes the stem/seat toward the closed position restricting flow through the pilot. This sensitive spring/diaphragm interaction closely tacks and responds to changes in upstream pressure.

START-UP/ADJUSTMENT

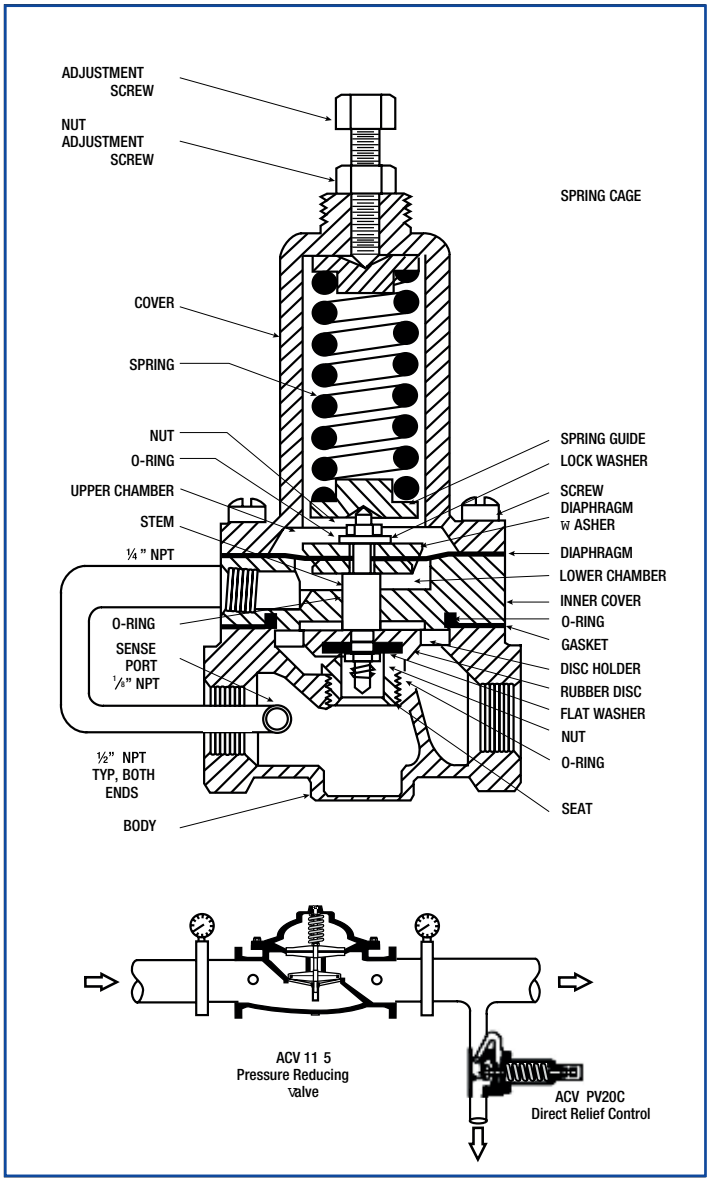
Follow the start-up procedure for the Baker function you have selected.

1. Turn the screw Clockwise (IN) to increase the set-point you are controlling.
2. Turn the screw Counterclockwise (OUT) to decrease the set-point you are controlling.

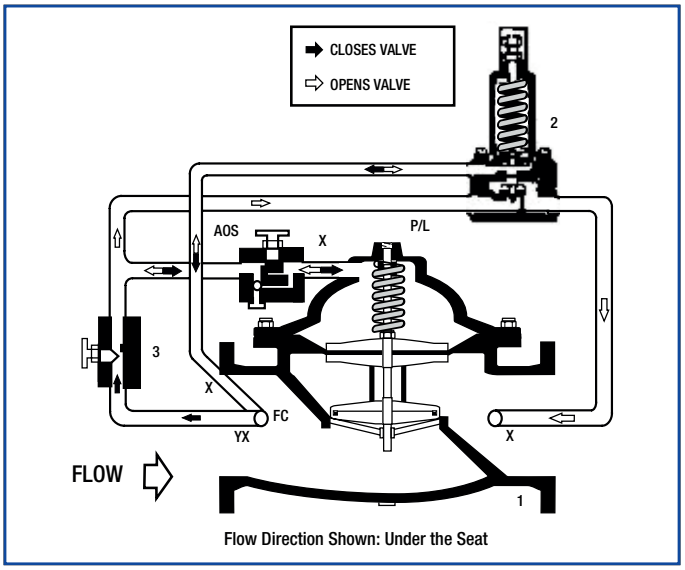
INSTALLATION

If the PV20C is to be field installed, follow the steps below.

1. Locate the flow arrow or bridge marking and install the control so the flow is under the seat.
2. Typical application shown on the right.



PRESSURE RELIEF/SUSTAINING



Flow Direction Shown: Under the Seat

FIG B116
Pressure Relief / Sustaining

Installed on a bypass line, mainline pressure is accurately controlled by relief of excess pressure. Installed in a mainline it prevents upstream pressure from dropping below a preset minimum. For very fast reaction requirement refer to Premier for info on gas loaded surge relief valve.

NOTE:
Adjustment range:
Standard: 20-1360 kPa
Optional: 0-204 kPa
100-2040 kPa

Additional relief/sustaining functions:
- **116FM/1116FM**
- **116-5 Pressure Sustaining / Check**
- **116-25 Differential Pressure Sustaining**
- **116-24 Differential Pressure Sustaining / Check**

116 RELIEF
QUICK SIZING: Valve size one or two sizes smaller than main line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow
- Capacity Chart

116 SUSTAINING
QUICK SIZING: Valve size same as line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow
- Capacity Chart
- Pressure drops at required flow
- Refer to Engineering Data - Pressure
- Drop Chart

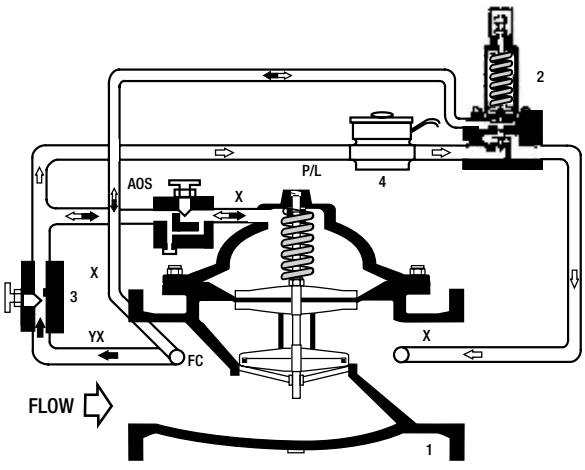
VALVE FUNCTION
Maintain constant upstream pressure (inlet to valve) by relieving excess Pressure.

COMPONENTS
1. Main Valve
2. PV20C Sustaining Control
3. Needle Valve - Adj. Closing Speed

ACCESSORIES
Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- FC - Flo-Clean Strainer
- P - Position Indicator
- AOS - Adjustable Opening Speed

Valve size (mm)	50	80	100	150	200	250	300	350	400	450	500	600
Max. continuous flow rate l/s (water)	13	30	50	114	200	310	440	540	695	955	1400	1700



Flow Direction Shown: Under the Seat
Optional 'R' Flow Over the Seat:

FIG B116-31
Pressure Sustaining / Solenoid On-Off

Installed in a mainline, and it prevents upstream pressure from dropping below a preset minimum. Solenoids' override of the sustaining function allows for electrical on-off operation.

NOTE:
Adjustment range:
Standard: 20-1360 kPa
Optional: 0-204 kPa, 100-2040 kPa
At time of order, advise factory actual system working pressure for correct solenoid selection.
(Consult the factory if more than 1020 kPa)
Enclosure: NEMA 1,2,3,3S,4,4X
Optional: Explosion proof
NEMA 3,3S,4,4X,6,6P,7,9
Specify energized to open or energized to close main valve.

QUICK SIZING: Valve size same size as line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart
- Pressure drops at required flow
- Refer to Engineering Data - Pressure Drop Chart

VALVE FUNCTION
- Maintain constant upstream pressure (inlet to valve) by relieving excess pressure.
- Solenoid provides electrical on/off override of relief/sustaining function

COMPONENTS
1. Main Valve
2. PV20C Sustaining Control
3. Needle Valve - Adj. Restriction - Closing
4. 2-Way Solenoid

ACCESSORIES
Located as indicated
Included as marked

- AOS - Adj. Opening Speed
- X - Isolation Cocks
- Y - Y-Strainer
- L - Limit Switch
- P - Position Indicator
- FC - Flo-Clean Strainer

SURGE RELIEF/CHECK VALVE FUNCTION

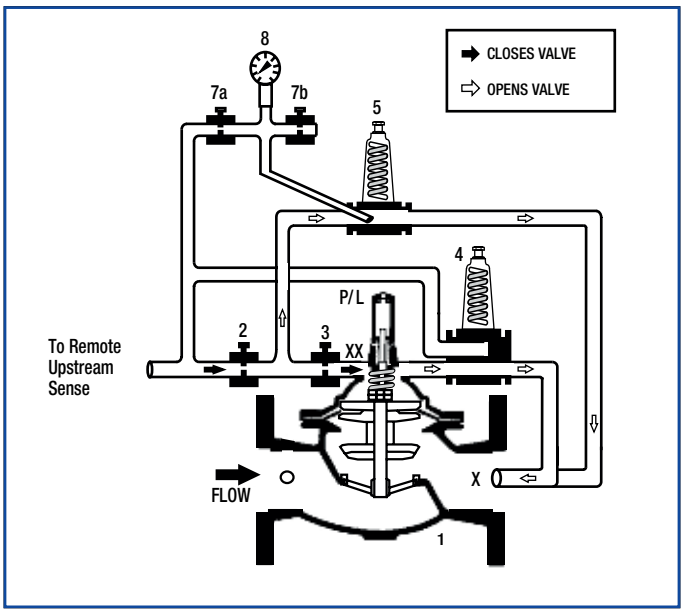


FIG B116-52
Surge Anticipator Relief / Remote Sense

Used in pumping systems to protect equipment from damaging pressure surges or waves caused by rapid changes of flow within the pipeline. The 116-52 responds by opening at a preset low pressure setting, allowing for quick relief of the returning high pressure wave. The valve remains open as the integral accumulator is charged and then closes. This prevents possible excess system drainage should pressure not return to/above the low pressure setting. It is also equipped with a high pressure control pilot which allows for high pressure relief service.

NOTE:
Adjustment range:
Low pressure : standard 20-1360 kPa, optional 0-204 kPa.
High pressure: standard 20-1360 kPa, optional 0-204, 100-2040 kPa

QUICK SIZING: Valve size one or two sizes smaller than main line.

POINTS TO CONSIDER:
- Refer to Engineering Data - Flow Capacity Chart

VALVE FUNCTION
Maintain constant upstream pressure (inlet to valve) by relieving excess pressure.

ACCESSORIES
Located as indicated
Included as marked

COMPONENTS
1. Main Valve
2. PV20C Sustaining Control
3. Needle Valve - Adj. Closing Speed

- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- FC - Flo-Clean Strainer
- P - Position Indicator
- AOS - Adjustable Opening Speed

FLOW CAPACITY CHART

Valve size (mm)	50	80	100	150	200	250	300	350	400	450	500	600
Max. continuous flow rate l/s (water)	13	30	50	114	200	310	440	540	695	955	1400	1700

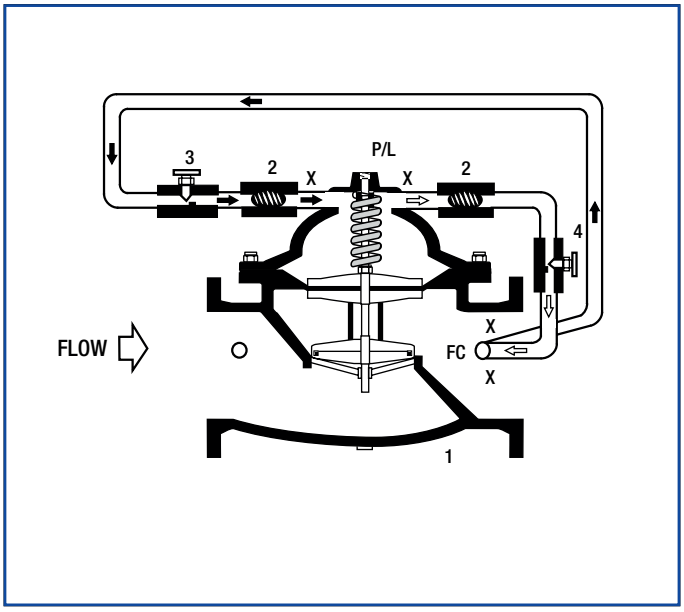


FIG B118-3R
Check Valve W/Separate Opening & Closing Speed Controls
Valves 100mm & smaller (150mm & larger uses 118-4R)

The FIG 118-3R permits flow when inlet pressure exceeds outlet pressure. Should pressure reversal occur the valve closes driptight.
Opening and closing speeds are separately adjustable.

118 - R - no speed control
118 - 1R - no closing speed (Sizes 50 -150mm)
118 - 2R - opening speed (Sizes 50 - 150mm)
118 - 3R - separate adjustable opening and closing speed 100mm & smaller
118 - 4R - separate 150mm & larger.

QUICK SIZING: Valve size same as line.

POINTS TO CONSIDER:
DISTRIBUTION FLOW:
- Refer to Engineering Data - Flow Capacity Chart
- Pressure drops at required flow.
- Refer to Engineering Data - Pressure Drop Chart

CHECK FLOW
- Check flow velocity exceeds a valve chart, consider adding a Relief Valve FIG 116 to your system.

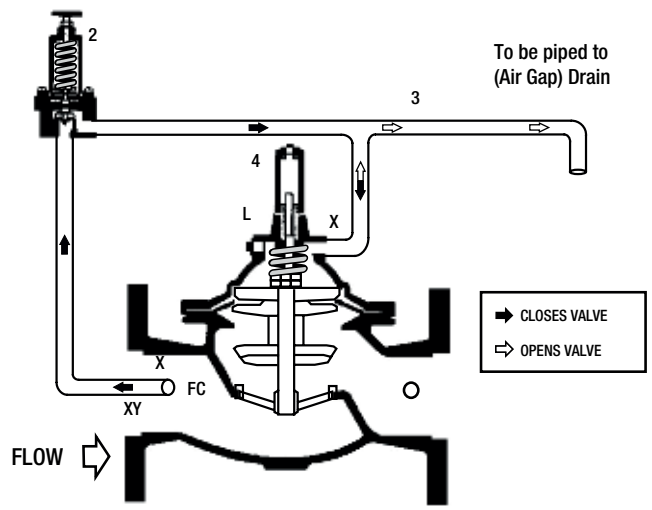
VALVE FUNCTION
- Valve closes at a controlled rate (adjustable) when outlet/ downstream pressure exceeds inlet/upstream pressure.
- Valve opens at a controlled rate
- (adjustable) when inlet/ upstream pressure exceeds outlet/downstream pressure.

ACCESSORIES
Located as indicated
Included as marked

COMPONENTS
1. Main Valve
2. Check Valve
3. Needle Valve - Adj. Closing Speed
4. Needle Valve - Adj. Opening Speed

- X - Isolation Cocks
- P - Position Indicator
- L - Limit Switch

HIGH PRESSURE SAFETY SHUT-OFF/ DOWNSTREAM RELIEF VALVE



Flow Direction Shown: "R" Flow Over the Seat
Optional Flow Under the Seat:

B116-Y

VALVE FUNCTION

- The valve is fully open when inlet pressure is below a shut-off controlset point
- The valve fully closes if inlet pressure exceeds a shut-off control-set point
- Can be equipped with a limit switch for signaling an alarm

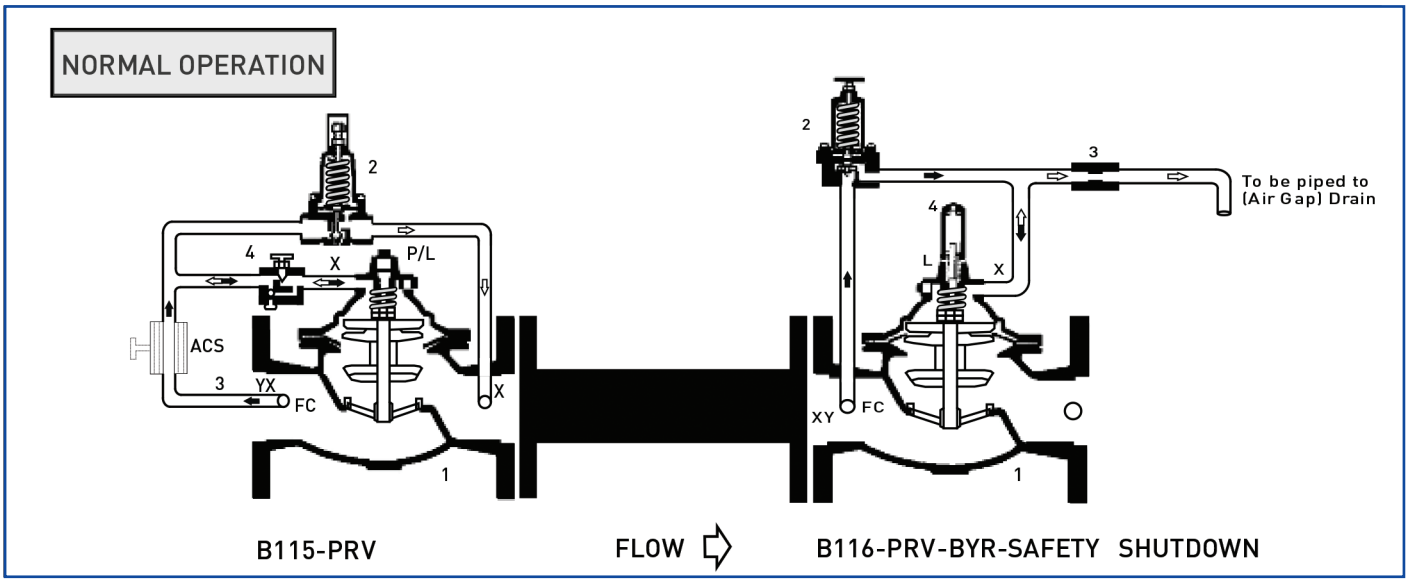
COMPONENTS

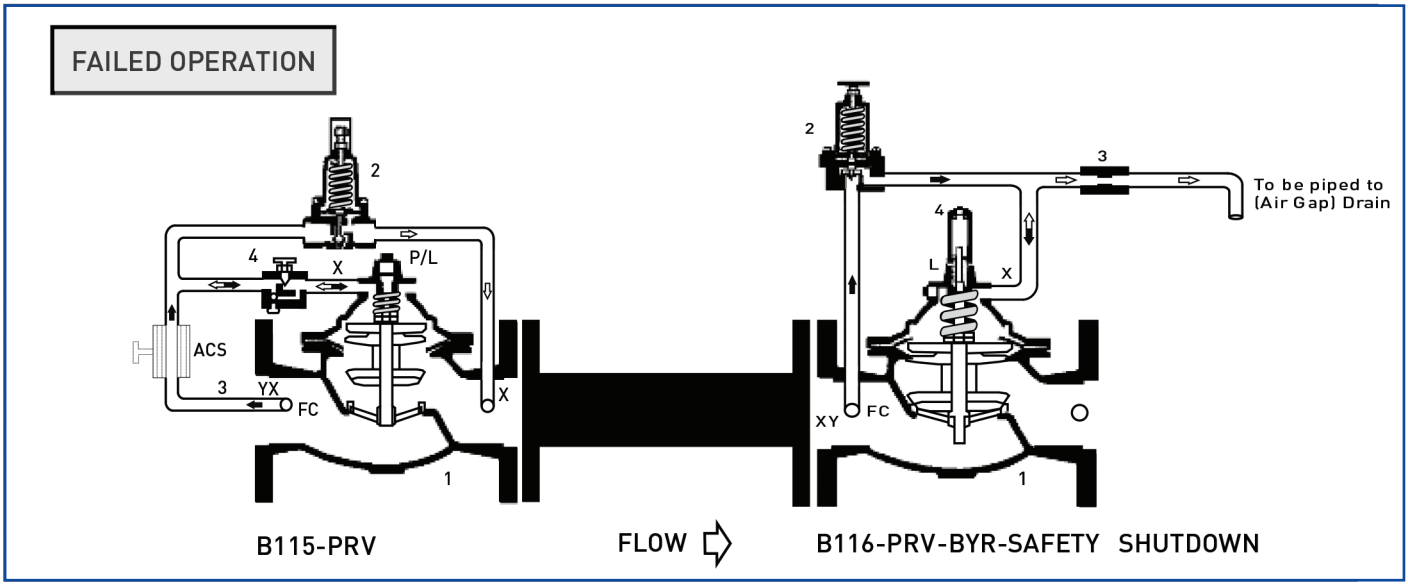
1. Main Valve
2. Bp30 Relief Control
3. Fixed Orifice
4. Position Indicator

ACCESSORIES

Located as indicated
Included as marked

- X - Isolation Cocks
- Y - Y-Strainer
- FC - Flow Clean Strainer
- L - Limit Switch



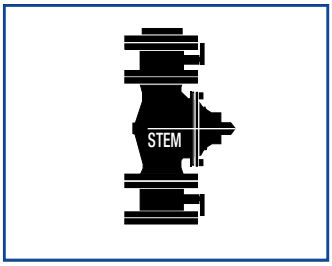


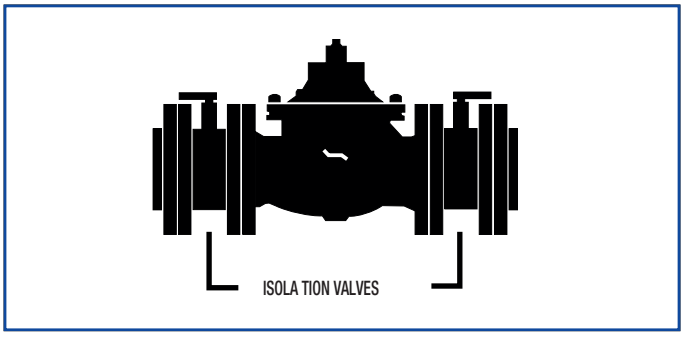
ENGINEERING DATA/SIZING

INSTALLATION RECOMMENDATIONS AND REQUIREMENTS

ISOLATION SHUT-OFF VALVES

Butterfly or similar type valves should be installed in the line upstream and downstream of the automatic control valve to allow for maintenance service. Installing an isolation valve will allow you to perform maintenance service without draining the system or exposing service personnel to line pressure.





SPECIAL CONSIDERATIONS

FLOAT VALVES

- Installing valves over open tanks should be avoided due to possible servicing problems.
- Install stilling wells around floats to protect them from turbulence.
- Remote mounted float controls should be connected to the main valve with a minimum of 3/8" tubing.

SOLENOID VALVES

- Electrical wiring should conform to NEMA codes to assure proper valve operation and longevity.

RATE OF FLOW VALVES

- A butterfly isolation valve cannot be installed directly to the valve inlet flange, as the disc will contact the orifice plate. A gate or ball type valve can be used or the isolation valve can be installed further upstream.

ALTITUDE VALVES

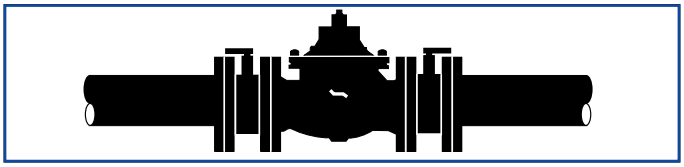
- Install the valve as close to the tank as possible, a maximum of 40 pipe diameters to assure accurate control.
- A sense line is required to connect the altitude control to the tank. To provide accurate reading of head pressure, the line should connect at the base of the water column. Minimum sense line size is ½". A shutoff valve should be installed in this line for service and start-up.

VERTICAL INSTALLATIONS

Avoid mounting valves 6" and larger in a vertical discharge position (valve stem horizontal or cover pointed sideways). If your installation requires this mounting position consult the factory or specify at time of order.

VALVE SIZING - PRESSURE REDUCING

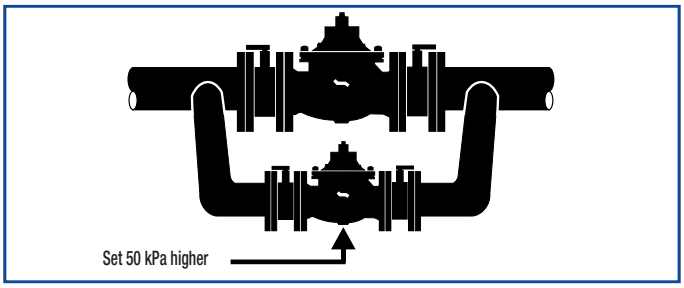
Selection of the correct size pressure reducing valve is a relatively simple process. Criteria for selection are minimum flow, normal flow, maximum flow and pressure drop across the valve. Following are explanations of the three types of PRV installations. These also apply to any functions combined with the reducing function, such as reducing/check and reducing /solenoid valves. A Relief valve should be installed downstream for dead-end service.



SINGLE VALVE INSTALLATION

A single reducing valve can be applied if operating flow, requirements are within the capacity of one size valve, and pressure drops are outside the Cavitation Zone.

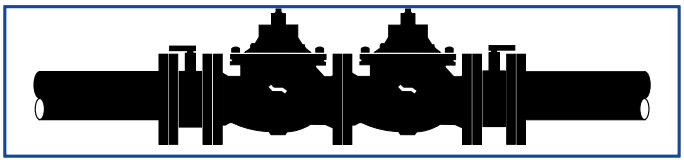
1. Select the valve size from SIZING CHART that is within the range of low to high flow. (Consider requirements of lowest demand equipment).
2. Check Pressure Drop (inlet-outlet) to insure that desired outlet pressure is above the recommended lowest outlet setting to avoid cavitation conditions. (Check Cavitation Chart page 27).



PARALLEL INSTALLATION

If flow requirement fall outside the capacity of a single valve, an additional smaller valve installed in parallel may be required. In parallel installations, the larger valve handles the requirements for maximum flow down to its low flow capacity. The small valve extends to the sum of the maximum flow of both valves.

1. Select the valve size combinations from SIZING CHART that is within low to high flow system range.
2. Check Pressure Drop (inlet-outlet) to confirm desired outlet pressure is above index psig, or check Cavitation Chart.



SERIES INSTALLATION

If pressure drop requirements cause the outlet pressure to be below the index psig, or fall in the Cavitation Zone, then two valves in series may be required. Each valve will function outside the cavitation zone to safely drop the high inlet pressure, in two steps, to the desired outlet pressure. Valve size is based upon the Minimum - Maximum flow ranges previously explained. Consult Baker representative for these applications.

ENGINEERING DATA

FLOW DATA 100 GLOBE

500MM, MAX FLOW = 1400 L/S

Valve size (mm)	50	80	100	150	200	250	300	350	400	450	500	600
Max. continuous flow rate l/s (water)	13	30	50	114	200	310	440	540	695	955	1400	1700

Maximum continuous flow based on pipe line velocity of 6 metres per second.
Maximum intermittent flow based on pipe line velocity of 7.6 metres per second.
The Cv factor of a valve is the flow rate in litres per second at 20°C that will cause a 1 kPa drop in pressure.
The factors stated are based upon a fully open valve.

Cv factor can be used in the following equations to determine flow (Q) and Pressure Drop (ΔP)

$Q\ (flow) = Cv\sqrt{\Delta P}$

Q in L/s

ΔP in kPa

$\Delta P = (Q/Cv)2$

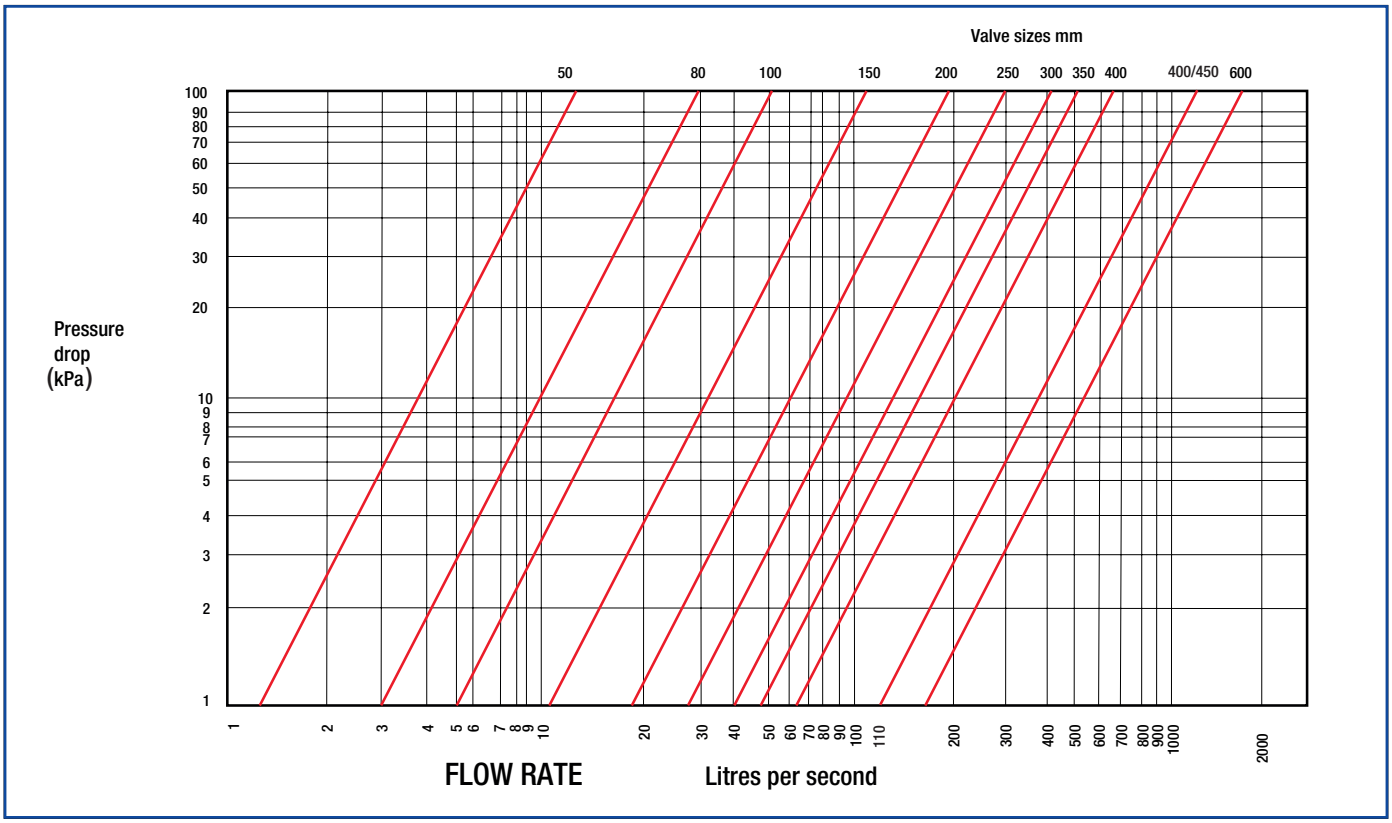
$Cv = \frac{Q}{\sqrt{\Delta P}}$

Equivalent Length of Pipe (K factor)

K is calculated from the formula $h = \frac{Kv^2}{2g}$

Where:
h = friction loss in metres of water
v = average velocity in m/s in a pipe of corresponding diameter
g = 9.81 m/s/s

PRESSURE DROP CHART TYPE GLOBE



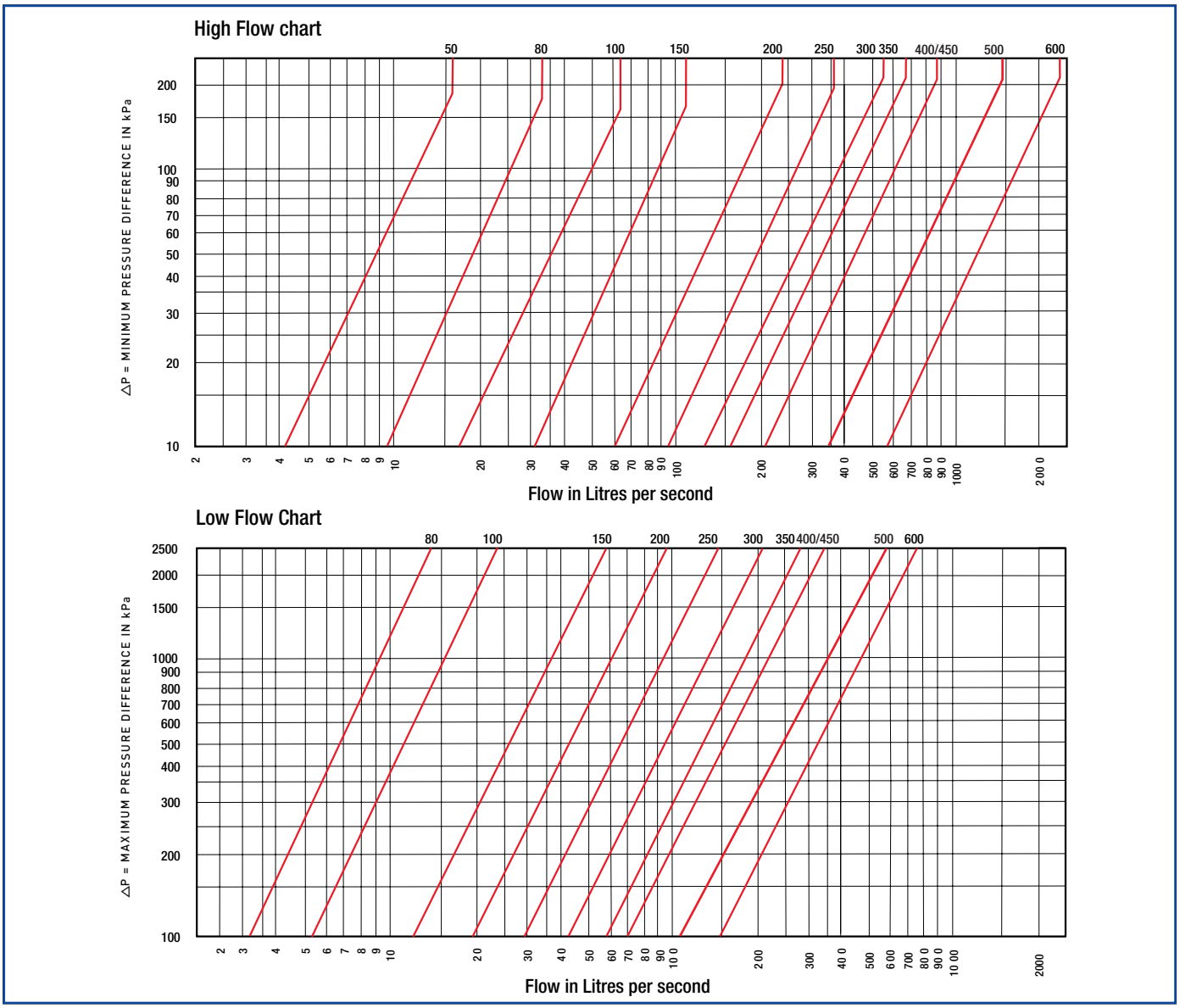
VALVE SIZING

TO PROPERLY SIZE AN AUTOMATIC CONTROL VALVE YOU NEED TO KNOW THE FOLLOWING:

- Minimum flow requirements
- Maximum flow requirements
- Outlet pressure
- Highest and lowest inlet pressure

1. Utilize the high flow chart and select the flow as found on the horizontal axis which corresponds with your maximum flow requirements.
2. From this point draw a vertical line until you intersect with the horizontal line corresponding with the minimum differential pressure. (Your minimum differential pressure will be the lowest inlet pressure minus the desired outlet pressure this is also known as the delta P).
3. From this point move right to the first valve size line. This will be the Minimum valve size which should be used on intermittent flow of 7.6 m/s. If maximum flow is continuous, then do not exceed the l/s (6m/s) listed on the maximum continuous flow table.
4. Utilize the flow chart and select the maximum differential pressure as found on the vertical axis. (The maximum rP will be the highest inlet pressure minus the desired outlet pressure).
5. From this point draw a horizontal line until you intersect with the line corresponding to the valve size as selected in step 3.
6. From this point draw a vertical line down to the horizontal axis. This will be the minimum flow capability of the valve based on these variables.
   a) If the minimum flow capability obtained from step 6 is above your actual minimum flow requirements, you should consider a parallel installation. Using the minimum flow capability, begin at step 1 to select the size you will need for this low-flow bypass.
   b) Use the cavitation chart and determine if the intersection of the inlet and outlet pressures falls in the shaded area. If so, you should consider a series installation. Both valves should be sized in accordance with the above steps.

MAXIMUM CONTINUOUS FLOW CHART



PRESSURE REDUCING/SIZING

QUICK SIZING CHART - PRESSURE REDUCING VALVES

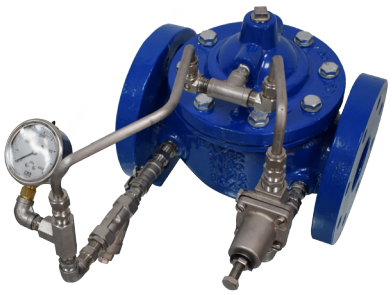
Select the flow range that meets your system requirements and correct valve(s).

NOTE:
Maximum flow rates in this table allow for continuous flows at velocity of 6m per second.
For maximum intermittent flow rates (7.6m per second) see flow Capacity Chart.
Baker 115 valves work best with 20 kPa differential or more.

Single Valve Installation	
System Flow Range in L/S	Size mm
0.06-13	50
1.9-30	80
3.2-50	100
7.0-114	150
13-200	200
19-310	250
25-440	300
32-540	350
41-695	400
72-955	450
110-1400	500
190-1700	600

Parallel Valve Installation		
System Flow Range in L/S	Size mm	Size mm
0.06-63	50	100
0.06-126	50	150
1.9-230	80	200
1.9-340	80	250
3-490	100	300
3-590	100	350
7-820	150	400
7-955	150	450
7-1400	150	500
7-1814	150	600

For sizes smaller than 50mm the Baker direct acting regulator is used.
For more information please contact your Baker representative.



CAVITATION

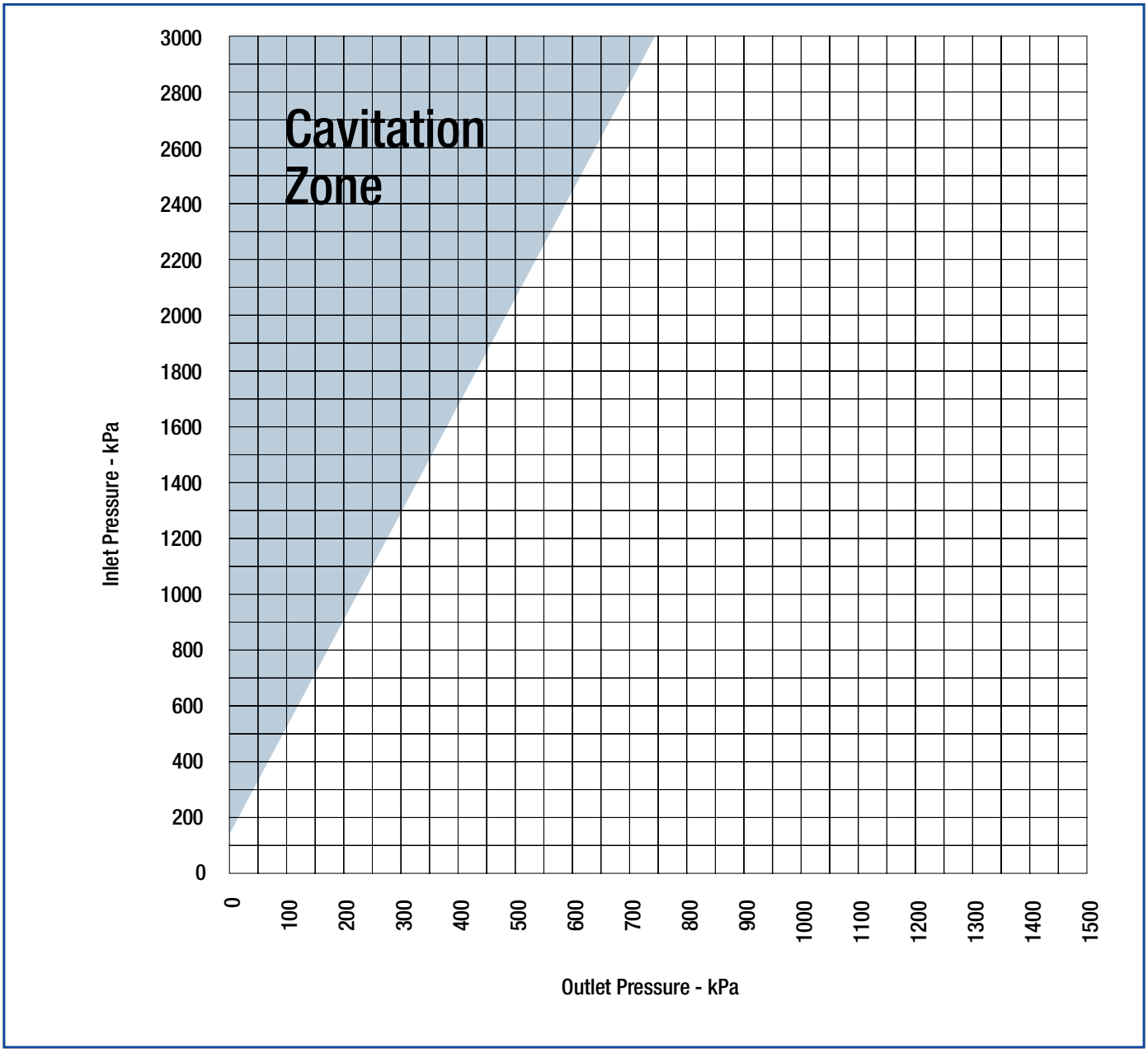
VALVE COVER CHAMBER CAPACITY

The chamber between cover and diaphragm is capable of holding the following volume of liquid. This chamber discharges liquid to open valve and must be filled to close valve. If your application requires the valve to discharge to atmosphere this information will be helpful to size drains or discharges lines. These volumes can also be used to calculate time of closure (or opening).

Valve size - mm	50	80	100	150	200	250	300	350	400	450	500	600
Litres	0.121	0.163	0.303	0.644	2	4.7	9.5	15.1	24.6	24.6	31.2	36

CAVITATION CHART

After selecting valve size, locate inlet and outlet pressures on this chart. If the intersection point falls in the shaded area, cavitation can occur. Operation of valves continually in the cavitation zone should be avoided.



HOW TO ORDER

To order the correct Control Valve please provide the following information :

Refer to the valve specification on page 5 and select the Control Valve # for detail list of standard/options.

Control Valve
- Size

Valve Material
- Ductile Iron
- Cast Steel

Body Type
- Single Chamber
- Power Chamber (Double)

End Connections
- To be Specified

Trim (Seat)
- Stainless Steel

Elastomers
- Neoprene (Standard)
- Viton
- E.P.D.M.

Accessories other than standard to be specified.

PURCHASE SPECIFICATIONS FOR BAKER CONTROL VALVES

- Self Actuated Globe Style Diaphragm operated water control valve.
- Standard body material : Ductile Iron.
- Standard seat material : Stainless Steel.
- Diaphragm assembly is supported by a dual bearing system for smooth control and long life.
- The soft seal consists of a Quad seal retained on 3 ½ sides by the quad seal retainer and quad seal washer, and protected from the flow path.
- Valve has a 4:1 cavitation-free pressure drop capability.
- Standard Coating : 250 microns FBE.

Additional information should be included for the following series of Control Valves.

110 Float Valves
- Pilot Mounting
- Valve Mounted
- Valve discharge vertical
- Valve discharge horizontal
- Remote mounted

113 Solenoid Valves And Solenoid Override On Any Control Valve
- Voltage
- Actuation
- Energised to open main valve
- Energised to close main valve

113/513 Pump Control Valve
- Voltage
- 2 or 3 Way Solenoid Operation
- Normally Open or Normally Closed Solenoid
- Energised to open main valve
- Energised to close main valve

114 Rate Of Flow Valve
- Desired flow rate
- Flow direction
- Over the Seat “R”
- Under the seat

115 Pressure Reducing Valve
- Maximum inlet pressure
- Desired outlet pressure

116 Pressure Relief/Sustaining
- Desired pressure setting

127 Altitude Control Valves
- Tank height (spring range)

LEARN MORE ABOUT VALVES BY CONTACTING THE ACADEMY

OVERVIEW

There is a wide range of valve types that have been developed to manage different fluids in a multitude of processes systems and conditions.

Some valves can start or stop flow processes whilst others throttle or regulate. Some work well in corrosive environments whilst others can withstand pressure.

The Academy aims to offer courses that assist our employees, clients, distributors, students and engineers in understanding valves and their application.

Each valve has its own advantages, disadvantages and limitations.

This course examines:

- The different valve types
- Valve end connections
- Levers, gearboxes and actuators
- Testing of valves
- Quality assurance
- Installation, operation and maintenance
- Manufacturing methods
- Reconditioning of valves

WHY SHOULD YOU ATTEND THIS COURSE?

- To expand your knowledge of the different valve types
- To understand the specifications and regulations applicable to valve products
- To get a better understanding of the manufacturing processes of valves
- To enable you to select the right valve for your application
- You can earn two CPD Points as the Valves Fundamental course is certified with SAIMechE
- The Valve Fundamentals course is also registered with ECSA

CONTACT THE ACADEMY TO BOOK YOUR SEAT!

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10 Chris Street, c/o Chris and Garfield Road, Alrode, Alberton, Gauteng, South Africa
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The ACADEMY


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