



VALVES & CONTROLS



GLOBE
NEEDLE
BALL
ANGLE SEAT
DIAPHRAGM
SOLENOID
PISTON
CHECK
ZONE
STEAM TRAPS
I to P's
POSITIONERS
POSITION INDICATORS

total instrument solution worldwide

Dwyer Instruments, Inc. produces a broad line of competitively priced valves and valve control products under its Proximity Controls and W.E. Anderson brand names. This catalog provides details of Dwyer's full valve product line, which includes globe, butterfly, ball, angle seat, piston, diaphragm and solenoid valves. Within each valve type Dwyer offers many different options so that you can select the proper valve to meet your specific application needs. We also offer valve position indicators, valve positioners, current to pressure transducers, steam traps, electric and pneumatic controllers, filters and regulators to complete your valve automation package.

Dwyer entered into the valve business in 1989 with the acquisition of Proximity Controls. Proximity Controls manufactures a full line of position indicating products for valves including the magnetic drive featured in the Mark Series. Dwyer then expanded by purchasing the rugged Hi-Flow™ control valve line from Taylor in 1991. Besides acquisitions Dwyer has continued to expand the product line to offer our customers a complete source for all of their valve needs.

In addition to making and selling quality valve products, Dwyer is committed to a standard of customer service – including competitive prices and knowledgeable, courteous technical support – that generates and sustains long-term relationships.

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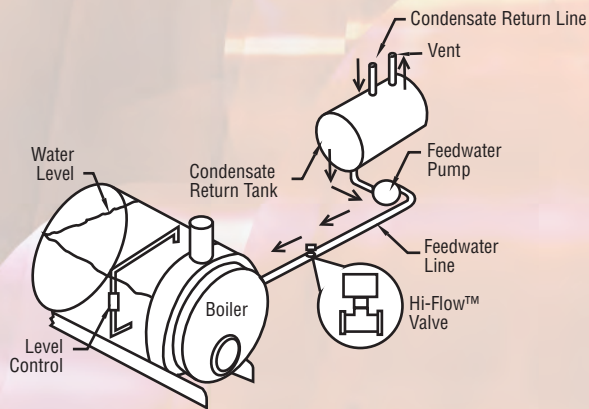
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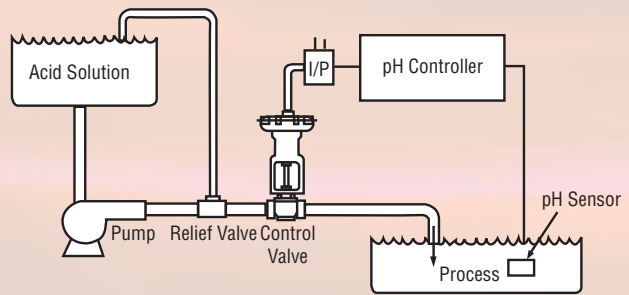
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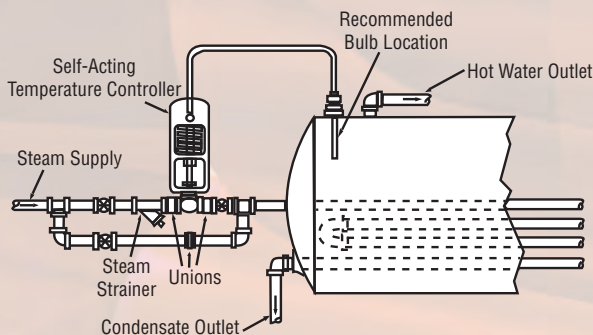
W.E. Anderson® Series Hi-Flow™ valves are used for flow control of water into industrial boilers.

Maintaining the proper water level in a boiler is critical to its proper operation. Too much water and water can get into the steam lines, while too little water and the boiler can over heat. Both conditions can lead to damage of the boiler or heating system. Feedwater going into the boiler needs to be controlled to maintain the proper boiler water level. The W. E. Anderson® Hi-Flow™ globe valve is used to control the flow of the feedwater to maintain that proper water level. The control valve is used with a proportioning electric actuator that is directly controlled by a level transmitter in the boiler. As the water level drops in the boiler the valve lets in more water and as water level increases the valve lets in less water. Thus proper water levels are always maintained keeping the boiler operating properly and efficiently.



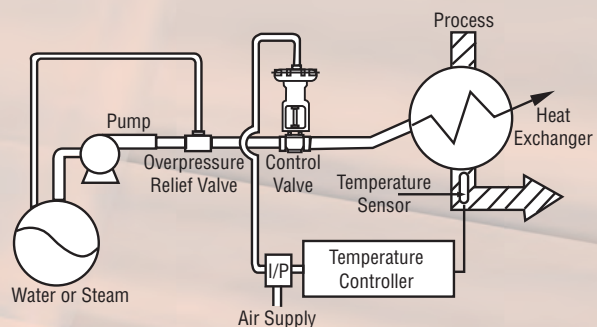
Regulating pH for food and dairy applications using linear or rotary pneumatic control valves.

Hi-Flow™ pneumatic control valve, available with bronze or 316 stainless steel body and 316 stainless steel trim, provides superior corrosion resistance and durability. A lined Plast-A-Vane® butterfly valve with pneumatic actuator could also be used to provide excellent corrosion resistant characteristics. Both types of valves yield superb flow characteristics and enhanced shut-off capabilities ensuring years of trouble-free, reliable operation. In the application shown, throttle action of the High-Flow™ linear globe valve, or the rotary movement of the Plast-A-Vane® quarter-turn butterfly valve, is used to regulate the flow of acid solution into a food/dairy process to accurately control the pH of the system.



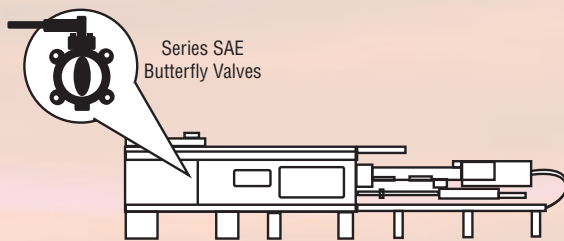
Regulating process temperature using W.E. Anderson® self-acting temperature control valve.

The self-acting temperature control valve features a self-contained valve, controller, and sealed thermal system in one compact package providing installation economy and long-term reliability. This package eliminates the temperature controller required with standard control valves. The dispensing application shown includes a 38R valve that opens when the temperature in the hot water tank decreases allowing the steam to heat the water and bring the temperature up to a required set point, at which point the valve will close. A valve that closes on temperature rise (direct acting) would be required for this application. The W.E. Anderson® Hi-Flow™ quick-opening, double seated valve enables fast response for improved process control in this application. If your application requires valve to open on temperature rise, then a reverse acting 38R is also offered.



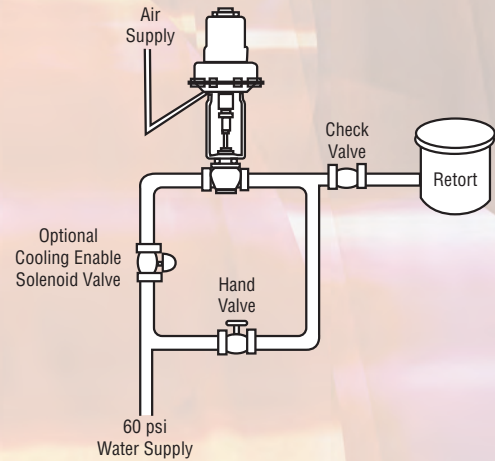
Process temperature control using pneumatic Hi-Flow™ control valves.

Pneumatic Hi-Flow™ control valves provide excellent control with high flow, wide rangeability and tight shutoff capabilities. The dispensing application shown uses a Lin-E-Aire® pneumatic actuator, operating off standard 3-15 psi control air signals, and a Hi-Flow™ linear control valve that apportions steam or water to a user process. The valve regulates cooling water or steam flow depending on the process requirement resident in the temperature controller program. This package can be provided with a Precisor® positioner and Proximity® position transmitter which provides an excellent process control application problem solution.



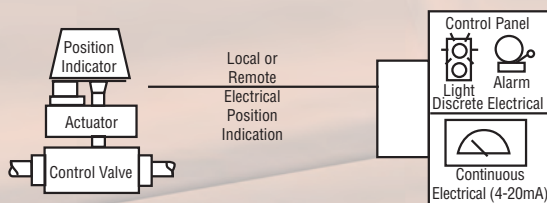
W.E. Anderson® Series SAE Butterfly Valves are utilized on hydraulic reservoirs on injection molding machines.

The SAE valve is used as a shut off valve on the hydraulic system on injection molding machines. Normally the valve is in the open position during operation. When the hydraulic pump needs servicing the valve is closed to isolate the hydraulic reservoir to prevent loss of hydraulic fluid. The SAE valve has connections conforming to SAE J518, which is a four screw split flange port. An o-ring seal is utilized in the connection design that reduces leaks associated with tapered thread and gasket type seals. The connection allows for the reduction of unneeded adapters and has a low profile reducing space requirements.



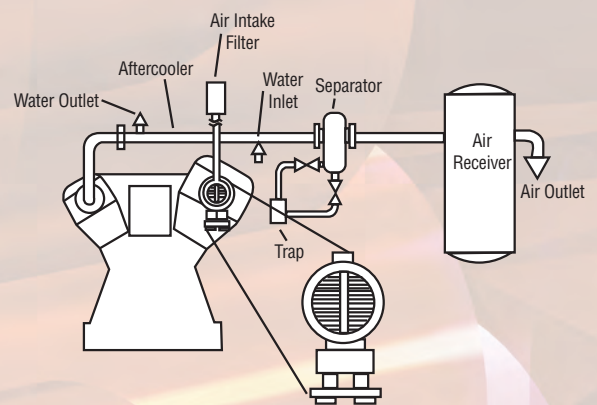
Quick response Hi-Flow™ valves control water flow in cooling process.

Dependable W.E. Anderson® Hi-Flow™ control valves with Lin-E-Aire® air-to-raise actuators combine to provide unsurpassed water flow management. This retort system employs the Hi-Flow™ valve because of its excellent control capabilities, which are necessary for this application. After the cooking process, the valve is opened slowly. Once the desired temperature has been reached, the supply is shut off and any additional cooling is done by use of the hand valve.



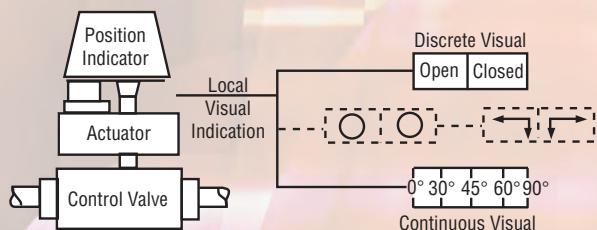
Proximity® Mark Series valve position indicator is perfect for valve position indication on offshore oil rigs.

Proximity® Mark Series position indicator is utilized in valve automation packages in harsh environments. The Mark Series mounts onto the top of rotary valve actuators and connects to the actuator shaft or attaches to the shaft of a linear valve for indicating valve position. Standard with the Mark Series is visual position indication with "OPEN", "CLOSED", and degree position status. The Mark Series is available with continuous position retransmission with a 4 to 20 mA output and up to six adjustable position indication switches for remote indication of valve status. Remote status transmitter is used for indication of exact valve position and switches provide discrete indication of valve open and closed status in the control room. The Mark Series is perfect for this application because of the 316 SS enclosure that withstands the sea spray environment, and the magnetic drive mechanism that completely seals the switch cavity from the environment.



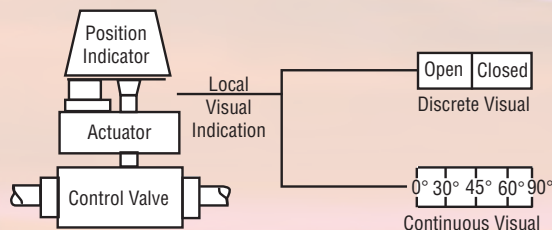
Compressor unloading using W.E. Anderson® BFFV butterfly valve.

When receiver pressure rises to a predetermined setting, the total closure valve closes automatically, blocking the air inlet and preventing air from entering the compressor. After all compressed air is evacuated from the cylinders and intercooler, the solenoid control valve on the high-pressure cylinder is opened to atmosphere allowing that minute amount of air remaining in the high-pressure cylinder to be exhausted. The compressor is now operating in a vacuum with minimal losses due only to mechanical friction in bearings and on sliding surfaces. Minimal horsepower is needed to overcome the mechanical losses.



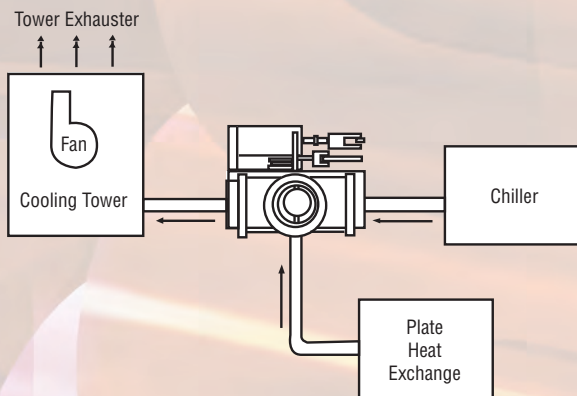
Visual valve position indication with Proximity® explosion-proof position indicators provides convenience and enhanced safety in valve monitoring.

For the convenience of the control valve user, a compact, adjustable stainless steel visual indicator is provided on all direct-drive Proximity® position indicating switches and transmitters. These industrial switches are commonly mounted on quarter-turn pneumatic actuators and valves. A magnetic design provides maximum safety by allowing complete sealing of the switch cavity. Over 2000 specific applications are covered with an extensive line of mounting kits built for individual valve and actuator brands and model numbers. As the valve and actuator is cycled, the input shaft of the position indicator rotates, causing a stainless steel cylinder to rotate inside a second stainless steel cylinder with windows. When the valve is open the word "OPEN" appears in the two windows located 180° apart. The compact and durable visual indicator displays discrete endpoints (OPEN or CLOSED) as well as scaled degrees (0-90). LED and flow path outputs are available options. Up to 3 conduit entrances allow utilization of this flexible indicator as a junction box for additional convenience as well as material and labor cost reduction to the user.



Proximity® Series QV indicates valve position locally and remotely.

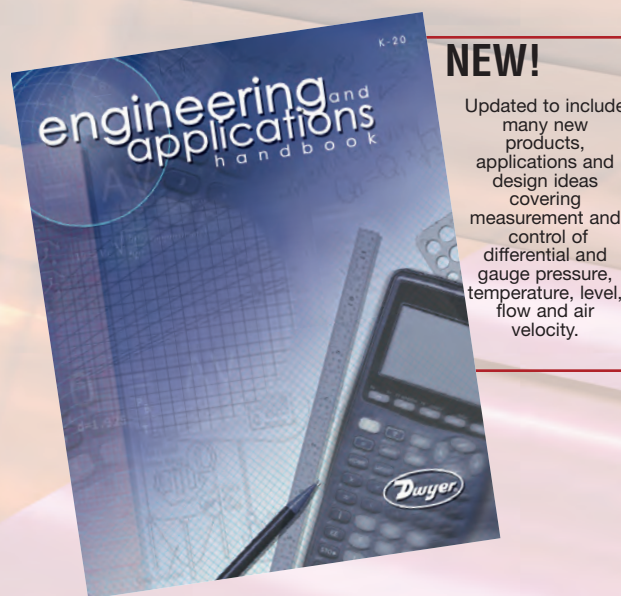
Proximity® Series QV position indicator is utilized in valve automation package. Quarter turn valves such as ball and butterfly valves are often automated with pneumatic or electric actuators. The actuator connects to the shaft of the valve and rotates it. Usually the actuator has a shaft of its own that comes out of the top and rotates as the actuator rotates the valve. The QV mounts onto the top of the actuator and connects to this actuator shaft for indicating valve position. When the valve is open or closed, the corresponding word "OPEN" or "CLOSED" appears in four windows 90° apart. The visual indicator also includes degree position indication of 0 to 90°. The QV is compact yet the visual indicator is large and easy to view from a distance. Adjustable position indication switches are available to remotely indicate if the valve is fully opened or closed. The QV assures proper operation of the valve and indicates problems so they can quickly be addressed.



Water-side Economizer System includes ABFV 3-way butterfly valve for accurate control of flow.

To ensure efficient utilization of cold water in HVAC systems, W.E. Anderson® ABFV 3-way butterfly valves are called upon to modulate flow. This common "water-side economizer" allows water from the plate heat exchanger to be diverted directly to the cooling tower if the temperature is cool enough, instead of coming directly from the condenser on the chiller.

FREE Engineering and Applications Handbook
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Introduction to the Hi-Flow™ Valve

The Hi-Flow™ control valves are pneumatic operated process control valves for use with controllers to regulate the flow of a process variable; that is steam, water, oil, gas, etc. Hi-Flow™ valves are perfect for applications in food processing, dairy production, HVAC, chemical/industrial processing, tire production, textile production, foundry operations, oil drilling rigs, automotive, and more.

Hi-Flow™ control valves were originally designed and manufactured by Taylor and are well known as a durable and dependable valve. Dwyer Instruments acquired the Hi-Flow™ line in 1991 and has continued manufacturing this great quality valve under the W.E. Anderson Division name. Dwyer Instruments offers units from stock and an exceptional lead time on made-to-order units.



FEATURES

- **Wide Rangeability:** This is the ability of a control valve to control from 100% of Cv down to low values of Cv. The ratio of the high to low values for the Hi-Flow™ valve is 50:1. The Hi-Flow™ valve offers good control at extremely low flow rates, which is particularly valuable when used on batch processes where initial flow is high, but the flow rate is low when the control point is reached.
- **Removable Seat Ring:** Seat ring screws into the body of the globe valve. The seat ring can be removed and replaced as the seat ring wears with use. Replacing the seat ring is much more cost effective than replacing the entire globe valve body.
- **High Capacity:** Hi-Flow™ valves have greater flow capacity than most conventional valves of the same size, offering the ability to use a smaller size valve that is less expensive.
- **Flow Characteristics:** Linear or equal percentage.
- **Selectable Fail Safe Condition:** Air-to-Raise or Air-to-Lower actuators and Push-to-Open and Push-to-Close valve bodies.
- **Packing:** Spring backed Teflon® V-rings to assure a tight seal on the stem.
- **Exceptional Shut-Off:** The Hi-Flow™ leakage rate meets ANSI/FCI 70-2 Class IV (0.01% of Cv in the closed position).
- **Adjustable Springs:** Springs are adjustable in the field for proper shut-off and control range.
- **Easy Maintenance:** Actuators can be removed as one part from the globe valve body without removing the valve from the line. Actuators of different sizes and actions can be field replaced and interchanged on all valve sizes.

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Selecting the Proper Valve

In selecting a valve, pick a valve that fits the application where it is being installed.

Data needed to choose the proper valve:

1. **Media:** Water, steam, or other gas or fluid.
 - Needed to check chemical compatibility with the valve material.
 - Needed for valve sizing.
2. **Process Temperature:** Standard operating conditions and maximum.
 - Standard temperature is used for valve sizing.
 - Maximum temperature must be below valve temperature rating.
3. **Process Pressure:** Standard operating conditions and maximum.
 - Standard pressure is used for valve sizing and actuator sizing.
 - Maximum pressure must be below valve pressure rating.
4. **Required Flow Capacity**
 - Application flow rate needed for valve sizing.
5. **Valve Operation**
 - 2-way or 3-way.
 - Action of the valve on air pressure loss. Fail Closed or Fail Open.
6. **Trim Style**
 - Linear or Equal Percentage flow characteristic.
 - Restricted or needle trim for low flows.
7. **Valve Body Size and Connection**
8. **Options**
 - Current to Pressure Transducer.
 - Positioner.

Valve Body

The Hi-Flow™ Valve Series offers two types of valve bodies, Push-to-Close (Fig. 1) and Push-to-Open (Fig. 2). Selection depends upon the valve action required in case of actuator air supply failure.

Push-to-Close: In this type the valve stem moves downward, pushing the valve plug closer to its seat in the valve body. This movement decreases the flow through the valve.

Push-to-Open: In this type the valve stem moves downward, pushing the valve plug away from its seat in the valve body. This movement increases flow through the valve.

Depending on actuator style, the Push-to-Open offers a plug that will close from upstream pressure on air supply loss.

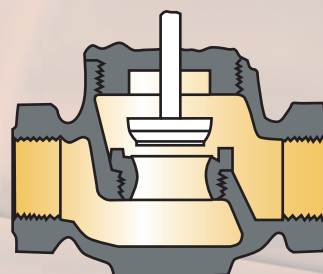


Figure 1. Push-to-Close Linear Valve Body

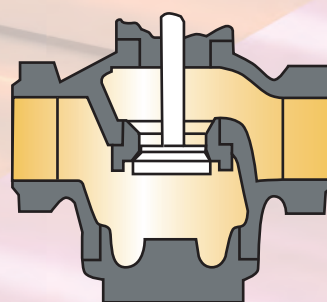


Figure 2. Push-to-Open Linear Valve Body

Actuators

Actuator Action

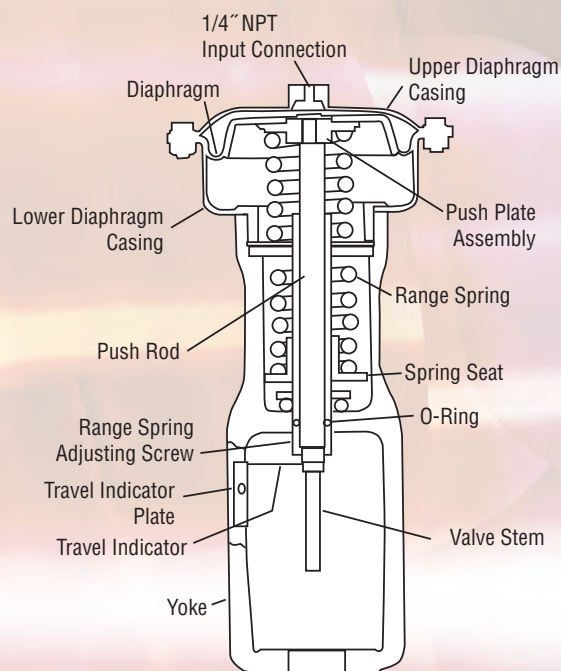
The Hi-Flow™ valve incorporates a Lin-E-Aire® pneumatic actuator that automatically controls the valve. The opening, closing and throttling of the valve plug in the valve body is accomplished by varying the air pressure to the diaphragm in the actuator.

There are two types of Lin-E-Aire® actuators; Air-to-Lower and Air-to-Raise. The selection of the type depends upon the desired operation on loss of air supply.

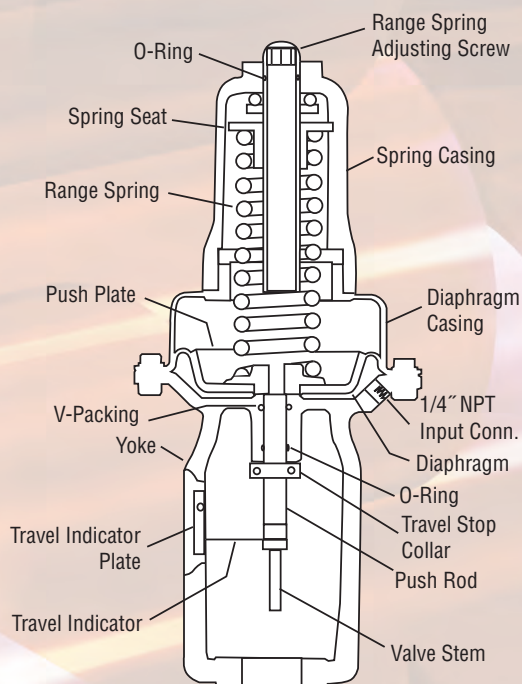
Actuator Sizing

The Lin-E-Aire® actuator size and spring are selected to meet the requirements of the application. There are three sizes of actuators available. The actuator must be sized to be large enough to shut-off the valve. The shut-off pressure is the difference between the inlet (upstream) and outlet (downstream) pressure when the valve is closed. If there is no outlet pressure, then the shut-off pressure is just the maximum upstream pressure. The charts on pages 18 to 20 show example model numbers with the maximum shut-off pressure for the three different actuator sizes. The column labeled MAX USP (maximum upstream pressure) is the maximum pressure that the actuator can shut-off against.

Standard operating range is 3 to 15 psig (.21 to 1.0 bar). The spring size is automatically chosen at the factory to provide a 3 to 15 psi operating range at the customer provided shut-off pressure. When ordering a valve the shut-off pressure must be given. The spring has an operating range of shut-off pressures that it will operate, and the Lin-E-Aire® actuators have range spring adjustments for adjusting the valve in the field. It is best to adjust the valve in the application so that it operates at the particular shut-off pressure present.



Air-to-Lower Actuator



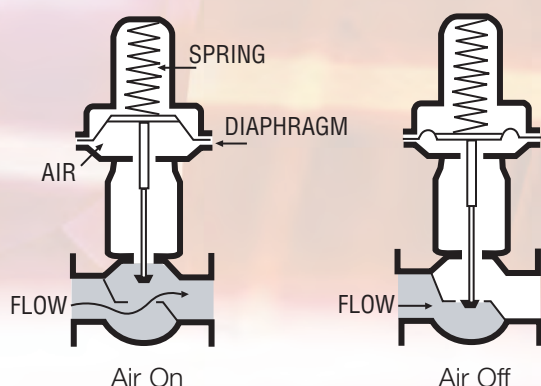
Air-to-Raise Actuator

Valve Operation

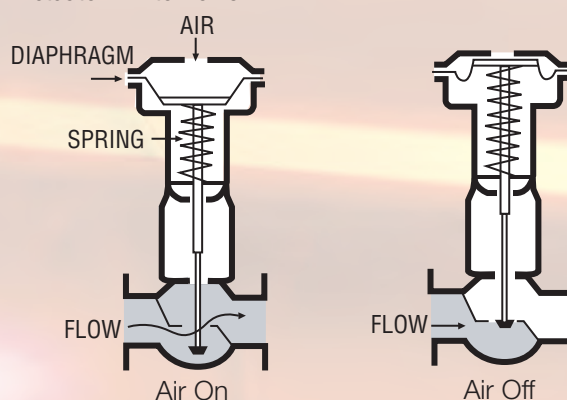
The Hi-Flow™ Series is offered in 2-way and 3-way body styles. 2-way valves are used for flow control and 3-way valves are used for either mixing or diverting service. With the 2-way type valve there are choices of Push-to-Open or Push-to-Close valve bodies and Air-to-Raise and Air-to-Lower actuators. The choice of the valve body and actuator depend on the desired valve action on loss of air pressure, the fail position. It is desirable that a failure in the operating air supply put the valve in the position of greatest safety for the process and equipment.

2-Way, Valve Action: Air-to-Open, Spring Closed (Air Off, Normal Position) “Normally Closed” or “Reverse Acting”

Valve Body: Push-to-Close
Actuator: Air-to-Raise

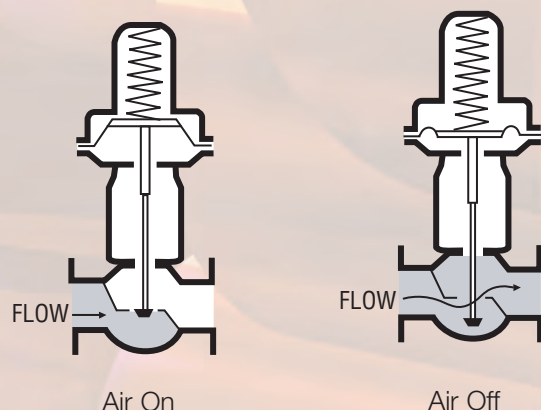


Valve Body: Push-to-Open
Actuator: Air-to-Lower

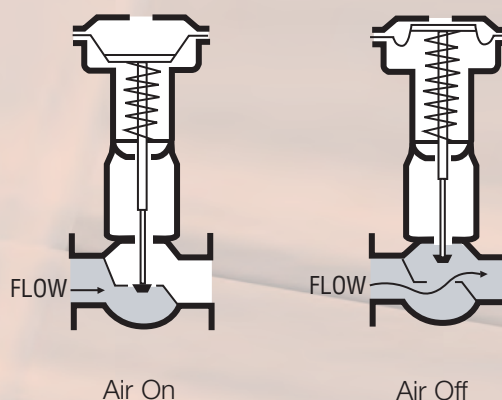


2-Way, Valve Action: Air-to-Close, Spring Open (Air Off, Normal Position) “Normally Open” or “Direct Acting”

Valve Body: Push-to-Open
Actuator: Air-to-Raise

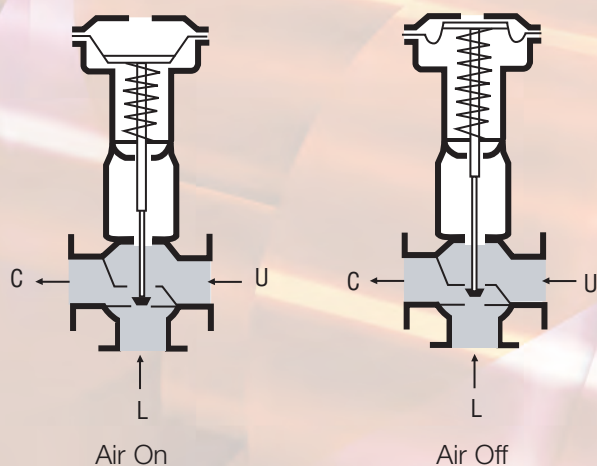


Valve Body: Push-to-Close
Actuator: Air-to-Lower

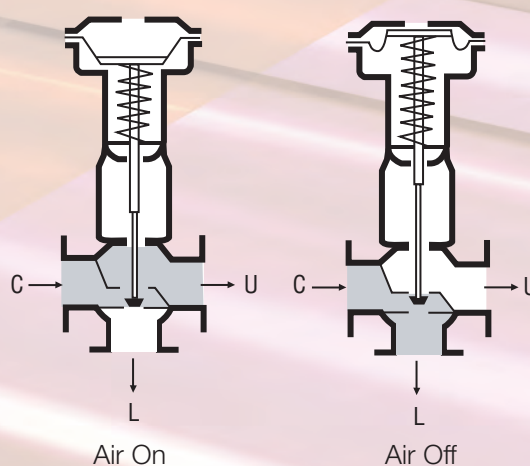


3-Way

Mixing



Diverting



Trim Styles

Flow Characteristic

The Hi-Flow™ valve is a control valve that is regulating the amount of flow through the valve. How the flow through the valve changes as the valve opens corresponds to the trim style, or flow characteristic, of the valve. The trim style is the shape of the plug in the valve. As the valve opens, the plug shape changes the size of the valve opening, which changes the flow rate through the valve.

There are two types of trim styles, or flow characteristics available in the Hi-Flow™ Series; Linear (Fig. 1) and Equal Percentage (Fig. 2). With Linear trim, equal increments of plug travel provide equal increments of flow change. With Equal Percentage trim, equal increments of plug travel provide uniform percentage increments of flow change. The correlation between plug travel and flow is shown in Figure 3. The actual flow rate by plug travel is shown on pages 14 and 15.

Choosing the optimum valve characteristic may require a detailed study of the process equipment and its operating conditions. However, in many applications, any valve will operate well and the characteristic need not be considered. Typically these are applications where load changes are small (maximum load no greater than three times the minimum).

A linear valve characteristic is nearly always desirable when the major load change in the process requires merely a change in flow through the valve. Such a load change could be a controller set point adjustment or some other load in the process itself calling for a new valve position. For example, when water is being heated by steam supplied through a control valve, a change in cold water temperature or in the rate of water throughput will call for a linear valve. On the other hand, fluctuations in steam pressure call for an equal percentage valve. There is no ideal solution and the user must decide what is best for the application.

Reduced Flow or Restricted Trim

The Hi-Flow™ Series offers restricted, a smaller port size, trim in the 3/4" and 1" size valve body. This allows a reduction in the flow rate through the valve without a reduction in pipe size. The 1" valve size is available with the 3/4" and 1/2" trim sizes, and the 3/4" valve size is available with the 1/2" trim size. The restricted trim is available in Linear or Equal Percentage characteristic. The flow rates are shown on pages 14 and 15.

The Hi-Flow™ Series offers needle plugs that reduce the orifice size from full port to a much smaller area size. Needle plugs are ideal for control of small flow rates and come in Linear (Fig. 4) or Equal Percentage (Fig. 5) characteristic. Needle plugs are available in the 1/2", 3/4", and 1" body sizes. Linear characteristic needle plug sizes are 3/32", 1/16", and 1/32". Equal Percentage characteristic needle plug sizes are 3/8", 5/16", 1/4", 3/16", and 1/8". The flow rates are shown on pages 14 and 15.

Diagram of Linear Plug

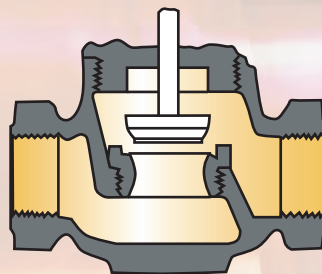


Figure 1. Push-to-Close Linear Valve Body

Diagram of Equal Percentage Plug

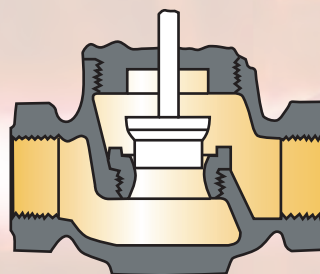


Figure 2. Push-to-Close Equal Percentage Valve Body

Flow Chart

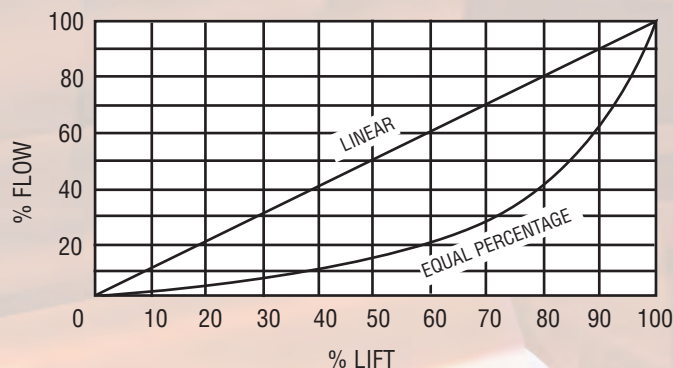


Figure 3. Inherent Flow Characteristics of Hi-Flow™ Valves

Diagram of Linear Needle

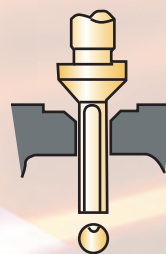


Figure 4. Push-to-Close Linear Needle Plug

Diagram of Equal Percentage Needle

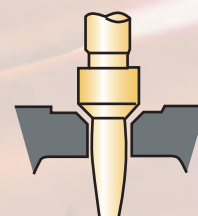


Figure 5. Push-to-Close Equal Percentage Needle Plug

Valve Sizing

It is essential to correctly size a control valve for the application. The valve will not control the process effectively or efficiently if it is sized incorrectly. A control valve should always be sized according to the flow requirement, not the line size. A valve that is too oversized will result in poor controllability of the process. The system will fluctuate and cycle from the lack of control. A valve that is undersized will result in having to take a larger pressure drop across the valve to achieve needed flow. The system will lose more pressure making the pump work harder.

All control valves have a rated flow capacity expressed as the Cv rating. Cv is the valve flow coefficient and is the number of U.S. gallons per minute of 60°F water that will pass through a fully open valve with a 1 psi pressure drop. For example, a Hi-Flow™ valve with a Cv rating of 10.75 will pass 10.75 GPM of water with a pressure drop of 1 psi. The higher the Cv, the higher the flow capacity of the valve.

To select the proper valve for the application it is necessary to calculate the needed flow capacity, or Cv. The necessary Cv for the application will be dependent upon the pressure drop across the valve. Pressure drop is the difference between the inlet and outlet pressure at full flow when the valve is fully open. The greater the pressure drop taken across the valve, the greater the flow through the valve. Design engineers try to keep the pressure drop as low as possible, but the valve, needs pressure drop to control the process.

Once the required Cv is determined, selection of the proper size control valve can be obtained by comparing the required Cv to the Cv values for the Hi-Flow™ valves. To size the valve properly, it is best to increase the required Cv at maximum flow by 10 to 15% to account for different operating conditions. Also, the minimum required controllable flow should fall within the rangeability of the valve. The rangeability of Hi-Flow™ valves is 50:1. For example, if a Hi-Flow™ valve was chosen with a Cv of 10.75, the minimum controllable Cv would be 10.75 divided by 50, or 0.215.

To calculate the required Cv for the application, use the following equations according to the process medium:

Liquid Service

Nomenclature

- Cv = Valve flow coefficient
- g = Specific gravity of liquid at flowing conditions
- P1 = Inlet (upstream) pressure, psia
- P2 = Outlet (downstream) pressure, psia
- ΔP = Pressure drop, P1-P2, psi
- Q = Volumetric flow rate, US GPM

For liquid service, the pressure drop, ΔP, must not exceed 50% of P1 to avoid cavitation damage.

$$\text{Formula: } Cv = Q \sqrt{\frac{g}{\Delta P}}$$

Example 1:

Medium: Water
Specific Gravity: 1.0
Flow Rate: 100 GPM
Pressure Drop: 5 psi

Needed Valve Cv:

$$Cv = 100 \sqrt{\frac{1.0}{5}} = 44.72$$

Example 2:

Medium: Water
Specific Gravity: 1.0
Flow Rate: 110 GPM
Valve Cv: 50.3

Pressure Drop:

$$\Delta P = \left(\frac{Q^2}{Cv} \right) = \left(\frac{110^2}{50.3} \right) = 4.78 \text{ psi}$$

Gas Service

Nomenclature

- Cv = Valve flow coefficient
- G = Specific gravity of gas at flowing conditions
- P1 = Inlet (upstream) pressure, psia
- P2 = Outlet (downstream) pressure, psia
- ΔP = Pressure drop, P1-P2, psi
- Q = Volumetric flow rate, SCFH
- T = Flow temperature, in °R = (460 + °F)
- psia = psig + 14.7

$$\text{Formula: } Cv = \frac{Q}{963} \sqrt{\frac{G \times T}{\Delta P (P_1 + P_2)}}$$

If pressure drop is greater than 50%, ΔP > P1/2, use:

$$Cv = \frac{Q}{750 P_1} \sqrt{G \times T}$$

Example:

Medium: Nitrogen
Specific Gravity: 0.966
Flow Rate: 10,000 SCFH
P1 = 100 psig: 100 + 14.7 = 114.7 psia
P2 = 95 psig: 95 + 14.7 = 109.7 psia
Pressure Drop: 5 psi
Temperature 70°F: 70 + 460 = 530°R

Needed Valve Cv:

$$Cv = \frac{10,000}{963} \sqrt{\frac{(.966) \times (530)}{(5) \times (114.7 + 109.7)}} = 7.01$$

Steam Service**Nomenclature**

C_v = Valve flow coefficient
 P_1 = Inlet (upstream) pressure, psia
 P_2 = Outlet (downstream) pressure, psia
 ΔP = Pressure drop, $P_1 - P_2$, psi
 W = Mass flow rate, lb/hr

Formulas:
$$C_v = \frac{W}{2.1 \sqrt{\Delta P (P_1 + P_2)}}$$

If pressure drop is greater than 50%, $\Delta P > P_1/2$, then use:

$$C_v = \frac{W}{1.65 \times P_1}$$

Example:

Medium: Steam

Flow Rate: 750 lb/hr

$P_1 = 100$ psig: $100 + 14.7 = 114.7$ psia

$P_2 = 95$ psig: $95 + 14.7 = 109.7$ psia

Pressure Drop: 5 psi

Needed Valve C_v :

$$C_v = \frac{750}{2.1 \sqrt{(5) \times (114.7 + 109.7)}} = 10.66$$

Process Valve Sizing Formulas**For Heating or Cooling Water**

$$GPM = \frac{\text{Btu/hr.}}{(\text{°F water temp. rise or drop}) \times 500}$$

$$GPM = \frac{\text{cfm} \times .009 \times \text{change in enthalpy of air - in Btu/#air}}{\text{°F water temperature change}}$$

For Heating Water with Steam

$$\text{lbs steam/hr} = 0.50 \times GPM \times (\text{°F water temp. rise})$$

For Heating or Cooling Water with Water

$$GPM_1 = GPM_2 \times \frac{(\text{°F water}_2 \text{ temp. rise or drop})}{(\text{°F water}_1 \text{ temp. rise or drop})}$$

For Heating Air with Steam Coils

$$\text{lbs steam/hr} = 1.08 (\text{°F air temp. rise}) \times \frac{\text{cfm}}{1000}$$

For Heating Air with Water Coils

$$GPM = 2.16 \times \frac{\text{cfm} \times (\text{°F air temp. rise})}{1000 \times (\text{°F air temp. drop})}$$

For Radiation

$$GPM = \frac{\text{sq. ft. EDR}}{50}$$

$$\text{lbs steam/hr.} = 0.24 \times \text{sq./ft. EDR (low pressure steam) (assume 20°F water temperature drop.)}$$

Flow Capacity, Cv - Linear Characteristic

LIQUID SIZING COEFFICIENTS, Cv - Linear Characteristics

Pipe Body Size, In.	Total Travel In.	VALVE OPENING-PERCENT OF TOTAL TRAVEL									
		10	20	30	40	50	60	70	80	90	100
1/2	5/16	.78	1.50	2.30	2.90	3.60	4.40	5.10	5.80	6.20	6.45
3/4	7/16	1.19	2.40	3.60	4.80	5.90	7.10	8.40	9.70	10.50	10.75
1	1/2	1.81	3.80	5.80	7.80	9.75	11.75	13.75	15.80	17.10	17.42
1-1/4	9/16	2.57	5.40	8.20	11.00	13.80	16.60	19.50	22.30	24.75	25.30
1-1/2	5/8	3.25	6.80	10.20	13.80	17.25	20.80	24.25	27.75	31.00	32.10
2	3/4	4.67	10.30	15.50	21.00	26.24	31.90	37.30	43.25	48.50	50.30
2-1/2	7/8	7.9	15.72	23.6	31.5	39.3	47.2	55.0	62.9	70.7	78.6
3	1	11.3	22.60	34.0	45.3	56.6	67.9	79.1	90.6	101.9	113.2
4	1-1/8	20.1	40.20	60.3	80.5	100.6	120.7	140.8	161.0	181.3	201.2

LIQUID SIZING COEFFICIENTS, Cv - Linear Characteristics with Restricted Trim

Body Size, In.	Port Size In.	Total Travel, In.	VALVE OPENING-PERCENT OF TOTAL TRAVEL									
			10	20	30	40	50	60	70	80	90	100
1/2	1/2	5/16	.78	1.50	2.30	2.90	3.60	4.40	5.10	5.80	6.20	6.45
3/4	1/2	5/16	.39	.94	1.67	2.48	3.06	3.98	4.79	5.70	6.50	7.10
3/4	3/4	7/16	1.19	2.40	3.60	4.80	5.90	7.10	8.40	9.70	10.5	10.8
1	1/2	7/16	.34	.83	1.42	2.06	2.84	3.63	4.38	5.25	6.56	7.92
1	3/4	1/2	.76	1.56	2.74	3.62	4.86	6.17	7.58	9.30	11.1	12.5
1	1	1/2	1.81	3.80	5.80	7.80	9.75	11.8	13.8	1.58	17.1	17.4

LIQUID SIZING COEFFICIENTS, Cv - Linear Characteristics Needle Valve

Body Size, In.	Port Size In.	Total Travel, In.	VALVE OPENING-PERCENT OF TOTAL TRAVEL									
			10	20	30	40	50	60	70	80	90	100
1/2 to 1	1/32	3/4	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.013	0.016	0.021
	1/16	3/4	0.004	0.014	0.024	0.033	0.042	0.051	0.060	0.069	0.078	0.086
	3/32	3/4	0.010	0.027	0.045	0.064	0.083	0.102	0.121	0.139	0.157	0.171

Flow Capacity, Cv - Equal Percentage Characteristic

LIQUID SIZING COEFFICIENTS, Cv - Equal Percentage Characteristics

Pipe Body Size, In.	Total Travel In.	VALVE OPENING-PERCENT OF TOTAL TRAVEL									
		10	20	30	40	50	60	70	80	90	100
1/2	3/8	.26	.42	.65	1.00	1.60	2.50	3.80	5.00	5.60	5.90
3/4	1/2	.32	.49	.78	1.26	2.05	3.25	5.30	6.80	7.90	8.70
1	5/8	.40	.65	1.05	1.70	2.76	4.55	7.40	10.02	12.00	13.30
1-1/4	3/4	.54	.87	1.40	2.35	3.75	6.30	10.05	14.50	17.00	19.50
1-1/2	7/8	.62	1.05	1.80	3.15	5.10	8.40	15.00	20.00	25.50	30.00
2	1	.73	1.26	2.20	3.85	6.60	11.50	20.00	28.00	36.00	43.00

LIQUID SIZING COEFFICIENTS, Cv - Equal Percentage Characteristics Restricted Trim

Body Size, In.	Port Size In.	Total Travel, In.	VALVE OPENING-PERCENT OF TOTAL TRAVEL									
			10	20	30	40	50	60	70	80	90	100
1/2	1/2	3/8	.26	.42	.65	1.00	1.60	2.50	3.80	5.00	5.60	5.90
3/4	1/2	13/32	0.201	0.357	0.564	0.894	1.54	3.23	4.06	4.88	5.75	6.42
1	1/2	7/16	.194	.350	.577	.910	1.55	3.15	3.87	4.81	6.14	7.54
1	3/4	9/16	.342	.532	.858	1.39	2.34	4.22	5.30	7.24	8.90	10.50

LIQUID SIZING COEFFICIENTS, Cv - Equal Percentage Characteristics Needle Valve

Body Size, In.	Port Size In.	Total Travel, In.	VALVE OPENING-PERCENT OF TOTAL TRAVEL									
			10	20	30	40	50	60	70	80	90	100
1/2 to 1	1/8	3/4	.029	.042	.050	.061	.086	.122	.166	.229	.317	.409
	3/16	3/4	.057	.077	.097	.130	.175	.224	.310	.455	.628	.871
	1/4	3/4	.067	.089	.123	.185	.261	.377	.553	.785	1.10	1.46
	5/16	3/4	.089	.118	.152	.205	.313	.462	.670	1.03	1.49	2.15
	3/8	3/4	.093	.149	.191	.289	.447	.702	1.05	1.51	2.20	3.07

Control Valves - Hi-Flow™ Series

Globe Valves, Ideal for Steam and Water Flow Control, 1/2" to 4" Sizes, 2-Way or 3-Way



2-Way with positioner and current to pressure transducer



2-Way Flanged



3-Way

W.E. Anderson Hi-Flow™ control valves are single seated, top or cage guided globe valves - probably the simplest, from a construction standpoint, yet most versatile control valve in use. The Hi-Flow™ valve can fit applications with a smaller size valve since the valve has a greater flow capacity than most conventional valves of the same size. Coupled with the high flow capacity, the Hi-Flow™ valve maintains a wide rangeability of 50:1 to insure precise control. Heavy duty Hi-Flow™ valves are ruggedly constructed of the highest quality materials, precision machined, and performance tested to assure years of trouble free service. Standard packing consists of Teflon® V-rings and wiper to minimize friction without leakage at high operating pressures. Available in brass, iron, or 316 SS body, trim is 316 SS with all welded plug construction to provide superior durability and corrosion resistance.

FEATURES

- Wide Rangeability of 50:1
- Exceptional shut-off and leak rate that meets ANSI/FCI 70-2 Class IV (0.01% of Cv in the closed position)
- Selectable fail safe condition with Air-to-Raise or Air-to-Lower actuators and Push-to-Open or Push-to-Close valve bodies
- Linear or equal percentage flow characteristics
- Low flow options of restricted trim or needle plug
- Removable and replaceable seat ring

APPLICATIONS

- Flow control, mixing, or diverting service.
- Perfect for steam, water or compatible glycol solutions.

SPECIFICATIONS

Valve Body

Service: Compatible liquids, gases, and steam.

Line Size: 1/2" to 4".

Body Style: 2-way or 3-way globe.

End Connections: 1/2" to 2" female NPT, 1-1/2" to 4" flanged.

Pressure Limit: Iron and Bronze Body: 250 psi (17.2 bar), 316 SS Body: 300 psi (20.7 bar).

Wetted Materials:

Body Material: Iron, bronze, or 316 SS.

Trim: 316 SS.

Packing: Teflon®.

Temperature Limits: 20 to 400°F (-7 to 204.4°C).

Actuator

Type: Pneumatic spring/diaphragm.

Control Signal: 3 to 15 psi (0.21 to 1.0 bar) standard. Custom ranges available.

Maximum Supply Pressure: 220, 222, and 230: 100 psi (6.89 bar). 221, 223, 231, and 233: 50 psi (3.45 bar).

Air Connection: 1/4" female NPT.

Temperature Limit: 150°F (66°C).

Positioners and current-to-pressure transducers available factory mounted. See Series 165 for positioners and see Series 2800 and 2900 for transducers.

How to Order:

Select model number from model chart or standard product chart and supply maximum upstream pressure, USP.

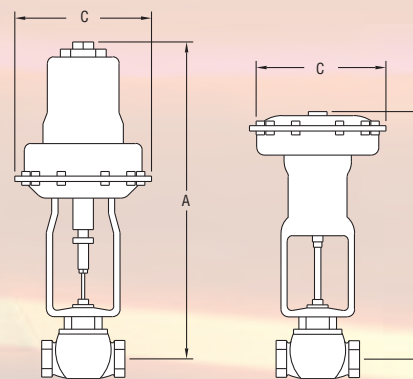
Control Valves - Hi-Flow™ Series Model Chart

Example	2	00	1	V	A	3	2	230		LO	2001VA32-230-LO Hi-Flow™ Globe Valve; 2-way, 3/4" NPT connection, linear plug, bronze body, 316 SS trim, reduced port 1/2" size.
Configuration	2 3										2-way 3-way
Valve Body Action		00 01									Push-To-Close Push-To-Open (2-way only)
Connection Size			0 1 2 3 4 5 6 7 8								1/2" NPT 3/4" NPT 1" NPT 1-1/4" NPT 1-1/2" NPT (or Flange with LRF option) 2" NPT (or Flange with LRF option) 2-1/2" Flange (see options) 3" Flange (see options) 4" Flange (see options)
Valve Seat				V W							Single Seat (2-way only) Double Seat (3-way only)
Valve Plug Type					A L S N						Linear Linear Needle (2000 to 2002 only) Equal Percentage (2000 to 2002 only) Equal Percentage Needle (2000 to 2002 only)
Valve Body Material						1 3 4					Ductile Iron Bronze 316 SS
Trim Material							2				316 SS
Actuator								220 221 222 223 230 231 233			Air-To-Lower, 20 in² Air-To-Lower, 45 in² Air-To-Lower, 45 in² Air-To-Lower, 80 in² Air-To-Raise, 20 in² (2-way only) Air-To-Raise, 45 in² (2-way only) Air-To-Raise, 80 in² (2-way only)
Needle Plug Port Size									2 3 4 5 6 7 8 9		1/8" for Type N valve plug 3/16" for Type N valve plug 1/4" for Type N valve plug 5/16" for Type N valve plug 3/8" for Type N valve plug 1/32" for Type L valve plug 1/16" for Type L valve plug 2/32" for Type L valve plug
Options										A LO L1 Z LRF HRF	Positioner factory mounted (specify positioner model) Reduced port: 3/4" to 1/2" port size (2001 only) Reduced port: 1" to 1/2" port size (2002 only) Reduced port: 1" to 3/4" port size (2002 only) Special operating range (2-10 psi, 10-18 psi) Low Range Flange: Class 125 in Iron or Class 150 Bronze, 316 SS body (for 1-1/2" and 2" sizes only, standard on 2-1/2", 3, and 4" size) High Range Flange: Class 250 in Iron or Class 300 in Bronze, 316 SS body (for 1-1/2" to 4" sizes)

Control Valves — Hi-Flow™ Series

2-Way Simplified Selection Guide with Standard Products

PIPE SIZE	Cv 100%	BODY MATERIAL	MODEL NO. (AIR-TO-OPEN)	MAX. USP psi (bar) 3-15 (.21-1.0)	A IN. (MM)	C IN. (MM)
1/2"	6.45	BRONZE	2000VA32-230	250 (17.2)	19% (501.7)	7% (196.9)
		316SS	2000VA42-230	300 (20.7)	19% (501.7)	7% (196.9)
3/4"	10.75	BRONZE	2001VA32-230	250 (17.2)	19% (501.7)	7% (196.9)
			2001VA32-231	250 (17.2)	20% (517.5)	10% (269.9)
		316SS	2001VA42-230	285 (19.7)	19% (501.7)	7% (196.9)
			2001VA42-231	300 (20.7)	20% (517.5)	10% (269.9)
1"	17.42	BRONZE	2002VA32-230	166 (11.4)	20% (512.8)	7% (196.9)
			2002VA32-231	250 (17.2)	20% (528.6)	10% (269.9)
		316SS	2002VA42-230	166 (11.4)	20% (512.8)	7% (196.9)
			2002VA42-231	300 (20.7)	20% (528.6)	10% (269.9)
1 1/4"	25.30	BRONZE	2003VA32-230	98 (6.8)	20% (515.9)	7% (196.9)
			2003VA32-231	245 (16.9)	20% (531.8)	10% (269.9)
			2003VA32-233	250 (17.2)	25% (645.3)	13% (339.7)
		316SS	2003VA42-230	98 (6.8)	20% (515.9)	7% (196.9)
			2003VA42-231	245 (17.0)	20% (531.8)	10% (269.9)
			2003VA42-233	300 (20.7)	25% (645.3)	13% (339.7)
1 1/2"	32.10	BRONZE	2004VA32-230	65 (4.5)	20% (525.5)	7% (196.9)
			2004VA32-231	168 (11.6)	21% (541.3)	10% (269.9)
			2004VA32-233	250 (17.2)	25% (654.8)	13% (339.7)
		316SS	2004VA42-230	65 (4.5)	20% (525.5)	7% (196.9)
			2004VA42-231	168 (11.6)	21% (541.3)	10% (269.9)
			2004VA42-233	300 (20.7)	25% (654.8)	13% (339.7)
2"	50.30	BRONZE	2005VA32-230	31 (2.1)	20% (531.8)	7% (196.9)
			2005VA32-231	88 (6.1)	21% (547.7)	10% (269.9)
			2005VA32-233	175 (12.1)	26% (661.2)	13% (339.7)
		316SS	2005VA42-230	31 (2.1)	20% (531.8)	7% (196.9)
			2005VA42-231	88 (6.1)	21% (547.7)	10% (269.9)
			2005VA42-233	175 (12.1)	26% (661.2)	13% (339.7)
*2 1/2"	78.60	IRON	2006VA12-233	105 (7.2)	26% (666.8)	13% (339.7)
		BRONZE	2006VA32-233	105 (7.2)	26% (666.8)	13% (339.7)
		316SS	2006VA42-233	105 (7.2)	26% (666.8)	13% (339.7)
*3"	113.2	IRON	2007VA12-233	52 (3.6)	27 (686)	13% (339.7)
		BRONZE	2007VA32-233	52 (3.6)	27 (686)	13% (339.7)
		316 SS	2007VA42-233	52 (3.6)	27 (686)	13% (339.7)
*4"	201.2	IRON	2008VA12-233	32 (2.2)	27 1/4 (692)	13% (339.7)
		BRONZE	2008VA32-233	32 (2.2)	27 1/4 (692)	13% (339.7)
		316SS	2008VA42-233	32 (2.2)	27 1/4 (692)	13% (339.7)



Caution: Use of an actuator supply gas other than air can create a hazardous environment because a small amount of gas continuously vents to atmosphere.

Use the chart to aid in the selection of Hi-Flow™ Control Valve. As long as the maximum upstream pressure (USP) is less than, or equal to, the value listed, the model shown can be manufactured and calibrated to your specific requirements. Specify maximum upstream pressure, USP, when ordering.

* Valve has flanged connections. Max. USP (PSI) is for Linear Valves. Consult factory for optional trim.

Control Valves — Hi-Flow™ Series

2-Way Simplified Selection Guide with Standard Products

PIPE SIZE	Cv 100%	BODY MATERIAL	MODEL NO. (AIR-TO-CLOSE)	MAX. USP psi (bar) 3-15 (.21-1.0)	B IN. (MM)	C IN. (MM)
1/2"	6.45	BRONZE	2000VA32-220	250 (17.2)	18 $\frac{1}{16}$ (468.3)	7 $\frac{7}{8}$ (196.9)
		316SS	2000VA42-220	300 (20.7)	18 $\frac{1}{16}$ (468.3)	7 $\frac{7}{8}$ (196.9)
3/4"	10.75	BRONZE	2001VA32-220	250 (17.2)	18 $\frac{1}{16}$ (468.3)	7 $\frac{7}{8}$ (196.9)
			2001VA32-221	250 (17.2)	19 $\frac{1}{16}$ (485.8)	10 $\frac{3}{4}$ (269.9)
		316SS	2001VA42-220	300 (20.7)	18 $\frac{1}{16}$ (468.3)	7 $\frac{7}{8}$ (196.9)
			2001VA42-221	300 (20.7)	19 $\frac{1}{16}$ (485.8)	10 $\frac{3}{4}$ (269.9)
1"	17.42	BRONZE	2002VA32-220	192 (13.2)	18 $\frac{1}{16}$ (479.4)	7 $\frac{7}{8}$ (196.9)
			2002VA32-221	250 (17.2)	19 $\frac{1}{16}$ (496.9)	10 $\frac{3}{4}$ (269.9)
		316SS	2002VA42-220	192 (13.2)	18 $\frac{1}{16}$ (479.4)	7 $\frac{7}{8}$ (196.9)
			2002VA42-221	300 (20.7)	19 $\frac{1}{16}$ (496.9)	10 $\frac{3}{4}$ (269.9)
1 1/4"	25.30	BRONZE	2003VA32-220	115 (7.9)	19 (482.6)	7 $\frac{7}{8}$ (196.9)
			2003VA32-221	250 (17.2)	19 $\frac{1}{16}$ (500.1)	10 $\frac{3}{4}$ (269.9)
			2003VA32-223	250 (17.2)	23 $\frac{3}{8}$ (587.4)	13 $\frac{3}{4}$ (339.7)
		316SS	2003VA42-220	115 (7.9)	19 (482.6)	7 $\frac{7}{8}$ (196.9)
			2003VA42-221	300 (20.7)	19 $\frac{1}{16}$ (500.1)	10 $\frac{3}{4}$ (269.9)
			2003VA42-223	300 (20.7)	23 $\frac{3}{8}$ (587.4)	13 $\frac{3}{4}$ (339.7)
1 1/2"	32.10	BRONZE	2004VA32-220	80 (5.5)	19 $\frac{1}{16}$ (492.1)	7 $\frac{7}{8}$ (196.9)
			2004VA32-221	235 (16.2)	20 $\frac{1}{16}$ (509.6)	10 $\frac{3}{4}$ (269.9)
			2004VA32-223	250 (17.2)	23 $\frac{3}{8}$ (596.9)	13 $\frac{3}{4}$ (339.7)
		316SS	2004VA42-220	80 (5.5)	19 $\frac{1}{16}$ (492.1)	7 $\frac{7}{8}$ (196.9)
			2004VA42-221	235 (16.2)	20 $\frac{1}{16}$ (509.6)	10 $\frac{3}{4}$ (269.9)
			2004VA42-223	300 (20.7)	23 $\frac{3}{8}$ (596.9)	13 $\frac{3}{4}$ (339.7)
2"	50.30	BRONZE	2005VA32-220	44 (3.0)	19 $\frac{1}{16}$ (498.5)	7 $\frac{7}{8}$ (196.9)
			2005VA32-221	140 (9.7)	20 $\frac{1}{16}$ (515.9)	10 $\frac{3}{4}$ (269.9)
			2005VA32-223	250 (17.2)	23 $\frac{3}{8}$ (603.3)	13 $\frac{3}{4}$ (339.7)
		316SS	2005VA42-220	44 (3.0)	19 $\frac{1}{16}$ (498.5)	7 $\frac{7}{8}$ (196.9)
			2005VA42-221	140 (9.7)	20 $\frac{1}{16}$ (515.9)	10 $\frac{3}{4}$ (269.9)
			2005VA42-223	272 (18.8)	23 $\frac{3}{8}$ (606.3)	13 $\frac{3}{4}$ (339.7)
*2 1/2"	78.60	IRON	2006VA12-223	190 (13.1)	24 $\frac{1}{16}$ (620.7)	13 $\frac{3}{4}$ (339.7)
		BRONZE	2006VA32-223	190 (13.1)	24 $\frac{1}{16}$ (620.7)	13 $\frac{3}{4}$ (339.7)
		316SS	2006VA42-223	190 (13.1)	24 $\frac{1}{16}$ (620.7)	13 $\frac{3}{4}$ (339.7)
*3"	113.2	IRON	2007VA12-223	132 (9.1)	24 $\frac{1}{16}$ (629)	13 $\frac{3}{4}$ (339.7)
		BRONZE	2007VA32-223	132 (9.1)	24 $\frac{1}{16}$ (629)	13 $\frac{3}{4}$ (339.7)
		316 SS	2007VA42-223	132 (9.1)	24 $\frac{1}{16}$ (629)	13 $\frac{3}{4}$ (339.7)
*4"	201.2	IRON	2008VA12-223	72 (4.9)	25 (635)	13 $\frac{3}{4}$ (339.7)
		BRONZE	2008VA32-223	72 (4.9)	25 (635)	13 $\frac{3}{4}$ (339.7)
		316SS	2008VA42-223	72 (4.9)	25 (635)	13 $\frac{3}{4}$ (339.7)

* Valve has flanged connections. Max. USP (PSI) is for Linear Valves. Consult factory for optional trim.

Control Valves - Hi-Flow™ Series

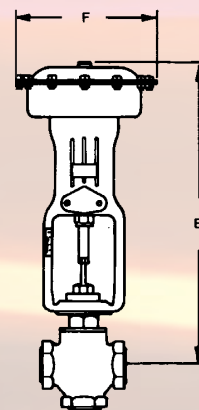
3-Way Standard Products for Mixing or Diverting

Control Valves - Hi-Flow™ Series, 3-Way Simplified Selection Guide with Standard Products

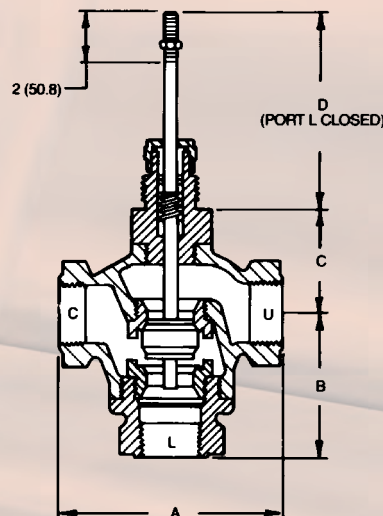
Use the chart below to aid in the selection of the most economical Hi-Flow™ 3-Way Control Valve for your application. Specify maximum upstream pressures (USP's); Mixing: USP_U and USP_L ; Diverting: USP_C ; based on standard 3-15 psi (.21-1.0 bar) pneumatic control signal.

PIPE SIZE	C _v 100%	BODY MATERIAL	MODEL NUMBER*	USP ^(a) PSI (bar)	E IN. (MM)	F IN. (MM)
½"	6.45	BRONZE	3000WA32-220	250 (17.2)	18⅞ (458.8)	7¼ (196.9)
		316SS	3000WA42-220	300 (20.7)	18⅞ (458.8)	7¼ (196.9)
¾"	10.75	BRONZE	3001WA32-220	250 (17.2)	18⅞ (458.8)	7¼ (196.9)
		316SS	3001WA42-220	300 (20.7)	18⅞ (458.8)	7¼ (196.9)
1"	17.42	BRONZE	3002WA32-220	200 (13.8)	18⅞ (465.1)	7¼ (196.9)
			3002WA32-221	250 (17.2)	19 (482.6)	10% (269.9)
		316SS	3002WA42-220	200 (13.8)	18⅞ (465.1)	7¼ (196.9)
			3002WA42-221	300 (20.7)	19 (482.6)	10% (269.9)
			3003WA32-220	120 (8.4)	18⅞ (466.7)	7¼ (196.9)
			3003WA32-221	250 (17.2)	19⅞ (484.2)	10% (269.9)
1¼"	25.30	BRONZE	3003WA42-220	120 (8.3)	18⅞ (466.7)	7¼ (196.9)
			3003WA42-221	300 (20.7)	19⅞ (484.2)	10% (269.9)
		316SS	3004WA32-220	80 (5.6)	18⅞ (473.1)	7¼ (196.9)
			3004WA32-221	200 (13.8)	19⅞ (490.5)	10% (269.9)
			3004WA32-223	250 (17.2)	21⅞ (542.9)	13% (339.7)
			3004WA42-220	80 (5.5)	18⅞ (473.1)	7¼ (196.9)
1½"	32.10	BRONZE	3004WA42-221	200 (13.8)	19⅞ (490.5)	10% (269.9)
			3004WA42-223	300 (20.7)	21⅞ (542.9)	13% (339.7)
		316SS	3005WA32-220	45 (3.1)	19⅞ (484.2)	7¼ (196.9)
			3005WA32-221	100 (6.9)	19⅞ (501.7)	10% (269.9)
			3005WA32-223	175 (12.1)	21⅞ (554.0)	13% (339.7)
			3005WA42-220	45 (3.1)	19⅞ (484.2)	7¼ (196.9)
2"	50.30	BRONZE	3005WA42-221	100 (6.9)	19⅞ (501.7)	10% (269.9)
			3005WA42-223	175 (12.1)	21⅞ (554.0)	13% (339.7)
		316SS	3006WA12-223	97 (6.7)	24.52 (622.8)	13% (339.7)
			3006WA32-223			
			3006WA42-223			
			3007WA12-223	58 (4.0)	24.64 (625.9)	13% (339.7)
*3"	113.2	BRONZE	3007WA32-223			
			3007WA42-223			
		316SS	3008WA12-223	32 (2.2)	24.89 (632.2)	13% (339.7)
			3008WA32-223			
			3008WA42-223			

* Valve has flanged connections. Max. USP (PSI) is for Linear Valves. Consult factory for optional trim.



Caution: Use of an actuator supply gas other than air can create a hazardous environment because a small amount of gas continuously vents to atmosphere.



DIMENSION DATA

PIPE SIZE	B IN. (MM)	C IN. (MM)	D IN. (MM)
1/2"	2⅞ (65.1)	2⅞ (55.6)	4⅞ (104.8)
3/4"	2⅞ (65.1)	2⅞ (55.6)	4⅞ (104.8)
1"	3 (76.2)	2⅞ (61.9)	4 (101.6)
1-1/4"	3⅞ (81.0)	2⅞ (63.5)	3⅞ (95.3)
1-1/2"	3⅞ (95.3)	2⅞ (69.9)	3⅞ (93.7)
2"	3⅞ (100.0)	3⅞ (81.0)	3⅞ (93.7)

MIXING SERVICE:

FLOW IN - ports U&L
FLOW OUT - port C

DIVERTING SERVICE:

FLOW IN - port C
FLOW OUT - ports U&L

Standard Models include LIN-E-AIRE® Air-To-Lower Actuator - port L opens on loss of Air

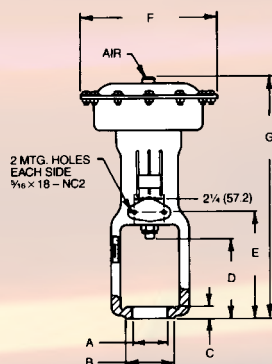
For diverting service, add USP_U and USP_C to determine the shut-off pressure. For mixing service compute: $(USP_U - USP_C) + (USP_L - USP_C)$ to determine the shutoff pressure.

LIN-E-AIRE® Pneumatic Valve Actuator

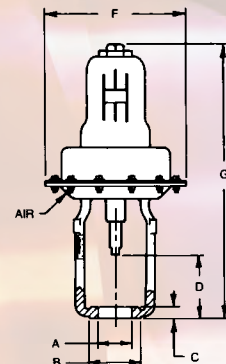
Air-To-Lower or Air-To-Raise



Air-to-Lower



Air-to-Raise



**Effective diaphragm area (A_e) decreases linearly with stroke: 20 in.² (129 cm²) — 2 in.²/in. (.5 cm²/mm); 45 in.² (290 cm²) — 3 in.²/in. (.76 cm²/mm); 80 in.² (516 cm²) — 3.5 in.²/in. (.89 cm²/mm).

TERM* NO.	PART NO.†	ACTION	T _{MODEL MAX} IN. (MM)	A _e ** IN. (CM ²)	A IN. (MM)	B IN. (MM)	C IN. (MM)	D IN. (MM)	E IN. (MM)	F IN. (MM)	G IN. (MM)	P _{max} PSI(KG/CM ²)	REPLACEMENT DIAPHRAGM
-220	15S620	AIR-TO-LOWER	1 (25.4)	20 (129)	1 1/8 (38.1)	3 (76.2)	1 1/8 (17.5)	3/8 (92.1)	7/8 (184.2)	7/8 (196.9)	15 1/8 (403.2)	100 (7.0)	61P252
-221	15S621	AIR-TO-LOWER	1 (25.4)	45 (290)	1 1/8 (38.1)	3 (76.2)	1 1/8 (17.5)	3/8 (92.1)	7/8 (184.2)	10 1/8 (269.9)	16 1/8 (420.7)	50 (3.5)	61P254
-222	15S622	AIR-TO-LOWER	1 1/8 (38.1)	45 (290)	1 1/8 (49.2)	3 (95.3)	3/8 (22.2)	3/8 (88.9)	8 1/8 (212.7)	10 1/8 (269.9)	18 1/8 (473.1)	100 (7.0)	61P254
-223	15S623	AIR-TO-LOWER	1 1/8 (38.1)	80 (516)	1 1/8 (49.2)	3 (95.3)	3/8 (22.2)	3/8 (88.9)	8 1/8 (212.7)	13 1/8 (339.7)	20 (508.0)	50 (3.5)	61P256
-230	15S630	AIR-TO-RAISE	1 (25.4)	20 (129)	1 1/8 (38.1)	3 (76.2)	1 1/8 (17.5)	3 (76.2)	—	7/8 (196.9)	17 1/8 (436.6)	100 (7.0)	61P253
-231	15S631	AIR-TO-RAISE	1 (25.4)	45 (290)	1 1/8 (38.1)	3 (76.2)	1 1/8 (17.5)	3 (76.2)	—	10 1/8 (269.9)	17 1/8 (452.4)	50 (3.5)	61P255
-233	15S633	AIR-TO-RAISE	1 1/8 (38.1)	80 (516)	1 1/8 (49.2)	3 (95.3)	3/8 (22.2)	3 (76.2)	—	13 1/8 (339.7)	22 1/8 (565.9)	50 (3.5)	61P347

*Add Termination No. suffix to base Valve Model No. for complete valve automation package.
†Specify Part No. for Pneumatic Actuator assembly only.

STANDARD SPRING SPECIFICATIONS

PART NO.	K LBF/IN. (DGF/MM)	F _{max} LBF(KGF)	COLOR CODE	USED IN TERM. NOS.
11P376	100 (1.79)	315 (143)	WHITE-YELLOW	220, 221 230, 231
11P377	180 (3.21)	448 (203)	WHITE-RED	
11P378	260 (4.64)	572 (259)	WHITE-BLUE	
11P379	350 (6.25)	870 (395)	WHITE-BROWN	
11P381	450 (8.04)	963 (437)	WHITE-GREEN	
11P382	560 (10.00)	1180 (535)	WHITE-ORANGE	
11P383	680 (12.14)	1530 (694)	WHITE-BLACK	
11P384	820 (14.64)	1435 (651)	WHITE-WHITE	
11P356	1000 (17.86)	1500 (680)	BROWN-BROWN	221 & 231
11P901	1250 (22.32)	1875 (850)	BROWN-GREEN	
11P385	100 (1.79)	368 (167)	YELLOW-RED	222, 223 & 233
11P386	180 (3.21)	600 (272)	YELLOW-BLUE	
11P387	260 (4.64)	847 (384)	YELLOW-BROWN	
11P388	350 (6.25)	1050 (476)	YELLOW-GREEN	
11P389	450 (8.04)	1150 (522)	YELLOW-ORANGE	
11P391	560 (10.00)	1210 (549)	YELLOW-BLACK	
11P392	680 (12.14)	1500 (680)	YELLOW-YELLOW	
11P902	820 (14.64)	1645 (746)	BROWN-ORANGE	
11P903	1000 (17.86)	2630 (1193)	BROWN-BLACK	223 & 233
11P904	1300 (23.22)	2460 (1116)	PURPLE-WHITE	

- Select Air-To-Raise (Lower) actuator based on control (valve) action and fail-safe condition requirements.
- Select minimum actuator size based on stroke, pneumatic control signal and maximum deliverable force requirements.
- Select spring based on stroke (T), pneumatic control range (typically, $P_1 = 3$ PSI and $P_2 = 15$ PSI), pre-load (typically, pressure drop x unbalanced area of plug $\Delta P \times A_p$) and maximum allowable spring force (F_{max}).

$$K = \frac{(P_2 \times A_{e2}) - (P_1 \times A_{e1}) - \Delta P \times A_p}{T}$$

$$F_{max} > (P_1 \times A_{e1}) + (K \times T) + [(\Delta P \times A_p) \text{ on air-to-open systems only}].$$

SPECIFICATIONS

Type: Pneumatic spring/diaphragm.
Control Signal: 3 to 15 psi (0.21 to 1.0 bar) standard.
 Custom ranges available.
Maximum Supply Pressure: 220, 222, and 230: 100 psi (6.89 bar). 221, 223, 231, and 233: 50 psi (3.45 bar).
Air Connection: 1/4" female NPT.
Diaphragm: Buna-N, nylon reinforced.
Diaphragm Support Plate, Spring, and Push Rod, Spring Adjustment: Plated steel.
Housing: Enamel coated steel.
Yoke: Enamel coated iron.
Temperature Limit: 150°F (66°C).

CAUTION: Use of an actuator supply gas other than air can create a hazardous environment because a small amount of gas continuously vents to atmosphere.

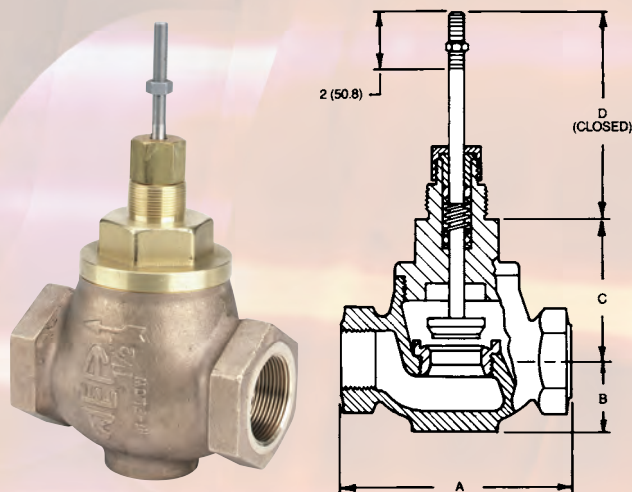
Suggested Specification

Pneumatic Actuator shall be (Air-To-Lower) (Air-To-Raise) type with minimal internal volume for fast response and molded nylon reinforced BUNA-N diaphragm capable of delivering near constant force throughout (1")(1 1/2") minimum stroke. Actuator shall have a wide choice of interchangeable range springs with readily accessible compression nuts permitting easy range change and adjustment. Actuator shall include a position indicator to provide a visual aid in determining inner valve position. Pneumatic Actuator shall be W.E. Anderson LIN-E-AIRE® Part No. ____ with spring Part No. ____.

Series
2000VA

Hi-Flow™ Control Valves Body Only

Push-To-Close, Linear Characteristics, Precise Control, High Flow Capacity



W.E. Anderson Hi-Flow™ Control Valves are versatile, single-seated, top-guided globe valves designed for precise control of pressure, temperature, level and flow process variables at an economical price. Standard models incorporate push-to-close action and linear flow characteristics generally accepted as industry standard; however, control valves with push-to-open action and/or equal percentage flow characteristics are also readily available to satisfy unique process control applications. High flow capacity coupled with superior rangeability (50:1) inherent in the Hi-Flow™ valve design enables the selection of standard models for a wide variety of process control applications without sacrificing control precision. Restricted trim and needle valves are also readily available for extreme low-flow applications with no reduction in pipe size required.

Heavy-duty Hi-Flow™ Control Valves are ruggedly constructed of the highest quality materials, precision machined and performance tested to assure years of trouble-free service. Available with Bronze, Iron, or 316SS body, trim is 316SS with all welded plug construction to provide superior durability and corrosion resistance. Standard packing consists of spring loaded Teflon® V-rings (3) and wiper to minimize friction without leakage at high operating pressures. Inverted V-ring construction for vacuum service; double opposing V-ring construction for alternating positive pressure/vacuum service; and graphite packing with or without built in lubricator are also readily available.

Suggested Specification

Control valve* shall be single-seated, top-guided globe valve with push-to-close action and linear flow characteristics. Valve shall have high flow capacity with 50:1 rangeability for precise control. Valve body shall be (Bronze, Iron, 316SS) and trim shall be 316SS with all welded plug construction to provide superior durability and corrosion resistance. Control valve* shall be W.E. Anderson Hi-Flow™ Part No. ____.

*Specify Model No. with appropriate suffix(es) (Actuator Term. No. etc.) for complete valve automation package (refer to pages 16-19 for sizing and ordering information).

DIMENSION DATA

PIPE SIZE	STROKE IN. (MM)	AREA* IN. ² (CM ²)	A (BRONZE) IN. (MM)	A (316SS) IN. (MM)	B IN. (MM)	C IN. (MM)	D IN. (MM)
1/2"	3/8 (7.9)	0.341 (2.20)	3 3/8 (95.3)	4 3/8 (106.4)	1 3/8 (34.9)	2 1/8 (65.1)	4 1/8 (109.5)
3/4"	1/2 (11.1)	0.556 (3.59)	3 1/2 (98.4)	4 1/2 (108.0)	1 1/2 (34.9)	2 1/2 (65.1)	4 1/2 (109.5)
1"	5/8 (12.7)	0.886 (5.72)	4 1/4 (120.7)	5 1/4 (133.4)	1 1/2 (41.3)	3 (76.2)	3 3/8 (100.0)
1 1/4"	3/4 (14.3)	1.413 (9.12)	5 (127.0)	5 3/4 (146.0)	1 3/4 (46.0)	3 1/2 (79.4)	3 3/4 (92.1)
1 1/2"	7/8 (15.9)	1.920 (12.39)	5 1/2 (139.7)	6 1/2 (155.6)	2 (50.8)	3 3/4 (88.9)	3 3/4 (100.0)
2"	1 (19.1)	3.142 (20.27)	6 1/2 (165.1)	6 3/4 (174.6)	2 1/2 (60.3)	3 3/4 (95.2)	3 3/4 (79.4)

*Unbalanced area of plug (A_p)

FLOW COEFFICIENTS, Cv

Cv vs. PERCENT OF TOTAL TRAVEL

SIZE	10	20	30	40	50	60	70	80	90	100
1/2"	.78	1.50	2.30	2.90	3.60	4.40	5.10	5.80	6.20	6.45
3/4"	1.19	2.40	3.60	4.80	5.90	7.10	8.40	9.70	10.50	10.75
1"	1.81	3.80	5.80	7.80	9.75	11.75	13.75	15.80	17.10	17.42
1 1/4"	2.57	5.40	8.20	11.00	13.80	16.60	19.50	22.30	24.75	25.30
1 1/2"	3.25	6.80	10.20	13.80	17.25	20.80	24.25	27.75	31.00	32.10
2"	4.67	10.30	15.50	21.00	26.40	31.90	37.30	43.25	48.50	50.30

SPECIFICATIONS

Service: Compatible liquids, gases, and steam.

Line Size: 1/2" to 2".

Body Style: 2-way, push-to-close globe.

End Connections: 1/2" to 2" female NPT.

Pressure Limit: Iron and Bronze Body: 250 psi (17.2 bar), 316 SS Body: 300 psi (20.7 bar).

Wetted Materials:

Body Material: Iron, bronze, or 316 SS.

Trim: 316 SS.

Packing: Teflon®.

Temperature Limits: 20 to 400°F (-7 to 204.4°C).

Flow Leakage: Meets ANSI/FCI 70-2 Class IV (0.01% of Cv in the closed position).

Stem Connection: 5/16" – 24 NF2.

Options: Push-To-Open action; Equal percentage characteristics; Restricted trim or needle plugs; Graphite packing with lubricator; custom connections; etc.

Consult factory with operating parameters for non-standard control valve requirements.

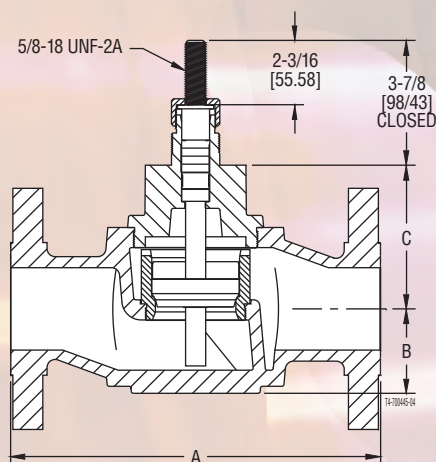
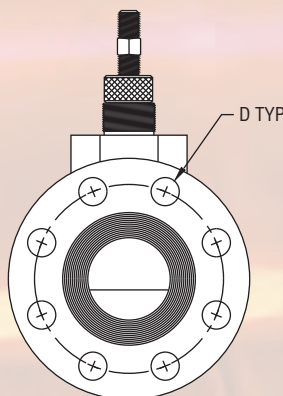
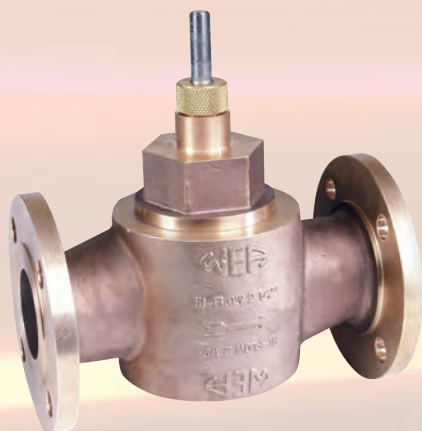
Model No./Part No. (valve body assemblies)

PIPE SIZE	MATERIAL	MODEL NO. *	REPLACEMENT SEAT RING	REPLACEMENT STEM & PLUG
½"	BRONZE	2000VA32	78P607	19S366
	IRON	2000VA12		
	316SS	2000VA42		
¾"	BRONZE	2001VA32	78P608	19S367
	IRON	2001VA12		
	316SS	2001VA42		
1"	BRONZE	2002VA32	78P609	19S368
	IRON	2002VA12		
	316SS	2002VA42		
1¼"	BRONZE	2003VA32	78P610	19S369
	IRON	2003VA12		
	316SS	2003VA42		
1½"	BRONZE	2004VA32	78P611	19S370
	IRON	2004VA12		
	316SS	2004VA42		
2"	BRONZE	2005VA32	78P612	19S371
	IRON	2005VA12		
	316SS	2005VA42		
PACKING KIT				43S17K

Series
2000VA

Flanged Hi-Flow™ Control Valves Body Only

Bronze, Stainless Steel or Iron, Excellent Control of Steam, High Flow Capacity, Linear or Equal Percent Trim



DIMENSIONS, INCHES [mm]

VALVE SIZE	RATING	STROKE	AREA*	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
2½"	125/150#	7/8 [22.23]	4.909 [124.69]	10⅞ [276.23]	2.58 [65.53]	4.52 [114.81]	7 [177.80]	(4) Ø3/4 [19.05] HOLES ON A 5½ [139.70] B.C.
2½"	250/300#	7/8 [22.23]	4.909 [124.69]	11½ [292.10]	2.58 [65.53]	4.52 [114.81]	7½ [190.50]	(8) Ø7/8 [22.23] HOLES ON A 5½ [149.23] B.C.
3"	125/150#	1 [25.40]	7.069 [179.55]	11¾ [298.45]	2.70 [68.58]	4.64 [117.86]	7½ [190.50]	(4) Ø3/4 [19.05] HOLES ON A 6 [152.40] B.C.
3"	250/300#	1 [25.40]	7.069 [179.55]	12½ [317.50]	2.70 [68.58]	4.64 [117.86]	8¼ [209.55]	(8) Ø7/8 [22.23] HOLES ON A 6½ [168.28] B.C.
4"	125/150#	1-1/8 [28.58]	12.566 [319.18]	13⅞ [352.43]	2.95 [74.93]	4.89 [124.21]	9 [228.60]	(8) Ø3/4 [19.05] HOLES ON A 7½ [190.50] B.C.
4"	250/300#	1-1/8 [28.58]	12.566 [319.18]	14½ [368.30]	2.95 [74.93]	4.89 [124.21]	10 [254.00]	(8) Ø7/8 [22.23] HOLES ON A 7½ [200.03] B.C.

*Note: Unbalanced area of plug (Ap).

FLOW COEFFICIENTS, Cv vs. Percent of Total Travel

Size	10	20	30	40	50	60	70	80	90	100
2½"	7.9	15.72	23.6	31.5	39.3	47.2	55.0	62.9	70.7	78.6
3"	11.3	22.60	34.0	45.3	56.6	67.9	79.1	90.6	101.9	113.2
4"	20.1	40.20	60.3	80.5	100.6	120.7	140.8	161.0	181.3	201.2

W.E. Anderson's Flanged Hi-Flow™ control valves incorporate the same versatility as our threaded, top-guided globe control valves. Designed for precise process control of pressure, temperature, flow and level, these valves conform to the requirements of Class 125 or Class 250 in Iron, or Class 150 and 300 in Bronze and Stainless Steel. Standard models incorporate push-to-close action and linear flow characteristics. Optional push-to-open, or equal percent flow characteristics are also available. High flow capacities and superior rangeability enable the Hi-Flow™ valve to be used for a wide range of process control applications.

Heavy-duty Hi-Flow™ control valves are ruggedly constructed of the highest quality materials, precision machined and performance tested to assure years of trouble-free service. Available with Bronze, Iron, or Stainless Steel body, trim is 316SS with all welded plug construction to provide superior durability and corrosion resistance. Standard packing consists of spring loaded Teflon® V-ring and wiper to minimize friction without leakage at high operating pressures. Inverted V-ring construction for vacuum service; double opposing V-ring construction for alternating pressure/vacuum service; and graphite packing with or without built in lubricator are also readily available.

SPECIFICATIONS

Service: Compatible liquids, gases, and steam.

Line Size: 2-1/2" to 4".

Body Style: 2-way, push-to-close globe.

End Connections: 2-1/2" to 4" flange. Standard ANSI Class 125 for iron body, ANSI Class 150 for bronze and 316 SS. Optional ANSI Class 250 for iron body, ANSI Class 300 for bronze or 316 SS. Dimensions comply with ANSI B16.1 or B16.5 requirements.

Pressure Limit: Iron and Bronze Body: 250 psi (17.2 bar), 316 SS Body: 300 psi (20.7 bar).

Wetted Materials:

Body Material: Iron, bronze, or 316 SS.

Trim: 316 SS.

Packing: Teflon®.

Temperature Limits: 20 to 400°F (-7 to 204.4°C).

Flow Leakage: Meets ANSI/FCI 70-2 Class IV (0.01% of Cv in the closed position).

Stem Connection: 5/16" - 24 NF2.

Options: Push-to-open, equal percentage characteristic, graphite packing with lubricator.

Size	Material	Part No.'s	Replacement Seat Ring	Replacement Stem & Plug
2½"	Bronze Iron St. Steel	2006VA32 2006VA12 2006VA42	420443-00	200473-00
3"	Bronze Iron St. Steel	2007VA32 2007VA12 2007VA42	421536-00	201042-00
4"	Bronze Iron St. Steel	2008VA32 2008VA12 2008VA42	421537-00	201043-00
Packing Kit				43S17K-F

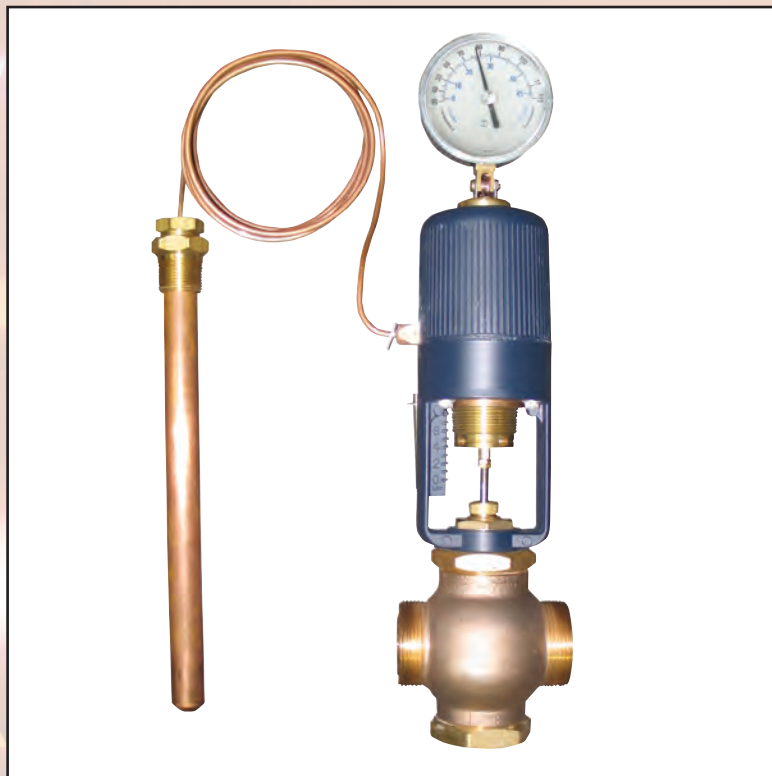
*Note: For Higher pressure rated flange add suffix "-HRF".

Specify Model No. with appropriate suffix(es) (Actuator Term. No. etc.) for complete valve automation package (refer to pages 16-19 for sizing and ordering information).

Series
38R

Self-Acting Temperature Control Valve

Require No External Power



Series 38R Self-Acting Temperature Control Valves require no external power sources and are ideal for regulating the temperature of tanks, process streams and various types of industrial equipment. The actuators are made with a rugged die-cast aluminum housing with a fully enclosed bellows assembly and internal over-range protection. Valves are offered in 1/2" through 6" connection sizes and 1/8" through 6" port sizes. The valve bodies are available in single-seated direct or reverse-acting, double-seated direct or reverse-acting, and 3-way designs with four choices of body material: bronze, cast-iron, cast-steel,

and 316 stainless steel. Actuators are available with or without indicating dials or in Fail-Safe. Non-indicating actuators feature a lower profile and should be implemented where space constraints may be an issue while the indicating actuator allows the operator to verify the process temperature and aid in temperature adjustment. Fail-Safe actuators are designed to cause the valve to fail in the safe control position (open in cooling application, closed in a heating application) should some accidental damage occur to the terminal system, resulting in loss of pressure charge. Also available with the Series 38R are a wide range of capillaries, bulbs, and thermowells.

HOW TO ORDER:

1. Select valve body by specifying valve action, connection/port size, valve seat configuration, body material, and trim material.
2. Select actuator by specifying the actuator type.
3. Select bulb by specifying bulb/capillary type.
4. Select capillary length.
5. Select without thermowell, or specify thermowell material.
6. Select nominal temperature range for control valve.

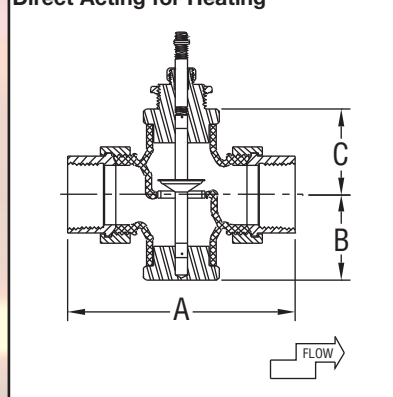
38R-XXXXAXX-XXXXXX-RXX

38R-XXXXAXX-XXXXXX-RXX
 38R-XXXXAXX-XXXXXX-RXX
 38R-XXXXAXX-XXXXXX-RXX
 38R-XXXXAXX-XXXXXX-RXX
 38R-XXXXAXX-XXXXXX-RXX

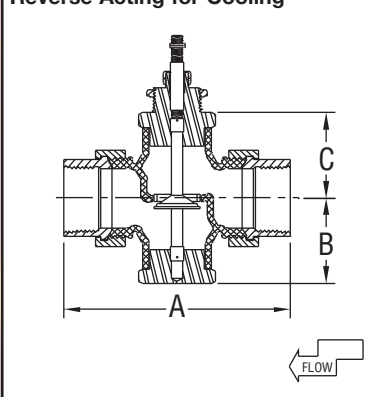
Series 38R Two-Way Bronze Valve Body

Single Seat 1/2" - 2"

Direct Acting for Heating



Reverse Acting for Cooling



SPECIFICATIONS

Wetted Materials:

Body: bronze;
Trim: 316 stainless steel;
Packing: PTFE;
Union: iron.

Trim Style: Modified linear.

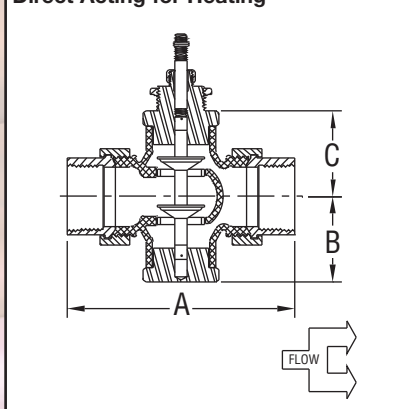
Connection: Threaded, malleable iron union ends.

Pressure and Temperature Limits: 250 psi (17.24 bar) @ 410°F (210°C).

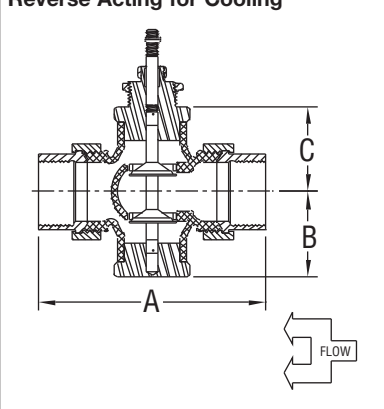
Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port			A	B	C	
DA1VA32	RA1VA32	1/2"	1/8"	0.17	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
DA2VA32	RA2VA32	1/2"	3/16"	0.35	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
DA3VA32	RA3VA32	1/2"	1/4"	0.7	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
DA4VA32	RA4VA32	1/2"	3/8"	1.4	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
D00VA32	R00VA32	1/2"	1/2"	2.8	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
D01VA32	R01VA32	3/4"	3/4"	5.6	140 (9.7)	5.6 (142)	2.3 (58)	2.3 (58)	4.9 (2.21)
D02VA32	R02VA32	1"	1"	8.4	80 (5.5)	6.0 (152)	2.3 (58)	2.3 (58)	6.0 (2.70)
D03VA32	R03VA32	1-1/4"	1-1/4"	15	50 (3.4)	7.2 (183)	2.6 (66)	2.6 (66)	9.7 (3.47)
D04VA32	R04VA32	1-1/2"	1-1/2"	21	35 (2.4)	7.7 (196)	2.6 (66)	2.6 (66)	10.8 (4.86)
D05VA32	R05VA32	2"	2"	33	20 (1.4)	8.6 (218)	3.1 (79)	3.1 (79)	16.3 (7.34)

Double Seat 3/4" - 2"

Direct Acting for Heating



Reverse Acting for Cooling



SPECIFICATIONS

Wetted Materials:

Body: bronze;
Trim: 316 stainless steel;
Packing: PTFE;
Union: iron.

Trim Style: Modified linear.

Connection: Threaded, malleable iron union ends.

Pressure and Temperature Limits: 250 psi (17.24 bar) @ 410°F (210°C).

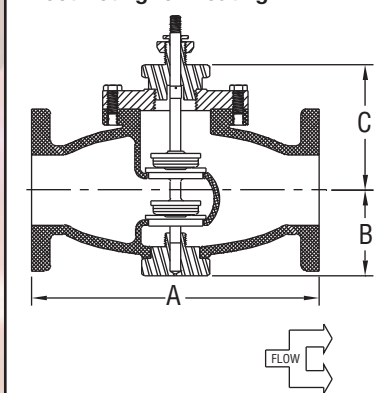
Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port			A	B	C	
D01WA32	R01WA32	3/4"	3/4"	8	250 (17.3)	5.6 (142)	2.3 (58)	2.3 (58)	5.0 (2.25)
D02WA32	R02WA32	1"	1"	12	250 (17.3)	6.0 (152)	2.3 (58)	2.3 (58)	6.1 (2.75)
D03WA32	R03WA32	1-1/4"	1-1/4"	21	250 (17.3)	7.2 (183)	2.6 (66)	2.6 (66)	10.1 (4.55)
D04WA32	R04WA32	1-1/2"	1-1/2"	30	250 (17.3)	7.7 (196)	2.6 (66)	2.6 (66)	11.1 (5.00)
D05WA32	R05WA32	2"	2"	47	250 (17.3)	8.6 (218)	3.1 (79)	3.1 (79)	17.0 (7.65)

Series
38R

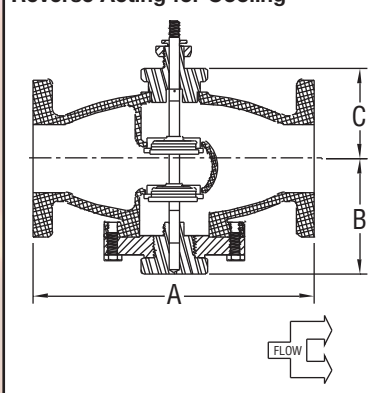
Two-Way Cast Iron Valve Body

Double Seat 2 1/2" - 6"

Direct Acting for Heating



Reverse Acting for Cooling



SPECIFICATIONS

Wetted Materials:

Body: cast iron;
Trim: 316 stainless steel;
Packing: PTFE.

Trim Style: Modified linear.

Connection: Class 125 flanged.

Pressure and Temperature Limits:

125 psi (8.62 bar) @ 350°F (149°C).

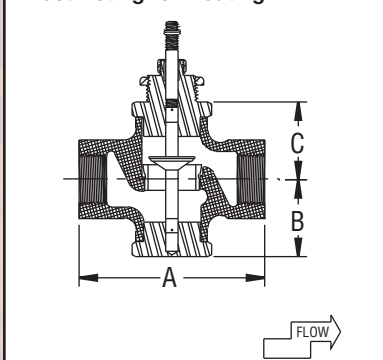
Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port			A	B	C	
D06WA12	R06WA12	2-1/2"	2-1/2"	69	65 (4.5)	7.8 (198)	4.8 (46)	5.4 (137)	45 (20)
D07WA12	R07WA12	3"	3"	90	50 (3.4)	9.0 (229)	5.0 (46)	5.6 (142)	70 (32)
D08WA12	R08WA12	4"	4"	196	40 (2.8)	11.4 (290)	6.3 (46)	6.5 (165)	100 (45)
D09WA12	R09WA12	5"	5"	248	30 (2.1)	12.0 (305)	6.9 (46)	7.3 (185)	155 (70)
D10WA12	R10WA12	6"	6"	340	25 (1.7)	14.1 (358)	7.5 (46)	8.0 (203)	180 (82)

Series
38R

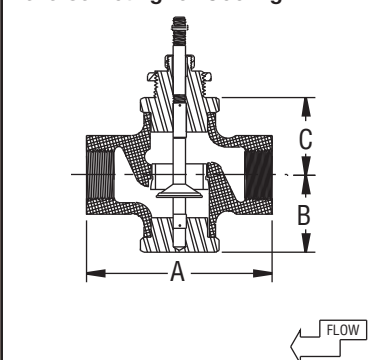
Two-Way Cast Steel Valve Body

Single Seat 3/4" - 1"

Direct Acting for Heating



Reverse Acting for Cooling



SPECIFICATIONS

Wetted Materials:

Body: cast steel;
Trim: 316 stainless steel;
Packing: PTFE.

Trim Style: Modified linear.

Connection: Threaded.

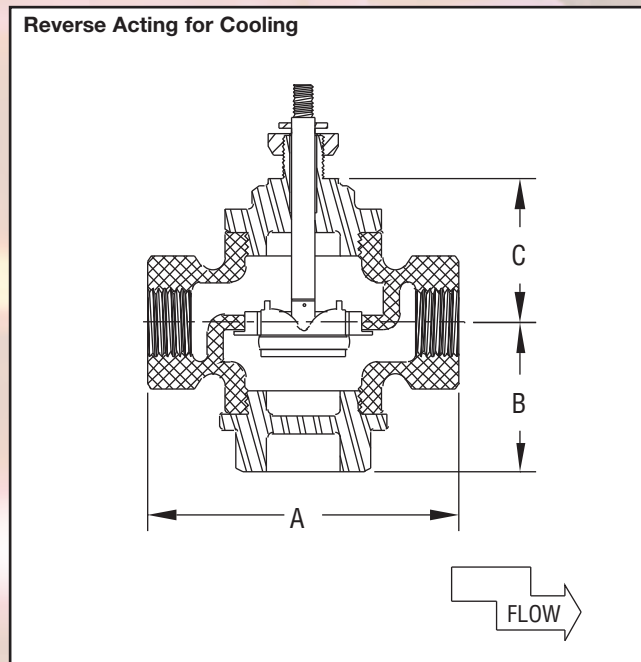
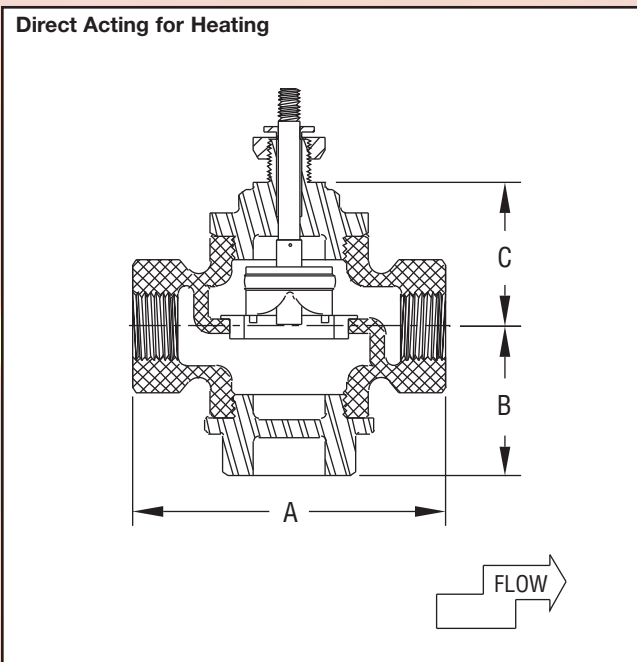
Pressure and Temperature Limits:

250 psi (17.24 bar) @ 410°F (210°C).

Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port (in)			A	B	C	
DB1VA22	-	3/4"	1/8"	0.17	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DB2VA22	-	3/4"	3/16"	0.35	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DB3VA22	-	3/4"	1/4"	0.7	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DB4VA22	-	3/4"	3/8"	1.4	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DB5VA22	RB5VA22	3/4"	1/2"	2.8	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
D01VA22	R01VA22	3/4"	3/4"	5.6	140 (9.7)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DC1VA22	-	1"	1/8"	0.17	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DC2VA22	-	1"	3/16"	0.35	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DC3VA22	-	1"	1/4"	0.7	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DC4VA22	-	1"	3/8"	1.4	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DC5VA22	RC5VA22	1"	1/2"	2.8	250 (17.3)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
DC6VA22	RC6VA22	1"	3/4"	5.6	140 (9.7)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)
D02VA22	R02VA22	1"	1"	8.4	80 (5.5)	6.0 (17.3)	2.3 (58)	2.3 (58)	9.2 (4.18)

Series 38R Two-Way Stainless Steel Valve Body

Single Seat 1/2" - 2"



SPECIFICATIONS

Wetted Materials:

Body: 316 stainless steel;

Trim: 316 stainless steel;

Packing: PTFE.

Trim Style: Modified linear.

Connection: Threaded.

Pressure and Temperature Limits: 250 psi (17.24 bar) @ 410°F (210°C).

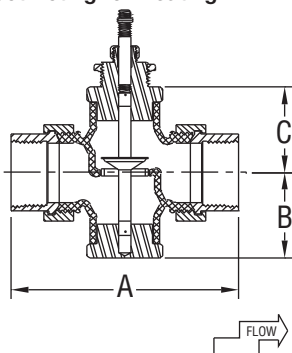
Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port			A	B	C	
DA1VA42	RA1VA42	1/2"	1/8"	0.34	250 (17.3)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
DA2VA42	RA2VA42	1/2"	3/16"	0.76	250 (17.3)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
DA3VA42	RA3VA42	1/2"	1/4"	1.5	250 (17.3)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
DA4VA42	RA4VA42	1/2"	3/8"	3.4	250 (17.3)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
D00VA42	R00VA42	1/2"	1/2"	6	250 (17.3)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
D01VA42	R01VA42	3/4"	3/4"	8.6	140 (9.7)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
D02VA42	R02VA42	1"	1"	14	60 (4.1)	5.0 (127)	2.9 (74)	3.4 (86)	8.0 (3.64)
D04VA42	R04VA42	1-1/2"	1-1/2"	27	25 (1.7)	6.1 (155)	3.5 (89)	4.0 (102)	15.5 (7.05)
D05VA42	R05VA42	2"	2"	33	15 (1.0)	6.5 (165)	3.9 (99)	4.2 (107)	19.0 (8.64)

Series
38R

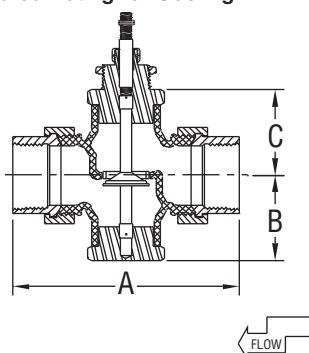
Two-Way Bronze Fail Safe Valve Body

Single Seat 1/2"

Direct Acting for Heating



Reverse Acting for Cooling



SPECIFICATIONS

Wetted Materials:

Body: bronze;
Trim: 316 stainless steel;
Packing: PTFE;
Union: iron.

Trim Style: Modified linear.

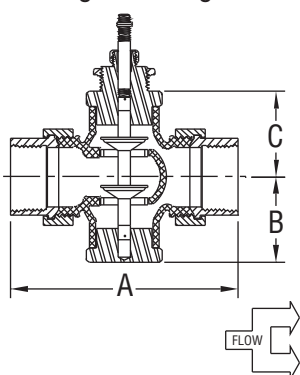
Connection: Threaded, malleable iron union ends.

Pressure and Temperature Limits: 250 psi (17.24 bar) @ 410°F (210°C).

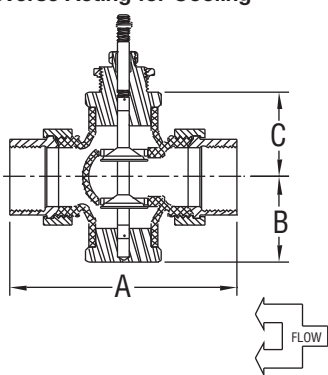
Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port			A	B	C	
DA1VA32	RA1VA32	1/2"	1/8"	0.12	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
DA2VA32	RA2VA32	1/2"	3/16"	0.25	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
DA3VA32	RA3VA32	1/2"	1/4"	0.5	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
DA4VA32	RA4VA32	1/2"	3/8"	1.0	150 (10.3)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)
D00VA32	R00VA32	1/2"	1/2"	2.0	100 (6.9)	4.8 (122)	1.8 (46)	1.8 (46)	3.0 (1.35)

Double Seat 3/4" - 2"

Direct Acting for Heating



Reverse Acting for Cooling



SPECIFICATIONS

Wetted Materials:

Body: bronze;
Trim: 316 stainless steel;
Packing: PTFE;
Union: iron.

Trim Style: Modified linear.

Connection: Threaded, malleable iron union ends.

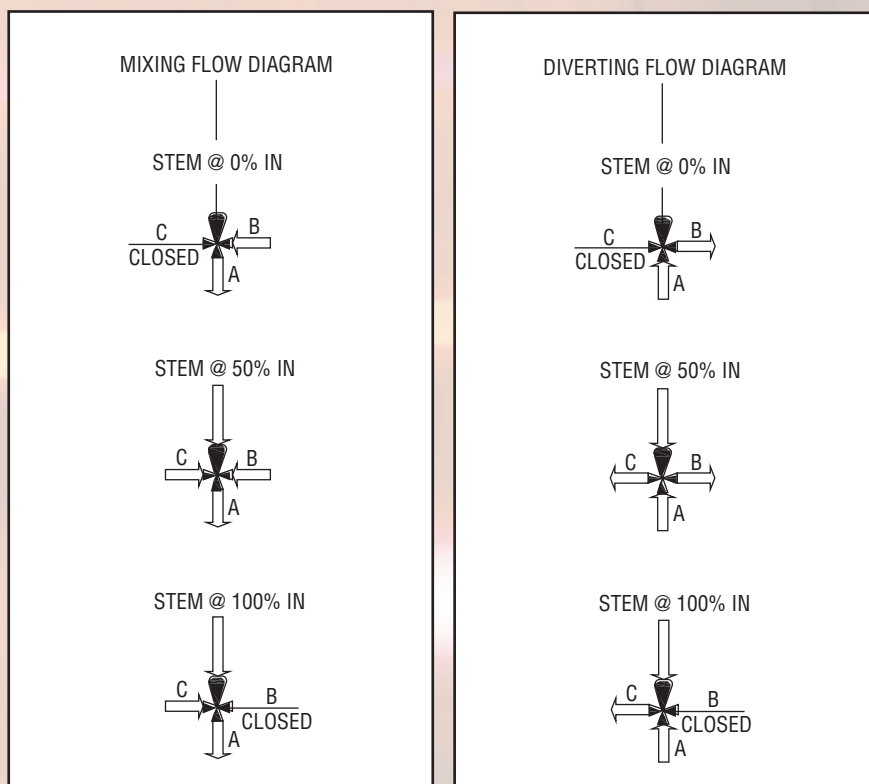
Pressure and Temperature Limits: 250 psi (17.24 bar) @ 410°F (210°C).

Valve Body Number		Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
Direct Acting Heating	Reverse Acting Cooling	Connection (NPT)	Nominal Port			A	B	C	
D01WA32	R01WA32	3/4"	3/4"	5.6	250 (17.3)	5.6 (142)	2.3 (58)	2.3 (58)	5.0 (2.25)
D02WA32	R02WA32	1"	1"	8.4	200 (13.8)	6.0 (152)	2.3 (58)	2.3 (58)	6.1 (2.75)
D03WA32	R03WA32	1-1/4"	1-1/4"	15	175 (12.1)	7.2 (183)	2.6 (66)	2.6 (66)	10.1 (4.55)
D04WA32	R04WA32	1-1/2"	1-1/2"	21	150 (10.3)	7.7 (196)	2.6 (66)	2.6 (66)	11.1 (5.00)
D05WA32	R05WA32	2"	2"	33	100 (6.9)	8.6 (278)	3.1 (79)	3.1 (79)	17.0 (7.65)

Series 38R Three-Way Self-Acting Temperature Control Valves

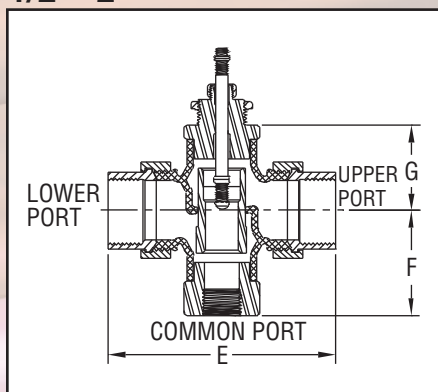
For Mixing or Diverting Applications

Series 38R Three-Way Self-Acting Temperature Control Valves can be used for both mixing and diverting flow applications. See the adjacent diagrams for the mixing and diverting flow patterns. To properly control the mixing of two flows, the inlet pressures at ports B and C should be as close as possible. The 38R Series Three-Way Valves are not designed for use in steam applications.



Series 38R Three-Way Bronze Valve Body

1/2" - 2"



SPECIFICATIONS

Wetted Materials:

Body: bronze;
Trim: bronze;
Packing: PTFE;
Union: iron.

Trim Style: Modified linear.

Connection: Threaded, malleable iron union ends.

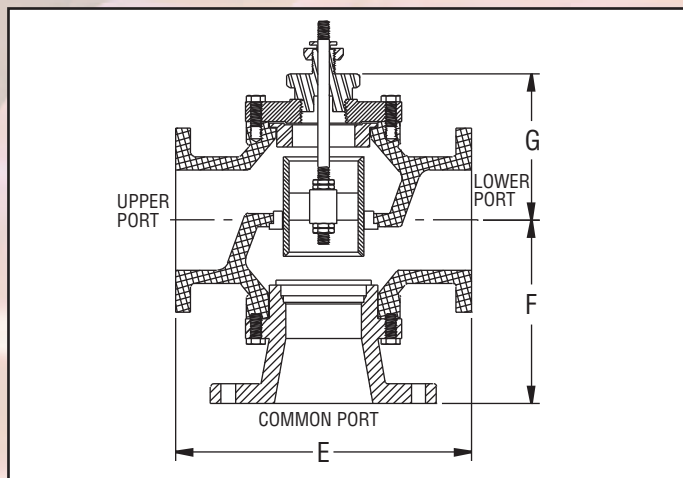
Pressure and Temperature Limits: 250 psi (17.24 bar) @ 300°F (149°C).

Valve Body Number	Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lb (kg)
	Connection (NPT)	Nominal Port			A	B	C	
300WA31	1/2"	1/2"	2.8	250 (17.3)	4.8 (122)	1.8 (46)	1.8 (46)	2.9 (1.31)
301WA31	3/4"	3/4"	5.6	250 (17.3)	5.6 (142)	2.3 (58)	2.3 (58)	4.7 (2.12)
302WA31	1"	1"	8.4	250 (17.3)	6.0 (152)	2.3 (58)	2.3 (58)	5.7 (2.57)
303WA31	1-1/4"	1-1/4"	15	250 (17.3)	7.2 (183)	2.8 (71)	2.6 (66)	9.5 (4.28)
304WA31	1-1/2"	1-1/2"	21	250 (17.3)	7.7 (196)	3.5 (89)	2.6 (66)	11.1 (5.00)
305WA31	2"	2"	33	250 (17.3)	8.6 (218)	4.1 (104)	3.1 (79)	16.7 (7.55)

Series
38R

Three-Way Cast Iron Valve Body

2-1/2" - 4"



SPECIFICATIONS

Wetted Materials:

Body: cast iron;
Trim: bronze;
Packing: PTFE;
Union: iron.

Trim Style: Modified linear.

Connection: Class 125 flanged.

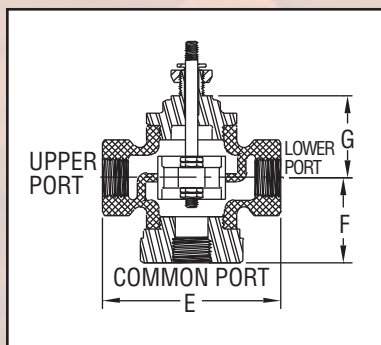
Pressure and Temperature Limits: 125 psi (8.62 bar) @ 300°F (149°C).

Valve Body Number	Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lbs. (kg)
	Connection (NPT)	Nominal Port			A	B	C	
306WA11	2-1/2"	2-1/2"	68	125 (8.6)	9.0 (229)	7.1 (180)	5.2 (132)	62 (28)
307WA11	3"	3"	85	125 (8.6)	10.0 (254)	8.0 (203)	6.0 (152)	80 (36)
308WA11	4"	4"	160	125 (8.6)	13.0 (330)	10.0 (254)	6.9 (175)	140 (64)

Series
38R

Three-Way Stainless Steel Valve Body

1/2" - 2"



SPECIFICATIONS

Wetted Materials:

Body: 316 stainless steel;
Trim: 316 stainless steel;
Packing: PTFE;
Union: iron.

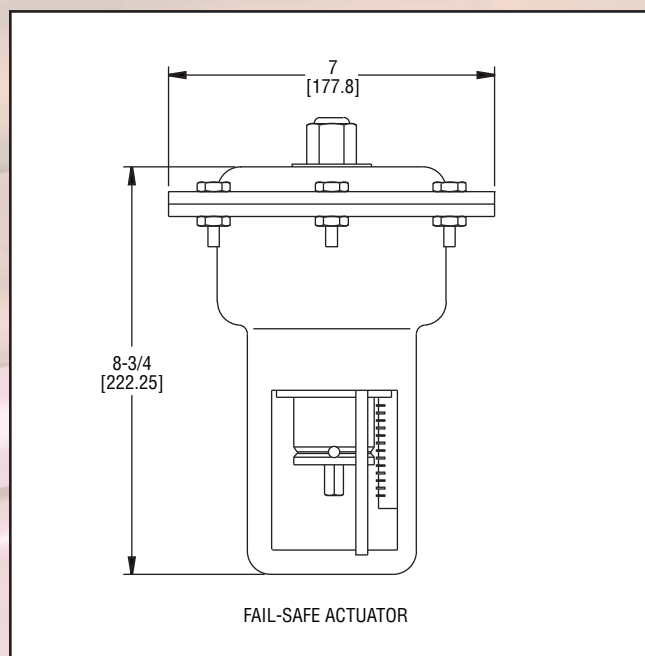
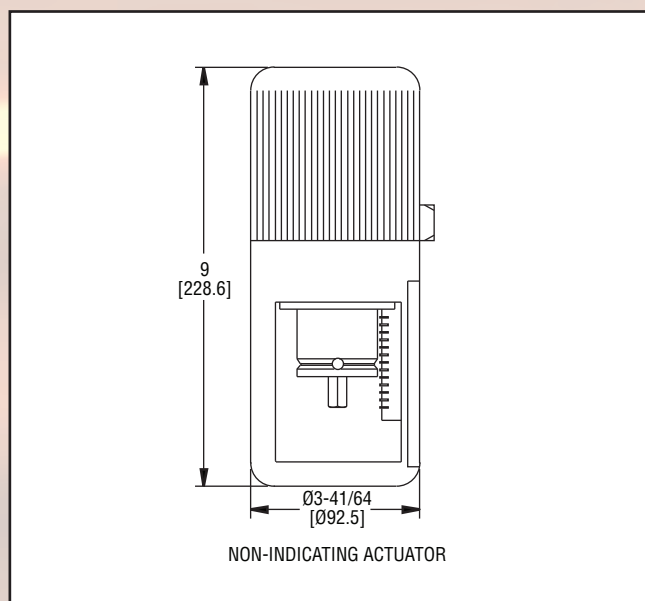
Trim Style: Modified linear.

Connection: Threaded.

Pressure and Temperature Limits: 250 psi (17.24 bar) @ 300°F (149°C).

Valve Body Number	Size		Capacity (Cv)	Maximum Close-Off Pressure psid (bar)	Dimensions in (mm)			Approximate Shipping Wt. lbs. (kg)
	Connection (NPT)	Nominal Port			A	B	C	
300WA42	1/2"	1/2"	6	300 (20.7)	4.9 (124)	2.9 (74)	3.4 (86)	7.5 (3.41)
301WA42	3/4"	3/4"	8	300 (20.7)	4.9 (124)	2.9 (74)	3.4 (86)	7.5 (3.41)
302WA42	1"	1"	11	300 (20.7)	4.9 (124)	2.9 (74)	3.4 (86)	7.5 (3.41)
304WA42	1-1/2"	1-1/2"	20	200 (13.8)	6.1 (155)	3.4 (86)	4.0 (102)	15 (6.82)
305WA42	2"	2"	30	100 (6.9)	6.5 (165)	3.8 (97)	4.2 (107)	18.5 (8.41)

Self-Acting Actuators require no external power to operate. The powder-coated aluminum housing allows these actuators to be rugged and lightweight. Indicating models include a dial gauge with swivel and angle adjustment. Actuators available in three styles: Non-Indicating, Indicating, and Fail-Safe.



SPECIFICATIONS

Power Requirements: Fully self-contained, no external power required.

Indicator: 3-1/2" dial thermometer, stainless steel case, swivel and angle adjustable (available for Indicating Actuator only).

Housing: Die cast aluminum, epoxy powder coated blue finish.

Set Point Scale: Integral to housing.

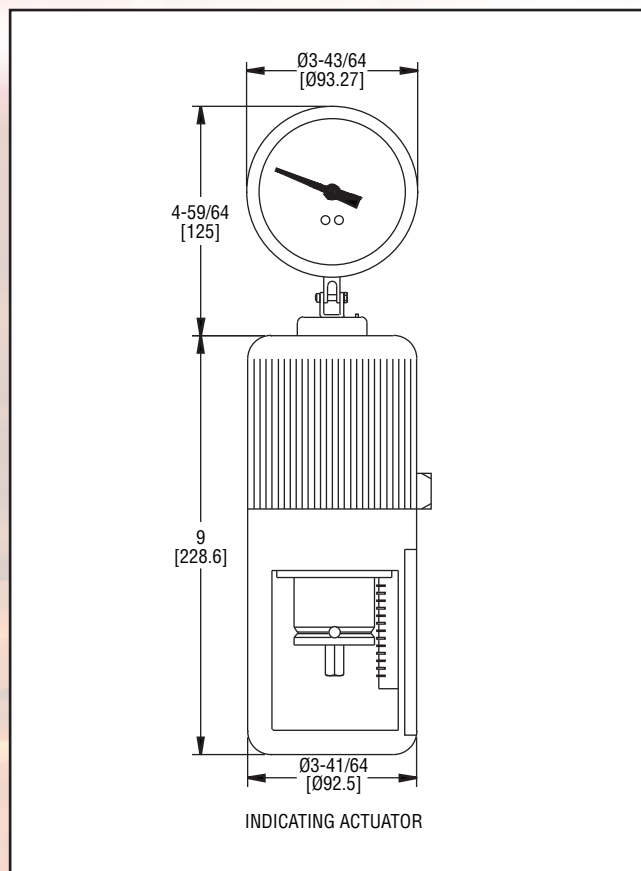
Bellows: High-pressure brass, corrosion resistant, tin-plated finish.

Adjustment Screws: Brass.

Range Adjustment Spring: Cadmium plated.

Overrange Protection: 100°F over upper range limit for temporary situations (not available for Fail-Safe actuators).

Weight: See model table.



Actuator Number	Description	Weight lb (kg)
1	Non-Indicating Temperature Control Actuator	6.0 (2.70)
2	Indicating Temperature Control Actuator	6.6 (2.97)
3	Fail-Safe Temperature Control Actuator	9.5 (4.32)

Bulb and Capillary Type

Order Number	Connection Style and Material	Bulb Material	
Union Connection			
01	Union Hub Brass	Copper	
02	Union Hub 316 Stainless Steel	316 Stainless Steel	
Adjustable Union Connection			
03	Union Hub Brass	Copper	
04	Union Hub 316 Stainless Steel	316 Stainless Steel	
Plain Bulb			
05	None	Copper	
06	None	316 Stainless Steel	
FEP Covered Bulb			
07	None	Copper with FEP Covering	
08	None	316 Stainless Steel with FEP Covering	
Union Connection with Spiral Armor			
09	Union Hub Brass	Copper with Stainless Steel Spiral Armor	
10	Union Hub 316 Stainless Steel	316 Stainless Steel with 316 Stainless Steel Spiral Armor	

Bulb and Capillary Order Number	Dimension	Non-Indicating and Indicating Actuators Capillary Lengths				Fail-Safe Actuators Capillary Lengths
		8 to 16 Feet in (mm)	20 Feet in (mm)	24 to 36 Feet in (mm)	40 to 52 Feet in (mm)	8 Feet* in (mm)
01, 02, 03, 04, 09, 10	A	13 (330)	16 (406)	20 (508)	24 (610)	16 (406)
	U	12.25 (311)	15.25 (387)	19.25 (489)	23.25 (591)	15.25 (387)
	D	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)
	H	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT
05, 06	X	13 (330)	16 (406)	20 (508)	24 (610)	16 (406)
	D	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)
07, 08	X	15 (381)	18 (457)	22 (559)	26 (660)	18 (457)
	D	1.16 (29)	1.16 (29)	1.16 (29)	1.16 (29)	1.16 (29)

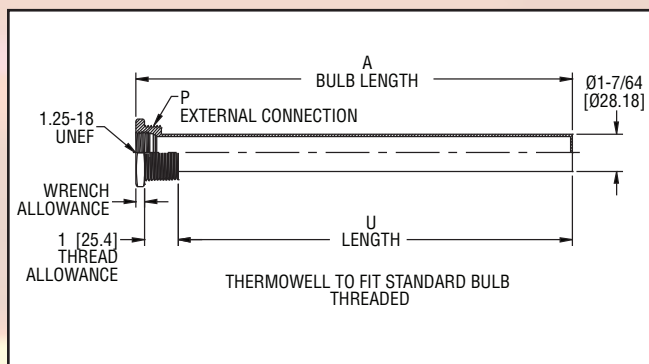
*On Fail-Safe models, minimum insertion length increases by 1" for each additional 4 ft capillary increment.

Capillary Length

Capillaries are available in lengths from 8 to 52 feet in 4-foot increments. Specify the desired length in feet in the model number with a two-digit number.

Example: 38R-XXXXAXX-XXX08X-RXX

Series 38R Thermowells



Thermowells are not recommended for FEP Covered Bulb. Thermowell length determined by length of ordered bulb.

Dimensions

Bulb Length (A) in (mm)	Length (U) in (mm)	External Connection (NPT)
13 (330)	12.25 (311)	1-1/4"
16 (406)	15.25 (387)	1-1/4"
20 (508)	19.25 (489)	1-1/4"
24 (610)	23.25 (591)	1-1/4"

Order Number	Description	Maximum Pressure psi (bar)
0	No Thermowell	--
1	316 SS Thermowell	1000 (68.9)
2	Brass Thermowell	500 (34.5)

Series 38R Temperature Ranges

Non-Indicating and Indicating Actuators

Range Number	Nominal Range °F (°C)	Recommended Working Span		Dial Thermometer Range °F (°C)
		Single Seat Heating Valves, Double Seat Heating Valves, Double Seat Cooling Valves, All Three-Way Valves °F (°C)	Single Seat Cooling Valves °F (°C)	
R01*	20 to 70 (-7 to 21)	40 to 65 (4 to 18)	N/A	30 to 115 (-1 to 46)
R02*	40 to 90 (5 to 32)	65 to 85 (18 to 29)	N/A	50 to 140 (10 to 60)
R03	30 to 115 (-1 to 46)	85 to 110 (29 to 43)	50 to 80 (10 to 27)	30 to 115 (-1 to 46)
R04	50 to 140 (10 to 60)	110 to 135 (43 to 57)	80 to 105 (27 to 41)	50 to 140 (10 to 60)
R05	75 to 165 (24 to 74)	135 to 160 (57 to 71)	105 to 130 (41 to 54)	75 to 165 (24 to 74)
R06	105 to 195 (41 to 91)	160 to 190 (71 to 88)	130 to 155 (54 to 68)	105 to 195 (41 to 91)
R07	125 to 215 (52 to 102)	190 to 210 (88 to 99)	155 to 180 (68 to 82)	125 to 215 (52 to 102)
R09	155 to 250 (68 to 121)	210 to 245 (99 to 118)	180 to 215 (82 to 102)	155 to 250 (68 to 121)
R10	200 to 280 (93 to 138)	245 to 275 (118 to 135)	215 to 245 (102 to 118)	200 to 280 (93 to 138)
R11	225 to 315 (107 to 157)	275 to 310 (135 to 152)	245 to 280 (118 to 138)	225 to 315 (107 to 157)
R12	255 to 370 (124 to 188)	305 to 365 (152 to 185)	275 to 335 (135 to 168)	255 to 370 (124 to 188)
R13	295 to 420 (146 to 216)	365 to 415 (185 to 213)	335 to 385 (168 to 196)	295 to 420 (146 to 216)
R14	310 to 440 (154 to 227)	415 to 435 (213 to 224)	385 to 405 (196 to 207)	310 to 440 (154 to 227)

*Not recommended for single seated valves.

Fail-Safe Actuators

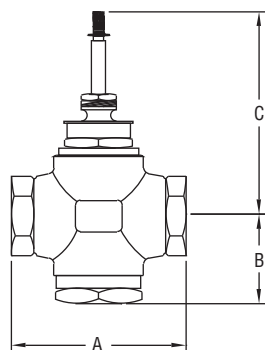
Range Number	Nominal Range and Recommended Working Span °F (°C)
R81	40 to 65 (4 to 18)
R82	55 to 80 (13 to 27)
R83	65 to 90 (18 to 32)
R84	80 to 110 (27 to 43)
R85	90 to 115 (32 to 46)
R86	110 to 140 (43 to 60)
R89	140 to 175 (60 to 79)
R90	170 to 195 (77 to 91)
R91	190 to 210 (88 to 99)
R92	205 to 225 (96 to 107)
R93	215 to 250 (102 to 121)
R94	230 to 265 (110 to 129)
R95	245 to 280 (118 to 138)
R96	270 to 300 (132 to 149)

The recommended working span typically falls within the upper third of the nominal range. Single Seat Heating, all Double Seat, and all Three-Way valves have a recommended working span in this part of the nominal range. However, due to the differing thrust requirements, Single Seat Cooling valves have a recommended working span in the middle third of the nominal range.

Series
GV1

Globe Control Valve

Low Cost, 1" to 2" Sizes, 2-Way or 3-Way



GV1

DIMENSIONS

Model	A	B	C
GV121	4-11/32" (110 mm)	2-3/8" (60 mm)	4-3/8" (111 mm)
GV122	4-47/64" (120 mm)	2-39/64" (66 mm)	4-3/8" (111 mm)
GV123	5-1/8" (130 mm)	2-11/16" (68 mm)	4-1/2" (114 mm)
GV124	5-23/32" (145 mm)	2-27/32" (72 mm)	4-31/32" (126 mm)
GV131	4-11/32" (110 mm)	3-5/64" (78 mm)	4-3/8" (111 mm)
GV132	4-47/64" (120 mm)	3-15/64" (82 mm)	4-3/8" (111 mm)
GV133	5-1/8" (130 mm)	3-15/64" (82 mm)	4-1/2" (114 mm)
GV134	5-23/32" (145 mm)	3-19/32" (91 mm)	4-31/32" (126 mm)

The Series GV1 globe valves can be conveniently paired with the Series EVA1 electric actuators, creating a low cost and compact control valve package. The globe design allows for exceptional throttling control in a wide range of applications, including central heating and air conditioning, water handling, and industrial manufacturing systems. Valves are manufactured in a variety of sizes, and are available in either two-way or three-way body styles. The forged brass body and equal percentage flow characteristic are ideal for many flow control systems.

FEATURES

- Low leakage rate (less than 0.05% of Cv)
- Equal percentage flow characteristic for excellent low flow control
- Forged brass construction
- Direct mounting actuator (Series EVA1) for compact control valve package

Model	Type	Pipe Size	Cv	Max. Diff. Pres. Fit with EVA1-	Stroke in. (mm)
GV121	2-Way	1"	9.3	87 psi (6 bar)	19/32" (15)
GV122		1-1/4"	17.4	58 psi (4 bar)	3/4" (19)
GV123		1-1/2"	25.5	43 psi (3 bar)	3/4" (19)
GV124		2"	40.6	29 psi (2 bar)	3/4" (19)
GV131	3-Way	1"	9.3	87 psi (6 bar)	19/32" (15)
GV132		1-1/4"	17.4	58 psi (4 bar)	3/4" (19)
GV133		1-1/2"	25.5	43 psi (3 bar)	3/4" (19)
GV134		2"	40.6	29 psi (2 bar)	3/4" (19)

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SPECIFICATIONS

Service: Compatible liquids and gases.

Line Size: 1" to 2".

Body Style: 2-way, push to open globe; 3-way globe.

End Connections: Female NPT.

Pressure Limit: 232 psi (16 bar).

Wetted Materials:

Body Material: Brass.

Stem: 302 SS.

Disc: Brass with Nitrile Gasket.

Packing: Fluon® filler with Nitrile O-ring.

Temperature Limits: 35 to 201°F (2 to 94°C).

Flow Characteristic: Equal percentage.

Flow Leakage: Less than 0.05% of Cv factor.

Stem Connection: M8 thread.

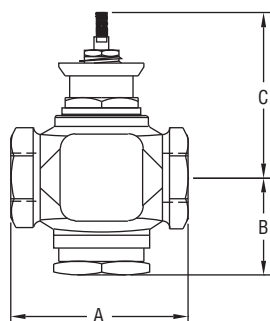
APPLICATIONS

- Mixing or diverting services with three way models
- Control water flow in heating or cooling processes
- HVAC zone management

Series
GV2
&
GV3

Globe Control Valves

Low Cost, 1" to 2-1/2" Sizes, 2-Way or 3-Way



DIMENSIONS

Model	A	B	C
GV221/321	4-11/32" (110 mm)	2-31/64" (63 mm)	4-17/64" (108 mm)
GV222/322	4-47/64" (120 mm)	2-23/32" (69 mm)	4-17/64" (108 mm)
GV223/323	5-1/8" (130 mm)	2-13/16" (71 mm)	4-3/8" (111 mm)
GV224/324	5-23/32" (145 mm)	3-3/64" (77 mm)	4-1/2" (114 mm)
GV225/325	4-11/32" (110 mm)	3-9/32" (83 mm)	4-25/32" (121 mm)
GV231/331	4-47/64" (120 mm)	3-13/64" (81 mm)	4-17/64" (108 mm)
GV232/332	5-1/8" (130 mm)	3-23/64" (85 mm)	4-17/64" (108 mm)
GV233/333	5-23/32" (145 mm)	3-23/64" (85 mm)	4-3/8" (111 mm)
GV234/334	5-1/8" (145 mm)	3-51/64" (96 mm)	4-1/2" (114 mm)
GV235/335	6-29/32" (175 mm)	4-7/64" (104 mm)	4-25/32" (121 mm)

The Series GV2 and GV3 globe valves can be conveniently paired with the Series EVA2 and EVA3 electric actuators, creating a low cost and compact control valve package. The globe design allows for exceptional throttling control in a wide range of applications, including central heating and air conditioning, water handling, and industrial manufacturing systems. Valves are manufactured in a variety of sizes, and are available in either two-way or three-way body styles. The forged brass body and equal percentage flow characteristic are ideal for many flow control systems. Series GV3 models incorporate a high intensity body casting for high temperature applications, including steam service.

FEATURES

- Low leakage rate (less than 0.05% of Cv)
- Equal percentage flow characteristic for excellent low flow control
- Forged brass construction
- Direct mounting actuator (Series EVA2 and EVA3) for compact control valve package
- GV3: Higher temperature rating, capable of steam service
- Control flow in heating or cooling processes

SPECIFICATIONS

Service: GV2: Compatible liquids and gases.

GV3: Compatible liquids, gases, and steam.

Line Size: 1" to 2-1/2".

Body Style: 2-way, push to open globe; 3-way globe.

End Connections: Female NPT.

Pressure Limit: 232 psi (16 bar) WOG; GV3: 130 psi SWP.

Wetted Materials:

Body Material: Brass.

Stem: SS (1Cr18Ni9).

Disc: GV2: Brass with Nitrile gasket.

GV3: Brass with Fluon® gasket.

Packing: GV2: Fluon® filler with Nitrile O-ring.

GV3: Fluon® filler with Fluorine O-ring.

Temperature Limits: GV2: 35 to 201°F (2 to 94°C), GV3: 35 to 356°F (2 to 180°C).

Flow Characteristic: Equal percentage.

Flow Leakage: Less than 0.05% of Cv factor.

Stem Connection: M8 thread.

SERIES GV2

Model	Type	Pipe Size	Cv	Max. Diff. Pres.		Stroke in (mm)
				Fit with EVA2-	Fit with EVA3-	
GV221	2-Way	1"	9.3	145 psi (10 bar)	203 psi (14 bar)	19/32" (15)
GV222		1-1/4"	18.6	109 psi (7.5 bar)	160 psi (11 bar)	3/4" (19)
GV223		1-1/2"	29.0	72 psi (5 bar)	116 psi (8 bar)	3/4" (19)
GV224		2"	46.4	43 psi (3 bar)	72 psi (5 bar)	7/8" (22)
GV225		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)
GV231	3-Way	1"	9.3	145 psi (10 bar)	203 psi (14 bar)	19/32" (15)
GV232		1-1/4"	18.6	109 psi (7.5 bar)	160 psi (11 bar)	3/4" (19)
GV233		1-1/2"	29.0	72 psi (5 bar)	116 psi (8 bar)	3/4" (19)
GV234		2"	46.4	43 psi (3 bar)	72 psi (5 bar)	7/8" (22)
GV235		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)

SERIES GV3

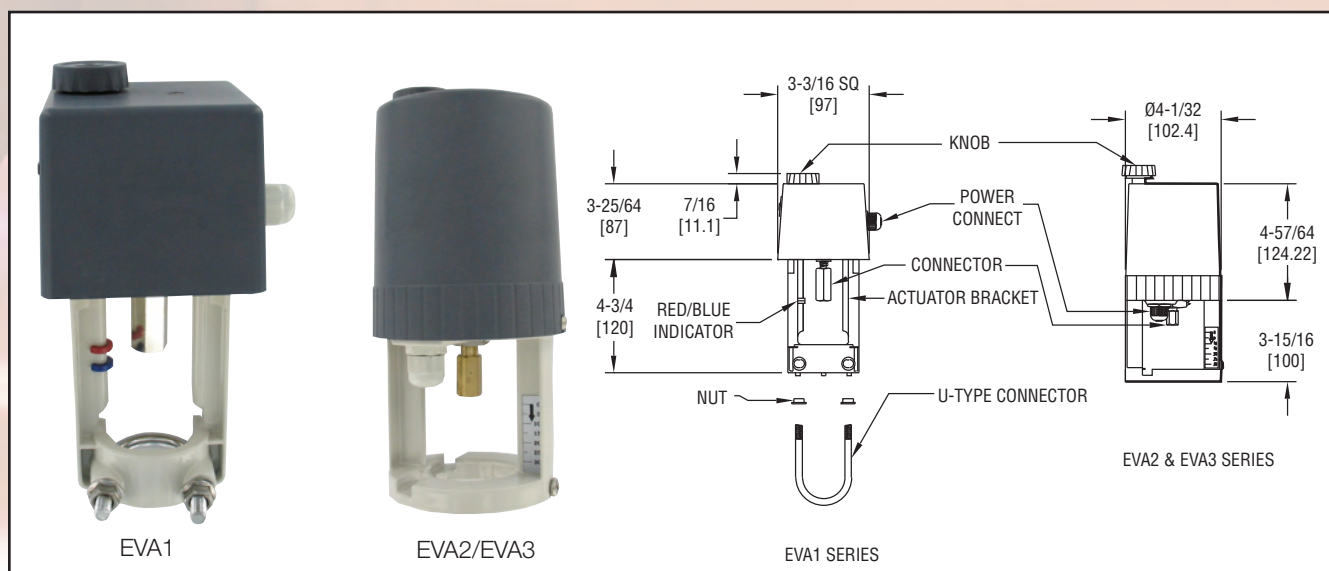
Model	Type	Pipe Size	Cv	Max. Diff. Pres.		Stroke in (mm)
				Fit with EVA2-	Fit with EVA3-	
GV321	2-Way	1"	9.3	116 psi (8 bar)	174 psi (12 bar)	19/32" (15)
GV322		1-1/4"	18.6	87 psi (6 bar)	145 psi (10 bar)	3/4" (19)
GV323		1-1/2"	29.0	58 psi (4 bar)	102 psi (7 bar)	3/4" (19)
GV324		2"	46.4	29 psi (2 bar)	58 psi (4 bar)	7/8" (22)
GV325		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)
GV331	3-Way	1"	9.3	116 psi (8 bar)	174 psi (12 bar)	19/32" (15)
GV332		1-1/4"	18.6	87 psi (6 bar)	145 psi (10 bar)	3/4" (19)
GV333		1-1/2"	29.0	58 psi (4 bar)	102 psi (7 bar)	3/4" (19)
GV334		2"	46.4	29 psi (2 bar)	58 psi (4 bar)	7/8" (22)
GV335		2-1/2"	73.1	29 psi (2 bar)	50 psi (3.5 bar)	7/8" (22)

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Series
EVA

Electric Actuator

Easily Installs Onto a Series GV Valve



The **Series EVA Electric Actuators** are designed to mount directly onto the Series GV globe valves, creating a complete, low cost, and compact control valve package. Floating or modulating control inputs are available, and the 24 VAC synchronic motor includes a magnetic clutch to protect the motor in stall conditions. Actuators are ruggedly constructed with a fire-proof ABS housing and robust aluminum bracket. Features include a visual position indicator and manual override to make this actuator an excellent choice for any size area, large or small.

FEATURES

- Manual Override
- Compact Size
- Floating Control or Selectable 0-10 VDC or 4-20 mA Proportional Control
- Reversible Direction on Proportional Models
- Magnetic Clutch Protects Motor in Stall Conditions

MODEL	ACTUATOR ACTION	OUTPUT FORCE	VALVE SIZE	COMPATIBLE VALVE TYPE
EVA1F	Floating	112 lb (500 N)	1" to 2"	GV1__
EVA1M	Modulating	112 lb (500 N)	1" to 2"	GV1__
EVA2F	Floating	225 lb (1000 N)	1" to 2-1/2"	GV2__ or GV3__
EVA2M	Modulating	225 lb (1000 N)	1" to 2-1/2"	GV2__ or GV3__
EVA3F	Floating	337 lb (1500 N)	1" to 2-1/2"	GV2__ or GV3__
EVA3M	Modulating	337 lb (1500 N)	1" to 2-1/2"	GV2__ or GV3__

SPECIFICATIONS

SERIES EVA1

Output Force: 112 lb (500 N).
Power Requirements: 24 VAC.
Power Consumption: EVA1F: 2.5 VA; EVA1M: 4.5 VA.
Cycle Time: 262 sec/in. (10.3 sec/mm).
Enclosure Rating: IP54.
Housing Material: Fire-proof ABS plastic (UL94V-0).
Bracket Material: Aluminum.
Operating Temperature: 36 to 131°F (2 to 55°C).
Storage Temperature: -4 to 149°F (-20 to 65°C).
Humidity Limit: <90%, non-condensing.
Electrical Connection: Screw terminal.
Modulating Input: 0 to 10 VDC or 4 to 20 mA.
Weight: EVA1F: 1.81 lb (0.8 kg); EVA1M: 1.92 lb (0.9 kg).

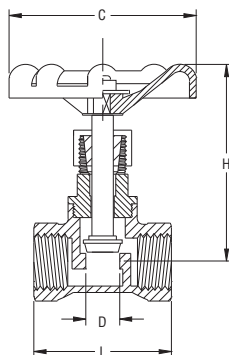
SERIES EVA2, EVA3

Output Force: EVA2: 225 lb (1000 N); EVA3: 337 lb (1500 N).
Power Requirements: 24 VAC.
Power Consumption: EVA2F (EVA3F): 5.5 VA; EVA2M (EVA3M): 7.5 VA.
Cycle Time: EVA2F (EVA2M): 97 sec/in. (3.8 sec/mm); EVA3F (EVA3M): 164 sec/in. (6.45 sec/mm).
Enclosure Rating: IP40.
Housing Material: Fire-proof ABS plastic (UL94V-0).
Bracket Material: Aluminum.
Operating Temperature: 36 to 131°F (2 to 55°C).
Storage Temperature: -4 to 149°F (-20 to 65°C).
Humidity Limit: <90%, non-condensing.
Electrical Connection: Screw terminal.
Modulating Input: 0 to 10 VDC or 4 to 20 mA.
Weight: EVA2F (EVA3F): 2.43 lb (1.1 kg); EVA2M (EVA3M): 3.31 lb (1.15 kg).

Series
HGV

Hand Operated Globe Valve

Low Cost, High Pressure Rating



Dimensions

PIPE SIZE	D in. [mm]	L in. [mm]	H (OPEN) in. [mm]	C in. [mm]
1/4"	13/32 [10]	2-3/64 [52]	4-1/64 [102]	2-3/8 [60]
3/8"	15/32 [12]	2-3/64 [52]	4-1/64 [102]	2-3/8 [60]
1/2"	19/32 [15]	2-3/64 [52]	4-1/64 [102]	2-3/8 [60]
3/4"	25/32 [20]	2-3/8 [60]	4-7/16 [113]	2-3/4 [70]
1"	63/64 [25]	2-53/64 [72]	4-27/32 [123]	2-3/4 [70]
1-1/4"	1-1/4 [32]	3-5/32 [80]	5-53/64 [148]	3-5/32 [80]
1-1/2"	1-37/64 [40]	3-35/64 [90]	6-19/64 [160]	3-17/32 [90]
2"	1-31/32 [50]	4-11/64 [106]	7-3/32 [180]	3-15/16 [100]

The Series HGV Hand Operated Globe Valves are an economical and functional alternative to large actuator/control valve packages. Metal-to-metal seating ensures excellent flow control and shut-off service. The body and bonnet are each constructed of CF8M (316) stainless steel for superb corrosion resistance and chemical compatibility.

FEATURES

- Threaded ends conform to ANSI B 2.1, BS 21, DIN 259/2999, ISO 228
- Stainless steel inside screw, screwed bonnet, swivel disc integral seat, rising stem and hand wheel

Model No.	Size	Cv Value
HGV00	1/4"	0.6
HGV01	3/8"	1.38
HGV02	1/2"	2.46
HGV03	3/4"	5.76
HGV04	1"	10.69
HGV05	1-1/4"	17.1
HGV06	1-1/2"	25.2
HGV07	2"	47.1

SPECIFICATIONS

Service: Compatible liquids and gases.

End Connections: Female NPT.

Wetted Materials:

Body, Bonnet, Packing Nut: CF8M (316) SS. Disc, Stem, Retainer Ring, Gland: 316 SS. Packing: PTFE.

Other Materials:

Hand Wheel: Cast Iron.

Plate: Aluminum.

Wheel Nut: 316 SS.

Pressure Limits: 725 psi (50.0 bar) from -20 to 200°F (-28.9 to 93.3°C); 500 psi (34.5 bar) at 300°F (148.9°C); 450 psi (31.0 bar) at 325°F (162.8°C); 100 psi (6.9 bar) at 350°F (176.7°C).

Temperature Limits: -20 to 356°F (-28.9 to 180°C).

Series
NVII

Needle Valve

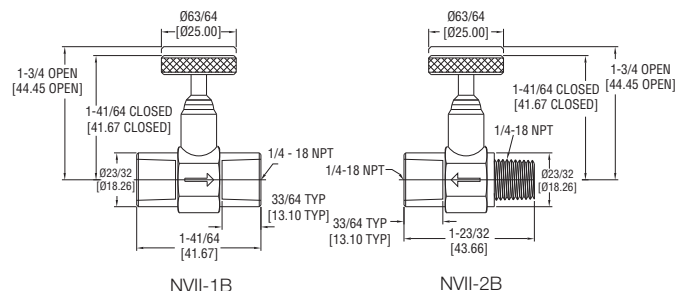
Economical, Pressures Up to 2000 psi, Blowout-Proof Stem



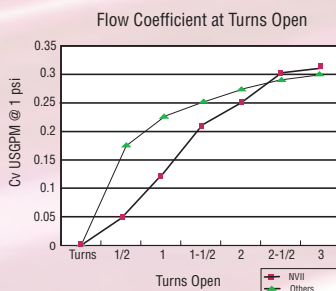
NVII-1B



NVII-2B



Model NVII Needle Valve provides easy flow regulation in all applications, including shut off and throttling for pressure gages and instruments. With a one piece, hot forged brass body construction, years of maintenance-free service can be expected. The Model NVII, with its tamper-proof design and blowout-proof stem, provides excellent performance and reliability.



SPECIFICATIONS

Service: Gases and liquids compatible with wetted materials. Not rated for steam use.

Pressure Limit: 2000 psi (138 bar) (CWP).

Wetted Materials:

Valve Body: Brass (CW617N).

Retainer, Handwheel: Brass (CW614N).

O-Ring: Fluoroelastomer.

Temperature Limits: -40 to 350°F (-40 to 176.7°C). (Warning: freezing of the fluid in the installation may severely damage the valve.)

Flow Coefficient: 0.31.

Weight: 0.22 lb.

Connection Size: 1/4" NPT.

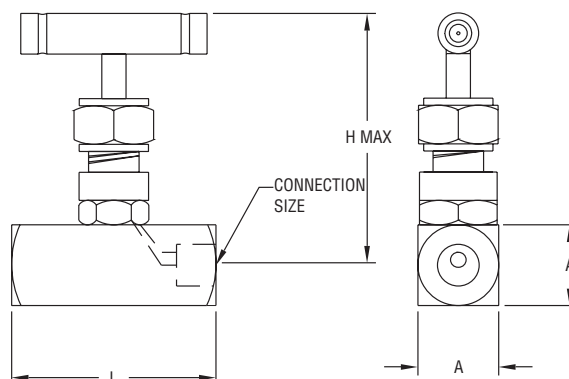
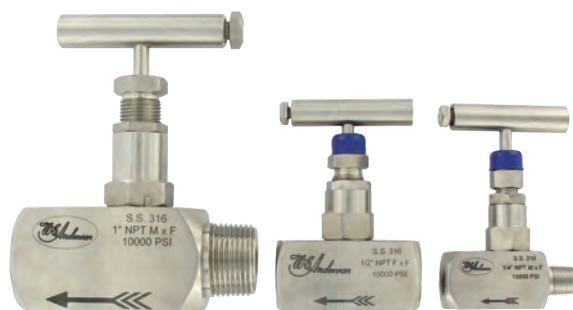
Model NVII-1B, Needle Valve (Female x Female)

Model NVII-2B, Needle Valve (Male x Female)

Series
HNV

Needle Valve

For Use with Gas and Liquids, Pressures Up to 6000 psi

**DIMENSIONS in (mm)**

CONNECTION	A	L	H	CONNECTION	A	L	H	CONNECTION	A	L	H
1/8" F x F		1-31/32 (50.01)		3/8" F x F		2-3/8 (60.33)		3/4" F x F		2-61/64 (59.13)	
1/8" M x F	7/8 (22.3)	2-11/64 (55.17)	2-3/8 (60.33)	3/8" M x F	63/64 (25)	2-9/16 (65.09)	2-9/16 (65.09)	3/4" M x F	1-1/2 (38.10)	3-5/32 (80.17)	3-23/64 (85/33)
1/8" M x M		2-3/8 (60.33)		3/8" M x M		2-49/64 (70.25)		3/4" M x M		3-23/64 (85.33)	
1/4" F x F		2-3/8 (60.33)		1/2" F x F		2-9/16 (65.09)		1" F x F		3-23/64 (85.33)	
1/4" M x F	63/64 (25)	2-9/16 (65.09)	2-9/16 (65.09)	1/2" M x F	1-17/64 (32.15)	2-49/64 (70.25)	2-49/64 (70.25)	1" M x F	1-25/32 (45.24)	4-7/64 (104.38)	3-3/4 (95.25)
1/4" M x M		2-49/16 (70.25)		1/2" M x M		2-61/64 (59.13)		1" M x M		4-9/64 (105.17)	

Series HNV Needle Valve is a barstock style needle valve that is designed for controlling low flow rates of liquids or gases. The valve series features fine threading and large seat area to ensure precise flow control. Wetted materials are 316 SS and PTFE making these ideal for use with corrosives. The HNV has been tested to assure vibration and thermal stability.

Body includes a lock pin to prevent accidental bonnet disengagement. The HNV is available in male x male, male x female, and female x female connections from 1/8" to 1". Tee handle is constructed of 316 SS and allows low torque operation.

FEATURES

- Solid Barstock Body
- 6000 psi (431 bar) Pressure Rating
- Panel Mountable
- Bubble Tight Shutoff
- Bonnet Lock Pin

APPLICATIONS

Test stands, laboratories, mobile equipment, hydraulic systems, sampling systems, metering service, and corrosives.

SPECIFICATIONS

Service: Gases and liquids compatible with wetted materials.

End Connections: NPT.

Wetted Materials: 316 SS and PTFE packing.

Pressure Limits: 6000 psi (431 bar) @ 200°F (93°C). 4000 psi (276 bar) @ 464°F (240°C).

Temperature Limits: 464°F (240°C).

Other Materials: Handle: 316 SS.

Options: Contact the factory for tube and BS connections, other materials of construction, NACE certified, and round handwheel handles.

HNV Needle Valve			
Pipe Size	Female X Female	Female X Male	Male X Male
	Model	Model	Model
1/8"	HNV-SSS31B	HNV-SSS21B	HNV-SSS11B
1/4"	HNV-SSS32B	HNV-SSS22B	HNV-SSS12B
3/8"	HNV-SSS33B	HNV-SSS23B	HNV-SSS13B
1/2"	HNV-SSS34B	HNV-SSS24B	HNV-SSS14B
3/4"	HNV-SSS35B	HNV-SSS25B	HNV-SSS15B
1"	HNV-SSS36B	HNV-SSS26B	HNV-SSS16B

Series
TDST

Thermodynamic Steam Trap

Compact, Works in Any Position

STEAM TRAPS

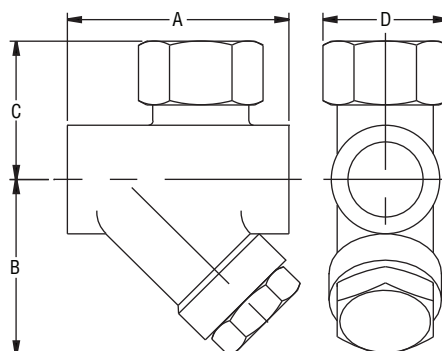


No Strainer

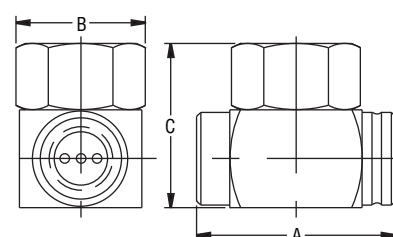


With Strainer

SIZE	A	B	C	D
3/8"	3" (76.2MM)	2-3/8" (60.3MM)	1-7/8" (47.6MM)	1-11/16" (42.84MM)
1/2"	3" (76.2MM)	2-3/8" (60.3MM)	1-7/8" (47.6MM)	1-11/16" (42.84MM)
3/4"	3" (76.2MM)	2-3/8" (60.3MM)	1-7/8" (47.6MM)	1-11/16" (42.84MM)
1"	3-1/4" (82.5MM)	2-1/2" (63.5MM)	2-1/8" (53.9MM)	1-11/16" (42.84MM)



SIZE	A	B	C
3/8"	2" (50.8MM)	1-3/4" (44.5MM)	1-3/4" (44.5MM)
1/2"	2-11/16" (76.2MM)	1-3/4" (44.5MM)	2" (50.8MM)
3/4"	2-13/16" (71.4MM)	2-5/19" (58.7MM)	2-7/16" (61.9MM)
1"	3-5/16" (84.1MM)	2-1/2" (63.5MM)	2-7/8" (73.0MM)



Series TDST Thermodynamic Steam Traps control steam and condensate movement to maximize removal of latent heat from steam for efficient system operation. The thermodynamic trap has cyclic on-off operation with a disk that is pushed open by incoming condensate and closes tightly when steam tries to escape. The compact design allows the steam trap to be mounted in any position and models available with an integral strainer remove the need for additional apparatus. When the trap is mounted vertically, it self-drains, making it freeze-resistant. The trap also handles water hammer, superheat, is resistant to internal and external corrosion, and is easy to install. A hardened 316 SS disc is the only moving part in the trap ensuring long service life. Audible discharge cycling makes it simple to check steam trap operation.

SPECIFICATIONS

Line Size: 3/8", 1/2", 3/4", 1".

End Connection: Female NPT.

Wetted Materials: Body: 420F SS, Cap & Disc: 416 SS, Strainer: SS.

Pressure Limit: 600 psig (41.3 bar).

Temperature Limit: 800°F (426.67°C).

Weight: See model chart.

Capacity: See capacity chart.

Model Number	Size	Integral Strainer	Weight lb (kg)
TDST-SSSD-N1	3/8"	No	0.8 (0.36)
TDST-SSSD-N2	1/2"	No	1.2 (0.55)
TDST-SSSD-N3	3/4"	No	1.85 (0.86)
TDST-SSSD-N4	1"	No	3.1 (1.8)
TDST-SSST-N1	3/8"	Yes	2.4 (1)
TDST-SSST-N2	1/2"	Yes	2.3 (1)
TDST-SSST-N3	3/4"	Yes	2.7 (1.2)
TDST-SSST-N4	1"	Yes	3.3 (1.5)

Capacity Chart

TDST-SSSD Maximum Capacity - lb/hr 10°F Below Saturation

NPT Connection	Differential Pressure psig (bar)													
	3.5 (0.24)	5 (0.34)	10 (0.7)	20 (1.4)	30 (2.1)	50 (3.4)	75 (5.2)	100 (6.9)	150 (10.3)	200 (13.8)	300 (20.7)	400 (27.6)	500 (34.5)	600 (41.3)
3/8"	180	185	190	200	215	245	305	370	500	610	790	960	1100	1250
1/2"	300	310	345	410	465	575	700	810	1000	1140	1410	1630	1830	2000
3/4"	405	420	470	560	640	810	1000	1160	1450	1670	2100	2430	2750	3050
1"	640	670	725	865	980	120	147	175	2200	2600	3250	3780	4250	4700

TDST-SSST Maximum Capacity - lb/hr 10°F Below Saturation

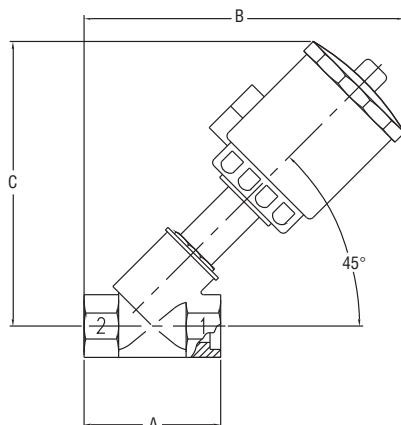
NPT Connection	Differential Pressure psig (bar)											
	10 (0.7)	20 (1.4)	30 (2.1)	50 (3.4)	75 (5.2)	100 (6.9)	150 (10.3)	200 (13.8)	300 (20.7)	400 (27.6)	500 (34.5)	600 (41.4)
3/8"	315	370	425	520	575	800	900	1080	1280	1380	1480	1650
1/2"	315	370	425	520	575	800	900	1080	1280	1380	1480	1650
3/4"	650	740	800	1000	1100	1400	1540	1630	1760	1930	2070	2200
1"	650	740	800	1000	1100	1400	1540	1630	1760	1930	2070	2200

Series
SAV-BT

Angle Seat Valve - Bronze NPT

Low Cost, Compact Design, For Use with Gases and Liquids

ANGLE SEAT



DIMENSIONS (in)					
Port Connection	A	B	C	Actuator Diameter	Cv
1/2 NPT	2-9/16	5-43/64	4-7/8	1-3/4	4.7
1/2 NPT	2-9/16	7-9/16	6-47/64	2-1/2	4.7
3/4 NPT	2-61/64	6-7/64	4-31/32	1-3/4	8.8
3/4 NPT	2-61/64	7-51/64	6-15/16	2-1/2	8.8
1 NPT	3-35/64	6-39/64	6-47/64	1-3/4	19.6
1 NPT	3-35/64	8-23/64	7-19/64	2-1/2	19.6
1 NPT	3-35/64	8-25/32	7-23/32	3-9/16	19.6
1-1/4 NPT	4-11/32	8-55/64	7-39/64	2-1/2	29.4
1-1/4 NPT	4-11/32	9-7/32	4-61/64	3-9/16	29.4
1-1/2 NPT	4-47/64	9-1/16	7-51/64	2-1/2	45.5
1-1/2 NPT	4-47/64	9-27/64	8-5/32	3-9/16	45.5
2 NPT	5-29/32	9-49/64	8-5/32	2-1/2	57.8
2 NPT	5-29/32	10-1/8	8-33/64	3-9/16	57.8

Save space while maintaining flow rates with the compact Series SAV-BT Angle Seat Valve. The pneumatic, externally piloted angle seat valve is operated by a single acting actuator with a mechanical spring for failsafe operation. Select from either normally closed (NC) or normally open (NO) configurations. Bi-directional valves (normally closed) are designed for special applications that require flow in both directions and incorporate an anti-waterhammer design for liquid applications flowing under the seat. Normally open valves can also be used to prevent waterhammer on valve closure in liquid applications.

Constructed of bronze, 316 SS, and PTFE seals, the Series SAV-BT can be used in most gas, liquid, and steam applications. Integral heat sinks dissipate heat protecting the Polyamide actuator, ensuring longer life.

The Series SAV-BT can be mounted in any position. For added flexibility, the actuator housing rotates 360 degrees for positioning of the pressure ports. Standard visual indicator shows open or closed position.

SPECIFICATIONS VALVE BODY

Service: Gases and liquids compatible with wetted materials.

Wetted Materials:

Valve Body: Bronze.

Plug and stem: AISI 316L SS.

Stem O-ring: Fluoroelastomers.

Seat and seal: PTFE.

Line Sizes: 1/2" to 2" NPT.

Pressure Limits: See table below.

Flow Leakage: Meets ANSI Class VI.

Temperature Limits: 14 to 356°F (-10 to 180°C).

ACTUATOR

Type: Piston/pneumatic spring.

Pilot Connections: 1-3/4" dia. act.: 1/8" BSP; 2-1/2" dia. act.: 1/4" BSP; 3-9/16" dia. act.: 1/4" BSP.

Pilot Media: Air, water, inert gas.

Pressure Limits: See table below.

Temperature Limit: 140°F (60°C).

ACCESSORIES

A-538 1/8" BSP to 1/8" NPT adapter,
for 1-3/4" dia. actuators

A-539 1/4" BSP to 1/4" NPT adapter,
for 2-1/2", 3-9/16" dia. actuators

For Solenoid Valve see Series PV.

Port Connection	Actuator Diameter	Normally Closed	Normally Open	Bi-directional (NC)
1/2 NPT	1-3/4"	SAV-BTA1-NC	SAV-BTA1-NO	SAV-BTA1-BD
1/2 NPT	2-1/2"	SAV-BTA2-NC	SAV-BTA2-NO	SAV-BTA2-BD
3/4 NPT	1-3/4"	SAV-BTB1-NC	SAV-BTB1-NO	SAV-BTB1-BD
3/4 NPT	2-1/2"	SAV-BTB2-NC	SAV-BTB2-NO	SAV-BTB2-BD
1 NPT	1-3/4"	SAV-BTC1-NC	SAV-BTC1-NO	SAV-BTC1-BD
1 NPT	2-1/2"	SAV-BTC2-NC	SAV-BTC2-NO	SAV-BTC2-BD
1 NPT	3-9/16"	SAV-BTC3-NC	SAV-BTC3-NO	SAV-BTC3-BD
1-1/4 NPT	2-1/2"	SAV-BTD2-NC	SAV-BTD2-NO	SAV-BTD2-BD
1-1/4 NPT	3-9/16"	SAV-BTD3-NC	SAV-BTD3-NO	SAV-BTD3-BD
1-1/2 NPT	2-1/2"	SAV-BTE2-NC	SAV-BTE2-NO	SAV-BTE2-BD
1-1/2 NPT	3-9/16"	SAV-BTE3-NC	SAV-BTE3-NO	SAV-BTE3-BD
2 NPT	2-1/2"	SAV-BTF2-NC	SAV-BTF2-NO	SAV-BTF2-BD
2 NPT	3-9/16"	SAV-BTF3-NC	SAV-BTF3-NO	SAV-BTF3-BD

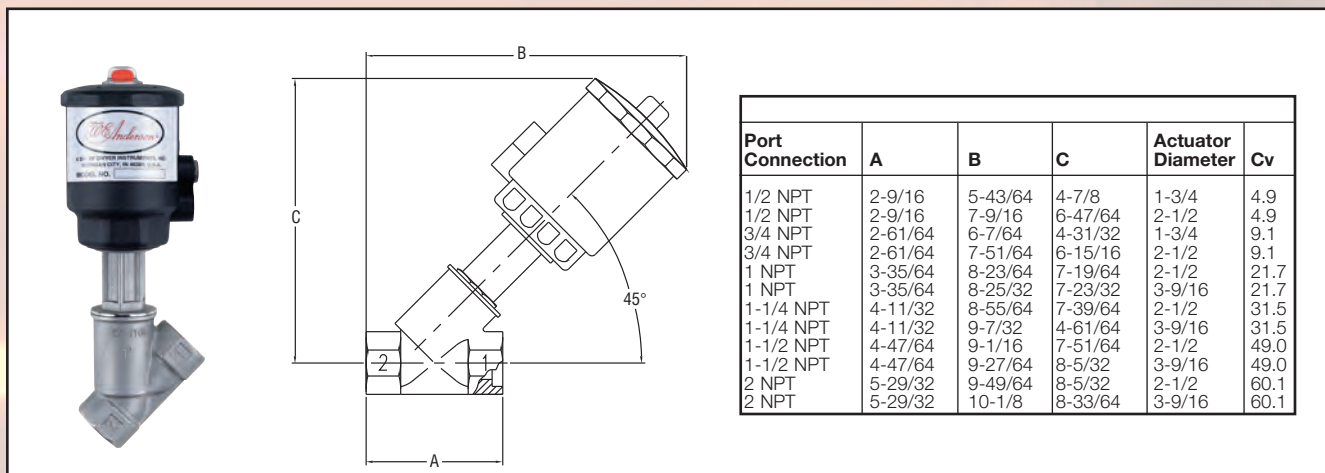
LINE AND PILOT PRESSURE CHART (psi)

Port Connection	Actuator Diameter	Normally Closed				Normally Open				Bi-Directional (Normally Closed)					
		Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.
1/2 NPT	1-3/4"	230	130	Overseat	26	150	230	Underseat	26	150	230/230	130/130	Ovr/Undr	73	150
1/2 NPT	2-1/2"	290	130	Overseat	22	150	230	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
3/4 NPT	1-3/4"	230	130	Overseat	26	150	230	Underseat	26	150	230/100	130/100	Ovr/Undr	73	150
3/4 NPT	2-1/2"	290	130	Overseat	22	150	230	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
1 NPT	1-3/4"	230	130	Overseat	26	150	230	Underseat	26	150	230/75	130/75	Ovr/Undr	73	150
1 NPT	2-1/2"	290	130	Overseat	22	150	230	Underseat	22	150	230/160	130/130	Ovr/Undr	55	150
1 NPT	3-9/16"	290	130	Overseat	15	120	230	Underseat	15	115	230/200	130/130	Ovr/Undr	48	115
1-1/4 NPT	2-1/2"	230	130	Overseat	44	150	230	Underseat	22	150	230/90	130/90	Ovr/Undr	55	150
1-1/4 NPT	3-9/16"	230	130	Overseat	36	120	230	Underseat	15	115	230/175	130/130	Ovr/Undr	48	115
1-1/2 NPT	2-1/2"	230	130	Overseat	44	150	230	Underseat	22	150	175/60	130/60	Ovr/Undr	55	150
1-1/2 NPT	3-9/16"	230	130	Overseat	36	120	230	Underseat	15	115	230/115	130/115	Ovr/Undr	48	115
2 NPT	2-1/2"	160	130	Overseat	44	150	175	Underseat	22	116	115/36	115/36	Ovr/Undr	55	150
2 NPT	3-9/16"	220	130	Overseat	36	120	230	Underseat	15	115	200/75	130/75	Ovr/Undr	48	115

Series
SAV-ST

Angle Seat Valve - Stainless Steel NPT

Low Cost, Compact Design, For Use with Gases & Liquids



Save space while maintaining flow rates with the compact Series SAV-ST Angle Seat Valve. The pneumatic, externally piloted angle seat valve is operated by a single acting actuator with a mechanical spring for failsafe operation. Select from either normally closed (NC) or normally open (NO) configurations. Bi-directional valves (normally closed) are designed for special applications that require flow in both directions and incorporate an anti-waterhammer design for liquid applications flowing under the seat. Normally open valves can also be used to prevent waterhammer on valve closure in liquid applications.

Constructed of investment case stainless steel and PTFE seals, the Series SAV-ST can be used in most gas, liquid, steam and corrosive applications. Integral heat sinks dissipate heat protecting the Polyamide actuator, ensuring longer life.

The Series SAV-ST can be mounted in any position. For added flexibility, the actuator housing rotates 360 degrees for positioning of the pressure ports. Standard visual indicator shows open or closed position.

SPECIFICATIONS

VALVE BODY

Service: Gases and liquids compatible with wetted materials.

Wetted Materials:

Valve Body: AISI 316L SS.

Plug and stem: AISI 316L SS.

Stem O-ring: Fluoroelastomer.

Seat and seal: PTFE.

Line Sizes: 1/2" to 2" NPT.

Pressure Limits: See table below.

Flow Leakage: Meets ANSI Class VI.

Temperature Limits: 14 to 356°F (-10 to 180°C).

ACTUATOR

Type: Piston/pneumatic spring.

Pilot Connections: 1-3/4" dia. act.: 1/8" BSP; 2-1/2" dia. act.: 1/4" BSP; 3-9/16" dia. act.: 1/4" BSP.

Pilot Media: Air, water, inert gas.

Pressure Limits: See table below.

Temperature Limit: 140°F (60°C).

Port Connection	Actuator Diameter	Normally Closed	Normally Open	Bi-directional (NC)
1/2 NPT	1-3/4"	SAV-STA1-NC	SAV-STA1-NO	SAV-STA1-BD
1/2 NPT	2-1/2"	SAV-STA2-NC	SAV-STA2-NO	SAV-STA2-BD
3/4 NPT	1-3/4"	SAV-STB1-NC	SAV-STB1-NO	SAV-STB1-BD
3/4 NPT	2-1/2"	SAV-STB2-NC	SAV-STB2-NO	SAV-STB2-BD
1 NPT	2-1/2"	SAV-STC2-NC	SAV-STC2-NO	SAV-STC2-BD
1 NPT	3-9/16"	SAV-STC3-NC	SAV-STC3-NO	SAV-STC3-BD
1-1/4 NPT	2-1/2"	SAV-STD2-NC	SAV-STD2-NO	SAV-STD2-BD
1-1/4 NPT	3-9/16"	SAV-STD3-NC	SAV-STD3-NO	SAV-STD3-BD
1-1/2 NPT	2-1/2"	SAV-STE2-NC	SAV-STE2-NO	SAV-STE2-BD
1-1/2 NPT	3-9/16"	SAV-STE3-NC	SAV-STE3-NO	SAV-STE3-BD
2 NPT	2-1/2"	SAV-STF2-NC	SAV-STF2-NO	SAV-STF2-BD
2 NPT	3-9/16"	SAV-STF3-NC	SAV-STF3-NO	SAV-STF3-BD

ACCESSORIES

A-538 1/8" BSP to 1/8" NPT adapter, for 1-3/4" dia. actuators

A-539 1/4" BSP to 1/4" NPT adapter, for 2-1/2", 3-9/16" dia. actuators

For Solenoid Valve see Series PV.

LINE AND PILOT PRESSURE CHART (psi)

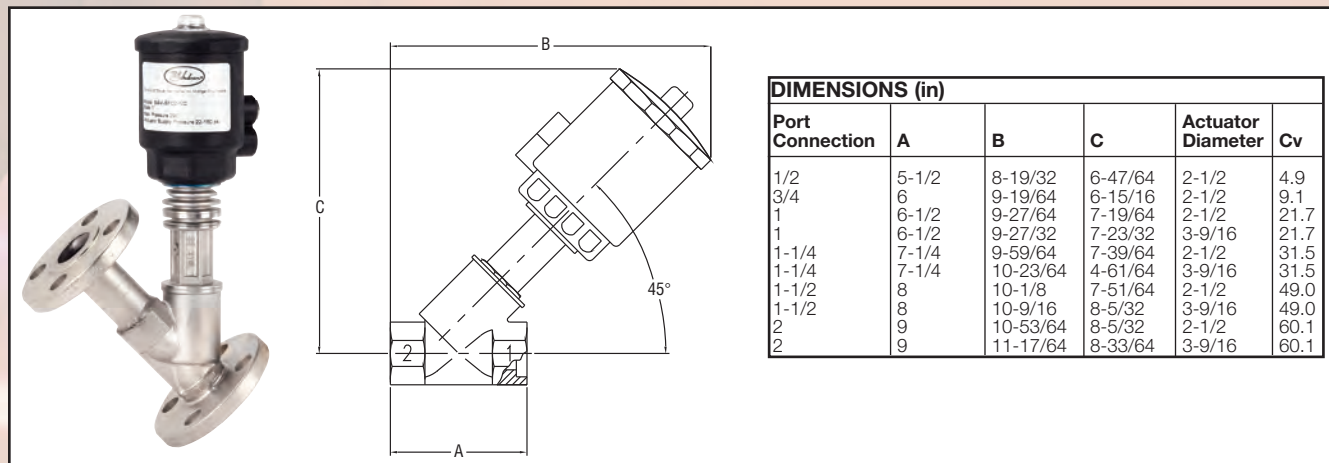
Port Connection	Actuator Diameter	Normally Closed					Normally Open					Bi-Directional (Normally Closed)				
		Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.
1/2 NPT	1-3/4"	230	130	Overseat	26	150	230	130	Underseat	26	150	230/230	130/130	Ovr/Undr	60	150
1/2 NPT	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
3/4 NPT	1-3/4"	230	130	Overseat	26	150	230	130	Underseat	26	150	230/100	130/100	Ovr/Undr	60	150
3/4 NPT	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
1 NPT	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/160	130/130	Ovr/Undr	55	150
1 NPT	3-9/16"	290	130	Overseat	15	115	230	130	Underseat	15	115	230/200	130/130	Ovr/Undr	48	115
1-1/4 NPT	2-1/2"	230	130	Overseat	41	150	230	130	Underseat	22	150	230/90	130/90	Ovr/Undr	55	150
1-1/4 NPT	3-9/16"	230	130	Overseat	41	115	230	130	Underseat	15	115	230/175	130/130	Ovr/Undr	48	115
1-1/2 NPT	2-1/2"	230	130	Overseat	41	150	230	130	Underseat	22	150	175/60	130/60	Ovr/Undr	55	150
1-1/2 NPT	3-9/16"	230	130	Overseat	41	115	230	130	Underseat	15	115	230/115	130/115	Ovr/Undr	48	115
2 NPT	2-1/2"	160	130	Overseat	41	150	175	130	Underseat	22	116	115/36	115/36	Ovr/Undr	55	150
2 NPT	3-9/16"	220	130	Overseat	41	115	230	130	Underseat	15	115	200/75	130/75	Ovr/Undr	48	115

Series
SAV-SF

Angle Seat Valve - Stainless Steel Flange

Low Cost, Compact Design, For Use with Gases & Liquids

ANGLE SEAT



DIMENSIONS (in)

Port Connection	A	B	C	Actuator Diameter	Cv
1/2	5-1/2	8-19/32	6-47/64	2-1/2	4.9
3/4	6	9-19/64	6-15/16	2-1/2	9.1
1	6-1/2	9-27/64	7-19/64	2-1/2	21.7
1	6-1/2	9-27/32	7-23/32	3-9/16	21.7
1-1/4	7-1/4	9-59/64	7-39/64	2-1/2	31.5
1-1/4	7-1/4	10-23/64	4-61/64	3-9/16	31.5
1-1/2	8	10-1/8	7-51/64	2-1/2	49.0
1-1/2	8	10-9/16	8-5/32	3-9/16	49.0
2	9	10-53/64	8-5/32	2-1/2	60.1
2	9	11-17/64	8-33/64	3-9/16	60.1

Save space while maintaining flow rates with the compact Series SAV-SF Angle Seat Valve. The pneumatic, externally piloted angle seat valve is operated by a single acting actuator with a mechanical spring for failsafe operation. Select from either normally closed (NC) or normally open (NO) configurations. Bi-directional valves (normally closed) are designed for special applications that require flow in both directions and incorporate an anti-waterhammer design for liquid applications flowing under the seat. Normally open valves can also be used to prevent waterhammer on valve closure in liquid applications.

Constructed of investment case stainless steel and PTFE seals, the Series SAV-SF can be used in most gas, liquid, steam and corrosive applications. Integral heat sinks dissipate heat protecting the Polyamide actuator, ensuring longer life.

The Series SAV-SF can be mounted in any position. For added flexibility, the actuator housing rotates 360 degrees for positioning of the pressure ports. Standard visual indicator shows open or closed position.

SPECIFICATIONS

VALVE BODY

Service: Gases and liquids compatible with wetted materials.

Wetted Materials:

Valve Body: AISI 316L SS.

Plug and stem: AISI 316L SS.

Stem O-ring: Fluoroelastomers.

Seat and seal: PTFE.

Line Sizes: 1/2" to 2".

Pressure Limits: See table below.

Temperature Limits: 14 to 356°F (-10 to 180°C).

Flow Leakage: Meets ANSI Class VI.

Connections: ANSI 150# Flange.

ACTUATOR

Type: Piston/pneumatic spring.

Pilot Connections: 1-3/4" dia. act.: 1/8" BSP; 2-1/2" dia. act.: 1/4" BSP; 3-9/16" dia. act.: 1/4" BSP.

Pilot Media: Air, water, inert gas.

Pressure Limits: See table below.

Temperature Limit: 140°F (60°C).

Port Connection	Actuator Diameter	Normally Closed	Normally Open	Bi-directional (NC)
1/2	2-1/2"	SAV-SFA2-NC	SAV-SFA2-NO	SAV-SFA2-BD
3/4	2-1/2"	SAV-SFB2-NC	SAV-SFB2-NO	SAV-SFB2-BD
1	2-1/2"	SAV-SFC2-NC	SAV-SFC2-NO	SAV-SFC2-BD
1	3-9/16"	SAV-SFC3-NC	SAV-SFC3-NO	SAV-SFC3-BD
1-1/4	2-1/2"	SAV-SFD2-NC	SAV-SFD2-NO	SAV-SFD2-BD
1-1/4	3-9/16"	SAV-SFD3-NC	SAV-SFD3-NO	SAV-SFD3-BD
1-1/2	2-1/2"	SAV-SFE2-NC	SAV-SFE2-NO	SAV-SFE2-BD
1-1/2	3-9/16"	SAV-SFE3-NC	SAV-SFE3-NO	SAV-SFE3-BD
2	2-1/2"	SAV-SFF2-NC	SAV-SFF2-NO	SAV-SFF2-BD
2	3-9/16"	SAV-SFF3-NC	SAV-SFF3-NO	SAV-SFF3-BD

ACCESSORIES

A-538 1/8" BSP to 1/8" NPT adapter,
for 1-3/4" dia. actuators

A-539 1/4" BSP to 1/4" NPT adapter,
for 2-1/2", 3-9/16" dia. actuators

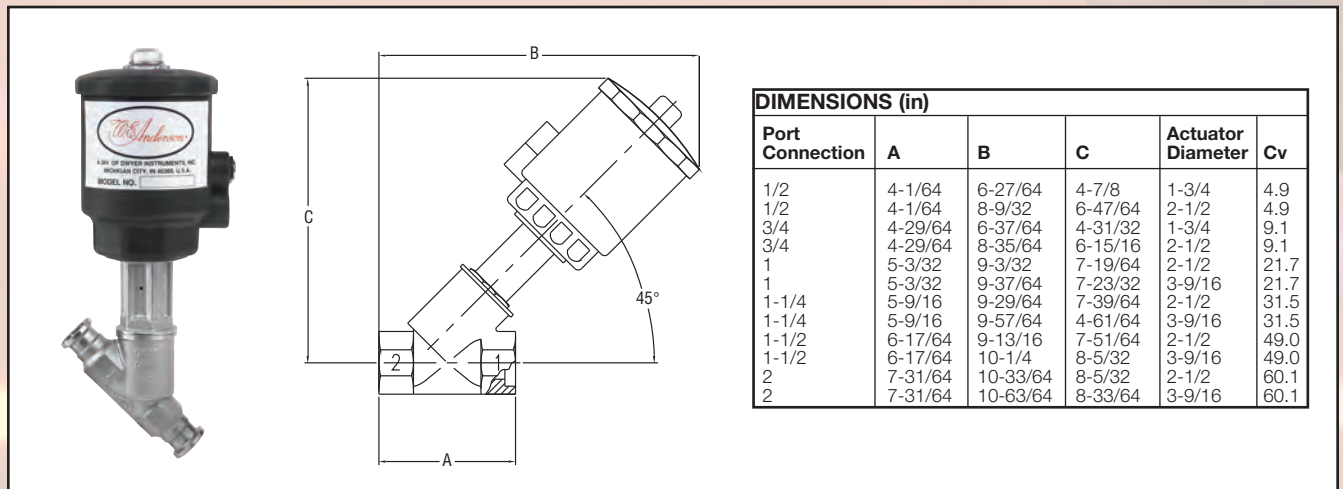
For Solenoid Valve see Series PV.

LINE AND PILOT PRESSURE CHART (psi)

Port Connection	Actuator Diameter	Normally Closed					Normally Open					Bi-Directional (Normally Closed)				
		Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.
1/2	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
3/4	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
1	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/160	130/130	Ovr/Undr	55	150
1	3-9/16"	290	130	Overseat	15	115	230	130	Underseat	15	115	230/200	130/130	Ovr/Undr	48	115
1-1/4	2-1/2"	230	130	Overseat	41	150	230	130	Underseat	22	150	230/90	130/90	Ovr/Undr	55	150
1-1/4	3-9/16"	230	130	Overseat	41	115	230	130	Underseat	15	115	230/175	130/130	Ovr/Undr	48	115
1-1/2	2-1/2"	230	130	Overseat	41	150	230	130	Underseat	22	150	175/60	130/60	Ovr/Undr	55	150
1-1/2	3-9/16"	230	130	Overseat	41	115	230	130	Underseat	15	115	230/115	130/115	Ovr/Undr	48	115
2	2-1/2"	160	130	Overseat	41	150	175	130	Underseat	22	116	115/36	115/36	Ovr/Undr	55	150
2	3-9/16"	220	130	Overseat	41	115	230	130	Underseat	15	115	200/75	130/75	Ovr/Undr	48	115

Series SAV-SSC Angle Seat Valve - SS Sanitary Clamp

Low Cost, Compact Design, For Use with Gases & Liquids



Save space while maintaining flow rates with the compact Series SAV-SSC Angle Seat Valve. The pneumatic, externally piloted angle seat valve is operated by a single acting actuator with a mechanical spring for failsafe operation. Select from either normally closed (NC) or normally open (NO) configurations. Bi-directional valves (normally closed) are designed for special applications that require flow in both directions and incorporate an anti-waterhammer design for liquid applications flowing under the seat. Normally open valves can also be used to prevent waterhammer on valve closure in liquid applications.

Constructed of investment cast stainless steel and PTFE seals, the Series SAV-SSC can be used in most gas, liquid, steam and corrosive applications. Integral heat sinks dissipate heat protecting the Polyamide actuator, ensuring longer life.

The Series SAV-SSC can be mounted in any position. For added flexibility, the actuator housing rotates 360 degrees for positioning of the pressure ports. Standard visual indicator shows open or closed position.

SPECIFICATIONS

VALVE BODY

Service: Gases and liquids compatible with wetted materials.

Wetted Materials:

Valve Body: AISI 316L SS.
Plug and stem: AISI 316L SS.
Stem O-ring: Fluoroelastomer.
Seat and seal: PTFE.

Line Sizes: 1/2" to 2".

Pressure Limits: See table below.

Temperature Limits: 14 to 356°F (-10 to 180°C).

Flow Leakage: Meets ANSI Class VI.

Connections: Sanitary clamp to ISO 2582 (clamp and clamp gasket not included).

ACTUATOR

Type: Piston/pneumatic spring.

Pilot Connections: 1-3/4" dia. act.: 1/8" BSP; 2-1/2" dia. act.: 1/4" BSP; 3-9/16" dia. act.: 1/4" BSP.

Pilot Media: Air, water, inert gas.

Pressure Limits: See table below.

Temperature Limit: 140°F (60°C).

Port Connection	Actuator Diameter	Normally Closed	Normally Open	Bi-directional (NC)
1/2	1-3/4"	SAV-SSCA1-NC	SAV-SSCA1-NO	SAV-SSCA1-BD
1/2	2-1/2"	SAV-SSCA2-NC	SAV-SSCA2-NO	SAV-SSCA2-BD
3/4	1-3/4"	SAV-SSCB1-NC	SAV-SSCB1-NO	SAV-SSCB1-BD
3/4	2-1/2"	SAV-SSCB2-NC	SAV-SSCB2-NO	SAV-SSCB2-BD
1	2-1/2"	SAV-SSCC2-NC	SAV-SSCC2-NO	SAV-SSCC2-BD
1	3-9/16"	SAV-SSCC3-NC	SAV-SSCC3-NO	SAV-SSCC3-BD
1-1/4	2-1/2"	SAV-SSCD2-NC	SAV-SSCD2-NO	SAV-SSCD2-BD
1-1/4	3-9/16"	SAV-SSCD3-NC	SAV-SSCD3-NO	SAV-SSCD3-BD
1-1/2	2-1/2"	SAV-SSCE2-NC	SAV-SSCE2-NO	SAV-SSCE2-BD
1-1/2	3-9/16"	SAV-SSCE3-NC	SAV-SSCE3-NO	SAV-SSCE3-BD
2	2-1/2"	SAV-SSCF2-NC	SAV-SSCF2-NO	SAV-SSCF2-BD
2	3-9/16"	SAV-SSCF3-NC	SAV-SSCF3-NO	SAV-SSCF3-BD

ACCESSORIES

A-538 1/8" BSP to 1/8" NPT adapter,
for 1-3/4" dia. actuators

A-539 1/4" BSP to 1/4" NPT adapter,
for 2-1/2", 3-9/16" dia. actuators

For Solenoid Valve see Series PV.

LINE AND PILOT PRESSURE CHART (psi)

Port Connection	Actuator Diameter	Normally Closed					Normally Open					Bi-Directional (Normally Closed)				
		Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.	Max. Line Pres.	Max. Steam Pres.	Flow Direction	Min. Pilot Pres.	Max. Pilot Pres.
1/2	1-3/4"	230	130	Overseat	26	150	230	130	Underseat	26	150	230/230	130/130	Ovr/Undr	60	150
1/2	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
3/4	1-3/4"	230	130	Overseat	26	150	230	130	Underseat	26	150	230/100	130/100	Ovr/Undr	60	150
3/4	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/230	130/130	Ovr/Undr	55	150
1	2-1/2"	290	130	Overseat	22	150	230	130	Underseat	22	150	230/160	130/130	Ovr/Undr	55	150
1	3-9/16"	290	130	Overseat	15	115	230	130	Underseat	15	115	230/200	130/130	Ovr/Undr	48	115
1-1/4	2-1/2"	230	130	Overseat	41	150	230	130	Underseat	22	150	230/90	130/90	Ovr/Undr	55	150
1-1/4	3-9/16"	230	130	Overseat	41	115	230	130	Underseat	15	115	230/175	130/130	Ovr/Undr	48	115
1-1/2	2-1/2"	230	130	Overseat	41	150	230	130	Underseat	22	150	175/60	130/60	Ovr/Undr	55	150
1-1/2	3-9/16"	230	130	Overseat	41	115	230	130	Underseat	15	115	230/115	130/115	Ovr/Undr	48	115
2	2-1/2"	160	130	Overseat	41	150	175	130	Underseat	22	116	115/36	115/36	Ovr/Undr	55	150
2	3-9/16"	220	130	Overseat	41	115	230	130	Underseat	15	115	200/75	130/75	Ovr/Undr	48	115

Series
MV

Mini Brass Ball Valve

Economical, Blowout-Proof Stem



Wedge Handle



Screwdriver Slot



Lever Handle



Tee Handle

Series MV Mini Brass Ball Valves are ideal for use in small, confined spaces, where larger valves are inappropriate. Installation is made easy with a choice of Female x Female or Male x Female process connections. Pure PTFE ball seats provide broad media compatibility and bubble tight shutoff. Double seal system allows valve to be operated in both directions. All handles are nylon, except a screwdriver type with a slotted screw. Wedge handle and screwdriver style have a blowout-proof brass stem for maximum safety and durability.

SPECIFICATIONS

Service: Gases and liquids compatible with wetted materials. Not rated for steam use.

End Connections: NPT, See model chart.

Pressure Limits:

MV4: -29" Hg to 200 psi
(-736 mm Hg to 13.8 bar) (CWP).

MV5: -29" Hg to 450 psi
(-736 mm Hg to 31 bar) (CWP).

Temperature Limits:

MV4: -4 to 200°F (-20 to 93.3°C).

MV5: -4 to 250°F (-20 to 121°C).

Wetted Materials:

Valve Body: Nickel Plated Brass (CW617N).

Valve Ball: Chrome-Plated Brass.

O-ring Stem Seal: Fluoroelastomer.

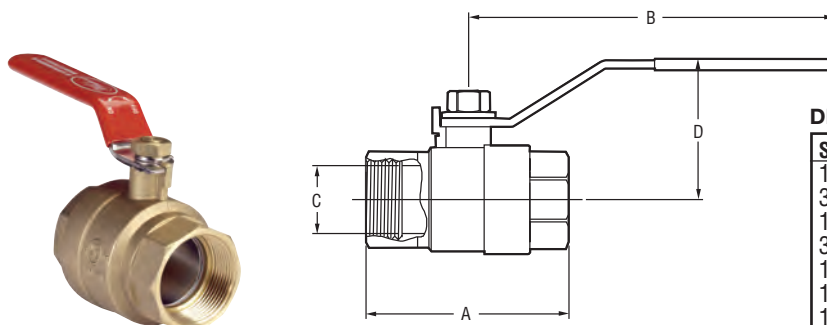
Ball Seats: PTFE.

Series MV Mini Brass Ball Valves					
Handle Style	Pipe Size	Cv Value	Max. Pressure	Female x Female	Male x Female
				Model	Model
Lever Handle	1/8"	5.3	200 psi (CWP)	MV4-LF1	MV4-LM1
	1/4"	6.6		MV4-LF2	MV4-LM2
	3/8"	6.6		MV4-LF3	MV4-LM3
	1/2"	11		MV4-LF4	MV4-LM4
Tee Handle	1/8"	5.3		MV4-TF1	MV4-TM1
	1/4"	6.6		MV4-TF2	MV4-TM2
	3/8"	6.6		MV4-TF3	MV4-TM3
	1/2"	11		MV4-TF4	MV4-TM4
Wedge Handle	1/8"	5.3	450 psi (CWP)	MV5-WF1	MV5-WM1
	1/4"	6.6		MV5-WF2	MV5-WM2
	3/8"	6.6		MV5-WF3	MV5-WM3
	1/2"	11		MV5-WF4	MV5-WM4
Screwdriver Slot	1/8"	5.3		MV5-SF1	MV5-SM1
	1/4"	6.6		MV5-SF2	MV5-SM2
	3/8"	6.6		MV5-SF3	MV5-SM3
	1/2"	11		MV5-SF4	MV5-SM4

Series
BV2MB

Two-Piece Hand Lever Brass Ball Valve

Full Port, Economical, Blowout-Proof Stem



DIMENSIONS (inches)

Size	A (Ref)	B (Ref)	C (Ref)	D (Ref)
1/4"	1.800	3.800	.393	1.250
3/8"	2.000	3.800	.393	1.250
1/2"	2.070	3.800	.551	1.830
3/4"	2.360	3.800	.748	1.950
1"	2.950	4.350	.944	2.170
1-1/4"	3.370	5.470	1.181	2.800
1-1/2"	3.740	5.470	1.496	3.030
2"	4.290	6.380	1.850	3.330
2-1/2"	5.650	8.720	2.440	4.000
3"	6.180	8.720	2.990	4.310

The Series BV2MB is an economical hand lever ball valve for commercial and general industrial use. The Series BV2MB is perfect for compressed air applications in dust collectors and pneumatic conveying systems. Valve body, body cap, and ball are made of quality brass. Seats and stem packing are constructed of TFE for long lasting service. Blowout-proof stem provides safety in the event of overpressure. Full port design allows for maximum Cv and minimal pressure drop.

Size	Model	Cv
1/4"	BV2MB00	7.5
3/8"	BV2MB01	7.5
1/2"	BV2MB02	16
3/4"	BV2MB03	43
1"	BV2MB04	58
1-1/4"	BV2MB05	105
1-1/2"	BV2MB06	160
2"	BV2MB07	325
2-1/2"	BV2MB08	475
3"	BV2MB09	780

SPECIFICATIONS

End Connections: 1/4" to 3" female NPT.

Pressure Limit: 1/4" to 1": 600 psi (41.4 bar), 1-1/4" to 2": 400 psi (27.6 bar), 2-1/2" to 3": 200 psi (13.8 bar) WOG.

Wetted Materials: Body and body cap: forged brass (ASTM B283-C37700); ball and stem: brass; seat and packing: TFE.

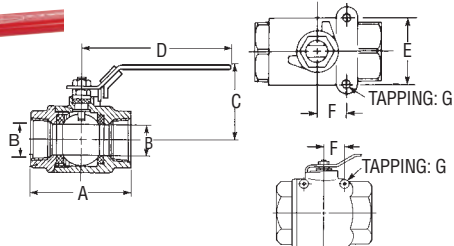
Temperature Limit: 10 to 200°F (-12 to 93°C).

Other Materials: Body seal: rubber; handle: plated steel; nut and gasket: brass.

Series
BV2M

Two-Piece Stainless Steel Ball Valve

Full Port, 1000 psig (69 bar)



DIMENSIONS (in)

Size	A	B	C	D	E	F	G (UNC)	Cv	Torque (in-lb)
1/4"	2.00	0.38	1.97	3.78	1.125	0.500	10-24	6	30
3/8"	2.00	0.46	1.97	3.78	1.125	0.500	10-24	7	30
1/2"	2.40	0.50	1.97	3.78	1.125	0.500	10-24	10	40
3/4"	2.95	0.79	2.52	5.12	1.375	0.875	10-24	24	80
1"	3.42	0.98	2.60	5.91	1.375	0.875	10-24	45	120
1-1/4"	3.97	1.26	3.11	5.91	1.500	1.000	1/4-20	90	240
1-1/2"	4.33	1.50	3.26	6.69	1.500	1.000	1/4-20	125	420
2"	5.19	1.97	3.70	6.69	1.500	1.000	1/4-20	190	560
2-1/2"	6.57	2.56	4.52	9.05	2.750	1.375	1/4-20	240	1100
3"	7.60	3.15	4.92	9.05	2.750	1.375	1/4-20	425	1600

The Series BV2 is the economical choice for high quality, stainless steel ball valves for use in chemical, petrochemical, pulp and paper and general applications. The Series BV2 body and endcaps are constructed of investment cast stainless steel, while stem is 316 SS. Seats and body seals are 15% glass reinforced PTFE providing broad media compatibility and bubble tight shutoff to 1000 psig (69 bar). Internally loaded, blowout-proof stem provides safety in the event of overpressure. Full port design allows for maximum Cv with minimal pressure drop. Integral actuator mounting pads allows for ease of automation.

SPECIFICATIONS

End Connections: Female NPT.

Pressure Limits: 1000 psi (69 bar) WOG, 150 psi (10.3 bar) SWP.

Wetted Materials: Body, Ball, End Cap: CF8M SS; Stem: 316 SS; Seat, Thrust Washer: RTFE; End Gasket, Stem Packing: PTFE.

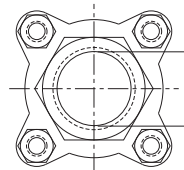
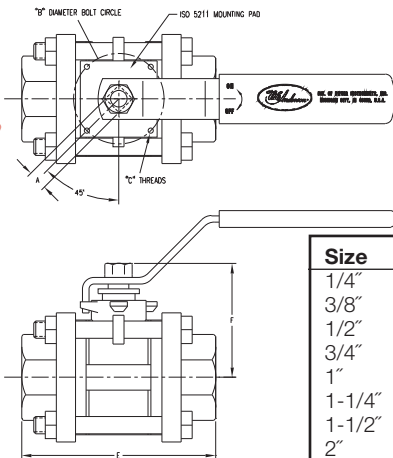
Temperature Limits: -20 to 450°F (-29 to 232°C).

Size	Model	Size	Model
1/4"	BV2M100	1-1/4"	BV2M105
3/8"	BV2M101	1-1/2"	BV2M106
1/2"	BV2M102	2"	BV2M107
3/4"	BV2M103	2-1/2"	BV2M108
1"	BV2M104	3"	BV2M109

Series
2BVS

Three-Piece Stainless Steel Ball Valve

Investment Cast Stainless Steel Construction, Hand Lever, Full Port



DIMENSIONS (in)

Size	A	B	C	D	E	F
1/4"	.354	1.42/1.65	.22/.28	.45	2.36	1.93
3/8"	.354	1.42/1.65	.22/.28	.50	2.36	1.93
1/2"	.354	1.42/1.65	.22/.28	.59	2.95	1.93
3/4"	.354	1.42/1.65	.22/.28	.79	3.15	2.09
1"	.433	1.65/1.97	.28/.35	.98	3.45	2.60
1-1/4"	.433	1.65/1.97	.28/.35	1.26	4.33	2.83
1-1/2"	.551	1.97/2.76	.28/.35	1.50	4.72	3.23
2"	.551	1.97/2.76	.28/.35	1.97	5.51	3.63

Series 2BVS Stainless Steel Manual Ball Valves

- Ideal for food and chemical applications.
- Swing-out 3-piece design for easy maintenance.
- ISO 5211 mounting pad.
- Full port
- Self-adjusting stem packing

The Series 2BVS is an economical, stainless steel, ball valve ideal for food, and chemical applications. Three piece design allows for easy swing-out inline maintenance and cleaning. The 2BVS Series is investment cast stainless steel, ensuring exceptional quality and corrosion resistance. Reinforced RTFE seats provide strength and excellent sealing up to 1000 psi. Standard ISO 5211 mounting pad allows for easy automation. Full port design provides maximum Cv with minimal pressure drop.

SPECIFICATIONS

End Connections: Female NPT.

Pressure Limits: 1/4" to 2" 1000 psi (69 bar) WOG; 125 psi (8.6 bar) SWP.

Wetted Materials: Body, Ball, End Cap: ASTM A351 CF8M (316 SS); Washer, Nut, Belleville Washer, Stem Nut: 304 SS; Stem: 316 SS; Body Seal, Stem Seal, Stem Packing: TFE; Seat: RTFE; O-Ring: Fluoroelastomer.

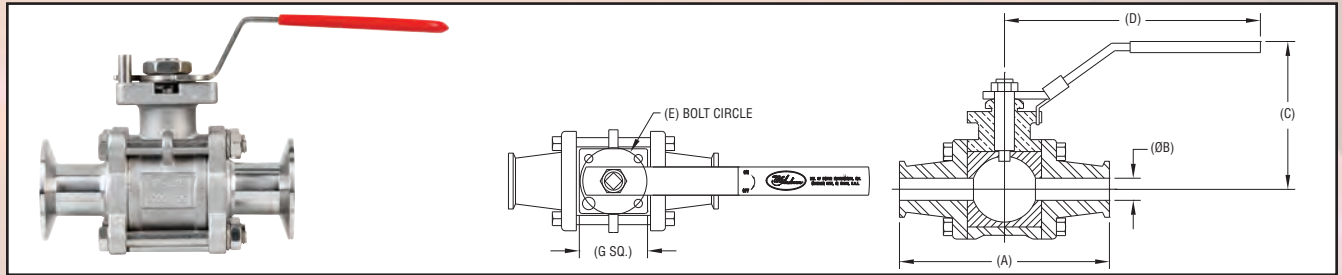
Temperature Limits: -40 to 450°F (-40 to 232°C).

Model	Size	Cv
2BVS3AT1000	1/4"	6
2BVS3BT1000	3/8"	9
2BVS3CT1000	1/2"	21
2BVS3ET1000	3/4"	37
2BVS3FT1000	1"	58
2BVS3GT1000	1-1/4"	93
2BVS3HT1000	1-1/2"	139
2BVS3JT1000	2"	232

Series
BV3HL

Three-Piece Sanitary Ball Valve

Hand Lever, Stainless Steel Construction, Cavity Filled



Series BV3HL Sanitary Manual Ball Valves

- Ideal sanitary ball valve for high purity applications, including food & beverage, pharmaceutical and biotech industries.
- Three-piece stainless steel investment cast body.
- 240 Grit internal polish.
- Polished clamp end to sanitary finish.
- PTFE cavity filler to reduce the threat of product entrapment.

Series BV3HL Sanitary Ball Valves feature sanitary clamp ends for easy line removal. The sanitary polish is ideal for use in pharmaceutical, food & beverage, and chemical processing systems. PTFE filled cavities aid to reduce product entrapment, while the full bore design provides consistent flow characteristics. The swing-out design of the valve allows for maintenance of the center section while leaving the ends clamped in place. Superior leak protection is accomplished by using a live-loaded packing system. An ISO 5211 mounting pad is provided for easy automation when combined with an electric or pneumatic actuator.

Size (in.)	Model
1/2"	BV3HL02TC
3/4"	BV3HL03TC
1"	BV3HL04TC
1-1/2"	BV3HL06TC
2"	BV3HL07TC
2-1/2"	BV3HL08TC
3"	BV3HL09TC
4"	BV3HL10TC

DIMENSIONS

Size (in.)	ISO 5211	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	G (in.)	Cv	Torque (in-lb)	Weight lb (kg)
1/2"	F03-F04	4.33	0.37	2.05	3.94	1.42/1.65	1.46	14	60	1.4 (0.64)
3/4"	F03-F04	4.68	0.63	2.24	5.16	1.42/1.65	1.46	45	80	2.0 (0.91)
1"	F04-F05	4.88	0.87	2.36	5.16	1.65/1.97	1.87	81	100	2.9 (1.3)
1-1/2"	F05-F07	5.55	1.37	3.54	7.36	1.97/2.76	2.20	215	380	5.7 (2.6)
2"	F05-F07	6.37	1.87	5.51	7.36	1.97/2.76	2.20	410	450	9.0 (4.1)
2-1/2"	F07	7.76	2.07	5.91	10.24	2.76	3.15	618	650	19.3 (8.8)
3"	F07	9.02	2.87	6.10	10.24	2.76	3.15	940	900	31.2 (14.2)
4"	F10	9.49	3.83	7.09	11.24	4.02	4.26	1840	1632	43.7 (19.8)

SPECIFICATIONS

Service: Compatible liquids and gases.

Body: 3-piece.

Line Size: 1/2" to 4".

End Connections: Sanitary clamp (liner meets BS 4825, part 3).

Pressure Limits: 1000 psi (69 bar) WOG.

Wetted Materials: Body, Ball, End Caps: CF8M stainless steel. Stem: 316 SS. Stem Seal: Fluoroelastomer. Seats, Body Seal, Thrust Washer, Packing: PTFE.

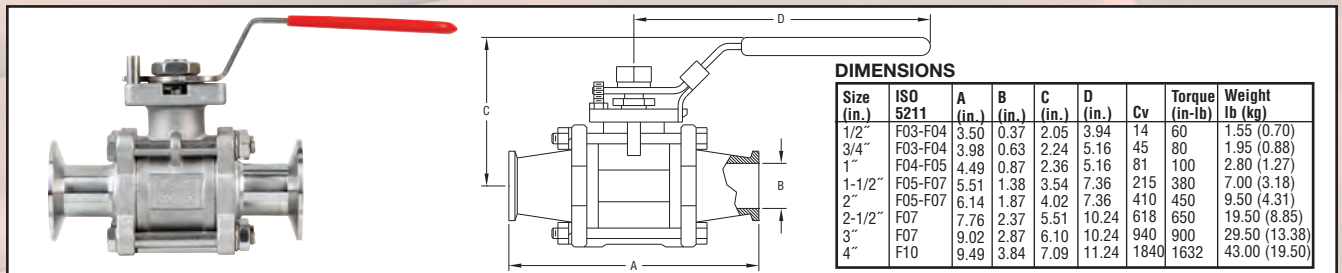
Temperature Limits: -40 to 450° (-40 to 232°C) CWP. 297°F (147°C) steam maximum.

Other Materials: 304 SS, vinyl.

Series
BV3HL-3A

Three-Piece Sanitary Ball Valve

Hand Lever, Cavity Filled, Meets 3A Sanitary Standards



Series BV3HL-3A Sanitary Manual Ball Valves

- Designed to meet 3A sanitary standards.
- Ideal sanitary ball valve for high purity applications, including food & beverage, pharmaceutical and biotech industries.
- Three-piece stainless steel investment cast body.
- 15RA internal bore polish.
- Polished clamp end to sanitary finish.
- TFE cavity filler to reduce the threat of product entrapment.

Series BV3HL-3A Sanitary Ball Valves are designed to meet 3A standards and feature sanitary clamp ends for easy line removal. The sanitary polish is ideal for use in pharmaceutical, food & beverage, and chemical processing systems, while the cavity filler aids to reduce product entrapment, and the full bore design provides consistent flow characteristics. The swing-out design of the valve allows for maintenance of the center section while leaving the ends clamped in place. Superior leak protection is accomplished by using a live-loaded packing system. An ISO 5211 mounting pad is provided for easy automation when combined with an electric or pneumatic actuator.

SPECIFICATIONS

Service: Compatible liquids and gases.

Body: 3-piece.

Line Size: 1/2" to 4".

End Connections: Sanitary clamp (liner meets BS 4825, part 3).

Pressure Limits: 1000 psi (69 bar) WOG.

Wetted Materials: Body, Ball, End Caps: CF8M SS. Stem: 316 SS. Seats, Body Seal, Thrust Washer, Packing: TFE.

Temperature Limits: -40 to 450°F (-40 to 232°C) CWP. 297°F (147°C) steam maximum.

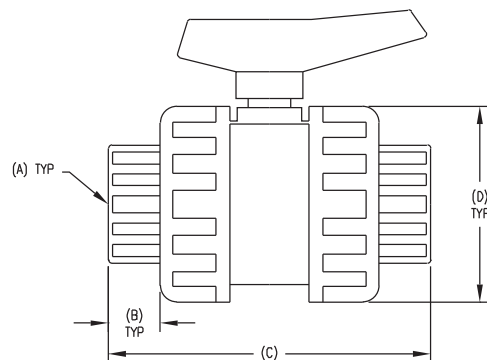
Other Materials: 304 SS, vinyl.

Agency Approvals: Meets 3A.

Size (in.)	Model
1/2"	BV3HL02TC-3A
3/4"	BV3HL03TC-3A
1"	BV3HL04TC-3A
1-1/2"	BV3HL06TC-3A
2"	BV3HL07TC-3A
2-1/2"	BV3HL08TC-3A
3"	BV3HL09TC-3A
4"	BV3HL10TC-3A

Series TBV True Union Ball Valve

PVC Construction, Economical, Full Port



D	L	H	E	Weight lb (kg)
1/2"	0.6"	3.3"	2.0"	0.4 (0.18)
3/4"	0.7"	4.3"	2.4"	0.7 (.32)
1"	0.9"	4.9"	2.8"	1.1 (0.5)
1-1/4"	1.0"	5.6"	3.3"	1.7 (0.8)
1-1/2"	1.2"	6.6"	4.1"	2.6 (1.2)
2"	1.5"	7.8"	4.7"	4.5 (2.0)
2-1/2"	1.7"	9.1"	5.8"	6.1 (2.8)
3"	2.0"	10.6"	7.0"	10.2 (4.6)
4"	2.4"	13.8"	7.0"	20 (9.1)

The Series TBV True Union Ball Valves are an economical, PVC constructed ball valve ideal for chemical and wastewater applications. The true union design allows for easy removal from a piping system without breaking down piping connections. The valve body can be lifted out of the line by unscrewing two assembly nuts. Series TBV ball valves feature a double o-ring stem seal for twice the leakage protection of valves with only a single stem seal. All plastic construction gives this series of ball valves superior corrosion resistance. Full port design provides maximum Cv with minimal pressure drop.

FEATURES

- Ideal corrosion resistant ball valve for chemical and wastewater applications.
- Easy to service.
- Double stem seals.
- Low operating torque.

Size	Cv	Model No	Connection
1/2"	7	TBV-1102D	Socket/Threaded
3/4"	18	TBV-1103D	Socket/Threaded
1"	32	TBV-1104D	Socket/Threaded
1-1/4"	114	TBV-1105D	Socket/Threaded
1-1/2"	203	TBV-1106D	Socket/Threaded
2"	243	TBV-1107D	Socket/Threaded
2-1/2"	292	TBV-1108T	Threaded
2-1/2"	292	TBV-1108S	Socket
3"	441	TBV-1109T	Threaded
3"	441	TBV-1109S	Socket
4"	476	TBV-1110T	Threaded
4"	476	TBV-1110S	Socket

SPECIFICATIONS

Service: Compatible liquids.

Line Size: 1/2" to 4".

Process Connections: Socket or female NPT.

Pressure Limits: 1/2" to 2": 240 psi (16.5 bar).

2-1/2" to 4": 150 psi (10.3 bar).

Wetted Materials: Ball, Stem, End Connector, Body Connector O-Ring, Seal Carrier: PVC; Stem O-Ring, Body O-Ring, Dampener Seal, End: EPDM; Seat: HDPE.

Temperature Limits: 32 to 110°F (0 to 43°C).

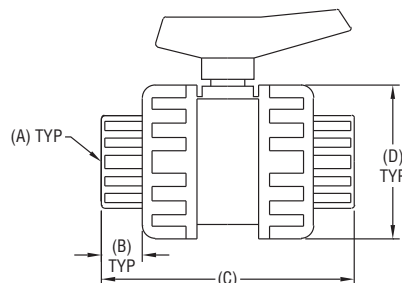
Other Materials: Handle: PP; Union Nut: PVC.

Agency Approvals: Meets NSF.

Series
TBV2

Industrial True Union Ball Valves

PVC or CPVC Construction, Full Port



D	L	H	E	Weight lb (kg)
1/2"	0.6"	3.3"	2.0"	0.63 (0.03)
3/4"	0.7"	4.3"	2.4"	0.81 (0.37)
1"	0.9"	4.9"	2.8"	1.38 (0.62)
1-1/4"	1.0"	5.6"	3.3"	1.75 (0.79)
1-1/2"	1.2"	6.6"	4.1"	2.75 (1.25)
2"	1.5"	7.8"	4.7"	4.66 (2.11)
2-1/2"	1.7"	9.1"	5.8"	6.0 (2.7)
3"	2.0"	10.6"	7.0"	10.5 (4.8)
4"	2.4"	13.8"	2.0"	21.0 (9.5)

The Series TBV2 Industrial True Union Ball Valves are an economical, PVC or CPVC constructed ball valve ideal for chemical and wastewater applications. The true union design permits easy removal from a piping system without breaking down piping connections. The valve body can be easily lifted out of the line by unscrewing two assembly nuts. A special threaded seal retainer allows for the seat to be adjusted while maintaining downstream system pressure. Series TBV2 ball valves feature a double o-ring stem seal for twice the leakage protection of valves with only a single stem seal. All plastic construction gives this line of valves superior corrosion resistance. Full port design provides maximum Cv with minimal pressure drop.

FEATURES

- Ideal corrosion resistant ball valve for chemical and waste water applications.
- Threaded seal carrier.
- Easy to service.
- Double stem seals.
- Reversible PTFE seats.

SPECIFICATIONS

Service: Compatible liquids.

Line Size: 1/2" to 4".

Process Connections: Socket or Female NPT.

Pressure Limits: 250 psi (17.2 bar).

Wetted Materials: Ball, Stem, End Connector, Body, Seal

Retainer: PVC or CPVC; O-Ring: EPDM or FPM; Seat: PTFE.

Temperature Limits: PVC: 150°F (43°C).

CPVC: 215°F (93°C).

Other Materials: Handle: PP; Union Nut: PVC or CPVC.

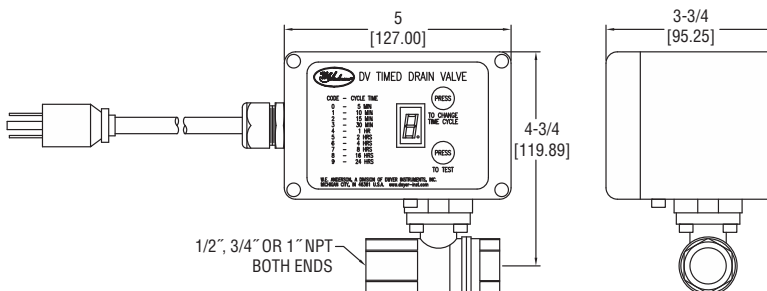
Agency Approvals: Meets NSF.

Size	Cv	Model No	Body Material	Seal	Connection	Size	Cv	Model No	Body Material	Seal	Connection
1/2"	7	TBV2-1102D	PVC	EPDM	Socket/Threaded	1/2"	8	TBV2-2102D	CPVC	EPDM	Socket/Threaded
3/4"	18	TBV2-1103D	PVC	EPDM	Socket/Threaded	3/4"	16	TBV2-2103D	CPVC	EPDM	Socket/Threaded
1"	32	TBV2-1104D	PVC	EPDM	Socket/Threaded	1"	29	TBV2-2104D	CPVC	EPDM	Socket/Threaded
1-1/4"	114	TBV2-1105D	PVC	EPDM	Socket/Threaded	1-1/4"	75	TBV2-2105D	CPVC	EPDM	Socket/Threaded
1-1/2"	203	TBV2-1106D	PVC	EPDM	Socket/Threaded	1-1/2"	90	TBV2-2106D	CPVC	EPDM	Socket/Threaded
2"	243	TBV2-1107D	PVC	EPDM	Socket/Threaded	2"	150	TBV2-2107D	CPVC	EPDM	Socket/Threaded
2-1/2"	292	TBV2-1108T	PVC	EPDM	Threaded	2-1/2"	340	TBV2-2108T	CPVC	EPDM	Threaded
2-1/2"	292	TBV2-1108S	PVC	EPDM	Socket	2-1/2"	340	TBV2-2108S	CPVC	EPDM	Socket
3"	441	TBV2-1109T	PVC	EPDM	Threaded	3"	490	TBV2-2109T	CPVC	EPDM	Threaded
3"	441	TBV2-1109S	PVC	EPDM	Socket	3"	490	TBV2-2109S	CPVC	EPDM	Socket
4"	476	TBV2-1110T	PVC	EPDM	Threaded	4"	600	TBV2-2110T	CPVC	EPDM	Threaded
4"	476	TBV2-1110S	PVC	EPDM	Socket	4"	600	TBV2-2110S	CPVC	EPDM	Socket
1/2"	7	TBV2-1202D	PVC	FPM	Socket/Threaded	1/2"	8	TBV2-2202D	CPVC	FPM	Socket/Threaded
3/4"	18	TBV2-1203D	PVC	FPM	Socket/Threaded	3/4"	16	TBV2-2203D	CPVC	FPM	Socket/Threaded
1"	32	TBV2-1204D	PVC	FPM	Socket/Threaded	1"	29	TBV2-2204D	CPVC	FPM	Socket/Threaded
1-1/4"	114	TBV2-1205D	PVC	FPM	Socket/Threaded	1-1/4"	75	TBV2-2205D	CPVC	FPM	Socket/Threaded
1-1/2"	203	TBV2-1206D	PVC	FPM	Socket/Threaded	1-1/2"	90	TBV2-2206D	CPVC	FPM	Socket/Threaded
2"	243	TBV2-1207D	PVC	FPM	Socket/Threaded	2"	150	TBV2-2207D	CPVC	FPM	Socket/Threaded
2-1/2"	292	TBV2-1208T	PVC	FPM	Threaded	2-1/2"	340	TBV2-2208T	CPVC	FPM	Threaded
2-1/2"	292	TBV2-1208S	PVC	FPM	Socket	2-1/2"	340	TBV2-2208S	CPVC	FPM	Socket
3"	441	TBV2-1209T	PVC	FPM	Threaded	3"	490	TBV2-2209T	CPVC	FPM	Threaded
3"	441	TBV2-1209S	PVC	FPM	Socket	3"	490	TBV2-2209S	CPVC	FPM	Socket
4"	476	TBV2-1210T	PVC	FPM	Threaded	4"	600	TBV2-2210T	CPVC	FPM	Threaded
4"	476	TBV2-1210S	PVC	FPM	Socket	4"	600	TBV2-2210S	CPVC	FPM	Socket

Series DV Timed Automatic Drain Valve

Motorized Ball Valve with Adjustable Digital Timer

BALL



Series DV is an automatic drain system designed to eliminate the need to manually drain water and harmful sediments from your compressed air system, thereby improving the systems performance. The unit can be used on receivers, dryers, tanks, and drop legs for sampling and purging a wide variety of liquids. The Series DV has a heavy-duty motor for operation under adverse conditions and an adjustable timer to meet specific user requirements. By design, the Series DV eliminates major drawbacks of other compressed air draining systems. The valve is brass for corrosion resistance and it is a full port ball valve giving maximum and unobstructed flow with no clogging. A test button allows for the unit to be cycled at any time. It is mountable in any position for easy plumbing and trouble free operation.

Model Number	Size
DV02	1/4" and 1/2"*
DV03	3/4"
DV04	1"

*Standard is 1/2" with 1/4" bushing.

SPECIFICATIONS

Body: 2 – piece.

Line Size: 1/4" to 1".

End Connections: Female NPT.

Pressure Limit: 200 psi (13.8 bar).

Wetted Materials: Body, End Cap: Forged Brass Ball; Stem: Chrome Plated Brass; Seat: RTFE; Stem Seal: Fluoroelastomer; Bushings: Brass.

Temperature Limits: 35 to 165°F (2 to 74°C).

Other Materials: Thrust washer: RTFE; Fasteners: Stainless Steel.

Discharge Time: 3.5 seconds non-adjustable.

Discharge Volume Cycle: 1/2": 0.92 gal @ 80 psi (valve only); 3/4": 1.64 gal @ 80 psi; 1": 2.50 gal @ 80 psi.

ACTUATOR

Electric Power Requirements: 110 VAC, 60 Hz, single phase.

Power Consumption: 2.5 A.

Cycle Time Adjustable: 5 min, 10 min, 15 min, 30 min, 1 hr, 2 hr, 4 hr, 8 hr, 16 hr, 24 hr.

Enclosure Rating: NEMA 4.

Housing Material: Polycarbonate.

Electrical Connection: 18 AWGX3C, 8 ft (24 m) power cord.

Series
ABV

Automated Two-Piece Brass Ball Valve

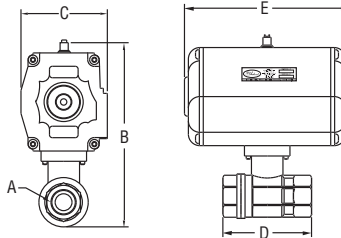
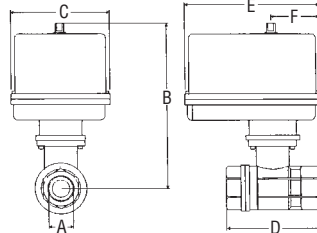
Electric and Pneumatic Actuators



Electric Actuator



Pneumatic Actuator



ELECTRIC (inches)								
A	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
B	6.130	6.199	6.574	6.700	8.291	8.623	9.177	9.611
C	4.000	4.000	4.000	4.000	4.215	4.215	4.215	4.215
D	2.638	2.980	3.350	3.657	4.126	4.805	6.496	7.402
E	5.630	5.630	5.630	5.630	5.630	6.880	6.880	6.880
F	2.310	2.310	2.310	2.310	2.430	2.430	2.430	2.430

PNEUMATIC DOUBLE ACTING (inches)										
A	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
B	4.200	4.200	4.200	4.269	4.644	4.770	6.226	6.558	7.552	7.986
C	1.780	1.780	1.780	1.780	1.780	1.780	2.880	2.880	3.169	3.169
D	2.638	2.638	2.638	2.980	3.350	3.657	4.126	4.805	6.496	7.402
E	4.257	4.257	4.257	4.527	4.527	4.527	6.585	6.585	7.717	9.842

PNEUMATIC SPRING RETURN (inches)										
A	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
B	5.060	5.060	5.060	5.129	5.504	5.630	6.666	6.998	8.532	8.996
C	2.880	2.880	2.880	2.880	2.880	2.880	3.175	3.175	4.173	5.249
D	2.638	2.638	2.638	2.980	3.350	3.657	4.126	4.805	6.496	7.402
E	6.585	6.585	6.585	6.585	6.585	6.585	7.788	7.788	9.843	11.693

ABV Series Automated Ball Valves

- Full port brass ball valve
- Direct mount actuators for compact assembly
- Electric actuator that is rated NEMA 4 and is available in two position or modulating
- Pneumatic double acting or spring return rack and pinion actuator

Series ABV incorporates a full port brass ball valve for great flow rates with minimal pressure drop. The valve features a blowout proof stem for added safety, reinforced PTFE seats and seals for longer life, and a Chrome/Nickel plated ball for better performance. Actuators are direct mounted creating a compact assembly for tight spaces. Double o-ring stem seals assure leak free operation.

The ABV Series is an economical automated valve package with either an electric or pneumatic actuator. Electric actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive the valve open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features thermal overload protection and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Spring return pneumatic actuator uses the air supply to open the valve and internally loaded springs return the valve to the closed position. Also available is the SV3 solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and epoxy coated aluminum for years of corrosion free service.

SPECIFICATION

Body: 2 - piece.

Line Size: 1/4" to 4".

End Connections: Female NPT.

Pressure Limit: 600 psi (41 bar) WOG, 100 psi (6.9 bar) SWP.

Wetted Materials: Body, End Cap, Stem: Brass. Ball: Chrome/Nickel plated brass. Seat, Stem Seal: PTFE.

Temperature Limit: 300°F (148°C).

Other Materials: Body Seal, Body O-ring, Stem O-ring: Fluoroelastomer.

ACTUATORS

Electric

Power Requirements: 115 VAC, 50/60 HZ, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption (Locked Rotor Current): Two position: 1/2" to 1-1/4": 0.55A, 1-1/2" to 2": 0.75A, 2-1/2" to 3": 0.99A. Modulating: 1/2" to 2": 0.75A, 2-1/2" to 3": 0.99A.

Cycle Time (per 90°): Two position: 1/2" to 1-1/4": 2.5 sec., 1-1/2" to 3": 5 sec. Modulating: 10 sec.

Duty Rating: Two position: 1/2" to 1-1/4": 75%, 1-1/2" to 3": 25%. Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-17 to 65°C).

Electrical Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA Series is double acting and SR Series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 130 psig (9.0 bar).

Air Connections:

ABV1SR610: 1/4" female NPT; All other models: 1/8" female NPT.

Air Consumption (per stroke):

DA1: 2.32 cu. in.; DA2, SR2: 9.34 cu. in.; DA3, SR3: 17.21 cu. in.; DA5, SR5: 39.54 cu. in.; SR6: 54.37 cu. in.

Cycle Time (per 90°): DA1: .03 sec.; DA2: .05 sec.; DA3: .06 sec.; DA5: .18 sec.; SR2: .09 sec.; SR3: .13 sec.; SR5: .28 sec.; SR6: .39 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 85°C).

Accessory Mounting: NAMUR standard.

Standard Features: Position indicator.

Size	Cv	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
		Model	Model	Model	Model
1/4"	6.3	ABV1DA100	ABV1SR200	ABV1U1100	ABV1V1200
3/8"	7.0	ABV1DA101	ABV1SR201	ABV1U1101	ABV1V1201
1/2"	19.0	ABV1DA102	ABV1SR202	ABV1U1102	ABV1V1202
3/4"	19.0	ABV1DA103	ABV1SR203	ABV1U1103	ABV1V1203
1"	34.5	ABV1DA104	ABV1SR204	ABV1U1104	ABV1V1204
1-1/4"	50.2	ABV1DA105	ABV1SR205	ABV1U1105	ABV1V1205
1-1/2"	268.4	ABV1DA206	ABV1SR306	ABV1U1206	ABV1V1206
2"	309.3	ABV1DA207	ABV1SR307	ABV1U1207	ABV1V1207
2-1/2"	629.5	ABV1DA308	ABV1SR508	ABV1U1308	ABV1V1308
3"	944.5	ABV1DA309	ABV1SR509	ABV1U1409	ABV1V1409
4"	1493.0	ABV1DA510	ABV1SR610	ABV1U1510	ABV1V1510

Options:

Explosion-proof Electric Actuator
-Add suffix "EX" to the model number

Optional Electric Actuator Supply Voltages
-Contact factory for model number change

Solenoid Valve - See Model SV3.

NOTE: All spring return actuators are factory standard as spring (fail) close.

Automated Two-Piece Stainless Steel Ball Valve

Electric and Pneumatic Actuators

BV2 Series Automated Ball Valves:

- BV2B Series is an electric actuator that is rated NEMA 4X and is available in two position or modulating
- BV2L Series is a low cost electric actuator that is rated NEMA 2 and is available in 120 VAC or 24 VAC/DC power supply with or without spring return
- BV2F Series is a pneumatic double acting rack and pinion actuator
- BV2J Series is a pneumatic spring return rack and pinion actuator
- BV2C Series is a pneumatic spring return rack and pinion actuator that is specifically for adverse environments and corrosive process materials



The Series BV2B incorporates a weatherproof, NEMA 4X, electric actuator powered by standard 115 VAC supply. Available in either two-position or proportional control, the BV2B provides an economical weatherproof automated valve package. Two-position actuators use the 115 VAC input to drive the valve open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features a single phase capacitor run motor with overload protection and a permanently lubricated gear train.



The Series BV2L is a low cost electric actuator combined with our durable two-piece stainless steel ball valve to make a compact, low cost, automated valve package. Electric actuators are available in either 24 VAC/DC or 120 VAC supply voltage. Spring return models return the valve to its failsafe position upon loss of power and are factory supplied to return to the closed position upon failure. The BV2L is an ideal valve package for HVAC applications and OEM's such as boiler manufacturers.



The Series BV2F is pneumatic double acting, rack and pinion actuated. The double acting actuator uses a pneumatic supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Available is a factory installed solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and polyurethane coated aluminum for years of corrosion free service.

The Series BV2J is the spring return version of the BV2F. The actuator uses the air supply to open the valve and internally loaded springs return the valve to the closed position.



The Series BV2C is designed to withstand the toughest environments. Incorporated in the BV2C is our two-piece stainless steel ball valve coupled with a pneumatic spring return rack and pinion actuator. The actuator body is constructed of glass-filled polyester with 303 SS shaft, polyaramide pistons, cylinder guides, and racks to provide optimum protection from adverse environments and corrosive process materials. All mounting hardware and couplings are constructed of 316 SS. This series is ideal for pharmaceutical, chemical, food and dairy, or pulp and paper industries where metal actuators would not survive.

SPECIFICATIONS

Body: 2- piece.

Line Size: 1/4" to 2".

End Connections: Female NPT.

Pressure Limit: 1000 psi (69 bar) WOG, 150 psi (10.3 bar) SWP.

Wetted Materials:

Body, Ball, End Cap: CF8M SS (316 SS).

Stem: 316 SS.

Seat, Thrust Washer: RTFE.

End Gasket, Stem Packing: PTFE.

Temperature Limits: -20 to 450°F (-29 to 232°C).

ACTUATORS

Electric "B" Series

Power Requirements: 115 VAC, 50/60 Hz, single phase.

Power Consumption: Locked Rotor Current: Two position: 0.70 A, Modulating: 0.56 A.

Cycle Time (per 90°): Two Position: 10 sec, Modulating: 30 sec.

Duty Rating: 30% at 75°F (24°C).

Enclosure Rating: NEMA 4X.

Housing Material: Anodized Aluminum with epoxy finish.

Temperature Limits: -40 to 140°F (-40 to 60°C).

Electrical Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Weight: 5 lb (2.27 kg), BA: 12 lb (5.44 kg).

Approvals: CSA.

Electric "L" Series

Power Requirements: L9, LQ: 120 VAC ±10% 50/60 Hz; L1, L7, LR, LS, LT: 24 VAC ± 20% 50/60 Hz, 24 VDC ±10%.

Power Consumption: LS: 2 W, LT: 2.5 W, L1: 3 W, L7, LR: 5W, LQ: 5.5 W, L9: 6 W.

Cycle Time (per 90°): LQ, LR: Motor <40 to 75 sec., Spring Return <25 sec. (<60 sec. under -4°F (-20°C)); L9, L7: Motor 150 sec., Spring Return < 20 sec.; LS: 110 sec. Maximum; LT: 150 sec. Maximum; L1: 140 sec. Maximum.

Duty Rating: Continuous.

Enclosure Rating: NEMA 2.

Temperature Limits: -22 to 122° F (-30 to 50° C).

Electrical Connection: 3 ft, 18 GA cable and 1/2" Conduit Connector (Except LS).

Weight: LS: 1.2 lb (.55 kg), LT: 2.8 lb (1.3 kg), LR: 3.1 lb (1.4 kg), LQ: 3.4 lb (1.54 kg), L1: 4.0 lb (1.8 kg), L7: 6.0 lb (2.7 kg), L9: 6.9 lb (3.1 kg).

Approvals: UL 873, CE (except L1), CSA.

Features: Position Indicator.

Pneumatic "F" and "J" Series

Type: F Series is double acting and J Series spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 125 psig (8.6 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): F1, J1: 9.6 cu. in.; F2, J2: 11.4 cu. in.; F3, J3: 27.5 cu. in.; J5: 55.5cu. in.

Cycle Time (per 90°): F: 1 sec., J: 2 sec.

Housing Material: Anodized aluminum body and polyurethane coated aluminum end caps.

Temperature Limit: -31 to 230°F (-35 to 110°C).

Accessory Mounting: NAMUR standard.

Standard Features: Position indicator.

Weight: F1, J1: 2.0 lb (.91 kg); F2, J2: 4.0 lb (1.81 kg); F3, J3: 7.5 lb (3.4 kg), J5: 13.2 lb (6.0 kg).

Pneumatic "C" Series

Type: Spring Return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar) [Can use air, water, or any other non-aggressive fluid].

Maximum Supply Pressure: 120 psig (8.3 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): C1: 4.58 cu. in., C2: 9.15 cu. in., C3: 21.4 cu. in.

Cycle Time (per 90°): Open/Closed: C1: 0.15/0.30 sec., C2: 0.20/0.40 sec, C3: 0.60/1.10 sec.

Housing Material: Glass filled polyester body and endcaps.

Shaft: 303 SS with double Buna N O-ring seal. Pistons, Guides, and Racks: Molded Polyaramide resin.

Temperature Limit: -25 to 195°F (-32 to 90°C).

Accessory Mounting: NAMUR standard.

Standard Features: Position indicator.

Weight: C1: 1.5 lb (.68 kg), C2: 3.0 lb (1.36 kg), C3: 6.0 lb (2.72 kg).

BV2 - F, J, C, and B Actuators

Size	Cv	Double Acting Pneumatic F Series	Spring Return Pneumatic J Series	Spring Return Pneumatic C Series	Two Position Electric B Series	Modulating Electric B Series
		Model	Model	Model	Model	Model
1/4"	6	BV2F100	BV2J100	BV2C100	BV2B700	BV2BA00
3/8"	7	BV2F101	BV2J101	BV2C101	BV2B701	BV2BA01
1/2"	10	BV2F102	BV2J102	BV2C102	BV2B702	BV2BA02
3/4"	24	BV2F103	BV2J203	BV2C203	BV2B703	BV2BA03
1"	45	BV2F104	BV2J204	BV2C204	BV2B704	BV2BA04
1-1/4"	90	BV2F205	BV2J305	BV2C205	BV2B705	BV2BA05
1-1/2"	125	BV2F306	BV2J506	BV2C306	BV2B706	BV2BA06
2"	190	BV2F307	BV2J507	BV2C307	BV2B707	BV2BA07

Options:

Factory Mounted Solenoid Valve (Pneumatic Actuators) - add suffix "-SV" to model number

BV2 - L Actuators

Size	Cv	Model Number	Supply Voltage	Spring Return
1/4"	6	BV2LQ00	120 VAC	Yes
3/8"	7	BV2LQ01	120 VAC	Yes
1/2"	10	BV2L902	120 VAC	Yes
3/4"	24	BV2L903	120 VAC	Yes
1"	45	BV2L904	120 VAC	Yes
1/4"	6	BV2LR00	24 VAC/DC	Yes
3/8"	7	BV2LR01	24 VAC/DC	Yes
1/2"	10	BV2L702	24 VAC/DC	Yes
3/4"	24	BV2L703	24 VAC/DC	Yes
1"	45	BV2L704	24 VAC/DC	Yes
1/4"	6	BV2LS00	24 VAC/DC	No
3/8"	7	BV2LS01	24 VAC/DC	No
1/2"	10	BV2LT02	24 VAC/DC	No
3/4"	24	BV2LT03	24 VAC/DC	No
1"	45	BV2LT04	24 VAC/DC	No
1-1/4"	90	BV2L105	24 VAC/DC	No

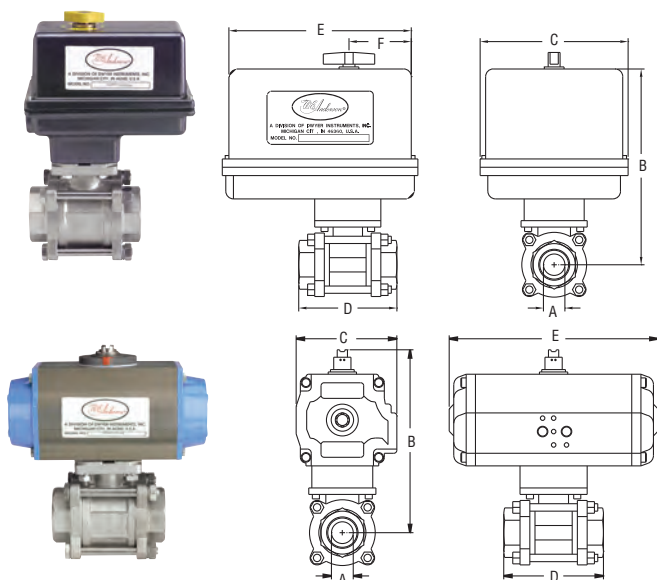
All spring return actuators are factory standard as spring (fail) close. For spring (fail) open valves add suffix "-FO" to the model number.

Series
BV3

Automated Ball Valve — Three-Piece SS NPT

Electric and Pneumatic Actuators

CLEARANCE REQUIRED FOR COVER REMOVAL: 3.000"



ELECTRIC										
A	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	2"	2-1/2"	3"	
B	6.274	6.274	6.274	6.432	7.427	7.663	8.057	8.411	12.570*	12.970*
C	4.000	4.000	4.000	4.000	4.250	4.250	4.250	4.250	7.000	7.000
D	2.362	2.362	2.582	3.149	3.543	4.330	4.724	5.511	6.540	7.400
E	5.800	5.800	5.800	5.800	6.880	6.880	6.880	6.880	7.000	7.000
F	2.300	2.300	2.300	2.300	2.430	2.430	2.430	2.430	2.380	2.380
ACT.	U11, V12	U11, V12	U11, V12	U11, V12	U12, V12	U12, V12	U12, V12	U13, V13	U15, V15	U16, V16

*INCLUDES DECLUTCHABLE MANUAL OVERRIDE AND HANDWHEEL

PNEUMATIC DOUBLE ACTING										
A	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
B	4.524	4.524	4.524	4.682	5.687	6.103	6.497	7.281	8.860	9.260
C	1.770	1.770	1.770	1.770	2.800	2.800	2.800	3.170	4.170	4.170
D	2.362	2.362	2.952	3.149	3.543	4.330	4.724	5.511	6.540	7.400
E	4.330	4.330	4.330	4.330	6.810	6.810	6.810	7.720	9.840	9.840
ACT.	DA1	DA1	DA1	DA1	DA2	DA2	DA3	DA3	DA5	DA5

PNEUMATIC SPRING RETURN										
A	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
B	5.394	5.394	5.394	5.552	6.297	6.533	6.927	8.271	10.190	10.590
C	2.800	2.800	2.800	2.800	3.170	3.170	3.170	4.170	5.390	5.390
D	2.362	2.362	2.952	3.149	3.543	4.330	4.724	5.511	6.540	7.400
E	6.810	6.810	6.810	6.810	7.720	7.720	9.550	9.550	13.580	13.580
ACT.	SR2	SR2	SR2	SR2	SR3	SR3	SR4	SR5	SR7	SR7

BV3 Series Automated Ball Valves

- Ideal for food or chemical processing
- 3-piece stainless steel investment cast body
- Internal entry blow-out stem
- 100% factory hydro-tested
- Polished stem for high cycling
- 1000 WOG PSI, 125 psi steam

Series BV3 incorporates a full port three piece stainless steel ball valve for great flow rates with minimal pressure drop. The valve features a blowout proof stem for added safety, reinforced PTFE seats and seals for longer life, and a 316SS (ASTM A351 GR CF8M) ball for better performance. Actuators are direct mounted creating a compact assembly for tight spaces. Double o-ring stem seals assure leak free operation.

The BV3 Series is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weather-proof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive the valve open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features thermal overload protection and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Spring return pneumatic actuators use the air supply to open the valve and internally loaded springs return the valve to the closed position. Also available is the SV3 solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and epoxy coated aluminum for years of corrosion free service.

SPECIFICATIONS

Body: 3 – piece.

Line Size: 1/4" to 3".

End Connections: Female NPT.

Pressure Limit: 1/4" to 2" 1000 psi (69 bar) WOG, 2-1/2" to 3" 800 psi (55 bar) WOG.

Wetted Materials:

Body, End Cap, Stem:

316 Stainless Steel.

Ball: 316 Stainless Steel.

Seat, Stem Seal: PTFE.

Temperature Limit: -40 to 450°F (-40 to 232°C).

Other Materials: Body Seal, Body O-ring, Stem O-ring: Fluoroelastomer.

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 HZ, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption (Locked Rotor Current): Two position: 1/4" to 3/4": 0.55A, 1" to 1-1/2": 0.75A, 2": 0.75A, 2-1/2": 0.75A, 3": 1.1A. Modulating: 1/4" to 3/4": 0.55A, 1" to 1-1/2": 0.75A, 2" and 2-1/2": 0.75A; 3": 1.1A.

Cycle Time (per 90°): Two position: 1/4" to 3/4": 2.5 sec., 1" to 2": 5 sec., 2-1/2" and 3": 15 sec. Modulating: 1/4" to 2": 10 sec., 2-1/2": 20 sec., 3": 30 sec.

Duty Rating: Two position: 1/4" to 3/4": 75%, 1" to 3": 25%. Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65° C).

Electrical Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA Series is double acting and SR Series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 130 psig (9.0 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): DA1: 2.32 cu. in.; DA2, SR2: 9.34 cu. in.; DA3, SR3: 17.21 cu. in.; SR4: 17.15 cu. in.; DA5, SR5: 39.54 cu. in.; SR6: 54.37 cu. in.; SR7: 103.74 cu. in.

Cycle Time (per 90°): DA1: .03 sec.; DA2: .05 sec.; DA3: .06 sec.; DA5: .18 sec.; SR2: .09 sec.; SR3: .13 sec.; SR4: .17 sec.; SR5: .28 sec.; SR6: .39 sec.; SR7: .60 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

Standard Features: Position indicator.

Size	Cv	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
		Model	Model	Model	Model
1/4"	10	BV3DA100	BV3SR200	BV3U1100	BV3V1200
3/8"	10	BV3DA101	BV3SR201	BV3U1101	BV3V1201
1/2"	18	BV3DA102	BV3SR202	BV3U1102	BV3V1202
3/4"	40	BV3DA103	BV3SR203	BV3U1103	BV3V1203
1"	70	BV3DA204	BV3SR304	BV3U1204	BV3V1204
1-1/4"	120	BV3DA205	BV3SR305	BV3U1205	BV3V1205
1-1/2"	210	BV3DA306	BV3SR406	BV3U1206	BV3V1206
2"	340	BV3DA307	BV3SR507	BV3U1307	BV3V1307
2-1/2"	400	BV3DA508	BV3SR708	BV3U1508	BV3V1508
3"	675	BV3DA509	BV3SR709	BV3U1609	BV3V1609

NOTE: All spring return actuators are factory standard as spring (fail) close.

Options:

Explosion-proof Electric Actuator
-Add suffix "EX" to the model number

Optional Electric Actuator Supply Voltages
-Contact factory for model number change

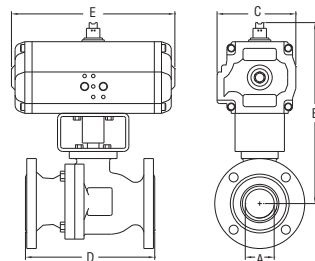
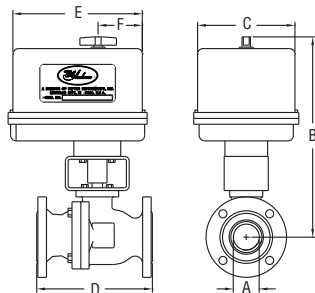
Solenoid Valve - See Model SV3.

Series
BV2

Automated Ball Valve — Two-Piece SS Flange

Electric and Pneumatic Actuators

CLEARANCE REQUIRED FOR COVER REMOVAL: 3.000"



ELECTRIC									
	1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	
A	8.210	9.010	9.340	13.060*	13.900*	14.970*	15.680*	18.900*	
B	4.000	4.250	4.250	7.000	7.000	7.000	7.000	10.000	
C	4.250	4.820	5.000	6.500	7.000	7.500	7.500	9.000	
D	5.630	6.880	7.000	7.000	7.000	7.000	7.000	10.000	
E	2.310	2.430	2.430	2.380	2.380	2.380	2.380	3.750	
ACT.	U11, V12	U12, V12	U12, V12	U13, V13	U15, V15	U15, V15	U16, V16	U17, V17	

*INCLUDES DECLUTCHABLE MANUAL OVERRIDE AND HANDWHEEL

PNEUMATIC DOUBLE ACTING									
	1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	
A	7.390	7.450	7.780	8.860	9.200	11.760	12.980	13.590	
B	2.800	2.800	2.800	3.170	3.170	4.170	4.840	4.840	
C	4.250	4.820	5.000	6.500	7.000	7.500	8.000	9.000	
D	6.810	6.810	6.810	9.550	9.550	9.840	11.690	11.690	
ACT.	DA2	DA2	DA2	DA3	DA4	DA5	DA5	DA7	

PNEUMATIC SPRING RETURN									
	1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	
A	7.760	7.880	8.210	10.360	10.700	13.530	15.810	16.420	
B	3.170	3.170	3.170	4.840	4.840	5.830	7.360	7.360	
C	4.250	4.820	5.000	6.500	7.000	7.500	8.000	9.000	
D	7.720	7.720	7.720	11.690	11.690	15.810	20.550	20.550	
ACT.	SR2	SR3	SR4	SR4	SR6	SR7	SR8	SR9	

BV2 Series Automated Ball Valves

- 150# full port flanged ball valve
- 2-piece stainless steel investment cast body
- PTFE seats and seals
- Ideal for industrial operations
- Electric or Pneumatic actuators

Our **Series BV2** ball valves offer ANSI 150# flanged ends for easy installation. 1/2" through 4" sizes are standard for great flow rates with minimal pressure drop. The valve features a blowout-proof stem for added safety, reinforced TFE seats and seals for longer life, and a 316SS (ASTM A351 GR CF8M) ball for better performance. Actuators are direct mounted, creating a compact assembly for tight spaces. Double o-ring stem seals assure leak-free operation.

The BV2 Series is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive the valve open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features thermal overload protection and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Spring return pneumatic actuators use the air supply to open the valve and internally loaded springs return the valve to the closed position. Also available is the SV3 solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and epoxy coated aluminum for years of corrosion free service.

SPECIFICATIONS

Body: 2 - piece.

Line Size: 1/2" to 4".

End Connections: 150# Flange.

Pressure Limit: 150 psi (10.3 bar).

Wetted Materials:

Body, End Cap, Stem:

316 Stainless Steel.

Ball: 316 Stainless Steel.

Seat, Stem Seal: PTFE.

Temperature Limit: -40 to 450°F

(-40 to 232°C).

Other Materials: Body Seal, Body

O-ring, Stem O-ring: Fluoroelastomer.

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 HZ, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption (Locked Rotor Current): Two position: 1/2": 0.55A, 3/4" and 1": 0.75A, 1-1/2": 0.99A, 2" and 2-1/2": 0.75A, 3": 1.1A. Modulating: 1/4" to 3/4": 0.55A, 1" to 1-1/2": 0.75A, 2": 0.75A, 2-1/2": 0.75A, 3" and 4": 1.1A.

Cycle Time (per 90°): Two position: 1/2": 2.5 sec., 3/4" to 1-1/2": 5 sec., 2" to 3": 15 sec., 4": 30 sec. Modulating: 1/2" to 1-1/2": 10 sec., 2" and 2-1/2": 20 sec., 4": 30 sec.

Duty Rating: Two position: 1/2": 75%, 3/4" to 4": 25%. Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Electrical Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA Series is double acting and SR Series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 130 psig (9.0 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): DA2, SR2: 9.34 cu. in.; DA3, SR3: 17.21 cu. in.; DA4, SR4: 20.5 cu. in.; DA5, SR5: 39.54 cu. in.; SR6: 54.37 cu. in.; SR7: 85.43 cu. in.; SR8: 122.05 cu. in.; SR9: 215.11 cu. in.

Cycle Time (per 90°): DA1: .03 sec.; DA2: .05 sec.; DA3: .06 sec.; DA5: .08 sec.; DA6: .18 sec.; SR2: .07 sec.; SR3: .13 sec.; SR4: .17 sec.; SR5: .28 sec.; SR6: .39 sec.; SR7: .60 sec.; SR8: .90 sec.; SR9: 1.75 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

Standard Features: Position indicator.

Size	Cv	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric	Options: Explosion-proof Electric Actuator -Add suffix "EX" to the model number Optional Electric Actuator Supply Voltages -Contact factory for model number change Solenoid Valve - See Model SV3.
		Model	Model	Model	Model	
1/2"	15	BV2DA202F1	BV2SR202F1	BV2U1102F1	BV2V1202F1	
3/4"	40	BV2DA203F1	BV2SR303F1	BV2U1203F1	BV2V1203F1	
1"	70	BV2DA204F1	BV2SR404F1	BV2U1204F1	BV2V1204F1	
1-1/2"	240	BV2DA306F1	BV2SR406F1	BV2U1306F1	BV2V1306F1	
2"	400	BV2DA407F1	BV2SR607F1	BV2U1507F1	BV2V1507F1	
2-1/2"	700	BV2DA508F1	BV2SR708F1	BV2U1508F1	BV2V1508F1	
3"	980	BV2DA509F1	BV2SR809F1	BV2U1609F1	BV2V1609F1	
4"	1700	BV2DA710F1	BV2SR910F1	BV2U1710F1	BV2V1710F1	

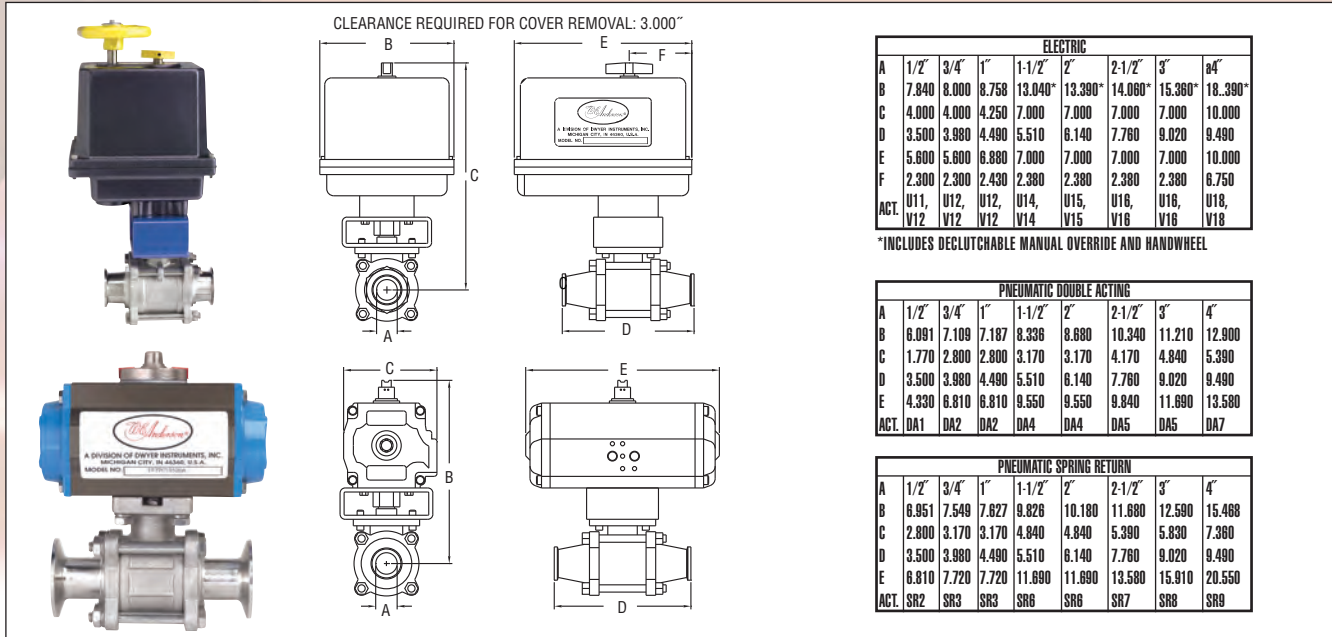
NOTE: All spring return actuators are factory standard as spring (fail) close.

Series
BV3

Automated Ball Valve — Three-Piece SS Sanitary

Electric and Pneumatic Actuators

BALL



BV3 Series Automated Ball Valves

- Ideal sanitary ball valve for high purity applications including food & beverage, pharmaceutical and biotech industries
- 3-piece stainless steel investment cast body
- 240 Grit Internal Polish
- Polished Clamp End to sanitary finish
- Cavity Filler to reduce the threat of product entrapment

Series BV3 ball valves feature sanitary clamp ends for easy line removal. The sanitary polish is ideal for use in pharmaceutical, food & beverage, and chemical processing systems, while the cavity filler aids to reduce product entrapment, and the full bore design provides consistent flow characteristics. Best of all, Dwyer Instruments sanitary ball valves are economical and durable.

The BV3 Series is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive the valve open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features thermal overload protection and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Spring return pneumatic actuators use the air supply to open the valve and internally loaded springs return the valve to the closed position. Also available is the SV3 solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and epoxy coated aluminum for years of corrosion free service.

SPECIFICATIONS

Body: 3 - piece.

Line Size: 1/2" to 4".

End Connections: Tri-Clamp.

Pressure Limit: 1/2" to 2" 1000 psi (69 bar) WOG. 2-1/2" to 4" 800 psi (55 bar) WOG.

Wetted Materials:

Body, End Cap, Stem:

316 Stainless Steel.

Ball: 316 Stainless Steel.

Seat, Stem Seal: PTFE.

Temperature Limit: -40 to 450°F (-40 to 232°C).

Other Materials: Body Seal, Thrust Washer: PTFE.

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 HZ, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption (Locked Rotor Current): Two position: 1/2": 0.55A, 3/4" to 2": 0.75A, 2-1/2" and 3": 1.1A, 4": 1.5A. Modulating: 1/4" to 3/4": 0.55A, 1" to 1-1/2": 0.75A, 2": 0.75A, 2-1/2": 0.75A, 3": 1.1A, 4": 1.5A.

Cycle Time (per 90°): Two position: 1/2": 2.5 sec., 3/4" and 1": 5 sec., 1-1/2": 10 sec., 2" to 3": 15 sec., 4": 12 sec., Modulating: 1/2" to 1-1/2": 10 sec., 2": 20 sec., 2-1/2" to 4": 30 sec.

Duty Cycle: Electric Two Position 1/2": 75%, All Others: 25%. Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Electrical Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA Series is double acting and SR Series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 130 psig (8.0 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): DA1: 2.32 cu. in.; DA2, SR2: 9.34 cu. in.; DA3, SR3: 17.21 cu. in.; DA4, SR4: 20.5 cu. in.; DA6, SR6: 66.75 cu. in.; DA7, SR7: 103.74 cu. in.; SR8: 122.05 cu. in.; SR9: 215.11 cu. in.

Cycle Time (per 90°): DA1: .03 sec.; DA2: .05 sec.; DA3: .06 sec.; DA5: .08 sec.; DA6: .18 sec.; SR2: .09 sec.; SR3: .13 sec.; SR4: .17 sec.; SR5: .28 sec.; SR6: .39 sec.; SR7: .60 sec.; SR8: .90 sec.; SR9: 1.75 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

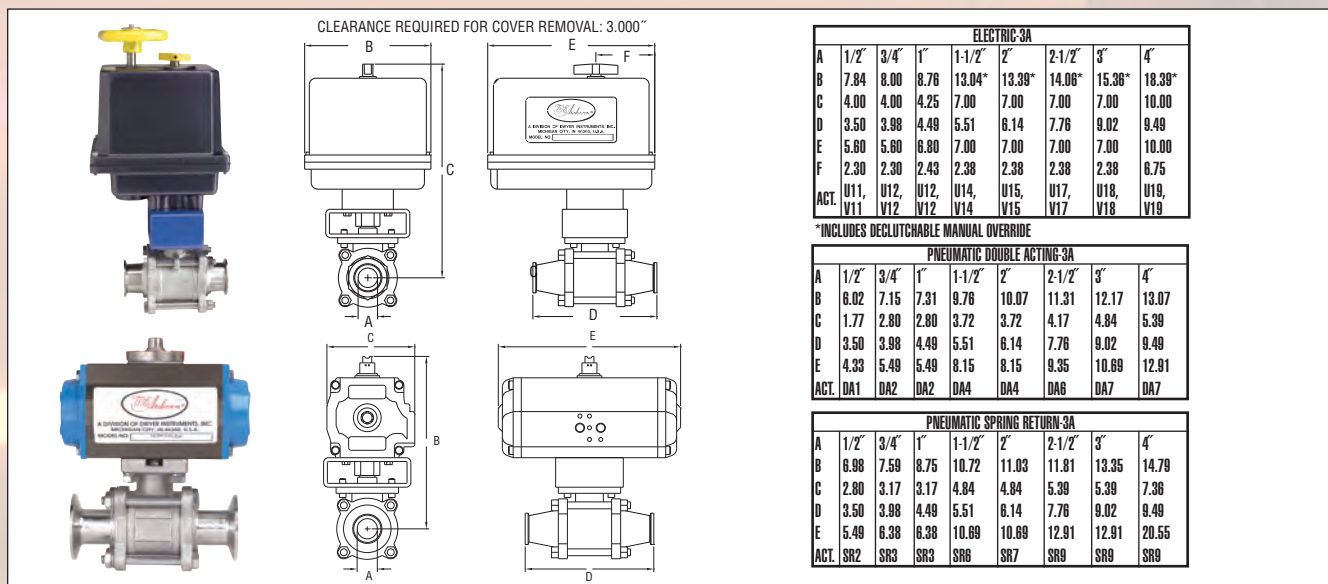
Standard Features: Position indicator.

Size	Cv	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric	Options:
		Model	Model	Model	Model	
1/2"	12	BV3DA102TC	BV3SR202TC	BV3U1102TC	BV3V1202TC	Explosion-proof Electric Actuator -Add suffix "EX" to the model number
3/4"	30	BV3DA203TC	BV3SR303TC	BV3U1203TC	BV3V1203TC	
1"	65	BV3DA204TC	BV3SR304TC	BV3U1204TC	BV3V1204TC	Optional Electric Actuator Supply Voltages -Contact factory for model number change
1-1/2"	205	BV3DA406TC	BV3SR606TC	BV3U1406TC	BV3V1406TC	
2"	380	BV3DA407TC	BV3SR607TC	BV3U1507TC	BV3V1507TC	Solenoid Valve - See Model SV3.
2-1/2"	430	BV3DA508TC	BV3SR708TC	BV3U1608TC	BV3V1608TC	
3"	675	BV3DA509TC	BV3SR809TC	BV3U1609TC	BV3V1609TC	
4"	1110	BV3DA710TC	BV3SR910TC	BV3U1810TC	BV3V1810TC	

NOTE: All spring return actuators are factory standard as spring (fail) close.

Series BV3-3A Automated Ball Valve - 3A Three-Piece SS

Electric and Pneumatic Actuators



BV3-3A Series Automated Ball Valves

- Designed to meet 3A sanitary standards.
- Ideal sanitary ball valve for food, beverage, semi-conductor, or pharmaceutical applications.
- 240 grit bore polish.
- 3-piece stainless steel investment cast body.
- Cavity filled design.

Series BV3-3A ball valves meet 3A sanitary standards and feature tri-clamp ends for easy line removal. This three-piece sanitary ball valve is ideal for use in food, beverage, semi-conductor, or pharmaceutical applications. The cavity filled and full bore designs aid to reduce product entrapment, and provide consistent flow characteristics.

The BV3-3A Series is an economical automated valve packaged with either an electric or pneumatic actuator. Electrically actuated models have a standard weatherproof, NEMA 4 enclosure, powered by a 115 VAC supply, and are available in either two-position or proportional control. The two position actuators use the 115 VAC input to drive the valve open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features a visual indicator, manual override, thermal overload protection, and permanently lubricated gears.

The pneumatic double acting actuator uses an air supply to drive the valve open and closed. The actuator has two supply ports with one driving the valve open and the other driving the valve closed. Spring return pneumatic actuators use the air supply to open the valve and internally loaded springs return the valve to the closed position. Also available is the SV3 solenoid valve to electrically switch the air supply pressure between the air supply ports for opening and closing the valve. Actuators are constructed of anodized and epoxy coated aluminum for years of corrosion free service.

SPECIFICATIONS

Body: 3-piece.
Line Size: 1/2" to 4".
End Connections: Tri-Clamp (liner meets BS 4825, part 3).
Pressure Limit: 1/2" to 2": 1000 psi (69 bar) WOG. 2-1/2" to 4": 800 psi (55 bar) WOG.
Wetted Materials:
 Body, Ball, End Caps: CF8M Stainless Steel.
 Stem: 316 Stainless Steel.
 Seats, Body Seal, Thrust Washer, Packing: TFE.
Temperature Limit: -40 to 450°F (-40 to 232°C) CWP.
Other Materials: 304 Stainless Steel, Vinyl.
Agency Approvals: Meets 3A.

ACTUATORS

Electric
Power Requirements: 115 VAC, 60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, 24 VDC.
Power Consumption (Locked Rotor Current): Two position: U11: 0.55A; U12 & U14: 0.75A; U15 & U17: 1.10A; U18: 2.60A; U19: 2.90A
 Modulating: V11: 0.55A; V12 & V14: 0.75A; V15 & V17: 1.10A; V18: 2.60A; V19: 2.90A
Cycle Time (per 90°): Two position: U11: 2.5 seconds; U12: 5 sec; U14: 10 sec; U15: 15 sec; U17: 30 sec; U18: 12 sec; U19: 14 sec.
 Modulating: V11: 5 seconds; V12: 10 sec; V14: 20 sec; V15: 30 sec; V17: 60 sec; V18: 24 sec; V19: 28 sec.
Duty Cycle: U11: 75%; U12, U14, U15, & U17: 25%; U18 & U19: 100%.
 Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: -40 to 150°F (-40 to 65°C).

Electrical Connection: 1/2" to 2-1/2": 1/2" NPT; 3" & 4": 3/4" NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override, thermal overload protection, permanently lubricated gears, and position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA Series is double acting and SR Series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 120 psi (8 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): DA1: 1.71 in³; DA2: 9.34 in³; DA4: 20.5 in³; DA6: 66.76 in³; DA7: 103.74 in³; SR2: 7.69 in³; SR3: 14.22 in³; SR6: 54.37 in³; SR7: 85.43 in³; SR9: 215.11 in³.

Cycle Time (90°): DA1: .03 sec; DA2: .04 sec; DA4: .12 sec; DA6: .27 sec; DA7: .47 sec; SR2: .09 sec; SR3: .14 sec; SR6: .46 sec; SR7: .78 sec; SR9: 1.34 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 85°C).

Accessory Mounting: NAMUR standard.

Standard Features: Position indicator.

Size	Cv	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
		Model	Model	Model	Model
1/2"	14	BV3DA102TC-3A	BV3SR202TC-3A	BV3U1102TC-3A	BV3V1102TC-3A
3/4"	45	BV3DA203TC-3A	BV3SR303TC-3A	BV3U1203TC-3A	BV3V1203TC-3A
1"	81	BV3DA204TC-3A	BV3SR304TC-3A	BV3U1204TC-3A	BV3V1204TC-3A
1-1/2"	215	BV3DA406TC-3A	BV3SR606TC-3A	BV3U1406TC-3A	BV3V1406TC-3A
2"	410	BV3DA407TC-3A	BV3SR707TC-3A	BV3U1507TC-3A	BV3V1507TC-3A
2-1/2"	618	BV3DA608TC-3A	BV3SR908TC-3A	BV3U1708TC-3A	BV3V1708TC-3A
3"	940	BV3DA709TC-3A	BV3SR909TC-3A	BV3U1809TC-3A	BV3V1809TC-3A
4"	1840	BV3DA710TC-3A	BV3SR910TC-3A	BV3U1910TC-3A	BV3V1910TC-3A

Options:

Explosion-proof Electric Actuator

-Add suffix "EX" to the model number

Optional Electric Actuator Supply Voltages

-Contact factory for model number change

Solenoid Valve-See Model SV3

NOTE: All spring return actuators are factory standard as spring (fail) close.

Series PBV Automated Ball Valve — Two-Way Plastic

Electric and Pneumatic Actuators

PVC Body

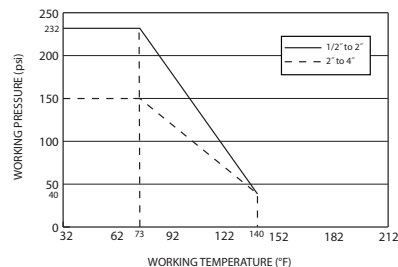


CPVC Body



*Please see website for dimensional drawings

PRESSURE - TEMPERATURE RATINGS
SERIES PBV



The Series PBV is ideal for services in industrial, chemical, turf and irrigation, and pool and spa applications, as well as for use with potable water. The valve features a shear-proof stem designed to prevent leakage in the event of damage, reinforced TFE seats and EPDM seals for longer life, and an all-plastic construction (PVC or CPVC) for heavyweight durability at a lightweight cost. Valves also come standard with selectable NPT or socket process connections.

The PBV is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive each of the valve ports open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features include thermal overload protection to withstand stall conditions, visual position indication and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive each of the actuator ports. Spring return pneumatic actuators use the air supply to drive the valve stem one direction, and internally loaded springs return the valve to its original position. Also available is the SV3 solenoid valve to electrically switch the supply pressure between the air supply ports. Actuators are constructed of anodized aluminum and are epoxy coated for years of corrosion free service.

Options:

Explosion-proof Electric Actuator
-Add suffix "EX" to the model number

Optional Electric Actuator Supply Voltages
-Contact factory for model number change

Solenoid Valve - See Model SV3.

SPECIFICATIONS

Service: Compatible liquids or gases.

Body: 2-way.

Line Size: 1/2" to 4".

End Connections: Female NPT or socket (field selectable).

Pressure Limit: 1/2" to 2": 232 psi (16.0 bar) @ 73°F (23°C); 2-1/2" to 4": 150 psi (10.3 bar) @ 73°F (23°C) WOG. Vacuum: 29" Hg.

Wetted Materials:

Body, End Connectors: PVC or CPVC.

Ball, Stem: PVC or CPVC.

Seat: TFE.

Stem Seal: EPDM.

Temperature Limit: 32 to 140°F (0 to 60°C).

Other Materials: Stem Bearing: Polypropylene (1-1/4" and up).

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption: (Locked Rotor Current): Two Position: 1/2" to 1-1/2": .55A, 2" to 4": 0.75A. Modulating: 1/2" to 2": 0.75A, 2-1/2": 1.1A, 3" and 4": 0.75A.

Cycle Time: (per 90°): Two Position: 1/2" to 1-1/2": 2.5 sec., 2" and 2-1/2": 5 sec., 3" and 4": 15 sec. Modulating: 1/2" to 2-1/2": 5 sec., 3" and 4": 15 sec.

Duty Cycle: Two Position: 1/2" to 1-1/2": 75%, 2" to 4": 25%. Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7 (Class 1, Div. II groups A, B, C, D).

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Conduit Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and visual position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA series is double acting and SR series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar). **Maximum Supply Pressure:** 120 psig (8 bar).

Air Connections: 1/4" female NPT.

Air Consumption: (per stroke) DA1: 2.32 cu. in.; DA2: 9.34 cu. in.; DA3: 17.21 cu. in.; DA4: 20.5 cu. in.; SR2: 9.34 cu. in.; SR3: 17.21 cu. in.; SR6: 54.34 cu. in.; SR7: 85.43 cu. in.

Cycle Time: (per 90°) DA1: .03 sec.; DA2: .04 sec.; DA3: .08 sec.; DA4: .12 sec.; SR2: .09 sec.; SR3: .14 sec.; SR6: .46 sec.; SR7: .83 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

Standard Features: Visual position indicator.

SERIES PBV AUTOMATED 2-WAY PLASTIC BALL VALVES - PVC

Size	CV	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
		Model	Model	Model	Model
1/2"	25	PBVPDA102	PBVPSR202	PBVPU1102	PBVPV1202
3/4"	51	PBVPDA103	PBVPSR203	PBVPU1103	PBVPV1203
1"	97	PBVPDA104	PBVPSR204	PBVPU1104	PBVPV1204
1-1/4"	204	PBVPDA105	PBVPSR205	PBVPU1105	PBVPV1205
1-1/2"	285	PBVPDA206	PBVPSR306	PBVPU1106	PBVPV1206
2"	540	PBVPDA207	PBVPSR307	PBVPU1207	PBVPV1207
2-1/2"	712	PBVPDA308	PBVPSR608	PBVPU1308	PBVPV1308
3"	1294	PBVPDA309	PBVPSR609	PBVPU1509	PBVPV1509
4"	2629	PBVPDA410	PBVPSR710	PBVPU1510	PBVPV1510

SERIES PBV AUTOMATED 2-WAY PLASTIC BALL VALVES - CPVC

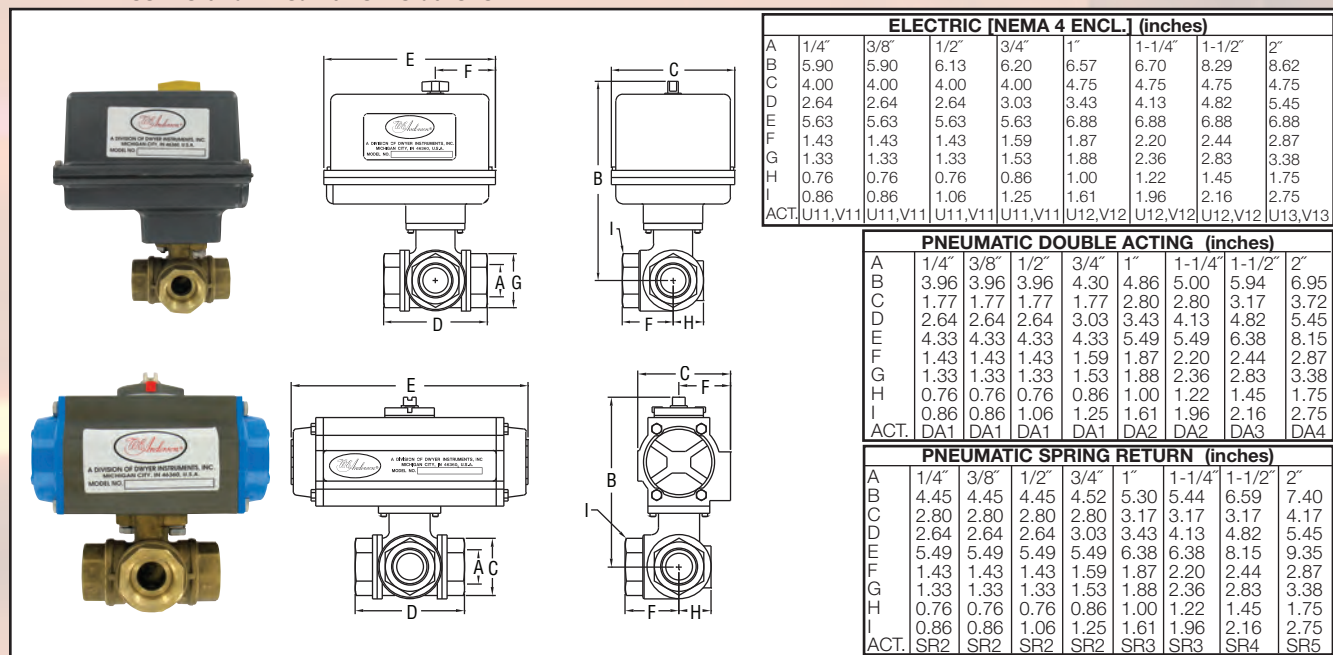
Size	CV	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
		Model	Model	Model	Model
1/2"	25	PBVCDA102	PBVCSR202	PBVPU1102	PBVCV1202
3/4"	51	PBVCDA103	PBVCSR203	PBVPU1103	PBVCV1203
1"	97	PBVCDA104	PBVCSR204	PBVPU1104	PBVCV1204
1-1/4"	204	PBVCDA105	PBVCSR205	PBVPU1105	PBVCV1205
1-1/2"	285	PBVCDA206	PBVCSR306	PBVPU1106	PBVCV1206
2"	540	PBVCDA207	PBVCSR307	PBVPU1207	PBVCV1207
2-1/2"	712	PBVCDA308	PBVCSR608	PBVPU1308	PBVCV1308
3"	1294	PBVCDA309	PBVCSR609	PBVPU1509	PBVCV1509
4"	2629	PBVCDA410	PBVCSR710	PBVPU1510	PBVCV1510

NOTE: All spring return actuators are factory standard as spring (fail) close. For spring (fail) open valves, add suffix "-FO" to the model number.

Series
3ABV

Automated Ball Valve - 3-Way Brass NPT

Electric and Pneumatic Actuators



The Series 3ABV incorporates a standard port valve for great flow rates with minimal pressure drop. Features include a blowout proof stem for added safety and reinforced TFE seats and seals for longer life and leak-free operation. The four seat design allows for high cyclic capabilities and tight shut-off in any position. Perfect for mixing or diverting services in the food and chemical processing industries.

The 3ABV is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive each of the valve ports open or closed, while the modulating actuator accepts a 4-20 mA input for infinite valve positioning. Actuator features include thermal overload protection to withstand stall conditions, visual position indication, and a permanently lubricated gear train.

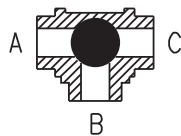
The pneumatic double acting actuator uses an air supply to drive each of the actuator ports. Spring return pneumatic actuators use the air supply to drive the valve stem in one direction, and internally loaded springs return the valve to its original position. Also available is the SV3 solenoid valve to electrically switch the supply pressure between the air supply ports. Actuators are constructed of anodized aluminum and are epoxy coated for years of corrosion free service.

HOW TO ORDER:

1. Select **Model No.** to specify pipe size and actuator.
2. Choose a **Port Configuration** to determine valve flow path.

Example: 3ABV1DA204-T2

Port Configuration		Flow Path	
		Act. Open	Act. Closed
"T" Port	-T1	All Open	A-B
	-T2	A-B	A-C
	-T3	A-C	B-C
	-T4	B-C	All Open
"L" Port	-L1	B-C	A-B
	-L2	A-B	All Closed
	-L3	All Closed	B-C



SPECIFICATIONS

Service: Compatible liquids, gases or steam.

Body: 3-way.

Line Size: 1/4" to 2".

End Connections: Female NPT.

Pressure Limits: 1/4" to 1-1/4": 435 psi (30 bar) WOG, 1-1/2": 232 psi (16 bar) WOG, 2": 145 psi (10 bar) WOG. 100 psi (6.9 bar) SWP.

Wetted Materials:

Body, End Cap, Stem: Brass.

Ball: Brass, Chrome Plated.

Seat, Stem Seal: TFE.

Temperature Limits: 320°F (160°C).

Other Materials: Body Seal, Body O-ring, Stem O-ring: Fluoroelastomer.

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption: (Locked Rotor Current): Two Position: 1/4" to 3/4": .55A, 1" to 2": .75A. Modulating: 1/4" to 3/4": .55A, 1" to 2": .75A.

Cycle Time: (per 90°): Two Position: 1/4" to 3/4": 2.5 sec., 1" to 2": 5 sec. Modulating: 1/4" to 3/4": 2.5 sec., 1" to 2": 5 sec.

Duty Cycle: Two Position: 1/4" to 3/4": 75%, 1" to 2": 25%. Modulating: 75%.

Options

Explosion Proof Electric Actuator

-Add suffix "-EX" to the model number

Optional Electric Actuator Supply Voltages

-Contact factory for model number change

Solenoid Valve - See Model SV3.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Conduit Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and visual position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA series is double acting and SR series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 120 psig (8 bar).

Air Connections: 1/4" female NPT.

Air Consumption: (per stroke) DA1: 2.32 cu. in.; DA2, SR2: 9.34 cu. in.; DA3, SR3: 17.21 cu. in.; DA4, SR4: 20.5 cu. in.; SR5: 39.54 cu. in.

Cycle Time: (per 90°) DA1: .03 sec.; DA2: .04 sec.; DA3: .08 sec.; DA4: .12 sec.; SR2: .09 sec.; SR3: .14 sec.; SR4: .22 sec.; SR5: .33 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

Standard Features: Visual position indicator.

Size (in.)	Cv		Double Acting Pneumatic		Spring Return Pneumatic		Two Position Electric		Modulating Electric	
	L-Port	T-Port	Model*		Model*		Model*		Model*	
1/4"	3.26	3.50	3ABV1DA100		3ABV1SR200		3ABV1U1100		3ABV1V1100	
3/8"	3.50	4.08	3ABV1DA101		3ABV1SR201		3ABV1U1101		3ABV1V1101	
1/2"	4.20	5.02	3ABV1DA102		3ABV1SR202		3ABV1U1102		3ABV1V1102	
3/4"	7.00	7.70	3ABV1DA103		3ABV1SR203		3ABV1U1103		3ABV1V1103	
1"	12.83	14.24	3ABV1DA204		3ABV1SR304		3ABV1U1204		3ABV1V1204	
1-1/4"	18.67	19.72	3ABV1DA205		3ABV1SR305		3ABV1U1205		3ABV1V1205	
1-1/2"	29.75	30.69	3ABV1DA306		3ABV1SR406		3ABV1U1206		3ABV1V1206	
2"	43.76	44.58	3ABV1DA407		3ABV1SR507		3ABV1U1307		3ABV1V1307	

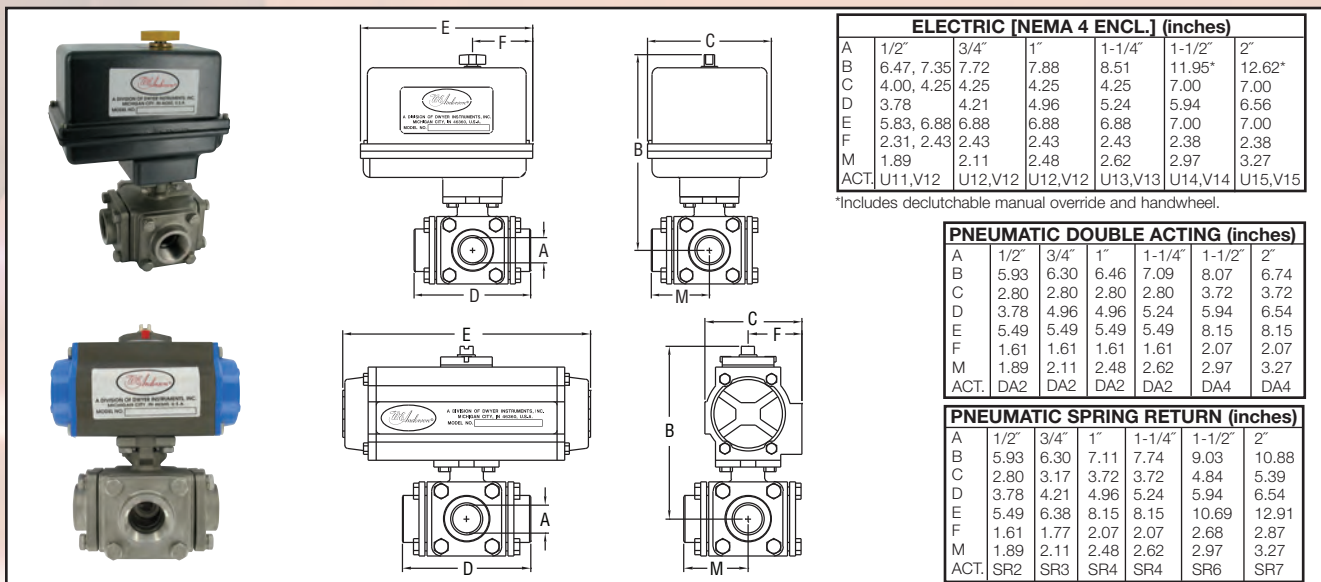
* Complete model includes **Port Configuration** - see "How to Order" above.

Series
3BV3

Automated Ball Valve - 3-Way SS NPT

Electric and Pneumatic Actuators

BALL



The Series 3BV3 incorporates a full port design for maximum flow rates with minimal pressure drop. Features include a blowout proof stem for added safety and reinforced RTFE seats and seals for longer life and leak free operation. The four seat design allows for high cyclic capabilities and tight shut off in any position. Perfect for mixing or diverting services in the food and chemical processing industries.

The 3BV3 is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive each of the valve ports open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features include thermal overload protection to withstand stall conditions, visual position indication and a permanently lubricated gear train.

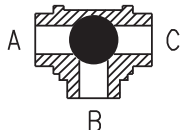
The pneumatic double acting actuator uses an air supply to drive each of the actuator ports. Spring return pneumatic actuators use the air supply to drive the valve stem one direction, and internally loaded springs return the valve to its original position. Also available is the SV3 solenoid valve to electrically switch the supply pressure between the air supply ports. Actuators are constructed of anodized aluminum and are epoxy coated for years of corrosion free service.

HOW TO ORDER:

1. Select **Model No.** to specify pipe size and actuator.
2. Choose a **Port Configuration** to determine valve flow path.

Example: 3BV3SR404-T2

Port Configuration	Flow Path	
	Act. Open	Act. Closed
"T" Port	-T1 All Open	A-B
	-T2 A-B	A-C
	-T3 A-C	B-C
	-T4 B-C	All Open
"L" Port	-L1 B-C	A-B
	-L2 A-B	All Closed
	-L3 All Closed	B-C



SPECIFICATIONS

Service: Compatible liquids, gases or steam.

Body: 3-way.

Line Size: 1/2" to 2".

End Connections: Female NPT.

Pressure Limit: 1000 psi (69 bar) WOG; 150 psi (10.3 bar) SWP.

Wetted Materials:

Body, End Cap, Stem: 316 SS.

Ball: 316 SS.

Seat, Stem Seal: RTFE.

Temperature Limit: -40 to 450°F (-40 to 232°C). Steam max.: 366°F (186°C).

Other Materials: Body Seal, Body O-ring, Stem O-ring: Fluoroelastomer.

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption: (Locked Rotor Current): Two Position: 1/2": .55A, 3/4" to 1-1/2": .75A, 2": 1.1A. Modulating: 1/2" to 1-1/2": .75A, 2": 1.1A.

Cycle Time: (per 90°): Two Position: 1/2": 2.5 sec., 3/4" to 1-1/4": 5 sec., 1-1/2": 10 sec., 2": 15 sec. Modulating: 1/2" to 1-1/4": 5 sec., 1-1/2": 10 sec., 2": 15 sec.

Duty Cycle: Two Position: 1/2": 75%, 3/4" to 2": 25%. Modulating: 75%.

Enclosure Rating: NEMA 4. Optional NEMA 7.

Housing Material: Aluminum with thermal bonding polyester powder finish.

Options

Explosion Proof Electric Actuator

-Add suffix "-EX" to the model number

Optional Electric Actuator Supply Voltages

-Contact factory for model number change

Solenoid Valve - See Model SV3.

Temperature Limit: 0 to 150°F

(-18 to 65°C).

Conduit Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and visual position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA series is double acting and SR series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 120 psig (8 bar).

Air Connections: 1/4" female NPT.

Air Consumption: (per stroke) DA1:

2.32 cu. in.; DA2, SR2: 9.34 cu. in.;

DA3, SR3: 17.21 cu. in.; DA4, SR4:

20.5 cu. in.; SR5: 39.54 cu. in.; SR6:

54.37 cu. in.; SR7: 85.43 cu. in.

Cycle Time: (per 90°) DA1: .03 sec.;

DA2: .04 sec.; DA3: .08 sec.; DA4: .12

sec.; SR2: .09 sec.; SR3: .14 sec.;

SR4: .22 sec.; SR5: .33 sec.; SR6: .46

sec.; SR7: .78 sec.

Housing Material: Anodized alu-

minum body and epoxy coated alu-

minum end caps.

Temperature Limit: -4 to 180°F

(-20 to 82°C).

Accessory Mounting: NAMUR stan-

dard.

Standard Features: Visual position

indicator.

Size (in.)	Cv		Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	L-Port	T-Port	Model*	Model*	Model*	Model*
1/2"	10.0	16.0	3BV3DA202	3BV3SR202	3BV3U1102	3BV3V1202
3/4"	14.0	24.0	3BV3DA203	3BV3SR303	3BV3U1203	3BV3V1203
1"	25.0	45.0	3BV3DA204	3BV3SR404	3BV3U1204	3BV3V1204
1-1/4"	34.0	77.0	3BV3DA205	3BV3SR405	3BV3U1305	3BV3V1305
1-1/2"	56.0	100.0	3BV3DA406	3BV3SR606	3BV3U1406	3BV3V1406
2"	110.0	430.0	3BV3DA407	3BV3SR707	3BV3U1507	3BV3V1507

* Complete model includes **Port Configuration** - see "How to Order" above.

Series 3PBV Automated Ball Valve — Three-Way Plastic

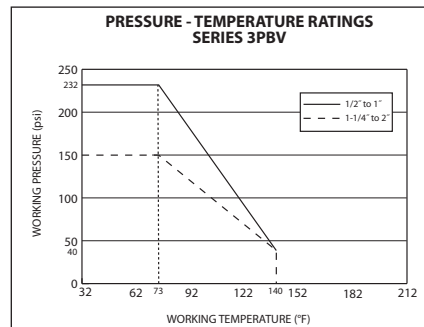
Electric and Pneumatic Actuators



Cv Values

*Please see website for dimensional drawings and Cv positions

Size	Position				
	A	B	C	D	E
1/2"	3.85	2.45	4.55	13.7	5.11
3/4"	9.50	6.65	10.2	26.6	10.5
1"	14.4	9.80	17.2	53.2	18.6
1-1/4"	27.3	18.9	32.2	73.5	33.3
1-1/2"	33.3	23.1	42.0	119	43.4
2"	63.0	43.4	84.0	224	85.4



The Series 3PBV is ideal for mixing or diverting services in industrial, chemical, turf and irrigation, and pool and spa applications, as well as for use with potable water. The valve features a 3-seat design for efficient automation, reinforced TFE seats and EPDM seals for longer life, and an all PVC construction for heavyweight durability at a lightweight cost. Valves also come standard with field selectable NPT or socket process connections.

The 3PBV is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive each of the valve ports open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features include thermal overload protection to withstand stall conditions, visual position indication and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive each of the actuator ports. Spring return pneumatic actuators use the air supply to drive the valve stem one direction, and internally loaded springs return the valve to its original position. Also available is the SV3 solenoid valve to electrically switch the supply pressure between the air supply ports. Actuators are constructed of anodized aluminum and are epoxy coated for years of corrosion free service.

HOW TO ORDER:

1. Select **Model No.** to specify pipe size and actuator.
2. Choose a **Port Configuration** to determine valve flow path.

Example: 3PBVPSR204-L3

Port Configuration	Flow Path		
	Act. Open	Act. Closed	
"T" Port	-T1 All Open	A-B	
	-T2 A-B	A-C	
	-T3 A-C	B-C	
	-T4 B-C	All Open	
"L" Port	-L1 B-C	A-B	
	-L2 A-B	All Closed	
	-L3 All Closed	B-C	

SERIES 3PBV AUTOMATED BALL VALVES - 3-WAY PLASTIC

Size	CV	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
		Model*	Model*	Model*	Model*
1/2"	See Chart Above	3PBVPDA102	3PBVPSR202	3PBVPU1102	3PBVPV1202
3/4"		3PBVPDA103	3PBVPSR203	3PBVPU1103	3PBVPV1203
1"		3PBVPDA104	3PBVPSR204	3PBVPU1104	3PBVPV1204
1-1/4"		3PBVPDA105	3PBVPSR205	3PBVPU1105	3PBVPV1205
1-1/2"		3PBVPDA206	3PBVPSR306	3PBVPU1106	3PBVPV1206
2"		3PBVPDA207	3PBVPSR307	3PBVPU1207	3PBVPV1207

* Complete model includes **Port Configuration** - see "How to Order" above.

OPTIONS:

Explosion-proof Electric Actuator

-Add suffix "EX" to the model number

Optional Electric Actuator Supply Voltages - Contact factory for model number change

Solenoid Valve - See Model SV3.

Conduit Connection: 1/2" female NPT.

Modulating Input: 4 to 20 mA.

Standard Features: Manual override and visual position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA series is double acting and SR series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 120 psig (8 bar).

Air Connections: 1/4" female NPT.

Air Consumption (per stroke): DA1: 2.32 cu. in.; DA2, SR2: 9.34 cu. in.; SR3: 17.21 cu. in.

Cycle Time (per 90°): DA1: .03 sec.; DA2: .04 sec.; SR2: .09 sec.; SR3: .14 sec.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

Accessory Mounting: NAMUR standard.

Standard Features: Visual position indicator.

SPECIFICATIONS

Service: Compatible liquids or gases.

Body: 3-way.

Line Size: 1/2" to 2".

End Connections: Female NPT or socket (field selectable).

Pressure Limit: 1/2" to 1": 232 psi (16.0 bar) @ 73°F (23°C); 1-1/4" to 2": 150 psi (10.3 bar) @ 73°F (23°C) WOG. Vacuum: 29" Hg. See chart for curve.

Wetted Materials:

Body, End Connectors: PVC.

Ball, Stem: PVC.

Seat: TFE.

Stem Seal: EPDM.

Temperature Limit: 32 to 140°F (0 to 60°C).

ACTUATORS

Electric

Power Requirements: 120 VAC, 50/60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption: (Locked Rotor Current): Two Position: 1/2" to 1-1/2": .55A, 2": 0.75A. Modulating: 0.75A.

Cycle Time: (per 90°): Two Position: 1/2" to 1-1/2": 2.5 sec., 2": 5 sec. Modulating: 5 sec.

Duty Cycle: Two Position: 1/2" to 1-1/2": 75%, 2": 25%. Modulating: 75%.

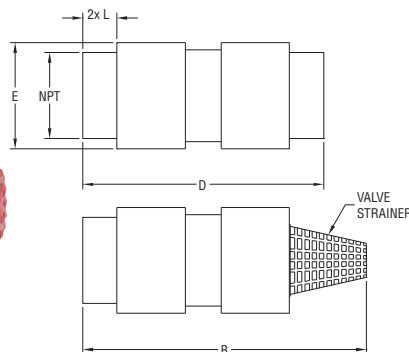
Enclosure Rating: NEMA 4. Optional NEMA 7 (Class 1, Div. II groups A, B, C, D).

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Spring Check Valve

PVC or CPVC, True Union, Compact Design



NPT	L	D	E	B	Weight lbs (kg)
1/2"	39/64 [15.48]	3-5/16 [84.14]	2 [50.8]	4-13/64 [106.76]	0.5 (0.23)
3/4"	45/64 [17.86]	4-5/16 [109.54]	2-13/32 [61.12]	5-7/64 [129.78]	0.75 (0.34)
1"	29/32 [23.02]	4-45/64 [119.46]	2-13/16 [71.44]	6-7/64 [155.18]	1.5 (0.68)
1-1/4"	1 [25.4]	5-39/64 [142.48]	3-5/16 [84.14]	6-29/32 [175.42]	1.625 (0.74)
1-1/2"	1-1/4 [31.75]	6-13/32 [162.72]	3-45/64 [94.06]	8 [203.2]	1.75 (0.79)
2"	1-1/2 [38.1]	7-39/64 [193.28]	4-39/64 [117.08]	9-13/32 [238.92]	3.5 (1.59)
2-1/2"	1-45/64 [43.26]	9-7/64 [231.38]	5-13/16 [147.64]	12 [304.8]	7 (3.18)
3"	2 [50.8]	10-39/64 [269.48]	7 [177.8]	14-5/16 [363.54]	9.5 (4.31)
4"	2-13/32 [61.12]	11 [279.4]	7 [177.8]	14-13/32 [365.92]	19 (8.62)

Series SCV Spring Check Valves provide an exact and reliable control of fluids. The SCV Spring Check Valves prevent reversal of flow in piping systems. They are ideal where back-flow could potentially cause damage to pumps, filters, or process equipment. The valves operate without the need for any adjustments or settings. Line pressure moves the plastic cone off the elastomer seat, opening the valve. When the inlet flow stops, a spring moves the cone back onto the seat, stopping the flow. The spring is constructed from 316 stainless steel. All valves feature a true union design that allows for easy removal from a piping system without breaking down piping connections. Just unscrew the two assembly nuts and lift the valve body out of the line. Series SCV Spring Check Valves are the valves of choice for cost sensitive applications that require a full-featured, no compromise value.

FEATURES

- Easy installation and maintenance.
- Rugged, cost effective design.
- May be used either vertically or horizontally.
- O-Rings available in EPDM or FPM.
- Silicone-free construction.

SPECIFICATIONS

Service: Compatible liquids.

Line Sizes: 1/2" to 4".

Process Connections: Socket or NPT female.

Pressure Limits: 1/2" to 2": rated 240 psi (16.5 bar) at 73°F (22.8°C).
2-1/2" to 4": rated 150 psi (10.3 bar) at 73°F (22.8°C).

Wetted Materials: PVC or CPVC with EPDM or FPM O-rings, PP foot valve screen, silicone-free construction, 316 SS spring.

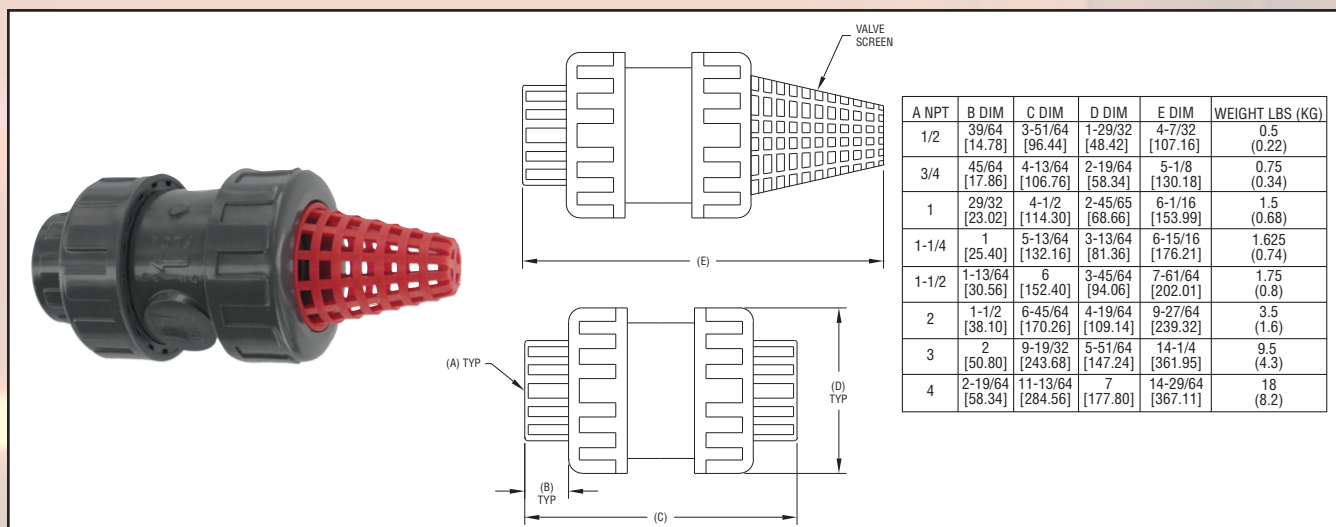
Temperature Limits: PVC: 110°F (43°C), CPVC: 200°F (93°C).

Size	Cv	Model No.	Body Material	Seal	Connection	Size	Cv	Model No.	Body Material	Seal	Connection
1/2"	68	SCV-1102D	PVC	EPDM	Socket/Threaded	1/2"	68	SCV-2202D	CPVC	FPM	Socket/Threaded
3/4"	133	SCV-1103D	PVC	EPDM	Socket/Threaded	3/4"	133	SCV-2203D	CPVC	FPM	Socket/Threaded
1"	208	SCV-1104D	PVC	EPDM	Socket/Threaded	1"	208	SCV-2204D	CPVC	FPM	Socket/Threaded
1-1/4"	383	SCV-1105D	PVC	EPDM	Socket/Threaded	1-1/4"	383	SCV-2205D	CPVC	FPM	Socket/Threaded
1-1/2"	667	SCV-1106D	PVC	EPDM	Socket/Threaded	1-1/2"	667	SCV-2206D	CPVC	FPM	Socket/Threaded
2"	850	SCV-1107D	PVC	EPDM	Socket/Threaded	2"	850	SCV-2207D	CPVC	FPM	Socket/Threaded
2-1/2"	1533	SCV-1108T	PVC	EPDM	Threaded	2-1/2"	1533	SCV-2208T	CPVC	FPM	Threaded
2-1/2"	1533	SCV-1108S	PVC	EPDM	Socket	2-1/2"	1533	SCV-2208S	CPVC	FPM	Socket
3"	147	SCV-1109T	PVC	EPDM	Threaded	3"	147	SCV-2209T	CPVC	FPM	Threaded
3"	147	SCV-1109S	PVC	EPDM	Socket	3"	147	SCV-2209S	CPVC	FPM	Socket
4"	160	SCV-1110T	PVC	EPDM	Threaded	4"	160	SCV-2210T	CPVC	FPM	Threaded
4"	160	SCV-1110S	PVC	EPDM	Socket	4"	160	SCV-2210S	CPVC	FPM	Socket

Series
BCV

True Union Ball Check Valve

PVC or CPVC Construction, Economical



The Series BCV True Union Ball Check Valves are economical, thermo-plastic ball check valves ideal for chemical and wastewater applications. The true union design allows for easy removal from a piping system without breaking down any piping connections. The valve body can be lifted out of the line by unscrewing two assembly nuts. Series BCV check valves are applied where back flow could potentially cause damage to pumps, filters, or process equipment. Line pressure moves the solid plastic ball off the elastomer seat, opening the valve. When the inlet flow stops, back pressure (3.75 psi minimum) moves the ball back onto the seat, stopping the flow. All plastic construction gives this series of check valves superior corrosion resistance and they will not contaminate sensitive fluids that come into contact with them. BCV check valves can be easily installed horizontally or vertically.

FEATURES

- Ideal corrosion resistant ball check valve for chemical and wastewater applications.
- Horizontal or vertical installation.
- Easy to service.
- Silicon free construction.

SPECIFICATIONS

Service: Compatible liquids.

Line Size: 1/2" to 4".

Process Connections: Socket or female NPT.

Pressure Limits: 1/2" to 2": 240 psi (16.5 bar), 2-1/2" to 4": 150 psi (10.3 bar).

Wetted Materials: Body, Ball, End Connector, Closing Ring, Seal Carrier: PVC or CPVC; Body O-Ring, End Connector O-Ring: EPDM or FPM; foot valve screen: PP.

Temperature Limits: PVC: 32 to 110°F (0 to 43°C).

CPVC: 32 to 200°F (0 to 93°C).

Other Materials: Union Nut: PVC or CPVC.

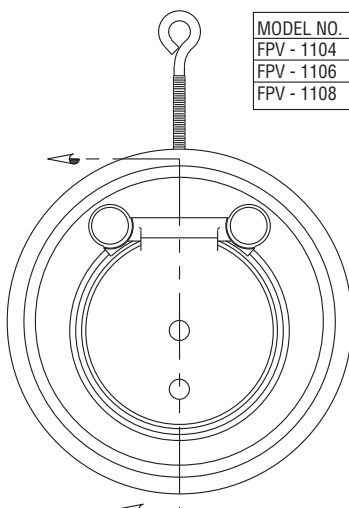
Agency Approvals: Meets NSF.

Size	Cv	Model No.	Body Material	Seal	Connection	Size	Cv	Model No.	Body Material	Seal	Connection
1/2"	6.9	BCV-1102D	PVC	EPDM	Socket/Threaded	1/2"	6.9	BCV-2102D	CPVC	EPDM	Socket/Threaded
3/4"	9.0	BCV-1103D	PVC	EPDM	Socket/Threaded	3/4"	9.0	BCV-2103D	CPVC	EPDM	Socket/Threaded
1"	21.6	BCV-1104D	PVC	EPDM	Socket/Threaded	1"	21.6	BCV-2104D	CPVC	EPDM	Socket/Threaded
1-1/4"	31.7	BCV-1105D	PVC	EPDM	Socket/Threaded	1-1/4"	31.7	BCV-2105D	CPVC	EPDM	Socket/Threaded
1-1/2"	55.7	BCV-1106D	PVC	EPDM	Socket/Threaded	1-1/2"	55.7	BCV-2106D	CPVC	EPDM	Socket/Threaded
2"	72.8	BCV-1107D	PVC	EPDM	Socket/Threaded	2"	72.8	BCV-2107D	CPVC	EPDM	Socket/Threaded
2-1/2"	135.3	BCV-1108T	PVC	EPDM	Threaded	2-1/2"	135.3	BCV-2108T	CPVC	EPDM	Threaded
2-1/2"	135.3	BCV-1108S	PVC	EPDM	Socket	2-1/2"	135.3	BCV-2108S	CPVC	EPDM	Socket
3"	192.9	BCV-1109T	PVC	EPDM	Threaded	3"	192.9	BCV-2109T	CPVC	EPDM	Threaded
3"	192.9	BCV-1109S	PVC	EPDM	Socket	3"	192.9	BCV-2109S	CPVC	EPDM	Socket
4"	250	BCV-1110T	PVC	EPDM	Threaded	4"	250	BCV-2110T	CPVC	EPDM	Threaded
4"	250	BCV-1110S	PVC	EPDM	Socket	4"	250	BCV-2110S	CPVC	EPDM	Socket
1/2"	6.9	BCV-1202D	PVC	FPM	Socket/Threaded	1/2"	6.9	BCV-2202D	CPVC	FPM	Socket/Threaded
3/4"	9.0	BCV-1203D	PVC	FPM	Socket/Threaded	3/4"	9.0	BCV-2203D	CPVC	FPM	Socket/Threaded
1"	21.6	BCV-1204D	PVC	FPM	Socket/Threaded	1"	21.6	BCV-2204D	CPVC	FPM	Socket/Threaded
1-1/4"	31.7	BCV-1205D	PVC	FPM	Socket/Threaded	1-1/4"	31.7	BCV-2205D	CPVC	FPM	Socket/Threaded
1-1/2"	55.7	BCV-1206D	PVC	FPM	Socket/Threaded	1-1/2"	55.7	BCV-2206D	CPVC	FPM	Socket/Threaded
2"	72.8	BCV-1207D	PVC	FPM	Socket/Threaded	2"	72.8	BCV-2207D	CPVC	FPM	Socket/Threaded
2-1/2"	135.3	BCV-1208T	PVC	FPM	Threaded	2-1/2"	135.3	BCV-2208T	CPVC	FPM	Threaded
2-1/2"	135.3	BCV-1208S	PVC	FPM	Socket	2-1/2"	135.3	BCV-2208S	CPVC	FPM	Socket
3"	192.9	BCV-1209T	PVC	FPM	Threaded	3"	192.9	BCV-2209T	CPVC	FPM	Threaded
3"	192.9	BCV-1209S	PVC	FPM	Socket	3"	192.9	BCV-2209S	CPVC	FPM	Socket
4"	250	BCV-1210T	PVC	FPM	Threaded	4"	250	BCV-2210T	CPVC	FPM	Threaded
4"	250	BCV-1210S	PVC	FPM	Socket	4"	250	BCV-2210S	CPVC	FPM	Socket

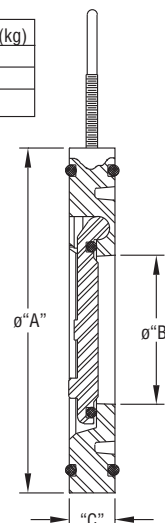
Series
FPV

Flap Check Valve

Wafer Style 4" to 8", PVC Construction



MODEL NO.	"A"	"B"	"C"	Weight lbs (kg)
FPV - 1104	6.5"	2.8"	.9"	1.3 (0.59)
FPV - 1106	8.7"	4.4"	1.0"	2.5 (1.13)
FPV - 1108	9.7"	5.5"	1.1"	5 (2.27)



CHECK

Series FPV Flap Check Valves prevent reversal of flow in piping systems. They are ideal where backflow could potentially cause damage to pumps, filters, or process equipment. The valves operate without the need for any adjustments or settings. Line pressure moves the solid plastic flap off the elastomer seat, opening the valve. When the inlet flow stops, back pressure moves the flap back onto the seat, stopping the flow. These flap check valves have been designed to provide excellent flow characteristics. Because of their straight-through flow design they have a lower pressure drop than other check valve designs, and their compact size takes up less space in the pipeline than other types of check valves. Because of their all plastic construction, these valves will never jam or stick as a result of rust or corrosion. Additionally, they will not contaminate sensitive fluids that come into contact with them. Series FPV Flap Check Valves are the valves of choice for cost sensitive applications that require a full featured, no compromise valve.

These flap check valves are supplied with o-rings set into the body faces. In most cases, flange gaskets are not required. Valves up to 8" usually require a spacer and should always be used with the same material as the valve. Spacers allow full disc opening with minimum interference. Spacers are not required for DIN and PVDF pipe.

FEATURES

- Low pressure drop design
- Compact, lightweight
- Easy installation
- No flange gaskets needed
- Installs between two standard flanges
- Rugged, cost effective design

SPECIFICATIONS

Service: Compatible fluids.

Line Size: 4" to 8".

Process Connections: Standard flanges.

Pressure Limits: 4": 150 psi (10.3 bar) at 73°F (22.8°C).

6" or 8": 90 psi (6.2 bar) at 73°F (22.8°C).

Wetted Materials: PVC body and flap with EPDM O-rings, Silicone free-construction.

Temperature Limits: 113°F (45°C).

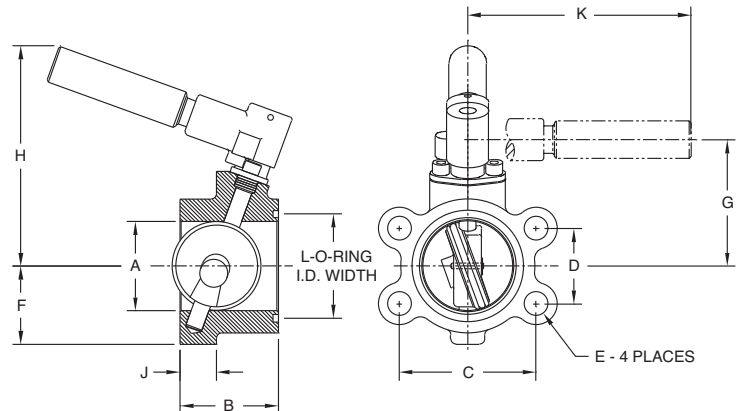
Other Materials: Plug: PP.

Size	Cv	Model No.	Description
4"	126	FPV-1104	4" PVC Flap Check Valve, EPDM
6"	655	FPV-1106	6" PVC Flap Check Valve, EPDM
8"	945	FPV-1108	8" PVC Flap Check Valve, EPDM

Series
SAE

Butterfly Valve

Low Cost, S.A.E. Flange, Hydraulic Reservoir Shut Off Valve



Valve Size	A In. (mm)	B In. (mm)	C In. (mm)	D In. (mm)	E In. (mm)	F In. (mm)	G In. (mm)	H In. (mm)	J In. (mm)	K In. (mm)	L In. (mm)	I.D. x WD
2"	2 (50.80)	2 (50.80)	3-1/16 (77.79)	1-11/16 (42.86)	1/2 (12.70)	1-3/4 (44.45)	2-13/16 (71.44)	5-1/8 (130.18)	13/16 (20.64)	5 (127.00)	2-1/4 (57.15)	1/8 (3.18)
2-1/2"	2-1/2 (63.50)	2 (50.80)	3-1/2 (88.90)	2 (50.80)	1/2 (12.70)	2-1/16 (52.39)	3-1/8 (79.38)	5-1/8 (130.18)	13/16 (20.64)	5 (127.00)	2-3/4 (69.85)	1/8 (3.18)
3"	3 (76.20)	2-1/2 (63.50)	4-3/16 (106.36)	2-7/16 (61.91)	5/8 (15.88)	2-5/16 (58.74)	3-3/8 (85.73)	5-1/8 (130.18)	1-1/16 (26.99)	5 (127.00)	3-3/8 (85.73)	1/8 (3.18)
4"	4 (101.60)	3-1/4 (82.55)	5-1/8 (130.18)	3-1/16 (77.79)	5/8 (15.88)	2-3/4 (69.85)	4 (101.60)	5-5/8 (142.88)	1-1/4 (31.75)	5 (127.00)	4-3/8 (111.13)	1/8 (3.18)
5"	5 (127.00)	4 (101.60)	6 (152.40)	3-5/8 (92.08)	5/8 (15.88)	3-5/16 (84.14)	4-3/8 (111.13)	6 (152.40)	1-1/2 (38.10)	5 (127.00)	5-3/8 (136.53)	1/8 (3.18)

The Series SAE Butterfly Valves are an ideal low cost hydraulic reservoir shut off valve. These valves are designed to meet the demanding needs of the fluid power industry. Unique features include an O-ring flange face seal complying with S.A.E. J518 dimensional requirements. This design provides for bubble tight reservoir shut off up to 25 psi (1.72 bar) and a maximum temperature of 180°F (82.2°C). The compact envelope dimension reduces space requirements. Unit allows for adjustment by incorporating an open/close detent position lock which can be infinitely positioned to achieve a desired flow rate. The unique design resists the vibrations associated with hydraulic pumps and pumping systems. Optional Fluoroelastomer seals and locking handle are available.

APPLICATIONS

As a standard feature on injection molding machines and large earth moving equipment, the low cost SAE Valve provides excellent shut-off on the reservoir side of hydraulic systems. Valve is typically open during normal operation until service would be required on any part of the hydraulic system at which time the valve is closed, allowing for service without loss of hydraulic fluid.

SPECIFICATIONS

Service: Compatible liquids and gases.

Line Size: 2" to 5".

Body Style: 2-way, lug butterfly.

End Connections: O-ring flange face seal (SAE J518).

Pressure Limit: Shut-off: 25 psi (1.72 bar) bubble tight, Body Shell: 500 psi (34.5 bar).

Wetted Materials:

Body and Disc/Vane: Cast iron.

O-rings: Buna-N or Fluoroelastomer.

Stem: Steel.

Temperature Limits: Buna-N: 180°F (82°C), Fluoroelastomer: 300°F (149°C).

Model No.	S.A.E. Flange Size
SAE-20	2"
SAE-25	2-1/2"
SAE-30	3"
SAE-40	4"
SAE-50	5"

Fluoroelastomer O-ring seals. Add VIT suffix (SAE-30-VIT)

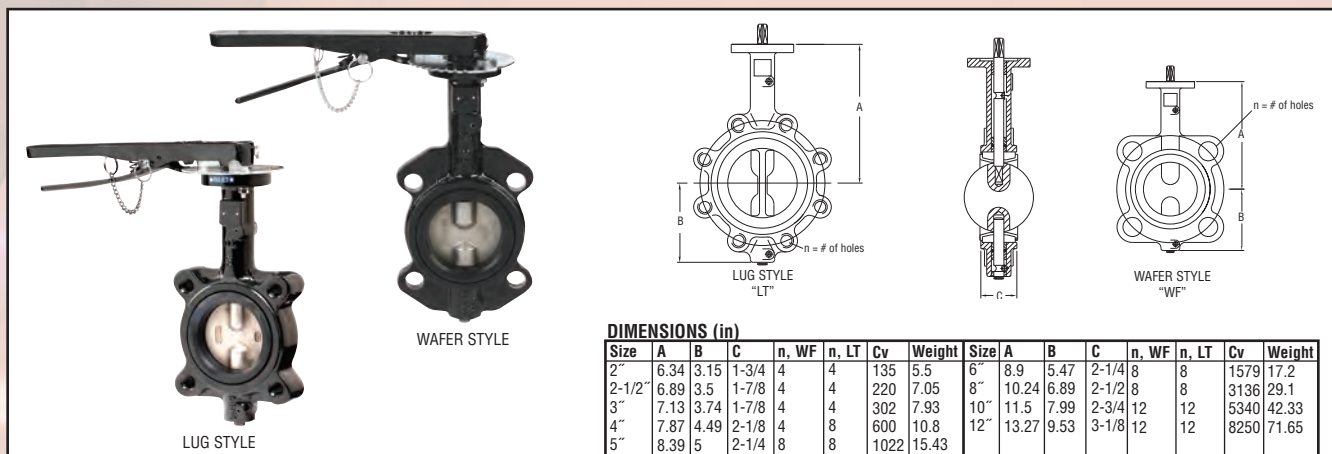
Locking handle. Add LHR suffix (SAE-30-LHR)

BUTTERFLY

Series
BFV

Butterfly Valve

Low Cost, Lever Operated, Lug or Wafer Pattern, 225 psig



DIMENSIONS (in)

Size	A	B	C	n, WF	n, LT	Cv	Weight	Size	A	B	C	n, WF	n, LT	Cv	Weight
2"	6.34	3.15	1-3/4	4	4	135	5.5	6"	8.9	5.47	2-1/4	8	8	1579	17.2
2-1/2"	6.89	3.5	1-7/8	4	4	220	7.05	8"	10.24	6.89	2-1/2	8	8	3136	29.1
3"	7.13	3.74	1-7/8	4	4	302	7.93	10"	11.5	7.99	2-3/4	12	12	5340	42.33
4"	7.87	4.49	2-1/8	4	8	600	10.8	12"	13.27	9.53	3-1/8	12	12	8250	71.65
5"	8.39	5	2-1/4	8	8	1022	15.43								

Series BFV Butterfly Valves

- Phenolic backed cartridge seat design for extended service and ease of replacement. Can be used for vacuum service.
- Extended neck for insulation - no fabricated extensions required.
- Machined flats attach disc/stem - no pins.
- Valve features a retainer lip for dead end service.
- Triple seal reduces possibility of external leakage.
- Silicone free from the factory - no aftermarket cleaning required.

The most critical aspect of the Series BFV Butterfly Valves is the cartridge seat design, which alleviates installation problems associated with common "dove tail design" seats. Valve torque is lower and more consistent because the seat dynamics do not rely on being mated between two flanges. Precision machining of the disc and body allow the cartridge design to maintain a tighter disc to seat tolerance, providing a perfect low torque seal each and every time the valve is cycled. Seat to disc seal is independent of flange support and capable of full rated dead end service. Select from wafer or lug patterns with either a 10-position locking handle lever or manual gear operator. Standard valves provide bubble tight sealing to 225 psi (15.5 bar) and are designed to comply with MSS-SP-67 and API-609.

Cv VALUES

Size	DEGREE OPENING								FULL OPEN
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.1	5	12	24	45	64	90	125	135
2-1/2"	0.2	8	20	37	65	98	144	204	220
3"	0.3	12	22	39	70	116	183	275	302
4"	0.5	17	36	78	139	230	364	546	600
5"	0.8	29	61	133	237	392	620	930	1022
6"	2	45	95	205	366	605	958	1437	1579
8"	3	89	188	408	727	1202	1903	2854	3136
10"	4	151	320	694	1237	2047	3240	4859	5340
12"	5	234	495	1072	1911	3162	5005	7505	8250

Cv is the number of U.S. GPM of 60°F water that will pass through the valve with a 1 PSI pressure drop.

SPECIFICATIONS

VALVE BODY

Service: Compatible liquids, gases, and steam.

Line Size: 2" to 12".

Body Style: 2-way, wafer or lug butterfly.

End Connections: Flange, to be used with flanges that are ANSI Class 125 (B16.1) and ANSI Class 150 (B16.5) dimensions.

Pressure Limit: 225 psi (15.5 bar) WOG.

Wetted Materials:

Body Material: Ductile iron.

Disc: 316 SS.

Seat and O-ring: EPDM or PTFE.

Stem: 410 SS.

Temperature Limits: Disc: EPDM: -50 to 250°F (-46 to 121°C). PTFE: 0 to 300°F (-18 to 149°C).

Bearings: Nylatron.

Flow Rate: See Cv chart.

Operator: 2 to 6": 10-position locking hand lever. 8 to 12": manual gear.

APPLICATIONS

- Perfect for on-off or throttling service
- Ideal for shut-off of water in chillers, cooling towers, and thermal storage systems
- Air dampers
- Irrigation systems
- Tank trucks
- Sewage systems, waste water treatment

OPERATING TORQUE VALUES (INCH LB)

EPDM Seats		Size (inches)									
Service Pressure		2	2-1/2	3	4	5	6	8	10	12	
50 psi	86	126	179	295	540	750	1440	2466	3510		
100 psi	108	144	195	310	610	780	1490	2910	4100		
150 psi	126	150	210	335	699	847	1549	3360	5560		
200 psi	150	198	297	400	725	940	1800	3890	7558		

PTFE Seats		Size (inches)									
Service Pressure		2	2-1/2	3	4	5	6	8	10	12	
50 psi	125	130	195	390	650	890	1690	3699	5265		
100 psi	130	145	210	430	690	940	1710	4365	6150		
150 psi	142	160	248	443	720	974	1770	5040	8340		
200 psi	180	220	340	490	795	1020	1890	5835	11367		

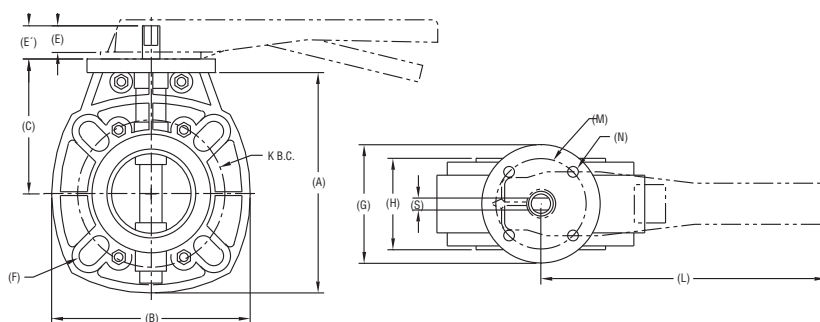
Size	Liner	Model	Size	Liner	Model
2"	EPDM	BFV202WFB311HL0	5"	EPDM	BFV205LTB311HL0
	PTFE	BFV202WFB341HL0		PTFE	BFV205LTB341HL0
	EPDM	BFV202LTB311HL0		EPDM	BFV206WFB311HL0
	PTFE	BFV202LTB341HL0		PTFE	BFV206WFB341HL0
2-1/2"	EPDM	BFV225WFB311HL0	6"	EPDM	BFV206LTB311HL0
	PTFE	BFV225WFB341HL0		PTFE	BFV206LTB341HL0
	EPDM	BFV225LTB311HL0		EPDM	BFV208WFB312MG0
	PTFE	BFV225LTB341HL0		PTFE	BFV208WFB342MG0
3"	EPDM	BFV203WFB311HL0	8"	EPDM	BFV208LTB312MG0
	PTFE	BFV203WFB341HL0		PTFE	BFV208LTB342MG0
	EPDM	BFV203LTB311HL0		EPDM	BFV210WFB312MG0
	PTFE	BFV203LTB341HL0		PTFE	BFV210WFB342MG0
4"	EPDM	BFV204WFB311HL0	10"	EPDM	BFV210LTB312MG0
	PTFE	BFV204WFB341HL0		PTFE	BFV210LTB342MG0
	EPDM	BFV204LTB311HL0		EPDM	BFV212WFB312MG0
	PTFE	BFV204LTB341HL0		PTFE	BFV212WFB342MG0
5"	EPDM	BFV205WFB311HL0	12"	EPDM	BFV212LTB312MG0
	PTFE	BFV205WFB341HL0		PTFE	BFV212LTB342MG0

BFV202WFB311HL0 WF=Wafer Pattern LT=Lug Pattern

Series
PBFV

Thermoplastic Butterfly Valve

One-Piece Body, Wafer Design



VALVE SIZE	DIM A	DIM B	DIM C	DIM D	DIM E	DIM F	DIM G	DIM H	DIM K	DIM L	DIM M	DIM N	DIM S	HOLES	WEIGHT LBS (KG)
2 IN	7-57/64 [201]	6-9/64 [156]	4-23/32 [120]	1-37/64 [40]	1-3/8 [35]	23/32 [18]	4-13/32 [112]	1-57/64 [48]	4-59/64 & 5-23/32 [125-145]	8-21/32 [220]	2-3/4 [70]	23/64 [9]	13/32 [10]	4	4.5 (2.0)
3 IN	9-9/64 [232]	7-31/64 [190]	5-23/64 [136]	1-37/64 [40]	1-3/8 [35]	3/4 [19]	4-13/32 [112]	2-3/64 [52]	5-57/64 & 6-11/16 [150-170]	9-41/64 [245]	2-3/4 [70]	23/64 [9]	31/64 [12]	8	6 (2.7)
4 IN	10-3/64 [255]	8-11/64 [212]	5-53/64 [148]	1-37/64 [40]	1-3/8 [35]	3/4 [19]	4-13/32 [112]	2-21/64 [112]	7-3/32 & 7-9/16 [180-192]	9-41/64 [245]	2-3/4 [70]	23/64 [9]	5/8 [16]	8	8 (3.6)
6 IN	11-3/16 [284]	9-3/8 [238]	6-29/64 [164]	1-37/64 [40]	1-3/8 [35]	7/8 [22]	4-13/32 [112]	2-17/64 [66]	7-31/64 & 8-15/32 [190-215]	12-19/32 [320]	2-3/4 [70]	23/64 [9]	25/32 [20]	8	13.5 (6.1)
8 IN/8 IN*	12-23/64 [314]	10-7/16 [265]	7-3/32 [180]	1-37/64 [40]	1-3/8 [35]	61/64 [24]	4-13/32 [112]	2-53/64 [72]	9-29/64 [240]	12-19/32 [320]	2-3/4 [70]	23/64 [9]	25/32 [20]	8	21(9.5)/ 30(13.6)
10 IN*	14-7/8 [378]	12-19/32 [320]	8-35/64 [217]	1-31/32 [50]	1-55/64 [47]	29/32 [23]	5-11/32 [136]	2-7/8 [73]	10-5/8 & 11-47/64 [270-298]	15-25/64 [391]	4-1/4 [102]	7/16 [11]	1-1/32 [26]	8	37 (16.8)

The Series PBFV Thermoplastic Butterfly Valves are an economical thermoplastic constructed butterfly valve ideal for chemical and wastewater applications. A one-piece body design incorporates fully supported flanged bolt holes to prevent stressing of the mating pipe flanges. Series PBFV valves feature a blowout-proof stainless steel stem and a unique, full body liner that has a V-notch retention design that assures positive sealing of the liner to the valve body. An integrally molded face seal provides positive sealing against the mating flange without the need for additional gaskets. Plastic construction gives this valve superior corrosion resistance and the valves will not contaminate sensitive fluids that come into contact with them.

FEATURES

- Ideal corrosion resistant butterfly valve for chemical and wastewater applications.
- Easily fitted into metal piping system.
- Blowout-proof shaft.
- Full body liner seal.

SPECIFICATIONS

Service: Compatible liquids and gases.

Line Size: 2" to 10".

Body Style: Wafer.

End Connections: Flange, to be used with flanges that are ANSI class 150 dimensions.

Pressure Limit: 150 psi (10.3 bar).

Wetted Materials:

Body Material: PP-H.

Disc: PVC or CPVC.

Liner and Seals: FPM or EPDM.

Stem: 316 SS.

Temperature Limits: PVC: 150°F (66°C).

CPVC: 215°F (102°C).

Operator: L at end of model number denotes locking hand lever. G at end of model number denotes manual gear.

Size	Cv	Model No.	Disc Material	Seal	Size	Cv	Model No.	Disc Material	Seal
2"	126	PBFV-202L312L	PVC	EPDM	2"	126	PBFV-202L322L	CPVC	EPDM
2"	126	PBFV-202L311L	PVC	FPM	2"	126	PBFV-202L321L	CPVC	FPM
3"	282	PBFV-203L312L	PVC	EPDM	3"	282	PBFV-203L322L	CPVC	EPDM
3"	282	PBFV-203L311L	PVC	FPM	3"	282	PBFV-203L321L	CPVC	FPM
4"	580	PBFV-204L312L	PVC	EPDM	4"	580	PBFV-204L322L	CPVC	EPDM
4"	580	PBFV-204L311L	PVC	FPM	4"	580	PBFV-204L321L	CPVC	FPM
6"	1134	PBFV-206L312L	PVC	EPDM	6"	1134	PBFV-206L322L	CPVC	EPDM
6"	1134	PBFV-206L311L	PVC	FPM	6"	1134	PBFV-206L321L	CPVC	FPM
8"	2311	PBFV-208L312L	PVC	EPDM	8"	2311	PBFV-208L322L	CPVC	EPDM
8"	2311	PBFV-208L312G	PVC	EPDM	8"	2311	PBFV-208L322G	CPVC	EPDM
10"	3655	PBFV-210L312G	PVC	EPDM	10"	3655	PBFV-210L322G	CPVC	EPDM
8"	2311	PBFV-208L311L	PVC	FPM	8"	2311	PBFV-208L321L	CPVC	FPM
8"	2311	PBFV-208L311G	PVC	FPM	8"	2311	PBFV-208L321G	CPVC	FPM
10"	3655	PBFV-210L311G	PVC	FPM	10"	3655	PBFV-210L321G	CPVC	FPM

Automated Butterfly Valve

Resilient Seated, Direct Mount Actuators



Pneumatic



Electric

*Please see website for dimensional drawings

The ABFV Series is offered with standard 316 SS disc, a through shaft that does not come in contact with the media, and choices of EPDM, BUNA-N, or fluoroelastomer liners for great chemical compatibility. Valve design has integral ISO mounting for direct mount actuators creating a more compact automated package. Body is epoxy coated for durable and attractive finish. Liner fully covers the body and assures tight seal with mating flanges without additional gaskets. One-piece shaft ensures positive valve positioning and is an anti-blowout design.

ABFV valves come in two-way and three-way packages. Three-way assemblies include valves and actuators mounted onto a 125# cast iron tee. When ordering you have the choice of valve arrangement for mixing or diverting applications. Valves come in lug or wafer style and wafer models have guide holes for bolts.

ABFV is an economical automated valve package with either an electric or pneumatic actuator. Electrically actuated models are weatherproof, NEMA 4, powered by standard 115 VAC supply, and are available in either two-position or proportional control. Two-position actuators use the 115 VAC input to drive each of the valve ports open or closed, while the modulating actuator accepts a 4 to 20 mA input for infinite valve positioning. Actuator features include thermal overload protection to withstand stall conditions, visual position indication and a permanently lubricated gear train.

The pneumatic double acting actuator uses an air supply to drive each of the actuator ports. Spring return pneumatic actuators use the air supply to drive the valve stem one direction, and internally loaded springs return the valve to its original position. Also available is the SV3 solenoid valve to electrically switch the supply pressure between the air supply ports. Actuators are constructed of anodized aluminum and are epoxy coated for years of corrosion free service.

Cv Values

Valve Size	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.1	5	12	24	45	64	90	125	135
2-1/2"	0.7	8	20	37	65	98	144	204	220
3"	0.3	12	22	39	70	116	183	275	302
4"	0.5	17	36	78	139	230	364	546	600
5"	0.8	29	61	133	237	392	620	930	1022
6"	2	45	95	205	366	605	958	1437	1539
8"	3	89	188	408	727	1202	1903	2854	3136
10"	4	151	320	694	1237	2034	3240	4859	5340
12"	5	234	495	1072	1911	3162	5005	7507	8250

SPECIFICATIONS

Valve Body

Service: Compatible liquids and gases.

Body: 2-way or 3-way.

Line Size: 2" to 12".

End Connections: Wafer or lug pattern designed for flanges to ANSI B16.1, BS4504, DIN 2501.

Pressure Limits: Up to 8": 225 psi (15.5 bar); 10" – 12": 150 psi (10.3 bar).

Wetted Materials: Disc: 316 SS; Liner: EPDM BUNA-N, or Fluoroelastomer.

Temperature Limits: EPDM: -30 to 275°F (-34 to 135°C); BUNA-N: 10 to 180°F (-12.2 to 82.2°C); Fluoroelastomer: 400°F (204°C).

Other Materials: Shaft: 316SS; Bottom/Top Bushing: bronze; Body: cast iron; Shaft Seal: EPDM.

ACTUATORS

Electric "U" and "V" Series

Power Requirements: 115 VAC, 50/60 Hz, single phase. Optional 220 VAC, 24 VAC, 12 VDC, and 24 VDC.

Power Consumption: (Locked Rotor Current): U_1, V_1: .55A; U_2, 3, 4, V_2, 3, 4: 0.75A; U_5, 6, 7, V_5, 6, 7: 1.1A; U_8, V_8: 2.6A; U_9, V_9: 2.9A. (Only for 115 VAC, for other voltages contact the factory).

Cycle Time: (sec. per 90°): U_1, V_1: 2.5; U_2, 3, V_2, 3: 5; U_4, V_4: 10; U_5, 6, V_5, 6: 15; U_7, V_7: 30; U_8, V_8: 12; U_9, V_9: 14. (Only for 115 VAC, for other voltages contact the factory).

Duty Cycle: U_1: 75%; U_2 to 7: 25%; U_8, 9: 100%; V_1 to 7: 75%; V_8, 9: 100%.

Enclosure Rating: NEMA 4. Optional NEMA 7 (Class 1, Div. II Groups A, B, C, D).

Housing Material: Aluminum with thermal bonding polyester powder finish.

Temperature Limit: 0 to 150°F (-18 to 65°C).

Conduit Connection: 1/2" female NPT.

Modulating Input (V Series): 4 to 20 mA.

Standard Features: Manual override and visual position indicator except modulating units.

Pneumatic "DA" and "SR" Series

Type: DA series is double acting and SR series is spring return (rack and pinion).

Normal Supply Pressure: 80 psi (5.5 bar).

Maximum Supply Pressure: 120 psig (8 bar).

Air Connections: DA1 to 5 and SR2 to 5: 1/8" female NPT, all others: 1/4" female NPT.

Air Consumption: (cu. in. per stroke) DA1: 2.32, DA2: 6.59, DA3: 12.14, DA4: 16.32, DA5: 30.2, DA6: 45.3, DA7: 61.0, DA8: 106.9, DA9: 137.9, DAA: 220.1, DAB: 348.1, DAC: 915.4, SR2: 7.7, SR3: 14.2, SR4: 17.2, SR5: 32.4, SR6: 54.4, SR7: 85.4, SR8: 122.1, SR9: 146.5, SRA: 215.1, SRB: 462.6, SRC: 945.9.

Cycle Time: (sec. per 90°): DA1: .03, DA2: .04, DA3: .08, DA4: .12, DA5: .19, DA6: 0.27, DA7: .47, DA8: .66, DA9: .93, DAA: 1.1, DAB: 1.7, DAC: 4.5, SR2: .09, SR3: .14, SR4: .22, SR5: .33, SR6: .46, SR7: .78, SR8: .90, SR9: .97, SRA: 1.34, SRB: 2.19, SRC: 6.20.

Housing Material: Anodized aluminum body and epoxy coated aluminum end caps.

Temperature Limit: -4 to 180°F (-20 to 82°C).

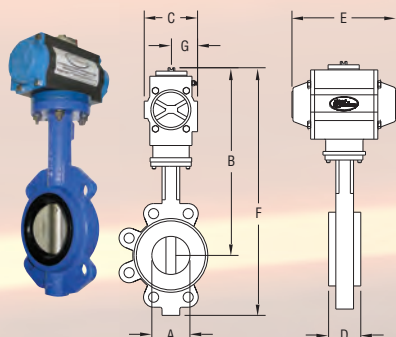
Accessory Mounting: NAMUR standard.

Standard Features: Visual position indicator.

Series ABFV Automated Butterfly Valve

Resilient Seated, Direct Mount Actuators

Pneumatic Actuated - DAX and SRX Actuators



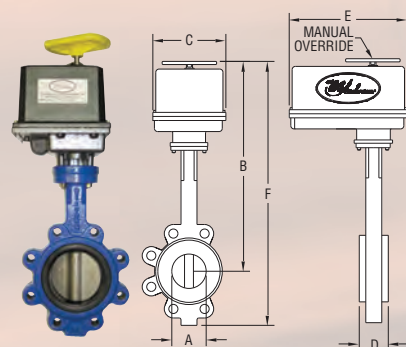
Pneumatic Size Chart - DA Series

A	B	C	D	E	F	G
2"	9-7/8 (250.83)	2-13/16 (41.44)	1-45/64 (43.26)	5-1/2 (139.7)	13-1/64 (330.6)	1-5/8 (41.28)
2-1/2"	10-27/64 (264.72)	2-13/16 (41.44)	1-13/16 (46.04)	5-1/2 (139.7)	13-59/64 (353.62)	1-5/8 (41.28)
3"	11-3/32 (281.78)	3-11/64 (80.57)	1-13/16 (46.04)	6-25/64 (162.32)	14-27/32 (337.03)	1-25/32 (45.24)
4"	11-27/32 (300.83)	3-11/64 (80.57)	2-1/16 (52.39)	6-25/64 (162.32)	16-21/64 (414.74)	1-25/32 (45.24)
5"	13-29/64 (341.71)	4-11/64 (105.97)	2-13/64 (55.96)	9-23/64 (237.73)	18-29/64 (468.71)	2-15/16 (58.74)
6"	13-31/32 (354.81)	4-11/64 (105.97)	2-13/64 (55.96)	9-23/64 (237.73)	19-7/16 (493.71)	2-15/16 (58.74)
8"	15-5/16 (388.94)	4-11/64 (105.97)	2-3/8 (60.33)	9-23/64 (237.73)	22-13/64 (563.96)	2-15/16 (58.74)
10"	18-1/4 (463.55)	5-25/64 (136.92)	2-11/16 (68.26)	12-59/64 (328.22)	26-1/4 (666.75)	2-7/8 (73.03)
12"	21-55/64 (555.23)	7-3/8 (187.33)	3-5/64 (78.18)	22-41/64 (575.07)	31-25/64 (797.32)	3-61/64 (100.41)

Pneumatic Size Chart - SR Series

A	B	C	D	E	F	G
2"	10-15/16 (261.94)	3-11/64 (80.57)	1-45/64 (43.26)	6-25/64 (162.32)	13-29/64 (341.71)	1-25/32 (45.24)
2-1/2"	10-55/64 (275.83)	3-11/64 (80.57)	1-13/16 (46.04)	6-25/64 (162.32)	14-29/64 (367.11)	1-25/32 (45.24)
3"	11-3/4 (298.45)	3-11/64 (80.57)	1-13/16 (46.04)	8-5/32 (207.17)	15-31/64 (393.3)	2-5/64 (52.78)
4"	12-15/16 (328.61)	4-11/64 (105.97)	2-1/16 (52.39)	9-23/64 (237.73)	17-27/64 (442.52)	2-5/16 (58.74)
5"	13-31/32 (354.81)	4-11/64 (105.97)	2-13/64 (55.96)	10-45/64 (271.86)	18-31/32 (481.81)	2-11/16 (58.74)
6"	15-9/16 (395.29)	5-25/64 (136.92)	2-13/64 (55.96)	12-59/64 (328.22)	21-1/32 (534.19)	2-7/8 (73.03)
8"	17 (431.8)	5-25/64 (136.92)	2-3/8 (60.33)	12-59/64 (328.22)	23-57/64 (606.83)	2-7/8 (73.03)
10"	20-3/32 (510.38)	5-25/64 (136.92)	2-11/16 (68.26)	20-9/16 (522.29)	28-5/64 (713.19)	3-61/64 (100.41)
12"	23-7/8 (606.43)	7-3/8 (187.33)	3-5/64 (78.18)	22-41/64 (575.07)	33-25/64 (848.12)	4-19/64 (109.14)

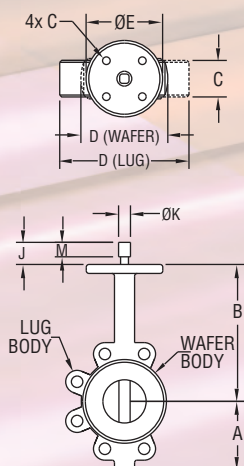
Electric Actuated - UXX and VXX Actuators



Electric Size Chart

A	B	C	D	E	F
2"	12-15/64 (310.75)	4-1/4 (107.95)	1-45/64 (43.26)	6-57/64 (175.02)	15-3/8 (390.53)
2-1/2"	12-25/32 (324.64)	4-1/4 (107.95)	1-13/16 (46.04)	6-57/64 (175.02)	16-9/32 (413.54)
3"	13 (330.2)	4-1/4 (107.95)	1-13/16 (46.04)	6-57/64 (175.02)	16-3/4 (425.45)
4"	13-3/4 (349.25)	4-1/4 (107.95)	2-1/16 (52.39)	6-57/64 (175.02)	18-1/4 (463.55)
5"	16-25/64 (416.32)	7 (177.8)	2-13/64 (55.96)	7 (177.8)	21-25/64 (543.32)
6"	16-29/32 (429.42)	7 (177.8)	2-13/64 (55.96)	7 (177.8)	22-3/8 (658.33)
8"	18-1/4 (463.55)	7 (177.8)	2-3/8 (60.33)	7 (177.8)	25-9/64 (638.57)
10"	23-9/64 (587.77)	10 (254)	2-11/16 (68.26)	10 (254)	31-1/8 (790.58)
12"	24-29/32 (632.62)	10 (254)	3-5/64 (78.18)	10 (254)	34-7/16 (874.71)

Valve Body Dimensions



Size	ISO	A	B	C	D Wafer	D Lug	E	G	J	K	M
2"	F07	3-5/32 (80.17)	6-11/32 (161.13)	1-45/64 (43.26)	4-1/32 (102.39)	5-63/64 (152)	3-35/64 (90.09)	23/64 (9.13)	1-1/32 (26.19)	9/16 (14.29)	43/64 (17.07)
2-1/2"	F07	3-1/2 (88.9)	6-57/64 (175.02)	1-13/16 (46.04)	4-49/64 (121.05)	6-3/4 (171.45)	3-35/64 (90.09)	23/64 (9.13)	1-1/32 (26.19)	9/16 (14.29)	43/64 (17.07)
3"	F07	3-3/4 (95.25)	7-9/64 (181.37)	1-13/16 (46.04)	5-31/64 (139.3)	7-7/8 (200.03)	3-35/64 (90.09)	23/64 (9.13)	1-1/32 (26.19)	9/16 (14.29)	43/64 (17.07)
4"	F07	4-1/2 (114.3)	7-7/8 (200.03)	2-1/16 (52.39)	6-5/16 (160.34)	9-1/32 (229.39)	3-35/64 (90.09)	23/64 (9.13)	1-3/16 (30.16)	23/32 (18.26)	53/64 (21.03)
5"	F07	5 (127)	8-25/64 (213.12)	2-13/64 (55.96)	7-31/64 (190.10)	10 (254)	3-35/64 (90.09)	23/64 (9.13)	1-3/16 (30.16)	23/32 (18.26)	53/64 (21.03)
6"	F07	5-31/64 (139.30)	8-29/32 (226.22)	2-13/64 (55.96)	8-15/32 (215.11)	11-1/32 (280.19)	3-35/64 (90.09)	31/64 (12.3)	1-5/16 (33.34)	7/8 (22.23)	61/64 (24.21)
8"	F07	6-57/64 (175.02)	10-1/4 (260.35)	2-3/8 (60.33)	10-19/32 (269.08)	13-1/2 (342.9)	3-35/64 (90.09)	31/64 (12.3)	1-5/16 (33.34)	7/8 (22.23)	61/64 (24.21)
10"	F10	8 (203.2)	11-1/2 (292.1)	2-11/16 (68.26)	13-1/8 (333.38)	15-63/64 (406)	4-59/64 (125.02)	31/64 (12.3)	1-55/64 (47.23)	1-7/64 (28.18)	61/64 (24.21)
12"	F10	9-17/32 (242.09)	13-9/32 (337.34)	3-5/64 (78.18)	15-3/32 (383.38)	19-1/32 (483.39)	4-59/64 (125.02)	31/64 (12.3)	1-55/64 (47.23)	1-7/64 (28.18)	61/64 (24.21)

Series ABFV Automated Butterfly Valve

Complete Model Chart - See next page for built model numbers

Empty Model Chart - See next page for built Model Numbers											
Example	ABFV	3	03	WFB	3	3	1	DA3	E	SV	ABFV303WFB331DA3E-SV
Construction	ABFV										Automated Butterfly Valve
Configuration		2									Two-Way
		3									Three-Way
Size			02								2"
			25								2-1/2"
			03								3"
			04								4"
			05								5"
			06								6"
			08								8"
			10								10"
			12								12"
	Body				WFB LTB						
Stem					3						316 SS
Disc						3					316 SS
Liner							1				EPDM
							2				Buna-N
							3				Fluoroelastomer
Actuator Type								DA1			Direct Acting Rack and Pinion Actuator, Size 32
								DA2			Direct Acting Rack and Pinion Actuator, Size 52
								DA3			Direct Acting Rack and Pinion Actuator, Size 63
								DA4			Direct Acting Rack and Pinion Actuator, Size 75
								DA5			Direct Acting Rack and Pinion Actuator, Size 85
								DA6			Direct Acting Rack and Pinion Actuator, Size 100
								DA7			Direct Acting Rack and Pinion Actuator, Size 115
								DA8			Direct Acting Rack and Pinion Actuator, Size 125
								DA9			Direct Acting Rack and Pinion Actuator, Size 140
								DAA			Direct Acting Rack and Pinion Actuator, Size 160
								DAB			Direct Acting Rack and Pinion Actuator, Size 200
								DAC			Direct Acting Rack and Pinion Actuator, Size 270
								SR2			Spring Return Rack and Pinion Actuator, Size 52
								SR3			Spring Return Rack and Pinion Actuator, Size 63
								SR4			Spring Return Rack and Pinion Actuator, Size 75
								SR5			Spring Return Rack and Pinion Actuator, Size 85
								SR6			Spring Return Rack and Pinion Actuator, Size 100
								SR7			Spring Return Rack and Pinion Actuator, Size 115
								SR8			Spring Return Rack and Pinion Actuator, Size 125
								SR9			Spring Return Rack and Pinion Actuator, Size 140
								SRA			Spring Return Rack and Pinion Actuator, Size 160
								SRB			Spring Return Rack and Pinion Actuator, Size 200
								SRC			Spring Return Rack and Pinion Actuator, Size 270
								U_1			Electric Two Position, Size 100
								U_2			Electric Two Position, Size 200
								U_3			Electric Two Position, Size 300
								U_4			Electric Two Position, Size 400
								U_5			Electric Two Position, Size 675
								U_6			Electric Two Position, Size 1000
								U_7			Electric Two Position, Size 1500
								U_8			Electric Two Position, Size 2000
								U_9			Electric Two Position, Size 3800
								U_A			Electric Two Position, Size 5000
								V_1			Electric Modulating, Size 100
							V_2			Electric Modulating, Size 200	
							V_3			Electric Modulating, Size 300	
							V_4			Electric Modulating, Size 400	
							V_5			Electric Modulating, Size 675	
							V_6			Electric Modulating, Size 1000	
							V_7			Electric Modulating, Size 1500	
							V_8			Electric Modulating, Size 2000	
							V_9			Electric Modulating, Size 3800	
							V_A			Electric Modulating, Size 5000	
Arrangement								A			2-Way, Normally Open
								C			2-Way, Normally Closed
								E			3-Way, Common/NO/NC
								G			3-Way, Common/NC/NO
								I			3-Way, NO/Common/NC
								K			3-Way, NC/Common/NO
								L			3-Way, NO/NC/Common
								M			3-Way, NC/NO/Common
Options										SV EX	Factory Mounted Solenoid Valve (Pneumatic Only) Explosion-Proof Electric Actuator (Electric Only)

For Electric U and V actuators middle term, V_1, is the power supply required. Model Code 1 is for 120 VAC, 2 is for 220 VAC, 3 is for 24 VAC and 4 is for 24 VDC. Example, U11, is 120 VAC two position. Consult factory for pricing.

For your convenience, sample model configurations are listed with the proper sized actuators. Models listed have cast iron body, 316 SS disc, and EPDM liner and o-rings. The 2-way models have a valve arrangement shown of normally closed, while the 3-way models have no valve arrangement code shown, please specify when ordering. All electric actuators shown are 115 VAC and NEMA 4. All pneumatic actuators are sized with an air supply pressure of 80 psi. Consult the factory for model number changes for electric actuator options of explosion-proof and other supply voltages.

2-Way, Lug Style, EPDM Liner

Size	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	Model	Model	Model	Model
2"	ABFV202LTB331DA2C	ABFV202LTB331SR4C	ABFV202LTB331U12C	ABFV202LTB331V12C
2-1/2"	ABFV225LTB331DA2C	ABFV225LTB331SR4C	ABFV225LTB331U12C	ABFV225LTB331V12C
3"	ABFV203LTB331DA3C	ABFV203LTB331SR5C	ABFV203LTB331U13C	ABFV203LTB331V13C
4"	ABFV204LTB331DA3C	ABFV204LTB331SR6C	ABFV204LTB331U14C	ABFV204LTB331V14C
5"	ABFV205LTB331DA5C	ABFV205LTB331SR6C	ABFV205LTB331U16C	ABFV205LTB331V16C
6"	ABFV206LTB331DA5C	ABFV206LTB331SR8C	ABFV206LTB331U16C	ABFV206LTB331V16C
8"	ABFV208LTB331DA6C	ABFV208LTB331SR8C	ABFV208LTB331U17C	ABFV208LTB331V17C
10"	ABFV210LTB331DA8C	ABFV210LTB331SR9C	ABFV210LTB331U19C	ABFV210LTB331V19C
12"	ABFV212LTB331DAAC	ABFV212LTB331SRBC	ABFV212LTB331U19C	ABFV212LTB331V19C

Model Numbers shown are normally closed, change the model code at the end from "C" to "A" for normally open.

2-Way, Wafer Style, EPDM Liner

Size	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	Model	Model	Model	Model
2"	ABFV202WFB331DA2C	ABFV202WFB331SR4C	ABFV202WFB331U12C	ABFV202WFB331V12C
2-1/2"	ABFV225WFB331DA2C	ABFV225WFB331SR4C	ABFV225WFB331U12C	ABFV225WFB331V12C
3"	ABFV203WFB331DA3C	ABFV203WFB331SR5C	ABFV203WFB331U13C	ABFV203WFB331V13C
4"	ABFV204WFB331DA3C	ABFV204WFB331SR6C	ABFV204WFB331U14C	ABFV204WFB331V14C
5"	ABFV205WFB331DA5C	ABFV205WFB331SR6C	ABFV205WFB331U16C	ABFV205WFB331V16C
6"	ABFV206WFB331DA5C	ABFV206WFB331SR8C	ABFV206WFB331U16C	ABFV206WFB331V16C
8"	ABFV208WFB331DA6C	ABFV208WFB331SR8C	ABFV208WFB331U17C	ABFV208WFB331V17C
10"	ABFV210WFB331DA8C	ABFV210WFB331SR9C	ABFV210WFB331U19C	ABFV210WFB331V19C
12"	ABFV212WFB331DAAC	ABFV212WFB331SRBC	ABFV212WFB331U19C	ABFV212WFB331V19C

Model Numbers shown are normally closed, change the model code at the end from "C" to "A" for normally open.

3-Way, Lug Style, EPDM Liner

Size	Double Acting Pneumatic	Spring Return Pneumatic	Two Position Electric	Modulating Electric
	Model*	Model*	Model*	Model*
2"	ABFV302LTB331DA3_	ABFV302LTB331SR5_	ABFV302LTB331U13_	ABFV302LTB331V13_
2-1/2"	ABFV325LTB331DA3_	ABFV325LTB331SR6_	ABFV325LTB331U14_	ABFV325LTB331V14_
3"	ABFV303LTB331DA4_	ABFV303LTB331SR6_	ABFV303LTB331U15_	ABFV303LTB331V15_
4"	ABFV304LTB331DA5_	ABFV304LTB331SR7_	ABFV304LTB331U16_	ABFV304LTB331V16_
5"	ABFV305LTB331DA6_	ABFV305LTB331SR9_	ABFV305LTB331U16_	ABFV305LTB331V16_
6"	ABFV306LTB331DA7_	ABFV306LTB331SR9_	ABFV306LTB331U17_	ABFV306LTB331V17_
8"	ABFV308LTB331DA9_	ABFV308LTB331SR9_	ABFV308LTB331U19_	ABFV308LTB331V19_
10"	ABFV310LTB331DAA_	ABFV310LTB331SRB_	ABFV310LTB331U19_	ABFV310LTB331V19_
12"	ABFV312LTB331DAB_	ABFV312LTB331SRC_	ABFV312LTB331U1A_	ABFV312LTB331V1A_

*Complete model includes Valve Arrangement - see Model Chart on previous page.

Options:**Explosion-proof Electric Actuator**

-Add suffix "EX" to the model number

Optional Electric Actuator Supply Voltages

-Contact factory for model number change

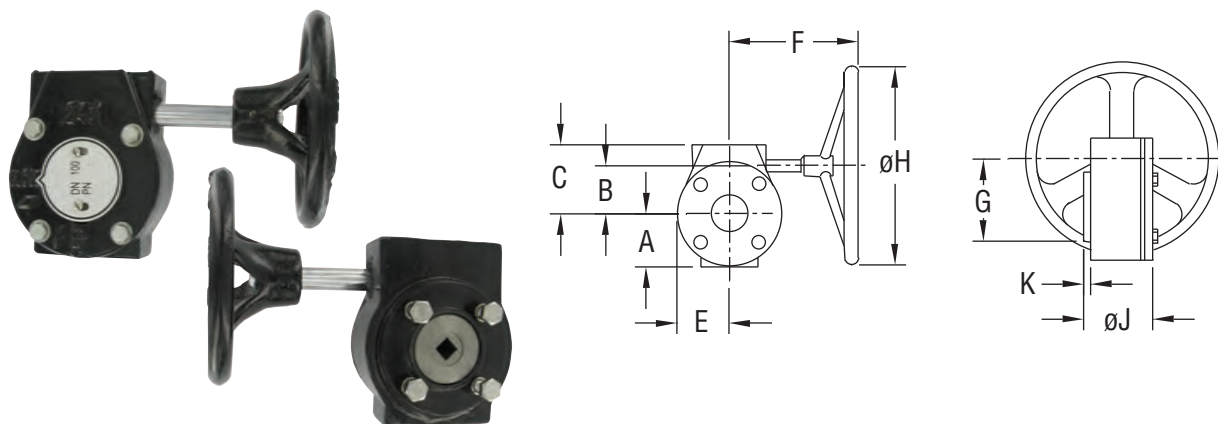
Sizes up to U_6, V_6

Sizes U_7, V_7 and up

Solenoid Valve - Add suffix -SV

Gear Operator

Rugged, Cast Iron Housing



Size in	A	B	C	E	F	G	øH	øJ	K
2" - 6"	2.047 (52 mm)	1.781 (45.24 mm)	2.922 (74.22 mm)	2.047 (52 mm)	6.000 (152.4 mm)	2.953 (75 mm)	5.906 (150.02 mm)	1.391 (35.32 mm)	.109 (2.78 mm)
8" - 10"	2.953 (75 mm)	2.484 (63.10 mm)	3.984 (101.20 mm)	2.953 (75 mm)	9.844 (250.03 mm)	3.391 (86.12 mm)	11.813 (300.04 mm)	2.766 (70.25 mm)	.125 (3.18 mm)
12"	3.203 (81.36 mm)	3.156 (80.17 mm)	4.656 (118.27 mm)	3.203 (81.36 mm)	8.938 (227.01 mm)	3.281 (83.34 mm)	11.813 (300.04 mm)	2.766 (70.25 mm)	.125 (3.18 mm)

The Series MGO Gear Operators offer heavy-duty on-off or throttling service for valves or dampers, including our BFV Series butterfly valves. These gear operators are self-lubricated for smooth, trouble-free operation. The rugged, cast iron body with O-ring body seals is weatherproof. A self-locking worm and worm gear holds the valve in the desired position. Features include a readily accessible hand wheel, a valve position indicator and mechanical travel stops that permit field adjustment for valve movement to specific degrees of rotation.

When choosing a gear operator, make sure that the input/output specifications meet those of the chosen valve's requirements. To determine the input torque, divide the required torque of the chosen valve by the mechanical advantage of the appropriate gear operator. Once the input torque is known, the hand wheel rim effort can be found by dividing the input required at the nut divided by the radius of the hand wheel.

SPECIFICATIONS

Materials: Cast iron housing, hardened steel internals, NBR seals.

Keyway Type: Square ISO male.

Ratio: 2 to 6": 24:1, 8 to 10": 30:1, and 12": 50:1.

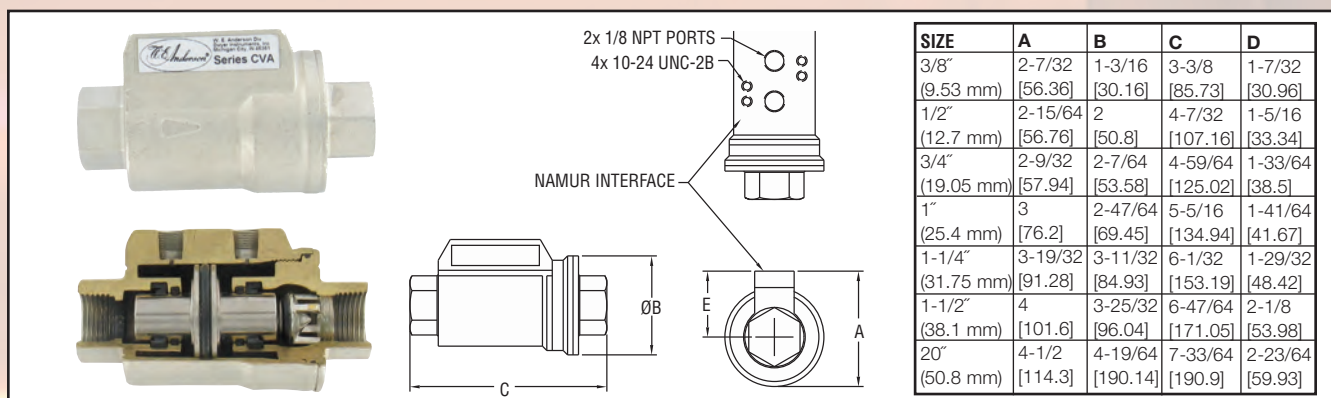
Mechanical Advantage: 2 to 6": 6.72, 8 to 10": 8.1, and 12": 13.5.

Weight: See model chart.

Model Number	Compatibility	Output Torque in-lb (N*m)		Weight lb (kg)
		Min.	Max.	
MGO-1T	Works with 2", 2.5", & 3" size BFV Series butterfly valves	1328 (150)	2390 (270)	11.5 (5.2)
MGO-2T	Works with 4" size BFV Series butterfly valves	1328 (150)	2390 (270)	11.5 (5.2)
MGO-3T	Works with 6" size BFV Series butterfly valves	1328 (150)	2390 (270)	11.5 (5.2)
MGO-4T	Works with 8" size BFV Series butterfly valves	4425 (500)	6196 (1200)	28.6 (13)
MGO-5T	Works with 10" size BFV Series butterfly valves	4425 (500)	6196 (1200)	28.6 (13)
MGO-6T	Works with 12" size BFV Series butterfly valves	8851 (1000)	10621 (1200)	33 (15)

Compact Valve and Actuator

Pneumatic Actuated, Direct Acting or Spring Return



CVA Series Actuated Valves

- Integrated pneumatic actuator.
- NAMUR solenoid mounting pad.
- Operating life over 1,000,000 cycles.
- Use in any mounting position.
- Ideal for air drying, laundry, dispensing, and pollution control equipment, process control applications, textile dyeing and drying, and industrial compressors.

Series CVA actuated valves combine a pneumatic actuator and a fast on-off control valve into one body, eliminating packing glands, actuators, and mounting kits. There are no exposed moving parts, eliminating pinch points and increasing operator safety. Because the actuator is part of the valve, costs are greatly reduced when compared to standard actuated valves. Balanced design reduces friction and wear, allowing the operating life to be tested to well over 1,000,000 cycles. The stroke is linear and parallel to the flow, dramatically reducing the required force to close or open the valve. The internal waterway design allows for optimum flow characteristics.

The pneumatic actuated valve can be double acting, spring return normally closed or normally open. The double acting model uses two supply ports (1/8" NPT) with one driving the valve open and the other driving the valve closed. Normally closed spring return pneumatic actuated models use the air supply to open the valve and internally loaded springs return the valve to the closed position. The normally open spring return model uses the air supply to close the valve and internally loaded springs return the valve to the open position.

APPLICATIONS

The three different seal options allow this pneumatic valve to be used with a variety of materials in a large range of temperatures. The Fluoroelastomer and Buna-N seals can be used for applications where higher temperatures are present. Fluoroelastomer seals are highly compatible with a majority of fluids, but should not be used in applications where steam is present. EPDM seals are ideal for hot water, but are not compatible with mineral products. Buna-N seals are designed for use with air, gas, oils, and water and should be used at lower temperatures.

SPECIFICATIONS

Body: 1-piece.

Line Size: 3/8" to 2".

End Connections: NPT female.

Pressure Limit: 150 psig (10.3 bar).

Wetted Materials: Body: Nickel Plated Brass.

Seals: Buna-N, Fluoroelastomer or EPDM.

Temperature Limit: Buna-N (NBR) seals: -4 to 176°F (-20 to 80°C);

Fluoroelastomer seals: -4 to 302°F (-20 to 150°C);

EPDM seals: -4 to 302°F (-20 to 150°C).

ACTUATORS

Pneumatic

Type: DA is double acting and SR is spring return.

Normal Supply Pressure: 43.5 psig (3 bar) for double acting;

61 psig (4.2 bar) for spring return.

Maximum Supply Pressure: 116 psig (8 bar) for double acting;

116 psig (8 bar) for spring return.

Air Connections: 1/8" NPT.

Air Consumption: 3/8": 0.73 cu. in.; 1/2": 1.05 cu. in.; 3/4": 1.90 cu. in.; 1": 2.45 cu. in.; 1-1/4": 4.58 cu. in.; 1-1/2": 6.70 cu. in.; 2": 12.75 cu. in.

Stroke Time: DA01 & DA02: .01 sec; DA03 & DA04: .02 sec; DA05: .03 sec; DA06: .06 sec; DA07: .07 sec. (spring stroke) NC01 & NC02: .02 sec; NC03: .03 sec; NC04: .04 sec; NC05: .07 sec; NC06: .11 sec; NC07: .13 sec. (air stroke) NC01 & NC02: .01 sec; NC03 & NC04: .02 sec; NC05: .04 sec; NC06: .06 sec; NC07: .07 sec. NO same as NC.

Accessory Mounting: NAMUR.

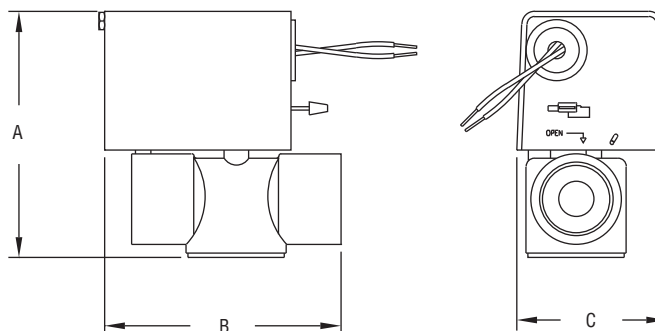
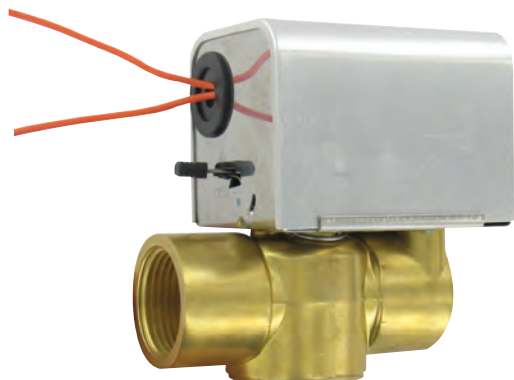
Sizes	Seat & Seal Material	Cv	Double Acting	Spring Return: Normally Closed	Spring Return: Normally Open
			Model	Model	Model
3/8"	Fluoroelastomer	8	CVAA-DA01	CVAA-NC01	CVAA-NO01
1/2"	Fluoroelastomer	10	CVAA-DA02	CVAA-NC02	CVAA-NO02
3/4"	Fluoroelastomer	13	CVAA-DA03	CVAA-NC03	CVAA-NO03
1"	Fluoroelastomer	17	CVAA-DA04	CVAA-NC04	CVAA-NO04
1-1/4"	Fluoroelastomer	28	CVAA-DA05	CVAA-NC05	CVAA-NO05
1-1/2"	Fluoroelastomer	57	CVAA-DA06	CVAA-NC06	CVAA-NO06
2"	Fluoroelastomer	81	CVAA-DA07	CVAA-NC07	CVAA-NO07
3/8"	EPDM	8	CVAB-DA01	CVAB-NC01	CVAB-NO01
1/2"	EPDM	10	CVAB-DA02	CVAB-NC02	CVAB-NO02
3/4"	EPDM	13	CVAB-DA03	CVAB-NC03	CVAB-NO03
1"	EPDM	17	CVAB-DA04	CVAB-NC04	CVAB-NO04
1-1/4"	EPDM	28	CVAB-DA05	CVAB-NC05	CVAB-NO05
1-1/2"	EPDM	57	CVAB-DA06	CVAB-NC06	CVAB-NO06
2"	EPDM	81	CVAB-DA07	CVAB-NC07	CVAB-NO07
3/8"	BUNA-N	8	CVAC-DA01	CVAC-NC01	CVAC-NO01
1/2"	BUNA-N	10	CVAC-DA02	CVAC-NC02	CVAC-NO02
3/4"	BUNA-N	13	CVAC-DA03	CVAC-NC03	CVAC-NO03
1"	BUNA-N	17	CVAC-DA04	CVAC-NC04	CVAC-NO04
1-1/4"	BUNA-N	28	CVAC-DA05	CVAC-NC05	CVAC-NO05
1-1/2"	BUNA-N	57	CVAC-DA06	CVAC-NC06	CVAC-NO06
2"	BUNA-N	81	CVAC-DA07	CVAC-NC07	CVAC-NO07

*Solenoid Valve – See Model SV3

Series
ZV1

Two-Way Zone Valve

Economical, Manual Override



Size	A [in (mm)]	C [in (mm)]	B [in (mm)]
1/2"	4.15 (105.5)	2.48 (63)	3.54 (90)
3/4"	4.15 (105.5)	2.48 (63)	3.66 (93)
1"	4.31 (109.5)	2.48 (63)	3.74 (95)

ZV1 Series Zone Valves are ideal for flow control in hot and cold water HVAC systems. Zone valves are typically used in conjunction with a thermostat to control room temperature. The ZV1 is electrically driven to open and spring to close. Units are available in 1/2", 3/4", and 1" sizes with 24 or 120 VAC power supply. Easy to install these units are direct replacements for competitor units. Manual override lever is easily accessible externally. Consult factory for 220 VAC power supply, optional auxiliary switches, and BSP or sweat connections.

SPECIFICATIONS

Service: Compatible fluids.

Body: 2-way, normally closed.

Line Size: 1/2" to 1".

End Connections: Female NPT (optional BSP, sweat connections).

Pressure Limits: Maximum: 300 psi (20.7 bar); Close-off: 1/2" to 3/4": 22 psi (1.5 bar), 1": 14.5 psi (1 bar).

Temperature Limits: Ambient: 32 to 104°F (0 to 40°C); Process: 32 to 201°F (0 to 94°C).

Wetted Materials: Brass, stainless steel, NBR.

Flow Characteristic: Quick opening.

Power Requirements: 120 VAC or 24 VAC, ±10%, 50/60 Hz. (Optional 220 VAC).

Power Consumption: 6.5 W.

Input: On/off.

Electrical Connection: 22 AWG, 5" (127 mm) long.

Cycle Time: Opening time: 11 seconds; Closing time: 5 seconds.

Enclosure Rating: General purpose.

Housing Material: Aluminum.

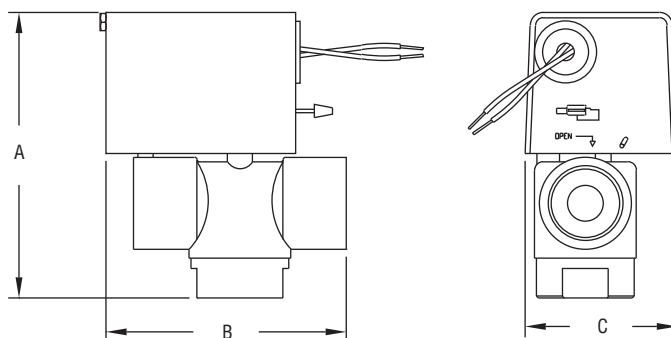
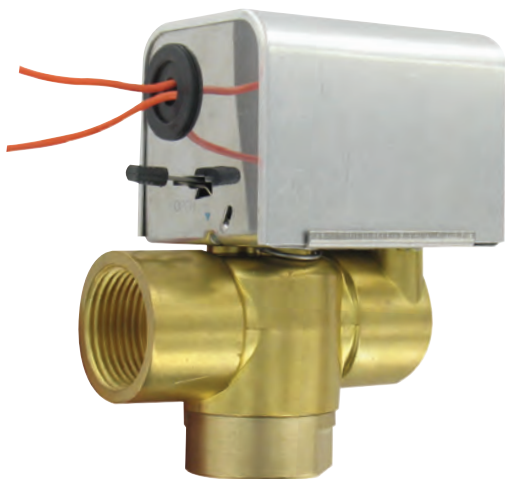
ZONE & PISTON

Model	Cv	Size	Supply Voltage
ZV1022	3.78	1/2"	120 VAC
ZV1024	3.78	1/2"	24 VAC
ZV1032	3.78	3/4"	120 VAC
ZV1034	3.78	3/4"	24 VAC
ZV1042	8.02	1"	120 VAC
ZV1044	8.02	1"	24 VAC

Series
3ZV1

Three-Way Zone Valve

Economical, Manual Override



Size	A [in (mm)]	C [in (mm)]	B [in (mm)]
1/2"	4.57 (116)	2.48 (63)	3.54 (90)
3/4"	4.69 (119)	2.48 (63)	3.66 (93)
1"	4.92 (125)	2.48 (63)	3.74 (95)

3ZV1 Series Zone Valves are ideal for flow control in hot and cold water HVAC systems. The 3ZV1 is electrically driven to open and spring to close. Units are available in 1/2", 3/4", and 1" sizes with 24 or 120 VAC power supply. Easy to install these units are direct replacements for competitor units. Manual override lever is easily accessible externally. Consult factory for 220 VAC power supply, optional auxiliary switches, and BSP or sweat connections.

SPECIFICATIONS

Service: Compatible fluids.

Body: 3-way.

Line Size: 1/2" to 1".

End Connections: Female NPT (optional BSP, sweat connections).

Pressure Limits: Maximum: 300 psi (20.7 bar); Close-off: see model chart.

Temperature Limits: Ambient: 32 to 104°F (0 to 40°C); Process: 32 to 201°F (0 to 94°C).

Wetted Materials: Brass, stainless steel, NBR.

Flow Characteristic: Quick opening.

Power Requirements: 120 VAC or 24 VAC, $\pm 10\%$, 50/60 Hz. (optional 220 VAC).

Power Consumption: 6.5 W.

Input: On/off.

Electrical Connection: 22 AWG, 5" (127 mm) long.

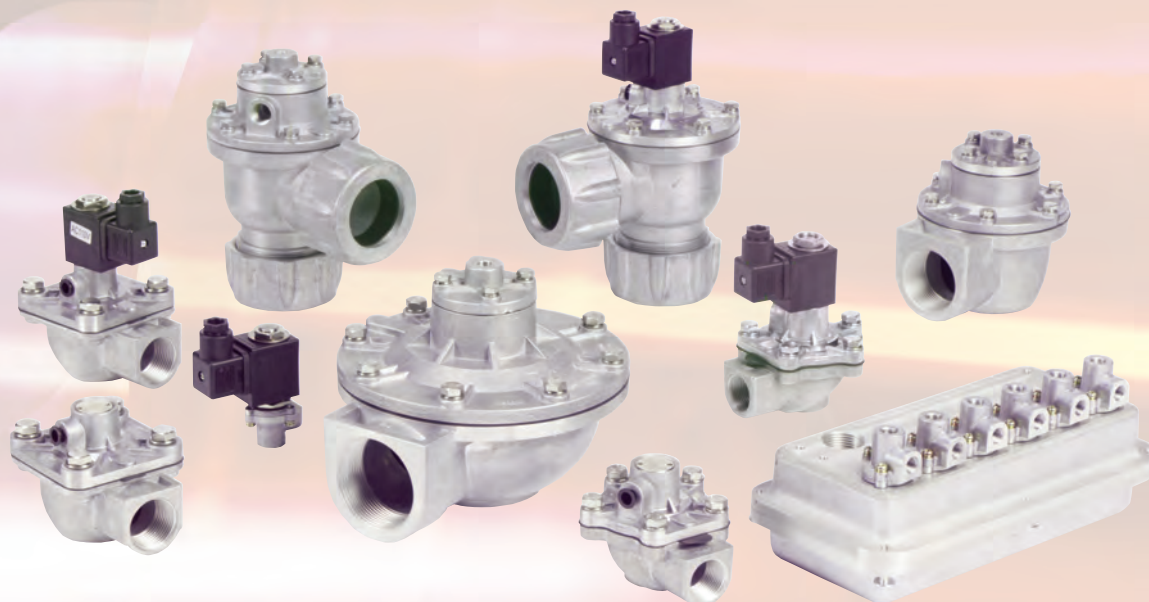
Cycle Time: Opening time: 11 seconds; Closing time: 5 seconds.

Enclosure Rating: General purpose.

Housing Material: Aluminum.

Model	Cv	Size	Supply Voltage	Close-off Pressure psi (bar)
3ZV1022	3.78	1/2"	120 VAC	22 (1.5)
3ZV1024	3.78	1/2"	24 VAC	22 (1.5)
3ZV1032	3.78	3/4"	120 VAC	14.5 (1.0)
3ZV1034	3.78	3/4"	24 VAC	14.5 (1.0)
3ZV1042	8.02	1"	120 VAC	10 (.70)
3ZV1044	8.02	1"	24 VAC	10 (.70)

Diaphragm Valves For Reverse Jet Pulse Dust Collection



FEATURES

- Fast Opening Design for Max Flow
- Industrial Construction and Design
- Available with Integrated or Remote Solenoids
- Pilot Valves Available in Weatherproof Enclosures
- Replacement Diaphragms Available

APPLICATIONS

- Bin Vents
- Bag Houses
- Cartridge Filters
- Down Draft Tables

Operating Principle

The valve is divided into two chambers by a diaphragm. These upper and lower chambers are connected by a small air passage so both chambers see the same pressure. When the exhaust is closed air cannot vent out of the upper chamber and the valve stays closed as shown in Figure 1. When the exhaust on the upper chamber is opened the air pressure decreases on the top of the diaphragm allowing the air pressure on the bottom to force open the valve by pushing the diaphragm up as shown in Figure 2. When the valve opens an abrupt air blast comes through the valve outlet and is directed by the dust collector to the dirty filter. The air pulse then blows out through the filter from the inside blowing the particulate accumulation off of the filter to clean it. After the air pulse the pressure in the upper and lower chamber will equalize and the spring pushes the valve back to a closed position. The valve exhaust port is controlled by either an integral or remote solenoid.

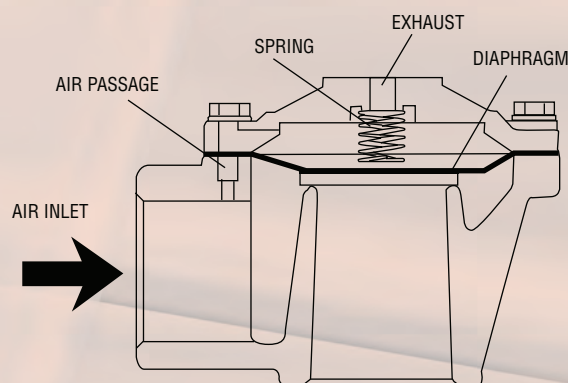


Figure 1. Closed Position

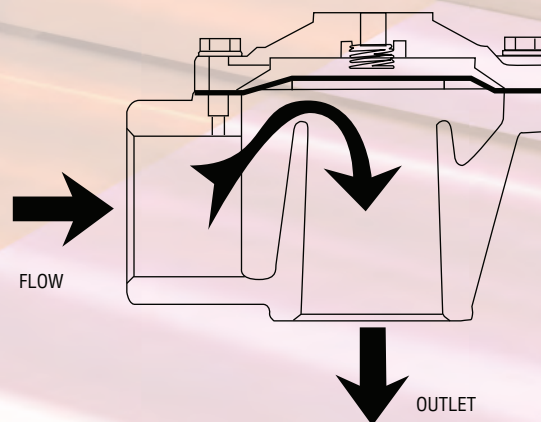


Figure 2. Open Position



DCV62T1D



DCV20C1D



RDCV62T



RDCV20C

The Series DCV/RDCV Dust Collection Valves are ideal for use with the Series DCT1000 and Series DCT500 duct collection timer boards for controlling the air pulse in jet pulse type dust collectors to clean the filters. Both the Series DCV and RDCV have the option for either coupling or NPT connections. The coupling connection allows for a quick and simple installation. Only the stub pipe and blowtube need to be cleaned and deburred before the valve is fit into position. The "T" Series DCV has female threaded connections. Both the "C" and "T" versions have a 90° angle between the inlet and outlet the most suitable configuration for pulse valve applications. The design offers not only ease of installation, but also minimal airflow restriction for an exceptional cleaning pulse. The valves are offered in both integrated and remote coil configurations.

Model Number	Size	Solenoid	Connection	Number of Diaphragms	Cv Factor (gal/min)
RDCV20T	3/4"	Remote	NPT	1	14
RDCV20C		Remote	Coupling		
DCV20T1D		Integral*	NPT		
DCV20C1D		Integral*	Coupling		
RDCV25T	1"	Remote	NPT	1	23
RDCV25C		Remote	Coupling		
DCV25T1D		Integral*	NPT		
DCV25C1D		Integral*	Coupling		
RDCV35T	1-1/2"	Remote	NPT	1	42
RDCV35C		Remote	Coupling		
DCV35T1D		Integral*	NPT		
DCV35C1D		Integral*	Coupling		
RDCV45T	1-1/2"	Remote	NPT	2	51
RDCV45C		Remote	Coupling		
DCV45T1D		Integral*	NPT		
DCV45C1D		Integral*	Coupling		
RDCV50T	2"	Remote	NPT	2	106
DCV50T1D		Integral*	NPT		
RDCV62T	2-1/2"	Remote	NPT	2	136
DCV62T1D		Integral*	NPT		
RDCV76T	3"	Remote	NPT	2	167
DCV76T1D		Integral*	NPT		

* 110 VAC with DIN Connector.

SPECIFICATIONS

Service: Compatible gases, filtered and oil free.

Wetted Materials: Body: aluminum; Trim: 304 SS; Diaphragm and seals: NBR; Diaphragm disc: polyamide.

Other Materials: Cover: aluminum; Body bolts and spring: 304 SS.

Pressure Limits: Minimum of 4.4 psi (0.3 bar), maximum of 124.7 psi (8.6 bar).

Temperature Limits: Ambient: -4 to 140°F (-20 to 60°C) for RDCV models, -4 to 122°F (-20 to 50°C) for DCV models; Operating: -4 to 185°F (-20 to 85°C).

Power Requirements: 110 VAC, 220 VAC, or 24 VDC for DCV models.

Power Consumption: 12 W, inrush: 17 VA; holding: 14.5 VA for DCV models.

Electrical Connection: DIN connection for DCV models.

Enclosure Rating: NEMA 4X (IP65) for DCV models.

Process Connection: See model chart.

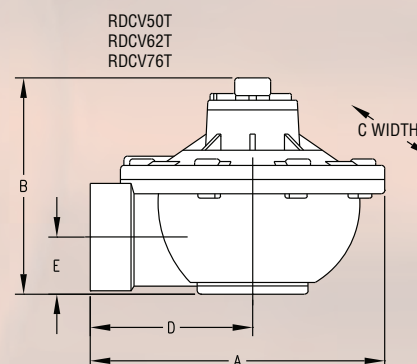
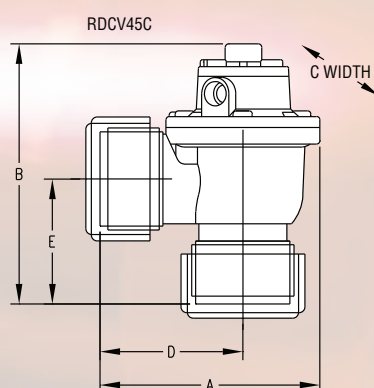
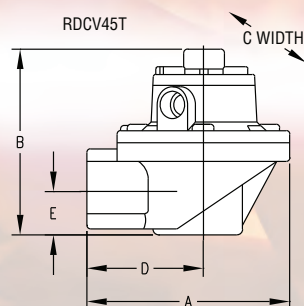
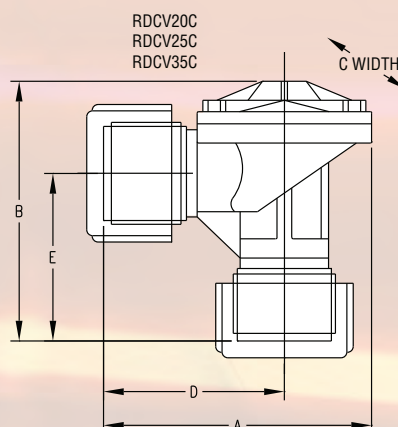
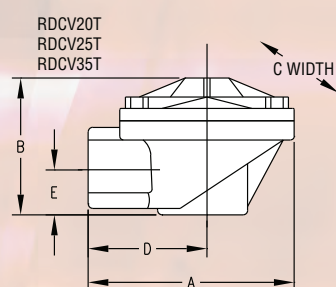
Mounting Orientation: Any position.

Agency Approvals: CE.

Series DCV/RDCV Model Guide

Construction	DCV	RDCV				Integrated Coil	Remote Coil
Size			20			3/4"	
			25			1"	
			35			1-1/2"	
			45			1-1/2" (2 Diaphragms)	
			50			2"	
			62			2-1/2"	
			76			3"	
Connection				T		NPT	
				C		Coupling (up to 1-1/2" only)	
Voltage				1		110 VAC (for integrated coil only)	
				2		220 VAC (for integrated coil only)	
				3		24 VDC (for integrated coil only)	
Electrical Connections					D	DIN (for integrated coil only)	

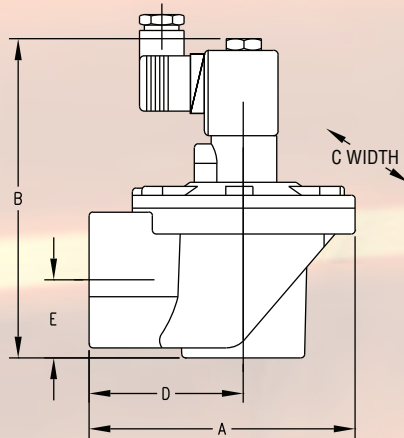
Remote Coil Valve



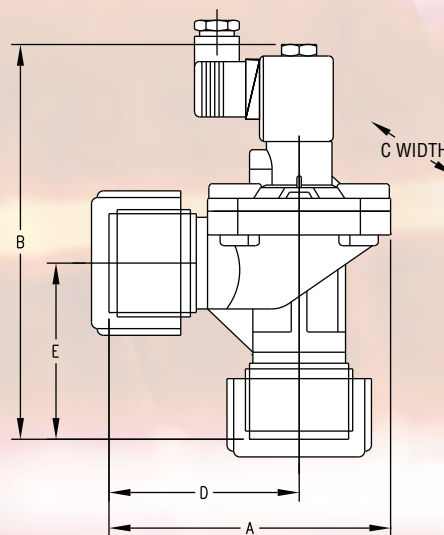
DIMENSIONAL CHART

Connection	Model Number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Weight lb (kg)
NPT	RDCV20T	3-15/16" (100)	2-31/32" (75)	3-7/16" (87)	2-3/16" (56)	25/32" (20)	1.12 (.51)
	RDCV25T	4-1/8" (105)	3" (76)	3-1/4" (83)	2-1/2" (64)	7/8" (22)	1.15 (.52)
	RDCV35T	5-1/8" (130)	4-29/32" (125)	4-3/8" (111)	4-1/2" (114)	1-9/32" (33)	2.0 (.91)
	RDCV45T	5-25/32" (147)	5-5/32" (131)	4-3/8" (111)	3-5/8" (91)	3" (76)	2.2 (1.0)
Coupling	RDCV50T	8-1/16" (205)	5-7/8" (149)	7-1/4" (184)	4-15/32" (113)	1-9/16" (40)	4.2 (1.9)
	RDCV62T	8-9/32" (210)	6-11/16" (170)	7-1/4" (184)	4-21/32" (118)	1-29/32" (48)	5.5 (2.5)
	RDCV76T	8-19/32" (218)	7-27/32" (199)	7-7/8" (200)	4-21/32" (118)	2-1/2" (63)	6.6 (3.0)
	RDCV20C	4-13/32" (112)	4" (102)	3-7/16" (87)	2-5/8" (67)	1-25/32" (45)	1.37 (.62)
	RDCV25C	4-5/8" (117)	5" (127)	3-1/4" (83)	3" (76)	2-3/4" (70)	2.1 (.96)
	RDCV35C	5-13/16" (147)	5-15/32" (139)	4-3/8" (111)	3-5/8" (91)	3" (76)	2.4 (1.1)
	RDCV45C	5-25/32" (147)	6-25/32" (172)	4-3/8" (111)	3-5/8" (91)	3" (76)	3.2 (1.45)

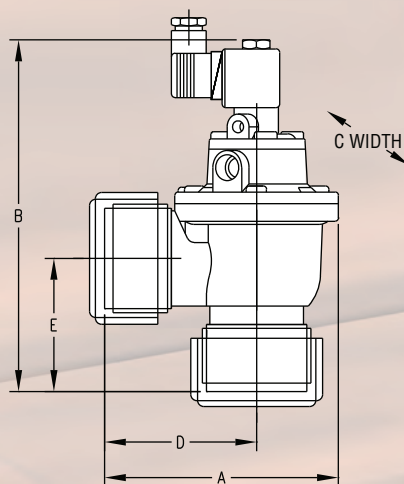
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DCV25T □ D
DCV35T □ D



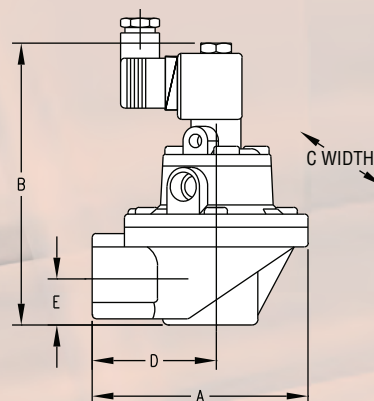
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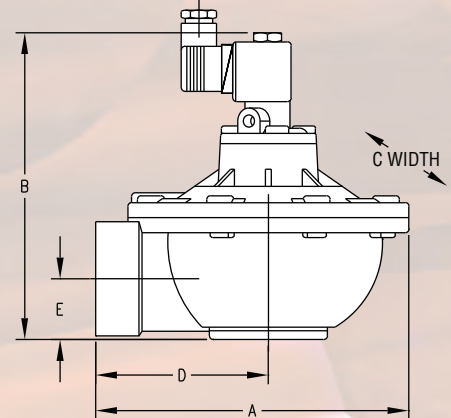
DCV45C □ D



DCV45T □ D



DCV50T □ D
DCV62T □ D
DCV76T □ D

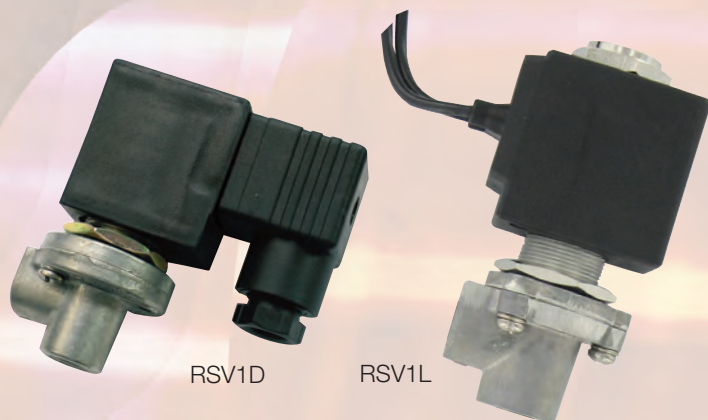


DIMENSIONAL CHART

Connection	Model Number	A (mm)	B(mm)	C (mm)	D(mm)	E (mm)	Weight lb (kb)
NPT	DCV20T_D	3-15/16" (100)	4-13/16" (122)	3-7/16" (87)	2-3/16" (56)	25/32" (20)	1.31 (.59)
	DCV25T_D	4-1/8" (105)	4-21/32" (126)	3-1/4" (83)	2-1/2" (64)	7/8" (22)	1.33 (.60)
	DCV35T_D	5-1/8" (130)	6-1/16" (154)	4-3/8" (111)	4-1/2" (114)	1-9/32" (33)	2.2 (.99)
	DCV45T_D	5-25/32" (147)	7-7/32" (183)	4-3/8" (111)	3-5/8" (91)	3" (76)	2.4 (1.1)
	DCV50T_D	8-1/16" (205)	7-29/32" (201)	7-1/4" (184)	4-15/32" (113)	1-9/16" (40)	4.4 (2.0)
	DCV62T_D	8-9/32" (210)	8-3/4" (222)	7-1/4" (184)	4-21/32" (118)	1-29/32" (48)	5.7 (2.6)
Coupling	DCV76T_D	8-19/32" (218)	9-7/8" (251)	7-7/8" (200)	4-21/32" (118)	2-1/2" (63)	6.8 (3.1)
	DCV20C_D	4-13/32" (112)	5-27/32" (148)	3-7/16" (87)	2-5/8" (67)	1-25/32" (45)	1.55 (.70)
	DCV25C_D	4-5/8" (117)	6-21/32" (177)	3-1/4" (83)	3" (76)	2-3/4" (70)	2.3 (1.0)
	DCV35C_D	5-13/16" (147)	7-21/32" (194)	4-3/8" (111)	3-5/8" (91)	3" (76)	2.6 (1.2)
	DCV45C_D	5-25/32" (147)	8-27/32" (224)	4-3/8" (111)	3-5/8" (91)	3" (76)	3.4 (1.5)

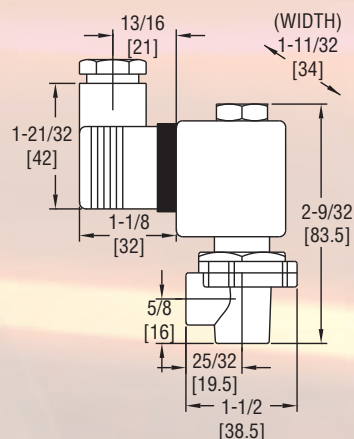
Pilot Solenoid Valve

For Use with Remote Valves



RSV1D

RSV1L



The **Series RSV Pilot Solenoid Valve** is used to operate the Series RDCV remote type diaphragm valve to air pulse clean filters in dust collectors. Series RDCV does not include an integral solenoid and needs to be activated remotely. The RSV can drive all size diaphragm valves. The units can be bought separately for mounting in a panel or can be purchased mounted on our SVE enclosure. Consult factory for mounting of RSV valves with our DCT timer boards together in one enclosure all pre-wired.

Model Number	Voltage	Electrical Connections	Cv
RSV1D	110 VAC	DIN	.33
RSV2D	220 VAC	DIN	.33
RSV3D	24 VDC	DIN	.33
RSV1L	110 VAC	Wire Leads	.33
RSV2L	220 VAC	Wire Leads	.33
RSV3L	24 VDC	Wire Leads	.33

SPECIFICATIONS

Service: Compatible gases, filtered and oil free.

Wetted Materials: Body: aluminum; Core and spring: 304 SS; Seals: NBR.

Pressure Limits: Minimum of 4.4 psi (0.3 bar), maximum of 124.7 psi (8.6 bar).

Temperature Limits: Ambient: -4 to 122°F (-20 to 50°C); Operating: -4 to 185°F (-20 to 85°C).

Power Requirements: 110 VAC, 220 VAC, or 24 VDC.

Power Consumption: 12 W, inrush: 17 VA, holding: 14.5 VA.

Enclosure Rating: NEMA 4X (IP65).

Electrical Connection: DIN connection or wire leads, 18 AWG, 22" (55 cm) long.

Process Connection: 1/8" female NPT.

Mounting Orientation: Any position.

Weight: 0.60 lb (0.27 kg).

Pneumatic Tube Length: Maximum of 9.8 ft (3 m).

Agency Approvals: CE.

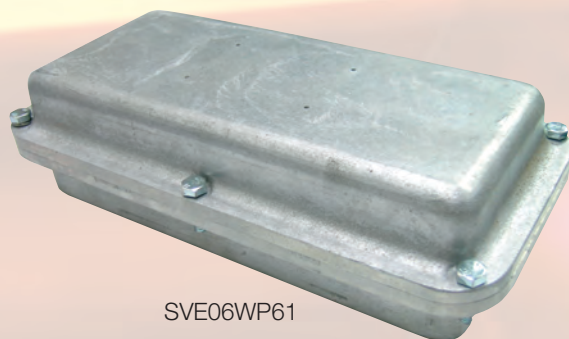
Series
SVE

Solenoid Valve Enclosure

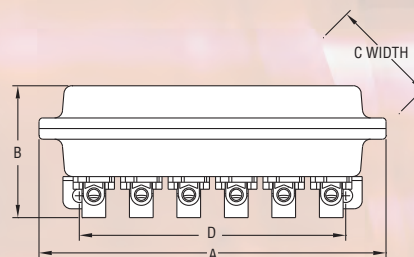
For the Series RSV Remote Solenoid Valves



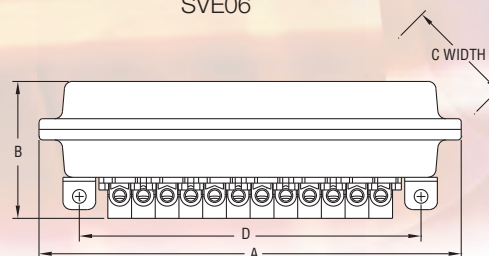
SVE06WP61



SVE06WP61



SVE06



SVE12

Model Number	A (mm)	B (mm)	C (mm)	D (mm)
SVE06	10-5/8" (270)	4-11/64" (106)	6-5/16" (160)	9-7/32" (234)
SVE12	18-29/32" (480)	4-11/64" (106)	6-5/16" (160)	17-9/16" (446)

The Series SVE are multi-valve enclosures for the RSV pilot valve. The SVE offers a convenient weatherproof enclosure package with all solenoids pre-wired to a terminal block. Enclosures are available in 6 or 12 valve size with choice of pilot valve voltage.

Series SVE Enclosure Model Guide

Solenoid Valve Enclosure	SVE				Enclosure for solenoid valves
Valve Enclosure Size		06			6 solenoid channels
		12			12 solenoid channels
Enclosure Type			WP		Weatherproof enclosure
Solenoids Fitted				02	2 Solenoids fitted
				03	3 Solenoids fitted
				04	4 Solenoids fitted
				05	5 Solenoids fitted
				06	6 Solenoids fitted
				07	7 Solenoids fitted
				08	8 Solenoids fitted
				09	9 Solenoids fitted
				10	10 Solenoids fitted
				11	11 Solenoids fitted
				12	12 Solenoids fitted
Voltage				1	110 VAC
				2	220 VAC
				3	24 VDC

Note: Maximum quantity of pre-fitted solenoids can not exceed the underlined number.

SPECIFICATIONS

Service: (For RSV) Compatible gases, filtered and oil free.

Wetted Materials: (For RSV) Body: aluminum; Core and spring: 304 SS; Seals: NBR.

Pressure Limits: (For RSV) Minimum of 4.4 psi (0.3 bar), maximum of 124.7 psi (8.6 bar).

Temperature Limits: Ambient: -4 to 122°F (-20 to 50°C); Operating: -4 to 185°F (-20 to 85°C).

Power Requirement: (For RSV) 110 VAC, 220 VAC, or 24 VDC.

Power Consumption: (For RSV) 12 W, inrush: 17 VA, holding: 14.5 VA.

Enclosure Rating: NEMA 4X (IP65).

Enclosure Material: Anodized aluminum with NBR gasket.

Electrical Connection: All RSV are pre-wired to a terminal strip.

Process Connection: (For RSV) 1/8" female NPT. (Consult factory for 1/4" NPT).

Conduit Connection: 3/4" female NPT.

Mounting Orientation: Any position.

Pneumatic Tube Length: Maximum of 9.8 ft (3 m).

Model Number	Quantity of Solenoid	Enclosure Type	Voltage
SVE06WP61	6	Weatherproof	110 VAC
SVE06WP62	6	Weatherproof	220 VAC
SVE06WP63	6	Weatherproof	24 VDC
SVE12WP121	12	Weatherproof	110 VAC
SVE12WP122	12	Weatherproof	220 VAC
SVE12WP123	12	Weatherproof	24 VDC

DIAPHRAGM &
SOLENOID

Series
BHC

Bulk Head Connector

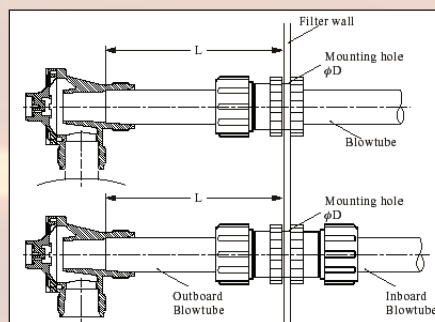
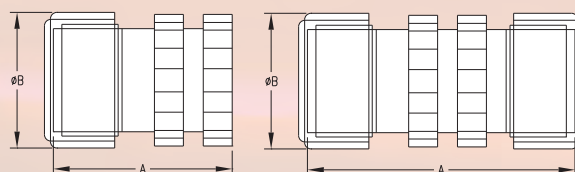
Coupling Accessories



BHC35DD



BHC35D



Series BHC Bulk Head Connectors allow for easy installation of blow tube through the dust collector wall and eliminate the need for welding or use of additional flanges. The fittings enable easy removal and reassembly of blow tubes for cleaning and maintenance. BHC models are available in single connection for through tube mounting or double connection for two piece tube mounting.

Model Number	Size	Connection
BHC20D	3/4"	One
BHC20DD	3/4"	Two
BHC25D	1"	One
BHC25DD	1"	Two
BHC35D	1-1/2"	One
BHC35DD	1-1/2"	Two

Model Number	A in (mm)	B in (mm)	D in (mm)	Min L in (mm)
BHC20D	2-3/8" (60.5)	2-5/16" (58.5)	1-25/32" to 2"	3-27/32"
BHC20DD	3-19/32" (91)	2-5/16" (58.5)	(45 to 51)	(97)
BHC25D	2-23/32" (69)	2-3/4" (70)	2-7/32" to 2-7/16"	4-21/32"
BHC25DD	3-31/32" (101)	2-3/4" (70)	(56 to 62)	(118)
BHC35D	2-15/16" (75)	3-15/32" (88)	2-27/32" to 3-1/16"	6-3/16"
BHC35DD	4-11/32" (110)	3-15/32" (88)	(72 to 78)	(157)

SPECIFICATIONS

Service: Compatible gases.

Wetted Material: Body, Ring nut, DIN nut: aluminum; Washer: SS41; Gasket: NBR.

Pressure Limits: 124.7 psi (8.6 bar).

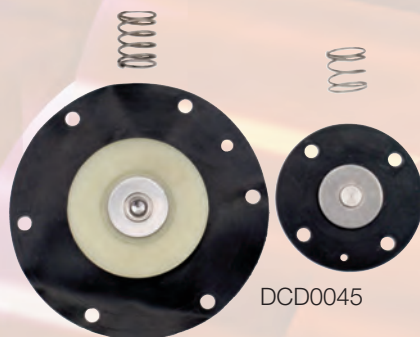
Temperature Limits: -4 to 185°F (-20 to 85°C).

Series
DCD

Repair Kit

Diaphragm Replacements for Series DCV/RDCV

DIAPHRAGM &
SOLENOID



DCD0045



DCD0035



DCD0020

Series DCD are replacement diaphragm kits for the Series DCV/RDCV valves. This kit includes the standard wearing parts of the valve for field replacement.

SPECIFICATIONS

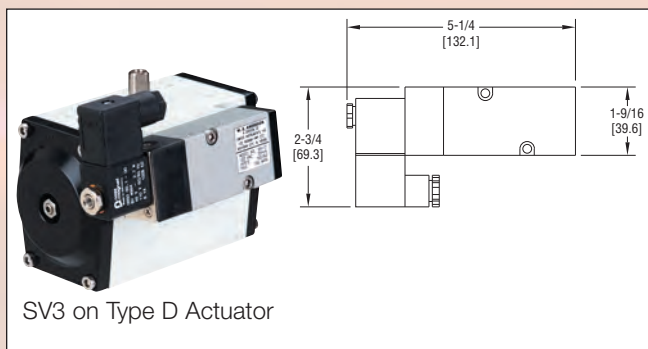
Materials: Diaphragm: NBR; Disc: polyamide; Spring: 304 SS.

Model Number	Diaphragm Valve Size	Model Number	Diaphragm Valve Size
DCD0020	3/4"	DCD0050	2"
DCD0025	1"	DCD0062	2-1/2"
DCD0035	1-1/2"	DCD0076	3"
DCD0045	1-1/2" (Dual)		

Note: All model numbers include the necessary quantity of replacement diaphragms along with the spring.

Series SV3 Solenoid Valve

Direct Mounts to NAMUR Pneumatic Actuators



Series SV Solenoid Valve will electrically operate pneumatic actuators for on-off applications. When the solenoid valve receives the electrical input signal it switches the pneumatic supply pressure to the actuator, which moves the valve from the closed to open position. The next impulse to the solenoid valve will make the valve move back to the closed position. The low cost solenoid valve directly mounts onto pneumatic actuators with standard NAMUR mounting configuration eliminating external tubing and fittings. Buna-N O-rings are included to seal the valve ports to the side of the actuator. Standard features include a manual override, safety position by mechanical spring, and a NEMA 4X enclosure. Direct mounts onto D, S, J, F, C, DA, or SR actuators.

SPECIFICATIONS

Power Requirements: 120 VAC, 240 VAC, 24 VAC, 24 VDC, or 12 VDC.

Supply Pressure: 20 psi (1.4 bar) to 120 psi (8.3 bar).

Air Connections: 1/4" female NPT.

Temperature Limits: -40 to 140°F (-40 to 60°C).

Electrical Connections: Screw terminal.

Conduit Connection: 1/2" female NPT.

Enclosure Rating: NEMA 4X.

Mounting: NAMUR VDI/VDE 3845.

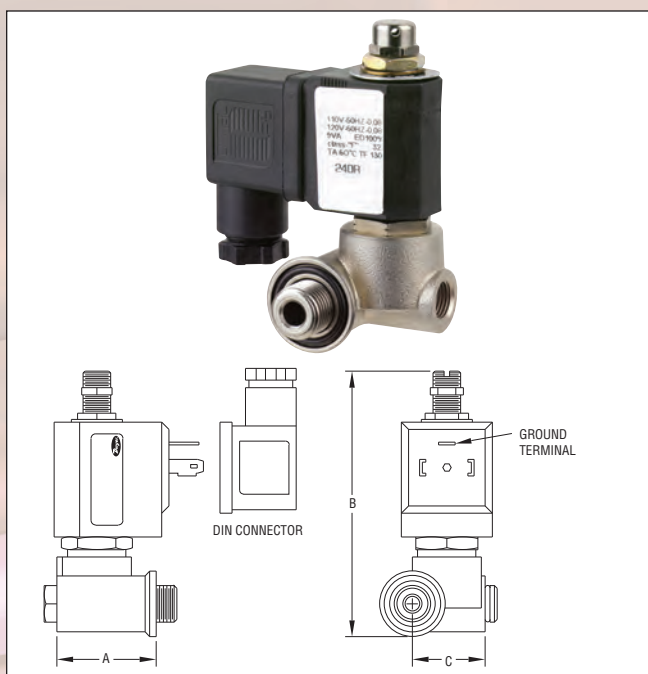
Standard Features: Manual override, mechanical spring safety position.

Optional Features: Other power voltages.

Model Number	Power
SV3	120 VAC
SV3-A	12 VDC
SV3-B	24 VDC
SV3-C	240 VAC
SV3-D	24 VAC

Series PV Solenoid Pilot Valve

Low Cost, Compact Design, For Use with SAV Angle Seat Valves



The Series PV three-way normally closed electro-pneumatic solenoid pilot valve can be direct mounted to operate the Series SAV Angle Seat Valve actuators. When the solenoid valve receives the electric input signal, it switches the pneumatic supply pressure to the actuator, which moves the valve from the closed to open position, or reversely for normally open valves. When the input to the solenoid valve stops, the pneumatic supply pressure is again blocked, and the valve returns to the normal position. Suitable for use with air or other inert gases, the valve is supplied with a DIN connector, and is fitted with a manual override. Water can also be used as a pilot media provided that a suitable drain line is attached to the exhaust outlet. Select the proper model according to the SAV valve actuator diameter and power requirements.

SPECIFICATIONS

Pilot Media: Air, water, or inert gases.

Power Requirements: See Model Chart.

Wetted Materials:

Body: Niploy coated brass.

Seal: FKM.

Maximum Supply Temperature: 150 psig.

Temperature Limits: 14 to 140°F (-10 to 60°C).

Actuator Connection: PV1_: 1/8" BSP; PV2_, PV3_: 1/4" BSP.

Pilot Media Connection: 1/8" NPT.

Coil Consumption:

PV1_, PV2_: AC: 9A (res.), 14A (ind.); DC: 6A.

PV3_: AC: 15A (res.), 30A (ind.); DC: 10A.

Mounting: Banjo connection.

Enclosure Rating: IP65 (with DIN connector).

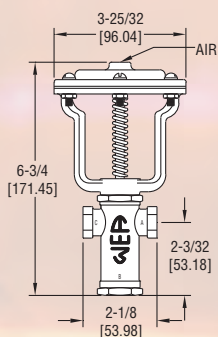
Standard Features: Manual override, DIN connector.

Model	Voltage	SAV Actuator Diameter	DIMENSIONS		
			A in. (mm)	B in. (mm)	C in. (mm)
PV11	240VAC	1-3/4"	1-1/4 (31.8)	3-1/32 (77.0)	1-1/16 (27.0)
PV12	120VAC				
PV13	24VAC				
PV14	24VDC	2-1/2"	1-3/8 (35.0)	3-1/16 (77.8)	1-1/16 (27.0)
PV21	240VAC				
PV22	120VAC				
PV23	24VAC				
PV24	24VDC	3-9/16"	1-3/8 (35.0)	3-3/4 (95.3)	1-1/16 (27.0)
PV31	240VAC				
PV32	120VAC				
PV33	24VAC				
PV34	24VDC				

Series
2V

Pneumatic Pilot Valve

Two-Way and Three-Way Valves — Air — Water — Gas — Steam Service



POPULAR MODELS

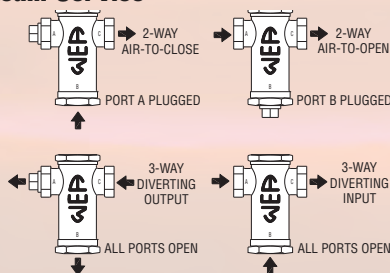
Model Number	Operation
2VA14000	TWO-WAY, AIR-TO-CLOSE
2VB14000	TWO-WAY, AIR-TO-OPEN
2VJ14000	THREE-WAY

W.E. Anderson Series 2V

Pneumatic Pilot Valves are compact, combination Two-Way/Three-Way globe valves. Minimal actuator volume and short valve stroke combine to deliver quick, positive action. Ideal for use in boosting response time of diaphragm actuators or as lock-in/lock-out devices.

Suggested Specification

Pneumatic Pilot Valve shall be 2-Way/ 3-Way design in compact size. Body shall be precision-machined Cast Bronze suitable for air, water, gas or steam service with tight shutoff at maximum fluid operating pressures. Actuator shall be of rugged Cast Iron construction with readily accessible spring compression nuts permitting easy pneumatic range adjustment. Pneumatic Pilot Valve shall be W.E. Anderson Model No. ____ configured for (2-Way, Air-To-Close) (2-Way, Air-To-Open) (3-Way) operation.



When used as a 3-Way pilot, ports "A" and "C" are connected when the diaphragm is inflated.
CAUTION: Use of an actuator supply gas other than air can create a hazardous environment because a small amount of gas continuously vents to atmosphere.

SPECIFICATIONS

VALVE BODY

Service: Compatible liquids, gases, and steam.

Line Size: 1/4".

Body Style: 2-way or 3-way globe.

End Connections: Female NPT.

Pressure Limit: Gases and liquids: 100 psi (7.00 bar) @ 170°F (77°C), Steam: 60 psi (4.14 bar) @ 274°F (134°C).

Wetted Materials:

Body Material: Bronze.

Trim: Composition.

Stuffing Box: Brass.

Packing: Rope.

Temperature Limits: Gases and liquids: 170°F (77°C), Steam: 274°F (134°C).

Flow Rate: Cv is 1.5 at 100% open.

Weight: 2.6 lb (1.2 kg).

ACTUATOR

Type: Pneumatic spring/diaphragm.

Control Signal: 0 to 30 psi (0 to 2.07 bar).

Air Connection: 1/8" female NPT.

Diaphragm: Natural rubber, cotton insert.

Diaphragm Support Plate, Housing,

Yoke: Cast Iron.

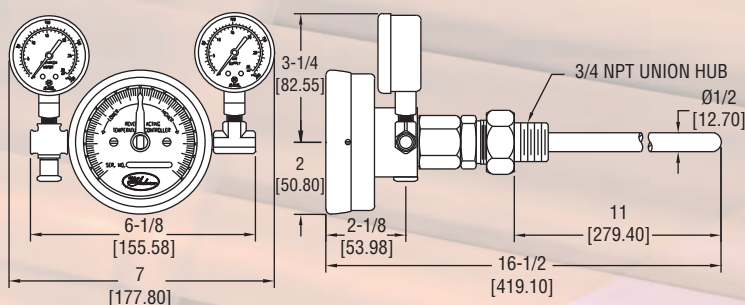
Spring: Plated Steel.

Temperature Limit: 150°F (66°C).

Series
7R

Temperature Controller

Low Cost, Choose Direct or Reverse Acting



Low Cost Series 7R Temperature Controller provides excellent process control when combined with the Hi-Flow™ Pneumatic Control Valve. This rugged unit utilizes time-proven bi-metal technology and can be installed in any position for application flexibility. The tamper resistant knob assures reliable, continuous operation. Precision gages provide accurate indication of supply pressure as it passes into the controller and outlet pressure into the pneumatic actuator.

Caution: Use of a supply gas other than air can create a hazardous environment because a small amount of gas is continuously vented to atmosphere.

POPULAR MODELS

MODEL NO.	ACTION
7RD314	Direct
7RR314	Reverse

SPECIFICATIONS

Supply Pressure: 20 psig (1.37 bar).

Temperature Range: 32 to 250°F (0 to 121°C).

Output: 3 to 15 psi (0.21 to 1.03 bar)

Wetted Materials: 304 stainless steel.

Process Connection: 3/4" male NPT union hub.

Air Connections: 1/8" female NPT.

Weight: 4.125 lb (1.87 kg)

Temperature Setpoint Scale: Arbitrary linear.

Standard Features: Pneumatic input and output gages.

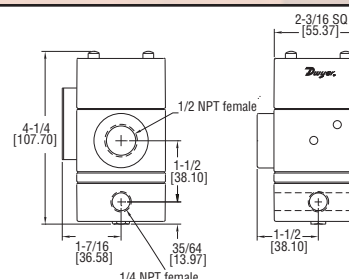
Suggested Specification

Temperature controller shall be installed for (direct)(reverse) acting service. Unit shall have adjustable tamper resistant knob. The outer stem shall be type 304 stainless steel welded construction, 12 inches (30.5 cm) long. The inner rod shall be constructed of invar nickel steel. Process connection shall be 3/4" NPT. Controller shall be W.E. Anderson Model No. 7R(D)(R)314.

Series
IP

Current to Pressure Transducer

Intrinsically Safe, NEMA 4X Enclosure, Field Reversible, Low Cost



The **Series IP Current to Pressure Transducer** converts a current input signal to a linearly proportional pneumatic output pressure. The features include built-in volume booster, low air consumption, field reversible (provides output which is inversely proportional to input signal) and flexible zero and span adjustments. The rugged NEMA 4X enclosure allows splashdown and outdoor installation. The IP can be used for applications that require operation of valve actuators, pneumatic valve positioners, damper and louver actuators, final control elements, relays, air cylinders, web tensioners, clutches and brakes.

Model Number	Input Ranges	Output Range	
		psi	kPa
IP-42	4-20 mA	3-15	20-100
IP-43	4-20 mA	3-27	20-185
IP-44	4-20 mA	6-30	40-200

SPECIFICATIONS

Service: Oil free, clean dry air filtered to 40 microns.

Input Signal: 4-20 mA.

Input Impedance: IP-42: 180 ohms; IP-43 and IP-44: 220 ohms.

Air Pressure: Minimum: 3 psig (21 kPa) above maximum output; Maximum: 100 psig (700 kPa).

Linearity: $\pm 0.75\%$ of span.

Hysteresis: $< 1\%$ of span.

Repeatability: $< 0.5\%$ of span.

Supply Pressure Sensitivity: $< \pm 0.1\%$ of span per psig ($\pm 0.15\%$ of span per 10 kPa).

Power Requirements: Loop-powered.

Temperature Limits: -20 to 140°F (-30 to 60°C).

Pressure Connections: 1/4" female NPT.

Electrical Connection: 1/2" female NPT.

Air Consumption: 0.03 SCFM (0.5 m³/h) typical.

Output Capacity: 4.5 SCFM (7.6 m³/h ANR) at 25 psig (175 kPa) supply; 12 SCFM (20 m³/h) at 100 psig (700 kPa) supply.

Relief Capacity: 2 SCFM (3.4 m³/h) at 5 psig (35 kPa) above 20 psig (140 kPa) setpoint.

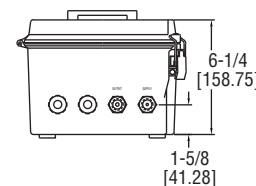
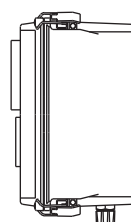
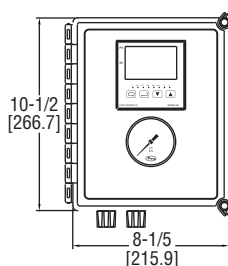
Weight: 2.1 lb (0.94 kg).

Agency Approvals: CE, FM.

Series
EP1000

Electro-pneumatic Controller

Low Cost, Easy Installation, Weatherproof, Fully Programmable Controller



Stop wasting time and money trying to find a suitable location to mount your controller and current to pressure transducer - The Series EP1000 Electro-pneumatic Controller combines the highest quality instrumentation in one compact NEMA 4X enclosure for easy, low cost installation. Simply provide a supply pressure and voltage with a standard thermocouple, RTD, DC voltage or DC current input to this unit and a traditional pneumatic process quickly converts to a state-of-the-art electronic operation. The versatile microprocessor based controller incorporates a high level of standard features. Typical function setup items appear in the control menu only when the function is selected, so you don't have to wade through unnecessary items. Standard features include Self-Tune, fully adjustable PID and Auto/Manual control. Combine this versatile controller with the Hi-Flow™ Valve for excellent process operation in industries like food and beverage processing, pulp and paper, chemical and pharmaceutical.

Model	Output Range psi (bar)
EP1000	3 to 15 (0.21 to 1.03)
EP1011	6 to 30 (0.41 to 2.07)

SPECIFICATIONS

Front Panel Selectable

Inputs: Thermocouple, RTD, DC voltage or DC current.

Supply Pressure: Minimum: EP1000: 18 psig (1.24 bar); EP1011: 33 psig (2.28 bar).

Maximum: 100 psig (6.89 bar).

Output: EP1000: 3 to 15 psig (0.21 to 1.03 bar);

EP1011: 6 to 30 psig (0.41 to 2.07 bar).

Accuracy: $\pm 1.0\%$ of span.

Linearity: $\pm 0.75\%$ of span.

Hysteresis: $\pm 1.0\%$ of span.

Repeatability: $\pm 0.5\%$ of span.

Power Requirements: 100 to 240 VAC, 50/60 Hz.

Temperature Limits: 32 to 122°F (0 to 50°C).

Pressure Connections: 1/4" female NPT.

Air Consumption: 0.03 scfm (0.5 m³/h) typical.

Output Capacity: 4.5 scfm (7.6 m³/h) at 25 psig (1.72 bar) supply; 12 scfm (20 m³/h) at 100 psig (6.89 bar) supply.

Enclosure: NEMA 4X.

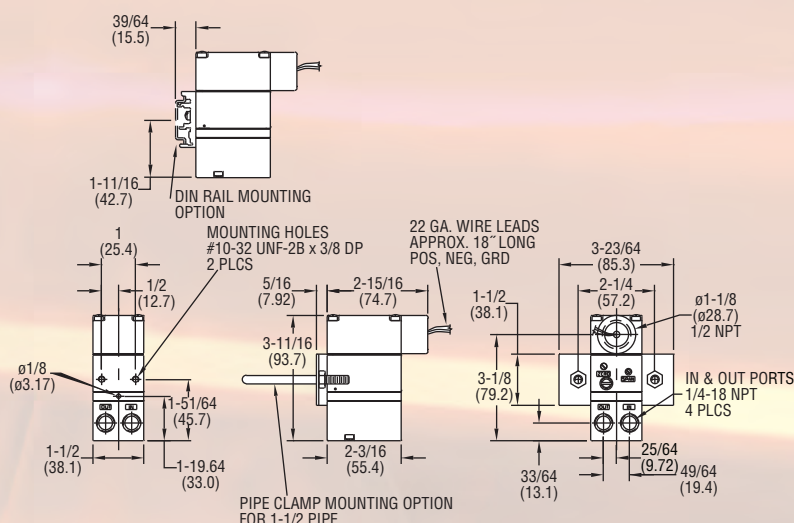
Weight: 8 lb 1 oz (3.67 kg).

1 to 15 &
POSITIONERS

Series
2700

Current to Pressure Transducer

NEMA 4X Enclosure, Compact Size, Reliable, Vibration Resistant



The **Series 2700 Current to Pressure Transducer** combines economical startup cost, low air consumption, and reliable performance to make the 2700 a great investment. The unit converts a variable current signal to a proportional pneumatic output. It has input and output ports on both the front and back which allows for versatile plumbing. The NEMA 4X enclosure enables the unit to be installed indoors or outdoors, however, the unit is not vibration resistant. It is FM and CSA approved for intrinsically safe operation. The 2700 is designed for remote or panel mounting. An integral volume booster provides high flow capacity, increasing control speed in critical applications. Other features include external zero and span adjustments which are convenient for field calibration.

SERIES 2700 MODELS

Model Number	Input	Output
2713-WP	4-20 mA	3-15 psig (0.2-1.0 bar)
2716-WP	4-20 mA	6-30 psig (0.4-2.1 bar)

ACCESSORIES

A-181 DIN Rail Mounting Kit, suitable for EN-50035, EN-50042, and EN-50022 rails

A-182 Pipe Mounting Kit, for 1-1/2 and 2" pipes

SPECIFICATIONS

Service: Oil free, clean dry air filtered to 40 microns.

Input Signal: 4-20 mA.

Air Supply: Minimum: 5 psig (0.3 bar) above maximum output; Maximum: 100 psig (6.9 bar).

Output: 3 to 15 psig (0.2 to 1.0 bar), 6 to 30 psig (0.4 to 2.1 bar).

Linearity: $\leq \pm 0.5\%$ of span.

Hysteresis: $< 0.5\%$ of span.

Repeatability: $< 0.5\%$ of span.

Supply Pressure Sensitivity: $< 0.1\%$ of span per 1.0 psig (0.1 bar).

Power Requirement: Loop powered.

Temperature Limits: -20 to 150°F (-29 to 66°C).

Pressure Connections: 1/4" female NPT.

Electrical Connection: 1/2" female NPT.

Air Consumption: 0.03 scfm (0.01 l/s) at midrange typical.

Output Capacity: 4.5 scfm (2.1 l/s) at 25 psig (1.7 bar) supply; 12.0 scfm (5.7 l/s) at 100 psig (6.9 bar) supply.

Enclosure: Chromate-treated aluminum with epoxy paint.

Enclosure Rating: NEMA 4X (IP65) and intrinsically safe.

Weight: 1.3 lb (0.59 kg).

Agency Approvals: CE, CSA, FM.

FM Intrinsically Safe Ratings:

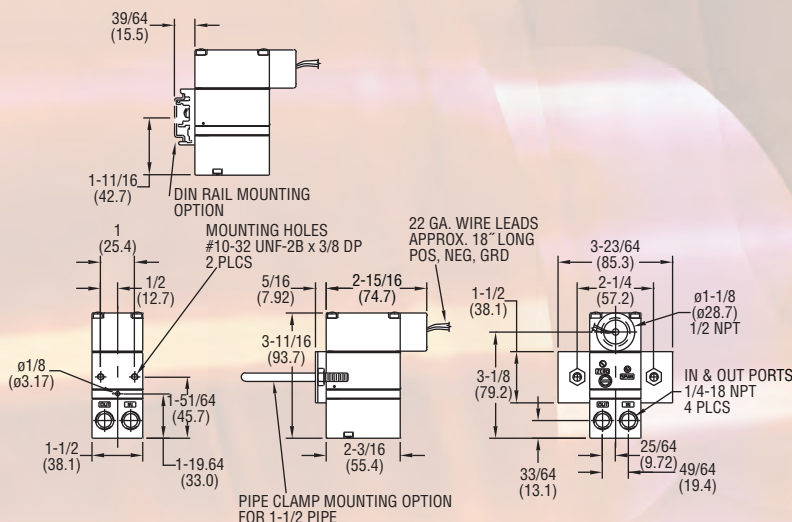
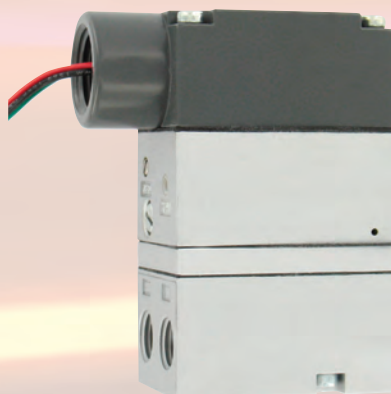
Class I, II, III, Division 1, Groups C, D, E, F and G; Class I, Division 2, Groups A, B, C and D; Class II and III, Division 2, Groups F and G.

CSA Intrinsically Safe Ratings: Class I, Division 2, Groups C and D; Class II, Groups E, F and G; Class III.

Series
2800

Current to Pressure Transducer

NEMA 4X Enclosure, Compact Size, Reliable, Vibration Resistant



The Series 2800 Current to Pressure Transducer utilizes a closed loop pressure feedback system that closely controls output and compensates for vibration, mounting angle, temperature, and supply pressure variations. These characteristics make this unit ideal for field mounting on a valve. The control mechanism is a piezoceramic actuator encapsulated in a protective skin, which provides a constant defense against humidity and contaminants. These features make this unit ideal for use in demanding applications. The 2800 also comes in a NEMA 4X enclosure and is field reversible. It is FM and CSA approved intrinsically safe, as well. For ease of installation, this model has input and output ports on both the front and back and can be easily panel mounted.

SERIES 2800 MODELS

Model Number	Input	Output
2813-WP	4-20 mA	3-15 psig (0.2-1.0 bar)
2816-WP	4-20 mA	6-30 psig (0.4-2.1 bar)

ACCESSORIES

A-180 Valve Mounting Kit, for Hi-Flow™ control valves

A-181 DIN Rail Mounting Kit, suitable for EN-50035, EN-50042, and EN-50022 rails

A-182 Pipe Mounting Kit, for 1-1/2 and 2" pipes

Valve Mount: For factory mounting and calibration to Hi-Flow™ control valves, add Current-to-Pressure Transducer model number as suffix

SPECIFICATIONS

Service: Oil free, clean dry air filtered to 40 microns.

Input Signal: 4-20 mA.

Air Supply: Minimum: 5 psig (0.3 bar) above maximum output; Maximum: 100 psig (6.9 bar).

Output: 3 to 15 psig (0.2 to 1.0 bar), 6 to 30 psig (0.4 to 2.1 bar).

Accuracy: ±0.1% of span.

Hysteresis: ±0.1% of span.

Repeatability: ±0.1% of span.

Deadband: 0.02% of span.

Power Requirement: Loop powered.

Temperature Limits: Operating: -40 to 160°F (-40 to 71°C); Storage: -40 to 200°F (-40 to 93°C).

Pressure Connections: 1/4" female NPT.

Electrical Connection: 1/2" female NPT.

Air Consumption: 0.025 scfm (0.01 l/s) at midrange typical.

Output Capacity: 4.5 scfm (2.1 l/s) at 25 psig (1.7 bar) supply; 12.0 scfm (5.7 l/s) at 100 psig (6.9 bar) supply.

Enclosure: Chromate-treated aluminum with epoxy paint.

Enclosure Rating: NEMA 4X (IP65) and intrinsically safe.

Weight: 0.8 lb (0.37 kg).

Agency Approvals: CE, CSA, FM.

FM Intrinsically Safe Ratings:

Class I, II, and III, Division 1, Groups C, D, E, F, and G; Class I, Zone 0, Group IIB; Class I, II, and III, Division 2, Groups A, B, C, D, F, and G.

CSA Intrinsically Safe Ratings:

Class I, Division 2, Groups A, B, C and D; Class II, Division 2, Groups F and G; Class III.

I to Ps &
POSTIONERS

Electro-Pneumatic Transducer

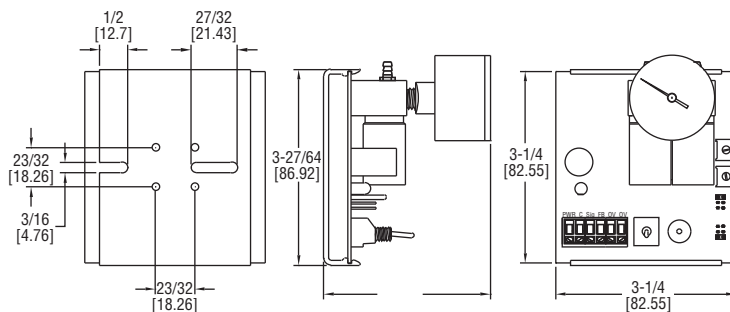
Low Cost, Selectable Input/Output, Manual Override



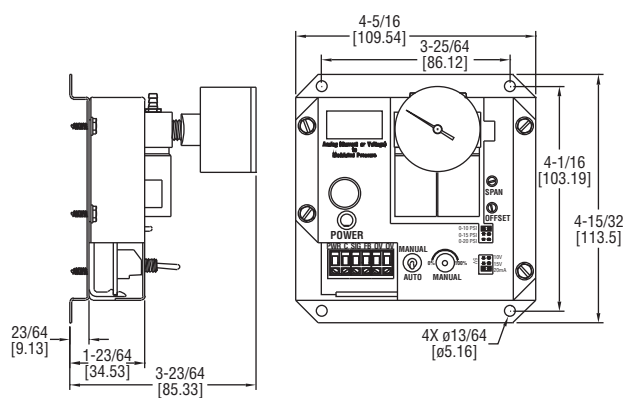
EPTA-B



EPTA-S



SHOWN WITH SNAP-TRACK MOUNTING



SHOWN WITH METAL BRACKET MOUNTING

The Series EPTA is an electric to pneumatic transducer that converts an analog input signal to a linearly proportionate pneumatic output by modulating its control valves to regulate branch line pressure to the set point determined by the input signal. All models incorporate two low voltage valves, an integral in-barb filter, a 0 to 30 psi analog gauge, an anodized aluminum manifold, and brass barbed fittings. The EPTA offers adjustable span and offset as well as manual override. This unit has no air consumption and is immune to mounting orientation. Output pressure ranges include field selectable 0 to 10, 0 to 15, and 0 to 20 psig. Also included is an analog 0 to 5 VDC feedback signal indicating the resultant branch line pressure. Universal 24 VAC/24 VDC supply voltage and field selectable 4 to 20 mA, 0 to 5 VDC, 0 to 10 VDC, or 0 to 15 VDC inputs ensure single unit compatibility with most systems. The standard models maintain branch pressure on power loss while the Fail-Safe models will drop the branch pressure to 0 psi on power loss. Mounting configurations include a metal bracket mount in the EPTA-B models and a snap-track mount in the EPTA-S models. The A-400 accessory kit will allow the EPTA-S models to be mounted on a standard DIN rail.

SPECIFICATIONS

Service: Clean dry air or any inert gas.

Input Signal: DC Current (4-20 mA) or DC Voltage (0-5/0-10/0-15).

Input Impedance:

Current: 250 ohms.

Voltage: Infinite.

Output Signal: Jumper selectable 0-10 psig (0-69 kPa), 0-15 psig (0-103 kPa), or 0-20 psig (0-138 kPa).

Feedback Output: 0 to 5 VDC.

Air Supply: 25 psig (172 kPa) maximum.

Air Flow: 750 scim.

Air Consumption: 0 scim normal operation, Fail-Safe model vents to 0 psi on power loss.

Accuracy:

±1.0% Full Scale @ room temperature.

±2.0% Full Scale @ 32 to 120°F (0 to 48.8°C).

Supply Voltage: 24 VDC (+10%/-5%) or 24 VAC (±10%) 50/60 Hz.

Supply Current: 180 mA maximum, 200 mA maximum on Fail-Safe model.

Temperature Limits:

Operating: 32 to 120°F (0 to 48.8°C).

Storage: -20 to 150°F (-6.7 to 65.6°C).

Operating Humidity Range: 5 to 95%, non-condensing.

Pressure Connections: 1/4" O.D. (polyethylene tubing optimum).

Electrical Connections: Plug-in Block Terminal type with 5mm pin spacing.

Wire Size: Up to one 14 AWG per terminal.

Weight: EPTA-S0: 6.9 oz. (196 g), EPTA-S1: 9.2 oz. (261 g), EPTA-B: 14.5 oz. (411 g).

Model No.	Description
EPTA-S0	Standard Snap-Track Mount Transducer
EPTA-B0	Standard Metal Bracket Mount Transducer
EPTA-S1	Snap-Track Mount Transducer with Fail-Safe
EPTA-B1	Metal Bracket Mount Transducer with Fail-Safe

ACCESSORIES

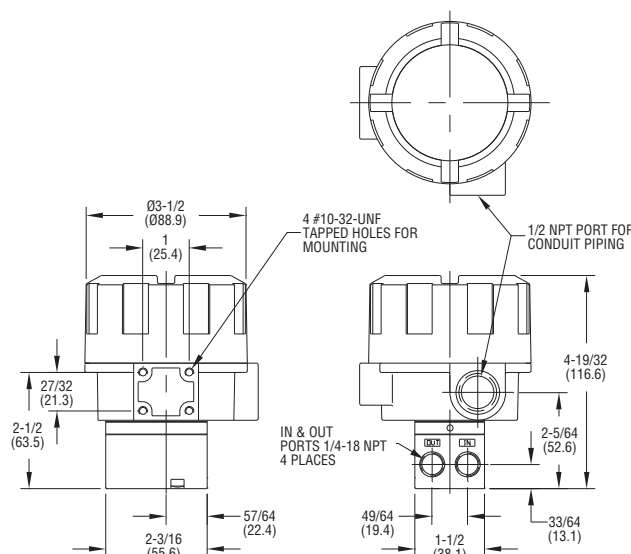
A-400, DIN Mounting Kit

A-403, Replacement Integral Barb Filter

Series
2900

Current to Pressure Transducer

Intrinsically Safe, Explosion-Proof, NEMA 4X Enclosure



The **Series 2900 Current to Pressure Transducer** delivers reliable high performance for the toughest applications in the most hazardous environments. Its NEMA 4X housing is designed and FM and CSA approved for both Intrinsically Safe and Explosion-proof operation. This unit has advanced circuitry which includes electronic feedback control for superior vibration protection and highly accurate output. The 2900 is not position sensitive and the easily accessible zero and span adjustments make field calibration quick and easy. For ease of installation, this model has input and output ports on both the front and back. It is also not vibration sensitive, which makes the 2900 ideal for field mounting on a valve. These features coupled with the unit's compact size help make set-up and installation simple.

FEATURES

- Designed for Hazardous Environments
- Vibration Resistant
- Explosion-Proof
- Weatherproof and Intrinsically Safe

Model Number	Input	Output
2913-E	4-20 mA	3-15 psig (0.2-1.0 bar)
2916-E	4-20 mA	6-30 psig (0.4-2.1 bar)

ACCESSORIES

A-180 Valve Mounting Kit, for Hi-Flow™ control valves

Valve Mount: For factory mounting and calibration to Hi-Flow™ control valves, add Current-to-Pressure Transducer model number as suffix

SPECIFICATIONS

Service: Oil free, clean dry air filtered to 40 microns.

Input Signal: 4-20 mA.

Air Supply: Minimum: 5 psig (0.3 bar) above maximum output; **Maximum:** 100 psig (6.9 bar).

Output: 3 to 15 psig (0.2 to 1.0 bar), 6 to 30 psig (0.4 to 2.1 bar).

Accuracy: ±0.1% of span.

Hysteresis: ±0.1% of span.

Repeatability: ±0.1% of span.

Deadband: 0.02% of span.

Power Requirement: Loop powered.

Temperature Limits: Operating: -40 to 160°F (-40 to 71°C); Storage: -40 to 200°F (-40 to 93°C).

Pressure Connections: 1/4" female NPT.

Electrical Connection: 1/2" female NPT.

Air Consumption: 0.05 scfm (0.02 l/s) at midrange typical.

Output Capacity: 4.5 scfm (2.1 l/s) at 25 psig (1.7 bar) supply; 12.0 scfm (5.7 l/s) at 100 psig (6.9 bar) supply.

Enclosure: Chromate-treated aluminum with epoxy paint.

Enclosure Rating: Weatherproof NEMA 4X (IP65), Explosion-proof and intrinsically safe.

Weight: 1.8 lb (0.82 kg).

Agency Approvals: CE, CSA, FM.

FM Ratings:

Explosion-proof for Class I Division 1, Groups B, C, and D; T6; Dust Ignitionproof for Class I, Division 1, Groups E, F, and G; T6; Intrinsically safe for Class I, II, and III, Division 1, Groups C, D, E, F, and G; T4 hazardous (classified) locations and intrinsically safe for Class I, Zone 0, Group IIB, T4 hazardous (classified) locations and suitable for Class I, Groups A, B, C, D, T4, and Class II and III, Division 2, Groups F and G; T6 hazardous (classified) locations.

CSA Ratings:

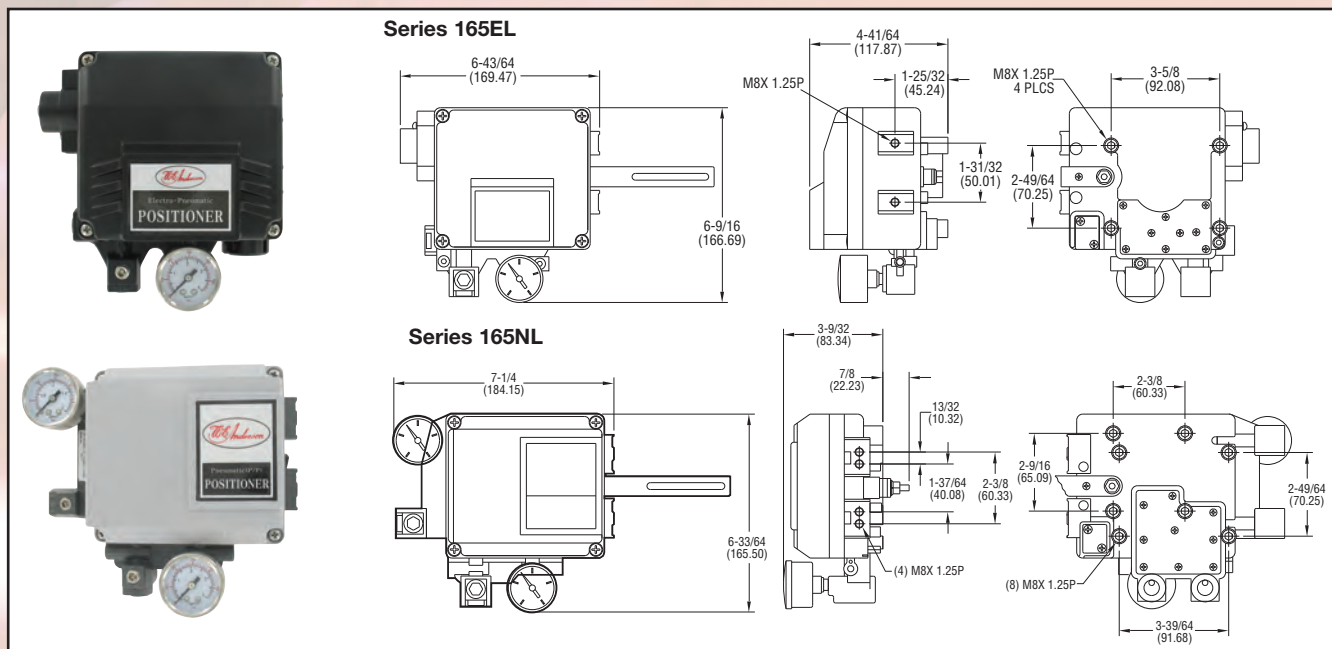
Class I Division 1, Groups B, C, and D; Class I, Division 2, Groups A, B, C and D; Class II, Division 1, Groups E, F, and G; Class II and III, Division 2, Groups F and G.

I to Ps &
POSTIONERS

Series
165

PRECISOR® II Pneumatic and Electro-Pneumatic Positioner

Low Cost, Linear Operation, Field Selectable Cam Design



The Series 165 PRECISOR® II Pneumatic and Electro-Pneumatic Positioners deliver stable process control at an exceptionally low price. Its rugged, durable design makes it ideal for harsh environments while maintaining precise, accurate positioning of the control element. Units can be easily changed from direct to reverse action, or vice versa. Low air consumption keeps operating costs at a minimum, while still responding quickly and accurately. Excellent for use in chemical processing, food and beverage, pulp and paper, and pharmaceutical industries, as well as many others.

Model No.	Input
165NL	3-15 psig
165EL	4-20 mA

How To Order:

1. Select Model No. to specify input control signal
2. For proper mounting hardware, order according to which actuator the positioner will be mounted to:

Mounting Kits

Model Number	For Actuator Models
A-233	220 and 221 Air-to-Lower
A-234	222 and 223 Air-to-Lower
A-235	230 and 231 Air-to-Raise
A-236	233 Air-to-Raise

Valve Mount: For factory mounting and calibration to Hi-Flow™ control valves, add suffix to valve model number of positioner. Example: 2004VA32-231-165EL

SPECIFICATIONS

Input Signal: Pneumatic: 3 to 15 psig (0.2 to 1 bar). Electro-Pneumatic: 4-20 mA DC.

Input Impedance: (165EL only): 250 ±15 Ohm.

Material: Aluminum diecasting.

Air Supply: 20 to 100 psig (1.4 to 6.9 bar).

Air Supply Connection: 1/4" NPT.

Gage Connection: 1/8" NPT.

Electrical Connection: Screw terminal.

Conduit Connection: 1/2" NPT (165EL only).

Linearity: ±0.2% of full scale.

Hysteresis: 1% of full scale.

Sensitivity: ±0.2% of full scale.

Repeatability: ±0.5% of full scale.

Air Consumption: 0.10 scfm (3 LPM) at 20 psig (1.4 bar) supply.

Flow Capacity: 28 scfm (80 LPM) at 20 psig (1.4 bar) supply.

Stroke: 0.5 to 6" (10 to 150 mm).

Enclosure Rating: IP66.

Operating Temperature: -4 to 160°F (-20 to 70°C).

Weight: 165NL: 3.1 lb (1.7 kg). 165EL: 6.1 lb (2.7 kg).

Agency Approvals: CE (165EL only).

APPLICATIONS

Series 165 PRECISOR® II Pneumatic and Electro-Pneumatic Positioners provide excellent modulating control when used between the Dwyer Temperature Controllers, Current to Pressure Transducer and the Hi-Flow™ Valve in such industries as the food and beverage processing, chemical, pharmaceutical, and wood pulp and paper.

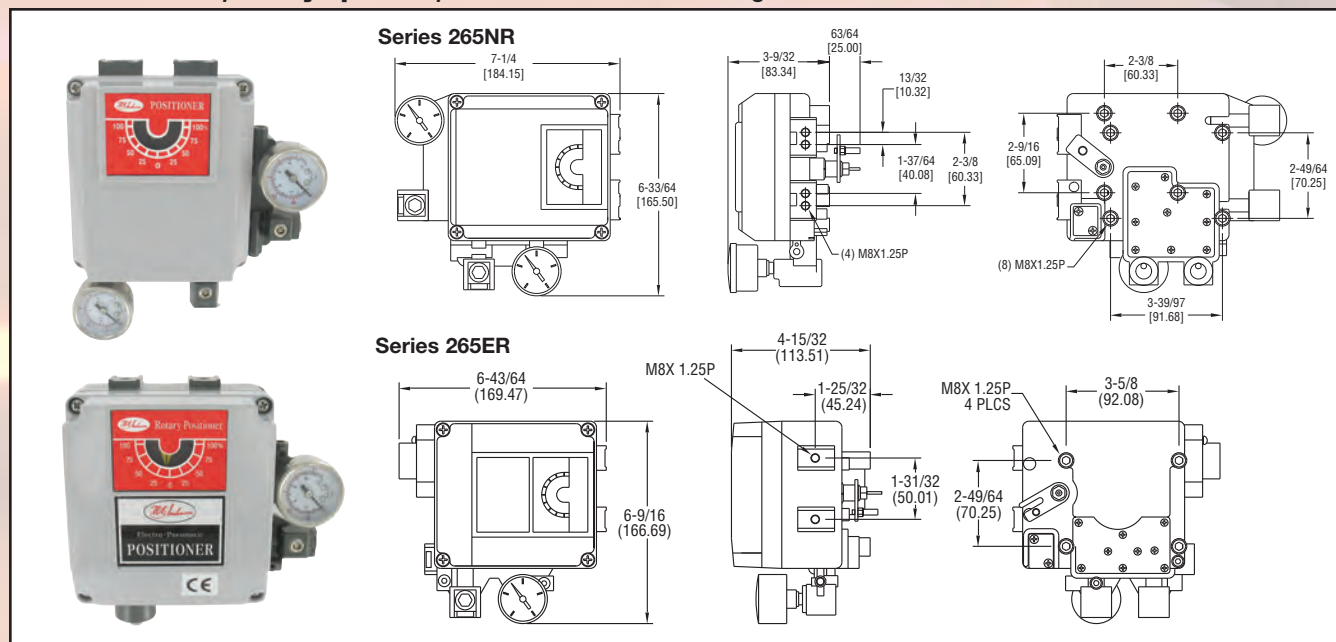
Suggested Specifications

Pneumatic and Electro-Pneumatic Positioners shall be cam characterized, with 0.5% full scale repeatability. The unit shall accept an input of 3-15 psig or 4-20 mA with capability of field-selectable modes of direct or reverse operation. Supply pressure shall be capable of 100 psig maximum. Unit shall be W.E. Anderson® Positioner Series 165.

Series
265

PRECISOR® II Pneumatic and Electro-Pneumatic Positioner

Low Cost, Rotary Operation, Field Selectable Cam Design



W.E. Anderson Series 265 PRECISOR® II Pneumatic and Electro-Pneumatic Positioners combine outstanding performance with an extremely low price, making it an exceptional value for industrial applications. Rotary valves with single or double acting pneumatic actuators can be precisely controlled, such as our ball and butterfly valves. The PRECISOR® II positioner proportionally modulates the valve from either an electric 4-20 mA or pneumatic 3-15 psig input signal, based on the model chosen. Its rugged, durable design makes it ideal for use in harsh environments, while maintaining precise, accurate positioning of the control elements. Includes a bracket for mounting onto actuators with NAMUR standard connections, and features a versatile linear cam for direct action, reverse action, or split ranges. An excellent choice when used in the chemical processing, food and beverage, pulp and paper, and pharmaceutical industries. Consult factory for other lever types.

Model No.	Input	Lever Type	Action
265ER-S5	4-20 mA	NAMUR	Single
265ER-D5	4-20 mA	NAMUR	Double
265NR-S5	3-15 psig	NAMUR	Single
265NR-D5	3-15 psig	NAMUR	Double

SPECIFICATIONS

Input Signal: Pneumatic: 3 to 15 psig (0.2 to 1 bar).

Electro-Pneumatic: 4-20 mA DC.

Input Impedance: (265ER only): 250 ±15 Ohm.

Material: Aluminum diecasting.

Air Supply: 20 to 100 psig (1.4 to 6.9 bar).

Air Supply Connection: 1/4" NPT.

Gage Connection: 1/8" NPT.

Electrical Connection: Screw terminal.

Conduit Connection: 1/2" NPT (265ER only).

Linearity: ±2% of full scale.

Hysteresis: 1% of full scale.

Sensitivity: ±0.5% of full scale.

Repeatability: ±0.5% of full scale.

Air Consumption: 0.10 scfm (3 LPM) at 20 psig (1.4 bar) supply.

Flow Capacity: 28 scfm (80 LPM) at 20 psig (1.4 bar) supply.

Stroke: 0 to 90°.

Enclosure Rating: IP66.

Operating Temperature: -4 to 160°F (-20 to 70°C).

Weight: 265NR: 3.1 lb (1.7 kg).

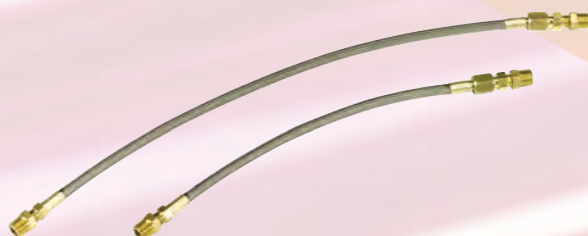
265ER: 6.2 lb (2.8 kg).

Agency Approvals: CE (265ER only).

Pneumatic Hosing and Fittings

Hosing and fittings for connecting positioners, current to pressure transducers, air filter gauges and other accessories to pneumatic actuated valves.

Model No.	Description
A-228	Stainless steel flex hose, 12" (30.48 cm) long, 1/8" male NPT connections
A-229	Stainless steel flex hose, 18" (45.72 cm) long, 1/8" male NPT connections
A-332	Brass adapter, 1/8" female NPT to 1/4" male NPT



Mark Series Position Indicators/Switches/Transmitters



**Mark 1 –
Polyester Coated
Aluminum**



**Mark 1 –
Stainless Steel**

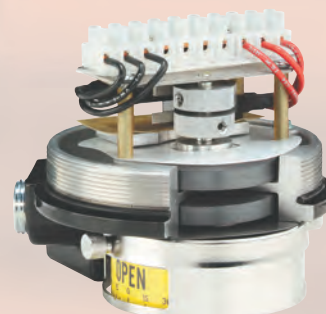
**Environmentally sealed for corrosive
areas.**

The Proximity Mark Series is a line of position indicators with a selection of various output options. Three model styles make up the Mark series to cover almost any application. Standard models in the Mark Series have visual position indicators and are weatherproof, explosion-proof, and submersible. A large variety of outputs are available to fit specific applications. There is a choice of 1 to 6 switch outputs of 16 varieties including inductive sensors, high temperature switches, gold contact switches, hermetically sealed switches, and high current switches. Besides the switch outputs the Series offers potentiometer outputs and 4 to 20 mA transmitters. The units are purchased for either direct drive applications, such as rotary valves, or lever drive applications, such as linear valves. Adjustable visual indicator is standard on direct drive units that displays OPEN / CLOSED status and degrees.

A magnetic drive that completely seals the switch compartment from the atmosphere for maximum leak protection is utilized in the Mark 1. The Mark 3 uses the same magnetic drive of the Mark 1, but it can be used for multi-turn applications with 1 to 25 revolutions, such as gate valves. A through shaft drive is incorporated in the Mark 4 making the unit a lower cost alternative to the Mark 1 for applications that are not as demanding.

Mark 1 Magnetic Coupling

- Features a magnetic coupling that isolates the switch compartment, completely sealing the unit from the surrounding atmosphere for maximum hazard and leak protection.
- EZset cams on switch models provide simple set point adjustment.
- Flexible design allows multiple switches and transmitter options.
- Ideal for corrosive environments.

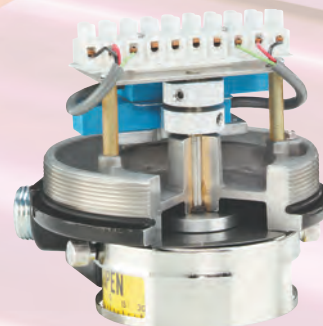


Mark 3 Multi-Turn

- Features a magnetic coupling that isolates the switch compartment, completely sealing the unit from the surrounding atmosphere for maximum hazard and leak protection.
- Multi-Turn models that can provide switch signals between 1 and 25 revolutions, and transmitter models for up to 10 revolutions without gear reduction.
- Flexible design allows multiple switches and transmitter options.
- Ideal for corrosive environments.

Mark 4 Thru Shaft

- Thru-Shaft design that features a 1" bushing for long life and o-rings to seal the switch compartment for hazard, corrosion, and leak protection.
- EZset cams on switch models provide simple set point adjustment.
- Flexible design allows multiple switches and transmitter options.
- A lower cost alternative to the Mark 1 Series for less demanding applications.



Mark Series Position Indicators/Switches/Transmitters

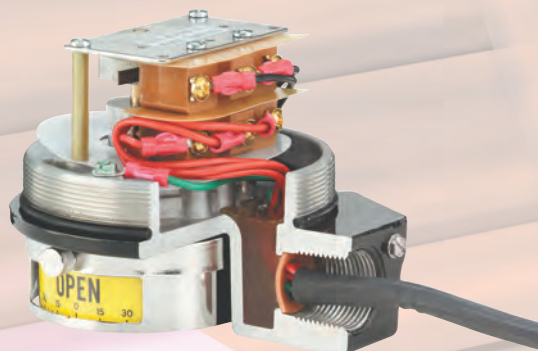


HART® Communications

- Available on Mark 1, 3, and 4 model indicators
- 4 to 20 mA analog position transmitter with HART® communications
- HART® features include:
 - Digital indication of position
 - 4 digital programmable position switches
 - Calibration of zero and span at the device from pushbuttons or through HART® master
 - Indication of sensor failure, programmable to 3.8 or 21 mA
 - Programmable dampening
 - Self test

Junction Package

Complete factory assembled packages combine visual indication, solenoids, switches and transmitter in a single convenient UL, CSA, ATEX, or SAA certified assembly which saves labor and reduces cost. The simple package is shipped ready for installation, complete with a custom designed mounting kit for your specific application. Many options are available such as painted aluminum, epoxy coated aluminum or stainless steel housings including a standard 3/4" NPT conduit entrance and choice of 1 or 2 additional 1/2" NPT conduit entrances. The optional conduit entrances are drilled and tapped in the base of the position indicator housing and solenoid valves are screwed into the entrances. 22 to 16 AWG wire leads from solenoids, switches and optional transmitter are terminated in prelabeled, easy-access terminal strips protected inside the housing. Note: UL, CSA, ATEX, or SAA approval requires complete package assembly by Proximity. Consult the factory for recommended UL, CSA, ATEX, or SAA approved solenoid valve options.



Factory Sealed Leads

Eliminate the possibility of conduit contamination and the need for seal fittings with Proximity's factory sealed (potted) leads. This seal has been UL tested to 6000 psi (413 bar) and listed for Class I, Groups A, B, C, D; Div. 1 & 2 atmospheres. Groups may vary depending on the switch model. Standard leads are 16 AWG and 36" (91.44 cm) long.

AS-Interface

- AS-Interface allowing networking of up to 31 devices over a 2-wire network
- Option for Mark 1 Magnetic Drive and Mark 4 Thru-Shaft Valve Position Indicators
- Available with 1 or 2 incorporated solenoid valves



POSITION
INDICATORS

Mark Series Model Chart

Construction	1		Mark 1, Magnetic Coupling Mark 3, Multi-Turn Mark 4, Thru-Shaft	Available Options "A" signifies available with corresponding construction style.		
	3			Mark		
	4			1	3	4
Output Type	1		1 Switch	A	--	A
	2		2 Switches	A	A	A
	3		Potentiometer, 1K Ohm. Available with switches, see note below.*	A	A	A
	32		Potentiometer, 2K Ohm. Available with switches, see note below.*	A	A	A
	35		Potentiometer, 5K Ohm. Available with switches, see note below.*	A	A	A
	310		Potentiometer, 10K Ohm. Available with switches, see note below.*	A	A	A
	320		Potentiometer, 20K Ohm. Available with switches, see note below.*	A	A	A
	4		4 Switches	A	A	A
	5		Transmitter, 4 to 20mA. Available with switches, see note below.*	A	A	A
	6		6 Switches. Available with Switch Types B, C, I, R, V, W.	A	A	A
Switch Type & Rating	7		AS-interface and 1 Switch. Available with Switch Types B, I, R, W.	A	--	A
	8		AS-interface and 2 Switches. Available with Switch Types B, I, R, W.	A	--	A
	9		HART® Transmitter. Available with switches, see note below.*	A	A	A
	A		SPDT Snap, Rated: 15A @ 125/250/480 VAC (~); 1/8 hp @ 125 VAC (~), 1/4 hp @ 250 VAC (~), 1/2A @ 125 VDC (=), 1/4A @ 250 VDC (=).	A	A	A
	B		Inductive Sensor. 10 to 30 VDC (=). Load: 0.1A.	A	--	A
	C		SPDT High Temperature Snap, 350°F (176°C) for 600 hours, Rated: 15.1A @ 125/250/277 VAC (~).	A	A	A
	D		DPDT Snap, Rated: 10A @ 125/250 VAC (~), 0.3A @ 125 VDC (=), 0.15A @ 250 VDC (=).	A	A	A
	G		SPDT Gold Contact Snap, Rated: 1A @ 125 VAC (~).	A	A	A
	H		SPDT Hermetically Sealed Snap, Rated: 1A @ 125 VAC (=).	A	--	A
	I		NAMUR Inductive Sensor. 15 mA max @ 5-25 VDC (~).	A	--	A
Driving Method	M		SPDT Magnetic Blow-Out, Rated: 10A @ 125 VAC (~) /VDC(=), 1/4 hp @ 125 VAC (~)/VDC(=).	A	A	A
	O		No Switches	A	A	A
	R		SPDT Hermetically Sealed Reed, Rated: 2A @ 125 VAC (~), 2A @ 24 VDC (=).	A	--	A
	S		SPDT Snap, Rated: 4A @ 125/250 VAC (~).	A	--	A
	T		SPDT High Temperature Snap, 250°F (121°C) Continuous, Rated: 5A @ 125/250/480 VAC (~).	A	A	A
	V		SPDT Snap, Rated: 10A @ 125/250 VAC (~), 1/3 hp @ 125/250 VAC (~), 1/2A @ 125 VDC (=), 1/4A @ 250 VDC (=), 4A @ 125 VAC (~) (tungsten).	A	A	A
	W		SPDT Gold Contact Snap, Rated 0.1A @ 125 VAC (~).	A	A	A
	D		Direct Drive (Yoke) with Stainless Steel Visual Indicator.	A	A	A
	L		Lever Drive (Shaft), No Visual Indicator.	A	A	A
Enclosure	0		Aluminum, Painted Black	A	A	A
	1		Aluminum, Painted White Epoxy with SS trim	A	A	A
	2		Aluminum, Painted Red	A	A	A
	3		Cast Bronze (Optional Wording)	A	A	A
	4		Aluminum, Painted Blue	A	A	A
	6		Cast 316 Stainless Steel	A	A	A
Options	J1		Junction Package with One 1/2" NPT Female Conduit Connection and Terminal Strip.	A	A	A
	J2		Junction Package with Two 1/2" NPT Female Conduit Connection and Terminal Strip.	A	A	A
	S		SAA Listed Flameproof	A	A	A
	SV1		1 Attached Solenoid Valve (Must be ordered with J1 option).	A	--	A
	SV2		2 Attached Solenoid Valves (Must be ordered with J2 option).	A	--	A
	MT		Metric Threaded Conduit Connection, M25 (M20 for optional J1 and J2 connections).	A	A	A
	B		Directive 94/9/EC, KEMA 03 ATEX 2391,  II 2 G Ex d IIC T6 (-25/-40/-50°C†† ≤ Tamb ≤ 70°C) (T5 (-25/-40/-50°C†† ≤ Tamb ≤ 80°C) optional wording).	A	A	A
	IS		Directive 94/9/EC, KEMA 03 ATEX 1392 x,  II 1 G Ex ia IIC T4.	A	A	A

*Note: Mark 1 and 4 potentiometer and transmitter outputs will have no switches when ordered with switch type 0; 2 switches if ordered with switch types B, C, I, R, V, or W; and 4 switches if ordered with switch type S. Mark 3 potentiometer and transmitter outputs will have no switches when ordered with switch type 0, and 2 switches if ordered with switch types A, G, M or T.

††Minimum temperature depends on output and switch type selected.

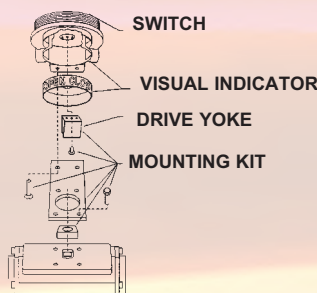
EXAMPLE MODEL NUMBERS

12VD0-J1

Mark 1, 2 Switches both Type V – SPDT, Direct Drive, Painted Aluminum Enclosure with Junction Package.

15VD0

Mark 1, 2 Switches both Type V – SPDT, 4 to 20 mA transmitter, Direct Drive, Painted Aluminum Enclosure.



Mounting kits with drive yoke (see drawing), or slotted lever arm, bracket, fasteners and other zinc plated or stainless steel hardware fit over 2000 popular valves and actuators. A high strength spring tempered stainless steel drive yoke/coupling is tailored to fit securely to a specific valve or actuator stem. There is no slip-page or binding. No special alignment fixtures are required due to switch offset design and yoke to stem engagement that makes installation a “snap”. Each kit is specially designed for a particular valve or actuator, making field mounting simple with standard tools. Please specify make and model of valve or actuator on order.

Mounting kits can be used interchangeably with all models since external mounting features are identical. Rotary valves utilize direct drive couplings and a slotted lever drive is used with linear valves. Lever drives convert linear motion to rotary. Stainless steel visual indicators are standard for direct drive, automated quarter-turn valve applications.

SPECIFICATIONS

General

Product Ratings:

Weatherproof and flameproof. NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 7, 9, 12, 13.

UL rated: Class I, Div. 1 & 2, Groups B, C, D (Some units available for Group A, consult factory); Class II, Div. 1 & 2, Groups E, F, and G.

CSA rated: Class I, Div. 1 & 2, Groups A, B, C, D; Class II, Div. 1 & 2, Groups E, F, and G; Submersible to 50 feet.

SAA rated: -S suffix, Certified Ex d IIC T6 IP68 (15 meters).

ATEX Compliant:

-B suffix, directive 94/9/EC.

KEMA 03 ATEX 2391,  II 2 G Ex d IIC T6 for -25°C/-40°C/-50°C ≤ Tamb ≤ 70°C and T5 for (-25°C/-40°C/-50°C ≤ Tamb ≤ 80°C optional wording) depending on output and switch type selected.

-IS suffix directive 94/9/EC.

KEMA 03 ATEX 1392X,  II 1 G Ex ia IIC T4.

(Switch type C is not available with ATEX; Switch type B is not available with ATEX intrinsically safe, -IS suffix).

Electrical Connections: Screw terminal. Optional factory sealed leads that are 36" (914.4 mm) of 16 AWG.

Conduit Connection: 3/4" female NPT standard. Optional one or two 1/2" female NPT. M25 and M20 optional (Standard on SAA certified products).

Mounting Orientation: Not position sensitive.

Weight: 4 to 6 lb (1.5 to 3.0 kg).

Operational Life: 10,000,000 cycles.

Maximum Altitude: 2000 meters.

Mark 1, 3 and 4 with Switch Outputs

Temperature Limits: -58 to 176°F (-50 to 80°C). Switch Type C rated to 350°F (176°C) for 600 hours, Switch Type T rated to 250°F (121°C) continuous. (ATEX flameproof, -B suffix, rated -50°C (-58°F) to 80°C (176°F) for switch type A, G, H, T, or M, -40°C (-40°F) to 80°C (176°F) for switch type O, R, S, V, or W, -25°C (-13°F) to 80°C (176°F) for switch type B, D, I, or AS Interface; ATEX intrinsically safe, -IS suffix rated -25°C (-13°F) to 40°C (104°F) for switch type D or I, -40°C (-40°F) to 40°C (104°F) for switch type R, V, or W, or -50°C (-58°F) to 40°C (104°F) for switch type A, G, or H.)

Switch Type: See model chart on page 8.

Electrical Rating: See model chart on page 8.

Set Point Adjustment: Mark 1 and 4: 5 to 360°. Mark 3: 1 to 25 revolutions.

Mark 1, 3, and 4 with Potentiometer

Accuracy: ± 0.5% of full span. Optional ± 0.25% of full span.

Temperature Limits: -40 to 176°F (-40 to 80°C). (ATEX flameproof, -B suffix, rated -40°C (-40°F) to 80°C (176°F) for switch types A, G, M, O, R, S, T, V, or W, -25°C (-13°F) to 80°C (176°F) for switch types B, D, or I.; ATEX intrinsically safe, -IS suffix, rated -25°C (-13°F) to 40°C (104°F) for switch type I, -40°C (-40°F) to 40°C (104°F) for switch types O, R, S, V, or W.)

Power Rating: 1.5 Watt maximum.

Output Signal: 1000 Ohm standard. Optional 2000, 5000, 10000, or 20000 Ohms.

Zero and Span Adjustments: Span trim pot with 2000 Ohm adjustment. No zero adjustment.

Rotational Travel: Mark 1 and 4: Minimum: 0°, Maximum: 340°. Mark 3: 0 to 10 revolutions.

Mark 1, 3, and 4 with Transmitter

Accuracy: ± 0.5% of full span. Optional ± 0.25% of full span.

Temperature Limits: -40 to 176°F (-40 to 80°C). (ATEX flameproof, -B suffix, rated -40°C (-40°F) to 80°C (176°F) for switch types A, G, M, O, R, S, T, V, or W, -25°C (-13°F) to 80°C (176°F) for switch types B, D, or I.; ATEX intrinsically safe, -IS suffix, rated -25°C (-13°F) to 40°C (104°F) for switch type I, -40°C (-40°F) to 40°C (104°F) for switch types O, R, S, V, or W.)

Power Requirements: 5 to 30 VDC.

Current Consumption: 50 mA.

Output Signal: 4 to 20 mA.

Zero and Span Adjustments: Trim pots for adjusting both. Mark 1 and 4: Span is adjustable from 50 to 300°. Mark 3: Span is adjustable from 1.5 to 8.5 revolutions.

Conduit Connection: 3/4" female NPT standard. Optional one or two 1/2" female NPT. M25 and M20 optional (Standard on SAA models).

Rotational Travel: Mark 1 and 4: Minimum: 50°, Maximum: 300°. Mark 3: Minimum: 1.5 revolutions, Maximum: 8.5 revolutions.

Mark 1, 3, and 4 with HART® Transmitter

Accuracy: ± 0.5% of full span. Optional ± 0.25% of full span.

Temperature Limits: -40 to 176°F (-40 to 80°C). (ATEX flameproof, -B suffix, rated -40°C (-40°F) to 80°C (176°F) for switch types A, G, M, O, R, S, V, or W, -25°C (-13°F) to 80°C (176°F) for switch types B, D or I.)

Power Requirements: 8 to 30 VDC.

Current Consumption: 21 mA.

Output Signal: 4 to 20 mA.

HART® Receive Impedance: Rx = 500 kΩ; Cx = 2500 pF.

Zero and Span Adjustments: Pushbuttons or HART master for setting both. Mark 1 and 4: Span is adjustable from 0 to 330°. Mark 3: Span is adjustable from 1.5 to 8.5 revolutions.

Conduit Connection: 3/4" female NPT standard. Optional one or two 1/2" female NPT. M25 and M20 optional (Standard on SAA models).

Rotational Travel: Mark 1 and 4: Maximum: 330°. Mark 3: Minimum: 1.5 revolutions, Maximum: 8.5 revolutions.

Series
QV

QUICK-VIEW® Valve Position Indicator/Switch

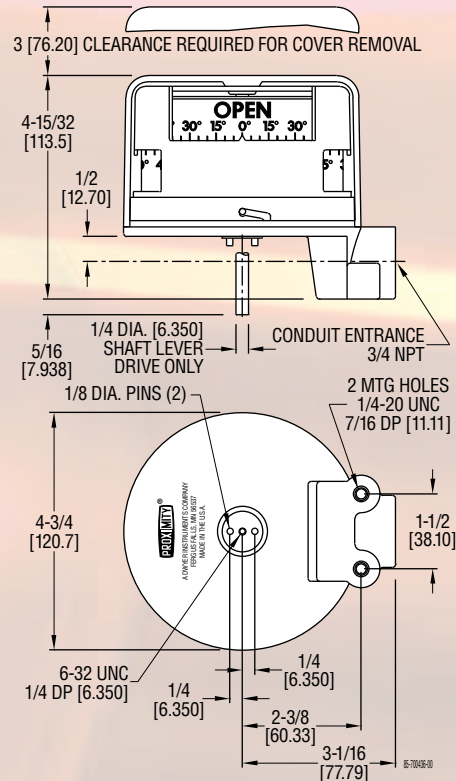
Ultra-Low Cost, Compact, Backlit, Corrosion Resistant



Backlighting Option



Internal View



FEATURES AND BENEFITS

The QUICK-VIEW® Rotary Valve Position Indicators are produced by Proximity with up to four individual mechanical or proximity switches. The QUICK-VIEW® is also available with optional backlighting. Benefits include:

- The lowest cost position indication.
- Extremely compact design.
- Easily interchangeable with key competition.
- Backlighting option available for maximum visibility.
- Integral flame retardant and corrosion protection.
- QUICK-VIEW® Indicator and mounting kits, including NAMUR kits, are stocked for fast delivery.
- Hazardous location option. Class I, Groups A, B, C, D; Class II, Groups F & G; Div. 2

APPLICATIONS

The QV Series Proximity Position Indicators are designed for maximum reliability in general purpose and corrosive environments. Applications include:

- Rotary and Linear Valves and Actuators
- Manual Valves
- Gear Operators
- Positioners

SPECIFICATIONS

Minimum Rotation Travel – Switches only: 5°

Maximum Rotation Travel – Switches only: 360°

Temperature Limits: -40 to 180°F (-40 to 82°C).

Switch Type: SPDT.

Electrical Rating:

QV-X1XXXX: 10A @ 125/250 VAC; 0.5A 125 VDC; 10A @ 24 VDC mech. switch.

QV-X2XXXX: 1A @ 125 VAC; 1A @ 24 VDC mech. switch.

QV-X3XXXX: 2A @ 125 VAC; 2A @ 30 VDC prox. switch.

QV-X4XXXX: 5-25 VDC NAMUR sensor.

QV-X5XXXX: 10-30 VDC INDUCTIVE sensor.

QV-X6XXXX: 10A @ 125/250 VAC mech. switch.

Lighting Supply Voltage: 24-28 VDC.

Enclosure Material: Polycarbonate housing and conduit.

Conduit Entrance: One 3/4" female NPT.

Enclosure Rating: NEMA 4, 4X. Optional explosion-proof, rated: Class I, Groups A, B, C, D; Class II, Groups F & G; Div. 2.

Maximum Altitude: 2000 m (6560 ft).

SUGGESTED SPECIFICATION

The position indicator shall be a Proximity model QV-XXXXXX QUICK-VIEW® valve position indicator. The (indicator) (switch) shall include: (0)(1)(2)(3)(4) switch element(s). The switch(es) shall (not be included) be SPDT (10 amp mechanical) (1 amp mechanical gold contacts) (2 amp proximity reed) (5-25 VDC NAMUR sensor) (10-30 VDC INDUCTIVE sensor). The mounting kit(s) will be (direct drive) (lever drive)(NAMUR). The lighting option is (not included) (28 VDC). The QV visual indicator is (not included) (standard) (upside down).

QUICK-VIEW® Valve Position Indicator/Switch

Ordering Information

QUICK-VIEW® COMPLETE MODEL CHART											
QV	MODEL NUMBER PREFIX										
	1ST CODE (1ST X) NUMBER OF SWITCHES										
	0	None*									
	1	One Switch*									
	2	Two Switches*									
	3	Three Switches*									
	4	Four Switches*									
		2nd Code (2nd X) Switch Type									
		0	No Switches*								
		1	10A Mechanical Snap Switch								
		2	0.1A Mechanical Gold Contacts								
		3	2A Proximity Reed Switch*								
		4	5-25 VDC Namur Sensor								
		5	10-30 VDC Inductive sensor								
		6	10A Mechanical Snap Switch								
			3rd Code (3rd X)								
			0	4th Code (4th X) Driving Style							
				1	Direct Drive*						
				2	Lever Drive*						
				3	Namur Drive*						
					5th Code (5th X) Lighting Option						
					0	None*					
					1	24 to 28 VDC Bright White LED's					
						6th Code (6th X) Visual Indication					
						0	None*				
						1	Standard (Open Closed)*				
						2	Upside Down (Open Closed)*				
							7th Code (7th X) Additional Options				
							EX	CLASS I, DIV. II, GROUPS A, B, C & D. CLASS II, DIV. II, GROUPS F & G.			
QV	2	1	0	1	0	1		- EXAMPLE POPULAR MODEL NUMBER			

* EX, Explosion-proof option available.

NOTES:

1. Consult factory for optional visual indicator colors.
2. The 1st, 2nd, 3rd and 6th codes cannot all be zero.

Series
VPS

Valve Position Sensor

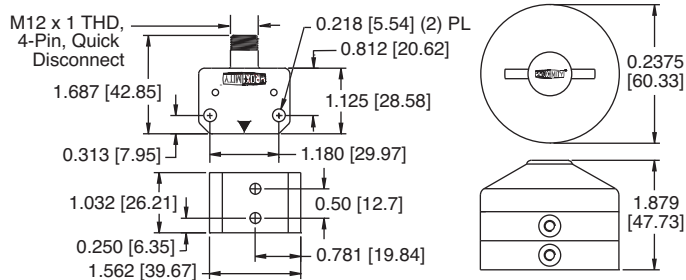
Dual Inductive, 2-Wire AC/DC Sensor, Fully Adjustable Target in 2° Increments



Model VPS2411



Model P1



Model VPS2411

Model P1

The dual inductive, 2-wire AC/DC Series VPS Valve Position Sensor maintains VDI/VDE 3845 dimensions so positioners can be easily mounted on top of the sensor and target. The Model VPS2411 Sensor and Model P1 Target mount easily and directly to actuators with ISO NAMUR topworks (see picture below). Fully adjustable target in 2° increments, the sensor has two independent LED's and bright Flow Line indicator that provide local visual indication. All electrical connections are made with the Model VIP82 4-pin quick disconnect cable (6 ft. in length) for ease in installation. Solid state components are fully embedded in an epoxy resin to prevent condensation build-up and to protect against vibration and shock. The rugged PBTP housing provides excellent corrosion resistance and moisture protection.

SPECIFICATIONS

Temperature Limits: -13 to 176°F (-25 to 80°C).

Power Requirements: 20-140 VAC (50/60 Hz), 10-200 VDC.

Switch Type: Dual normally open.

Electrical Rating: 200 mA.

Minimum Load Current: 5 mA.

Leakage Current: 0.8 mA.

Voltage Drop: 5.0 V.

Repeatability: 0.01 mm.

Hysteresis: 3-15% of sensing range.

Switching Frequency: 25 Hz.

Housing Material: Polybutylene Terephthalate.

Mounting Holes: NAMUR Mounting - 3.15" x 1.18" (80 x 30 mm) or 5.118" x 1.18" (130 x 30 mm).

Electrical Connection: 4-pin quick disconnect.



Model VPS and P1 mounted on an actuator with a positioner mounted on top.

Model VPS2411 Valve Position Sensor

Model P1 Valve Position Target

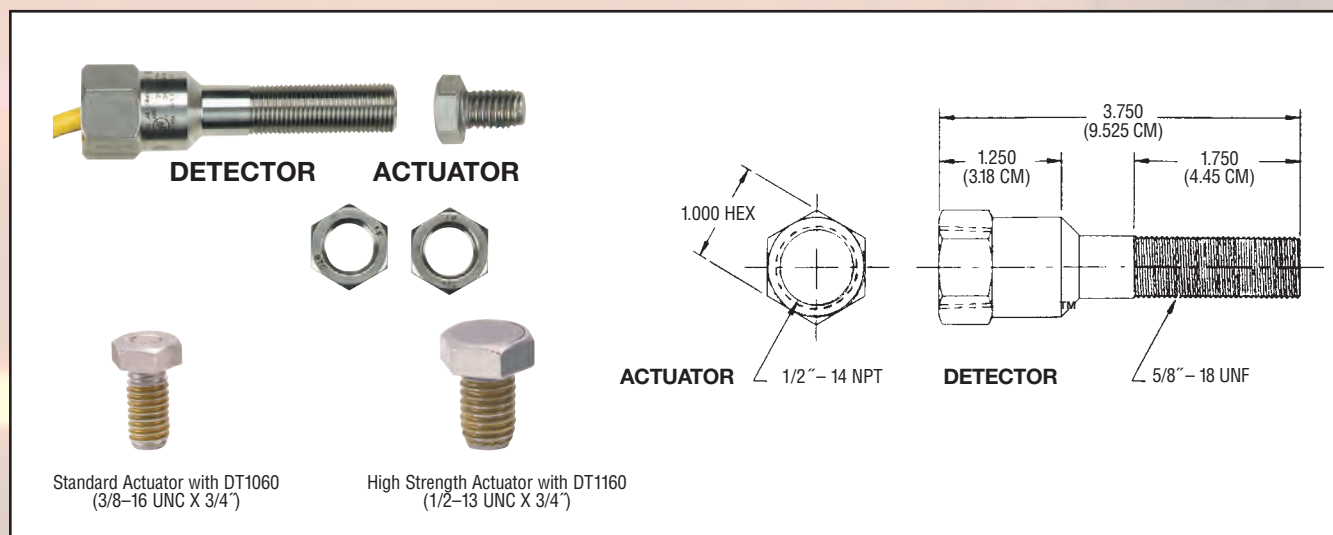
Model VIP82 Quick Disconnect Cable

POSITION
INDICATORS

Series
DT

Detector Position Sensor

Reliable Magnetic Point Sensor, Stainless Steel Housing, AC or DC



The **Series DT Detector Position Sensors** are reliable, magnetically actuated, stainless steel, completely interchangeable with competitive units. AC or DC for user friendly operation. They have no moving parts, eliminate costly seal fittings and offer enhanced reliability by eliminating arcing. Unintentional actuation by metals is not a problem. The sensor consists of a durable hermetically sealed reed switch potted in a stainless steel housing and a separate 316 SS magnetic actuator bolt. As the actuator moves within the sensing range of the sensor, the magnet in the actuator changes the state of reed switch contacts inside the sensor. This either opens or closes a circuit depending on wiring configuration. Sensing distance is 0.1" (2.54 mm) for the standard actuator. Greater sensitivity of a larger magnetic actuator increases the sensing distance to 0.5" (12.7 mm).

The Detector is excellent for hazardous and corrosive environments, solid state and intrinsically safe applications. A Detector may be mounted in any position. For installation in hazardous locations be sure to check local and national electrical codes. The Detector is designed to NEMA 1, 3, 4, 4X, 6, 7, 9, 12 and 13.

APPLICATIONS

The Detector is used for control element position monitoring and indication with devices such as Linear Valves - Actuators & Cylinders - Rotary Valves - Dampers.

Model No.	Description	Sensing Distance
DT1060	Detector and standard actuator	0.1" (2.54 mm)
DT1160	Detector and high strength actuator	0.5" (12.7 mm)

SPECIFICATIONS

Temperature Limits: -40 to 163°F (-40 to 73°C).

Switch Type: Tungsten, SPDT, Form C.

Electrical Rating: 3A @ 125 VAC, 3A @ 30 VDC.

Enclosure Rating: Weatherproof; Hermetically Sealed; Explosion-proof UL & CSA Listed for Class I, Groups A, B, C, & D; Class II, Groups E, F & G. Divisions 1 & 2.

Intrinsically Safe: Simple Apparatus (w/barrier).

Operating/Response Time: 3.0 m Sec.

Initial Contact Resistance: 0.50 ohms (Max).

Repeatability: 0.005 in. (.01 cm).

Hysteresis: 0.030 in. (.08 cm).

Electrical Connection: Factory sealed leads with 18" minimum, 4 conductor, PVC insulated, 18 AWG - Green/Red/Black/White (Ground/NC/ NO/Common).

Housing: 316 SS.

Potting: Epoxy Resin.

Conduit: 1/2"-14" female NPT.

Weight: 0.32 lb (145 g); 0.45 lb (204 g) with actuator.

Suggested Specification

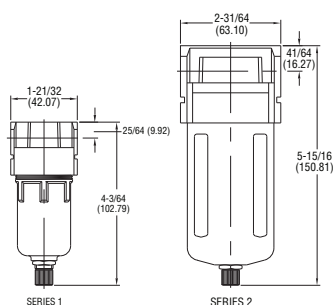
Position sensor shall be magnetically operated Proximity Detector model (DT1060) (DT1160). Sensing distance shall be (0.1") (0.5"). The sensor shall be SPDT, Form C, hermetically sealed and rated 3 amps 125 VAC, 3 amps 30 VDC, and shall include a stainless steel actuator with internal magnet. The 316 SS housing shall be designed to NEMA 4, 4X, 7, 9, UL & CSA certified Class I, Groups A,B, C & D; Class II, Groups E, F, & G, Divs. 1 & 2 requirements and have a 1/2" NPT conduit entrance.

POSITION
INDICATORS

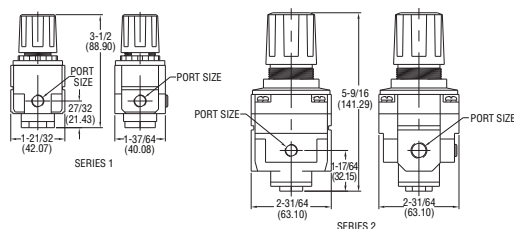
Filters, Regulators and Lubricators

For Pneumatic Air Applications

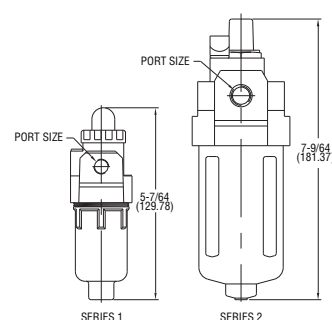
Series F Filters



Series R Regulators



Series L Lubricators



F Series Filters keep air and pneumatic systems operating cleanly and efficiently. Port sizes, filter elements, and drain options available to service broad application requirements.

R Series Pressure Regulators offer economic prices and high performance pressure regulation. Configurable units offer a variety of fitting and port sizes, and supply pressures ranging from 10 to 120 psig. The non-rising adjustment knob allows for simple and precise monitoring of pressure and features push-pull lock ring.

L Series Lubricators maintain safe operation and longevity of pneumatic systems. Top plug permits filling without removing bowl or disconnecting air-lines. Adjustable drop rate fits any application.

Model Number	Process Connection	Filtration	Drain
F1-150M	1/8" NPT	50 microns	Manual
F2-250M	1/4" NPT	50 microns	Manual

Model Number	Process Connection	Pressure Range
R1-1120	1/8" NPT	120 psi
R2-2120	1/4" NPT	120 psi

Model Number	Process Connection
L1-1	1/8" NPT
L2-2	1/4" NPT

SPECIFICATIONS

	Size 1	Size 2
GENERAL		
Service	Air	Air
Temperature Limits	41 to 140°F (5 to 60°C)	41 to 140°F (5 to 60°C)
Maximum Supply Pressure	165 psig	165 psig
FILTERS		
Process Connection	1/8", 1/4" NPT	1/4", 3/8", 1/2" NPT
Filtration (micron)	5μ, 25μ, 50μ	5μ, 25μ, 50μ
Maximum Supply Pressure	165 psi	165 psi
Drain	Manual/Semi-Auto	Manual/Semi-Auto
Bowl Capacity	0.75 inch³	2.75 inch³
Flow (based on 100 psi inlet pressure w/ 50 micron filter)	55, 85 SCFM	120, 120, 120 SCFM
Construction	Body: Aluminum; Filter: Sintered Bronze	
REGULATORS		
Process Connection	1/8", 1/4" NPT	1/4", 3/8", 1/2" NPT
Effect of Supply Pressure Variation (25 psig) on Outlet Pressure	<0.2 psig	<0.2 psig
Exhaust Capacity (5 psig above 20 psig set point)	<0.25 SCFM	<0.25 SCFM
Flow Capacity at 100 psig Supply and 70 psig Outlet	40, 60 SCFM	90, 120, 120 SCFM
Output Pressure Ranges	0-10 psig 0-30 psig 0-60 psig 0-120 psig	0-10 psig 0-30 psig 0-60 psig 0-120 psig
Total Air Consumption @ Maximum Output	0.3 SCFH	0.3 SCFH
Construction	Body: Aluminum; Bowl: Polycarbonate	
LUBRICATORS		
Process Connection	1/8", 1/4" NPT	1/4", 3/8", 1/2" NPT
Lubrication	Mist	Mist
Bowl Capacity	1.22 inch³	5.18 inch³
Flow (based on 100 psi inlet pressure)	55, 115 SCFM	125, 125, 125 SCFM
Construction	Body: Aluminum	

FEATURES

Filter

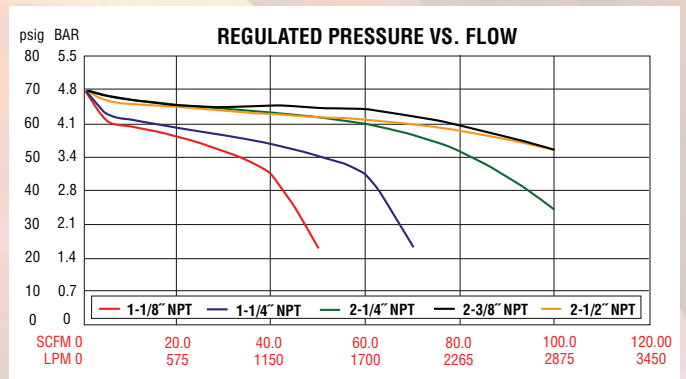
- Polycarbonate bowl with metal guard
- Filter options 5μ, 25μ, 50μ
- Manual, semi-automatic or automatic drain options

Regulator

- Rolling diaphragm
- Panel/pipe/bracket mountable
- Aluminum body, polycarbonate bonnet and knob
- Non-rising adjustment knob with push-pull lock ring

Lubricator

- Field serviceable polycarbonate bowl
- Polycarbonate bowl includes metal guard and top plug
- Adjustable drip rate



F Series Filters						
Function	F					Filter
Body Style	1					1 Size
	2					2 Size
Process Connection			1			1/8" NPT (1 Size only)
			2			1/4" NPT
			3			3/8" NPT (2 Size only)
			4			1/2" NPT (2 Size only)
Filtration				50		50 micron filter
				25		25 micron filter
				05		5 micron filter
Drain					M	Manual drain
					S	Semi-Automatic drain
					A	Automatic drain (2 Size only)

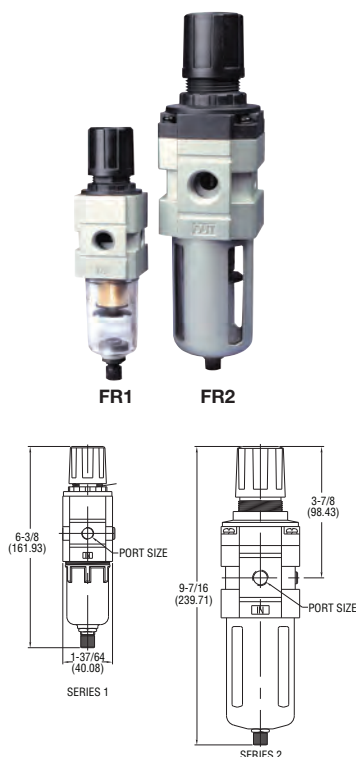
R Series Pressure Regulators						
Function	R					Regulator
Body Style	1					1 Size
	2					2 Size
Process Connection			1			1/8" NPT (1 Size only)
			2			1/4" NPT
			3			3/8" NPT (2 Size only)
			4			1/2" NPT (2 Size only)
Pressure Range				010		0-10 psi outlet pressure
				030		0-30 psi outlet pressure
				060		0-60 psi outlet pressure
				120		0-120 psi outlet pressure

L Series Lubricators						
Function	L					Lubricator
Body Style	1					1 Size
	2					2 Size
Process Connection			1			1/8" NPT (1 Size only)
			2			1/4" NPT
			3			3/8" NPT (2 Size only)
			4			1/2" NPT (2 Size only)

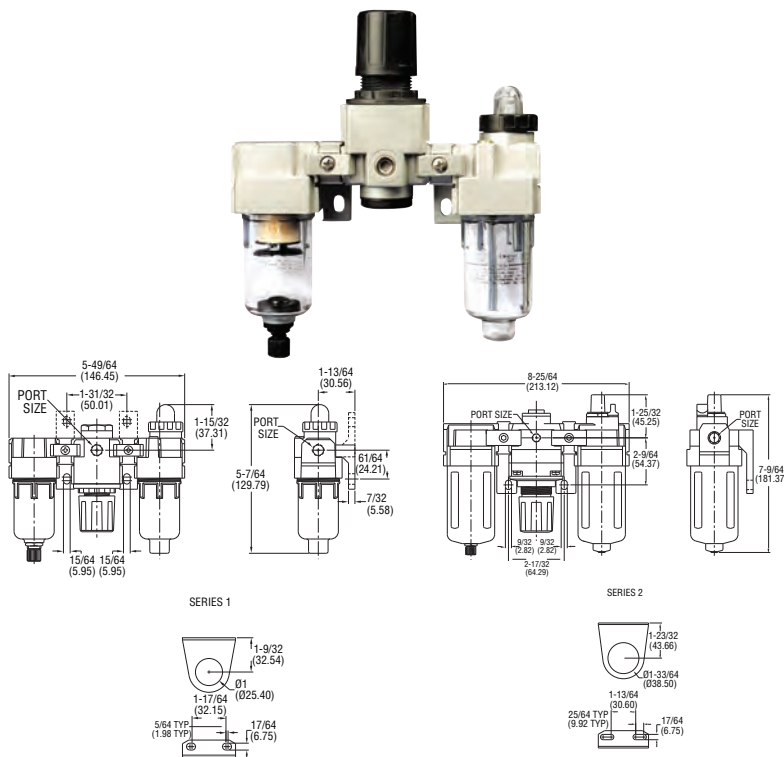
Filters, Regulators and Lubricators

Combination Packages For Pneumatic Air Applications

Series FR Filter-Regulator



Series FRL Filter-Regulator-Lubricator



The Series FR Filter-Regulators are combination units that provide maximum options in minimal space. Constructed of aluminum and polycarbonate, these rugged units offer the same air pressure regulation features as our standard R Series units side-by-side with the convenience of an F Series filter. Unscrewing the adjustment knob and retaining flange easily adapts panel or bracket mounting.

The Series FRL takes the FR Series to the next level by including an L Series lubricator. The package is completely installed and ready to go right out of the box.

Model Number	Process Connection	Pressure Range	Filtration
FR1-112050M	1/8" NPT	120 psi	50 microns
FR2-212050M	1/4" NPT	120 psi	50 microns
FRL1-112050M	1/8" NPT	120 psi	50 microns
FRL2-212050M	1/4" NPT	120 psi	50 microns

SPECIFICATIONS

	Size 1	Size 2
GENERAL		
Service	Air	Air
Temperature Limits	41 to 140°F (5 to 60°C)	41 to 140°F (5 to 60°C)
Maximum Supply Pressure	165 psig	165 psig
FILTERS		
Process Connection	1/8", 1/4" NPT	1/4", 3/8", 1/2" NPT
Filtration (micron)	5μ, 25μ, 50μ	5μ, 25μ, 50μ
Maximum Supply Pressure	165 psi	165 psi
Drain	Manual/Semi-Auto	Manual/Semi-Auto
Bowl Capacity	0.75 inch ³	2.75 inch ³
Flow (based on 100 psi inlet pressure w/ 50 micron filter)	55, 85 SCFM	120, 120, 120 SCFM
Construction	Body: Aluminum; Filter: Sintered Bronze	
REGULATORS		
Process Connection	1/8", 1/4" NPT	1/4", 3/8", 1/2" NPT
Effect of Supply Pressure Variation (25 psig) on Outlet Pressure	<0.2 psig	<0.2 psig
Exhaust Capacity (5 psig above 20 psig set point)	<0.25 SCFM	<0.25 SCFM
Flow Capacity at 100 psig Supply and 70 psig Outlet	40, 60 SCFM	90, 120, 120 SCFM
Output Pressure Ranges	0-10 psig 0-30 psig 0-60 psig 0-120 psig	0-10 psig 0-30 psig 0-60 psig 0-120 psig
Total Air Consumption @ Maximum Output	0.3 SCFH	0.3 SCFH
Construction	Body: Aluminum; Bowl: Polycarbonate	
LUBRICATORS		
Process Connection	1/8", 1/4" NPT	1/4", 3/8", 1/2" NPT
Lubrication	Mist	Mist
Bowl Capacity	1.22 inch ³	5.18 inch ³
Flow (based on 100 psi inlet pressure)	55, 115 SCFM	125, 125, 125 SCFM
Construction	Body: Aluminum	

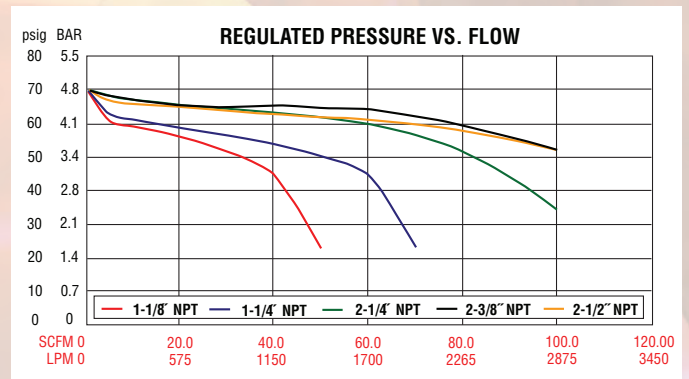
FEATURES

FR Filter Regulator Combo

- Aluminum and polycarbonate construction
- Manual, semi-auto or autodrain available
- 1 Size has polycarbonate bowl, 2 Size has polycarbonate bowl with metal guard
- Non-rising adjustment knob with push-pull lock ring feature
- Panel or bracket mounting

FRL Package

- All-in-one package ready for installation
- Automatic drain
- 50µ filter standard (others available)
- 120 psi regulator & 1/8" NPT on 1 Size
- 120 psi regulator & 1/4" NPT on 2 Size

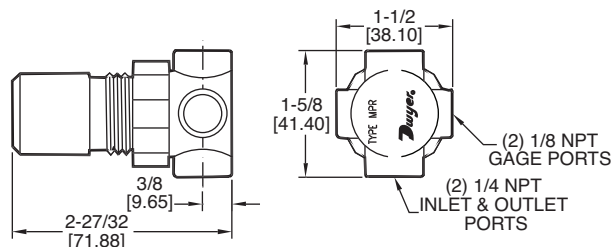


Filters - Regulators & Filters-Regulators-Lubricators									
Function	FR								Filter - Regulator Filter - Regulator - Lubricator
Body Style	FRL	1							1 Size 2 Size
Process Connection		2		1					1/8" NPT (1 Size only) 1/4" NPT 3/8" NPT (2 Size only) 1/2" NPT (2 Size only)
Pressure Range				010					0-10 psi outlet pressure 0-30 psi outlet pressure 0-60 psi outlet pressure 0-120 psi outlet pressure
Filtration				030					
				060					
				120					
					50				50 micron filter
					25				25 micron filter
					05				5 micron filter
Drain						M			Manual drain (standard)
						S			Semi-Automatic drain
						A			Automatic drain (2 Series only)

Series
MPR

Miniature Pressure Regulator

Air or Water Regulator, Compact and Lightweight, Low Cost



The Series MPR Miniature Pressure Regulators are compact units that provide low cost, high performance pressure regulation of compressed air or air/water. The low torque, non-rising adjustment knob with locking capability provides easy and precise adjustment. Models for use with air are self relieving. Models for air/water are non-relieving.

ACCESSORIES

MPR-B, Mounting Bracket

MPR-N, Panel Mounting Nut

Model Number		Range
Air	Air/Water	
MPR1-0	MPR2-0	0 to 5 psi
MPR1-1	MPR2-1	0 to 15 psi
MPR1-2	MPR2-2	0 to 30 psi
MPR1-3	MPR2-3	0 to 60 psi
MPR1-4	MPR2-4	0 to 100 psi

SPECIFICATIONS

Service: Compressed air or water.

Wetted Materials: Body: Zinc; Bonnet: Acetal; Diaphragm/Seals: Nitrile; Internals: Aluminum, brass, acetal steel, music wire (MPR2 is plated with electroless nickel for water use).

Maximum Supply Pressure: 250 psig (17.2 bar).

Temperature Limits: 0 to 150°F (-18 to 60°C).

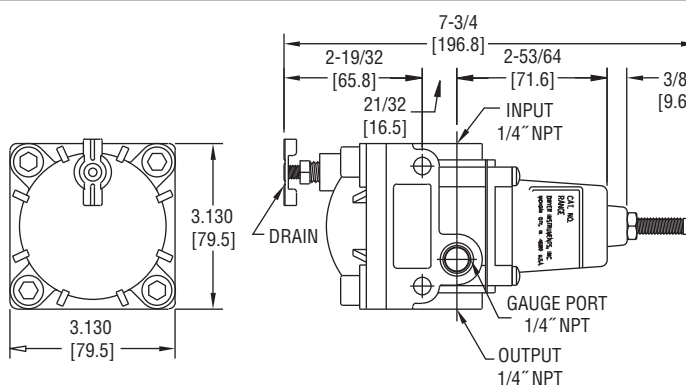
Flow Capacity: 24 SCFM (48 m³/hr) at 100 psig (6.9 bar) supply, 60 psig (4.1 bar) output.

Process Connection: Inlet and Outlet: Two 1/4" female NPT; Two 1/8" female NPT gage ports.

Weight: 4 oz (113 g).

Series
AFR

Air Filter Regulator



Series AFR Air Filter Regulator provides clean air pressure to pneumatic controllers, valve positioners, air cylinders and other equipment. Self-relieving regulator is equipped with a 40 micron filter housed in a dripwell with gage port.

MODEL NO.	RANGE
AFR1	0 to 10 psi (0 to 65 kPa)
AFR2	0 to 30 psi (0 to 200 kPa)
AFR3	0 to 60 psi (0 to 400 kPa)
AFR4	0 to 120 psi (0 to 800 kPa)

SPECIFICATIONS

Service: Air only.

Body: Aluminum alloy, irridite and baked epoxy finish; Filter: phenolic impregnated cellulose; Diaphragm and valve seat plug: nitrile elastomer.

Max. Supply Pressure: 250 psig (1700 kPa).

Temperature Limits: 0 to 160°F (-18 to 71°C).

Sensitivity: 1" (2.5 cm) of water.

Consumption: <6 SCFH (0.17 m³/hr).

Flow Capacity: 20 SCFM (33 m³/hr) @ 100 psig (700 kPa) supply.

Exhaust Capacity: 0.1 SCFM (0.17 m³/hr) with downstream pressure 5 psig (35 kPa) above set point.

Process Connection: 1/4" female NPT.

Weight: 1.6 lb (725 g).

AFR-BRKT, Mounting Bracket

Useful Steam Information

1 Boiler HP = 34.5 lb/hr

EDR (Equivalent Direct Radiation) = 240 Btu/hr per FT²

1 Therm = 100,000

To convert Btu/hr to lb/hr of steam, divide Btu/hr by the latent heat of vaporization (h_{fg}) at the corresponding steam pressure.

EXAMPLE:

100,000 Btu/hr = 105 lb/hr of 5 psig steam

$$\left(\frac{100,000 \text{ Btu/hr}}{954} \right) = 105 \text{ lb/hr}$$

STEAM DATA		
psig	Temperature (°F)	Latent Heat (h_{fg})
0	212	970
5	237	954
15	250	945
50	298	912
100	338	880

Conversion Factors

$$\text{Boiler Horsepower (BHP)} = \frac{\text{E.D.R.}}{139}$$

$$\text{Gallons of Water} = \frac{\text{Lbs. of Water}}{8.33}$$

$$\text{B.T.U.H} = \text{E.D.R.} \times 240$$

$$\text{E.D.R.} = \frac{\text{B.T.U.H}}{240}$$

$$\text{B.T.U.H} = \text{B.H.P.} \times 33,479$$

Boiler Steaming Rate (Gallons Per Minute)

$$\text{GPM} = \frac{\text{E.D.R.}}{2000}$$

$$\text{GPM} = (\text{BHP}) \times 0.069$$

$$\text{GPM} = \frac{\text{B.T.U.}}{480,000}$$

$$\text{GPM} = \text{E.D.R.} \times 0.000496$$

$$\text{Pounds of condensate per hour} = \frac{\text{E.D.R.}}{4}$$

Specific Gravity of Liquid

Liquid	Specific Gravity
Acetone	0.792
Alcohol, ethyl	0.791
Alcohol, methyl	0.810
Ammonia, saturated	0.655
Benzene	0.9
Brine (10% Na Cl)	1.08
Carbolic acid	0.950 to 0.965
Carbon disulfide	1.293
Carbon tetrachloride	1.595
Chloroform	1.489
Ether	0.736
Fuel Oils	
1	0.82 to 0.95
2	0.82 to 0.95
3	0.82 to 0.95
5A	0.82 to 0.95
5B	0.82 to 0.95
6	0.82 to 0.95
Gas oils	0.89
Gasolines	
a	0.74
b	0.72
c	0.68
Glycerine	1.260
Heptane-n	0.688
Hexane	0.664
Kerosene	0.820
Mercury	13.600
Methyl acetate	0.93
Methyl iodide	2.28
Milk	1.028 to 1.035
Naptha, petroleum ether	0.665
Naptha, wood	0.848 to 0.810
Oils	
Castor	0.969
Coconut	0.925
Cotton seed	0.926
Creosote	1.040 to 1.200
Linseed, boiled	0.924
Olive	0.918
Palm	0.924
Peanut	0.92
Sesame Seed	0.923
Soy Bean	0.924 to .928
Pentane	.623
Propylene glycol	1.038
SAE 30 Lube Oil	0.9
Sea Water	1.025
Sodium chloride	
5%	1.037
25%	1.196
	1.19
Sodium hydroxide (caustic soda)	
20%	1.22
30%	1.33
40%	1.43
Turpentine (spirits)	0.870
Water	1.000

Hazardous Locations Listings

Class I (-4)	Flammable gases or vapors are or may be present in sufficient quantities to produce explosive or ignitable mixtures.
Division I (-4A)	Gases or vapors are or may be in the atmosphere in normal operations.
Group A (-2)	Containing acetylene.
Group B (-2)	Containing hydrogen, ethylene oxide & propylene oxide or gases or vapors of equivalent hazard.
Group C (-2)	Containing ethyl-ether vapor, ethylene or cyclopropane.
Group D (-2)	Containing gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, lacquer solvent or natural gas.
Division II (-4B)	Gases or vapors are not normally present. They may be present due to leakage, accidents or maintenance. It is possible for one atmosphere to contain the same items as listed for Groups of Division I of this class.
Class II (-5)	Combustible dust may be present in sufficient quantities to produce an explosive atmosphere.
Division I (-5A)	Dust in suspension. Dust is or may be present in the atmosphere due to normal operating conditions.
Group E (-2)	Containing metal dust, including aluminum, magnesiums and their commercial alloys, and other metals of similar hazardous characteristics.
Group F (-2)	Containing carbon black, coal or coke dust.
Group G (-2)	Containing flour, starch or grain dust.
Division II (-5D)	Dust not normally in suspension. Possibly containing the same items as listed for Groups of Division I of this class.
Class III (-6)	Ignitable fibers are present, but not necessarily present in air in quantities sufficient to produce ignitable mixtures.
Division I (-6A)	Easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used.
Division II (-6B)	

NEMA Standards for Industrial Enclosures

Type 1	General purpose - indoor.
Type 2	Drip-proof - indoor. Protects against limited amounts of falling liquids and dirt.
Type 3	Dust-tight, raintight and sleet resistant - outdoor. Protects against windblown dust, rain sleet and external ice formation.
Type 3R	Same as Type 3, except not dust-tight.
Type 3S	Same as Type 3, but provides for operation of external mechanism when ice-laden.
Type 4	Watertight and dust-tight - indoor and outdoor. Protects against windblown dust and rain, splashing water and hose-directed water.
Type 4X	Same as Type 4 except also corrosion resistant.
Type 5	Dust-tight - indoor. Protects against dust and falling dirt.
Type 6	Submersible, watertight and dust-tight - indoor and outdoor. Protects against water entry during occasional temporary submersion to a limited depth.
Type 6P	Same as Type 6 except for prolonged submersion.
Type 7	Class I indoor hazardous locations. Explosion proof, may be A, B, C or D.
Type 8	Class I indoor or outdoor hazardous locations - oil immersed equipment, may be A, B, C or D.
Type 9	Class II indoor hazardous locations. Explosion proof, may be E, F or G.
Type 10	Mining Enforcement Safety Administration. Explosion proof in methane or natural gas.
Type 11	Corrosion resistant and drip-proof - oil-immersed - indoor .
Type 12	Dust-tight and drip-tight - indoor, non-corrosive dripping liquids.
Type 12K	Same as Type 12 except enclosures have knockouts.
Type 13	Oil-tight and dust-tight - indoors, non-corrosive spray of water, oil and coolant.

Pressure Conversion Chart

in./H.O	P.S.I.	in/Hg	mm/H.O	mm/Hg	kg/cm ²	bar	mbar	Pa	kPa
.1	.0036	.0073	2.534	.1863	.0002	.0002	.2482	24.82	.0248
.2	.0072	.0146	5.067	.3726	.0005	.0005	.4964	49.64	.0496
.4	.0144	.0293	10.13	.7452	.0010	.0010	.9928	99.28	.0993
.6	.0216	.0440	15.20	1.118	.0015	.0015	1.489	148.9	.1489
.8	.0289	.0588	20.34	1.496	.0020	.0020	1.992	199.2	.1992
1.0	.0361	.0735	25.41	1.868	.0025	.0025	2.489	248.9	.2489
2	.0722	.1470	50.81	3.736	.0050	.0050	4.978	497.8	.4978
3	.1083	.2205	76.22	5.604	.0075	.0075	7.467	746.7	.7476
4	.1444	.2940	101.62	7.472	.0102	.0099	9.956	995.6	.9956
5	.1804	.3673	127.0	9.335	.0127	.0124	12.44	1244	1.244
6	.2165	.4408	152.4	11.203	.0152	.0149	14.93	1493	1.493
7	.2526	.5143	177.8	13.072	.0178	.0174	17.42	1742	1.742
8	.2887	.5878	203.2	14.940	.0203	.0199	19.90	1990	1.990
9	.3248	.6613	228.6	16.808	.0228	.0224	22.39	2239	2.239
10	.3609	.7348	254.0	18.676	.0254	.0249	24.88	2488	2.488
11	.3970	.8083	279.4	20.544	.0279	.0274	27.37	2737	2.737
12	.4331	.8818	304.8	22.412	.0304	.0299	29.86	2986	2.986
13	.4692	.9553	330.2	24.280	.0330	.0324	32.35	3235	3.235
14	.5053	1.029	355.6	26.148	.0355	.0348	34.84	3484	3.484
15	.5414	1.102	381.0	28.016	.0381	.0373	37.33	3733	3.733
16	.5774	1.176	406.4	29.879	.0406	.0398	39.81	3981	3.981
17	.6136	1.249	431.8	31.752	.0431	.0423	42.31	4231	4.231
18	.6496	1.322	457.2	33.616	.0457	.0448	44.79	4479	4.479
19	.6857	1.396	482.6	35.484	.0482	.0473	47.28	4728	4.728
20	.7218	1.470	508.0	37.352	.0507	.0498	49.77	4977	4.977
21	.7579	1.543	533.4	39.22	.0533	.0523	52.26	5226	5.226
22	.7940	1.616	558.8	41.09	.0558	.0547	54.74	5474	5.474
23	.8301	1.690	584.2	42.96	.0584	.0572	57.23	5723	5.723
24	.8662	1.764	609.6	44.82	.0609	.0597	59.72	5972	5.972
25	.9023	1.837	635.0	46.69	.0634	.0622	62.21	6221	6.221
26	.9384	1.910	660.4	48.56	.0660	.0647	64.70	6470	6.470
27	.9745	1.984	685.8	50.43	.0685	.0672	67.19	6719	6.719
28	1.010	2.056	710.8	52.26	.0710	.0696	69.64	6964	6.964
29	1.047	2.132	736.8	54.18	.0736	.0722	72.19	7219	7.219
30	1.083	2.205	762.2	56.04	.0761	.0747	74.67	7467	7.467
31	1.119	2.278	787.5	57.91	.0787	.0772	77.15	7715	7.715
32	1.155	2.352	812.8	59.77	.0812	.0796	79.63	7963	7.963
33	1.191	2.425	838.2	61.63	.0837	.0821	82.12	8212	8.212
34	1.227	2.498	863.5	63.49	.0862	.0846	84.60	8460	8.460
35	1.263	2.571	888.9	65.36	.0888	.0871	87.08	8708	8.708
36	1.299	2.645	914.2	67.22	.0913	.0896	89.56	8956	8.956
37	1.335	2.718	939.5	69.08	.0938	.0920	92.04	9204	9.204
38	1.371	2.791	964.9	70.95	.0964	.0945	94.53	9453	9.453
39	1.408	2.876	990.9	72.86	.0990	.0971	97.08	9708	9.708
40	1.444	2.949	1016	74.72	.1015	.0996	99.56	9956	9.956
41	1.480	3.013	1042	76.59	.1040	.1020	102.04	102.04	10.204
42	1.516	3.086	1067	78.45	.1066	.1045	104.5	104.5	10.45
43	1.552	3.160	1092	80.31	.1091	.1070	107.0	107.0	10.70
44	1.588	3.233	1118	82.18	.1116	.1095	109.5	109.5	10.95
45	1.624	3.306	1143	84.04	.1142	.1120	112.0	112.0	11.20
46	1.660	3.378	1168	85.90	.1167	.1144	114.5	114.5	11.44
47	1.696	3.451	1194	87.76	.1192	.1169	116.9	116.9	11.69
48	1.732	3.526	1219	89.63	.1218	.1194	119.4	119.4	11.94
49	1.768	3.600	1244	91.49	.1243	.1219	121.9	121.9	12.19
50	1.804	3.673	1270	93.35	.1268	.1244	124.8	124.8	12.44
51	1.841	3.748	1296	95.27	.1294	.1269	126.9	126.9	12.69
52	1.877	3.822	1321	97.13	.1320	.1294	129.4	129.4	12.94
53	1.913	3.895	1346	98.99	.1345	.1319	131.9	131.9	13.19
54	1.949	3.968	1372	100.8	.1370	.1344	134.8	134.8	13.44
55	1.985	4.041	1397	102.7	.1395	.1369	136.9	136.9	13.69
56	2.021	4.115	1422	104.6	.1421	.1393	139.3	139.3	13.93
57	2.057	4.188	1448	106.4	.1446	.1418	141.8	141.8	14.18
58	2.093	4.261	1473	108.3	.1471	.1443	144.3	144.3	14.43
59	2.129	4.335	1498	110.2	.1497	.1468	146.8	146.8	14.68
60	2.165	4.408	1524	112.0	.1522	.1493	149.3	149.3	14.93
61	2.202	4.483	1550	113.9	.1548	.1518	151.8	151.8	15.18
62	2.238	4.556	1575	115.8	.1573	.1543	154.3	154.3	15.43
63	2.274	4.630	1600	117.7	.1599	.1568	156.8	156.8	15.68
64	2.310	4.703	1626	119.5	.1624	.1593	159.3	159.3	15.93
65	2.346	4.776	1651	121.4	.1649	.1618	161.8	161.8	16.18
66	2.382	4.850	1676	123.3	.1674	.1642	164.2	164.2	16.42
67	2.418	4.923	1702	125.1	.1700	.1667	166.7	166.7	16.67
68	2.454	4.996	1727	127.0	.1725	.1692	169.2	169.2	16.92
69	2.490	5.070	1752	128.8	.1750	.1717	171.7	171.7	17.17
70	2.526	5.143	1778	130.7	.1776	.1742	174.2	174.2	17.42
71	2.562	5.216	1803	132.6	.1801	.1766	176.6	176.6	17.66
72	2.598	5.290	1828	134.4	.1826	.1791	179.1	179.1	17.91
73	2.635	5.365	1854	136.4	.1852	.1817	181.7	181.7	18.17
74	2.671	5.438	1880	138.2	.1878	.1842	184.2	184.2	18.42
75	2.707	5.511	1905	140.1	.1903	.1866	186.6	186.6	18.66
76	2.743	5.585	1930	141.9	.1928	.1891	189.1	189.1	18.91
77	2.779	5.658	1956	143.8	.1954	.1916	191.6	191.6	19.16
78	2.815	5.731	1981	145.7	.1979	.1941	194.1	194.1	19.41
79	2.851	5.805	2006	147.5	.2004	.1966	196.6	196.6	19.66
80	2.887	5.878	2032	149.4	.2030	.1991	199.1	199.1	19.91
81	2.923	5.951	2057	151.2	.2055	.2015	201.5	201.5	20.15
82	2.959	6.024	2082	153.1	.2080	.2040	204.0	204.0	20.40
83	2.996	6.100	2108	155.0	.2106	.2066	206.6	206.6	20.66
84	3.032	6.173	2134	156.9	.2131	.2091	209.1	209.1	20.91
85	3.068	6.246	2159	158.8	.2157	.2115	211.5	211.5	21.15
86	3.104	6.320	2184	160.6	.2182	.2140	214.0	214.0	21.40
87	3.140	6.393	2210	162.5	.2207	.2165	216.5	216.5	21.65
88	3.176	6.466	2235	164.4	.2233	.2190	219.0	219.0	21.90
89	3.212	6.540	2260	166.2	.2258	.2215	221.5	221.5	22.15
90	3.248	6.613	2286	168.1	.2283	.2239	223.9	223.9	22.39
91	3.284	6.686	2311	169.9	.2309	.2264	226.4	226.4	22.64
92	3.320	6.760	2336	171.8	.2334	.2289	228.9	228.9	22.89
93	3.356	6.833	2362	173.7	.2359	.2314	231.4	231.4	23.14
94	3.392	6.906	2387	175.5	.2384	.2339	233.9	233.9	23.39
95	3.429	6.981	2413	177.4	.2410	.2364	236.4	236.4	23.64
96	3.465	7.055	2438	179.3	.2436	.2389	238.9	238.9	23.89
97	3.501	7.128	2464	181.2	.2461	.2414	241.4	241.4	24.14
98	3.537	7.201	2489	183.0	.2486	.2439	243.9	243.9	24.39
99	3.573	7.275	2514	184.9	.2512	.2464	246.4	246.4	24.64
100	3.609	7.348	2540	186.8	.2537	.2488	248.8	248.8	24.88

P.S.I.	in/H.O	in/Hg	mm/H.O	mm/Hg	kg/cm²	bar	mbar	Pa	kPa
1.0	27.71	2.036	703.1	51.75	.0703	.0689	68.95	6895	6.895
1.1	30.45	2.240	773.4	56.89	.0773	.0758	75.84	7584	7.584
1.2	33.22	2.443	843.7	62.06	.0844	.0827	82.74	8274	8.274
1.3	35.98	2.647	914.0	67.23	.0914	.0896	89.63	8963	8.963
1.4	38.75	2.850	984.3	72.40	.0984	.0965	96.52	9652	9.652
1.5	41.52	3.054	1055	77.57	.1055	.1034	103.4	10340	10.34
1.6	44.29	3.258	1125	82.74	.1125	.1103	110.3	11030	11.03
1.7	47.06	3.461	1195	87.92	.1195	.1172	117.2	11720	11.72
1.8	49.82	3.665	1266	93.09	.1266	.1241	124.1	12410	12.41
1.9	52.59	3.868	1336	98.26	.1336	.1310	131.0	13100	13.10
2.0	55.36	4.072	1406	103.4	.1406	.1379	137.9	13790	13.79
2.1	58.13	4.276	1476	108.6	.1476	.1448	144.8	14480	14.48
2.2	60.90	4.479	1547	113.8	.1547	.1517	151.7	15170	15.17
2.3	63.67	4.683	1617	118.9	.1617	.1586	158.6	15860	15.86
2.4	66.43	4.886	1687	124.1	.1687	.1655	165.5	16550	16.55
2.5	69.20	5.090	1758	129.3	.1758	.1724	172.4	17240	17.24
2.6	71.97	5.294	1828	134.5	.1828	.1793	179.3	17930	17.93
2.7	74.74	5.497	1898	139.6	.1898	.1862	186.2	18620	18.62
2.8	77.51	5.701	1969	144.8	.1968	.1930	193.0	19300	19.30
2.9	80.27	5.904	2039	150.0	.2039	.1999	199.9	19990	19.99
3.0	83.04	6.108	2109	155.1	.2109	.2068	206.8	20680	20.68
3.1	85.81	6.312	2180	160.3	.2180	.2137	213.7	21370	21.37
3.2	88.58	6.515	2250	165.5	.2250	.2206	220.6	22060	22.06
3.3	91.35	6.719	2320	170.7	.2320	.2275	227.5	22750	22.75
3.4	94.11	6.922	2390	175.8	.2390	.2344	234.4	23440	23.44
3.5	96.88	7.126	2461	181.0	.2461	.2413	241.3	24130	24.13
3.6	99.65	7.330	2531	186.2	.2531	.2482	248.2	24820	24.82
3.7	102.4	7.535	2601	191.3	.2601	.2551	255.1	25510	25.51
3.8	105.2	7.737	2672	196.5	.2672	.2620	262.0	26200	26.20
3.9	108.0	7.940	2742	201.7	.2742	.2689	268.9	26890	26.89
4.0	110.7	8.144	2812	206.9	.2812	.2758	275.8	27580	27.58
4.1	113.5	8.348	2883	212.0	.2883	.2827	282.7	28270	28.27
4.2	116.3	8.551	2953	217.2	.2953	.2896	289.6	28960	28.96
4.3	119.0	8.755	3023	222.4	.3023	.2965	296.5	29650	29.65
4.4	121.8	8.958	3094	227.5	.3094	.3034	303.4	30338	30.34
4.5	124.6	9.162	3164	232.7	.3164	.3103	310.3	31030	31.03
4.6	127.3	9.366	3234	237.9	.3234	.3172	317.2	31720	31.72
4.7	130.1	9.569	3304	243.1	.3304	.3240	324.0	32400	32.40
4.8	132.9	9.773	3375	248.2	.3375	.3310	331.0	33100	33.10
4.9	135.6	9.976	3445	253.4	.3445	.3378	337.8	33780	33.78
5.0	138.4	10.18	3515	258.6	.3515	.3447	344.7	34470	34.47
5.1	141.2	10.38	3586	263.7	.3586	.3516	351.6	35160	35.16
5.2	143.9	10.59	3656	268.9	.3656	.3585	358.5	35850	35.85
5.3	146.7	10.79	3726	274.1	.3726	.3654	365.4	36540	36.54
5.4	149.5	10.99	3797	279.3	.3797	.3723	372.3	37230	37.23
5.5	152.2	11.20	3876	284.4	.3867	.3792	379.2	37920	37.92
5.6	155.0	11.40	3973	289.6	.3937	.3861	386.1	38610	38.61
5.7	157.8	11.60	4008	294.8	.4007	.3930	393.0	39300	39.30
5.8	160.5	11.81	4078	299.9	.4078	.3999	399.9	39990	39.99
5.9	163.3	12.01	4148	305.1	.4148	.4068	406.8	40680	40.68
6.0	166.1	12.22	4218	310.3	.4218	.4137	413.7	41370	41.37
6.1	168.8	12.42	4289	315.5	.4289	.4206	420.6	42060	42.06
6.2	171.6	12.62	4359	320.6	.4359	.4275	427.5	42750	42.75
6.3	174.4	12.83	4429	325.8	.4429	.4344	434.4	43440	43.44
6.4	177.2	13.03	4500	331.0	.4500	.4413	441.3	44130	44.13
6.5	179.9	13.23	4570	336.1	.4570	.4482	448.2	44820	44.82
6.6	182.7	13.44	4640	341.3	.4640	.4550	455.0	45500	45.50
6.7	185.5	13.64	4711	346.5	.4710	.4619	461.9	46190	46.19
6.8	188.2	13.84	4781	351.7	.4781	.4688	468.8	46880	46.88
6.9	191.0	14.05	4851	356.8	.4851	.4757	475.7	47570	47.57
7.0	193.8	14.25	4922	362.0	.4921	.4826	482.6	48260	48.26
7.1	196.5	14.46	4992	367.2	.4992	.4895	489.5	48950	48.95
7.2	199.3	14.66	5062	372.3	.5062	.4964	496.4	49640	49.64
7.3	202.1	14.86	5132	377.5	.5132	.5033	503.3	50330	50.33
7.4	204.8	15.07	5203	382.7	.5203	.5102	510.2	51020	51.02
7.5	207.6	15.27	5273	387.9	.5273	.5171	517.1	51710	51.71
7.6	210.4	15.47	5343	393.0	.5343	.5240	524.0	52400	52.40
7.8	215.9	15.88	5484	403.4	.5484	.5378	537.8	53780	53.78
8.0	221.4	16.29	5625	413.7	.5625	.5516	551.6	55160	55.16
8.2	227.0	16.70	5765	424.1	.5765	.5654	565.4	56540	56.54
8.4	232.5	17.10	5906	434.4	.5906	.5792	579.2	57920	57.92
8.6	238.0	17.51	6047	444.7	.6046	.5929	592.9	59290	59.29
8.8	243.6	17.92	6187	455.1	.6187	.6067	606.7	60670	60.67
9.0	249.1	18.32	6328	465.4	.6328	.6205	620.5	62050	62.05
9.2	254.7	18.73	6468	475.8	.6468	.6343	634.3	63430	63.43
9.4	260.2	19.14	6609	486.1	.6609	.6481	648.1	64810	64.81
9.6	265.7	19.54	6750	496.5	.6749	.6619	661.9	66190	66.19
9.8	271.3	19.95	6890	506.8	.6890	.6757	675.7	67570	67.57
10.0	276.8	20.36	7031	517.1	.7031	.6895	689.5	68950	68.95
11.0	304.5	22.40	7734	568.9	.7734	.7584	758.4	75840	75.84
12.0	332.2	24.43	8437	620.6	.8437	.8274	827.4	82740	82.74
13.0	359.8	26.47	9140	672.3	.9140	.8963	896.3	89630	89.63
14.0	387.5	28.50	9843	724.0	.9843	.9652	965.2	96520	96.52
14.7	406.9	29.93	10340	760.2	1.033	1.014	1014	10140	101.4
15.0	415.2	30.54	10550	775.7	1.055	1.034	1034	10340	103.4
16.0	442.9	32.58	11250	827.4	1.125	1.103	1103	11030	110.3
17.0	470.6	34.61	11950	879.1	1.195	1.172	1172	11720	117.2
18.0	498.2	36.65	12660	930.9	1.265	1.241	1241	12410	124.1
19.0	525.9	36.68	13360	982.6	1.336	1.310	1310	13100	131.0
20.0	553.6	40.72	14060	1034	1.406	1.379	1379	13790	137.9
21.0	581.3	42.76	14770	1086	1.476	1.448	1448	14480	144.8
22.0	609.0	44.79	15470	1138	1.547	1.517	1517	15170	151.7
23.0	636.7	46.83	16170	1189	1.617	1.586	1586	15860	158.6
24.0	664.3	48.86	16870	1241	1.687	1.655	1655	16550	165.5
25.0	692.0	50.90	17580	1293	1.758	1.724	1724	17240	172.4

Reference Tables

AREA OF CIRCLES IN FT ²			
Diam. in Inches	AREA Square Feet	Diam. in Inches	AREA Square Feet
1	.0054	30	4.909
1½	.0123	31	5.241
2	.0218	32	5.585
2½	.0341	33	5.940
3	.0491	34	6.305
3½	.0668	35	6.611
4	.0873	36	7.069
4½	.1105	37	7.467
5	.1364	38	7.876
5½	.1650	39	8.296
6	.1964	40	8.727
6½	.2305	41	9.168
7	.2673	42	9.621
7½	.3068	43	10.08
8	.3491	44	10.56
8½	.3940	45	11.04
9	.4418	46	11.54
9½	.4923	47	12.05
10	.5454	48	12.57
11	.6600	49	13.10
12	.7854	50	13.64
13	.9218	51	14.19
14	1.069	52	14.75
15	1.227	53	15.32
16	1.396	54	15.90
17	1.576	56	17.10
18	1.767	58	18.35
19	1.969	60	19.63
20	2.182	62	20.97
21	2.405	64	22.34
22	2.640	66	23.76
23	2.885	68	25.22
24	3.142	70	26.73
25	3.409	72	28.27
26	3.687	74	29.87
27	3.976	76	31.50
28	4.276	78	33.18
29	4.587	80	34.91

VOLUME EQUIVALENTS	
1 CU. FT. =	1728 Cu. In. 7.481 Gal. (U.S.) 28.317 Liters 28.317 Cu. Cm.
1 GAL. (U.S.) =	231 Cu. In. .1337 Cu. Ft. 3.785 Liters 3785 Cu. Cm.
1 LITER =	.0353 Cu. Ft. .2642 Gal. (U.S.) 1000 Cu. Cm.

ALTITUDE PRESSURE TABLE		
Mercury at 0°C (32°F)		
Altitude in feet	Inches of Mercury	In Millimeters of Mercury
-1,000	31.02	787.9
0	29.921	760.0
1,000	28.86	732.9
2,000	27.82	706.6
3,000	26.81	681.1
4,000	25.84	656.3
5,000	24.89	632.3
6,000	23.98	609.0
7,000	23.09	586.4
8,000	22.22	564.4
9,000	21.38	543.2
10,000	20.58	522.6
15,000	16.88	428.8
20,000	13.75	349.1
25,000	11.10	281.9
30,000	8.88	225.6
35,000	7.04	178.7
40,000	5.54	140.7
45,000	4.36	110.8
50,000	3.436	87.30

SPECIFIC GRAVITIES OF GASES		
(BASED ON 68°F AND 14.7 LBS. ABS.)		
ACETYLENE	C.H.	.897
AIR		1.000
AMMONIA	NH.	.587
ARGON	A	1.378
BUTANE-N	C.H.	2.390
BUTANE-ISO	(CH ₃) ₂ CH CH ₃	1.990
CARBON DIOXIDE	CO ₂	1.517
CARBON MONOXIDE	CO	.966
CHLORINE	CL ₂	2.452
ETHANE	C ₂ H ₆	1.035
HELIUM	He	.138
HYDROGEN	H ₂	.070
METHANE	CH ₄	.553
NATURAL GAS		.665
(Approx. Avg.)		
NITRIC OXIDE	NO	1.035
NITROGEN	N ₂	.966
NITROUS OXIDE	N ₂ O	1.518
OXYGEN	O ₂	1.103
PROPANE	C ₃ H ₈	1.550
SULPHUR DIOXIDE	SO ₂	2.209

FLOW EQUIVALENTS			
1 Cu. Ft./Hr.	1 Cu. Ft./Min.	1 CC/Min.	1 CC/Hr.
.0166 Cu. Ft./Min. LPM	60 Cu. Ft./Hr. LPM	60 CC/Hr. Cu. Ft./Min.	.0167 CC/Min. Cu. Ft./Min.
.4719 LPM	28.316 LPH	.000035 Cu. Ft./Hr.	.0000005 Cu. Ft./Hr.
28.316 LPH	1699 LPM	.0021 Cu. Ft./Hr.	.00003 Cu. Ft./Hr.
471.947 CC/Min.	28317 CC/Min.	.001 LPM	.000017 LPM
28317 CC/Hr.	1,699,011 CC/Hr.	.06 LPH	.001 LPH
.1247 Gal/Min.	7.481 Gal/Min.	.00026 Gal/Min.	.000004 Gal/Min.
7.481 Gal/Hr.	448.831 Gal/Hr.	.0159 Gal/Hr.	.00026 Gal/Hr.
1 LPM	1 LPH	1 Gal/Min.	1 Gal/Hr.
60 LPH	.0166 LPM	60 Gal/Hr.	.0167 Gal/Min.
.035 Cu. Ft./Min.	.00059 Cu. Ft./Min.	.1337 Cu. Ft./Min.	.002 Cu. Ft./Min.
2.1189 Cu. Ft./Hr.	.035 Cu. Ft./Hr.	8.021 Cu. Ft./Hr.	.1337 Cu. Ft./Hr.
1000 CC/Min.	16.667 CC/Min.	3.785 LPM	.063 LPM
60,002 CC/Hr.	1000 CC/Hr.	227.118 LPH	3.785 LPH
.264 Gal/Min.	.004 Gal/Min.	3,785.412 CC/Min.	63.069 CC/Min.
15.851 Gal/Hr.	.264 Gal/Hr.	227,125 CC/Hr.	3785 CC/Hr.



Discount Schedule and Conditions of Sale

NOTE: Each item (model, range, part number, etc.) is discounted independently. In an order for more than one item, different items cannot be combined to earn a greater discount. Most items are subject to STANDARD schedule at right. Prices followed by the symbol ® are subject to discounts per schedule B. Certain items such as repairs, repair parts, EXPL and WP housings, special scale and tag charges are priced at net and earn no discount.	INDUSTRIAL DISCOUNT SCHEDULE		
	QUANTITY OF EACH ITEM	DISCOUNTS	
		STANDARD	SCHEDULE B
	1-24	Net	Net
	25-99	5%	Net
	100-249	10%	5%
	250-499	15%	10%
	500-Up	20%	15%

Terms and Conditions of Sale

- 1. Prices and Specifications** are subject to change without notice.
- 2. Shipping dates** are approximate. They are dependent upon credit approval and subject to delays beyond our control.
- 3. Terms:** Net 30 days to companies with established credit rating. In the event Buyer fails to fulfill previous terms of payment, or in case Seller shall have any doubt at any time as to Buyer's financial responsibility, Seller may decline to make further deliveries except upon receipt of cash in advance or other special arrangements.
- 4. Liability Point and Title:** All material is sold F.O.B. Factory (Domestic) / FCA Free Carrier (International). Title to all material sold shall pass to buyer upon delivery by Seller to carrier at shipping point.
- 5. State and Local Taxes:** Any taxes which the Seller may be required to pay or collect upon or with respect to the sale, purchase, delivery, use or consumption of any of the material covered hereby shall be for the account of the Buyer and shall be added to the purchase price.
- 6. Special tooling,** dies, silk screens and molds acquired specially to produce goods for Buyer remain the property of Dwyer Instruments, Inc., and may not be removed. They will be maintained in good condition for a minimum period of three years from the date of the original purchase order.
- 7. Export Orders:** Terms, discounts and conditions of sale for purchase orders originating or for shipment to final destinations outside the U.S.A. will be furnished upon request.
- 8. Limited Warranty:** The Seller warrants all Dwyer instruments and equipment to be free from defects in workmanship or material under normal use and service for a period of one year from date of shipment. Liability under this warranty is limited to repair or replacement F.O.B. Factory (Domestic) / FCA Free Carrier (International) of any parts which prove to be defective within that time or repayment of the purchase price at the Seller's option provided the instruments have been returned, transportation prepaid, within one year from date of purchase. All technical advice, recommendations and services are based on technical data and information which the Seller believes to be reliable and are intended for use by persons having skill and knowledge of the business, at their own discretion. In no case is Seller liable beyond replacement of equipment F.O.B. Factory (Domestic) / FCA Free Carrier (International) or the full purchase price. This warranty does not apply if the maximum ratings label is removed or if the instrument or equipment is abused, altered, used at ratings above the maximum specified, or otherwise misused in any way.

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- 10. Acceptance:** All orders shall be subject to the terms and conditions contained or referred to in the Seller's quotation, acknowledgment, and to those listed here and to no others whatsoever. No waiver, alteration or modification of these terms and conditions shall be binding unless in writing and signed by an executive officer of the Seller. All orders are subject to written acceptance by Dwyer Instruments, Inc., Michigan City, Indiana, U.S.A.



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