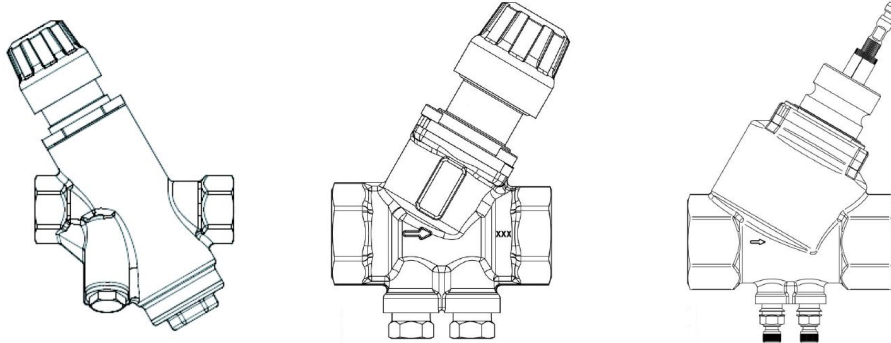




**Pressure Independent Control Series  
Two-Way, Brass Valve Bodies  
1/2 to 2" Brass Body (Ansi Class 250)**



**1/2 to 1-1/4 Inch NC**

**1/2- to 1-1/4-Inch NO**

**1-1/2 to 2-Inch NO**

**Description**

The Pressure Independent Control Valves integrate three functions into a single device: control valve, adjustable flow limiter, and automatic pressure regulator. The 1/2-inch Normally Open valves have a 2.5 mm stroke, and a threaded valve bonnet for use with EN56/ES67 Electronic Valve Actuators. The 3/4- to 1-1/4-inch Normally Open and 1/2 to 1-1/4 inch Normally Closed Valves have a 5 or 5.5 mm stroke, and a threaded valve bonnet for use with EN56/ES67 Electronic Valve Actuators. The 1-1/2 and 2-inch Normally Open Valves have a 15 mm stroke and use the EN45 Electronic Valve Actuators.

**Features**

- Control valve with integrated pressure regulator and adjustable flow limiter.
- ANSI Class 250 valve body.
- 200 psi close-off with ANSI Class IV leakage (1/2 to 1-1/4-inch Normally Open).
- 100 psi close-off with ANSI Class IV leakage (1-1/2- and 2-inch Normally Open).
- 45 psi close-off with ANSI Class IV leakage (1/2 to 1-1/4 inch Normally Closed).
- Linear Flow Characteristic.
- Stainless Steel Stem.
- 1-1/2- and 2-Inch Normally Open Valves include P/T ports.
- EN45 actuators for 1-1/2- and 2-inch Normally Open Valves can also be set for Normally Closed operation (reverse acting). See note on page 2.

**Application**

For use in HVAC applications with Pressure Independent Control EN56/ES67, or EN45 Electronic Actuators, to control hot or chilled water or 50% water-glycol solution in closed loop systems.

**Warning/Caution**

**Notations**

<b>WARNING:</b>		Personal injury or loss of life may occur if you do not perform a procedure as specified.
<b>CAUTION:</b>		Equipment damage may occur if you do not perform a procedure as specified.



Line Size inch (mm)	Factory Preset Max GPM	Normally Open	Normally Closed
1/2 (15)	0.5	PICV2-050(.9)NO-.5	PICV2-050(2.7)NC-.5
	1	PICV2-050(2.5)NO-1	PICV2-050(2.7)NC-1
	1.5	PICV2-050(2.5)NO-1.5	PICV2-050(2.7)NC-1.5
	2	PICV2-050(2.5)NO-2	PICV2-050(2.7)NC-2
	2.5	PICV2-050(2.5)NO-2.5	PICV2-050(2.7)NC-2.5
	3	–	PICV2-050(7.5)NC-3
	3.5	–	PICV2-050(7.5)NC-3.5
	4	–	PICV2-050(7.5)NC-4
	4.5	–	PICV2-050(7.5)NC-4.5
	5	–	PICV2-050(7.5)NC-5
	5.5	–	PICV2-050(7.5)NC-5.5
	6	–	PICV2-050(7.5)NC-6
	6.5	–	PICV2-050(7.5)NC-6.5
	7	–	PICV2-050(7.5)NC-7
7.5	–	PICV2-050(7.5)NC-7.5	
3/4 (20)	1	PICV2-075(5.8)NO-1	PICV2-075(4.5)NC-1
	1.5	PICV2-075(5.8)NO-1.5	PICV2-075(4.5)NC-1.5
	2	PICV2-075(5.8)NO-2	PICV2-075(4.5)NC-2
	2.5	PICV2-075(5.8)NO-2.5	PICV2-075(4.5)NC-2.5
	3	PICV2-075(5.8)NO-3	PICV2-075(4.5)NC-3
	3.5	PICV2-075(5.8)NO-3.5	PICV2-075(4.5)NC-3.5
	4	PICV2-075(5.8)NO-4	PICV2-075(4.5)NC-4
	4.5	PICV2-075(5.8)NO-4.5	PICV2-075(4.5)NC-4.5
	5	PICV2-075(5.8)NO-5	PICV2-075(8.9)NC-5
	5.5	PICV2-075(5.8)NO-5.5	PICV2-075(8.9)NC-5.5
	6	–	PICV2-075(8.9)NC-6
	6.5	–	PICV2-075(8.9)NC-6.5
	7	–	PICV2-075(8.9)NC-7
	7.5	–	PICV2-075(8.9)NC-7.5
8	–	PICV2-075(8.9)NC-8	
8.5	–	PICV2-075(8.9)NC-8.5	
1 (25)	1	–	PICV2-100(8.9)NC-1
	2	–	PICV2-100(8.9)NC-2
	3	–	PICV2-100(8.9)NC-3
	4	–	PICV2-100(8.9)NC-4
	5	PICV2-100(8.0)NO-5	PICV2-100(8.9)NC-5
	6	PICV2-100(8.0)NO-6	PICV2-100(8.9)NC-6
	7	PICV2-100(8.0)NO-7	PICV2-100(8.9)NC-7
	8	PICV2-100(8.0)NO-8	PICV2-100(8.9)NC-8
	9	–	PICV2-100(8.9)NC-9

Line Size inch (mm)	Factory Preset Max GPM	Normally Open	Normally Closed	
1-1/4	3	–	PICV2-125(13.2)NC-3	
	4	–	PICV2-125(13.2)NC-4	
	5	–	PICV2-125(13.2)NC-5	
	6	–	PICV2-125(13.2)NC-6	
	7	–	PICV2-125(13.2)NC-7	
	8	–	PICV2-125(13.2)NC-8	
	9	PICV2-125(18)NO-9	PICV2-125(13.2)NC-9	
	10	PICV2-125(18)NO-10	PICV2-125(13.2)NC-10	
	11	PICV2-125(18)NO-11	PICV2-125(13.2)NC-11	
	12	PICV2-125(18)NO-12	PICV2-125(13.2)NC-12	
	13	PICV2-125(18)NO-13	PICV2-125(13.2)NC-13	
	14	PICV2-125(18)NO-14	–	
	15	PICV2-125(18)NO-15	–	
	16	PICV2-125(18)NO-16	–	
	17	PICV2-125(18)NO-17	–	
	18	PICV2-125(18)NO-18	–	
	1-1/2	15	PICV2-150(40)NO-15	–
		20	PICV2-150(40)NO-20	–
25		PICV2-150(40)NO-25	–	
30		PICV2-150(40)NO-30	–	
35		PICV2-150(40)NO-35	–	
40		PICV2-150(40)NO-40	–	
2	20	PICV2-200(50)NO-20	–	
	25	PICV2-200(50)NO-25	–	
	30	PICV2-200(50)NO-30	–	
	35	PICV2-200(50)NO-35	–	
	40	PICV2-200(50)NO-40	–	
	45	PICV2-200(50)NO-45	–	
50	PICV2-200(50)NO-50	–		

\* See EN45 Electronic Valve Actuator, NSR, 24 Vac Proportional Control Technical Instructions, EN45 Electronic Valve Actuator, NSR, 24Vac, 3-Position Control Technical Instructions, and EN45 Electronic Valve Actuator Installation Instruction for reverse-acting (normally closed) operation.



Specifications

Line sizes	1/2- to 2-inch (15 to 50 mm)
Capacity	See Table 2
Body style	2-way
Action	Normally Closed and Normally Open
Valve body rating	ANSI Class 250
Connection	Internal NPT thread
Stem travel (Stroke)	
1/2-inch NO	2.5 mm
3/4-inch NO and 1/2 to 1-1/4 inch NC	5 mm
1- and 1-1/4-inch NO	5.5 mm
1-1/2 to 2-inch NO	15 mm

Table 2. Reference: Valve Body Flow Range.

Action	Valve Body	Line Size Inch (mm)	GPM Flow Range
Normally Closed	PICV2-050(2.7)NC	1/2 (15)	0.3 to 2.7
	PICV2-050(7.5)NC		1.0 to 7.5
	PICV2-075(4.5)NC	3/4 (20)	0.5 to 4.5
	PICV2-075(8.9)NC		1.0 to 8.9
	PICV2-100(8.9)NC	1 (25)	1.0 to 8.9
	PICV2-125(13.2)NC	1-1/4 (32)	2.5 to 13.2
Normally Open	PICV2-050(.9)NO	1/2 (15)	0.2 to 0.9
	PICV2-050(2.5)NO		0.5 to 2.5
	PICV2-075(5.8)NO	3/4 (20)	1 to 5.8
	PICV2-100(8.0)NO	1 (25)	1.2 to 8
	PICV2-125(18)NO	1-1/4 (32)	3 to 18
	PICV2-150(40)NO	1-1/2 (40)	10 to 40
	PICV2-200(50)NO	2 (50)	10 to 50

Material

Body

1/2- to 1-1/4-inch	Brass
1-1/2- and 2-inch	Ductile Iron
Plug	Brass
Stem, spring	Stainless Steel
Seals	EPDM 281 O-ring

Operating

Controlled medium	Hot/chilled water or 50% water-glycol solutions in closed loop systems
Medium temperature range	34°F to 248°F (1°C to 120°C)
Leakage rate	
1/2- to 1-1/4-inch NO	ANSI Class IV (0.01%) @ 200 psi
1-1/2- and 2-inch NO	ANSI Class IV (0.01%) @ 100 psi
1/2- to 1-1/4 inch NC	ANSI Class IV (0.01%) @ 45 psi
Flow characteristics	Linear
Pressure regulation flow accuracy	+/- 5% from 5 to 58psi
	+/-10% from Δp min. to 5 psi
Range of Pressure Independence	See Table 3.



Table 3. Pressure Independence Range.

Action	Valve	Size	$\Delta p_{min}$ (psi)	$\Delta p_{max}$ (psi)
Normally Closed	PICV2-050(2.7)NC	1/2	2.3	58
	PICV2-050(7.5)NC		2.6	
	PICV2-075(4.5)NC	3/4	2.3	
	PICV2-075(8.9)NC		3.2	
	PICV2-100(8.9)NC	1	3.2	
	PICV2-125(13.2)NC	1-1/4	2.6	
Normally Open	PICV2-050(.9)NO	1/2	2.3	
	PICV2-050(2.5)NO		2.7	
	PICV2-075(5.8)NO	3/4	3.1	
	PICV2-100(8.0)NO	1	4.0	
	PICV2-125(18)NO	1-1/4	4.1	
	PICV2-150(40)NO	1-1/2	3.6	
	PICV2-200(50)NO	2	5.0	

**Miscellaneous**

Mounting location NEMA 1 (interior only)  
Dimensions and weight See Figure 2 and Figure 3.

**Accessory**

P/T port set for PICV P/T Port Set  
One set of high and low pressure measuring ports to replace blank caps in valves

**P/T Ports Installation**

The low-pressure P/T port (blue indicator ring) should be located on the downstream side of the valve. The high pressure P/T port (red indicator ring) will be located on the upstream or inlet side of the valve.

**For 1/2 and 1-1/4-inch Normally Open Valves**

**Note:**  
1-1/2- and 2-inch normally open valves ship with P/T ports installed.

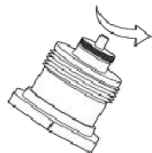
**For 1/2 to 1-1/4-inch Normally Closed valves**

The low-pressure P/T port (blue indicator ring) should be located on the side of the valve with the raised lettering and label. The high-pressure P/T port (red indicator ring) will be located on the opposite side.

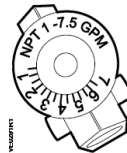
**Presetting Adjustment**

Prior to mounting the actuator, verify the valve is set to ordered flow setting (suffix of part number).

To change the valve flow setting, see Steps 2, 3, and 4 below (Flow setting scales are in gallons per minute (gpm) on all valves):



1. On 1/2- to 1-1/4-inch valves, loosen the brass knurled nut. On 1-1/2 and 2-inch valves, loosen the valve stem.



2. Adjust the desired dial setting with the white knob.
3. Retighten the brass knurled nut or valve stem by hand.

**NOTE:** When tightening the knurled nut on 1/2- to 1-1/4-inch valves, some force is required to reach the required physical stop; approximately an additional 1/2 to 3/4 extra turn after initial “finger tight” resistance is felt.



**Presetting  
Adjustment,  
Continued**



**CAUTION:**

On 1-1/2- and 2-inch valves, do NOT use tools to tighten the valve stem. Hand-tighten only or damage will occur.



**CAUTION:**

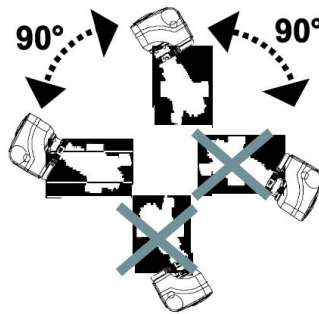
Do NOT rotate the actuator on the valve once the actuator and valve stem are connected. Doing so will inadvertently adjust the flow setting of the valve or damage the stem.

**Mounting and  
Installation**

Install the valve so the flow follows the direction of the arrow indicated on the valve body.

For best performance, install the valve assembly with the actuator above the valve body. The valve and actuator can be installed in any position between vertical and horizontal. See Figure 1.

Do not install the valve assembly with the actuator below horizontal or upside down.



**Figure 1. Recommended Installation Orientations.**

**NOTE:** Allow sufficient space for servicing the valve and actuator. Instructions for field mounting an actuator, wiring diagrams, and start-up are covered in the *EN56/ES67 Series Electronic Valve Actuator Installation Instructions* and *EN45 Electronic Valve Actuators Installation Instructions*.

**Commissioning  
Notes**



**CAUTION:**

The Pressure Independent Control Valves must be open when flushing or pressure testing the system. Strong pressure impacts can damage closed Pressure Independent Control Valves.

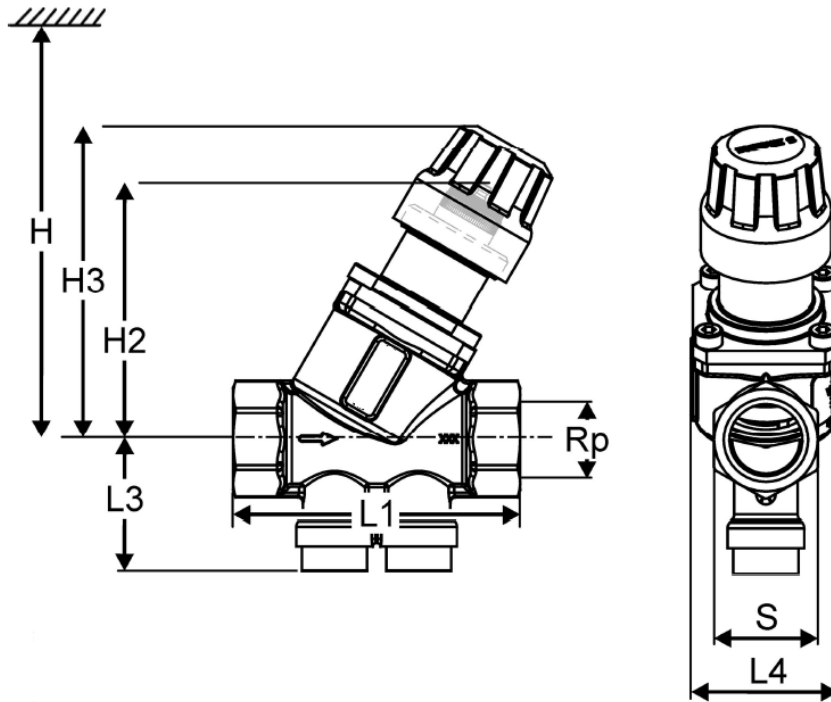


**CAUTION:**

Differential pressure across the valve greater than 58 psi will result in damage to the pressure regulator.

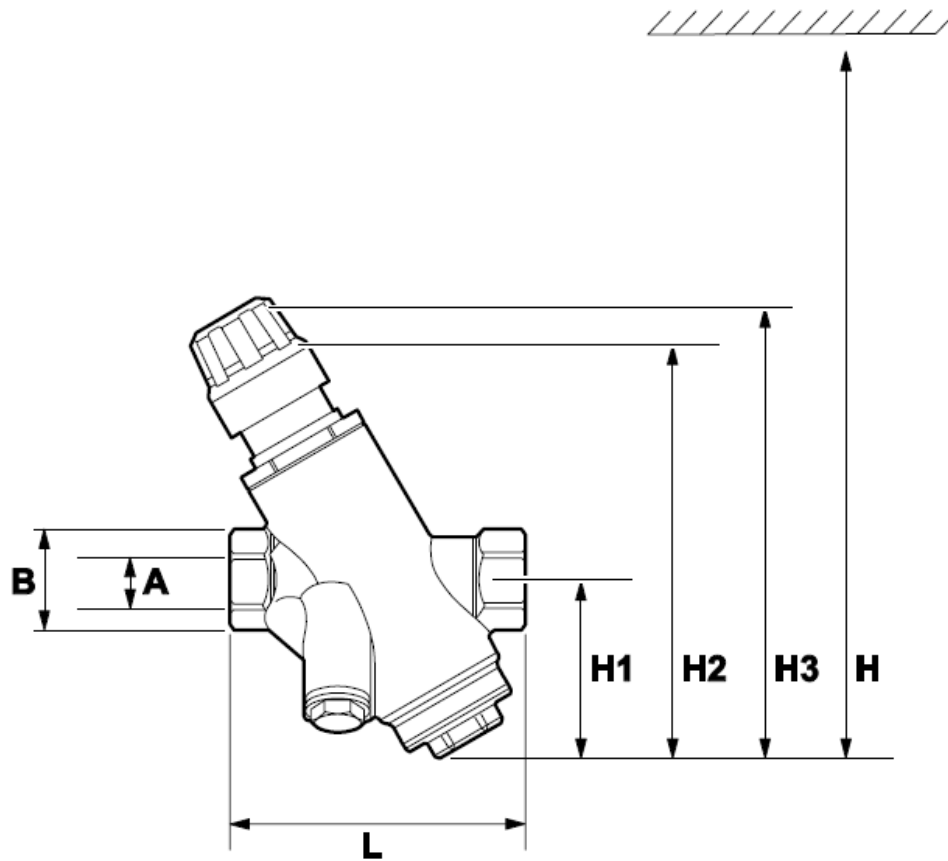


Dimensions in Inches (mm)



Valve P/N	Valve Size Inch (mm)	S	L1	L3	L4	H2	H3	H	Weight (lb (kg))
PICV2-050(.9)NO	1/2 (15)	1.1 (27)	3.0 (75)	1.6 (41)	1.5 (38)	2.6 (67.3)	3.2 (82.4)	14.6 (371)	1.1 (0.50)
PICV2-050(2.5)NO		1.1 (27)	3.0 (75)	1.6 (41)	1.5 (38)	2.6 (67.3)	3.2 (82.4)	14.6 (371)	1.1 (0.50)
PICV2-075(5.8)NO	3/4 (20)	1.25 (32)	3.1 (79)	1.6 (41)	1.5 (38)	2.7 (67.5)	3.3 (82.5)	14.7 (374)	1.2 (0.53)
PICV2-100(8.0)NO	1 (25)	1.5 (40)	4.0 (100)	1.7 (44)	1.5 (38)	2.8 (71)	3.3 (82.5)	14.7 (374)	2.5 (1.14)
PICV2-125(18)NO	1-1/4 (32)	1.8 (46)	4.1 (104)	2.1 (53)	2.5 (65)	3.4 (86)	4.0 (100)	15.4 (391)	2.8 (1.27)
PICV2-150(40)NO	1-1/2 (40)	2.3 (58)	5.4 (138)	2.7 (68)	3.7 (94)	5.9 (149)	-	20 (508)	7.2 (3.28)
PICV2-200(50)NO	2 (50)	2.8 (72)	5.4 (138)	2.9 (74)	3.7 (94)	5.9 (149)	-	20 (508)	8.2 (3.71)

Figure 2. Two-Way Normally Open Valves Dimensions.



Valve P/N	Valve Size Inch (mm)	A	B	L	H1	H2	H3	H	Weight (lb (kg))
PICV2-050(2.7)NC	1/2 (15)	.50 (15)	1.1 (27)	3.5 (88)	2.1 (53)	4.8 (123)	5.3 (135)	16.3 (414)	2.0 (0.9)
PICV2-050(7.5)NC		.50 (15)	1.1 (27)	3.5 (88)	2.1 (53)	4.8 (123)	5.3 (135)	16.3 (414)	2.0 (0.9)
PICV2-075(4.5)NC	3/4 (20)	.75 (20)	1.3 (32)	3.5 (88)	2.1 (53)	4.8 (123)	5.3 (135)	16.3 (414)	2.0 (0.9)
PICV2-075(8.9)NC		.75 (20)	1.3 (32)	3.5 (88)	2.1 (53)	4.8 (123)	5.3 (135)	16.3 (414)	2.0 (0.9)
PICV2-100(8.9)NC	1 (25)	1.0 (25)	1.5 (39)	3.6 (92)	2.1 (53)	4.8 (123)	5.3 (135)	16.3 (414)	2.0 (0.9)
PICV2-125(13.2)NC	1-1/4 (32)	1.25 (32)	1.8 (46)	5.0 (128)	2.7 (69)	5.7 (145)	6.2 (158)	19.9 (505)	3.3 (1.5)

Figure 3. Two-Way Normally Closed Valves Dimensions.

Information in this publication is based on current specifications. The company reserves the right to make changes in specifications and models as design improvements are introduced.



**Two-Way Cast Iron Flanged PICV Control Valve  
Adjustable Flow Limiter and Automatic Pressure Regulator  
2-1/2 to 6" ANSI Class 125 or 250**

**Description**

Pressure Independent Control Valves integrate three functions into a single device: control valve, adjustable flow limiter and automatic differential pressure regulator. They are available in both ANSI Class 125 and 250.



**Features**

- Control valve with integrated differential pressure regulator and adjustable flow limiter
- ANSI 125 and ANSI 250 bodies and flanges
- 2-1/2-, 3-, 4-, 5-, and 6-inch (65, 80, 100, 125, and 150 mm)
- Field adjustable presetting
- ANSI Class IV leakage (0.01%)
- Pressure test (P/T) points
- Can be equipped with EN180, EN360, or ES247 electro-motoric actuators

**Valve Body Flow Maximums**

**Table 1**


Size	Maximum Flow Range GPM	ANSI Class 125	ANSI Class 250	ΔP Regulator Operating Range psi (kPa)
2-1/2"	19 to 110	PICV2-250(110)-125		3.6 to 90 (25 to 600)
	26 to 154	PICV2-250(154)-125		8 to 90 (55 to 600)
	19 to 110		PICV2-250(110)-250	3.6 to 90 (25 to 600)
	26 to 154		PICV2-250(154)-250	8 to 90 (55 to 600)
3"	24 to 150	PICV2-300(150)-125		3.6 to 90 (25 to 600)
	31 to 190	PICV2-300(190)-125		8 to 90 (55 to 600)
	24 to 150		PICV2-300(150)-250	3.6 to 90 (25 to 600)
	31 to 190		PICV2-300(190)-250	8 to 90 (55 to 600)
4"	55 to 300	PICV2-400(300)-125		5 to 90 (35 to 600)
	65 to 395	PICV2-400(395)-125		10 to 90 (70 to 600)
	55 to 300		PICV2-400(300)-250	5 to 90 (35 to 600)
	65 to 395		PICV2-400(395)-250	10 to 90 (70 to 600)
5"	85 to 485	PICV2-500(485)-125		5 to 90 (35 to 600)
	105 to 595	PICV2-500(595)-125		8 to 90 (55 to 600)
	85 to 485		PICV2-500(485)-250	5 to 90 (35 to 600)
	105 to 595		PICV2-500(595)-250	8 to 90 (55 to 600)
6"	115 to 650	PICV2-600(650)-125		5 to 90 (35 to 600)
	140 to 860	PICV2-600(860)-125		9 to 90 (62 to 600)
	115 to 650		PICV2-600(650)-250	5 to 90 (35 to 600)
	140 to 860		PICV2-600(860)-250	9 to 90 (62 to 600)





- Application**
- For use in heating, ventilating and air conditioning systems as a control valve
  - For closed loop hot or chilled water applications

**Caution Notations**

<b>CAUTION:</b>		Equipment damage may occur if you do not perform a procedure as specified.
-----------------	---	--

<b>Specifications</b>  Functional Data	Line size	2-1/2-inch (65 mm) to 6-inch (150 mm)		
	Body style	Flanged		
	Pressure class	ANSI 125 and ANSI 250		
	Pressure regulation flow accuracy	± 5% from 10 to 90 psi (4- and 6-inch high flow from 15 to 90 psi) ±10% from $\Delta p_{min}$ to 10 psi or 15 psi, as noted above.		
	Valve characteristic	Linear		
	Close-off	100 psi (700 kPa)		
	Leakage rate	< Class IV (0 to 0.01% of nominal maximum flow)		
	Operating direction	Normally open (push to close)		
	Permissible media	Hot water, chilled water, water/glycol solution		
	Medium temperature range	34°F to 248°F (1°C to 120°C)		
	Nominal stroke	2-1/2-inch and 3-inch 4 to 6-inch	3/4-inch (20 mm) 1-1/2-inch (40 mm)	
	Materials	Valve body	Cast iron	
Stem, spring, seat		Stainless steel		
Plug		Brass (DZR)		
Regulator		Stainless steel		
Seals		EPDM (peroxide cured)		
General ambient conditions	Temperature			
	Operation	5°F to 131°F (-15°C to 55°C)		
	Transport	-22°F to 149°F (-30°C to 65°C)		
	Storage	5°F to 122°F (-15°C to 50°C)		
	Humidity			
	Operation	5 to 95% rh		
Transport	<95% rh			
Storage	5 to 95% rh			
Miscellaneous	Canadian Registration Number	OH7645.5R1 (for 2-1/2-inch and 3-inch only)		

**Table 2. Cast Iron Valve Body Ratings.**

Temperature		Pressure psig (kPa)			
°F	°C	ANSI Class 125		ANSI Class 250	
-20 to 150	-30 to 66	200	(1387)	500	(3447)
200	93	190	(1310)	460	(3171)
250	121	175	(1206)	415	(2861)
300	149	165	(1137)	375	(2585)
400	204	140	(965)	290	(1999)
450	232	125	(861)	250	(1723)



Table 3. Close-off Pressures for Electronic Actuators.

Valve Size In. (mm)	EN180 Non-Spring Return		EN360 Non-Spring Return		ES247 Spring Return	
	psi	kPa	psi	kPa	psi	kPa
2-1/2 (65)	100	700	–	–	100	700
3 (80)	100	700	–	–	100	700
4 (100)	–	–	100	700	100	700
5 (125)	–	–	100	700	100	700
6 (150)	–	–	100	700	100	700

Mechanical Design

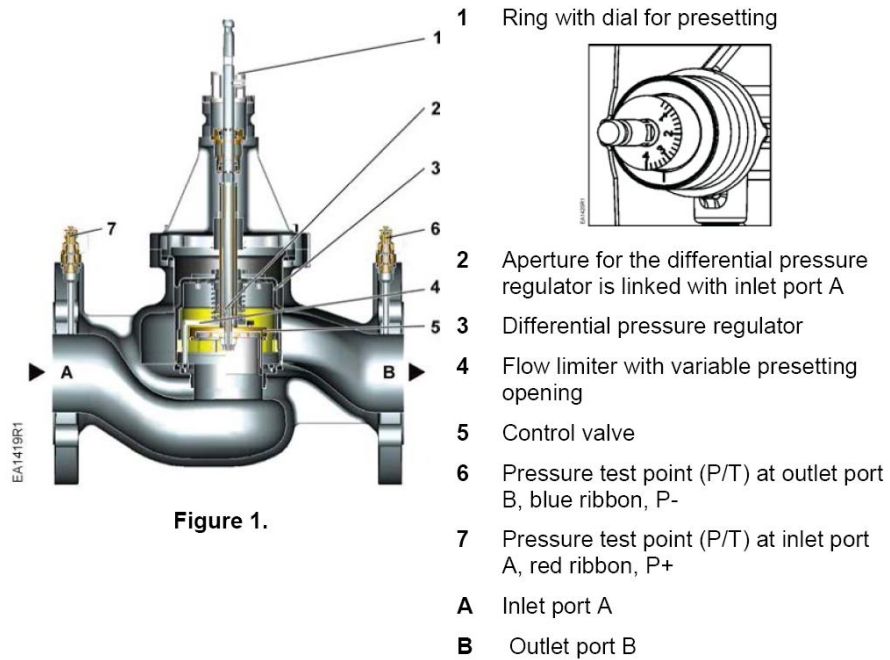


Figure 1.

Operation

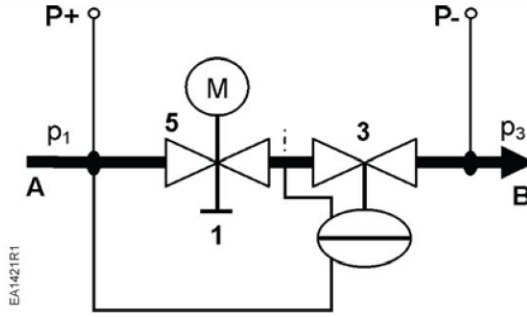
The Pressure Independent Control Valves combine three functions (see Figure 2):

- a control valve (5) for controlling the volumetric flow,
- a field-adjustable flow limiter (4) with a dial (1) for a pre-settable maximum volumetric flow,
- a differential pressure regulator (3) that automatically adjusts to pressure fluctuations in the hydraulic system respectively across the control valve to maintain a constant flow.

The mechanical series-connected differential pressure regulator keeps the differential pressure constant across the control valve, thus maintaining constant flow. The desired maximum volumetric flow can be preset with the field adjustable flow limiter. The building automation system controller (not shown) and the actuator regulate the volumetric flow and consequently the desired temperature in buildings, rooms or zones.



Operation,  
continued



- A Inlet medium (inlet port A)
- B Outlet medium (outlet port B)
- 1 Flow limiter with dial for presetting
- 3 Differential pressure regulator
- 5 Control valve with mounted actuator
- P- P/T port, pressure test point with blue ribbon (6)
- P+ P/T port, pressure test point with red ribbon (7)
- p1 Pressure at inlet port A of PICV Valve
- p3 Pressure at outlet port B of PICV Valve

Figure 2. Pressure Independent Control Valve Operation.

Medium Flow

The medium entering the Pressure Independent Control Valve (inlet port A) first passes through the variable presetting opening (4) which is connected to the ring with a dial (1) for presetting the desired maximum volumetric flow. The actuator (not shown here) opens and accurately positions the control valve. Then, the medium flows through control valve (5) with a linear characteristic.

Before leaving the Pressure Independent Control Valve (outlet port B), the medium passes through a built-in mechanical differential pressure regulator (3). This differential pressure regulator is the heart of the Pressure Independent Control Valve and ensures that the selected volumetric flow is maintained across the whole working range and independent of the inlet pressure p1.

Pressure Test Points

The Pressure Independent Control Valve is equipped with two pressure test points (P+, P-) for measuring and monitoring the differential pressure across the valve during commissioning.

Manual Control

Manual control is only possible with a mounted actuator.

Advantages

The advantages of Pressure Independent Control Valves are:

- Once the flow limiter is set to design flow, the hydronic circuit self balances, even when changes to the system are made, such as additions.
- For any heat demand the Pressure Independent Control Valve with mounted actuator can be set to the desired volumetric flow and will remain constant regardless of pressure fluctuations in the system.

Constant flow regardless of pressure changes in the system leads to a more stable control, less wasted energy and greater comfort.



**Volumetric Flow/  
Dial Presetting**

Tables to determine the dial setting for a desired volumetric flow.

**Table 4. 2-1/2-Inch Valves Flow Rates.**

Low Flow Valves PICV2-250(110)		
Setting	Max. GPM	Max. m <sup>3</sup> /h
4.0	110.0	25.0
3.8	102.1	23.2
3.6	94.7	21.5
3.4	87.7	19.9
3.2	81.3	18.5
3.0	75.3	17.1
2.8	69.7	15.8
2.6	64.5	14.6
2.4	59.6	13.5
2.2	55.0	12.5
2.0	50.6	11.5
1.8	46.4	10.5
1.6	42.2	9.6
1.4	38.0	8.6
1.2	33.7	7.7
1.0	29.2	6.6
0.8	24.5	5.6
0.6	19.3	4.4

High Flow Valves PICV2-250(154)		
Setting	Max. GPM	Max. m <sup>3</sup> /h
4.0	154.0	35.0
3.8	143.2	32.5
3.6	133.0	30.2
3.4	123.4	28.0
3.2	114.4	26.0
3.0	105.9	24.1
2.8	98.0	22.3
2.6	90.6	20.6
2.4	83.6	19.0
2.2	77.0	17.5
2.0	70.6	16.0
1.8	64.5	14.6
1.6	58.5	13.3
1.4	52.5	11.9
1.2	46.4	10.5
1.0	40.1	9.1
0.8	33.4	7.6
0.6	26.2	6.0

**Table 5. 3-Inch Valves Flow Rates.**

Low Flow Valves PICV2-300(150)		
Setting	Max. GPM	Max. m <sup>3</sup> /h
4.0	149.8	34.0
3.8	137.6	31.3
3.6	126.5	28.7
3.4	116.4	26.4
3.2	107.1	24.3
3.0	98.7	22.4
2.8	91.0	20.7
2.6	83.9	19.1
2.4	77.3	17.6
2.2	71.1	16.1
2.0	65.2	14.8
1.8	59.5	13.5
1.6	53.8	12.2
1.4	48.2	10.9
1.2	42.4	9.6
1.0	36.5	8.3
0.8	30.2	6.9
0.6	23.5	5.3

High Flow Valves PICV2-300(190)		
Setting	Max. GPM	Max. m <sup>3</sup> /h
4.0	189.5	43.0
3.8	175.2	39.8
3.6	162.2	36.8
3.4	150.1	34.1
3.2	139.1	31.6
3.0	128.9	29.3
2.8	119.4	27.1
2.6	110.5	25.1
2.4	102.2	23.2
2.2	94.2	21.4
2.0	86.5	19.6
1.8	79.0	17.9
1.6	71.5	16.2
1.4	63.9	14.5
1.2	56.2	12.8
1.0	48.2	10.9
0.8	39.8	9.0
0.6	30.9	7.0

**Table 6. 4-Inch Valves Flow Rates.**

Low Flow Valves PICV2-400(300)		
Setting	Max. GPM	Max m <sup>3</sup> /h
4.0	300	68
3.8	273	62
3.6	250	57
3.4	229	52
3.2	210	48
3.0	194	44
2.8	179	41
2.6	166	38
2.4	154	35
2.2	143	32
2.0	132	30
1.8	122	28
1.6	112	26
1.4	102	23
1.2	91	21
1.0	80	18
0.8	67	15
0.6	55	12

High Flow Valves PICV2-400(395)		
Setting	Max. GPM	Max m <sup>3</sup> /h
4.0	395	90
3.8	360	82
3.6	327	74
3.4	298	68
3.2	272	62
3.0	250	57
2.8	230	52
2.6	212	48
2.4	196	45
2.2	181	41
2.0	168	38
1.8	154	35
1.6	141	32
1.4	128	29
1.2	114	26
1.0	99	23
0.8	83	19
0.6	65	15

**Table 7. 5-Inch Valves Flow Rates.**

Low Flow Valves PICV2-500(485)		
Setting	Max. GPM	Max m <sup>3</sup> /h
4.0	485	110
3.8	446	101
3.6	412	94
3.4	382	87
3.2	355	81
3.0	330	75
2.8	308	70
2.6	286	65
2.4	266	60
2.2	246	56
2.0	227	52
1.8	207	47
1.6	188	43
1.4	167	38
1.2	147	33
1.0	125	29
0.8	104	24
0.6	85	18

High Flow Valves PICV2-500(595)		
Setting	Max. GPM	Max m <sup>3</sup> /h
4.0	595	135
3.8	550	125
3.6	511	116
3.4	475	108
3.2	443	101
3.0	414	94
2.8	387	88
2.6	361	82
2.4	336	76
2.2	312	71
2.0	288	66
1.8	264	60
1.6	240	55
1.4	215	49
1.2	188	43
1.0	161	37
0.8	132	30
0.6	105	23



Table 8. 6-Inch Valves Flow Rates.

Low Flow Valves PICV2-600(650)			High Flow Valves PICV2-600(860)		
Setting	Max. GPM	Max m <sup>3</sup> /h	Setting	Max. GPM	Max m <sup>3</sup> /h
4.0	650	148	4.0	860	195
3.8	610	139	3.8	796	181
3.6	571	130	3.6	737	167
3.4	533	121	3.4	683	155
3.2	497	113	3.2	632	144
3.0	462	105	3.0	586	133
2.8	429	98	2.8	542	123
2.6	398	90	2.6	501	114
2.4	367	83	2.4	463	105
2.2	338	77	2.2	427	97
2.0	310	70	2.0	392	89
1.8	282	64	1.8	358	81
1.6	255	58	1.6	324	74
1.4	228	52	1.4	291	66
1.2	201	46	1.2	256	58
1.0	173	39	1.0	220	50
0.8	143	33	0.8	182	41
0.6	115	26	0.6	140	32

Engineering Notes



CAUTION:

Install the valve so that the flow of the medium matches the direction of the arrow on the valve body. Failure to do so may damage the differential pressure regulator.

Recommendations

- A strainer or dirt trap should be fitted upstream of the valve to enhance reliability and service life.
- Remove dirt, welding beads, and so on from valves and pipes.
- Do not insulate the actuator bracket; air circulation must be ensured.

Mounting Notes

Pressure Independent Control Valves and actuators can be easily assembled on site. Neither special tools nor adjustments, besides the presetting, are required. Prior to mounting the actuator, the required volumetric flow must be set. Each valve is supplied with a bib tag indicating the maximum GPM flow for each setting of the flow limiter.

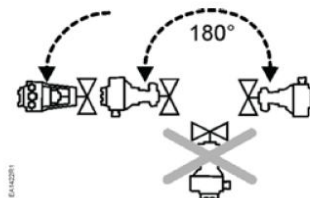


Figure 3. Accepted Mounting Positions.





Dimensions

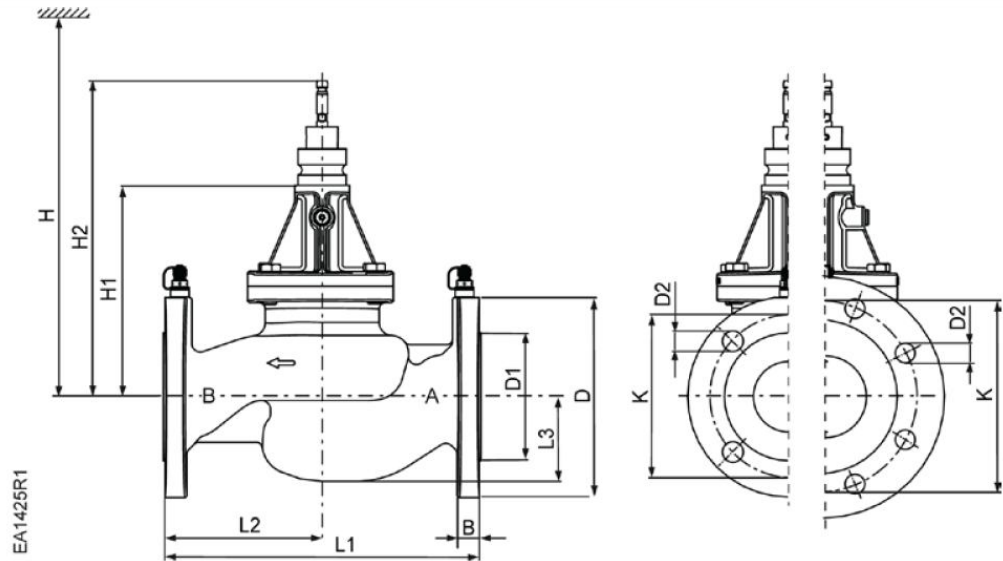


Table 9. Dimensions and Weights.

ANSI Class	Valve Size Inches (mm)	B	Ø D	Ø D1	Ø D2	L1	L2	L3	Ø K	H1	H2	H			Weight Pounds (kg)
												EN180	EN360	ES247	
125	2.5 (65)	0.69 (17.5)	7.01 (178)	N/A	0.75 (19)	10.87 (276)	5.43 (138)	3.11 (79)	5.50 (140)	7.68 (195)	11.42 (290)	25.08 (637)	—	26.93 (684)	42 (19)
250		1.00 (25.4)	7.48 (190)	4.96 (126)	0.88 (22.4)	11.50 (292)	5.75 (146)	3.31 (84)	5.88 (149.4)	7.68 (195)	11.42 (290)	25.08 (637)	—	26.93 (684)	56 (25.4)
125	3 (80)	0.75 (19)	7.50 (191)	N/A	0.75 (19)	11.75 (298)	5.87 (149)	3.75 (95.3)	6.00 (152)	8.52 (216.5)	12.32 (313)	25.95 (659)	—	23.86 (606)	62 (28.1)
250		1.12 (28.5)	8.25 (210)	5.69 (145)	0.88 (22.4)	12.5 (318)	6.26 (159)	3.88 (98.4)	6.62 (168)	8.52 (216.5)	12.32 (313)	25.95 (659)	—	23.86 (606)	82 (37.2)
125	4 (100)	0.98 (25)	9.00 (228.6)	N/A	0.75 (19)	13.86 (352)	7.40 (188)	4.49 (114)	7.5 (190.5)	13.07 (332)	19.23 (488.5)	—	31.38 (797)	32.32 (821)	123 (55.6)
250		1.14 (29)	10 (254)	6.94 (176.3)	0.88 (22.4)	14.40 (365.8)	7.63 (193.8)	4.61 (117)	7.88 (200.2)	13.07 (332)	19.23 (488.5)	—	31.38 (797)	32.32 (821)	156 (70.8)
125	5 (125)	0.98 (25)	10 (254)	N/A	0.88 (22.4)	15.75 (400)	8.07 (205)	5.30 (134.7)	8.50 (215.9)	14.06 (357)	15.63 (397)	—	34.06 (865)	35.00 (889)	170 (77.2)
250		1.52 (38.6)	10.9 (276.9)	8.31 (211.1)	0.88 (22.4)	16.62 (422.2)	8.51 (216.1)	5.50 (139.6)	9.25 (235)	14.06 (357)	15.63 (397)	—	34.92 (887)	35.87 (911)	221 (100)
125	6 (150)	1.05 (26.70)	11 (279.4)	N/A	0.88 (22.4)	17.76 (451)	9.17 (233)	6.15 (156.3)	9.50 (241.3)	15.79 (401)	17.48 (444)	—	36.06 (916)	37.01 (940)	235 (106)
250		1.58 (40.1)	12.5 (317.5)	9.69 (246.1)	0.88 (22.4)	18.62 (473)	9.61 (244)	6.34 (161.1)	10.63 (270)	15.79 (401)	17.48 (444)	—	36.93 (938)	37.87 (962)	303 (138)

ØD1 = Raised area of flange

H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, maintenance, etc.

H1 = Dimension from the pipe center to install the actuator (upper edge)

H2 = Valve in the «Open» position means that the valve stem is fully extended

Warranty

Application-related technical data are guaranteed only when the valves are used in connection with our recommended actuators.

Warranty is void, if used with non-recommended actuators.



## Pressure Independent Control Series 2-Way Valves and Electronic Valve Actuators

### Description

The 1/2- to 1-1/4-inch Pressure Independent Control Valves have a 2.5, 5, or 5.5 mm stroke, and work with the EN56 / ES67 Series Electronic Actuators. The 1-1/2 to 2-inch normally open valves have a 15 mm stroke and work with the EN45 Series Electronic Actuators. EN45 Actuators for 1-1/2- and 2-inch Normally Open Valves can also be set for Normally Closed operation (reverse acting). The EN56 / ES67 and EN45 Actuators require a 24 Volt power supply to provide floating or 0 to 10 Vdc control.

Typical applications include control of hot or chilled water or water-glycol solutions up to 50% in closed loop systems.

### Features

The Pressure Independent Control Valves include a pressure regulator, a flow limiter, and a control valve in a single device.

The Actuators have a direct-coupled installation, manual override and visual position indication.

### Technical Data

#### Typical Specifications

Flow shall be varied by actuator position. At any given position, flow through the valve shall not vary more than  $\pm 5\%$  from 5 to 58 psi due to system pressure fluctuations across the valve in the selected operating range. Valves shall be pressure independent between a differential pressure of 2.3 or 5 PSID (depending on valve size) and 58 PSID. Length of stroke shall be consistent and independent of flow setting.

#### Valve Specifications

Body material:	Brass (1/2- to 1-1/4-inch)	
	Ductile Iron (1-1/2- and 2-inch)	
	Stainless Steel	
Stem:	1/2-inch to 2-inch (15 mm to 50 mm)	
Line size:	2-Way	
Action:	ANSI 250	
Valve body rating:		
Close-off pressure/Leakage rate:		
	1/2- to 1-1/4-inch, NO	200 psi/ANSI Class IV (0.01%)
	1-1/2 and 2-inch NO	100 psi/ANSI Class IV (p.01%)
	1/2- to 1-1/4-inch, NC	45 psi/ANSI Class IV (0.01%)
Medium temperature range:	34°F to 248°F (1°C to 120°C)	
Flow characteristic:	Linear	
Connection:	NPT threaded	

#### Actuator Specifications

Operating voltage:		
	EN56C2 / ES67C2	24 Vac
	EN56B2	24 Vac/dc
	ES67B2	24 Vac
	EN45	24 Vac/dc
Frequency:		60 Hz
Power consumption (normal operation):		
	EN56C2	0.8 VA
	ES67C2	2 VA
	EN56B2	2.5 VA
	ES67B2	2 VA
	EN45B2	8 VA
	EN45C2	5 VA
Signal:		
	EN56C2 / ES67C2 /	Floating
	EN45C2	Floating
	EN56B2 / ES67B2	0 to 10 Vdc
	EN45B2	0 to 10 Vdc or 4 to 20 mA
Run time (in seconds):		<b>Stroke</b>
		<b>2.5 mm    5/5.5 mm    15 mm</b>
	EN56C2	75    150    —
	ES67C2	70    125    —
	EN56B2	45    90    —
	ES67B2	15    30    —
	EN45	—    —    30
Force:		
	EN56 (NSR)	>56 lb (250 N)
	ES67 (SR)	67 lb (300 N)
	EN45	45 lb (200 N)

#### Agency Certification:

UL	Meets UL 873
cUL	Certified to Canadian Standard C22.2 No. 24.93

#### Mounting Location

NEMA 1 (Interior only)



Table 1. Valve and Actuator Assemblies.

Valve Body	Normally Open/Closed	Line Size Inch (mm)	GPM Flow Range	Non-Spring Return				Spring Return	
				EN56C2	EN56B2	EN45C2	EN45B2	ES67C2	ES67B2
				Floating	0-10V	Floating	0-10V/ 4-20mA	Floating	0-10V
PICV2-050(9.0)NO-X	Open	1/2 (15)	0.2 to 0.9	•	•			•	•
PICV2-050(2.5)NO-X	Open		0.5 to 2.5	•	•			•	•
PICV2-050(2.7)NC-X	Closed		0.3 to 2.7	•	•			•	•
PICV2-050(7.5)NC-X	Closed		1.0 to 7.5	•	•			•	•
PICV2-075(4.5)NC-X	Closed	3/4 (20)	0.5 to 4.5	•	•			•	•
PICV2-075(5.8)NO-X	Open		1.0 to 5.8	•	•			•	•
PICV2-075(8.9)NC-X	Closed		1.0 to 8.9	•	•			•	•
PICV2-100(8.9)NC-X	Closed	1 (25)	1.0 to 8.9	•	•			•	•
PICV2-100(8.0)NO-X	Open		1.2 to 8	•	•			•	•
PICV2-125(13.2)NC-X	Closed	1-1/4 (32)	2.5 to 13.2	•	•			•	•
PICV2-125(18)NO-X	Open		3 to 18	•	•			•	•
PICV2-150(13.2)NO-X	Open	1-1/2 (40)	10 to 40			•	•		
PICV2-200(50)NO-X	Open	2 (50)	10 to 50			•	•		

X = Any available preset flow rate found on Page 2 of the Two-way PICV Valves Technical Bulletin

Information in this publication is based on current specifications. The company reserves the right to make changes in specifications and models as design improvements are introduced.





## Pressure Independent Control Series 2-Way Flanged Valves and Electromotoric Valve Actuators

### Description

The 2-1/2-inch and 3-inch Pressure Independent Control Valves have a 3/4-inch (20 mm) stroke, and work with the EN180 and ES247 Series Electromotoric Actuators. The 4-, 5-, and 6-inch valves have a 1-1/2-inch (40 mm) stroke, and work with the EN360 and ES247 Series Electromotoric Actuators. The actuators require a 24 Vac/dc operating voltage and accept floating, 0 to 10 Vdc, or 4 to 20 mA control signals.

Typical applications include control of hot or chilled water or water-glycol solutions up to 50% in closed loop systems.

### Features

The Pressure Independent Control Valves include a pressure regulator, a flow limiter, and a control valve in a single device.

EN180, EN360 and ES247 Actuators have a direct-coupled installation, manual override and visual position indication.

### Technical Data

#### Typical Specifications

Flow shall be varied by actuator position. At any given position, flow through the valve shall not vary more than +/- 10% due to system pressure fluctuations across the valve in the selected operating range. Valves shall be pressure independent between a differential pressure of 5 to 90 psi for low-flow valves, or 11 to 90 psi for high-flow valves. Length of stroke shall be consistent and independent of flow setting.

#### Valve Specifications

Body material:	Cast iron
Stem:	Stainless steel
Line size:	2-1/2-inch (65 mm) to 6-inch (150 mm)
Action:	2-way
Valve body rating:	ANSI 125/ANSI 250
Close-off:	100 psi (700 kPa) p
Leakage rate:	< ANSI Class IV (0.01%)
Media temperature range:	34°F to 248°F (1°C to 120°C)
Flow characteristic:	Linear
Connection:	ANSI flanged

#### Actuator Specifications

Operating voltage:	EN180 / EN360 / ES247	24 Vac/dc
Frequency:		50/60 Hz
Power consumption (normal operation):	EN180C2 / EN360C2	5 VA (3.75W)/7 VA (4.5W)
	EN180B2 / EN360B2	8 VA (3.75W)/9.5 VA (4.5W)
	ES247	20 VA/7.5W
Control Signal:	EN180C2 / EN360C2	Floating
	EN180B2 / EN360B2	0 to 10 Vdc, 4 to 20 mA
	ES247	Selectable (Floating, 0 to 10 Vdc, 4 to 20 mA)
Run time:	EN180	30 seconds
	EN360	120 seconds
	ES247	40 to 240 seconds (adjustable)
Force:	EN180	180 lb (800 N)
	EN360	360 lb (1600 N)
	ES247	250 lb (1100 N)
Weight:	EN180	4.1 lbs (1.85 kg)
	EN360	4.23 lbs (1.92 kg)
	ES247	14 lbs (6.2 kg)
Agency Certifications:	UL	UL 873
	cUL	Canadian Standard C22.2 No. 24



**Table 2. 2-1/2-Inch to 6-Inch 2-Way Valve and Actuator Assemblies.**

Valve Body	ANSI Class	Line Size Inch (mm)	Maximum Flow	Non-Spring Return				Spring Return	
				EN180B2 0-10V	EN180C2 Floating	EN360B2 0-10V	EN360C2 Floating	ES247M2-NO	ES247M2-NC
								Normally Open	Normally Closed
PICV2-250(110)-125	125	2.5 (65)	110	•	•			•	•
PICV2-250(110)-250	250			•	•			•	•
PICV2-250(154)-125	125		154	•	•			•	•
PICV2-250(154)-250	250			•	•			•	•
PICV2-300(150)-125	125	3 (80)	150	•	•			•	•
PICV2-300(150)-250	250			•	•			•	•
PICV2-300(190)-125	125		190	•	•			•	•
PICV2-300(190)-250	250			•	•			•	•
PICV2-400(300)-125	125	4 (100)	300			•	•	•	•
PICV2-400(300)-250	250					•	•	•	•
PICV2-400(395)-125	125		395			•	•	•	•
PICV2-400(395)-250	250					•	•	•	•
PICV2-500(485)-125	125	5 (125)	485			•	•	•	•
PICV2-500(485)-250	250					•	•	•	•
PICV2-500(595)-125	125		595			•	•	•	•
PICV2-500(595)-250	250					•	•	•	•
PICV2-600(650)-125	125	6 (150)	650			•	•	•	•
PICV2-600(650)-250	250					•	•	•	•
PICV2-600(860)-125	125		860			•	•	•	•
PICV2-600(860)-250	250					•	•	•	•

**Information in this publication is based on current specifications. The company reserves the right to make changes in specifications and models as design improvements are introduced.**