VP140 1/2 Inch to 2 Inch (DN15-DN50) Pressure Independent Control Valve Product Bulletin

Code No. LIT-12012610
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Refer to the QuickLIT website for the most up-to-date version of this document.

VP140 Series Pressure Independent Valves are designed to regulate the flow of hot or chilled water and 50% glycol solutions in response to the demand of a controller in HVAC systems.

The pressure independent valves eliminate the need for separate balancing valves. These valves are available in sizes 1/2 through 2 in. (DN15 through DN50) with factory-mounted Johnson Controls® Non-Spring Return and Spring Return Electric Actuators for floating or proportional control.

⚠ WARNING

This product is made of copper alloy, which contains lead. The product is therefore not to be used on drinking water.

Figure 1: VP140 Series Pressure Independent Valve and Actuator Assembly

Features and Benefits

Features	Benefits
Availability of both axial (globe) and rotary (ball) valve styles	Application flexibility
No Cv calculation	Simplifies valve selection
Automatic system balancing	Prevents overflow or underflow to maximize system performance.
Combined control and balancing valve	Reduces installation time and cost.
Close-off pressure rating — Axial valve 100 psi (700 kPa) and Rotary valve 200 psi (1,400 kPa)	Provides tight shutoff in high pressure systems.
Wide range of operating differential pressure rating	Allows use of valve in range of systems.
Availability of factory-mounted Electric Actuators	Reduces installation time and cost.
American National Standards Institute (ANSI) Class IV Leakage and ±5% Flow Accuracy	Reduces energy costs and provides superior room comfort.

WARNING: BRASS MAY CONTAIN LEAD

To fulfill our obligations towards Article 33, in accordance to the European REACH Regulation No 1907/2006 EC, we hereby inform you that this article contains the following Substances of Very High Concern mentioned on the Candidate list:

- Lead

Table 1: Ordering Information

V	P	1													**Family**	Pressure Independent Characterized Control Valve	
1	2	3														**1**	Mechanical Pressure Independent Control Valve
			4 4												**Connection Type**	**4**	NPT Female
				0											**Pressure Port**	**0**	Pressure Port
					A 6										**Size**	**A**	1/2 in. (DN15) Axial
																B	3/4 in. (DN20) Axial
																C	1 in. (DN25) Axial
																D	1-1/4 in. (DN32) Axial
																E	1-1/2 in. (DN40) Rotary – Iron body
																F	2 in. (DN50) Rotary – Iron body
																L	1/2 in. (DN15) Rotary – Brass body
																M	3/4 in. (DN20) Rotary – Brass body
																N	1 in. (DN25) Rotary – Brass body
																P	1-1/4 in (DN32) Rotary – Brass body
																Q	1-1/4 in (DN32) Rotary – Iron body
						A 7	A 8								**Flow Rate (GPM)**	Maximum Flow Rates in Gallons Per Minute (GPM) by Valve Size **Note** All Ax valves are for 1/2 inch size All Bx valves are for 3/4 inch size All Cx valves are for 1 inch size	
																AA	0.66 GPM (150 l/h)
																AE	2.6 GPM (600 l/h)
																AG	3.4 GPM (780 l/h)
																AJ	4.4 GPM (1000 l/h)
																AN	6.6 GPM (1500 l/h)
																AU	9.7 GPM (2200 l/h)
																AW	11.9 GPM (2700 l/h)
																AY	13.2 GPM (3000 l/h)
																BB	26.4 GPM (6000 l/h)
																BC	39.6 GPM (9000 l/h)
																BD	48.4 GPM (11000 l/h)
																BE	52.8 GPM (12000 l/h)
																BF	79.3 GPM (18000 l/h)
																CA	1.6 GPM (360 l/h)
																CB	3.0 GPM (700 l/h)
																CC	5.0 GPM (1150 l/h)
																CD	17.6 GPM (4000 l/h)
								+ 9							**Actuator Mounting**	+ = Factory-Mounted Actuator (Not present in all code numbers.) (Leave fields 9 through 15 blank for valves without factory-mounted actuator)	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**= Field**		
V	P	1	4	0	A	A	A	+								Example: Pressure Independent Axial Valve, 1/2 Inch, NPT with Pressure Ports and 0.66 GPM maximum flow.	
Valve								+	**Actuator**								

Ordering Information - Adding a Factory-Mounted Electric Actuator

V P 1 4 0 A A A +	Actuator Mounting	+	Factory-Mounted Actuator.	
9				
7	Actuator Family	9	VA9000 Series Direct Mounting Actuators	
10		7	VA-748x Non-Spring Return	
7 8	Actuator Series	10	VA9310-HGA-2 Non-Spring Return	
11 12		23	VA9203-xxx 2(z) Spring Opens	
		28	VA9208-AGA-2 and VA9208-GGA-2 Spring Opens	
		43	VA9203-xxx-2(Z) Spring Closes	
		48	VA9208-AGA-2 and VA9208-GGA-2 Spring Closes	
		78	VA-748x Non-Spring Return (All axial valves)	
		A4	VA9104-xGA-2S, Non-Spring Return, 120 in. Cable	
G	Control Type	A	Floating, AC/DC 24 V Input	VA9104 VA9203 VA9208 VA9308
13		G	Proportional, DC 0 (2) to 10 V or 0 (4) to 20 mA	VA9104 VA9203 VA9208
		H	Universal Input for On/Off, Floating and Proportional 0(2) to 10 VDC with Adjustable Span	VA9310
G 14	Supply Voltage	G	24 VAC (All Models), 24 VAC/VDC (VA9300 Series)	
A	Auxiliary Switch	A	No auxiliary switch (all models)	
15		B	One auxiliary switch	
		C	Two auxiliary switches	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	= Field			
V P 1 4 0 A A A + 7 7 8 G G A		Example: Pressure Independent Axial Valve, 1/2 Inch, NPT with Pressure Ports and 0.66 GPM maximum flow, with factory mounted VA-7482-8002-RA Proportional Control, 24 VAC/VDC with no auxiliary switch.		
Valve + Actuator				

Ordering Information

Table 2: Axial (Globe) PICVs and Actuator Combinations

Valve Code Number	Size, in.	Maximum GPM	Close-Off Pressure	24 VAC/DC Non-Spring Return Proportional DC 0 (2) to 10 V or 0 (4) to 20 mA VA-7482-8002-RA
VP140AAA	1/2	0.66	100 psi (700 kPa)	VP140AAA+778GGA
VP140AAE		2.6		VP140AAE+778GGA
VP140AAG		3.4		VP140AAG+778GGA
VP140BAJ	3/4	4.4		VP140BAJ+778GGA
VP140BAN		6.6		VP140BAN+778GGA
VP140BAU		9.7		VP140BAU+778GGA
VP140CAU	1	9.7		VP140CAU+778GGA
VP140CAW		11.9		VP140CAW+778GGA
VP140DAW	1-1/14	11.9		VP140DAW+778GGA
VP140DAY		13.2		VP140DAY+778GGA

Table 3: Brass Body Ball PICVs & NSR Actuator Combinations

Valve Code Number	Size, in.	Maximum GPM	Close-Off Pressure	24 VAC	
				Non-Spring Return	
				Floating	Proportional DC 0 (2) to 10 V or 0 (4) to 20 mA
				VA9104-AGA-2S	VA9104-GGA-2S
VP140LCA	1/2	1.6	200 psi (1,400 kPa)	VP140LCA+9A4AGA	VP140LCA+9A4GGA
VP140LCB		3.0		VP140LCB+9A4AGA	VP140LCB+9A4GGA
VP140LAJ		4.4		VP140LAJ+9A4AGA	VP140LAJ+9A4GGA
VP140MAG	3/4	3.4		VP140MAG+9A4AGA	VP140MAG+9A4GGA
VP140MCC		5.0		VP140MCC+9A4AGA	VP140MCC+9A4GGA
VP140MAU		9.7		VP140MAU+9A4AGA	VP140MAU+9A4GGA
VP140NAU	1	9.7		VP140NAU+9A4AGA	VP140NAU+9A4GGA
VP140NAW		11.9		VP140NAW+9A4AGA	VP140NAW+9A4GGA
VP140PAY	1-1/4	13.2		VP140PAY+9A4AGA	VP140PAY+9A4GGA
VP140PCD		17.6		VP140PCD+9A4AGA	VP140PCD+9A4GGA

Table 4: Brass Body Ball PICVs & Spring Return Actuator Combinations

Valve Code Number	Size, in.	Maximum GPM	Close-Off Pressure	24 VAC/VDC			
				Spring Opens		Spring Closes	
				On/Off and Floating	Proportional DC 0(12) to 10 V or 0 (4) to 20 mA	On/Off and Floating	Proportional DC 0(12) to 10 V or 0 (4) to 20 mA
				VA9203-AGA-2Z	VA9203-GGA-2Z	VA9203-AGA-2Z	VA9203-GGA-2Z
VP140LCA	1/2	1.6	200 psi (1,400 kPa)	VP140LCA+923AGA	VP140LCA+923GGA	VP140LCA+943AGA	VP140LCA+943GGA
VP140LCB		3.0		VP140LCB+923AGA	VP140LCB+923GGA	VP140LCB+943AGA	VP140LCB+943GGA
VP140LAJ		4.4		VP140LAJ+923AGA	VP140LAJ+923GGA	VP140LAJ+943AGA	VP140LAJ+943GGA
VP140MAG	3/4	3.4		VP140MAG+923AGA	VP140MAG+923GGA	VP140MAG+943AGA	VP140MAG+943GGA
VP140MCC		5.0		VP140MCC+923AGA	VP140MCC+923GGA	VP140MCC+943AGA	VP140MCC+943GGA
VP140MAU		9.7		VP140MAU+923AGA	VP140MAU+923GGA	VP140MAU+943AGA	VP140MAU+943GGA
VP140NAU	1	9.7		VP140NAU+923AGA	VP140NAU+923GGA	VP140NAU+943AGA	VP140NAU+943GGA
VP140NAW		11.9		VP140NAW+923AGA	VP140NAW+923GGA	VP140NAW+943AGA	VP140NAW+943GGA
VP140PAY	1-1/4	13.2		VP140PAY+923AGA	VP140PAY+923GGA	VP140PAY+943AGA	VP140PAY+943GGA
VP140PCD		17.6		VP140PCD+923AGA	VP140PCD+923GGA	VP140PCD+943AGA	VP140PCD+943GGA

Table 4: Iron Body Ball PICVs and Spring Actuator Combinations

Valve Code Number	Size, in.	Maximum GPM	Close-Off pressure	24 VAC/DC		
				Non-Spring Return	Spring Opens	Spring Closes
				Universal Input for On/Off, Floating and Proportional 0 (2) to 10 VDC with Adjustable Span	Proportional DC 0 (2) to 10 V or 0 (4) to 20 mA	Proportional DC 0 (2) to 10 V or 0 (4) to 20 mA
				VA9310-HGA-2	VA9208-GGA-2	VA9208-GGA-2
VP140QBB	1-1/4	26.4	200 psi (1,400 kPa)	**VP140QBB+910HGA**	**VP140QBB+928GGA**	**VP140QBB+948GGA**
VP140EBB	1-1/2	26.4		**VP140EBB+910HGA**	**VP140EBB+928GGA**	**VP140EBB+948GGA**
VP140EBC		39.6		**VP140EBC+910HGA**	**VP140EBC+928GGA**	**VP140EBC+948GGA**
VP140FBD	2	48.4		**VP140FBD+910HGA**	**VP140FBD+928GGA**	**VP140FBD+948GGA**
VP140FBE		52.8		**VP140FBE+910HGA**	**VP140FBE+928GGA**	**VP140FBE+948GGA**
VP140FBF		79.3		**VP140FBF+910HGA**	**VP140FBF+928GGA**	**VP140FBF+948GGA**

Table 5: Actuators

Code Number	Valve Compatibility	Spring Return	Proportional Control DC 0 (2) to 10 V or 0 (4) to 20 mA	Floating Point Control	Adjustable Span	Universal Input for On/Off	24 VAC/VDC	24 VAC
VA-7482-8002-RA	Axial (Globe)	No	Yes	No	No	No	Yes	No
VA9104-AGA-2S	Brass Body Ball Valves	No	No	Yes	No	No	No	Yes
VA9104-GGA-2S		No	Yes	No	No	No	No	Yes
VA9203-AGA-2Z		Yes	No	Yes	No	Yes	Yes	No
VA9203-GGA-2Z		Yes	Yes	No	No	No	Yes	No
VA9310-HGA-2	Iron Body Ball Valves	No	Yes	Yes	Yes	Yes	Yes	No
VA9208-GGA-2		Yes	Yes	No	No	No	Yes	No

For actuator technical specifications, refer to the following:

- *VA-748x Electric Valve Actuators (LIT-1900866)*
- *VA9104 Series Electric Non-Spring Return Valve Actuators (LIT-1900354)*
- *VA9203-xxx-xx Series Electric Spring-Return Actuators (LIT-1900692)*
- *VA9300 Series Electric Non-Spring Return Valve Actuators (LIT-1901002)*
- *VA9208-xxx-xx Series Electric Spring-Return Actuators (LIT-1900648)*

Table 6: Accessories

Code Number	Description
M9000-342	Weather shield kit for VA9104, VA9203, VA9208 or VA9310 Series Electric Actuators (quantity 1)

PICV Overview

The VP140 PICV is a combination three main components; a pressure regulator, a regulating valve and a control valve. The pressure regulator adjusts the system for pressure fluctuation, while the regulating valve sets the maximum flow.

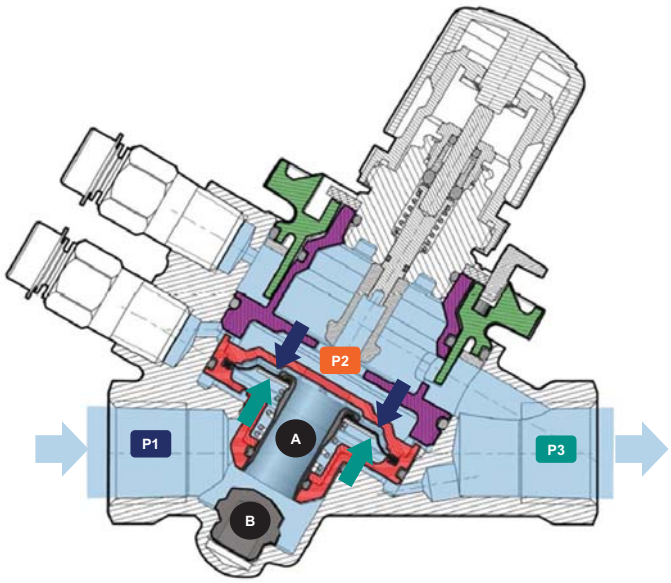
The control valve modulates between the minimum and maximum flow in response to the configured flow rate. Because flow is controlled at the desired rate independent of any pressure fluctuations in the system, there is no need for balancing valves. Valve selection is according to gallons per minute (GPM) flow requirements, meaning that flow co-efficent (Cv) calculation is not needed. This reduces installation, commissioning and operational costs.

Differential pressure regulator

Figure 2 illustrates how the differential pressure regulator functions for all VP140 models. Inlet pressure at P1 is transmitted to the top of the diaphragm, and the outlet pressure at P3 is transmitted to the bottom of the diaphragm. A constant effective differential pressure (dP) is maintained between P2 and P3 as the shuttle moves up and down in response to the following changes:

- As P1 increases relative to P3 it acts on the diaphragm, closing shuttle A against seat B, thus decreasing the effective dP.
- As P1 decreases relative to P3, the diaphragm is pushed up. This opens shuttle A from seat B, thus increasing the effective dP.

Figure 2: Differential Pressure Regulator



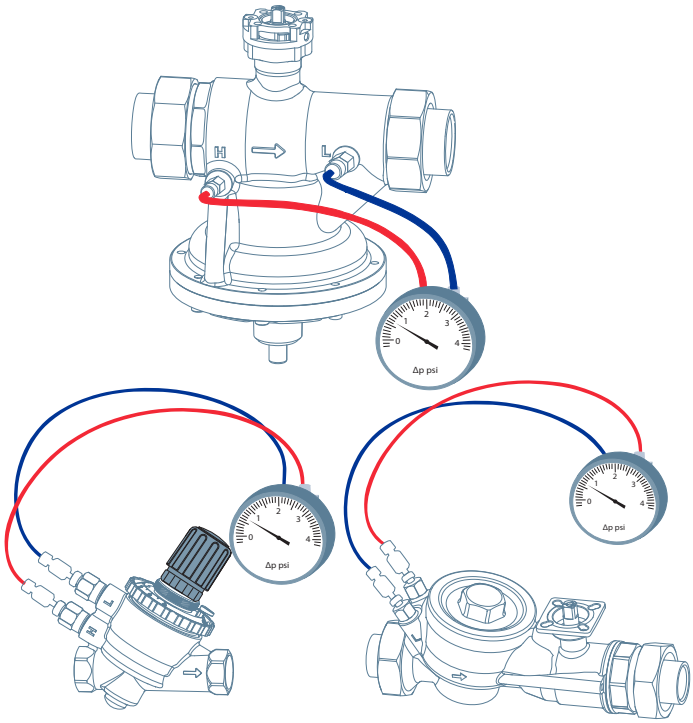
Installation and Maintenance

The VP140 PICV must be mounted with the arrow on the valve oriented in the same direction as the flow. Mounting it in the wrong direction may harm the system and valve itself. If flow reversal cannot be avoided, mount a check valve.

Operating range verification

To ensure that the valve is working in the operating range, you must measure the differential pressure across the valve. Figure 3 illustrates how to measure the differential operating range for each VP140 model.

Figure 3: Measuring the differential pressure.



The valve is in the operating range if the value at P1-P2 (ΔP) is higher than the start up value. If the ΔP measured value is lower than the start up value, then the valve works as a fixed orifice valve. See Table 7 for minimum differential pressure requirements for each valve model.

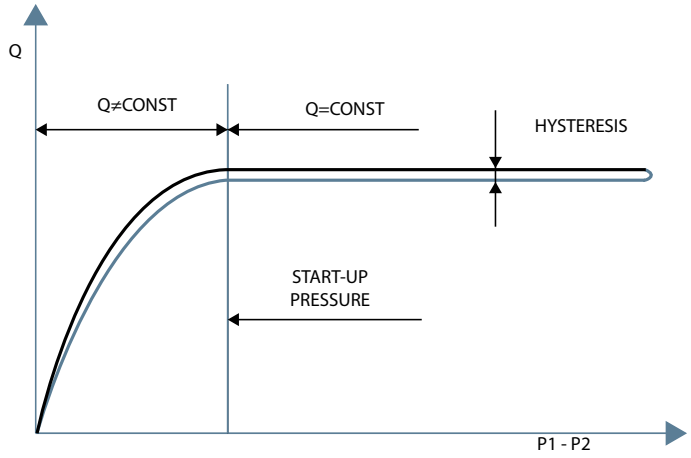


Table 7: Minimum differential pressure requirements

VP140 Series Model	Start up pressure	
Axial (Globe) PICVs		
	psi	**kPa**
VP140AAA	2.9	20
VP140AAE	3.6	25
VP140AAG	3.6	25
VP140BAJ	4.4	30
VP140BAN	5.1	35
VP140BAU	3.6	25
VP140CAU	5.1	35
VP140CAW	8.3	25
VP140DAW	4.4	30
VP140DAY	5.1	35
Brass Body Ball PICVs		
VP140LCA	2.9	20
VP140LCB	2.9	20
VP140LAJ	2.9	20
VP140MAG	3.6	25
VP140MCC	3.6	25
VP140MAU	4.4	30
VP140NAU	4.4	30
VP140NAW	4.4	30
VP140PAY	4.4	30
VP140PCD	4.4	30

Table 7: Minimum differential pressure requirements

VP140 Series Model	Start up pressure	
Iron Body Ball PICVs		
	psi	**kPa**
VP140QBB	4.4	30
VP140EBB	2.9	20
VP140EBC	4.4	30
VP140FBD	5.1	35
VP140FBE	5.1	35
VP140FBF	5.1	35

Flow control and adjustment curves

The types of adjustment of the control valve are ON/ OFF, linear or equipercentage. The adjustment must be chosen according to the coupling with the heat exchanger, and according to the type of control to be performed on the system. For example, for ON/OFF, a valve with an ON/OFF curve is sufficient. A modulating control requires a linear or equipercentage characteristic.

- Graph A depicts the optimal characteristic curve for the remote control of a heating system
- Graph B depicts the curve of heat exchangers used in thermo hydraulic systems.
- Graphs C1, C2, and C3 depict the curves of ON/OFF, linear adjustments of the control valves.

Graphs D1, D2, and D3 depict the curves that are the result of joining the curve of Graph B with different curves. Graph D3 depicts the curve obtained when an equipercentage valve is combined with a heat exchanger, and corresponds to the optimal control curve depicted in Graph A. See Figure 4.

Figure 4: Flow control and adjustment graphs

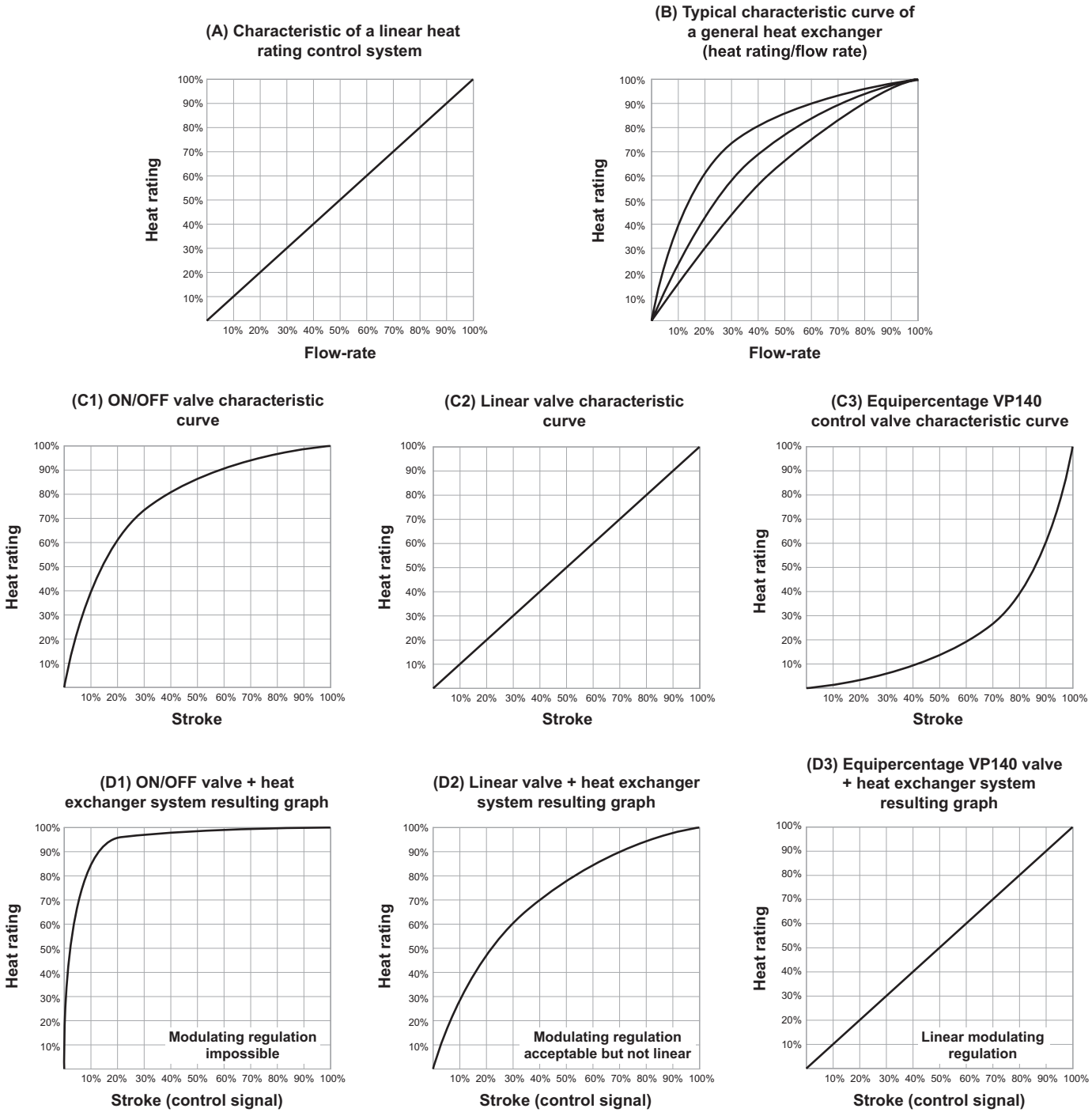
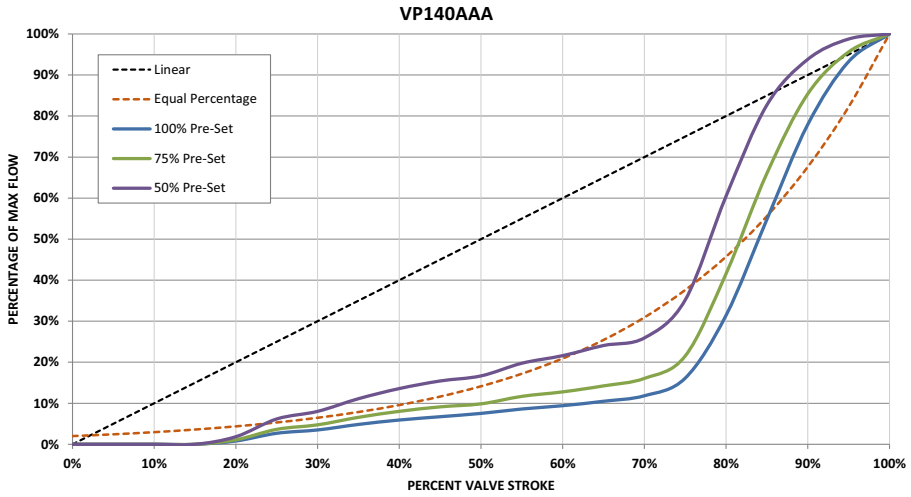
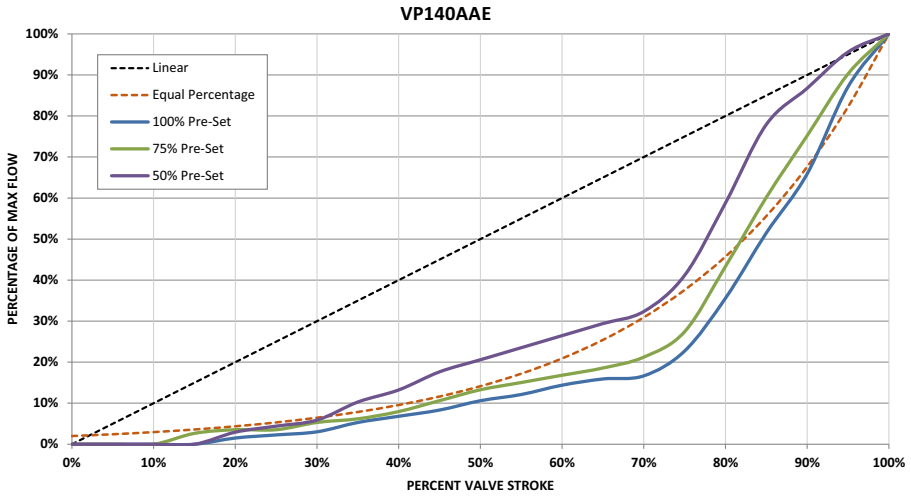
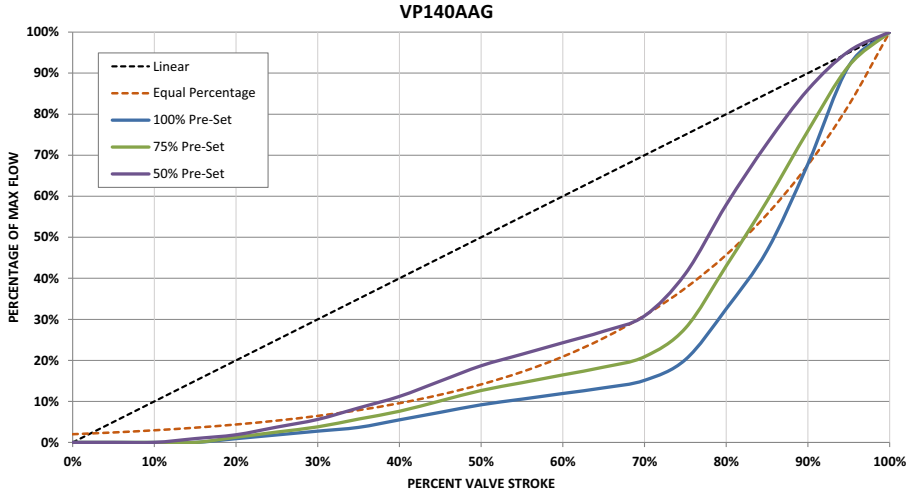


Figure 5: VP140Axx and VP140Bxx flow rate charts







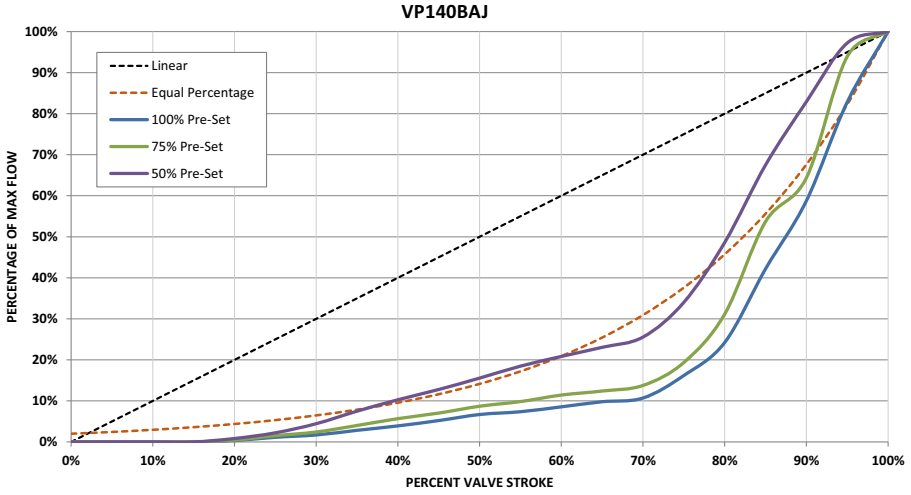
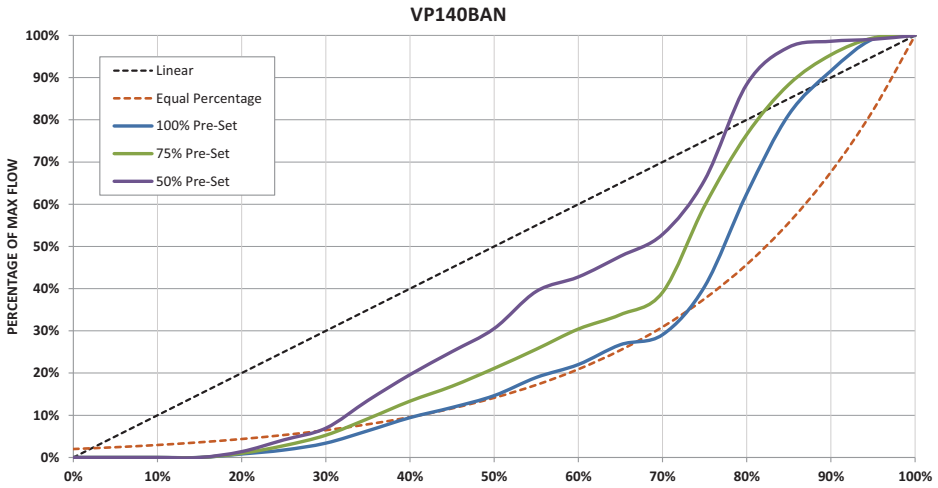
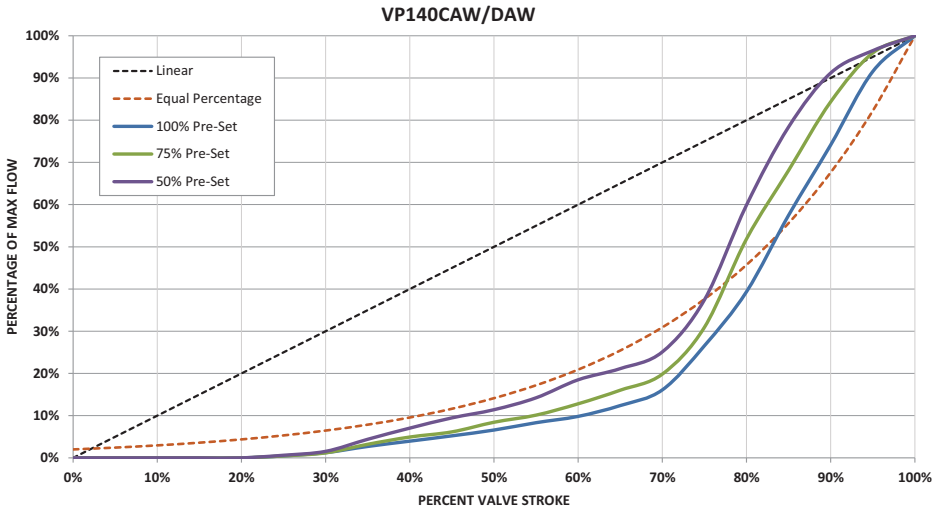
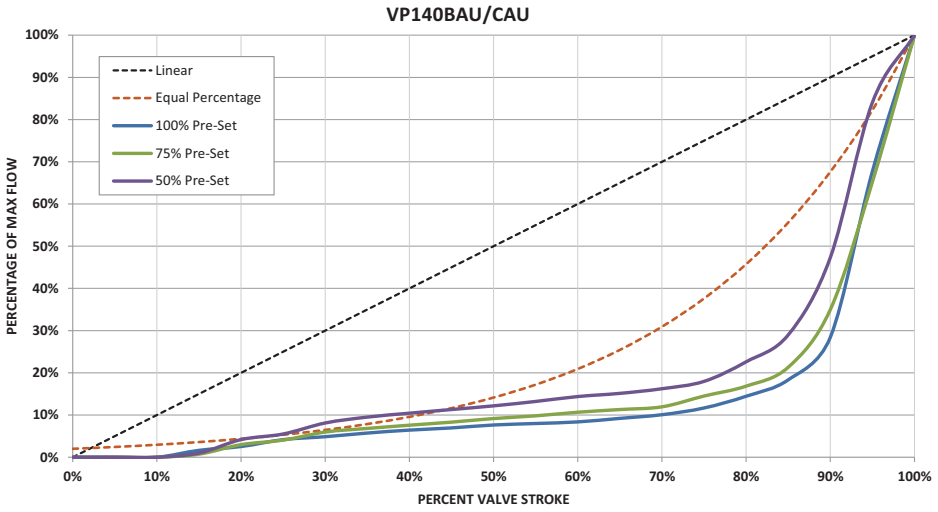


Figure 6: VP140Bxx, VP140Cxx and VP140Dxx flow rate charts







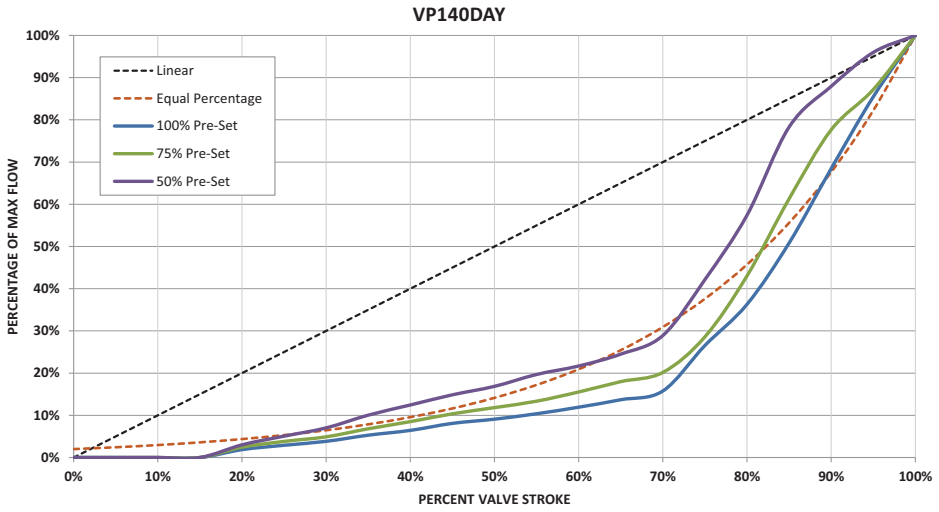
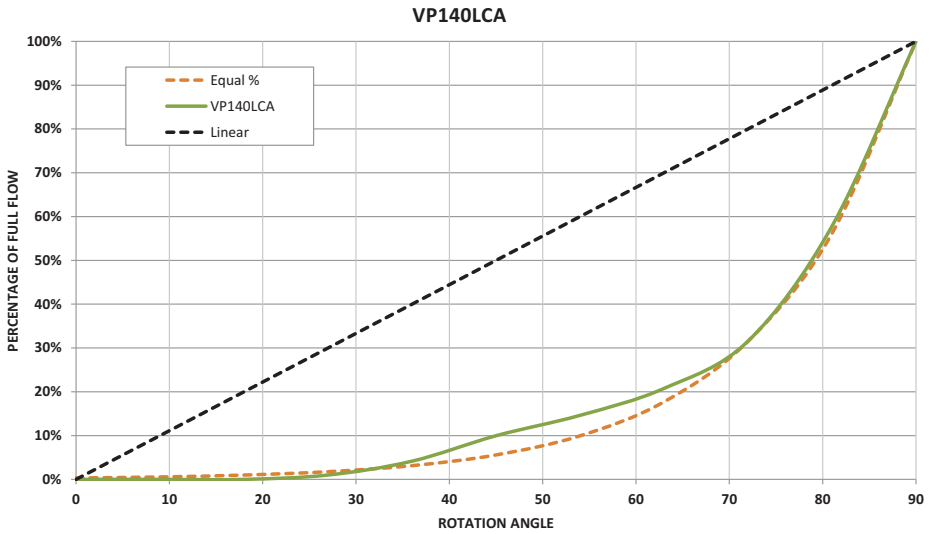
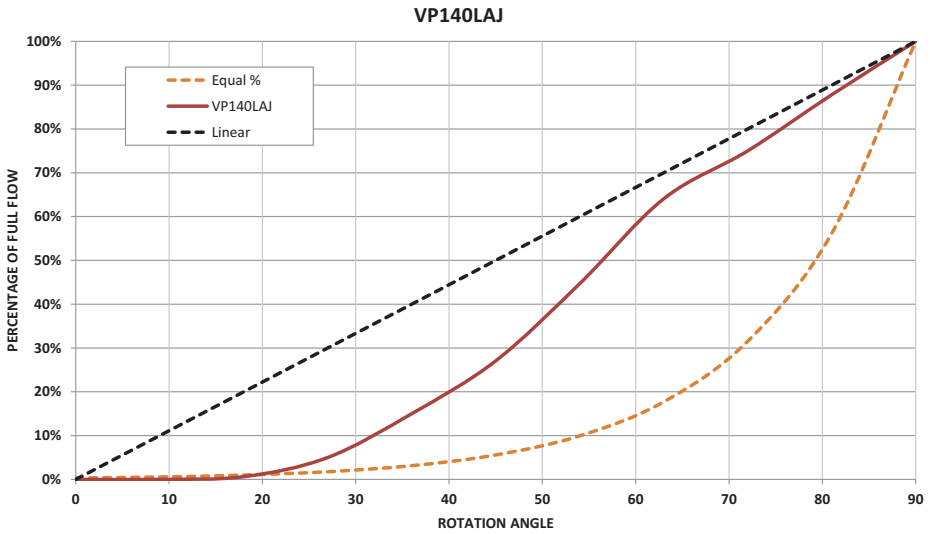
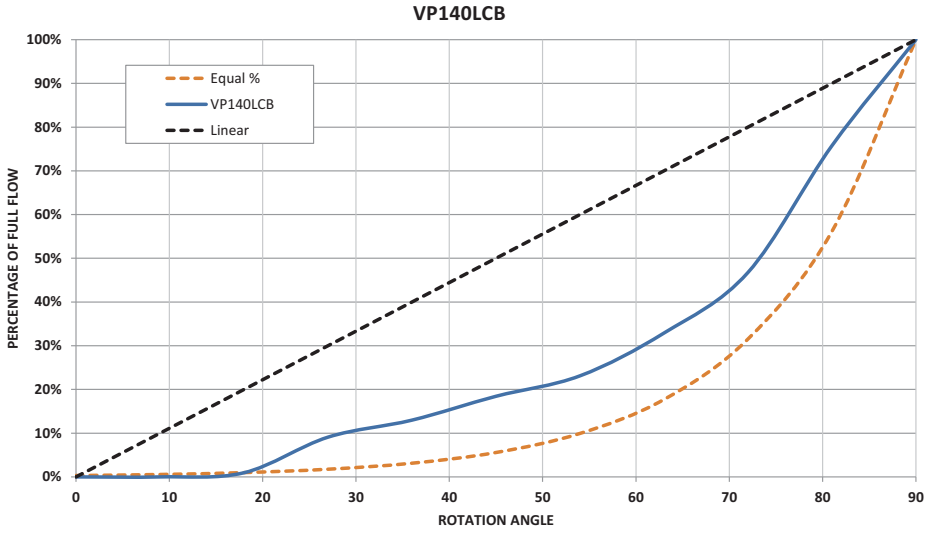


Figure 7: VP140Lxx and VP140Mxx flow rate charts







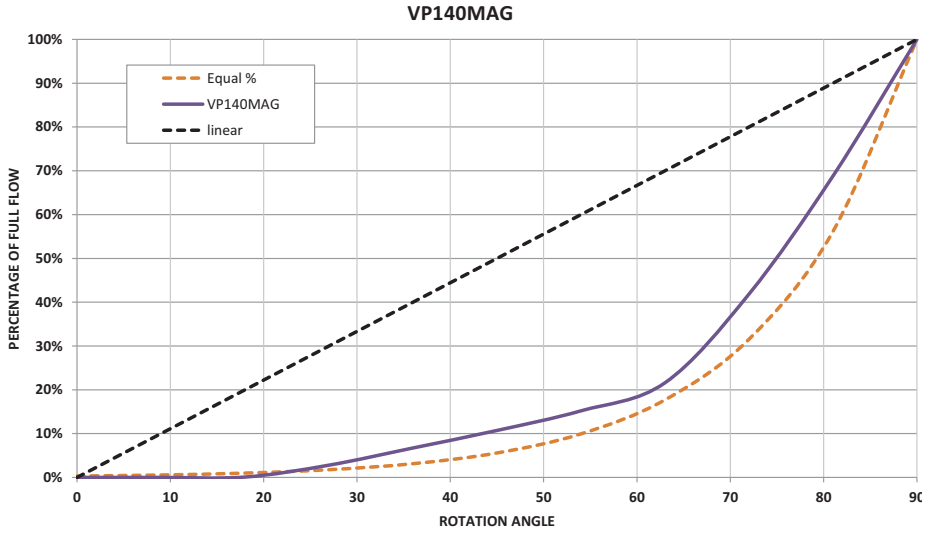
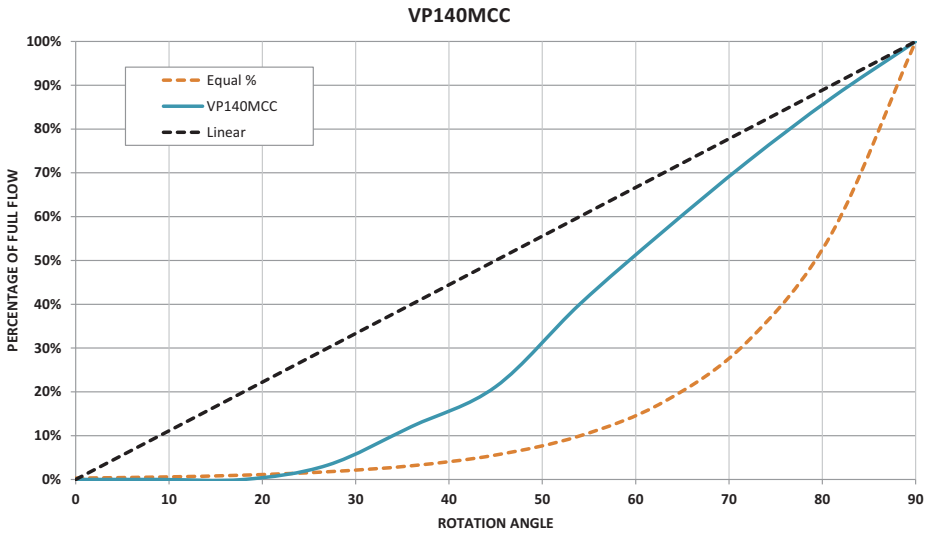
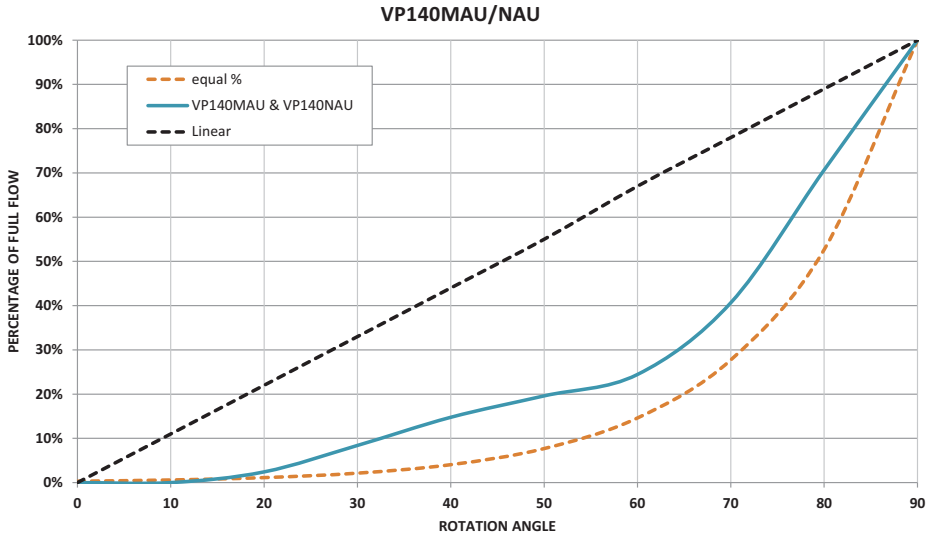


Figure 8: VP140Mxx and VP140Nxx, flow rate charts





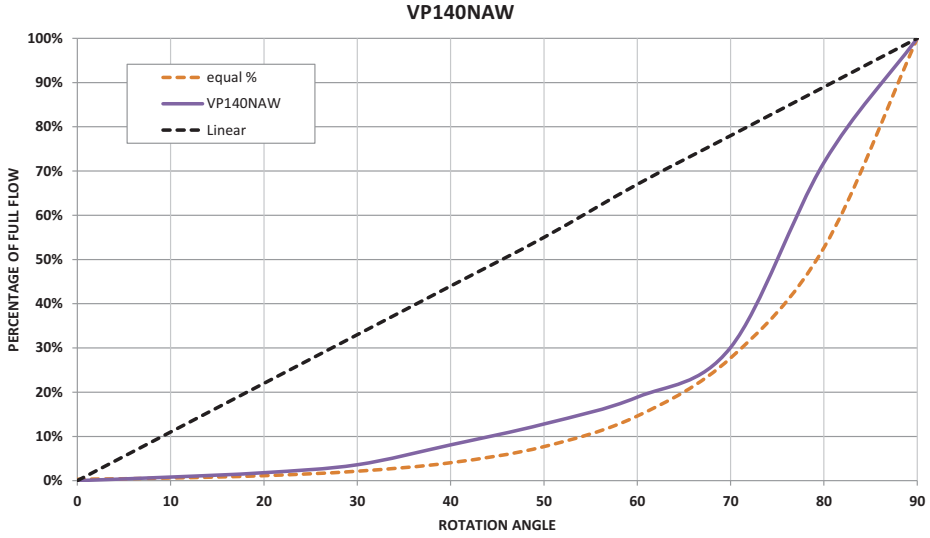
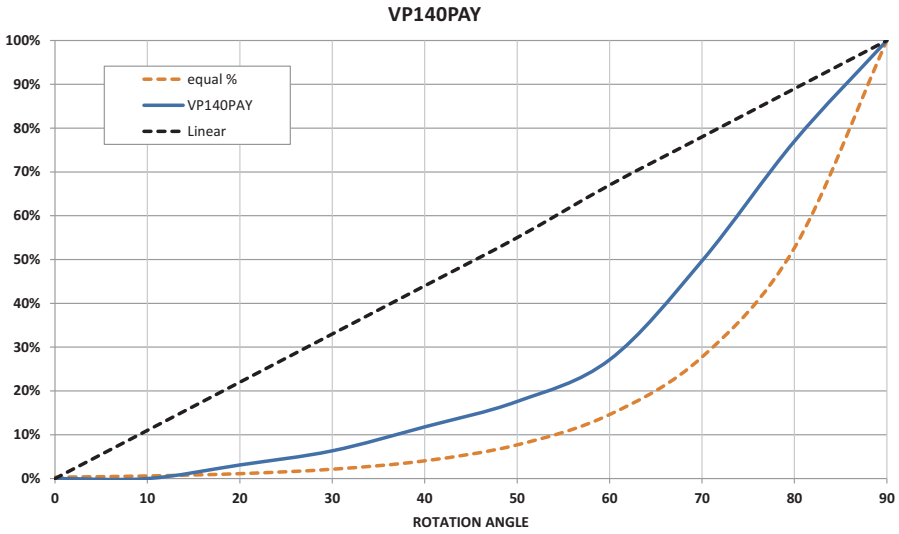


Figure 9: VP140PAY and VP140PCD flow rate charts



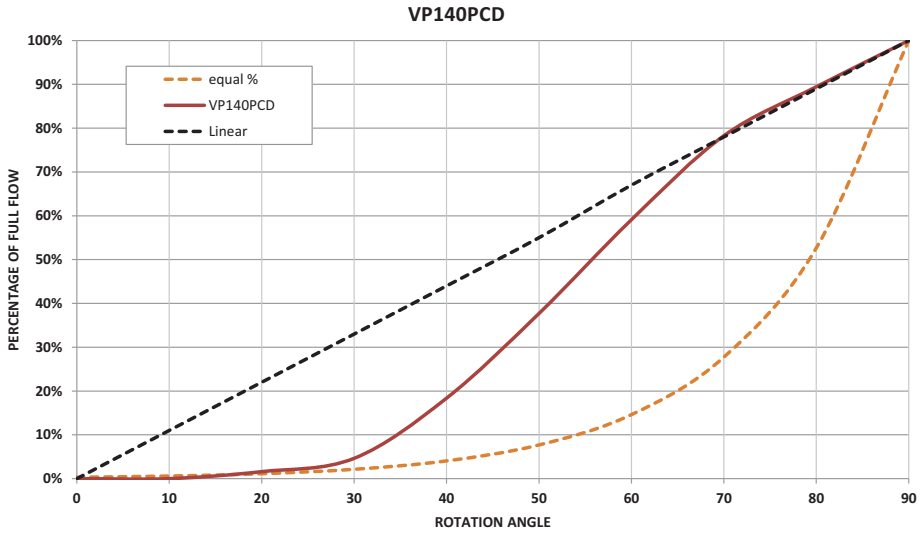
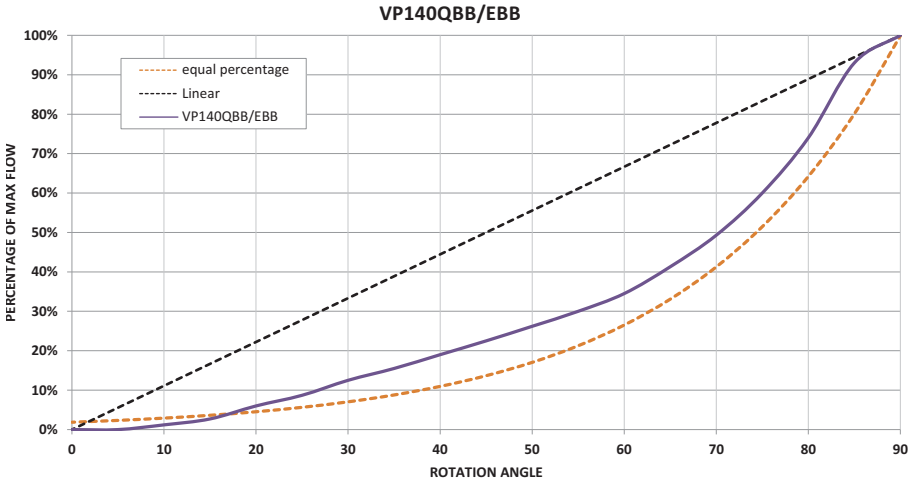


Figure 10: VP140QBB/VP140EBB and VP140EBC flow rate charts



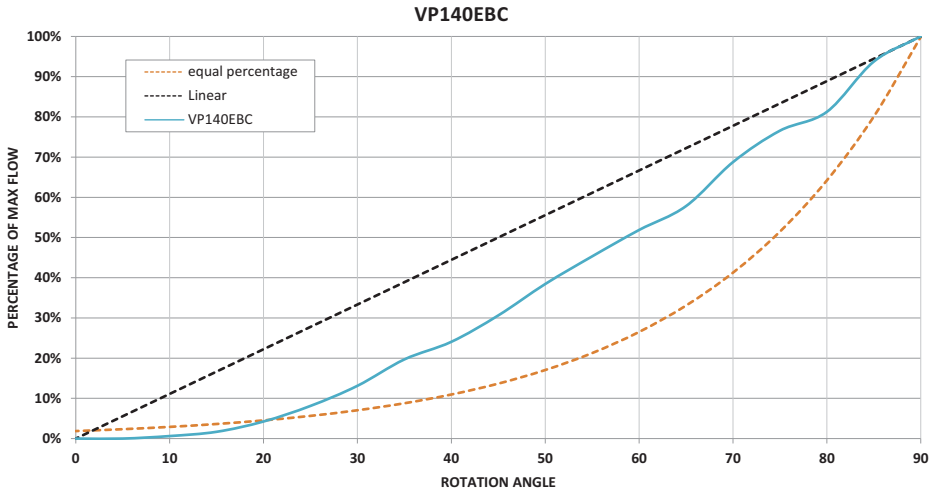
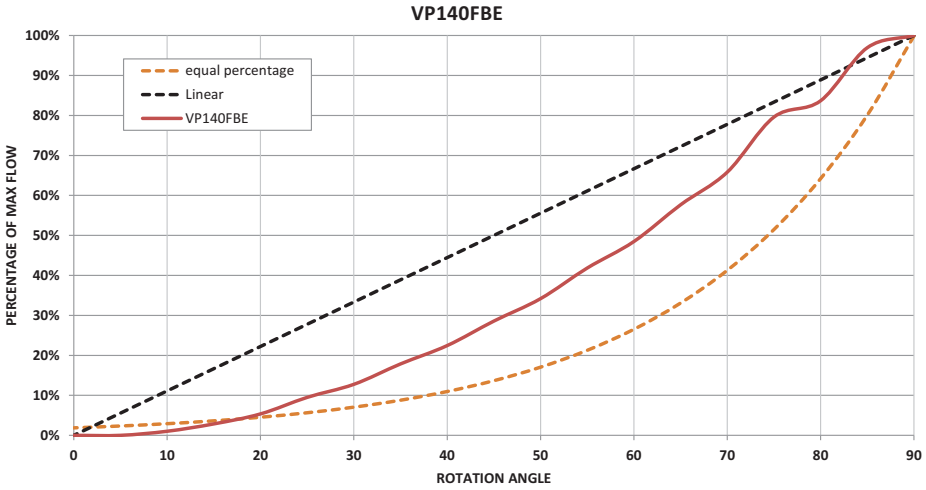
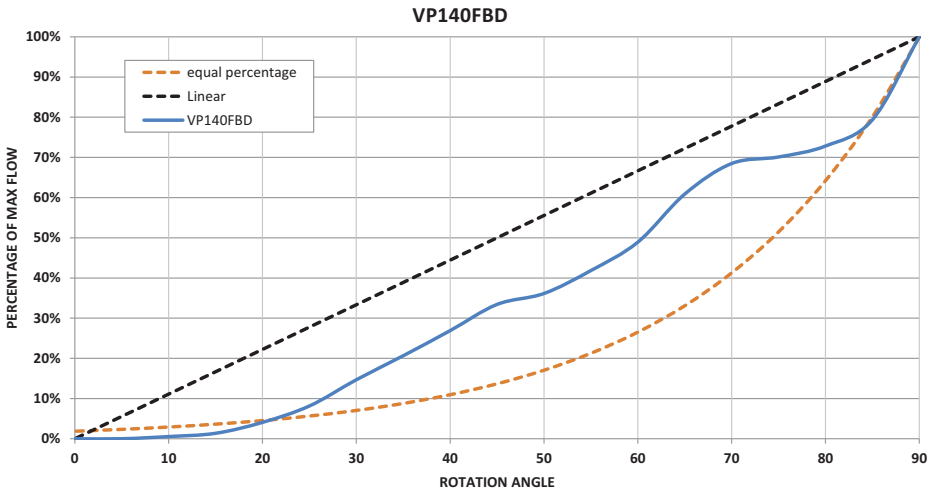
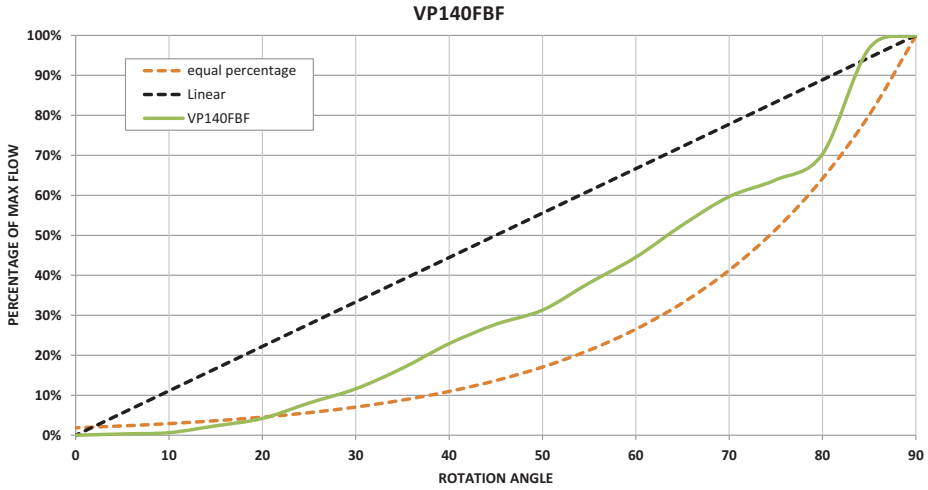


Figure 11: VP140Fxx and compiled Iron Body Ball flow rate charts







Flow rate adjustment

Use the following tables as a reference for the maximum flow rate in gallons per minute (GPM) or liters per hour (l/h) of each valve model.

Table 8: VP140 Axial Global Valve - Axx and Bxx

	VP140AAA		VP140AAE		VP14AAG		VP140BAJ		VP140BAN		VP140BAU	
Pre-Setting	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**
100%	0.66	150	2.6	600	3.4	780	4.4	1,000	6.6	1,500	9.7	2,200
90%	0.59	135	2.4	540	3.1	702	4.0	900	5.9	1,350	8.7	1,980
80%	0.53	120	2.1	480	2.7	624	3.5	800	5.3	1,200	7.8	1,760
70%	0.46	105	1.9	420	2.4	546	3.1	700	4.6	1,050	6.8	1,540
60%	0.39	90	1.6	360	2.1	468	2.6	600	4.0	900	5.8	1,320
50%	0.33	75	1.3	300	1.7	390	2.2	500	3.3	750	4.9	1,100
40%	0.26	60	1.1	240	1.4	312	1.8	400	2.7	600	3.9	880
30%	0.19	45	0.8	180	1.0	234	1.3	300	2.0	450	2.9	660
20%	0.13	30	0.5	120	0.7	156	0.9	200	---	---	1.9	440
10%	0.07	15	0.3	60	0.3	78	0.4	100	---	---	1.0	220

Table 9: VP140 Axial Global Valve - Cxx and Dxx

	VP14CAN		VP140CAU		VP14CAW		VP140DAW		VP140DAY	
Pre-Setting	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**
100%	6.6	1,500	9.7	2,200	11.8	2,700	11.8	2,700	13.2	3,000
90%	5.9	1,350	8.7	1,980	10.6	2,430	10.6	2,430	11.8	2,700
80%	5.3	1,200	7.8	1,760	9.4	2,160	9.4	2,160	10.6	2,400
70%	4.6	1,050	6.8	1,540	8.3	1,890	8.3	1,890	9.2	2,100
60%	4.0	900	5.8	1,320	7.1	1,620	7.1	1,620	7.3	1,800
50%	3.3	750	4.9	1,100	5.9	1,350	5.9	1,350	6.6	1,500
40%	2.6	600	3.9	880	4.7	1,080	4.7	1,080	5.3	1,200
30%	2.0	450	2.9	660	3.5	810	3.5	810	4.0	900
20%	---	---	1.9	440	2.4	540	2.4	540	2.6	600
10%	---	---	1.0	220	1.2	270	1.2	270	1.3	300

Table 10: VP140 Brass Body Ball Rotary Valve - Lxx and Mxx

	VP140LCA		VP140LCB		VP140LAJ		VP140MAG		VP140MCC		VP140MAU	
Pre-Setting	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**
100%	1.6	360	3.0	700	4.4	1000	3.4	780	5.0	1,150	9.7	2,200
90%	0.9	210	2.5	563	4.2	960	2.8	626	4.9	1,122	7.1	1,615
80%	0.5	114	1.5	341	3.7	845	1.7	286	4.5	1,032	4.5	1,015
70%	0.3	75	1.0	207	3.2	737	1.0	215	3.5	805	2.9	647
60%	0.2	53	0.7	153	2.5	570	0.7	153	2.5	561	2.2	508
50%	0.16	36	0.4	98	1.7	380	0.6	129	1.4	323	1.6	372
40%	0.07	15	0.3	74	1.0	232	0.4	93	0.6	141	0.9	213
30%	0.02	4	0.2	39	0.6	132	0.2	53	0.04	9	0.5	121
20%	--	--	--	--	0.1	23	--	--	--	--	0.2	44
10%	--	--	--	--	--	--	--	--	--	--	--	--

Table 11: VP140 Brass Body Ball Rotary Valve - Nxx and Pxx

	VP140NAU		VP140NAW		VP140PAY		VP140PCD	
Pre-Setting	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**
100%	9.7	2,200	11.9	2,700	13.2	3,000	17.6	4,000
90%	7.1	1,615	8.7	1,978	10.5	2,383	15.9	3,621
80%	4.5	1,015	5.4	1,237	7.3	1,654	14.2	3,220
70%	2.9	647	3.5	795	4.5	1,017	11.4	2,594
60%	2.2	508	2.7	623	2.8	642	8.2	1,853
50%	1.6	372	2.0	456	2.0	445	4.5	1,088
40%	0.9	213	1.1	257	1.3	288	2.2	510
30%	0.5	121	0.6	144	0.7	162	0.7	147
20%	0.2	44	0.2	54	0.3	76	0.2	47
10%	--	--	--	--	--	--	--	--

Table 12: VP140 Iron Body Ball Rotary Valve - QBB, Exx, and Fxx

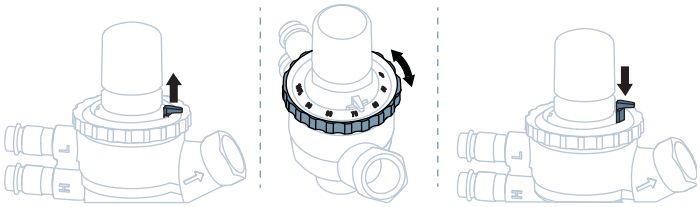
	VP140QBB		VP101EBB		VP101EBC		VP140FBD		VP140FBE		VP140FBF	
Pre-Setting	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**	**GPM**	**l/h**
100%	26.4	6,000	26.4	6,000	39.6	9,000	48.4	11,000	52.8	12,000	79.3	18,000
90%	23.8	5,400	23.8	5,400	35.7	8,100	43.6	9,900	47.6	10,800	71.3	16,200
80%	21.1	4,800	21.1	4,800	31.7	7,200	38.7	8,800	42.3	9,600	63.4	14,400
70%	18.5	4,200	18.5	4,200	27.7	6,300	33.9	7,700	37.0	8,400	55.5	12,600
60%	15.9	3,600	15.9	3,600	23.8	5,400	29.1	6,600	31.7	7,200	47.6	10,800
50%	13.2	3,000	13.2	3,000	19.8	4,500	24.2	5,500	26.4	6,000	39.6	9,000
40%	10.6	2,400	10.6	2,400	15.9	3,600	19.4	4,400	21.1	4,800	31.7	7,200
30%	7.9	1,800	7.9	1,800	11.9	2,700	14.5	3,300	15.9	3,600	23.8	5,400
20%	--	--	--	--	--	--	--	--	--	--	--	--
10%	--	--	--	--	--	--	--	--	--	--	--	--

Setting the maximum flow rate

Refer to the following examples as a guidance for setting the maximum flow rate.

Example 1: *A 1/2 Inch axial globe valve with a required flow of 0.26 GPM*

1. Select a VP140AAA model with a maximum GPM of 0.66.
2. Refer to Table 8 to determine the percentage value to adjust the maximum flow rate to. The values on the adjustment dial indicate the percentage value of the maximum flow rate. For the VP140AAA valve, 40% of the maximum flow rate is 0.26 GPM.
3. Rotate the adjustment dial to the required percentage setting.



Example 2: *A 1/2 Inch ball valve with a required flow rate of 0.5 GPM with a* ***proportional control actuator***

1. Select a VP140LCA model with a maximum GPM of 1.6.
2. Refer to Table 10 to determine the percentage value to adjust the maximum flow rate to. For the VP140LCA model, 80% of the maximum flow rate is 0.5 GPM. An 80% setting corresponds to 80% of the control signal, or 8V. Therefore, 0.5 GPM corresponds to 8V, or 80% of a 0-10V signal.
3. Configure the control signal to span between 0–8V.

Example 3: *A 1/2 inch ball valve with a required flow rate of 0.5 GPM with a* ***floating control actuator***

1. Select a VP140LCA model with a maximum GPM of 1.6.
2. Refer to Table 10 to determine the percentage value to adjust the maximum flow rate to. For the VP140LCA model, 80% of the maximum flow rate is 0.5 GPM. This corresponds to 80% rotation, which is 72° of the maximum 90°.
3. Configure the control signal by calculating the required drive time for the rotation:
   - To calculate required drive time for rotation for the V9104-AGA-2S actuator:

     60s for 90° rotation

     [60s / 90°] = [Xs/72°]

     90X = 4320

     X = 48s

     Therefore, the time required for a 72° rotation is 48 seconds.
   - To calculate required drive time for rotation for the VA9203-AGA-2Z actuator:

     90 seconds for 90° rotation

     [90s / 90°] = [Xs/72°]

     X = 72s

     Therefore, the time required for a 72° rotation is 72 seconds.

Example 4: *A 1-1/4 inch ball valve with a required flow rate of 16 GPM*

1. Select a VP140QBB model with a maximum GPM of 26.4
2. Refer to Table 12 to determine the percentage value to adjust the maximum flow rate for. In this case, 60% of the maximum flow rate is 15.9 GPM.
3. Use the manual pre-setting device to set the flow rate. The values on the adjustment dial of the device indicate the percentage value of the maximum flow rate. See Figure 12.
4. Calibrate the actuator to adapt the input signal to the new valve rotation. This is required if the maximum flow rate is both preset in the field or preset in the factory. After calibration the actuator redefines the selected input signal proportionally across a reduced rotation range. The actuator maintains calibration when power is lost or removed.

   See *Calibrating the VA9310 series electric non-spring return valve actuator*

   OR

   See *Calibrating the VA9208 proportional spring return valve actuator*

Figure 12: Setting the maximum flow rate

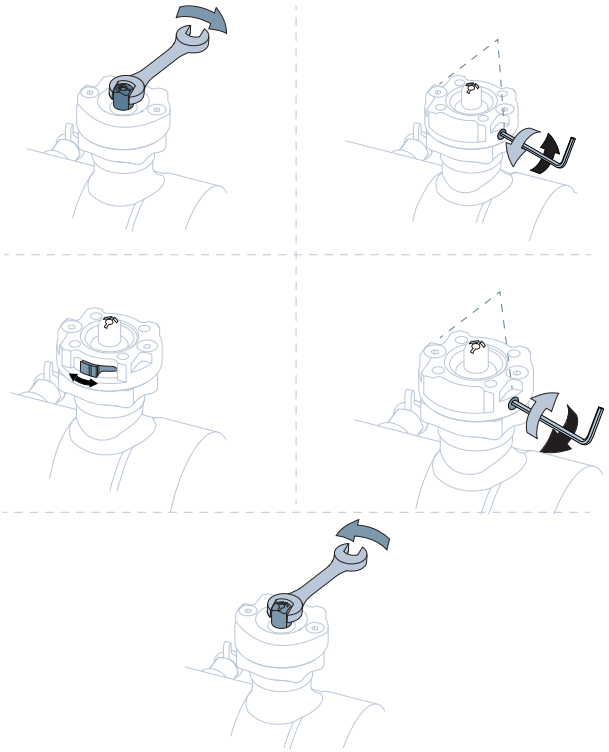
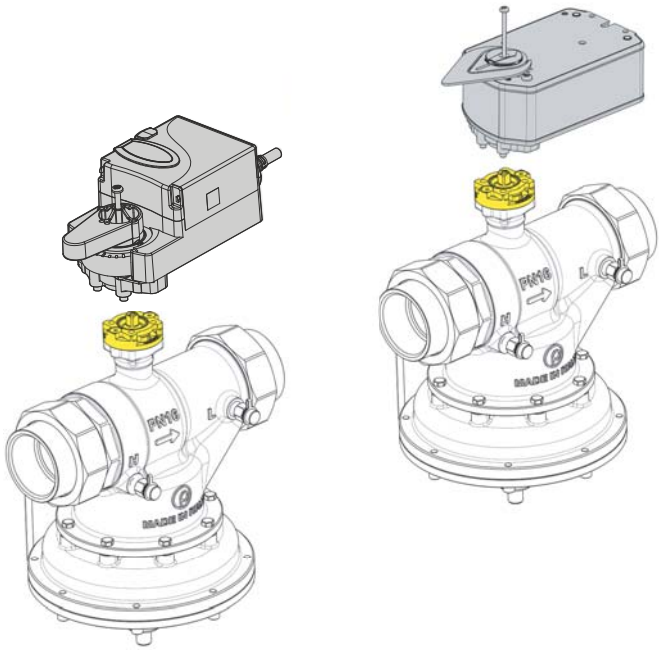


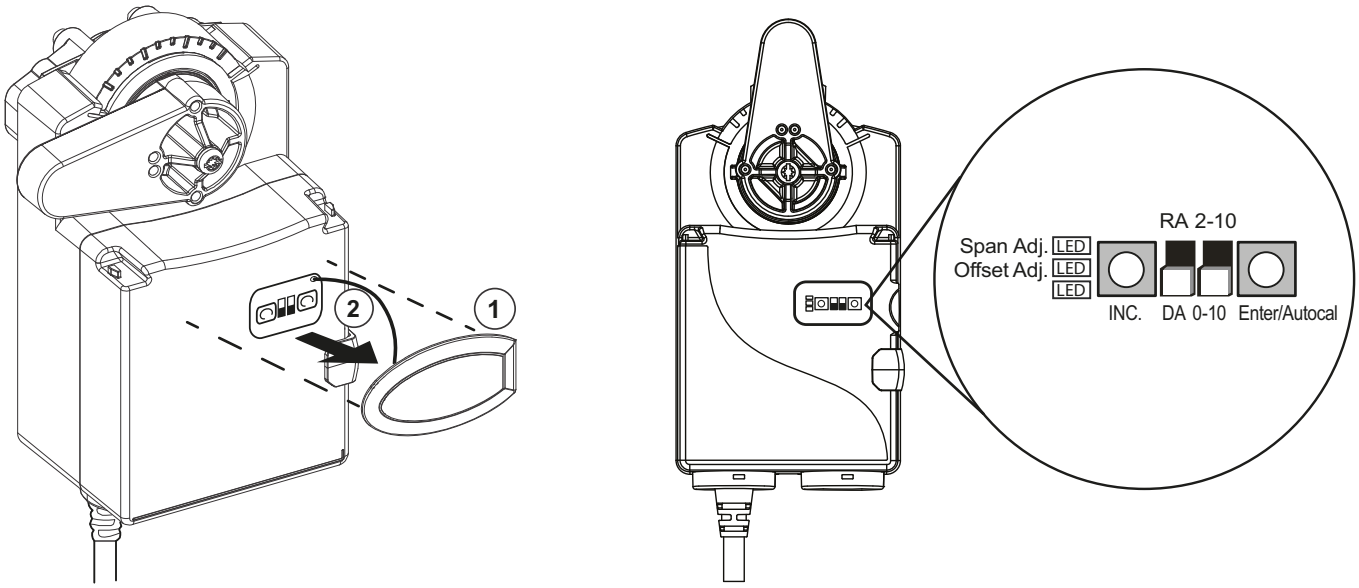
Figure 13: Iron body ball valves with VA9310 and VA9208 actuator assembly



Calibrating the VA9310 series electric non-spring return valve actuator

1. Remove the oval cover on the front of the unit.
2. With power applied to the actuator, press **Enter/Autocal** until all three LEDs turn on.

The actuator rotates until the end-stops are found. When the actuator reaches the starting position and stops the actuator has calibrated



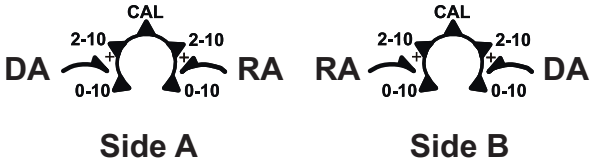
Calibrating the VA9208 proportional spring return valve actuator

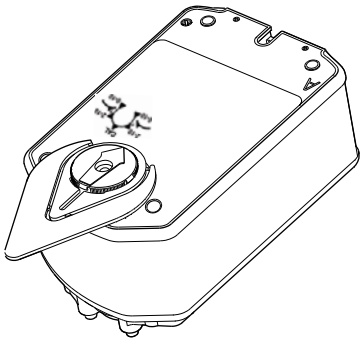
1. With power applied to the actuator, move the mode selection switch to the CAL position and leave it in this position for approximately 5 seconds. The actuator begins rotating until the end-stops are found.
2. Move the mode selection switch to the desired input signal range. Selection can be made while the calibration process is in progress, or after completion. The selected input signal is proportionally reconfigured to the reduced rotation range.

Note: During normal operation, if the actuator stroke increases due to seal or seat wear, input signals are automatically reconfigured to the increased rotation range in approximately 0.5° increments.

The mode selection switch must remain out of the CAL position for at least 2 seconds before re-initiating the CAL function.

If the mode selection switch is left in the CAL position, the actuator defaults to 0-10 V input signal range, DA.





Applications

The valves can be applied in any applications that have traditionally used pressure dependent control valves to regulate water flow in HVAC applications.

Actuator Assembly

For valves that do not come with an actuator already assembled, see the following manuals for assembly instructions and technical specifications.

- *VP140 1/2 Inch to 1-1/4 Inch (DN15-DN32) Pressure Independent Control Valve Installation Instructions (Part No. 14-88360-03389*)

VP140 1-1/4 Inch to 2 Inch (DN32-DN50)

- *VA9208-GGx-x Series Proportional Spring Return Valve Actuators Installation Instructions (Part No. 14-1379-21)*
- *VA9310 Series Electric Non-Spring Return Valve Actuators (Part No. 34-636-2464)*

VP140 1/2 Inch to 1-1/4 Inch (DN15-DN32)

- *VA9104-xGA-2S Series Electric Non-Spring Return Valve Actuators Installation Instructions (Part No. 14-1336-15)*
- *VA9203-AGx-2Z Series On/Off and Floating Point Electric Spring Return Valve Actuators Installation Instructions (Part No. 14-1380-8)*
- *VA9203-GGx-xx Series Proportional Electric Spring Return Valve Actuators Installation Instructions (Part No. 14-1380-24)*

Dimensions

Figure 14 and Figure 15 show the dimensions of the VP140Axx, VP140Bxx, VP140Cxx. Series valve and VP140Axx, VP140Bxx, VP140Cxx. Series valve with actuator assembly.

Figure 14: VP140 Axx, VP140 Bxx and VP140 Cxx dimensions, in. (mm)

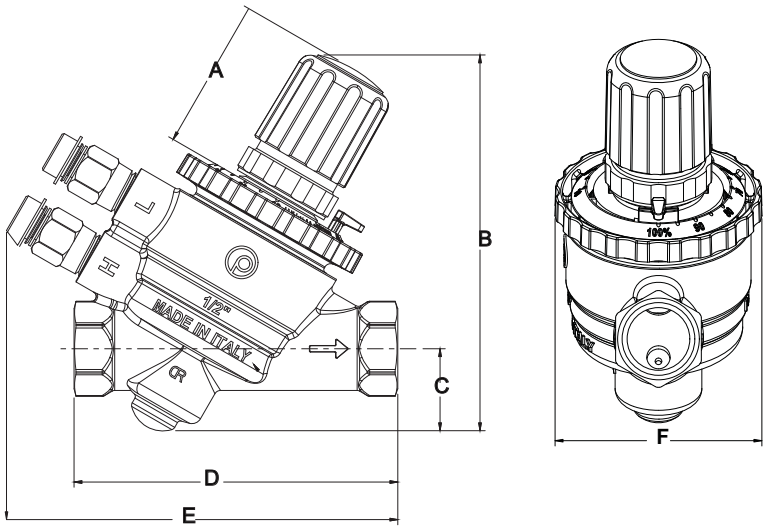


Table 13: VP140Axx, VP140Bxx and VP140Cxx dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E	F
VP140AAA	**1/2” DN15**	1.9 (47)	4.5 (115)	1.0 (25)	3.9 (99)	4.7 (120)	2.4 (62)
VP140AAE	**1/2” DN15**	1.9 (47)	4.5 (115)	1.0 (25)	3.9 (99)	4.7 (120)	2.4 (62)
VP140AAG	**1/2” DN15**	1.9 (47)	4.5 (115)	1.0 (25)	3.9 (99)	4.7 (120)	2.4 (62)
VP140BAJ	**3/4” DN20**	1.9 (47)	4.5 (115)	1.0 (25)	4.3 (108)	5.0 (127)	2.4 (62)
VP140BAN	**3/4” DN20**	1.9 (47)	4.5 (115)	1.0 (25)	4.3 (108)	5.0 (127)	2.4 (62)

Figure 15: VP140 Axx, VP140 Bxx, VP140 Cxx. Series valve with actuator assembly dimensions, in. (mm

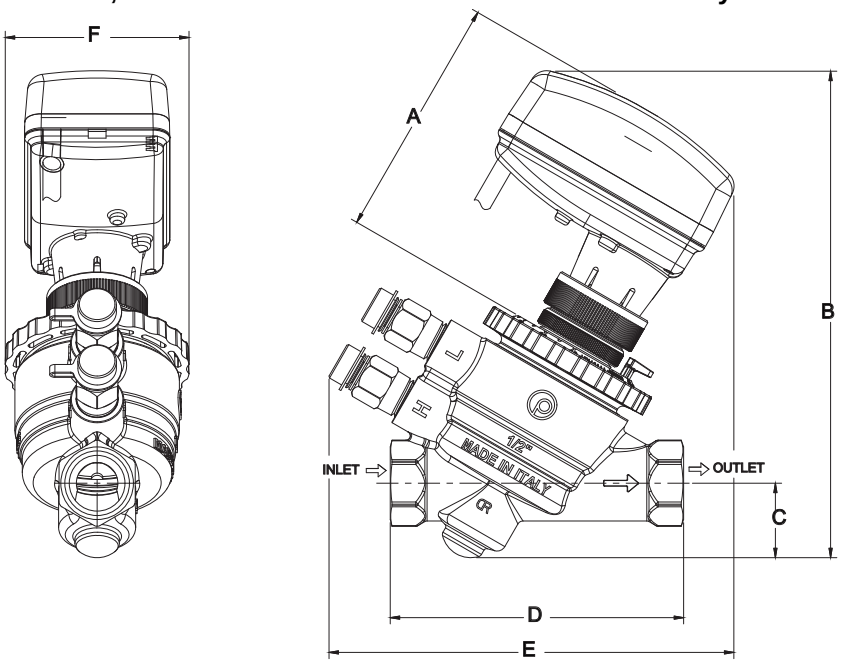


Table 14: VP140Axx, VP140Bxx, VP140Cxx. Series valve with actuator assembly dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E	F
VP140AAA+778GGA	**1/2" DN15**	3.2 (82)	6.5 (164)	1.0 (25)	3.9 (99)	5.4 (137)	2.4 (62)
VP140AAE+778GGA	**1/2" DN15**	3.2 (82)	6.5 (164)	1.0 (25)	3.9 (99)	5.4 (137)	2.4 (62)
VP140AAG+778GGA	**1/2" DN15**	3.2 (82)	6.5 (164)	1.0 (25)	3.9 (99)	5.4 (137)	2.4 (62)
VP140BAJ+778GGA	**3/4" DN20**	3.2 (82)	6.5 (164)	1.0 (25)	4.2 (108)	5.4 (137)	2.4 (62)
VP140BAN+778GGA	**3/4" DN20**	3.2 (82)	6.5 (164)	1.0 (25)	4.2 (108)	5.4 (137)	2.4 (62)

Figure 16 and Figure 17 show the dimensions of the VP140Bxx, VP140Cxx, and VP140Dxx Series valve.

Figure 16: VP140 Bxx, VP140 Cxx and VP140 Dxx dimensions, in. (mm)

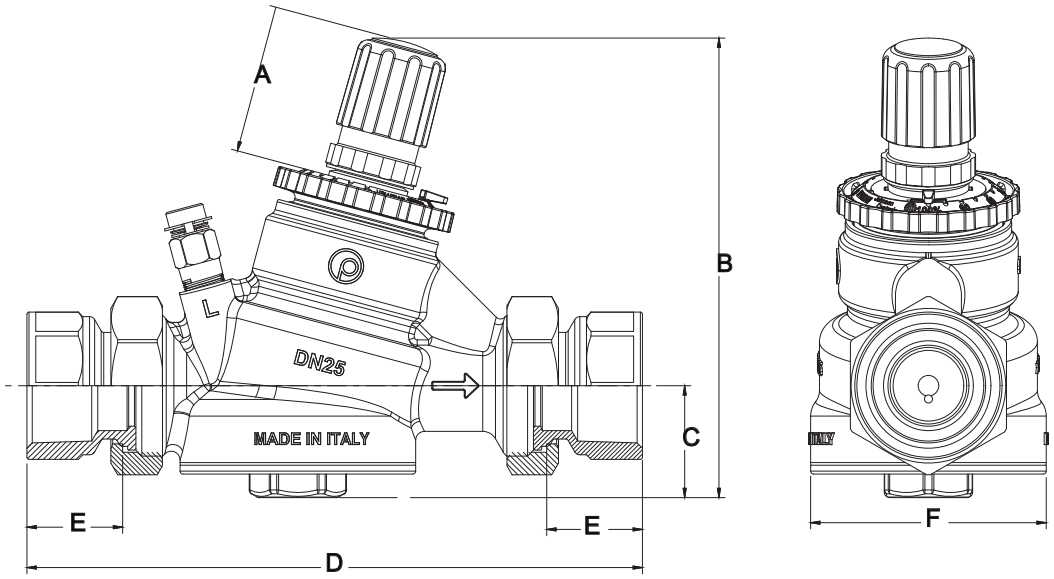


Table 15: VP140Bxx, VP140Cxx and VP140Dxx dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E	F
VP140BAU	**3/4” DN20**	1.9 (47)	6.0 (152)	1.5 (38)	6.3 (176)	0.7 (17)	3.2 (80)
VP140CAU	**1” DN25**	1.9 (47)	6.0 (152)	1.5 (38)	7.3 (184)	0.9 (22)	3.2 (80)
VP140CAW	**1” DN25**	1.9 (47)	6.0 (152)	1.5 (38)	7.3 (184)	0.9 (22)	3.2 (80)
VP140DAW	**1-1/4” DN32**	1.9 (47)	6.0 (152)	1.5 (38)	8.2 (209)	0.9 (22)	3.2 (80)
VP140DAY	**1-1/4” DN32**	1.9 (47)	6.0 (152)	1.5 (38)	8.2 (209)	0.9 (22)	3.2 (80)

Figure 17: VP140 Bxx, VP140 Cxx and VP140 Dxx with actuator assembly dimensions, in. (mm)

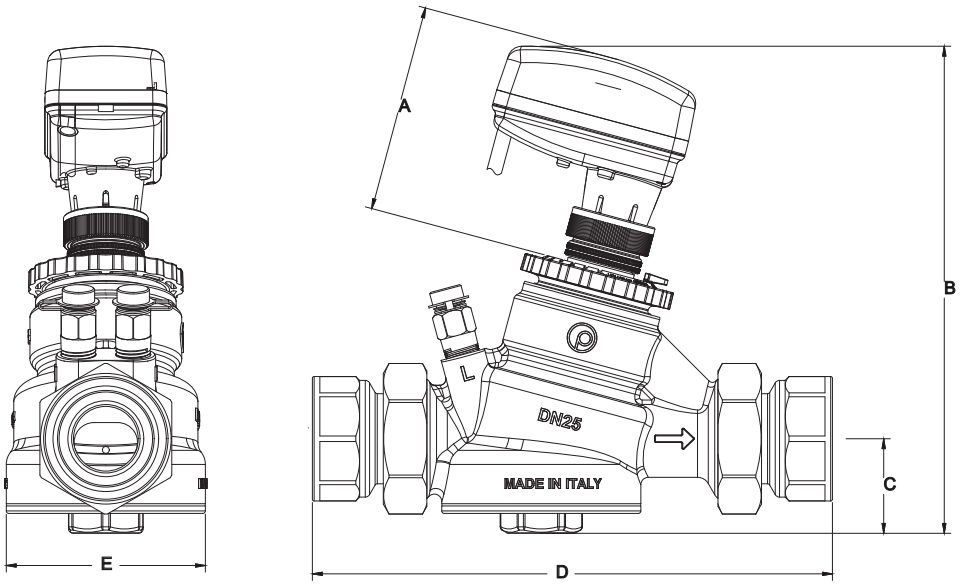


Table 16: VP140Bxx, VP140Cxx and VP140Dxx with actuator assembly dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140BAU+778GGA	**3/4” DN20**	3.3 (83)	7.7 (196)	1.5 (38)	6.9 (176)	3.2 (80)
VP140CAU+778GGA	**1” DN25**	3.3 (83)	7.7 (196)	1.5 (38)	7.2 (184)	3.2 (80)
VP140CAW+778GGA	**1” DN25**	3.3 (83)	7.7 (196)	1.5 (38)	7.2 (184)	3.2 (80)
VP140DAW+778GGA	**1-1/4” DN32**	3.3 (83)	7.7 (196)	1.5 (38)	8.2 (209)	3.2 (80)
VP140DAY+778GGA	**1-1/4” DN32**	3.3 (83)	7.7 (196)	1.5 (38)	8.2 (209)	3.2 (80)

Figure 18 and Figure 19 show the dimensions of the VP140Lxx, VP140Mxx, VP140Nxx and VP140Pxx Valve Series.

Figure 18: VP140 Lxx and VP140 Mxx valves

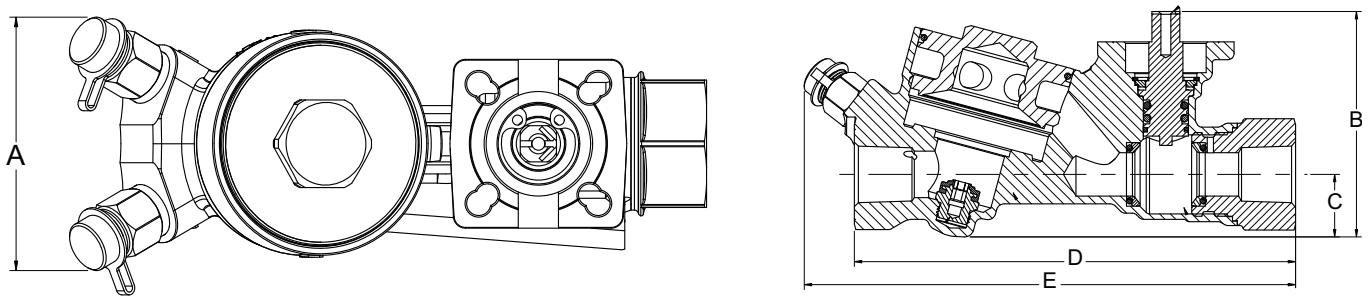


Table 17: VP140Lxx and VP140Mxx dimensions in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140LCA	**1/2” DN15**	2.4 (62)	2.9 (73)	0.8 (20)	6 (142)	6.2 (158)
VP140LCB	**1/2” DN15**	2.4 (62)	2.9 (73)	0.8 (20)	6 (142)	6.2 (158)
VP140LAJ	**1/2” DN15**	2.4 (62)	2.9 (73)	0.8 (20)	6 (142)	6.2 (158)
VP140MAG	**3/4” DN20**	2.4 (62)	2.9 (73)	0.8 (20)	6 (142)	6.2 (158)
VP140MCC	**3/4” DN20**	2.4 (62)	2.9 (73)	0.8 (20)	6 (142)	6.2 (158)

Figure 19: VP140 Mxx, VP140 Nxx and VP140 Pxx dimensions in. (mm)

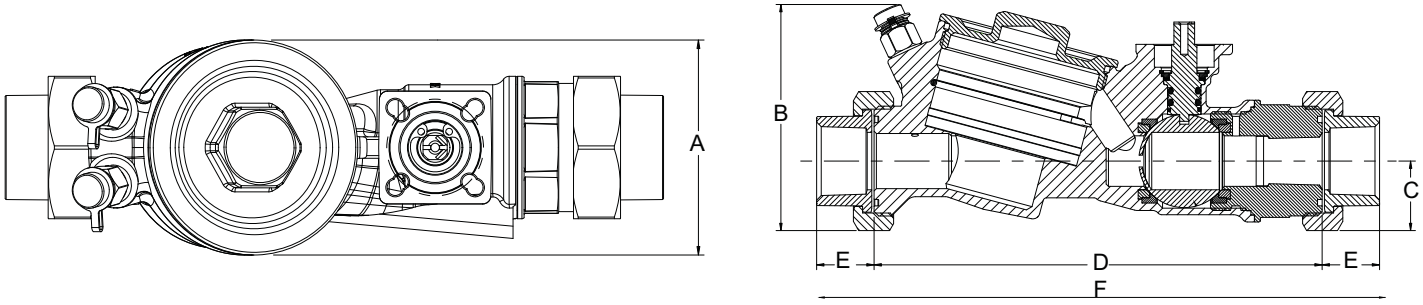


Table 18: VP140Mxx, VP140Nxx and VP140Pxx dimensions in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140MAU	**3/4” DN20**	3.2 (80)	3.9 (98)	1 (27)	7.7 (195)	0.8 (20)
VP140NAU	**1” DN25**	3.2 (80)	3.9 (98)	1 (27)	7.7 (195)	0.9 (25)
VP140NAW	**1” DN25**	3.2 (80)	3.9 (98)	1 (27)	7.7 (195)	0.9 (25)
VP140PAY	**1-1/4” DN32**	3.2 (80)	3.9 (98)	1 (27)	7.7 (195)	1.5 (37)
VP140PCD	**1-1/4” DN32**	3.2 (80)	3.9 (98)	1 (27)	7.7 (195)	1.5 (37)

Figure 20 and Figure 21 show the dimensions of the VP140Lxx and VP140Mxx Series Valve with the VA-9104 Series Actuator assembled.

Figure 20: VP140 Lxx and Mxx with VA-9104 Series Actuator assembled

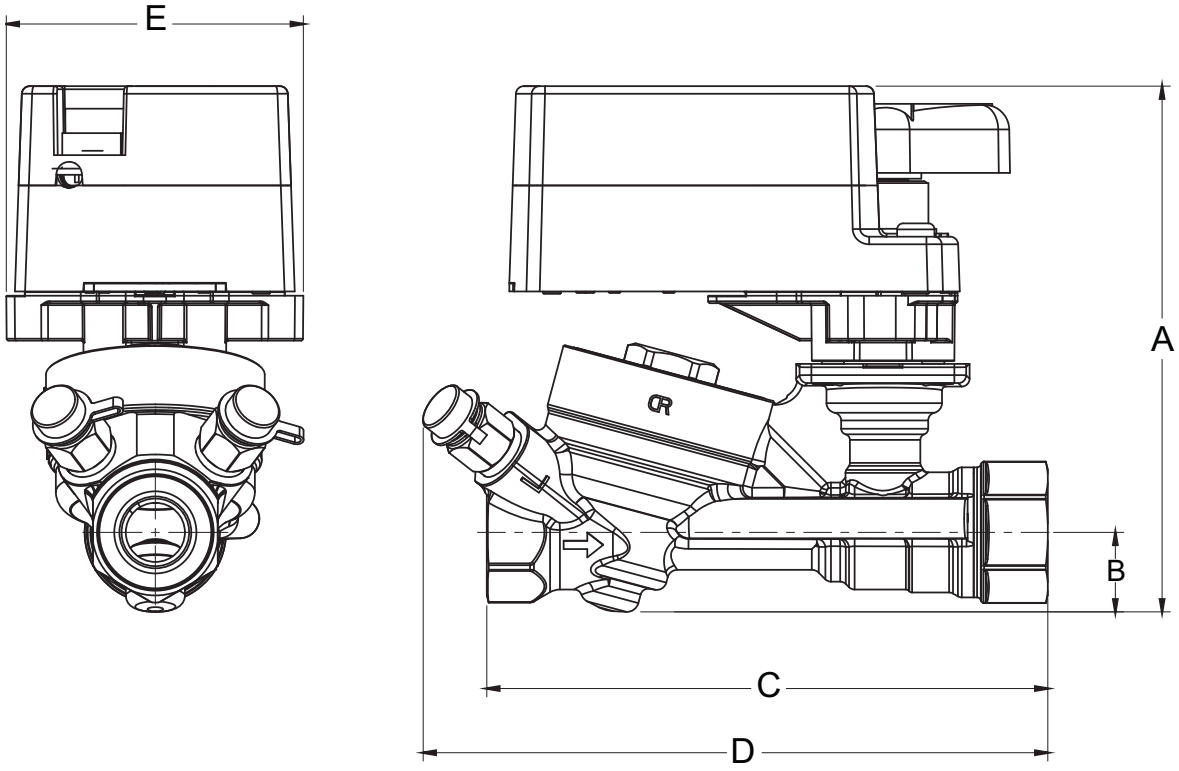


Table 19: VP140Lxx and Mxx with VA-9104 Series Actuator assembled dimensions in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140LCA+9A4xxx	**1/2”” DN15**	5.2 (133)	1 (20)	5.6 (142)	6.2 (158)	2.9 (75)
VP140LCB+9A4xxx	**1/2” DN15**	5.2 (133)	1 (20)	5.6 (142)	6.2 (158)	2.9 (75)
VP140LAJ+9A4xxx	**1/2” DN15**	5.2 (133)	1 (20)	5.6 (142)	6.2 (158)	2.9 (75)
VP140MAG+9A4xxx	**3/4” DN20**	5.2 (133)	1 (20)	5.6 (142)	6.2 (158)	2.9 (75)
VP140MCC+9A4xxx	**3/4” DN20**	5.2 (133)	1 (20)	5.6 (142)	6.2 (158)	2.9 (75)

Figure 21: VP140 Lxx and VP140 Mxx with VA-9203 Series Actuator assembled

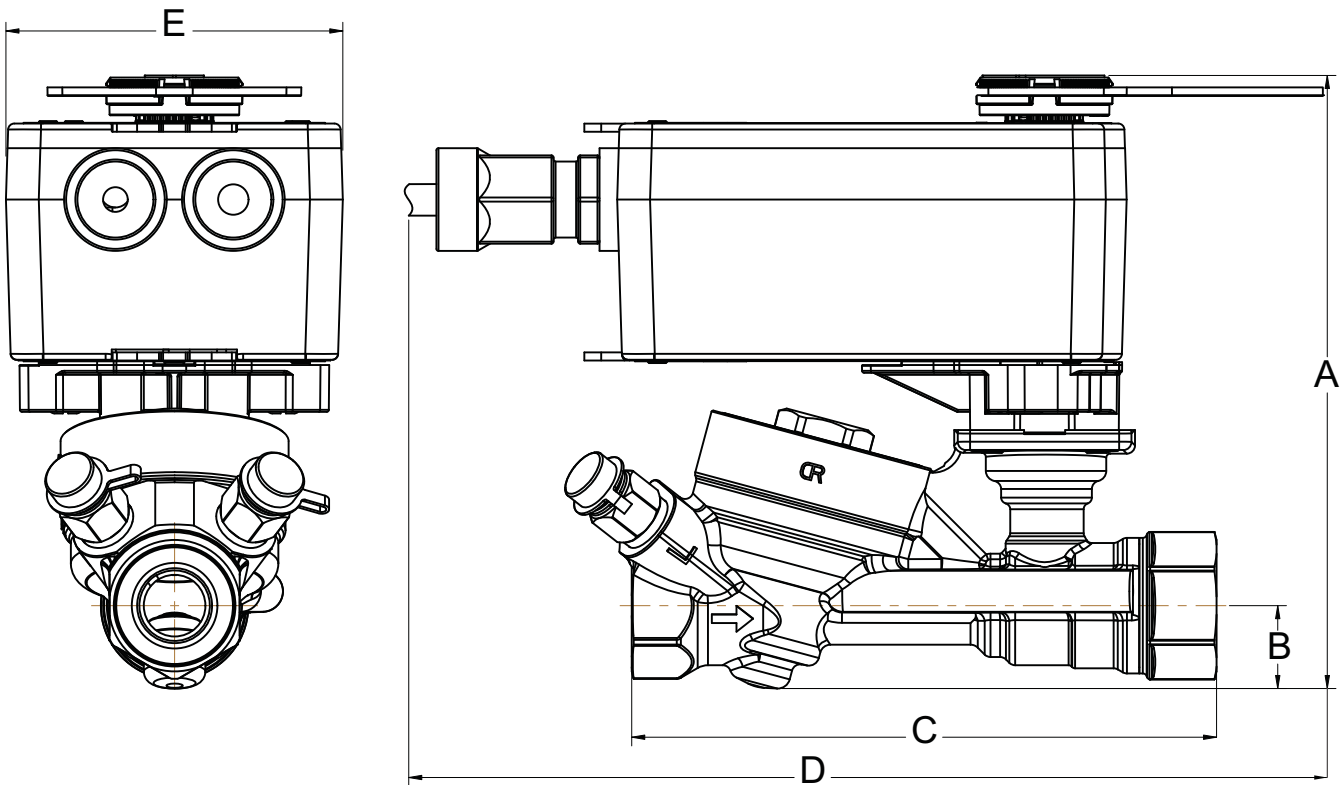


Table 20: VP140Lxx, and VP140Mxx with VA-9203 Series Actuator assembled in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140LCA+923xxx	**1/2” DN20**	6 (149)	0.8 (20)	5.6 (142)	8.7 (220)	3.2 (82)
VP140LCB+923xxx	**1/2” DN25**	6 (149)	0.8 (20)	5.6 (142)	8.7 (220)	3.2 (82)
VP140LAJ+923xxx	**1/2” DN25**	6 (149)	0.8 (20)	5.6 (142)	8.7 (220)	3.2 (82)
VP140MAG+923xxx	**3/4” DN32**	6 (149)	0.8 (20)	5.6 (142)	8.7 (220)	3.2 (82)
VP140MCC+923xxx	**3/4” DN32**	6 (149)	0.8 (20)	5.6 (142)	8.7 (220)	3.2 (82)

Figure 22 and Figure 23 show the dimensions for the VP140Mxx, VP140Nxx and VP140Pxx Series Valves with VA-9203 Series Actuator and VA-9104 Series Actuator assembly

Figure 22: VP140 Mxx, VP140 Nxx, and VP140 Pxx with VA-9104 Series Actuator assembled

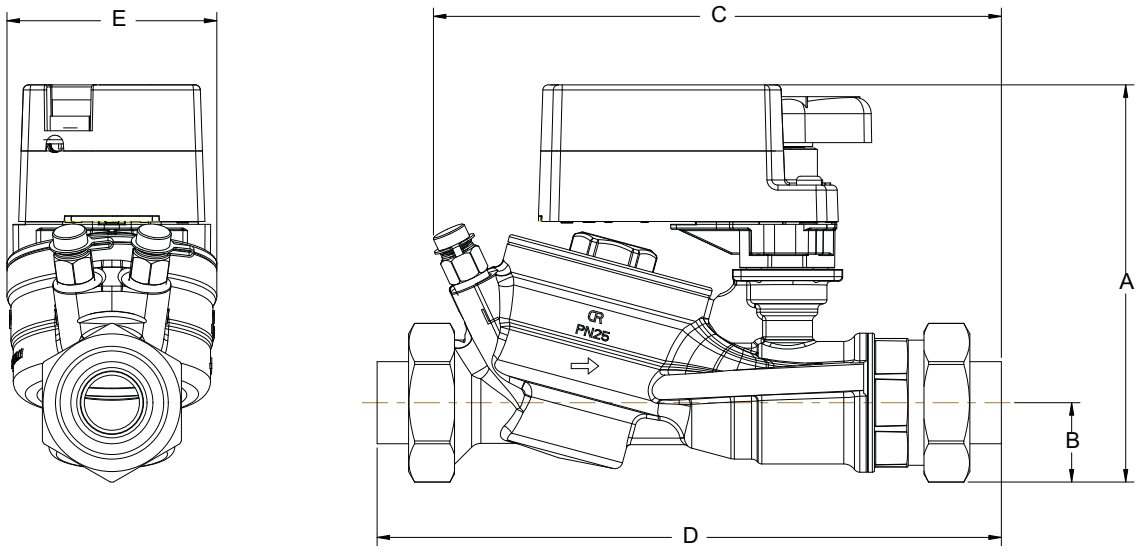


Table 21: VP140Mxx, VP140Nxx, and VP140Pxx with VA-9104 Series Actuator assembled in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140MAU+9A4xxx	**3/4” DN20**	6 (151)	1.2 (30)	8.5 (217)	9.4 (238)	3.2 (80)
VP140NAU+9A4xxx	**1” DN25**	6 (151)	1.2 (30)	8.5 (217)	9.4 (238)	3.2 (80)
VP140NAW+9A4xxx	**1” DN25**	6 (151)	1.2 (30)	8.7 (220)	9.6 (245)	3.2 (80)
VP140PAY+9A4xxx	**1-1/4” DN32**	6 (151)	1.2 (30)	9.2 (233)	10.7 (271)	3.2 (80)
VP140PCD+9A4xxx	**1-1/4” DN32**	6 (151)	1.2 (30)	9.2 (233)	10.7 (271)	3.2 (80)

Figure 23: VP140 Mxx VP140Nxx and VP140with VA-9203 Series Actuator assembled

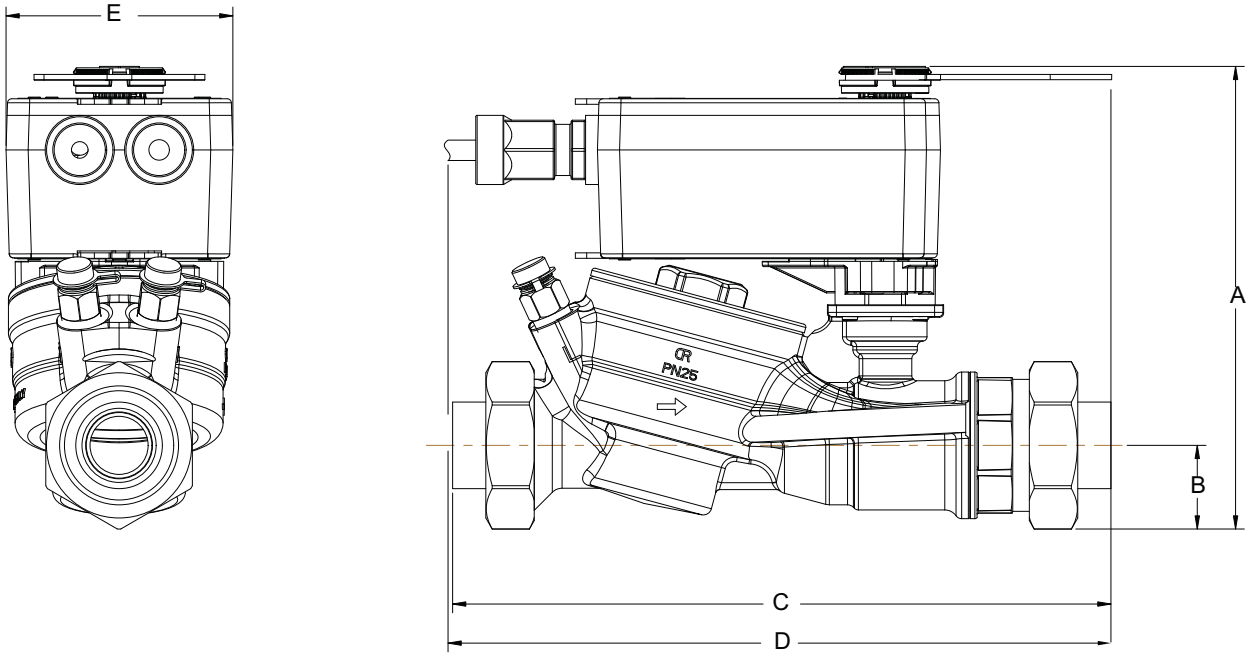


Table 22: VP140Mxx VP140Nxx and VP140with VA-9203 Series Actuator assembled dimensions in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140MAU+923xxx	**3/4” DN20**	6.6 (167)	1.2 (30)	9.4 (238)	9.2 (234)	3.2 (82)
VP140NAU+923xxx	**1” DN25**	6.6 (167)	1.2 (30)	9.4 (238)	9.2 (234)	3.2 (82)
VP140NAW+923xxx	**1” DN25**	6.6 (167)	1.2 (30)	9.6 (245)	9.8 (249)	3.2 (82)
VP140PAY+923xxx	**1-1/4” DN32**	6.6 (167)	1.2 (30)	10.7 (271)	10 (256)	3.2 (82)
VP140PCD+923xxx	**1-1/4” DN32**	6.6 (167)	1.2 (30)	10.7 (271)	10 (256)	3.2 (82)

Figure 24 shows the dimensions of the VP140Qxx, VP140Exx and VP140Fxx Series valve.

Figure 24: VP140 Qxx, VP140 Exx and VP140 Fxx Series valve

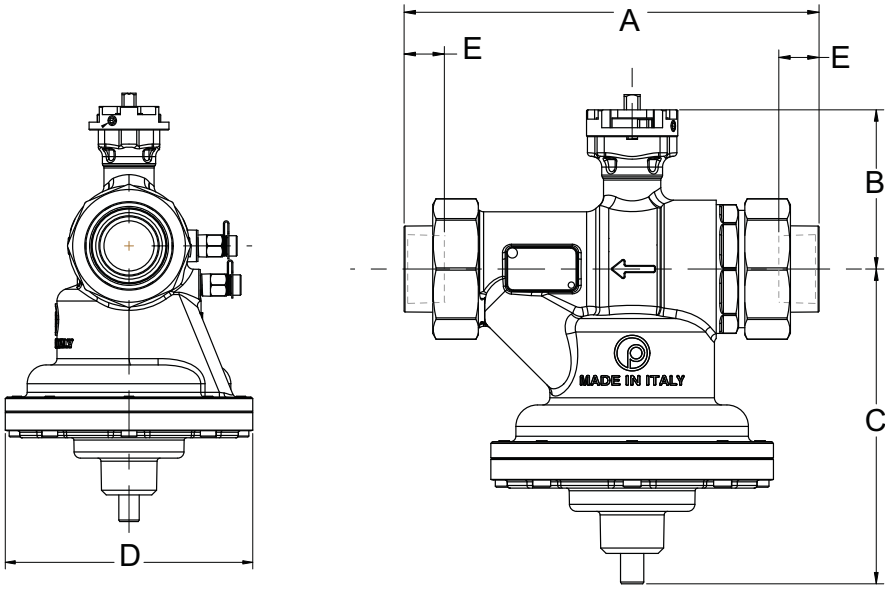


Table 23: P140 Qxx, VP140Exx and VP140Fxx Series valve dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140QBB	**1-1/4” DN32**	9.13 (232)	3.50 (89)	6.93 (176)	6.22 (158)	0.93 (24)
VP140EBB	**1-1/2” DN40**	9.09 (231)	3.50 (89)	6.93 (176)	6.22 (158)	0.93 (24)
VP140EBC	**1-1/2” DN40**	9.09 (231)	3.50 (89)	6.93 (176)	6.22 (158)	0.93 (24)
VP140FBD	**2” DN50**	10.94 (278)	3.50 (89)	6.93 (176)	6.22 (158)	0.93 (24)
VP140FBE	**2” DN50**	10.51 (267)	3.82 (97)	8.70 (221)	7.79 (198)	1.10 (28)
VP140FBF	**2” DN50**	10.51 (267)	3.82 (97)	8.70 (221)	7.79 (198)	1.10 (28)

Figure 25 and Figure 26 show the dimensions of the VP 140 Qxx, Exx and Fxx Series valve with Spring and Non-Spring Return Actuator assemblies.

Figure 25: VP140 Qxx, VP140 Exx and VP140 Fxx Series Valve with Spring Return actuator assembly

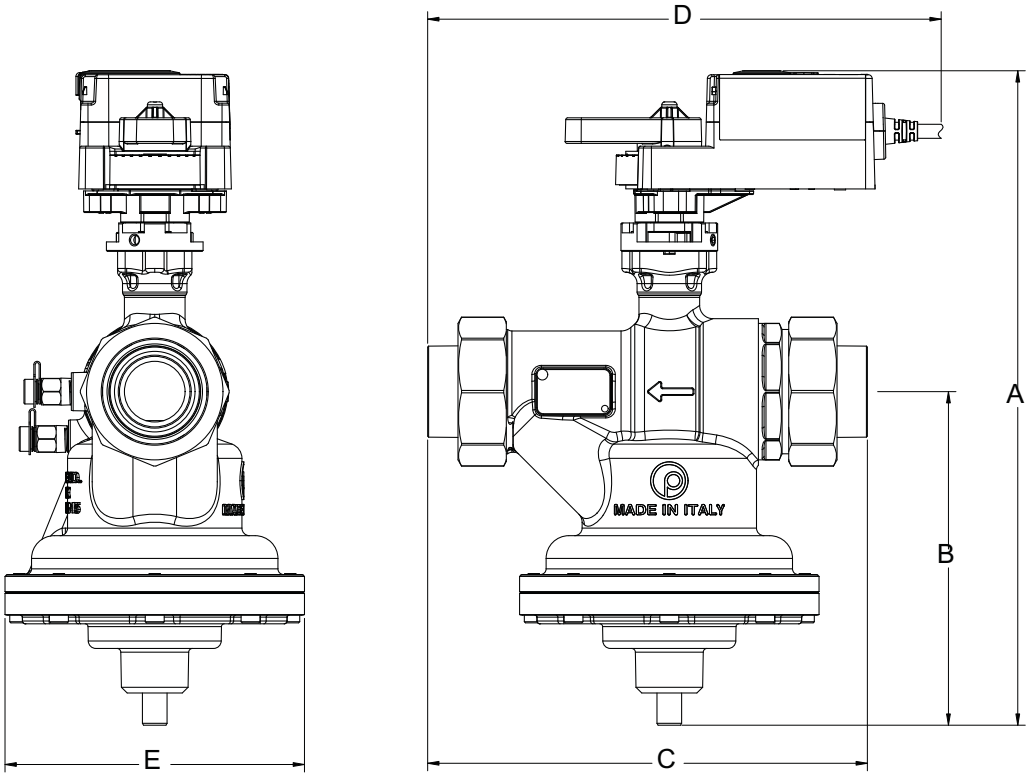


Table 24: VP140Qxx, VP140 Exx and VP140Fxx Series Valve with Spring Return actuator assembly dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140QBB+910HGA	**1-1/4” DN32**	13.59 (345)	6.23 (176)	9.13 (232)	10.57 (269)	6.22 (158)
VP140EBB+910HGA	**1-1/2” DN40**	13.59 (345)	6.23 (176)	9.09 (231)	10.57 (269)	6.22 (158)
VP140EBC+910HGA	**1-1/2” DN40**	13.59 (345)	6.23 (176)	9.09 (231)	10.57 (269)	6.22 (158)
VP140FBD+910HGA	**2” DN50**	13.59 (345)	6.23 (176)	10.94 (278)	10.57 (269)	6.22 (158)
VP140FBE+910HGA	**2” DN50**	15.69 (399)	8.70 (221)	10.51 (267)	11.32 (289)	7.80 (198)
VP140FBF+910HGA	**2” DN50**	15.69 (399)	8.70 (221)	10.51 (267)	11.32 (289)	7.80 (198)

Figure 26: VP140 Qxx, VP140 Exx and VP140 Fxx Series Valve with Non-Spring Return actuator assembly

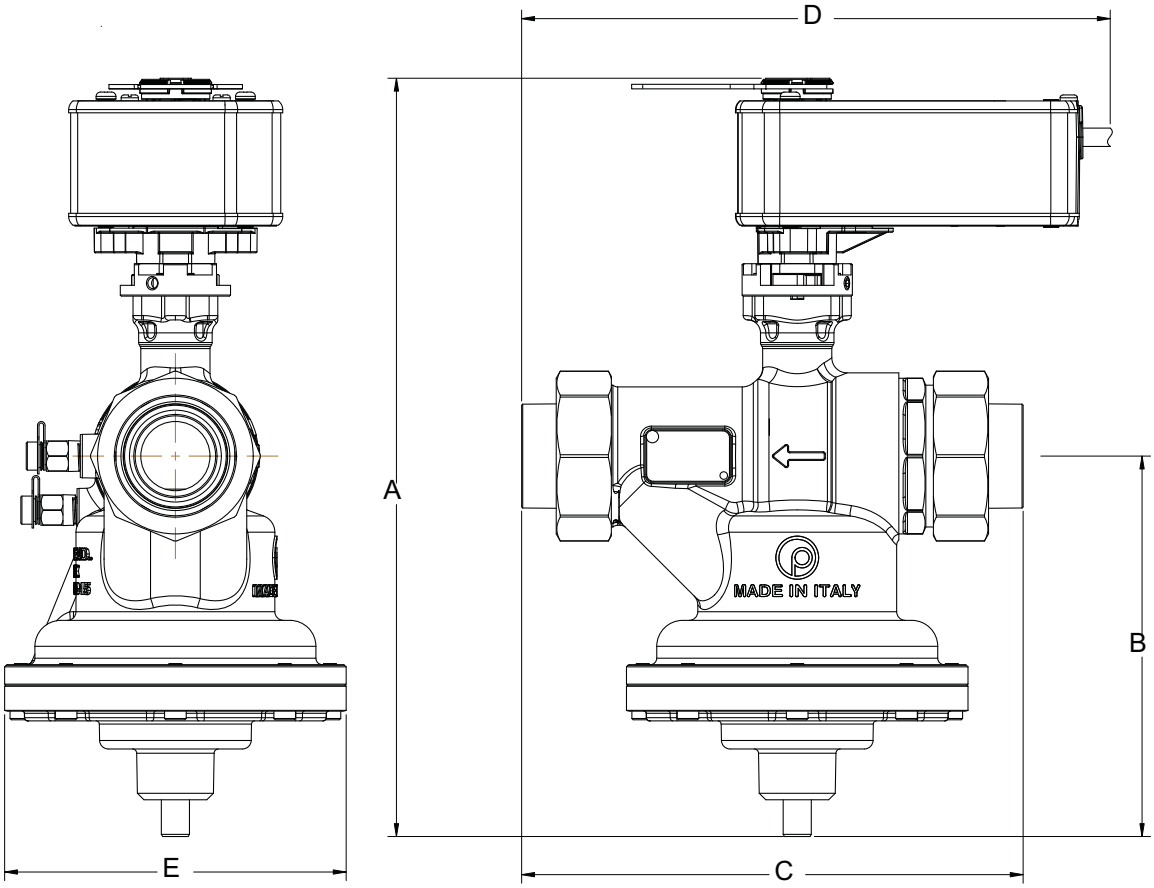


Table 25: VP140Qxx, VP140 Exx and VP140Fxx Series Valve with Non-Spring Return actuator assembly Dimensions, in. (mm)

	Valve Size, in. (DN)	A	B	C	D	E
VP140QBB+910HGA	**1-1/4” DN32**	13.59 (345)	6.23 (176)	9.13 (232)	10.57 (269)	6.22 (158)
VP140EBB+910HGA	**1-1/2” DN40**	13.59 (345)	6.23 (176)	9.09 (231)	10.57 (269)	6.22 (158)
VP140EBC+910HGA	**1-1/2” DN40**	13.59 (345)	6.23 (176)	9.09 (231)	10.57 (269)	6.22 (158)
VP140FBD+910HGA	**2” DN50**	13.59 (345)	6.23 (176)	10.94 (278)	10.57 (269)	6.22 (158)
VP140FBE+910HGA	**2” DN50**	15.69 (399)	8.70 (221)	10.51 (267)	11.32 (289)	7.80 (198)
VP140FBF+910HGA	**2” DN50**	15.69 (399)	8.70 (221)	10.51 (267)	11.32 (289)	7.80 (198)

Materials

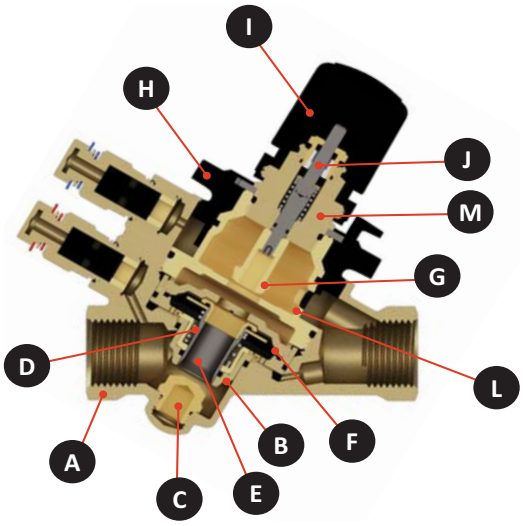


Table 25: VP140 Axial Globe Materials

A	Body forging	DZR Brass CW602N
B	Cartridge body	PSU
C	Cartridge seat	Brass CW614N
D	Cartridge spring	Stainless steel AISI 302
E	Cartridge shutter	Stainless steel AISI 303
F	Diaphragm EPDM	EPDM
G	Globe	Brass CW614N
H	Hand-wheel	PSU (Polysulfone)
I	Headwork cap	ABS
J	Headwork pin	Stainless steel AISI 303
	All o-rings	EPDM
L	Pre-setting seat	Brass CW614N
M	Valve headwork	Brass CW614N

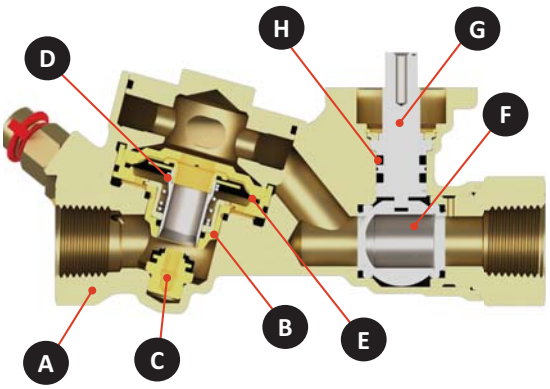


Table 26: VP140 Brass Body Ball Valve Materials

A	Body forging	DZR Brass CW602N
B	Cartridge body	Brass CW614N
C	Cartridge seat	Brass CW614N
D	Cartridge spring	Stainless Steel AISI 302
E	Diaphragm	EPDM
F	Ball	Chrome Plated Brass CW617N
G	Stem	Brass CW614N
H	Stem o-rings	Viton

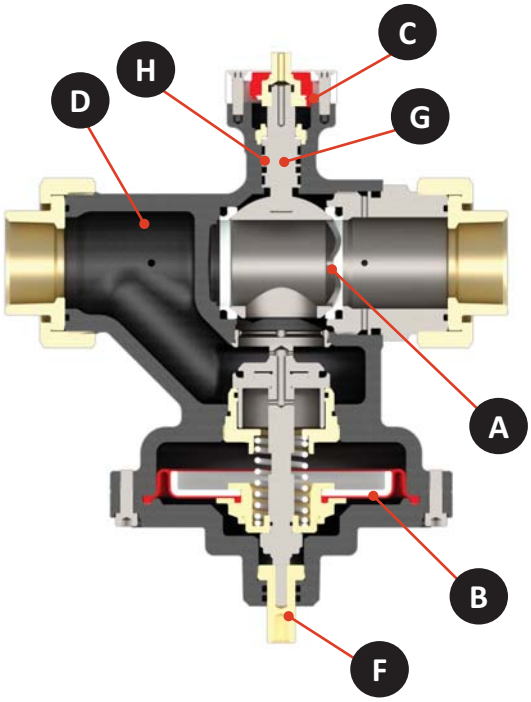


Table 27: Iron Body Ball Valve Materials

A	Ball	Chrome Plated Brass CW617N
B	Cartridge	High resistance polymer - EPDM Stainless steel AISI 303
C	Presetting	Brass CW617N
D	Body	Ductile Iron
	Gaskets	EPDM-x
F	Additional manual shut-off device	Brass CW614N
G	Stem	Brass CW614N
H	Stem o-rings	Viton

Valve Technical Specifications

Table 26: Axial (globe) PICVs

Service [1]		Water or water-glycol mixture, (up to 50% glycol) quality to VDI 2035
Accuracy up to 15 PSID (100 kPa)		± 5%
Fluid Temperature Limits		14 to 248 °F (-10 to 120 °C), Not Rated for Steam Service
Maximum Actuator Fluid Temperature Limit		14 to 212 °F (-10 to 100 °C), Not Rated for Steam Service
Maximum ΔP		87 psi (600 kPa)
Maximum working pressures		362 psi (2,500 kPa)
Close-Off Pressure		100 psi (700 kPa)
Minimum ΔP for start-up	**VP140AAA**	2.9 psi (20 kPa)
	VP140AAE	3.6 psi (25 kPa)
	VP140AAG	5.1 psi (35 kPa)
	VP140BAJ	4.4 psi (30 kPa)
	VP140BAN	5.1 psi (35 kPa)
	VP140BAU	3.6 psi (25 kPa)
	VP140CAU	
	VP140CAW	4.4 psi (30 kPa)
	VP140DAW	
	VP140DAY	5.1 psi (35 kPa)
Maximum Flow Rate	**VP140AAA**	0.66 GPM (150 l/h)
	VP140AAE	2.6 GPM (600 l/h)
	VP140AAG	3.4 GPM (780 l/h)
	VP140BAJ	4.4 GPM (1,000 l/h)
	VP140BAN	6.6 GPM (1,500 l/h)
	VP140BAU	9.7 GPM (2,200 l/h)
	VP140CAU	
	VP140CAW	11.9 GPM (2,700 l/h)
	VP140DAW	
	VP140DAY	13.2 GPM (3,000 l/h)
Connection	**VP140AAA**	1/2 inch female NPT
	VP140AAE	
	VP140AAG	
	VP140BAJ	3/4 inch female NPT
	VP140BAN	
	VP140BAU	3/4 inch female NPT Union
	VP140CAU	1 inch female NPT Union
	VP140CAW	
	VP140DAW	1 1/4 inch female NPT Union
	VP140DAY	
Minimum Ambient Operating Conditions	**VA-7482-8002-RA**	32 °F (0 °C)
Maximum Ambient Operating Conditions (limited by the actuator)	**VA-7482-8002-RA**	122 °F (50 °C), 90% RH, Noncondensing
Materials	Body forging	DZR Brass CW602N
	Cartridge body	PSU
	Cartridge seat	Brass CW614N
	Cartridge spring	Stainless steel AISI 302
	Cartridge shutter	Stainless steel AISI 303
	Diaphragm EPDM	EPDM
	Globe	Brass CW614N
	Hand-wheel	PSU (Polysulfone)
	Headwork cap	ABS
	Headwork pin	Stainless steel AISI 303
	All o-rings	EPDM
	Pre-setting seat	Brass CW614N
	Valve headwork	Brass CW614N
Leakage		ANSI Class IV IEC 60534-4 American National Standards Institute (ANSI) Class IV Leakage
Compliance CE		Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the PED (Pressure Equipment Directive)

1. Johnson Controls does not accept any liability for improper or wrong use of this product. Proper water treatment is recommended; refer to the VDI 2035 Guideline. Furthermore, maximum iron oxide in the water passing through the control valve (PICV) should not exceed 25 mg/Kg (25 ppm). To ensure the main pipework is cleaned appropriately, flushing by-passes should be used without flushing through the pressure regulator of the Pressure Independent Control Valve.

Table 27: Brass Body Ball PICVs

Service [1]		Water or water-glycol mixture, (up to 50% glycol) quality to VDI 2035
Accuracy up to 15 PSID (100 kPa)		± 5%
Fluid Temperature Limits		14 to 248 °F (-10 to 120 °C), Not Rated for Steam Service
Maximum Actuator Fluid Temperature Limit		14 to 212 °F (-10 to 100 °C), Not Rated for Steam Service
Maximum ΔP		58 psi (400 kPa)
Maximum working pressure		360 psi (2,500 kPa)
Close-Off Pressure		200 psi (1,400 kPa)
Minimum ΔP for start-up	**VP140LCA**	2.9 psi (20 kPa)
	VP140LCB	
	VP140LAJ	
	VP140MAG	3.6 psi (25 kPa)
	VP140MCC	
	VP140MAU	4.4 psi (30 kPa)
	VP140NAU	
	VP140NAW	
	VP140PAY	
	VP140PCD	
Maximum Flow Rate	**VP140LCA**	1.6 GPM (360 l/h)
	VP140LCB	3.0 GPM (600 l/h)
	VP140LAJ	4.4 GPM (1,000 l/h)
	VP140MAG	3.4 GPM (780 l/h)
	VP140MCC	5.0 GPM (1,150 l/h)
	VP140MAU	9.7 GPM (2,200 l/h)
	VP140NAU	
	VP140NAW	11.9 GPM (2,700 l/h)
	VP140PAY	13.2 GPM (3,000 l/h)
	VP140PCD	17.6 GPM (4,000 l/h)
Connection	**VP140LCA**	1/2 inch female NPT
	VP140LCB	
	VP140LAJ	
	VP140MAG	3/4 inch female NPT
	VP140MCC	
	VP140MAU	3/4 inch female NPT Union
	VP140NAU	1 inch female NPT Union
	VP140NAW	
	VP140PAY	1 1/4 inch female NPT Union
	VP140PCD	
Minimum Ambient Operating Conditions	**VA9104-AGA-2S**	-4 °F (-20 °C)
	VA9104-GGA-2S	
	VA9203-AGA-2Z	-22 °F (-30 °C)
	VA9203-GGA-2Z	
Maximum Ambient Operating Conditions (limited by the actuator)	**VA9104-AGA-2S**	140 °F (60 °C), 90% RH, Noncondensing
	VA9104-GGA-2S	
	VA9203-AGA-2Z	
	VA9203-GGA-2Z	
Materials	Body forging	DZR Brass CW602N
	Cartridge body	Brass CW614N
	Cartridge seat	Brass CW614N
	Cartridge spring	Stainless Steel AISI 302
	Diaphragm	EPDM
	Ball	Chrome Plated Brass CW617N
	Stem	Brass CW614N
	Stem o-rings	Viton
Leakage		ANSI Class IV IEC 60534-4 American National Standards Institute (ANSI) Class IV Leakage
Compliance CE	Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the PED (Pressure Equipment Directive)	

1. Johnson Controls does not accept any liability for improper or wrong use of this product. Proper water treatment is recommended; refer to the VDI 2035 Guideline. Furthermore, maximum iron oxide in the water passing through the control valve (PICV) should not exceed 25 mg/Kg (25 ppm). To ensure the main pipework is cleaned appropriately, flushing by-passes should be used without flushing through the pressure regulator of the Pressure Independent Control Valve.

Table 28: Iron Body Ball PICVs

Service[1]		Water or water-glycol mixture, (up to 50% glycol) quality to VDI 2035
Accuracy up to 15 PSID, 100 kPa		± 5%
Fluid Temperature Limits		14 to 248 °F (-10 to 120 °C), Not Rated for Steam Service
Maximum Actuator Fluid Temperature Limit		14 to 212 °F (-10 to 100 °C), Not Rated for Steam Service
Maximum ΔP		87 psi (600 kPa)
Maximum working pressure		232 psi (1,600 kPa)
Close-Off Pressure		200 psi (1,400 kPa)
Minimum ΔP for start-up	**VP140QBB**	4.4 psi (30 kPa)
	VP140EBB	
	VP140EBC	5.1 psi (35 kPa)
	VP140FBD	5.8 psi (40 kPa)
	VP140FBE	5.1 psi (35 kPa)
	VP140FBF	
Maximum Flow Rate	**VP140QBB**	26.4 GPM (6,000 l/h)
	VP140EBB	
	VP140EBC	39.6 GPM (9,000 l/h)
	VP140FBD	48.4 GPM (11,000 l/h)
	VP140FBE	52.8 GPM (12,000 l/h)
	VP140FBF	79.3 GPM (18,000 l/h)
Connection	**VP140QBB**	1-1/4 inch female NPT Union
	VP140EBB	1-1/2 inch female NPT Union
	VP140EBC	
	VP140FBD	2 inch female NPT Union
	VP140FBE	
	VP140FBF	
Minimum Ambient Operating Conditions	**VA9310-HGA-2**	-20 °F (-30 °C)
	VA9208-GGA-2	-40 °F (-40 °C)
Maximum Ambient Operating Conditions (limited by the actuator)	**VA9310-HGA-2**	140 °F (60 °C), 95% RH, Noncondensing
	VA9208-GGA-2	140 °F (60 °C) 90% RH, Noncondensing
Materials	Ball	Chrome Plated Brass CW617N
	Cartridge	High resistance polymer - EPDM Stainless steel AISI 303
	Presetting	Brass CW617N
	Body	Ductile Iron
	Gaskets	EPDM-x
	Additional manual shut-off device	Brass CW614N
	Stem	Brass CW614N
	Stem o-rings	Viton
Leakage		ANSI Class IV IEC 60534-4 American National Standards Institute (ANSI) Class IV Leakage
Compliance CE	Johnson Controls, declares that this product is in compliance with the essential requirements and other relevant provisions of the PED (Pressure Equipment Directive)	

1. Johnson Controls does not accept any liability for improper or wrong use of this product. Proper water treatment is recommended; refer to the VDI 2035 Guideline. Furthermore, maximum iron oxide in the water passing through the control valve (PICV) should not exceed 25 mg/Kg (25 ppm). To ensure the main pipework is cleaned appropriately, flushing by-passes should be used without flushing through the pressure regulator of the Pressure Independent Control Valve.

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