



1. PIBCV Valves and Actuators

Pressure Independent Balancing Control Valves provide the optimum control of fluid flow, unaffected by changes in system pressure. With inherent hydronic system balancing characteristics, PIBCV products provide the ultimate solution for the most energy efficient room temperature control.

Additional benefits of PIBCV include reducing the time taken for system balancing and commissioning.



1. PIBCV Valves and Actuators

VP228E, VP229E, VP220E

The VP228E, VP229E, and VP220E are threaded pressure independent balance and control valves for use in heating and cooling circuits.

- Stable hydronic flow, independent of any change in system pressure.
- Without an actuator, the valve can be operated an automatic balancing valve for flow limiting applications.
- Simple to calculate and adjust to the needed flow setting



DN10-32



DN40-50

Specifications

Pressure Class	PN16
Function	Normally Open / Stem Up
End Connection	External Thread, ISO228/1
Media Temperature	-10...120 °C
Leakage (ISO 5208)	
DN10...DN32	Tight - no visible leakage
DN40...DN50	Max. 0.05% of Q _{nom}
Stroke	
VP228E	2.25 mm
VP229E (DN15...DN20)	4.0 mm
VP229E (DN25...DN32)	4.5 mm
VP220E	10 mm

Materials	DN10...32	DN40...50
Valve body	DZR Brass	GG 25
Control Valve, Cone	Brass CW 614N	Brass CW 614N
Seat	DZR Brass	SS 1.4305
Seals	EPDM	EPDM

DN	Litres/Hour		Litres/Second		Cubic Meters/ Hour		ΔP (Q _{nom}) (kPa)	Connection Ext. Thread (ISO 228/1)	Part No.		Suitable Actuator
	Q _{min}	Q _{nom} (100%)	Q _{min}	Q _{nom} (100%)	Q _{min}	Q _{nom} (100%)			Without T/P ports	With T/P Ports	
DN10	30	150	0.008	0.04	0.03	0.15	16-600	G 1/2A	VP228E-10BQLNT	VP228E-10BQL	MP120 MP130 MP300-SR
	55	275	0.015	0.08	0.06	0.28			VP228E-10BQSNT	VP228E-10BQS	
DN15	55	275	0.015	0.08	0.06	0.28		G 3/4A	VP228E-15BQLNT	VP228E-15BQL	
	90	450	0.025	0.13	0.09	0.45			VP228E-15BQSNT	VP228E-15BQS	
DN20	227	1,135	0.063	0.32	0.23	1.14		G 1A	VP229E-15BQHNT		
	180	900	0.050	0.25	0.18	0.90			VP228E-20BQSNT	VP228E-20BQS	
DN25	340	1,700	0.094	0.47	0.34	1.70	G 1 1/4A	VP229E-20BQHNT			
	340	1,700	0.09	0.47	0.34	1.70		VP229E-25BQSNT	VP229E-25BQS		
DN32	545	2,700	0.15	0.76	0.54	2.70	G 1 1/2A	VP229E-25BQHNT			
	640	3,200	0.18	0.89	0.64	3.20		VP229E-32BQSNT	VP229E-32BQS		
DN40	800	4,000	0.22	1.1	0.80	4.00	G 2A	VP229E-32BQHNT			
	3,200	7,500	0.8	2.08	3.0	7.5			VP220E-40CQS	MP500C MP500C-SR	
DN50	5,000	12,500	1.4	3.47	5.0	12.5	G 2 1/2A		VP220E-50CQS		

Note: A Higher flow (Q max) is achievable on some sizes by increasing the pressure drop through the valve; please refer to specific technical data sheets.
 ΔP : Differential Pressure Operating range. The differential pressure across the valve must be within the range specified for predictable, stable and fully adjustable flow to the limits detailed within

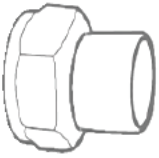
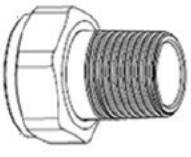
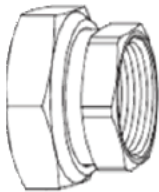
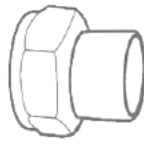
Accessories

Part Number	Description	Quantity per Pack
911 4060 000	Commissioning Label Set / Flow Tag Hanger ID	48

Pipe Connections

The VP228E, VP229E and VP220E have Male threaded end connections for the attachment of various pipe connections.

Pipe connections are supplied in pairs and are typically a two piece + gasket separable design allowing the valve to be removed with minimal disruption to the pipework. On some sizes a one piece + gasket inseparable design is necessary and additional couplings may be required for practical disassembly.

Valve DN	Pipe Connection type	Part Number	Valve Connection	End Fitting Connection
DN10	 <p>Solder</p>	911 2113 010	G1/2	15 mm*
DN15		911 2113 015	G3/4	15 mm
		911 2113 115		22 mm *
DN20		911 2113 020	G1	15 mm
		911 2113 120		22 mm
DN25		911 2113 025	G1.1/4	28 mm
DN32		911 2113 032	G1.1/2	35 mm
DN40		911 2113 040	G2	42 mm
DN50		911 2113 050	G2.1/2	54 mm
DN10		 <p>R taper Male thread</p>	911 2112 010	G1/2
DN15	911 2112 015		G3/4	R 1/2
DN20	911 2112 020		G1	R 3/4
DN25	911 2112 025		G1.1/4	R 1
DN32	911 2112 032		G1.1/2	R 1. 1/4
DN40	911 2112 040		G2	R 1.1/2
DN50	911 2112 050		G2.1/2	R 2
DN10	 <p>Female thread</p>	911 2111 010	G1/2	Rp 1/2*
DN15		911 2111 015	G3/4	Rp 1/2*
DN20		911 2111 020	G1	Rp 1/2
DN25		911 2111 025	G1.1/4	Rp 3/4
DN32		911 2111 032	G1.1/2	Rp 1
DN40		911 2111 040	G2	Rp 1.1/4
DN50		911 2111 050	G2 1/2	Rp 1.1/2
DN20	 <p>Weld</p>	911 2115 020	G1	26.9 mm
DN25		911 2115 025	G1.1/4	33.7 mm
DN32		911 2115 032	G1.1/2	42.4 mm
DN40		911 2115 040	G2	48.3 mm
DN50		911 2115 050	G2.1/2	60.3 mm

* One piece compact design (inseparable); additional coupler may be needed to ease assembly / disassembly.
Two end connection sets per pack. Order one pack per valve.

1. PIBCV Valves and Actuators

VP220F, VP221F, VP222F

The VP220F, VP221F, and VP222F are flanged pressure independent balance and control valves for large flows in heating and cooling circuits.

- Stable Hydronic flow independent of any change in system pressure.
- Without an actuator, the valve can be operated as an automatic balancing valve for flow limiting applications.



Specifications

Pressure Class	PN16
Function	Stem Up Valve Open
End Connection	Flanged PN16, ISO 7005-2
Media Temperature	-20...120 °C
Leakage (ISO 5208)	
DN50...100	0.05 % of Q_{nom}
DN125...250	0.01 % of Q_{nom}

Materials	DN50...100	DN125	DN150...250
Valve body	GG25	GG25	GG25
Seals, Membranes	EPDM	EPDM	EPDM
Cone	CW 614N	1 (W.Nr.1.4404NC)	1.4021
Seat	1.4305	1.4305	1.4027
Springs	1.4568/1.4310	1.4401	1.4310
Gaskets	NBR	Graphite	Non-asbestos

DN	Litres/Hour		Litres/Second		Cubic Meters/Hour		ΔP (Q_{nom}) (kPa)	Part Number	Suitable Actuator	
	Qmin	Qnom (100%)	Qmin	Qnom (100%)	Qmin	Qnom (100%)				
DN50	5,000	12,500	1.4	3.5	5.0	12.5	30-600	VP220F-50CQS	MP500C MP500C-SR	
DN65	8,000	20,000	2.2	5.6	8.0	20.0	30-600	VP220F-65CQS		
	10,000	25,000	2.8	6.9	10.0	25.0	60-600	VP220F-65CQH		
DN80	11,200	28,000	3.1	7.8	11.2	28.0	30-600	VP220F-80CQS		
	16,000	40,000	4.4	11.1	16.0	40.0	60-600	VP220F-80CQH		
DN100	15,200	38,000	4.2	10.6	15.2	38.0	30-600	VP220F-100CQS		
	23,600	59,000	6.6	16.4	23.6	59.0	60-600	VP220F-100CQH		
DN125	36,000	90,000	10.0	25.0	36.0	90.0	60-600	VP221F-125CQS		MP2000 MP2000-SR
	44,000	110,000	12	31	44	110	60-600	VP221F-125CQH		
DN150	58,000	145,000	16	40	58	145	40-600	VP221F-150CQS		
	76,000	190,000	21	53	76	190	60-600	VP221F-150CQH		
DN200	76,000	200,000	21	56	76	200	40-600	VP222F-200CQS	MP4000	
	100,000	270,000	28	75	100	270	60-600	VP222F-200CQH		
DN250	112,000	300,000	31	83	112	300	40-600	VP222F-250CQS		
	148,000	370,000	41	103	148	370	60-600	VP222F-250CQH		

Accessories, Stem Lock Handles

Converts a standard PIBCV valve to automatic flow regulation valve / flow controller which provides a fixed flow against varying pressure, Stem Lock Handle are fitted in replacement of an actuator.

*DN10-32 valves are supplied with a plastic flow setting cap for the same purpose.

Part Number	Valve Size
911 4070 000	DN40...100
911 4071 000	DN125...150
911 4072 000	DN200...250

MP130 Actuators

The MP130 is a family of compact and low power motoric actuators that drive the DN10...32 SmartX PIBCV in various hydronic HVAC applications.

The modulating actuators have fine positional control and are self-calibrating to the adjustable stroke/flow setting in the VP228E and VP229E valves which provide optimal hydronic control.

- Low Noise Operation
- Overload Protection
- Manual override in all models



Specifications

Close off force	130 N
Stroke	5 mm
Max. medium temperature	120 °C
Environment	
Operating Temperature	0... 55 °C
Storage / transportation	-40 ...70 °C

Relative humidity	max. 95 %
Enclosure rating	IP 42
Weight	0.3 kg

Part Number	Control Signal (Y)	Speed (s/mm)	Position Feedback (U)	Cable Length (m)	Voltage (50/60 Hz)	Power consumption running (standby)
MP130-24M	0 (2)...10 Vdc	24	-	1.5	24 Vac	2 VA (.5 W)
MP130-24M-10M				10		
MP130-24MP			0 (2)...10 Vdc	1.5		1.5 VA (.4 W)
MP130-24MP-10M				10		
MP130-24T	two-position	12		1.5	24 Vac	1 VA
MP130-230T					230 Vac	8 VA
MP130-24F	floating	24	-	10	24 Vac	1 VA (0W)
MP130-24F-10M					230 Vac	8 VA (0W)
MP130-230F				1.5	230 Vac	8 VA (0W)

Note: Actuators with 5 m and 10 m cable length are produced on request. Please note this increases lead time.

1. PIBCV Valves and Actuators

MP120/MP140

MP120NC and MP140NO are small thermoelectric valve actuators in zone applications for two-point and pulse-width-modulated (PWM) regulation of the SmartX PIBCV valves, from DN10...DN32. The MP120 has a manual override operation for easy flushing.

- Water-protected housing design in all mounting positions
- Pluggable cable for easy installation and servicing
- Low power consumption – allowing many actuators to be driven from the same controller
- Visual indicator showing valve position and type of action (NO or NC)



MP120 NC



MP140 NO

Specifications

Power supply	
MP120xx-24T:	24 Vac/Vdc ± 20%
MP120xx-230T:	230 Vac + 10%...15%
Power consumption	2 W
Environment	
Operating Temperature	Max. 50 °C
Protection standard	IP44 in all mounting positions
Cable length (standard)	1.5 m
Cable size	2 x 0.5 mm ²
Medium temperature	Max. 120 °C
Valve connection	M30 x 1.5

Stroke Range	
MP120NC	8 mm
MP140NO	4 mm

Part Number	Action	Voltage	Operational Flow Range	
			VP228E	VP229E
MP120NC-24T	Normally Closed (Stem Down)	24 Vac/Vdc	20-120%	20-110%
MP120NC-230T		230 Vac		
MP140NO-24T	Normally open (Stem Up)	24 Vac/Vdc		20-80%
MP140NO-230T		230 Vac		

MP140NO is limited to 80% of Q_{nom} on VP229E

MP300-SR

MP300-SR actuators with Floating and Proportional control are low voltage motoric actuators for the Smart X PIBCV DN10-32 Valves. These actuators have a spring return safety function that provides for an open or close valve in the event of power loss. The Spring return safety function should not be used for two-position control.



Specifications

Power supply	24 V; +10...-15 %; AC
Frequency	50/60 Hz
Power consumption	9 VA
Control input Y	0...10 (2...10) V 0...20 (4...20) mA
Output signal U	0...10 (2...10) V
Speed	11.75 (50 hz) s/mm
Max. medium temperature	120 °C
Environment	
Operating Temperature	0...55 °C
Enclosure rating	IP 54
Weight	0.8 kg

Part Number	Spring Return Direction	Linkage type (Included with actuator)
MP300-SRU	Up - Normally Open	Adapter
MP300-SRD	Down - Normally Closed	Spacer

1. PIBCV Valves and Actuators

MP500C

MP500C linear electro-mechanical actuator for the control of the VP220 SmartX PIBCV, DN40...100.

MP500C is controls either by an increase/decrease floating signal or by a range of modulating control signals between the span of 0...10 V.

- High resolution control for precise fluid control.
- Working range and end point switches calibrate to any stroke and flow setting of the valve.
- Fixed proportional running time of 15s regardless of valve stroke.



- Multi-signal control for either 3-point increase/decrease signal or various modulating control signals including sequencing.
- Stroke Indicators on the yoke provide clear visual indication to the valves opening position.

Specifications

Supply Voltage	24 Vac +/- 10%, 50...60Hz 24 Vdc +/- 15%
Power consumption	average 15 VA
Transformer sizing	50 VA
Running time	15 s
Modulating	300 s/60 s
Increase/decrease	
Duty cycle	max. 20%/60 minutes
Analog input (Y-M)	
Voltage Range	0...10 Vdc
Selectable Input signals	2...10 V, 0...5 V, 2...6 V, 5...10 V, 6...10 V
Impedance	minimum 100 k Ohm
Digital input (Y2-Y1)	
Voltage across open input	24 Vac
Current through closed input	5 mA
Minimum Pulse time	20 ms

Output U (Position Feedback Signal)	2...10 V
Load	2 mA
Wiring Entry	
Conduit connection	2 x M20 knockout
Cable gland	1 x 6..12 mm O/D
Environment	
Operating Temperature	-10...+50 °C
Storage temperature	-25...+65 °C
Humidity	max. 90% RH non-condensing
Enclosure rating	IP 54 (NEMA 2)
Sound power level	max. 32 dBA
Material	
Housing	Aluminium
Cover	ABS/PC plastic
Color	aluminium/grey
Weight	1.8 kg (3.96 lb.)

Part Number	Description	SmartX Valve
MP500C	Forta Multi-signal control actuator	DN40-100
880 0104 000	S2 (Aux End Switch)	

MP500C-SR

The MP500C-SR is spring return linear electro-mechanical actuator for the control of the VP220 SmartX PIBCV, DN40-100.

- Universal control input and self calibrating to any valve setting.
- High resolution control board allows precise fluid control.
- Working range and end point switches calibrate to any stroke and flow setting of the valve.
- A proportional set running time of 15s regardless of valve stroke.
- Stroke Indicators on the yoke provide clear visual indication to the valves opening position.



Specifications

MP500C-SRU	Stem up (retract)
MP500C-SRD	Stem down (extend)
Voltage supply	24 Vac ±10% 50-60Hz
Power consumption	
Running	30 VA (21 W)
Rest	7 W
Running Time	
Modulating	15 sec.
Increase/decrease	60/300 sec. (selectable)
Spring return	13 sec.
Transformer Sizing	50 VA
Stroke Range	2...35 mm
Force, nominal	500 N
Analog input Voltage range	0...10 Vdc
Selectable input signals	0...10, 2...10, 0...5, 2...6, 5...10, 6...10 Vdc
Digital inputs, Y1, Y2	
Voltage across open input	24 Vac
Current through closed input	5 mA
Minimum Pulse time	20 ms

Output, Y (Feedback)	2...10 Vdc or 0...5 Vdc (0-100%) - Load 2 mA
Wiring Entry	
Conduit connection	4 x M20 capped holes
Cable gland	1 x 6..12 mm O/D, IP68
Environment	
Operating and Storage Temperature	-10 / +50 °C
Humidity	max 90% RH
Enclosure rating	IP54
Sound power level	43 dBA
Max cable core diameter	2.5 mm ²
S2 Auxillary Switch Relay (optional accessory)	SPDT, 24 Vac 4A AC1 (contacts made at 5% and 95% of end stroke)
Weight	2.8 Kg

Part Number	Description	Function on Power Failure	SmartX Valve
MP500C-SRU	Spring return (stem up)	Valve Open	DN40...100
MP500C-SRD	Spring return (stem down)	Valve Closed	
880 0104 000	S2 auxiliary end point switches		

1. PIBCV Valves and Actuators

MP2000

MP2000 actuator is used with pressure independent balancing and control large valve type SmartX PIBCV DN125 and DN150. The actuator has universal control inputs and is self-calibrating.

- Over load protected.
- Diagnostic LED for operational data capture and self-stroking feature.
- Manual override.



Specifications

Power supply	24 Vac, +10...-15%
Power consumption	9 VA
Frequency	50 / 60 Hz
Control signal input	Modulating and 3 Point floating
Control input Y	0...10 V (2...10) Ri = 24 kΩ 0...20 mA (4...20) Ri = 500 Ω
Output signal X	0...10 V (2...10)
Speed	8 s/mm
Max. medium temperature	200 °C

Environment	
Operating	0...55 °C
Storage / transp. temp	-40...+70 °C
Protection class	III safety extra-low voltage
Enclosure rating	IP 54
Weight	7.5 kg

Part Number	Description	SmartX Valve
MP2000	Multi-signal Actuator, Fail in place	DN125...150

MP2000-SR

The MP2000-SR is a spring return actuator used with the DN125...150 SmartX PIBCV.

The actuator has universal control inputs and is self-calibrating .

- Manual operation mechanical and/or electrical
- Position indication, LED signalization
- Selectable speed 4 or 6 s/mm
- Integrated external switch
- Linear to EQ% Curve Adaptation
- Anti-oscillation function
- 3-point floating or modulating control selection
- Thermal and overload protection
- Precise regulation and fast response on 3-point signal (0.01 s)

Specifications

Nominal voltage	24 Vac/Vdc, 50 Hz/60 Hz
Power consumption	15 VA
Control input signal	Modulating or 3-point floating
Control input Y	0...10 V (2...10 V) Ri = 24 kΩ 0...20 mA (4...20 mA) Ri = 500 Ω
Position Feedback U	0...10 V (2...10 V)
Speed (selectable)	4 or 6 s/mm
Environment	
Operating Temperature	0...+ 55 °C



Enclosure rating	IP 54
Weight	8.6 kg
Safety function runtime/50 mm stroke	120 s
Manual operation	Electrical and Mechanical

Part No.	Spring Return Direction	SmartX Valve
MP2000-SRU	Stem UP, retracts (valve open)	DN125...150
MP2000-SRD	Stem Down, extends (valve closed)	

MP2000-SR-230

The MP2000-SR-230 is a line voltage spring return actuator for the DN125...150 SmartX PIBCV.

The actuator has universal control inputs and is self-calibrating.

- Manual operation mechanical and/or electrical
- Position indication, LED signalization
- Integrated external switch
- 3-point or modulating control selection



Specifications

Nominal voltage	230 Vac, 50 Hz/60 Hz
Control input signal	Modulating or 3-point
Control input Y	0...10 Vdc (2...10) 0...20 mA (4...20) 3-point
Control output U	0...10 Vdc (2...10) 0...20 mA (4...20)
Speed (selectable)	2 or 6 s/mm
Temperature Operating	0...+ 55 °C

Humidity	5...95%
Enclosure rating	IP 54
Power consumption	35.7 VA
Weight	8.6 Kg
Safety function runtime/50 mm stroke	120 s.
Manual operation	Electrical and Mechanical

Part Number	Description	SmartX Valve
MP2000-SRU-230	Stem Up (Valve Open)	DN125...DN150
MP2000-SRD-230	Stem Down (Valve Closed)	

MP4000

The MP4000 is a powerful universal control actuator for the DN200 and DN250 Smart X PIBCV.

- Universal input control and self-calibrating.
- Manual operation mechanical and/or electrical
- Position indication, LED signalization
- Integrated external switch
- Characteristic optimization
- 3-point floating or modulating control selection
- Thermic and overload protection
- Precise regulation and fast response on 3-point signal (0.01 s)



Specifications

Power supply	24 Vac/Vdc (+10, -15%)
Power consumption	15 VA
Signal	10 mA
Frequency	50/60 Hz
Control input Y	0...10 Vdc (2...10 Vdc); 0...20 mA (4...20 mA)
Control output U	0...10 Vdc (2...10 Vdc); 0...20 mA (4...20 mA)
Speed (selectable)	3 s/mm or 6 s/mm
Max. spindle travel	80 mm
Max. medium temperature	200 °C

Environment Ambient Temperature	0...+ 55 °C
Storage / transport Temperature	-40...+70 °C
Humidity	5...95%
Protection class	II
Enclosure rating	IP 54, Type 2
Electrical connection	conduit
Weight	7.5 Kg
Manual operation	Electrical and mechanical
Power failure response	Stem remains in last position

Part Number	Description	SmartX Valve
MP4000	Multi-signal control, Fail in place	DN200-250