

P1000 Series Pressure-Independent Valves

Description

P1000 Series Pressure-Independent Valves are designed to regulate the flow of hot or chilled water and 60% 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® VA2104 and VA2120 Series Non-Spring-Return and M2204 and M2215 Series Spring-Return Electric Actuators for floating or proportional control.

Refer to the *P1000 Series Pressure-Independent Valves Product Bulletin (LIT-12011272)* for important product application information.

Features

- 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.

- 600 psi Static Pressure Rating for 1/2 through 1 in. Valves and 400 psi Static Pressure Rating for 1-1/4 through 2 in. Valves — allow use of valve in a wide range of systems.
- 200 psi Closeoff Pressure Rating — provides tight shutoff in high-pressure systems.
- 5 to 50 psi Operating Differential Pressure Rating — allows use of valve in a wide range of systems.
- Availability of Factory-Mounted VA2104, VA2120, VA2202, M2204, or M2215 Series Electric Actuators — reduces installation time, thus reducing overall installation cost.
- Maintenance-Free Design — eliminates need for periodic rebuilding and rebalancing of the system, with no packings to adjust.
- American National Standards Institute (ANSI) Class IV Leakage and ±5% Flow Accuracy — reduces energy costs and provides superior room comfort.



P1000 Series Pressure-Independent Valve Assembly

Repair Information

If the P1000 Series Pressure-Independent Valve fails to operate within its specifications, replace the valve body, actuator, or entire assembly. For replacement parts, contact the nearest Johnson Controls representative.

Selection Charts

Two-Way Non-Spring Return (Part 1 of 2)

Valve Code Number	Size, in.	Flow Rate, gpm	Closeoff psig	24 VAC Supply	
				Floating	DC 0 to 10 V Proportional
				VA2104-AGA-2	VA2104-HGA-2
P1241A00	1/2	0.5	200	P1241A00+21LAGA	P1241A00+21LHGA
P1241A01		1		P1241A01+21LAGA	P1241A01+21LHGA
P1241A02		1.5		P1241A01521LAGA	P1241A01521LHGA
		2		P1241A02+21LAGA	P1241A02+21LHGA
P1241A03		2.5		P1241A02521LAGA	P1241A02521LHGA
		3		P1241A03+21LAGA	P1241A03+21LHGA
P1241A04		3.5		P1241A03521LAGA	P1241A03521LHGA
		4		P1241A04+21LAGA	P1241A04+21LHGA
P1241A05		4.5		P1241A04521LAGA	P1241A04521LHGA
		5		P1241A05+21LAGA	P1241A05+21LHGA
P1241B06	5.5	P1241A05521LAGA	P1241A05521LHGA		
	3/4	6	200	P1241B06+21LAGA	P1241B06+21LHGA
6.5		P1241B06521LAGA		P1241B06521LHGA	
P1241B07		7		P1241B07+21LAGA	P1241B07+21LHGA
		7.5		P1241B07521LAGA	P1241B07521LHGA
P1241B08		8		P1241B08+21LAGA	P1241B08+21LHGA
		8.5		P1241B08521LAGA	P1241B08521LHGA
P1241B09		9		P1241B09+21LAGA	P1241B09+21LHGA
		9.5		P1241B09521LAGA	P1241B09521LHGA
P1241B10		10		P1241B10+21LAGA	P1241B10+21LHGA

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 2014 Johnson Controls, Inc.

P1000 Series Pressure-Independent Valves (Continued)

Two-Way Non-Spring Return (Part 2 of 2)

Valve Code Number	Size, in.	Flow Rate, gpm	Closeoff psig	24 VAC Supply	
				Floating	DC 0 to 10 V Proportional
				VA2104-AGA-2	VA2104-HGA-2
P1241C11	1	11	200	P1241C11+21LAGA	P1241C11+21LHGA
P1241C12		12		P1241C12+21LAGA	P1241C12+21LHGA
P1241C13		13		P1241C13+21LAGA	P1241C13+21LHGA
P1241C14		14		P1241C14+21LAGA	P1241C14+21LHGA
P1241C15		15		P1241C15+21LAGA	P1241C15+21LHGA
P1241C16		16		P1241C16+21LAGA	P1241C16+21LHGA
P1241C17		17		P1241C17+21LAGA	P1241C17+21LHGA
P1241C18		18		P1241C18+21LAGA	P1241C18+21LHGA
P1241C19		19		P1241C19+21LAGA	P1241C19+21LHGA
P1241D18	1-1/4	18	200		P1241D18+21AHGA
P1241D19		19			P1241D19+21AHGA
P1241D20		20			P1241D20+21AHGA
P1241D21		21			P1241D21+21AHGA
P1241D22		22			P1241D22+21AHGA
P1241D23		23			P1241D23+21AHGA
P1241D24		24			P1241D24+21AHGA
P1241D25		25			P1241D25+21AHGA
P1241E26	1-1/2	26	200		P1241E26+21AHGA
P1241E27		27			P1241E27+21AHGA
P1241E28		28			P1241E28+21AHGA
P1241E29		29			P1241E29+21AHGA
P1241E30		30			P1241E30+21AHGA
P1241E31		31			P1241E31+21AHGA
P1241E32		32			P1241E32+21AHGA
P1241E33	33		P1241E33+21AHGA		
P1241F33	2	33	200		P1241F33+21AHGA
P1241F34		34			P1241F34+21AHGA
P1241F35		35			P1241F35+21AHGA
P1241F36		36			P1241F36+21AHGA
P1241F37		37			P1241F37+21AHGA
P1241F38		38			P1241F38+21AHGA
P1241F39		39			P1241F39+21AHGA
P1241F40		40			P1241F40+21AHGA
P1241F44		44			P1241F44+21AHGA
P1241F48		48			P1241F48+21AHGA
P1241F52		52			P1241F52+21AHGA
P1241F56		56			P1241F56+21AHGA
P1241F60		60			P1241F60+21AHGA
P1241F65		65			P1241F65+21AHGA
P1241F70		70			P1241F70+21AHGA
P1241F75		75			P1241F75+21AHGA
P1241F80		80			P1241F80+21AHGA
P1241F90	90		P1241F90+21AHGA		
P1241F100	100		P1241F100+21AHGA		

Pressure-Independent Valves

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P1000 Series Pressure-Independent Valves (Continued)

Two-Way Spring Return (Part 1 of 2)¹

Valve Code Number	Size, in.	Flow Rate, gpm	Closeoff psig	24 VAC Supply			
				DC 0 to 10 V Proportional			
				Spring Return Open	Spring Return Closed		
Assemblies with VA2202-HGA-2P Spring-Return Actuator							
P1241A00	1/2	0.5	200	P1241A00+22THGA	P1241A00+24THGA		
P1241A01		1		P1241A01+22THGA	P1241A01+24THGA		
P1241A02		1.5		P1241A01522THGA	P1241A01524THGA		
		2		P1241A02+22THGA	P1241A02+24THGA		
P1241A03		2.5		P1241A02522THGA	P1241A02524THGA		
		3		P1241A03+22THGA	P1241A03+24THGA		
P1241A04		3.5		P1241A03522THGA	P1241A03524THGA		
		4		P1241A04+22THGA	P1241A04+24THGA		
P1241A05		4.5		P1241A04522THGA	P1241A04524THGA		
		5		P1241A05+22THGA	P1241A05+24THGA		
		5.5		P1241A05522THGA	P1241A05524THGA		
Assemblies with M2204-HGA-2 Spring-Return Actuator							
P1241A00		1/2		0.5	200	P1241A00+22LHGA	P1241A00+24LHGA
P1241A01				1		P1241A01+22LHGA	P1241A01+24LHGA
P1241A02	1.5		P1241A01522LHGA	P1241A01524LHGA			
	2		P1241A02+22LHGA	P1241A02+24LHGA			
P1241A03	2.5		P1241A02522LHGA	P1241A02524LHGA			
	3		P1241A03+22LHGA	P1241A03+24LHGA			
P1241A04	3.5		P1241A03522LHGA	P1241A03524LHGA			
	4		P1241A04+22LHGA	P1241A04+24LHGA			
P1241A05	4.5		P1241A04522LHGA	P1241A04524LHGA			
	5		P1241A05+22LHGA	P1241A05+24LHGA			
	5.5		P1241A05522LHGA	P1241A05524LHGA			
P1241B06	3/4		6	200		P1241B06+22LHGA	P1241B06+24LHGA
P1241B07			6.5			P1241B06522LHGA	P1241B06524LHGA
			7			P1241B07+22LHGA	P1241B07+24LHGA
P1241B08		7.5	P1241B07522LHGA		P1241B07524LHGA		
		8	P1241B08+22LHGA		P1241B08+24LHGA		
P1241B09		8.5	P1241B08522LHGA		P1241B08524LHGA		
		9	P1241B09+22LHGA		P1241B09+24LHGA		
P1241B10		9.5	P1241B09522LHGA		P1241B09524LHGA		
		10	P1241B10+22LHGA		P1241B10+24LHGA		
P1241C11		1	11		200	P1241C11+22LHGA	P1241C11+24LHGA
P1241C12	12		P1241C12+22LHGA	P1241C12+24LHGA			
P1241C13	13		P1241C13+22LHGA	P1241C13+24LHGA			
P1241C14	14		P1241C14+22LHGA	P1241C14+24LHGA			
P1241C15	15		P1241C15+22LHGA	P1241C15+24LHGA			
P1241C16	16		P1241C16+22LHGA	P1241C16+24LHGA			
P1241C17	17		P1241C17+22LHGA	P1241C17+24LHGA			
P1241C18	18		P1241C18+22LHGA	P1241C18+24LHGA			
P1241C19	19		P1241C19+22LHGA	P1241C19+24LHGA			

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P1000 Series Pressure-Independent Valves (Continued)

Two-Way Spring Return (Part 2 of 2)¹

Valve Code Number	Size, in.	Flow Rate, gpm	Closeoff psig	24 VAC Supply	
				DC 0 to 10 V Proportional	
				Spring Return Open	Spring Return Closed
Assemblies with M2215-HGA-2 Spring-Return Actuator					
P1241D18	1-1/4	18	200	P1241D18+22AHGA	P1241D18+24AHGA
P1241D19		19		P1241D19+22AHGA	P1241D19+24AHGA
P1241D20		20		P1241D20+22AHGA	P1241D20+24AHGA
P1241D21		21		P1241D21+22AHGA	P1241D21+24AHGA
P1241D22		22		P1241D22+22AHGA	P1241D22+24AHGA
P1241D23		23		P1241D23+22AHGA	P1241D23+24AHGA
P1241D24		24		P1241D24+22AHGA	P1241D24+24AHGA
P1241D25		25		P1241D25+22AHGA	P1241D25+24AHGA
P1241D26		26		P1241D26+22AHGA	P1241D26+24AHGA
P1241E26	1-1/2	26	200	P1241E26+22AHGA	P1241E26+24AHGA
P1241E27		27		P1241E27+22AHGA	P1241E27+24AHGA
P1241E28		28		P1241E28+22AHGA	P1241E28+24AHGA
P1241E29		29		P1241E29+22AHGA	P1241E29+24AHGA
P1241E30		30		P1241E30+22AHGA	P1241E30+24AHGA
P1241E31		31		P1241E31+22AHGA	P1241E31+24AHGA
P1241E32		32		P1241E32+22AHGA	P1241E32+24AHGA
P1241E33		33		P1241E33+22AHGA	P1241E33+24AHGA
P1241F33	2	33	200	P1241F33+22AHGA	P1241F33+24AHGA
P1241F34		34		P1241F34+22AHGA	P1241F34+24AHGA
P1241F35		35		P1241F35+22AHGA	P1241F35+24AHGA
P1241F36		36		P1241F36+22AHGA	P1241F36+24AHGA
P1241F37		37		P1241F37+22AHGA	P1241F37+24AHGA
P1241F38		38		P1241F38+22AHGA	P1241F38+24AHGA
P1241F39		39		P1241F39+22AHGA	P1241F39+24AHGA
P1241F40		40		P1241F40+22AHGA	P1241F40+24AHGA
P1241F44		44		P1241F44+22AHGA	P1241F44+24AHGA
P1241F48		48		P1241F48+22AHGA	P1241F48+24AHGA
P1241F52		52		P1241F52+22AHGA	P1241F52+24AHGA
P1241F56		56		P1241F56+22AHGA	P1241F56+24AHGA
P1241F60		60		P1241F60+22AHGA	P1241F60+24AHGA
P1241F65		65		P1241F65+22AHGA	P1241F65+24AHGA
P1241F70		70		P1241F70+22AHGA	P1241F70+24AHGA
P1241F75		75		P1241F75+22AHGA	P1241F75+24AHGA
P1241F80		80		P1241F80+22AHGA	P1241F80+24AHGA
P1241F90		90		P1241F90+22AHGA	P1241F90+24AHGA
P1241F100	100	P1241F10022AHGA	P1241F10024AHGA		

1. All valves with proportional control actuators are shipped from the factory programmed with the valve fully closed at a 0 VDC input signal.

P1000 Series Pressure-Independent Valves (Continued)

Field Adjustable Flow Ranges and Runtime Data (Part 1 of 2)

Size, in.	Valve Code Number	Factory Flow Rate, gpm	Field Adjustable Flow Range Using FlowSetR™ Base, gpm	Running Time (Seconds)	
	Without Pressure Taps			VA2104-AGA-2	VA2104-HGA-2 VA2120-HGA-2 VA2202-HGA-2P M2204-HGA-2 M2215-HGA-2
1/2	P1241A00	0.5	0.5 to 1.0	36	100
	P1241A01	1	0.5 to 1.0	60	
	P1241A015	1.5	0.5 to 5.5	47	
	P1241A02	2	0.5 to 5.5	51	
	P1241A025	2.5	0.5 to 5.5	53	
	P1241A03	3	0.5 to 5.5	56	
	P1241A035	3.5	0.5 to 5.5	58	
	P1241A04	4	0.5 to 5.5	63	
	P1241A045	4.5	0.5 to 5.5	66	
	P1241A05	5	0.5 to 5.5	68	
	P1241A055	5.5	0.5 to 5.5	73	
3/4	P1241B06	6	2 to 10	61	100
	P1241B065	6.5	2 to 10	62	
	P1241B07	7	2 to 10	64	
	P1241B075	7.5	2 to 10	66	
	P1241B08	8	2 to 10	67	
	P1241B085	8.5	2 to 10	68	
	P1241B09	9	2 to 10	69	
	P1241B095	9.5	2 to 10	71	
	P1241B10	10	2 to 10	76	
	1	P1241C11	11	2 to 16	
P1241C12		12	2 to 16	62	
P1241C13		13	2 to 16	64	
P1241C14		14	2 to 16	67	
P1241C15		15	2 to 16	69	
P1241C16		16	2 to 16	86	
P1241C17		17	6 to 19	65	
P1241C18		18	6 to 19	67	
P1241C19		19	6 to 19	78	
1-1/4	P1241D18	18			100
	P1241D19	19			
	P1241D20	20			
	P1241D21	21			
	P1241D22	22			
	P1241D23	23			
	P1241D24	24			
	P1241D25	25			
1-1/2	P1241E26	26			100
	P1241E27	27			
	P1241E28	28			
	P1241E29	29			
	P1241E30	30			
	P1241E31	31			
	P1241E32	32			
P1241E33	33				

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P1000 Series Pressure-Independent Valves (Continued)

Field Adjustable Flow Ranges and Runtime Data (Part 2 of 2)

Size, in.	Valve Code Number	Factory Flow Rate, gpm	Field Adjustable Flow Range Using FlowSetR™ Base, gpm	Running Time (Seconds)	
	Without Pressure Taps			VA2104-AGA-2	VA2104-HGA-2 VA2120-HGA-2 VA2202-HGA-2P M2204-HGA-2 M2215-HGA-2
2	P1241F33	33			100
	P1241F34	34			
	P1241F35	35			
	P1241F36	36			
	P1241F37	37			
	P1241F38	38			
	P1241F39	39			
	P1241F40	40			
	P1241F44	44			
	P1241F48	48			
	P1241F52	52			
	P1241F56	56			
	P1241F60	60			
	P1241F65	65			
	P1241F70	70			
	P1241F75	75			
	P1241F80	80			
P1241F90	90				
P1241F100	100				

Technical Specifications

P1000 Series Pressure-Independent Valves (Part 1 of 2)		
Service¹	Hot or Chilled Water, and 60% Glycol Solutions for HVAC Systems	
Valve Fluid Temperature Limits	0 to 212°F (-18 to 100°C)	
Valve Body Pressure/Temperature Rating	600 psig (4,134 kPa) - Sizes 1/2, 3/4, and 1 in. 400 psig (2,756 kPa) - Sizes 1-1/4, 1-1/2, and 2 in.	
Maximum Closeoff Pressure	200 psi (1,378 kPa)	
Recommended Minimum Differential Operating Pressure	5 psi (34 kPa)	
Maximum Recommended Operating Pressure Drop	50 psi Maximum Differential Pressure	
Flow Characteristics	Equal Percentage	
Flow Accuracy	±10% Combination of Manufacturing Tolerances and Pressure Variations	
Valve Body Size/Flow Rate	See Field Adjustable Flow Ranges and Runtime Data .	
Leakage	0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4	
End Connections	National Pipe Thread (NPT)	
Material	Body	Forged Brass, Nickel Plated
	Ball	Chrome-Plated Brass
	Stem	Chrome-Plated Brass
	Seats	Fiberglass Reinforced Teflon® Polytetrafluoroethylene (PTFE)
	Characterizing Disk	Tefzel®
	Packing	Two Ethylene Propylene Diene Monomer (EPDM) O-Rings
	Diaphragm	Polyester Reinforced Silicone
	Regulator	Stainless Steel/Brass/Delrin
	Spring	Stainless Steel
Power Requirements	VA2104-AGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 3 VA Supply Class 2
	VA2104-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 4 VA Supply Class 2
	VA2120-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 5 VA Supply Class 2
	VA2202-HGA-2P	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 4 VA Supply Class 2
	M2204-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 5 VA Supply Class 2
	M2215-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 10 VA Supply Class 2

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P1000 Series Pressure-Independent Valves (Continued)

P1000 Series Pressure-Independent Valves (Part 2 of 2)		
Input Signal	Floating	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%
	Proportional	DC 0 to 10 V, 4 to 20 mA with Field Furnished 500 Ohm Resistor
Input Impedance	Floating	600 Ohms
	Proportional	100,000 Ohms for DC 0 to 10 V
Feedback	Proportional Only	DC 0 to 10 V, 0.5 mA Maximum
Electric Connection	VA2104, VA2120	36 in. (0.91 m) 18 AWG Plenum Rated Cable, 1/2 in. Conduit
	VA2202	36 in. (0.91 m) 18 AWG Plenum Rated Cable, 1/2 in. Conduit
	M2204	
	M2215	36 in. (0.91 m) 18 AWG Appliance Cable, 1/2 in. Conduit
Runtime		See <i>Field Adjustable Flow Ranges and Runtime Data</i> .
Audible Noise Rating	VA2104	< 35 dB (A)
	M2204	< 30 dB (A) Operating, < 62 dB (A) Spring Return
	VA2202	< 35 dB (A) Operating, < 65 dB (A) Spring Return
	VA2120, M2215	< 45 dB (A)
Manual Override	VA2104	External Push Button and Handle
	VA2120	
	VA2202	None
	M2204	
Actuator Ambient Conditions	Operating	-22 to 122°F (-30 to 50°C), 5 to 95% RH Noncondensing (EN 60730-1)
	Storage	-40 to 176°F (-40 to 80°C), 5 to 95% RH Noncondensing (EN 60730-1)
Housing	VA2104 VA2120 M2204 M2215	NEMA 2 (IP54)
	VA2202	NEMA 2 (IP42)
Housing Material	VA2104 VA2120 VA2202	Thermoplastic Material, UL 94-5V
	M2204 M2215	Zinc-Coated Metal
Compliance (North America)	VA2104 VA2120 M2204 M2215	UL Listed, File E22734, CCN XAPX (United States) and XAPX7 (Canada)
	VA2202	UL Listed According to UL 60730-1, UL 60730-2-14 (XAPX) cUL Listed According to CAN/CSA C22.2 No. 24 (XAPX7)

1. Proper water treatment is recommended; refer to the VDI 2035 Guideline.