P1000 Series

LIT-1900445

Pressure Independent Valves

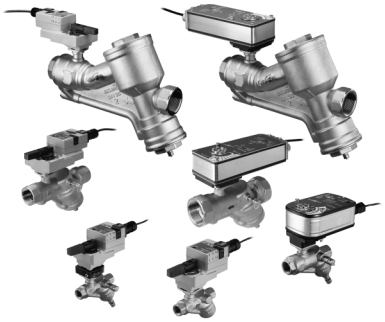
Description

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 Heating, Ventilating, and Air Conditioning (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 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 allows 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
- available with factory-mounted VA2104, VA2120, M2204, or M2215 Series Electric Actuators reduces installation time to reduce overall installation cost
- maintenance-free design eliminates need for periodic rebuilding and rebalancing of the system, with no packings to adjust
- 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 Pressure Independent Valve fails to operate within its specifications, refer to the *P1000 Pressure Independent Valves Product Bulletin (LIT-12011272)* for a list of replacement parts available.

Selection Charts

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

Size, in.	Flow Rate (GPM)	Closeoff psig	24 VAC			
			No Pressure Taps		With Two Pressure Taps	
			Floating	DC 0 to 10 V Proportional	Floating	DC 0 to 10 V Proportional
			VA2104-AGA-2	VA2104-HGA-2	VA2104-AGA-2	VA2104-HGA-2; VA2120-HGA-2
1/2	0.5	200	P1241A00+21LAGA	P1241A00+21LHGA	P1242A00+21LAGA	P1242A00+21LHGA
	1		P1241A01+21LAGA	P1241A01+21LHGA	P1242A01+21LAGA	P1242A01+21LHGA
	1.5		P1241A01521LAGA	P1241A01521LHGA	P1242A01521LAGA	P1242A01521LHGA
	2		P1241A02+21LAGA	P1241A02+21LHGA	P1242A02+21LAGA	P1242A02+21LHGA
	3		P1241A03+21LAGA	P1241A03+21LHGA	P1242A03+21LAGA	P1242A03+21LHGA
	4		P1241A04+21LAGA	P1241A04+21LHGA	P1242A04+21LAGA	P1242A04+21LHGA
	5		P1241A05+21LAGA	P1241A05+21LHGA	P1242A05+21LAGA	P1242A05+21LHGA
3/4	6	200	P1241B06+21LAGA	P1241B06+21LHGA	P1242B06+21LAGA	P1242B06+21LHGA
	7		P1241B07+21LAGA	P1241B07+21LHGA	P1242B07+21LAGA	P1242B07+21LHGA
	8		P1241B08+21LAGA	P1241B08+21LHGA	P1242B08+21LAGA	P1242B08+21LHGA
	9		P1241B09+21LAGA	P1241B09+21LHGA	P1242B09+21LAGA	P1242B09+21LHGA
	10		P1241B10+21LAGA	P1241B10+21LHGA	P1242B10+21LAGA	P1242B10+21LHGA
1	12	200	P1241C12+21LAGA	P1241C12+21LHGA	P1242C12+21LAGA	P1242C12+21LHGA
	14		P1241C14+21LAGA	P1241C14+21LHGA	P1242C14+21LAGA	P1242C14+21LHGA
	16		P1241C16+21LAGA	P1241C16+21LHGA	P1242C16+21LAGA	P1242C16+21LHGA
	18		P1241C18+21LAGA	P1241C18+21LHGA	P1242C18+21LAGA	P1242C18+21LHGA
1-1/4	18	200	—	—	—	P1242D18+21AHGA
	20		—	—	—	P1242D20+21AHGA
	22		—	—	—	P1242D22+21AHGA
	24		—	—	—	P1242D24+21AHGA
	26		—	—	—	P1242D26+21AHGA
1-1/2	26	200	—	—	—	P1242E26+21AHGA
	28		—	—	—	P1242E28+21AHGA
	30		—	—	—	P1242E30+21AHGA
	33		—	—	—	P1242E33+21AHGA

P1000 Series Pressure Independent Valves (Continued)

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

Size, in.	Flow Rate (GPM)	Closeoff psig	24 VAC			
			No Pressure Taps		With Two Pressure Taps	
			Floating	DC 0 to 10 V Proportional	Floating	DC 0 to 10 V Proportional
			VA2104-AGA-2	VA2104-HGA-2	VA2104-AGA-2	VA2104-HGA-2; VA2120-HGA-2
2	33	200	—	—	—	P1242F33+21AHGA
	36		—	—	—	P1242F36+21AHGA
	40		—	—	—	P1242F40+21AHGA
	44		—	—	—	P1242F44+21AHGA
	48		—	—	—	P1242F48+21AHGA
	52		—	—	—	P1242F52+21AHGA
	56		—	—	—	P1242F56+21AHGA
	60		—	—	—	P1242F60+21AHGA
	65		—	—	—	P1242F65+21AHGA
	70		—	—	—	P1242F70+21AHGA
	75		—	—	—	P1242F75+21AHGA
	80		—	—	—	P1242F80+21AHGA

Two-Way Spring Return

Size, in.	Flow Rate (GPM)	Closeoff psig	DC 0 to 10 V Proportional Control, 24 VAC Supply			
			Spring Return Open		Spring Return Closed	
			Without Pressure Taps	With Pressure Taps	Without Pressure Taps	With Pressure Taps
			M2204-AGA-2	M2204-HGA-2	M2204-AGA-2	M2204-HGA-2; M2215-HGA-2
1/2	0.5	200	P1241A00+22LHGA	P1242A00+22LHGA	P1241A00+24LHGA	P1242A00+24LHGA
	1		P1241A01+22LHGA	P1242A01+22LHGA	P1241A01+24LHGA	P1242A01+24LHGA
	1.5		P1241A01522LHGA	P1242A01522LHGA	P1241A01524LHGA	P1242A01524LHGA
	2		P1241A02+22LHGA	P1242A02+22LHGA	P1241A02+24LHGA	P1242A02+24LHGA
	3		P1241A03+22LHGA	P1242A03+22LHGA	P1241A03+24LHGA	P1242A03+24LHGA
	4		P1241A04+22LHGA	P1242A04+22LHGA	P1241A04+24LHGA	P1242A04+24LHGA
	5		P1241A05+22LHGA	P1242A05+22LHGA	P1241A05+24LHGA	P1242A05+24LHGA
3/4	6	200	P1241B06+22LHGA	P1242B06+22LHGA	P1241B06+24LHGA	P1242B06+24LHGA
	7		P1241B07+22LHGA	P1242B07+22LHGA	P1241B07+24LHGA	P1242B07+24LHGA
	8		P1241B08+22LHGA	P1242B08+22LHGA	P1241B08+24LHGA	P1242B08+24LHGA
	9		P1241B09+22LHGA	P1242B09+22LHGA	P1241B09+24LHGA	P1242B09+24LHGA
	10		P1241B10+22LHGA	P1242B10+22LHGA	P1241B10+24LHGA	P1242B10+24LHGA
1	12	200	P1241C12+22LHGA	P1242C12+22LHGA	P1241C12+24LHGA	P1242C12+24LHGA
	14		P1241C14+22LHGA	P1242C14+22LHGA	P1241C14+24LHGA	P1242C14+24LHGA
	16		P1241C16+22LHGA	P1242C16+22LHGA	P1241C16+24LHGA	P1242C16+24LHGA
	18		P1241C18+22LHGA	P1242C18+22LHGA	P1241C18+24LHGA	P1242C18+24LHGA
1-1/4	18	200	—	P1242D18+22AHGA	—	P1242D18+24AHGA
	20		—	P1242D20+22AHGA	—	P1242D20+24AHGA
	22		—	P1242D22+22AHGA	—	P1242D22+24AHGA
	24		—	P1242D24+22AHGA	—	P1242D24+24AHGA
	26		—	P1242D26+22AHGA	—	P1242D26+24AHGA
1-1/2	26	200	—	P1242E26+22AHGA	—	P1242E26+24AHGA
	28		—	P1242E28+22AHGA	—	P1242E28+24AHGA
	30		—	P1242E30+22AHGA	—	P1242E30+24AHGA
	33		—	P1242E33+22AHGA	—	P1242E33+24AHGA
2	33	200	—	P1242F33+22AHGA	—	P1242F33+24AHGA
	36		—	P1242F36+22AHGA	—	P1242F36+24AHGA
	40		—	P1242F40+22AHGA	—	P1242F40+24AHGA
	44		—	P1242F44+22AHGA	—	P1242F44+24AHGA
	48		—	P1242F48+22AHGA	—	P1242F48+24AHGA
	52		—	P1242F52+22AHGA	—	P1242F52+24AHGA
	56		—	P1242F56+22AHGA	—	P1242F56+24AHGA
	60		—	P1242F60+22AHGA	—	P1242F60+24AHGA
	65		—	P1242F65+22AHGA	—	P1242F65+24AHGA
	70		—	P1242F70+22AHGA	—	P1242F70+22AHGA
	75		—	P1242F75+22AHGA	—	P1242F75+24AHGA
	80		—	P1242F80+22AHGA	—	P1242F80+24AHGA

P1000 Series Pressure Independent Valves (Continued)

Technical Specifications

P1000 Series Pressure Independent Valves		
Service[1]		Hot Water, 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		Less than or Equal to 5% from 5 to 50 psi Differential Pressure
Valve Body Size/Flow Rate		See the following Field Adjustable Flow Ranges, Pressure Tap Flow Data, and Run Time Data Table.
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
	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
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. (.91 m) 18 AWG Plenum Rated Cable, 1/2 in. Conduit
	M2204	36 in. (.91 m) 18 AWG Plenum Rated Cable, 1/2 in. Conduit
	M2215	36 in. (.91 m) 18 AWG Appliance Cable, 1/2 in. Conduit
Runtime		See the following Field Adjustable Flow Ranges, Pressure Tap Flow Data, and Run Time Data Table.
Audible Noise Rating	**VA2104**	<35 dB (A)
	M2204	<30 dB (A) Operating, <62 dB (A) Spring Return
	VA2120, M2215	<45 dB (A)
Manual Override	**Non-Spring Return**	External Push Button and Handle
	Spring Return	Hex Crank (M2215 only - No Manual Override for 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		NEMA 2 (IP54)
Housing Material	**VA2104, VA2120**	Thermoplastic Material, UL 94-5V
	M2204, M2215	Zinc-Coated Metal
Compliance	**North America**	UL Listed, File E22734, CCN XAPX (United States) and XAPX7 (Canada)

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

P1000 Series Pressure Independent Valves (Continued)

Field Adjustable Flow Ranges, Pressure Tap Flow Data, and Runtime Data

Size, in.	Valve Code Number		Factory Flow Rate (GPM)	Field Adjustable Flow Range Using FlowSetR Base (GPM)	Different Pressure Drop across Pressure Taps at Factory Flow Rate	Running Time (Seconds)	
	Without Pressure Taps	With Pressure Taps				VA2104-AGA-2	VA2104-HGA-2 VA2120-HGA-2 M2204-HGA-2 M2215-HGA-2
1/2	P1241A00	P1242A00	0.5	0.5 to 1.3	2.8	36	100
	P1241A01	P1242A01	1	0.5 to 1.3	2.5	60	
	P1241A015	P1242A015	1.5	0.5 to 5.5	2.5	47	
	P1241A02	P1242A02	2	0.5 to 5.5	2.5	51	
	P1241A03	P1242A03	3	0.5 to 5.5	2.5	56	
	P1241A04	P1242A04	4	0.5 to 5.5	2.3	63	
	P1241A05	P1242A05	5	0.5 to 5.5	2.0	68	
3/4	P1241B06	P1242B06	6	2 to 10	2.75	61	100
	P1241B07	P1242B07	7	2 to 10	2.75	64	
	P1241B08	P1242B08	8	2 to 10	2.0	67	
	P1241B09	P1242B09	9	2 to 10	2.0	69	
	P1241B10	P1242B10	10	2 to 10	2.5	76	
1	P1241C12	P1242C12	12	2 to 16	2.9	62	100
	P1241C14	P1242C14	14	2 to 16	2.6	67	
	P1241C16	P1242C16	16	2 to 16	1.6	86	
	P1241C18	P1242C18	18	6 to 19	1.4	67	
1-1/4		P1242D18	18		3.5		100
		P1242D20	20		3.2		
		P1242D22	22		3.0		
		P1242D24	24		3.0		
		P1242D26	26		3.4		
1-1/2		P1242E26	26		3.5		100
		P1242E28	28		3.4		
		P1242E30	30		3.2		
		P1242E33	33		3.3		
2		P1242F33	33		2.5		100
		P1242F36	36		2.4		
		P1242F40	40		2.4		
		P1242F44	44		3.8		
		P1242F48	48		3.0		
		P1242F52	52		2.7		
		P1242F56	56		2.1		
		P1242F60	60		1.9		
		P1242F65	65		2.0		
		P1242F70	70		2.0		
		P1242F75	75		1.8		
		P1242F80	80		2.0		