PP1 Series Piping Packages for VG1000 Series Ball Valves

Product Bulletin

PP12xxxxx-1 Series, PP18xxxxx-1 Series

Code No. LIT-12011974
Issued October 2020

PP1 Series Piping Packages are designed to provide an easier way to deploy control valve solutions to a job site. Built around Johnson Controls® field-proven VG1000 Series Ball Valves using standard components, each piping package is tested under 100 psig (689 kPa) for 24 hours and then reduced to 40 psig (276 kPa) before shipping to ensure leak-free control valve solutions.

Johnson Controls piping packages are manufactured by United Association of Journeymen & Apprentices of the Plumbing and Pipe Fitting Industry of USA and Canada pipe fitters and provide defect-free solutions for 3/4 to 1-1/4 in. pipe sizes for both two-way and three-way applications.

Johnson Controls piping packages significantly reduce site labor. A piping package can be secured using the ProPress® fitting system or by soldering to fasten it to the piping infrastructure.

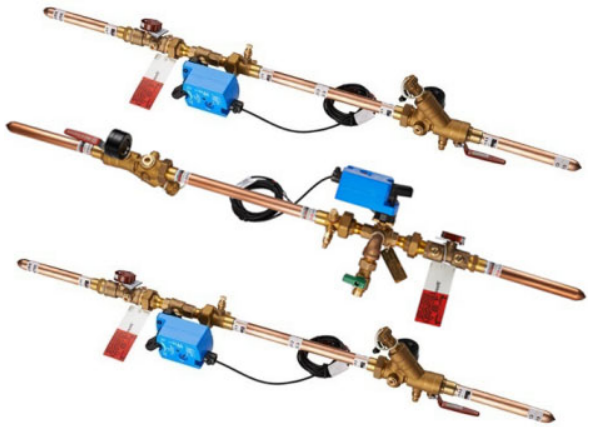


Figure 1: PP1 Series Piping Packages

Table 1: Features and benefits

Features	Benefits
Assembly in a factory environment following the recommended component manufacturer procedure	Ensures the components are not affected by overheating during sweating.
100% tested under 100 psig (689 kPa) for 24 hours	Provides leak-free assurance.
VG1000 Series Ball Valves	Allow for a wide range of application options, high close-off pressures, and accurate control under all conditions.
Manufactured by United Association of Journeymen & Apprentices of the Plumbing and Pipe Fitting Industry of USA and Canada Pipe Fitters	Ensures superior workmanship for a high-quality assembly.

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

⚠ WARNING This product can expose you to chemicals including lead, which is known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

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

Johnson Controls

Ordering information

Table 2: PP1 Series Piping Package selection matrix

PP1	x	x	x	xxx-1	x		
PP1	Piping package for VG1000 Series Ball Valves						
	2	Two-way valve models					
	8	Three-way valve models					
		B	Piping package size 3/4 in.				
		C	Piping package size 1 in.				
		D	Piping package size 1-1/4 in.				
			M	Manual balancing valves			
				001	Sequential number		
			A	Automatic balancing valves			
				005	0.5 GPM	**090**	9 GPM
				010	1 GPM	**100**	10 GPM
				015	1.5 GPM	**110**	11 GPM
				020	2 GPM	**120**	12 GPM
				025	2.5 GPM	**130**	13 GPM
				030	3 GPM	**140**	14 GPM
				035	3.5 GPM	**150**	15 GPM
				040	4 GPM	**160**	16 GPM
				045	4.5 GPM	**170**	17 GPM
				050	5 GPM	**180**	18 GPM
				055	5.5 GPM	**190**	19 GPM
				060	6 GPM	**200**	20 GPM
				070	7 GPM	**210**	21 GPM
				080	8 GPM	**220**	22 GPM
					N	Assembled and sold without a control valve for assembly in field - ships pressurized	

IMPORTANT: The PP1 Series Piping Packages are intended to control hot water and chilled water flow under normal equipment operating conditions. Where failure or malfunction of any component of the piping package could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the piping package.

Control valve components

The PP1 Series Piping Packages include a two-way automatic flow control valve, a two-way manual flow control valve, or a three-way manual flow control valve. Select the piping package appropriate for your application.

Two-way automatic flow control valves

Two-way automatic flow control valves consist of an automatic flow control valve, a union connection, a VG1000 Series Ball Valve and actuator, and a Y-strainer with a union end ball valve.

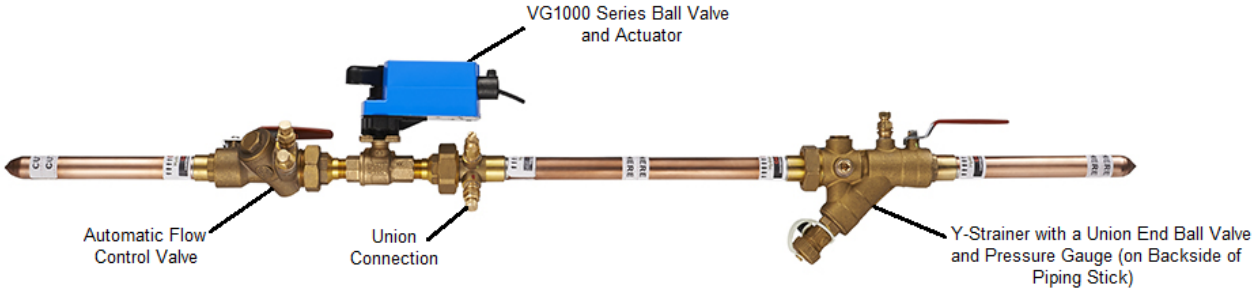


Figure 2: Two-way automatic flow control valve

Table 3: Two-way automatic flow control valve models

Code number	GPM	Pipe size, in.	Supply pipe	Return pipe			
			Y-strainer with a union end ball valve	Automatic flow control valve	Union connection	VG1000 Series Ball Valve	
						Size, in. (DN)	Cv
PP12BA005-1	0.5	3/4	UBY 3/4”S x 3/4”S	AC 3/4”S x 1/2”M	UA 3/4”S x 1/2”M	1/2 (DN15)	1.2
PP12BA010-1	1						
PP12BA015-1	1.5						
PP12BA020-1	2						1.2, 1.9, 2.9
PP12BA025-1	2.5						
PP12BA030-1	3						
PP12BA035-1	3.5						1.2, 1.9, 2.9, 4.7
PP12BA040-1	4						
PP12BA045-1	4.5						2.9, 4.7, 7.4
PP12BA050-1	5						
PP12BA055-1	5.5						
PP12CA060-1	6	1	UBY 1”S x 1”S	AC 1”S x 3/4”M	UA 1”S x 3/4”M	3/4 (DN20)	4.7, 7.4
PP12CA070-1	7						
PP12CA080-1	8						
PP12CA090-1	9						4.7, 7.4, 11.8
PP12CA100-1	10						

Table 3: Two-way automatic flow control valve models

Code number	GPM	Pipe size, in.	Supply pipe	Return pipe			
			Y-strainer with a union end ball valve	Automatic flow control valve	Union connection	VG1000 Series Ball Valve	
						Size, in. (DN)	Cv
PP12DA110-1	11	1-1/4	UBY 1-1/4"S x 1 1/4"	AC 1-1/4"S x 1"M	UA 1-1/4"S x 1"M	1 (DN25)	7.4, 11.8, 18.7
PP12DA120-1	12						
PP12DA130-1	13						
PP12DA140-1	14						
PP12DA150-1	15						11.8, 18.7
PP12DA160-1	16						
PP12DA170-1	17						
PP12DA180-1	18						
PP12DA190-1	19						
PP12DA200-1	20						
PP12DA210-1	21						
PP12DA220-1	22						

Two-way manual flow control valves

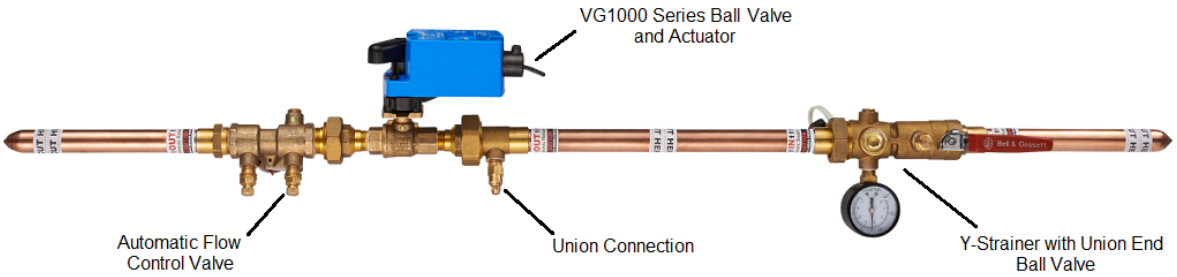


Figure 3: Two-way manual flow control valve

Table 4: Two-way manual flow control valve models

Code number	GPM	Pipe size, in.	Supply pipe	Return pipe			
			Y-strainer with a union end ball valve	Manual balancing valve	Union connection	VG1000 Series Ball Valve	
						Size, in. (DN)	Cv
PP12BM001-1	0.5–7	3/4	UBY 3/4"S x 3/4"S	MC 3/4"S x 1/2"M	UA 3/4"S x 1/2"M	1/2 (DN15)	1.2, 1.9, 2.9, 4.7
PP12CM001-1	1.5–14	1	UBY 1"S x 1"S	MC 1"S x 1/2"M	UA 1"S x 1/2"M		4.7, 7.4
PP12CM002-1				MC 1"S x 3/4"M	UA 1"S x 3/4"M	3/4 (DN20)	4.7, 7.4, 11.7
PP12DM001-1	4.5–31	1-1/4	UBY 1 1/4"S x 1 1/4"S	MC 1-1/4"S x 1"M	UA 1 1/4"S x 1"M	1 (DN25)	7.4, 11.7, 18.7

Three-way manual flow control valves

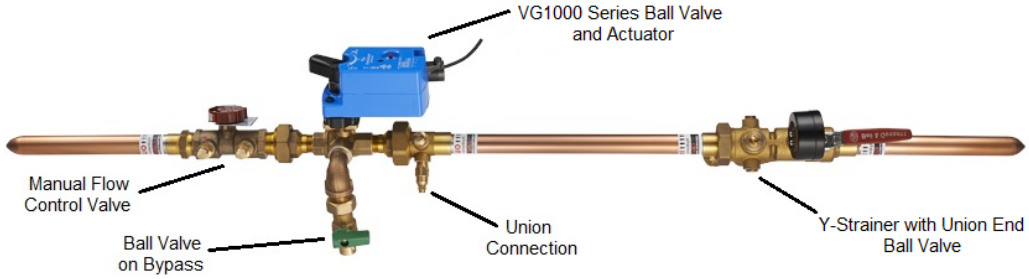


Figure 4: Three-way manual flow control valve

Table 5: Three-way manual flow control valve models

Code number	GPM	Pipe size, in.	Supply pipe	Return pipe				Bypass pipe
			Y-strainer with a union end ball valve	Manual balancing valve	Union connection	VG1000 Series Ball Valve		Ball valve
						Size, in. (DN)	Cv	
PP18BM001-1	0.5–7	3/4	UBY 3/4”S x 3/4”S	MC 3/4”S x 1/2”M	UA 3/4”S x 1/2”M	1/2 (DN15)	1.2, 1.9, 2.9, 4.7	UBV 1/2”S x 1/2”M
PP18CM001-1	1.5–14	1	UBY 1”S x 1”S	MC 1”S x 1/2”M	UA 1”S x 1/2”M		4.7, 7.4	UBV 3/4”S x 3/4”M
PP18CM002-1				MC 1”S x 3/4”M	UA 1”S x 3/4”M	3/4 (DN20)	4.7, 7.4, 11.7	
PP18DM001-1	4.5–31	1-1/4	UBY 1 1/4”S x 1 1/4”S	MC 1-1/4”S x 1”M	UA 1 1/4”S x 1”M	1 (DN25)	7.4, 11.7, 18.7	UBV 1”S x 1”M

Supply pipe components

The supply pipe components include an all-in-one valve with a Y-strainer, with a union end ball valve and a pressure gauge. Y-strainers are furnished with a 20 mesh stainless steel screen, hose end drain valve for purging, one pressure and temperature port for commissioning, and one plugged bypass port. Three additional 1/4 in. taps are plugged and available for accessories when needed. The supply pipe is rated for 400 psig (2,758 kPa) and 250°F (121°C).

Y-strainer with a union end ball valve

The Y-strainer with a union end ball valve includes the following accessories:

- Blowdown drain with 3/4 in. hose bib and cap
- Lever handle for the ball valve
- Pressure gauge
- Pressure and temperature test plug

See Figure 5 and Table 6 for the dimensions of the Y-strainer.

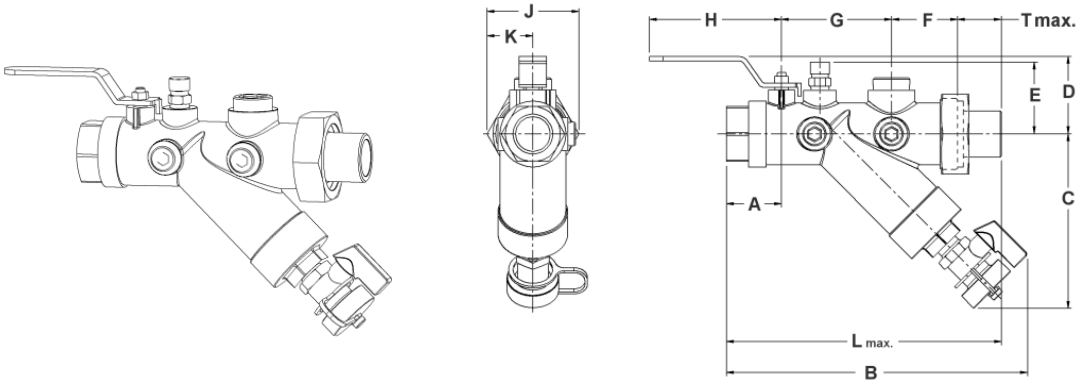


Figure 5: Y-strainer with union end ball valve

Table 6: Y-strainer with a union end ball valve dimensions, in. (mm)

Size	A	B	C	D	E	F	G	H	J	K	T (max)	L (max)	Weight, lb (kg)
3/4 (19)	1.45 (37)	6.60 (167)	3.76 (96)	2.08 (53)	2.29 (58)	1.27 (32)	2.69 (68)	3.50 (89)	1.90 (48)	0.95 (24)	1.55 (39)	6.97 (177)	3.8 (1.7)
1 (25)	1.43 (36)	7.85 (199)	4.63 (118)	2.29 (58)	2.44 (62)	2.04 (52)	3.60 (91)	4.00 (102)	2.10 (53)	1.05 (27)	2.00 (51)	9.07 (230)	4.3 (2)
1-1/4 (32)	1.71 (43)	8.21 (209)	4.88 (124)	2.65 (67)	2.73 (69)	1.89 (48)	3.80 (97)	5.38 (137)	2.81 (71)	1.41 (36)	2.00 (51)	9.40 (239)	5.6 (2.5)

Pressure gauge

The pressure gauge is an industry standard, Grade B component with a minimum accuracy of ±3.75% per ASME B40.100.

The piping stick is pressurized for 24 hours at 100 psig (689 kPa) before shipping to test all connection point and gaskets. The pressure is reduced to 40 psig (276 kPa) prior to shipping.



Figure 6: Pressure gauge

Return pipe components

The return pipe components include:

- Combination commissioning valve and automatic flow limiting valve, or a calibrated manual balancing valve with shut-off ball valve. These valves are rated for 400 psig (2,758 kPa) and 250°F (121°C).
- VG1000 Series Ball Valve, rated for water usage for 580 psig (3,999 kPa) at 203°F (95°C) (brass stem models) or 464 psig (3,199 kPa) at 284°F (140°C) (stainless steel stem model).
- Union connection with pressure taps, rated for 400 psig (2,758 kPa) and 250°F (121°C).

Union connection

The union connection includes the following accessories:

- 1/4 in. male national pipe thread (MNPT) pressure and temperature test plug
- 1/4 in. MNPT coin operated manual air vent

See Figure 7 and Table 7 for the dimensions of the union connection.

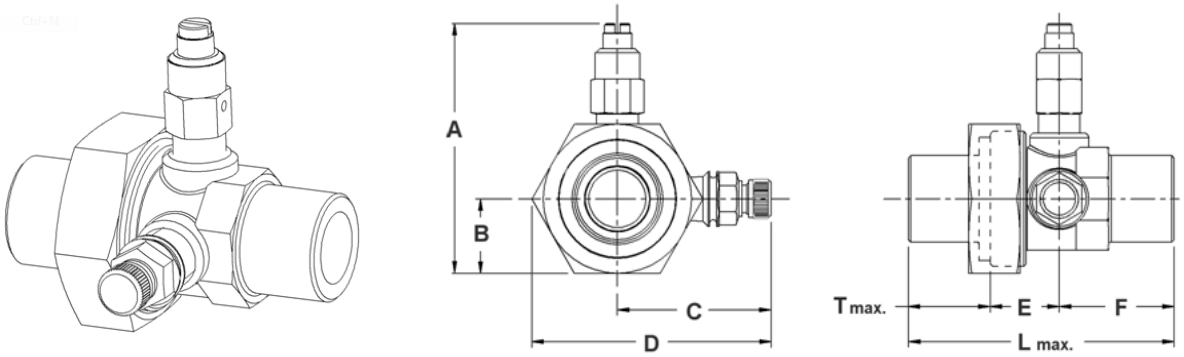


Figure 7: Union connection

Table 7: Union connection dimensions, in. (mm)

Size	A	B	C	D	E	F	T (max)	L (max)	Weight, lb (kg)
3/4 (19)	2.98 (76)	0.88 (22)	2.01 (51)	2.96 (75)	0.86 (22)	1.28 (33)	1.55 (39)	3.59 (91)	1.3 (0.59)
1 (25)	3.19 (81)	0.97 (25)	2.14 (54)	3.19 (81)	0.89 (23)	1.51 (38)	2.00 (51)	4.41 (112)	1.6 (0.73)
1-1/4 (32)	3.73 (95)	1.24 (31)	2.40 (61)	3.80 (97)	1.08 (27)	1.89 (48)	2.00 (51)	4.12 (105)	2.4 (1.09)

Combination commissioning valve and automatic flow limiting valve

The combination commissioning valve and automatic flow limiting valve include the following accessories:

- Removable flow limiting diaphragm cartridge

  Note: The diaphragm cartridge allows easy access for inspection, cleaning, or flow rate changes without disturbing the piping.

- Two 1 in. pressure and temperature ports
- Hanging ID tag for commissioning

See Figure 8 and Table 8 for the dimensions of the combination commissioning valve and automatic flow limiting valve.

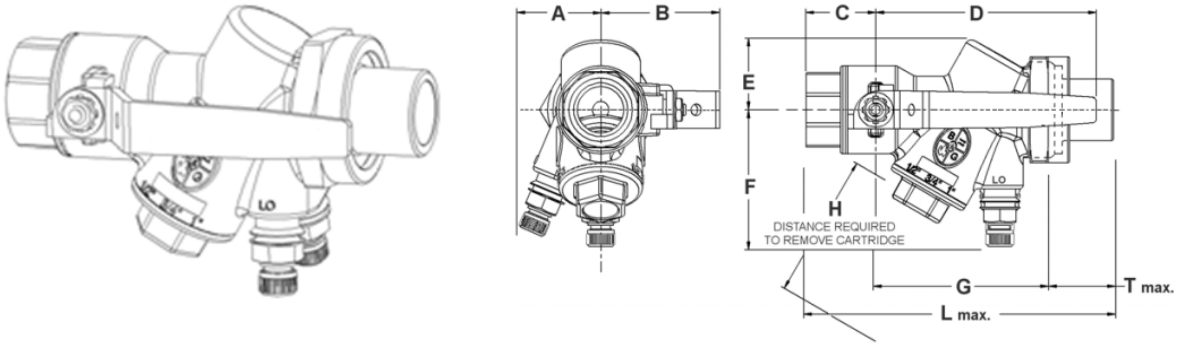


Figure 8: Combination commissioning valve and automatic flow limiting valve

Table 8: Combination commissioning valve and automatic flow limiting valve dimensions, in. (mm)

Size	A	B	C	D	E	F	G	H	T (max)	L (max)	Weight, lb (kg)
3/4 (19)	1.42 (36)	1.93 (49)	1.38 (35)	3.74 (95)	1.18 (30)	2.36 (60)	3.03 (77)	1.77 (45)	0.98 (25)	5.39 (137)	2.4 (1.09)
1 (25)	1.42 (36)	1.93 (49)	1.46 (37)	3.74 (95)	1.18 (30)	2.36 (60)	3.03 (77)	1.77 (45)	1.69 (43)	6.18 (157)	2.6 (1.18)
1-1/4 (32)	1.65 (42)	2.87 (73)	1.85 (47)	5.2 (132)	1.89 (48)	2.95 (75)	4.67 (119)	2.46 (62)	1.93 (49)	8.45 (215)	7.1 (3.22)

Calibrated manual balancing valve with shut-off ball valve

This valve includes the following accessories:

- Lockable adjustment knob with scale
- Two 1/4 in. MNPT pressure and temperature test plugs
- Commissioning tag

See Figure 9 and Table 9 for the dimensions of the calibrated manual balancing valve with shut-off ball valve.

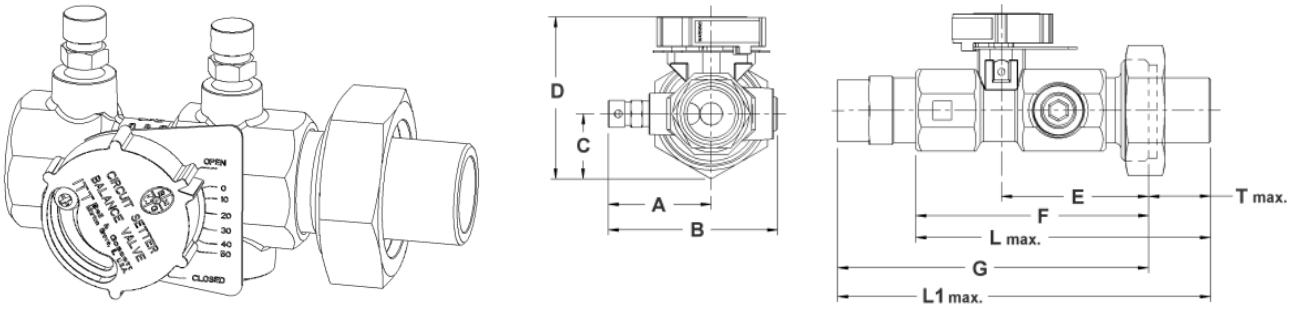


Figure 9: Calibrated manual balancing valve with shut-off ball valve

Table 9: Calibrated manual balancing valve with shut-off ball valve dimensions, in. (mm)

Size	A	B	C	D	E	F	L (max)	G	L1 (max)	T (max)	Weight, lb (kg)
3/4 (19)	2.03 (52)	3.12 (79)	0.66 (17)	2.20 (56)	2.28 (58)	3.66 (93)	-	4.68 (119)	6.23 (158)	1.55 (39)	2.4 (1.09)
1 (25)	2.18 (55)	3.42 (87)	0.81 (21)	2.51 (64)	2.62 (67)	4.36 (111)	-	5.55 (141)	7.55 (192)	2.00 (51)	3.4 (86)
1-1/4 (32)	2.32 (59)	3.70 (94)	1.00 (25)	3.29 (84)	3.11 (79)	5.05 (128)	-	6.25 (159)	8.25 (210)	2.00 (51)	5.2 (132)

Calibrated manual balancing valve flow charts

See Figure 10 through Figure 12 for flow charts of the 3/4 in., 1 in., and 1-1/4 in. calibrated manual balancing valves.

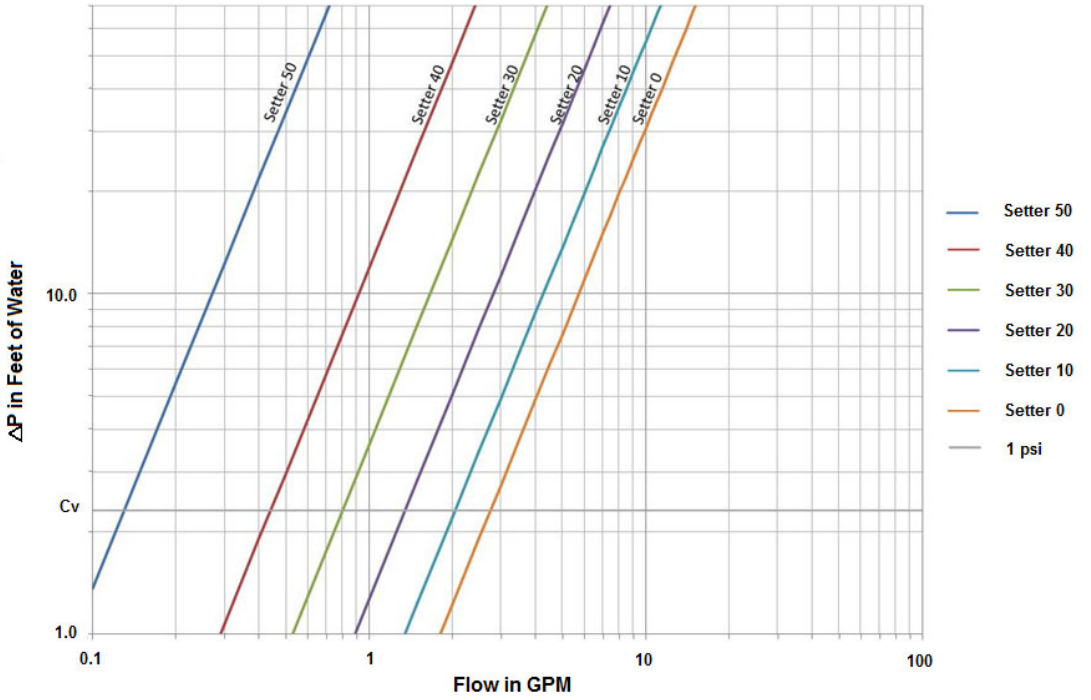


Figure 10: Flow chart for the 3/4 in. calibrated manual balancing valve

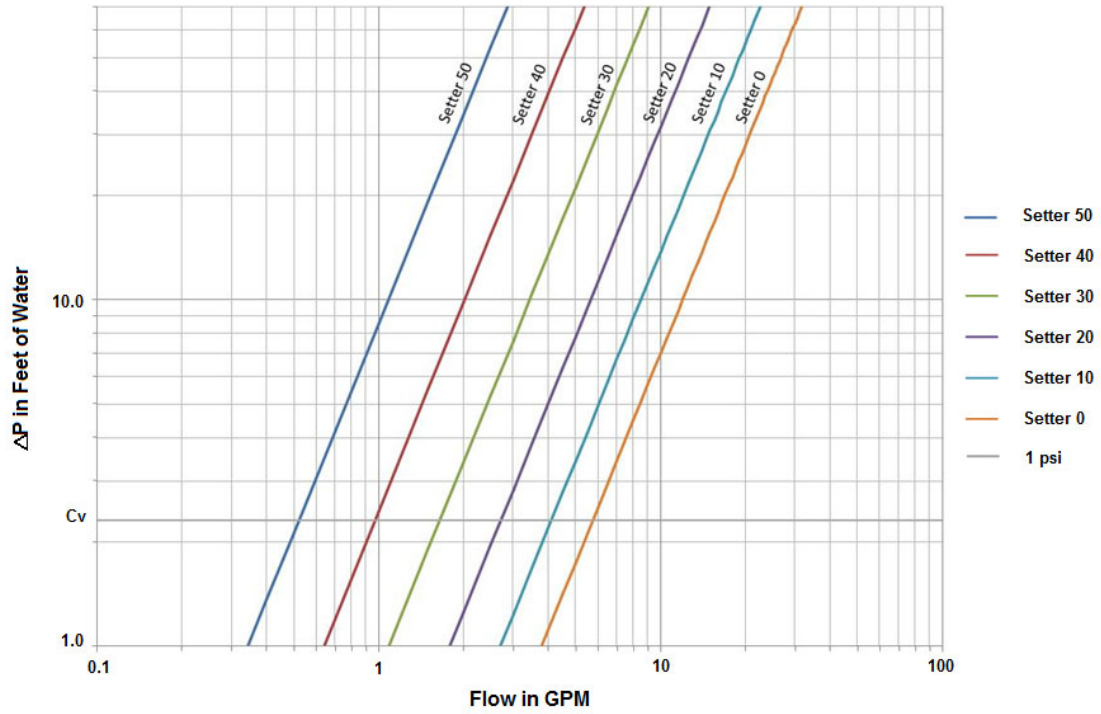


Figure 11: Flow chart for the 1 in. calibrated manual balancing valve

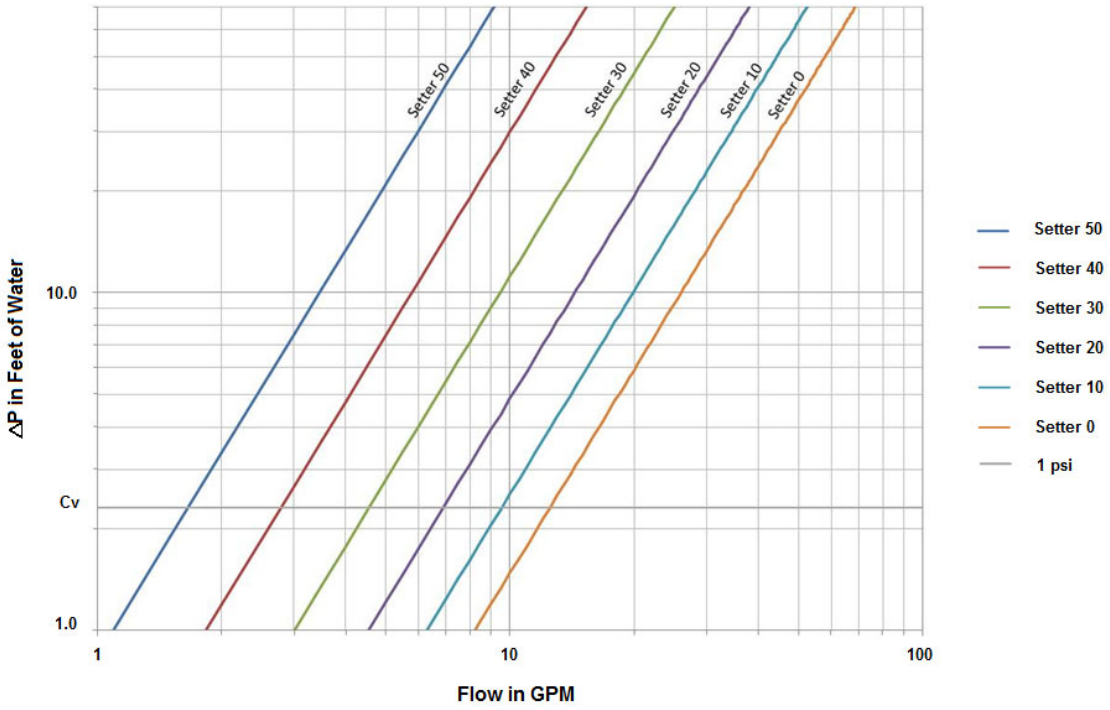


Figure 12: Flow chart for the 1-1/4 in. calibrated manual balancing valve

Bypass pipe components (three-way valve models)

Ball valve

The ball valve includes four ports each with a plug installed.

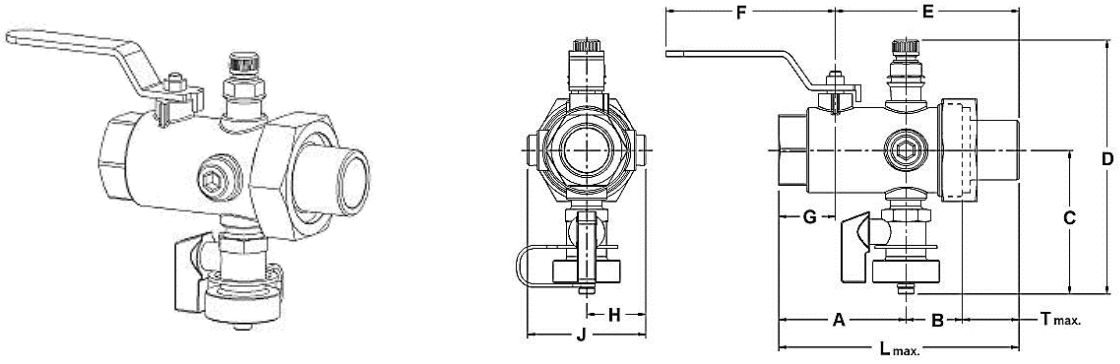


Figure 13: Bypass pipe ball valve

Table 10: Calibrated manual balancing valve with shut-off ball valve dimensions, in. (mm)

Size	A	B	C	D	E	F	G	H	J	T (max)	L (max)	Weight, lb (kg)
3/4 (19)	2.02 (51)	0.4 (10)	2.53 (64)	4.58 (116)	3.54 (90)	3.38 (86)	1.03 (26)	0.90 (23)	1.81 (46)	1.55 (39)	3.97 (101)	1.6 (1.09)
1 (25)	2.67 (68)	0.66 (17)	2.76 (70)	5.05 (128)	3.79 (96)	3.50 (89)	1.45 (37)	1.14 (29)	2.28 (58)	1.55 (39)	5.08 (129)	1.9 (86)
1-1/4 (32)	2.69 (68)	0.88 (22)	2.76 (70)	5.05 (128)	4.14 (105)	4.00 (102)	1.43 (36)	1.14 (29)	2.28 (58)	2.00 (51)	5.57 (141)	2.9 (132)

Motorized control valves

The VG1000 Series Ball Valve is a motorized control valve (Figure 14). Refer to the *VG1000 Series Forged Brass Ball Valves Product Bulletin (LIT-977132)* for more details. All threaded ball valves are compatible with the piping packages.

For more information on the electric valve actuators as well as available models, refer to the following documents:

- *VA9104-xGA-2S, -3S Series Electric Non-Spring Return Valve Actuators Product Bulletin (LIT-12011050)*
- *M9106-xGx-2 Series Electric Non-Spring Return Actuators Product Bulletin (LIT-2681123)*
- *VA9203 Series Electric Spring Return Actuator Product Bulletin (LIT-12011702)*



Figure 14: Motorized control valves

Installation

The PP1 Series Piping Package allows for a simple installation to the VAV box. Use the following steps and Figure 15 to install the piping package.

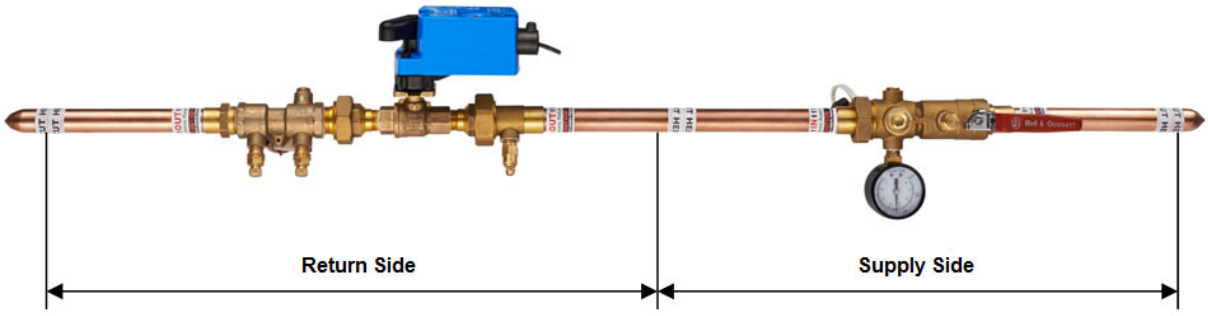


Figure 15: Piping package return and supply sides

1. Verify that the pressure in the pipe is above the ambient pressure on the gauge.

Note: Pipes are tested in production at 100 psig (689 kPa) for 24 hours and brought down to 40 psig (276 kPa) prior to shipping.

2. Measure the length of pipe needed on the supply side and on the return side to match the length needed for the installation.
3. Cut the pipe at the location measured.
4. Sweat or press the supply side of the pipe.
5. Measure the length of pipe needed on the bypass (for the three-way valve models).
6. Sweat or press the return side of the pipe.

For the three-way valve models:

7. Screw the bypass pipe into the Y-strainer with a union end ball valve on the supply line.
8. Sweat the pipe provided to the ball valve on the bypass pipe.

Repair information

If the PP1 Series Piping Package fails to operate within its specifications, replace the unit. For a replacement piping package, contact the nearest Johnson Controls representative.

Technical specifications

Y-strainer with a union end ball valve

Product code	UBY
Body	Forged brass C37000
Ball	Full port chrome plated
Ball seal	Teflon®
Stem	Explosion-proof
O-rings	Ethylene propylene diene monomer (EPDM)
Filter screen	20 mesh, stainless steel
Maximum seat pressure rating	400 psig (2,758 kPa)
Operating temperature	-4 to 250°F (20 to 121°C)

Union connection

Product code	UA
Body	Forged brass C37000
O-ring	EPDM
Maximum pressure	400 psig
Maximum operating temperature	-4 to 250°F (20 to 121°C)

Combination commissioning valve and automatic flow limiting valve

Product code	AC
Body	Brass C37710
Ball	Chrome plated brass C37710
Ball seat	Teflon
O-ring	EPDM
Diaphragm	Reinforced EPDM
Spring	Stainless steel
Tail piece, nut	Brass
Stem	Blowout-proof
Maximum seat pressure rating	400 psig (2,758 kPa)
Operating temperature	-4 to 250°F (20 to 121°C)
Flow rate accuracy	±5%

Cartridge (included in combination commissioning valve and automatic flow limiting valve)

Body	Brass C36000 or equivalent
Spring	304 stainless steel
Diaphragm and O-ring	EPDM
Orifice	Brass C36000 or equivalent

Calibrated manual balancing valve with shut-off ball valve

Product code	MC
Body	Brass ASTM B584-844
Ball	Brass ASTM B16 C36000
Ball Seal	Glass and carbon-filled Teflon
Stem O-ring	EPDM
Maximum working pressure	300 psig (2,069 kPa)
Operating temperature	-4 to 250°F (20 to 121°C)

Pressure gauge

Case	Black painted steel
Dial	Black figures on white background
Tube and sprocket	Bronze
Accuracy	ASME B40.100, Grade B, ±3.75% (0 to 25 psig [0 to 172 kPa]: 3%, 25 to 75 psig [172 to 517 kPa]: 2%, 75 to 100 psig [517 to 689 kPa]: 3%)
Operating temperature	-40 to 150°F (-40 to 65°C)

Ball valve (three-way valve models)

Product code	UBV
Body	Brass C37000
Handle	Chrome plated steel with plastic cover
Ball	Chrome plated
Ball seal	Teflon
O-ring	EPDM
Union seal	Viton O-ring
Stem	Explosion-proof
Maximum seat pressure rating	400 psig (2,758 kPa)
Operating temperature	-4 to 250°F (20 to 121°C)

Pipe

Copper pipe	Type L

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

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Patents

Patents: http://jcipat.com

Single point of contact

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