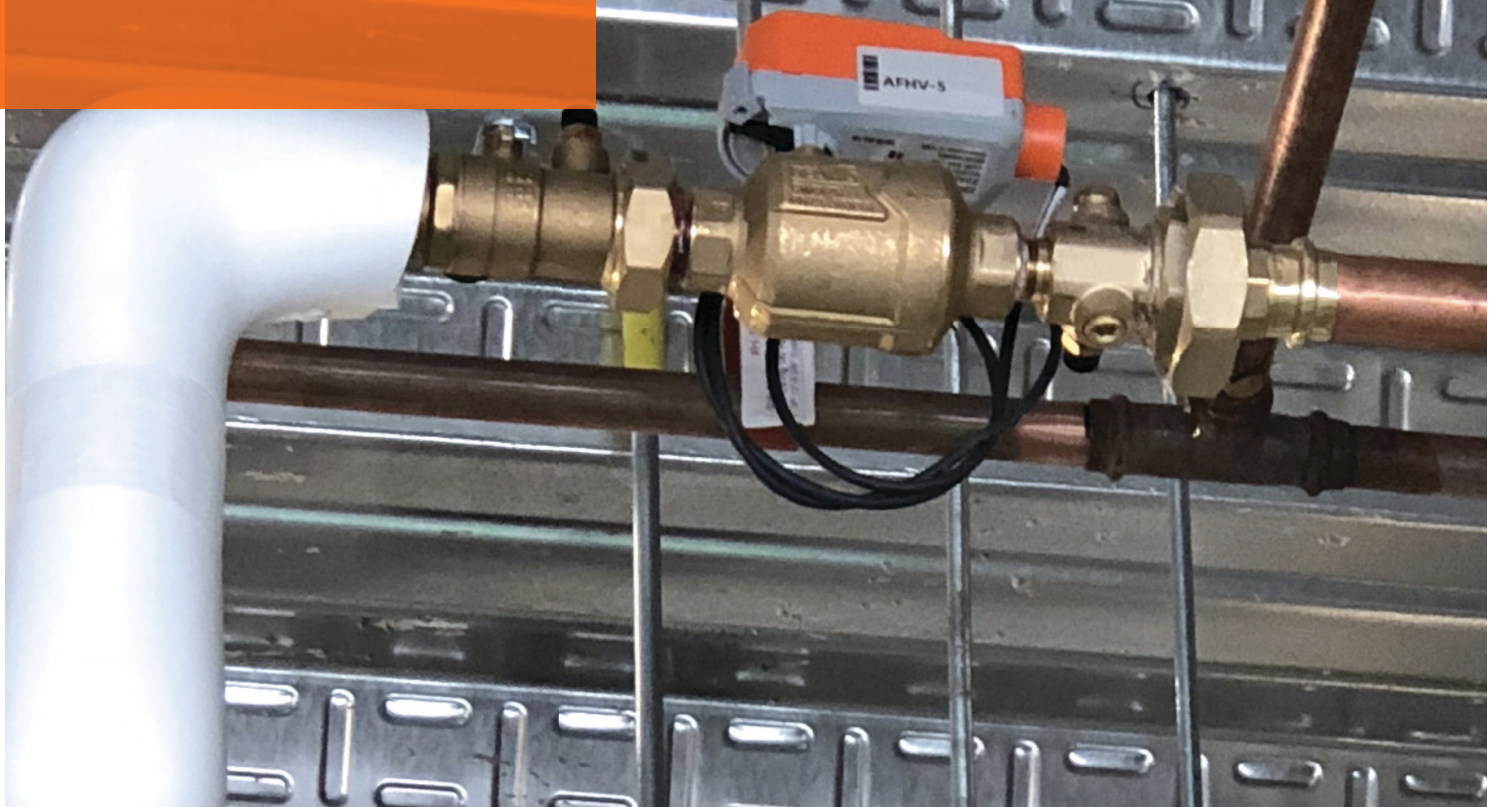


**Fast Delivery
and Ease of
Installation**



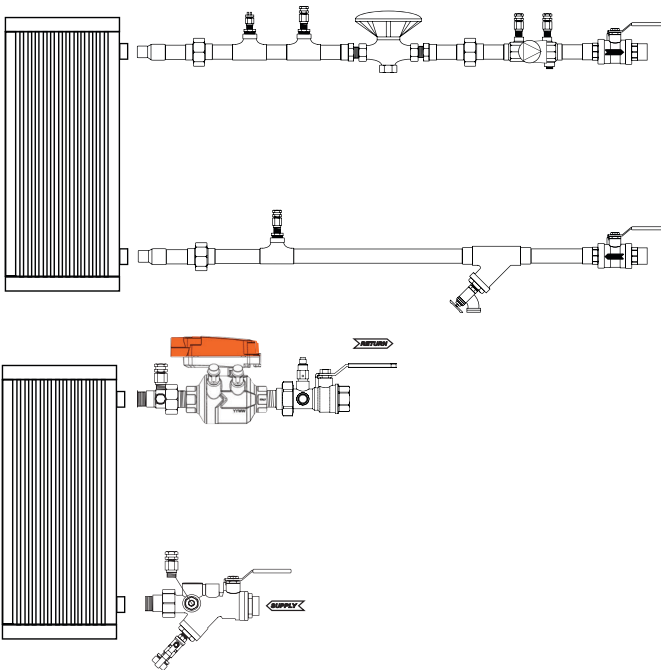
Piping Packages

Belimo Piping Packages are a streamlined method of piping HVAC terminal units reducing time, space, and labor required to make the connection from the distribution piping to the coil. Piping packages are custom factory assemblies, which include isolation for control valve and coil, pressure/temperature test ports for balancing, manual air vents, and strainer with integral drain options. These customizable assemblies dramatically simplifying the contractor's job by reducing connections to as few as four with less opportunity for errors.

Available configuration with the Energy Valve, ePIV, PIQCV, QCV, CCV, and standard zone valve assemblies offer solutions for a wide variety of hydronic applications. Belimo piping packages are backed with a 5-year warranty.*

FEATURES

- Eliminates numerous piping connections saving time and money
- Convenient access allows for easy commissioning providing optimal performance
- Each standard or customized solution comes bagged and tagged for easy job site distribution
- Factory assembled and 100% leak tested for reliable operation



The Conventional Way

18 Pieces, 22 Connections
10 minutes/connection x 22 connections
220/60 minutes= 3.66 hours

3.66 hours x \$36 an hour= Labor Cost of \$132

The Belimo Way

2 Pieces, 4 Connections
10 minutes/connection x 4 connections
40/60 minutes= 0.667 hours

0.667 hours x \$36 an hour= Labor Cost of \$24

*2-year warranty on standard zone valves.

Piping Package Nomenclature

P 2	1 1 1	1 2 1 3	1 2 1 1	2
Piping Package P = Piping Package Valve Type 2 = 2-way CCV 3 = 3-way CCV E = ePIV / EV P = PIQCV Q = QCV Z = Zone Options S = Supply Side Package X = Extension Package	Union Valve Size 1 = ½" 2 = ¾" 3 = 1" 4 = 1...¾" 5 = ¾...1½" A = 1½" B = 1¼" C = 2" D = 1¼...1" E = 1½...1¼" F = 2...1½" G = 1...½" H = 1¼...¾" J = 1½...1" K = 2...1¼" Body End 1 = Female NPT 2 = Copper Sweat Configuration 1 = Standard Tailpiece End Male NPT Only	Isolation Valve / Manual Balance Valve Valve Size 1 = ½" 2 = ¾" 3 = 1" 4 = 1...¾" 5 = ¾...1½" A = 1½" B = 1¼" C = 2" D = 1¼...1" E = 1½...1¼" F = 2...1½" G = 1...½" H = 1¼...¾" J = 1½...1" K = 2...1¼" Body End 1 = Female NPT 2 = Copper Sweat Configuration 1 = Standard Tailpiece End Male NPT Only	Strainer / Isolation Valve Valve Size 1 = ½" 2 = ¾" 3 = 1" 4 = 1...¾" 5 = ¾...1½" A = 1½" B = 1¼" C = 2" D = 1¼...1" E = 1½...1¼" F = 2...1½" G = 1...½" H = 1¼...¾" J = 1½...1" K = 2...1¼" Body End 1 = Female NPT 2 = Copper Sweat Configuration 1 = Standard Tailpiece End (Strainer Option) 1 = Female NPT 2 = Copper Sweat 3 = Male NPT Tailpiece End (Isolation Valve Option) 0 = Select "0" for Isolation Valve Option Male NPT Only	Hose Diameter & Length 1 = ½" (12" length) 2 = ½" (24" length) 3 = ¾" (12" length) 4 = ¾" (24" length) 5 = 1" (12" length) 6 = 1" (24" length) 7 = ½" (18" length) 8 = ¾" (18" length) 9 = 1" (18" length) A = 1¼" (18" length) H = 1¼" (24" length) B = 1¼" (36" length) C = 1½" (18" length) D = 1½" (24" length) E = 1½" (36" length) F = 2" (24" length) G = 2" (36" length)

Please refer to typical Piping Package layouts on pages prior to ordering. Nomenclature chart does not include all options or press connection types. Manual Balance Valves require flow consideration for proper sizing. Download Select-Pro software for complete options and available configurations. Consult factory for lead time. Non-standard items have increased lead time.

Non-Standard items include:

- 1¼...2" packages of all types
- All sizes of Unions, Manual Balance Valves, Strainers and Isolation Valves without P/T ports
- All sizes of Unions, Manual Balance Valves, Strainers and Isolation Valves with extensions
- All sizes of components with press fit connections

Note: Piping Package smart code does not include the Belimo control valve in the price.

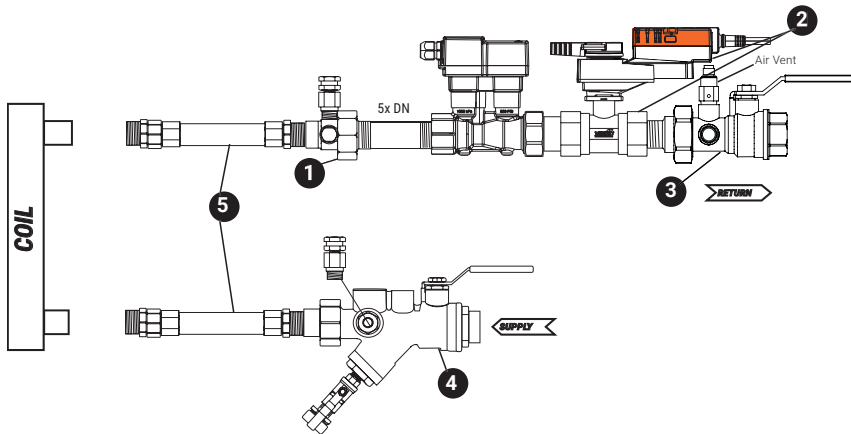
Piping packages at a glance

Use Belimo SelectPro™ the software tool for accurate sizing and selecting.

Standard Packages	Size	Union	Manual Balance Valve	Isolation Valve	Strainer	Hoses	5-Year Warranty
Energy Valve	½" - 2"	■		■	■	■	■
ePIV	½" - 2"	■		■	■	■	■
PIQCV	½" - ¾"	■		■	■	■	■
CCV	½" - 2"	■	■		■	■	■
QCV Zone Valve	½" - ¾"	■	■		■	■	■
Standard Zone Valve	½" - 1"	■	■		■	■	

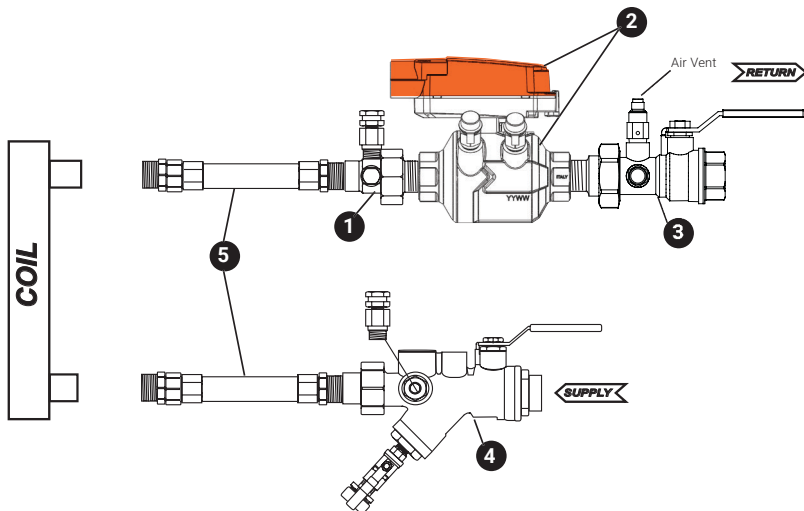
Pressure Independent

2-way Electronic Pressure Independent Valve (ePIV) / Energy Valve (EV)



1. Union with 5x DN tail
2. Belimo valve assembly
3. Isolation valve
4. Strainer or isolation valve
5. Optional hoses are available

2-way Pressure Independent Quick Connect Valve (PIQCV)

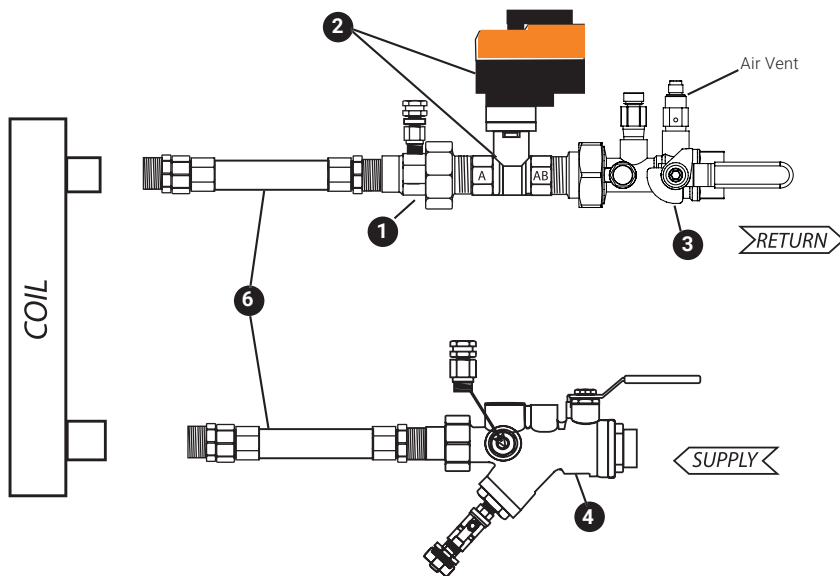


1. Union
2. Belimo valve assembly
3. Isolation valve
4. Strainer or isolation valve
5. Optional hoses are available

Factory assembled and tested

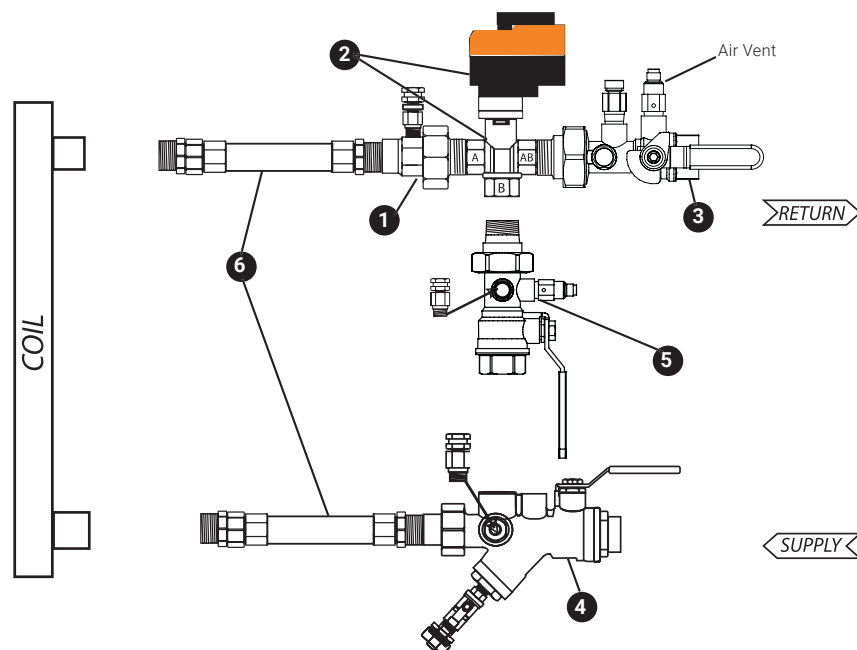
Pressure Dependent

2-way Characterized Control Valve (CCV)



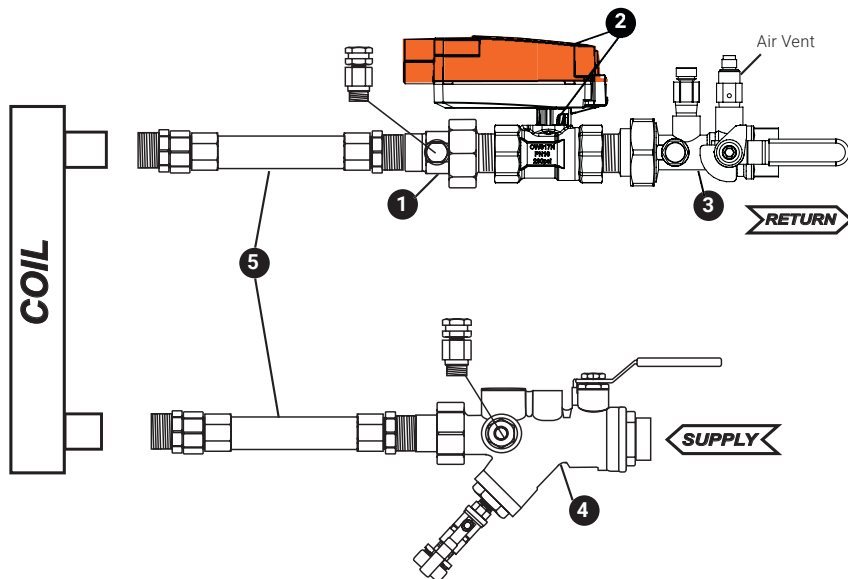
- 1. Union
- 2. Belimo valve assembly
- 3. Manual balance valve
- 4. Strainer or isolation valve
- 5. Isolation valve
- 6. Optional hoses are available

3-way Characterized Control Valve (CCV)

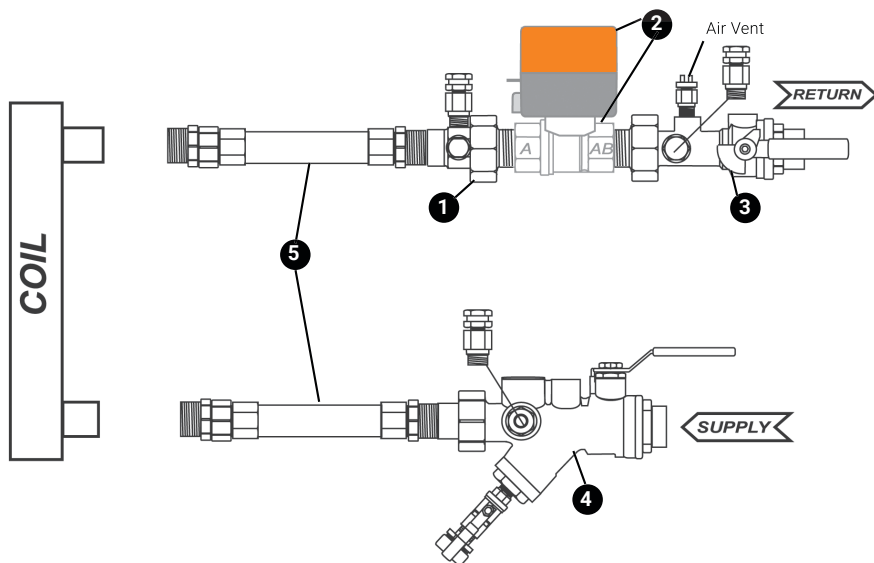


Pressure Dependent

2-way Belimo ZoneTight™ Zone Valve, Quick Connect Valve (QCV)



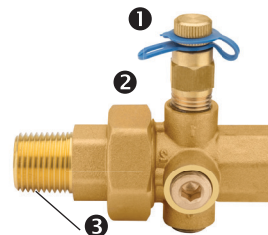
2-way Standard Zone Valve



Featured components

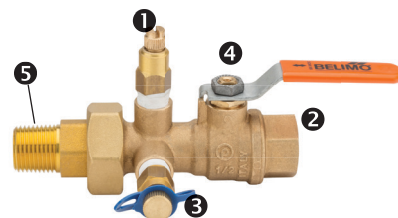
Union combined with multiple fittings, and (pressure/temperature) PT readout port into a single part.

- ❶ ¼" PT readout port
- ❷ Forged brass body available in male NPT, female NPT, copper sweat or press-fit
- ❸ Tail piece available with up to two line size reductions, male NPT standard



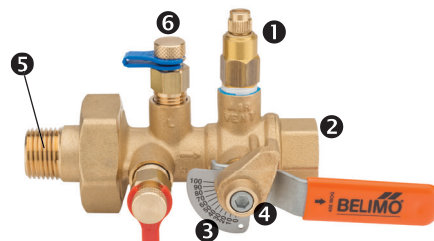
Isolation Valve combine with a union, manual air vent, and PT port into a single part which eliminates up to 7 piping connections.

- ❶ Manual air vent
- ❷ Forged brass body, chrome ball available in female NPT, copper sweat or press-fit
- ❸ ¼" PT readout port
- ❹ Triple seal, blow out proof stem with 2 Viton® o-rings and Teflon® packing with chrome ball
- ❺ Tail piece available with up to two line size reductions, male NPT standard



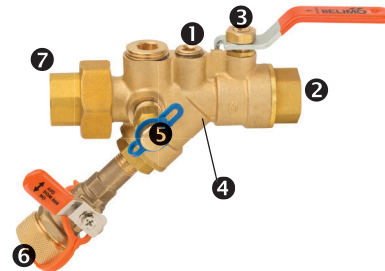
Manual Balance Valve is a combination of an isolation valve, union, manual air vent, PT readout port with a high signal, low loss venturi which eliminates up to 8 piping connections.

- ❶ Manual air vent
- ❷ Forged brass body available in female NPT, copper sweat or press-fit
- ❸ Forged brass memory stop with arc indicator pad
- ❹ Triple seal, blow out proof stem with 2 Viton® o-rings and Teflon® packing
- ❺ Tail piece available with up to two line size reductions, male NPT standard
- ❻ (2) ¼" PT readout ports



Strainer is a combination of an isolation valve, a 20 mesh stainless steel screen, union, and a PT port which eliminates up to 8 piping connections.

- ❶ Standard ¼" accessory tapping
- ❷ Forged brass body, chrome plated ball available in female NPT, copper sweat or press-fit
- ❸ Solid brass stem with 2 Viton® o-rings and Teflon® packing
- ❹ Large 20 mesh stainless steel screen
- ❺ ¼" PT readout port
- ❻ ¼" Ball valve drain with ¾" hose end connection with cap
- ❼ Tail piece available with up to two line size reductions, in male NPT, female NPT, and copper sweat

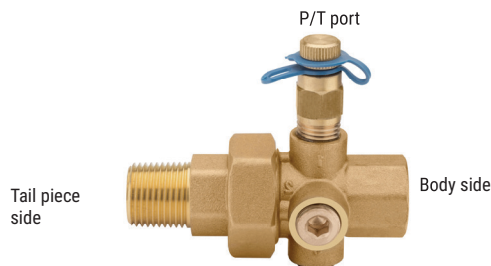


Hoses are designed for operating conditions in heating and air conditioning coil applications and are not sensitive to glycol or water treatment fluids. Hoses have a male NPT connection and are sold two per package. Available length options include 12, 18, 24, and 36 inches.

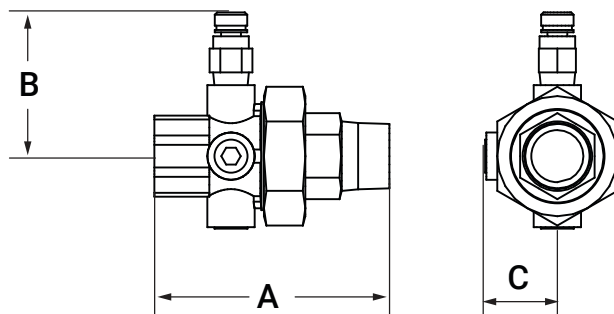


Note: Standard pipe packages are ½" to 1". Packages 1 ¼" to 2," or that include components with press-fit connections, extensions, or less P/T ports may carry increased lead time. Consult the factory.

Viton® is a register trademark of DuPont.



Technical Data	
Fluid	chilled or hot water, 60% glycol
Sizes	½", ¾", 1", 1¼", 1½", 2"
Materials:	
Body	forged brass
Union nut	forged brass
Tailpiece	forged brass
O-ring	EPDM
Readout port body & cap	extruded brass
Readout port seal	Nordel
Pressure /temp. ratings:	
½"...2"	600 psi
Component temperature	250°F maximum



Valve Nominal Size		Dimensions Inches [mm]		
Inches	DN [mm]	A	B	C
½"	[10]	3.47 [88.14]	1.94 [49.28]	0.87 [22.10]
¾"	[15]	3.55 [90.17]	2.17 [55.12]	1.10 [27.94]
1"	[25]	3.92 [99.57]	2.17 [55.12]	1.10 [27.94]
1¼"	[32]	4.16 [105.66]	2.56 [65.02]	1.51 [38.35]
1½"	[40]	4.18 [106.17]	2.56 [65.02]	1.51 [38.35]
2"	[50]	4.47 [113.54]	2.87 [72.91]	1.82 [46.23]

Application

The integrated Union with readout port combines the features of a union, reducer/adaptor fittings and pressure/temperature readout port into a single unit.

This greatly simplifies the Contractor's job by eliminating numerous piping connections, thus saving time, money, and potential leak points. The Union is available with female NPT, male NPT or copper sweat connections, making tough piping jobs a snap.

Connection Availability	
Body end	female NPT ½"...2" male NPT ½"...2" copper SWT ½"...2"
Tailpiece end	male NPT ½"...2"
Body end with one size reduction	female NPT ¾"...2" male NPT ¾"...2" copper SWT ¾"...2"
Body end with two size reductions	female NPT 1"...2" male NPT 1"...2" copper SWT 1"...2"

Part Number	
PPU111	½" female NPT with P/T port
PPU121	½" sweat with P/T port
PPU131	½" male NPT with P/T port
PPU211	¾" female NPT with P/T port
PPU221	¾" sweat with P/T port
PPU231	¾" male NPT with P/T port
PPU311	1" female NPT with P/T port
PPU321	1" sweat with P/T port
PPU331	1" male NPT with P/T port
PPU411	1" to ¾" female NPT with P/T port
PPU421	1" to ¾" sweat with P/T port
PPU431	1" to ¾" male NPT with P/T port
PPU511	¾" to ½" female NPT with P/T port
PPU521	¾" to ½" sweat with P/T port
PPU531	¾" to ½" male NPT with P/T port

Note: All reductions are on the tail piece side.

Only standard items are shown. Consult factory or Select-Pro software for full range of available options including 1¼"...2" sizes.

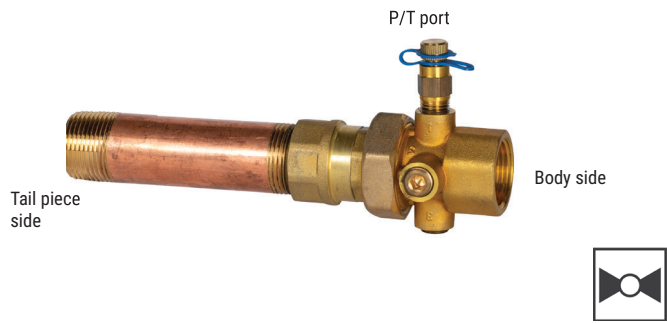
Custom Option: The Union is available in a body side press fit option for sizes ½"...2"

The Press Fit Union is rated 250PSI WOG. Connections are manufactured to IAPMO PS 117 for direct mechanical connection to ASTM B88-Type K, L and M copper tubing in the hard drawn condition.

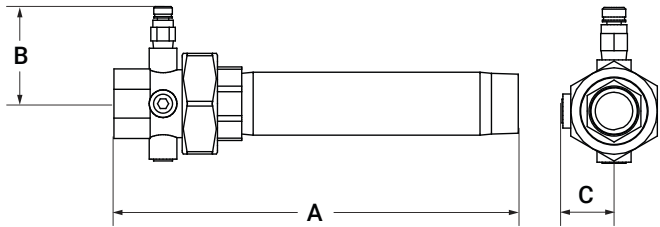
Safety Note

Warning: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

Union Valve
Integrated Union with 5xDN tail / Readout Port



Technical Data table with 2 columns: Specification and Value. Rows include Fluid (chilled or hot water, 60% glycol), Sizes (1/2", 3/4", 1", 1 1/4", 1 1/2", 2"), Materials (Body: forged brass, Union nut: forged brass, Tailpiece: forged brass with red brass tail extension, O-ring: EPDM, Readout port body & cap: extruded brass, Readout port seal: Nordel), and Pressure /temp. ratings (600 psi, 250°F maximum).



Dimensions table with 5 columns: Valve Nominal Size (Inches, DN [mm]), A (Inches [mm]), B (Inches [mm]), and C (Inches [mm]). Rows provide dimensions for sizes from 1/2" to 2".

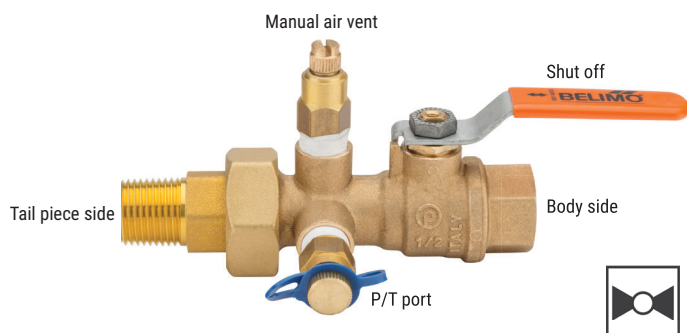
Application
The integrated Union with readout port combines the features of a union, 5xDN tail adaptor fittings and pressure/temperature readout port into a single unit designed specifically for use with ePIV/EV.
This greatly simplifies the Contractor's job by eliminating numerous piping connections, thus saving time, money, and potential leak points. The Union is available with female NPT connections, making tough piping jobs a snap.

Connection Availability table with 2 columns: Connection Type and Size. Rows show Body end (female NPT 1/2"...2") and Tailpiece end (male NPT 1/2"...2").

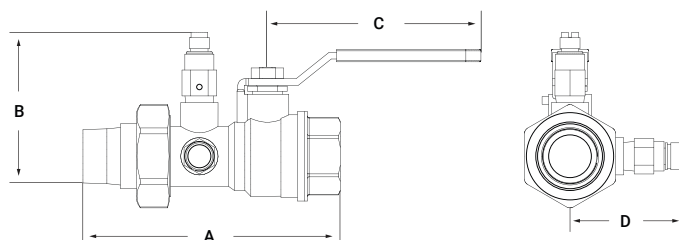
Part Number table with 2 columns: Part Number and Description. Rows list part numbers PPU11C through PPUC1C and their corresponding NPT sizes and P/T port features.

Safety Note

Warning: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov



Technical Data	
Fluid	chilled or hot water, 60% glycol
Sizes	½", ¾", 1", 1¼", 1½", 2"
Materials:	
Body	forged brass
Gland nut	extruded brass
Ball	chrome plated/hot forged brass
Stem	extruded brass
Union nut	forged brass
Tailpiece	forged brass
Seats	virgin PTFE
Packing	virgin PTFE
Stem o-rings	Viton
Readout port body & cap	extruded brass
Readout port seal	Nordel
Pressure/temp ratings	
½"...¾"	600 psi
1"...2"	500 psi
Component temperature	300°F maximum
Leakage	0%



Valve Nominal Size		Cv	Dimensions Inches [mm]			
Inches	DN [mm]		A	B	C	D
½"	[10]	20.25	4.94 [125.48]	2.17 [55.12]	3 [76.20]	1.94 [49.28]
¾"	[15]	41.83	4.7 [119.38]	2.27 [57.66]	3.9 [99.06]	2.04 [51.82]
1"	[25]	78.38	5.42 [137.67]	2.36 [59.94]	4.72 [119.89]	2.14 [54.36]
1¼"	[32]	132.1	6.33 [160.78]	2.56 [65.02]	4.72 [119.89]	2.36 [59.94]
1½"	[40]	206.96	6.98 [177.29]	2.69 [68.33]	6.06 [153.92]	2.53 [64.26]
2"	[50]	346	7.96 [202.18]	3.56 [90.42]	6.09 [154.69]	2.83 [71.88]

Note: the Cv factor is the flow rate in GPM through the valve at a 1 PSID. For calculated pressure drop across the Isolation valve, calculate $P = \left(\frac{GPM}{Cv}\right)^2$. Cv rating supplied in the chart.

Application

This Isolation Valve combines the features of an isolation valve, union, and pressure/temperature readout ports into a single unit. The full port design is favored by Engineers because it minimizes terminal unit piping pressure drop and the forged brass body ensures reliable leak-free performance.

This Isolation Valve greatly simplifies the contractor's job by eliminating up to nine piping connections, thus saving time, money, and potential leak points. The Isolation Valve requires only one third the space of the components it replaces, making tough piping jobs a snap.

- All Isolation Valves are equipped with a manual air vent.

Connection Availability

Body end	female NPT ½"...2"
	copper SWT ½"...2"
Tailpiece end	male NPT ½"...2"
Body end with one size reduction	female NPT ¾"...2"
	copper SWT ¾"...2"
Body end with two size reduction	female NPT 1"...2"
	copper SWT 1"...2"

Part Number

PPV1110	½" female w/manual air vent and P/T port
PPV1210	½" sweat w/manual air vent and P/T port
PPV2110	¾" female w/manual air vent and P/T port
PPV2210	¾" sweat w/manual air vent and P/T port
PPV3110	1" female w/manual air vent and P/T port
PPV3210	1" sweat w/manual air vent and P/T port
PPV4110	1" to ¾" female w/manual air vent and P/T port
PPV4210	1" to ¾" sweat w/manual air vent and P/T port
PPV5110	¾" to ½" female w/manual air vent and P/T port
PPV5210	¾" to ½" sweat w/manual air vent and P/T port

Note: All reductions are on the tail piece side.

Only standard items are shown. Consult factory or Select-Pro software for full range of available options including 1¼"...2" sizes.

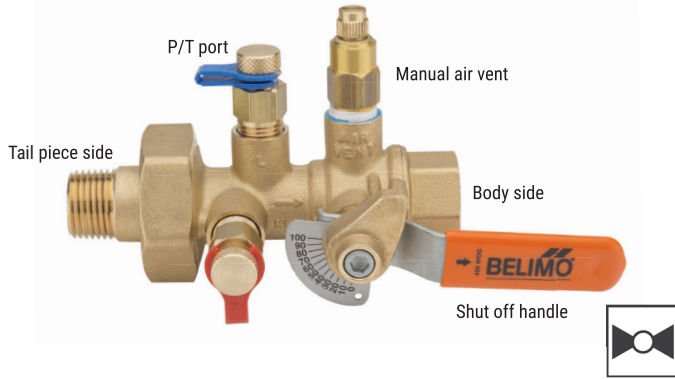
Custom Option: The Isolation Valve is available in a body side press fit option for sizes ½"...2". The Press Fit Isolation Valve is rated 250PSI WOG. Connections are manufactured to IAPMO PS 117 for direct mechanical connection to ASTM B88-Type K, L and M copper tubing in the hard drawn condition.

Safety Note

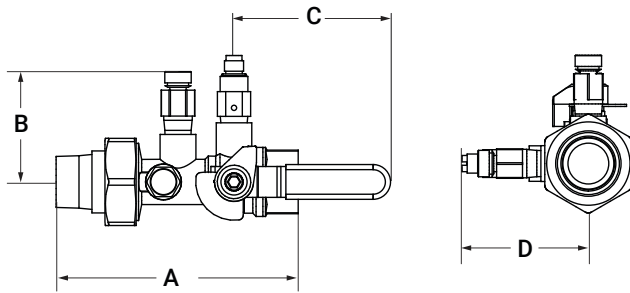
Warning: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

Manual Balance Valve

Integrated Manual Balancing Valve/Union/Isolation Valve



Technical Data	
Fluid	chilled or hot water, 60% glycol
Sizes	½", ¾", 1, 1¼", 1½", 2"
Materials:	
Body	forged brass
Ball	chrome plated/forged brass
Stem	extruded brass
Union	forged brass
Tailpiece	forged brass
Gland nut	extruded brass
Seals & packing	Virgin PTFE
O-rings	Viton
Venturi	extruded brass
Readout port body & cap	extruded brass
Readout port seal	Nordel
Memory stop	forged brass
Pressure /temp. ratings:	
½"...2"	400 psi
Component temperature	300°F maximum
Leakage	0%



Valve Nominal Size		Dimensions Inches [mm]			
Inches	DN [mm]	A	B	C	D
½"	[10]	4.50 [114.30]	2.05 [52.07]	3.00 [76.20]	2.42 [61.47]
¾"	[15]	4.63 [117.60]	2.05 [52.07]	3.00 [76.20]	2.42 [61.47]
1"	[25]	5.37 [136.40]	2.15 [54.61]	3.90 [99.06]	2.55 [64.77]
1¼"	[32]	6.67 [169.42]	2.30 [58.42]	4.70 [119.38]	2.68 [68.07]
1½"	[40]	7.31 [185.67]	2.49 [63.25]	4.72 [119.89]	2.89 [73.41]
2"	[50]	8.50 [215.90]	3.32 [84.33]	6.17 [156.72]	3.11 [78.99]

*For calculated press drop across the Manual Balance Valve calculate $P = \frac{(GPM)^2}{C_v}$
 Cv rating is based on Venturi size and Cv noted in graph on page 13
 (i.e. Venturi 4 has a Cv rating of 1.30)

Application

The Manual Balance Valve combines the features of an isolation valve, union, and pressure/temperature readout ports, along with the added value of a low-loss, high-signal venturi readout device into a single unit. The addition of the venturi makes this product perfect for readout and setting flow of individual circuits accurate to +/- 2%. Also, the forged brass body of the Manual Balance Valve is favored by Engineers because it ensures reliable, leak-free performance.

The Manual Balance Valve greatly simplifies the Contractor's job by eliminating up to ten piping connections, thus saving time, money, and potential leak points. Finally, the Manual Balance Valve is available with female NPT, male NPT, or SWT, single and double nominal size reducer tailpiece connections making tough piping jobs a snap.

- All Manual Balance Valves come with a manual air vent.

Connection Availability

Body end	female NPT ½"...2" copper SWT ½"...2"
Tailpiece end	male NPT ½"...2"
Body end with one size reduction	female NPT ¾"...2" copper SWT ¾"...2"
Body end with two size reductions	female NPT 1"...2" copper SWT 1"...2"

Part Number

PPL1111	½" x ½" (Cv 1.30, 0.48...1.21 GPM)
PPL1112	½" x ½" (Cv 2.65, 0.89...2.47 GPM)
PPL1113	½" x ½" (Cv 7.05, 2.22...6.60 GPM)
PPL2111	¾" x ¾" (Cv 1.30, 0.48...1.21 GPM)
PPL2112	¾" x ¾" (Cv 2.65, 0.89...2.47 GPM)
PPL2113	¾" x ¾" (Cv 7.05, 2.22...6.60 GPM)
PPL3114	1" x 1" (Cv 7.05, 2.6...6.60 GPM)
PPL3115	1" x 1" (Cv 17.6, 5.5...16.5 GPM)
PPL4114	1" x ¾" (Cv 7.05, 2.6...6.60 GPM)
PPL4115	1" x ¾" (Cv 17.6, 5.5...16.5 GPM)
PPL5111	¾" x ½" (Cv 1.30, 0.48...1.21 GPM)
PPL5112	¾" x ½" (Cv 2.65, 0.89...2.47 GPM)
PPL5113	¾" x ½" (Cv 7.05, 2.22...6.60 GPM)
PPLA11B*	1½" x 1½" (Cv 57.0, 12.8...38.0 GPM)
PPLB11A*	1¼" x 1¼" (Cv 34.0, 10.6...31.8 GPM)
PPLC11C*	2" x 2" (Cv 57.0, 18.0...38.0 GPM)
PPLC11D*	2" x 2" (Cv 88, 30.0...88.0 GPM)
PPLD114*	1¼" x 1" (Cv 34.0, 10.6...31.8 GPM)
PPLF11B*	1½" x 1¼" (Cv 57.0, 12.8...38.0 GPM)
PPLF11C*	2" x 1½" (Cv 57.0, 18.0...53.0 GPM)
PPLG114*	1" x ½" (Cv 7.05, 2.6...6.6 GPM)
PPLG115*	1" x ½" (Cv 17.6, 5.5...16.5 GPM)
PPLH11A*	1¼" x ¾" (Cv 34.0, 10.6...31.8 GPM)
PPLJ11B*	1½" x 1" (Cv 57.0, 12.8...38.0 GPM)
PPLK11C*	2" x 1¼" (Cv 57.0, 18.0...53.0 GPM)

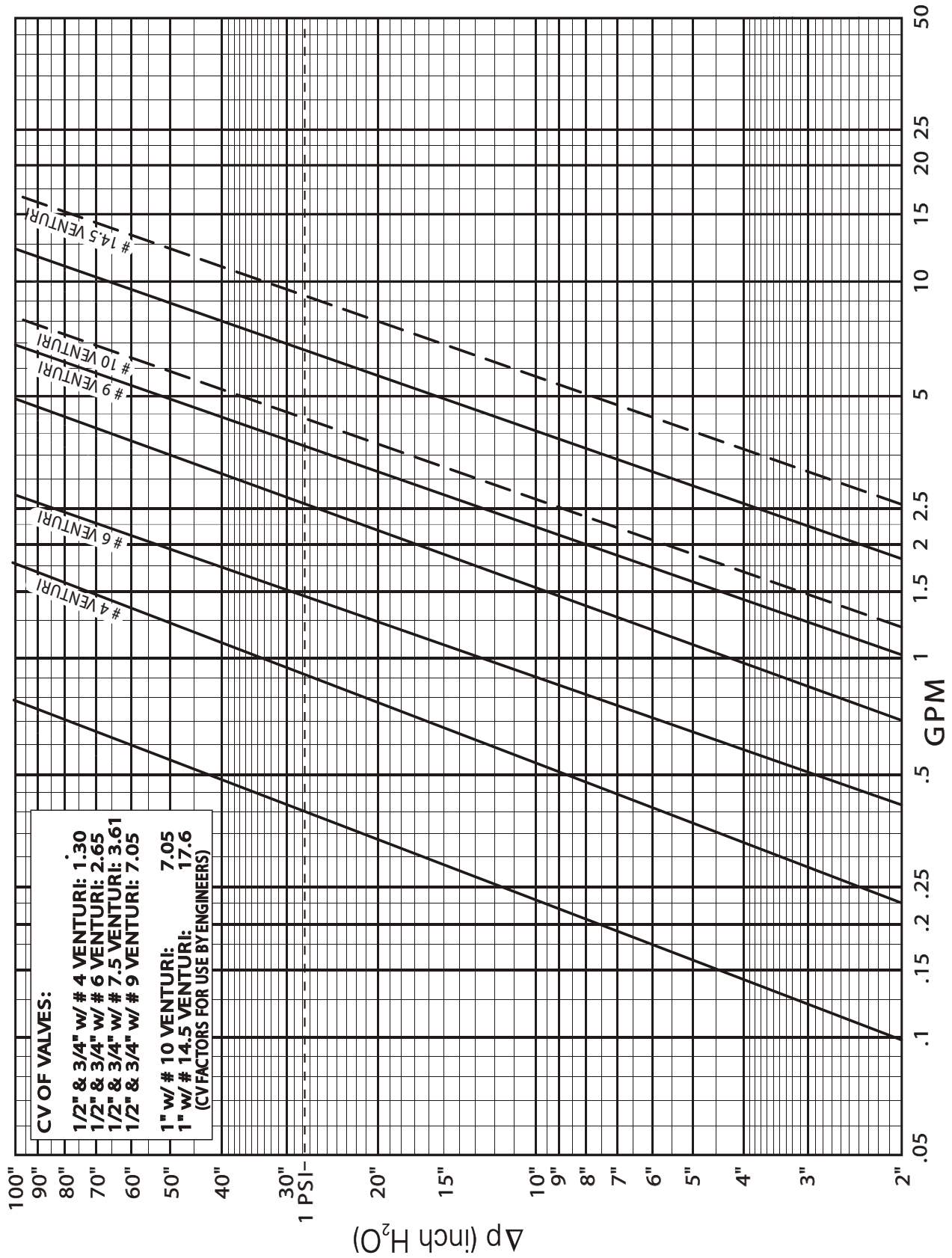
*Non-Standard Items

**Referenced flow values are based on 10...90" Dp range at 2 ft. head.

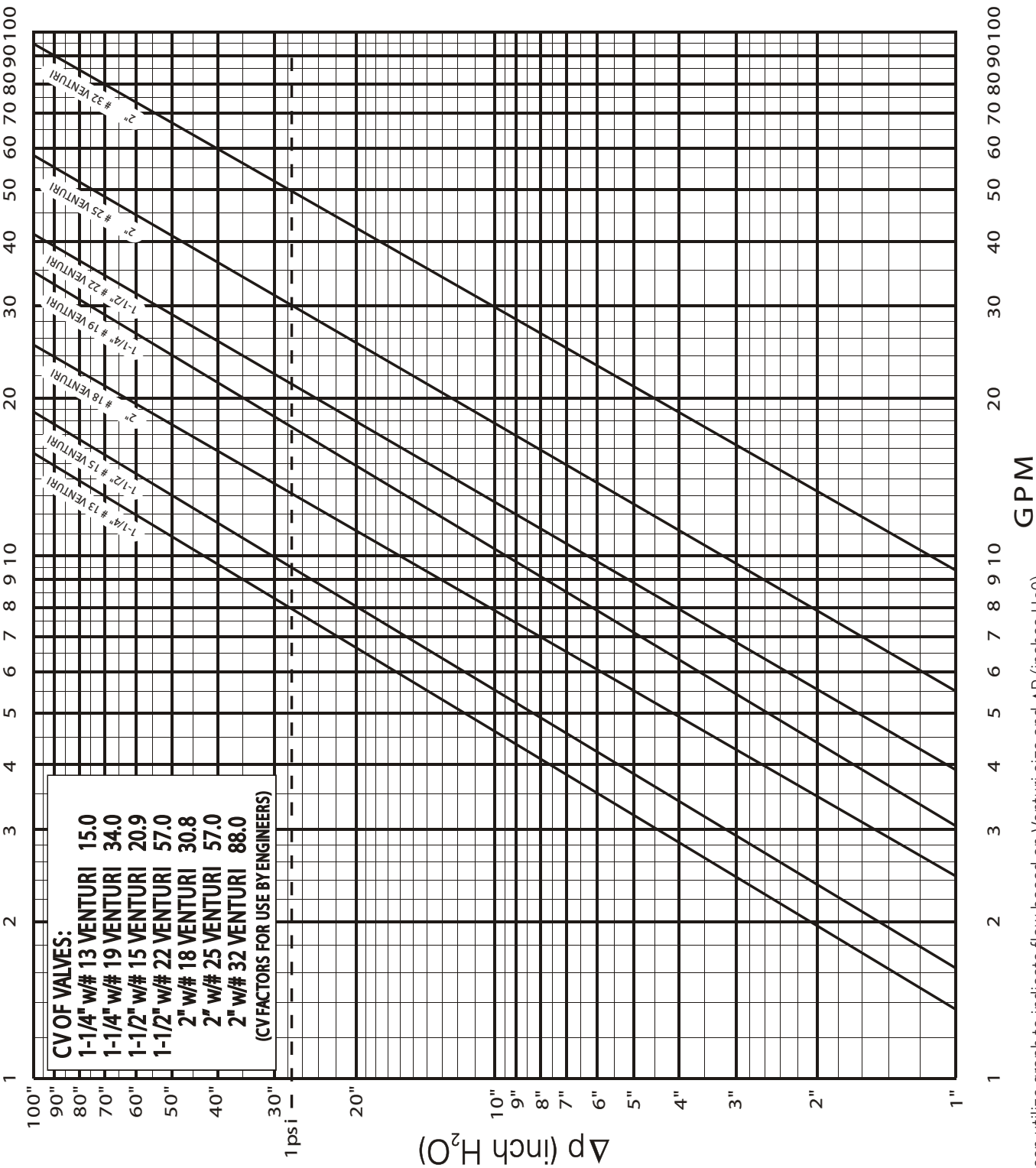
Custom Option: The Manual Balance Valve is available in a body side press fit option for sizes ½"...2". The Press Fit Manual Balance Valve is rated 250PSI WOG. Connections are manufactured to IAPMO PS 117 for direct mechanical connection to ASTM B88-Type K, L and M copper tubing in the hard drawn condition.

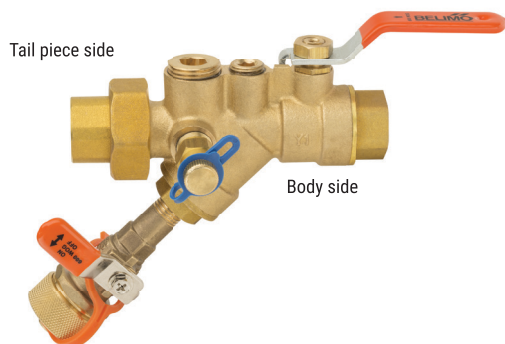
Safety Note

Warning: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

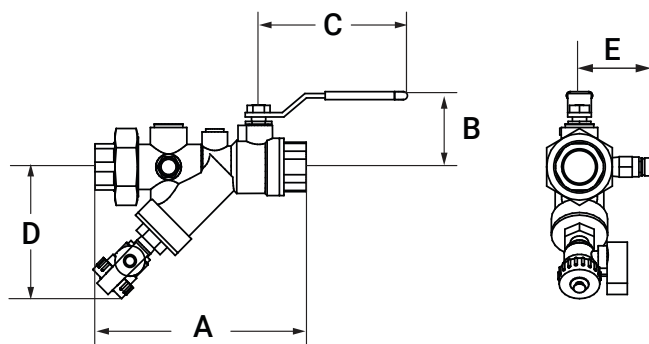


Balancer can utilize graph to indicate flow based on Venturi size and ΔP (inches H_2O).





Technical Data	
Fluid	chilled or hot water, 60% glycol
Sizes	½", ¾", 1", 1¼", 1½", 2"
Materials:	
Body	forged brass
Union nut	forged brass
Ball	chrome plated/forged brass
Stem piece & gland nut	forged brass
Tailpiece	forged brass
Seals & packing	PTFE
Stem o-rings	Viton
Strainer screen	304 stainless steel / 20 mesh standard
Readout port body & cap	extruded brass
Readout port seal	Nordel
Pressure /temp. ratings:	
½"...2"	600 psi
Component temperature	325°F maximum
Leakage	0%



Valve		Cv	Dimensions Inches [mm]				
Nominal Size	DN [mm]		A	B	C	D	E
½"	[10]	5.50	5.37 [136.40]	2.00 [50.80]	3.10 [78.74]	3.07 [77.98]	1.90 [48.26]
¾"	[15]	9.00	5.84 [148.34]	2.00 [50.80]	4.10 [104.14]	4.31 [109.47]	2.00 [50.80]
1"	[25]	9.00	6.85 [173.99]	2.00 [50.80]	4.10 [104.14]	4.31 [109.47]	2.00 [50.80]
1¼"	[32]	28.00	7.65 [194.31]	2.67 [67.82]	4.83 [122.68]	4.64 [117.86]	2.22 [56.39]
1½"	[40]	28.00	8.89 [225.81]	2.66 [67.56]	4.90 [124.46]	4.64 [117.86]	2.22 [56.39]
2"	[50]	32.00	11.47 [291.34]	3.23 [82.04]	6.48 [164.59]	5.26 [133.60]	2.63 [66.80]

Note: the Cv factor is the flow rate in GPM through the valve at a 1 PSID. For calculated pressure drop across the Strainer, calculate $P = \frac{GPM^2}{Cv^2}$. Cv rating supplied in the chart.

Application

The Strainer combines the features of an isolation valve, strainer, union, and pressure/temperature readout port into a single unit. The forged brass body ensures reliable, leak-free performance. Multiple taps/bosses offer versatility for additional accessories to accommodate piping configuration requirements.

The Strainer greatly simplifies the Contractor's job by eliminating several piping connections, thus saving time, money, and potential leak points. Finally, the Strainer requires only one third the space of the components it replaces, making tough piping jobs a snap.

Connection Availability

Body end	female NPT ½"...2" copper SWT ½"...2"
Tailpiece end	female NPT ½"...2" male NPT ½"...2" copper SWT ½"...2"
Tailpiece end with one size reduction	female NPT ¾"...2" male NPT ¾"...2" copper SWT ½"...2"
Body end with two size reduction	female NPT 1"...2" copper SWT 1"...2"

Part Number

PPS1111	½" strainer, female NPT to female NPT w/blow down/drain port and P/T port
PPS1112	½" strainer, female NPT, sweat w/blow down/drain port and P/T port
PPS1113	½" strainer, female NPT to male NPT w/blow down/drain port and P/T port
PPS1211	½" strainer, sweat to female NPT w/blow down/drain port and P/T port
PPS1212	½" strainer, sweat to sweat w/blow down/drain port and P/T port
PPS1213	½" strainer, sweat to male NPT w/blow down/drain port and P/T port
PPS2111	¾" strainer, female NPT to female NPT w/blow down/drain port and P/T port
PPS2112	¾" strainer, female NPT to sweat w/blow down/drain port and P/T port
PPS2113	¾" strainer, female NPT to male NPT w/blow down/drain port and P/T port
PPS2211	¾" strainer, sweat to female NPT w/blow down/drain port and P/T port
PPS2212	¾" strainer, sweat to sweat w/blow down/drain port and P/T port
PPS2213	¾" strainer, sweat to male NPT w/blow down/drain port and P/T port
PPS3111	1" strainer, female NPT to female NPT w/blow down/drain port and P/T port
PPS3112	1" strainer, female NPT to sweat w/blow down/drain port and P/T port
PPS3113	1" strainer, female NPT to male NPT w/blow down/drain port and P/T port
PPS3211	1" strainer, sweat to female NPT w/blow down/drain port and P/T port
PPS3212	1" strainer, sweat to sweat w/blow down/drain port and P/T port
PPS3213	1" strainer, sweat to male NPT w/blow down/drain port and P/T port
PPS4111	1" to ¾" strainer, female NPT to female NPT w/blow down/drain port and P/T port
PPS4112	1" to ¾" strainer, female NPT to sweat w/blow down/drain port and P/T port
PPS4113	1" to ¾" strainer, female NPT to male NPT w/blow down/drain port and P/T port
PPS4211	1" to ¾" strainer, sweat to female NPT w/blow down/drain port and P/T port
PPS4212	1" to ¾" strainer, sweat to sweat w/blow down/drain port and P/T port
PPS4213	1" to ¾" strainer, sweat to male NPT w/blow down/drain port and P/T port
PPS5111	¾" to ½" strainer, female NPT to female NPT w/blow down/drain port and P/T port
PPS5112	¾" to ½" strainer, female NPT to sweat w/blow down/drain port and P/T port
PPS5113	¾" to ½" strainer, female NPT to male NPT w/blow down/drain port and P/T port
PPS5211	¾" to ½" strainer, sweat to female NPT w/blow down/drain port and P/T port
PPS5212	¾" to ½" strainer, sweat to sweat w/blow down/drain port and P/T port
PPS5213	¾" to ½" strainer, sweat to male NPT w/blow down/drain port and P/T port

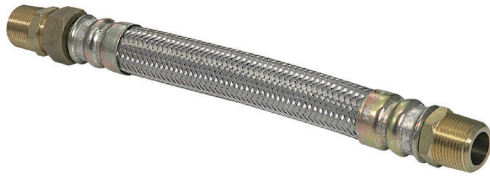
Note: All reductions are on the tail piece side.

Only standard items are shown. Consult factory or Select-Pro software for full range of available options including 1¼"...2" sizes.

Custom Option: The Strainer is available in a body side press fit option for sizes ½"...2". The Press Fit Strainer is rated 250PSI WOG. Connections are manufactured to IAPMO PS 117 for direct mechanical connection to ASTM B88-Type K, L and M copper tubing in the hard drawn condition.

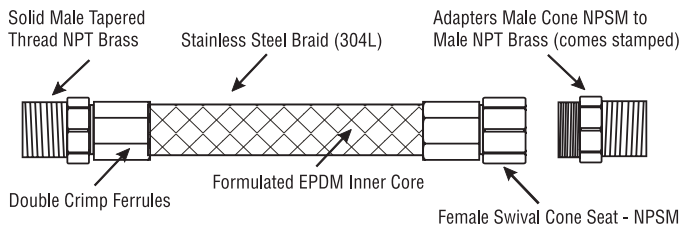
Safety Note

Warning: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov



Technical Data	
External braiding	stainless steel AISI 304
Crimping ferrules	stainless steel AISI 304
Connectors	machined brass
Fiber gasket	BA-U fiber washer
Core	formulated EPDM
Operating & burst pressure rating:	
1/2"	375 psi operating *400 psi <195°F [90°C] 1500 psi burst pressure
3/4"	300 psi operating *400 psi <195°F [90°C] 1200 psi burst pressure
1"	225 psi operating 900 psi burst pressure
1 1/4"	200 psi operating 800 psi burst pressure
1 1/2"	175 psi operating 600 psi burst pressure
2"	150 psi operating 500 psi burst pressure
Component temperature	-5...+230°F [-20...+110°C] less than 41°F with use of glycol additive

Note: Fluid temperature may be limited by the hose rating



Dimensions	
Hose Size	Dimensions Inches [mm]
12" [304.80] Length	1/2" [12.70] 3/4" [19.05] 1" [25.40]
24" [609.60] Length	1/2" [12.70] 3/4" [19.05] 1" [25.40]

Male NPT hose connection must mate with end connection of Union and Strainer (female NPT must be selected for Strainer tallpiece and Union body if ordering hoses.)

Application

The flex hose has been specially designed for operating conditions in heating and air conditioning application coils.

Each hose is made up of several components and the special 12 point double crimping on the ferrule under strict quality control gives this hose double security against any leakage. The special EPDM core meets a fully defined specification. Shore hardness, resistance to aging, mechanical resistance (elasticity, tensile fracture, stretching), ability to accept chemical agents in contact with the elastomer and non-toxic. The elastomer is not sensitive to Glycol or water treatment products.

Hoses meet 25/50 flammability and smoke development classification requirements of codes and specifications when tested by ASTM E 84 method.

All hoses are male NPT x female swivel NPSM male cone to male NPT adaptor.

On Installation: Avoid absolutely any tension due to stretching during the course of tightening the connectors.

1. Install and tighten the fixed male connector (if applicable).
2. Install and tighten the union adaptor (if applicable).
3. Install and tighten the swivel nut. Use two spanners in order to screw in the union: one to hold the hexagon of the adaptor and the other to tighten the nut at the same time.

Important: Do not re-screw the fixed connector or adaptor after tightening the swivel nut; this will cause tensioning of the flexible hose with a risk of rapid deterioration at this point. On removal, take the same precautions. If the flexible hose incorporates two fixed connectors, at least one must be installed on a counter-part fitted with a screw connector.

Part Number	
PHOSE1	1/2", 12" long male NPT X male NPT
PHOSE2	1/2", 24" long male NPT X male NPT
PHOSE3	3/4", 12" long male NPT X male NPT
PHOSE4	3/4", 24" long male NPT X male NPT
PHOSE5	1", 12" long male NPT X male NPT
PHOSE6	1", 24" long male NPT X male NPT

Only standard items are shown. Consult factory or Select-Pro software for full range of available options including 1 1/4"...2" sizes.

NOTE: Every piping package that is ordered with a flexible hose will have 2 hoses and will be loose in the bag for easy connection to any side of the package.

Cv Ratings		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
12" Length	Cv	3.3	11.0	20.9	NA	NA	NA
18" Length	Cv	3.2	10.7	20.3	37.9	64.4	NA
24" Length	Cv	3.1	9.9	19.5	36.9	61.0	110.7
36" Length	Cv	3.0	9.3	18.2	34.7 ^{Cv}	55.0	100.8

For calculated pressure drop across each hose, calculate $P = \frac{(GPM)^2}{Cv}$. Cv rating is supplied in the above chart.

Safety Note

Warning: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

I. General

1.1. The following Terms and Conditions of Sale and Warranty ("Terms") apply to the sale of products described in this Product Guide and products sold by Seller as an original equipment manufacturer ("OEM") which may not be included in this Product Guide ("Product" or "Products"). As used herein, "Seller" or "Belimo" refers to Belimo Aircontrols (USA), Inc., or Belimo Aircontrols (CAN), Inc., or Belimo Automation AG, or Belimo Brasil – Comércio de Automação Ltda. as applicable, and "Client" refers to the individual or business entity that purchases the Products directly from Seller. These Terms shall apply unless the Seller and Client mutually agree to different terms and memorialize such agreement in writing signed by both Client and Seller or (ii) unless Seller changes these Terms and publishes the Terms on its Website to be found at: www.belimo.us, in which case the most recent Terms published on the Website will prevail. In case Seller's delivery includes software and/or application software and accompanying documentation, the terms of the license agreement for such software and/or application software are applicable in addition to these Terms. However, in case of conflicts between the terms and conditions of the license agreement and the Terms, the terms and conditions of the license agreement shall prevail.

II. Price

2.1. The Seller's price for Products (the "Price") is net, F.O.B. Point of Origin, and is calculated in US currency for sales made by Belimo Aircontrols (USA), Inc., and calculated in Canadian currency for sales made by Belimo Aircontrols (CAN) Inc., and Brazilian currency for sales made by Belimo Automation AG or Belimo Brasil – Comércio de Automação Ltda. to Clients in Brazil.

2.2. The Price, unless otherwise agreed upon, does not include freight and packaging (wooden crates, pallets, etc.), the costs of which will be charged to Client at cost for each shipment and shall be payable with payment of the Price.

2.3. Orders for Products where the total order has a net value of less than US \$300 (CAN \$300) will be subject to a US \$20 (CAN \$20) handling fee (the "Handling Fee"). The Handling Fee will not be charged for orders of Products with a net value equal to or greater than US \$300 (CAN \$300) or for Products ordered through Seller's e-commerce ordering system at: www.belimo.us.

2.4. Seller reserves the right to make partial deliveries of orders of Products, each of which deliveries may be invoiced separately by Seller.

2.5. The Price does not include charges for wiring diagrams, installation, and commissioning, which will be charged to Client separately and will be payable on demand.

III. Payment

3.1. Invoices are payable in US currency for sales made by Belimo Aircontrols (USA), Inc., and in Canadian currency for sales made by Belimo Aircontrols (CAN); Inc., and in Brazilian currency for sales made by Belimo Automation AG on behalf of Brazil or Belimo Brasil – Comércio de Automação Ltda. Payments on invoices are due no later than 30 days from the date of invoice, without any deductions.

3.2. If Client maintains an outstanding balance for 45 days or more after the date of invoice, Client may be subject to restricted shipments of Products. A Client may also be required to pay for all future deliveries of Products on a cash-on-delivery only basis.

IV. Title and Risk

4.1. Title to Products will pass to Client from the Seller based upon the agreed Incoterms as stated on the Order Confirmation. The Seller retains the right to a return of the Product when payment is not received.

V. Damage or Loss in Transit

5.1. Seller assumes no liability for damage or loss of shipment of Products, which risk shall at all times remain with the carrier. All shipments must be unpacked and examined by Client immediately upon receipt. Any external evidence of loss or damage must be noted on the freight bill accompanying the shipment of Products or carrier's receipt and signed by the carrier's agent at the time of delivery. Failure to do so will result in the carrier's refusal to honor any claim relating to damage of Products. Client must also notify Seller within 5 days of such damage by providing Seller with a copy of the freight bill or damage report so that Seller can file a claim for loss or damage in transit with the carrier. If the damage does not become apparent until the shipment is unpacked, Client must make a request for inspection

by the carrier's agent and file with the carrier within 15 days after receipt of product and notify Seller of the same.

VI. Delivery

6.1. Seller undertakes to make every attempt to adhere to its stated delivery parameters and to make a timely delivery of the Products but does not guarantee any delivery specifications. Each contract entered into for the purchase of Products is not cancelable nor is Seller liable for any direct or indirect losses that may arise, for any reason whatsoever, due to Seller's failure to meet any stated or assumed delivery schedules.

VII. Inventory Overstock

7.1. If Client has an overstock of Product inventory, such Products received by Client cannot be returned unless and until: (i) Client alerts Seller that it intends to return some overstock of Products, (ii) Seller agrees to accept such return, (iii) Client obtains a Return Material Authorization ("RMA") number from Seller for such return of such Products, and (iv) Client follows all return instructions provided by the Seller. The RMA number must be clearly written on the outside of all packaging for any returned overstock of Products.

7.2. Only such Products returned in original packaging and shipped to Seller at Client's cost may be accepted for return under this Section. Client is also responsible for payment of a restocking charge for all returned overstocked Products in an amount no less than 20% of the invoice value of the Products ("Restocking Charges"). Any piping package or custom order returns carry a minimum restocking charge of 75% of the invoice value. Returns that result from Seller errors and not overstocking will be credited in full and will not be subject to Restocking Charges.

7.3. Any Product received damaged or showing evidence of having been installed will be refused or assessed a higher restocking charge.

7.4. If Client requests product to be returned to Client, the Client will be responsible for return shipping charges. See specific product literature for exclusions or exceptions.

7.5. Any products that are designed to a Client's unique specifications (e.g. retrofit) are not returnable.

VIII. Handling, Installation and Use of Products

8.1. Products are only intended for installation and commissioning by trained technicians.

8.2. The installation and exchange of Products may only be carried out by trained technicians. Products may only be handled by trained technicians and only in accordance with the most current valid data and installation sheets.

IX. Limited Warranty

A. 5-year Limited Warranty

9.1. Products that are designated by Seller as carrying a 5-year warranty to a location in the United States, Canada, or Latin America shall carry a 5-year warranty. The 5-year warranty is unconditional for the first two years from the date of sale of the Products to Client, subject to the Limitation On Warranty in Section 9C. After the first two years from the date of sale, the warranty coverage shall not apply to damage to Products not resulting from normal wear and tear (e.g. negligence, misuse, or failure to maintain). Product specific terms of warranty with regard to warranty period or conditions of warranty may apply to certain specified Products as stated in the documentation for those Products.

B. 2-year Conditional Warranty

9.2. Products that are designated by Seller as carrying a 2-year warranty to a location in the United States, Canada, or Latin America shall carry a 2-year warranty. The 2-year warranty is conditional from the date of sale of the Products to Client, and the warranty coverage shall not apply to damage to Products not resulting from normal wear and tear (e.g. negligence, misuse, or failure to maintain). Product specific terms of warranty with regard to warranty period or conditions of warranty may apply to certain specified Products as stated in the documentation for those Products.

C. Limitation On Warranty; Warranty Disclaimer

9.3. Seller's warranties hereunder shall be null and void in the event of any: (a) modification or unauthorized repairs of Products by Client; (b) unauthorized incorporation or integration of Products into or with Client's equipment; (c) use of Products in an unauthorized manner; or (d) damage to Products not caused by Seller.

9.4. These Terms constitute the entire understanding and agreement

between Seller and Client regarding the warranties that cover Products and supersedes all previous understandings, agreements, communications and representations. All Seller warranties are extended only to Client and are non-transferrable. All Seller warranties shall extend only to HVAC use of the Products. If Products are used in non-HVAC applications (e.g., aircraft, industrial processes, etc.), Seller's warranties will not cover such Products. Client will be solely responsible for any damage to or malfunction of Products or for any damage resulting from such use of Products.

9.5. Both the conditional and unconditional warranties hereunder cover the Products only, and do NOT cover labor associated with the troubleshooting, removal or replacement of such Products.

9.6. EXCEPT FOR THE EXPRESS WARRANTIES SPECIFIED IN SECTION IX, SELLER MAKES NO OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND DISCLAIMS ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND IMPLIED WARRANTY OF MERCHANTABILITY.

D. Remedies

9.7. If a defect arises in the Product and an RMA is issued as provided in Section 9.8, Seller will, at its option and to the extent permitted by law, either (1) repair the Product at no charge, using new or refurbished replacement parts or (2) replace the Product with a new Product. In the event of such a defect, to the extent permitted by law, these are Client's sole and exclusive remedies.

9.8. Client cannot return Products to Seller unless: (i) Client notifies Seller that it intends to return such Products, (ii) Seller agrees to accept the return of such Products, (iii) Client obtains a RMA number from Seller for the return of such Products, and (iv) Client follows all return instructions provided by the Seller. Client shall promptly notify Seller of Products' alleged defect and provide Seller with other evidence and documentation reasonably requested by Seller. The RMA number must be clearly written on the outside of all packaging for any returned Products. Only Products returned to the proper location as instructed by Seller and identified with an RMA number will be considered for credit.

9.9. Returns that result from Seller's breach of these Terms will be credited in full and will not be subject to Restocking Charges.

9.10. Seller-authorized support technicians are available for troubleshooting before any shipments to Seller. The contact information for Belimo customer service is listed on the back page of Belimo's Product Guide and Price List ("PGPL") or may be found at www.belimo.us.

9.11. If Seller determines that a problem cannot be resolved without Product replacement, an RMA number will be issued by Seller for return of the Products. Prior to returning any Products under a warranty, Client must obtain an RMA number from Seller, along with shipping instructions for the return. The RMA number must be clearly written on the outside of the box containing the returned Products. Only Products returned to the proper location and identified with an RMA number will be accepted by the Seller.

9.12. All returned Products should be packaged appropriately to prevent further damage. Seller reserves the right to refuse any returned Product if improperly packaged or labeled (e.g. without an RMA number on the outside of packaging). Products returned without proper RMA documentation will void Seller's warranty. Seller is not responsible for charges that Client may incur as a result of the removal or replacement of Products.

9.13. Repaired or replacement Products are shipped from Seller via ground shipment. Other shipping methods are available at the sole expense of the Client.

9.14. Repaired, replaced or exchanged Products will carry a warranty for a period of time equal to the greater of: (i) the remainder of the original 5-year warranty or 2-year warranty that was applicable to the repaired, replaced or exchanged Products, or (ii) six months, effective from the date the repaired, exchanged or replaced Products are shipped by Seller (the "Replacement Warranty Period").

9.15. If Seller determines that Product under warranty is to be replaced, Seller may elect to send a replacement in advance of receiving the returned item. For valve products 2½" in diameter or greater, a purchase order is required. An invoice will be issued and shall be due and payable if the returned Products are not received by Seller within 60 days from the date that the replacement Products are shipped. Additional charges may apply if the nature of the problem has been misrepresented by Client.

9.16. New Products ordered in an attempt to circumvent the warranty process may NOT be reimbursed if, upon receipt of returned Products, it is determined that the defect in the returned Products is actually field related, or the Products have been returned for cosmetic reasons only.

X. Liability Disclaimer

10.1. IN NO EVENT SHALL SELLER HAVE ANY LIABILITY TO CLIENT OR ANY THIRD PARTY FOR ANY (a) LOST PROFITS OR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, OR FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, OR (b) ANY DAMAGES WHATSOEVER RESULTING FROM THE PERFORMANCE OR A TEMPORARY OR PERMANENT LOSS OF USE OF PRODUCTS, HOWEVER CAUSED UNDER ANY THEORY OF LIABILITY AND WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STATUTE OR OTHERWISE. THE FOREGOING LIMITATIONS SHALL APPLY EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND NOTWITHSTANDING THE FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY STATED HEREIN. SELLERS MAXIMUM AGGREGATE LIABILITY UNDER, ARISING FROM OR IN CONNECTION WITH THE SALE OF ITS PRODUCTS TO CLIENT, SHALL BE LIMITED TO THE AMOUNT PAID BY CLIENT FOR THE PRODUCT DEEMED RESPONSIBLE FOR THE LOSS OR DAMAGE.

10.2. Client releases Seller in full from any possible third party claims resulting in connection with the circumstances listed above. This also applies to claims in connection with products liability.

10.3. If Client becomes aware that any third party has made or appears likely to make any claim regarding Products (including, without limitation, regarding Product defects or rights infringed by Products), then Client shall immediately inform Seller and afford to Seller all assistance that Seller may require to enforce its rights and defend such claim.


XI. Proper Law and Jurisdiction

11.1. All sales of Products under these Terms described herein shall be governed by the laws of the State of Connecticut, without regard to its conflicts of law principles, and Seller and Client agree to submit to the exclusive jurisdiction of the federal and state courts located in the State of Connecticut with respect to any dispute arising from the subject matter hereof. The Seller and Client hereby waive all rights to a jury trial in connection with any claims relating to the subject matter hereof. All causes of action arising out of or connected to the sales of Products under these Terms shall be resolved individually, with no right by Seller or Client to participate in a representative capacity, or as a member of any class action.

XII. Privacy and Data

12.1 Seller places great value on the implementation of lawful data processing to protect Client's personal data. Seller is obliged to process Client's personal data in accordance with applicable law. Seller is dependent on the services of a third party for the provision of its services. Seller has obligated the third party to process Client's data only in connection with the services agreed with Seller, to ensure the same level of data protection as Seller, and to not pass on Client's data to other third parties without Client's consent. When processing Client's data and transferring Client's data to third parties, Seller will use reasonable commercial efforts to provide an appropriate level of data protection and that appropriate organizational and technical measures are implemented to protect Client's personal data. More detailed information on Seller's data protection guidelines is available from the following Internet address: www.belimo.com/privacy.

XIII. California Proposition 65

 13.1 WARNING: Some Belimo Products can expose you to chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm. Please refer to the Product specific Technical Data sheet at www.belimo.us for details.

For more information see www.p65warnings.ca.gov

Belimo Americas

USA, Latin America, and the Caribbean: www.belimo.us

Canada: www.belimo.ca, Brazil: www.belimo.com.br

Belimo Worldwide: www.belimo.com