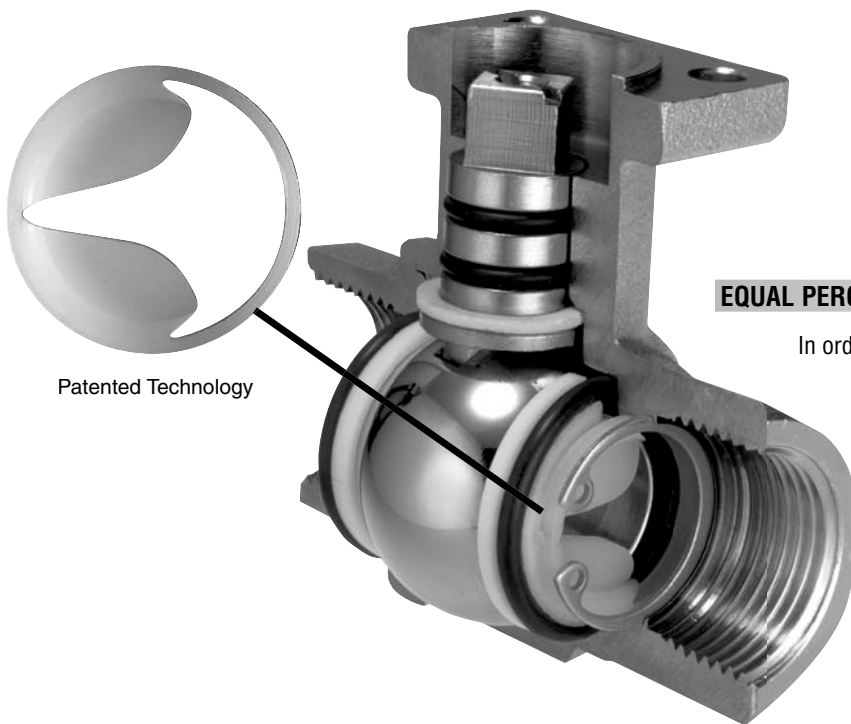


Features and Benefits



EQUAL PERCENTAGE VALVE CHARACTERISTIC

In order to ensure good stability of control, it is essential for a control valve to have an equal percentage characteristic. This type of characteristic produces a linear variation in thermal output according to the amount of opening of the valve (also known as the system characteristic). Under normal testing conditions a conventional ball valve exhibits an S-shaped characteristic. When it is installed in a real system, however, this characteristic is seriously deformed because, compared with its nominal size, a ball valve possesses an extremely high flow coefficient. Whether used with or without pipe reducers or a reduced bore, they do not normally allow stable regulation of the thermal capacity.

Belimo's unique Characterized Control Valve™ (CCV) is very different. A special characterizing disc inside the valve gives it an equal percentage characteristic which is comparable with that of a globe valve of the same nominal size. The flow (the C_V value) is reduced to the required value by a combination of the hole in the ball and the shaped aperture in the disc. The increase in flow as the valve is opened is very slow and controlled.

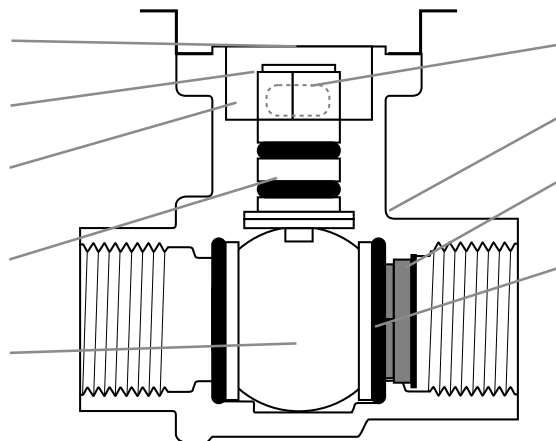
This produces better part-load behavior and improved stability of control while also optimizing energy consumption.

BENEFIT OF THE BELIMO CHARACTERIZING DISC

- Equal percentage flow characteristic.
- Excellent control stability assured with the characterizing disc.
- C_V values equal to C_V values of globe valves the same size.
- The need for multiple pipe reduction is usually eliminated.
- Better control prevents "hunting" of the control loop, increasing life span of actuator and valve.

FEATURES

- Thermal isolating adapter between flange and actuator.
- Easy direct coupling of actuator with a single screw.
- Perpendicular mounting flange and square drive head eliminate lateral forces on the stem.
- Blow-out proof stem with thrust-bearing Teflon® disc and double O-ring design for long service life.*
- Non-corroding chrome-plated brass or stainless ball.



- Vent holes reduce condensation build-up.
- Forged brass valve body — no pin-hole leaks.
- Characterizing disc — made of Tefzel® known for excellent strength and chemical resistance.
- Teflon® seats with O-rings provide constant seating force against the ball and reduce torque requirement.
- Actuator can be mounted in four different positions.

* Designed for service life of over 100,000 full cycles.
Teflon® and Tefzel® are both registered trademarks of Dupont.

Feature / Benefits

Characterized Control Valves™ (CCV)



COORDINATED MOTORIZED OPERATION

The optimum functionality of the Belimo CCV is assured by properly coordinating its actuation with MFT. Specially developed rotary actuators provide the necessary precision for modulating, floating-point, and on/off methods of control.

All CCVs are supplied with the appropriate rotary actuator to provide the close-off and operation desired.

OPTIMIZED FOR CONTROL

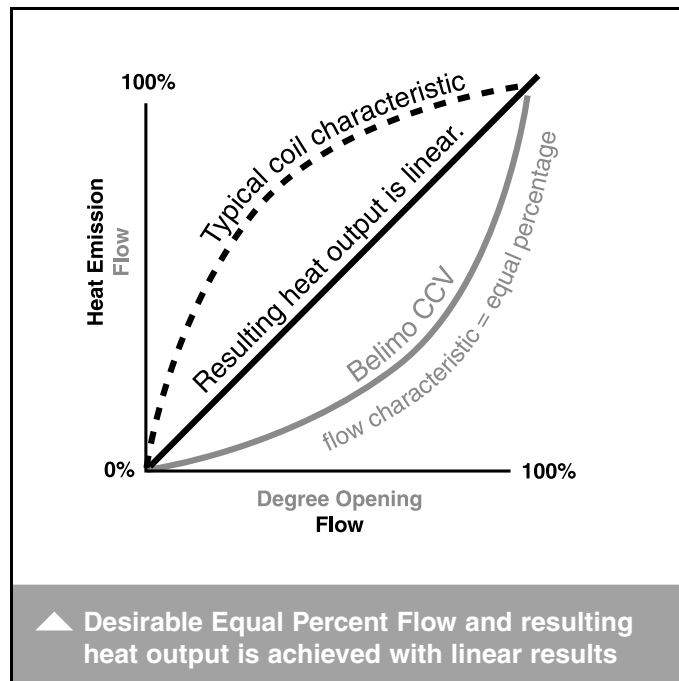
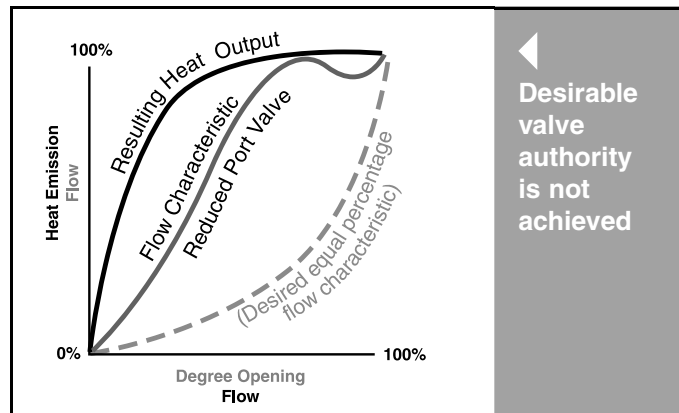
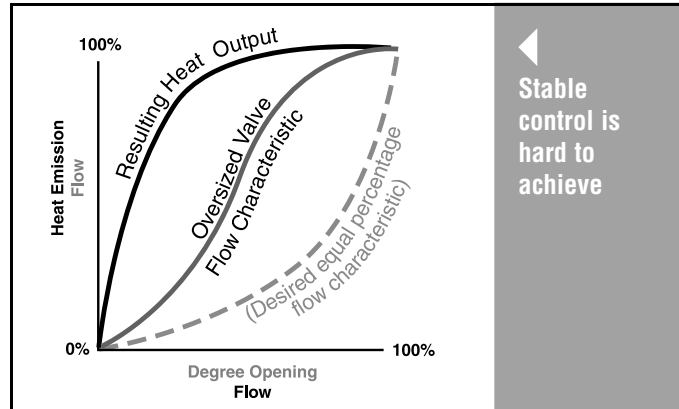
The Belimo CCV marries known technology with an innovative development – the unique characterizing disc.

The marriage of CCV and MFT technologies has produced a range of valuable features which surpass the capabilities of globe valves at a very attractive price level:

- An equal-percentage valve characteristic
- Unlike a globe valve, no sudden change in inlet flow upon opening
- Excellent stability of control
- C_v values comparable with those of globe valves of the same size or larger
- Higher close-off ratings than standard globe valves
- 100% tight shut-off on two-way valves means NO leak-by unlike globe valves that have ANSI IV shutoff (leakage rate of 0.01% of the C_v rating)
- Three-way valve can be piped in mixing or diverting application

B2 Series	Two-way
B3 Series	Three-way Mixing/Diverting
B6 Series	Two-way Flanged
½" to 3"	
Service:	Chilled/hot water, 60% glycol
C_v Range	0.3-240
Material:	Stainless trim or Brass trim
Control:	On/Off, Floating, 2-10 VDC Multi-Function Technology® Spring Return or Non-Spring Return

Flow Characteristics of Conventional Ball Valves versus BELIMO CHARACTERIZED CONTROL VALVES



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2-Way Valve Flow Rate for Water Applications (Gallons Per Minute, GPM)

C _v Maximum Rating	Inches	DN mm	2-Way CCV	Pressure Drop Across the Valve									
				1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
0.3	½"	15	B207(B)	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9
0.46	½"	15	B208(B)	0.5	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5
0.8	½"	15	B209(B)	0.8	1.1	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.5
1.2	½"	15	B210(B)	1.2	1.7	2.1	2.4	2.8	2.9	3.2	3.4	3.6	3.8
1.9	½"	15	B211(B)	1.9	2.7	3.3	3.8	4.2	4.7	5.0	5.4	5.7	6.0
3	½"	15	B212(B)	3.0	4.2	5.2	6.0	6.8	7.3	7.9	8.5	9.0	9.5
4.7	½"	15	B213(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
7.4	½"	15	B214(B)	7.4	10	13	15	17	18	20	21	22	23
10	½"	15	B215(B)*	10	14	17	20	22	24	26	28	30	32
4.7	¾"	20	B217(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
7.4	¾"	20	B218(B)	7.4	10	13	15	17	18	20	21	22	23
10	¾"	20	B219(B)	10	14	17	20	22	24	26	28	30	32
24	¾"	20	B220(B)*	24	34	42	48	54	59	63	68	72	76
7.4	1"	25	B222	7.4	10	13	15	17	18	20	21	22	23
10	1"	25	B223	10	14	17	20	22	24	26	28	30	32
19	1"	25	B224	19	27	33	38	42	47	50	54	57	60
30	1"	25	B225*	30	42	52	60	67	73	79	85	90	95
10	1¼"	32	B229	10	14	17	20	22	24	26	28	30	32
19	1¼"	32	B230*	19	27	33	38	42	47	50	54	57	60
25	1¼"	32	B231	25	35	43	50	56	61	66	71	75	79
37	1¼"	32	B232*	37	52	64	74	83	91	98	105	111	117
19	1½"	40	B238	19	27	33	38	42	47	50	54	57	60
29	1½"	40	B239	29	41	50	58	65	71	77	82	87	92
37	1½"	40	B240*	37	52	64	74	83	91	98	105	111	117
29	2"	50	B248	29	41	50	58	65	71	77	82	87	92
46	2"	50	B249	46	65	80	92	103	113	122	130	138	145
57	2"	50	B250*	57	81	99	114	127	140	151	161	171	180
65	2"	50	B251	65	92	113	130	145	159	170	194	195	206
85	2"	50	B252	85	120	147	170	190	208	225	240	255	269
120	2"	50	B253	120	170	208	240	268	294	318	339	360	380
240	2"	50	B254*	240	339	416	480	537	588	635	679	720	759
60	2½"	65	B261	60	85	104	120	134	147	159	170	180	190
75	2½"	65	B262	75	106	130	150	168	194	198	212	225	237
110	2½"	65	B263	110	156	191	220	246	269	291	311	330	348
150	2½"	65	B264	150	212	260	300	335	367	397	424	450	474
210	2½"	65	B265*	210	297	364	420	470	514	556	594	630	664
70	3"	80	B277	70	99	121	140	157	172	185	198	210	221
130	3"	80	B278	130	194	225	260	290	318	344	368	390	411
170	3"	80	B280*	170	240	294	340	380	416	450	481	510	538
60	2½"	65	B661	60	85	104	120	134	147	159	170	180	190
75	2½"	65	B662	75	106	130	150	168	194	198	212	225	237
110	2½"	65	B663	110	156	191	220	246	269	291	311	330	348
150	2½"	65	B664	150	212	260	300	335	367	397	424	450	474
210	2½"	65	B665*	210	297	364	420	470	514	556	594	630	664
70	3"	80	B677	70	99	121	140	157	172	185	198	210	221
130	3"	80	B678	130	194	225	260	290	318	344	368	390	411
170	3"	80	B680*	170	240	294	340	380	416	450	481	510	538
73	2½"	65	B6250S-070	73	103	126	145	159	175	187	205	212	223
11	2½"	65	B6250S-110	110	156	191	220	244	266	282	296	312	320
11	3"	80	B6300S-110	110	156	191	220	244	266	282	296	312	320

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$GPM = C_v \times \sqrt{\Delta p}$

*Models with no characterizing disc.

The influence of the pipe geometry due to reduced flow is negligible for all valves 57 C_v and below with characterizing discs.

3-Way Valve Flow Rate for Water Applications (Gallons Per Minute, GPM)

C _v Maximum Rating	Inches	DN mm	3-Way CCV	Pressure Drop Across the Valve									
				1 psi	2 psi	3 psi	4 psi	5 psi	6 psi	7 psi	8 psi	9 psi	10 psi
0.3	½"	15	B307(B)	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9
0.46	½"	15	B308(B)	0.5	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5
0.8	½"	15	B309(B)	0.8	1.1	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.5
1.2	½"	15	B310(B)	1.2	1.7	2.1	2.4	2.8	2.9	3.2	3.4	3.6	3.8
1.9	½"	15	B311(B)	1.9	2.7	3.3	3.8	4.2	4.7	5.0	5.4	5.7	6.0
3	½"	15	B312(B)	3.0	4.2	5.2	6.0	6.8	7.3	7.9	8.5	9.0	9.5
4.7	½"	15	B313(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
10	½"	15	B315(B)*	10	14	17	20	22	24	26	28	30	32
4.7	¾"	20	B317(B)	4.7	6.6	8.1	9.4	11	12	12	13	14	15
7.4	¾"	20	B318(B)	7.4	10	13	15	17	18	20	21	22	23
24	¾"	20	B320(B)*	24	34	42	48	54	59	63	68	72	76
7.4	1"	25	B322	7.4	10	13	15	17	18	20	21	22	23
10	1"	25	B323	10	14	17	20	22	24	26	28	30	32
30	1"	25	B325*	30	42	52	60	67	73	79	85	90	95
10	1¼"	32	B329	10	14	17	20	22	25	27	28	30	32
19	1¼"	32	B330	19	27	33	38	43	47	50	54	57	60
25	1¼"	32	B331	25	35	43	50	56	61	66	71	75	79
19	1½"	40	B338	19	27	33	38	43	47	50	54	57	60
29	1½"	40	B339	29	41	50	58	65	71	77	82	87	92
37	1½"	40	B340	37	52	64	74	83	91	98	105	111	117
46	1½"	40	B341	46	65	80	92	103	113	122	130	138	146
29	2"	50	B347	29	41	50	58	65	71	77	82	87	92
37	2"	50	B348	37	52	64	74	83	91	98	105	111	117
46	2"	50	B349	46	65	80	92	103	113	122	130	138	146
57	2"	50	B350	57	81	99	114	128	140	151	161	171	180
68	2"	50	B351	68	96	118	136	152	167	180	192	204	215
83	2"	50	B352	83	117	144	166	186	204	220	235	249	263

GPM = C_v × √Δp * = Models with no characterizing disc.

The influence of the pipe geometry due to reduced flow is negligible for all valves 83 C_v and below with characterizing discs.

SET-UP

	2-WAY VALVE		3-WAY VALVE		
	SPECIFY UPON ORDERING		SPECIFY UPON ORDERING		
NON-SPRING RETURN Stays in Last Position	TR24-3-T US TR24-3 US On/Off or Floating Point Actuators	Power to pin 2 will drive valve CCW. Power to pin 3 will drive valve CW.		Power to pin 2 will drive valve CCW. Power to pin 3 will drive valve CW.	
	TR24-SR-T US TR24-SR US Proportional Type Actuators	NC: Closed A to AB, will open as voltage increases.	NO: Open A to AB, will close as voltage increases. (Can be chosen with switch inside terminal block of actuator.)	NC: Closed A to AB, will open as voltage increases.	NO: Open A to AB, will close as voltage increases. (Can be chosen with switch inside terminal block of actuator.)
	LRB24 (-3), MFT, SR LRX24 (-3), MFT, SR ARB24 (-3), MFT, SR ARX24 (-3), MFT, SR Floating Point or Proportional Type Actuators	Power to pin 2 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "1" position, to reverse select the "0" position.	NO: Open A to AB, will close as voltage increases or power applied. (Can be chosen with CW/CCW switch.)	Power to pin 2 will drive valve CW. Power to pin 3 will drive valve CCW. The above will function when the directional switch is in the "1" position, to reverse select the "0" position.	NO: Open A to AB, will close as voltage increases or power applied. (Can be chosen with CW/CCW switch.)
SPRING RETURN Note Fail Position	TFX24 US LF24 US AF24 US	NO/FO Valve: Open A to AB will drive closed. Spring Action: Will spring open A to AB upon power loss.	NC/FC Valve: Closed A to AB will drive open. Spring Action: Will spring closed A to AB upon power loss.	NO/FO Valve: Open A to AB will drive closed. Spring Action: Will spring open A to AB upon power loss.	NC/FC Valve: Closed A to AB will drive open. Spring Action: Will spring closed A to AB upon power loss.
	TF (-3), MFT, SR LF (-3), MFT, SR AF (-3), MFT, SR Floating Point or Proportional Type Actuators	NC/FO Valve: Closed A to AB will drive open. Spring Action: Will spring open A to AB upon power loss.	NC/FC or NO/FC Valve: Closed A to AB or Open A to AB. (Can be chosen with CW/CCW switch.) Spring Action: Will spring closed A to AB upon power loss. NO/FO Valve: Open A to AB Spring Action: Will spring open A to AB upon power loss. (NO action can be chosen with CW/CCW switch.)	NC/FO Valve: Closed A to AB will drive open Spring Action: Will spring open A to AB upon power loss.	NC/FC or NO/FC Valve: Closed A to AB or Open A to AB. (Can be chosen with CW/CCW switch.) Spring Action: Will spring closed A to AB upon power loss. NO/FO Valve: Open A to AB Spring Action: Will spring open A to AB upon power loss. (NO action can be chosen with CW/CCW switch.)

GENERAL WIRING INSTRUCTIONS

WARNING The wiring technician must be trained and experienced with electronic circuits. Disconnect power supply before attempting any wiring connections or changes. Make all connections in accordance with wiring diagrams and follow all applicable local and national codes. Provide disconnect and overload protection as required. Use copper, twisted pair, conductors only. If using electrical conduit, the attachment to the actuator must be made with flexible conduit.

Always read the controller manufacturer's installation literature carefully before making any connections. Follow all instructions in this literature. If you have any questions, contact the controller manufacturer and/or Belimo.

Transformer(s)

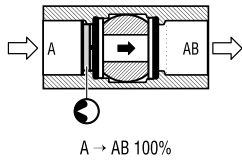
Belimo actuators require a 24 VAC class 2 transformer and draws a maximum of 10 VA per actuator. The actuator enclosure cannot be opened in the field, there are no parts or components to be replaced or repaired.

- EMC directive: 89/336/EEC
- Software class A: Mode of operation type 1
- Low voltage directive: 73/23/EEC

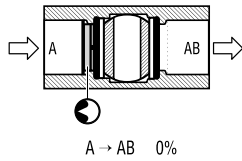
CAUTION It is good practice to power electronic or digital controllers from a separate power transformer than that used for actuators or other end devices. The power supply design in our actuators and other end devices use half wave rectification. Some controllers use full wave rectification. When these two different types of power supplies are connected to the same power transformer and the DC commons are connected together, a short circuit is created across one of the diodes in the full wave power supply, damaging the controller. Only use a single power transformer to power the controller and actuator if you know the controller power supply uses half wave rectification.

FLOW PATTERNS

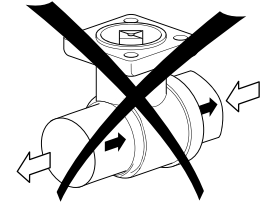
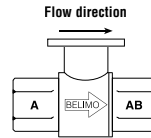
2-way Characterized Control Valves™



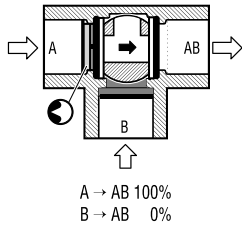
(Belimo B2 Series)
(Belimo B6 Series)



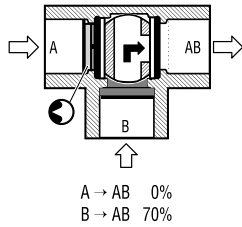
Two-way valves should be installed with the disc upstream.



3-way Characterized Control Valves™ MIXING

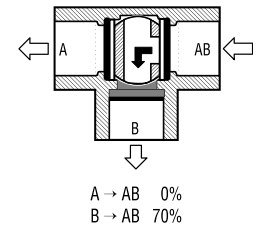
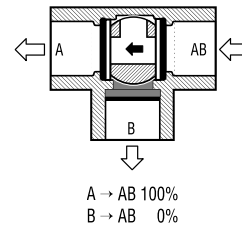


(Belimo B3 Series)



The A-port must be piped to the coil to maintain proper control.

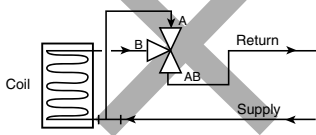
DIVERTING



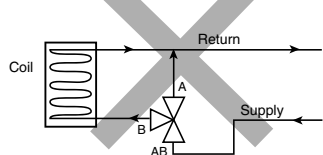
INCORRECT PIPING

The A-port must be piped to the coil to maintain proper control.

Three-Way Mixing Valve Piping Diagram
(2 Inputs, 1 Output)



Three-Way Diverting Valve Piping Diagram
(1 Input, 2 Outputs)



WARNING! Do Not Pipe in this manner!

Note Valve Porting!

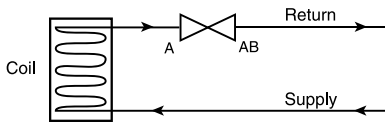
The A-port must be piped to the coil! Not the B-port!

Flow is not possible from A to B. If AB-port is not piped as the common port, the valve must be re-piped. It is good practice to install a balancing valve in the bypass line. These valves are intended for closed loop systems. Do not install in an open loop system or in an application that is open to atmospheric pressure.

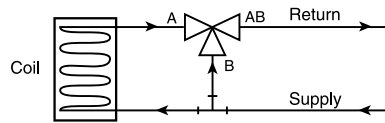
OPERATION/INSTALLATION – CORRECT PIPING

2-way valves should be installed with the disc upstream. If installed with disc downstream, flow curve will be deeper. If installed “backwards” it is NOT necessary to remove and change. No damage or control problems will occur.

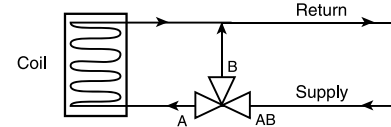
2-way Valve Piping Diagram
(1 Input, 1 Output)



3-way Mixing Valve Piping Diagram
(2 Inputs, 1 Output)



3-way Diverting Valve Piping Diagram
(1 Input, 2 Outputs)



3-WAY VALVES MUST BE PIPED CORRECTLY. They can be mixing or diverting. Mixing is the preferred piping arrangement.

The BELIMO Characterized Control Valve is a CONTROL valve, not a manual valve adapted for actuation. The control port is the A-port. It is similar to the globe valve in that the middle port is the B or bypass port. The common port AB is on the main opposite the A-port. These diagrams are for typical applications only. Consult engineering specification and drawings for particular circumstances.

REDUCED B-PORT FLOW

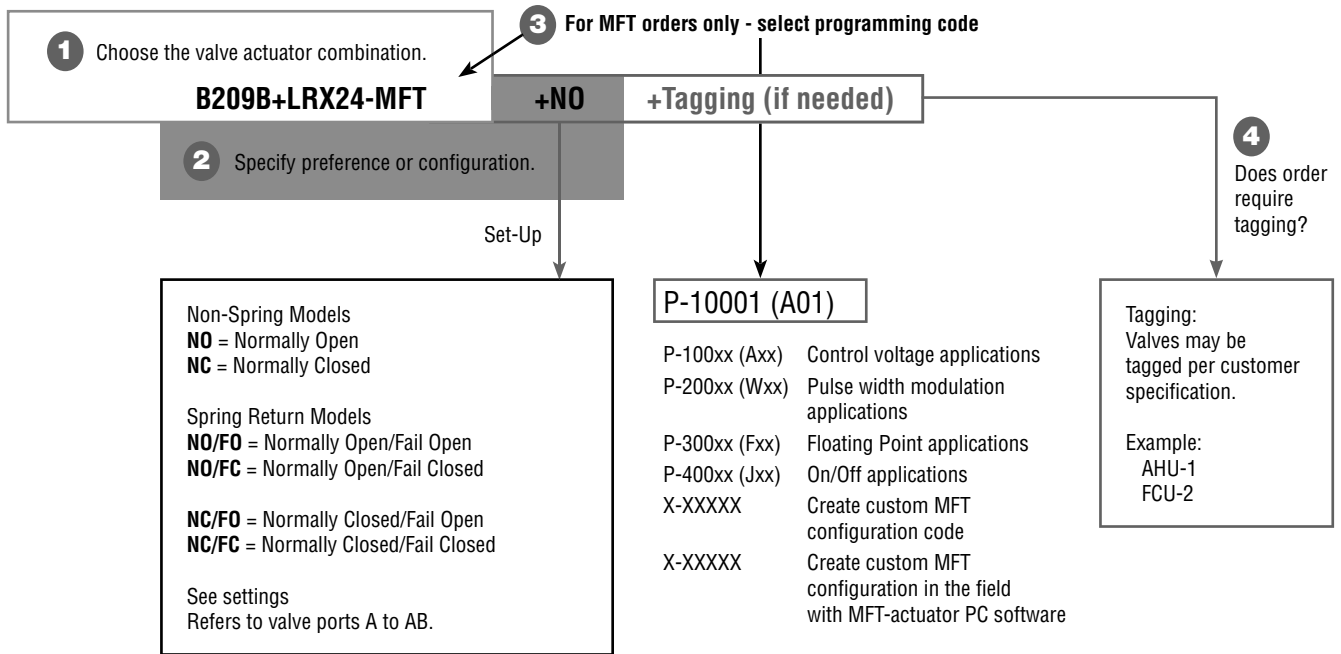
Note: The B-port flow of the 3-way CCV is lower than that of the A-port. In most applications this is beneficial since the reduced flow compensates for the in-existent pressure drop across the coil in the bypass mode. Therefore, proper sizing is important to avoid flow noise in particular when the system is designed with constant speed pumps. Please refer to our valve sizing and selection guidelines.

The flow velocity in the pipe upstream and downstream of the valve should be considered as well. The typical HVAC design maximum flow is 4 to 8 ft/s to avoid noise issues.

Also, the pipe reduction factor must be considered and can be found on pages 3 and 4. Pipe reducers decrease the C_v value of a valve and consequently increase the pressure drop across the valve, a situation that could lead to noise or a lower than designed flow.

B2	09	B	LRX	24	-MFT	
<p>Valve</p> <p>B2 = 2-way B3 = 3-way B6 = 2-way Flanged</p>	<p>Valve Size</p> <p>07-80 = ½"-3"</p>	<p>Trim Material</p> <p>B = Brass Blank = Stainless Steel Trim</p>	<p>Actuator Type</p> <p>Non-Spring Return TR... LRB... LRX... ARB... ARX... LRQ... NRQ... Spring Return TF... LF... AF...</p>	<p>Power Supply</p> <p>24 = 24 VAC/DC 120 = 120 VAC* 230 = 230 VAC</p>	<p>Control</p> <p>Blank = On/Off, Floating -3 = Floating Point -SR = 2-10 VDC -MFT = Multi-Function Technology -MFT95 = 0-135 Ω</p>	<p>-T = Terminal Strip -S = Built-in Auxiliary Switch N4 = NEMA 4X, UL Type 4X, IP 66/67 Enclosure</p>

ORDERING EXAMPLE



5 Complete Ordering Example: **B209B+LRX24-MFT+NO+A01**

*TF, LR and AR Series has 100 to 240 VAC nominal power supply.

B2 Series, 2-Way, Characterized Control Valve Chrome Plated Brass Ball and Brass Stem



Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.

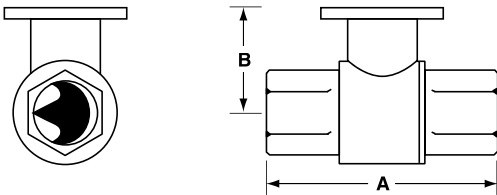
Technical Data	
Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage
Action	90° rotation
Sizes	½", ¾"
Type of end fitting	NPT female ends
Materials:	
Body	forged brass, nickel plated
Ball	chrome plated brass
Stem	nickel plated brass
Seats	PTFE
Characterizing disc	Tefzel®
Packing	2 EPDM O-rings, lubricated
Pressure rating	600 psi per EN 12266-1:2003
Media temp. range	0°F to 212°F [-18°C to 100°C]
Close off pressure	200 psi
Maximum differential pressure (ΔP)	30 psi for typical applications
Leakage	0% for A to AB
C _v rating	A-port: see product chart for values

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C _v	Valve Nominal Size		Type	Suitable Actuators			
	Inches	DN [mm]	2-way NPT	Non-Spring		Spring	
0.3	½	15	B207B	TR Series	LR Series	TF Series	LF Series
0.46	½	15	B208B				
0.8	½	15	B209B				
1.2	½	15	B210B				
1.9	½	15	B211B				
3	½	15	B212B				
4.7	½	15	B213B				
7.4	½	15	B214B				
10	½	15	B215B*				
4.7	¾	20	B217B				
7.4	¾	20	B218B				
10	¾	20	B219B				
24	¾	20	B220B*				

*Models without characterizing disc

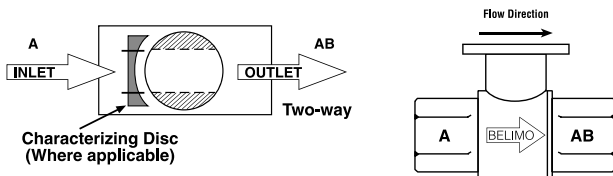
Dimensions



2Way Valve-B207-B220

Valve Body	Valve Nominal Size		Dimensions (Inches [mm])	
	Inches	DN [mm]	A	B
B207B-B211B	½"	15	2.41" [61.1]	1.39" [35.2]
B212B-B215B	½"	15	2.38" [60.4]	1.72" [43.7]
B217B-B220B	¾"	20	2.73" [69.3]	1.81" [45.9]

Flow Patterns



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Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

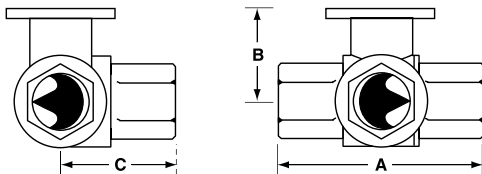
Technical Data	
Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage B-port modified for constant common port flow
Action	90° rotation
Sizes	½", ¾"
Type of end fitting	NPT female ends
Materials:	
Body	forged brass, nickel plated
Ball	chrome plated brass
Stem	nickel plated brass
Seats	PTFE
Characterizing disc	Tefzel®
Packing	2 EPDM O-rings, lubricated
Pressure rating	600 psi per EN 12266-1:2003
Media temp. range	0°F to 212°F [-18°C to 100°C]
Close off pressure	200 psi
Maximum differential pressure (ΔP)	30 psi for typical applications
Leakage	0% for A to AB <2.0% for B to AB
C _v rating	A-port: see product chart for values B-port: 70% of A to AB C _v

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C _v	Valve Nominal Size		Type	Suitable Actuators			
	Inches	DN [mm]	3-way NPT	Non-Spring	Spring		
0.3	½	15	B307B	TR Series	LR Series		
0.46	½	15	B308B				
0.8	½	15	B309B				
1.2	½	15	B310B				
1.9	½	15	B311B				
3	½	15	B312B				
4.7	½	15	B313B				
10	½	15	B315B*				
4.7	¾	20	B317B			TF Series	LF Series
7.4	¾	20	B318B				
24	¾	20	B320B*				

*Models without characterizing disc

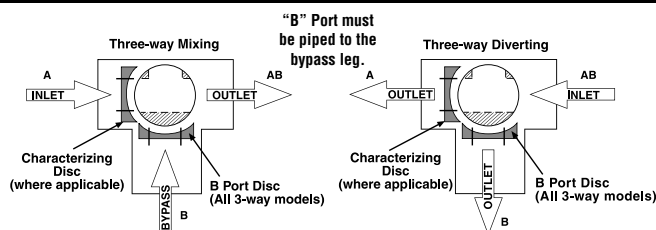
Dimensions



3Way/Valve-B307-B320

Valve Body	Valve Nominal Size		Dimensions (Inches [mm])		
	Inches	DN [mm]	A	B	C
B307B-B311B	½"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312B-B315B	½"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]
B317B-B320B	¾"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]

Flow Patterns





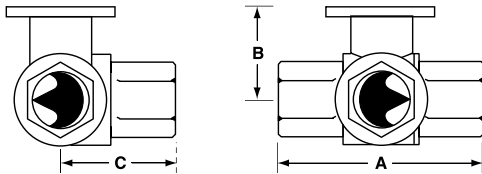
Application

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable or constant flow.

Technical Data	
Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage B-port modified for constant common port flow
Action	90° rotation
Sizes	½", ¾", 1", 1¼", 1½", 2"
Type of end fitting	NPT female ends
Materials:	
Body	forged brass, nickel plated
Ball	stainless steel
Stem	stainless steel
Seats	PTFE
Characterizing disc	Tefzel®
Packing	2 EPDM O-rings, lubricated
Body Pressure rating	
600 psi*	½" - 1"
400 psi*	1¼" - 2"
Media temp. range	0°F to 212°F [-18°C to 100°C]
Close off pressure	
200 psi	½" - 2"
Maximum differential pressure (ΔP)	30 psi for typical applications
Leakage	0% for A to AB <2.0% for B to AB
C _v rating	A-port: see product chart for values B-port: 70% of A to AB C _v

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*Per EN 12266-1:2003

Dimensions

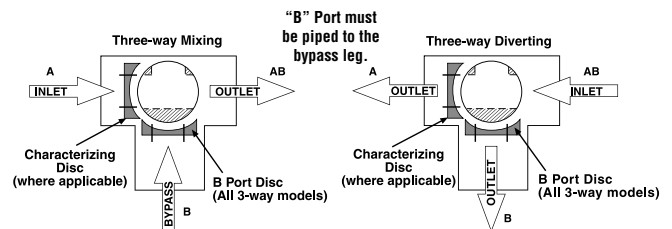


Valve Body	Valve Nominal Size		Dimensions (Inches [mm])		
	Inches	DN [mm]	A	B	C
B307-B311	½"	15	2.41" [61.1]	1.39" [35.2]	1.20" [30.6]
B312-B315	½"	15	2.38" [60.4]	1.72" [43.7]	1.26" [32.1]
B317-B320	¾"	20	2.73" [69.3]	1.81" [45.9]	1.45" [36.8]
B322-B325	1"	25	3.09" [78.4]	1.81" [45.9]	1.56" [39.8]
B329-B331	1¼"	32	3.96" [100.6]	2.21" [56.2]	2.14" [54.3]
B338-B341	1½"	40	4.39" [111.6]	2.45" [62.2]	2.33" [59.1]
B347-B352	2"	50	4.90" [124.5]	2.68" [68.0]	2.60" [66.0]

C _v	Valve Nominal Size		Type	Suitable Actuators				
	Inches	DN [mm]	3-Way NPT	Non-Spring	Spring			
0.3	½"	15	B307	TR Series	LR Series	NR...N4 Series		
0.46	½"	15	B308					
0.8	½"	15	B309					
1.2	½"	15	B310					
1.9	½"	15	B311					
3	½"	15	B312					
4.7	½"	15	B313					
10	½"	15	B315*					
4.7	¾"	20	B317				TF Series	LF Series
7.4	¾"	20	B318					
24	¾"	20	B320*					
7.4	1"	25	B322					
10	1"	25	B323					
30	1"	25	B325*					
10	1¼"	32	B329	AR Series	AR...N4 Series			
19	1¼"	32	B330					
25	1¼"	32	B331					
19	1½"	40	B338					
29	1½"	40	B339					
37	1½"	40	B340					
46	1½"	40	B341					
29	2"	50	B347			AF Series		
37	2"	50	B348					
46	2"	50	B349					
57	2"	50	B350					
68	2"	50	B351					
83	2"	50	B352					

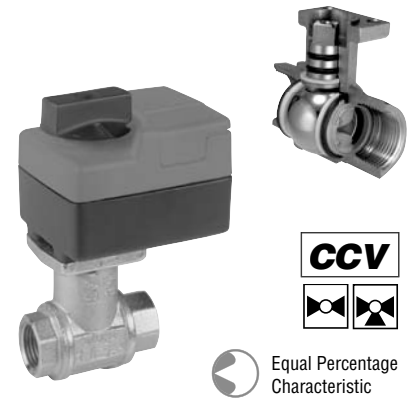
*Models without characterizing disc

Flow Patterns



C _v	Valve Nominal Size		Type			Suitable Actuators		
	Inches	DN [mm]	2-way NPT	3-way NPT	2-way Flange	Non-Spring Return	Spring Return	NEMA 4X
0.3	½	15	B207(B)	B307(B)	–	TR Series	TF Series	NR Series
0.46	½	15	B208(B)	B308(B)	–			
0.8	½	15	B209(B)	B309(B)	–			
1.2	½	15	B210(B)	B310(B)	–			
1.9	½	15	B211(B)	B311(B)	–			
3	½	15	B212(B)	B312(B)	–			
4.7	½	15	B213(B)	B313(B)	–			
7.4	½	15	B214(B)	–	–			
10	½	15	B215(B)*	B315(B)*	–			
4.7	¾	20	B217(B)	B317(B)	–			
7.4	¾	20	B218(B)	B318(B)	–			
10	¾	20	B219(B)	–	–			
24	¾	20	B220(B)*	B320(B)*	–			
7.4	1	25	B222	B322	–			
10	1	25	B223	B323	–			
19	1	25	B224	–	–			
30	1	25	B225*	B325*	–			
10	1¼	32	B229	B329	–			
19	1¼	32	B230*	B330	–			
25	1¼	32	B231	B331	–			
37	1¼	32	B232*	–	–			
19	1½	40	B238	B338	–			
29	1½	40	B239	B339	–			
37	1½	40	B240*	B340	–			
46	1½	40	–	B341	–			
29	2	50	B248	B347	–			
37	2	50	–	B348	–			
46	2	50	B249	B349	–			
57	2	50	B250*	B350	–			
65	2	50	B251	–	–			
68	2	50	–	B351	–			
83	2	50	–	B352	–			
85	2	50	B252	–	–			
120	2	50	B253	–	–			
240	2	50	B254*	–	–			
60	2½	65	B261	–	B661			
70	2½	65	–	–	B6250S-070			
75	2½	65	B262	–	B662			
110	2½	65	B263	–	B663, B6250S-110			
150	2½	65	B264	–	B664			
210	2½	65	B265*	–	B665*			
70	3	80	B277	–	B677			
110	3	80	–	–	B6300S-110			
130	3	80	B278	–	B678			
170	3	80	B280*	–	B680*			

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Applications
Water-side control of heating and cooling systems, for AHUs, re-heat coils, fan coil units, unit ventilators and heat pumps.

Mode of Operation
The Characterized Control Valve is operated by a rotary actuator. The actuators are controlled by a standard voltage for on/off control or a proportional signal or 3-point control system which move the ball of the valve to the position dictated by the control system.

Product Features
The equal-percentage characteristic of the flow is ensured by the integral characterizing disc. This characteristic provides linear heating or cooling output from the coil improving energy efficiency and comfort.

Actuator Specifications

Control type	On/Off, Floating Point, 2-10 VDC, Multi-Function Technology (MFT)
Manual override	TR, LR, AR, and AF series
Electrical connection	3 ft [1m] cable with ½" conduit fitting or covered screw terminal strip

Valve Specifications

Service	chilled or hot water, 60% glycol
Flow characteristic	A-port equal percentage B-port modified for constant common port flow
Action	max 90° rotation
Sizes	½" - 3"
Type of end fitting	½" - 3" NPT female ends 2½" - 3" ANSI 125 flange pattern
Materials	Body: forged brass, nickel plated Ball: stainless steel Stem: [BXXXB - chrome plated brass] stainless steel [BXXXB - nickel plated brass] Seats: PTFE Characterizing disc: TEFZEL® Packing: stainless steel (B6250/300) 2 EPDM O-rings, lubricated
Pressure rating	2-way: 600 psi (½" - 1¼" (B230) 400 psi (1¼" (B231) - 3") 3-way: ½" - 1" 1¼" - 3"
Media temp range	0°F to 212°F [-18°C to 100°C]
Close-off pressure	2-way: 200 psi (½" - 2" (B250) 100 psi (2" (B251) - 3", B6 3-way: ½" - 2"
Maximum differential pressure (ΔP)	30 psi, 58 psi (B6250/300)
Leakage	0% for A to AB < 2.0% for B to AB
C _v rating	A port: see product chart above for values B port: 70% of A to AB C _v

* Models without characterizing disc (B) Models with chrome plated brass ball and brass stem

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