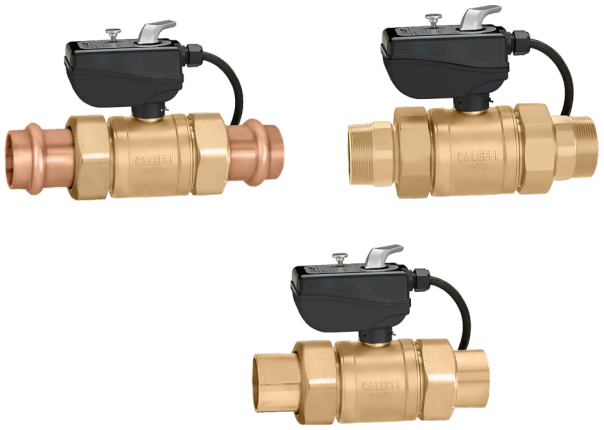
High flow 2-way motorized ball valve

638 series

01196/24 NA



Function

The 638 series high flow 2-way motorized ball valves are perfect for shutoff and isolation in hydronic heating or cooling applications. Bubble-tight sealing, high differential pressure closeoff and significant Cv flow coefficients make the 638 series ideal for application in large-scale hydronic and geothermal systems. The valve body has dual Posi-Stop™ union connections for installation and service efficiency.

The 3-wire floating control fail-in-place actuator includes auxiliary contacts, a convenient integral manual override feature and a user-friendly position indicator.

Product range

638 series: Two-way motorized ball valve for hydronic and geothermal systems, 24 VAC, 6 VA .....connections ¾", 1", 1¼", 1½", 2" press, NPT female, sweat union

Technical specifications

Valve body

Materials

Body:	brass EN 12165 CW617N
Ball:	brass EN 12165 CW617N, chrome plated
Ball seal:	PTFE with EPDM O-Ring
Control stem seal:	double EPDM O-Ring
Union seal (Posi-Stop™) for sizes ¾", 1", 1¼":	EPDM O-Ring

Note: EPDM o-rings are peroxide-cured.

Performance

Medium:	water, glycol solutions
Max. percentage of glycol:	50%
Maximum working pressure:	230 psi (16 bar)
Maximum differential pressure:	
3/4" to 1 1/4":	150 psi (10 bar)
1 1/2" to 2":	75 psi (5 bar)

Fluid working temperature range:	14 to 230 °F (-10 to 110 °C)
Operating ambient temperature range:	14 to 230 °F (-10 to 110 °C)

Shutoff leakage: bubble-tight

Flow coefficient:

¾" size:	Cv=20 (Kv=17)
1" size:	Cv=42 (Kv=36.5)
1¼" size:	Cv=56 (Kv=48)
1½" size:	Cv=89 (Kv=77)
2" size:	Cv=162 (Kv=140)

Connections:

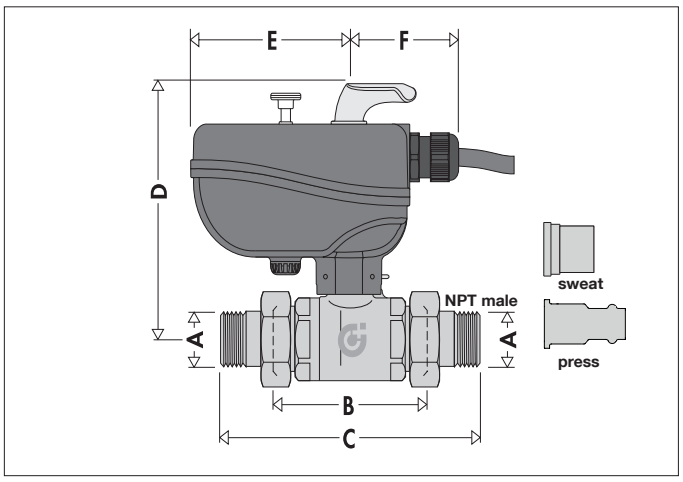
3/4", 1", 1 1/4", 1 1/2", 2" press, NPT male, sweat union

Actuator

Synchronous motor

Power:	24 VAC, 6 VA
Auxiliary microswitch contact rating:	6A at 24 VAC
Protection class:	NEMA 4 (IP 65)
Stoke time (90 degrees rotation):	50 seconds
Supply cable length:	32 inches (0.8 m)
Dynamic torque:	133 lbf-in (15 N·m)

Dimensions

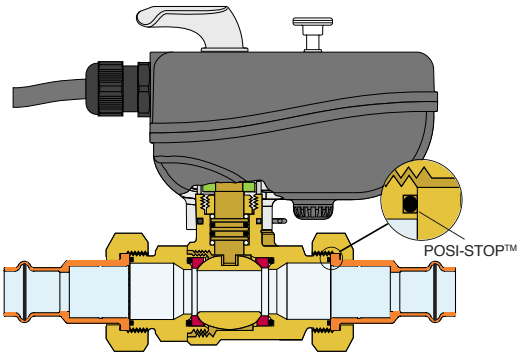


Code	A	B	C	D	Lay Length	E	F	Wt. (lb.)	Cv (Kv)
638054A 103	¾" NPT male	3 5/16"	5½"	4¾"	--	3⅜"	2 5/16"	3.3	20 (17)
638064A 103	1" NPT male	3¾"	8 1/16"	5"	--			4.5	42 (36.5)
638074A 103	1¼" NPT male	4 1/16"	7 11/16"	5"	--			5.6	56 (48)
638084A 103	1½" NPT male	4¾"	9 3/16"	7⅝"	--			12	89 (77)
638094A 103	2" NPT male	4¾"	9⅜"	7⅝"	--			12.4	162 (140)
638054A 109	¾" sweat	3 5/16"	5 5/16"	4¾"	3 13/16"			3.3	20 (17)
638064A 109	1" sweat	3¾"	5 13/16"	5"	4"			4.5	42 (36.5)
638074A 109	1¼" sweat	4 1/16"	6⅜"	5"	4¼"			5.6	56 (48)
638084A 109	1½" sweat	4¾"	7⅛"	7⅝"	4 15/16"			12	89 (77)
638094A 109	2" sweat	4¾"	7⅝"	7⅝"	4½"			12.4	162 (140)
638054A 106	¾" press	3 5/16"	6 3/16"	4¾"	4 5/16"			2.7	20 (17)
638064A 106	1" press	3¾"	7⅛"	5"	5"			4.8	42 (36.5)
638074A 106	1¼" press	4 1/16"	10⅛"	5"	7 15/16"			5.8	56 (48)
638084A 106	1½" press	4¾"	10⅛"	7⅝"	7⅜"			11.6	89 (77)
638094A 106	2" press	4¾"	13 5/16"	7⅝"	10¼"			11.8	162 (140)

Construction details

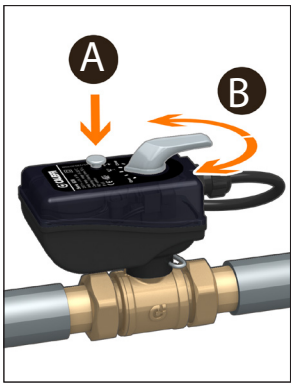
Valve

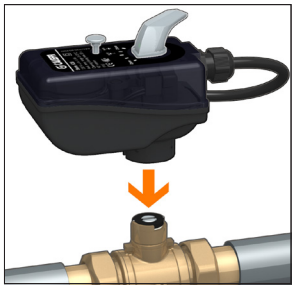
The valves are designed with union connections and Posi-Stop™ union seals on both tailpiece connections for sizes 3/4, 1 and 1-1/4 inch. Sizes 1-1/2 and 2 inch have fiber washer union seals. The ball is designed to allow high differential operating pressures and, when fully open, low differential pressure loss. The low opening and closing torques combined with 133 lbf-in (15 N-m) actuator dynamic torque, provides short 50 second 90 degree stroking time.

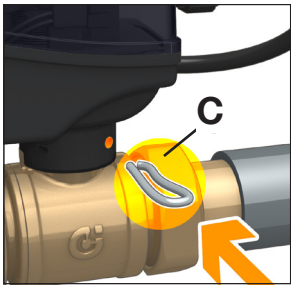


Actuator manual opening/ closing

The actuator has a control lever (B), for valve manual opening and closing, that can be operated by pressing the button (A). The lever also acts as a position indicator. Install the actuator on the valve body, with the stainless steel clip (C), which also enables quick disassembly in order to check and operate the control stem of the ball with the aid of a screwdriver.



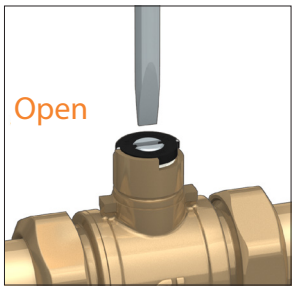


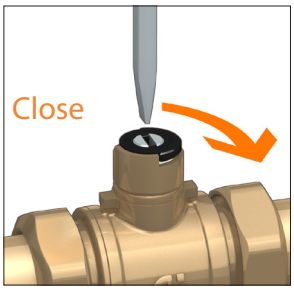


Directions of flow and position indicator

When the actuator is removed, a slot becomes visible at the top of the control stem where the actuator pin connects:

- This slot allows manual opening and closing of the valve using a screwdriver.
- The ball's position and flow condition are indicated by the slot direction, which is useful during testing or system inspection.
- Flow condition given slot position are shown in figures below.





Protection class

The valve can be installed in a vertical, horizontal or upside-down position, as shown in the figure, as the actuator is certified to NEMA 4 (IP 65)) protection class.

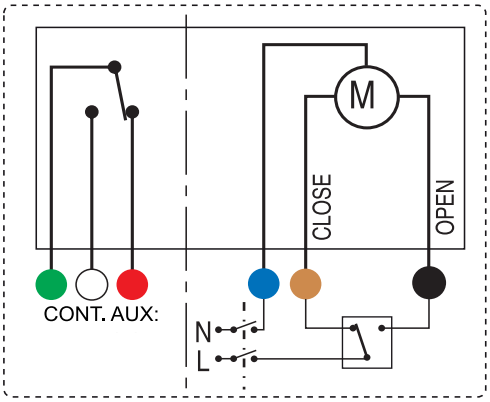
Electrical connections

Wiring diagram

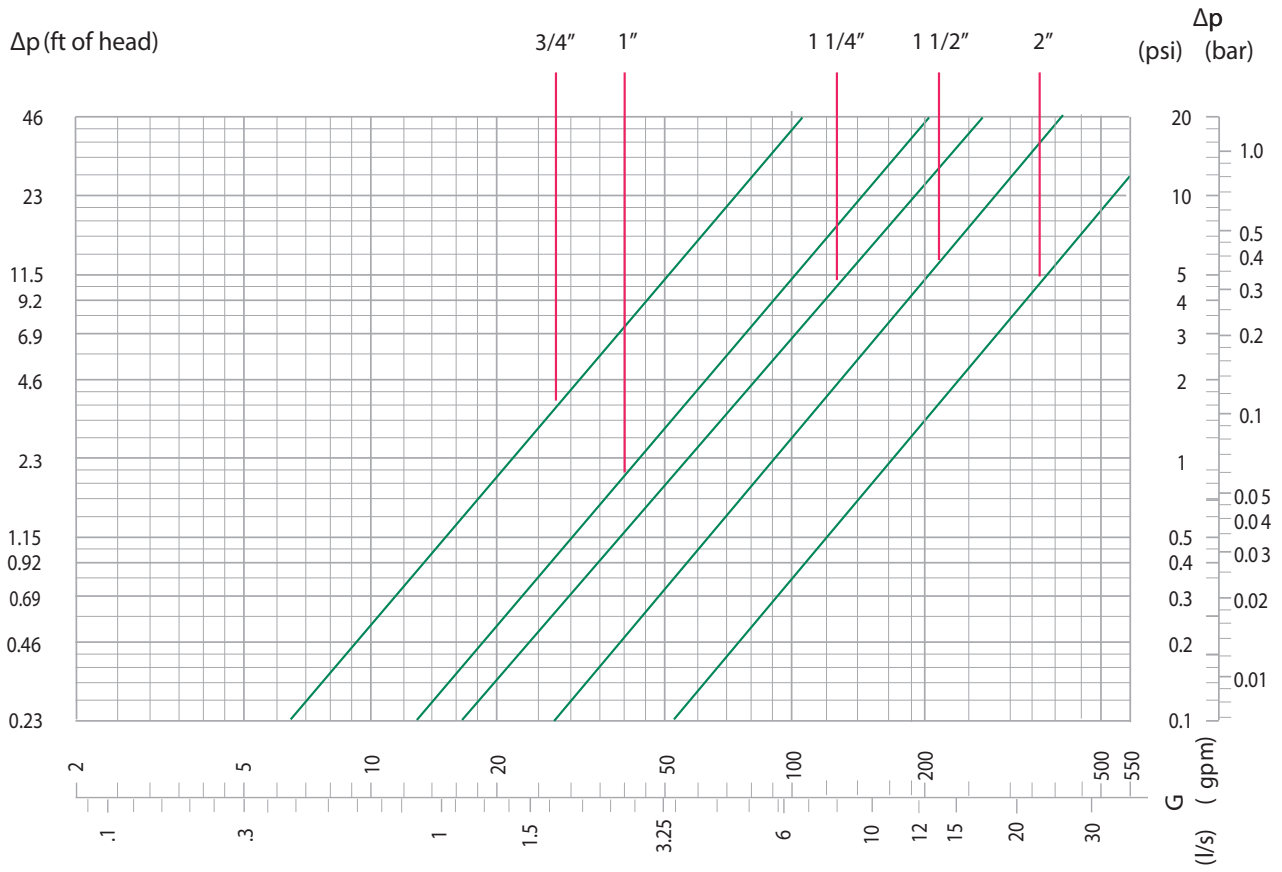
Internal diagram while valve is in closed position.

Auxiliary microswitch

The auxiliary microswitch is activated when the actuator begins to open. It deactivates when the actuator is 95% closed.

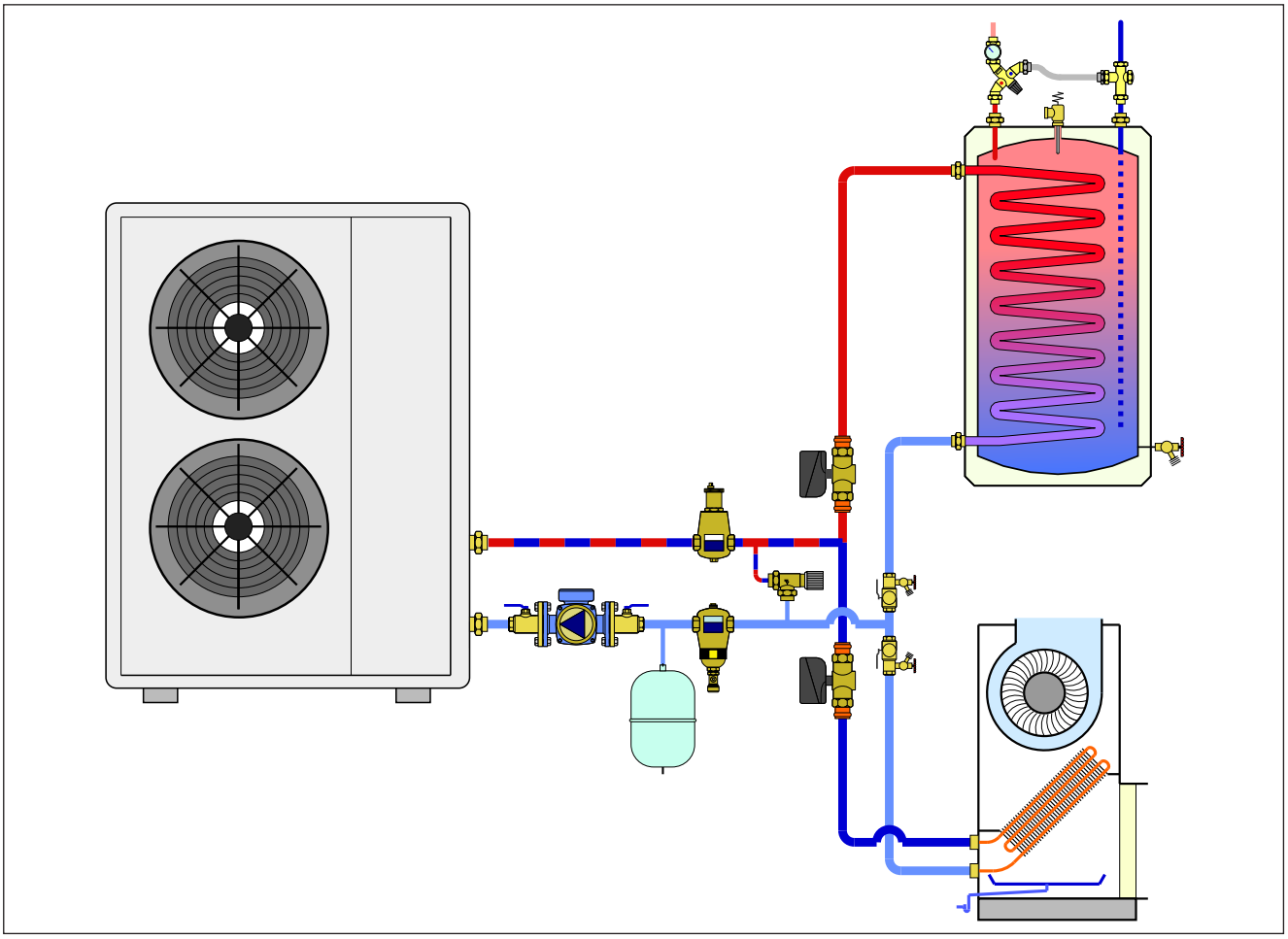


Flow curve



	Flow coefficient				
Size	**3/4"**	**1"**	**1 1/4"**	**1 1/2"**	**2"**
Cv	20	42	56	89	162
Kv	17	36.5	48	77	140

Application diagrams

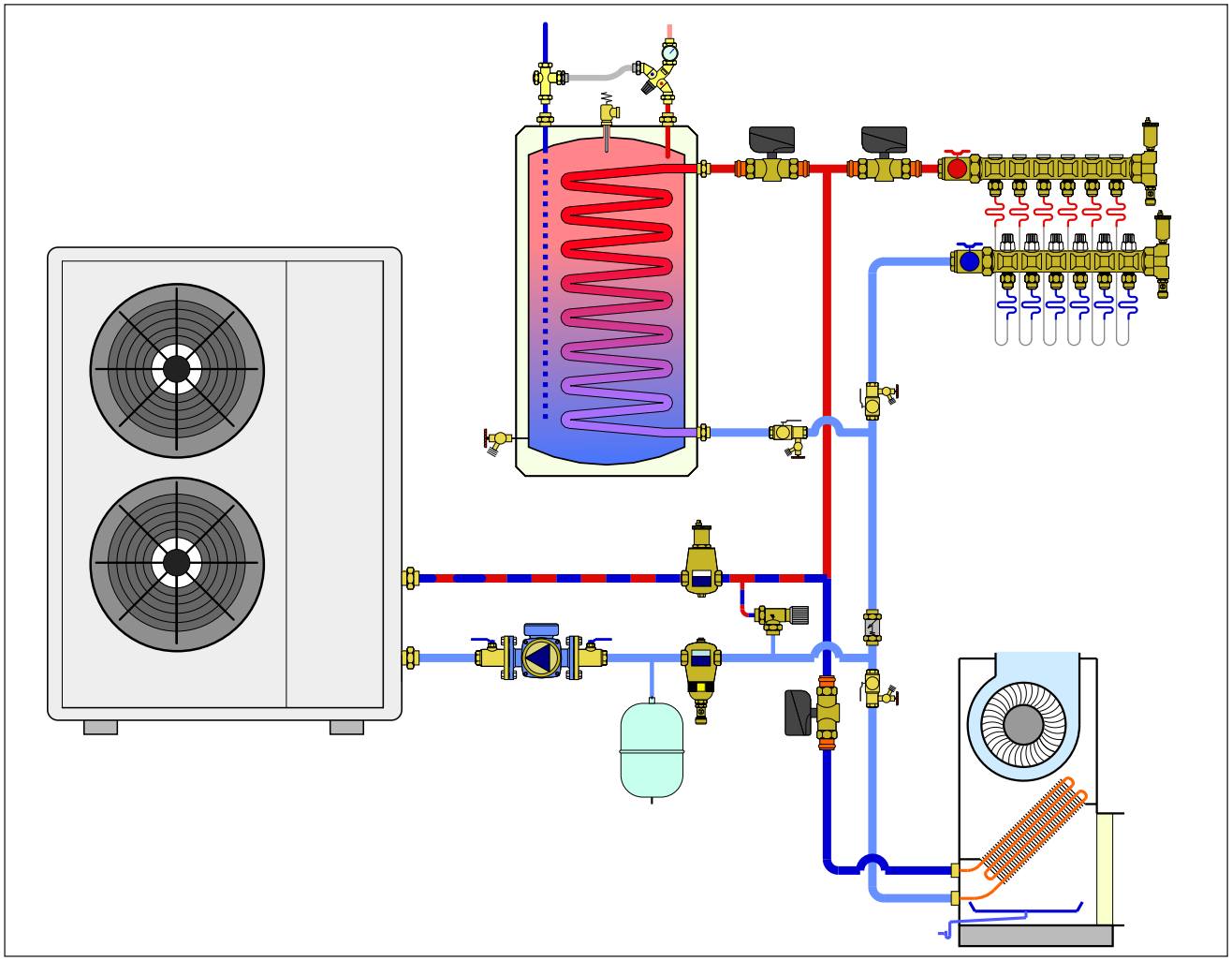


Application A
Indirect Domestic Hot Water heating and chilled water cooling with heat pump

In DHW heating mode the upper 638 is open and the lower one is closed. In cooling mode the lower 638 is open and the upper one is closed. During a transition from DHW to cooling, it's undesirable to send residual hot fluid in the piping and heat pump into the cooling coil (it would create a surge of hot air from the air handler).

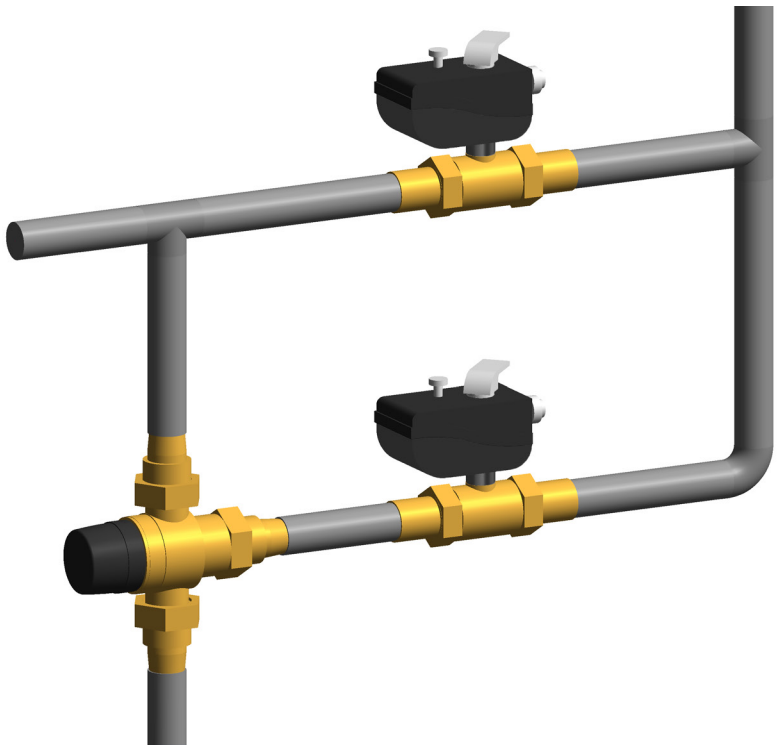
Likewise, when transitioning from cooling to DHW heating, it's undesirable to send cool fluid into the indirect tank.

The way either of these is avoided is by keeping both 638 valves closed, and allowing the flow from the heat pump to"short circuit" back through the differential pressure by-pass valve as its temperature is transitioning.
Typically these transitions only take 2 or 3 minutes, but this approach avoids creating discomfort from the cooling coil and chilled fluid entry into the indirect tank.
The two 638 valves could also be coordinated to shift heat pump between space heating with the air handlers and DHW.



Application B
Indirect Domestic Hot Water heating , radiant space heating and chilled water cooling with heat pump

In DHW heating mode the upper 638 is open and the lower one is closed. In cooling mode the lower 638 is open and the upper one is closed. Three 638 2-way valve are used with same type of control logic between cooling and DHW described in Application A.



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SPECIFICATION SUMMARY

638 series

Two-way motorized ball valve for hydronic and geothermal systems. NPT female, sweat and press union connection sizes 3/4” to 2”. Full port type ball valve. Brass body. Chrome plated brass ball. Control stem seal with double peroxide-cured EPDM o-ring seal. PTFE ball seal with peroxide-cured EPDM o-ring seal for compensation of mechanical slack. Peroxide-cured EPDM o-ring Posi-Stop™ union seals. Water and 50% max. glycol solutions. Maximum working pressure 230 psi (16 bar). Maximum differential pressure 150 psi (10 bar) (from 3/4” to 1 1/4”), 75 psi (5 bar) (from 1 1/2”-2”). Actuator power 24 V AC, 6 VA; with auxiliary microswitch, auxiliary microswitch contact rating 6 A at 24 VAC; dynamic torque 133 lb-in (15 N·m.) Stroke time 50 seconds (90° rotation). Protection class NEMA 4 (IP 65). Electric supply cable length 32 inches (0.8 m). Ambient conditions for valve with actuator: medium working temperature range 14 degrees F to 230 degrees F (-10 degrees C to 110 degrees C); ambient temperature: operation 14 degrees F to 230 degrees F (-10 degrees C to 110 degrees C).

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