PROJECT:	LA CROSSE COUNTY SOLAR HOT WATER PROJECTS- LAKEVIEW HEALTH CENTER
LOCATION:	WEST SALEM, WI
ITEM: SPECIFICATION:	3-WAY DIVERTING VALVE
DESCRIPTION:	
3-Way Diverting Valve	Caleffi Z-one Zone Valve - Z300737 3-Way Valve Body & Z126000 Normally Closed Valve Actuator
INSTALLER:	Hooper Corporation 2030 Pennsylvania Ave. Madison, WI 53706
CONTACT:	Mike Peterson
PHONE:	(608) 249-0451 ext. 130
FAX:	(608) 249-7360
WARRANTY & CERTIFICATE:	One year parts and labor warranty (Unless specified otherwise by manufacturer)

3-Way Valve - Lakeview

Z-one™ zone valves

Z series

E239721
c UL us LISTED
86BP

• US Patent 7,048,251; others pending

Function

Z-one valves are used to automatically shut-off the flow or redirect hot and chilled water in hydronic heating and air conditioning systems.

The motorized two position, on/off, spring return Z1 series actuator has a end mounted push button for quick installation to valve body. The actuator is equipped with or without auxiliary switch and configured Normally Closed or Normally Opened with wire or terminal connections.

The zero leakage high temperature zone valve body Z2 series is 2-way straight through and the valve body Z3 series is 3-way diverting. The Z1 series actuator is easily attached by a push button lock and without tools.

The high temperature and high close-off performance characteristics of these zone valves, combined with the compact size, makes them suitable to fit inside baseboard or directly in fan coils units.

Quick Order Code Numbers: 24VAC Normally Closed Actuator and 2-way Valve Body Combinations

Code	Description	Connection
Z32	Z121000 without auxiliary switch, 18 inch wire connection + Z200053 flare body	1/2" SAE
Z40	Z111000 with auxiliary switch, 18 inch wire connection + Z200043 flare body + NA61241K	Inverted
Z40F	Z111000 with auxiliary switch, 18 inch wire connection + Z200043 flare body + two NA10006 sweat	3/4"
Z42	Z111000 with auxiliary switch, 18 inch wire connection + Z200053 flare body	1/2" SAE
Z44	Z111000 with auxiliary switch, 18 inch wire connection + Z200432 sweat body	1/2"
Z45	Z111000 with auxiliary switch, 18 inch wire connection + Z200537 sweat body	3/4"
Z46	Z111000 with auxiliary switch, 18 inch wire connection + Z200637 sweat body	1"
Z47	Z111000 with auxiliary switch, 18 inch wire connection + Z200737 sweat body	1 1/4"
Z50	Z151000 with auxiliary switch, screw terminal connection + Z200043 flare body + NA61241K	Inverted
Z50F	Z151000 with auxiliary switch, screw terminal connection + Z200043 flare body + two NA10006 sweat	3/4"
Z54	Z151000 with auxiliary switch, screw terminal connection + Z200432 sweat body	1/2"
Z55	Z151000 with auxiliary switch, screw terminal connection + Z200537 sweat body	3/4"
Z56	Z151000 with auxiliary switch, screw terminal connection + Z200637 sweat body	1"
Z57	Z151000 with auxiliary switch, screw terminal connection + Z200737 sweat body	1 1/4"
NA10005	Inverted flare nut with attached copper sweat tail piece	1/2"
NA10006	Inverted flare nut with attached copper sweat tail piece	3/4"
NA10007	Inverted flare nut with attached copper sweat tail piece	1"
NA61241K	Inverted flare extension adaptor to retrofit body into an old style asymmetrical zone valve opening	Inverted
NA10124	SAE flare nut with attached copper sweat tail piece	3/4"

Technical specification

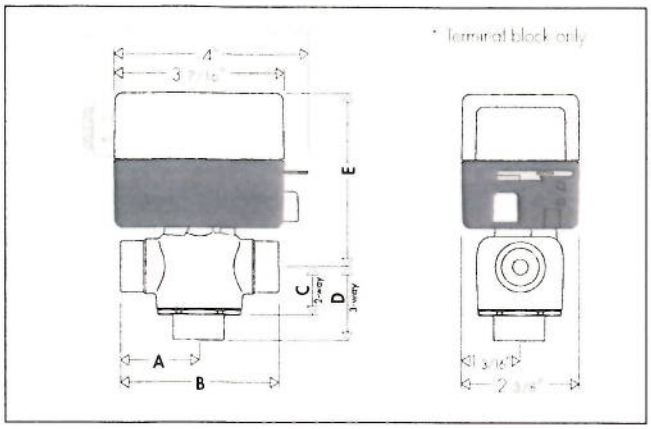
Valve body

Material:	- body:	forged brass
	- seat:	machined brass
	- stem:	stainless steel
	- two o-ring seals and paddle:	EPDM
Flow:		1 to 7.5 Cv (0.9 to 6.5 kv)
Medium:		water and glycol, low pressure steam
Maximum percent of glycol:		50%
Temperature range:		32 to 240°F (0 to 115°C)
Max. static pressure:		15 psi (1 bar) steam 300 psi (20 bar)
Max. closeoff Δ pressure:		20 to 75 psi (138 to 517 kPa)
Connection:	- sweat:	1/2", 3/4", 1" & 1 1/4"
	- NPT female:	1/2", 3/4" & 1"
	- SAE flare:	1/2"
	- inverted flare:	1/2", 3/4" & 1" sweat fittings separate

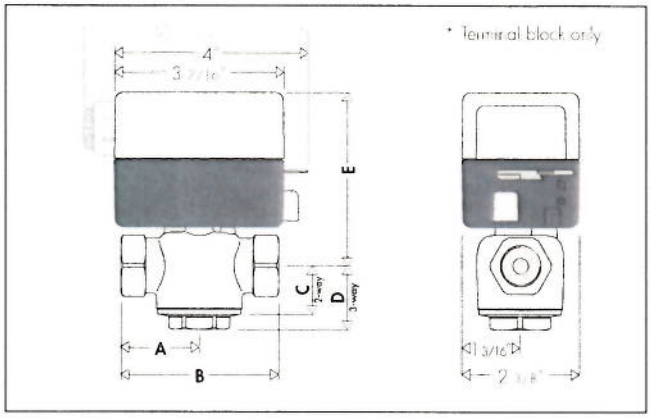
Actuator

Material:	- base and cover:	polycarbonate
	- baseplate:	aluminum
AC voltage:		24V - 120V - 208V - 230V - 277V; 50/60 Hz
Power requirements:		6.5 W, 7 VA
Power connections:	- terminal screws with auxiliary switch:	24V only
	- wire lead length:	18" (45 cm) 24V only 6" (15 cm) 120, 208, 230, 277V
Auxiliary switch capacity:		0.4A, 24V (24V only) 5.0A, 250V (120, 208, 230, 277V)
Ambient temperature range:		32 to 104°F (0 to 40°C) 24, 120V 32 to 170°F (0 to 77°C) 208, 230, 277V
Humidity:		95% non-condensing
Full Stroke Time:	- open	< 60 seconds
	- close:	< 10 seconds
Approvals:		UL, cUL Listed & CE

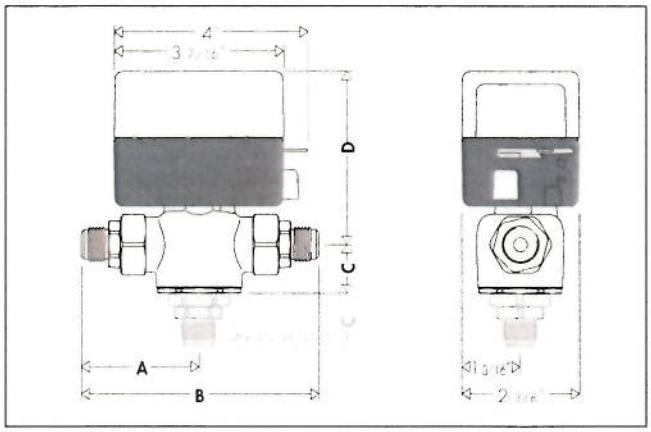
Dimensions



Connections	A	B	C	D	E
1/2" sweat	1 5/16"	2 5/8"	15/16"	1 5/16"	3 1/2"
3/4" sweat	1 3/8"	2 3/4"	15/16"	1 1/2"	3 1/2"
1" sweat	1 11/16"	3 3/8"	15/16"	1 9/16"	3 11/16"
1 1/4" sweat	1 13/16"	3 5/8"	15/16"	1 11/16"	3 11/16"



Connections	A	B	C	D	E
1/2" NPT	1 7/16"	2 7/8"	15/16"	1 1/4"	3 1/2"
3/4" NPT	1 9/16"	3 1/16"	15/16"	1 1/4"	3 11/16"
1" NPT	1 13/16"	3 5/8"	15/16"	1 11/16"	3 11/16"
Inverted flare	1 3/8"	2 3/4"	15/16"	1 1/4"	3 1/2"
with adaptor (NA6124K)	1 3/8"	3 1/2"	15/16"	1 1/4"	3 1/2"



Connections	A	B	C	D
2-way 1/2" SAE Flare	2 11/32"	4 11/16"	15/16"	3 1/2"
3-way 1/2" SAE Flare	2 11/32"	4 11/16"	2 1/8"	3 1/2"

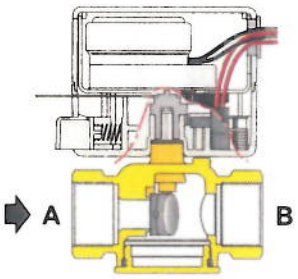
Operating principle

The Z-one actuator has a synchronous motor that winds the return spring and moves the valve paddle to the desired position. When power is removed the actuator spring returns the valve paddle. The Zone actuator is equipped with or without auxiliary switch.

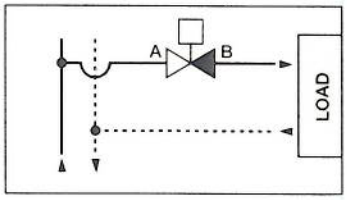
Operation of normally closed valve

	2-way	3-way
N.C. without power	Port "A" closed	Port "A" closed Port "B" open Port "AB" open
N.C. opened with power	Port "A" opened	Port "A" opened Port "B" closed Port "AB" open
N.C. manually opened	Port "A" open	Port "A" opened Port "B" opened Port "AB" opened

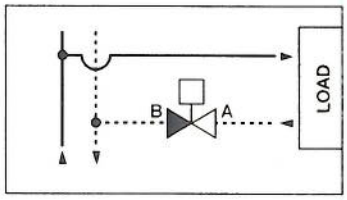
2-way
(with the power off, passage A is closed)



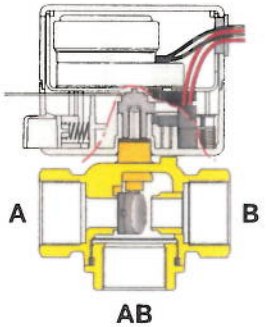
2-way installed on the flow side



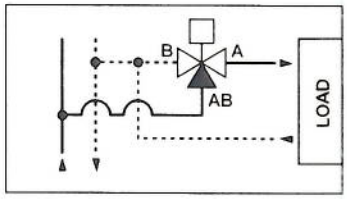
2-way installed on the return side



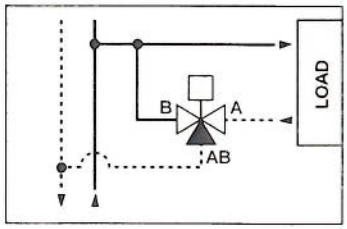
3-way
(with the power off, passage A is closed)



3-way installed on the flow side as a diverting valve configuration



3-way installed on the return side as a mixing valve configeration



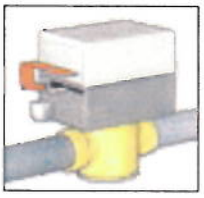
Construction details

• Auxiliary switch

The actuator contains an auxiliary microswitch to operate other devices. The 24 V actuators use a sealed reed switch, patent pending, which has been produced specifically for use with relays, boiler contacts (TT) and DDC systems. The 120 V - 277 V actuators use a conventional microswitch with silver contacts. The auxiliary switch is activated when the valve is 60% open or when the actuator is manually opened.

• Manual opening

The valve can be opened manually by moving the lever for opening it. When the power is restored the manual control is automatically overridden. The auxiliary switch in 24 V actuators is tripped when the unit is put into manual open position. This helps during start up to check if the wiring is correct without firing the valve electrically with the thermostat.



• Easy push button

A simple push of the button makes it easy to remove it from the body of the valve for maintenance or replacement operations.
Warning: the actuator can only be used with valve bodies Z2-Z3 series.

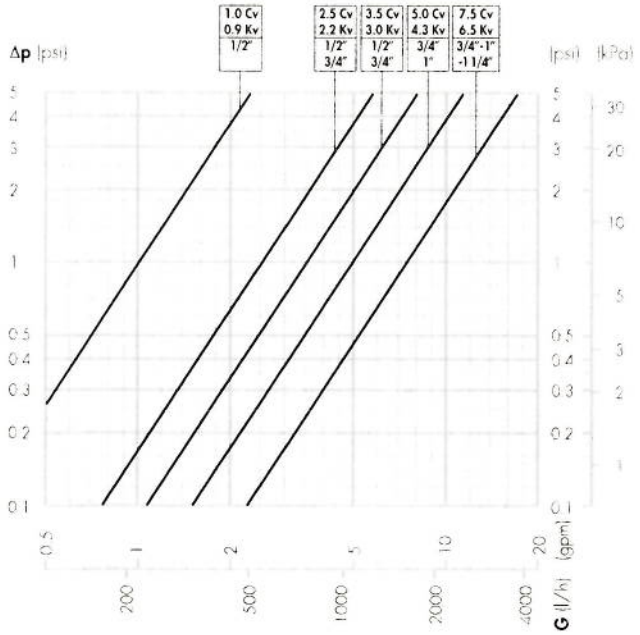
• Operation

The actuator is fitted with a special mechanism for gradual movement of the valve paddle which provides smooth and quiet constant operation. Power-on full stroke run time is 60 seconds with power-off return time running less than 10 seconds, reducing or eliminating the effects of water hammer.

Flow characteristics

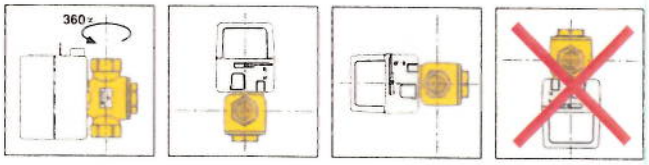
Connection size	Flow coefficient	Max. Close-off ΔP
1/2"	1.0 Cv (0.9 Kv)	75 psi (517 kPa)
1/2" - 3/4"	2.5 Cv (2.2 Kv)	50 psi (345 kPa)
1/2" - 3/4"	3.5 Cv (3.0 Kv)	30 psi (207 kPa)
3/4" - 1"	5.0 Cv (4.3 Kv)	25 psi (172 kPa)
3/4" - 1" - 1 1/4"	7.5 Cv (6.5 Kv)	20 psi (138 kPa)

Hydraulic characteristics



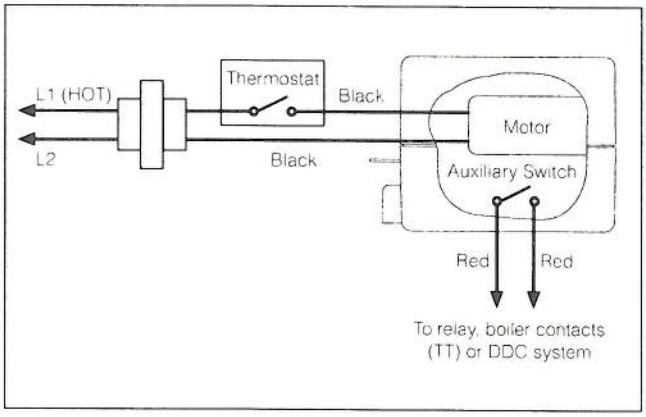
Installation

- The valve can be fitted either vertically or horizontally, with the actuator in any position, **except upside down**.

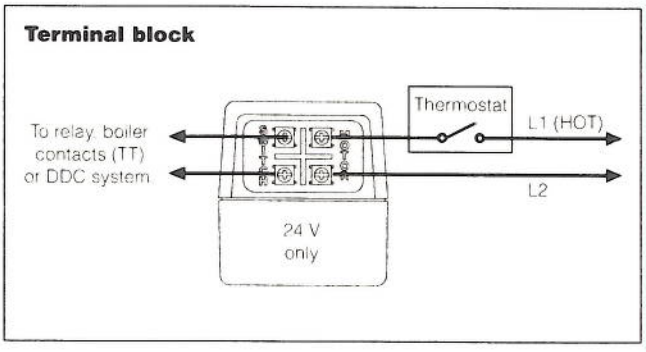


- If it is installed inside a encloser it is important to ensure that there is adequate ventilation inside the encloser itself.
- The three-way valve cannot be transformed into a two-way valve and vice versa.
- When zone valves are installed, the direction of flow must be observed as shown in the diagrams below.
- Two-way zone valves can be installed on both the flow and return sides; the direction of flow indicated by the arrow on the body of the valve must be observed.
- Three way zone valve can be fitted with NC actuator only (rotate 180° the valve body for NO application).

Wiring diagram

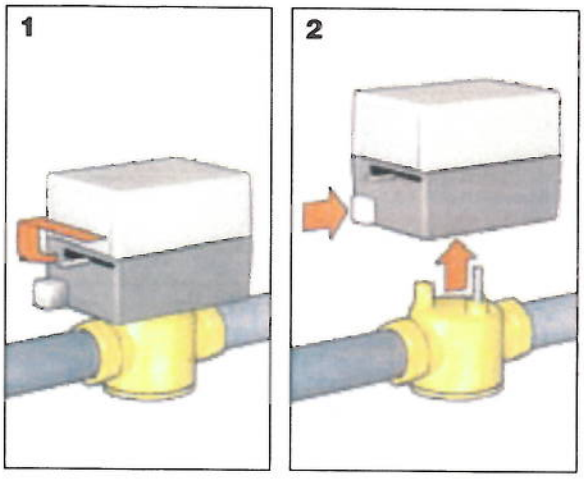


Terminal block



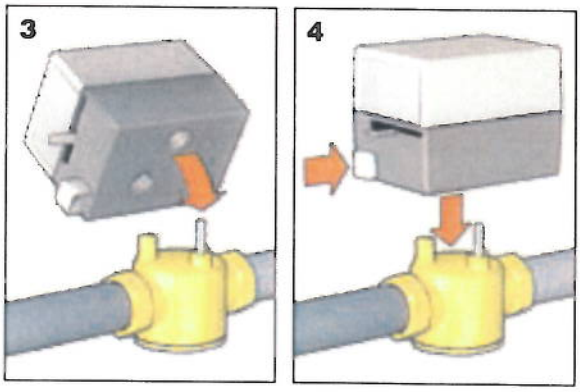
Removal of the actuator

1. Move the manual open lever to the lock open position.
2. Press the push button in and pull the actuator up.



Fitting of the actuator

1. Move the manual open lever to the lock open position.
3. Verify the correct position of the valve stem into the mating actuator hole. Move stem if required to allign.
4. Press the push button in and slide the actuator onto the valve body, release the push button.



Z-one Normally Closed Valve Actuators

Code	*Description*
Z111000	24V with auxiliary switch 18" wire
Z116000	120V with auxiliary switch 6" wire
Z113000	208V with auxiliary switch 6" wire
Z114000	230V with auxiliary switch 6" wire
Z115000	277V with auxiliary switch 6" wire
Z151000	24V w/auxiliary switch terminal block
Z121000	24V without auxiliary switch 18" wire
Z126000	120V without auxiliary switch 6" wire
Z123000	208V without auxiliary switch 6" wire
Z124000	230V without auxiliary switch 6" wire
Z125000	277V without auxiliary switch 6" wire

Z-one Normally Open Valve Actuators

Code	*Description*
Z131000	24V with auxiliary switch 18" wire
Z136000	120V with auxiliary switch 6" wire
Z133000	208V with auxiliary switch 6" wire
Z134000	230V with auxiliary switch 6" wire
Z135000	277V with auxiliary switch 6" wire
Z141000	24V without auxiliary switch 18" wire
Z146000	120V without auxiliary switch 6" wire
Z143000	208V without auxiliary switch 6" wire
Z144000	230V without auxiliary switch 6" wire
Z145000	277V without auxiliary switch 6" wire

Z-one 2-way Straight Through Valve Bodies

Code	*Description*	*Cv*	*ΔP*
Z200041	Inverted Flare	1.0	75 psi
Z200042	Inverted Flare	2.5	50 psi
Z200043	Inverted Flare	3.5	30 psi
Z200053	1/2" SAE Flare	3.5	30 psi
Z200411	1/2" NPT	1.0	75 psi
Z200412	1/2" NPT	2.5	50 psi
Z200413	1/2" NPT	3.5	30 psi
Z200431	1/2" Sweat	1.0	75 psi
Z200432	1/2" Sweat	2.5	50 psi
Z200433	1/2" Sweat	3.5	30 psi
Z200512	3/4" NPT	2.5	50 psi
Z200513	3/4" NPT	3.5	30 psi
Z200515	3/4" NPT	5.0	25 psi
Z200517	3/4" NPT	7.5	20 psi
Z200532	3/4" Sweat	2.5	50 psi
Z200533	3/4" Sweat	3.5	30 psi
Z200535	3/4" Sweat	5.0	25 psi
Z200537	3/4" Sweat	7.5	20 psi
Z200617	1" NPT	7.5	20 psi
Z200635	1" Sweat	5.0	25 psi
Z200637	1" Sweat	7.5	20 psi
Z200737	1-1/4" Sweat	7.5	20 psi

Z-one 3-way Diverting Valve Bodies

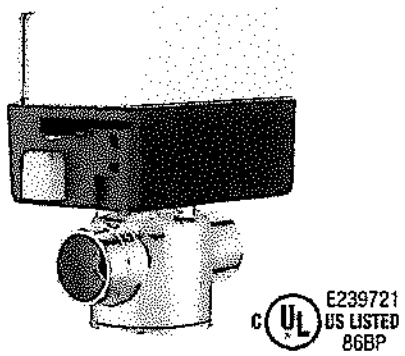
Code	*Description*	*Cv*	*ΔP*
Z300041	Inverted Flare	1.0	75 psi
Z300042	Inverted Flare	2.5	50 psi
Z300043	Inverted Flare	3.5	30 psi
Z300053	1/2" SAE Flare	3.5	30 psi
Z300411	1/2" NPT	1.0	75 psi
Z300412	1/2" NPT	2.5	50 psi
Z300413	1/2" NPT	3.5	30 psi
Z300431	1/2" Sweat	1.0	75 psi
Z300432	1/2" Sweat	2.5	50 psi
Z300433	1/2" Sweat	3.5	30 psi
Z300512	3/4" NPT	2.5	50 psi
Z300513	3/4" NPT	3.5	30 psi
Z300515	3/4" NPT	5.0	25 psi
Z300517	3/4" NPT	7.5	20 psi
Z300532	3/4" Sweat	2.5	50 psi
Z300533	3/4" Sweat	3.5	30 psi
Z300535	3/4" Sweat	5.0	25 psi
Z300537	3/4" Sweat	7.5	20 psi
Z300617	1" NPT	7.5	20 psi
Z300635	1" Sweat	5.0	25 psi
Z300637	1" Sweat	7.5	20 psi
Z300737	1-1/4" Sweat	7.5	20 psi

CALEFFI

www.caleffi.com

NA10073

Z-one™ **Z1, Z2, Z3 Series**



Function

The Z-one, a two-position spring return zone valve, is used in heating and air-conditioning systems. The Z-one series consist of a Z1 actuator which is easily attached to a Z2 (2-way) or Z3 (3-way) valve body. Z1 actuator is equipped with or without auxiliary switch.

The Z-one actuator has a synchronous motor that winds the return spring and moves the valve paddle to the desired position. When power is removed the actuator spring returns the valve paddle.

US Patent 7,048,251

Technical Characteristics of Body

Material:	- body:	forged brass
	- seat:	machined brass
	- stem:	stainless steel
	- two o-ring seals	EPDM
	- paddle	EPDM
Medium:		water and glycol
Maximum percent of glycol:		50%
Temperature range:		32 to 240°F (0 – 115°C)
Max. static pressure:		15 psi (1 bar) steam
		300 psi (20 bar)
Connection:	- sweat	½", ¾" 1" & 1 ¼"
	- NPT	½", ¾" & 1"
	- BSP	½", ¾" & 1"
	- inverted flare	½", ¾" & 1" sweat fittings

Technical Characteristics of Actuator

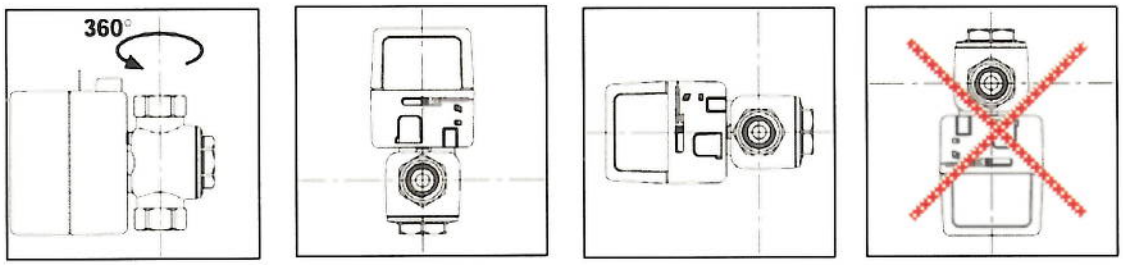
Material:	- base and cover:	polycarbonate
	- base plate:	aluminum
Motor:	- voltage:	24 VAC 50/60 Hz Class 2
		120 VAC 50/60 Hz
		208 VAC 50/60 Hz
		230 VAC 50/60 Hz
		277 VAC 50/60 Hz
Wire lead length:		6" (15cm), 24V only -18" (45cm)
Power requirements:		6.5 W, 7 VA
Ambient temperature range:		32 - 104°F (170°F optional)
Auxiliary switch:		24 VAC: 0.4 A, 24 V
		120-277 VAC: 5 A, 250 V
Humidity:		95% non-condensing
Approvals:		UL, cUL Listed & CE

Flow Characteristics

Connection size	Flow Coefficient	Max. Close-off ΔP
1/2"	1.0 Cv (0.9 kv)	75 PSI (517 kPa)
1/2"	2.5 Cv (2.2 kv)	50 PSI (345 kPa)
3/4"		
1/2"	3.5 Cv (3.0 kv)	30 PSI (207 kPa)
3/4"		
3/4"	5.0 Cv (4.3 kv)	25 PSI (172 kPa)
1"		
3/4"	7.5 Cv (6.5 kv)	20 PSI (138 kPa)
1"		
1"	7.5 Cv (6.5 kv)	20 PSI (138 kPa)
1 1/4"		

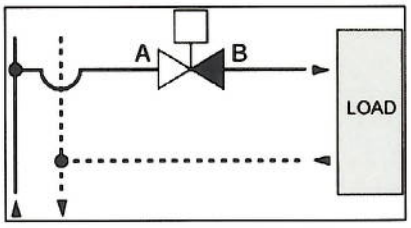
Installation

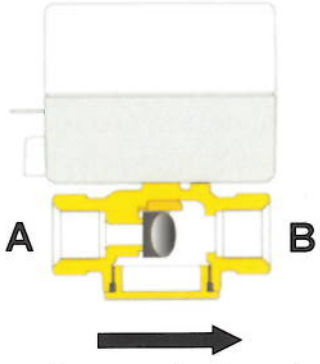
The valve can be installed vertically or horizontally, but not turned upside down.



- A 3-way valve cannot be transformed into a 2-way valve and vice versa.
- The flow is from A to B (see diagram below) and must be installed so the paddle closes against the direction of flow as indicated in the following diagrams.
- The 2-way valves can be installed on the supply or on the return; for correct installation it is necessary to respect the direction of flow indicated from the arrow on the body valve.

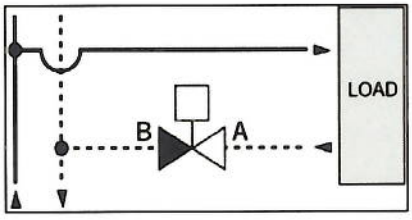
2-way installed on the supply

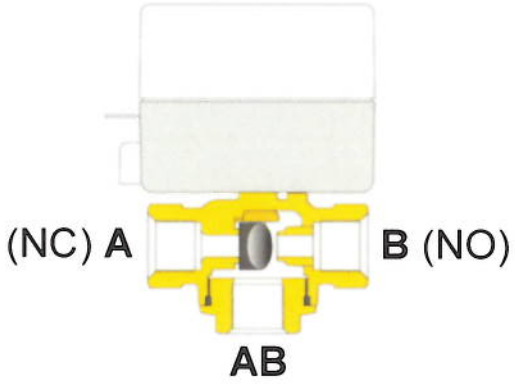




2-way valve with normally closed actuator

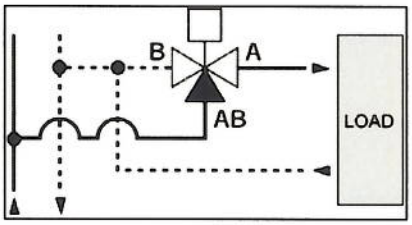
2-way installed on the return



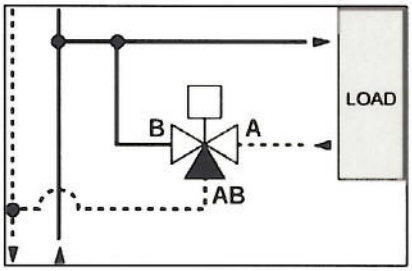


3-way valve with normally closed actuator
(Note: 3-way uses only normally closed actuator)

3-way installed on the supply in diverting configuration



3-way installed on the return

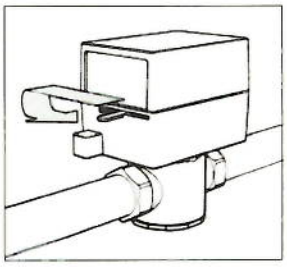


Operation of Normally Closed Valve

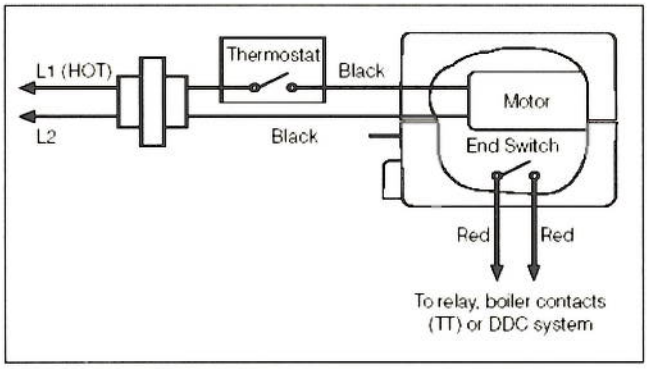
	2-way	3-way
N.C. without power	Port "A" closed	Port "A" closed Port "B" opened Port "AB" opened
N.C. opened with power	Port "A" opened	Port "A" opened Port "B" closed Port "AB" opened
N.C. manually opened	Port "A" opened	Port "A" opened Port "B" opened Port "AB" opened

Manual Open

The manual opening is achieved by moving the manual opening lever to the locked position. When power is applied, the manual lever unlocks automatically.

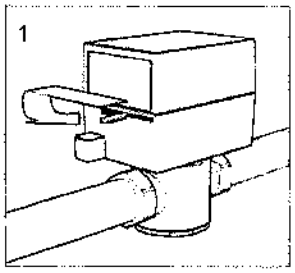


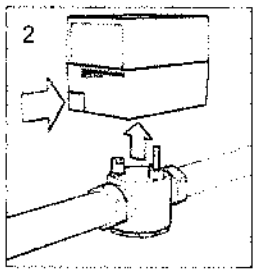
Wiring Diagram



Removing the Actuator

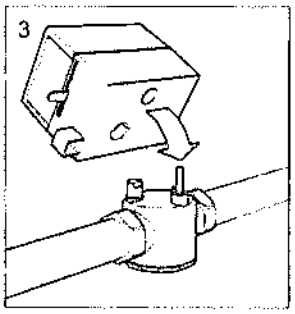
1. Move the manual open lever to the lock open position.
2. Press the push button in and pull the actuator up.

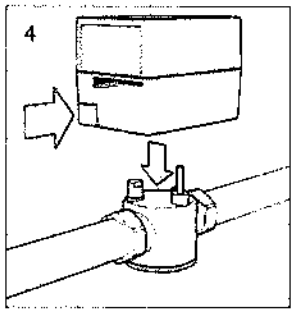




Installing the Actuator

1. Move the manual open lever to the lock open position.
3. Verify the correct position of the valve stem into the mating actuator hole. Rotate stem if required to align.
4. Press the push button in and slide the actuator onto the valve body, release the push button.





SAFETY INSTRUCTION

This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**

CAUTION: All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of systems in accordance with all applicable codes and ordinances.

CAUTION: Over-tightening and breakage can occur with the use of Teflon pipe joint compounds. Teflon provides lubricity so that care must be exercised not to over-tighten joints. Failure to follow these instructions could result in property damage and /or personal injury.

WARNING: System fluids are under pressure or temperature can be hazardous. Be sure the pressure has been reduced to zero and the system temperature is below 100°F (38°C). Failure to follow these instructions could result in property damage and/or personal injury.

CAUTION: Avoid locations with excessive moisture, explosive vapors, corrosive fumes or vibration. Failure to follow these instructions could result in stress corrosion resulting in property damage and/or personal injury.

Caleffi shall not be liable for damages resulting from stress corrosion, misapplication or misuse of it products.

Caleffi North America, Inc.
3883 W. Milwaukee Road / Milwaukee, WI 53208
Tel: 414.238.2360 / Fax: 414.238.2366 / www.caleffi.com