

## Z-one™ Motorized zone valve

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**code Z1, Z2, Z3 series**

### INSTALLATION AND COMMISSIONING MANUAL



#### 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. 24V actuators use a sealed reed switch for end switch, requiring no minimum current load.

#### Technical specification

##### Valve body

Material: - body: forged brass (\*optional low-lead brass available)

- seat: machined brass
- stem: stainless steel
- two o-ring seals and paddle: EPDM

Flow: 1.0, 2.5, 3.5, 5.0, 7.5 Cv

Suitable fluids:

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. close-off  $\Delta$  pressure: 20 to 75 psid  
(138 to 517 kPa)

Close-off seat leakage: 100% bubble-tight

Connection:

- sweat: 1/2", 3/4" & 1" & 1 1/4"
- press: 1/2", 3/4" & 1"
- NPT female: 1/2", 3/4" & 1"
- SAE flare: 1/2"
- inverted flare: 1/2", 3/4" & 1" sweat, fittings

separate

Lay length (press connections): size 1/2 inch: 3 1/2";  
size 3/4 inch: 3 3/4"; size 1 inch (PL)\*\*: 5";  
size 1 1/4 inch: 4 1/8"

\*Low-lead brass models available, see Plumbing and Hydronics Catalog. NSF/ANSI 372-2011, Drinking Water System Components-Lead Content Reduction of Lead in Drinking Water Act, California Health and Safety Code 116875 S.3874, Reduction in Drinking Water Act, certified by ICC-ES, file PMG-1360.

\*\*Models with "L" suffix have one long tailpiece on outlet to provide extra long lay length for retrofit convenience.

##### Actuator

Material: - base and cover: polycarbonate  
- base plate: aluminum

Motor\*: - AC voltage:

24 V - 120 V - 208 V - 230 V - 277 V; 50/60 Hz

Power requirements: 5.0 W, 7 VA

Power connections:

- Terminal screws with auxiliary switch: 24 V only
- Wire lead length: 18" (45 cm), 24 V only  
6" (15 cm), 120, 208, 230, 277 V

Auxiliary microswitch:

0.0 A min, 0.4 A max, 24 V (24V actuators only); 0.25 A min, 5.0 A max, 250 V (120, 208, 230, 277 V actuators).

Ambient temperature range:

32 to 104°F (0 to 40°C) 24, 120 V  
32 to 170°F (0 to 77°C) 208, 230, 277 V

Humidity: 95% non-condensing

Full Stroke Time: - On: <60 seconds  
- Off: 6 seconds

Approvals: UL873, cUL Listed & CE

UL 1995 sec. 18 approved for air plenum and ducts.

Environmental: Indoor only

\* 208 V - 230 V - 277 V models Normally Closed only.

**Power to Normally Open Actuators should be turned off during extended idle periods.**



## 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.



**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



**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.



**CAUTION:** 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 its products.



**Approval for low-lead brass:** NSF/ANSI 372-2011, Drinking Water System Components-Lead Content Reduction of Lead in Drinking Water Act, California Health and Safety Code 116875 S.3874, Reduction of Lead in Drinking Water Act, certified by ICC-ES, file PMG-1360.

**LEAVE THIS MANUAL FOR THE USER**



## CONSIGNE DE SÉCURITÉ

Ce symbole d'avertissement servira dans ce manuel à attirer l'attention sur la sécurité concernant instructions. Lorsqu'il est utilisé, ce symbole signifie.

**ATTENTION! DEVEZ-VOUS ÊTRE ALERTES ! VOTRE SÉCURITÉ EST EN JEU ! NE PAS SUIVRE CES INSTRUCTIONS PEUT PROVOQUER UN RISQUE DE SÉCURITÉ.**



**AVERTISSEMENT:** Ce produit peut vous exposer à des produits chimiques comme le plomb, qui est connu dans l'État de Californie pour causer le cancer, dommages à la naissance ou autre. Pour plus d'informations rendez-vous [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).



**ATTENTION:** Tous les travaux doivent être effectués par du personnel qualifié formé à la bonne application, installation et maintenance des systèmes conformément aux codes et règlements locaux.



**ATTENTION:** Un serrage excessif et la rupture peuvent se produire avec l'utilisation de raccords filetés de tuyaux téflon. Téflon fournit un pouvoir lubrifiant afin qu'il doit être prudent pour ne pas trop serrer les joints. Suivre ces instructions peut entraîner de propriété dommages et/ou des blessures.



**ATTENTION:** Système fluides sont sous pression ou de température peut s'avérer dangereuse. Veillez à ce que la pression a été réduite à zéro et la température du système est inférieure à 100°F (38 ° c). De suivre ces instructions peut entraîner des dommages matériels et/ou des blessures corporelles graves.



**ATTENTION:** Évitez les endroits avec une humidité excessive, les vapeurs explosives, les vapeurs corrosives ou les vibrations. Suivre ces instructions peut entraîner de la corrosion sous tension, ce qui entraîne des dommages matériels ou corporels.

Caleffi décline toute responsabilité pour dommages résultant de la corrosion, une mauvaise utilisation ou utilisation abusive de celui-ci produits.

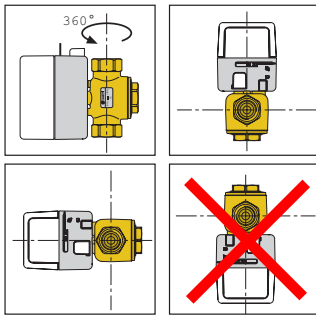
**LAISSEZ CE MANUEL AVEC**

## Flow characteristics

Connection size	Flow coefficient	Max. Close-off $\Delta P$
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)

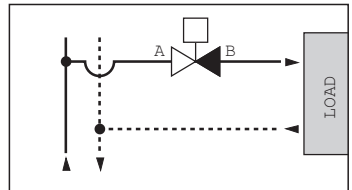
## Installation

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

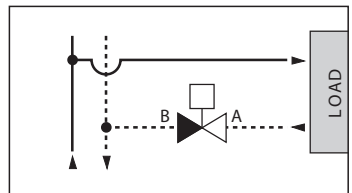


- If it is installed inside an enclosure it is important to ensure that there is adequate ventilation inside the enclosure itself.
- The three-way valve cannot be transformed into a two-way valve and vice versa.
- When zone valves are installed, the direction of flow must be observed.
- Two-way zone valves can be installed either in the supply or return piping; the direction of flow indicated by the arrow on the body of the valve must be observed.
- Three-way zone valves use the normally closed actuator only (rotate 180° the valve body for normally open application).

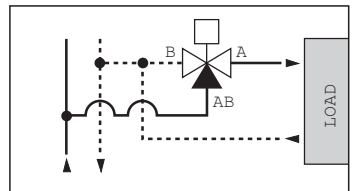
### 2-way installed on the supply side



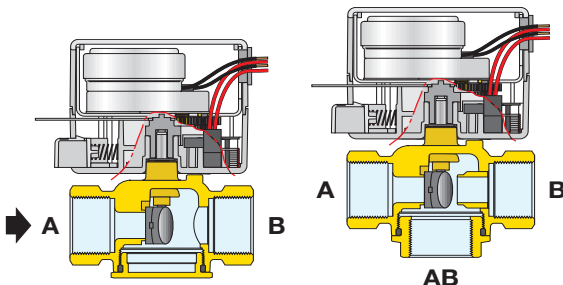
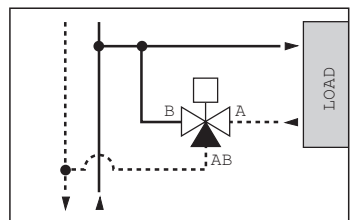
### 2-way installed on the return side



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



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



**2-way valve with normally closed actuator**

**3-way valve with normally closed actuator**

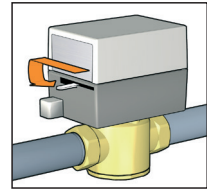
(Note: 3-way uses only normally closed actuator)

### Operation of normally closed valve

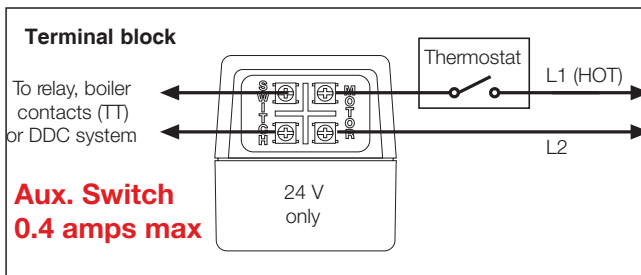
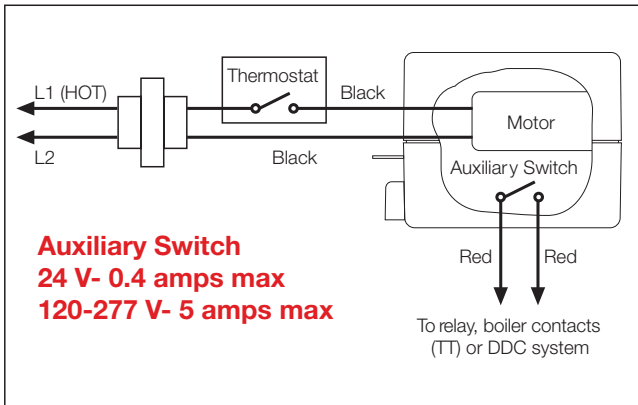
	2-way	3-way
N.C. without power	Port "A" closed	Port "A" closed Port "B" open Port "AB" open
N.C. opened with power	Port "A" open	Port "A" open Port "B" closed Port "AB" open
N.C. manually opened	Port "A" open	Port "A" open Port "B" open Port "AB" open

### Manual opening (Normally closed actuator only)

Use the manual opening lever to open the valve. When the power is restored the manual control is automatically overridden. The auxiliary micro-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. Note: The manual open lever travels through nearly all of the actuator stroke, providing a good indicator of the valve's position.

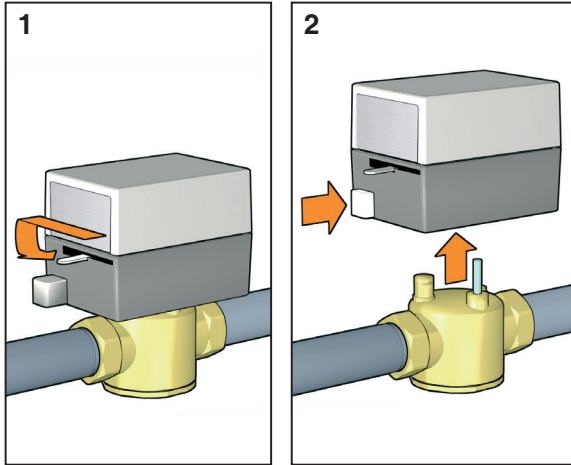


### Wiring diagram



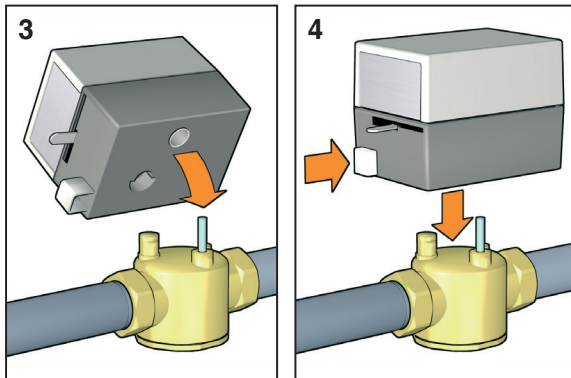
### Remove the actuator

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



### Install 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 align.
4. Press the push button in and slide the actuator onto the valve body, release the push button.



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