

# Z-one™ zone valves



## Z series



### 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, and is UL listed for plenum installations.

The motorized two position, on/off, spring return Z1 series actuator has an 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.

- US Patent 7,048,251; others pending

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

Code	Description	Connection
<b>Z32</b>	Z121000 without auxiliary switch, 18 inch wire connection + Z200053 flare body	1/2" SAE
<b>Z32F</b>	Z121000 without auxiliary switch, 18 inch wire connection + Z200053 flare body + NA10124	sweat 3/4"
<b>Z40</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200043 flare body + NA61241	Inverted
<b>Z40F</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200043 flare body + two NA10006	sweat 3/4"
<b>Z42</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200053 flare body	1/2" SAE
<b>Z42F</b>	Z111000 with auxiliary switch, 18 inch wire connections + Z200053 flare body + NA10124	sweat 3/4"
<b>Z44</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200432 sweat body	1/2"
<b>Z45</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200537 sweat body	3/4"
<b>Z46</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200637 sweat body	1"
<b>Z47</b>	Z111000 with auxiliary switch, 18 inch wire connection + Z200737 sweat body	1 1/4"
<b>Z50</b>	Z151000 with auxiliary switch, screw terminal connection + Z200043 flare body + NA61241K	Inverted
<b>Z50F</b>	Z151000 with auxiliary switch, screw terminal connection + Z200043 flare body + two NA10006 sweat	3/4"
<b>Z54</b>	Z151000 with auxiliary switch, screw terminal connection + Z200432 sweat body	1/2"
<b>Z55</b>	Z151000 with auxiliary switch, screw terminal connection + Z200537 sweat body	3/4"
<b>Z56</b>	Z151000 with auxiliary switch, screw terminal connection + Z200637 sweat body	1"
<b>Z57</b>	Z151000 with auxiliary switch, screw terminal connection + Z200737 sweat body	1 1/4"
<b>NA10005</b>	Inverted flare nut with attached copper sweat tail piece	1/2"
<b>NA10006</b>	Inverted flare nut with attached copper sweat tail piece	3/4"
<b>NA10007</b>	Inverted flare nut with attached copper sweat tail piece	1"
<b>NA61241</b>	Inverted flare extension adaptor to retrofit body into an old style asymmetrical zone valve opening	Inverted
<b>NA10124</b>	SAE flare nut with attached copper sweat tail piece	3/4"

### Technical specification

#### Valve body

Material: - body: forged brass (optional lead-free brass)  
 - seat: machined brass  
 - stem: stainless steel  
 - two o-ring seals and paddle: EPDM

Flow: 1 to 7.5 Cv (0.9 to 115°C)  
 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

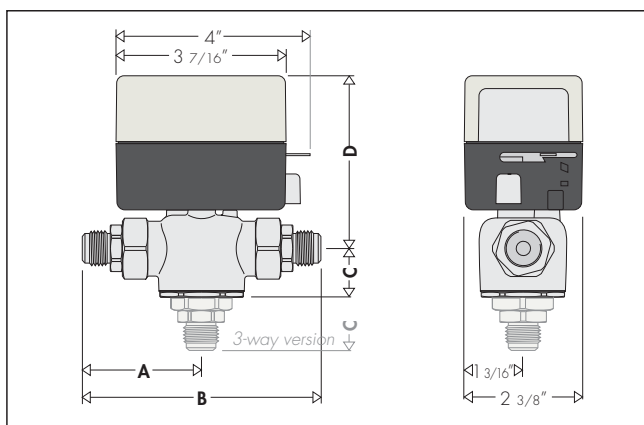
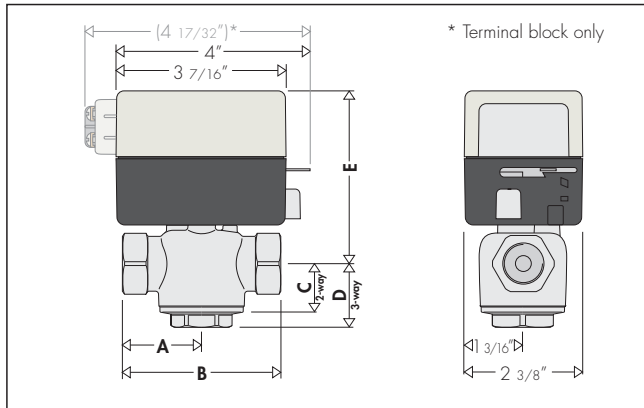
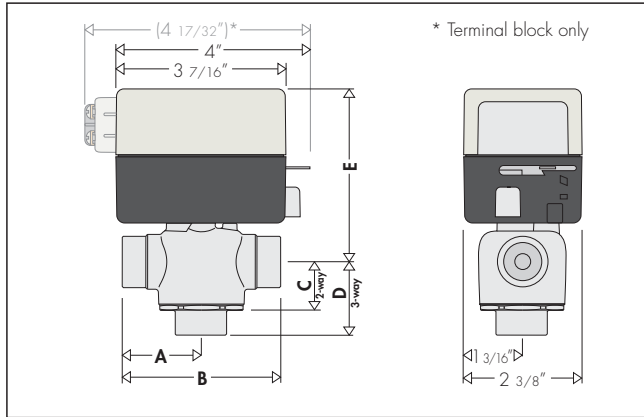
Approvals: for lead-free brass Lead plumbing law compliance (0.25% Max. weighted average lead content), Lead plumbing law certified by IAPMO R&T

#### 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 switch: 0.0 A min, 0.4 A max, 24 V (24V only)  
 0.25 A min, 5 A max, 250 V (Z111000 HCS)  
 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 plenums and ducts,  
 Normally Open Actuators must be powered down during off-season

## Dimensions



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

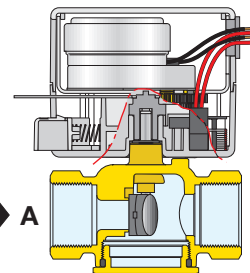
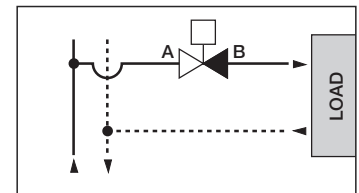
	2-way	3-way
N.C. without power	Port "A" closed	Port "A" closed Port "B" open Port "AB" open
N.C. opened with power	Port "A" opened	Port "A" opened Port "B" closed Port "AB" open
N.C. manually opened	Port "A" open	Port "A" opened Port "B" opened Port "AB" opened

### 2-way

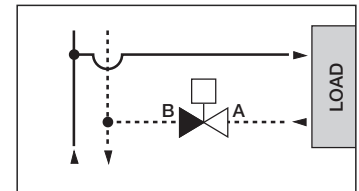
(with the power off, passage A is closed)



### 2-way installed on the flow side



### 2-way installed on the return side

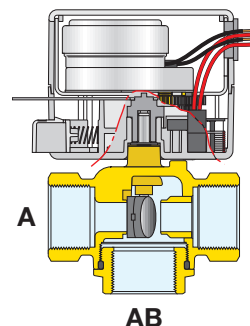
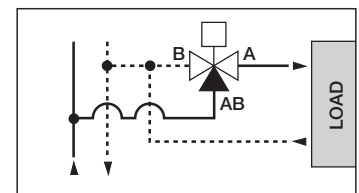


### 3-way

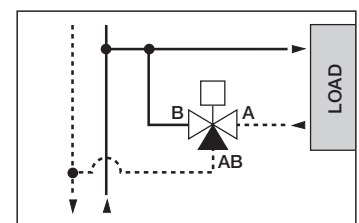
(with the power off, passage A is closed)



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



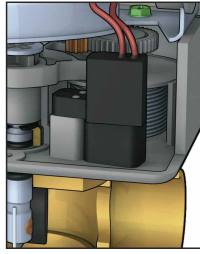
### 3-way installed on the return side as a mixing valve configuration



## Construction details

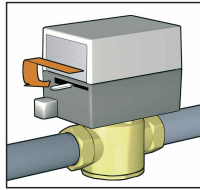
### • Auxiliary switch

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. It requires no minimum current load. The 120 V - 277 V actuators, and actuator model number Z111000 HCS for applications requiring greater than 400 mA, 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 (Normally closed actuator only)

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.

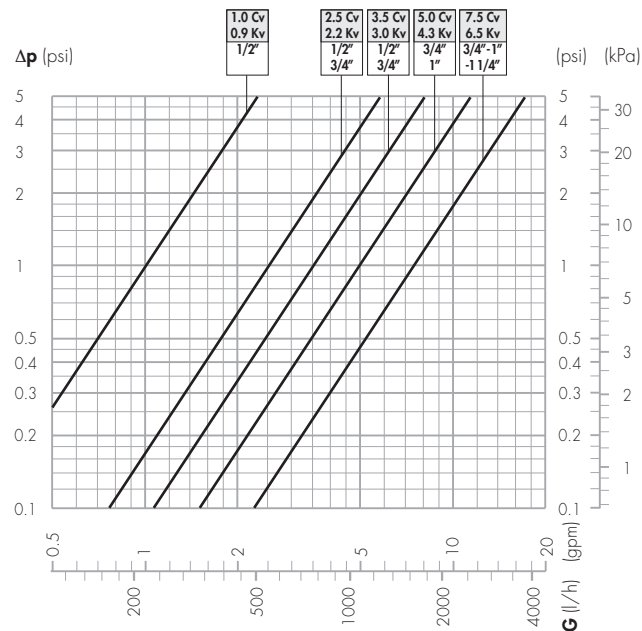
### • Operation

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 6 second power-off return time eliminating the effects of water hammer.

## Flow characteristics

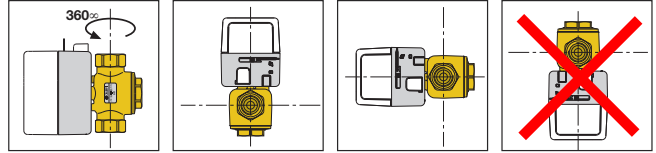
Connection size	Flow coefficient	Max. Close-off ΔP
1/2"	1.0 Cv (0.9 Kv)	75 psi (517 kPa)
1/2" - 3/4"	2.5 Cv (2.2 Kv)	50 psi (345 kPa)
1/2" - 3/4"	3.5 Cv (3.0 Kv)	30 psi (207 kPa)
3/4" - 1"	5.0 Cv (4.3 Kv)	25 psi (172 kPa)
3/4" - 1" - 1 1/4"	7.5 Cv (6.5 Kv)	20 psi (138 kPa)

## 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 enclosure it is important to ensure that there is adequate ventilation inside the enclosure itself.

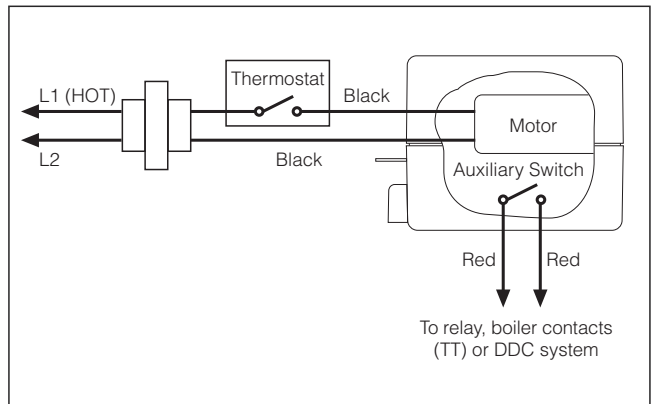
- The three-way valve cannot be transformed into a two-way valve and vice versa.

- When zone valves are installed, the direction of flow must be observed as shown in the diagrams below.

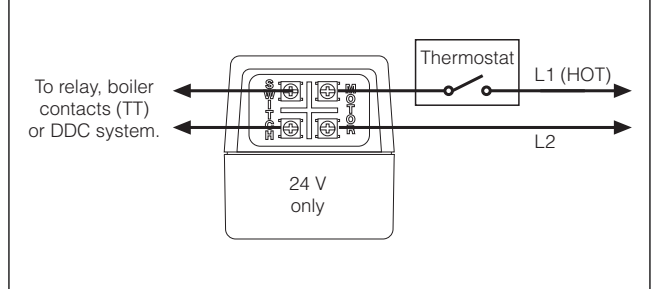
- Two-way zone valves can be installed on both the flow and return sides; the direction of flow indicated by the arrow on the body of the valve must be observed.

- Three way zone valve can be fitted with NC actuator only (rotate 180° the valve body for NO application).

## Wiring diagram

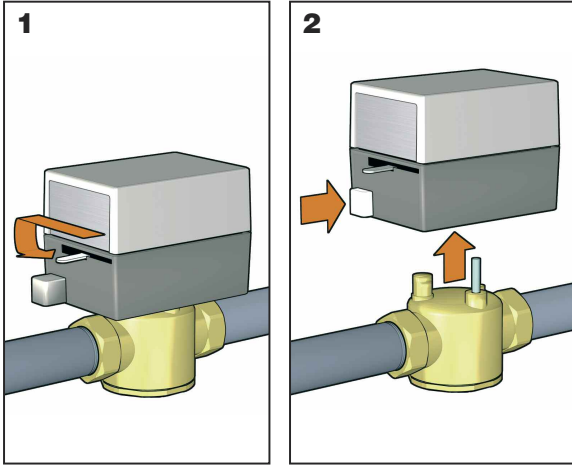


## Terminal block



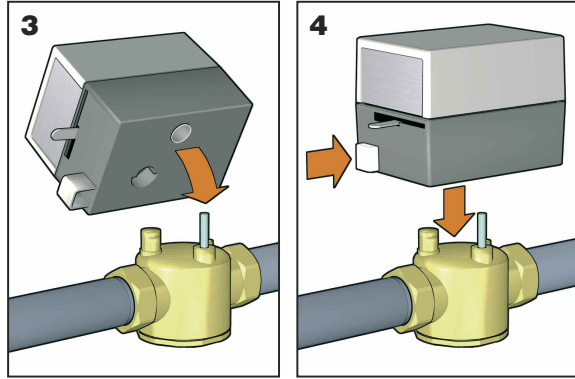
## Removal of the actuator

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 align.
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
Z111000 HCS	24V with high current aux. 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
Z207433	1/2" Sweat lead-free brass	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
Z207537	3/4" Sweat lead-free brass	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
Z307433	1/2" Sweat lead-free brass	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
Z307537	3/4" Sweat lead-free brass	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

**Z-one Normally Closed Valve Actuators & 2-way Straight Through Valve Body Combinations Matrix**

actuator body	Z111000	Z116000	Z113000	Z114000	Z115000	Z151000	Z121000	Z126000	Z123000	Z124000	Z125000
Z200041	Z411041	Z416041	Z413041	Z414041	Z415041	Z451041	Z421041	Z426041	Z423041	Z424041	Z425041
Z200042	Z411042	Z416042	Z413042	Z414042	Z415042	Z451042	Z421042	Z426042	Z423042	Z424042	Z425042
Z200043	Z411043	Z416043	Z413043	Z414043	Z415043	Z451043	Z421043	Z426043	Z423043	Z424043	Z425043
Z200053	Z42	Z416053	Z413053	Z414053	Z415053	Z451053	Z32	Z426053	Z423053	Z424053	Z425053
Z200411	Z411411	Z416411	Z413411	Z414411	Z415411	Z451411	Z421411	Z426411	Z423411	Z424411	Z425411
Z200412	Z411412	Z416412	Z413412	Z414412	Z415412	Z451412	Z421412	Z426412	Z423412	Z424412	Z425412
Z200413	Z411413	Z416413	Z413413	Z414413	Z415413	Z451413	Z421413	Z426413	Z423413	Z424413	Z425413
Z200431	Z411431	Z416431	Z413431	Z414431	Z415431	Z451431	Z421431	Z426431	Z423431	Z424431	Z425431
Z200432	Z44	Z416432	Z413432	Z414432	Z415432	Z54	Z421432	Z426432	Z423432	Z424432	Z425432
Z207433	Z411433	Z416433	Z413433	Z414433	Z415433	Z451433	Z421433	Z426433	Z423433	Z424433	Z425433
Z200512	Z411512	Z416512	Z413512	Z414512	Z415512	Z451512	Z421512	Z426512	Z423512	Z424512	Z425512
Z200513	Z411513	Z416513	Z413513	Z414513	Z415513	Z451513	Z421513	Z426513	Z423513	Z424513	Z425513
Z200515	Z411515	Z416515	Z413515	Z414515	Z415515	Z451515	Z421515	Z426515	Z423515	Z424515	Z425515
Z200517	Z411517	Z416517	Z413517	Z414517	Z415517	Z451517	Z421517	Z426517	Z423517	Z424517	Z425517
Z200532	Z411532	Z416532	Z413532	Z414532	Z415532	Z451532	Z421532	Z426532	Z423532	Z424532	Z425532
Z200533	Z411533	Z416533	Z413533	Z414533	Z415533	Z451533	Z421533	Z426533	Z423533	Z424533	Z425533
Z200535	Z411535	Z416535	Z413535	Z414535	Z415535	Z451535	Z421535	Z426535	Z423535	Z424535	Z425535
Z200537	Z45	Z416537	Z413537	Z414537	Z415537	Z55	Z421537	Z426537	Z423537	Z424537	Z425537
Z200617	Z411617	Z416617	Z413617	Z414617	Z415617	Z451617	Z421617	Z426617	Z423617	Z424617	Z425617
Z200635	Z411635	Z416635	Z413635	Z414635	Z415635	Z451635	Z421635	Z426635	Z423635	Z424635	Z425635
Z200637	Z46	Z416637	Z413637	Z414637	Z415637	Z56	Z421637	Z426637	Z423637	Z424637	Z425637
Z200737	Z47	Z416737	Z413737	Z414737	Z415737	Z57	Z421737	Z426737	Z423737	Z424737	Z425737

**Z-one Normally Closed Valve Actuators & 3-way Diverting Valve Body Combinations Matrix**

actuator body	Z111000	Z116000	Z113000	Z114000	Z115000	Z151000	Z121000	Z126000	Z123000	Z124000	Z125000
Z300041	Z611041	Z616041	Z613041	Z614041	Z615041	Z651041	Z621041	Z626041	Z623041	Z624041	Z625041
Z300042	Z611042	Z616042	Z613042	Z614042	Z615042	Z651042	Z621042	Z626042	Z623042	Z624042	Z625042
Z300043	Z611043	Z616043	Z613043	Z614043	Z615043	Z651043	Z621043	Z626043	Z623043	Z624043	Z625043
Z300053	Z611053	Z616053	Z613053	Z614053	Z615053	Z651053	Z621053	Z626053	Z623053	Z624053	Z625053
Z300411	Z611411	Z616411	Z613411	Z614411	Z615411	Z651411	Z621411	Z626411	Z623411	Z624411	Z625411
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Z300513	Z611513	Z616513	Z613513	Z614513	Z615513	Z651513	Z621513	Z626513	Z623513	Z624513	Z625513
Z300515	Z611515	Z616515	Z613515	Z614515	Z615515	Z651515	Z621515	Z626515	Z623515	Z624515	Z625515
Z300517	Z611517	Z616517	Z613517	Z614517	Z615517	Z651517	Z621517	Z626517	Z623517	Z624517	Z625517
Z300532	Z611532	Z616532	Z613532	Z614532	Z615532	Z651532	Z621532	Z626532	Z623532	Z624532	Z625532
Z300533	Z611533	Z616533	Z613533	Z614533	Z615533	Z651533	Z621533	Z626533	Z623533	Z624533	Z625533
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Z300537	Z611537	Z616537	Z613537	Z614537	Z615537	Z651537	Z621537	Z626537	Z623537	Z624537	Z625537
Z300617	Z611617	Z616617	Z613617	Z614617	Z615617	Z651617	Z621617	Z626617	Z623617	Z624617	Z625617
Z300635	Z611635	Z616635	Z613635	Z614635	Z615635	Z651635	Z621635	Z626635	Z623635	Z624635	Z625635
Z300637	Z611637	Z616637	Z613637	Z614637	Z615637	Z651637	Z621637	Z626637	Z623637	Z624637	Z625637
Z300737	Z611737	Z616737	Z613737	Z614737	Z615737	Z651737	Z621737	Z626737	Z623737	Z624737	Z625737

## Z-one Normally Open Valve Actuators & 2-way Straight Thru Valve Body Combinations Matrix

actuator body	Z131000	Z136000	Z133000	Z134000	Z135000	Z141000	Z146000	Z143000	Z144000	Z145000
<b>Z200041</b>	Z431041	Z436041	Z433041	Z434041	Z435041	Z441041	Z446041	Z443041	Z444041	Z445041
<b>Z200042</b>	Z431042	Z436042	Z433042	Z434042	Z435042	Z441042	Z446042	Z443042	Z444042	Z445042
<b>Z200043</b>	Z431043	Z436043	Z433043	Z434043	Z435043	Z441043	Z446043	Z443043	Z444043	Z445043
<b>Z200053</b>	Z431053	Z436053	Z433053	Z434053	Z435043	Z441053	Z446053	Z443053	Z444053	Z445053
<b>Z200411</b>	Z431411	Z436411	Z433411	Z434411	Z435411	Z441411	Z446411	Z443411	Z444411	Z445411
<b>Z200412</b>	Z431412	Z436412	Z433412	Z434412	Z435412	Z441412	Z446412	Z443412	Z444412	Z445412
<b>Z200413</b>	Z431413	Z436413	Z433413	Z434413	Z435413	Z441413	Z446413	Z443413	Z444413	Z445413
<b>Z200431</b>	Z431431	Z436431	Z433431	Z434431	Z435431	Z441431	Z446431	Z443431	Z444431	Z445431
<b>Z200432</b>	Z431432	Z436432	Z433432	Z434432	Z435432	Z441432	Z446432	Z443432	Z444432	Z445432
<b>Z207433</b>	Z431433	Z436433	Z433433	Z434433	Z435433	Z441433	Z446433	Z443433	Z444433	Z445433
<b>Z200512</b>	Z431512	Z436512	Z433512	Z434512	Z435512	Z441512	Z446512	Z443512	Z444512	Z445512
<b>Z200513</b>	Z431513	Z436513	Z433513	Z434513	Z435513	Z441513	Z446513	Z443513	Z444513	Z445513
<b>Z200515</b>	Z431515	Z436515	Z433515	Z434515	Z435515	Z441515	Z446515	Z443515	Z444515	Z445515
<b>Z200517</b>	Z431517	Z436517	Z433517	Z434517	Z435517	Z441517	Z446517	Z443517	Z444517	Z445517
<b>Z200532</b>	Z431532	Z436532	Z433532	Z434532	Z435532	Z441532	Z446532	Z443532	Z444532	Z445532
<b>Z200533</b>	Z431533	Z436533	Z433533	Z434533	Z435533	Z441533	Z446533	Z443533	Z444533	Z445533
<b>Z200535</b>	Z431535	Z436535	Z433535	Z434535	Z435535	Z441535	Z446535	Z443535	Z444535	Z445535
<b>Z200537</b>	Z431537	Z436537	Z433537	Z434537	Z435537	Z441537	Z446537	Z443537	Z444537	Z445537
<b>Z200617</b>	Z431617	Z436617	Z433617	Z434617	Z435617	Z441617	Z446617	Z443617	Z444617	Z445617
<b>Z200635</b>	Z431635	Z436635	Z433635	Z434635	Z435635	Z441635	Z446635	Z443635	Z444635	Z445635
<b>Z200637</b>	Z431637	Z436637	Z433637	Z434637	Z435637	Z441637	Z446637	Z443637	Z444637	Z445637
<b>Z200737</b>	Z431737	Z436737	Z433737	Z434737	Z435737	Z441737	Z446737	Z443737	Z444737	Z445737

To use the above tables follow this example: Select actuator Z131000 from the top row combined with body Z200041 from left column to create the combination Z431041.

## SPECIFICATION SUMMARIES

The Z-one series two-position spring return with removable actuator zone valve. Z1 series actuator is NC or NO 24 V to 277 V 50/60 Hz 6.5 W 7 VA, with or without auxiliary switch {(24 V: 0.4A max, 24 V) (120-277 V: 5.0A, 250 V)}, Auxiliary switch for 24 V actuator is a sealed reed switch requiring no minimum current load, includes leads or terminal block (24 V only); operating temperature from 32 ~ 104°F for 24 V and 120 V actuators; 32 ~ 170 deg F for 208 V, 230 V, 277 V actuators. Z2 (2-way) series and Z3 (3-way) series are forged brass (2-way and 3-way 1/2" and 3/4" sweat valve bodies pn Zn07433 and Zn07537 are lead-free certified by IAPMO R&T) valve body rated at 300 psi, temperature rated 32 ~ 240°F. Valve stem stainless steel, seals EPDM, flows from 1.0 ~ 7.5 Cv connections size from 1/2" to 1 1/4", sweat, NPT female threads, SAE flare and inverted flare. Actuator approved for UL873, including air plenums and ducts rating per UL 1995 section 18.

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.

