

## VZCR Series DC Motor-Driven Capacitor-Return Zone Valves

- Provides economical control of hot or chilled water for zone, fan coil, baseboard radiator and VAV reheat applications
- Actuator screws in place for quick and simple assembly and removal during installation and provides for quick replacement during service
- Forged brass body and stainless steel stem
- 2-way normally-closed and 3-way mixing only are available
- For 2-wire on/off, 3-wire floating or 2-wire 0(2)-10 VDC/0(4)-20 mA input control signal
- 1,600 kPa system operating pressure
- 1/2", 3/4" and 1" line size

- BSP parallel end connections
- Actuator can be field installed after piping is completed

The DC motor-driven zone valves are designed for capacitor-return control of chilled water and hot water flow through coils and heat exchanges of all types in a variety of heating, ventilation and air conditioning (HVAC) applications.

A built-in capacitor in the actuator is charged up when power is turned on. The capacitor will discharge and return the actuator to its normal or power fail-safe position, either fully-closed or fully-open depending on its DA or RA setting, when power is interrupted.



### Specifications

Valve body pressure rating	PN16 (230 PSIG) system operating pressure				
Fluid temperature limits	-10 to 120°C				
Ambient temperature limits	Working: 2 to 55°C, 0-90% RH non-condensing Storage: -20 to 65°C, 0-90% RH non-condensing				
Product model numbers	See Fig. 1: Valve code number selection guide				
Service	Chilled and hot water, up to 50% Glycol solutions				
Leakage rate	Less than 0.05% of Kv				
Power supply	2-wire on-off and 3-wire floating: 24 or 230 V 50/60 Hz ±10% 2-wire modulating: 24 V 50/60 Hz ±10% only				
Input signal impedance	2-wire on-off or 3-wire floating: 250 Ω, nominal 2-wire modulating: 200,000 Ω for voltage input; 500 Ω for current input				
Feedback signal	2-wire modulating models only: 0-10 VDC for 90° span				
Actuator leads	200 mm long 2x0.3 mm <sup>2</sup> cable for 2-wire on-off models; 400 mm long 4x0.3 mm <sup>2</sup> cable for 3-wire floating and 2-wire modulating models				
Power Consumption	2 W				
Stroke	Valve: 3.5 mm ±5%; Actuator: 6 mm maximum				
Stroke speed	5 s/mm				
Flow Coefficients & Maximum Close-Off Pressures:					
		Cv (Kv)		Close-off ΔP PSI (kPa)	
	Valve size	2-way	3-way	2-way	3-way
	1/2"	2.3 (2.0)	2.3 (2.0)	58 (400)	58 (400)
	3/4"	4.1 (3.5)	4.1 (3.5)	58 (400)	58 (400)
	1"	5.9 (5.0)	5.9 (5.0)	58 (400)	58 (400)
Flow characteristic	Quick opening				
Valve body materials	Body	Forged brass			
	Stem	Stainless steel 303			
	Spring	Stainless steel 301			
	Valve plate	Brass			
	Seal	Hard seal			
	O-ring seal	EPDM			
Actuator	Enclosure	Fire-retardant engineering plastic (UL94V-0)			
	DC motor	Capacitor-return on power interruption			
	Force	150 N nominal			
Protection Class	IP54				
Piping connections	BSP parallel				
Agency approval	CE Mark compliant pending				
Dimensions	See Fig. 2: Dimensions in mm				
Shipping weight	1/2": 630 g (1.4 lb); 3/4": 700 g (1.5 lb); 1": 1030 g (2.3 lb); 1-1/4": 2100 g (4.6 lb)				

*The performance specifications above are nominal and subject to tolerances and application variables of generally acceptable industry standards. The Manufacturer shall not be liable for damages resulting from misapplication or misuse of its products.*

**Fig. 1: Valve Code Number Selection Guide**

Configuration	Valve Size	Cv Factor	Pipe Connections	Valve Actuator Type	Power Supply	Options	Separator	Valve Type
2	3	4	B	4	A	0	-	VZCR
<b>Valve Code Number Designations</b>								

**Configuration**

2 = 2-way  
3 = 3-way mixing

**Valve Size**

2 = 1/2" (15 mm)  
3 = 3/4" (20 mm)  
4 = 1" (25 mm)

**Cv Factor**

2 = 2.3 for 1/2" valve body only  
4 = 4.1 for 3/4" valve body only  
5 = 5.9 for 1" valve body only

**Pipe Connections**

B = BSP

**Valve Actuator Type**

2 = 2-wire on-off  
3 = 3-wire floating  
4 = 2-wire modulating

**Valve Actuator Type**

2 = 2-wire on-off actuator  
3 = 3-wire floating actuator  
4 = 2-wire modulating actuator

**Power Supply**

A = 24 V 50/60 Hz ±10%  
U = 230 V 50/60 Hz ±10%  
Note: modulating models are available with 24 VAC power supply only.

**Options**

0 = No options

**Valve Type**

VZCR = VZCR Series capacitor-return zone valves

When ordering the body and actuator unassembled, enter the body and actuator code numbers as two separate items, example: 234B-VZCR and 4A0-VZCR.

**Application Overview**

The VZCR Series DC motor-driven capacitor-return zone valves accurately control the flow of chilled water and hot water through coils and heat exchanges of all types, in a wide range of heating, ventilating and air conditioning (HVAC) applications. Each zone valve is operated by a DC motor, proven to be reliable in millions of installation worldwide. The actuator can be removed from the valve body quickly and easily, simplifying installation and servicing. No special linkage kit or commissioning is required.

**To Order**

Specify the code number from the Valve Code Number Selection Guide.

**Repair Parts**

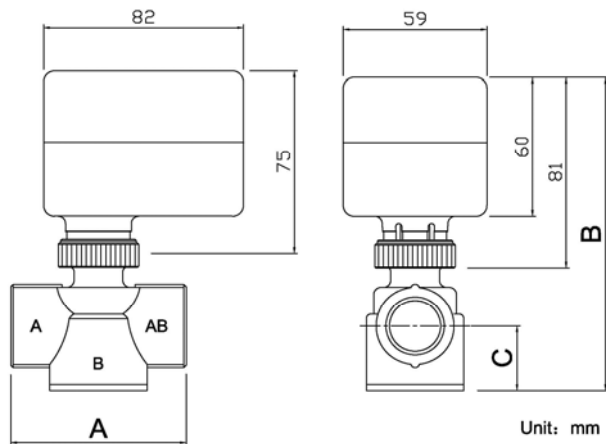
Available repair parts for VZCR Series DC motor-driven capacitor-return zone valves include replacement valve bodies and replacement actuators. No other field repairs should be attempted.

**Manual Opening/Closing of Valve**

Each VZCR Series motor-driven zone valve is supplied with a black protective cap as shown. This cap allows the valve to be opened for system flushing before it is put into operation. Save the cap if subsequent manual valve opening is required. Remove the actuator and screw in the cap for this operation.



**Fig. 2: Dimensions in mm**



Valve Size	A		B		C	
	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
1/2" BSP parallel	60 (2-3/8")	60 (2-3/8")	121.5 (4-3/4")	136 (5-3/8")	15.5 (5/8")	30 (1-3/16")
3/4" BSP parallel	65 (2-9/16")	65 (2-9/16")	123.5 (4-7/8")	139 (5-1/2")	17.5 (11/16")	33 (1-5/16")
1" BSP parallel	84 (3-5/16")	84 (3-5/16")	128 (5")	146 (5-3/4")	22 (7/8")	40 (1-9/16")

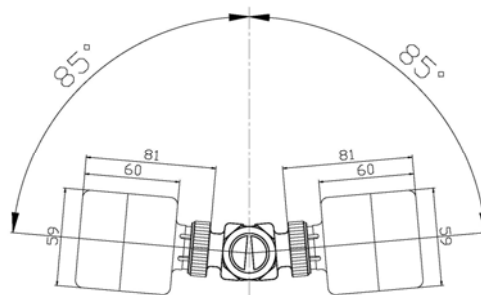
**Mounting**

The valves can be mounted in horizontal or vertical piping. When installed in horizontal piping, the actuator must be above the valve body and can be tilted left or right but it must not be tilted below 85° from vertical.

**Notes:**

- Make certain there is no overhead water source that may drip onto valve actuator.
- In normal service, as some condensation may occur on or around the valve, the valve must be installed over a drip pan.
- For maintenance purposes, install the valve with sufficient headroom to allow complete valve actuator removal.

**Mounting Orientation**



In horizontal piping applications, mount the valve within 85° of the upright position.

**PIPING & INSTALLATION**

The zone valves must be piped so that the plug always closes against the direction of flow. Refer to Fig.3 to Fig.5. The valves are designed for application in closed hydronic heating and cooling systems and are not recommended for use in systems requiring high amounts of make-up water (open systems). High levels of dissolved oxygen and chlorine found in open systems may attack the valve materials and result in premature failure.

**Notes:**

- 2-way and 3-way valves are always closed at Port "A" when no power is applied to the motor.
- On power-up, the valve closes to Port "B" on 3-way valves.
- Orient the 3-way valve body as needed for normally-closed or normally-open flow through coil.

Fig.3: 2-Way Valve Piped N.C. to the Coil

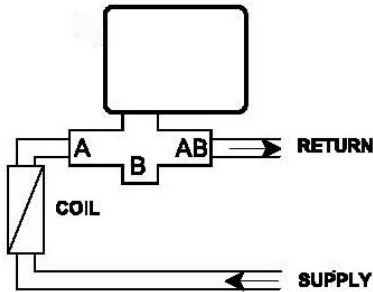


Fig.4: 3-Way Valve in Mixing Configuration N.C. to the Coil

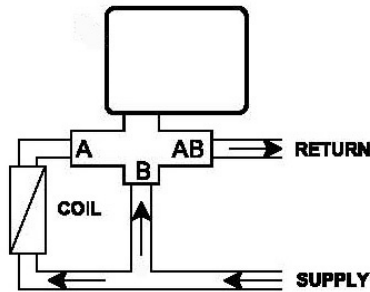


Fig.5: 3-Way Valve in Mixing Configuration N.O. to the Coil

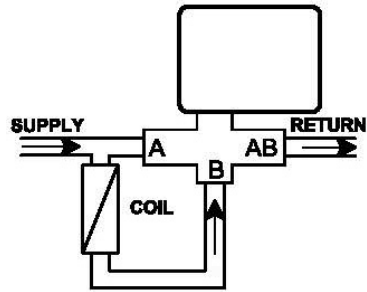
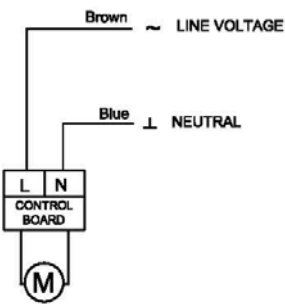
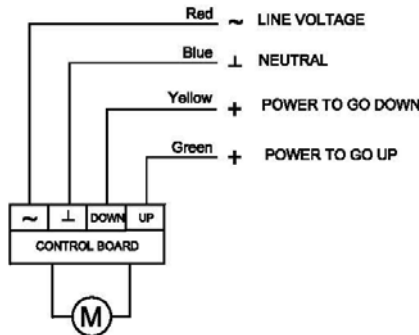


Fig. 6: Actuator Wiring

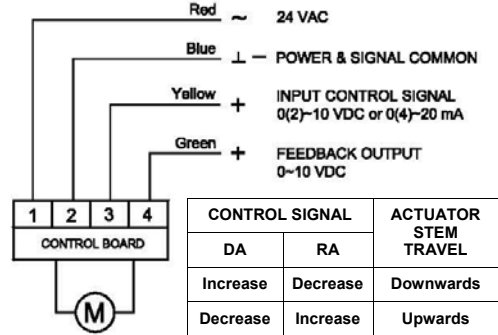
For 2-Wire On-Off Actuators



For 3-Wire Floating Actuators



For 2-Wire Modulating Actuators



### Valve Stroke Self Calibration Procedure

#### Calibration Mode

Do not remove actuator cover. After power is turned on, press auto-calibration switch SW1. The actuator stem will start going down until reaching its maximum stroke. When the gear chain is blocked, the actuator stem will start reversing its travel until reaching its initial position. The valve stroke calibration data will be kept in the actuator's micro-computer memory and no further recalibration is required when power is turned on again.

#### Change of Input Control Signal of Modulating Models

Remove actuator cover. After power is turned on, change

the dip switch positions of JP1 as desired (see below JP1 switch setting), press the auto-calibration switch SW1 and power indicating light LED1 will start flashing. The actuator stem will start going down until reaching its maximum stroke. When the gear chain is blocked, the actuator stem will start reversing its travel until reaching its initial position. LED 1 will stop flashing when the calibration process has completed. The actuator will go into operating mode automatically. The valve stroke calibration data will be kept in the actuator's micro-computer memory and no further recalibration is required when power is turned on again.

JP1 SWITCH SETTING					DEFAULT SETTING	PCB DIAGRAM
CTRL SIGNAL MODE	0-10V DC	2-10V DC	0-20mA DC	4-20mA DC		
DA	OFF ON 1 2 3 4	OFF ON 1 2 3 4	OFF ON 1 2 3 4	OFF ON 1 2 3 4	OFF ON 1 2 3 4	
RA	OFF ON 1 2 3 4	OFF ON 1 2 3 4	OFF ON 1 2 3 4	OFF ON 1 2 3 4	OFF ON 1 2 3 4	

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