

**OPERATION**

**WITH SERIES 60 FLOATING (TRISTATE) CONTROLLER**

(Refer to figure 5)

A Series 60 floating controller has SPDT contact closure outputs with a center-off position. On a change in temperature from the set point, the controller will close either the Open or Close contacts creating a momentary voltage pulse on the gray or white input leads, driving the valve to a new position. The pulse must be at least 1/2 second long in order to be detected by the VC6936. The pulse can be held as long as necessary.

For control stability, the stroke time of the actuator while powered has been simulated at 120 seconds. In fail safe and testing operation, the actuator travels through its stroke in 12 seconds.

**POWER FAILURE REPOSITION (FAIL SAFE OPERATION)**

On a loss of power, the actuator will drive to its stand-by position using energy stored in the supercapacitors, and will resume normal operation on power up. On loss of signal, a VC6936 wired for PFR-Open will open the A port fully. A VC6936 wired for PFR-Close will close the A port. The motor can drive the valve through its full stroke in 12 seconds.

PFR position is chosen during installation. The black wire is connected to common (blue) to fail safe open, or to 24V (brown) to fail safe closed.

The PFR position can be controlled dynamically with a SPST signal by applying 24V power to the PFR direction selection lead while power is present. Applying 24V will cause the valve to close the A port when power is lost. Not applying power will cause the valve to open the A port when power is lost. This can be useful in 2-pipe systems where both hot and chilled water may be used depending on the season, and a different fail safe mode is required for each condition.

Because of the soft close off characteristic of the VC valve, initial (and final) movements of the actuator do not cause significant changes in the valve stem position.

**START UP**

On initial power-up, the capacitors will take about 60 seconds to charge. The LED will flash slowly during this period. When ready, the actuator will drive the valve through one full stroke cycle over 24 seconds to calibrate its position, and exercise the valve cartridge, the LED will glow steadily.

*This self-calibration action repeats daily. If anything interferes with the self-calibration process, the LED will flash rapidly and the actuator will not respond to control signals.*

**CHECK-OUT**

1. Raise the set point of the thermostat above room temperature to initiate a call for heat if the valve is wired for heating control.

2. Observe all control devices. A 2 way valve should open, or port A in a 3-way valve should open, and port B close in 120 seconds.
3. Lower the set point of the thermostat below room temperature.
4. Observe the control devices. A 2 way valve should close, or port A in a 3-way valve should close, and port B open in 120 seconds.
5. Remove power from the actuator. The VC6936 waits 3 seconds then drives valve to its fail safe position, e.g.: open, in 12 seconds or less.
6. Restore power to the actuator. Valve should drive to the position required by the thermostat or controller in 120 seconds or less.

**SERVICE**

This valve should be serviced by a trained, experienced service technician.

1. If the valve is leaking, drain system OR isolate valve from the system. Do not remove valve body from plumbing.
2. Check to see if the cartridge needs to be replaced.
3. If the motor or other internal parts of the actuator is damaged, replace the entire actuator assembly.

NOTE: Honeywell hydronic valves are designed and tested for silent operation in properly designed and installed systems. However, water noises may occur as a result of excessive water velocity. Piping noises may also occur in high temperature (over 212°F [100°C]) systems with insufficient water pressure.

**TO REPLACE ACTUATOR**

Replacement of an actuator does not require draining the system, provided the valve body and valve cartridge assembly remain in the pipeline.

1. Check replacement part number and voltage ratings for match with old device.
2. Disconnect power supply before servicing to avoid electrical shock or equipment damage.
3. Disconnect leadwires to actuator and remove. Where appropriate, label wires for rewiring.
4. The actuator head is automatically latched to the valve. To remove, press up on the latch mechanism with your thumb. It is located directly below the white manual open lever (see figure 3 below). Simultaneously press the actuator down towards the body with moderate hand force and turn the actuator counter-clockwise by 1/8 turn (45 degrees). Lift the actuator off the valve body.
5. Install the new actuator by reversing the process in (4).
6. Reconnect leadwires.
7. Restore power, and check out operation.

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**Honeywell**

**VC6936**

**Floating Cartridge/Cage Valve  
with Power Failure Reposition**

**PRODUCT DATA**



The VC6936 Fail Safe Floating Control Valve provides proportional control of hot or chilled water in commercial heating and cooling applications, such as unit ventilators. On a power failure, this patented actuator design drives the valve to the fail safe position, either fully open or closed according to the installer's wiring connections.

The VC6936 uses a microprocessor-controlled, low voltage stepper motor with a supercapacitor-based power supply capable of storing enough power to drive the valve to its fail safe position when 24V power is removed from the actuator.

A VC hydronic valve consists of a valve body and replaceable characterized cartridge assembly. When used with a Honeywell VC6900 or VC7900-series actuator, the valve provides proportional flow control. Three-way bodies may be used in either diverting or mixing applications. VC valves use cam-operated cartridge travel to resist water hammer. Limit switches prevent motor overrun.

**Specifications**

The specifications following are nominal and conform to generally accepted industry standards. Honeywell is not responsible for damages resulting from misapplication or misuse of its products.

**Power:**

24 V, 50-60 Hz, 12 W. Class 2 circuit  
18VA maximum (during start up).

**Control Signal:**

24 Vac, 1.5mA Floating Signal (two mutually-exclusive momentary contacts for open and close, with minimum 0.5 seconds on and off timing.)

**Annunciation:** red LED on cable end.

**Nominal Control Timing:** 120 seconds full stroke

**Electrical Termination:**

5 feet [1.5m] plenum-rated cable per UL94-5V. Flexible conduit clamp (3/8") included.

**Operating Ambient:**

32 to 140°F [0 to +60°C].  
5-95% RH (non-condensing)

**Shipping and Storage Temperature:**

-40 to 150°F [-40 to +65°C]

**Atmosphere:** Non-corrosive, non-explosive.

**Approvals:**

UL (plenum rating), CE (pending)  
FCC Part 15 Class B

**Fluid temperatures:** 34 to 203°F [1 to 95°C]

**Pressure Rating:**

Static - 300 psi [20 Bar] maximum.  
Burst - 1500 psi [100 Bar]

**Operating Differential and Close-off:**

60 psi maximum [4 bar]

**Stem Travel:** 0.4 inches [10mm]

**Flow Characteristics:**

Linear or equal percentage, per Table 2.

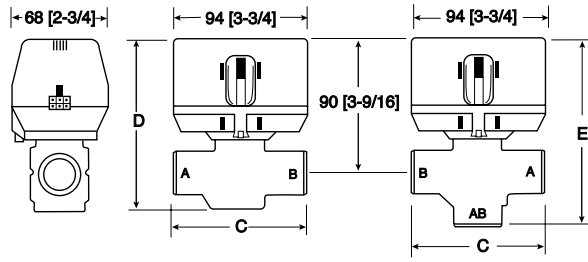
**MODELS:**

Actuator: VC6936ZZ11

Bodies: VCZ..., per table: 2

**Table 1. Series 60, 24V AC Actuator**

Model Series	Voltage (50/60 Hz)	Nominal Stroke Timing	Electrical Connection
VC6936	24 Vac	120 seconds. Fail Safe: 12 seconds	5' [1.5m] plenum-rated cable

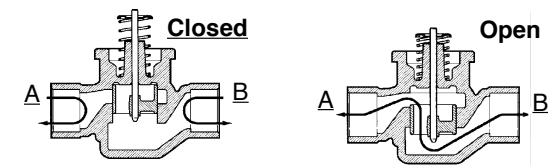


**Table 2 VC Series Valve Bodies**

2-way Valve Number	[5] Cartridge Pipe Fitting Sizes	1000	1100	1400	1500	1600	
		Nominal kVS Rating [8]					
VCZAF	1/2" BSPP (int.) [2]	3.0	2.6		0.6	1.1	
VCZAB	1/2" BSPT (int.)		2.9		0.6	1.1	
VCZAJ	3/4" BSPP (int.)	5.3	4.5	3.3	0.7	1.3	
VCZAK	3/4" BSPT (int.)				0.7	1.3	
VCZAH	3/4" BSPP (ext.)	6.0	4.6	3.7	5.7	3.6	
VCZAG	22MM Compression [3]						5.7
VCZAP	1" BSPP (int)	6.0	5.3	5.7	5.7	5.4	
VCZAQ	1" BSPP (ext.)						
VCZAT	1" BSPT (int.)						
VCZAN	28 MM Compression [3]						
NORTH AMERICA STANDARD MODELS		Nominal Cv Rating					
VCZAC	3/8" FLARE [1]		2.1				
VCZAA	1/2" SWEAT		3.2	2.9	0.7	1.3	
VCZAD	1/2" FLARE [1]		3.1				
VCZAE	1/2" INVERTED FLARE [1]		3.2				
VCZBB	1/2" NPT (int.)		3.4	2.9	0.7	1.3	
VCZAL	3/4" NPT (int.)		4.7	3.9	0.8	1.5	
VCZAM	3/4" SWEAT		4.6				
VCZAR	1" NPT (int.)		6.6				
VCZAS	1" SWEAT		6.2				
VCZBE	1-1/4" SWEAT		7.0				
VCZBD	1-1/4" NPT (int.)						
3-way Valve Number		[5] Cartridge Pipe Fitting Sizes	6000	6100	6400	6500	6600
			Nominal kVS Rating [8]				
VCZME	1/2" BSPP (int.) [2]	3.4	3.2				
VCZMN	1/2" BSPT (int.)		3.3				
VCZMH	3/4" BSPP (int.)	7.0	5.9				
VCZMJ	3/4" BSPT (int.)		5.3				
VCZMG	3/4" BSPP (ext.)	7.1	5.7				
VCZMF	22 mm Compression [3]		5.9				
VCZMP	1" BSPP (int)	7.7	6.4				
VCZMQ	1" BSPP (ext.)		6.8				
VCZMT	1" BSPT (int.)	7.7	6.9				
VCZMM	28 mm Compression [3]		6.4				
NORTH AMERICA STANDARD MODELS		Nominal Cv Rating					
VCZMB	3/8" FLARE [1]		2.7				
VCZMA	1/2" SWEAT		3.8				
VCZMC	1/2" FLARE [1]		4.2				
VCZMD	1/2" INVERTED FLARE [1]		3.7				
VCZNB	1/2" NPT (int.)		6.6				
VCZMK	3/4" NPT (int.)		5.9				
VCZML	3/4" SWEAT		8.6				
VCZMR	1" NPT (int.)		6.6				
VCZMS	1" SWEAT		8.6				
VCZNE	1-1/4" SWEAT						
VCZND	1-1/4" NPT (int.)						
FLOW CHARACTERISTIC		Quick Open	Linear	Equal Percentage			
APPLICATION		[6]	On-Off [7]				
			Modulating				

[4] Pipe Fitting Sizes	Dimension C		Dimension D		Dimension E	
	mm	Inches	mm	Inches	mm	Inches
1/2" BSPP (int.) [2]	98	3-7/8	111	4-3/8	136	5-11/32
1/2" BSPT (int.)						
3/4" BSPP (int.)	94	3-11/16	113	4-7/16	130	5-1/8
3/4" BSPT (int.)						
3/4" BSPP (ext.)						
22mm Compression [3]	112	4-7/16			140	5-1/2
1" BSPP (int.)	94	3-11/16			136	5-11/32
1" BSPP (ext.)	95	3-11/17	114	4-7/17	137	5-11/33
1" BSPT (int.)	94	3-11/16	113	4-7/16	136	5-11/32
28mm Compression [3]	116	4-9/16			147	5-13/16
NORTH AMERICA STANDARD MODELS						
3/8" FLARE [1]	98	3-7/8			136	5-11/32
1/2" SWEAT	89	3-1/2			130	5-1/8
1/2" FLARE [1]			111	4-3/8		
1/2" INVERTED FLARE [1]	98	3-7/8			136	5-11/32
1/2" NPT (int.)						
3/4" NPT (int.)					130	5-1/8
3/4" SWEAT	94	3-11/16	113	4-7/16	132	5-3/16
1" NPT (int.)						
1" SWEAT					136	5-11/32
1-1/4" SWEAT						
1-1/4" NPT (int.)	110	4-5/16	118	4-5/8	142	5-5/8

[1] No adapters  
 [2] Suitable for use as 15 mm compression fitting  
 [3] Includes compression nuts and olives  
 [4] Some models not available in all countries



**Figure 2 - Fluid flow of 2-way**

[1] No adapters  
 [2] Suitable for use as 15 mm compression fitting  
 [3] Includes compression nuts and olives  
 [4] "1200" series cartridge has the same Cv/kV rating as "1100" series. Suitable for use in potable water applications.  
 [5] Model availability is country specific. Some models are not available in all countries.  
 [6] Can be used for modulating with appropriate software  
 [7] Use balancing valve for very low flow on-off applications  
 [8] Multiply the kv rating by 1.167 to obtain Cv rating  
**Example:** 2-way, 3/4" BSPT (internally threaded) valve number VCZAJ1400 has a kv rating of 3.9; 3-way 1/2" Sweat valve number VCZMA6100 has a Cv rating of 3.8.

**INSTALLATION**

WHEN INSTALLING THIS PRODUCT:

1. Read these instructions carefully. Failure to follow them could damage the product
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. Always conduct a thorough check out when installation is completed.
5. While not necessary to remove the actuator from the body, it can be removed for ease of installation. The actuator can be installed in any of the four orientations to suit the most convenient wiring direction. Actuator latching mechanism works only when the lengths of the actuator and the valve body are parallel to each other.

An extra 1" (25 mm) head clearance is required to remove the actuator.

**IMPORTANT:**  
 For trouble-free operation of the product, good installation practice must include initial system flushing, chemical water treatment, and the use of a 50 micron (preferably 5 micron) 10% side stream system filter(s). Remove all filter(s) before flushing. Limit flow through the filter to 5~10% of total system flow to prevent 'starving' the system. Ensure filter cartridge is changed frequently enough to prevent clogging.

Put the VC actuator manual lever in the manual open or the fully open (down) position to allow initial system flushing with the actuator mounted. This may be done without electrical hook-up. Alternatively, reusable flush caps, part # 272866B, may be purchased separately for use in initial flushing of dirty hydronic systems.

**Do not use boiler additives, solder flux and wetted materials which are petroleum based or contain mineral oil, hydrocarbons, or ethylene glycol acetate. Compounds which can be used, with minimum 50% water dilution, are diethylene glycol, ethylene glycol, and propylene glycol (antifreeze solutions).**

**PLUMBING**

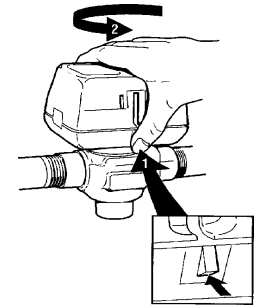
The valve may be plumbed in any angle but preferably not with the actuator below horizontal level of the body. Make sure there is enough room around the actuator for servicing or replacement. Refer to installation & instruction sheet 95C-10919 for valve installation instructions.

**TO INSTALL ACTUATOR**

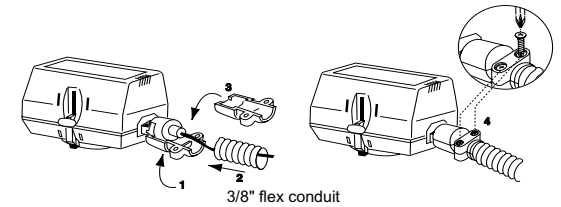
Installation of a new actuator does not require draining the system, provided the valve body and valve cartridge assembly remain in the pipes. Wiring may be done either before or after the actuator is installed.

1. The actuator head is automatically latched to the valve. Align the coupling hole in the bottom of the actuator with the valve stem. Press the actuator down towards the body with moderate hand force and turn the actuator counter-clockwise by 1/8 turn (45 degrees) to line up the actuator with the piping. The latch will click when engaged. See Figure 3

Note: The actuator can also be installed at right angles to the valve body but in this position the latch mechanism will not engage.



**Fig. 3 - Latch Mechanism to detach Actuator**



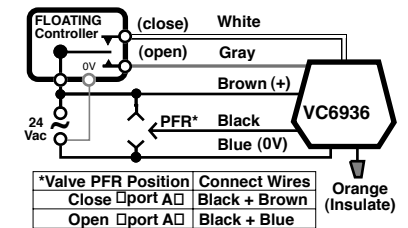
**Fig. 4 - Flexible Conduit Attachment**

**WIRING**

See figure 5 for single unit wiring details with a floating controller.

**CAUTION**

1. Disconnect power supply before connecting wiring to prevent electrical shock and equipment damage.
2. Never jumper the supply wires or actuator terminals even temporarily. This may damage the controller.
3. Verify wiring connections of the brown and blue lead wires with respect to the controller. The actuator will not operate if these are wrong. Inputs are switched from the "hot" side of the controller's power supply.
4. Multiple valves may be connected in parallel to a single controller and transformer, up to the current rating of the controller and transformer.



**Fig. 5- Wiring color code for cable VC6936 actuator, and Series 60 floating (Tristate) controller.**