

## VC7900 Series Modulating Control Valves

### PRODUCT DATA



### GENERAL

The VC7900 Series Modulating Control Valves provide precision flow control of hot or chilled water in various heating and cooling applications.

The VC hydronic valve consists of a valve body and replaceable characterized cartridge assembly. When used with a Honeywell VC7900 actuator, the valve provides proportional flow in modulating, diverting or mixing applications. They are designed to operate silently and resist water hammer. These actuators have conformally coated printed circuit boards for humidity resistance.

VC7934 actuators meet the requirements of UL94-5V fire retardancy for mounting in return air plenums.

The VC7900 series valve actuator is used with any 0–10 Vdc or 2–10 Vdc controller.

### FEATURES

- All actuators are interchangeable and suitable for all valves, 1/2" through 1", providing maximum installation flexibility with minimum stock.
- Replaceable cartridge provides easy valve serviceability without plumbing.
- High close-off pressure rating is suitable for open systems and hydronic HVAC systems with temporary high head pressure.
- Actuator is constructed of moisture and humidity resistant materials.
- Motor de-energizes when valve not in motion, extending service life.
- Manual opener and position indicator. This "manual opener" may be used for filling, venting, and draining the system.
- Twist-lock actuator can be installed after plumbing work has been completed, which makes for more efficient on-site installation. Multi-directional actuator mount allows for 4 different wiring orientations, thus providing ease of wiring and service.
- Body dimensions are comparable to existing Honeywell products (V4043/4044 and V8043/8044), and in most cases can be interchanged.
- Sweat-fitted valves are supplied with the cartridge loose, to facilitate soldering operations (an installation tool is included).
- In this balanced valve design, the internal piston moves up and down across the water flow. The actuator provides sinusoidal piston travel action for "soft shut-off" and open, to eliminate water hammer in most applications.
- In 2-way valves, flow can be in either direction.
- In 3-way valves, flow can be mixing or diverting.

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## SPECIFICATIONS

Table 1. Series 70, 0/2 -10 Vdc Actuator

Model Series	Voltage (50/60 Hz)	Nominal Full Stroke Timing	Electrical Connection
VC7930	24 Vac	120 seconds at 60 Hz	6-pin Molex
VC7931			1 meter cable
VC7934	24 Vac, plenum-rated	150 seconds at 50 Hz	1 m Teflon® cable

Table 2. Valve Body Models, with characterized flow.

2-Way		Body Style		3-Way	
O.S. No. (VCz...)	Cv Rating	Size	Fitting	O.S. No. (VCz...)	Cv Rating
AA11xx	3.2	1/2"	Sweat NPT internal (F NPT)	MA61xx	3.8
AM11xx	4.6	3/4"		ML61xx	5.9
AS11xx	6.2	1"		MS61xx	6.6
BB11xx	3.2	1/2"		NB61xx	3.7
AL11xx	4.7	3/4"		MK61xx	6.6
AR11xx	6.6	1"	MR61xx	8.6	
AC11xx	2.1	3/8"	Flare	MB61xx	2.7
AD11xx	3.1	1/2"		MC61xx	3.8
AE11xx	3.2	1/2"	Inverted Flare	MD61xx	4.2
AB11xx	3.4	1/2"	BSPT internal	MN61xx	3.8
AK11xx	4.7	3/4"		MJ61xx	6.2
AT11xx	6.6	1"		MT61xx	8.1
AF11xx	3.0	1/2"	BSPP internal	ME61xx	3.7
AJ11xx	5.2	3/4"		MH61xx	6.9
AP11xx	6.6	1"		MP61xx	7.5
AH11xx	5.2	3/4"	BSPP external	MG61xx	6.7
AQ11xx	6.2	1"		MQ61xx	7.9
AF11xx	3.0	15mm	Compression	ME61xx	3.7
AG11xx*	5.4	22mm		MF61xx*	6.9
AN11xx*	6.3	28mm		MM61xx*	7.5

\*Includes compression nuts and olives.

For example, to order a 2 minute stroke timing actuator, with 1 meter cable and no auxiliary switch, you would order **VC7931zz11**. The last two digits, "11", indicate that the actuator comes with conformally-coated printed circuit board. To order a 3-way 3/4" BSPP internally threaded body with characterized flow cartridge, you would select **VCzMH6100**. Complete actuator and valve assemblies may also be available in your region, for example as: **VC7931MH6111**.

**Supply Voltage:**  
24V, 50-60Hz. Class 2 circuit

**Label color code**  
Blue

**Control Signal:**  
Nominal 0/2 to 10 Vdc (actual 2 to 9 Vdc).  
Input impedance 47.5 kΩ.

**Power Consumption:**  
4 Watts Max. at nominal voltage (during valve position change).  
Note: Use 24 V Class 2 transformer. Provide 6 VA for connection wire sizing.

Maximum duty cycle: 15%.

**Nominal Timing:**  
Opens in 2 minutes @ 60Hz  
Actual full stroke timing is 140 sec.  
Note: Timing is approximately 20% longer @ 50Hz

**Electrical Termination: 3 Versions Available:**  
1) Molex™ (header #39-30-1060). Requires mating connector (receptacle/housing #39-01-2060) – **VC7930**  
**OR**  
2) With integral 1 meter (nominal 39") leadwire cable – **VC7931**  
**OR**  
3) With integral 1 meter plenum-rated leadwire cable and 3/8" flexible conduit connector (low voltage only) – **VC7934**

**Operating Ambient Temperature:**  
0 to 65 Celsius (32 to 150 degrees Fahrenheit)

**Shipping and Storage Temperature:**  
-40 to +65 Celsius (-40 to 150 degrees Fahrenheit)

**Atmosphere:**  
Non-condensing, non-corrosive, non-explosive.  
VC7934 meets UL94-5V requirements for installation in return air plenums.

**Minimum & Maximum fluid temperatures:**  
1 to 95 Celsius (34 to 203 degrees Fahrenheit)

**Operating Pressure Differential:**  
Maximum - 4 bar (60 psi)

**Pressure Rating:** Static - 20 Bar (300 psi)  
Burst - 100 Bar (1500 psi)

**Valve Material:**  
Body of bronze  
Cartridge of Ryton™ (polyphenylene sulphide) and Noryl™ (polyphenylene oxide)  
O-ring seals of EPDM rubber  
Stem of stainless steel

**Stem Travel:** 10 mm (0.4 inches)

**Flow Characteristic:** Linear

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

## ORDERING INFORMATION

Before ordering please determine the following:

1. The body type: 2-way or 3-way
2. The actuator voltage: 24V/50-60Hz
3. The pipe fitting, size, and flow capacity rating (Cv) required
4. Order Specification Number
5. Accessories, if desired.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (please check the white pages of your phone directory).
2. On the World Wide Web: <http://www.honeywell.ca/water-products/>. Includes email feedback and inquiry form.
3. In U.S.A.: Honeywell Inc., 1885 Douglas Drive North, Minneapolis, MN 55422-4386. 1-800-441-7017  
World Wide Web: <http://www.hbc.honeywell.com>

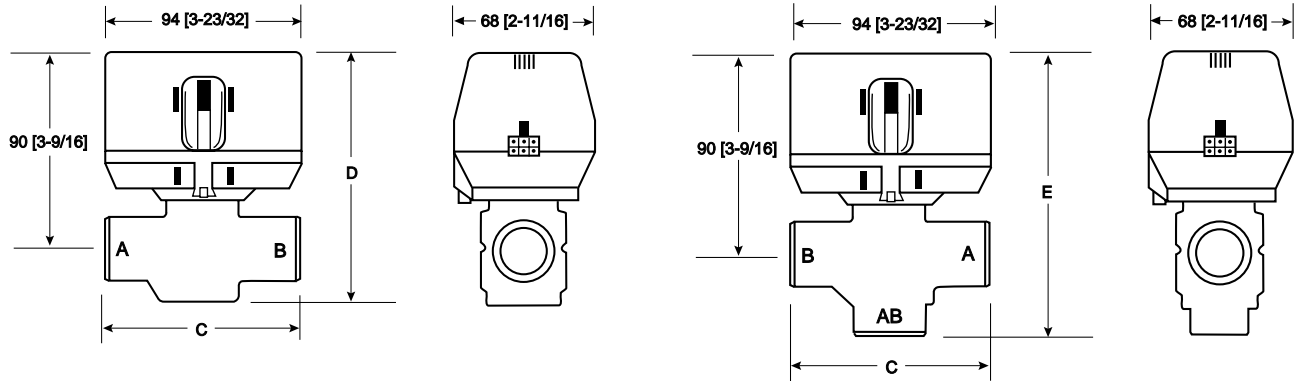
4. In Canada: Honeywell Limited-Limitée, 155 Gordon Baker Rd., North York, ON M2H 3N7. 1-800-405-9835

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

**Accessories and Replacement Parts:**

- 40007029-002: Wrench for removing VC cartridge
- VCZZ1100: 2-way characterized cartridge, unit pack
- VCZZ6100: 3-way characterized cartridge, unit pack

**Fig. 1 - Nominal dimensions in inches and millimetres**



**Table 3. 2-Way Nominal Dimensions**

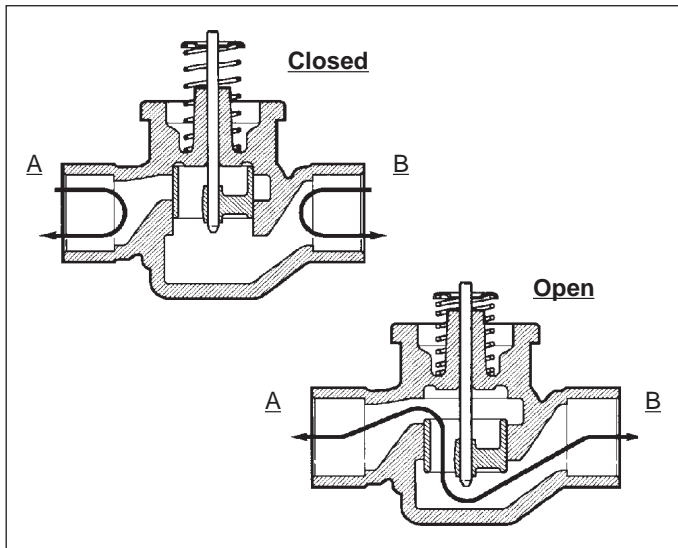
Dimensions	C		D	
	mm	Inches	mm	Inches
<b>Pipe fitting sizes</b>				
3/8" FLARE (no adapter)	98	3-7/8	111	4-3/8
1/2" SWEAT	98	3-7/8	111	4-3/8
1/2" F NPT	98	3-7/8	111	4-3/8
1/2" FLARE (no adapter)	98	3-7/8	111	4-3/8
1/2" INVERTED FLARE (no adapter)	98	3-7/8	111	4-3/8
1/2" BSPP(int.), 15 mm Compression	98	3-7/8	111	4-3/8
1/2" BSPP(int.)	98	3-7/8	111	4-3/8
3/4" SWEAT	94	3-11/16	113	4-7/16
3/4" F NPT	94	3-11/16	113	4-7/16
3/4" BSPP (int.), 3/4" BSPT (int.)	94	3-11/16	113	4-7/16
3/4" BSPP (ext.)	94	3-11/16	113	4-7/16
22mm* Compression	112	4-7/16	113	4-7/16
1" SWEAT	94	3-11/16	113	4-7/16
1" F NPT	94	3-11/16	113	4-7/16
1" BSPP (int. & ext.)	94	3-11/16	113	4-7/16
28mm* Compression	116	4-9/16	113	4-7/16

**Table 4. 3-Way Nominal Dimensions**

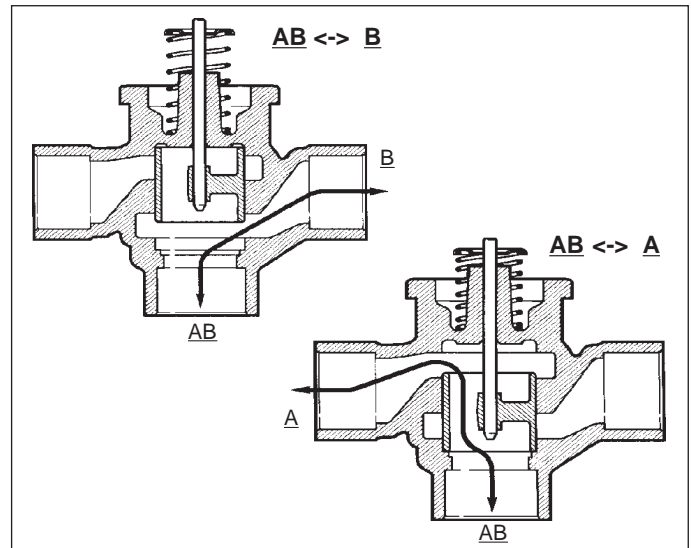
Dimensions	C		E	
	mm	Inches	mm	Inches
<b>Pipe fitting sizes</b>				
3/8" FLARE (no adapter)	98	3-7/8	136	5-11/32
1/2" SWEAT	98	3-7/8	136	5-11/32
1/2" F NPT	98	3-7/8	136	5-11/32
1/2" FLARE (no adapter)	98	3-7/8	136	5-11/32
1/2" INVERTED FLARE (no adapter)	98	3-7/8	136	5-11/32
1/2" BSPP(int.), 15 mm Compression	98	3-7/8	136	5-11/32
1/2" BSPP(int.)	98	3-7/8	136	5-11/32
3/4" SWEAT	94	3-11/16	132	5-3/16
3/4" F NPT	94	3-11/16	130	5-3/32
3/4" BSPP (int.), 3/4" BSPT (int.)	94	3-11/16	130	5-3/32
3/4" BSPP (ext.)	94	3-11/16	130	5-3/32
22mm* Compression	112	4-7/16	140	5-1/2
1" SWEAT	94	3-11/16	136	5-11/32
1" F NPT	94	3-11/16	136	5-11/32
1" BSPP (int. & ext.)	94	3-11/16	136	5-11/32
28mm* Compression	116	4-9/16	147	5-13/16

\*Includes compression nuts and olives

**Fig. 2 - Fluid flow of 2-way valves**



**Fig. 3 - Fluid flow of 3-way valves**



## INSTALLATION

### WHEN INSTALLING THIS PRODUCT:

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
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-person.
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.
6. An extra 25 mm head clearance is required to remove the actuator.



### 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 thermostat.

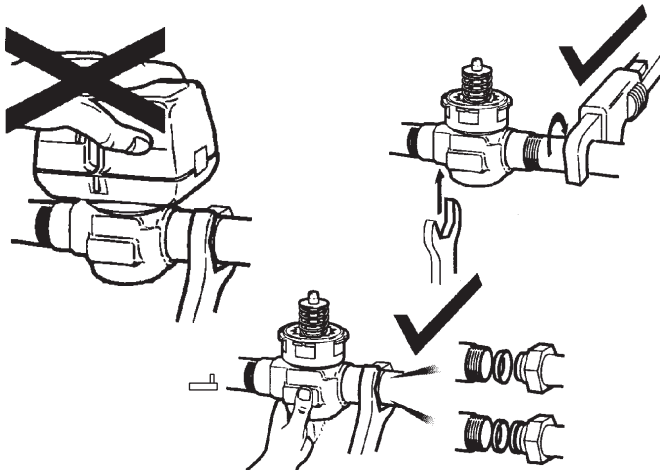
### PLUMBING

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. For use in diverting applications, the valve is installed with the flow water entering through bottom port AB, and diverting through end ports A or B. In mixing applications the valve is installed with inlet to A or B and outlet through AB.

Mount the valve directly in the tube or pipe. Do not grip the actuator while making and tightening up plumbing connections. Either hold valve body in your hand or attach adjustable spanner (38 mm or 1-1/2") across hexagonal or flat faces on the valve body. (Figure 4).

**NOTE:** For trouble free operation of this product, **good installation practice** includes *initial system flushing* and the installation of *50 micron* (or finer) system *side stream filter(s)*.

Fig. 4 - Plumbing the VC Valve



### COMPRESSION MODELS

For compression fitted models, tighten the compression nuts enough to make a watertight seal. **TAKE CARE NOT TO OVER TIGHTEN.** Maximum torque limit is 45 Nm (33 ft.-lb.) for the 22 mm compression fitting, and 65Nm(48 ft.-lb.) for the 28 mm compression fitting.

### SWEAT MODELS

On sweat fitted valves, the cartridge is shipped loose to avoid being damaged during the solder operation.

1. Remove valve actuator from body and solder the connecting pipes in accordance with normal soldering practices.
2. After soldering and valve has cooled, remove cartridge assembly from plastic bag, insert into the valve body and tighten down with enclosed wrench(part# 40007029-002) until it bottoms out. **DO NOT OVER TIGHTEN** (maximum torque is 4.5 Nm (40 in.-lb.). The top surface of the cartridge will be flush with the top edge of the body casting.
3. Replace valve actuator.

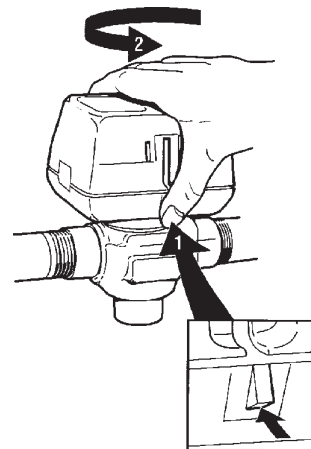
### TO INSTALL REPLACEMENT ACTUATOR

#### IMPORTANT

Installation of a new 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, or depress tab on Molex™ connector 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 5 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.

Fig. 5 - Latch Mechanism to detach Actuator



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

5. Install the new actuator by reversing the process in (4).
6. Reconnect leadwires or Molex™ connector.
7. Restore power, and check-out operation.

**MANUAL OPENER**

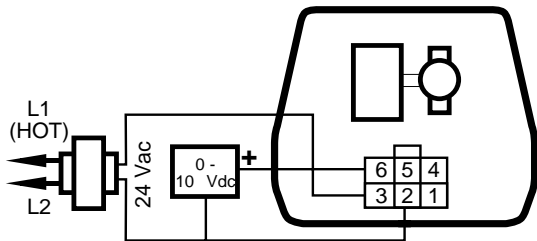
The manual opener can be manipulated only when in the up position. The "A" port can be manually opened by firmly pushing the white manual lever down to midway and in. In this position both the "A" and "B" ports are open, and with auxiliary switch models the switch is closed. This "manual open" position may be used for filling, venting and draining the system, or for opening the valve in case of power failure. The valve can be restored manually to the closed position by depressing the white manual lever lightly and then pulling the lever out. The valve and actuator will return to the automatic position when power is restored.

**NOTE:** If the valve is powered open, it cannot be manually closed, unless actuator is removed.

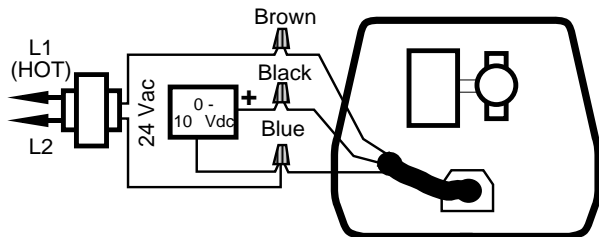
**WIRING**

See figures 6a and 6b for single unit wiring details. Multiple valves may be connected in parallel to a single controller and transformer, up to the current rating of the controller and transformer.

**Fig. 6a - Connector Pin Configuration for Molex' Model and 0 / 2 – 10 Vdc Controllers (Series 70).**



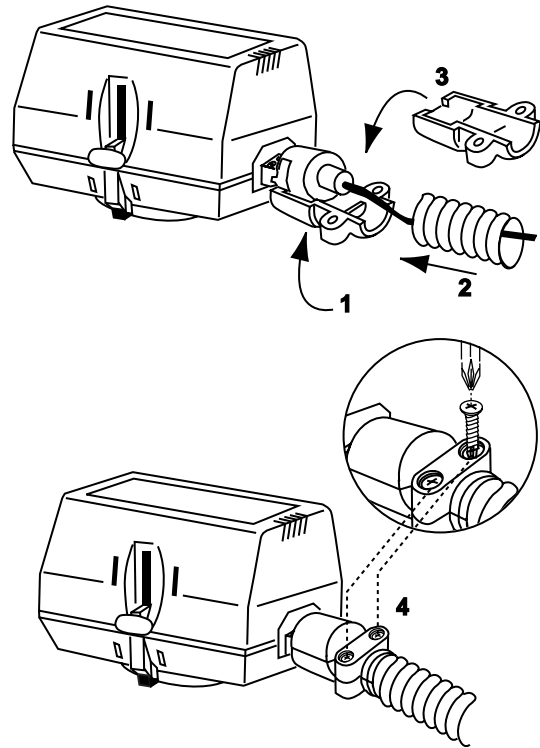
**Fig. 6b - Wiring Colour Code for Cable Models and 0 / 2 – 10 Vdc Controllers (Series 70).**



**CONDUIT CONNECTION**

VC7934 may be installed as a plenum-rated cable model. Where local codes require conduit, the conduit adapter may be used with empty 3/8" flexible conduit to provide mechanical protection for the wiring. All wiring connections must be made in an approved electrical junction box. Refer to figure 7.

**Fig.7 - VC valve actuator electrical conduit installation**



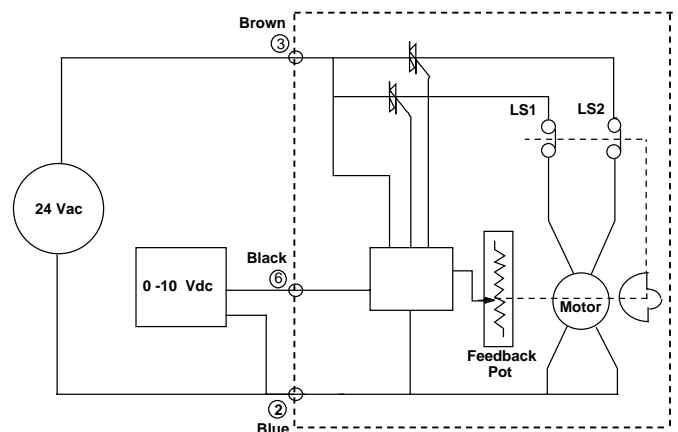
**OPERATION**

**WITH SERIES 70, 0 / 2 - 10 VDC CONTROLLER**

(refer to figure 8)

In the VC7900, an electronic circuit compares the voltage of the feedback potentiometer to the signal voltage. If they are different, then the circuit closes the appropriate triac and drives the motor in the direction that will bring the circuit back into balance. In addition, the standard limit switches maintain the travel to the normal operating range.

**Fig. 8 - Wiring Schematic of the VC7900 Series Actuators**



In a direct acting model, 2 V signal will be fully closed, and 9 V will be fully open. In a reverse acting model, 9 V is closed and 2 V is open. However, because of the soft close off of the VC valve, initial (and final) movements of the actuator will not cause any significant changes in the valve stem position.

On a loss of power, the actuator will remain in the last position, and will resume normal operation on power up. On loss of signal, a direct acting device will go to the closed default position. A reverse acting device will default open.

### **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.

### **IMPORTANT**

Do not use boiler additives 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(anti-freeze solutions).

### **CHECK-OUT**

1. Raise the set point of the thermostat above room temperature to initiate a call for heat.
2. Observe all control devices - 2 way valve should open. Port A in 3 way valve should open, and port B should close.
3. Lower the set point of the thermostat below room temperature.
4. Observe the control devices. 2 way valve should close. Port A in 3 way valve should close, and port B should open.

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