Honeywell

VC2, VC4, VC60, VC8

On-Off Actuator for VC Series Balanced Hydronic Valves

These 2-position (open/close) control **actuators** are used with VCZ 1000, 1100, 6000 and 6100 series hydronic valves in a normal indoor environment to provide quick opening/closing to control the flow of hot and/or chilled water or glycol solution to 60% concentration. They are designed for on-off "zone" control of heating/cooling systems, or to control individual fan coil, baseboard radiator or convector applications.

Depending on the model selected, the actuator can be controlled by a low or line voltage SPST or SPDT controller, such as a room thermostat, aquastat or flow switch.

VC80 series valve actuators are designed to be used with hard-wired electronic thermostats with series anticipator or power-stealing thermostats. Recommended control thermostats include T8601D, T8401C, T8380 and T8360 families.

VC actuators use cam-operated cartridge travel to resist water hammer. Internal limit switches prevent motor overrun. Some of these actuators have conformally coated printed circuit boards for humidity resistance.

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.

Voltage:	**Label Colour Code**
24V 50Hz ; 24V 60Hz Models	Blue
100-130 V 50-60 Hz Model	Black
200-240 V 50-60 Hz Model	Red

Power consumption:
6 Watts Max. at nominal Voltage (during valve position change).
Use 24 V Class 2 transformer.
Provide 6 VA per valve for transformer and connection wire sizing.

Maximum Duty Cycle: 15%

Nominal timing: Valve opens in 6 seconds @ 60 Hz (20% longer @ 50 Hz)

Electrical termination: Available in 3 versions:
(1) Molex™ (header # 39-30-1060). Requires mating connector (receptacle/housing # 39-01-2060). OR
(2) integral 1 meter [nominal 39"] leadwire cable.
(3) 5 feet [1.5 meter] plenum-rated cable per UL94-5V.
Includes plastic adapter for use with 3/8" flexible conduit.

End switch rating :
2.2 A inductive from 5 to 110 Vac,
1.0 A inductive above 110 to 277 Vac.
Min. DC switching capability: 5 mA @ 24 Vdc

Operating ambient temperature:
0 to 65°C [32 to 150°F]

Humidity Rating: 5-95% RH (non-condensing)

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

Shipping & storage temperature: -40 to +65°C [-40 to +150°F]

Atmosphere: non-corrosive, non-explosive

Nominal Dimensions (Actuator only):
3-23/32" width x 2-11/16" depth x 2-3/4" height
94 mm width x 68 mm depth x 70 mm height

Accessories: 272866B Valve Flushing Cap

MODELS:

Actuator Only: VC2, VC4, VC60, VC8 (See Table 1)

Bodies (Order Separately): VCZ..., (See 95C-10919)

Actuators

Model No.	Power	Control Input	Auxiliary Switch	Special Features
INTERNATIONAL MODEL [4]				
VC2010zz00	24V~50Hz	SPDT	- -	Molex
VC2011zz00	24V~50Hz	SPDT	- -	Cable
VC2012zz00 [1]	24V~50Hz	SPDT	- -	Molex
VC2611zz00	24V~50Hz	SPDT	Yes	Cable
VC4012zz00	200-240V~50-60Hz	SPST	- -	Molex
VC4013zz00	200-240V~50-60Hz	SPST	- -	Cable
VC4013zz11 [3]	200-240V~50-60Hz	SPST	- -	Cable
VC4613zz00	200-240V~50-60Hz	SPST	Yes	Cable
VC6012zz00	200-240V~50-60Hz	SPDT	- -	Molex
VC6013zz00	200-240V~50-60Hz	SPDT	- -	Cable
VC6013zz11 [3]	200-240V~50-60Hz	SPDT	- -	Cable
VC6612zz00	200-240V~50-60Hz	SPDT	Yes	Molex
VC6613zz00	200-240V~50-60Hz	SPDT	Yes	Cable
VC8011zz00	24V~50Hz	SPST	- -	Cable
VC8611zz00	24V~50Hz	SPST	Yes	Cable
NORTH AMERICA MODELS [4]				
VC2114zz11 [3]	24V~60Hz	SPDT	- -	Plenum[2]
VC2714zz11 [3]	24V~60Hz	SPDT	Yes	Plenum[2]
VC4011zz11 [3]	120V~60Hz	SPST	- -	Cable
VC4013zz11 [3]	200-240V~50-60Hz	SPST	- -	Cable
VC8111zz11 [3]	24V~60Hz	SPST	- -	Cable
VC8114zz11 [3]	24V~60Hz	SPST	- -	Plenum[2]
VC8711zz11 [3]	24V~60Hz	SPST	Yes	Cable
VC8714zz11 [3]	24V~60Hz	SPST	Yes	Plenum[2]

NOTE:

[1] with Snubber circuit

[2] Plenum rated with 1.5 meter cable

[3] Model number ending with "11" has conformal coated printed circuit board for heating/cooling use.

[4] Some models are not available in all countries. Not all VC Actuator modes are shown.

Table 1 - Actuator Model Identifiers

VC Valve Assembled dimensions for reference (Figure 1 & Table 2):

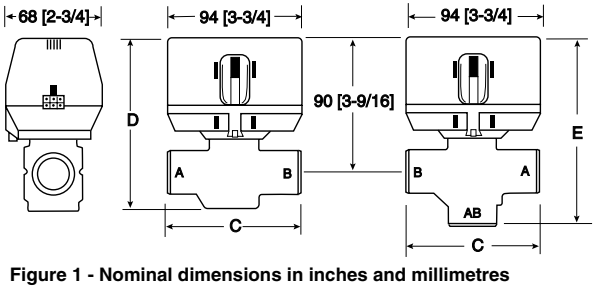

Figure 1 - Nominal dimensions in inches and millimetres

[4] Dimension / Pipe Fitting Sizes	C mm	C Inches	D mm	D Inches	E mm	E 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	111	4-3/8	136	5-11/32
1/2" SWEAT	89	3-1/2			130	5-1/8
1/2" FLARE [1]	98	3-7/8			136	5-11/32
1/2" INVERTED FLARE [1]						
1/2" NPT (int.)						
3/4" NPT (int.)	94	3-11/16	113	4-7/16	130	5-1/8
3/4" SWEAT					132	5-3/16
1" NPT (int.)					136	
1" SWEAT						5-11/32
1-1/4" SWEAT	110	4-5/16	118	4-5/8	142	5-5/8
1-1/4" NPT (int.)						

[1] No adapters

[2] Suitable for use as15 mm compression fitting

[3] Dimensions shown with nuts and olives installed

[4] **Some models not available in all countries**

Table 2 - VC Valve assembled dimensions

MANUAL OPENER

The manual opener can be manipulated only when in the up position. The motorized valve can be opened by firmly pushing the red manual lever down to midway and in. This holds the valve in the open position. This "manual open" position may be used for filling, venting, 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 red 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 (the lever is down), it can not be manually closed unless actuator is removed.

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 technician.
4. Always conduct a thorough checkout 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 position to suit the most convenient wiring mode.
6. An extra 1" (25 mm) head clearance is required to remove the actuator.

CAUTION:

Disconnect power supply before connecting wiring to prevent electrical shock and equipment damage.

On 24 V systems, **never** jumper the valve coil terminals, even temporarily. This may damage the thermostat.

PLUMBING

Refer to the VC Series Cartridge Valve Installation and Instruction sheet, form number 95C-10919, for plumbing instructions.

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 (or finer) system side stream filter(s). Remove all filters before flushing.

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).

TO INSTALL ACTUATOR

Installation of the actuator does not require draining the system, provided the valve body and valve cartridge assembly remain in the pipeline. 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 2.

   NOTE: The actuator can also be installed at right angles to the valve body but in this position the latch mechanism will not engage.
2. Connect leadwires. See Figure 3 for flexible conduit installation with plenum-cable models.

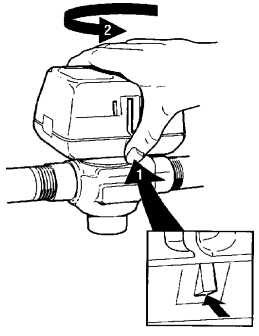

Figure 2 - Latch Mechanism to detach Actuator

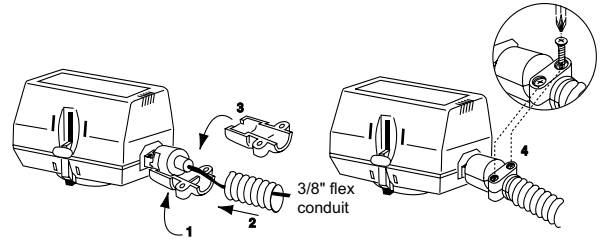

Figure 3 - Flexible Conduit Attachment

WIRING

NOTE: Each 3-wire (SPDT) actuator must have individual spdt controller. Use series 40 or 80 for single controller to control multiple valves.

Figures 4, 5, 6 and 7 show wiring connections. Port "A" *open* and *closed* denote valve open and closed positions respectively. On auxiliary switch models, terminal 4 (grey wire) contact makes at the end of the Port A opening stroke. On Molex connector models, valve & auxiliary switch boltage must be the same to meet approval requirement. For mixed line voltage and 24 VAC (Safety Extra Low Voltage) application, the cable version is recommended.

CAUTION:

Disconnect power supply before connecting wiring to prevent electrical shock and equipment damage.

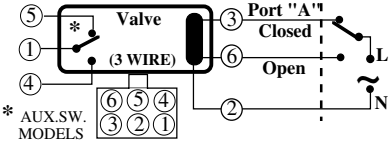

Figure 4 - Wire configuration for MOLEX™ models for SPDT controller. (Series 20 & 60).

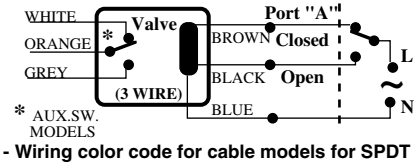

Figure 5 - Wiring color code for cable models for SPDT controller. (Series 20 & 60)

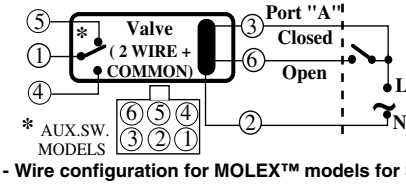

Figure 6 - Wire configuration for MOLEX™ models for SPST controller. (Series 40 & 80)

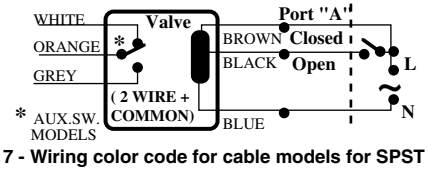

Figure 7 - Wiring color code for cable models for SPST controller. (Series 40 & 80)

OPERATION

Actuator Type	Connection		Valve Movement
	Cable Model	Molex™ Model	
3-WIRE (for SPDT controller)	Blue & Brown energised Black de-energized	Pin #2 & #3 energised Pin #6 de-energised	Closes
	Blue & Black energised Brown de-energized	Pin #2 & #6 energised Pin #3 de-energised	Opens
2 + COM. (for SPST controller)	Blue & Brown energised Black open	Pin #2 & #3 energised Pin #3 & #6 open	Closes
	Blue & Brown energised Black closed	Pin #2 & #3 energised Pin #3 & #6 closed	Opens

WHEN USED WITH SPDT (3-WIRE) CONTROLLER (Figure 8): On a call for heat, the NO thermostat contacts close, the valve opens. When the valve reaches the fully open position, the cam actuated SW1 closes and SW2 opens. When the need for heat is satisfied the NC thermostat contacts close, energizing the valve through SW1 to close the valve. When the valve reaches the fully close position, the cam actuated SW2 closes and SW1 opens anticipating the next call for heat cycle.
In a power failure the valve will stay at whatever position it was in when the power was interrupted. When power is restored, the valve will respond to the controller demand.

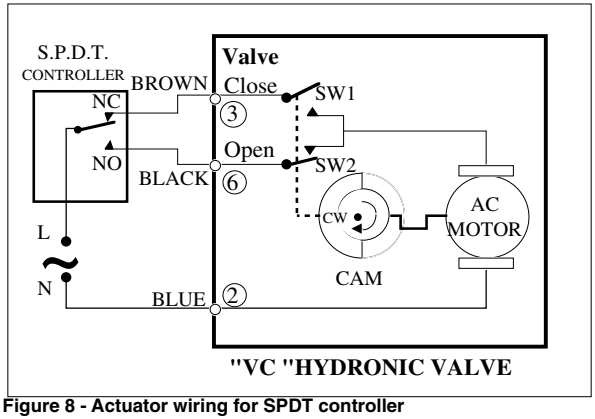

Figure 8 - Actuator wiring for SPDT controller

NOTE: VC2114 and VC8114 actuators must be used with separately-powered (hardwired) electronic controllers. Their sustained current draw is too low for power stealing (parasitic power) thermostats or series anticipators of electromechanical thermostats.

WHEN USED WITH SPST CONTROLLER (Figure 9): On a call for heat, RLY1 is energized making the NO contacts in SW3, the valve opens. When the valve reaches the fully open position the cam operated SW1 closes and SW2 opens. When need for heat is satisfied, the thermostat contacts open, RLY1 is de-energized and the valve motor is driven closed through SW1 and the NC contacts of SW3. When the valve reaches the fully closed position, the cam operated SW2 closes and SW1 opens anticipating the next call for heat cycle.

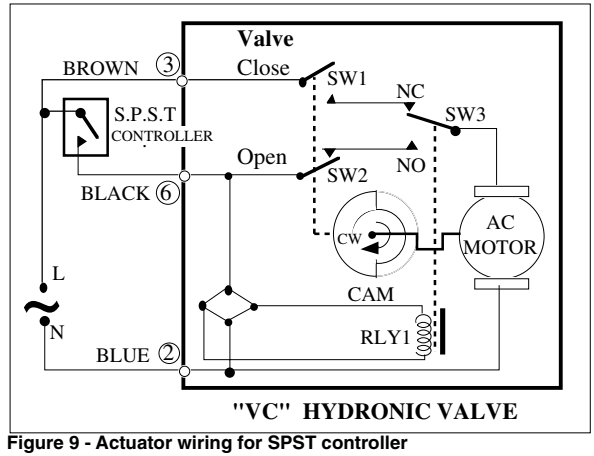

Figure 9 - Actuator wiring for SPST controller

CHECKOUT

1. Raise the set point of the thermostat above room temperature to initiate a call for heat. Red valve position lever should move downward to the open position.
2. For auxiliary switch models, observe all control devices. The valve should open and the auxiliary switch (if present) should close and make at the end of the opening stroke to activate auxiliary equipment.
3. Lower the set point of the zone thermostat below room temperature.
4. Observe the control devices. The valve should close and all auxiliary equipment should stop.

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.
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 occur in high temperature (over 212°F [100°C]) systems with insufficient water pressure.

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VC6800, VC6900 Series Floating Control Valves

PRODUCT DATA

GENERAL

The VC6800/VC6900 Series Modulating Control Valves provide optimum control of hot and/or chilled water flow in various heating and cooling applications, such as fan coil units, reheat coils and perimeter heating systems.

The VC hydronic valve consists of a valve body and replaceable characterized cartridge assembly. When used with a Honeywell VC6800/VC6900 series actuator, the valve provides linear flow in either diverting or mixing applications. They are designed to provide sinusoidal valve actuator travel, and therefore operate silently and resist water hammer.

Compatible with 24 Vac, 3-wire signal, the VC series valve actuator is used with either a single pole double throw two-position controller for on-off control, or a floating controller, for modulating control. These actuators have conformal coated printed circuit boards for humidity resistance. Through an internal switching mechanism, the actuator takes power only while driving the valve to the commanded position.

FEATURES

- **All actuators are interchangeable and suitable for all valves, 1/2" through 1", providing maximum installation flexibility with minimum stocking requirements.**
- **A locking tab secures the actuator to the body of the valve.**
- **Multi-directional actuator mount allows for 4 different wiring orientations, thus providing ease of wiring and service.**
- **Actuator is constructed of moisture and humidity-resistant materials.**
- **Long service life because the actuator motor de-energises when not in motion.**
- **Manual opener and position indicator. This "manual opener" position may be used for filling, venting, and draining the system.**
- **Bayonet-mount for actuator head. Actuator can be installed after plumbing work has been completed, which makes for more efficient on-site installation.**
- **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 is bi-directional.**
- **In 3-way valves, flow can be mixing or diverting.**

Contents

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SPECIFICATIONS

Table 1. Actuator Model Identifiers

Model Series	Voltage (50/60Hz)	Auxiliary Switch	Nominal full open Time @ 60 Hz	Type of Electrical Connection
VC6830	24 Vac	SPDT	120 sec.	Molex
VC6831	24 Vac	SPDT	120 sec.	1 metre cable
VC6930	24 Vac	-	120 sec.	Molex
VC6931	24 Vac	-	120 sec.	1 metre cable
VC6940	24 Vac	-	12 sec.	Molex

**** Plenum rated cover & cable**

Table 2. Body Fitting Model Identifiers

2-way Valve Number	Cv Rating	Body Fitting	3-way Valve Number	Cv Rating
AA11xx	3.2	1/2" Sweat	MA61xx	3.8
AC11xx	2.1	3/8" Flare	MB61xx	2.7
AD11xx	3.1	1/2" Flare	MC61xx	3.8
AE11xx	3.2	1/2" Inv. Flare	MD61xx	4.2
AF11xx	3.0	1/2" BSPP/15mm int	ME61xx	3.7
AB11xx	3.4	1/2" BSPT int	MN61xx	3.8
AM11xx	4.6	3/4" Sweat	ML61xx	5.9
AH11xx	5.2	3/4" BSPP ext	MG61xx	6.7
AJ11xx	5.2	3/4" BSPP int	MH61xx	6.9
AK11xx	4.7	3/4" BSPT int	MJ61xx	6.2
AL11xx	4.7	3/4" NPT int	MK61xx	6.6
AG11xx	5.4	22mm Compression*	MF61xx	6.9
AP11xx	6.6	1" BSPP int	MP61xx	7.5
AQ11xx	6.2	1" BSPP ext	MQ61xx	7.9
AS11xx	6.2	1" Sweat	MS61xx	6.6
AR11xx	6.6	1" NPT int	MR61xx	8.6
AT11xx	6.6	1" BSPT int	MT61xx	8.1
AN11xx	6.3	28mm Compression*	MM61xx	7.5

*****Includes compression nuts and olives

For example, to order a 120 second stroke timing actuator, with 1 meter cable and no auxiliary switch, on a 3-way 3/4" BSPP internal thread body, you would order VC6931MH6111. The last two digits, "11", indicate that the actuator comes with conformal coated printed circuit board.

Voltage: **Colour coded label**
24V, 50-60Hz Model Blue

Power Consumption:
4 Watts Max. at nominal voltage (during valve position change).
Note: Use 6 VA for Class 2 transformer and connection wire sizing. Maximum duty cycle 15%.

End Switch Rating:
2.2 A inductive from 5 to 110 Vac
1.0 A inductive above 110 to 277 Vac
Min. DC switching capability: 0.005 A @ 24 Vdc
Note: Use model V6831 only for mixed line and low voltage applications.

Nominal Timing:
See Table 1
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), *or*
2) With integral 1 metre (nominal 39") leadwire cable, or

Operating Ambient Temperature:
0 to 65 degrees C (32 to 150 degrees F)

Shipping and Storage Temperature:
-40 to +65 degrees C (-40 to 150 degrees F)

Atmosphere:
Non-corrosive, non-explosive

Minimum & Maximum fluid temperatures:
1 to 95 degrees C (34 to 203 degrees F)

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 Characteristics: Linear

The specifications above are nominal and conform to generally acceptable 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. Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, ON M1V 4Z9.

In U.S.A. - Honeywell, 1885 Douglas Drive North, Minneapolis, Minnesota 55422-4386. 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.

Approvals:
Underwriters Laboratories Inc. Listed
CSA Approved
CE Approved under EMC 89/336/EEC

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

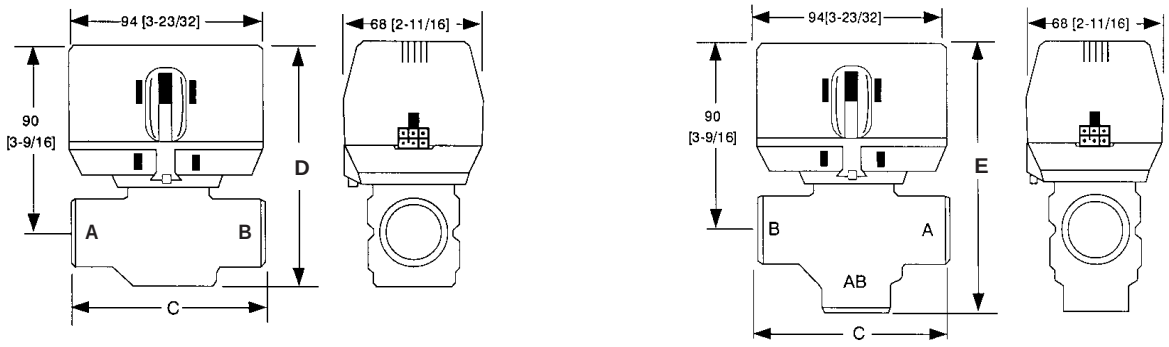


Table 3. 2-Way Nominal Dimensions

Dimensions / Pipe fitting sizes	C mm	C Inches	D mm	D Inches
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" 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 COMP.	98	3 -7/8	111	4-3/8
1/2" BSPP(int.)	98	3 -7/8	111	4-3/8
3/4" BSPP (int. & ext.), 3/4" BSPT (int.)	94	3-11/16	113	4-7/16
3/4" NPT (int.)	94	3-11/16	113	4-7/16
3/4" SWEAT	94	3-11/16	113	4-7/16
22mm* COMPRESSION	112	4-7/16	113	4-7/16
1" BSPP (int. & ext.), 1" NPT (int.)	94	3-11/16	113	4-7/16
1" SWEAT	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 / Pipe fitting sizes	C mm	C Inches	E mm	E Inches
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" 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 COMP.	98	3 -7/8	136	5-11/32
1/2" BSPP(int.)	98	3 -7/8	136	5-11/32
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
3/4" NPT (int.)	94	3-11/16	130	5-3/32
3/4" SWEAT	94	3-11/16	132	5-3/16
22mm* COMPRESSION	112	4-7/16	140	5-1/2
1" BSPP (int. & ext.), 1" NPT (int.)	94	3-11/16	136	5-11/32
1" SWEAT	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

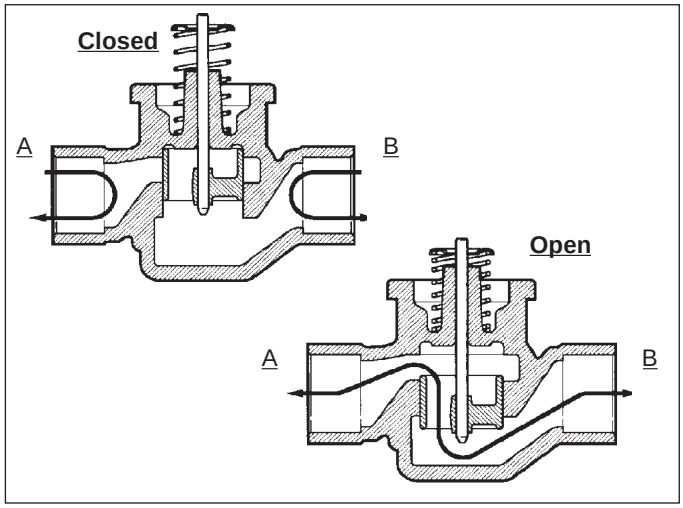
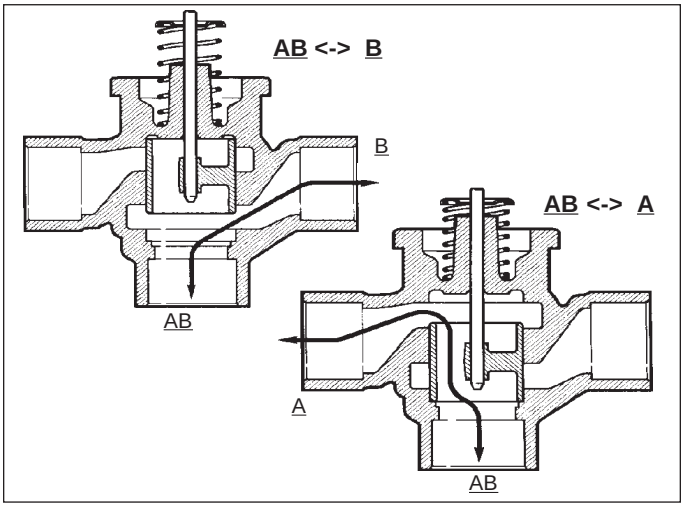


Fig. 3 - Fluid flow of 3-way valves



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)

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 45Nm (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 4.5Nm [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.

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.

Fig. 4 - Plumbing of the VC Valve

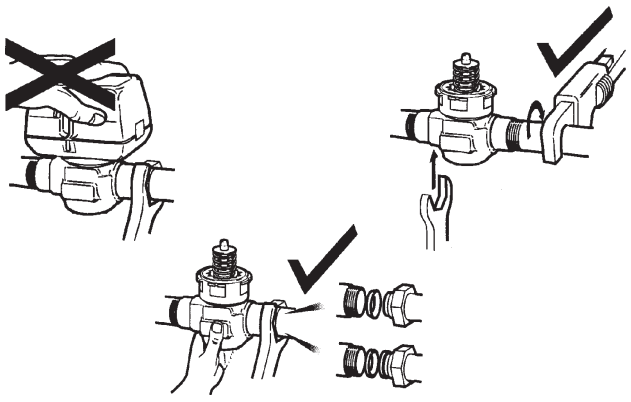
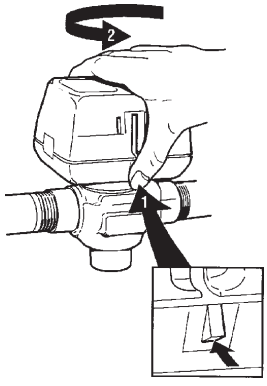


Fig. 5 - Latch Mechanism to detach Actuator



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

One controller and a separate transformer is required to operate each valve. Figures 6a and 6b show wiring connections. Port "A" *open* and *closed* denote valve open and closed positions respectively. On auxiliary switch models, contact makes in between (NC) terminal 1(orange wire) and (NO) terminal 4 (grey wire) in mid-range of opening cycle. On Molex™ connector models, valve & auxiliary switch voltage must be the same to meet approval requirement. When mixing line voltage and 24 Vac (Safety Extra Low Voltage) application together, the cable version must be used.

Fig. 6a - Connector Pin Configuration for Molex™ Models for SPDT, floating Controller (Series 60).

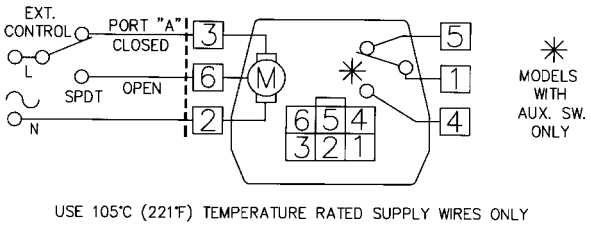
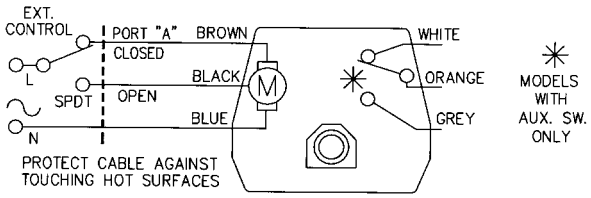


Fig. 6b - Wiring Colour Code for Cable Models for SPDT, floating Controller (Series 60).

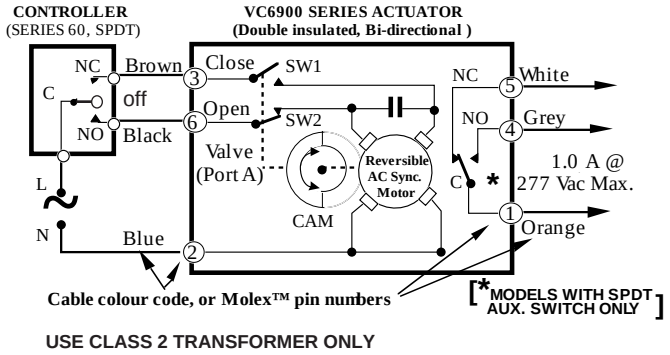


OPERATIONS

WITH SERIES 60 FLOATING CONTROLLER:
(refer to figure 7)

The series 60 floating controller is an SPDT controller with a centre-off position. On a change in temperature from the set point, the controller will close the NO or NC contacts, driving the valve to an intermediate position until a further change at the controller. The valve is set between the limits of the controller to satisfy various load requirements. In the event of a power failure, the valve will stay at whatever position it was in when the power was interrupted. When power is restored, the valve will respond to the controller demand.

Fig. 7 - Wiring Schematic of the VC6900 Series Actuators



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 - The 2 way valve should open. Port A of the 3 way valve should open, port B should close. The auxiliary switch (if present) should operate and make at the end of the opening stroke, activat ing the auxiliary equipment.
3. Lower the set point of the thermostat below room temperature.
4. Observe the control devices. The 2 way valve should close. Port A of the 3 way valve should close. All auxiliary equipment should stop.

Honeywell

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95C-10828-1 Rev. 11/96 Printed in U.S.A. www.honeywell.com/building/components

Honeywell

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-energiszes 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.

CONTENTS

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 O.S. No. (VCz...)	2-Way Cv Rating	Body Style Size	Body Style Fitting	3-Way O.S. No. (VCz...)	3-Way Cv Rating
AA11xx	3.2	1/2"	Sweat	MA61xx	3.8
AM11xx	4.6	3/4"		ML61xx	5.9
AS11xx	6.2	1"		MS61xx	6.6
BB11xx	3.2	1/2"	NPT internal (F NPT)	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 (check white pages of your phone directory).
2. On the World Wide Web: www.honeywell.com/building/components
3. In U.S.A.: Honeywell, 1885 Douglas Drive North, Minneapolis, MN 55422-4386.
4. In Canada: Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, ON M1V 4Z9.

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

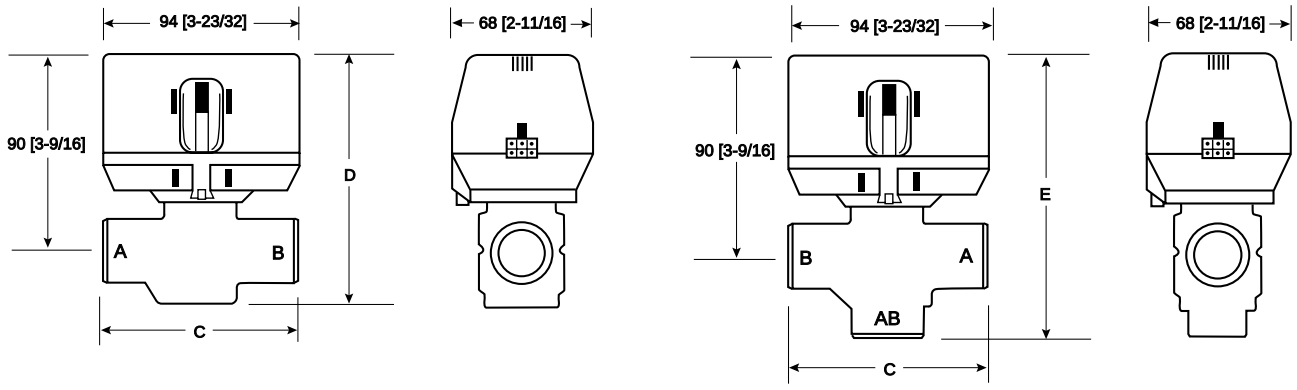


Table 3. 2-Way Nominal Dimensions

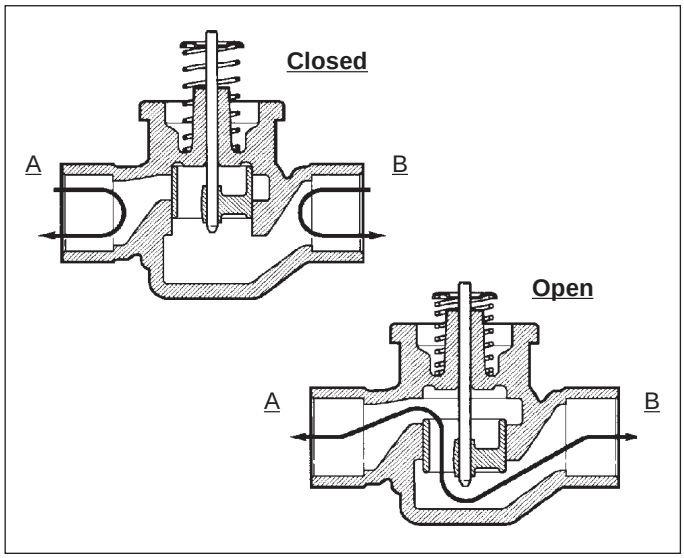
Dimensions / Pipe fitting sizes	C mm	C Inches	D mm	D Inches
3/8" FLARE (no adapter)	98	3 -7/8	111	4-3/8
1/2" SWEAT	98	3 -7/8	111	4-3/8
1/2" F NPT	98	3 -7/8	111	4-3/8
1/2" FLARE (no adapter)	98	3 -7/8	111	4-3/8
1/2" INVERTED FLARE (no adapter)	98	3 -7/8	111	4-3/8
1/2" BSPP(int.), 15 mm Compression	98	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 / Pipe fitting sizes	C mm	C Inches	E mm	E Inches
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



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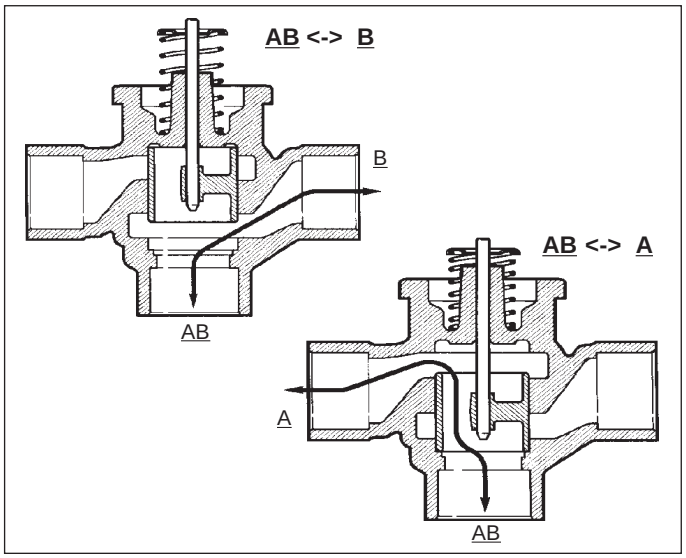


INSTALLATION

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 parallet 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

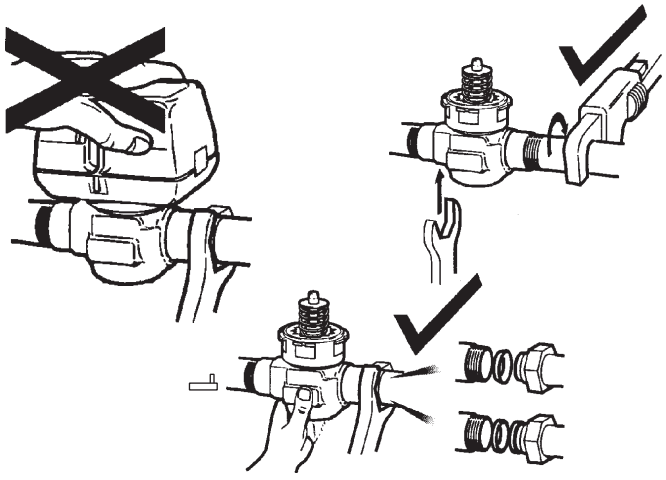
The valve may be plumbed in any angle but preferably not with the actuator below horizontal level of the body. Make sure there is enough room around the actuator for servicing or replacement.

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.

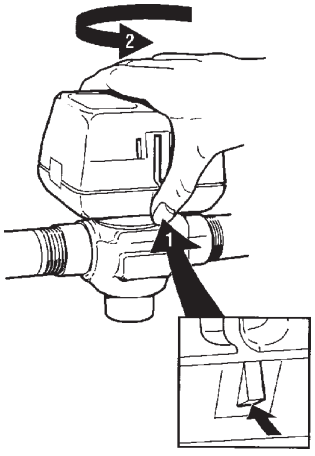
TO INSTALL REPLACEMENT ACTUATOR

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).

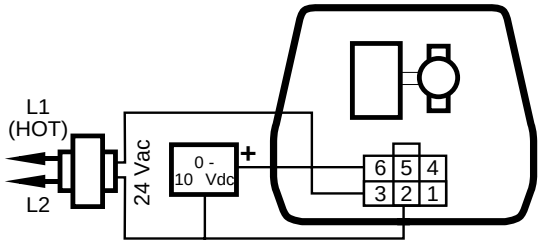
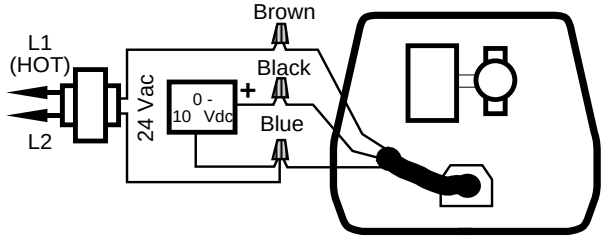


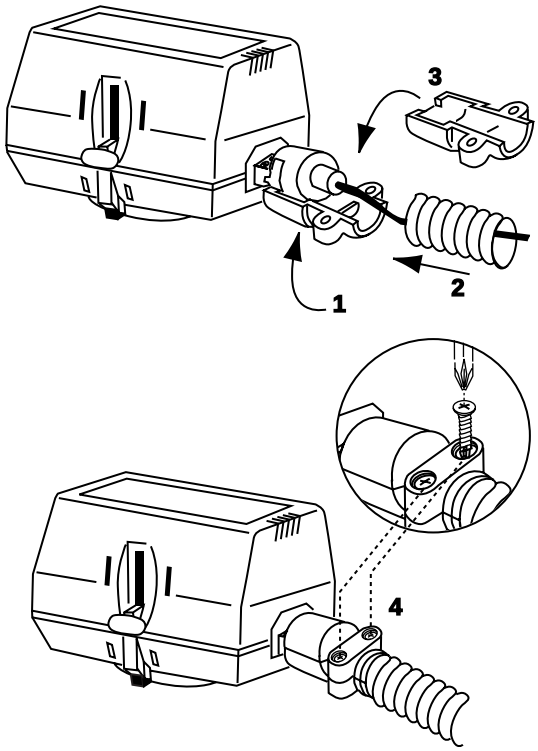
Fig. 6b - Wiring Colour Code for Cable Models and 0 / 2 – 10 Vdc Controllers (Series 70).



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



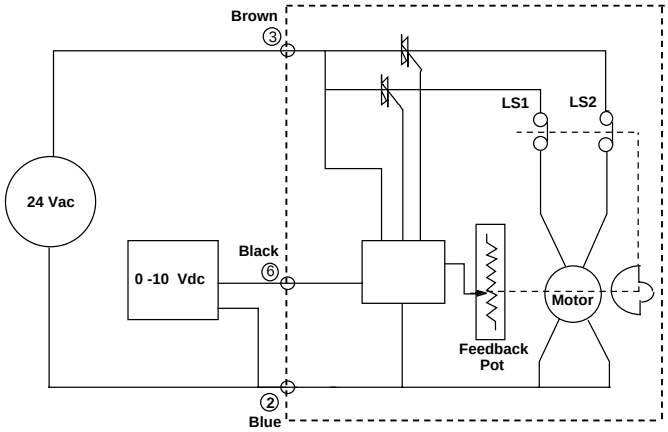
OPERATION

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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