

VC SERIES

3 - Way, Balanced Hydronic Valves

These two position 3 way hydronic valves are intended for use in a normal indoor environment to control the flow of hot and/or cold water, or glycol solution to 50% concentration.

They consist of an actuator, valve and replaceable valve cartridge assembly. These valves can be piped for either diverting or mixing valve applications in central heating and/or cooling systems; or for individual fan coil, radiator or convector applications.

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



SPECIFICATIONS

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

Voltage: Colour coded label

24V 50Hz; 24V 60Hz Models	Blue
100-130V 50-60Hz Model	Black
200-240V 50-60Hz Model	Red

Power consumption :

6 Watts Max. at nominal Voltages(during valve position change)
Use 24 V Class 2 transformer. Provide 6 VA for 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: 5 mA @ 24 Vdc

Nominal timing :

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

Electrical termination : Available in 2 versions,

- (1) Molex™ (header # 39-30-1060). Requires mating connector (receptacle/housing # 39-01-2060). OR
- (2) With integral 1 meter [nominal 39"] leadwire cable.

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

Shipping & storage temperature:

-40 to +65 °C [-40 to +150°F]

Atmosphere: non-corrosive, non-explosive

Min. & max. fluid temperatures: 1° to 95°C [34°to 203°F].

(Short duration peak: 120°C [248°F])

Operating pressure differential : Max. - 4 Bar [60 psi]

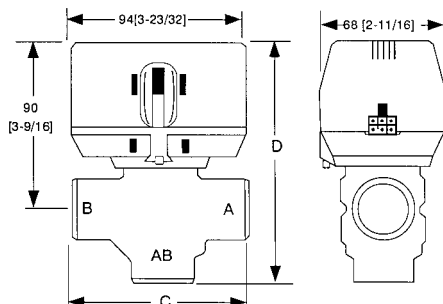
Pressure rating : Static - 20 Bar [300 psi]

Burst - 100 Bar [1500 psi]

Valve material: Body of bronze; cartridge of Ryton™ (polyphenylene sulphide) & Noryl™ (polyphenylene oxide); O-ring seals of EPDM rubber; stainless steel stem.

Dimensions / pipe fitting sizes / flow ratings (nominal Cv):

See Diagram.

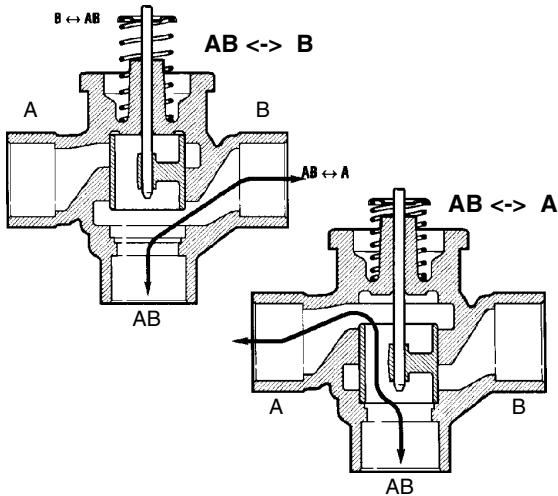


Nominal dimensions in mm and inches

Pipe Fitting Sizes	Dimensions		C		D		Cv (nominal)	
	mm	Inches	mm	Inches	mm	Inches	6000	6100
3/8" FLARE (no adapter)	98	3 - 7/8	136	5-11/32	3.0	2.7		
1/2" SWEAT	98	3 - 7/8	136	5-11/32	4.2	3.8		
1/2" FLARE (no adapter)	98	3 - 7/8	136	5-11/32	4.0	3.8		
1/2" INVERTED FLARE (no adapter)	98	3 - 7/8	136	5-11/32	4.2	4.2		
1/2" BSPP (int.), 15 MM Comp.	98	3 - 7/8	136	5-11/32	4.0	3.7		
1/2" BSPT (int.)	98	3 - 7/8	136	5-11/32	4.0	3.8		
1/2" BSPP (ext.)	98	3 - 7/8	136	5-11/32	4.0	3.7		
3/4" BSPP (int.)	94	3-11/16	130	5-3/32	8.2	6.9		
3/4" BSPT (int.)	94	3-11/16	130	5-3/32	8.2	6.2		
3/4" BSPP (ext.)	94	3-11/16	130	5-3/32	8.0	6.7		
3/4" NPT (int.)	94	3-11/16	130	5-3/32	8.6	6.6		
3/4" SWEAT	94	3-11/16	132	5-3/16	7.5	5.9		
22 MM* Compression	112	4-7/16	140	5-1/2	8.3	6.9		
1" BSPP (int.)	94	3-11/16	136	5-11/32	9.0	7.5		
1" BSPP (ext.)	94	3-11/16	136	5-11/32	9.0	7.9		
1"BSPT(int.)	94	3-11/16	136	5-11/32	9.0	8.1		
1" NPT (int.)	94	3-11/16	136	5-11/32	9.0	8.6		
1" SWEAT	94	3-11/16	136	5-11/32	9.0	6.6		
28 MM* Compression	116	4-9/16	147	5-13/16	9.0	7.5		

* Includes compression nuts and olives

Flow: Bottom port is marked AB. End ports are marked A & B. Port A is closed and port B open with the stem up position (Figure 1). Flow can be A or B to AB for mixing, or AB to A or B for diverting.



**Figure 1 : Fluid flow direction of 3-way valve
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 red 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 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, 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-person.
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 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 24V systems, **never** jumper the valve coil terminals, even temporarily. This may damage the thermostat.

PLUMBING



IMPORTANT:

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).

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).

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 2)

If assembly valve train on a bench, take care not to deform body with vice.

Do not place the raised "H" logo between the jaws of the vice. Excess jaw force can deform the body.

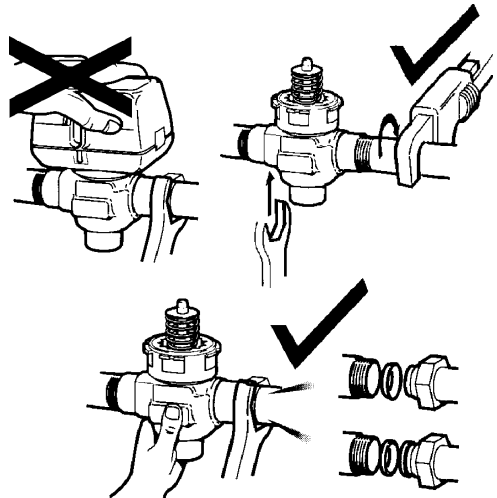


Figure 2: Plumbing of the VC valve.

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 33 ft-lb for the 22 mm compression fitting, and 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 until it bottoms out. **DO NOT OVER TIGHTEN** (maximum torque is 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

NOTE: 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 located directly below the red manual open lever with thumb (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.
- NOTE:** The actuator can also be installed at right angles to the valve body but in this position the latch mechanism is not engaged.
5. Install the new actuator by reversing the process in (4).
 6. Reconnect leadwires or Molex™ connector.
 7. Restore power, and checkout operation.

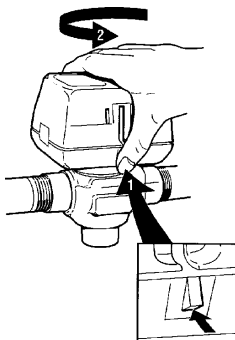


Figure 3: Actuator Head Removal.

WIRING

NOTE: Each 3-wire (SPDT) actuator must have individual SPDT controller.

Use series 40 or 80 for single controller to control multiple valves. 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.

Figures 4A, 4B, 5A, 5B 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 voltage 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. For mixed line voltage and 24 Vac (Safety Extra Low Voltage) application, the cable assembly version is recommended.

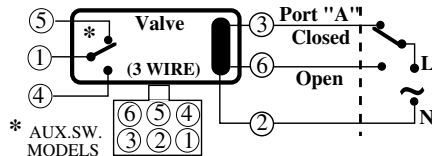


Figure 4A - Wire configuration for MOLEX™ models for SPDT controller. (Series 20 & 60).

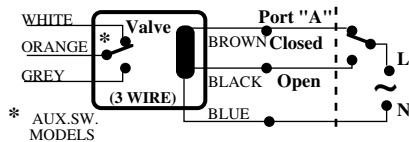


Figure 4B: Wiring color code for cable models for SPDT controller. (Series 20 & 60)

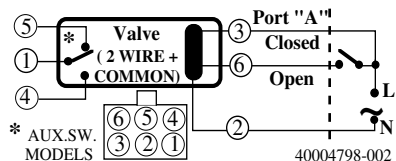


Figure 5A - Wire configuration for MOLEX™ models for SPST controller. (Series 40 & 80)

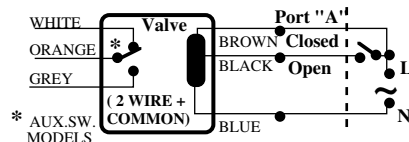


Figure 5B : Wiring color code for cable models for SPST controller. (Series 40 & 80)

Actuator Type	Connection		Valve Movement
	Cable model	Molex™ model	
3-WIRE (for SPDT controller)	Blue & Brown energised	Pin# 2 & 3 energised	A port closes
	Black de-energised	Pin# 6 de-energised	
	Blue & black energised	Pin# 2 & 6 energised	B port closes
	Brown de-energised	Pin# 3 de-energised	
2 + COM. (for SPST controller)	Blue & Brown energised	Pin# 2 & 3 energised	A port closes
	Brown & Black open	Pin# 3 & 6 open	
	Blue & Brown energised	Pin# 2 & 3 energised	B port closes
	Brown & Black closed	Pin# 3 & 6 closed	

OPERATION

WHEN USED WITH SPDT (3-WIRE) CONTROLLER (Fig. 6): On a call for heat, the NO thermostat contacts close, the valve opens port "A" and closes port "B". When the valve reaches port "A" fully open position, the cam actuated SW1 closes and SW2 opens. When the need for heat is satisfied, the NC thermostat contacts close, energising the valve through SW1 to close port "A". When the port "A" is fully closed, the cam actuated SW2 closes and SW1 opens anticipating the next call for heat cycle. On 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.

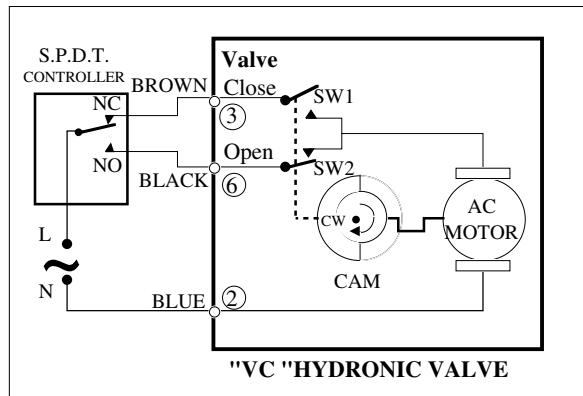


Figure 6: Actuator wiring for SPDT controller

WHEN USED WITH SPST CONTROLLER (Fig. 7): On a call for heat, the thermostat contacts close. RLY1 is energized making the NO contacts in SW3, valve opens port "A" and closes port "B". When the port "A" fully open position is reached, the cam operated SW1 closes and SW2 opens. When need for heat is satisfied, the thermostat contacts open. RLY1 is de-energized making the NC contacts in SW3, and port "A" is driven close through SW1 and the NC contacts of SW3. When the port "A" fully close position is reached, the cam operated SW2 closes and SW1 opens anticipating the next call for heat cycle.

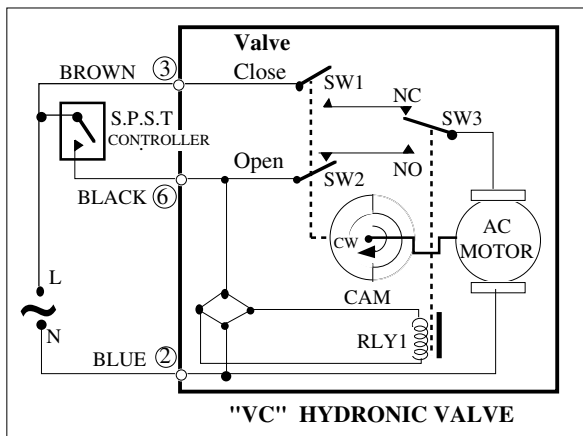


Figure 6: Actuator wiring for SPST controller

CHECKOUT

1. Raise the set point of the thermostat above room temperature to initiate a call for heat.
2. Observe all control devices - Port A should open, port B should close and the auxiliary switch (if present) should operate and make at the end of the opening stroke activating the auxiliary equipment.
3. Lower the set point of the thermostat below room temperature.
4. Observe the control devices. Port A 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. 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 occur in high temperature (over 212°F [100°C]) systems with insufficient water pressure.

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.

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