



# VC7900 Series Modulating Control Valves

## PRODUCT DATA



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

The VC hydronic valve consists of a valve body and replaceable characterized cartridge assembly. When used with a Resideo VC7900 actuator, the valve provides proportional flow in either diverting or mixing applications. They are designed to provide sinusoidal valve actuator travel, and therefore operate silently and resist water hammer. The VC7900 series valve actuator is used with any 0-10 Vdc controller.

## SPECIFICATIONS

**Supply Voltage:** 24V, 50-60Hz; Class 2 circuit  
**Colour Coded Label:** Blue

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

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

**Maximum Duty Cycle:** 15%

**Nominal Timing:** Opens in 2 minutes @ 60 Hz

**Actual Full Stroke Timing is 140 sec**  
Note: Timing is approximately 20% longer @ 50 Hz

### 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
- VC7934 meets UL94-5V requirements for installation in return air plenums.

### Operating Ambient Temperature:

0 to 65 °C (32 to 150 °F) (VC7934 is 60 °C [140 °F] max.)

### Shipping & Storage Temperature:

-40 to +65 °C (-40 to +150 °F)

### Atmosphere:

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

**Min. & Max. Fluid Temperatures:** Max. – 4 Bar (60 psi)

**Operating Pressure Differential:** Max. – 4 Bar (60 psi)

### Pressure Rating:

Static – 20 Bar (300 psi)  
Burst – 100 Bar (1500 psi)

**Valve Material:** Body of brass; cartridge of Ryton™ (polyphenylene sulphide), Noryl™ (polyphenylene oxide) and Fortron; O-ring seals of EPDM rubber; stainless steel stem.

**Flow Characteristics:** Linear

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

### Accessories and Replacement Parts:

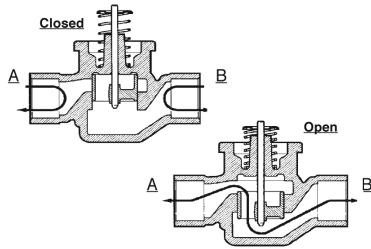
40007029-002: Wrench for removing VC cartridge  
VCZZ1100: 2-way characterized cartridge, unit pack  
VCZZ6100: 3-way characterized cartridge, unit pack



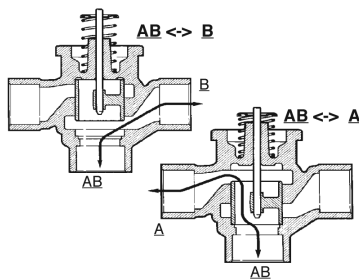
**Table 1. Series 70, 0/2-10 Vdc Actuator.**

Model Series	Voltage (50/60 Hz)	Nominal 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	1.5 m plenum-rated cable

NOTE: Timing is approximately 20% longer @ 50 Hz.



**Fig. 1. Fluid flow of 2-way valves**



**Fig. 2. Fluid flow of 3-way valves**

**Table 2. Valve Body Models.**

2-way Valve Number	CV Rating	Body Fitting	3-way Valve Number	Cv Rating
AA11xx	3.2	1/2" Sweat	MA61xx	3.8
AA15xx	0.7	1/2" Sweat		
AA16xx	1.3	1/2" Sweat		
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
BB15xx	0.7	1/2" NPT		
BB16xx	1.3	1/2" NPT		

\*Includes compression nuts and olives

**Table 3. 2-Way Nominal Dimensions (See Fig. 3).**

Pipe Fitting Sizes	Dimensions		C		D	
	mm	inches	mm	inches	mm	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		
22 MM* 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		
28 MM* Compression	116	4-9/16	113	4-7/16		

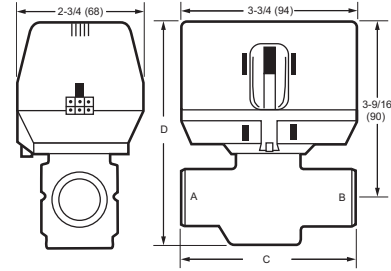
\*Includes compression nuts and olives

**Table 4. 3-Way Nominal Dimensions (See Fig. 4).**

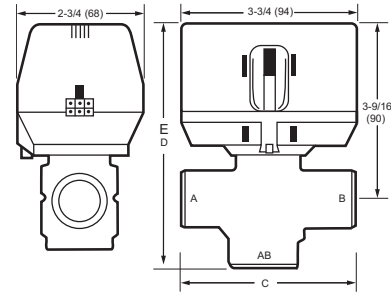
Pipe Fitting Sizes	C		D	
	mm	inches	mm	inches
3/8" Flare (no adapter)	98	3-7/8	136	5-11/32
1/2" Sweat	98	3-7/8	136	5-11/32
1/2" Flare (no adapter)	98	3-7/8	136	5-11/32
1/2" Inverted Flare (no adapter)	98	3-7/8	136	5-11/32
1/2" BSPP (int.), 15 MM Comp.	98	3-7/8	136	5-11/32
1/2" BSPP (int.)	98	3-7/8	136	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
22 MM* 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
28 MM* Compression	116	4-9/16	147	5-13/16

\*Includes compression nuts and olives

For example, to order a 120 second stroke timing actuator, with a 1 meter cable and no auxiliary switch, on a 3-way 3/4" BSPP internal thread body, you would order VC7931MH6111.



**Fig. 3. 2-Way nominal dimensions in inches and millimeters.**



**Fig. 4. 3-Way nominal dimensions in inches and millimeters.**

## 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 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

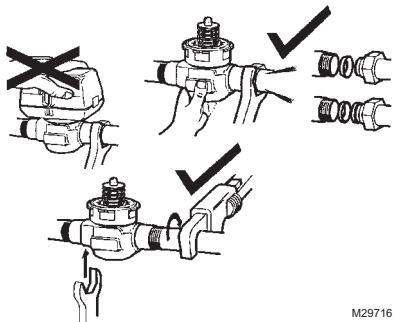
1. Disconnect power supply before connecting wiring to prevent electrical shock and equipment damage.
2. On 24 V systems, never jumper the valve coil terminals, even temporarily. This may damage the thermostat.

### PLUMBING

The valve may be plumbed in any angle but preferably not with the actuator below the horizontal level of valve 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 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 the hexagonal or flat faces on the valve body. (Fig. 5).



M29716

Fig. 5. Plumbing of the VC valve.

### 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).

### 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 65 Nm (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

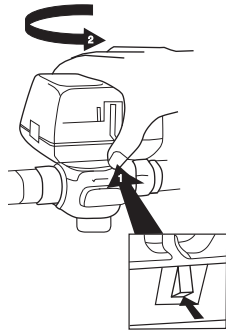
### IMPORTANT

*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 located directly below the white manual open lever with thumb (See Fig. 6). 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 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. 6. Latch Mechanism to detach Actuator**

## MANUAL OPENER

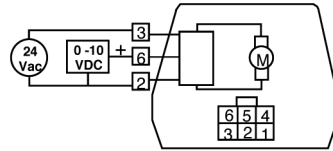
The manual opener can be manipulated only when in the up position. The motorized valve can be opened by firmly pushing the white manual lever down to midway and in. In this position both the "A" and "B" ports are open, and with auxiliary switch models the switch is closed. This "manual open" position may be used for filling, venting, or 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 can not be manually closed unless actuator is removed.

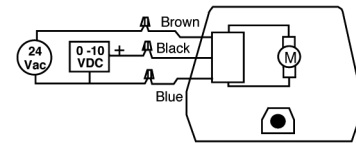
## WIRING

See Figures 7A and 7B 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. 7a. Connector Pin Configuration for Molex™ Models for 0-10 Vdc Controller (Series 70)**



**Fig. 7b. Wiring Colour Code for Cable Models for 0-10 Vdc Controller (Series 70)**

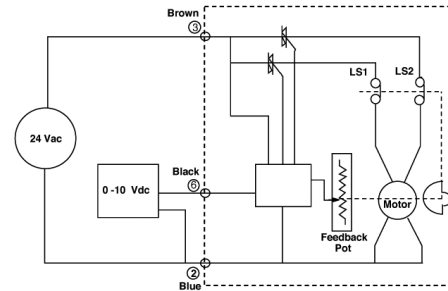
## OPERATIONS

WITH SERIES 70, 0/2 - 10 VDC CONTROLLER  
(refer to Fig. 7)

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.

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 go to the open default position.



**Fig. 8. Wiring Schematic of the VC7900 Series Actuator**

## 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 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: Resideo 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.

## CHECKOUT

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 zone 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.

VC7900 SERIES MODULATING CONTROL VALVES



[www.resideo.com](http://www.resideo.com)

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