VC6930, VC7930 Series
MODULATING CONTROL VALVES

INSTALLATION INSTRUCTIONS

The VC6930/7930 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. The 3-way 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 VC6930 actuator is used with either a single pole double throw two-position controller for on-off control, or a floating controller, for modulating control. The VC7930 responds to a 2-10Vdc analog signal. These actuators have conformal coated printed circuit boards for humidity resistance. Through an internal switching mechanism, the actuator takes power only when driving the valve to the commanded position.

SPECIFICATIONS

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

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

Maximum duty cycle:15%

Nominal Full Stroke Timing (approx.): 165s @ 50 Hz / 140s @ 60 Hz

Electrical Termination: Molex™ (header #39-30-1060) with adapter to AMP 1-480701-0 (X19140256090)

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

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

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

Atmosphere: Non-corrosive, non-explosive.

Operating Pressure Differential: Maximum – 4 bar (60 psi)

Static Pressure Rating: 20 Bar (300 psig)

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

Stem Travel: 10 mm (0.4 inches)

Flow Characteristics: Linear, Equal Percentage

The specifications above are nominal and conform to generally acceptable industry standards. Trane 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 linear cartridge, unit pack with wrench
VCZZ1800: 2-way equal percentage cartridge, unit pack with wrench
VCZZ6100: 3-way linear cartridge, unit pack with wrench
VCZZ6600: 3-way linear cartridge, unit pack with wrench

Table 1. X-Code Table.

X-code	Model	Description		
X13611047010	VC6930BB1832	1/2" 2-way, 1.9 Cv,	Floating,	NPT
X13611047020	VC6930BB1132	1/2" 2-way, 3.3 Cv,	Floating,	NPT
X13611048010	VC6930NB6632	1/2" 3-way, 1.5 Cv,	Floating,	NPT
X13611048020	VC6930NB6132	1/2" 3-way, 3.8 Cv,	Floating,	NPT
X13611049010	VC6930AL1132	3/4" 2-way, 4.7 Cv,	Floating,	NPT
X13611050010	VC6930MK6132	3/4" 3-way, 6.6 Cv,	Floating,	NPT
X13611051010	VC6930AR1132	1" 2-way, 6.6 Cv,	Floating,	NPT
X13611066010	VC6930AA1832	1/2" 2-way, 1.9 Cv,	Floating,	Sweat
X13611067010	VC6930AA1132	1/2" 2-way, 3.3 Cv,	Floating,	Sweat
X13611068010	VC6930AM1132	3/4" 2-way, 4.7 Cv,	Floating,	Sweat
X13611069010	VC6930AS1132	1" 2-way, 6.6 Cv,	Floating,	Sweat
X13611070010	VC6930MA6632	1/2" 3-way, 1.5 Cv	Floating,	Sweat
X13611071010	VC6930MA6132	1/2" 3-way, 3.8 Cv,	Floating,	Sweat
X13611072010	VC6930ML6132	3/4" 3-way, 6.6 Cv,	Floating,	Sweat
X13611074010	VC7930AA1832	1/2" 2-way, 1.9 Cv,	2-10 Vdc,	Sweat
X13611075010	VC7930AA1132	1/2" 2-way, 3.3 Cv,	2-10 Vdc,	Sweat
X13611076010	VC7930AM1132	3/4" 2-way, 4.7 Cv,	2-10 Vdc,	Sweat
X13611077010	VC7930AS1132	1" 2-way, 6.6 Cv,	2-10 Vdc,	Sweat
X13611078010	VC7930MA6632	1/2" 3-way, 1.5 Cv	2-10 Vdc,	Sweat
X13611079010	VC7930MA6132	1/2" 3-way, 3.8 Cv,	2-10 Vdc,	Sweat
X13611080010	VC7930ML6132	3/4" 3-way, 6.6 Cv,	2-10 Vdc,	Sweat

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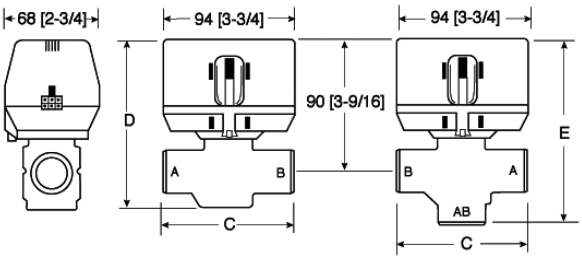

Fig. 1. Nominal dimensions in inches and millimeters

Table 2. Valve Sizes.

North America Standard Models						
Pipe Fitting Size	**Dimensions**					
	C		**D**		**E**	
	mm	**inches**	**mm**	**inches**	**mm**	**inches**
1/2" NPT (int.)	98	3-7/8	111	4-3/8	136	5-11/32
1/2" SWEAT	89	3-1/2	111	4-3/8	130	5-1/8
3/4" NPT (int.)	94	3-11/16	113	4-7/16	130	5-1/8
3/4" SWEAT	94	3-11/16	113	4-7/16	132	5-3/16
1" NPT (int.)	94	3-11/16	113	4-7/16	136	5-11/32
1" SWEAT	94	3-11/16	113	4-7/16	136	5-11/32
1-1/4" NPT (int.)	110	4-5/16	118	4-5/8	142	5-5/8
1-1/4" SWEAT	110	4-5/16	118	4-5/8	142	5-5/8

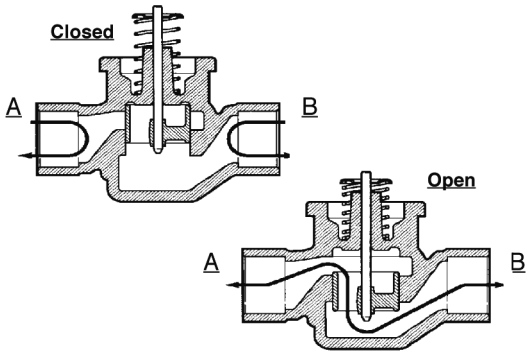

Fig. 2. Fluid flow of 2-way

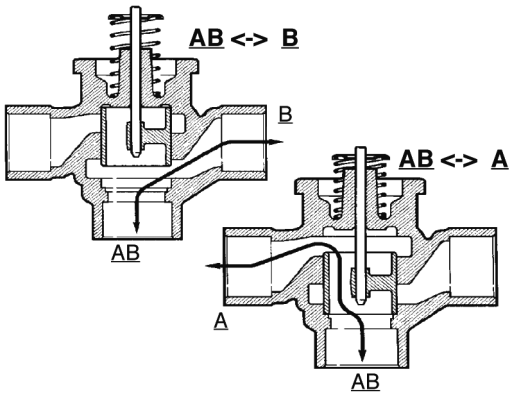

Fig. 3. Fluid flow of 3-way

Table 3. Flow capacity rating of valves in Cv.

North America Standard Models 2-way.						
Pipe Fitting Size	**Cartridge**					
	1000	**1100**	**1400**	**1500**	**1600**	**1800**
	Nominal CV Rating					
1/2" NPT (int.)		3.4	2.9	0.7	1.3	1.9
3/4" NPT (int.)		4.7	3.9	0.8	1.5	
1" NPT (int.)		6.6	4.2	0.8	1.5	
1-1/4" NPT (int.)		7.0	4.2	0.8	1.5	

North America Standard Models 3-way.						
Pipe Fitting Size	**Cartridge**					
	6000	**6100**	**6400**	**6500**	**6600**	**6800**
	Nominal CV Rating					
1/2" NPT (int.)		3.8			1.5	
3/4" NPT (int.)		6.6				
1" NPT (int.)		8.6				
1-1/4" NPT (int.)		8.6				

NOTE: Ratings in shaded cells are provided for reference, but are not stocked devices. These combinations can be made up in the field by replacing the cartridge with the desired model. For example, to create a 1.5 Cv 1.25" 2-way valve, order a VCZBD1100 and a VCZZ1600 cartridge assembly.

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 applications.
3. Installer must be a trained and experienced service technician.
4. Always conduct a thorough check-out when installation is completed.
5. While not necessary to remove the actuator from the body, it can be removed for ease of installation. The actuator can be installed in any of the four orientations to suit the most convenient wiring direction. Actuator latching mechanism works only when the lengths of the actuator and the valve body are parallel to each other.
6. An extra 1" (25 mm) head clearance above the actuator, 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 controller.

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).

The manual lever on the actuator is used both as a position indicator as a manual opener for system filling. To flush, drive actuator to full open position. Alternatively, reusable flush caps, part # 272866B, may be purchased separately for use in initial flushing of dirty hydronic systems.

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

Plumbing

The valve may be plumbed in any angle, including vertical piping, but preferable 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 1-12") across hexagonal or flat faces on the valve body (Fig. 4).

If assembling valve train on a bench, take care no to deform body with vice. **Do not place the raised branding logo between the jaws of the vice.** Excess jaw force can deform the body.

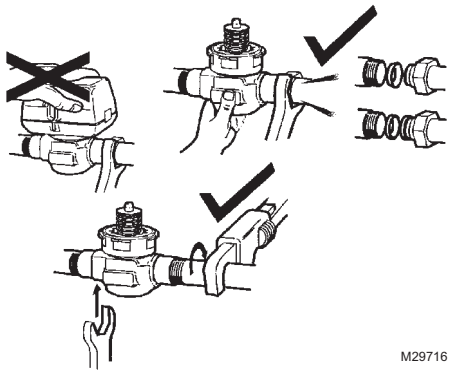

Fig. 4. Plumbing of the VC Valve.

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 [40in-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 with your thumb. It is located directly below the white manual open lever (see Fig. 5). 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 Molex™ connector.
7. Restore power, and check-out operation.

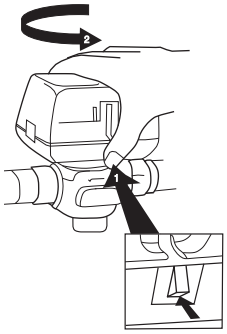

Fig. 5. Latch Mechanism to detach Actuator

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; 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 VC6930 valve. A common controller may be used with isolation relays between each VC6930 actuator. Actuator interaction can result otherwise.

Fig. 6 shows single unit wiring connections. Port "A" *open* and *closed* denote valve open and closed positions respectively.

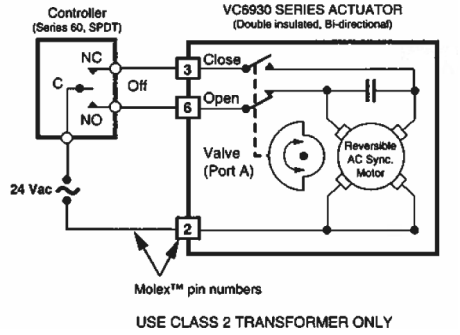

Fig. 6. Wiring Schematic of the VC6930 Series Actuators

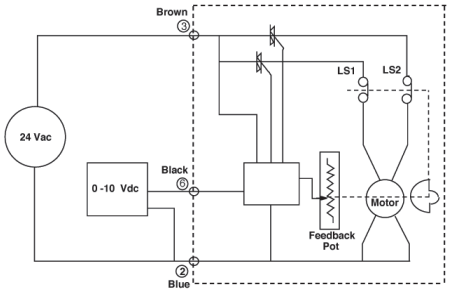

Fig. 7. Wiring Schematic of the VC7930 Series Actuators

OPERATIONS

WITH SERIES 60 FLOATING CONTROLLER:
(refer to Fig. 6)

The series 60 floating controller is an SPDT (Single Pole, Double Throw) controller with a centre-off position (SP3T). 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.

WITH SERIES 70 FLOATING CONTROLLER:
(refer to Fig. 7)

In the VC 7900 series, 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 10 V will be fully open. Because of the soft close off feature, initial (and final) movements of the actuator will not cause any significant changes in the valve stem position.

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: The 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.

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, activating 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.

WEEE Directive 2012/19/EU Waste of Electrical and Electronic Equipment

Do not dispose of this device and contained batteries with general household waste. For proper treatment, recovery and recycling, please take the device and contained batteries to designated collection points. Disposing of this device and contained batteries correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

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