

VT Series Terminal Unit Valves 1/2 inch, 2-Way and 3-Way ANSI Class 250 Body Rating

The VT Series Terminal Unit Valves are designed to accurately regulate the flow of steam, hot water, or chilled water through coils or heat exchangers of all types, in a wide range of HVAC applications. These valves are designed and tested in full compliance with ANSI B16.15 Class 250

pressure/temperature ratings, ANSI B16.104 Class IV control valve shutoff leakage, and ISA S75.11 flow characteristic standards. Meeting these ratings assures certifiable control performance accuracy as well as reliable, long-term service.

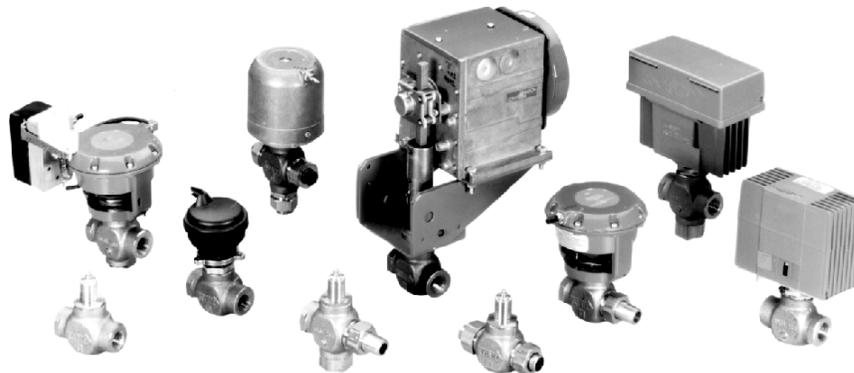


Figure 1: The VT Series Terminal Unit Valve Family

Features and Benefits	
<input type="checkbox"/> Cast Brass Valve Available with a Wide Range of Pneumatic and Electric Actuators	Broad selection
<input type="checkbox"/> Complies with ANSI and ISA Standards	Certifiable control valve accuracy and performance
<input type="checkbox"/> Designed for Use in Hot Water, Chilled Water, and Steam Applications	Universal application
<input type="checkbox"/> Uses Standard Johnson Controls Ring Pack Packings	Proven reliability and long life
<input type="checkbox"/> Flexible Features and Options Ordering Template	Easy selection from a broad range of factory-preassembled combinations
Continued on next page . . .	

Features and Benefits (Cont.)	
<input type="checkbox"/> Body Rated 400 psig Static Pressure	Valve not restricted to building location
<input type="checkbox"/> Every Valve Tested for Tight Initial and Long-term Shutoff	Assures occupant comfort and energy conservation
<input type="checkbox"/> Factory Assembled Valves with Threaded or Union-type End Connections	Will accommodate wide range of installation requirements
<input type="checkbox"/> Union Angle and Union Globe Dimensions and Nuts Match Old Johnson Controls Valves V-3752, V-3755, and V-3800	Old tailpiece can be reused and new VT Valve can be installed using old nut

Application Overview

The VT Series valve body features an integral seat and is available in normally open, normally closed, and 3-way mixing styles (Figure 2), with either union-globe, -angle, -sweat or threaded connections (Figure 3). The valve can be ordered with or without a variety of actuators including pneumatic V-3000 Series exposed or enclosed, and with factory-mounted positioner option; V-3802 Series oval top models; or the economical V-4000 non-metallic actuator. The valve can also be ordered with an electric actuator: VA-8020, VA-8022, VA-8050, VA-8051, or VA-8052 Series or an M100 Series actuator. All electric actuators are fully compatible with Metasys® controllers, reducing installation costs. Refer to Tables 1 through 3 for ordering data, actuator sizing, and additional details.

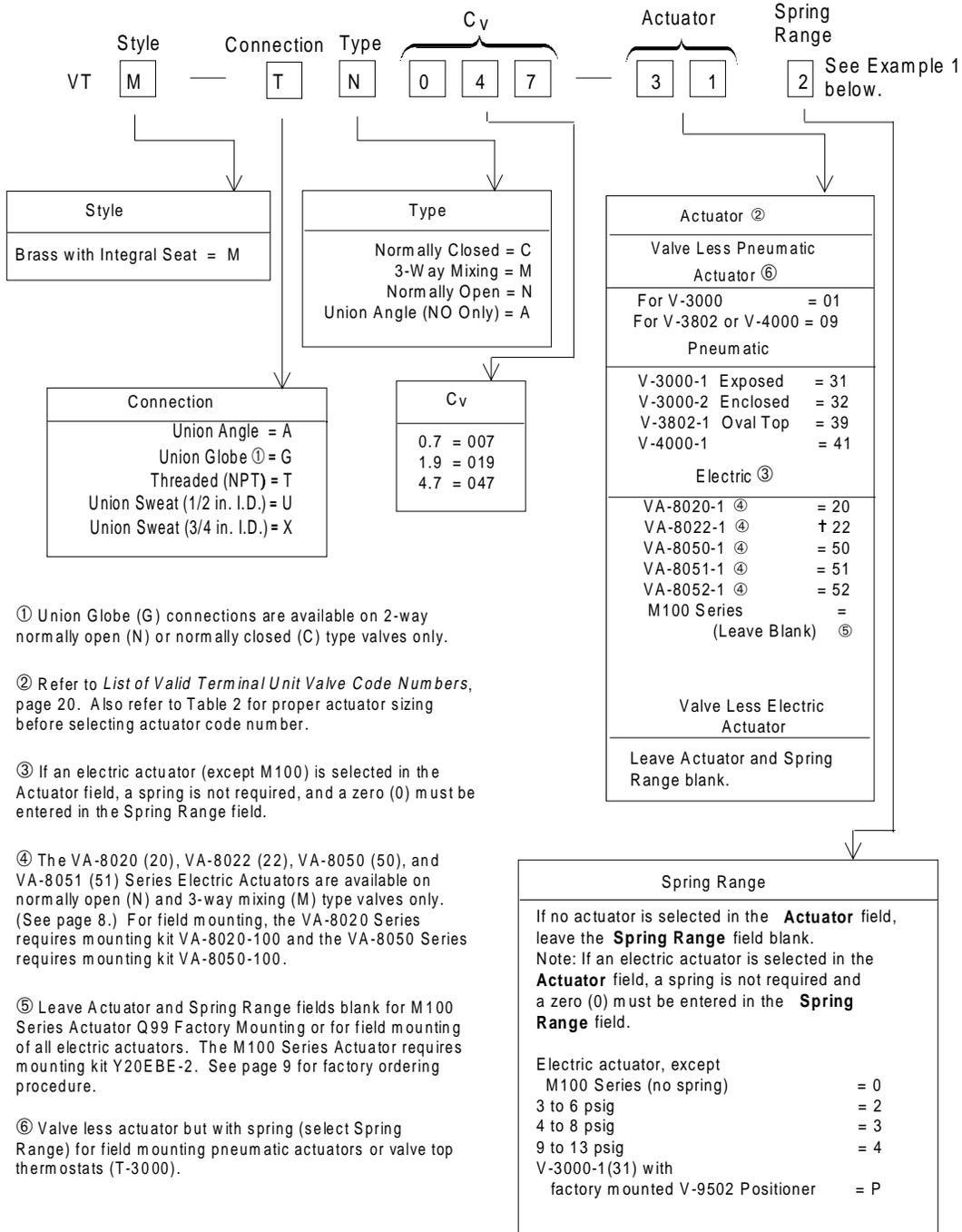
The valve and actuator provide a Push-Down-To-Close (PDTC) combination for normally open applications and a Push-Down-To-Open (PDTO) combination for normally closed applications.

The modulating valve plug(s) provides an equal percentage relationship between valve travel and flow at a constant pressure drop. A molded composition disc that provides tight shutoff is mechanically retained on the valve plug(s). An arrow is cast on one side of the valve body indicating the direction of flow for proper piping.

The ANSI 250 rating is also cast into the valve body to clearly identify the valve's certifiable pressure rating.

Use plumbing copper for all lines, not refrigerant copper, for sweat connections. VT Series valves with electric actuators are shipped in the open position. After installation the system can be flushed without having to open all the valves manually.

Table 1: Ordering Data



① Union Globe (G) connections are available on 2-way normally open (N) or normally closed (C) type valves only.

② Refer to *List of Valid Terminal Unit Valve Code Numbers*, page 20. Also refer to Table 2 for proper actuator sizing before selecting actuator code number.

③ If an electric actuator (except M100) is selected in the Actuator field, a spring is not required, and a zero (0) must be entered in the Spring Range field.

④ The VA-8020 (20), VA-8022 (22), VA-8050 (50), and VA-8051 (51) Series Electric Actuators are available on normally open (N) and 3-way mixing (M) type valves only. (See page 8.) For field mounting, the VA-8020 Series requires mounting kit VA-8020-100 and the VA-8050 Series requires mounting kit VA-8050-100.

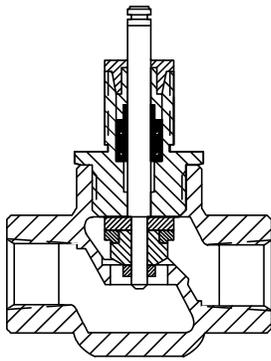
⑤ Leave Actuator and Spring Range fields blank for M100 Series Actuator Q99 Factory Mounting or for field mounting of all electric actuators. The M100 Series Actuator requires mounting kit Y20EBE-2. See page 9 for factory ordering procedure.

⑥ Valve less actuator but with spring (select Spring Range) for field mounting pneumatic actuators or valve top thermostats (T-3000).

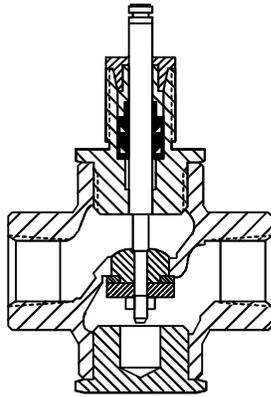
Example 1: To order a 1/2 inch, normally open, cast brass terminal unit valve, which features an integral seat, threaded connections, a Cv of 4.7, and an exposed style V-3000 Series Pneumatic Actuator with a 3 to 6 psig spring range, use product code no. VTM-TN047-312.

Example 2: To order a 1/2 inch, normally open, cast brass terminal unit valve, which features an integral seat, Union Globe connection, a Cv of 4.7 and a VA-8020 Series Electric Actuator, use product code no. VTM-GN047-200.

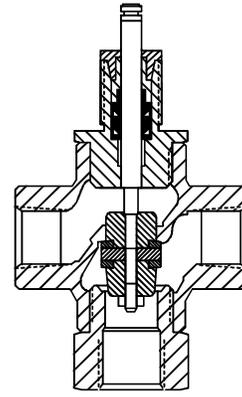
Example 3: To order a 1/2 inch, normally closed, cast brass terminal unit valve body only (no actuator), which features an integral seat, Union Sweat connections, and a Cv of 1.9, use product code no. VTM-UC019.



**NPT Normally Open
(Push Down to Close)**

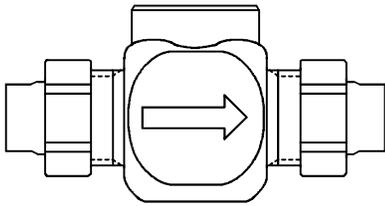


**NPT Normally Closed
(Push Down To Open)**

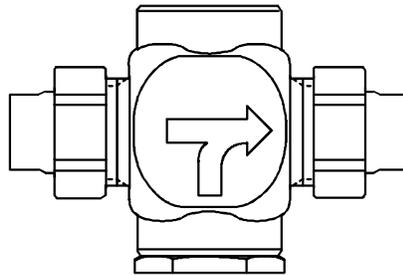


NPT 3-Way Mixing

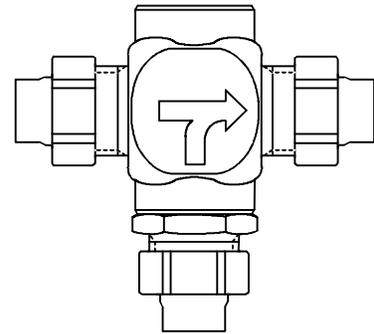
Figure 2: Internal Views of the VT Series Valve Body



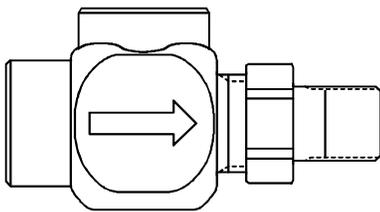
**Union Sweat
Normally Open
(Push Down to Close)**



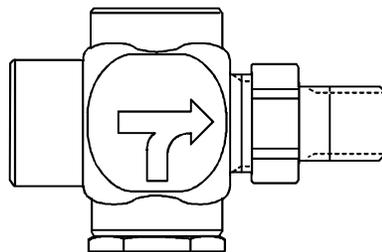
**Union Sweat
Normally Closed
(Push Down to Open)**



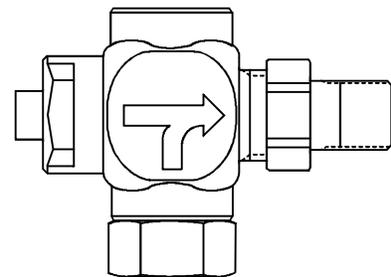
**Union Sweat
3-Way Mixing**



**Union Globe
Normally Open
(Push Down to Close)**



**Union Globe
Normally Closed
(Push Down to Open)**



**Union Angle
Normally Open
(Push Down to Close)**

Figure 3: End Connections Available for the VT Series Valve

Table 2: Pneumatic Actuator Sizing/Maximum Closeoff Pressures

Nominal Spring Range psig (kPa)	Supply Pressure psig (kPa)	2-Way psig (kPa)				3-Way psig (kPa)			
		Normally Open		Normally Closed **		Normally Open Port		Normally Closed Port **	
		Cv = 0.7	Cv = 1.9 or 4.7	Cv = 0.7	Cv = 1.9 or 4.7	Cv = 0.7	Cv = 1.9 or 4.7	Cv = 0.7	Cv = 1.9 or 4.7
V-3000 (31 and 32) Pneumatic Actuator—Effective Area 8 square inches (5,160 square millimeters)									
3 to 6 (21 to 42)	15 (105)	345* (2415)	180 (1260)	184 (1288)	52 (364)	345* (2415)	180 (1260)	184 (1288)	52 (364)
	20 (140)	345* (2415)	307 (2149)			345* (2415)	307 (2149)		
4 to 8 (28 to 56)	15 (105)	328 (2296)	130 (910)	290 (2030)	82 (574)	328 (2286)	130 (910)	290 (2030)	82 (574)
	20 (140)	345* (2415)	256 (1792)			345* (2415)	256 (1792)		
9 to 13 (63 to 91)	15 (105)	8 (56)	3 (21)	345 (2415)	232 (1624)	8 (56)	3 (21)	345 (2415)	232 (1624)
	20 (140)	328 (2296)	130 (910)			328 (2296)	130 (910)		
V-3802 (39) Pneumatic Actuator—Effective Area 4 square inches (2,580 square millimeters)									
3 to 6 (21 to 42)	15 (105)	168 (1176)	66 (462)	NA	NA	NA	NA	NA	NA
	20 (140)	328 (2296)	130 (910)	NA	NA	NA	NA	NA	NA
4 to 8 (28 to 56)	15 (105)	104 (728)	41 (287)	NA	NA	NA	NA	NA	NA
	20 (140)	264 (1848)	104 (728)	NA	NA	NA	NA	NA	NA
9 to 13 (63 to 91)	15 (105)	—	—	343 (2401)	97 (679)	NA	NA	343 (2401)	97 (679)
	20 (140)	104 (728)	41 (287)			104 (728)	41 (287)		
V-4000-1 (41) Pneumatic Actuator—Effective Area 4 square inches (2,580 square millimeters)									
3 to 6 (21 to 42)	15 (105)	168 (1176)	66 (462)	NA	NA	NA	NA	NA	NA
	20 (140)	328 (2296)	130 (910)	NA	NA	NA	NA	NA	NA
4 to 8 (28 to 56)	15 (105)	104 (728)	41 (287)	79 (553)	22 (154)	104 (728)	41 (287)	79 (553)	22 (154)
	20 (140)	264 (1848)	104 (728)			264 (1848)	104 (728)		
9 to 13 (63 to 91)	15 (105)	—	—	343 (2401)	97 (679)	—	—	343 (2401)	97 (679)
	20 (140)	104 (728)	41 (287)			104 (728)	41 (287)		

NA = Not Available

*Limited by body pressure rating. ** Normally Closed valve closeoff listings are given at 0 psig (0 kPa) supply pressure.

Note: Closeoff pressures listed are the maximum allowable that will maintain specified closeoff (seat) leakage rates when the valve is installed with pressure under the seat.

Table 3: Electric Actuator Sizing/Maximum Closeoff Pressures

2-Way psig (kPa)				3-Way psig (kPa)			
Push Down to Close		Push Down to Open		Push Down to Close Port		Push Down to Open Port	
Cv = 0.7	Cv = 1.9 or 4.7	Cv = 0.7	Cv = 1.9 or 4.7	Cv = 0.7	Cv = 1.9 or 4.7	Cv = 0.7	Cv = 1.9 or 4.7
Electric VA-8020 (20) and VA-8022 (22)--Output Force 22 lb (98 N)							
112 (784)	44 (388)	184 (1288)	52 (364)	112 (784)	44 (308)	184 (1288)	52 (364)
Electric VA-8050 (50), VA-8051 (51), and VA-8052 (52)--Output Force 50 lb (222 N)							
336 (2352)	133 (931)	345* (2415)	157 (1099)	336 (2352)	133 (931)	345* (2415)	157 (1099)
M110 with Y20EBD-5 Linkage--Output Force 40 lb (178 N)							
256 (1792)	101 (707)	345* (2415)	120 (840)	256 (1792)	101 (707)	345* (2415)	120 (840)
M120 or M130 with Y20EBD-1 Linkage--Output Force 75 lb (334 N)							
345* (2415)	212 (1484)	345* (2415)	250 (1750)	345* (2415)	212 (1484)	345* (2415)	250 (1750)
M120 or M130 with Y20EBD-6 Linkage--Output Force 100 lb (445 N)							
345* (2415)	291 (2037)	345* (2415)	344 (2408)	345* (2415)	291 (2037)	345* (2415)	344 (2408)

NA = Not Available

*Limited by body pressure rating.

Note: Closeoff pressures listed are the maximum allowable that will maintain specified closeoff (seat) leakage rates when the valve is installed with pressure under the seat

V Valve Actuator Selection (See Tables 1 through 3.)

V-3000 Series Pneumatic Actuators

Two models of V-3000 Series Pneumatic Actuators are available; the exposed model (31) is designed for installation in a protected location and the enclosed model (32) is designed for installation in a location where the actuator might be subjected to tampering. See Table 2 for actuator sizing selection. A V-9502 Series Valve Positioner can be ordered separately or factory mounted (3A) for use on the exposed model only in applications where sequential operation is desired or additional positioning power is necessary. The V-9502 Pneumatic Valve Actuator Positioner is a precision relay device designed to operate a valve actuator in applications requiring stable, accurate control. The positioner provides maximum positioning power to resist external forces, which might otherwise overcome the actuator. Refer to Table 4 for ordering information.

Both models of the V-3000 have a molded synthetic elastomer diaphragm design. This molded diaphragm provides a constant effective area throughout the valve stem stroke. All parts are protected by a sturdy die cast aluminum housing. The actuator assembly can be removed or repositioned by loosening a single set screw without disturbing the rest of the valve assembly.

V-3802 Series Pneumatic Oval Top Actuator

The V-3802 (39) Series Pneumatic Oval Top Actuator is specifically designed for use where mounting space is restricted. See Table 2 for actuator sizing selection. This comparatively small oval enclosed actuator has sufficient force to handle most seating pressures and features a die cast aluminum housing and a molded, synthetic elastomer diaphragm that provides a constant effective area throughout the valve stem stroke. Like the V-3000 Series Actuators, the V-3802 can be removed or repositioned by loosening a single set screw without disturbing the rest of the valve assembly.

V-4000 Actuators

The V-4000 (41) is a Small Pneumatic Actuator which can be factory or field mounted to VT valves. In addition to normally open valve type on all three spring ranges, this four square inch actuator is also available on normally closed and 3-way valves with 4-8 and 9-13 psig ranges. For sizing and spring range availability, see Table 2. It has a snap-on, hand tightened mounting that uses no set screw and requires no tools for mounting or removal. It is designed to replace V-3802 Oval Top Actuators. This small actuator has a sturdy glass-reinforced nylon housing. It is limited to 200°F (93°C) operating temperature. The fabric-reinforced synthetic rubber diaphragm provides a constant effective area throughout the valve stroke. Due to the simplicity of the design, it is more economical to replace the actuator than repair it. Therefore, no repair parts are needed or provided.

Table 4: Accessories (Order Separately)

Description	Code No.
Valve Position Indicator for V-3000-1 Exposed Style (31) Pneumatically Actuated Valves	V-3000-10
Valve Position Indicator for Electrically Actuated Valves w/ VA-805X Actuators only	VA-8000-102
Auxiliary Interface Board for Use with Electrically Actuated Valves Used in Conjunction with a DSC-8500	VA-8000-104
Steam Insulator Kit for Electrically Actuated Valves Used in Steam Applications with VA-805X Actuators only	VA-8000-101
Valve Positioner for Field Mounting to a V-3000-1 Exposed Style (31) Pneumatically Actuated Valve	V-9502-15
Valve Positioner Spring for V-3000-1 Exposed Style (31) Pneumatically Actuated Valves Utilizing a V-9502-15 Positioner [Span Equals 4.3 psi (30 kPa)]	V-9502-101
Mounting Kit for Shop or Field Coupling of a VA-8020-1 or VA-8022-1 Electric Actuator to a VT Series Terminal Unit Valve Body	VA-8020-100
Mounting Kit for Shop or Field Coupling of a VA-8050-1, VA-8051-1, or VA-8052-1 Electric Actuator to a VT Series Terminal Unit Valve Body	VA-8050-100
Mounting Kit for Shop or Field Coupling of an M100 Series Electric Actuator to a VT Series Terminal Unit Valve Body. Used with Y20EBD-1, -5, and -6 Linkage	Y20EBE-2

VA-8020 and VA-8022 Series Electric Actuators

The VA-8020 (20) and VA-8022 (22) Series Electric Actuators are synchronous motor-driven, force sensor limited, non-spring return actuators that feature a 22 pound seating force in a compact design. The VA-8020 (20) accepts floating control from a 3-wire, 24 VAC control signal. The VA-8022 (22) typically accepts proportional control from a 0 to 10 VDC control signal; however, it can be field adjusted to accept any signal up to 30 VDC. In addition, the VA-8022 (22) features an input signal reversing feature that, when combined with the VT Series Valve body, allows it to be used in both heating and cooling applications. Valve body can be ordered separately (e.g., VTM-TN047). See Actuator Selection field in Table 1 for electric actuator field mounting using kit VA-8020-100.

VA-8050, VA-8051, and VA-8052 Series Electric Actuators

The VA-8050 (50), VA-8051 (51), and VA-8052 (52) Series Electric Actuators are synchronous motor-driven, non-spring return actuators that feature a force sensing mechanism that assures a constant 50 pound seating force. The VA-8050 (50) accepts floating control and requires a 3-wire, 24 VAC control signal from a controller. The VA-8051 (51) accepts floating/incremental or proportional control with either a 3-wire, 24 VAC control signal or a ± 12 VDC signal from a DSC-8500. For DSC-8500 applications, a VA-8000-104 Auxiliary Interface Board (ordered separately, Table 4) is required. The VA-8051 (51) includes a 3400 ohm position feedback potentiometer for remote position indication to meters or as a position feedback to a DSC-8500. The VA-8052 (52) provides proportional control and requires a 2-wire, 0 to 10 VDC control signal and 24 VAC power. See Table 4 for field mounting accessories.

Valve Body Types for Electric Actuators

For floating/incremental signal, non-spring return, electric actuators VA-8020, VA-8050, and VA-8051, the push down to close (Normally Open – N) body type meets the needs of any HVAC application. Because of this, push down to open (Normally Closed – C) type is not available with these actuators.

For the VA-8052 proportional, non-spring return, electric actuator, Normally Open (N) and Normally Closed (C) body types are both available to suit cooling only and heating only HVAC control application respectively.

For the VA-8022 proportional actuator, only the Normally Open (N) type body is available because the input signal reversing feature accommodates both heating and cooling HVAC applications.

M100 Electric Actuators

M100 Series Electric Actuators are rotary actuators which, coupled with a Y20EBD-X linkage kit and using a Y20EBE-2 mounting kit, can be mounted on a VT valve. The actuator can be adjusted for the desired closeoff pressure on the valve (see Table 3).

Table 5: M100 Electric Actuator Models

Actuator	Type	Linkage	Mounting Kit
M110	Spring Return	Y20EBD-5	Y20EBE-2
M120	Non Spring Return	Y20EBD-1	Y20EBE-2
M130	Spring Return	Y20EBD-1	Y20EBE-2
M120	Non Spring Return	Y20EBD-6	Y20EBE-2
M130	Spring Return	Y20EBD-6	Y20EBE-2

The M120 is a non-spring return actuator which will hold its position when de-energized. The M110 and M130 are spring return actuators which will return the valve to its normal operating position when de-energized.

The actuator can be mounted for stem up or stem down operation, push down to close, push down to open, pull up to close, or pull up to open. On 3-way valves, the seating force can be applied on both the up and the down stroke.

Through selection of plug-in electronic boards, the M100 Series actuator is compatible with all Johnson Controls controllers and can provide proportional action on-off (floating), potentiometer, and Metasys as well as control by direct digital input from C500 or Metasys Zone Bus controllers. The M100 Series actuator requires 25 VA from a 24 VAC, 50/60 Hz power supply.

Factory assembly of M100 Series actuators to VT valves is available using Q99 ordering codes as follows:

Table 6: Q99 Ordering Codes

Code	Valve	Valve Type
Q99ADN-1	VTM-XCXXX VTM-XNXXX	2-Way Valves, Stem Down
Q99ADN-3	VTM-XMXXX	3-Way Valves, Stem Down
Q99AUP-1	VTM-XCXXX VTM-XNXXX	2-Way Valves, Stem Up
Q99AUP-3	VTM-XMXXX	3-Way Valves, Stem Up

Example of factory ordering procedure is as follows (order must be given in this sequence for factory to assemble it):

Table 7: Factory Ordering Procedure

Item	Description	Code Number
1	Valve Body	VTM-TN019
2	M100 Actuator	M110AAB-1
3	Linkage	Y20EBD-5
4	Mounting Kit	Y20EBE-2
5	Assembly Code	Q99ADN-1

See Table 4 for field mounting accessories.

No Actuator for Pneumatic Actuator Field Mounting

Valve less actuator for field mounting of V-3000-1 (01X), V-3000-2 (01X), V-3802-1 (09X), and V-4000-1 (09X). Also, for field replacement of valves with valve top thermostats such as T-3000 Series (01X). Permits field mounting reusing existing actuators. It is necessary to specify spring range and actuator type (01X or 09X) as this option will be supplied with spring intact.

No Actuator for Electric Actuator Field Mounting

Order valve with code number developed from Tables 1 through 3 leaving actuator field blank. The valve is supplied with universal actuator mounting bonnet and slotted-top stem. Field or shop mounting of electric actuators requires actuator mounting kits per the following table:

Table 8: Actuator Mounting Kits

Actuator	Linkage	Mounting Kit	Valve
M110XXX	Y20EBD-5	Y20EBE-2	VTM-XXXXX
M120XXX	Y20EBD-1	Y20EBE-2	VTM-XXXXX
M130XXX	Y20EBD-1	Y20EBE-2	VTM-XXXXX
M120XXX	Y20EBD-6	Y20EBE-2	VTM-XXXXX
M130XXX	Y20EBD-6	Y20EBE-2	VTM-XXXXX
VA-8020	--	VA-8020-100	VTM-XXXXX
VA-8022	--	VA-8020-100	VTM-XXXXX
VA-8050①	--	VA-8050-100	VTM-XXXXX
VA-8051①	--	VA-8050-100	VTM-XXXXX
VA-8052①	--	VA-8050-100	VTM-XXXXX

① For steam applications, order Steam Insulator Kit VA-8000-101.

Operation

V-3000 (31 or 32), V-3802 (39), or V-4000 (41) Actuated Valves

Air pressure from a pneumatic controller is applied to the diaphragm of the actuator, which moves the piston against the forces of the internal spring and the fluids. The piston will move the valve plugs to a position where the diaphragm pressure and the spring force balance against the fluid forces. These fluid forces will cause the operating range to shift from the nominal spring range. Reducing the air pressure to the diaphragm of the actuator allows the spring to return the valve plug to its normal position.

VA-8020 (20) Actuated Valves

The VA-8020 (20) actuated valve operates on a 24 VAC control signal from a compatible controller. Recommended system controllers include the DSC-8500 and the Metasys C210 Digital Controller.

The controller sends a 24 VAC signal to either the up (valve stem extended) or down (valve stem retracted) wire on the actuator depending on the desired movement of the valve. This signal drives the actuator motor, causing the valve stem to move in the desired direction. Once the valve closes, a shutoff force builds up. When this force reaches 22 pounds, a lever within the actuator trips a force sensor, which stops the motor.

Field calibration of the force sensor is not required. The actuator maintains the shutoff force even if power to the controller is lost. When the controller signals the valve to move in the opposite direction, the shutoff force is reduced and the valve modulates. The drive up/drive down (stem up/stem down) action of the valve can be reversed by switching the leads from the controller.

Valve stem positioning can be accomplished manually by turning the adjustment knob on the lower right portion of the actuator. Rotating the manual adjustment knob counterclockwise moves the valve stem up. In the event of power outage or signal loss, the actuator maintains the last valve position (default state).

VA-8022 (22) Actuator Valves

The VA-8022 (22) actuated valve operates on 24 VAC power and requires a 0 to 10 VDC control signal from a compatible controller. Recommended system controllers include the DSC-8500 and the Metasys C210 Digital Controller.

The actuator uses the voltage level on the control signal to accurately position the valve. The controller sends a DC voltage signal to the input terminal on the actuator circuit board. This signal causes the valve stem to move in the appropriate direction until its position (as sensed by the feedback potentiometer) reaches the position commanded by the controller. The span and offset potentiometers of the actuator can be adjusted in the field to fine-tune the modulation range of the actuator to the specific controller's signal level.

Once the valve stem reaches the end of travel, a shutoff force builds up. When this force reaches 22 pounds, a lever within the actuator trips a force sensor, which stops the motor. When the controller signals the valve to move in the opposite direction, the shutoff force is reduced and the valve modulates.

Field calibration of the force sensor is not required. In the event of control signal loss, the actuator moves to the zero voltage input position: valve stem up in the Drive-Down (DD) mode or valve stem down in the Drive-Up (DU) mode. The drive-up/drive-down action of the valve can be reversed by moving the DU/DD jumper on the circuit board.

Valve stem positioning can be accomplished manually by turning the adjustment knob on the lower right portion of the actuator. Rotating the manual adjustment knob counterclockwise moves the valve stem up. The actuator maintains the shutoff force even if power to the controller is lost (default state).

VA-8050 (50) and VA-8051 (51) Actuated Valves

The VA-8050 (50) and VA-8051 (51) actuated valves operate on a 24 VAC control signal from a compatible controller. Recommended system controllers for the VA-8050 (50) include the DSC-8500 and the Metasys C210 Digital Controller. Recommended system controllers for the VA-8051 (51) include the DSC-8500 and the C210 Digital Controller.

The controller sends a 24 VAC signal to the up or down terminal on the circuit board depending on the desired movement of the valve. This signal causes the motor to rotate in the proper direction and, through the lead screw and lever, move the valve stem and plug assembly up or down. When the controller stops sending a signal, the valve stem and plug assembly remains in place.

When the controller closes the valve, a shutoff force will build up. When this force reaches 50 pounds, the lever activates a force sensor, which stops the motor. Field calibration of the force sensor is not required. The actuator maintains the shutoff force even if power to the controller is lost. When the controller signals the valve to move in the opposite direction, the shutoff force will be reduced and the valve will modulate.

On VA-8051 (51) actuated valves, an internal position feedback potentiometer is connected to the R, W, and S terminals. Specifically, the wiper is connected to W. The wiper will be at the R end when the actuator is retracted and at the S end when the actuator is fully stroked.

VA-8052 (52) Actuated Valves

The VA-8052 (52) actuated valve operates on 24 VAC power and a 0 to 10 VDC control signal from a compatible controller. Recommended system controllers include the Metasys C210 Digital Controller and the DSC-8500.

The controller sends a voltage signal (typically 0 to 10 VDC) to the COM (common) and IN (input) terminals on the actuator circuit board, depending on the desired position of the valve. This signal is compared to the actual valve position via the integral feedback potentiometer. The internal circuit then causes the motor to rotate in the proper direction and, via the lead screw and lever, move the valve stem and plug assembly to the position called for by the input signal.

When the controller closes the valve, a shutoff force builds up. When this force reaches 50 pounds, the lever activates a force sensor which stops the motor. Field calibration of the force sensor is not required. The actuator maintains the shutoff force even if power to the controller is lost. When the controller signals the valve to move in the opposite direction, the shutoff force is reduced and the valve modulates.

M100 Series Actuated Valves

The M100 Series actuated valve operates on 24 volts AC and is available with On-Off/floating control action or proportional control action. The actuator is spring return to normal position on loss of power. The M100 Series is Metasys compatible and will work with any Johnson Controls controller.

The controller sends a signal to the actuator dependent on the desired movement of the valve. This signal causes the motor to rotate in the proper direction and, through the rack and pinion, drive the valve stem and plug assembly up or down. When the controller stops sending a signal, the valve stem and plug assembly remains in place. When the controller closes the valve, it applies the set spring load to the valve stem at the actuator's end of travel. On 3-way valves, the preset spring load is applied at both ends of travel. On loss of power, the actuator will return to its normal position and apply the set load to the valve stem in that position.

Installation

It is recommended that the VT Series Valve be mounted in an upright position in a conveniently accessible location. Sufficient clearance must be allowed for actuator removal. (See Table 9 and Figures 4 through 8.) The valve must be piped with the flow(s) in the direction(s) indicated by the arrow(s), so that the plug seats against the flow.

Union sweat fittings are furnished finger tight.

Remove the fitting from the valve and sweat onto the line. Then mount the valve on the fittings.

On electrically actuated valve assemblies, all wiring must be in accordance with applicable electrical code requirements. Input lines to the actuator must be wired correctly for the valve to move in the proper direction.

When used with V-3000 pneumatic actuators, field adjustments for accurate sequencing with other valves can be made to “fine tune” the actuator. Turning the actuator lower spring seat will compress or extend the spring to change the setting of the valve. Turning the lower spring seat counterclockwise (looking down on the actuator) will raise the diaphragm pressure required to start to move the valve; clockwise will lower this setting. Table 10 gives the adjustment ratio for V-3000 actuators used on VT valves.

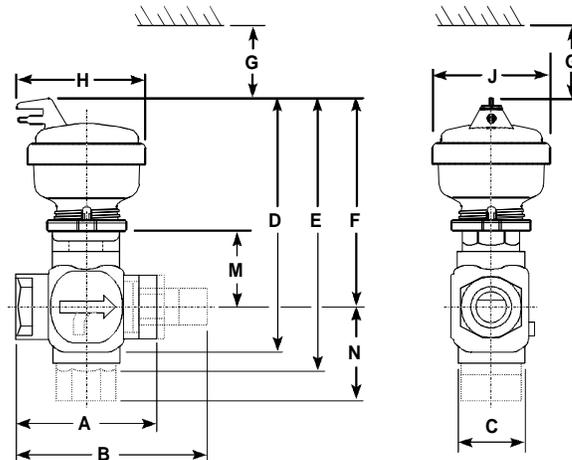


Figure 4: VT Series Valve with V-4000-1 (41) Pneumatic Actuator ①

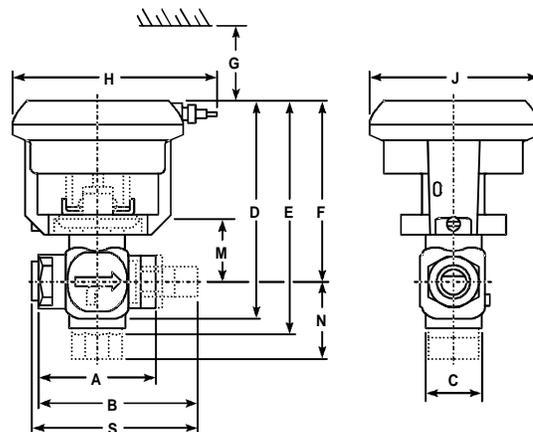


Figure 5: VT Series Valve with V-3000-1 (31) or V-3000-2 (32) Pneumatic Actuator ①

① See Table 9 for dimensions. See Figure 9 for Union Sweat Connection dimensions.

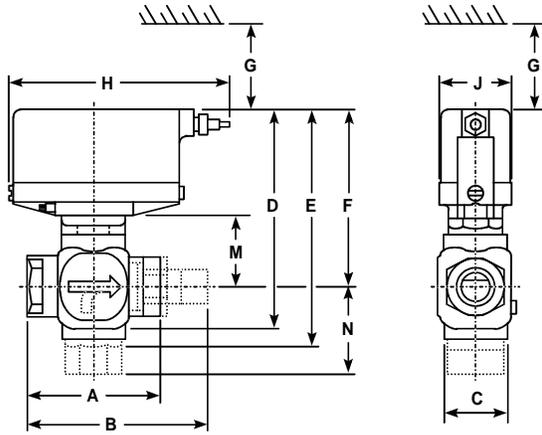


Figure 6: VT Series Valve with V-3802-1 (39) Pneumatic Actuator ①

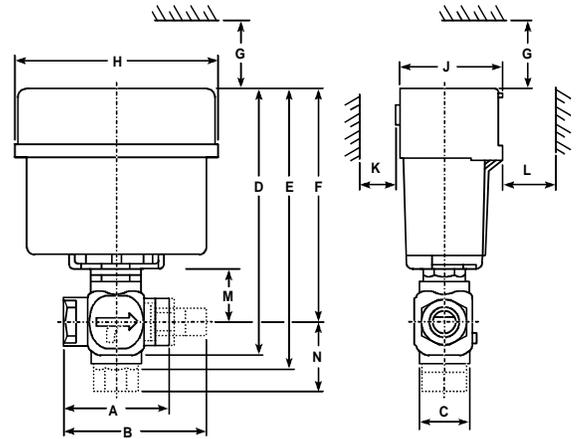


Figure 7: VT Series Valve with Electric Actuator (20, 22, 50, 51 or 52) ①

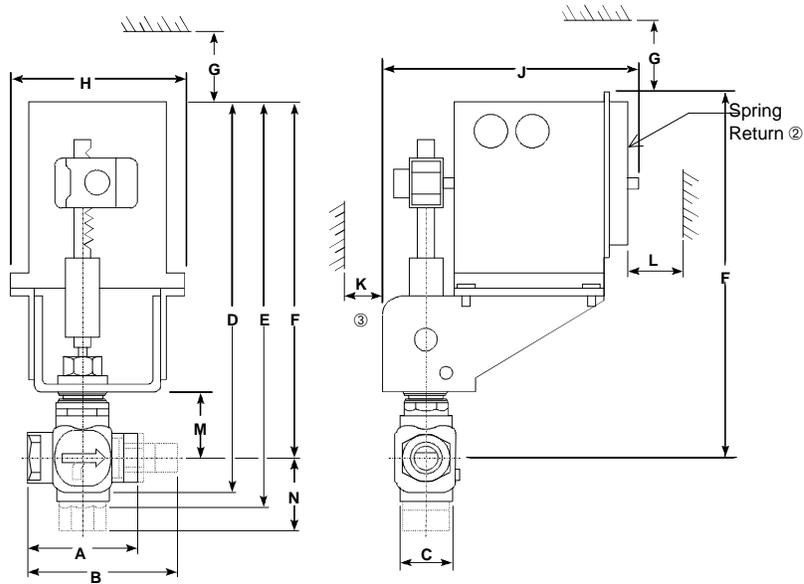


Figure 8: VT Series Valve with M100 Electric Actuator ①

① See Table 9 for dimensions. See Figure 9 for Union Sweat Connection dimensions.

② Subtract 0.77 inches (19.6 mm) for no spring return.

③ Front must be accessible.

Table 9: VT Series Dimensions

Actuator Type (Code)	Dimensions, in. (mm)							
	A	B Union Globe	C	D 2-Way N.O.	E 2-Way N.C.	F	G ①③⑤	H
V-3000-1 (31) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	5-3/4 (146)	6-7/32 (158)	4-13/16 (122)	3-5/8 (92)	5-1/4 (133)
V-3000-2 (32) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	6-3/8 (162)	6-27/32 (174)	5-7/16 (138)	3-5/8 (92)	4-1/2 (114)
V-3802-1 (39) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	5-3/16 (132)	5-21/32 (144)	4-1/4 (108)	3-1/4 (82)	4-31/32 (126)
V-4000-1 (41) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	5-25/32 (147)	6-1/4 (159)	4-27/32 (123)	3-1/4 (83)	2-27/32 (72)
VA-8020-1 (20) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	7-1/8 (181)	7-19/32 (193)	6-3/16 (157)	1-1/2 (38)	5 (127)
VA-8022-1 (22) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	7-1/8 (181)	7-19/32 (193)	6-3/16 (157)	1-1/2 (38)	5 (127)
VA-8050-1 (50) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	8 (203)	8-15/32 (215)	7-1/16 (179)	5-1/2 (140)	6-1/32 (153)
VA-8051-1 (51) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	8 (203)	8-15/32 (215)	7-1/16 (179)	5-1/2 (140)	6-1/32 (153)
VA-8052-1 (52) ⑧	3 (76)	4-1/16 (103)	1-17/32 (39)	8 (203)	8-15/32 (215)	7-1/16 (179)	5-1/2 (140)	6-1/32 (153)
M100	3 (76)	4-1/16 (103)	1-17/32 (39)	11-5/32 (283)	11-5/8 (295)	10-3/16 (259)	7 (178)	5-21/32 (143)
No Actuator	3 (76)	4-1/16 (103)	1-17/32 (39)	5-3/32 (129)	5-9/16 (141)	—	—	—

Continued on next page . . .

Actuator Type (Code)	Dimensions, in. (mm) (Cont.)							
	J	K ②	L ③ ⑤	M ④	N 3-Way Mixing NPT	P Union Sweat ⑥	R Union Sweat 3-Way ⑦	S Union Angle Body
V-3000-1 (31) ⑧	4-7/16 (113)	—	—	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
V-3000-2 (32) ⑧	3-23/32 (94)	—	—	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
V-3802-1 (39) ⑧	1-5/8 (41)	—	—	2-3/32 (53)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
V-4000-1 (41) ⑧	2-27/32 (72)	—	—	2-3/32 (53)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
VA-8020-1 (20) ⑧	2-1/2 (65)	—	6 (152)	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
VA-8022-1 (22) ⑧	2-1/2 (65)	—	6 (152)	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
VA-8050-1 (50) ⑧	3-3/32 (79)	1-1/4 (32)	3 (76)	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
VA-8051-1 (51) ⑧	3-3/32 (79)	1-1/4 (32)	3 (76)	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
VA-8052-1 (52) ⑧	3-3/32 (79)	1-1/4 (32)	3 (76)	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
M100	9-3/16 (234)	4 (102)	1 (25)	1-23/32 (44)	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)
No Actuator	—	—	—	—	1-31/32 (50)	4-3/16 (106)	2-17/32 (64)	1-7/8 (48)

① Minimum top clearance for actuator cover removal for VA-8050-1 (50), VA-8051-1 (51), and VA-8052-1 (52);
Minimum top clearance for complete actuators removal for all other models.

② Minimum side clearance for complete actuator removal.

③ Minimum side clearance for actuator cover removal.

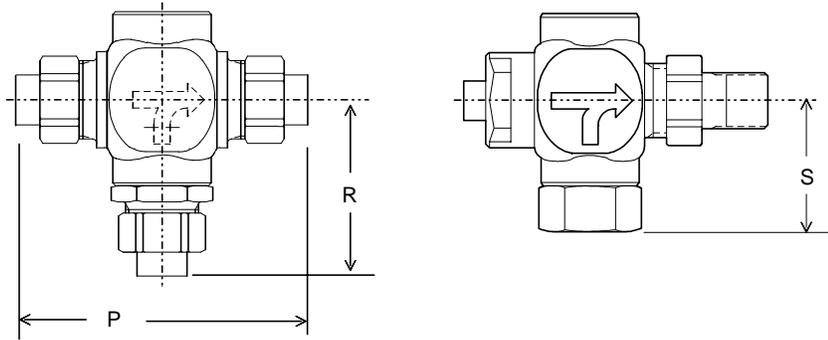
④ Dimension is measured to top of mounting plate.

⑤ Either minimum top clearance (G) or minimum side clearance (L) is required--not both.

⑥ Shown for 1/2 in. I.D. ends: P = 4-25/32 in. (121 mm) for 3/4 in. I.D. expanded ends (X).

⑦ Shown for 1/2 in. I.D. ends: R = 2-13/16 in. (72 mm) for 3/4 in. I.D. expanded ends (X).

⑧ See Table 1 for Actuator Code.



Union Sweat

Union Angle

Figure 9: VT Series Valve Union Sweat Connections

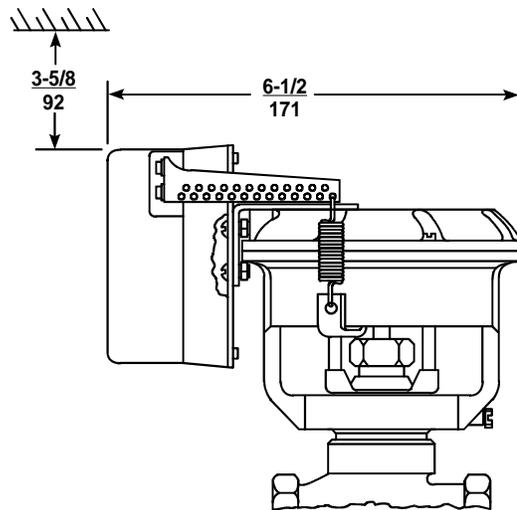


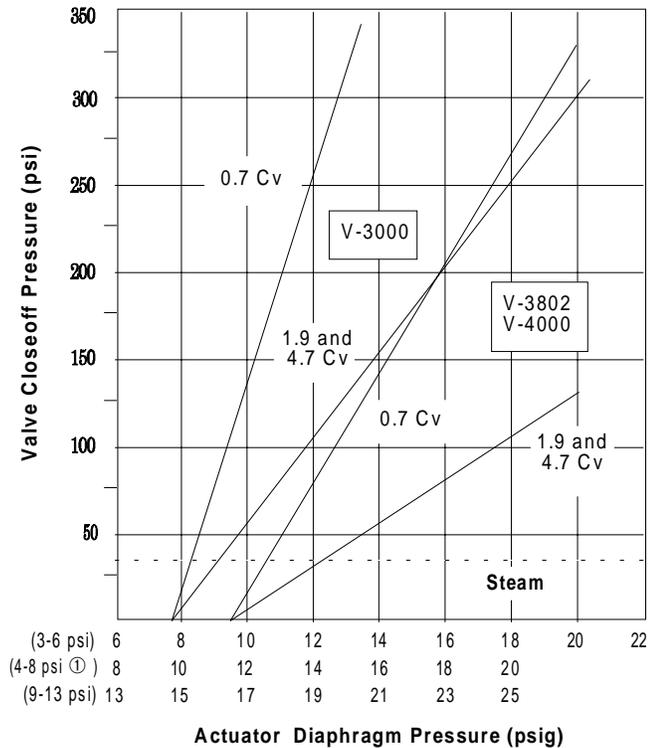
Figure 10: V-9502 Positioner Mounted on a V-3000-1 Exposed Style (31) Pneumatically Actuated Valve

Table 10: Spring Adjustment Ratios

Valve	Actuator	Spring Size, PSI ①	Adjustment Ratio ②
VT	V-3000	3-6	0.53
VT	V-3000	4-8	0.71
VT	V-3000	9-13	0.71

Refer to the installation instructions included with each VT Series Valve for additional piping, wiring, and mounting details.

- ① The spring range is specified by the diaphragm pressure at the top of the stroke and the bottom of the stroke.
- ② The Adjustment Ratio is given as changes in diaphragm pressure (psig) per turn of the lower spring seat.
- ③ The spring assembly used for the V-3802 and V-4000 actuators **can not** be adjusted.



① V-3802 is not available with 4-8 psi spring.

Figure 11: Closeoff Pressures
2-Way Normally Open or 3-Way Normally Open Port Valve with
V-3000-1 (31), V-3000-2 (32), V-3802-1 (39), or V-4000-1 (41) Pneumatic Actuator

Repair Information

The only accessories and maintenance parts available for the VT Series Terminal Unit Valve are replacement spring kits, packings, and packing nut. Refer to Table 11 for ordering details. Other than the packings, field repairs must not be made. For a replacement VT Series Valve, contact the nearest Johnson Controls branch office or distributor.

For a list of available repair parts for the various actuators used with the VT Series Valve, refer to the appropriate actuator product bulletin.

Table 11: VT Series Valve Accessories and Maintenance Parts

Item	Code Number	Description
Spring Kits	V-9999-6001*	Spring kit, 3-6 psig, 5/16 in. stroke, for VT Valve with V-3802 or V-4000 Actuator.
	V-9999-6002*	Spring kit, 4-8 psig, 5/16 in. stroke, for VT Valve with V-3802 or V-4000 Actuator.
Packing Nut	V-9999-649	Packing Nut for all VT styles
Ring Packing	V-9999-608**	Single Pack
	V-9999-610**	10-Pack (Contains enough materials to repack 10 valves)
	V-9999-630***	50-Pack (Contains u-cups and o-rings only to repack 50 valves)

* Spring kit contains: spring, upper spring plate, retainer, and instructions.

** Packing kit contains: O-rings, crocus cloth, assembly tool, gland nut liner, guide, extractor/installer, ring pack assembly, follower, grease, and instructions.

*** Silicone grease is not included in this kit; order V-999-606 separately.

Note: For a list of available repair parts for the various actuators used with the VT Series Valve, refer to the appropriate actuator product bulletin.

List of Valid Terminal Unit Valve Code Numbers

Union Angle (NO) 0.7 C_v

VTM-AA007
VTM-AA007-012
VTM-AA007-013
VTM-AA007-014
VTM-AA007-092
VTM-AA007-093
VTM-AA007-094
VTM-AA007-200
VTM-AA007-220
VTM-AA007-312
VTM-AA007-313
VTM-AA007-314
VTM-AA007-31P
VTM-AA007-322
VTM-AA007-323
VTM-AA007-324
VTM-AA007-392
VTM-AA007-393
VTM-AA007-394
VTM-AA007-412
VTM-AA007-413
VTM-AA007-414
VTM-AA007-500
VTM-AA007-510
VTM-AA007-520

Union Angle (NO) 1.9 C_v

VTM-AA019
VTM-AA019-012
VTM-AA019-013
VTM-AA019-014
VTM-AA019-092
VTM-AA019-093
VTM-AA019-094
VTM-AA019-200
VTM-AA019-220
VTM-AA019-312
VTM-AA019-313
VTM-AA019-314
VTM-AA019-31P
VTM-AA019-322
VTM-AA019-323
VTM-AA019-324
VTM-AA019-392
VTM-AA019-393
VTM-AA019-394

VTM-AA019-412
VTM-AA019-413
VTM-AA019-414
VTM-AA019-500
VTM-AA019-510
VTM-AA019-520

Union Angle (NO) 4.7 C_v

VTM-AA047
VTM-AA047-012
VTM-AA047-013
VTM-AA047-014
VTM-AA047-092
VTM-AA047-093
VTM-AA047-094
VTM-AA047-200
VTM-AA047-220
VTM-AA047-312
VTM-AA047-313
VTM-AA047-314
VTM-AA047-31P
VTM-AA047-322
VTM-AA047-323
VTM-AA047-324
VTM-AA047-392
VTM-AA047-393
VTM-AA047-394
VTM-AA047-412
VTM-AA047-413
VTM-AA047-414
VTM-AA047-500
VTM-AA047-510
VTM-AA047-520

Union Globe (NC) 0.7 C_v

VTM-GC007
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VTM-GC007-013
VTM-GC007-014
VTM-GC007-094
VTM-GC007-312
VTM-GC007-313
VTM-GC007-314
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VTM-GC007-324

VTM-GC007-394
VTM-GC007-413
VTM-GC007-414
VTM-GC007-520

Union Globe (NC) 1.9 C_v

VTM-GC019
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VTM-GC019-014
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VTM-GC019-313
VTM-GC019-314
VTM-GC019-31P
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VTM-GC019-323
VTM-GC019-324
VTM-GC019-394
VTM-GC019-413
VTM-GC019-414
VTM-GC019-520

Union Globe (NC) 4.7 C_v

VTM-GC047
VTM-GC047-012
VTM-GC047-013
VTM-GC047-014
VTM-GC047-094
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VTM-GC047-313
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VTM-GC047-324
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VTM-GC047-413
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VTM-GC047-520

Union Globe (NO) 0.7 C_v

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VTM-GN007-013
VTM-GN007-014

VTM-GN007-092
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VTM-GN007-094
VTM-GN007-200
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VTM-GN007-323
VTM-GN007-324
VTM-GN007-392
VTM-GN007-393
VTM-GN007-394
VTM-GN007-412
VTM-GN007-413
VTM-GN007-414
VTM-GN007-500
VTM-GN007-510
VTM-GN007-520

Union Globe (NO) 1.9 C_v

VTM-GN019
VTM-GN019-012
VTM-GN019-013
VTM-GN019-014
VTM-GN019-092
VTM-GN019-093
VTM-GN019-094
VTM-GN019-200
VTM-GN019-220
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VTM-GN019-314
VTM-GN019-31P
VTM-GN019-322
VTM-GN019-323
VTM-GN019-324
VTM-GN019-392
VTM-GN019-393
VTM-GN019-394
VTM-GN019-412
VTM-GN019-413
VTM-GN019-414
VTM-GN019-500
VTM-GN019-510
VTM-GN019-520

Union Globe (NO)
4.7 C_v

VTM-GN047
VTM-GN047-012
VTM-GN047-013
VTM-GN047-014
VTM-GN047-092
VTM-GN047-093
VTM-GN047-094
VTM-GN047-200
VTM-GN047-220
VTM-GN047-312
VTM-GN047-313
VTM-GN047-314
VTM-GN047-31P
VTM-GN047-322
VTM-GN047-323
VTM-GN047-324
VTM-GN047-392
VTM-GN047-393
VTM-GN047-394
VTM-GN047-412
VTM-GN047-413
VTM-GN047-414
VTM-GN047-500
VTM-GN047-510
VTM-GN047-520

Threaded (NC)
0.7 C_v

VTM-TC007
VTM-TC007-012
VTM-TC007-013
VTM-TC007-014
VTM-TC007-094
VTM-TC007-312
VTM-TC007-313
VTM-TC007-314
VTM-TC007-31P
VTM-TC007-322
VTM-TC007-323
VTM-TC007-324
VTM-TC007-394
VTM-TC007-413
VTM-TC007-414
VTM-TC007-520

Threaded (NC)
1.9 C_v

VTM-TC019
VTM-TC019-012
VTM-TC019-013
VTM-TC019-014

VTM-TC019-094
VTM-TC019-312
VTM-TC019-313
VTM-TC019-314
VTM-TC019-31P
VTM-TC019-322
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VTM-TC019-324
VTM-TC019-394
VTM-TC019-413
VTM-TC019-414
VTM-TC019-520

Threaded (NC)
4.7 C_v

VTM-TC047
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VTM-TC047-013
VTM-TC047-014
VTM-TC047-094
VTM-TC047-312
VTM-TC047-313
VTM-TC047-314
VTM-TN019-314
VTM-TC047-31P
VTM-TC047-322
VTM-TC047-323
VTM-TC047-324
VTM-TC047-394
VTM-TC047-413
VTM-TC047-414
VTM-TC047-520

Threaded (Mixing)
0.7 C_v

VTM-TM007
VTM-TM007-012
VTM-TM007-013
VTM-TM007-014
VTM-TM007-094
VTM-TM007-200
VTM-TM007-220
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VTM-TM007-313
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VTM-TM007-324
VTM-TM007-394
VTM-TM007-413
VTM-TM007-414
VTM-TM007-500
VTM-TM007-510

VTM-TM007-520

Threaded (Mixing)
1.9 C_v

VTM-TM019
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VTM-TM019-014
VTM-TM019-094
VTM-TM019-200
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VTM-TM019-313
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VTM-TM019-324
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VTM-TM019-510
VTM-TM019-520

Threaded (Mixing)
4.7 C_v

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VTM-TM047-014
VTM-TM047-094
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VTM-TM047-413
VTM-TM047-414
VTM-TM047-500
VTM-TM047-510
VTM-TM047-520

Threaded (NO)
0.7 C_v

VTM-TN007
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VTM-TN007-013
VTM-TN007-014
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VTM-TN007-093
VTM-TN007-094
VTM-TN007-200
VTM-TN007-220
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VTM-TN007-414
VTM-TN007-500
VTM-TN007-510
VTM-TN007-520

Threaded (NO)
1.9 C_v

VTM-TN019
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VTM-TN019-013
VTM-TN019-014
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VTM-TN019-093
VTM-TN019-094
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VTM-TN019-394
VTM-TN019-412
VTM-TN019-413
VTM-TN019-414
VTM-TN019-500
VTM-TN019-510
VTM-TN019-520

**Threaded (NO)
4.7 C_v**

VTM-TN047
VTM-TN047-012
VTM-TN047-013
VTM-TN047-014
VTM-TN047-092
VTM-TN047-093
VTM-TN047-094
VTM-TN047-200
VTM-TN047-220
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VTM-TN047-314
VTM-TN047-31P
VTM-TN047-322
VTM-TN047-323
VTM-TN047-324
VTM-TN047-392
VTM-TN047-393
VTM-TN047-394
VTM-TN047-412
VTM-TN047-413
VTM-TN047-414
VTM-TN047-500
VTM-TN047-510
VTM-TN047-520

**Union Sweat 1/2 in.
(NC) 0.7 C_v**

VTM-UC007
VTM-UC007-012
VTM-UC007-013
VTM-UC007-014
VTM-UC007-094
VTM-UC007-312
VTM-UC007-313
VTM-UC007-314
VTM-UC007-31P
VTM-UC007-322
VTM-UC007-323
VTM-UC007-324
VTM-UC007-394
VTM-UC007-413
VTM-UC007-414
VTM-UC007-520

**Union Sweat 1/2 in.
(NC) 1.9 C_v**

VTM-UC019

VTM-UC019-012
VTM-UC019-013
VTM-UC019-014
VTM-UC019-094
VTM-UC019-312
VTM-UC019-313
VTM-UC019-314
VTM-UC019-31P
VTM-UC019-322
VTM-UC019-323
VTM-UC019-324
VTM-UC019-394
VTM-UC019-413
VTM-UC019-414
VTM-UC019-520

**Union Sweat 1/2 in.
(NC) 4.7 C_v**

VTM-UC047
VTM-UC047-012
VTM-UC047-013
VTM-UC047-014
VTM-UC047-094
VTM-UC047-312
VTM-UC047-313
VTM-UC047-314
VTM-UC047-31P
VTM-UC047-322
VTM-UC047-323
VTM-UC047-324
VTM-UC047-394
VTM-UC047-413
VTM-UC047-414
VTM-UC047-520

**Union Sweat 1/2 in.
(Mixing) 0.7 C_v**

VTM-UM007
VTM-UM007-012
VTM-UM007-013
VTM-UM007-014
VTM-UM007-094
VTM-UM007-200
VTM-UM007-220
VTM-UM007-312
VTM-UM007-313
VTM-UM007-314
VTM-UM007-31P
VTM-UM007-322
VTM-UM007-323
VTM-UM007-324
VTM-UM007-394
VTM-UM007-413
VTM-UM007-414
VTM-UM007-500

VTM-UM007-510
VTM-UM007-520

**Union Sweat 1/2 in.
(Mixing) 1.9 C_v**

VTM-UM019
VTM-UM019-012
VTM-UM019-013
VTM-UM019-014
VTM-UM019-094
VTM-UM019-200
VTM-UM019-220
VTM-UM019-312
VTM-UM019-313
VTM-UM019-314
VTM-UM019-31P
VTM-UM019-322
VTM-UM019-323
VTM-UM019-324
VTM-UM019-394
VTM-UM019-413
VTM-UM019-414
VTM-UM019-500
VTM-UM019-510
VTM-UM019-520

**Union Sweat 1/2 in.
(Mixing) 4.7 C_v**

VTM-UM047
VTM-UM047-012
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VTM-UM047-014
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VTM-UM047-324
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VTM-UM047-413
VTM-UM047-414
VTM-UM047-500
VTM-UM047-510
VTM-UM047-520

**Union Sweat 1/2 in.
(NO) 0.7 C_v**

VTM-UN007
VTM-UN007-012

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VTM-UN007-094
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VTM-UN007-394
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**Union Sweat 1/2 in.
(NO) 1.9 C_v**

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**Union Sweat 1/2 in.
(NO) 4.7 C_v**

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VTM-UN047-394
VTM-UN047-412
VTM-UN047-413
VTM-UN047-414
VTM-UN047-500
VTM-UN047-510
VTM-UN047-520

**Union Sweat 7/8 in.
(NC) 0.7 C_v**

VTM-XC007
VTM-XC007-012
VTM-XC007-013
VTM-XC007-014
VTM-XC007-094
VTM-XC007-312
VTM-XC007-313
VTM-XC007-314
VTM-XC007-31P
VTM-XC007-322
VTM-XC007-323
VTM-XC007-324
VTM-XC007-394
VTM-XC007-413
VTM-XC007-414
VTM-XC007-520

**Union Sweat 7/8 in.
(NC) 1.9 C_v**

VTM-XC019
VTM-XC019-012
VTM-XC019-013
VTM-XC019-014
VTM-XC019-094
VTM-XC019-312
VTM-XC019-313
VTM-XC019-314
VTM-XC019-31P
VTM-XC019-322
VTM-XC019-323
VTM-XC019-324
VTM-XC019-394
VTM-XC019-413
VTM-XC019-414
VTM-XC019-520

**Union Sweat 7/8 in.
(NC) 4.7 C_v**

VTM-XC047
VTM-XC047-012
VTM-XC047-013
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VTM-XC047-31P
VTM-XC047-322
VTM-XC047-323
VTM-XC047-324
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VTM-XC047-520

**Union Sweat 7/8 in.
(Mixing) 0.7 C_v**

VTM-XM007
VTM-XM007-012
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**Union Sweat 7/8 in.
(Mixing) 1.9 C_v**

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**Union Sweat 7/8 in.
(Mixing) 4.7 C_v**

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**Union Sweat 7/8 in.
(NO) 0.7 C_v**

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**Union Sweat 7/8 in.
(NO) 1.9 C_v**

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VTM-XN019-510
VTM-XN019-520

**Union Sweat 7/8 in.
(NO) 4.7 C_v**

VTM-XN047
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VTM-XN047-520

Specifications

Product	VT Series Terminal Unit Valves		
Service	Hot Water, Chilled Water, and Steam		
Models and Ordering Data	See Table 1.		
Valve Body Size and Styles	1/2 in., 2-way and 3-way with Union Globe, Union Sweat, Union Angle or Threaded Connections		
Actuator Sizing/Max. Closeoff Pressures	See Table 2.		
Valve Stroke	5/16 inch		
Valve Stem Diameter	1/4 inch		
Valve Body Pressure/Temp. Rating	Meets Requirements of ANSI B16.15, Class 250		
Valve Assembly Maximum Allowable Pressure/Temperature	Steam	35 psig (245 kPa) Saturated	
	Water	400 psig (2800 kPa) up to 150°F (66°C) Decreasing to 345 psig (2415 kPa) at 281°F (140°C)	
Flow Characteristics	Equal Percentage per ISA/ANSI S75.11		
Flow Coefficients (Cv)	0.7, 1.9, or 4.7. See Table 1.		
Maximum Seat Leakage	0.01% of Max. Rated Valve Capacity per ANSI B16.104, Class IV		
Rangeability (Per ISA/ANSI S75.11*)	Cv = 0.7	18:1	
	Cv = 1.9	22:1	
	Cv = 4.7	34:1	
Maximum Control Pressure (Pneumatically Actuated Valves Only)	30 psig (210 kPa)		
Maximum Recommended Differential Pressure for Valve Sizing	35 psi (245 kPa)		
Materials	Bonnet	Brass	
	Trim	Stem	316 Stainless Steel
		Plug	Brass with Molded and Mechanically Retained Composition Disc
	Body	Cast Brass with Integral Seat	
	Packing	Non-adjustable EPT (Ethylene Propylene Terpolymer) Ring Packs	
	Tailpiece	Brass	
	Union Nut	Brass	
Fluid Operating Temperature Limits	35 to 28°F (2 to 138°C)		
	With V-4000-1 (41)	35 to 200°F (2 to 93°C)	
	With VA-8020 (20), VA-8022 (22)	190°F (88°C) maximum	
With VA-8050 (50), VA-8051 (51) and VA-8052 (52)	Hot Water: 195°F (90°C) maximum Steam: 280°F (138°C) maximum (Steam insulator included in factory assembly.)		
Storage Temperature Limits	-10 to 150°F (-23 to 66°C)		
Accessories (Order Separately)	See Table 4.		

* Rangeability is defined as the ratio of maximum flow to minimum controllable flow per ISA/ANSI S75.11 (1985) Inherent Flow Characteristic and Rangeability for Control Valves.

Note: For electric actuator specifications, refer to the appropriate electric actuator product bulletin.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



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