VA-748x Electric Valve Actuators

Product Bulletin

VA-7480-0312, VA-7482-0312
VA-7482-8002-RA, VA-7482-9002-RA

Code No. LIT-12011893
Issued January 20, 2016

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VA-748x Series Electric Valve Actuators provide floating or proportional control in HVAC applications. The compact design of this actuator series makes it ideal for installations in confined locations, such as fan coil applications.

The VA-748x Series Actuator is designed for field mounting onto the terminal unit valves made by Johnson Controls and its competitors. Due to the innovative concept of auto stroke detection, the VA-748x actuator can be installed over most of the conventional terminal unit valves in the market and pressure independent control valves with variable strokes.



Figure 1: VA-748x-0312 Electric Valve Actuator

Table 1: Features and Benefits

Features	Benefits
Auto-commissioning	Simplifies installation, since models require no adjustments in the field.
Auto-shutoff Actuator Motor	Extends actuator life by reducing drive time and excessive motor wear.
Durable, Heat-stabilized, Plastic Resin Enclosure	Allows the actuator to be used in applications with fluid temperatures up to 203°F (95°C).
Actuator that Can Be Mounted after the Valve Body is Piped	Simplifies installation and provides application flexibility.
Compact Design	Allows for installation in confined locations, such as fan coil applications.
Operating Status LED	Provides direct, visual indication of the actuator operating status.
Actuator That Can Be Rotated after it is Mounted on the Valve Body	Simplifies installation by allowing the actuator wiring entry to be located in any direction.

Application

IMPORTANT: Use the VA-748x Electric Valve Actuators to control equipment under normal operating conditions. Where failure or malfunction of the electric valve actuators could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the electric valve actuators.

Operation

The VA-748x actuators are available for use with floating and proportional controllers.

24 VAC Floating Control Model (VA-7480-0312 Model)

When the signal is applied to the black and red wires, the actuator stem extends. When the signal is removed, the actuator remains in position. If the signal remains applied to the red wire, the actuator times out and the motor shuts off after approximately 90 seconds (VA-7480-0312).

When the signal is applied to the black and orange wires, the actuator stem retracts. When the signal is removed, the actuator remains in position. If the signal remains applied to the orange wire, the actuator times out and shuts off the motor after approximately 90 seconds (VA-7480-0312).

End of Stroke Confirmation

When the signal is applied in the same direction, the actuator turns on every 2 hours and drives in the signal direction for approximately 90 seconds (VA-7480-0312) to confirm the end of the stroke.

24 VAC/VDC Proportional Control Model (VA-7482-0312 Model)

When power is applied, the actuator self-calibrates, performing a complete cycle. The actuator moves the stem down for a complete mechanical valve stroke until no changes are detected. Once the auto-zero is detected, the actuator moves the stem accordingly with the input signal within the value of the electrical stroke (0.19 in. [4.8 mm nominal]).

When the input signal increases (for example, 0 V to 10 V), the actuator stem extends if the actuator is configured as direct acting (DA) or retracts if the actuator is configured as reverse acting (RA).

When the input signal decreases (for example, 10 V to 0 V), the actuator stem retracts if the actuator is configured as DA or extends if the actuator is configured as RA.

Auto Stroke Detection Models for Proportional Control Mode (VA-7482-8002-RA and VA-7482-9002-RA Models)

The auto stroke detection series is suitable with valves having a minimum of 20 N spring preloading. When the power is applied, the actuator self-calibrates performing a complete cycle to detect the real valve stroke. The actuator moves the stem down for a complete mechanical valve stroke until no stroke changes are detected.

Once the lower valve stem position is detected, the actuator moves the spindle of the actuator up until the spindle is fully retracted in the actuator. The microprocessor counts and stores the full stroke of the actuator. The actuator then drives the spindle down in order to detect the upper valve stem position and to calculate the real stroke, minus the gap value. As soon as the spindle of the actuator touches the valve stem, the actuator exits the self-calibration mode (the LED turns red and blinks) and enters the operational mode (the LED turns green).

When the input signal increases (for example, from 0 V to 10 V), the actuator is configured as Direct Action (DA). The actuator retracts if the actuator is configured as Reverse Action (RA).

When the input signal decreases (for example, from 10 V to 0 V), the actuator stem retracts if the actuator is configured as Direct Action (DA). The actuator extends if the actuator is configured as Reverse Action (RA).

End of Stroke Confirmation

VA-7482-0312 Model

When the signal is 0 or 100%, the actuator turns on every 2 hours and drives in the signal direction for approximately 60 seconds to confirm the end of the stroke.

VA-7482-8002-RA and VA-7482-9002-RA Models

When the input signal remains at 100% for one hour, the actuator turns on the motor and drives the spindle for approximately 60 seconds to confirm the end of the stroke.

Operating Status Indicators

The floating models are equipped with a green LED that provides information about the operating status.

The proportional models are equipped with a bi-color green/red LED which provides information about the operating status and diagnostics.

Table 2: Floating Models LED Status

LED Status		Description
Off	●	No Power Supply
Green Blinking	◑	Moving to Position
Green Blinking	◑	End Stroke Confirmation
Green Steady On	☼	End Stroke Reached

Table 3: Proportional Models LED Status

LED Status		Description
Off	●	No Power Supply
Green Blinking	◑	Moving to Position
Green Blinking	◑	End Stroke Confirmation
Green Steady On	☼	Position Reached
Red Blinking	◑	Cycle
Red Steady On	☼	4/20 mA or 2/10 VDC Signal Lost

Wiring Diagrams

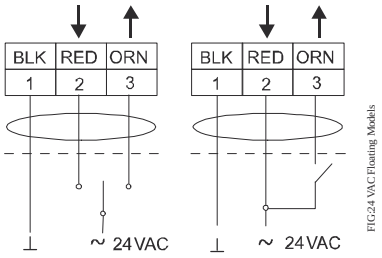


Figure 2: 24 VAC Floating Model Wiring Diagrams

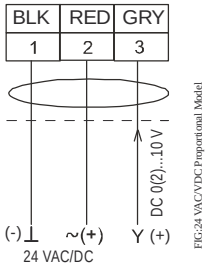


Figure 3: 24 VAC/VDC Proportional Model Wiring Diagrams

Dimensions

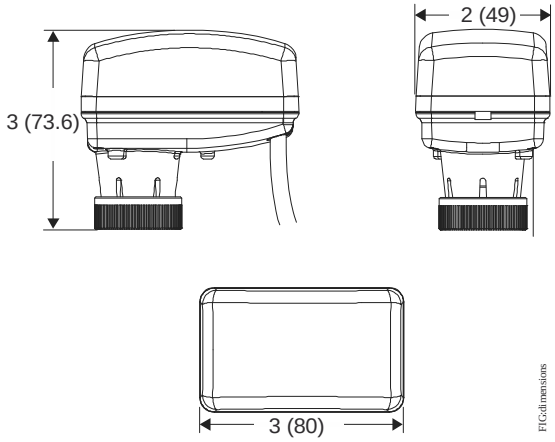
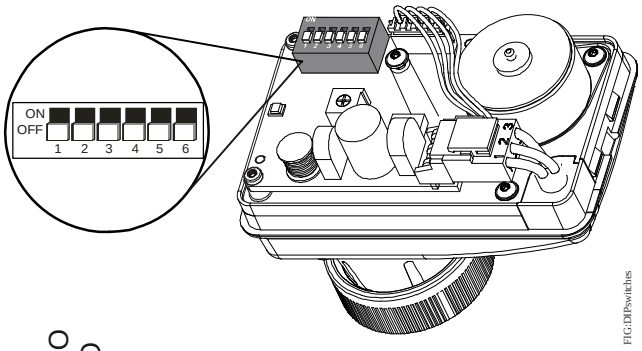


Figure 4: VA-748x Dimensions, in. (mm)

DIP Switch Settings for Proportional Model (VA-7482 Only)

All the proportional models have a six DIP switches that allow the user to configure the actuator in the field.

The actuator is shipped from the factory with all the DIP switches in OFF position.



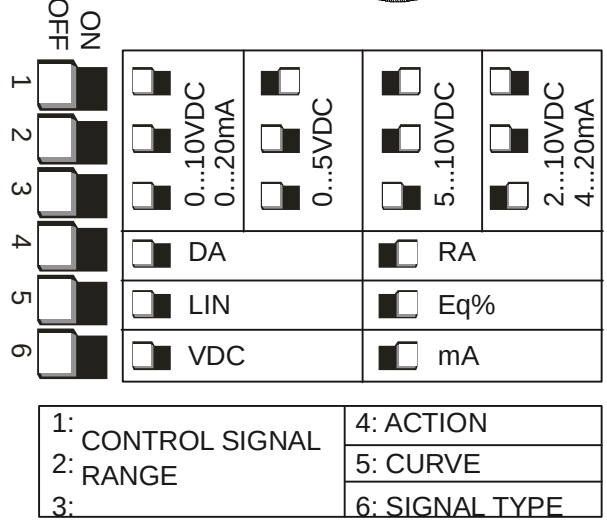


Figure 5: Switch Positions

DIP Switch 1, 2, 3, and 6

DIP switch 1, 2, and 3 allow the user to change the analog input ranges. To change from voltage analog input to current analog input set DIP switch 6 accordingly.

DIP Switch 4

DIP switch 4 allows the user to change the action of the actuator in relation to the analog input.

DIP switch 4 is off (DA) when the signal increases and the actuator stem extends.

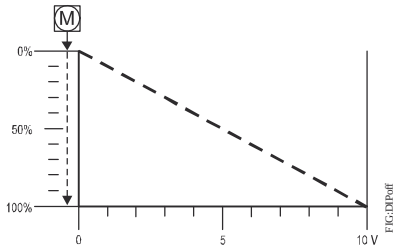


Figure 6: DIP Switch 4 Off (DA)

DIP switch 4 is on (RA) when the signal increases and the actuator stem retracts.

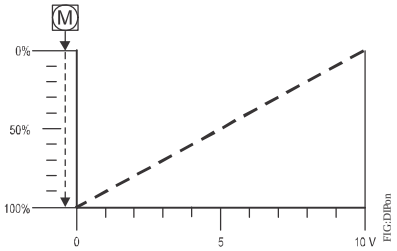


Figure 7: DIP Switch 4 On (RA)

DIP Switch 5

DIP switch 5 allows the user to change the control characteristic of the actuator in order to obtain a combination of valve and actuator Linear or Almost Equal Percentage.

DIP Switch 5 OFF (Linear)

When DIP switch 5 is set to Off, we recommend you use the valve with the linear or equal percentage control characteristic.

DIP Switch 5 ON (Almost Equal Percentage)

When DIP switch 5 is set to On, we recommend you use the valve with the quick opening or on/off control characteristic.

Jumper Settings

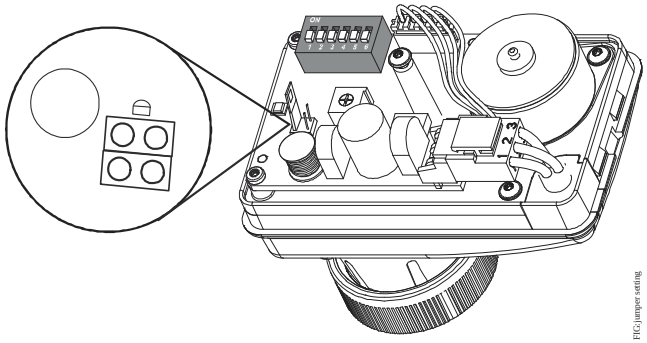


Figure 8: Jumper Location

Proportional Model (VA-7482-0312 Only), Suitable for the VG4000 and VG5000

For proportional actuators suitable for the VG5000 or VG4000, the jumper on the VA-7482-0312 allows the user to set the push down to close (PDTC) or push down to open (PDTO) function.

The actuator is set at the factory for use with two-way PDTC VG4200 and VG5200 valves.

For two-way PDTO VG4400 and VG5400 valve applications, set the valve port selection jumper on the VA-7482-0312 to PDTO. For three-way VG4800 and VG5800 valve applications, set the jumper on the VA-7482-0312 to the valve port type that corresponds to the service port of the valve.

Table 4: Actuator Closing Dimensions

Product Code	Valve Type	Upper Mechanical End Stroke (UMES)	Lower Mechanical End Stroke (LMES)
VA-7482-0312[1]	**Push Down to Close (PDTC - Factory Set)** 	0.64 in. (16.3 mm)	0.4 in. (10.0 mm)
	Push Down to Open (PDTO) 		
VA-7482-9002-RA[2]	**Auto Stroke Detection**	0.57 in. (14.5 mm)	0.32 in. (8.2 mm)
VA-7482-8002-RA[2]	**Auto Stroke Detection**	0.64 in. (16.3 mm)	0.4 in. (10.0 mm)

1. On the proportional model, the jumper allows the user to set the PDTC or PDTO function. The actuator is factory set for use with two-way VG4200 and VG5200 valves with PDTC. For two-way VG4400 and VG5400 valve applications with PDTO, set the valve port selection jumper to PDTO. For three-way VG4800 and VG5800 valve applications, set the jumper to the valve port type that corresponds to the service port of the valve.
2. The proportional actuator series is suitable for different terminal units. See Table 6 for the valve compatibility matrix.

Repair Information

If the VA-748x electric actuator fails to operate within its specifications, replace the unit. For a replacement electric actuator, contact the nearest Johnson Controls® representative.

Ordering Information

Table 5: VA-748x Electric Valve Actuators

Code Number	Power Supply	Control Type	Actuator Speed	Mounting Thread Nut	Cable Length (Factory Mounted)
VA-7480-0312	24 VAC	Floating	13 s/mm	M28 x 1.5	118 in. (3 m)
VA-7482-0312	24 VAC/VDC	Proportional	8 s/mm	M28 x 1.5	118 in. (3 m)
VA-7482-8002-RA	24 VAC/VDC	Proportional	8 s/mm	M30 x 1.5	59 in. (1.5 m)
VA-7482-9002-RA	24 VAC/VDC	Proportional	8 s/mm	M30 x 1.5	59 in. (1.5 m)

Table 6: Valve Compatibility Matrix

Actuator Code	Johnson Controls	Danfoss	Frese	Industrie Technik	Oventrop	Sauter	Schneider Electric	Siemens	TA Hydronics	Fratelli Pettinaroli	Watts Industries	Controlli
VA-7480-0312 **VA-7482-0312**	VG4000 Series (discontinued) VG5000 Series (discontinued)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VA-7482-8002-RA	VG6000 Series V5000 Series VP1000 Series	AB-QM (DN10 to DN32)	N/A	VFX Series (DN15 to DN20)	COCON QTZ (DN10 to DN32) COCON 2TZ (DN15 to DN20) Tri-M Plus (DN15)	VUT Series BUT Series VXL Series BXL Series VCL DN10 to DN32) VUL Series BUL Series	VZx8 Series VZx8C (DN15 to DN20)	VVP47 Series VXP47 Series VMP47 Series	TBV-C (DN15 to DN20) TBV-CM (DN15 to DN25) TBV-CMP (DN15 to DN25) KTCM512 (DN15 to DN25)	91 Series 93 Series	2131 Series 3131 Series 4131 Series	N/A
VA-7482-9002-RA	N/A	N/A	Optima Compact 53-13xx 2.5 mm (DN10 to DN20) Optima Compact 53-13xx 5.0 mm (DN10 to DN20) Optima Compact 53-13xx 5.5 mm DN25 to DN32)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VSX03PB VSX04PB VSX05PB VSX06PB (DN10 to DN20) VSXT03PB VSXT04PB VSXT06PB (DN10 to DN20) VSXT07PB VSX08PB (DN25 to DN32)

Table 7: Accessory (Order Separately)

Code Number	Description
VA-7482-CAB32	118 in. (3 m) cable kit for proportional actuator

Technical Specifications

VA-748x Electric Valve Actuator

Power Requirements	**VA-7480-0312**	24 VAC ±15% at 50/60 Hz; 2.5 VA at maximum power supply; Class 2
	VA-7482-xxx2	24 VAC ±15% at 50/60 Hz; 24 VDC ±15% at 2.5 VA at maximum power supply; Class 2
Input Signal	**VA-7480-0312**	24 VAC, 50/60 Hz
	VA-7482-xxx2	0 to 10 VDC or 0 to 20 mA
Input Signal Adjustments	**VA-7480-0312**	None
	VA-7482-xxx2	Input Signal: 0 to 10 VDC, 2 to 10 VDC, 0 to 5 VDC, 5 to 10 VDC, 0 to 20 mA, or 4 to 20 mA Direction: direct (drive down) or reverse (drive up) with input signal increase
Input Impedance	**VA-7480-0312**	3,900 ohms
	VA-7482-xxx2	100,000 ohms
Electrical Connections	**VA-7480-0312** **VA-7482-0312**	18 AWG cable; 118 in. (3 m) long
	VA-7482-8002-RA **VA-7482-9002-RA**	18 AWG cable; 59 in. (1.5 m) long
Mechanical Connections		Threaded coupling for Johnson Controls VG4000, VG5000, M28x1, and M28x5 Series Zone Valves Threaded coupling for Johnson Controls VG6000, V5000, VP100, M30x1, and M30x5 Series Zone Valves
Protection		NEMA 2, IP43
Output Force	**VA-7480-0312** **VA-7482-0312**	21.5 lb (96 N) minimum
	VA-7482-8002-RA **VA-7482-9002-RA**	31.4 lb (140 N) minimum
Mechanical Stroke		0.25 in. (6.3 mm) maximum
Full Stroke Cycle Time		Floating 13 s/mm, proportional 8 s/mm
Full Stroke Cycles	**VA-7480-0312** **VA-7482-0312**	250,000
	VA-7482-8002-RA **VA-7482-9002-RA**	150,000
Audible Noise Rating		<30 dBA
Fluid Temperature Limits		35 to 203°F (2 to 95°C)
Ambient Operating Conditions		32 to 122°F (0 to 50°C), noncondensing
Ambient Storage Conditions		-4 to 149°F (-20 to 65°C), noncondensing
Compliance	**United States**	Tested per UL2043. Suitable for Use in Other Environmental Air Space (Plenums) in Accordance with Section 300.22 (C) of the National Electrical Code. UL 60730-1 Listed Type 2 Enclosure, File E194024 XAPX XAPX7
	Canada	CSA C22.2 No. 139 Certified, File LR85083, Class 3221 01
	Europe	CE Mark – Johnson Controls, Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.

The performance specifications are nominal and conform to acceptable industry standard. 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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