

VA-748x

Electric Terminal Unit Actuator

Product Bulletin

The VA-748x Series provides floating or proportional control in HVAC applications.

The compact design of this actuator makes it suitable for installation in confined spaces, such as fan coil, chilled ceiling, manifolds, etc.

The VA-748x Series actuator is designed for field mounting onto Johnson Control and competitor's Terminal Unit Valves.

Due to the innovative concept of auto stroke detection, the VA-748x can be installed over most of the conventional terminal unit valve in the market and PICV with variable strokes.



- **Low and line voltage**
Flexible applications
- **Floating and proportional control**
Flexible application
- **Voltage and current analog input**
Suitable for any controller
- **Different analog input ranges**
Flexible applications
- **Different actuator speed**
New market opportunities
- **Double colour LED**
Provide information about status and diagnostic
- **Removable cable**
No expert requires for connection or replacement
- **Different cable length available as separate kit**
OEM's version easily available
- **Auto Stroke Detection**
Suitable for valve with variable stroke

Ordering Codes

Product Codes	Control Type	Power Supply	Running Time	Nominal Force	Factory Stroke Config.	Cable Length	Mounting Thread nut	Special Config.
VA-7480-0011	Floating	24 Vac	13 sec/mm	120 N	---	1.5 m	M28x1.5	---
VA-7480-0312						3m		UL Listed
VA-7481-0011			1.5 m			---		
VA-7480-0001							8 sec/mm	
VA-7481-0001			13 sec/mm					
VA-7480-0201-TA			8 sec/mm			M30x1,5		
VA-7480-0501-TA		13 sec/mm	2 m					
VA-7480-4001			5 m	---				
VA-7480-4003		230 Vac	120 N	13 sec/mm		1.5 m	M28x1.5	
VA-7480-0013								8 sec/mm
VA-7481-0013								
VA-7480-0003							8 sec/mm	M30x1,5
VA-7481-0003								
VA-7482-1001							Proportional	24 Vac/Vdc
VA-7482-2001	4.3 mm							
VA-7482-3001	6.0 mm							
VA-7482-1001-RA	3.2 mm	3 m	Reverse action					
VA-7482-1301-RA	4.3 mm							
VA-7482-2001-RA	---	1.5 m	M28x1.5	---				
VA-7482-0011					3 m	UL Listed		
VA-7482-0311	2 m	5 m	Reverse action					
VA-7482-0312				1.5 m	M30x1,5	---		
VA-7482-2201-TA	2.8 mm							
VA-7482-2501-TA		5.3 mm						
VA-7482-5001	5.8 mm							
VA-7482-6001		160 N	Auto stroke detection	2 m	Reverse action			
VA-7482-7001								
VA-7482-8201								
VA-7482-9201								
VA-7482-8201-RA	Reverse action							
VA-7482-9201-RA								

Accessories (order separately)

Accessories Codes	Description	Packing
VA-7480-CAB21	Floating 24 V – 2 meter length	Plastic Bag
VA-7480-CAB31	Floating 24 V – 3 meter length	
VA-7480-CAB51	Floating 24 V – 5 meter length	
VA-7480-CAB11	Floating 24 V – 10 meter length	
VA-7480-CAB33	Floating 230 V – 3 meter length	
VA-7480-CAB53	Floating 230 V – 5 meter length	
VA-7480-CAB73	Floating 230 V – 7 meter length	
VA-7480-CAB13	Floating 230 V – 10 meter length	
VA-7482-CAB21	Proportional 24 V – 2 meter length	
VA-7482-CAB31	Proportional 24 V – 3 meter length	
VA-7482-CAB51	Proportional 24 V – 5 meter length	
VA-7482-CAB71-HF	Proportional 24 V – 7 meter length - Halogen free	
VA-7482-CAB21-HF	Proportional 24 V – 2 meter length - Halogen free	
VA-7482CAB7452	Cable kit to replace VA-7452 with VA-7482	

Valve Compatibility (1/2)

Actuator Codes	Johnson Controls	Danfoss	Frese	Industrie Technik	Oventrop	Sauter	Schneider Electric	Siemens	TA Hydraulics	Fratelli Pettinaroli	Watts Industries	Controlli
VA-7480-0011	VG4000 Series (discontinued) VG5000 Series (discontinued)	---	---	---	---	---	---	---	---	---	---	---
VA-7480-0312												
VA-7481-0011												
VA-7480-0013												
VA-7481-0013												
VA-7482-0011												
VA-7482-0311												
VA-7482-0312												
VA-7480-0001	VG6000 Series V5000 Series VP1000 Series	AB-QM (DN15-DN32)	---	VFX (DN15-DN20)	COCON QTZ (DN10-DN32) COCON 2TZ (DN15-DN20) Tri-M Plus (DN15)	VUL Series BUL Series VUT Series BUT Series VXL Series BXL Series VCL (DN10-DN32)	VZx8 Series VZx8C (DN15-DN20)	VVP47 Series VXP47 Series VMP47 Series VVI46 Series VXI46 Series VVS46 Series VXS46 Series	---	91 Series 93 Series	2131 Series 3131 Series 4131 Series	---
VA-7481-0001												
VA-7480-0003												
VA-7481-0003												
VA-7482-1001 VA-7482-1001-RA VA-7482-1301-RA	VG6000 Series VP1000 (DN15-DN20)	AB-QM (DN10-DN20)	---	VFX Series (DN15-DN20)	COCON QTZ (DN10-DN15)	VUT Series BUT Series VXL Series BXL Series VCL (DN10-DN15)	VZx8 Series VZx8C (DN15-DN20)	VVP47 Series VXP47 Series VMP47 Series VVI46 Series VXI46 Series VVS46 Series VXS46 Series	---	91 Series	2131 Series 3131 Series 4131 Series	---
VA-7482-2001 VA-7482-2001-RA	V5000 Series	---	---	---	COCON QTZ (DN20-DN32) COCON 2TZ (DN15-DN20) Tri-M Plus (DN15)	VUL Series BUL Series VCL (DN20-DN32)	---	---	---	---	---	---
VA-7482-3001	VP1000 (DN25-DN32)	AB-QM (DN25-DN32)	---	---	---	---	---	---	---	93 Series	---	---
VA-7480-0201-TA VA-7480-0501-TA	---	---	---	---	---	---	---	---	TBV-C (DN15-DN25) TBV-CM (DN15-DN25) TBV-CMP (DN15-DN25) KTCM512 (DN15-DN25)	---	---	---

...Continued...

Valve Compatibility (2/2)

Actuator Codes	Johnson Controls	Danfoss	Frese	Industrie Technik	Oventrop	Sauter	Schneider Electric	Siemens	TA Hydraulics	Fratelli Pettinaroli	Watts Industries	Controlli
VA-7482-2201-TA VA-7482-2501-TA	---	---	---	---	---	---	---	---	TBV-C (DN15-DN20) TBV-CM (DN15-DN25) TBV-CMP (DN15-DN25) KTCM512 (DN15-DN25)	---	---	---
VA-7480-4001 VA-7480-4003	---	---	Optima Compact 53-13xx (DN10-DN32)	---	---	---	---	---	---	---	---	VSX0xPB VSXT0xPB (DN10-DN32)
VA-7482-5001	---	---	Optima Compact 53-13xx 2,5 mm (DN10-DN20)	---	---	---	---	---	---	---	---	VSX03PB VSX04PB VSX05PB VSX06PB (DN10-DN20)
VA-7482-6001	---	---	Optima Compact 53-13xx 5,0 mm (DN10-DN20)	---	---	---	---	---	---	---	---	VSXT03PB VSXT04PB VSXT06PB (DN10-DN20)
VA-7482-7001	---	---	Optima Compact 53-13xx 5,5 mm (DN25-DN32)	---	---	---	---	---	---	---	---	VSXT07PB VSX08PB (DN25-DN32)
VA-7482-8201 VA-7482-8201-RA	VG6000 Series V5000 Series VP1000 Series	AB-QM (DN10-DN32)	---	VFX Series (DN15-DN20)	COCON QTZ (DN10-DN32) COCON 2TZ (DN15-DN20) Tri-M Plus (DN15)	VUT Series BUT Series VXL Series BXL Series VCL (DN10-DN32) VUL Series BUL Series	VZx8 Series VZx8C (DN15-DN20)	VVP47 Series VXP47 Series VMP47 Series VVI46 Series VXI46 Series VVS46 Series VXS46 Series	TBV-C (DN15-DN20) TBV-CM (DN15-DN25) TBV-CMP (DN15-DN25) KTCM512 (DN15-DN25)	91 Series 93 Series	2131 Series 3131 Series 4131 Series	---
VA-7482-9201 VA-7482-9201-RA	---	---	Optima Compact 53-13xx 2,5 mm (DN10-DN20) Optima Compact 53-13xx 5,0 mm (DN10-DN20) Optima Compact 53-13xx 5,5 mm (DN25-DN32)	---	---	---	---	---	---	---	---	VSX03PB VSX04PB VSX05PB VSX06PB (DN10-DN20) VSXT03PB VSXT04PB VSXT06PB (DN10-DN20) VSXT07PB VSX08PB (DN25-DN32)

Operation

24 Vac Floating 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 will time out and shut off the motor after approximately 90 seconds (13 sec / mm models) and approximately 60 seconds (8 sec / mm models).

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 will time out and shut off the motor after approximately 90 seconds (13 sec/mm models) and approximately 60 seconds (8 sec/mm models).

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 (13 sec / mm models) and approximately 60 seconds (8 sec / mm models) to confirm the end of stroke position.

Input	Direction	
Red wire energised	↓	Actuator stem extends
Orange wire energised	↑	Actuator stem retracts

230 Vac Floating Model

When the signal is applied to the blue and brown wires, the actuator stem extends. When the signal is removed the actuator remains in position. If the signal remains applied to the brown wire, the actuator will time out and shut off the motor after approximately 90 seconds (13 sec/mm models) and approximately 60 seconds (8 sec/mm models).

When the signal is applied to the blue 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 will time out and shut off the motor after approximately 90 seconds (13 sec/mm models) and approximately 60 seconds (8 sec/mm models).

End of stroke Confirmation

When the signal is applied continuously in the same direction, the actuator turns on every 2 hours and drives in the signal direction for approximately 90 seconds (13 sec/mm models) and approximately 60 seconds (8 sec/mm models) to confirm the end of stroke position.

Input	Direction	
Brown wire energised	↓	Actuator stem extends
Orange wire energised	↑	Actuator stem retracts

24 Vac/Vdc Proportional Model Calibration Cycle

VA-7482-xx01 Factory Stroke configured series (Jumper Setting)

When the power is applied, the actuator self-calibrates performing an auto zero detection 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 as per jumper setting.

When the input signal increases (eg. from 0V to 10V) the actuator stem extends if the actuator is configured as Direct Action (DA) or retracts if the actuator is configured as Reverse Action (RA).

When the input signal decreases (eg. from 10V to 0V) the actuator stem retracts if the actuator is configured as Direct Action (DA) or extends if the actuator is configured as Reverse Action (RA) (see table below).

VA-7482-8x01 and VA-7482-9x01 Auto Stroke detection series

IMPORTANT: Auto Stroke detection Series is suitable with valves having minimum 2 kg 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 moved the spindle of actuator up until the spindle is fully retracted in the actuator and the microprocessor counts and stores the full stroke of the actuator, then the actuator drives the spindle down in order to detect the upper valve stem position and being able to calculate the real stroke, subtracting the gap value. As soon as the spindle of the actuator touches the valve stem, the actuator leaves the self-calibration procedure (led red blinking) and enter in the operational mode (led green).

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

When the input signal decreases (eg. from 10V to 0V) the actuator stem retracts if the actuator is configured as Direct Action (DA) or extends if the actuator is configured as Reverse Action (RA) (see table below).

End of stroke confirmation

For VA-7482-0011 model only:

When the input signal is at 0 or 100%, the actuator turns on every 2 hours and drives in the signal direction for approximately 90 seconds (13 sec/mm models) and approximately 60 seconds (8 sec/mm models) to confirm the end of stroke position.

For VA-7482-xx01 models:

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

For VA-7482-8x01 and VA-7482-9x01 models:

When the input signal remains at 100% for 1 hour, the actuator turn on the motor and drives the spindle in accordance with the signal for approximately 60 sec. to confirm the end of the stroke confirmation.

Action	Input	Direction	
Direct Acting	0...10Vdc	↓	Actuator stem extends
	10...0Vdc	↑	Actuator stem retracts
Reverse Acting	0...10Vdc	↑	Actuator stem retracts
	10...0Vdc	↓	Actuator stem extends

Operating status indication

24 Vac/ 230 Vac Floating Model

The floating models are equipped with a green LED which provides the information about the operating status as follow:

OFF		No power supply
Green Blinking		Moving to position
Green Blinking		End stroke confirmation
Green Steady On		End Stroke reached

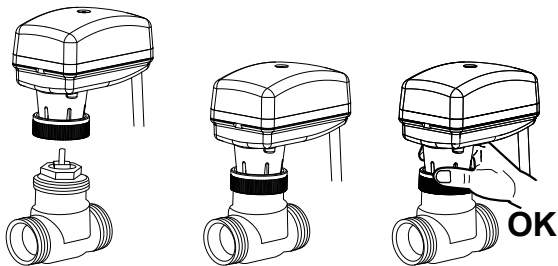
24 Vac/Vdc Proportional Model

The proportional models are equipped with a bi-colour LED (green-red) which provides the information about the operating status and diagnostic as follow:

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

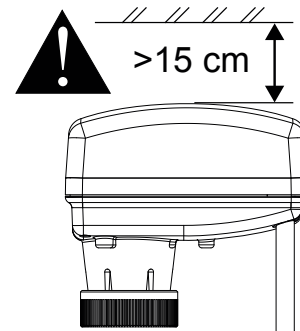
Mounting Instruction

When mounting the actuator on terminal unit valves, please follows the instruction below:

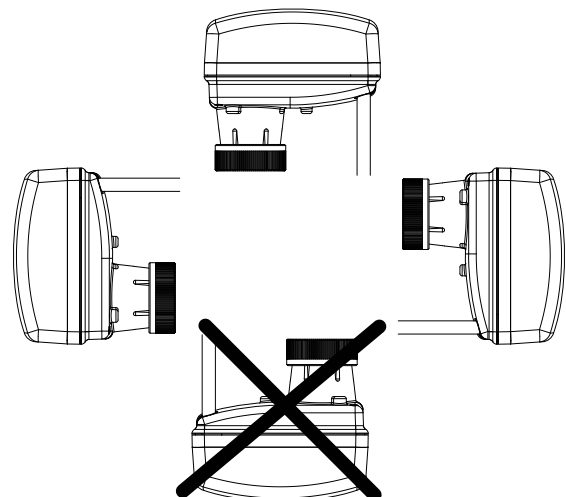


Never use the actuator as a mounting lever.

- It is recommended that the valves be mounted upright or at angles not greater than 90° in an easily accessible location.
- Do not mount the actuator upside down to avoid dripping water, which could enter the housing and damage the mechanism or motor.
- Do not cover with insulating material.
- Sufficient clearance must be allowed for actuator removal (refer to the dimension drawings).



- Mounting position:



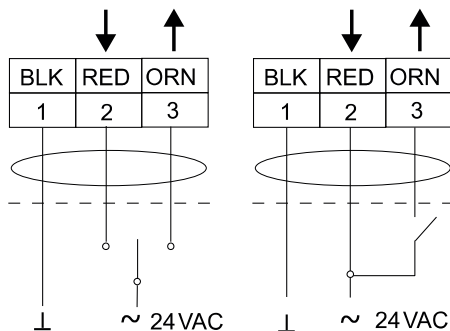
Wiring Instruction



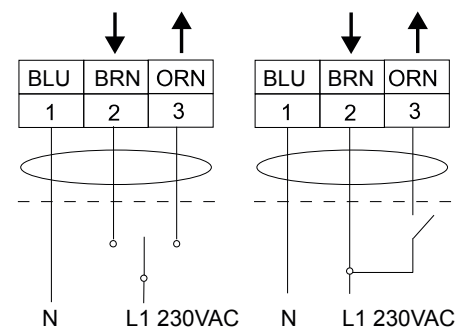
WARNING

When servicing make sure that:

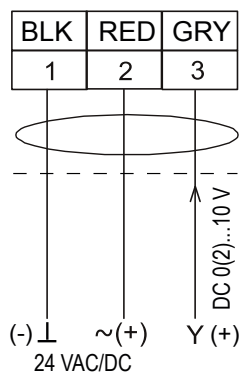
- The electric supply to the actuator is switched off to avoid possible damage to the equipment, personal injury or shock.
- You do not touch or attempt to connect or disconnect wires when electric power is on.
- All wiring should conform to local codes and must be carried out by authorized personnel only.
- Keep high and low voltage wiring separated.
- When using multi-stranded wire apply a cable ferrule to the cable end.
- Make sure that the line power supply is in accordance with the power supply specified on the device.
- Check all wiring connections before applying power to the system.
- Contact with components carrying hazardous voltage can cause electric shock and may result in severe injury or death.
- Short-circuited or improperly connected wires may result in permanent damage to the equipment.
- Not adhering to these operational instructions could cause injury or damage the equipment.



24 Vac Floating Model - Wiring Diagrams



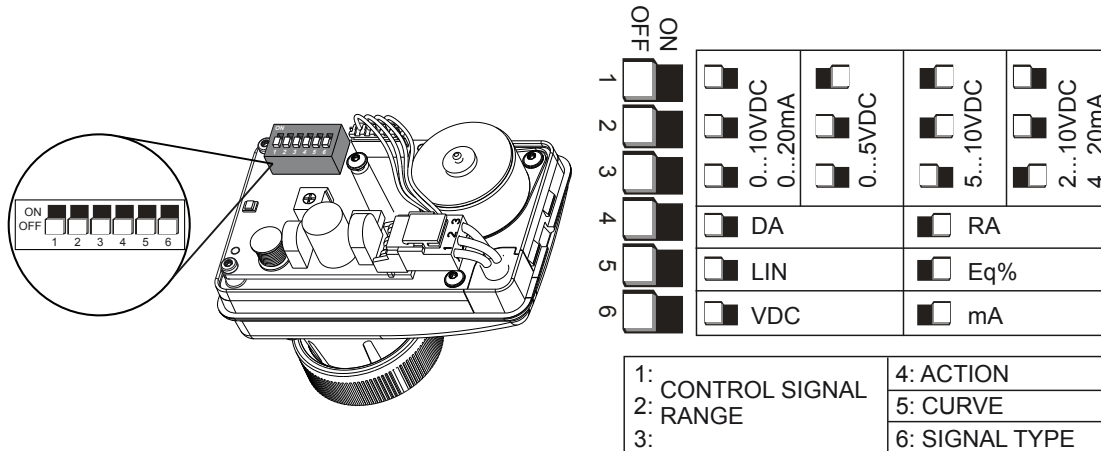
230 Vac Floating Model - Wiring Diagrams



24 Vac/Vdc Proportional Model - Wiring Diagrams

Dip switch settings for Proportional model only (VA-7482)

All the proportional models have a 6 dip switches which allow the user to field configure the actuator. The actuator is factory released with all the dip switches in OFF position.

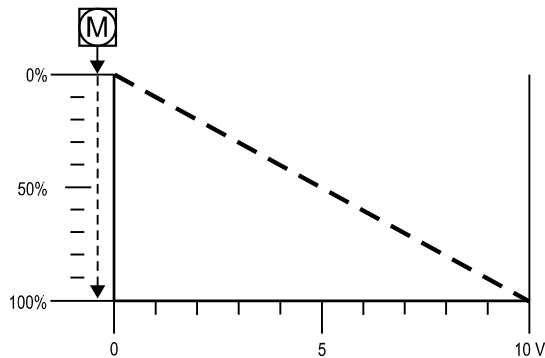


Dip Switch 1 – 2 – 3 – 6

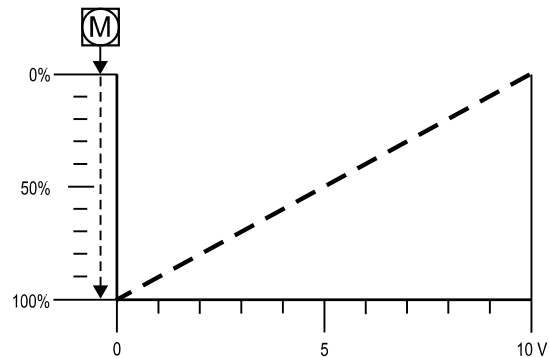
The dip switch 1-2-3 allow the user to change the analog input ranges. To switch from voltage analog input to current analog input the dip switch 6 has to be set accordingly.

Dip Switch 4

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



The dip switch 4 OFF (Direct Acting – DA)
When the signal increases the actuator stem extends.



The dip switch 4 ON (Reversing Acting – RA)
When the signal increases the actuator stem retracts.

Dip Switch 5

The dip switch 5 allows the user to change the control characteristic of the actuator in order to obtain the a combination of valve and actuator linear or almost equal percentage.

The dip switch 5 OFF (Linear)

We recommend to use along with valve with linear or equal percentage control characteristic.

The dip switch 5 ON (almost Equal Percentage)

We recommend to use along with valve with quick opening or on/off control characteristic.

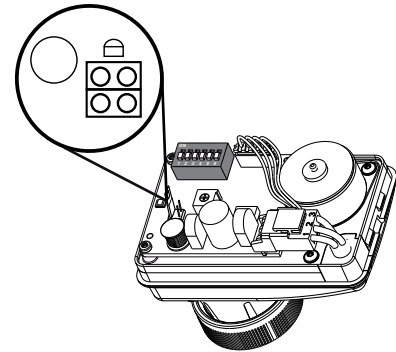
Electrical actuator stroke and Closing Dimensions

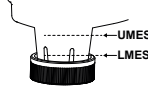









All the Proportional models with factory stroke configuration option have 1 jumper which allow the user to change the electrical stroke.

From factory the actuators are delivered as follow (see table below).

All the Proportional models with Auto stroke detection do not require the jumper because they are able to detect the real valve stroke by automatically stroke detection.

All the Floating models have fixed stroke and the jumper option is not available.

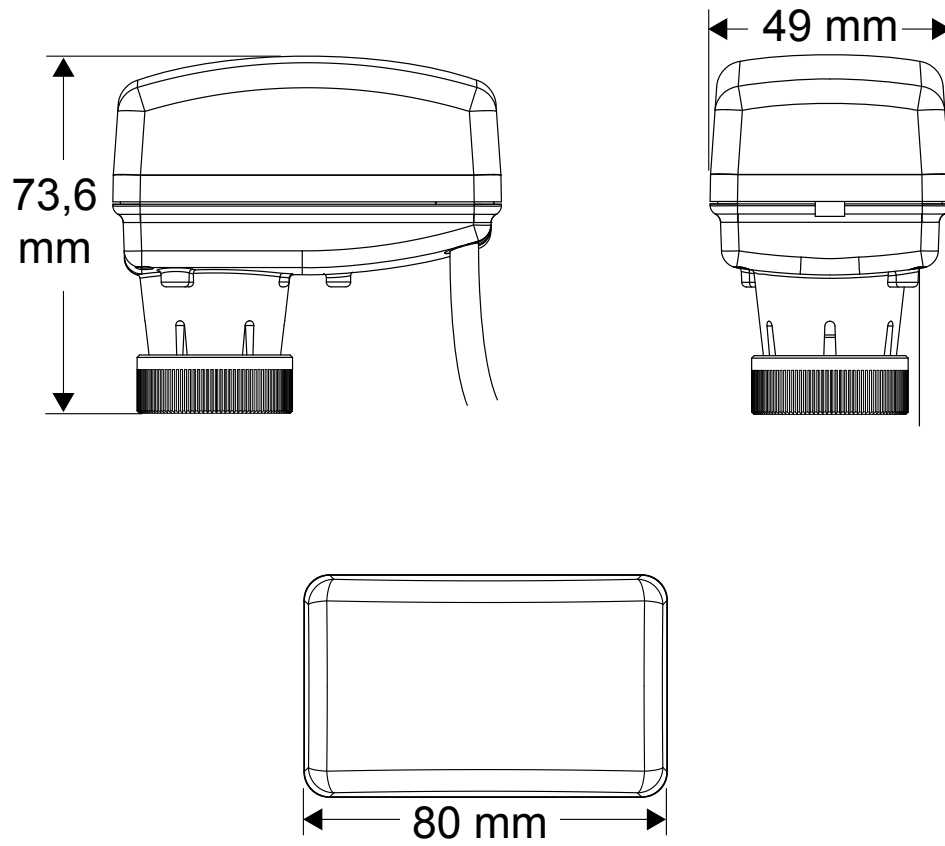


		Product Codes	Note
UMES 16,3 mm LMES 10,0 mm		PDTC	Proportional model VA-7482-0011 (suitable for the VG5000 and VG4000) For proportional actuator suitable the VG5000 or VG4000, the jumper allow the user to set push down to close (PDTC) or push down to open (PDTO) function. The actuator is factory set for use with 2-way Push Down to Close (PDTC) VG4200 and VG5200 valves. For 2-way Push Down To Open (PDTO) VG4400 and VG5400 valve applications set the valve port selection jumper to PDTO. For 3-way VG4800 and VG5800 valve applications set the jumper to the valve port type that corresponds to the service port of the valve.
		PDTO	
		3,2 mm	VA-7482-1x01
		4,3 mm	VA-7482-2x01
		6,0 mm	VA-7482-3x01
		Auto Stroke Detection	VA-7482-8x01
UMES 14,5 mm LMES 8,2 mm		2,8 mm	VA-7482-5x01
		5,3 mm	VA-7482-6x01
		5,8 mm	VA-7482-7x01
		Auto Stroke Detection	VA-7482-9x01
UMES 16,3 mm LMES 10,0 mm	---	VA-7480-0xxx VA-7481-0xxx	Floating model VA-7480-0xxx / VA-7481-0xxx / VA-7480-4xxx All the Floating models have fixed stroke and the jumper option is not available.
UMES 14,5 mm LMES 8,2 mm	---	VA-7480-4xxx	


Note:

UMES: Upper Mechanical End Stroke / LMES: Lower Mechanical End Stroke

Dimensions (mm)



Technical Specifications

Actuator Models	VA-7480-00x1	VA-7481-00x1	VA-7480-00x3	VA-7481-00x3	VA-7482-x0x1
Action Control	Floating or PAT				Proportional
Supply Voltage (50/60Hz)	24 VAC +/-15%		230 VAC +/-10%		24 VAC +/-15% 24 VDC +/-15%
Input Impedance					
	Voltage: ---				>100 kΩ
	Current: ---				500 Ω
Power Consumption					
	Apparent: 2.5 VA		6.0 VA		2.5 VA
	Active: 1.5 W		2.2 W		1.5 W
Maximum Mechanical Stroke	6.3 mm				
Running Time	13 sec/mm	8 sec/mm	13 sec/mm	8 sec/mm	8 sec/mm
Protection	IP43				
Material					
	Cover: ABS + PC				
	Yoke: PA66 – Glass Mineral filled (30% total)				
	Thread Nut: Brass CuZn40Pb2				
Housing Colour	White semitransparent				
Thread Nut Connection	See "Ordering Codes"				
Ambient Operating Condition	0 °C to 50 °C, 10 to 90 RH%				
Ambient Storage Condition	-20 °C to 65 °C, 5 to 95 RH%				
Max. Fluid Temperature	95 °C				
Electrical Connections	1.5 m cable length (3 x 0.35 mm ²)		1.5 m cable length (3 x 0.75 mm ²)		1.5 m cable length (3 x 0.35 mm ²)
Operating Status Indications	LED				
Audible Noise Rating	< 30 dB(A)				
Shipping Weight	0.2 Kg				
 Compliance	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.				

Building Efficiency

Headquarters: Milwaukee, Wisconsin, USA
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