

# VA120...

## Electric Terminal Unit Actuator



The VA120... 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 VA120.. Series actuator is designed for field mounting onto FRAKTA KVDN.../ DKV... and competitor's Terminal Unit Valves.

Due to the innovative concept of auto stroke detection, the VA120.1M can be installed over most of the conventional terminal unit valve in the market and PICV with variable strokes.



### Benefits

- **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

- **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

### Technical Specifications

Actuator	VA120.1	VA120.2	VA120.1M
Torque	120 N	120 N	160 N
Running Time	8 / 13 sec/mm	8 / 13 sec/mm	8 sec/mm
Supply Voltage	24 VAC +/-15%	230 VAC +/-10%	24 VAC/DC +/-15%
Frequency	50-60 Hz	50-60 Hz	
Power Consumption			
- Apparent	2.5 VA	6.0 VA	2.5 VA
- Active	1.5 W	2.2 W	1.5 W
Input Impedance			
- Voltage	---	---	>100 kΩ
- Current			500 Ω
Electrical Connections	1.5 m cable length ( 3 x 0.35 mm <sup>2</sup> )	1.5 m cable length ( 3 x 0.75 mm <sup>2</sup> )	2 m cable Halogen Free ( 3 x 0.35 mm <sup>2</sup> )
Maximum Mechanical Stroke	6.3 mm		
Degree of Protection	IP 43		
Material			
- Cover	ABS + PC		
- Yoke	PA66 - Glass Mineral filled (30% total)		
- Thread Nut	Brass CuZn40Pb2		
Housing Colour	white semitransparent		
Thread Nut Connection	M30 x 1.5		
Operating Status Indications	LED		
Sound power level	<30 dB (A)		
Protection Class	II		
Ambient conditions			
- Operating temperature	-0...+50 °C		
- Storage temperature	-20...+65 °C		
- Humidity	5...95% RH not condensing		
Max. Fluid Temperature	95 °C		
Weight	0.2 Kg		
Service	Maintenance-free		
CE Compliance	Johnson Controls, Inc., declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.		

### Operation

#### 24 Vac Floating Model VA120.1

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 VA120.2

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

# VA120...

## Electric Terminal Unit Actuator



### 24 Vac/Vdc Proportional VA120.1M Calibration Cycle

#### Auto Stroke

**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

##### VA120.1M:

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

#### Compatible with the following valves



V5000	(DN10-DN20)
VG6000	(DN15-DN25)
VP1000	(DN15-DN20)
VP1000	(DN25-DN32)



VUT	
BUT	
VXL	
BXL	
VUL (DN10-DN20)	
BUL (DN10-DN20)	
VCL (DN10-DN15)	
VCL (DN20-DN32)	



VVP47	(DN15-DN25)
VXP47	(DN15-DN25)
VMP47	(DN15-DN25)
VVI46	(DN15-DN25)
VXI46	(DN15-DN25)
VVS46	(DN15-DN25)
VXS46	(DN15-DN25)



COCON QTZ	(DN10-DN15)
COCON QTZ	(DN20-DN32)
COCON 2TZ	(DN15-DN20)



TBV-C	(DN15-DN20)
TBV-CM	(DN15-DN25)
TBV-CMP	(DN15-D25)
KTCM512	(DN15-DN25)



VZx8	(DN15-DN25)
VZx8C	(DN15-DN20)



Optima Compact	* depending on valve cartridge
(DN15-DN32)	



AB-QM	(DN15-DN32)
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VSX	(DN15-DN25)
VMX	(DN15-DN25)
VTX	(DN15-DN25)



91 Series	(DN10-DN20)
93 Series	(DN25-DN32)



777 Series	
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145 Series	(DN15-DN25)
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2131	(DN15-DN25)
3131	(DN15-DN25)
4131	(DN15-DN25)



VFX	(DN15-DN20)
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### Operating status indication

#### VA120.1 / VA120.2

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

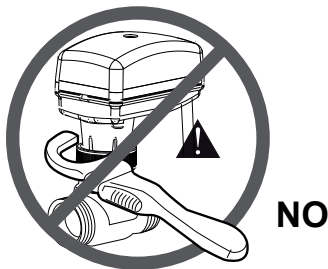
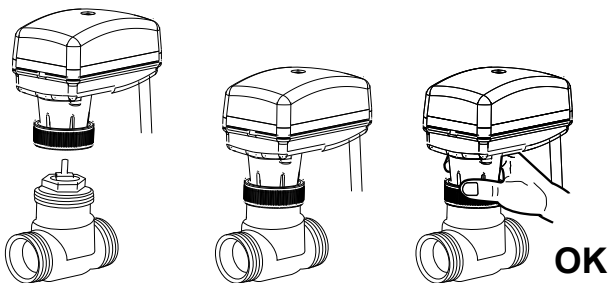
#### VA120.1M

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

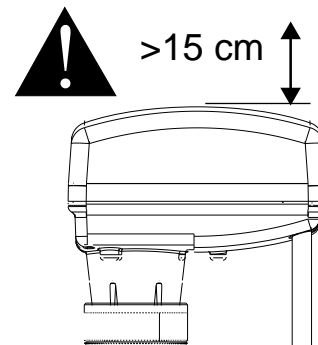
### Mounting Instruction

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

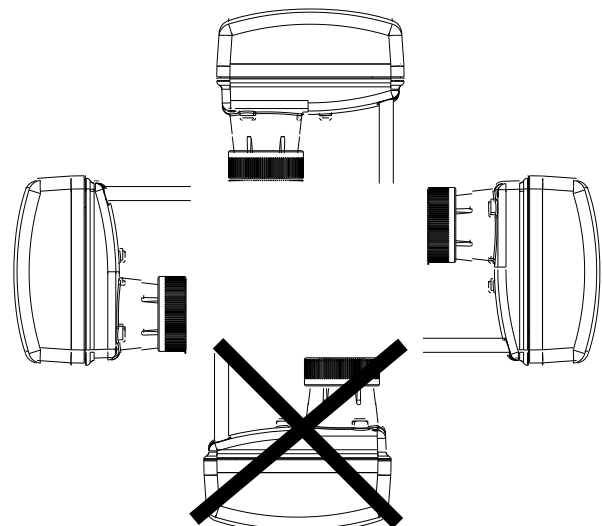


Never use the actuator as a mounting lever.

- 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:



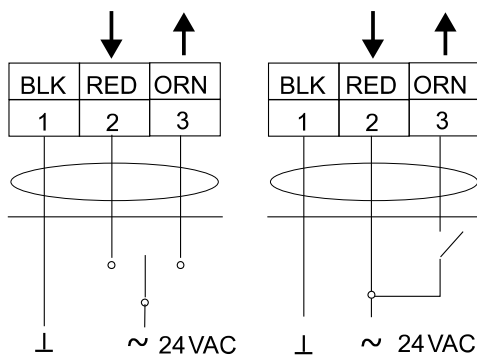
## Wiring Instruction



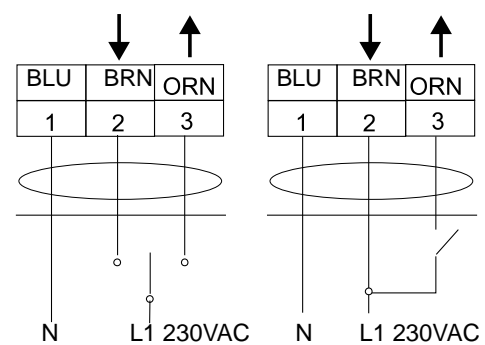
### WARNING

#### When servicing make sure that:

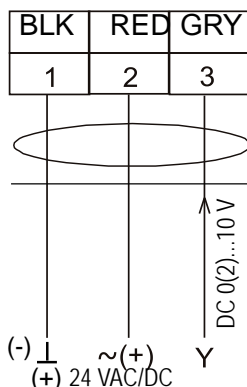
- The electric supply to the actuator is switched off to avoid possible damage to the equipment, personal injury or shock.
- You do not touch or attempt to connect or disconnect wires when electric power is on.
- All wiring should conform to local codes and must be carried out by authorized personnel 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 improper connected wires may result in permanent damage to the equipment.
- Not adhering to these operational instructions could cause injury or damage the equipment.



VA120.1 - Wiring Diagrams



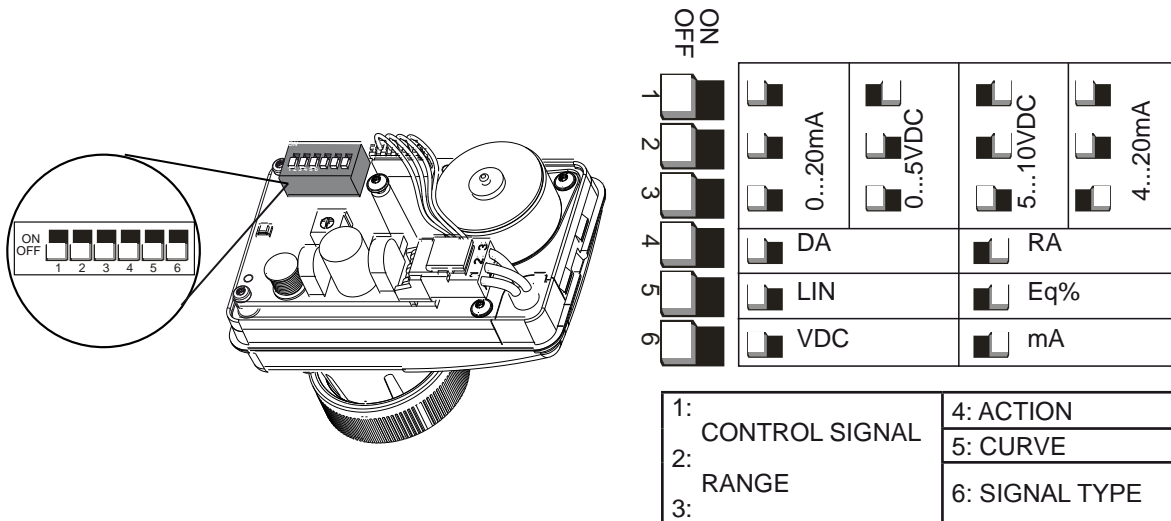
VA120.2 - Wiring Diagrams



VA120.1M - Wiring Diagrams

### Dip switch settings for Proportional model only VA120.1M

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.

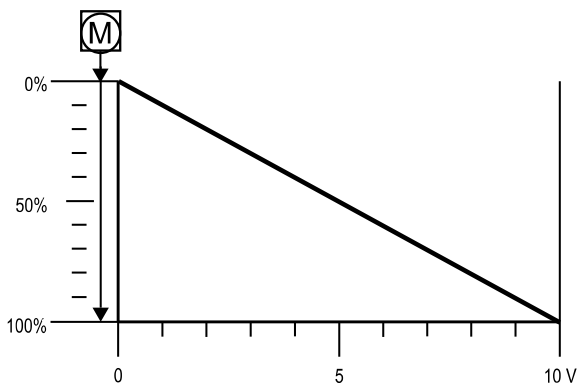


### Dip Switch 1 – 2 – 3 – 6

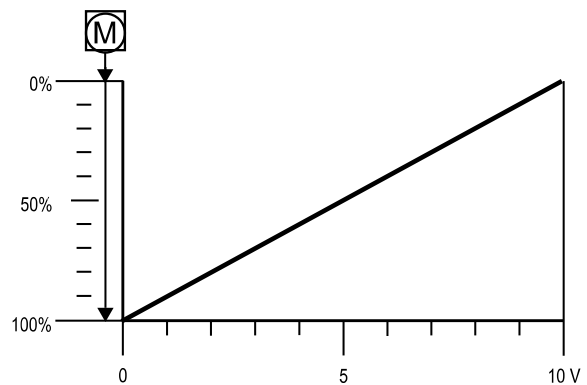
The dip switch 1-2-3 allow the user to change the analog input ranges. To switch from voltage analog input to current analog input the dip switch 6 has to be set accordingly.

### 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.

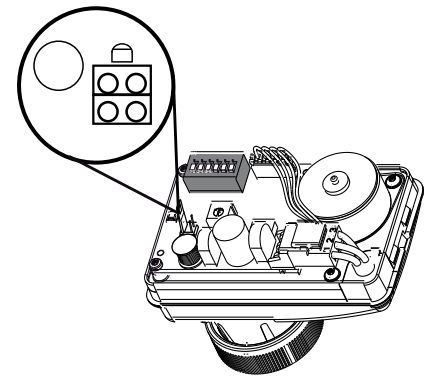
#### The dip switch 5 ON (almost Equal Percentage)

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

### Electrical actuator stroke and Closing Dimensions

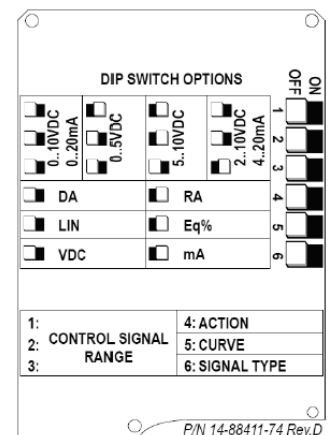
All the Proportional models with factory stroke configuration option have 1 jumper which allow the user to change the electrical stroke.

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.



### Actuator Information

<b>Closing Dimension:</b>	16,3....10,0mm
<b>Actuator running time:</b>	8sec/mm
<b>Factory Set AI:</b>	0-10V (dip 1-2-3-6 OFF)
<b>Factory Set Elect. Stroke:</b>	None - (Auto Stroke Detection)
<b>Factory Set Action:</b>	Direct (dip 4 OFF)
<b>Factory Set Behaviour:</b>	Linear (dip 5 OFF)



### Dimensions (mm)

