VA-7003 Series

Intelligent Actuators for VB-7000 Flanged Globe Valve Bodies

Features

- Bi-directional synchronous motor with Hall effect sensor switch
- Self stroke adjustment with memory
- Valve position indicator
- 0(2)-10 VDC or 0(4)-20 mA input models available
- Jumper selectable DA or RA setting
- Returns actuator to its fully up or fully down position when lack of input signal
- 0-10 VDC feedback signal
- Optional manual open/close positioner

General

The VA-7003 Series electric valve actuators are designed for 0(2)-10 VDC or 0(4)-20 mA control of VB-7000 Series 2-way or 3-way brass globe valve bodies.

The VA-7003 Series actuators feature a bi-directional synchronous motor with Hall effect sensor to eliminate the need for position switches. Position feedback from a 0-10 VDC potentiometer is a standard feature for all actuators. For ease of operation, factory-mount VA-7003 Series actuators onto the VB-7000 Series valve bodies are recommended.

For best control results, the thermostat or controller should be selected or adjusted to complement the stroke time of the VA-7003 actuator.

Direct Action (DA) and Reverse Action (RA) Switch Setting

DA is set to extend actuator stem when input signal increases and RA to retract actuator stem when input signal increases.The factory setting is DA. Can be changed in the field to RA by moving the switch 3 position at JP1.

Input Signal Interruption Protection

When there is no input signal or input signal is open-circuited, the actuator will return to its fully up or fully down position, depending on DA/RA (switch 2) setting at JP1. DA setting denotes fully up position and RA setting denotes fully down position.

Ordering

To order, specify complete model numbers. If 0(4)-20 mA input signal actuators are required, it is highly recommended to specify this requirement for factory-mount valve/actuator set on ordering, as fine factory adjustments on the control board may be needed

to accomplish best control results. Field change of 0(4)-20 mA input signal to 0(2)-10 VDC is not recommended.

Replacement and Repair

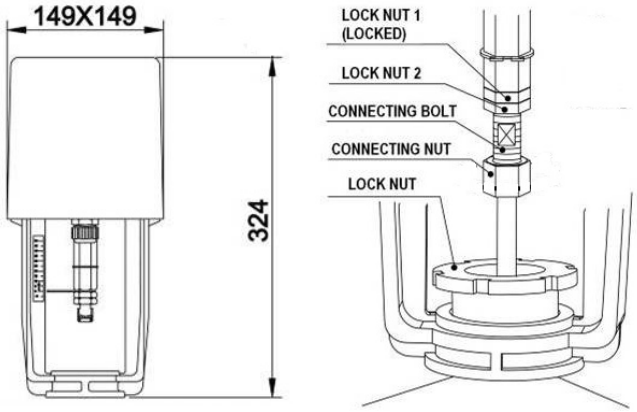
Field repairs must not be made and no field replacement parts are available.

Specifications

Product model numbers	VA-7103	0(2)-10 VDC (0(4)-20 mA) model
	VA-7103M	0(2)-10 VDC (0(4)-20 mA) model with manual open/close Positioner
	VA-7203	0(2)-10 VDC (0(4)-20 mA) model
	VA-7203M	0(2)-10 VDC (0(4)-20 mA) model with manual open/close Positioner
Actuator type	Non-spring return	
Control action	0(2)-10 VDC or 0(4)-20 mA: selectable DA or RA	
Power supply	24 V ±10% 50/60 Hz only	
Power rating	10 VA	
Input signal	Proportional: 0(2)-10 VDC or 0(4)-20 mA	
Input impedance	Proportional: 200,000 Ω of voltage input; 500 Ω of current input	
Feedback signal	0-10 VDC	
Motor type	Bi-directional synchronous motor with magnetic clutch	
Close-off force	2500 N for VA-7103 Series 4000 N for VA-7203 Series	
Stroke	48 mm maximum	
Electrical connection	Non-removable terminal block, wire size 1mm^2 or 18 AWG solid copper recommended	
Protection class	IP42	
Materials: Gear	Stainless steel and brass	
Reducer plate	Galvanized steel	
Bracket	Die-cast aluminum alloy	
Casing	Fire-retardant molded ABS (UL94V-0)	
Operating time	At 50 Hz: 4.6 s/mm for VA-7100 Series and 8.3 s/mm for VA-7200 Series At 60 Hz: 3.8 s/mm for VA-7100 Series and 6.9 s/mm for VA-7200 Series	
Ambient Conditions	Operating: 2 to 55ºC (36 to 131ºF); 0-90% RH, non-condensing Storage: -20 to 65ºC (-4 to 149ºF); 0-90% RH, non-condensing	
Accessories	Locknut and position pointer	
Factory settings	Input signal: 0-10 VDC Stroke self-calibration: at 50 Hz Control action: DA Failure protection: Up At fully-closed position (upwards)	
Dimensions	See Figure 1: Dimensions in mm and Mounting Details	
Shipping Weights	4.1 kg (9.1 lb) for VA-7103 Series 4.3 kg (9.5 lb) for VA-7203 Series	

The performance specifications above are nominal and subject to tolerances and application variables of generally acceptable industry standards. The Manufacturer shall not be liable for damages resulting from misapplication or misuse of its products.

Figure 1: Dimensions in mm and Mounting Details

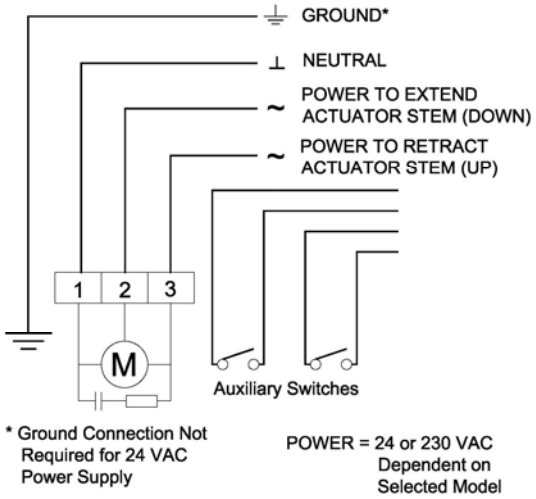


Mounting and Installation

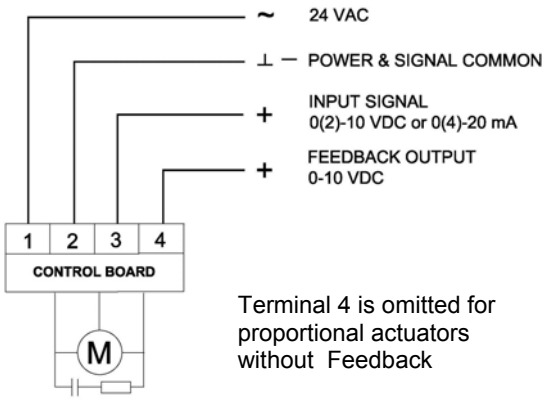
1. Mount the actuator bracket to the valve body.
2. Place the two half snap rings to the groove on the valve stem, lift and couple the valve stem to the connecting bolt. Rotate the connecting nut as far as it can go but not too tight and tighten actuator locknut 2 with a wrench. This is the fully-closed position of the valve set.
3. Tighten the valve locknut to secure the actuator bracket position.
4. Allow enough headroom for removing the actuator from the valve body.

Figure 2: Wiring Diagrams

3-Wire Floating Actuators



Proportional Actuators with Feedback



Terminal 4 is omitted for proportional actuators without Feedback

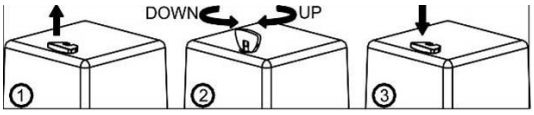
CAUTION: Equipment Damage Hazard

- Do not install the actuator in atmospheres where explosive or corrosive vapors or escaping gases are present. This could result in damage to the actuator.
- Protect the actuator against water dripping.

WARNING:

- All VA-7003 Series actuators are designed for use only in conjunction with operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add safety devices or alarm systems that protect against, and/or warn of, control failure.
- Electrical shock hazard! Disconnect power before installation to prevent electrical shock or equipment damage.

Manual Open/Close Positioner

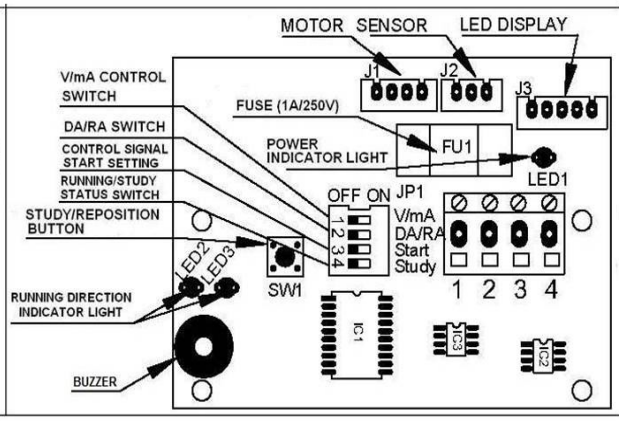


NOTE: Disconnect power supply before operating manual open/close positioner.

Figure 3: Jumper Settings

Jumper JP1 **Control Board**

CONTROL SIGNAL / STATUS SWITCH		0~10V DC	2~10V DC	0~20mA DC	4~20mA DC	DEFAULT SETTING
RUNNING STATUS	DA	OFF ON 1234	OFF ON 1234	OFF ON 1234	OFF ON 1234	OFF ON 1234
	RA	OFF ON 1234	OFF ON 1234	OFF ON 1234	OFF ON 1234	
STUDY STATUS	DA	OFF ON 1234	OFF ON 1234	OFF ON 1234	OFF ON 1234	
	RA	OFF ON 1234	OFF ON 1234	OFF ON 1234	OFF ON 1234	



Notes: 1. It is highly recommended that JP1 be set in run mode when the valve is in normal service.
2. For 60 Hz power supply operation, specify this requirement on ordering or implement the study mode at least once in the field.

Valve Stroke Self Calibration

Study Mode
After power is turned on, set all dip switches of JP1 according to the above table. Firstly, set switch 4 of JP1 to "ON" position. Press STUDY/REPOSITION momentary switch SW1 once, power LED1 will start flickering and buzzer sounds every 5 seconds. Actuator stem starts moving downwards and opening the valve until reaching its maximum stroke. When the gear chain is blocked, the actuator stem starts moving upwards and closing the valve until the valve is fully closed and the gear train is blocked again. The power LED1 becomes steady and the buzzer sounds a long beep, indicating that the study mode is finished and over. The valve stroke calibration data will be kept in the actuator's microcomputer memory and no further recalibration is required when power is turned on again.

After the test, place switch 4 to "OFF" position to put the actuator into run mode. Note that if the switch 4 is not placed back to its "OFF" position after the study mode, the valve assembly will still operate normally but the actuator will have to go through the study mode every time when power is turned on.

Run Mode
Every time when power is turned on, the power LED1 lights up steadily and the actuator will retract to its fully-closed position. The buzzer will then sound a long beep, indicating that the actuator is now ready to act in accordance with the input signal.

Change of Operating Mode
If operating mode needs to be changed, change the dip switch positions of JP1 as desired and new settings will be confirmed after the STUDY/ REPOSITION switch SW1 is pressed once. It is not necessary to turn the power off for this process to take place.

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