VA-7000 Series

# Electric Actuators for VB-7000 Flanged Globe Valve Bodies

## Features

- 24 VAC bi-directional synchronous motor
- Valve position indicator
- 3-wire floating or 0-10 VDC or 4-20 mA input models available (3-wire on-off models available as option)
- Jumper selectable DA or RA setting (0-10 VDC or 4-20 mA models only)
- Jumper selectable valve stroke: 24, 36, 40 or 42 mm
- Optional time-out protection for 3-wire floating models
- Returns actuator to its fully up or fully down position when lack of input signal
- Optional 0-10 VDC feedback signal (for 0-10 VDC or 4-20 mA models only)
- Optional auxiliary switches (for 3-wire floating models only)
- Optional manual open/close positioner

## General

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

The VA-7000 Series actuators feature a bi-directional synchronous motor with fully-closed and fully-open position limit switches. Position feedback from a 0-10 VDC potentiometer is a standard feature for all 0-10 VDC or 4-20 mA actuators.
For ease of operation, if the VA-7000 Series actuators are factory mounted onto the VB-7000 Series valve bodies, field calibration of travel adjustments of the actuators is not required.

For best control results, the thermostat or controller should be selected or adjusted to complement the stroke time of the VA-7000 actuator.

## Direct Action (DA) and Reverse Action (RA) Jumper Setting (Proportional Models Only)

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 jumper from J1 to J2.

## Optional Feedback Signal (Proportional Models Only)

0-10 VDC feedback signal is available on VA-7101x and VA-7201x actuators.

## Optional Auxiliary Switches

The actuators are available with auxiliary switches as an option on 3-wire floating models only, which allow contact activation between fully-closed and fully-open positions.

## Input Signal Interruption Protection (Proportional Models Only)

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 the J4 jumper setting. The factory setting is fully up position. Can be changed in the field to fully down position by moving the jumper at J4

## Ordering

To order, specify complete model numbers. If 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 0-20 mA input signal to 2-10 VDC is not recommended.

## Replacement and Repair

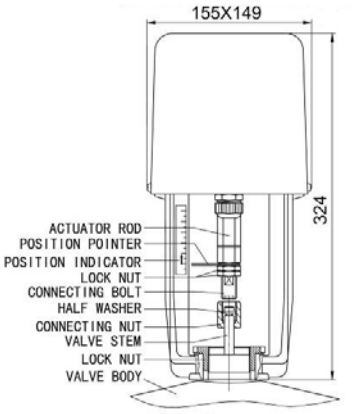
Field repairs must not be made and no field replacement parts are available.

## Specifications

| | | |
|---|---|---|
| Product model numbers | VA-7100x<br>VA-7101x<br>VA-7102x<br>VA-7104x<br>VA-7200x<br>VA-7201x<br>VA-7202x<br>VA-7204x | 3-wire floating model<br>0-10 VDC model with 0-10 VDC feedback<br>0-10 VDC model without 0-10 VDC feedback<br>3-wire floating model with time-out protection<br>3-wire floating model<br>0-10 VDC model with 0-10 VDC feedback<br>0-10 VDC model without 0-10 VDC feedback<br>3-wire floating model with time-out protection |
| | Where x = omitted = standard model without options<br>x = M = with manual open/close positioner<br>x = S = with 2 auxiliary switches<br>x = K = with manual open/close positioner and 2 auxiliary switches<br>**Notes:** Above model numbers are for 24 VAC supply voltage. Add suffix "(230)" to the model numbers when ordering 230 VAC supply voltage version. Example: VA-7100M(230). | |
| Actuator type | Non-spring return | |
| Control action | 3-wire floating: reversible<br>0)-10 VDC or 4-20 mA: selectable DA or RA | |
| Power supply | 3-wire floating: 24 or 230 V ±10% 50/60 Hz<br>0-10 VDC or 4-20 mA: 24 V ±10% 50/60 Hz only | |
| Power rating | 10 VA | |
| Input signal | 3-wire floating: 24 or 230 V ±10% 50/60 Hz<br>Proportional: 0-10 VDC or 4-20 mA | |
| Input impedance | Proportional: 100,000 Ω of voltage input; 500 Ω of current input | |
| Feedback signal | 0-10 VDC (VA-7101x and VA-7201x models only) | |
| Auxiliary switch contact rating | Two SPDT rated at 24 VAC 1.5 A inductive, 3 A resistive per switch | |
| Motor type | Bi-directional synchronous motor | |
| Close-off force | 2500 N for VA-7100 Series<br>4000 N for VA-7200 Series | |
| Stroke | Choice of 13, 15, 17, 19 or 22 mm by jumper | |
| Electrical connection | Non-removable terminal block (wire leads for auxiliary switches), wire size 1mm$^2$ or 18 AWG solid copper recommended | |
| Protection class | IP42 | |
| Materials: Gear | Stainless steel and brass | |
| Reducer chassis | Zinc-plated 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<br>At 60 Hz: 3.8 s/mm for VA-3100 Series and 6.9 s/mm for VA-7200 Series | |
| Ambient Conditions | Operating: 2 to 55ºC (36 to 131ºF); 0-90% RH, non-condensing<br>Storage: -20 to 65ºC (-4 to 149ºF); 0-90% RH, non-condensing | |
| Accessories | Locknuts, connecting nut, half washer and position pointer | |
| Factory settings | <u>3-wire floating</u><br>At fully-open position (downwards)<br><u>0-10 VDC (if 4-20 mA not specified)</u><br>Stroke: 42 mm<br>Input signal: 0-10 VDC<br>Control action: DA<br>Failure protection: Up<br>At fully-open position (downwards) | |
| Dimensions | See Figure 1: Dimensions in mm and Mounting Details | |
| Shipping Weights | 4.1 kg (9.1 lb) for VA-7100 Series<br>4.3 kg (9.5 lb) for VA-7200 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

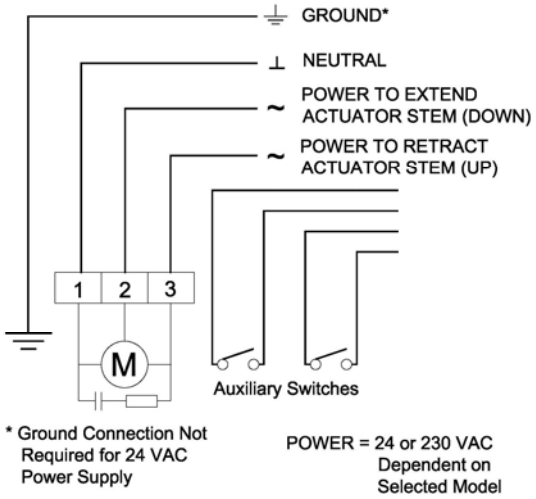



**Mounting and Installation**

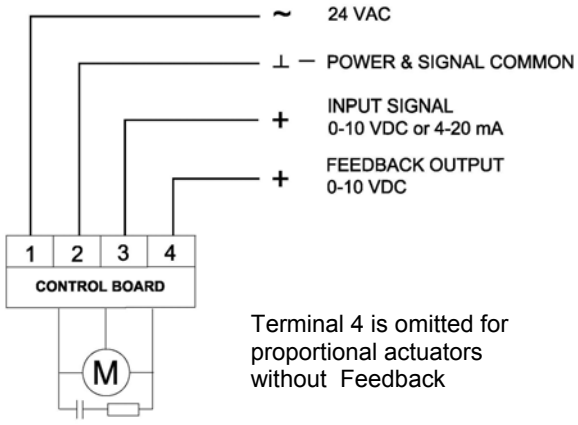
1. Mount the actuator bracket to the valve body, install the connecting nut onto the valve stem and insert the two half washers into its groove on the top.
2. Place the position pointer and locknut to the actuator connecting bolt. Rotate the valve connecting nut into the actuator connecting bolt as far as it can go and tighten the actuator locknut 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**

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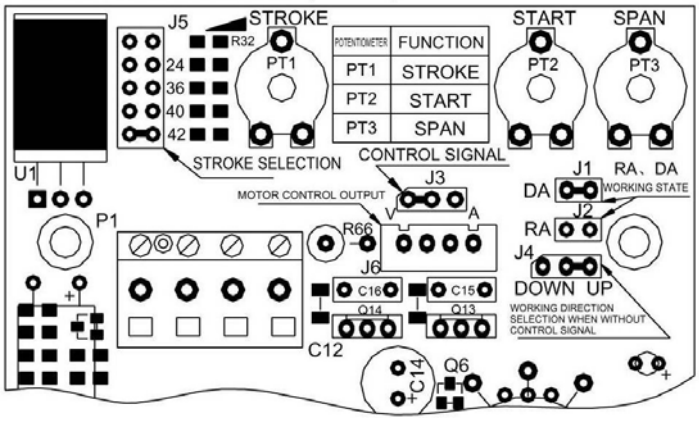
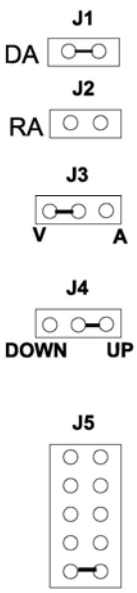
## Figure 3: Jumper Settings

**Control Board**




**Jumpers**




TRAVEL DIRECTION JUMPERS
DA: Signal increase to go down
Signal decrease to go up
RA: Signal decrease to go down
Signal increase to go up

INPUT SIGNAL JUMPER
V = Voltage Input
A = Current Input

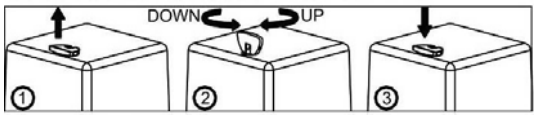
INPUT SIGNAL INTERRUPTION PROTECTION JUMPER
UP = Fully retracted
DOWN = Fully extended

VALVE STROKE JUMPER
24 = 24 mm
36 = 36 mm
40 = 40 mm
42 = 42 mm

**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-3000 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.
- Do not adjust potentiometers PT2 and PT3 which are for factory use only.

### Manual Open/Close Positioner




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

## Valve Stroke Calibration

**For 3-wire Floating Actuators**
1. Apply power to Terminals 1 and 3 and the valve stem starts moving upwards until it stops at its fully-closed position.
2. Apply power to Terminals 1 and 2 and the valve stem starts moving downwards until it stops at its fully-open position.
3. If the valve stem has not moved to the top or bottom end but the motor has been locked (motor shaft keeps vibrating), disconnect power and adjust the distance between the connecting bolt and the connecting nut.
4. Repeat Steps 1 to 3 until both top and bottom ends are reached.

**For Proportional Actuators**
1. Set stroke jumper J5 according to the VB-7000 valve body stroke.
2. Connect 24 VAC power to Terminals 1(~) and 2 (⊥).
3. Apply fully-open signal, 10 V or 20 mA, to Terminals 2(-) and 3(+) and actuator will start moving downwards until the red indicating LED turns off.
4. If the actuator stops but the LED remains on, it means that the valve stem has been over-driven. Adjust the stroke potentiometer PT1 until the LED goes off.
5. Apply fully-closed signal, 0 VDC or 4 mA, and actuator will start moving upwards until the LED goes off.
6. If the actuator stops but the LED remains on, loosen the actuator locknut and slightly unscrew the valve stem from the actuator connecting bolt until the LED goes off. Tighten the locknut to confirm this fully-closed position.
7. Repeat Steps 3 to 6 to ensure correct working cycle between the fully-closed and fully-open positions.