VA-3500/VA-3600 Series

Intelligent Actuators for VB-3000Q Series Brass Globe Valve Bodies

Features

- Bi-directional synchronous motor with Hall effect sensor switch
- Self stroke adjustment with memory
- Valve position indicator
- 3-wire floating, 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 LED stroke display for proportional models
- Optional 2 auxiliary switches
- Optional manual open/close positioner

General

The VA-3500/VA-3600 Series electric valve actuators are designed for 3-wire floating, 0(2)-10 VDC or 0(4)-20 mA control of VB-3000Q Series 2-way or 3-way brass globe valve bodies.

The VA-3500/VA-3600 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-3500/VA-3600 Series actuators onto the VB-3000Q 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-3500/VA-3600 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

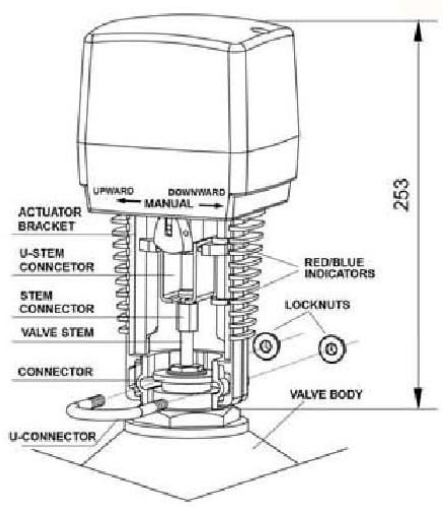
Field repairs must not be made and no field replacement parts are available. When a discontinued VA-3000 Series actuator is replaced with a VA-3500 or VA-3600 Series intelligent actuator, order a VB-3000Q valve connector

Specifications

Product model numbers	VA-3500x 3-wire floating model VA-3503x 0(2)-10 VDC (0(4)-20 mA) model VA-3503Dx 0(2)-10 VDC (0(4)-20 mA) model, with LED stroke display VA-3600x 3-wire floating model VA-3603x 0(2)-10 VDC (0(4)-20 mA) model VA-3603Dx 0(2)-10 VDC (0(4)-20 mA) model, with LED stroke display Where x = omitted = standard model without options x = M = with manual open/close positioner x = S = with 2 auxiliary switches x = K = with manual open/close positioner and 2 auxiliary switches **Notes:** Above model numbers are for 24 VAC supply voltage. Add suffix "(230)" to the 3-wire floating model numbers only when ordering 230 VAC supply voltage version. Example: VA-3500M(230).
Actuator type	Non-spring return
Control action	3-wire floating; or
	0(2)-10 VDC or 0(4)-20 mA, selectable DA or RA
Power supply	24 V ±10% 50/60 Hz for all models or 230 V ±10% 50/60 for 3-wire floating models only
Power rating	1 VA for PCB
Input signal	3-wire floating;
	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 (1 mA)
Motor type	Bi-directional synchronous motor with Hall effect sensor
Close-off force	1000 N for VA-3500 Series
	1500 N for VA-3600Series
Stroke	29 mm maximum
Electrical connection	Non-removable terminal block, wire size 1mm^2 or 18 AWG solid copper recommended
Protection class	IP54
Materials: Gear	Stainless steel and POM plastic for VA-3500 Series
	Stainless steel and brass for VA-3600 Series
Bracket	Die-cast aluminum alloy
Casing	Fire-retardant molded ABS (UL94V-0)
Operating time	At 50 Hz: 4.6 s/mm for VA-3500 Series and 7.77 s/mm for VA-3600 Series
	At 60 Hz: 3.8 s/mm for VA-3500 Series and 6.45 s/mm for VA-3600 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	U-connector and locknuts
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	1.10 kg (2.4 lb) for VA-3500 Series
	1.15 kg (2.5 lb) for VA-3600 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



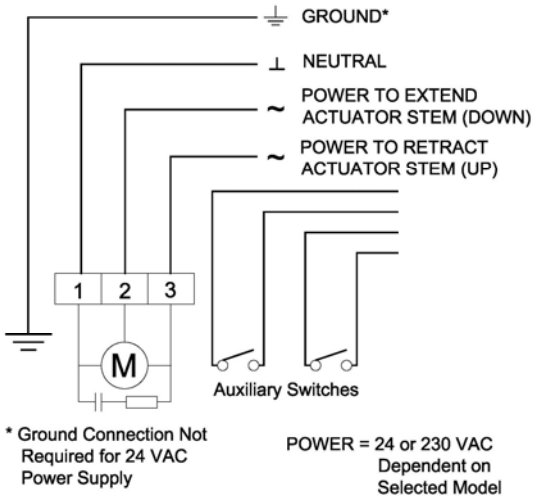
Mounting and Installation

1. Mount the actuator bracket to the valve body and install the U-connector and locknuts to secure the actuator bracket position.
2. Lift and couple the valve stem to the actuator U-connector. Rotate and tighten the stem connector as far as it can go. This is the fully-closed position of the valve set.
3. Allow at least 100 mm headroom for removing the actuator from the valve body.

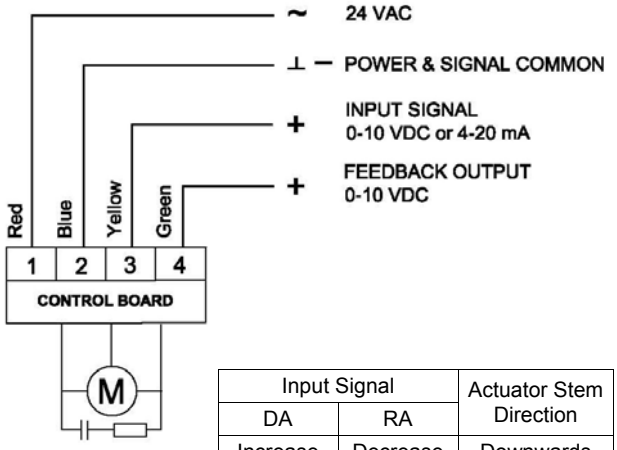
Note: When replacing a discontinued VA-3000 Series actuator with a VA-3500 or VA-3600 intelligent actuator, remove the original VB-3000 valve connector and replace with a new VB-3000Q valve connector which is ordered separately.

Figure 2: Wiring Diagrams

3-Wire Floating Actuators



Proportional Actuators with Feedback



Input Signal		Actuator Stem Direction
DA	RA	
Increase	Decrease	Downwards
Decrease	Increase	Upwards

CAUTION: Equipment Damage Hazard

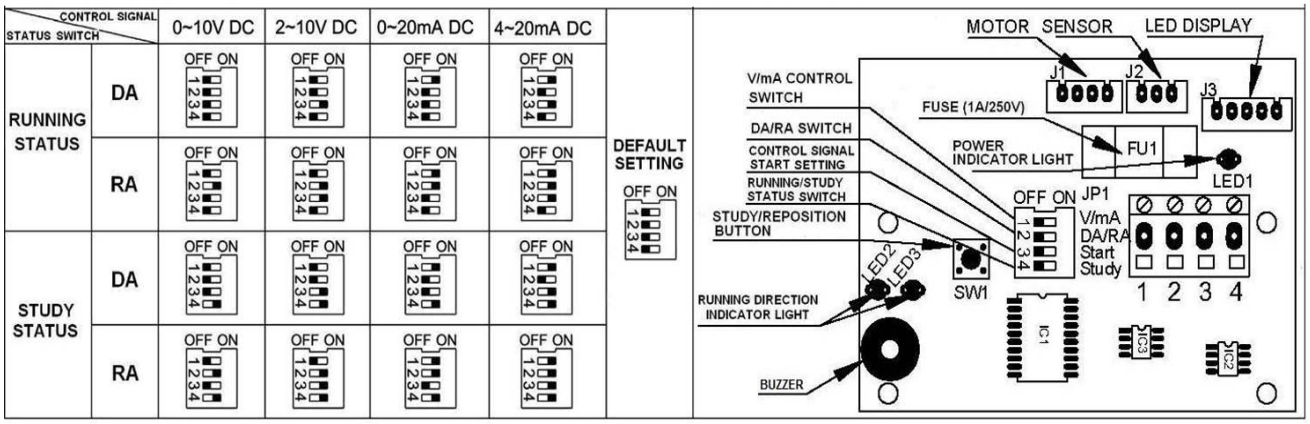
- Do not install the actuator in atmospheres where explosive or corrosive vapors or escaping gases are present. This could result in damage to the actuator.
- Protect the actuator against water dripping.

WARNING:

- All VA-3500/VA-3600 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.

Figure 3: Jumper Settings

Jumper JP1 **Control Board**



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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