

# VAP/VAF-B Series Actuator





# VAP/VAF-B Series Actuator



VAP/VAF 500/1000 Series



VAP/VAF 1800/3000 Series

## Feature

- 1: Modulating control models (VAP-B) and floating control models (VAF-B)
- 2: Rated force of 500N/1000N/1800N/3000N
- 3: Operating voltage for VAP-B is 24VAC, VAF-B is either 24VAC or 220VAC
- 4: Direct mounting on valve body
- 5: Position feedback signal of 0 (2) V~10VDC or 0 (4) ~20mA (VAP-B only)
- 6: Self-adapting function, automatic detection of max. stroke (VAP-B only)
- 7: CE certified actuator

## Technical Data

### VAP-B Series

Model	VAP500-24-B	VAP1000-24-B	VAP1800-24-B	VAP3000-24-B	Model	VAP500-24-B/VAP1000-24-B/ VAP1800-24-B/VAP3000-24-B
Rating Force	500N	1000N	1800N	3000N	Control Signal	0 (2) ~10VDC, 0 (4)~20mA
Power Supply	24V AC +/-15%				Feedback Signal	0 (2) ~10VDC, 0 (4)~20mA
Type of Control	Proportional				Voltage Input Impedance	>100K
Power Consumption	7.5VA		15VA		Current Input Impedance	<0.167K
Max. Stroke	22mm		43mm		Voltage Output Load	>1K
Running Speed	3.85s/mm (50Hz)		3.2s/mm (50Hz)		Current Output Load	<0.5K
Net Weight	1.7Kg		5.2Kg		Up and Down Dead Band	≤2.5%
Sensitivity	High sensitivity≤1.0%; Low sensitivity≤1.5%		High sensitivity≤1.5%; Low sensitivity≤2.0%		Ambient Humidity	≤95% RH (40°C)
Enclosure Rating	IP54				Ambient Temperature	-10°C~50°C

Note: Sensitivity is related with resolution of control signal. Default low sensitivity is good for most HVAC application while in some critical control applications, high sensitivity is recommended.

## VAF-B Series

<b>Model</b>	VAF500-24-B	VAF500-220-B	VAF1000-24-B	VAF1000-220-B	VAF1800-24-B	VAF1800-220-B	VAF3000-24-B	VAF3000-220-B
<b>Rating Force</b>	500N		1000N		1800N		3000N	
<b>Power Supply</b>	24V AC+/-15%	220V AC+/-15%	24V AC+/-15%	220V AC+/-15%	24V AC+/-15%	220V AC+/-15%	24V AC+/-15%	220V AC+/-15%
<b>Type of Control</b>	Floating							
<b>Power Consumption</b>	5.5VA				13VA			
<b>Max. Stroke</b>	22mm				43mm			
<b>Running Speed</b>	3.85s/mm(50Hz)				3.2s/mm(50Hz)			
<b>Net Weight</b>	1.7kg				5.2kg			
<b>Enclosure Rating</b>	IP54							
<b>Ambient Humidity</b>	≤95% RH (40°C)							
<b>Ambient Temperature</b>	-10°C~50°C							

## Control Function

For VAP-B Series modulating actuator, the control signal between terminal O and E:

Signal goes up, actuator shaft extends

Signal goes down, actuator shaft retracts

Signal keeps same, actuator shaft stay unchanged.

Note: this can be adjusted by DIP switch.

For VAF-B Series floating actuator, signal on:

Terminal 1 and 2, actuator shaft extends

Terminal 1 and 3, actuator shaft retracts

Neither of them, actuator shaft stops

## Valve Models

This actuator can work with Johnson Controls VGA series globe valve.

VGA82xx 2-way flanged globe valve

VGA88xx 3-way flanged mixing globe valve

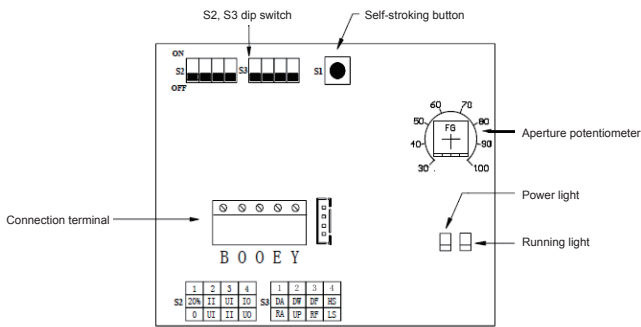
VGA89xx 3-way flanged diverting globe valve

VGA72xx 2-way threaded globe valve

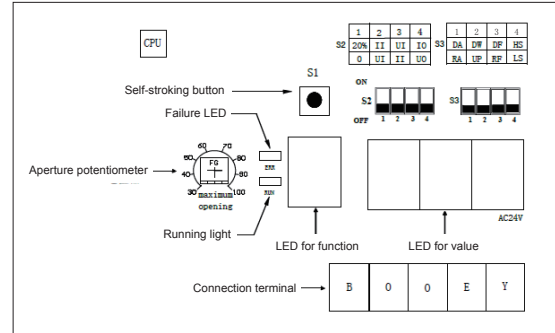
VGA78xx 3-way threaded mixing globe valve

VGA79xx 3-way threaded diverting globe valve

## PCB Design (VAP-B only)



VAP500-24-B/VAP1000-24-B



VAP1800-24-B/VAP3000-24-B

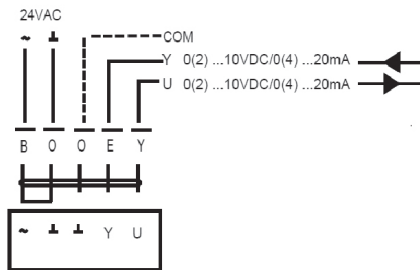
Note: Aperture potentiometer is adjusted to limit the maximum opening, which can be used in for example, different flow rate during summer and winter.

## Mechanical Design

- Maintenance free
- Manual adjustment
- Window/LED for VAX1800/3000 series

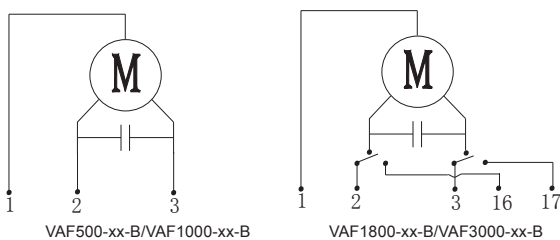
## Wiring Diagram

### VAP-B



Terminal	
B,O	24VAC Power supply
O	COM for control/feedback signal
E	Control signal
Y	Feedback signal

### VAF-B



VAF500-xx-B/VAF1000-xx-B

VAF1800-xx-B/VAF3000-xx-B

1	COM
2	DOWN
3	UP
16	Active contact for DOWN limiter (Voltage)
17	Active contact for UP limiter (Voltage)

Note 1: Active contact is 24VAC when power is 24VAC and active contact is 220VAC when power is 220VAC.

Note 2: Active contact is triggered by stall force in either 0% or 100%.

When actuator retracts to the upper limit position, the motor is power off and the red up limit indicator light is on.

When actuator extracts to the down limit position, the motor is power off and the green down limit indicator light is on.

## Commissioning Instruction (VAP-B only):

- A. Assemble the actuator with valve body. ( Please refer to installation instructions)
- B. Turn off the power switch of actuator.(Power switch is under the right side of VAP1800-24-B /VAP3000-24-B actuator, no power switch for VAP500-24-B/VAP1000-24-B)
- C. Finish the wiring. (Please refer to wiring diagram)
- D. Set DIP switches as required. (DIP switches can be set when power on)
- E. Turn on the power switch of actuator.
- F. Self-stroking. (Factory setting: self-stroking starts automatically when power on each time) : The purpose of this step is to make the actuator matching with the stroke of the valve body.
  - 1) Turn on the power switch, self-stroking starts automatically.
  - 2) Running light (RUN) flickers (frequency 1Hz. Actuator axes extends until down limit position, then retracts to up limit position. This moment, actuator can not be controlled by control signal.)
  - 3) Running light (RUN) stops flickering after appr. 3 minutes when self-stroking finish. Now actuator matches the stroke of the valve body. Actuator can be controlled by control signal.
- G. Aperture regulating. Biggest stroke of the valve can be adjusted from 30%~100% of its original stroke by regulating the aperture potentiometer. Flow rate can be regulated neatly.(40%~30%, only low sensitivity of control signal. 100%~40% high and low sensitivity selectable.)

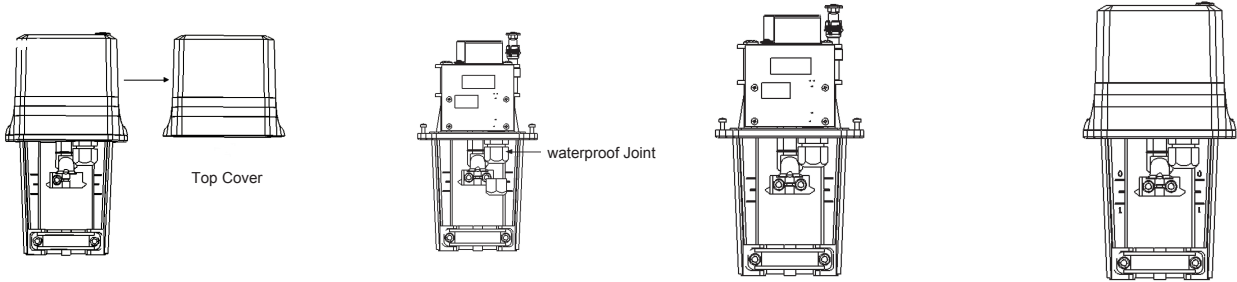
Remarks: 1. When power on, self-stroking can also be operated manually by pressing the red selfstroking button on PCB for over 3 seconds. Self-stroking cycle repeats as step 2) & 3).  
 2. If you want to change self-stroking mode, adjust the seventh DIP switch. (Please refer to DIP switch setting).

## DIP Switch Setting (VAP-B only):

DIP		Function	Description	
S2	1	Starting of control / feedback signal	ON	20%:The starting control / feedback signal is 20% (namely 4~20mA or 2~10VDC)
			OFF	0:The starting control / feedback signal is 0 (namely 0~20mA or 0~10VDC) (factory setting)
	2	Type of control signal	ON	II: current signal
			OFF	UI: voltage signal (factory setting)
	3	Selection of control signal	ON	UI: voltage signal (factory setting)
			OFF	II: current signal
	4	Type of feedback signal	ON	IO: current signal
			OFF	UO: voltage signal (factory setting)
S3	1	Operating mode	ON	DA: when control signal is increasing, the actuator axes extends
			OFF	RA: when controls signal is increasing, the actuator axes retracts (factory setting)
	2	Losing control signal mode	ON	DW: When lose control signal (voltage type), the minimum control signal (will be applied automatically) When lose control signal (current type), the minimum control signal (will be applied automatically)
			OFF	UP: When lose control signal (voltage type), the maximum control signal (will be applied automatically) When lose control signal (current type), the minimum control signal (will be applied automatically)
	3	Self-stroking mode	ON	DF: Power up each time, self-stroking starts automatically (factory setting)
			OFF	RF: Self-stroking starts only when press the red self-stroking button manually
	4	Sensitivity	ON	HS: The high sensitivity of control signal (VAP500-24-B/VAP1000-24-B) $\leq 1.0\%$ (100%~40%); $\leq 1.5\%$ (40%~30%) The high sensitivity of control signal (VAP1800-24-B/VAP3000-24-B) $\leq 1.5\%$ (100%~40%); $\leq 2\%$ (40%~30%)
			OFF	LS: The low sensitivity of control signal (VAP500-24-B/VAP1000-24-B) $\leq 1.5\%$ (100%~30%) (factory setting) The low sensitivity of control signal (VAP1800-24-B/VAP3000-24-B) $\leq 2\%$ (100%~30%) (factory setting)

## Wiring Instruction

### VAX500/1000 Series



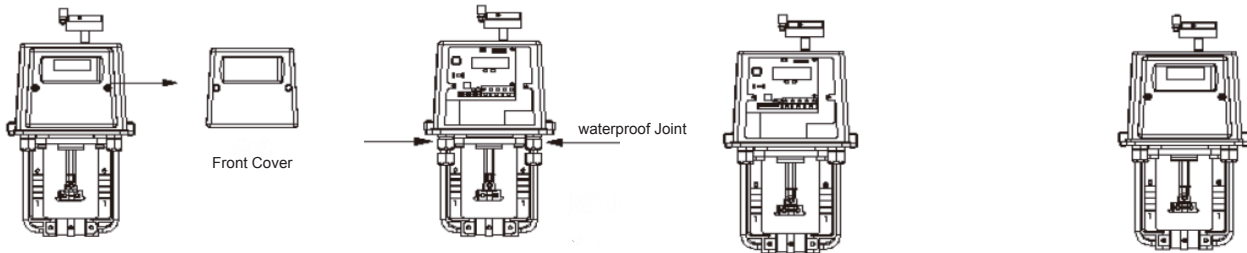
Remove the top cover, prepare to wire.

Unscrew the waterproof joint, wire goes through the hole of waterproof joint, connect the wire to the terminals as required.

Screw the waterproof joint after wiring.

Assemble the top cover and tighten the screws.

### VAX1800/3000 Series



Remove the front cover, prepare to wire.

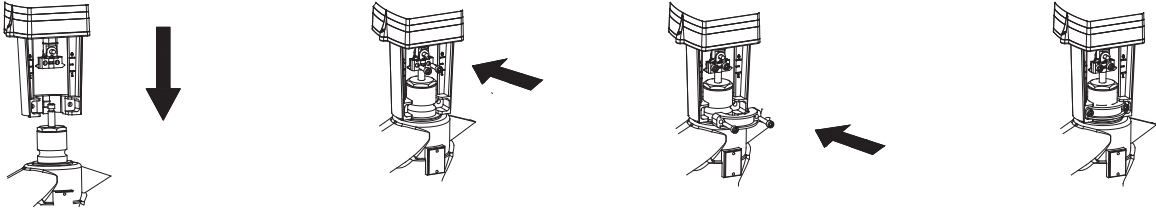
Note: No need to remove the top cover for wiring.

Unscrew the waterproof joint, wire goes through the hole of waterproof joint, connect the wire to the terminals as required.

Screw the waterproof joint after wiring.

Assemble the top cover and tighten the screws.

## Installation with Valve



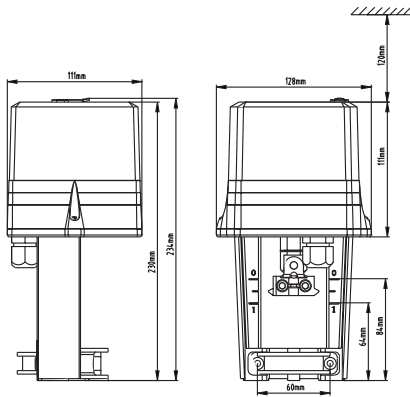
Prepare for assembling the actuator, take down the fixed fitting firstly, and then disentangle the clip.

Keep the actuator's axes and the valve's stem concentric, make these two connecting faces and keep coinciding. Then lock the two screws on the clip.

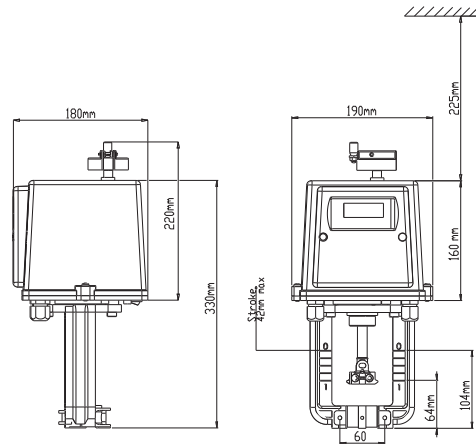
Pull the fixed fitting to the groove and lock by two screws.

The status after assembled.

## Dimensions



VAx500/1000 Series



VAx1800/3000 Series

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