

Modulating & On/Off Globe Valve Actuators



MVL

DESCRIPTION

Electronic, asynchronous, motor-driven, bidirectional, noiseless, globe valve, non-spring and spring return (fail-safe control) actuators.

APPLICATION

Actuators with integrated coupling for 1/2" to 8", 2-way or 3-way globe valves in commercial and industrial heating, ventilation and air-conditioning systems. Can be controlled by any compatible electric or electronic analog controller, DDC/PLC control or automation system.

FEATURES

- Easy valve-actuator coupling
- Manual override
- Overload protected
- Selectable control ranges
- Low power consumption
- Compact size
- Quiet operation
- Maintenance free
- Two-year warranty



SPECIFICATIONS

Control		Running time	Refer to table
Input signal	Refer to table	Power failure	
- voltage	0.1 mA max.	- actuator, NSR	Stay in last position of operation
- current	4-20 mA w/250 Ω load	- actuator, w/SR	Spring return to fully closed or open position
- connection	3-wire, 4-wire or 5-wire		Markers on actuator coupling linkage indicate piston/stem position
Feedback signal	Refer to table	Position indicator	Electronic throughout stroke
- voltage	2 mA max.		
Electrical		Overload protection	
Power supply	Refer to table	Manual override	
Frequency	50/60 Hz	- actuator, NSR	Built-in knob
Power consumption	12 VA	- actuator, w/SR	Use of external wrench

Input Signal	Feedback Signal	Power (± 10%)	Spring Return	Part Numbers
Tri-state (3-point floating), or On/Off	1K Ω pot, optional	24 VAC	n/a	MVL46
			SR stem up SR stem down	MVL46A MVL46C
		110 VAC	n/a	MVL66
		230 VAC	n/a	MVL26
Proportional, range/action selectable: • 0-10 VDC • 1-5 VDC • 6-9 VDC • 2-10 VDC • 4-7 VDC • 8-11 VDC • 4-20 mA • Direct action • Reverse action	Selectable: • 0-10 VDC • 10-0 VDC • 0-200 μA • 200-0 μA	24 VAC	n/a	MVL56
			SR stem up SR stem down	MVL56A MVL56C

Performance

Positioning force		Motor type	Reversible asynchronous motor w/built-in end switches
- actuator, NSR	337 lbf (1500 N)	Noise level	
- actuator, w/SR	157 lbf (700 N)	- actuator, NSR	< max. 30 dB(A)
Positioning stroke		- actuator, w/SR	< max. 62 dB(A)
- MVL 46/66/26	0 to 1.77 in. (0 to 45 mm)		
- MVL 56	0.39 to 1.77 in. (10 to 45 mm)		
- mechanical stroke end	0.83 in. (21.0 mm)		

SPECIFICATIONS

Environmental

Permissible ambient
 - working temperature 5°F to 122°F (-15°C to 50°C)
 - storage temperature -13°F to 149°F (-25°C to 65°C)
 - humidity Max. 80% RH

Physical

Enclosure Fire retardant, UL94-HB
 - cover material ABS
 - frame/linkage material Alloy die-cast
 - color Blue and black
 - protection NEMA 2 (IP 55), conforms to IEC 730-1(93)/6.5.3
 - protection class DIN 400050 (IEC 529)
 Mounting position Horizontal or vertical; avoid cable outlet pointing upwards

Cable entry 2 holes, covered for 1/2" conduit connector; diameter 0.75 in. (19 mm)

Wire connection Terminal block, screw type for lead wire
 Wire size Min. 16 AWG (1.5 mm²)
 Max. 14 AWG (2.5 mm²)

Weight
 - actuator, NSR 6.6 lbs. (3.0 kg)
 - actuator, w/SR 8.8 lbs. (4.0 kg)

Valve Body, Compatibilities
 VSG, VMB16, SS, DS, 3V, VBS, VBG, V.B standard and high performance globe valve series, and other valves fitting MVL stroke specification

Valve Coupling Manufacturing Conformity
 Integrated linkage
 ISO 9001 certified
 EMC 89/336 directive, EN 50081-1 for emission and EN 50082-1 for immunity
 CE

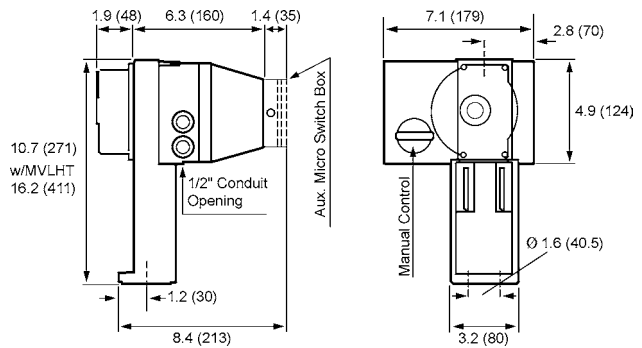
Listings/Approvals Warranty
 Two-year material and workmanship

OPTIONS

- **DMVL** (2) SPDT 250 VAC, 10(3) A, Aux. micro switches, separate box attachment to actuator enclosure
 w/adjustable cam, 0-100% of stroke, terminal block, screw type for lead wire, confirms to IEC 730-1(93)16.4.3.2
- **MVLPA** 1K Ω, 0-100% of stroke, terminal block, screw type for lead wire
 Aux. feedback pot built-on separate PC board
- MVLPA4** For MVL46
- MVLPA4M** For MVL46 A/C
- MVLPA6** For MVL66
- MVLPA2** For MVL26
- **AG31** For coupling MVL to VSB/VMB valve series
 Linkage kit

DIMENSIONS

inches (mm)



Running Time, full stroke			
w/Valve series, Size, Stroke Length	Seconds @		
	50 Hz	60 Hz	SR*
VSB/VMB, 1/2" to 2", 0.65 in. (16.5 mm)	22	19	16
VSG/VMB16, 2 1/2", 0.98 in. (25 mm)	33	28	25
VSG/VMB16, 3"+ up 1.77 in. (45 mm)	60	50	45

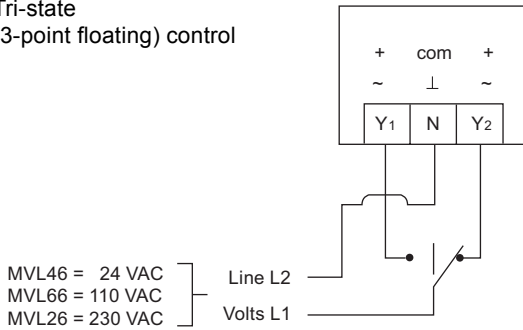
* SR = Spring return

- **MVLHT** Actuator-valve mount spacer
 To reduce direct exposure of valves high temperature fluids when actuator is vertically installed and fluid temperature is above 248° (120°C)
- **245/6** Stem heater
 For media temperature below 14°F (-10°C) to avoid freeze-up of actuator/valve stem, 24 VAC, 25 VA for 246, and 75 VA for 245
- 245** For VSG, VMB16, SS, DS and 3V valve series
- 246** For VSB and VMB valve series

WIRING CONFIGURATION

MVL46/66/26

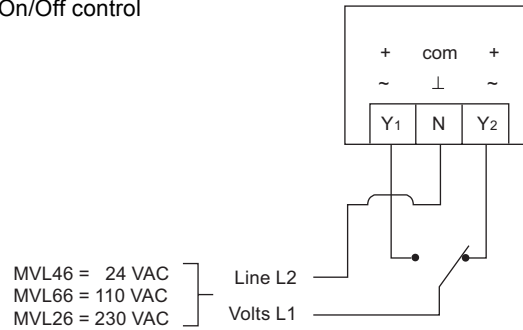
Tri-state
(3-point floating) control



MVL46 = 24 VAC
MVL66 = 110 VAC
MVL26 = 230 VAC

MVL46/66/26

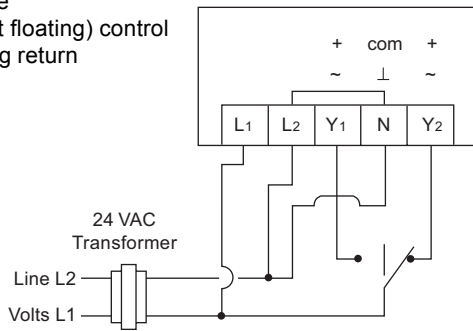
On/Off control



MVL46 = 24 VAC
MVL66 = 110 VAC
MVL26 = 230 VAC

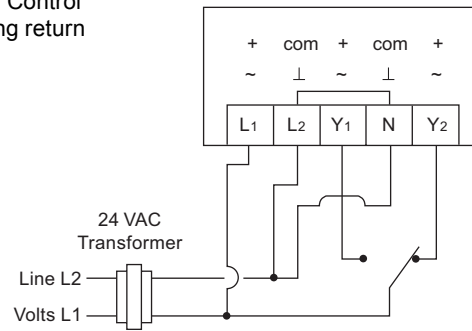
MVL46 A/C

Tri-state
(3-point floating) control
w/spring return



MVL46 A/C

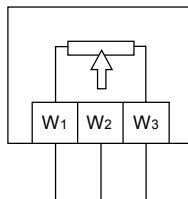
On/Off Control
w/spring return



MVLPA.

Option for MVL46/66/26

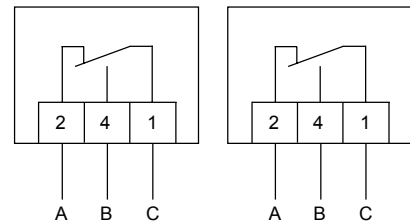
(1) Feedback pot 1K Ω
Actuator stem up:
W2 - W3 = 0K Ω
W2 - W1 = 1K Ω
50 Ω change with each
1 mm stem stroke



DMVL

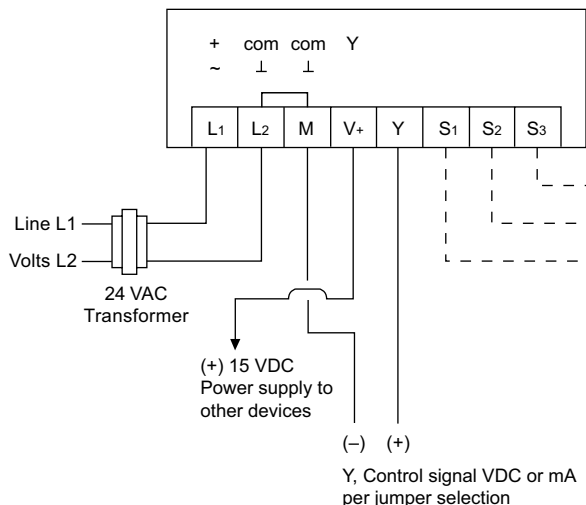
Option for MVL46/66/26/56

(2) Auxiliary switches,
SPDT, 250 VAC,
10(3) A
w/adjustable cam
for setting between
0-100% of stroke



WIRING CONFIGURATION (Cont...)

MVL56 (56 A/C)
Proportional control



MVL56 (56 A/C)
Signal selection

Jumper 2-pin selection of VDC or mA signal (Y) and control action (located on PC board above wire connection terminal block)

(3) jumpers supplied (factory set):
- over 6-9 VDC pins
- over A pin and middle pin
- over DIP pin (spare jumper)

U, Feedback signal to controller or indicator.

Voltage:
M and S₂ = 0-10 VDC
M and S₃ = 10-0 VDC

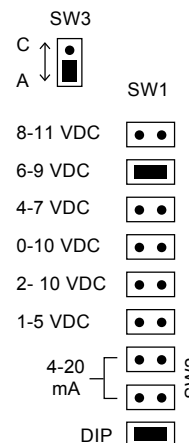
Current:
S₁ and S₂ = 0-200 μA
S₁ and S₃ = 200-0 μA

SW1 (VDC):
Set jumper-pin appropriately, or

SW2 (4-20 mA):
Set jumpers over the two 4-20 mA pin sections vertically (use jumper from SW 1 and DIP)

SW3 (Direct/reverse action):
Set jumper-pin appropriately, with increased control signal

C = stem moves down
A = stem moves up (factory set)



- Notes: • Wire connection location is below back cover, opposite site of the manual override knob.
- Actuator will be damaged if power of 26.5 VAC or higher is applied to the 24 VAC actuators.
- Observe polarity on secondary of transformers. All common and signal (-) must be connected in line. Incorrect polarity can cause controller damage or operation error.

- Provide overload protection for line voltage and disconnect as required.
- Additionally, for MVL56, MVL56A, MVL56C*
- Always use a separate transformer when controller power is full-wave rectified.

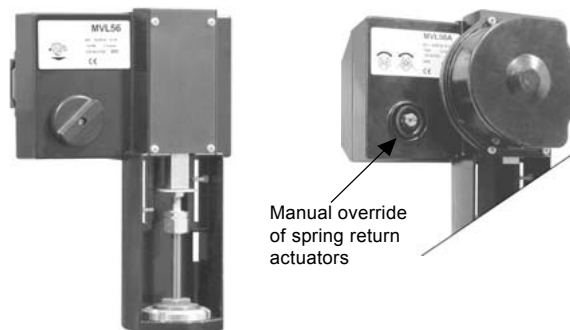
Actuator Stroke Direction, valve position			
Actuator /Valve stem stroke direction (A to AB)	MVL46/66/26 Tri-state or On/Off	MVL56 VAC or mA	
		Jumper "C"	Jumper "A"
Downwards, VSG, VMB16 valve opens	N - Y ₂ connect	w/increased signal	w/decreased signal
Upwards, VSG, VMB16 valve closes	N - Y ₁ connect	w/decreased signal	w/increased signal

MANUAL OVERRIDE

Manual override can be operated only without power supplied to the actuator.

Non-spring return actuators are equipped with a manual override knob, push-in action, for turning into appropriate valve stem position.

Spring return actuators are equipped with a hexagon shaft for using an external wrench.



COUPLING TO VALVE BODY

Compatibility:

- Direct coupling of VSG, VMB16, SS, DS, 3V, VSS, VBS, VBG, VM globe valve series
- With AG31 linkage kit coupling of VSB, VMB globe valve series
- Other globe valves with strokes from 0 to 1.77 in. (0 to 45 mm) using tri-state actuators, and with strokes 0.39 in. to 1.77 in. (10 to 45 mm) using proportional actuators

Actuator - Valve Direct Coupling:

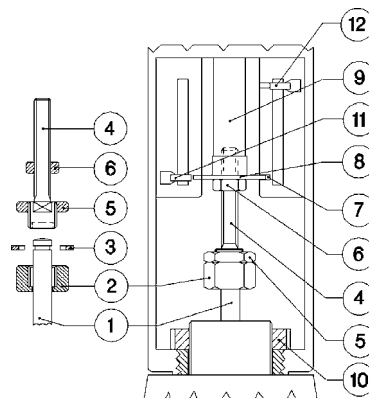
The supplied linkage assembly kit, actuator stem to valve stem connection, is required for coupling.

- a) Take upper stem linkage pieces, ④ linkage stem, ⑤ locknut, ⑥ locknut, ⑧ indicator disc, and assemble as shown on illustration.
- b) Screw ④ upper stem linkage assembly into ⑨ of actuator connector block at least 1 in., and hand tighten ⑥ locknut. The ⑧ indicator disc should be between ⑥ locknut and ⑨ connector block.
- c) Place ② nut on ① stem (female thread pointing upwards).
- d) Place actuator onto valve body, lock down tight ⑩ ring nut for holding actuator on valve body. Also, secure appropriate actuator head mounting direction.
- e) Use manual override knob to lower actuator stem until it sits on the top of valve stem.
- f) Pull up ② nut just below stem slot.
- g) Place ③ two half moon washers into ① valve stem slot, and move ② nut so both washers are inside the nut.
- h) Attach ② nut to upper linkage and tighten. Also, tighten counter clockwise ⑤ locking nut to ② nut.
- i) Move the manual override clockwise to insure that actuator/valve stem stroke is in maximum downward position.
- j) Secure that ⑧ indicator disc is within the lower indicator window location. If not, screw ④ upper stem linkage further into ⑨ actuator connector block.
- k) Set lower position indicator (orange tab) at this lower position.
- l) Manually, stroke the valve into maximum upward stem position. The ⑧ indicator disc should be within the position window slot and should not touch any part of upper actuator body.
- m) Lock all locknuts.
- n) Set upper position indicator (orange tab) at this upper position.

Actuator - Valve Installation:

Actuator shall be mounted as shown on illustration. Avoid conduit/cable outlet pointing upward. For field access to inside of actuator it is required to leave 4 to 8 in. (100 to 200 mm) open space around the actuator.

Install actuator/valve horizontally only if valve media temperature is above 248°F (120°C).



Actuator - Valve Stroke Calibration:

Implement calibration without power applied to the actuator.

- a) Remove actuator cover.
- b) Manually, stroke actuator/valve stem with override knob into maximum upward position.
- c) Adjust (PL) and (PR) calibration pot with gear,
 - turn (PL) pot/gear maximum clockwise
 - turn (PR) pot/gear maximum counter clockwise.
- d) Manually, stroke actuator/valve stem with override knob into maximum downwards and back upwards position (cycling of full stroke) to synchronize the two potentiometers for appropriate valve stroke.

