MVC503R

Compact actuator with electronic emergency return for PICVs and globe valves

MODEL	CONTROL SIGNAL	POWER SUPPLY	FORCE [N]	IP
MVC503R	Proportional	24 Vac/dc	300	54

APPLICATION AND USE

MVC503R actuator with fail safe function can be used with valves push/pull (using auto stroke calibration) or with valves with spring return using fixed stroke to control hot /cool water flow rate in two/four pipes terminal units, zone and solar plants, small reheating and dehumidifcation coils. Fail safe function is used in all the application where we need to specify the valve position (fully open or fully closed) in case of power absence.

OPERATION

MVC503R is an electrical bidirectional actuator. The valve stem is activated through a synchronous motor and a gear train optimised in order to have high performances and minimal noise emissions.
The actuator is equipped with super capacitors able to proved the energy to fully close or fully open the valve in case of power loss.
The final position of the actuator can be selected by Dipswitch No. 7.
The actuator is equipped with a mechanism able to stop the power supply when the force of 300 N is reached. If configured as auto calibration stroke, the software of the proportional models enables
the stroke calibration, so it can be used on any valve, as long as it respects the maximum stroke limit allowed (look at the above table).
Moreover proportional models are equipped with 3 LEDs whose operation is explained in the table at page 5.
MVC503R is proportional and can work with 0-10 Vdc, 2-10 Vdc, 0-5 Vdc, 6-10 Vdc and 4-20 mA working fields.

POSSIBLE CONNECTIONS AND MATCHES

MVC503R is used with valves without spring. The actuator has a joint that allows a solid connection to the valve stem.
MVC503R can also be used with iSMA CONTROLLI valves with spring. In this case the actuator is not solidly connected to the valve stem, but pushes the stem downwards during movement; the return of the stem is made by the spring present in the valve itself which guarantees the contact of the stem with the actuator.
In case of use of non iSMA CONTROLLI valves please contact technical office for proper adaptor.
The table below shows the compatible valve models:

MODEL	VALVES WITHOUT SPRING				
	VSB.T-VMB.T 3/4" .. 2" STROKE 5,5 mm	2-3TGB15B 1/2" STROKE 11,5 mm	2-3TBB.T 1/2" .. 2" STROKE 12 mm	2TGA.BT 3/4" .. 2" STROKE 8,5 mm	VALVES OF OTHER MANUFACTURERS STROKE max 12 mm
MVC503R	●	● AG74-03	●	●	●

The performances stated in this sheet can be modified without any prior notice.

MODEL	VALVES WITH SPRING			
	VLX / VLX.P 3/4" .. 1 ¼" STROKE 4 mm	VSXT/VMXT/VTXT 1/2" .. 3/4" STROKE 5,5 mm	VSXT.PBP 1 ½" STROKE 5,5 mm	VSBT.-VMBT. 3/4" .. 1 ½" STROKE 5,5 mm
MVC503R	●	●	●	●

For the stroke setting see the table "**Fixed stroke range selection**".

WARNING - In case of MVC used on a valve produced before September 2019 to replace an MVT, the 55061 kit must be used.

VALVE (production previous September 2019)	ACTUATOR to be replaced	Replacement KIT
VSB.T-VMB.T	MVT203 MVT403 MVT503	55061
2-3TBB.T		
2-3TGB.B		

MANUFACTURING CHARACTERISTICS

The actuator housing is made of a polymeric fireproof material; a metal ring nut M30x1,5 is dedicated to the connection with the valve.
The actuator is equipped with a 5 wires cable for electric connection.

SAFETY REQUIREMENTS

1. Install on the power supply line a protecting device to avoid short circuits (fuse or magneto-thermic) according to the specifications;
2. in case of accidental removal of the cover and/or of the connector cover, make sure that power is disconnected before working on the actuator or near it;
3. the products are maintenance free.

VARIANTS

PS107 actuator with M28x1,5 ring nut.

ACCESSORIES

AG74-03 2-3TGB.B iSMA CONTROLLI valves adaptor (N.B. to be used in replacing of the spindle extension provided with the valves).
55061 Kit of adapters for coupling the actuator with VSB.T-VMB.T, 2-3TBB.T and 2-3TGB.B series valves produced before September 2019.

In case of use of non iSMA CONTROLLI valves please contact technical secretariat for proper adaptor.

TECHNICAL CHARACTERISTICS

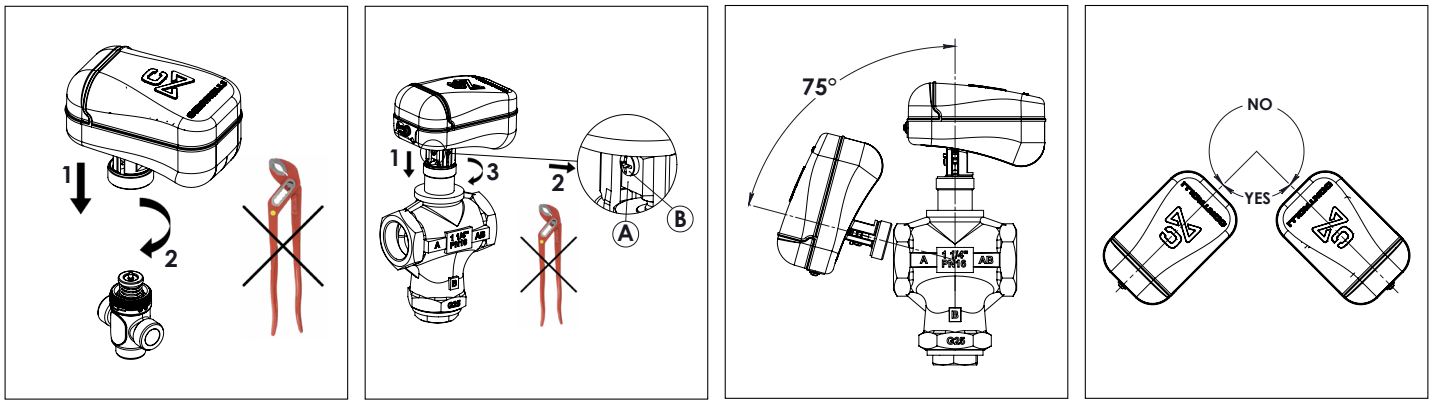
CHARACTERISTIC	DESCRIPTION
Power supply	24 Vac/dc ± 10%
Speed	5 s/mm
Force	300 N (UNI 9497:1989)
Cable	5 wires 1,5 m (CEI 20-22/II)
Weight	0,4 kg
Protection degree	IP54
Feedback signal	2-10 V (2 V retracted spindle in direct action, 2 V extended spindle in reverse action)
Charging time for supercapacitors	~ 45 sec
Speed in Emergency positioning	3 s/mm

CHARACTERISTIC		DESCRIPTION
Transformer sizing		20 VA
Consumption	supercapacitor charging	12 W
	moving	6 W
	holding position	1,5 W
Manual override		with 3 mm hex key
Reference Directives and Standards		EMC 2014/30/UE according to EN 61326-1: 2013

INSTALLATION AND MOUNTING

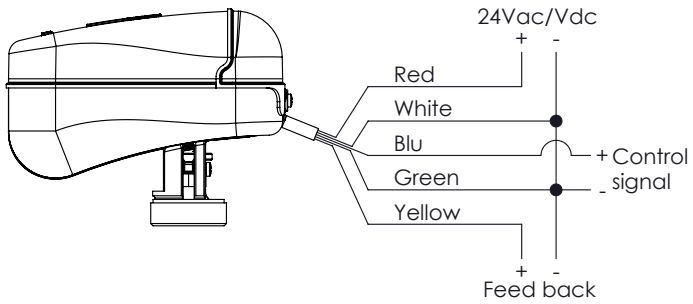
When assembled with valve with spring, before assembling the valve and the actuator, check that the actuator screw jack is fully retracted. If not, remember that, to mount the actuator on the valve in the right position, you have to overcome the spring force of the valve itself. Screw in the M30x1,5 ring nut firmly on the valve thread.

For all the valves without spring, mount the actuator on the valve screwing in the M30x1,5 ring nut without locking it; using the manual override make the screw jack go down until to align the actuator spindle slot with the locknut (A), secure with the bolt (B) through threaded hole in locknut (A). Rotate the actuator in the desired position and lock the M30x1,5 ring nut.
Respect the orientation of the actuator shown in the figures below.



WIRING DIAGRAM

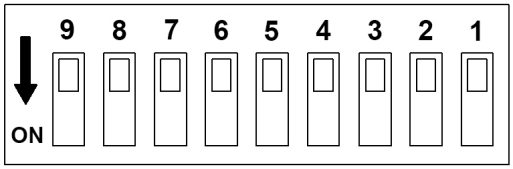
Wiring shall be executed according to the local valid laws.
To check the direction of movement of the spindle, compare the direction of rotation of the manual override with the indication on the base. The movement of the valve stem can also be observed through the slots in correspondence with the fixing ring nut.



RANGE SELECTION

The actuator is supplied prearranged for 0-10V control signal, direct action and fully extended return position (DOWN); to modify this setting, follow these instructions:

4. Remove the cover and the connector (look at the following picture).
5. Change the DIP switches as indicated in the following scheme.
6. The new settings will be active on the next power off/on cycle.



DIP	ON	OFF
1	Reverse action	Direct action
2	2-10/6-10 V	0-10/0-5 V
3	Range SEQ	Range NORM
4	Fixed stroke	Auto calibrated stroke
5	4-20 mA	DC Voltage range
6	Calibration/Fixed stroke	Fixed stroke
7	Emergency position UP	Emergency position DOWN
8	Fixed stroke selection	Fixed stroke selection
9	Fixed stroke selection	Fixed stroke selection

The actuator can be coupled with iSMA CONTROLLI valves without spring using auto calibration stroke; or to valves with spring return using fixed stroke. Actuators with fixed stroke (DIP 4 ON) have only reverse action.

Calibration (valid only with DIP 4 OFF)

This function helps to calibrate the maximum valve time stroke, so that the actuator can place the valve correctly following the control signal. If the actuator is powered on, this action can be repeated any time DIP 6 goes from OFF to ON and DIP 4 is OFF.

Fixed stroke range selection

Through DIP 4 you can choose (on the basis of the coupled valve) if the stroke must be fixed or automatically calibrated. In case of fixed stroke (DIP 4 ON) the learning function (DIP 6) change its meaning: DIP 8 and 9 will be used to choose the fixed stroke value (look at the table).

DIP 6	DIP 8	DIP 9	VALVE STROKE [mm]
OFF	OFF	OFF	2,5
OFF	OFF	ON	3
OFF	ON	OFF	3,5
OFF	ON	ON	4
ON	OFF	OFF	4,5
ON	OFF	ON	5
ON	ON	OFF	5,5
ON	ON	ON	6,5

Direct/Reverse action

Through DIP1 is possible to set direct or reverse action. In direct action without control signal the actuator is fully retracted with feedback set to 2V. With reverse action the actuator is fully exteded and the feedback without control signal is 2 V in this position.

Setting Control Signal Fields

Through DIP 2,3 and 5 it is possible to set 5 different input ranges.
If DIP 5 is ON, the input range is set at 4-20mA and DIP 2 and 3 have no meaning. If DIP 5 is OFF, the possible ranges are: 0-10/2-10 if DIP 3 is OFF and 0-5/6-10 if DIP 3 is ON.

Initial Positioning

It is executed every time the actuator is powered and before to have performed the learning of the race. This operation allows the servocontrol to start from a certain position for then follow the command signal. This position depends on the selection made on DIP 1.

Unexpected stall condition

If an unexpected stop during the stroke occurs, this function has the aim to make it disappear. The actuator will be driven in the opposite direction and then it will try again to reach the position.
If it was not unlocked after the first 3 attempts, after a 1 minute pause, 3 more attempts are made.

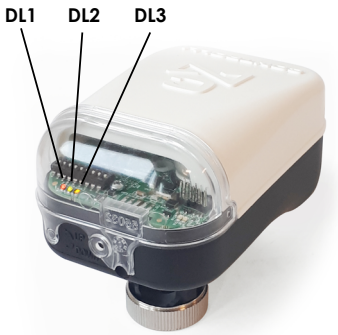
Feedback output signal (2-10V)

The actuator is equipped with a proper output to transmit the feedback signal relating to the supposed actuator position. This signal can vary from 2 to 10V. During the "automatic stroke calibration" and "Initial positioning" function it is set at 2V. During the emergency positioning function the feedback signal is set to 1V.

Manual override

To activate the manual override, remove the power supply, remove the transparent cover and insert a 3 mm hexagonal key into the front hole and turn the key until the desired position is reached.

LED BEHAVIOUR

Description	DL1 (red)	DL2 (green)	DL3 (yellow)	
Calibration	Alternate blinking 5 Hz		ON	
Initial positioning	Alternate blinking 1 Hz		ON	
Running UP	OFF	Blinking 1 Hz	ON	
End of stroke UP	OFF	ON	ON	
Running DOWN	Blinking 1 Hz	OFF	ON	
End of stroke DOWN	ON	OFF	ON	
Holding	OFF	OFF	ON	
Unexpected stall	Solid 5 Hz		ON	
Low voltage power supply	OFF	OFF	Blinking 1 Hz	
High voltage power supply	OFF	OFF	Blinking 5 Hz	
Calibrated stroke lower than minimum	Blinking 1 Hz	ON	ON	
Calibrated stroke higher than max	ON	Blinking 1 Hz	ON	
Extra stroke	Blinking 5 Hz	OFF	ON	
Actuator OFF	OFF	OFF	OFF	
Emergency positioning	Solid 1 Hz		OFF	
Supercap charging phase	ON	ON	ON	

DIMENSIONS [mm]