MG350C-24M

SmartX Globe Valve Actuator

Product Description

The MG350C-24M is a compact electro-mechanical actuator for controlling the VG210 and VG310 two-way and three-way linear globe valves.

The MG350C-24M is a modulating actuator within the SmartX Actuator family. The MG350C actuators are primarily designed for applications where the demands on speed and thrust are relatively small, such as:

- Mixing and injection heating circuits
- Small air handling systems
- Large Fan coil units

Features

- Selectable Control Signal. Choose between the control signal range of 0-10 Vdc or 2-10 Vdc and direct or reverse action.
- High Functionality
  - Stable force control with stall protection
  - Hysteresis Control - Intelligent response to fluctuating control signals, extending actuator life and better plant regulation
  - High Resolution PCBA and motor transmission for fine valve plug position and excellent flow control.
  - Low power holding
- Auto adaptation to valve end stroke limits upon first power up
- LED status indication
  - Tri-color LED for operation, calibration, and alarm notification
- Removable terminal block and cable gland for ease installation
- Compact Construction: Optimally designed to fit with the Venta VG210 and VG310.

Specifications

Supply voltage	24 Vac/dc ±20% 50/60 Hz
Power Consumption (50Hz) Running Holding	 3.5 W 0.5W
Transformer sizing	7.2 VA
Running Time	8 s/mm (Full stroke time, VG210 / VG310 = 88 sec)
Max. Stroke	16.5 mm
Nominal Force	350 N
Analog input Voltage range	 0…10 Vdc
Selectable input signals	0…10 Vdc, 2…10 Vdc
Impedance	min. 100 kΩ
Positional accuracy	2%
Environmental Ambient operational temperature range Storage temperature range Ambient humidity	 –5…+55°C (for valve fluid temperatures up to 130°C) –40…+70°C max . 95% RH (NC)
Protection rating	IP 53 (vertically mounted)
Sound power level	max. 30 dBA

Weight (shipping)	0.673 kg
Key Materials Yoke Material Housing (Covers)	 Aluminum PBT/PC
Standards Emission/Immunity Heat Humidity Cold Vibration	EMC 2004/108/EU, EN 61326-1:2006 & EN 60730-2-9 & UL 60730-1(2-14) IEC-68-2-2 IEC-68-2-3 IEC-68-2-1 IEC-68-2-6
Mechanical Manual Override	 3 mm Hex (T style hand tool recommend)
Position indication	Yoke position indicator with red and blue position markers for hot and cold pipe indication (green position indicator for closed valve)
Cable Gland wire size	6…12 mm
Conduit hole	M20

North America (USA): +1 888 444 1311
Europe, Middle East & Africa (Sweden): +46 10 478 2000
Asia Pacific (Singapore): +65 6484 7877
product.support@schneider-electric.com
www.schneider-electric.com

Life Is On Schneider Electric

Document Number: F-27940-5

May, 2017 tc

Function

Actuator

The actuator utilises a stepper motor to accurately position the main spindle via a gearbox based on the control signal received from the controller.

Control Signal

This MG350C-24M SmartX Actuator series can be controlled by a 0…10 Vdc or 2…10 Vdc variable modulating voltage configured using Dip Switch No. 4. The modulating voltage model has selectable direct or reserve action is configured with dip switch No. 3.

With all Switches off, the MG350C-24MP will drive the VG210 / VG310R as 0…10 Vdc with 0V being a closed valve.

Positioning and Accuracy

The MG350 series actuators include a built-in microprocessor that provides accurate motor control and overload protection at all of its stroke positions. The microprocessor constantly monitors the rotation of the stepper motor and stops the pulses to the motor when it senses a stall condition.

The MG350C-24M proportional actuators provides a 1% positioning accuracy and “a change of direction” algorithm with a wider 2.5% accuracy to accurately follow the proportional control signal while not responding unnecessarily to electric noise and control input instability.

Initial Power Up / Calibration

Upon initial power up the calibration process begins automatically (with no alarms available for 120 minutes) and the actuator learns the hard end stop limits of the valve it is connected to and spans the control signal input to these end positions. These positions are stored permanently in the actuator memory. Calibration will also take place after a 15 second delay after re-positioning any DIP switches.

During the calibration process, the actuator’s LED provides indication of calibration status by flashing red, orange green.

After the actuator has calibrated it will respond to its control signal. Following any loss of power, the actuator will check the retracted closed position of the valve stroke prior to responding to the control signal. If the actuator is unable to calibrate, it provides an red LED status error.

Commissioning

Set the switches on the circuit board before installing the actuator. There are no other switches or potentiometers to be set or adjusted. Stroke calibration / end position adjustment auto initiates when the actuator is first powered up.

During stroke calibration / end position adjustment, the MG350 first retracts, then extends. The actuator drives the valve to the 0 V position, depending on the Direct or Reverse switch setting unless a control signal is applied.

Stroke Calibration / End point position adjustment is mandatory every time the actuator is installed on a valve and/or the valve is serviced.

Maintenance

The actuator is maintenance-free.

Manual Operation

⚠ WARNING

RISK OF BURNS OR FLYING PARTS

If the valve stem, spindle, or plug has been damaged, it may blow out under pressure while servicing the actuator.

- Isolate and depressurize the valve before servicing.
- Manually check valve stem, spindle, or plug integrity by moving it within the valve. If the part can be removed, replace the valve assembly.

Failure to follow these instructions may result in death or serious injury.

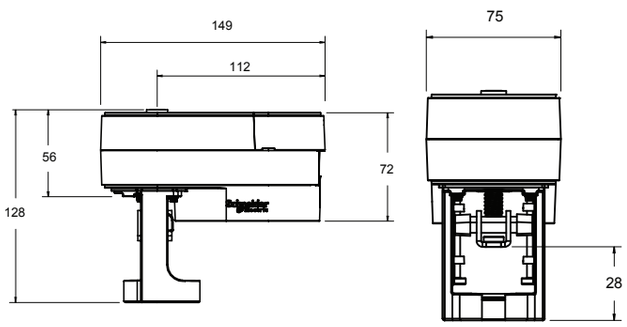
A 3mm hex key can be used to manually drive and position the MG350C SmartX Actuator. Do not depress the hex key during normal operation. The hex key is not supplied with the actuator.

The Hex key should be depressed firmly to disengage the main drive motor and continue to be depressed whilst rotating the key to adjust actuator position. It takes approximately 3 full rotations of the manual override to fully stroke the valve, each manual override turn moves the valve stem about 4 mm.

The actuator can be driven manually when power is supplied to the actuator but it will lose knowledge of its position and should be re-calibrated. To prevent the actuator from electrically taking over the manual position, cut the power supply to the board by removing the terminal connector.

Upon re-initialization of electrical power, the actuator calibrates the stroke limits. There may be a load click as the main drive motor re-engages after a manual operation.

Dimensions (mm)

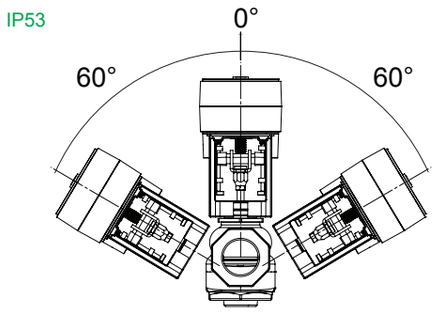


Mounting

Mount the actuator horizontally, vertically, or in any position in between, but not upside down. If the media temperature is above 120°C, install the actuator at an angle over the pipework to reduce the radiant heat influence.

For water ingress protection, do not mount actuators below the horizontal plane of the valve. IP63 will be achieved will a mounting orientation from vertical to 60 deg. IP51 will be achieved to 85 deg.

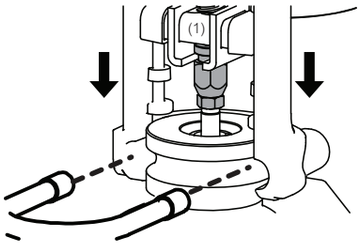
Document Number: F-27940-5



Mounting the Actuator on the VG210/VG310 Valve

The VG210 / VG310 valves will need to have the 18mm stem high connector fitted, this is provided with the actuator for new installations. If possible, position the valve stem by hand to align with the actuator clasp (1). The actuator is delivered so it is not needed to operate the manual override to assemble the product.

1. Pull the valve stem up and slide the actuator onto the valve neck, aligning the groove on the stem connector into the slot of the actuator clasp.



2. Push the actuator down and insert the U-bolt brace.
3. Secure with the flanged nuts.
4. Tighten and secure the valve stem flanged nut.

Colored Valve Limit Indicators

The colored end stop limits on the yoke are provided to show the valve plug position according to the valve stroke.

After mounting the actuator, arrange the position and colour of the limits as per the table below, discarding either the red or blue as needed.

Squeeze the end stop limits either side of the actuator cross bar and initiate a calibration sequence, the actuator will then automatically push the end stop limits to the exact limits of the valve stroke.

Limit stop function and color

Green	Closed valve
Red	Open heating circuit
Blue	Chilled water circuit

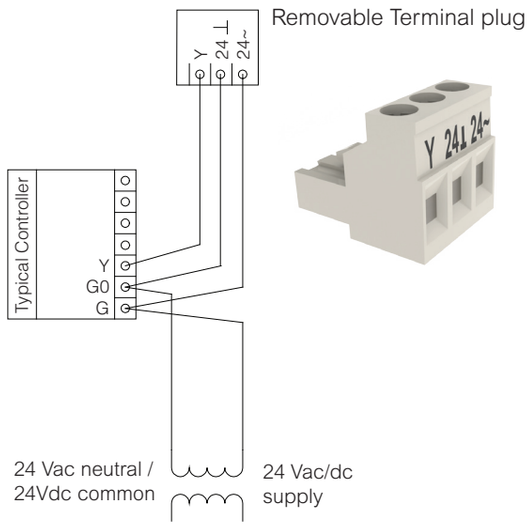
Terminal Block Connection

Terminal	Function	Description
Y	Signal Input	Input Signal: analog voltage 0…10 Vdc, 2…10 Vdc
24 ⊥	24 V Return	24 Vac (neutral) or 24 Vdc (common)
24 ~	24 Vac	24 Vac (hot) or 24 Vdc (supply)

Cable Information

Cable type	Maximum length	Minimum cross sectional area
Power	100 m (328 ft)	1.5 mm2 (AWG 16)
Control/Feedback	200 m (656 ft)	0.5 mm2 (AWG 20)

Wiring Diagram



Document Number: F-27940-5

May, 2017 tc

DIP Switch Operation

The MG350C-24M has a DIP switch block located under the cover to the left of the wiring terminal. The actuator is shipped with all DIP switches in the OFF (down) position.

If any DIP switch is changed while the actuator is unpowered, it recognizes the DIP switch change the next time the actuator is powered, initiates a calibration sequence and then controls according to the latest settings.

If a DIP switch is changed while the actuator is powered, the actuator recognizes the change and will initiate a calibration sequence after 15 seconds. Afterwards, the actuator will be under the command of the control signal according to the latest settings.

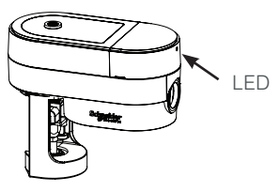
Dip Switch Function

	Switch 1	Switch 2	Switch 3	Switch 4
Function	No Function	No Function	Input Signal Action (Direct / Reverse)	Input Signal Range
ON Position (Switch up)	Not used	Not Used	Reverse Acting - an increase in input signal retracts the actuator linkage and rises the valve stem	2…10 Vdc
OFF Position (Switch down)	Not used	Not used	Direct Acting - an increase in input signal extends the actuator and lowers the valve stem	0…10 Vdc

All DIP switches are set in the default “OFF” position at the factory.

Normal LED Operation

LED Color	Blinking pattern	Function
Orange	light 0.3 sec, every second	Indicates actuator is extending, lowering the valve stem to open the valve
Green	light 0.3 sec, every second.	Indicates actuator is retracting, lifting the valve stem to close the valve



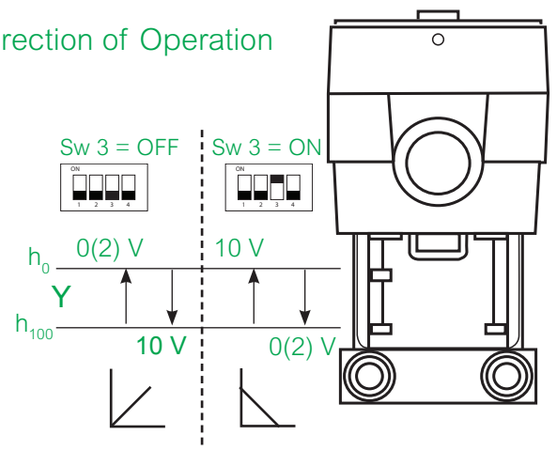
Calibration and Alarm LED’s

LED Color	LED Blinking Pattern	Function	Recommended Actions
Orange Green Red	Each color cycles on for 1/3 sec	Calibration: the three LED colors flash until the calibration is complete (orange, green, red, repeated).	Wait for calibration to finish
Red	Solid	Inadequate stroke during Calibration	Check freedom of valve stem movement and proper linkage connection.
Red	3 seconds On, 1 second Off	Unexpected stall	Check for freedom of valve stem movement and proper linkage connection, possible debris /sediment in the valve body.
Red	6 seconds On, 1 second Off	Control signal out of range 2…10 Vdc only.	Check input signal range / dipswitch setting: underrange (below 2 Vdc)
Red	Solid	Actuator fault	Replace actuator

Unexpected Stall

Stall within stroke range is typically due to a blocked valve. In this condition, the actuator retries the closing point and if unsuccessful will initiate an anti-blocking process and open the valve a set distance to flush any debris through. This will be repeated twice unless the original calibrated stroke position is realized.

Direction of Operation



Document Number: F-27940-5