

SpaceLogic MG600C



Product Description

The **SpaceLogic** MG600C is an electro-mechanical actuator for the control of two and three-way globe valves in:

- Heating and Cooling systems
- Air Handling systems

The **SpaceLogic** MG600C has a compact yoke which is designed to fit directly onto VG210.. and VG310.. threaded globe valves without any linkage kits providing a quick and simple connection to the valves U brace bonnet and slotted stem connection.

Brushless DC motors and a high resolution control board allow a very fine fluid control in globe valves.

Features

- Working range and end point switches adjust automatically to valve stroke.
- Firmware calibrates consistent running time regardless of valve stroke.
- Configurable for either a 3-point increase/decrease signal or various modulating control signals including sequencing.
- U-Bolt connection allows direct mounting without any mounting kit or special tools.
- The Manual override can be operated without disconnecting the power to the board.
- Stroke Indicators on the yoke of the actuator provide clear visual indication to the valves opening position.

Specifications

Voltage supply	24 Vac +25%/-35%, 50...60 Hz 24 Vdc +/- 20%
Power Consumption	
Running	4W
Rest	3W
Transformer Size	30 VA
Running time	
Modulating	60 s
Increase/decrease	60/300 sec. (selectable)
Duty cycle	
Full load, max. amb. temp.	20%
Half load, Typical room temp.	80%
Stroke range	9...30 mm
Factory set stroke	11 mm
Force, nominal	600 N
Proportional / Modulating, Analog input, X1-MX	
Voltage Range	0...10 V
Selectable Input Signals	0...10V, 2...10V, 0...5V, 2...6V, 5...10V, 6...10V min. 100 k Ohm
Impedance	
Floating Digital inputs, VH-VC	
Voltage across open input	24 Vac
Current through closed input	5 mA
Pulse time	min. 20 ms
Output, G1	
Voltage	16 Vdc ± 0,3 V
Load	25 mA short-circuit proof

Output, Y (Position Feedback)	2...10 V (0...100%)
Load	2 mA
Environment	
Ambient Temperature	-10...+50 °C
Ambient Humidity	max 90% RH
Enclosure rating	IP54
Sound power level	max. 32 dBa
Weight	1.7 Kg.
Materials of Construction	
Housing	Aluminium
Cover	ABS/PC Plastic
Colour	Gray
Max. cable core diameter	2.5 mm²
Wiring entry	
Conduit connection	3 x M20 screwed
Cable gland	1 x 6...12 mm O/D, IP68
S2 Auxillary Switch Relay	2x SPDT, 24Vac 4A AC1 accessory (contacts made at 5% and 95% of end stroke)
Standards/Directives	
ElectroMagnetic Compatability [EMC]	2014/30/EU
Low voltage directive [LVD]	2014/35/EU
Restriction of Hazardous Substances [RoHS2]	2011/65/EC
Heat	IEC 60068-2-2
Humidity	IEC 60068-2-3
Cold	IEC 60068-2-1
Vibration	IEC 60068-2-6

Function

The actuator utilises a brushless DC motor to accurately position the main spindle via a gearbox in accordance to the control signal received from the controller.

Upon initial power up and activation of end stroke calibration switch 9 the actuator undertakes a full stroke cycle to learn the valve end stop positions and to program the S2 Auxiliary switch points.

Control signal

The MG600C actuator can either be controlled by an increase/decrease signal or by a range of proportional dc voltage signals.

The actuator is very flexible regarding the configuration of input signal selection and a direct or inverse actuation. Normally for an increase/decrease the actuator moves inwards (up) on an increase signal and outwards (down) on a decrease signal, see Settings.

Position feedback

The MG600C actuators are equipped with a 2-10 Vdc position feedback signal. 2V corresponds to the closed position and 10V to the open position.

End point switches

When fitted, the end point switches are calibrated during initial stroke learning procedure. The end switch points are made at 5% and 95% of calibrated stroke position. When actuators are controlled in normal or sequence control it is possible to use the end point switches to toggle when the valve is in the effective open or closed state.

Calibration

When the actuator is first installed on a valve and/or the valve is later maintained or serviced, calibration by Dipswitch No. 9 is mandatory. If calibration is not performed the actuator may not be able to properly modulate within the actual stroke range of the valve.

Maintenance

The actuator is maintenance-free.

Mounting

The actuator may be mounted horizontally, vertically and in any position in between, but not upside down, see figure 3.

To mount the actuator on a VG210 or VG310 valve, slide the actuator onto the valve neck, aligning the slot on the valve stem adaptor fit into the groove on the cross bar. Then slide the 'U' brace over the groove on the valve neck and into the actuator yoke and secure the flanged nuts. It may be necessary to operate the manual override lever to align the actuator cross bar with the valve stem.

When installed with 3 conductors, where the control signal reference is connected to G0, the motor current of the actuator can cause varying voltage loss in the cable and thus in the reference level. The MG600C has a highly sensitive control signal input, can detect this varying signal and try to follow it, making it difficult for the actuator to find a stable position.

This variation may be accepted in simplified installations on the following conditions: the cables between the controller and actuator are shorter than 100 m, the cross-sectional area is larger than 1.5 mm² (AWG 16) and the cables are only connected to one actuator. Please refer to the section labelled "Wiring Examples" for wiring instructions.

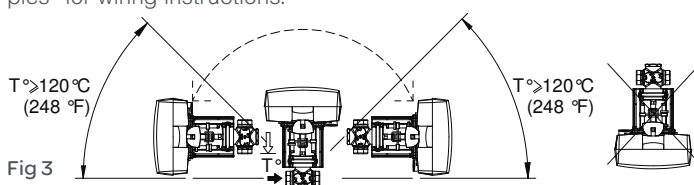


Fig 3

Manual Operation

The actuator can be manually overridden by operation of the manual override lever without disconnecting the power to the actuator. See Figure 2. When the lever is lowered into the (MAN) position the power to the board is cut, by rotating the lever the actuator spindle can be raised or lowered.

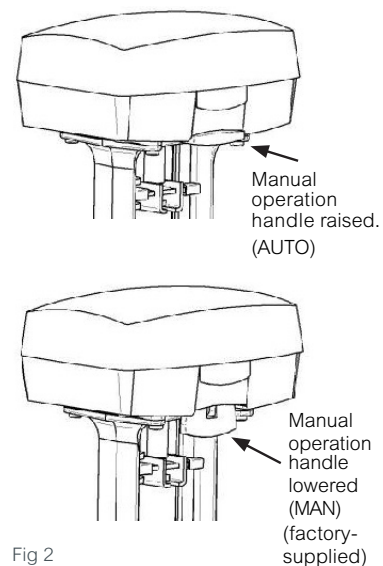


Fig 2

Installation

Note:

- Hot media hazard. Before removing actuator from valve or opening the valve, ensure that the valve control medium is isolated and relieve the pressure.
- Work should only be carried out by a competent engineer.

The switches on the circuit board should be set before the actuator is installed. There are no other switches or potentiometers that can be set or adjusted.

To make an end position adjustment stroke calibration, momentary latch switch 9, »OP/ADJ« into its ADJ position and then back to its OP position. The supply voltage must be applied to the actuator and the manual operation lever raised to initiate the calibration process. When an end position adjustment is made, the actuator closes the valve and opens it fully.

The adjustment is finished by the actuator closing the valve again; the electronic circuitry then adjusts the stroke and the running time to the valve. The set values are stored in the EEPROM of the actuator so that they will remain after a loss of voltage. When the end position adjustment is complete, the actuator starts to control the valve according to the control signal.

Electrical Connections

Block	Function	Description
G	24 Vac/Vdc	Supply voltage
G0	24 Vac/Vdc RTN (Ground)	
X1	Input	Control Signal, proportional
MX	Input, neutral	
VH	Increase	Control Signal, Inc/Dec, 3 point floating (VH, VC short circuited to G0)
VC	Decrease	
G1	16 Vdc	External Supply, 25mA max.
Y	0-100%	Feedback signal (2-10V)

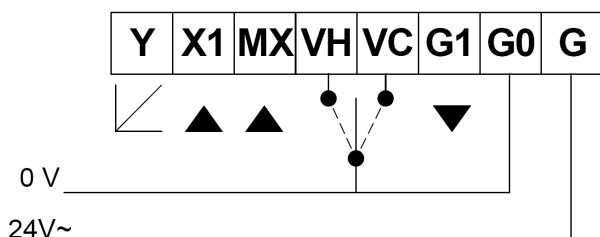
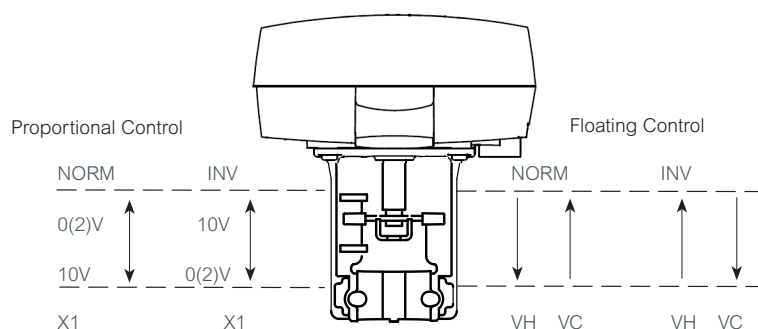


Fig 4

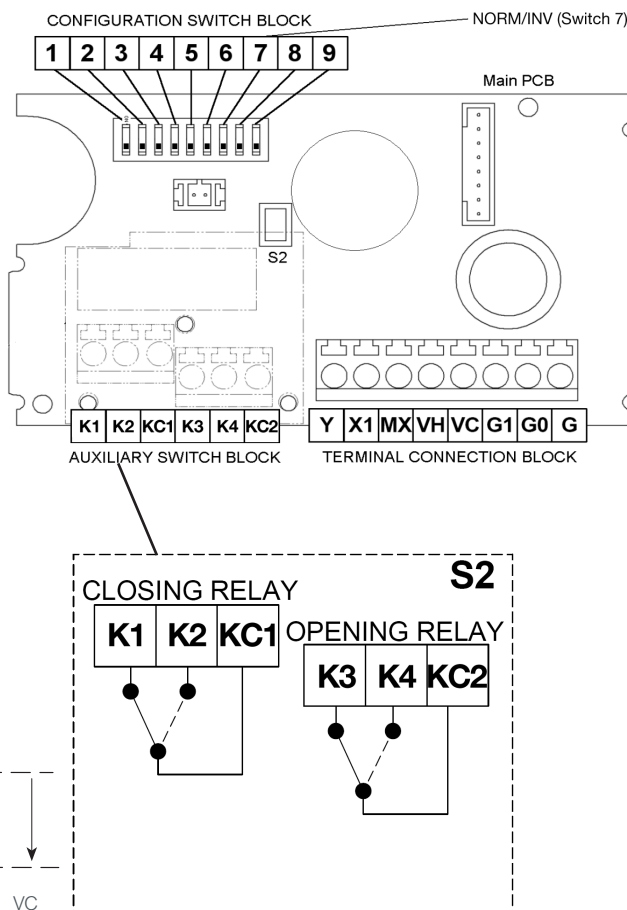
Direction of operation according to Switch 7



Cable Lengths

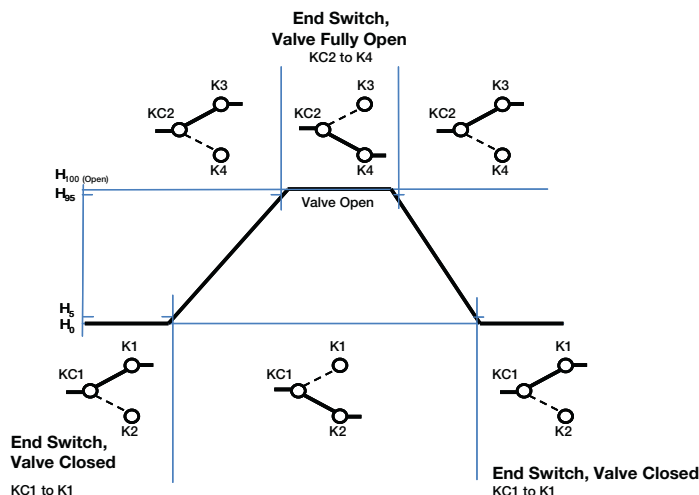
The power cables connected to G, G0 and G1 should be max. 100 m and have a cross-sectional area of min. 1.5 mm² (AWG 16). Other control cables should be max. 200 m and have a cross-sectional area of min. 0.5 mm² (AWG 20).

Connections / PCB Layout



Optional Auxiliary Switch Function (S2)

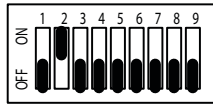
With the actuator powered and being controlled by the input signal the optional auxiliary switches only transfer contacts as follows, driving from full retract to full extend the auxiliary contacts transfer when the actuator is about 95% of full extend travel. When the actuator drives from full extend to full retract the contacts will transfer when the actuator is about 95% of full retract travel.



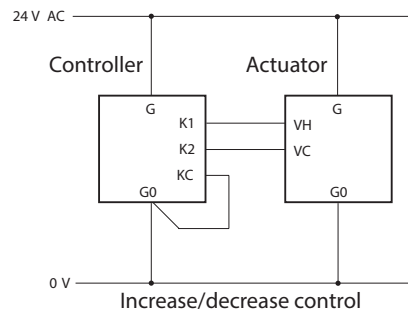
Wiring Examples

Typical Wiring

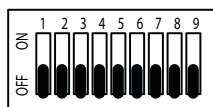
Floating



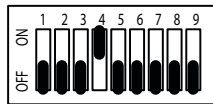
50 VA transformer required per actuator



Proportional

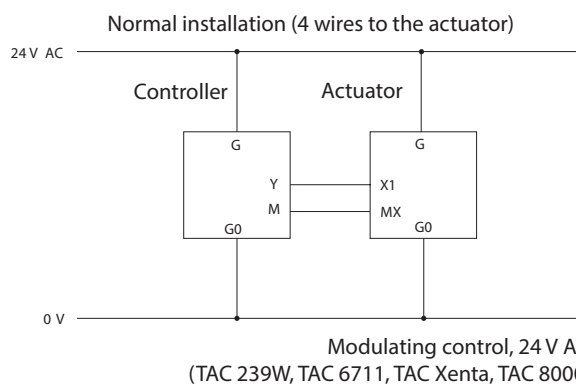


0-10 V

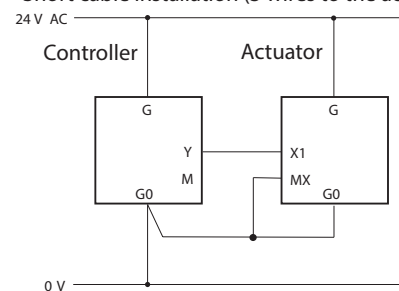


2-10 V

50 VA transformer required per actuator

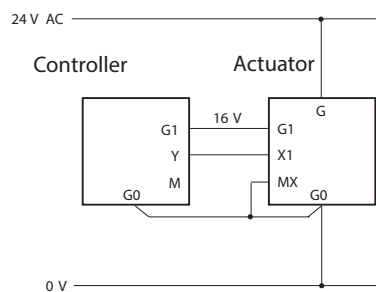


Short cable installation (3 wires to the actuator)

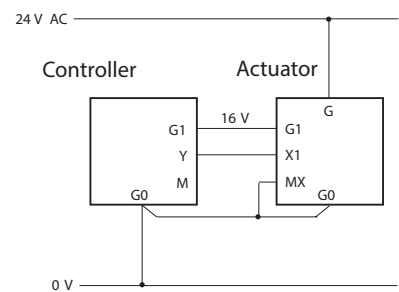


Modulating control, 24 V AC supply to the controller
(TAC 239W, TAC 6711, TAC Xenta, TAC 8000, TAC 230U, TAC 2000, TAC 9000, TAC 77xx)

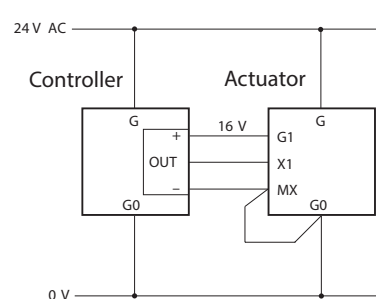
Normal installation (5 wires to the actuator)



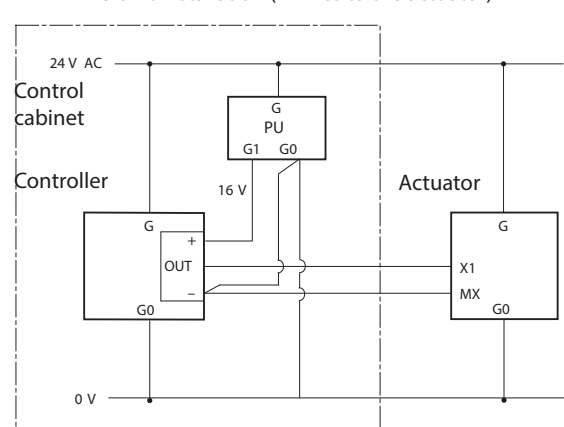
Short cable installation (4 wires to the actuator)



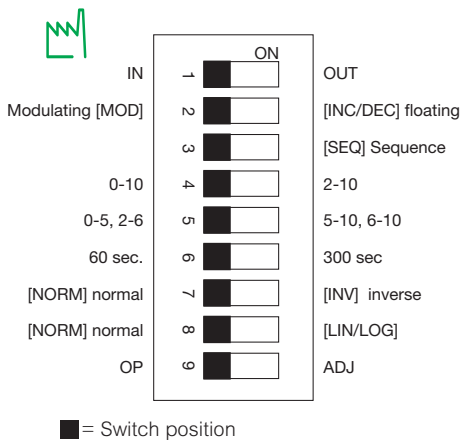
Normal installation (5 wires to the actuator)



PU unit installation (4 wires to the actuator)



DIP Switch Settings



Sw	Description	Off Position	On Position
1	Valve closing screw direction Note: Switch influences the feedback signal and end point relay switch	IN - Actuator retracts to 'close' the valve	OUT - Actuator extends to 'close' the valve. This setting should not be selected with the VG210../ VG310.. valves
2	Control mode	Modulating (proportional) signal	Increase/Decrease (Floating) signal
3	Sequence operation (modulating control only)	Normal operation.	Sequence control [SEQ]
4	Input voltage range	0...10 Vdc.	2...10 Vdc.
5	Working voltage range (modulating sequence control)	0...5 Vdc (switch 4 off) or 2...6 Vdc (switch 4 on)	5...10 Vdc (switch 4 off) or 6...10 Vdc (switch 4 on)
6	Running time (floating Control) or Safety function (2-10V control)	60 sec. / safety Off	300 sec. / safety On
7	Direction of movement	Normal [NORM] - (Direct action) High voltage signal = 100% flow	Inverse [INV] - (Reverse Action) High Voltage signal = 0% flow
8	Valve characteristic	Normal	Linear / Logarithmic (LIN / LOG) (changes an EQ% valve to Linear or changes a Linear valve to quick opening)
9	Input signal/ Stroke Calibration	Operation (OP)	Stroke Callibration [ADJ] (monetary switch to undertake end position adjustment)

There is a 9 switch configuration block on the circuit board. The factory setting is all switches in the "OFF" position. Upon initial installation, set up the configuration switch prior to applying power. Any subsequent changes to these settings will not be registered until the power has been interrupted to the board or switch No. 9 is initiated (End position adjustment) to re-calibrate the actuator and valve assembly.

1 Feedback signal

IN (Sw1 is Off) - Actuator retracts to 'close' the valve.

OUT (Sw 1 is On) - Actuator extends to 'close' the valve. This setting should not be selected with the VG210../ VG310.. valves

2 Control signal MOD / INC

MG600C is either controlled by a variable direct voltage, for a modulating signal (MOD), or by a 3-point increase/ decrease signal (INC).

3 Sequence or parallel control— — — / SEQ

With sequence (or parallel) control (SEQ), two actuators/valves can be controlled with one control signal. For each actuator using part signal control it is possible to determine which voltage range to use. An upper signal range of 5...10 V (6...10 V) or a lower signal range with 0...5 V (2...6 V). If the switch NORM / INV is in the NORM position, the higher voltage corresponds to 100% flow and the lower voltage to 0%. With the INV position selected the opposite function is obtained.

Note: If sequence or parallel control is not used, the switch — — — / SEQ must be in the OFF position.

4 Input Voltage range—0...10 / 2...10

Choice of either 0...10V or 2...10V input control voltage signal.

5 Operational voltage range (SEQ / SPLIT)

When switch 3 (SEQ) ON Choice to split operational voltage range:

Off: low: 0...5 V (2...6 V)

On: high: 5...10V (6...10 V)

If switch 7 is in the NORM position, the higher voltage cor-

responds to 100% flow and the lower one to 0%. To achieve the opposite function, switch 7 should be put in its INV position.

6 Running time—60 s / 300 s

On increase/decrease control, it is possible to select the running time between 60 s (off) or 300 s (on). With modulating control, the running time is always 15 s / 20 s / 30 s depending on stroke.

7 Direction of movement—NORM / INV

The Norm / INV switch reverses the actuator direction of movement relative to signal change. With the switch in the NORM position, the actuator spindle moves up when the signal decreases. With the switch in the INV, the actuator spindle moves down when the signal decreases.

8 Linearization—NORM / LIN/LG

With the linearization switch then valve flow characteristic can be modified. Selecting LIN/LG will change characteristics of an equally modified percentage (EQM) valve to behave in a linear function. It will also change a valve designed for linear flow to operate with "Quick opening characteristics". i.e. with a small control signal, the valve will open quickly to allow high flow control.

9 Input signal and stroke Callibration

OP / ADJ Switch used to calibrate the actuator stroke with the valve end positions during actuator is commissioning. Momentarily place the switch in the ON position. The actuator will automatically find the end positions of the valve. At the end of the adjustment all the other dip switch settings (1 to 8) will be registered again. Stroke calibration will only be initiated once power is applied to the actuator and the user has triggered this switch.

Note: For the actuator to register new settings for the switches, the supply voltage must be cut, the settings made, and then the power reconnected or the end position adjustment must be initiated again (see point 9). (This does not apply to the switch OP/ADJ).