

MG600 SR



INTRODUCTION

MG600 SR is a compact linear electro-mechanical actuator with spring return operation for the control of the VG210.. and VG310.. globe valves in:

- Hot water systems
- Heating and Cooling systems
- Air handling systems

MG600 SR family of actuators utilise brushless DC motors and a high resolution control board allow a very fine fluid control in the VG210/VG310 globe valves.

SPECIFICATIONS

Spring return direction

| | |
|---------------------------|-----------------------------|
| MG600C-SRU | Stem up (retract) |
| MG600-SRD | Stem down (extend) |
| Voltage supply | 24 Vac +/- 20% ±20% 50-60Hz |
| Power consumption running | 21 W |
| Power consumption rest. | 7 W |

Running time

| | |
|--------------------------|--|
| Modulating | 15 sec. |
| Increase/decrease | .60/300 sec. (selectable) |
| Spring return 9-25 (mm.) | 13 sec. |
| Transformer Size | 50 VA |
| Stroke | 9 - 25 mm. |
| Force, nominal | 600 N |
| Duty cycle | .20%/60 minutes (full load, high amb. temp.) 80%/60 min. (half load, room temp.) |

Analogue input

| | |
|-----------|----------------------------------|
| Voltage | 0-10V |
| Impedance | min 100K Ohm |
| range: | 0-10, 2-10, 0-5, 2-6, 5-10, 6-10 |

Digital inputs VH-VC

| | |
|------------------------------|---------|
| Voltage across open input | .24V ac |
| Current through Closed input | 5mA |
| Pulse time | .20ms |

Output, G1

| | |
|---------|---------------------------------|
| Voltage | 16 VDC ± 0,3 V - |
| | Load 25 mA, short-circuit proof |

Position Feedback, Y

| | |
|--------|--------------------------|
| signal | 2-10 V or 0-5 V (0-100%) |
| | Load 2 mA |

The working range and end point switches of the actuator are adjusted automatically to the stroke of the valve.

When driven electrically, the firmware of the actuator calibrates a consistent running time regardless of the valve stroke.

Upon power failure, the mechanical spring return mechanism drives the motor in turn generating power to the board to control the spring return braking speed, avoiding mechanical stress and system water hammer.

All actuators can be configured for either a 3 point increase/decrease signal or various modulating control signals including sequencing. The U-Bolt connection allows quick and easy direct mounting onto the majority of vent valves without any mounting kit or special tools.

Environmental

| | |
|---------------------|---------------|
| Ambient Temperature | -10 to +50 °C |
| Ambient Humidity | max 90% RH |
| Enclosure rating | .IP54 |
| Sound power lever | .43 dBa |

Standards

| | |
|-------------------|--|
| Emission/Immunity | EMC 2004/108/CE according to EN 61326-1:2006 |
| Heat | IEC-68-2-2 |
| Humidity | IEC-68-2-3 |
| Cold | IEC-68-2-1 |
| Vibration | IEC-68-2-6 |
| Weight | 2,8 Kg |

Materials

| | |
|---------|-------------------|
| Housing | Alluminium - |
| Cover | ABS plastic, grey |

Direct connection to valves

| | |
|--------------|----------------|
| Venta Valves | .VG210 / VG310 |
|--------------|----------------|

S2 Auxiliary Switch Relay (optional accessory)

| | |
|-------------------------|---|
| Contacts | SPDT, 24V AC 4A AC1 (contacts made at 5% and 95% of end stroke) |
| Max cable core diameter | .2.5 mm ² |

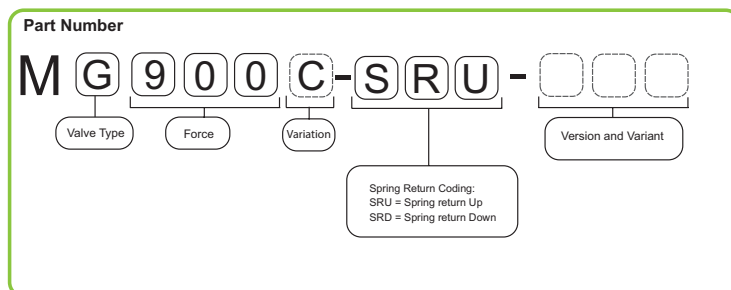
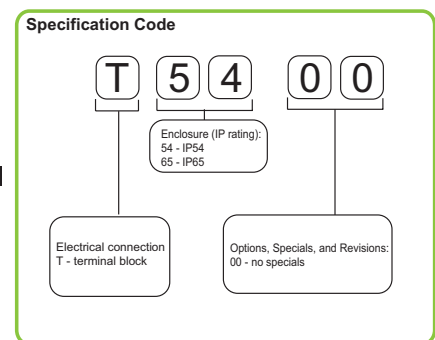
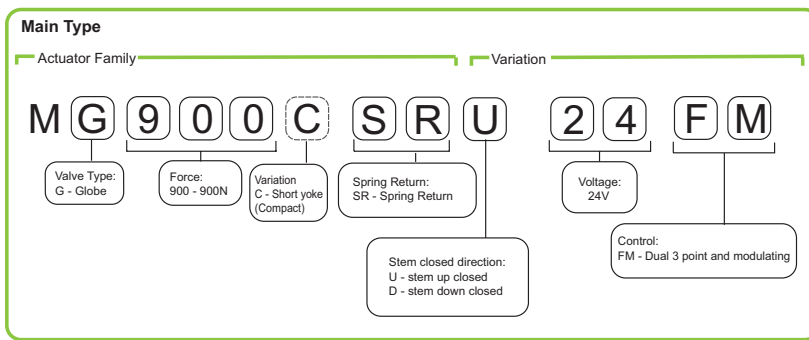
ORDERING TABLE

| Part Number | Type Designation | Spring Return Direction | VG210 | VG310 |
|-------------|------------------------|-------------------------|-----------------|-----------------|
| MG600C-SRU | MG600C SRU-24FM T54 00 | Spring return stem up | Normally closed | Normally closed |
| MG600C-SRD | MG600C SRD-24FM T54 00 | Spring return stem down | Normally open | Normally open |

ACCESSORIES

| Part number | Description |
|--------------|---------------------------------|
| 880-0104-000 | S2 auxiliary end point switches |
| 880-0109-000 | Yoke Heater |

TYPE DESIGNATION & PART NUMBERING SYSTEM



DIMENSIONS (mm)

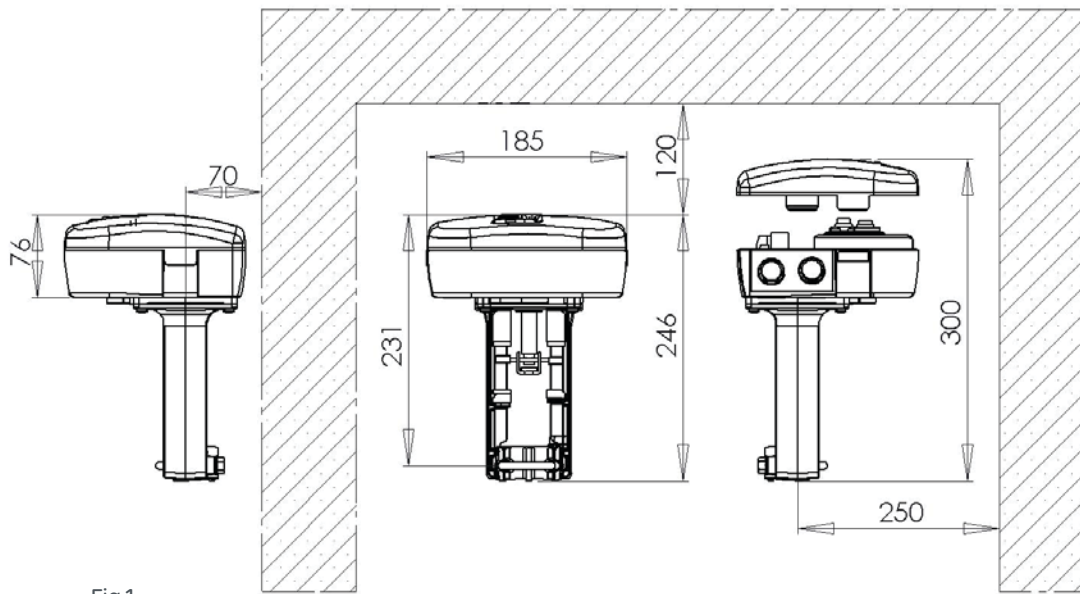


Fig 1

FUNCTION

The actuator

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 start up the and self stroking activation the actuator performs a full stroke cycle to lean the valve end stop positions and to calibrate the motor speed and actuator full stroke running time. End switch point adjustment is also calibrated during this process.

In case of power failure the actuator is equipped with spring return function which returns the valve and actuator back to the rest position.

The actuator can not be configured or modified between spring return stem up and spring return stem down.

Control signal

MG600 SR actuator can either be controlled by an increase/decrease signal or by a variable direct voltage.

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

Spring pretension

To ensure tight shut off from an assembled SR actuator and control valve for closure on spring return function, it is necessary during installation, to align the actuator spindle with the required valve stroke and stroke limits. Installation instructions 02-00014-## should be referred to for the correct set-up.

Position feedback

MG600 SR actuators are equipped with a 2-10V and 0-5V DC position feedback signal selectable by Switch No 1.

End point switch (Accessory)

When fitted, the End point switch (S2 Auxillary Switch relay) is calibrated during the initial stroke learning procedure. The switch points electronically make at 5% and 95% of the 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 fully open or fully closed.

MAINTENANCE

The actuator is maintenance-free.

Manual operation

To operate the manual override, the power to the actuator must be cut.

The manual override feature allows the actuator to be positioned independently of any external control signal can be operated with or without the cover attached. The operating direction of both the manual override and lock screw are clearly labelled on both the cover and inside the actuator.

The Manual override is driven by a 5mm Hex slot, a small 5mm hex (Allen)key is supplied with the actuator and retained in the actuator cover. The action of the manual override is always against the spring tension.

The actuator spindle position can be locked against the spring by twisting the lock screw in the direction as shown on the actuator. The manual override lock should only be released by again; either by nudging the manual override by 10° in the normal direction (against the spring), or, by re-applying power to the actuator. The Actuator when it is initially powered up will momentarily drive against the spring to release the manual override lock before being driven by an external control signal

The manual override and lock must only ever be operated in one direction. This direction is clearly labelled on both cover and inside the actuator. If the hex key is left in the hex manual override drive socket, the hex key will rotate as the actuator is driven. This is not recommended and damage could occur if the key is not free to rotate

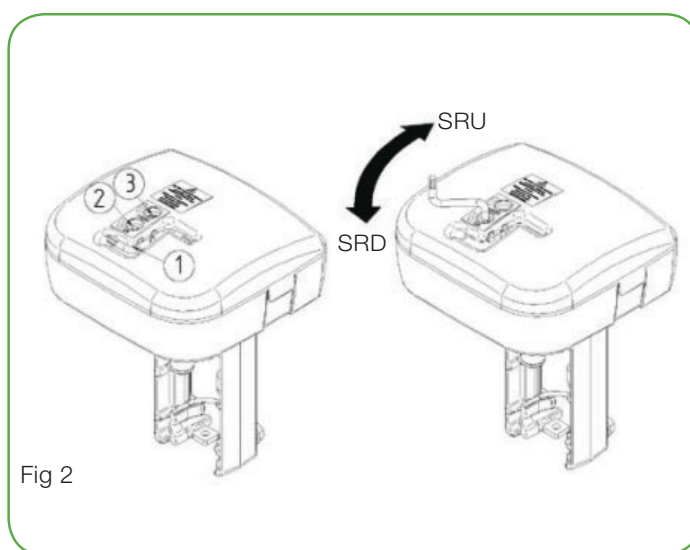










Fig 2

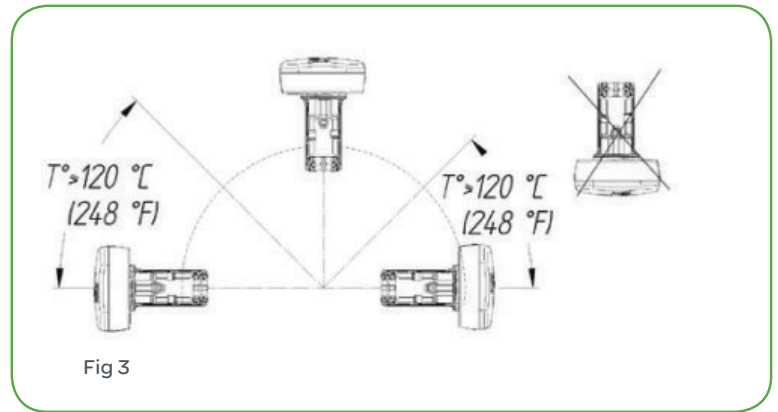
- | | |
|---|--|
| <ul style="list-style-type: none"> 1. Hex (Allen) Key 2. Manual override drive socket 3. Lock screw. | <ul style="list-style-type: none"> SRU (-SU)  Manual override operation  Lock operation  Unlock operation.  Twist manual override 10° SRU (-SD)  Manual override operation  Lock operation  Unlock operation.  Twist manual override 10° |
|---|--|

Cable lengths

Power the cables 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). The max section cable is 2.5 mm² .

N.B.! When installed with 3 conductors, where the control signal reference is connected to G0, the motor current of the actuator will cause varying voltage loss in the cable and thus in the reference level. The MG600 SR has a highly sensitive control circuitry which can be influenced by interference in the control signal which the actuator can try to follow. This influence may be reduced in simple installations by shortening the cable lengths below 100m and /or increasing the cross sectional area of the cable above 1.5mm² (AWG 16) and the cables are spured to only one actuator.



ELECTRICAL CONNECTIONS

| Terminal | Function | Description |
|----------|------------------------------|-----------------------------|
| G | 24 V AC | Supply voltage |
| G0 | Ground | |
| X1 | Input, proportional | Control signal |
| MX | Input, neutral, porportional | |
| VH | Increase, 3-point | VH, VC connected to G0 |
| VC | Decrease, 3-point | |
| G1 | 16 V DC | External supply, 25 mA max. |
| Y | 0-100% | Feedback signal |

CONNECTIONS / PCB LAYOUT

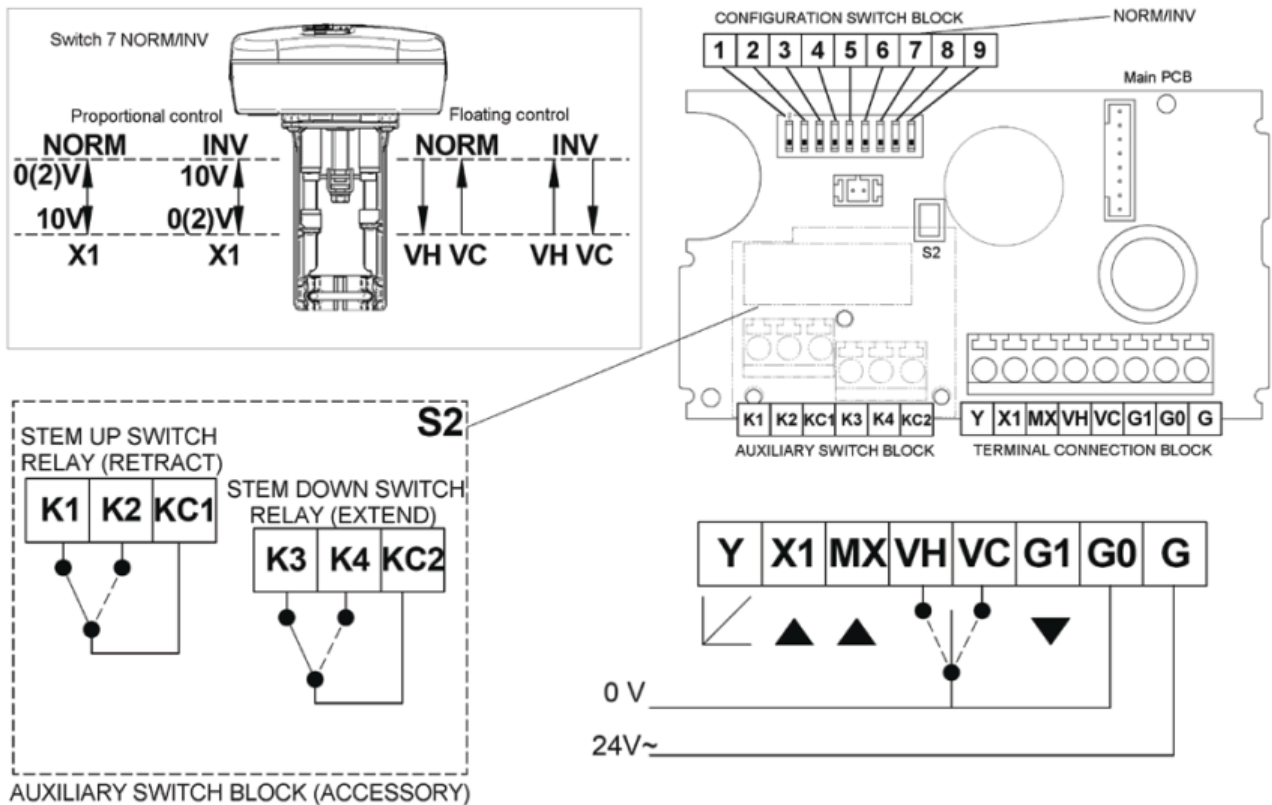
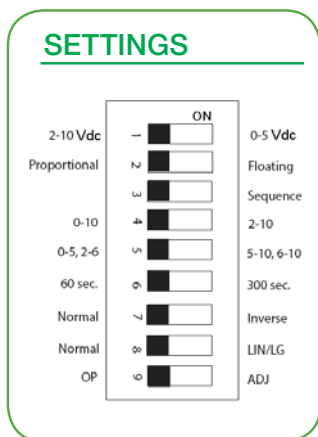


Fig 4



| Switch Setting | Description | Off Position (1) | On Position |
|----------------|--|--|---|
| 1 | Feedback signal | 2-10 Vdc | 0-5 Vdc |
| 2 | Control mode | Proportional signal (no sequencing) | Floating signal |
| 3 | Sequence operation | Normal operation (no sequencing) | "SW 2 off, SW 3 on, SW 4 select base range (0-10 or 2-10) SW 5 select sequence range." |
| 4 | Input voltage range | 0 to 10 Vdc | 2 to 10 Vdc |
| 5 | Operational Working voltage range (if SW3, SEQ selected) | 0 to 5 Vdc or 2 to 6 Vdc | 5 to 10 Vdc or 6 to 10 Vdc |
| 6 | "Running time (floating control only)" | 60 sec. | 300 sec. |
| 7 | Normal Direction of movement | Actuator spindle moves upwards with a decreasing control signal. (Normal operation for stem up closed valve) | Actuator spindle moves up with an increasing control signal (Normal operation for a stem down closed valve) |
| 8 | Linearization | Normal | Changes a EQ valve to linear flow behavior. Changes a Linear valve to a logarithmic behaviour |
| 9 | Input signal/ Stroke Calibration | Normal | Calibrate input control signal and the valve stroke |

There is a 9 switch configuration block on the circuit board. On delivery ('Factory'), all switches are 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

Select between 2-10V and 0-5V feedback voltage output.

2 Control signal—MOD / INC

MG600 SR 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 corresponds 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 Calibration OP / ADJ

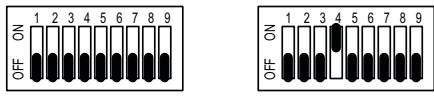
Switch used to calibrate the actuator stroke with the valve end positions during actuator is commissioning. By momentarily placing the switch in the ON position, the actuator will automatically find the end positions of the valve. At the end of the adjustment all the other dip switch settings (1 to 8) will be registered again.

Stroke calibration will only be initiated once power is applied to the actuator and the user has triggered this switch. The MG600 SR actuator is delivered pre-programmed for Venta valves with a 20mm stroke

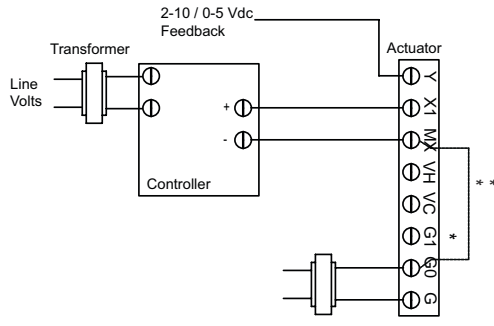
Note! For the actuator to register new settings for the switches, the supply voltage must be cut, the settings made, and then the power reconnected or the end position adjustment must be initiated again (see point 9). (This does not apply to the switch OP/ADJ).

WIRING EXAMPLES

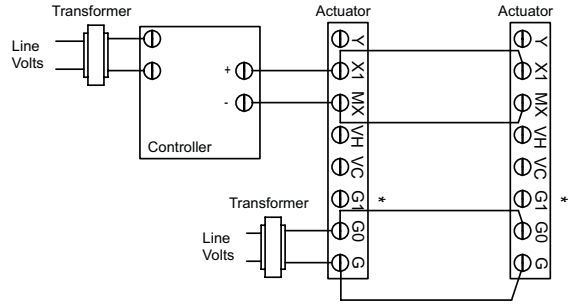
PROPORTIONAL



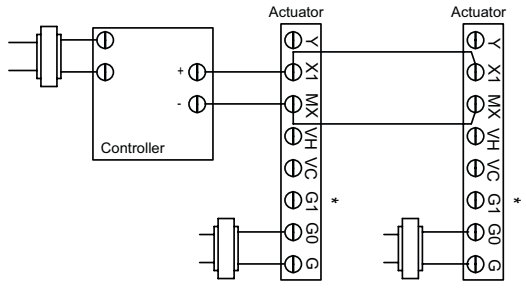
0-10 V
2-10 V
50 VA transformer required per actuator



0-10/2-10 Vdc Proportional Application
* Provides 16 Vdc, 25mA output source
** Optional Ground connection



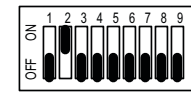
0-10/2-10Vdc Proportional Multiple
Actuators powered from single source.
* Provides 16 Vdc, 25mA output source



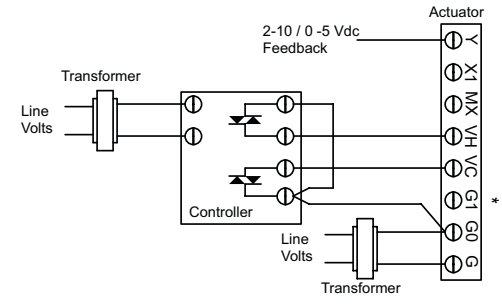
0-10/2-10Vdc Proportional Multiple
Actuators powered from separate sources.
* Provides 16 Vdc, 25mA output

Caution: this product contains a half-wave rectifier power supply and must not be powered off transformers used to power other devices utilising non-isolated full-wave rectifier power supplies. The Secondary side of the transformer should also be fused on the non grounded side.

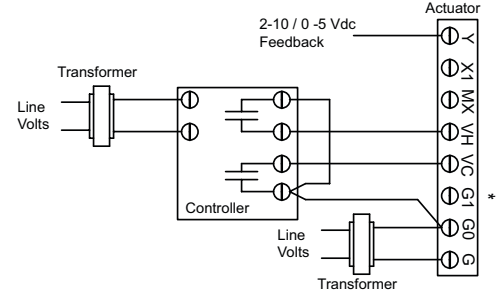
FLOATING



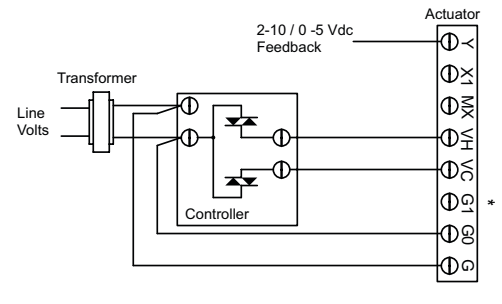
50 VA transformer required per actuator



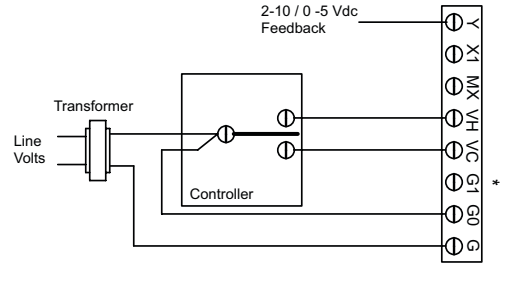
TRIAC SINK Application
Two power sources
* Provides 16 Vdc, 25mA output source



RELAY SINK Application
Two power sources
* Provides 16 Vdc, 25mA output source



TRIAC SINK Application
One power source
* Provides 16 Vdc, 25mA output source



RELAY SINK Application
One power source
* Provides 16 Vdc, 25mA output source

