

M800 is an electro-mechanical actuator for the control of two-way and three-way plug valves in:

- domestic hot water systems
- heating systems
- air handling systems

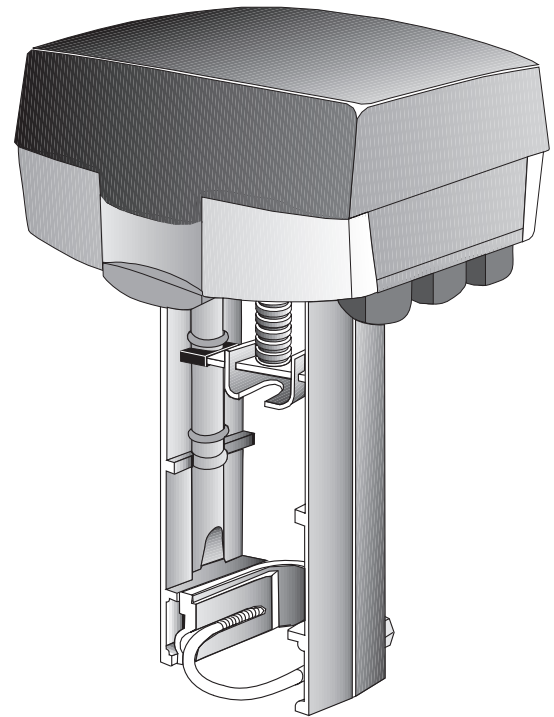
M800 is either controlled by an increase/decrease signal or by a modulating 2–10 V control signal. Modulating control makes for a faster positioning of the actuator.

The electronic circuitry of the actuator ensures that the running time is the same, regardless of the stroke of the valve in question.

It is easy to mount and connect the actuator. It can be mounted directly onto TAC's control valves, without any mounting kit.

The working range of the actuator is adjusted automatically depending on the stroke of the valve. The electronic circuitry of the actuator then takes care of the adjustment of the valve end positions.

The actuator is supplied by 24 V AC. It can provide 16 V DC voltage supply for older TAC controllers.



TECHNICAL DATA, M800

Part numbers see the table on the next page
 Supply voltage 24 V AC $\pm 10\%$, 50–60 Hz
 Power consumption average 15 VA
 Transformer sizing 50 VA
 Running time:
 Modulating 10–25 mm (0.39 - 1 in.) 15 s
 Modulating 25–32 mm (1 - 1.26 in.) 20 s
 Modulating 10–52 mm (0.39 - 2.05 in.) 30 s
 Increase/decrease 300 s/60 s
 Close off time with STS, at power failure:
 Stroke 10–25 mm (0.39 - 1 in.) max. 20 s
 Stroke 25–32 mm (1 - 1.26 in.) max. 25 s
 Stroke 32–52 mm (1.26 - 2 in.) max. 35 s
 Stroke 10–52 mm (0.39 - 2 in.)
 Factory set stroke 41 mm (1.61 in.)
 Thrust 800 N (180 lbf)
 Duty cycle max. 20%/60 minutes
 Analog input:
 Voltage 0–10 V
 Impedance min 100 k Ω
 Digital inputs VH–VC:
 Voltage across open input 24 V AC
 Current through closed input 5 mA
 Pulse time min. 20 ms

Output G1:
 Voltage 16 V DC $\pm 0,3$ V
 Load 25 mA, short-circuit proof
 Output Y:
 Voltage 2-10 V (0-100%)
 Load 2 mA
 Ambient temperature:
 Operation –10 – +50 °C (14°F - 122°F)
 Storage –10 – +50 °C (14°F - 122°F)
 Ambient humidity max. 90% RH
 Enclosure rating IP 54
 Standards:
 Emission EN 50081-1:1992
 Immunity EN 50082-1:1992
 Heat IEC-68-2-2
 Humidity IEC-68-2-3
 Cold IEC-68-2-1
 Salt mist IEC-68-2-11
 Vibration IEC-68-2-6
 Material:
 Housing aluminium
 Cover ABS/PC plastic
 Color aluminium/black
 Weight 1.8 kg (3.96 lb.)
 Dimensions (mm) refer to the table on the next page

PART NUMBERS

Designation	Explanation	Part number
M800	modulating control signal or increase/decrease signal	880-0310-020
M800-S2	modulating control signal or increase/decrease signal and end point switches	880-0311-020
M800-ST5	modulating control signal or increase/decrease signal and self testing safety device	880-0312-030
M800-S2-ST5	modulating control signal or increase/decrease signal with end point switches and self testing safety device	880-0313-030

DIMENSIONS

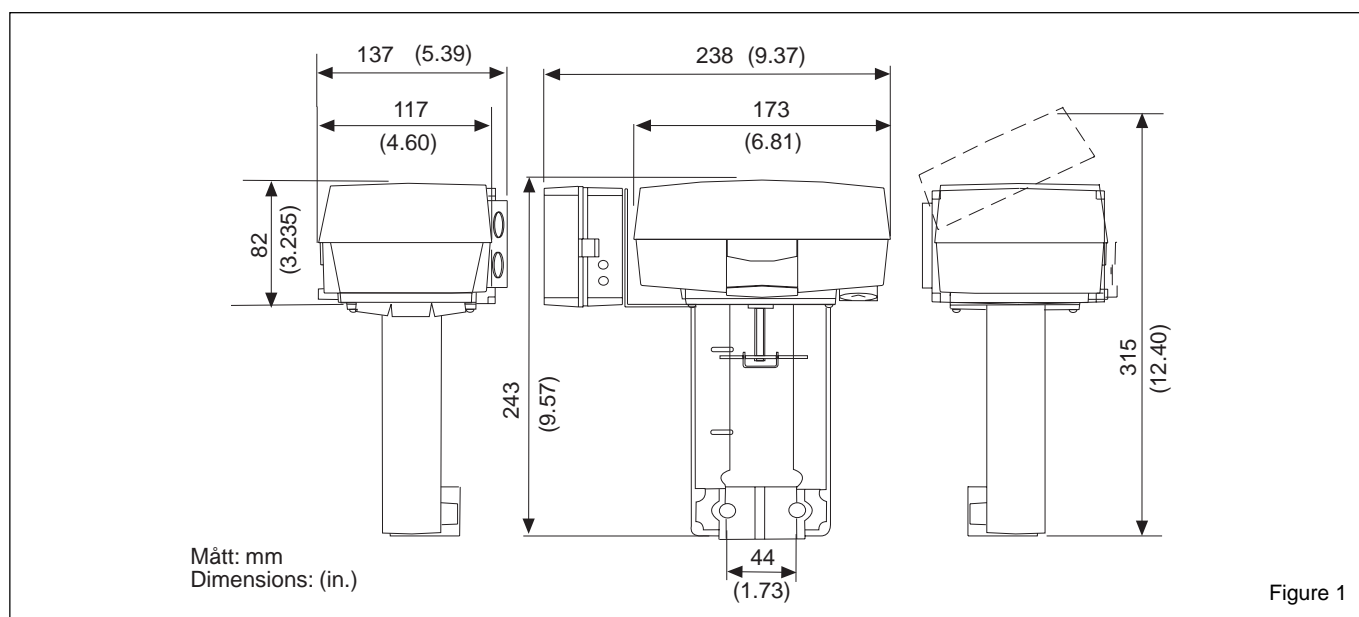


Figure 1

FUNCTION

The actuator

The step motor of the actuator turns a screw via a gear wheel. The motor receives a control signal from a controller. The screw gets a linear movement which moves the stem of the valve.

Control signal

M800 can either be controlled by an increase/decrease signal or by a variable direct voltage.

If an increase/decrease signal is used, the actuator normally moves inwards on an increase signal and outwards on a decrease signal, see Settings.

Manual operation

There is a manual operation handle on the actuator, see figure 2. When it is lowered, the motor stops. Then, the actuator can be operated manually if the handle is turned.

Position feedback

Forta actuators are equipped with a 2–10 V DC position feedback signal, where 2 V always corresponds to the closed position and 10 V to the open position.

End point switches

When actuators are controlled in sequence, it is possible to use the end point switches that have set positions. They will toggle when the valve is fully open or fully closed, respectively.

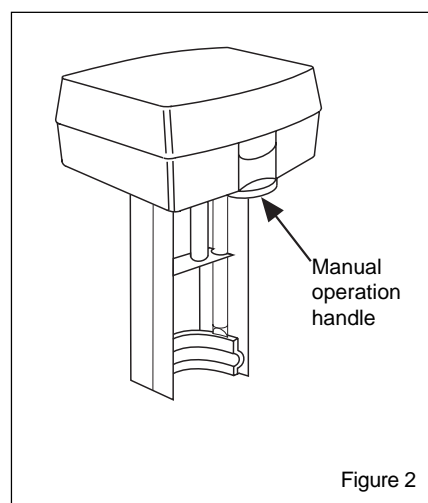


Figure 2

MOUNTING

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

N.B.! Do not use the actuator for the DN15 valves V298, V282, V294, V384, V386 and V394.

To mount the actuator on a valve, slide the actuator onto the valve neck, thus making the square nut on the valve spindle fit into the groove on the cross bar. Then slide the brace into the groove on the valve neck and secure the nuts.

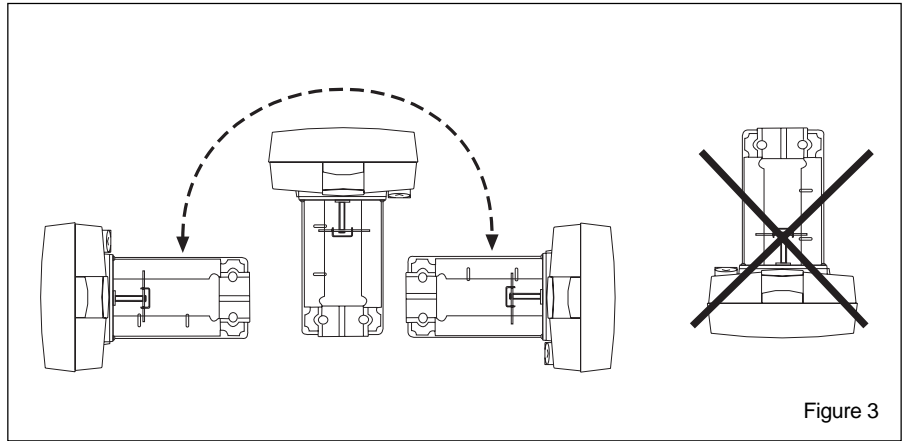


Figure 3

SELF TESTING SAFETY DEVICE, STS

STS is a processor controlled, battery operated safety device which monitors the presence of supply voltage to Forta actuators. The device supplies the actuator with power so that the actuator is able to close the valve in the event of a loss of power.

The battery is tested periodically during normal operation. Moreover, it is charged continuously for maintenance purposes.

Batteries for the STS uses NiCd.

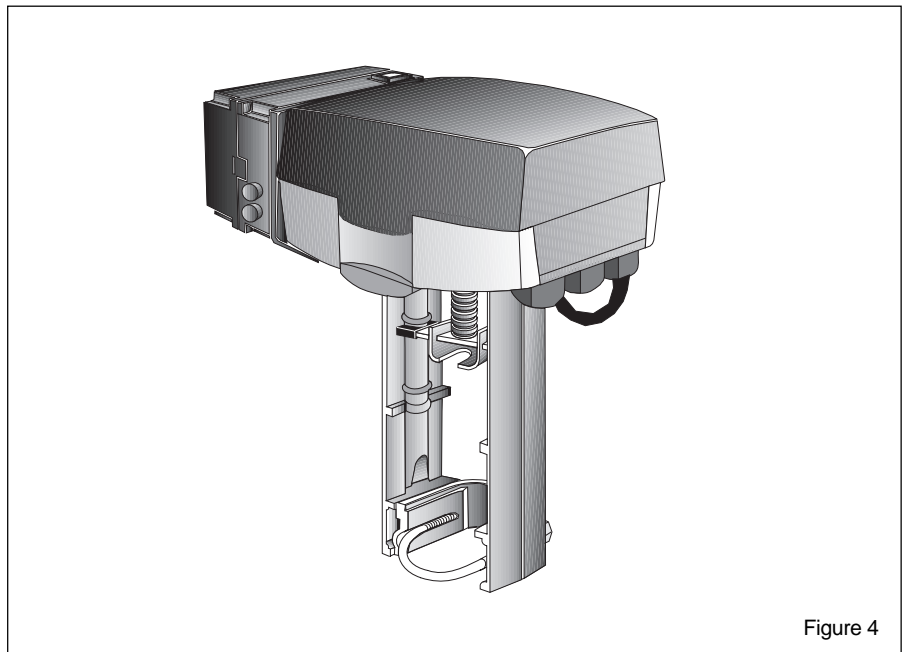


Figure 4

TECHNICAL DATA, STS

Supply voltage, G	24 V AC $\pm 10\%$
G0	return
Output voltage AC-DC, GF	24 V DC $\pm 10\%$
G0F	return, alt. 24 V AC $\pm 10\%$
Time to toggle AC to DC	max. 5 s
DC voltage supplied during	70 s
Inputs:	
Battery A	8,4 V DC—min 600 mAh
Outputs:	
Battery B, "rapid charging"	115 mA
Alarm outputs KC, K1 and K2	2 A—24 V AC two-way SPDT
Indication:	
Green LED	Normal operation
Red LED	Alarm
Red LED on circuit board	Rapid charging is active
Settings:	
Bypass MAN	no jumper, external button
Bypass AUTO	jumper on, internal function

Ambient temperature	$-10\text{ }^{\circ}\text{C} - +50\text{ }^{\circ}\text{C}$ (14°F - 122°F)
Ambient humidity	max 65 % RH
Enclosure rating	IP 44
Standards:	
Emission	EN 50081-1:1992
Immunity	EN 50082-1:1992
Heat	IEC-68-2-2
Cold	IEC-68-2-1
Materials:	
Box	PC Makrolon 8035
Lid	PC Makrolon 8035
Bracket	SS 1412-2
Color	black
Weight, including battery	0.3 kg (0.7 lb.)
Dimensions	please refer to the dimension drawing

Block	Function	Description
G	24 V AC	Supply voltage
G0	24 V AC rtn	
X1	Input	Control signals (VH, VC short-circuited to G0)
MX	Input, neutral	
VH	Increase	
VC	Decrease	Supply for RC Feedback signal
G1	16 V DC	
Y	0–100 %	

N.B.! When installed with three 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. Forta, which has a highly sensitive control signal input, will detect the varying signal and follow it, which makes 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 (328 ft.), 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 figures labelled “Simplified installation” for wiring instructions.

Cable lengths

The cables to G, G0 and G1 should be max. 100 m (328 ft.) and have a cross-sectional area of min. 1,5 mm² (AWG 16).

Other cables should be max. 200 m (656 ft.) and have a cross-sectional area of min. 0,5 mm² (AWG 20).

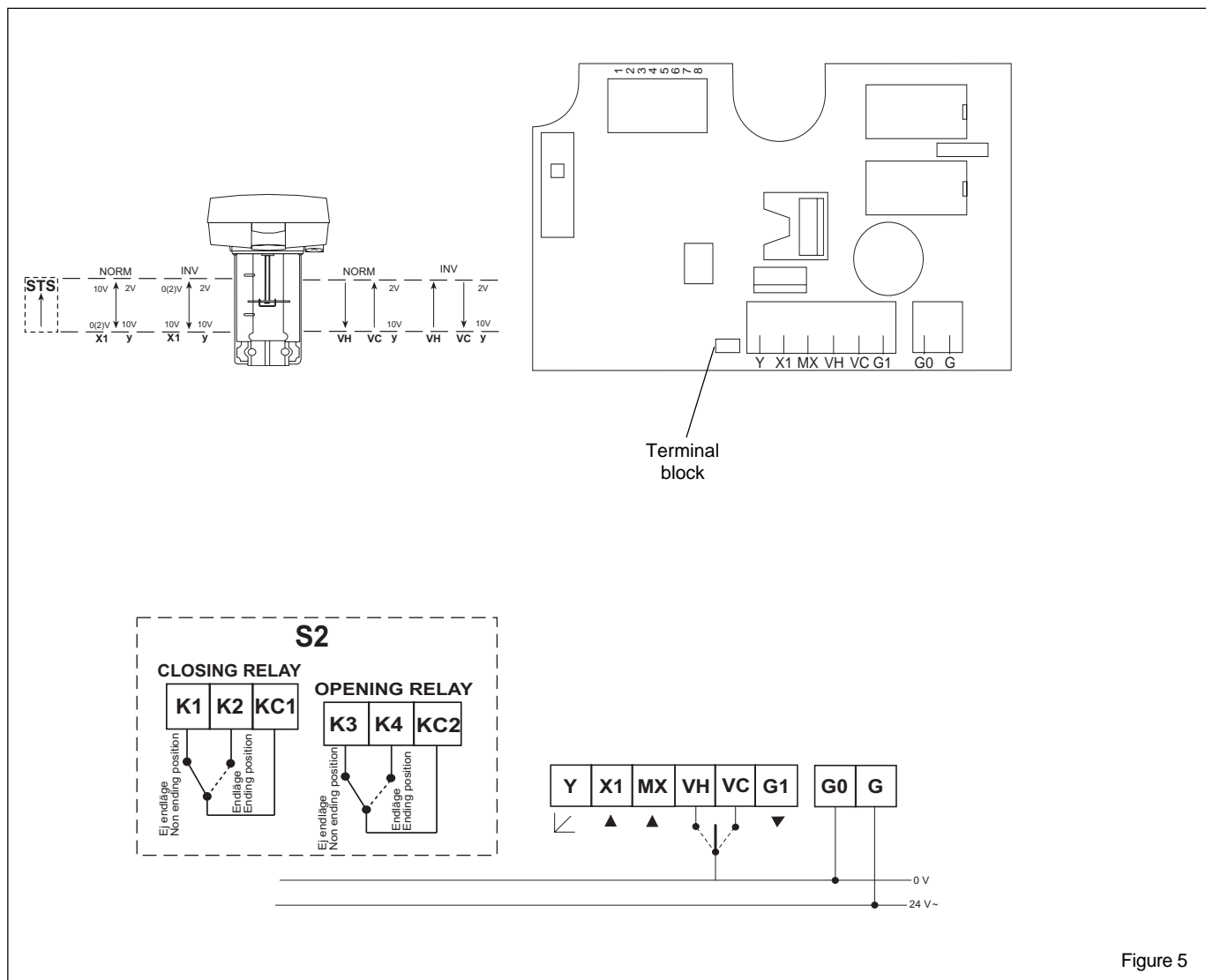


Figure 5

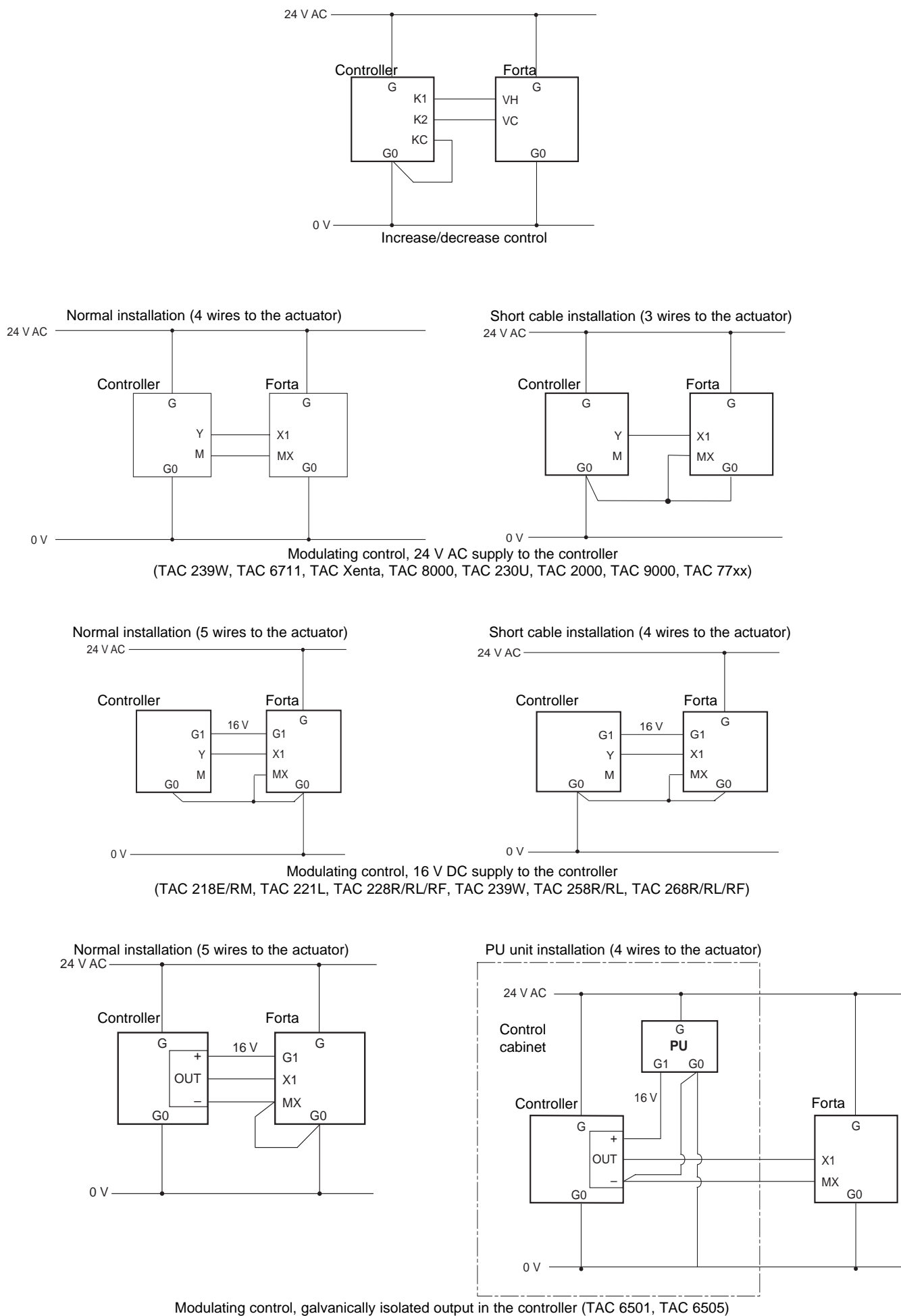


Figure 6

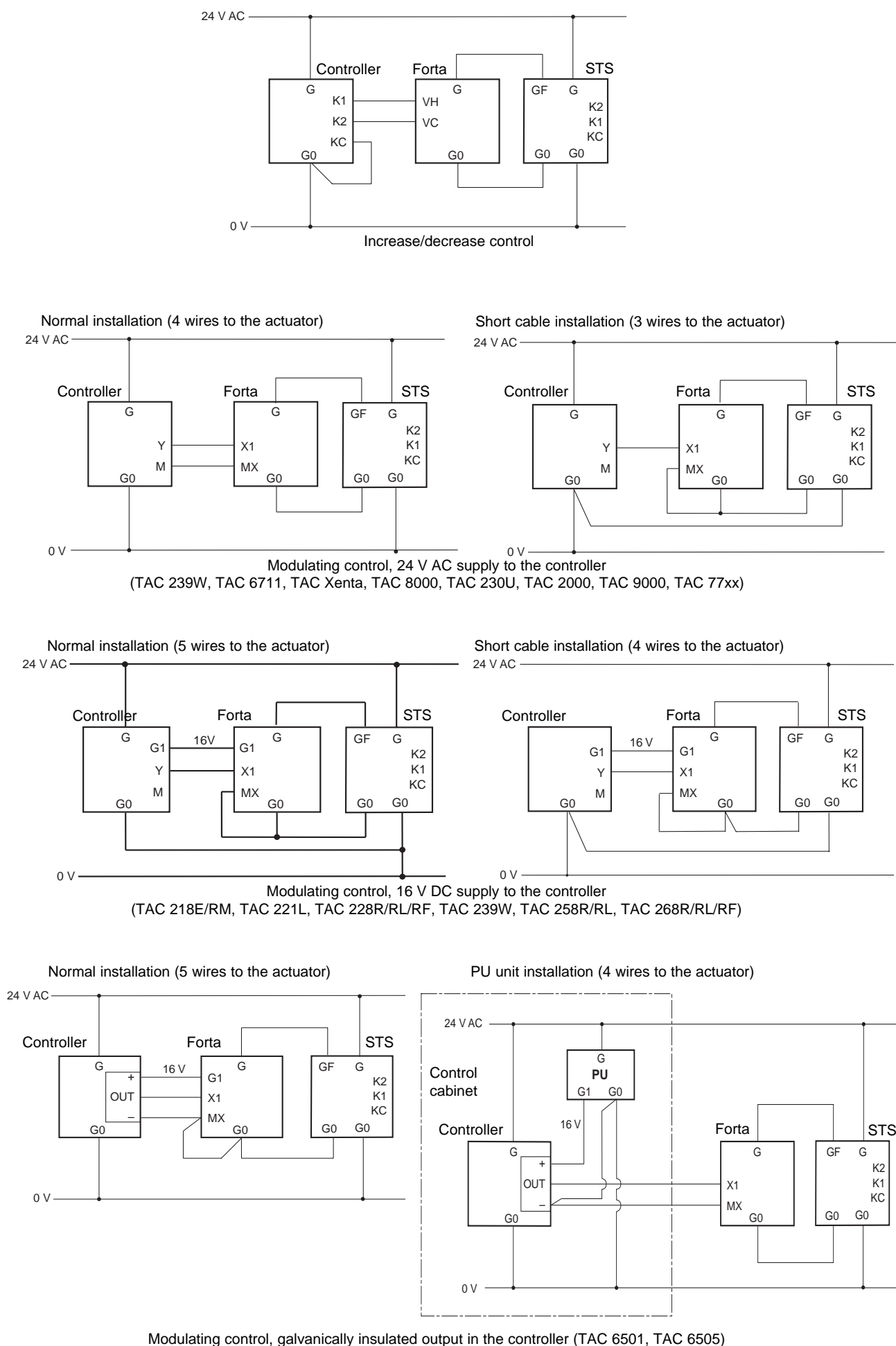


Figure 7

			Function in the "OFF" position	"ON" position	Description
MOD		1 INC	Modulating	Increase/decrease	Control
---		2 SEQ	---	Sequence	Control
2-10		3 0-10	2-10 V	0-10 V	Voltage range
6-10, 5-10		4 2-6, 0-5	6-10 V, 5-10 V	2-6 V, 0-5 V	Part of voltage range
60 s		5 300 s	60 s	300 s	Running time
NORM		6 INV	Normal	Inverted	Direction of movement
NORM		7 LIN/LG	Normal	Linear/Logarithmic	Valve characteristic
OP		8 ADJ	Operation	End position adjustment	Operation/End position adjustment

Figure 8

There are eight switches in a row on the circuit board, see figure 8.

M800: On delivery, all switches are in the "OFF" position, except for the third one.

Control signal—MOD/INC

M800 can either be controlled by an increase/decrease signal or by a variable direct voltage, a so called modulating signal, so a certain voltage level corresponds to a certain position.

Sequence or parallel control— --/SEQ

With sequence or parallel control, two actuators can be controlled by only one control signal.

You can choose which part of a voltage range to use, the upper one 6-10 V (5-10 V) or the lower one 2-6 V (0-5 V). If the switch »NORM/INV« is in the NORM position, the higher voltage corresponds to 0% flow and the lower one to 100%. To achieve the opposite function, the switch »NORM/INV« should be put in the INV position.

Note! If sequence or parallel control is not used, the switch »--/SEQ« must be in the left position, as the switch for modulating or increase/decrease control »MOD/INC« is not valid during sequence or parallel control.

Voltage range—2-10/0-10

You can choose whether to use the control signal voltage range 2-10 V or 0-10 V.

Part of voltage range— 6-10, 5-10/2-6, 0-5

You can choose which part of a voltage range to use, the upper one 6-10 V (5-10 V) or the lower one 2-6 V (0-5 V). If the switch is in the NORM position, the higher voltage corresponds to 0% and the lower one to 100%. To achieve the opposite function, the switch should be put in its INV position.

Running time—60 s/300 s

During increase/decrease control, you can choose between 60 s or 300 s running time. During modulating control, the running time is always 15 s/20 s.

Direction of movement—NORM/INV

When normal direction of movement is used, the screw of the actuator moves inwards when the control voltage decreases or if the actuator gets an increase signal. With the switch »NORM/INV«, the direction of movement can be changed.

Linearization—NORM/LIN/LG

It is possible to choose whether the motorized valve characteristics should be affected or remain unchanged. If you wish for the characteristics to be affected, the choice »LIN/LG« will make the characteristics of an equally modified percentage (EQM) valve almost linear. A motorized valve equipped with a linear valve will operate with "Quick open characteristics", i.e. when the control signal is only increased a little, the valve will be almost completely open.

Note! For the actuator to register new settings of the switches, the supply voltage must be cut or the manual operation handle lowered when the settings are done, and then it must be raised again. (This does not apply to the switch »OP/ADJ«.)

End position adjustment—OP/ADJ

The switch is used to adjust the end positions when the actuator is in operation.

ACTUATOR INSTALLATION

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

To make an end position adjustment, you only have to switch the switch »OP/ADJ« into its ADJ position, when the supply voltage has been turned on, and then back to its OP position.

When an end position adjustment is made, Forta 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.

MAINTENANCE

The actuator is maintenance-free.

ACCESSORIES

Circuit board, M750/M800	1-001-0636-1
TAC Forta Handbook (GB)	0-004-7804
S2-Forta	880-0104-000
STS-Forta M310/M800	880-0107-010
NiCd batteries for the STS	1-001-9024-0

