

M700



Product Description

The Forta M700 is a spring return electro-mechanical actuator for the control of two-way and three-way plug valves in:

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

The Forta M700 is either controlled by an increase/decrease signal or by a modulating 0–10 V control signal. Modulating control allows for 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.

These actuators are easy to mount and connect. They can be mounted directly onto 20 mm stroke Venta control valves, without any mounting kit.

For Satchwell valves, a linkage is included (see Available Products, next page).

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 requires 24 VAC supply voltage to operate. It can provide 16 VDC voltage supply for older TAC controllers.

Available Products

Part Number	Designation	Description
880-0430-030	M700-SRSU	modulating control signal or increase/decrease signal, "Stem Up" spring action (the stem is pulled up when power off)
880-0431-000	M700-S2-SRSU	modulating control signal or increase/decrease signal, "Stem Up" spring action (the stem is pulled up when power off) and end point switches
880-0440-000	M700-SRSD	modulating control signal or increase/decrease signal, "StemDown"spring action (the stem is pushed down when power off)
880-0441-000	M700-S2-SRSD	modulating control signal or increase/decrease signal, "Stem Down"spring action (the stem is pushed down when power off) and end point switches
880-0630-000	M700-SRSU+L7SV	modulating control signal or increase/decrease signal, "Stem Up"spring action (the stem is pulled up when power off), including a linkage for Satchwell valves
880-0631-000	M700-S2-SRSU+L7SV	modulating control signal or increase/decrease signal, "Stem Up" spring action (the stem is pulled up when power off) and end point switches, including a linkage for Satchwell valves
880-0641-000	M700-SRSD+L7SV	modulating control signal or increase/decrease signal, "Stem Down" spring action (the stem is pushed down when power off), including a linkage for Satchwell valves
880-0641-000	M700-S2-SRSD+L7SV	modulating control signal or increase/decrease signal, "Stem Down" spring action (the stem is pushed down when power off), and end point switches, including a linkage for Satchwell valves

Specifications

Supply voltage

24 VAC +25%/-30%, 50-60 Hz

Power consumption

Average 30 VA

Transformer sizing

50 VA

Stroke

9-52 mm

Factory set stroke

20 mm

Thrust

700 N

Duty cycle

max. 20%/60 min.

Running time - motor

Modulating 10-25 mm

15 sec

Modulating 25-32 mm

20 sec

Modulating 32-52 mm

30 sec

Increase/decrease

300 sec/600 sec

Running time - spring return

20 mm stroke

Less than 35 seconds

45 mm stroke

Less than 65 seconds

Analog input

Input Voltage Range

0-10 VDC

Selectable Ranges

0-10V, 2-10V, 0-5V, 5-10V,
2-6V, 6-10V

Impedance

min. 100 kΩ

Digital inputs VH-VC

Voltage across open input

24 VAC

Current through closed input

5 mA

Pulse time

min. 20 msec

Output G1

Voltage

16 VDC +/- 0.3 V

Load

25 mA, short circuit proof

Output Y (position feedback)

Voltage

2-10 V (0-100%)

Load

2 mA

Ambient conditions

Operation temperature

-10 to +50°C

Storage temperature

-10 to +50°C

Humidity

max. 90% RH

Sound power level

max. 50 dBA

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

Vibration

IEC-68-2-6

Enclosure rating

IP54

Material

Housing

Aluminum

Cover

ABS plastic

Physical

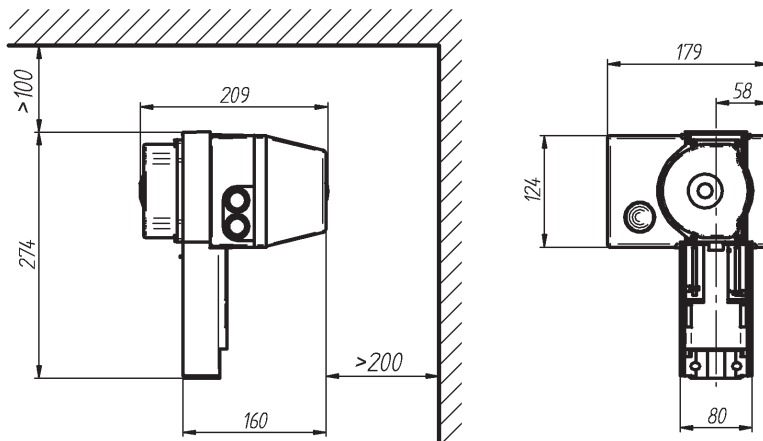
Color

Black/grey

Weight

1.8 kg (3.96 lb)

Dimensions (mm)



Function

The actuator

The brushless DC-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.

In case of power loss, the spring will bring the actuator totally up ("SRSU" models) or totally down ("SRSD" models)

Control signal

The Forta M700 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

Due to the safety function implemented, manually operating the actuator is only possible when the power is disconnected. A 10 mm spanner or wrench is required (see figure 2).

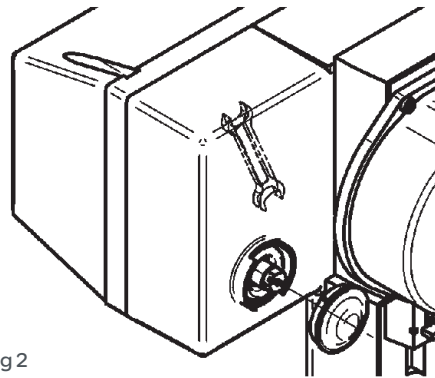
Position feedback

Forta M700 actuators are equipped with a 2–10 VDC or 0-5 VDC position feedback signal, where 2 V (0 V) always corresponds to the closed position and 10 V (5 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.

Manual Override Operation



Mounting

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

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

To mount the actuator on to a valve, position the actuator over the valve bonnet and connect the U brace through the groove on the valve neck into the mounting holes on the actuator. Secure with the flanged nuts.

Couple the valve stem to the actuator spindle using the stem linkage/extension. It may be necessary to operate the manual override to position the actuator spindle to the stroke limit. Ensure the valve is able to fully stroke and the actuator provides a small spring pre-load against the closing limit of the valve.

Electrical Connections

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

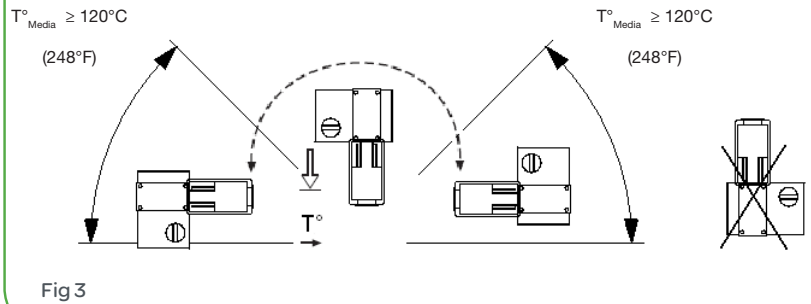
When installed with three conductors, where the control signal reference is connected to G0, the motor current of the actuator causes varying voltage loss in the cable and thus in the reference level. Forta, which has a highly sensitive control signal input, detects the varying signal and follows it, 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 (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.

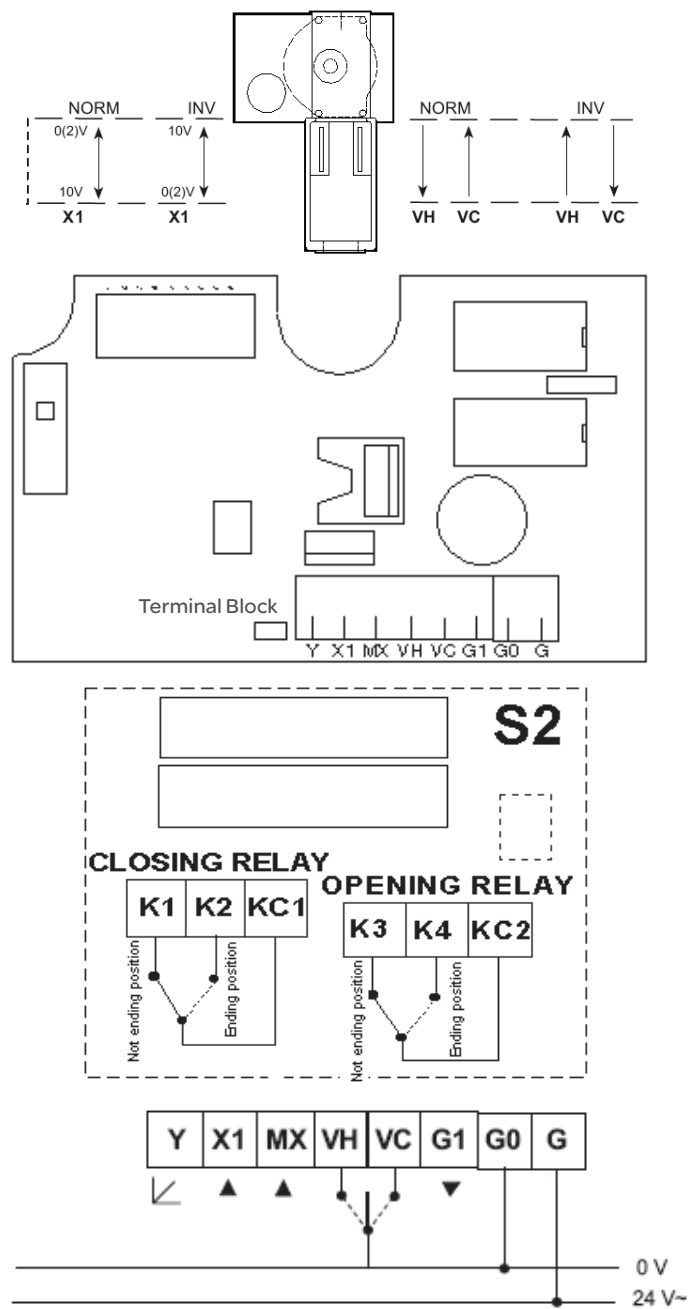
Cable lengths

For cables to G, G0 and G1 use a maximum of 100 m (328 ft.) with a cross-sectional area of minimum 1.5 mm² (AWG 16). For other cables, use a maximum of 200 m (656 ft.) with a cross-sectional area of min. 0.5 mm² (AWG 20).

Mounting

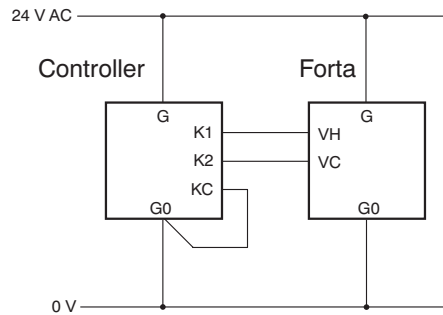


Connections



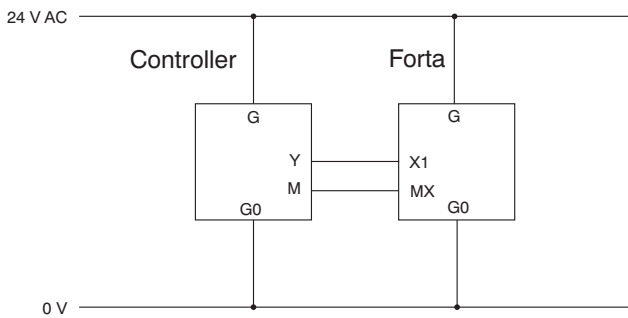
Wiring Examples

Increase/decrease control

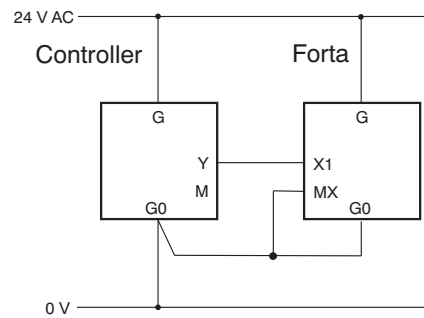


Modulating control

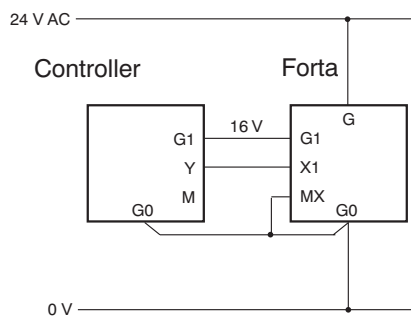
Normal installation (4 wires to the actuator)



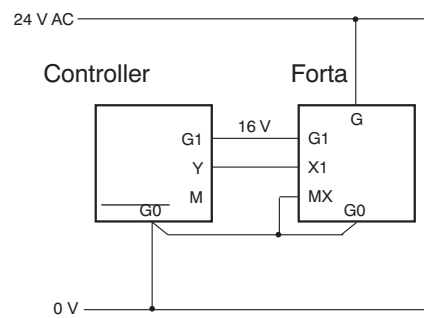
Short cable installation (3 wires to the actuator)



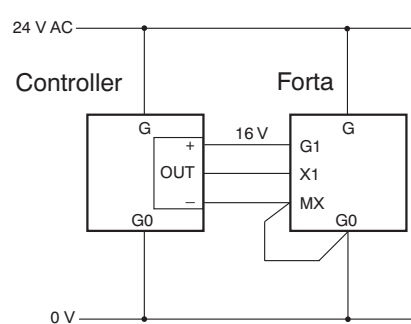
Normal installation (5 wires to the actuator)



Short cable installation (4 wires to the actuator)



Normal installation (5 wires to the actuator)



PU unit installation (4 wires to the actuator)

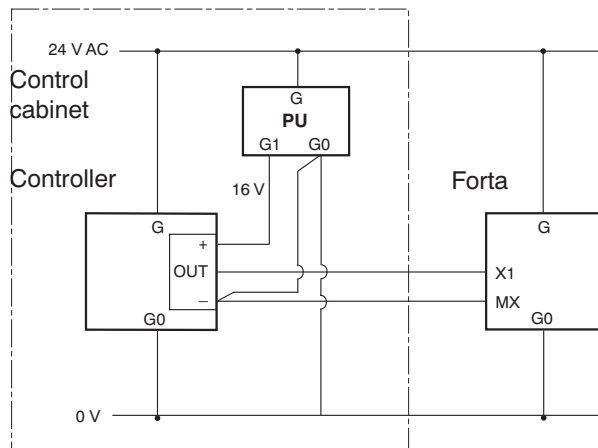


Fig 5

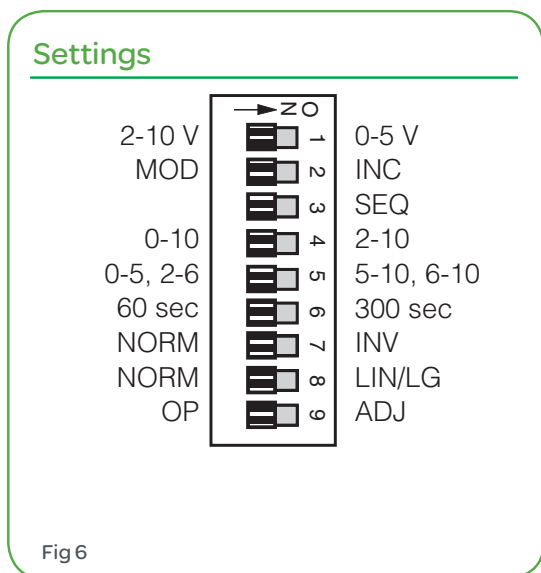


Fig 6

	Function in the "OFF" pos.	"ON" position	Description
1	2-10 V	0-5 V	Feedback signal
2	Modulating	Increase/decrease	Control (not at Sequence)
3	-	Sequence	Sequence control
4	0-10 V	2-10 V	Voltage range
5	0-5 V, 2-6 V	5-10 V, 6-10 V	Sequence voltage (higher range with Sw.4 ON)
6	60 sec	300 sec	Running time (Floating Control only)
7	Normal	Inverted	Direction of movement
8	Normal (EQ)	Linear/Logarithmic	Flow characteristic (EQ Valve)
9	Operation	End position adjust (mom.)	Operation/End position adjustment

There are nine DIP switches in a row on the circuit board. On delivery ('Factory'), all switches are in the "OFF" position.

1 Feedback signal selection

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

2 Control signal—MOD / INC

Forta can either be controlled by a variable direct voltage, a modulating signal (MOD), or by an increase/decrease signal (INC).

3 Sequence or parallel control— --- / SEQ

With sequence (or parallel) control (SEQ), two actuators/valves can be controlled with a single control signal.

For each of these, choose which part of the voltage range to use, the upper range, 5-10 V (6-10 V) or the lower one, 0-5 V (2-6 V).

Note: If sequence or parallel control is not used, the switch -- / SEQ must be in the OFF position, as the switch MOD / INC is not valid during sequence or parallel control.

4 Voltage range—0-10 / 2-10

Choose the control signal voltage range (either 0-10 V or 2-10 V).

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

Under sequence control (switch 3 ON). Choose which part of a voltage range to use, the lower one 0-5 V (2-6 V) or the upper one 5-10 V (6-10 V). The voltages within brackets are operational with switch 4 ON.

If switch 7 is in the NORM position, the higher voltage corresponds to 100% flow and the lower one to 0%. The INV position reverses this function.

6 Running time—60 s / 300 s

With increase/decrease control, you can choose a running time between 60 sec or 300 sec.

With modulating control, the running time is always 15 sec / 20 sec / 30 sec. depending on the valve stroke.

7 Direction of movement—NORM / INV

When normal direction of movement is used, the screw of the actuator moves inwards as the control voltage decreases or if the actuator gets a decrease signal.

With the switch NORM / INV, the direction of movement can be changed.

8 Linearization—NORM / LIN/LG

The motorized valve characteristics can be modified. Use the LIN/LG setting to make the characteristics of an equally modified percentage (EQM) valve almost linear.

On the other hand, with LIN/LG a motorized valve equipped with a linear valve operates with "Quick open characteristics." This means that with a small control signal, the valve is almost completely open.

9 End position adjustment—OP / ADJ

This switch is only used to adjust the end positions when the actuator is commissioned.

Momentarily put the switch in the ON position. The actuator automatically finds the end positions of the valve.

At the end of the adjustment all the other DIP switch settings (1 to 8) are read again.

For All Switches

For the actuator to register new DIP switch settings, turn off the power supply, adjust the switches, and restore power.

(This does not apply to the switch OP/ADJ).

Actuator Installation

Set the switches on the circuit board before installing the actuator. There are no other switches or potentiometers to set or adjust.

To make an end position adjustment, move the switch »OP/ADJ« into its ADJ position, turn on the supply voltage, and then move the switch 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 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.

⚠ WARNING

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

Maintenance

The actuator is maintenance-free.

Accessories

S2-Forta (auxiliary switch)	880-0104-000
Circuit board, M700-SRSU	1-001-0678-0
Circuit board, M700-SRSD	1-001-0679-0
Linkage Satchwell valves, L7SV	880-0126-000