Forta M800

Product Description

M800 is an electro-mechanical actuator for the control of two-way and three-way globe/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 0…10 V control signal. Modulating control makes for a faster positioning of the actuator.

For Satchwell valves a linkage is included (see Part Numbers on page 2).

Features

- Electronic circuitry ensures running time is the same regardless of the stroke of the valve in question.
- Easy to mount and connect- the actuator can be mounted directly onto 20mm stroke Schneider-Electric control valves, without any mounting kit. A stem extension is required to connect onto the VG210R and VG310R valves.
- Working range adjusts automatically depending on the stroke of the valve; electronic circuitry of the actuator then takes care of the adjustment of the valve end positions.
- Manual override operates without disconnecting power to the board. Stroke Indicators on the yoke provide clear visual indication to the valves opening position.

Specifications

Part numbers	(Table on next page)
Supply Voltage	24V AC +/- 25%, 50…60Hz 24V DC +/- 10%
Power consumption	average 15 VA
Transformer sizing	50 VA
Running time Modulating 9…25 mm Modulating 25…32 mm Modulating 32…52 mm	15 s 20 s 30 s
Increase/decrease	300 s/60 s
Stroke	9…52 mm
Default factory set stroke	20 mm
Thrust	800 N (180 lbf.)
Duty cycle	max. 20%/60 minutes
Modulating / Proportional Analog input (X1-MX) Voltage Range	0…10 V
Impedance	min 100 k Ohm
Digital inputs, Floating VH–VC Selectable Input Signals	0…10V, 2…10V, 0…5V, 2…6V, 5…10V, 6…10V
Voltage across open input	24 V AC
Current through closed input	5 mA
Pulse time	min. 20 ms

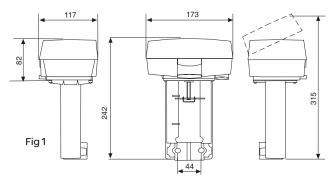|	
Output G1 Voltage Load	16 V DC ±0.3 V 25 mA, short-circuit proof
Output Y (Position Feedback Signal) Voltage	2…10 V (0…100%)
Load	2 mA
Environmental Operation temperature Storage temperature Ambient humidity Enclosure rating Sound power level	−10…+50 °C −10…+50 °C max. 90% RH IP 54 max. 40 dBA
Standards Emission / immunity	EMC 2004/108/CE according to 613626-1:2006
Heat Humidity Cold Vibration	IEC-68-2-2 IEC-68-2-3 IEC-68-2-1 IEC-68-2-6
Material Housing Cover Colour Weight	aluminium ABS/PC plastic aluminium/grey 1.8 kg (3.96 lb.)

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Part Numbers

Designation	Explanation	Part Number
M800	modulating control signal or increase/decrease signal	880-0310-030
M800-S2	modulating control signal or increase/decrease signal and end point switches	880-0311-030
M800+L2SV	modulating control signal or increase/decrease signal, including a linkage for Satchwell valves	880-0650-000
M800-S2+L2SV	modulating control signal or increase/decrease signal and end point switches, including a linkage for Satchwell valves	880-0651-000

Dimensions (mm)

Fig 1

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.

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.

Mounting

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

NOTE: Do not use the actuator for the old 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.

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. The actuator is supplied with the manual operation lowered.
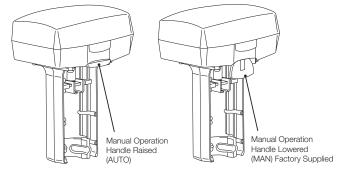
Manual Operation Handle

Manual Operation Handle Raised (AUTO)

Manual Operation Handle Lowered (MAN) Factory Supplied

Fig 2

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 (depending on switch nr.1).

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.
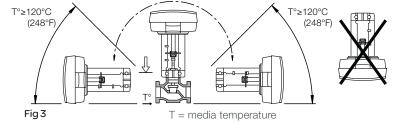

⚠ WARNING

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.

T°≥120°C (248°F)   T°≥120°C (248°F)

Fig 3   T = media temperature

When media T ° exceeds 120° mount the actuator between 45° and the horizontal position (see drawing)

Actuator Installation

Before installing it is necessary to remove the antistatic protection placed under the cover.

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

S2-Forta (Aux Switch)	880-0104-000
Circuit board M800	1-001-0674-0
Linkage Satchwell valves L2SV	880-0124-000
Stem Extension, VG210R, VG310R	AV-823
Yoke Heater (-10'C)	880 0109 000

Electrical Connections

Block	Function	Description
G	24 V AC	Supply voltage
G0	24V AC rtn	Supply voltage
X1	Input	Control signals
MX	Input, neutral	Modulating input control
VH	Increase	Floating input Control
VC	Decrease	(VH, VC short circuited to G)
G1	16 V DC	Local controller supply
Y	0…100%	2…10V Feedback signal

NOTE: 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.
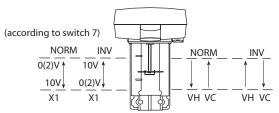
This variation may be accepted in simplified installations on the following conditions: the cables between the controller and actuator are shorter than 100 m (328 ft.), the cross-sectional area is larger than 1.5 mm2 (AWG 16) and the cables are only connected to one actuator. Please refer to the figures for 3-wire connectoin instructions.
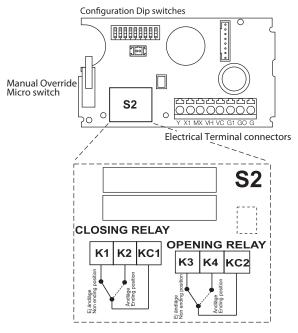
Cable Lengths

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).

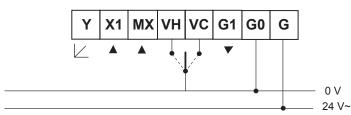Other cables should be max. 200 m (656 ft.) and have a cross-sectional area of min. 0.5 mm² (AWG 20).

Connections/PCB Layout

Fig 4

KC1 to K1 makes upon a fully closed valve
KC2 to K4 makes upon a fully open valve

Wiring Examples

Typical Wiring

Floating Control
(Increase/Decrease)

Increase/decrease control

Modulating control,
24 V AC supply to
the controller

Normal installation
(4 wires to the actuator)

Short cable installation
(3 wires to the actuator)

Modulating control,
16 V DC supply to
the controller

Normal installation
(5 wires to the actuator)

Short cable installation
(4 wires to the actuator)

Modulating control, gal-
vanically isolated output
in the controller

Normal installation
(5 wires to the actuator)

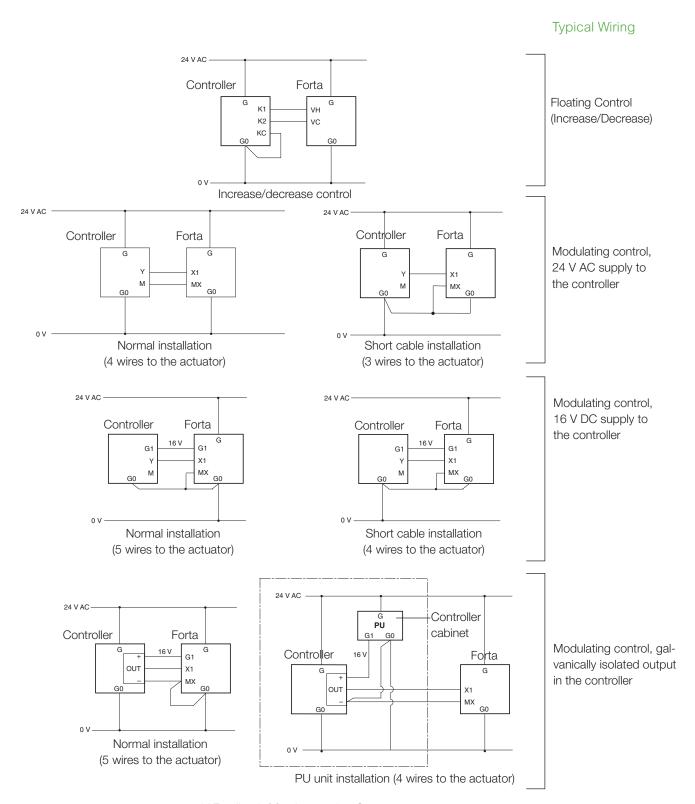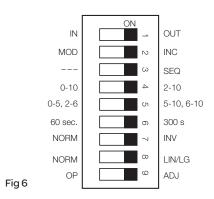PU unit installation (4 wires to the actuator)

Fig 5   2…10V Feedback (Y) referenced to G0

Program (Dip Switch) Switch Settings

Switch Number	OFF Position	ON Position	Description
1	In (Retract)	Out (Extend)	Valve closing screw direction
2	Modulating	Increase/decrease	Control
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 Rage (Dependency on Sw4)
6	60 s	300 s	Running time (Floating Control)
7	Normal (Direct)	Inverted (Reverse)	Direction of movement against Control Signal
8	Normal	Linear/Logarithmic	Valve characteristic
9	Operation	End position adjust	Operation/End position adjustment

Settings

Fig 6

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

1 Valve Closing Screw Direction—IN / OUT

IN direction of movement is used when the screw of the actuator moves inwards to close the valve.

OUT direction of movement is used when the screw of the actuator moves outwards to close the valve.

2 Control signal—MOD / INC

Y=2V for closed valve - see M1500

Forta can either be controlled by a variable direct voltage, a so called 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 by only one control signal.

Depending on Switch 4 and 5, you can choose which part of the voltage range to use, the upper one, 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.

4 Voltage range—0…10 / 2…10

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

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

Under Sequence you can 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 bracketed control voltage is 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%. To achieve the opposite function, switch 7 for a closed valve should be put in its INV position.

6 Running time—60 s / 300 s

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

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

7 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 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. The setting LIN/LG will make the flow characteristics of an equal percentage valve valve linear.

Consequently, a linear valve characteristic will operate as 'Quick open'. i.e. with a small control signal, a linear valve will provide a high flow rate.

NOTE: For the actuator to register new settings of the switches, the supply voltage must be cut or the manual operation handle lowered, the settings done, and then the handle raised again.

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

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 will automatically find the end positions of the valve.