



M4410C/L

Small linear thermoelectric Actuator

APPLICATION

The M4410C/L Small Linear Thermoelectric Actuators are used in room and zone applications for time-controlled two-point regulation of heating and cooling systems such as fan coil units, radiators, floor heating systems, chilled ceilings, and convectors.

- Fit on standard M30 x 1.5 heating/cooling valves, thermostatic radiator valves, and valve inserts for manifolds and compact radiators.
- The actuator (in combination with adapter VA80, incl. in the delivery) is suitable use with the following
 - the 2-way and 3-way V58xxA4, V58xxC4, and VSO series of small linear valves with 2.5-mm stroke
 - TRVs V300 and V2000
 - Therafix TRV V2464 and V2474 series with 2.5 to 3-mm stroke
- Additional valve adapters on request

SPECIAL FEATURES

- No mounting tools required (easily mounted using valve adapter)
- Water-protected housing design in all mounting positions
- Auxiliary switch models for driving pumps or fans
- Normally-open and normally-closed models
- Compact design allows installation in limited space
- Function display showing stem position (extended or retracted)
- Noiseless operation
- Reliable longterm operation

TECHNICAL DATA

Specifications	
Material:	Polyamide / light gray (RAL 7035)
Cable:	Fixed, 1 m, PVC / light gray (RAL7035)
Wires:	2 x 0.75 mm ² (with aux. switch: 4 x 0.75 mm ²)
Maximum stroke:	5 mm
Stem force:	96 N
Protection standard:	IP54 in all mounting positions
Protection class:	M4410C: III M4410L: II
CE conformity:	EN 60730



Specifications	
Max. permissible auxiliary switch current:	M4410C4540: 3 A res., 1 A ind. M4410L4540: 5 A res., 1 A ind.
Switching point:	Approx. 2 mm (versions with auxiliary switch)
Surge protection:	2.5 kV
Humidity:	max. 95%
End position:	15.5 mm
Electrical specifications	
Initial current:	M4410Cxxx: <300 mA** M4410Lxxx: <550 mA**
Power supply:	M4410C: 24 VAC/DC +20...10% M4410L: 230 VAC +10...-10%,50/60 Hz
Power consumption:	1 W ± 15%*
Open/closing time:	4.0 min.*
Temperature	
Fluid temperature:	0 ... +100 °C (or higher,depending upon chosen adapter)
Storage temperature:	-25 ... +60 °C
Ambient temperature:	0 ... +60 °C

* All values at nominal voltage 24 VAC/DC, 230 VAC, 50 Hz, ambient temperature: 20 °C

**Average over max. 2 min (M4410Cxxxx) or max. 100 ms (M4410Lxxxx)

METHOD OF OPERATION

The M4410C/L actuator uses a PTC resistor-heated wax element and a compression spring. The wax element is heated by applying the operating voltage and moves the integrated stem. The force generated by the movement is transferred to the valve lifter, thus opening or closing the valve.

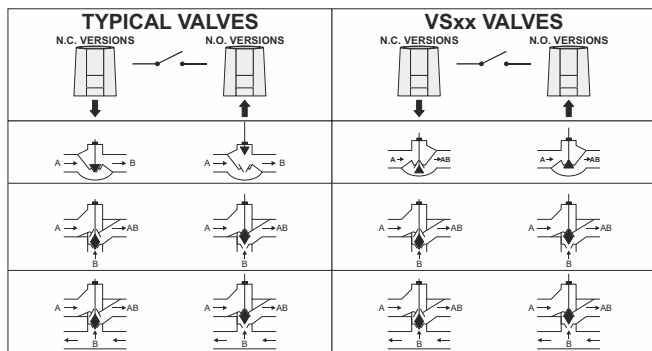


Fig. 1 Opening / closing depending upon valve type

N.C. VERSIONS

In the case of N.C. versions, upon application of the operating voltage and expiration of the dead time, the stem retracts and thus steadily opens the valve.

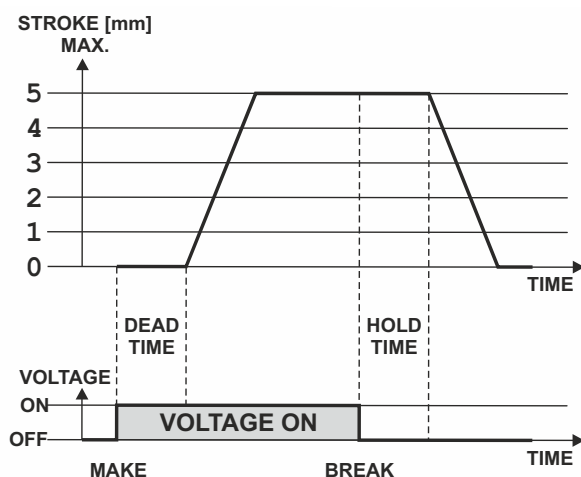


Fig. 2 Opening / closing time of N.C. versions

After the operating voltage is cut and the hold time expires, the elastic force of the compression spring extends the stem and thus steadily closes (opens) the valve. The elastic force of the compression spring matches the closing/opening force of commercially-available valves, and thus keeps the valve securely closed (open).

N.O. VERSIONS

In the case of N.O. versions, upon application of the operating voltage and expiration of the dead time, the stem extends and thus steadily closes the valve.

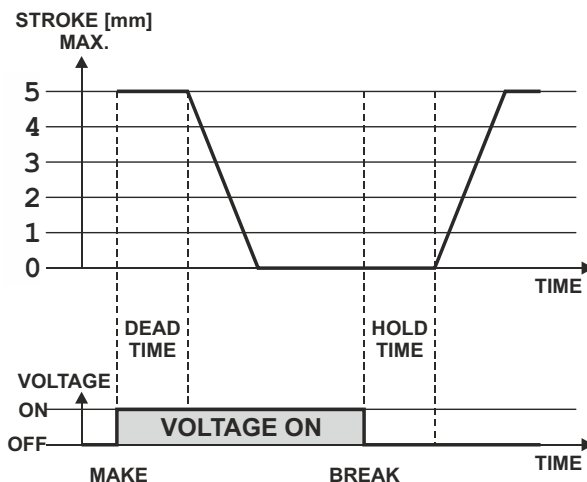


Fig. 3 Opening / closing time of N.O. versions

After the operating voltage is cut and the hold time expires, the elastic force of the compression spring retracts the stem and thus steadily opens (closes) the valve.

N.C. VERSIONS WITH AUXILIARY SWITCH

In the case of N.C. versions with auxiliary switch, upon application of the operating voltage and expiration of the dead time, the stem retracts and thus steadily opens the valve. The integrated micro-switch is closed with a travel path of approx. 2 mm.

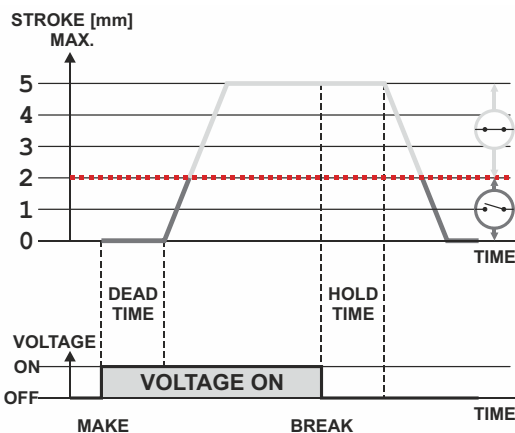


Fig. 4 Opening / closing time of N.C. versions with auxiliary switch

After the operating voltage is cut and the hold time expires, the elastic force of the compression spring extends the stem and thus steadily closes (opens) the valve. The integrated micro-switch is opened after an actuator travel of approx. 3 mm.

"FIRST OPEN" FUNCTION (N.C. VERSIONS, ONLY)

At delivery, and before the N.C. actuator is powered for the first time, it functions like an N.O. version; this is due to the "First Open" function. This enables heating operation during early construction phases even before completion of the electric wiring. When subsequently commissioning the system, upon applying current (for more than 6 minutes) to the actuator for the first time, the "First Open" function is automatically disabled and the actuator henceforth functions like an N.C. actuator.

Display

The function display (all-round display) of the actuator shows at first glance whether the stem is extended or retracted; this can be also felt in the dark.

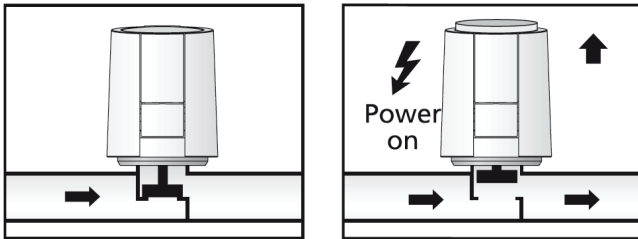


Fig. 5 Extrusion of the function display of N.C. versions when stem has retracted

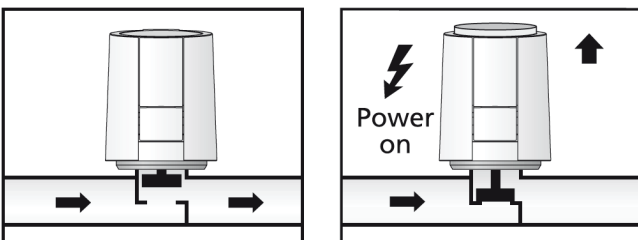


Fig. 6 Extrusion of the function display of N.O. versions when stem has extended

INSTALLATION GUIDELINES

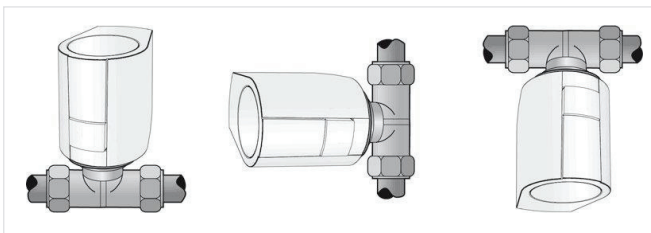


Fig. 7 Installation orientations (vertical, horizontal, "overhead")

The actuator is installed preferably in the vertical or the horizontal orientation.

i Connection cables must not touch the piping (heat transfer)!

Only a safety-isolating transformer in accordance with EN 60335 may be used. The rated capacity of the transformer must be based on the initial current of the actuators.

Rule of thumb: $P_{\text{TRANSFORMER}} = n \times 6 \text{ VA}$ (where "n" = the number of drives)

Installation

The valve adapter assortment guarantees a perfect match of the actuator to almost all valve bottoms and heating circuit distributors available on the market. The actuator is simply plugged on to the appropriate valve adapter previously installed manually.

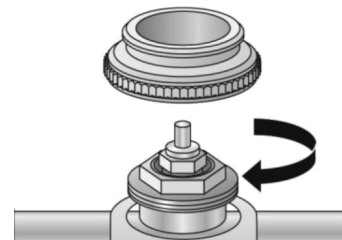


Fig. 8 Step 1: Manually screwing the adapter onto valve

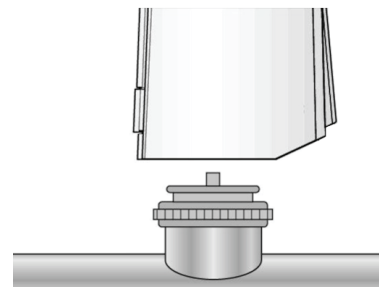


Fig. 9 Step 2: Manually positioning actuator



Fig. 10 Step 3: Pressing down actuator onto valve adapter

Wiring

i To protect against overloading, fusing appropriate to the given cable cross-section must be installed.

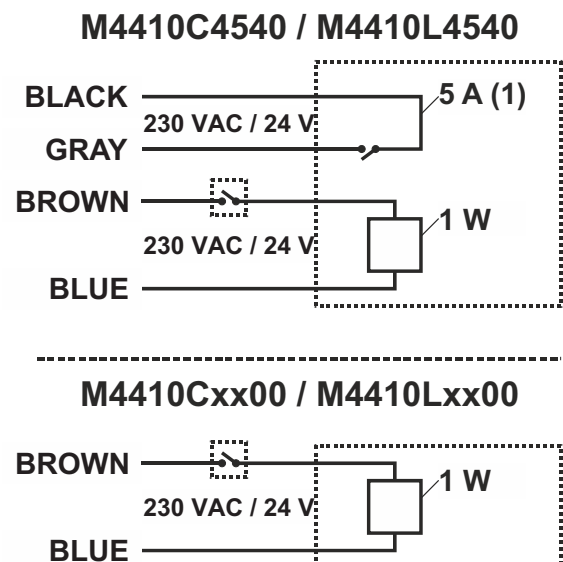
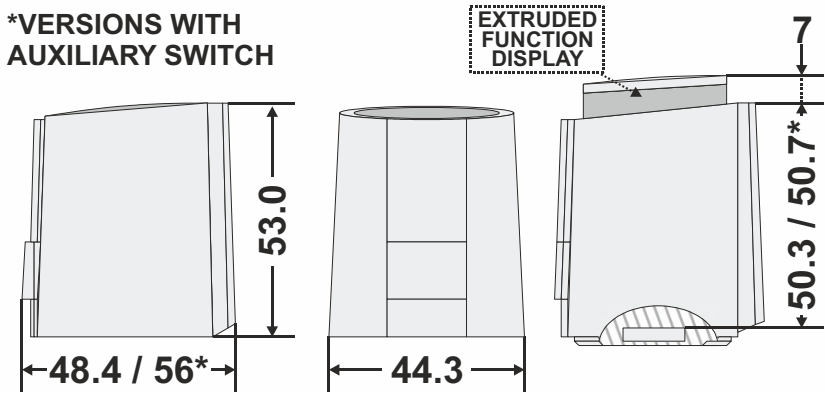


Fig. 11 Wiring diagram

DIMENSIONS

Overview



Note: All dimensions in mm unless stated otherwise.

ORDERING INFORMATION

The following tables contain all the information you need to make an order of an item of your choice. When ordering, please always state the type, the ordering or the part number.

Options

Order number	Function	Description	Supply voltage
M4410C4500	Normally Closed	stem extends	24 VAC/DC
M4410C4000	Normally Open	stem retracts	
M4410C4540	Normally Closed	stem extends, with auxiliary switch	
M4410L4500	Normally Closed	stem extends	230 VAC
M4410L4000	Normally Open	stem retracts	
M4410L4540	Normally Closed	stem extends, with auxiliary switch	

For more information
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