M4410C/L
SMALL LINEAR THERMOELECTRIC ACTUATORS

PRODUCT DATA

FEATURES
- No mounting tools required (easily mounted using valve adapter)
- Water-protected housing design (IP54) in all mounting positions
- Auxiliary switch models for driving pumps or fans
- Normally-open (N.O. = stem retracted when actuator not under current) and normally-closed (N.C. = stem extended when actuator not under current) models
- Compact design allows installation in limited space
- Function display showing stem position (extended or retracted)
- Noiseless, reliable long-term operation
- Surge protection (2.5 kV)

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 valves having a closing dimension of 11.5 ±0.3 mm:
  - the 2-way and 3-way V58xxA4, V58xxC4, and VSO series of small linear valves with 2.5-mm stroke;
  - TRVs V300 and V2000;
  - Theratif TRV V2464 and V2474 series with 2.5 to 3-mm stroke.
- Additional valve adapters on request.

SPECIFICATIONS

Max. stroke 5 mm
Power supply
- M4410C: 24 VAC/DC +20…-10%
- M4410L: 230 VAC +10…-10%, 50/60 Hz
Power consumption 1 W ± 15%
Max. permissible aux. switch current
- M4410C4540: 3 A res., 1 A ind.
- M4410L4540: 5 A res., 1 A ind.
Switching point Approx. 2 mm (versions with aux. switch)
Stem force 100 N ± 5%
Fluid temperature 0 … +100 °C (or higher, depending upon chosen adapter)
Storage temperature -25 … +60 °C
Ambient temperature 0 … +60 °C
Opening/closing time see Table 2 on pg. 2
Protection Class
- M4410C: III;
- M4410L: II
Protection standard (according to EN60730)
- IP54 in all mounting positions
CE conformity EN 60730
Housing material Polyamide / light gray (RAL 7035)
Cable Fixed, 1 m, PVC / light gray (RAL 7035)
Wires 2 x 0.75 mm²
(Surface switch: 4 x 0.75 mm²)
Surge protection 2.5 kV
Humidity max. 95%
End position 15.5 mm
## ORDERING INFORMATION

### Table 1. Models

<table>
<thead>
<tr>
<th>order number</th>
<th>function (without power)</th>
<th>additional features</th>
<th>voltage</th>
<th>max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4410C4500</td>
<td>normally closed (stem extends)</td>
<td>--</td>
<td>24 VAC/DC</td>
<td>5 mm</td>
</tr>
<tr>
<td>M4410C4000</td>
<td>normally open (stem retracts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4410C4540</td>
<td>normally closed (stem extends)</td>
<td>With auxiliary switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4410L4500</td>
<td>normally closed (stem extends)</td>
<td>--</td>
<td>230 VAC</td>
<td></td>
</tr>
<tr>
<td>M4410L4000</td>
<td>normally open (stem retracts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4410L4540</td>
<td>normally closed (stem extends)</td>
<td>With auxiliary switch</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* In combination with a standard 2-way valve: stem extends = valve closes, stem retracts = valve opens.

### Table 2. Electrical specifications

<table>
<thead>
<tr>
<th>order number</th>
<th>inrush current*</th>
<th>power consumption*</th>
<th>Closing and opening time for nominal valve stroke*</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4410Cxxxx</td>
<td>&lt; 300 mA**</td>
<td>1 W ± 15%</td>
<td>~4.0 min</td>
</tr>
<tr>
<td>M4410Lxxxx</td>
<td>&lt; 550 mA**</td>
<td>1 W ± 15%</td>
<td>~4.0 min</td>
</tr>
</tbody>
</table>

* 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).
DIMENSIONS

*VERSIONS WITH AUXILIARY SWITCH

Fig. 1. Dimensions (in mm)

INSTALLATION ORIENTATIONS

Fig. 2. Installation orientations (vertical, horizontal, “overhead”)

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

NOTE: 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)

ASSEMBLY

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. 3. Step 1: Manually screwing the adapter onto valve

Fig. 4. Step 2: Manually positioning actuator

Fig. 5. Step 3: Pressing down actuator onto valve adapter

WIRING DIAGRAM

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

![Wiring Diagram](image)

Fig. 6. Wiring diagram
FUNCTION
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 (depending upon the valve type – see Fig. 7).

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 (closes – see Fig. 7) the valve.

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 (opens – see Fig. 7) 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 (closes – see Fig. 7) the valve. The integrated micro-switch is closed with a travel path of approx. 2 mm.

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 (opens – see Fig. 7) the valve.

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.
FUNCTION 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. 11. Extrusion of the function display of N.C. versions when stem has retracted

Fig. 12. Extrusion of the function display of N.O. versions when stem has extended

"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.