


EMOtec



Actuators

Thermal actuator for heating, ventilation, and air conditioning systems


Engineering
GREAT Solutions

EMOTec

The EMOTec thermal actuator with position indicator (NC) can be installed in temperature and/or timerelated 2-point control systems.

Key features

- > **Compact sizes especially suited to manifold cabinets**
- > **Simple functional testing by means of position indicator (with NC model)**
- > **Safe because of overvoltage protection (with 230 V model)**
- > **Trouble-free because it is silent and needs no maintenance**



Technical description

The EMOTec thermal actuator is a twopoint actuator for connection to a temperature controller with two-point output, e.g. room Thermostat P or Radiocontrol F-System for floor heating.

The actuator NC is equipped with a position indicator on the top (valve closed / valve open).

Models with 230 V (with built-in overvoltage protection 2.5 kV) and 24 V operating voltages, each NC or NO.

EMOTec has an electrically heated expansion system which is secured against overtravel.

The positioning force within the close range is adapted to thermostatic valve bodies with soft valve discs.

It is maintenance free and functions without noise.

Depending on the model, in a currentless status, EMOTec holds the valve closed (NC model) or open (NO model).

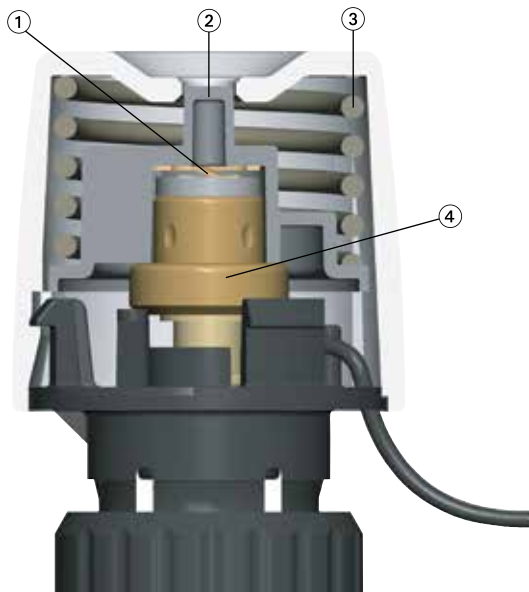
The body is designed in a white RAL 9016, heat-resistant, shock-proof plastic.

The EMOTec is designed to be installed on all IMI Heimeier thermostatic valve bodies and three-way valves. Adapters enable the mounting of thermostatic valve bodies of other manufacturers, see accessories.

Its compactness also makes it especially suited to install in manifold cabinets.

Construction

EMOtec 230 V model (NC)



1. PTC heating element
2. Position indicator
3. Spring
4. Expansion system

Function

Closed when currentless (NC model)

Initiating operating voltage heats up the expansion system of the actuator. After the time lag, a uniform opening process ensues. If the voltage is cutoff, the actuator closes via the cooling of the expansion system after the time lag.

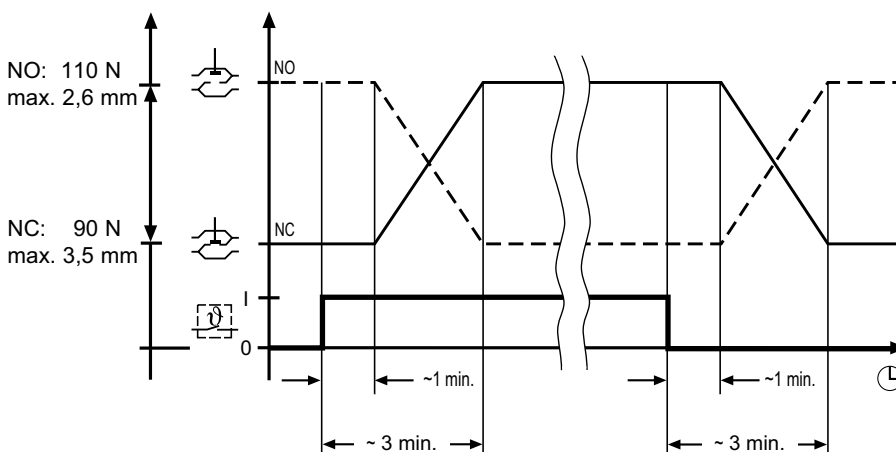
Open when currentless (NO model)

Initiating operating voltage heats up the expansion system of the actuator. After the time lag, a uniform closing process ensues. If the voltage is cutoff, the actuator opens via the cooling of the expansion system after the time lag.

Note:

When conducting a performance test, be sure to check the time response (time lag)!
Opening and closing times are dependent on the ambient temperature.

Action chart



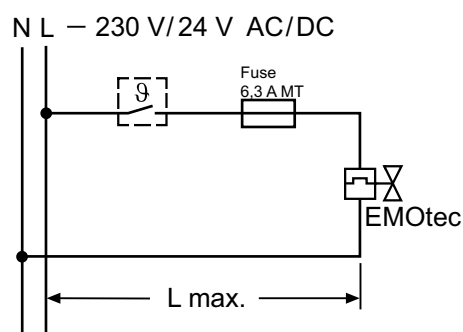
Application

The EMOTec thermal actuator can be installed in temperature and/or time-related 2-point control systems, especially for floor heating.

The position indicator with model NC enables simple functional testing, e.g. during the mounting of the actuator on heating manifolds.

Depending on the operating conditions to be fulfilled, EMOTec can also be used in other applications in heating, ventilation and air-conditioning systems.

Connection diagram



(see planning notes)

Technical data

| | 230 V | 24 V |
|--|---|---|
| Operating voltage: | 230 V AC/DC (+10%/-15%) | 24 V AC/DC (+25%/-10%) |
| - Frequency | 0-60 Hz | 0-60 Hz |
| Power draw (continuous operation): | 3 W (VA) | 3 W (VA) |
| - when operating | 90 W (VA) | 9 W (VA) |
| Stroke: | NO 2,6 mm / NC 3,5 mm | NO 2,5 mm / NC 3,5 mm |
| Pressure power: | NO 110 N / NC 90 N | NO 110 N / NC 90 N |
| Close and open time: | ~3 min. | ~3 min. |
| Type of protection: | EN 60529 | EN 60529 |
| - horizontal installation | IP 43 | IP 43 |
| - vertical standing installation | IP 43 | IP 43 |
| Protection class: | II, EN 60730 only with appropriate installation | II, EN 60730 only with appropriate installation |
| Overvoltage protection: | Varistor | - |
| Body, colour: | ABS/PC (shock-resistant), white RAL 9016 | ABS/PC (shock-resistant), white RAL 9016 |
| Connection cable: | 1 m ¹ , 2 x 0,50 mm ² | 1 m ¹ , 2 x 0,50 mm ² |
| CE certification (EMC / LV): | EN 55014-1, EN 60730-2-14 | EN 55014-1, EN 60730-2-14 |
| Ambient temperature (in operation): | 0°C - 50°C (32°F - 122°F) | 0°C - 50°C (32°F - 122°F) |
| Medium temperature: | max. 100°C (212°F) | max. 100°C (212°F) |
| Storage temperature: | -20°C - +70°C (-4°F - +158°F) | -20°C - +70°C (-4°F - +158°F) |
| Mounting: | fits all HEIMEIER thermostatic valve bodies and three-way valves | fits all HEIMEIER thermostatic valve bodies and three-way valves |

*) custom lengths upon request

Max. permissible differential pressure with which the valve is still closed: See prospectus for thermostatic valve body; three-way reversing valve; three-way mixing valve; control valves for floor heating systems.

Planning notes

24 V transformer dimensioning

For operation with 24 V low voltage, a transformer is required which is in compliance with EN 60730 and possesses sufficient capacity.

For dimensioning transformer power, the value for the operating phase needs to be taken into account. The same applies to the layout of switching contacts of room temperature controllers.

The minimum transformer power supplied results from:

the sum of the power consumed by the EMOTec 24 V (in the switch-on phase) plus the sum of the power consumed by the Thermostat P.

Room temperature controller (art. no. 1946/48-00.500) needs not be taken into account.

Calculation example:

2 ea. Thermostat P 24 V (art. no. 1942-00.500) at 1.5 VA
each = 3 VA
6 ea. EMOTec 24 V (art. no. 1827-00.500) at 9 VA
each = 54 VA
Total consumption = 57 VA
(= minimum transformer power delivery)
Selected transformer = 63 VA

24 V protective low voltage

With the required protective low voltage (SELV based on DIN VDE 0100) a safety isolating transformer in compliance with EN 61558 must be used.

Length of cable

In order to maintain the declared opening times for the actuators, the voltage loss (depending on length of cable and cross section) in the operating phase on the supply lines to the actuators may not exceed 4%.

For general dimensioning with copper lines, use the following standard formula:

$$L \text{ max.} = l / n$$

$L \text{ max.}$: max. length of cable in [m] (see "Connection diagram")

l : table value in [m]

n : number of actuators

| Line: Type/name | Cross section: A [mm ²] | I for each model: | | Note: Application; comparison |
|-----------------------------|---|-------------------|-------------|--|
| | | 230 V [m] | 24 V [m] | |
| LiY/twin flexible rod | 0,34 | - | 38 | only for 24 V; corresponds to \varnothing 0.6 mm |
| Y(R)/bell wire | 0,50 | - | 56 | only for 24 V; model Y(R) 2 x 0.8 |
| H03VVF/PVC mains cable | 0,75 | 840 | 84 | not to be concealed under plaster |
| NYM/house wiring cable | 1,50 | 1680 | 168 | also for NYIF 1.5 mm ² |
| NYIF/flat webbed house wire | 2,50 | 2800 | 280 | also for NYM 2.5 mm ² |

Calculation example

Goal:

max. length of cable $L \text{ max.}$

Given:

Voltage $U = 24 \text{ V}$

Conductor cross section $A = 2 \times 1.5 \text{ mm}^2$

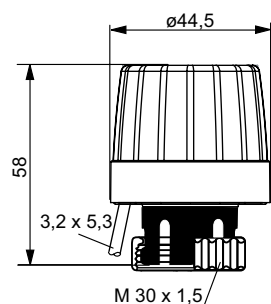
Value in table $l = 168 \text{ m}$

Number of actuators $n = 4$

Solution:

$$l \text{ max.} = l / n = 168 \text{ m} / 4 = 42 \text{ m}$$

Articles



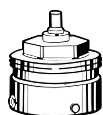
EMOTec

| Type | EAN | Article No |
|-------------------------|---------------|-------------|
| 230 V | | |
| Currentless closed (NC) | 4024052460359 | 1807-00.500 |
| Currentless open (NO) | 4024052490752 | 1809-00.500 |
| 24 V | | |
| Currentless closed (NC) | 4024052460458 | 1827-00.500 |
| Currentless open (NO) | 4024052491551 | 1829-00.500 |

110 V model on request

1 mm = 0,0394 inch

Accessories



Connecting to other brands

Adapter for mounting the EMOTec on valve bodies of other manufacturers. Threads M 30 x 1.5 factory standard.

| Manufacturer | EAN | Article No |
|---|---------------|-------------|
| Danfoss RA | 4024052297016 | 9702-24.700 |
| Danfoss RAV | 4024052300112 | 9800-24.700 |
| Danfoss RAVL | 4024052295913 | 9700-24.700 |
| Vaillant (Ø≈30 mm) | 4024052296019 | 9700-27.700 |
| TA (M28x1,5) | 4024052336418 | 9701-28.700 |
| Herz | 4024052296316 | 9700-30.700 |
| Markaryd | 4024052296514 | 9700-41.700 |
| Comap | 4024052296712 | 9700-55.700 |
| Oventrop (M30x1,0) | 4024052428519 | 9700-10.700 |
| Giacomini | 4024052429714 | 9700-33.700 |
| Ista | 4024052511419 | 9700-36.700 |
| Rotex | 4024052429615 | 9700-32.700 |
| Uponor (Velta) | 4024052448111 | 9700-34.700 |
| - Euro-/compact distributor or return valve 17 | | |
| Uponor (Velta) | 4024052510917 | 9701-34.700 |
| - Provario distributor | | |

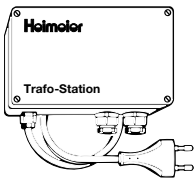


Connecting to radiators with integrated valves

Adapter for mounting the EMOTec with M 30 x 1.5 connection on thermostatic insert for **Series 2** or **Series 3** clamping joint. M 30 x 1.5 threading, factory standard

Radiator manufacturers: thermostatic head prospectus

| Model | EAN | Article No |
|-----------------|---------------|-------------|
| Series 2 | 4024052297214 | 9703-24.700 |
| Series 3 | 4024052313518 | 9704-24.700 |



Transformer station

The transformer station is a 24V/ max. 60VA low-voltage transformer in accordance with EN 60335 in a protective insulation and a shock-proof plastic body. It is used as a power supply for actuators and room temperature controllers. The transformer station is protected at the output and line ends by standard finewire fuses.

EAN

4024052139613

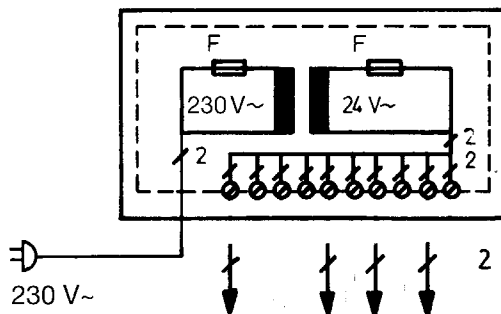
Article No

1600-00.000

Technical data – Transformer station

| | |
|--|--|
| Operating voltage: | 230 V AC (+ 6% / -15%); 50/60 Hz; 60 VA |
| Output voltage: | 24 V AC (+ 25% / -10%); 50 / 60 Hz |
| Power output (in continuous operation): | max. 56 VA |
| Output connections: | max. 10 actuators and 10 room temperature controllers (see connection diagram/application example) |
| Length of cable Ø: | max. values see "Planning notes" |
| Type of protection: | IP 22 based on EN 60529 (depending on installation requirements) |
| Safety class: | II, EN 60335 |
| Body, -color: | ABS (shock-proof), light grey based on RAL 7035 |
| Power supply connection: | plug-in device; 1 m; 2 x 0.75 mm ² with European plug |
| Connector terminal (clamping area): | max. 2.5 mm ² |
| CE certification (EMV/NS): | EN 55014-1, EN 55014-2 / EN 60335-1 |
| Ambient temperature (in operation): | 0°C - 60°C (32°F - 140°F) |
| Mounting: | Mounted to wall; cable fed from below |
| Dimensions (w x h x d): | 200 mm x 120 mm x 90 mm |

Connection diagram



Application example

