

# 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

### Applications:

Designed for ON/OFF or PWM control.

### Supply voltage:

24 V AC/DC (+25%/-10%)  
230 V AC/DC (+10%/-15%)  
0-60 Hz

### Power consumption:

	24 V	230 V
Starting	≤ 9 W (VA)	≤ 90 W (VA)
During operation	≤ 3 W (VA)	≤ 3 W (VA)

### Operating cycle time:

~3 min

### Adjusting force:

NO 110 N / NC 90 N

### Temperature:

Max. ambient temperature: 50°C  
Min. ambient temperature: 0°C  
Max. medium temperature: 100°C  
Storage temperature: -20°C bis +70°C

### Enclosure class:

EN 60529, IP 43 bei allen Einbaulagen.

### Protection class:

II, EN 60730

### Overvoltage protection:

Varistor with 230 V model.

### Certification:

CE, EN 55014-1, EN 60730-2-14

### Cable:

Cable length: 1 m,  
up to 2 m cable length on request.  
Connection cable: 2 x 0,50 mm<sup>2</sup>.

### Stroke:

NO 2,6 mm.  
NC 3,5 mm, valve position visible due to position indicator.

### Connection to valve:

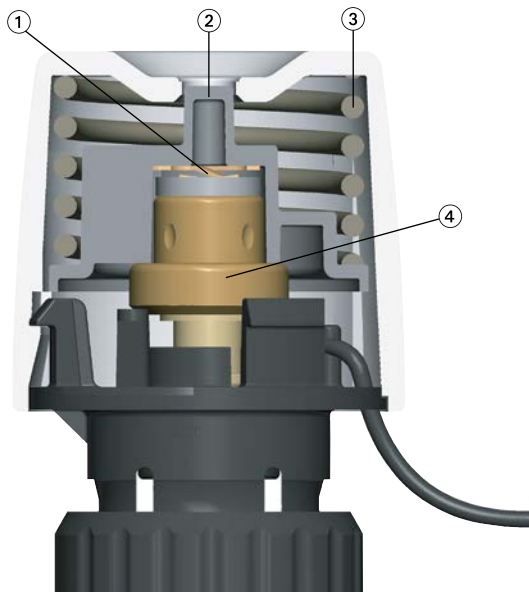
M30x1,5

### Body:

Shock-resistant PC/ABS, white RAL 9016.

## 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.

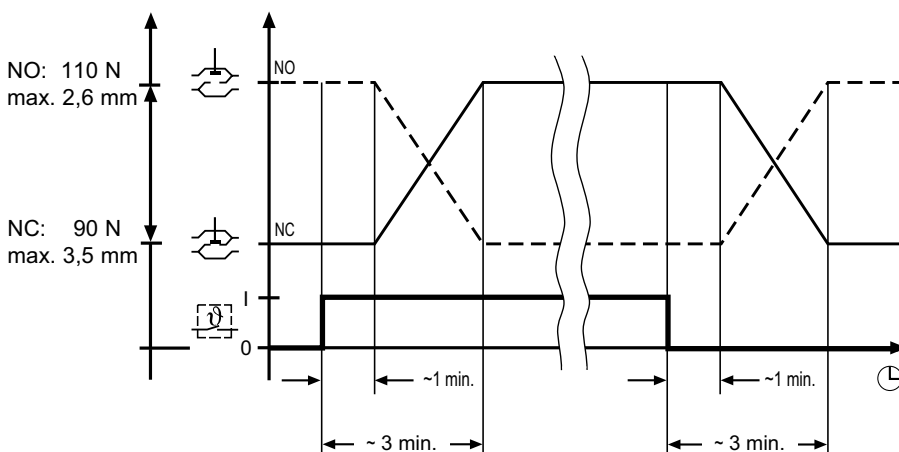
### Open when currentless (NO model)

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



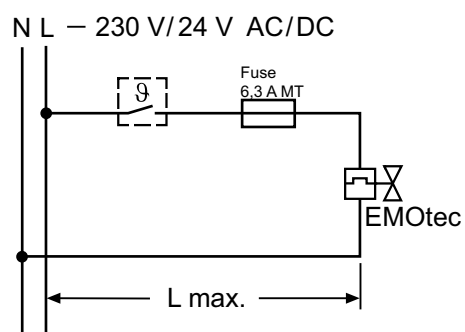
## Application

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)

## 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:

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

L max.: max. length of cable in [m] (see "Connection diagram")

I: table value in [m]

n: number of actuators

Line: Type/name	Cross section: A [mm <sup>2</sup> ]	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 <sup>2</sup>
NYIF/flat webbed house wire	2,50	2800	280	also for NYM 2.5 mm <sup>2</sup>

### Calculation example

Goal:

max. length of cable L max.

Given:

Voltage U = 24 V

Conductor cross section A = 2 x 1.5 mm<sup>2</sup>

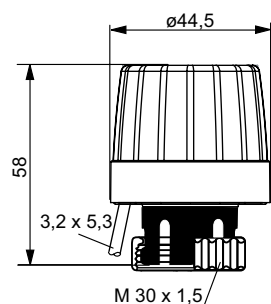
Value in table I = 168 m

Number of actuators n = 4

Solution:

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

## Articles



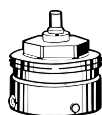
### EMOTec

Type	EAN	Article No
<b>230 V</b>		
Currentless closed (NC)	4024052460359	1807-00.500
Currentless open (NO)	4024052490752	1809-00.500
<b>24 V</b>		
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		

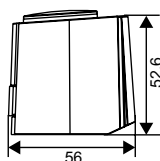


### Connecting to radiators with integrated valves

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

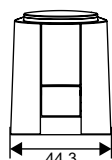
Model	EAN	Article No
<b>Series 2</b>	4024052297214	9703-24.700
<b>Series 3</b>	4024052313518	9704-24.700

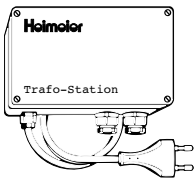


### Thermal actuator with auxiliary switch

Max. switching current auxiliary switch:  
Type 230 V: 5 (1) A; 24 V: 3 (1) A.  
Stroke: 4 mm.  
Connection to valve: IMI Heimeier M 30x1,5, with enclosed adapter.  
Adjusting force: 100 N.  
Cable length: 1 m fixed.  
Connection cable: 4 x 0,75 mm<sup>2</sup>

Model	EAN	Artikel-Nr.
<b>230 V</b>		
Currentless closed (NC)	4024052977819	4968-03.000
<b>24 V</b>		
Currentless closed (NC)	4024052977918	4988-03.000





### 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

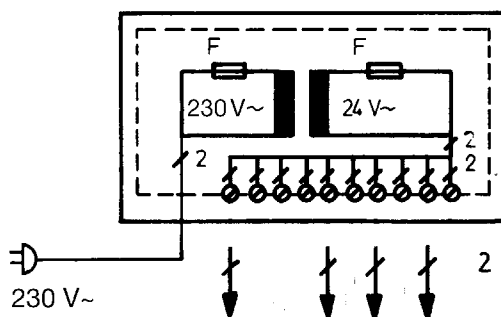
#### Article No

1600-00.000

### Technical data – Transformer station

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

### Connection diagram



### Application example

