

110C-024-010

Thermoelectric Actuator

Description

Thermoelectric actuator for the discrete control of heating and cooling systems. The control of the actuators is performed by a 0-10 VDC signal via a central DDC system or by a room thermostat. Principal area of application is the building management systems range.

Furthermore, the variants with valve stroke recognition automatically register the stroke for an optimum use of the active control voltage range. This guarantees an even more precise control of all valves.



Features

General data

Modern design

Travel path variant 4.0 mm / 5.0 mm (further variants on request)

Designs "normally closed" (NC) and "normally open" (NO)

Power consumption of only 1 watt

Control by a 0-10 VDC signal

Optionally with valve stroke recognition

Short response times, resulting in improved control response

Closing point verification and possible adaptation during operation

Complete compatibility to the valve adapter system

Simple plug-in installation

360° installation position

Patented 100% protection in case of leaky valves

"First open" function

Adaptation check on the valve

Plug-in connecting cable

Alignment aid on the valve

Compact size, small dimensions

All around function display

Noiseless and maintenance-free

High functional safety and long expected service life

Optionally also as 24 VDC variant

Certified by the TÜV

Variants

In its basic version, 110C-024-010 is delivered in a neutral design with Gruner logo, with plugged connection cable, function display white/white, with valve adapter and laser marking.

Types	Stroke Recognition	Operating Voltage	Control Voltage	Stroke	Closing Force	Control Direction	Running Time	Electrical connection
110C-024-010	No	24 VDC	0-10	5.0 mm	100 N	NC	30 s/mm	1m connection plug-in white PVC 2 x 0.22 mm ²

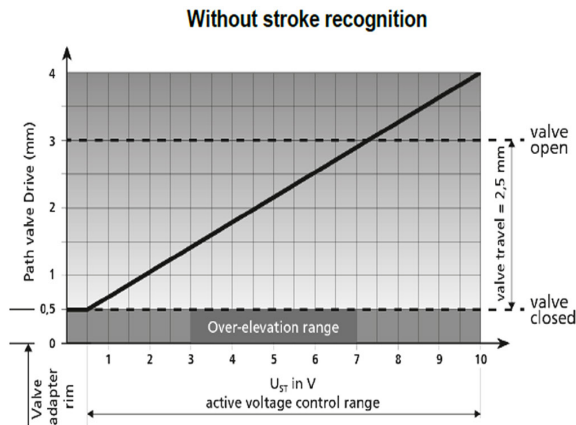
Function

The actuator mechanism uses a PTC resistor-heated elastic element and a compression spring. The elastic element is heated by applying the operating voltage and moves the integrated plunger. The force generated by this movement is transferred to the plunger, thus opening or closing the valve.

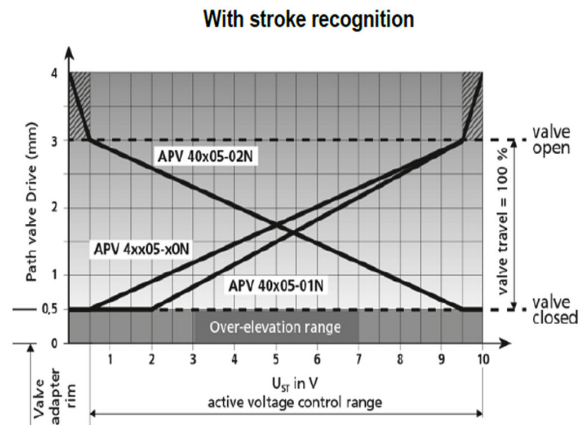
Version NC : Normally-closed with and without valve stroke recognition (valve closed)

In factory setting, NC and NO actuators keep the valve opened. For the NC actuator, this is achieved with the “First-Open” function. The first-open function is unlocked initially for the NC actuator after switching on the operating voltage for the first time. Subsequently both actuator types (NC and NO) automatically determine the valve closing point. For actuators with valve stroke recognition, the stroke is detected additionally. After this process the actuators assume their normal operation. The saved values are used for control requirements and for position determination after a voltage interruption. The saved values are checked during the running operation and adapted as needed in order to counteract deviations. This process guarantees an optimum adaptation of the actuator to the valve. If a control voltage is applied after the closing point detection, the actuator opens the valve evenly with the plunger movement after the dead time has elapsed, and the actuator moves precisely to the calculated position.

An internal wear-free position detection controls the temperature required for the maximum stroke (minus over-elevation) and consequently the energy intake of the elastic element. No excess energy is stored inside the elastic element. If the control voltage is reduced, the electronic control system immediately adapts the heat input to the elastic element. In the range of 0 – 0.5 V (depending on the model) the actuator remains in a quiescent state in order to ignore ripple voltage occurring in long cables (rpm). The closing force of the compression spring is matched to the closing force of commercially available valves and keeps the valve closed when de-energised.



If a 4 mm actuator without valve stroke recognition is used for valves with a stroke of 2.5 mm, the actuator drives without load for control voltages from 7.5 V to 10 V.

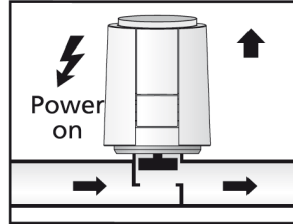
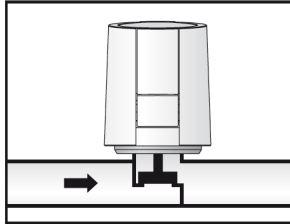


For the variant with valve stroke recognition, the actuator calculates the stroke and automatically adapts the active control voltage range to this. This allows an even more precise control of the valve. The complete voltage spike of the thermostat is used for flow control purposes.

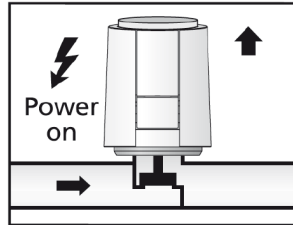
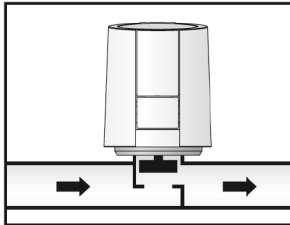
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Function Display

The function display (all around display) of the Actuator shows at the first glance whether the valve is open or closed; this can also be felt in the dark.



- For the version NC: Normally closed extracts the function display when the valve opens.



- For the version NO: Normally open extracts the function display when the valve is closed.

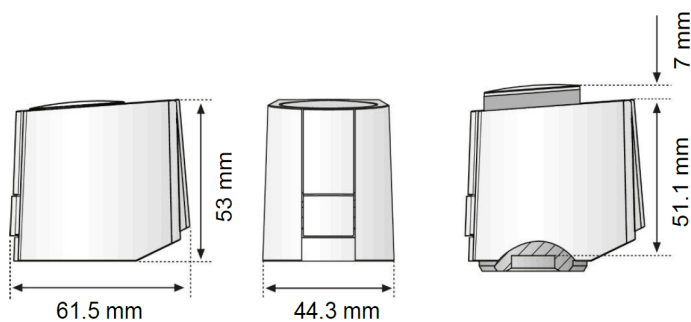
2.3 "First Open" Function (for NC variants only)

In its delivery condition, the actuator is normally open due to the "First Open" function. This enables heating operation during the carcass construction phase even when the electric wiring of the room-by-room temperature control is not yet complete. When commissioning the system at a later date, the "First Open" function is automatically unlocked by applying the operating voltage (for more than 6 minutes) and the actuator is fully operable.

Technical data

Voltage (according to variant)	24 VAC, -10 % ... +20 %, 50-60 Hz 24 VDC, -20 % ... +20 %	110C-024-010 110B-024-010
Control voltage range	0 V... 10 V (reverse polarity protected)	
Max. inrush current	< 320 mA for max. 2 min.	
Operating power	1 W ¹⁾	
Resistance of control voltage input	100 kΩ	
Stroke	4.0 / 5.0 mm (minus 0.5 mm over-elevation)	
Actuation force	100 N +5 %	
Fluid temperature	0 °C to +100 °C ²⁾	
Storage temperature	-25 °C to +60 °C	
Ambient temperature	0°C to +60 °C	
Degree of protection	IP 54 ³⁾	
Protection class	III	
CE Conformity according to	EN 60730	
casing	Material	Polyamide
	Color	White
	Type	3 x 0.22 mm ² PVC
Connection line	Color	white
	Length	1 m
Weight with connection cable (1 m)	111 g	1) Measured with precision power meter LMG95
Over voltage strength according to EN 60730-1	1 kV	2) or higher, depending on the adapter 3) in all installation positions

Dimensions



Dimensions

Installation height

Certificates

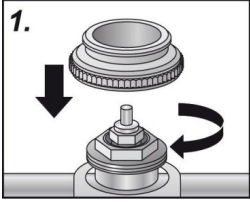
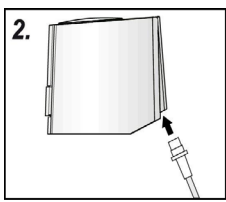
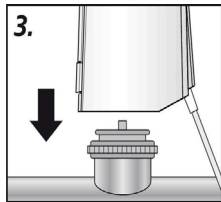
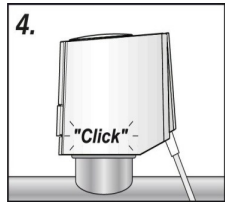


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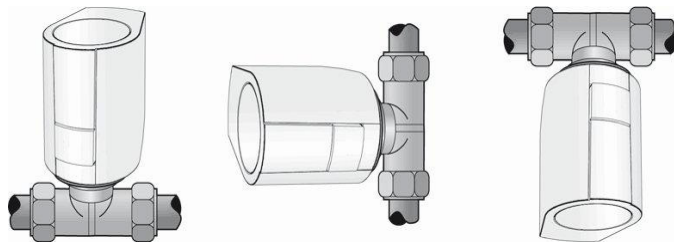
Installation notes

Installation with valve adapter

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 valve adapter previously installed manually.

<p>1.</p>  <p>Screw the valve adapte manually onto the valve.</p>	<p>2.</p>  <p>Connect the line to the actuator.</p>	<p>3.</p>  <p>Position the Actuator manually in vertical position to the valve adapter.</p>	<p>4.</p>  <p>Latch the Actuator 5 to the valve adapter by manually applied vertical pressure until a clicking sound is heard.</p>
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Installation Position



Vertical

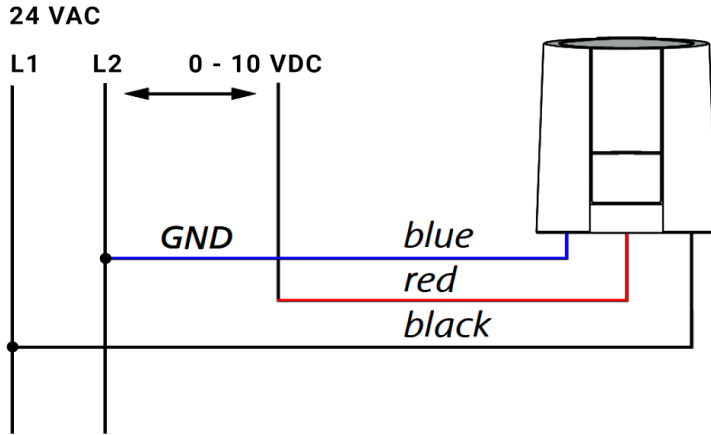
Horizontal

"overhead"

The Actuator must be installed preferably in vertical or horizontal installation position. In case of "overhead" installation, special circumstances (e. g. drain water) can reduce the lifetime of the actuator.

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Electric connection



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Cable

We recommend the following cable lengths for installing a 24 VDC system:

Cable	Section	Length
Standard DDC line	0.22 mm ²	20 m
J-Y(ST)Y	0.8 mm ²	45 m
NYM / NYIF	1.5 mm ²	136 m

Transformer/power supply

A safety isolating transformer according to EN 61558-2-6 (for the AC variant) or a switching power supply according to EN 61558-2-16 (for DC variant) must always be used.

The dimensioning of the transformer or the switching power supply results from the making capacity of the OEM Actuators.

Rule-of-thumb formula:

$$P_{\text{transformer}} = 6 \text{ W} \times n$$

$$n = \text{Number of OEM Actuators}$$

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