

# Actuators

# Actuator 24V



## Technical information - Actuator 24 V

The Actuator 24 V standard is a thermoelectric actuator for opening and closing valves on waterborne heating and cooling systems.

Features, as protection in case of leaky valves, compact and modern casing, versions in normally closed and normally open, valve adapter concept and an enhanced life time makes the actuator competitive and flexible.

The actuator 24 V is controlled by a 24 V room thermostat with two-point output or pulse-width modulation.

## Features

- Modern design
- Power consumption 1 watt
- Compact size, small dimensions
- Available in normally closed (NC) or normally open (NO)
- Patented 100% protection against leaky valves
- All around function indicator
- Maintenance-free
- Noiseless
- High functional safety and long expected service life
- Enhanced over-voltage protection
- Low power consumption
- 360° installation position
- Snap-on installation
- Valve-adapter concept
- Adaptation check on valve
- Certified by TÜV
- First-Open function (for NC only)
- Non-halogen connection cable - compliance with fire protection and environmental regulation

## General information

The actuator serves for optimum control of valves on heating and cooling circuits. Control is done from a room thermostat with two-point output or pulse-width modulation. The Actuator 24 V is delivered with fixed non-halogen connecting cable, function indicator blue / gray, without valve adapter.

Non-halogen connection cable - compliance with fire protection and environmental regulations

## Scope of supply (standard)

- 1x Actuator 24 V
- 1x Connection cable in white, 1 m, Hal F H03Z1Z1
- 1x installation manual with 12 languages

## Standard Version:

A 40405: 24 V – normally closed (NC)

## Alternative Version:

A 41405: 24 V – normally open (NO)

## Accessories:

A valve adapter suiting your application can be ordered separately.

## Functions

### In general:

The actuator mechanism of the 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 piston. The force generated by the movement is transferred on to the piston lifter and thus opens and closes the valve.

### Standard version:

Normally Closed (NC)

The valve is opened steadily by the piston motion upon switching on the operating voltage and after expiry of the dead time. The wax element cools down after the operating voltage is cut and after expiry of the hold time, the valve is closed evenly by the closing force of the compression spring.

The closing force of the compression spring is matched to the closing force of commercially available valves and keeps the valve normally closed.

### First-Open function (for NC only)

In its delivery condition, the actuator is kept open when de-energised due to the First-Open function (filling). This enables heating or cooling operation during the carcass construction phase even when the electric wiring is not yet complete. During the later electrical start-up, the First-Open function is unlocked by applying the operating voltage for more than 6 minutes. The actuator will then be completely operable.

### Valve-Adapter

A valve-adapter concept guarantees a perfect match of the actuator to almost any valve bottom or heating circuit distributor available on the market. Simply snap-on the actuator to the pre-installed valve adapter.

### Function indicator:

The function indicator of the actuator (all-round indicator) allows identifying the operating condition (valve open or closed) at a glance. It is also possible to feel the current operating state when it's dark.

### Alternative version:

Normally Open (NO)

In case of the normally open version, ram motion is re-directed by mechanical means, resulting in precisely opposite actuator function.

# Actuators

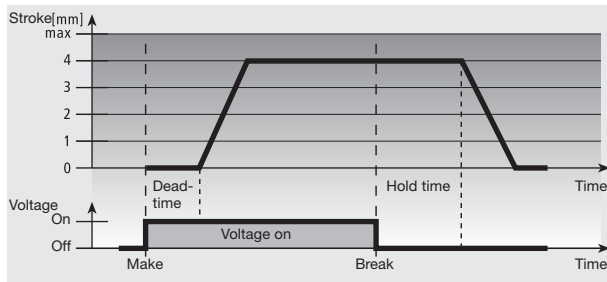
# Actuator 24V

## Technical information

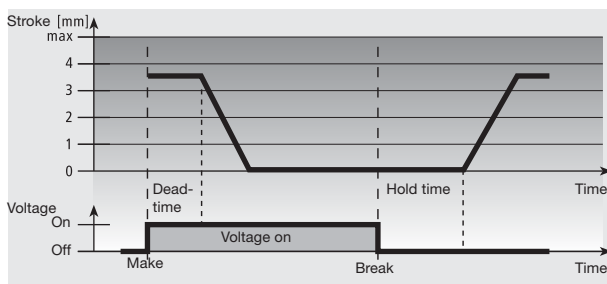
<b>Type</b>	<b>A 40405 / A 41405</b>
Version	normally closed / normally open
Voltage	24 V AC/DC , +20%...-10 % , 0-60 Hz
Max. inrush current	< 300 mA during 2 min max.
Operating current	75 mA
Operating power	1 W <sup>1)</sup>
Closing and opening times	approx. 3 min.
Actuator travel	4 mm
Actuating force	100 N ± 5%
Fluid temperature	0 – 100 °C
Storage temperature	-25 to +60°C
Ambient temperature	0 to +60°C
Protection type / protection class	IP 54 / III
CE conformity according to	EN 60730
Housing / housing colour	Polyamide / grey
Weight	100 g with a 1 m connecting cable
Connection cable in white, 1 m, Hal F H03Z1Z1	

## Characteristic curves

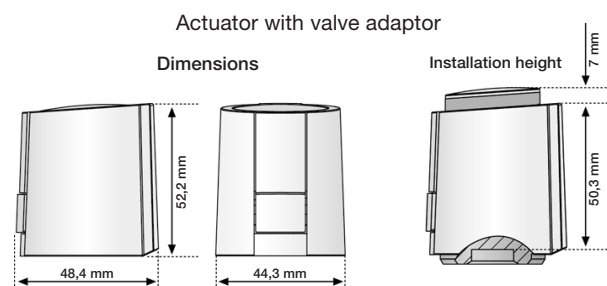
### Normally closed (NC)



### Normally open (NO)

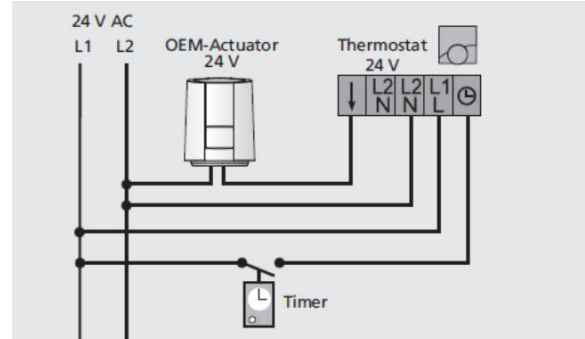


## Actuator measurements



## Planning and installation notes

### Connections Overview



### Calculation of maximum cable length (copper cable) for 24 V rated voltage

- L = K × A / n
- A Conductor cross-section in mm<sup>2</sup>
- n Number of Actuators
- K Constant (269 m/mm<sup>2</sup>)
- L Cable length in m

We recommend the following cables for installing a 24 V system:

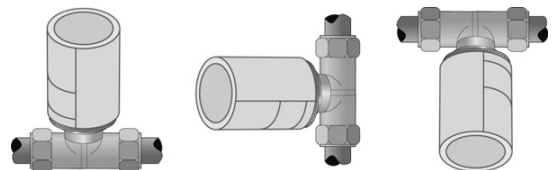
Telephone wire:	J-Y(ST)Y	0,8 mm <sup>2</sup>
Light plastic-sheathed cable:	NYM	1,5 mm <sup>2</sup>
Flat webbed building wire:	NYIF	1,5 mm <sup>2</sup>

### Transformer:

A safety isolating transformer according to EN 61558-2-6 (Europe) or class II FCC-quality proofed (North America) must always be used. Transformer dimensioning results from the making capacity of the actuators.

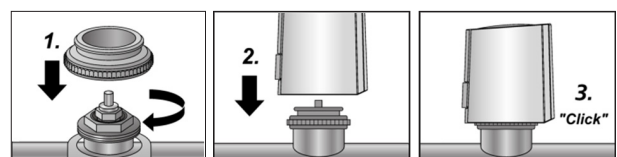
Rule-of-thumb formula:  $P_{\text{Transformer}} = 6 \text{ W} \times n$   
 n = number of Actuators

### Installation Positions



Preferred installation positions of the actuator are vertical and horizontal. An up-side down position may reduce product life through special circumstances (e.g. contaminated water).

### Valve Adaptation



Valve adaptation is archived by a valve adaptor which is available in different versions to suit the most common valve bottoms and heating circuit distributors (please consider when ordering).

The OEM Actuator 24V is certified by TÜV Süd, TÜV

# Actuators

# Actuator Proportional



## Technical information, Alpha-Actuators

### Actuator: Proportional APR 40405

The actuator: Proportional is a thermo-electronic actuator for opening and closing valves in direct proportion to the applied control voltage. Powerless control is by a 0-10 V signal which is provided either by a room thermostat or by a central BMS system. If a control voltage is applied, the actuator opens the valve proportionally to the detected actuator travel. The wide choice of valve adapters guarantees perfect adaptation to 99 % of all valve bottoms and distributors available on the market.

## Features

- Modern design
- Control by a 0-10 V DC signal
- Short response time
- Compact size, small dimensions
- First Open function
- All-round function display
- Maintenance-free
- Noiseless
- High functional safety and long expected service life
- Low power consumption, only 1 W
- Plug-in connecting cable
- 360° installation position
- Plug-in installation
- Valve adapter system
- Adaptation check on valve
- Patented 100 % protection in case of leaky valves
- Antitheft function by means of removable clear view visor
- Certified by **TÜV**
- Non-halogen connection cable - compliance with fire protection and environmental regulation

## General information

Single room control of heating circuit distributors, radiators, cooling ceilings and similar units. Ideally suited in combination with central DDC systems in building services management systems.

The Actuator proportional is delivered with plugged con-

necting cable, function display white/ white and without valve adapter.

### Scope of supply (standard)

1 x Actuator 5 proportional with first-open function  
1 x connection cable, white, 1 m,  
Hal F LiYY 3 x 0.22 mm<sup>2</sup>.

### Standard Version:

APR 40405 0 – 10 V (NC)

### Alternative version

APR 40405 Version 2 - 10 V (NC)  
APR 40405 Version 10 – 0 V (NC)  
(cable with plugs to be ordered separately)

### Optionally available extensions

Connection cable (1 m, 2 m, 5 m and 10 m)  
Connection cable non-halogen ((2 m, 3 m, 5m and 10 m)

### Accessories

A valve adapter suiting your application can ordered separately.

## Functions

### In general

The actuator mechanism of the 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 piston. The force generated by this movement is transferred to the piston, thus opening or closing the valve.

### Standard Version

Normally closed (NC).

After switching on the operating voltage, the first-open function is unlocked. Directly after that, the actuator automatically detects the valve closing point and switches to regular operation. 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.

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

# Actuators

# Alpha-Actuator

## Valve Adapter Concept

A valve adapter concept guarantees a perfect match of the actuator to almost any valve bottom or heating circuit distributor available on the market. Simply snap-on the actuator to the pre-installed valve adapter.

## Function display

The function display (all-round display) of the actuator shows at the first glance whether the valve is “open” or “closed”.

## First open function (for NC only)

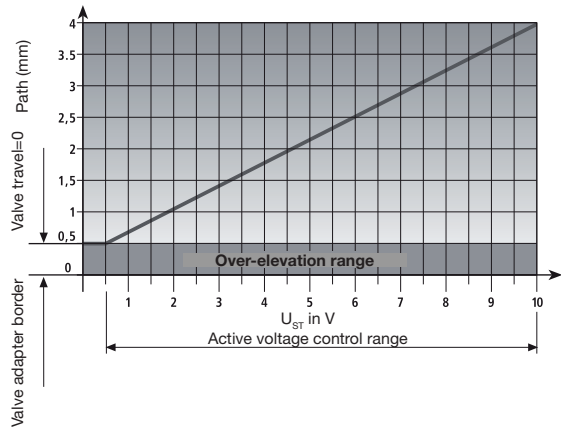
In its delivery condition, the actuator is normally open due to the First open function (filling). This enables heating and cooling operation during the carcass construction phase even when the electric wiring is not yet complete. During the later electrical start-up, the first open function is unlocked by applying the operating voltage for more than 6 minutes. The actuator will then be completely operable.

## Technical data

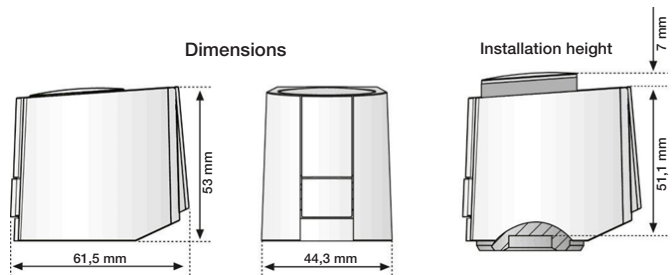
<b>Type</b>	<b>APR 40405</b>
Version	Normally closed
Operating voltage	24 V AC, -10%...+20%, 50-60 Hz
Max. inrush current	<300 mA during 2 min. max.
Operating current	83 mA
Operating power	1 W
Control voltage	0 – 10 V (rev. polarity protected)
Input resistance	100 kΩ
Actuator travel	4,0 mm (minus 0,5 mm over-elevation)
Average actuation delay	30 s/mm
Actuating force	100 N+/- 5%
Fluid temperature	0 - 100 °C
Storage temperature	-25 to +65 °C
Ambient temperature	0 to +60 °C
Degree/ class of protection	IP 54 / III
Casing/colour	Polyamide / white
CE conformity according to	EN 60730
Housing / housing colour	polyamide, white (RAL 9003)
Weight	11 g with connection cable
Connecting cable	Hal F LiYY 3 x 0.22 mm <sup>2</sup> , white
Cable length	1 m
Overvoltage strength acc. to EN 60730	min. 1 kV

## Characteristic curves

### Normally closed (NC)



## Actuator measurements



## Certified

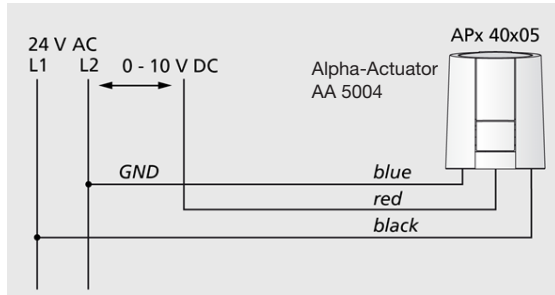
The Actuator is certified by TÜV Süd, TÜV

# Actuators

# Alpha-Actuator

## Planning and installation notes

### Connections Overview



### Calculation of maximum cable length (copper cable) for 24 V rated voltage

$$L = K \times A / n$$

A Conductor cross-section in mm<sup>2</sup>

n Number of Actuators

K Constant (269 m/mm<sup>2</sup>)

L Cable length in m

We recommend the following cable length for installing a 24 V system:

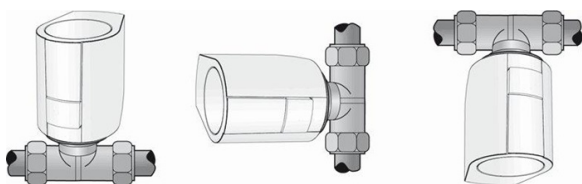
Standard DDC line:	0.22 mm <sup>2</sup>	20 m
J-Y(ST)Y:	0.8 mm <sup>2</sup>	45 m
NYM/NYIF:	1.5 mm <sup>2</sup>	136 m

### Transformer:

A safety isolating transformer according to EN 61558-2-6 (Europe) must always be used. Transformer dimensioning results from the making capacity of the Actuators.

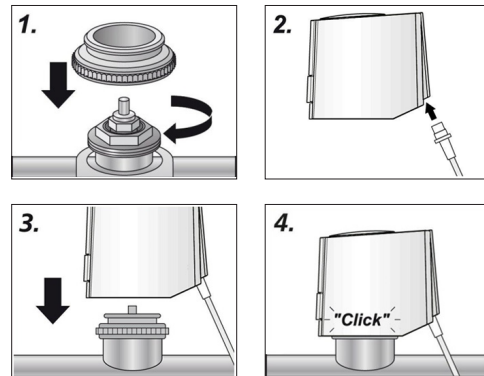
Rule-of-thumb formula:  $P_{\text{Transformer}} = 6 W \times n$   
 n = number of Actuators

### Installation positions



Preferred installation positions of the Alpha-Actuator are vertical and horizontal. An up-side down position may reduce product life through special circumstances (e.g. contaminated water).

### Valve adaption



Valve adaption is achieved by a valve adapter which is available in different versions to suit the most common valve bottoms and heating circuit distributors (please consider when ordering).