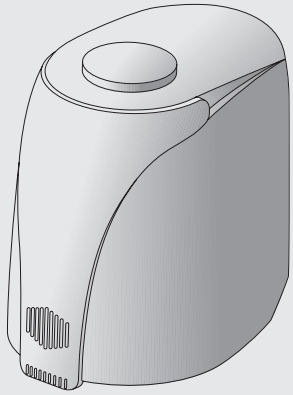
Valve Drives

Alpha-Actuator 4: Proportional
AA 5004

The Alpha-Actuator 4: Proportional is a thermoelectric drive 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, in most cases, by a central DDC system in the application range of the building service management.
If a control voltage is applied, the drive 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 heating circuit distributors available on the market.



Features

- Control by a 0-10 V DC signal
- Short response times, resulting in improved control response
- Closing point verification and possible adaptation during operation
- Small dimensions
- First-Open function
- Function display
- Maintenance-free
- Noiseless
- High functional safety and long expected service life
- Low power consumption
- Plug-in connecting cable
- 360° installation position
- Plug-in installation
- Valve adapter system
- Adaptation check on valve bottom
- 100% protection in case of leaky valves
- Antitheft function by means of removable clear view visor

Application

- Control systems in heating, air conditioning and ventilation systems
- Single room control of concealed heating systems
- Comfortable control of heating circuit distributors, radiators, cooling ceilings and similar units.
- Ideally suited in combination with central DDC systems in building services management systems

General information

Scope of delivery (Standard)
- 1 x Alpha-Actuator 4: Proportional with First-Open function
- 1 x connection line, 1 metre (plug-in type)
- 1 x installation instructions in 10 languages

Type designation
AA 5004: Version 0-10 V; 100 kΩ - normally closed

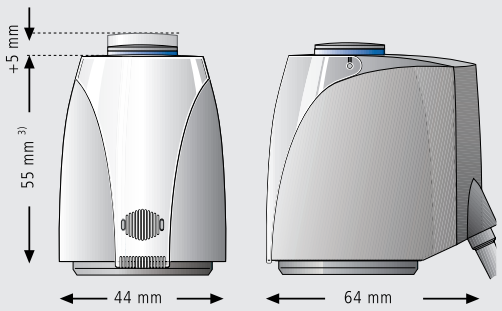
Alternative design
AA 5014: Version 2-10 V; 100 kΩ - normally closed
AA 5024: Version 10-0 V; 100 kΩ - normally closed

Optionally available
- Optionally available extensions
- Non halogen connection line
- Other control voltage variants
- Connection line up to 20 m
- Operation voltage: DC

Accessories
- Valve adapters for the most common valve bottoms available on the market must be ordered separately.

Technical data

Type	AA 5004
Version	normally closed
Operating voltage	24 V AC, -10%...+40%, 50–60 Hz
Max. inrush current	< 250 mA during 2 min. max.
Operating current	approx. 80 mA
Operating power	2 W
Control voltage	0-10 V DC
Input resistance	100 kΩ, (10 kΩ as option)
Actuator travel	4 mm (minus over-elevation); max. 3.5 mm
Average actuation delay	30 s/mm
Actuating force	100 N +/- 5%
Fluid temperature	0 to 100°C [1]
Storage temperature	-25 to +65°C
Ambient temperature	0 to +60°C
Protection type	IP 54 [2]
CE conformity according to	EN 60730
Housing / housing colour	polyamide, white (RAL 9003)
Weight	100 g without adapter and cable
Connecting cable / cable length / weight	3 x 0.22 mm² PVC, white / 1 m / 30 g
Special length of connecting cable	up to 20 m max.
Protection class	III



[1] or higher, depending on the adapter length
[2] in all mounting positions with plug-in connection line
[3] with respect to standard valve

Valve Drives

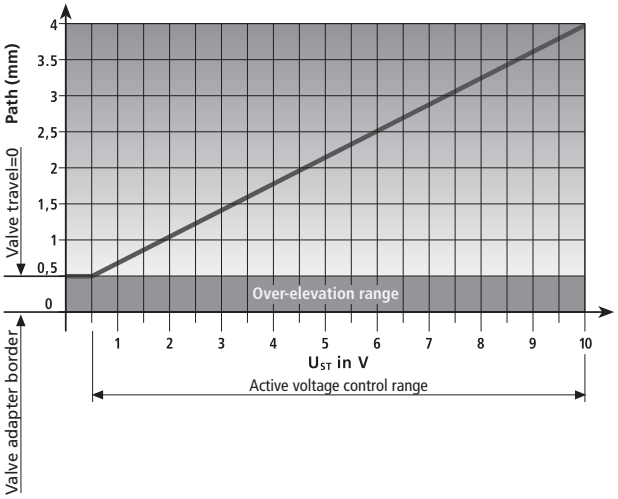
Functions

General

The drive mechanism of the Alpha-Actuator 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.

Standard version

For the design "normally closed", the First-Open function is unlocked after the first application of the operating voltage of 24 V AC. Directly after that, the drive detects the valve closing point and switches to regular operation. This ensures an optimum match with the specific valve used.



If a control voltage of 0.5 – 10 V DC is applied after the closing point detection, the drive opens the valve – after the dead time has elapsed – with the plunger movement, evenly and permanently corresponding to the valve travel. An internal wear-free position detection controls the temperature required for the maximum stroke of 4 mm (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, the actuator remains in a quiescent state in order to ignore ripple voltage occurring in long cables (U_{min}). After the waiting time is elapsed, the valve is closed evenly with 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 closed when de-energised (NC).

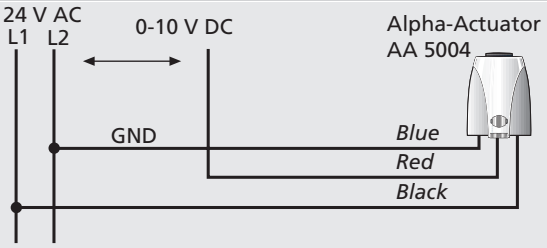
Valve adapter system
The valve adapter system guarantees a perfect match of the actuator to almost any valve bottom and heating circuit distributor available on the market. The Alpha-Actuator is simply plugged on to the previously installed valve adapter.

Function display
The function display (all-round display) of the Alpha-Actuator shows at the first glance whether the valve is "open" or "closed".

First-Open function
In its delivery condition, the Alpha-Actuator is kept open when de-energised due to the First-Open function (filling). This enables heating 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 prior to the detection of the closing point. This is only done once during thecommissioning. In case of later voltage interruptions, control operation starts immediately. The Alpha-Actuator 4 is completely operable.

Planning and installation notes

Connections survey



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

L = K x A / n

A	Conductor cross-section in mm²
n	Number of Alpha-Actuators
K	Constant (269 m/mm²)
L	Cable length in m

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

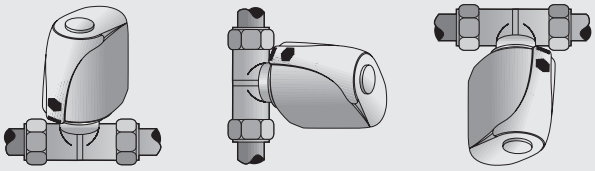
Telephone line:	J-Y(ST)Y	0.6 mm²
Light plastic-sheathed cable:	NYM	1.5 mm²
Flat webbed building wire:	NYIF	1.5 mm²

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

Rule-of-thumb formula: $P_{Transformer}$ = 6W x n

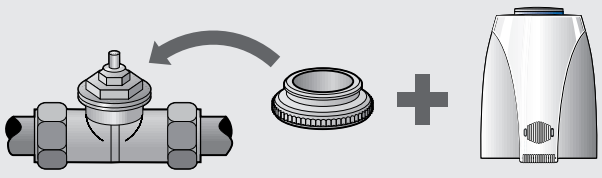
n = Number of Alpha-Actuators

Installation positions



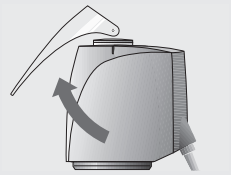
Prefered installation positions of the Alpha-Actuator are vertical and horizontal. An "overhead" position may reduce product life through special circumstances (e.g. contaminated water).

Valve adaptation



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

Antitheft device



The Alpha-Actuator can be protected against unauthorised access simply by removing the visor, e.g. on the radiator.

Customer-specific versions and ordering information

Our staff will be glad to assist you in finding the valve drive fitting your application.
Call us under: +49 (0) 5341 – 84 75 - 0

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