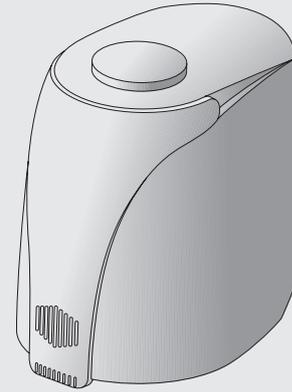


Alpha-Actuator 4: Pulse-proportional AA 6004

The Alpha-Actuator 4: Pulse-Proportional version is a thermoelectronic actuator for opening and closing valves. In the application range of building management systems, it controls the flow proportional 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.

Due to the special controlling behaviour, a trouble-free parallel operation of several actuators is possible independent from the valve characteristics.

A wide choice of valve adapters guarantees perfect adaptation to a large number of valve bottoms and heating circuit distributors.



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 AA 6004 with First-Open function
- 1 x connection line, 1 metre (plug-in type)
- 1 x installation instructions in 10 languages

Type designation

AA 6004: 0-10 V; 100 kΩ

Alternative design

AA 6014; 2-10 V; 100 kΩ

Optionally available

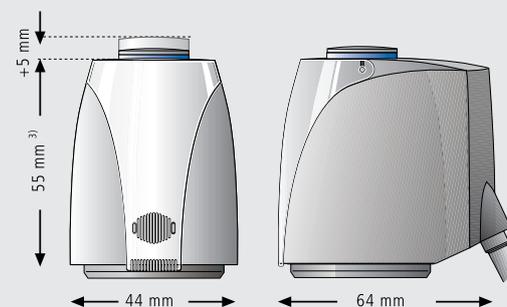
- Non halogen connection line
- Other control voltage variants
- Connection line up to 20 m
- Operation voltage: DC

Accessories

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

Technical data

Type	AA 6004
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
Degree / class of protection	IP 54 ²⁾ / III
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 mm ² PVC, white / 1 m / 30 g
Special length of connecting cable	up to 20 m max.



¹⁾ or higher, depending on the adapter length

²⁾ in all mounting positions with plug-in connection line

³⁾ with respect to standard valve

Function

General

The actuator 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 actuator 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 actuator opens the valve – after the dead time has elapsed – with the plunger movement 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. 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.

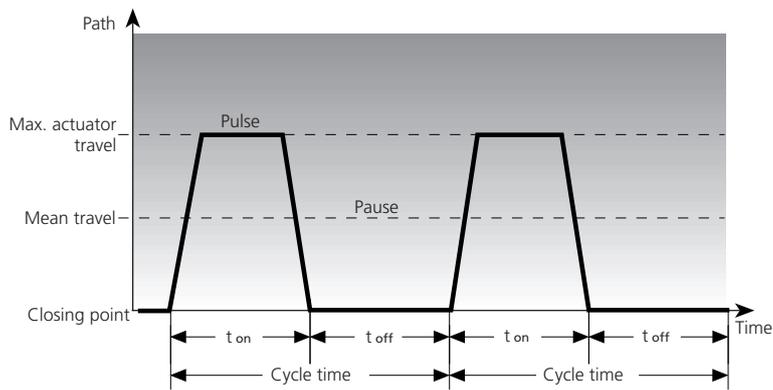
Function display

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

First-Open Funktion

In its delivery condition, the Alpha-Actuator is kept open when de-energised due to the First-Open function. 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 the first commissioning. In case of later voltage interruptions, control operation starts immediately.

Path-time behaviour

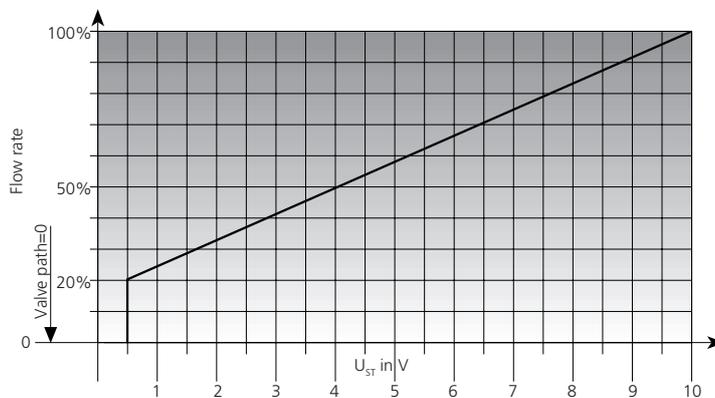


The Alpha-Actuator AA 6004 considers the valve characteristic in order to use a wider control voltage range. At the same time, the good parallel behaviour of the Alpha-Actuator 5004 Proportional is improved further. Parallel behaviour means that the heating or cooling capacity of several radiators with one Alpha-Actuator, each with the same control, is identical.

The actuator opens and closes the valve in a pulsating rhythm. During this process, the pulse times and the actuator travel paths are precisely measured. From these values, the actuator calculates the pause times

on the basis of the supposed valve characteristic and the control voltage applied. The slowness of the elastic element and the valve tolerances therefore do not need to be considered.

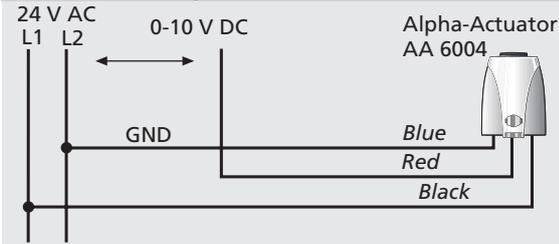
An example: When a flow of 50% is to be set, a control voltage of 4 Volts must be applied to the Alpha-Actuator 6004/6014. The actuator achieves a flow of 50% over the cycle time, if t_{on} is 50% and t_{off} is 50% of the overall cycle time.



Above a control voltage of 10V, the valve is always open. Due to the precise time and path measurement and due to the supposed valve characteristic, the actuator is able to set short t_{on} and t_{off} times. This enables a wide spectrum of applications in heating and cooling applications to the Alpha-Actuator 6004/6014.

Planning and installation notes

Connections survey



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

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

A	Conductor cross-section in mm ²
n	Number of Alpha-Actuators
K	Constant (269 m/mm ²)
L	Cable length in m

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

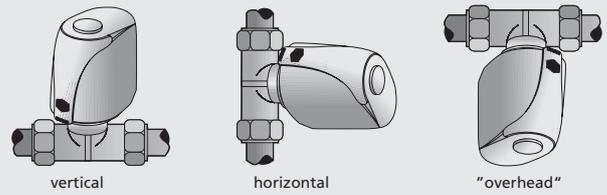
Telephone line:	J-Y(ST)Y	0.6 mm ²
Light plastic-sheathed cable:	NYM	1.5 mm ²
Flat webbed building wire:	NYIF	1.5 mm ²

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.

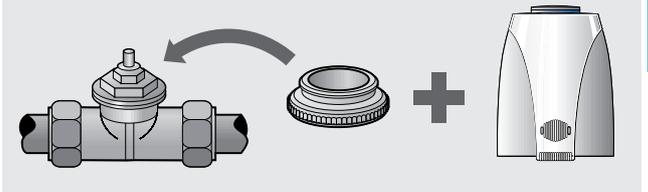
Rule-of-thumb formula: $P_{\text{transformer}} = 6 W \times n$
n = Number of Alpha-Actuators

Installation positions



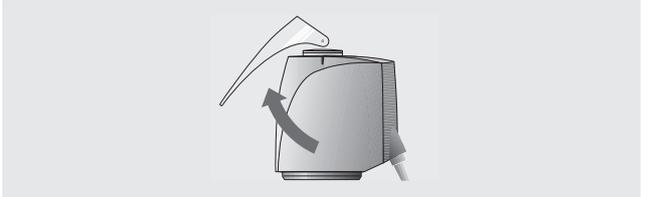
Preferred installation positions of the Alpha-Actuator are vertical and horizontal. An "overhead" position may reduce product life through special circumstances (e.g. contaminated water).

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 actuator fitting your application.
Call us under: +49 (0) 5341 – 84 75 - 0