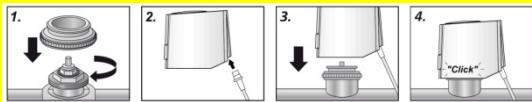




Adaptor to be used between actuator and valve.



Adaptors available to more than 50 valve brands on the market.

For examples:

Honeywell, Siemens (Landis & Staefa), Danfoss, Johnson Controls, Sauter, Tour & Anderson, MMA (Markaryd), Cazzaniga, Herz, Oventrop, Heimeier and many more.

Valve adaptors can be used on new and existing valves

## Features

- Control Signals  
Proportional: 0-10 Vdc, 2-10 Vdc or 10-0 Vdc
- Power supply 24 Vac, on request 24 Vdc
- Actuating force 100 N
- Available in  
Normally Closed (NC) or  
Normally Open (NO)
- Stroke variants 4.0 mm / 5.0 mm  
(other stroke variants on demand)
- All around function indicator
- Adaptation check on valve
- Valve adaptors available to motorize  
most valve brands on the market
- Simple snap-on installation
- Power consumption 1 watt
- 360° installation position
- Patented 100% protection against leaky valves.
- First-Open Function
- Alignment aid on the valve
- Compact size, small dimensions
- Noiseless and maintenance-free
- High functional safety and long expected service life
- Certified by TÜV and CE

## Description

The proportional actuator APR/APV is a thermoelectric actuator for the discrete control of heating and cooling systems in direct proportion to the applied control voltage.

The control of the actuators is performed by a 0-10 Vdc signal via DDC control system or by a room thermostat.

Principal area of application is the building management systems range.

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

Ordering.

Types	Stroke recognition	Operating voltage		Control voltage	Stroke	Closing force	Control direction	Average actuation delay
<i>APR 40405-00N</i>	no	24 V	AC	0 – 10 V	4.0 mm	100 N	NC	30 s/mm
<i>APR 40405-01N</i>	no	24 V	AC	2 – 10 V	4.0 mm	100 N	NC	30 s/mm
<i>APR 40405-02N</i>	no	24 V	AC	10 – 0 V	4.0 mm	100 N	NC	30 s/mm
<i>APR 42405-00N</i>	no	24 V	DC	0 – 10 V	4.0 mm	100 N	NC	30 s/mm
<i>APV 41405-10N</i>	yes	24 V	AC	0 – 10 V	4.0 mm	100 N	NO	30 s/mm
<i>APV 43405-10N</i>	yes	24 V	DC	0 – 10 V	4.0 mm	100 N	NO	30 s/mm
<i>APR 40505-00N</i>	no	24 V	AC	0 – 10 V	5.0 mm	100 N	NC	30 s/mm
<i>APR 40505-01N</i>	no	24 V	AC	2 – 10 V	5.0 mm	100 N	NC	30 s/mm
<i>APR 40505-02N</i>	no	24 V	AC	10 – 0 V	5.0 mm	100 N	NC	30 s/mm
<i>APR 42505-00N</i>	no	24 V	DC	0 – 10 V	5.0 mm	100 N	NC	30 s/mm
<i>APV 40505-00N</i>	yes	24 V	AC	0 – 10 V	5.0 mm	100 N	NC	30 s/mm
<i>APV 40505-01N</i>	yes	24 V	AC	2 – 10 V	5.0 mm	100 N	NC	30 s/mm
<i>APV 40505-02N</i>	yes	24 V	AC	10 – 0 V	5.0 mm	100 N	NC	30 s/mm
<i>APV 42505-00N</i>	yes	24 V	DC	0 – 10 V	5.0 mm	100 N	NC	30 s/mm

**On next page:  
Different adaptors to be used between actuator and valve**

**Adaptor to be used between actuator and valve**

Adaptor Type	Collar/ Thread	Valve
VA 80	M30x1.5	VCP valve VZH-series, Heimeier, Tour & Andersson as of 1999, Honeywell V9050, Johnson Controls V5210KC, V5510KC, Sauter VXL F200 & 210, BXL F200 & 210, BUT 010 F410
VA 50	M30x1.5	Landis & Gyr, Siemens VDN 215, Cazzaniga, Sauter VXL F220, BUT015 F410, BUT010 F400, BUT015 F210, Herz
VA 32	M28x1.5	Tour & Andersson before 1999
VA 54	M28x1.5	Tour & Andersson RVT-K around 1992, MMA (Markaryd)
VA 10	M30x1.5	Siemens (Landis & Satefa), Tour & Andersson TBV-CM, TBV-CMP.
VA 16	M28x1.5	Herz
VA 59	Clamping ring	Danfoss RAV/L
VA 39	M30x1.0	Oventrop
VA 26	Clamping ring	Giacomini
VA 18	M30x1.5	Honeywell
VA 17	M28x1.5	MMA (Markaryd)
VA 72	Grub screw	Danfoss RAV
VA 78	Grub screw	Danfoss RA (RA N, RA UN) high flange
VA 02	M30 x 1.50	Oponor, LK

Other adaptors available.

**Functions**

The actuator mechanism of the APR/APV-series 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.

**Version NC: Normally-closed with and without valve path 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 on sequently the energy intake of the elastic element.

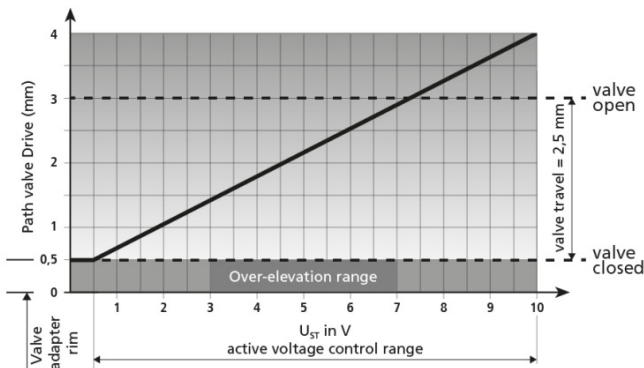
No excess energy is stored inside the elastic element.

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).

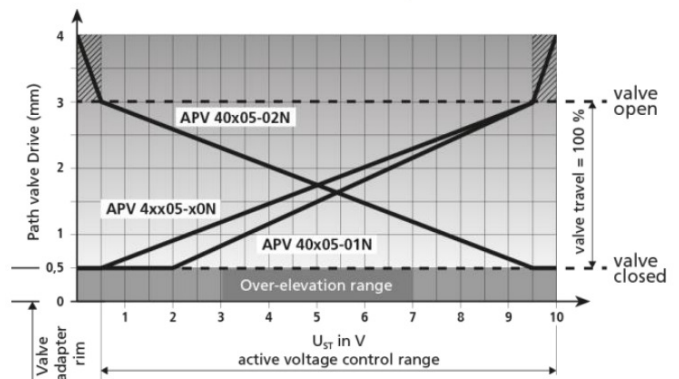
The closing force of the compression spring is matched to the closing force of commercially available valves and keeps the valve closed when de-energised

**Without stroke recognition**



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.

**With stroke recognition**

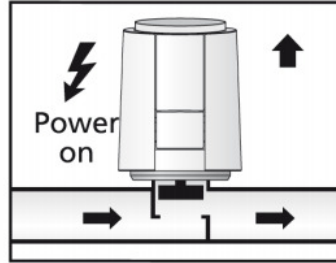
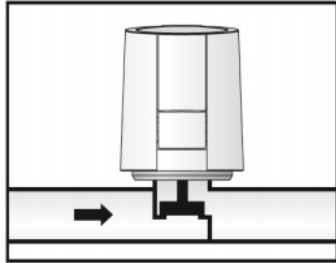


For the variant with valve stroke recognition, the actuator calculates the stroke and automatically adapts the active control voltage range to this.

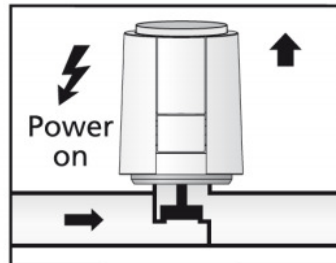
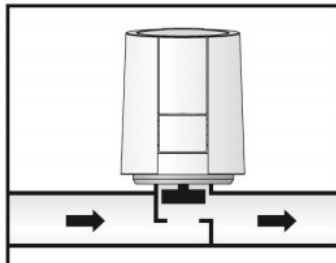
This allows an even more precise control of the valve. The complete voltage spike of the thermostat is used for flow control purposes.

**Function Display**

The function display (all-round display) of the APR / APV-series actuator shows at first glance whether the valve is open or closed; this can be also 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.

**First-Open Function (for NC only)**

In its delivery condition, the APR / APV-series actuators 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 single room control is not yet complete.

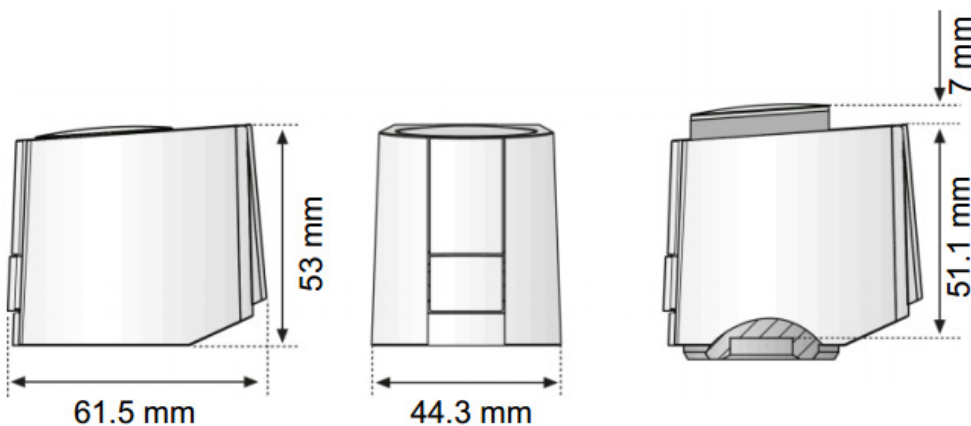
When commissioning the system at a later date, the "First Open" function is automatically unlocked by applying the operating voltage (for more than 6 minutes) and the actuator is fully operable

Technical data

Voltage (according to variant)	24 V AC, -10 % ... +20 %, 50-60 Hz 24 V DC, -20 % ... +20 %,	
Control voltage range	0 V... 10 V (reverse polarity protected)	
Max. inrush current	< 320 mA for max. 2 min.	
Operating power	1 W <sup>1)</sup>	
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 <sup>2)</sup>	
Storage temperature	-25 °C to +60 °C	
Ambient temperature	0 °C to +60 °C	
Degree of protection	IP 54 <sup>3)</sup>	
Protection Class	III	
CE conformity according to	EN 60730	
Casing	material	Polyamide
	colour	white
Connection line	type	3 x 0.22 mm <sup>2</sup> PVC
	colour	white
	length	1 m
	Weight with connection cable (1 m)	111 g
Overvoltage strength according to EN 60730-1	1 kV	

- 1) measured with precision reference instrument LMG95
- 2) in dependence of the adapter even higher
- 3) in all installation positions

Dimensions



Dimensions

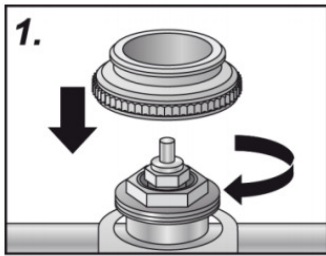
Installation height

**Installation Notes**

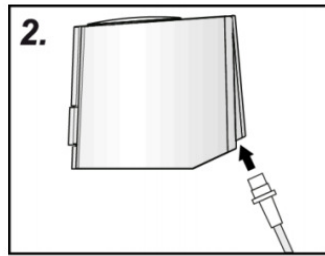
**Installation with valve adaptor**

The valve adapter assortment guarantees a perfect match of the actuator to almost all valve bottoms and heating circuit distributors available on the market.

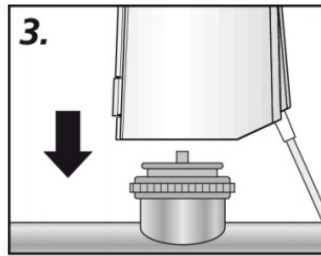
The APR / APV-series actuators is simply plugged on to the valve adapter previously installed manually.



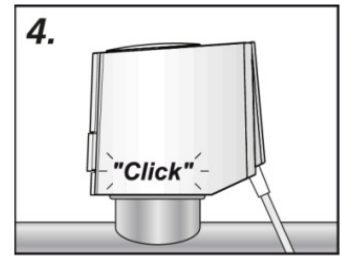
1. Screw the adapter manually onto the valve.



2. Connect the line to the actuator.



3. Position the APR / APV-series actuator manually in vertical position to the valve adapter. .

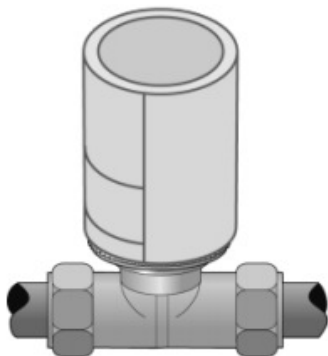


4. Latch the APR / APV-series actuator to the valve adapter by manually applied vertical pressure; this can be done noiselessly and without any problems.

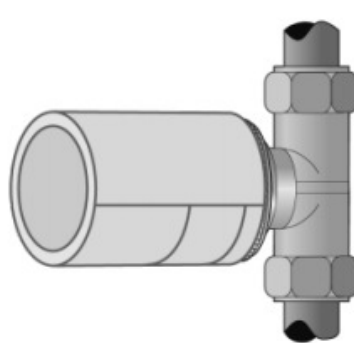
**Installation positions**

The APR / APV-series actuator must be installed preferably in vertical or horizontal installation position.

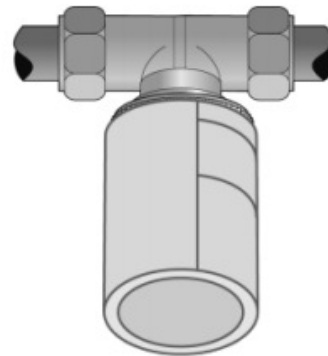
For "overhead" installation special circumstances (e. g. drainwater) can reduce the lifetime of the actuator.



**Vertical**

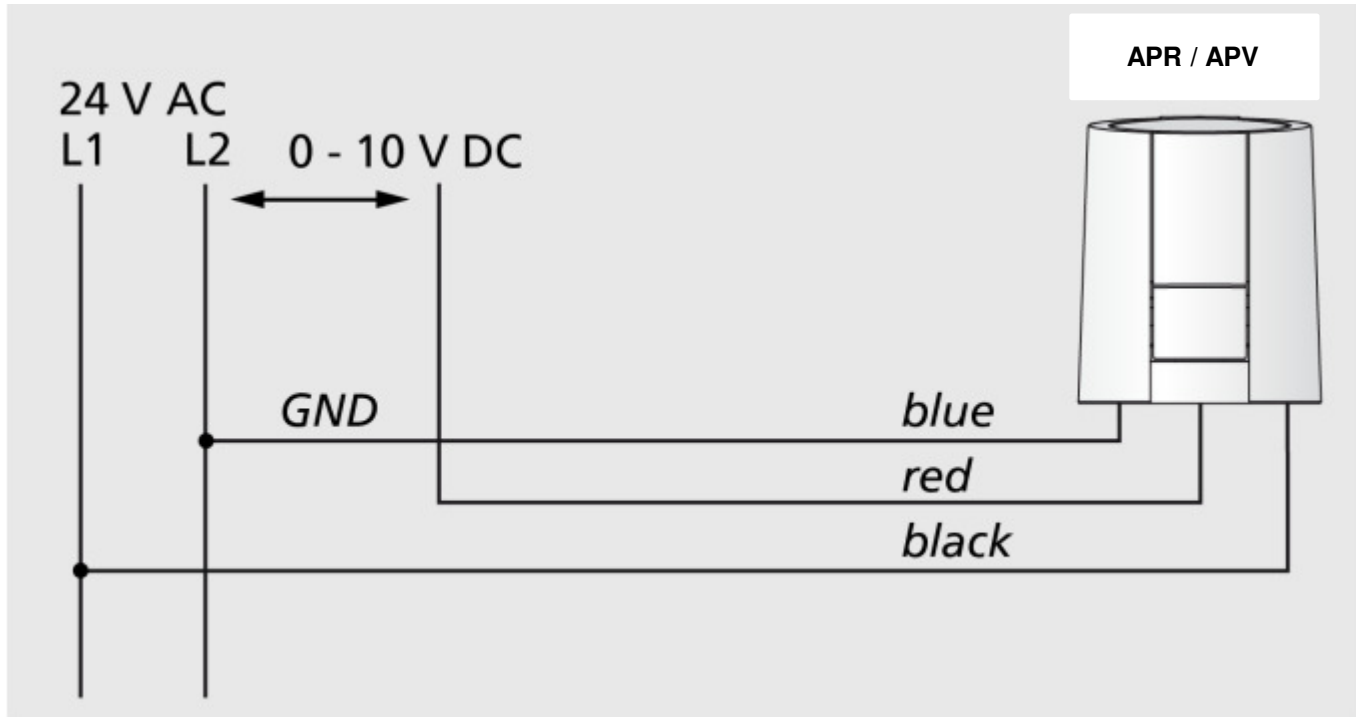


**Horizontal**



**Upside Down**

**Electrical installations**



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

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

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-sheated 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) must always be used.

Transformer dimensioning results from the making capacity of the APR / APV-series actuator .

Rule-of-thumb formula:  $P_{Trafo} = 6 W \times n$   
n = number of APR / APV-series actuator