

Data Sheet

Actuator ABNM A5 LOG/LIN 0-10 V Proportional

Application



The ABNM A5 0-10V thermal actuator has been specifically designed for use with AB-QM valves ½" to 1¼" in heating and cooling applications.

Actuator convincing features are:

- Stem travel of 5.0 mm or 6.5 mm
- Detection of AB-QM opening and closing point
- Available as normally closed (NC) or normally open (NO) during loss of power
- Power consumption 1/1.2 W
- Plug-in cable of different lengths

- Simple snap-on installation
- NEMA 3 (IP54) in any installation position
- First-Open function (NC versions)
- Compact size, small dimensions
- LIN and LOG (equal percentage) versions
- 24V AC power source
- All round function indicator
- Noiseless and maintenance-free
- UL Certified

Control is done by a 0-10 V signal, which is provided either by a 3rd party room thermostat or, typically by a central direct digital control (DDC) system. The actuator converts the 0-10 V signal into a proportional actuator travel, which can be either linear (ABNM A5 LIN) or logarithmic/equal percentage (ABNM A5 LOG).

For fan coil unit or chilled ceiling application choice of logarithmic version is recommended (water to air heat exchanger). The result will be linear system response and thus optimal room temperature control.

Ordering

Type	Supply voltage	Stem Travel	Normally Open/ Normally Closed	Version	Code no.
ABNM A5, includes VA41 mounting adapter, without wiring cable*	24 V AC	5 mm	NC	LOG	082F1160
			NC	LIN	082F1161
		6.5 mm	NO	LOG	082F1163
			NO	LIN	082F1165

* Cable is ordered separately refer to Accessories

Accessories

Cables are not included and should be ordered separately.

Cables	Code no.
3 feet (1 meter)	082F1081
16 feet (5 metres)	082F1082
32 feet (10 metres)	082F1083

Function

The actuator mechanism of the ABNM actuator uses a positive temperature coefficient (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 valve spindle and thus opening or closing the valve. The actuator provides active regulation in a defined range (see characteristic curve between 0.5 V and 9.5 V).

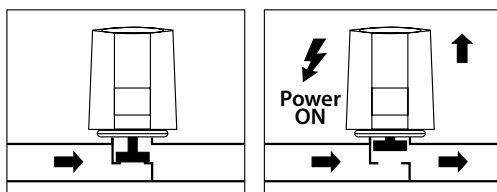
Located on the top of the actuator is a visible feedback of whether the valve is "open" or "closed".

First open function (for NC versions only)

In its delivery condition ABNM is partly open due to the first open function (filling). This partial open position of the actuator allows flow through the valve. During the later electrical start-up, the first open function is unlocked by applying the power supply for more than 6 minutes.

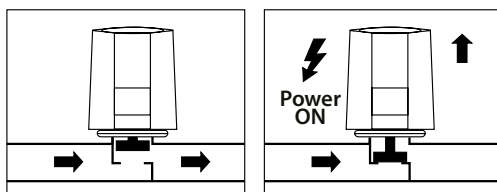
Version NC "normally closed"

In case of the normally closed version, valve is closed when power is removed from the valve. In addition when the actuator receives a 0VDC signal the valve will be closed.



Version NO "normally open"

In case of the normally open version, the valve is fully open when power is removed from the actuator or when the actuator receives 10VDC.



Automatic initial calibration (for NC and NO versions)

Automatic initial calibration is done only at the first power on of the actuator (new actuator). Power supply needs to be applied for 30 min. (± 10 min.) in order to finalize calibration phase, which includes valve opening and closing point detection. This ensures an optimum match with the AB-QM valve used at any preset between 20% and 100%. Active control range is between

0.5 V and 9.5 V what ensures precise flow and temperature control.

Automatic initial calibration stores calibration parameters directly in actuator non-volatile memory. Information remains in actuator memory also if actuator power supply is disconnected.

Manual re-calibration (for NC and NO versions)

In case you change valve type or valve preset after initial calibration is finished, apply 0 V control voltage for 15 min. for closing point detection and 10 V control voltage for 15 min. for new opening point detection.

Please note actuator stores this information in non-volatile memory 24 hours after re-calibration. If power is lost within 24 hours after re-calibration, then this information is lost, and you need to repeat the re-calibration procedure.

Automatic re-calibration (for NC and NO versions)

In case you change valve type or valve preset after initial calibration is finished and exact timing of re-calibration is not important, manual re-calibration procedure can be avoided. Controller will during normal course of operation sooner or later give control signal 0 V and 10 V. Actuator will automatically detect new closing point when control signal is 0 V for 15 min. and new opening point when control signal is 10 V for 15 min. We cannot guarantee duration of this procedure, as it depends from control signal from controller.

Operation after power-off (for NC and NO versions)

After power off (in case actuator was not removed from the valve) actuator will undergo normal operation within:

- 1 min. if power off was <10 s
- 15 min. if power off was >10 s

If power is lost within 24 hours after re-calibration, then you need to repeat re-calibration procedure.

Data

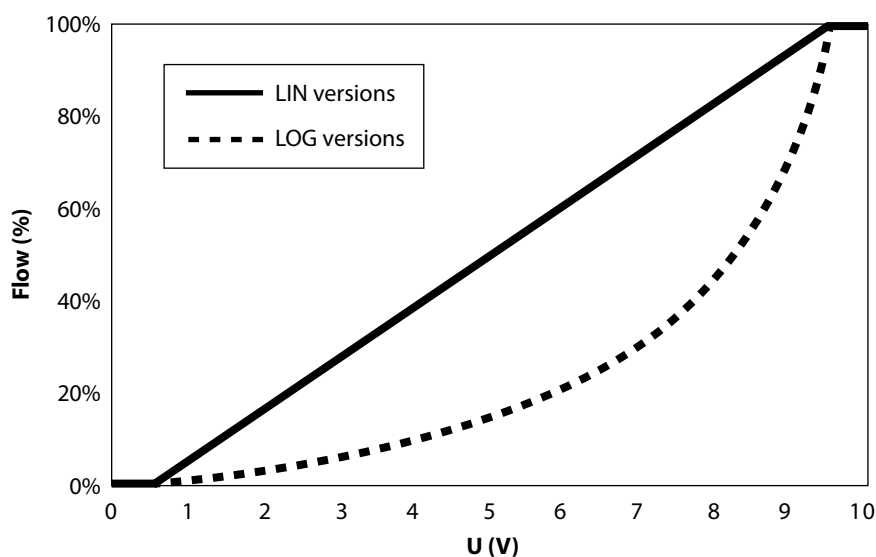
ABNM A5 type	5 mm versions AC	6.5 mm versions AC
Versions	NC, LOG/LIN	NC/NO, LOG/LIN
Voltage	24 V AC 50/60 Hz (-10% to +20%)	24 V AC 50/60 Hz (-10% to +20%)
Max. inrush current	< 300 mA for max. 2 min.	< 300 mA for max. 2 min.
Operating power	1 W ¹⁾	1.2 W ¹⁾
Control voltage	0-10 V DC	0-10 V DC
Input resistance	100 kΩ	100 kΩ
Actuator travel	5 mm (- 0.5 mm overclosing)	6.5 mm (- 0.5 mm overclosing)
Actuating linear force	100 N ± 5%	125 N ± 5%
Closing (NC) or opening (NO) time when de-energized	3-5 min.	3-5 min.
Speed	30 s/mm ²⁾	30 s/mm ²⁾
Calibration time (including First Open for NC)	30 ± 10 min. ²⁾	30 ± 10 min. ²⁾
Delay when energized (heat up time)	2-3 min.	2-3 min.
Fluid temperature	32 to 212°F (0 to 100° C) ²⁾	
Storage temperature	-13 to 149°F (-25 to 65° C)	
Ambient temperature	32 to 140°F (0 to 60° C)	
Degree/class of protection	NEMA 3/ IP54 ³⁾ /III safety extra-low voltage	
CE conformity according to	EN60730	
UL certification	UL60730	
Connecting cable (ordered separately)	3 x 0.22 mm ²	
Mounting adapter (included)	VA 41	
Overvoltage resistance EN60730-1	min. 1 kV	
Weight	0.24 lb (111 g) 0.24 lb (111 g)	
Housing material	Polyamid / white	

¹⁾ Measured with precision power meter LMG95.

²⁾ Measured at ambient temperature 68°F (20°C). Due to thermal working principle of actuator some parameters vary with ambient temperature. At higher ambient temperatures actuator opening is faster and closing slower. At lower ambient temperatures actuator closing will be faster and opening slower.

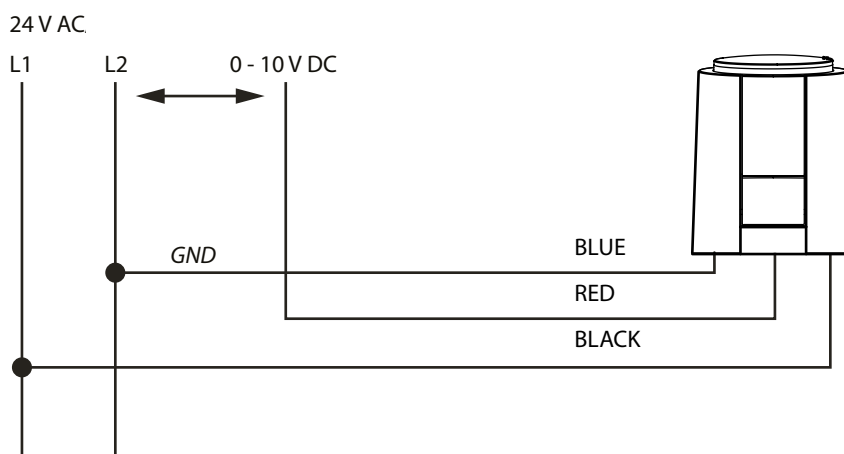
³⁾ In all installation positions with cable plugged in.

Characteristic Curves



Control characteristics of LOG and LIN versions.

Electrical Connections



Transformer

Rule-of-the-thumb formula for dimensioning transformer:

$$P_{\text{transformer}} = 6 \text{ W} \times \text{number of ABNM actuators}$$

Calculation of max. cable length (copper cable):

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

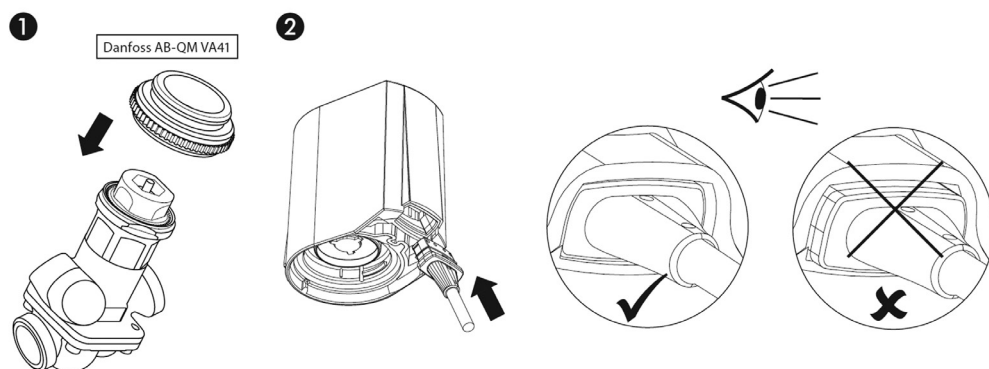
A: Conductor cross-section in mm²

n: Number of ABNM actuators

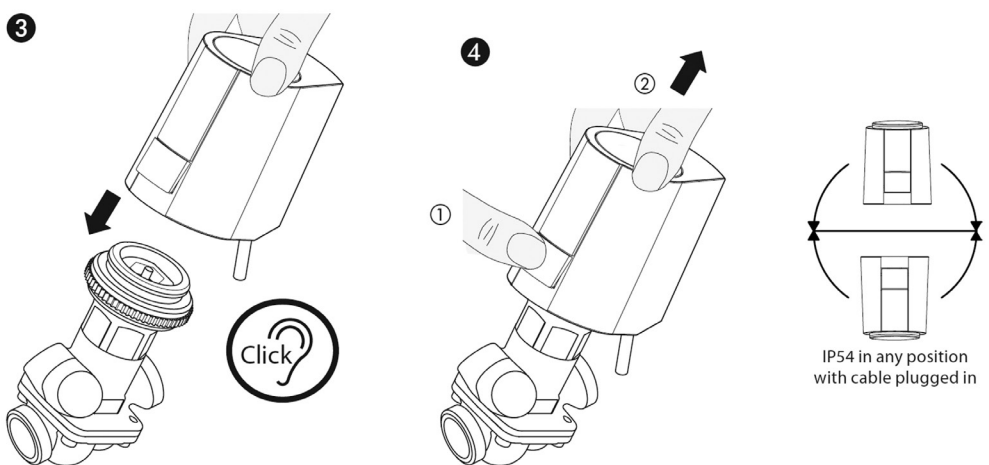
K: Constant for copper (269 m/mm²)

L: Cable length in m

Installation

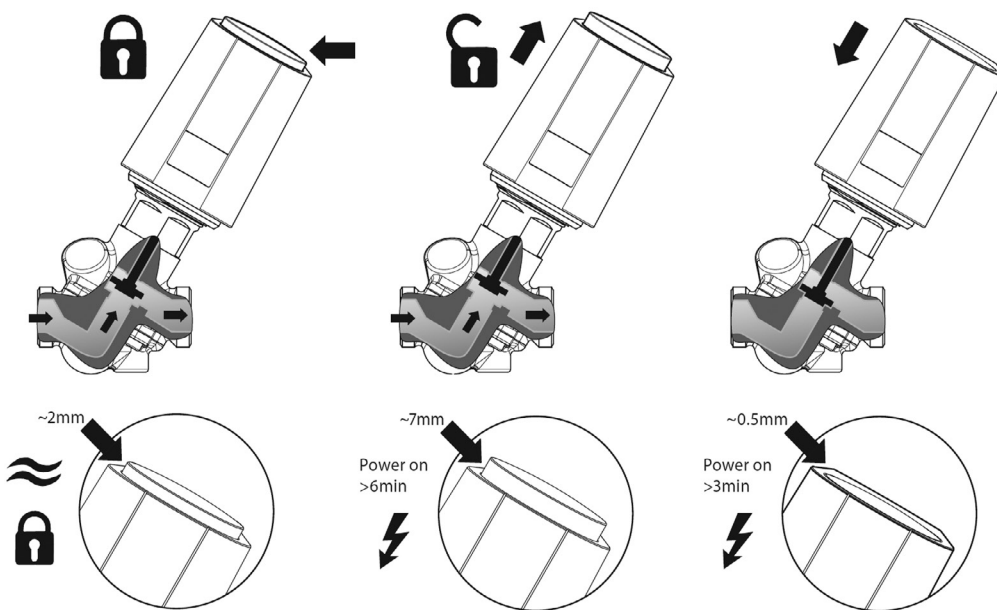


Screw the valve adapter manually onto the valve and connect cable and actuator.



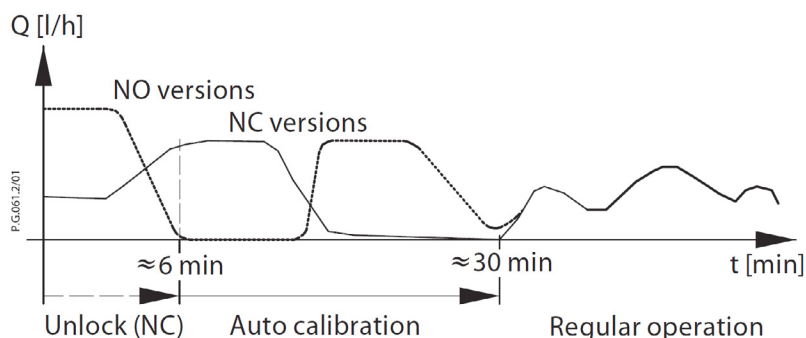
Place the actuator vertically on the valve adapter. The actuator snaps onto the valve adapter with a "click" when pressed down vertically by hand.

First Open Function



Presentation of First Open Function (Unlock NC version).

Calibration



Detection of open/close point

Automatic initial calibration procedure to actual preset AB-QM stroke (detection of opening and closing point). ABNM A5 actuator needs ~30 min. for first calibration (including First Open Function (NC versions only) and valve open and close point detection. In case of power loss the actuator will remember its position and will not need recalibration.

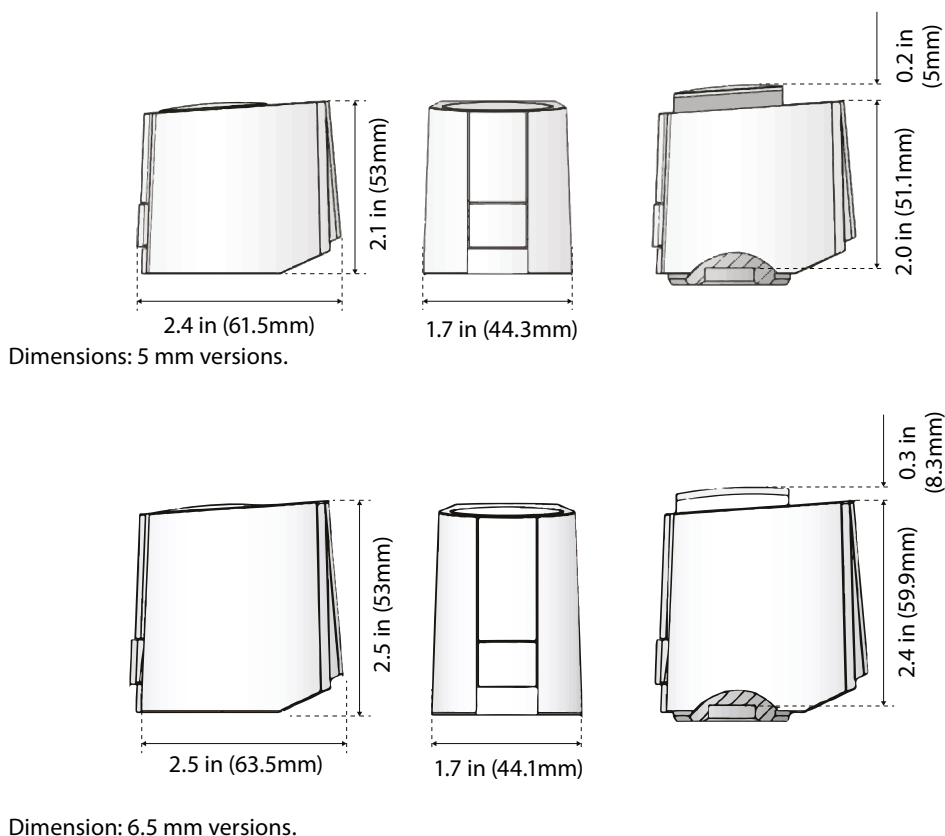
If valve preset is changed after first calibration is finished, actuator will automatically detect new open and close point during normal operation.

In order to accelerate this process cycle voltage to 0 V for 15 min. and 10 V for 15 min.

In case of power loss within 24 hours after re-calibration the actuator will lose its calibration parameters and need re-calibration.

In case of power loss after 24 hours after re-calibration the actuator will remember its position and will not need recalibration.

Dimensions



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