Data Sheet

Actuator Type ABNM-LOG/LIN for AB-QM, 0-10 V Proportional

Application

The ABNM actuator is a thermoelectric actuator for opening and closing valves in the fields of heating, ventilation and air conditioning systems (HVAC).

Control is done by a 0-10 V signal, which is provided either by a room thermostat or, in most cases, 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 LIN) or logarithmic (ABNM LOG).

- Ideal use in heating/cooling systems and in combination with central direct digital control (DDC) systems in building management systems (BMS).
- **ABNM LOG** for actuating valves controlling the flow of liquid to air heat exchanges, e.g. cooling fan coils or air handling units.
- **ABNM LIN** for actuating valves controlling the flow of liquid to liquid heat exchangers.

Function

The actuator mechanism of the ABNM actuator uses a positive temperature coefficient (PTC) resistorheated 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.

The closing force of the compression spring (100 N actuating force) is matched to the closing force of the valves and keeps the valve closed when de-energized. When the control voltage is applied (0-10 V), the wax element is heated under electronic control. The actuator provides active regulation in a defined range (see characteristic curve between 0.5 V and 10 V).

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. The relation between control voltage and actuator travel is balanced by optical path measurement, allowing very accurate positioning. When the control voltage is outside of the active range, the valve is kept closed by the closing force of the compression spring.

First open function (for NC only)
In its delivery condition, the ABNM is kept open when de-energized due to the first open function (filling). This enables heating/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 and the ABNM will then be completely operable.

Automatic calibration
During the electrical start-up the valve closing point is detected. This ensures an optimum match with the specific valve used.

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

Code Nos. and Technical Data

Type	Supply voltage	Control voltage	Valve function	Cable* length	**Code no.**
ABNM LOG with VA50 adapter	24 V AC	0-10 V DC	NC (normally closed)	1 m	**082F1191**
ABNM LOG with VA50 adapter	24 V AC	0-10 V DC	NC (normally closed)	5 m	**082F1192**
ABNM LIN with VA50 adapter	24 V AC	0-10 V DC	NC (normally closed)	1 m	**082F1193**
ABNM LOG without adapter	24 V AC	0-10 V DC	NC (normally closed)	no	**082F1198**
ABNM LIN without adapter	24 V AC	0-10 V DC	NC (normally closed)	no	**082F1199**

* Halogen free

Note: For theft protection order 082F1091

Accessories

Valve adapters

Connection	**Code no.**
Danfoss AB-QM VA50	**082F1075**

Cable (halogen free)

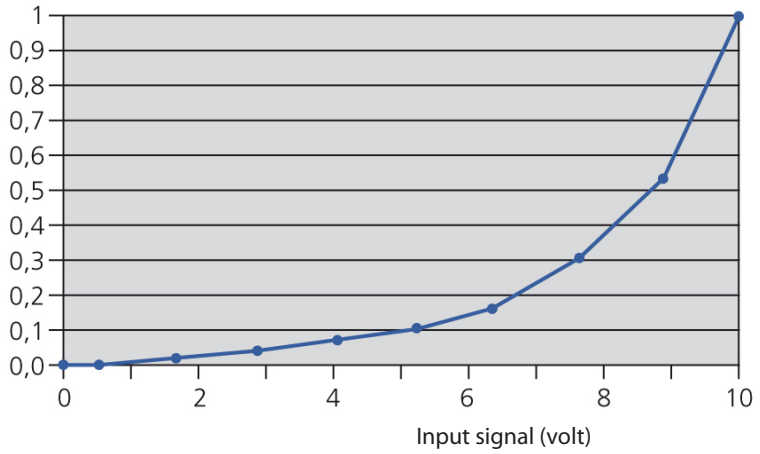
Length	**Code no.**
1 meter	**082F1081**
5 meter	**082F1082**
10 meter	**082F1083**

Data

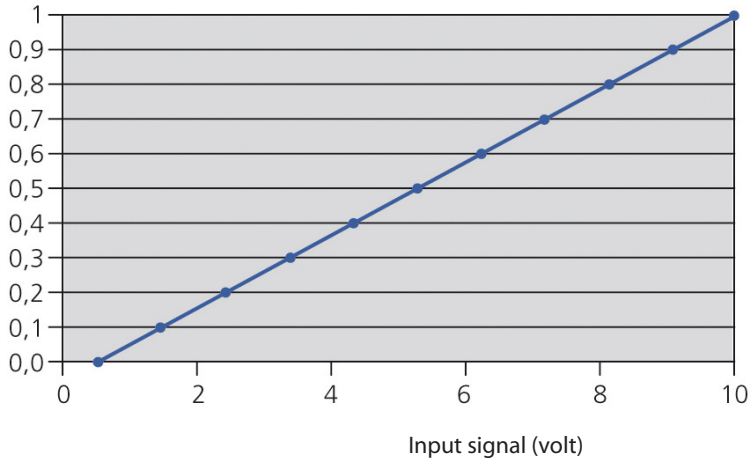
Version	Closed when de-energized
Voltage	24 VAC 50/60 Hz (-10% to +20%)
Max. inrush current	<300 mA during approx. 2 min.
Operating current	90 mA
Operating power	0.4 W
Control voltage	0-10 V DC
Proportional conversion range of control voltage	0.5-10 V DC
Input resistance	100 kΩ (also 10 kΩ factory setting, if ordered)
Actuator travel	In the range 0.5-10V the actuator proportional controls (LOG or LIN) a 0-4 mm stroke, starting from the closing point of the valve. The stroke is mechanically limited at 4.5 mm.
Average actuation delay	30 s/mm
Actuating force	100 N +/- 5%
Operating temperature	0 - 60 °C
Fluid temperature	0 - 100 °C
Storage temperature	-25 to 65 °C
Ambient temperature	0 to 60 °C
Relative humidity	max. 80%
Degree/class of protection	IP54 (only when connected to cable)/Safety extra-low voltage
CE conformity according to	60730
Housing/housing colour	Polyamid/white RAL 9003
Weight	100 g without adapter and cable
Connecting cable/cable length	3 x 0.22 mm^2 PVC, white, halogen free/1 meter, 30 g

Characteristic Curves

ABNM-LOG, transformation curve

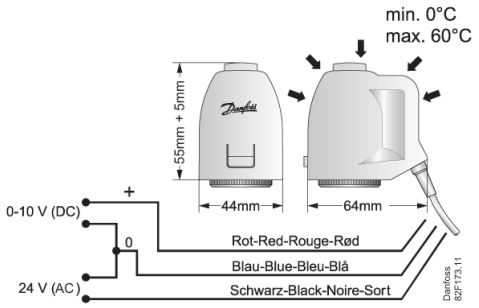


ABNM-LIN, transformation curve



ABNM actuator
The actuator converts the 0-10 V signal into a proportional actuator travel of 0-4.5 mm.

Dimensions Connections



Transformer

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

$P_{transformer}$ = 6 W x number of ABNM actuators

Calculation of max. cable length (copper cable)

L = K x A / n

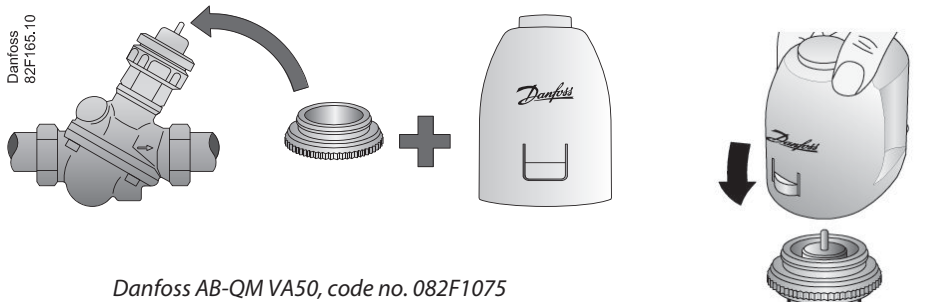
A: Conductor cross-section in mm^2

n: Number of ABNM actuators

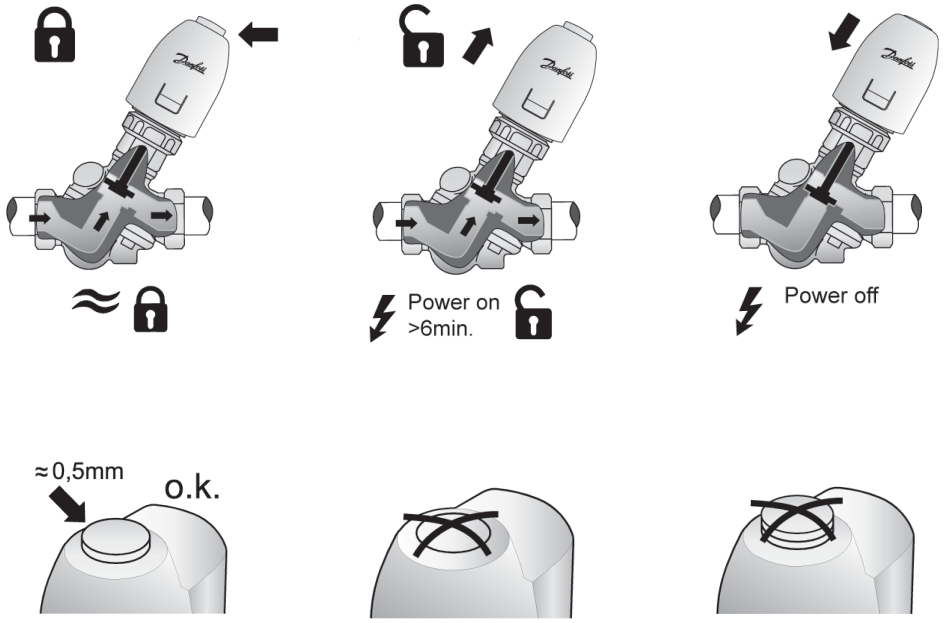
K: Constant for copper (269 m/mm^2)

L: Cable length in m

Installation



Danfoss AB-QM VA50, code no. 082F1075



1. Screw the suitable valve adapter on the valve by hand.
2. The actuator is mounted on the adapter ring. ABNM can be mounted in 360°.
3. Switch on the power supply.

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