Data sheet

Actuator Type ABNM - 0-10 V Proportional

Application

The ABNM actuator is thermoelectric actuator for opening and closing valves and is used in the fields of heating, ventilation and air conditioning systems.
Control is 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.

- For actuating valves on heating circuit distributors, radiators, convectors and similar units.
- Ideal use in fast heating/cooling systems (e.g. fan coils, air conditioner boxes etc.)
- In combination with central direct digital control (DDC) systems in building management systems (BMS).

Function

The actuator mechanism of the ABNM actuator uses a Positive Temperature Coefficient (PTC), resistorheated wax element and a compression spring.

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 only in a defined range (see characteristic curve between 0.5 V and 10 V). Between 0 V and 0.5 V, the ABNM actuator is in a quiescent state in order to be able to ignore any possible ripple voltage occurring in the lower control voltage range in long cables.

ABNM has:

- First open function
- Automatic calibration

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.

Code nos. and technical data

Type	Supply voltage	Control voltage	Valve function	Cable length	**Code no.**
With adapter for Danfoss RA valves	24 V AC	0-10 V DC	NC (normally closed)	1 m	**082F1091**
No adapter				1 m	**082F1094**
No adapter				5 m	**082F1095**
No adapter				8 m	**082F1096**

Accessories

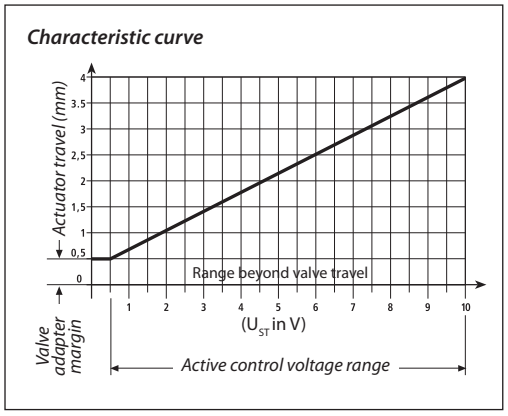
Valve adapters

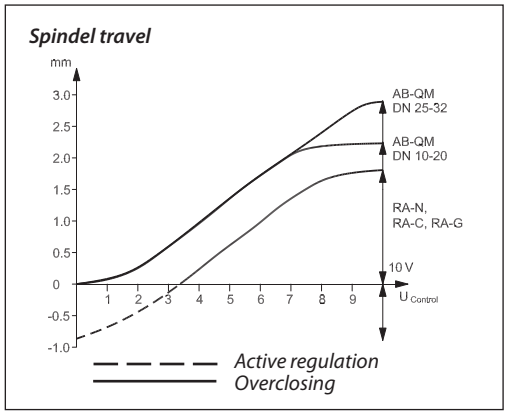
Connection	**Code no.**
Danfoss RA 2000	**082F1071**
Danfoss AB-QM	**082F1072**
M30 x 1.5 Heimeier, MNG, Oventrop	**082F1073**
Danfoss RAV	**082F1074**

Data

Version	Closed when de-energized
Voltage	24 VAC 50/60 Hz (-20% to 40%)
Max. inrush current	250 mA during approx. 2 min.
Operating current	83 mA
Operating power	2 W
Control voltage	0-10 V DC
Proportional conversion range of control voltage	0,5-10 V DC
Input resistance	100 kΩ
Actuator travel	3.5 mm (incl. valve adapter margin = 4mm)
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 / 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 mm2 PVC, white / 1, 5 or 8 meter

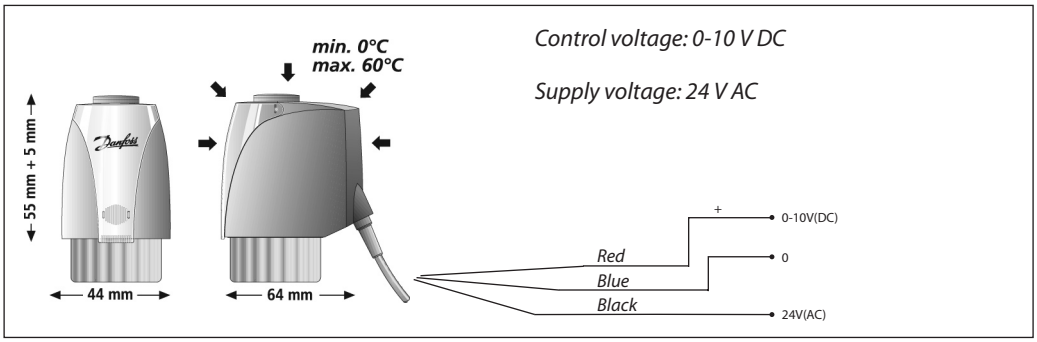
Characteristic curves





ABNM actuator
The actuator converts the 0-10 V signal into a proportional actuator travel of 0-3.5 mm (incl. adapter margin = 4mm).

Dimensions Connection



Transformer

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

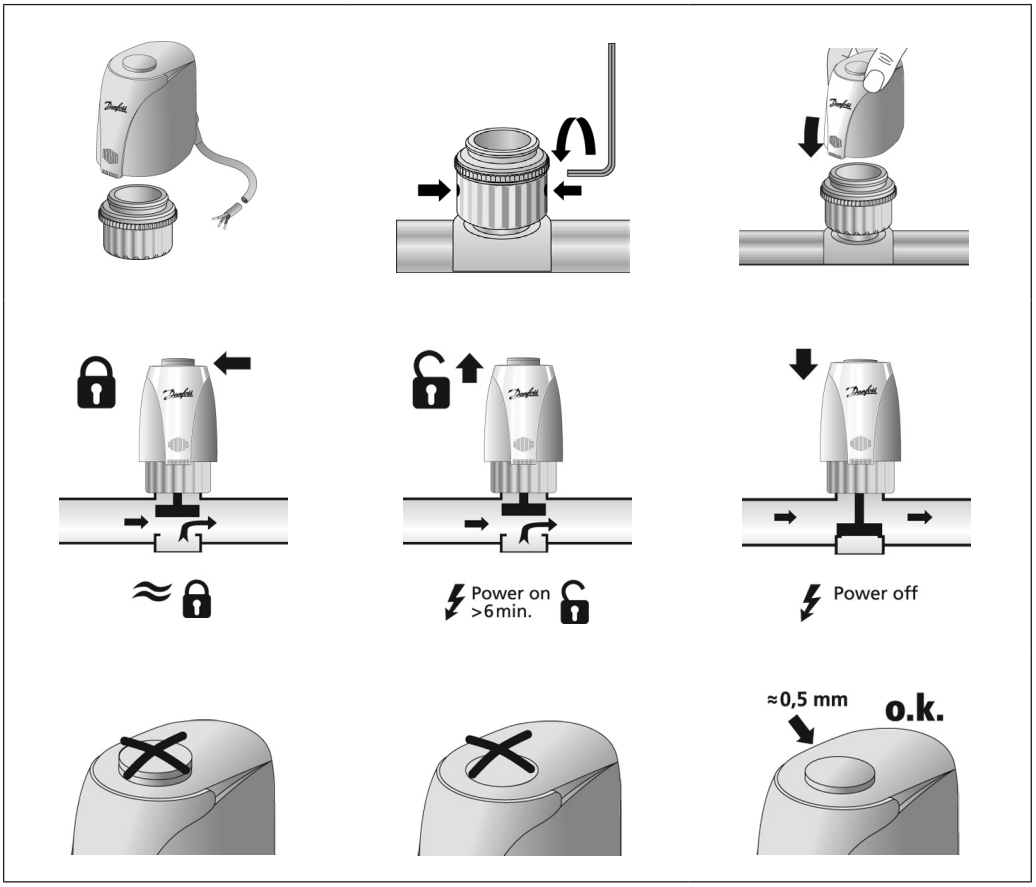
$P_{transformer}$ = 6 W x number of ABNM actuators

Calculation of max. cable length (copper cable)

L = K x A / n

A: *Conductor cross-section in mm²*
n: *Number of ABNM actuators*
K: *Constant for copper (269 m/mm²)*
L: *Cable length in m*

Installation



ABNM can be mounted in 360°. Due to high IP class moist is not a problem. A 2 mm Allen key is used to fit valve adapter.

First-Open function
In its delivery condition, the ABNM-Actuator is open when de-energized 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.

Function Display
The function display of the ABNM-Actuator (all-round display) allows identifying the operating condition (valve open/closed and intermediate positions) at a glance.

Theft protection

If the shield is taken off, it is not possible to part the thermal actuator from the adapter.