

## Data Sheet

# Actuator type ABNM with Theft Protection, 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 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.

- Ideal use in heating/cooling systems and 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 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 (100N 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-energised 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

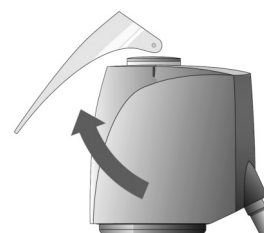
During the electrical start-up the valve closing point is detected. This ensures an optimum match with the specific valve used.

#### Function display

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

#### Theft protection

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



**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	<b>082F1091</b>

**Accessories**
**Valve adapters**

Connection	Code no.
Danfoss RA 2000 (VA78)	<b>082F1071</b>
M30 x 1.5 Heimeier, MNG, Oventrop	<b>082F1073</b>

Note: For AB-QM adaptor order 082F1072 or 082F1075 for ABNM LOG/LIN actuator.

**Cable (halogen free)**

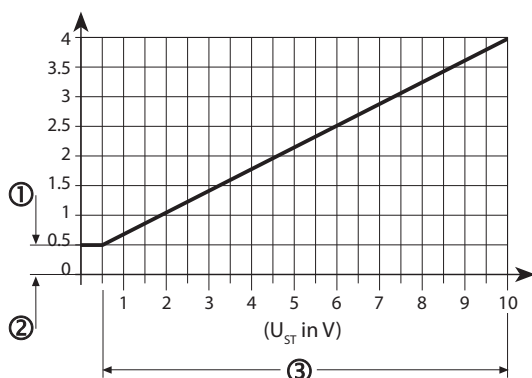
Length	Code no.
1 meter	<b>082F1081</b>
5 meter	<b>082F1082</b>
10 meter	<b>082F1083</b>

**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 k $\Omega$ (10 k $\Omega$ possible, if ordered)
Actuator travel	4 mm (minus over-elevation); max. 3.5 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/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 <sup>2</sup> PVC, white/1

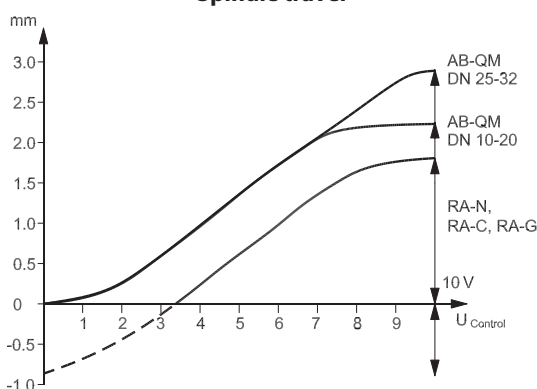
Characteristic Curves

Characteristic curve



- ① Actuator travel (mm)
- ② Valve adapter margin
- ③ Active control voltage range

Spindle travel

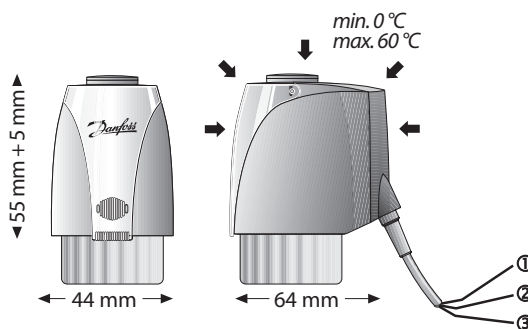


- Active regulation
- Overclosing

ABNM actuator

The actuator converts the 0-10 V signal into a proportional actuator travel of 4 mm.

Dimensions Connections



- ③ Black, 24 VAC
- ② Blue, 0
- ① Red, 0 - 10 VDC

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)

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

L: Cable length in m

K: Constant for copper (269 m/mm<sup>2</sup>)

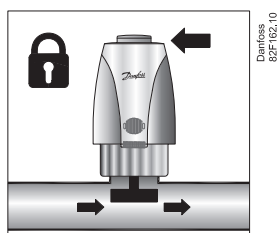
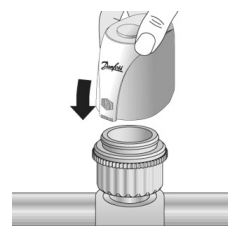
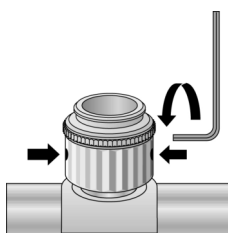
A: Conductor cross-section in mm<sup>2</sup>

n: Number of ABNM actuators

Installation



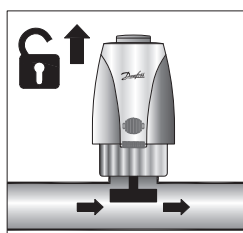
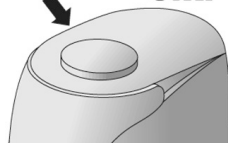
Danfoss RA 2000, VA78,  
code no. 082F1071



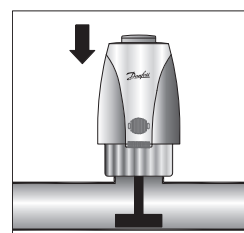
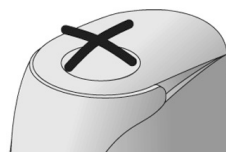
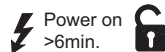
Danfoss  
82F102, 10



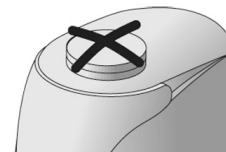
≈ 0,5 mm o.k.



Danfoss  
82F103, 10



Danfoss  
82F104, 10



ABNM can be mounted in 360°. A 2 mm Allen key is used to fit the valve adapter.

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