

Thermostats type MBC 8000 and MBC 8100

Description



MBC thermostats are temperature controlled switches designed for use in severe industrial environments. It consists of the standard series MBC 8000 and the special series MBC 8100 with ship approvals. In MBC thermostats special attention has been given to meeting demands for:

- compact design
- a high level of enclosure
- robust and reliable construction
- resistance to shock and vibration
- low differential and high repeatability

The MBC thermostat is part of the Danfoss block controls programme consisting of MBC pressure controls and thermostats, MBS pressure transmitters and MBV test valves.

The thermostats are suitable for use in monitoring and alarm systems in factories, diesel plant, compressors, power stations and on board ship.

Approvals

CE marked acc. to EN 60 947-5-1
CCC, China Compulsory Certificate

Ship approvals, MBC 8100 only

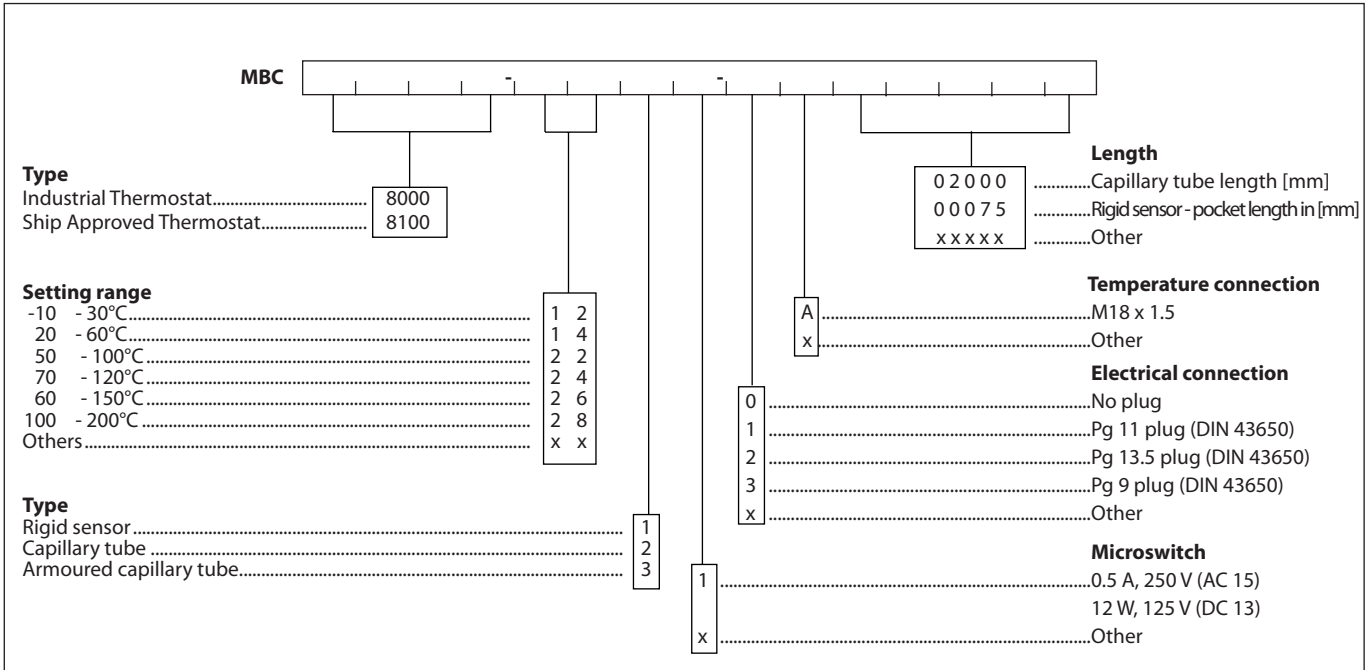
Det norske Veritas, Norway
American Bureau of Shipping
Lloyds Register of Shipping, UK
Germanischer Lloyd, Germany

Bureau Veritas, France
Registro Italiano Navale, Italy
Nippon Kaiji Kyokai, Japan
KRS, Korean Register of Shipping
RMRS, Russian Maritime Register of Shipping

Standard types

Setting range	Fixed diff.	Max. sensor temp.	Cap.-length	Capillary tube		Armoured capillary tube		Sensor pocket	Rigid sensor	
				Code no.	Type MBC 8100	Code no.	Type MBC 8100		Code no.	Type MBC 8100
-10 - 30	3	80	2	061B820166	1221-1A02000	061B810166	1231-1A02000			
20 - 60	3	130	2			061B810266	1431-1A02000			
20 - 60	3	130						75	061B800266	1411-1A00075
50 - 100	4	200	2	061B820366	2221-1A02000	061B810366	2231-1A02000			
50 - 100	4	200						75	061B800366	2211-1A00075
70 - 120	5	220	2			061B810466	2431-1A02000			
70 - 120	5	220						75	061B800466	2411-1A00075
60 - 150	6	250	2	061B820566	2621-1A02000	061B810566	2631-1A02000			
60 - 150	6	250						75	061B800566	2611-1A00075

Ordering of customized types



Technical data

Contact load (Alternating current):
 Inductive: 0.5 A, 250 V, AC15
 Direct current: 12 W, 125V, DC 13

Enclosure
 IP 65 to IEC 529 and DIN 40050.
 Anodized Al Mg Si 1.

Ambient temperature -40 to +70 °C

Electrical connection
 DIN 43650 plug, Pg 9, Pg 11, Pg 13.5

Shock resistance:
 50 g / 6 ms, 500 g / 1ms
 acc. to IEC 68-2-27
 Free fall acc. to IEC 68-2-32

Switch
 Single-pole changeover switch (SPDT).

Vibration resistance
 Sin 4 g, 5Hz → 200 Hz acc. to IEC 68-2-6. *)

Properties acc. to EN 60947

Wire dimensions

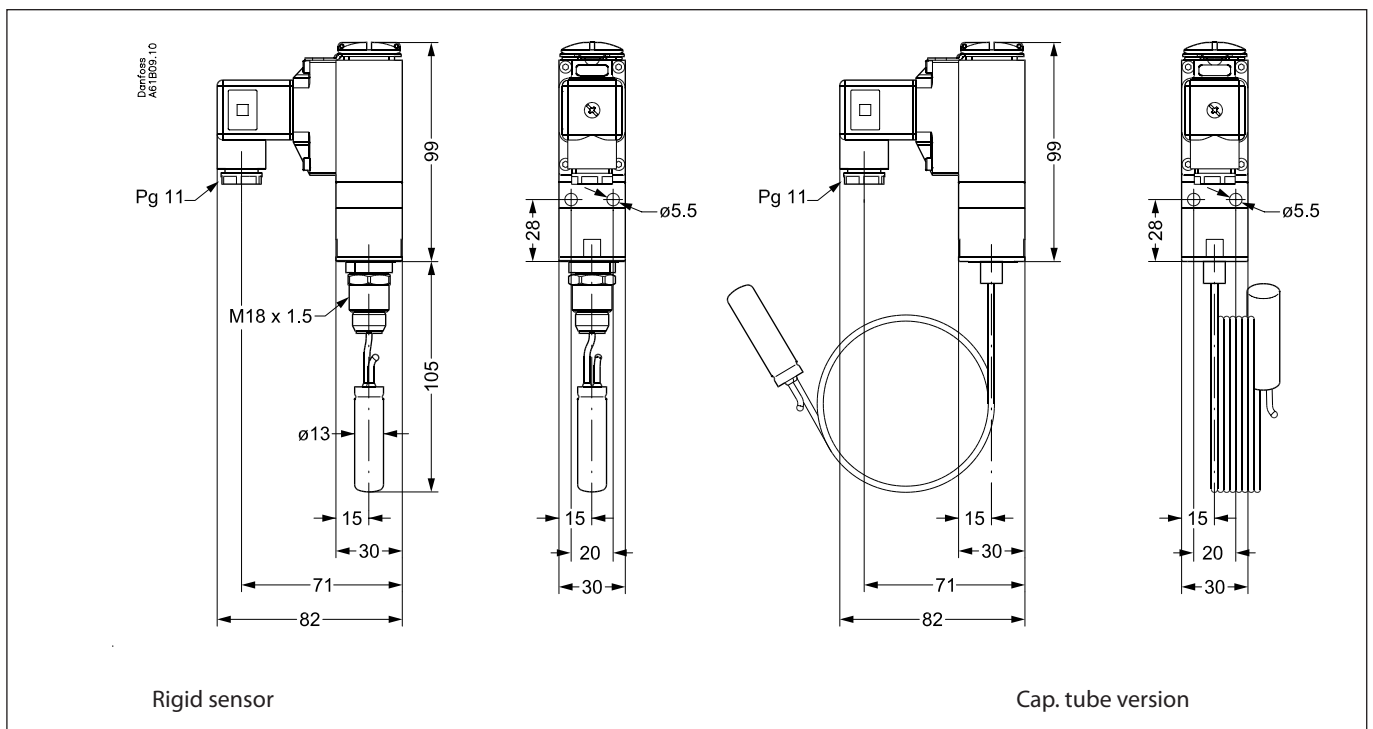
Solid/stranded	0.2 - 1.5 mm ²
Flexible, w/out ferrules	0.2 - 1.5 mm ²
Flexible, with ferrules	0.2 - 1 mm ²
Tightening torque	max. 1.2 Nm
Rated Impuls voltage	4 kV
Pollution degree	3
Short circuit protection, fuse	2 Amp
Insulation	250 V
IP-index	65

*) If higher vibrations are present in the system/installation, thermostats with capillary tube or armoured capillary tube are recommended.

Accessories: Sensor pockets for MBC thermostats	Sensor pocket	A mm	Thread B	Code no.	Sensor pocket	A mm	Thread B	Code no.
<p>Supplied without gland nut, gaskets and washer</p>	Brass	75	1/2 NPT	060L326466	Steel 18/8	75	G 1/2 A	060L326766
		75	G 1/2 A	060L326266				
		75	G 3/4 A	060L326666				
		75	G 1/2 A (ISO 228/1)	060L328166				
	Brass	110	1/2 NPT	060L327066	Steel 18/8	110	G 1/2 A	060L326866
		110	G 1/2 A	060L327166				
		110	G 1/2 A (ISO 228/1)	060L340666				
		110	G 3/4 A (ISO 228/1)	060L340366				
	Brass	160	G 1/2 A	060L326366	Steel 18/8	160	G 1/2 A	060L326966
	160	G 3/4 A (ISO 228/1)	060L340566					

Part	Description	Code no.
<p>Clamping band</p>	For thermostats with remote sensor (L = 392 mm)	017-420466
<p>Heat-conductive compound (4.5 cm³ tube)</p>	For thermostats with sensor fitted in a sensor pocket. Compound for filling sensor pocket to improve heat transfer between pocket and sensor. Application range for compound: -20 to +150 °C, momentarily up to 220 °C.	041E0114
<p>Gasket set</p>	For MBC thermostats without armoured capillary tubes	060L327366
<p>Gasket set</p>	For MBC thermostats with armoured capillary tubes	060L036666

Dimensions



Setting point correction

The sensor on MBC 8100 thermostats contains an adsorption charge. Therefore its function is not affected whether the sensor is placed warmer or colder than the remaining part of the thermostatic element (bellows and capillary tube). However, such a charge is to some extent sensitive to changes in the temperature of the bellows and capillary tube. Under normal conditions this is of no importance, but if the thermostat is to be used in extreme ambient temperatures the setting point might change.

The deviation can be compensated for as follows:

Setting point correction = Z x a

Z can be found from fig. 1, while **a** is the correction factor from the table below.

Regulation range °C	Correction factor a for thermostats	
	with rigid sensor	with 2 and 5 m capillary tube
-10 → +30		1.1
20 → 50	1.0	1.4
50 → 100	1.5	2.2
70 → 120	1.7	2.4
60 → 150		3.7
100 → 200		6.2

Example

A MBC 8100 with capillary tube length 2 m and range 50 → 100°C must cut out at 75°C in 70°C ambient temperature. At which cut out temperature should this thermostat be set at in 20°C ambient temperature?

The relative setting **Z** can be calculated from the following formula:

$$\frac{\text{Setting value} - \text{min. range}}{\text{max. range} - \text{min. range}} \times 100\%$$

Relative setting: $\frac{75 - 50}{100 - 50} \times 100 = 50\%$

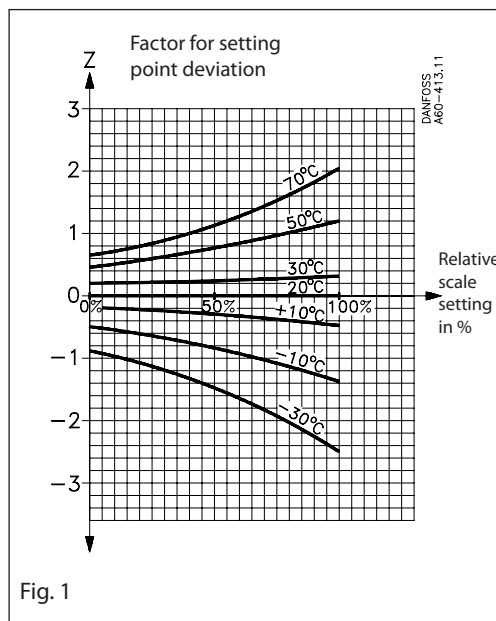


Fig. 1

Relative setting:

Factor for setting point deviation **Z** (fig. 1).
Z - 1.2

Correction factor **a** (table under fig. 1) a = 2.2

Setting point correction $Z \times a = 1.2 \times 2.2 = 2.6^\circ\text{C}$

The MBC must be set at 75 + 2.6 = 77.6°C in 20°C ambient temperature in order to cut out at 75°C ambient temperature.

Installation

Installation

MBC thermostats are designed to withstand the shocks that occur, e.g. in ships, on compressors and in large machine installations. MBC thermostats with remote sensor are fitted with 5 mm screws to bulkheads or similar. See fig. 2

MBC thermostats with rigid sensor are self-supporting from the sensor pocket.
For permissible media pressure see fig. 3.

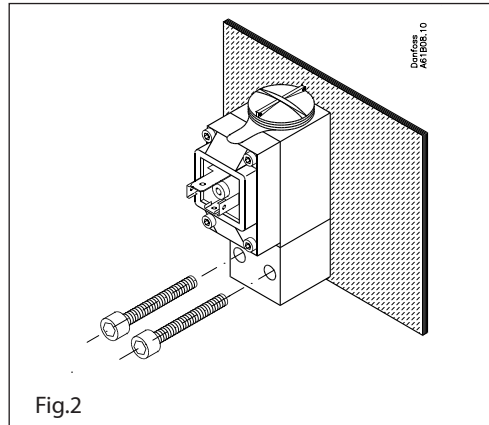


Fig.2

Resistance to media

Material specifications for sensor pockets:

Sensor pocket, brass

The tube is made of Ms 72 to DIN 17660, the threaded portion of So Ms 58Pb to DIN 17661.

Sensor pocket, stainless steel 18/8

Material designation 1.4305 to DIN 17440.

Sensor position

As far as possible the sensor should be positioned so that its longitudinal axis is at right angles to the direction of flow. The active part of the sensor is $\varnothing 13$ mm x 50 mm long on thermostats with rigid sensors and 2 m capillary tube.

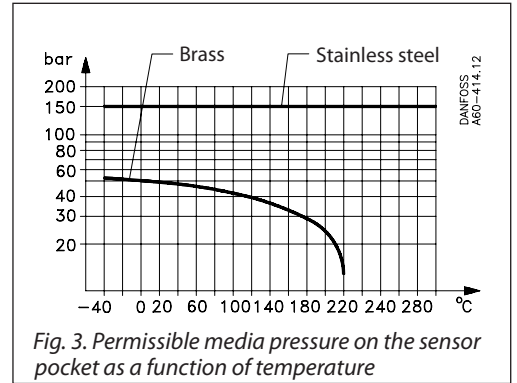


Fig. 3. Permissible media pressure on the sensor pocket as a function of temperature

Setting

When the top cover screw at the thermostat is removed, the range can be set with the setting screw. The differential is non-adjustable.

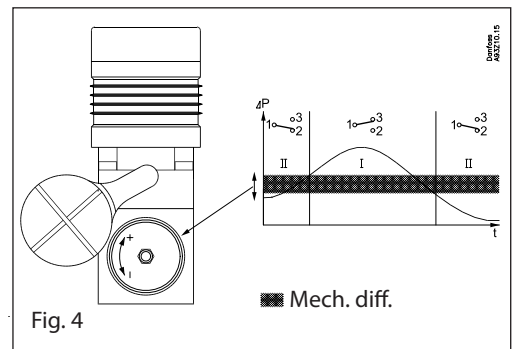


Fig. 4