

Data Sheet

Temperature sensor

Types **MBT 5250**, **MBT 5260** and **MBT 5252**

Heavy-duty marine approved temperature sensor.



Heavy-duty temperature sensors for controlling cooling water, lubrication oil, hydraulic oil and refrigeration plants within general industry and marine applications. These temperature sensors are based on a standardized Pt 100 or Pt 1000 element, which gives a reliable and accurate measurement. All three sensor types can be delivered with NTC / PTC elements on request.

In the low temperature version (-50 – 200 °C) the measuring insert is based on a silicone cable, which makes the sensor very resistant towards vibrations. The MBT 5250 with changeable measuring insert and MBT 5260 with fixed measuring insert are equipped with EN 175301-803-A, Pg 9 as standard. The MBT 5252 is equipped with a B-head as standard, but can also be delivered with B-mini Head on request.

If needed, a transmitter (MBT 9110) can be ordered as an integrated part of the MBT 5252 sensor.

Features:

- Gaseous or liquid media, e.g. air, gas, vapour, water or oil
- Up to 200 °C media temperature (MBT 5250 and MBT 5260)
- Up to 200 °C or 400 °C media temperature (MBT 5252)
- Pt 100 or Pt 1000 sensing element
- Can be used with 2 or 3 wire connections
- Gold plated male and female connector (MBT 5250 and MBT 5260)
- MBT 5250 and MBT 5252 with interchangeable measuring insert
- MBT 5260 with fixed measuring insert
- Available with built-in transmitter (MBT 5252)

Product specification

Technical data

MBT 5250, MBT 5260

Table 1: General data

Features	Description	
Measuring range	-50 – 200 °C	
Sensing element	Pt 100, Pt 1000	
Protection tube	ø8 × 1 mm	
Permissible media velocity	Air	25 m/s
	Water	3 m/s

Table 2: Connection

Process connection	G ¼ A	G ¼ A G ¾ A – M18	G ¾ A M24
Max. tightening torque	25 Nm	50 Nm	100 Nm

Table 3: Response times

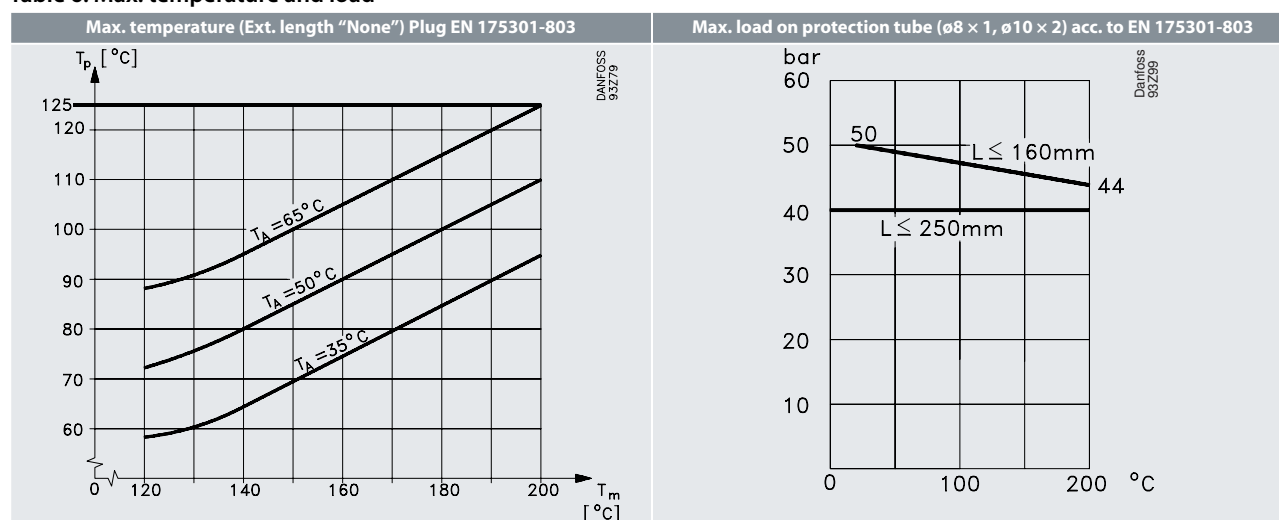
Type	Protection tube	Indicative response times			
		Water 0.2 m/s		Air 1 m/s	
		t _{0.5}	t _{0.9}	t _{0.5}	t _{0.9}
MBT 5250 with interchangeable measuring insert	ø8 × 1 mm	9 s	33 s	95 s	310 s
MBT 5260 with fixed meas. ins.	ø8 × 1 mm	6 s	20 s	35 s	140 s

Table 4: Mechanical and environmental specifications

Features	Description
Sensor tolerances	EN 60751 Class B: ± (0.3 + 0.005 × t) t = temperature of medium, numerical value
Vibration stability	Shock: 100 g / 6 ms
	Vibrations: 4 g sine function 5 – 200 Hz, measured acc. to IEC 60068-2-6
Enclosure	IP65 according to IEC 60529
Cable entry EN 175301-803	Pg 9, Pg 11 or Pg 13.5

Table 5: Materials

Features	Description
Protection tube in contact with media	W.no. 1.4571 (AISI 316 Ti)
Process connection	W.no. 1.4404 (AISI 316 L)
Extension length	W.no. 1.4571 (AISI 316 Ti)
Union	Nickel plated brass
Gasket	Silicone
Plug EN 175301-803	PA 6.6 (max 125 °C)

Table 6: Max. temperature and load


L	Insertion length	T_p	Temperature for electric plug
T_m	Media temperature	T_A	Ambient temperature

NOTE:

For extension length = 50 mm no limitations up to 200 °C media temperature and 90 °C ambient temperature.

MBT 5252
Table 7: General data

Features	Description	
Measuring range	-50 – 200 °C or -50 – 400 °C	
Sensing element	Pt 100, Pt 1000	
Protection tube	Low temperature: ø10 × 2 mm High temperature: ø11 × 1 mm	
Permissible media velocity	Air	25 m/s
	Stream	25 m/s
	Water	3 m/s

Table 8: Connection

Process connection	G ¼	G ¼ A – G ½ A G ¾ A – M18	G ¾ A M24
Max. tightening torque	25 Nm	50 Nm	100 Nm

Table 9: Response times

Type	Protection tube	Indicative response times			
		Water 0.2 m/s		Air 1 m/s	
		t _{0.5}	t _{0.9}	t _{0.5}	t _{0.9}
MBT 5252	ø10 × 2 mm	14 s	42 s	110 s	390 s
MBT 5252 (HT)	ø11 × 1 mm	25 s	80 s	150 s	450 s

Table 10: Materials

Features	Description
Protection tube in contact with media	W.no. 1.4571 (AISI 316 Ti)
Process connection	W.no. 1.4404 (AISI 316 L)
Extension length	W.no. 1.4571 (AISI 316 Ti)
Union	Nickel plated brass
Connection head	Die cast aluminium

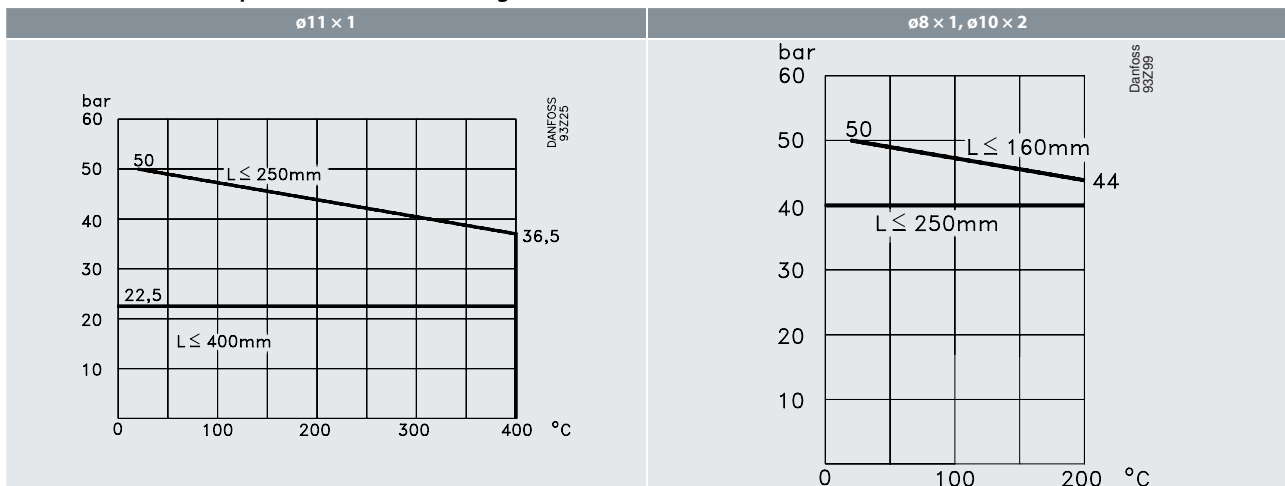
Temperature sensor, Types MBT 5250, MBT 5260 and MBT 5252

Table 11: Mechanical and environmental specifications

Features	Description	
Max. ambient temperature ⁽¹⁾	Sensors without transmitter	90 °C
	Sensors with transmitter	85 °C
Sensor tolerance	EN 60751 Class B: $\pm (0.3 + 0.005 \times t)$	t = temperature of medium, numerical value
Vibration stability	Shock:	100 g / 6 ms
	Vibrations:	4 g sine function 5 – 200 Hz, measured acc. to IEC 60068-2-6
Enclosure	IP65 according to IEC 60529	
Cable entry B-head	Pg16	
Cable entry BM	Pg 9	
Temperature transmitter MBT 9110	Supply voltage:	8 – 35 V DC
	Output:	4 – 20 mA

⁽¹⁾ The temperature of the transmitter is influenced by media temperature, ambient temperature and ventilation in the engine room. If the temperature of the transmitter exceeds the max. allowed temperature the transmitter must be data placed in a separated enclosure, as described in the separate sheet for MBT 9110.

Table 12: Max. load on protection tube according to DIN 43763

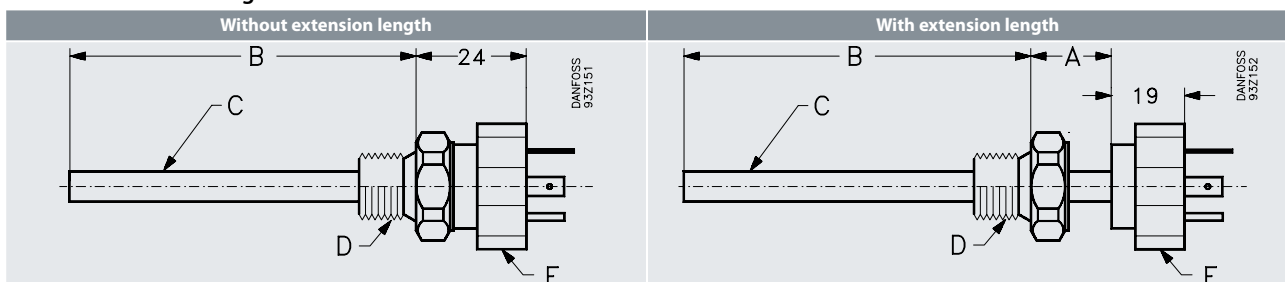


L Insertion length

Dimensions

MBT 5250, MBT 5260

Table 13: Extension length



A Extension length

B Insertion length

C Protection tube

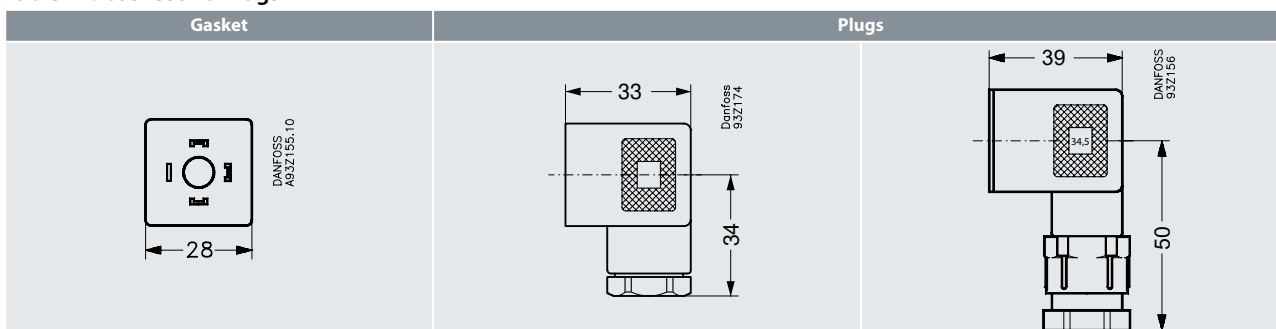
D Process connection

E Union

NOTE:

- Tightening torque for the mounting screw at the rear end of the electrical connection plug: 25 Ncm
- Tightening torque for the union (position "E"): 17 Nm

Table 14: Gasket and Plugs



Units: mm

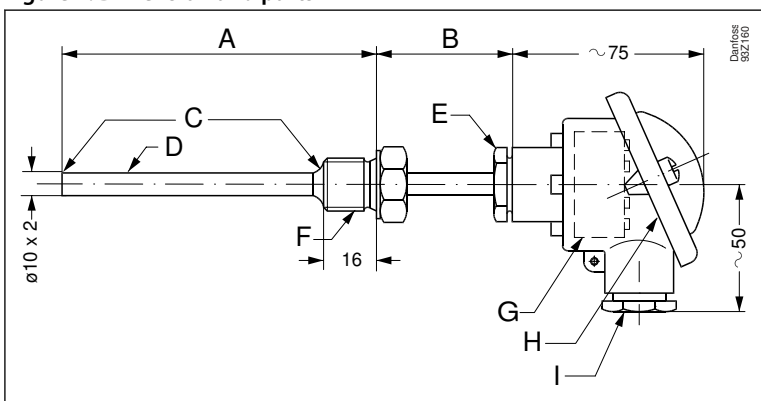
Table 15: Connection

Process connection	G ¼	G ¼ A – G ½ A G ¾ A – M18	G ¾ A M24
Width across flats	HEX 22	HEX 27	HEX 32

MBT 5252

Unit: mm

Figure 1: Dimension and parts



A	Insertion length	D	Protection tube	G	Transmitter type MBT 9110, as terminal block
B	Extension length	E	Union nut	H	Connection head, type B
C	Welded	F	Process connection	I	Pg 16

Also available with:

Figure 2: Type BM

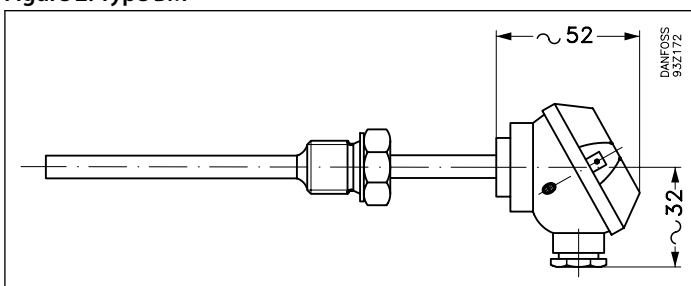


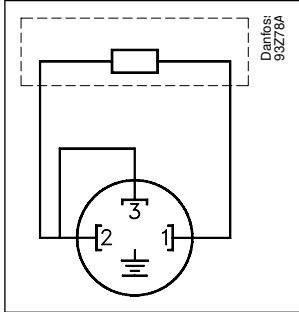
Table 16: Connection

Process connection	G ½ A, ½–14 NPT	G ¾ A
Width across flats	HEX 27	HEX 32

Electrical connection

MBT 5250, MBT 5260

Figure 3: Electrical connection



2-wire, 3 terminals
(Ground not connected)

MBT 5252

Table 17: Electrical connection

With temperature transmitter			Without temperature transmitter 1 x Pt100			Without temperature transmitter 2 x Pt100		
	B	1xTC 1xPt		C	1xPt		C	2xPt
	C			D			F	
	D			E			G	
	E			F				
	F			G				
	G							
Danfoss 84217			Danfoss 84216			Danfoss 84214		

A	Jumper	D	4-Wire
B	Termocuple	E	3-Wire
C	2-Wire 3-Terminals Jumper connected	F	2-Wire
		G	Connection

Ordering

MBT 5250

Figure 4: Ordering for MBT 5250

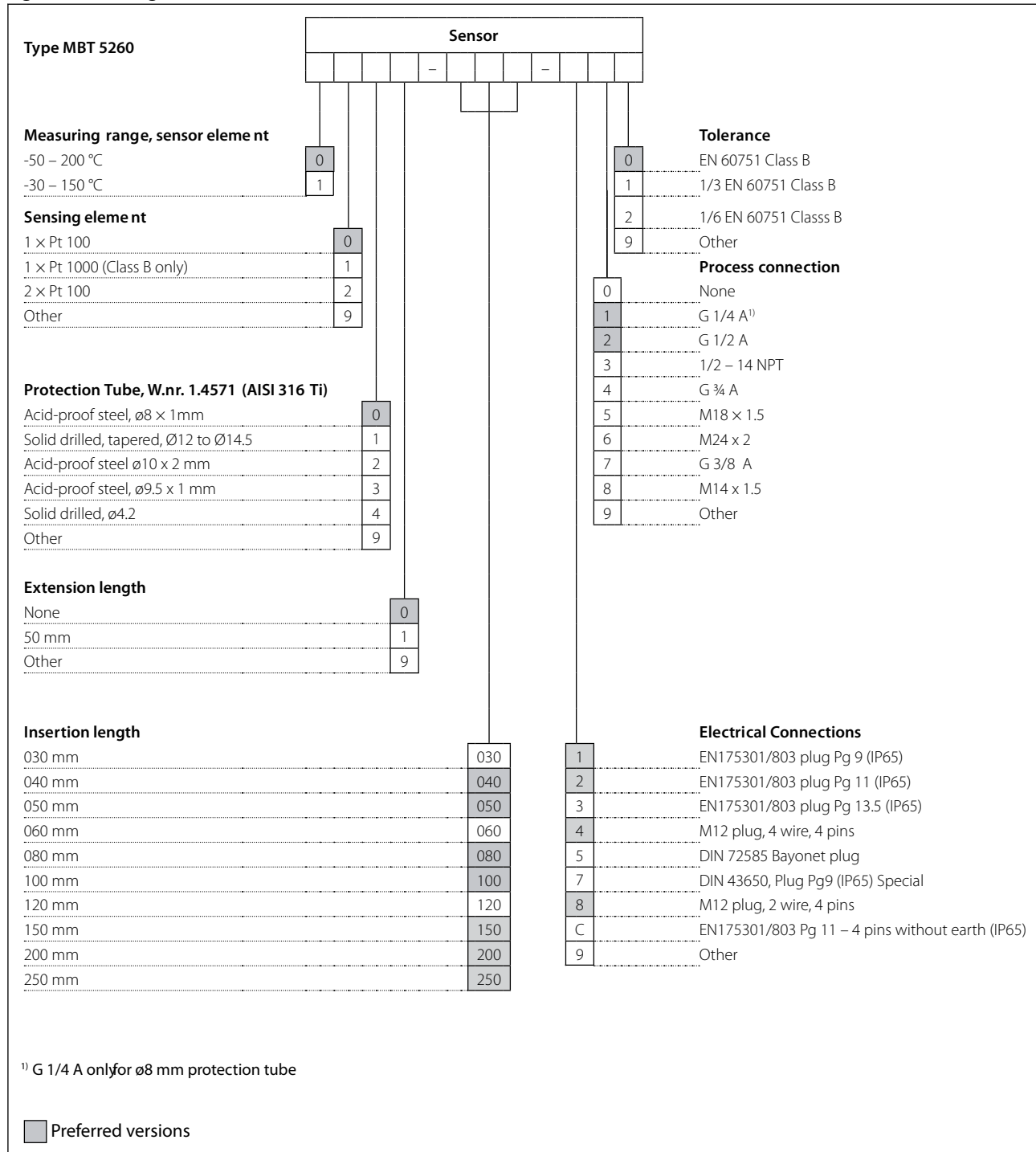
Type MBT 5250		Sensor	
Measuring range, sensor element		Tolerance	
-50 – 200 °C	0	0	EN 60751 Class B
		1	1/3 EN 60751 Class B
		2	1/6 EN 60751 Class B
		3	EN 60751 Class A
		4	B-value (25°/85° C): 3540 ± 1%
Sensing element		Process connection	
1 × Pt 100	0	0	None
1 × Pt 1000 (Class B only)	1	1	G 1/4 A ¹⁾
2 × Pt 100	2	2	G 1/2 A
2 × Pt 1000 (Class B only)	3	3	1/2 – 14 NPT
1 × NTC 2055 ± 1% Ohm	4	4	G 3/4 A
Protection Tube, W.nr. 1.4571 (AISI 316 Ti)		5	M18 × 1.5
Acid-proof steel, ø8 × 1 mm	0	6	M24 × 2
Solid drilled, tapered, ø12 to ø14.5	1	7	G 3/8 A
Acid-proof steel, ø10 × 2 mm	2	8	M33 × 2
Acid-proof steel, ø10 × 2 mm	3	9	1/4 – 18 NPT
Extension length		A	M22 × 1.5
None	0	B	M16 × 1.5
50 mm	1	C	M14 × 1.5
Insertion length		D	Adjustable fitting, Brass G 1/4 A ¹⁾
050 mm	050	E	3/4 – 16 UNF
060 mm	060	F	1/4 – 18 NPT
080 mm	080	G	M20 × 1.5
100 mm	100	Electrical Connections	
120 mm	120	0	EN 175301/803 excl. female plug
150 mm	150	1	EN 175301/803 Plug Pg 9 (IP65)
200 mm	200	2	EN 175301/803 Plug Pg 11 (IP65)
250 mm	250	3	EN 175301/803 Plug Pg 13.5 (IP65)
		4	APD plug ISO 15170-1
		5	DIN 0627, M12
		6	EN 175301/803 Plug Pg 11 (IP65) with finger screw
		7	EN 175301/803 Plug Pg 9 (IP65) special
		8	ITT Cannon 4 pins Au
		9	Other
		A	EN 175301/803 GL plug Pg 13.5 (IP65) Sn pins
		B	EN 175301/803 plug Pg 9, 4 pins without earth (IP65)
		C	EN 175301/803 plug Pg 11, 4 pins without earth (IP65)
		D	Hunnel HSK-M/Pg 9 (IP68) Metal
		E	EN 175301/803 plug M16 (IP 65)

¹⁾ Only ø8 x 1 mm tube

Preferred versions

MBT 5260

Figure 5: Ordering for MBT 5260



MBT 5252

Figure 6: Ordering for MBT 5252

Type MBT 5252	Sensor					Transmitter			
	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8	Digit 9
Measuring range, sensor element	0								
-50 – 200 °C	0								
-50 – 400 °C	1								
Sensing element									
1 × Pt 100		0							
2 × Pt 100 (-50 – 200 °C)		1							
1 × Pt 1000		2							
2 × Pt 1000 (-50 – 200 °C)		3							
Other		9							
Protection Tube, W.nr. 1.4571 (AISI 316 Ti)									
Acid-proof steel, ø8 mm (-50 – 200 °C)									
Acid-proof steel, ø10 mm (-50 – 200 °C)									
Acid-proof steel, ø11 mm (-50 – 400 °C)									
Other									
Extension length									
None									
50 mm									
100 mm									
Other									
Insertion length									
50 mm					0050				
100 mm					0100				
150 mm					0150				
200 mm					0200				
250 mm					0250				
300 mm					0300				
400 mm					0400				
500 mm					0500				
xx0 mm					xxx0				
Connection head									
B (IP65)					0				
B-mini (IP65) (only up to 4 terminals) (transmitter not possible)					1				
Other					9				
Process connection									
G ¼ A (only ø8 mm protection tube)					0	0			
G 3/8 A					1	3			
G ½ A					2	9			
G ¾ A					3				
½ -14 NPT					7				
Other					9				

Transmitter setting, end of range

0	0
1	1
2	2
3	3
9	4
	5
	6
	7
	8
9	9

0 °C (or none)

Temperature range 220 °C = 22
 Temperature range 150 °C = 15
 1. digit defines 100's
 2. digit defines 10's

Other

Transmitter setting, start of range

0
1
4
9

None
 0 °C
 -50 °C
 Other

Transmitter type As terminal block

0
G
L
A
J
B
9

None
 Standard
 Standard EEx ia IIC T4/T6
In heightened lid
 Standard
 Standard EEx ia IIC T4/T6
 Galvanically isolated
 Other

Connection

0
1
2

2-wire, 3 terminals
 4-wire, also to be used for 3 wire
 2 wire, 2 terminals

Tolerance

0
1
2
3
7
9

EN 60751 Class B
 EN 60751 Class A
 Other

■ Preferred versions

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

MBT 5250

Table 18: MBT 5250

File name	Document type	Document topic	Approval authority
DLN 34014-AE002	Marine - Safety Certificate	–	KR
TA18505M	Marine - Safety Certificate	–	NKK
06839-E0 BV	Marine - Safety Certificate	–	BV
17-LD1597279-PDA	Marine - Safety Certificate	–	ABS
TAA000006F Rev. 2	Marine - Safety Certificate	–	DNV GL
ELE-061415XG	Marine - Safety Certificate	–	RINA
GB19PTB00025	Marine - Safety Certificate	–	CCS
14-20066 (E1)	Marine - Safety Certificate	–	LR
DK.C.32.004.A 41461	Measuring - Performance Certificate	–	GOST
097R0004.01	Manufacturers Declaration	RoHS	Danfoss
084R1022.01	Manufacturers Declaration	China RoHS	Danfoss
SMS.W.II-2179-B.0	Marine - Manufacturing Permission	–	BV
12CA69359	Explosive - Safety Certificate	ATEX	DEMKO
087R0017.00	Manufacturers Declaration	Simple apparatus	Danfoss
OC.C.32.004.A 75977	Measuring - Performance Certificate	–	GOST

MBT 5260

Table 19: MBT 5260

File name	Document type	Document topic	Approval authority
DLN 34014-AE002	Marine - Safety Certificate	–	KR
ELE-061415XG	Marine - Safety Certificate	–	RINA
17-LD1597279-PDA	Marine - Safety Certificate	–	ABS
06839-E0 BV	Marine - Safety Certificate	–	BV
TAA000006F Rev. 2	Marine - Safety Certificate	–	DNV GL
TA18505M	Marine - Safety Certificate	–	NKK
14-20066 (E1)	Marine - Safety Certificate	–	LR
DK.C.32.004.A 41461	Measuring - Performance Certificate	–	GOST
097R0004.01	Manufacturers Declaration	RoHS	Danfoss
084R1022.01	Manufacturers Declaration	China RoHS	Danfoss
TAA000012M	Marine - Safety Certificate	–	DNV GL
SMS.W.II-2179-B.0	Marine - Manufacturing Permission	–	BV
12CA69359	Explosive - Safety Certificate	ATEX	DEMKO
087R0017.00	Manufacturers Declaration	Simple apparatus	Danfoss
OC.C.32.004.A 75977	Measuring - Performance Certificate	–	GOST

MBT 5252

Table 20: MBT 5252

File name	Document type	Document topic	Approval authority
GB19PTB00025	Marine - Safety Certificate	–	CCS
DLN 34014-AE002	Marine - Safety Certificate	–	KR
ELE-061415XG	Marine - Safety Certificate	–	RINA
17-LD1597279-PDA	Marine - Safety Certificate	–	ABS
06839-E0 BV	Marine - Safety Certificate	–	BV
TAA000006F Rev. 2	Marine - Safety Certificate	–	DNV GL
TA18505M	Marine - Safety Certificate	–	NKK

Temperature sensor, Types MBT 5250, MBT 5260 and MBT 5252

File name	Document type	Document topic	Approval authority
14-20066 (E1)	Marine - Safety Certificate	–	LR
084R1019.01	EU Declaration	EMCD/ROHS	Danfoss
DK.C.32.004.A 41460	Measuring - Performance Certificate	–	GOST
DK.C.32.004.A 41461	Measuring - Performance Certificate	–	GOST
RU Д-ДК.АЛ87.В.00022_19	EAC Declaration	EMC	EAC
084R1022.01	Manufacturers Declaration	China RoHS	Danfoss
097R0004.01	Manufacturers Declaration	RoHS	Danfoss
SMS.W.II-2179-B.0	Marine - Manufacturing Permission	–	BV
12CA69359	Explosive - Safety Certificate	ATEX	DEMKO
087R0017.00	Manufacturers Declaration	Simple apparatus	Danfoss
OC.C.32.004.A 75977	Measuring - Performance Certificate	–	GOST

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