

Technical brochure

Exhaust gas temperature sensors type MBT 5113 and MBT 5116



Heavy-duty sensors used for measuring regulating exhaust gas from diesel engines, turbines and compressors within stationary and marine applications.

MBT 5113 – based on thermocouple technology for media temperatures up to 800° C.

MBT 5116 – based on a Pt 100 element technology for standardised signals, high accuracy and media temperature up to 600° C.

Features

MBT 5113

- Up to 800° C media temperatures
- Available with built-in transmitter
- Available with Eex ia IIC T4/T6 approval
- Changeable insert

MBT 5116

- Up to 600° C media temperatures
- 2- or 3 wire connections
- Solid drilled protection tube for high resistance to shock and vibrations
- Available in 2 versions:
- Slim-line for compact installations
- B-head for standard installations

Approvals

Certified by all major international marine approval authorities:

- Lloyds Register of Shipping, LR
- Germanischer Lloyd, GL (MBT 5116 Slim-line)
- Registro Italiano Navare, RINA
- American Bureau of Shipping, ABS
- Bureau Veritas, BV
- Det Norske Veritas, DNV
- Nippon Kaiji Kyokai, Class NK
- China Classification Society, CCS
- Korean Register of Shipping, KR

**Technical data
MBT 5113**

Response times

	Indicative response times VDI/VDE 3522			
	Water 0.2 m/s		Air 1 m/s	
24 14	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$
	30 s.	95 s.	150 s.	450 s.

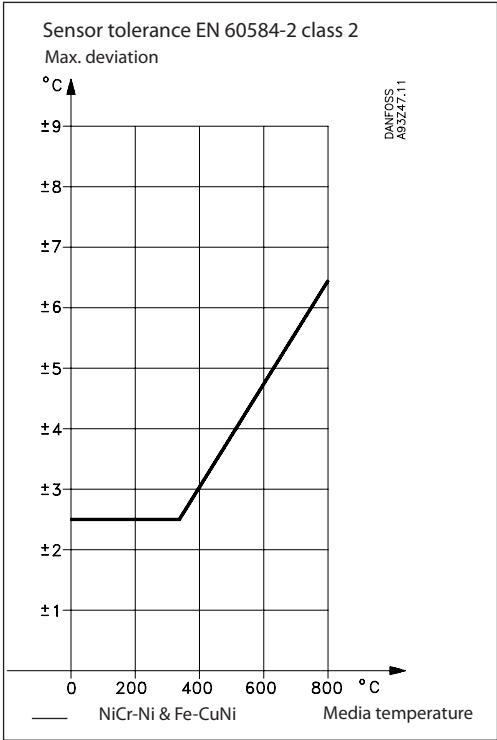
Mechanical and environmental specifications

Max. temperature 1)	Ambient:	90°C for sensors without temperature transmitter
	Transmitter:	85°C for sensors with temperature transm. galvanic isolation
Vibration stability	Shock:	100 g in 6 ms
	Vibrations:	4g sine function 2-100 Hz, measured according to IEC 68-2-6
Enclosure	IP 65 according to IEC 529	
Cable entry	PG 16	

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

Recommendations

- In order to reduce the heat at the temperature transmitter the recommended extension length for sensors with temperature transmitter type MBT 9110 is 100 mm
- Thermocouple 1 x NiCr-Ni, type K are recommended as standard for sensors with temperature transmitters



**Ordering - Standard
MBT 5113 B-Head**

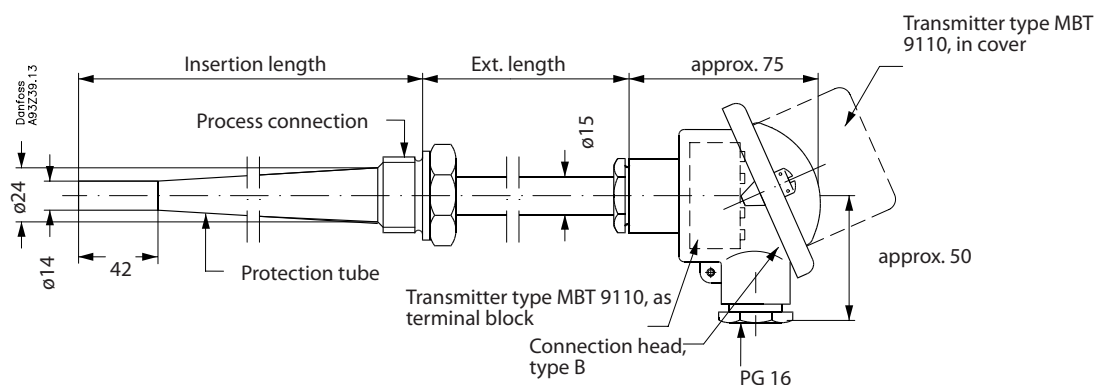
Measuring range:	-50 to +800°C
Thermocouple:	1 × NiCr-Ni, type K
Tolerance:	EN 60584-2 class 2
Extension length:	50 mm
Protection tube:	Tapered $\varnothing 24 \rightarrow \varnothing 14$, AISI 316
Electrical connection:	Pg 16 (IP 65)

Insertion length [mm]	Process connection G3/4"
100	084Z5052
150	084Z5274
200	084Z5248
250	084Z5275
300	084Z7014

**Ordering - Standard
MBT5113 B-Head
with built-in transmitter**

Measuring range:	-50 to +800°C
Thermocouple:	1 × NiCr-Ni, type K
Tolerance:	EN 60584-2 class 2
Extension length:	100 mm
Protection tube:	Tapered $\varnothing 24 \rightarrow \varnothing 14$, AISI 316
Electrical connection:	Pg 16 (IP 65)
Transmitter type:	MBT9110 as terminal block
Transmitter output:	4-20 mA
Transmitter setting:	0 to 600°C

Insertion length [mm]	Process connection G3/4"
100	084Z5276
150	084Z5257
200	084Z5277
250	084Z5278

**Dimensions
MBT 5113**


All dimensions in millimeter

Weight 1) [kg]

Insertion length [mm]	Process connection	
	G1/2"	G3/4"
80	0.48	
100	0.52	0.60
120	0.56	0.64
150	0.60	0.70
170		0.72
200		0.76
250		0.85
300		1.04

1) MBT 9110 transmitter increases the weight by approx. 50 g (as terminal box) or approx. 80 g (in tightened lid)

Technical data
MBT 5116

Response time

Protection tube	Indicative response times according to VDI/VDE 3522			
	Water 0.2 m/s		Air 1 m/s	
	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$
Ø24 → Ø14	30 s.	95 s.	150 s.	450 s.

Material

Slim-Line	Housing	Nickel plated brass
	Union	Nickel plated brass
	Cover	Nickel plated brass
	Spring (internal mounted)	W.no. 1.4568
	Extension length	AISI 316
	Protection tube in contact with media	AISI 316
B-Head	Union	Nickel plated brass
	Connection head	Die cast aluminium
	Extension length	AISI 316
	Protection tube in contact with media	AISI 316

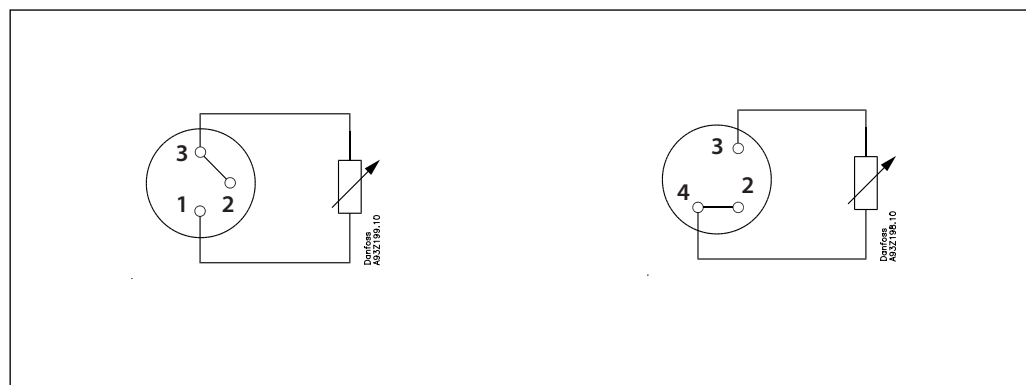
Mechanical and environmental specifications

Max. ambient temperature: Slim-Line: B-Head:	75°C with 600°C media temperature 90°C with 600°C media temperature
Sensor tolerance	EN 60751 Class B: $\pm(0.3 + 0.005xt)$ t = temperature of medium, numerical value
Insulation resistance	Minimum 0.5 M Ohm at 600°C according to EN60751
Vibration stability	Shock: 100g in 6 ms Vibrations: 4g sine function, 2–200Hz, measured according to IEC 68-2-6
Enclosure	IP65 according to IEC 529
Cable entry: Slim-Line B-Head	PG13,5 PG16

Electrical connection

Slim-line, 2 wires, 3 terminals

B-Head, 2 wires, 3 terminals



**Ordering MBT5116
Slim-Line**

Measuring range:	-50 to +600°C
Resistance value:	Pt100
Tolerance:	EN 60751 class B
Extension length:	50mm
Electrical connection:	Pg13.5 (IP65)

Insertion length [mm]	MBT 5116 Slim-Line		MBT 156
	Process connection		Insertion element
	G1/2"	G3/4"	
80	084Z8157¹⁾		084Z4320
100	084Z8158¹⁾	084Z8150¹⁾	084Z4321
120	084Z8159	084Z8151	084Z4323
150	084Z8186¹⁾	084Z8152¹⁾	084Z4324
170		084Z8153	084Z4325
200		084Z8154¹⁾	084Z4326
250		084Z8155	084Z4327
300		084Z8156	084Z4328

¹⁾ Preferred versions
Other specifications on request

**Ordering MBT 5116
B-Head**

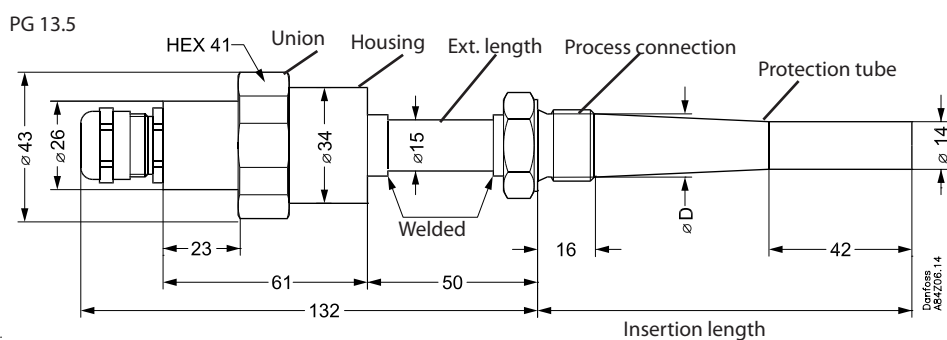
Measuring range:	-50 to +600°C
Resistance value:	Pt100
Tolerance:	EN 60751 class B
Extension length:	50mm
Electrical connection:	Pg16 (IP65)

Insertion length [mm]	MBT 5116 B-Head		MBT 156
	Process connection		Insertion element
	G1/2"	G3/4"	
80	084Z5156¹⁾		
100	084Z5157¹⁾	084Z5160¹⁾	084Z4330
120		084Z5048	
150	084Z5159¹⁾	084Z5024¹⁾	084Z4332
200		084Z5025¹⁾	
250		084Z5034	084Z4335
300		084Z5026	084Z4336

¹⁾ Preferred versions
Other specifications on request

Dimensions

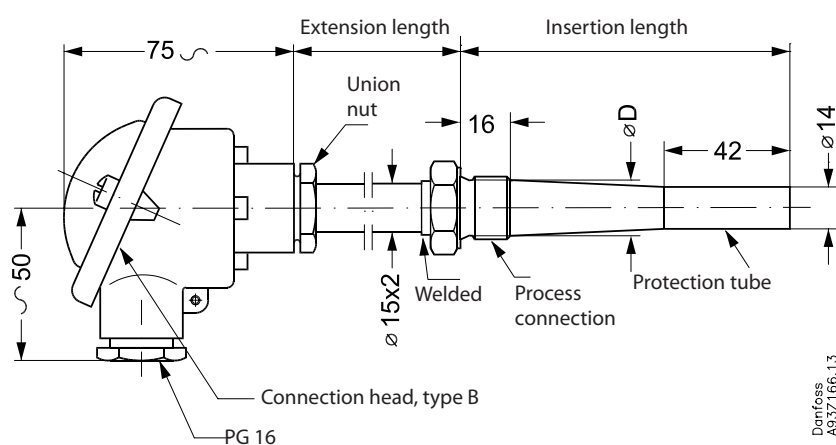
MBT 5116 Slim-line



Process connection		$\varnothing D$
G $\frac{1}{2}$ " A	HEX 27	18 mm
G $\frac{3}{4}$ " A	HEX 32	24 mm

Note: Tightening torque moment for the union max.: 25 Nm

MBT 5116 B-head



Process connection		D
G $\frac{1}{2}$ " A	HEX 27	18 mm
G $\frac{3}{4}$ " A	HEX 32	24 mm

Weight [kg]

Insertion length (mm)	Process connection			
	Slim-line		B-head	
	G1/2"	G3/4"	G1/2"	G3/4"
80	0.43		0.48	
100	0.46	0.52	0.52	0.60
120	0.48	0.57	0.56	0.64
150	0.52	0.64	0.60	0.70
200		0.76		0.76
250		0.89		0.85
300		0.99		1.04