

Data Sheet

Temperature sensor
Type **MBT 5113** and **MBT 5116**

2 stroke exhaust gas temperature sensors



Heavy-duty sensors used for measuring 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 / Pt 1000 element technology for standardised signals, high accuracy and media temperature up to 600 °C.

Features:

- MBT 5113
 - Up to 800 °C media temperatures
 - B-head for standard installations
 - Changeable inserts
 - Solid drilled protection tube for high resistance to shock and vibrations
 - 1 or 2 x NiCr-Ni, type K
- 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
 - Changeable insert
 - 1 or 2 x Pt 100 / Pt 1000

Product specification

Technical data

MBT 5113

Table 1: General data

| Features | Specifications |
|-----------------|--|
| Measuring range | -50 – 800 °C |
| Sensing element | 1 x NiCr-Ni, type K or 2 x NiCr-Ni, type K |
| Protection tube | ø24 / ø14, AISI 316 Ti |

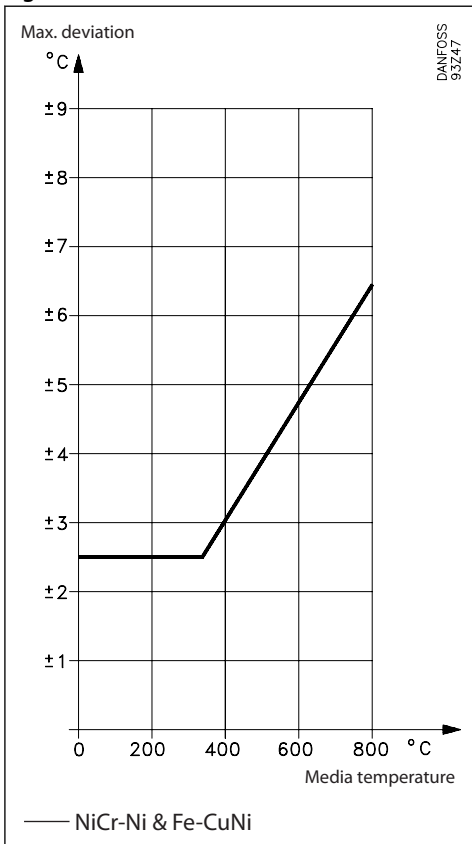
Table 2: Response times

| Protection tube | Indicative response times | | | |
|-----------------|---------------------------|-----------|-----------|-----------|
| | Water 0.2 m/s | | Air 1 m/s | |
| ø24 / ø14 | $t_{0.5}$ | $t_{0.9}$ | $t_{0.5}$ | $t_{0.9}$ |
| | 30 s | 95 s | 200 s | 700 s |

Table 3: Mechanical and environmental specifications

| Features | Specifications |
|---------------------|---|
| Max. temperature | Ambient: 90 °C with 800 °C media temperature 85 °C with transmitter |
| Vibration stability | Shock: 100 g/6 ms Vibrations: 4 g sine function, 2 – 100 Hz, measured according to IEC 60068-2-6 |
| Enclosure | IP65 according to IEC 60529 |
| Cable entry | Pg 16 |

Figure 1: Sensor tolerance EN 60584-2 class 2



MBT 5116

Table 4: General data

| Features | Specifications |
|-----------------|----------------------------------|
| Measuring range | -50 – 600 °C |
| Sensing element | 1 or 2 x Pt 100/1 or 2 x Pt 1000 |
| Protection tube | ø24 / ø14, AISI 316 |

Table 5: Response times

| Protection tube | Indicative response times | | | |
|-----------------|---------------------------|-----------|-----------|-----------|
| | Water 0.2 m/s | | Air 1 m/s | |
| ø24 / ø14 | $t_{0.5}$ | $t_{0.9}$ | $t_{0.5}$ | $t_{0.9}$ |
| | 30 s | 95 s | 150 s | 450 s |

Table 6: Mechanical and environmental specifications

| Features | Specifications | |
|--------------------------|--|---|
| Max. ambient temperature | Slim-Line: | 75 °C with 600 °C media temperature |
| | B-Head: | 90 °C with 600 °C media temperature |
| Sensor tolerance | EN 60751 Class B: $\pm(0.3 + 0.005 \times t)$ t = temperature of medium, numerical value | |
| Insulation resistance | Minimum 0.5 M Ohm at 600 °C according to EN60751 | |
| Vibration stability | Shock: | 100 g/6 ms |
| | Vibrations: | 4 g sine function, 2 – 200Hz, measured according to IEC 60068-2-6 |
| Enclosure | IP65 according to IEC 60529 | |
| Cable entry | Slim-Line | Pg 13.5 |
| | B-Head | Pg 16 |

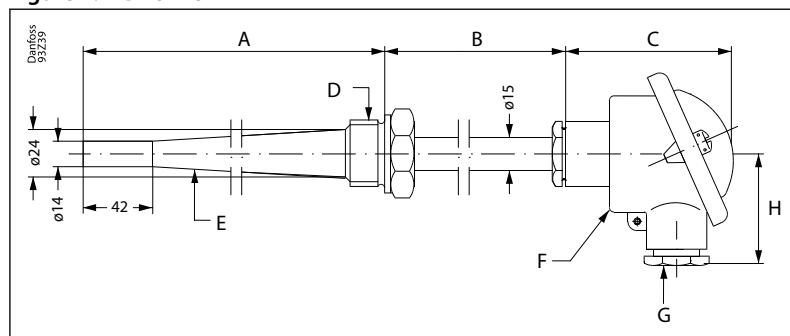
Table 7: Material

| Type | Feature | 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 |

Dimensions

MBT 5113

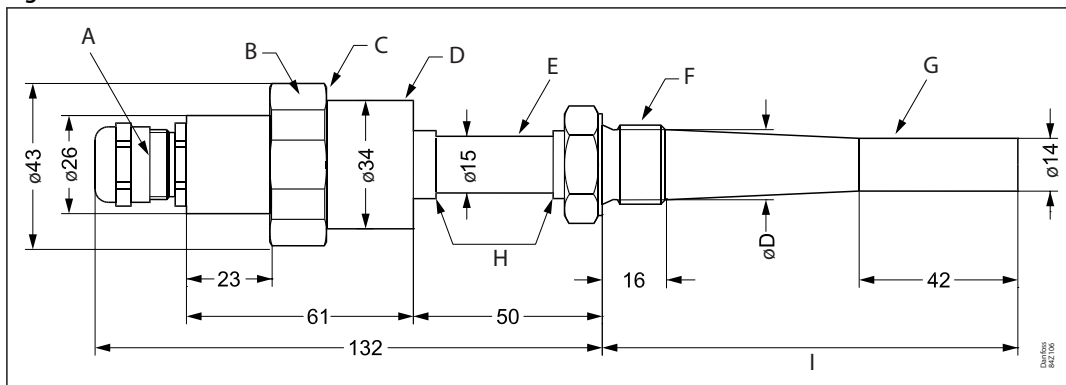
Figure 2: MBT 5113



| | | | | | |
|----------|------------------|----------|-------------------------|----------|------------|
| A | Insertion length | D | Process connection | G | Pg 16 |
| B | Extension length | E | Protection tube | H | Approx. 50 |
| C | Approx. 75 | F | Connection head, type B | | |

MBT 5116

Figure 3: MBT 5116 Slim-line



| | | | | | |
|----------|---------|----------|--------------------|----------|------------------|
| A | Pg 13.5 | D | Housing | G | Protection tube |
| B | HEX 41 | E | Ext. length | H | Welded |
| C | Union | F | Process connection | I | Insertion length |

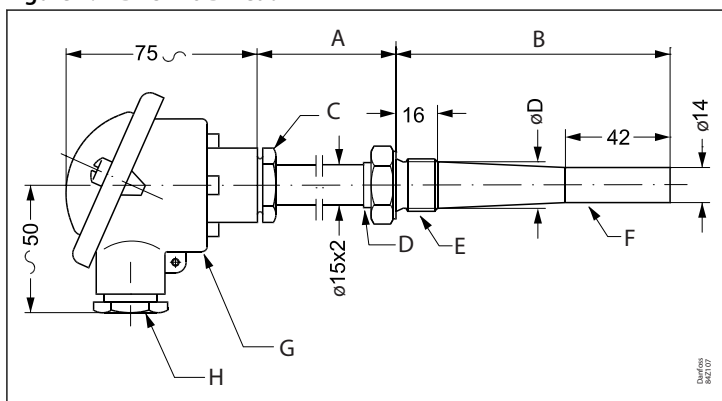
Table 8: Connection

| Process connection | G ½ A | G ¾ A |
|--------------------|--------|--------|
| Width across flats | HEX 27 | HEX 32 |
| øD | 18 mm | 24 mm |

NOTE:

Tightening torque moment for the union max. 25 Nm

Figure 4: MBT 5116 B-head



| | | | | | |
|----------|------------------|----------|--------------------|----------|-------------------------|
| A | Extension length | D | Welded | G | Connection head, type B |
| B | Insertion length | E | Process connection | H | Pg 16 |
| C | Union nut | F | Protection tube | | |

Table 9: Connection

| Process connection | G ½ A | G ¾ A |
|--------------------|--------|--------|
| Width across flats | HEX 27 | HEX 32 |
| øD | 18 mm | 24 mm |

Net weight (kg)

MBT 5113

Table 10: Net weight - MBT 5113

| Insertion length [mm] | Process connection | |
|-----------------------|--------------------|--------|
| | G 1/2" | G 3/4" |
| 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 |

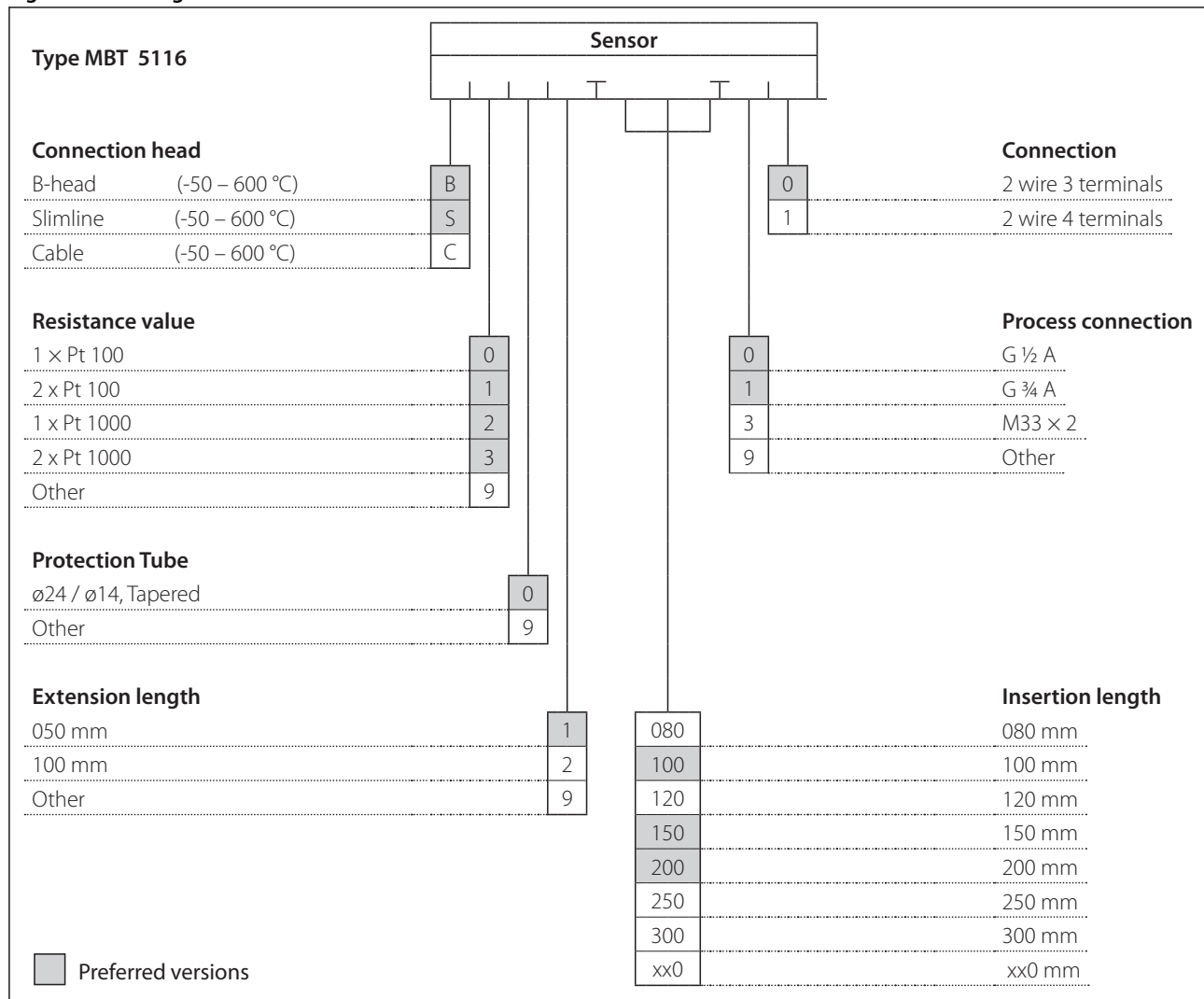
MBT 5116

Table 11: Net weight - MBT 5116

| Insertion length [mm] | Process connection | | | |
|-----------------------|--------------------|--------|--------|--------|
| | Slim-line | | B-head | |
| | G 1/2" | G 3/4" | G 1/2" | G 3/4" |
| 80 | 0.43 | – | 0.48 | – |
| 100 | 0.46 | 0.52 | 0.52 | 0.6 |
| 120 | 0.48 | 0.57 | 0.56 | 0.64 |
| 150 | 0.52 | 0.64 | 0.6 | 0.7 |
| 200 | – | 0.76 | – | 0.76 |
| 250 | – | 0.89 | – | 0.85 |
| 300 | – | 0.99 | – | 1.04 |

MBT 5116

Figure 6: Ordering for MBT 5116



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.

Table 12: MBT 5113

| File name | Document type | Document topic | Approval authority |
|-------------------------|-------------------------------------|------------------|--------------------|
| CPH 04967-AE009 | Marine - Safety Certificate | - | KR |
| ELE064120XP-001 | Marine - Safety Certificate | - | RINA |
| 16-LD1487293-PDA | Marine - Safety Certificate | - | ABS |
| 06510-E0 BV | Marine - Safety Certificate | - | BV |
| GB19PTB00025 | Marine - Safety Certificate | - | CCS |
| TAA0000130 Rev. 1 | Marine - Safety Certificate | - | DNV GL |
| TA19235M | Marine - Safety Certificate | - | NKK |
| 17-20082(E1) | Marine - Safety Certificate | - | LR |
| 084R1019.01 | EU Declaration | EMCD/ROHS | Danfoss |
| RU Д-DK.AJ87.B.00022_19 | EAC Declaration | EMC | EAC |
| OC.C.32.004.A 41459 | Measuring - Performance Certificate | - | GOST |
| OC.C.32.004.A 41460 | Measuring - Performance Certificate | - | GOST |
| 084R1021.00 | 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 |

Table 13: MBT 5116

| File name | Document type | Document topic | Approval authority |
|---------------------|-------------------------------------|------------------|--------------------|
| 17-20082(E1) | Marine - Safety Certificate | - | LR |
| GB19PTB00025 | Marine - Safety Certificate | - | CCS |
| 06509-F0 BV | Marine - Safety Certificate | - | BV |
| TAA0000065 Rev. 1 | Marine - Safety Certificate | - | DNV GL |
| CPH 04967-AE009 | Marine - Safety Certificate | - | KR |
| ELE064120XP-001 | Marine - Safety Certificate | - | RINA |
| 16-LD1487293-PDA | Marine - Safety Certificate | - | ABS |
| TA19235M | Marine - Safety Certificate | - | NKK |
| 084R1019.01 | EU Declaration | EMCD/ROHS | Danfoss |
| OC.C.32.004.A 41460 | Measuring - Performance Certificate | - | GOST |
| OC.C.32.004.A 41461 | Measuring - Performance Certificate | - | GOST |
| 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 |

Table 14: MBT 5116 - Slim-line

| File name | Document type | Document topic | Approval authority |
|-------------------|-----------------------------------|----------------|--------------------|
| CPH 04967-AE009 | Marine - Safety Certificate | - | KR |
| ELE064120XP-001 | Marine - Safety Certificate | - | RINA |
| 06509-F0 BV | Marine - Safety Certificate | - | BV |
| GB19PTB00025 | Marine - Safety Certificate | - | CCS |
| 17-20082(E1) | Marine - Safety Certificate | - | LR |
| TA19235M | Marine - Safety Certificate | - | NKK |
| SMS.W.II-2179-B.0 | Marine - Manufacturing Permission | - | BV |

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