

Data Sheet

Pressure transmitter Type **MBS 9300**

For marine applications



Compact pressure transmitter programme, MBS 9300 gauge version is designed for use in marine applications e.g. crankcase and turbocharger filters monitoring as well as applications within level measurement.

The programme covers 4 – 20 mA and ratiometric 10-90% of supply output signals, pressure span from 40 – 400 mbar as well as bidirectional ranges.

Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

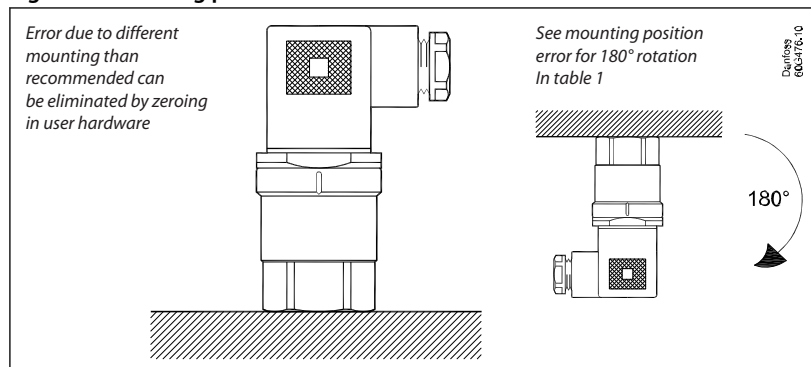
Features

- Compact design
- Full scale span from 40 – 400 mbar
 - bidirectional ranges available, e.g. -40 – 70 mbar etc.
 - lowest zero point –150 mbar
 - max full scale 250 mbar
- Digital temperature compensated
- Output signals 4-20 mA and Ratiometric 10-90% of supply
- Excellent shock and vibration robustness
- Reverse polarity protection
- With build-in clipping function and self-diagnostic features on request
- Enclosure and wetted parts of stainless steel (AISI 316L)
- EU RO Mutual Recognition
- Customer specific versions on request
- For use in Zone 2 explosive atmosphere

Applications

Recommended mounting position

Figure 1: Mounting position



Product specification

Technical specifications

Table 1: Performance (EN 60770)

| Description | Value range | | | | | Units |
|--|-------------|---------|---------|----------|---------|--------------------------------------|
| Full-scale span (FSS) Full-Scale Span (FSS) is the difference between the upper limit and the lower limit of the pressure range. (e.g. for pressure range -30 – 30 mbar, FSS = 60 mbar.) | 40 | 60 | 100/140 | 150 | 250/400 | mbar |
| Accuracy @ 25 °C (incl. non-linearity, hysteresis and repeatability) | ≤ ± 2 | ≤ ± 1.5 | ≤ ± 1 | ≤ ± 0.5 | ≤ ± 0.5 | % FSS typ. |
| Non-linearity (BFSL) | ≤ ± 0.2 | ≤ ± 0.2 | ≤ ± 0.2 | ≤ ± 0.2 | ≤ ± 0.2 | % FSS |
| Hysteresis and repeatability | ≤ ± 0.1 | ≤ ± 0.1 | ≤ ± 0.1 | ≤ ± 0.1 | ≤ ± 0.1 | % FSS |
| Total error band (TEB) within compensated temperature range | ≤ ± 5 | ≤ ± 3 | ≤ ± 2 | ≤ ± 1.5 | ≤ ± 1.5 | % FSS |
| Mounting position error for 180° rotation | ≤ ± 1.25 | ≤ ± 0.8 | ≤ ± 0.5 | ≤ ± 0.35 | ≤ ± 0.2 | % FSS |
| Overload pressure (static) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | bar |
| Burst pressure | 50 | 50 | 50 | 50 | 50 | bar |
| Response time | | | | | | < 2 ms |
| Resolution | | | | | | Infinite |
| Durability P: 10 – 90% FS | | | | | | 10 × 10 ⁶ pressure cycles |

Table 2: Electrical specifications

| | | |
|--|--|---------------------------|
| Nom. output signal (short circuit protected) | 4 – 20 mA | Ratiometric 10-90% supply |
| Supply voltage [U _g], reverse polarity protected | 9 – 32 V DC | 5 V DC +/- 10% |
| Supply voltage dependency | < ± 0.05% FSS / 10 V | - |
| Load [R _L] (load connected to 0 V) | R _L ≤ (U _g - 8 V) / 0.02 A | R _L ≥ 1.5 kΩ |
| Supply current consumption | - | ≤ 6 mA |
| Sink / Source | - | 3.3 mA |
| Output impedance | - | ≤ 25 Ω |

Table 3: Environmental specifications

| | | |
|---------------------------------------|---|-----------------|
| Media temperature range | FPM gasket | -20 °C – 100 °C |
| | NBR gasket | -25 °C – 85 °C |
| Ambient temperature range | See Electrical connection | |
| Compensated temperature range | 0 °C – 80 °C | |
| Transport / storage temperature range | -40 °C – 125 °C | |
| EMC - Emission | EN 61000-6-3 and EN61236-1 | |
| EMC Immunity | EN 61000-6-2 and EN61236-1 | |

Pressure transmitter, type MBS 9300

| | | | |
|--|------------|---|---|
| Vibration stability | Sinusoidal | 15.9 mm-pp, 2 Hz – 25 Hz 20 g, 25 Hz – 2 kHz | IEC 60068-2-6 |
| | Random | 7.5 g _{rms} , 5 Hz – 1 kHz | IEC 60068-2-64 |
| Shock resistance | Shock | 500 g / 1 ms | IEC 60068-2-27 |
| | Free fall | 1 m | IEC 60068-2-32 |
| Enclosure (depending on electrical connection) | | | See Electrical connection |

Table 4: Explosive atmospheres

| | | |
|------------------------------------|--|-----------------------|
| Zone 2 applications ⁽¹⁾ | | EN60079-0; EN60079-15 |
|------------------------------------|--|-----------------------|

⁽¹⁾ When used in ATEX Zone 2 areas at low temperatures the cable and plug must be protected against impact.

Table 5: Mechanical specifications

| | |
|-------------------------|---|
| Net weight | 0.2 – 0.3 kg |
| Electrical connector | See Electrical connection |
| Pressure connection | See Electrical connection |
| Materials, wetted parts | EN 10088; 1.4404 (AISI 316 L) |

Dimensions / Combinations

Table 6: Connections dimensions / combinations

| Type code: Electrical connection | A1 | A6 | A9 |
|--|-----------------------|------------------------|--------------------------|
| | EN 175301-803-A, Pg 9 | EN 175301-803-A, Pg 11 | EN 175301-803-A, Pg 13.5 |
| | | | |
| | | | |
| | | | |
| Type code: Pressure connection | DIN 3852-E, M14x1.5 | DIN 3852-E, G½ | DIN 3852-E, G¼ |
| Recommended torque: | 20 – 25 Nm | | |

Electrical connection

Table 7: Electrical connection

| Type code | A0, A1, A6 and A9 EN 175301-803-A |
|--|--|
| | |
| Ambient temperature | -25 °C – 100 °C (ATEX zone 2 = -10 °C – 85 °C) |
| Enclosure | IP65 |
| Materials | Glass filled polyamid, PA 6.6 |
| Electrical connection 4-20 mA (2 wire) | Pin 1: + supply Pin 2: - supply Pin 3: Not used Earth: Connected to transmitter enclosure |
| Electrical connection Ratiometric 10-90% supply | Pin 1: + supply Pin 2: - common Pin 3: Output Earth: Connected to transmitter enclosure |

For proper ventilation of atmospheric reference pressure a vented cable is recommended.

Ordering

| | | | | | | | | | | | | | | | | | |
|--|--|------------------|-------------------------------------|--------------------------------|-------------------------------------|---------------|---|-------------|-------------------------------|-------------|-----|--------------|-----|--------------|-----|--------------|-----|
| Type 9300 | | | | | | | | | | | | | | | | | |
| Pressure range | <table border="1"> <tr><td>-20 – 20 mbar</td><td>A 1</td></tr> <tr><td>-30 – 30 mbar</td><td>A 2</td></tr> <tr><td>-70 – 70 mbar</td><td>A 3</td></tr> <tr><td>0 – 40 mbar</td><td>B 1</td></tr> <tr><td>0 – 60 mbar</td><td>B 2</td></tr> <tr><td>0 – 100 mbar</td><td>B 3</td></tr> <tr><td>0 – 150 mbar</td><td>B 4</td></tr> <tr><td>0 – 250 mbar</td><td>B 5</td></tr> </table> | -20 – 20 mbar | A 1 | -30 – 30 mbar | A 2 | -70 – 70 mbar | A 3 | 0 – 40 mbar | B 1 | 0 – 60 mbar | B 2 | 0 – 100 mbar | B 3 | 0 – 150 mbar | B 4 | 0 – 250 mbar | B 5 |
| -20 – 20 mbar | A 1 | | | | | | | | | | | | | | | | |
| -30 – 30 mbar | A 2 | | | | | | | | | | | | | | | | |
| -70 – 70 mbar | A 3 | | | | | | | | | | | | | | | | |
| 0 – 40 mbar | B 1 | | | | | | | | | | | | | | | | |
| 0 – 60 mbar | B 2 | | | | | | | | | | | | | | | | |
| 0 – 100 mbar | B 3 | | | | | | | | | | | | | | | | |
| 0 – 150 mbar | B 4 | | | | | | | | | | | | | | | | |
| 0 – 250 mbar | B 5 | | | | | | | | | | | | | | | | |
| Pressure reference | <table border="1"> <tr><td>Gauge (relative)</td><td>1</td></tr> </table> | Gauge (relative) | 1 | | | | | | | | | | | | | | |
| Gauge (relative) | 1 | | | | | | | | | | | | | | | | |
| Output signal | <table border="1"> <tr><td>4 - 20 mA</td><td>1</td></tr> <tr><td>Ratiometric 10 - 90% of supply</td><td>6</td></tr> </table> | 4 - 20 mA | 1 | Ratiometric 10 - 90% of supply | 6 | | | | | | | | | | | | |
| 4 - 20 mA | 1 | | | | | | | | | | | | | | | | |
| Ratiometric 10 - 90% of supply | 6 | | | | | | | | | | | | | | | | |
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| 2 | Gasket, NBR | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr><td>G B 0 8</td><td>DIN 3852-E-G1/2, gasket DIN 3869-21</td></tr> <tr><td>G B 0 4</td><td>DIN 3852-E-G1/4, gasket DIN 3869-14</td></tr> <tr><td>F A 0 9</td><td>DIN 3852-E-M14 x1.5, gasket DIN 3869-14</td></tr> </table> | G B 0 8 | DIN 3852-E-G1/2, gasket DIN 3869-21 | G B 0 4 | DIN 3852-E-G1/4, gasket DIN 3869-14 | F A 0 9 | DIN 3852-E-M14 x1.5, gasket DIN 3869-14 | | | | | | | | | | |
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| A 9 | Plug Pg 13.5 (EN175301-803-A) | | | | | | | | | | | | | | | | |
| <p>Non-standard build-up codes on request. However, minimum order quantities may apply. Please contact your Danfoss officer for further information.</p> | | | | | | | | | | | | | | | | | |

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 8: Certificates and declarations

| File name | Document type | Document topic | Approval authority |
|--------------------|---|--------------------------|--------------------|
| 064G9615.06 | EU Declaration | ATEX/EMCD/RoHS | Danfoss |
| TAA00000W0 | Marine - Safety Certificate | - | DNV GL |
| ELE-311018XG | Marine - Safety Certificate | - | RINA |
| 08472-D0 BV | Marine - Safety Certificate | - | BV |
| 20-LD1952235-PDA | Marine - Safety Certificate | - | ABS |
| HTS-ETS 39049-19 | Marine - Safety Certificate | - | LR |
| CPH 04967-AE006 | Marine - Safety Certificate | - | KR |
| MRA000001Z | Marine - Safety Certificate | EU RO Mutual Recognition | DNV GL |
| E311982 | Electrical - Safety Certificate | - | UL |
| E227388 | Explosive - Safety Certificate | Hazardous Locations | UL |
| 064R9402.00 | Manufacturers Declaration | PED | Danfoss |
| 064R9401.00 | Manufacturers Declaration | China RoHS | Danfoss |
| SMS.W.II-2179-B.0 | Marine - Manufacturing Permission | - | BV |
| B-BK-60210-1170_19 | Food and Health - Performance Certificate | - | PZH |

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