ENGINEERING TOMORROW

Data Sheet

# Pressure transmitters Type **MBS 33**

For industrial applications


The standard pressure transmitters MBS 33 are designed for use in almost all industrial applications, and offer reliable pressure measurements, even under harsh environmental conditions.

The flexible pressure transmitter programme covers different output signals, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar and a wide range of pressure and electrical connections.

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**

- Designed for use in severe industrial environments
- CE-marked: EMC protected in accordance with EU EMC Directive
- Enclosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Fully digitally compensated
- Output signals:
  - 0 – 5 V, 1 – 5 V, 1 – 6 V or 0 – 10 V DC
  - 4 – 20 mA
- A wide range of pressure connections
- Electrical connection: plug or cable
- For use in ATEX Zone 2 explosive atmospheres
- UL approved

# Product specification

## Technical data

### Table 1: Performance (EN 60770)

| | | |
|---|---|---|
| Accuracy (incl. non-linearity, hysteresis and repeatability) | | ≤ ± 0.3% FS (typ.) |
| | | ≤ ± 0.8% FS (max.) |
| Non-linearity BFSL (conformity) | | ≤ ± 0.2% FS |
| Hysteresis and repeatability | | ≤ ± 0.1% FS |
| Thermal zero point shift | | ≤ ± 0.1% FS / 10K (typ.) |
| | | ≤ ± 0.2% FS / 10K (max.) |
| Thermal sensitivity (span) shift | | ≤ ± 0.1% FS / 10K (typ.) |
| | | ≤ ± 0.2% FS / 10K (max.) |
| Response time | Liquids with viscosity < 100 cSt | < 4 ms |
| Overload pressure (static) | | 6 × FS (max. 1500 bar) |
| Burst pressure | | 6 × FS (max. 2000 bar) |
| Power-up time | | < 50 ms |
| Durability, P: 10 – 90% FS | | > 10 × $10^6$ cycles |

### Table 2: Electrical specifications

| | | | |
|---|---|---|---|
| Nom. output signal (short-circuit protected) | 4 – 20 mA | 0 – 5 V, 1 – 5 V, 1– 6 V | 0 – 10 V |
| Supply voltage [$U_B$], polarity protected | 9 – 32 V DC | | 15 – 32 V DC |
| Supply – current consumption | - | ≤ 5 mA | ≤ 8 mA |
| Supply voltage dependency | < 0.1% FS / 10 V | < 0.05% FS / 10 V | |
| Output limitation | 22.4 mA (typ.) | 0-5 V: 5.75 V<br>1-5 V: 5.6 V<br>1-6 V: 6.75 V | 0-10 V: 11.5 V |
| Sink / Source | - | < 1 mA | |
| Load [$R_L$] (load connected to 0 V) | $R_L$ ≤ ($U_B$ - 9 V) / 0.02 A | $R_L$ ≥ 10 kΩ | $R_L$ ≥ 15 kΩ |

### Table 3: Environmental conditions

| | | | |
|---|---|---|---|
| Sensor operating temperature | | Normal | -40 – 85 °C |
| | | ATEX Zone 2 | -10 – 85 °C |
| Media temperature range | | | -40 – 85 °C |
| Ambient temperature range (depending on electrical connection) | | | See Electrical connections |
| Compensated temperature range | | | 0 – 80 °C |
| Transport / storage temperature range | | | -50 – 85 °C |
| EMC – Emission | | | EN 61000-6-3 |
| EMC – Immunity | | | EN 61000-6-2 |
| Insulation resistance | | | > 100 MΩ at 500 V DC |
| Mains frequency test | | | Based on SEN 361503 |
| Vibration stability | Sinusoidal | 15.9 mm-pp, 5 Hz – 25 Hz | IEC 60068-2-6 |
| | | 20 g, 25 Hz – 2 kHz | |
| | 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 connections |

### Table 4: Explosive atmospheres

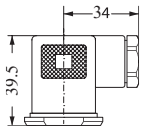
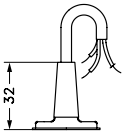
| | | |
|---|---|---|
| Zone 2 applications[1] | CE Ex II 3G<br>Ex ce IIA T3 Gc<br>-10°C<Ta<+85°C | EN60079-0; EN60079-7 |

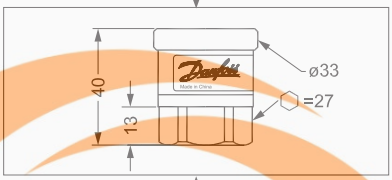
[1] When used in ATEX Zone 2 areas at low temperatures the cable and plug must be protected against impact.

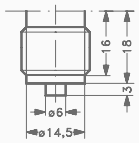
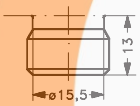
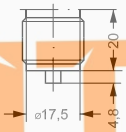
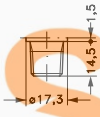
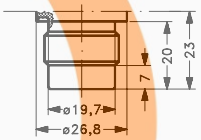
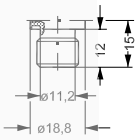
**Table 5: Mechanical characteristics**

| | | |
|---|---|---|
| Materials | Wetted parts | EN 10088-1; 1.4404 (AISI 316 L) |
| | Enclosure | EN 10088-1; 1.4404 (AISI 316 L) |
| | Electrical connections | See Electrical connections |
| Net weight (depending on pressure connection and electrical connection) | | 0.2 – 0.3 kg |

## Dimensions / Combinations

| Type code | A1 | A3 |
|---|---|---|
| | EN175301-803-A, Pg 9 | 2 m screened cable |
| |   |   |

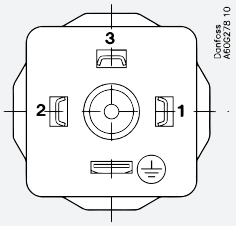
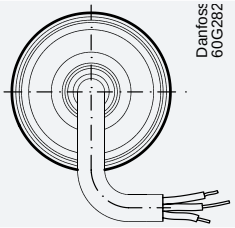



| | | | | | | |
|---|---|---|---|---|---|---|
| |   |   |   |   |   |   |
| | G ¼ A (EN 837) | M18 × 1.5 (DIN 3852/3) | G ½ A (EN 837) | ¼ –18 NPT | M22 ×1.5 (DIN 3852-E) | G ¼ (DIN 3852-E) |
| **Type code** | **AB04** | **AB12** | **AB08** | **AC04** | **BA16** | **GB04** |
| Recommended torque [1] | 30 – 35 Nm | 30 – 35 Nm | 30 – 35 Nm | 2 – 3 turns after finger tightened | 30 – 35 Nm | 30 – 35 Nm |

(1) Depends of different parameters as packing material, mating material, thread lubrication and pressure level.

## Electrical connections

**Table 6: Electrical connections**

| Type code | A1 | A3 |
|---|---|---|
| |   |   |
| | EN 175301-803-A, Pg 9 | 2 m screened cable |
| Ambient temperature | -40 – 85 °C | -30 – 85 °C |
| Enclosure (IP protection fulfilled together with mating connector) | IP65 | IP67 |

| Type code | A1 | A3 |
|---|---|---|
| Material | Glass filled polyamid, PA 6.6 | Polyolefin cable with PE shrinkage tubing |
| Electrical connection, 4 – 20 mA output (2 wire) | Pin1: + supply<br>Pin 2: ÷ supply<br>Pin 3: not used<br>⏚<br>Earth: Connected to MBS enclosure | Brown wire: + supply<br>Black wire: ÷ supply<br>Red wire: not used<br>Orange: not used<br>Screen: not connected to MBS enclosure |
| Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V output | Pin1: + supply<br>Pin 2: ÷ supply[1]<br>Pin 3: + output<br>⏚<br>Earth: Connected to MBS enclosure | Brown wire: + output<br>Black wire: ÷ supply[1]<br>Red wire: + supply<br>Orange: not used<br>Screen: not connected to MBS enclosure |

[1] Common

# Ordering

## Ordering standard

MBS 33 – –

**Gasket / O-ring material**

| | |
|---|---|
| 0 | No gasket |
| 2 | Gasket, NBR -40 °C – 85 °C |
| 4 | O-ring, NBR -40 °C – 85 °C |

**Measuring range**

| | |
|---|---|
| 0 – 1.0 bar | 1 0 |
| 0 – 1.6 bar | 1 2 |
| 0 – 2.5 bar | 1 4 |
| 0 – 4.0 bar | 1 6 |
| 0 – 6.0 bar | 1 8 |
| 0 – 10 bar | 2 0 |
| 0 – 16 bar | 2 2 |
| 0 – 25 bar | 2 4 |
| 0 – 40 bar | 2 6 |
| 0 – 60 bar | 2 8 |
| 0 – 100 bar | 3 0 |
| 0 – 160 bar | 3 2 |
| 0 – 250 bar | 3 4 |
| 0 – 400 bar | 3 6 |
| 0 – 600 bar | 3 8 |

**Pressure connection**

| | |
|---|---|
| A B 0 4 | G ¼ A (EN 837) |
| A B 0 8 | G ½ A (EN 837) |
| A C 0 4 | ¼ – 18 NPT |
| B A 1 2 | M18 × 1.5 (DIN 3852/3) |
| B A 1 6 | M22 × 1.5 (DIN 3852-E) |
| G B 0 4 | G ¼ (DIN 3852-E) |

**Electrical connection**

| | |
|---|---|
| A1 | Plug Pg 9 (EN175301-803-A) |
| A3 | Screened cable, 2 m |

**Output signal**

| | |
|---|---|
| 1 | 4 – 20 mA |
| 2 | 0 – 5 V |
| 3 | 1 – 5 V |
| 4 | 1 – 6 V |
| 5 | 0 – 10 V |

**Pressure reference**

| | |
|---|---|
| Gauge (relative) | 1 |
| Absolute | 2 |

Preferred version

**NOTE:**
Non-standard build-up combinations may be selected. However, minimum order quantities may apply. Please contact your local Danfoss office for further information or request on other 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.

### Valid certificates and declarations

**Table 7: Certificates and declarations**

| File name | Document type | Document topic | Approval authority |
|---|---|---|---|
| CRN.0F18477.5123467890YTN | Pressure - Safety Certificate | CRN | TSSA |
| B-BK-60210-1170/19 | PZH | - | - |
| 1786330 | Explosive - Safety Certificate | - | CSA |
| 064R9402.00 | Manufacturers Declaration | MD Declaration | Danfoss |
| 064G9615.06 | EU Delcaration | ATEX/EMCD/RoHS | Danfoss |
| 060R3160.00 | Manufacturers Declaration | China RoHS | Danfoss |
| Д-DK.БЛ08.B.00302_18 | EAC RU | EAC Declaration | - |
| DK.C.30.018.A 31316 | Measuring - Performance Certificate | - | Gost |
| OC.C.30.004.A 53828-1 | Measuring - Performance Certificate | - | Gost |
| E311982 | Electrical safety certificate | - | UL |
| E494625 | Electrical safety certificate | - | UL |
| E227388 | Electrical safet certificate | Hazardous Locations | UL |