

Data sheet

High temperature pressure transmitters for heavy-duty applications MBS 2200 and MBS 2250



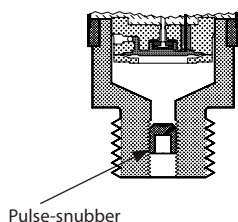
The compact heavy duty pressure transmitter type MBS 2200 and MBS 2250 are designed for use in severe industrial and hydraulic applications. MBS 2250 with integrated pulse-snubber is suitable for use in applications with severe medium influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions.

The flexible program of pressure transmitters with ratiometric output covers absolute or gauge (relative) versions, measuring ranges from 0–1 to 0–600 bar and a wide range of pressure and electrical connections.

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

Features

- Designed for use in harsh industrial environments
- For medium and ambient temperatures up to 125 °C
- With integrated pulse-snubber
- Ratiometric output signal: 10 – 90% of supply voltage
- Enclosure and wetted parts of AISI 316L
- A wide range of pressure and electrical connections
- Temperature compensated, linearized and laser adjusted
- For use in Zone 2 explosive atmospheres

Application and media conditions (MBS 2250)

Application

Cavitation, liquid hammer and pressure peaks may occur in hydraulic systems with changes in flow velocity, e.g. fast closing of a valve or pump starts and stops.

The problem may occur on the inlet and outlet side, even at rather low operating pressures.

Media condition

Clogging of the nozzle may occur in liquids containing particles. Mounting the transmitter in an upright position minimizes the risk of clogging, because the flow in the nozzle is limited to the start-up period until the dead volume behind the nozzle orifice is filled. The media viscosity has only little effect on the response time. Even at a viscosities up to 100 cSt, the response time will not exceed 4 ms.

Technical data
Performance (EN 60770)

| | | |
|--|---|---------|
| Accuracy | $\leq \pm 0.5\% \text{ FS (typ.)}$ | |
| | $\leq \pm 1.0\% \text{ FS (max.)}$ | |
| Non-linearity (best fit straight line) | $\leq \pm 0.2\% \text{ FS}$ | |
| Hysteresis and repeatability | $\leq \pm 0.1\% \text{ FS}$ | |
| Thermal error band (compensated temperature range) | $\leq \pm 1.0\% \text{ FS}$ | |
| Response time | Liquids with viscosity < 100 cSt | < 4 ms |
| | Air and gases (MBS 2250) | < 35 ms |
| Overload pressure (static) | Min. $6 \times \text{FS}$ (max. 1500 bar) | |
| Burst pressure | $6 \times \text{FS}$ (max. 2000 bar) | |
| Durability, P: 10 – 90% FS | > 10×10^6 cycles | |

Electrical specifications

| | |
|--|---|
| Nom. output signal | 10 – 90% of supply voltage |
| Supply voltage [U_b], polarity protected | 4.75–8 V d.c. 5 V d.c. (nom.) |
| Power consumption | $\leq 5 \text{ mA}$ at 5 V d.c. |
| Output impedance | $\leq 25 \Omega$ |
| Load [R_L] (load connected to ground) | $R_L \geq 10 \text{ k}\Omega$ at 5 V d.c. |

Environmental conditions

| | | |
|--|------------------------------------|-------------------------------------|
| Sensor temperature range | Normal | -40 – 125 °C |
| | ATEX Zone 2 | -10 – 85 °C |
| Media temperature range | 165 - (0.35 x ambient temperature) | |
| Ambient temperature range (depending on electrical connection) | See page 5 | |
| Compensated temperature range | 0 – 100 °C | |
| Transport / storage temperature range | -50 – 125 °C | |
| EMC – Emission | EN 61000-6-3 | |
| EMC – Immunity | EN 61000-6-2 | |
| Insulation resistance | > 100 M Ω at 100 V d.c. | |
| Mains frequency test | 500 V, 50 Hz | Based on SEN 361503 |
| Vibration stability | Sinusoidal | 20 g, 25 Hz – 2 kHz |
| | Random | 7.5 g _{rms} , 5 Hz – 1 kHz |
| Shock resistance | Shock | 500 g / 1 ms |
| | Free fall | 1 m |
| Enclosure (depending on electrical connection) | See page 5 | |

Technical data
(continued)
Explosive atmospheres

| | | |
|---------------------|---|-----------------------|
| Zone 2 applications | II 3G Ex nA IIA T3 Gc -20C<Ta<+85C | EN60079-0; EN60079-15 |
|---------------------|---|-----------------------|

When used in ATEX Zone 2 areas at temperatures <-10 °C the cable and plug must be protected against impact.

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 page 5 |
| Net weight (depending on pressure connection and electrical connection) | | 0.2 – 0.3 kg |

Ordering standard

MBS 2200
MBS 2250

| | |
|------------------------|----|
| Measuring range | |
| 0 – 1.0 bar | 10 |
| 0 – 1.6 bar | 12 |
| 0 – 2.5 bar | 14 |
| 0 – 4.0 bar | 16 |
| 0 – 6.0 bar | 18 |
| 0 – 10 bar | 20 |
| 0 – 16 bar | 22 |
| 0 – 25 bar | 24 |
| 0 – 40 bar | 26 |
| 0 – 60 bar | 28 |
| 0 – 100 bar | 30 |
| 0 – 160 bar | 32 |
| 0 – 250 bar | 34 |
| 0 – 400 bar | 36 |
| 0 – 600 bar | 38 |

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

| | |
|-----------------------|---|
| Output signal | |
| Ratiometric, 10 – 90% | 6 |

| | |
|---------------------------------|--------------------------------------|
| Gasket / O-ring material | |
| 0 | No gasket (see pressure connections) |
| 1 | Viton (media temp: -20 – 125 °C) |

| | |
|----------------------------|---|
| Pressure connection | |
| G B 0 6 | DIN 3852-A-G 3/8; excl. gasket |
| A B 0 8 | G 1/2 A (EN 837); excl. gasket |
| A C 0 4 | 1/4 –18 NPT excl. gasket |
| F A 0 9 | DIN 3852-E-M14 x 1.5, gasket: DIN 3869-14 NBR |
| G A 1 2 | DIN 3852-A-M18 x 1.5 excl. gasket |
| G B 0 4 | DIN 3852-E-G 1/4, gasket: DIN 3869-14 NBR |

| | |
|------------------------------|--|
| Electrical connection | |
| 1 | Plug Pg 9 (EN175301-803-A) |
| 2 | * Plug, AMP Econoseal, J series, male, excl. female plug |
| 3 | Screened cable, 2 m |
| 5 | * Plug, EN 60947-5-2, M12 x 1, 4 PIN male, excl. female plug |
| 7 | Plug, ISO 15170-A1-3-2-Sn male, excl. female plug |
| 8 | * Plug, AMP Superseal 1.5 series male, excl. female plug |

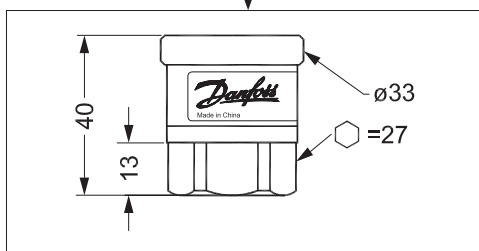
* Gauge versions only available as sealed gauge versions

Preferred version

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.

Dimensions / Combinations

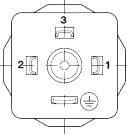
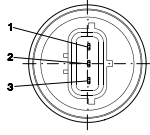
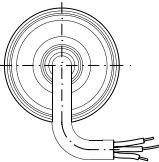
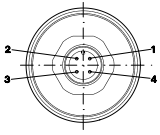
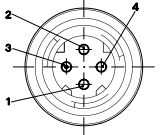
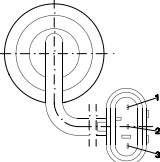

| Type code | 1 | 2 | 3 | 5 | 7 | 8 |
|-----------|----------------------|---------------|--------------------|------------------------------|------------------------------------|---------------|
| | EN175301-803-A, Pg 9 | AMP Econoseal | 2 m screened cable | EN 60947-5-2 4-pin; M 12 x 1 | ISO 15170-A1-3.2-Sn (Bayonet plug) | AMP Superseal |
| | | | | | | |



| | DIN 3852-A-G 3/8 | DIN 3852-A M18 x 1.5 | G 1/2 A (EN 837) | 1/4 - 18 NPT | DIN 3852-E-M14 x 1.5 Gasket: DIN 3869-14-NBR | DIN 3852-E-G 1/4 Gasket: DIN 3869-14 |
|----------------------------------|------------------|----------------------|------------------|------------------------------------|---|---|
| Type code | GB06 | GA12 | AB08 | AC04 | FA09 | 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 on different parameters as packing material, mating material, thread lubrication and pressure level

Electrical connections

| Type code, page 4 | 1 | 2 | 3 | 5 | 7 | 8 |
|---|---|--|--|---|---|--|
| |  <p>EN 175301-803-A, Pg 9</p> |  <p>AMP Econoseal J series (male)</p> |  <p>2 m screened cable</p> |  <p>EN 60947-5-2 M12 x 1; 4-pin</p> |  <p>ISO 15170-A1-3.2-Sn (Bayonet plug)</p> |  <p>AMP Superseal</p> |
| Ambient temperature | -40 – 125 °C | -40 – 105 °C | -30 – 85 °C | -25 – 90 °C | -40 – 125 °C | -40 – 125 °C |
| Enclosure (IP protection fulfilled together with mating connector) | IP65 | IP67 | IP67 | IP67 | IP67 / IP69K | IP67 |
| Material | Glass filled polyamid, PA 6.6 | Glass filled polyamid, PA 6.6 ¹⁾ | Poliolyfin cable with PE shrinkage tubing | Nickel plated brass, CuZn/Ni | Glass filled polyester, PBT | Glass filled polyamid, PA 6.6 ²⁾ |
| Electrical connection, Ratiometric output, 10 – 90% of supply voltage | Pin 1: + supply Pin 2: ÷ supply Pin 3: Output ³⁾  Earth: Connected to MBS enclosure | Pin 1: + supply Pin 2: ÷ supply Pin 3: Output ³⁾ | Brown wire: Output Black wire: ÷ supply Red wire: + supply ³⁾ Orange: Not used Screen: Not connected to MBS enclosure | Pin 1: + supply Pin 2: Not used Pin 3: Output Pin 4: ÷ supply ³⁾ | Pin 1: + supply Pin 2: Output Pin 3: Ventilation Pin 4: ÷ supply ³⁾ | Pin 1: + supply Pin 2: ÷ supply Pin 3: Output ³⁾ |

¹⁾ Female plug: Glass filled polyester, PBT

²⁾ Wire: PTFE (teflon) Protection sleeve: PBT mesh (polyester)

³⁾ Common

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