

Data sheet

# Pressure transmitters for heavy duty applications

## Type MBS 3200 and 3250



The compact high temperature pressure transmitter MBS 3200 is designed for use in hydraulic and almost all industrial applications, and offers a reliable pressure measurement, even under harsh environmental conditions.

MBS 3250 with integrated pulse-snubber is designed for use in hydraulic applications with severe medium influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions.

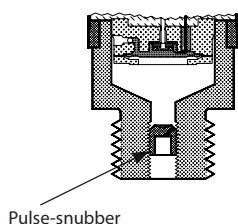
The flexible pressure transmitter programme covers different output signals, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar and a wide range of pressure and electrical connections.

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 and hydraulic environments
- For medium and ambient temperatures upto 125 °C
- With integrated pulse-snubber. Protected against cavitation, liquid hammering and pressure peaks (MBS 3250)
- All standard output signals: 4 – 20 mA, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 - 10 V, 1 - 10 V
- 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 3250)**



*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 (incl. non-linearity, hysteresis and repeatability) | ≤ ± 0.5% FS (typ.)               |         |
|  | ≤ ± 1.0% FS (max.)               |         |
| Non-linearity BFSL (conformity)                              | ≤ ± 0.2% FS                      |         |
| Hysteresis and repeatability                                 | ≤ ± 0.1% FS                      |         |
| Thermal error band (compensated temperature range)           | ≤ ± 1.0% FS                      |         |
| Response time  | Liquids with viscosity < 100 cSt | < 4 ms  |
|  | Air and gases (MBS 3250)         | < 35 ms |
| Overload pressure (static)                                   | 6 × FS (max. 1500 bar)           |         |
| Burst pressure   | 6 × FS (max. 2000 bar)           |         |
| Durability, P: 10 – 90% FS                                   | > 10×10 <sup>6</sup> cycles      |         |

*Electrical specifications*

|  |  |                        |                        |
|--|--|------------------------|------------------------|
| Nom. output signal (short-circuit protected)         | 4 – 20 mA  | 0–5, 1–5, 1–6 V d.c.   | 0–10 V, 1–10 V d.c.    |
| Supply voltage [U <sub>B</sub> ], polarity protected | 9–32 V d.c.                                      | 10–30 V d.c.           | 15–30 V d.c.           |
| Supply – current consumption                         | –  | ≤ 5 mA                 | ≤ 8 mA                 |
| Supply voltage dependency                            | ≤ ± 0.1% FS / 10 V                               |                        |                        |
| Current limitation                                   | 28 mA (typ.)                                     | –                      |                        |
| Output impedance                                     | –  | ≥ 25 kΩ                |                        |
| Load [R <sub>L</sub> ] (load connected to 0 V)       | R <sub>L</sub> ≤ (U <sub>B</sub> - 9 V) / 0.02 A | R <sub>L</sub> ≥ 10 kΩ | R <sub>L</sub> ≥ 15 kΩ |

*Environmental conditions*

|  |                                    |                                     |
|--|------------------------------------|-------------------------------------|
| Sensor temperature range (depending on gasket material)        | Normal                             | -40 – 125 °C                        |
|  | ATEX Zone 2                        | -10 – 125 °C                        |
| Max. media temperature   | 165 – (0.35 × 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 mΩ at 100 V d.c.             |                                     |
| Mains frequency test   | Based on SEN 361503                |                                     |
| Vibration stability  | Sinusoidal                         | 15.9 mm-pp, 5 Hz – 25 Hz            |
|  |                                    | 20 g, 25 Hz – 2 kHz                 |
| Shock resistance   | Random                             | 7.5 g <sub>rms</sub> , 5 Hz – 1 kHz |
|  | Shock                              | 500 g / 1 ms                        |
| Enclosure (depending on electrical connection)                 | Free fall                          | 1 m                                 |
|  | See page 5                         |                                     |

Technical data

(continued)

Explosive atmospheres

|                     |   |                       |
|---------------------|---|-----------------------|
| Zone 2 applications | <b>II 3G</b><br><b>Ex nA IIA T3 Gc</b><br><b>-40C&lt;Ta&lt;+85C</b> | 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                      |
|   | Pressure connection    | See page 4                      |
| Net weight (depending on pressure connection and electrical connection) |                        | 0.2 – 0.3 kg                    |

Ordering standard

**MBS 3200**  
**MBS 3250**

| 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 |   |
|---------------|---|
| 4 – 20 mA     | 1 |
| 0 – 5 V       | 2 |
| 1 – 5 V       | 3 |
| 1 – 6 V       | 4 |
| 0 – 10 V      | 5 |
| 1 – 10 V      | 7 |

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

| Pressure connection |   |
|---------------------|---|
| A B 0 4             | G ¼ A (EN837) – MBS 3200                                  |
| A B 0 8             | G ½ A (EN837)   |
| A C 0 4             | ¼ – 18 NPT  |
| B C 0 8             | ½ – 14 NPT – MBS 3200                                     |
| G A 1 2             | DIN 3852-A M18 × 1.5, excl. gasket – MBS 3250             |
| G B 0 4             | DIN 3852-E-G ¼, gasket: DIN 3869-14 NBR                   |
| F A 0 9             | DIN 3852-E-M 14 × 1.5, gasket: DIN 3869-14 NBR – MBS 3250 |

| Electrical connection |  |
|-----------------------|--|
| 1                     | Plug EN175301-803-A, Pg 9                                |
| 2                     | * Plug, AMP Econoseal, J series, male, excl. female plug |
| 3                     | Screened cable, 2 m                                      |
| 5                     | * Plug, EN 60947-5-2, M12 × 1, male, excl. female plug   |
| 8                     | * Plug, AMP Superseal 1.5 series male, excl. female plug |

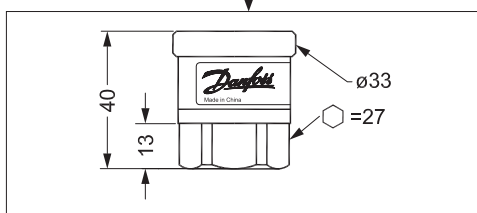
\* Gauge versions only available as sealed gauge versions

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

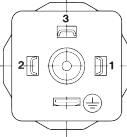
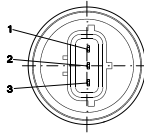
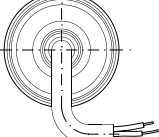
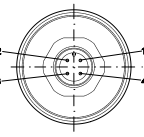
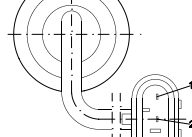


| Type code | 1                       | 2             | 3                  | 5                             | 8             |
|-----------|-------------------------|---------------|--------------------|-------------------------------|---------------|
|           | EN175301-803-A,<br>Pg 9 | AMP Econoseal | 2 m screened cable | EN 60947-5-2<br>M12 x 1,4 Pin | AMP Superseal |
|           |                         |               |                    |                               |               |



|                                  | G ½ A (EN 837) | ¼ – 18 NPT                         | DIN 3852-E-M<br>14 x 1.5<br>Gasket:<br>DIN 3869-14-NBR | DIN 3852-A-M<br>18 x 1.5,<br>excl. gasket | DIN 3852-E-G ¼<br>Gasket:<br>DIN 3869-14-NBR | G ¼ A (EN837) | ½ - 14 NPT                         |
|----------------------------------|----------------|------------------------------------|--|---|--|---------------|------------------------------------|
| Type code                        | AB08           | AC04                               | FA09   | GA12                                      | GB04   | AB04          | AC08                               |
| Recommended torque <sup>1)</sup> | 30 – 35 Nm     | 2 – 3 turns after finger tightened | 30 – 35 Nm   | 30 – 35 Nm                                | 30 – 35 Nm                                   | 30 – 35 Nm    | 2 – 3 turns after finger tightened |

<sup>1)</sup> Depends of different parameters as packing material, mating material, thread lubrication and pressure level

Electrical connections

| Type code  | 1   | 2  | 3  | 5  | 8  |
|--|---|--|--|--|--|
|  |  <p>EN 175301-803-A,<br/>Pg 9</p>  |  <p>AMP Econoseal<br/>J series (male)</p> |  <p>2 m screened cable</p>                                    |  <p>EN 60497-5-2<br/>M12 x 1, 4 Pin</p> |  <p>AMP Superseal<br/>1.5 series (male)</p> |
| Ambient temperature, 4 – 20 mA output                                      | -40 – 100 °C  | -40 – 100 °C   | -30 – 85 °C  | -25 – 90 °C  | -40 – 100 °C   |
| Ambient temperature, 0 – 5V, 1 – 5 V, 1 – 6 V, 0 – 10 V, output            | -40 – 125 °C  | -40 – 105 °C   | -30 – 85 °C  | -25 – 90 °C  | -40 – 125 °C   |
| Enclosure (IP protection fulfilled together with mating connector)         | IP65  | IP67   | IP67   | IP67   | IP67   |
| Material   | Glass filled polyamid, PA 6.6   | Glass filled polyamid, PA 6.6 <sup>1)</sup>  | Poliolyfin cable with PE shrinkage tubing  | Nickel plated brass, CuZn/Ni   | Glass filled polyamid, PA 6.6 <sup>2)</sup>  |
| Electrical connection, 4 – 20 mA output (2 wire)                           | Pin 1: + supply<br>Pin 2: ÷ supply<br>Pin 3: not used<br><br>Earth: Connected to MBS enclosure               | Pin 1: + supply<br>Pin 2: ÷ supply<br>Pin 3: not used  | Brown wire: + supply<br>Black wire: ÷ supply<br>Red wire: not used<br>Orange: Not used<br>Screen: Not connected to MBS enclosure               | Pin 1: + supply<br>Pin 2: not used<br>Pin 3: not used<br>Pin 4: ÷ supply   | Pin 1: + supply<br>Pin 2: ÷ supply<br>Pin 3: not used  |
| Electrical connection, 0 – 5V, 1 – 5 V, 1 – 6 V, 0 – 10 V, 1 – 10 V output | Pin 1: + supply<br>Pin 2: ÷ supply <sup>3)</sup><br>Pin 3: + output<br><br>Earth: Connected to MBS enclosure | Pin 1: + supply<br>Pin 2: ÷ supply <sup>3)</sup><br>Pin 3: + output  | Brown wire: + output<br>Black wire: ÷ supply <sup>3)</sup><br>Red wire: + supply<br>Orange: not used<br>Screen: not connected to MBS enclosure | Pin 1: + supply<br>Pin 2: not used<br>Pin 3: + output<br>Pin 4: ÷ supply <sup>3)</sup>                                     | Pin 1: + supply<br>Pin 2: ÷ supply <sup>3)</sup><br>Pin 3: + output  |

<sup>1)</sup> Female plug: Glass filled polyester, PBT

<sup>2)</sup> Wire: PTFE (teflon) Protection sleeve: PBT mesh (polyester)

<sup>3)</sup> Common