

## Data sheet

# Pressure transmitters for heavy-duty applications, Type MBS 2050



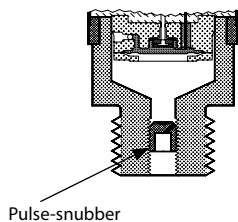
The compact heavy duty pressure transmitter MBS 2050 with integrated pulse-snubber is designed for use in hydraulic applications with severe medium influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions.

The flexible program of pressure transmitters with ratiometric output signal 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 severe industrial environments
- Resistant to cavitation, liquid hammer and pressure peaks
- Enclosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 0 – 600 bar
- Ratiometric output signal: 10 – 90% of supply voltage
- A wide range of pressure and electrical connections
- Temperature compensated and laser calibrated
- For use in Zone 2 explosive atmospheres

**Application and media conditions**

*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)		$\leq \pm 0.5\%$ FS (typ.)
		$\leq \pm 1.0\%$ FS (max.)
Non-linearity BFSL (conformity)		$\leq \pm 0.2\%$ FS
Hysteresis and repeatability		$\leq \pm 0.1\%$ FS
Thermal zero point shift		$\leq \pm 0.1\%$ FS/10K (typ.)
		$\leq \pm 0.2\%$ FS/10K (max.)
Thermal sensitivity (span) shift		$\leq \pm 0.1\%$ FS/10K (typ.)
		$\leq \pm 0.2\%$ FS/10K (max.)
Response time	Liquids with viscosity < 100 cSt	< 4 ms
	Air and gases	< 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	10 – 90% of $V_{\text{supply}}$
Supply voltage $V_{\text{supply}}$ , polarity protected	4.75 – 8 V d.c. 5 V d.c. (nom.)
Power consumption	$\leq 5$ mA at 5 V d.c.
Output impedance	$\leq 25 \Omega$
Load Resistance [ $R_L$ ]	$R_L \geq 10 \text{ k}\Omega$ at 5 V d.c.

**Technical data**  
*(continued)*
**Environmental conditions**

Sensor temperature range		-40 – 85 °C	
Ambient temperature range (depending on electrical connection)		See page 5	
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 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	IEC 60068-2-6
	Random	7.5 g <sub>rms</sub> , 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 page 5	

**Explosive atmospheres**

Zone 2 applications	  <b>II 3G</b> <b>Ex nA IIC T3 Gc</b> <b>-40C&lt;Ta&lt;+85C</b>	EN60079-0; EN60079-15
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**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 2050**

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	
AB 0 8	G ½ A (EN 837)
AC 0 4	¼ – 18 NPT
FA 1 2	DIN 385 ¾, M18 × 1.5 – 6 g, NBR O-ring
FD 1 0	⅝ – 18 UNF – 2A (SAE J514) NBR O-ring
GB 0 4	DIN 3852-E-G ¼; Gasket: DIN 3869-14 NBR

Pressure reference	
Gauge (relative)	1
Absolute	2

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, IEC 60947-5-2, M12 × 1, male, excl. female plug
6	Plug Pg 11 (EN 175301-803-A)
8 *	Plug, AMP Superseal 1.5 series male, excl. female plug

**Output signal**  
Ratiometric, 10 – 90%

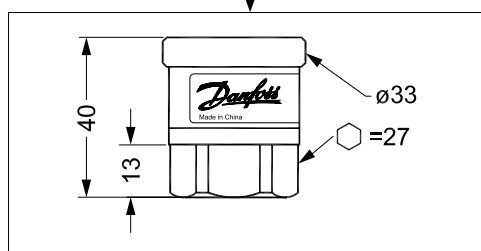
\* Gauge versions only available as sealed gauge versions

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

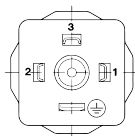
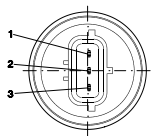
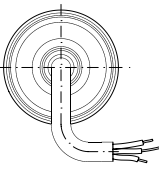
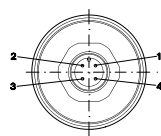
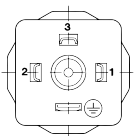
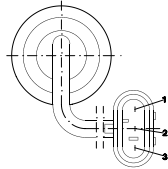


Type code	1	2	3	5	6	8
	EN175301-803-A, Pg 9	AMP Econoseal	2 m screened cable	EN 60947-5-2 M 12 x 1; 4-pin	EN 175301-803-A, Pg 11	AMP Superseal



	1/16- 18 UNF-2A (SAE J514)	G 1/2 A (EN 837)	1/4 - 18 NPT	DIN 385 2/5, M 18 x 1.5 - 6 g NBR O-ring	DIN 3852-E-G 1/4 Gasket: DIN 3869-14
Type code	FD10	AB08	AC04	FA12	GB04
Recommended torque <sup>1)</sup>	30 – 35 Nm	30 – 35 Nm	2 – 3 turns after finger tightened	30 – 35 Nm	30 – 35 Nm

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

Electrical connections

Type code, page 4	1	2	3	5	6	8
	 EN 175301-803-A, Pg 9	 AMP Econoseal J series (male)	 2 m screened cable	 EN 60947-5-2 M12 x 1; 4-pin	 EN 175301-803-A, Pg 11	 AMP Superseal 1.5 series (male)
Ambient temperature	-40 – 85 °C	-40 – 85 °C	-30 – 85 °C	-25 – 85 °C	-40 – 85 °C	-40 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP67	IP67	IP65	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	Glass filled polyamid, PA 6.6 <sup>2)</sup>
Electrical connection, Ratiometric output, 10 – 90% of supply voltage	Pin 1: + supply Pin 2: ÷ supply Pin 3: Output <sup>3)</sup>  Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: Output <sup>3)</sup>	Brown wire: Output Black wire: ÷ supply Red wire: + supply <sup>3)</sup> Orange: Not used Screen: Not connected to MBS enclosure	Pin 1: + supply Pin 2: Not used Pin 3: Output Pin 4: ÷ supply <sup>3)</sup>	Pin 1: + supply Pin 2: - supply Pin 3: Output <sup>3)</sup>  Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: Output <sup>3)</sup>

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

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

<sup>3)</sup> Common