

Data sheet

# Pressure transmitters for industrial applications

## MBS 4050



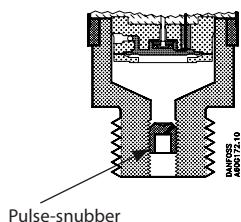
The standard heavy duty pressure transmitter MBS 4050 with integrated pulse-snubber is designed for use in industrial applications with severe media influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions.

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.

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
- 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 up to 600 bar
- All standard output signals:  
4 – 20 mA, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V
- A wide range of pressure and electrical connections
- Temperature compensated and laser calibrated
- For use in Zone 2 explosive atmosphere

**Application and media conditions**

**Application**

Cavitation, liquid hammer and pressure peaks may occur in liquid filled 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.)
		< ± 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
	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 (short-circuit protected)	4 – 20 mA	0–5 V, 1–5 V, 1–6 V	0–10 V
Supply voltage [U <sub>B</sub> ], polarity protected	10–30 V	9–30 V	15–30 V
Supply – current consumption	–	≤ 5 mA	≤ 8 mA
Supply voltage dependency	≤ ± 0.05% FS / 10 V	≤ ± 0.05% FS / 10 V	≤ ± 0.05% FS / 10 V
Current limitation	28 mA (typ.)	–	
Output impedance	–	< 25 Ω	< 25 Ω
Load [R <sub>L</sub> ] (load connected to 0 V)	R <sub>L</sub> ≤ (U <sub>B</sub> - 10V) / 0.02 A	R <sub>L</sub> ≥ 10 kΩ	R <sub>L</sub> ≥ 15 kΩ

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

Sensor temperature range	Normal	-40 – 85 °C
	ATEX Zone 2	-10 – 85 °C
Media temperature range	115 - (0.35 × Ambient temp.)	
Ambient temperature range (depending on electrical connection)	See page 6	
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	
Mains frequency test	Based on SEN 361503	
Vibration stability	Sinusoidal	15.9 mm-pp, 5 Hz – 25 Hz
		20 g, 25 Hz – 2 kHz
	Random	7.5 g <sub>rms</sub> , 5 Hz – 1 kHz
Shock resistance	Shock	500 g / 1 ms
	Free fall	1 m
Enclosure (depending on electrical connection)	See page 6	

**Explosive atmospheres**

Zone 2 applications	<b>II 3G</b> <b>Ex nA IIA T3 Gc</b> <b>-20C&lt;Ta&lt;+85C</b>	EN60079-0; EN60079-15
---------------------	---	-----------------------

When used in ATEX Zone 2 areas at temperature <-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 6
Net Weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

Ordering standard

**MBS 4050**

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

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

Pressure connection	
A B 0 8	G ½ A (EN 837)
A C 0 4	¼ – 18 NPT
F A 1 2	DIN 3852/3, M18 × 1.5 – 6g, NBR
G B 0 4	DIN 3852-E-G ¼ A, gasket DIN 3869-14 NBR

Electrical connection	
A1	Plug Pg 9 (EN175301-803-A)
G1	* Plug, AMP Econoseal, J series, male, excl. female plug (move to front)
A3	Screened cable, 2 m
D9	* Plug AMP 173065, male flying leads 125 mm excl. female plug
E3	* Plug, EN 60947-5-2, M12 × 1, male excl. female plug
A6	Plug Pg 11 (EN 175301-803-A)

Output signal	
1	4 – 20 mA
2	0 – 5 V DC
3	1 – 5 V DC
5	1 – 6 V DC
6	0 – 10 V DC

Pressure reference	
Gauge (relative)	1
Absolute	2

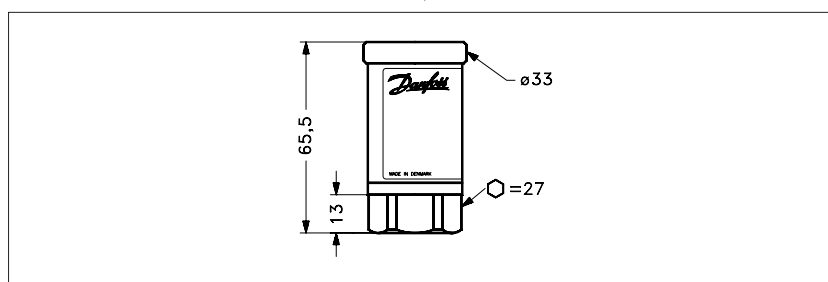
\* Gauge versions only available as sealed gauge versions

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	A1	G1	A3	D9	E3	A6
	EN175301-803-A, Pg 9	AMP Econoseal	2 m screened cable	AMP 173065, male, Flying leads, 125 mm	EN 60947-5-2 M12 x 1, 4 Pin	EN 175301-803-A, Pg11



	DIN 3852-E-G ¼ A gasket DIN 3869-14 NBR	DIN 3852/3 M18 x 1.5 - 6g NBR, O-ring	G ½ A (EN 837)	¼ - 18 NPT
Type code	GB04	FA12	AB08	AC04
Recommended torque <sup>1)</sup>	30 - 35 Nm	30 - 35 Nm	30 - 35 Nm	2 - 3 turns after finger tightened

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

**Electrical connections**

Type code	A1	G1	A3	D9	E3	A6
	EN 175301-803, Pg 9	AMP Econoseal J series (male)	2 m screened cable	AMP 173065, male Flying leads 125 mm	EN 60497-5-2 M12 x 1; 4 Pin	EN 175301-803-A, Pg 11
Ambient temperature	-40 – 85 °C	-40 – 85 °C	-30 – 85 °C	-40 – 85 °C	-25 – 85 °C	-40 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP67	IP67	IP67	IP65
Material	Glass filled polyamid, PA 6.6	Glass filled polyamid, PA 6.6	Poliolyfin cable with PE shirkage tubing	Glass filled polyester, PBT	Nickel plated brass, CuZn/Ni	Glass filled polyamid, PA 6.6
Electrical connection, 4 – 20 mA output (2 wire)	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used  Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used	Brown wire: + supply Black wire: ÷ supply Red wire: not used Orange: not used Screen: not connected to MBS enclosure	Pin 1: (red): + supply Pin 2: (black): - supply Pin 3: (white): not used	Pin 1: + supply Pin 2: not used Pin 3: not used Pin 4: ÷ supply	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used  Earth: Connected to MBS enclosure
Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V output	Pin 1: + supply Pin 2: ÷ supply <sup>2)</sup> Pin 3: + output  Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply <sup>2)</sup> Pin 3: + output	Brown wire: output Black wire: ÷ supply <sup>2)</sup> Red wire: + supply Orange: not used Screen: not connected to MBS enclosure	Pin 1: (red): + supply Pin 2: (black): - supply <sup>2)</sup> Pin 3: (white): + output	Pin 1: + supply Pin 2: not used Pin 3: + output Pin 4: ÷ supply <sup>2)</sup>	Pin 1: + supply Pin 2: ÷ supply <sup>2)</sup> Pin 3: + output  Earth: Connected to MBS enclosure

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

<sup>2)</sup> Common