ENGINEERING
TOMORROW

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.

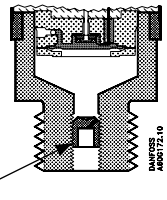
The flexible pressure transmitter programme covers different output signals, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar and a wide range of pressure and electrical connections.

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
- Enslosure 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 × 10^6 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_B], 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_L] (load connected to 0 V)	R_L ≤ (U_B - 10V) / 0.02 A	R_L ≥ 10 kΩ	R_L ≥ 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	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 page 6

Explosive atmospheres

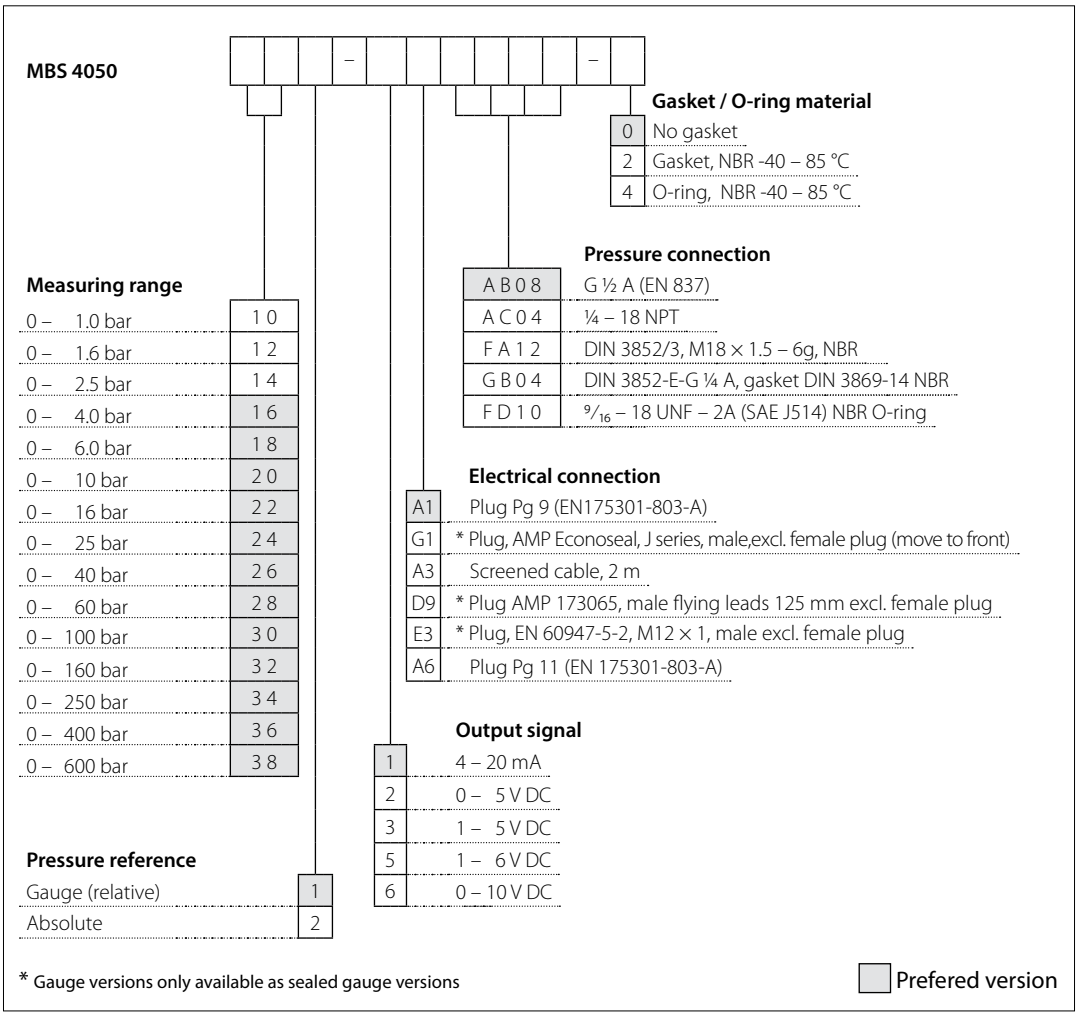
Zone 2 applications	CE Ex II 3G Ex nA IIA T3 Gc -20C<Ta<+85C	EN60079-0; EN60079-15

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

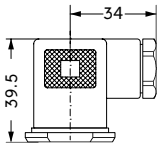
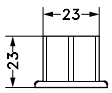
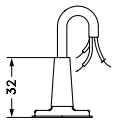
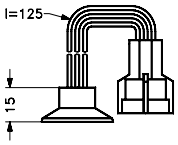
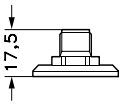
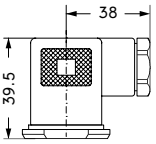
Ordering standard

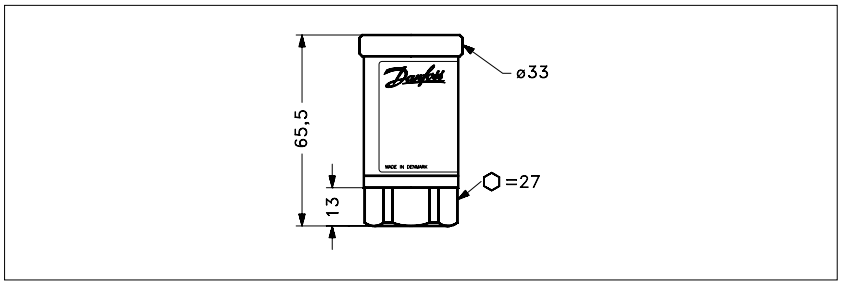


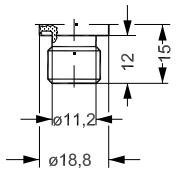
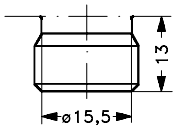
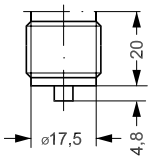
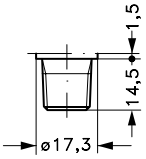
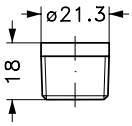
Non-standard build-up combinations may be selected. However, minimum order quantities may apply.

Please contact your local Danfoss office for further information or request on other versions.

Dimensions/Combinations

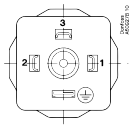
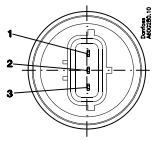
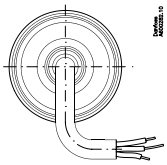
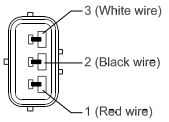
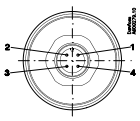
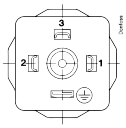
Type code	A1	G1	A3	D9	E3	A6
	EN175301-803-A, Pg 9	AMP Econoseal	2 m screened cable	AMP 173065, male, Flying leads, 125 mm	EN 60947-5-2 M12 x 1, 4 Pin	EN 175301-803-A, Pg11
						



					
	DIN 3852-E-G ¼ A gasket DIN 3869-14 NBR	DIN 3852/3 M18 × 1.5 – 6g NBR, O-ring	G ½ A (EN 837)	¼ – 18 NPT	$^{9}/_{16}$ –18 UNF-2A (SAE J514) NBR, O-ring
Type code	**GB04**	**FA12**	**AB08**	**AC04**	**FD10**
Recommended torque [1]	30 – 35 Nm	30 – 35 Nm	30 – 35 Nm	2 – 3 turns after finger tightened	30 – 35 Nm

[1] 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 × 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 shirnkage 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 [2]) Pin 3: + output Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply [2]) Pin 3: + output	Brown wire: output Black wire: ÷ supply [2]) Red wire: + supply Orange: not used Screen: not connected to MBS enclosure	Pin 1: (red): + supply Pin 2: (black): - supply [2]) Pin 3: (white): + output	Pin 1: + supply Pin 2: not used Pin 3: + output Pin 4: ÷ supply [2])	Pin 1: + supply Pin 2: ÷ supply [2]) Pin 3: + output Earth: Connected to MBS enclosure

[1]) Female plug: Glass filled polyester, PBT
[2]) Common