ENGINEERING
TOMORROW

Data sheet

Pressure transmitters for heavy-duty applications
MBS 2000 and MBS 2050

The compact heavy duty pressure transmitters MBS 2000 and MBS 2050 are designed for use in hydraulic applications.

MBS 2050 with integrated pulse-snubber is designed for use in applications with severe medium influences like cavitation, liquid hammer or pressure peaks. Both types offer a reliable pressure measurement, even under harsh environmental conditions.

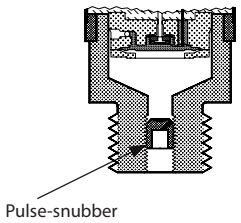
The flexible program of pressure transmitters with ratiometric output signal covers absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar and a wide range of pressure and electrical connections.

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
- Protected against cavitation, liquid hammering and pressure peaks (MBS 2050)
- Enslosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute upto 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 (MBS 2050)



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 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 (MBS 2050)	< 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	10 – 90% of [U_B]
Supply voltage [U_B], polarity protected	4.75 – 8 V d.c. 5 V d.c. (nom.)
Power consumption	≤ 5 mA at 5 V d.c.
Output impedance	≤ 25 Ω
Load Resistance [R_L]	R_L ≥ 10 kΩ at 5 V d.c.

Technical data
(continued)

Environmental conditions

Sensor temperature range	Normal		-40 – 85 °C
	ATEX Zone 2		-10 – 85 °C
Media temperature range			115 - (0.35 x ambient temperature)
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 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_{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

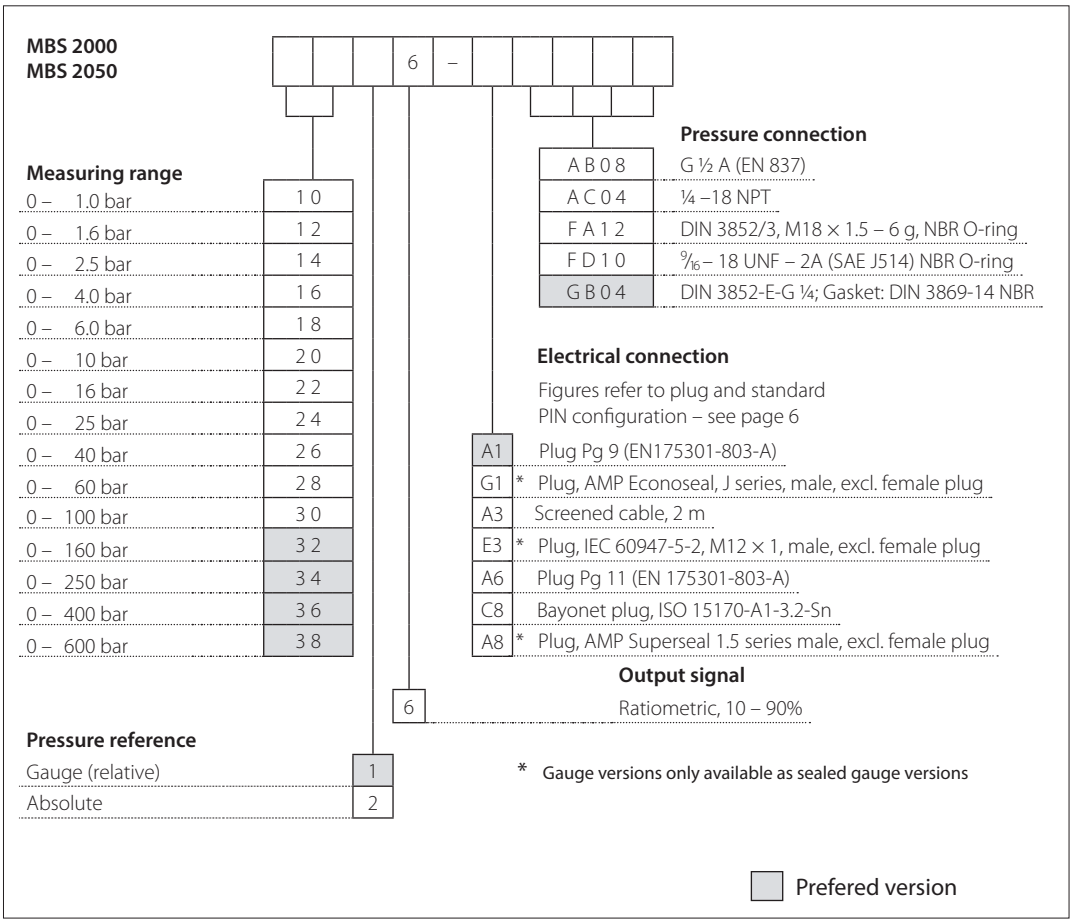
Zone 2 applications	CE Ex II 3G Ex nA IIA T3 Gc -20C<Ta<+85C	EN60079-0; EN60079-15

In ATEX Zone 2 applications with temperatures < -10 °C 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

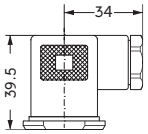
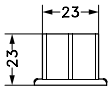
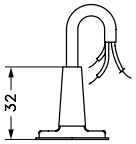
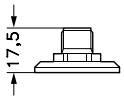
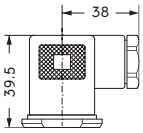
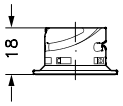
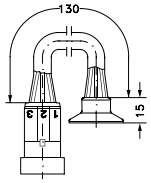
Ordering standard

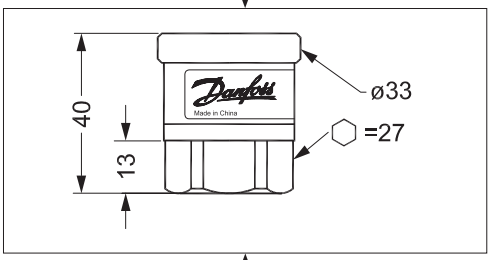


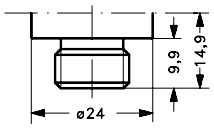
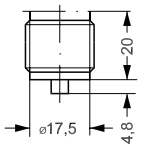
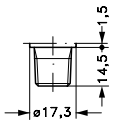
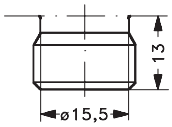
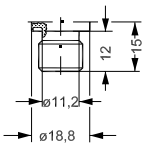
Non-standard build-up combinations may be selected. However, minimum order quantities may apply.

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

Dimensions / Combinations

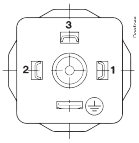
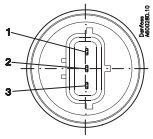
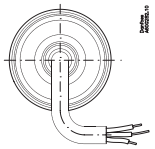
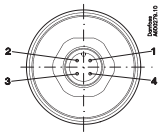
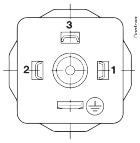
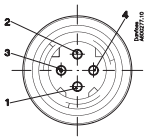
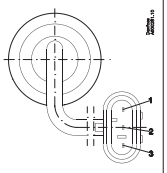
Type code	A1	G1	A3	E3	A6	C8	A8
	EN175301-803-A, Pg 9	AMP Econoseal	2 m screened cable	EN 60947-5-2 M 12 × 1; 4-pin	EN 175301-803-A, Pg 11	ISO 15170-A1-3.2-SN Bayonet plug	AMP Superseal
							



					
	$^{9}/_{16}$– 18 UNF-2A (SAE J514)	G ½ A (EN 837)	¼ – 18 NPT	DIN 3852/3, M 18 × 1.5 – 6 g NBR O-ring	DIN 3852-E-G ¼ Gasket: DIN 3869-14
Type code	**FD10**	**AB08**	**AC04**	**FA12**	**GB04**
Recommended torque[1])	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	A1	G1	A3	E3	A6	C8	A8
	 EN 175301-803-A, Pg 9	 AMP Econoseal J series (male)	 2 m screened cable	 EN 60947-5-2 M12 × 1; 4-pin	 EN 175301-803-A, Pg 11	 ISO 15170-A1-3.2-Sn	 AMP Superseal 1.5 series (male)
Ambient temperature	-40 – 85 °C	-40 – 85 °C	-30 – 85 °C	-25 – 85 °C	-40 – 85 °C	-40 – 125 °C	-40 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP67	IP67	IP65	IP68 / 69K	IP67
Material	Glass filled polyamide, PA 6.6	Glass filled polyamide, PA 6.6[1])	Polyolefin cable with PE shrinkage tubing	Nickel plated brass, CuZn/Ni	Glass filled polyamide, PA 6.6	Glass filled polyester PBT	Glass filled polyamide, 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: - supply Pin 3: output[3]) ⏚ Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply[3]) Pin 3: + output Pin 4: Not used	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