ENGINEERING TOMORROW

Data sheet

Pressure transmitter for marine applications
MBS 3100 and MBS 3150



The compact ship approved pressure transmitters MBS 3100 and MBS 3150 are designed for use in almost all marine applications.

MBS 3150 with integrated pulse-snubber is suitable in marine 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, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar. A wide range of pressure and electrical connections are available.

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

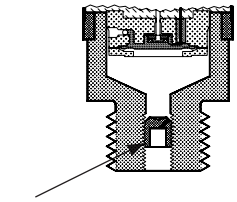
- Designed for use in severe maritime environments
- All relevant marine approvals
- Enslosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 0 up to 600 bar
- Standard output signal: 4 – 20 mA
- A wide range of pressure connections
- Temperature compensated and laser calibrated
- For use in zone 2 explosive atmospheres

Approvals

Lloyds Register of shipping, LRS
Germanischer Lloyd, GL
Bureau Veritas, BV
Det Norske Veritas, DNV
Registro Italiano Navale, RINA
Nippon Kaiji Kyokai, NKK
American Bureau of Shipping, ABS
Korean Register of Shipping, KR
China Classification Society, CCS
Russian Maritime Register of Shipping, RMRS

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Application and media conditions (MBS 3150)



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.)
		≤ ± 1% 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 MBS 3100		< 4 ms
Response time MBS 3150	Liquids with viscosity < 100 cSt	< 4 ms
	Air and gases (MBS 3150)	< 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
Supply voltage [U_B], polarity protected	9 – 32 V d.c.
Supply voltage dependency	≤ ± 0.1% FS / 10 V
Current limitation	28 mA (typ.)
Load [R_L] (load connected to 0 V)	$R_L \leq (U_B - 9V) / 0.02$ A [Ω]

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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

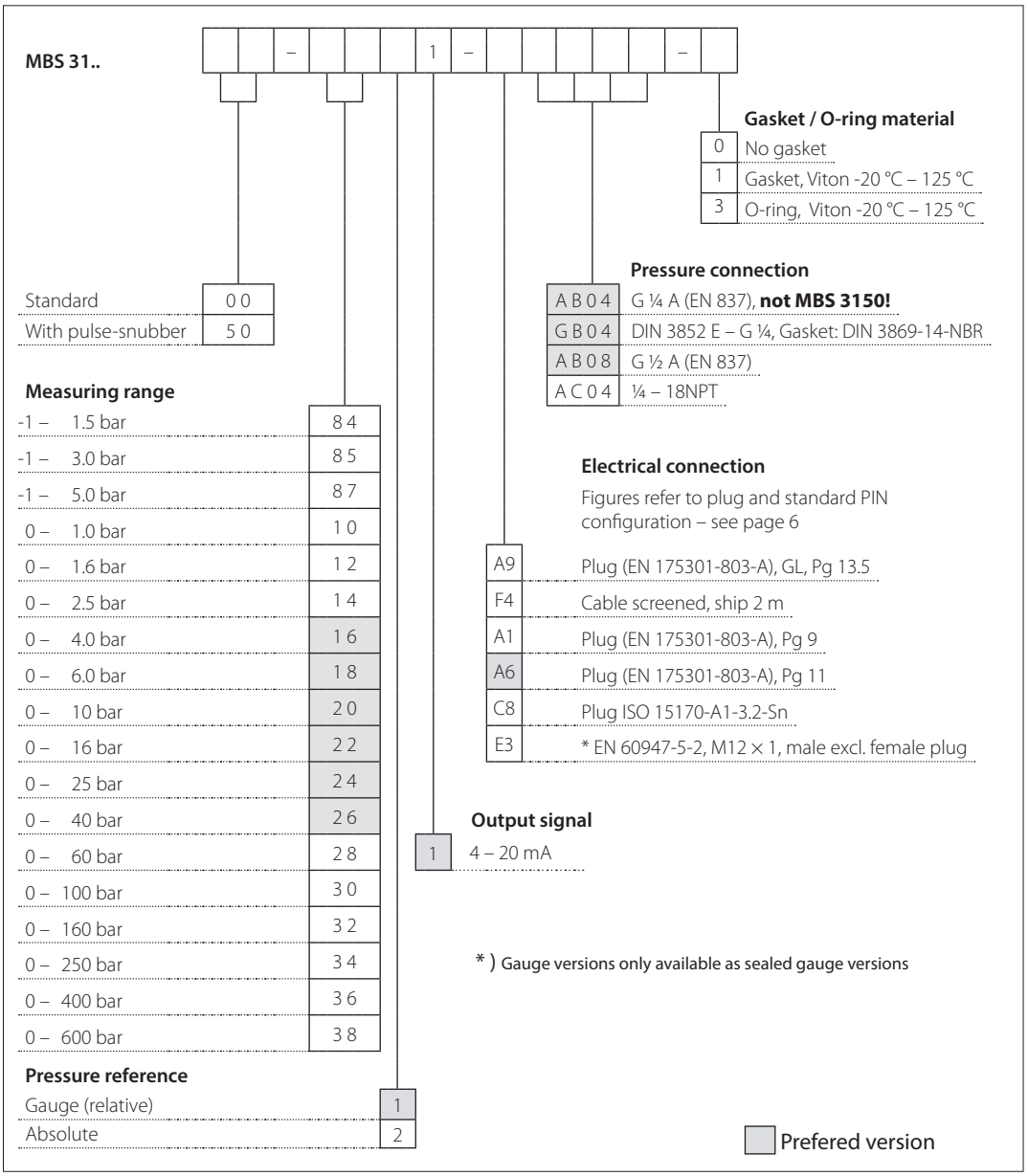
Zone 2 applications	CE Ex II 3G Ex nA IIA T3 Gc -20C<Ta<+85C	EN60079-0; EN60079-15

When used in ATEX Zone 2 areas at 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 6
	Pressure conncetion	See page 6
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

Ordering standard



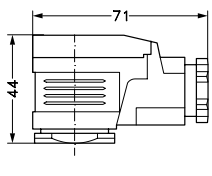
Non-standard build-up combinations may be selected. However, minimum order quantities may apply.

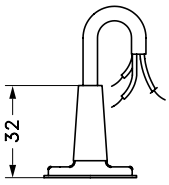
Please contact your local Danfoss office for further information or request on other versions.

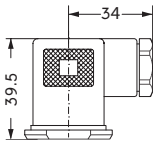
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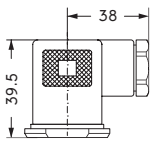
Dimensions / Combinations

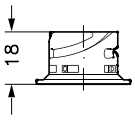
Type code	A9	F4	A1	A6	C8	E3
	EN175301-803-A, Pg 13.5	Cable screened, ship 2 m	EN 175301-803-A, Pg 9	EN175301-803-A, Pg 11	ISO 15170-A1-3.2-Sn	EN 60947-5-2 M 12 × 1; 4-pin

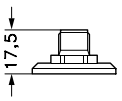


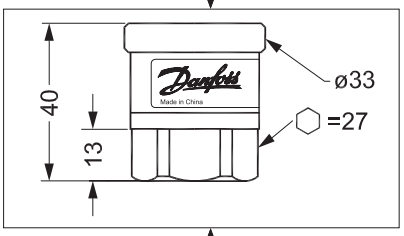


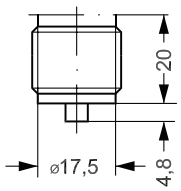
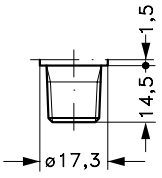
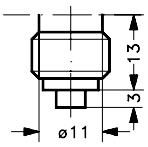
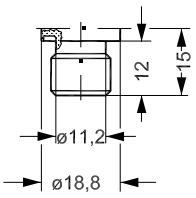






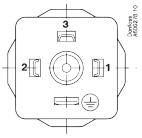
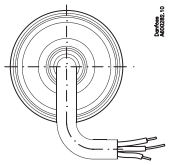
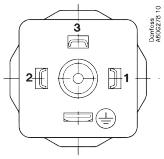
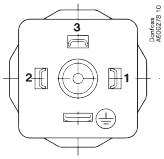
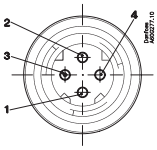
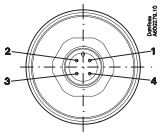




			
G ½ A (EN 837)	¼ – 18 NPT	G ¼ A (EN 837) AB04 [2]	DIN 3852-E-G ¼ Gasket: DIN 3869-14
Type code	**AB08**	**AC04**	**AB04**	**GB04**
Recommended torque [1]	30 – 35 Nm	2 – 3 turns after finger tightened	30 – 35 Nm	30 – 35 Nm

[1]) Depends of different parameters such as gasket material, mating material, thread lubrication and pressure level
[2]) Not for MBS 3150!

Electrical connections

Type code	A9	F4	A1	A6	C8	E3
	 EN 175301-803-A, Pg 13.5	 Cable screened, ship 2 m	 EN 175301-803-A, Pg 9	 EN 175301-803-A, Pg 11	 ISO 15170-A1-3.2-Sn	 EN 60947-5-2 M 12 × 1; 4-pin
Ambient temperature	-40 – 85 °C	-40 – 85 °C	-40 – 85 °C	-40 – 85 °C	-40 – 85 °C	-25 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP65	IP65	IP67 / IP69K	IP67
Material	Glass filled polyamid, PA 6.6	Polyolefin cable with PE shrinkage tubing	Glass filled polyamid, PA 6.6	Glass filled polyamid, PA 6.6	Glass filled polyester, PBI	Nickel plated brass, CuZn / Ni
Electrical connection, 4 – 20 mA output (2 wire)	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used ⏚ Earth: Connected to MBS enclosure	Brown wire: + supply Black wire: ÷ supply Red wire: not used Orange: not used Screen: not connected to MBS enclosure	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 ⏚ Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used Pin 4: not used	Pin 1: + supply Pin 2: not used Pin 3: not used Pin 4: - supply

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