ENGINEERING TOMORROW

Data Sheet

Pressure transmitter Type **MBS 3300** and **MBS 3350**

For high temperature marine applications

The compact high temperature pressure transmitter is designed for use in almost all marine applications, 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.

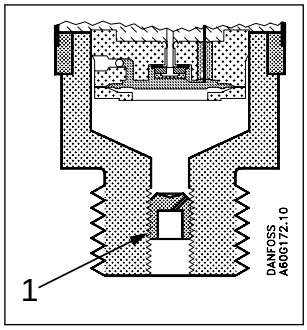
A robust design, an exellent vibration stability, and a high degree of EMC / EMI protection equip the pressure transmitter to meet the most stringent marine requirements.

Features

- Designed for use in severe maritime environments
- For medium and ambient temperatures up to 125 °C
- All standard output signals:
  - Ratiometric 10 - 90% of supply
  - 4 – 20 mA
  - 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V
- Enclosure and wetted parts of AISI 316L
- A wide range of pressure and electrical connections
- Fully digitally compensated
- For use in ATEX Zone 2 explosive atmospheres
- UL approved

Applications

Application and media conditions (MBS 3350)



1	Pulse-snubber

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 startup 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.

Product specification

Technical data

Table 1: 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 error band (compensated temperature range)		≤ ± 1.0% FS
Response time	Liquids with viscosity < 100 cSt	< 4 ms
	Air and gases (MBS 3350)	< 35 ms
Overload pressure (static)		6 × FS (max. 1500 bar)
Burst pressure		6 × FS (max. 2000 bar)
Power-up time		< 50 ms
Durability, P: 10 – 90% FS		> 10 × 10^6 cycles

Table 2: Electrical specifications

Nom. output signal (short-circuit protected)	4 – 20 mA	0 – 5 V, 1 – 5 V, 1– 6 V	0 – 10 V	10 – 90% of supply voltage
Supply voltage [U_B], polarity protected	9 – 32 V DC (12 / 24 V DC nom.)	9 – 32 V DC (12 / 24 V DC nom.)	15 – 32 V DC (12 / 24 V DC nom.)	4.5 – 5.5 V DC (5 V DC nom.)
Supply – current consumption	–	≤ 5 mA	≤ 8 mA	≤ 5 mA - 5 V
Supply voltage dependency	< 0.1% FS / 10 V	< 0.05% FS / 10 V		–
Ratiometricity	–	–		< 0.05% FS / 4.5 - 5.5 V
Output limitation	22.4 mA	0-5 V: 5.75 V 1-5 V: 5.6 V 1-6 V: 6.75 V	0-10 V: 11.5 V	≈ supply voltage
Sink / Source	–	< 1 mA		
Load [R_L] (load connected to 0 V)	$R_L \geq (U_B - 9\ V) / 0.02\ A$	$R_L \geq 10\ k\Omega$	$R_L \geq 15\ k\Omega$	$R_L \geq 10\ k\Omega$ at 5 V DC

Table 3: Environmental conditions

Sensor operating temperature (depending on gasket material)	4 – 20 mA		-40 – 100 °C
	10 – 90% of supply voltage 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V		-40 – 125 °C
Media temperature range			-40 – 125 °C
Ambient temperature range (depending on electrical connection)			See Electrical connections
Compensated temperature range			0 – 100 °C
Transport/storage temperature range			-50 – 125 °C
EMC – Emission			EN 61000-6-3
EMC – Immunity			EN 61000-6-2
Insulation resistance			> 100 MΩ at 500 V DC
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 Electrical connections

Table 4: Explosive atmospheres

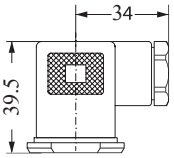
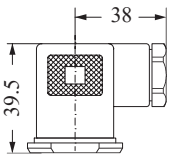
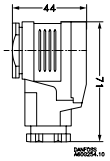
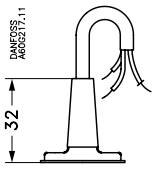
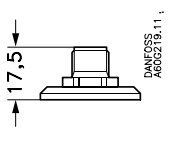
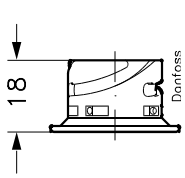
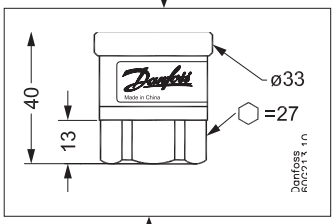
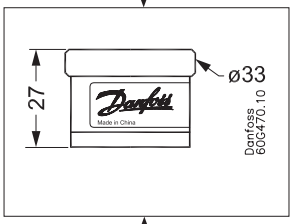
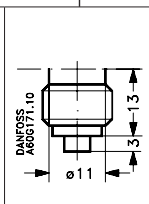
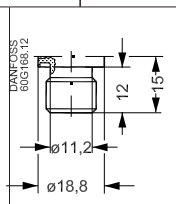
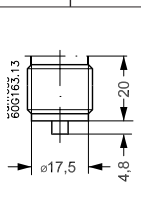
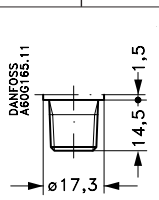
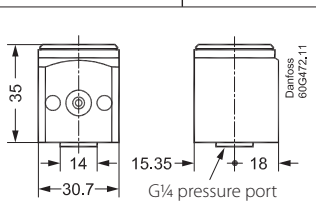
Zone 2 applications[1]	CE Ex II 3G Ex ce IIA T3 Gc -10°C<Ta<+85°C	EN60079-0; EN60079-7

[1] When used in ATEX Zone 2 areas at low temperatures the cable and plug must be protected against impact.

Table 5: 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 Electrical connections
	Pressure connections	See Electrical connections
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

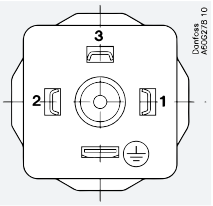
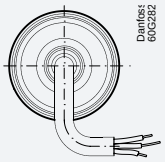
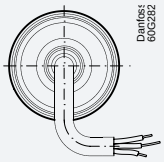
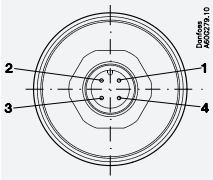
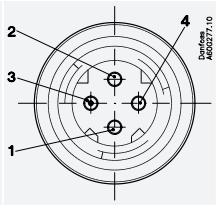
Dimensions/Combinations

Type code	A1	A6	A9	F4 / DG	E3	C8
	EN 175301-803-A Pg 9	EN 175301-803-A Pg 11	EN 175301-803-A Pg 13.5	Cable screened ship 2 m / 3 m	EN 60947-5-2; M12 x 1 male excl. female plug	ISO 15170-A1-3-2-Sn Bayonet
						
						
						
	G¼ A (EN 837)	G¼ (DIN 3852-E)	G½ A (EN 837)	¼ - 18 NPT	G¼ A female with flange	
Type code	**AB04**	**GB04**	**AB08**	**AC04**	**CD28**	
Recomended torque[1)]	30 - 35 Nm	30 - 35 Nm	30 - 35 Nm	2 - 3 turns after finger tightened		

(1)Depends on various parameters such as seal material, coupling material, thread lubrication and pressure level

Electrical connections

Table 6: Electrical connections

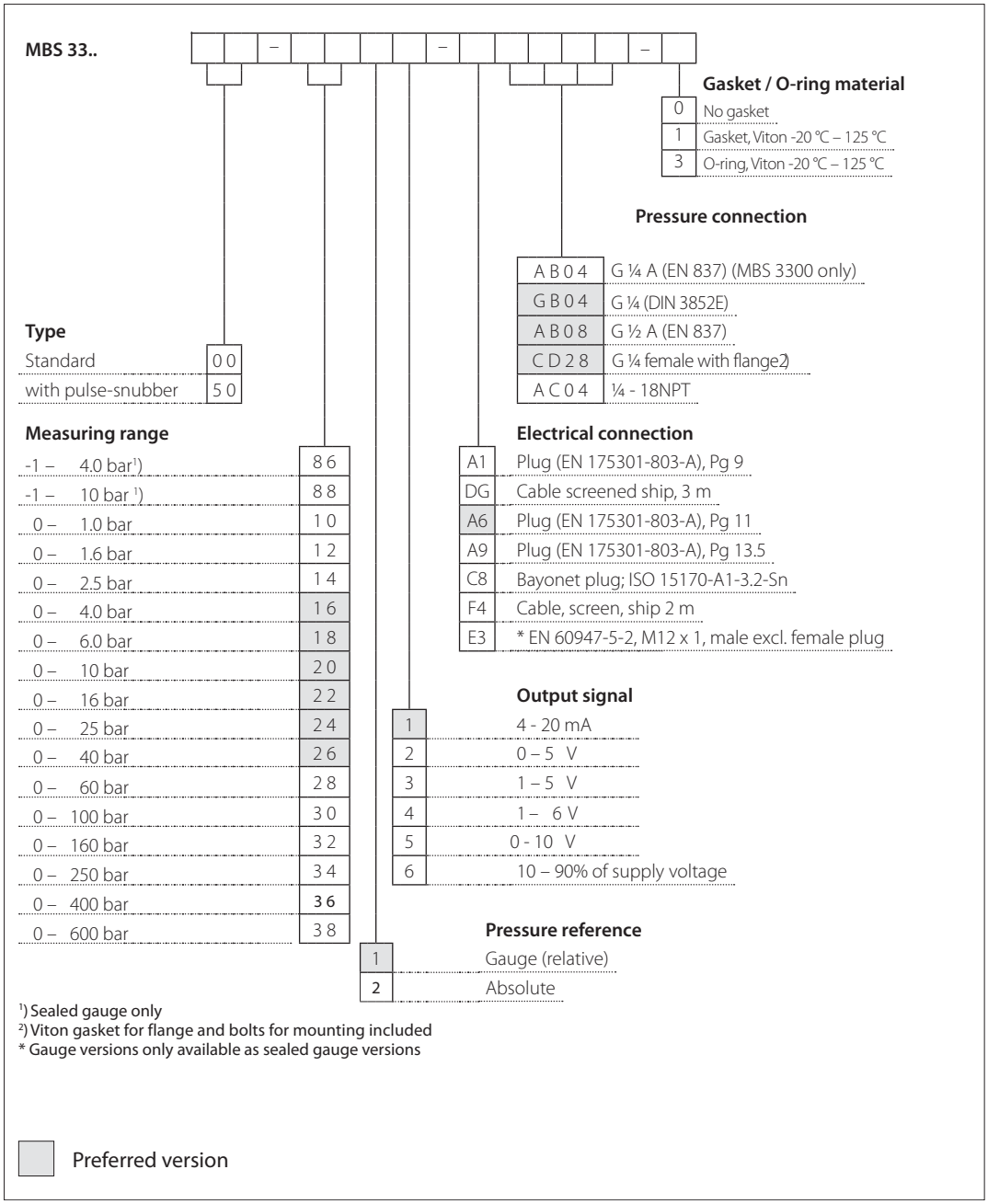
Type code See Dimensions/Combinations	A1 / A6 / A9	DG	F4	E3	C8
					
	EN 175301-803-A, Pg 9/11/13.5	Cable screened ship, 3 m	Cable screened ship 2m	EN 60947-5-2 M12 × 1; 4-pin	ISO 15170-A1-3.2-Sn Bayonet
Ambient temperature 4 - 20 mA output	-40 – 100 °C	-30 – 100 °C	-30 – 100 °C	-25 – 90 °C	-40 – 100 °C
Ambient temperature 0 - 5 V, 1 - 5 V, 1 - 6 V, 0 - 10 V and ratiometric output	-40 – 125°C	-30 – 125 °C	-30 – 125 °C	-25 – 90 °C	-40 – 125 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP67	IP67	IP67
Material	Glass filled polyamid, PA 6.6	RTFRO with PE shrinkage tubing	Polylefin cable with PE Shrinkage tubing	Nickel plated brass, CuZn/Ni	Glass filled polyester PBT
Electrical connection, 4 – 20 mA output (2 wire)	Pin1: + supply Pin 2: ÷ supply Pin 3: not used ⏚ Earth: Connected to MBS enclosure	Black wire:: + supply Blue wire: ÷ supply Brown wire: not used Screen: Connected to MBS enclosure	Brown wire: + supply Black wire: ÷ supply Red wire: not used Orange: not used Screen: not connected to MBS enclosure	Pin1: + supply Pin 2: not used Pin 3: not used Pin 4: - supply	Pin1: + supply Pin 2: ÷ supply Pin 3: not used Pin 4: not used
Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V and ratiometric output	Pin1: + supply Pin 2: ÷ supply[1] Pin 3: + output ⏚ Earth: Connected to MBS enclosure	Black wire:: + supply Blue wire: ÷ supply[1] Brown wire: + output Screen: Connected to MBS enclosure	Red wire: + Supply Black wire: - supply [1] Brown wire: Output Orange: not used Screen: not connected to MBS enclosure	Pin1: + supply Pin 2: not used Pin 3: + output Pin 4: - supply [1]	Pin1: + supply Pin 2: output Pin 3: Ventilation Pin 4: ÷supply[1]

[1] Common

Ordering

Ordering standard

Figure 1: MBS ordering standard



NOTE:
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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Table 7: Certificates and declarations

File name	Document type	Document topic	Approval authority
18-LD1740756-1-PDA	Safety certificate	Marine approval	ABS
08472-E0 BV	Safety certificate	Marine approval	BV
TJ20PTB00030	Safety certificate	Marine approval	CCS
1786330	Explosive - Safety Certificate	Explosive	CSA
064R9402.00	Manufacturers Declaration	PED	Danfoss
064G9615.06	EU Declaration	ATEX/EMCD/RoHS	Danfoss
060R3160.00	Manufacturers Declaration	China RoHS	Danfoss
TAA000025S rev. 1	Safety certificate	Marine approval	DNV GL
Д-DK.БЛ08.B.00302_18	-	EAC Declaration	EAC RU
OC.C.30.004.A 53828-1	Measuring - Performance certificate	-	GOST
CPH 04967-AE006	Safety certificate	Marine approval	KR
2008558TA	Safety certificate	Marine approval	LR
TA20389M	Safety certificate	Marine approval	NKK
ELE098420XG	-	-	RINA
CRN.0F18477.5123467890YTN	Pressure - Safety certificate	CRN	TSSA
E311982	Electrical - Safety Certificate	-	UL
E494625	Electrical - Safety Certificate	-	UL
E227388	Electrical - Safety Certificate	Hazardous Locations	UL

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