

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.

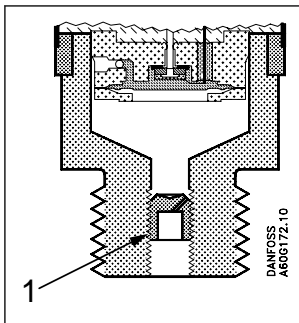
A robust design, an excellent vibration stability, and a high degree of EMC / EMI protection equip the pressure transmitter to meet the most stringent marine requirements.

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)	$\leq \pm 0.5\%$ FS (typ.)
	$\leq \pm 1.0\%$ FS (max.)
Non-linearity BFSL (conformity)	$\leq \pm 0.2\%$ FS
Hysteresis and repeatability	$\leq \pm 0.1\%$ FS
Thermal error band (compensated temperature range)	$\leq \pm 1.0\%$ FS
Response time	Liquids with viscosity < 100 cSt
	Air and gases (MBS 3350)
Overload pressure (static)	$6 \times$ FS (max. 1500 bar)
Burst pressure	$6 \times$ FS (max. 2000 bar)
Power-up time	< 50 ms
Durability, P: 10 – 90% FS	$> 10 \times 10^6$ 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	\approx 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 Ω	$R_L \geq 15$ k Ω	$R_L \geq 10$ k Ω 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 M Ω at 500 V DC
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 _{rms} , 5 Hz – 1 kHz
Shock resistance	Shock	500 g / 1 ms
	Free fall	1 m
Enclosure (depending on electrical connection)		See Electrical connections

Table 4: Explosive atmospheres

Zone 2 applications ⁽¹⁾		EN60079-0; EN60079-7
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⁽¹⁾ When used in ATEX Zone 2 areas at low temperatures the cable and plug must be protected against impact.

Pressure transmitter, type MBS 3300 and MBS 3350

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

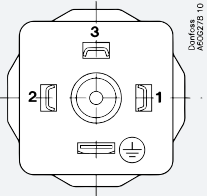
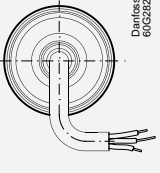
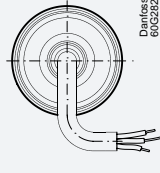
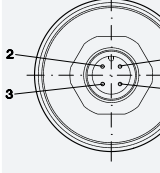
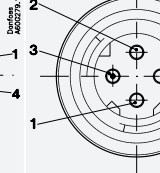


Dimensions/Combinations

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
	G $\frac{1}{4}$ A (EN 837)	G $\frac{1}{4}$ (DIN 3852-E)	G $\frac{1}{2}$ A (EN 837)	$\frac{1}{4}$ - 18 NPT	G $\frac{1}{4}$ A female with flange	
Type code	AB04	GB04	AB08	AC04	CD28	
Recommended 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

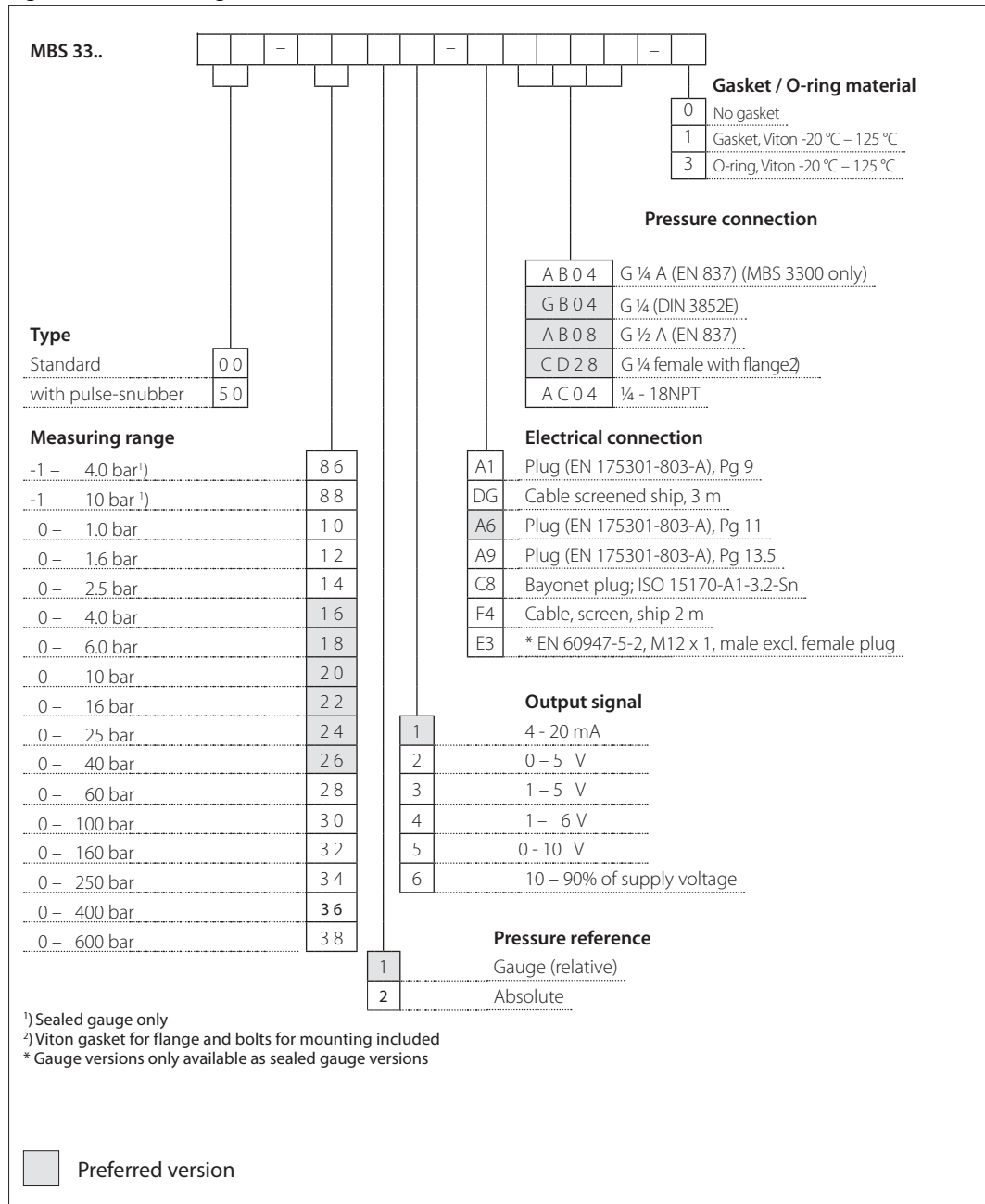
Type code See Dimensions/Combinations	A1 / A6 / A9	DG	F4	E3	C8
					
	EN 175301-803-A, Pg 9/11/13.5	Cable screened ship, 3 m	Cable screened ship 2m	EN 60947-5-2 M12 x 1; 4-pin	ISO 15170-A1-3.2-Sn Bayonet
Ambient temperature 4 - 20 mA output	-40 – 100 °C	-30 – 100 °C	-30 – 100 °C	-25 – 90 °C	-40 – 100 °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	Polyolefin 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	Pin 1: + 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 out- put	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	Pin 1: + 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.

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Valid certificates and declarations

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-ДК.БЛ08.В.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.OF18477.5123467890YTN	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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