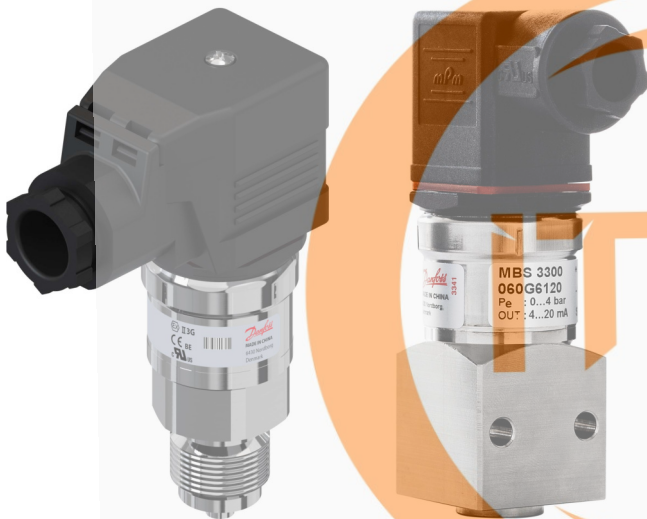


Data Sheet

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.

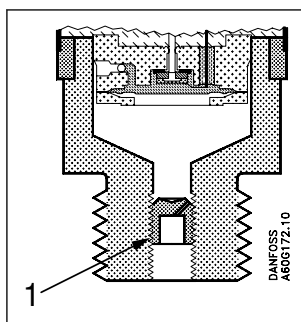
A robust design, an excellent vibration stability, and a high degree of EMC / EMI protection equip the pressure transmitter to meet the most stringent marine requirements.

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.

Liquid backlash can create huge pressure peaks of a non uniform nature and damage the diaphragm. 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)	$\leq \pm 0.5\% \text{ FS (typ.)}$
	$\leq \pm 1.0\% \text{ FS (max.)}$
Non-linearity BFSL (conformity)	$\leq \pm 0.2\% \text{ FS}$
Hysteresis and repeatability	$\leq \pm 0.1\% \text{ FS}$
Thermal error band (compensated temperature range)	$\leq \pm 1.0\% \text{ FS}$
Response time	Liquids with viscosity < 100 cSt
	Air and gases (MBS 3350)
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
MTTFd - Calculation based on the SN 29500	> 100 years

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	–	$\leq 5 \text{ mA}$	$\leq 8 \text{ mA}$	$\leq 5 \text{ mA} - 5 \text{ V}$
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]	R _L ≤ (U _B – 9 V) / 0.02 A	R _L ≥ 10 kΩ	R _L ≥ 15 kΩ	R _L ≥ 10 kΩ 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	–40 – 125 °C
	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
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⁾	II 3G Ex ec IIA T3 Gc –20 °C < Ta < +85 °C	EN60079-0; EN60079-7
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⁽¹⁾ The Pressure transmitter must be installed where it cannot be exposed to impact in normal use.

- Only versions with EN 175301-803-A, Screened cable, Flying leads, ISO 15170 Bayonet or Deutsch DT04-4p
- Deutsch DT04-4P: Must be installed in an enclosure that complies with the impact requirements in accordance to EN 60079-0

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

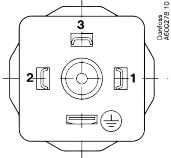
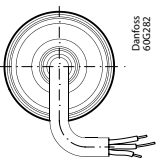
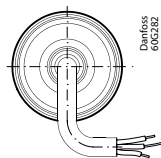
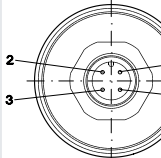
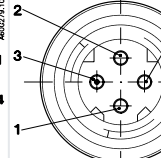
Dimensions/Combinations

Type code	A1	A6	H3	F4 / DG	E3	C8
	EN 175301-803-A Pg 9	EN 175301-803-A Pg 11	EN 175301-803-A M20	Cable screened ship 2 m / 3 m	IEC 61076-2-101; M12 x1 male excl. female plug	ISO 15170-A1-3-2-Sn Bayonet
	G1/4 A (EN 837)	G1/4 (DIN 3852-E)	G1/2 A (EN 837)	1/4 - 18 NPT	G1/4 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: Standard Electrical connections

Type code See Dimensions/Combinations	A0 / A1 / A6 / H3	DG	F4	E3	C8
					
	EN 175301-803-A, 4PIN male, Pg9, Pg11 and M20	Cable screened ship, 3 m	Cable screened ship 2m	IEC 61076-2-101 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
Atex Zone 2 enclosure		IP54			
Material	Glass filled polyamid, PA 6.6	RTFRO with PE shrinkage tubing	RTFRO 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	Black wire: + supply Blue wire: ÷ supply Brown wire: not used Screen: 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 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	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

MBS 33..		Gasket / O-ring material	
Type		0	No gasket
Standard	00	1	Gasket, Viton -20 °C – 125 °C
with pulse-snubber	50	2	Gasket, NBR -40°C - 100°C
Measuring range		3	O-ring, Viton -20 °C – 125 °C
-1 – 4.0 bar ¹⁾	86	4	O-ring, NBR -40°C - 100°C
-1 – 10 bar ¹⁾	88		
0 – 1.0 bar	10	Pressure connection	
0 – 1.6 bar	12	A B 0 4	G 1/4 A (EN 837) (MBS 3300 only)
0 – 2.5 bar	14	A B 0 8	G 1/2 A (EN 837)
0 – 4.0 bar	16	A C 0 4	1/4 - 18NPT
0 – 6.0 bar	18	C D 2 8	G 1/4 female with flange ²⁾
0 – 10 bar	20	F B 0 4	G1/4 (DIN 3852-G)
0 – 16 bar	22	G B 0 4	G 1/4 (DIN 3852E)
0 – 25 bar	24	Electrical connection	
0 – 40 bar	26	A0	4 Pin male (EN 175301-803-A)
0 – 60 bar	28	A1	Angular connector (EN 175301-803-A), Pg 9
0 – 100 bar	30	A6	Angular connector (EN 175301-803-A), Pg 11
0 – 160 bar	32	C8	Bayonet plug; ISO 15170-A1-3.2-Sn
0 – 250 bar	34	DG	Cable screened ship, 3 m
0 – 400 bar	36	E3	* IEC 61076-2-101, M12 x 1, male excl. female plug
0 – 600 bar	38	F4	Cable, screen, ship 2 m
		H3	Angular connector (EN 175301-803-A), M20
		Output signal	
		1	4 - 20 mA
		2	0 - 5 V
		3	1 - 5 V
		4	1 - 6 V
		5	0 - 10 V
		6	10 - 90% of supply voltage
		Pressure reference	
		1	Gauge (relative)
		2	Absolute
		3	Sealed gauge

¹⁾ Sealed gauge only
²⁾ NBR gasket for flange and bolts for mounting included
* Gauge versions only available as sealed gauge versions

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
08472-E0 BV	Safety certificate	Marine approval	BV
064G9615.11	EU_UK Declaration	ATEX/EMC/RoHS	Danfoss
TAA000025S rev. 1	Safety certificate	Marine approval	DNV GL
CPH 04967-AE006	Safety certificate	Marine approval	KR
2008558TA	Safety certificate	Marine approval	LR
TA20389M	Safety certificate	Marine approval	NKK
ELE098420XG	Safety certificate	Marine approval	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
E31024	Electrical Safety Certificate	-	UL
SMS.W.II-2179-C.0	Marine	Manufacturing Permission	BV
E510763	Electrical - safety certificate	Hazardous Locations	UL
CCS TJ22PTB00047	Safety Certificate	Marine approval	CCS
ABS 23-2425974-PDA	Safety Certificate	Marine approval	ABS
UA.TR.089.1015.05-22	Safety Certificate	Pressure	LLC CDC EURO TYSK
Danfoss UA 2023-01-10	UA Declaration	EMC/LVD	Danfoss
Danfoss UA 2023-01-10	UA Declaration	PED	DANFOSS
EAC KZ 7500533.13.12.00845	EAC Declaration	EMC	EAC