

## Data Sheet

Pressure transmitter  
Type **MBS 33M**

For high accuracy marine applications



The high accuracy transmitter MBS 33M 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 a 4 – 20 mA output signal, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar. A wide range of pressure and electrical connections.

Excellent vibration stability, robust construction, 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
- All relevant marine approvals
- Enclosure 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
- Fully digitally compensated
- For use in ATEX Zone 2 explosive atmospheres
- UL approved

## Product specification

### Technical data

**Table 1: Performance (EN 60770)**

Accuracy (incl. non-linearity, hysteresis and repeatability)		≤ ± 0.3% FS (typ.) ≤ ± 0.8% 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
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 <sup>6</sup> cycles

**Table 2: Electrical specifications**

Nom. output signal (short-circuit protected)		4 – 20 mA
Supply voltage [U <sub>B</sub> ] (polarity protected)		9 – 32 V DC (12 / 24 V DC nom.)
Supply voltage dependency		< 0.1% FS / 10 V
Output limitation		22.4 mA
Load [R <sub>L</sub> ] (load connected to 0 V)		R <sub>L</sub> ≤ (U <sub>B</sub> - 9 V) / 0.02 A[Ω]

**Table 3: Environmental conditions**

Sensor operating temperature	Normal		-40 – 85 °C
	ATEX Zone 2		-10 – 85 °C
Media temperature range			-40 – 85 °C
Ambient temperature range (depending on electrical connection)			See <a href="#">Electrical connections</a>
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 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	
Shock resistance	Random	7.5 g <sub>rms</sub> , 5 Hz – 1 kHz	IEC 60068-2-64
	Shock	500 g / 1 ms	IEC 60068-2-27
Shock resistance	Free fall	1 m	IEC 60068-2-32
	Enclosure (depending on electrical connection)		See <a href="#">Electrical connections</a>

**Table 4: Explosive atmospheres**

Zone 2 applications <sup>(1)</sup>	 Ex ce IIA T3 Gc -10°C < Ta < +85°C	EN60079-0; EN60079-7
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<sup>(1)</sup> 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 <a href="#">Electrical connections</a>
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

## Dimensions / Combinations

Table 6: Dimensions / Combinations

Type code	A1	A3	A6	A9	
	EN175301-803-A, Pg9	2 m screened cable	EN 175301-803-A, Pg 11	EN175301-803-A, Pg 13.5	
	G 1/4 A (EN 837)	G 1/2 A (EN 837)	1/4 – 18 NPT	1/2 – 14 NPT	G 1/4 (DIN 3852-E)
Type code	<b>AB04</b>	<b>AB08</b>	<b>AC04</b>	<b>AC08</b>	<b>GB04</b>
Recommended torque <sup>(1)</sup>	30 – 35 Nm	30 – 35 Nm	2 – 3 turns after finger tight-ened	2 – 3 turns after finger tight-ened	30 – 35 Nm

<sup>(1)</sup> Depends on different parameters as packing material, mating material, thread lubrication and pressure level

## Electrical connections

Type code	A1	A3	A6	A9
	EN 175301-803-A, Pg 13.5	2 m screened cable	EN 175301-803-A, Pg 9	EN 175301-803-A, Pg 11
Ambient temperature	-40 – 85 °C	-30 – 85 °C	-40 – 85 °C	-40 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP65	IP65
Material	Glass filled polyamid, PA 6.6	Poliolyfin cable with PE shrinkage tubing	Glass filled polyamid, PA 6.6	Glass filled polyamid, PA 6.6
Electrical connection, 4 – 20 mA output (2 wire)	Pin1: + 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	Pin1: + supply Pin 2: ÷ supply Pin 3: not used  Earth: Connected to MBS enclosure	Pin1: + supply Pin 2: ÷ supply Pin 3: not used  Earth: Connected to MBS enclosure

## Ordering

### Ordering standard

**MBS 33M**

Measuring range	
0 – 1.0 bar	1 0
0 – 1.6 bar	1 2
0 – 2.5 bar	1 4
0 – 4.0 bar	1 6
0 – 6.0 bar	1 8
0 – 10 bar	2 0
0 – 16 bar	2 2
0 – 25 bar	2 4
0 – 40 bar	2 6
0 – 60 bar	2 8
0 – 100 bar	3 0
0 – 160 bar	3 2
0 – 250 bar	3 4
0 – 400 bar	3 6
0 – 600 bar	3 8

Gasket / O-ring material	
0	No gasket
2	Gasket, NBR -40 °C – 85 °C
4	O-ring, NBR -40 °C – 85 °C

Pressure connection	
A B 0 4	G ¼ A (EN 837)
A B 0 8	G ½ A (EN 837)
A C 0 4	¼ – 18NPT
A C 0 8	½ – 14NPT
G B 0 4	DIN 3852-E-G ¼;

Electrical connection	
A1	Plug Pg 9 (EN175301-803-A)
A3	Screened cable, 2 m
A6	Plug Pg 11 (EN 175301-803-A)
A9	Plug Pg 13.5 (EN 175301-803-A)

Output signal	
1	4 – 20 mA

Pressure reference	
Gauge (relative)	1
Absolute	2

1 - Preferred version

**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](http://danfoss.com) or contact your local Danfoss representative if you have any questions.

**Table 7: Certificates and declarations**

File name	Document type	Document topic	Approval authority
18.10316.266	Marine - Safety Certificate	-	RMRS
19-20025	Marine - Safety Certificate	-	LR
05270-F0 BV	Marine - Safety Certificate	-	BV
18-LD1740756-1-PDA	Marine - Safety Certificate	-	ABS
TAA00000W0	Marine - Safety Certificate	-	DNV GL
TJ18T00028	Marine - Safety Certificate	-	CCS
TA17320M	Marine - Safety Certificate	-	NKK
SMS.W.II-2179-B.0	Marine - Manufacturing Permission	-	BV
E227388	Explosive - Safety Certificate	Hazardous Locations	UL
E31024	Electrical - Safety Certificate	-	UL
E311982	Electrical - Safety Certificate	-	UL
E494625	Electrical - Safety Certificate	-	UL
DK.C.30.018.A 31316	Measuring - Performance Certificate	-	GOST
064G9615.06	EU Declaration	ATEX/EMCD/RoHS	Danfoss
CRN.0F18477.5123467890YTN	Pressure - Safety Certificate	CRN	TSSA
060R3160.00	Manufacturers Declaration	China RoHS	Danfoss
064R9402.00	Manufacturers Declaration	PED	Danfoss
1786330	Explosive - Safety Certificate	-	CSA

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