

Data sheet

# Pressure transmitter for marine applications

## MBS 33M



The standard pressure 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 industrial 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

### Approvals

Det Norske Veritas/Germanischer Lloyd, DNV GL  
Lloyds Register of Shipping, LR  
Bureau Veritas; BV  
Registro Italiana 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

**Technical data**
*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 zero point shift	$\leq \pm 0.1\%$ FS / 10K (typ.)
	$\leq \pm 0.2\%$ FS / 10K (max.)
Thermal sensitivity (span) shift	$\leq \pm 0.1\%$ FS / 10K (typ.)
	$\leq \pm 0.2\%$ 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

*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)	$R_L \leq (U_B - 10 V) / 0.02 A [\Omega]$

*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 page 5	
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	
	Random	7.5 g <sub>rms</sub> , 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 5	

**Technical data**  
*(continued)*
**Explosive atmospheres**

Zone 2 applications	<b>II 3G</b> <b>Ex nA IIA T3 Gc</b> <b>-10 °C &lt; Ta &lt; + 85 °C</b>	EN60079-0; EN60079-15; EN60079-7
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When used in ATEX Zone 2 areas at low temperatures 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 5
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

**Ordering standard**

**MBS 33M**

Measuring range	
0 – 1.0 bar	10
0 – 1.6 bar	12
0 – 2.5 bar	14
0 – 4.0 bar	16
0 – 6.0 bar	18
0 – 10 bar	20
0 – 16 bar	22
0 – 25 bar	24
0 – 40 bar	26
0 – 60 bar	28
0 – 100 bar	30
0 – 160 bar	32
0 – 250 bar	34
0 – 400 bar	36
0 – 600 bar	38

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

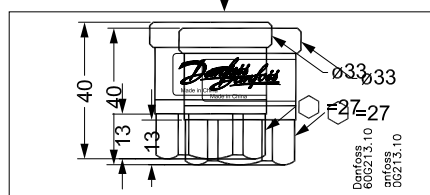
Pressure reference	
Gauge (relative)	1
Absolute	2

Preferred version

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.

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	AB04	AB08	AC04	AC08	GB04
Recommended torque <sup>1)</sup>	30 – 35 Nm	30 – 35 Nm	2 – 3 turns after finger tightened	2 – 3 turns after finger tightened	30 – 35 Nm

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

**Electrical connections**

Type code, see page 4	A1	A3	A6	A9
	<p>EN 175301-803-A, Pg 13.5</p>	<p>2 m screened cable</p>	<p>EN 175301-803-A, Pg 9</p>	<p>EN 175301-803-A, Pg 11</p>
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)	<p>Pin 1: + supply Pin 2: ÷ supply Pin 3: not used</p> <p>Earth: Connected to MBS enclosure</p>	<p>Brown wire: + supply Black wire: ÷ supply Red wire: not used Orange: not used Screen: not connected to MBS enclosure</p>	<p>Pin 1: + supply Pin 2: ÷ supply Pin 3: not used</p> <p>Earth: Connected to MBS enclosure</p>	<p>Pin 1: + supply Pin 2: ÷ supply Pin 3: not used</p> <p>Earth: Connected to MBS enclosure</p>