

Data Sheet

# Pressure transmitters Type **MBS 33**

For industrial applications



The standard pressure transmitters MBS 33 are designed for use in almost all industrial applications, and offer reliable pressure measurements, 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.

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 industrial environments
- CE-marked: EMC protected in accordance with EU EMC Directive
- Enclosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Fully digitally compensated
- Output signals:
  - 0 – 5 V, 1 – 5 V, 1 – 6 V or 0 – 10 V DC
  - 4 – 20 mA
- A wide range of pressure connections
- Electrical connection: plug or cable
- 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)		$\leq \pm 0.3\%$ FS (typ.)
		$\leq \pm 0.8\%$ 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

**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
Supply voltage [U <sub>B</sub> ], polarity protected	9 – 32 V DC		15 – 32 V DC
Supply – current consumption	-	$\leq 5$ mA	$\leq 8$ mA
Supply voltage dependency	< 0.1% FS / 10 V	< 0.05% FS / 10 V	
Output limitation	22.4 mA (typ.)	0-5 V: 5.75 V 1-5 V: 5.6 V 1-6 V: 6.75 V	0-10 V: 11.5 V
Sink / Source	-	< 1 mA	
Load [R <sub>L</sub> ] (load connected to 0 V)	$R_L \leq (U_B - 9 \text{ V}) / 0.02 \text{ A}$	$R_L \geq 10 \text{ k}\Omega$	$R_L \geq 15 \text{ k}\Omega$

**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 20 g, 25 Hz – 2 kHz	IEC 60068-2-6
	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 <a href="#">Electrical connections</a>	

**Table 4: Explosive atmospheres**

Zone 2 applications <sup>(1)</sup>	<b>II 3G</b> 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.

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**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 <b>Electrical connections</b>
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

## Dimensions / Combinations

Type code	A1				A3	
	EN175301-803-A, Pg 9				2 m screened cable	
	<p>G ¼ A (EN 837)</p>	<p>M18 × 1.5 (DIN 3852/3)</p>	<p>G ½ A (EN 837)</p>	<p>¼ – 18 NPT</p>	<p>M22 × 1.5 (DIN 3852-E)</p>	<p>G ¼ (DIN 3852-E)</p>
<b>Type code</b>	<b>AB04</b>	<b>AB12</b>	<b>AB08</b>	<b>AC04</b>	<b>BA16</b>	<b>GB04</b>
Recommended torque <sup>1)</sup>	30 – 35 Nm	30 – 35 Nm	30 – 35 Nm	2 – 3 turns after finger tightened	30 – 35 Nm	30 – 35 Nm



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

## Electrical connections

**Table 6: Electrical connections**

Type code	A1	A3
	<p>EN 175301-803-A, Pg 9</p>	<p>2 m screened cable</p>
Ambient temperature	-40 – 85 °C	-30 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67


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Type code	A1	A3
Material	Glass filled polyamid, PA 6.6	Polyolefin cable with PE shrinkage tubing
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
Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V output	Pin1: + supply Pin 2: ÷ supply <sup>(1)</sup> Pin 3: + output  Earth: Connected to MBS enclosure	Brown wire: + output Black wire: ÷ supply <sup>(1)</sup> Red wire: + supply Orange: not used Screen: not connected to MBS enclosure

<sup>(1)</sup> Common

## Ordering

### Ordering standard

MBS 33		Gasket / O-ring material	
		0	No gasket
		2	Gasket, NBR -40 °C – 85 °C
		4	O-ring, NBR -40 °C – 85 °C
Measuring range		Pressure connection	
0 – 1.0 bar	1 0	A B 0 4	G ¼ A (EN 837)
0 – 1.6 bar	1 2	A B 0 8	G ½ A (EN 837)
0 – 2.5 bar	1 4	A C 0 4	¼ – 18 NPT
0 – 4.0 bar	1 6	B A 1 2	M18 × 1.5 (DIN 3852/3)
0 – 6.0 bar	1 8	B A 1 6	M22 × 1.5 (DIN 3852-E)
0 – 10 bar	2 0	G B 0 4	G ¼ (DIN 3852-E)
0 – 16 bar	2 2		
0 – 25 bar	2 4	Electrical connection	
0 – 40 bar	2 6	A1	Plug Pg 9 (EN175301-803-A)
0 – 60 bar	2 8	A3	Screened cable, 2 m
0 – 100 bar	3 0	Output signal	
0 – 160 bar	3 2	1	4 – 20 mA
0 – 250 bar	3 4	2	0 – 5 V
0 – 400 bar	3 6	3	1 – 5 V
0 – 600 bar	3 8	4	1 – 6 V
		5	0 – 10 V
Pressure reference			
Gauge (relative)	1		
Absolute	2		
	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.

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### Valid certificates and declarations

**Table 7: Certificates and declarations**

File name	Document type	Document topic	Approval authority
CRN.OF18477.5123467890YTN	Pressure - Safety Certificate	CRN	TSSA
B-BK-60210-1170/19	PZH	-	-
1786330	Explosive - Safety Certificate	-	CSA
064R9402.00	Manufacturers Declaration	MD Declaration	Danfoss
064G9615.06	EU Delcaration	ATEX/EMCD/RoHS	Danfoss
060R3160.00	Manufacturers Declaration	China RoHS	Danfoss
Д-ДК.БЛ08.В.00302_18	EAC RU	EAC Declaration	-
DK.C.30.018.A 31316	Measuring - Performance Certificate	-	Gost
OC.C.30.004.A 53828-1	Measuring - Performance Certificate	-	Gost
E311982	Electrical safety certificate	-	UL
E494625	Electrical safety certificate	-	UL
E227388	Electrical safet certificate	Hazardous Locations	UL

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