

Data Sheet

# Pressure transmitter Type **MBS 3000** and **MBS 3050**

For general industrial purposes



The compact pressure transmitter, type MBS 3000, is designed for use in industrial and hydraulic applications, and offers a reliable pressure measurement, even under harsh environmental conditions.

The compact heavy duty pressure transmitter MBS 3050 with integrated pulse-snubber is designed for use in hydraulic applications with severe medium influences like cavitation, liquid hammer or pressure peaks 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. A wide range of pressure and electrical connections are available.

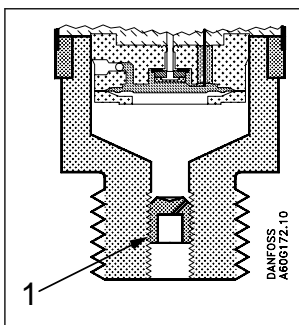
Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

## Features

- Designed for use in severe industrial and hydraulic environments
- Resistant to cavitation, liquid hammer and pressure peaks (MBS 3050)
- Enclosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 0 up to 600 bar
- All standard output signals: 4 – 20 mA, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V, 1 – 10 V, Ratiometric output signal: 10-90% of supply voltage
- 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 for MBS 3050



- 1 Pulse-snubber

### Application for MBS 3050

Cavitation, liquid hammer and pressure peaks may occur in hydraulic systems with changes in flow velocity, e.g. fast closing of a valve or when a pump starts and stops.

The problem may occur on the inlet and outlet side of the application, even at rather low operating pressures.

### Media condition for MBS 3050

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 start-up 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)	≤ ± 0.5% FS (typ.) ≤ ± 1% 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
Response time: Air and gases (MBS 3050)	< 35 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, 1 – 5, 1 – 6 V	0 – 10 V, 1 – 10 V	Ratiometric 10 – 90% of [U <sub>B</sub> ]
Supply voltage [U <sub>B</sub> ], polarity protected	9 – 32 V DC	9 – 32 V DC	15 – 32 V DC	4.5 – 5.5 V DC
Supply – current consumption	–	≤ 5 mA	≤ 8 mA	≤ 5 mA at 5 V DC
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	0-10V: 11.5 V	≈ supply voltage
Sink / Source	–	< 1 mA		
Load [R <sub>L</sub> ] (load connected to 0 V)	R <sub>L</sub> ≤ (U <sub>B</sub> - 9 V) / 0.02 A	R <sub>L</sub> ≥ 10 kΩ	R <sub>L</sub> ≥ 15 kΩ	R <sub>L</sub> ≥ 10 kΩ at 5 V DC

**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>	II 3G 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.

## Pressure transmitter, type MBS 3000 and MBS 3050

**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

Type code	A1	A3	E3	A8	A6	C8	D9	G1	
	ENI 75301-803-A, Pg 9	2 m screened cable	EN 60947-5-2 M1.2 x 1.4-pin	AMP Superseal	EN 175301-803-A Pg 11	ISO 15170-A1-3.2-SN	AMP 173065, male, Flying leads	AMP Econoseal	
Type code	AB04	AB06	AB08	AC04	AC08	GB04	FA09	FA12	FD10
Recommended torque <sup>1)</sup>	30 - 35 Nm	30 - 35 Nm	30 - 35 Nm	2 - 3 turns after finger tightened	2 - 3 turns after finger tightened	30 - 35 Nm	30 - 35 Nm	30 - 35 Nm	30 - 35 Nm

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

## Electrical connections

Table 6: Electrical connections

Type code	A1 & A6	A3	E3	A8	C8	D9	G1
	<p>EN 175301-803-A, Pg 9 &amp; Pg 11</p>	<p>2 m screened cable</p>	<p>EN 60947-5-2 M12 x 1; 4-pin</p>	<p>AMP Superseal 1.5 series (male)</p>	<p>ISO 15170-A1-3.2-Sn Bayonet</p>	<p>AMP 173065, male Flying leads 125 mm</p>	<p>AMP Econoseal J series (male)</p>
Ambient temperature	-40 – 85 °C	-30 – 85 °C	-25 – 90 °C	-30 – 85 °C	-40 – 85 °C	-40 – 85 °C	-30 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP67	IP67	IP67/IP69	IP67	IP67
Material	Glass filled polyamide, PA 6.6 <sup>(1)</sup>	Poliolyfin cable with PE shrinkage tubing	Nickel plated brass, CuZn/Ni	Glass filled polyamide, PA 6.6 <sup>(2)</sup>	Glass filled polyester PBT <sup>(2)</sup>	Glass filled polyester PBT <sup>(2)</sup>	Glass filled polyamide, PA 6.6 <sup>(1)</sup>
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: not used Pin 3: not used Pin 4: ÷ supply</p>	<p>Pin 1: + supply Pin 2: ÷ supply Pin 3: not used</p>	-	<p>Pin 1: + supply Pin 2: - supply Pin 3: not used</p>	<p>Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: not used</p>
Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V, 1 – 10 V output	<p>Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output</p> <p>Earth: Connected to MBS enclosure</p>	<p>Brown wire: + output Black wire: ÷ supply Red wire: + supply Orange: not used Screen: not connected to MBS enclosure</p>	<p>Pin 1: + supply Pin 2: not used Pin 3: + output Pin 4: ÷ supply/ common</p>	<p>Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output</p>	-	<p>Pin 1: + supply Pin 2: - supply Pin 3: + output</p>	<p>Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output</p>
Electrical connection Ratio-metric output, 10-90% of supply voltage	<p>Pin 1: + supply Pin 2: ÷ supply Pin 3: output/ common</p> <p>Earth: Connected to MBS enclosure</p>	<p>Brown wire: output Black wire: ÷ supply Red wire: Common<sup>(3)</sup> Orange: not used Screen: not connected to MBS enclosure</p>	<p>Pin 1: + supply Pin 2: not used Pin 3: output Pin 4: ÷ supply/ common</p>	<p>Pin 1: + supply Pin 2: ÷ supply Pin 3: output/ common</p>	<p>Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output Pin 4: Not used</p>	-	<p>Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output</p>

<sup>(1)</sup> Female plug: Glass filled polyester, PBT

<sup>(2)</sup> Wire: PTFE (teflon) Protection sleeve: PBT mesh (polyester)

<sup>(3)</sup> Common

## Ordering

### Ordering standard

**MBS 30..**

Standard	00
With pulse-snubber	50

Measuring range	
0 – 1 bar	10
0 – 1.6 bar	12
0 – 2.5 bar	14
0 – 4 bar	16
0 – 6 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

Pressure reference	
Gauge (relative)	1
Absolute	2

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

Pressure connection	
AB04	G ¼ A (EN 837) (MBS 3000 only)
AB06	G ⅜ A (EN 837) (MBS 3000 only)
AB08	G ½ A (EN 837)
AC04	¼ – 18 NPT
AC08	½ – 14 NPT (MBS 3000 only)
GB04	DIN 3852-E -G ¼,
FA09	DIN 3852-E-M14 x 1.5
FA12	DIN 3852/3, M18 x 1.5-6g
FD10	⅝ – 18 UBF - 2A (SA EJ514)

Electrical connection	
Figures refer to plug and standard PIN configuration - see “Electrical connection”	
A1	Plug Pg 9 (EN 175301-803-A)
A6	Plug, Pg 11 (EN 175301-803-A)
A3	Screened cable, 2 m
E3	* Plug, EN 60947-5-2, M12 x 1; 4-pin; male, excl. female plug
A8	* Plug, AMP Superseal 1.5 series male, excl. female plug
C8	Bayonet plug, ISO 15170-A1-3.2 Sn (Ratiometric output only)
D9	* Plug, AMP 173065, male flying leads 125 mm excl. female plug
G1	* Plug, AMP Econoseal, J series, male excl. female plug

Output signal	
1	4 – 20 mA
2	0 – 5 V
3	1 – 5 V
4	1 – 6 V
5	0 – 10 V
7	1 – 10 V
6	Ratiometric, 10 – 90%

Preferred versions

\* 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.

## 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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**Table 7: Certificates and declarations**

File name	Document type	Document topic	Approval authority
060G9688.00	Manufacturers Declaration	-	Danfoss
097R0004.01	Manufacturers Declaration	RoHS	Danfoss
UA.1O146.D.00075-19	UA Declaration	EMCD/LVD	LLC CDC EURO TYSK
084R1022.01	Manufacturers Declaration	China RoHS	Danfoss
087R0017.00	Manufacturers Declaration	Simple apparatus	Danfoss

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