

## 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.

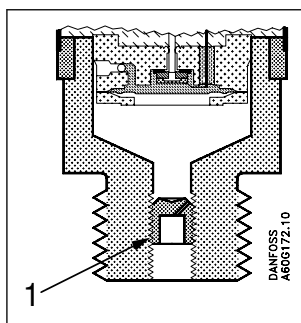
Excellent vibration stability, robust construction, and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

## 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

## 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> - 9V) / 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
	Random	7.5 g <sub>rms</sub> , 5 Hz – 1 kHz
Shock resistance	Shock	500 g / 1 ms
	Free fall	1 m
Enclosure (depending on electrical connection)		See <a href="#">Electrical connections</a>

**Table 4: Explosive atmospheres**

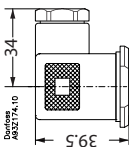
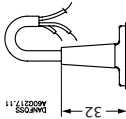
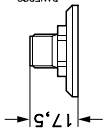
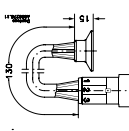
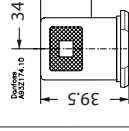
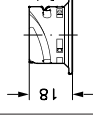
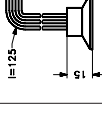
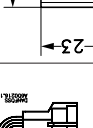
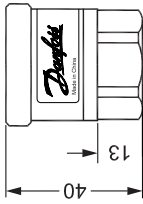
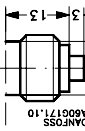
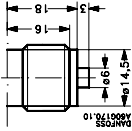
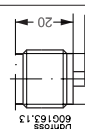
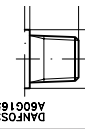
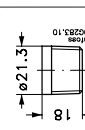
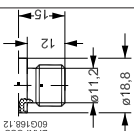
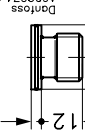
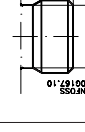
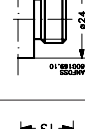
Zone 2 applications <sup>(1)</sup>	II 3G Ex nA IIA T3 Gc -10 °C < Ta < +85 °C	EN60079-0; EN60079-15
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<sup>(1)</sup> When used in ATEX Zone 2 areas at low temperatures the cable and plug must be protected against impact.

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

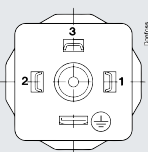
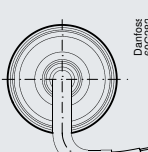
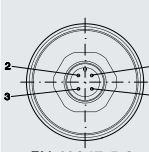
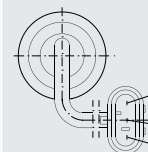
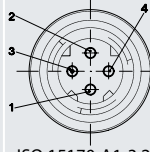
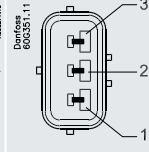
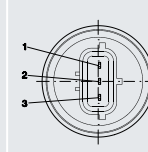



## Dimensions/Combinations

Type code	A1	A3	E3	A8	A6	C8	D9	G1	
	EN175301-803-A, Pg 9	2 m screened cable	EN 60947-5-2 M12 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
	G 1/4 A (EN 837)	G 3/8 A (EN 837)	G 1/2 A (EN 837)	1/4 - 18 NPT	1/2 - 14 NPT	G 1/4 R (DIN 3852-E)	M 18 x 1.5 - 6 g (ISO 261)	9/16-18 UNF-2A (SAE J514)	

1) 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
	 EN 175301-803-A, Pg 9 & Pg 11	 2 m screened cable	 EN 60947-5-2 M12 x 1; 4-pin	 AMP Superseal 1.5 series (male)	 ISO 15170-A1-3.2-Sn Bayonet	 AMP 173065, male Flying leads 125 mm	 AMP Econoseal J series (male)
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	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)	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: not used Pin 3: not used Pin 4: ÷ supply	Pin1: + supply Pin 2: ÷ supply Pin 3: not used	-	Pin 1: + supply Pin 2: - supply Pin 3: not used	Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: not used
Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V, 1 – 10 V output	Pin1: + supply Pin 2: ÷ supply/ common Pin 3: + output  Earth: Connected to MBS enclosure	Brown wire: + output Black wire: ÷ supply Red wire: + supply Orange: not used Screen: not connected to MBS enclosure	Pin1: + supply Pin 2: not used Pin 3: + output Pin 4: ÷ supply/ common	Pin1: + supply Pin 2: ÷ supply/ common Pin 3: + output	-	Pin 1: + supply Pin 2: - supply Pin 3: + output	Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output
Electrical connection Ratio-metric output, 10-90% of supply voltage	Pin1: + supply Pin 2: ÷ supply Pin 3: output/ common  Earth: Connected to MBS enclosure	Brown wire: output Black wire: ÷ supply Red wire: Common <sup>(3)</sup> Orange: not used Screen: not connected to MBS enclosure	Pin1: + supply Pin 2: not used Pin 3: output Pin 4: ÷ supply/ common	Pin1: + supply Pin 2: ÷ supply Pin 3: output/ common	Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output Pin 4: Not used	-	Pin 1: + supply Pin 2: ÷ supply/ common Pin 3: + output

<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

[illegible]

Non-standard build-up combinations may be selected. However, minimum order quantities may apply. Please contact your local Danfoss office for further information.

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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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