Niehues
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ENGINEERING TOMORROW

Danfoss

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.

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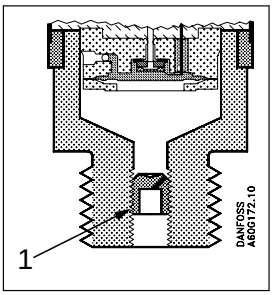
Features

- Designed for use in severe industrial and hydraulic environments
- Resistant to cavitation, liquid hammer and pressure peaks (MBS 3050)
- Enslosure 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 × 10^6 cycles
MTTFd - Calculation based on the SN 29500	> 100 years

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_B]
Supply voltage [U_B], 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_L] (load connected to 0 V)	R_L ≤ (U_B - 9 V) / 0.02 A	R_L ≥ 10 kΩ	R_L ≥ 15 kΩ	R_L ≥ 10 kΩ at 5 V DC

Table 3: Environmental conditions

Sensor operating temperature	Normal		-40 – 85 °C
	ATEX Zone 2		-20 - 85°C
Media temperature range			-40 – 85 °C
Ambient temperature range (depending on electrical connection)			See Electrical connections
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
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_{rms}, 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 Electrical connections

Table 4: Explosive atmospheres

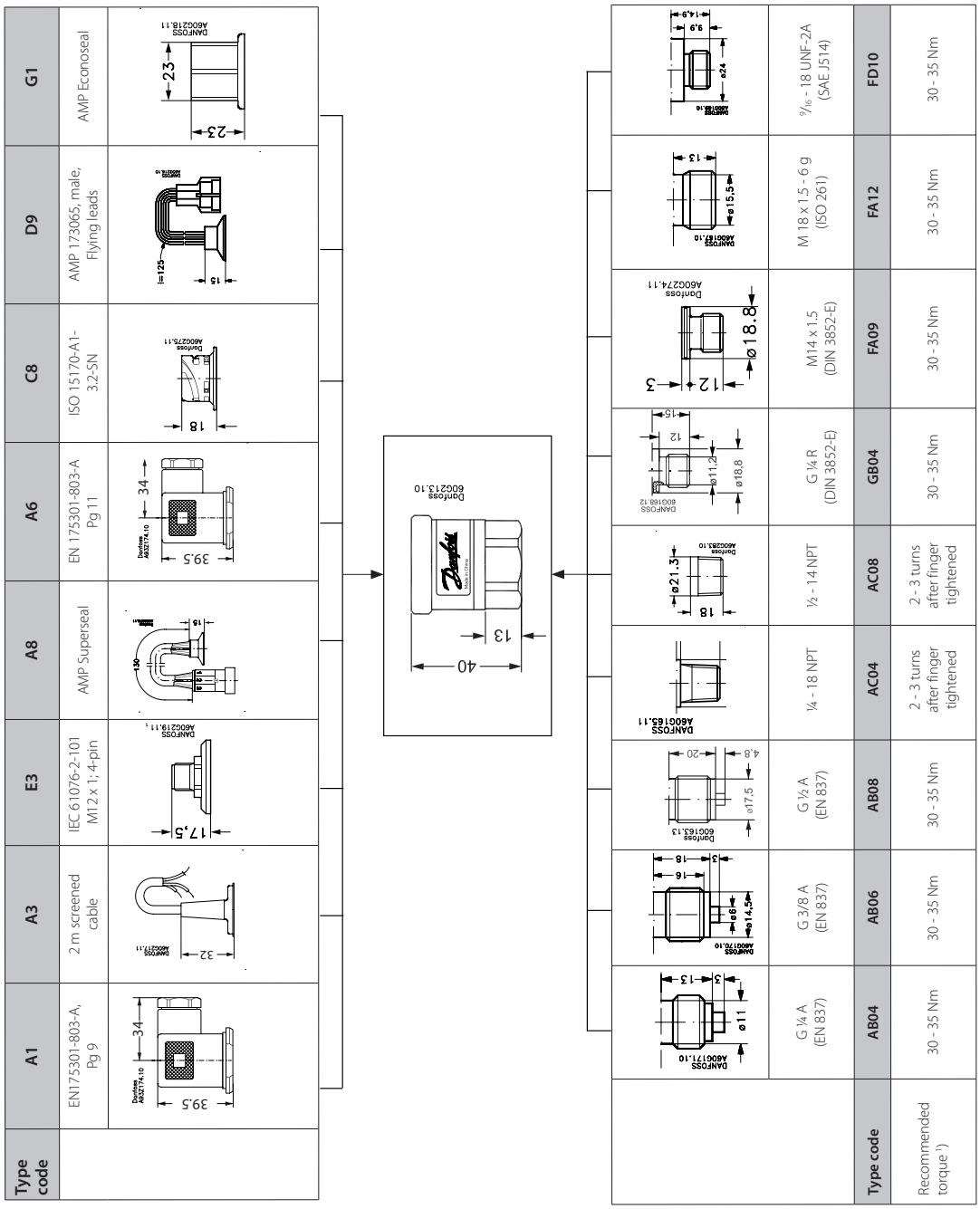
Zone 2 applications[1]	CE Ex II 3G Ex ce IIA T3 Gc -20°C<Ta<+85°C	EN60079-0; EN60079-7

[1] 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 Electrical connections
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

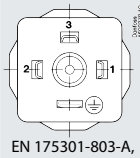
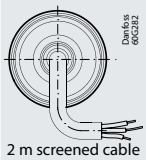
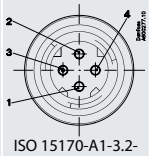
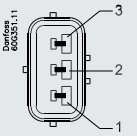
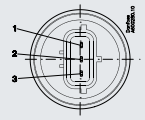
Dimensions/Combinations



1)Depends on different parameters such as gasket maetrial, mating material, thread lubrication and pressure level

Electrical connections

Table 6: Electrical connections

Type code	A1 & A6	A3 & A0	E3	A8	C8	D9	G1
	 EN 175301-803-A, Pg 9 & Pg 11	 2 m screened cable	 IEC 61076-2-101 M12 × 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/IP69	IP67	IP67
Atex Zone 2 enclosure	IP54						
Material	Glass filled polyamid, PA 6.6[1]	Poliolyfin cable with PE shrinkage tubing	Nickel plated brass, CuZn/Ni	Glass filled polyamid, PA 6.6[2]	Glass filled polyester PBT[2]	Glass filled polyester PBT[2]	Glass filled polyamide, PA 6.6[1]
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 Ratiometric 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[3] 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

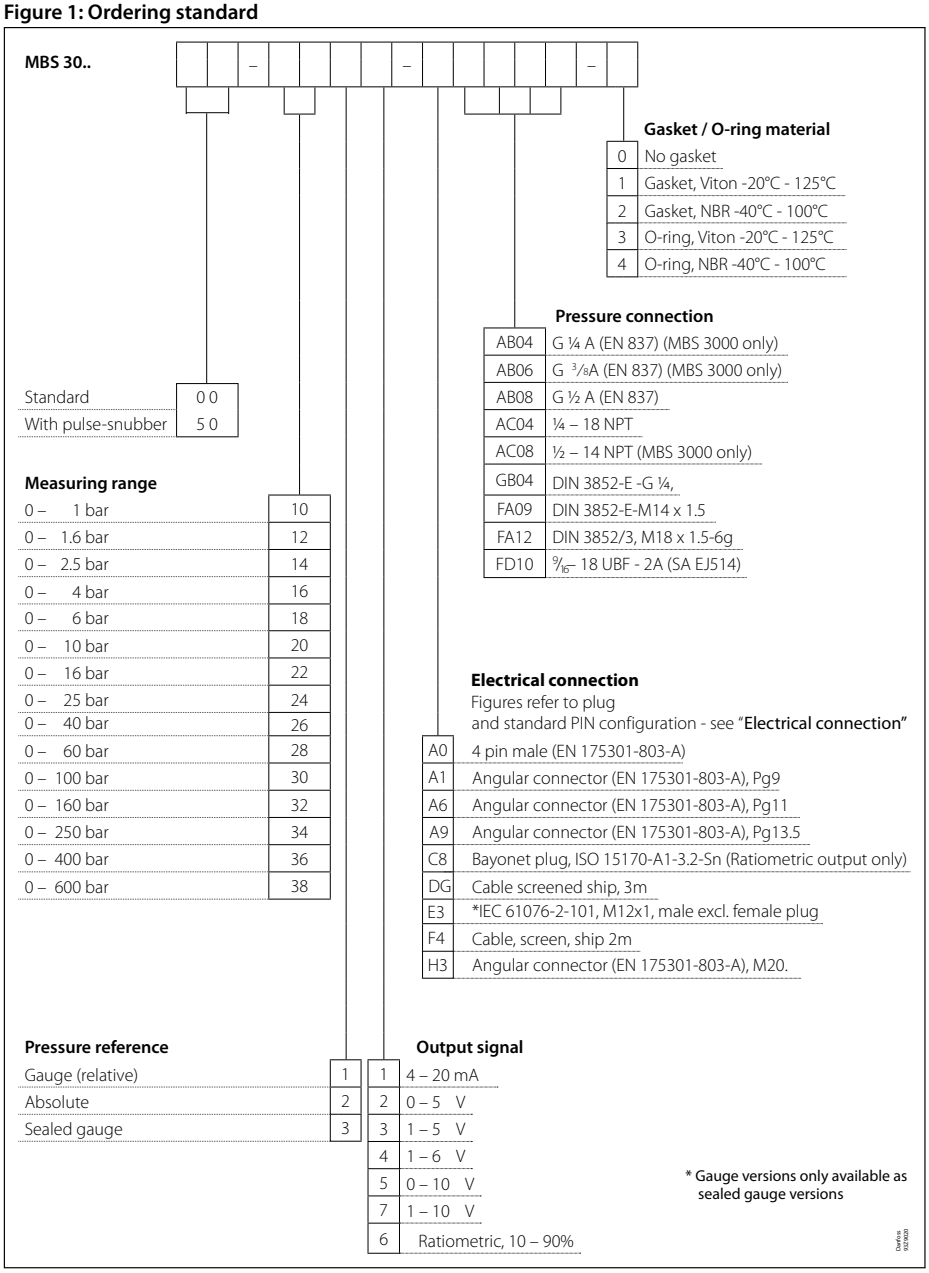
[1] Female plug: Glass filled polyester, PBT
[2] Wire: PTFE (teflon) Protection sleeve: PBT mesh (polyester)
[3] Common

NOTE:
Please check store.danfoss.com to find the correct variant for your requirements.

Ordering

Ordering standard

Figure 1: Ordering standard



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.

Some approvals may change over time. You can check the most current status at 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
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
E31024	Electrical Safety Certificate	-	UL
E311982	Electrical Safety Certificate	-	UL
E494625	Electrical Safety Certificate	-	UL
E227388	Electrical Safety Certificate	-	UL
064G9615.10	EU-UK Declaration	ATEX/EMCD/RoHS	Danfoss
060R3160.00	Manufactures Declaration	-	Danfoss
CRN.0F18477.5123467890YTN	Pressure Safety Certificate	-	TSSA

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