Data sheet

Pressure transmitter for general industrial purposes Type MBS 3000 and MBS 3050

The compact pressure transmitter, type MBS 3000, is designed for use in almost all industrial 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.

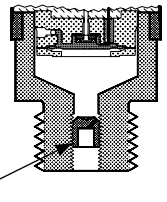
The flexible pressure transmitter programme covers different output signals, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar.
A wide range of pressure and electrical connections are available.

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)
- 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
- A wide range of pressure and electrical connections
- Temperature compensated and laser calibrated
- For use in zone 2 explosive atmospheres

Application and media conditions for MBS 3050



Application

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

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

Media condition

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.

Technical data

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
	Air and gases (MBS 3050)	< 35 ms
Overload pressure (static)		6 × FS (max. 1500 bar)
Burst pressure		6 × FS (max. 2000 bar)
Durability, P: 10 – 90% FS		>10 × 10^6 cycles

Electrical specifications

Nom. output signal (short-circuit protected)	4 – 20 mA	0 – 5, 1 – 5, 1 – 6 V	0 – 10 V, 1 – 10 V
Supply voltage [U_B], polarity protected	9 – 32 V	9 – 30 V	15 – 30 V
Supply – current consumption	–	≤ 5 mA	≤ 8 mA
Supply voltage dependency	≤ ± 0.1% FS / 10 V		
Current limitation	28 mA (typ.)	–	
Output impedance	–	≥ 25 kΩ	
Load [R_L] (load connected to 0 V)	$R_L \leq (U_B - 9V) / 0.02$ A	$R_L \geq 10$ kΩ	$R_L \geq 15$ kΩ

Technical data
(continued)

Environmental conditions

Sensor temperature range		Normal	-40 – 85 °C
		ATEX Zone 2	-10 – 85 °C
Media temperature range			115 - (0.35 × Ambient temp.)
Ambient temperature range (depending on electrical connection)			See page 6
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 100 V
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_{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 page 6

Explosive atmospheres

Zone 2 applications	CE Ex II 3G Ex nA IIA T3 Gc -20C<Ta<+85C	EN60079-0; EN60079-15

When used in ATEX Zone 2 areas at temperatures <-10 °C 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 6
Net weight (depending on pressure connection and electrical connection)		0.2 – 0.3 kg

Ordering standard

MBS 30.. [ ][ ] – [ ][ ][ ][ ] – [ ][ ][ ][ ][ ]

Standard / With pulse-snubber

Standard	0 0
With pulse-snubber	5 0

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

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

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, Gasket: DIN 3869-14 NBR
FA09	DIN 3852-E-M14 × 1.5, Gasket: DIN3869-14-NBR (MBS 3050 only)

Electrical connection

Figures refer to plug and standard PIN configuration – see page 5

1	Plug Pg 9 (EN 175301-803-A)
2	* Plug, AMP Econoseal, J Series, male, excl. female plug
3	Screened cable, 2 m
5	* Plug, EN 60947-5-2, M12 × 1; 4-pin; male, excl. female plug
8	* Plug, AMP Superseal 1.5 series male, excl. female plug

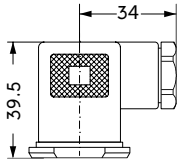
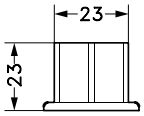
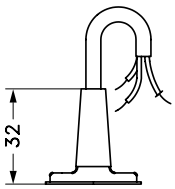
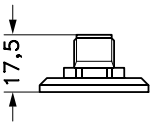
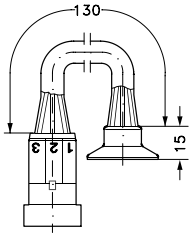
Preferred versions

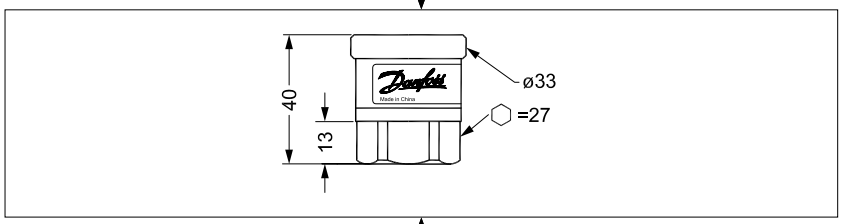
*) Gauge versions only available as sealed gauge versions

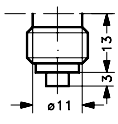
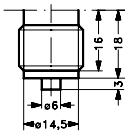
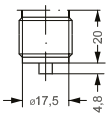
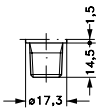
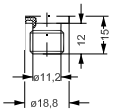
Non-standard build-up combinations may be selected. However, minimum order quantities may apply.

Please contact your local Danfoss office for further information.

Dimensions/Combinations

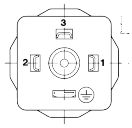
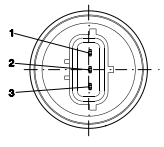
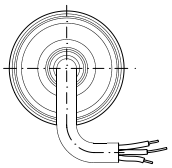
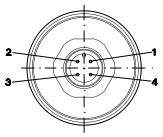
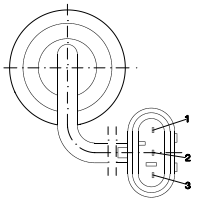
Type code	1	2	3	5	8
	EN175301-803-A, Pg 9	AMP Econoseal	2 m screened cable	EN 60947-5-2 M12 × 1; 4-pin	AMP Superseal
					



							
	G ¼ A (EN 837)	G 3/8 A (EN 837)	G ½ A (EN 837)	¼ – 18 NPT	½ – 14 NPT	DIN 3852-E-G ¼ Gasket: DIN 3869-14-NBR	DIN 3852-E-M14 x 1.5 Gasket: DIN 3869-14-NBR
Type code	**AB04**	**AB06**	**AB08**	**AC04**	**AC08**	**GB04**	**FA09**
Recommended torque [1])	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

[1]) Depends of different parameters such as gasket material, mating material, thread lubrication and pressure level

Electrical connections

Type code	1	2	3	5	8
	 EN 175301-803-A, Pg 9	 AMP Econoseal J series (male)	 2 m screened cable	 EN 60947-5-2 M12 × 1; 4-pin	 AMP Superseal 1.5 series (male)
Ambient temperature	-40 – 85 °C	-40 – 85 °C	-30 – 85 °C	-25 – 85 °C	-40 – 85 °C
Enclosure (IP protection fulfilled together with mating connector)	IP65	IP67	IP67	IP67	IP67
Material	Glass filled polyamid, PA 6.6	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]
Electrical connection, 4 – 20 mA output (2 wire)	Pin1: + supply Pin 2: ÷ supply Pin 3: not used  Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used	Brown wire: + supply Black wire: ÷ supply Red wire: not used Orange: not used Screen: not connected to MBS enclosure	Pin 1: + supply Pin 2: not used Pin 3: not used Pin 4: ÷ supply	Pin 1: + supply Pin 2: ÷ supply Pin 3: not used
Electrical connection, 0 – 5 V, 1 – 5 V, 1 – 6 V, 0 – 10 V, 1 – 10 V output	Pin 1: + supply Pin 2: ÷ supply/common Pin 3: + output  Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply/common Pin 3: + output	Brown wire: + output Black wire: ÷ supply Red wire: + supply Orange: not used Screen: not connected to MBS enclosure	Pin 1: + supply Pin 2: not used Pin 3: + output Pin 4: ÷ supply/common	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)