Pressure transmitter for heavy-duty applications

Type MBS 2050

Technical brochure

Features

- Designed for use in severe industrial environments
- Resistant to cavitation, liquid hammer and pressure peaks
- Enslosure and wetted parts of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 0 up to 600 bar
- Ratiometric output signal: 10-90% of supply voltage
- A wide range of pressure and electrical connections
- Temperature compensated and laser calibrated

Description

The compact heavy duty pressure transmitter MBS 2050 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 program of pressure transmitters with ratiometric output signal cover, absolute and gauge (relative) versions, measuring ranges from 0-1 to 0-600 bar and a wide range of pressure and electrical connections.

A robust design an excellent vibration stability and a high degree of EMC/EMI protection equip the pressure transmitter to meet the most stringent industrial requirements.

Ordering standard versions

Plug: Pg 9 (EN 175301-803-A)
Ratiometric output10-90% of supply voltage

Pressure Connection	Pressure range Pe[1] [bar]	Type [2]	Code no.
DIN 3852-G 1/4A NBR, O-ring	0 - 160	MBS 2050 3216-1FB04	**060G1404**
	0 - 250	MBS 2050 3416-1FB04	**060G1405**
	0 - 400	MBS 2050 3616-1FB04	**060G1406**
	0 - 600	MBS 2050 3816-1FB04	**060G1407**

1) Relative/gauge

2) Pressure port code FB04 ~ GB04

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	< 35 ms
Overload pressure (Static)		6 × FS (max. 1500 bar)
Burst pressure		> 6 × FS (max. 2000 bar)
Durability, P: 10-90% FS		>10×10⁶ cycles

Electrical specifications

Nom. output signal	10 - 90% of Vsupply
Supply voltage V_{supply} (polarity protected)	4.75 to 8 V d.c. 5 V d.c. (nom.)
Power consumption	<5mA at 5 V d.c.
Output impedance	<25 Ω
Load resistance RL	RL > 10 kΩ at 5 V d.c.

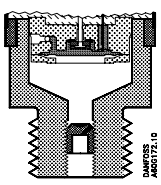
Environmental conditions

Medium temperature range			–40 → +85°C
Ambient temperature range (depending on electrical connection)			see page 5
Compensated temperature range			0 → +80°C
Transport 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			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}, 5Hz-1kHz	IEC 60068-2-64
Shock resistance	Shock	500 g / 1 ms	IEC 60068 - 2 - 27
	Free fall		IEC 60068 - 2 - 32
Enclosure (depending on electrical connection)			see page 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 page 5
Weight (depending on pressure connection and electrical connection		0.2 - 0.3 kg

Appliction and media conditions



Application
Cavitation, liquid hammer and pressure peaks may occur in liquid filled 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 restricted to the start-up period when the dead volume behind the nozzle fills, and furthermore because the nozzle orifice is relatively big (0.3 mm). 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.

Ordering of special versions

MBS 2050- 6-

Measuring range

0 - 1 bar	1 0
0 - 1.6 bar	1 2
0 - 2.5 bar	1 4
0 - 4 bar	1 6
0 - 6 bar	1 8
0 - 10 bar	2 0
0 - 16 bar	2 2
0 - 25 bar	2 4
0 - 40 bar	2 6
0 - 60 bar	2 8
0 - 100 bar	3 0
0 - 160 bar	3 2
0 - 250 bar	3 4
0 - 400 bar	3 6
0 - 600 bar	3 8

Pressure reference

Gauge (relative)	1
Absolute	2

Pressure connection

A B 0 8	$G^1/_2$ A (EN 837)
A C 0 4	$^1/_4$ -18 NPT
F A 1 2	DIN 3852/3, M18X1,5 - 6g, NBR O-ring
F D 1 0	$^9/_{16}$ - 18 UNF - 2A (SAE J514) NBR O-ring
G B 0 4	DIN 3852-E-$G^1/_4$ Gasket: DIN 3869-14 NBR

Electrical connection

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

1	Plug Pg 9 (EN175301-803-A)
2 *	Plug, AMP Econoseal, J series, male,excl. female plug
3	Screened cable, 2 m
5 *	Plug, IEC 60947-5-2, M12 × 1, male,excl. female plug
6	Plug Pg 11 (EN 175301-803-A)
8 *	Plug, AMP Superseal 1.5 series male, excl. female plug

Output signal

6 Ratiometric, 10-90%

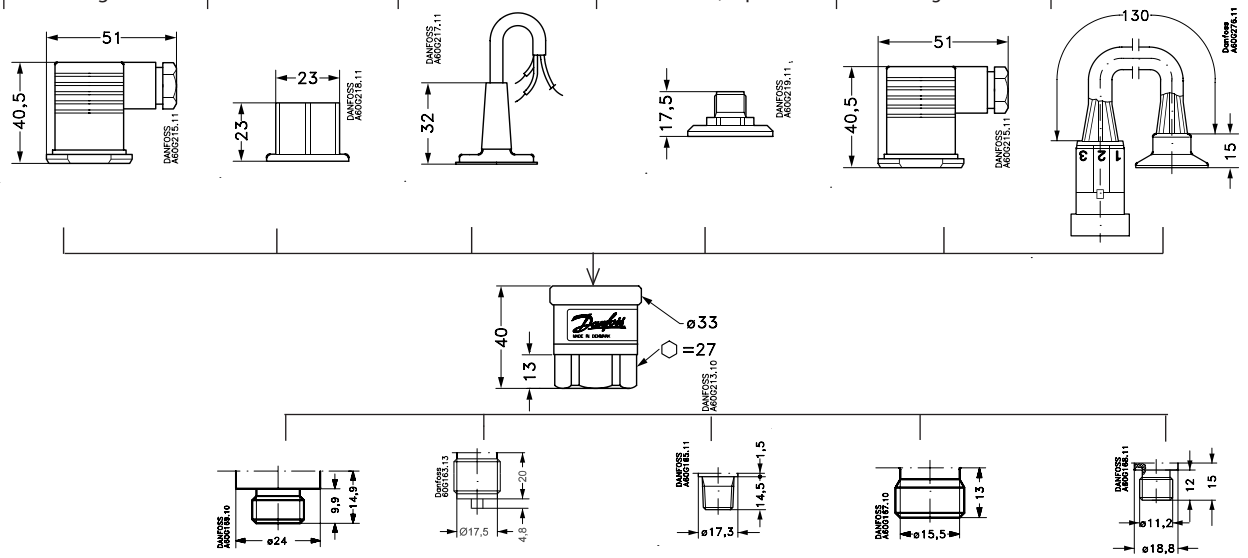
* *Gauge versions only available as sealed gauge versions*

Prefered version

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.

Dimensions / Combinations

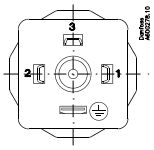
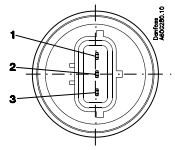
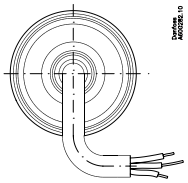
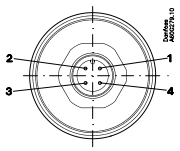
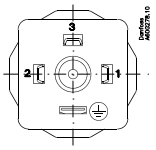
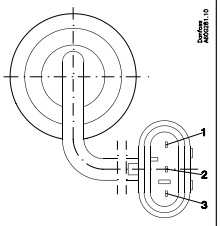
Type code	1	2	3	5	6	8
	EN175301-803-A, Pg 9	AMP Econoseal	2 m screened cable	EN 60947 - 5 - 2 M12x1; 4-pin	EN 175301-803-A, Pg 11	AMP Superseal



	$^9/_{16}$-18 UNF-2A (SAE J514)	G ½ A (EN 837)	¼ - 18 NPT	DIN 3852/3, M 18x105-6g NBR O-ring	DIN 3852-E-G ¼ Gasket: DIN 3869-14
Type code	FD10	AB08	AC04	FA12	GB04
Recommended torque 1)	30-35 Nm	30-35 Nm	2-3 turns after finger tightened	30-35 Nm	30-35 Nm

1)Depends of different parameters as packing material, mating material, thread lubrication and pressure level.

Electrical connections

Type code, page 4					
1	2	3	5	6	8
EN 175301-803-A, Pg 9	AMP Econoseal J series (male)	2 m screened cable	EN 60947-5-2 M12x1; 4-pin	EN 175301-803-A, Pg 11	AMP Superseal 1.5 series (male)
					
Ambient temperature					
–40 → + 85 °C	–40 → + 85 °C	–30 → +85 °C	–25 → +85 °C	–40 → +85 °C	–40 → +85 °C
Enclosure (IP protection fulfilled together with mating connector)					
IP 65	IP 67	IP 67	IP 67	IP 65	IP 67
Materials					
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	Glass filled polyamid, PA 6.6[2)]
Electrical connection, Ratiometric output, 10-90% of supply voltage					
Pin 1: + supply Pin 2: ÷ supply Pin 3: Output Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply 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	Pin 1: + supply Pin 2: - supply Pin 3: Output Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: Output

1) Female plug: Glass filled polyester, PBT
2) Wire: PETFE (teflon)
Protection sleeve: PBT mesh (polyester)