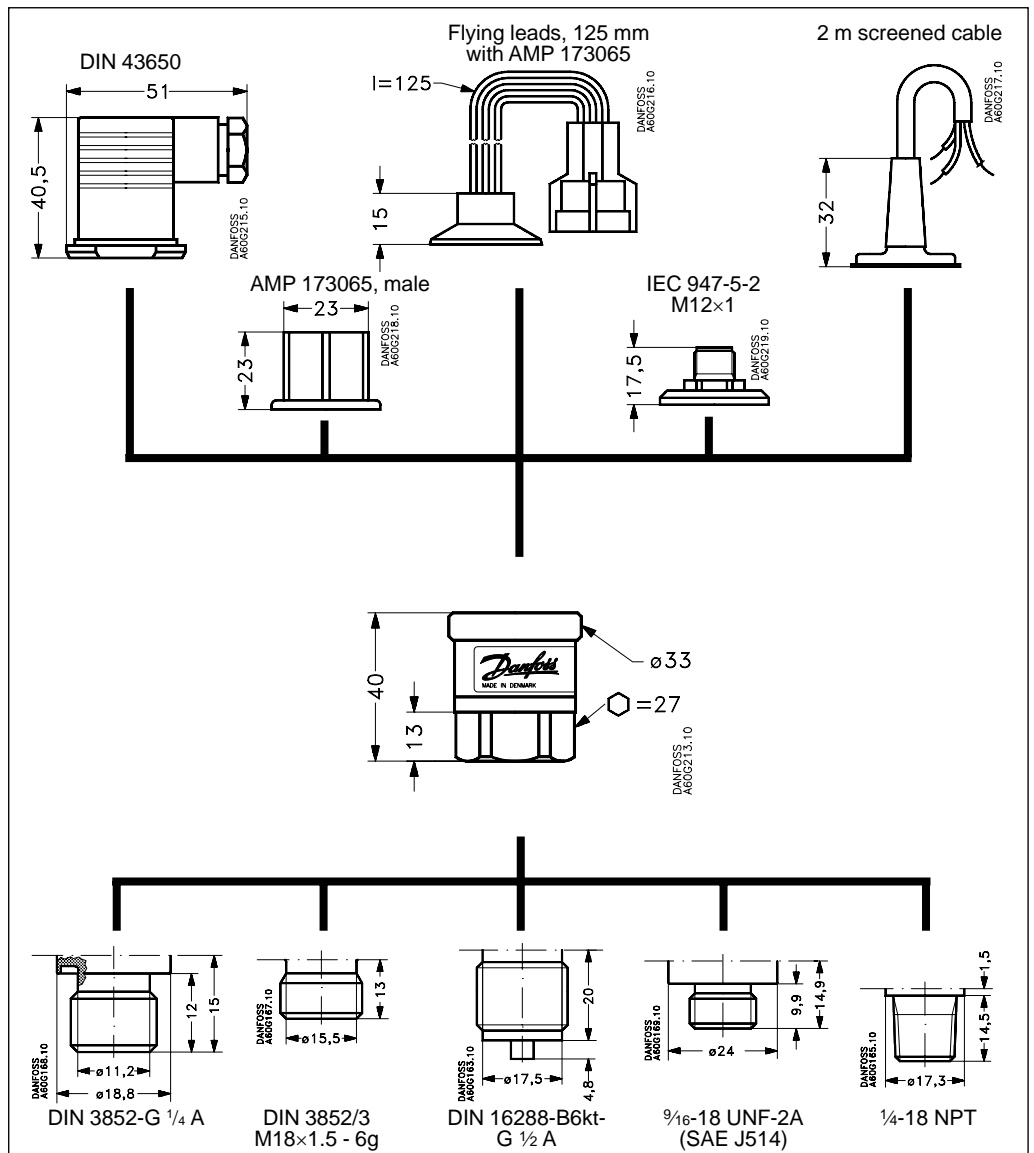


## Heavy-duty Pressure Transmitters, type MBS 2050



- Resistant to cavitation, liquid hammer and pressure peaks
- Overload pressure 10-20× measuring range
- Durability: >10 million cycles
- For use in severe industrial environments:
  - High vibration stability
  - IP 67 versions available
  - Wetted parts and enclosure of acid resistant steel
- CE-marked: EMC protected in accordance with EU EMC directive
- Temperature compensated, linearized and laser calibrated
- Ratiometric output signal – 10-90% of supply voltage

### Dimensions



## Technical data

## Performance (IEC 770)

Accuracy (at reference conditions)	$\pm 0.3\%$ FS (typ.) $\pm 1\%$ FS (max.)
Non-linearity (Best fit straight line)	$< \pm 0.2\%$ FS
Hysteresis and repeatability	$\leq \pm 0.1\%$ FS
Thermal zero point shift	$\leq \pm 0.1\%$ FS/10K (typ.) $\leq \pm 0.2\%$ FS/10K (max.)
Thermal sensitivity (span) shift	$\leq \pm 0.1\%$ FS/10K (typ.) $\leq \pm 0.2\%$ FS/10K (max.)
Response time (liquids)	$< 4$ ms
Overload (static) and burst pressure	10-20×FS - depending on measuring range Max overload: 1500 bar Max. burst: 2000 bar
Durability, P: 10-90% FS	$> 10 \times 10^6$ cycles

## Electrical specifications

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

## Environmental conditions

Operating temperature range	-40 to 85°C			
Compensated temperature range	0 to 80°C			
Transport temperature range	-50 to 85°C			
EMC - Emission	EN 50081-1			
EMC - Immunity	Electrostatic discharge	Air mode 8 kV Contact mode 4 kV	EN 50082-2 (IEC 801-2)	
	RF field	10 V/m, 26 MHz - 1 GHz	EN 50082-2 (IEC 801-3)	
		conducted	10 V <sub>rms</sub> , 150 kHz - 30 MHz	EN 50082-2 (IEC 801-6)
	Transient	burst	4 kV (CM), Clamp	EN 50082-2 (IEC 801-4)
		surge	1 kV (CM,DM), Rg = 42 $\Omega$	EN 50082-2 (IEC 801-5)
Insulation resistance		$> 100$ M $\Omega$ at 500 V d.c.		
Mains frequency test	500 V, 50 Hz	SEN 361503		
Vibration stability	Sinusoidal	20 g, 25 Hz - 2 kHz	IEC 68-2-6	
	Random	7,5 g <sub>rms</sub> , 5 Hz - 1 kHz	IEC 68-2-34, IEC 68-2-36	
Shock resistance	Shock	500 g / 1 ms	IEC 68-2-27	
	Free fall		IEC 68-2-32	
Enclosure	DIN 43650 Plug		IP 65 - IEC 529	
	IEC 947-5-2, M12×1		IP 67 - IEC 529	
	AMP 173065		IP 67 - IEC 529	
	2 m cable		IP 67 - IEC 529	

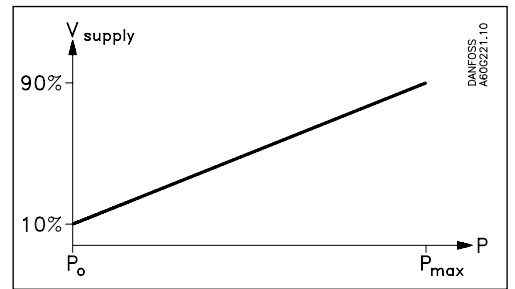
## Mechanical characteristics

Materials	Wetted parts	DIN 17440-1.4404 (AISI 316 L)
	Enclosure	DIN 17440-1.4404 (AISI 316 L)
Weight		0.2 kg

**Principle of operation**

The MBS 2050 pressure transmitter converts the measured pressure into a linear and temperature compensated output signal which is proportional to the transmitter supply voltage. The output signal will be within 10-90% of the supply voltage.

This signal is well suited for direct connection to an A/D converter, on the condition that the transmitter and A/D converter uses the same voltage reference to eliminate errors (Ratiometrically coupled A/D converter).



**Application and media conditions**

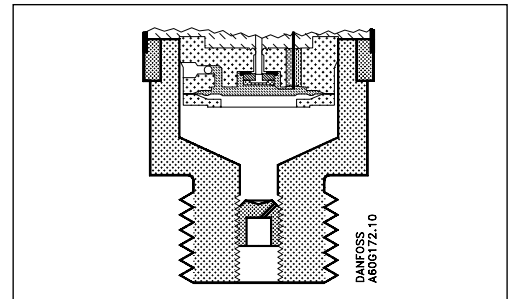
MBS 2050 with integrated pulse-snubber is specially suited for hydraulic applications where cavitation, liquid hammer or pressure peaks may occur – influences that often cause a short but extreme excess of the measuring range of the transmitter.

The integrated pulse-snubber is in principle designed as a nozzle mounted in the passage between the measured medium and the pressure sensitive element of the transmitter.

*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.



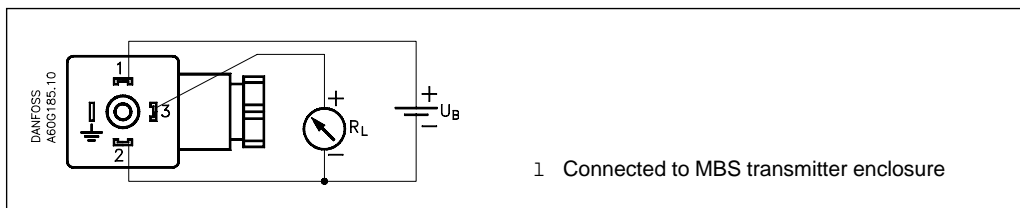
*Media condition*

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 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.

**Pressure connections**

Dimensions					
Pressure connection	DIN 3852-G 1/4 A	DIN 3852/3 M18 x 1.5 - 6g	DIN 16288-B6kt-G 1/2 A	9/16-18 UNF-2A (SAE J514)	1/4-18 NPT
PN	630 bar	630 bar	630 bar	630 bar	630 bar
Gasket	O-ring, 13.3x1.8, NBR	O-ring, 15.4x2.1, NBR		O-ring, 12x2, NBR	
Type no.	MBS2050-XXXX-XFB04	MBS2050-XXXX-XFA12	MBS2050-XXXX-XEB08	MBS2050-XXXX-XFD10	MBS2050-XXXX-XEC04

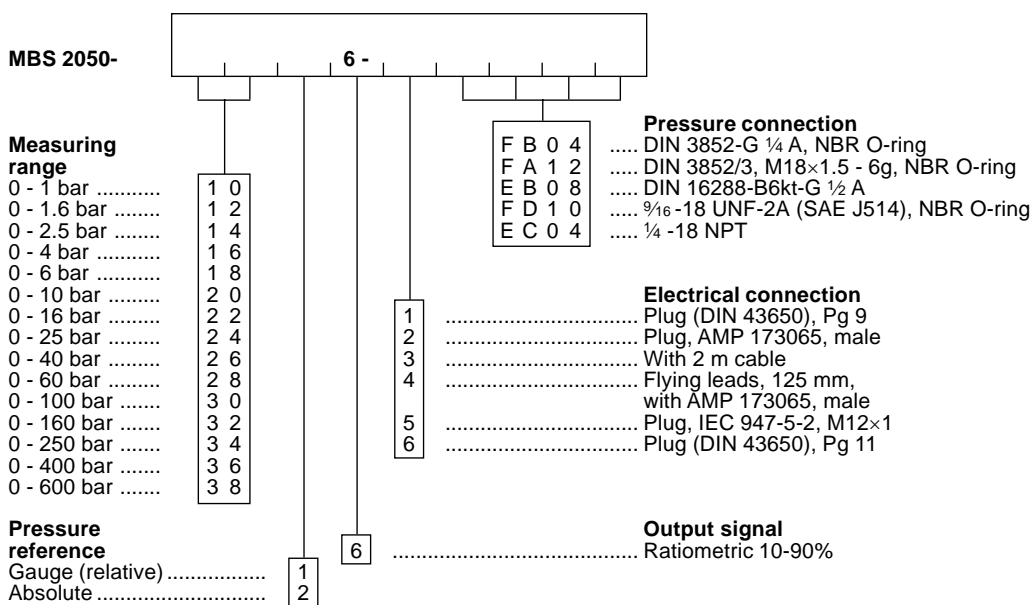
**Electrical connections  
DIN 43650  
(Others on request)**



**Ordering  
Standard version with  
DIN 43650 plug**

Pressure connection	Pressure range $P_e$	Type no.	Code no.
DIN 3852-G 1/4A	0 - 160 bar	MBS 2050 3216-1FB04	<b>060G1404</b>
	0 - 250 bar	MBS 2050 3416-1FB04	<b>060G1405</b>
	0 - 400 bar	MBS 2050 3616-1FB04	<b>060G1406</b>
	0 - 600 bar	MBS 2050 3816-1FB04	<b>060G1407</b>

**Ordering,  
Special versions**



**Danfoss pressure transmitter programme**

Danfoss Pressure and Temperature Controls offers the following product programme of Heavy-duty Transmitters:

*Data Sheets:*

Heavy-duty Transmitters, type MBS 3050	IK.21.J1.—
Heavy-duty Transmitters, type MBS 4050	IK.20.Z3.—
Heavy-duty Transmitters, type MBS 5050	IK.21.K1.—

*Articles:*

The Liquid (Water) Hammer Phenomena	IH.20.C1.—
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