ENGINEERING
TOMORROW

Data sheet

Pressure transmitter for marine applications
Type MBS 5100 and MBS 5150



The ship approved high accuracy block pressure transmitter is designed for use in almost all marine applications. MBS 5150 with integrated pulse snubber is designed for use in marine applications with severe medium influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions.
The transmitters can be easily mounted directly on the MBV 5000 block test valve or the threaded pressure connection can be used.
The flexible pressure transmitter programme covers a 4 – 20 mA output signal, absolute or gauge (relative) versions, measuring ranges from 0 – 1 to 0 – 600 bar with zero and span adjustment.
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

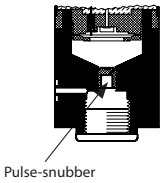
- Designed for use in severe maritime environments
- MBS 5150 with integrated pulse-snubber is suitable in marine applications with severe medium influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions
- Pressure connection of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 0 up to 600 bar
- Output signal: 4 – 20 mA
- A wide range of pressure connections
- Temperature compensated and laser calibrated
- Accuracy 0.3% FS
- Zero and span adjustment

Approvals

Lloyds Register of shipping, LRS
Germanischer Lloyd, GL
Bureau Veritas, BV
Det Norske Veritas, DNV
Registro Italiano Navale, RINA
Nippon Kaiji Kyokai, NKK
American Bureau of Shipping, ABS
Korean Register of Shipping, KR
China Classification Society, CCS
Russian Maritime Register of Shipping, RMRS

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Application and media conditions for MBS 5150



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)		≤ ± 0.1% FS (typ.)
		≤ ± 0.3% 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 5150)	< 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
Zero point adjustment	0 – 1 to 0 – 10 bar mearsuring range	-5 – 20% FS
	0 – 16 to 0 – 40 bar measuring range	-5 – 10% FS
	0 – 60 to 0 – 600 bar measuring range	-5 – 2.5% FS
Span adjustment	0 – 1 to 0 – 600 bar measuring range	-5 – 5.0% FS

Electrical specifications

Nom. output signal (short-circuit protected)	4 – 20 mA
Supply voltage [U_B], polarity protected	10 – 32 V DC
Supply voltage dependency	≤ ± 0.01% FS / 10 V
Current limitation (linear output signal up to 1.5 × rated range)	28 mA (typ.)
Load [R_L] (load connected to 0 V)	R_L ≤ (U_B- 10 V) / 0.02 A [Ω]

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Technical data

Environmental conditions

Sensor temperature range	Normal		-40 – 85 °C
Media temperature range			115 - (0.35 x ambient temp.)
Ambient temperature range (depending on electrical connection)			-40 – 85 °C
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[1])
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 (IP protection fulfilled together with mating connector)			IP65

[1]) RF field 10 V/m, 26 MHz - 2 GHz deviation < 2% FS

Mechanical characteristics

Electrical connection			EN 175301-803-A plug
Electrical connection, material			Glass filled polyamide PA 6.6
Wetted parts, material	Versions without flange connection		EN 10088-1; 1.4404 (AISI 316L)
	Versions with flange connection	Pressure connection	AISI 316L
		Plug	Nickel plated brass
		Plug gasket	W.no. 10388 Sn5
		O-ring for flange	NBR
Enclosure material			Anodized AlMgSiPb
Net weight			0.4 kg

Ordering standard

MBS 51 – 1 –

Gasket / O-ring material

0	No gasket
2	Gasket, NBR -40° – 85°C
4	O-ring, NBR -40° – 85°C

Type

Standard	0 0
With pulse snubber	5 0

Pressure connection

C A 0 5	M10 × 1 female
C B 0 4	G ¼ female
C C 0 4	¼ – NPT female
D A 0 5	M10 × 1 female with flange
D B 0 4	G ¼ female with flange connection

Measuring range

0 – 1.0 bar	1 0
0 – 1.6 bar	1 2
0 – 2.5 bar	1 4
0 – 4.0 bar	1 6
0 – 6.0 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

Electrical connection

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

A0	No plug (EN 175301-803-A)
A6	Plug (EN 175301-803-A), Pg 11
A9	Plug (EN 175301-803-A), GL Pg 13.5
A1	Plug (EN 175301-803-A), Pg 9

Output signal

1	4 – 20 mA

Pressure reference

Gauge (relative)	1
Absolute	2

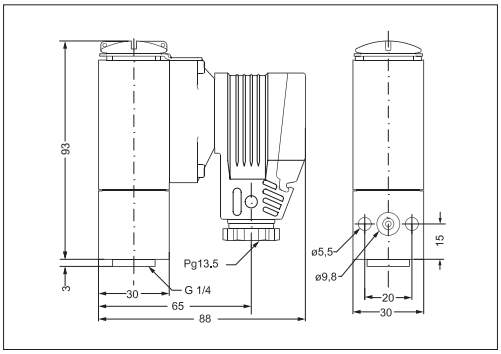
Prefered version

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

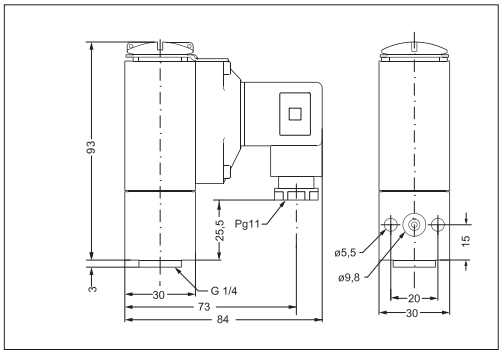
Please contact your local Danfoss office for further information or request for other versions.

Dimensions

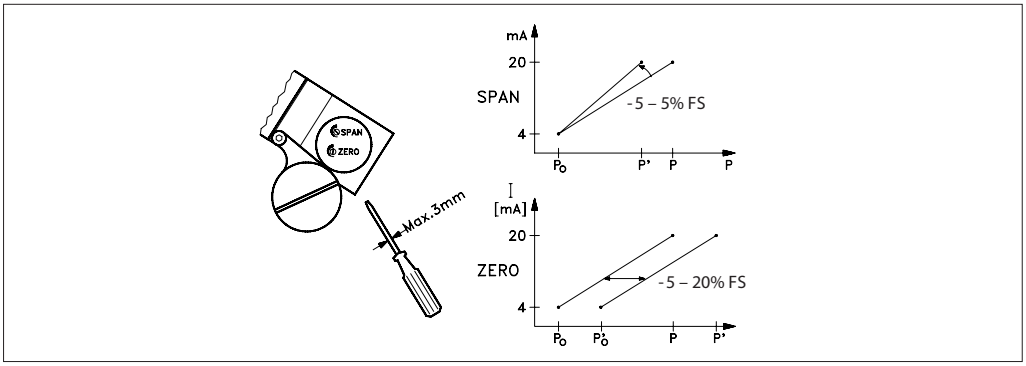
Plug Pg 13.5, EN 175301-803-A



Plug Pg 9 – 11, EN 175301-803-A

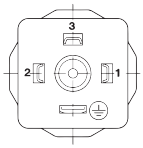
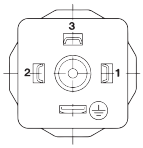
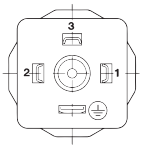


Adjustment



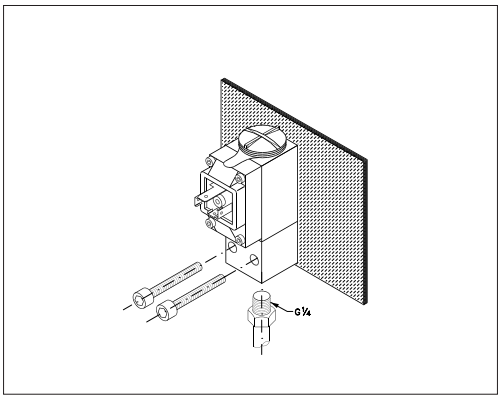
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Electrical connections

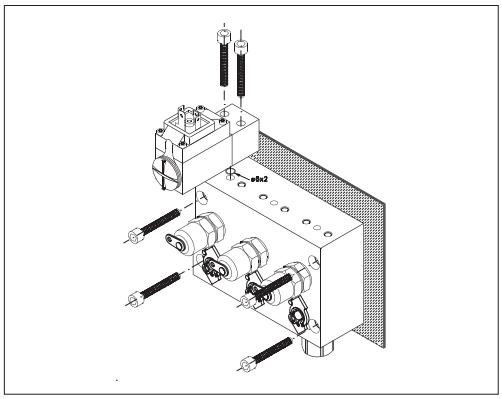
Plug type, page 4	A6	A9	A1
	 EN 175301-803-A, Pg 11	 EN 175301-803-A, Pg 13.5	 EN 175301-803-A, Pg 9
Electrical connection, 4 – 20 mA output (2 wire)	Pin 1: + supply Pin 2: ÷ supply Pin 3: Function test 40 – 200 mV ⏚ Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: Function test 40 – 200 mV ⏚ Earth: Connected to MBS enclosure	Pin 1: + supply Pin 2: ÷ supply Pin 3: Function test 40 – 200 mV ⏚ Earth: Connected to MBS enclosure

Mechanical connection

Thread



Flange



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