

Data Sheet

Pressure transmitter Type **MBS 5100** and **MBS 5150**

For marine applications



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 – 4 to 0 – 400 bar.

Excellent vibration stability, robust construction, and a high degree of EMC / EMI protection equip the pressure transmitter to meet the most stringent marine requirements.

Features

Features

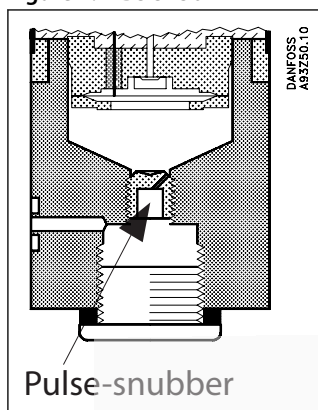
- Designed for use in severe maritime environments
- MBS 5150 with integrated pulse-snubber is suitable in marine applications with severe medium influences like cavitation, liquid hammer or pressure peaks and offers a reliable pressure measurement, even under harsh environmental conditions
- Pressure connection of acid-resistant stainless steel (AISI 316L)
- Pressure ranges in relative (gauge) or absolute from 4 up to 400 bar
- Output signal: 4 – 20 mA
- A wide range of pressure connections
- Fully digitally compensated
- Accuracy 0.3% FS (max)
- UL approved
- Several Marine approvals



Application

Application and media conditions for MBS 5150

Figure 1: 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. Liquid backlash can create huge pressure peaks of a non uniform nature and damage the diaphragm. 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.

Product specification

Technical data

Table 1: Performance (EN 60770)

Description	Values
Accuracy (incl. non-linearity, hysteresis and repeatability)	$\leq \pm 0.1\% \text{ FS (typ.)}$ $\leq \pm 0.3\% \text{ FS (max.)}$
Non-linearity BFSL (conformity)	$\leq \pm 0.2\% \text{ FS}$
Hysteresis and repeatability	$\leq \pm 0.1\% \text{ FS}$
Response time	Liquids with viscosity < 100 cSt Air and gases (MBS 5150)
	< 4 ms < 35 ms
Overload pressure (static)	6 × FS (max. 1500 bar)
Burst pressure	6 × FS (max. 2000 bar)
Power-up time	< 50ms
Durability, P: 10 – 90% FS	> 10 × 10 ⁶ cycles
MTTFd - Calculation based on the SN 29500	> 100 Years

Table 2: Electrical specifications

Description	Values
Nom. output signal (short-circuit protected)	4 – 20 mA
Supply voltage [UB], polarity protected	9 – 32 V DC
Supply voltage dependency	$\leq \pm 0.1\% \text{ FS} / 10 \text{ V}$
Current limitation (linear output signal up to 1.5 × rated range)	22.4 mA
Load [RL] (load connected to 0 V)	$RL \leq (U_B - 9 \text{ V}) / 0.02 \text{ A } [\Omega]$

Table 3: Environmental conditions

Description	Values
Sensor temperature range	Normal -40 – 85 °C
Media temperature range	-40 – 85 °C
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
Insulation resistance	> 100 MΩ at 500 V
Vibration stability	Sinusoidal 15.9 mm-pp, 5 Hz – 25 Hz 20 g, 25 Hz – 2 kHz Random 7.5 grms, 5 Hz – 1 kHz
	IEC 60068-2-6 IEC 60068-2-64
Shock resistance	Shock 500 g / 1 ms Free fall 1 m
	IEC 60068-2-27 IEC 60068-2-32
Enclosure (IP protection fulfilled together with mating connector)	IP65 (IP54 ATEX Zone 2)

Table 4: Explosive atmospheres

Zone 2 applications ⁽¹⁾	II 3G Ex ec IIA T4 Gc -20 °C < Ta < +85 °C	EN60079-0, EN60079-7
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⁽¹⁾ The Pressure transmitter must be installed where it cannot be exposed to impact in normal use

Pressure transmitter, Type MBS 5100 and MBS 5150

Table 5: Mechanical characteristics

Description			Values
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

Dimension

Table 6: Dimension

Plug M20, EN 175301-803-A	Plug Pg 9 – 11, EN 175301-803-A

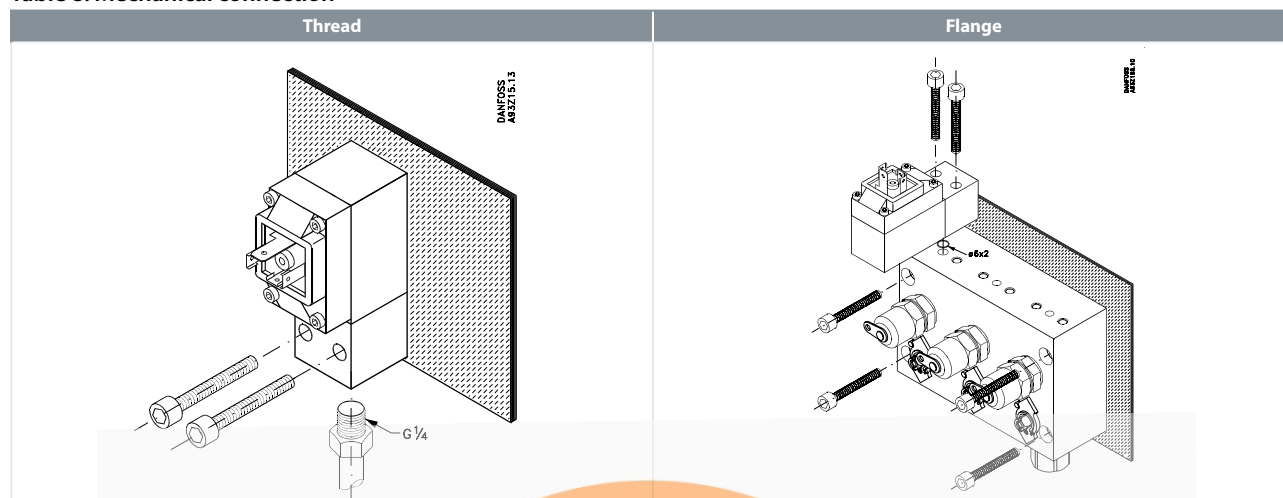
Electrical connections

Table 7: Electrical connections

Plug type, page 4	A6	H3	A0/A1/J7
	EN 175301-803-A, Pg 11	175301-803-A, M20	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

Table 8: Mechanical connection



Ordering

Ordering standards

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.

Figure 2: Ordering standards

MBS 51

Type

Standard	0 0
With pulse snubber	5 0

Measuring range

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

Pressure reference

Gauge (relative)	1
Absolute	2

Gasket / O-ring material

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

Pressure connection

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

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

A 0	No plug (EN 175301-803-A)
A 1	Plug (EN 175301-803-A), Pg 9
A 6	Plug (EN 175301-803-A), Pg 11
H 3	Plug (EN 175301-803-A), M20
J 7	Plug (EN175301-803-A), PG9 Steel

Output signal

1	4 – 20 mA
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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.

Valid approvals

Table 9: valid approvals

File name	Document type	Document topic	Approval authority
BV 06094-F0 BV	Marine - Safety Certificate		BV
DNV TAA000013G Rev.2	Marine - Safety Certificate		DNV
RINA ELE031621XP	Marine - Safety Certificate		RINA
NKK TA21099M	Marine - Safety Certificate		NKK
LR 2010635TA-02	Marine - Safety Certificate		LR
ABS 21-2092809-PDA	Marine - Safety Certificate		ABS
KR DLN 34014-AE001	Marine - Safety Certificate		KR
CCS TJ22PTB00047	Marine - Safety Certificate		CCS
UL E227388	Explosive - Safety Certificate	Hazardous Locations	UL
UL E31024	Electrical - Safety Certificate		UL
UL E311982	Electrical - Safety Certificate		UL
UL E510763	Electrical - Safety Certificate		UL
Danfoss EU-UK 064G9615.11	EU-UK Declaration	EMC/RoHS/ATEX	Danfoss
BV SMS.W.II-2179-C.0	Marine - Manufacturing Permission		BV
UL E494625	Electrical - Safety Certificate		UL
TSSA CRN.0F18477.5123467890YTN	Pressure - Safety Certificate	CRN	TSSA

