SensaCo Ltd.

DMK 457

Pressure Transmitter for Shipbuilding and Offshore

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

- from 0 ... 400 mbar up to 0 ... 600 bar

Output signals

2-wire: 4 ... 20 mA
others on request

Special characteristics

- LR-certificate (Lloyd´s Register)
- DNV-approval (Det Norske Veritas)
- ABS-certificate
  (American Bureau of Shipping)
- CCS-certificate
  (China Classification Society)
- pressure port in CuNiFe
  (sea water resistant)
- oxygen application

Optional versions

- IS-version
  Ex ia = intrinsically safe
  for gases and dusts

The pressure transmitter DMK 457 with ceramic sensor has been designed for typical applications in shipbuilding and offshore constructions as alternative to our pressure transmitter DMP 457 with piezoresistive stainless steel sensor.

In combination with the copper-nickel-alloy the DMK 457 is suitable for seawater, e.g. level measurement in ballast tanks, etc.

Preferred areas of use are

Drives
Compressors
Boiler
Pneumatic control systems
Oxygen applications

Fuel and oil

Water and sea water

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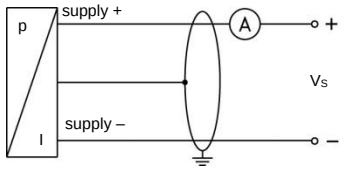
Input pressure range																			
Nominal pressure gauge [bar]	-1 … 0	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs. [bar]	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Level gauge / abs. [mH_2O]	-	-	6	10	16	25	40	60	100	160	250	400	600	-	-	-	-	-
Overpressure [bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
Burst pressure ≥ [bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880
Vacuum resistance	p_N ≥ 1 bar: unlimited vacuum resistance p_N < 1 bar: on request																	

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}
Performance	
Accuracy [1]	IEC 60770: ≤ ± 0.5 % FSO
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.3% FSO / year at reference conditions
Response time	< 10 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (offset and span)	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	0 ... 85 °C
Permissible temperatures	
Medium	-40 ... 125°C
Electronics / environment	-40 ... 85°C
Storage	-40 ... 100°C
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to - EN 61326 - DNV (Det Norske Veritas)
Mechanical stability	
Vibration	4 g (according to DNV: class B, curve 2 / basis: IEC 60068-2-6)
Materials	
Pressure port	standard: stainless steel 1.4404 (316L) option [2]: CuNi10Fe1Mn (sea water resistant) - for p_N ≤ 400 bar with mechanical connection G1/2" DIN 3852, G1/2" EN 837, G1/2" open port, G1/4" DIN 3852, G1/4" EN 837 - in combination with housing in CuNi10Fe1Mn (not with field housing) -
Housing	standard: stainless steel 1.4404 (316L) option [2]: CuNi10Fe1Mn (sea water resistant) - in combination with pressure port in CuNi10Fe1Mn - option field housing: stainless steel 1.4404 (316L); with cable gland (CuNi10Fe1Mn not possible)
Cable sheath	TPE -U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)
Seals (media wetted)	standard: FKM option: FFKM (only for p_N ≤ 100 bar) others on request
Diaphragm	ceramic Al_2O_3 96 %
Media wetted parts	pressure port, seals, diaphragm
[2] IS-version on request	
Category of the environment	
Lloyd´s Register (LR) [3]	EMV1, EMV2, EMV3, EMV4 number of certificate: 13/20055
Det Norske Veritas (DNV)	temperature: D number of certificate: TAA00001GR humidity: B vibration: B electromagnetic compatibility: B enclosure: D
[3] for p_N ≤ 160 bar	

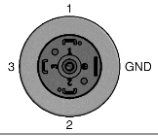
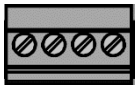
Explosion protection	
Approvals DX19-DMK 457	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, L_i ≈ 0 µH with field housing: C_i = 105 nF with cable outlet: C_i = 84.7 nF with ISO 4400: C_i = 62.2 nF the supply connections have an inner capacity of max. 90 nF (140 nF with field housing) to the housing
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1µH/m
Miscellaneous	
Option oxygen application	for p_N ≤ 25 bar: O-ring in FKM Vi 567 (with BAM-approval) permissible maximum values are 25 bar/150° C
Current consumption	max. 25 mA
Weight	approx. 140 g (with ISO 4400)
Installation position	any
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [4]
ATEX-directive	2014/34/EU
[4] This directive is only valid for devices with maximum permissible overpressure > 200 bar	

Wiring diagram

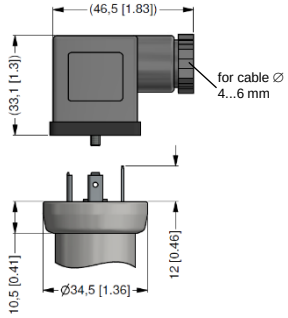
2-wire-system (current)



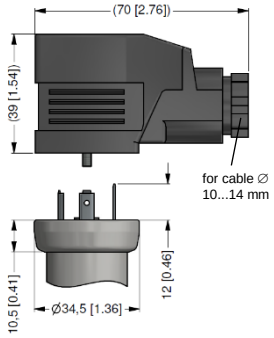
Pin configuration

Electrical connection	ISO 4400	field housing (clamp section: 2.5 mm²)	cable colours (IEC 60757)
			
Supply + Supply –	1 2	VS+ VS-	WH (white) BN (brown)
Shield	ground pin ⏚	GND	GNYE (green-yellow)

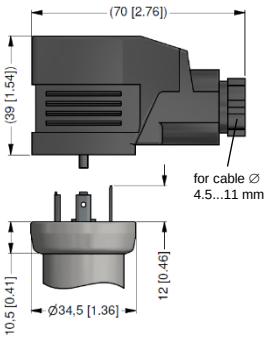
Electrical connections [5] (dimensions mm / in)



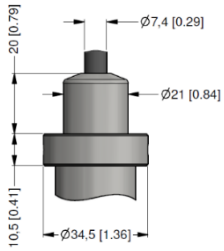
ISO 4400 - **code G10**
(IP 65)



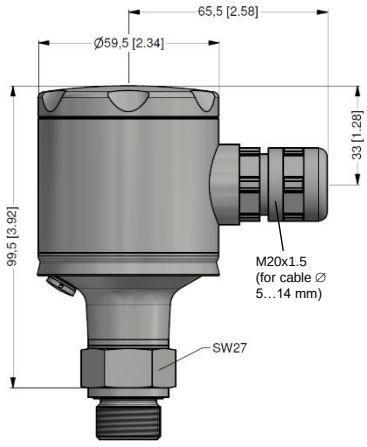
ISO 4400 - **code G00**
(IP 65)



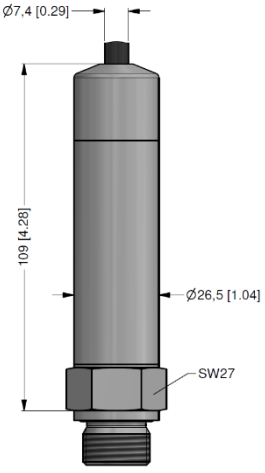
ISO 4400 - **code G01**
(IP 65)



cable outlet [6, 7]
(IP 68)



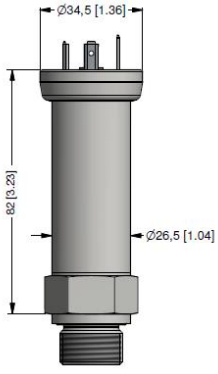
universal field housing
(IP 67)

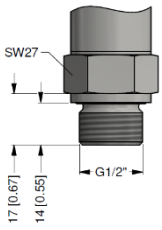


submersible version [7]
(IP 68)

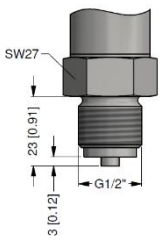
[5] *Generally shielded cable has to be used! Cable versions are delivered with shielded cable. For ISO 4400 the use of shielded cable is compulsory.*
[6] *tested at 4 bar or 40 mH$_2$O for 24 hours*
[7] *shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed); different lengths available*

Mechanical connection (dimensions mm / in)

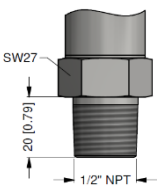




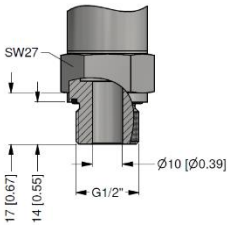
G1/2" DIN 3852



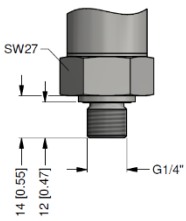
G1/2" EN 837



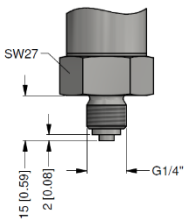
1/2" NPT



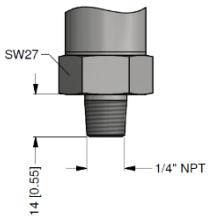
G1/2" open port
DIN 3852 (≤ 40 bar)



G1/4" DIN 3852



G1/4" EN 837



1/4" NPT

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Ordering code DMK 457

DMK 457 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Pressure			
in bar, gauge		5 9 0	
in bar, absolute [1]		5 9 1	
in mH_2O, gauge		5 9 2	
in mH_2O, absolute [1]		5 9 3	
Input [mH_2O]	[bar]		
4	0.4 [1]	4 0 0 0	
6	0.6	6 0 0 0	
10	1.0	1 0 0 1	
16	1.6	1 6 0 1	
25	2.5	2 5 0 1	
40	4.0	4 0 0 1	
60	6.0	6 0 0 1	
100	10	1 0 0 2	
160	16	1 6 0 2	
250	25	2 5 0 2	
400	40	4 0 0 2	
600	60	6 0 0 2	
	100	1 0 0 3	
	160	1 6 0 3	
	250	2 5 0 3	
	400	4 0 0 3	
	600	6 0 0 3	
	-1 … 0	X 1 0 2	
	customer	9 9 9 9	consult
Output			
4 … 20 mA / 2-wire		1	
intrinsic safety 4 … 20 mA / 2-wire		E	
customer		9	consult
Accuracy			
0.5 % FSO		5	
customer		9	consult
Electrical connection			
male and female plug ISO 4400 (for cable Ø 4...6 mm)		G 1 0	
male and female plug ISO 4400 GL [2] (for cable Ø 10...14 mm)		G 0 0	
male and female plug ISO 4400 GL [2] (for cable Ø 4.5...11 mm)		G 0 1	
cable outlet with TPE-U-cable [3]		T R 3	
field housing stainless steel 1.4404 (316L)		8 8 0	
submersible version in 1.4404 (316L) with TPE-U-cable [3]		T T 3	
submersible version in CuNiFe with TPE-U-cable [3]		T S 3	
customer		9 9 9	consult
Mechanical connection			
G1/2" DIN 3852		1 0 0	
G1/2" EN 837		2 0 0	
G1/4" DIN 3852		3 0 0	
G1/4" EN 837		4 0 0	
G1/2" DIN 3852 open pressure port [4]		H 0 0	
1/2" NPT		N 0 0	
1/4" NPT		N 4 0	
customer		9 9 9	consult
Seals			
FKM		1	
FFKM [5]		7	
customer		9	consult
Pressure port			
stainless steel 1.4404 (316L)		1	
copper-nickel-alloy (CuNi10Fe1Mn) [6]		K	
customer		9	consult
Diaphragm			
ceramics Al_2O_3 96 %		2	
customer		9	consult
Special version			
standard		0 0 0	
oxygen application [7]		0 0 7	
customer		9 9 9	consult

[1] absolute pressure possible from 0.6 bar
[2] cable socket is GL-approbated
[3] shielded TPE-U-cable with ventilation tube available in different lengths
[4] only for $p_N \leq 40$ bar possible
[5] only for $p_N \leq 100$ bar possible
[6] optionally for nominal pressure ranges up to 400 bar and mechanical connections G1/2" DIN 3852, G1/2" EN 837, G1/2" open pressure port, G1/4" DIN 3852, G1/4" EN837 in combination with housing in CuNi10Fe1Mn (not with field housing)
[7] oxygen application with FKM seal possible up to 25 bar

01.04.2022

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