BD|SENSORS
pressure measurement

DMP 457

Pressure Transmitter for Shipbuilding and Offshore

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 100 mbar up to 0 ... 600 bar

Output signals

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

Special characteristics

- LR-certificate (Lloyd´s Register)
- DNV▪GL Type Approval (Det Norske Veritas ▪ Germanischer Lloyd)
- ABS-certificate (American Bureau of Shipping)
- CCS-certificate (China Classification Society)
- flush pressure port G 1/2" from 100 mbar
- excellent thermal behaviour

Optional versions

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

The pressure transmitter DMP 457 has been especially designed for rough conditions occurring especially in shipbuilding and offshore applications. All gaseous and liquid media, which are compatible with stainless steel 1.4404 (316L) respectively can be used.

Sensor element is a piezoresistive stainless steel sensor with high accuracy and excellent long-term stability. In order to meet the special requirements for shipbuilding and offshore applications extensive tests had to be passed to get the Lloyd´s Register (LR), Det Norske Veritas ▪ Germanischer Lloyd (DNV▪GL) and China Classification Society (CCS) approvals.

Preferred areas of use are

Diesel engines, drives
Compressors, pumps
Boiler
Hydraulic and pneumatic control systems

Fuel and oil

Input pressure range [1]											
Nominal pressure gauge	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure abs.	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Level gauge / abs.	[mH_2O]	-	1	1.6	2.5	4	6	10	16	25	40	60
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Nominal pressure gauge	[bar]	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs.	[bar]	10	16	25	40	60	100	160	250	400	600
Level gauge / abs.	[mH_2O]	100	160	250	400	-	-	-	-	-	-
Overpressure	[bar]	40	80	80	105	210	600	600	1000	1000	1000
Burst pressure ≥	[bar]	50	120	120	210	420	1000	1000	1250	-	-
Vacuum resistance		p_N ≥ 1 bar: unlimited vacuum resistance					p_N < 1 bar: on request				

[1] *from 60 bar: measurement starts with ambient pressure*

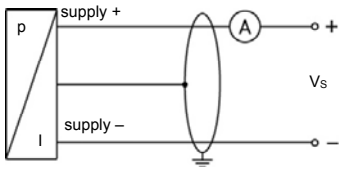
Output signal / Supply			
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}		
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}		
Performance			
Accuracy [2]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO		
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$		
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ		
Long term stability	≤ ± 0.1 % FSO / year by reference conditions		
Response time	< 10 msec		
[2] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*			
Thermal effects (Offset and Span) / Permissible temperatures			
Nominal pressure p_N [bar]	-1 ... 0	< 0.4	≥ 0.40
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 70	-20 ... 85
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▪GL (Det Norske Veritas ▪ Germanischer Lloyd)		
Mechanical stability			
Vibration	4 g (according to DNV▪GL: class B, curve 2 / basis: IEC 60068-2-6)		
Materials			
Pressure port	stainless steel 1.4404 (316L)		
Housing	standard: stainless steel 1.4404 (316L) option field housing: stainless steel 1.4404 (316L), with cable gland		
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: welded version [3]		others on request
Diaphragm	stainless steel 1.4435 (316L)		
Media wetted parts	pressure port, seals, diaphragm		
[3] *welded version only with pressure ports according to EN 837; possible for nominal pressure ranges p_N ≤ 40 bar*			
Category of the environment			
Lloyd´s Register (LR)	EMV1, EMV2, EMV3, EMV4		number of certificate: 13/20055
Det Norske Veritas ▪ Germanischer Lloyd (DNV▪GL)	temperature: D humidity: B vibration: B electromagnetic compatibility: B enclosure: D		number of certificate: TAA00001GR

Explosion protection	
Approvals DX19-DMP 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 T 85°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: -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	
Current consumption	max. 25 mA
Weight	approx. 140 g (with ISO 4400)
Installation position	any [4]
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [5]
ATEX Directive	2014/34/EU

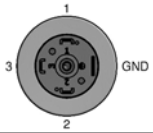
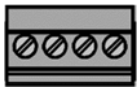
[4] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges p_N ≤ 1 bar.
[5] This directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagram

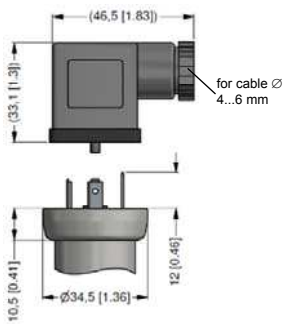
2-wire-system (current)



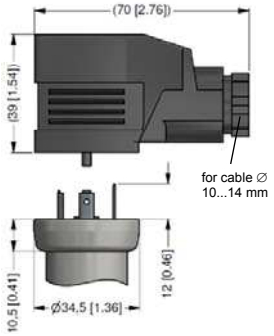
Pin configuration

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

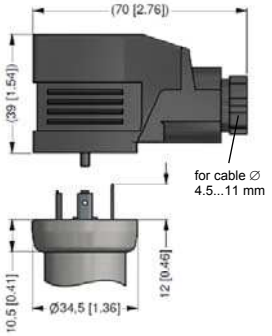
Electrical connections [6] (dimensions mm / in)



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



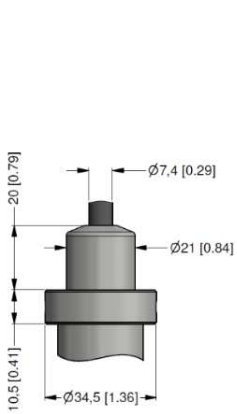
ISO 4400 - **Code G00**
(IP 65)



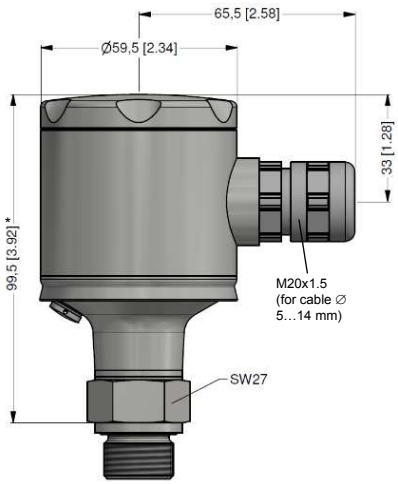
ISO 4400 - **Code G01**
(IP 65)

[6] Generally shielded cable has to be used! Cable versions are delivered with shielded cable. For ISO 4400 the use of shielded cable is compulsory.

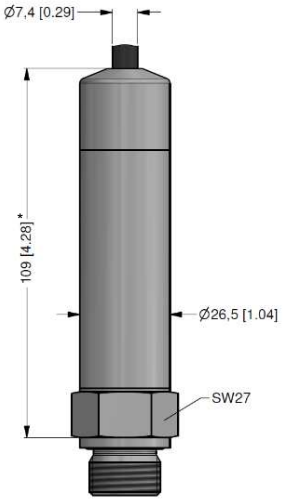
Electrical connections [6] (dimensions mm / in)



cable outlet [7, 8]
(IP 68)



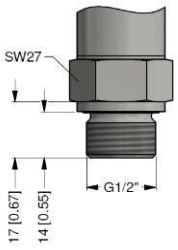
universal field housing
(IP 67)



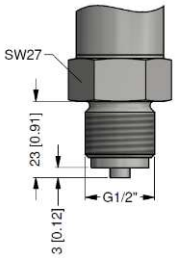
submersible version [8]
(IP 68)

[6] Generally shielded cable has to be used! Cable versions are delivered with shielded cable. For ISO 4400 the use of shielded cable is compulsory.
[7] tested at 4 bar or 40 mH_2O for 24 hours
[8] shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed); different lengths available
** total lengths increase by 9 mm for $p_N \geq 100$ bar with the optional accuracy ≤ ± 0.25 % FSO*

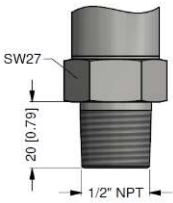
Mechanical connections (dimensions mm / in)



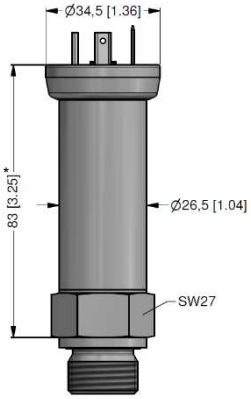
G1/2" DIN 3852

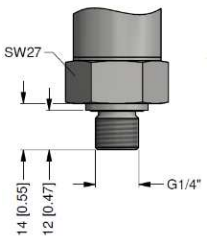


G1/2" EN 837

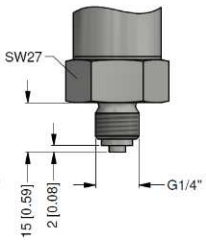


1/2" NPT

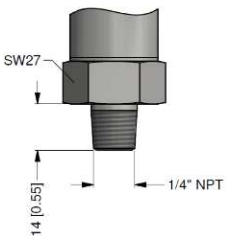




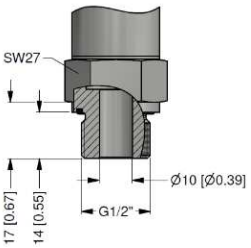
G1/4" DIN 3852



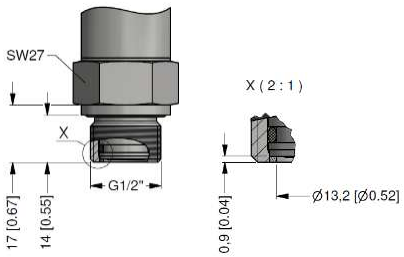
G1/4" EN 837



1/4" NPT



G1/2" open port DIN 3852
($p_N \leq 40$ bar)



G1/2" flush DIN 3852
($p_N \leq 40$ bar)

** total lengths increase by 9 mm for $p_N \geq 100$ bar with the optional accuracy ≤ ± 0.25 % FSO*

Ordering code DMP 457

DMP 457 □□□-□□□□-□-□-□□□-□□□-□-□□□

Pressure		Code	
in bar, gauge [1]		600	
in bar, absolute [2]		601	
in mH_2O, gauge [1]		602	
in mH_2O, absolute [2]		603	
Input [mH_2O]	[bar]		
1.0	0.10 [2]	1000	
1.6	0.16 [2]	1600	
2.5	0.25 [2]	2500	
4.0	0.40	4000	
6.0	0.60	6000	
10	1.0	1001	
16	1.6	1601	
25	2.5	2501	
40	4.0	4001	
60	6.0	6001	
100	10	1002	
160	16	1602	
250	25	2502	
400	40	4002	
	60	6002	
	100	1003	
	160	1603	
	250	2503	
	400	4003	
	600	6003	
	-1 … 0	X102	
	customer	9999	consult
Output			
4 … 20 mA / 2-wire		1	
intrinsic safety 4 … 20 mA / 2-wire		E	
customer		9	consult
Accuracy			
standard for $p_N \geq 0,4$ bar:	0.35 % FSO	3	
standard for $p_N < 0,4$ bar:	0.50 % FSO	5	
option for $p_N \geq 0,4$ bar:	0.25 % FSO	2	
customer		9	consult
Electrical connection			
male and female plug ISO 4400 (for cable Ø 4...6 mm)		G10	
male and female plug ISO 4400 GL [3] (for cable Ø 10...14 mm)		G00	
male and female plug ISO 4400 GL [3] (for cable Ø 4,5...11 mm)		G01	
cable outlet (TPE-U-cable) [4]		TR3	
field housing stainless steel (316L)		880	
submersible version (1.4404 / 316L) with TPE-U-cable [4]		TT3	
customer		999	consult
Mechanical connection			
G1/2" DIN 3852		100	
G1/2" EN 837		200	
G1/4" DIN 3852		300	
G1/4" EN 837		400	
G 1/2" DIN 3852 with flush sensor [5]		F00	
G1/2" DIN 3852 open pressure port [5]		H00	
1/2" NPT		N00	
1/4" NPT		N40	
customer		999	consult
Seals			
FKM		1	
without (welded version) [6]		2	
customer		9	consult
Special version			
standard		000	
customer		999	consult

[1] from 60 bar: measurement starts with ambient pressure
[2] absolute pressure possible from 0.4 bar
[3] cable socket is GL-approbated
[4] shielded TPE-U-cable with ventilation tube available in different lengths
[5] only for $p_N \leq 40$ bar possible
[6] welded version only with pressure ports according to EN 837; possible with pressure ranges $p_N \leq 40$ bar