



# 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

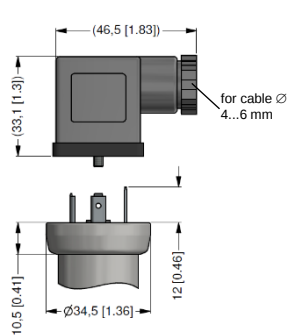


| Input pressure range   |                     |                                                                                           |     |     |    |     |     |    |    |     |     |     |     |     |     |     |     |     |     |
|------------------------|---------------------|-------------------------------------------------------------------------------------------|-----|-----|----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 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 <sub>2</sub> O] | -                                                                                         | -   | 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 <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance<br>p <sub>N</sub> < 1 bar: on request |     |     |    |     |     |    |    |     |     |     |     |     |     |     |     |     |     |

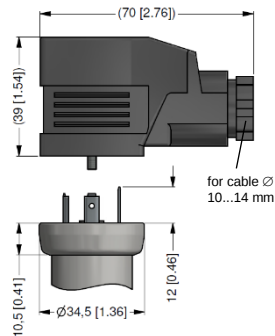
| Output signal / Supply                                                                                           |                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard                                                                                                         | 2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>                                                                                                                                                                                                                                                     |
| Option IS-version                                                                                                | 2-wire: 4 ... 20 mA / V <sub>S</sub> = 10 ... 28 V <sub>DC</sub>                                                                                                                                                                                                                                                    |
| Performance                                                                                                      |                                                                                                                                                                                                                                                                                                                     |
| Accuracy <sup>1</sup>                                                                                            | IEC 60770: ≤ ± 0.5 % FSO                                                                                                                                                                                                                                                                                            |
| Permissible load                                                                                                 | R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω                                                                                                                                                                                                                                              |
| Influence effects                                                                                                | supply: 0.05 % FSO / 10 V<br>load: 0.05 % FSO / kΩ                                                                                                                                                                                                                                                                  |
| Long term stability                                                                                              | ≤ ± 0.3% FSO / year at reference conditions                                                                                                                                                                                                                                                                         |
| Response time                                                                                                    | < 10 msec                                                                                                                                                                                                                                                                                                           |
| <sup>1</sup> 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<br>- EN 61326<br>- 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)<br>option <sup>2</sup> : CuNi10Fe1Mn (sea water resistant) - for p <sub>N</sub> ≤ 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<br>- in combination with housing in CuNi10Fe1Mn (not with field housing) - |
| Housing                                                                                                          | standard: stainless steel 1.4404 (316L)<br>option <sup>2</sup> : CuNi10Fe1Mn (sea water resistant) - in combination with pressure port in CuNi10Fe1Mn -<br>option field housing: stainless steel 1.4404 (316L); with cable gland (CuNi10Fe1Mn not possible)                                                         |
| Cable sheath                                                                                                     | TPE -U<br>(flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)                                                                                                                                                                              |
| Seals (media wetted)                                                                                             | standard: FKM<br>option: FFKM (only for p <sub>N</sub> ≤ 100 bar) others on request                                                                                                                                                                                                                                 |
| Diaphragm                                                                                                        | ceramic Al <sub>2</sub> O <sub>3</sub> 96 %                                                                                                                                                                                                                                                                         |
| Media wetted parts                                                                                               | pressure port, seals, diaphragm                                                                                                                                                                                                                                                                                     |
| <sup>2</sup> IS-version on request                                                                               |                                                                                                                                                                                                                                                                                                                     |
| Category of the environment                                                                                      |                                                                                                                                                                                                                                                                                                                     |
| Lloyd's Register (LR) <sup>3</sup>                                                                               | EMV1, EMV2, EMV3, EMV4 number of certificate: 13/20055                                                                                                                                                                                                                                                              |
| Det Norske Veritas (DNV)                                                                                         | temperature: D number of certificate: TAA00001GR<br>humidity: B<br>vibration: B<br>electromagnetic compatibility: B<br>enclosure: D                                                                                                                                                                                 |
| <sup>3</sup> for p <sub>N</sub> ≤ 160 bar                                                                        |                                                                                                                                                                                                                                                                                                                     |

| Explosion protection                                                                                  |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------|
| Approvals<br>DX19-DMK 457                                                                             | IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X<br>zone 0: II 1G Ex ia IIB T4 Ga<br>zone 20: II 1D Ex ia IIIC T135 °C Da                                                                                                                                                                                                                               |                                                                  |                                          |
| Safety technical maximum values                                                                       | U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, L <sub>i</sub> ≈ 0 µH<br>with field housing: C <sub>i</sub> = 105 nF<br>with cable outlet: C <sub>i</sub> = 84.7 nF<br>with ISO 4400: C <sub>i</sub> = 62.2 nF<br>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 <sub>atm</sub> 0.8 bar up to 1.1 bar<br>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<br>cable inductance: signal line/shield also signal line/signal line: 1µH/m                                                                                                                                                                                         |                                                                  |                                          |
| Miscellaneous                                                                                         |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
| Option oxygen application                                                                             | for p <sub>N</sub> ≤ 25 bar: O-ring in FKM Vi 567 (with BAM-approval)<br>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<br>Pressure Equipment Directive: 2014/68/EU (module A) <sup>4</sup>                                                                                                                                                                                                                                                    |                                                                  |                                          |
| ATEX-directive                                                                                        | 2014/34/EU                                                                                                                                                                                                                                                                                                                                       |                                                                  |                                          |
| <sup>4</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
| Wiring diagram                                                                                        |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
| 2-wire-system (current)                                                                               |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
|                                                                                                       |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
| Pin configuration                                                                                     |                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                          |
| Electrical connection                                                                                 | <div>ISO 4400</div>                                                                                                                                                                                                                                                                                                                              | <div>field housing<br/>(clamp section: 2.5 mm<sup>2</sup>)</div> | <div>cable colours<br/>(IEC 60757)</div> |
| Supply +                                                                                              | 1                                                                                                                                                                                                                                                                                                                                                | VS+                                                              | WH (white)                               |
| Supply –                                                                                              | 2                                                                                                                                                                                                                                                                                                                                                | VS-                                                              | BN (brown)                               |
| Shield                                                                                                | ground pin                                                                                                                                                                                                                                                                                                                                       | GND                                                              | GYNE (green-yellow)                      |

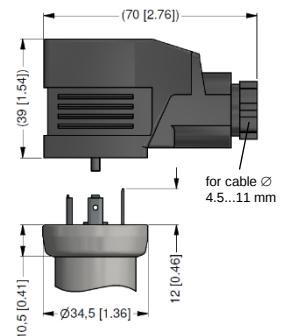
## Electrical connections <sup>5</sup> (dimensions mm / in)



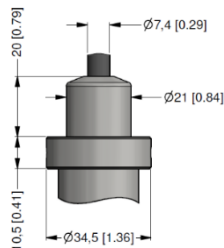
ISO 4400 - code G10  
(IP 65)



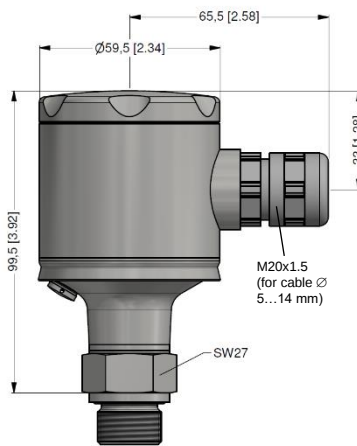
ISO 4400 - code G00  
(IP 65)



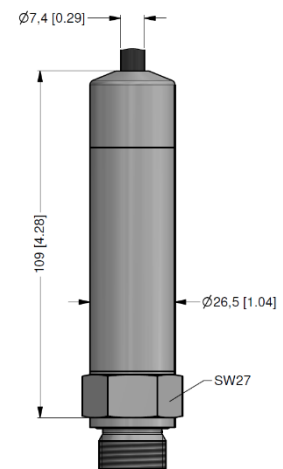
ISO 4400 - code G01  
(IP 65)



cable outlet <sup>6, 7</sup>  
(IP 68)



universal field housing  
(IP 67)



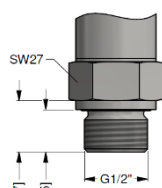
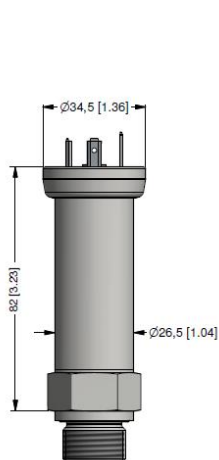
submersible version <sup>7</sup>  
(IP 68)

<sup>5</sup> Generally shielded cable has to be used! Cable versions are delivered with shielded cable. For ISO 4400 the use of shielded cable is compulsory.

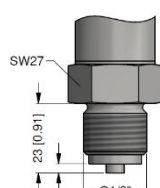
<sup>6</sup> tested at 4 bar or 40 mH<sub>2</sub>O for 24 hours

<sup>7</sup> shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed); different lengths available

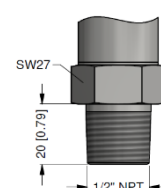
## Mechanical connection (dimensions mm / in)



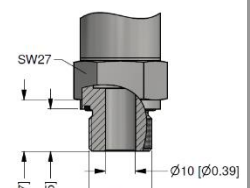
G1/2" DIN 3852



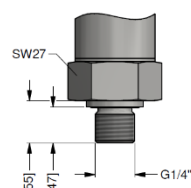
G1/2" EN 837



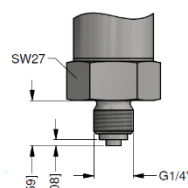
1/2" NPT



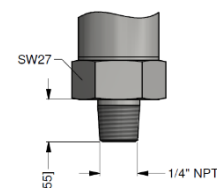
G1/2" open port  
DIN 3852 (≤ 40 bar)



G1/4" DIN 3852



G1/4" EN 837



1/4" NPT

Ordering code DMK 457

DMK 457

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| □ | □ | □ | - | □ | □ | □ | □ | - | □ | - | □ | □ | □ | - | □ | □ | □ | - | □ | □ | □ | - | □ | □ | □ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

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

<sup>1</sup> absolute pressure possible from 0.6 bar

<sup>2</sup> cable socket is GL-approved

<sup>3</sup> shielded TPE-U-cable with ventilation tube available in different lengths

<sup>4</sup> only for  $p_N \leq 40$  bar possible

<sup>5</sup> only for  $p_N \leq 100$  bar possible

<sup>6</sup> 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)

<sup>7</sup> oxygen application with FKM seal possible up to 25 bar