

# 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



# DMP 457

Pressure Transmitter for Shipbuilding and Offshore

Technical Data

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

<sup>1</sup> from 60 bar: measurement starts with ambient pressure

| 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>2</sup>  | standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO<br>nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO<br>option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % 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    | ≤ ± 0.1 % FSO / year by reference conditions  |
| Response time          | < 10 msec   |

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

| Thermal effects (Offset and Span) / Permissible temperatures |         |  |                                  |
|--|---------|--|----------------------------------|
| Nominal pressure p <sub>N</sub>                              | [bar]   | -1 ... 0   | < 0.4                            |
| Tolerance band   | [% FSO] | ≤ ± 0.75   | ≤ ± 1                            |
| in compensated range   | [°C]    | -20 ... 85   | 0 ... 70                         |
| Permissible temperatures                                     |         | medium: -40 ... 125°C<br>electronics / environment: -40 ... 85°C<br>storage: -40 ... 100°C | ≥ 0.40<br>≤ ± 0.75<br>-20 ... 85 |

| 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•GL (Det Norske Veritas • Germanischer Lloyd) |

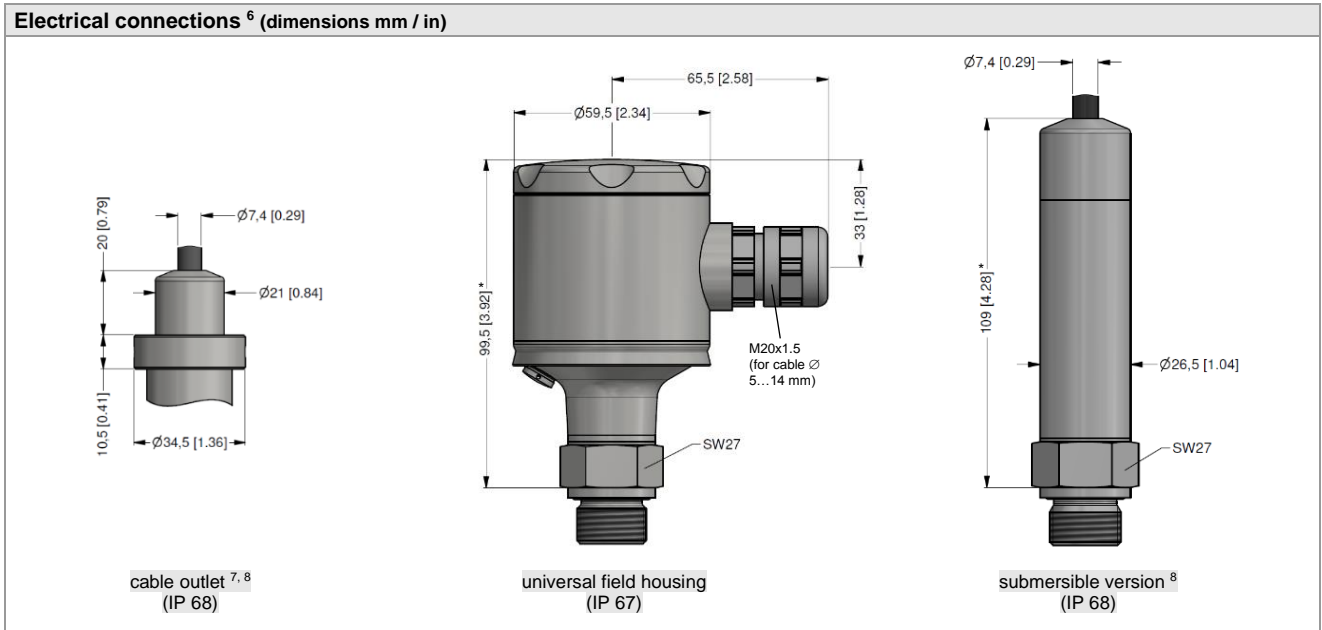
| Mechanical stability |  |
|----------------------|--|
| Vibration            | 4 g (according to DNV•GL: class B, curve 2 / basis: IEC 60068-2-6) |

| Materials            |   |
|----------------------|---|
| Pressure port        | stainless steel 1.4404 (316L)   |
| Housing              | standard: stainless steel 1.4404 (316L)<br>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<br>option: welded version <sup>3</sup> others on request  |
| Diaphragm            | stainless steel 1.4435 (316L)   |
| Media wetted parts   | pressure port, seals, diaphragm   |

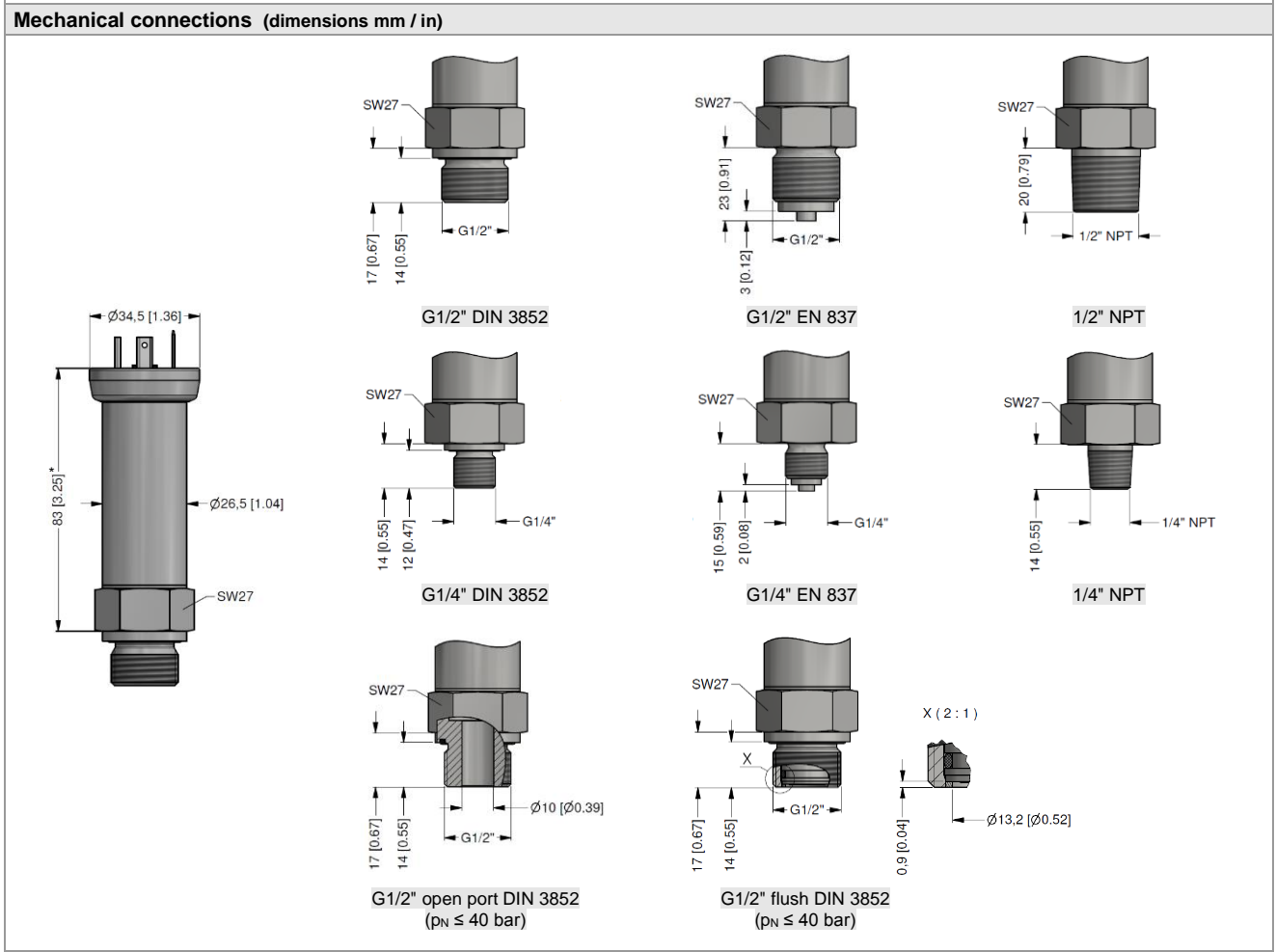
<sup>3</sup> welded version only with pressure ports according to EN 837; possible for nominal pressure ranges p<sub>N</sub> ≤ 40 bar

| 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<br>humidity: B<br>vibration: B<br>electromagnetic compatibility: B<br>enclosure: D | number of certificate: TAA00001GR |

| Explosion protection   |   |  |                              |
|--|---|--|------------------------------|
| Approvals<br>DX19-DMP 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  | $U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $L_i \approx 0 \text{ }\mu\text{H}$<br>with field housing: $C_i = 105 \text{ nF}$<br>with cable outlet: $C_i = 84.7 \text{ nF}$<br>with ISO 4400: $C_i = 62.2 \text{ nF}$<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 $p_{\text{atm}}$ 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: 1 $\mu\text{H}/\text{m}$   |  |                              |
| Miscellaneous  |   |  |                              |
| Current consumption  | max. 25 mA  |  |                              |
| Weight   | approx. 140 g (with ISO 4400)   |  |                              |
| Installation position  | any <sup>4</sup>  |  |                              |
| Operational life   | 100 million load cycles   |  |                              |
| CE-conformity  | EMC Directive: 2014/30/EU<br>Pressure Equipment Directive: 2014/68/EU (module A) <sup>5</sup>   |  |                              |
| ATEX Directive   | 2014/34/EU  |  |                              |
| <sup>4</sup> 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 $p_N \leq 1 \text{ bar}$ .<br><sup>5</sup> 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<br>(clamp section: 2.5 mm <sup>2</sup> ) | cable colours<br>(IEC 60757) |
|  |   |  |                              |
| Supply +   | 1   | VS+  | WH (white)                   |
| Supply -   | 2   | VS-  | BN (brown)                   |
| Shield   | ground pin  | GND  | GNYE (green-yellow)          |
| Electrical connections <sup>6</sup> (dimensions mm / in)   |   |  |                              |
|  |   |  |                              |
| <sup>6</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> 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>7</sup> tested at 4 bar or 40 mH<sub>2</sub>O for 24 hours  
<sup>8</sup> 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  $\leq \pm 0.25$  % FSO



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

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## Ordering code DMP 457

**DMP 457**



| Pressure   |                   |                     |       |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
|--|-------------------|---------------------|-------|---|---|---|---|--|--|--|--|--|--|--|--|--|---------|
| in bar, gauge <sup>1</sup>   |                   | 6                   | 0     | 0 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| in bar, absolute <sup>2</sup>  |                   | 6                   | 0     | 1 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| in mH <sub>2</sub> O, gauge <sup>1</sup>                                   |                   | 6                   | 0     | 2 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| in mH <sub>2</sub> O, absolute <sup>2</sup>                                |                   | 6                   | 0     | 3 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| Input  |                   | [mH <sub>2</sub> O] | [bar] |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
| 1.0  | 0.10 <sup>2</sup> |                     |       | 1 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |         |
| 1.6  | 0.16 <sup>2</sup> |                     |       | 1 | 6 | 0 | 0 |  |  |  |  |  |  |  |  |  |         |
| 2.5  | 0.25 <sup>2</sup> |                     |       | 2 | 5 | 0 | 0 |  |  |  |  |  |  |  |  |  |         |
| 4.0  | 0.40              |                     |       | 4 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |  |         |
| 6.0  | 0.60              |                     |       | 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 |  |  |  |  |  |  |  |  |  |         |
| 60   | 60                |                     |       | 6 | 0 | 0 | 2 |  |  |  |  |  |  |  |  |  |         |
| 100  | 100               |                     |       | 1 | 0 | 0 | 3 |  |  |  |  |  |  |  |  |  |         |
| 160  | 160               |                     |       | 1 | 6 | 0 | 3 |  |  |  |  |  |  |  |  |  |         |
| 250  | 250               |                     |       | 2 | 5 | 0 | 3 |  |  |  |  |  |  |  |  |  |         |
| 400  | 400               |                     |       | 4 | 0 | 0 | 3 |  |  |  |  |  |  |  |  |  |         |
| 600  | 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   |                   |                     |       |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
| standard for p <sub>N</sub> ≥ 0,4 bar:                                     | 0.35 % FSO        |                     |       | 3 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| standard for p <sub>N</sub> < 0,4 bar:                                     | 0.50 % FSO        |                     |       | 5 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| option for p <sub>N</sub> ≥ 0,4 bar:                                       | 0.25 % FSO        |                     |       | 2 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| customer   |                   |                     |       | 9 |   |   |   |  |  |  |  |  |  |  |  |  | consult |
| Electrical connection  |                   |                     |       |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
| male and female plug ISO 4400<br>(for cable Ø 4...6 mm)                    |                   |                     |       | G | 1 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| male and female plug ISO 4400 GL <sup>3</sup><br>(for cable Ø 10...14 mm)  |                   |                     |       | G | 0 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| male and female plug ISO 4400 GL <sup>3</sup><br>(for cable Ø 4,5...11 mm) |                   |                     |       | G | 0 | 1 |   |  |  |  |  |  |  |  |  |  |         |
| cable outlet (TPE-U-cable) <sup>4</sup>                                    |                   |                     |       | T | R | 3 |   |  |  |  |  |  |  |  |  |  |         |
| field housing stainless steel (316L)                                       |                   |                     |       | 8 | 8 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| submersible version (1.4404 / 316L)  |                   |                     |       | T | T | 3 |   |  |  |  |  |  |  |  |  |  |         |
| with TPE-U-cable <sup>4</sup>  |                   |                     |       |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
| 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 |   |  |  |  |  |  |  |  |  |  |         |
| G 1/2" DIN 3852 with<br>flush sensor <sup>5</sup>                          |                   |                     |       | F | 0 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| G1/2" DIN 3852 open pressure port <sup>5</sup>                             |                   |                     |       | H | 0 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| 1/2" NPT   |                   |                     |       | N | 0 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| 1/4" NPT   |                   |                     |       | N | 4 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| customer   |                   |                     |       | 9 | 9 | 9 |   |  |  |  |  |  |  |  |  |  | consult |
| Seals  |                   |                     |       |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
| FKM  |                   |                     |       | 1 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| without (welded version) <sup>6</sup>                                      |                   |                     |       | 2 |   |   |   |  |  |  |  |  |  |  |  |  |         |
| customer   |                   |                     |       | 9 |   |   |   |  |  |  |  |  |  |  |  |  | consult |
| Special version  |                   |                     |       |   |   |   |   |  |  |  |  |  |  |  |  |  |         |
| standard   |                   |                     |       | 0 | 0 | 0 |   |  |  |  |  |  |  |  |  |  |         |
| customer   |                   |                     |       | 9 | 9 | 9 |   |  |  |  |  |  |  |  |  |  | consult |

<sup>1</sup> from 60 bar: measurement starts with ambient pressure  
<sup>2</sup> absolute pressure possible from 0.4 bar  
<sup>3</sup> cable socket is GL-approved  
<sup>4</sup> shielded TPE-U-cable with ventilation tube available in different lengths  
<sup>5</sup> only for p<sub>N</sub> ≤ 40 bar possible  
<sup>6</sup> welded version only with pressure ports according to EN 837; possible with pressure ranges p<sub>N</sub> ≤ 40 bar

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