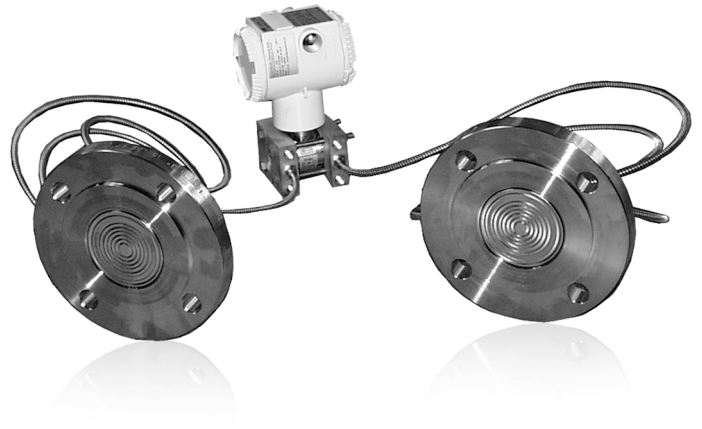


# Model 265DR Differential

## Series 2600T Pressure Transmitters

Engineered solutions for all applications



**With remote seals with capillary tube**

**Base accuracy**

–  $\pm 0.04$  %

**Messspannengrenzen**

– 1 ... 10,000 kPa; 4 in H<sub>2</sub>O up to 1,450 psi

**Proven sensor technology together with state-of-the-art digital technology**

**Comprehensive selection of sensors**

– Optimized performance and stability

**Flexible configuration options**

– On device using control buttons in combination with LCD display, handheld terminal, or PC user interface

**Various communication protocols available**

– Enables integration into HART®, PROFIBUS PA, and FOUNDATION fieldbus platforms  
– Upgrade options thanks to interchangeable electronics with automatic configuration

**Adherence to Pressure Equipment Directive (PED) category III**

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## 1 General description

This data sheet describes transmitters fitted with either one or two remote seals. The remote seals are connected to the transmitter sensor via a capillary tube.

Model 265DR can be used for measuring differential pressure. For this purpose, you can either use two identical remote seals of the same type and size or only one (on the plus or minus side). If only one remote seal is used, a standard 1/4-18 NPT (flange) or 1/2-14 NPT (adapter flange) threaded connection is available for the other side of the measuring equipment.

The following table indicates the standard remote seal types which may be combined with the 265DR transmitter.

Model	Remote seal type	Size
S265W	Wafer remote seals, flush diaphragm	2 in/DN 50 3 in/DN 80
	Wafer remote seal with extended diaphragm	2 in/DN 50 3 in/DN 80
S265F	Flange remote seal, flush diaphragm	2 in/DN 50 3 in/DN 80
	Flange remote seal with extended diaphragm	2 in/DN 50 3 in/DN 80



### Important

All data and detailed information can be found on remote seal data sheet SS/S265.

## 2 Functional specifications

### Measuring range and span limits

Sensor code	Upper range limit (URL)	Lower range limit (LRL)	Minimum span							
			One remote seal (maximum capillary tube length: 16 m (630 inches))				Two remote seals of the same design (maximum capillary tube length: 16 m (630 inches))			
			Flush diaphragm		With extended diaphragm		Flush diaphragm		With extended diaphragm	
			DN 50 / 2 in	DN 80 / 3 in DN 100 / 4 in	DN 50 / 2 in	DN 80 / 3 in DN 100 / 4 in	DN 50 / 2 in	DN 80 / 3 in DN 100 / 4 in	DN 50 / 2 in	DN 80 / 3 in DN 100 / 4 in
<b>C</b>	6 kPa 60 mbar 24 in H <sub>2</sub> O	-6 kPa -60 mbar -24 in H <sub>2</sub> O		6 kPa 60 mbar 24 in H <sub>2</sub> O		6 kPa 60 mbar 24 in H <sub>2</sub> O	2 kPa 20 mbar 8 in H <sub>2</sub> O	1 kPa 10 mbar 4 in H <sub>2</sub> O	3 kPa 30 mbar 12 in H <sub>2</sub> O	1 kPa 10 mbar 4 in H <sub>2</sub> O
<b>F</b>	40 kPa 400 mbar 160 in H <sub>2</sub> O	-40 kPa -400 mbar -160 in H <sub>2</sub> O	10 kPa 100 mbar 40 in H <sub>2</sub> O	6 kPa 60 mbar 24 in H <sub>2</sub> O	16 kPa 160 mbar 64 in H <sub>2</sub> O	6 kPa 60 mbar 24 in H <sub>2</sub> O	3 kPa 30 mbar 12 in H <sub>2</sub> O	1.3 kPa 13.3 mbar 5.3 in H <sub>2</sub> O	3 kPa 30 mbar 12 in H <sub>2</sub> O	1.3 kPa 13.3 mbar 5.3 in H <sub>2</sub> O
<b>L</b>	250 kPa 2500 mbar 1000 in H <sub>2</sub> O	-250 kPa -2500 mbar -1000 in H <sub>2</sub> O	10 kPa 100 mbar 40 in H <sub>2</sub> O	6 kPa 60 mbar 24 in H <sub>2</sub> O	16 kPa 160 mbar 64 in H <sub>2</sub> O	6 kPa 60 mbar 24 in H <sub>2</sub> O	8.3 kPa 83 mbar 34 in H <sub>2</sub> O	8.3 kPa 83 mbar 34 in H <sub>2</sub> O	8.3 kPa 83 mbar 34 in H <sub>2</sub> O	8.3 kPa 83 mbar 34 in H <sub>2</sub> O
<b>N</b>	2000 kPa 20 bar 290 psi	-2000 kPa -20 bar -290 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi	67 kPa 0.67 bar 9.7 psi
<b>R</b>	10000 kPa 100 bar 1450 psi	-10000 kPa -100 bar -1450 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi	333 kPa 3.3 bar 49 psi

### Span limits

Maximum span = URL = Upper range limit

With differential pressure models, the span can be adjusted within the span limits right up to the  $\pm$  upper range limit.

Example:

-400 ... 400 mbar

To optimize the performance characteristics, it is recommended that you select the transmitter sensor with the lowest turndown (TD) ratio.

Recommendation for square root function:

At least 10 % of upper range limit (URL)

### Zero suppression and elevation

The zero position and span can be set to any value within the range limits listed in the table if:

- Set span  $\geq$  minimum span

### Damping

Adjustable time constant: 0 ... 60 s

This is in addition to the sensor response time.

### Warm-up time

According to the technical data, with minimum damping the transmitter will be ready for operation in a maximum of 2.5 s.

### Insulation resistance

>100 M $\Omega$  at 500 V DC (between terminals and ground)

### 3 Operating limits

#### 3.1 Temperature limits in °C (°F)

##### Environment

	Ambient temperature range
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
LCD display	-20 ... 70 °C (-4 ... 158 °F)
Viton seals	-20 ... 85 °C (-4 ... 185 °F)
PTFE seals	-20 ... 85 °C (-4 ... 185 °F)



##### Important

For applications in potentially explosive atmospheres, the temperature range specified on the relevant certificate/approval must be observed.

##### Process

ID letter(s), density and process temperature usage restrictions for the various filling liquids in the capillary tube/remote seal:

Filling liquid	ID	Density at 20 °C in kg/m <sup>3</sup>	Process temperature range
Silicone oil	IB	924	-30 ... 250 °C (-22 ... 482 °F)
Carbon fluoride	L	1860	-30 ... 150 °C (-22 ... 302 °F)
High-temperature oil	SH	1070	-10 ... 375 °C (14 ... 707 °F)
White oil	WB	849	-6 ... 200 °C (21 ... 392 °F)
Vacuum-tight	IC-V	1055	-30 ... 200 °C (-22 ... 392 °F)

##### Storage

	Storage temperature range
Storage temperature	-50 ... 85 °C (-58 ... 185 °F)
Storage temperature for white oil filling	-6 ... 85 °C (21 ... 185 °F)
LCD display	-40 ... 85 °C (-40 ... 185 °F)

	Humidity during storage
Relative humidity	Up to 75 %

#### 3.2 Pressure limits

##### Minimum pressure

Filling liquids	ID	Pressure in kPa abs.					
		20 °C (68 °F)	100 °C (212 °F)	150 °C (302 °F)	200 °C (392 °F)	250 °C (482 °F)	375 °C (707 °F)
Silicone oil	IB	> 50	> 50	> 50	> 75	> 100	-
Carbon fluoride	L	> 100	> 100	> 100	-	-	-
High temperature oil	SH	> 50	> 50	> 50	> 75	> 100	> 100
White oil	WB	> 50	> 100	> 100	> 100	> 100	-
Silicone oil for vacuum-tight design	IC-V	> 0.5	> 2.5	> 3.8	> 5.0	-	-



##### Important

Data relating to maximum working pressure for the relevant remote seal can be found in the remote seal data sheet.

##### Pressure test

The 265DR transmitter can withstand a pressure test applied simultaneously from both sides of up to 1.5 times the static pressure range of the transmitter, or up to 1.5 times the flange pressure level, depending upon which value is lower.

##### Overpressure limits (without damage to the transmitter)

In accordance with the static pressure range of the transmitter or flange pressure level of the remote seal (refer to the remote seal data sheet), depending on which of these values is the smaller.

## 4 Environmental limits

### Electromagnetic compatibility (EMC)

Conforms to the requirements and tests for EMC Directive 89/336/EC, as well as to EN 61000-6-3 concerning emitted interference and EN 61000-6-2 concerning interference immunity.

Meets NAMUR recommendations.

### Low Voltage Directive

Complies with 73/23/EC.

### Pressure Equipment Directive (PED)

Instruments with a maximum operating pressure of 25 MPa, 250 bar, 3,625 psi, or 41 MPa, 410 bar, 5,945 psi, comply with Directive 97/23/EC Category III, module H.

### Humidity

Relative humidity: Up to 100 %

Condensation, icing: Permissible

### Vibration resistance

Acceleration up to 2 g at frequencies up to 1,000 Hz (according to IEC 60068-2-6).

### Shock resistance (acc. to IEC 60068-2-27)

Acceleration: 50 g

Duration: 11 ms

### Protection type (humid and dusty atmospheres)

The transmitter is dust and sand-tight, and is protected against immersion effects as defined by the following standards:

- IEC EN 60529 (1989) with IP 67 (with IP 68 on request)
- NEMA 4X
- JIS C0920

Protection type with plug connection: IP 65

## 5 Potentially explosive atmospheres

### Transmitter with "Intrinsically safe EEx ia" type of explosion protection in accordance with Directive 94/9/EC (ATEX)

Transmitter with 4 ... 20 mA output signal and HART communication:

Designation: II 1/2 GD T 50 °C EEx ia IIC T6  
 II 1/2 GD T 95 °C EEx ia IIC T4

Power supply and signal circuit with "Intrinsically safe, EEx ib IIB/IIC" or "Intrinsically safe, EEx ia IIB/IIC" type of explosion protection, for connection to supply units with the following maximum values:

II 1/2 GD T 50 °C EEx ia or ib IIC T6  
 II 1/2 GD T 95 °C EEx ia or ib IIC T4

Temperature class T4:

$U_i = 30 \text{ V}$

$I_i = 200 \text{ mA}$

$P_i = 0.8 \text{ W}$  for T4 where  $T_a = -40 \dots 85 \text{ °C}$

$P_i = 1.0 \text{ W}$  for T4 where  $T_a = -40 \dots 70 \text{ °C}$

For temperature class T6:

$P_i = 0.7 \text{ W}$  for T6 where  $T_a = -40 \dots 40 \text{ °C}$

Effective internal capacitance:  $C_i = 10 \text{ nF}$

Effective internal inductance:  $L_i \approx 0$

Fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus):

Designation: FISCO field device  
 II 1/2G Ex ia IIC T6 or T4  
 II 1/2D Ex iaD 20 T50 °C or T95 °C

Power supply and signal circuit with "Intrinsically safe" type of explosion protection, only for connection to supply units certified according to the FISCO concept and with the following maximum values:

$U_i = 17.5 \text{ V}$

$I_i = 500 \text{ mA}$

$P_i = 8.75 \text{ W}$

or connection to supply units or barriers with linear characteristics.

Maximum values:

$U_i = 24 \text{ V}$

$I_i = 250 \text{ mA}$

$P_i = 1.2 \text{ W}$

Effective internal inductance:  $L_i = 10 \text{ } \mu\text{H}$ ,

Effective internal capacitance:  $C_i = 5 \text{ nF}$

Permissible ambient temperature range depending on temperature class:

Temperature class	Lower limit of ambient temperature	Upper limit of ambient temperature
T4	-40 °C (-40 °F)	85 °C (185 °F)
T5, T6	-40 °C (-40 °F)	40 °C (104 °F)

### Category 3 transmitter for use in "Zone 2" as defined by Directive 94/9/EC (ATEX)

Transmitter with 4 ... 20 mA output signal and HART communication:

Designation: II 3 GD T 50 °C EEx nL IIC T6  
 II 3 GD T 95 °C EEx nL IIC T4

Operating conditions:

Supply and signal circuit

(terminal signal ±):

$U \leq 45 \text{ V}$

$I \leq 22.5 \text{ mA}$

Ambient temperature range:

Temperature class T4:  $T_a = -40 \dots 85 \text{ °C}$

Temperature class T5 and T6:  $T_a = -40 \dots 40 \text{ °C}$

### Transmitter with "Flameproof EEx d" type of explosion protection in accordance with Directive 94/9/EC (ATEX)

Transmitter with 4 ... 20 mA output signal, HART communication, and fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus)

Designation: II 1/2 G EEx d IIC T6

Operating conditions:

Ambient temperature range:  $-40 \dots 75 \text{ °C}$

**Transmitter with "Intrinsically safe EEx ia" type of explosion protection in accordance with Directive 94/9/EC (ATEX), or**

**"Flameproof EEx d" type of explosion protection in accordance with Directive 94/9/EC (ATEX), or**

**"Limited energy EEx nL" type of explosion protection in accordance with Directive 94/9/EC (ATEX) (alternative certification)**

Transmitter with 4 ... 20 mA output signal and HART communication:

Identification: II 1/2 GD T50 °C EEx ia IIC T6  
II 1/2 GD T95 °C EEx ia IIC T4;  
(refer to "EEx ia" for additional data)

or

Identification: II 1/2 GD T85 °C EEx d IIC T6  
Ambient temperature range: -40 ... 75 °C

or

Identification: II 3 GD T50 °C EEx nL IIC T6  
II 3 GD T95 °C EEx nL IIC T4  
(refer to "EEx nL" for additional data)

**Factory Mutual (FM)**

Transmitter with 4 ... 20 mA output signal and HART communication:

**Intrinsically safe protection**

Class I; Division 1; Groups A, B, C, D;  
Class I; Zone 0; Group IIC; AEx ia IIC

Degree of protection: NEMA type 4X (indoor  
or outdoor installation)

Permissible ambient temperature range depending on temperature class:

<b><math>U_{max} = 30 \text{ V}</math>, <math>C_i = 10.5 \text{ nF}</math>, <math>L_i = 10 \text{ }\mu\text{H}</math></b>			
<b>Ambient temperature</b>	<b>Temperature class</b>	<b><math>I_{max}</math></b>	<b><math>P_i</math></b>
-40 ... 85 °C (-40 ... 185 °F)	T4	200 mA	0.8 W
-40 ... 70 °C (-40 ... 158 °F)			1 W
-40 ... 40 °C (-40 ... 104 °F)	T5	25 mA	0.75 W
	T6		0.5 W

Fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus):

**Intrinsically safe protection:**

Class I, II, and III; Division 1;  
Groups A, B, C, D, E, F, G;  
Class I; Zone 0; AEx ia Group IIC T6, T4;  
Non-incendive Class I, II, and III; Division 2;  
Groups A, B, C, D, F, G

Transmitter with 4 ... 20 mA output signal, HART communication, and fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus):

**Explosion-proof protection:**

Class I, Division 1, Groups A, B, C, D;  
Class II/III, Division 1, Groups E, F, G

Degree of protection: NEMA type 4X (indoor  
or outdoor installation)

**Canadian Standards Association (CSA)**

Transmitter with 4 ... 20 mA output signal, HART communication, and fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus)

**Explosion-proof protection:**

Class I, Division 1, Groups B, C, D;  
Class II, Division 1, Groups E, F, G

Degree of protection: NEMA type 4X (indoor  
or outdoor installation)

**Standards Association of Australia (SAA)**

**Transmitter with "Intrinsically safe EEx ia" and "Non-sparking EEx n" types of protection**

Transmitter with 4 ... 20 mA output signal and HART communication:

Identification:

Ex ia IIC T4 ( $P_i \leq 0.8 \text{ W}$ ,  $T_a = 85 \text{ }^\circ\text{C}$ )/T6 ( $P_i \leq 0.7 \text{ W}$ ,  $T_a = 40 \text{ }^\circ\text{C}$ )  
Ex n IIC T4 ( $T_a = 85 \text{ }^\circ\text{C}$ )/T6 ( $T_a = 40 \text{ }^\circ\text{C}$ )  
IP 66

Intrinsically safe installation input parameters:

$U_i = 30 \text{ V}$   
 $I_i = 200 \text{ mA}$   
 $P_i = 0.8 \text{ W}$  for T4 where  $T_a = +85 \text{ }^\circ\text{C}$  or  
 $P_i = 0.7 \text{ W}$  for T6 where  $T_a = +40 \text{ }^\circ\text{C}$

Effective internal capacitance:  $C_i = 52 \text{ nF}$

Effective internal inductance:  $L_i \approx 0 \text{ mH}$

EEx n installation input parameters:

$U_i = 30 \text{ V}$

**Transmitter with "Flameproof Ex d" type of explosion protection**

Transmitter with 4 ... 20 mA output signal, HART communication, and fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus, Modbus):

Identification:

Zone 1: Ex d IIC T6 (Tamb +75 °C) IP66 / IP67  
Zone A21: Ex tD A21 T85 (Tamb +75 °C) IP66 / IP67

**NEPSI (China)**

**Intrinsically safe protection**

Transmitter with 4 ... 20 mA output signal and HART communication:

Identification: Ex ia IIC T4/T6

Permissible ambient temperature range depending on temperature class:

Temperature class	Ambient temperature	Pi
T4	-40 ... 85 °C (-40 ... 185 °F)	0.8
T4	-40 ... 70 °C (-40 ... 158 °F)	1.0
T6	-40 ... 40 °C (-40 ... 104 °F)	0.7

Supply and signal circuit for connection to supply units with the following maximum values:

<b>U<sub>i max</sub> = 30 V, I<sub>i max</sub> = 200 mA</b>			
Temperature class	P <sub>i max</sub>	Max. internal parameters	
		C <sub>i</sub> (nF)	L <sub>i</sub> (µH)
T6	0.7	47	10
T4	0.8	47	10
T4	1.0	47	10

Fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus)

Identification: Ex ia IIB/IIC T4 ... T6

Permissible ambient temperature range depending on temperature class:

Temperature class	Ambient temperature
T4	-40 ... 85 °C (-40 ... 185 °F)
T5	-40 ... 50 °C (-40 ... 122 °F)
T6	-40 ... 40 °C (-40 ... 104 °F)

Supply and signal circuit for connection to supply units with the following maximum values:

Ex mark	Supply unit Characteristic	U <sub>i max</sub> (V)	I <sub>i max</sub> (mA)	P <sub>i max</sub> (W)
Ex ia IIC T4 ... T6	Rectangular or trapezoidal	17.5	360	2.52
Ex ia IIB T4 ... T6	Rectangular or trapezoidal	17.5	380	5.32
Ex ia IIC T4 ... T6	Linear	24	250	1.2
C <sub>i max</sub> (nF)		L <sub>i max</sub> (µH)		
0		10		

**Explosion-proof protection**

Transmitter with 4 ... 20 mA output signal, HART communication, and fieldbus transmitter (PROFIBUS PA / FOUNDATION Fieldbus)

Identification: Ex d IIC T6

**Operating conditions**

Ambient temperature range: -40 ... 75 °C (-40 ... 167 °F)

**Overfill protection**

Model 265DR as part of overfill protection on containers used for storing flammable or non-flammable liquids that are hazardous to water

Flammable liquids	Only in conjunction with EEx ia approval
Total pressure	Up to 4 MPa, 40 bar, 580 psi
Sensor code	C, F, or L
Filling liquid	Silicone oil
Process temperature limits on remote seal	-30 ... ≤ 250 °C (-22 ... ≤ 482 °F)
Approval	Z-65.11-271



## 6 Electrical data and options

### 6.1 HART digital communication and 4 ... 20 mA output current

#### Power supply

The transmitter operates at voltages between 10.5 and 45 V DC with no load, and is protected against reverse polarity connection (additional load enables operation above 45 V DC).

With a backlit LCD display, the minimum voltage is 14 V DC.

In the case of the EEx ia version and other intrinsically safe, approved versions, the supply voltage must not exceed 30 V DC.

#### Ripple

Maximum permissible supply voltage ripple during communication: According to HART FSK "Physical Layer" specification rev. 8.1.

#### Load limitations

Total loop resistance with 4 ... 20 mA and HART:

$$R(k\Omega) = \frac{\text{Voltage supply} - \text{Minimum operating voltage (VDC)}}{22.5 \text{ mA}}$$



#### Important

A minimum resistance of 250  $\Omega$  is required for HART communication.

#### LCD display (optional)

19-segment alphanumeric display (two lines, six characters) with additional bar chart display; option of backlighting for customized display of:

- Output current in percent
- Output current in mA
- Freely selectable process variable

Diagnostic messages, alarms, measuring range upper limit violations, and changes to the configuration are also displayed.

#### Output signal

4 ... 20 mA two-wire output; linear output signal or square root output signal.

Additionally:

- Characteristic with exponents 3/2 or 5/2
  - Horizontal cylindrical container
  - Spherical vessel
  - Freely programmable characteristic with 20 reference points
- HART® communication provides digital process variables (% , mA , or engineering units) superimposed on the 4 ... 20 mA signal (protocol in accordance with Bell 202 FSK standard).

#### Output current limits (according to NAMUR standard)

Overload condition:

- Lower limit: 3.8 mA (can be configured up to 3.5 mA)
- Upper limit: 20.5 mA (can be configured up to 22.5 mA)

#### Alarm current

Minimum alarm current:	Can be configured from 3.5 ... 4 mA; default setting: 3.6 mA
Max. alarm current:	Can be configured from 20 ... 22.5 mA; default setting: 21 mA
Default setting:	Maximum alarm current

#### SIL: Functional safety (optional)

According to IEC 61 508/61 511

Device with certificate of conformity for use in safety-related applications, up to and including SIL 2.

## 6.2 PROFIBUS PA output

### Device type

Pressure transmitter conforming to Profile 3.0, Class A and B;  
ID number 04C2 HEX

### Power supply

The transmitter is operated at 10.2 ... 32 V DC (no polarity).  
The supply voltage must not exceed 17.5 V DC when used in EEx ia zones.  
Intrinsically safe installation in accordance with FISCO model.

### Current consumption

Operating (quiescent): 11.7 mA  
Fault current limiting: Maximum 17.3 mA

### Output signal

Physical layer in accordance with IEC 1158-2/EN 61158-2;  
transmission using Manchester II modulation at 31.25 kbit/sec.

### Output interface

PROFIBUS PA communication according to PROFIBUS DP 50170  
Part 2 / DIN 19245 Parts 1-3

### Output cycle time

40 ms

### Function blocks

2 standard analog input function blocks  
1 transducer block  
1 physical block

### LCD display (optional)

19-segment alphanumeric display (two lines, six characters) with  
additional bar chart display; option of backlighting.  
Customized display:  
Output value in percent or OUT (analog input)  
Diagnostic messages, alarms, measuring range upper limit violations,  
and changes to the configuration are also displayed.

### Transmitter interference mode

Permanent self-diagnosis; potential errors indicated in diagnostic  
parameters and in the status of process values.

## 6.3 FOUNDATION Fieldbus output

### Power supply

The transmitter is operated at 10.2 ... 32 V DC (no polarity).  
The supply voltage must not exceed 17.5 V DC when used in EEx ia zones.  
Intrinsically safe installation in accordance with FISCO model.

### Current consumption

Operating (quiescent): 11.7 mA  
Fault current limiting: Maximum 17.3 mA

### Output signal

Physical layer in accordance with IEC 1158-2/EN 61158-2;  
transmission using Manchester II modulation at 31.25 kbit/sec.

### Function blocks/execution time

2 standard analog input function blocks/maximum 25 ms  
1 standard PID function block

### Additional blocks

1 manufacturer-specific pressure with calibration transducer block  
1 enhanced resource block

### Number of link objects

10

### Number of VCRs

16

### Output interface

FOUNDATION fieldbus digital communication protocol in accordance  
with standard H1; complies with specification V. 1.5.  
FF registration no.: IT023600

### LCD display (optional)

19-segment alphanumeric display (two lines, six characters) with  
additional bar chart display; option of backlighting.  
Customized display:  
Output value in percent or OUT (analog input)  
Diagnostic messages, alarms, measuring range upper limit violations,  
and changes to the configuration are also displayed.

### Transmitter interference mode

Permanent self-diagnosis; potential errors indicated in diagnostic  
parameters and in the status of process values.

## 7 Measuring accuracy

### Reference conditions according to IEC 60770

- Ambient temperature  $T_U$  = constant, in range: 18 ... 30 °C (64 ... 86 °F)
- Relative humidity = constant, in range: 30 ... 80 %
- Atmospheric pressure  $P_U$  = constant, in range: 950 ... 1,060 mbar
- Position of measuring cell (isolating diaphragm areas): Vertical  $\pm 1^\circ$
- Span based on zero position
- Isolating diaphragm material: Hastelloy C276™
- Filling liquid: Silicone oil
- Supply voltage: 24 V DC
- Load with HART: 250  $\Omega$
- Transmitter not grounded
- Characteristic setting: Linear, 4 ... 20 mA

Unless otherwise specified:

- The reference conditions apply for the following performance characteristics.
- Errors are given as a percentage of the span value.

The accuracy of the measurement in relation to the upper range limit (URL) is affected by the turndown (TD); i.e., the ratio of the upper range limit (URL) to the set span (URL/span).



### Important

Select the transmitter sensor with the smallest possible turndown. This optimizes the accuracy of the measurement.

The limit values and response times are dependent upon the type of remote seal and measuring point. Refer also to the remote seal data sheet.

### Devices with two remote seals

When using devices with two remote seals, the arrangement should be as symmetrical as possible (nominal size, capillary tube length, diaphragm material).

### Measuring error (for terminal based conformity)

Percentage of set span, consisting of non-linearity, hysteresis, and non-reproducibility.

In the case of fieldbus devices, span refers to the analog input function block output scale range.

### Measuring error for differential pressure sensor

Turndown	Measuring error
1:1 to 10:1	$\pm 0.04$ %
>10:1	$\pm (0.04 + 0.005 \times TD - 0.05)$ %

### Measuring error for absolute pressure sensor

	Measuring error
-	80 kPa, 800 mbar, 321 in H <sub>2</sub> O

## 8 Operating influences

Thermal change in ambient temperature on the zero signal and span (turndown up to 15:1), in relation to the set span

Differential pressure sensor:

Range	Maximum effect on zero signal and span
-10 ... 60 °C (14 ... 140 °F)	$\pm (0.06 \% \times TD + 0.05 \%)$
-40 ... -10 °C (-40 ... 14 °F) and 60 ... 80 °C (140 ... 176 °F)	$\pm (0.025 \% / 10 \text{ K} \times TD + 0.03 \% / 10 \text{ K})$

### Absolute pressure sensor

For the entire temperature range of 120 K

- **Zero signal**  
 For sensors C, F, L, N, R:  
 40 kPa, 400 mbar, 160 in H<sub>2</sub>O  
 (absolute pressure sensor 41 MPa, 410 bar, 5,945 psi)
- **Span**  
 For sensors C, F, L, N, R:  
 0.3 kPa, 3 bar, 43.5 psi  
 (absolute pressure sensor 41 MPa, 410 bar, 5,945 psi)

The entire temperature may be defined as the combined effect of the above factors on the transmitter plus the remote seal influences, depending on the operating temperature.



#### Important

Detailed information about additional influences on remote seals can be found in the remote seal data sheet.

Static pressure (zero signal errors may be calibrated out at operating pressure)

Measuring range	Sensor C, F, L, N	Sensor R
Zero signal	Up to 100 bar: 0.05 % URL	Up to 100 bar: 0.1 % URL
	> 100 bar: 0.05 % URL / 100 bar	> 100 bar: 0.1 % URL / 100 bar
Span	Up to 100 bar: 0.05 % span	Up to 100 bar: 0.1 % span
	> 100 bar: 0.05 % span / 100 bar	> 100 bar: 0.1 % span / 100 bar

### Power supply

Within the specified limits for the voltage/load, the total effect is less than 0.001 % of the upper range limit per volt.

### Load

Within the specified load/voltage limits, the total effect is negligible.

### Electromagnetic fields

Total effect: Less than 0.05 % of span between 80 and 1,000 MHz and at field strengths of up to 10 V/m, when tested with unshielded cables, and either with or without a display.

### Installation position



#### Important

Capillary tube influences due to differing installation heights are not included in the following information.

Rotations in the plane of the diaphragm have a negligible effect. A tilt from the vertical causes a zero position shift of the upper range limit, which can be corrected using an appropriate zero position adjustment. This has no effect on the span.

Zero position shift:  $\sin \alpha \times 0.35 \text{ kPa}$  (3.5 mbar, 1.4 in H<sub>2</sub>O)

## 9 Technical specification



### Important

Please refer to the ordering information to check the availability of different versions of the relevant model.

### Materials

Isolating diaphragms <sup>1)</sup>	Hastelloy C276™; Stainless steel (316L/1.4435); Monel 400™; Tantalum
Process flange, adapter, plug and drain/vent valve <sup>1)</sup>	Hastelloy C276™; Stainless steel (316L/1.4404); Monel 400™
Blind flange (remote seal side)	Stainless steel (304/1.4301)
Sensor filling liquid	Silicone oil, inert filling (carbon fluoride)
Sensor housing	Stainless steel (316L/1.4404)
Mounting bracket	Stainless steel (304/1.4301)
Seals <sup>1)</sup>	Viton™ (FPM) color: Green; Buna (NBR): Color: Black; EPDM color: Black; PTFE color: White
Screws and nuts	Stainless steel Class A4-70 screws and nuts to ISO 3506, in compliance with NACE MR0175 Class II
Electronics housing and cover	Barrel design: <ul style="list-style-type: none"> <li>Aluminum alloy with low copper content (&lt; 0.1 %), baked epoxy finish</li> <li>Stainless steel (316L/1.4404)</li> </ul> DIN design: <ul style="list-style-type: none"> <li>Aluminum alloy with low copper content (&lt; 0.1 %), baked epoxy finish</li> </ul>
O-ring cover	Viton™
Local zero position and span adjustments	Fiber glass-reinforced polycarbonate plastic (removable), no adjustment options for stainless steel housings
Name plate	Stainless steel (304/1.4301) or plastic data plate attached to the electronics housing

™ Hastelloy is a Cabot Corporation trademark.

™ Monel is an International Nickel Co. trademark.

™ Viton is a DuPont de Nemours trademark.

1) Transmitter wetted parts

### Calibration

Standard	0 to upper range limit (URL) for ambient temperature and atmospheric pressure
Optional	To specified span

### Optional accessories

Mounting bracket	For vertical and horizontal 60 mm (2") pipes or wall mounting
LCD display	Plug-in and rotatable design
Additional tag plate, e. g. for marking measuring points	Tag with wire (both stainless steel) attached to the transmitter, with a maximum of 30 characters including spaces.
Lightning protection	Up to 4 kV <ul style="list-style-type: none"> <li>Voltage pulses: 1.2 µs rise time; 50 µs delay time at half value</li> <li>Current pulses: 8 µs rise time; 20 µs delay time at half value</li> </ul> Not available for devices with ATEX-Ex nL or PROFIBUS PA / FOUNDATION fieldbus featuring ATEX-Ex i or FM intrinsically safe designs.

### Certificates (test, design, characteristics, material traceability)

#### Process connections

The types of process connection for remote seals are detailed in the remote seal data sheet.

Flange on the minus side:

1/4-18 NPT on the process axis (7/16-20 UNF threading or DIN 19213 connection with M10 threading) or via a 1/2-14 NPT adapter on the process axis.

#### Electrical connections

Two 1/2 – 14 NPT or M20 x 1.5 threaded bores for cable glands directly on housing, or plug connector.

#### Plug connector versions

- HART: Straight or angled Harting Han 8D (8U) connector and one mating plug.
- FOUNDATION fieldbus / PROFIBUS PA: 7/8" plug/M12 x 1

#### Terminals

HART version: Four terminals for signal/external display, for wire cross sections of up to 2.5 mm<sup>2</sup> (14 AWG), and four connection points for testing and communication purposes.

Fieldbus versions: Two signal terminals (bus connection) for wire cross sections of up to 2.5 mm<sup>2</sup> (14 AWG)

#### Grounding

Internal and external ground terminals for wire cross sections of up to 4 mm<sup>2</sup> (12 AWG) are provided.

#### Installation position

The transmitter can be installed in any position. The electronics housing may be rotated 360°. A stop is provided to prevent overtravel.

#### Weight (without options and remote seals)

Approximately 3.5 kg (7.72 lb), add 1.5 kg (3.31 lb) for stainless steel housing

Packaging adds 0.65 kg (1.43 lb)

#### Packaging

Carton

## 10 Configuration

### 10.1 Transmitter with HART communication and 4 ... 20 mA output current

#### Standard configuration

Transmitters are calibrated at the factory to the customer's specified measuring range. The calibrated range and measuring point number are provided on the name plate. If this data has not been specified, the transmitter will be delivered with the following configuration:

4 mA	Zero position
20 mA	Upper range limit (URL)
Output	Linear
Damping	0.125 sec.
Transmitter failure mode	21 mA
Optional LCD display	0 ... 100 % linear

Any or all of the configurable parameters listed above - including the upper and lower range limit values - can easily be changed using a portable HART handheld communicator or a PC running the configuration software SMART VISION with DTM for 2600T. Data regarding flange type and material, O-ring materials, and type of filling liquid is stored in the device.

### 10.2 Transmitter with PROFIBUS PA communication

Transmitters are calibrated at the factory to the customer's specified measuring range. The calibrated range and measuring point number are provided on the name plate. If this data has not been specified, the transmitter will be delivered with the following configuration:

Measuring profile	Pressure
Engineering unit	mbar/bar
Output scale 0 %	Lower range limit (LRL)
Output scale 100 %	Upper range limit (URL)
Output	Linear
Upper alarm limit	Upper range limit (URL)
Upper warning limit	Upper range limit (URL)
Lower warning limit	Lower range limit (LRL)
Lower alarm limit	Lower range limit (LRL)
Hysteresis limit value	0.5 % of output scale
PV filter	0.125 sec.
Address	126

Any or all of the configurable parameters listed above - including the upper and lower range limit values - can easily be changed using a PC running the configuration software SMART VISION with DTM for 2600T. Data regarding flange type and material, O-ring materials, and type of filling liquid is stored in the device.

### 10.3 Transmitter with FOUNDATION Fieldbus communication

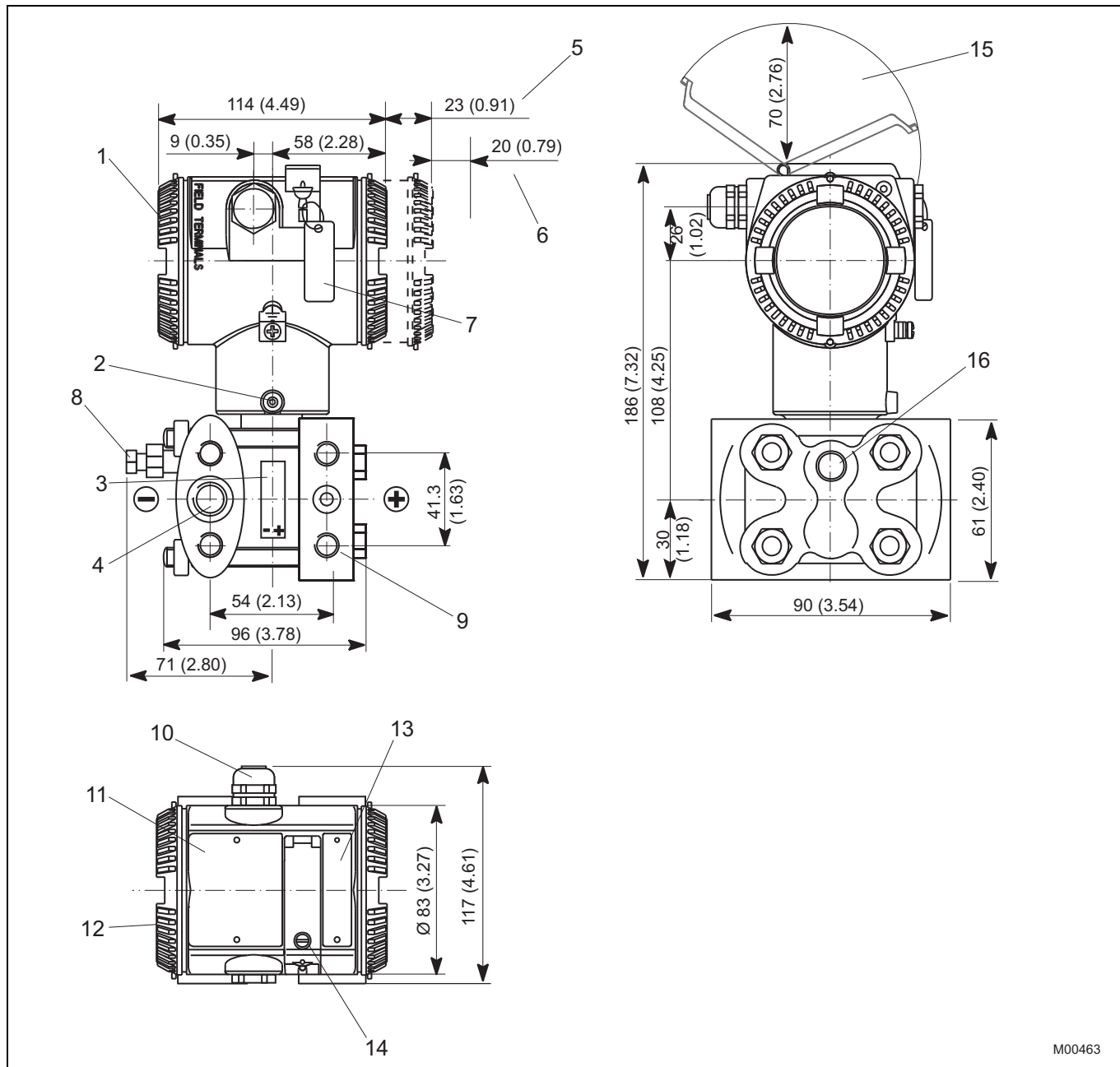
Transmitters are calibrated at the factory to the customer's specified measuring range. The calibrated range and measuring point number are provided on the name plate. If this data has not been specified, the transmitter will be delivered with the following configuration:

Measuring profile	Pressure
Engineering unit	mbar/bar
Output scale 0 %	Lower range limit (LRL)
Output scale 100 %	Upper range limit (URL)
Output	Linear
Upper alarm limit	Upper range limit (URL)
Upper warning limit	Upper range limit (URL)
Lower warning limit	Lower range limit (LRL)
Lower alarm limit	Lower range limit (LRL)
Hysteresis limit value	0.5 % of output scale
PV filter	0.125 sec.
Address	Not required

Any or all of the configurable parameters listed above - including the upper and lower range limit values - can be changed using any FOUNDATION Fieldbus-compatible configuration tool. Data regarding flange type and material, O-ring materials, and type of filling liquid is stored in the device.

## 11 Mounting dimensions (not design data)

### 11.1 Transmitter with barrel housing (without remote seal)



M00463

Fig. 1: Dimensions in mm (inches), deviations in the drawing are possible

- |   |   |
|---|---|
| 1 Terminal side   | 10 Electrical connection  |
| 2 Housing stop-screw  | 11 Name plate   |
| 3 Sensor plate  | 12 Housing cover  |
| 4 Process connection (conforms to IEC 61518)                          | 13 Plate with key legend, etc.  |
| 5 With LCD display (optional)   | 14 Captive fixing screw for keyboard cover                                  |
| 6 Space for removing the cover required                               | 15 Space for rotating the keyboard cover required                           |
| 7 Additional tag plate, e. g. for marking measuring points (optional) | 16 Upper or lower threaded bore (optional); 1/4-18 NPT for drain/vent valve |
| 8 Drain/vent valve (optional)   |   |
| 9 Thread for fixing screws<br>(see "Process connections" data)        |   |

11.2 Transmitter with DIN housing (without remote seal)

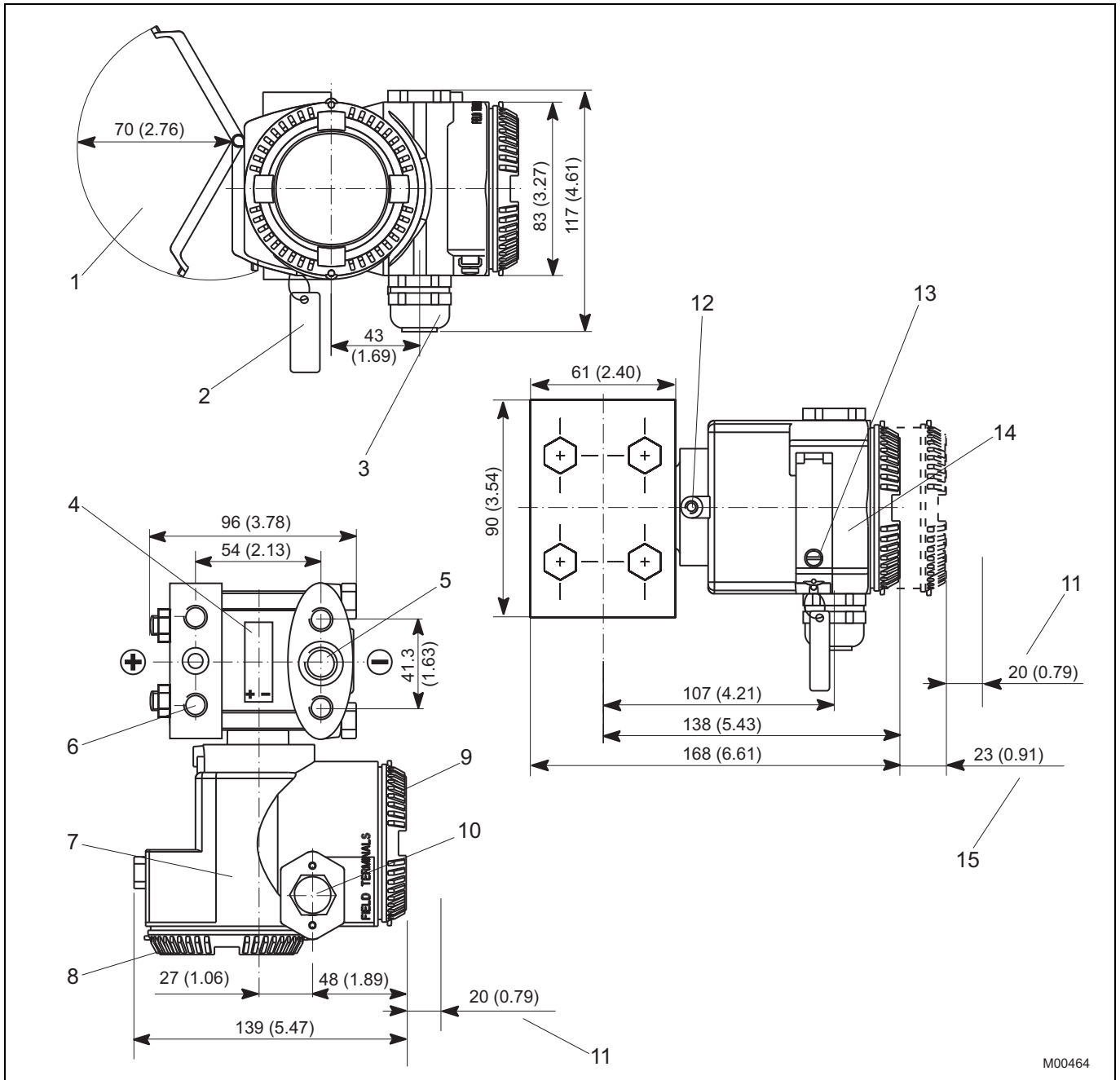


Fig. 2: Dimensions in mm (inches), deviations in the drawing are possible

- |   |  |
|---|--|
| 1 Space for rotating the keyboard cover required                      | 8 Housing cover                            |
| 2 Additional tag plate, e. g. for marking measuring points (optional) | 9 Terminal side                            |
| 3 Electrical connection   | 10 Electrical connection (blind plug)      |
| 4 Sensor plate  | 11 Space for removing the cover required   |
| 5 Process connection (conforms to IEC 61518)                          | 12 Housing stop-screw                      |
| 6 Thread for fixing screws<br>(see "Process connections" data)        | 13 Captive fixing screw for keyboard cover |
| 7 Name plate  | 14 Plate with key legend, etc.             |
|   | 15 With LCD display                        |

M00464



### 11.3 Mounting options with bracket

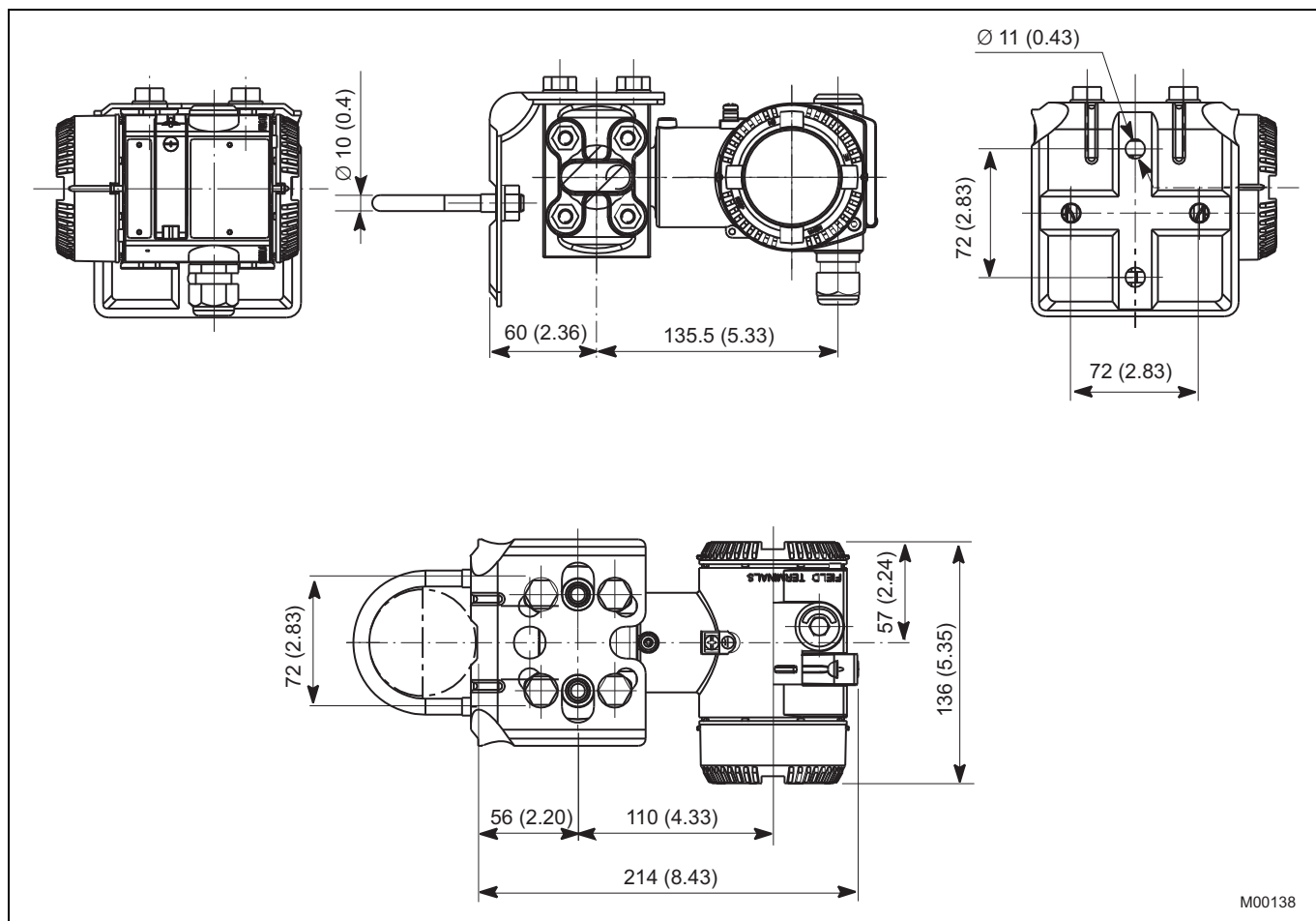


Fig. 3: Dimensions in mm (inches), deviations in the drawing are possible

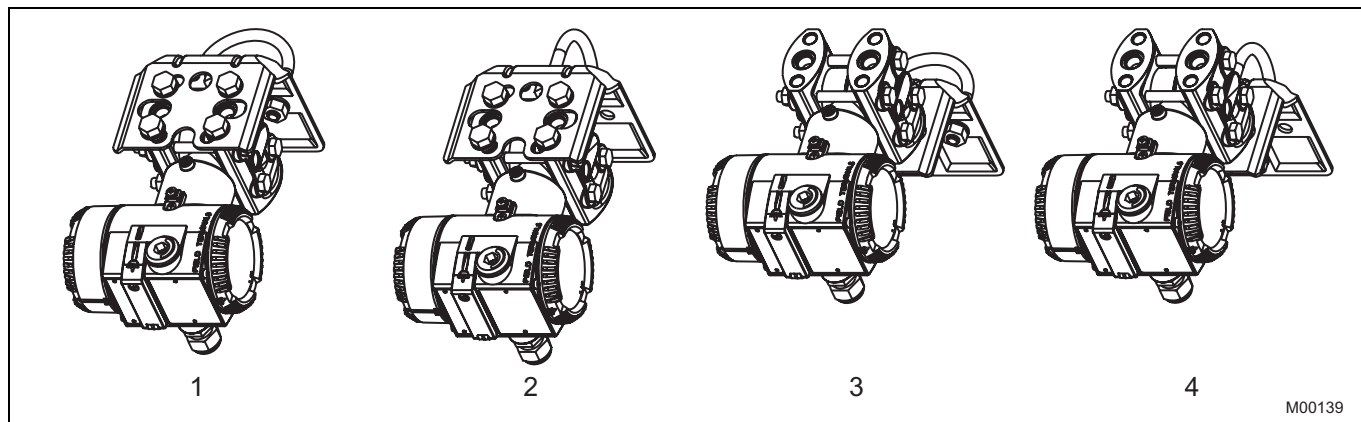


Fig. 4: Deviations in the drawing are possible

- 1 Vertical pipe mounting
- 2 Horizontal pipe mounting
- 3 Vertical pipe mounting and transmitter above the mounting bracket
- 4 Horizontal pipe mounting and transmitter above the mounting bracket

## 12 Electrical connections

### 12.1 Standard terminal strip

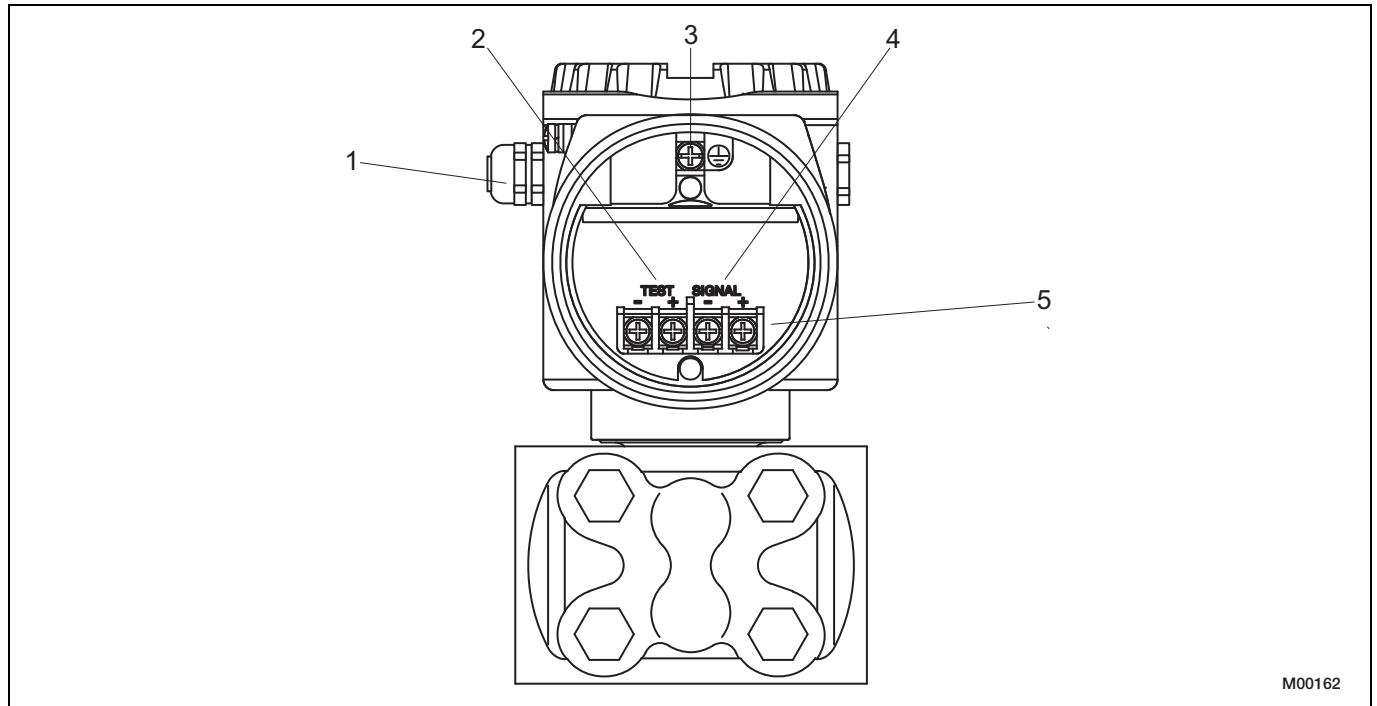


Fig. 5

- |   |   |
|---|---|
| 1 Cable entry   | 4 Output signal / power supply  |
| 2 Test terminals for 4 ... 20 mA (not with fieldbus transmitters) | 5 Screw terminals for leads with cross section of 0.5 ... 2.5 mm <sup>2</sup> (AWG 20 ... AWG 14) |
| 3 Ground/equipotential bonding terminal                           |   |

### 12.2 Fieldbus plug connector



Fig. 6

Pin (male) assignment		
Pin number	FOUNDATION fieldbus	PROFIBUS PA
1	FF-	PA+
2	FF+	Ground
3	Shield	PA-
4	Ground	Shield

Mating plug (socket) not supplied

### 12.3 Harting Han 8D (8U) plug connector

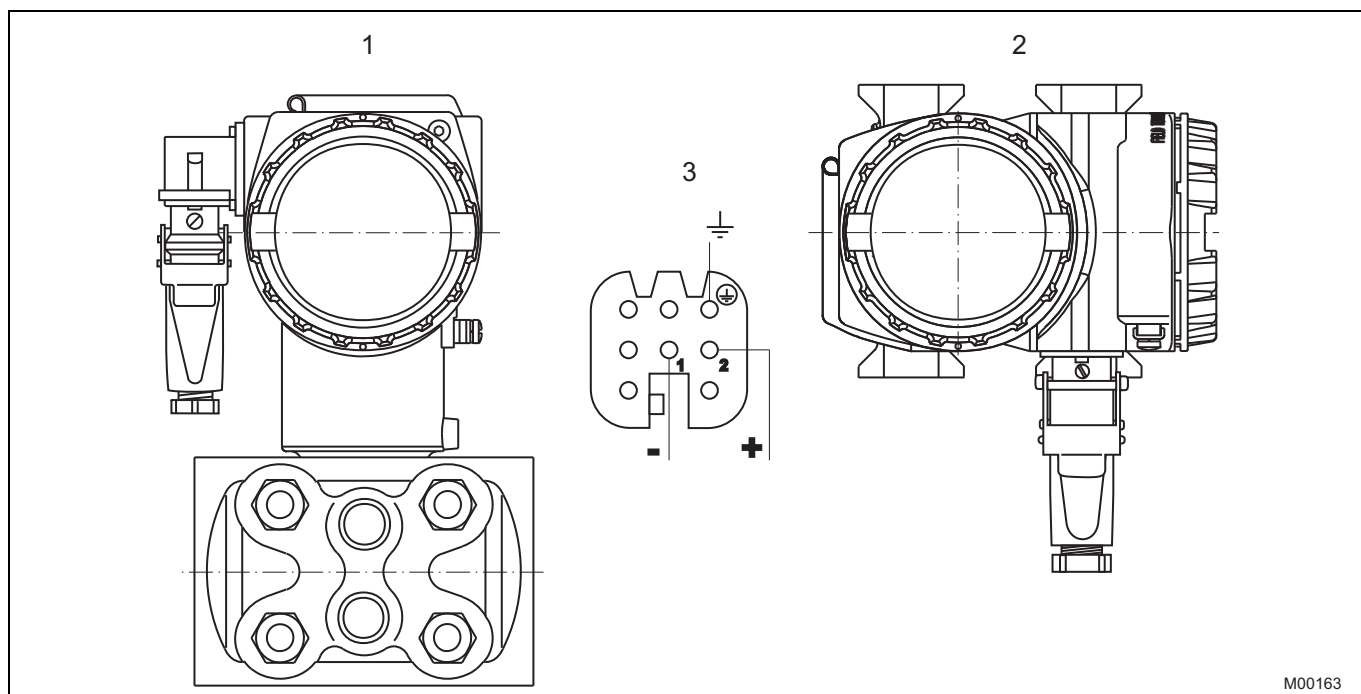


Fig. 7

- 1 Barrel housing
- 2 DIN housing

- 3 Harting Han 8D (8U) socket insert for mating plug supplied (view of sockets)

### 13 Ordering information

	Main Catalog No.										Additional Catalog No.	
	Variant digit No.	1 - 5	6	7	8	9	10	11	12	XX	XX	
<b>265DR Differential Pressure Transmitter, with Remote Seal with Capillary Tube, Base Accuracy 0.04%</b>	<b>265DR</b>	X	X	X	X	X	X	X	X	X	X	
<b>Sensor - Span Limits</b>												
6 kPa / 60 mbar / 24 in. H2O		C										
40 kPa / 400 mbar / 160 in. H2O		F										
250 kPa / 2500 mbar / 1000 in. H2O		L										
2000 kPa / 20 bar / 290 psi		N										
10000 kPa / 100 bar / 1450 psi		R										
<b>Static Pressure</b>												
16 MPa / 160 bar / 2320 psi			C									
25 MPa / 250 bar / 3625 psi			Z									
41 MPa / 410 bar / 5945 psi			T									
<b>Diaphragm Material / Fill Fluid</b>												
AISI 316L SST (1.4435) / Silicone Oil, NACE					S							
Hastelloy C-276 / Silicone Oil, NACE					K							
Monel 400 / Silicone Oil, NACE					M							
Monel 400 Gold-plated / Silicone Oil, NACE					V							
Tantalum / Silicone Oil, NACE					T							
AISI 316L SST (1.4435) / Inert Fluid, NACE				1)	A							
Hastelloy C-276 / Inert Fluid, NACE				1)	F							
Monel 400 / Inert Fluid, NACE				1)	C							
Monel 400 Gold-plated / Inert Fluid, NACE				1)	Y							
Tantalum / Inert Fluid, NACE				1)	D							
With Two Remote Seals / Silicone Oil					R							
With Two Remote Seals / Inert Fluid				1)	2							
<b>Process Connection Material / Process Connection</b>												
AISI 316L SST (1.4404 / 1.4408) / 1/4-18 NPT-f direct, NACE						A						
AISI 316L SST (1.4404 / 1.4408) / 1/2-14 NPT-f through Adapter, NACE						B						
AISI 316L SST (1.4404 / 1.4408) / 1/4-18 NPT-f direct (DIN 19213), NACE						C						
Hastelloy C-276 / 1/4-18 NPT-f direct, NACE						D						
Hastelloy C-276 / 1/2-14 NPT-f through Adapter, NACE						E						
Monel 400 / 1/4-18 NPT-f direct, NACE						G						
Monel 400 / 1/2-14 NPT-f through Adapter, NACE						H						
AISI 316L SST (1.4404 / 1.4408) / With Two Remote Seals						R						
<b>Bolts / Gaskets</b>												
AISI 316L SST / Viton, NACE						1)	3					
AISI 316L SST / PTFE, NACE (max. 25 MPa)							4					
AISI 316L SST / EPDM, NACE							5					
AISI 316L SST / Perbunan							6					
AISI 316L SST / Graphit							7					
AISI 316L SST / With Two Remote Seals							R					

1) Suitable for Oxygen Applications

Continued on next page

<b>Main Catalog No.</b>												<b>Additional Catalog No.</b>		
Variant digit No.	1 - 5	6	7	8	9	10	11	12			XX			
<b>265DR Differential Pressure Transmitter, with Remote Seal with Capillary Tube, Base Accuracy 0.04%</b>														<b>XX</b>
<b>Electronic Housing Material / Electrical Connection</b>														
Aluminium Alloy (Barrel Type) / 1/2-14 NPT														A
Aluminium Alloy (Barrel Type) / M20 x 1.5												2)		B
Aluminium Alloy (Barrel Type) / Harting Han Connector												3)		E
Aluminium Alloy (Barrel Type) / Fieldbus Connector												4)		G
AISI 316L SST (Barrel Type) / 1/2-14 NPT														S
AISI 316L SST (Barrel Type) / M20 x 1.5												2)		T
Aluminium Alloy (DIN Type) / M20 x 1.5												2)		J
Aluminium Alloy (DIN Type) / Harting Han Connector												3)		K
Aluminium Alloy (DIN Type) / Fieldbus Connector												4)		W
<b>Output</b>														
HART Digital Communication and 4 ... 20 mA												5)		H
HART Digital Communication and 4 ... 20 mA												6)		<b>1</b>
PROFIBUS PA												5)		P
PROFIBUS PA												6)		2
FOUNDATION Fieldbus												5)		F
FOUNDATION Fieldbus												6)		3
<b>Vent Valve Material / Position</b>														
AISI 316L SST (1.4404) / On Process Axis, NACE														V1
AISI 316L SST (1.4404) / On Flange Side Top, NACE														V2
AISI 316L SST (1.4404) / On Flange Side Bottom, NACE														V3
Hastelloy C-276 / On Process Axis, NACE														V4
Hastelloy C-276 / On Flange Side Top, NACE														V5
Hastelloy C-276 / On Flange Side Bottom, NACE														V6
Monel 400 / On Process Axis, NACE														V7
Monel 400 / On Flange Side Top, NACE														V8
Monel 400 / On Flange Side Bottom, NACE														V9
<b>Explosion Protection Certification</b>														
ATEX Group II Category 1/2 GD - Intrinsic Safety EEx ia														E1
ATEX Group II Category 1/2 G - Flameproof EEx d														E2
ATEX Group II Category 3 GD - Type of Protection N EEx nL Energy Limited														E3
ATEX II 1/2 GD EEx ia + ATEX II 1/2 GD EEx d + ATEX EEx nL														EW
Factory Mutual (FM) - Intrinsically Safe														EA
Factory Mutual (FM) - Explosion Proof												7)		EB
Canadian Standard Association (CSA) - Explosion Proof														EE
Canadian Standard Association (CSA) - Explosion Proof (Canada & USA)														EM
NEPSI Ex ia II C T4/T6														EY
NEPSI Ex d II C T6														EZ
GOST (Russia) EEx ia														W1
GOST (Russia) EEx d														W2
GOST (Kazakhstan) EEx ia														W3
GOST (Kazakhstan) EEx d														W4
GOST (Ukraine) EEx ia														WA
GOST (Ukraine) EEx d														WB
SAA Ex d IIC T6 and Ex td A21 IP 66 T85 °C														X1
SAA Ex ia IIC T4/T6 and Ex n IIC T4/T6												8)		X2

- 2) Not available with FM, CSA
- 3) Not available with EExnL, EExd, FM, CSA
- 4) Not available with EEx nL, EEx d, FM-/ CSA-/ NEPSI-Explosion Proof
- 5) No Additional Options
- 6) Options requested (to be ordered by Additional Ordering Code)
- 7) Only with Electrical Connection 1/2-14 NPT and Stainless Steel Tag Plate
- 8) Only with Output HART / 4 ... 20 mA, not with SIL2

Continued on next page

	Main Catalog No.								Additional Catalog No.
	1 - 5	6	7	8	9	10	11	12	XX
	265DR	X	X	X	X	X	X	X	XX
<b>Integrated Digital Display (LCD)</b> With Integrated LCD Display With Integrated LCD Display (Backlit)									L1 L2
<b>Mounting Bracket Shape / Material</b> For Pipe Mounting / AISI 304 SST (1.4301) For Wall Mounting / AISI 304 SST (1.4301)									B2 B4
<b>Surge Protector</b> Surge / Transient Protector								9)	S1
<b>Operating Manual</b> German Spanish French Swedish Russian									M1 M3 M4 M7 MB
<b>Label and Tag Language / Material</b> German / Stainless Steel German and English / Plastic								10) 11)	T1 TA
<b>Additional Tag Plate</b> Stainless Steel									I1
<b>Connector</b> Fieldbus 7/8 in. (without Mating Plug, recommended for FOUNDATION Fieldbus) Fieldbus M12 x 1 (without Mating Plug, recommended for PROFIBUS PA) Harting Han 8D (8U) - Straight Entry Harting Han 8D (8U) - Angle Entry									U1 U2 U3 U4
<b>Output Characteristic</b> Square Root Characteristic									224
<b>Material: 2.1 Compliance</b> Certificate of Compliance with the Order EN 10204-2.1 of Process Wetted Parts									H1
<b>Material: 3.1 Inspection</b> Inspection Certificate EN 10204-3.1 of the pressure-bearing and process wetted parts with analysis certificates as material verification								12)	H3
<b>Material: 2.2 Test Report</b> Test Report EN 10204-2.2 of the Pressure Bearing and Process Wetted Parts									H4
<b>Certificates: 3.1 Calibration</b> Inspection Certificate EN 10204-3.1 of Calibration									C1
<b>Certificates: 3.1 Cleanliness Stage</b> Inspection Certificate EN 10204-3.1 of the Cleanliness Stage									C3
<b>Certificates: 3.1 Helium Leakage Test</b> Inspection Certificate EN 10204-3.1 of Helium Leakage Test of the Sensor Module									C4
<b>Certificates: 3.1 Pressure Test</b> Inspection Certificate EN 10204-3.1 of the Pressure Test									C5

- 9) Not with ATEX-EEx nL (Code E3), not with PROFIBUS PA / FOUNDATION Fieldbus (Code 2, 3) with Intrinsic Safety EEx ia (Code E1,EY), not with FM Intrinsically Safe (Code EA) and SAA (Code X2)
- 10) Not available with DIN Electronic Housing Code J, K, W
- 11) Not available with Factory Mutual - Explosion Proof
- 12) Minor Parts with Factory Certificate acc. to EN 10204

Continued on next page



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