ABB MEASUREMENT & ANALYTICS | DATA SHEET

266CRH / CRT

Multivariable pressure transmitter with Modbus® communication

Measuring accuracy

Stated at reference condition to IEC 60770:

- Ambient temperature of 20 °C (68 °F), relative humidity of 65 %, atmospheric pressure of 1013 hPa (1013 mbar).
- Mounting position with vertical diaphragm.
- Zero based range for transmitter with isolating diaphragms in AISI 316 L ss or Hastelloy, silicone oil fill and digital trim values equal to the span end points.

Unless otherwise specified, errors are quoted as % of span. Some performance referring to the Upper Range Limit are affected by the actual turndown (TD) as ratio between Upper Range Limit (URL) and calibrated span.

Note
IT IS RECOMMENDED TO SELECT THE TRANSMITTER SENSOR CODE PROVIDING THE TURNDOWN VALUE AS LOWEST AS POSSIBLE TO OPTIMIZE PERFORMANCE CHARACTERISTICS.

Dynamic behavior

In accordance with IEC 61298-1

Sensors	Time constant (63.2 % of total step response)
Sensors F to R	150 ms
Sensor C	400 ms
Sensor A	1000 ms
266CXX: Reaction time for all sensors	70 ms

Step response time (total) = reaction time + time constant

Measuring error

% of calibrated span, consisting of terminal-based non-linearity, hysteresis, and non-repeatability.

Model	DP sensor	For TD range	Measuring error
266CRH with DF Mnemonic P3, F3, E3, F2	C	From 1:1 to 5:1	±0.075 %
	C	From 5:1 to 10:1	±(0.015 × TD) %
	F to N	From 1:1 to 10:1	±0.075 %
	F to N	From 10:1 to 60:1	±(0.075 + 0.005 × TD − 0.05) %
266CRH with DF Mnemonic different from above	C	From 1:1 to 5:1	±0.10 %
	C	From 5:1 to 10:1	±(0.02 × TD) %
	F to N	From 1:1 to 10:1	±0.10 %
	F to N	From 10:1 to 60:1	±(0.01 × TD) %

Model	DP sensor	For TD range	Measuring error
266CRT with DF Mnemonic P3, F3, E3, F2	C	From 1:1 to 5:1	±0.04 %
	C	From 5:1 to 10:1	±(0.008 × TD) %
	F to N	From 1:1 to 10:1	±0.04 %
	F to N	From 10:1 to 60:1	±(0.04 + 0.005 × TD − 0.05) %
266CRT with DF Mnemonic different from above	C	From 1:1 to 5:1	±0.065 %
	C	From 5:1 to 10:1	±(0.013 × TD) %
	F to N	From 1:1 to 10:1	±0.065 %
	F to N	From 10:1 to 60:1	±(0.0065 × TD) %

… Measuring accuracy

Recommendation for square root function
At least 10 % of upper measuring range limit (URL)

Model	Pabs sensor (second sensor)	Measuring error
266CXX	1 to 3	±0.05 %
	4	±0.075 %

Model	Process temperature measurement (Pt100) in acc. with IEC 60751	Measuring error – Transmitter component
266CXX	−200 to 850 °C (−328 to 1,562 °F)	±0.3 K (0.54 °F)

266CXX: The measuring accuracy of the mass or standard volume flow is not affected by the accuracy of the dp, p, and T measurement alone; rather, it also depends upon the primary device used (discharge coefficient), the pressure and temperature range to be compensated, as well as other parameters.
In typical applications, the flow measurement accuracy (without the primary device accuracy) is ±0.7 to 0.9 % of the mass flow.

Ambient temperature
Per 20 K change within the limits of −40 to 85 °C
(per 36 °F change within the limits of −40 to 185 °F):

Model	Sensor	For TD range	
266CRH	C to N	10:1	±(0.04 % URL + 0.06 % measuring span)
266CRT	C to N	10:1	±(0.03 % URL + 0.045 % measuring span)

Absolute pressure sensor
Per 20 K change between the limits of −40 to 85 °C
(−40 to 185 °F):
±(0.08 % URL + 0.08 % measuring span)

Limited to ±(0.1 % URL + 0.1 % measuring span) for the entire temperature range of 125 K within the limits −40 to 85 °C (−40 to 185 °F).

Note
SEE DATA SHEET DS/S26 FOR ADDITIONAL TEMPERATURE EFFECTS ON THE DIAPHRAGM SEALS:

The total temperature effect can be defined as the combined influence of the factors referred to above on the transmitter plus the influence of the diaphragm seal, dependent upon the operating temperature.

Static pressure
Models 266CRX (zero signal errors may be calibrated out at operating pressure)

Measuring range	Sensors C, F, L, N
Zero signal error	Up to 100 bar: 0.05 % URL
	> 100 bar: 0.05 % URL/100 bar
Span error	Up to 100 bar: 0.05 % measuring span
	> 100 bar: 0.05 % measuring span / 100 bar

Electromagnetic field
Meets all requirements of EN 61326.

Technical specification

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

Materials

Process separating diaphragms*
Stainless steel 1.4435 (AISI 316L);
Hastelloy C276®; Monel 400®;
Tantalum

A diaphragm seal with the required diaphragm material can be selected in this case too (as with the high pressure side).

Process flanges, adapters, screw plugs, and vent / drain valves*
Stainless steel 1.4404 / 1.4408 (AISI 316L);
Hastelloy C276®; Monel 400®

Screws and nuts
Screws and nuts made from stainless steel AISI 316, class A4-70 as per UNI 7323 (ISO 3506) in compliance with NACE MR0175 Class II

Seals*
Viton™ (FPM); Buna® (NBR); EPDM; PTFE; Graphite

Diaphragm seal membrane material (high pressure side)*
Stainless steel AISI 316 L; Hastelloy C-276®;
Hastelloy C-2000®; Inconel 625®; Tantalum;
Stainless steel AISI 316 L or Hastelloy C-276® with non-stick coating;
Stainless steel AISI 316 L with anti-corrosion coating;
Stainless steel AISI 316 L, gold-plated;
Super duplex stainless steel (UNS S32750 in acc. with ASTM SA479);
Diaflex (AISI with anti-abrasion treatment)

Extension material*
Stainless steel AISI 316 L (also for Diaflex-coated and gold-plated diaphragm); Hastelloy C-276®;
Stainless steel AISI 316 L or Hastelloy C-276® with the same coating as the diaphragm

Diaphragm seal filling fluid
Silicone oil DC200; silicone oil; fluorocarbon (Galden™);
Low-viscosity silicone oil Baysilone PD5;
Mineral oil Esso Marcol 122™

Sensor filling fluid
Silicone oil, fluorocarbon (Galden)

Pressure sensor housing
Stainless steel 1.4404 (AISI 316L)

Electronics housing and cover
Aluminum alloy (copper content ≤ 0.3 %) with baked epoxy finish (color RAL 9002);
Stainless steel AISI 316L.

Cover O-ring
Buna N® (Perbunan)

Mounting bracket**
Galvanized C steel with chromium passivation;
Stainless steel AISI 316, AISI 316L

Local zero point, measuring span, and write protection settings
Fiber glass-reinforced polyphenylene oxide (removable)

Plates
Stainless steel (AISI 316) for transmitter name plate, certification plate, optional measuring point tag plate / settings plate fastened to the electronics housing, and optional tag plate with customer data.
All plates laser-labeled.

* Wetted parts of the transmitter.

** U-bolt material: Stainless steel AISI 400;
Screw material: high-strength alloy steel or stainless steel AISI 316

Calibration

Standard:
0 to measuring range upper limit, for ambient temperature and atmospheric pressure
Optional:
To specified measuring span

… Technical specification

Surge protection

The 266 Modbus multivariable pressure transmitter comes standard with a surge / transient suppression scheme build into the termination block.

- Up to 4 kV on power supply
- Up to 2 kV on I/O
- Voltage: 1.2 µs rise time / 50 µs delay time at half value

Optional accessories

Mounting bracket

For vertical and horizontal 60 mm (2 in) pipes or wall mounting

LCD display

Can be rotated in 90° increments into 4 positions

Additional tag plates

Code I2:
For measuring point tag (up to 30 characters) and calibration specifications (up to 30 characters: lower and upper value plus unit), attached to transmitter housing.
Code I1:
For customer data (4 lines with 30 characters each), attached to transmitter housing with wire.

Certificates

Test, design, characteristics, material traceability. Refer to **Ordering Information** on page 23.

Name plate and operating instruction language

Refer to **Ordering Information** on page 23.

Process connections

Flanges

¼-18 NPT on the process axis

Adapters

½-14 NPT on the process axis

Fastening screw threads

$^{7}/_{16}$-20 UNF with 41.3 mm center distance

Process connection via diaphragm seal

See data sheet DS/S26

Electrical connections

Cable entry

Two ½-14 NPT or M20 × 1.5 threaded bores for cable glands, directly on housing.

Terminals

- Two terminal for power (+ and –).
- Two terminals for RS485 communication.
- Four terminals for a Pt100 resistance thermometer with four-wire technology.

For wire cross sections of up to 2.5 mm^2 (14 AWG) and connection points for testing and communication purposes.

Grounding

Internal and external ground terminals are provided for 6 mm^2 (10 AWG) wire cross sections.

Mounting position

The transmitters can be installed in any position.
The electronic housing can be rotated into any position. A stop is provided to prevent overturning.

Weight

Pressure transmitter without options or diaphragm seal

Approximately 3.8 kg (8.4 lb);
Add 1.5 kg (3.3 lb) for housings made from stainless steel.

Packaging

Add 650 g (1.5 lb) for packaging.

Packaging

Carton, dimensions depending on device design.

Configuration

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

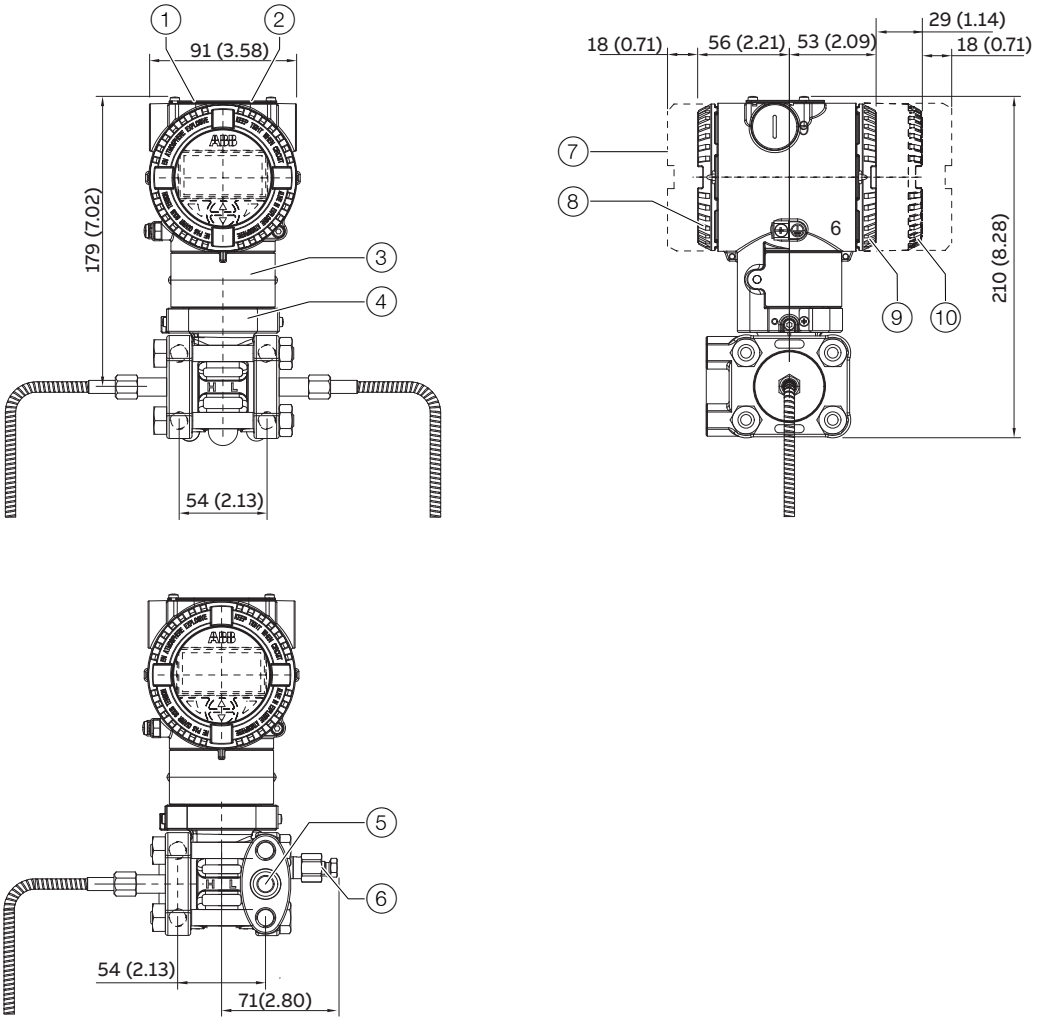
Parameter	Value
Device mode	Operate (Modbus)
Device address	247
Multivariable calculation	No calculation
Software tag (max. 8 characters)	blank
Optional LCD display	PV (DP) in kPa; output in percent as bargraph display
(DP) Physical unit	kPa
(DP) Output scale 0%	0 (LRL)
(DP) Output scale 100%	Upper Range Limit (URL)
Output	Linear
Damping	0.125 s
(PS) Physical unit	MPa
(PS) Output scale 0%	0 (LRL)
(PS) Output scale 100%	Upper Range Limit (URL)
Damping	0.125 s
(T) Physical unit	°C
(T) Output scale 0%	–200 (LRL)
(T) Output scale 100%	+850 Upper Range Limit (URL)
Damping	10 s

Any or all of the configurable parameters listed above – including the lower and upper range values (with the same unit of measurement) – can easily be changed using a PC running the configuration software with the DTM for 266Cxx-Modbus.
Specifications concerning the flange type and materials, O-ring and vent / drain valve materials, and additional device options are stored in the transmitter database.

Note
For device functionality and simulation purpose a 178 Ω resistor (206 °C [402.8 °F]) and 2 jumpers are installed in the PT100 connection

Mounting dimensions

Transmitter with barrel housing



1. Push buttons
2. Name plate
3. Certification plate
4. Optional plate (code I2)
5. Process connection
6. Vent / drain valve
7. Space for removing the cover
8. Terminal side
9. Electronics side
10. LCD display housing cover

Figure 3: Barrel housing, Dimensions in mm (in)

Transmitter with barrel housing and mounting bracket, for vertical or horizontal mounting on 60 mm (2 in) pipe

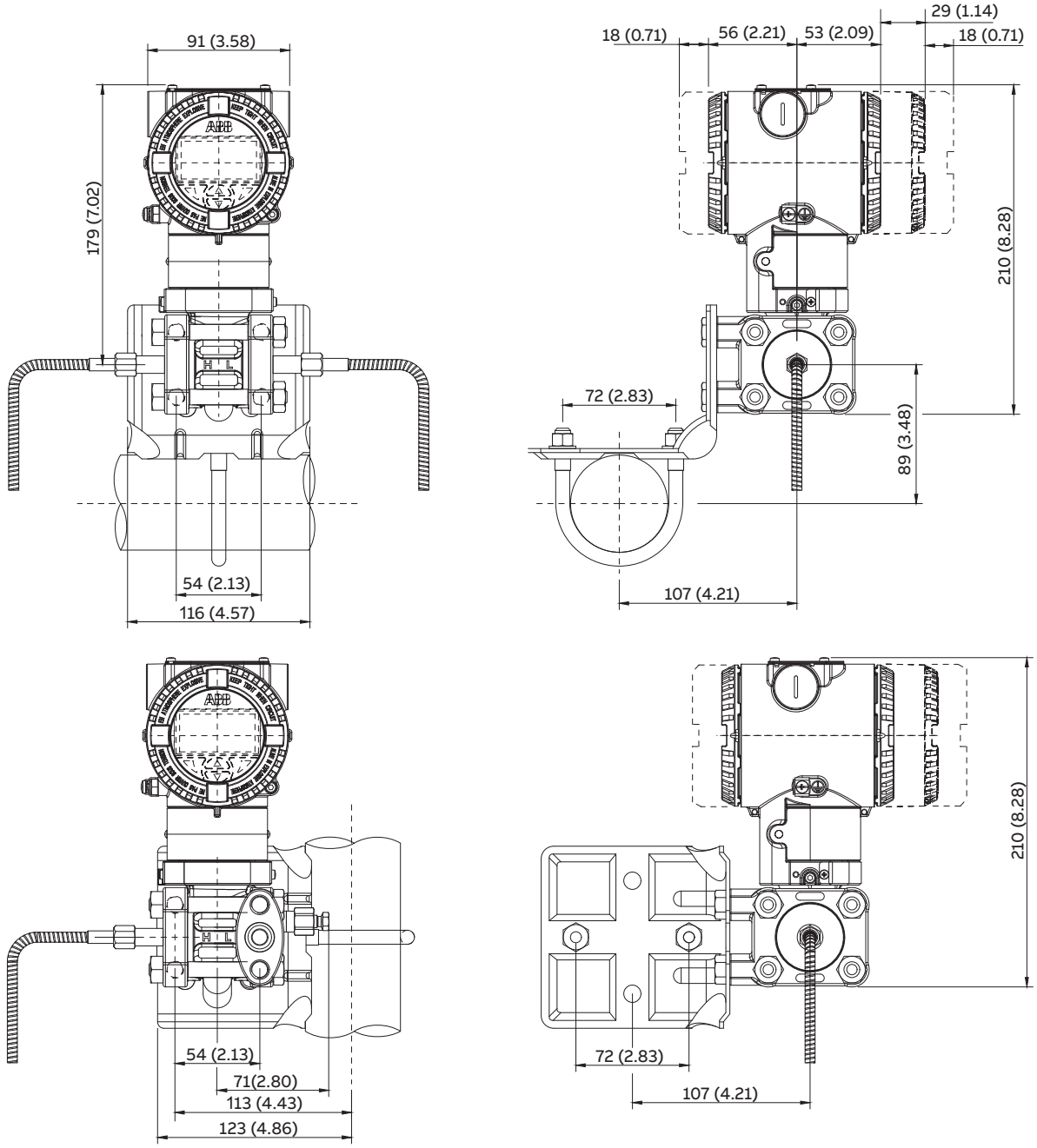


Figure 4: Pipe mounting - barrel housing, Dimensions in mm (in)

… Mounting dimensions

Transmitter with DIN housing and mounting bracket, for vertical or horizontal mounting on 60 mm (2 in) pipe

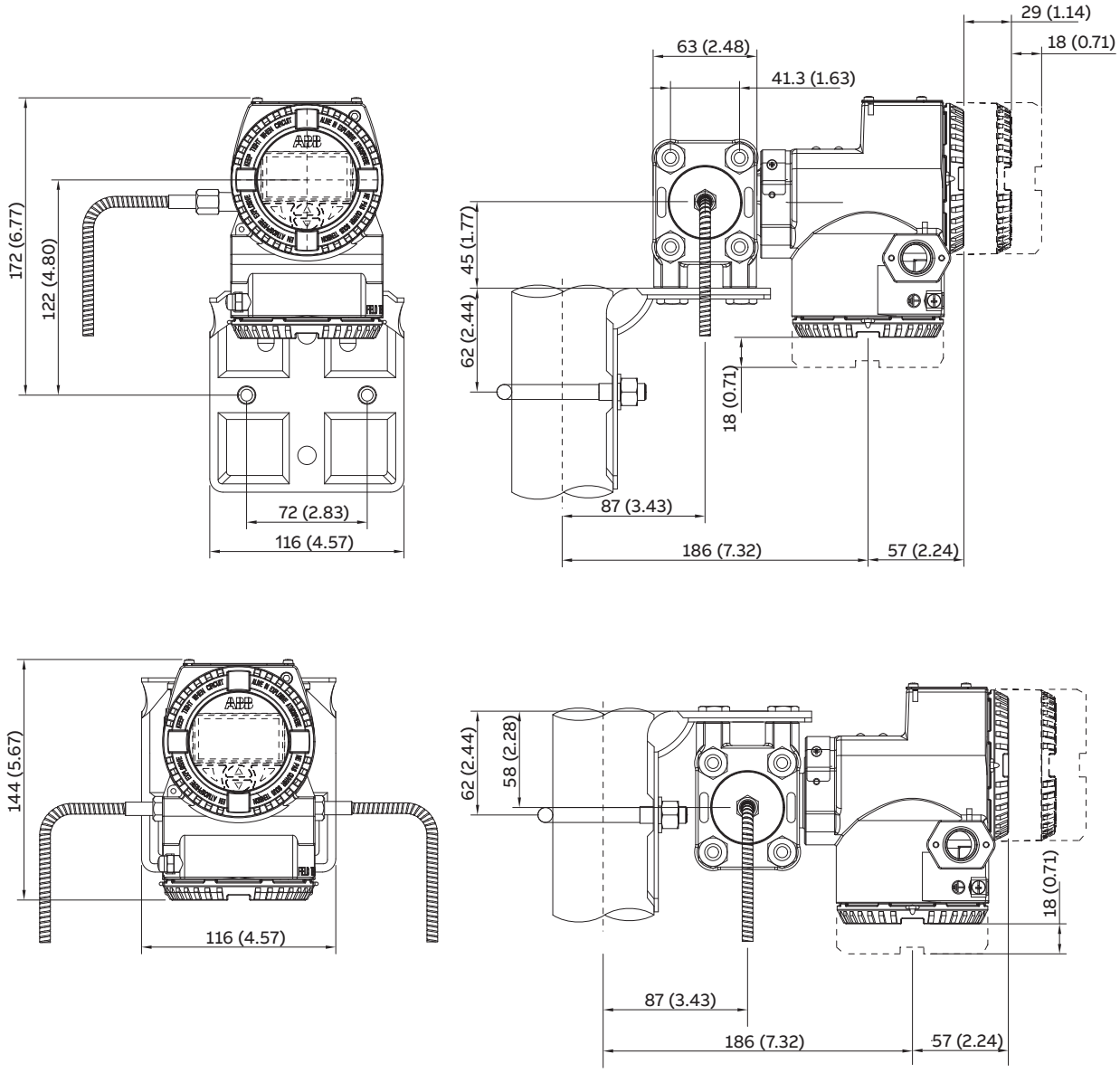


Figure 5: Pipe mounting – DIN housing, Dimensions in mm (in)

Transmitter with barrel housing and flat bracket, for vertical or horizontal mounting on 60 mm (2 in) pipe

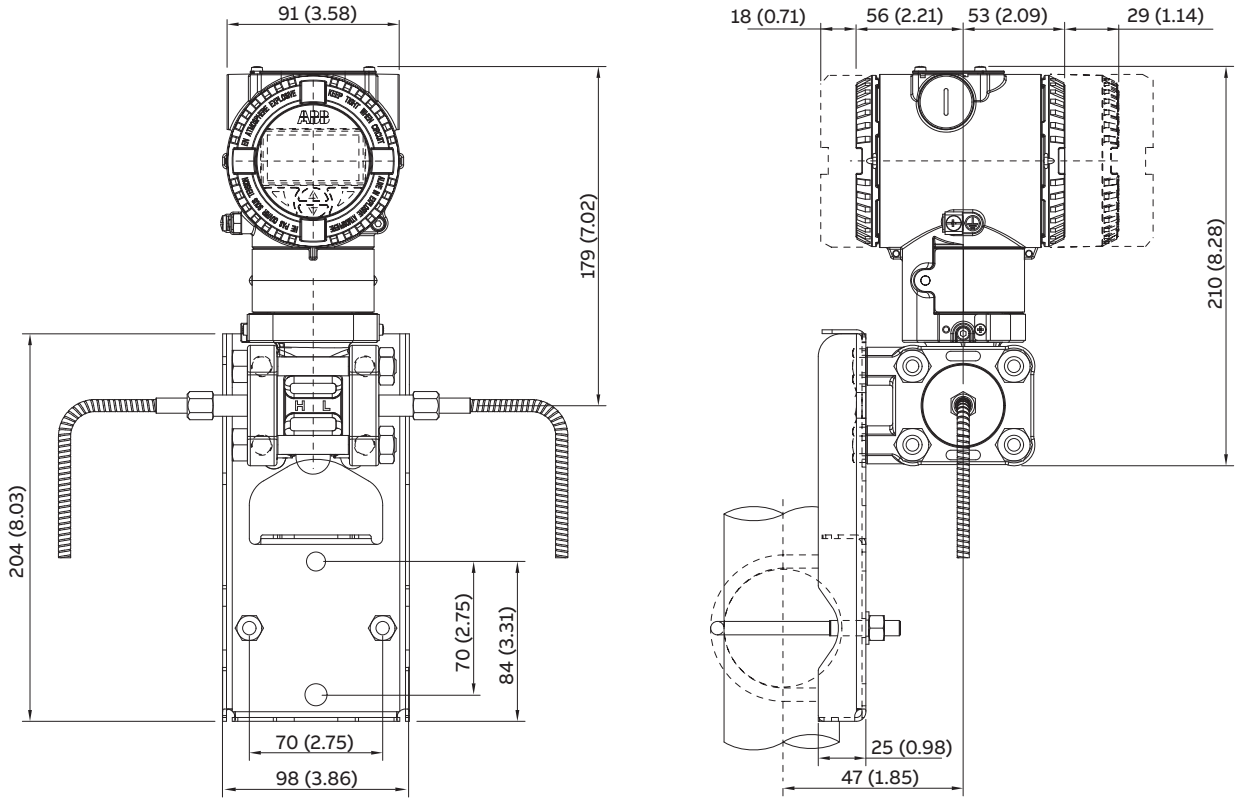
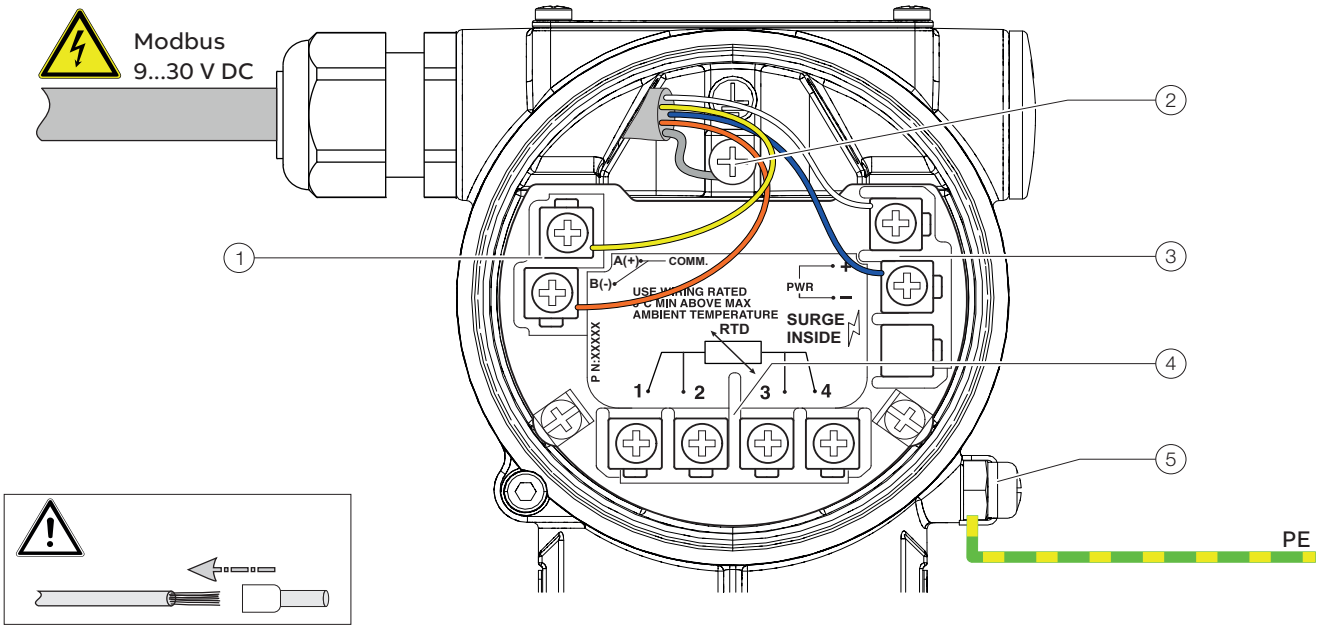


Figure 6: Flat bracket for pipe mounting – barrel housing, Dimensions in mm (in)

Electrical connections



1. Terminals for Modbus® interface
2. Terminal for PE / Cable Shield
3. Terminals for power supply
4. Terminals for Pt100 resistance thermometer
5. Ground terminal

PE Potential equalization

Figure 7: Connection on the device (example)

Ordering Information

266CRH and 266CRT

Base model								
Multivariable transmitter with remote seal(s), for mass flow and level, base accuracy 0.075 %	**266CRH**	**X**	**X**	**X**	**X**	X	X	X
Multivariable transmitter with remote seal, for mass flow and level, base accuracy 0.04 %	**266CRT**	**X**	**X**	**X**	**X**	X	X	X
Sensor Span Limits								
0.6 and 6 kPa (6 and 60 mbar / 2.41 and 24 in H_2O)		C						
0.67 and 40 kPa (6.7 and 400 mbar / 2.67 and 160 in H_2O)		F						
4.17 and 250 kPa (41.7 and 2500 mbar / 16.7 and 1000 in H_2O)		L						
33.3 and 2000 kPa (0.333 and 20 bar / 4.83 and 290 psi)		N						
Maximum Working Pressure								
0 and 2 MPa (0 and 20 bar / 0 and 290 psi)			2					
0 and 10 MPa (0 and 100 bar / 0 and 1450 psi) (not with Sensor Span Limits code A)			3					
0 and 41 MPa (0 and 410 bar / 0 and 5945 psi) (not with Sensor Span Limits code A)			4					
Diaphragm Material / Fill Fluid								
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 - Galden (Suitable for oxygen applications) (NACE)				A*				
Hastelloy C-276 / Inert fluid - Galden (Suitable for oxygen applications) (NACE)				F*				
Monel 400 / Inert fluid - Galden (Suitable for oxygen applications) (NACE)				C*				
Monel 400 gold-plated / Inert fluid - Galden (Suitable for oxygen applications) (NACE)				Y*				
Tantalum / Inert fluid - Galden (Suitable for oxygen applications) (NACE)				D*				
Diaphragm seal / Silicone oil (Seal to be quoted separately)				R				
Diaphragm seal / Inert fluid - Galden (Seal to be quoted separately)				2				
Process Flanges and Adapters Material / Connection								
AISI 316L SST (1.4404 / 1.4408) / ¼-18 NPT female direct / horizontal connection (NACE)					A			
AISI 316L SST (1.4404 / 1.4408) / ½-14 NPT female through adapter / horizontal connection (NACE)					B			
AISI 316L SST (1.4404 / 1.4408) / ¼-18 NPT female direct (DIN 19212) / horizontal connection (NACE)					C			
Hastelloy C-276 / ¼-18 NPT female direct / horizontal connection (NACE)					D			
Hastelloy C-276 / ½-14 NPT female through adapter / horizontal connection (NACE)					E			
Monel 400 / ¼-18 NPT female direct / horizontal connection (NACE)					G			
Monel 400 / ½-14 NPT female through adapter / horizontal connection (NACE)					H			
AISI 316L SST (1.4404 / 1.4408) / For two seals construction (NACE)					R			

* Suitable for Oxygen service

Continued see next page

… Ordering Information

Base model				
Multivariable transmitter with remote seal(s), for mass flow and level, base accuracy 0.075 %	**266CRH**	**X**	**X**	**X**
Multivariable transmitter with remote seal, for mass flow and level, base accuracy 0.04 %	**266CRT**	**X**	**X**	**X**
Bolts Material / Gaskets Material				
AISI 316L SST (NACE - non exposed) / Viton (Suitable for oxygen applications)		3*		
AISI 316L SST (NACE - non exposed) / PTFE (Max. 25 MPa / 250 bar / 3625 psi)		4		
AISI 316L SST (NACE - non exposed) / EPDM		5		
AISI 316L SST (NACE - non exposed) / Perbunan		6		
AISI 316L SST (NACE - non exposed) / Graphite		7		
AISI 316L SST (NACE - non exposed) / Without gaskets (For two seals construction)		R		
Housing Material / Electrical Connection				
Aluminium alloy (Barrel type) ½-14 NPT			A	
Aluminium alloy (Barrel type) M20 × 1.5			B	
AISI 316L SST (Barrel type) ½-14 NPT			S	
AISI 316L SST (Barrel type) M20 × 1.5			T	
Output				
Modbus RS 485 / No additional options				N
Modbus RS 485 / Options requested (to be ordered by Additional ordering code)				6

* Suitable for Oxygen service

Additional ordering information for model 266CRH and 266CRT

Multivariable transmitter with remote seal(s), for mass flow and level, base accuracy 0.075 %	**266CRH**	**XX**	**XX**	
Multivariable transmitter with remote seal, for mass flow and level, base accuracy 0.04 %	**266CRT**	**XX**	**XX**	
Vent and Drain Valve Material / Position				
AISI 316L SST (1.4403) / On process axis (NACE)		V1		
AISI 316L SST (1.4403) / On flanges side top (NACE)		V2		
AISI 316L SST (1.4403) / On flanges side bottom (NACE)		V3		
Hastelloy C-276 / On process axis (NACE)		V4		
Hastelloy C-276 / On flanges side top (NACE)		V5		
Hastelloy C-276 / On flanges side bottom (NACE)		V6		
Monel 400 / On process axis (NACE)		V7		
Monel 400 / On flanges side top (NACE)		V8		
Monel 400 / On flanges side bottom (NACE)		V9		
Explosion Protection Certification				
ATEX Group II Category 1/2 GD - Flameproof Ex d				E2
ATEX Group II Category 3 GD - Type of protection "N" Ex nL design compliance				E3
FM Approvals (USA and Canada) Explosion proof and Type „n“				ET
Combined ATEX, IECEx, FM Approvals (USA and Canada)				EN
IEC Approval Group II Category 1/2 GD - Flameproof Ex d				E9
IEC Approval Group II Category 3 GD - Type of protection "N" Ex nL design compliance				ER

Continued see next page

Additional ordering information							
Multivariable transmitter with remote seal(s), for mass flow and level, base accuracy 0.075 %	**266CRH**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
Multivariable transmitter with remote seal, for mass flow and level, base accuracy 0.04 %	**266CRT**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**
Integral LCD							
With integral LCD display		L1					
TTG (Through The Glass) integral digital LCD display		L5					
Mounting Bracket Shape / Material							
For pipe mounting / Carbon steel (not suitable for AISI housing)			B1				
For pipe mounting / AISI 316 SST (1.4401) (not suitable for AISI housing)			B2				
For wall mounting / Carbon steel (not suitable for AISI housing)			B3				
For wall mounting / AISI 316 SST (1.4401) (not suitable for AISI housing)			B4				
Flat type bracket / AISI 316 SST (1.4401) (suitable for AISI housing)			B5				
Operating Instruction Language							
German				M1			
English				M5			
Label and Tag Language							
German					T1		
Italian					T2		
Spanish					T3		
French					T4		
Additional Tag Plate							
Supplemental wired-on stainless steel plate (4 lines, 32 characters each)						I1	
Laser printing of tag on stainless steel plate						I2	
Stainless steel tag, certifikation and wire-on plates						I3	
Configuration							
Standard pressure = in H_2O / psi at 68 °F							N2
Standard pressure = in H_2O / psi at 39.2 °F							N3
Standard pressure = in H_2O / psi at 20 °C							N4
Standard pressure = in H_2O / psi at 4 °C							N5
Custom							N6

… Ordering Information

Additional ordering information				
Multivariable transmitter with remote seal(s), for mass flow and level, base accuracy 0.075 %	**266CRH**	**XX**	**XX**	**XX**
Multivariable transmitter with remote seal, for mass flow and level, base accuracy 0.04 %	**266CRT**	**XX**	**XX**	**XX**
Certificates				
Inspection certificate 3.1 acc. EN 10204 of calibration		C1		
Inspection certificate 3.1 acc. EN 10204 of the cleanliness stage		C3		
Inspection certificate 3.1 acc. EN 10204 of helium leakage test of the sensor module		C4		
Inspection certificate 3.1 acc. EN 10204 of pressure test		C5		
Declaration of compliance with the order 2.1 acc. EN 10204 for instrument design		C6		
Separate calibration record		CC		
PMI test on wetted parts		CT		
Material Traceability				
Inspection certificate 3.1 acc. EN 10204 of pressure-bearing and process wetted parts with analysis certificates as material verification			H3*	
Material certificate 2.2 acc. EN 10204 of the pressure bearing and process wetted parts			H4	
Connector				
With cable gland M20 × 1.5				U8

* Minor Parts with Factory Certificate acc. to EN 10204

Standard delivery scope (changes possible with additional ordering code)

- Adapters supplied loose
- Sealing plug for horizontal connection flange on the process axis (if no remote seal is selected); no vent / drain valve
- For standard applications (without explosion protection)
- No display, no mounting bracket, no surge protector
- Multilanguage short operating instruction and English labelling
- Configuration with kPa and °C units
- No test, inspection, or material certificates

Important remark for all models

The selection of suitable wetted parts and filling fluid for compatibility with the process media is a customer's responsibility, if not otherwise notified before manufacturing.

NACE compliance information

1 The materials of constructions comply with metallurgical recommendations of NACE MR0175/ISO 15156 for sour oil field production environments. As specific environmental limits may apply to certain materials, please consult latest standard for further details. Materials AISI 316 / AISI 316L, Hastelloy C-276, Monel 400 also conform to NACE MR0103 for sour refining environments.

2 NACE MR0175 addresses bolting requirements in two classes:

Exposed bolts: bolts directly exposed to the sour environment or buried, encapsulated or anyway not exposed to atmosphere.

Non exposed bolts: the bolting must not be directly exposed to sour environments, and must be directly exposed to the atmosphere at all times.

266CRH, 266CRT bolting identified by ‘NACE’ are in compliance to the requirements of NACE MR0175 when considered ‘non exposed bolting’.

Trademarks

Hastelloy is a registered trademark of Haynes International, Inc.

Monel is a registered trademark of Special Metals Corporation

Modbus is a registered trademark of the Modbus Organization

™ Viton is a DuPont de Nemours trademark

™ DC200 is a Dow Corning Corporation trademark

Galden is a Montefluos trademark

™ Halocarbon is a Halocarbon Products Co. trademark

Neobee M 20 is a Stepan Company trademark

™ Esso Marcol 122 is an Esso Italiana trademark

Syltherm is a Dow Chemical Company trademark

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