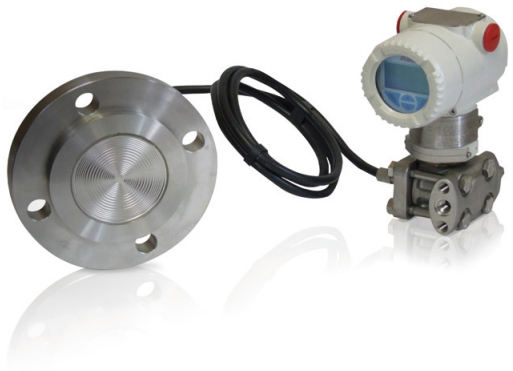
Data Sheet DS/266MRH-EN Rev. H

Model 266MRH Differential for high static pressure with remote seals

Engineered solutions for all applications

Measurement made easy



Base accuracy
— from 0.06 % of calibrated span

Reliable sensing system coupled with very latest digital technologies
— provides large turn down ratio up to 60:1

Comprehensive sensor choice
— optimize in-use total performance and stability

Flexible configuration facilities
— provided locally via local LCD keypad

New TTG (Through-The-Glass) keypad technology
— allows quick and easy local configuration without opening the cover, even in explosion proof environments

IEC 61508 certification
— version for SIL2 (1oo1) and SIL3 (1oo2) applications

PED compliance
— Sound Engineering Practice (SEP)

Model 266MRH Differential for high static pressure with remote seals

Functional Specifications

Range and span limits

Sensor Code	Upper Range Limit (URL)	Lower Range Limit (LRL)	Minimum span
C	6 kPa 60 mbar 24 in. H2O	–6 kPa –60 mbar –24 in. H2O	0.3 kPa 3 mbar 1.2 in. H2O
F	40 kPa 400 mbar 160 in. H2O	–40 kPa –400 mbar –160 in. H2O	0.67 kPa 6.7 mbar 2.67 inH2O
L	250 kPa 2500 mbar 1000 in. H2O	–250 kPa –2500 mbar –1000 in. H2O	4.2 kPa 42 mbar 16.8 in. H2O
N	2000 kPa 20 bar 290 psi	–2000 kPa –20 bar –290 psi	33.4 kPa 0.334 bar 4.85 psi
R	10000 kPa 100 bar 1450 psi	–10000 kPa –100 bar –1450 psi	167 kPa 1.67 bar 24.17 psi

Second sensor for absolute pressure measurement of 266MRH high static differential pressure transmitter

Measuring range: 41 MPa, 410 bar, 5945 psi

Span limits

Maximum span = URL (can be further adjusted up to ± URL (TD = 0.5) for differential models, within the range limits)
IT IS RECOMMENDED TO SELECT THE TRANSMITTER SENSOR CODE PROVIDING THE TURNDOWN VALUE AS LOWEST AS POSSIBLE TO OPTIMIZE PERFORMANCE CHARACTERISTICS.

Zero suppression and elevation

Zero and span can be adjusted to any value within the range limits detailed in the table as long as:
– calibrated span ≥ minimum span

Damping

Selectable time constant : between 0 and 60 s
This is in addition to sensor response time.

Turn on time

Operation within specification in less than 10 s with minimum damping.

Insulation resistance

> 100 MΩ at 500 V DC (terminals to earth)

Operative limits

REFER ALSO TO S26X DATA SHEET FOR POSSIBLE FURTHER LIMITATION DUE TO SEAL VARIANTS

Pressure limits:

Overpressure limits

Without damage to the transmitter

Sensors	Fill fluid	Overpressure limits
Sensor C to R	Silicone oil	0.07 kPa abs, 0.7 mbar abs, 0.5 mmHg and 41 MPa, 410 bar, 5945 psi
Sensor C to R	Inert (Galden)	17.5 kPa abs, 175 mbar abs, 131 mmHg and 41 MPa, 410 bar, 5945 psi

Static pressure limits

Transmitters for high static differential pressure model 266MRH operates within specifications between the following limits:

Sensors	Fill fluid	Static pressure limits
Sensor C to R	Silicone oil	3.5 kPa abs, 35 mbar abs, 0.5 psia and 41 MPa, 410 bar, 5945 psi
Sensor C to R	Inert (Galden)	17.5 kPa abs, 175 mbar abs, 131 mmHg and 41 MPa, 410 bar, 5945 psi

Proof pressure

The transmitter can be exposed without leaking to line pressure of up 1.5 times the nominal pressure simultaneously on both sides (61.5 MPa, 615 bar, 8917 psi).
Meet ANSI/ISA–S 82.03 hydrostatic test requirements.

Temperature limits °C (°F) :

Ambient

is the operating temperature

Model 266MRH	Ambient temperature limits
Silicone oil	–40 and 85 °C (–40 and 185 °F)
Inert (Galden)	–40 and 85 °C (–40 and 185 °F)

Model 266MRH	Ambient temperature limits
LCD integral display	–40 and 85 °C (–40 and 185 °F)
Viton gasket	–20 and 85 °C (–4 and 185 °F)
PTFE gasket	–20 and 85 °C (–4 and 185 °F)

LCD display may not be clearly readable below –20 °C (–4 °F) or above +70 °C (+158 °F)

Model 266MRH	Ambient temperature limit
Painted AISI 316 L ss housing	max 70 °C (158 °F) countinuous

IMPORTANT

For Hazardous Atmosphere applications see the temperature range specified on the certificate/approval relevant to the aimed type of protection.

Process

The following table show characteristics of fill fluids when used in transmitters with remote seal(s).

Fill fluid (application)	Process temperature and pressure limits			
	Tmax @ Pabs > of	Pmin mbar abs (mmHg)	Tmax @ Pmin	Tmin
Silicone oil PMX 200	250 (480)	0.7	130	–40
10 cSt	@ 385 mbar	(0.5)	(266)	(–40)
Silicone oil Baysilone PD5	250 (480)	0.7	45	–85
5 cSt	@ 900 mbar	(0.5)	(123)	(–121)
Inert oil Galden G5	160 (320)	2.1	60	–20
(oxygen service)	@ 1 bar	(1.52)	(140)	(–4)
Inert oil Halocarbon 4.2	180 (356)	4	70	–20
(oxygen service)	@ 425 mbar	(3)	(158)	(–4)
Silicone polymer Syltherm XLT	100 (212)	2.1	20	–100
(cryogenic service)	@ 118 mbar	(1.52)	(68)	(–148)
Silicone oil DC	375 (707)	0.7	220	–10
for high temperature	@ 1 bar	(0.5)	(428)	(14)
Vegetable oil Neobee M–20	200 (390)	10	20	–18
(food – sanitary) FDA approved	@ 1 bar	(7.2)	(68)	(0)
Mineral oil Esso Marcol 122	250 (480)	0.7	110	–6
(food – sanitary) FDA approved	@ 630 mbar	(0.5)	(230)	(21)
Glycerin Water 70%	93 (200)	1000	93	–7
(food – sanitary) FDA approved	@ 1 bar	(760)	(200)	(20)

Storage

Model 266MRH	Storage temperature limits
Storage limits	–50 and 85 °C (–58 and 185 °F)
LCD integral display	–40 and 85 °C (–40 and 185 °F)

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Environmental limits

Electromagnetic compatibility (EMC)
Comply with EN 61326-1 and NAMUR NE 021 (2004) (option).
Surge immunity level (with surge protector): 4 kV
(according to IEC 1000-4–5 EN 61000–4–5)

Pressure equipment directive (PED)
Comply with 97/23/EC following Sound Engineering Practice (SEP).

Humidity
Relative humidity: up to 100 %
Condensing, icing: admissible

Vibration resistance
Accelerations up to 2 g at frequency up to 1000 Hz
(according to IEC 60068–2–6)

Shock resistance
Acceleration: 50 g
Duration: 11 ms
(according to IEC 60068–2–27)

Wet and dust-laden atmospheres
The transmitter is dust and sand tight and protected against immersion effects as defined by IEC 60529 (2001) to IP 67 (IP 68 on request) or by NEMA Type 4X.
IP65 with Harting Han connector.
Aluminium and AISI housings as barrel version also comply to IP 66 as defined by IEC 60529 (2001).

Hazardous atmospheres
With or without integral display

INTRINSIC SAFETY:
ATEX Europe (code E1) approval
II 1 G Ex ia IIC T6/T5/T4 and II 1/2 G Ex ia IIC T6/T5/T4 and
II 1 D Ex iaD 20 T85 °C and II 1/2 D Ex iaD 21 T85 °C; IP67.
IECEx (code E8) approval
Ex ia IIC T6/T5/T4 and Ex iaD 20 T85 °C and Ex iaD 21 T85 °C; IP67.
NEPSI China (code EY)
Ex ia IIC T4~T6, DIP A20T_A, T4~T6.

EXPLOSION PROOF:
ATEX Europe (code E2) approval
II 1/2 G Ex d IIC T6 and II 1/2 D Ex tD A21 IP67 T85 °C (Ta = –50 to +75 °C).
IECEx (code E9) approval
Ex d IIC T6 and Ex tD A21 IP67 T85 °C (Ta = –50 to +75 °C).
NEPSI China (code EZ)
Ex d IIC T6, DIP A21T_A, T6.

TYPE “N”:
ATEX Europe (code E3) type examination
II 3 G Ex nL IIC T6/T5/T4 and II 3 D Ex tD A22 IP67 T85 °C; IP67.
IECEx (code ER) type examination
Ex nL IIC T6/T5/T4; IP67.
NEPSI China (code ES) type examination
Ex nL IIC T4~T6, DIP A22T_A, T6.

FM Approvals US (code E6) and FM Approvals Canada (code E4):
- Explosionproof (US): Class I, Div. 1, Groups A, B, C, D
- Explosionproof (Canada): Class I, Div. 1, Groups B, C, D
- Dust ignitionproof : Class II, Div. 1, Groups E, F, G
- Suitable for: Class II, Div. 2, Groups F, G; Class III, Div.1, 2
- Nonincendive: Class I, Div. 2, Groups A, B, C, D
- Intrinsically safe: Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G
  Class I, Zone 0 AEx ia IIC T6/T4, Zone 0 (FM US)
  Class I, Zone 0 Ex ia IIC T6/T4, Zone 0 (FM Canada)

COMBINED ATEX (code EW = E1 + E2 + E3), (code E7 = E1 + E2)
COMBINED ATEX, FM and IECEx Approvals (code EN = EW + E4 + E6+ EI)
COMBINED FM Approvals US and Canada
- Intrinsically safe (code EA)
- Explosionproof (code EB)
- Nonincendive (code EC)

COMBINED IEC (code EH = E8 + E9), (code EI = E8 + E9 + ER)
COMBINED NEPSI (code EP = EY + EZ), (code EQ = EY + EZ + ES)
Technical Regulations Customs Union EAC (Russia, Kazakhstan, Belarus), Inmetro (Brazil), Kosha (Korea).

REFER TO CERTIFICATES FOR AMBIENT TEMPERATURE RANGES (WITHIN THE LIMITS OF -50 TO 85°C) RELATED TO THE DIFFERENT TEMPERATURE CLASSES

Electrical Characteristics and Options

Optional indicators

Integral display with integral keypad (code L1)

Wide screen LCD, 128 x 64 pixel, 52.5 x 27.2 mm (2.06 x 1.07 in.) dot matrix.
Multilanguage.
Four keys for configuration and management of device.
Easy setup for quick commissioning.
User selectable application-specific visualizations.
Totalized and instantaneous flow indication.
Display may also indicate static pressure, sensor temperature and diagnostic messages and provides configuration facilities.

Integral display with Through-The-Glass (TTG) activated keypad (code L5)

As above integral display but equipped with the innovative TTG keypad allowing the activation of the configuration and management menus of the device without the need of removing the transmitter housing cover.
TTG keypad is protected against accidental activations.

Optional surge protection

Up to 4kV
- voltage 1.2 µs rise time / 50 µs delay time to half value
- current 8 µs rise time / 20 µs delay time to half value

Process diagnostics (PILD)

Plugged impulse line detection (PILD) generates a warning via communication (HART, PA, FF). The device can be configured to drive the output to “Alarm current” or set a status “BAD”.

HART® digital communication and 4 to 20 mA output Advanced functionality

Device type:$1a07_{hex}$ (listed with HCF)

Power supply

The transmitter operates from 10.5 to 42 V DC with no load and is protected against reverse polarity connection (additional load allows operations over 42 V DC).
For Ex ia and other intrinsically safe approval power supply must not exceed 30 V DC. Minimum operating voltage increases to 12.3 V DC with optional surge protector

Ripple

20 mV max on a 250 Ω load as per HART specifications.

Load limitations

4 to 20 mA and HART total loop resistance :

$$R\ (k\Omega) = \frac{\text{Supply voltage} - \text{min. operating voltage (V DC)}}{22\ \text{mA}}$$

A minimum of 250 Ω is required for HART communication.

Output signal

Two–wire 4 to 20 mA, user-selectable for linear or square root output, power of $^{3}/_{2}$ or $^{5}/_{2}$, square root for bidirectional flow, 22 points linearization table (i.e. for horizontal or spherical tank level measurement). HART® communication provides digital process variable superimposed on 4 to 20 mA signal, with protocol based on Bell 202 FSK standard.
HART revision 5 is the default HART output.
HART revision 7 is available on request.

Output current limits (to NAMUR NE 43 standard)

Overload condition
- Lower limit: 3.8 mA (configurable from 3.8 to 4 mA)
- Upper limit: 20.5 mA (configurable from 20 to 21 mA)

Alarm current
- Lower limit: 3.6 mA (configurable from 3.6 to 4 mA)
- Upper limit: 21 mA (configurable from 20 to 23 mA, limited to 22 mA for HART Safety; apply for electronics release 7.1.15 or later)

Factory setting: high alarm current

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FOUNDATION Fieldbus™ output

Device type

LINK MASTER DEVICE
Link Active Scheduler (LAS) capability implemented.
Manufacturer code: 000320_{hex}
Device type code: 0007_{hex}

Power supply

The transmitter operates from 9 to 32 V DC, polarity independent, with or without surge protector.
For Ex ia approval power supply must not exceed 24 V DC (entity certification) or 17.5 V DC (FISCO certification), according to FF–816.

Current consumption

operating (quiescent): 15 mA
fault current limiting: 20 mA max.

Output signal

Physical layer in compliance to IEC 1158–2/EN 61158–2 with transmission to Manchester II modulation, at 31.25 kbit/s.

Function blocks/execution period

3 enhanced Analog Input blocks/25 ms max (each)
1 enhanced PID block/40 ms max.
1 standard ARitmetic block/25 ms
1 standard Input Selector block/25 ms
1 standard Control Selector block/25 ms
1 standard Signal Characterization block/25 ms
1 standard Integrator/Totalizer block/25 ms

Additional blocks

1 enhanced Resource block,
1 custom Pressure with calibration transducer block
1 custom Advanced Diagnostics transducer block including Plugged Input Line Detection
1 custom Local Display transducer block

Number of link objects

35

Number of VCRs

35

Output interface

FOUNDATION fieldbus digital communication protocol to standard H1, compliant to specification V. 1.7.

Transmitter failure mode

The output signal is “frozen” to the last valid value on gross transmitter failure condition, detected by self-diagnostics which also indicate a BAD conditions. If electronic failure or short circuit occur the transmitter consumption is electronically limited at a defined value (20 mA approx), for safety of the network.

PROFIBUS® PA output

Device type

Pressure transmitter compliant to Profiles 3.0.1
Identification number: 3450_{hex}

Power supply

The transmitter operates from 9 to 32 V DC , polarity independent, with or without surge protector.
For Ex ia approval power supply must not exceed 17.5 V DC.
Intrinsic safety installation according to FISCO model.

Current consumption

operating (quiescent): 15 mA
fault current limiting: 20 mA max.

Output signal

Physical layer in compliance to IEC 1158–2/EN 61158–2 with transmission to Manchester II modulation, at 31.25 kbit/s.

Output interface

PROFIBUS PA communication according to Profibus DP50170 Part 2/DIN 19245 part 1–3.

Output update time

25 ms

Data blocks

3 analog input, 1 physical.

Additional blocks

1 Pressure with calibration transducer block
1 Advanced Diagnostics transducer block including Plugged Input Line Detection
1 Local Display transducer block

Transmitter failure mode

On gross transmitter failure condition, detected by self-diagnostics, the output signal can be driven to defined conditions, selectable by the user as safe, last valid or calculated value.
If electronic failure or short circuit occur the transmitter consumption is electronically limited at a defined value (20 mA approx), for safety of the network.

Performance specifications

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 and zero based range for transmitter with isolating diaphragms in AISI 316 L ss or Hastelloy and silicone oil fill and HART digital trim values equal to 4 mA and to 20 mA span end points, in linear mode. 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.
IT IS RECOMMENDED TO SELECT THE TRANSMITTER SENSOR CODE PROVIDING THE TURNDOWN VALUE AS LOWEST AS POSSIBLE TO OPTIMIZE PERFORMANCE CHARACTERISTICS.

Accuracy rating

% of calibrated span, including combined effects of terminal based linearity, hysteresis and repeatability.
For fieldbus versions SPAN refer to analog input function block outscale range

Model	Sensor	for TD	
266MRH	F	from 1:1 to 10:1	± 0.06 %
with seals	F	from 10:1 to 60:1	± (0.006 x TD) %
mnemonic	L, N, R	from 1:1 to 10:1	± 0.075 %
P3, F3, E3,	L, N, R	from 10:1 to 60:1	± (0.0075 x TD) %
S3, F2	C	from 1:1 to 5:1	± 0.10 %
	C	from 5:1 to 20:1	± (0.02 x TD) %
266MRH	F, L, N, R	from 1:1 to 10:1	± 0.10 %
with seals	F, L, N, R	from 10:1 to 60:1	± (0.01 x TD) %
mnemonic different	C	from 1:1 to 5:1	± 0.15 %
from above	C	from 5:1 to 20:1	± (0.03 x TD) %

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Ambient temperature

per 20K change between the limits of –40 °C to +85 °C
(per 36 °F change between the limits of –40 to +185 °F):

Model	Sensor	for TD up to	
266MRH	F, L, N, R	10 : 1	± (0.04 % URL + 0.065 % span)
266MRH	C	10 : 1	± (0.06 % URL + 0.10 % span)

REFER TO S26 SEALS DATA SHEET FOR TEMPERATURE ADDITIONAL EFFECTS OF REMOTE SEAL(S)

Static pressure

(zero errors can be calibrated out at line pressure)
per 2 MPa, 20 bar or 290 psi
Model 266MRH with remote seals
— zero error: ±0.25% of URL
— span error: ±0.25% of reading

Supply voltage

Within voltage/load specified limits the total effect is less than 0.005 % of URL per volt.

Load

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

Electromagnetic field

Meets all the requirements of EN 61326 and NAMUR NE 21 for surge immunity level.

Common mode interference

No effect from 100Vrms @ 50Hz, or 50 V DC

Physical Specification

(Refer to ordering information sheets for variant availability related to specific model or versions code)

Materials of model 266MRH

Seal side process diaphragm (remote seals) (*)

AISI 316 L ss; Hastelloy® C-276; Hastelloy® C-2000; Inconel 625; Tantalum; AISI 316 L ss or Hastelloy® C-276 with anti-stick coating; AISI 316 L ss with anti-corrosion coating; AISI 316 L ss gold plated; Superduplex ss (UNS S32750 to ASTM SA479); Diaflex (AISI with anti-abrasion treatment).

Extension material (*)

AISI 316 L ss (also for Diaflex and gold plated diaphragms); Hastelloy® C-276; AISI 316 L ss or Hastelloy® C-276 with coating same as diaphragm

Seal side fill fluid (remote seal)

Silicone oil-PMX 200®; Silicone oil for high temperature; Inert-Galden®; Inert-Halocarbon® 4.2; Silicone Polymer-Syltherm XLT®; Low viscosity silicone oil-Baysilone® M5; Glycerin Water; Vegetable oil-Neobee® M-20; Mineral oil-Esso Marcol 122®.

Process flanges

AISI 316 L ss.

Sensor fill fluid

Silicone oil; Inert fill (Galden®).

Mounting bracket (**)

Zinc plated carbon steel with chrome passivation; AISI 316 ss; AISI 316 L ss.

Sensor housing

AISI 316 L ss.

Bolts and nuts

AISI 316 ss bolts and nuts Class A4 per UNI 7323 (ISO 3506), in compliance with NACE MR0175 Class II.

(*) Wetted parts of the transmitter.
(**) U-bolt material: high-strength alloy steel or AISI 316 L ss; bolts/nuts material: high-strength alloy steel or AISI 316 ss.

Electronic housing and covers
Aluminium alloy (copper content ≤ 0.3 %) with baked epoxy finish (colour RAL9002); AISI 316 L ss;
AISI 316 L ss with two components epoxy mastic coated with acrylic epoxy finish (colour aluminium grey), with antistatic agents according to CEI EN 60079.

Covers O-ring
Buna N.

Local adjustments (zero, span and write protect)
External non-intrusive for zero, span and write protect in glass filled polyphenylene oxyde, removable.

Plates
Transmitter nameplate: AISI 316 ss screwed to the electronics housing.
Certification plate and optional tag/calibration plate : self-adhesive attached to the electronics housing or AISI 316 ss fastened to the electronics housing with rivets or screws.
Optional wired-on customer data plate: AISI 316 ss.
Laser printing on metal or thermal printing on self-adhesive.
For AISI 316 L ss housing it is mandatory to select option I2 or I3 for plates in AISI 316 ss.

Calibration
Standard: at maximum span, zero based range, ambient temperature and pressure;
Optional: at specified range and ambient conditions.

Optional extras

Mounting brackets (code Bx)
For vertical and horizontal 60mm. (2in) pipes or wall mounting. (EXCEPT U-BOLT ASSEMBLY WHICH IS NOT SUPPLIED FOR WALL MOUNTING, PARTS ARE THE SAME FOR PIPE AND WALL BRACKET OPTIONS, AS PER RELEVANT MATERIALS).

Display (code Lx)
4-position (at 90°) user orientable.

Optional plates (code Ix)
Code I2: AISI 316 ss plate with laser printed tag (up to 31 characters) and calibration details (up to 31 characters: lower and upper range values and engineering unit) fixed onto transmitter housing.
Code I1: AISI 316 ss wired-on plate with laser printed customized data (4 lines of 32 characters with 4 mm/0.16 in. height).

Surge protection (code S2)

Test Certificates (test, design, calibration, material traceability) (codes Cx and Hx)

Tag and manual language (codes Tx and Mx)

Communication connectors (code Ux)

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Process connections
Refer to S26 seal data sheet for process connection variants through remote seals

Electrical connections
Two $^{1}/_{2}$ in. – 14 NPT or M20x1.5 threaded conduit entries, direct on housing.
Special communication connector (on request)
— HART: straight or angle Harting Han 8D connector and one plug
— FOUNDATION Fieldbus, PROFIBUS PA: M12x1 or 7/8 in.

Terminal block
HART version: three terminals for signal/external meter wiring up to 2.5 mm² (14 AWG), also connection points for test and communication purposes.
Fieldbus versions: two terminals for signal wiring (bus connection) up to 2.5 mm² (14 AWG)

Grounding
Internal and external 6 mm² (10 AWG) ground termination points are provided.

Mounting position
Transmitter can be mounted in any position.
Electronics housing may be rotated to any position. A positive stop prevents over travel.

Mass (without options and seals)
3.7 kg approx (8.2 lb); add 1.5 kg (3.3 lb) for AISI housing.
Add 650 g (1.5 lb) for packing.
Consider additional weight up to 50 kg (up to 110 lb) for seals.

Packing
Carton.

Configuration

Transmitter with HART communication and 4 to 20 mA
Standard configuration
Transmitters are factory calibrated to customer's specified range. Calibrated range and tag number are stamped on the tag plate. If a calibration range and tag data are not specified, the transmitter will be supplied with the plate left blank and configured as follows:

Engineering Unit	kPa
4 mA	Zero
20 mA	Upper Range Limit (URL)
Output	Linear
Damping	1 s
Transmitter failure mode	Upscale
Software tag (8 characters max)	Blank
Optional LCD display	PV in kPa; output in mA and in percentage on bargraph

Any or all the above configurable parameters, including Lower range–value and Upper range-value which must be the same unit of measure, can be easily changed using the HART hand–held communicator or by a PC running the configuration software with DTM for 266 models. The transmitter database is customized with specified flange type and material, O–ring and drain/vent materials and meter code option.

Custom configuration (option N6)
The following data may be specified in addition to the standard configuration parameters:

Descriptor	16 alphanumeric characters
Message	32 alphanumeric characters
Date	Day, month, year

For HART protocol available engineering units of pressure measure are :
Pa, kPa, MPa
in. H2O@4 °C, mmH2O@4 °C, psi
in. H2O@20 °C, ftH2O@20 °C, mmH2O@20 °C
inHg, mmHg, Torr
g/cm², kg/cm², atm
mbar, bar
These and others are available for PROFIBUS and FOUNDATION Fieldbus.

Transmitter with PROFIBUS PA communication

Standard configuration

Transmitters are factory calibrated to customer's specified range. Calibrated range and tag number are stamped on the tag plate. If a calibration range and tag data are not specified, the transmitter will be supplied with the plate left blank and configured as follows:

Measure Profile	Pressure
Engineering Unit	kPa
Output scale 0 %	Lower Range Limit (LRL)
Output scale 100 %	Upper Range Limit (URL)
Output	Linear
Hi-Hi Limit	Upper Range Limit (URL)
Hi Limit	Upper Range Limit (URL)
Low Limit	Lower Range Limit (LRL)
Low-Low Limit	Lower Range Limit (LRL)
Limits hysteresis	0.5 % of output scale
PV filter	0 s
Address (set by local key)	126
Tag	32 alphanumeric characters
Optional LCD display	PV in kPa; output in percentage on bargraph

Any or all the above configurable parameters, including the range values which must be the same unit of measure, can be easily changed by a PC running the configuration software with DTM for 266 models.The transmitter database is customized with specified flange type and material, O–ring and drain/vent materials and meter code option.

Custom configuration (option N6)

The following data may be specified in addition to the standard configuration parameters:

Descriptor	32 alphanumeric characters
Message	32 alphanumeric characters
Date	Day, month, year

Transmitter with FOUNDATION Fieldbus communication

Standard configuration

Transmitters are factory calibrated to customer's specified range. Calibrated range and tag number are stamped on the tag plate. If a calibration range and tag data are not specified, the transmitter will be supplied with the plate left blank and the analog input function block FB1 is configured as follows:

Measure Profile	Pressure
Engineering Unit	kPa
Output scale 0 %	Lower Range Limit (LRL)
Output scale 100 %	Upper Range Limit (URL)
Output	Linear
Hi-Hi Limit	Upper Range Limit (URL)
Hi Limit :	Upper Range Limit (URL)
Low Limit	Lower Range Limit (LRL)
Low-Low Limit	Lower Range Limit (LRL)
Limits hysteresis	0.5 % of output scale
PV filter time	0 s
Tag	32 alphanumeric characters
Optional LCD display	PV in kPa; output in percentage on bargraph

The analog input function block FB2 and FB3 are configured respectively for the sensor temperature measured in °C and for the static pressure measured in MPa.
Any or all the above configurable parameters, including the range values, can be changed using any host compliant to FOUNDATION fieldbus. The transmitter database is customized with specified flange type and material, O–ring and drain/vent materials and meter code option.

Custom configuration (option N6)

The following data may be specified in addition to the standard configuration parameters:

Descriptor	32 alphanumeric characters
Message	32 alphanumeric characters
Date	Day, month, year

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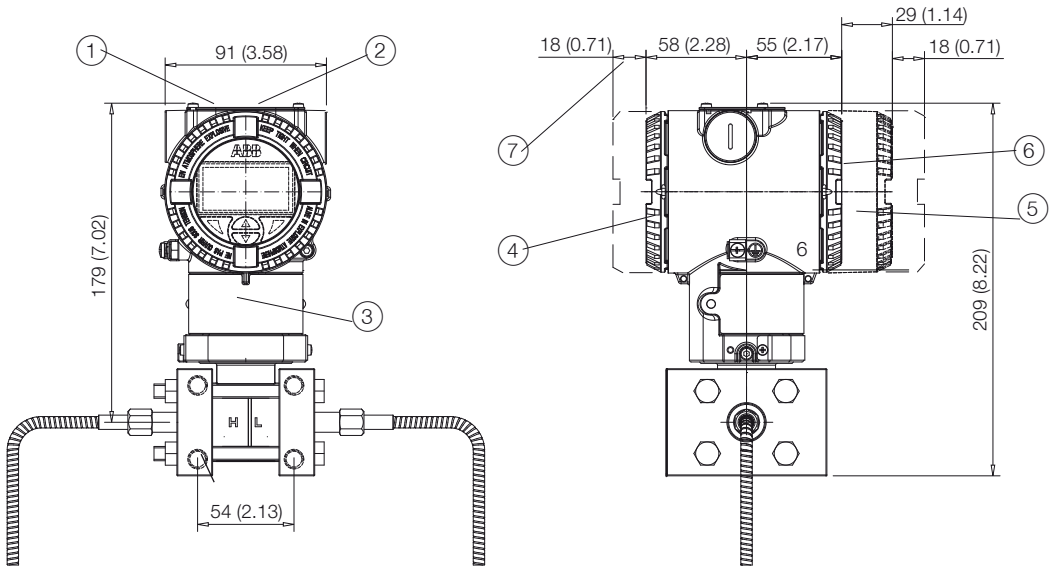
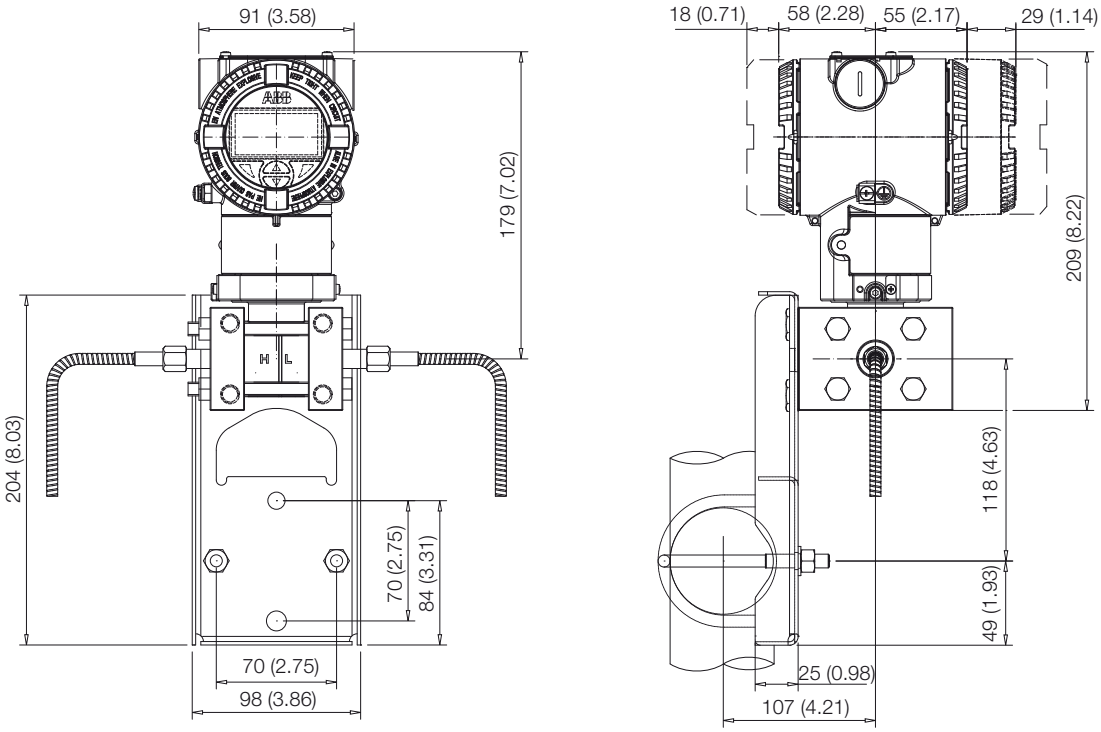
MOUNTING DIMENSIONS (not for construction unless certified) – dimensions in mm. (in.)

266MRH with barrel housing

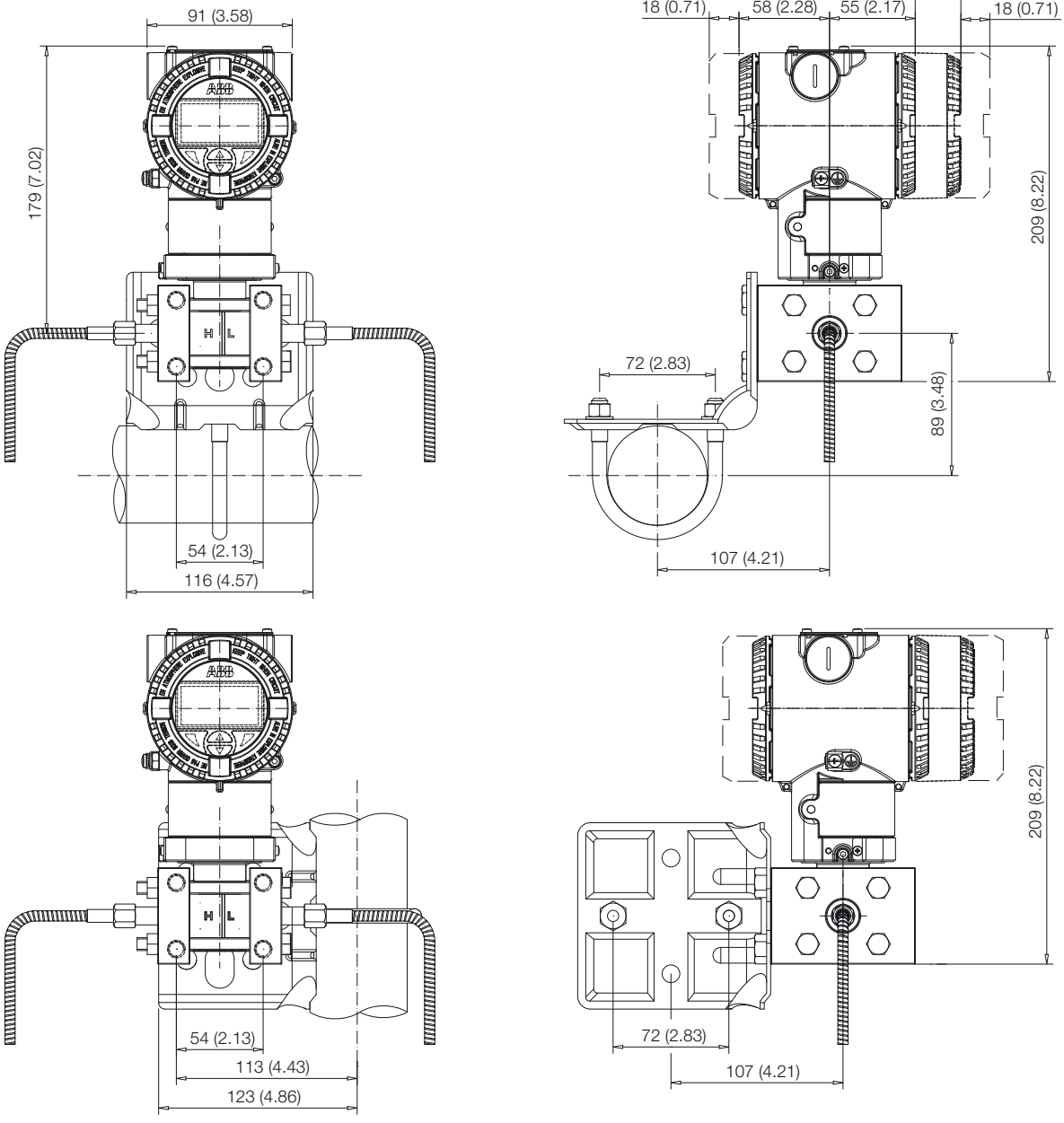


(1) Adjustments | (2) Identification plate | (3) Certification plate | (4) Terminal side | (5) L1 and L5 integral display housing | (6) Electronic side | (7) Space for cover removal

266MRH with barrel housing on flat bracket for vertical or horizontal 60 mm. (2 in.) pipe

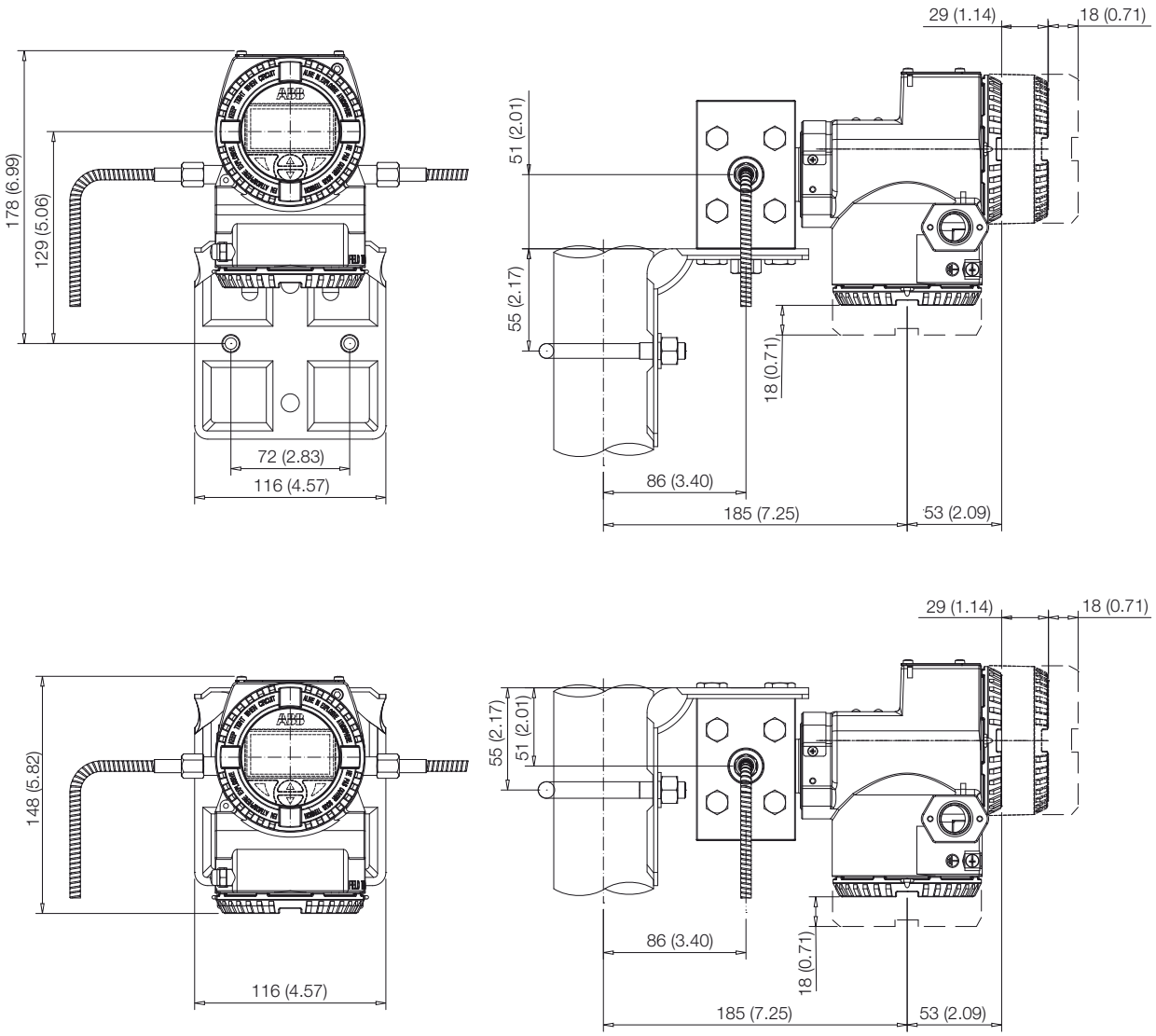


266MRH with barrel housing on bracket for vertical or horizontal 60 mm. (2 in.) pipe



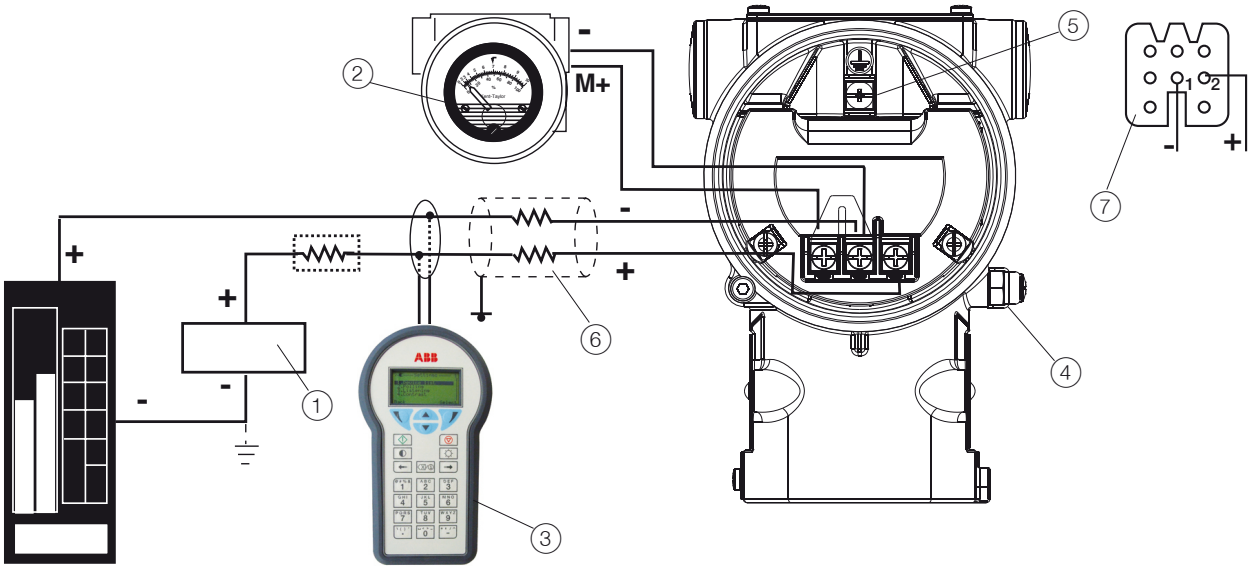
Model 266MRH Differential for high static pressure with remote seals

266MRH with DIN housing on bracket for vertical or horizontal 60 mm. (2 in.) pipe



Electrical connections

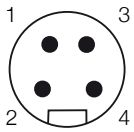
HART Version



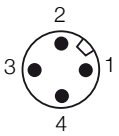
HART hand-held communicator may be connected at any wiring termination point in the loop, providing the minimum resistance is 250 ohm. If this is less than 250 ohm, additional resistance should be added to allow communications. Maximum voltage drop on external remote indicator is 0.7 V DC.

FIELDBUS Versions

7/8 in connector

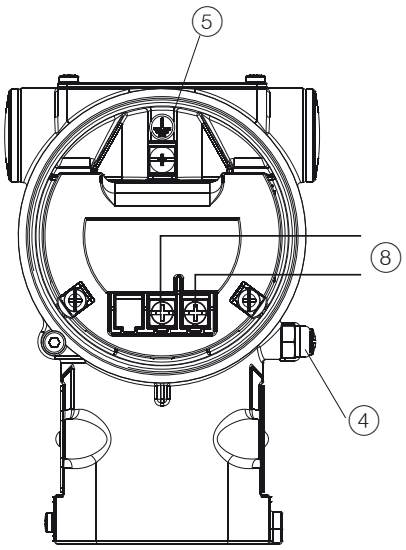


M12 x 1 connector



PIN (male) IDENTIFICATION		
	FOUNDATION Fieldbus	PROFIBUS PA
1	DATA -	DATA +
2	DATA +	GROUND
3	SHIELD	DATA -
4	GROUND	SHIELD

CONNECTOR IS SUPPLIED LOOSE
WITHOUT MATING FEMALE PLUG



(1) Power source | (2) Remote indicator | (3) Handheld communicator | (4) External ground termination point | (5) Internal ground termination point | (6) Line load | (7) Harting Han 8D socket insert for mating plug (supplied loose) | (8) Fieldbus line (polarity independent)

Model 266MRH Differential for high static pressure with remote seals

BASIC ORDERING INFORMATION model 266MRH Differential Pressure Transmitter for high static line pressure with remote seal

Select one character or set of characters from each category and specify complete catalog number.
Refer to additional ordering information and specify one or more codes for each transmitter if additional options are required.

BASE MODEL - 1st to 6th characters				2 6 6 M R H	X	T	X	X	X	X	X
Differential Pressure Transmitter for high static with remote seals– BASE ACCURACY 0.06 %											
SENSOR - Span limits - 7th characters											
0.3 and 6 kPa	3 and 60 mbar	1.2 and 24 inH2O			C						
0.67 and 40 kPa	6.7 and 400 mbar	2.67 and 160 inH2O			F						
4.2 and 250 kPa	42 and 2500 mbar	16.8 and 1000 inH2O			L						
33.4 and 2000 kPa	0.334 and 20 bar	4.85 and 290 psi			N						
167 and 10000 kPa	1.67 and 100 bar	24.17 and 1450 psi			R						
Use code - 8th characters						T					
Diaphragm material / Fill fluid (wetted parts) - 9th characters											
AISI 316 L ss		Silicone oil					R				
AISI 316 L ss		Inert fluid - Galden					2				
Process flanges material and connection - 10th characters											
AISI 316 L ss for seal construction				NACE				R			
Bolts- 11th characters											
AISI 316 ss (NACE - non exposed) without gaskets for seal construction									R		
Housing material and electrical connection - 12th characters											
Aluminium alloy (barrel version)		1/2 in. – 14 NPT								A	
Aluminium alloy (barrel version)		M20 x 1.5 (CM 20)								B	
Aluminium alloy (barrel version)		Harting Han 8D connector	(general purpose only)				(Note 1)			E	
Aluminium alloy (barrel version)		Fieldbus connector	(general purpose only)				(Note 1)			G	
AISI 316 L ss (barrel version) (I2 or I3 required)		1/2 in. – 14 NPT								S	
AISI 316 L ss (barrel version) (I2 or I3 required)		M20 x 1.5 (CM20)								T	
AISI 316 L ss (barrel version) (I2 or I3 required)		Fieldbus connector	(general purpose only)				(Note 1)			Z	
AISI 316 L ss painted (barrel version) (I2 or I3 required)		1/2 in. – 14 NPT								C	
AISI 316 L ss painted (barrel version) (I2 or I3 required)		M20 x 1.5 (CM20)								D	
AISI 316 L ss painted (barrel version) (I2 or I3 required)		Fieldbus connector	(general purpose only)				(Note 1)			F	
Aluminium alloy (DIN version)		M20 x 1.5 (CM20)	(not Ex d or XP)							J	
Aluminium alloy (DIN version)		Harting Han 8D connector	(general purpose only)				(Note 1)			K	
Aluminium alloy (DIN version)		Fieldbus connector	(general purpose only)				(Note 1)			W	
Output/Additional options - 13th characters											
HART and 4 to 20 mA - Advanced functionality		No additional options					(Notes 2, 3)				H
HART and 4 to 20 mA - Advanced functionality		Options requested by “Additional ordering code”					(Note 2)				1
PROFIBUS PA		No additional options					(Notes 2, 3)				P
PROFIBUS PA		Options requested by “Additional ordering code”					(Note 3)				2
FOUNDATION Fieldbus		No additional options					(Notes 2, 3)				F
FOUNDATION Fieldbus		Options requested by “Additional ordering code”					(Note 3)				3
HART and 4 to 20 mA Safety - certified to IEC 61508		No additional options					(Notes 2, 3)				T
HART and 4 to 20 mA Safety - certified to IEC 61508		Options requested by “Additional ordering code”					(Note 2)				8

ADDITIONAL ORDERING INFORMATION for model 266MRH

Add one or more 2-digit code(s) after the basic ordering information to select all required options

		XX	XX
Hazardous area certifications			
ATEX Intrinsic Safety Ex ia	(Notes 2, 3)	E1	
ATEX Explosion Proof Ex d	(Notes 2, 3, 4)	E2	
ATEX Type „N“	(Notes 2, 3)	E3	
Combined ATEX - Intrinsic Safety, Explosion Proof and Type „N“	(Notes 2, 3, 4)	EW	
Combined ATEX - Intrinsic Safety and Explosion Proof	(Notes 2, 3, 4)	E7	
Combined ATEX, IECEx, FM Approvals (USA) and FM Approvals (Canada)	(Notes 2, 3, 4)	EN	
FM Approvals (Canada) approval	(Notes 2, 3, 4)	E4	
FM Approvals (USA) approval	(Notes 2, 3, 4)	E6	
FM Approvals (USA and Canada) Intrinsic Safety	(Notes 2, 3)	EA	
FM Approvals (USA and Canada) Explosion Proof	(Notes 2, 3, 4)	EB	
FM Approvals (USA and Canada) Nonincendive	(Notes 2, 3)	EC	
IECEx Intrinsic Safety Ex ia	(Notes 2, 3)	E8	
IECEx Explosion Proof Ex d	(Notes 2, 3, 4)	E9	
IECEx Type „N“ Ex nL	(Notes 2, 3)	ER	
Combined IECEx - Intrinsic Safety, Explosion Proof and Type „N“	(Notes 2, 3, 4)	EI	
Combined IECEx - Intrinsic Safety and Explosion Proof	(Notes 2, 3, 4)	EH	
NEPSI Intrinsic Safety Ex ia	(Notes 2, 3)	EY	
NEPSI Explosion Proof Ex d	(Notes 2, 3, 4)	EZ	
NEPSI Type „N“	(Notes 2, 3)	ES	
Combined NEPSI - Intrinsic Safety, Explosion Proof and Type „N“	(Notes 2, 3, 4)	EQ	
Combined NEPSI - Intrinsic Safety and Explosion Proof	(Notes 2, 3, 4)	EP	
Other hazardous area certifications (ONLY AS ALTERNATIVE TO BASIC CERTIFICATION CODE Ex)			
Technical Regulations Customs Union (EAC) Intrinsic Safety Ex ia for Russia	(Notes 2, 3)	W1	
Technical Regulations Customs Union (EAC) Explosion Proof Ex d for Russia	(Notes 2, 3, 4)	W2	
Technical Regulations Customs Union (EAC) combined Ex ia and Ex d for Russia	(Notes 2, 3, 4)	WC	
Technical Regulations Customs Union (EAC) Intrinsic Safety Ex ia for Kazakhstan	(Notes 2, 3)	W3	
Technical Regulations Customs Union (EAC) Explosion Proof Ex d for Kazakhstan	(Notes 2, 3, 4)	W4	
Technical Regulations Customs Union (EAC) combined Ex ia and Ex d for Kazakhstan	(Notes 2, 3, 4)	WD	
Inmetro (Brazil) Ex ia	(Notes 2, 3)	W5	
Inmetro (Brazil) Ex d	(Notes 2, 3, 4)	W6	
Inmetro (Brazil) Ex nL	(Notes 2, 3)	W7	
Combined Inmetro (Brazil) - Intrinsic Safety, Explosion Proof and Type „N“	(Notes 2, 3, 4)	W8	
Technical Regulations Customs Union (EAC) Intrinsic Safety Ex ia for Belarus	(Notes 2, 3)	WF	
Technical Regulations Customs Union (EAC) Explosion Proof Ex d for Belarus	(Notes 2, 3, 4)	WG	
Technical Regulations Customs Union (EAC) combined Ex ia and Ex d for Belarus	(Notes 2, 3, 4)	WH	
Kosha (Korea) Intrinsic Safety Ex ia IIC T6, IP67	(Notes 2, 3)	WM	
Kosha (Korea) Explosion Proof Ex d IIC T6, IP67	(Notes 2, 3, 4)	WN	
Combined Kosha (Korea) - Intrinsic Safety and Explosion Proof	(Notes 2, 3, 4)	WP	
Integral LCD			
Digital LCD integral display			L1
TTG (Through-The-Glass) digital LCD controlled display			L5

Model 266MRH Differential for high static pressure with remote seals

ADDITIONAL ORDERING INFORMATION for model 266MRH		XX	XX	XX	XX	XX	XX	XX
Mounting bracket (shape and material)								
For pipe mounting - Carbon steel	(Not suitable for AISI housing)	B1						
For pipe mounting - AISI 316 L ss		B2						
For wall mounting - Carbon steel	(Not suitable for AISI housing)	B3						
For wall mounting - AISI 316 L ss		B4						
Flat type for box - AISI 316 ss		B5						
Surge								
Surge/Transient Protector			S2					
Operating manual (multiple selection allowed)								
German (FOR HART and PROFIBUS VERSIONS)				M1				
Italian (ONLY FOR HART VERSIONS)				M2				
Spanish (FOR HART and FOUNDATION Fieldbus VERSIONS)				M3				
French (ONLY FOR HART VERSIONS)				M4				
English				M5				
Chinese (ONLY FOR HART VERSIONS)				M6				
Swedish (ONLY FOR HART VERSIONS)				M7				
Polish (ONLY FOR HART VERSIONS)				M9				
Portuguese (ONLY FOR HART VERSIONS)				MA				
Russian (ONLY FOR HART VERSIONS)				MB				
Dutch (ONLY FOR HART VERSIONS)				MD				
Danish (ONLY FOR HART VERSIONS)				MF				
Japanese (ONLY FOR HART VERSIONS)				MJ				
Romenian (ONLY FOR HART VERSIONS)				MR				
Turkish (ONLY FOR HART VERSIONS)				MT				
Plates language								
German					T1			
Italian					T2			
Spanish					T3			
French					T4			
Additional tag plate								
Supplemental wired-on stainless steel plate						I1		
Tag and certification stainless steel plates and laser printing of tag						I2		
Tag, certification and supplemental wired-on stainless steel plates and laser printing of tag						I3		
Configuration								
Standard – Pressure = inH2O/ psi at 68 °F; Temperature = deg. F							N2	
Standard – Pressure = inH2O/ psi at 39.2 °F; Temperature = deg. F							N3	
Standard – Pressure = inH2O/ psi at 20 °C; Temperature = deg. C							N4	
Standard – Pressure = inH2O/ psi at 4 °C; Temperature = deg. C							N5	
Custom							N6	
Certificates (multiple selection allowed)								
Inspection certificate EN 10204–3.1 of calibration (9-point)								C1
Inspection certificate EN 10204–3.1 of the pressure test								C5
Certificate of compliance with the order EN 10204–2.1 of instrument design								C6
Printed record of configured data of transmitter								CG
PMI test of wetted parts								CT

ADDITIONAL ORDERING INFORMATION FOR MODEL 266MRH			XX	XX	XX	XX
Approvals						
GOST (Russia) Metrologic Pattern	(NOT APPLICABLE WITH ANY HAZARDOUS AREA CERTIFICATION)		Y1			
GOST (Kazakhstan) Metrologic Pattern	(NOT APPLICABLE WITH ANY HAZARDOUS AREA CERTIFICATION)		Y2			
GOST (Belarus) Metrologic Pattern	(NOT APPLICABLE WITH ANY HAZARDOUS AREA CERTIFICATION)		Y4			
Chinese pattern	(NOT APPLICABLE WITH ANY HAZARDOUS AREA CERTIFICATION)		Y5			
DNV approval				YA		
Approval for Custody transfer (PENDING)				YC		
Conformity to NAMUR NE 021 (2004)	(NOT APPLICABLE WITH SURGE PROTECTOR CODE “S2”)	(Notes 6, 7)		YE		
Material traceability						
Certificate of compliance with the order EN 10204–2.1 of process wetted parts					H1	
Inspection certificate EN 10204–3.1 of process wetted parts					H3	
Test report EN 10204–2.2 of pressure bearing and process wetted parts					H4	
Connector						
Fieldbus 7/8 in. (Recommended for FOUNDATION Fieldbus) - (supplied loose without mating female plug)		(Notes 3, 5)				U1
Fieldbus M12x1 (Recommended for PROFIBUS PA) - (supplied loose without mating female plug)		(Notes 3, 5)				U2
Harting Han 8D – straight entry - (supplied loose)		(Notes 2, 5)				U3
Harting Han 8D – angle entry - (supplied loose)		(Notes 2, 5)				U4

Nota 1: Select type in additional ordering code
Note 2: Not available with Housing code G, Z, W, F
Note 3: Not available with Housing code E, K
Note 4: Not available with Housing code J, K, W
Note 5: Not available with Housing code A, B, S, T, J
Note 6: Not available with Output code 2 and 3
Note 7: Not available with Hazardous area certification code EW, EN, E4, E6, EA, EB, EC, EY, EZ, ES, EQ, EP, W1, W2, WC, W3, W4, WD, W5, W6, W7, W8, WF, WG, WH, WM, WN, WP

Standard delivery items (can be differently specified by additional ordering code)

– General purpose (no electrical certification)
– No display, no mounting bracket, no surge protection
– Multilanguage short-form operating instruction manual and labels in english (metal nameplate; self-adhesive certification and tag)
– Configuration with kPa and deg. C units
– No test, inspection or material traceability 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. AISI 316/316 L, Hastelloy C-276, Monel 400 also conform to NACE MR0103 for sour refining environments.
(2) NACE MR-01-75 addresses bolting requirements in two classes:
  – Exposed bolts: bolts directly exposed to the sour environment or buried, incapsulated 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.

266MRH bolting identified by “NACE” are in compliance with requirements of NACE MR0175 when considered “non exposed bolting”.

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