NivoGuide®

UWT
LEVEL. UP TO THE MAX.

Overview

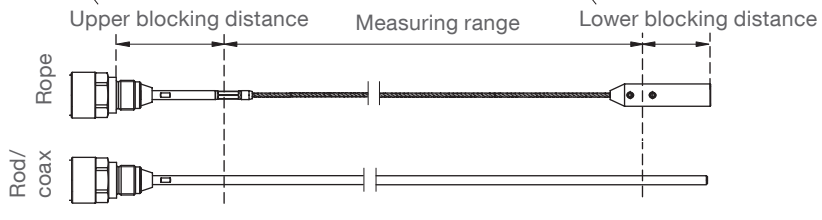
- Guided microvave for continuous level and interface measurement of liquids
- TDR technology
- Works in applications with steam, buildup, foam generation or condensation
- Wide range of applications
- Maintenance free
- Compact unit
- Standard version
- High temperature and high pressure version
- Rod, rope or coax version
- Cutable probes
- High chemical resistance of the probe
- Second line of defense (optional)
- Electronic 2-wire 4 - 20 mA, HART
- Electronic 4-wire Modbus
- Integrated Display and Adjustment Module
- Extensive Diagnostics
- Multiple approvals available
- 2011/65/EU RoHS conform
- Operation via Bluetooth & UWT Level App

Approvals	CE/ UKCA		
	ATEX/ UKEX/ IEC-Ex/ INMETRO	Zone 0 and 0/1	Intrinsically Safe
		Zone 1 and 0/1	Flameproof
		Zone 20 and 20/21	Dust Ignition Proof
	FM	General purp.	
		Cl. I, II, III Div. 1	Intrinsically Safe
		Cl. I Div. 1	Explosionproof
		Cl. I, II, III Div. 2	Non incendive
		Cl. II, III Div. 1	Dust Ignition Proof
	TR-CU	Ordinary Locations	
		Zone 0 and 0/1	Intrinsically Safe
		Zone 1 and 0/1	Flameproof
		Zone 20 and 20/21	Dust Ignition Proof
	Functional safety	IEC 61508	SIL2 single-channel / SIL3 multi-channel

Electronics	Operating voltage	9.6 … 35 V DC, 2-wire loop 8 ... 30 V DC, 4-wire Limited voltage range for Ex ia and with Display and Adjustment Module
	Measuring signal	Current loop 4 - 20 mA according to NAMUR NE 43, HART Option additional current output: 4 - 20 mA (passive) Modbus RTU
	Display and Adjustment Module	• LCD-display with background light • Display of acual measurement • Display of setup parameters (e.g. min. and max adjustment, material properties, damping, linearisation, false signal suppression) • After programming the display can be removed. The setted parameters can be copied to other units. • Display of diagnistics data (e.g. temperature, echo curve, trailing pointer) simulation of level) • Operation via push buttons, • Operation via Bluetooth & UWT Level App
Housing	Material, version	Aluminium, single- or double chamber (powder coated) Stainless steel, single chamber (electro polished)
	Ingress protection	Type 6P/ IP66/ IP68 (0.2 bar)
	Ambient temperature	-40 … +80 °C (-40 … +176 °F)
Blocking distance	Upper/ lower blocking distance	No measurement is possible within this area. Observe increased deviation of measurement value next to the blocking distance (details see Operating instructions).

(in mm)	Rope /Rod	Coax	PFA
Water	80	30	100
Oil	150	100	200

(in mm)	Rope /Rod	Coax	PFA
Water	0	0	0
Oil	50-200	50	200



NG 8100 Standard version

Length of extension "L"	Rod Rope Coax	300 .. 6,000 mm (11.81 .. 236") 500 .. 75,000 mm (19.7 .. 2,953") 300 .. 6,000 mm (11.81 .. 236")
Diameter	Rod Rope Coax	ø8 mm (ø0.31") ø12 mm (ø0.47") ø2 mm (ø0.08") ø4 mm (ø0.16") ø21.3 mm (ø0.84") ø42.2 mm (ø1.67")
Material	Rod Rope Gravity weight Coax Rope Lead-through of probe to process side (rod/ rope/ coax lead-through): Isolation material: PEEK or PPS Sealing: FKM, FFKM, EPDM or silicone FEP coated Process connection: Thread Flange Second line of defense* (optional):	1.4404 (SS316L) 1.4401 (SS316) 1.4404 (SS316L) 1.4404 (SS316L)/ PFA 1.4401 (SS316)/ PFA 1.4404 (SS316L) with sealing Klingersil C-4400 1.4435 (SS316L), welded Borosilicate glass GPC 540 / 316L
Process temperature (thread- or flange temperatur)	Depending on lead-through lead-through of probe to process side (rod/ rope/ coax lead-through): Sealing FKM, EPDM or silicone FEP coated: -40 … +150°C (-40 … +302°F) with isolation material PEEK -40 … +80°C (-40 … +176°F) with isolation material PPS Sealing FFKM: -20 … +150°C (-4 … +302°F) with isolation material PEEK -20 … +200°C (-4 … +392°F) with isolation material PEEK and temperature adapter Sealing borosilicate glass: -60 ... +150°C (-76 ... +302°F)	

* The Second Line of Defense is a second level of the process separation in the form of a gas-tight feedthrough in the lower part of the housing, preventing product from penetrating into the housing.

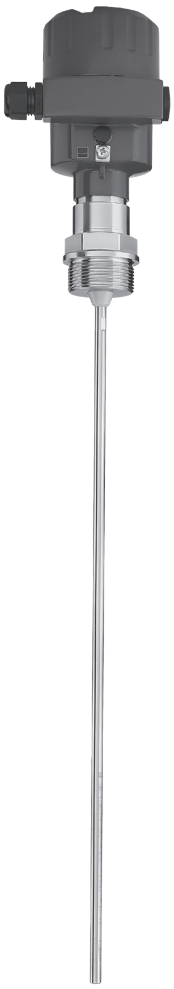
Remote version	Length, HF connection cable to external housing	1m, 2m, 5m, 10m, 15m *
	Material HF connection cable	PE
	Material connection plug	Cu-alloy (nickle-plated)

* Max. probe length 40 m and $\varepsilon r > 10$.

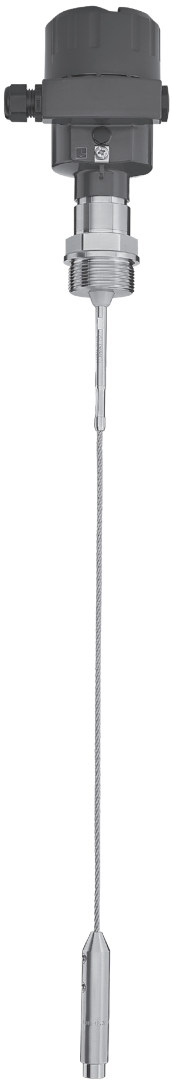
NG 8100 Standard version

Process pressure	Depending on lead-through lead-through of probe to process side (rod/ rope/ coax lead-through): -1 .. 40 bar (-14.5 … +580 psi g) with isolation material PEEK -1 .. 6 bar (-14.5 … +87 psi g) with isolation material PPS For flanges the max. pressure rating of the flange must be additionally observed.
Lateral load/ tensile load	Max. lateral load (torque): Rod ø8 mm 10 Nm (7.38 lbf ft) Rod ø12 mm 30 Nm (22.13 lbf ft) Coax ø21.3 mm 60 Nm (44 lbf ft) Coax ø42.2 mm 300 Nm (221 lbf ft) Max. tensile load: Rope ø2 mm 1.5 KN (337 lbf) Rope ø4 mm 2.5 KN (562 lbf)
Dielectric constant of the medium	Rope / Rod DK ≥1.6 Coax DK ≥1.4

NG 8100 Standard version



Rod version
(pos.8 E, pos.5+6 3D)



Rope version
(pos.8 A, pos.5+6 3D)

Coax version
(pos.8 L, pos.5+6 3D)

Cable entries (by default)
Depending on model selected, the following cable entries are supported (details and options see pos.13):

Version:	Cable entry:
CE, UKCA, ATEX, UKEX, IEC-Ex, INMETRO, TR-CU	M20 x 1.5 1x screwed cable gland, 1x blind plug
FM	NPT ½" tapered ANSI B1.20.1 1x open conduit + 1x blind plug

Housing
Standard housing is aluminium single chamber.
Alternative housings see option pos.16.

Display and Adjustment Module (pos. 9)

NG 8200 High temperatur- and high pressure version

Length of extension "L"	Rod Rope Coax	300 .. 6,000 mm (11.81 .. 236") 500 .. 60,000 mm (19.7 .. 2,362") 300 .. 6,000 mm (11.81 .. 236")
Diameter	Rod Rope Coax	ø8 mm (ø0.31") ø16 mm (ø0.63") ø2 mm (ø0.08") ø4 mm (ø0.16") ø21.3 mm (ø0.84") ø42.2 mm (ø1.67")
Material	Rod Rope Gravity weight Coax Centering weight Lead-through of probe to process side (rod/ rope/ coax lead-through): Version: / 250°C / 280°C/450°C Isolation material: / PEEK / Ceramic Sealing: / FFKM / Graphite Process connection: Thread Flange Second line of defense* (optional):	1.4404 (SS316L) 1.4401 (SS316) 1.4404 (SS316L) 1.4404 (SS316L) 1.4401 (SS316) 1.4404 (SS316L) For 250°C version with sealing Klingersil C-4400 1.4435 (SS316L), welded Borosilikate glas GPC 540 / 316L
Process temperature (thread- or flange temperatur)	Selectable	-20 … +250°C (-4 … +482°F) -196 … +280°C (-321 … +536°F) -196 … +450°C (-321 … +842°F)
Process pressure	250°C version 280°C/450°C version For flanges the max. pressure rating of the flange must be additionally observed. Derating of max. pressure with temperature must be observed (details see operating instructions).	-1 .. 100 bar (-14.5 +1.450 psi g) -1 .. 400 bar (-14.5 +5.800 psi g)
Lateral load/ tensile load	Max. lateral load (torque): Rod ø8 mm Rod ø16 mm Coax ø21.3 mm Coax ø42.2 mm Max. tensile load: Rope ø2 mm Rope ø4 mm	 4 Nm (3 lbf ft) 30 Nm (22.13 lbf ft) 60 Nm (44 lbf ft) 300 Nm (221 lbf ft) 1.5 KN (337 lbf) 2.5 KN (562 lbf)
Dielectric constant of the medium	Rope / Rod Coax	DK ≥1.6 DK ≥1.4

* The Second Line of Defense is a second level of the process separation in the form of a gas-tight feedthrough in the lower part of the housing, preventing product from penetrating into the housing.

NG 8200 High temperatur- and high pressure version

Rod version 450°C
(pos.3 2, Pos.8 E, Pos.5+6 3D)

Rope version 250°C
(pos. 3.3, Pos.8 A, Pos.5+6 3D)

Coax version 280°C
(pos. 3.1, Pos.8 P, Pos.5+6 3D)

Cable entries (by default)
Depending on model selected, the following cable entries are supported (details and options see pos.13):

Version:	Cable entry:
CE, UKCA, ATEX, UKEX, IEC-Ex, INMETRO, TR-CU	M20 x 1.5 1x screwed cable gland, 1x blind plug
FM	NPT ½" tapered ANSI B1.20.1 1x open conduit + 1x blind plug

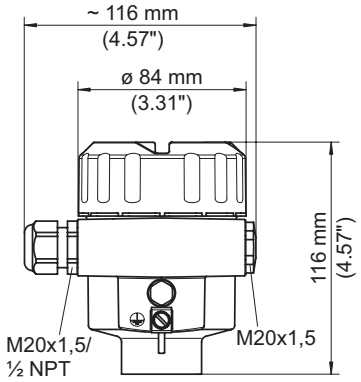
Housing
Standard housing is aluminium single chamber.
Alternative housings see option pos.16.

Display and Adjustment Module (pos. 9)

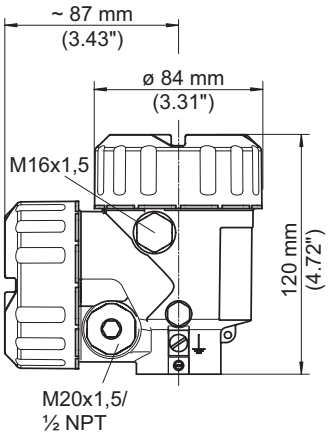
Dimensions

NG 8100 / NG 8200 Housing

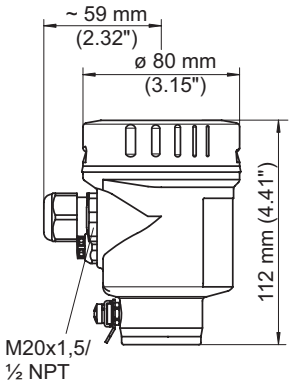
Aluminium
single chamber



Aluminium
double chamber

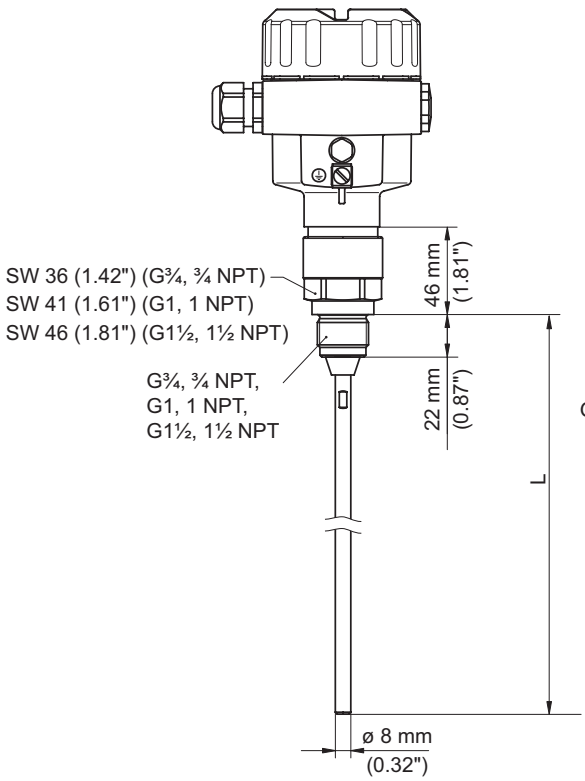


Stainless steel
single chamber

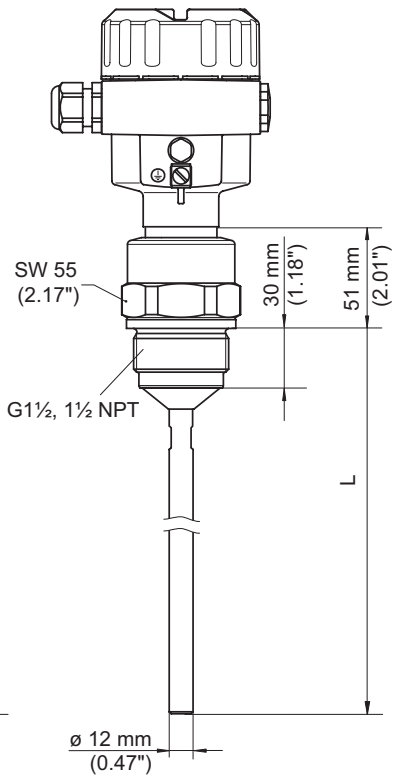


NG 8100 Rod version

Rod ø8 mm
Process connection: thread,
without temperature
adapter (80°C/150°C)

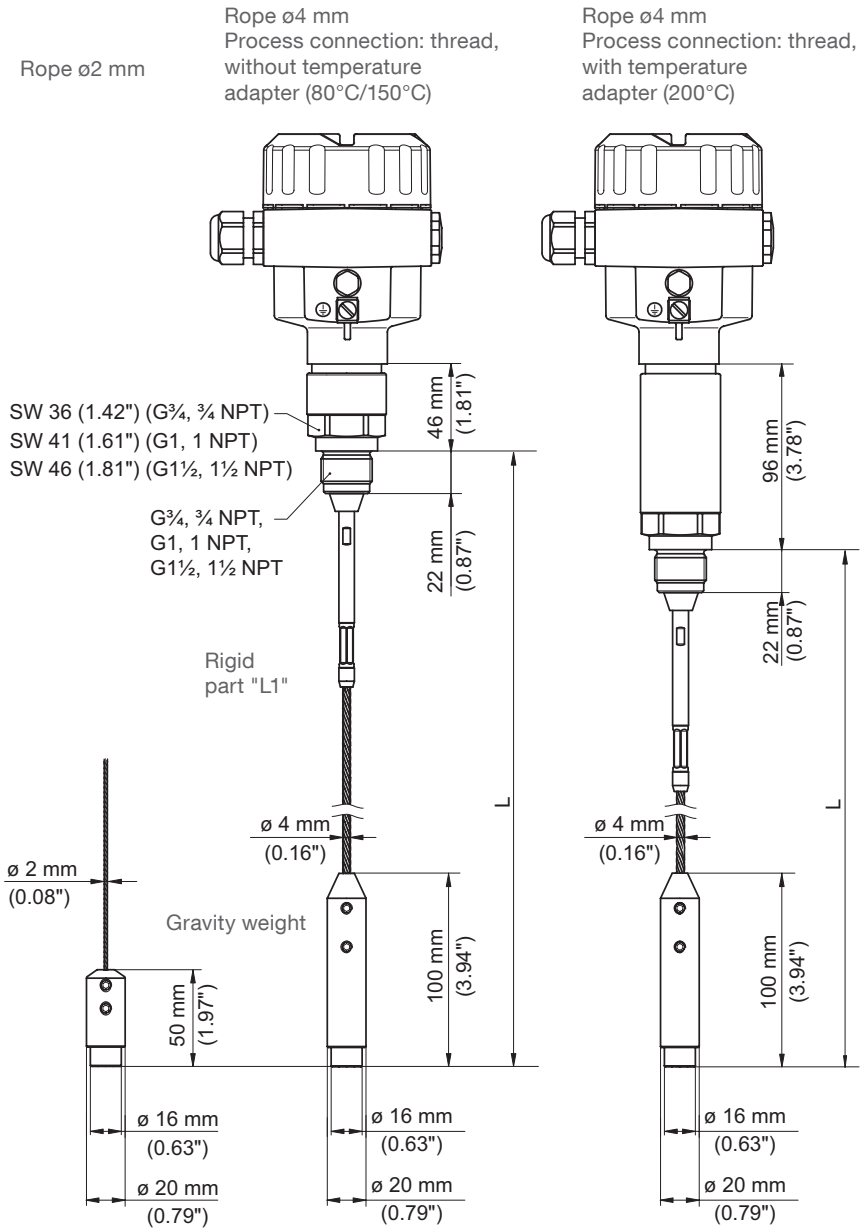


Rod ø12 mm
Process connection: thread,
without temperature
adapter (80°C/150°C)



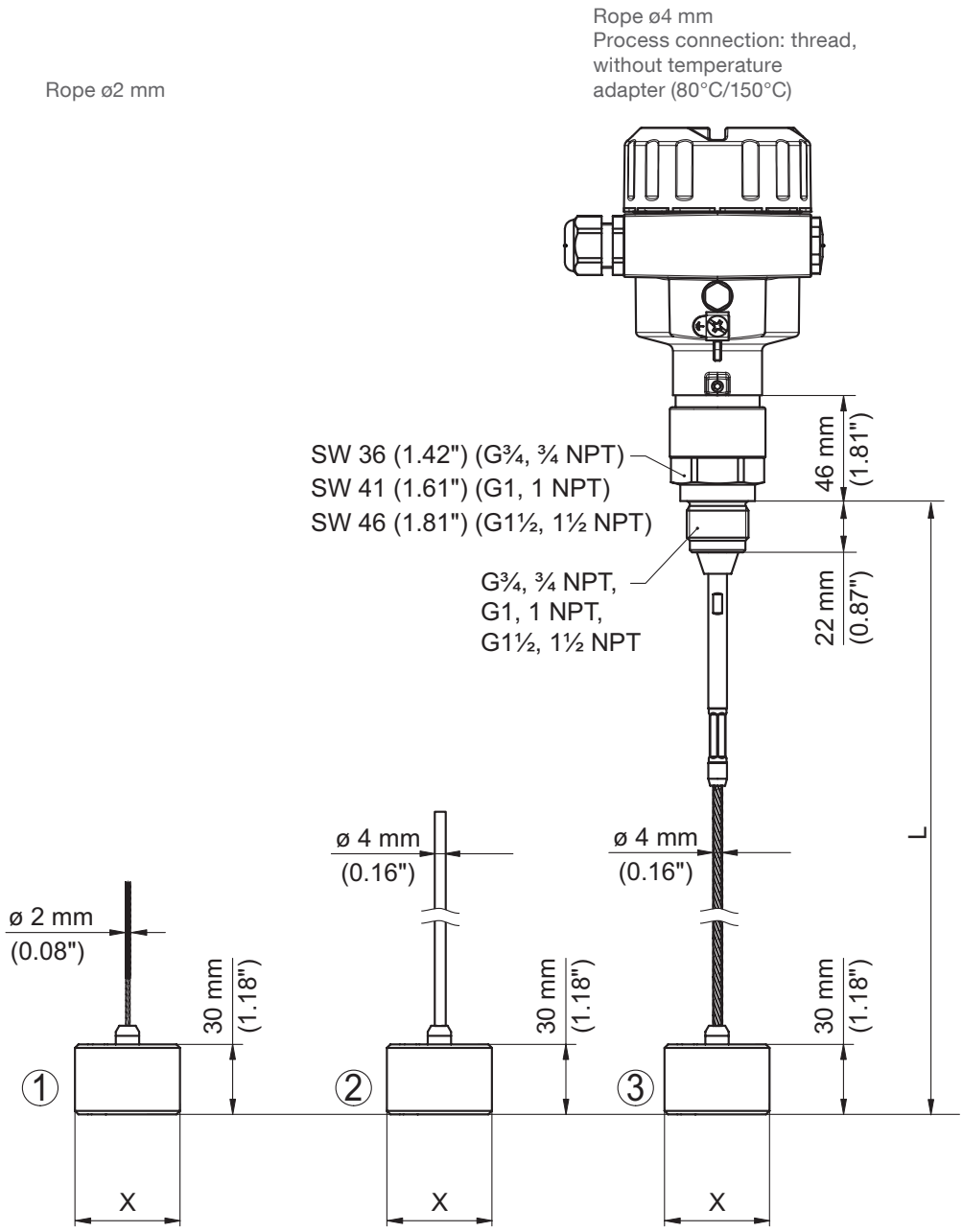
Dimensions

NG 8100 Rope version



Dimensions

NG 8100 Rope version with centering weight

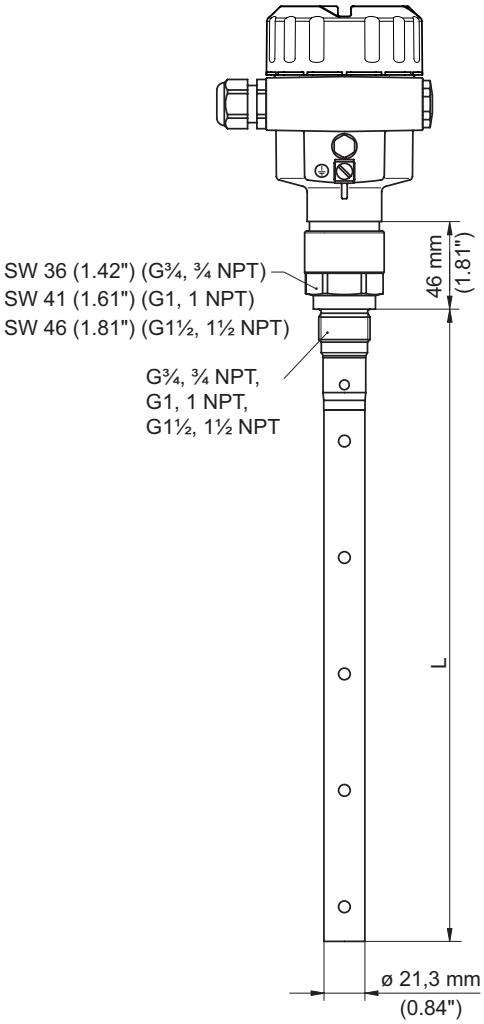


Dimension centering weigth		Suitable for pipe diameters
Diameter	Height	
40 mm	30 mm	2"
45 mm	30 mm	2"
70 mm	30 mm	3"
75 mm	30 mm	3"
95 mm	30 mm	4"
145 mm	30 mm	6"
195 mm	30 mm	8"

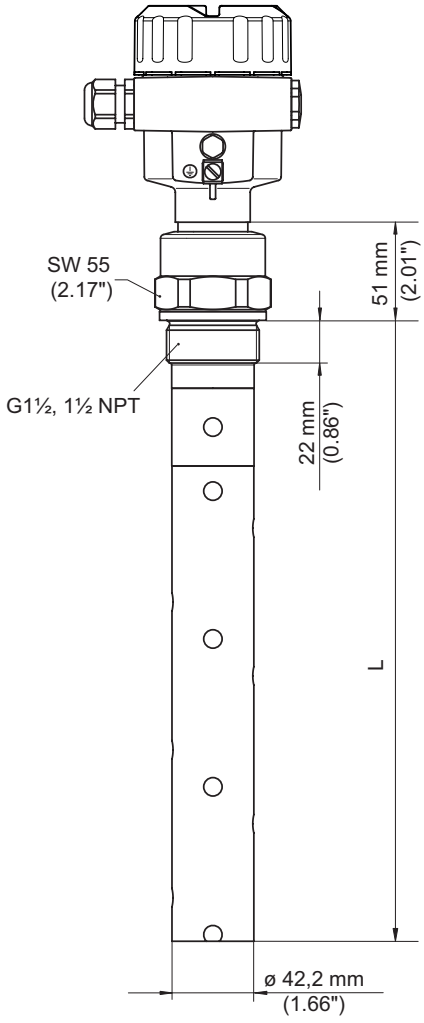
Dimensions

NG 8100 Coax version

Coax ø21.3 mm
Process connection: thread, without temperature adapter (80°C/150°C)



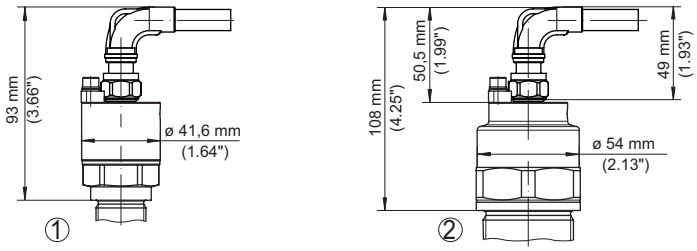
Coax ø42.2 mm
Process connection: thread, without temperature adapter (80°C/150°C)



Dimensions

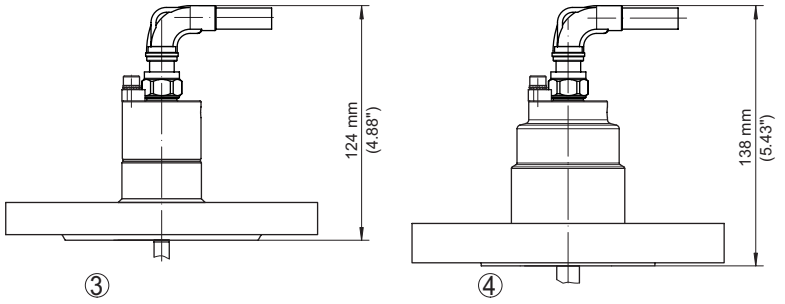
NG 8100 Remote version

Thread version



1: with rope-ø 2, 4 mm (0.079", 0.157") or rod-ø 8 mm (0.315")
2: with rod-ø 12 mm (0.472")

Flange version



3: with rope-ø 2, 4 mm (0.079", 0.157") or rod-ø 8 mm (0.315")
4: with rod-ø 12 mm (0.472")

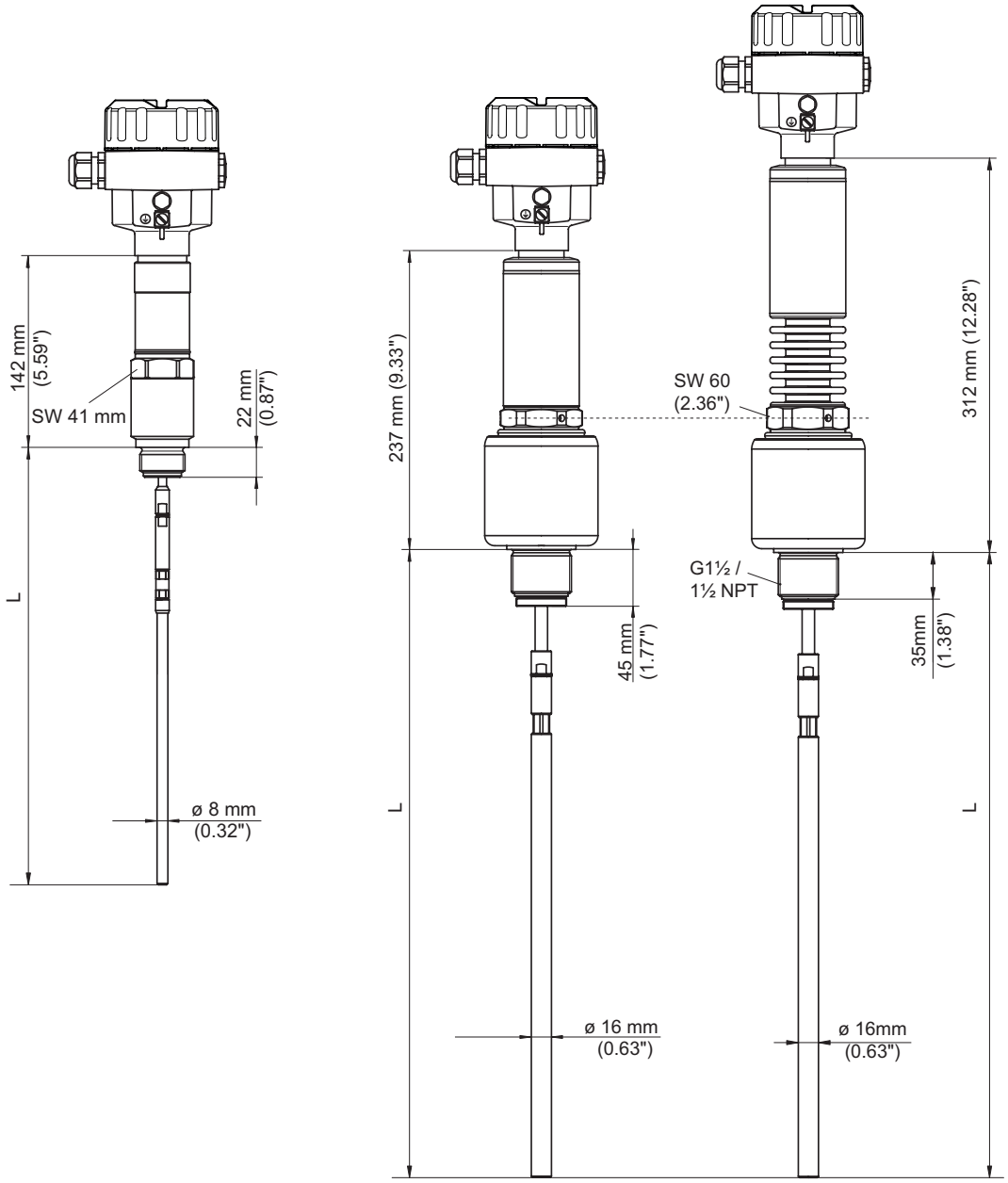
Dimensions

NG 8200 Rod version

Process temp. 250°C
Rod ø8 mm
Process connection: thread

Process temp. 280°C
Rod ø16 mm
Process connection: thread

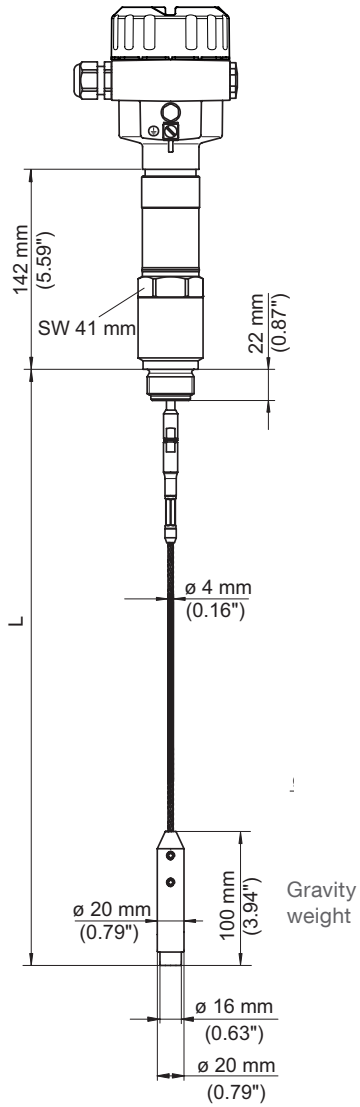
Process temp. 450°C
Rod ø16 mm
Process connection: thread



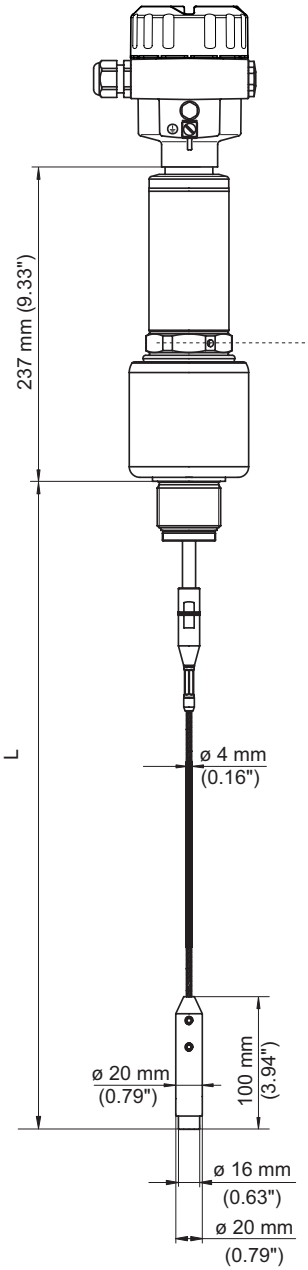
Dimensions

NG 8200 Rope version

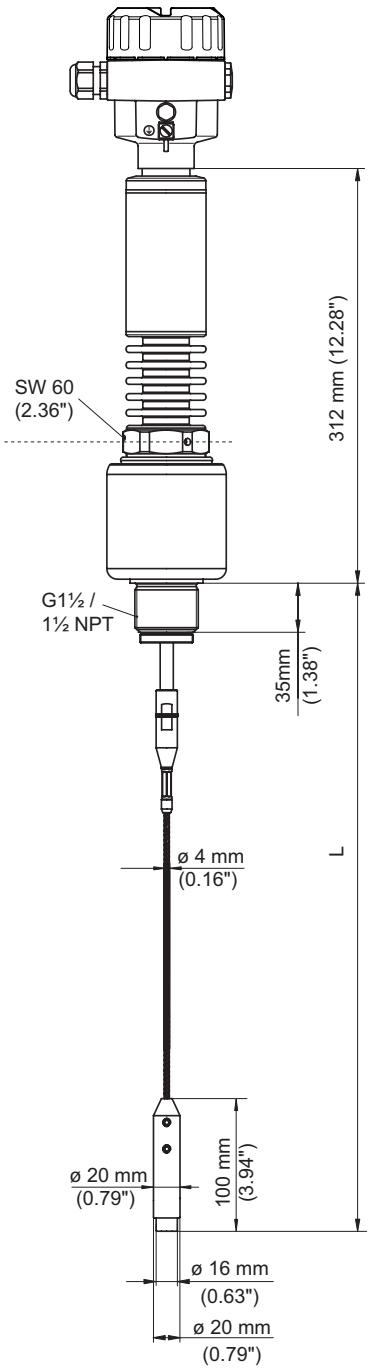
Process temp. 250°C
Rope ø4 mm
Process connection: thread

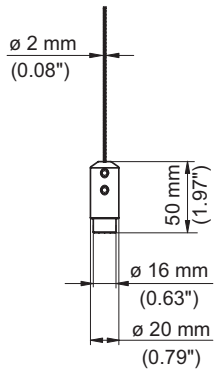


Process temp. 280°C
Rope ø4 mm
Process connection: thread



Process temp. 450°C
Rope ø4 mm
Process connection: thread





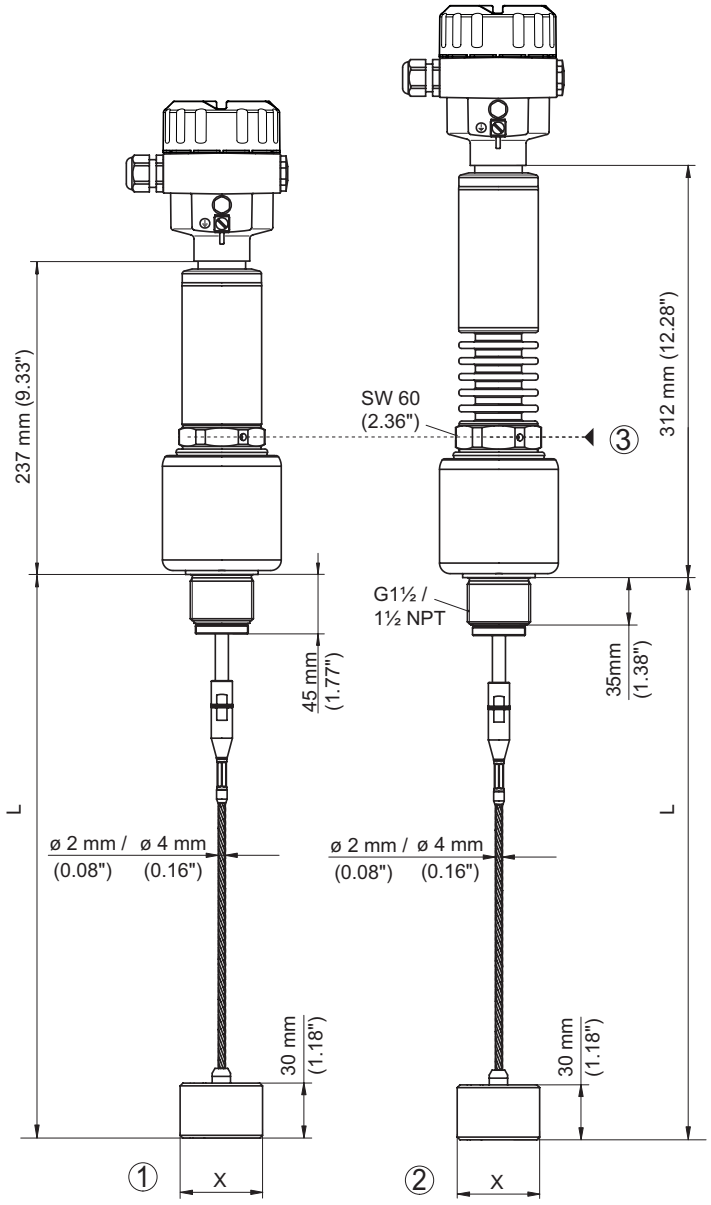
Rope ø2 mm

Dimensions

NG 8200 Rope version with centering weigth

Process temp. 280°C
Rope ø2/ 4 mm
Process connection: thread

Process temp. 450°C
Rope ø2/ 4 mm
Process connection: thread

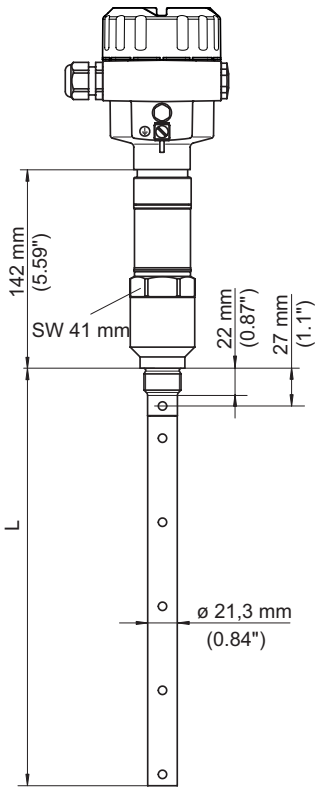


Dimension centering weigth		Suitable for pipe diameters
Diameter	Height	
40 mm	30 mm	2"
45 mm	30 mm	2"
70 mm	30 mm	3"
75 mm	30 mm	3"
95 mm	30 mm	4"
145 mm	30 mm	6"
195 mm	30 mm	8"

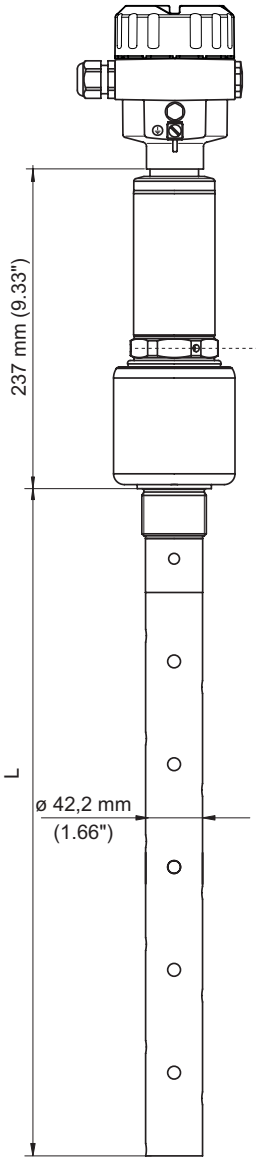
Dimensions

NG 8200 Coax version

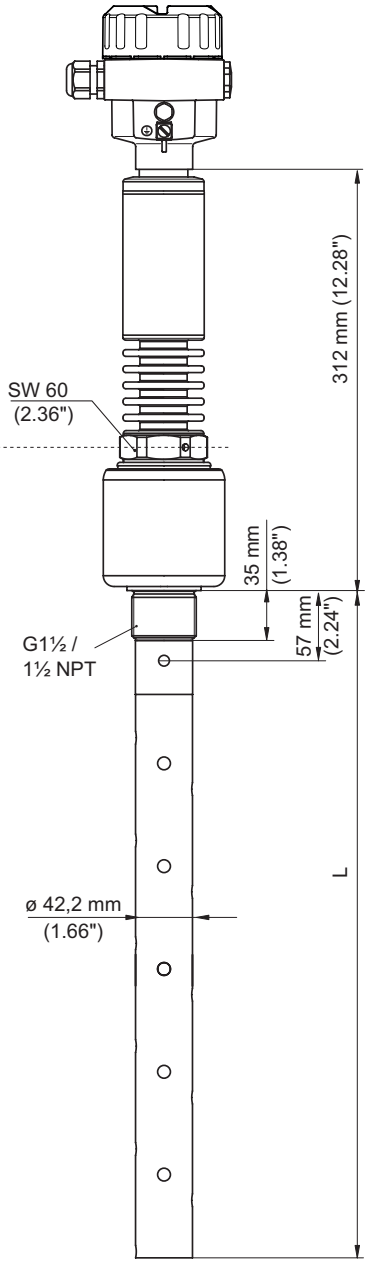
Process temp. 250°C
Coax ø21.3 mm
Process connection: thread



Process temp. 280°C
Coax ø42.2 mm
Process connection: thread



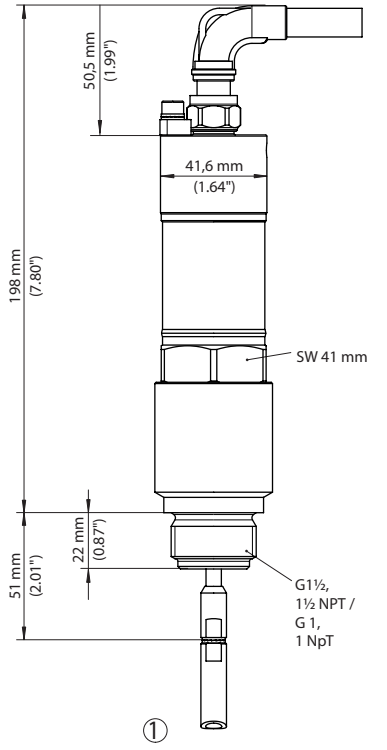
Process temp. 450°C
Coax ø42.2 mm
Process connection: thread



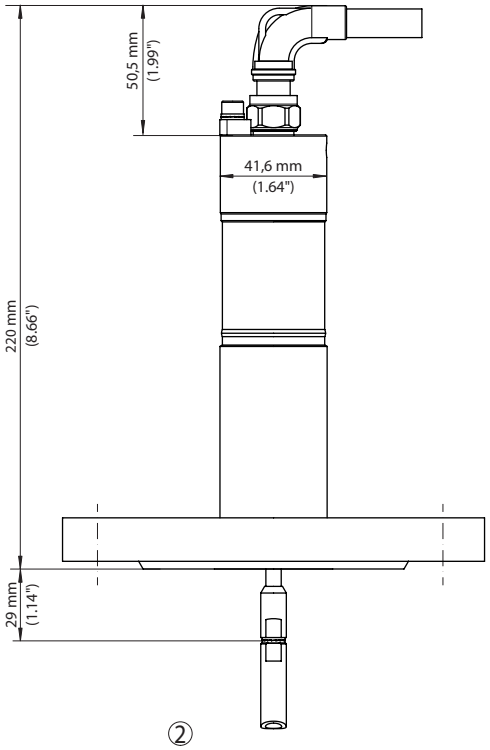
Dimensions

NG 8200 Remote version 250°C

Thread version

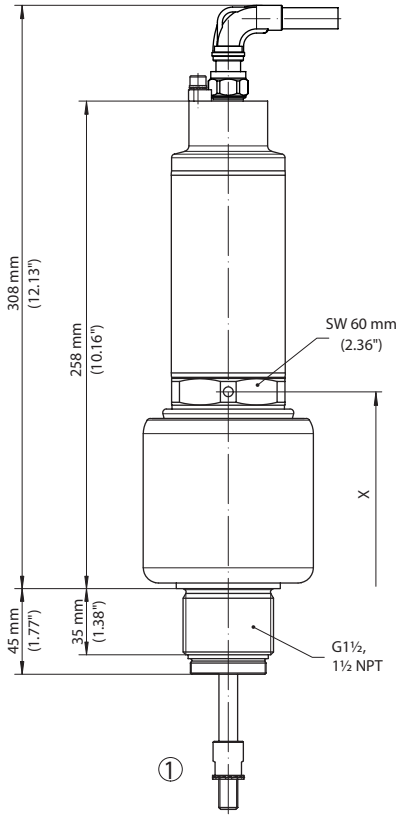


Flange version

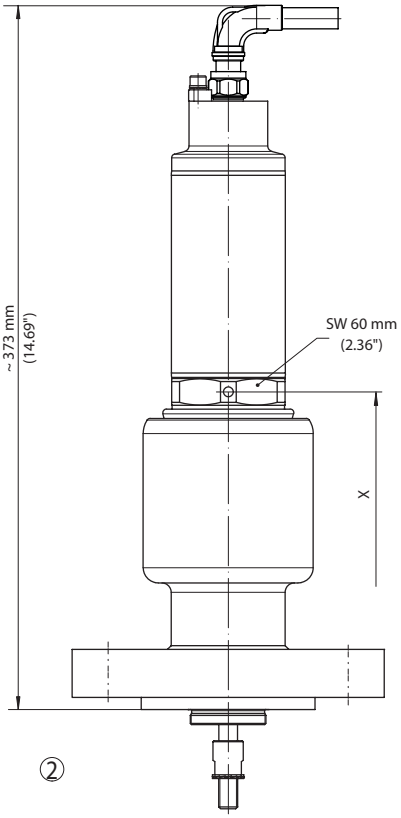


NG 8200 Remote version 280°C

Thread version



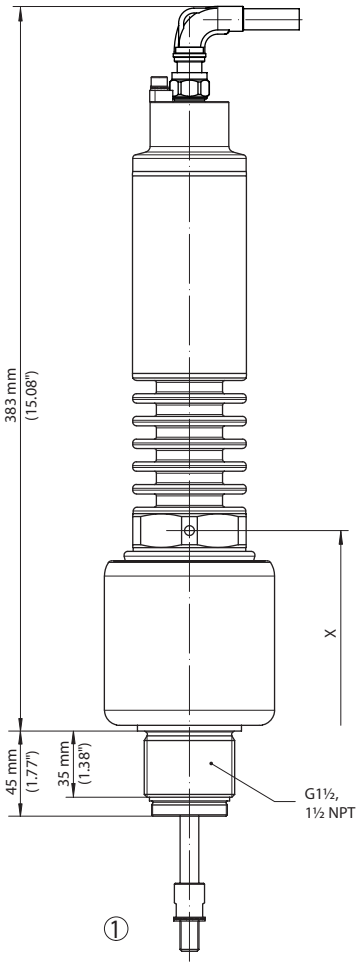
Flange version



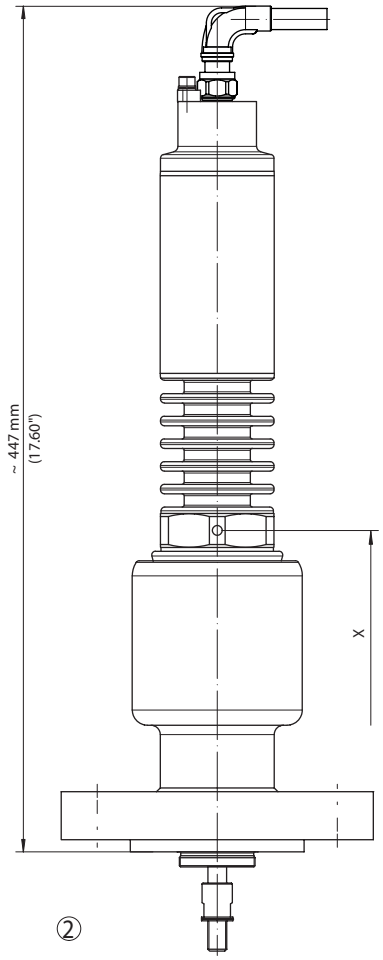
Dimensions

NG 8200 Remote version 450°C

Thread version



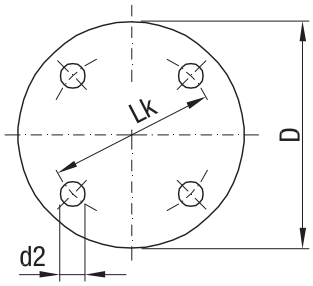
Flange version



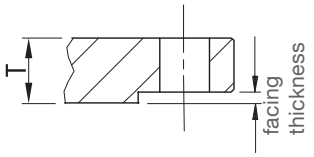
Dimensions

Flanges

	Code	Type	Number of holes	d2 mm (inch)	Lk mm (inch)	D mm (inch)	T thickness mm (inch)
ASME B16.5, raised face	5A	1" 150 lbs	4	15.9 (0.63)	79.3 (3.12)	108.0 (4.25)	14.3 (0.56)
	5B	1" 300 lbs	4	19.1 (0.75)	88.9 (3.5)	124.0 (4.88)	17.5 (0.69)
	5C	1" 600 lbs	4	19.1 (0.75)	88.9 (3.5)	124.0 (4.88)	17.5 (0.69)
	5D	1½" 150 lbs	4	15.9 (0.63)	98.6 (3.88)	127.0 (5.0)	17.5 (0.69)
	5E	1½" 300 lbs	4	22.2 (0.87)	114.3 (4.5)	155.5 (6.12)	20.6 (0.81)
	5F	1½" 600 lbs	4	22.2 (0.87)	114.3 (4.5)	155.5 (6.12)	22.4 (0.88)
	5G	2" 150 lbs	4	19.1 (0.75)	120.7 (4.75)	152.4 (6.01)	19.1 (0.75)
	5H	2" 300 lbs	8	19.1 (0.75)	127.0 (5.0)	165.1 (6.5)	22.4 (0.88)
	5J	2" 600 lbs	8	19.1 (0.75)	127.0 (5.0)	165.1 (6.5)	25.4 (1.0)
	5R	2" 1500 lbs	8	25.4 (1.0)	165.1 (6.5)	215.9 (8.5)	38.1 (1.5)
	5K	3" 150 lbs	4	19.1 (0.75)	152.4 (6.01)	190.5 (7.5)	23.9 (0.94)
	5L	3" 300 lbs	8	22.2 (0.87)	168.2 (6.62)	209.6 (8.25)	26.9 (1.06)
	5M	3" 600 lbs	8	22.2 (0.87)	168.2 (6.62)	209.6 (8.25)	31.8 (1.25)
	5S	3" 1500 lbs	8	38.1 (1.5)	203.2 (8.0)	266.7 (10.5)	47.8 (1.88)
	5N	4" 150 lbs	8	19.1 (0.75)	190.5 (7.5)	228.6 (9.0)	23.9 (0.94)
	5P	4" 300 lbs	8	22.2 (0.87)	200.2 (7.88)	254.0 (10.0)	30.2 (1.19)
	5Q	4" 600 lbs	8	25.4 (1.0)	215.9 (8.5)	273.1 (10.75)	38.1 (1.5)
	5T	4" 1500 lbs	8	35.1 (1.38)	241.3 (9.5)	311.2 (12.25)	53.8 (2.12)
EN 1092-1 type B1, raised face	6A	DN25 PN16	4	14.0 (0.55)	85.0 (3.35)	115.0 (4.53)	18.0 (0.71)
	6B	DN25 PN40	4	14.0 (0.55)	85.0 (3.35)	115.0 (4.53)	18.0 (0.71)
	6C	DN40 PN16	4	18.0 (0.71)	110.0 (4.33)	150.0 (5.91)	18.0 (0.71)
	6D	DN40 PN40	4	18.0 (0.71)	110.0 (4.33)	150.0 (5.91)	18.0 (0.71)
	6Q	DN40 PN100	4	22.0 (0.87)	125.0 (4.92)	170.0 (6.69)	26.0 (1.02)
	6E	DN50 PN16	4	18.0 (0.71)	125.0 (4.92)	165.0 (6.5)	18.0 (0.71)
	6F	DN50 PN40	4	18.0 (0.71)	125.0 (4.92)	165.0 (6.5)	20.0 (0.79)
	6R	DN50 PN100	4	26.0 (1.02)	145.0 (5.71)	195.0 (7.68)	28.0 (1.10)
	6T	DN65 PN160	8	26.0 (1.02)	170.0 (6.69)	220.0 (8.66)	34.0 (1.34)
	6G	DN80 PN16	8	18.0 (0.71)	160.0 (6.3)	200.0 (7.87)	20.0 (0.79)
	6H	DN80 PN40	8	18.0 (0.71)	160.0 (6.3)	200.0 (7.87)	24.0 (0.94)
	6U	DN80 PN100	8	26.0 (1.02)	180.0 (7.09)	230.0 (9.06)	32.0 (1.26)
	6J	DN100 PN16	8	18.0 (0.71)	180.0 (7.09)	220.0 (8.66)	20.0 (0.79)
	6K	DN100 PN40	8	22.0 (0.87)	190.0 (7.48)	235.0 (9.25)	24.0 (0.94)
	6L	DN150 PN16	8	22.0 (0.87)	240.0 (9.45)	285.0 (11.2)	22.0 (0.87)
	6M	DN150 PN40	8	26.0 (1.02)	250.0 (9.84)	300.0 (11.8)	28.0 (1.10)
	6N	DN200 PN10	8	22.0 (0.87)	295.0 (11.6)	340.0 (13.4)	24.0 (0.94)
	6V	DN200 PN16	12	22.0 (0.87)	295.0 (11.6)	340.0 (13.4)	24.0 (0.94)
	6P	DN200 PN40	12	30.0 (1.18)	320.0 (12.6)	375.0 (14.8)	36.0 (1.42)



Raised face



Type	Facing thickness
DN25 - DN200 ASME 150 lbs ASME 300 lbs	2 mm (0.08")
ASME 600 lbs ASME 1500 lbs	7 mm (0.28")

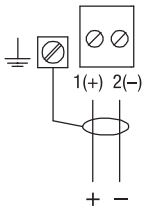
Detailed Ex-markings

pos.2	Certificate		Protection method
Q	ATEX/ UKEX II 1G ATEX/ UKEX II 1/2G	Ex ia IIC T6..T1 Ga Ex ia IIC T6..T1 Ga/Gb	Intrinsically Safe
Y	ATEX/ UKEX II 1G ATEX/ UKEX II 1/2G	Ex ia IIC T6..T1 Ga Ex ia IIC T6..T1 Ga/Gb	Intrinsically Safe
	ATEX/ UKEX II 1D ATEX/ UKEX II 1/2D	Ex ta IIIC T! Da Ex ta/tb IIIC T! Da/Db	Dust Ignition Proof
V	ATEX/ UKEX II 1/2G ATEX/ UKEX II 2G	Ex db IIC T6...T1 Ga/Gb Ex db IIC T6...T1 Gb	Flameproof
W	ATEX/ UKEX II 1D ATEX/ UKEX II 1/2D	Ex ta IIIC T! Da Ex ta/tb IIIC T! Da/Db	Dust Ignition Proof
B	IEC Ex	Ex ia IIC T6..T1 Ga Ex ia IIC T6..T1 Ga/Gb	Intrinsically Safe
D	IEC Ex	Ex ia IIC T6..T1 Ga Ex ia IIC T6..T1 Ga/Gb	Intrinsically Safe
		Ex ta IIIC T! Da Ex ta/tb IIIC T! Da/Db	Dust Ignition Proof
C	IEC Ex	Ex db IIC T6...T1 Ga/Gb Ex db IIC T6...T1 Gb	Flameproof
A	IEC Ex	Ex ta IIIC T! Da Ex ta/tb IIIC T! Da/Db	Dust Ignition Proof
F	INMETRO	Ex ia IIC T6…T1 Ga Ex ia IIC T6…T1 Ga/Gb	Intrinsically Safe
G	INMETRO	Ex ia IIC T6…T1 Ga Ex ia IIC T6…T1 Gb/Gb	Intrinsically Safe
		Ex ta IIIC T! Da Ex ta/tb IIIC T! Da/Db	Dust Ignition Proof
K	INMETRO	Ex db IIC T6…T1 Ga/Gb Ex db IIC T6…T1 Gb	Flameproof
L	INMETRO	Ex ta IIIC T! Da Ex ta/tb IIIC T! Da/Db	Dust Ignition Proof
H	FM	NI Class I,II,III Div.2, Gr. A,B,C,D,F,G	Non incendive
P	FM	IS Class I, II, III Div.1, Gr. A-G	Intrinsically Safe
U	FM	XP Class I Div.1, Gr. A-D	Explosionproof
N	FM	DIP Class II,III Div.1, Gr. E,F,G	Dust Ignition Proof
X	TR-CU	0Ex ia IIC T6…T1 Ga X Ga/Gb Ex ia IIC T6…T1 X	Intrinsically Safe
J	TR-CU	0Ex ia IIC T6…T1 Ga X Ga/Gb Ex ia IIC T6…T1 X	Intrinsically Safe
		Ex ta IIIC T... Da X Ex ta/tb IIIC T... Da/Db X	Dust Ignition Proof
R	TR-CU	Ga/Gb Ex db IIC T6…T1 X 1Ex db IIC T6…T1 Gb X	Flameproof
1	TR-CU	Ex ta IIIC T... Da X Ex ta/tb IIIC T... Da/Db X	Dust Ignition Proof

Electrical Installation

4-20 mA

The terminals are located below the Display and Adjustment Module. To connect the unit, remove the display by gently turning the display counter-clockwise until it is free.



4-20 mA (Schleife)

Wire cross-section (spring-loaded terminals) :
Massive wire, stranded wire 0,2 … 2,5 mm² (AWG 24 … 14)
Stranded wire with end sleeve 0,2 … 1,5 mm² (AWG 24 … 16)
Connect cable shield to ground terminal.

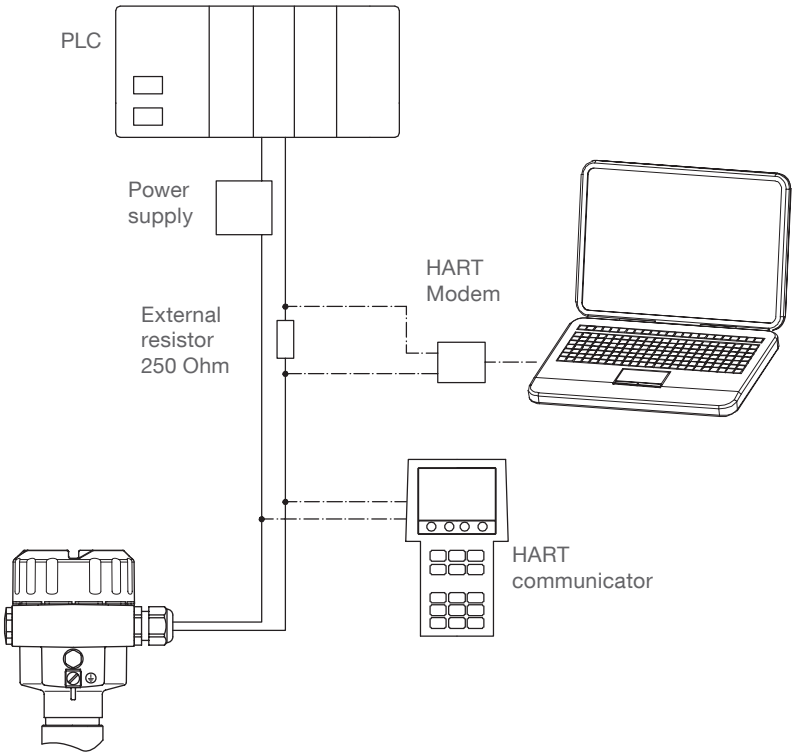
Operating voltage (voltage present at terminals):

Version	Display and Adjustment Module (illuminated)	Operating voltage 4 - 20 mA, HART	Operating voltage 4-wire Modbus
Non-Ex, Ex d	without	9,6 … 35 V DC	8 ... 30 V DC
	with	16 … 35 V DC	16 … 35 V DC
Ex ia	without	9,6 … 30 V DC	8 ... 30 V DC
	with	16 … 30 V DC	16 … 30 V DC

4-20 mA HART

Typical PLC/ mA configuration with HART:

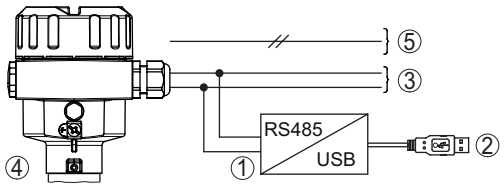
- Depending on the system design, the power supply may be separate from the PLC, or integral to it.
- HART resistance (total loop resistance, that is, cable resistance plus 250 Ohm (external resistor) must be limited to a certain value, to ensure a proper function.
  Max. loop resistance = (supply voltage - min. voltage present at terminals) / 22mA
  Example: CE/ UKCA-unit with 24 V DC supply: Max. loop resistance = (24 V - 9,6 V) / 22 mA = 655 Ω
- The external resistor is not required, if the PLC has an integral 250 Ohm resistor.



Electrical Installation

Modbus and interface adapter RS 485/USB

Connection of the PC to the RS 485 cable is carried out via a standard interface adapter RS 485/USB.
For parameter adjustement, it is absolutely necessary to disconnect from the RTU.



1 Interface adapter RS 485/USB
2 USB cable to the PC
3 RS 485 cable
4 Sensor
5 Voltage supply