

# Guided Wave Radar Level Transmitter



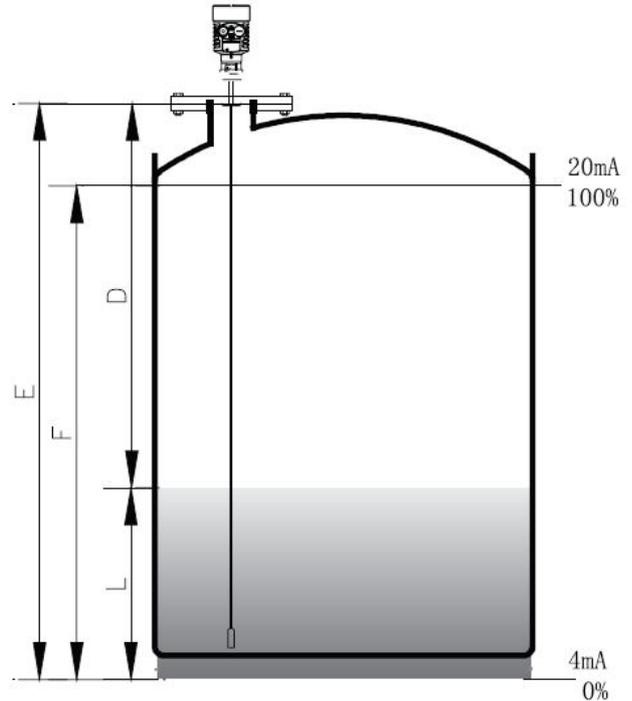
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# 1. Product description

## 1.1. Working principle

Guided wave radar transmitter works on the principle of time and travel (TDR). Radar wave travels at the velocity of light. The flying time is converted into level signal via the electronic units. The probe emits high frequency wave pulses which travel along a cable probe or a rod probe. When the wave pulses reach surface



of a medium, it will be reflected back and received by the receiver, and then the distance signal will be converted into level signals.

### ■ Input

The reflected wave pulses travel back along the cable and arrive at the electronic units. The microprocessor will process the signals and recognize the returned waves from medium surface. The identification of correct return wave signals can be done by the intelligent software. The distance  $D$  from the medium surface is proportional to the travel time:

$$D=C \times T/2 \text{ (C is velocity of light)}$$

Due to the empty tank height  $E$  is known, and then the level  $L$  is:

$$L=E-D, \text{ (Please kindly refer to the picture above)}$$

## ■ Output

By setting of empty tank height E as zero point, the height of full tank F as full scale point, and other applicable parameters, the instrument will adapt into the working environment automatically and output 4-20mA correspondingly.

### 1.2. Measuring range

F - Measuring range

E - Distance of empty tank

B - Dead zone on the top

K - Min. distance between probe and tank inner wall

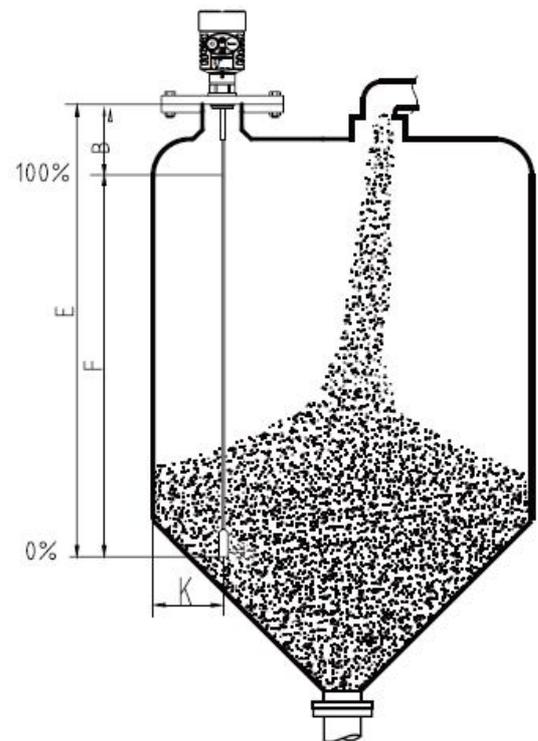
Dead zone at top refers to the min. distance between the highest medium position and the measuring reference position (point).

Dead zone at bottom refers to the distance which cannot be measured accurately nearby the end of the cable.

The distance between the dead zone at the top and the dead zone at the bottom is the effective measuring distance.

Note:

Level measurement in a tank can be effectively performed only when the medium level within the top dead zone and the bottom dead zone.



## 2. Introduction

### TLR31

- Features: Cable probe, two optional sensor types: for liquids or solids.
- Application: liquids or solid powders.
- Measuring range: 30m
- Process connection: thread, flange
- Process temperature: -40°C - +250°C
- Process pressure: -0.1 - +2MPa
- Accuracy:  $\pm 3\text{mm}$
- Repeatability:  $\pm 2\text{mm}$
- Frequency range: 100MHz ~ 1.8GHz
- Explosion proof: Ex ia IIC T6 Ga
- Enclosure protection grade: IP67
- Signal output: 4-20mA/ HART  
(2-wire/ 4-wire)



TLR31

### TLR32

- Features: Single rod probe
- Application: liquids
- Measuring range: 6m
- Process connection: flange, thread
- Medium temperature: -40°C - +250°C



TLR32

- Process pressure: -0.1 - +2MPa
- Accuracy:  $\pm 3\text{mm}$
- Repeatability:  $\pm 2\text{mm}$
- Frequency range: 100MHZ~1.8GHz
- Explosion proof: Ex ia IIC T6 Ga
- Enclosure protection grade: IP67
- Signal output: 4-20mA/ HART (2-wire/ 4-wire)

### TLR33

- Features: Twin-cable probes
- Application: solid powders and low dielectric constant liquids.
- Measuring range: 30m
- Process connection: thread, flange
- Medium temperature:  $-40^{\circ}\text{C}$  -  $+250^{\circ}\text{C}$
- Process pressure: -0.1 - +2MPa
- Accuracy:  $\pm 3\text{mm}$
- Repeatability:  $\pm 2\text{mm}$
- Frequency range: 100MHZ~1.8GHz
- Explosion proof: Ex ia IIC T6 Ga
- Enclosure protection grade: IP67
- Signal output: 4-20mA/ HART (2-wire/ 4-wire)



## TLR 34

- Features: Ceramic sensor for high temperature and high pressure. Single rod probe and coaxial probe are available for option
- Application: liquids
- Measuring range: 6m
- Process connection: thread, flange
- Medium temperature: -200°C - +400°C
- Process pressure: -0.1 - 40MPa
- Accuracy:  $\pm 3\text{mm}$
- Repeatability:  $\pm 2\text{mm}$
- Frequency range: 100MHZ~1.8GHZ
- Explosion proof: Ex ia IIC T6 Ga
- Protection grade: IP67
- Signal output: 4-20mA/ HART (2-wire/ 4-wire)



TLR 34

## TLR 35

- Features: PTFE Single rod probe
- Application: corrosive liquids
- Measuring range: 6m
- Process connection: flange
- Medium temperature: -40°C - +120°C
- Process pressure: -0.1 - 2.0MPa



TLR 35

- Accuracy:  $\pm 3\text{mm}$
- Repeatability:  $\pm 2\text{mm}$
- Frequency range: 100MHz - 1.8GHz
- Explosion proof: Ex ia IIC T6 Ga
- Protection grade: IP67
- Signal output: 4-20mA/ HART (2-wire/ 4-wire)

### TLR 36

- Features: Coaxial probe
- Application: liquids with lower dielectric constant or liquids with wavy surface, best choice for measurement of storage tank with complicated inner structure
- Measuring range: 6m
- Process connection: thread, flange
- Medium temperature:  $- 40^{\circ}\text{C} - +250^{\circ}\text{C}$
- Process pressure:  $- 0.1 - 2.0\text{MPa}$
- Accuracy:  $\pm 3\text{mm}$
- Repeatability:  $\pm 2\text{mm}$
- Frequency range: 100MHz - 1.8GHz
- Explosion proof: Ex ia IIC T6 Ga
- Protection grade: IP67
- Signal output: 4-20mA/ HART (2-wire/ 4-wire)



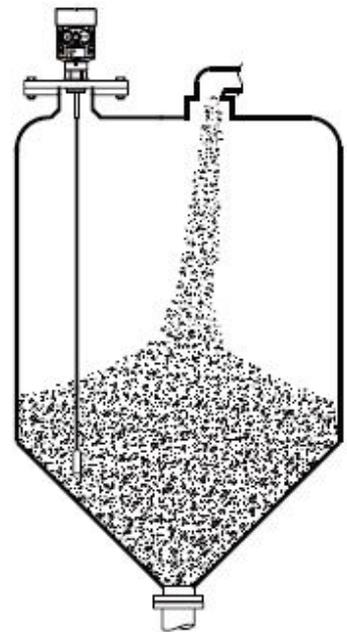
TLR 36

### 3. Installation guide

The following installation guide is suitable to the level measurement for both liquids and solids with cable probe or rod probe. Coaxial tube probe is only suitable to liquids.

#### 3.1. Mounting position

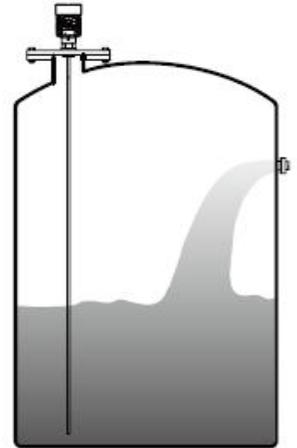
- Keep the probe away from the medium inlet and outlet as far as possible.
- For metal tanks and plastic tanks, it is not allowed for probe to touch the inner wall along its whole length.
- For cable probe or rod probe, the probe must be kept away from inner wall at least 300mm.
- The distance from probe bottom end to the bottom of a tank (flat bottom tanks) is approx. 50mm.
- Probe should keep away from any obstacle inside a tank at least 300mm.
- When bottom of a tank is tapered, the transmitter can be mounted in the middle of tank top. So it can measure the level of medium to the bottom of the tank.



3.2. This drawing on the right is for the installation of a guided wave radar transmitter with a rod probe, mainly for liquid level measurement.

The features are as follows:

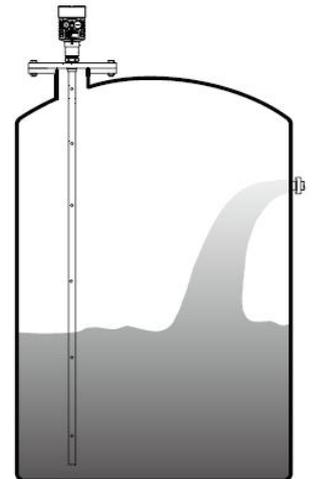
- It can measure any liquid which dielectric constant is  $\geq 1.9$ .
- Generally it can measure a liquid which viscosity is  $\leq 500\text{cst}$  and is not adhesive.
- The maximum measuring range of rod probe guided wave radar can be up to 6 m.
- Measurement will not be affected when there is steam and foam in a tank since the instrument has strong immunity.



3.3. This drawing on the right is for the installation of a guided wave radar transmitter with a coaxial probe, mainly for liquid level measurement.

The features are as follows:

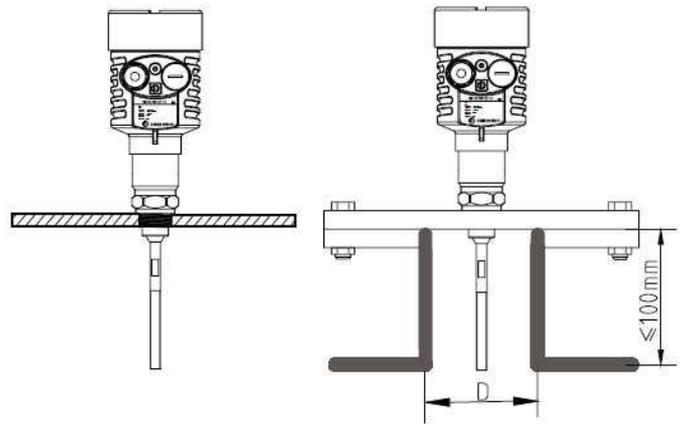
- Coaxial tube radar can be used for liquids with low dielectric constant to ensure the exact measurement.
- It can measure any liquid which dielectric constant is  $\geq 1.6$ .
- Generally it can measure a liquid which viscosity is  $\leq 500\text{cst}$  and not adhesive.
- The maximum measuring range of coaxial probe radar can be up to 6m.
- Measurement will not be affected when there is steam and foam in a tank since the instrument has strong immunity.



3.4. Installation methods

- Properly installation of the transmitter can make correct and reliable measurement.

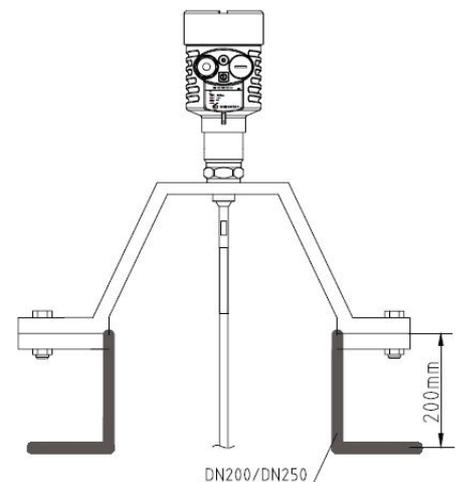
The transmitter can be mounted with thread, and the installation height should be higher than



100mm. It can also be mounted on a short pipe with the diameter of 2" - 6" . The installation height of the short pipe should be  $\leq 100\text{mm}$ . When the instrument has to be mounted on a longer short pipe, the cable probe should be fixed at the bottom end of it, or use the centering frame to fix the probe so as to avoid it from contacting the short pipe end.

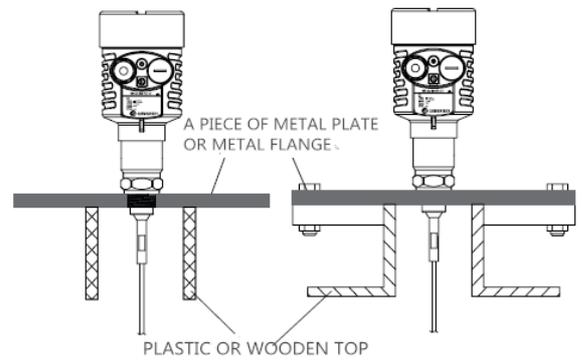
- Mounting on a short pipe DN200 or DN250

When the transmitter has to be mounted in a short pipe which diameter is  $>200\text{mm}$ , there will be echoes created inside the short pipe wall, this will cause the error especially when the medium has low dielectric constant. Therefore, a special flange with "horn" is required for the short pipe which diameter is 200mm or 250mm.

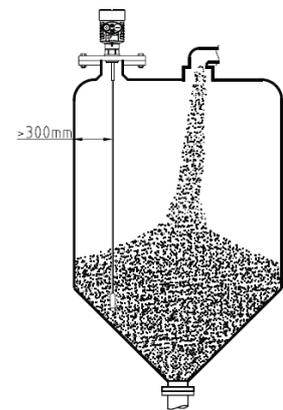


- Installation on a plastic tank

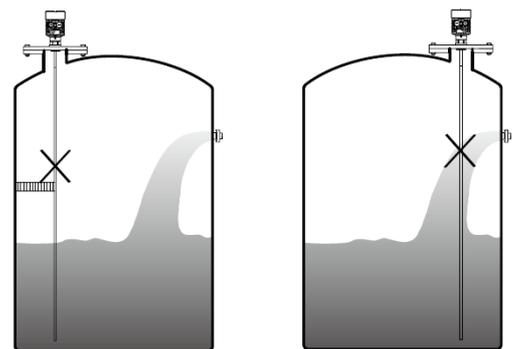
Note: whichever cable probe or rod probe, the connection surface must be metal if you want to keep the transmitter normal work. When a transmitter is mounted on a plastic tank, metal flange is required for the transmitter if the tank top is also plastic material or other



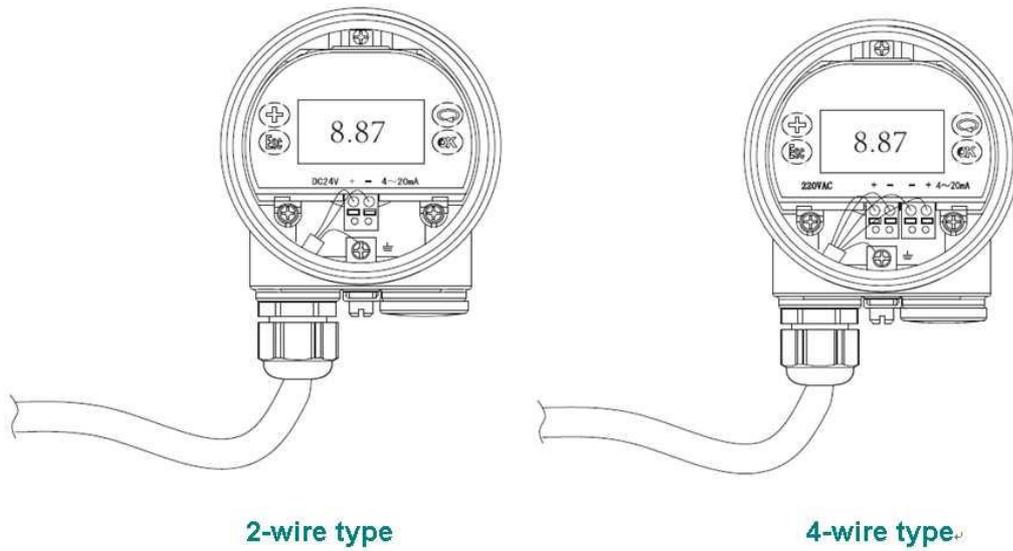
- Distance between probe and tank wall It is suggested the min. distance between a transmitter probe and the inner wall side a tank is atleast more than 300mm, for a concrete tank, at least 500mm, the distance between probe bottom and tank bottom is larger than 50mm.



- Keep anything inside a tank away from the microwave sensing components, i.e. the probe (see the picture on the right). Radar is not allowed to be mounted above the medium inlet (see the picture on



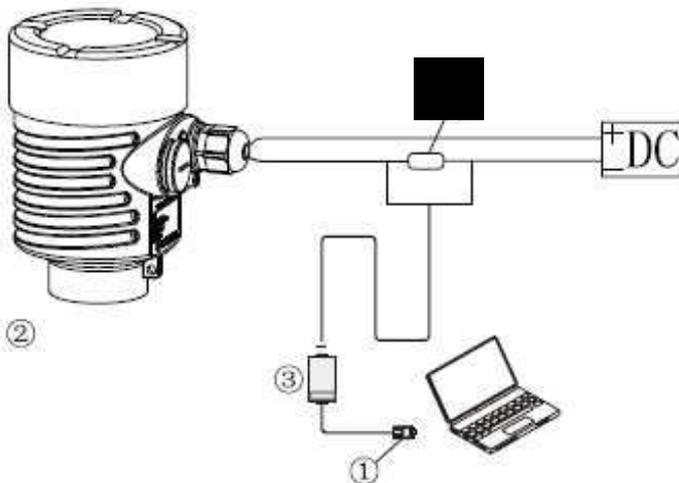
#### 4. Wiring (see the picture below)



## 5. Calibration

### 5.1. Calibration with a PC and software

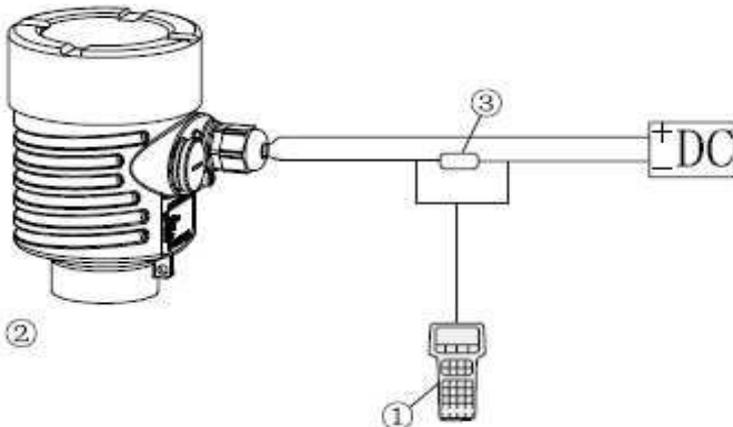
All radar transmitters can be debugged by software via a PC no matter what kind of output signals it is, 4 – 20mA/ HART. A transmitter drive “CONNECTCAT” is required when using the software for the debugging.



Radar transmitter requires 24V DC when debugging via software, at the same time to be connected with a 250ohm resistance in the front of the HART adapter. If it is an integrated HART resistance (the integrated

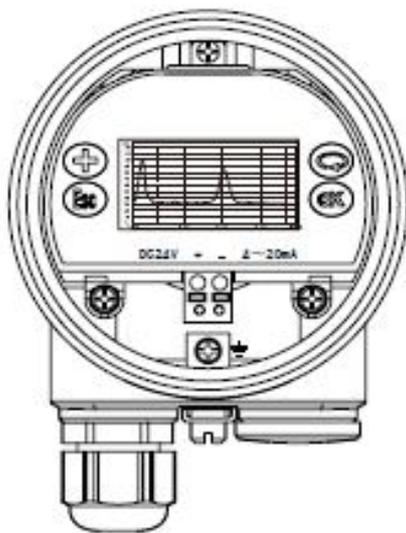
resistance is 250ohm), then the additional outside resistance is not required, HART adapter can be connected in parallel to 4~20mA wire.

### 5.2. Calibration with a HART hand-hold communicator



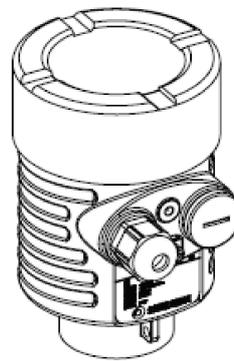
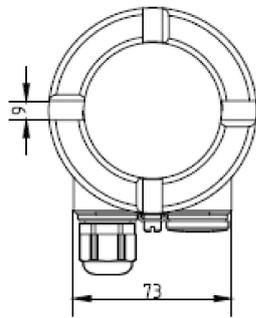
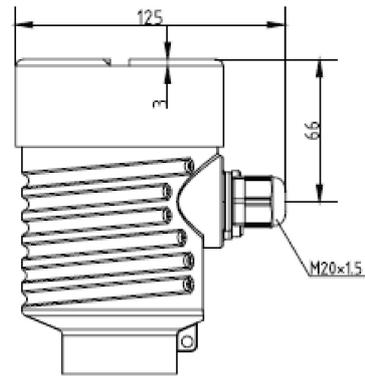
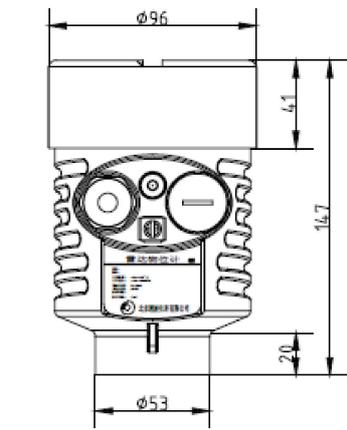
### 5.3. Calibration with a programmer module

The programmer module is composed of 4 buttons and 1 LCD display, which can display the setting menu and parameters setting.

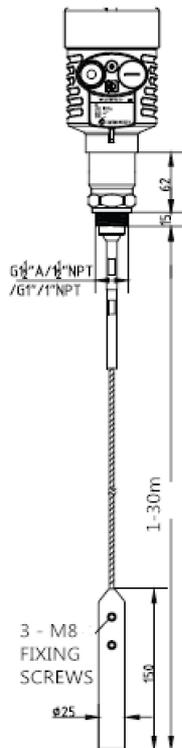


## 6. Dimensions

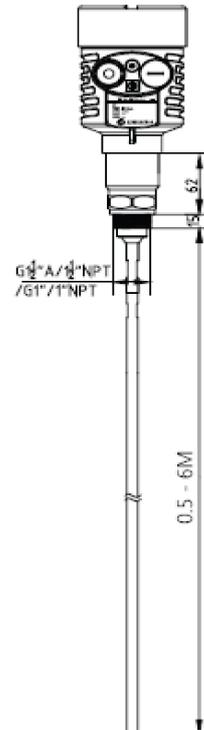
Housing Material: AL



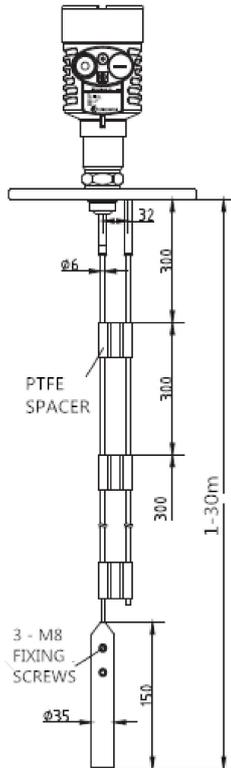
TLR 31



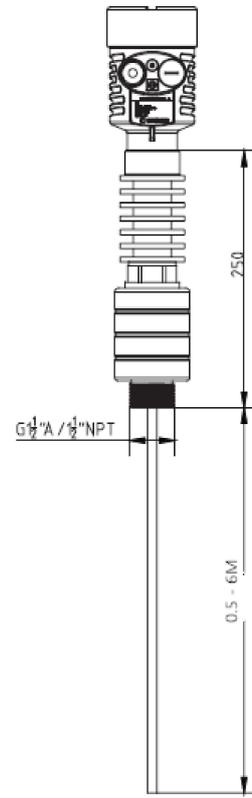
TLR 32



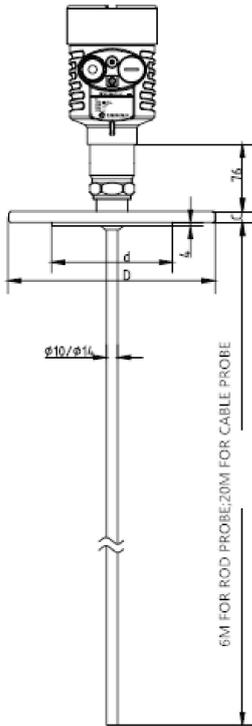
TLR 33



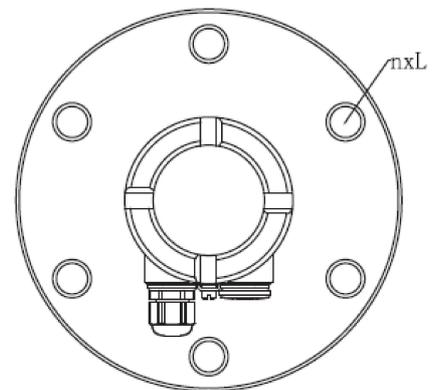
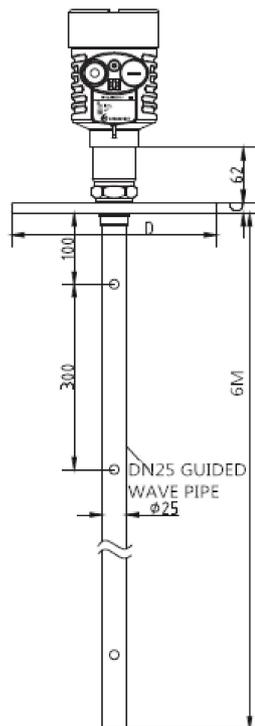
TLR 34



TLR 35



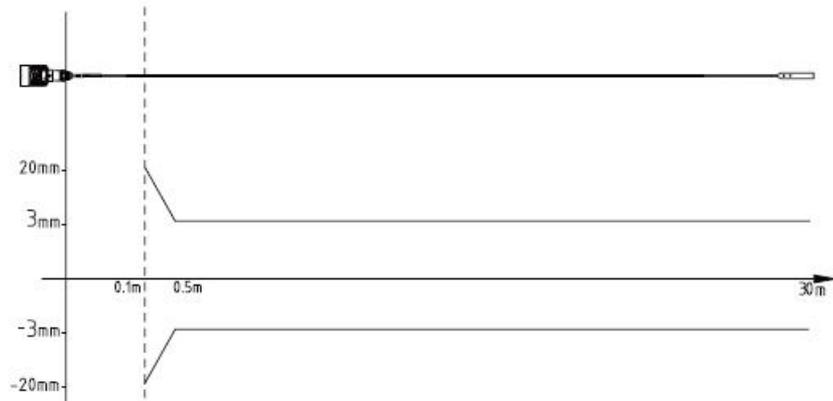
TLR 36



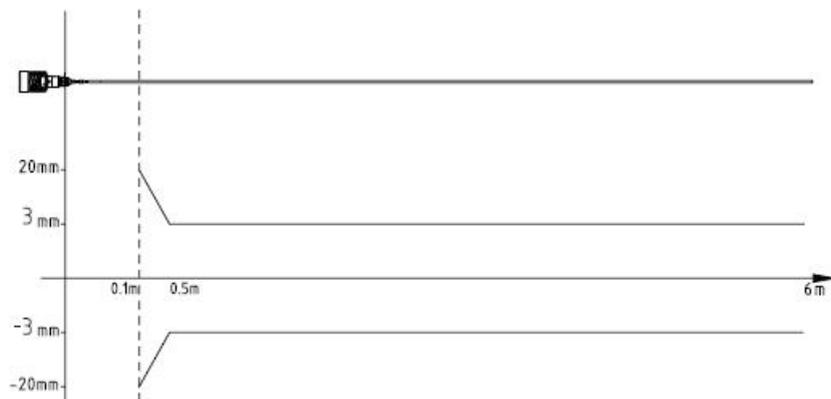
Flange Size Table (GB/ T9119-2000)					Unit: mm
No.	Size	OD	Hole Centers Distance K	Hole quantity n	Hole Diameter L
1	DN50	Ø165	Ø125	4	18
2	DN80	Ø200	Ø160	8	18
3	DN100	Ø220	Ø180	8	18
4	DN150	Ø285	Ø240	8	22
5	DN200	Ø340	Ø295	12	22
6	DN250	Ø405	Ø355	12	26

## 7. Linearity

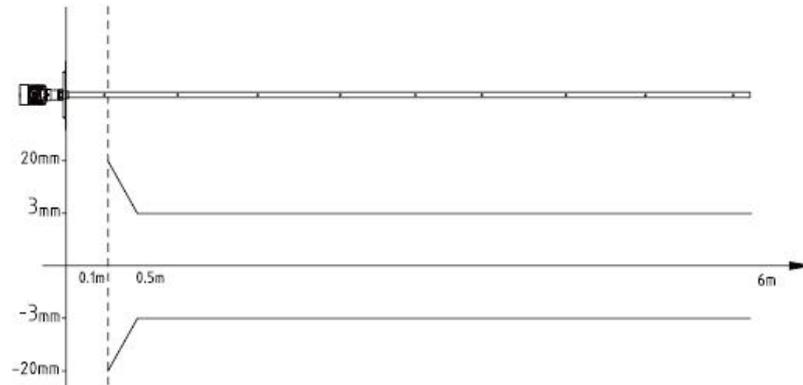
### Cable probe



### Rod probe



## Coaxial tube probe



## 8. Technical data

### General parameters

Working frequency: 100MHz - 1.8GHz

Measuring range: 0 - 30m for cable probe;

0 - 6m for rod probe or coaxial probe;

Repeatability:  $\pm 2\text{mm}$

Resolution: 1mm

Sample: echo sampling 55 times /s

Responding time:  $>0.2\text{s}$  (depends on the application)

Current signal output: 4 - 20mA

Accuracy:  $\pm 3\text{mm}$

Communication: HART protocol

Process connection: Thread, G1" A or G1 1/2" A.

Flange, DN50, DN80, DN100, DN150, DN200, DN250

Process pressure: -0.1- 2MPa

Power supply: 24V DC (+/-10%), ripple voltage: 1Vpp

Power consumption: Max.22.5mA

Ambient temperature: -40°C- +70°C

Explosion proof approval: Ex ia IIC T6 Ga

Enclosure protection grade: IP67

2-wire connection: input and signal output share one 2-wire shielded cable.

Cable entry: M20\*1.5 or 1/2"NPT\* for two (cable diameter is 5 - 9mm)

Measuring range: The following table shows the relationship between different mediums and the possible measuring range.

Medium group	DK(	Solid particles	Liquid	Measuring range
1	1.4~1.6		- concentrate, e.g. N2CO2	3m (only for coaxial probe)
2	1.6~1.9	- White lime - Specials Cement - Sugar	- Liquefied gas, e.g. Propane - Solvent - Freon - Palm oil	20m
3	1.9~2.5	- Normal cement - Plaster	- Mineral oil, fuel	20m
4	2.5~4	- Grain, seeds - Stone - Sand	- Benzene, styrene, Toluene - Furan - Naphthalene	25m
5	4~7	- Moist stone, mineral - Salt	- Chlorobenzene, Chloroform - Cellulose spray - Isocyan hydrochloric Acid - Aniline	30m
6	>7	- Metal powder - Carbon black - Coal	- Liquid with water - Alcohol - Liquid ammonia	30m

## 9. Model selection table

TLR 31

Code	Approvals		
P	Standard type (Non-explosion)		
I	Intrinsically safe type (Ex ia IIC T6 Ga)		
D	Explosion isolation type (Ex d IIC T6 Gb)		
E	Classification certificate (CCS)		
Code	Cable probe diameter/ Material		
A	Liquid 4mm/ SS304		
B	Liquid 4mm/ SS316L		
C	Solid 6mm/ SS304		
D	Solid 6mm/ SS316L		
Code	Sensor type/ Material		
	Material	SS304	SS316L
Flange size	Code		
Thread G1½	A Liquid	GA	GB
Thread 1½ NPT	Liquid	NA	NB
Thread G1½	A Solid	GC	GD
Thread 1½ NPT	Solid	NC	ND
Thread G¾	A Liquid	G3	G4
Thread ¾ NPT	Liquid	N3	N4
Y	Special design		
Code	Flange matching/ Material		
	Material	SS304	SS316L
Flange size	Code	Face Flange	Face Flange
DN40 PN16 flange		AA	AB
DN50 PN16 flange		BA	BB
DN65 PN16 flange		CA	CB
DN80 PN16 flange		DA	DB
DN100 PN16 flange		EA	EB
DN125 PN16 flange		FA	FB
DN150 PN16 flange		GA	GB

DN200 PN16 flange	HA	HB
DN250 PN16 flange	JA	JB
ANSI 1.5" 150lb flange	AAM	ABM
ANSI 2" 150lb flange	BAM	BBM
ANSI 2.5" 150lb flange	CAM	CBM
ANSI 3" 150lb flange	DAM	DBM
ANSI 4" 150lb flange	EAM	EBM
ANSI 5" 150lb flange	FAM	FBM
ANSI 6" 150lb flange	GAM	GBM
ANSI 8" 150lb flange	HAM	HBM
ANSI 10" 150lb flange	JAM	JBM
X None Y Special design		
Code	High temperature adaptor/ Process temperature	
P	Without/ (-40 ~ +130)	
G	With/ (-40 ~ +250)	
Code	Electronic unit	
2	(4~20)mA/ 24V DC 2-wire	
3	(4~20)mA/ 24V DC 4-wire	
4	(4~20)mA/ 220V AC 4-wire	
5	(4~20)mA/ 24V DC/ HART/ 2-wire	
6	(4~20)mA/ 24V DC/ HART/ 4-wire	
7	(4~20)mA/ 220V AC/ HART/ 4-wire	
Y	Special design	
Code	Housing/ Enclosure protection grade	
L	Aluminum/ IP 67	
G	Stainless steel 304/ IP 67	
Code	Cable entry	
M	M20x1.5	
N	½ NPT	
Code	Display/ Programmer	
V	With	
X	Without	

Note: Connection flange standard refers to GB/ T9119-2000 PN1.6MPa/ 12mm in thickness.

TLR 32

Code	Approvals			
P	Standard type (Non-explosion)			
I	Intrinsically safe type (Ex ia IIC T6 Ga)			
D	Explosion isolation type (Ex d IIC T6 Gb)			
Code	Cable probe/ Material			
A	6mm/ SS304			
B	6mm/ SS316L			
C	10mm/ SS304			
D	10mm/ SS316L			
Code	Sensor type/ Material			
Material Flange size Code		SS304	SS316L	
Thread G1½	A Liquid	GA	GB	
Thread 1½	NPT Liquid	NA	NB	
Thread G¾	A Liquid	G3	G4	
Thread ¾	NPT Liquid	N3	N4	
Y	Special design			
Code	Flange matching/ Material			
Material Flange size Code		SS304	SS316L	
		Face Flange	Face Flange	
DN40 PN16 flange		AA	AB	
DN50 PN16 flange		BA	BB	
DN65 PN16 flange		CA	CB	
DN80 PN16 flange		DA	DB	
DN100 PN16 flange		EA	EB	
DN125 PN16 flange		FA	FB	
DN150 PN16 flange		GA	GB	
DN200 PN16 flange		HA	HB	
DN250 PN16 flange		JA	JB	

ANSI 1.5" 150lb flange	AAM	ABM
ANSI 2" 150lb flange	BAM	BBM
ANSI 2.5" 150lb flange	CAM	CBM
ANSI 3" 150lb flange	DAM	DBM
ANSI 4" 150lb flange	EAM	EBM
ANSI 5" 150lb flange	FAM	FBM
ANSI 6" 150lb flange	GAM	GBM
ANSI 8" 150lb flange	HAM	HBM
ANSI 10" 150lb flange	JAM	JBM
X	None	
Y	Special design	
Code	High temperature adaptor/ Process temperature	
P	Without/ (-40 ~ +130)	
G	With/ (-40 ~ +250)	
Code	Electronic unit	
2	(4~20)mA/ 24V DC 2-wire	
3	(4~20)mA/ 24V DC 4-wire	
4	(4~20)mA/ 220V AC 4-wire	
5	(4~20)mA/ 24V DC/ HART/ 2-wire	
6	(4~20)mA/ 24V DC/ HART/ 4-wire	
7	(4~20)mA/ 220V AC/ HART/ 4-wire	
Y	Special design	
Code	Housing/ Enclosure protection grade	
L	Aluminum/ IP 67	
G	Stainless steel 304/ IP 67	
Code	Cable entry	
M	M20x1.5	
N	½ NPT	
Code	Display/ Programmer	
V	With	
X	Without	

Note: Connection flange standard refers to GB/ T9119-2000 PN1.6MPa/ 12mm in thickness.

TLR 33

Code	Approvals			
P	Standard type (Non-explosion)			
I	Intrinsically safe type (Ex ia IIC T6 Ga)			
D	Explosion isolation type (Ex d IIC T6 Gb)			
E	Classification certificate (CCS)			
Code	Cable probe diameter/ Material			
CC	Twin cable 6mm/ SS304			
DC	Twin cable 6mm/ SS316L			
Code	Flange matching/ Material			
	Material	SS304	SS316L	
Flange size	Code	Face Flange	Face Flange	
DN80 PN16 flange		DA	DB	
DN100 PN16 flange		EA	EB	
DN125 PN16 flange		FA	FB	
DN150 PN16 flange		GA	GB	
DN200 PN16 flange		HA	HB	
DN250 PN16 flange		JA	JB	
ANSI 3" 150lb flange		DAM	DBM	
ANSI 4" 150lb flange		EAM	EBM	
ANSI 5" 150lb flange		FAM	FBM	
ANSI 6" 150lb flange		GAM	GBM	
ANSI 8" 150lb flange		HAM	HBM	
ANSI 10" 150lb flange		JAM	JBM	

Y	Special design
Code	High temperature adaptor/ Process temperature
P	Without/ (-40 ~ +130)
G	With/ (-40 ~ +250)
Code	Electronic unit
2	(4~20)mA/ 24V DC 2-wire
3	(4~20)mA/ 24V DC 4-wire
4	(4~20)mA/ 220V AC 4-wire
5	(4~20)mA/ 24V DC/ HART/ 2-wire
6	(4~20)mA/ 24V DC/ HART/ 4-wire
7	(4~20)mA/ 220V AC/ HART/ 4-wire
Y	Special design
Code	Housing/ Enclosure protection grade
L	Aluminum/ IP 67
G	Stainless steel 304/ IP 67
Code	Cable entry
M	M20x1.5
N	½ NPT
Code	Display/ Programmer
V	With
X	Without

Note: Connection flange standard refers to GB/ T9119-2000 PN1.6MPa/ 12mm in thickness.

TLR 34

Code	Approvals			
P	Standard type (Non-explosion)			
I	Intrinsically safe type (Ex ia IIC T6 Ga)			
D	Explosion isolation type (Ex d IIC T6 Gb)			
Code	Cable probe/ Material			
A	6mm/ SS304			
B	6mm / SS316L			
C	10mm/ SS304			
D	10mm / SS316L			
Code	Sensor type/ Material			
Material Flange size Code		SS304	SS316L	
		Thread G1½ A Liquid	GA	GB
Thread 1½ NPT Liquid		NA	NB	
Y	Special design			
Code	Flange matching/material			
Material Flange size Code		SS304	SS316L	
		Face Flange	Face Flange	
DN40 PN16 flange		AA	AB	
DN50 PN16 flange		BA	BB	
DN65 PN16 flange		CA	CB	
DN80 PN16 flange		DA	DB	
DN100 PN16 flange		EA	EB	
DN125 PN16 flange		FA	FB	
DN150 PN16 flange		GA	GB	
DN200 PN16 flange		HA	HB	
DN250 PN16 flange		JA	JB	

ANSI 1.5" 150lb flange	AAM	ABM
ANSI 2" 150lb flange	BAM	BBM
ANSI 2.5" 150lb flange	CAM	CBM
ANSI 3" 150lb flange	DAM	DBM
ANSI 4" 150lb flange	EAM	EBM
ANSI 5" 150lb flange	FAM	FBM
ANSI 6" 150lb flange	GAM	GBM
ANSI 8" 150lb flange	HAM	HBM
ANSI 10" 150lb flange	JAM	JBM
X	None	
Y	Special design	
Code	High temperature adaptor/ Process temperature	
G	With/ (-200 ~ +400)	
Code	Electronic unit	
2	(4~20)mA/ 24V DC 2-wire	
3	(4~20)mA/ 24V DC 4-wire	
4	(4~20)mA/ 220V AC 4-wire	
5	(4~20)mA/ 24V DC/ HART/ 2-wire	
6	(4~20)mA/ 24V DC/ HART/ 4-wire	
7	(4~20)mA/ 220V AC/ HART/ 4-wire	
Y	Special design	
Code	Housing/ Enclosure protection grade	
L	Aluminum/ IP 67	
G	Stainless steel 304/ IP 67	
Code	Cable entry	
M	M20x1.5	
N	½ NPT	
Code	Display/ Programmer	
V	With	
X	Without	

Note: Connection flange standard refers to GB/ T9119-2000 PN1.6MPa/ 12mm in thickness.

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Code	Approvals		
P	Standard type (Non-explosion)		
I	Intrinsically safe type (Ex ia IIC T6 Ga)		
D	Explosion isolation type (Ex d IIC T6 Gb)		
E	Classification certificate (CCS)		
Code	Cable probe diameter/ Material		
A	8mm/ SS304 with PTFE sleeve		
B	8mm / SS316L with PTFE sleeve		
C	12mm/ SS304 with PTFE sleeve		
D	12mm / SS316L with PTFE sleeve		
Code	Flange matching/ Material		
	Material	SS304	SS316L
Flange size	Code	Face Flange	Face Flange
DN40 PN16 flange		AA	AB
DN50 PN16 flange		BA	BB
DN65 PN16 flange		CA	CB
DN80 PN16 flange		DA	DB
DN100 PN16 flange		EA	EB
DN125 PN16 flange		FA	FB
DN150 PN16 flange		GA	GB
DN200 PN16 flange		HA	HB
DN250 PN16 flange		JA	JB
ANSI 1.5" 150lb flange		AAM	ABM
ANSI 2" 150lb flange		BAM	BBM
ANSI 2.5" 150lb flange		CAM	CBM
ANSI 3" 150lb flange		DAM	DBM
ANSI 4" 150lb flange		EAM	EBM
ANSI 5" 150lb flange		FAM	FBM

ANSI 6" 150lb flange	GAM	GBM
ANSI 8" 150lb flange	HAM	HBM
ANSI 10" 150lb flange	JAM	JBM
X	None	
Y	Special design	
Code	High temperature adaptor/ Process temperature	
P	Without/ (-40 ~ +130)	
G	With/ (-40 ~ +250)	
Code	Electronic unit	
2	(4~20)mA/ 24V DC 2-wire	
3	(4~20)mA/ 24V DC 4-wire	
4	(4~20)mA/ 220V AC 4-wire	
5	(4~20)mA/ 24V DC/ HART/ 2-wire	
6	(4~20)mA/ 24V DC/ HART/ 4-wire	
7	(4~20)mA/ 220V AC/ HART/ 4-wire	
Y	Special design	
Code	Housing/ Enclosure protection grade	
L	Aluminum/ IP 67	
G	Stainless steel 304/ IP 67	
Code	Cable entry	
M	M20x1.5	
N	½ NPT	
Code	Display/ Programmer	
V	With	
X	Without	

Note: Connection flange standard refers to GB/ T9119-2000 PN1.6MPa/ 12mm in thickness.

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Code	Approvals		
P	Standard type (Non-explosion)		
I	Intrinsically safe type (Ex ia IIC T6 Ga)		
D	Explosion isolation type (Ex d IIC T6 Gb)		
Code	Coaxial tube probe/ Material		
A	25mm/ SS304		
B	25mm/ SS316L		
C	50mm/ SS304		
D	50mm/ SS316L		
Code	Sensor type/ Material		
Material		SS304	SS316L
Flange size	Code		
Thread G1½	A Liquid	GA	GB
Thread 1½	NPT Liquid	NA	NB
Thread G¾	A Liquid	G3	G4
Thread ¾	NPT Liquid	N3	N4
Y	Special design		
Code	Flange matching/ Material		
Material		SS304	SS316L
Flange size	Code	Face Flange	Face Flange
DN40 PN16 flange		AA	AB
DN50 PN16 flange		BA	BB
DN65 PN16 flange		CA	CB
DN80 PN16 flange		DA	DB
DN100 PN16 flange		EA	EB
DN125 PN16 flange		FA	FB
DN150 PN16 flange		GA	GB
DN200 PN16 flange		HA	HB

DN250 PN16 flange	JA	JB
ANSI 1.5" 150lb flange	AAM	ABM
ANSI 2" 150lb flange	BAM	BBM
ANSI 2.5" 150lb flange	CAM	CBM
ANSI 3" 150lb flange	DAM	DBM
ANSI 4" 150lb flange	EAM	EBM
ANSI 5" 150lb flange	FAM	FBM
ANSI 6" 150lb flange	GAM	GBM
ANSI 8" 150lb flange	HAM	HBM
ANSI 10" 150lb flange	JAM	JBM
X None		
Y Special design		
Code	High temperature adaptor/ Process temperature	
P	Without/ (-40 ~ +130)	
G	With/ (-40 ~ +250)	
Code	Electronic unit	
2	(4~20)mA/ 24V DC 2-wire	
3	(4~20)mA/ 24V DC 4-wire	
4	(4~20)mA/ 220V AC 4-wire	
5	(4~20)mA/ 24V DC/ HART/ 2-wire	
6	(4~20)mA/ 24V DC/ HART/ 4-wire	
7	(4~20)mA/ 220V AC/ HART/ 4-wire	
Y	Special design	
Code	Housing/ Enclosure protection grade	
L	Aluminum/ IP 67	
G	Stainless steel 304/ IP 67	
Code	Cable entry	
M	M20x1.5	
N	½ NPT	
Code	Display/ Programmer	
V	With	
X	Without	

Note: Connection flange standard refers to GB/ T9119-2000 PN1.6MPa/ 12mm in thickness.

## 10. Data sheet for model selection

### Customer information

Company: Contact person:

Address: Post code:

Telephone: Fax:

Mobile phone: E-mail:

Date:

### Certificate

- Standard type (non-explosion proof)
- Intrinsically safe (Ex ib IIB T5)
- Intrinsically safe (Ex ib IIC T6 Gb)
- Intrinsically safe + marine approval (Ex ib IIC T6 Gb)
- Intrinsically safe + flame proof (Ex d ib IIC T6)

### Tank/container information

Tank type:

- Storage tank
- Reaction tank
- Separation tank
- Marine tank

Tank structure:

- Tank material:
- Tank pressure:

Tank size:

Height of tank: m

Diameter of tank: m

Shape of tank top:

- Arch
- Flat top
- Open
- Conic

Shape of tank bottom:

- Tapered
- Flat
- Inclined
- Arch

Installation:

- Top mounted
- Side mounted
- Bypass pipe mounted
- Wave guide pipe mounted

Extension pipe at tank top (important information):

Pipe height: mm, Pipe diameter: mm

Measuring medium

Medium name:      ▪ Liquid      ▪ solid      ▪ mix medium

Medium temperature: °C

Dielectric constant:

Adhesion:    ▪ Yes    ▪ No

Stirring:     ▪ Yes     ▪ No

Process connection

Thread: ( ▪ G1½" ▪ 1½" NPT ▪ G2" A ▪ G1" A ▪ 1" NPT)

▪ Flange (DN=        )        ▪ Flange (ANSI=        )

Power supply:

▪ 24V DC 2-wire        ▪ 220V AC

Output: ▪ 4-20mA        ▪ HART        ▪ PROFIBUS PA

Display: ▪ With display and programmer

▪ Without display and programmer