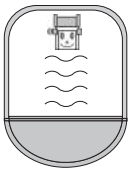
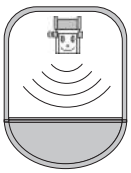
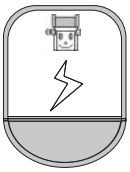
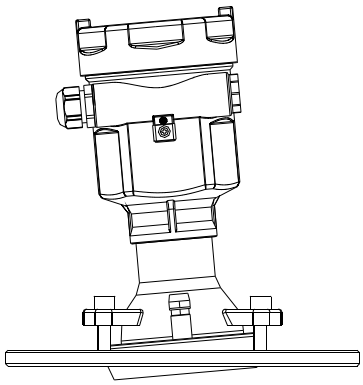
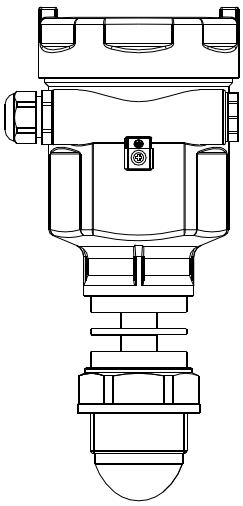
80G Radar Level Instrument





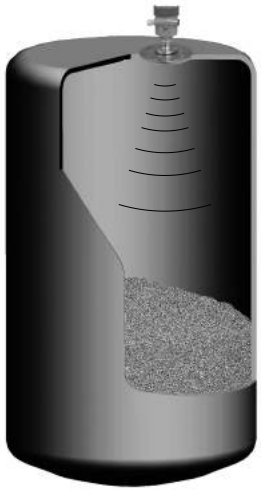






Contents

1. Principle of Measurement



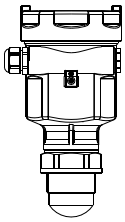
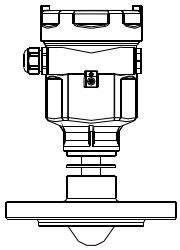
Principle

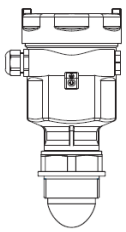
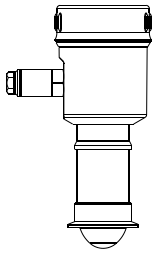
Frequency modulated continuous wave (FMCW) is adopted for radar level instrument (80G). The antenna transmits the high frequency and frequency modulated radar signal. The frequency of the radar signal linearly increases. The transmitted radar signal is reflected by dielectric to be measured and received by antenna. At the same time, the difference between the frequency of transmitted signal and that of the received signal is proportional to the measured distance. Therefore, the distance is calculated by the spectrum derived from the analog-to-digital conversion frequency difference and the fast Fourier transform (FFT).

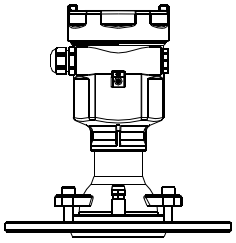
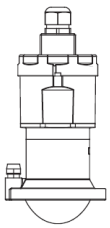
Features

1. High frequency, small beam angle, and smaller unmeasurable zone which can help to measure the tanks with small diameter and can adapt to the connecting pipe on the tank;
2. Centralized energy and stronger anti-jamming capability which have significantly improved the measurement accuracy and reliability;
3. Small antenna size which facilitates the installation.

2. Brief description of instrument

	SDRD81	SDRD82
		
Application:	Liquid	Liquid Suitable for the strong corrosive liquids Vapour /Foam
Measurement range:	0～30m/0-100M	0～30m
Measurement accuracy:	±2mm/±10mm	±2mm
Process temperature:	(-40～90)℃	(-40～150)℃ (-40～200)℃
Process pressure	(-0.1～0.1)MPa	(-0.1～2.5)MPa
Frequency:	80GHz	80GHz
Signal output:	(4～20)mA/HART RS485/MODBUS Protocol	(4～20)mA/HART RS485/MODBUS Protocol
Power supply:	2-Wire(DC24V) 4-Wire(DC10.8～26.4V)	2-Wire(DC24V) 4-Wire(DC10.8～26.4V)
Display/programming:	Optional	Optional
Housing:	B (See page 6)	A/B/D/G/H (See page 6)
Antenna material:	PP	316L+PTFE/316L+PFA (See page 6)
Installation form:	Thread/Strap/holder (See page 6)	Flange (See page 6)
Level :	IP66	IP67/IP66

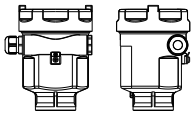
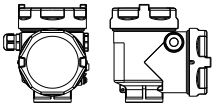
	SDRD83	SDRD85
		
Application:	Liquid Suitable for the strong corrosive or Pressure resistance liquid	Liquid Hygiene
Measurement range:	0～10m	0～30m
Measurement accuracy:	±2mm	±2mm
Process temperature:	(-40～110)℃	(-40～130)℃
Process pressure	(-0.1～0.5)MPa (Suitable for thestrong corrosive liquid) (-0.1～4.0)MPa(Pressure resistance liquid) (See page 6)	(-0.1～4.0)MPa
Frequency:	80GHz	80GHz
Signal output:	(4～20)mA/HART RS485/MODBUS Protocol	(4～20)mA/HART RS485/MODBUS Protocol
Power supply:	2-Wire(DC24V) 4-Wire(DC10.8～26.4V)	2-Wire(DC24V) 4-Wire(DC10.8～26.4V)
Display/programming:	Optional	Optional
Housing:	A/B/D/G/H (See page 6)	A/B/D/G/H/K
Antenna material:	PFA/316L+PTFE (See page 6)	PTFE (See page 6)
Installation form:	Thread (See page 6)	2" clamp/3-1/2"Clamp (See page 6)
Protection Level :	IP67/IP66	IP67/IP66

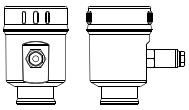
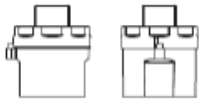
	SDRD87	SDRD88
		
Application:	Solid/liquid Storage vessel/process vessel or high dust occasion	Solid/liquid
Measurement range:	0～120m	0～120m
Measurement accuracy:	±5mm	±5mm
Process temperature:	(-40～110)℃ (-40～130)℃ (-40～195)℃ (See page 6)	(-40～80)℃
Process pressure	(-0.1～0.3)MPa	(-0.1～0.1)MPa
Frequency:	80GHz	80GHz
Signal output:	(4～20)mA/HART RS485/MODBUS Protocol	(4～20)mA/HART RS485/MODBUS Protocol
Power supply:	2-Wire(DC24V) 4-Wire(DC10.8～26.4V)	2-Wire(DC24V) 4-Wire(DC10.8～26.4V)
Display/programming:	Optional	No
Housing:	A/B/D/G/H ※1 (See page 6)	F (See page 6)
Antenna material:	Aluminum substrate plastic +PP/ 316L+PTFE/316L+PEEK/ 316L+PEEK Heat sink (See page 6)	PFA
Installation form:	Thread/Strap/holder	Flange
Protection Level :	IP67/IP66	IP68

Note

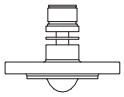
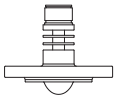
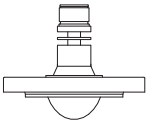
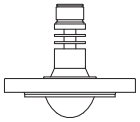
1. Intrinsically safe + dust version instrument can only use A, G .

Housing

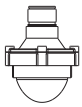
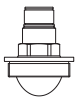
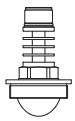
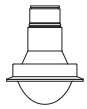
		
No.	A/ B /G	D/ H
Material	Aluminum Alloy/Plastic/Stainless Steel 316L	Aluminum ally/Stainless Steel 316L
Features	Single Lumen	2-Chamber

		
No.	K	F
Material	Stainless Steel 316L (Surface machining)	PBT
Features	Hygiene	–

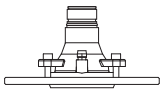
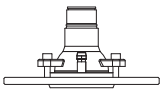
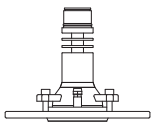
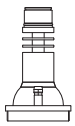
Antenna

							
No.	BG (SDRD81)	HG (SDRD81)	DS (SDRD82)	DQ (SDRD82)	ES (SDRD82)	EQ (SDRD82)	AP (SDRD83)
Material	PP	PP	316L+PTFE 316L+PFA	316L+PTFE	316L+PTFE 316L+PFA	316L+PTFE	PFA
Install	G1½A	M94X2 strap Holder	DN50 DN80 DN100	DN50 DN80 DN100	DN80 DN100 DN125 DN150	DN80 DN100 DN125 DN150	G¾A ¾NPT
Features	Liquid 90˚C	Liquid 90˚C	* Note 1 150˚C	* Note 1 200˚C	* Note 1 150˚C	* Note 1 200˚C	Anti-corrosive 130˚C

* Note 1: Anti-corrosive/High pressure

								
AM (SDRD83)	FP (SDRD83)	FM (SDRD83)	FT (SDRD83)	GP (SDRD83)	GM (SDRD83)	GT (SDRD83)	KW (SDRD85)	KQ (SDRD85)
316L+PTFE	PFA	316L+PTFE	316L+PTFE	PFA	316L+PTFE	316L+PTFE	PTFE	PTFE
G¾A ¾NPT	G1½A 1½NPT	G1½A 1½NPT	G1½A 1½NPT	G3A	G3A	G3A	2"CLAMP	3½"CLAMP
*Note 1 130˚C	Anti-Corrosive 130˚C	* Note 1 130˚C	*Note 1 200˚C	Anti-Corrosive 130˚C	*Note 1 130˚C	*Note 1 200˚C	Hygenic 130˚C	Hygenic 130˚C

* Note 1: Anti-corrosive/High pressure

							
	MW (SDRD87)	NW (SDRD87)	RW (SDRD87)	HG (SDRD87)	JG (SDRD87)	LG (SDRD87)	ST (SDRD88)
Material	Alum lined plastic+PTFE Alum lined plastic+PP	316L+PTFE 316L+PEEK 316L+PP	316L+PTFE 316L+PEEK	Alum lined plastic+PTFE Alum lined plastic +PP	316L+PTFE 316L+PEEK 316L+PP	316L+PTFE 316L+PEEK	PFA
Install	DN100 DN125 DN150	DN100 DN125 DN150	DN100 DN125 DN150	DN100 DN125 DN150 Strap	DN100 DN125 DN150	DN100 DN125 DN150	DN100 DN125 DN150 DN200 DN250
Feature	*Note 2 110˚C	*Note 2 130˚C	*Note 2 200˚C	*Note 3 110˚C	*Note 3 130˚C	*Note 3 200˚C	*Note 4 80˚C

*Note 2:Gimbal/Purge/Normal Pressure

*Note 3: Screw /Purge/Normal Pressure

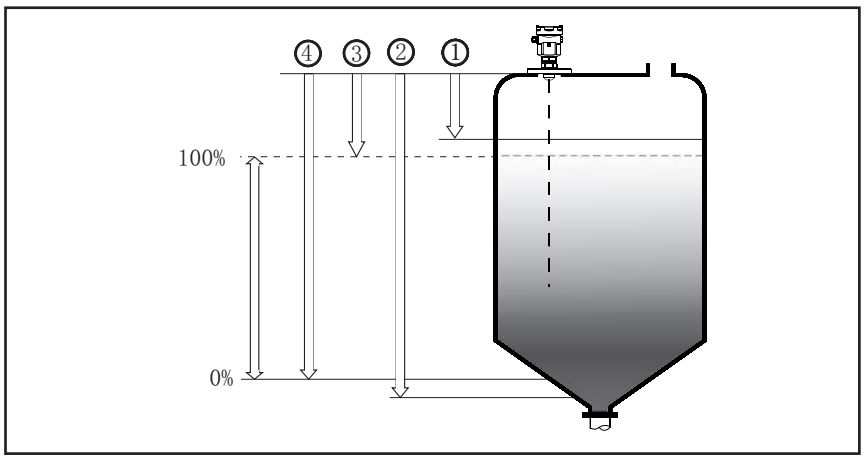
*Note 4 :Screw/Gimbal

3. Requirement of installation

Basic requirements

When the antenna transmits the microwave pulse, it has a certain transmitting angle. There shall be noobstacles in the area radiated by the transmitted microwave beam from the lower edge of the antenna to the dielectric surface to be measured. Therefore, it is necessary to avoid the facilities in the tank during installation, for example: human ladder, limit switch, heating equipment, supports, etc. If necessary, "Virtual Echo Learning" should be implemented. In addition, please note that the microwave beam should not intersect the charging material flow. During the installation of instrument, please also note that: the highest material level shall not enter the unmeasurable zone; the instrument shall be kept at a certain distance from the wall of tank; the installation of instrument should enable the transmitting direction of antenna to be perpendicular to the dielectric surface to be measured as much as possible. The instruments installed in the explosion-proof area shall be in compliance with the national installation regulations of explosion-proof dangerous area. The die-casting aluminum should be adopted for the housing of explosion-proof instrument. The explosion-proof instrument can be installed in the occasion that is required to be explosion-proof, and the instrument should be grounded.

Graphic illustration

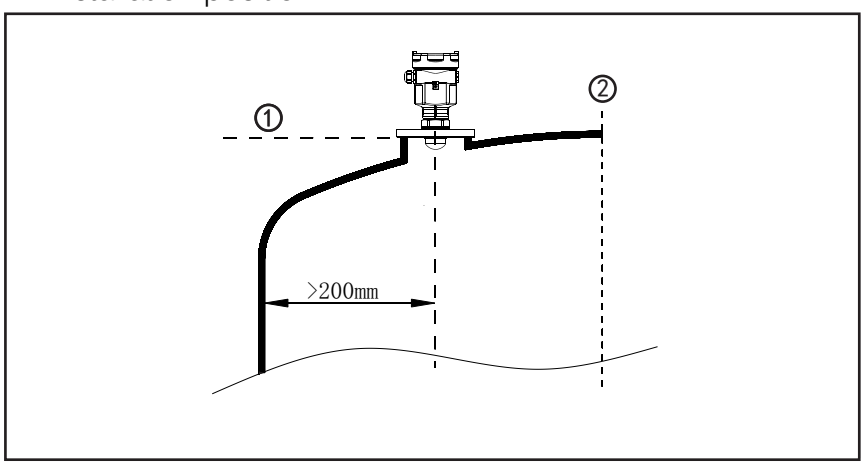


The reference plane for measurement is the sealing surface of threads or flanges.

1 Scope of unmeasurable zone
2 Setting of measurement range
3 Adjustment at high level
4 Adjustment at low level

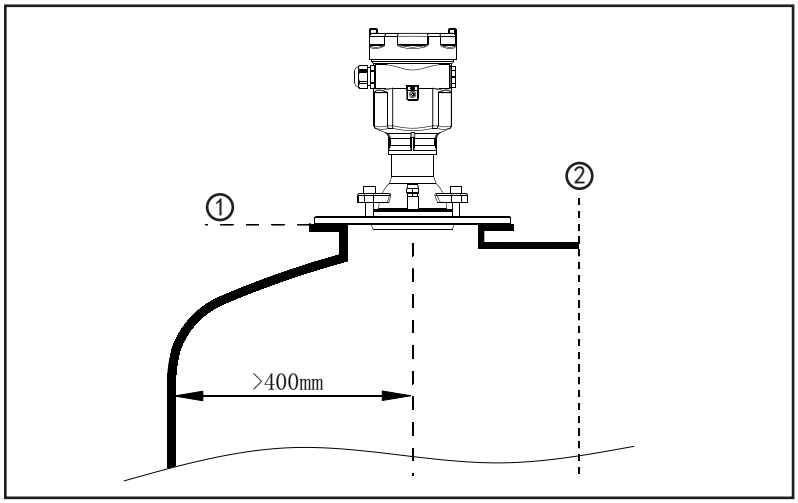
Note: when the radar level instrument is used, please make sure that the highest material level does not enter the unmeasurable zone (No. 1 area shown in the figure).

Installation position

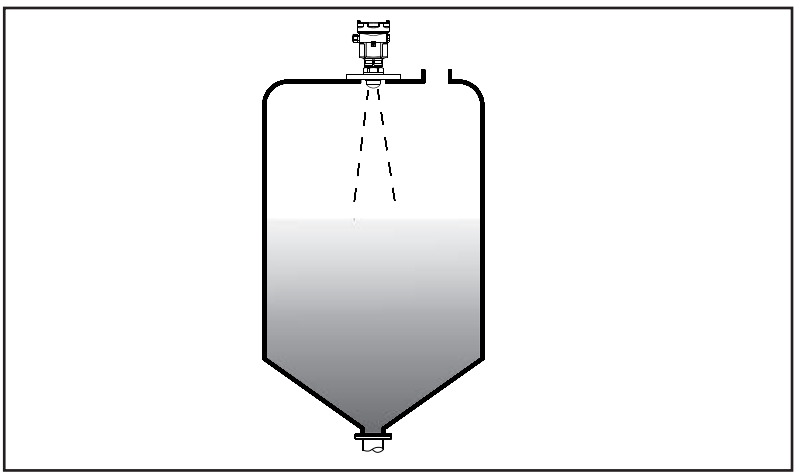


During the installation, please note that the instrument should be kept at a distance of 200mm at least from the vessel wall.

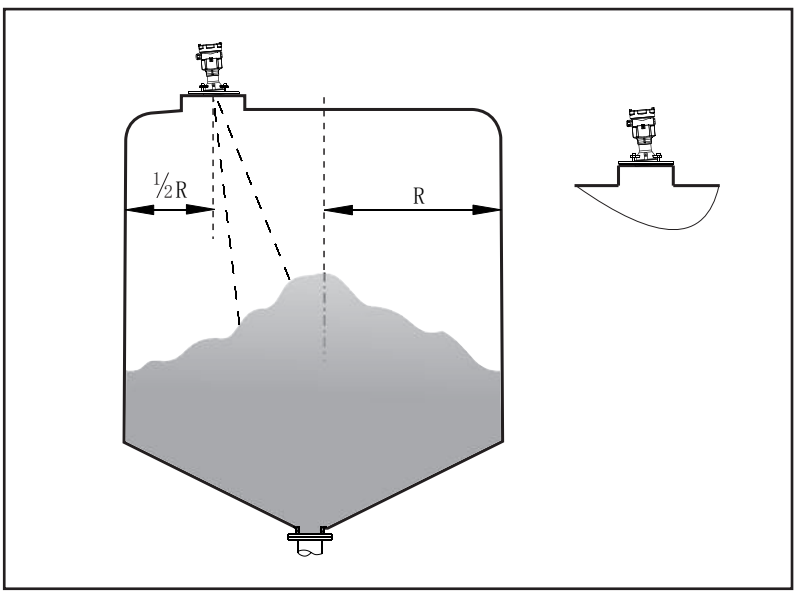
1 Reference plane
2 Center of the vessel or symmetry axis



1 Reference plane
2 Center of the vessel or symmetry axis

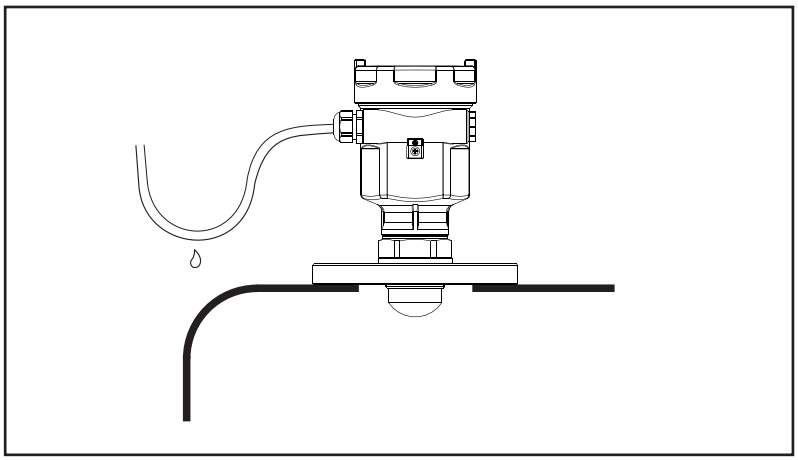


As for the conical vessel with flat tank top, the best installation position of instrument is the top center of the vessel, which ensures that the bottom of the container is measured.



Installation with gimbal installation

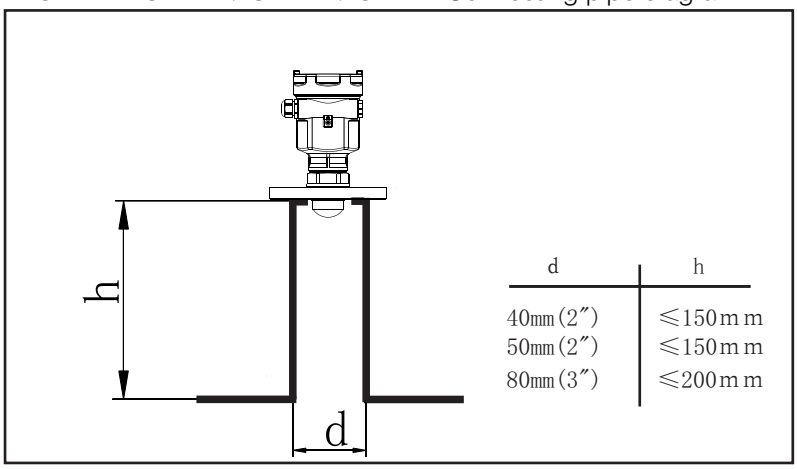
Moisture-proof



As for the instrument installed in outside or wet indoor environment and cooling or heating tanks, the cable gland should be tightened and the cable at the cable entry should be bend downward for preventing moisture. As shown in the figure:

Antenna extension

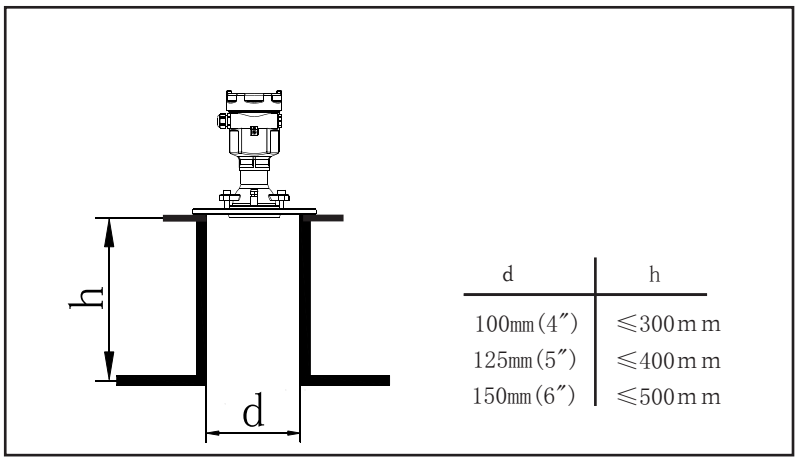
SDRD81～SDRD85、SDRD88、SDRD89 Connecting pipe diagram



d	h
40mm(2″)	≤150mm
50mm(2″)	≤150mm
80mm(3″)	≤200mm

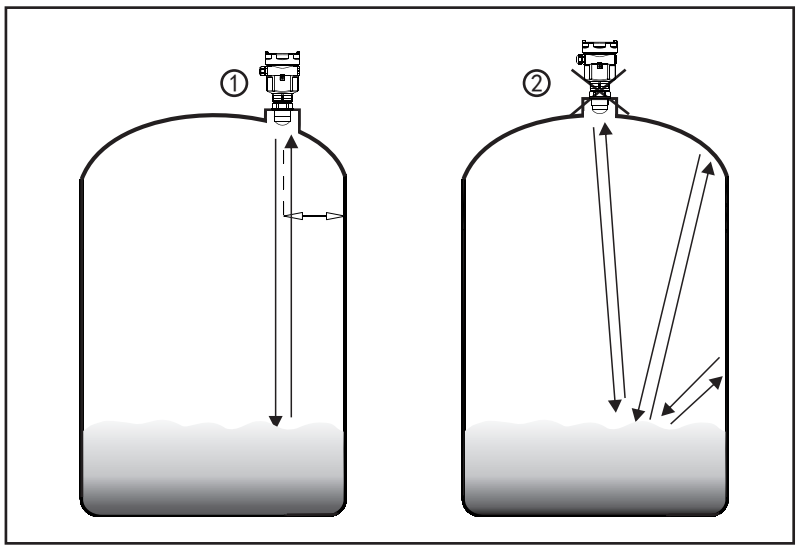
If the reflection property of the dielectric to be measured is good, the antenna extension can also be longer than the length of antenna. See the following table for the standard length of antenna extension. See the following table for the standard length in such case. The ends must be ground without the bulges, for example, burrs. If necessary, "virtual echo learning" function should be used. Eliminating the reflection on the ends of smaller connecting pipe also can achieve better measurement results.

SDRD87Connecting pipe diagram

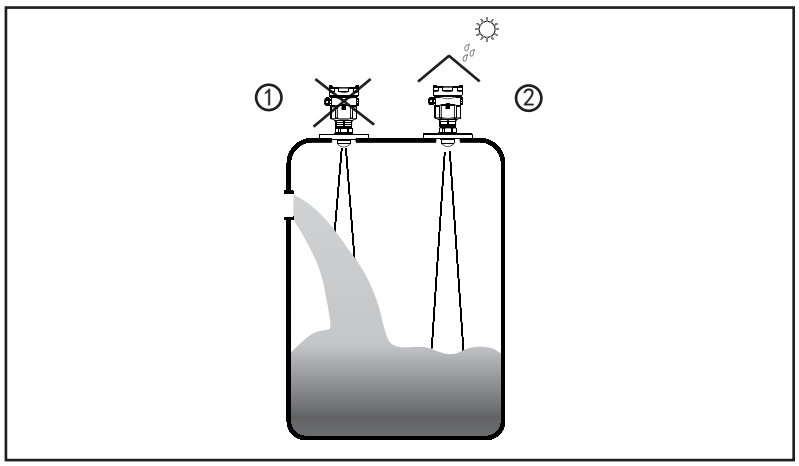


d	h
100mm(4″)	≤300mm
125mm(5″)	≤400mm
150mm(6″)	≤500mm

- Rights and wrongs of installation position

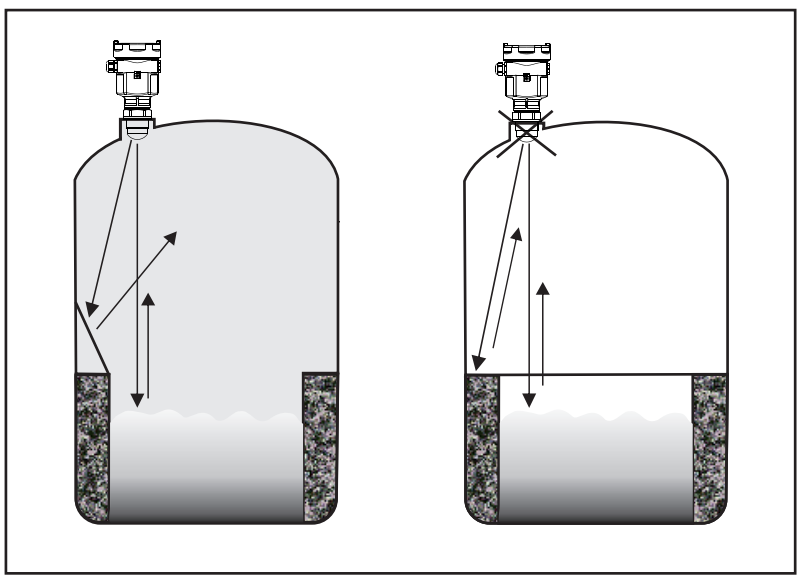


1. Correct
2. Error: Instruments are installed in the arched or round top of tank, which will result in multiple echoes. So it should be avoided as much as possible during the installation.



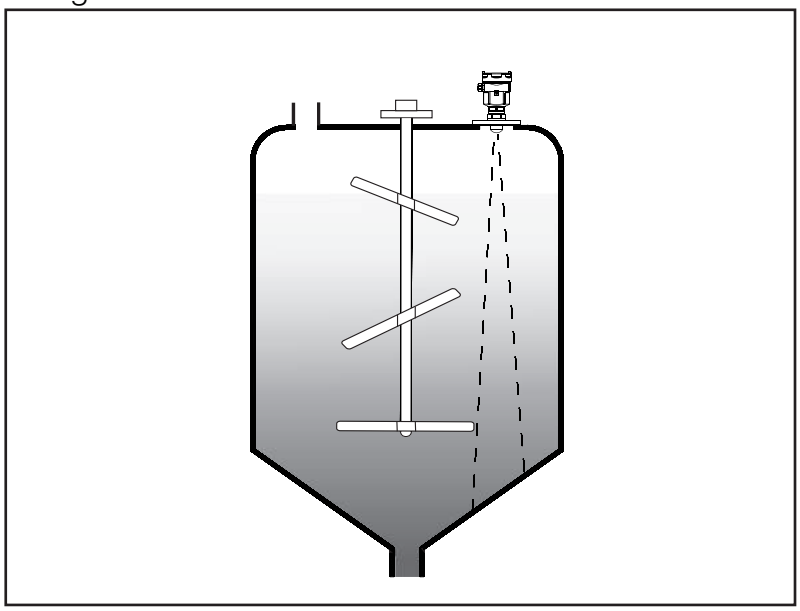
Error: instruments should not be installed above the charging material flow, in order to ensure that the dielectric surface is to be measured, rather than the charging material flow.
2 Correct
Note: sun-shading and rain-proof measures should be adopted for the outdoor installation.

- Installation of reflecting plate



If there are barriers in the tank, the reflecting plate can be installed to reflect the reflected wave of barriers out. If necessary, "virtual echo learning" can be implemented.

- Agitation



If there are agitation in the tank, the instruments should be installed as far away from agitators as possible. Once the installation is completed, the "virtual echo learning" should be carried out while agitators are running, to eliminate the influence of fraud echo generated by mixing blades. If foam or wave is generated due to the agitation, the waveguide installation method should be adopted.

4 Electrical connection

Supply voltage

(4-20)mA/HART (2-Wire)

Power supply and the output current signal are carried by the same two-core cable.See the technical data for the detailed range of supply voltage. A safety barrier should be placed between the power supply and instrument for the intrinsically safe version.

The grounding mode of current output can be adopted for the standard instrument, while the floating current output should be adopted for the explosion-proof instrument. Both of instrument and grounding terminals should be grounded well. Normally, the grounding terminals can be connected to the grounding point of tank or the nearby ground in case of plastic tank.

Installation of connecting cables

General introduction

The common two-core cable can be used as the power supply cable, and the outside diameter of the cable should be (5-9)mm to ensure the sealing of cable entry. In case of electromagnetic interference, it is recommended to use the shielded cable.

(4-20)mA/HART (2-Wire)

The common two-core cable can be used as the power supply cable.

(4-20)mA/HART/RS485 (4-Wire)

The cable with earth wire should be used as the power supply cable.

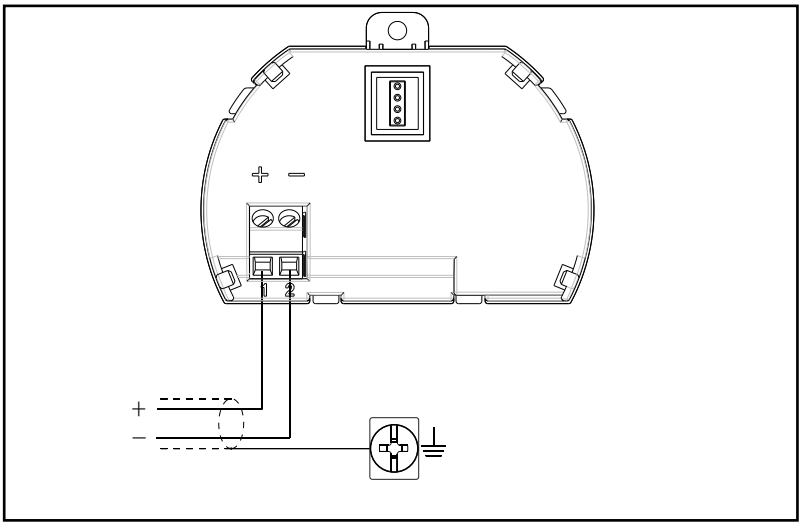
Shielding and wiring of cables

The two ends of the shielded cable should be grounded. The shielded cable must be directly connected to the grounding terminals inside of the sensor, while the outside grounding terminals on the housing must be grounded.

In case of grounding current, the shielding side away from the instrument of the shielded cable must be grounded via a ceramic capacitor (for example: 1nF/1500V), in order for the blocking and bypassing of high frequency interference signal.

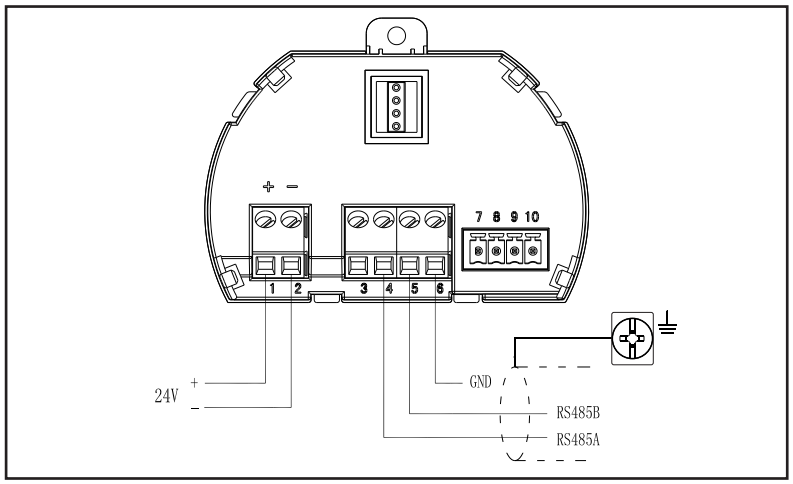
Wiring mode

2-Wire



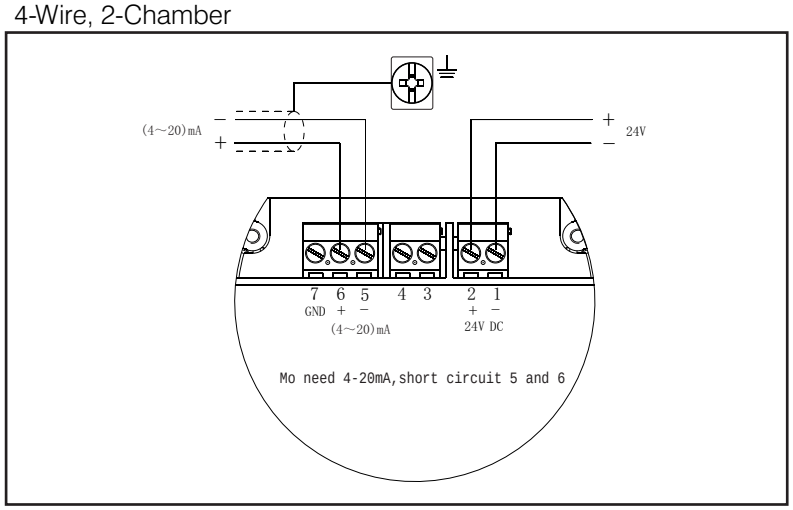
2-wire wiring used for HART (electronic unit B)

4-Wire



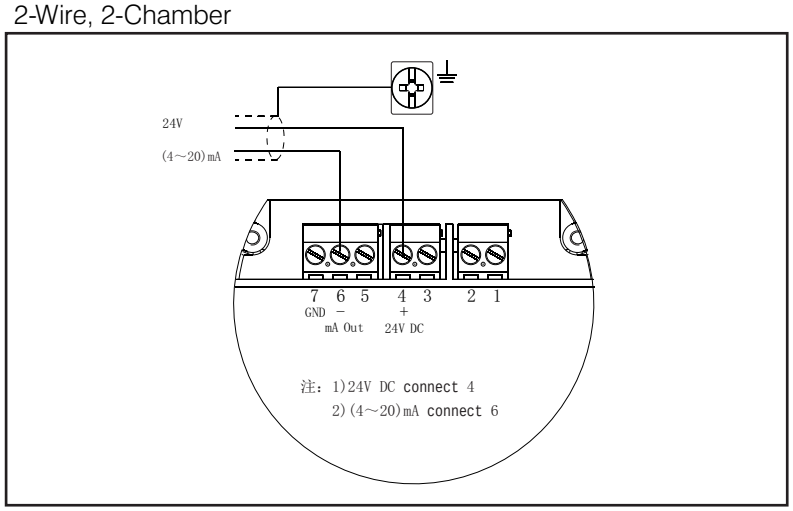
(10.8～26. 4)V DC power supply, RS485/MODBUS protocol output (electronic unit R)

4-Wire, 2-Chamber



24V DC power supply, (4-20)mA output (electronic unit C)

2-Wire, 2-Chamber



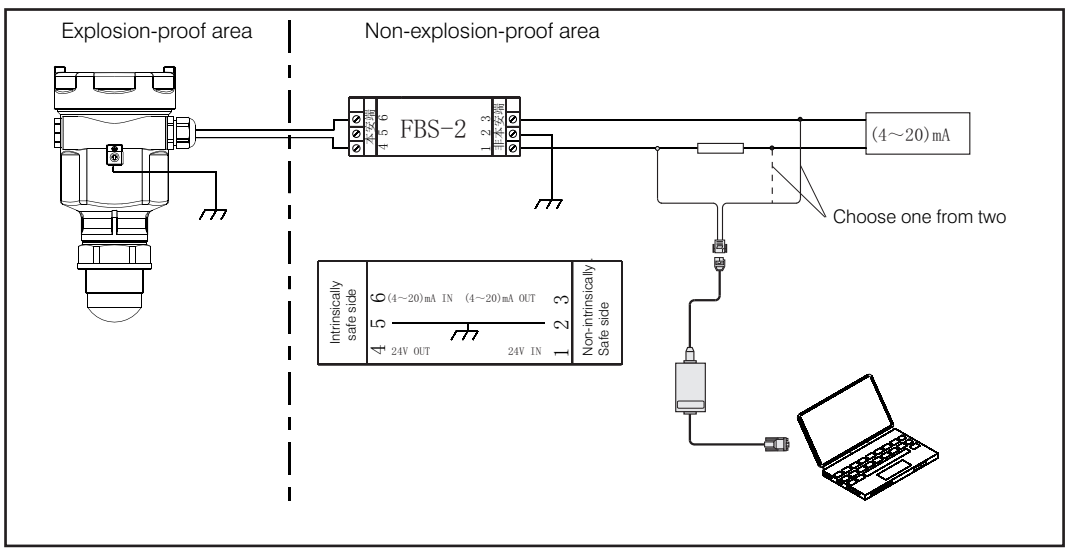
24V DC power supply, (4-20)mA output (electronic unit E)

Explosion-proof connection

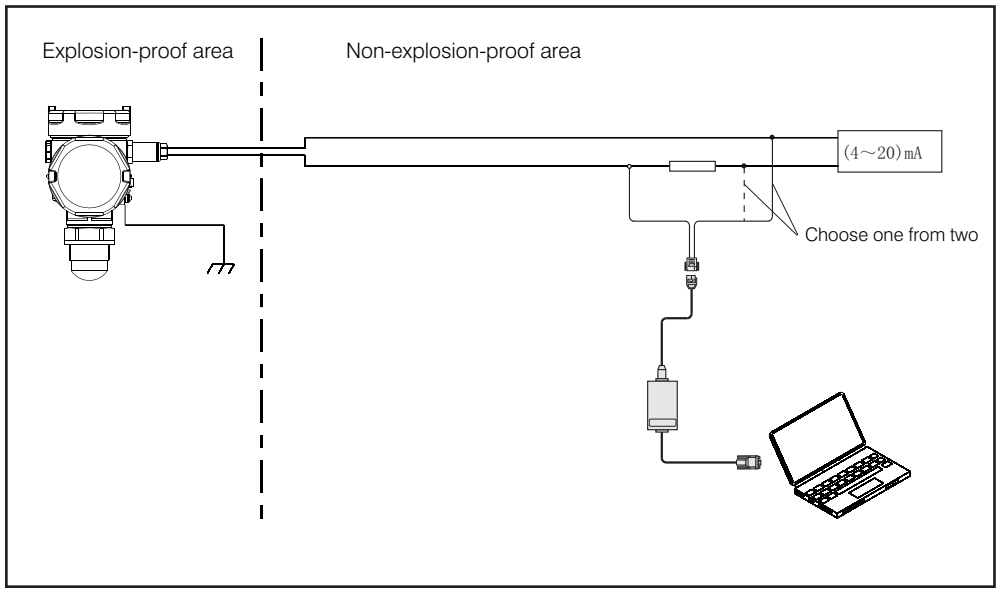
The explosion-proof types of the product include the intrinsically safe/ intrinsically safe + dust version/intrinsic safe+ flameproof approval. The working ambient temperature is (-40-65)℃. Under normal or fault conditions, the max temperature at any part of the surface should not exceed T3 (195℃), T4 (130℃), T5 (95℃) and T6 (80℃). Explosion-proof sign: Exia ⅡC T6 Ga/Exia D 20 T80℃/Ex d ia[ia Ga] ⅡC T6 Gb. The die-casting aluminum or 316L housing material is adopted for the intrinsically safe + dust version/ intrinsically safe +flameproof approval level instrument. The plastic, die-casting aluminum or 316L housing material is adopted for the intrinsically safe level instrument. The glue sealing structure is adopted for the electronic parts to ensure the sparks generated by the circuit fault will not be discharged. The product is applicable to the continuous level measurement for the media of inflammable gas/dust below the explosion-proof grades of Exia ⅡC T6 Ga/Exia D 20 T80℃/Ex d ia[ia Ga] ⅡC T6 Gb. When the explosion-proof instrument is used, safety barrier should be applied for its power supply. FBS-2 safety barrier is an associated equipment of this product, and its explosion-proof type is intrinsically safe. Explosion-proof sign: [Exia] ⅡC, with supply voltage of 24V DC±5%, short-circuit current of 130.5mA and working current of (4-20)mA. The shielded cable should be adopted for all cables. The max length from the instrument to safety barrier is 500m. Distributed capacity ≤0.1 μF/Km, distributed inductance ≤1mH/Km. During installation, instrument should be grounded. The associated equipment without the explosion-proof test should not be used.

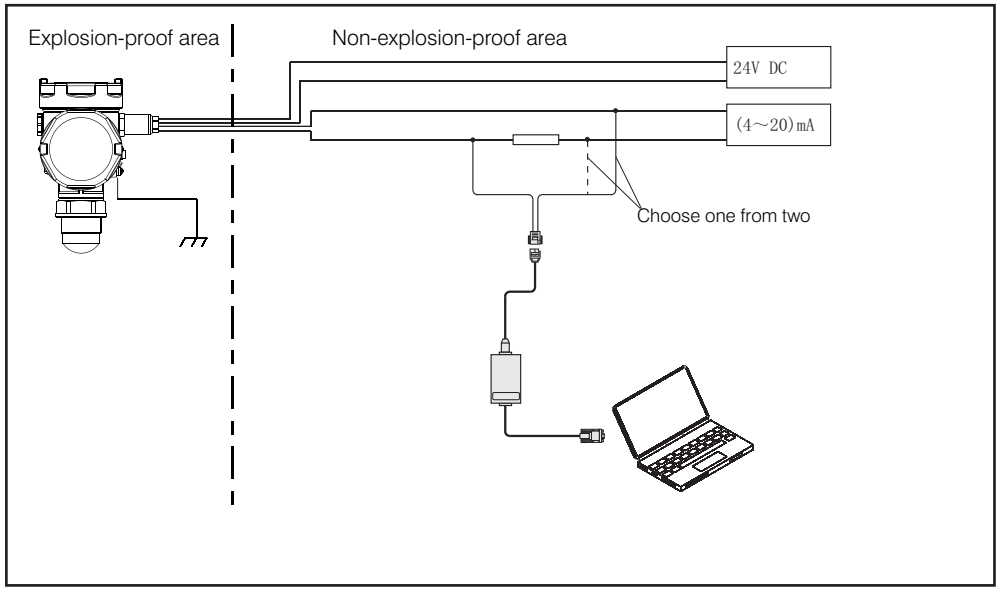
Parameters of FBS-2 safety barrier

(U_m)	(U_o)	(I_o)	(C_o)	(L_o)	(P_o)
250V VDC/AC	25.2 VDC	130.5mA	100nf	0.3mH	0.82W
	(U_i)	(I_i)	(C_i)	(L_i)	(P_i)
	26.4 VDC	166mA	0 μf	102 μH	1.096W



Wiring diagram of intrinsically safe/intrinsically safe + dust version





Explosion-proof wiring of intrinsically safe+ flameproof approval

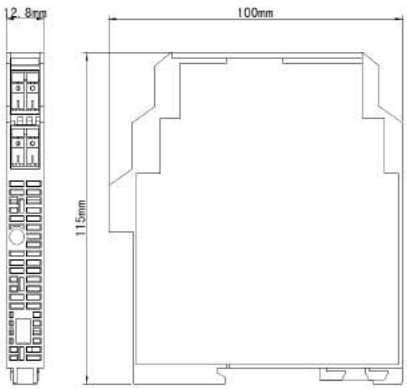
When RS485 intrinsically safe instrument is used, the communication input type isolated safety barrier should be used for power supply. NPEXA-C711 safety barrier is an associated equipment of this product, and its explosion-proof type is intrinsically safe.

External dimension of NPEXA-C711 communication input type isolated safety barrier

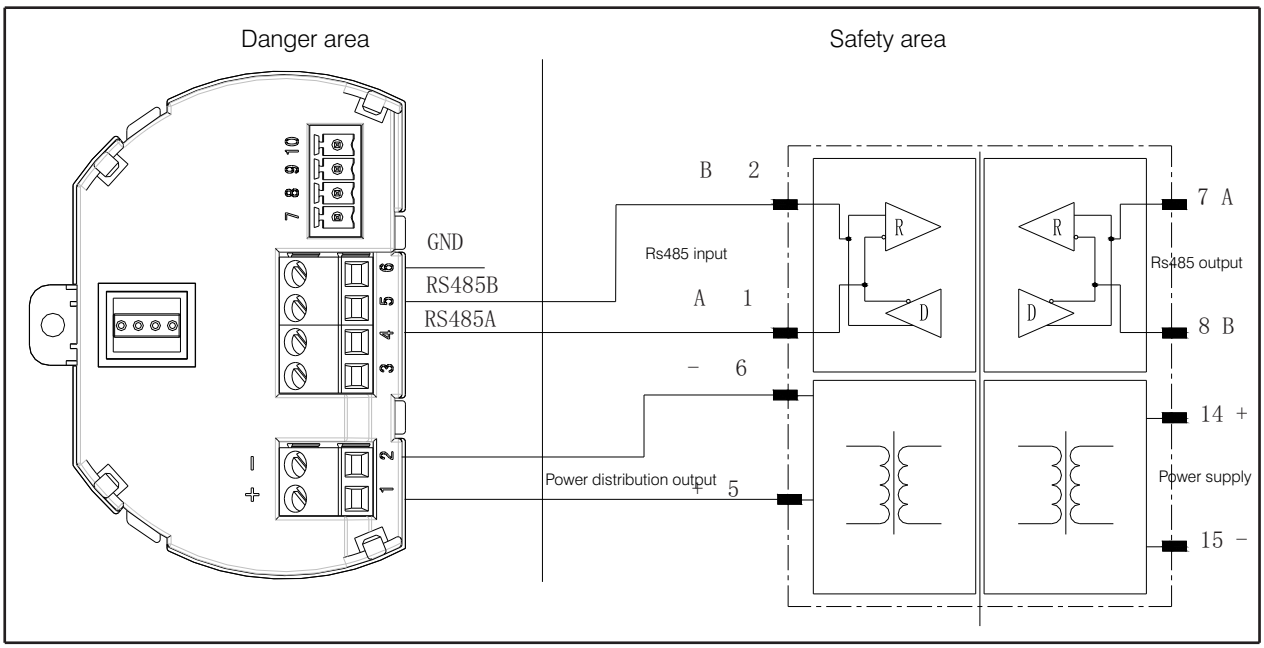
Port characteristics	Between No.1, No.2 terminals and GND	Between terminal 5 and terminal 6
Uo	6.5V	21V
Io	68mA	165mA
Po	111mW	866mW
Co	17.5 μF	0.13μF
Lo	5.4mA	0.91mA
Um	250V AC/DC	250V AC/DC

External dimension of NPEXA-C711 communication input type isolated safety barrier

WXHXD=12.8mmx100mmx115mm



Explosion-proof wiring of Rs485 intrinsically safe



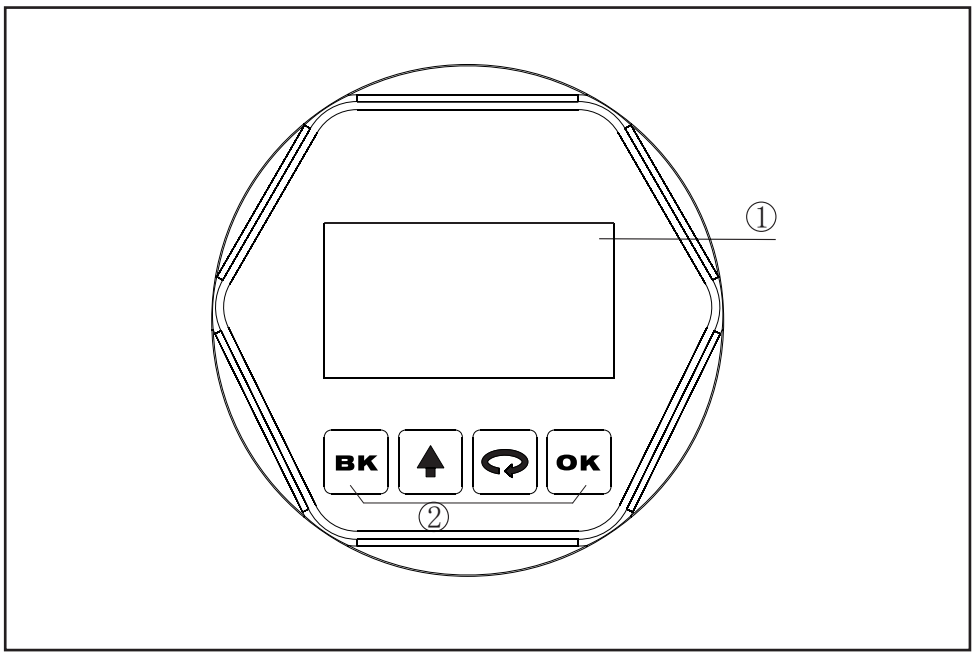
5 Instrument debugging

Debugging method

There are four debugging methods for SDRD8X
1 Display/debugging module (View Point)
2 Host computer debugging software
3 HART hand-held programmer

ViewPoint is a pluggable display/debugging tool. The debugging can be done through operating with 4 buttons on ViewPoint. The language for the debugging menu is optional. After debugging, ViewPoint is only used for display in general, and the measurement value can be seen clearly through the glass window.

Display/debugging module



1. Liquid crystal display
2. Button

1. Liquid crystal display 2. Button

[**OK**]Button
–Enter programming mode;
–Confirm programming options;
–Confirm parameter modification.

[↻]Button
–Choose programming options;
–Choose the parameter bit to edit;
–Display of parameters.

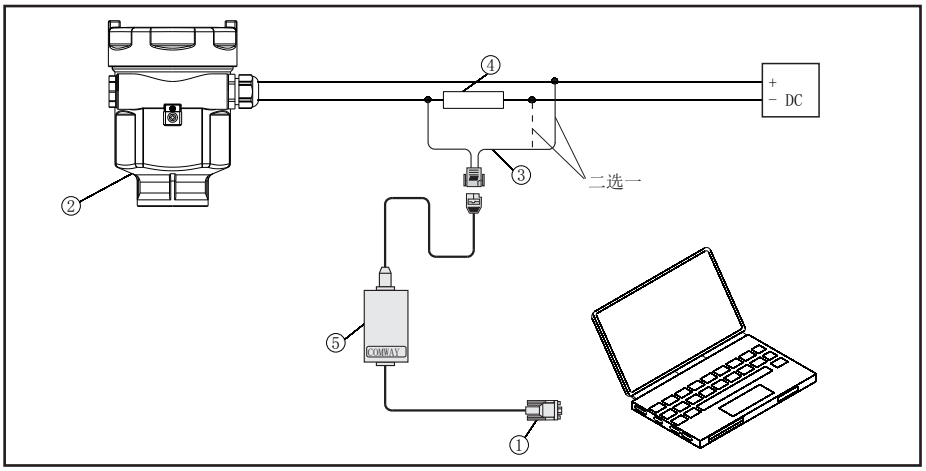
[▲]Button
–Modify parameter values;

[**BK**]Button
–Exit programming mode;
–Return to higher level menu.

Shortcut keys
[**BK**]displays the frequency spectrum

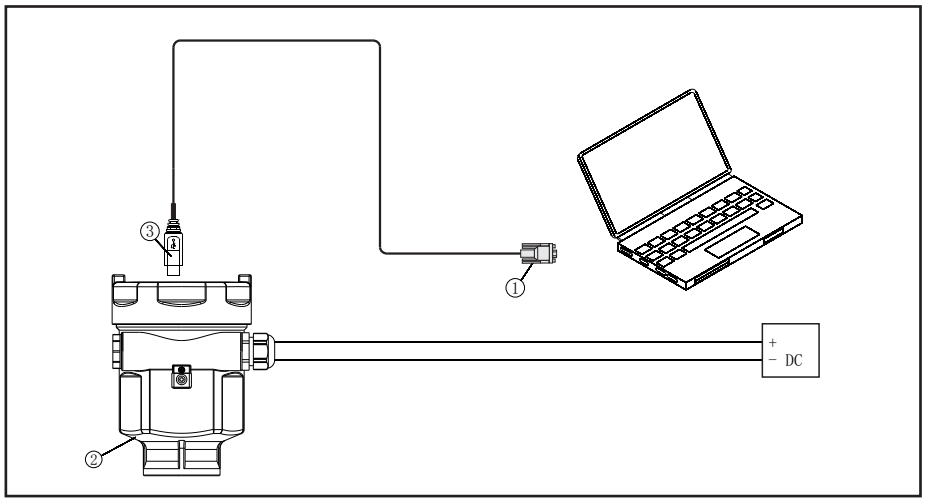
- Debugging of host computer

Connect to the host computer via HART



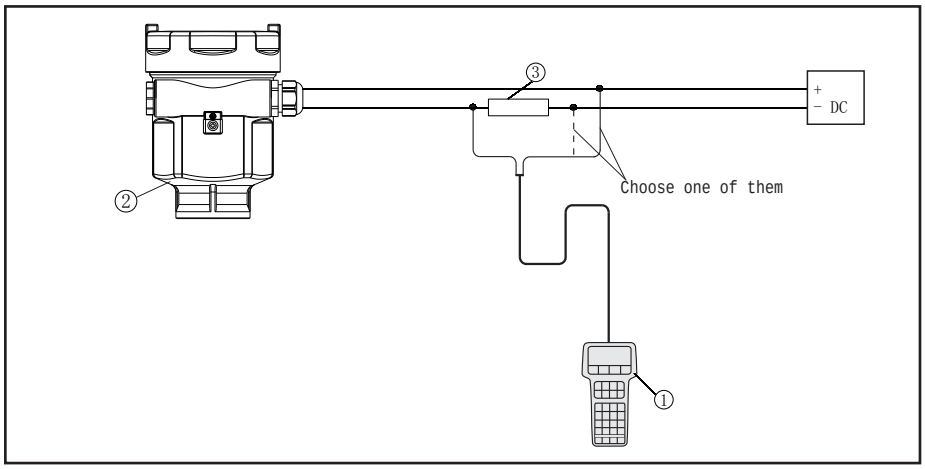
1 USB interface
2 SDRD8X
3 HART adapter used for COMWAY converter
4 250 Ω
5 COMWAY converter

Connect to the host computer via USB



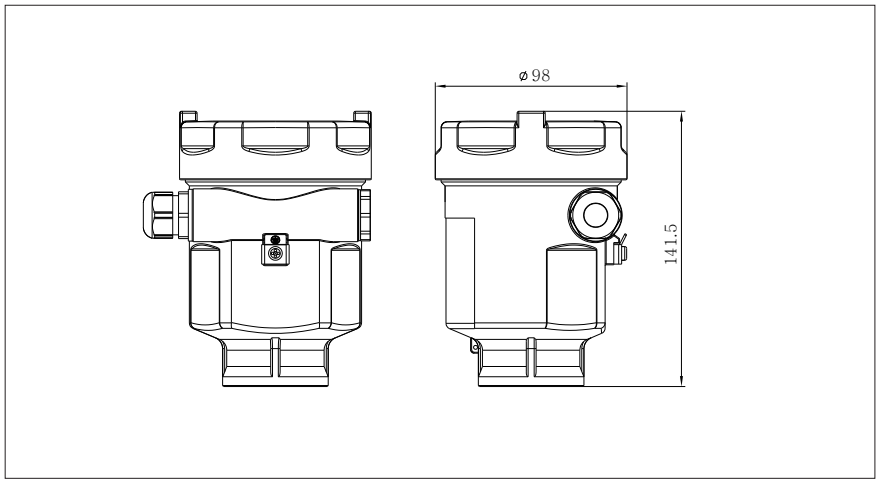
1 USB interface
2 SDRD8X
3 USB interface

HART hand-held programmer can be used for programming of SDRD8X

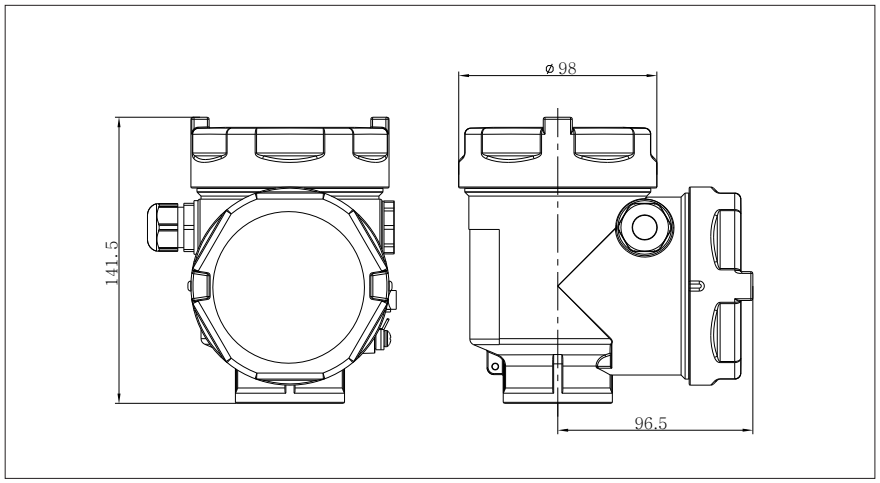


1 HART hand-held programmer
2 SDRD8X
3 250 Ω

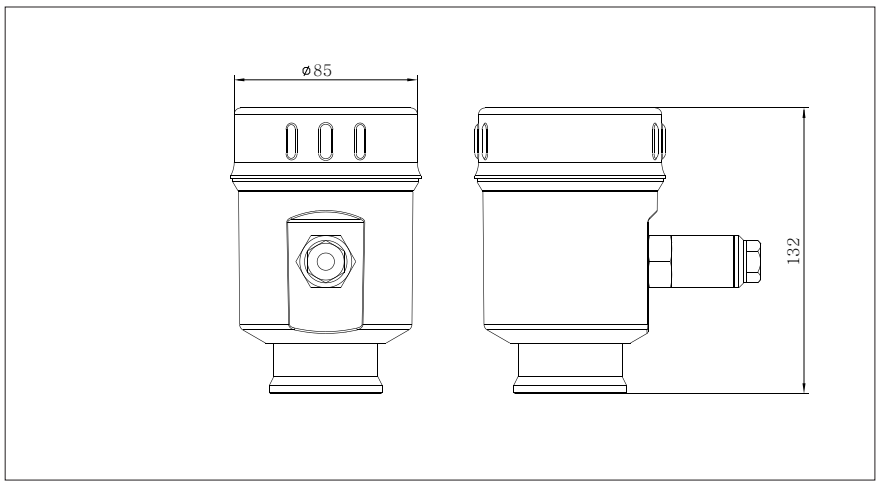
6 Structure size (unit: mm)



A/B/G type housing
Material:AL/PBT/316L

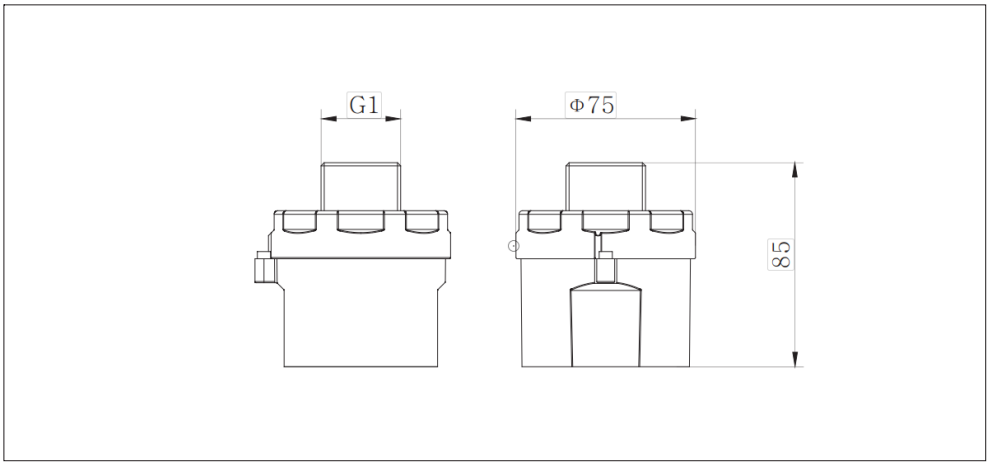


D/H type housing
Material:AL/316L

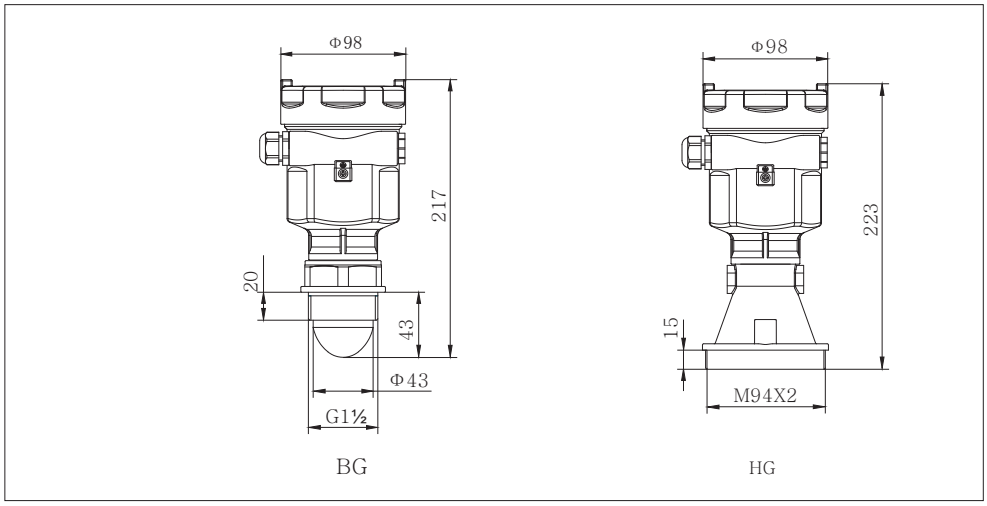


K type housing
Material: Stainless steel 316L (surface machining)

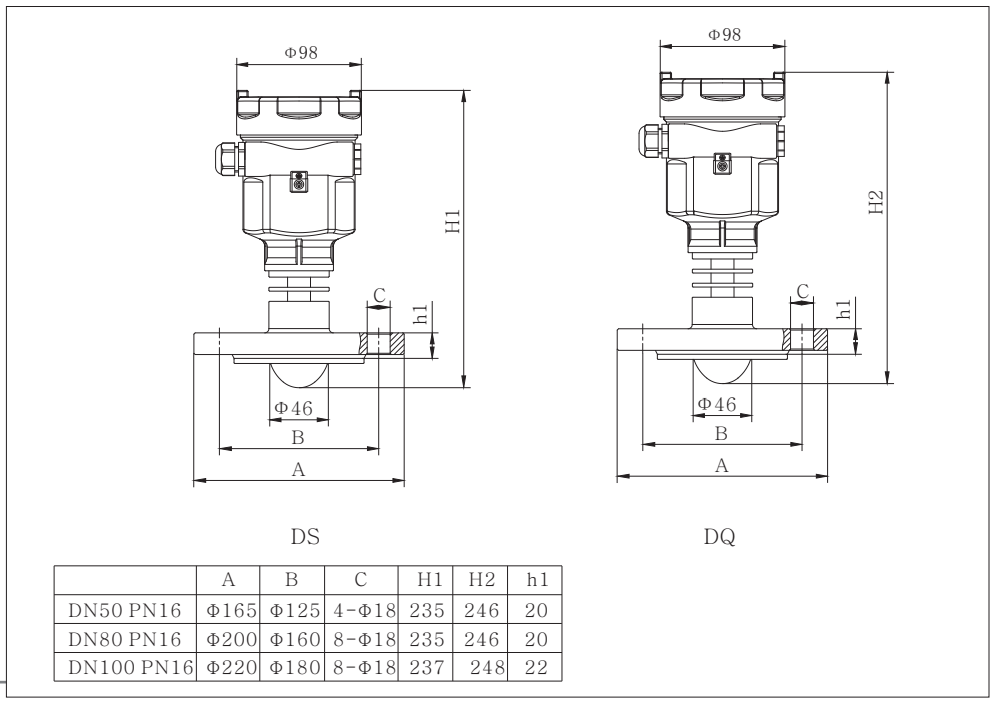
F type housing
Material:PBT



SDRD81
Antenna:BG,HG

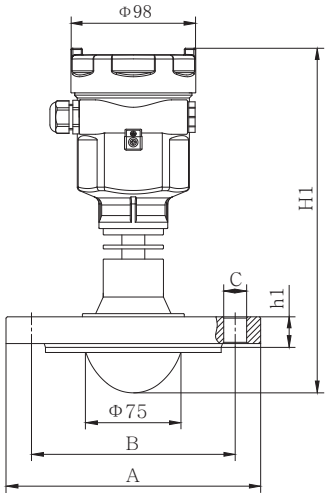


SDRD82
Antenna:DS.DQ

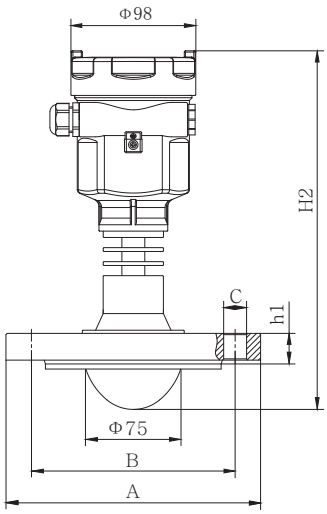


	A	B	C	H1	H2	h1
DN50 PN16	Φ165	Φ125	4-Φ18	235	246	20
DN80 PN16	Φ200	Φ160	8-Φ18	235	246	20
DN100 PN16	Φ220	Φ180	8-Φ18	237	248	22

SDRD82
Antenna:ES,EQ



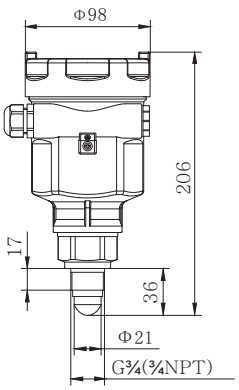
ES



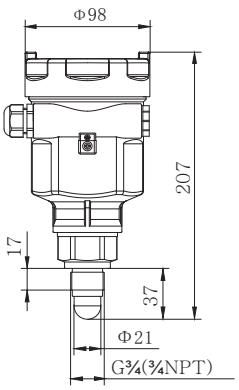
EQ

	A	B	C	H1	H2	h1
DN80 PN16	Φ200	Φ160	8-Φ18	277	288	20
DN100 PN16	Φ220	Φ180	8-Φ18	279	290	22
DN125 PN16	Φ250	Φ210	8-Φ18	279	290	22
DN150 PN16	Φ285	Φ240	8-Φ22	281	292	24

SDRD83
Antenna:AP,AM

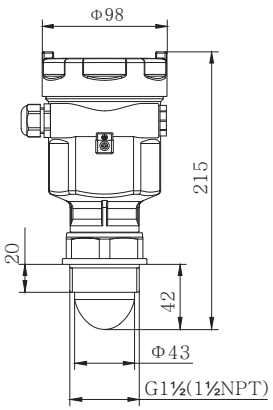


AP

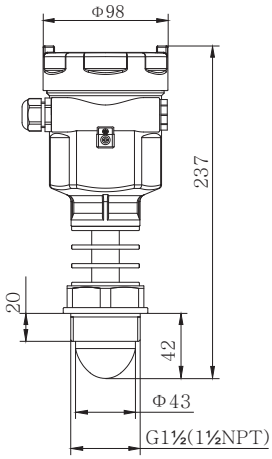


AM

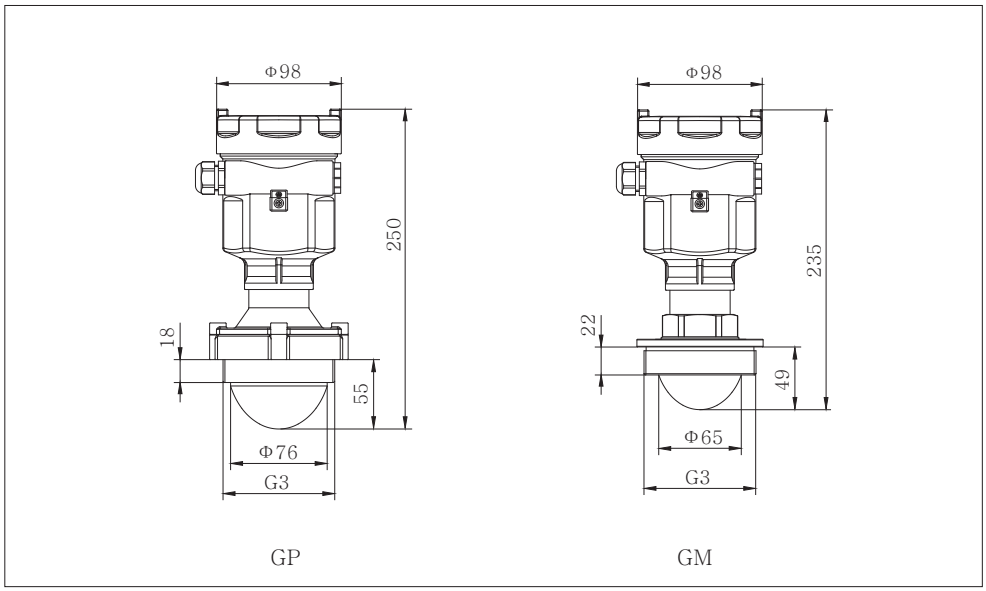
SDRD83
Antenna:FP,FM,
FT



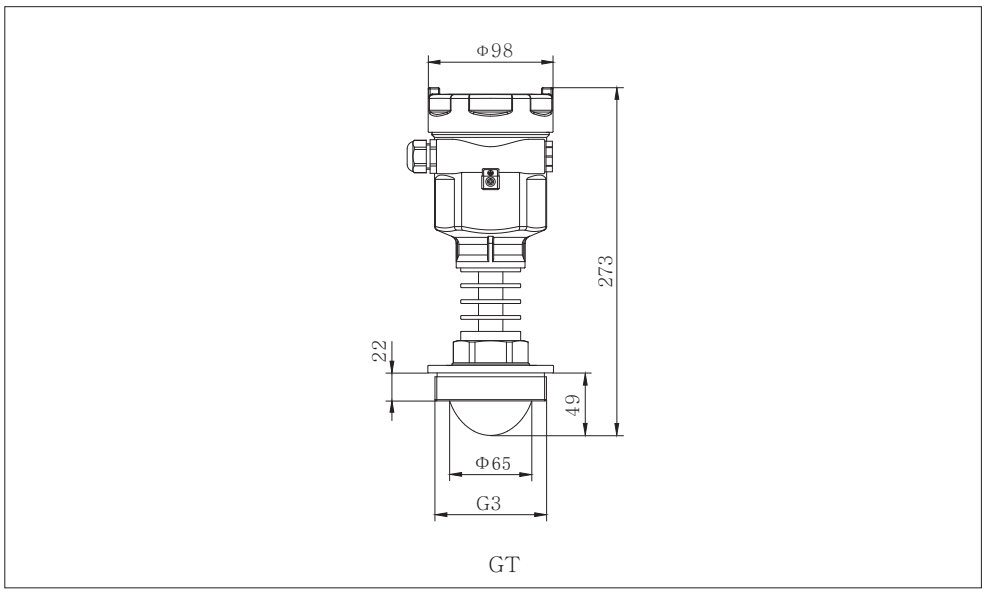
FP/FM



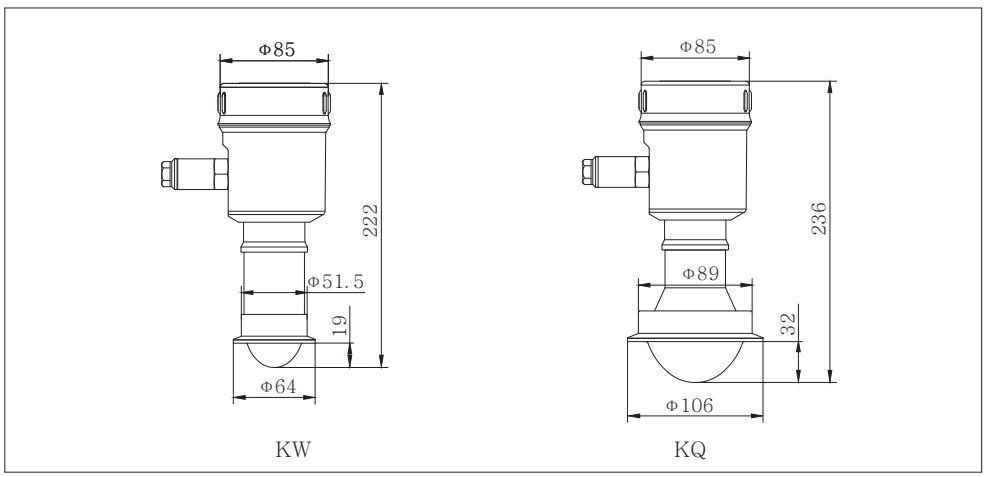
FT



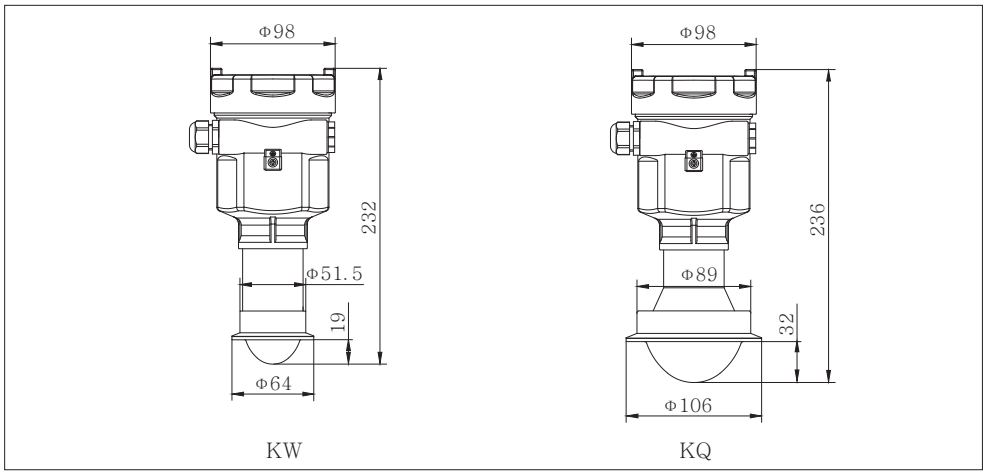
SDRD83
Antenna:GP、GM



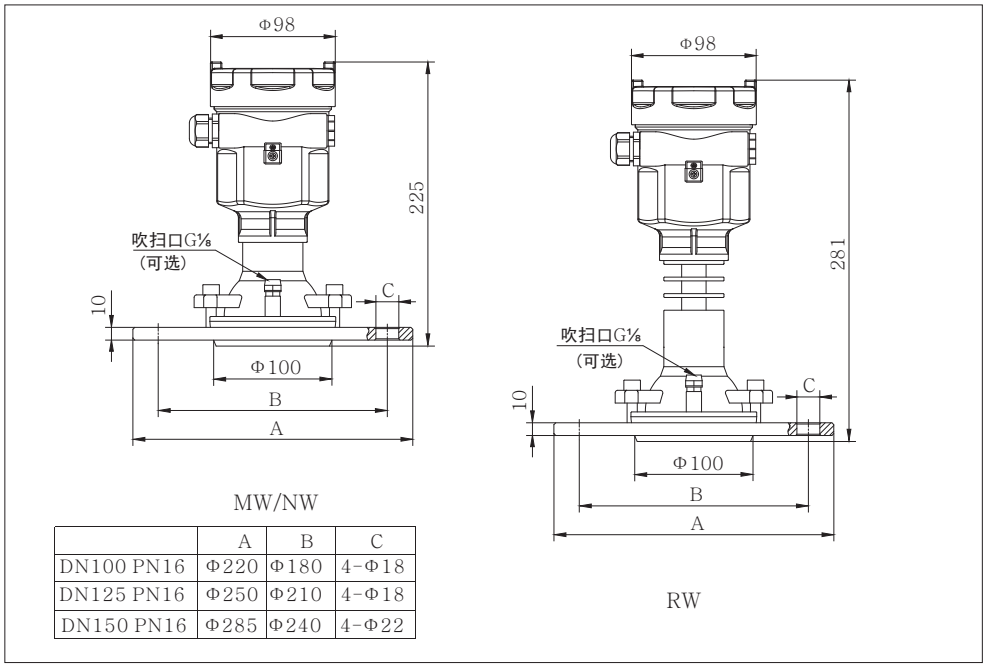
SDRD 83
Antenna:GT



SDRD 85
Antenna:KW,KQ
Housing: K

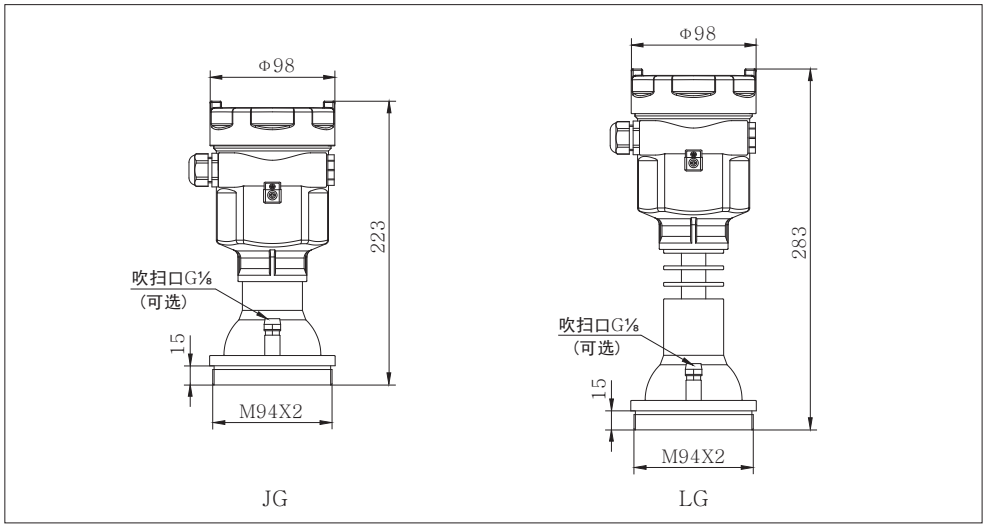


SDRD85
Antenna:KW,KQ

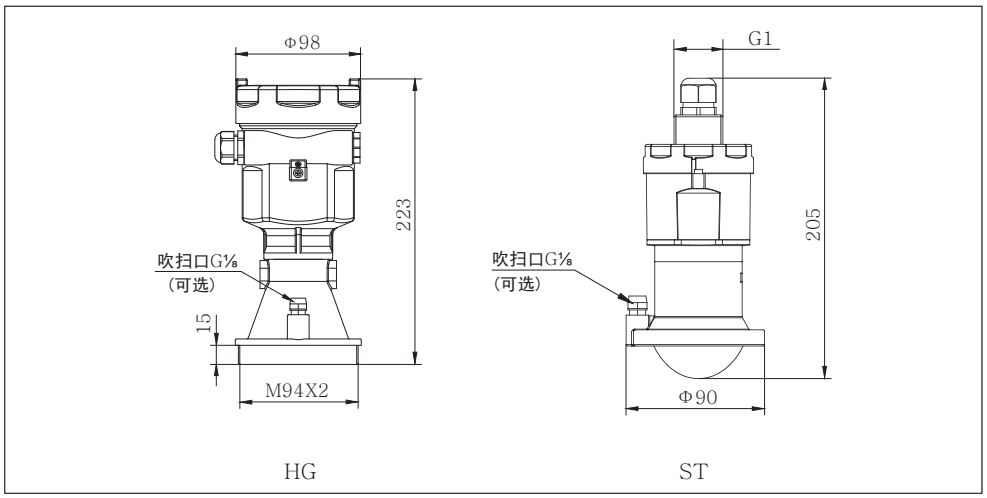


	A	B	C
DN100 PN16	Φ220	Φ180	4-Φ18
DN125 PN16	Φ250	Φ210	4-Φ18
DN150 PN16	Φ285	Φ240	4-Φ22

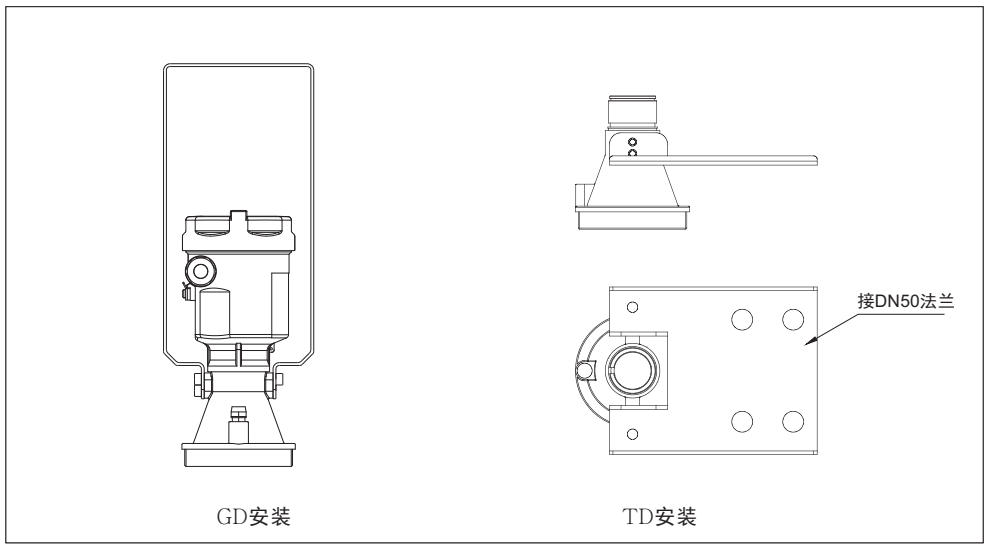
SDRD87
Antenna:MW/NW



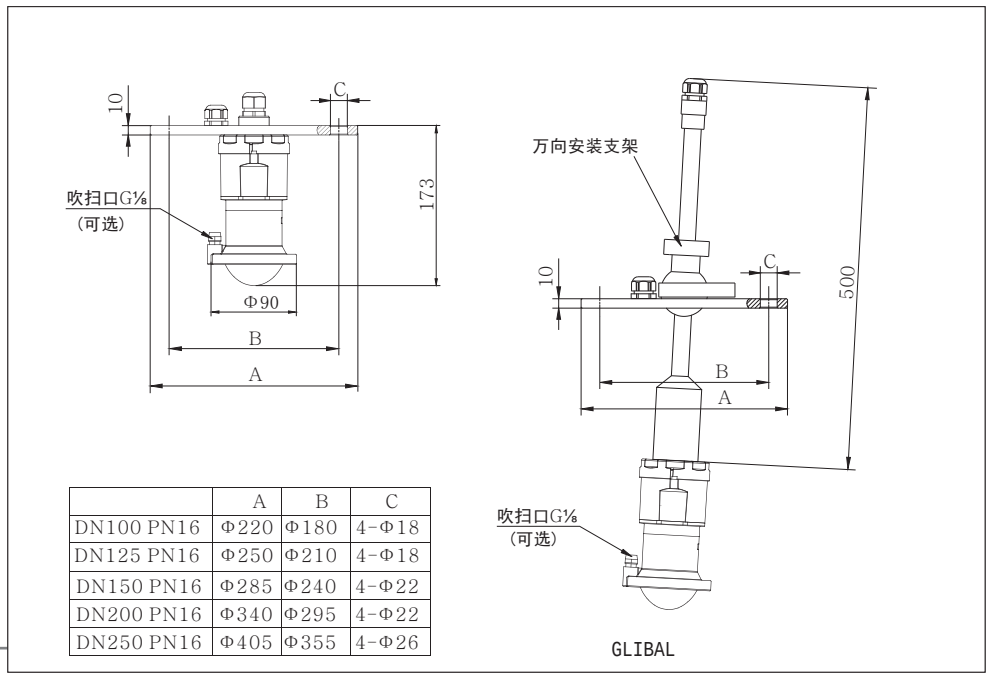
SDRD87
Antenna:JG/LG



SDRD87/88
Antenna:HG/ST



SDRD81/87
Antenna:GD/TD



	A	B	C
DN100 PN16	Φ220	Φ180	4-Φ18
DN125 PN16	Φ250	Φ210	4-Φ18
DN150 PN16	Φ285	Φ240	4-Φ22
DN200 PN16	Φ340	Φ295	4-Φ22
DN250 PN16	Φ405	Φ355	4-Φ26

SDRD 88
Install

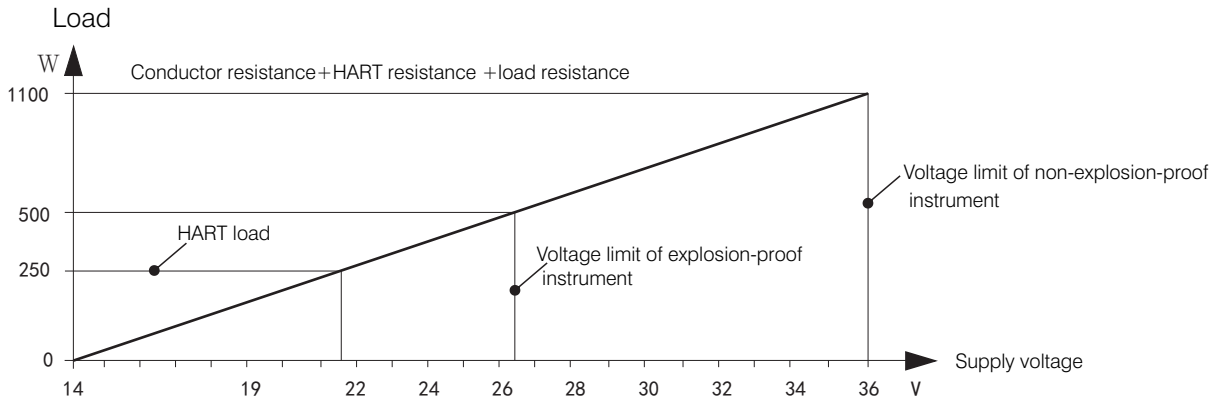
7 Technical parameters

- General data

Housing	Aluminum, plastic and stainless steel 316L
Sealing between the housing and housing cover	Silicone rubber
Window on housing	Transparent PC
Grounding terminal	Stainless steel
Weight	
SDRD81	2.2Kg (depending on the antenna and housing)
SDRD82	8.0Kg (depending on the antenna and housing)
SDRD83	1.8Kg (depending on the antenna and housing)
SDRD85	2.2Kg (depending on the antenna and housing)
SDRD87	8.8Kg (depending on the antenna and housing)
SDRD88	2.0Kg (depending on the antenna and housing)

Supply voltage		
	Standard type	(20～28)V DC
2-Wire	Intrinsically safe/ intrinsically safe + dust version	24(1±10%)V DC
	Power consumption	max.22.5mA
	Ripples are allowed	
	－<100Hz	Uss<1V
	－(100～100K)Hz	Uss<100mV
4-Wire	Intrinsically safe/ intrinsically safe + dust version	(10.8～26.4)V DC
	Power consumption	max.12mA
4-Wire, 2-Chamber	Intrinsically safe/ +flameproof approval	24(1±10%)V DC
	Power consumption	max.1VA,1W
Cable parameters	Cable entry/plug	One M20x1.5 cable entry (cable with diameter of 5...9mm), and a M20x1.5 blind plug
	Spring collecting terminals	Used for conductor with cross section of 2.5mm^2
Output parameter	Output signal	(4-20)mA/HART/RS485/MODBUS protocol
	Resolution	0.3 μA
	Fault signal	Current output is unchanged; 20.5mA; 22mA; 3.9mA
	–2-wire load resistance	Refer to the following diagram
	Integral time	0-40s, adjustable

2-Wire load resistance figure



- Feature parameters

Unmeasurable area		Ends of antenna
Maximum measurement	-SDRD81	30m/100m (liquid)
	-SDRD82	30m(liquid)
	-SDRD83	10m/30m/120m (liquid)
	-SDRD85	30m(liquid)
	-SDRD87	120m(solid)
	-SDRD88	120m(liquid)
	-	
	-	
Microwave frequency		77～81GHz
Measurement interval		About 1s (depending on the setting of parameters)
Adjust time[1)]		About 1s (depending on the setting of parameters)
Display resolution		1mm
Accuracy		See the accuracy figure
Temperature for storage and transport		(-40～55)℃
Relative humidity		<95%
Pressure		Max.4.0MPa
Vibration-proof		Mechanical shock 10m/s^2, (10-150)Hz

Operating temperature

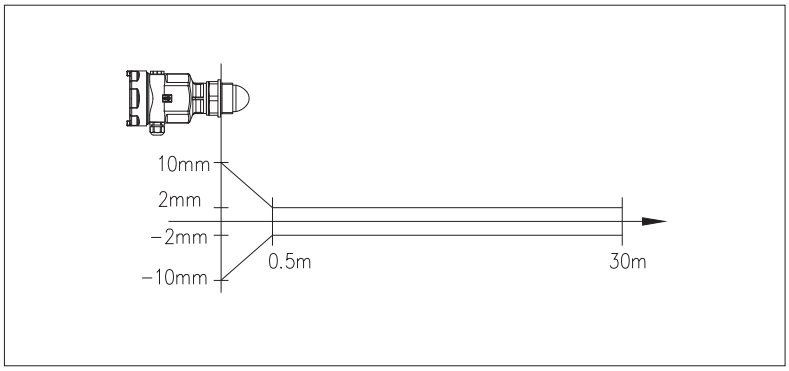
Standard type (-40～80)℃

The explosion-proof types

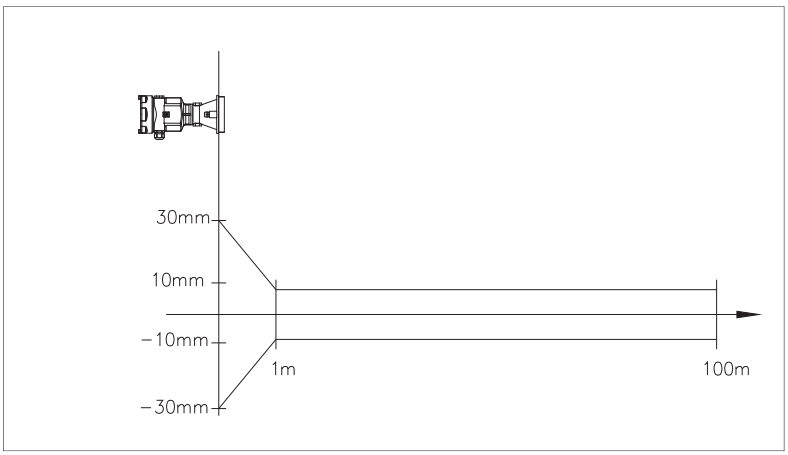
Ambient temperature (℃)	Medium temperature (℃)	Group
-40～65	130～195	T3
	95～130	T4
	80～95	T5
	60～80	T6

1) Time required for giving the correct level after severe sudden change of level (max error of 10%).

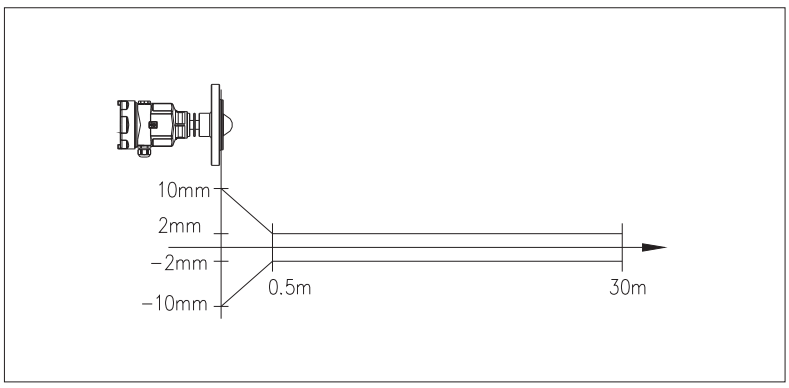
SDRD81	3dB Transimiting angle	6°
	Accuracy	see below



SDRD81	3dB Transimiting angle	4°
	Accuracy	see below



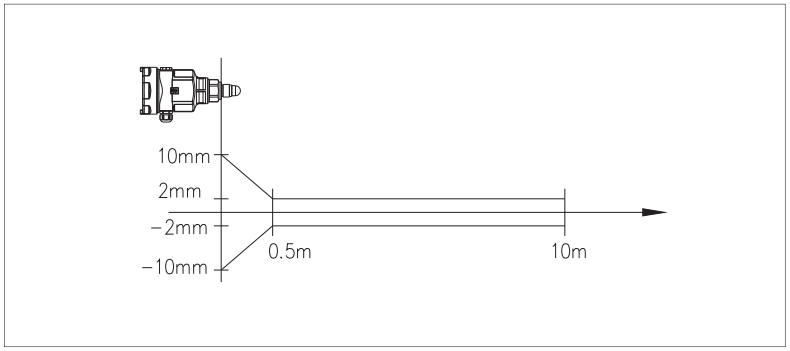
SDRD82	3dB Transimiting angle	
	Lens Diameter 50	6 °
	Lens Diamter 80	3 °
	Accuracy	see below



SDRD83 3dB Transimiting angle

Lens Diameter 3/4" 14 °

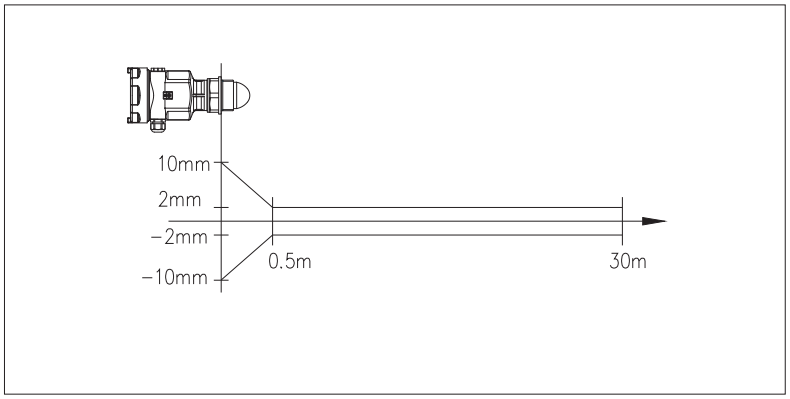
Accuracy see below



SDRD83 3dB Transimiting angle

Lens Diameter 1-1/2" 6 °

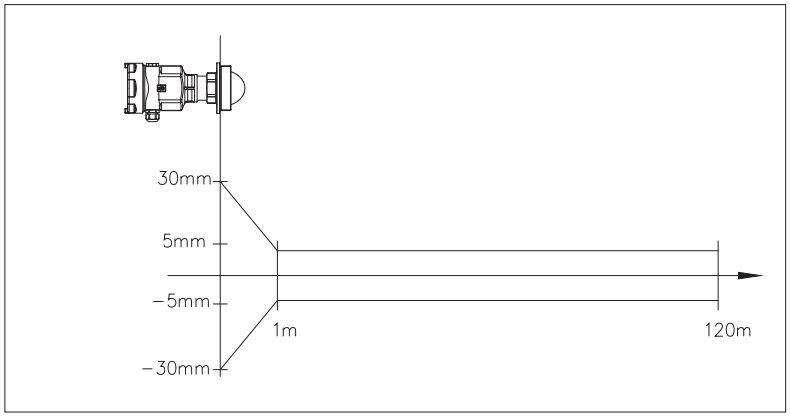
Accuracy see below



SDRD83 3dB Transimiting angle

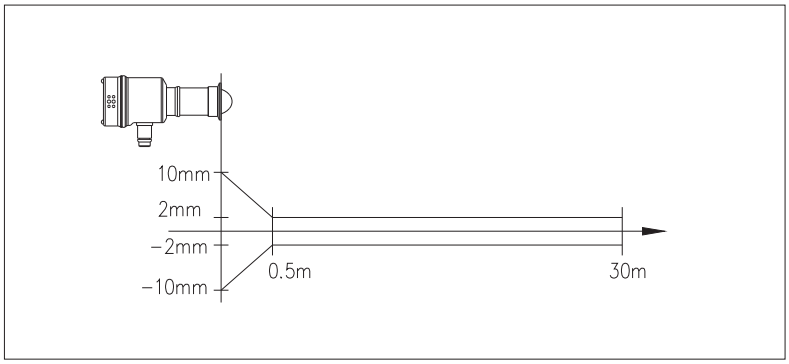
Lens Diameter 3" 3 °

Accuracy see below



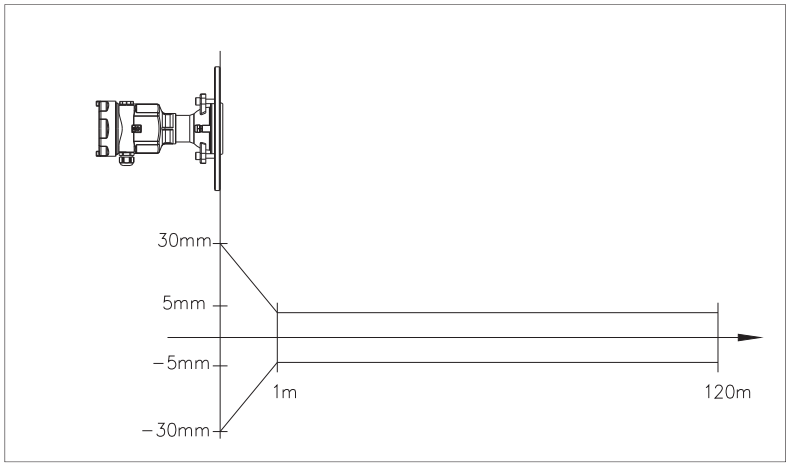
SDRD85

3dB Transimiting angle	
Lens Diameter 50	6 °
Lens Diamter 80	3 °
Accuracy	see below



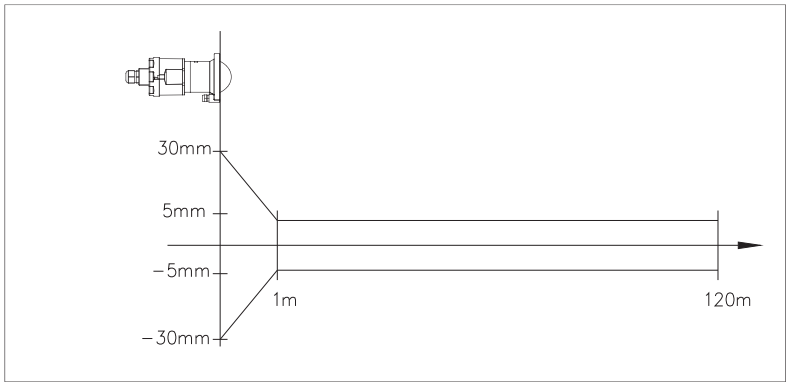
SDRD87

3dB Transimiting angle	4 °
Accuracy	see below



SDRD88

3dB Transimiting angle	4 °
Accuracy	see below



8. Product model Selection

8.1 SDRD81 Product model Selection

Mark	Code	Description
SDRD 81	SDRD 81	SDRD 81 series 80G Radar
Approvals	P	Standard (non-explosion-proof)
Antenna Type	BG	(-40~90) °C/ (-0.1~0.1)Mpa /Lens Diameter 43mm
	HG	(-40~90) °C/(-0.1~0.1)Mpa /Lens Diameter 80mm
Antenna Material	D	PP (-40~90) ° C
Process Connection	GP	G thread G1-1/2
	MP	Thread M94×2
	GD	Hanger
	TD	Holder
Sealing	X	None
Electronic	B	(4~20)mA/Hart/2 wire
	R	RS485/MODBUS
	X	Others
Housing	B	Plastic/IP66
Cable Entry	M	M20×1.5
Display	A	Integral display
	C	Remote display
	X	None

8.2 SDRD82 Product model Selection

Mark	Code	Description
SDRD 82	SDRD 82	SDRD 82 series 80G Radar
Approvals	P	Standard (non-explosion-proof)
	I	Intrinsic safety (Ex ia IIC T2-T6 Ga)
	G	Intrinsic safety + explosion proof (Ex d ia T2~T6 Gb)
Antenna Type	DS	(-40~150) °C/(-0.1~2.5)Mpa ,Lens Diameter 50 mm
	DQ	(-40~200) °C/(-0.1~2.5)Mpa ,Lens Diameter 50mm
	ES	(-40~150) °C/(-0.1~2.5)Mpa ,Lens Diameter 80 mm
	EQ	(-40~200) °C/(-0.1~2.5)Mpa ,Lens Diameter 80mm
Antenna Material	A	PTFE (-40~200) °C
	B	PFA(-40~150) °C
Process Connection	FA	DN50,PN16 Flange,Stainless steel 316L
	FB	DN80,PN16 Flange, Stainless steel 316L
	FC	DN100,PN16 Flange, Stainless steel 316L
	FD	DN125,PN16 Flange, Stainless steel 316L
	FE	DN150, PN16 Flange, Stainless steel 316L
	X	Other Flange standard
Sealing	X	None
Electronic	B	(4~20)mA/Hart/2 wire
	R	RS485/MODBUS
	E	(4~20)mA/(18~25)V DC/ Hart,2 wire,2 chambers
	C	(4~20)mA/(18~25)V DC/ Hart,4 wire,2 chambers
	D	(4~20)mA/220V AC / Hart,4 wire,2 chambers
	X	Others
Housing	B	Plastic/IP66
	A	Aluminum/IP67
	G	Stainless steel 316L/IP67
	D	Aluminum/2 chamber/IP67
	H	Stainless steel 316L /2 chamber/IP67
Cable Entry	M	M20×1.5
	N	1/2”NPT
Display	A	Integral display
	C	Remote display
	X	None

8.3 SDRD83 Product model Selection

Mark	Code	Description
SDRD 83	SDRD 83	SDRD 83 series 80G Radar
Approvals	P	Standard (non-explosion-proof)
	I	Intrinsic safety (Ex ia IIC T2-T6 Ga)
	G	Intrinsic safety + explosion proof (Ex d ia T2~T6 Gb)
Antenna Type	DS	(-40~150) °C/(-0.1~2.5)Mpa ,Lens Diameter 50 mm
	DQ	(-40~200) °C/(-0.1~2.5)Mpa ,Lens Diameter 50mm
	ES	(-40~150) °C/(-0.1~2.5)Mpa ,Lens Diameter 80 mm
	EQ	(-40~200) °C/(-0.1~2.5)Mpa ,Lens Diameter 80mm
Antenna Material	A	PTFE (-40~200) °C
	B	PFA(-40~150) °C
Process Connection	FA	DN50,PN16 Flange,Stainless steel 316L
	FB	DN80,PN16 Flange, Stainless steel 316L
	FC	DN100,PN16 Flange, Stainless steel 316L
	FD	DN125,PN16 Flange, Stainless steel 316L
	FE	DN150, PN16 Flange, Stainless steel 316L
	X	Other Flange standard
Sealing	X	None
Electronic	B	(4~20)mA/Hart/2 wire
	R	RS485/MODBUS
	E	(4~20)mA/(18~25)V DC/ Hart,2 wire,2 chambers
	C	(4~20)mA/(18~25)V DC/ Hart,4 wire,2 chambers
	D	(4~20)mA/220V AC / Hart,4 wire,2 chambers
	X	Others
Housing	B	Plastic/IP66
	A	Aluminum/IP67
	G	Stainless steel 316L/IP67
	D	Aluminum/2 chamber/IP67
	H	Stainless steel 316L /2 chamber/IP67
Cable Entry	M	M20×1.5
	N	1/2”NPT
Display	A	Integral display
	C	Remote display
	X	None

8.4 SDRD85 Product model Selection

Mark	Code	Description
SDRD 85		SDRD 85 series 80G Radar
Approvals	P	Standard (non-explosion-proof)
	I	Intrinsic safety (Ex ia IIC T2-T6 Ga)
	G	Intrinsic safety + explosion proof (Ex d ia T2~T6 Gb)
Antenna Type	KW	(-40~130) °C/(-0.1~1.0)Mpa ,Lens Diameter 50 mm
	KQ	(-40~130) °C/(-0.1~1.0)Mpa ,Lens Diameter 80m
Antenna Material	A	PTFE (-40~200) °C
Process Connection	KA	2”Clamp,PN16,OD=64mm ,ISO2852,DIN32676
	KB	3-1/2”Clamp,PN16,OD=106mm ,ISO2852,DIN32676
Sealing	X	None
Electronic	B	(4~20)mA/Hart/2 wire
	R	RS485/MODBUS
	E	(4~20)mA/(18~25)V DC/ Hart,2 wire,2 chambers
	C	(4~20)mA/(18~25)V DC/ Hart,4 wire,2 chambers
	D	(4~20)mA/220V AC / Hart,4 wire,2 chambers
	X	Others
Housing	B	Plastic/IP66
	A	Aluminum/IP67
	G	Stainless steel 316L/IP67
	D	Aluminum/2 chamber/IP67
	H	Stainless steel 316L /2 chamber/IP67
Cable Entry	M	M20×1.5
	N	1/2”NPT
Display	A	Integral display
	C	Remote display
	X	None

8.5 SDRD87 Product model Selection

Mark	Code	Description
SDRD 87		SDRD 87 series 80G Radar
Approvals	P	Standard (non-explosion-proof)
	I	Intrinsic safety (Ex ia IIC T2-T6 Ga)
	G	Intrinsic safety + explosion proof (Ex d ia T2~T6 Gb)
Antenna Type	MW	(-40~110)° C/Normal Pressure/ Plastic lined alum./Gimbal
	NW	(-40~130)° C/Normal Pressure/SUS 316L./Gimbal
	RW	(-40~200)° C/Normal Pressure/SUS 316L./Gimbal
	HG	(-40~110)° C/Normal Pres./ Plastic lined alum./M94×2/Hang
	JG	(-40~130)° C/-0.1~0.3Mpa./SUS 316L./ M94×2
	LG	(-40~200)° C/-0.1~0.3Mpa./SUS 316L./ M94×2
Antenna Material	D	PP(-40~110) °C
	A	PTFE (-40~200) °C
	G	PEEK (-40~200) °C
Process Connection	FC	DN100,PN16 Flange, Stainless steel 316L
	FD	DN125,PN16 Flange, Stainless steel 316L
	FE	DN150, PN16 Flange, Stainless steel 316L
	X	Other Flange standard
	GD	Hanger
Sealing	A	FKM (-40~200) °C
Electronic	B	(4~20)mA/Hart/2 wire
	R	RS485/MODBUS
	E	(4~20)mA/(18~25)V DC/ Hart,2 wire,2 chambers
	C	(4~20)mA/(18~25)V DC/ Hart,4 wire,2 chambers
	D	(4~20)mA/220V AC / Hart,4 wire,2 chambers
	X	Others
Housing	B	Plastic/IP66
	A	Aluminum/IP67
	G	Stainless steel 316L/IP67
	D	Aluminum/2 chamber/IP67
	H	Stainless steel 316L /2 chamber/IP67
Cable Entry	M	M20×1.5
	N	1/2”NPT
Display	A	Integral display
	C	Remote display
	X	None

8.6 SDRD88 Product model Selection

Mark	Code	Description
SDRD 88		SDRD 88 series 80G Radar
Approvals	P	Standard (non-explosion-proof)
	I	Intrinsic safety (Ex ia IIC T2-T6 Ga)
Antenna Type	ST	(-40~80) °C/(-0.1~1.0)Mpa ,Lens Diameter 61 mm
Antenna Material	B	PFA (-40~80) °C
Process Connection	GP	Thread G1
	WX	Gimbal
Flange	FC	DN100,PN16 Flange, Stainless steel 316L
	FD	DN125,PN16 Flange, Stainless steel 316L
	FE	DN150, PN16 Flange, Stainless steel 316L
	FF	DN200,PN16 Flange, Stainless steel 316L
	FG	DN250,PN16 Flange, Stainless steel 316L
	FX	Other flange standard
	F0	No Flange
Electronic	B	(4~20)mA/Hart/2 wire
	R	RS485/MODBUS
	X	Others
Housing	F	Plastic /IP68
Display	E	No display, with Bluetooth

9 Application Questionnaire

Approvals

☐ Standard (non-explosion-proof)
☐ intrinsically safe (Exia IIC T6 Ga)
☐ Intrinsically safe + dust version (Ex ia D 20 T80℃)
☐ Intrinsically safe+ flameproof approval(Exdia [ia Ga] IIC T6 Gb)

Measured Medium

Name _____
Condition ☐ Liquid (☐ Volatile gas ☐Crystal ☐ Viscous) ☐ Solid（Form ☐Mass ☐Particle ☐Dust）
Temperature: Min._____℃ Norm._____℃ Max._____℃
Surface ☐ Flat ☐ Turbulent ☐ Agitated Vorte
Dielectric Constant ☐ εr<3 ☐ εr>3

Atmosphere

Atmosphere ☐Form ☐Foam ☐ Dust ☐ Deposit ☐ Vapour
Atmosphere Pressure Min. _____ Norm. _____ Max. _____

Vessel

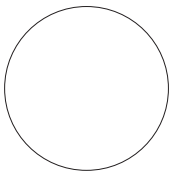
Shape of Top ☐ Flat ☐ Arch ☐ Conical ☐ Horizontal
Height _____ Diameter _____
Critical Information
Nozzle Length: _____ Nozzle Diameter: _____ Measurement Range: _____

Process Connection

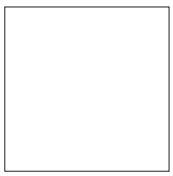
Thread（☐ G¾A ☐ ¾NPT ☐ G1½A ☐ 1½NPT ☐ G3A ☐ 3NPT）
☐ Flange（DN= ） ☐ Swivelling Holder ☐Chuck and Clamp

Installation

Mode: ☐ Top ☐ Side
Filling Stream inlet position and installation position （Please specify in the diagram below）



Circular Vessel



Square Vessel

Power Supply ☐2-wire 24V DC ☐4-wire 24V DC

Communication ☐(4～20) mA/HART ☐RS485/MODBUS protocol

Display ☐ With Programmer ☐ With Display ☐None

Customer Information

Contact: _____
Company: _____
Address: _____
P. C.: _____ Tel: _____
Email: _____ Fax: _____

Please give brief explanation on the application of instrument:

Date: _____

Silver Automation Instruments Ltd.
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