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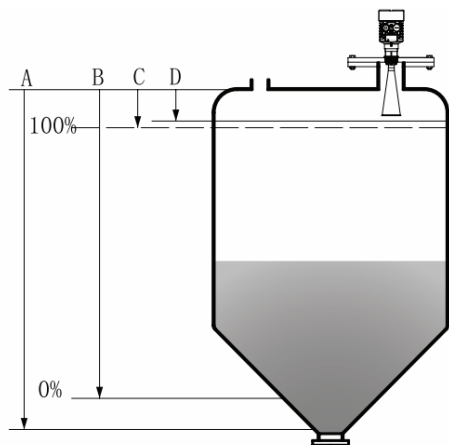
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Product Overview

SKRD90 series radar level meter adopts 26GHz transmission frequency technology, output 4-20mA analog signals; the max level is 70m; the antenna is optimized, new type microprocessors can analysis higher signals. SKRD90 series can be applied in Reaction kettles or silos where the environment is complicated.

- Principle

The extremely narrow microwave pulse emitted by the antenna on radar level instrument can travel at the speed of light and part of its energy, which is reflected off the surface of target medium, is received by the very same antenna. The time lapse between pulse emission and reception by the antenna is proportional to the distance between the surface of target medium and the reference point on antenna



- A. Set range
- B. Min. adjustment
- C. Max. adjustment
- D. Blanking Zone

The reference plane is the thread or flange surface.

Note: The highest level of measured medium must not enter into vblanking zone while radar level measurement instrument is in operation.

- Features

The guided wave radar level instrument, adopted 26GHz as transmission frequency, which make this series have specialties as below:

- None contact measuring, none abrasion, none pollution
- Small antenna size, easy to install
- Shorter wave length, better reflection from slant
- Small blind zone, can be used in small tank
- Small beam angle, which centralize energy, Maks SKRD90 high ability of anti-jamming.
- Almost free from corrosion and foam.
- Almost free from the vapor, temperature and pressure effect
- Can be used in dusty environment
- Can be used in fluctuation environment
- 26GHz frequency, good choice to measure solids and low dielectric material

Introduction

SKRD91



Application:	Highly erosive liquids
Max. range:	20m
Process connection:	Screw, flanges
Process temperature:	-40~120° C
Process pressure:	-0.1~0.3Mpa
Accuracy:	±5mm
Frequency range:	26GHz
Explosive rating:	Exib IIC T6 Gb
Protection level:	IP67
Output signal:	4~20mA/HART(2 wire/4 wire) RS485/Modbus

SKRD92



Application:	Level measurement in liquids, under certain temperature and pressure, mildly erosive liquids
Max. range:	30m
Process connection:	Screw, flanges
Process temperature:	-40~250° C
Process pressure:	-0.1~4.0Mpa
Accuracy:	±3mm
Frequency range:	26GHz
Explosive rating:	Exib IIC T6 Gb
Protection level:	IP67
Output signal:	4~20mA/HART(2 wire/4 wire) RS485/Modbus

SKRD93



Application:	Strong dew/dust/crystal solid
Max. range:	70m
Process connection:	Screw, flanges
Process temperature:	-40~120° C
Process pressure:	-0.1~4.0Mpa
Accuracy:	±15mm
Frequency range:	26GHz
Explosive rating:	Exib IIC T6 Gb
Protection level:	IP67
Output signal:	4~20mA/HART(2 wire/4 wire) RS485/Modbus

SKRD94



Application: Strong dew/dust/crystal Solid
 Max. range: 70m
 Process connection: Screw, flanges
 Process temperature: -40~240° C
 Process pressure: -0.1~4.0Mpa
 Accuracy: ± 15mm
 Frequency range: 26GHz
 Explosive rating: Exib IIC T6 Gb
 Protection level: IP67
 Output signal: 4~20mA/HART(2 wire/4 wire)
 RS485/Modbus

SKRD95



Application: Solid particle, powder
 Max. range: 30m
 Process connection: Screw, flanges
 Process temperature: -40~250° C
 Process pressure: atmospheric pressure
 Accuracy: ± 10mm
 Frequency range: 26GHz
 Explosive rating: Exib IIC T6 Gb
 Protection level: IP67
 Output signal: 4~20mA/HART(2 wire/4 wire)
 RS485/Modbus

SKRD96



Application: Sanitary liquids, strong erosive liquids
 Max. range: 20m
 Process connection: flanges
 Process temperature: -40~150° C
 Process pressure: -0.1~0.5 Mpa
 Accuracy: ± 3mm
 Frequency range: 26GHz
 Explosive rating: Exib IIC T6 Gb
 Protection level: IP67
 Output signal: 4~20mA/HART(2 wire/4 wire)
 RS485/Modbus

Mounting Requirement

- Preparation before installation

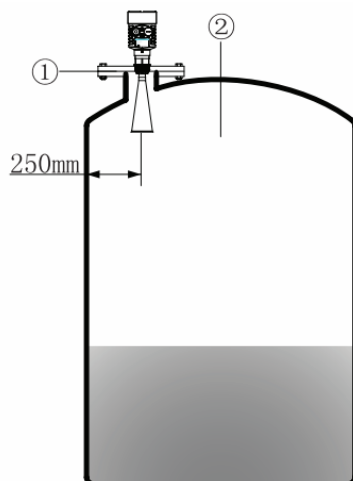
Following points need to be paid attention to:

- Enough space needs to be reserved
- Avoid strong vibration space
- Following installation requirements need be complied

* Installation Instruction:

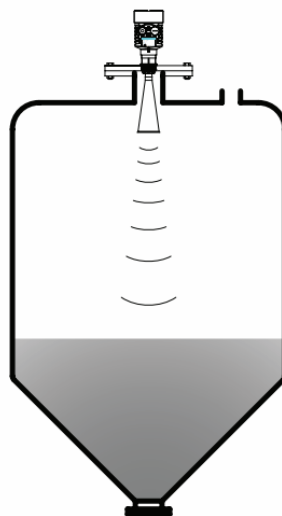
The radar level meter should be installed in the 1/4 or 1/6 of diameter of the storage tank; min. distance required between the radar level meter and vessel wall is 250mm

► Installation Instruction: The radar level meter should be installed in the 1/4 or 1/6 of diameter of the storage tank; min. distance required between the radar level meter and vessel wall is 250mm

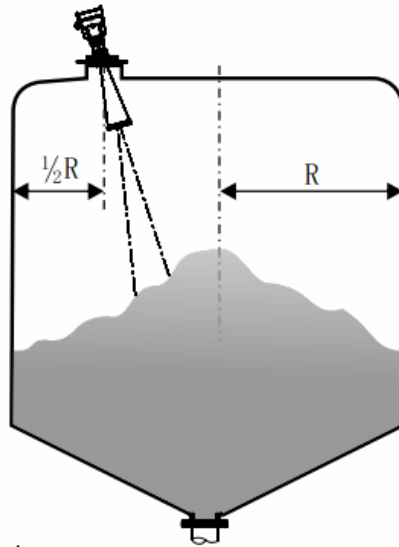


- ①Reference Plane
- ②Center of Vessel or Symmetrical axis

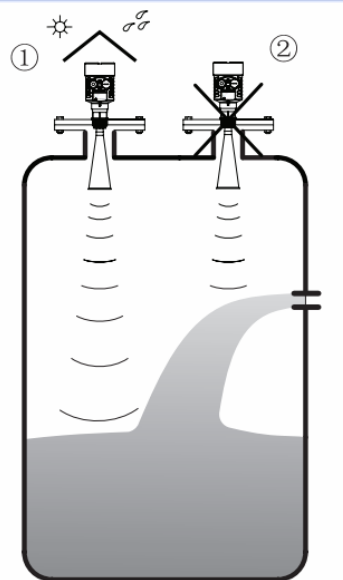
► The best mounting position for a conical vessel with flat top is the center of its top, as the effective measurement can reach the bottom of vessel.



- ▶ Storage tank with stockpile: The Antenna should be vertical to the stockpile, if the stockpile is not even; gimbal is required to adjust the horn antenna.

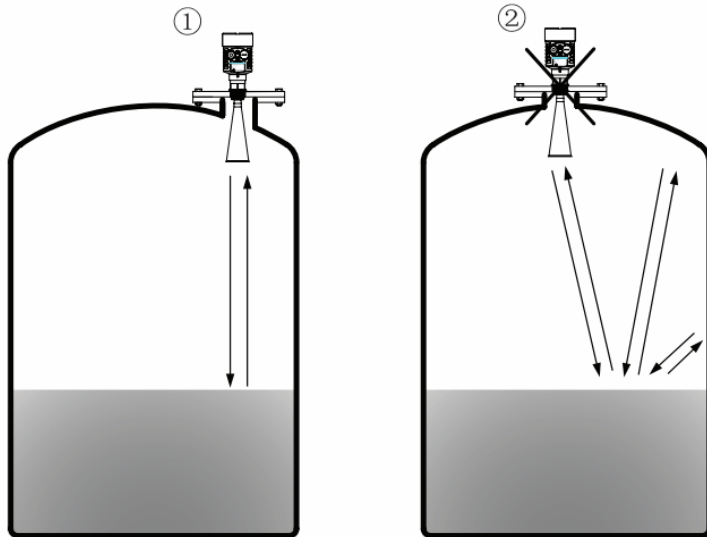


- Typical wrong installation:
 - ▶ the radar should not be installed in the feed port, also the radar is better to be free from rain and sunshine.



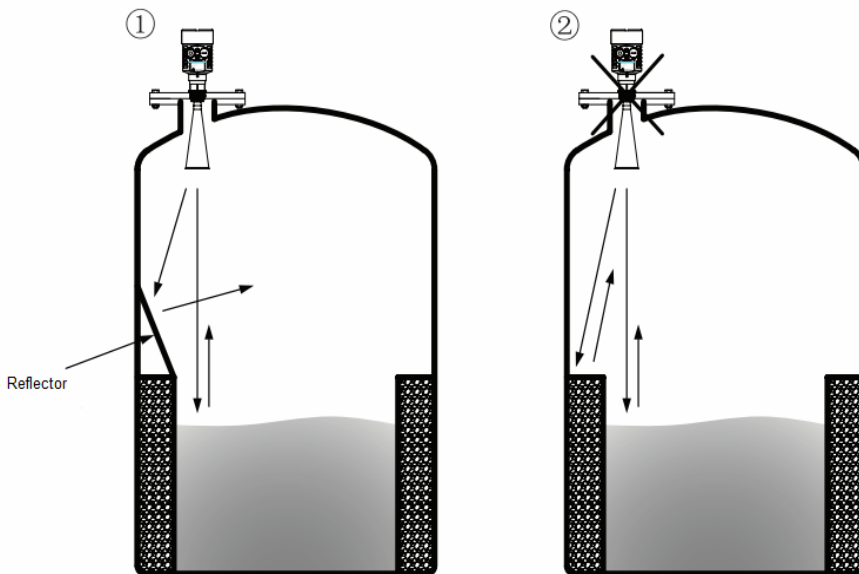
- ① Correct
- ② Wrong

► The radar level meter should not be installed in the center of arch tank , if installed in the center, it will result in multiple echoes and affect the measuring effect.



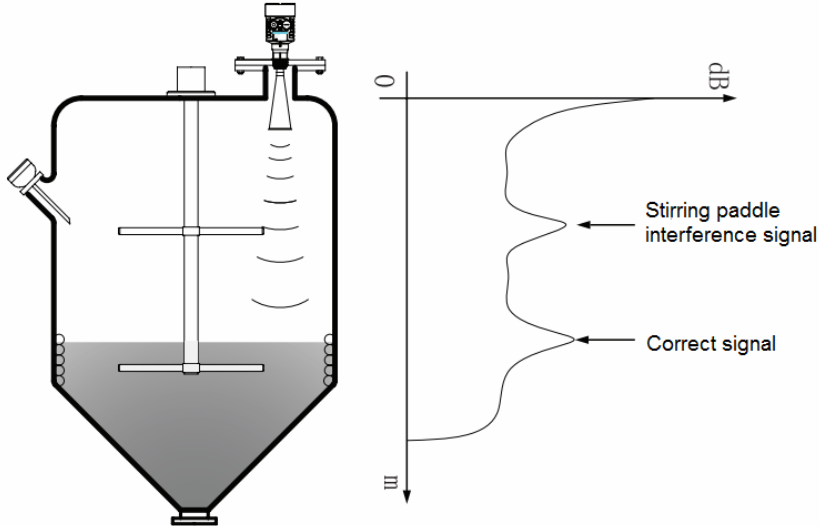
①Correct
②Wrong

► If there are obstacles in the tank which can affect the measuring result, reflector is required.



①Correct
②Wrong

- ▶ If there is obstacle in the area where the microwave covers, such as ladder, limit switch, heating devices, support .etc which will lead to a wrong measuring, wave guide is required.

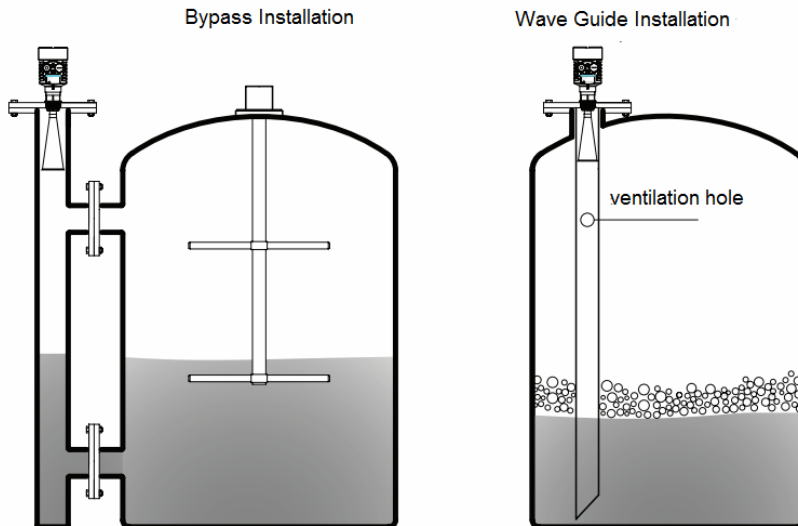


- ▶ If there are obstacles in the tank which can affect the measuring result, reflector is required.

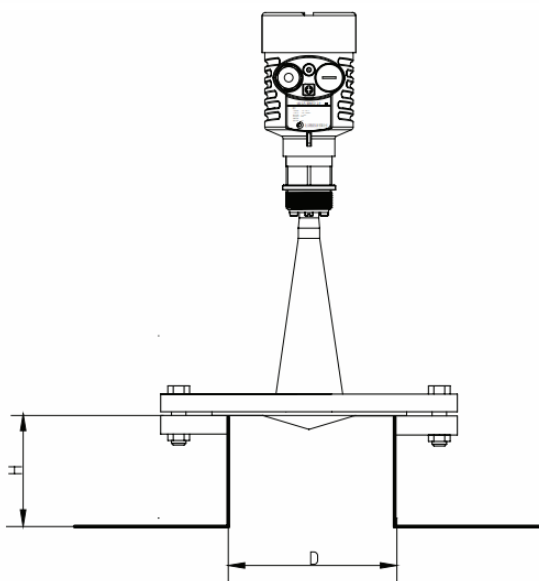
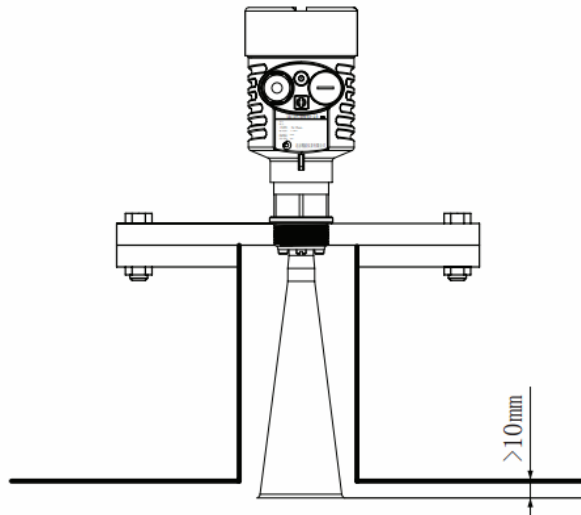
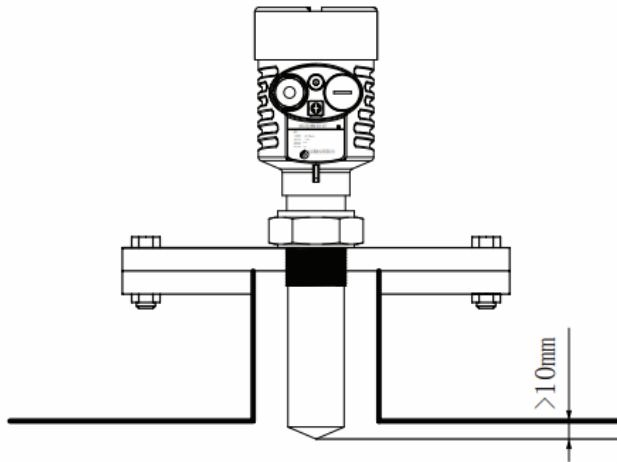
Note: the diameter of ventilation hole is 5~10mm.

The diameter of wave guide is minimum 50mm, and the internal of the pipe should be smooth.

Suitable for liquids with good fluidity, not good for viscous liquids.



- ▶ Connection Pipe requirement: Antenna minimum length into tank is 10mm



D	H _{max}
50mm	100
80mm	150
100mm	200

Electrical Connection

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- **Power supply**

(4~20mA) /HART(2 wire)

The power supply and output signal using the same cable, specified power supply refer to technical data; for Intrinsically safe type radar level meter, Safety Barrier is needed between power supply and radar level meter.

(4~20mA) /HART(4 wire)

The power supply and output signal using separate cables, specified power supply refer to technical data;

RS485/Modbus

Power supply and Modbus signal using the same shielded cable with 2 cores.

- **Install Connection cable**

General Introduction

Cable external diameter:

5~9mm (M20*1.5)

3.5mm~8.7mm(½NPT)

Connection cable is 2 core or 4 core cables. The Sensor cable need to be shielded cable to free from electric drive, power supply cable or launcher devices interface

(4~20mA) /HART(2 wire)

Power supply cable can be common 2 core cable

(4~20mA) /HART(4 wire)

Power supply cable should be cable with grounding.

RS485/Modbus

Power supply cable should be shielded cable

General Introduction

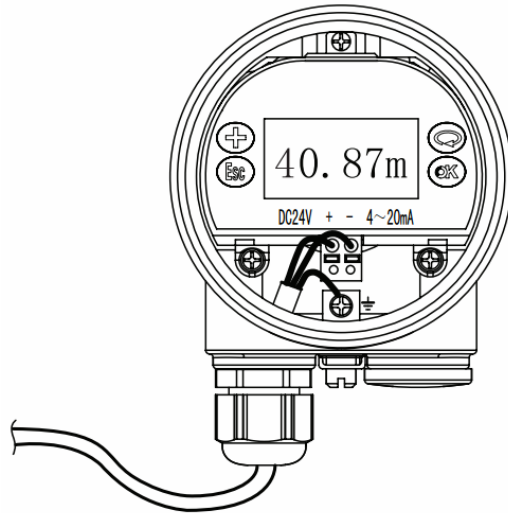
Ideally, both ends of the shield cable should be grounded, but we should notice that there is grounding compensation cable pass the sensor cable shield. When grounding, we can connect one end(In switch cabinet, for example)with ground potential capacitance(1 Mf;1500V)

Lower resistance grounding is recommended

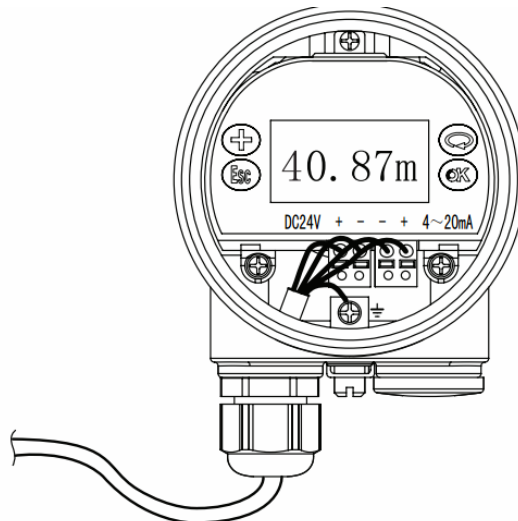
(Note: if the instrument is used in hazardous area, for potential transmission, both ends can not be grounded.

- **Wiring**

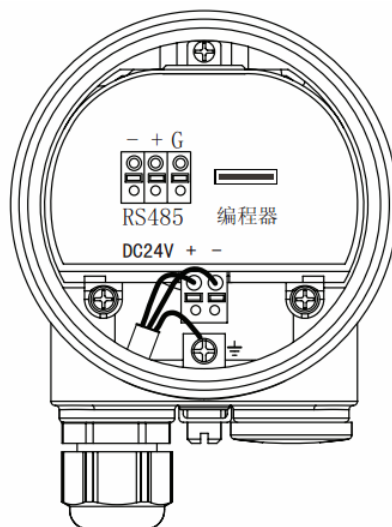
- ▶ 24V 2-Wire connection:



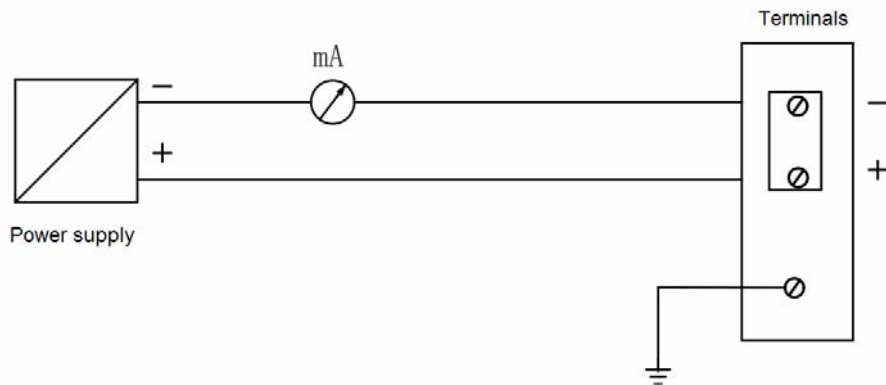
- ▶ 24V 4-Wire connection:



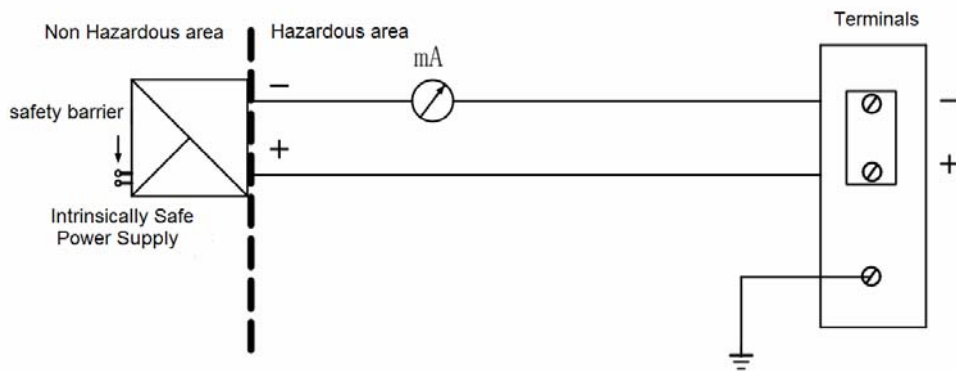
- ▶ 24V RS485/Modbus connection:



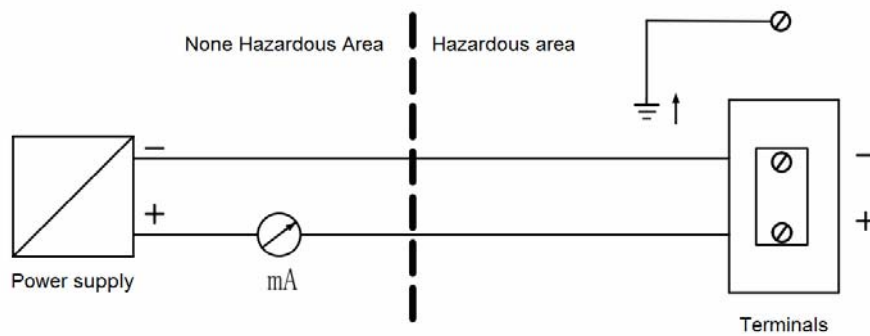
- ▶ Standard type (None hazardous area protection)



- ▶ Intrinsically safe Proof



- ▶ Explosive Proof



- **Safety Guidance**

All the electrical connection operation should be taken when all the power supply is cut off.

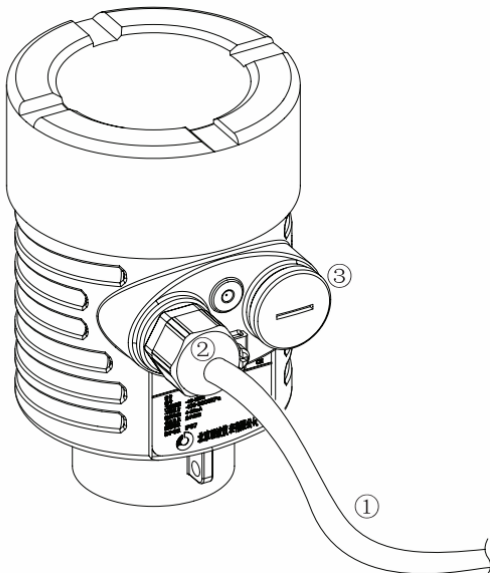
Comply with your local area electrical installation standard

Only Trained person can take all the operations.

Check all the product specifications on the name plate of the radar level meter, whether they can meet your demand

- **Protection level**

Our meter is IP67 level, showing as the following picture:



IP 67 Requirements:

Please make sure all the sealing port is undamaged

Please make sure all the cables are undamaged

Please make sure all the cables meet electrical connection standard

The cable should be decurved before into the electrical connection port, showing as ①

Please tighten the sealing plug ,show as ②

The unused electrical ports should be plugged. Showing as ③

Adjustment Instructions

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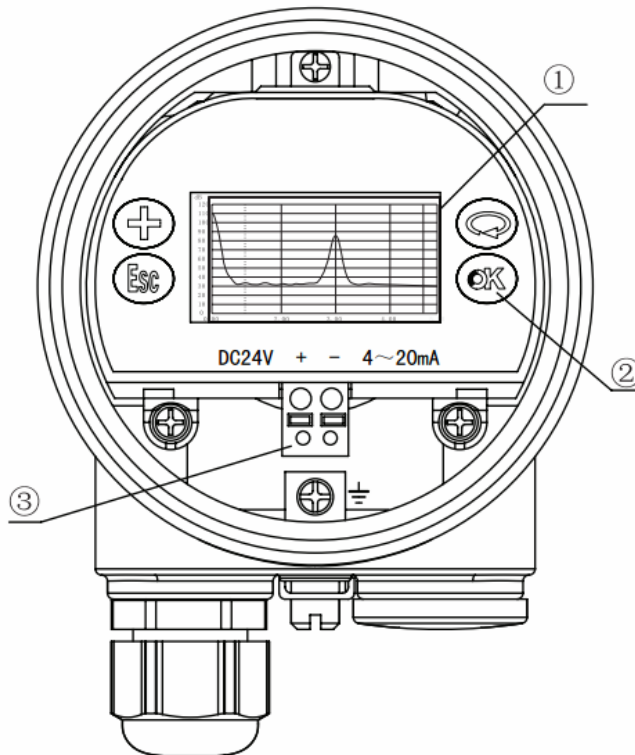
- **Adjust methods**

Three ways can be chosen when adjusting the radar level meter:

1. by adjusting the display /buttons
2. by adjusting the host computer
3. Handheld HART Communicator

- **Display /buttons:**

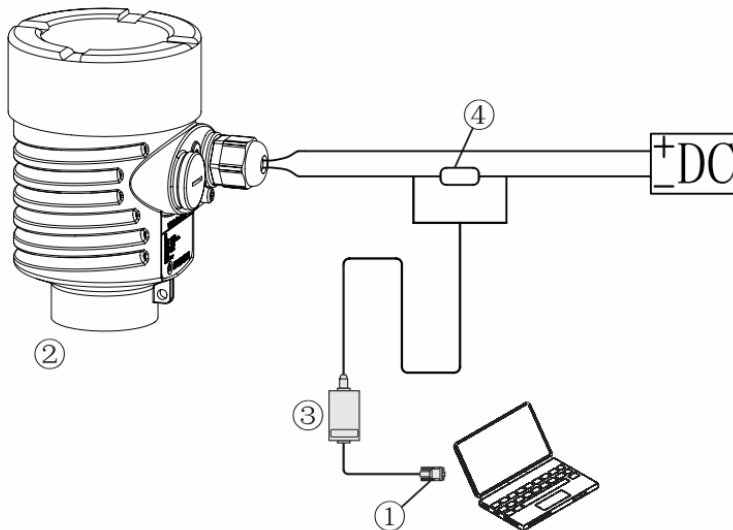
There are four buttons on display; Optional menu operation languages are available for selection. It is only used for display after adjustment in that the measurement results can be seen clearly through the glass window.



- ① LCD display
- ② Buttons
- ③ Wiring terminals

● **Host Computer Adjustment**

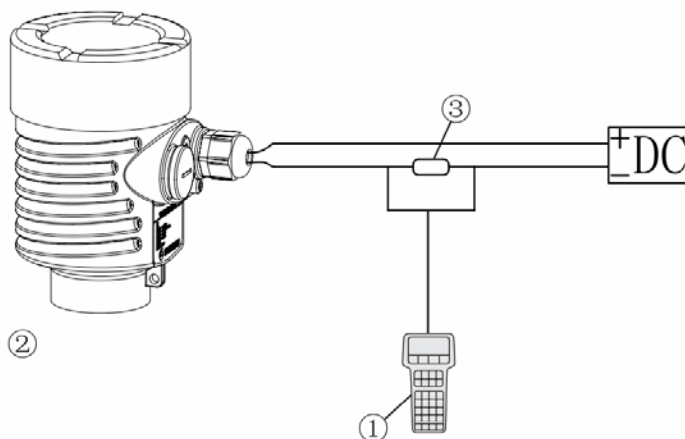
Connect the radar level meter with Host Computer through HART



- ① RS232 or USB interface
- ② SKRD90
- ③ Hart Adapter
- ④ 250 Ω Resistance

● **Handheld HART Communicator**

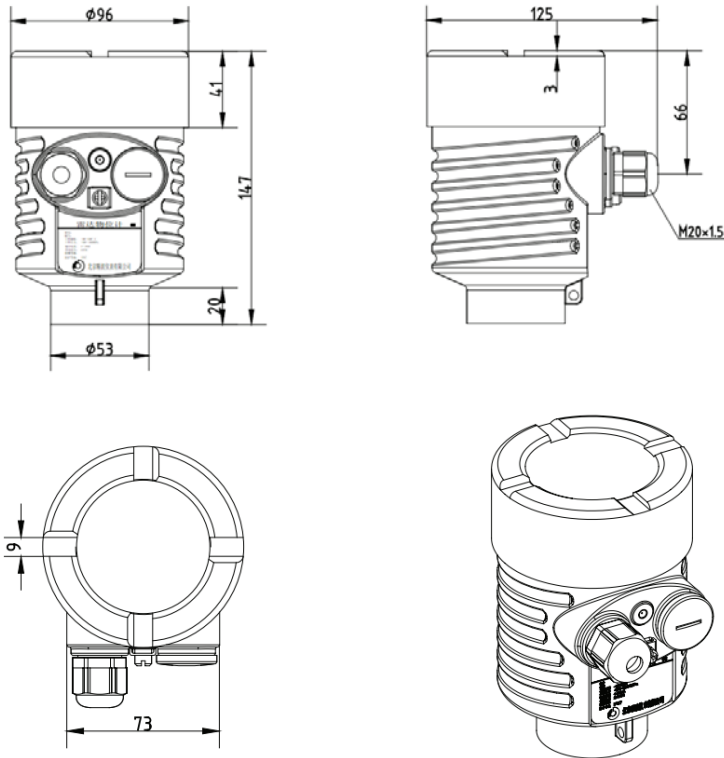
SKRD90 can be adjust by Handheld Hart Communicator



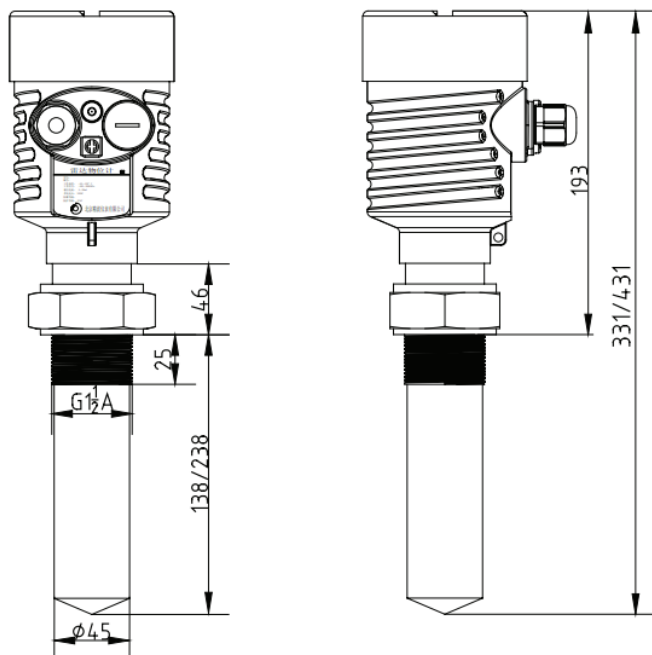
- ① HART Communicator
- ② SKRD90
- ③ 250 Ω Resistance

Dimensional Drawing

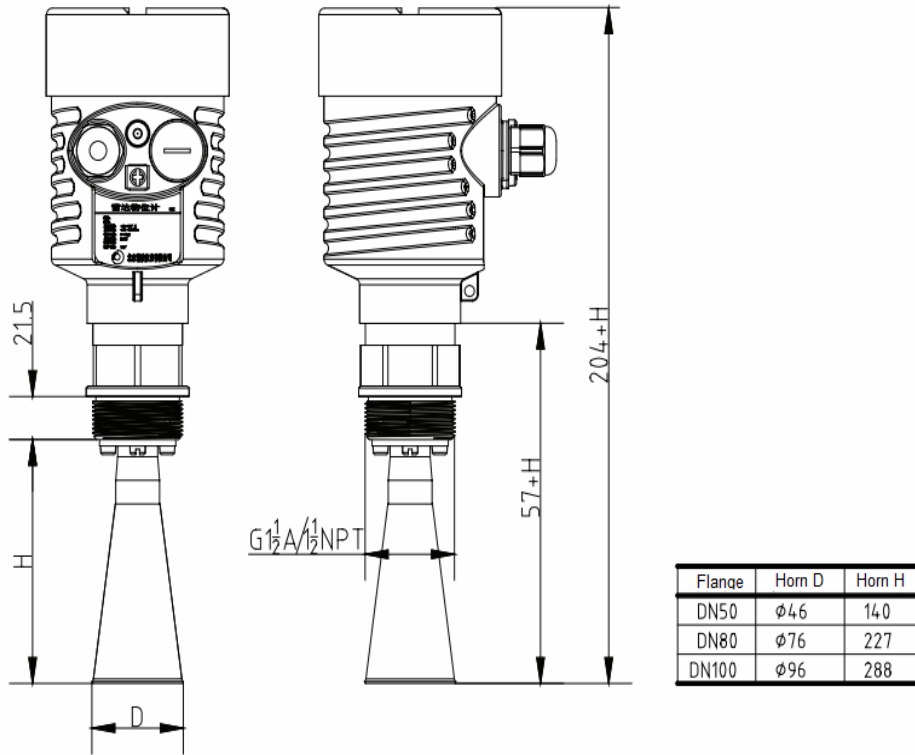
Housing Dimensions



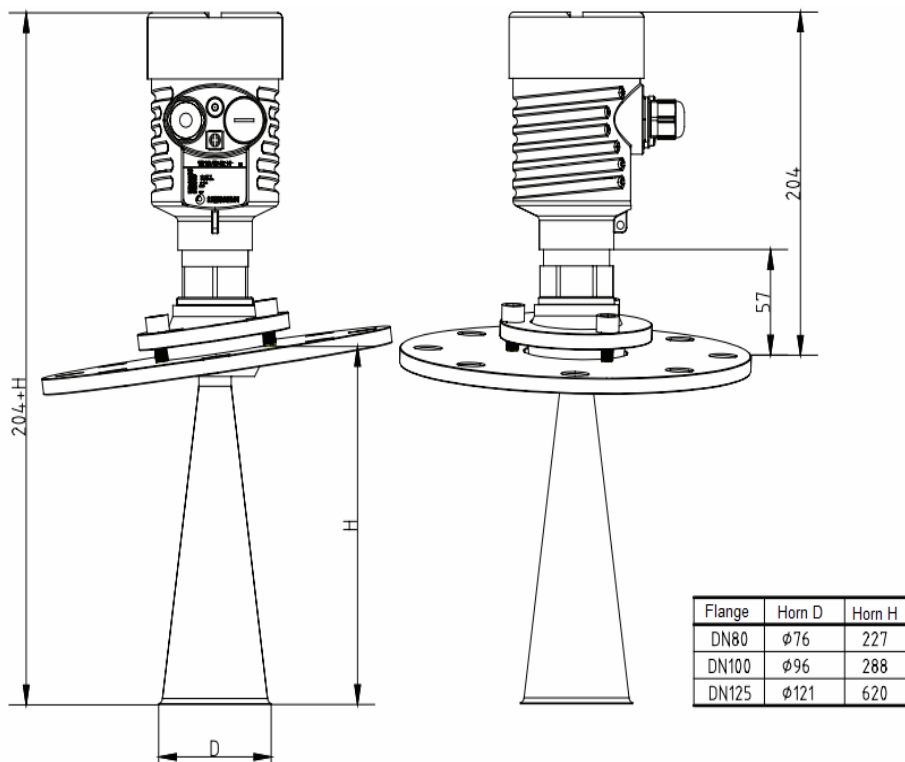
SKRD91



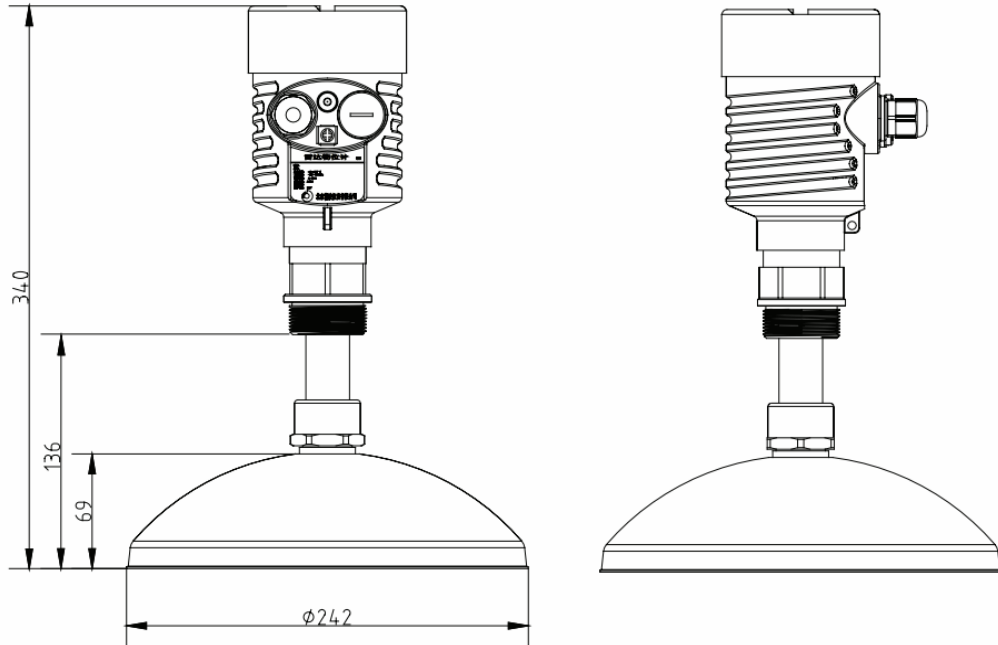
SKRD92



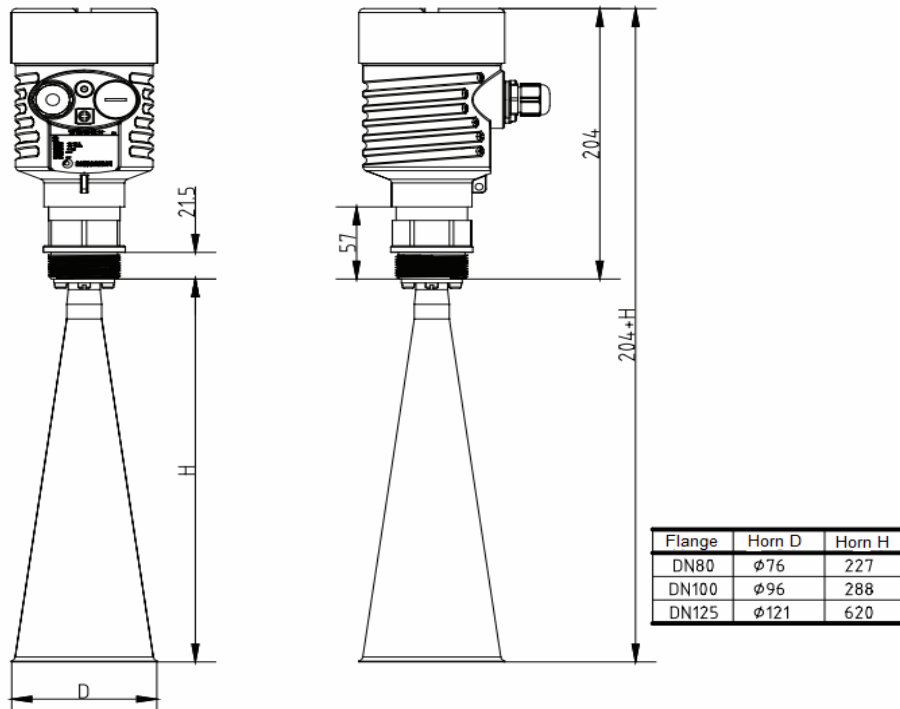
SKRD93



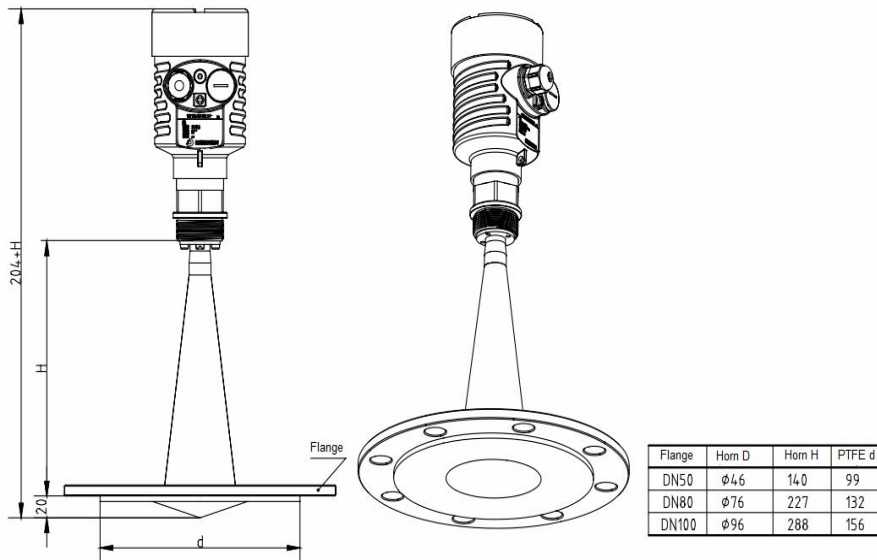
SKRD94



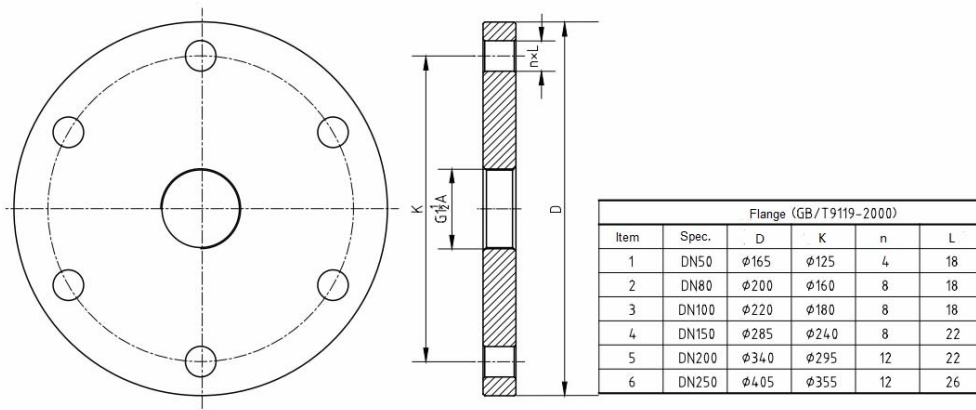
SKRD95



SKRD96



Flange Dimensions



Technical Specifications

● General Information

Specification	SKRD91	SKRD92	SKRD93	SKRD94	SKRD95	SKRD96
Process	G $\frac{1}{2}$ "A	G $\frac{1}{2}$ "A	G $\frac{1}{2}$ "A	G $\frac{1}{2}$ "A	G $\frac{1}{2}$ "A	G $\frac{1}{2}$ "A
Connection	1 $\frac{1}{2}$ " NPT	1 $\frac{1}{2}$ " NPT	1 $\frac{1}{2}$ " NPT	1 $\frac{1}{2}$ " NPT	1 $\frac{1}{2}$ " NPT	1 $\frac{1}{2}$ " NPT
	Flange	Flange	Flange	Flange	Flange	Flange
Antenna material	PTFE	SS/PTFE	SS/PTFE	SS/PTFE	SS/PTFE	SS/PTFE

Housing

Sealing rings	Silicone
Display	Polycarbonate
Ground terminal	Stainless Steel

Weight

-SKRD91	1kg(Depend on process connections and housings)
-SKRD92	2kg(Depend on process connections and housings)
-SKRD93	6kg(Depend on process connections and housings)
-SKRD94	7kg(Depend on process connections and housings)
-SKRD95	2kg(Depend on process connections and housings)
-SKRD96	3kg(Depend on process connections and housings)

Power supply

2 wire	Standard Version	(16~36)V DC
	Intrinsically safe Type	(21.6~26.4)V DC
	Consumption	max.22.5mA
	Ripple Allowed	
	<100Hz	U _{ss} <1V
	(100~100K)Hz	U _{ss} <10mV

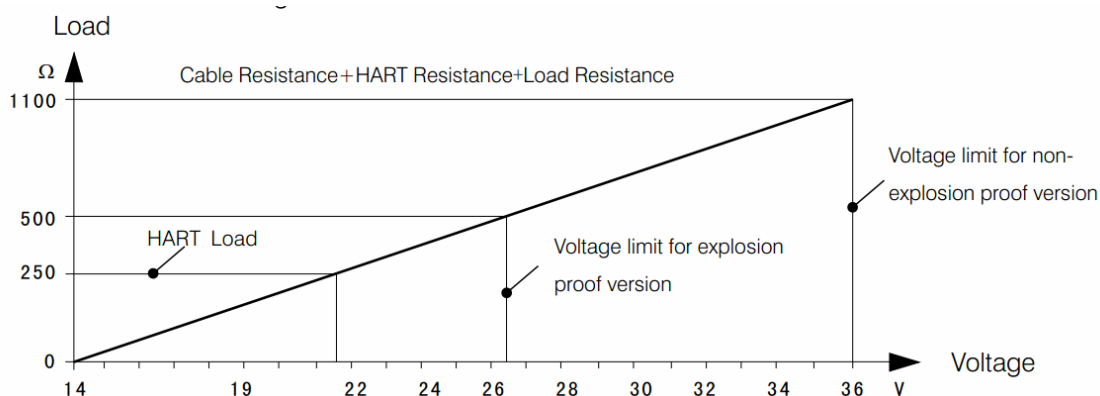
Cable Parameters

Cable Entry/Plug	One cable entry of M20x1.5(cable diameter of 5~9mm) one binding of M20x1.5
------------------	---

Output

Connection terminals	Cross section of cable is 2.5mm ²
Output Signal	4...20mA/HART
Resolution	1.6μA
Fault Signal	Constant current output: 20.5mA 22mA; 3.9mA
-2-wire load resistance	See diagram below
Integration Time	0...40sec, adjustable

2-wire load Resistance Diagram



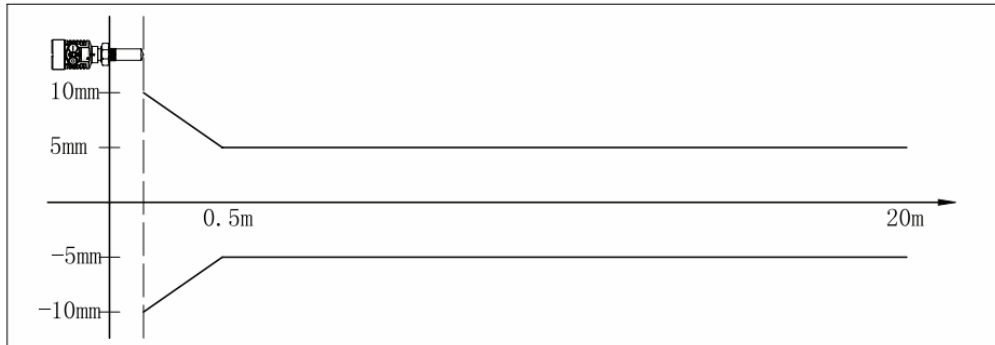
● Characteristic Parameter

Blanking Distance	End of Antenna	
Max Measurement Distance	SKRD91	20m(liquid)
	SKRD92	30m(liquid)
	SKRD93	70m(solid)
	SKRD94	70m(solid)
	SKRD95	30m(solid)
	SKRD96	20m(liquid)
Microwave Frequency	26GHz	
Communication Interface	HART/Modbus	
Measurement Interval	About 1sec (Depend on parameter settings)	
Adjustment Time	About 1sec (Depend on parameter settings)	
Resolution of display	1 mm	
Temperature for Storage/Transport	(-40~100)C	
Process Temperature (Probe)	SKRD91	(-40~130) ° C
	SKRD92	(-40~250) ° C
	SKRD93	(-40~250) ° C
	SKRD94	(-40~250) ° C
	SKRD95	(-40~250) ° C
	SKRD96	(-40~150) ° C
Relative Humidity	<95%	
Pressure	Max.40MPa	
Vibration Proof	Mechanical vibration	10m/s 10m/s , 10~150Hz

Instrument linearity

SKRD91

Beam angle 22°



SKRD92

Beam Angle

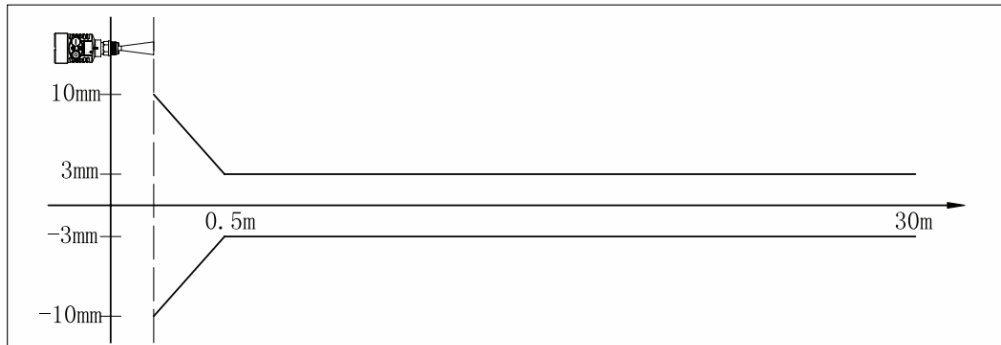
-Φ46mm 18°

-Φ76mm 12°

-Φ96mm 8°

-Φ121mm 6°

Accuracy See diagram below



SKRD93

Beam Angle

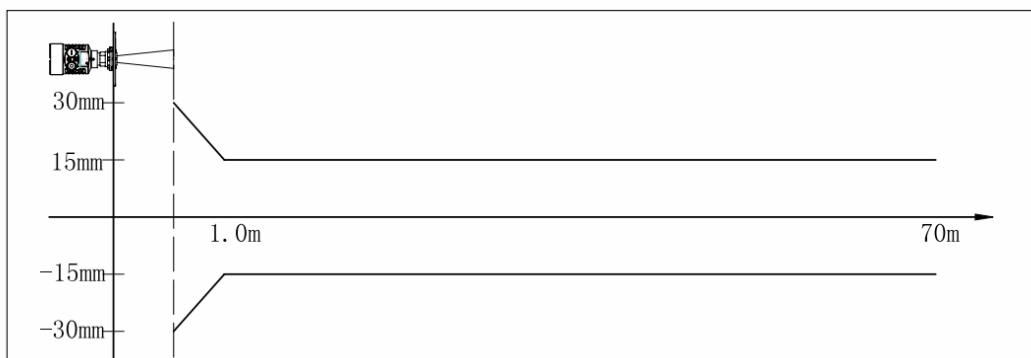
-Φ46mm 18°

-Φ76mm 12°

-Φ96mm 8°

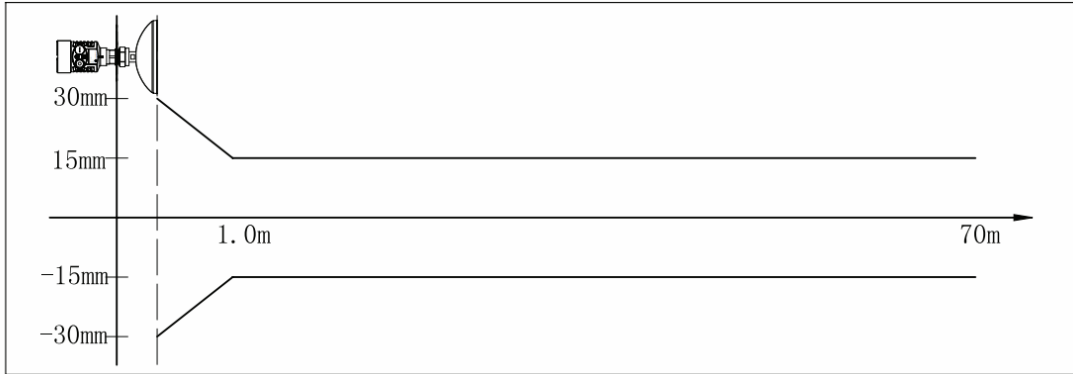
-Φ121mm 6°

Accuracy See diagram below



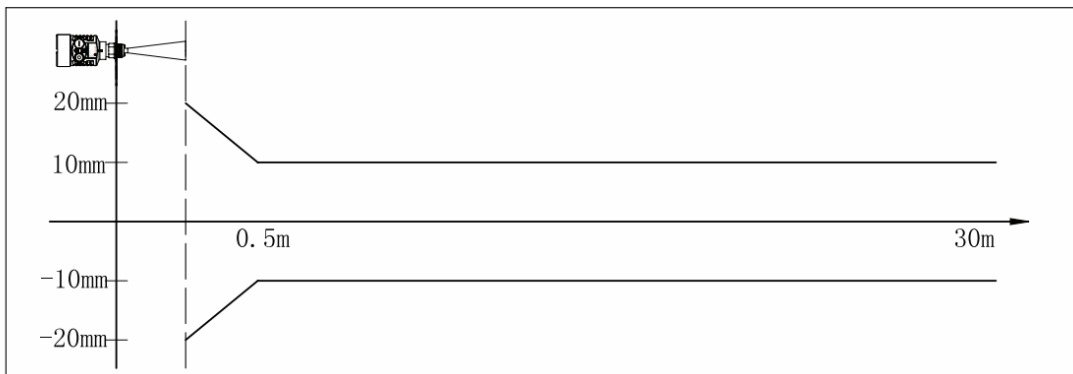
SKRD94

Beam angle	
-Φ196mm	5°
-Φ242mm	4°
Accuracy	See diagram below



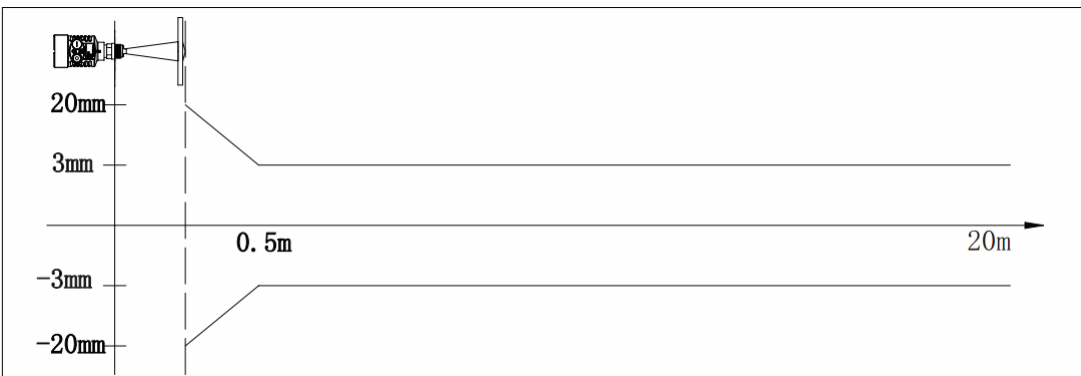
SKRD95

Beam Angle	
-Φ76mm	12°
-Φ96mm	8°
-Φ121mm	6°
Accuracy	See diagram below



SKRD96

Beam Angle	
-Φ46mm	18°
-Φ76mm	12°
-Φ96mm	8°



Selection & Ordering Information

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SKRD91

Explosive Proof	
P	Standard(Without Approval)
I	Intrinsically Safe (Exia IIC T6 Gb)
D	Intrinsically Safe+Flameproof Approval (Exd ia IIC T6 Gb)
Antenna/Material/Process Temperature/Antenna length	
B	Airproof Horn/PTFE/(-40~120) ° C
Process Connection/Material	
G	Thread G1½”A
N	Thread 1½NPT
A	Flange DN50/PP
B	Flange DN80/PP
C	Flange DN100/PP
Y	Special Demand
Length of Vessel Socket	
A	100mm
B	200mm
Electronic	
2	(4~20)mA/ 2-Wire
3	(4~20)mA/(22.8~26.4)V DC/HART/2-Wire
4	(4~20)mA/(22.8~26.4)V DC/HART/4-Wire
5	RS485/Modbus
Housing/Protection	
L	Aluminium/IP67
G	Stainless steel 304/IP67
Cable Entry	
M	M20x1.5
N	½NPT
Display/Programming	
A	Yes
X	No

SKRD92

Explosive Proof	
P	Standard(Without Approval)
I	Intrinsically Safe (Exia IIC T6 Gb)
D	Intrinsically Safe+Flameproof Approval (Exd ia IIC T6 Gb)
Process Connection/Material	
G	Thread G1½”A
N	Thread 1½NPT
A	Flange DN50/PP
B	Flange DN80/PP
C	Flange DN100/PP
Y	Special Demand
Antenna/Material	
A	Horn Φ46mm/Stainless Steel 304
B	Horn Φ76mm/Stainless Steel 304
C	Horn Φ96mm/Stainless Steel 304
Y	Special Demand
Seal/Process Temperature	
V	Viton(-40~150) ° C
K	Kalrez(-40~250) ° C
Electronic	
2	(4~20)mA/ 2-Wire
3	(4~20)mA/(22.8~26.4)V DC/HART/2-Wire
4	(4~20)mA/(22.8~26.4)V DC/HART/4-Wire
5	RS485/Modbus
Housing/Protection	
L	Aluminium/IP67
G	Stainless steel 304/IP67
Cable Entry	
M	M20x1.5
N	½NPT
Display/Programming	
A	Yes
X	No

SKRD93

Explosive Proof	
P	Standard(Without Approval)
I	Intrinsically Safe (Exia IIC T6 Gb)
D	Intrinsically Safe+Flameproof Approval (Exd ia IIC T6 Gb)
Process Connection/Material	
G	Thread G1½”A /stainless steel 304
N	Thread 1½NPT/stainless steel 304
B	Flange DN80/stainless steel 304
C	Flange DN100/stainless steel 304
D	Flange DN125/ stainless steel 304
E	Flange DN150/ stainless steel 304
F	Flange DN200/ stainless steel 304
H	Flange DN250/ stainless steel 304
M	Flange DN80/ gimbal/stainless steel 304
K	Flange DN100/ gimbal/stainless steel 304
T	Flange DN125/ gimbal/stainless steel 304
Z	Flange DN150/ gimbal/stainless steel 304
W	Flange DN200/ gimbal/stainless steel 304
V	Flange DN250/ gimbal/stainless steel 304
Y	Special Demand
Antenna/Material	
B	Horn Φ76mm/Stainless Steel 304
C	Horn Φ96mm/Stainless Steel 304
D	Horn Φ121mm/Stainless Steel 304
Seal/Process Temperature	
V	Viton(-40~150) ° C
K	Kalrez(-40~250) ° C
Electronic	
2	(4~20)mA/ 2-Wire
3	(4~20)mA/(22.8~26.4)V DC/HART/2-Wire
4	(4~20)mA/(22.8~26.4)V DC/HART/4-Wire
5	RS485/Modbus
Housing/Protection	
L	Aluminium/IP67
G	Stainless steel 304/IP67
Cable Entry	
M	M20x1.5
N	½NPT
Display/Programming	
A	Yes
X	No

SKRD94

Explosive Proof	
P	Standard(Without Approval)
I	Intrinsically Safe (Exia IIC T6 Gb)
D	Intrinsically Safe+Flameproof Approval (Exd ia IIC T6 Gb)
Process Connection/Material	
G	Thread G1½”A /stainless steel 304
N	Thread 1½NPT/stainless steel 304
B	Flange DN80/stainless steel 304
C	Flange DN100/stainless steel 304
D	Flange DN125/ stainless steel 304
E	Flange DN150/ stainless steel 304
F	Flange DN200/ stainless steel 304
H	Flange DN250/ stainless steel 304
M	Flange DN80/ gimbal/stainless steel 304
K	Flange DN100/ gimbal/stainless steel 304
T	Flange DN125/ gimbal/stainless steel 304
Z	Flange DN150/ gimbal/stainless steel 304
W	Flange DN200/ gimbal/stainless steel 304
V	Flange DN250/ gimbal/stainless steel 304
Y	Special Demand
Antenna/Material	
B	Paraboloid horn Φ196mm/Stainless Steel 304
C	Paraboloid horn Φ242mm/Stainless Steel 304
Seal/Process Temperature	
V	Viton(-40~150) ° C
K	Kalrez(-40~250) ° C
Electronic	
2	(4~20)mA/ 2-Wire
3	(4~20)mA/(22.8~26.4)V DC/HART/2-Wire
4	(4~20)mA/(22.8~26.4)V DC/HART/4-Wire
5	RS485/Modbus
Housing/Protection	
L	Aluminium/IP67
G	Stainless steel 304/IP67
Cable Entry	
M	M20x1.5
N	½NPT
Display/Programming	
A	Yes
X	No

SKRD95

Explosive Proof	
P	Standard(Without Approval)
I	Intrinsically Safe (Exia IIC T6 Gb)
D	Intrinsically Safe+Flameproof Approval (Exd ia IIC T6 Gb)
Process Connection/Material	
G	Thread G1½”A /stainless steel 304
N	Thread 1½NPT/stainless steel 304
B	Flange DN80/stainless steel 304
C	Flange DN100/stainless steel 304
D	Flange DN125/ stainless steel 304
E	Flange DN150/ stainless steel 304
F	Flange DN200/ stainless steel 304
H	Flange DN250/ stainless steel 304
M	Flange DN80/ gimbal/stainless steel 304
K	Flange DN100/ gimbal/stainless steel 304
T	Flange DN125/ gimbal/stainless steel 304
Z	Flange DN150/ gimbal/stainless steel 304
W	Flange DN200/ gimbal/stainless steel 304
V	Flange DN250/ gimbal/stainless steel 304
Y	Special Demand
Antenna/Material	
B	Horn Φ76mm/Stainless Steel 304
C	Horn Φ96mm/Stainless Steel 304
D	Horn Φ121mm/Stainless Steel 304
Seal/Process Temperature	
V	Viton(-40~150) ° C
K	Kalrez(-40~250) ° C
Electronic	
2	(4~20)mA/ 2-Wire
3	(4~20)mA/(22.8~26.4)V DC/HART/2-Wire
4	(4~20)mA/(22.8~26.4)V DC/HART/4-Wire
5	RS485/Modbus
Housing/Protection	
L	Aluminium/IP67
G	Stainless steel 304/IP67
Cable Entry	
M	M20x1.5
N	½NPT
Display/Programming	
A	Yes
X	No

SKRD96

Explosive Proof	
P	Standard(Without Approval)
I	Intrinsically Safe (Exia IIC T6 Gb)
D	Intrinsically Safe+Flameproof Approval (Exd ia IIC T6 Gb)
Process Connection/Material	
B	Flange DN80/stainless steel 304
C	Flange DN100/stainless steel 304
D	Flange DN125/ stainless steel 304
E	Flange DN150/ stainless steel 304
F	Flange DN200/ stainless steel 304
Y	Special Demand
Antenna/Material	
A	Horn Φ46mm/Stainless Steel 304
B	Horn Φ76mm/Stainless Steel 304
C	Horn Φ96mm/Stainless Steel 304
Seal/Process Temperature	
V	Viton(-40~150) ° C
Electronic	
2	(4~20)mA/ 2-Wire
3	(4~20)mA/(22.8~26.4)V DC/HART/2-Wire
4	(4~20)mA/(22.8~26.4)V DC/HART/4-Wire
5	RS485/Modbus
Housing/Protection	
L	Aluminium/IP67
G	Stainless steel 304/IP67
Cable Entry	
M	M20x1.5
N	½NPT
Display/Programming	
A	Yes
X	No

9 Application Questionnaire

Approvals

- Standard Version
 Intrinsically Safe Version (Exia IIC T6)
 Intrinsically Safe Version (Exia IIC T6)
 Intrinsically Safe Version+Ship Approval (Exia IIC T6)
 Intrinsically Safe Version+Explosion Proof (Exd [ia] IIC T6)

Measured Medium

Name _____
 Condition
 Liquid
 Solid (Form
 Mass
 Particle
 Dust)
 Temperature: Min. _____ °C Norm. _____ °C Max. _____ °C
 Surface Flat Turbulent Agitated Vorte
 Dielectric Constant $\epsilon_r < 3$ $\epsilon_r > 3$

Atmosphere

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

Vessel

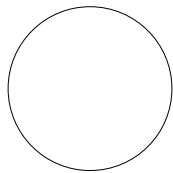
Shape of Top Flat Arch Conical Horizontal
 Height _____ Diameter _____
 Critical Information
 Nozzle Length: _____ Nozzle Diameter: _____ Measurement Range: _____

Process Connection

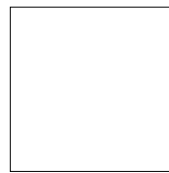
Thread (G $\frac{3}{4}$ A $\frac{3}{4}$ NPT G1A G1A, M105x2 G1 $\frac{1}{2}$ A 1 $\frac{1}{2}$ NPT G2A)
 Flange (DN=) Swivelling Holder

Installation

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



Circular Vessel



Square Vessel

Power Supply 220V AC 2-wire 24V DC 3-wire 24V DC 4-wire 24V DC

Communication (4~20) mA/HART

Display Yes No

Customer Information

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

Please give brief explanation on the application of instrument:

Date: