

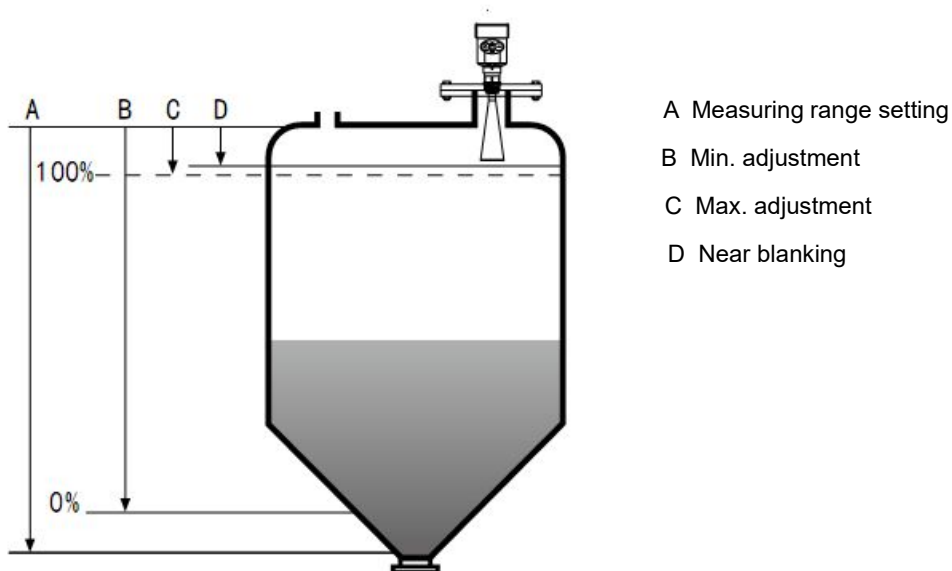
## 26GHz High Frequency Radar Level Transmitter Instruction

### 1. Product Description

DCRD1000A Series Radar Level Transmitter is high-frequency level measurement instruments with the maximum measuring distance up to 70 meters. The antenna is further optimized, and the new-type microprocessor can perform higher rate of signal analysis and processing, making the instrument available for complex measurement conditions, such as reactors, solid silos.

### Principle

Radar level antenna emits narrow microwave pulses that transmitted down by the antenna. The microwave comes into contact with the measured medium surface then reflected back and receiving by the antenna system. The signal is transmitted to electronic circuit and partly convert to level signals (as the microwave featured with high propagation speed, it's almost instantaneous for the electromagnetic waves to reach the target and return to the receiver)



Note: When applying the radar level transmitter, make sure that the highest material level cannot reach the measurement blind spot (the territory that indicate as D)

### Features of 26GHz Radar Level Transmitter

- Small antenna size, easy to install; non-contact radar, no wear, no pollution.
- Almost free from corrosion, foam impact; hardly affected by the change of the temperature, pressure and water vapor in the atmosphere.
- Severe dust environment is not likely to affect the work of the high-frequency level transmitter.
- Shorter wavelength can achieve better reflection for the inclined solid surface.
- The small field angle and energy concentration, enhanced echo capabilities, and beneficial to avoid

interference.

- Minimized measuring blind spot can gain better result of small tank measurement.
- High SNR, even in the case of fluctuations can result in better performance.
- High frequency, the best choice to measure solids and low dielectric media.

## 2. Instrument Introduction

### DCRD1000A1

#### Technical Parameter



<b>Application</b>	All kinds of strong corrosive liquid, strong acid, strong base, Chemical liquid
<b>Measuring range</b>	20meter
<b>Process connection</b>	Screw, Flange
<b>Medium Temperature</b>	-40~120°C
<b>Process pressure</b>	-0.1~0.3MPa
<b>Precision</b>	± 5mm
<b>Frequency range</b>	26GHz
<b>Anti-explosion/safety grade</b>	Exia IIC T6 Ga /IP67
<b>Signal output</b>	4...20mA/HART(Two-wire/ Four) RS485/Mod bus

### DCRD1000A2

#### Technical Parameter



<b>Application</b>	Temperature resistance, withstand pressure, slightly corrosive liquid, sewage, petroleum, river channel, heavy steam conditions, etc.
<b>Measuring range</b>	30 meter
<b>Process connection</b>	Screw, Flange
<b>Medium Temperature</b>	-40~250°C
<b>Process pressure</b>	-0.1~4.0MPa
<b>Precision</b>	± 3mm
<b>Frequency range</b>	26GHz
<b>Anti-explosion/safety grade</b>	Exia IIC T6 Ga /IP67
<b>Signal output</b>	4...20mA/HART(Two-wire/ Four) RS485/Mod bus

### DCRD1000A3

#### Technical Parameter



<b>Application</b>	Storage containers, process vessels or strong dust and crystallization, condensation occasion
<b>Measuring range</b>	70 meter
<b>Process connection</b>	Screw, Flange
<b>Medium Temperature</b>	-40~250°C
<b>Process pressure</b>	Atmospheric
<b>Precision</b>	± 15mm
<b>Frequency range</b>	26GHz
<b>Anti-explosion/safety grade</b>	Exia IIC T6 Ga /IP67
<b>Signal output</b>	4...20mA/HART(Two-wire/ Four) RS485/Mod bus

**DCRD1000A4**

**Technical Parameter**

<b>Application</b>	Storage containers, process vessels or strong dust and crystallization, condensation occasion
<b>Measuring range</b>	70 meter
<b>Process connection</b>	Screw, Flange
<b>Medium Temperature</b>	-40~250°C
<b>Process pressure</b>	Atmospheric
<b>Precision</b>	± 15mm
<b>Frequency range</b>	26GHz
<b>Anti-explosion/safety grade</b>	Exia IIC T6 Ga /IP67
<b>Signal output</b>	4...20mA/HART(Two-wire/ Four) RS485/Mod bus

**DCRD1000A5**

**Technical Parameter**

<b>Application</b>	Solid particles, powder, dust
<b>Measuring range</b>	30 meter
<b>Process connection</b>	Screw, Flange
<b>Medium Temperature</b>	-40~250°C
<b>Process pressure</b>	Atmospheric
<b>Precision</b>	± 10mm
<b>Frequency range</b>	26GHz
<b>Anti-explosion/safety grade</b>	Exia IIC T6 Ga /IP67
<b>Signal output</b>	4...20mA/HART(Two-wire/ Four) RS485/Mod bus

**DCRD1000A6**

**Technical Parameter**

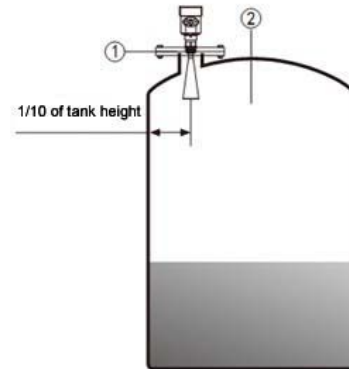
<b>Application</b>	Hygienic liquid storage container, strong corrosive container
<b>Measuring range</b>	20 meter
<b>Process connection</b>	Screw, Flange
<b>Medium Temperature</b>	-40~150°C
<b>Process pressure</b>	Atmospheric
<b>Precision</b>	± 3mm
<b>Frequency range</b>	26GHz
<b>Anti-explosion/safety grade</b>	Exia IIC T6 Ga /IP67
<b>Signal output</b>	4...20mA/HART(Two-wire/ Four) RS485/Mod bus

### 3. Installation Requirements

#### Installation Guideline

Installed in a quarter or sixth of the diameter.

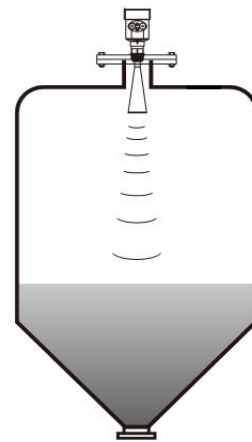
Note: The minimum distance from the tank wall shall be tenth of the tank height.



Note: ① datum plane

② vessel center or axis of symmetry

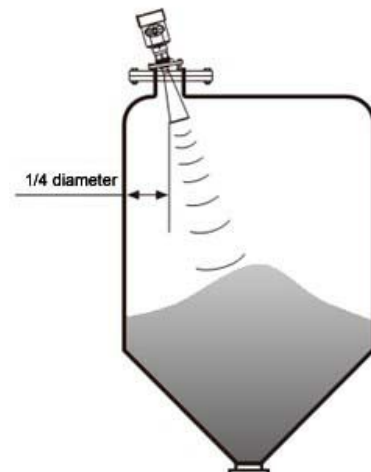
For conical tank top plane, it can be installed on the middle of the tank top to ensure the measurement of the conical bottom.



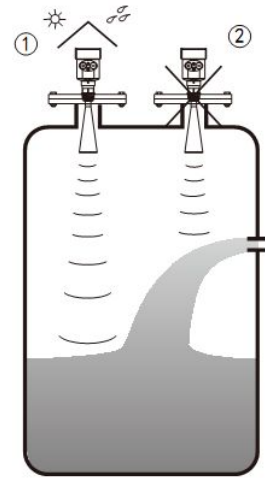
When there's the material pile, the antenna need to perpendicular alignment to the material surface.

If the material is uneven, and the heap angle is large then the universal flange is needed to adjust the horn angle to aim the charge level.

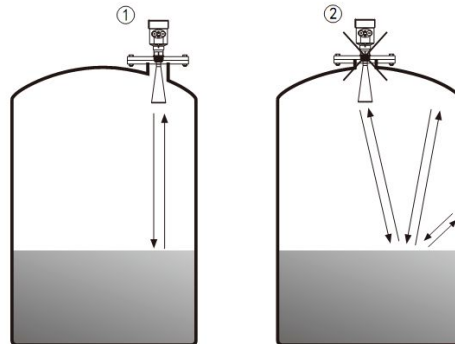
(Due to the inclination of the solid surface it will cause the echo decay, or even the signal loss problem)



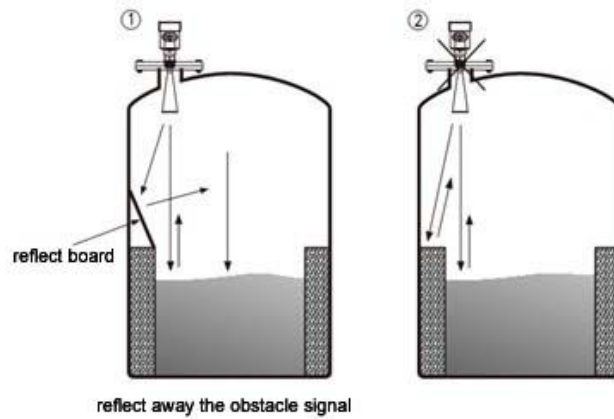
Radar cannot be installed above the tapered tank into the mouth;  
In outdoor installation, sunshade and rainproof measures should be taken.



Instrument cannot be installed in the middle of the arch or round tank top. It will be affected by multiple echo. The multiple echoes may be larger than the true echo signal threshold, because the top can be concentrated by multiple echoes. It cannot be installed in a central position.



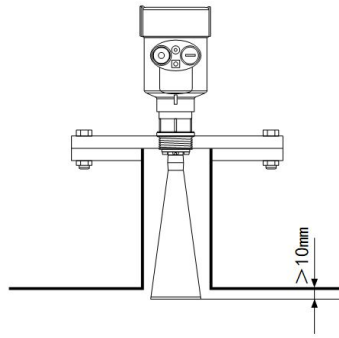
When the tank obstacles affect the measurement, the reflect board must be installed for proper measurement.



①right

②wrong

The pipe joint height requirements: it must ensure that the antenna extends into the tank for at least 10mm.



## 4. Electrical connection

### Supply voltage

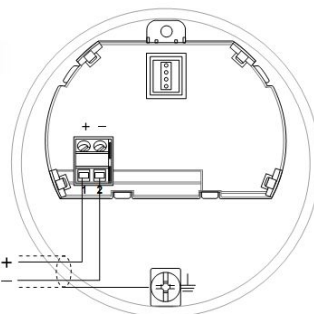
(4~20) mA/HART (two-wire) Power supply and output current signals share a two-core shielded cable. Specific supply voltage ranges see technical data. For intrinsically safe power supply, guard grating should be added between supply power and the instrument.

(4~20) mA/HART (four-wire) Power supply and current signal is separated by individually using a cable. Specific supply voltage ranges see technical data.

RS485/Modbus The supply voltage and Modbus signal line respectively use a shield cable. Specific supply voltage ranges see technical data.

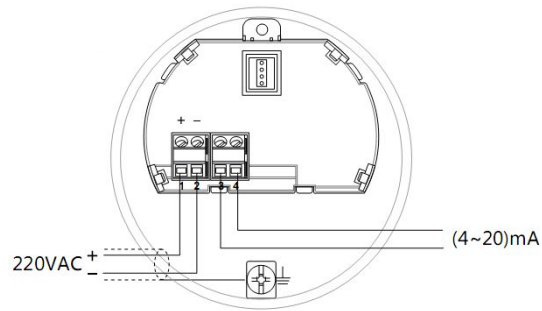
### Connection type

24V two-wire wiring diagram:

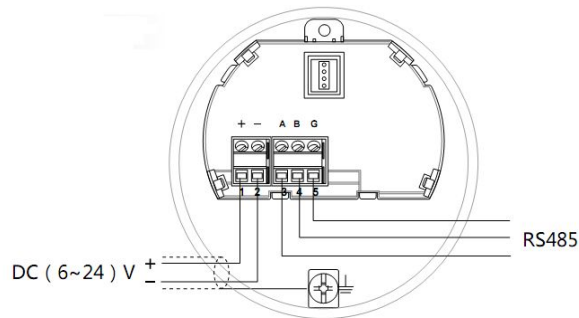


220V four-wire wiring diagram:





24V RS485/Modbus wiring diagram:



### Safety guidance

Please comply with local electrical installation regulations requirements!

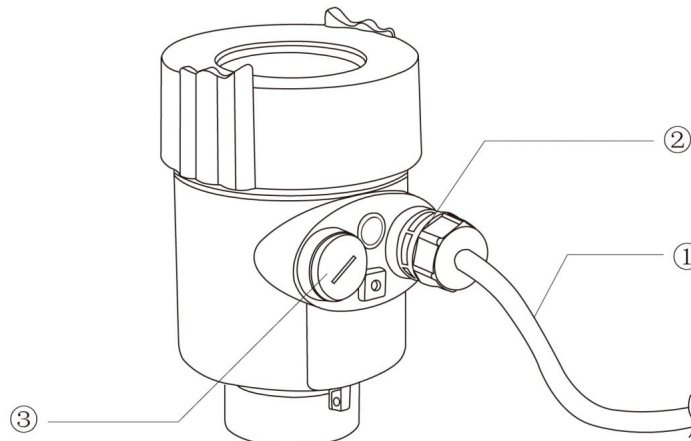
Please abide by local health and safety personnel procedures requirements.

All operations on the instrument electrical components must be done by properly trained professionals.

Please check the meter nameplate to ensure that product specifications meet your requirements. Make sure that the supply voltage fit the meter nameplate requirement.

### Protection grade

The instruments fully meet the requirements of protection class IP66/67; make sure the cable sealing head waterproofness. As shown below:



How to ensure that the installation meets IP67 requirements:

Make sure the seal head is not damaged.

Make sure that the cable is not damaged.

Make sure the used cable is in line with the electrical connection specifications.

Before access the electrical interface, the cable will bend down, to ensure that water does not flow into the housing, see ①

Please tighten the cable sealing head, see ②

Keep unused electrical interface stopped up with blind block, see ③

## 5. Instrument Debug

Three debugging method:

Display/ keypad

Upper computer debugging

HART handheld programmer

Display/ keypad

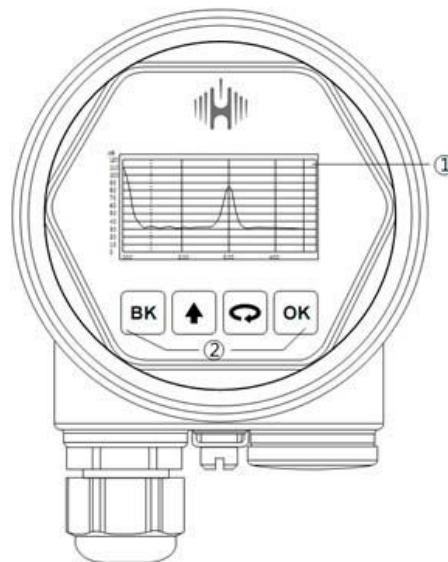
To debug by the four keys on the LCD of the instrument.

Debug menu language is optional. After debugging, it generally used for display. It's quite clear to read off the measured values (See instrument keypad setup instructions)

### Display/Keypad

① LCD display

② Keypad



### Upper computer debugging

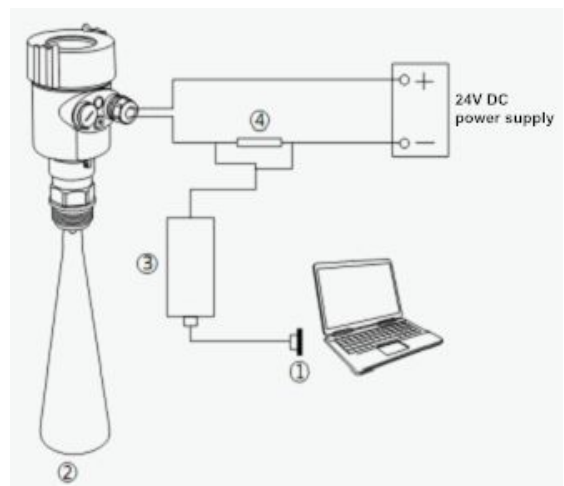
Connected with the upper computer via HART

① RS232 interface / or USB interface

② Radar Level Transmitter

③ HART adapter

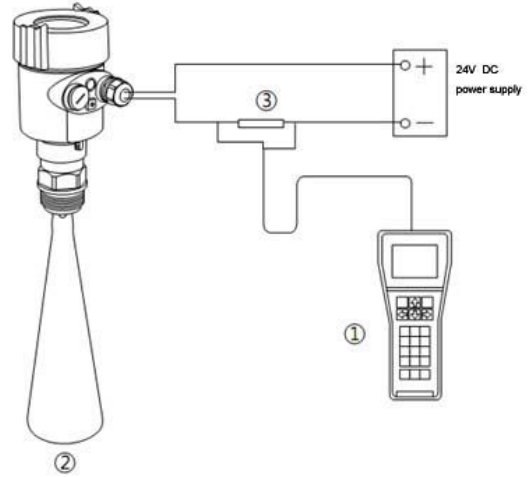
④ 250Ω resistor





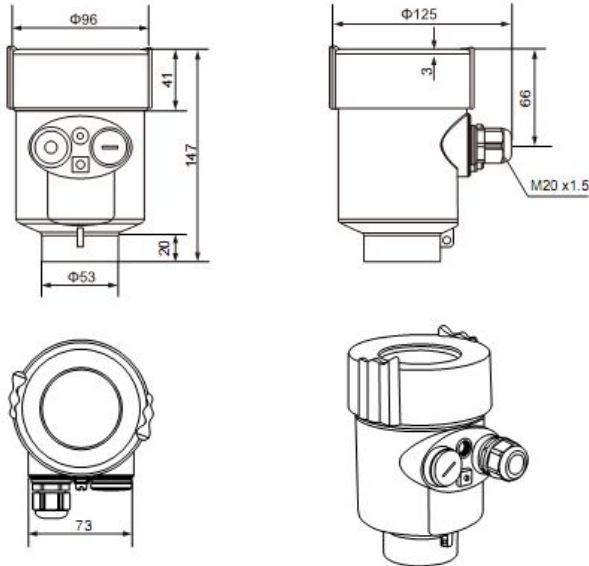
HART handheld programmer programming

- ① HART handheld programmer
- ② Radar Level Transmitter
- ③ 250Ω resistor



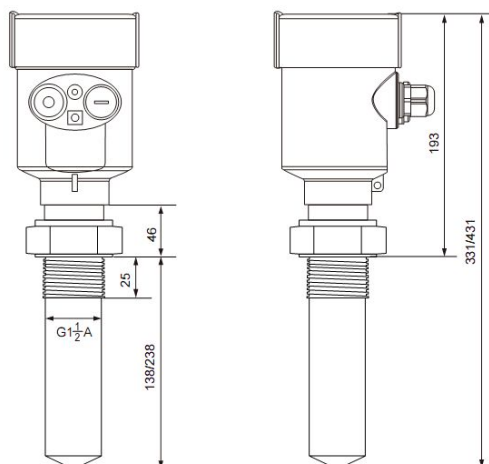
**6. Structure size** unit: mm

Housing

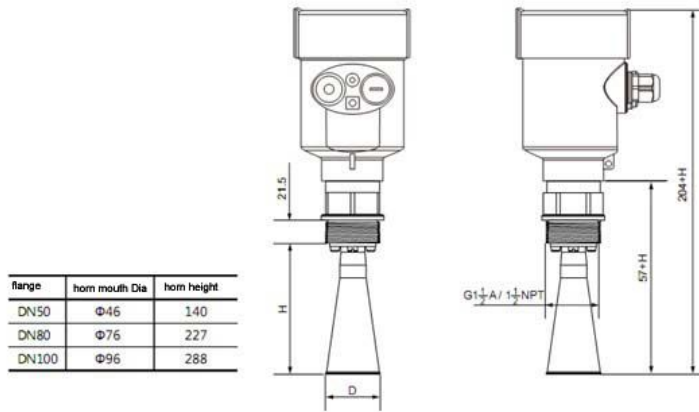


**External dimension**

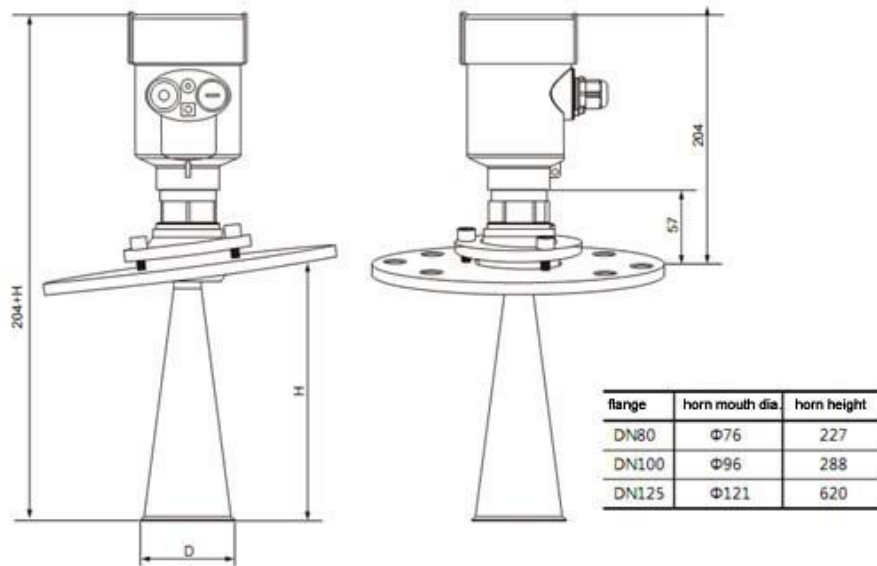
DCRD1000A1



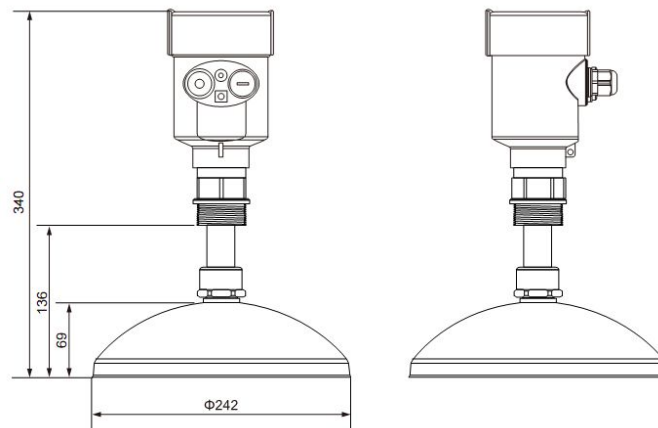
DCRD1000A2

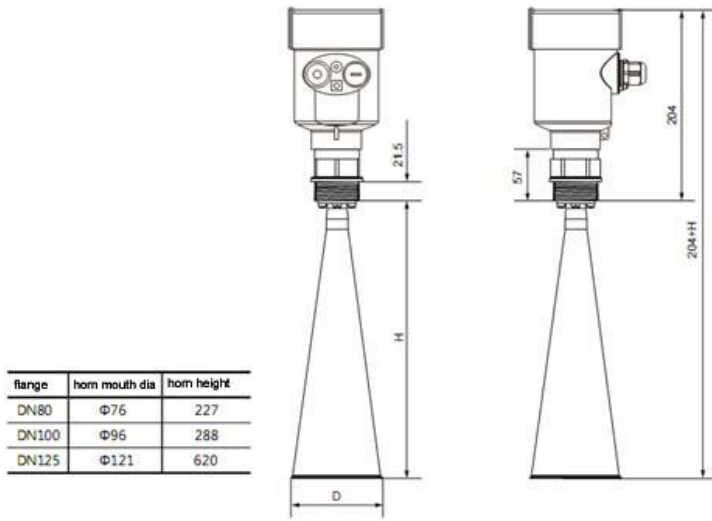
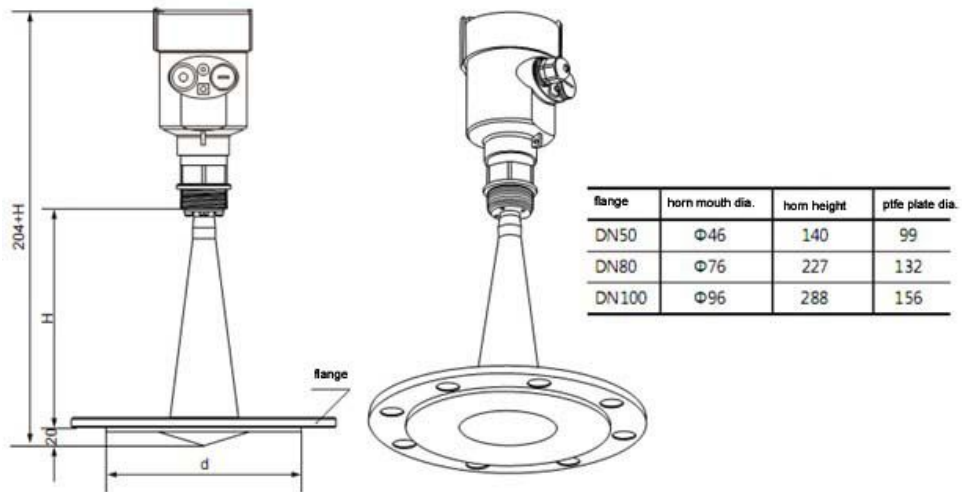
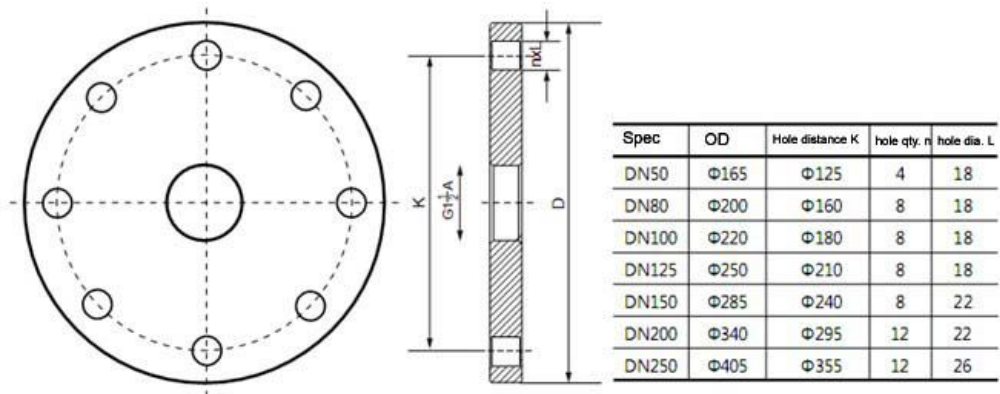


DCRD1000A3



DCRD1000A4



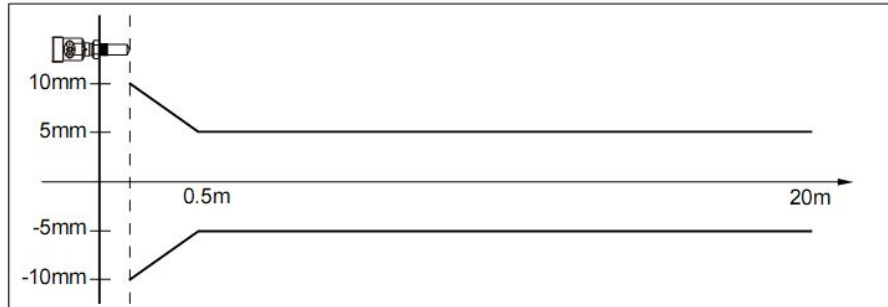
**DCRD1000A5**

**DCRD1000A6**

**Flange I**




## 8. Instrument linear

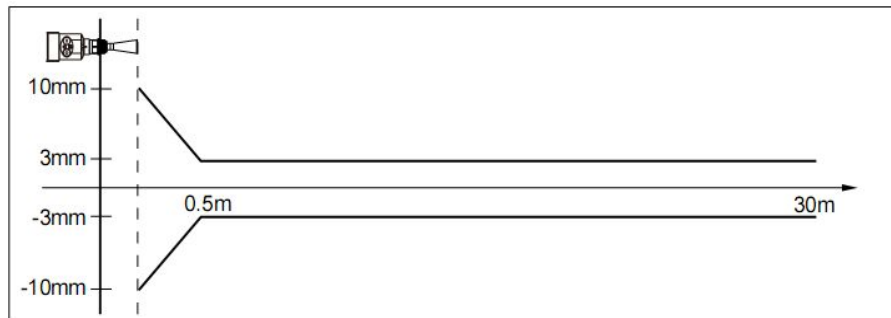
DCRD1000A1

Launching angle                      20°  
Precision                                      see below



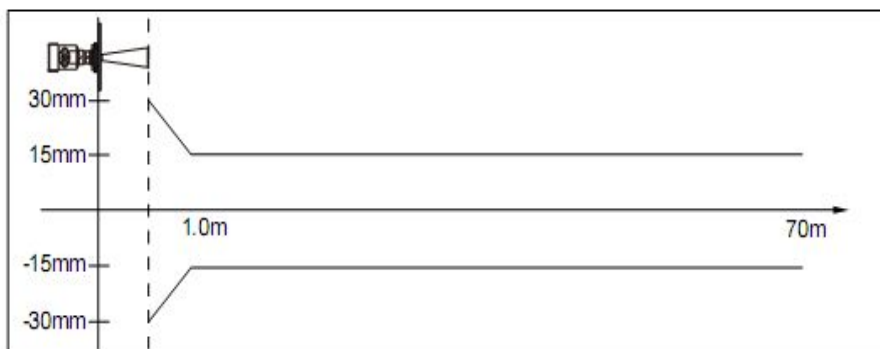
DCRD1000A2

Launching angle                      depends on antenna size  
-Φ 46mm                                  18°  
-Φ 76mm                                  12°  
-Φ 96mm                                  8°  
Precision                                      see below



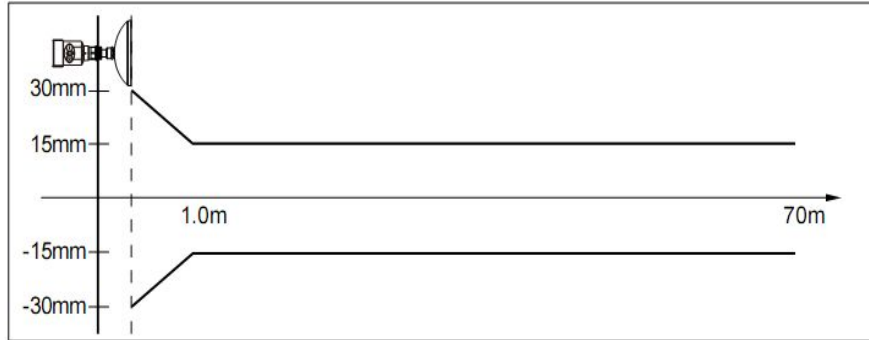
DCRD1000A3

Launching angle                      depend on antenna size  
-Φ 76mm                                  12°  
-Φ 96mm                                  8°  
-Φ 121mm                                 6°  
Precision                                      see below



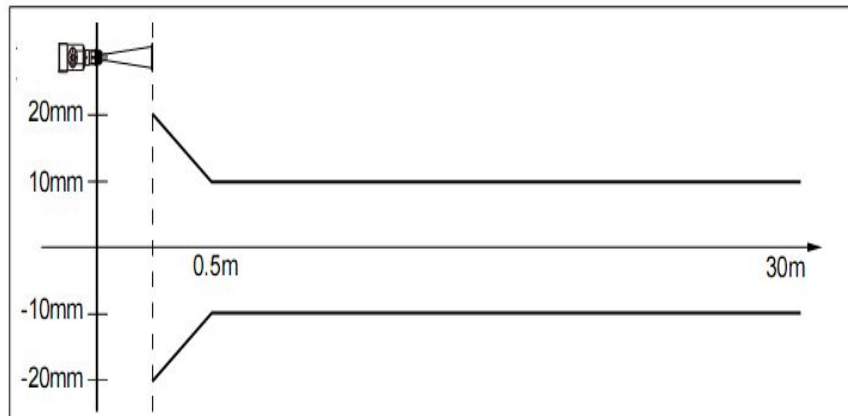
DCRD1000A4

Launching angle	depend on antenna size
- $\Phi$ 242mm	4°
Precision	see below



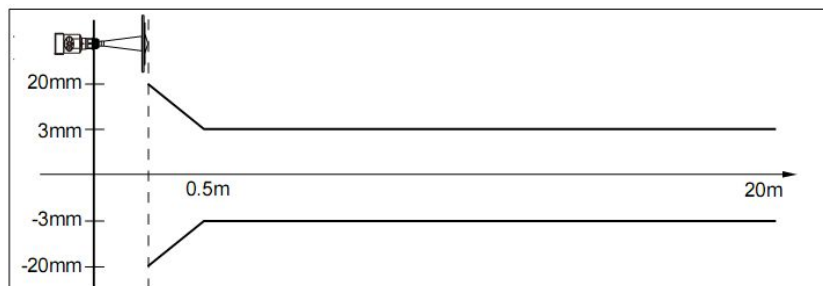
DCRD1000A5

Launching angle	depend on antenna size
- $\Phi$ 76mm	12°
- $\Phi$ 96mm	8°
- $\Phi$ 121mm	6°
Precision	see below



DCRD1000A6

Launching angle	depend on antenna size
- $\Phi$ 46mm	18°
- $\Phi$ 76mm	12°
- $\Phi$ 96mm	8°
Precision	see below



## 9. Model selection table

### DCRD1000A1

#### Model selection:

##### Anti-explosion

- P Standard (non-Ex)
- I Intrinsically Safe (Exia IIC T6 Ga)

##### Antenna Type / Material / Process temperature

- F Sealed horn  $\Phi 45$  / PTFE / (- 40 ~ 120) ° C

##### Process connection / Material

- G Screw thread G 1½A
- N Screw thread 1½NPT
- A Flange DN50 / PP
- B Flange DN80 / PP
- C Flange DN100 / PP
- Y Special custom

##### Electronics unit

- 2 (4 ~ 20) mA / (24) V DC / two-wire
- 3 (4 ~ 20) mA / (~ 24) V DC / HART two-wire
- 4 (4 ~ 20) mA / (~ 220) V AC / four-wire
- 5 RS485/Mod bus

##### Housing / Safety grade

- L Aluminum / IP67
- G Stainless steel 304 / IP67

##### Cable entry

- M M20 \* I. 5
- N 1/2 NPT

##### Display/ programming

- A With
- X Without

##### Special custom

- Y Special custom

### DCRD1000A2

#### Anti-explosion

- P Standard (non-Ex)
- I Intrinsically Safe (Exia IIC T6 Ga)

#### Process connection / Material

- G Screw thread G1½ A / stainless steel 304
- N Screw thread 1½ NPT / stainless steel 304

- A Flange DN50 / stainless steel 304
- B Flange DN80 / stainless steel 304
- C Flange DN100 / stainless steel 304
- Y Special custom

**Antenna Type / Material**

- B Horn antenna  $\Phi$ 46mm / stainless steel 304
- C Horn antenna  $\Phi$ 76mm / stainless steel 304
- D Horn antenna  $\Phi$  96mm / stainless steel 304
- Y Special custom

**Seal/ process temperature**

- V Viton / (- 40 ~ 150) ° C
- K Kalrez / (- 40 ~ 250) ° C

**Electronics unit**

- 2 (4 ~ 20) mA / (24) V DC / two-wire
- 3 (4 ~ 20) mA / (~ 24) V DC / HART two-wire
- 4 (4 ~ 20) mA / (~ 220) V AC / four-wire
- 5 RS485/Mod bus

**Housing / Safety grade**

- L Aluminum / IP67
- G Stainless steel 304 / IP67

**Cable entry**

- M M20xl. 5
- N 1/2 NPT

**Live display/ programming**

- A With
- X Without

**Special custom**

- Y Special custom

**DCRD1000A3**

**Anti-explosion**

- P Standard (non-Ex)
- I Intrinsically Safe (Exia IIC T6 Ga)

**Process connection/ Material**

- G Screw thread G1½ A / stainless steel 304
- N Screw thread 1½ NPT / 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 / universal joint (stainless steel) 304
- K Flange DN100 / universal joint (stainless steel) 304
- T Flange DN125 / universal joint (stainless steel) 304
- Z Flange DN150 / universal joint (stainless steel) 304
- W Flange DN200 / universal joint (stainless steel) 304
- V Flange DN250 / universal joint (stainless steel) 304
- Y Special custom

**Antenna Type/ Material**

- C Horn antenna  $\Phi$  76mm / stainless steel 304
- D Horn antenna  $\Phi$  96mm / stainless steel 304
- E Horn antenna  $\Phi$  121mm / stainless steel 304
- Y Special custom

**Seal/ process temperature**

- V Viton / (- 40 ~ 150) ° C
- K Kalrez / (- 40 ~ 250) ° C

**Electronics unit**

- 2 (4 ~ 20) mA / (24) V DC / two-wire
- 3 (4 ~ 20) mA / (~ 24) V DC / HART two-wire system
- 4 (4 ~ 20) mA / (~ 220) V AC / four-wire system
- 5 RS485/Mod bus

**Housing / Safety grade**

- L Aluminum / IP67
- G Stainless steel 304 / IP67

**Cable entry**

- M M20xl. 5
- N 1/2 NPT

**Live display/ programming**

- A With
- X Without

**Special custom**

- Y Special custom

**DCRD1000A4****Anti-explosion**

- P Standard (non-Ex)

I Intrinsically Safe (Exia IIC T6 Ga)

**Process connection/ Material**

G Screw thread G1½ A / stainless steel 304

N Screw thread 1½ NPT / 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 / universal joint (stainless steel) 304

K Flange DN100 / universal joint (stainless steel) 304

T Flange DN125 / universal joint (stainless steel) 304

Z Flange DN150 / universal joint (stainless steel) 304

W Flange DN200 / universal joint (stainless steel) 304

V Flange DN250 / universal joint (stainless steel) 304

Y Special custom

**Antenna Type/ Material**

C Parabolic antenna  $\Phi$  242mm / stainless steel 304

**Seal/ process temperature**

V Viton / (- 40 ~ 150) ° C

K Kalrez / (- 40 ~ 250) ° C

**Electronics unit**

2 (4 ~ 20) mA / (24) V DC / two-wire

3 (4 ~ 20) mA / (~ 24) V DC / HART two-wire system

4 (4 ~ 20) mA / (~ 220) V AC / four-wire system

5 RS485/Mod bus

**Housing / Safety grade**

L Aluminum / IP67

G Stainless steel 304 / IP67

**Cable entry**

M M20xl. 5

N 1/2 NPT

**Live display/ programming**

A With

X Without

**Special custom**

Y Special custom

## **DCRD1000A5**

### **Anti-explosion**

P Standard (non-Ex)

I Intrinsically Safe (Exia IIC T6 Ga)

### **Process connection/ Material**

G Screw thread G1½ A / stainless steel 304

N Screw thread 1½ NPT / 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 / universal joint (stainless steel) 304

K Flange DN100 / universal joint (stainless steel) 304

T Flange DN125 / universal joint (stainless steel) 304

Z Flange DN150 / universal joint (stainless steel) 304

W Flange DN200 / universal joint (stainless steel) 304

V Flange DN250 / universal joint (stainless steel) 304

Y Special custom

### **Antenna Type/ Material**

C Horn antenna  $\Phi$  76mm / stainless steel 304

D Horn antenna  $\Phi$  96mm / stainless steel 304

E Horn antenna  $\Phi$  121mm / stainless steel 304

### **Seal/ process temperature**

V Viton / (- 40 ~ 120) ° C

K Kalrez / (- 40 ~ 250) ° C

### **Electronics unit**

2 (4 ~ 20) mA / (24) V DC / two-wire

3 (4 ~ 20) mA / (~ 24) V DC / HART two-wire system

4 (4 ~ 20) mA / (~ 220) V AC / four-wire system

5 RS485/Mod bus

### **Housing / Safety grade**

L Aluminum / IP67

G Stainless steel 304 / IP67

### **Cable entry**

M M20xl. 5

N 1/2 NPT

**Live display/ programming**

A With

X Without

**Special custom**

Y Special custom

**DCRD1000A6**

**Anti-explosion**

P Standard (non-Ex)

I Intrinsically Safe (Exia IIC T6 Ga)

**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

H Flange DN250 / stainless steel 304

Y Special custom

**Antenna Type/ Material**

B Horn antenna  $\Phi$  46mm / stainless steel 304

C Horn antenna  $\Phi$  76mm / stainless steel 304

D Horn antenna  $\Phi$  96mm / stainless steel 304

**Seal/ process temperature**

V Viton / (- 40 ~ 120) ° C

**Electronics unit**

2 (4 ~ 20) mA / (24) V DC / two-wire

3 (4 ~ 20) mA / (~ 24) V DC / HART two-wire system

4 (4 ~ 20) mA / (~ 220) V AC / four-wire system

5 RS485/Mod bus

**Housing / Safety grade**

L Aluminum / IP67

G Stainless steel 304 / IP67

**Cable entry**

M M20xl. 5

N 1/2 NPT

**Live display/ programming**

A With

X Without

**Special custom**

Y Special custom