

6.8GHz Intelligent Radar Level Transmitter Instruction

1. Product Description

1.1 Introduction

DCRD1000B series level gauge is the advanced radar level measurement instruments, with maximum measuring distance 35m for level measurement of storage tanks, process vessels or intermediate buffer tank, and output 4 ... 20mA analog signal.

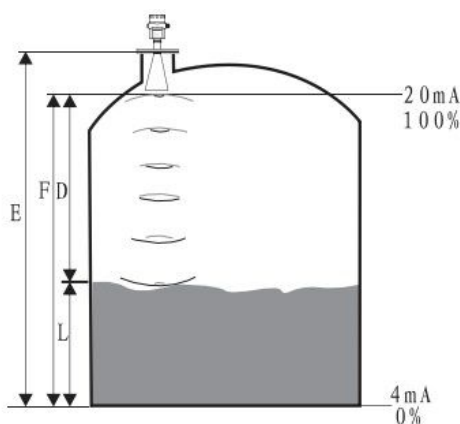
1.2 Product Features

- Adopt advanced non-contact measurement
- Apply extremely stable manufacturing materials
- Level measurement of liquid, solid medium
- Measure all media that the dielectric constant is larger than 1.8
- Measuring range 0 ... 20m (can be extended to 35 meters)
- Adopt the two-wire, loop-powered technology that the supply voltage and output signals transmitted via a two-core cable
- 4 ... 20mA output or digital signal output
- Resolution 1mm
- Not affected by noise, steam, dust, vacuum and other working conditions
- Not affected by fluid density, viscosity and temperature changes
- Process pressure up to 4MPa
- Process temperatures up to 250 °C

1.3 Measuring principle

High-frequency microwave pulse transmitting and receiving by the antenna system, the radar wave travel in speed of light, the running time can be converted into level signal by the electronics component. A special time extension method can guarantee stable and accurate measurement in very short time.

Even under more complex conditions with the false echoes, by the latest micro-processing technology and debugging software, it can accurately identify the echo of material.



1.4 Input

The antenna receives the reflected microwave pulses and transmits it to the electronic circuits, the microprocessors

process this signal, and identify the echo that generate by the micropulse on the material surface. The correct echo signal completed by the intelligent software, the precision can reach millimeter. The distance D that from the material surface is proportional to the pulse travel time T: $D = C \times T / 2$ (where C is the speed of light)

Because the empty tank distance E is known, the level L is: $L=E-D$

1.5 Output

By entering the empty height E (= zero), full tank height F (= full scale) and some applications parameters for setting, application parameters will automatically adapt the instrument to fit the measuring environment. Corresponds to 4-20mA output.

2. Instrument Introduction

DCRD1000B1

Technical Parameter:

Application	Simple process conditions, corrosive liquids, slurries and such as: waste water tanks, acid tanks, slurry tanks, solid particles, small oil storage tanks
Measuring range	20 meter
Process connection	Screw thread, Flange(optional)
Medium Temperature	-40-120°C
Process pressure	-0.1-0.3Mpa
Repeatability	± 2mm
Precision	± 10mm
Frequency range	6.8GHz
Anti-explosion/safety grade	Exia IIC T6/IP67
Signal output	4~20mA/HART(Two-wire/Four) RS485/Mod bus

DCRD1000B2

Technical Parameter:

Application	Storage corrosive liquids, slurries and waste water tanks, acid tanks, slurry tanks, solid particles, small oil tanks
Measuring range	20 meter
Process connection	Flange
Medium Temperature	-40-150°C
Process pressure	-0.1-1.6Mpa
Repeatability	± 2mm
Precision	± 10mm
Frequency range	6.8GHz
Anti-explosion/safety grade	Exia IIC T6/IP67
Signal output	4~20mA/HART(Two-wire/Four) RS485/Mod bus

DCRD1000B3**Technical Parameter:**

Application	variety of storage containers or process measurement environment, liquids, slurries and solids, such as: crude oil, light oil storage tanks, coal, pulverized coal positions, volatile liquid storage tanks, coke material level, slurry storage tanks, solid particles
Measuring range	35 meter
Process connection/fitting	Flange
Process Temperature	-40-250°C
Process pressure	-0.1-2Mpa
Repeatability	± 2mm
Precision	± 10mm
Frequency band	6.8GHz
Anti-explosion/safety grade	Exia IIC T6/IP67
Signal output	4~20mA/HART(Two-wire/Four) RS485/Mod bus

DCRD1000B4**Technical Parameter:**

Application	powder material, solid particles, measurement of the bulk material, like raw coal bunker, powder coal coke material level, etc.
Measuring range	30 meter
Process connection	Universal Flange
Medium Temperature	-40-250°C
Process pressure	Atmospheric
Repeatability	± 2mm
Precision	±15mm
Frequency range	6.8GHz
Anti-explosion/safety grade	Exia IIC T6/IP67
Signal output	4~20mA/HART(Two-wire/Four) RS485/Mod bus

DCRD1000B5**Technical Parameter:**

Application	low dielectric constant liquids and liquid storage tanks with agitators
Measuring range	20 meter
Process connection	Flange
Medium Temperature	-40-250°C
Process pressure	-0.1-2Mpa
Precision	±10mm

Frequency range	6.8GHz
Anti-explosion/safety grade	Exia IIC T6/IP67
Signal output	4~20mA/HART(Two-wire/Four) RS485/Mod bus

DCRD1000B6

Technical Parameter:

Application	Blast furnace, thicker tank and conditions that install short tube on higher position
Measuring range	30meter
Process connection	Flange
Medium Temperature	-40-500°C
Process pressure	Atmospheric
Precision	±15mm
Frequency range	6.8GHz
Anti-explosion/safety grade	Exia IIC T6/IP67
Signal output	4...20mA/HART(Two-wire)

3. Installation

3.1 Installation site

- It is recommended that the distance (1), or the distance from the tank wall to the install short tube wall should be greater than one-sixth of the tank diameter.
- The minimum distance from the tank wall is 300mm, the suggested installation distance ≥ 500 mm.
- It is not allowed to be installed above the Material Inlet (4).
- It's not allowed to install in the central location (3), or it will produce multiple false echoes, echo interference can cause signal loss.
- If it's impossible to keep the distance between the meter and the tank wall, the tank wall media will adhere and cause false echoes, false echo storage should proceed when debugging the instrument.

3.2 Tank installation

- In the signal beam, installation materials should be avoided as follows(1): for example, the limit switches, temperature sensors, etc.
- Symmetric device (2), such as vacuum ring, heating coils, baffles, etc.
- If there' s (1) (2) interfere object, then the waveguide should be applied in the measurement.

3.3 Best mounting options

3.3 Optimum installation Selection

- Antenna size: as the antenna size get bigger, the beam angle get smaller and the echo interference get weaker.
- Antenna Adjustment: adjust the antenna to fit to the best measurement position.
- Waveguide: the waveguide is used to avoid interference echoes.

3.4 The tank installation of DCRD1000B1, DCRD1000B2

3.4.1 Standard Installation

- radar antenna cannot be tilted to the tank wall.
- In order to minimize the influence of the temperature, the connection must be used in the spring mating flange gasket.
- radar transmitting rod antenna must extend at short pipe installation.
- upright rod antenna, do not let the radar beam is directed tank wall.

3.4.2 DCRD1000B1 Series Typical Installation

●The PTFE (polytetrafluoroethylene) rod antenna particularly suitable for measurement of corrosive medi such as acids and alkali. The sterile container of food industry should avoid reaction, and install small size instrument,

There will be no reaction and the desired container opening is small- only 50mm or G11 / 2A

threaded hole.

The rod antenna that install on the G1^{1/2}A threaded connection pipe.

- For liquid measurement, rod antenna can be mounted directly on the container opening, the opening hole size: G11 / 2A, DN50 ... DN150, the connection pipe length cannot exceed 150mm (if apply longer antenna, connection pipe cannot exceed 250mm), Note: mechanical bearing capacity of PTFE rod antenna is limited, if subjected to bending force, it will deform or broken.

The rod antenna that install on the G1^{1/2}A thread.

3.5 DCRD1000B3 tank installation

3.5.1 Standard Installation

- the horn antenna must extend out the short tube, or the antenna extension tube should be applied.
- the horn antenna must be adjusted to vertical, the radar beam shall not point to the tank wall.

3.5.2 Apply the antenna extension tube when the short tube is lengthy

- When the horn is shorter than the installation short pipe, the antenna extension tube should be applied.
- If the pipe socket diameter is greater than the installation short pipe, then the antenna extension tube shall be installed inside the container and raise the meter. The meter will raise at least 100mm if the extension tube is selected.

Special extension tube

- If the antenna needs to be mounted vertically or perpendicular to the tank wall, then the extension tube of 120° or 90° can be applied.

Measured exteriorly through the plastic tank wall.

- medium dielectric permittivity $\epsilon_r > 10$
- highest liquid level should be 20cm lower than the tank top
- the distance H should be greater than 100mm
- It is recommended to use the support installation to adjust to ideal H
- If possible, the installation in a refrigerator or the adhesion occasion should be avoided, and there should be protective measures for the space between the antenna and the container
 - Apply low dielectric constant building material and the corresponding thickness, while the conductive plastic can't be used.
 - If possible, apply antenna DN250/10"
 - Do not install any components (such as pipes) that may cause interference within the beam range outside the tank

The echo signal diagram as below:

Figure I normal level echo

Figure II false echo

Figure III false echo storage capabilities can eliminate the interference waves that generated by fake wave

Figure II

4. Measures inside the waveguide

4.1 General Introduction

- If the device is complex within the container, such as: heating coil, heat exchanger or blender that runs quickly and so on. Then the antenna that used in waveguide pipe installation should be applied. When the medium causes lasting vortex the device inside the container cause false reflections, such antenna may be used.
- As the radar signal is focused in the waveguide pipe, it is possible to measure the medium with small dielectric constant ($\epsilon_r = 1.6 \dots 3$)
- The waveguide tube with downside openings must meet the needed minimum level, so as to measured inside the pipeline.
- Note the vent above the waveguide pipe and the hemi-side of the instrumentation sign should in a straight line.
- In addition to the installation of the waveguide pipe inside the container, the bypass pipe outside the container can be installed.
- If the measurement through the waveguide or bypass pipe, due to changes in the running time of the radar signal, the maximum measuring range will reduce 5 ... 20% (for example: DN50: 15m instead of 20m, DN100: 18m, not 20m).
- The sensor label alignment axis of the waveguide apertures. Because of the polarization of the radar signal, only in this direction, the reliable measurements is guaranteed.

The guided wave pipe
welded on the container

The guided wave pipe installed on
the container connecting pipe

The antenna for bypass
installation

- If the sensor is installed in the bypass pipe (for example: previously used a float steel measuring device), radar sensors must be installed at least 500mm above the connection part of the bypass pipe and the upper part of the container. If the inner wall of the bypass pipe is uneven, it is necessary to use an additional measure casing (pipe casing pipe).
- If the medium with small dielectric constant (<4), the length of the bypass pipe to be larger than normal bypass pipe, as part of the radar signal can penetrate the medium with small dielectric constant, when the medium of bypass pipe is few, the signal reflected by the bypass pipe bottom is stronger than the reflecting signal of medium, meanwhile the measurement error frequently occurs. In this case, if extend the bypass pipe (300 ... 800mm), the radar signal through the medium may be attenuated in this section medium. The deflector can be installed at the bottom of the bypass pipe, and will refracted away the radar signal that arrive the bottom.

The extended bypass pipe used for measurement
of medium with large surface fluctuation. Measurement of the medium with small dielectric constant
through bypass pipe

4.2 Adhesion Medium

- For adhesion medium, the waveguide diameter should be as large as possible. For the non-adhesive medium, the waveguide diameter may be 50mm. As for the media with few adhesion, the waveguide diameter is generally 100mm or 150mm.

- DN50, DN80, DN100, DN150 installation
guided wave

If the media adhesion is too strong, it cannot be measured by the waveguide tube.

4.3 Measure mixed medium through waveguide tube

- If it's needed to measure the mixed or layering medium inside the waveguide tube, the round hole, lengthy round hole or rectangle hole should be opened on waveguide tube. The hole opening is in order to fully mix the medium inside tube.
- The wide rectangle hole will cause false echo, therefore the rectangle hole cannot be wider than 10mm. In order to reduce the signal noise surface, the round opening is superior to rectangle hole.

Same medium Mixed medium Mixed medium Mixed medium

4.4 The waveguide tube with ball valve

- If employ ball valve on waveguide tube, the instrument maintenance can be done without opening container(such as: measurement of liquid gas or toxic medium)
- In order to eliminate the ball valve gallery influence on measurement, the ball valve diameter should match the waveguide diameter. The distance should be at least 500mm from the ball valve to instrument flange.

5. The design guide of waveguide tube

The waveguide tube is generally applied to DN50, DN80, DN100 and DN150 flange.

- Figure I is the waveguide tube that used for DN50 flange. Take as example for introduction.

The waveguide tube wall should be smooth (average roughness $Rz \leq 30$). The waveguide tube can adopt stretching or vertical sew weld SS tube. When welding the flange or joint pipe, there should be no welding line or raised edge, and the knot pipe and flange should be fixed from inside.

Pay attention not to penetrate knot pipe wall in welding process. The inner wall of knot pipe should retain smooth, if carelessly penetrate the pipe wall, then it should be reflat, or it will cause large false echo.

- Figure II is introduction is used for DN100 flange waveguide tube

The DN80, DN100, DN150 flange radar sensor equipped with horn antenna. As for these sensors, one end of the sensor can replace the pre-weld flange plate through flat weld flange.

Figure I

Figure II

stir the flowing medium, the waveguide pipe should be fixed at container bottom. As for longer pipe, subsection settlement should be considered. If the dielectric constant is small(<3), the radar signal will penetrate medium. When the container approach blank, the reflex echo from container bottom will affect measurement. The reflect board can be installed at the end of the waveguide pipe to reflect away the reflex echo. Through the reflect board, the point level of blank container can be accurately measured. If not apply the reflect board, then the end of the waveguide pipe should be bend to a curve degree, then the container bottom echo can also be reflect away.

waveguide pipe end
curve diagram

bypass pipe end curve
diagram

6. False echo

The incorrect installation will cause large false echo, below is the wrong installation.

Bulge part inside the container

- Inside the container, if there's upper surface as the bulge part of the plane, it will have great influence upon measurement. The reflect board should be added on bulge part to guarantee the regular measurement.

Right

Wrong

Medium adhesion

- If the sensor installation is too close to container, then the medium adheres to container wall will cause false reflection. The sensor should keep right distance with the container wall.

Right

Wrong

Device inside the container

- The device inside the container, for example: ladder will cause the false echo. When designing the installation location, there cannot be anything block the operation of the radar signal.

Right

Wrong

Holder inside the container

- It's same as the other container device, the support inside the container will cause strong false echo, which can be effectively prevented by adopting reflect board.

Right

Wrong

7. Typical fault installation

Large medium fluctuation

- If the medium cause strong vortex, such as: owing to stirring or strong chemical reaction, etc. It's suggested to apply waveguide tube or bypass tube for measurement. Pay attention there should not be any adhesion medium inside the waveguide or bypass pipe. If the medium may cause adhesion, then the 100mm standard or thicker waveguide or bypass pipe should be applied.

Right

Wrong

Container joint pipe too long

- If the container joint pipe too long, it will cause false echo. It should ensure that the horn opening antenna extension pipe is 10mm or more. If apply the stick antenna, the container joint pipe length will be max.100 or 60mm(stick length 545mm,max. container joint pipe 250mm).

Hemisphere or arch container top

- The hemisphere or arch container top is equivalently as bulge optical lens for radar sensor. If the radar sensor is being installer on the focal point of the bulge optical lens, the false echo received by sensor will be strengthened. The best installation site is at the 1/2 of the container diameter.

Right

Right

Wrong

Horn opening antenna, the length of right and wrong joint pipe

Wrong

wrong

Installed on the arch container top

right

wrong

The right and wrong joint pipe of stick antenna.

The sensor installation is not align at the medium surface

- If the sensor installation is not align at medium surface, the measuring signal will deduce. The radar sensor axis should align to medium surface.

Wrong installation of waveguide pipe

- No air hole opened

There should be opening on waveguide pipe upper end. There will be fault measurement without opening.

right

wrong

The sensor should align at medium surface

right

wrong

- The sensor is too close to the container wall

If the sensor is too close to the container, it will cause strong false echo. The adhesive medium, rivet, bolt or welding line will cause false echo. Therefore the sensor should maintain certain distance with the contain wall.

- If the reflection condition is well (liquid medium, no other container device), it's suggested that inside the cone launch angle, the container wall cannot block the radar signal. If the reflection condition is not well, then there shouldn't be interference outside the cone launch angle.

Spurging

- The thick and stiff foam at the medium surface will cause measuring error. It's needed to take measures, such as other measuring method by choosing bypass pipe, such as: capacitive electrode or static pressure sensor.

8. DCRD1000B Series Dimension

Housing

Material: AL/316L

DCRD1000B1 Threaded type

DCRD1000B2 Flange type

DCRD1000B3 flange type

9. Flange outline dimensional drawing

10. Launch angle and false reflect

- The radar signal focus through antenna system, the launch of radar beam is similar to light beam of torch in shape of cone. The cone launch angle is depend on antenna size.
- Any object inside the cone launch range will reflect radar signal, especially the pipeline, support or other device that cause false reflect. For example: the false reflect that 6 meters from the launch antenna is 9 times stronger than that of 18 meters.
- As for the false reflect surface, the energy of radar signal is separated to a large area. Then the false signal that being reflect back is weak, not like the nearby false echo that has great influence upon measurement.
- It should launch along sensor axis direction that is vertical from the medium surface. It's needed to avoid any device in the whole launch angle, especially the 1/3 territory that nearest the antenna.
- If the launch radar signal can vertically reach the medium surface without any container device, then it's the best measurement condition.

Launch angle of stick antenna

DN100 horn opening launch angle

DN150 horn opening launch angle

DN250 horn opening launch angle

11. Instrument linear
DCRD1000B1

DCRD1000B2

DCRD1000B3

12. Measurement condition

Attention:

- The measurement range count from the point that the light beam arrive the container bottom, but under special condition, if the container bottom is concave or cone, it cannot be measured when the level is lower than this point.
- If the medium is low dielectric constant in low level, the tank bottom is visible, seen at this time in order to ensure measurement accuracy, it is recommended to set zero position at the low level that's in C position to ensure measurement accuracy
- Theoretically it's possible to reach the tip position of the antenna, but considering the impact of corrosion and adhesion, the final value of the measuring range should be at least 100mm from the tip of the antenna.
- For overflow protection, it can define a safe distance attached to the blind zone.
- Minimum measuring range is related to antenna.
- The foam can either absorb microwaves or reflect it away with different concentrations. But it's measurable under certain conditions.
- When the measurement range is exceeded, the instrument output 22mA current.

13. Connection mode

14. Debugging

DCRD1000B series can debug through three ways:

- By display adjusting module RBPM
- By testing software RBSOFT
- By HART handheld programmer

14.1 Debug through programme module (HDPM)

HDPM programming unit is made up of six buttons and an LCD screen that can display adjustment menu and parameter settings. Its function is equivalent to an analysis process instrumentation.

14.2 Via RBSOFT software debugging

Regardless of the signal output type, 4 ... 20mA / HART, radar sensors can be debugged by software. Using WKSOFT software for instrument debug, the instrument CONNECTCAT drive is needed.

Apply the software debugging, powered up 24VDC for the radar instrument, add 250 ohms resistance while connecting front-end of HART adapter. If the integrated HART resistance (internal resistance 250 ohms) power meter, there's no need to add additional external resistors, it's possible that the HART adapter and the 4 ... 20mA wire in parallel.

14.3 Via HART handheld programmer

15. Technical data

Basic parameter	working frequency: 6.8GHz angle of beam light: 24°WKRD51, WKRD52 20°WKRD53 with DN150 flange 16°WKRD53 with DN200 flange 14°WKRD53 with DN250 flange measurement range: 0...35m repeatability: ±2mm resolution ratio 1mm sampling: echo sampling 55 times/S response speed: >0.2s(depend on specific situation) current signal: 4...20mA accuracy: <0.1%
antenna material	WKRD51: PP or PTFE WKRD52: PTFE WKRD53: SS
communication interface	HART communication protocol
process connection	WKRD51 (PP, PTFE stick antenna) : G1 ¹ / ₂ A or 1 ¹ / ₂ NPT WKRD52(PTFE stick antenna): revers flange DN50, DN80, DN100, DN150, DN200, DN250 WKRD53(horn opening antenna): flange DN50, DN80, DN100, DN150, DN200, DN250
power	power: 24V DC(+/-10%), ripple voltage: 1Vpp consumption: max22.5mA
environmental conditions	temperature: -40°C...+70°C

pressure (gage pressure)—1...4MPa

anti-explosion certificate Exia IIC T6

shell protection class IP67

two-wire connection power supply and signal output share the same two-cored wire

cable entry two M20*1.5 or two 1/2NPT (cable diameter 5...9mm)

16. Model selection:

DCRD1000B1

Anti-explosion

P Standard (non-Ex)

I Intrinsically Safe (Exia IIC T6 Ga)

Antenna Type/ Material/ Process Temperature

SP Plastic rod / PP / -40 ... 100 °C

SF Plastic rod / PTFE / -40 ... 120 °C

Process connection

G Screw thread G1½A

N Screw thread 1½NPT

A PP flange DN50 PN16C type

B PP flange DN80 PN16C type

C PP flange DN100 PN16C type

D PP flange DN150 PN16C type

E PP flange DN200 PN16C type

F PP flange DN250 PN16C type

Y Special custom

Container joint tube length

A 50mm

B 100mm

C 150mm

D 200mm

E 250mm

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 M20xl. 5

N 1/2 NPT

Live display/ programming

- A With
- X Without

Special custom

- Y Special custom

DCRD1000B2**Anti-explosion**

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

Antenna Type/ Material

- SP plastic rod / PTFE

Process connection

- FA PTFE flanging, stainless steel flange DN50 PN16C type,
- FB PTFE flanging, stainless steel flange DN80 PN16 C type,
- FC PTFE flanging, stainless steel flange DN100 PN16 C type,
- FD PTFE flanging, stainless steel flange DN150 PN16 C type,
- FE PTFE flanging, stainless steel flange DN200 PN16 C type,
- FF PTFE flanging, stainless steel flange DN250 PN16 C type
- Y Special custom

Seal/ process temperature

- P Common seal /-40...100°C
- G High temperature seal/-40...150°C with radiator

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

DCRD1000B3**Anti-explosion**

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

Process connection

- A Flange DN50 PN16 C type
- B Flange DN80 PN16 C type
- C Flange DN100 PN16 C type
- D Flange DN150 PN16 C type
- E Flange DN200 PN16 C type
- H Flange DN250 PN16 C type
- Y Special custom

Antenna Type/ Material

- B Horn antenna 96mm / stainless steel 304
- C Horn antenna 146mm / stainless steel 304
- D Horn antenna 196mm / stainless steel 304
- E Horn antenna 242mm / stainless steel 304
- Y Special custom

Antenna extension tube

1. None
2. 200mm
3. 300mm
4. 400mm

Seal/ process temperature

- P Common seal /-40...120°C
- G High temperature seal /-40...250°C with radiator

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

DCRD1000B4

Anti-explosion

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

Process connection

- Z Universal flange DN150
- W Universal joint flange DN200

V Universal joint flange DN250

Y Special custom

Antenna Type/ Material

C Horn antenna 146mm / stainless steel 304

D Horn antenna 196mm / stainless steel 304

E Horn antenna 242mm / stainless steel 304

Antenna extension tube

1. None

2. 200mm

3. 300mm

4. 400mm

Seal/ process temperature

P common seal /-40...120°C

G high temperature seal /-40...250°C with radiator

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

DCRD1000B5

Anti-explosion

P Standard (non-Ex)

I Intrinsically Safe (Exia IIC T6 Ga)

Process connection

A Flange DN50 PN16 C type

B Flange DN80 PN16 C type

C Flange DN100 PN16 C type

Y Special custom

Antenna Type/ Material

A DN50 waveguide / stainless steel 304

B DN80 waveguide / stainless steel 304

C DN100 waveguide / stainless steel 304

Seal/ process temperature

- P Common seal /-40...120°C
- G High temperature seal /-40...250°C with radiator

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

DCRD1000B6**Anti-explosion**

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

Process connection

- D Flange DN150 PN16 C type
- E Flange DN200 PN16 C type
- H Flange DN250 PN16 C type
- Y Special custom

Antenna Type/ Material

- D Horn antenna 146mm / stainless steel 304
- E Horn antenna 196mm / stainless steel 304
- F Horn antenna 242mm / stainless steel 304

Antenna extension tube

- 1. 1000mm
- 2. 1500mm
- 3. 2000mm
- 4. 2500mm
- 5. 3000mm

Seal/ process temperature

- P Common seal /-40...120°C
- G High temperature seal /-40...250°C with radiator

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