Radar Level Transmitter RD269X series

High Frequency (26 GHz)

Intelligent Noncontact Radar Level Transmitter

Index

Workshop . . . . . .

1. Product Description

RD269X series transmitters are 26GHz High-Frequency Radar Level Transmitters with analog signals 4-20mA, the Max. measuring distance is up to 70m.

The antenna has been further optimized, and the latest update microprocessor can make higher speed signals analysis, which enables the level transmitters can be used in very complicated measuring applications such as reaction kettle or solid bunker.

Features

The Radar Level Transmitter adapts the emitting frequency of 26GHz, therefore it has the following features:

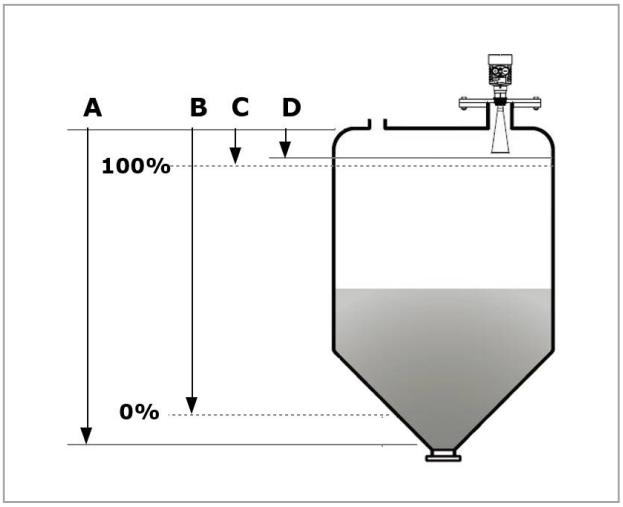
- Noncontact measuring, no abrasion, no contamination
- Easy installation due to small size of antenna
- Shorter wave length, which can get better reflect for the inclined solid surface.
- Smaller measuring dead zone, which can get better measuring result for small tanks.
- Smaller beam angle, which makes the energy be more concentrated, enhancing the wave reflection ability which can keep signals more powerful to avoid obstacles.
- Almost unaffected by corrosion and foams.
- Almost unaffected by changes of steam, temperature and pressure in the air.
- Even in heavy dust environment, the transmitter can also receive the real level return wave.
- High SNR, which can make the instrument get better performance.
- Frequency 26GHz is the best option for measuring solid and low dielectric constant medium.

Working principle

The Radar Level Transmitter antenna emits narrower micro wave pulses which will be transmitted via the antenna. The micro wave will be reflected back after touching the surface of a medium, then antenna system will receive it and transmit it into the electrical circuit, which will be automatically turned into the level signals.

A: Setting measuring range
B: Low level adjustment
C: High level adjustment
D: Dead zone

Measuring reference: the bottom surface of threads or the sealing surface of a flange.



Note: when using the radar level transmitter, must keep the highest level of medium out of the dead zone (see area D shown in the drawing)

2. Reference table for RD269X series

RD2691	RD2692	RD2693	RD2694	RD2695	RD2696
					

Model	Application	Antenna		Min. Dielectric constant	Dead zone (m)	Max. range for Solid bulk (m)	Max. range for Solid powder (m)	Max. range for Liquid (m)	Accuracy (mm)	Full beam angle
		Dia. (mm)	Length (mm)							
RD2691	Liquid	45	138	2.5~3.0	0.5			5	3mm	20°
	Remark: Suggested to be used for corrosive liquid with range longer than 2m									
RD2692	Liquid	46	120	2.5~3.0	0.5			5	2-3mm	18°
	Liquid	76	227	2.5~3.0	0.5			10	2-3mm	12°
	Liquid	96	288	2.5~3.0	0.5			15	2-3mm	8°
	Liquid	121	620	2.5~3.0	0.5			30	2-3mm	6
	Remark: Suggested to be used for common liquid with high temperature, high pressure, and light corrosion.									
RD2693	Solid/ Liquid	76	227	2.5~3.0	0.8	10	10		15mm	12°
	Solid/ Liquid	96	288	2.5~3.0	1	20	20		15mm	8°
	Solid/ Liquid	121	620	2.5~3.0	1	35	30		15mm	6°
	Remark: Suggested to be used for solid particles or bulks with heavy dust, easy crystallizing, and material, Process the container or strong dust easily crystallized and condensation.									
RD2694	Solid	196	136	2.5~3.0	1	45	40		15mm	4°
	Solid	242	136	2.5~3.0	1	70	65		15mm	4°
	Remark: Suggested to be used for solid particles or bulks with heavy dust, easy crystallizing, and material, Process the container or strong dust easily crystallized and condensation.									
RD2695	Solid/ Liquid	76	227	2.5~3.0	0.5	8	8	10	5mm	12°
	Solid/ Liquid	96	288	2.5~3.0	0.8	13	13	15	5mm	8°
	Solid/ Liquid	121	620	2.5~3.0	1	15	15	20	5mm	6°
	Remark: Suggested to be used for solid particles or bulks									
RD2696	Liquid	48	120	2.5~3.0	0.5			5	3mm	18°
	Liquid	76	227	2.5~3.0	0.5			10	3mm	12°
	Liquid	96	288	2.5~3.0	0.6			15	3mm	8°
	Remark: Be suitable for hygienic tanks or tanks with strong corrosive liquids.									

Note: Dielectric constant of the medium has to be considered for model selection. The bigger the dielectric constant is, the longer the range could be.

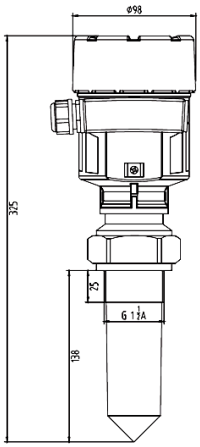
3. Introduction of Transmitter

RD2691

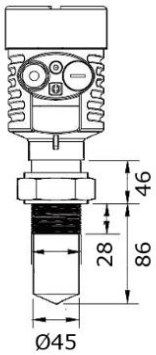
● Features	Corrosion resistant and wholly sealed radar antenna, short dead zone and easy installation. It's mainly used for measurement of strong corrosive liquids such as hydrochloric acid, nitric acid, sulfuric acid, alkali liquids, etc, in industries of chemical, metallurgy, refinery, food processing, etc.
● Measuring range (Maximum)	20m (Depends on dielectric constant of different medium and the concrete working conditions)
● Process connection	Thread, Flange
● Process temperature	-60°C … +120°C
● Process pressure	-0.1 ~ 0.3MPa
● Accuracy	±2~3mm
● Repeatability	±1mm
● Frequency range	26GHz
● Explosion proof	Ex ia IIC T6
● Enclosure protection grade	IP67
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus
● Air purging and liquid rinsing	On request
● For those with communication of RS485/ Modbus, backlight is available on request	

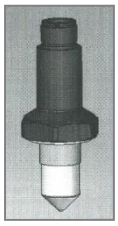
Dimensions of RD2691

● **Standard Type**



● **Small type**

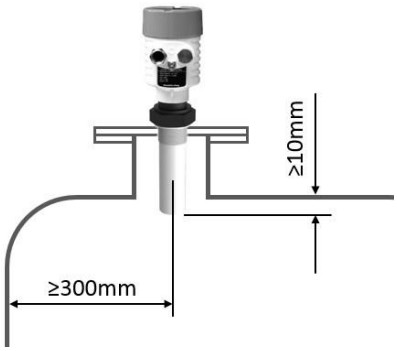




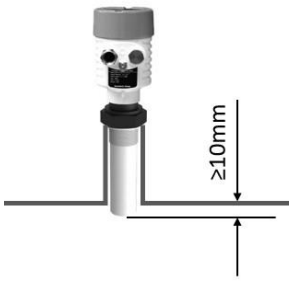
Remarks: In case pipe length is 238mm, the horn size is 72mm.
Other sizes and angle can be discussed. Please consult with us.

Installation of RD2691

● **Installation with flange**



● **Installation with thread**

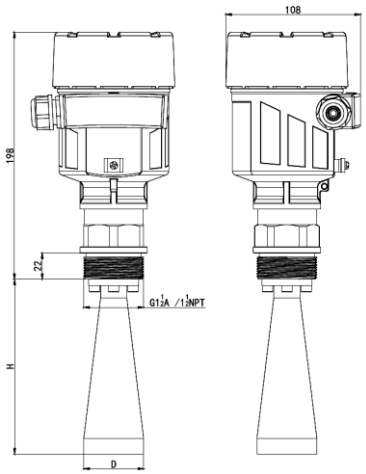


The minimum distance between the symmetrical central line of the transmitter and the inner tank wall should be at least 300mm

RD2692

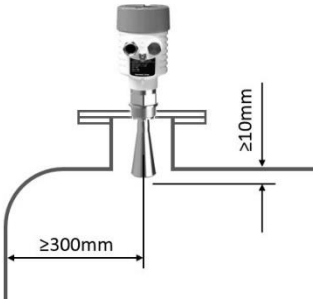
● Features	Horn antenna, small beam angle, strong wave focusing, high accuracy. It's mainly used for measurement of light corrosive liquids with high temperature and pressure in industries of petroleum, chemical, metallurgy and water treatment, etc.
● Measuring range (Maximum)	30m (Depends on dielectric constant of different medium and the concrete working conditions)
● Process connection	Thread, Flange
● Process temperature	-60°C … +250°C
● Process pressure	-0.1 ~ 4.0MPa
● Accuracy	±2~3mm
● Repeatability	±1mm
● Frequency range	26GHz
● Explosion proof	Ex ia IIC T6
● Enclosure protection grade	IP67
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus
● For those with communication of RS485/ Modbus, backlight is available on request	

Dimensions of RD2692

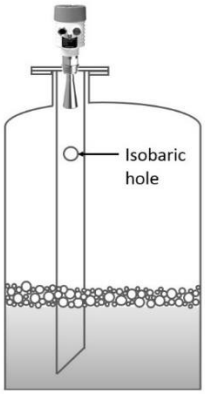


Horn model selection	
Horn diameter D (mm)	Horn height H (mm)
Ø46	140
Ø76	227
Ø96	288
Ø121	620

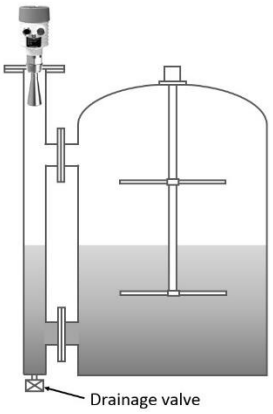
Installation of RD2692



The minimum distance between the symmetrical central line of the transmitter and the inner tank wall should be at least 300mm



For measurement with a wave guide pipe



For measurement with a by-pass pipe

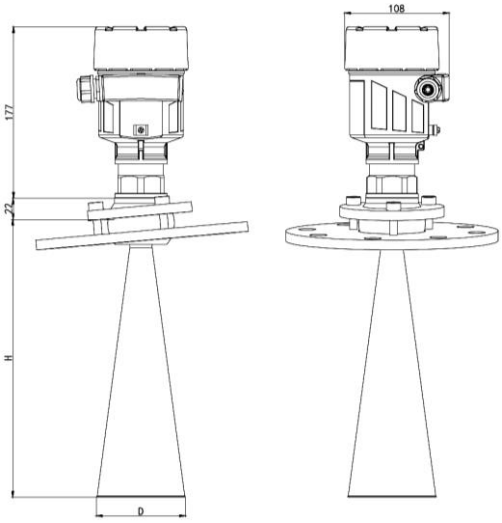
RD2692W

● Features	High accuracy, strong strength of anti-interference, not affected by temperature, humidity, wind force and direction, easy installation And calibration, low power consumption.
● Application	Suitable for water level measurement and monitoring of lakes, reservoirs, rivers, open channels, and tidal level of oceans.
● Measuring range (Maximum)	30m
● Process connection material	PP / SS
● Process temperature	-40°C … +100°C
● Process pressure	ATM
● Antenna material	SS
● Accuracy	±3mm
● Frequency range	26GHz
● Signal output	RS485/ Modbus
● Power supply	6 to 24V DC
● Display	Optional
● Backlight	On request

RD2693

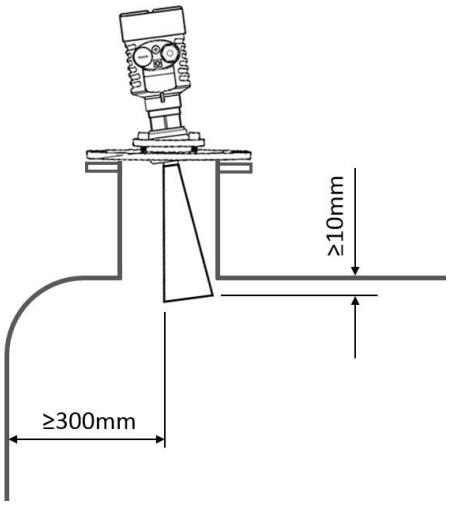
● Application	Solid powder, particles, bulks, with heavy dust, easy crystallization and condensation, Liquid (special) etc.
● Measuring range (Maximum)	70m (Depends on dielectric constant of different medium and the concrete working conditions)
● Process connection	Thread, Flange
● Process temperature	-60°C … +250°C
● Process pressure	ATM or -0.1 ~ 0.3MPa
● Accuracy	±15mm
● Repeatability	±2mm
● Frequency range	26GHz
● Explosion proof	Ex ia IIC T6
● Enclosure protection grade	IP67
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus
● With universal joint flange, the antenna can aim at the solid level surface exactly to get more accurate measured value.	
● For those with communication of RS485/ Modbus, backlight is available on request	

Dimensions of RD2693



Horn model selection	
Horn diameter D (mm)	Horn height H (mm)
Ø76	227
Ø96	288
Ø121	620

Installation of RD2693



Keep the mounting position away from the feeding opening

Mounting position: keep the outskirt of the antenna at least 300mm away from the inner wall of a tank

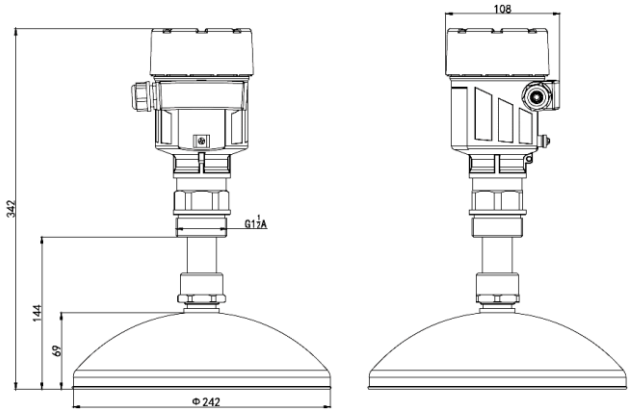
RD2693W

● Features	High accuracy, strong strength of anti-interference, not affected by temperature, humidity, wind force and direction, easy installation and calibration, low power consumption.
● Application	Water level measurement and monitoring of lakes, reservoirs, rivers, open channels, and tidal level of oceans.
● Measuring range (Maximum)	70m (depends on dielectric constant of different medium and the concrete working conditions)
● Process connection material	PP / SS
● Process temperature	-40°C … +100°C
● Process pressure	ATM
● Antenna material	SS
● Accuracy	±10mm
● Frequency range	26GHz
● Signal output	RS485/ Modbus
● Power supply	6 to 24V DC
● Display	Optional
● Backlight	On request

RD2694

● Application	Solid level for process tanks with heavy dust or ash, easy crystallization and condensation. etc.
● Measuring range (Maximum)	70m (Depends on dielectric constant of different medium and the concrete working conditions)
● Process connection	Thread, Flange
● Process temperature	-60°C … +250°C
● Process pressure	ATM or -0.1 ~ 0.3MPa
● Accuracy	±15mm
● Repeatability	±2mm
● Frequency range	26GHz
● Explosion proof	Ex ia IIC T6
● Enclosure protection grade	IP67
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus
● With universal joint flange, the antenna can aim at the solid level surface exactly to get more accurate measured value.	
● For those with communication of RS485/ Modbus, backlight is available on request	

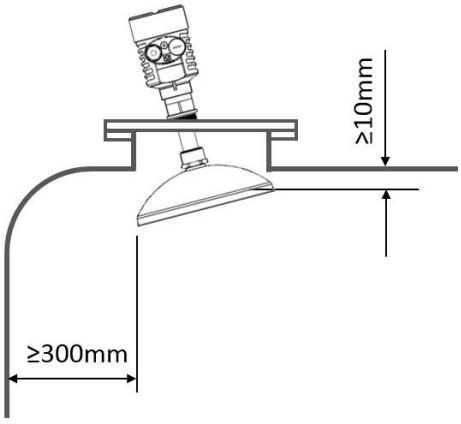
Dimensions of RD2694



Beam angle per horn size:

● Antenna Size (mm)	Φ196	Φ242
● Beam angle	5°	4°

Installation of RD2694



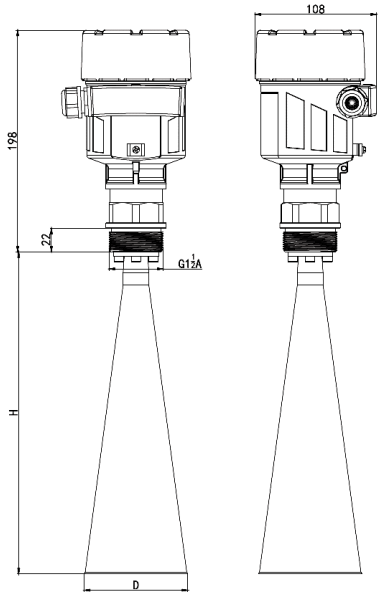
Keep away from the feeding mouth

The minimum distance between the outskirt of the parabolic antenna and the inner tank wall should be at least 300mm

RD2695

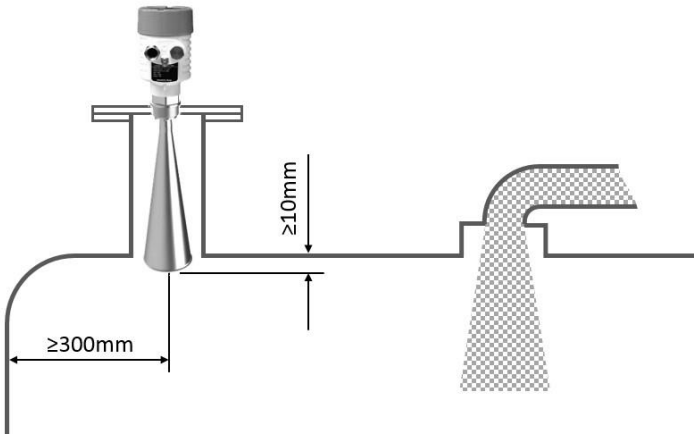
● Application	Liquid, solid particles and bulks
● Measuring range (Maximum)	35m (Depends on dielectric constant of different medium and the concrete working conditions)
● Process connection	Thread, Flange
● Process temperature	-60°C … +250°C
● Process pressure	ATM or -0.1 ~ 4.0MPa
● Accuracy	±3mm for liquids, ±10mm for solids
● Repeatability	±1mm
● Frequency range	26GHz
● Explosion proof	Ex ia IIC T6
● Enclosure protection grade	IP67
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus
● For those with communication of RS485/ Modbus, backlight is available on request	

Dimensions of RD2695



Horn model selection	
Horn diameter D (mm)	Horn height H (mm)
Ø76	227
Ø96	288
Ø121	620

Installation of RD2695



Keep away from feeding mouth

The minimum distance between the symmetrical central line of the transmitter and the inner tank wall should be at least 300mm

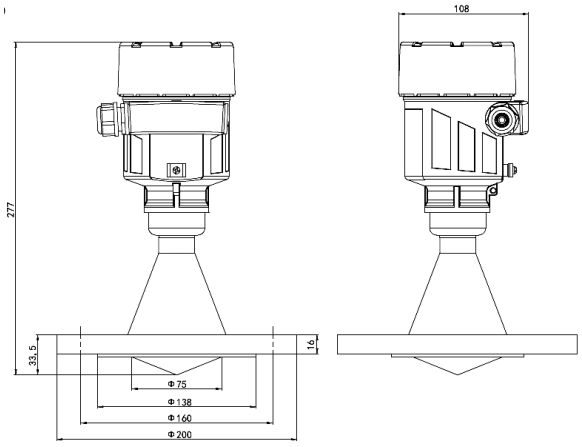
	RD2695S	RD2695DS

Description/ Model	RD2695S	RD2695DS
● Features	Sealed antenna with anti-corrosion cover	Whole sealed structure
● Application	be suitable for strong acids, alkalis, or other strongly corrosive liquids, or liquids with heavy steam, etc.	be suitable for strongly corrosive liquids tanks with corrosive environment
● Antenna size	** 62mm, corresponding to flange sizes, DN80, DN100 ** 96mm, corresponding to flange sizes, DN150, DN200	
● Measuring range (Maximum)	35m	
● Process connection	Flange	
● Process temperature	-60°C … +150°C	
● Process pressure	-0.1 ~ 1.0MPa	
● Accuracy	±3mm	
● Frequency range	26GHz	
● Explosion proof	Ex ia IIC T6	
● Enclosure protection grade	IP67	
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus	
● For those with communication of RS485/ Modbus, backlight is available on request		

RD2696

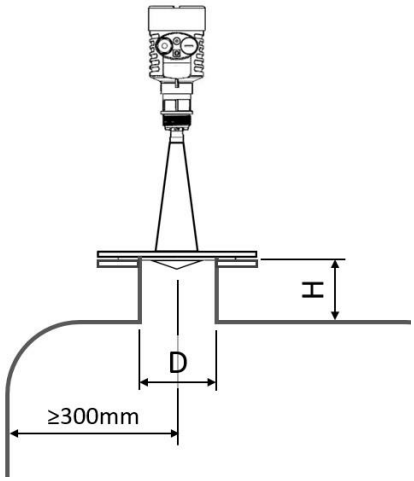
● Application	Sanitary liquid storage containers, heavy corrosive container
● Measuring range (Maximum)	20m (Depends on dielectric constant of different medium and the concrete working conditions)
● Process connection	Flange
● Process temperature	-60°C … +150°C
● Process pressure	ATM or -0.1 ~ 0.3MPa
● Accuracy	±2mm
● Repeatability	±1mm
● Frequency range	26GHz
● Explosion proof	Ex ia IIC T6
● Enclosure protection grade	IP67
● Signal output	4-20mA/ HART (2-wire/ 4-wire), RS485/ Modbus
● For those with communication of RS485/ Modbus, backlight is available on request	

Dimensions of RD2696



Horn model selection		
Horn diameter D (mm)	Horn height H (mm)	PVDF Plate d (mm)
Ø76	227	Ø99
Ø96	288	Ø132
Ø121	620	Ø156

Installation of RD2696



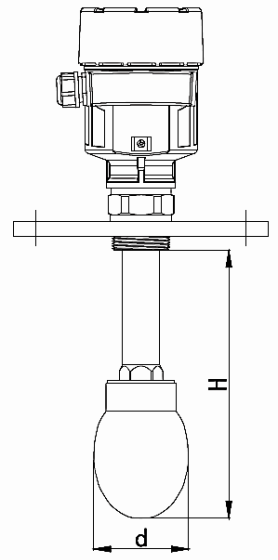
D (mm)	H (mm)
Ø50	100
Ø80	150
Ø100	200

The minimum distance between the symmetrical central line of the transmitter and the inner tank wall should be at least 300mm

Drip antenna type

● Application Model	RD2692	RD2693	RD2695
● Features	The angle of wave [beam] is low. The ability to collect waves is strong. Precision is strong.		
● Application	Suitable for mass measurements. The level of solid materials with lots of dust is highly measured.		
● Measuring range (Maximum)	20m	50m	30m
● Process connection	Thread, Flange		
● Process temperature	-60°C … +120°C		
● Process pressure	ATM		
● Accuracy	±3mm	±10mm	±5mm
● Repeatability	±1mm		
● Explosion proof	Ex ia IIC T6		
● Signal output	4-20mA/ HART (24V DC 2-wire/ 4-wire), 4-20mA/ HART (220V AC 4-wire), RS485/ Modbus (6~24V DC)		
● Enclosure protection grade	IP67		

Dimensions of drip antenna



Size	D (mm) Dia. of drip antenna	H (mm) Height of antenna	Antenna material
DN80	Ø75	207	KA/ PTFE
DN100	Ø95	233	LA/ PTFE
DN150	Ø145	287	MA/ PTFE

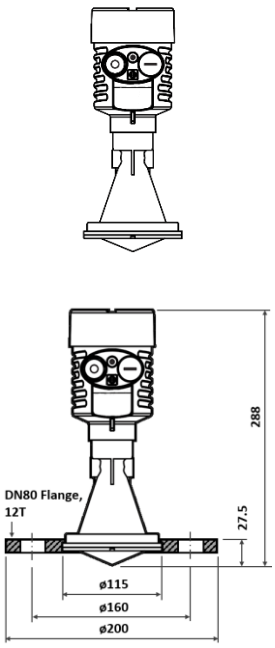
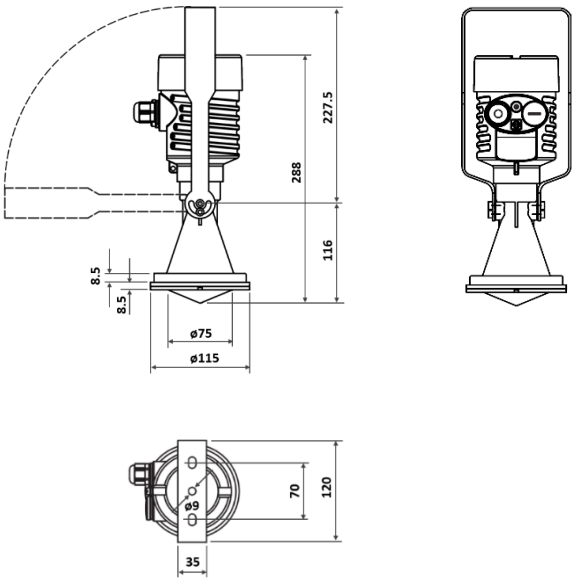
Beam angle per dead zone:

	RD2692	RD2693	RD2695
● Antenna Size (mm)	Φ75	Φ95	Φ145
● Beam angle	8°	6°	4°
● Dead zone	0.5m	0.5m	1m

Plastic horn antenna type

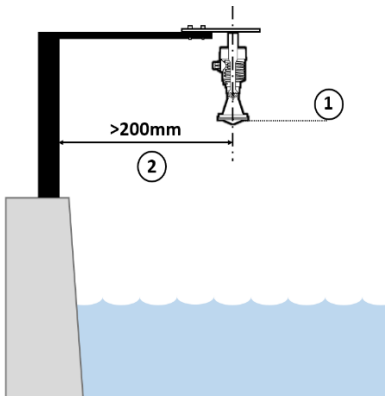
● Application Model	RD2692	RD2693	RD2695
● Features	Stable performance, strong ability of anti-interference, unaffected by temperature, humidity or wind force, compact and light weight, easy installation and calibration, low power consumption, small beam angle, can be debugged at PC via serial port.		
● Application	Suitable for water level monitoring in lake, river channel, reservoir, open channel, agricultural irrigation canals, urban road or bridge.		
● Measuring range (Maximum)	20m	50m	30m
● Process connection	Wall mounting with bracket, Flange		
● Process temperature	-60°C … +120°C		
● Process pressure	ATM		
● Accuracy	±3mm	±10mm	±5mm
● Repeatability	±1mm		
● Antenna material	PP		
● Explosion proof	Ex ia IIC T6		
● Beam angle	10 degree		
● Dead zone	0.3~1m		
● Signal output	4-20mA/ HART (24V DC 2-wire/ 4-wire), 4-20mA/ HART (220V AC 4-wire), RS485/ Modbus (6~24V DC)		
● Enclosure protection grade	IP67		

Dimensions

Clamp flange	Wall mounting with bracket/ SUS304
	

Plastic horn.	RD2692	RD2693	RD2695
Antenna type/ material	Horn antenna Φ75mm/ Plastic		
Beam angle	10°		
Clamp flange Size	DN80, DN100, DN125, DN150		
Clamp flange Material	PP, PTFE, SUS304, SUS316L		

Installation



Note:

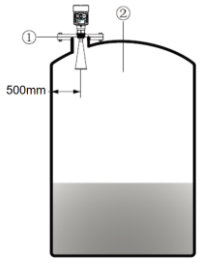
① Reference surface

② Extension length of support

4. Installation Guide

■ Preparation before installation

Please note the below items to make sure the proper installation of the instrument.
Please leave enough space for the installation.
Please keep the installation position away from where there is strong vibration. In order to make the fast, easy and safe installation, please follow the installation instructions below!



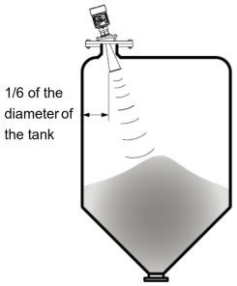
- **Installation instruction (refer to the figure upper right):** the instrument should be mounted at 1/6 of the tank diameter and the minimum distance between the symmetrical central line of the transmitter and the inner tank wall should be more than 300mm.

  Note: ① Reference surface

  ② Symmetrical central line of the tank

- **Tapered tank:** When the top surface of a tank is flat, the instrument can be mounted in the middle of the top, which can ensure the measurement to the bottom of the tank.

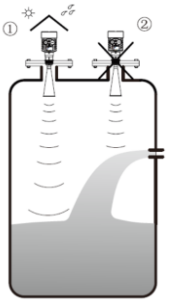
- **Tank with pile:** the antenna should focus on the material surface vertically.
  When the solid level surface is not flat and horizontal, and repose angle is big, a flange with a universal joint must be used, with which the angle of the antenna can be adjusted and focus on the material surface as much as possible.



■ Typical installation error

- **Instrument cannot be mounted above feeding inlet.** Keep the installation place away from sunshine or rain for the outdoor installation.

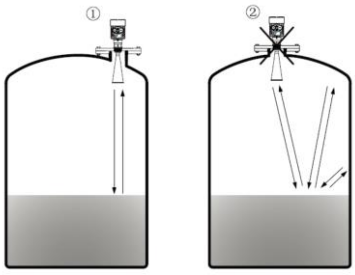
  ① Correct
  ② Wrong



- The instrument cannot be mounted at the middle of a arch tank. If so, it will have indirect echoes and be affected by multiple echoes.
  Multiple echoes amplitudes might be stronger than those of the real return signals.

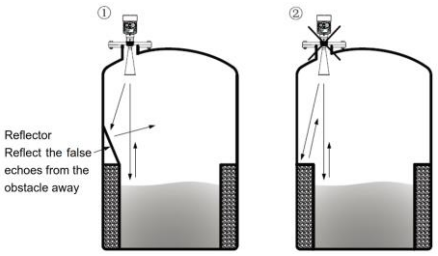
  The arch top can cause multiple echoes; therefore, the instrument cannot be mounted at the center of the tank top.

  ① Correct
  ② Wrong



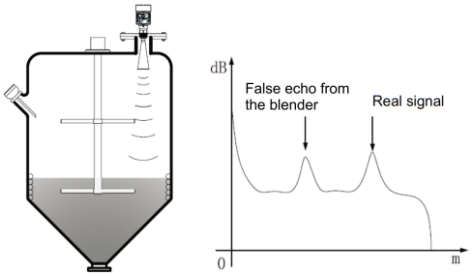
● A reflector is needed when there is an obstacle which may interrupt the measurement in the tank.

① Correct
② Wrong



■ Measurement with guide wave pipe

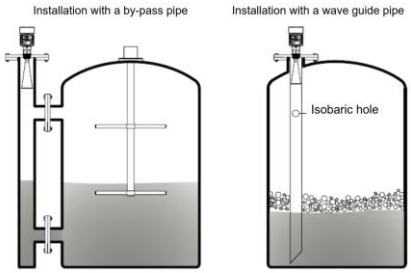
● When there is an obstacle in the area of the signal beam, e.g. a ladder, a limit switch, a heating device, a rack or a blender etc, it will interrupt the measurement and lead to wrong measuring result. In this case, a wave guide pipe is needed for the measurement.



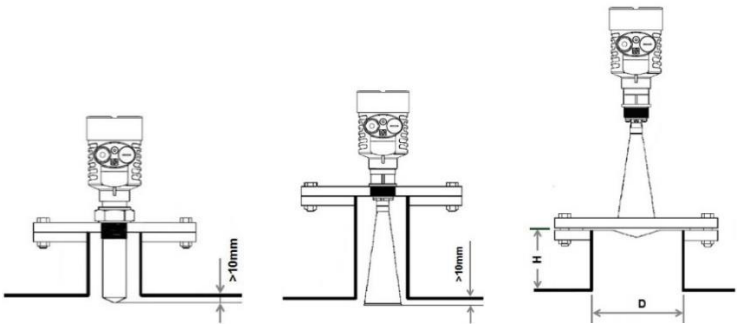
● Installation by a wave guide pipe (a wave guide pipe or a bypass pipe) can avoid being affected by any obstacle, foams or liquid waves.

Note: the isobaric hole diameter is 5~10mm. Min. diameter of the wave guide pipe is 50mm with smooth inner wall.

With a wave guide pipe, instrument can only measure a liquid with good liquidity. Measurement with wave guide pipe is not suitable for viscous liquids.



● Height of the extension pipe (or, mounting pipe, or nozzle): the antenna must be extended into the tank at least 10mm. (please refer to the pictures below)



D	H max
50mm	100mm
80mm	150mm
100mm	200mm

5. Electric Connection

Power supply

4~20mA/ HART (2-wire)

Power supply shares one 2-wire cable with the output signal. Regarding to the actual power supply voltage, see the technical data. A safety barrier must be installed between the power supply and the transmitter for the intrinsically safe type.

4~20mA/ HART (4-wire)

Power supply and signal current are separate; each has one 2-wire cable. See the technical data for the actual power supply voltage.

RS485/Modbus

Power supply and the Modbus signal wire are separate; each has one 2-wire shielded cable. See the technical data for the actual power supply voltage.

Cable

General introduction

Cable OD: 5~9mm (M20 x 1.5)
3.5~8.7mm (1/2" NPT)
2-wire or 4-wire cables are used for the electric connection. Due to the electromagnetic interference from the motor drive device, power supply wires or remission devices, the transmitter wires need to be the shielded cable.

4~20mA/ HART (2-wire)

Normal 2-wire cable can be used for the power supply.

4~20mA/ HART (4-wire)

Cables with ground wire for the power supply.

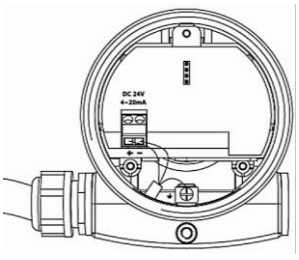
RS485/ Modbus

Power supply cables should be shielded wires cable.

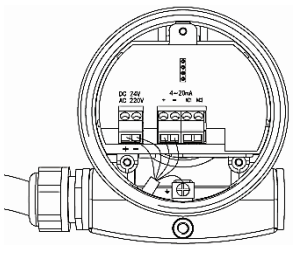
Shielded wire and ground wire of the cable:

Ideally the two ends of shielded wire should be connected the ground. But note that: there will be the grounding compensation current passing through the shielded wire. A grounding electric capacity (e.g. 1μF: 1500V) can be connected to one end (e.g. switch cabinet) when the both ends are connected to the ground. Try to use a resistance with much possible lower value to be connected the ground. (Note: if the transmitter is used in the Explosion area, it is not allowed to connect the both ends to the ground due to the potential output.)

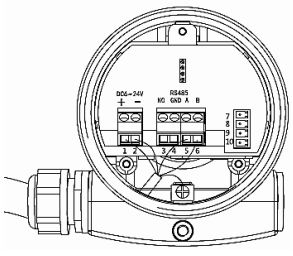
Wiring



4~20mA/ HART (2-wire)
24V DC power supply



4~20mA/ HART (4-wire)
220V AC/ 24V DC power supply



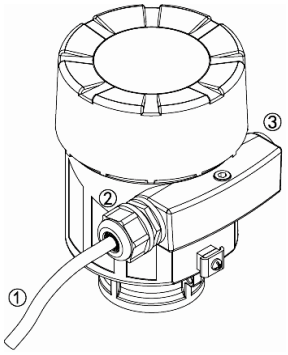
RS485/ Modbus
6~24V DC power supply

- **Safety instructions**

All the electric connection must be done under the situation of power being off.
Please follow the introduction of the manual. Please follow the requirements of the local regulation on electrical connection. Please follow the local regulations on the human health and safety.
All the electrical operation must be done by the qualified professional technician.
Please check the nameplate of a transmitter to ensure it can meet your technical requirements.
Please make sure the power supply is in accordance with the value printed on the name plate.

- **Enclosure protection grade**

This instrument is in fully conformity with the requirements of the enclosure protection grade IP67.
Please make sure the waterproof of the cable entry seal.
See the drawing right:
How to make sure the installation can meet the requirements of IP67:
Please make sure the cable entry seal is not damaged.
Please make sure the cable is not damaged.
Please make sure the cable meets the requirements of the electrical connection regulations.



Bend the cable down before entering the electrical inlet,
which will keep the water away from the housing, see mark ① at the above drawing.
Please tighten the cable entry seal, see mark ② at the above drawing.
Please tighten the unused cable entry with a seal cap. See mark ③ at the above drawing.

6. Transmitter Calibration

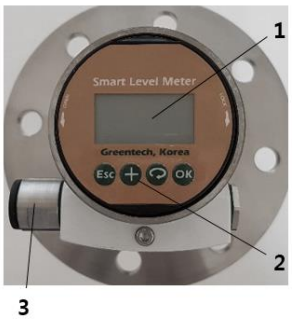
- **Methods of debugging**

There are three debugging methods for RD2690 series:

① With display/ buttons
② With a PC with the software
③ With a HART handhold communicator

- **Display/ button:**

Debugging can be done with the 4 buttons on the display screen.
Menu language is optional.
After debugging, the display keeps the normal working condition.
The measured values can be clearly read through the glass screen.

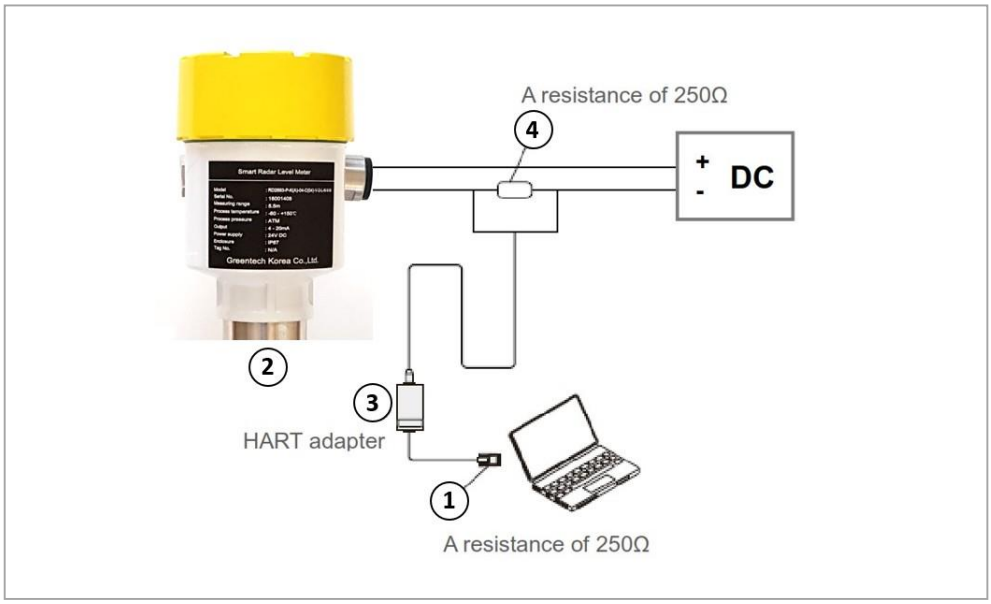


Display/ button

① LCD display
② Buttons
③ Wiring terminal

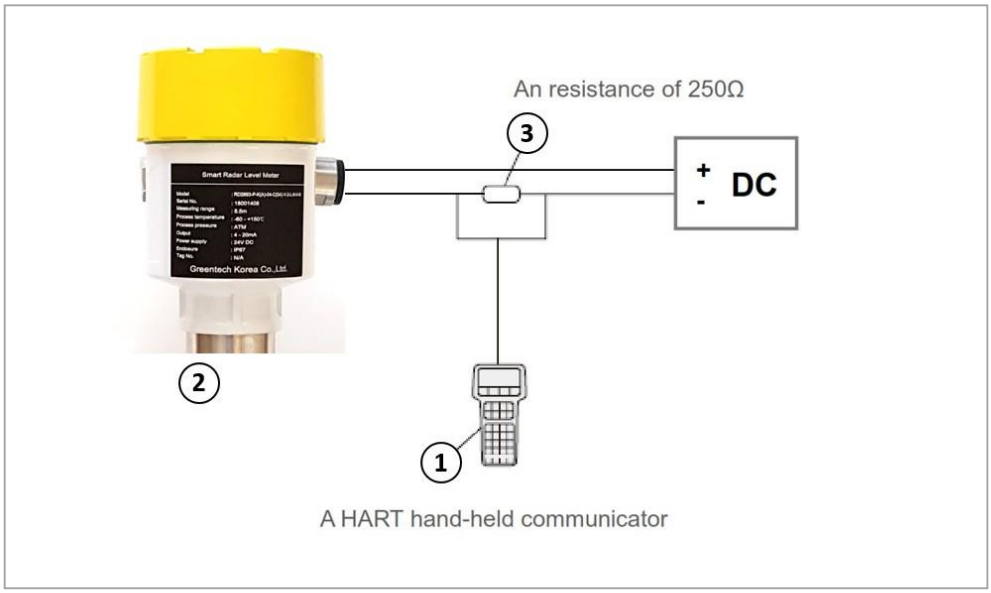
Debugging with a PC with a software

Connect a PC with a HART modem



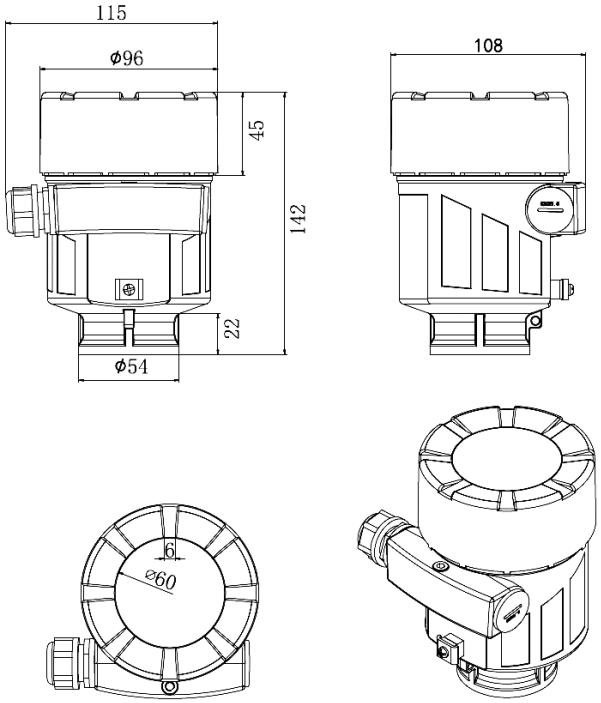
HART hand-held communicator

RD269X series radar can be calibrated with a HART hand-held communicator.

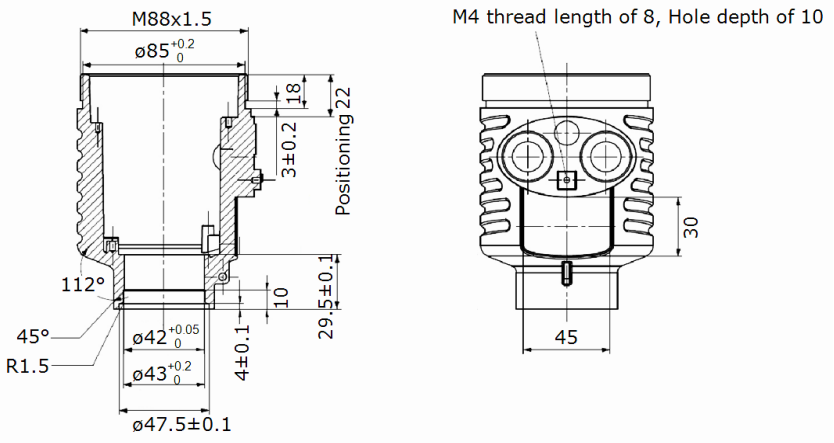


7. Structure Dimensions (unit: mm)

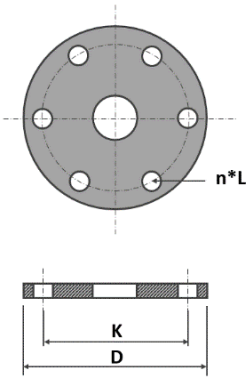
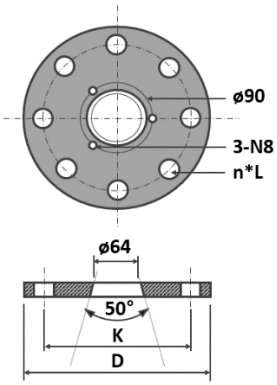
- **Housing material: Aluminum**



- **Explosion proof (Housing with Flame proof)**



Flange Dimension: Thickness12mm

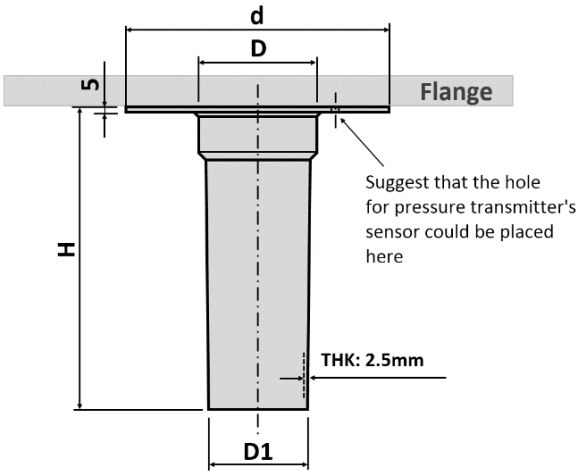
Flat Flange	Universal Flange
	

	DIN PN16		
Size	**D**.: Out Diameter	**K**: Hole Centers Distance	**n*L**: Hole Qty* Dia
DN40	Ø150	Ø110	4-18
DN50	Ø165	Ø125	4-18
DN65	Ø185	Ø145	4-18
DN80	Ø200	Ø160	8-18
DN100	Ø220	Ø180	8-18
DN125	Ø250	Ø210	8-18
DN150	Ø285	Ø240	8-22
DN200	Ø340	Ø295	12-22
DN250	Ø405	Ø355	12-26

Option

	Air Purge Set & Nozzle	Anticorrosive function	Protection Cap
Applied Model	RD2691, RD2693 RD2694, RD2695	RD2692, RD2693 RD2695, RD2695S	RD2692, RD2693 RD2695
Photo	 	 	

Anti-corrosive tube



Size	d Dia. of RF face	D Max. Dia.of outer surface	H Length	D1 Inner Dia.	Dia. of suitable antenna's mouth
DN80	Ø132	Ø78	202	Ø65	Ø62
DN100	Ø156	Ø78	202	Ø65	
DN150	Ø211	Ø120	307	Ø97	Ø96
DN200	Ø266	Ø120	307	Ø97	

8. Technical Data

General data

Model	RD2691	RD2692	RD2693	RD2694	RD2695	RD2696
Process Connection	Thread G1 1/2”					
	Thread 1 1/2” NPT					
	Flange					
Antenna material	PVDF	SUS304, SUS316L, PVDF				

Housing

Seal between housing and cover: Silicon rubber
Housing and display screen: PC
Ground connection: Stainless steel

Weight

- RD2691 1kg (depends on the process connection)
- RD2692 2kg (depends on the process connection)
- RD2693 6kg (depends on the process connection)
- RD2694 7kg (depends on the process connection)
- RD2695 2kg (depends on the process connection)
- RD2696 3kg (depends on the process connection)

Power supply

2-wire Standard type: 16~26V DC
Intrinsically safe: 21.6~26.4V DC
Power consumption: Max 22.5mA/1W
Allowed ripple: <100Hz Uss<1V
(100~100K) Hz Uss<10mV

Cable parameter

Cable inlet/ plug: 1 M20x1.5 cable entry (cable diameter 5~9mm), one blindness block, M20x1.5
Wiring terminal: cross section 2.5m²

Output parameter

Output signal/ communication protocol: 4~20mA/ HART, RS485/ Modbus
Resolution: 1.6μA
Error signal: output current no change, 20.5mA, or 22mA, or 3.9mA
2-wire, load resistance, see the drawing below: Integral time: 0~50s, adjustable

Features:

Dead zone: the remote end of an antenna

Max. Measuring range:

RD2691	20m (Liquid)
RD2692	30m (Liquid)
RD2692W	30m (Lakes, Rivers, Oceans)
RD2693	70m (Solid or Liquid)
RD2693W	70m (Lakes, Rivers, Oceans)
RD2694	70m (Solid)
RD2695	35m (Solid or Liquid)
RD2695S	35m (Liquid)
RD2695DS	35m (Liquid)
RD2696	20m (Liquid)

** **Note:** the maximum measuring range depends on the dielectric constant and concrete working conditions.

Micro-wave frequency: 26GHz

Communication connection: HART communication protocol/ Modbus communication protocol;
Measuring interval: approx. 1 second (depends on the parameter setting)
Adjustable time: approx. 1 second (depends on the parameter setting)
Display resolution: 1mm
Ambient temperature: -40~+70°C

Process temperature (temperature of antenna):

RD2691 :	-60°C…….+120°C
RD2692 :	-60°C…….+250°C
RD2692W :	-40°C…….+100°C
RD2693 :	-60°C…….+250°C
RD2693W :	-40°C…….+100°C
RD2694 :	-60°C…….+250°C
RD2695 :	-60°C…….+250°C
RD2695S :	-60°C…….+150°C
RD2695DS :	-60°C…….+150°C
RD2696 :	-60°C…….+150°C

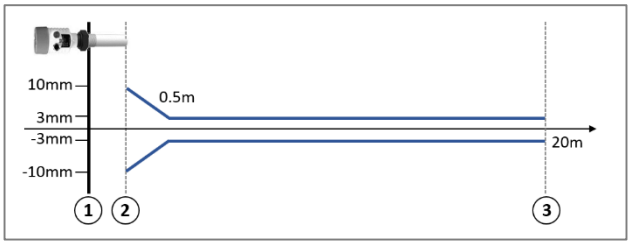
Relative humidity: <95%
Pressure: Max. 4Mpa
Resistance to vibration: mechanic vibration 10m/s², 10~150Hz

9. Transmitter Linearity

● RD2691

Beam angle depends on the Probe length. For the accuracy, please refer to the graph below:

Probe length (mm)	Beam angle
138	20°
238	14°



① Reference plane ② Antenna edge ③ Measuring range

● RD2692

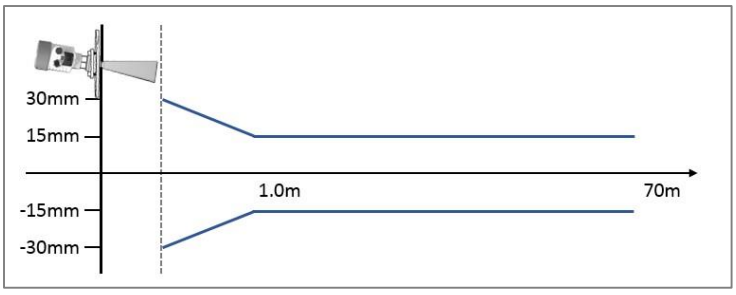
Beam angle depends on the antenna dimension. For the accuracy, please refer to the graph below:

Antenna Size (mm)	Beam angle
Φ46	18°
Φ76	12°
Φ96	8°
Φ121	6°

● RD2693

Beam angle depends on the antenna dimension. For the accuracy, please refer to the graph below:

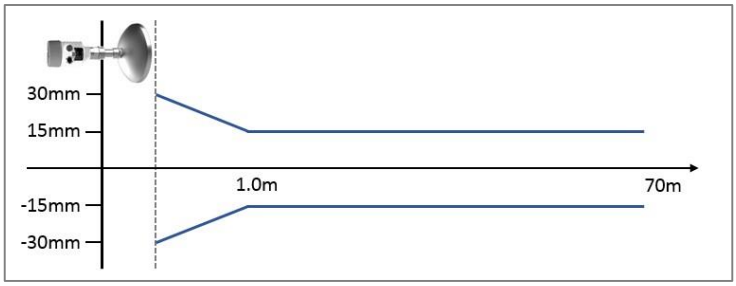
Antenna Size (mm)	Beam angle
Φ46	18°
Φ76	12°
Φ96	8°
Φ121	6°



● RD2694

Beam angle depends on the antenna dimension. For the accuracy, please refer to the graph below:

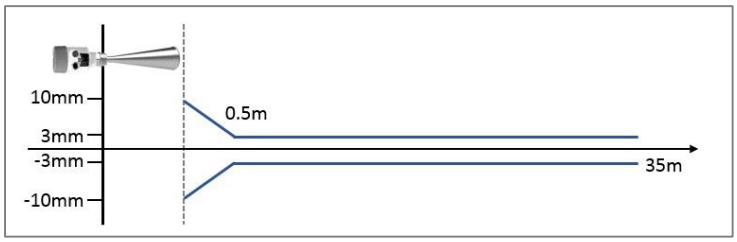
Antenna Size (mm)	Beam angle
Φ196	5°
Φ242	4°



● RD2695

Beam angle depends on the antenna dimension. For the accuracy, please refer to the graph below:

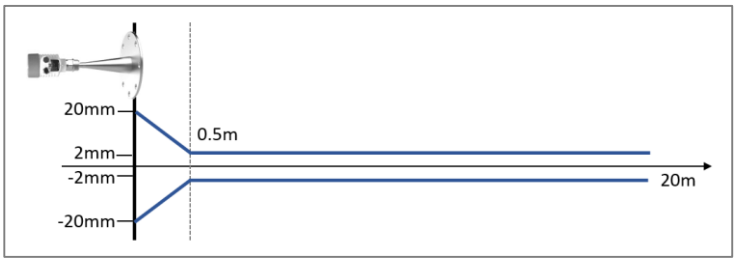
Antenna Size (mm)	Beam angle
Φ76	12°
Φ96	8°
Φ121	6°



● RD2696

Beam angle depends on the antenna dimension. For the accuracy, please refer to the graph below:

Antenna Size (mm)	Beam angle
Φ46	18°
Φ76	12°
Φ96	8°



10. Model selection 26GHz Non-contact Radar Level Transmitter

RD2691					
Explosion proof			**P**	Standard type (Non-explosion)	
			I	Intrinsically type (Ex ia IIC T6)	
			D	Intrinsically and explosion proof type (Ex d ia IIC T6)	
Antenna type/ material /process temperature			**F**	PVDF / -60 ~ +120°C	
Process connection	Size		**( )**	**G1.5**: Thread G1 1/2", **N1.5**: Thread 1 1/2" NPT	
			A1 ( )	DN40 flange	(**A**): ANSI150LB, FF (**J**): JIS10K, FF (**D**): DIN PN16, FF
			A2 ( )	DN50 flange	
			A3 ( )	DN65 flange	
			B ( )	DN80 flange	
			C ( )	DN100 flange	
			D ( )	DN125 flange	
			E ( )	DN150 flange	
			F ( )	DN200 flange	
			H ( )	DN250 flange	
	Material	Thread	**X**	PVDF	
		Flange	**P**	PVC	
			( )	(**04**): SUS304, (**16**): SUS316L	
			Y	Others	
Probe length			**A**	138mm (Standard)	
			B	238mm	
			C	86mm	
Electronic unit			**2**	4~20mA/24V DC 2-wire	
			3	4~20mA /220V AC 4-wire	
			4	4~20mA /24V DC/ HART 2-wire	
			5	RS485/ Modbus	
			Y	Others	
Housing/ protection grade			**( )**	**L**: Aluminum/ IP67, **G**: SUS304/ IP67	
Cable entry			**( )**	**M**: M20x1.5, **N**: 1/2" NPT	
Display			**( )**	**V**: With, **X**: Without	
Option			**N**	No	
			O	Air Purge Set	
Measuring range				( ) m	

RD2692	Standard			
RD2692W	Water monitoring for lakes, rivers, reservoirs, open channels and tides of oceans, etc. (RS485/ Modbus only)			
Explosion proof		**P**	Standard type (Non-explosion)	
		I	Intrinsically type (Ex ia IIC T6)	
		D	Intrinsically and explosion proof type (Ex d ia IIC T6)	
		E	Certificate for ship building	
Process connection	Size	**( )**	**G1.5**: Thread G1 1/2”, **N1.5**: Thread 1 1/2” NPT	
		A1 ( )	DN40 flange	(**A**): ANSI150LB, FF (**J**): JIS10K, FF (**D**): DIN PN16, FF
		A2 ( )	DN50 flange	
		A3 ( )	DN65 flange	
		B ( )	DN80 flange	
		C ( )	DN100 flange	
		D ( )	DN125 flange	
		E ( )	DN150 flange	
		F ( )	DN200 flange	
		H ( )	DN250 flange	
		W	Wall mounting with bracket (Plastic horn only)	
	Material	**( )**	(**04**): SUS304, (**16**): SUS316L	
Antenna type/ Material	Horn type	**A1 ( )**	Horn antenna Φ36mm/ (**04**): SUS304, (**16**): SUS316L	
		A2 ( )	Horn antenna Φ46mm/ (**04**): SUS304, (**16**): SUS316L	
		A3 ( )	Horn antenna Φ62mm/ (**04**): SUS304, (**16**): SUS316L	
		B ( )	Horn antenna Φ76mm/ (**04**): SUS304, (**16**): SUS316L	
		C ( )	Horn antenna Φ96mm/ (**04**): SUS304, (**16**): SUS316L	
		D ( )	Horn antenna Φ121mm/ (**04**): SUS304, (**16**): SUS316L	
		P	Horn antenna: Plastic, Φ76mm/ Plastic-wall mounting only.	
	Drip type	**R ( )**	Drip antenna (**A**): Φ 75mm, (**B**): Φ 95mm, (**C**): Φ145mm	
Seal/ process temperature		**L**	-40°C ~+100°C: RD2692W only	
		V	Viton/ -60°C ~+150°C	
		K	Kalrez/ -60°C ~ +250°C	
Electronic unit		**2**	4~20mA/24V DC 2-wire	
		3	4~20mA /220V AC 4-wire	
		4	4~20mA /24V DC/ HART 2-wire	
		5	RS485/ Modbus	
		Y	Others	
Housing/ protection grade		**( )**	**L**: Aluminum/ IP67, **G**: SUS304/ IP67	
Cable entry		**( )**	**M**: M20x1.5, **N**: 1/2” NPT	
Display		**( )**	**V**: With, **X**: Without	
Option	RD2692	**N**	No	
		F	Anti-corrosion function: PVDF	
		P	Protection Cap	
	RD2692W	**M**	Mounting bracket	
		B	Back light	
Measuring range			( ) m	

RD2693	Standard			
RD2693W	Water monitoring for lakes, rivers, reservoirs, open channels and tides of oceans, etc. (RS485/ Modbus only)			
Explosion proof		**P**	Standard type (Non-explosion)	
		I	Intrinsically type (Ex ia IIC T6)	
		D	Intrinsically and explosion proof type (Ex d ia IIC T6)	
Process connection	Size	**( )**	**G1.5**: Thread G1 1/2", **N1.5**: Thread 1 1/2" NPT	
		A1 ( )	DN40 flange	(**A**): ANSI150LB, FF (**J**): JIS10K, FF (**D**): DIN PN16, FF
		A2 ( )	DN50 flange	
		A3 ( )	DN65 flange	
		B ( )	DN80 flange	
		C ( )	DN100 flange	
		D ( )	DN125 flange	
		E ( )	DN150 flange	
		F ( )	DN200 flange	
		H ( )	DN250 flange	
		M ( )	DN80 flange, With universal joint.	
		K ( )	DN100 flange, With universal joint.	
		T ( )	DN125 flange, With universal joint	
		Z ( )	DN150 flange, With universal joint	
		W ( )	DN200 flange, With universal joint	
		V ( )	DN250 flange, With universal joint	
		W	Wall mounting with bracket (Plastic horn only)	
	Material	**( )**	(**04**): SUS304, (**16**): SUS316L	
Antenna type/ Material	Horn	**A1 ( )**	Horn antenna Φ36mm/ (**04**): SUS304, (**16**): SUS316L	
		A2 ( )	Horn antenna Φ46mm/ (**04**): SUS304, (**16**): SUS316L	
		A3 ( )	Horn antenna Φ62mm/ (**04**): SUS304, (**16**): SUS316L	
		B ( )	Horn antenna Φ76mm/ (**04**): SUS304, (**16**): SUS316L	
		C ( )	Horn antenna Φ96mm/ (**04**): SUS304, (**16**): SUS316L	
		D ( )	Horn antenna Φ121mm/ (**04**): SUS304, (**16**): SUS316L	
	Drip type	**R ( )**	Drip antenna (**A**): Φ 75mm, (**B**): Φ 95mm, (**C**): Φ145mm	
Seal/ process temperature		**L**	-40°C ~+100°C: RD2693W only	
		V	Viton/ -60°C ~+150°C	
		K	Kalrez/ -60°C - +250°C	
Electronic unit		**2**	4~20mA/24V DC 2-wire	
		3	4~20mA /220V AC 4-wire	
		4	4~20mA /24V DC/ HART 2-wire	
		5	RS485/ Modbus	
		Y	Others	
Housing/ protection grade		**( )**	**L**: Aluminum/ IP67, **G**: SUS304/ IP67	
Cable entry		**( )**	**M**: M20x1.5, **N**: 1/2" NPT	
Display		**( )**	**V**: With, **X**: Without	
Option	RD2693	**N**	No	
		O	Air Purge Set	
		F	Anti-corrosion function: PVDF	
		P	Protection Cap	
	RD2693W	**M**	Mounting bracket	
		B	Back light	
Measuring range			( ) m	

RD2694				
Explosion proof		P	Standard type (Non-explosion)	
		I	Intrinsically type (Ex ia IIC T6)	
		D	Intrinsically and explosion proof type (Ex d ia IIC T6)	
Process connection	Size	( )	**G1.5**: Thread G1 1/2", **N1.5**: Thread 1 1/2" NPT	
		A1 ( )	DN40 flange	(**A**): ANSI150LB, FF (**J**): JIS10K, FF (**D**): DIN PN16, FF
		A2 ( )	DN50 flange	
		A3 ( )	DN65 flange	
		B ( )	DN80 flange	
		C ( )	DN100 flange	
		D ( )	DN125 flange	
		E ( )	DN150 flange	
		F ( )	DN200 flange	
		H ( )	DN250 flange	
		M ( )	DN80 flange, With universal joint.	
		K ( )	DN100 flange, With universal joint.	
		T ( )	DN125 flange, With universal joint	
		Z ( )	DN150 flange, With universal joint	
		W ( )	DN200 flange, With universal joint	
		V ( )	DN250 flange, With universal joint	
	Material	( )	(**04**): SUS304, (**16**): SUS316L	
Antenna type/ Material		F	Parabolic antenna Φ196mm, SUS304	
		G	Parabolic antenna Φ242mm, SUS304	
Seal/ process temp.		( )	**V:** Viton/ -60°C ~+150°C, **K:** Kalrez/ -60°C ~ +250°C	
Electronic unit		2	4~20mA/24V DC 2-wire	
		3	4~20mA /220V AC 4-wire	
		4	4~20mA /24V DC/ HART 2-wire	
		5	RS485/ Modbus	
		Y	Others	
Housing/ protection grade		( )	**L**: Aluminum/ IP67, **G**: SUS304/ IP67	
Cable entry		( )	**M**: M20x1.5, **N**: 1/2" NPT	
Display		( )	**V**: With, **X**: Without	
Option		N	No	
		O	Air Purge Set	
Measuring range			( ) m	

RD2695			Standard	
Explosion proof			**P**	Standard type (Non-explosion)
			I	Intrinsically type (Ex ia IIC T6)
			D	Intrinsically and explosion proof type (Ex d ia IIC T6)
			E	Certificate for ship building
Process connection	Size		**( )**	**G1.5**: Thread G1 1/2", **N1.5**: Thread 1 1/2" NPT
			A1 ( )	DN40 flange
			A2 ( )	DN50 flange
			A3 ( )	DN65 flange
			B ( )	DN80 flange
			C ( )	DN100 flange
			D ( )	DN125 flange
			E ( )	DN150 flange
			F ( )	DN200 flange
			H ( )	DN250 flange
			M ( )	DN80 flange, With universal joint.
			K ( )	DN100 flange, With universal joint.
			T ( )	DN125 flange, With universal joint
			Z ( )	DN150 flange, With universal joint
			W ( )	DN200 flange, With universal joint
			V ( )	DN250 flange, With universal joint
			W	Wall mounting with bracket (Plastic horn only)
	Material		**( )**	(**04**): SUS304, (**16**): SUS316L
Antenna type/ Material	Horn		**A1 ( )**	Horn antenna Φ36mm/ (**04**): SUS304, (**16**): SUS316L
			A2 ( )	Horn antenna Φ46mm/ (**04**): SUS304, (**16**): SUS316L
			A3 ( )	Horn antenna Φ62mm/ (**04**): SUS304, (**16**): SUS316L
			B ( )	Horn antenna Φ76mm/ (**04**): SUS304, (**16**): SUS316L
			C ( )	Horn antenna Φ96mm/ (**04**): SUS304, (**16**): SUS316L
			D ( )	Horn antenna Φ121mm/ (**04**): SUS304, (**16**): SUS316L
			P	Horn antenna: Plastic, Φ76mm/ Plastic-wall mounting only.
	Drip type		**R ( )**	Drip antenna (**A**): Φ 75mm, (**B**): Φ 95mm, (**C**): Φ145mm
Seal/ process temp.			**( )**	**V:** Viton/ -60°C ~+150°C, **K:** Kalrez/ -60°C ~ +250°C
Electronic unit			**2**	4~20mA/ 24V DC 2-wire
			3	4~20mA / 220V AC 4-wire
			4	4~20mA / 24V DC/ HART 2-wire
			5	RS485/ Modbus
			Y	Others
Housing/ protection grade			**( )**	**L**: Aluminum/ IP67, **G**: SUS304/ IP67
Cable entry			**( )**	**M**: M20x1.5, **N**: 1/2" NPT
Display			**( )**	**V**: With, **X**: Without
Option for RD2695 only			**N**	No
			F	Anticorrosive function
			O	Air Purge Set
			P	Protection Cap
Measuring range				( ) m

RD2695S	Strong corrosive liquids, PVDF Sealed antenna with anti-corrosion cover			
RD2695DS	Strong corrosive liquids, PVDF Whole sealed instrument			
Explosion proof		**P**	Standard type (Non-explosion)	
		I	Intrinsically type (Ex ia IIC T6)	
		D	Intrinsically and explosion proof type (Ex d ia IIC T6)	
		E	Certificate for ship building	
Process connection		**B ( )**	DN80 flange	(**A**): ANSI150LB, FF (**J**): JIS10K, FF (**D**): DIN PN16, FF
		C ( )	DN100 flange	
		D ( )	DN125 flange	
		E ( )	DN150 flange	
		F ( )	DN200 flange	
		H ( )	DN250 flange	
	Material	**P**	PVDF for RD2695DS only	
		( )	(**04**): SUS304, (**16**): SUS316L	
Antenna type/ Material		**A ( )**	Horn antenna Φ62mm/ (**04**): SUS304, (**16**): SUS316L	
		C ( )	Horn antenna Φ96mm/ (**04**): SUS304, (**16**): SUS316L	
Seal/ process temp.		**V**	Viton/ -60°C ~+150°C	
Electronic unit		**2**	4~20mA/24V DC 2-wire	
		3	4~20mA /220V AC 4-wire	
		4	4~20mA /24V DC/ HART 2-wire	
		5	RS485/ Modbus	
		Y	Others	
Housing/ protection grade		**( )**	**L**: Aluminum/ IP67, **G**: SUS304/ IP67	
Cable entry		**( )**	**M**: M20x1.5, **N**: 1/2” NPT	
Display		**( )**	**V**: With for RD2695S only, **X**: Without	
Measuring range			( ) m	

RD2696				
Explosion proof		P	Standard type (Non-explosion)	
		I	Intrinsically type (Ex ia IIC T6)	
		D	Intrinsically and explosion proof type (Ex d IIC T6)	
Process connection	Size	A2 ( )	DN50 Plane complex flange	(**A**): ANSI150LB, FF (**J**): JIS10K, FF (**D**): DIN PN16, FF
		A3 ( )	DN65 Plane complex flange	
		B ( )	DN80 Plane complex flange	
		C ( )	DN100 Plane complex flange	
		D ( )	DN125 Plane complex flange	
		E ( )	DN150 Plane complex flange	
		F ( )	DN200 Plane complex flange	
		H ( )	DN250 Plane complex flange	
	Material	( )	(**04**): SUS304, (**16**): SUS316L	
Seal/ process temperature		V	Viton/ -60°C ~+150°C	
Electronic unit		2	4~20mA/24V DC 2-wire	
		3	4~20mA /220V AC 4-wire	
		4	4~20mA /24V DC/ HART 2-wire	
		5	RS485/ Modbus	
		Y	Others	
Housing/ protection grade		( )	**L**: Aluminum/ IP67, **G**: SUS304/ IP67	
Cable entry		( )	**M**: M20x1.5, **N**: 1/2” NPT	
Display		( )	**V**: With, **X**: Without	
Measuring range			( ) m	

Notes: The signal converter colors may be changed by customer’s request.
This technical specification may be upgraded without prior notice.

11. Data Sheet for Model Selection

Customer information

Company: _____ Contact person: _____

Address: _____ Post code: _____

Telephone: _____ Fax: _____

Mobile phone: _____ E-mail: _____

Date: _____

Certificate

□ Standard type (Non-explosion proof □ Intrinsically safe (Ex ia IIC T5)

□ Intrinsically safe (Ex ia IIC T6)

□ Intrinsically safe type + marine approval (Ex ia IIC T6)

□ Intrinsically safe + explosion proof type (Exd ia IIC T6)

Tank/container information

Tank type:

□ Storage tank □ Reaction tank □ Separation tank □ Marine tank

Tank structure:

□ Tank material : □ Tank pressure :

Tank size: Height of tank : _____ m Diameter of tank : _____ m

Top of the tank:

□ Arch type □ Flat top □ Open type □ Conic top

Bottom of tank:

□ Tapered bottom □ Flat bottom □ Inclined bottom □ Arch bottom

Installation position:

□ Top installation □ Side installation □ Bypass installation □ Wave guide pipe installation

Connection pipe for tank top installation (important information):

Connection pipe height: mm, connection pipe diameter: mm

Measuring medium

Medium name : □ Liquid □ solid □ mix medium

Medium temperature: _____°C

Dielectric constant:

Adhesive: □ Yes □ No Stirring: □ Yes □ No

Process connection

Thread: □ G1 1/2” □ 1 1/2” NPT Flange: □ DIN PN16 □ ANSI 150# □ JIS 10K

Power supply: □ 24V DC 2-wire □ 220V DC 4-wire □ 220V AC □ 6V DC □ 12V DC

Output: □ 4-20mA □ HART □ RS485/ Modbus

Display: □ with display and programmer □ Without display and programmer