User's Manual

Supmea

# Radar Level meter

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# 26GHz Radar Level Meter

## 1. Product Overview

This series of radar level meter adopted 26G high frequency radar sensor, the maximum measurement range can reach up to 80 meters. Antenna is optimized further processing, the new fast microprocessors have higher speed and efficiency can be done signal analysis, the instrumentation can be used for reactor, solid silo and very complex measurement environment.

### ● Principle

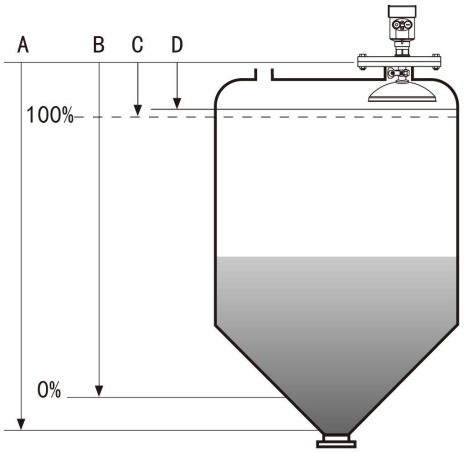
Radar level transmitter antenna microwave pulse is narrow, the downward transmission antenna. Microwave exposure to the medium surface is reflected back again by the antenna system receives, sends the signal to the electronic circuit automatically converted into level signals (because the microwave propagation speed, electromagnetic wave to reach the target and the reflected back to the receiver this time is almost instantaneous).

A Range set

B Low adjustment

C High

D Blind area




**Datum measurement:** Screw thread bottom or the sealing surface of the flange.

***Note:*** *Make sure the radar level meter the highest level cannot enter the measuring blind area (Figure D shown below).*

### ● The characteristics of 26G radar level meter:

- Small antenna size, easy to install; Non-contact radar, no wear, no pollution.
- Almost no corrosion, bubble effect; almost not affected by water vapor in the atmosphere, the temperature and pressure changes.
- Serious dust environment on the high level meter work has little effect.
- A shorter wavelength, the reflection of solid surface inclination is better.
- Beam angle is small, the energy is concentrated, can enhance the ability of echo

and to avoid interference.

- The measuring range is smaller, for a measurement will yield good results.
- High signal-to-noise ratio, the level fluctuation state can obtain better performance.
- High frequency, measurement of solid and low dielectric constant of the best choice.

## 2. Product Introduction

### SUP-RD904

Application：Solid material, Strong dust,
easy to crystallize, condensation occasion
Measuring Range：80 meters
Process Connection：Thread, Universal Flange
Process Temperature： -40℃~130℃(Standard type)
-40℃~230℃(High temperature type)
Process Pressure：-0.1 ~ 0.3 MPa
Measurement Accuracy： ± 15mm
Protection Grade：IP67
Frequency Range： 26GHz
Display：LED, Programmable
Supply：2-wire（DC24V）/ 4-wire（DC24V /AC220V ）
Signal Output：4... 20mA / HART (2-wire / 4-wire )
RS485/ Modbus
Outer Covering：Aluminum / Plastic / Stainless steel

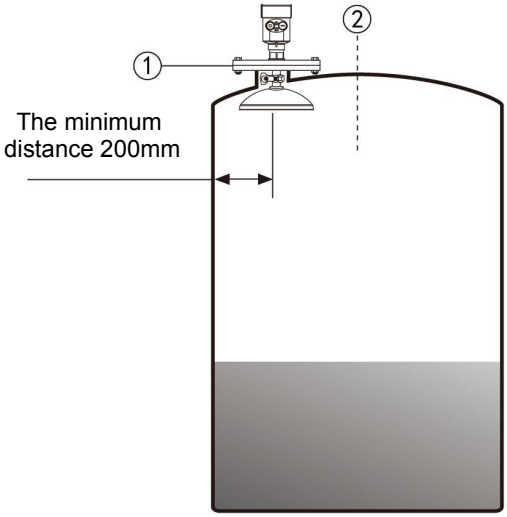
## 3. The Installation Requirements

- **Installation guide:**

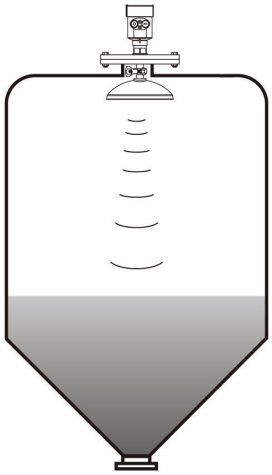
The instrument is preferably installed at 1/4 or 1/6 of the diameter of the tank.

Note: The minimum distance from the tank wall should be 200mm.

Note: ① datum
②The container center or axis of symmetry

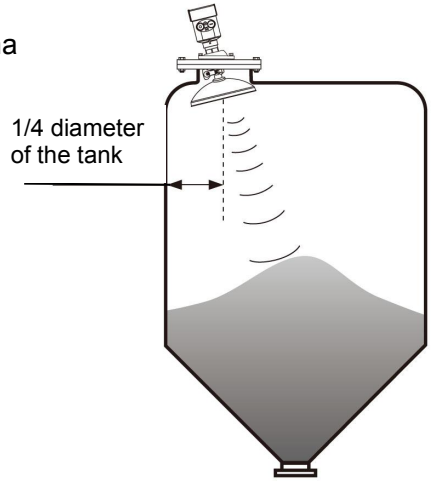


- The top conical tank level, can be installed at the top of the tank is intermediate, can guarantee the measurement to the conical bottom.



- A feed antenna to the vertical alignment surface. If the surface is rough, stack angle must be used to adjust the angle of universal flange of the antenna to the alignment surface.

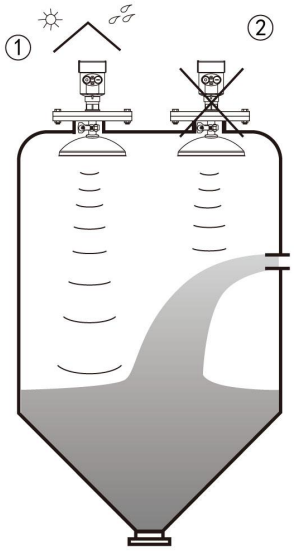
  (Due to the solid surface tilt will cause the echo attenuation, even Loss of signal.)




- **Typical installation errors：**

➢ Conical tank cannot be installed above the feed port.

***Note***: outdoor installation should adopt sunshade.

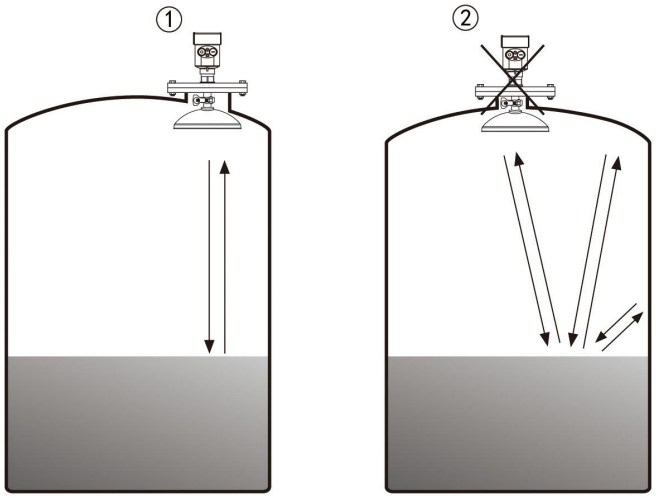



① Correct

② Error rainproof measures

➢ The instrument cannot be installed in the arched or domed roof intermediate. In addition to produce indirect echo is also affected by the echoes. Multiple echo can be larger than the real value of signal echo, because through the top can concentrate multiple echo. So cannot be installed in a central location.

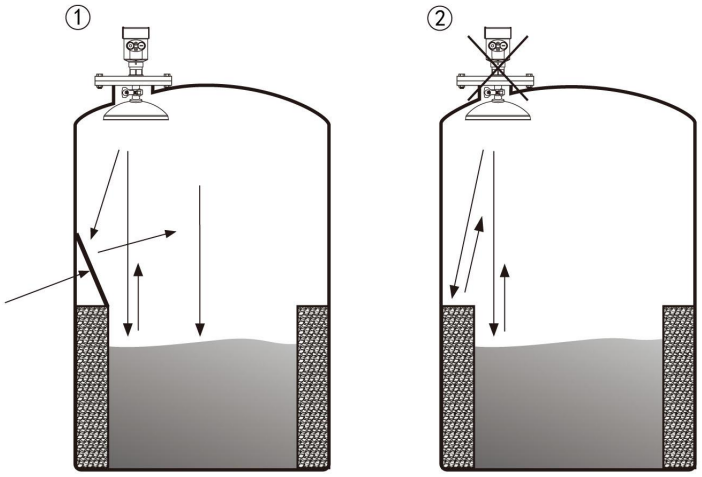
① Correct
② Error




➢ There are obstacles affecting measurement needed reflection plate.

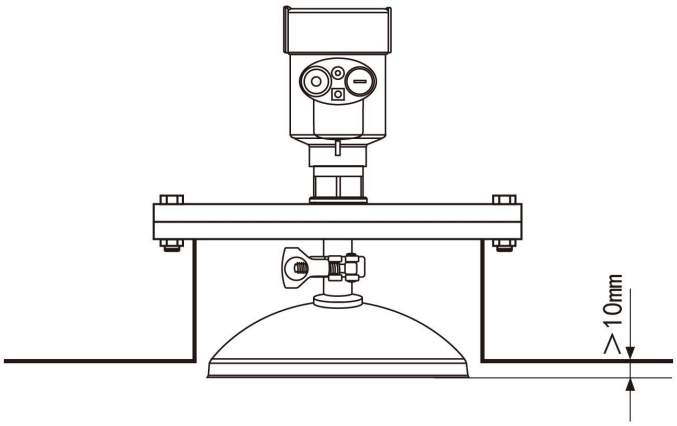
① Correct
② Error

The reflecting plate is the role of reflection disturbance signal.




## ● Height of nozzle:

Antenna extends into the tank at least 10mm distance.



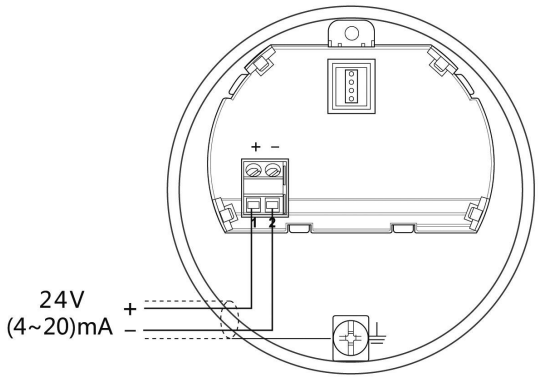
# 4. The Electrical Connection

- **The power supply voltage:**

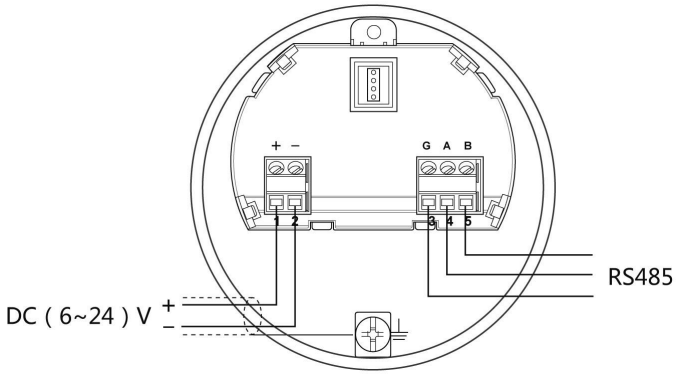
| | |
|---|---|
| (4~20)mA/HART (Two wire system) | The power supply and the output current signal sharing a two core shield cable. The supply voltage range see technical data. For intrinsically safe type must be a safety barrier between the power supply and the instrument. |
| (4~20)mA/HART(Four wire system) | Separate power supply and the current signal, respectively using a two-core shielded cable. The supply voltage range see technical data. |
| RS485 / Modbus | Power supply and Modbus signal line separated respectively using a two-core shielded cable, the power supply voltage range see technical data. |

- **Connection mode:**

➢ 24V two wire wiring diagram as follows:




➢ 6~24V RS485/Modbus wiring diagram as follows:



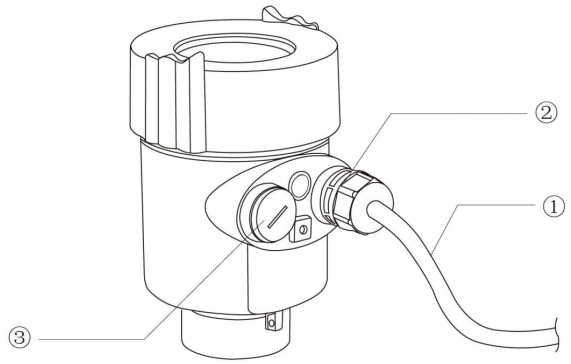
- **Safety instructions:**

- Please observe the local electrical code requirements!
- Please comply with local requirements for personnel health and safety regulations. All electrical components of instrument operation must be completed by the formal training of professionals.
- Please check the instrument nameplate to provide product specifications meet your requirements. Please make sure that the power supply voltage and instrument nameplate on the requirements.

- **Protection grade:**

This instrument meets the protection class IP66/67 requirements, please ensure the waterproof cable sealing head. The following diagram:

：




**How to install to meet the requirements of IP67:**

Please make sure that the sealing head is not damaged.
Please make sure that the cable is not damaged.
Please make sure that the cable for use with electrical connection specification.
Cable into the electrical interface before its curved downward, ensure that the water will not flow into the shell, see the①
Tighten the cable seal head, see the②
Please electrical interface will not use blind plug tight, see the③

# 5. Instrument Commissioning

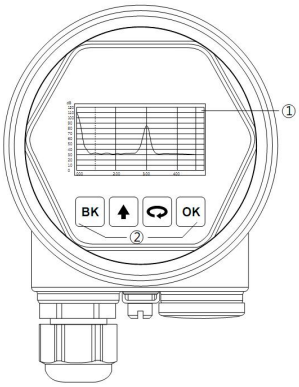
- **There are three kinds of debugging method:**
  1) Display / Keyboard

2) Host debugging
3) HART handheld programmer

- **Display / Keyboard:**

Please debug the instrumentation by four buttons on the display screen. There are three debug menu languages optional. After debugging is generally used only for display, through the glass window can read measured value very clearly.

Display / Keyboard



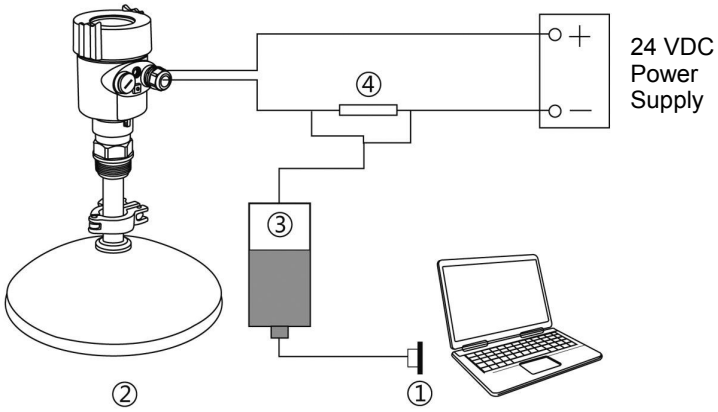

① Liquid crystal display(LCD)

② The key

- **PC debugging:**

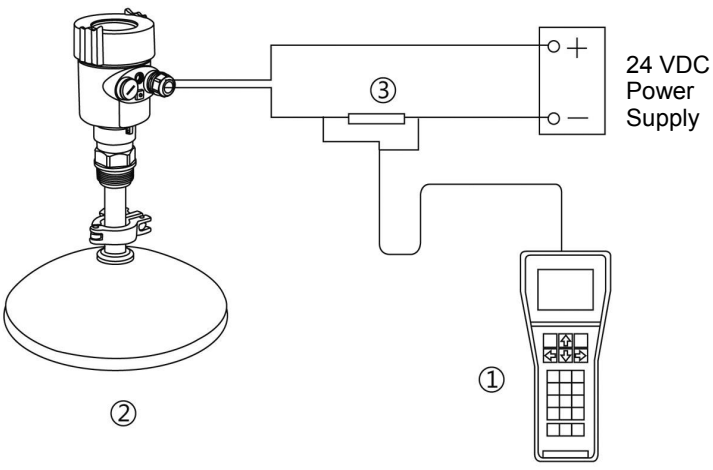
Connected to PC by HART

① RS232 interface or USB interface
② Radar level meter
③ HART adapter
④ 250 Ω resistor



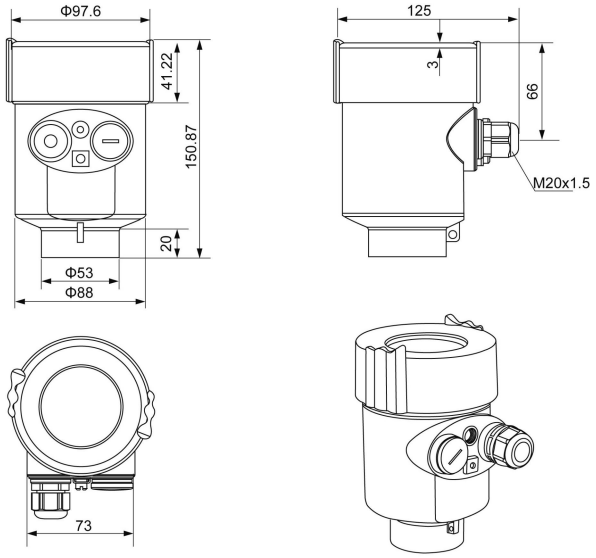

- **HART handheld programmer:**

① HART handheld programmer
② Radar level meter
③ 250 Ωresistor



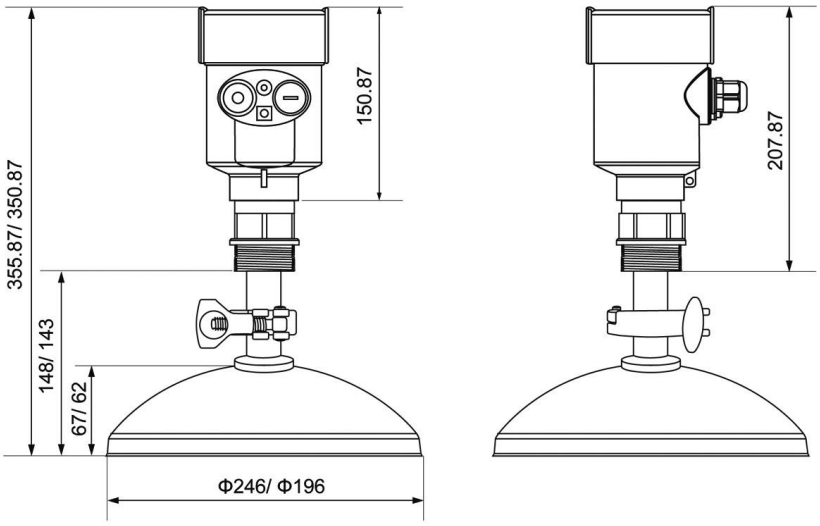
## 6. Structure Size (Unit: mm)

- **The outer shell**:

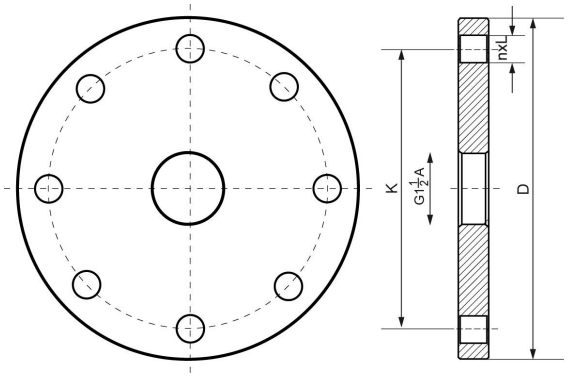



- **Appearance size:**

**SUP-RD904**




- **Flange type:**




| Flange Selection Tables | | | | |
|---|---|---|---|---|
| Specification | Outer diameter D | Hole center distance K | Number of Holes n | Hole diameter L |
| DN50 | Φ165 | Φ125 | 4 | 18 |
| DN80 | Φ200 | Φ160 | 8 | 18 |
| DN100 | Φ220 | Φ180 | 8 | 18 |
| DN125 | Φ250 | Φ210 | 8 | 18 |
| DN150 | Φ285 | Φ240 | 8 | 22 |
| DN200 | Φ340 | Φ295 | 12 | 22 |
| DN250 | Φ405 | Φ355 | 12 | 26 |

# 7. Technical Parameters

**Process Connection**

Thread G1½″ A
Thread 1½″ NPT
Flange

**Antenna Material**

Stainless Steel

**The outer shell**

| | |
|---|---|
| The seal between the shell and the shell cover | Silicone rubber |
| Casing window | Polycarbonate |
| The ground terminal | Stainless steel |

**The power supply voltage**

*Two wire system*

| | |
|---|---|
| The standard type | (16 ~ 26) V DC |
| Intrinsically safe | (21.6 ~ 26.4) V DC |
| Power dissipation | max 22.5mA / 1W |
| Allowable ripple | |
| - <100Hz | Uss<lV |
| - (100～100K) Hz | Uss<l0mV |

*Flameproof*

(22.8 ~ 26.4) V DC 2-wire system
(198 ~242)V AC 4-wire system / 110V AC 4-wire system

**The cable parameters**

| | |
|---|---|
| Cable entrance / plug | 1 M20xl.5 cable entrance |
| | 1 blind plug |
| Terminal | Conductor cross section 2.5mm² |

**Output parameters**

| | |
|---|---|
| The output signal | (4 ~ 20) mA / RS485 |
| Communication protocol | HART |

| | |
|---|---|
| Resolution | 1.6 μ A |
| Fault signal | Constant current output;<br>20. 5mA<br>22mA<br>3.9mA |
| The integral time | (0 ~ 36) s, adjustable |

| | |
|---|---|
| **Blind area** | the ends of the antenna |
| **The maximum distance measurement** | 80 meters |
| **Microwave frequency** | 26GHz |
| **Communication interface** | HART communication protocol |
| **The measurement interval** | about 1 second (depending on the parameter settings) |
| **Adjust the time** | about 1 second (depending on the parameter settings) |
| **Display resolution** | 1 mm |
| **Working storage and transportation temperature** | (-40～80) ℃ |

**Process temperature** (the temperature of the antenna part)

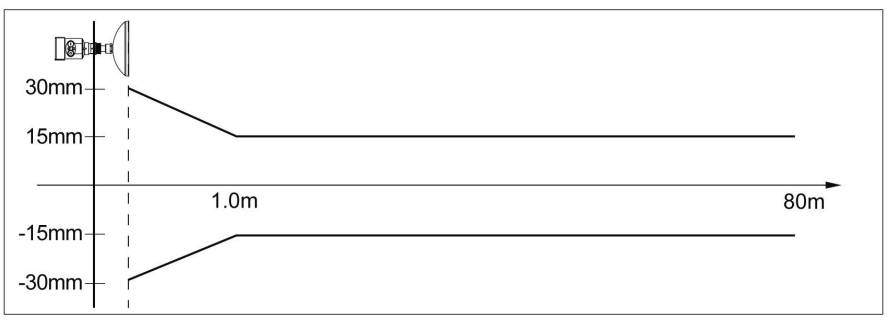
-40℃~130℃(Standard type) / -40℃~230℃(High temperature type)

| | |
|---|---|
| **Pressure** | Max.4MPa |
| **Seismic** | Mechanical vibration l0m/s², (10 ~ 150) Hz |

# 8. Meter Linearity

**SUP-RD904**

| | |
|---|---|
| Emission angle | Depending on the size of the antenna |
| -¢196mm | 4° |
| -¢242mm | 4° |
| Precision | See chart |



# 9. Product Model Selection

- **SUP-RD904**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Process Connection / Material** | | | | | | | | | |
| G Thread G1½″A / Stainless Steel 304 | | | | | | | | | |
| N 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 | | | | | | | | | |
| K Flange DN100 / Universal joint | | | | | | | | | |
| T Flange DN125 / Universal joint | | | | | | | | | |
| Z Flange DN150 / Universal joint | | | | | | | | | |
| W Flange DN200 / Universal joint | | | | | | | | | |
| V Flange DN250 / Universal joint | | | | | | | | | |
| Y Special Custom | | | | | | | | | |
| | **Antenna Type / Material** | | | | | | | | |
| | A Parabolic antenna Φ196mm / Stainless Steel 316L | | | | | | | | |
| | B Parabolic antenna Φ242mm / Stainless Steel 316L | | | | | | | | |
| | | **Seal Up / Process Temperature** | | | | | | | |
| | | V Viton / (-40~130) ℃ | | | | | | | |
| | | K Kalrez / (-40~230) ℃ | | | | | | | |
| | | | **The Electronic Unit** | | | | | | |
| | | | 3 (4~20) mA / 24V DC / HART two wire system | | | | | | |
| | | | 4 (4~20) mA / 220V AC / HART four wire system | | | | | | |
| | | | 5 RS485 / Modbus / 6~24V/ Four wire system | | | | | | |
| | | | | **Outer Covering / Protection Grade** | | | | | |
| | | | | L Aluminum / Single chamber / IP67 | | | | | |
| | | | | H Aluminum / Double chamber / IP67 | | | | | |
| | | | | G Plastic / Single chamber / IP65 | | | | | |
| | | | | K Stainless steel / Single chamber / IP67 | | | | | |
| | | | | | **Cable Line** | | | | |
| | | | | | M M 20x1.5 | | | | |
| | | | | | N ½″ NPT | | | | |
| | | | | | | **Site Display/The Programmer** | | | |
| | | | | | | A With | | | |
| | | | | | | X Without | | | |

## Material level meter selection parameter table

### Customer information

Company: _____ Contact: _____
Address: _____ Zip code: _____
The Telephone: _____ Fax:_____ Mobile phone: _____
E-mail: _____ Date: _____

## Tank / Container Information

***The Types of Tank:***

□ Tank □ Reaction Tank □ Separation Tank □ Marine Tank

***The Tank Structure:***

Material of Tank: _____ Pressure: _____

**Tank size:**

Tank Height: _____ m Diameter: _____

***The top of the tank:***

□ Vault □ Flat □ Open □ Cone type

***The bottom of the tank:***

□ Cone bottom □ Flat □ Slope bottom □ Arc bottom

***Installation:***

□ Top installation □ Side installation

□ The bypass pipe mount □ Guided wave pipe installation

***Installation takes over the top of the tank (information):***

Height of take over : _____ mm Diameter of take over :_____ mm

## Measurement of Medium

***Media name:*** □ Liquid □ Solid □ Mixed Media

***Medium temperature:*** _____ ℃

***Dielectric Constant:***

***Linked material:*** □ Yes □ No

***Mixing:*** □ Yes □ No

## Process Connection

***Thread:*** □ G1½″ A □ 1½″ NPT

***Flange*** □ Flange (DN= ) □ Flange (ANSI= )

***Power supply:***

□ 24V DC Two wire system □ 24V DC Four wire system □ 220V AC Four wire system

***Output:*** □ 4-20mA □ HART

***Display:*** □ Take the meter display program □ Without meter display program

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