26GHz Radar Level Meter

Product Manual

Model：903

Directory

1、Product Overview.....1

2、Product Introduction.....2

3、The Installation Requirements.....2

4、The Electrical Connection.....4

5、Instrument Commissioning.....7

6、Structure Size.....9

7、Technical Parameters.....10

8、Meter Linearity.....11

9、Product Model Selection.....12

Material level meter selection parameter table.....13

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 70 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

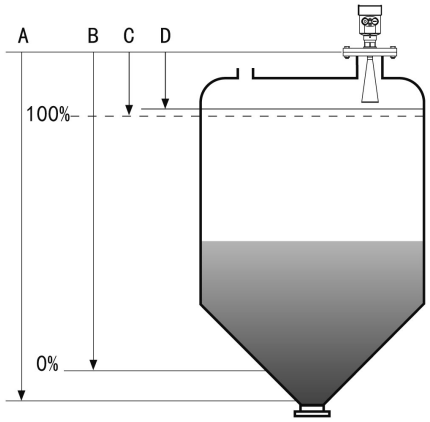
Radar level transmitter antenna microwave pulse is narrow, the downward transmission antenna. Microwave exposure to the medium surface is reflected back again by the antenna system receives, sends the signal to the electronic circuit automatically converted into level signals (because the microwave propagation 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.

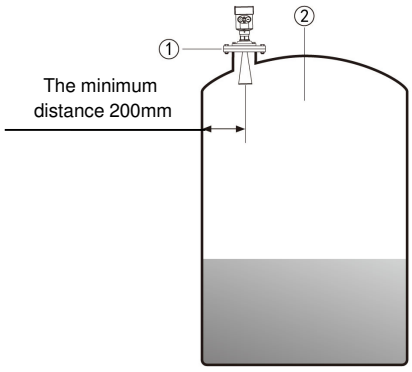
2. Product Introduction

- **903**

Application：Solid material, Strong dust
easy to crystallize, condensation occasion
Measuring Range： 70 meters
Process Connection：Universal Flange
Process Temperature： -40℃~130℃(Standard type)
-40℃~250℃(High temperature type)
Process Pressure：-0.1~4.0 MPa (Flat flange)
-0.1~0.3MPa (Universal flange)
Protection Grade： IP67
Accuracy： ±15mm
Frequency Range：26GHz
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
Explosion-proof Grade：Exia Ⅱ C T6 Ga/ Exd Ⅱ C T6 Gb

3. The Installation Requirements

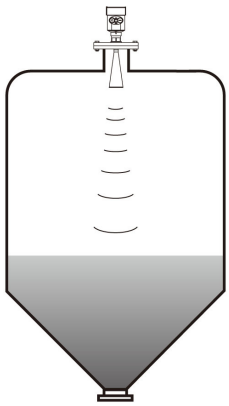
- **Installation guide:**



Be installed in the diameter of the 1/4 or 1/6.
Note: The minimum distance from the tank
wall should be 200mm.

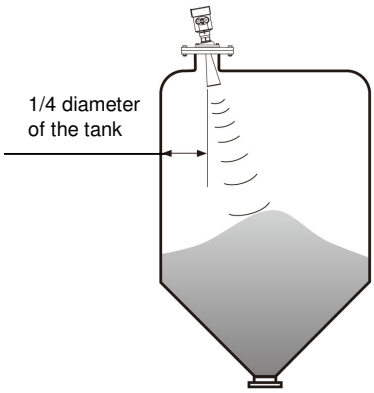
Note: ① datum
②The container center or axis of symmetry

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

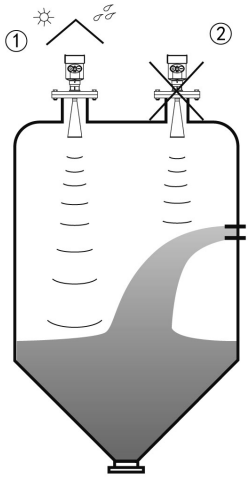


- A feed antenna to the vertical alignment surface. If the surface is rough, stack angle must be used to adjust the angle of cardan flange of the antenna to the alignment surface.

  (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.

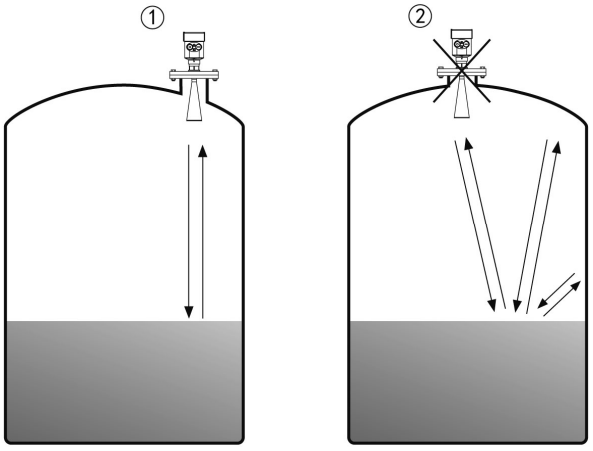
① Correct

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.

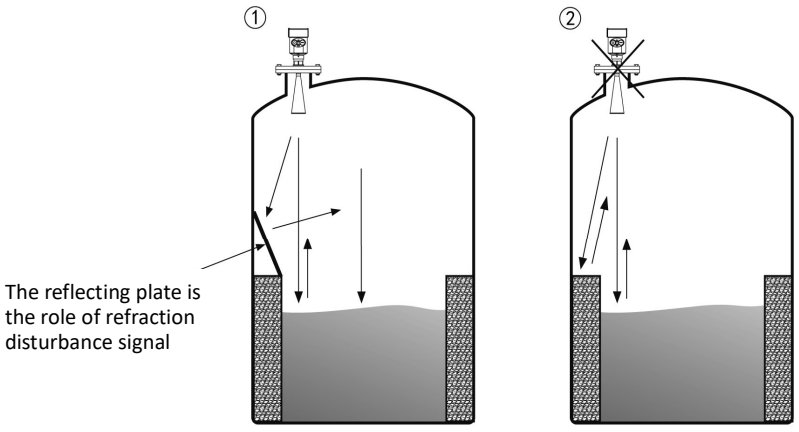
① Correct

② Error



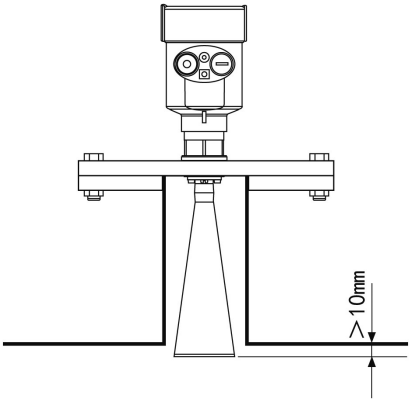
➢ There are obstacles affecting measurement needed reflection plate.

① Correct
② Error



- **Height of nozzle:**

Antenna extends into the tank at least 10mm distance.



4. The Electrical Connection

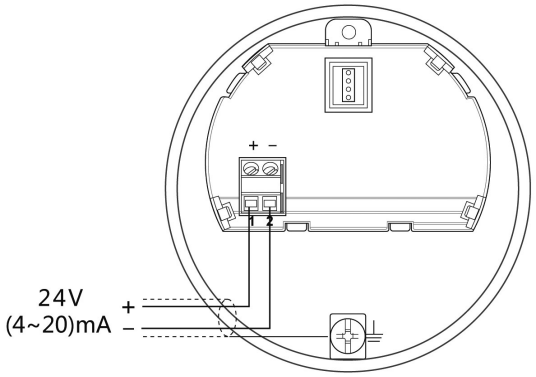
- **The power supply voltage:**

(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.

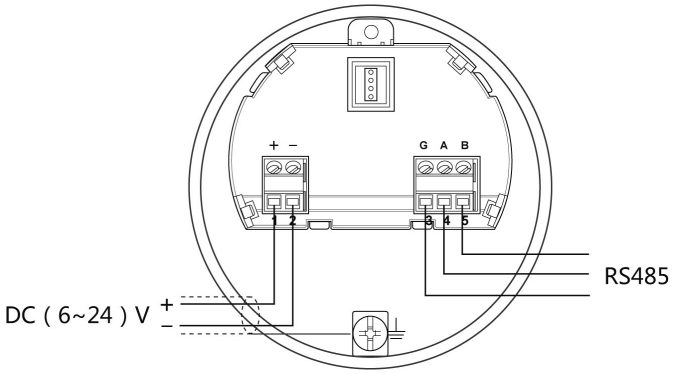
RS485 / Modbus	Power supply and Modbus signal line separated respectively using a two-core shielded cable, the power supply voltage range see technical data.

- **Connection mode:**

- 24V two wire wiring diagram as follows:



- 24V RS485/Modbus wiring diagram as follows:



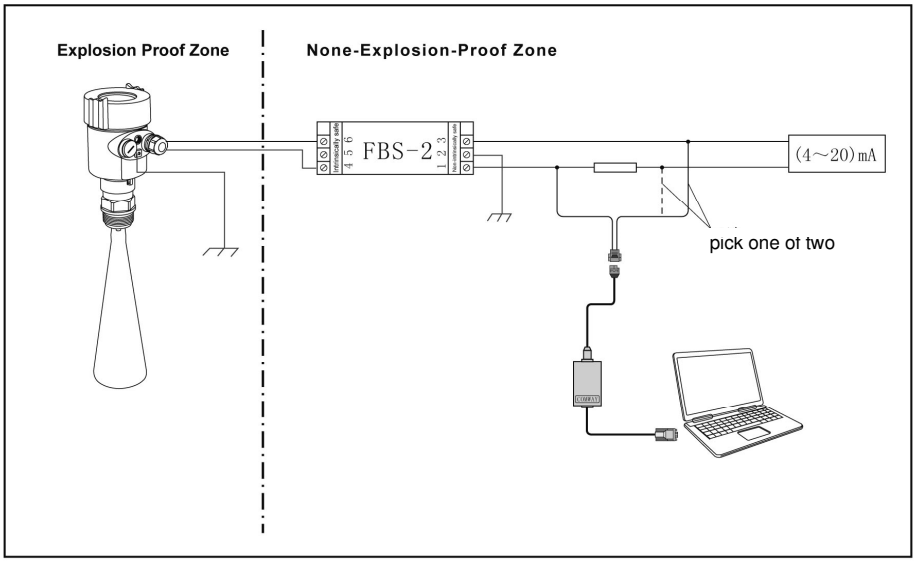
- **Explosion Proof Connection**

The intrinsic safety version sensors (Exia IIc T6) use Alu-die casting housing and filling Silicone rubber sealant's internal structure aimed to prevent sparks resulted from circuit failure from leaking out. It is applicable for the continuous level measurement of flammable medium under Exia IIc T6.

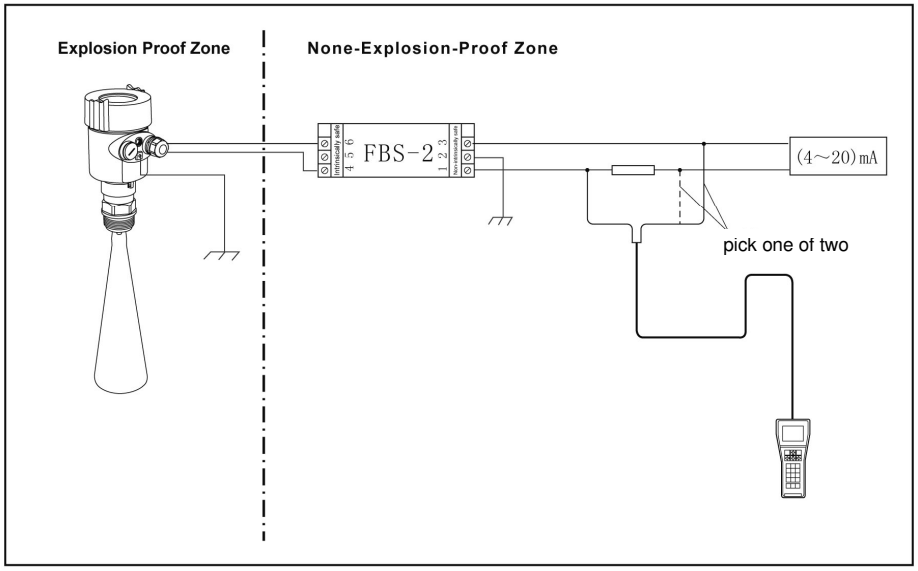
A safety barrier FBS-2 must be used together with the intrinsic safety instrument. It is an associated device to this product for the power supply of this product. The main specification is intrinsic safety: Exia IIC, voltage of power supply: 24V DC±5%, short-circuit current: 135mA, operating current: 4...20mA.

All cables must be shielded. The max length is 500m for the cable from the barrier to the sensor. Stray capacitor ≤ 0.1 μF/Km, stray inductance 1mH/Km. Instrument must be

connected to the ground potential. Any unapproved associated device is not allowed to be used.



Adjustment with Software



Adjustment with HART Handheld Programmer

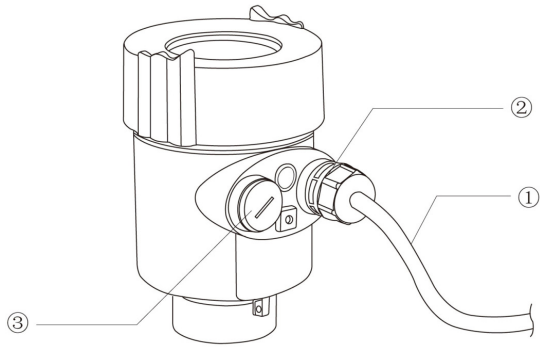
- **Safety instructions:**

- 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

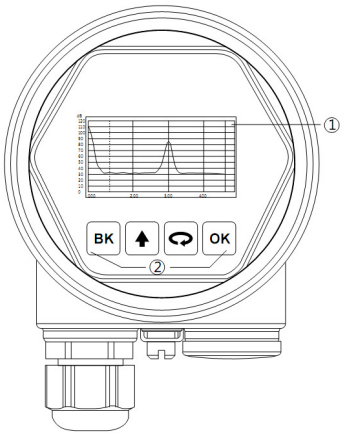
- **Display / Keyboard:**

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)

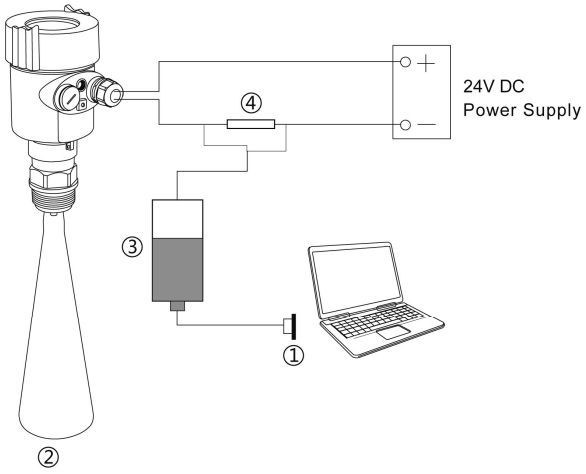
② The key



- **PC debugging:**

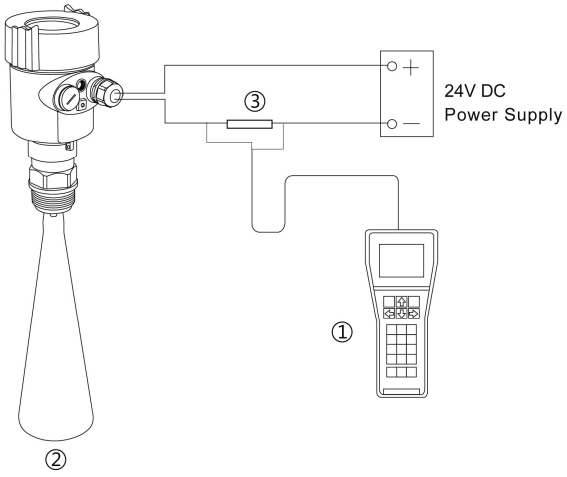
Connected to PC by HART

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



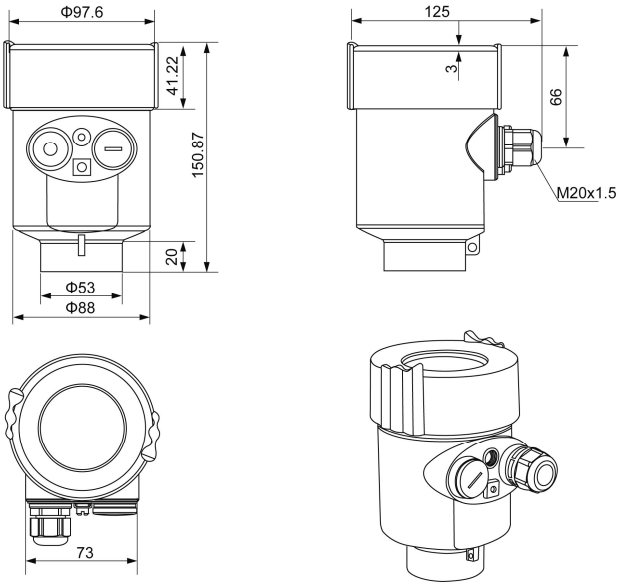
- **HART handheld programmer:**

① HART handheld programmer
② Radar level meter
③ 250 Ω resistor



6. Structure Size (Unit: mm)

- **The outer shell**:



- **Appearance size:**

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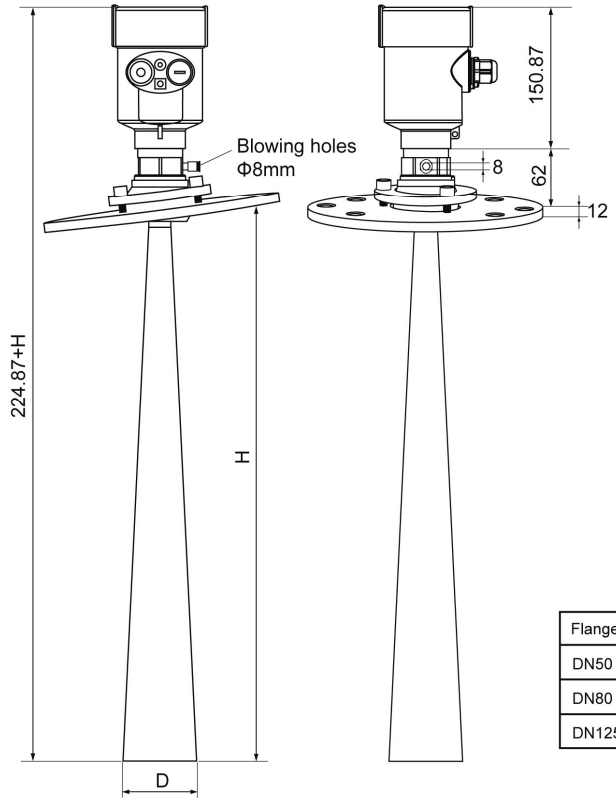
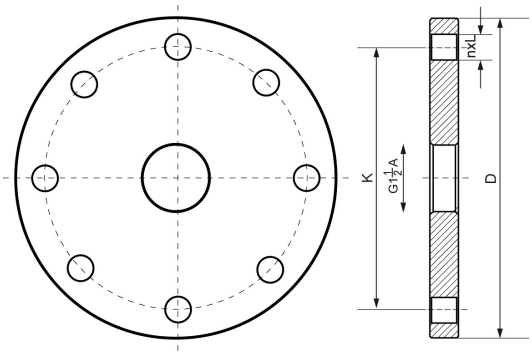


Flange	Trumpet diameter D	Trumpet height H
DN50	Φ76	205
DN80	Φ96	290
DN125	Φ121	610

- **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; 20. 5mA 22mA 3.9mA
The integral time	(0 ~ 36) s, adjustable

Blind area	the ends of the antenna
The maximum distance measurement	70 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	(-40～100) ℃

Process temperature (the temperature of the antenna part)

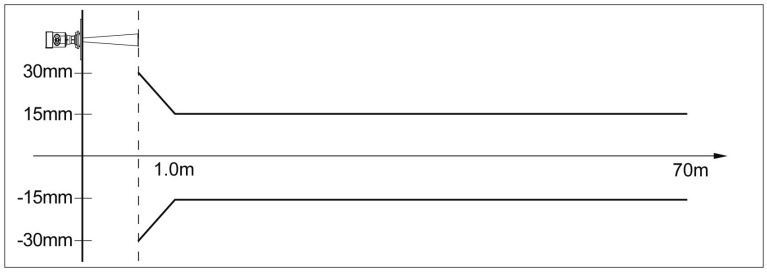
(-40～130)℃ Standard type ／ (-40～250)℃ High temperature type

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

8. Meter Linearity

903

Emission angle	Depending on the size of the antenna
- ¢46mm	18°
- ¢76mm	12°
- ¢96mm	8°
- ¢121mm	6°
Precision	See chart



9. Product Model Selection

- **903**

License							
P Standard (Non-explosion-proof)							
I Intrinsically safe (Exia IIC T6 Ga)							
G Flameproof (Exd IIC T6 Gb)							
	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						
	M Flange DN80 / Universal joint						
	K Flange DN100 / Universal joint						
	T Flange DN125 / Universal joint						
	Z Flange DN150 / Universal joint						
	Y Special Custom						
		Antenna Type / Material					
		B Horn Antenna Φ76mm / Stainless Steel 316L (With blow holes or dust cover)					
		C Horn Antenna Φ96mm / Stainless Steel 316L (With blow holes or dust cover)					
		D Horn Antenna Φ121mm / Stainless Steel 316L(With blow holes or dust cover)					
		Y Special Custom					
			Seal Up / Process Temperature				
			V Viton / (-40~130) ℃				
			K Kalrez / (-40~250) ℃				
				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	
							Field 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: _____

License

□The standard type (Non-explosion-proof) □ Intrinsically safe (Exia IIB T5)
□ Intrinsically safe (Exia IIC T6 Ga) □ Intrinsically safe + marine license (Exia IIC T6 Ga)
□ Flame proof (Exd IIC T6 Gb)

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