Datasheet

Radar level meter

SIN-RD902T

Sinomeasure

Committed to process automation solutions

Tel: 86-13336194863

E-mail: info@sinomeasure.com

www.sino-measure.com

Datasheet

Radar level meter
SIN-RD902T

Ultrasonic level transmitter is microprocessor controlled digital level meter. Ultrasonic pulses generated by the sensor (transducer) emitted in the measurement, the surface acoustic wave after reflection by the liquid receiving same sensor or an ultrasonic receiver, by a piezoelectric crystal or a magnetostrictive device into an electrical signal by transmitting and receiving sound waves to calculate the time between the sensor surface to the distance measured liquid. As a result of non-contact measurement, measured media is almost unlimited, can be used to measure the height of a variety of liquid and solid materials.

Application

- River
- Reservoir
- Tank

Radar level meter

Features

- Non-contact,maintenance-freemeasurement
- Measurement unaffected by media properties, like dc value or density
- Calibration without filling or discharging
- Unbeatable price performance
- Intelligent regulator
- 8-Bit Micro-Controller form Atmel – Stable and reliable

Principle

Measuring principle Short ultrasonic pulses in the range of 35 kHz to 70 kHz are emitted by the transducer to the product surface, reflected there and received by the transducer. The pulses travel at the speed of sound - the elapsed time from emission to reception of the signals depends on the level in the vessel. The latest microcomputer technology and the proven processing software select the level echo from among any number of false echoes and calculate the exact distance to the product surface. An integrated temperature sensor detects the temperature in the vessel and compensates the influence of temperature on the signal running time. By simply entering the vessel dimensions, a level-proportional signal is generated from the distance. It is not necessary to fill the vessel for adjustment.

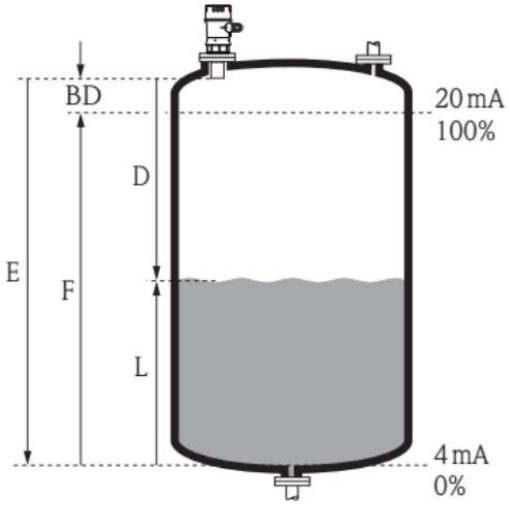
The instrument uses the time t (and the velocity of sound c) to calculate the distance D between the sensor membrane and the product surface:

$$D = \frac{c \times t}{2}$$

As the device knows the empty distance E from a user entry, it can calculate the level as follows:

$$L = E - D$$

An integrated temperature sensor (NTC) compensates for changes in the velocity of sound caused by temperature changes.



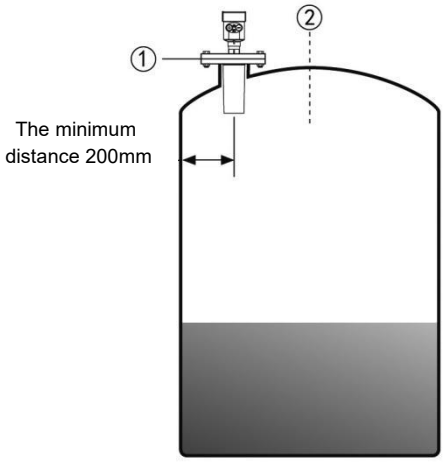
Parameters		
Process Connection	Thread G1½"A Thread 1½"NPT Flange	
Antenna Material	PVDF/PFA	
The ground terminal	Stainless steel	
The outer shell		
The seal between the shell and the shell cover	Silicone rubber	
Casing window	Polycarbonate	
The ground terminal	Stainless steel	
The power supply voltage		
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	(100～100K) Hz
	Uss<lV	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	M20xl.5 cable entrance blind plug	
Terminal	Conductor cross section 2.5mm²	
Output parameters		
The output signal	(4 ~ 20) mA/RS485	
Communication protocol	HART	
Resolution	1.6μA	
Fault signal	Constant current output; 20. 5mA 22mA 3.9mA	
The integral time	(0 ~ 36) s, adjustable	
Others		
Blind area	the ends of the antenn a	
The maximum distance measurement	30 meters (for solids)	
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	(-40 to 130)°C for standard model / (-40 to 230)°C for high-temperature model
Pressure	Max.4MPa
Seismic	Mechanical vibration l0m/s², (10 ~ 150) Hz

Installation Requirements

Installation guide:

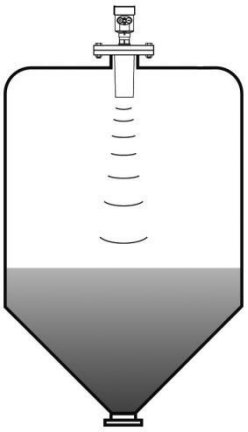
902T product used to measure corrosive liquids, vapors, volatile liquids and to prevent condensation during measurement.
It needs to install flange connection.

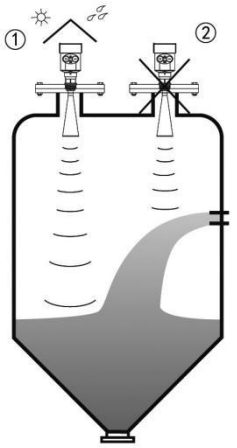


Be installed in the diameter of the 1/4 or 1/6.
Note: The minimum distance from the tank wall should be 200mm.

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

- For the top of the flat conical tank, meter can be installed in the middle of the tank top to the bottom of the cone to ensure measurement.





■ **Typical installation errors：**

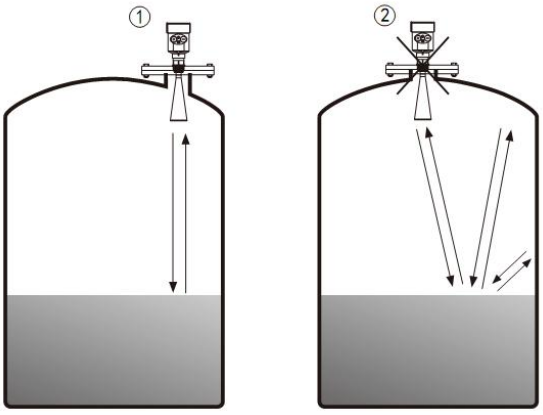
➢ Conical tank cannot be installed above the feed port.

Note: outdoor installation should adopt sunshade.

➢ 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

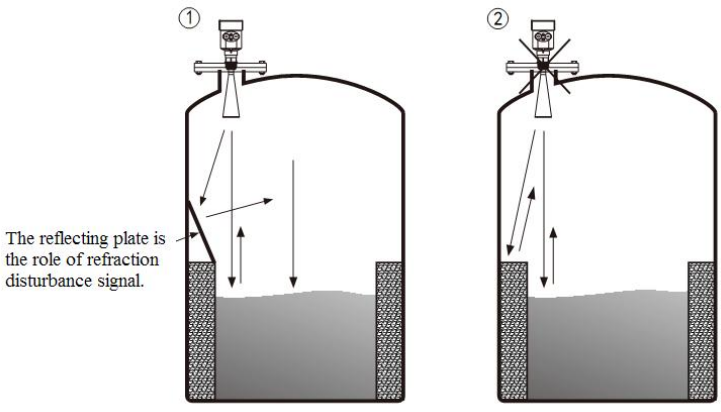
② Error



➢ There are obstacles affecting measurement needed reflection plate.

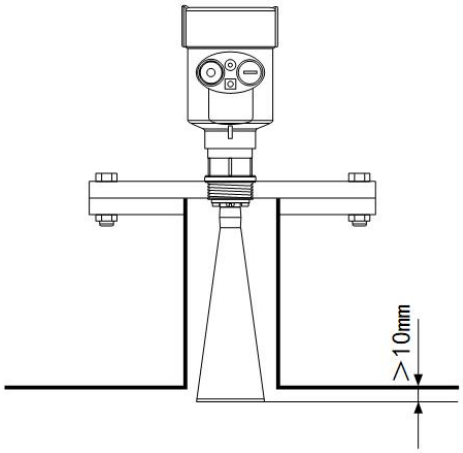
① Correct

② Error



- **Height of nozzle:**

Antenna extends into the tank
at least 10mm distance.



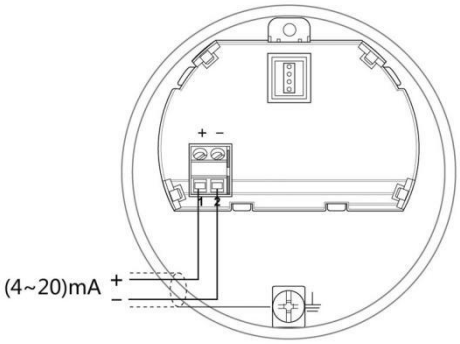
Electrical Connection

The power supply voltage:

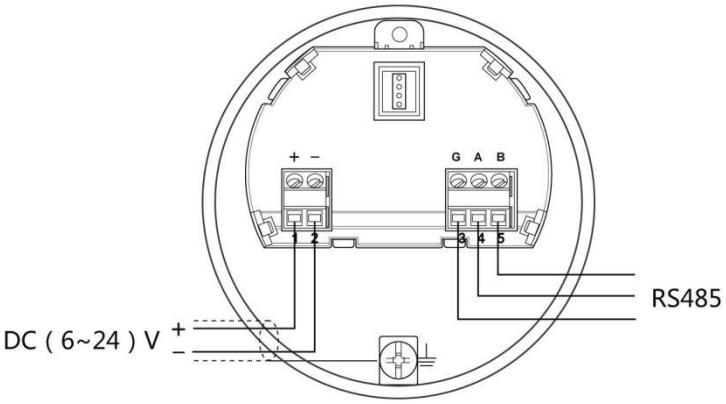
(4~20)mA/HART (Two wire system)	The power supply and the output current signal sharing a two core shield cable. The supply voltage range see technical data. For intrinsically safe type must be a safety barrier between the power supply and the instrument.
(4~20)mA/HART(Four wire system)	Separate power 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:



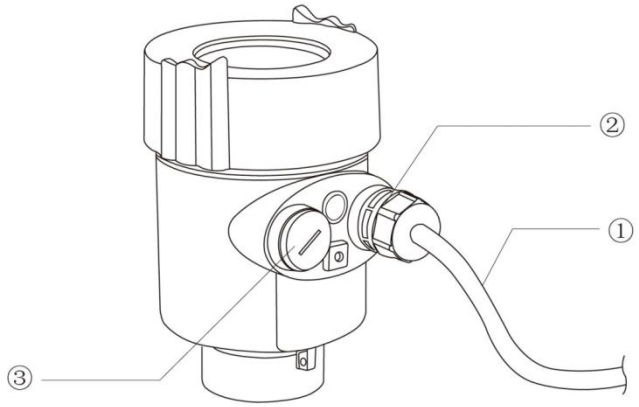
■ Safety instructions:

- ➢ 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

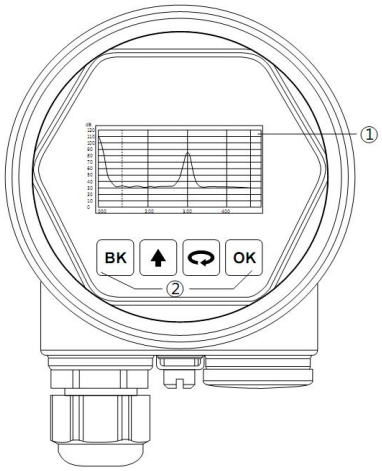
Instrument Commissionin

- **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



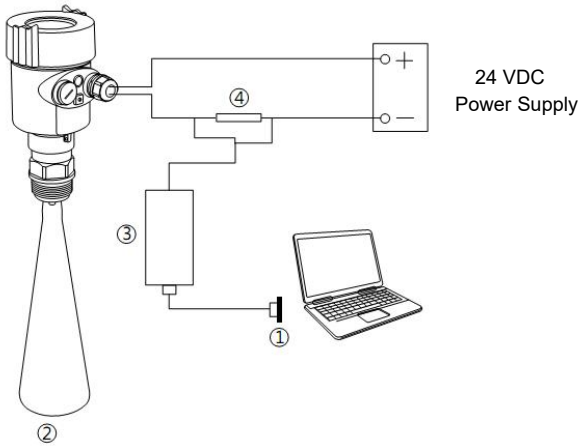
① Liquid crystal display(LCD)

② The key

- **PC debugging:**

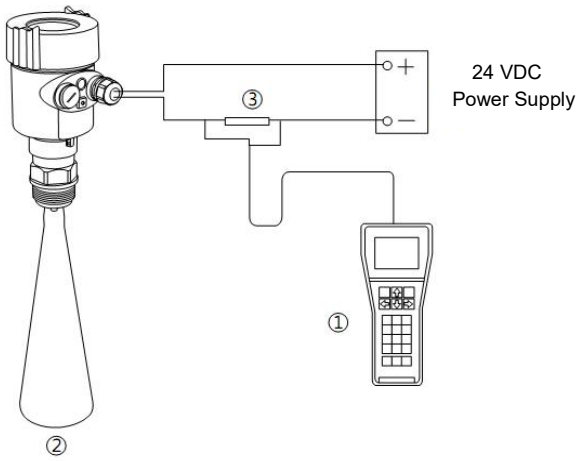
Connected to PC by HART

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



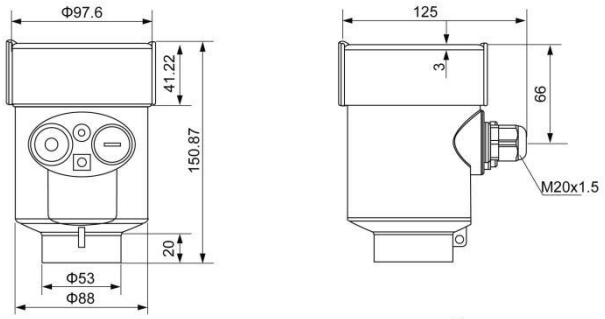
■ HART handheld programmer:

① HART handheld programmer
② Radar level meter
③ 250 Ωresistor

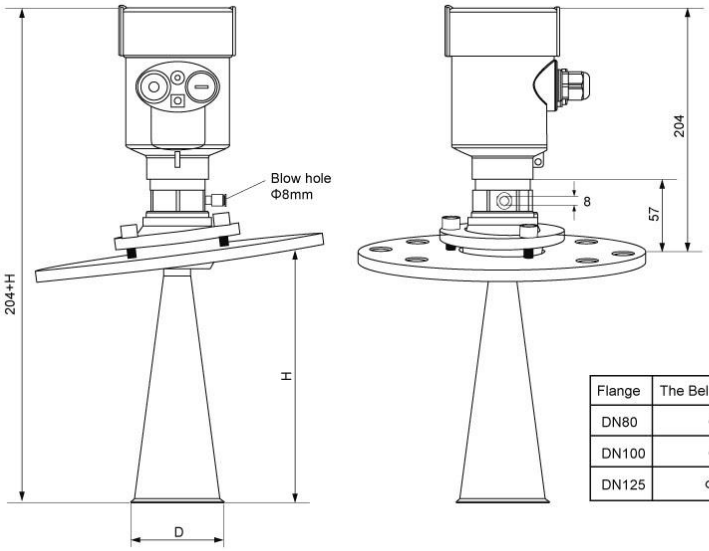


Structure Size

■ **The outer shell**:

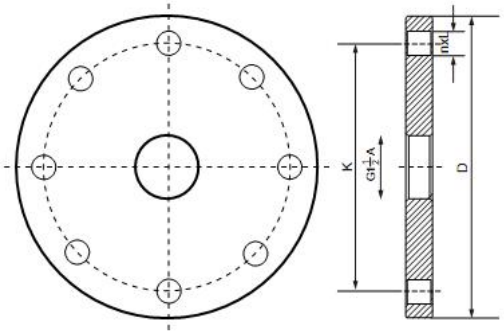


SIN-RD905



Flange	The Bell Diameter D	Bell height H
DN80	Φ76	227
DN100	Φ96	288
DN125	Φ121	620

■ **Flange type:**

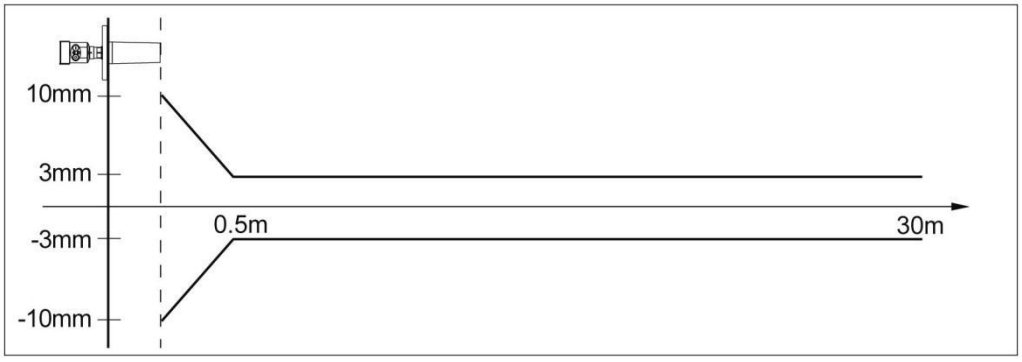


Specifications	Outer diameterD	Center Kong JuK	The number of holes n	ApertureL
DN50	φ165	φ125	4	18
DN80	φ200	φ160	8	18
DN100	φ220	φ180	8	18
DN125	φ250	φ210	8	18
DN150	φ285	φ240	8	22
DN200	φ340	φ295	12	22
DN250	φ405	φ355	12	26

Meter Linearity

902T

Emission angle	Depending on the size of the antenna
-¢65mm	14°
Precision	See chart



Model selection

- **902T**

License
P Standard (Non-explosion-proof)

Process Connection / Material
A Flange DN80 / Stainless Steel 304
B Flange DN100 / Stainless Steel 304
Y Special Custom

Antenna Type / Material
A Internal tapered rod antenna PVDF / 78mm
B Internal tapered rod antenna PFA / 78mm

Seal Up / Process Temperature
V Viton / (-40~130) ℃
P PFA / (-40~250) ℃

The Electronic Unit
3 (4~20) mA / 24V DC
4 (4~20) mA / 220V AC
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

Ordering Code

Radar Level Transmitter RD902T									Description
RD902T	-	-	-	-	-	-	-	-	
Measuring Medium		A							Liquid
		B							Solid Powder
Measurement Range			05						5m
			10						10m
			15						15m
			20						20m
			XX						Other
Antenna Type				KN					Horn Mouth H205mm×Φ76mm 304SS/PTFE
				KQ					Horn Mouth H205mm×Φ76mm 304SS/PFA
				KR					Horn Mouth H290mm×Φ96mm 304SS/PTFE
				KT					Horn Mouth H290mm×Φ96mm 304SS/PFA
				XX					Other
Output and Power Supply					A2				Two-wire 4-20mA+HART
					SC				4-20mA+HART，24VDC
					R2				RS485，24VDC
					XX				Other
Thread Type						FE			HG/T20592 PN10/25 DN80 304SS
						FK			HG/T20592 PN10/25 DN80 SS316L
						FF			HG/T20592 PN10/16 DN100 304SS
						FL			HG/T20592 PN10/16 DN100 SS316L
						XX			Other
High Temperature Resistance							TE		'-40-130℃
							TH		'-40-230℃

Electrical Interface, Housing Material, and Ingress Protection	WH		M20×1.5 Cable Gland, Aluminum Alloy, IP67
Explosion-Proof Option		00	None
		E4	CNEX Ex db ⅡC T6 Gb