北京格莱普科技有限公司
BEIJING GALLOP TECHNOLOGY CO.,LTD.

Low frequency radar level meter manual

Product overview

1, the introduction

GRD60 series sensors are advanced radar level meter, measuring distance maximum 30 meters, can be used to storage tanks, intermediate buffer tank container or process level measurement, 4 ~ 20 ma output analog signal.

2, measuring principle,

By transmitting and receiving antenna system with low energy extremely short microwave pulse radar wave run at the speed of light, running time can be transformed into material level signal by electronic parts, a special time extension methods can ensure stable and accurate measurement very short time. Even if the condition is more complex cases, false echo, with the latest micro-processing technology and debug software can accurately analyze the level of the echo. Antenna receiving the reflected microwave pulse and sending them to the electronic circuit, microprocessor to signal processing, identify the micro pulse produced by the echo in the material surface. Correct echo signal recognition by the pulse software complete, precision can reach millimeter level. Distance on the surface of the material distance D is proportional to the pulse travel time T:

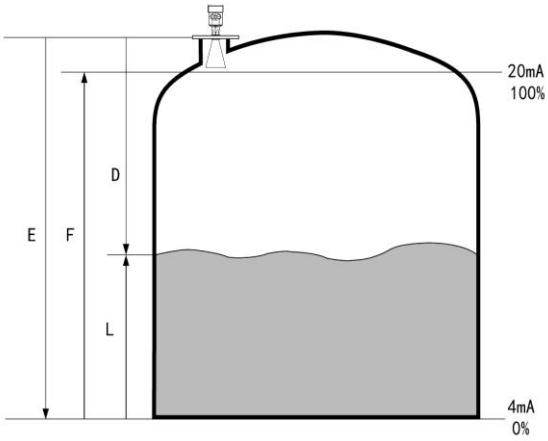
D = C * T / 2,

Where C is the speed of light

E known due to empty cans of distance, the level of L as follows:

L = E – D

By entering empty cans height E (= zero), full tank height F (= full scale) and some applications to set parameters, application parameters will be automatically adapt instrument to measure the environment. Corresponding to 4 ~ 20 ma output.



3, the application

adopts advanced non-contact measurement

use extremely stable materials

liquid, solid medium level measurement

can measure all the medium dielectric constant > 1.8

measurement range 0 ~ 20 m (can be extended to 35 meters)

using two wire system, the circuit power supply technology, the power supply voltage and the output signal through a two core cable transmission

4 ~ 20 ma output type or digital signal output? resolution of 1 mm

is not affected by noise, steam and dust, vacuum condition

from medium the influence of the change of the density, viscosity and temperature
process pressure up to 4 mpa
process temperature to 250 ℃

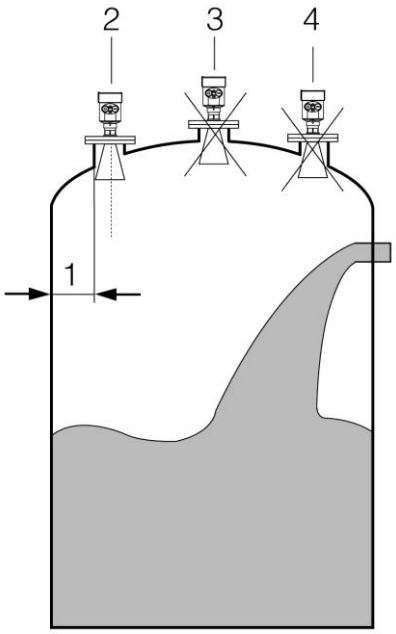
Product introduction

GRD603

Applicable medium: liquid, especially with pressure and volatile liquid
Should use: crude oil, light oil level measurement, aluminum hydroxide level measurement, raw coal, limestone position measurement, coke material level measurement
Explosion-proof certification: Exd IIC T6 Gb
Protection grade: IP67Measuring range: 30 m
Day line, horn antenna
Frequency ratio: 6.3 GHz
Process temperature (40 ~ 250 ℃)Accuracy: + / - 10 mm
Process pressure: 0.1 MPa ~ 4)
Signal output: (4 ~ 20 mA/HART
The scene shows: four LCD programmable
Electricity source, two wire (DC24V)/four wire (DC24V/AC220V)
Heavy after sex: plus or minus 1 mm
The process connection: flange (optional)

The installation guide

1, the installation instructions



recommend position (2), the walls of the tank wall to install a short tube distance shall meet the following requirements: the best distance from the tank wall 1/4 or 1/6 of the tank diameter, distance to the tank wall, the minimum installation for 1/10 of the measurement range.

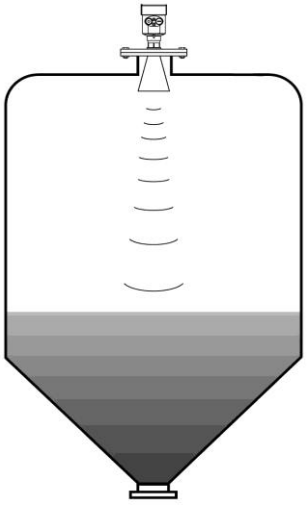
For example: 10 m liquid storage tanks, tank wall, the minimum installation should be 1 m distance.? cannot be installed on into the top of the mouth (4).

cannot be installed in the center position (3), if the installation in the center, will produce multiple false echo, echo interference can cause real signal loss.

if you can't keep distance between the tank wall, the impaction of the medium can cause false echo, adhesion when debugging instrument should be false echo storage.

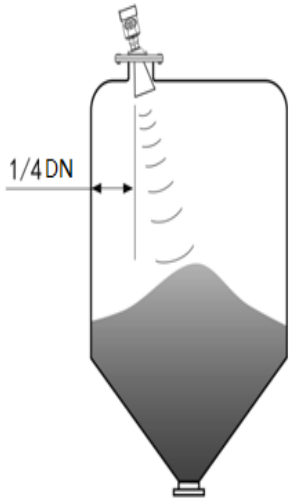
2, the installation of tapered tank

Cone top plane, can be installed on the roof right in the middle, can guarantee the measurement to the bottom of the cone.

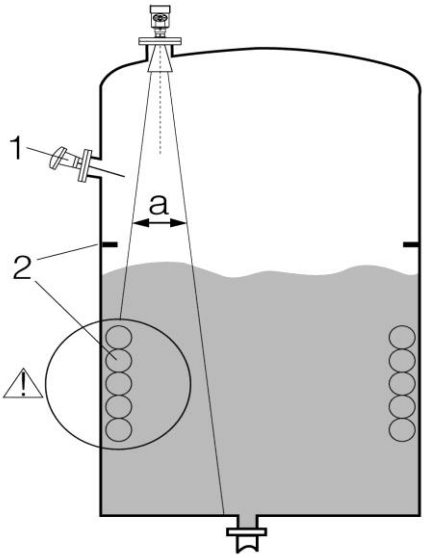


3, have a heap of material storage tank

Have a windrow antenna to the vertical alignment of material surface .If the surface is uneven, Angle of large universal flange must be used to adjust the Angle of speakers make the horn on the material surface as far as possible.(due to the tilt of the solid surface can cause echo attenuation, or even a loss of signal)



4, tank installation instructions



in signal beam, should avoid to have the following installed: such as: (1) limit switch, temperature sensor, etc.

symmetric device such as (2) : vacuum ring, heating coil, damper and so on

if tank (1) (2) the intervention objects, guided wave tube to measure should be adopted.

5, the best installation option

antenna size: the larger the antenna, the smaller the beam Angle, clutter echo will be weaker.

antenna adjustment: adjust the antenna to the optimum measuring position.

guided wave tube: echo guided wave work to avoid interference

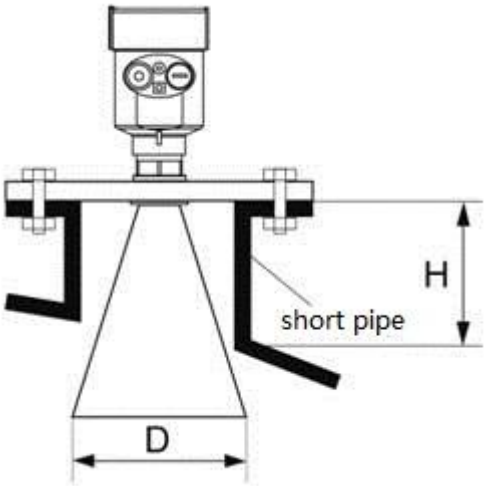
6, the typical installation (GRD603)

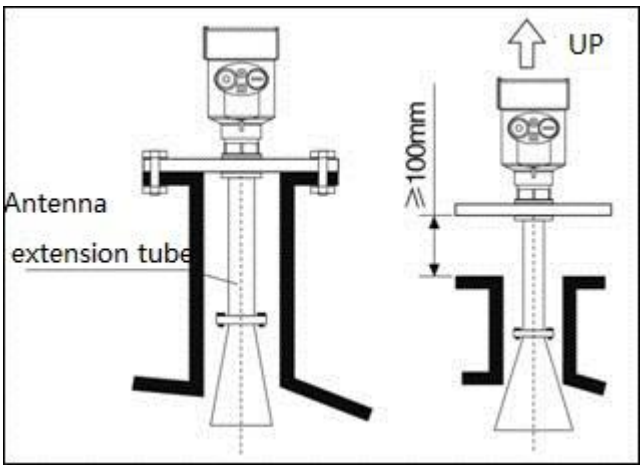
horn antenna must be installed extended short tube,

Otherwise the antenna extension tube should be used.

horn antenna must adjust to the vertical,

Don't let LeiDaShu pointing in the direction of tank wall.



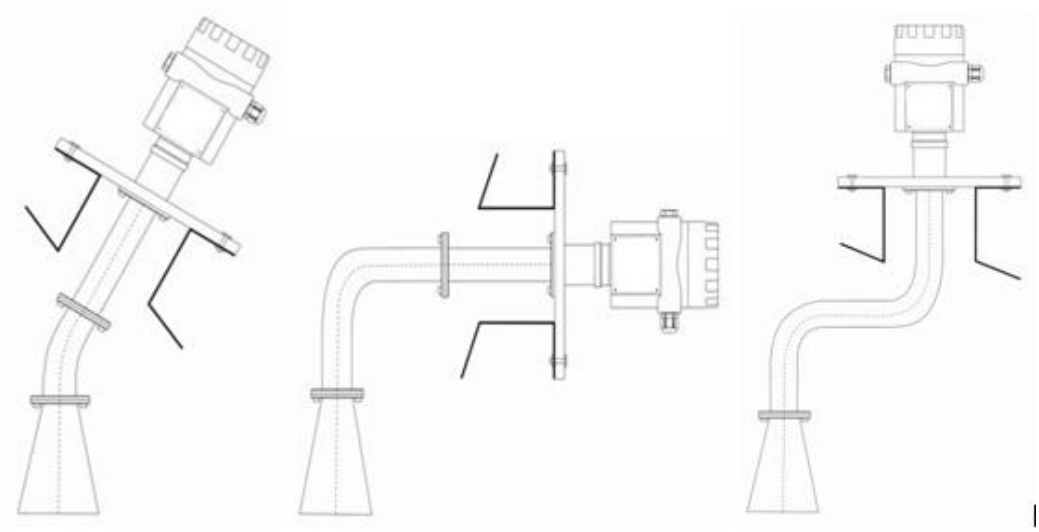


Installing a short tube longer using antenna extension tube

when the speaker length less than installing a short length of pipe, using antenna extension tube. if the loudspeaker diameter greater than the diameter of the spool installation, antennas, including extension tube from container installation, and meter high. Choose extension tube instrument raise at least 100 mm.

Special extension tube

if the antenna need to tilt or perpendicular to the tank wall installation, can use the extension of 120 ° or 90 ° tube.



medium dielectric constant epsilon r st13 of 10

highest level should be lower than the roof 200 mm

speakers from the roof should be greater than 100 mm

recommended bearing installation in order to adjust to the height of the ideal

if possible avoid installed in refrigerated or adhesion, the space between the antenna and container should be protective measures

choose containers building materials of low dielectric constant and the thickness of the corresponding, shall not be used conductive plastics

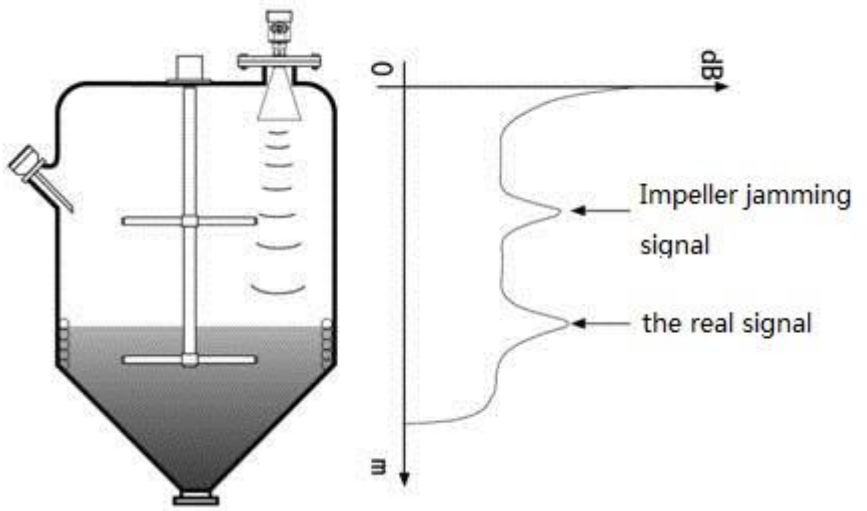
if possible, use the antenna DN250/10"

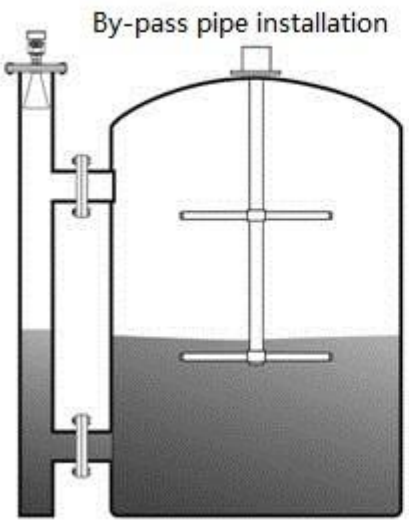
within tank outside the beam do not install any parts may cause interference (such as pipe)

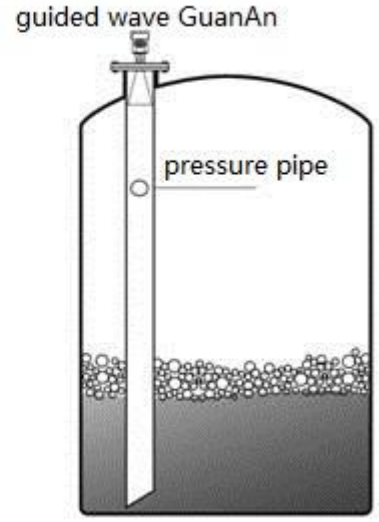
Guided wave tube in the measurement

Emission of microwave beam radiation area is disabled by such things as a ladder, limit switches, heating equipment, support, etc., can cause interference, cause measurement error.

If the affected need to add guided wave tube was measured.







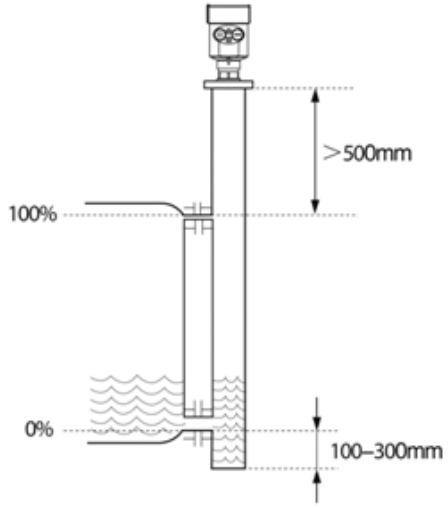
Note:

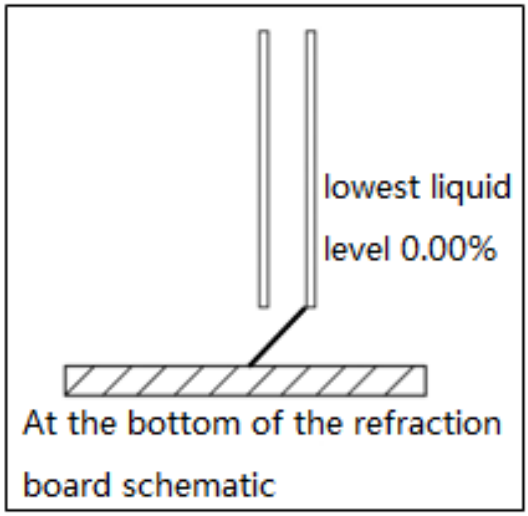
such as hole (5 ~ 10) mm in diameter, the diameter of the guided wave tube at least 50 mm and wall should be smooth; Can measure the dielectric constant of small medium (epsilon r = 1.6 ~ 3); Can only measure the liquid medium, viscous medium can't measure with guided wave tube.

if the sensor is installed on the by-pass pipe, radar sensor must be installed in the above the by-pass pipe at upper part of the connecting part of at least 500 mm. At the bottom of the by-pass pipe should be below the by-pass pipe and container at the bottom of the connecting part of at least 300 mm.

if the dielectric constant of medium small (< 4), part of the radar signal can penetrate medium small dielectric constant.

When little medium tank, from the bottom of the reflection echo signal the reflected signal is stronger than the media, often occurs at this point measurement error, this kind of circumstance, can be installed in the tank bottom refraction board, will be at the bottom of the radar signal refraction.





Installation steps

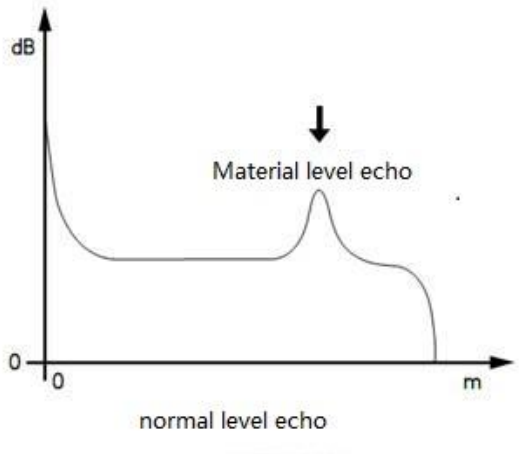
In order to better play to the performance of the product, when installed, please follow the steps below:

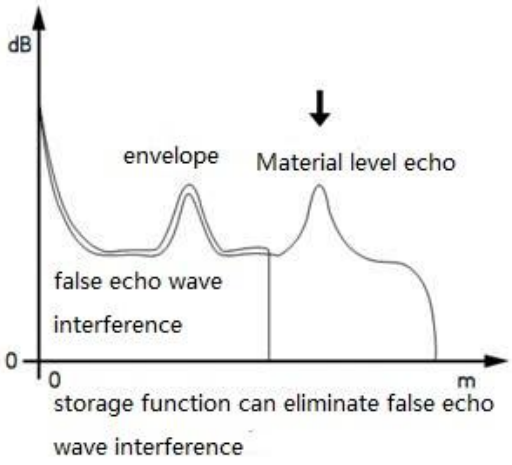
before open the process of the tank connection, must confirm there is no pressure tank, no harmful medium.

shall confirm the container empty cans or material level just covered under the condition of the tank bottom positioning adjustment, under the circumstances of less material level can also locate adjustment; Storage can be false echoes, optimize the echo signal.

in the optimal location of fixed flange or tighten the screw thread, and if necessary, to replace the sealing ring.

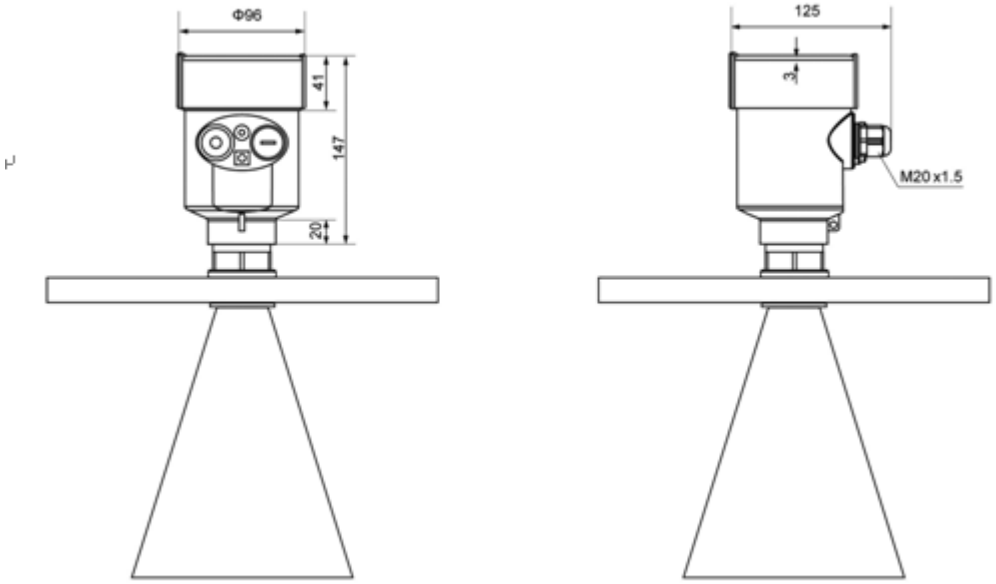
Below is the echo signal:



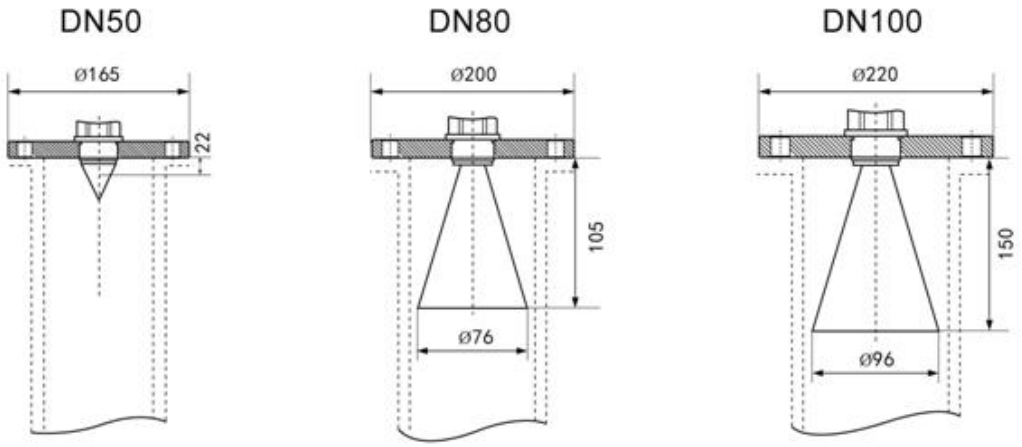


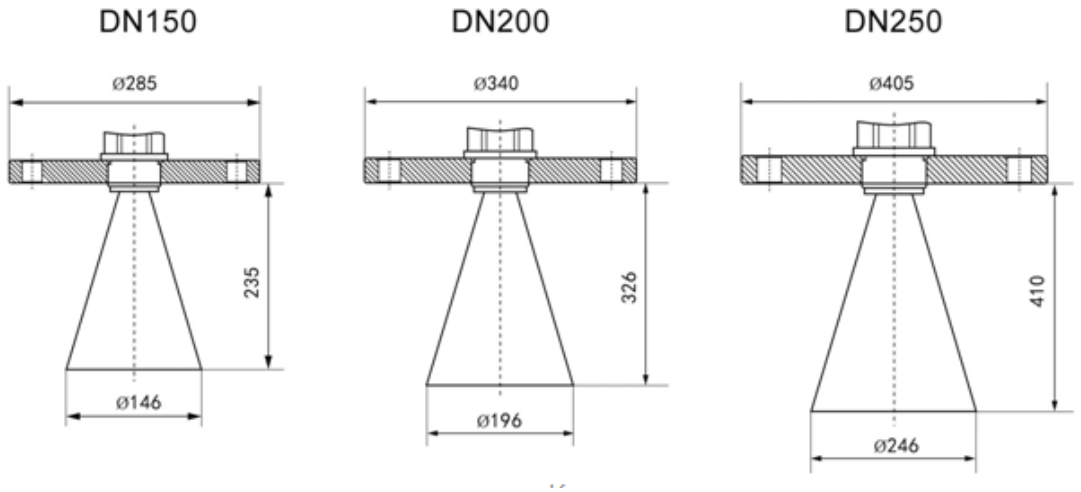
the size of the instrument

Bell mouth radar antenna size(unit: mm)

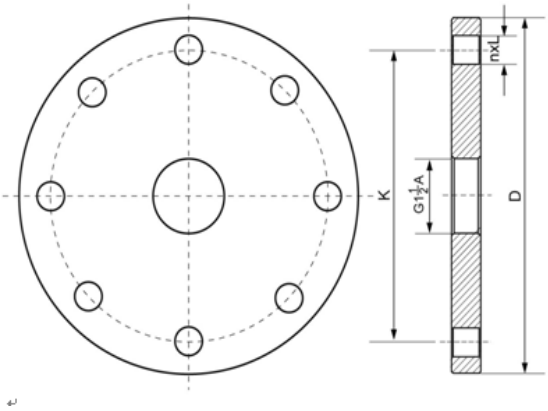


Bell mouth size(mm)





Flange dimensions

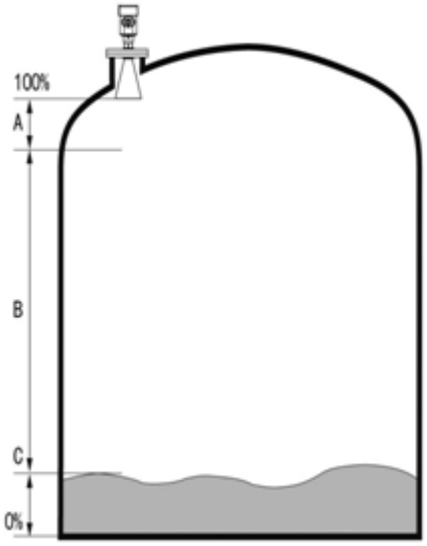


Flange selection table

	D	K	N	L
DN50	Φ165	Φ125	4	18
DN80	Φ200	Φ160	8	18
DN100	Φ220	Φ180	8	18
DN150	Φ285	Φ240	8	22
DN200	Φ340	Φ295	12	22
DN250	Φ405	Φ355	12	26

Matters needing attention:

measurement range from beam hit the point at the tank bottom, but under special circumstances, if the tank bottom concave type or conical, when the level below this point cannot be measured;
if the medium to low dielectric constant when it is in low level, tank bottom, at this time in order to ensure the accuracy of measurement, recommendations will be zero set in the position of height of C;
theoretical measurement to the position of the antenna tip is possible, but considering the corrosion and the influence of the adhesion, measurement range of terminal value should be at least 100 mm distance from the tip of the antenna;
to overflow protection, can define a safety distance attached to the blind area;? minimum measuring range is related with the antenna;
with different concentration, foam can absorb microwaves, and it can be reflected, but under certain conditions can be measured.
when no echo signal, the output current radar for 22 ma.



Electrical connections

1, the power supply voltage

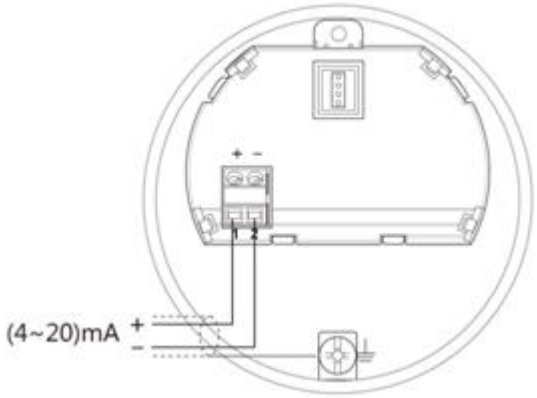
(4 ~ 20 mA/HART (two wire system) power supply and the output current signal a sharing core shielded cable. Specific see technical data for the power supply voltage range. For this safety type must be between power supply and the instrument with a safety barrier.

4 ~ 20 mA/HART (four wire) separate power supply and current signal, each using a power cable. Specific see technical data for the power supply voltage range.

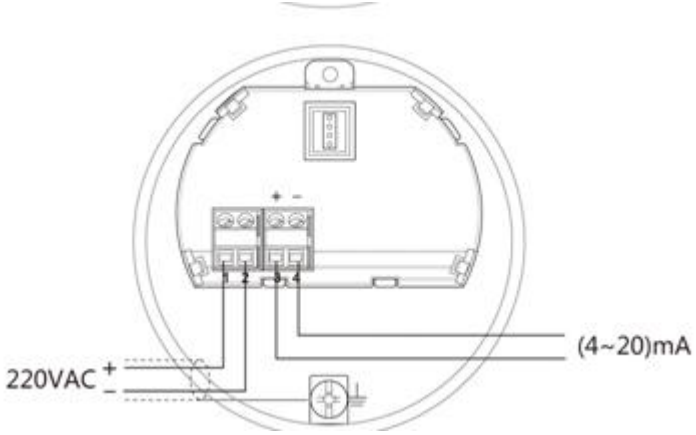
RS485 / Modbus power supply and Modbus signal lines divide and use a shielded cable respectively, specific see technical data for the power supply voltage range.

2, connection mode,

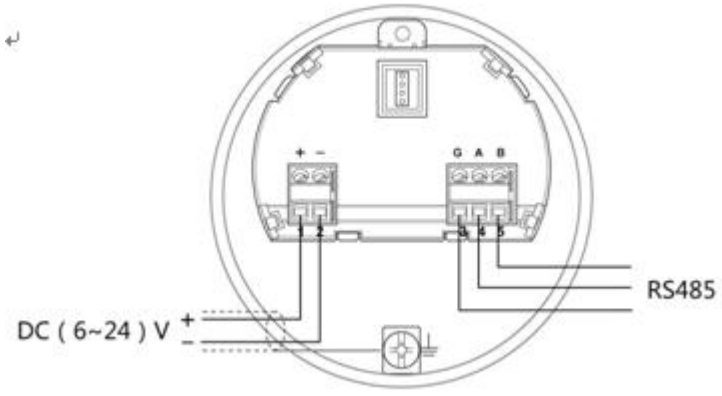
24 v two-wire system wiring diagram:



220 v four wire wiring diagram:



24 v RS485 / Modbus wiring diagram:



Commissioning

three debug method:

1) show/button

(2) the upper machine debugging

(3) HART handheld programmer

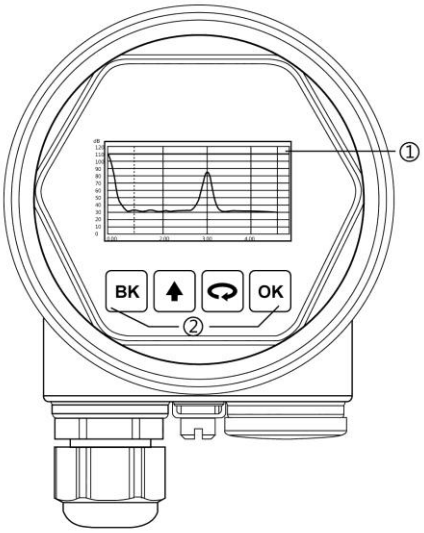
show/button

By showing the four buttons on the screen for debugging, debugging menu language is optional. After debugging, generally only for display, through the glass Windows can read very clearly the measured values.

Show/button

(1) liquid crystal display (LCD)

(2) button



PC debugging

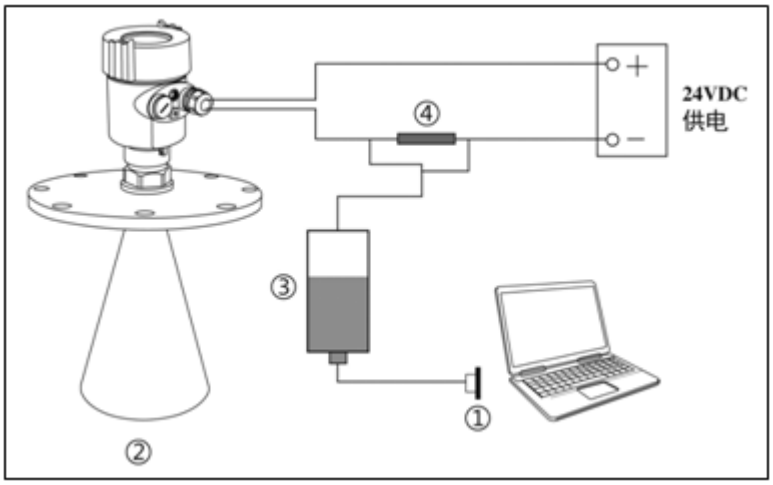
Are connected to the PC by HART

(1)/RS232 interface or USB interface

(2) radar level meter

(3) the HART adapter

(4) 250 Ω resistance



HART handheld programmer programming

(1)HART handheld programmer

(2) radar level meter

(3) 250 Ω resistance