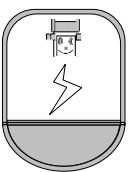
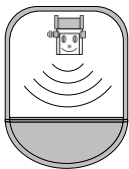
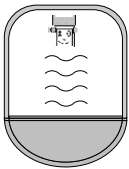




Level Measurement Expert

6GHz Pulse Radar Level Instrument



Beijing GODA Instruments Co., Ltd.
北京古大仪表有限公司



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1. For your safety

- **Authorised personal**

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

- **Appropriate use**

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

- **FCC Certification**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

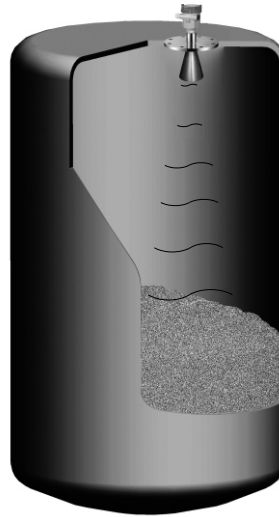
(2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Warning: User must keep a safety distance of at least 20cm from the antenna.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2. Measurement Principle



- Principle

The extremely narrow microwave pulse emitted by the antenna on radar level instrument can travel at the speed of light and part of its energy, which is reflected off the surface of target medium, is received by the very same antenna. The time lapse between pulse emission and reception by the antenna is proportional to the distance between the surface of target medium and the reference point on antenna. However, due to the fact that the electromagnetic wave is transmitted at extremely high speed, which leads to the tiny time lapse (nanosecond level) and makes it difficult to be identified, GDRD5X series of radar level instrument have adopted a special demodulation technology, enabling itself to detect the time lapse between pulse emission and reception correctly, and eventually generate accurate measurement result.

- Features

Equipped with advanced microprocessor and unique EchoDiscovery echo processing technology, the radar level instrument can be used under various hazardous process conditions.

The false echo storage function enables the instrument to detect the true echo with the presence of multiple false echoes and eventually generate accurate measurement results.

There are multiple options available in choosing various process connection and detection component, which enables GDRD5X series radar level instrument to be applied in a broad array of hazardous applications, such as high temperature, high pressure, small dielectric constant and so on.

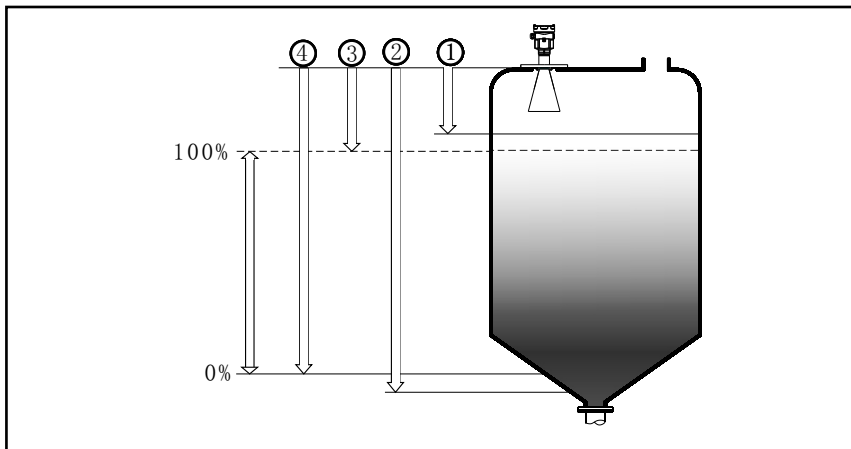
The guided wave radar level instrument, with pulses as its working tool and extremely low emission power, can be mounted on various metal or nonmetal vessels, harmless towards the environment and human beings.

3. Mounting Requirements

● Basic Requirements

There is a certain existing beam angle while the antenna transmitting microwave pulses. There should be no barriers between the lower edge of antenna and surface of measured medium. Therefore it is highly recommended to avoid facilities inside vessels, such as ladders, limit switches, heating spirals, struts and etc, during the mounting process. "False echo learning" must be carried out during the installation in this case. Furthermore, microwave beams must NOT intersect the filling streams. Be cautious during the installation: the highest level of target medium must NOT enter into blanking zone; the instrument must keep certain distance to vessel walls; every possible measure needs to be taken to position the instrument so that the direction of antenna emission is perpendicular to the surface of measured medium. The installation of instruments in explosion proof area must abide by relevant local or federal safety regulations. Aluminum housing should be used for intrinsically safe explosion proof version, which is also applicable in explosion proof areas. The instrument must be connected with ground in this case.

● Illustrations

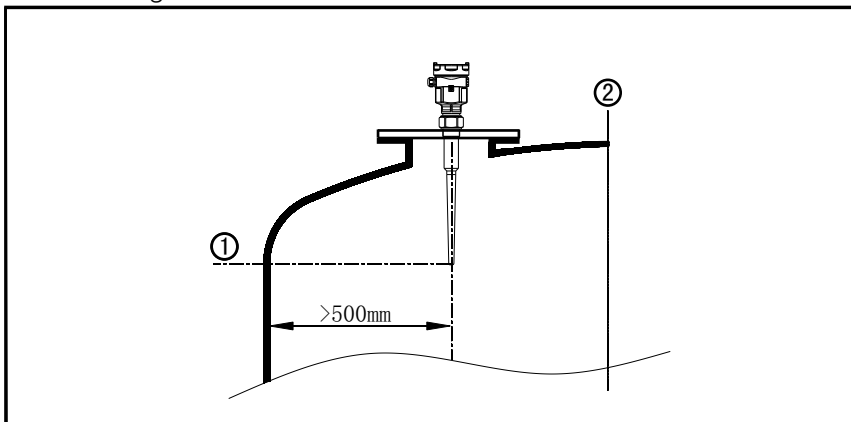


The reference plane is the thread or flange surface

1. Blanking Zone(menu1.9)
2. Empty(menu1.8)
3. Max. Adjustment(menu1.2)
4. Min. Adjustment(menu1.1)

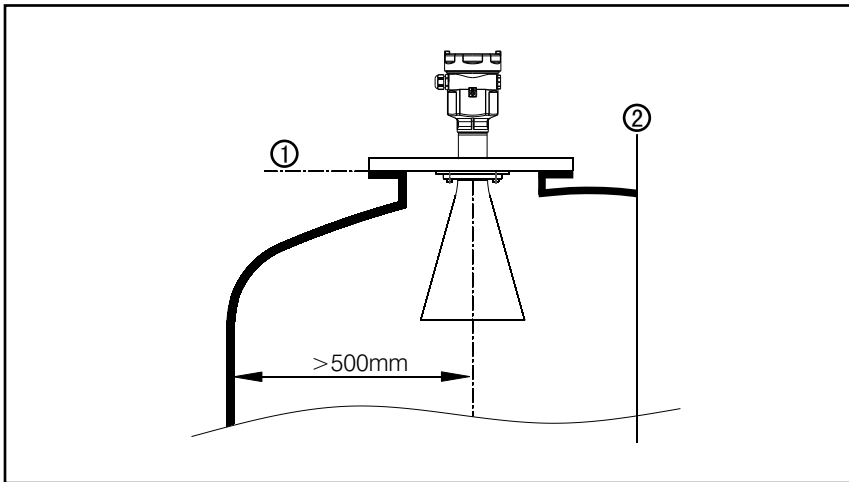
Note: The highest level of measured medium must not enter into blanking zone while radar level measurement instrument is in operation.

● Mounting Position

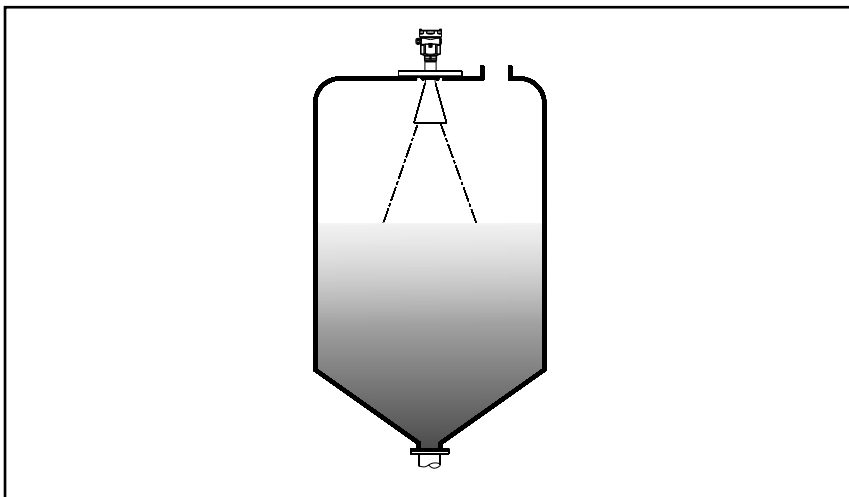


Minimum distance of 500mm between instrument and vessel wall during installation

1. Reference Plane
2. Center of Vessel or Symmetrical Axis

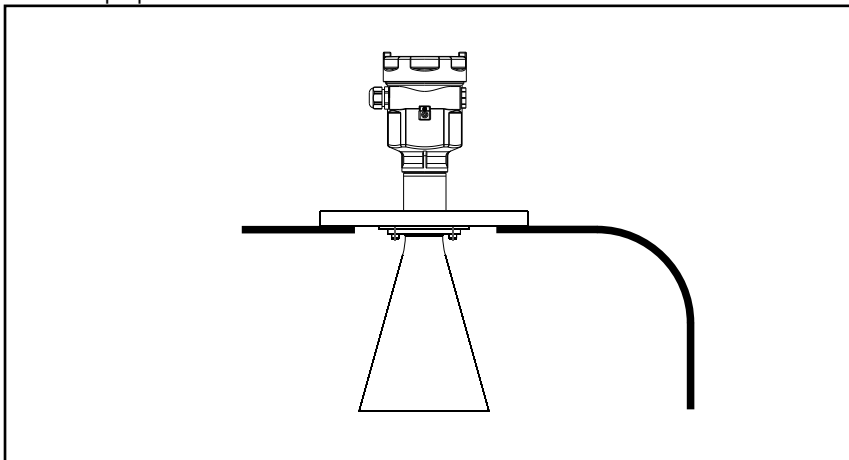


- 1. Reference Plane
- 2. Center of Vessel or Symmetrical Axis



The best mounting position for a conical vessel with flat top is the center of its top, as the effective measurement can reach the bottom of vessel.

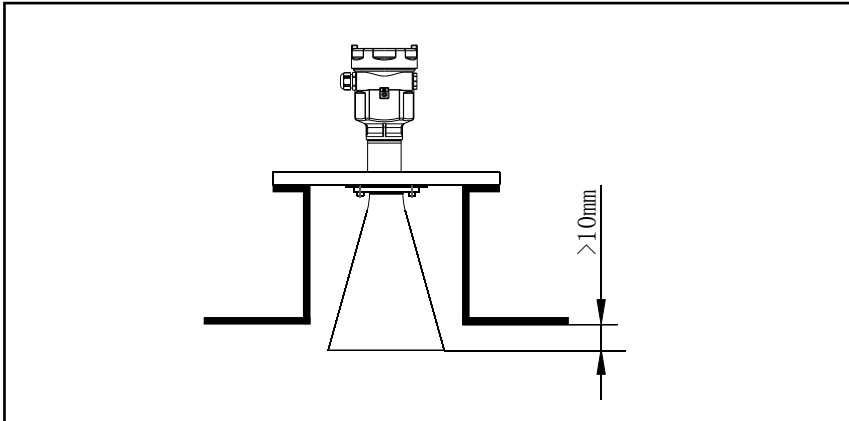
● Damp-proof



In order to avoid dampness under outdoor or humid indoor conditions or for those instruments mounted on cooling/heating vessels, seal rings used on cables should be screwed tight, plus the cable must be bended downward outside cable entry, indicated on the diagram below

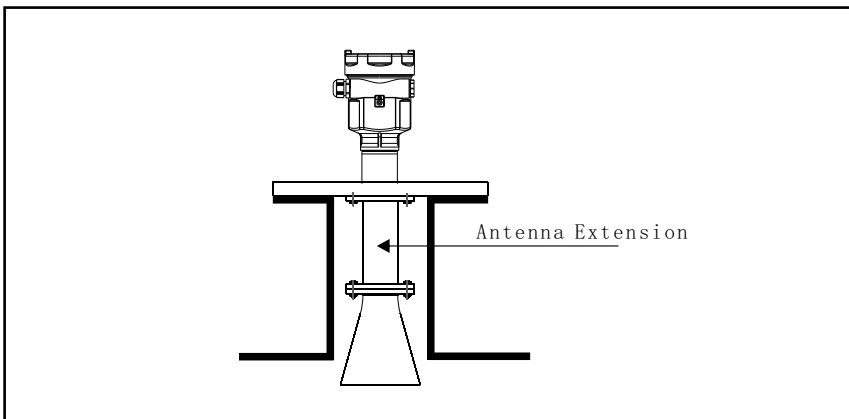
- Socket

Horn Antenna



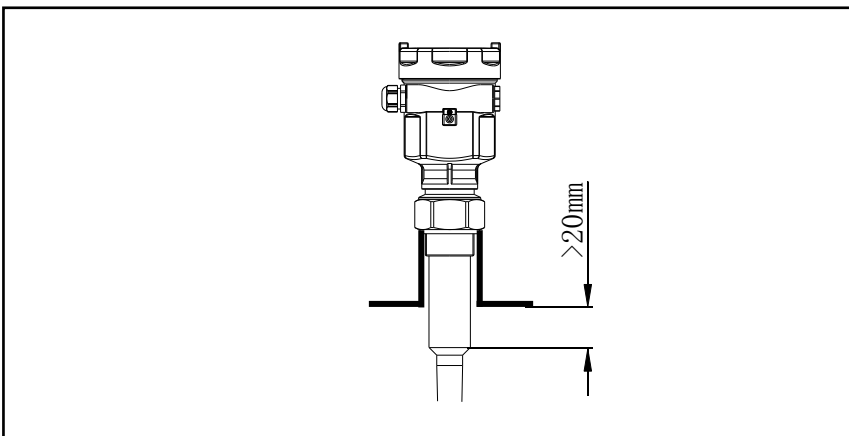
The transducer end must at least protrude 10mm out of socket.

Antenna Extension



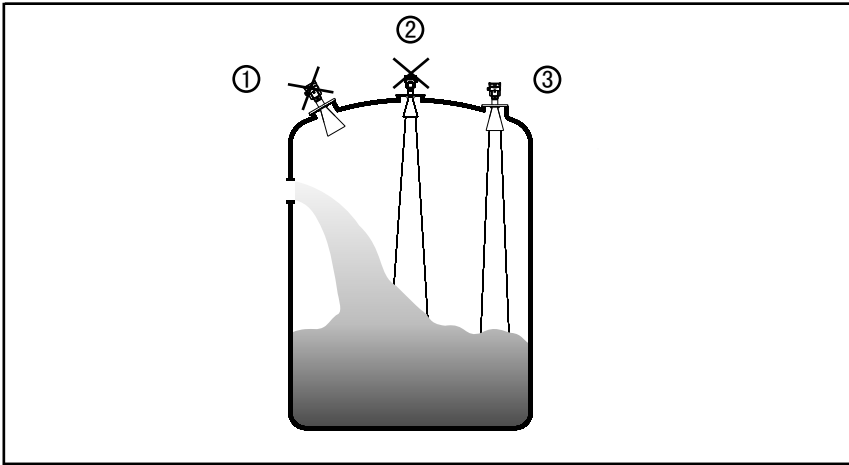
You are advised to use antenna extension if the antenna is shorter than socket.

Rod Antenna

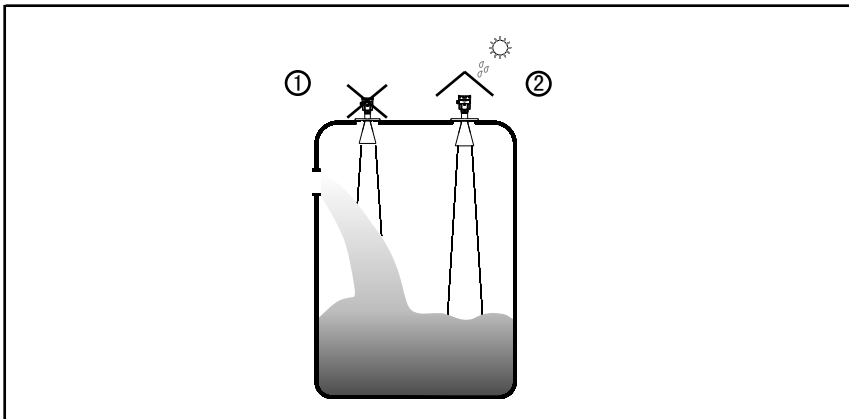


The working part of antenna ,ie. the cone-shaped body of antenna must be fully exposed from the socket. In order to meet the application requirement of various sockets, different radar level instruments of various sockets, different radar level instruments of variable length are available for customers to choose from(see Chapter 6 Dimensional Drawings).

● Rights and Wrongs in Mounting

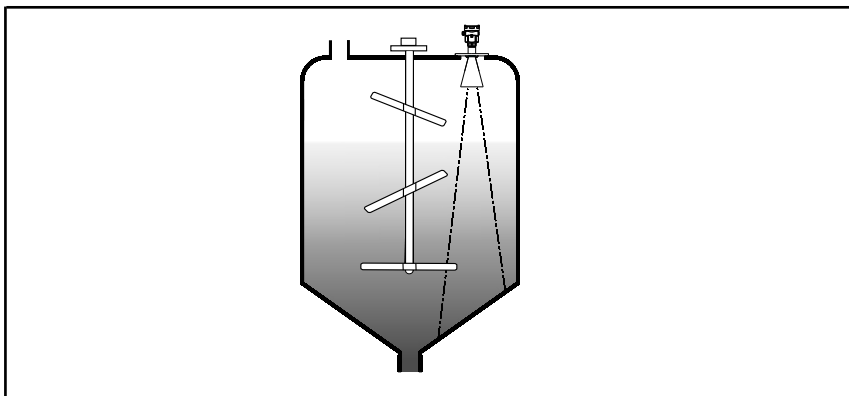


- 1. Wrong: Fail to turn the antenna perpendicular to the surface of target medium.
- 2. Wrong: Instruments are mounted in the center of concave or arched vessel tops, which results in multiple echoes.
- 3. Correct



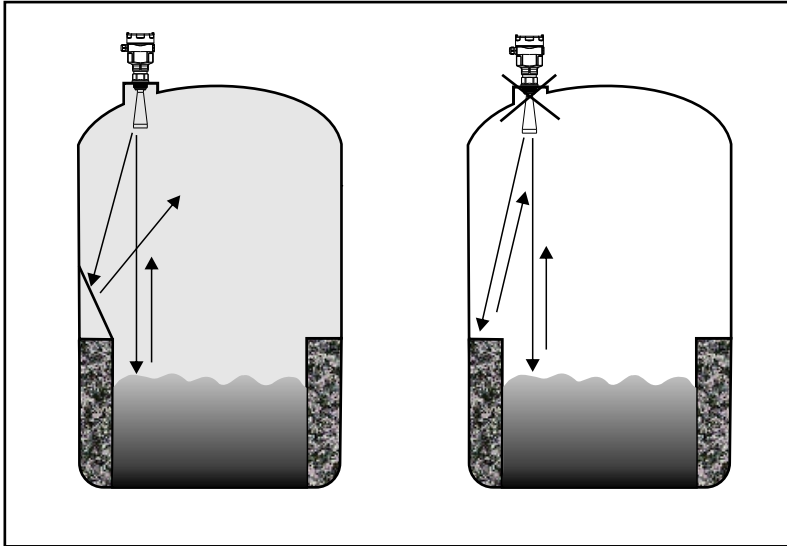
- 1. Wrong: Mount the instrument in/above filling stream, which results in the measurement of filling stream not the target medium.
- 2. Correct:

Agitator



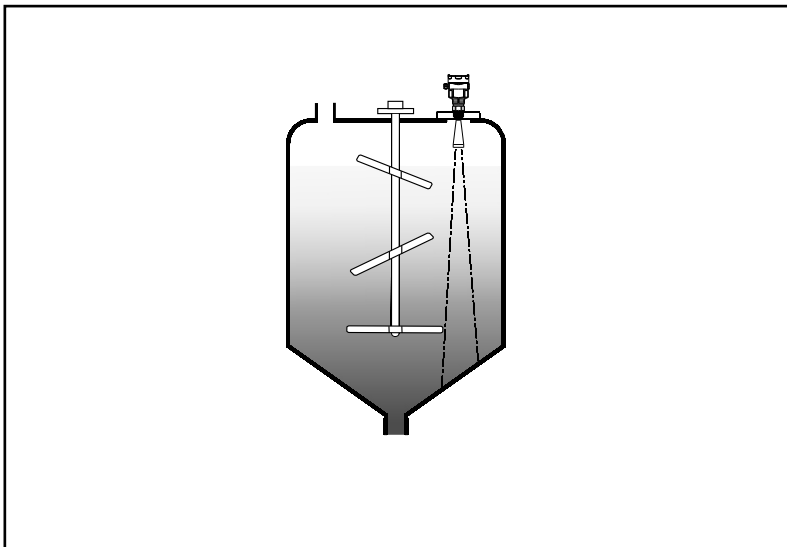
If there are agitators in vessels, instrument must be mounted as far away from agitators as possible. Once installation completed, a "false echo learning" should be carried out while agitators in motion to eliminate negative influence caused by false echo of agitators. You are advised to opt for installation with standpipe if foam or wave is generated due to the action of agitators.

- Reflection board installation



If there are barriers in vessels, it is required to mount baffle-board, by doing this, the echo reflected by the barrier will be reflected out. And "False Echo Storage" will be applied.

- Agitator



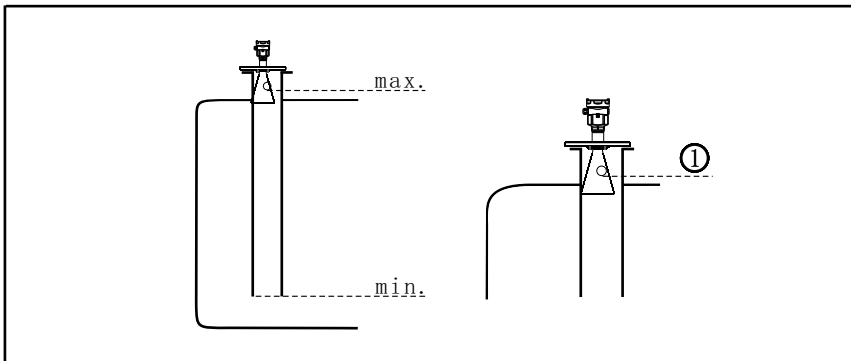
If there are agitators in vessels, instrument must be mounted as far away from agitators as possible. Once installation completed, a "false echo learning" should be carried out while agitators in motion to eliminate negative influence caused by false echo of agitators. You are advised to opt for installation with standpipe if foam or wave is generated due to the action of agitators.

- Foam

Due to the action of filling, stirring or other processes inside vessels, dense foams are formed on the surface of some liquid medium, which could attenuate emitting signals considerably. You are advised to mount the instrument inside a standpipe or opt for a guided wave radar level instrument if the generation of foam incurs measurement errors.

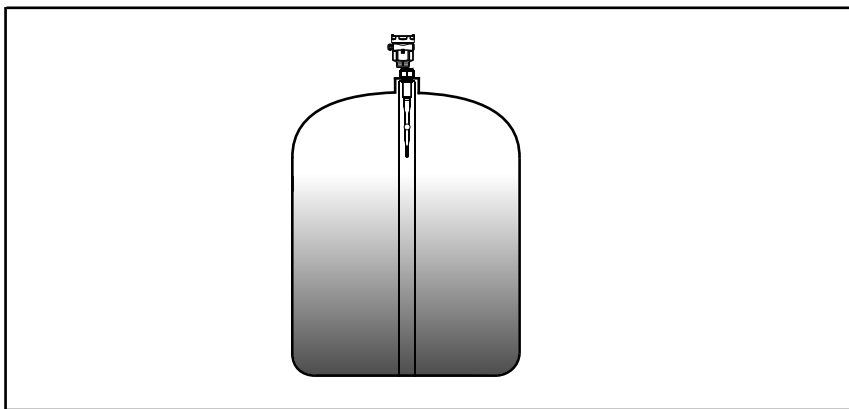
- Installation with Standpipe

By using standpipe, the influence of foams can be reduced.



Vent hole of diameter 5-10mm

If the measurement is undertaken by GDRD5X inside a metal standpipe, the minimum inner diameter of standpipe should be 50mm. Avoid large cracks or welding seam when connecting standpipe. False echo storage must be carried out as well in this case. Note: You must NOT mount instrument inside standpipe while measuring adhesive medium.



Installation with a plastic standpipe can avoid the generation of multiple false echoes while the instrument being mounted on the center of vessel top. You are advised to use PP or PTFE if the measured medium is strong acidic or alkaline.

5 Electrical Connection

Power Supply

20mA/HART(2-Wire) Power supply and current signal are carried by the same two-wire connection cable. This equipment is not allowed to be connected to public utility power lines. See the Technical Specifications of this guide for detailed requirement on power supply. A safety barrier should be placed between power supply and instrument for intrinsically safe version.

See the Technical Specifications of this guide for detailed requirement on power supply. Earth-connected current output can be used for standard version of level instruments, while the explosion proof version must be operated with a floating current output. Both instruments and earth terminals should be connected with ground firmly and securely. Normally you can either choose to connect with the earth terminal on vessel or adjacent ground in case of plastic vessels.

Cable Connection General Introduction

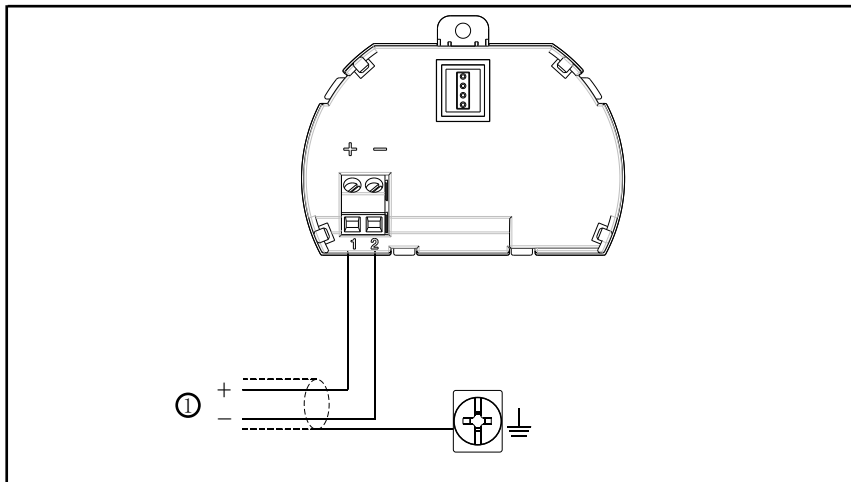
Standard 2-wire cable with outside diameter of 5...9mm, which assures the seal effect of cable entry, can be used as feeder cable. You are recommended to use screened

Shielding & Grounding

The two ends of shielded cable must be connected with earth terminal. The shielded cable must be connected with inner earth terminal directly inside the transducer, while the outside earth terminal on housing must be connected with ground. In the event of earth-connected current, the shielding side of shielded cable must be connected to ground potential via a ceramic capacitor (e.g. : 1 μ F 1500V) in order to dampen the low frequency grounding current and avoid the disturbance caused by high frequency signals

Wiring Diagram

2-wire

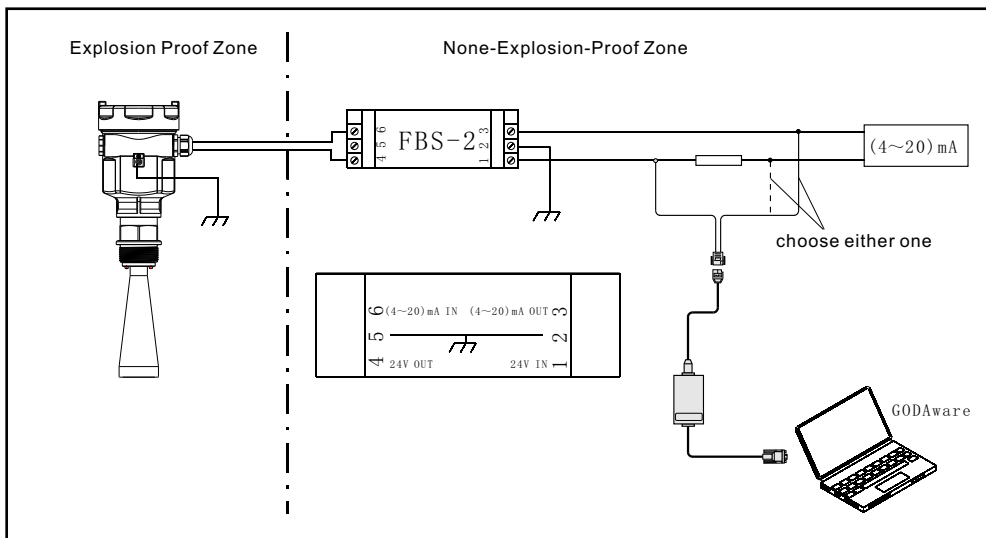


2-wire wiring used for HART
1) Power Supply and Signal Output

- Explosion Proof Connection

This product is an intrinsic safety explosion proof version (Exia II C T6 Ga) with stainless steel housing and plastic-encapsulated internal structure aimed to prevent sparks resulted from transducer and circuit malfunction from leaking out. It is applicable for the non-contact continuous level measurement of flammable medium under the level of explosion proof inferior to Exia II C T6 Ga. You are required to use series (intrinsic safety explosion proof: [Exia] II C, voltage of power supply: 24V DC±10%, short-circuit current: 114mA, operating current: 4...20mA) of safety barriers, which are supplementary to this product, for the power supply of this product.

All connection cables must be screened with max. length of 500m. Stray capacitor ≤ 0.1 μ F/Km, stray inductance ≤ 1mH/Km. The level measurement instrument must be connected to ground potential and unapproved supplementary devices are not allowed to use.



Adjust with GODAware

6 Adjustment Instructions

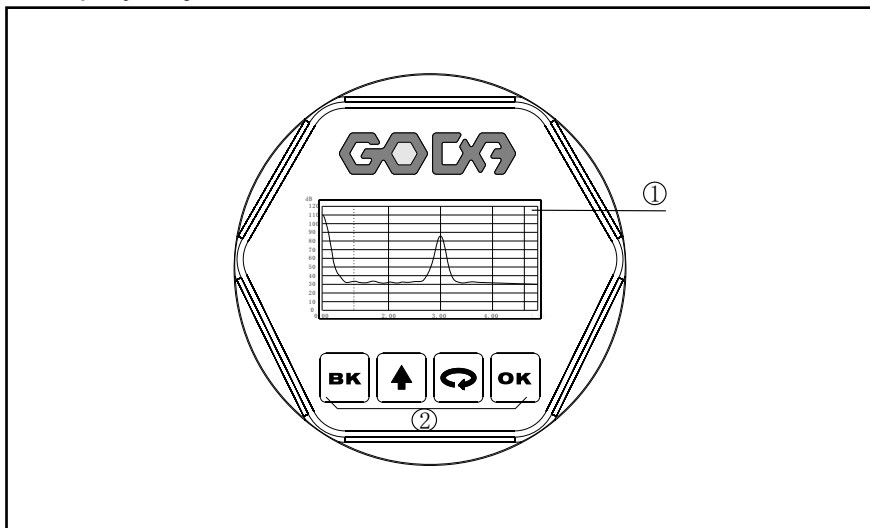
● Adjustment Methods

Three adjustment methods available for GDRD series :

1. Display/Adjustment Module
2. Adjustment software GODAware
3. HART handheld programmer

ViewPoint is a pluggable display/adjustment module. The adjustment can be done through operating with four buttons on ViewPoint. Optional menu operation languages are available for selection. ViewPoint is only used for display after adjustment in that the measurement results can be seen clearly through the glass window.

Display/Adjustment Module



1 LCD 2 Adjustment Keypad

[OK] Keypad

- Enter programming mode;
- Confirm programming options;
- Confirm modifications to parameters.

[↻] Keypad

- Choose programming options;
- Choose the digit of parameters to edit;
- Display the contents of parameters.

[↑] Keypad

- Modify parameter values.

[BK] Keypad

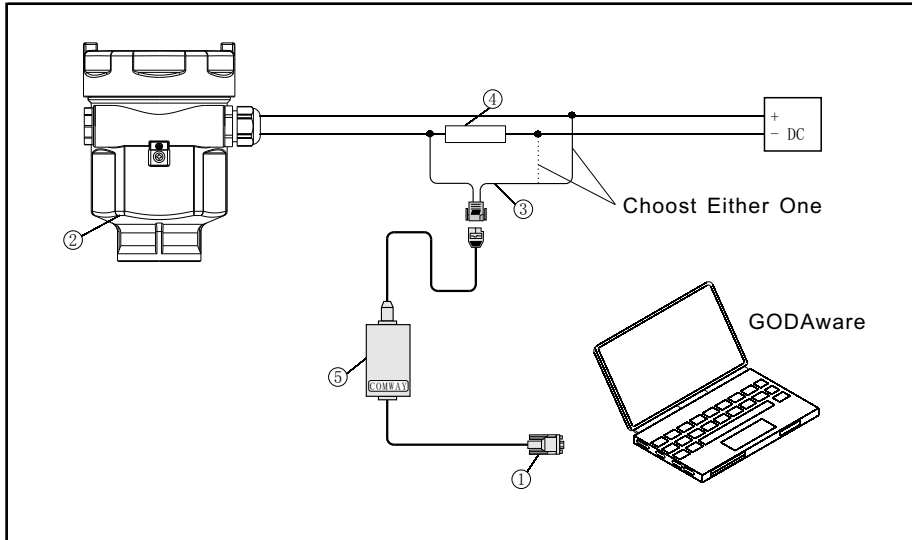
- Programming mode exit;
- Return to higher menu level.

Shortcut

- [BK] Display Echo wave

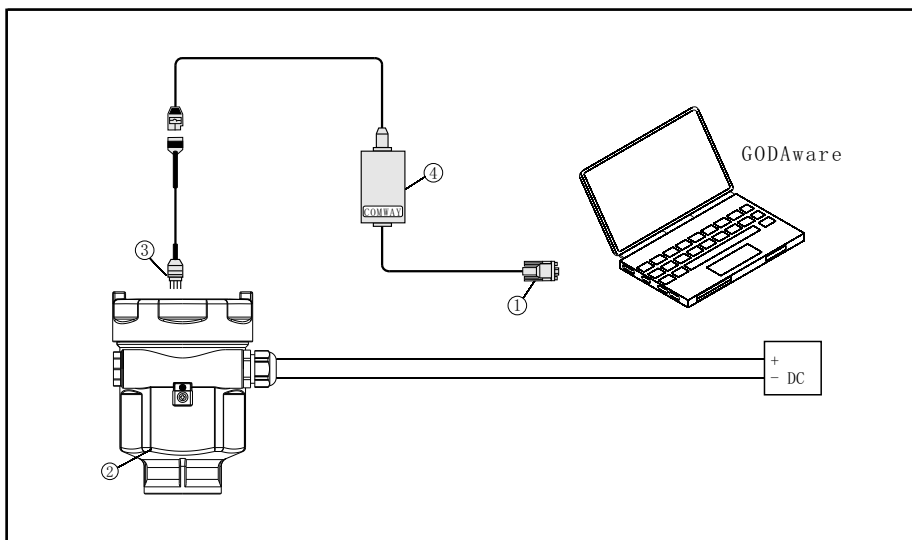
● GODAware

Connect with another unit through HART.



- 1 RS232 Connect Cable/USB port
- 2 GDRD series
- 3 HATR pont adapter used on COMWAY convertor
- 4 250 ohm Resistance
- 5 COMWAY Convertor

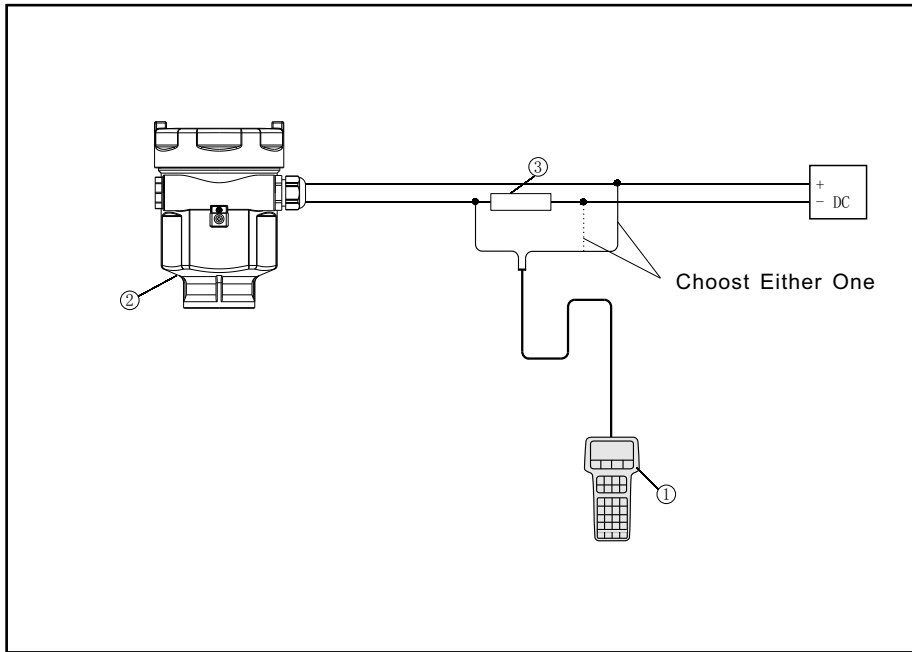
Connect with another unit through I²C.



- 1 RS232 Connect Cable/USB port
- 2 GDRD series
- 3 I²C adapter pont used on MOMWAY convertor
- 4 COMWAY Convertor

HART Handheld Programmer

Adjust GDRD series with HART Handheld Programmer



1 HART Handheld Programmer

2 GDRD series

3 250 ohm Resistance

9 Selection & Ordering Information

- GDRD53

| | |
|---------------------------------------|---|
| (a)Explosion Proof Approval | |
| P | Standard |
| I | Intrinsic Safety (Exia IIC T6 Ga) |
| (b)Shape of Antenna/Material | |
| K | Horn Φ100mm Stainless Steel/Internal PFA coating |
| L | Horn Φ150mm Stainless Steel/Internal PFA coating |
| (c)Antenna Extension | |
| A | No |
| B | 200mm |
| C | 500mm |
| D | 1000mm |
| E | 2000mm |
| X | Special Design |
| (d)Process Connection/Material | |
| FA | Flange DN50 PN1.6 Stainless Steel316L(GB/T9119-2000) |
| FB | Flange D80 PN1.6 Stainless Steel316L(GB/T9119-2000) |
| FC | Flange DN100 PN1.6 Stainless Steel316L(GB/T9119-2000) |
| FD | Flange DN150 PN1.6 Stainless Steel316L(GB/T9119-2000) |
| FE | Flange Dn200 PN1.6 Stainless Steel316L(GB/T9119-2000) |
| YP | Special Design |
| (e)Electronic | |
| B | (4~20)mA/HART 2-Wire |
| (f)Housing | |
| A: | Aluminium |
| G: | Stainless Steel |
| (g)Cable Entry | |
| M | M20x1.5 |
| N | ½NPT |
| (h)Display/Programming | |
| A | Yes |
| X | No |
| (i)Huff | |
| A | Yes |
| X | No |



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