



# OPERATING INSTRUCTIONS

## TRACER AIR™ LTТА RADAR LEVEL TRANSMITTER



## Principle of Operation

*Please read carefully! No liability can be accepted for damage caused by improper use or installation of the Tracer Air™ Level Transmitter.*

The Tracer Air™ Radar Level Transmitter is accurate, easy to use and cost efficient. Featuring through the air technology, the radar level antenna emits narrow microwave pulses that transmit down the antenna. The signal comes into contact with the application surface then reflects back to the device. The Tracer Air™ is pre-calibrated at our facility for easy installation. Some typical applications include corrosive or non-corrosive liquid level monitoring, small tank or process vessel, bulk tote tanks and difficult measurement applications.



## Safety Precautions

If you are unsure of the suitability of a Tracer Air™ Radar Level Transmitter for your installation, please consult your FLO-CORP representative for further information.

**NOTE: REMOVE ALL PACKING INSERTS BEFORE OPERATING LEVEL TRANSMITTER.**

## Authorized Personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorized by the plant operator. During work on and with the device the required personal protection equipment must always be worn.

## Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel over fill or damage to system components through incorrect mounting or adjustment.

## General Safety Instructions

The user must take note of the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument. During the entire duration of use, the user is obliged to determine the compliance of the required occupational safety measures with the current valid rules and regulations and also take note of new regulations.

## Disclaimer

The information contained in this document is subject to change without notice. FLO-CORP makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

## FEATURES & BENEFITS

- Small antenna size, non-contact radar, rugged design
- Pre-calibrated for easy installation and setup
- No moving parts
- Measures solids or liquids
- Cost 20 to 30% less on average than other brands
- Ideal for difficult level measurement applications such as vapor, steam, pressure, change of temperature, dust and foam.
- High SNR, even in the case of fluctuations results in accurate performance
- High frequency, the best choice to measure solids and low dielectric media
- HART® 2-Wire System
- Intrinsically Safe (Exia IIC T6 Ga)
- Economically Priced

## SPECIFICATIONS

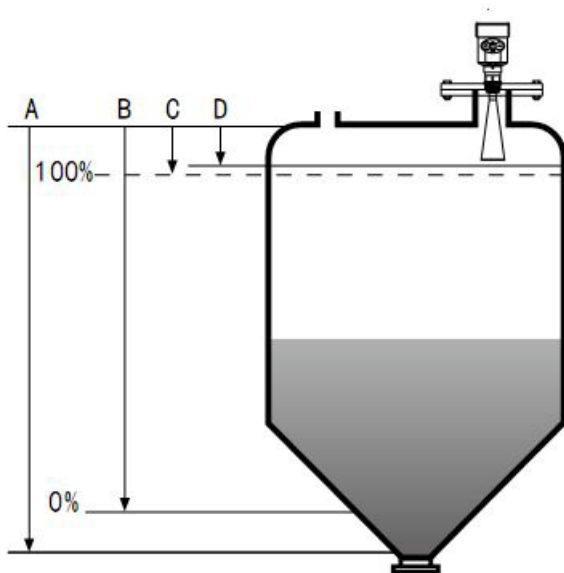
|                                |                                                          |
|--------------------------------|----------------------------------------------------------|
| <b>Measuring Range</b>         | SS 304: 98 feet (30 meters)<br>PTFE: 65 feet (20 meters) |
| <b>Process Connection</b>      | 1½ NPT                                                   |
| <b>Antenna Material</b>        | SS 304 or PTFE                                           |
| <b>Accuracy</b>                | ±0.1in                                                   |
| <b>Application Temperature</b> | -40°F to 482°F (-40°C to 250°C)                          |

|                           |                                               |
|---------------------------|-----------------------------------------------|
| <b>Process Pressure</b>   | -0.1 ~ 4.0 Mpa                                |
| <b>Frequency Range</b>    | 26GHz                                         |
| <b>Signal Output</b>      | 4-20mA / HART®(Two-wire / Four) RS485/ Modbus |
| <b>Cable Entry</b>        | 1/2 NPT                                       |
| <b>Hazardous Location</b> | Intrinsically safe (Exia IIC T6 Ga)           |

*Specifications are subject to change without notice.*

## TECHNOLOGY

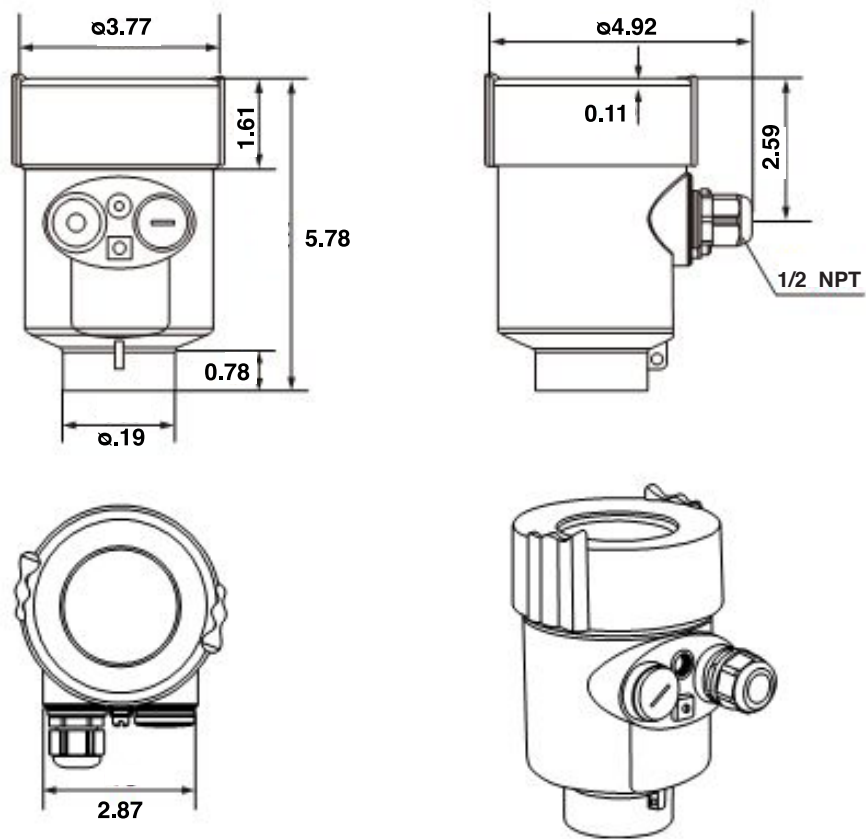
The Tracer Air™ radar level transmitter features through the air technology which emits narrow microwave pulses down the cone shaped antenna. The microwave signal comes in contact with the measured medium surface and reflects back to the antenna. The signal is transmitted to the electronic circuit and partly converts to level signals (as microwave featured with high propagation speed, it is almost instantaneous for the electromagnetic waves to reach the target and return to the receiver).



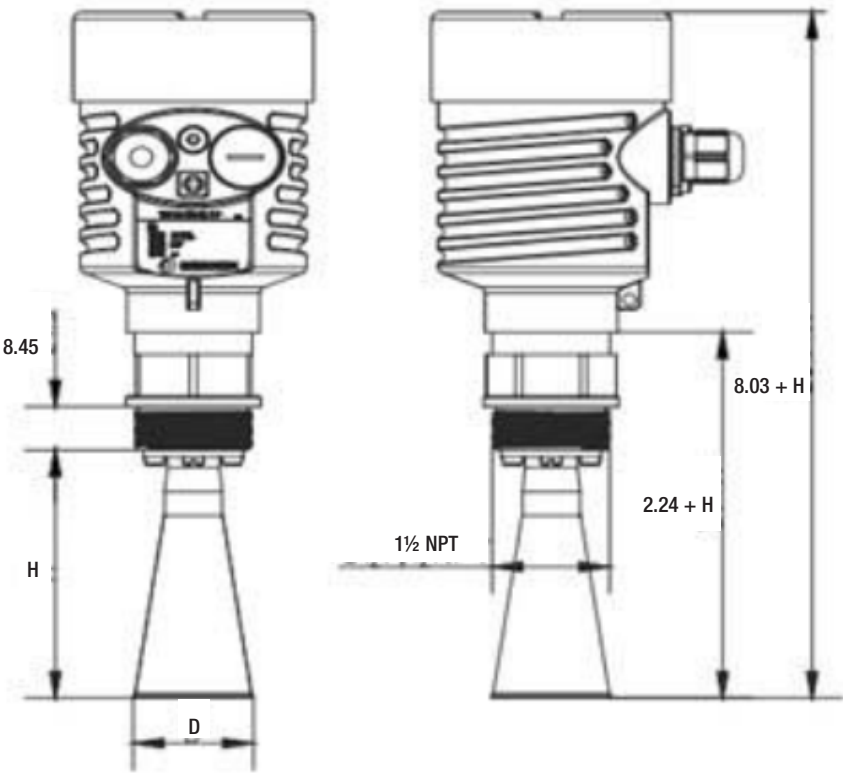
|          |                         |
|----------|-------------------------|
| <b>A</b> | Measuring Range Setting |
| <b>B</b> | Minimum Adjustment      |
| <b>C</b> | Maximum Adjustment      |
| <b>D</b> | Near Blanking           |

**Note:** When applying the radar level transmitter, make sure that the highest material level cannot reach the measurement blind spot (D).

ENCLOSURE DIMENSIONS

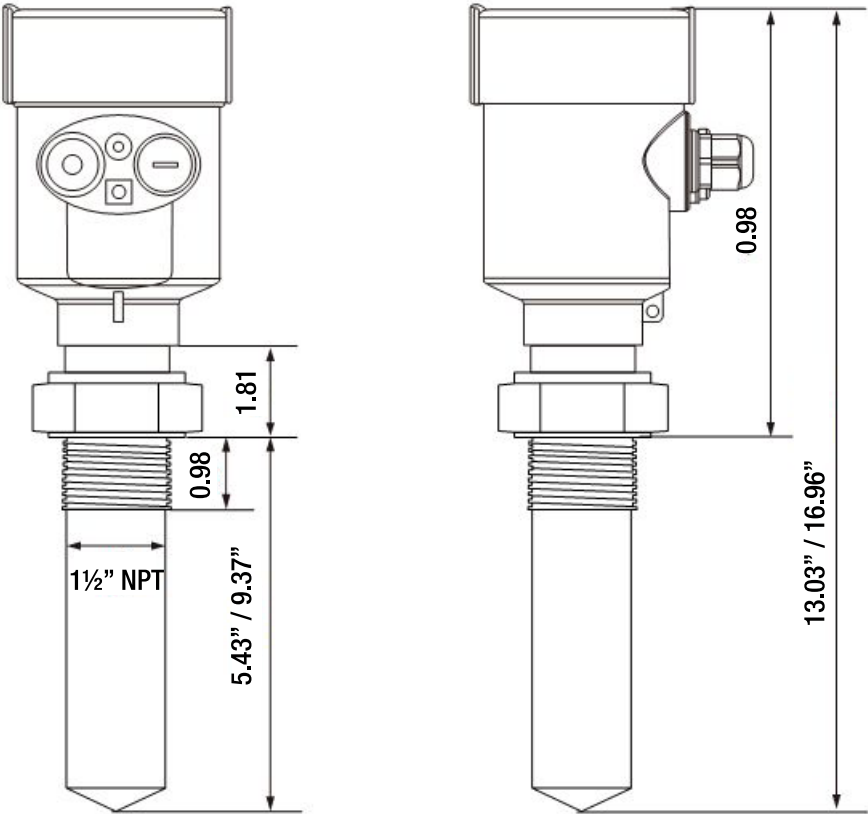


STAINLESS STEEL 304 ANTENNA DIMENSIONS (IN)



| FLANGE | D: Horn Mouth Diameter | H: Horn Height |
|--------|------------------------|----------------|
| F2     | 1.81                   | 5.51           |
| F3     | 2.99                   | 8.93           |
| F4     | 3.77                   | 11.33          |

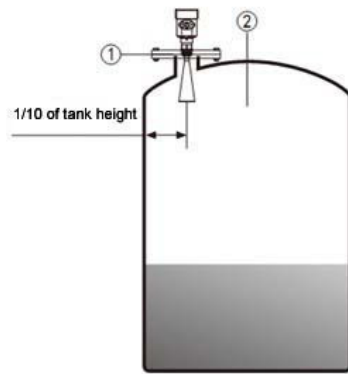
PTFE ANTENNA DIMENSIONS (IN)



## INSTALLATION

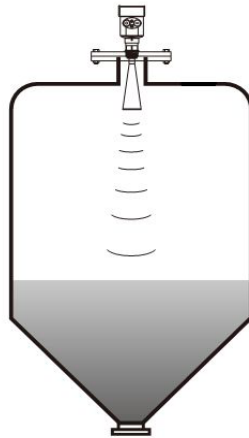
Installed in a quarter or sixth of the diameter.

Note: The minimum distance from the tank wall should be a tenth of the tank height.

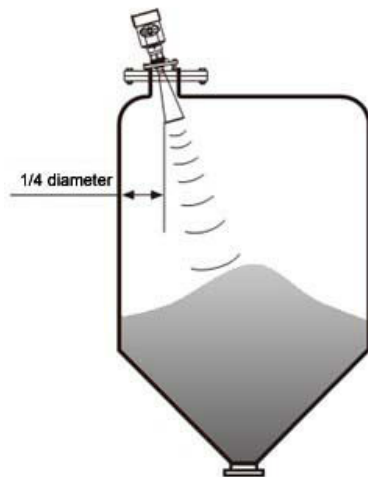


- 1) Datum Plane
- 2) Vessel Center or Axis of Symmetry

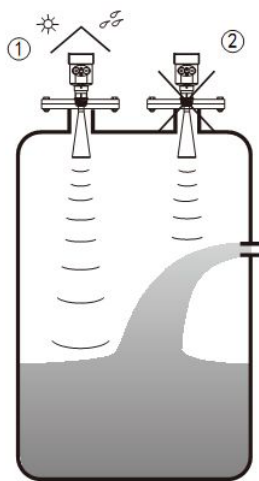
For conical tank top plane, it can be installed on the top center of the tank to ensure the measurement of the conical bottom.



When there is material pile, the antenna needs to be perpendicularly aligned to the material surface. If the material is uneven, and the heap angle is large then the universal flange is needed to adjust the horn angle to aim the charge level. *(Due to the indication of the solid surface, it will cause the echo decay or even the signal loss problem).*

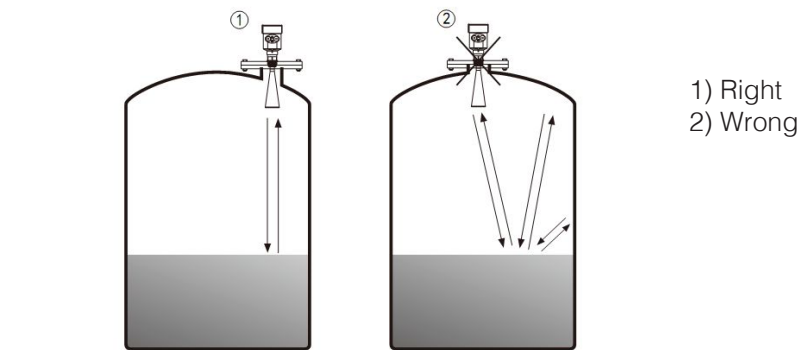


The Tracer Air™ cannot be installed above the tapered tank into the mouth. In an outdoor installation, sunshade and rainproof measures should be taken.

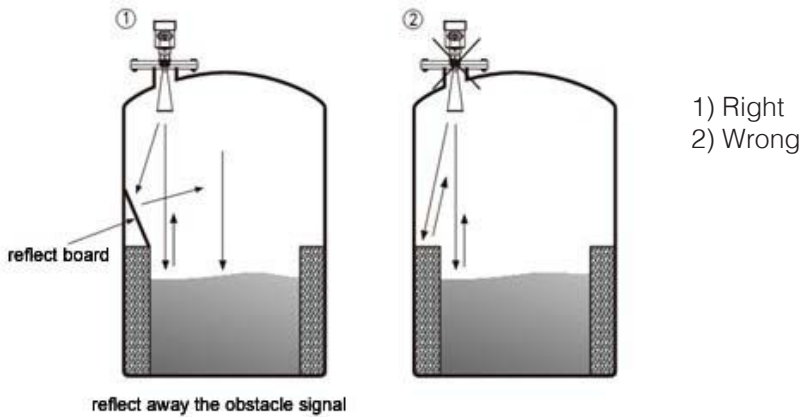


- 1) Right
- 2) Wrong

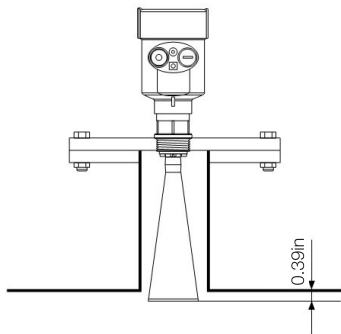
The Tracer Air™ cannot be installed in the middle of the arch or round tank top. In addition to indirect echo signal, it will be affected by multiple echos. The multiple echoes may be larger than the true echo signal threshold, because the top can be concentrated by multiple echoes. It cannot be installed in a central position.



When the tank obstacles affect the measurement, the reflect board must be installed for proper measurement



The pipe joint height requirements: it must ensure that the antenna extends into the tank for at least 0.39 inches.





## PROGRAMMING

The keypads on the transmitter are  (exit settings, go back to menu item ) (Select parameters, modify numbers in ascending order)  (Move cursor, browse menu)  (enter the menu, enter setting)

Initial menu window menu structure: Basic Settings / Display / Diagnostics / Service / Info

When cursor is on Basic Settings: Press 

First basic menu option: If you do not wish to adjust the Min. Adjustment, Press  Adjust measuring range using Min. Adjustment 1.1

In the main menu, when the menu displays “Basic Settings”, press  to enter the basic setup sub menu, the display will indicate a 1.1 in the upper right hand corner.

Press  to enter programming lowest level percent (0.00%) and distance in feet for the level application (typically the full tank height). This would also be referred to the maximum distance or height of the tank. If the editing is finished, press  to confirm, otherwise, press the Arrow  to go to the next programming option.

Adjust measuring range using Max. Adjustment 1.2

In the submenu, when the menu number displays 1.1, please press “Arrow Around” key to enter the Max. Adjustment, the display will indicate a 1.2 in the upper right hand corner.

Press  to enter programming highest level percent (100.00%) and distance in feet (1'04" minimum). If the editing is finished, press  to confirm, otherwise, press the Arrow  to go to the next programming option.

Adjust the Medium 1.3

In the submenu, when the menu number displays 1.2, please press “Arrow Around” key to enter the Medium selection, the display will indicate a 1.3 in the upper right hand corner.

Press  to select your proper Medium option (Liquid, Solid, Micro DK). This is accomplished by pressing the  to scroll through the options. Once the cursor is over the correct Medium selection, press the . The display will then read Adjust Damping 1.4

Adjust Damping 1.4

In the submenu, when the menu number displays 1.3, please press “Arrow Around” key to enter the Damping selection, the display will indicate a 1.4 in the upper right hand corner.

Press  to enter the programming damping section. Press the  to increase numerals and the  to scroll left to right. Once the desired damping is selected press 

Then press the  to move to section 1.5

Adjust Mapping Curve 1.5

In the submenu, when the menu number displays 1.4, please press “Arrow Around” key to enter the Mapping Curve selection, the display will indicate a 1.5 in the upper right hand corner.

Press  to enter the Mapping Curve and select either “Linear” or “Cone” by pressing the . Once the desired mapping curve is selected press .

Then press the  to move to section 1.6

Adjust Scaled Units 1.6

In the submenu, when the menu number displays 1.5, please press “Arrow Around” key to enter the Scaled Units selection, the display will indicate a 1.6 in the upper right hand corner.

Press the  button to enter the Scaled Units. Select your desired scaled units (Height, Mass, Flow,

Volume, No Units) then press . Then select your desired scaled units of measure (m, ft, in, cm, mm) then press  and the display will go back to the Scaled Units submenu. Press the  to scroll to the next submenu Scaling 1.7

#### Adjust Scaling 1.7

In the submenu, when the menu number displays 1.6, please press “Arrow Around” key to enter the Scaling selection, the display will indicate a 1.7 in the upper right hand corner.

Press  to enter programming lowest level percent and distance in feet for the level application (typically the full tank height). Then press the  to scroll down to the highest level percent and distance in feet for the level application. If the editing is finished, press  to confirm, otherwise, press the  to go to the next programming option.

#### Adjust Range 1.8

In the submenu, when the menu number displays 1.7, please press “Arrow Around” key to enter the Range selection, the display will indicate a 1.8 in the upper right hand corner.

Press  to enter programming the maximum range of the application in ft. Press the  to change the numeric value and the  to scroll left to right. Then press  once the correct range is inputted. Then press the  to enter section 1.9

#### Adjust Near Blanking 1.9

In the submenu, when the menu number displays 1.8, please press “Arrow Around” key to enter the Near Blanking selection, the display will indicate a 1.9 in the upper right hand corner.

Press  to adjust your desired Near Blanking (Deadband). This is accomplished by pressing the  to change the numeric value and the  to scroll left to right. Once the desired Near Blanking is inputted press  to return to submenu 1.9

You have now successfully completed the basic setup menu. Press the  to return to the menu section. .

## SERVICE MENU

Service menu contains Service menu contains functions, for the use of trained personnel. The menu contains false echoes study, time-varying gain control, reset and save the instrument parameters, etc.

When the LCD displays main menu, press  key to move the arrow to service item, it displays as following:

```
Basic settings      4
Display
Diagnostics
>Service
Info
```

## False Echo Memory

When some fixed obstacles exist in the measuring range, the function of learning false echo memory is used to overcome the influence. When the LCD displays main menu 4, press  to enter service item, it displays as following:

```
False echo memory  4.1
>Delete
Update
Create new
Edit
```

Input the real echo distance value prompted, then press  key to confirm. The LCD displays "please wait", the instruments start false echo learning, and then return to false echo learning menu.(note: the distinction of update and create new false echo is: the false echo curve will be reset after the real echo when it is created but it remains after the real echo when updated) If the false echo curve needs adjusted, press  key to move the arrow to desired item, and

press  key to confirm. This function can edit or modify the established false echo to meet the requirements of special conditions. The LCD displays the following after entering false echo editing.

Note: this menu needs to be operated by professional personnel

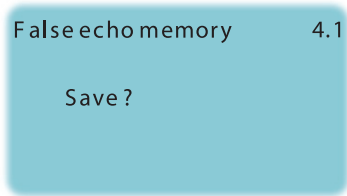
```
False echo memory  4.1
Delete
Update
Create new
>Edit
```

```
False echo memory  4.1

Start 01.0    A MP 0 000
End   2.0    A MP 0 000
      m(d)
```

Curve editing takes two points, initial point and end point as position coordinate of the desired editing curve each time. Followed by the corresponding amplitude value to be modified (note: When the distance coordinate input or is modified, followed by the corresponding amplitude it will automatically update according to the current saved data, as reference of the amplitude modifying); after you are finished the modifying the two coordinates, press **OK** key to confirm the change; the instrument will automatically add together the two input points into a straight line and generate a new false echo curve, to replace the original curve.

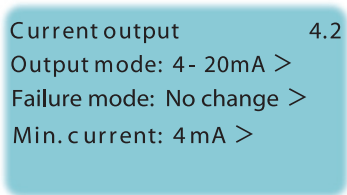
After press **OK** key to confirm, the interface will display the modified false echo curve for reference, and then press **BK** key can return to the above editing interface to continue editing. When confirm the false echo editing meets the working condition requirements, press **BK** key again to quit the false echo the edit menu. The LCD displays as following:



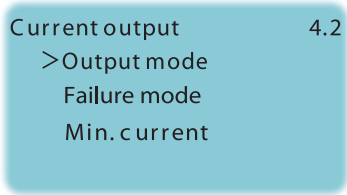
Press **OK** key to save the above modification, press **BK** key to quit.

**Current Output**

This setup is used to select the current output mode. When the LCD displays main menu 4.1, press  key and the LCD displays as following:



Press **OK** key

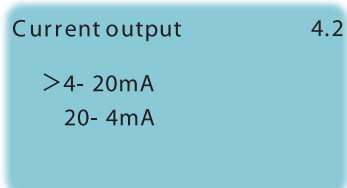


## Output Mode

Output Mode is used to select 4-20mA or 20-4mA;

4-20mA indicates that the low material level corresponds to 4mA, high material level corresponds to 20mA  
20-4mA indicates that the low material level corresponds 20mA, high material level corresponds 4mA.

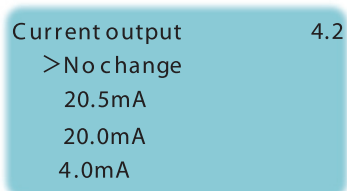
When the LCD displays current output selection menu 4.2, press  key to move the arrow to the output mode and press  key to confirm. The displays as following:



## Failure Mode

Press  key to choose the desired setup and press  key to confirm. Failure mode is used to select when a fault alarm, output current is not changed, output 20.5mA, 22mA or < 3.8mA.

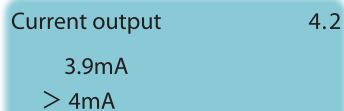
When the LCD displays current output selection menu 4.2, press  key to move the arrow to the fault mode and press  key to confirm. The LCD displays as following:



Press  key to choose the desired setup and press  key to confirm.

## Minimum Current

Minimum current is used to select output minimum electric injection as 4mA or 3.8mA. When the LCD displays current output selection menu 4.2, press **OK** key to move the arrow to the minimum current and press **OK** key to confirm. The LCD displays as following:



Current output 4.2  
3.9mA  
> 4mA

## Reset

Reset function is used to reset the instrument parameters. There are four reset functions: basic setup, factory setup, measured peak value and cumulative flow.

Basic setup is a basic setup of the instrument parameters restore to factory default

The measured peak value reset is to reset the cumulative flow when the instrument is used for open-channel meter.

When the LCD displays current output (menu 4.2), press  key to enter reset function, it displays as following:

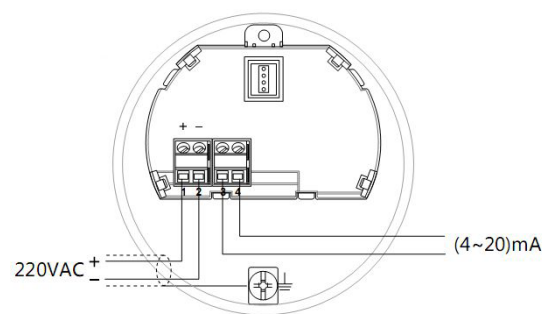
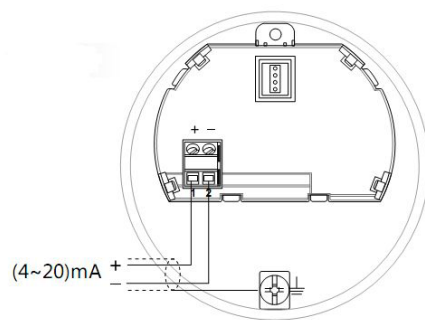


Reset 4.3  
Select reset >

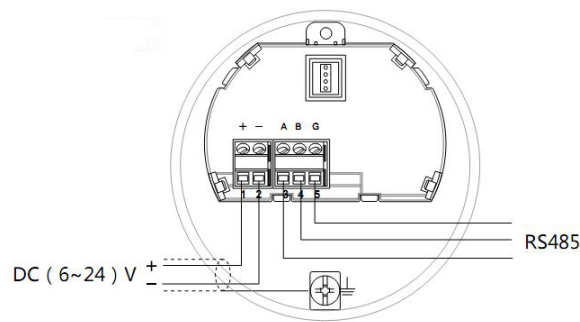
Press **OK** key to enter reset selection menu to select the corresponding reset function.

## ELECTRICAL CONNECTION

### Supply Voltage Wiring Diagram

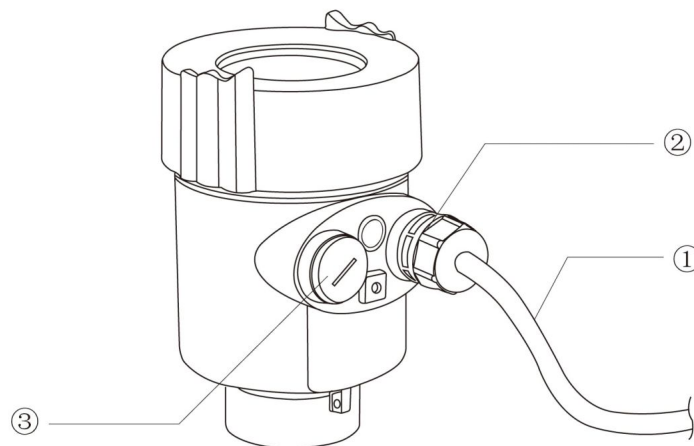


## 24V RS485 / Modbus Wiring Diagram



### Protection Grade

The Tracer Air™ Radar Level Transmitter fully meets the requirements of protection class IP66/67; Confirm that the cable is sealed to ensure waterproof enclosure.



How to ensure that the installation meets IP67 requirements:

- Confirm the seal head and cable are not damaged
- Confirm the cable is in line with the electrical connection specifications
- Before accessing the electrical interface, the cable will bend down to ensure that water does not flow into the housing (figure 1). Tighten the cable on enclosure (figure 2). Keep unused electrical interfaced interface plugged (figure 3).



## INSTRUMENT DEBUG

Three debugging methods:

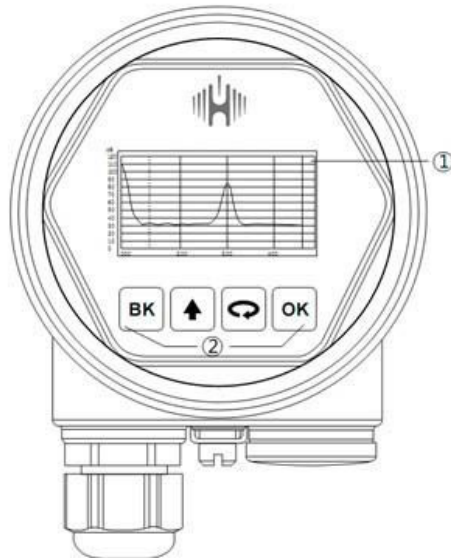
- 1) Display / Keypad
- 2) Upper Computer Debugging
- 3) HART Handheld programmer

### Display / Keypad

To debug by the four keys on the LCD of the instrument:

- Debug menu language is optional. After debugging it generally is used for display. It is quit clear to read off the measured values. (See instrument keypad setup instructions).

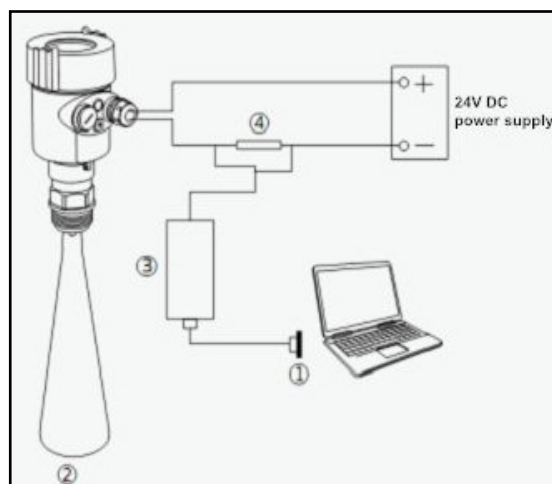
- 1) LCD Display
- 2) Keypad



### Upper Computer Debugging

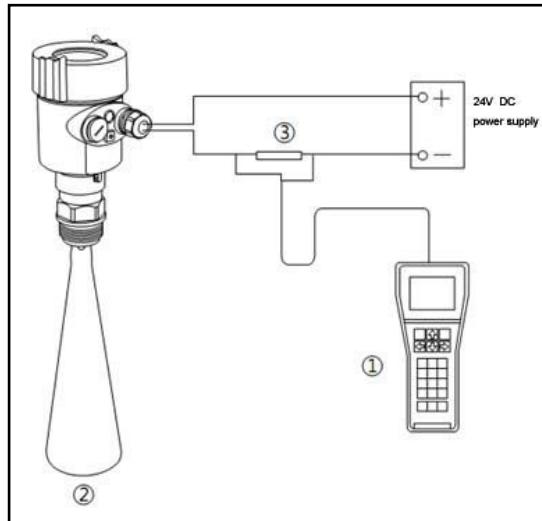
Connected with the upper computer via HART

- 1) RS232 Interface / or USB Interface
- 2) Radar Level Transmitter
- 3) HART Adapter
- 4) 250Ω Resistor



## HART Handheld Programmer

- 1) HART Handheld Programmer
- 2) Radar Level Transmitter
- 3) 250 $\Omega$  Resistor



# Ordering Information

## FLO-CORP MODEL NUMBER BUILDER

For Assistance Call 877.356.5463

Use the diagram below, working from left to right to construct your FLO-CORP Model Number.  
Simply match the category number to the corresponding box number.

**Example: LTTA-S-N1-3-2-SN**

Tracer Air™ Radar Level Transmitter with Stainless Steel 304 Horn Material, 1½" NPT Process Connection, 1.81" Horn Diameter, HART Communication with Stainless Steel housing and 1/2 NPT Cable Entry

**LTTA** —  —   —  —  —

**LTTA** —  —   —  —  —

**Horn Material (1)** —

**P)** PTFE (up to 65ft range)  
**S)** Stainless Steel 304 (up to 98ft range)

**Process Connection (2)** —

**N1)** 1½" Threaded NPT  
**G1)** 1½" Threaded G  
**F2)** ANSI 150lb 2" Flanged  
**F3)** ANSI 150lb 3" Flanged  
**F4)** ANSI 150lb 4" Flanged  
**S1)** Special Custom

**Antenna Horn Length / Diameter** —

**1)** 3.93" (100mm) *(PTFE ONLY)*  
**2)** 7.87" (200mm) *(PTFE ONLY)*  
**3)** 1.81" (46mm) *(SS 304 ONLY)*  
**4)** 2.99" (76mm) *(SS 304 ONLY)*  
**5)** 3.77" (96mm) *(SS 304 ONLY)*  
**6)** Special Custom

**Communication** —

**1)** 4-20mA / 24VDC / Two-wire  
**2)** 4-20mA / ~24 VDC / HART two-wire  
**3)** 4-20mA / ~ 220 VAC / Four-wire  
**4)** RS485 / Modbus

**Housing / Safety Grade (3)** —

**A)** Aluminum / IP67  
**S)** Stainless Steel 304 / IP67

**Cable Entry** —

**N)** 1/2 NPT  
**M)** M20x1.5



LTTA-S SHOWN



Ordering Notes:  
(1) Select the best configuration based on your requirements  
(2) Contact factory for custom process connection  
(3) Select Stainless Steel option if Explosion Proof Enclosure is required