

# USER MANUAL

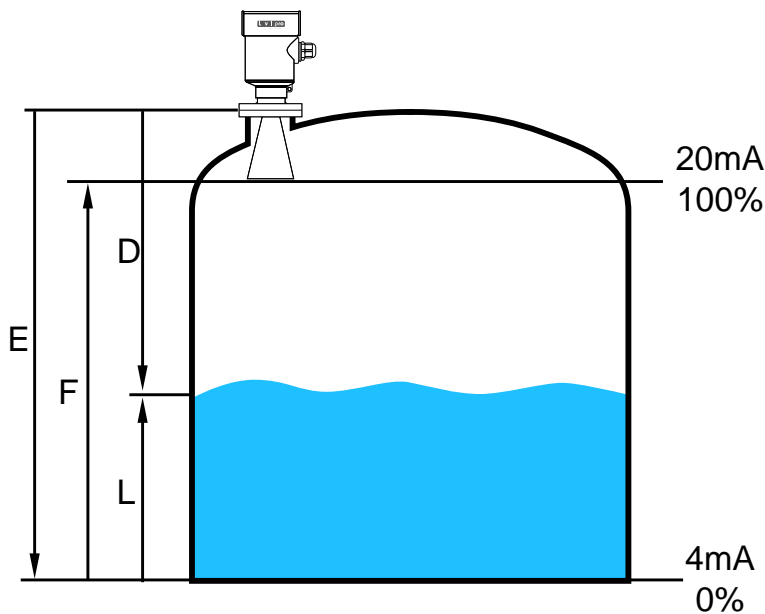
## ProScan Radar Level Sensor



Read the user's manual carefully before starting to use the unit or software.  
Producer reserves the right to implement changes without prior notice.

## Measurement Principles

The ProScan-8000 transmitter measures the liquid level in the tank by using an all plastic (PP or PVDF) antenna or horn that sends and receives low energy radar pulses. The sensor is mounted to the top of the tank and the pulsed signal is reflected off the liquid surface, the echo (returned signal) is then picked up or received by the transmitter's antenna. The frequency pulse sent by the transmitter is reflected or echoed off the surface of the liquid being measured. The time it takes is compared to known laws of physics (speed of light), once this is done the distance can be determined, and very accurately measured.



$$\text{Distance} = (\text{Speed of Light} \times \text{Time Delay}) / 2$$

The ProScan-8000 does not contact the process liquid and therefore is an excellent choice for applications that may be corrosive, coating, dirty, or crystallizing. They are temperature compensated over the entire range (-40-260F) and can be used on to measure liquid under pressure or vacuum

The ProScan-8000 is both reliable and accurate; there is no requirement for re-calibration, and virtually zero maintenance as there are no moving parts.

The ProScan-8000 utilizes a special microprocessor technology and mapping software that allows it to be used where other non-contact level sensing products fail i.e. Ultrasonic's.

Some of these applications are foam, vapor, and turbulence\*

This adaptive learning technology of the ProScan-8000 allows the sensor to filter out objects and conditions that may affect the reading...its state of the art made simple

\* it is important to note that vapor density, highly turbulent surfaces, obstructions, and low dielectric liquid constants can greatly reduce the returning pulse signal, or worse eliminate it altogether, this is known as a 'lost' condition.

## ProScan-8000 Application

The **ProScan-8000** radar level Transmitter is suitable for Corrosive liquid.

The **ProScan-8000** microwave pulse, frequency. The energy Pulse is low and can be installed on top metal, non-metallic Tank.

### ProScan-8000 Series





### Features:

Suitable for Medium	Corrosive Liquids
Exlosion-proof Grade	Exia IIC T6 Ga/ Exd ia IIC T6 Ga
Measuring Range	20m 66FT
Aerials	PP or PTFE
Frequency	6 GHZ
Temperature	(40-130°C) (-40 -260°F)
Measurement Accuracy	15"
Process Pressure	(-0.1 -0.3) MPa
Output Signal	(4-20) mA/HART
Display	Four LCD
Power Source	RS-485
Repeatability	±1mm, 0.03"
Shell	Epoxy Coated Aluminum
Connection	NPT/Flanged.

## Applicable Media:

- The ProScan-8000 Series Radar Level Meter is applicable to perform non-contacting continuous measurement to the level of liquid, pulp and aggregate pulp. The equipment is adaptive to environments with large temperature and pressure difference, inert gas and volatilization.
- The measurement is performed through microwave impulses. The equipment is capable to work within industrial frequency scope, applicable to use in various metal, non-metal container or pipe without any harm to human body or the environment.

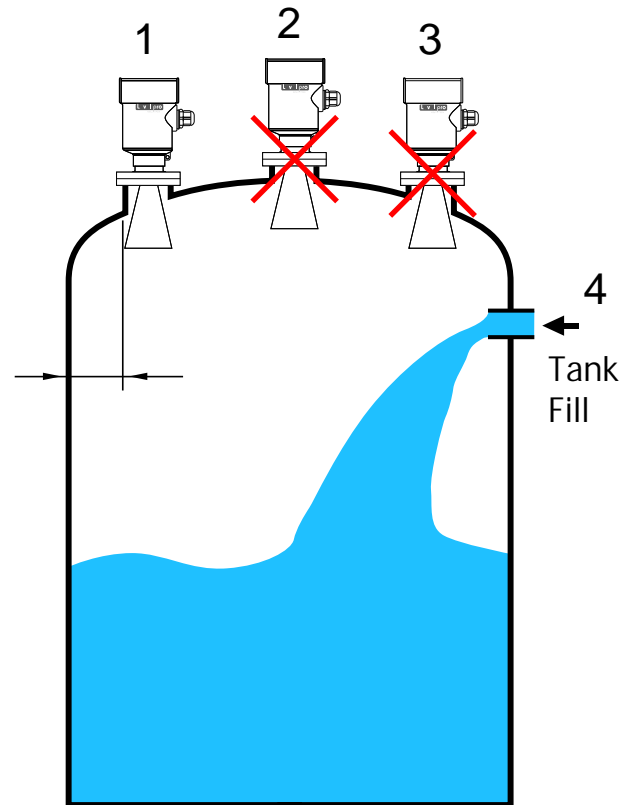
## Product Introduction:

Image of		
Model	ProScan-8000	ProScan-8000
Application	Erosive liquid, sizing agent, or solid aggregate with simple process conditions  Acids Bases	Corrosive liquid, pulp, solid  E.g. Water tank Acid and Alkali stand Pulp tank Solid particle Small oil tank
Range of measurement	20m 66FT	20m
Process	Thread 1½"	Flange

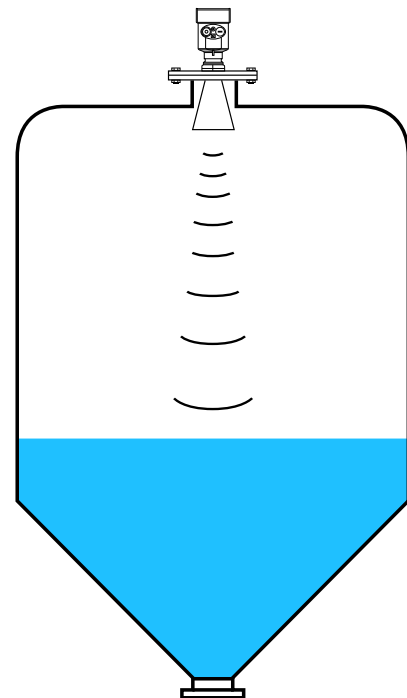
## ProScan Installation Manual :

### Installation Instruction

- The recommended position (1), the ratio of outer wall of tank to install Location to the tank diameter 1:6, the minimum distance from the installation of tank wall as the measurement range to that of the Overall Height 1:10. For example: liquid level of storage tank 30ft, and the tank wall install the minimum distance of 1ft.
- Do not be install above the discharge port (3).
- Do not be install in the center position (2), Of a Parabolic Tank, this will result false echo, clutter to real signal loss.
- The Ensure and signal loss tank wall is free of foveing objects which can cause ensure by false echo, when debugging instrument should be false echo storage.

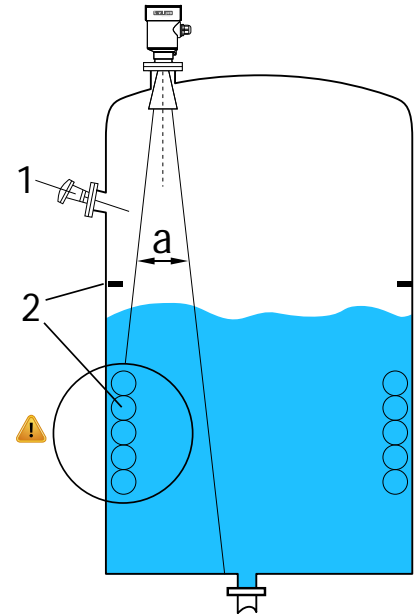


When Installing on top of a conical tank the ProScan 8000 should be installed at the center of the tank. The beams may not reach to the bottom of the conical bottom.



### Tank Installation Instructions:

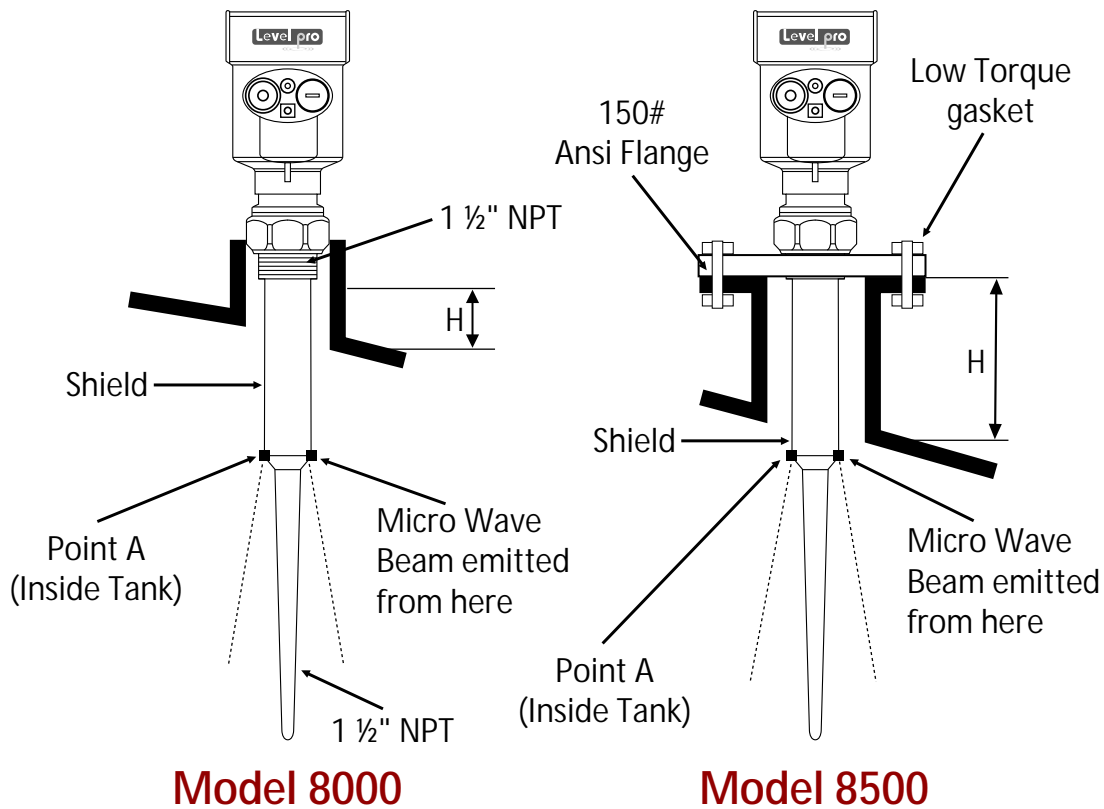
- The ProScan-8000 signal beam, should come in contact not the following installation:  
With such items (1) switch, temperature sensors.
- Devices such as (2):  
A heating coils, Baffle plates etc.



### Tank Installation:

#### Standard Installation

- Ensure the radar antenna tilt or Lean does to wards to the tank wall.
- The rod antenna launching point must reach out to install pipe.
- The 90 vertical placement of the Sensor, The beam must be perpendicular to liquid.

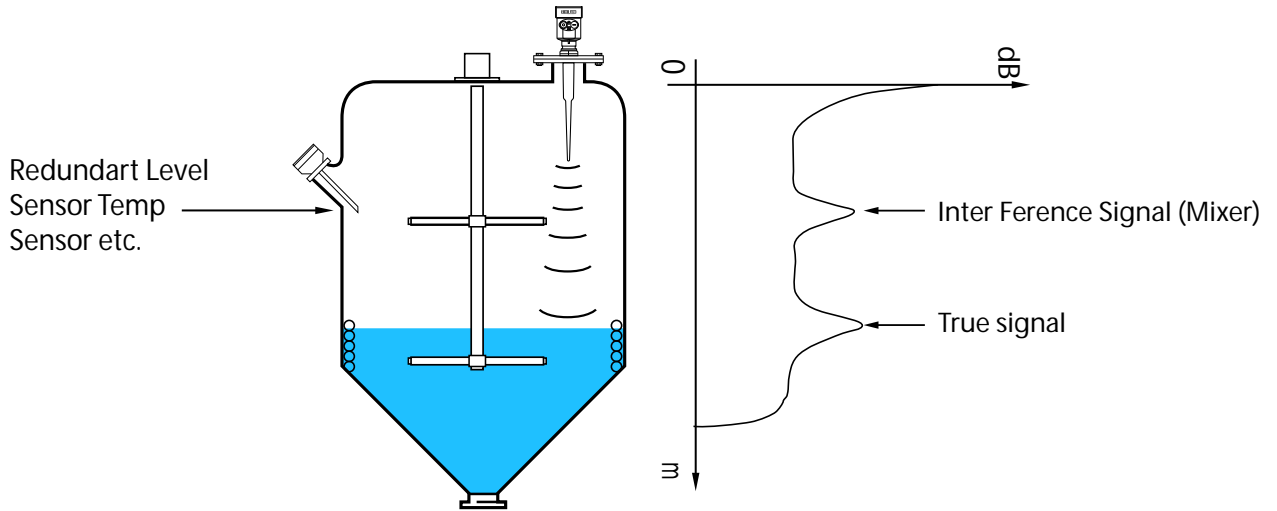


**Model 8000**

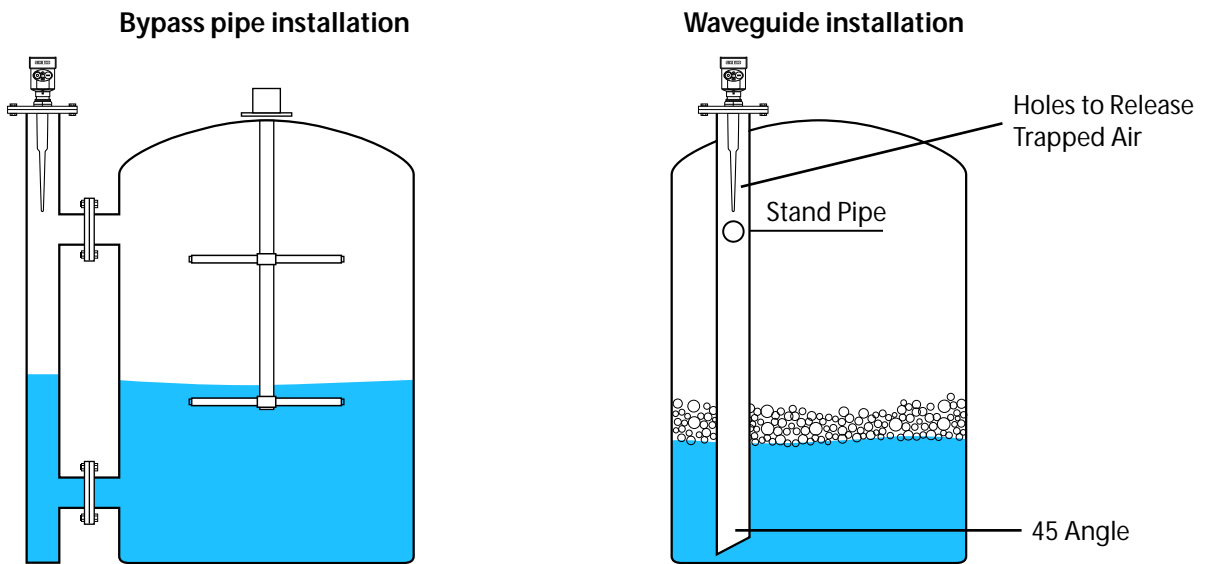
**Model 8500**

## Waveguide Measurement :

If there is an obstacle, such as a ladder, limit switches mixer or heating equipment, within the range of the microwave beam emitted radiation will lead to measurement errors. If affected, the need to add another waveguide measured.



The guided wave tube (or Bypass pipe) can be installed inside the container to avoid obstacles, foam, liquid surface fluctuations and other obstruction that can impact the measurement.



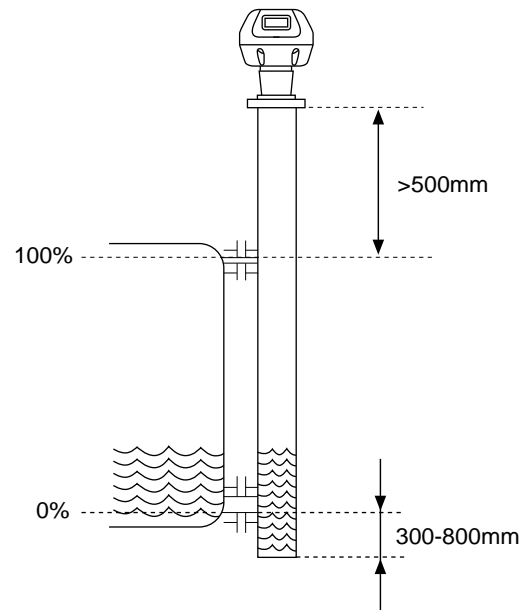
**Note:**

- Stand Pipe diameter 5 ~ 10mm.
- Waveguide diameter of at least 50mm, and the inner walls must be smooth.
- Measuring only good mobility media, viscous media can not be measured with a waveguide.

## The Bypass Pipe Installation :

If the sensor is installed in a bypass pipe, the communication housing must be located higher than that of the by-pass pipe and also that of the upper part of the container by a minimum of  $>500\text{mm}$ ;

bypass pipe at the bottom must be lower than the connecting part of the by-pass pipe and that of the bottom of the container by a minimum of  $>300\text{mm}$

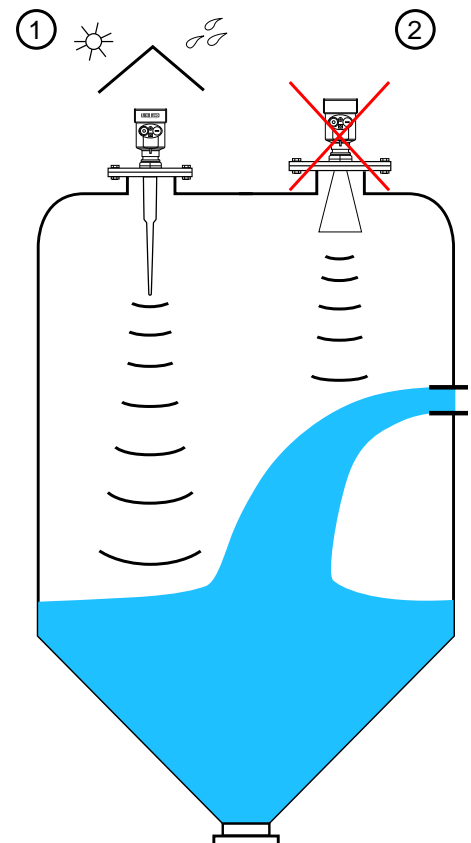


Radar installation site display unit and connected component parallel.

## Typical Installation Errors :

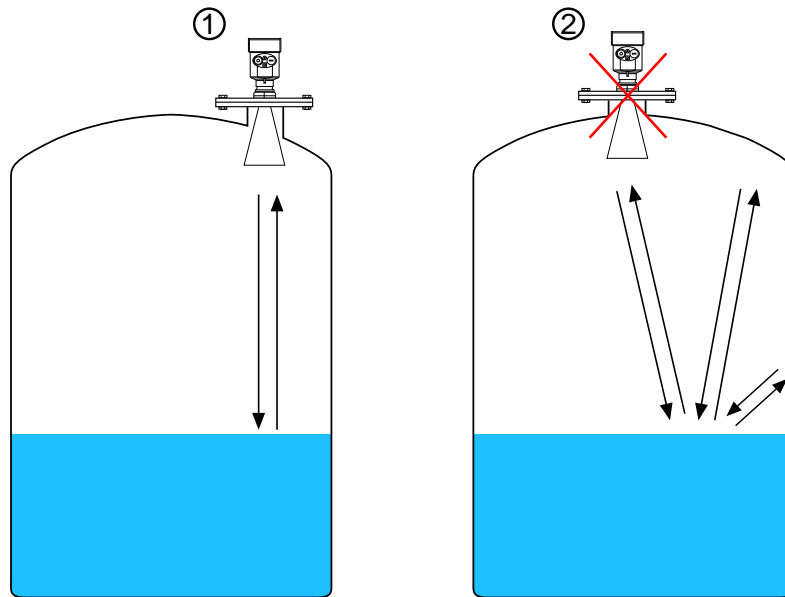
Tank cannot be installed above the feed port.

**Note: outdoor installation should adopt sunshade.**

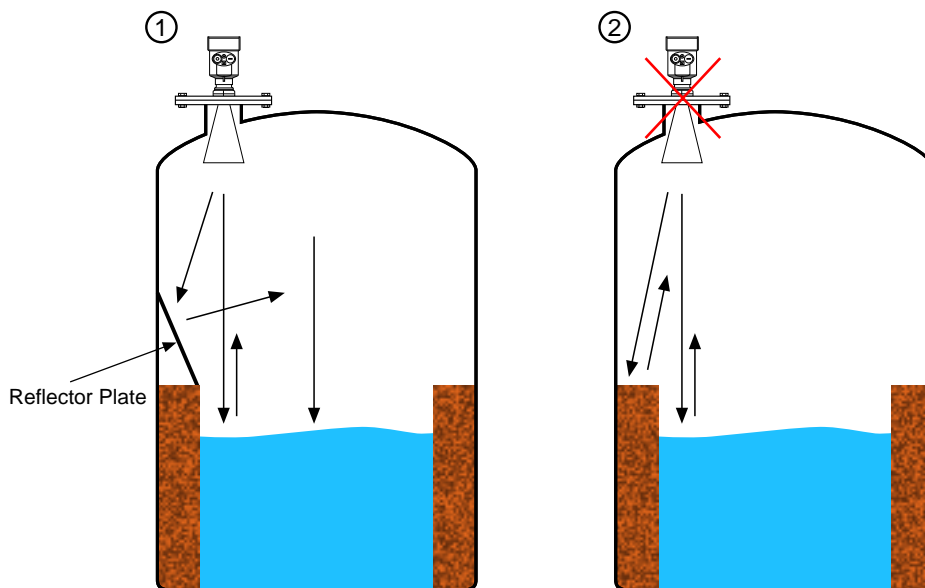




The ProScan 8000 instrument in the center of a parabolic domed tank should be avoided. It should be installed in arched or domed roof tank. The result can be Multiple echo that can be larger than the real value of signal echo.

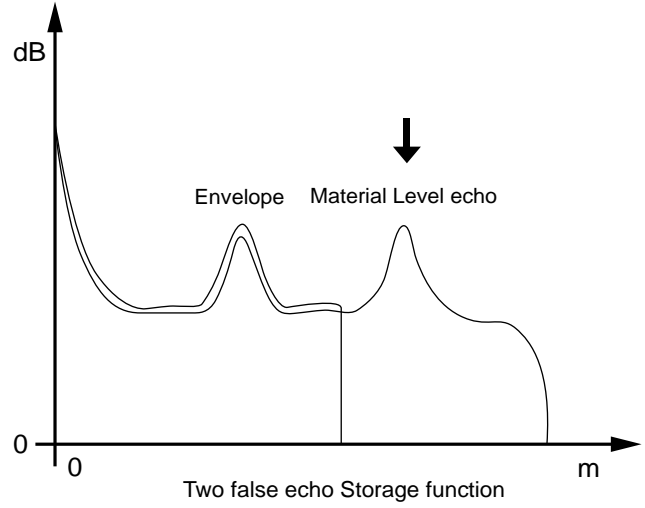
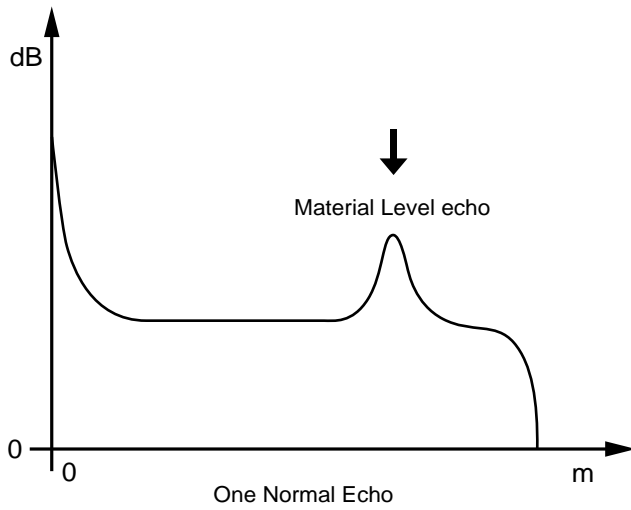


If there are obstacles affecting the measurement then a reflection plate is required.



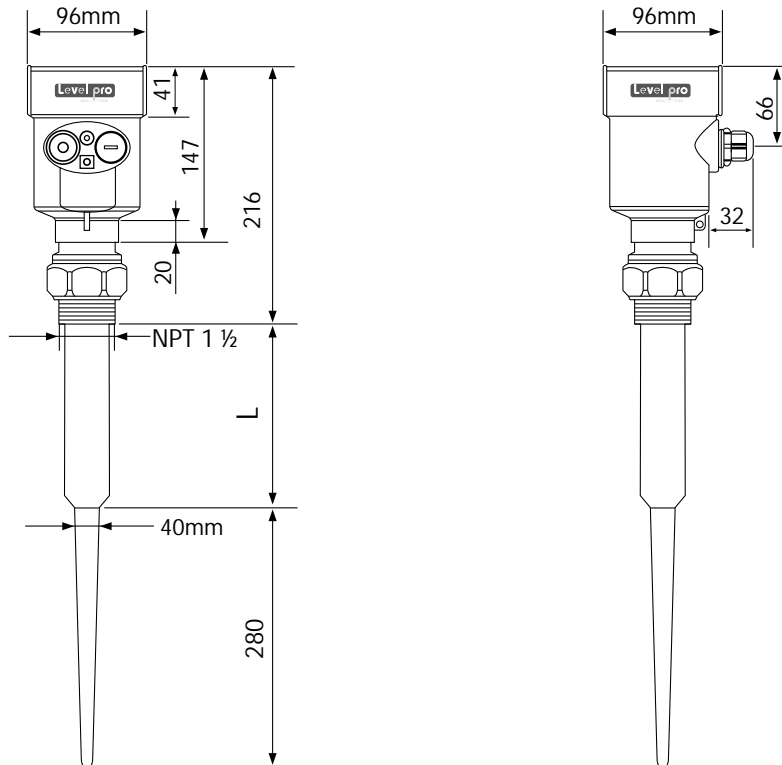
The barriers go signal refraction

Below is a schematic diagram of the echo signal:



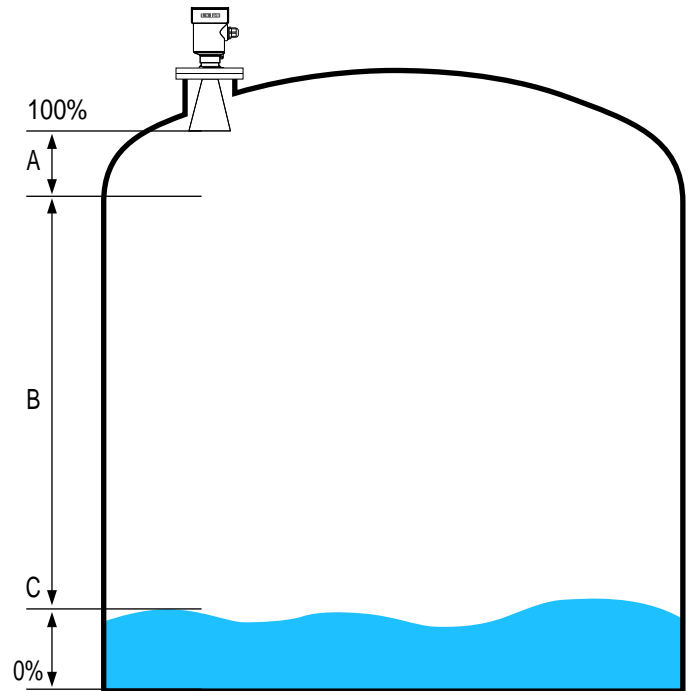
## Dimensions of Instruments:

The rod antenna radar size (unit: mm)



## Conditions

- The measurement range is calculated from the bottom of the tank.
- Low dielectric constant in a low level, the bottom of the tank can be seen, this time in order to ensure the measuring precision, suggestions will be zero shift.
- Measurement of antenna theory to the position Of the tip is possible, but taking into account the effect of corrosion and adhesion, the measuring range of the tip distance of >100mm.
- For overflow protection, a redundant define a safe distance outside the dead area.
- Level Sensor or switch is recommend.
- Different densities of, foam can absorb beam carry hot's of light airy end to absorb the, also can be reflected, but under certain conditions can be measured.
- If signal goes lost , the output current is 22mA.



## The Electrical Connection

### (4~20)mA/HART (Two wire system)

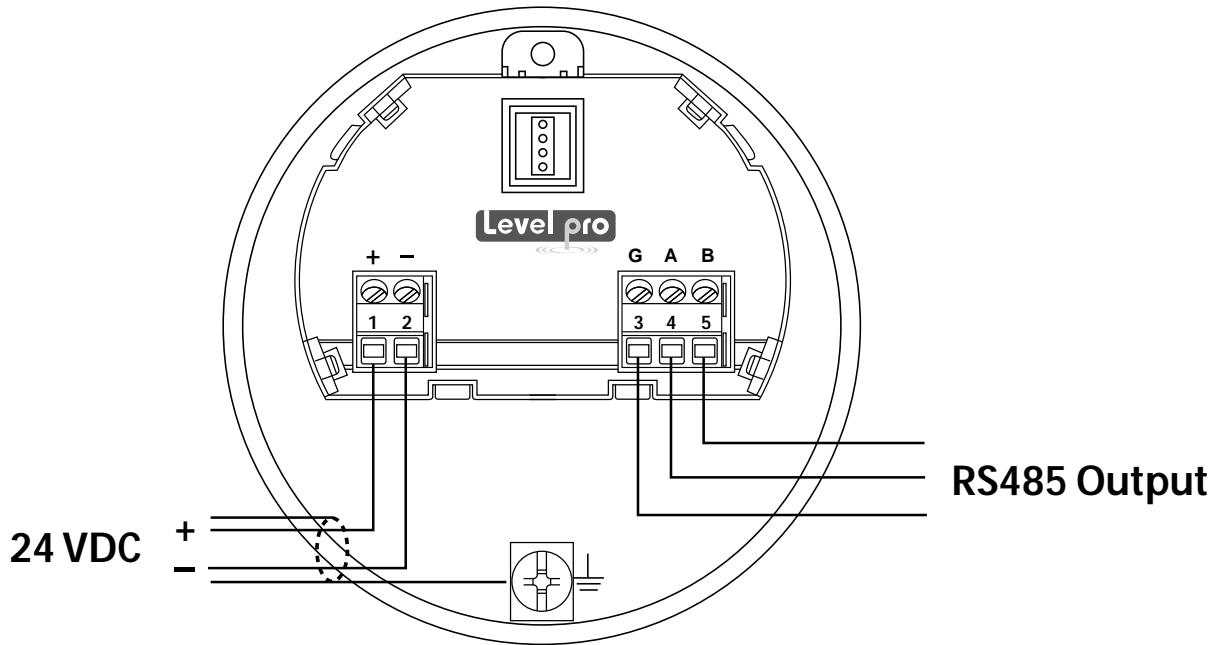
The power supply and the output current signal sharing two core shield cable is required. For intrinsically safe Application a safety barrier between the power supply and the instrument must be installed.

### RS485 / Modbus

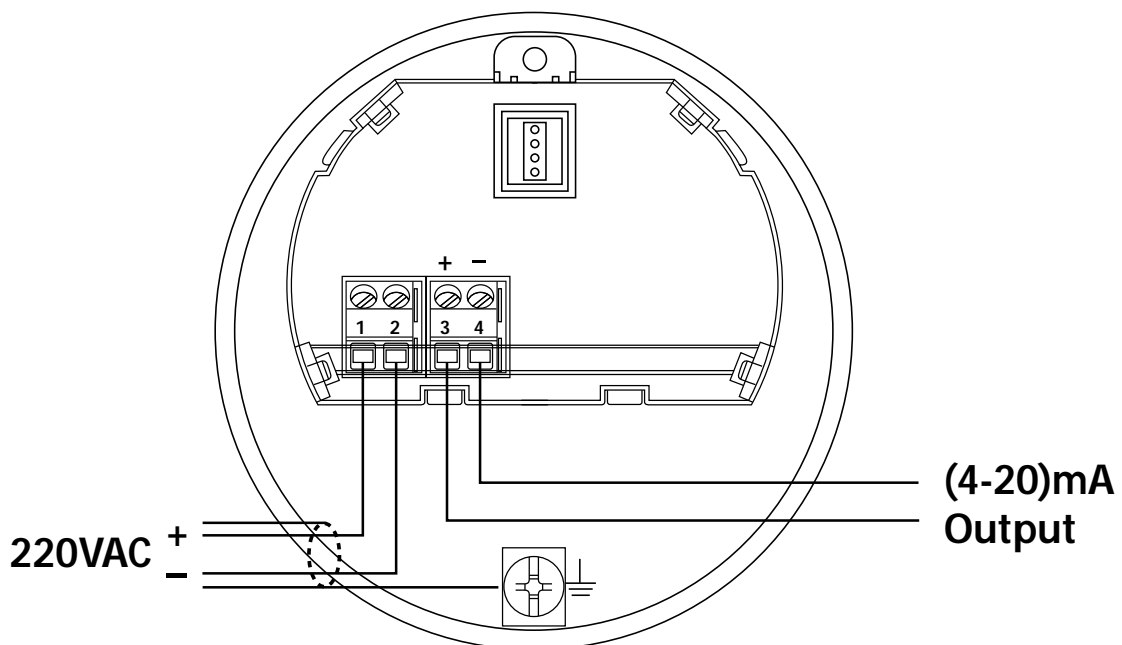
Power supply and Modbus signal line are separate shielded cable is required, the power supply voltage range see technical data.

## Connection Mode:

24V two wire wiring diagram as follows:



24V RS485/Modbus wiring diagram as follows:



## Safety Instructions:

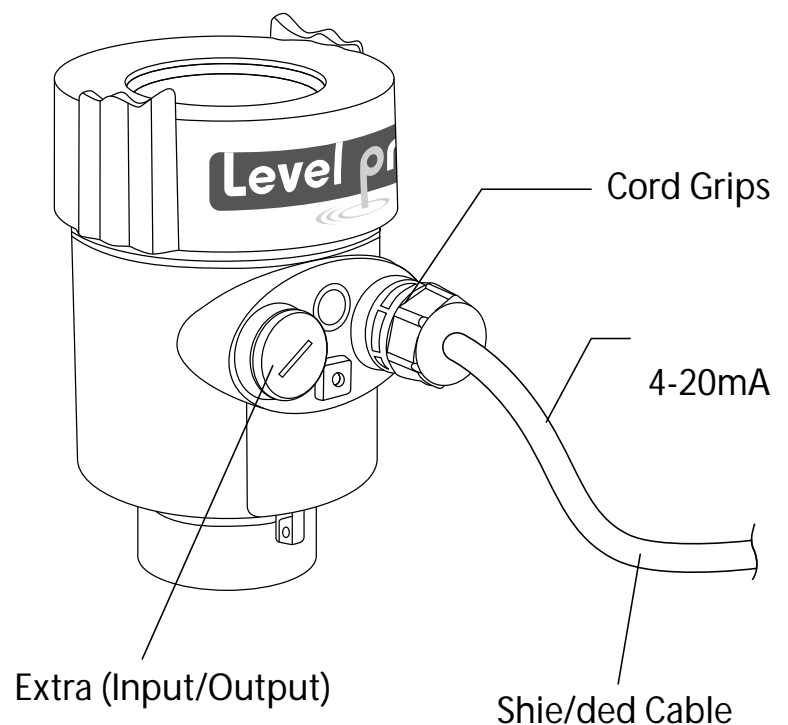
- Please observe your local electrical code requirements!
- Please comply your local requirements for personnel health and safety.
- All electrical components of instrument operation must be completed by trained of professionals.
- Please check the instrument nameplate to provide product specifications ensuring they meet your requirements. Please ensure that the power supply voltage and instrument nameplate on the requirements.

## Protection Grade:

This ProScan-8000 meets the protection class IP66/67 requirements, please ensure the waterproof cable sealing head is Sealed tightly. The following diagram:

### How to install to meet the requirements of IP67:

- Ensure that the sealing head is not damaged.
- That the cable is not damaged.
- 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 gland, see the (1)
- Tighten the cable gland, see the(2)
- Please electrical interface that is not used is sealed tight(3)



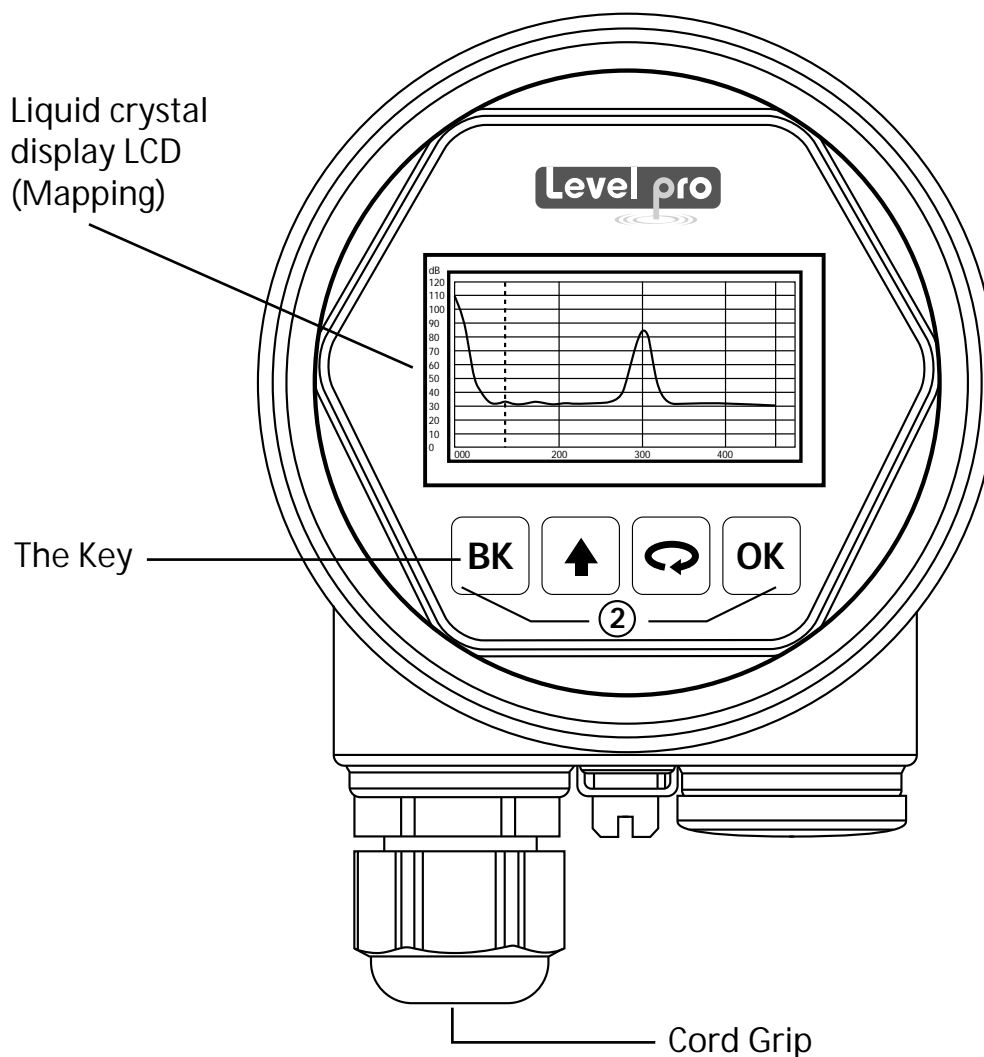
## Programming

There are three kinds of debugging method:

- 1) Display / Keyboard
- 2) Host
- 3) HART Handheld Programmer

### Display / Keyboard:

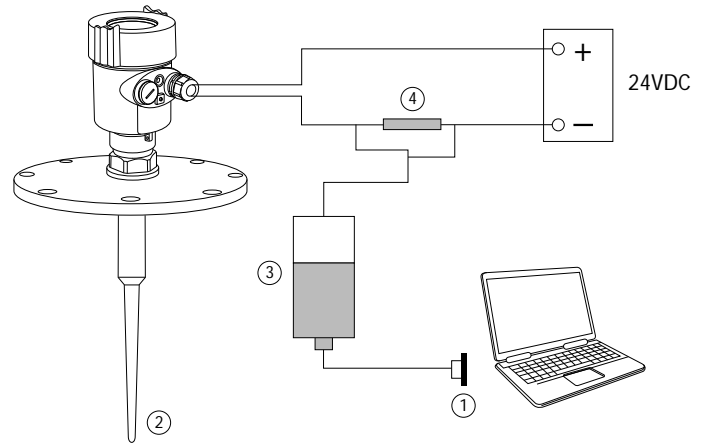
The ProScan is Programmed using four buttons located on the display screen. There are three Programming menu languages available. After debugging is generally used only for display, through the glass window can read measured value very clearly.



## PC Programming

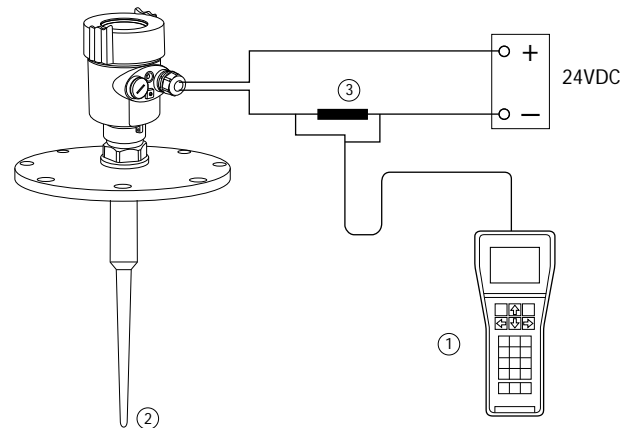
### Connected to PC by HART

- (1) RS485 interface or USB interface
- (2) Radar level meter
- (3) HART adapter
- (4) 250Ω resistor



### HART Handheld Programmer:

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



## Technical Parameters

### Basic parameters

- Operating Frequency: 6GHz
- Beam angle: 24°
- Measuring range: 0-20mA
- Repeatability:  $\pm 1$ mm
- Resolution: 1mm
- Sampling: sampling 55 /s echo
- Speed of Response: < 0.2S (depending on the specific use)
- The Current Signal: 4-20mA
- Accuracy: < 0.1%

## The Material of the Antenna

8000: PP  
8200: PTFE

## Communication Interface

### Process Connections

8000: G1 ½" NPT threaded connection  
8200: PTFE DN50, DN80, DN100 Flange, 2", 3", 4" Ansi 150 lb

### Electric source

Power Supply: 24V DC ( $\pm 10\%$ ), ripple voltage: 1Vpp  
Power Consumption: max22.5mA

### Environmental Conditions

Environment Temperature: - 40 °C... 70 °C  
The Vessel Pressure (gauge): 0.1... 4Mpa

### Explosion-proof Grade

Exia IIC T6 Ga / Exd (ia) IIC T6 Ga

### Protection Grade

IP67

### Two Wire Connection

The power sharing and signal output to a two core wire  
Cable Entrance: 2 M20  $\times$  1.5 (normal),  
The diameter of the cable 5... 9mm



## Product Model Selection

### Model-8000

**License**

- GP General Purpose
- I Intrinsically safe (Exia IIC T6 Ga)
- IS Intrinsically safe type, flameproof [Exd (ia) IIC T6 Ga]

**Antenna Type / Material / Temperature**

- PR Rod Antenna / PP / -40... 120°C
- TR Rod Antenna / PTFE / -40... 120°C

**Process Connection (Threaded Type)**

- G Thread G1. A
- N Thread 1. NPT

**Flange Matching / Material (IF Required)**

- DN80 FB (PTFE)
- DN100 FC (PTFE)
- FO No Selected
- FX Special Custom

**Shielding Length**

- 2 50mm 2"
- 4 100mm 4"
- 6 150mm 6"
- 8 200mm 8"
- 10 250mm 10"

**Shell / Protection Grade**

- A Aluminum /IP67

**Shell / Protection Grade**

- L Aluminum /IP67

**Cable Line**

- M M 20x1.5
- N . NPT

**Field Display**

- D Local Display
- X Without

**Hand Held Programmer**

- Yes
- X Without

## Model-8500

### License

- GP General Purpose
- I Intrinsically safe (Exia IIC T6 Ga)
- IS Intrinsically safe type, flameproof [Exd (ia) IIC T6 Ga]

### Antenna Type / Material / Temperature

- PR Rod Antenna / PP / -40... 120°C
- TR Rod Antenna / PTFE / -40... 120°C

### Process Connection (Threaded Type)

- G Thread G1. A
- N Thread 1. NPT

### Flange Matching / Material (IF Required)

- DN80 FB (PTFE)
- DN100 FC (PTFE)
- F0 No Selected
- FX Special Custom

### Shielding Length

- 2 50mm 2"
- 4 100mm 4"
- 6 150mm 6"
- 8 200mm 8"
- 10 250mm 10"

### Shell / Protection Grade

- A Aluminum /IP67

### Shell / Protection Grade

- L Aluminum /IP67

### Cable Line

- M M 20x1.5
- N . NPT

### Field Display

- D Local Display
- X Without

### Hand Held Programmer

- Yes
- X Without