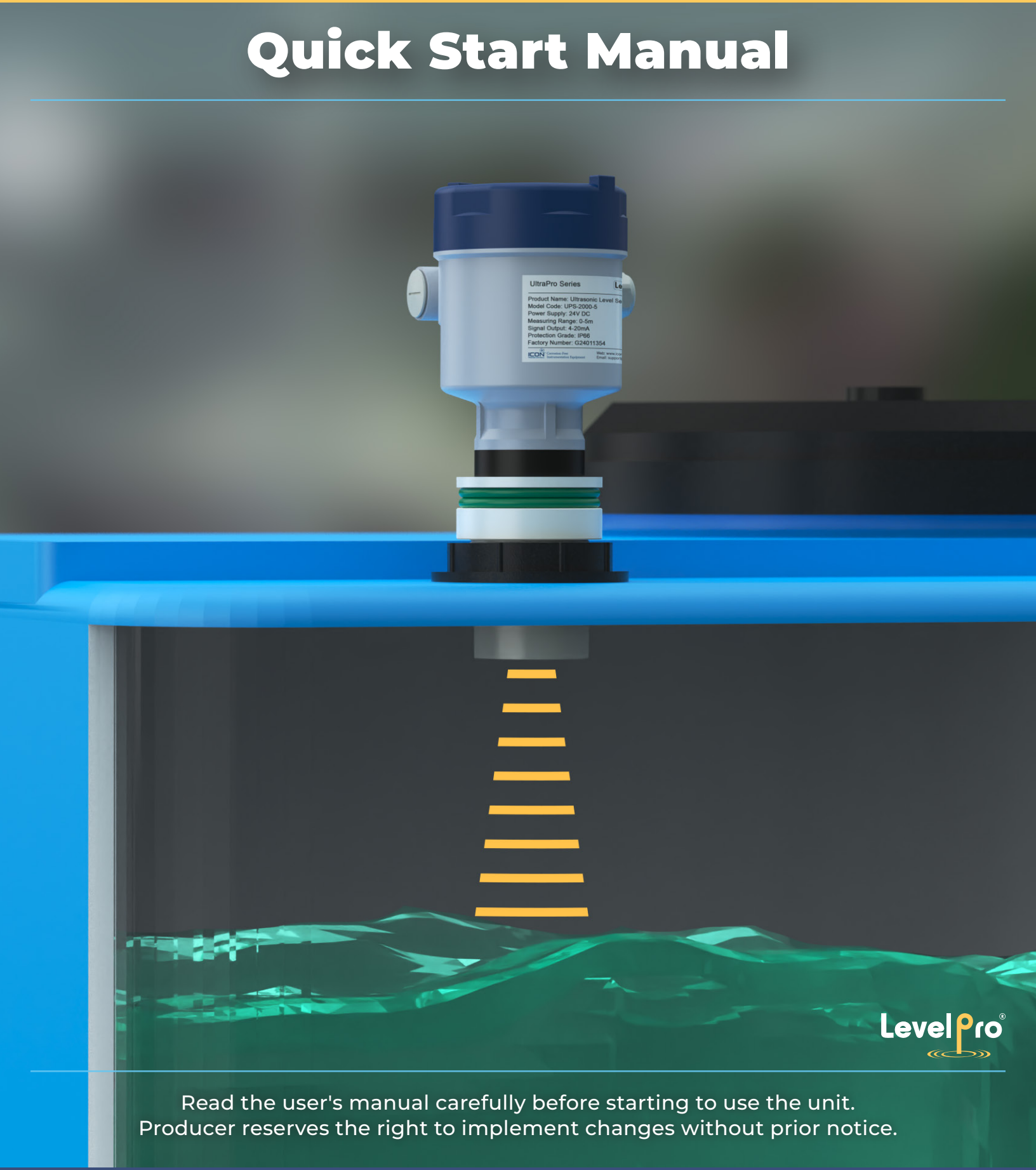
Quick Start Manual



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

Safety Information

- De-pressurize and vent system prior to installation or removal
- Confirm chemical compatibility before use
- **DO NOT** exceed maximum temperature or pressure specifications
- **ALWAYS** wear safety goggles or face-shield during installation and/or service
- **DO NOT** alter product construction

Warning | Caution | Danger

Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, or failure, injury, or death.

Do Not Use Tools

Use of tool(s) may damage produced beyond repair and potentially void product warranty.

Intended Use

The **UltraPro®** ultrasonic level sensor is a high precision non-contact type level measuring instrument that is user friendly and requires no maitenance. It should be used on relatively easy process conditions with varying liquid media consistencies.

The manufacturer is not responsible for improper use, losses of work caused by either direct or indirect damage, and for expenses incurred during installation or use of the level sensor.

The manufacturer is not liable for any injury, damage or harm due to inappropriate or unintended use or modifications of the level sensor. Conversions and/or changes to the level sensor may only be made, if they are expressly performed in accordance with the operating instructions in this operating manual.

Personnel for Installation, Commissioning, and Operation

All operations described in this instruction manual (i.e. assembly, electrical installation, commissioning and maintenance of the level sensor) must be carried out only by trained personnel or an accredited person. The qualified personnel must have read and understood the operating instructions in this manual and must follow said instructions accordingly.

The installer has to ensure that the level sensor is correctly connected according to the electrical connection diagrams in this operating manual.

Serious injury or death from electric shock may occur if wiring, installation, disassembly or removal of wires is performed while electrical power is energized.

Warranty and post warranty service must be exclusively carried out by the manufacturer.

Product Description

The UltraPro® 2000 Ultrasonic Level Sensor Transmitters are 2-Wire loop-powered sensors designed to provide reliable and accurate continuous liquid level measurement.

All UltraPro® 2000 Series are reliable and offer both 4-20mA and 4-20mA + HART outputs.

Some key applications for the UltraPro® 2000 include: Chemical Storage Tanks, Waste Sumps, Bulk Storage, Tanker Trucks, Day Tanks, Process Tanks, Neutralization Tanks, and Wastewater applications.

The UltraPro® 2000 Series are designed to work with most types of remote instrumentation such as remote displays and remote monitoring solutions.

LevelPro® — UltraPro® 2000 Series
Ultrasonic Level Sensor

ICON PROCESS CONTROLS™ Corrosion-Free Instrumentation Equipment™

Technical Specifications

General	
Sensing Range	5m (16.4ft) | 10m (32.8ft)
Resolution	<0.04" | 1mm
Accuracy	5m: 0.2% | 10m: 0.15%
Temperature Error	Max 0.04% | K
Maximum Overpressure	14.5 Psi | 0.1MPa
Measuring Period	1m{0.5s} 2m{0.5} 6m{1.2s} 10m{1.2s} 20m{5s}
Maximum Current Output Load	@ U = 24VDC Rmax = 270 | @ U = 22VDC Rmax = 180 | @ U = 20VDC Rmax = 90
Delay Between Rise Time	1m{5s} 2m{5s} 6m{5s} 10m{9s} 20m{9s}
Minimum Voltage Load	Rmin > 1k Ohm
Protection Class	NEMA 4X | IP66
Materials	
Sensor Body	PTFE Teflon® | 316SS (Explosion Proof)
O-Rings	FKM
Housing	ABS
Electrical	
Output	4-20mA (Limit values 3.9 – 20.5mA) / HART
Supply Voltage	18 to 36 VDC ± 10% regulated
Supply Current	4-20mA, Max 22mA | 0 to 10V (limit values 0 to 10.2V)
Display	
LCD	
Operating Temperature	
PTFE	-22°F to 158°F | -30°C to 70°C
ABS	32°F to 140°F | 0°C to 60°C
Standards & Approvals	
CE | FCC | RoHS Compliant	

Features

- Up to 0.15% Accuracy
- Simple Programming | Under 1 minute
- Loop Powered 4-20mA | HART
- Explosion Proof Option
- Narrow Beam Technology
- No FOB or Computer Required

Model Selection

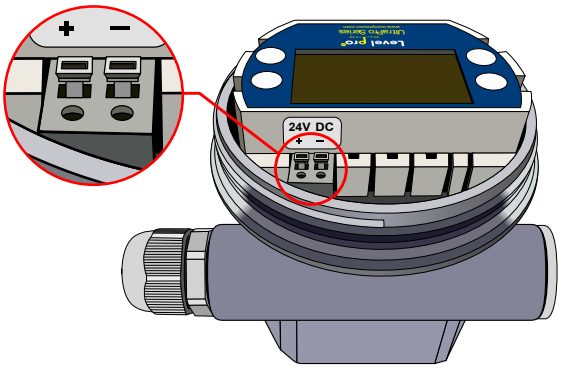
UltraPro® 2000 — Ultrasonic Level Transmitter			
Part Number	**Material**	**Range**	**Output**
UPS-2000-5	Teflon®	5m	4-20mA
UPS-2000-10	Teflon®	10m	4-20mA
UPS-2000-5-XP	316SS	5m	4-20mA
UPS-2000-10-XP	316SS	10m	4-20mA

Add Suffix - "H" ▸ 4-20mA + HART Output

ABS PVDF PTFE FKM RoHS Compliant CE

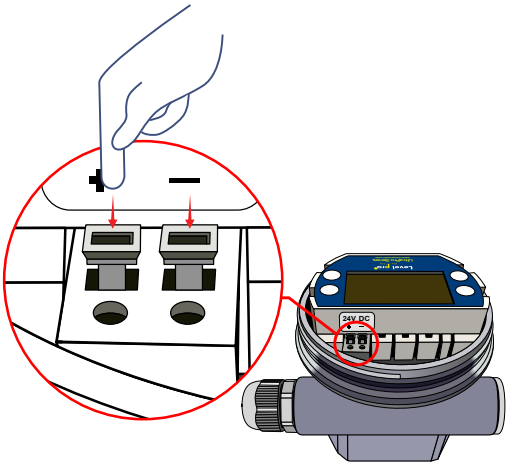
Installation and Connection

01 **24V DC**



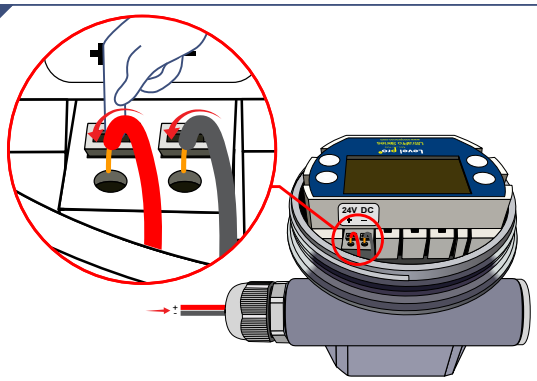
Remove the display protector/lid to locate the wiring terminals.

02



Push the tabs down to insert your wires.

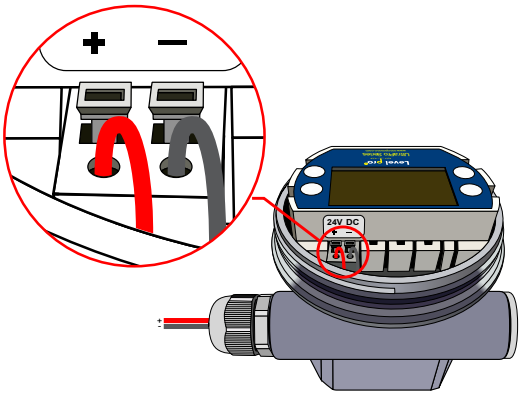
03



Feed wires through cable grip.

With the tabs pushed down, insert the fed wires into the respective terminals.

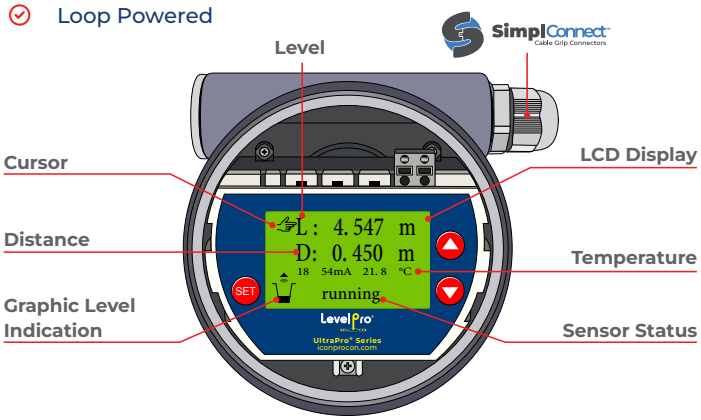
04



Release tabs to secure the wires in place.

Display Description & Button Functions

- Simple Programming
- Loop Powered



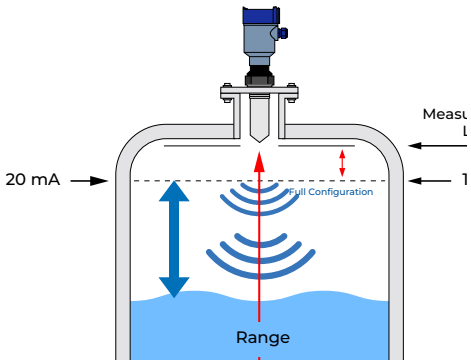
Press SET for 2s to Display the Main Menu.
Press SET to Confirm selection.
Press ▲ / ▼ to Move cursor Down/Up between options.
Press ▲ / ▼ to Modify Digits (0-9).

Quick Start Programming

General Information

Since installation conditions vary, some basic information is required:

1. Overall Tank Height
2. High Level Point
3. Empty or Zero Level Point



Selecting the Measurement Mode

Level and Distance Measuring Modes are available.

The factory default is level.

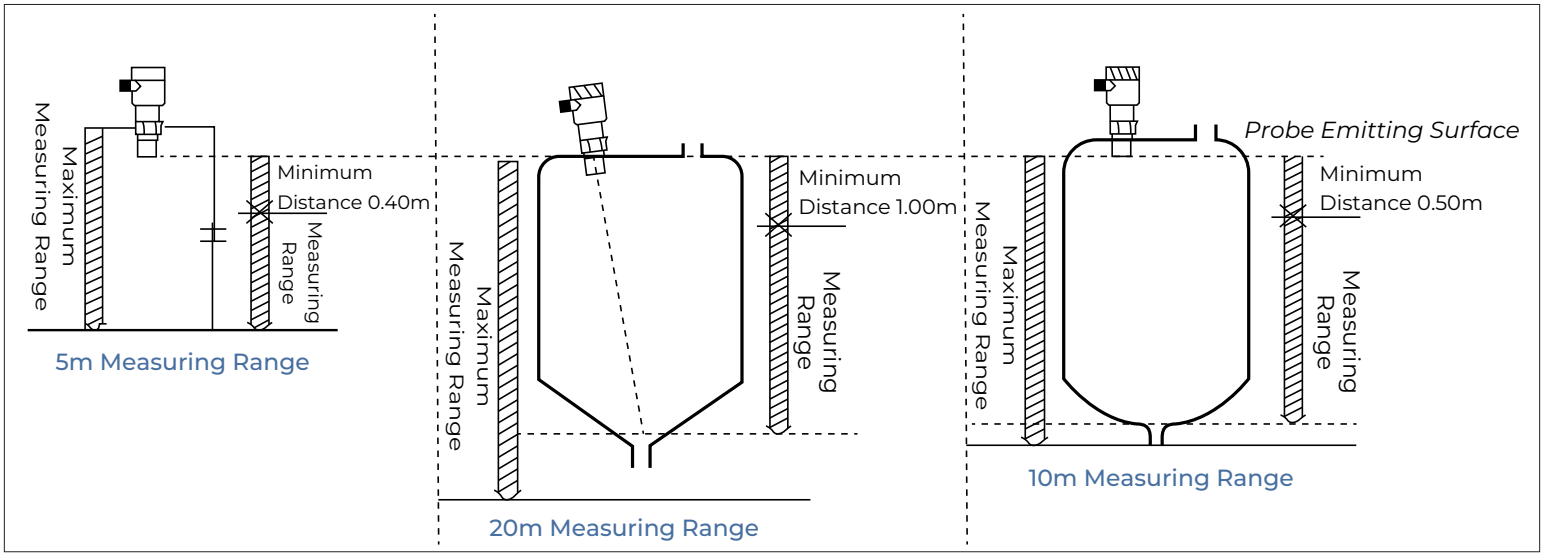
▲ / ▼ = Move Curser Up/Down SET = Confirm Selection

STEPS	DISPLAY	OPERATION
1 Display Screen SET 2 SEC		Display Screen
2 Main Menu SET	0 Quit 1 Factory Set 2 User Set	Main Menu
3 Parameter Setting SET	Parameter S	Parameter Setting
4 Input Bottom Distance SET	Input Bottom Dist 1. 50	Input Bottom Distance From Transducer to Tank Bottom Factory Default : 5m | 10m
5 Measure Type SET	Measure Type Level/Distance Level Measure Type Level/Distance Distance	Measure Type Select Level | Distance Factory Default : Level Use ▲ / ▼ to change values.
6 4mA Point SET	4mA Point 0. 00 m	4mA Point Input **Low** Level. Factory Default : 0
7 20mA Point SET	20mA Point 0. 00 m	20mA Point Input **High** Level. Must be below 5m for 5m Sensor and 10m for 10m Sensor. Use ▲ / ▼ to change values.
8 Quit SET	Quit Yes Quit No	Quit Select Yes | No Programming Complete.

Understanding Terminology

Measuring Range

The meaning of measuring range is very important for sensor type selection. Please refer to the diagrams below.



Ultrasonic wave beam is gathered by the probe. The emitting of impulse wave beam is like the light beam of flashlight. The further it is from the probe, the greater the diffusion area is.

Distance Mode

Under distance measuring mode, setting of reference zero point is meaningless and the positions of maximum of measuring range and minimum of measuring range are as shown in Fig. 1.1.

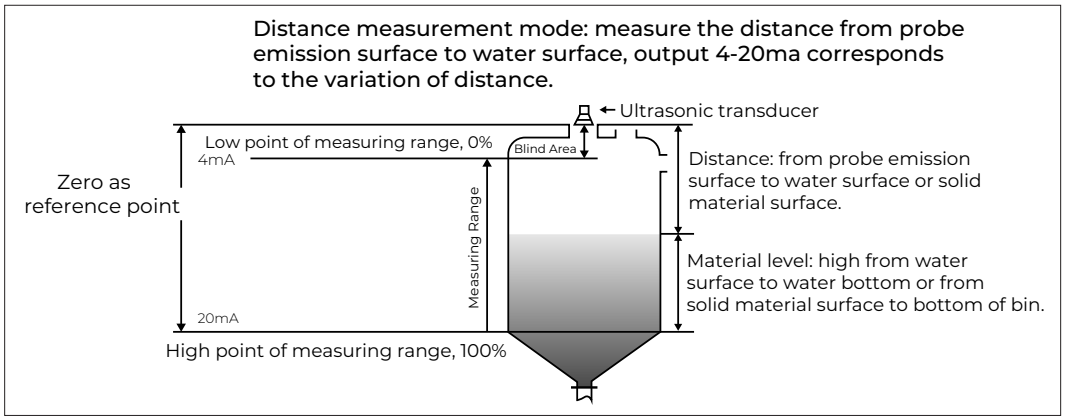


Fig. 1.1 Diagram of Distance Measurement

Level Mode

Under material level measuring mode, the positions of reference zero point, maximum of measuring range and minimum of measuring range are as shown in Fig. 1.2.

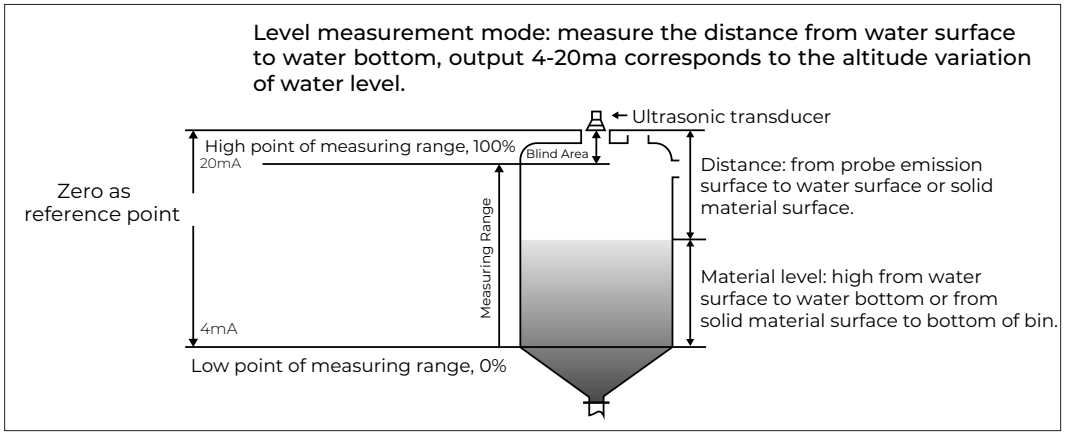


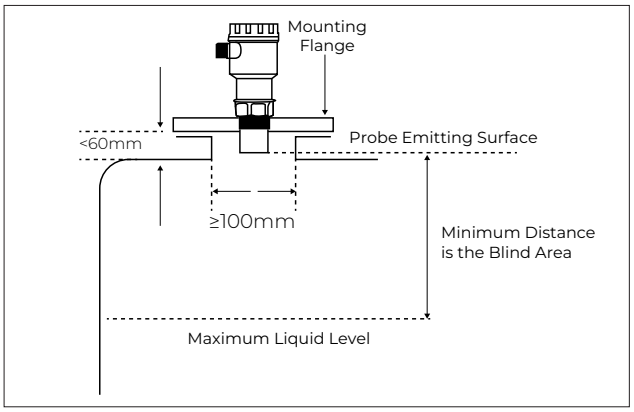
Fig. 1.2 Diagram of Material Measurement Level

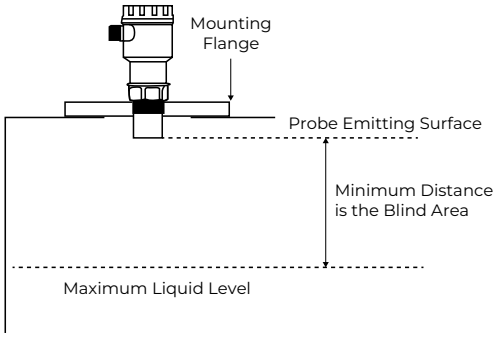
Liquid Measurement

Flat-top Tank

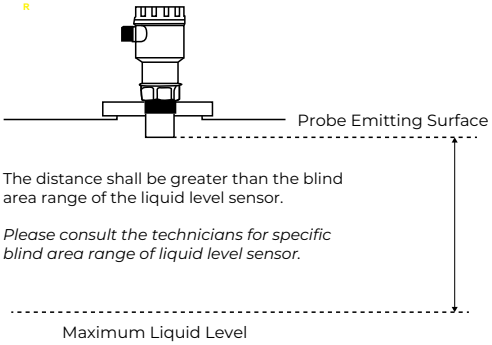
Normally, the flat-top tank has a short connecting pipe whose datum plane is the under surface of flange. Under the premise that the connecting pipe length is ≤60mm, inner diameter is ≥100mm and inner wall is smooth and free of burr and bulges, the measurement can be carried out if the emitting surface of installed probe is 3 cm below the flange under surface.

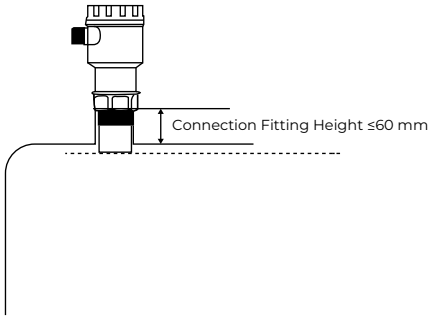
The most ideal installation is to directly install the sensor on the flat-top container without using the connecting pipe and the round opening on the container is good enough for the fixing of mounting flange. The probe emitting surface is below the datum plane.





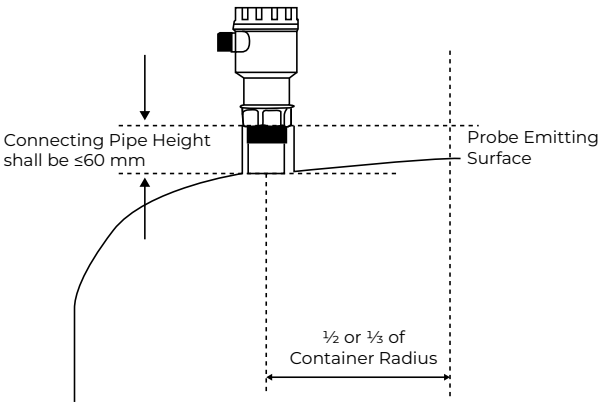
Flange-type Installation on the Flat-top Tank

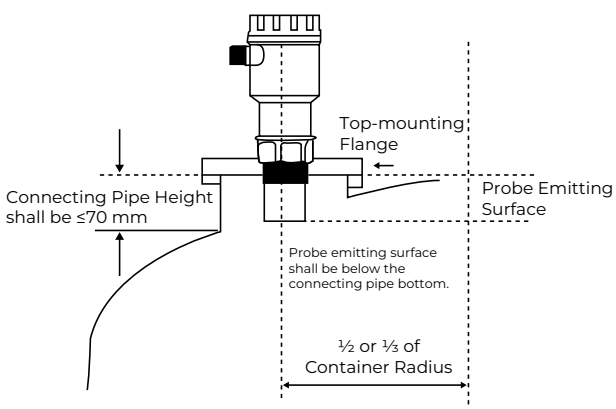




Round-top Tank

For round-top tanks, the sensor should be installed at ½ or ⅔ of the tank top radius, ensuring that the required distance from the tank wall is met. The arch tank-top is like a convex lens to the ultrasonic pulse. If the probe is installed at the focus of the convex lens, it will receive all the false echoes.





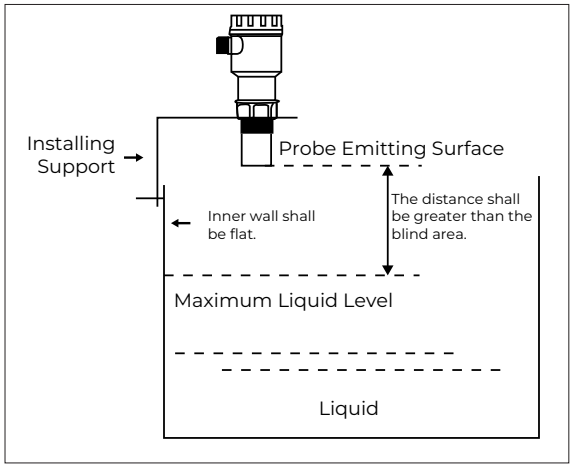
For most arch tanks, the length of connecting pipe plus flange on the top is 150-180mm. But the part below the probe thread of ultrasonic level sensor is not so long (elongated probe is available for customization to make sure the probe emitting surface is below the connecting pipe bottom). In this case, the proportional relation between the diameter and length of connecting pipe shall be noted.

S/N	Length of Connecting Pipe	Min. Inner Diameter of Connecting Pipe	Remarks
1	150mm	100mm	The inner wall of connecting pipe is free of burr and bulges and vertical and the weld joint shall be polished. The connection of connecting pipe and tank top shall be outwards polished at an oblique angle of 45°.
2	200mm	150mm	
3	250mm	180mm	
4	300mm	220mm	
5	400mm	280mm	

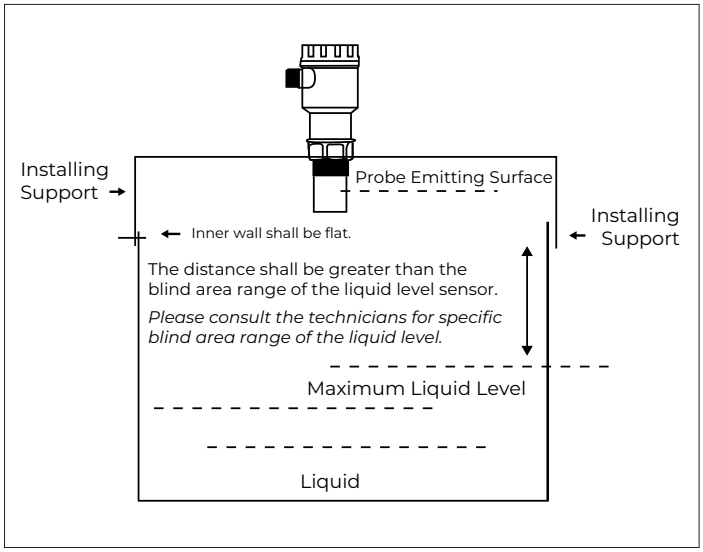
Open Container

For open containers, the support shall be used for installation. The bearing capacity of support shall be noted and certain distance shall be kept between the sensor and container wall. If the upper part and the lower part of the open container or stock bin inner wall are flat and free of hanging/any other objects, the distance between the sensor and container wall is detailed as follows:

Max. Measuring Range	Min. Distance to Wall
5m	0.5m
10m	1.0m
15m	1.5m
20m	2.5m
30m	3.5m
40m	5m
50m	6m
60m	7m
70m	8m



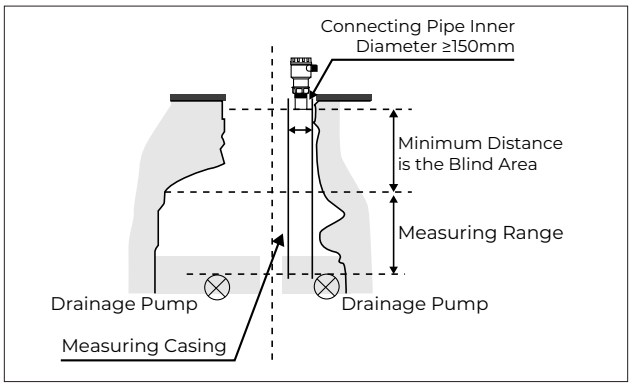
As the open container has no focusing effect, the sensor can be installed in the middle of the container.



Draining Well & Common Well

Normally, the wellhole and wellhead of drainage wells are narrow, and the well wall is uneven – which makes it difficult to conduct ultrasonic measurement. This can be solved by installing a section of connecting pipe or a whole measuring casing.

Attention shall be paid to the fact that the blind area will be enlarged for about 50~100% after the sensor is put into the connecting pipe. So the factors for blind area expansion shall be considered. Thus, when the connecting pipe is used, if the original probe blind area is 0.50m, it will be enlarged to 1.00m after the probe is put into the connecting pipe.

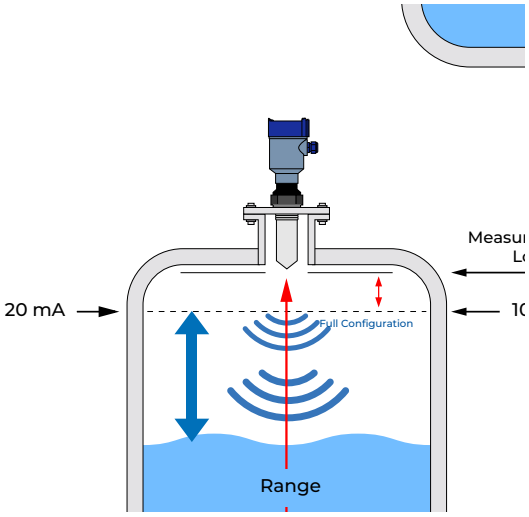


Correct Sensor Position Installation

Any objects within the range of emitting angle (i.e. pipe, support, weld joint, reinforcing rib, mixing propeller, hanging object, etc.), will lead to strong false echo – especially objects within the range of emitting angle, which are near the probe.

Example: the false echo caused by the pipe at 6m from the probe is 9x stronger than that caused by the same pipe at 18m from the probe.

Try every effort to make sensor axis perpendicular to the medium surface and avoid any other object within the range of emitting angle, such as pipe and support.



Troubleshooting

Error	Possible Causes	Corrective Action
UltraPro® works but there is no change of trumpet icon ( ) on the LCD, which system is in wave loss state.	1. The measured area is beyond the measuring range of sensor. 2. The measured medium has strong disturbance, vibration or vapor. 3. There are strong interference sources around such as frequency converter and motor. 4. The probe is not perpendicular to the measured surface. 5. There are objects in the measured space (i.e. ladders, rods, etc.). 6. The liquid is in a blind area.	1. Replace the level meter with a level meter with greater measuring range. 2. The meter will restore the normal measurement automatically after the measured medium gets back to calm. 3. Check surrounding environment and realize good electromagnetic shielding. Make it grounded reliably — do not share one power supply with frequency converter and motor. 4. Reinstall probe andensure it is perpendicular to liquid surface. 5. Select an appropriate position for installation and prevent interfering objects. 6. Raise the installation position of probe.

Warranty, Returns and Limitations

Warranty

Icon Process Controls Ltd warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service in accordance with instructions furnished by **Icon Process Controls Ltd** for a period of one year from the date of sale of such products. **Icon Process Controls Ltd** obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd option, of the products or components, which **Icon Process Controls Ltd** examination determines to its satisfaction to be defective in material or workmanship within the warranty period. **Icon Process Controls Ltd** must be notified pursuant to the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for the one year from the date of replacement.

Returns

Products cannot be returned to **Icon Process Controls Ltd** without prior authorization. To return a product that is thought to be defective, go to www.iconprocon.com, and submit a customer return (MRA) request form and follow the instructions therein. All warranty and non-warranty product returns to **Icon Process Controls Ltd** must be shipped prepaid and insured. **Icon Process Controls Ltd** will not be responsible for any products lost or damaged in shipment.

Limitations

This warranty does not apply to products which: 1) are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above; 2) have been subjected to electrical, mechanical or chemical damage due to improper, accidental or negligent use; 3) have been modified or altered; 4) anyone other than service personnel authorized by **Icon Process Controls Ltd** have attempted to repair; 5) have been involved in accidents or natural disasters; or 6) are damaged during return shipment to **Icon Process Controls Ltd** reserves the right to unilaterally waive this warranty and dispose of any product returned to **Icon Process Controls Ltd** where: 1) there is evidence of a potentially hazardous material present with the product; or 2) the product has remained unclaimed at **Icon Process Controls Ltd** for more than 30 days after **Icon Process Controls Ltd** has dutifully requested disposition. This warranty contains the sole express warranty made by **Icon Process Controls Ltd** in connection with its products. **ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED**. The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. **IN NO EVENT SHALL Icon Process Controls Ltd BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON. THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF Icon Process Controls Ltd**. This warranty will be interpreted pursuant to the laws of the province of Ontario, Canada.

If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

For additional product documentation and technical support visit:

www.iconprocon.com | e-mail: sales@iconprocon.com or support@iconprocon.com | Ph: 905.469.9283

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