

ULTRASONIC LEVEL SENSOR



Datasheet

LUDP / LUDR

Working Principle

Measuring principle Short ultrasonic pulses in the range of 35 kHz to 70 kHz are emitted by the transducer to the product surface, reflected there and received by the transducer. The pulses travel at the speed of sound - the elapsed time from emission to reception of the signals depends on the level in the vessel. The latest microcomputer technology and the proven processing software select the level echo from among any number of false echoes and calculate the exact distance to the product surface. An integrated temperature sensor detects the temperature in the vessel and compensates the influence of temperature on the signal running time. By simply entering the vessel dimensions, a level-proportional signal is generated from the distance. It is not necessary to fill the vessel for adjustment.

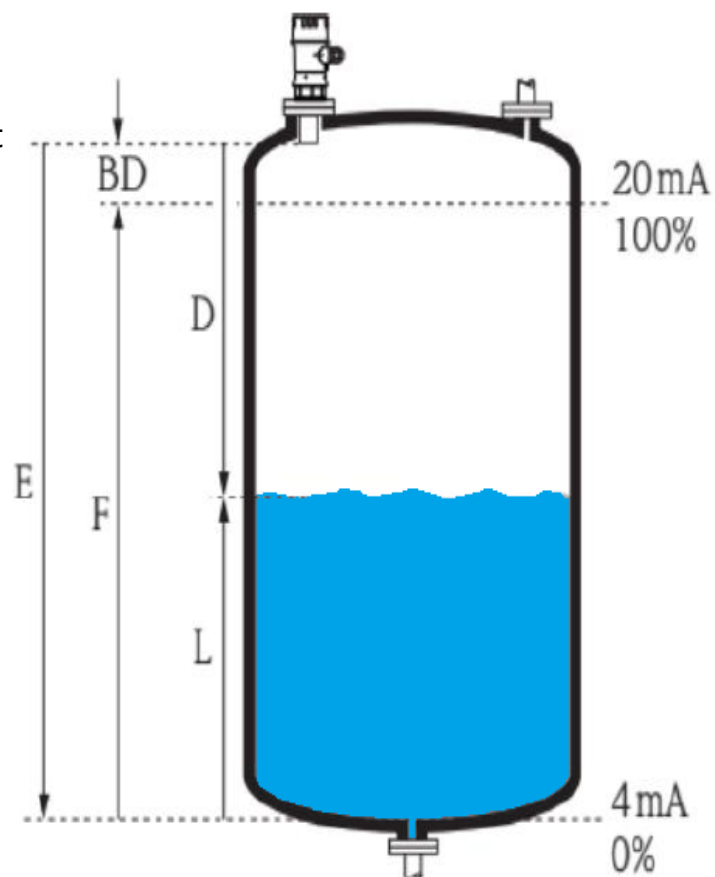
The instrument uses the time t (and the velocity of sound c) to calculate the distance D between the sensor membrane and the product surface:

$$D = \frac{c \times t}{2}$$

As the device knows the empty distance E from a user entry, it can calculate the level as follows:

$$L = E - D$$

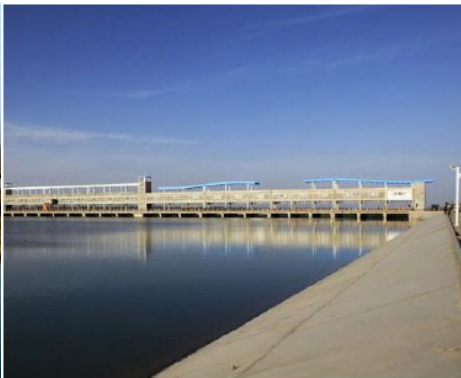
An integrated temperature sensor (NTC) compensates for changes in the velocity of sound caused by temperature changes.



Applications



RIVER



RESERVOIR



TANK

Characteristics

Measuring principle Short ultrasonic pulses in the range of 35 kHz to 70 kHz are emitted by the transducer to the product surface, reflected there and received by the transducer. The pulses travel at the speed of sound - the elapsed time from emission to reception of the signals depends on the level in the vessel. The latest microcomputer technology and the proven processing software select the level echo from among any number of false echoes and calculate the exact distance to the product surface. An integrated temperature sensor detects the temperature in the vessel and compensates the influence of temperature on the signal running time. By simply entering the vessel dimensions, a level-proportional signal is generated from the distance. It is not necessary to fill the vessel for adjustment.

Compact: LUDP



Remote: LUDR



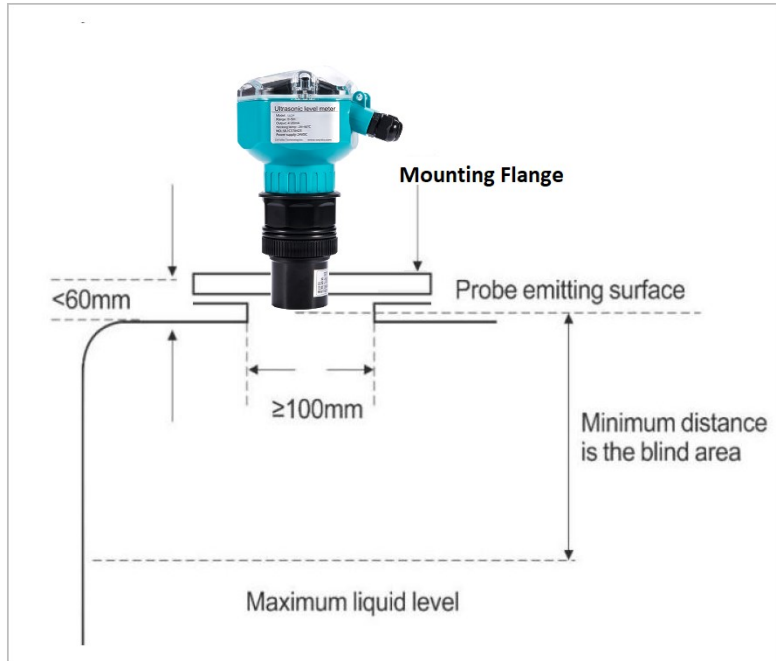
Technical Specifications

Function	LUDP Compact Type	LUDR Remote Type
Range	5m, 10m, 15m, 20m, 30m, 40m, 50m, 60m	5m, 10m, 15m, 20m, 30m, 40m, 50m, 60m, 70m
Accuracy	0.25% - 0.5%	
Resolution	3mm or 0.1%	
Display	English	
Analog Output	Four-wire 4 ~ 20mA/510 Ω load Two-wire 4 ~ 20mA/250 Ω load	4 ~ 20mA/510 Ω load
Relay Output	Two groups: AC 250V/ 8A or DC 30V/5A Status can be programmed	Two groups for single channel Four groups for double channels AC 250V/ 8A or DC 30V/ 5A Status can be programmed
Power Supply	Standard: 24VDC Optional: 220V AC+15%50 Hz	Standard: 220V AC+15% 50Hz Optional: 24VDC 120mA or Customize: 12VDC or Battery
Environment Temperature	LED : -20~+60°C, Probe : 20~+80°C	
Communication	Option: RS485, RS232 Communication (manufactures agreement)	
Ingress Protection	LED: IP65, Probe: IP68	
Cable Probe	No	Standard: 10m Longest: 100m
Probe Installation	According to the range and the probe type	

Power Consumption	Remote Type	Current	Power	
	Power Supply:		24V	
	No relay:		100mA	24×100mA=2.4W
	Channel 1 of Relay:		120mA	24×120mA=2.9W
	Channel 2 of Relay:		145mA	24×145mA=3.5W
	Channel 3 of Relay:		170mA	24×170mA=4.1W
	Channel 4 of Relay:		190mA	24×190mA=4.6W
	Compact Type (Four-Wire System)			
	Power Supply:		24V	
	No relay:		80mA	24×80mA=1.9W
	Channel 1 of Relay:		105mA	24×105mA=2.5W
	Channel 2 of Relay:		130mA	24×130mA=3.1W
	Compact Type (Two-Wire System)			
	Power Supply:		24V	
	No relay:		30mA	24×30mA=0.72W

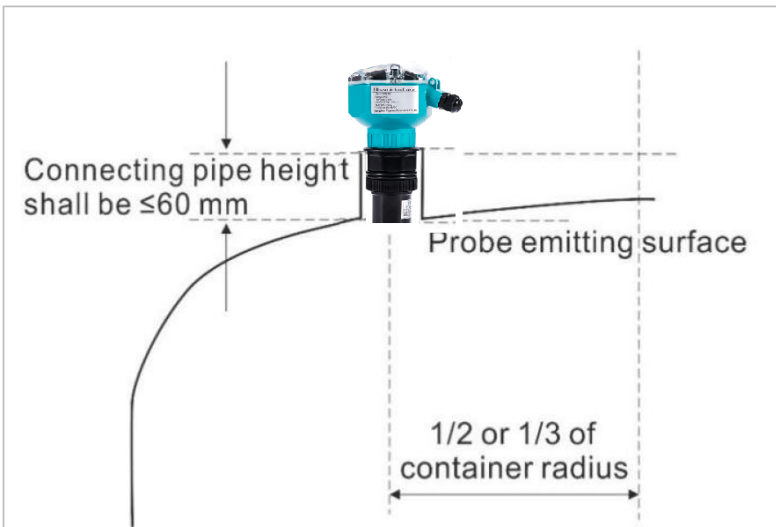
Installation

Liquid Measurement



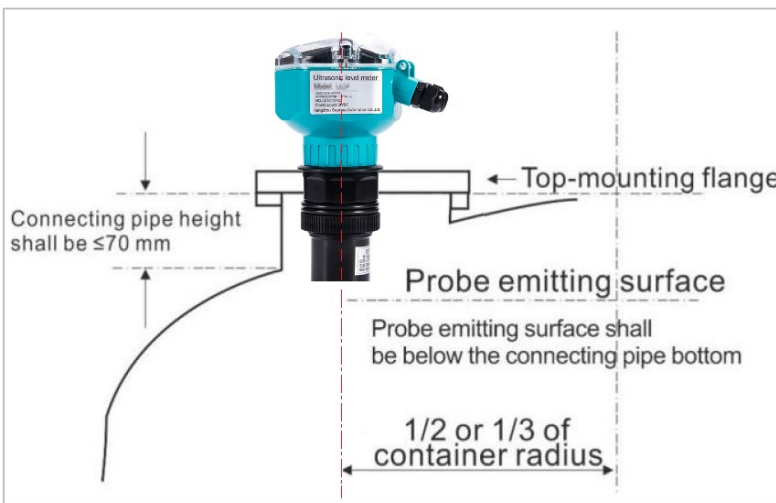
Flat Tank

There is datum of the connected tube under the flange. The connected tube length $\leq 60\text{mm}$, inner diameter of connected tube $\geq 100\text{mm}$, inner wall of connected tube is smooth (No burrs, raised), after installation it can be measured when the launch surface of probe should be lower than under the flange by 3cm



Arched Tanks

Not to install the center of top tank, but installed position which is $1/2$ or $2/3$ of radius in the top. Because the top arched tank like a convex lens, if the probe installed on focus point of convex lens, ultrasonic pulses will receive the false echoes



Installation on Nipple Joint – Arch Tank Top

On top of the most arched tank, the length of connected tube and flange together is 150-180mm, however, the length of bottom probe thread is not so long, (max probe can be customized by our company, to enable launched surface of probe less than the bottom connected-tube), then we need to check ratio between the diameter and the length of connected tube.

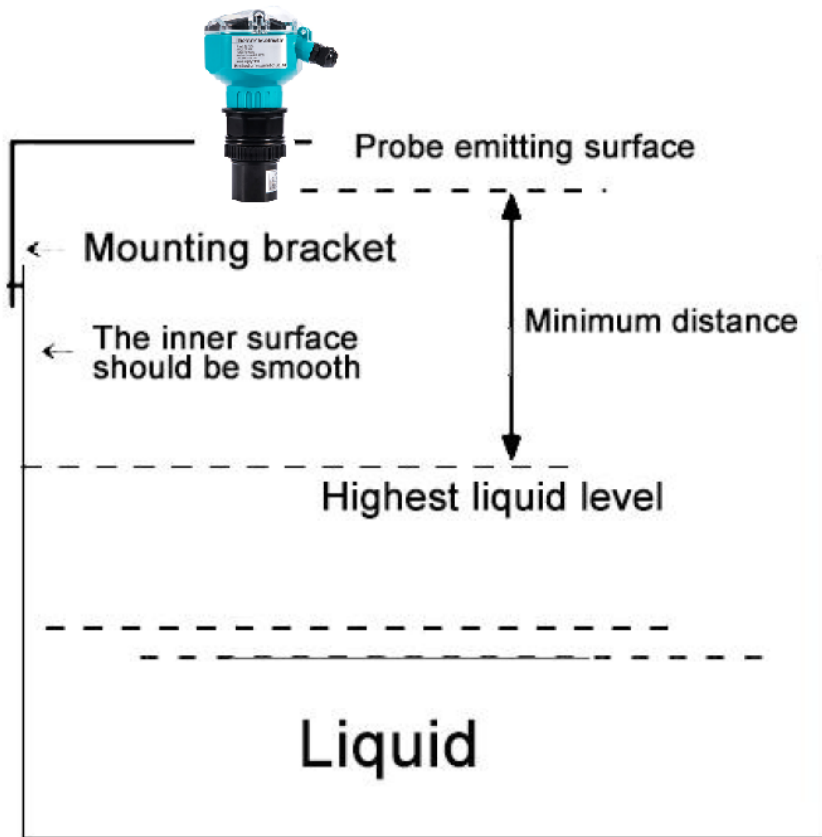
Please check the following table:

S/N	Length	Diameter	Note
1	150mm	200mm	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	260mm	
3	250mm	325mm	
4	300mm	360mm	

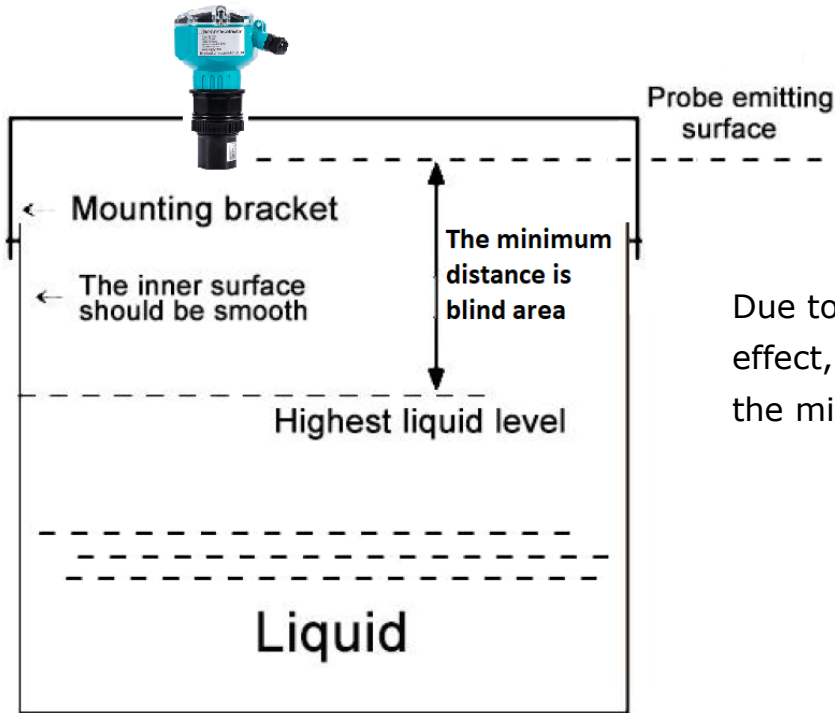
Opening Container

If the container wall is flat, then the distance from sensor to the container wall is in the following table:

Maximum Range	Distance	Maximum Range	Distance	Maximum Range	Distance
5m	0.5m	10m	1.0m	15m	1.5m
20m	2m	30m	3m	40m	4m
50m	6m	60m	7m	70m	8m

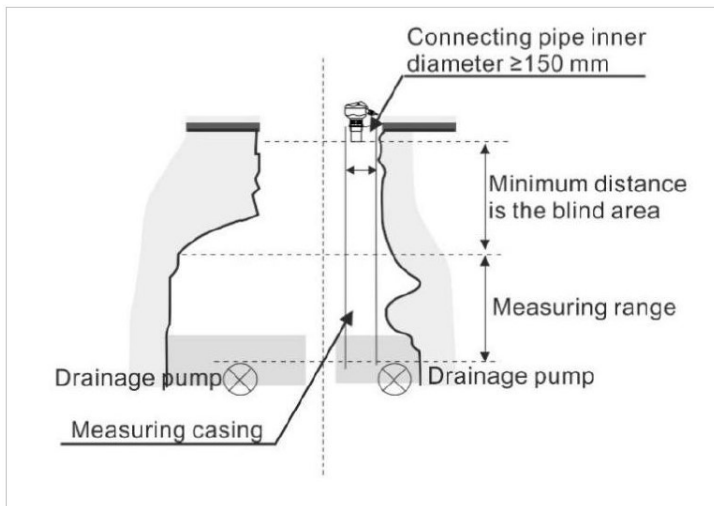


Bracket mounting-installed on the side of open container



Due to open containers have no focus effect, the sensor can be installed in the middle of the container.

Bracket mounting-installed on the side of open container



Draining Well and Normal Well

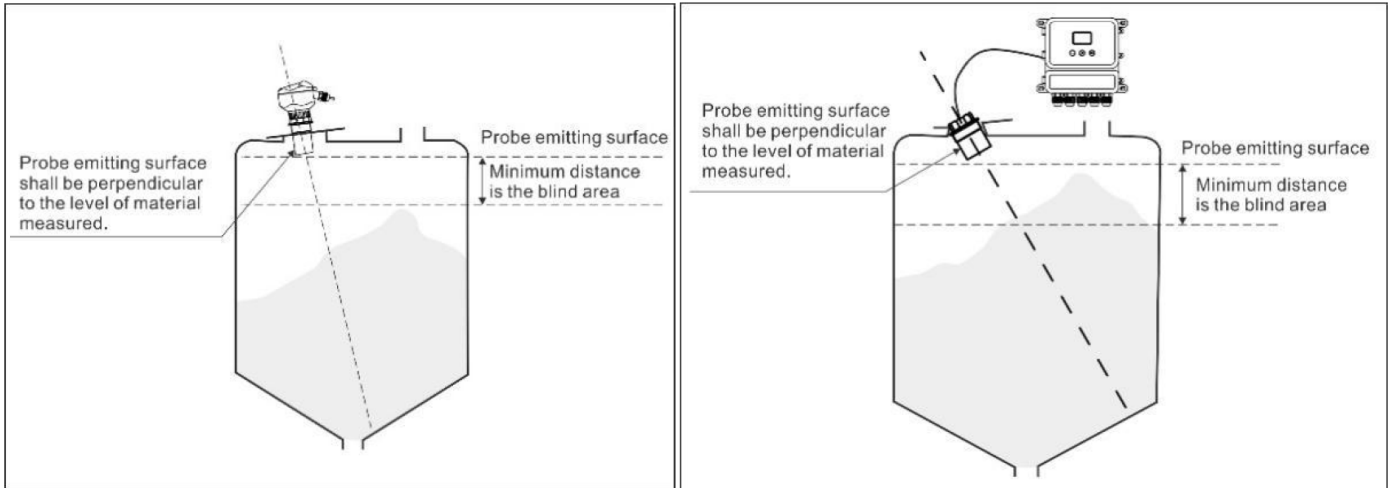
The way of well and wellhead are narrow and the wall is not flat. This problem can be resolved by installed a part of connected-tube or whole bushing.

Note: After put the sensor in the connected-tube, the blind area will be bigger (about 50~ 100%)

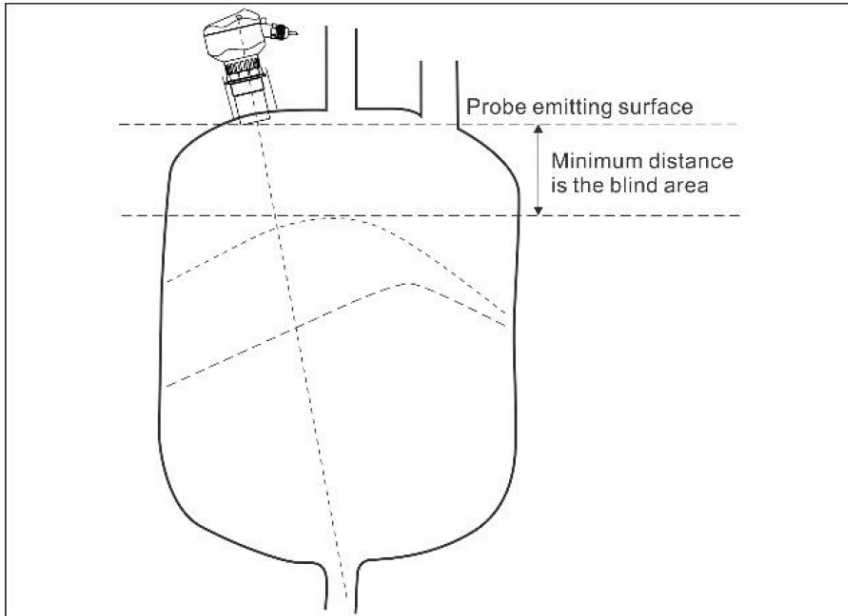
Normal wells (including water wells, deep wells) don't have large diameter. So the measured bushing can be installed to achieve the best result. Inner wall of bushing must be smooth (PVC, PE pipe can be used), inner diameter $\geq 150\text{mm}$ (measure range 10 m) or diameter $\geq 200\text{mm}$ (Measure range 20 m).

Solid Measurement

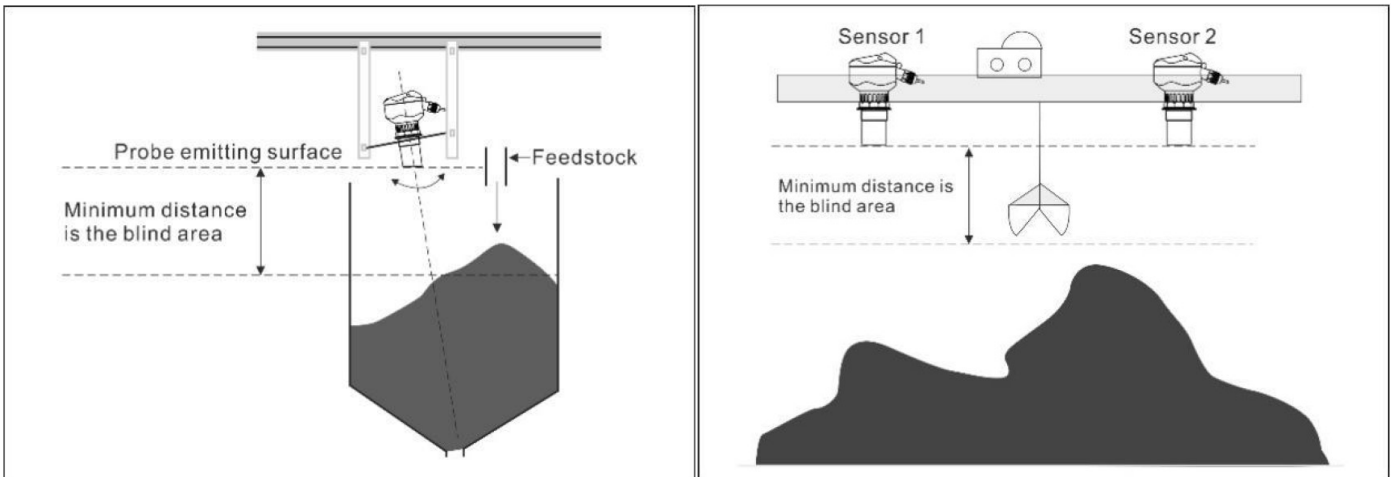
With Flange



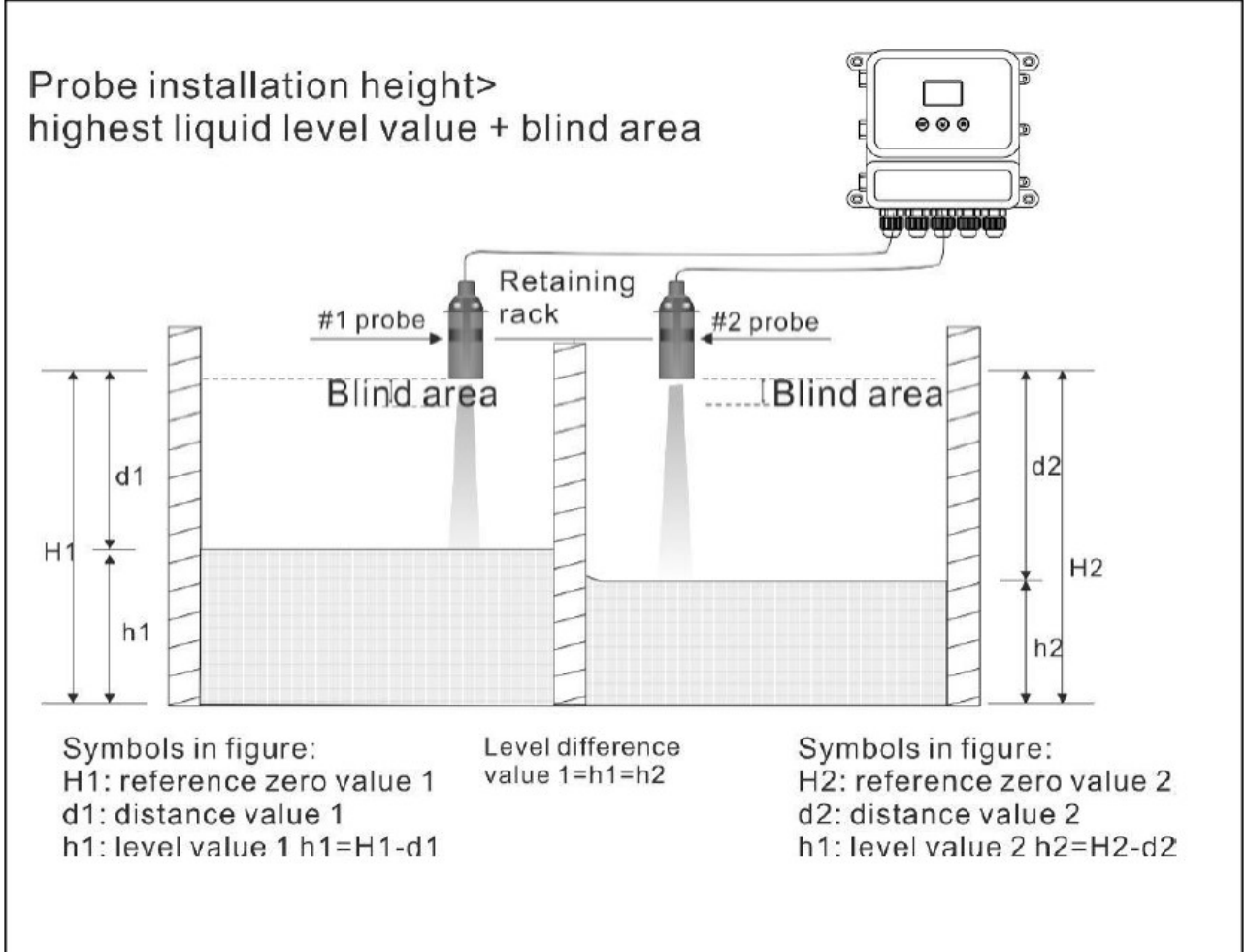
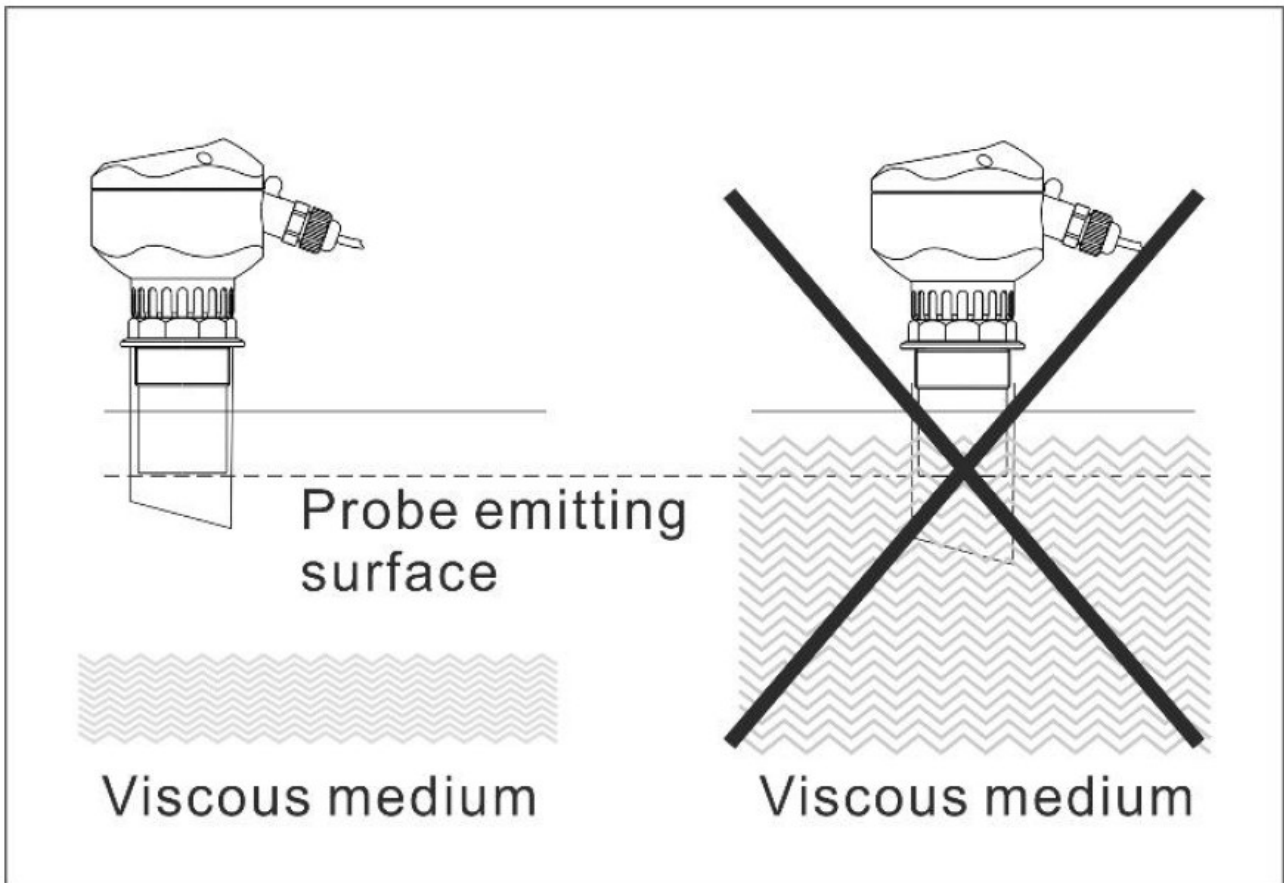
With Thread



Gantry Installation

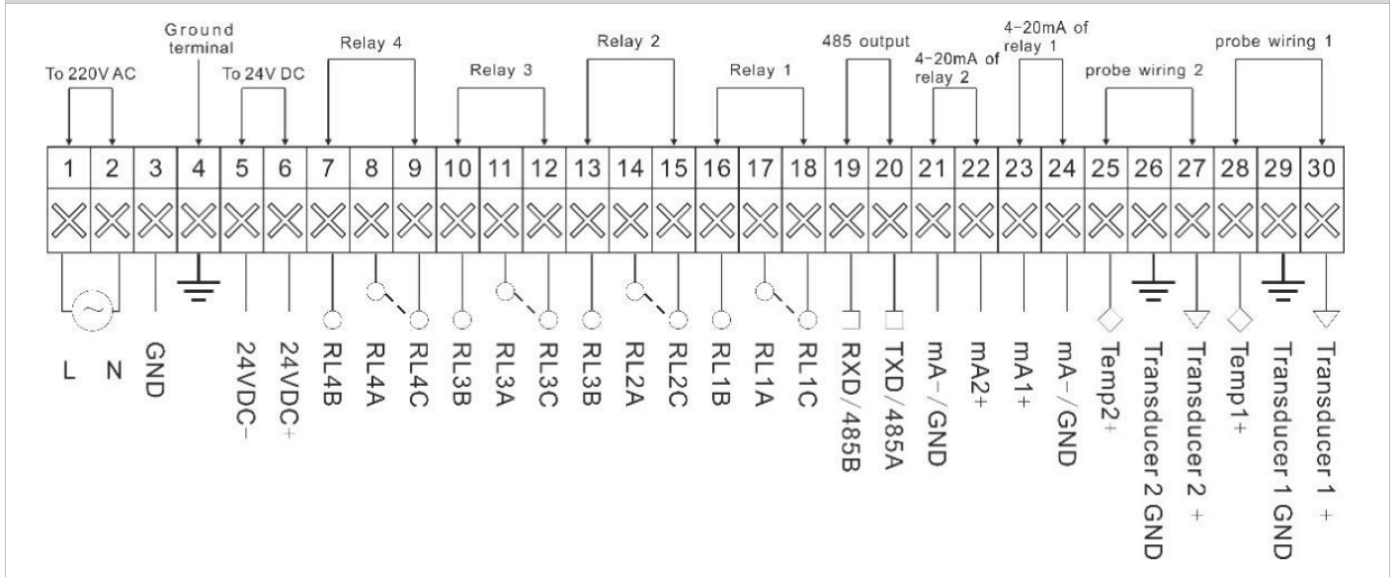


Wave -guide pipe cannot be soaked in the viscous medium

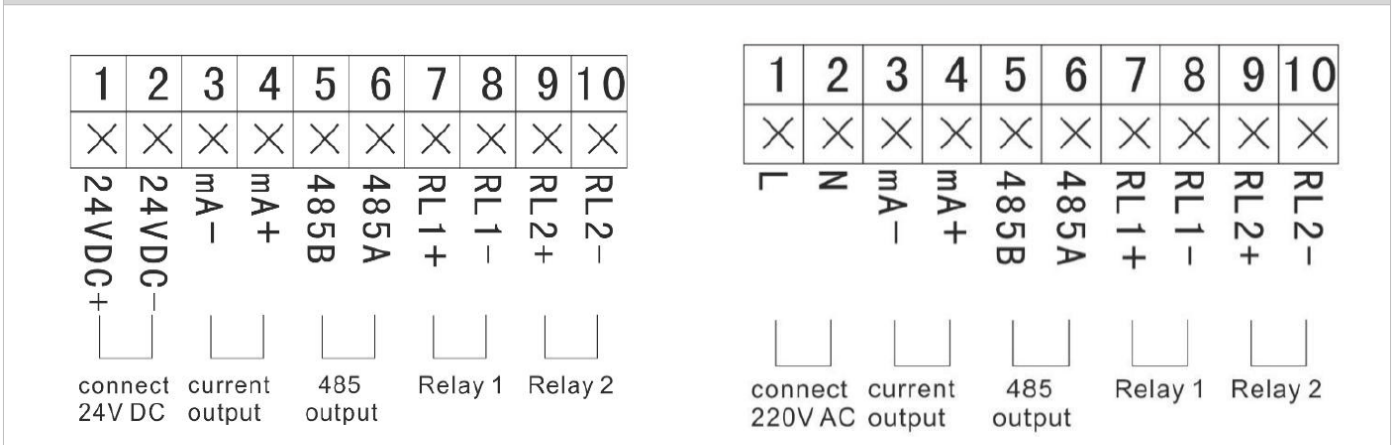


Wiring

Remote type



Compact type

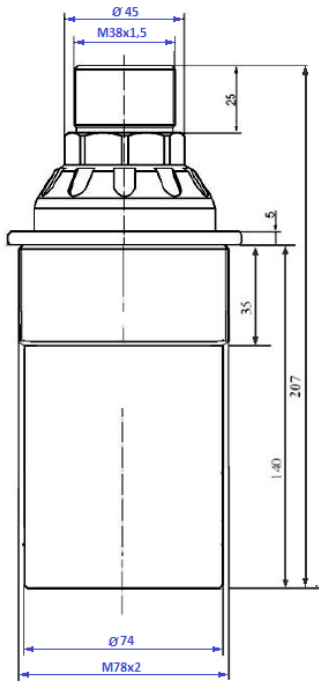
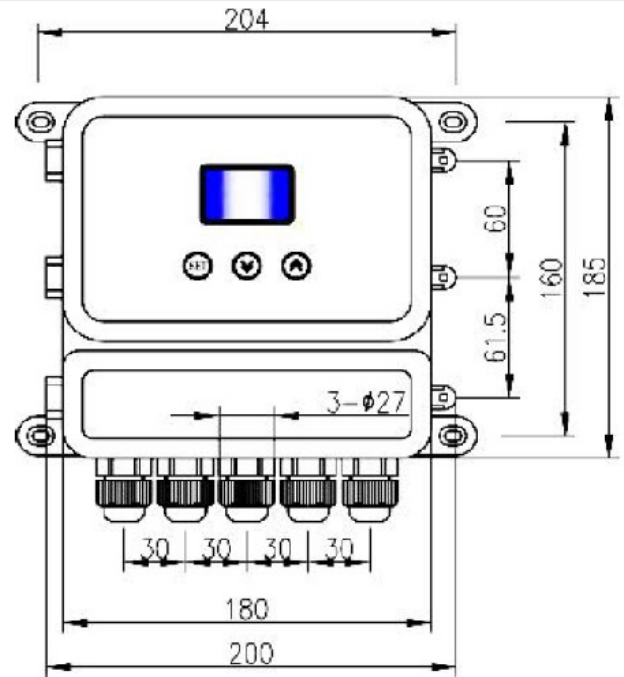


24V DC (Four Wire)

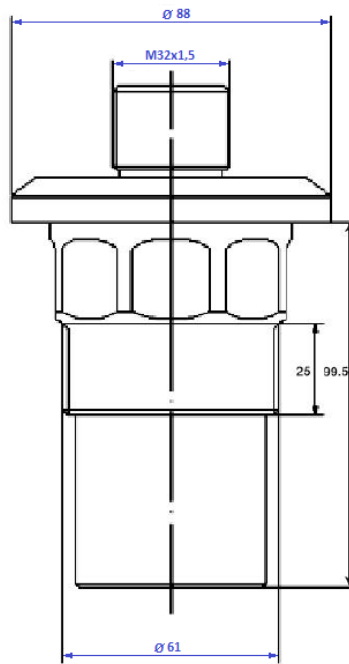
24V DC (Two Wire)

Dimensions

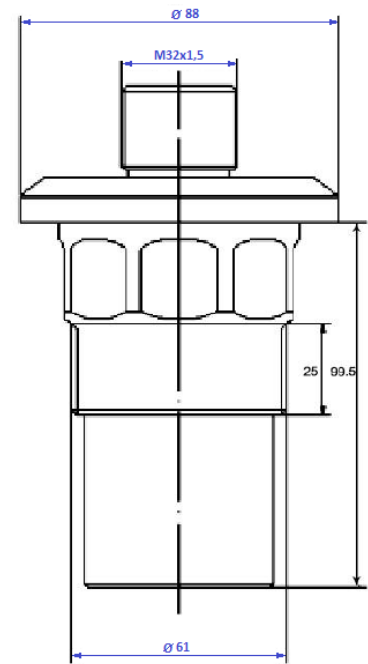
Remote Type



0.8m - 20 m

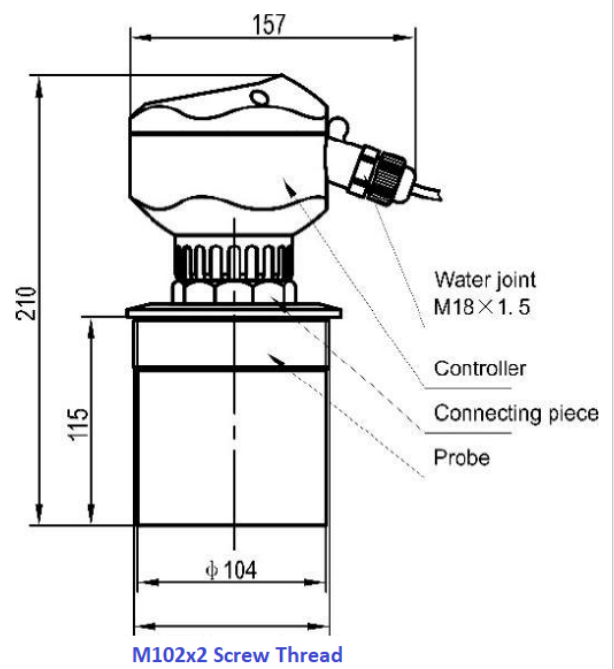
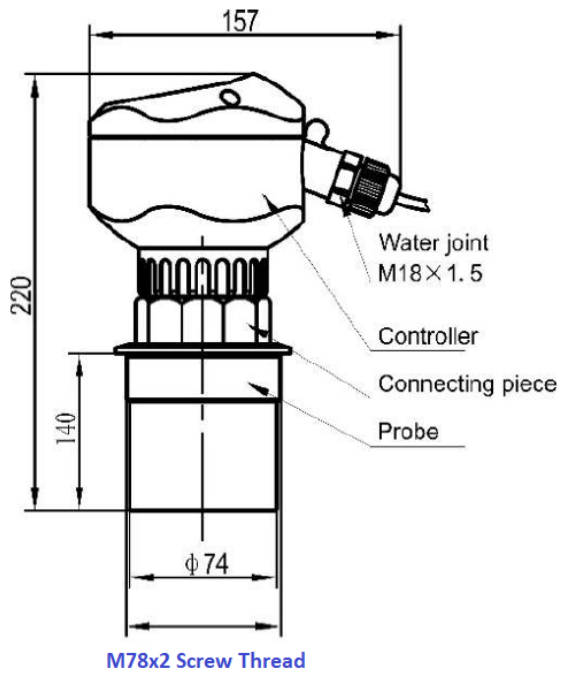
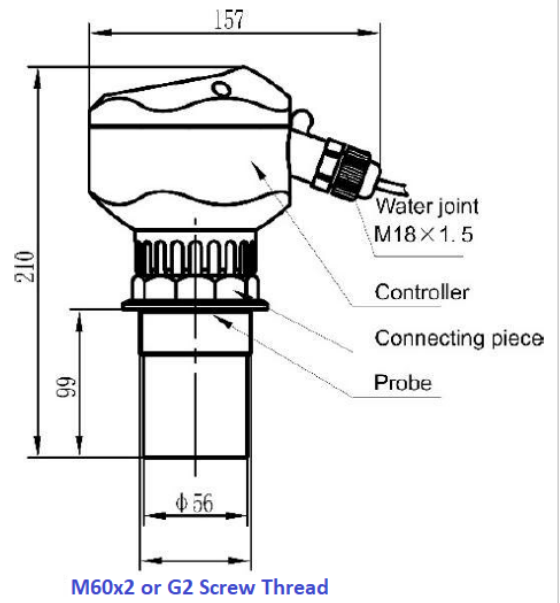
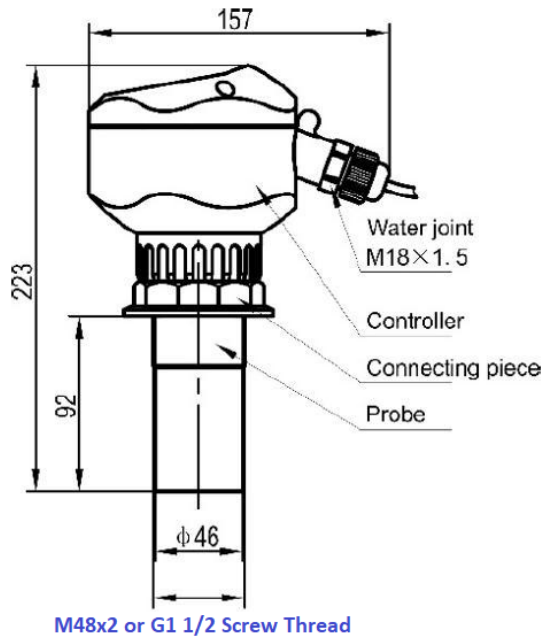


0.5m - 10m



0.4m - 5m

Compact type



Product Selection

Ultrasonic Level Sensor										
ORDERING CODE	LU	DP	-	R1	-	O1	-	S1	-	10
TYPE	LU									
MODEL	Compact	DP								
	Remote	DR								
RANGE	5 m			R1						
	10 m			R2						
	15 m			R3						
	20 m			R4						
	30 m			R5						
	40 m			R6						
	50 m			R7						
	60 m			R8						
	70 m			R9						
	Other			RR						
RELAY OUTPUT	AC250V, 8A					O1				
	DC30V, 8A					O2				
POWER SUPPLY	AC 220V							S1		
	DC 24V							S2		
	DC 12V							S3		
	Battery Powered							S4		
CABLE LENGTH	5 m									05
	10 m									10
	15 m									15
	20 m									20
	30 m									30
	40 m									40
	50 m									50
	Other									xx



CeYeKo

Fluid Measurement Technology

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