

Ultrasonic level meter

Committed to process automation solutions

Datasheet



SUP- DP/SUP-DFG

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.

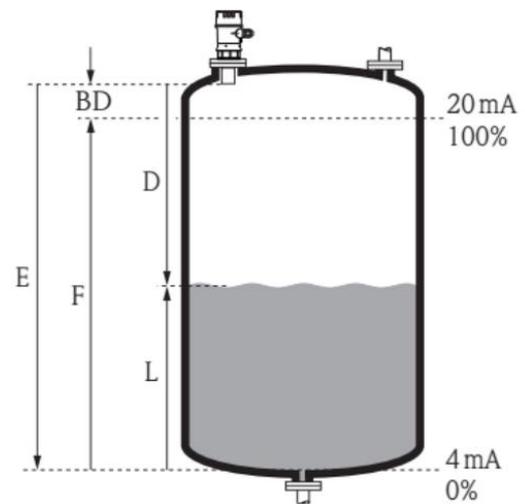
The instrument uses the time t (and the velocity of sound c) to calculate the distance D between the sensor membrane and the product surface:

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

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.



Application



River



Reservoir



Tank

Characteristics

- Non-contact, maintenance-free measurement
- Measurement unaffected by media properties, like dc value or density
- Calibration without filling or discharging
- Unbeatable price performance
- Intelligent regulator
- 8-Bit Micro-Controller form Atmel – Stable and reliable

Type overview



Parameter

Function	Compact type	Remote type
Range	5m、10m、15m、20m、30m、40m、50m、60m	5m、10m、15m、20m、30m、40m、50m、60m、70m
Accuracy	0.5%-1.0%	0.5%-1.0%
Resolution	3mm or 0.1%	3mm or 0.1%
Display	English and Chinese LED	English and Chinese LED
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℃, Probe : 20~+80℃	LED : -20~+60℃, Probe : 20~+80℃
Communication	Option: RS485,232 Communication (manufactures agreement)	Option: RS485,232 Communication (manufactures agreement)
Ingress protection	LED: IP66, Probe: IP68	LED: IP65, Probe: IP68
Cable probe	No	standars:10m longest:100m
Probe installation	According to the range and the probe type	According to the range and the probe type

Power consumption	Remote type
	Power supply:24V,
	No relay: 100mA
	Channel 2 of Relay: 150mA;
	Channel 4 of Relay: 200mA;
	The specific power is as follows;
	No relay: 24×100mA=2.4W;
	Channel 2 of Relay: 24×150mA=3.6W; Channel 4 of Relay: 24×200mA=4.8W;
Power consumption	Compact type (four-wire system)
	Power supply:24V,

	No relay: 80mA
	Channel 2 of Relay: 150mA;
	The specific power is as follows;
	No relay: $24 \times 80\text{mA} = 1.92\text{W}$;
	Channel 2 of Relay: $24 \times 150\text{mA} = 3.6\text{W}$;
Power consumption	Compact type (two-wire system)
	Power supply: 24V,
	No relay: 20mA
	The specific power is as follows:
	No relay: $24 \times 20\text{mA} = 0.48\text{W}$

Installation

<p>Mounting flange</p> <p><math>\le 60\text{mm}</math></p> <p><math>\ge 100\text{mm}</math></p> <p>Probe emitting surface</p> <p>Minimum distance is the blind area</p> <p>Maximum liquid level</p>	<p>Flat tank</p> <p>There is datum of the connected tube under the flange. The connected tube length $\le 60\text{mm}$, inner diameter of connected tube $\ge 100\text{mm}$, 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</p>
<p>Connecting pipe height shall be $\le 60\text{mm}$</p> <p>Probe emitting surface</p> <p>$1/2 \text{ or } 1/3$ of container radius</p>	<p>Arched tanks</p> <p>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</p>

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, (maximum 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 .

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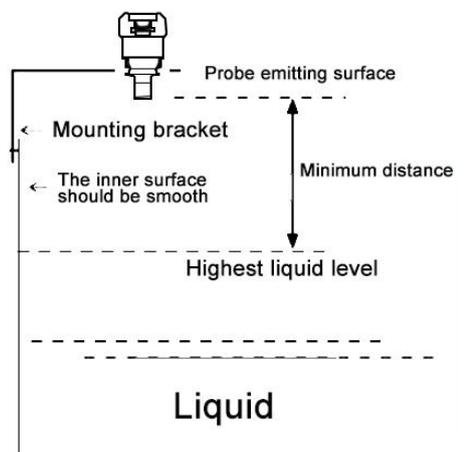
Please check the following table:

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	

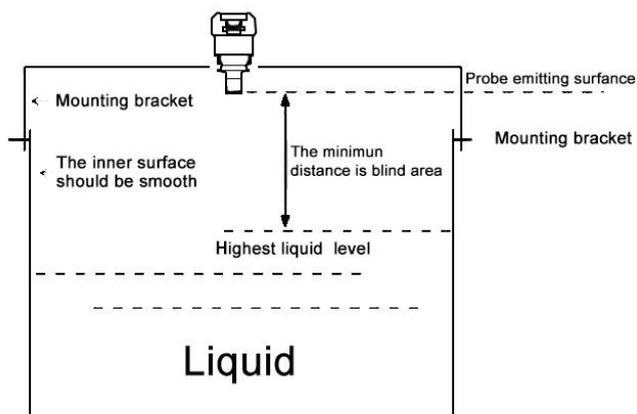
Opening container

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

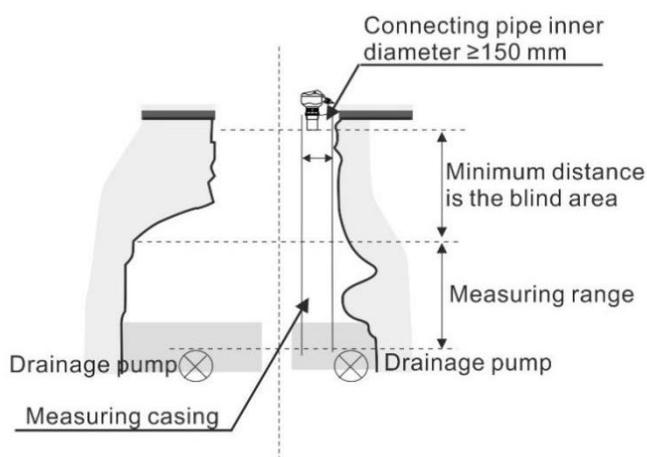


Bracket mounting-installed on the side of the open container



Bracket mounting-installed on the center of the open container

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



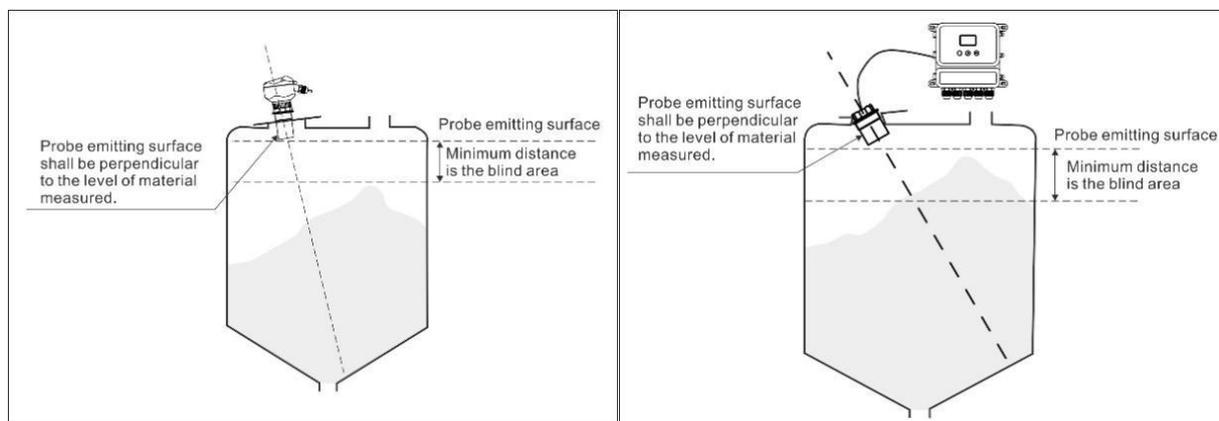
Draining well and normal well

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%)

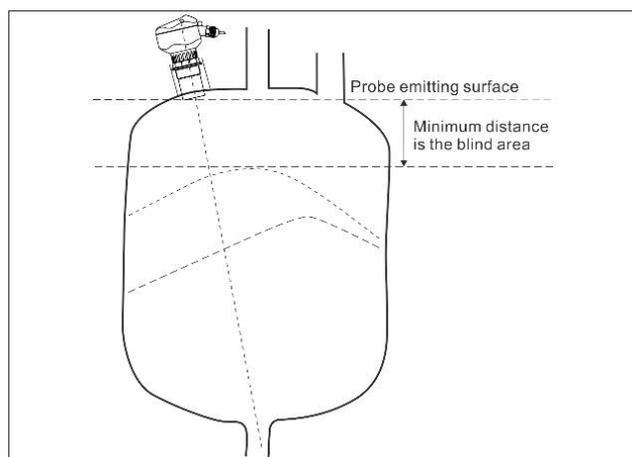
Normal wells (including water wells, deep wells) don't have large diameter. So the measured bushing can be installed to achieve the best result. Inner wall of bushing must be smooth (PVC, PE pipe can be used), inner diameter ≥ 150 mm (measure range 10 m) or diameter ≥ 200 mm (measure range 20 m).

Solid measurement

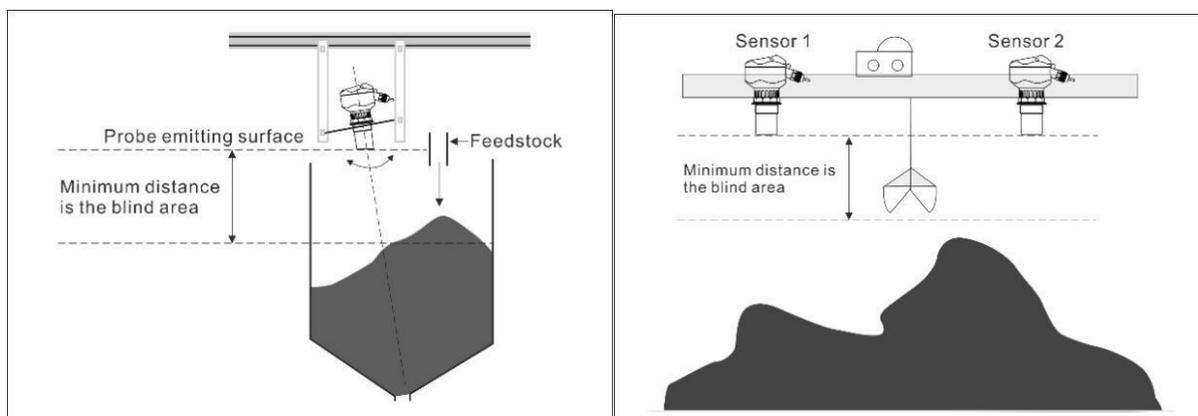
With flange



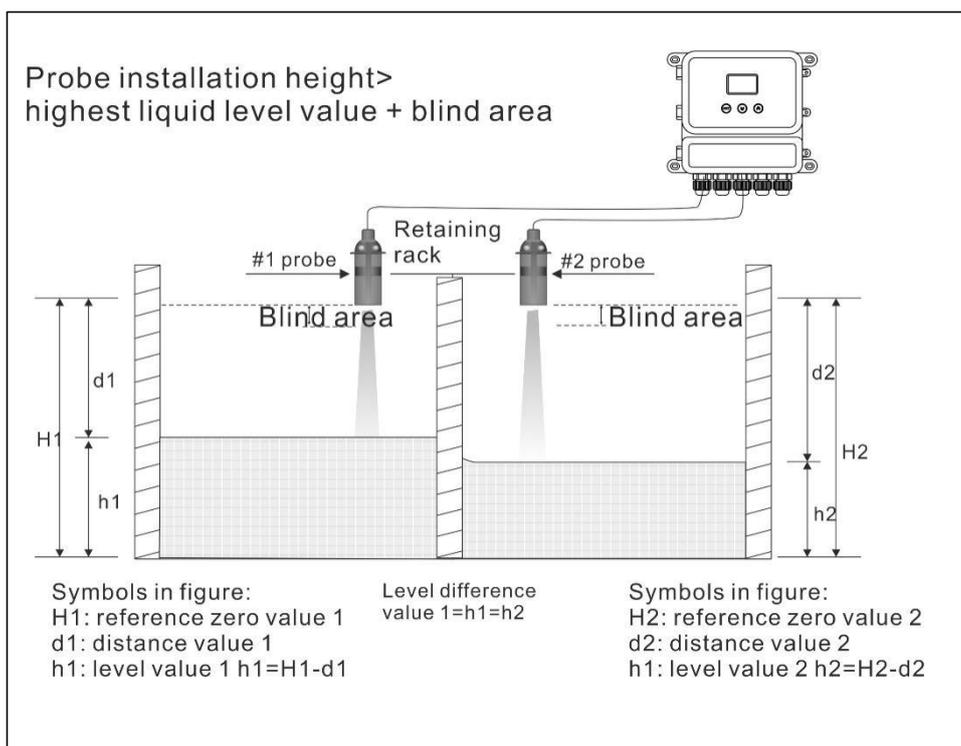
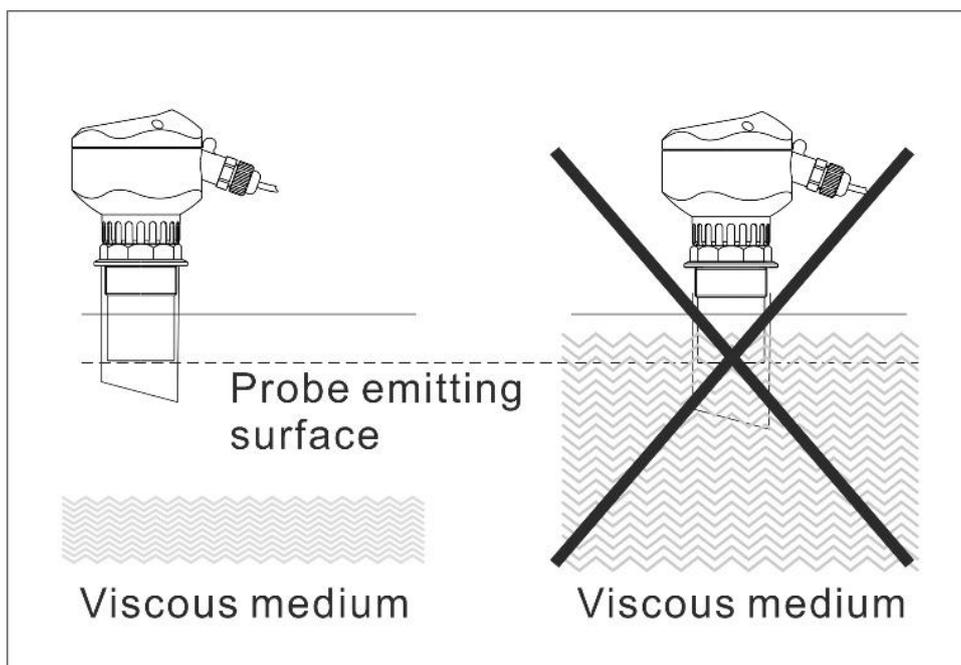
With thread



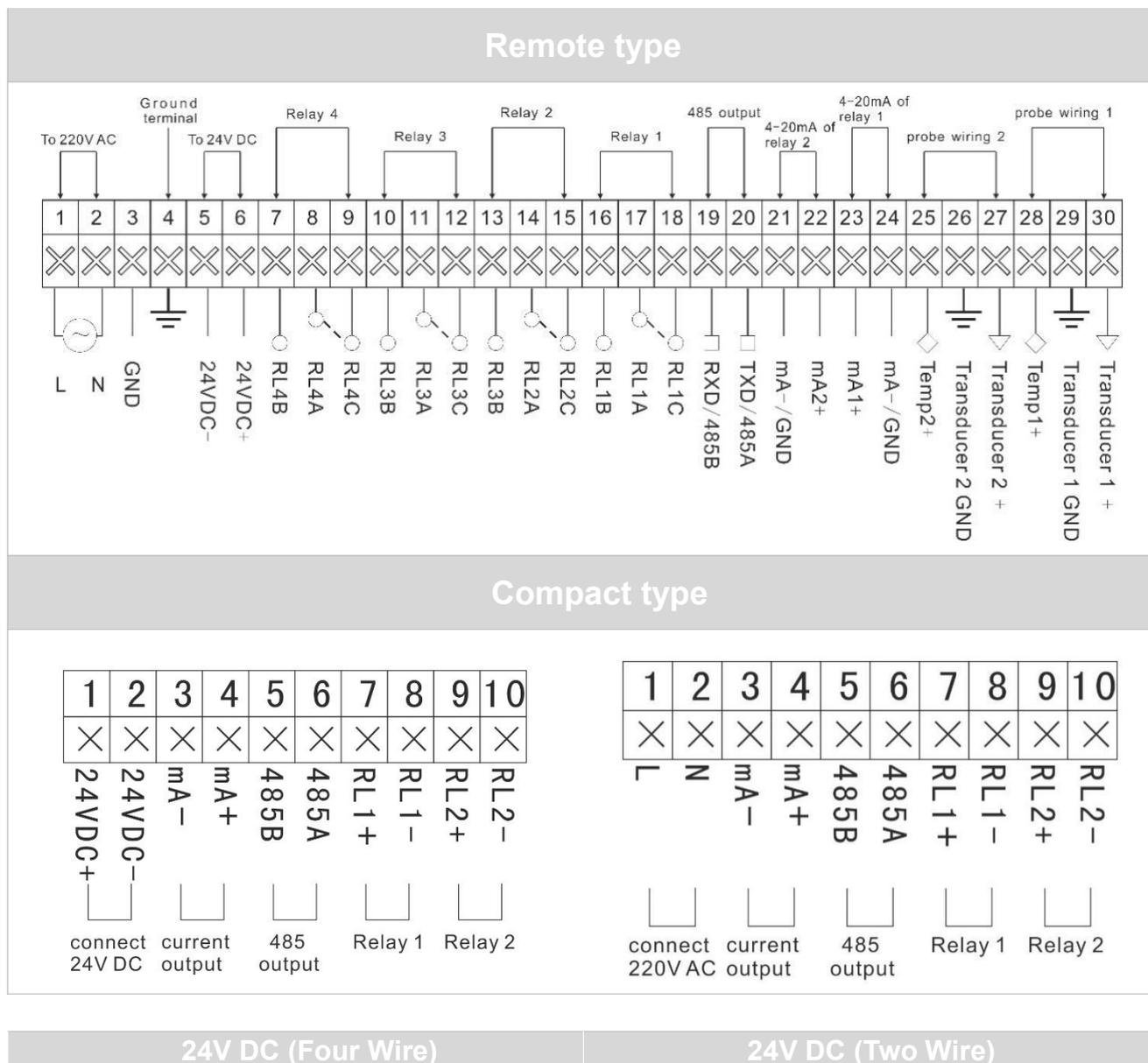
Gantry installation



Wave -guide pipe cannot be soaked in the viscous medium

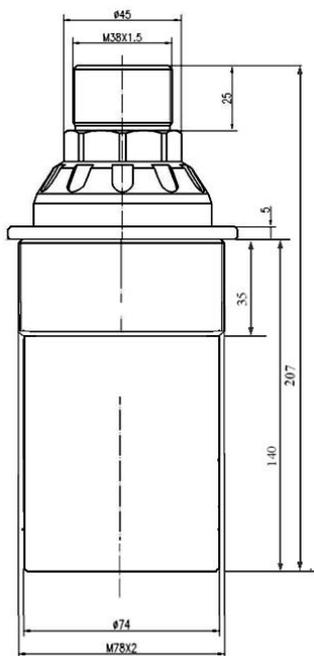
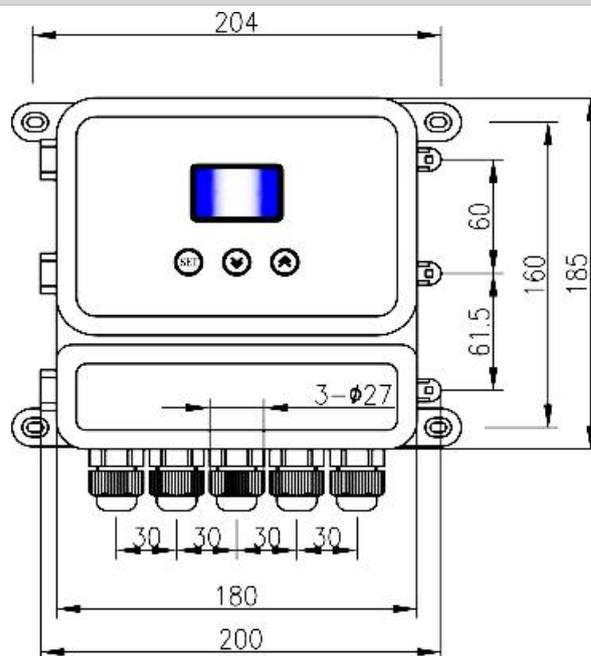


Wiring

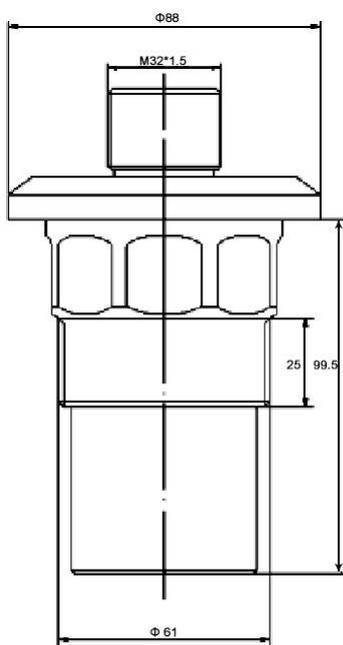


Dimension

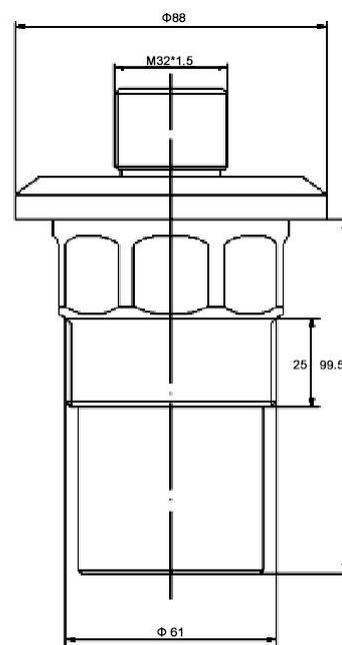
Remote type



0.8m - 20 m

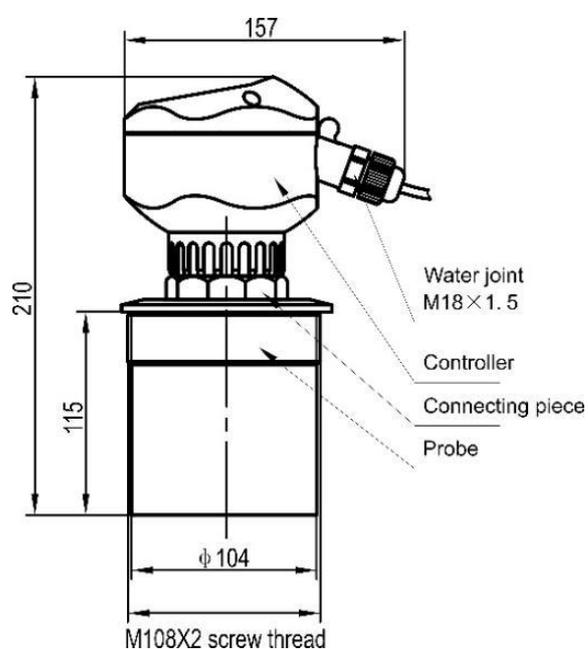
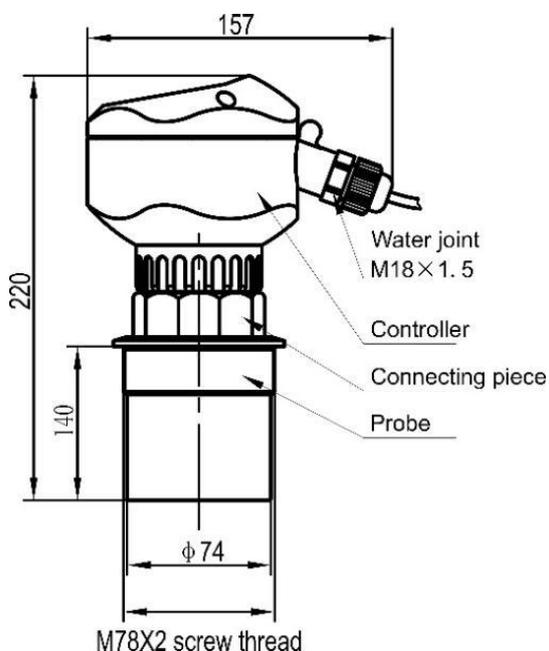
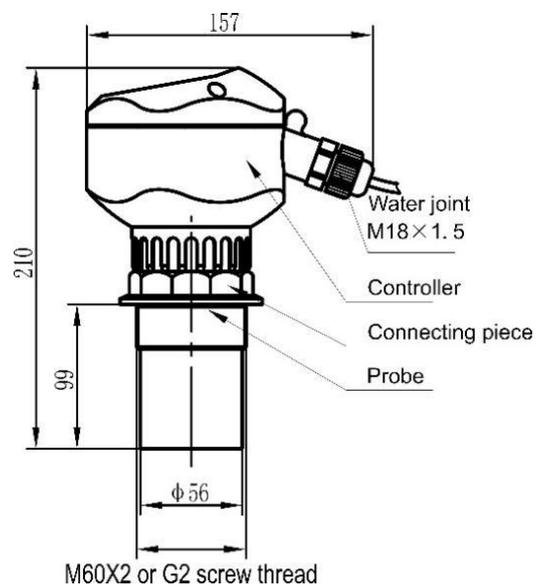
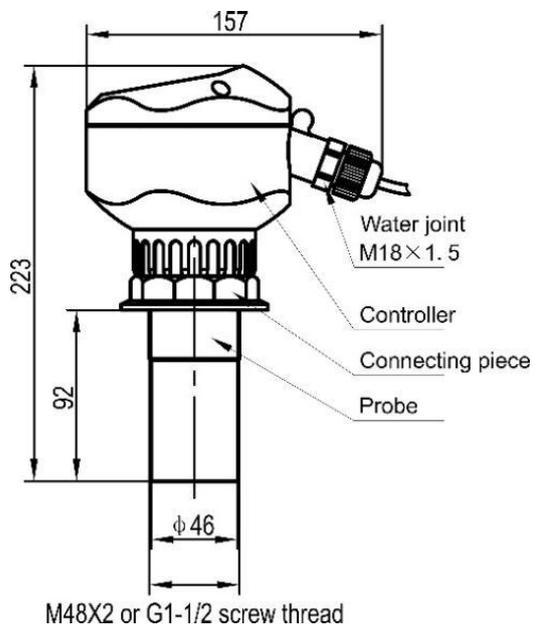


0.5m - 10m



0.4m - 5m

Compact type



Ordering Code

Integrated Type Ultrasonic Level Transmitter DP							Description	
Model	DP						Integrated Type Ultrasonic Level Transmitter	
Measurement Range and Thread Type	C						5m, G2	
	D						10m, G2	
	L						15m, M78×2	
	M						20m, M78×2	
	N						30m, G3	
	X						Other	
Probe Material		NS					Plastic ABS	
		N6					Polytetrafluoroethylene (PTFE)	
Accuracy		K					0.5 Class	
		L					1.0 Class	
Output and Power Supply			A1				2-Wire 4-20mA	
			SA					4-20mA, 24VDC
			SG					4-20mA + Dual SPST, 24VDC
			SE					4-20mA+RS485, 24VDC
			SP					4-20mA + Dual SPST + RS485, 24VDC
			SB					4-20mA, 220VAC
			SR					4-20mA + Dual SPST + RS485, 220VAC
			XX					Other
Electrical Interface, Housing Material, and Ingress Protection				WC			M18×1.5 Cable Gland, Plastic ABS, IP65	
Accessories				EA			L-shaped Stainless Steel Mounting Bracket, 0.8m	
				EB				L-shaped Stainless Steel Mounting Bracket, 1.5m

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