

OPERATING INSTRUCTIONS
RANGER ELITE™ LTR ULTRASONIC
LEVEL TRANSMITTER

24VDC 2-wire



1. Overview

1.1 Features

The Ranger Elite™ ultrasonic liquid level meter draws on the advantages of many liquid level meters and solves the problem that ultrasonics cannot be used at high temperatures. A universal liquid level meter that realizes full digitalization and humanized design concept. This product has the characteristics of strong anti-interference, good linearity and high precision. It can meet most liquid level and material level measurement requirements without coming into contact with industrial media, and can be widely used in various fields related to material level and liquid level measurement and control.

- Built-in ultrasonic ranging and pressure ranging.
- Built-in wireless communication such as NB-IoT and 4G (can be customized)
- Built-in battery power supply
- Built-in solar charging
- Voltage DC3.7-32V
- Working temperature up to 110°C
- Backup and restore setting function
- The function of measuring various physical quantities.
- Support 4-20mA/HART (HART can be customized)
- Support custom serial port data format.
- The range starting point and ending point can be set at will.
- Distance measurement with increment/difference can measure both distance and level.
- The intensity of emission pulse with 0-100 levels can be set according to working conditions.
- With LCD display (with backlight)

1.2 Technical Parameters

Range: Max Range: 40 feet

Blind zone: <8.0" inches (

Measure error: $\pm 0.25\%FS(3-40 \text{ ft.})$

Display: OLED、LCD

Display resolution: 1mm

Frequency: 20~350KHz

Power: 12-32VDC、18-32VDC (2 wire)

Power consumption: <1.5W

Output (optional):

4~20mA RL>600Ω (standard)

Hart (2 wire) Optional:

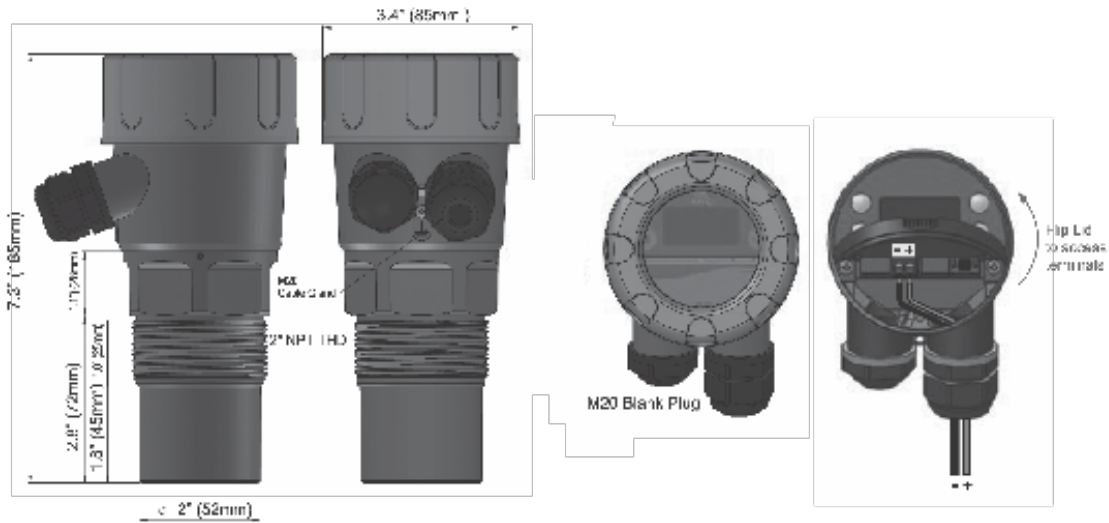
Blue tooth

Sensor Material: ABS/PP/PVDF/PTFE is Optional)

Cable Entry: M20X1.5

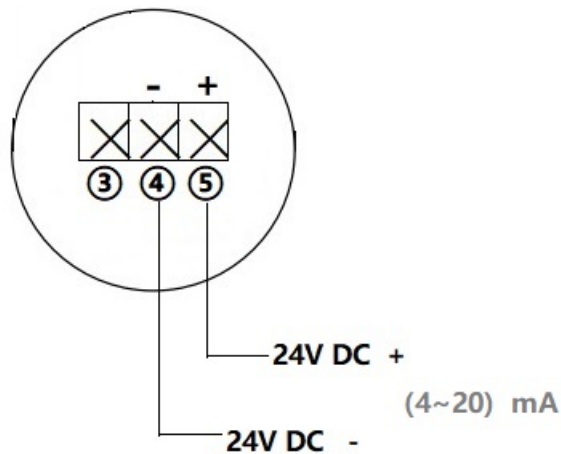
Process connection: 2" MNPT
 Working environment: -20~65°C, -30~100°C, -0.07~0.1MPa
 Storage humidity: ≤80%RH without condensation
 Protection degree: IP65(Standard)
 Explosion-proof grade (optional): EXiaIBT4Ga

1.3 Outer Dimensions



1.4 Wiring

24V DC Two-wire:



2. Installation

2.1 Sensor installation

- The probe generates ultrasonic pulse waves and detection echoes at the same time, and the ultrasonic pulse waves propagate out from the surface of the probe in a certain conical wave surface. There should be no obstructions in this area and should be kept away from the feed opening. The installation location of the probe should be selected where there are no obstacles between the emitting surface of the probe and the medium being measured. (See **Figure 1.**)
- The shape of the vessel needs to be taken into consideration when installing the probe. If the probe is not installed correctly, containers of a certain shape will produce secondary echoes. This type of problem is mainly concentrated on the top of conical and spherical tanks. This special shape can refocus and amplify the emitted echo, producing erroneous readings. Choosing the correct installation location can solve this problem. (Please see **Figure 2.**)

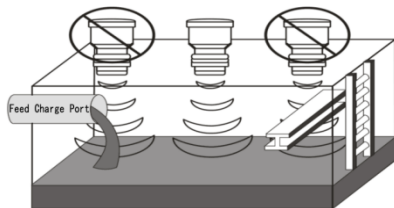


Figure 1.

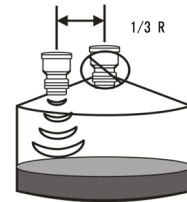
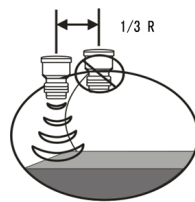
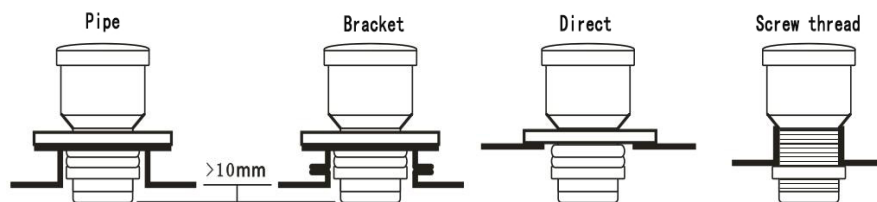


Figure 2.

- The probe can be installed with flange or standard thread. Whether flange or threaded, with or without a cone, ensure that the bottom of the probe protrudes from the bottom of the process connection. **Figure 3.** shows the correct installation method.



- The distance from the probe to the container wall should be maintained within the ideal area as shown in the figure. Figure 4 shows the area between the measuring range and the probe installation distance from the container wall. If the installation distance is less than the distance specified by the lower line of the ideal gap, the probe should be installed within the "mini Gap" area. If the installation distance from the side wall is still below the "mini Gap" line, the transmitter may not measure the level correctly. See **Figure 4**.
- In the measurement of solid materials, the probe should be typically installed at a distance of 1/3 of the container wall from the side wall to the central feed inlet. When the material is piled up, it will form a cone. The installation position of the probe shown in **Figures 5 and 6** will give a reading of the average level, which is the level height when the materials are piled flat. This is correct for conical stacking or concave stacking surface when discharging. The average level height measured by this installation is correct only for cylindrical containers and the inlet is at the center line of the container. For containers with other shapes or the inlet is not in the middle position, the probe should be installed according to the user's requirements and meet the above requirements.

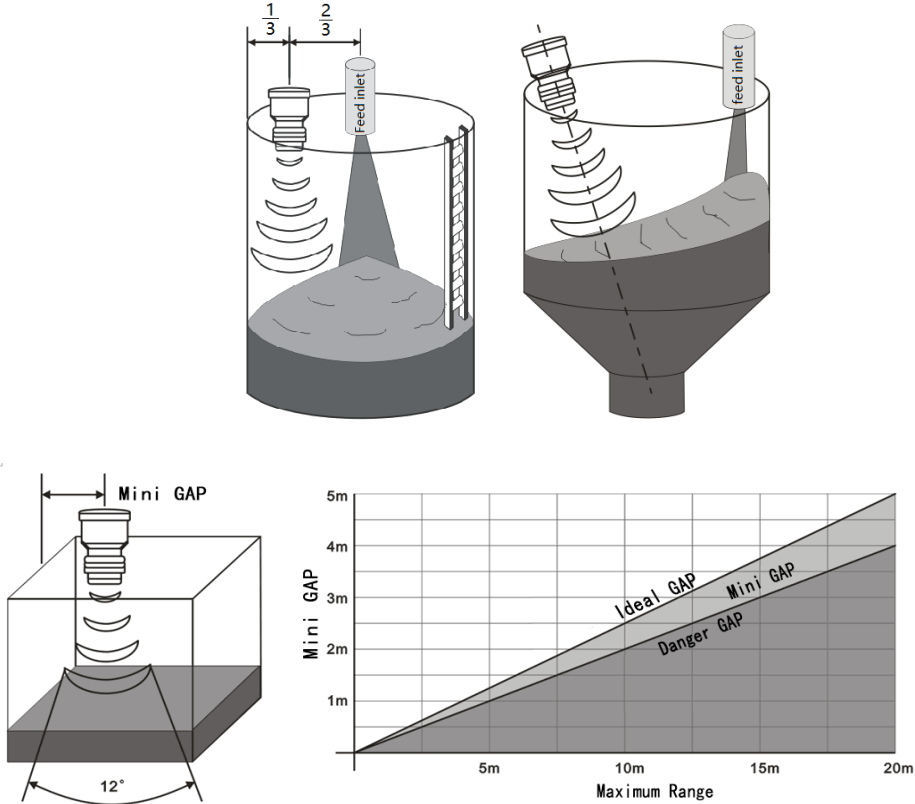


Figure 4.

- Ultrasonic measurement will get the best effect for liquid with calm surface and no waves. If there are impurities, bubbles or large fluctuations on the surface of the liquid, a wave guide pipe should be installed. The diameter of wave guide pipe should be greater than 120mm, and there is no joint. As shown in **figure 7**.

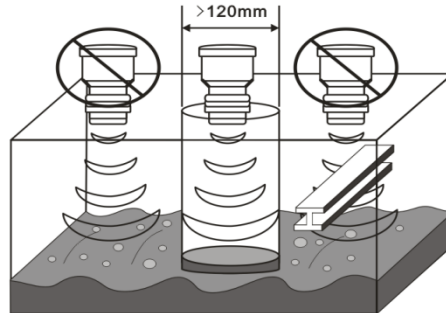


Figure 7

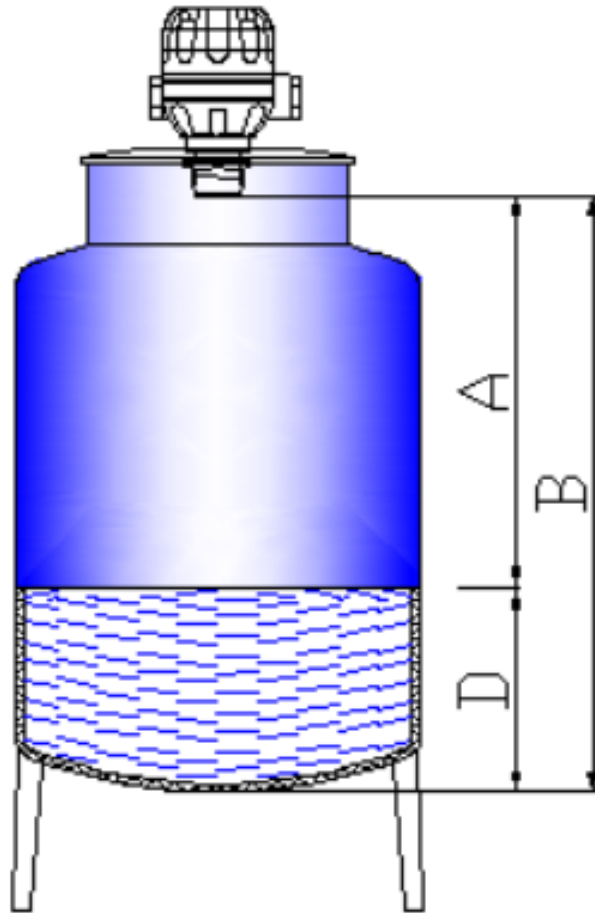
2 Working Mode

2.2.1 Measure the liquid level

B (Installation height)	the distance from bottom of container to sensor surface.
A	the distance between sensor surface and liquid surface.
D	the height of the liquids.

$$D = B \text{ (Installation Height)} - A$$

The display value is the liquids level (D).



2.2.2 Measure the distance(Air)

Set $B = 0$, display value is the distance from sensor surface to liquid surface(A).

2.2.3 Environment and Filtering


This instrument default dynamic filtering, to avoid the filter interference of mixing, tank walls, and other fixed bars. But for totally enclosed small space or other easily formed secondary echo environment, it's not reliable. When the display value is about twice the actual value regularly, change "Environment" to "Closed".

2.2.4 Environment and Filtering

It is recommended to use a 24V DC stabilized power supply greater than 2W for power supply. If a switching power supply is used to supply DC, the negative DC power supply must be connected to the earth. Please refer to the manual for installation and wiring. In order to ensure the stable operation of the machine and the accuracy of analog output, please power on for >15 minutes to warm up before normal use. Tighten the back cover to prevent water or dust from entering. When working in the field, please build an awning above the material (liquid) level meter to avoid direct sunlight and rain, and take lightning protection measures.

3. Setting and debugging

Two wire ultrasonic level meter menu

	
A	Menu, shift, return
B	Scroll down, add up
C	OK, Confirm

Basic Setting: The instrument is LCD display, with key operation instruction. Press the key “A” appears instruction interface.

According to the instruction, operation can be work.

Default User password is "0000" ; Administrator password is "1000".

Menu and Function			
1 st level	2 nd level	3 rd level	Instruction
Users			Default“0000”
Administrator			Default“1000”
Mounting	Input Mounting Height		Input the distance for sensor bottom to tank bottom (m)
	Environment		Open or closed (default closed)
Output	Analog	Starting point	0 corresponds to 4mA (unit m)
		Ending point	Full scale corresponds to 20mA (unit m)
		Low end	Fine tuning
		High end	Fine tuning
		Virtual output	Not modifiable
		Analog configuration	Not modifiable
Display	Serial	Address	HART address
		Read/write	Read only(default)
Display	Display Unit		m (default) , cm,mm,yard,foot,inch,L,m ³ ,g,kg
	Reserved Decimal Number		3 (default)

	Display Conversion		Not modifiable	
	Contrast		Not modifiable	
	Display Delay		15minutes (default)	
Probe	Medium	Medium Selection	Not modifiable	
		Custom Speed		
	Characteristic	Cycle		
		Blind		
		Intensity		
		Gain		
		Gain Max		
		Threshold		
	Filtering	No		
		Rapidly		
		Fast	default	
		General		
		Stable		
	Amendment	Temperature	Not modifiable	
Display				
Linear				
System	Set User	User	"0000"	
		Admin	"1000"	
	Language	Chinese、English		
	Restore	Cancel/Confirm	Choose Confirm	
	Back Up			

4. Trouble shooting

1、 Not working, no display, no sound
Probable reasons: ① Power is not connected or "+" "-" polarities are connected reversely ② Too low voltage resulting no working or too high resulting damage
Solutions: ① Check to ensure correct wiring as instructed. ② Use 12-24V DC supply, or contact with distributor
2、 No display, sensor has sound
Probable reasons: ① Turning off ② Connected to high voltage, damaging display chip

<p>Solutions:</p> <ul style="list-style-type: none"> ① Press "B" to turn on display; ② contact with distributor.
3、 With sound and display, but the values not change with distance
<p>Probable reasons:</p> <ul style="list-style-type: none"> ① Too low input voltage ② Sensor or power driver damaged
<p>Solutions:</p> <ul style="list-style-type: none"> ① 12-24V DC supply ② Contact with distributor
4、 With display ,but value is irregular fluctuation
<p>Probable reasons:</p> <ul style="list-style-type: none"> ① Deflective installation ② improper setting of pulse intensity, leading to great residual vibration or diffraction ③ more than 2 instruments work together, interfering each other ④ too much electromagnetic disturbance in working area ⑤ There are bubbles or debris on liquid
<p>Solutions:</p> <ul style="list-style-type: none"> ① Adjust the axis of sensor vertical to surface to be measured ② in general, range of 1-3m, transmit intensity is 2-5 ③ try to eliminate interference ④ find out disturbance source and shield ⑤ eliminate bubbles or debris
5、 Big error
<p>Probable reasons:</p> <p>① Non vertical installation, leading to multiple reflection ② installed too close to wall, sonic wave reflected midway ③ check "BD" ④ check temperature display</p>
<p>Solutions:</p> <p>① Adjust installation positions several times. ② correctly set "BD" ③ adjust temperature ("TE") to proper value.</p>
6、 Abnormal current output
<p>Probable reasons:</p> <p>① Too large load resistance ② FS, AL or AH changed. ③ undesired supply rectification and filtering ④ electrify time is not enough</p>
<p>Solutions:</p> <p>① Lower load resistance ② readjust parameter ③ replace with DC regulated supply with larger capacity ④ electrify > 15 minutes before work</p>
7、 Abnormal RS485 output

Ordering Information

For Assistance Call 330.331.7331

FLO-CORP MODEL NUMBER BUILDER

Example: LTRE-0-NN Ranger Elite™ Ultrasonic Level Transmitter with 2" NPT Process Connection and 8" to 480" Measuring Range: 8" to 480"

LTRE LTRE - 0 - NN

Process Mount 0) NPT (US) Additional Options NN)) None

Ranger Elite™ is a product of FLO CORP INC.

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