Ultrasonic Level Transmitter (ULT)
Instruction manual

Ultrasonic Level Transmitter

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ientek Co., Ltd.

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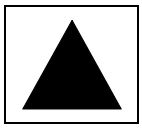
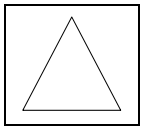
Preface :

ientek Model : ULT Ultrasonic Level Transmitter offer advanced for today's' demanding level measurement needs from customer.
This device provide maximum benefits superior results and it has carefully designed instructing manual, And Also,
The device ientek ultrasonic level transmitter is not liable for any damage or personal injury.
Whatsoever resulting from the use of ientek instrument standard ultrasonic level transmitter.



Warning 1 : When wiring or connecting this unit to a power source, only qualities personal should be installed and wired.



Warning 2 : Always main power-off before install and remove or disassembly ultrasonic level transmitter unit

Caution : During operation, please wait 1 minute as stare-up with stability.

Caution :

① Always fully qualified personal should be performed maintenance or trouble shooting procedures.
② Printed circuit boards will be sensitive to electrostatic discharge, to avoid damaging boards follow these precautions to minimize the risk of damage.

- Before handling the assembly, discharge your body touching a grounded
- When possible, use grounded electrostatic discharge wise straps when handling sensitive components.

Caution : For all installations of Level meter standard industrial wiring practices apply.
Caution : Be sure that your Level meter is equipped for the correct input power by checking the label on the outside of the unit and this manual wiring diagram.
Caution : Before powering-up for the first time, check all wiring to ensure.
Caution : Before attempting any maintenance make sure there is no pressure in the tank or vessel and must be carried out with the power-off

Information

ientek Ultrasonic Level Transmitter Model: ULT is designed to accurately measure and control flows of process liquids.
When receiving a ientek Level meter, carefully check the outside packing carton or damage incurred in shipment.
If the carton is damaged, notify the local carrier and submit a report to the ientek Factory No2.
(See manual surface) Addressing Information.
Do not return any equipment to the factory without first contacting ientek.

If you encounter a problem with your Applications,
for each step : Installation / Wiring
Operation
Set up procedure

Verify that with ientek

We are working 09:00 AM to 18:00 PM Monday to Saturday in a Week.

Chapter Ⅰ. Introduction

1. Introduction

This manual contains information about ientek Model : ULT (Ultrasonic Level Transmitter) Ultrasonic Level Transmitter with 4 chapters :

- Ultrasonic Level Transmitter and theory of operational principle
- Operation system
- Maintenance
- Trouble shooting advice

1.1 Description

ientek's ultrasonic level transmitter is manufactured to be suitable in corrosiveness, viscosity gas, place that steam.
Display is manufactured in dark place on Backlight function internal organs so that level confirmation may be available, and operation principle is as following.
The Ultrasonic pulse that is transmitted from the sensor hits the liquid that subject to measure and returns from it by reflections.
And the sensor receives that returning echo.
The pulses are to be input to the converter in the mode of electric signals, and at this moment, the signals, proportioned to the distance which is computed out by measuring the time difference between transmitting pulse and receiving pulse, are to be output.

1.2 Specifications

Model	ULT (Ultrasonic Level Transmitter)	
Measuring method	Ultrasonic pulse reflection	
Measuring range	Liquid	4.00m, 6.00m, 8.00m(A), 10.00m, 15.00m, 20.00m, 30.00m
	Solid	3.00m, 4.00m, 6.00m, 10.00m, 15.00m
Blanking Distance	3~5% (F.S.)	
Accuracy	0.25% Full Span (Air)	
Data Setting	3 induction buttons (MOV, INC, SEL)	
Operating temp.	-20℃ ~ +85℃	
Temp. Compensation	The whole range is automatic	
Output (2, 3, 4 Wire)	• Analog : DC 4-20mA 500Ω • Resolution Ratio : 0.03% full span	
Measurement Cycle	1.5 second	
Resolution	1mm	
Resolution Ratio Shown	4m, 6m, 8m (1mm)	
	8.00m(A), 10m, 15m, 20m, 30m (1cm)	
Display	4 Digit number LCD	
Pressure Range	±0.1MP (Press definitely)	
Cable Diameter	Φ6 ~ Φ12mm	
Single Wire Diameter	Φ0.5 ~ Φ1.78mm	
Electrical Conn.	Cable grand (PG13.5)	
Power Supply	One body type : DC24V ±20% (80mA) Remote type : DC24V ±20% or 220VAC (50mA)	

Model	ULT (Ultrasonic Level Transmitter) Sensor	
Beam Angle	8º(3db) : Measuring Range 4m, 6m, 8m	
	5º(3db) : Measuring Range 8m(A), 10m, 15m, 20m, 30m	
Case Material	ABS	
Sensor Material	PVC	
Enclosure	IP68 : Sensor IP65 : Controller	
Installation Method	Flange or Screw	
Flange Standard of Butt Join	Minimum DN65 Minimum DN80 Minimum DN150 Minimum DN200	Measuring range 4m 6m 8m Measuring range 8m(A) 10m Measuring range 15m Measuring range 15m 20m 30m

1.3 Feature

- Simple installation / operation
- Two Relay output
- 2, 3, 4 Wire selection possibility
- Can measure to maximum 40m according to sensor.
- Temperature for correct water level measure / speed of sound correction.

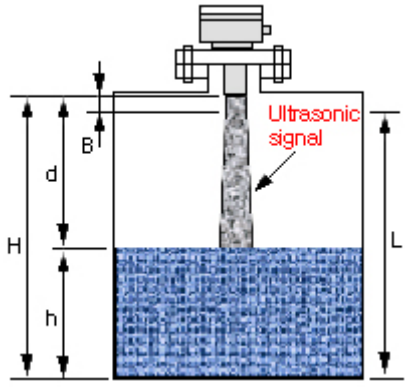
1.4 Applications

These products is designed to monitor and level measuring liquids and powder.
It can be applied to various industries.

- Level measurement
- Water tank level measurement
- Liquid storage tank level measurement
- Apart/Building water tank level measurement
- Sewage disposal plant
- Beverage storage tank level measurement

1.5 Operation principle

The level meter is composed with the designed in the integrative ultrasonic wave sensor and electronic unit.
The level meter installs on the top of the container, under the control of the electronic unit, the sensor and the launches a bunch of ultrasonic pulses to the things of tested.
Sound wave is reflected by object surface, parts of reflected return waves echo are received and change into the electric signal. The time of launching ultrasonic wave to receiving it again is direct ratio to the distance of sensor to the things of tested.
The electronic unit measures the time, and calculate out the distance examined according to the known velocity of sound.
Then draw the location value of things through subtraction operation.



Symbol In The Picture:
B : Blanking Distance
d : Empty Distance
h : Thing Location
H : Installation Height
L : Measuring Range

h = H - d

The sketch map of measuring the thing location

Ultrasonic wave spread speed among gas is influenced by gas temperature, when level meter works, it measures gas temperature needing, compensates for the velocity of sound, so as to ensure the precision of measuring.
While level meter launches the ultrasonic pulse, it can't measure the return waves at the same time. So one short distance down word from sensor is **blanking distance**.
If the supreme thing location examined enters the blanking distance, the instrument can't measure correctly, then error.
If needing, we can count the level meter and increase to install.

Chapter Ⅱ. Operation system

2.1 Instrument of working station and operation

Display Modes

4 digit LCD liquid crystal display

Buttons

There are 4 keys on the instrument, the function as follows:

SEL : For choosing different display content or parameter.

INC : When setting up the parameter input a certain digit figure from 0 to 9 circulation change.

MOV : Choose a certain digit while setting up the parameter. When choosing this digit, this digit becomes dark, later pressed INC key and revised its value.

R : Press this key, the instrument is restored.

Working State And Setting Up The Parameter

The instrument has two kinds of working state:

Measure state & State of setting up the parameter

Pressing SEL, MOV key at the same time can be switched around.

Measure State

Measure state, instrument can make the thing location value, empty from value, temperature value shown by turns.

Press SEL key to choose. Give a demonstration as follows: (please pay attention to marking symbols)

Display Mode	LCD
Thing Location Value	3.692
Empty From Value	2.586
Temperature Value	16.2

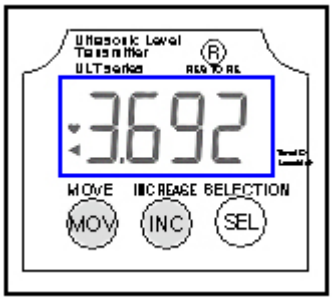
No matter what kinds of number value it will be shown, the current outputting of instrument is always the corresponding thing location value.

Display screen offside has a sign (▲)to flicker, indicate that having echo to be admitted arriving at.

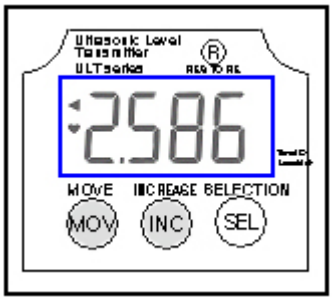
The unit of the thing location value and the empty from value is meter(m), the unit of temperature is degrees centigrade.

Pressing SEL and MOV keys at the same time, instrument can enter the state of the setting up parameters.

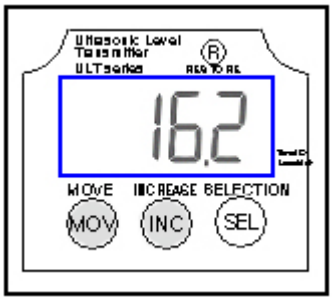
The level meter shown thing location value first after started, restored or exit of parameter setting up.



The thing location value



The empty from value



The temperature value

Press SEL key to choose display, make the thing location value, empty from value, temperature value shown by turns.

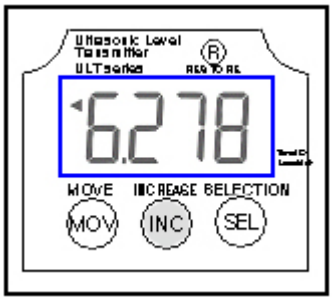
Leave off the key quickly after press down, instrument can showing by turns.
Alone press INC, MOV keys is invalidate.
Pressing SEL and MOV keys at the same time, instrument can enter the state of the setting up parameters.

State of Setting Up The Parameter

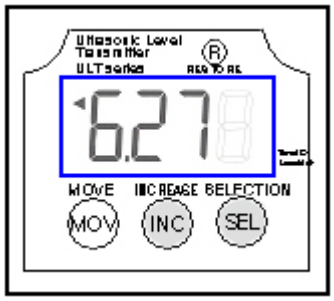
In this state, the instrument shows various kinds of parameters needing users to set up.
Press SEL key to choose. The content and sign give a demonstration as follows

Display Mode	LCD
Installation Height	6.278
Measuring Range	6.000
Inside password	00

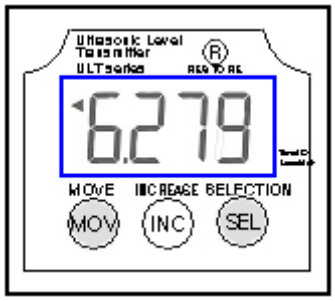
Installation Height: The distance from launch surface of the sensor to the container bottom.
Measuring Range: The maximum of the examined thing location, output the current of 20mA correspondingly.
Inside password: After inputting correct value, the instrument enters the state of the inside working parameter setting up.
Users needn't set up the numerical value, please don't enter the state of the inside working parameter setting. Should press SEL key and leave this parameter.
Or press SEL and MOV keys at the same time and withdraw the parameter setting.
Press SEL key and choose the parameter, press MOV and INC key to revise.
Should press SEL key once again after revising, in order to enable the instrument to store this parameter.
Pushing SEL and MOV keys at the same time can withdraw from the state of the parameter setting up, and store the parameters.



Pressing SEL and MOV keys

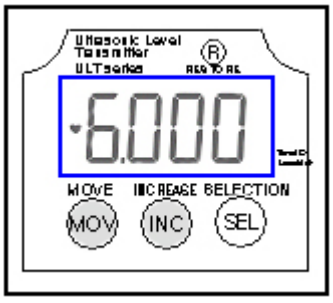


Press MOV choose the carry

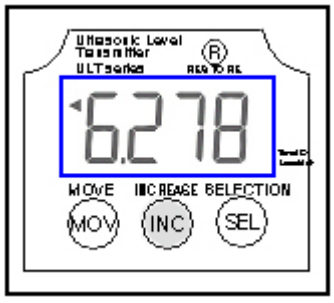


Press INC, to change the value.

At the same time , enter state of parameter. Of the setting up parameters



Press SEL key to store the previous parameters and enter next



Pushing SEL and MOV keys at the same time with draw from the state of the parameter setting up

Instrument checkout

Instrument can checkout aim at surface of wall.

But should pay attention to it, in order to improve stability of measuring.

In the instrument have inspect window, its collectivity extent is 1 meter (m), the mark out of the measuring window range, instrument needs a judgment course, So the measuring instance can't have break over 0.5m or instrument need time about 10s to feedback.

For the break from farness to near sometimes, instrument will appear Mistake.

But in fact measuring it is usually being less.

INSTRUMENT INSTALLING

The rational installation of the instrument is the key to working reliably.

The instrument install above container, launch surface of the sensor should point to the liquid surface or the material surface vertically.

If it is the airtight container, should adopt the flange type to install.

Other situations can install with the simple support.

Flange type installation should furnish the flange according to the instrument whorl size.

Installation Demand

When ultrasonic wave is launched, it will have a very small diffusion angle.

If have other object in the diffusion angle, ultrasonic wave will reflect, some measure error will appear when the reflection strong enough.

But velvet container can't reflect ultrasonic wave, send from above.

△ **Installation site far away from accidental container wall to try one's best, far away from the object that can stop sound wave of container such as escalator, transfusing mouth and blender etc..**

△ **Measuring Range 4m, 6m, 8m as follows instance must use a Cannula outside of the sensor.**

1. At the place of container flange to install.
2. Install at the thicker floor slab hatch.
3. Along raise place of the container(pool) stomata to install.
4. Take the sensor in the circle tube to install.

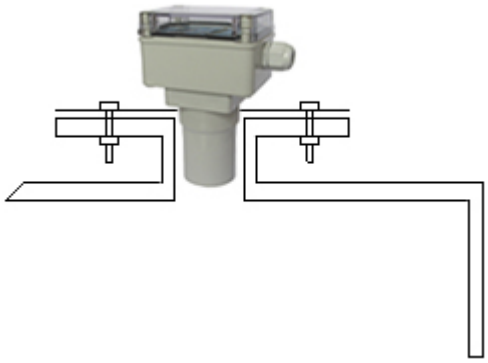
△ **If it is the airtight container, the flange on the container should accord with the following demand :**

Mode	Demand
Measuring Range 4m, 6m, 8m	Minimum 65mm inner diameter of the flange. Insure the inboard wall of nozzle smooth. And a **Cannula** must be used outside of the sensor at the same time.
Measuring Range 8m(A), 10m	Minimum 80mm inner diameter of the flange, nozzle length should less than 150mm, insure the inboard wall of nozzle smooth, under along a smooth arc.
Measuring Range 15m, 20m, 30m	Minimum 200mm inner diameter of the flange, flange nozzle length should less than 200mm. Measuring Range 15m : Minimum 150mm inner diameter of the flange. Flange nozzle length should less than 150mm.

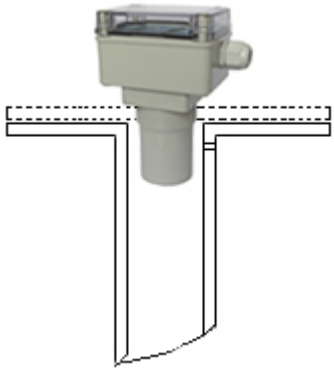
Narrate: When the sensor of measuring range 4m, 6m, 8m their side face closer comparatively to other object.

This object come into surrounding more to sensor, or the area is too big to the face of sensor, the instrument maybe become fake signal, So that the instrument can't natural work. with above-mentioned instance must install cannula on the sensor.

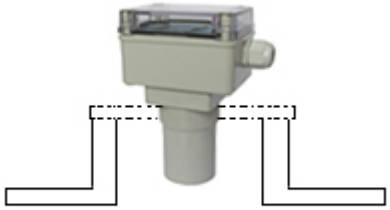
Showing as follows:



At the place of container flange to install.



Take the sensor in the circle tube to install.



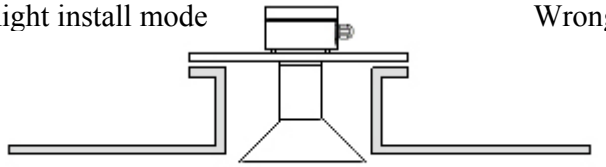
Along raise place of the container (Pool).

Install at the thicker floor slab hatch

Measuring range 4m, 6m, 8m level meter where need install cannula

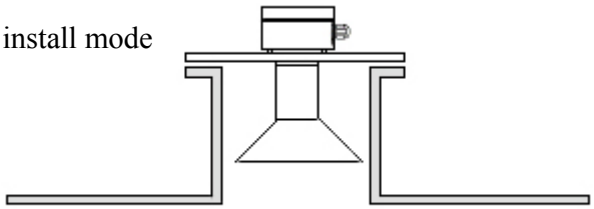
△ Measuring range15m, 20m, 30m level meter : when they are install at the flange on the container, at the thicker floor slab hatch, Along raise place of the container(pool) stomata, demand the highness or the thickness should less than the length of the sensor.
Showing as follows :

Right install mode



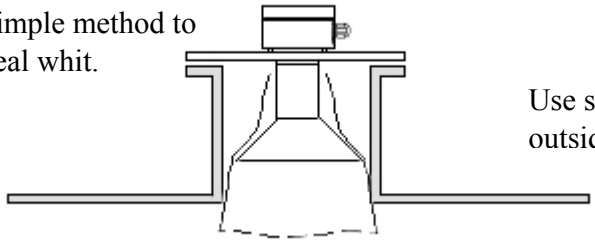
Sensor should put out

Wrong install mode



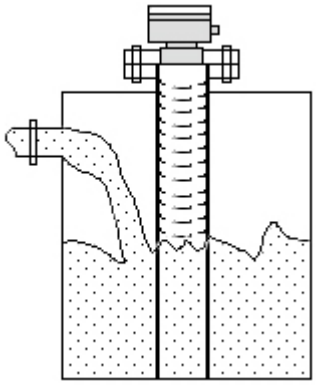
The front of the sensor should place at the tube

Simple method to deal whit.

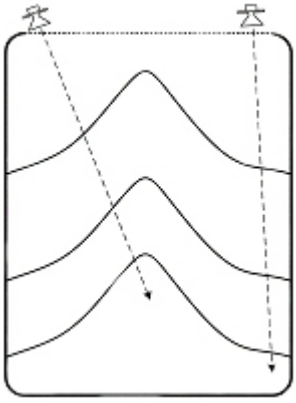


Use soft plastic Use soft plastic package the sensor outside until out of the tube needn’t verv order.

Standard disposal method: 1. Shorten the nozzle
2. Lengthen the sensor



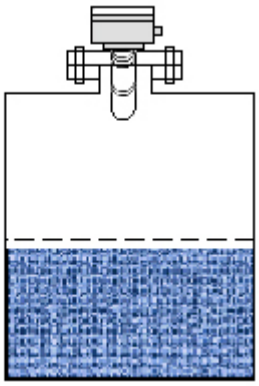
Join the plastic tube to level off measuring



install position and angle, when measure material location

△ If exist that the liquid fluctuate great, or having floaters, having objects that stops the sound wave etc., can insert a plastic tube to the container, make the sound wave spread in the plastic tube only, it is reliable to guarantee measurement steadily.
Demand the inner diameter of the plastic tube bigger than the outer diameter of the sensor.
Inboard wall must be smooth, equal straight and no seam.
The plastic tube should be straight, one hole should be open in top and bottom, so as to ensure that it is the same to be in charge of the internal and external level Simultaneity, for measuring range 4m, 6m, 8m level meter, a Cannula must be used outside of the sensor.

△ Launch surface of the level meter sensor should point to the liquid surface or the material surface vertically, should aim at goal as much as possible when installing when install to the cold area, should choose the lengthen sensor of the level meter.
The plastic make the sensor extend into the container, shun frost and lengthen sensor shun frost and icing.
How length need to lengthen, can confirm when subscribe for.



△ Should guarantee the level not to enter the blanking distance at it can increase installation height if need.
When increase installation height, require that the inner wall of nozzle should be smooth, its inner diameter should smaller than container flange's inner diameter.
When the flange type installed, it should be a plastic material flange compounded for the sensor.
Wiring:
Need to take off the hiding line board at the time of wiring, and emerges the whole terminal block.
Wiring use “one” word screwdriver as following picture.
Work After Electrifying:
Instrument show “HLUC” at first after electrify, show level value after a few seconds, indicator lamp glitter once every second at the same time.
What the instrument actual measured is the distance from sensor to the liquid or the material, later converted out the liquid location or material location value, it is very important to grasp this principle.

Press SEL key can look over measure distance value and temperature value.
Press MOV and SEL keys at the same time can enter parameter setting up state, after setting up installing height and measuring range, established upper limit and lower limit according to the need, then pressed SEL key once again.
Then press MOV and SEL keys at the same time and return to measure state.
The instrument will show correct level value, will output the correct current signal, the switch signal in the upper limit and lower limit.
If measurement is wrong, please refer to the next section that "Trouble Deal With".

Instrument Airproof

To keep it beautiful, we should make the cable in order and the hide line board covered, after finish the state of the parameter setting up.
Because the cover is plastic material, so should make that four bolts keeping balance and strict.
Be assure the cover transmit Screw down the enter line prevent water tie-in.
You'd better take the insulating tape bundle prevent water tie-in.
You'd better make the outside cable de-flexibility. prevent rain water in leakage.
Especially, there are more cables entering, by all means, deal whit it as above.

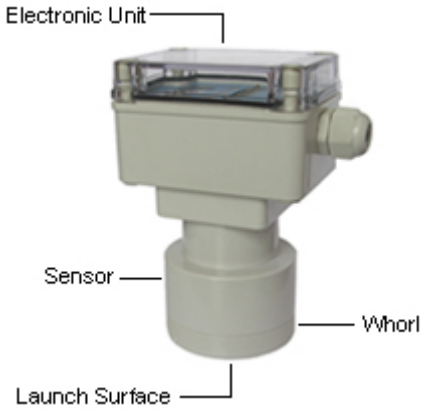
Rain water can't enter

Rain water can enter

If the application place have causticity gas, you'd better use plasticene to the cable's entrance, insure causticity gas can't enter instrument bosom.

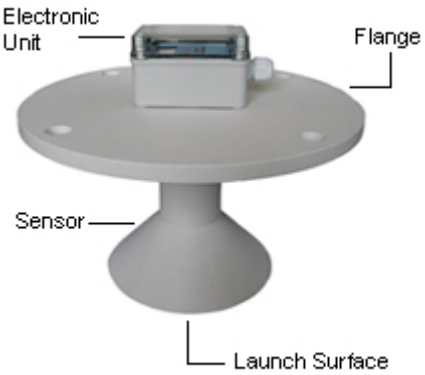
2.2 Make Up & The structure

Whole Structure : There are three kinds of forms in level meter:



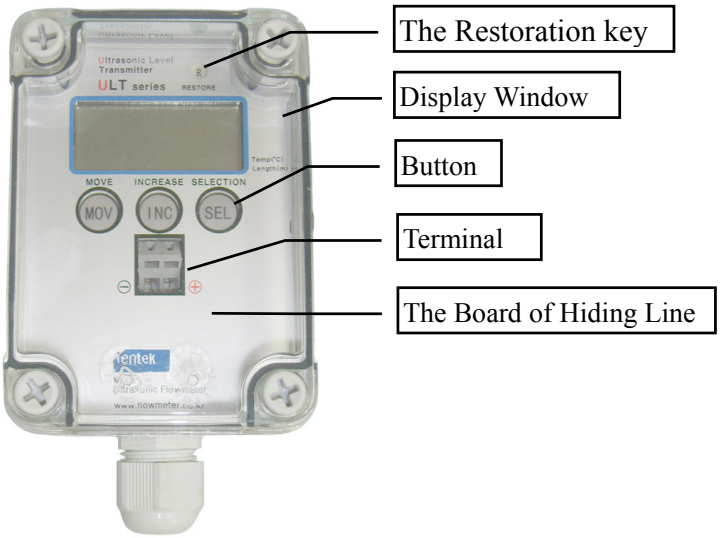
Model: 4m, 6m, 8m

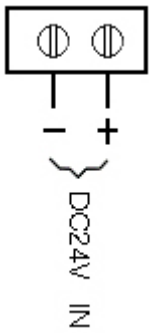
Model: 8m (A), 10m



Model: 15m, 20m, 30m

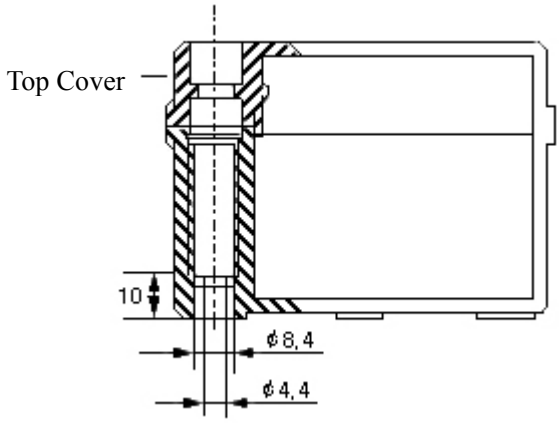
The Panel of The Electronic Unit :



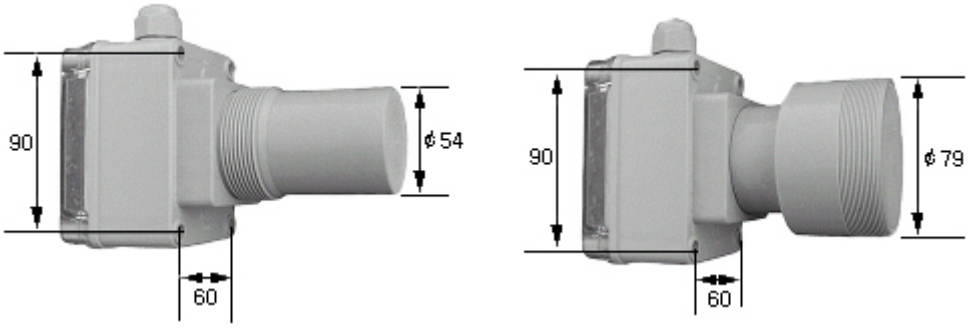


Terminal Block Diagram :

The Crossing Hole Structure of Installation With Brackets :

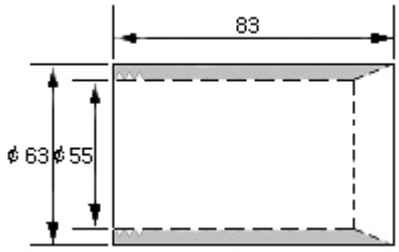


Should open the top cover while installing, then penetrate M4 regular screw or the bolt downwards.



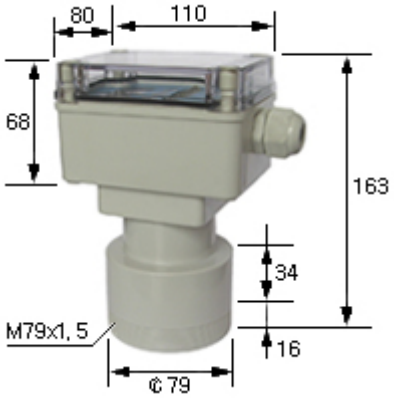
The Crossing Hole Position Of Installation With Brackets

Cannula: Using for Model 4m 6m 8m ultrasonic level meter, when installing at a flange or in a tube, the cannula must be fixed on the sensor.
A screw thread is in the cannula, it can fix on the sensor directly:

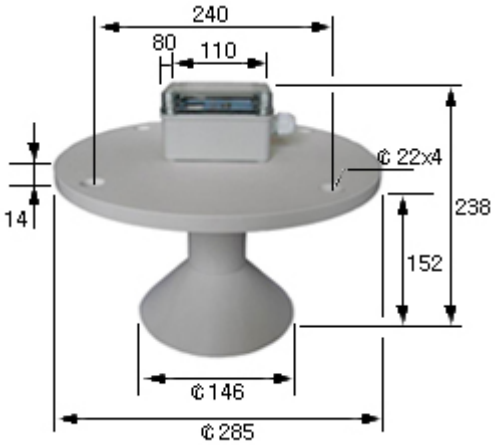


The External Dimension of Level mete :

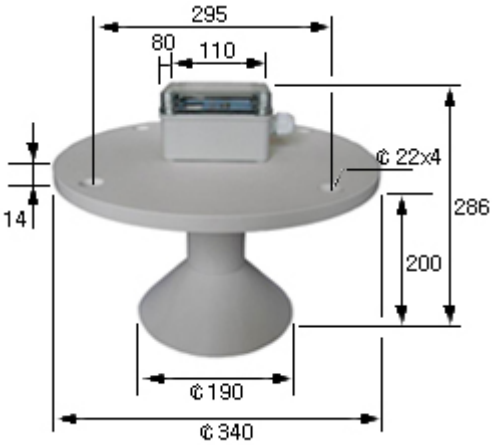
Model: 4m, 6m, 8m



Model: 8m(A), 10m

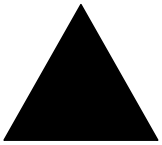


The External Dimension of Mode : 15m



The External Dimension of Mode : 20m, 30m

Chapter Ⅲ. Maintenance



Warning : All maintenance operations must be carried out with the power-off

• Model : ULT basically has been designed in a way of maintenace-free.
However, if you have any inquiries or any problems on the product please call the following numbers for appropriate services or technical supports.
(Ref: manual surface Addressing)
• The sensor and its immediate area are very much sensitive and vulnerable with impurities and contaminants of the fluid and it may cause a quality deterioration to certain degree depending upon the level of contaminations.
Therefore it is highly recommended that you will clean up the areas of sensor that are to be contacted with the fluid with soft brush more than several time a year this then will reduce problems mostly.
• If any inadequate levels are given to the sensor chit which is doing sensing, the sensor will most likely be cleaned out.
So, it should be carefully treated especially when installed, and make sure it will not be dropped down during in storage.
• To inspect the sensor or remove the from tank if it is visibly dirty, clean it with water or alcohol, until it appears clean again.
• If converter (electro unit) is error measuring range contact prior to ientek A/S center.

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E-mail: master@flowcountry.com

Chapter Ⅴ. Trouble Shooting

DEALLING WITH TROUBLES

Trouble Phenomenon	Trouble Reason	Solution
The instrument does not show, and does not work	It is wrong to supply power Wiring mistake	Check DC24v supplies power is right or not Check wiring is right or not
The instrument showing, not working	Sensor has not aimed at the liquid or the material Fluctuating range is very great the liquid Do not level extremely the material There are thicker foams the liquid The container bottom is not the level after the supplies are emptied. Exceeding the Measuring Range	Adjust the sensor and aim at the liquid or the material Join a plastic tube to the container Use level meter of the greater measuring range Use level meter of the greater measuring range Resume working naturally after adding the liquid or the material Use level meter of the greater measuring range
The instrument shows the unstable or there are great deviations in measurement value.	The level enters the blanking distance Model 4m 6m level meter instilled on flange There are strong electromagnetisms interfered There are objects which stops the ultrasonic wave Have compounded the metal flange ring to sensor Touching with the metal on the sensor's launch surface or side face	Increase the installation height or prevent the level too high a **Cannula** must be used outside of the sensor Connect the earth or add the shielding for the level meter Change the installation site or join a plastic tube Use the plastic flange ring instead Use the rubber cushion to isolate from metal
The measure value has a small deviation all the time	The Installation height setting up has deviation There is a deviation all the time in distance measurement	Set up again The velocity of sound of gas changes, contact with producer.