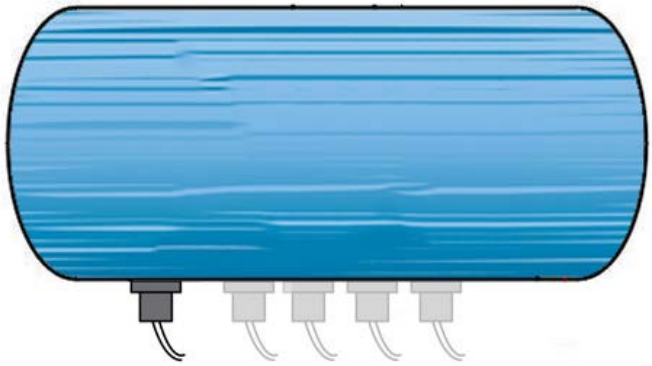
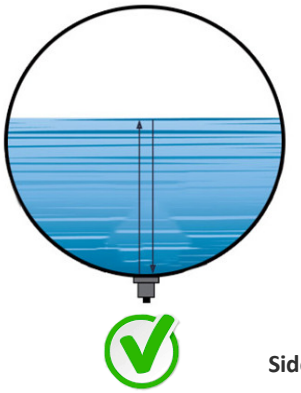
Installation instruction of
Non-invasive gauge (SK-WY02) on Horizontal Tank

Sensor Installation

Step 1 : Find a suitable installation position for <u>MEA sensor</u>



Front view



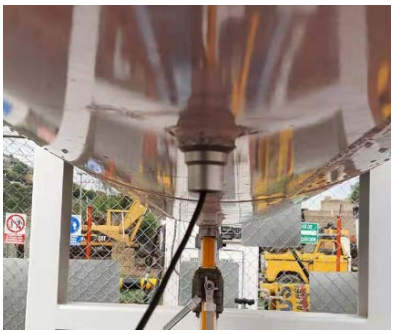
Side view

On Horizontal tank, theMEA sensor position is the direct bottom, the probe sensor has to be**perpendicular** to the liquid surface.

Please avoiding

1. <u>Tank welding gap line</u>
2. <u>Inlet and outlet structure, esp for inlet pipe/pump.</u>

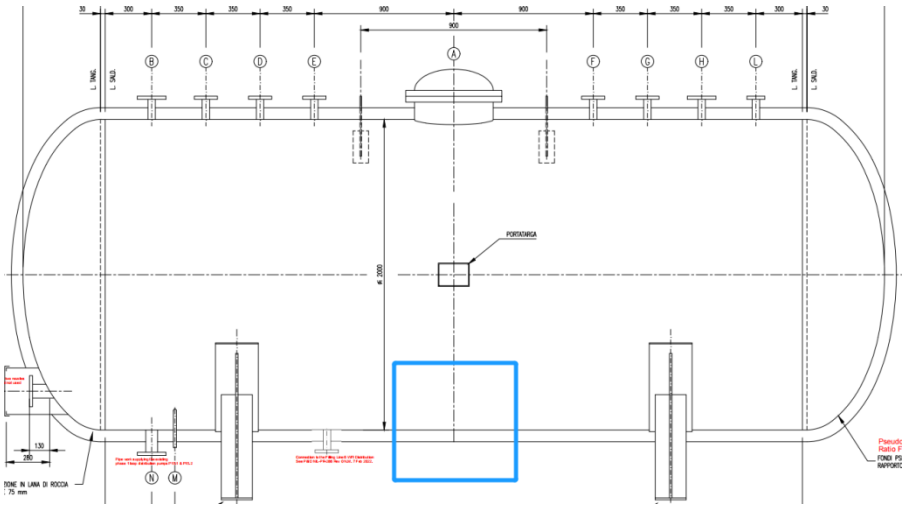
(if close to the inlet/outlet, The impact of the water flow will influence the measurement as during liquid in and out)



Based on your tank condition:

Blue frame is the suggested position for MEA sensor installation

- Under the Manhole. No obstacle structure.
- Away from pipe at the bottom
- Avoid the temperature sensor at top



Step 2 : Find a suitable installation position for CAL sensor

CAL Sensor Introduction

Diameter Calibration Sensor(CAL), which is bonded on the sidewall, to continuously calibrate the real-time sound velocity and update to the Transmitter.

In some practical applications, the sound velocity would be varied due to environment/liquid temperature change. The accurate sound **velocity(v)**value would be a key point for the level measurement result:

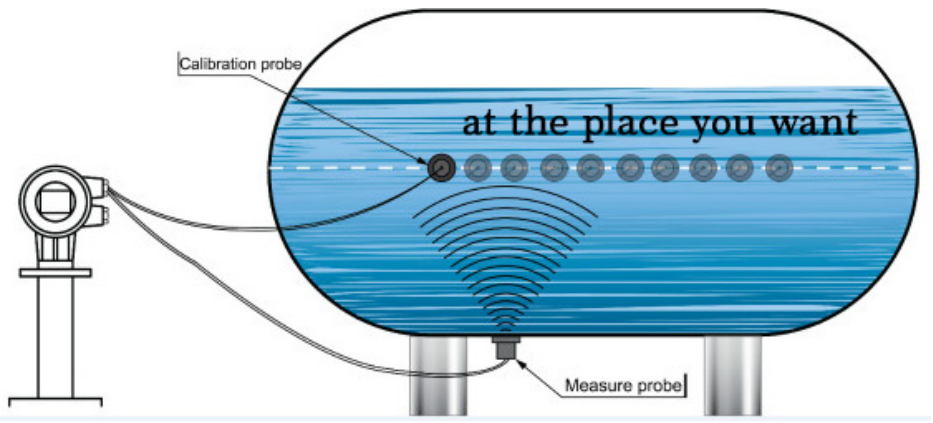
$$H = v \times (\frac{t}{2} - \frac{t_g}{2}) \times \alpha$$

CAL Sensor Position

On horizontal tank, the installation for CAL sensor is on**Equatorial position**, so that the probe sensor is **parallel** to the liquid surface.

Based on your tank condition:

CAL sensor position should be set on the **Equatorial position,** at any places on the equatorial line



Step 3 : Wire connection (CAL and MEA)

MEA sensor (Temp is optional)

Power DC 24V (orange Terminal)

CAL sensor port

Sensor wire - Terminal : ”+” and “-”

Measuring wire:
the core is the”+”, and the shielding layer is the “-”;

Calibration sensor is the same:
the core is the”+”, and the shielding layer is the “-”;

Insert the wire into the MEA/CAL/24V(Power) port of the Transmitter

Step 4: Sensor Installation

1. clean the wall, **polishing the position with Sandpaper(10cm*10cm space is suggested)**
(Reduce signal interference, make sensor completely coupled with the tank wall)

2. Apply silicone grease on the sensor (2-3mm)

3. Press it on the place you select(on tank wall) tightly. Rotate it and squeeze out the air, make sensor completely coupled with the tank wall.(Now please find the good signal by moving the probe slightly)

4.Press tightly, magnetically bond the sensor shell on the wall.(After get the good signal)

5. Fixed the sensor shell by waterproof glue.

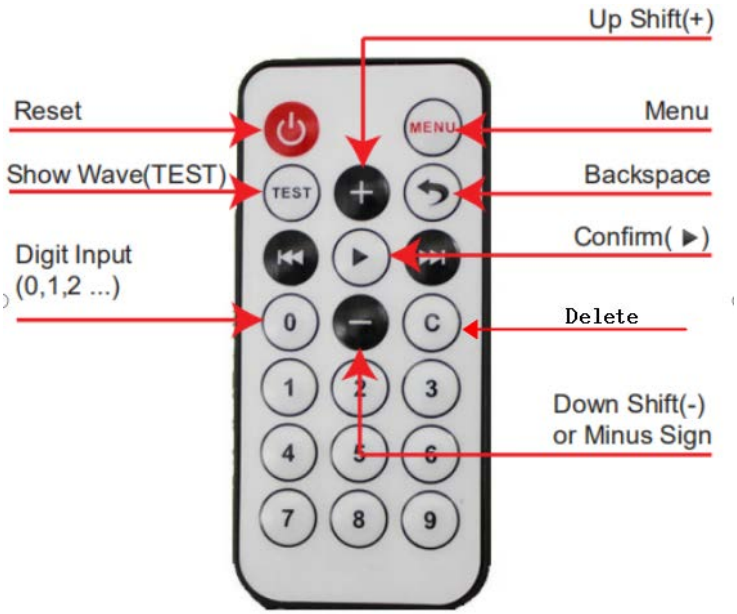
6. Electrical connection

Checking the wave form quality

Please ignore the color of the housing.

Step 5. Parameter setting

Remote Control Introduction



1、**Reset/restart:** reset or restart the instrument;

2、**Menu:** Open the menu, check and change the working parameters.

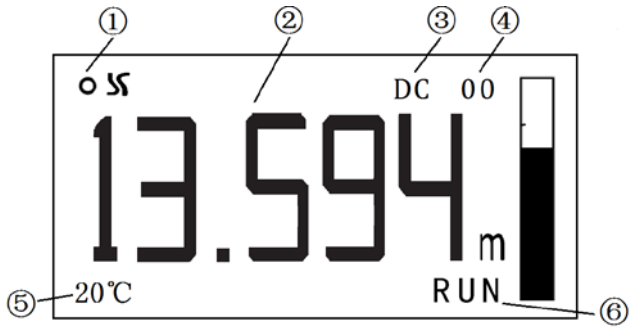
3、**Test:** Display real-time echo wave and parameters of the instrument and assist in debugging and diagnosis.

4、**Backspace:** Under the menu or waveform interface, return to the main working interface.

5、All of the other button are used to edit the con-figs.

Parameters introduction

Level interface



① Work Indicator: Blinking tips at work

② Level Display : Level Value (m); Percentage(%)

③ Working Mode

SM:Single probe measurement

DC: Diameter Calibration

TC: Temperature Calibration

DT: Double ways calibration

④Fault Code

00:No fault

01:Current Output Fault

02:Receiving waveform abnormality

08:Level entering dead zone

10:No echo signals

20:Abnormal transmitting waveform

80:Excessive noise interference

⑤ Temperature(Optional)

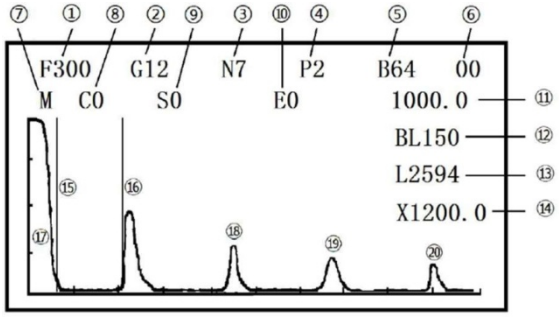
When the temperature calibration function is turned on, the measured temperature value is displayed.

⑥ Probe Working indicator

RUN:measuring probe(MEA) is working

CAL:calibration probe(CAL) is working

Wave interface



① F(100~2000) working frequency

② G(0~96) gain value

③ N(1~10)Number of emission pulses

④ P(1/2) power switch (P1 - low power), (P2 - high power)

⑤ B(1~1000)Envelope width

⑥ (00~FF) fault code

⑦(M/C)measureprobe/calibration probe waveform switching display

⑧ C(0/1)Manual Calibrate the Sound Speed

⑨ Sxxxxx(unit:mm)Initial position of waveform display

⑩ Exxxxx(unit:mm)Termination position of waveform display

⑪ (unit:m/s)sound speed value

⑫ BLxxx(Unit:mm)Blind area value

⑬ Lxxxx(unit:mm)level value

⑭ (unit: mm) Waveform area X-axis scale value

⑮ blind area zone position

⑯ echo position(Primary echo)

⑰ Transmitting wave

⑱ Second echo

⑲ Third echo

⑳ Fourth echo

①②⑤⑫⑬ ***are important parameters***

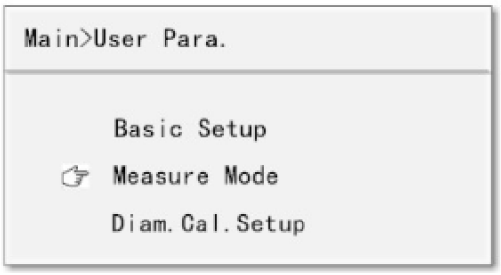
Settings

1. **Input Measuring Range value(For MEA Sensor)**

Press "menu", then “User Parameter”

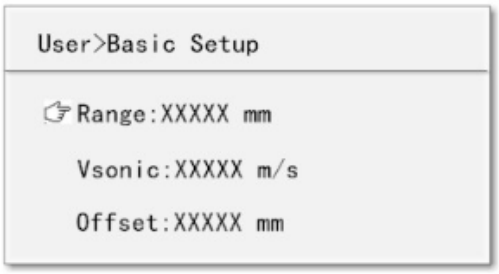
Input User password: **Dynamic Code *2-1** (exp: DC=16, Password=31)

User Parameter - press “Measure Mode”



Range - input your Tank Height(Exp: 2m, imput “2000”)

Vsonic- keep the default value (or input 1485, based on our experience)



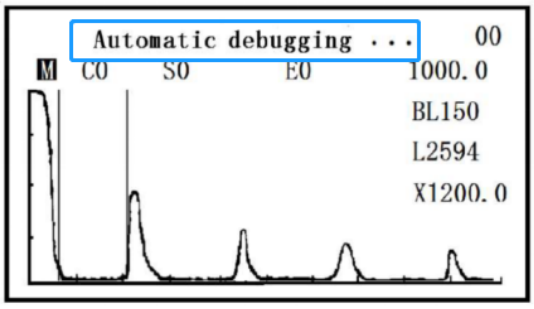
2. Auto debugging and and check waveform quality

Auto debugging

Use remote control, back to the main interface.

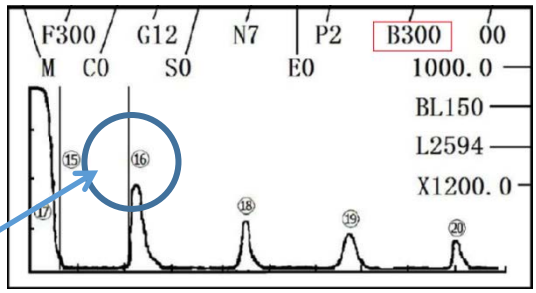
Press "0"**six times** in the initial interface of the main table (waveform display or liquid level display interface) to enter the automatic calibration mode, which takes about 5 minutes.

The mode will automatically find the appropriate frequency to obtain more accurate liquid level value. (Suitable for simple measuring task like water)



Check wave form quality

Press “TEST”, switch Level interface to Wave interface.



How to judge a good Waveform Quality :

1. **Gain "Gxx"** and **blind zone"BLxxx"** are as small as possible.
2. **Thefirst echowave** is higher than that of other echoes.
3. Waveform noise is small and there is no clutter interference.
4. The waveform is smooth and without bifurcation.
5. The echo position is stable and reliable.

Ideal waveform: Clean and clear wave, **“BL” and“G”** are small

***If waveform/blind zone is not ideal**

1. Change Frequency

Press “TEST”, enter in Wave Form

Press “1” for six or more time, switch to Manual debug mode

Select “**F” value** (Frequency),**“B” value**(Envelope width)change the default frequency by using arrow keys (increase or decrease)

Based on our experience, on Horizontal tank:

The ideal frequency “F” value: **140 or 160**

The Envelope width“B”: **30**

Each storage tank is in different situation, including: sediment condition tank wall thickness, sensor position, current level height.

So there are no fixed parameters to input. The above value is for reference based on our past application task.

There will be a suitable Frequency value(**F)** for each tank.

By adjusting it, and check the result

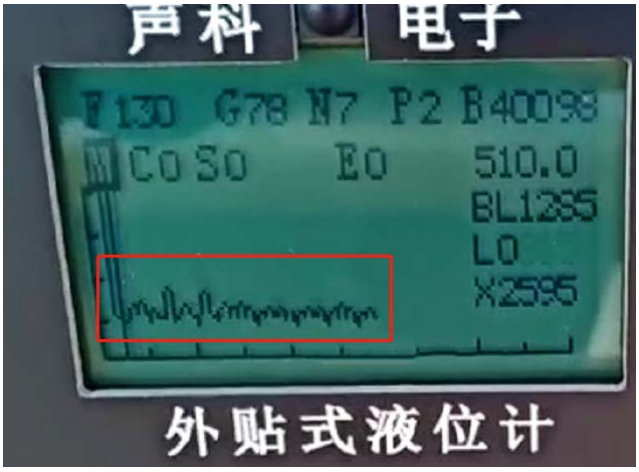
2. Change sensor position

If the result is still bad after adjusting frequency, it may requires to:

- adjust sensor position

- recheck if sensor is tightly contact with tank wall.

The most common Bad Waveform examples (require to change the sensor position)



Unable to detect level (no Echo), liquid level**”L”**= 0

Wave Tailing is large, Bling zone **“BL”** value is super high.

3. CAL sensor setting

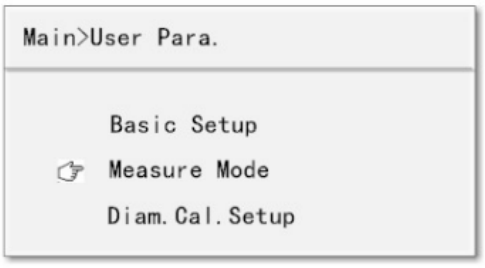
Once the MEA setting, Auto debugging, waveform checking is done, time to set CAL sensor

a. SwitchMeasure Mode as **Diameter Calibration ("Diam Cal")**

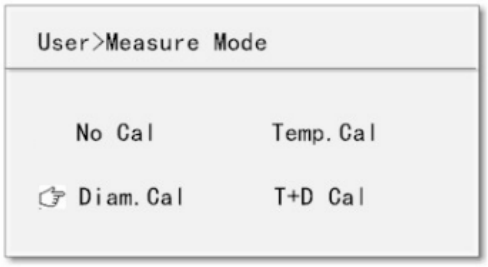
Press "**menu**", then **"User Parameter"**

Input User password: **Dynamic Code *2-1** (exp: DC=16, Password=31)

Select **"Measure Mode**"

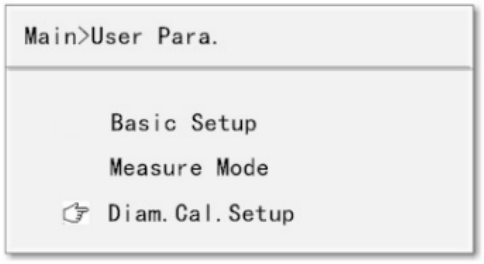


Select "**Diam. Cal"**, and back



b. Input Diameter calibration value

Back to **"Diam.Cal.Setup"**



Input **"Distance"** and **"Height"**

Distance: input Tank Diameter

(Exp: 2000mm)

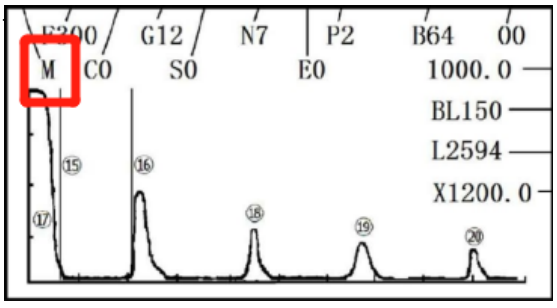
Height: sensor installation position. (Half of the Measuring Range, exp: 1000mm)

Period: Default **20min**

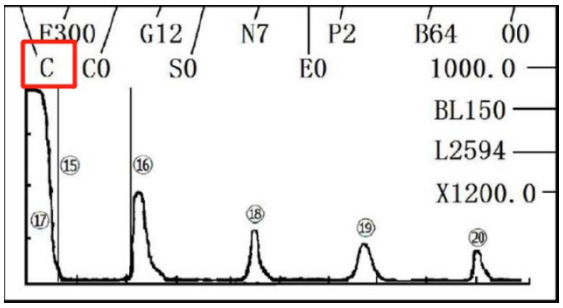
C. Switch **MEA sensor wave interface** to **CAL sensor interface, how to?**

- Press "TEST", entering Wave interface display, at that time, the interface is **MEA sensor** (before we have set it)

- Using remote control, Change **"M"** to **"C"**, by arrow key, switch from MEA waveform to CAL sensor waveform

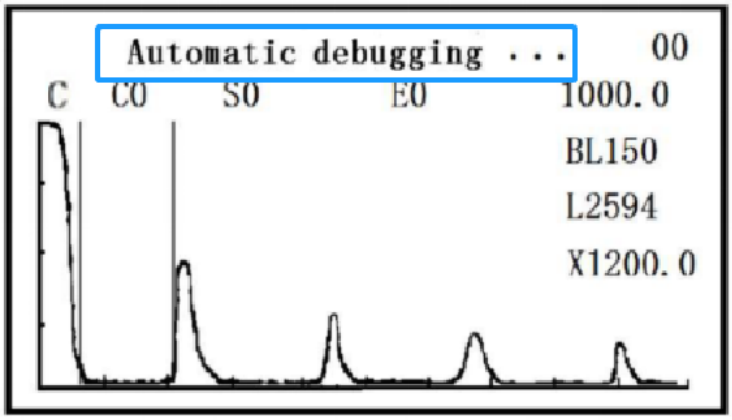


(MEA sensor wave, M)



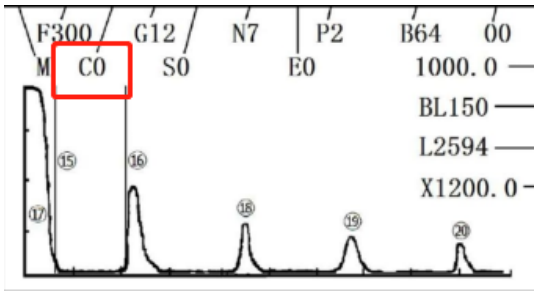
(CAL sensor wave, C)

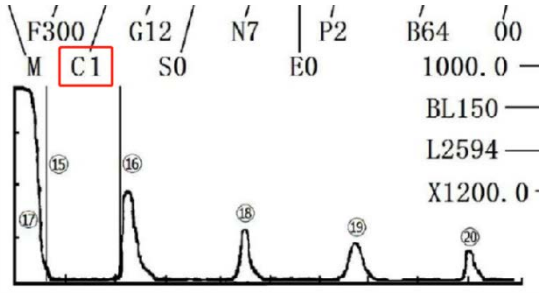
D. Run auto debugging for CAL sensor, by Pressing"0"**six times,** and wait (the same with MEA Sensor). then heck the wave form quality.



e. When the waveform is ok, Switch **“C0”** to **“C1”**by arrow key, Sound velocity(v) would be auto updated/input.

In brief, CAL sensor updating the correct real time sound speed to MEA Sensor. For better accuracy.





According to our experience:

The sound speed value for water media, is **1485**

Note:

1. Senor position selection is critical step.
2. Make sure the sensor probe tightly contact with tank wall.
3. For saving time by avoiding duplication of effort (change sensor position), please ensure the parameter setting is well done before applying glue to fix it.

Step 6. Liquid Level Comparison

Compare with the update Liquid Level to with your current Level instrument tools.

Final Step: Settle Transmitter

Fixing thetransmitter base at the suitable place.

Arrange the wire.

Installation complete.