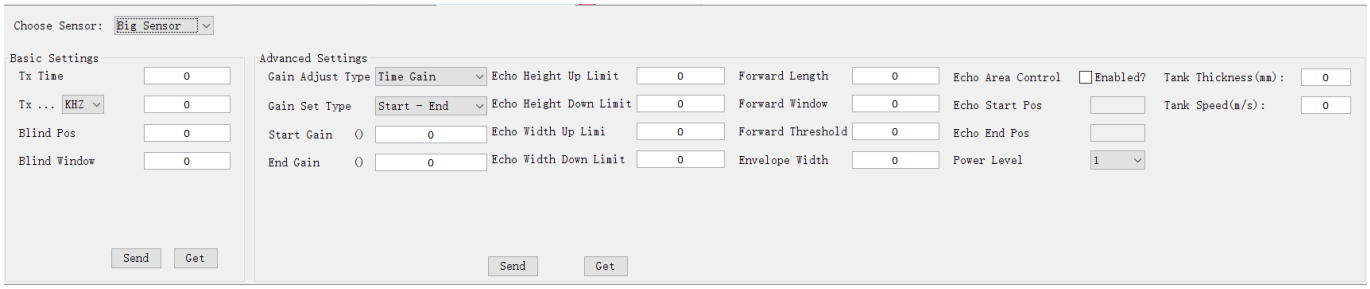
Level Gauge Soft User Manual

Revision：1.0.8
At：Wednesday, June 27, 2018

1 Measure Settings：



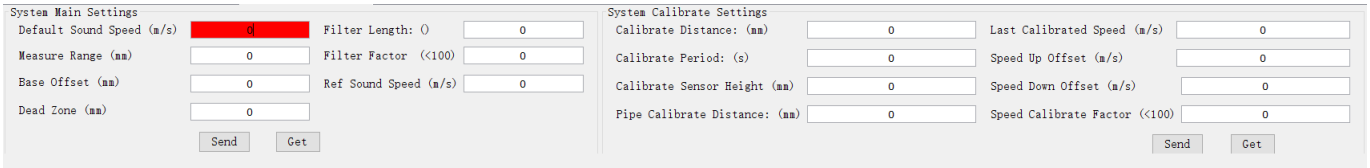
- **Choose Sensor:【**Big Sensor, Small Sensor**】**: Select the probe corresponding to the current parameter。When select the “BIG SENSOR”,then all read or write actions will only take effect on big sensor，When select the “SMALL SENSOR”, then all read or write actions will only take effect on small sensor。
- **Tx Time**：[1，100]：Default to 7。It indicates how many sonic wave pulses are emitted. Within a certain range, the number of transmitted pulses has little effect on the echo amplitude. However, it will increase the width of the transmitted wave as well as the tailing and the width of the echo.。
- **Tx Frequency**：[1，20000]KHZ：It is the frequency of sound waves emitted. Generally depends on the condition of the measured medium and the wall thickness of the tank. This parameter has a greater impact on the echo.。
- **Blind Pos**：[10，20000]：It is used to judge whether the level has entered into the dead zone. The setting should be based on the position of the trailing wave of the transmitted wave. Note: This parameter is only valid under "Time Gain", "Auto Gain", and "Fixed Gain". Under "Auto Gain - Enhanced", This item is automatically searched.。
- **Blind Window**：[1，10000]：Defaults to 100. It is generally recommended to set to half of the width of the envelope (or more than half, the larger the more stable, but with larger the dead zone). If the echo energy in this window is greater than the preset threshold, it is considered that the dead zone has been entered.
- **Gain Adjust Type**：[Time Gain, Auto Gain, Auto Gain-Enhanced, Fixed Gain]: The time gain indicates that as the liquid level rises, the gain will also increase. Fixed gain means that the gain will remain constant throughout the echo reception process. Automatic Gain/Auto Gain - Enhanced: Indicates that the gain stays the same throughout

the echo reception process, but unlike the fixed gain, it automatically adjusts the system gain based on the signal strength so that the received signal level is within expectations. **In normal use, "Auto Gain - Enhanced Edition" is generally selected. Other gain adjustment methods can only be used for debugging.**

- **Gain Set Type**： You can ignore this item。
- **Start Gain**：[0，128]：You can ignore this item
- **End Gain**：[0，128]：You can ignore this item
- **Gain Period**：[1，10000]：You can ignore this item
- **Start Pos**：[0，65000]：You can ignore this item
- **Amplitude**：[0，5000]：Mainly used for "automatic gain" and "automatic gain-enhanced." Used to set the desired strength of the signal。
- **Echo Height Up Limit**：[0，20000]：In general, it is recommended to use the default value. 0 means not enabled.
- **Echo Height Down Limit**：[10，20000]：In general, it is recommended to use the default value.
- **Echo Width Up Limit**：[0，50000]：In general, it is recommended to use the default value. 0 means not enabled.
- **Echo Width Down Limit**：[1，50000]：In general, it is recommended to use the default value.
- **Forward Length**：[0，10000]：You can ignore this item。
- **Forward Window**：[1，10000]：You can ignore this item。
- **Forward Threshold**：[1，1000]：You can ignore this item。
- **Envelope Width**：[1，10000]：The size of the window that envelopes the waveform. The smaller the envelope width, the more accurate the waveform, but rough; the larger the envelope width, the smoother the waveform and the more stable the measurement. Enlarging the envelope width only increases the dead zone for measurement. In addition, there is no other negative effect (does not affect the measurement accuracy). In general, it is recommended to set according to the empirical value at the end of the article. The lower limit of the echo width should always be less than or equal to the envelope width. The forward search length should always be greater than or equal to the envelope width
- **Echo Start Pos**：[1，1000000]：You can ignore this item
- **Echo End Pos**：[1，1000000]：You can ignore this item
- **Power Level**：Used to set the transmit power. Divided into 4 gears: 1st gear is the weakest and 4th gear is the strongest. In the latest version of the instrument, different gears also correspond to different measurement speeds. The higher the gear, the slower the measurement speed; the lower the gear, the faster the measurement. Therefore, it is generally recommended that large tanks can select 4th gear; small cans should select the 1st gear

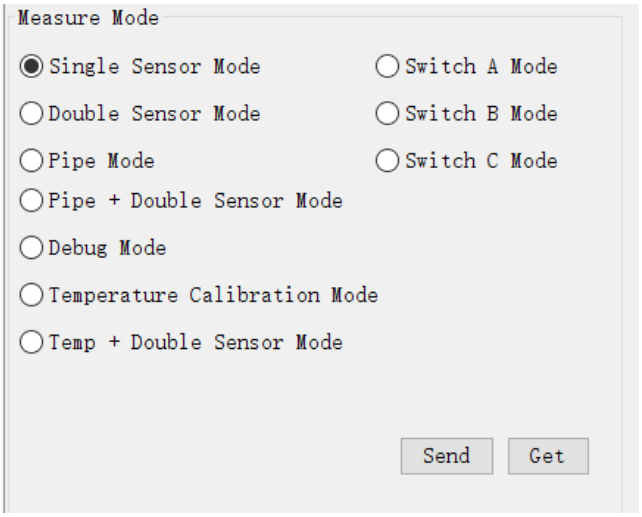
- **Tank Thickness：[0，128]mm** The thickness of the tank wall, and must be filled in according to actual conditions, otherwise it will affect the measurement accuracy. The unit is mm
- **Tank Speed：[0， 10000]m/s** The speed of sound waves (transverse waves) in the tank wall. The unit is m/s. If the tank wall thickness and sound velocity of the tank wall are both 0, it means that the influence of the tank wall is not considered

3 System Settings



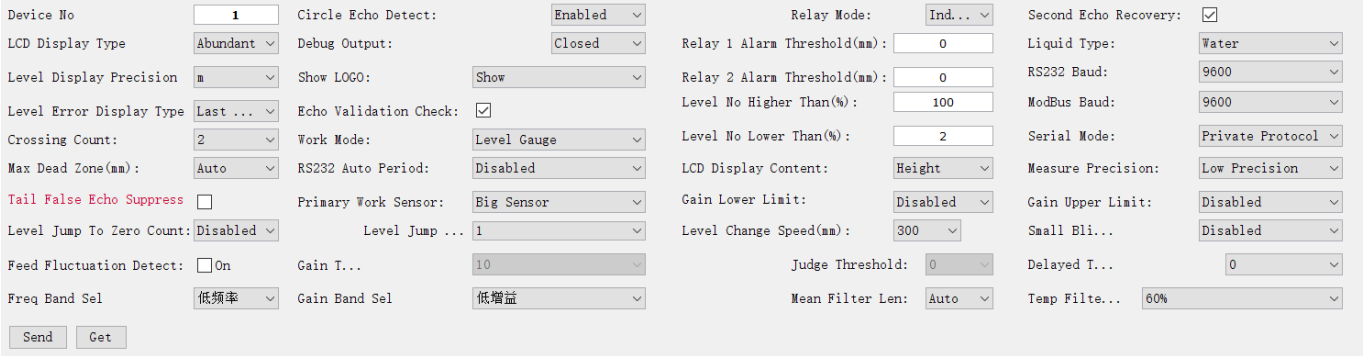
- **Default Sound Speed**：[10，10000]m/s：Generally depends on the condition of the measured medium. Indicates the speed of sound the system uses in single probe mode.
- **Measure Range**：[10，100000]mm：Generally depends on the shape of the tank. Indicates the highest level that the level gauge can measure. It also determines the 4~20mA current output
- **Base Offset**：[-50000，50000]mm：Indicates the offset of the liquid level measured by the system relative to the horizontal plane
- **Dead Zone**：[0，10000]mm：You can ignore this item。
- **Filter Length**：[5，60000]：You can ignore this item。
- **Filter Factor**：[1，99]，You can ignore this item
- **Ref Sound Speed**：[10，10000]m/s：You can ignore this item
- **Calibrate Distance**：[20，100000]mm：You can ignore this item. It is only used in Double Sensor Mode.
- **Calibrate Period**：[2，1000000]s：You can ignore this item. It is only used in Double Sensor Mode.
- **Calibrate Sensor Height**：[1，100000]mm：You can ignore this item. It is only used in Double Sensor Mode.
- **Pipe Calibrate Distance**：[-10000，10000]mm：You can ignore this item. It is only used in Double Sensor Mode.
- **Last Calibrated Speed**：[100，10000]m/s：You can ignore this item. It is only used in Double Sensor Mode.
- **Speed Up Offset**：[1，1000]m/s：You can ignore this item. It is only used in Double Sensor Mode.
- **Speed Down Offset**：[1，1000]m/s：You can ignore this item. It is only used in Double Sensor Mode.
- **Speed Calibrate Factor**：[1，99]：You can ignore this item. It is only used in Double Sensor Mode.

4 Measure Mode



- **Single Sensor Mode**：In this mode, the level gauge uses the system default sound speed
- **Double Sensor Mode**：You can ignore this item。
- **Pipe Mode**：You can ignore this item。
- **Pipe + Double Sensor Mode**：You can ignore this item。
- **Debug Mode**：You can ignore this item。
- **Temperature Calibration Mode**：The temperature calibration mode can be selected due to the defect of the double probe calibration mode (it cannot be calibrated when the liquid level is less than half), and the user has high requirements for measurement accuracy. Currently only oil level gauges and level gauges with temperature measurement support this function. If the temperature calibration mode is enabled, the "Media Type" parameter must be changed in the advanced system settings. At present, it supports the temperature correction of several common liquids such as propylene, liquid ammonia, propane, water, gasoline, diesel oil, and kerosene. At the same time, the “hysteresis temperature” should also be reasonably adjusted to further improve the accuracy of temperature measurement.
- **Level Switch A,B,C Mode**：You can ignore this item。

5 System Advanced Setting



- **Device No**：The address or other unique identifier used to identify the level gauge. The default is 1. Modbus communication protocol will use this parameter
- **Level Display Precision**：The accuracy of the liquid level displayed on the liquid level gauge LCD. It is divided into 5 levels: 0.1mm, millimeter, centimeter, decimeter, meter, and the default is meter. Note: Only the oil level gauge supports 0.1mm
- **Show Logo**：When turned on, the company logo will be displayed when the level gauge is booted. When closed, it is not displayed. Default on
- **Liquid Type**：Set the measured media type. When using temperature calibration, the system can perform real-time sound velocity temperature calibration according to media type
- **Modbus Baud Rate**：Used to set Modbus communication baud rate
- **Serial Mode[Private Protocol，Modbus]**：设 The working mode of the serial port of the level meter: private protocol: refers to the communication protocol used when the debugging software sets the parameters. This protocol is private and not open to external. Modbus: Make the 485 serial port work in Modbus mode, so that multiple level gauges can be networked
- **Level Change Speed：[0,700]** The maximum allowable difference between the two adjacent valid measurements of the level gauge. The default is 200 and the unit is mm. Setting suggestion: When the measuring range is less than 5 meters, it is set to 100; when the measuring range is 5 to 10 meters, it is set to 200; when the measuring range is more than 10 meters, it is set to 300. The greater the range, the speed of change should increase! Disabled = 0 indicates that this function is disabled and any level of liquid level change will be accepted.
- **Max Dead Zone:[0, 6200]** The maximum dead zone of the meter. If the dead zone detected by the level gauge is greater than this value, the level gauge is considered to have entered the dead zone. The default is auto (half the range). Disabled means to turn off the maximum blind detection.

- **Delayed Temperature：【-32， 31】。**The temperature measured by the system is the temperature of the tank wall, and the actual temperature required by the system is the temperature inside the tank. There is a certain difference between these two temperatures, and the hysteresis temperature is used to correct this error. Default is 0, which means no correction
- **Delayed Temperature Filter Factor：【0%， 100%】。**Because there is a non-linear relationship between the temperature in the tank and the temperature of the probe, this coefficient is used to adjust the relationship so that the temperature measured from the probe can best approximate the true temperature in the tank. The default is 60%. The smaller the value, the closer to the probe's original temperature; the larger the value, the slower the temperature change.
- **Mean Filter Len：【10， 150】**: It is used to smooth the display level(4-20 mA output) and make the DCS curve smoother. Note: Generally only used in harsh working conditions. The default is Auto(20)

Envelope Width

Experienced Reference Value

Horizontal Tank：100 ~ 400

Vertical Tank：400 ~ 600

Sphere Tank：600 ~ 1000

Reference Setting

- Forward Length = Envelope Width
- Echo Width Down Limit = smaller of【Default Value and Envelope Width / 3】
- Blind Window >= Envelope Width / 2

Adjusting the "Signal Smooth" under "Diagnostics" in the Infrared Menu allows you to change the above 4 parameters in one click. (Note: Signal Smooth = Envelope Width)