Guided Wave Radar Level Meter

manual of operation
Program Introduction: Adjustments can be done with four buttons on the view point. Optional menu languages are available. View point is only used for display after adjustments. Measurement results would be displayed on the LCD.

Display / Adjustment Module

Key Functions:

- **[OK]** Keypad
  - Enter programming mode;
  - Confirm programming options;
  - Confirm modifications to parameters.

- **[▲]** Keypad
  - Modify parameter values;
  - Enter display mode while running;

- **[◄]** Keypad
  - Choose programming options;
  - Change programming options;
  - Choose the digit of parameters to edit;

- **[BK]** Keypad
  - Programming mode exit;
  - Return to higher menu level;
  - During operation, Measurements / echo waveform switching;
Adjustments parameter settings and testings can be done by the four keys on View Point.

**Program Menu Structure**

Menu Structure is shown in the appendix. Turn to next menu item pointed by right arrow with OK. Turn to next menu item pointed by down arrow with . Turn to left item with BK.

**Program Submenu**

**Basic settings**

Basic adjustment for the Sensor are included in this menu. They are min. adjustment, max. adjustment, medium, damping time, Mapping curve, scaled units, scaling, Range, near blanking and sensor tag.

**Display**

In this menu you can setup the sensor display mode and adjust B/W contrast for LCD.

**Diagnostic**

In this menu you can check and test the sensor. You can view the measurement peak values, meas status, Choose curve, echo-curve and Simulation.

**Service**

In this menu you can store False echo memory, current output, Reset, Language, Address, SYS KEY, Distance Adj, Envelope amplitude, Multi-point calibration, Lower signal levels.

**Info**

The information of sensor including sensor type, serial number, date of manufacture, software version.

**Program operation**

Enter program mode by press OK. Display programming submenu. Press to select the programming submenus, to change the different programming items. Press OK to confirm after each parameter editings. Otherwise the modification will be abandoned. Press BK to quit program status.

**Parameters editing**

The first digit of the edited parameter will be displayed in black background on entering parameter editing. Modify the digit with . Then you can edit next digit with . After editing, press OK to confirm and store the modification.

**Optional item programming**

Some settings can be done by selecting one of several optional items with and confirming with OK.

**Program menu instruction**

1. **Basic settings**

   Basic settings include setting the main parameters of the instrument, such as min/max adjustment, medium, damping and etc. In the operating state, press OK to enter programming mode, then the menu is displayed as below:

   ![Program Menu](image)

   Note: The menu item number is displayed on the top right corner.
1. 1 Min. adjustment
Min. adjustment applied for the range setting. The item is one of the two setting points that regulates the linear scaled current output. At main menu (the menu number is 1.0), select Basic settings and confirm with OK. Now the Min. Adjustment is displayed on LCD. The menu item number is 1.1.

```
Min. adjustment 1.1
  10.000 m (d)
at 0% (4mA)
m (d)
```

Press OK to enter Min. adjustment Programmed distance values. See parameter edition to learn how to edit parameters. Press ok key to confirm, press the BK button to give up programming.

1. 2 Max. adjustment
When the LCD displays the menu number is 1.1, press the OK to enter Max. adjustment, LCD displays as below.

```
Max. adjustment 1.2
  0.000 m (d)
at 100% (20mA)
m (d)
```

In this case, press OK to edit Max. adjustment.

1. 3 Medium
When LCD menu is 1.2, press OK to enter Medium menu, LCD displays as below.

```
Medium 1.3
  Liquid ▲
```

There are three options to choose from Liquid, Solid, and Micro DK. By setting the property of the medium, measurement can be made accurately.

1. 4 Fast level change
When LCD menu is 1.3, Available OK to move the arrow to select Medium as a liquid or solid, to enter Fast level change setting menu, LCD displays as below.

```
Fast level change 1.3
  15.0 m/min
```
First echo

When you select liquid or solid, LCD menu is Fast level change setting menu, press \( \text{OK} \) to enter First echo, LCD displays as below.

\[ \text{First echo} \]
\[ 100\% \]

Press \( \text{OK} \) to edit First echo.

(Liquid)

Agitated surface

When selecting Medium of the liquid, the liquid crystal display menu First echo, press \( \text{OK} \) to Agitated surface, LCD displays as below.

\[ \text{Agitated surface} \]
\[ \text{No} \]

Then press \( \text{OK} \) to enter the selection menu.

(Liquid)

Foaming

When the liquid crystal display menu is Agitated surface, press \( \text{OK} \) to Foaming, LCD displays as below.

\[ \text{Foaming} \]
\[ \text{No} \]

Then press \( \text{OK} \) to enter Foaming menu.
(Liquid) Hopper

When the liquid crystal display menu is Foaming, press \( \text{Hopper} \) to enter Hopper, LCD displays as below.

Then press \( \text{Yes} \) to enter Hopper menu.

(Liquid) Measure in tube

When the liquid crystal display menu is Hopper, press \( \text{Measure in tube} \) to enter Measure in tube, LCD displays as below.

Press \( \text{OK} \) to edit Measure in tube, LCD displays as below.

Press \( \text{select} \) to select Yes, Press \( \text{OK} \) to enter Measure diameter, LCD displays as below.

Note: Measure in tube must be the case where the waveguide is present in order to set up effective.
When selecting Medium of the Solid, the liquid crystal display menu First echo, press \( \text{大型} \) to Large angle repose, LCD displays as below.

When the liquid crystal display menu is Large angle repose, press \( \text{小型} \) to enter next menu, LCD displays as below.

When the liquid crystal display menu is Power, press \( \text{小型} \) to enter Hopper, LCD displays as below.

After adjustment is complete, Press \( \text{小型} \) to return to the previous menu.
1.4 Damping

When LCD menu is 1.4, press ✔️ to enter Damping setting menu, LCD displays as below.

![Damping](image)

you have finished editing, press ✔️ to confirm.

1.5 Mapping curve

This menu define the correlation between the measured value and the current output. Linear or non-linear mapping can be selected in this menu. For the non-linear correlations, parameters setting must be done by a computer previously.

When the menu item number is 1.4, press ✔️ to enter Mapping curve LCD displays as below.

![Mapping curve](image)

Press ✔️ to edit Mapping curve, Use ➦ to select linear or other optional mapping, then press ✔️ to confirm.

![Mapping curve](image)

1.6 Scaled units

The unit of the scaled output value can be set in this menu. When LCD menu is 1.5, press ✔️ to enter Scaled units menu, LCD displays as below.

![Scaled units](image)

Press ✔️ to enter the editing menu, then Press ➦ move arrow to select the measure word and corresponding unit, confirm by ✔️.
1.7 Scaling

When LCD menu is 1.6, press \( \text{ok} \) to enter Scaling menu, LCD displays as below.

- **Scaling**
  - \( 0\% = 0.00 \)
  - \( 100\% = 10.000 \)

Press \( \text{ok} \), 0% corresponds to the parameter field anti-black, Use the \( \uparrow \) and \( \downarrow \) to set the parameters, Press \( \text{ok} \) to confirm and enter the corresponding value of 100%, with the same method to set 100% of the parameters. After editing press \( \text{ok} \) to confirm and enter the next menu, Use the \( \uparrow \) and \( \downarrow \) to set Decimal point, Press \( \text{ok} \) to confirm.

1.8 Range

In order to obtain the correct measurement results, set the range of the instrument. When the single display is 1.7, press \( \text{ok} \) to enter the range setting menu, LCD displays as below.

- **Range**
  - 5.000 m (d)

Under normal circumstances, the range setting value is adjusted in accordance with the previous low move to complete the set. If you want to adjust, press \( \text{ok} \) to enter the range setting. See Character/number parameter editing method in the previous edit the distance value. Press \( \text{ok} \) to confirm, press \( \text{bk} \) to exit programming.

1.9 Near blanking

When a fixed obstruction interference measurement is made close to the sensor surface mounting screw and the maximum feed height does not reach the obstruction, Near blanking setting function can be used to avoid measurement errors. When LCD menu is 1.8, press \( \text{ok} \) to enter Near blanking menu, LCD displays as below.

- **Near blanking**
  - 0.400 m (d)

1.10 Sensor tag

When LCD menu is 1.9, press \( \text{ok} \) to enter Sensor tag menu, LCD displays as below.

- **Sensor tag**

Press \( \text{ok} \) to enter the parameter edit state, press \( \text{ok} \) to confirm.

The basic setup menu ends here.
2. Display

This menu is used to set display mode.

When the LCD displays the main menu, press , move arrow to point to the type you want, LCD displays as below.

Press OK to enter Display menu.

2.1 Display Value

Indicating that the parameters of the current display is Distance, that is, the instrument displays the measured null value. Press OK enter the edit mode, LCD display

press . Move the arrow to the desired parameter, press OK to confirm, Press OK to exit the programming and return to the previous menu.

2.2 LCD contrast

When the menu item is 2.1, press to enter LCD contrast menu LCD displays as below.

Press OK to enter the adjustment state

Use and to increase or decrease the contrast, then press the OK to confirm the adjustment and save the result.
3. Diagnostics

The running status of the sensor can be provided by the menu Diagnostics, and furthermore sensor testing can be done.

When the LCD displays the main menu, press \(\text{Menu}\), move arrow to point to the type you want, LCD displays as below.

### 3.1 Peak values

Press \(\text{OK}\) to enter Diagnostics menu.

#### Peak values

- Distance-min: 0.000 m (d)
- Distance-max: 0.000 m (d)

### 3.2 Meas Status

When LCD menu is 3.1, press \(\text{Down}\) to enter Meas Status menu, LCD displays as below.

#### Meas Status

- meas reliability: 10 dB
- sensor status: OK

### 3.3 Choose curve

When LCD menu is 3.2, press \(\text{Down}\) to enter Choose curve menu, LCD displays as below.

#### Choose curve

- Echo curve

Press \(\text{OK}\) to enter Choose curve menu.

#### Choose curve

- Echo curve
- False echo curve
- Echo curve (Effective)
- Output trend

Press \(\text{Move}\) move arrow to select the curve what you want, confirm by \(\text{OK}\).
3.4 Echo curve

When LCD menu is 3.3, press [ ] , the LCD shows the selected curve

Curve zoom function
In the LCD display curve, press [OK] to enter the curve zoom edit menu, Liquid Crystal Display Curve Zoom is used to zoom in on the time axis and amplitude to make the curve more visible.

Press [ ] move arrow, select the scaling direction of the curve or does not scale, press [OK] to confirm. When Y-axis zoom is selected, press [OK] to enter the zoom selection menu; press [bk] to exit the curve display.

3.5 Simulation

Simulation is used to simulate the 4~20mA current output. By current output simulation the accuracy and linearity of the current output can be checked. And the system testing can be carried out.

Press [ ] to enter Simulation menu when the menu item number is 3.4, LCD displays as below

Press [OK] to enter Simulation setting

press [OK] to confirm, enter the appropriate settings menu, complete the numerical settings, press [OK] to confirm, this time, the current output simulation value.
4 Service

This menu with professional functions can only be used by trained technicians. They are False echo storage, reset, sensor settings back up Password setting and etc. When the LCD displays the main menu, press ➡️, move arrow to Service item, LCD displays as below

4.1 False echo memory

When there is a fixed obstacle interference measurement within the measurement range, the function of false echo memory can be used to overcome its effects. When the LCD displays the main menu item is 4.0, press OK, enter to Service submenu, LCD displays as below

Press OK, LCD displays as below

When you select update/create new, you are asked to input a distance value for the real echo. Then press OK to confirm it and to start the operation. It will take some time to store the false echo.

Enter the true echo distance value, then press OK to confirm after entering the distance value, please wait for a while, The instrument is performing false echo learning, return to the previous menu after finishing.

Note: The difference between updating the False Echo curve and the New False Echo curve is that the False Echo Curve after the Real Echo is cleared by the New False Echo Curve, and the False Echo Curve after the Real Echo is updated constant.

If you want to edit the false echo curve, press ➡️ to move the arrow to this item, with OK to enter the edit menu.

Press ➡️, select Update/Create new/Edit/Delete a false echo, confirm with OK.

When you select update/create new, you are asked to input a distance value for the real echo. Then press OK to confirm it and to start the operation. It will take some time to store the false echo.
4.2 Current output

This setting is used to set the current output mode.

When LCD menu is 4.1, press , LCD displays as below

```
Current output
Output mode: 4~20mA
```

Press , you get

```
Current output
4~20mA
20~4mA
```

Select output current as 4-20mA or 20-4mA. 4-20mA mean the Min. level is corresponding to 4mA and the Max. level is corresponding to 20mA. 20-4mA mean the Min. Level is corresponding to 20mA and the Max. level is corresponding to 4mA.

press , you select the item you want and confirm with .

4.3 Reset

With the reset function, modified settings are reset. When the liquid crystal display Current output (menu number 4.2), press enter the reset function, the LCD display

```
Reset
Basic set
```

Press to confirm the selection, the parameters in the instrument settings will be restored to the factory settings before commissioning.

4.5 Language

In this menu you can change the language. English and Chinese are available.

When the liquid crystal display Reset (menu number 4.3), Press to enter Language menu, LCD displays as below.

```
Language
English
```

Press , select the desired language.
Press **ok** to confirm your choice.

**4.6 Address**

When the liquid crystal display Language (menu number 4.5), press **enter** enter the Address, the LCD display

Press **ok** to confirm your choice.

**4.8 SYS KEY**

The password is used to protect the instrument parameters. After the password function is enabled, you need to input the password when changing any one of the instrument parameters. Once the correct password is entered, the password protection function can be canceled within the time limit, and the parameters of the instrument can be modified.

When the liquid crystal display Address (menu number 4.6), Press **to enter SYS KEY menu, LCD displays as below**

Press **ok** to confirm Password setting function.
4.9 Distance Adj

The distance Adj setting is used to modify the instrument measurement error. The value is the difference between the actual distance value and the displayed distance value. When the menu item is 4.8, press \( \square \) to enter Distance Adj menu, LCD displays as below.

\[
\begin{array}{l}
\text{Distance Adj} \\
0.596 \text{ m (d)}
\end{array}
\]

Press \( \square \) to enter the parameter editing menu, Press \( \square \) to change the different programming items.

\[
\begin{array}{l}
\text{Distance Adj} \\
0.596 \text{ m (d)}
\end{array}
\]

Press \( \square \) to confirm.

4.10 Envelope amplitude

Signal threshold

When the menu item is 4.9, press \( \square \) to enter Envelope amplitude menu, LCD displays as below.

\[
\begin{array}{l}
\text{Envelope amplitude} \\
3 \text{ dB} \\
\text{Signal threshold} \\
10 \text{ dB}
\end{array}
\]

Press \( \square \) to confirm the setting.

4.11 Multi-point calibration

When the menu item is 4.10, press \( \square \) to enter Multi-point calibration menu, LCD displays as below.

\[
\begin{array}{l}
\text{Multi-point calibration} \\
\text{change?}
\end{array}
\]

Press \( \square \) to enter Simulation setting.

\[
\begin{array}{l}
\text{Multi-point calibration} \\
\text{▶ Delete} \\
\text{New}
\end{array}
\]
Press [OK], complete the delete function, press [ ] enter the new

<table>
<thead>
<tr>
<th>Multi-point calibration</th>
<th>4.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection</td>
<td>0.000 m (d)</td>
</tr>
<tr>
<td>Actual Value</td>
<td>0.000 m (d)</td>
</tr>
</tbody>
</table>

Press [OK] to enter the parameter editing menu, Press [ ] to change the different programming items, confirm with [OK].

<table>
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<td>Actual Value</td>
<td>0.000 m (d)</td>
</tr>
</tbody>
</table>

4.12 Lower signal levels
When the menu item is 4.11, press [ ] to enter Lower signal levels menu, LCD displays as below

<table>
<thead>
<tr>
<th>Lower signal levels</th>
<th>4.12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>6.000 m (d)</td>
</tr>
<tr>
<td>End</td>
<td>6.600 m (d)</td>
</tr>
<tr>
<td>Reduce to</td>
<td>20 dB</td>
</tr>
</tbody>
</table>

Press [OK] to enter the parameter editing menu, Press [ ] to change the different programming items, confirm with [OK].

<table>
<thead>
<tr>
<th>Lower signal levels</th>
<th>4.12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>6.000 m (d)</td>
</tr>
<tr>
<td>End</td>
<td>6.600 m (d)</td>
</tr>
<tr>
<td></td>
<td>20 dB</td>
</tr>
</tbody>
</table>

5 Information
In this menu the most important sensor information can be displayed: Sensor type, product serial number, production date, software version number and so on.
When the LCD displays the main menu, press [ ], move arrow to Information item, LCD displays as below

<table>
<thead>
<tr>
<th>Basic settings</th>
<th>5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>Diagnostics</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td></td>
</tr>
<tr>
<td>Info</td>
<td></td>
</tr>
</tbody>
</table>
Press \textbf{OK} to enter Information setting, LCD displays as below

\begin{tabular}{|l|}
\hline
Sensor type & xxxxxxxx \\
Serial number & 123456 \\
\hline
\end{tabular}

5.1

Press \textbf{ ...} , LCD displays as below

\begin{tabular}{|l|}
\hline
Date of manufacture & 150101 \\
Software version & 000001 \\
\hline
\end{tabular}

5.2

Press \textbf{BK} to exit editing and return to the main menu.

\textbf{Example: To display echo curve do as follow:}

\textbf{One way:}

1. Press \textbf{OK} to enter program status, Main menu is displayed on LCD.
2. Select submenu: Press \textbf{ ...} to select Diagnostics submenu item.
3. Press \textbf{OK} to enter the submenu menu number is 3.1.
4. Press \textbf{ ...} to enter next menu, the menu number is 3.2.
5. Press \textbf{ ...} again, the menu number is 3.3. If this is the "echo curve” go to item 8 below.
6. Press \textbf{OK} to enter the curve select menu (3.3).
7. Press \textbf{ ...} to set arrow to point to Echo Curve, confirm with \textbf{OK}.
8. Press \textbf{ ...}, the echo curve will be shown. Menu number is 3.4.
9. Press \textbf{OK} to enter curve zoom menu.
10. Press \textbf{ ...} to select Y zoom, confirm with \textbf{OK}.
11. Press \textbf{ ...} to mark the start position, confirm with \textbf{OK}.
12. Press \textbf{ ...} to mark the end position, confirm with \textbf{OK}. The selected area curve is enlarged.
13. Press \textbf{BK} several times to return to run state.

\textbf{Mode two:} Under the main interface, press \textbf{BK} can display echo curve on measurement mode, but it has no zoom functions.
Debugging the notes:

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Guided Wave Radar Level Meter