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Ultrasonic Level Transmitter
WL750
Congratulations on your purchase of the Ultrasonic Level Transmitter. This instrument has been quality tested and approved for providing accurate and reliable measurements. We are confident that you will find the Ultrasonic Level Transmitter to be a valuable asset for your application. Should you require assistance, our technical staff will be happy to help.

Table of Contents

I. Checklist • • • • • • • Page 3
II. Inspection • • • • • • • 3
III. Specifications • • • • • • • 4
IV. Operation • • • • • • • 6
V. Installation • • • • • • • 7
VI. Programming • • • • • • • 8
VII. Maintenance • • • • • • • 15
VIII. Troubleshooting • • • • • • • 15
IX. Warranty • • • • • • • 16

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I. Ultrasonic Level Transmitter Checklist

   a. Ultrasonic Level Transmitter

   b. Manual

II. Inspection

   a. Your Ultrasonic Level Transmitter was carefully inspected and certified by our Quality Assurance Team before shipping. If any damage has occurred during shipping, please notify Global Water Instrumentation, Inc. and file a claim with the carrier involved.

   b. Use the checklist to ensure that you have received everything needed to operate the Ultrasonic Level Transmitter.
### III. Specifications

**Electrical:**
- **Supply Voltage:** 18 to 30 VDC
- **Power Consumption:** < 3 Watts
- **Output:** 4-20 mA, 0-20 mA (2-10 V, 0-10 V across, 500-Ohm resistor to 0 V)
- **Switching Values (S1 and S2):** PNP or NPN selectable; 300 mA load sum max.; programmable as min. or max. value; short circuit proof; reverse polarity proof
- **Hysteresis:** Adjustable; position depends on min. or max. setting
- **Display:** Graphical LCD display; temperature range -20°C to 70°C (-4°F to 158°F); 32x16 pixels; back-lit LED signaling lamp
- **Connection:** M 12x1; 5-pole locking plug

**Operational:**
- **Accuracy:** ±0.2% full scale
- **Linearity Error:** <0.3% full scale
- **Temperature Error:** 0.03% °C
- **Operating Temperature:** 0°C to 70°C (32°F to 158°F)
- **Operating Pressure:** Ambient
- **Approval:** CE, IP67 (Totally protected against dust, protected against the effects of immersion between 0 – 1 meter)
<table>
<thead>
<tr>
<th>Range</th>
<th>WL750-4</th>
<th>0.66 ft. to 4.3 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WL750-8</td>
<td>0.98 ft. to 7.5 ft</td>
</tr>
</tbody>
</table>

**Mechanical:**

- **Wetted Materials**: PET 30% GV, epoxy resin, POM
- **Housing Materials**: Stainless steel, tempered glass, POM ring
- **Housing**: Flange mount with center hole 35.5mm and three fastening through holes for screws or bolts
IV. Operation

a. The Ultrasonic Level Transmitter is designed to be a self-contained continuous level sensor and control, requiring only a power source. A 16-bit microcontroller, with a 14-bit A/D converter and a 12-bit D/A converter, provides the necessary processing speed and measurement accuracy. The signal is displayed with units using a back-lit LCD graphical display and converted to a 4-20 mA signal.

b. Two switch points with either a positive or a negative output can be programmed over the complete range. (See Programming Section, page 11.) The switching point hysteresis can be set separately in value and direction (minimum/maximum switching value). Upward and downward crossings of switching points and error messages are shown in the display with a flashing red LED that is easily visible from a distance.

c. Other parameters can be changed using codes, including: signal filter; selectable unit (inch, cm) includes automatic conversion of the values; selectable 0-20 mA or 4-20 mA output; value assignment of 4-20 mA (setting of zero point and span).

d. The complete housing can be rotated around the mechanical connection so that the correct reading position can be set after mounting. (See Installation Section) This Ultrasonic Level Transmitter is very easy to use, as dialog messages are displayed for the user. It can also be set when wearing protective gloves, if necessary.

**Operation Range**

![Operation Range Diagram](image)

*Figure 1*
V. Installation

Sensor Installation:
The sensor uses a flange-type mounting scheme. Generally, the sensor must be located so that the signal path is free of obstructions. The sensor should be mounted level and perpendicular to the surface of the material to be monitored. If the vessel has a sloped top, consider using a self-aligning bulkhead fitting or a flange fitting with a riser that will allow the sensor to be positioned relative to the material's surface. Swivel mounts are a good choice in resolving this type of installation problem. The use of a mounting bracket would be for open-topped tanks, sumps or reservoirs. If the installation will have large electrical equipment situated near the sensor, then earthed steel conduit must be used.
VI. Programming

a. Programming Overview
The programming ring can be rotated from the Neutral center position to Position 1 and Position 2. The following actions are possible:

**A – Display of parameters with Position 1** (simultaneous display of the set parameters) – Turn the programming ring left to Position 1 to begin cycling through these programming parameters: Switching points S1 and S2, Hysteresis direction of S1 and S2, Hysteresis Hyst 1 and Hyst 2, Code (allows editing of additional parameters), Filter, Units, Output, 4 mA Value and 20 mA value. See following pages for detailed programming instructions.

**B – Editing with Position 2** Turn the programming ring to the right to Position 2 and a flashing cursor appears showing the position to be changed. With repeated turning to Position 2, the values are increased. By turning to Position 1, you obtain the next position. Each position can be edited in this way. **If there is no action within 5 seconds, the device returns to the normal display section without the change being accepted, and you will have to cycle through the program again.**

**C – Saving the change with Position 1** Turning one time toward Position 1 after quitting the last value signifies acceptance of the change.

b. Programming Protection
The programming ring can be pulled off, inverted, and replaced. This will prevent further programming resulting from turning the ring in either direction. (See Protecting your Programming Parameters section.)
c. Programming the Ultrasonic Level Transmitter:
   1. On power-up, a logo is displayed, followed by the preset level/unit measurement. Changing the level (by float movement) will be reflected in the display. If the level is at either of the preset switch levels $S_1$ or $S_2$ (the upper and lower levels), the display will also be alternating between the $S_1$ (or $S_2$) status indication with the level reading. The **Switch Active** status is also indicated by a flashing LED.

   By rotating the program ring to Position 1 (P1, toward the left) and then back to Neutral, the program steps to the S1 setting. The level for activation of the S1 switch is indicated, and may be edited by turning the program ring to the P2 position (see below). This will highlight the tenths digit. The digit value is advancing by alternating the program ring from center to the right P2 position.

   Turning the ring to the P1 position accepts that value and moves to the next digit. Turning the ring to Neutral and then back to P1 will cycle through all of the digits and then accept the values.

![Figure 4](image-url)
2. Programming Positions
The P1 to Neutral movement steps the program through positions in the following sequence:

<table>
<thead>
<tr>
<th>#.#.# Inches (cm)</th>
<th>OR</th>
<th>#.#.</th>
<th>S1</th>
<th>&lt; S1</th>
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</table>

- Switch point 1 value, sets level for activation.
- Switch point 1 is active if the level is below S1.
- Hysteresis threshold added to switch point 1 for switch = active.
- Switch point 2 value, sets level for activation.
- Switch point 2 is active if the level is above (or below) S2.
- Hysteresis threshold added to switch point 2 for switch = active.
- To access other program parameters, rotate ring to P2 and change 000 to 111.
- Returns to regular display of current float level.

Figure 5
3. Modifying Operating Parameters
From any of the Programming Position steps noted in Figure 5 on page 13, follow these steps to modify the operating parameter:
   a) Turn the programming ring to the right to Position 2, and then back to Neutral, to bring up the editing cursor in the first decimal place.
   b) Turning the ring to the right and back to Neutral increases the current decimal place to the next highest value.
   c) Turning the ring to the left and back to Neutral moves the cursor on to the next decimal position. Repeat step 2 to edit the current position.
   d) To confirm the new value, continue to turn the ring to the left and back to neutral until you cycle through all of the decimal places and the next parameter shows on the display.

4. Entering Additional Program Parameters
   a) After reaching the Code step, enter “111” by turning the ring 1 to Neutral, and you can access these additional parameters:

   ![Figure 6](image)

   **Figure 6**
5. Protecting your Programming Parameters
   a) Pull off the ring. Keep it as a personal key.
   b) Use ring in reverse position on the sensor (PROG. LOCK position.)

![Figure 7](image)

<table>
<thead>
<tr>
<th>Unlocked Position</th>
<th>Locked Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Figure 8" /></td>
<td><img src="image" alt="Figure 9" /></td>
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</tbody>
</table>

6. Factory Settings
   a) Enter code “989” to return to factory settings.

Note: During the programming process, if there is no new action taken within 30 seconds, the sensor will return to “measurement display” without saving your changes. You will have to go through the entire program a second time to re-program the unit.
**HOW TO MODIFY THE SENSOR OPERATING PARAMETERS**

Example: \( S1 = +18.6 \) inches (or cm)

- If the ring is turned right toward Position 2 (EDIT), a cursor appears while the parameter you want to modify is displayed.
  - \( S1 \)
  - +0.0
  - Inch (cm)

- Turning left moves the cursor to the next decimal position.
  - \( S1 \)
  - +25.6

- Moving ring 3 times to the right, alternating to Position 2 and center, and you will see a 3-digit increase to the figure marked by the cursor’s location.
  - \( S1 \)
  - +28.6

- Turn the ring 2 times to the left, toward Position 1, and the cursor disappears. The modified \( S1 \) is now visible and the next parameter is shown automatically.
  - \( S1 \)
  - +18.6

**HOW TO ENTER ADDITIONAL PARAMETERS & INFORMATION**

- When the program ring is turned to the right toward Position 2 (EDIT), a cursor appears at the parameter to modify.
  - \( S1 \)
  - +25.6
  - Inch (cm)

- Turning right effects an increase of the figure.
  - \( S1 \)
  - +28.6

- Turning left moves the cursor to the next decimal position.
  - \( S1 \)
  - +18.6

- **Filter for display and analog output:** (It is a FIFO filter and the time to accomplish the actual measurement value corresponds to the seconds shown in the display.)
  - \( S1 \)
  - +0.0

- **Selection of various units** (inches, cm, PSI).
  - Display and switch points are recalculated automatically.
  - \( S1 \)
  - 0 0 0

- **Set analog output** (0-20 mA or 4-20 mA).
  - \( S1 \)
  - 0

- **Start of analog output range** (in the selected unit).
  - \( S1 \)
  - +0.0

- **End of analog output range** (in the selected unit).
  - \( S1 \)
  - +111

**NOTE:** If you remain idle in the programming stage for 30 seconds, the display indication will return to “measurement display” without saving your new settings. You will have to cycle through the program again to make your changes.

**To RETURN TO THE FACTORY DEFAULT SETTING:**

Set the code to 999.

All individual parameters are now overwritten.

Figure 10
Terminal Assignment

The switch points are automatically changing to positive or negative, depending on your interface.

Mating Connector
M12 x 1, 5-position female, shielded straight or M121x 1, 5-position female, shielded, right angle

Example of hysteresis setting:
Examples with S1 as maximum switching point and as minimum switching point:

Figure 11

Figure 12
VII. Maintenance

a. The unit must be checked periodically. The suggested maintenance rate depends on the installation area. Check batteries for correct voltage periodically.

VIII. Trouble Shooting

a. Call us for tech support: 800-876-1172 or 916-638-3429 (many problems can be solved over the phone). Fax: 916-638-3270 or Email: globalw@globalw.com.

Be prepared to describe the problem you are experiencing including specific details of the application and installation and any additional pertinent information.

b. In the event that the equipment needs to be returned to the factory for any reason, please call to obtain an RMA# (Return Material authorization). Do not return items without an RMA# displayed on the outside of the package.

Clean and decontaminate the Ultrasonic Level Transmitter, if necessary.

Include a written statement describing the problems.

Send the package with shipping prepaid to our factory address. Insure your shipment, as the warranty does not cover damage incurred during transit.

c. When calling for tech support, please have the following information ready:

   1. Model #.
   2. Unit serial number.
   3. P.O.# the equipment was purchased on.
   4. Our sales order number or the invoice number.
   5. Repair instructions and/or specific problems relating to the product.
IX. Warranty

a. Global Water Instrumentation, Inc. warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment from factory. Global Water’s obligations under this warranty are limited to, at Global Water’s option: (I) replacing or (II) repairing; any products determined to be defective. In no case shall Global Water’s liability exceed the products original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by Global Water Instrumentation, Inc., or which has been subject to misuse, negligence or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

b. The warranty begins on the date of your invoice.