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Quick Start Guide

Water Level Temperature Sensor (WLTS)

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*High Quality Groundwater and Surface Water Monitoring Instrumentation*

> **Note:** If you are using the WLTS Current Loop Adaptor for use with at 4-20mA setup, please see the separate User Guide. This Guide is for MODBUS and SDI-12 setups.

Getting Started

1. Download the latest version of the WLTS PC Software Utility from: https://downloads. solinst.com/ and install the software on your PC. You will require Windows 10 or 11 to run the program.

> **Note:** The Firmware Upgrade Utility will also be downloaded with the WLTS Utility. See the Water Level Temperature Sensor User Guide for firmware update instructions.

2. Connect the USB-A Programming Cable to the Water Level Temperature Sensor. To connect to the Sensor, line up the pin and socket. Gently push the connections together and twist **slightly** until you feel/hear a **small click** when the properly aligned connection is made. **Only tighten the coupling** while holding the cable still. Tighten the coupling until it seats.

USB-A Programming Cable
alignment socket

Sensor
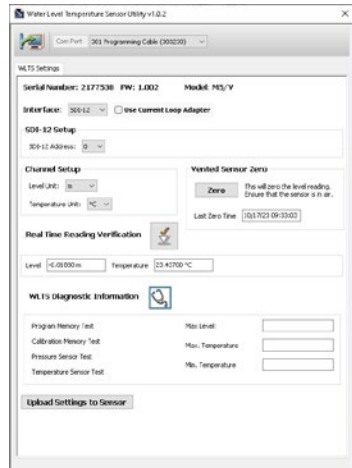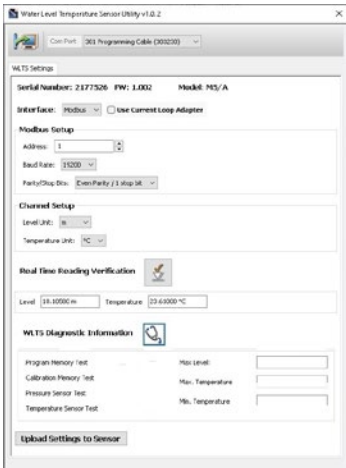alignment pin

Coupling
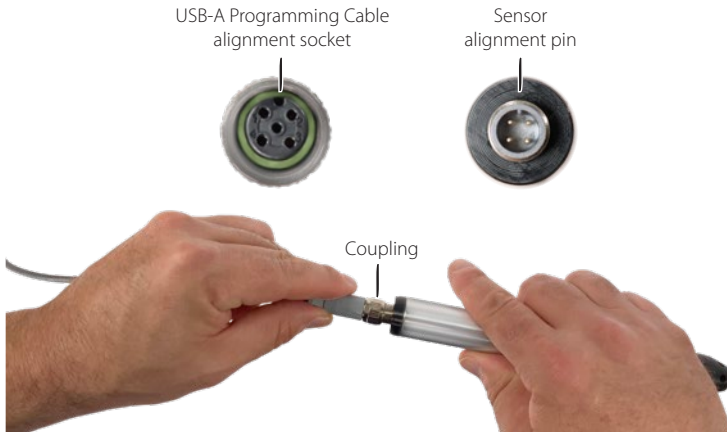
Connecting Sensor to USB-A Programming Cable

3. Plug the USB-A Programming Cable into your computer.

Sensor Connected to a PC Using the USB-A Programming Cable

WLTS PC Software Utility - MODBUS and SDI-12

Programming the Water Level Temperature Sensor (WLTS)

1. Start the WLTS Utility.
2. Select the appropriate Com Port for the connected WLTS from the drop-down menu.
3. Click the 'Retrieve Settings' icon. This will retrieve and display the current programmed settings for the connected WLTS, as well as the serial number, firmware version, and model.
4. You can now customize the WLTS protocol and measurement parameter settings. Select MODBUS or SDI-12 from the Interface drop-down.
5. MODBUS settings options include: Address (set between 1 and 247), Baud Rate, Parity and Stop Bits.

> **Note:** Without setting a specific address or Baud rate, the WLTS will power up with a default MODBUS device address of 1, Baud rate of 19,200, even parity and 1 stop bit).

SDI-12 settings include the Address (The address can be customized to any value from "0" to "9", "A" to "Z", or "a" to "z", giving a total of 62 unique addresses).

> **Note:** Without setting a specific address, the WLTS will power up with a default SDI-12 device address of 0. The communication settings for the WLTS comply with the SDI-12 standard at 1200 baud, 1 start bit, 7 data bits, 1 parity bit (even parity), and 1 stop bit.

6. For both protocols, set the units that the WLTS will be measuring in for the Level and Temperature Channels. When finished, click Upload Settings To Sensor.

> **Note:** You can also perform a "Field Zero" in air for the vented sensors.

> **Note:** See the 301 WLTS User Guide for your specific communication protocol (MODBUS, SDI-12) for full definitions of the available commands.

WLTS PC Software Utility - Diagnostic Information

7. To test that the Sensor is reading correctly before connecting it to the Communication/ Vented Cable for deployment, you can click the Real Time Reading Verification icon to obtain real-time readings from the Sensor.

8. If further Diagnostic Information is required, click the Diagnostics icon to perform a series of tests (Memory and Sensor) and obtain Level and Temperature information that may be helpful when troubleshooting any issues.

Connecting the Communication/Vented Cable

1. Remove the USB-A Programming Cable from the Sensor.
2. Connect the Communication/Vented Cable to the sensor by lining up the pin and socket. Gently push the connections together and twist **slightly** until you feel/hear a **small click** when the properly aligned connection is made. **Only tighten the coupling** while holding the cable still. Tighten the coupling until it seats.

Communication/Vented Cable alignment socket

Sensor alignment pin

Coupling
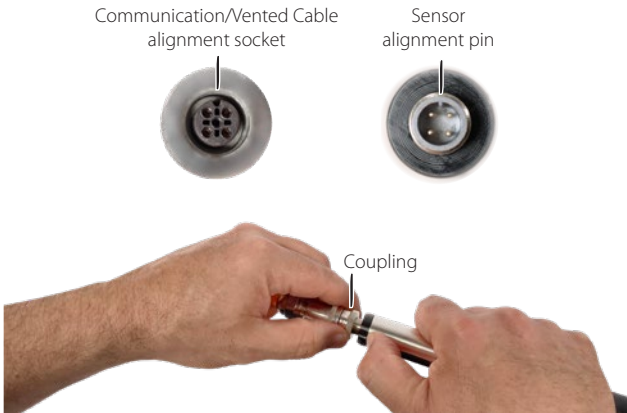
Connecting Sensor to Communication/Vented Cable

Wiring Connections for MODBUS/SDI-12

Refer to the diagrams below, for proper wiring connections for each protocol type:

MODBUS

SDI-12

Gore Vent Cap

Vented Communication Cable

Note: The Vented Communication Cables will also have a vent tube to surface with a gore vent cap to ensure airflow through, while preventing moisture from entering the tube.

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Water Level Temperature Sensor Field Notes

Tip: It is recommended to take a manual water level measurement before installing a Water Level Temperature Sensor, shortly after installation, periodically during your monitoring interval, and at the end of your measurement period. Use these measurements to verify WLTS readings, and for data adjustments later on. Ensure you take manual readings as close in time as possible to a scheduled WLTS reading.

Note: The WLTS can withstand over-pressurization of 2 times the intended range, e.g. a Model M10 can accommodate a fluctuation of 20 meters or 60 feet and still record pressure. However, over-range accuracy is not guaranteed.

Before Deployment, make sure you do the following:

- Program your WLTS, using the WLTS Utility, with the correct settings

- Locate the zero point of the pressure sensor, which is indicated by the machined line around the body of the Sensor.

- Determine deployment depth to ensure the WLTS does not touch the bottom of a tank, well, etc. (avoid submergence in sediment)

Note: The length of the Communication/Vented Cable should not be assumed as the deployment depth, as there may be some slack in the cable.

- Determine the minimum and maximum expected water levels, as the WLTS must remain submerged for the entire monitoring period, without over-ranging the pressure sensor.

- Use a Solinst Model 101 or 102 Water Level Meter to take a manual depth to water measurement that will be used to verify WLTS readings.
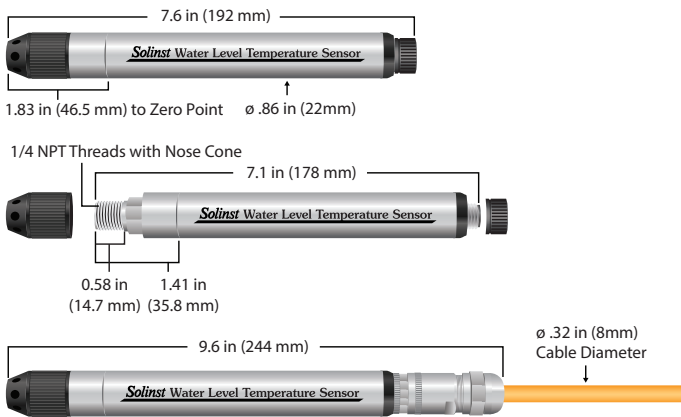
Water Level Temperature Sensor Dimensions

Measurement Principles

Absolute Level:

> When submerged, absolute pressure sensors measure total pressure – the pressure of air plus water column above their zero point. The actual pressure of just water above the sensor is obtained by subtracting barometric pressure from the total pressure.

Vented (Gauged) Level:

> When submerged, vented pressure sensors detect both water and barometric pressure. However, a vent tube to surface allows barometric effects on the pressure sensor to be eliminated. Therefore, they provide readings of the actual pressure of just water above the pressure sensor zero point.

Deployment

- The WLTS is designed to be conveniently installed in a number of applications, as long as proper precautions and recommendations are followed.

- The nose cone of the Sensor can be removed to make use of the 1/4" NPTM threaded connection.

- Do not drop the WLTS into the water, carefully lower it into place. Avoid installing in areas where "water hammer" or hydraulic jump" (very sudden, large increases in pressure) may occur.

- Be careful not to nick or bend the Vented Cable during installation (use a maximum 1" (25 mm) bend radius as a precaution). Do not kink or nick the vent tube at surface.

After Deployment, make sure you do the following:

- Take a manual depth to water measurement after the WLTS has stabilized (approximately 10 minutes).

- Take another manual depth to water measurement just before removing the WLTS.

Once the Water Level Temperature Sensor has been installed and powered up, you can start configuring it.

> **Note:** See the 301 Water Level Temperature Sensor User Guide for your specific communication protocol (MODBUS, SDI-12) for full definitions of the available commands.

Maintenance

As with any monitoring project, you should select the proper equipment and determine a maintenance schedule based on the environment specific to your application.

For the WLTS, this means selecting the appropriate pressure range, ensuring the monitoring temperatures are within the instruments specifications, and making sure the wetted materials are compatible with site chemistry.

Other maintenance tips include:

- Clean the connections to ensure a proper seal. A cotton swab can be used to clear any moisture, or debris from the connectors.
- Keep the dust caps on all of the connections, when not in use.
- Store the WLTS in its case, and the Communication/Vented Cable on its spool when not in use.
- Clean the WLTS as required.
- To ensure the vent tube is dry before deployment or storage, Solinst offers a Vented Cable Blowout Fitting that allows you to blow nitrogen gas through the tube.

> **Note:** See the 301 WLTS User Guides for more maintenance and troubleshooting tips.

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