Solinst®

Quick Start Guide

Levelogger Series

High Quality Groundwater and Surface Water Monitoring Instrumentation

To begin using your Levelogger, download the newest version of Levelogger Software and User Guide by visiting: www.solinst.com/Downloads/ or insert the software CD provided.

Installing the Software

1. To activate the software install, click on the 'setup.exe' file located on the software CD.
2. The Software Installation Wizard will guide you through the remaining installation process.

Installing the Hardware

1. Connect the communications device, either the Optical Reader or PC Interface Cable, to the computer.

Notes: **USB connections require installation of a driver to the assigned device. See the USB Installation Guide for details.**

USB Installation Guide

Notes: **1. Levelogger Software comes pre loaded with necessary USB drivers.**
2. The following steps are based on the Windows® 7 operating system, if using another operating system, refer to the Levelogger User Guide.

1. Connect the USB device into the computer. This will begin the 'Found New Hardware Wizard'.
2. The 'Found New Hardware Wizard' will give the option to connect to Windows Update to search for software components, select "No, not at this time".
3. Two options are provided:
   i. If you have the Levelogger Software CD, select "Install the software automatically".
   ii. If you do not have the CD, select "Install from a list or specific location". In the next window select "Search for the best drivers in these locations" and "Include this location in the search".
   Select the browse button and choose this location:
   Program Files/Solinst/Levelogger 4_0/USB Drivers

Note: **During the USB Installation, a message may appear stating that the USB Serial Converter has not passed Windows Logo testing, select "Continue anyway".**

4. Windows will confirm that the unit is now installed. Restart your computer. Repeat the above steps if your first install fails.

PC Interface Cable

Optical Reader Connection

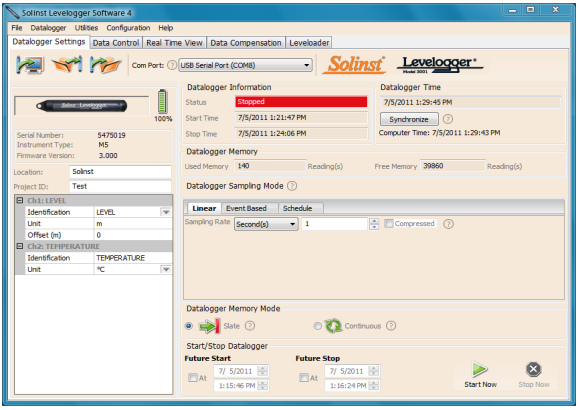
If your device is plugged in and the Found New Hardware Wizard fails to start, then follow these steps:

1. Open the Device Manager. Typically this is found through the path:
   Start > Control Panel > System > Hardware and Sound > Device Manager
2. Identify the Solinst device from the list. The device will be categorized under 'Other Devices' or 'Universal Serial Bus Controllers' (look for yellow warning icon).
3. Highlight the device in the list and right click. You will see an option to "Update the driver". This will start the 'Hardware Update Wizard'. Follow the steps for your operating system.
4. Once installed, the Com Port number will appear in Device Manager under 'Ports (Com & LPT)'.

Programming the Levelogger

Notes: **Ensure the Levelogger is operating with the latest firmware. Visit the Solinst website or software update feature for assistance.**

1. Connect the Levelogger to the communications device and start the software.
2. Select the appropriate COM or USB port for the connected communications device from the centre drop-down menu.
3. Click the 'Retrieve Settings from Levelogger' icon. This will retrieve and display the current programmed settings for the connected Levelogger.
4. You can now customize the Levelogger including your Project ID, Location, Sampling Mode and Rate, and Future Stop and Start times.



Datalogger Settings Window

Note: **Clicking on the (?) embedded in the software will provide you with a short explanation of that feature, e.g. Com Port, Slate Mode, Time Synchronization, etc.**

Starting and Stopping the Levelogger

1. If desired, enter a Future Start and/or Future Stop Time.
2. When the 'Start' icon is selected, all settings are applied to the Levelogger and it will start logging at the specified time.
3. To start logging immediately, do not fill in the Future Start field, and click the 'Start Now' icon.

Note: **When the 'Start' icon is selected, a window will pop-up as an alert that the previous data will be erased.**

4. To stop the Levelogger immediately, click the 'Stop Now' icon.

Tip

If a number of Leveloggers are to be programmed with identical inputs, clicking the 'Save Default Settings' icon will create a template.

Rainlogger Programming

The Rainfall Calibration Constant 'value' of the tipping bucket rain gauge used with the Rainlogger is required when programming the Rainlogger. Consult the Levelogger User Guide for more information on programming the Rainlogger.

LTC Calibration

Before deploying your LTC Levelogger Junior, be sure to calibrate the instrument. To begin calibration, open the 'Conductivity Cal' tab and follow the steps provided. Consult the Levelogger User Guide for more information.

Tip

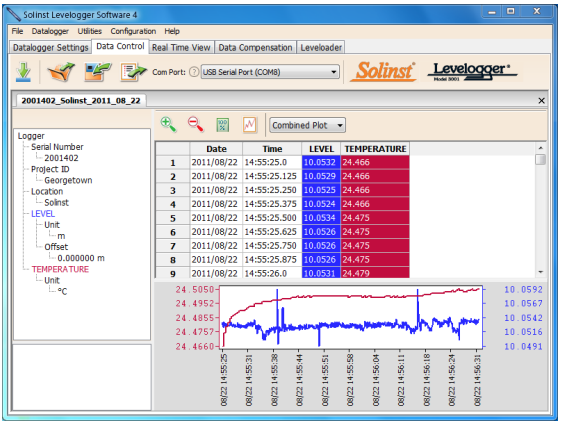
The 'future start' and 'future stop' options are ideal for synchronizing the data collection of multiple Leveloggers.

Downloading and Working with Data

1. Click the 'Data Control' tab to access the 'Data Control' window. This window is laid out in three sections: Levelogger settings, tabular data, and graphical data.
2. To download the data from a connected Levelogger, select the 'Download Data from Levelogger' icon. There are four options for downloading data. They are: All Data, Append Download, Partial Download and Recover Previous Log. The data will be presented in both tabular and graphical format.

Note: The default directory for downloaded and saved data is in the 'Data' folder: <C:\Program\Files\Solinst\Levelogger 4_0\Data>. Data is saved as a .xle data file.

3. To save data, click the 'Save Data' icon and input desired name for the saved file.
4. To export the file for use in other software, click the 'Export' icon. The file can be exported to a *.csv or *.xml file.



Data Control Window

Note

To change the default directory for downloaded data, use the 'Configuration' menu at the top of the software window. Select 'Application Settings' and input or navigate to a different folder destination. Click 'OK'.

Tip

*The *.csv and *.xml file formats are supported and can be imported by most spreadsheet and database programs.*

*The data graph can be exported to a *.bmp file or a *.wmf file by clicking File > Export > Graph.*

Real Time View

Real Time View provides on-screen measurement as data is being recorded by the connected datalogger. A view rate is set independently of the logging period of the Levelogger and does not interfere with internal logging taking place. To take a reading at any specific time, click Read Now and that reading will be added to the displayed data. The data can be exported and saved.

Compensate the Data

Click the 'Data Compensation' tab to open the Data Compensation window. In this window the 'Wizard' will guide you through Barometric Compensation, Manual Data Adjustments, Offsets, Altitude Correction, Unit Conversions, Density Adjustments, Conductivity Conversions, and Barometric Efficiency Compensations on your open data files. Multiple Levelogger files can be barometrically compensated at once, using one open Barologger file.

Tip

'Manual Data Adjustment' allows you to use manual water level measurements to adjust your data to depth to water readings.

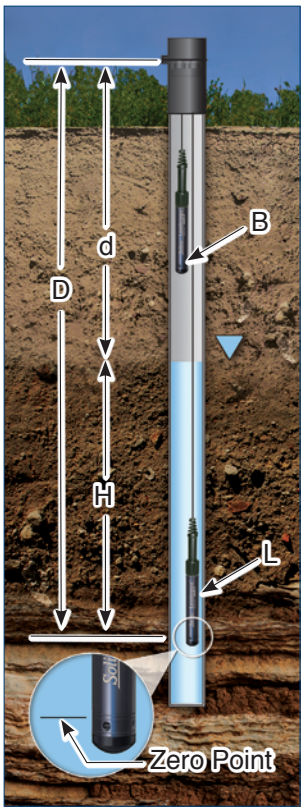
Levelogger Edge Field Measurement

Levelogger Edge Ranges

Each model of Levelogger is rated for a specific submergence depth (Table 1). The choice of model largely depends on the accuracy of the water level required and the submergence depth. The selection, however, should be based on the maximum anticipated water level fluctuation.

Model	Submergence Depth	Accuracy
Barologger	Air only	± 0.05 kPa
F15, M5	16.4 ft, 5 m	± 0.010 ft, 0.3 cm
F30, M10	32.8 ft, 10 m	± 0.016 ft, 0.5 cm
F65, M20	65.6 ft, 20 m	± 0.032 ft, 1 cm
F100, M30	98.4 ft, 30 m	± 0.064 ft, 1.5 cm
F300, M100	328.1 ft, 100 m	± 0.164 ft, 5 cm

Table 1 - Levelogger Edge Range



Measurement Fundamentals

Leveloggers **(L)** measure the total pressure acting on a transducer at their zero point/sensor. The total pressure is caused by the column of water lying above the Levelogger pressure sensor AND the barometric (atmospheric) pressure acting on the water surface. To compensate for barometric pressure fluctuations and get true height of water column measurements **(H)**, a Barologger **(B)** is required, i.e.:

Levelogger Reading (L)
-
Barologger Reading (B)
=
Height of Water Column (H)

Verifying Readings

The best recommendation is to compare barometrically compensated Levelogger data **(H)** with a measured depth to water level value **(d)** (using a Water Level Meter). The deployment depth of the Levelogger **(D)**, minus the manual depth to water measurement **(d)**, should equal the compensated Levelogger reading, i.e.:

Deployment Depth (D)
-
Depth to Water (d)
=
Height of Water Column (H)

Note

The Levelogger Edge can withstand over-pressurization of 2 times the intended range, e.g. a Model M10/F30 can accommodate a fluctuation of 20 meters or 60 feet and still record pressure. However, over-range accuracy is not guaranteed.

Barologger Edge

A single Barologger can be used to compensate all Leveloggers on site, within a 20 mile/30 km radius and with every 1000 ft (300 m) change in elevation.

Tip

To adjust all readings in your Levelogger file to depth to water below a well casing **(d)**, *record a manual water level measurement using a water level meter. This reading should correspond in date and time with an actual Levelogger recording. Use this as a reference datum in the Manual Data Adjustment option in the Levelogger Software Data Compensation Wizard.*

Levelogger Field Notes

Before Deployment

Before deployment, make sure you do the following:

- Program your Levelogger, using Levelogger Software, with the correct project identification, memory mode, sampling regime, time, etc.

> **Note: It is useful to synchronize the times of all Leveloggers and Barologgers being used for the same project.**

- Set a future start time, or start the Levelogger if deploying on a wireline/ Kevlar rope (Leveloggers can be started after deployment if using a Direct Read Cable)
- Determine borehole depth to ensure Levelogger does not touch the bottom of the well (avoid submergence in sediment)
- Record the deployment depth of your Levelogger
- Use a Solinst Model 101 or 102 Water Level Meter to take a manual depth to water measurement that will be used to verify Levelogger readings
- Determine the minimum and maximum expected water levels, as Leveloggers must remain submerged for the entire monitoring period, and Barologgers must not be submerged

Deployment

- Deploy your Levelogger and Barologger using a direct read cable for down-well communication, or use an inexpensive wireline or Kevlar cord.

> **Note: For information on other types of installations, see the latest Levelogger User Guide.**

- Install the Barologger in a similar thermal environment as the Levelogger
- The Barologger should be suspended beyond the frost line and deep enough to avoid large temperature fluctuations
- Ensure the Barologger location is vented to atmosphere

Wireline/Cord Deployment

Direct Read Deployment

Tip

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

Well Caps

The Model 3001 2" (or 4" with Adaptor) Well Cap Assembly provides a secure method of installing your Levelogger using wireline/Kevlar cord or Direct Read Cables.

After Deployment

After deployment, make sure you do the following:

- Take a manual depth to water measurement after the well has stabilized (approximately 10 minutes)
- Take another manual depth to water measurement just before removing the Levelogger from the well

In-field Communication

If you have installed your Levelogger using wireline/Kevlar cord, you can communicate with your Levelogger via an Optical Reader and Levelogger Software on a laptop PC.

If you have installed your Levelogger using a Direct Read Cable, you can communicate with your Levelogger via a PC Interface Cable and Levelogger Software on a laptop PC, or a Leveloader Gold, without removing the Levelogger from the well.

Optical Reader

PC Interface Cable

Leveloader Gold

Frequently Asked Questions

How can I protect my Levelogger from corrosive or marine environments?

The Levelogger Edge has a corrosion resistant Titanium-based coating. In harsher chemical environments, you can protect the Levelogger using a thin latex balloon filled with non-corrosive/non-toxic fluid (tap water). As pressure changes, the fluid encasing the loggers will transmit the pressure differential to the logger's pressure transducer, without exposing it to corrosive conditions.

How do I install my Levelogger in a surface water application?

For installations within rivers, streams, wetlands, lakes and watershed or drainage basin monitoring, the shallow pressure range Levelogger Edge (M5/F15) or Levelogger Junior Edge (M5/F15) should be considered. For installation in streams or rivers, stilling wells can be constructed which shield the instrument from the water turbulence. Alternatively, Leveloggers can be lowered into a protective pipe or casing and then attached to a permanent fixture such as a bridge, pier or hand driven marker/rod.

How do I protect my Levelogger from freezing?

To avoid icing/freezing and transducer damage, the easiest method is to lower the transducer to a point in the water column below the frost line or ice formation depth. In water bodies such as shallow streams, wetlands or ponds where icing/freezing may penetrate to the bottom, install the Levelogger in a vented stilling well imbedded into the bottom of the water body beyond the frost line.

If this is not possible, place the Levelogger inside two elongated silicon, rubber or latex balloons filled with a non-toxic, non-corrosive anti-freeze solution or saltwater solution. Place the balloons in a section of perforated, 1.25" (30 mm) ID pipe and install the logger in the monitored water. The antifreeze solution will protect the Levelogger from ice expansion at the pressure transducer, yet transmit any pressure and temperature fluctuations that occur.

Troubleshooting Guide

Levelogger Software:

1. You must have administrator privileges to install software on a computer.
2. Windows XP, Vista, and Windows 7 operating systems support Levelogger Software.

Levelogger data has been accidentally erased:

If the Levelogger has been restarted and the old data has not been saved, select the download option "Recover Previous Log". This will download your previous data set.

Communication Errors:

"Port Cannot Open", "Check Com Port"

1. Reason: Software was started before USB device was connected to computer.
   Solution: Restart computer, connect USB device, start software.
2. Reason: Incorrect Com Port is selected in Com Port selection menu.
   Solution: Check the Com Port location for the installed device, by accessing the 'Device Manager' (through the Control Panel), and selecting the "Ports" section. This will state the Com Port the device is installed on.
3. Reason: Another device shares the same Com Port or is causing a communication conflict.
   Solution: Ensure that software for PDA or other devices, which automatically synchronize, are disabled. Ask your system administrator for assistance.
4. Reason: RS-232 Adaptor to USB converter is improperly installed.

   Note: Not all converters are compatible with all makes and models of computers.

   Solution: Reinstall supplied driver for converter device.

"Communication Time-Out", "Communication Error"

1. Reason: Levelogger, Direct Read Cable, or communications device has failed.
   Solution: a) Narrow down the failure by using a different Levelogger, Direct Read Cable, or another communications device.
   b) Clean the optical "eyes" on the Levelogger and the cable, with a soft cloth.
   c) Check that the communication cable is connected to the same Com Port that is chosen in the upper middle of the Levelogger Software window.

   Check the Com Port settings. They should be as follows:
   - Bits per second: 9600
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None

   d) Try using a different computer, to see if this is the cause of the problem.
   e) If using a laptop (especially in conjunction with a Direct Read Cable) your Com Port may not be powered adequately to receive/transmit data. Try using a desktop computer to test this.
   f) If problem persists, contact Solinst.

Note: All Leveloggers should be deployed and stored with the installation cap or direct read cable attached. This prevents unnecessary battery drainage and protects the optical eyes.

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For further information contact: Solinst Canada Ltd.
Fax: +1 (905) 873-1992; (800) 516-9081 Tel: +1 (905) 873-2255; (800) 661-2023
35 Todd Road, Georgetown, Ontario Canada L7G 4R8
Web Site: www.solinst.com E-mail: instruments@solinst.com

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