



Solinst[®]

**Dataloggers &
Telemetry Systems**

www.solinst.com

Dataloggers & Telemetry Systems

The Choice for Groundwater and Surface Water Monitoring Professionals

Solinst is committed to providing clients with high quality groundwater and surface water monitoring instruments they can rely on. As such, Solinst designs, manufactures, calibrates and tests all products from the ground up, making certain the whole process is completed with precision. Firsthand knowledge and control of the entire operation from conception to final delivery to the client, guarantees the highest quality product.

Research and feedback from clients is integrated into the development approach to ensure the needs of each unique user and application are met. This allows continuous advancement and improvement as requirements evolve. The commitment to clients is forefront when producing Solinst dataloggers, telemetry systems, software and accessories.

The advanced manufacturing processes and high grade materials used when producing dataloggers are carefully chosen. A thorough calibration setup is used to ensure the accuracy of the dataloggers. Quality control procedures mean each datalogger is tested before delivery to the client.



Priority is also given to the ability to conveniently upgrade firmware and software as new features become available, and ensuring compatibility between old and new equipment.

Overall operation of the dataloggers and Solinst telemetry systems are designed to be reliable, user-friendly and virtually maintenance-free. As a result, dataloggers are ideal for short-term, as well as long-term, continuous monitoring applications of varying purposes and in all types of environments.



Levellogger® Model 3001

Absolute Precision Water Level and Temperature Datalogging

The **Model 3001 Levellogger® Edge** provides absolute precision when automatically recording changes in water level (pressure) and temperature. It is a self-contained (non-vented) datalogger, that uses a superior, corrosion-resistant, Hastelloy® pressure sensor with an accuracy of $\pm 0.05\%$ FS.

The Hastelloy sensor has great performance and response times in extreme temperature and pressure environments. It can withstand 2 times over-pressure without permanent damage. The Levellogger Edge comes in different pressure ranges to suit expected water level fluctuations, from 15 ft. to 600 ft. (5 m to 200 m).

The sealed unit contains a temperature sensor that gives accurate readings ($\pm 0.05^\circ\text{C}$) and provides temperature compensated water level values. The Levellogger Edge has a lithium battery that lasts 10 years based on 1 reading every minute. The internal datalogger has FRAM memory for 40,000 level and temperature readings, or up to 120,000 using the compressed linear sampling option.

For use in seawater, and for extra corrosion and chemical resistance, the 7/8" x 6.25" (22 mm x 159 mm) stainless steel housing is coated in a Titanium based PVD finish. The Faraday cage design provides protection against power surges or lightning strikes. The Levellogger Edge operates in temperatures from -20°C to 80°C (0°C to 50°C is the temperature compensation range).

The Levellogger Edge is programmed using the intuitive Levellogger PC Software, or alternatively using the Solinst Levellogger App and Interface. Optical infrared communication allows multiple installation options, including stand-alone, or Direct Read communication. There are many convenient accessories and remote monitoring options to suit each application.

*Hastelloy is a registered trademark of Haynes International Inc.



Model 3001 Levellogger Edge
and Barologger Edge

The Levellogger Edge can be set to record as often as every 1/8 of a second, up to every 99 hours. There are linear, event-based, and scheduled sampling mode options. Scheduled sampling is ideal for groundwater professionals conducting aquifer characterization tests.

Because Levelloggers are absolute dataloggers, they measure both water pressure and barometric pressure above the sensor. Using a separate **Barologger Edge** is the most efficient and accurate method to obtain simultaneous barometric readings in air. The readings can be used to subtract from the Levellogger data, to obtain true water levels.

The Levellogger Software Data Wizard allows multiple Levellogger files to be compensated at once, using one Barologger file. Only one Barologger is required within a 20 mile (30 km) radius, or with every 1000 ft. (300 m) change in elevation.



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Additional Datalogging Options

The **Model 3001 LTC Levelogger Edge**, in addition to the Hastelloy pressure transducer and accurate temperature thermistor, has a 4-electrode platinum conductivity sensor. It is ideal for measuring water level, temperature and conductivity during:

- Salt water intrusion and soil salination studies
- Plume remediation projects
- Leachate monitoring programs at landfills
- Mine tailings monitoring projects
- Water quality programs at waste disposal storage sites
- Agricultural and stormwater (road salt) runoff monitoring
- Water quality initiatives in watershed studies

The LTC Levelogger Edge also includes non-volatile memory for 27,000 readings of level, temperature, and conductivity, and a 8-year lithium battery. The 7/8" x 7.5" (22 mm x 190 mm) stainless steel body is coated in a Titanium ceramic PVD coating for corrosion resistance.

Levelogger Software includes a Calibration Wizard that guides the user through a 1 to 4-point calibration of the conductivity sensor, using standard solutions. The conductivity sensor autoranges from 0–100,000 $\mu\text{S}/\text{cm}$ and calibrates from 50–80,000 $\mu\text{S}/\text{cm}$ with an accuracy of $\pm 1\%$ from 5,000 $\mu\text{S}/\text{cm}$ –80,000 $\mu\text{S}/\text{cm}$ and the greater of $\pm 2\%$ or 15 $\mu\text{S}/\text{cm}$ from 80 $\mu\text{S}/\text{cm}$ –5,000 $\mu\text{S}/\text{cm}$. Automatic readings are linear, and can be set to record every 2 seconds to 99 hours.

The LTC Levelogger Edge is also compatible with all Levelogger communication and deployment accessories. A Barologger Edge can be used to compensate the water level readings.



Model 3001 LTC Levelogger Edge and Levelogger Junior Edge

The **Model 3001 Levelogger Junior Edge** is designed to be an inexpensive alternative for automatic, continuous water level and temperature datalogging.

The Levelogger Junior Edge operates like the Levelogger Edge absolute datalogger, but has streamlined functions. It uses the same durable Hastelloy pressure transducer as the Levelogger Edge, and is calibrated to provide 0.1% FS accuracy. The Levelogger Junior Edge comes in two pressure ranges, 15 ft. and 30 ft. (5 m and 10 m). Also excellent for groundwater and surface water applications.

The sealed 7/8" x 5.6" (22 mm x 142 mm) stainless steel housing includes the pressure transducer, temperature sensor, 5-year lithium battery, and FRAM memory for 40,000 water level and temperature measurements. The Levelogger Junior Edge can be set to record linearly from 1/2 a second to 99 hours.

The Levelogger Junior Edge is compatible with Levelogger Software and accessories, including communication cables, well caps, Solinst Telemetry Systems and SDI-12 Interface Cable. Barologger Edge data can be used to barometrically compensate Levelogger Junior Edge data.



Enhance Your Monitoring Network



The **Model 3002 Rainlogger Edge** simply connects to, and records and stores the tips of a tipping-bucket rain gauge. The rain event time stamp and total rainfall per time period are stored in non-volatile memory. Up to 60,000 readings can be saved.

The durable ABS housing is compact, 7/8"x 5.5" (22 mm x 140 mm), and provides ESD (electrostatic discharge) protection. The lithium battery lasts up to 10 years. The Rainlogger Edge is deployed in the field using a 3-pin connection cable to the tipping bucket rain gauge. The Rainlogger Edge is also compatible with all Levellogger communication and deployment accessories.

The Rainlogger Edge is programmed, and data downloaded, using Levellogger Software. This allows rainfall data to be integrated into projects using Levellogger data, which is ideal for correlating precipitation events with changes in groundwater and surface water levels, or conductivity. The Rainlogger Edge is excellent for measuring local precipitation and peak rainfall events, for stormwater management, and watershed, drainage basin, agricultural and forestry studies.

Convenient Levellogger Software

Levellogger Software is user-friendly. It auto-detects the type of datalogger connected, and provides the appropriate programming options. The Datalogger Settings tab provides information about the connected datalogger, including battery level. It is used to set a sampling regime, and start and stop dataloggers. There are options for immediate start or a future start and stop times. Settings files can be saved for easy re-use. Apply the settings files to synchronize all dataloggers in one project.

Data Control is used to download, view, and export data files for use in other software programs. The Real Time View tab is used to actively view data as it is being collected by the datalogger. The Data Wizard is used to perform multiple data compensations, including barometric compensation, manual data adjustments, and parameter adjustments. The Conductivity Cal tab is used to calibrate the LTC Levellogger Edge.

The Software also includes helpful Utilities. The Diagnostic Utility can be used in case of an unexpected problem. It checks the function, calibration, backup and logging memories, the pressure transducer, temperature sensor and battery voltage, as well as enabling a complete Memory Dump, if required. The Firmware Upgrade Utility allows you to update dataloggers as new firmware becomes available.



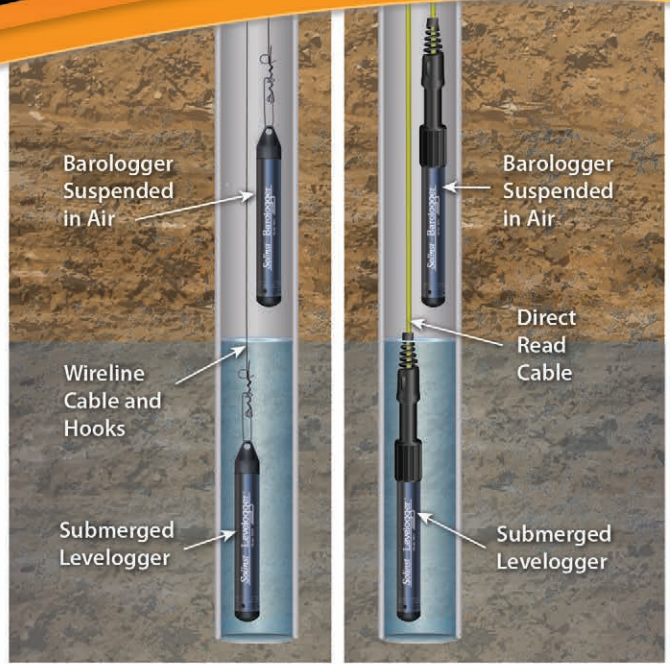
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Levellogger Programming and Deployment

Choose Direct Read deployment if you wish to connect and communicate with your Levellogger in the field, without removing it from the well. Choose wireline or Kevlar cord to minimize costs, and if you do not require communication while the Levellogger is recording down-well.



The 3001 Well Cap Assembly is designed to fit 2" wells (or 4" with reducer).



Wireline Deployment

Direct Read Cable Deployment

Levelloggers use optical infrared communication. To begin using your Solinst Levellogger, an Optical Reader (USB) for connection to a laptop or desktop PC, and Levellogger Software is required.

The Standard Communication Package is all you need if you are planning to deploy your Levelloggers using wireline or Kevlar cord. The Optical Reader allows you to program your Levellogger before deploying it. Upon retrieval, the Optical Reader is used to download data to your laptop or desktop PC.

If you are deploying your Levellogger using a Direct Read Cable, you will need a Direct Read Communication Package. It comes with the Optical Reader as well as a PC Interface Cable, which connects a Direct Read Cable to a Laptop for communication with a Levellogger while it is still deployed.

Users can also customize their own deployment method based on their application needs, especially surface water applications. A Biofoul Screen provides extra protection against biofouling. Artesian well adaptors are also available.



Maintenance-Free Vented Water Level Measurement



Level Vent
Model 3250

AquaVent
Model 3500

The Model 3250 LevelVent & Model 3500 AquaVent record very accurate water level and temperature measurements in shallow groundwater and surface water applications. The loggers combine pressure and temperature sensors, a datalogger, and memory for up to 120,000 data logs within a 7/8" x 7" (22 mm x 178 mm) stainless steel housing. The LevelVent logger also contains an 10-year lithium battery (based on 1 reading per minute).

The LevelVent and AquaVent use a vented pressure sensor; it is open to the atmosphere via a vent tube to surface. This applies atmospheric pressure to the sensor, resulting in water level readings that are automatically compensated for barometric effects.

The loggers use the same durable Hastelloy pressure sensor as the Levellogger Edge, providing 0.05% FS accuracy. It can operate in temperatures from -20°C to 80°C (0°C to 50°C is the temperature compensation range).

The LevelVent and AquaVent come in different pressure ranges to suit expected water level fluctuations, from 15 ft. to 65 ft. (5 to 20 m). Vented Cables are available in lengths to 500 ft. (150 m). The Vented Cable and loggers are protected from moisture by built-in desiccants and hydrophobic filters.

When programmed using Levellogger Software, the LevelVent and AquaVent can be set to record as often as every 1/8 of a second. There are linear, event-based, and scheduled sampling mode options. The LevelVent and AquaVent are also compatible with the Solinst Levellogger App and Interface and DataGrabber.

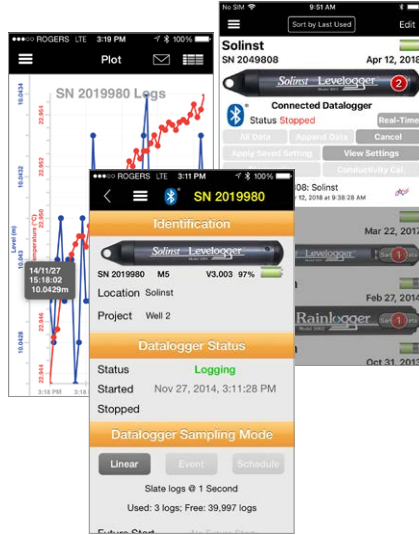
The LevelVent Wellhead is compact and seats inside a Solinst 2" Well Cap Assembly. It provides an easy connection for communication accessories. The LevelVent Wellhead connects to Solinst Levellogger PC Software using a USB PC Interface Cable. The Levellogger App Interface and DataGrabber connect directly to the LevelVent Wellhead.

The AquaVent Wellhead fits conveniently onto a 2" (50 mm) well casing. There are two options; the SP Wellhead has connections for communicating with Solinst software and accessories; SPX Wellhead has the added option of communicating with third party dataloggers or telemetry systems using MODBUS (RS-232/RS-485) or SDI-12 protocols.

Each AquaVent Wellhead contains four 1.5V AA lithium batteries that power the AquaVent logger. They are user replaceable and can last up to 8 years based on 1 reading per minute.



Dataloggers & Telemetry Systems



Direct Read to
Optical Adaptors



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Make Data Collection More Efficient

Connect to your Dataloggers Using your Smart Device

The **Levellogger App Interface** allows you to connect to your dataloggers using *Bluetooth®* wireless technology and your Apple® or Android™ smart device. Once connected, you can program and view data from the connected datalogger, using the Solinst Levellogger App.

The Levellogger App Interface is convenient and compact in design; it is very easily transported. It has an IP 64 rating. The Levellogger App Interface uses four 1.5V AA replaceable lithium batteries, that are easily accessed. The batteries last 500 full datalogger downloads (@21°C). The Interface has a power button; there is an auto-off after 10 minutes of inactivity to preserve the battery. An LED light on the Levellogger App Interface indicates its status.

The Levellogger App Interface connects to the top end of a Levellogger's Direct Read Cable, directly to a Levellogger using an Adaptor, or to a LevelVent or AquaVent Wellhead. Simply, turn the Levellogger Interface App on and pair it with your Apple smart device, to access the Solinst Levellogger App.

The **Solinst Levellogger App** can be downloaded from the App StoreSM or on Google PlayTM. It is very streamlined, making it easy to use. It provides information about the connected datalogger, including battery level, location, and serial number.

Without bringing a laptop to the field, the Solinst Levellogger App provides all major programming options available with the Solinst Levellogger PC Software, including future start and stop times, and scheduled sampling. You can save up to 10 settings that can be applied to Levelloggers when required. This can help standardize all dataloggers across a project, with synchronized start times and sampling regimes.

The Solinst Levellogger App allows you to immediately check real-time readings from the connected datalogger, as well as download and view logged readings in a graph or database format. The data can be e-mailed from your smart device, or transferred to your computer when you get back to the office.



Simple Field Data Transfer Device



The **DataGrabber™** is a very convenient device for downloading data from Solinst dataloggers in the field. The DataGrabber simply copies data from a connected datalogger to a USB flash drive.

The DataGrabber is compact – designed to fit in your pocket. It uses one 9V replaceable battery. It connects to the top end of a Levellogger's Direct Read Cable, directly to a Levellogger using an Adaptor, or to LevelVent or AquaVent Wellhead.

To operate, connect your datalogger, insert the USB device, and press the push-button. All of the data in the connected datalogger is transferred to the USB device. The transfer does not interrupt a running datalogger, and the data in memory is not erased. A light indicates the DataGrabber's functions.



Simple Telemetry for Solinst Dataloggers

The **LevelSender** is a simple, low cost telemetry system designed to wirelessly send data from dataloggers in the field, via GSM communication, to a Home Station computer, a number of different e-mails and an SMS address.

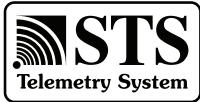
Each LevelSender device has a single port to connect one datalogger with an optional splitter that allows the connection of a second datalogger.

LevelSender stations are compact in design, which allows them to be discreetly installed inside 2" (50 mm) well caps. With low power needs, LevelSender stations use three replaceable 1.5V AA lithium batteries to operate.

Data is received as text via e-mail and SMS, and is also received at a Home Station computer in a dynamic database, or exported from the LevelSender PC Software Utility as .xle files that can be opened for use in Solinst Levellogger Software.



Dataloggers & Telemetry Systems



The Model 9100 STS Edge Telemetry System provides a remote monitoring solution for Solinst dataloggers. The STS System uses wireless cellular technology to connect a number of remotely located dataloggers to a central Access database, or for viewing continuous, real-time data.

STS Telemetry Systems use a standardized Remote Station hardware setup that includes a GSM modem. A user-supplied lead-acid 12V battery provides power. There are also options for back-up power, including solar panels or direct AC. The communication options are flexible to suit each site.

Programming remote networks is simplified using the intuitive STS/RRL Telemetry Software. The Software is used to create sampling and reporting schedules. The software also provides a simple method to store and manage your own data.

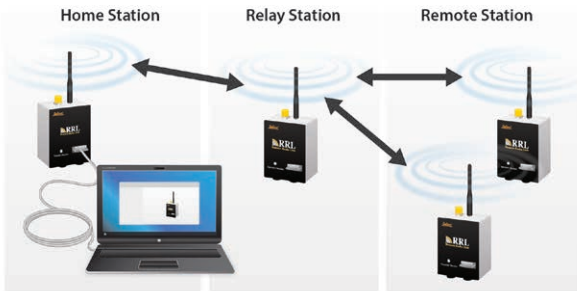
Communication from the Home Station computer is two-way; therefore, you can program alarms to be sent as e-mail when a high, low, or a certain percentage change is detected in the field.

Remote Monitoring Solutions



Maintenance is made simple through remote diagnostic reporting, and the ability to update the data collection schedule from the Home Station.

By eliminating manual data collection, STS Telemetry provides an efficient and convenient method of collecting remote data. Less time and money is spent traveling to each site, and without data-hosting fees, there are further cost savings.



The Model 9200 RRL Remote Radio Link is an inexpensive solution for creating a closed-loop network of Solinst dataloggers. The RRL is excellent for local sites such as landfills, golf courses, or mine sites. Radio communication has the benefit of no service fees, and no loss of data due to signal issues. RRL radios can transmit data up to 20 miles/30 km (line-of-sight).

RRL Stations have standardized hardware, therefore they have the flexibility to be programmed as a Home Station, Remote Station, or Relay Station. Setup is simple using a "Wizard" in the STS/RRL Telemetry Software. The Stations are powered by 6 replaceable 3.6V AA lithium batteries, with the option of using a solar panel.



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