# Solinst Levelogger® 5

Model 3001

# 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. With over 40 years of engineering experience, 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.

# Absolute Precision
# Water Level and Temperature Datalogging



**The Model 3001 Levelogger® 5** 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 ±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 Levelogger 5 comes in different pressure ranges to suit expected water level fluctuations, from 5 m to 200 m (15 ft. to 600 ft.).

The sealed unit contains a temperature sensor that gives accurate readings (±0.05ºC) and provides temperature compensated water level values. The Levelogger 5 has a lithium battery that lasts 10 years based on 1 reading every minute. The internal datalogger has memory for 150,000 level and temperature readings.

For use in seawater, and for extra corrosion, abrasion and chemical resistance, the 22 mm x 160 mm (7/8" x 6.3") stainless steel housing has a durable coating (inside and out) baked-on using polymerization technology. The Faraday cage design provides protection against power surges or lightning strikes. The Levelogger 5 operates in temperatures from -20ºC to 80ºC (0ºC to 50ºC is the temperature compensation range).

*Hastelloy is a registered trademark of Haynes International Inc.*

The Levelogger 5 is programmed using the intuitive Solinst Levelogger PC Software, or alternatively, using the Solinst Levelogger App. Single-eye, high-speed optical 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.

The Levelogger 5 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 Leveloggers are absolute dataloggers, they measure both water pressure and barometric pressure above the sensor. Using a separate **Barologger 5** is the most efficient and accurate method to obtain simultaneous barometric readings in air. The readings can be used to subtract from the Levelogger data, to obtain true water levels.

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

# Dataloggers & Telemetry Systems



## Additional Datalogging Options

**The Model 3001 Levelogger 5 LTC**, 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 Levelogger 5 LTC includes memory for 100,000 readings of level, temperature, and conductivity, and a 8-year lithium battery. The 22 mm x 208 mm (7/8" x 8.2") stainless steel body has a baked-on finish (inside and out) using polymerization technology for extra corrosion, abrasion, and chemical 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 µS/cm and calibrates from 50–80,000 µS/cm. Accuracy is ±1% from 5,000 µS/cm–80,000 µS/cm and the greater of ±2% or 15 µS/cm from 50 µS/cm–5,000 µS/cm.

The Levelogger 5 LTC can be set to record every 2 seconds to 99 hours, in linear, event-base, or scheduled sampling modes. It is compatible with all Levelogger communication and deployment accessories. A Barologger 5 can be used to compensate the water level readings.

**The Model 3001 Levelogger 5 Junior** is designed to be an inexpensive alternative for automatic, continuous water level and temperature datalogging.



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

The sealed 22 mm x 160 mm (7/8" x 6.3") stainless steel housing includes the pressure transducer, temperature sensor, 5-year lithium battery, and memory for 75,000 water level and temperature measurements. The Levelogger 5 Junior can be set to record linearly from 1/2 a second to 99 hours.

The Levelogger 5 Junior is compatible with Levelogger Software and accessories, including communication cables, well caps, Solinst Telemetry Systems and SDI-12 Interface Cable. Barologger 5 data can be used to barometrically compensate Levelogger 5 Junior data.

## Convenient Levelogger Software

**Levelogger Software is user-friendly.** It auto-detects the type of datalogger connected and provides the appropriate programming options. The Datalogger Settings tab includes 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 view live data as it is being collected. Multiple data compensations, including barometric compensation, manual data adjustments, and parameter adjustments are performed using the Data Wizard. The Conductivity Cal tab is used to calibrate the Levelogger 5 LTC.

The Software also includes helpful Utilities. The Diagnostic Utility is available for a quick check on the health of your datalogger. It checks the function, calibration, backup and logging memories, 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.

## Enhance Your Monitoring Network

**The Model 3002 Rainlogger 5** 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 100,000 readings can be saved.

The durable ABS housing is compact, 22 mm x 160 mm (7/8" x 6.3"), and provides ESD (electrostatic discharge) protection. The lithium battery lasts up to 10 years. The Rainlogger 5 is deployed in the field using a 3-pin connection cable to the tipping bucket rain gauge. The Rainlogger 5 is also compatible with all Levelogger communication and deployment accessories.

The Rainlogger 5 is programmed, and data downloaded, using Levelogger Software. This allows rainfall data to be integrated into projects using Levelogger data, which is ideal for correlating precipitation events with changes in groundwater and surface water levels, or conductivity. The Rainlogger 5 is excellent for measuring local precipitation and peak rainfall events, for stormwater management, and watershed, drainage basin, agricultural and forestry studies.
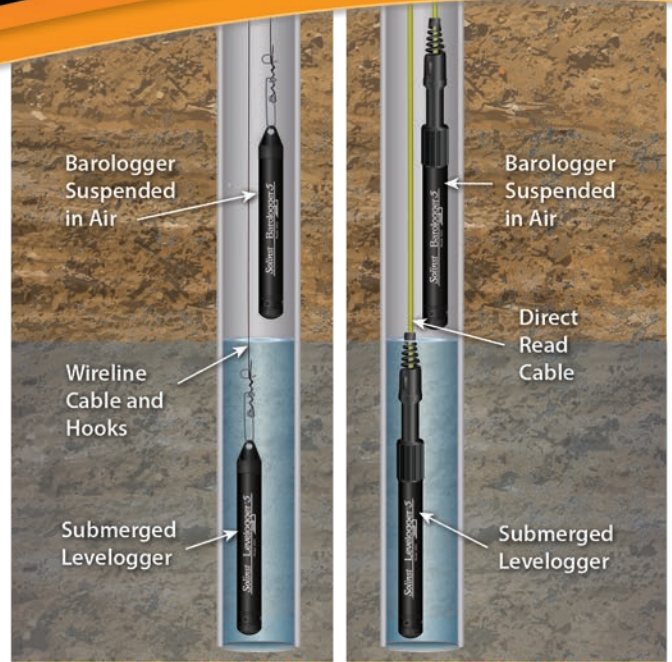
# Dataloggers & Telemetry Systems

## Levelogger Programming and Deployment

Choose direct read deployment if you wish to connect and communicate with your Levelogger 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 Levelogger is recording down-well.

L5 Direct Read Cable

Levelogger 5

Desktop Reader 5

Field Reader 5

PC Interface Cable

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

3001 Biofoul Screen



Barologger Suspended in Air

Wireline Cable and Hooks

Submerged Levelogger

Barologger Suspended in Air

Direct Read Cable

Submerged Levelogger

Wireline Deployment      Direct Read Cable Deployment

Leveloggers use high-speed optical communication. To begin using your Solinst Levelogger, a USB Desktop Reader 5 or Field Reader 5 connects it to a laptop or desktop PC for programming with Levelogger Software.

A **Desktop Reader 5** or **Field Reader 5** is all you need if you are planning to deploy your Leveloggers using wireline or Kevlar cord. The Reader allows you to program your Levelogger before deploying it. Upon retrieval, the Reader is used to download data to your laptop or desktop PC.

If you are deploying your Levelogger using an L5 Direct Read Cable, you will also need a PC Interface Cable. The PC Interface Cable connects an L5 Direct Read Cable to a Laptop for communication with a Levelogger 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.

# Vented Water Level Measurement



**The Model 3250 LevelVent 5 & 3500 AquaVent 5** record very accurate water level and temperature measurements in shallow groundwater and surface water applications. The loggers combine pressure and temperature sensors, datalogger, and memory for up to 150,000 data logs within a 22 mm x 173 mm (7/8" x 6.8") stainless steel housing with corrosion-resistant coating. The LevelVent 5 logger also contains an 10-year lithium battery (based on 1 reading per minute).

The LevelVent 5 and AquaVent 5 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 Levelogger 5, providing 0.05% FS accuracy. It can operate in temperatures from -20ºC to 80ºC (0ºC to 50ºC is the temperature compensation range).

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

When programmed using Levelogger Software, the LevelVent 5 and AquaVent 5 can be set to record as often as every 1/8 of a second. There are linear, event-based, and scheduled sampling mode options. They are also compatible with the Solinst Levelogger 5 App Interface, Solinst Readout Unit (SRU) and DataGrabber 5.

The LevelVent 5 Wellhead is compact and seats inside a Solinst 2" Well Cap Assembly. It provides an easy connection for communication accessories. The LevelVent 5 Wellhead connects to Solinst Levelogger PC Software using a USB PC Interface Cable. The Levelogger 5 App Interface, SRU and DataGrabber 5 connect directly to the LevelVent 5 Wellhead.

The AquaVent 5 Wellhead fits conveniently onto a 2" (50 mm) well casing. The SPX Wellhead has connections for communicating with Solinst software and accessories; and a second connection for communicating with third party dataloggers or telemetry systems using MODBUS (RS-232/RS-485) or SDI-12 protocols.

Each AquaVent 5 Wellhead contains four 1.5V AA lithium batteries that power the AquaVent 5 logger. They are user replaceable and can last up to 8 years based on 1 reading per minute.

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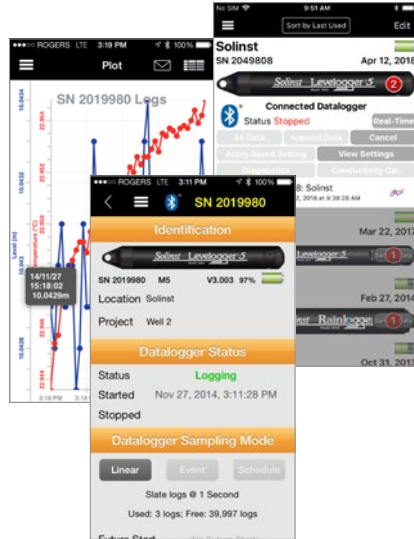




L5 Threaded and
Slip Fit Adaptors

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## Make Data Collection More Efficient

### Connect to your Dataloggers Using your Smart Device

**The Levelogger 5 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 Levelogger App.

The Levelogger 5 App Interface is convenient and compact in design; it is very easily transported. It has an IP 64 rating. The Levelogger 5 App Interface uses four 1.5V AA replaceable lithium batteries that are easily accessed. The batteries last 500 full datalogger downloads (@21ºC). 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 Levelogger 5 App Interface indicates its status.

The Levelogger 5 App Interface connects to the top end of a Levelogger's Direct Read Cable, directly to a Levelogger using an Adaptor, or to a LevelVent or AquaVent Wellhead. Turn the Levelogger 5 Interface App on and pair it with your smart device to access the Solinst Levelogger App.

**The Solinst Levelogger App** can be downloaded from the App Store℠ or on Google Play™. 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 Levelogger App provides all major programming options available with the Solinst Levelogger PC Software, including future start and stop times, and scheduled sampling. You can save up to 10 settings that can be applied to Leveloggers when required. This can help standardize all dataloggers across a project, with synchronized start times and sampling regimes.

The Solinst Levelogger App allows you to check real-time readings from the connected datalogger immediately, as well as download and view logs 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.

## Handy Field Data Transfer Device

**The Model 4001 Solinst Readout Unit (SRU)** is an in-field device designed to take and display instant water level readings from a deployed Solinst datalogger.

A real-time monitoring session can be started independent of the datalogger's internal logging. Real-time logs can be saved in the SRU memory. The SRU has a built-in barometer, which provides the option of barometrically compensating the real-time readings.

The SRU also functions as a data download and storage device. Saved log files can be transferred to a PC and viewed using Levelogger Software. The SRU also displays the datalogger's status, including battery level, memory, serial number, and firmware version.

**The DataGrabber 5** is a very convenient device for downloading data from Solinst dataloggers in the field. The DataGrabber 5 copies data to a USB flash drive.

The DataGrabber 5 is compact—designed to fit in your pocket. It uses one 9V replaceable battery. It connects to the top end of a Levelogger's Direct Read Cable, directly to a Levelogger 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.

## Versatile Submersible Water Level Transmitter

**The Model 301 Water Level Temperature Sensor** is a compact, all-in-one submersible hydrostatic level transmitter that provides fast, continuous, and accurate water level and temperature readings for a wide variety of applications.

The 301 Water Level Temperature Sensor works with digital and analog protocols – MODBUS, SDI-12 and 4-20mA (add-on adaptor) – which makes them easy to integrate into your existing SCADA or PLC systems.

The durable water level pressure sensor provides 0.05% FS accuracy with automatically temperature compensated readings and options for absolute and gauged (vented) pressure sensor setups. Factory calibrated to NIST traceable standards.

There are six pressure ranges (5–200 m), with communication cable assemblies available in lengths up to 300 metres. Vented cables contain built-in hydrophobic water-blocking filters (no consumable desiccants).

The Sensor features a slim, robust 22 mm x 192 mm (7/8" x 7.55") 316L stainless steel housing with a removable nose cone for optional use of the 1/4" NPTM threaded connection to attach to pipes/conduit. Double o-ring seals prevent leaks, and a Faraday cage design protects against power surges and lightning.

PC software utilities make it very straightforward to set up the sensor for different protocols, perform diagnostics, and update sensor firmware if required. Connect to a PC using a USB-A Programming Cable.

With the fastest output rate on the market at 1 second, the Water Level Temperature Sensor is Ideal for measuring hydrostatic liquid levels long-term in industrial, municipal, and environmental applications.

![Solinst logo]

## Simple Telemetry for Solinst Dataloggers

![LS5 LevelSender logo]

**The 9500 LevelSender 5** is a simple, low cost system designed to wirelessly send data from dataloggers in the field, via 4G cellular communication, to the Solinst Cloud or a Home Station computer and an FTP server; email and SMS are also options.

Each LevelSender 5 has a single port to connect one datalogger with an optional splitter that allows the connection of a second datalogger. A built-in barometer allows Levelogger data to be automatically compensated for barometric affects.

LevelSender 5 stations are compact in design, which allows them to be discreetly installed inside 2" well caps. With low power needs, LevelSender 5 stations use three replaceable 1.5V AA lithium batteries to operate. Solinst provides a ready-to-go option with a pre-programmed SIM card and low cost cellular plan managed and billed directly through Solinst.

Data is sent to the Solinst Cloud, or received on an FTP server, at a Home Station computer in a dynamic database, or via e-mail and SMS. Data can be exported as .xle files that can be opened for use in Solinst Levelogger Software.

## Solinst® Cloud

**Solinst Cloud** is a device and data-management web-tool that provides quick and secure access to your crucial water monitoring projects. Effortlessly connect to your remote monitoring sites and Solinst devices using your browser. It is a total solution for maintaining projects and giving real-time access to your devices, data and alarms. Solinst Cloud provides an intuitive interface to configure your LevelSender telemetry systems and monitoring networks. It organizes your information into projects, making it easy to get your data. The Dashboard view is simple to navigate to critical details, such as alarm triggers and the latest reports.
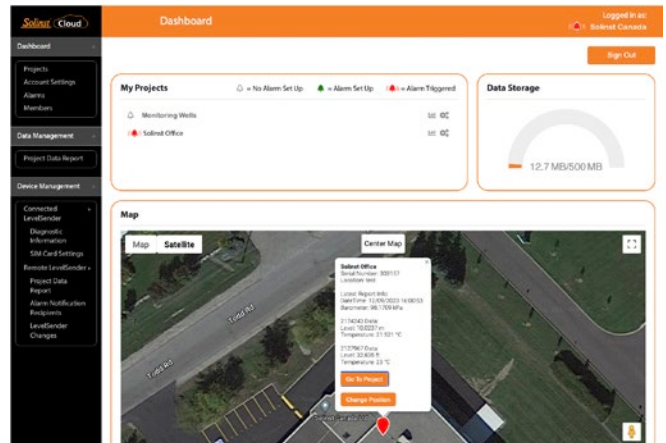


Solinstcloud.com Dashboard

## Discover Anywhere Monitoring

**The Model 9700 SolSat 5 Satellite Telemetry** is an advanced telemetry system that leverages Iridium satellite technology to provide global connectivity for your remote water monitoring projects.

The SolSat 5 uses TextAnywhere two-way global satellite messaging service to send data from Solinst dataloggers in the field to a secure web portal where you have complete control of your data. TextAnywhere also allows you to text or email through the integral SolSat 5 Wi-Fi App, providing convenience and safety when at remote sites.

The SolSat 5 is compact, lightweight, and features a robust weatherproof enclosure. It is installed anywhere with very little site preparation, saving costs and time in the field. A built-in solar panel extends the battery life. You can easily upgrade your existing Levelogger installations by adding the SolSat 5. One Solinst datalogger can be connected to a SolSat 5 using an existing direct read cable.

The SolSat 5 is simple to set up with Solinst dataloggers using an integral, secure Wi-Fi App on your smartphone or laptop. The app allows viewing, scheduling, and configuration wirelessly from your browser. You can also set high or low-level alarms for the connected datalogger.

Select a low-cost data plan of your choice through Solinst – sampling rate to collect data from the connected datalogger and a report rate to send data via satellite transmission. Along with water level, temperature, conductivity, or barometric data, battery voltage from the remote SolSat 5 is received with each data report. The built-in barometric sensor allows for automatically compensated water level data reported from the field.

# Remote Monitoring Solutions



**The Model 9100 STS Telemetry System** provides a remote monitoring solution for Solinst dataloggers. The STS System uses the latest in wireless 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 Solinst 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.

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 30 km /20 miles (line-of-sight).

RRL Stations have standardized hardware, therefore they have the flexibility to be programmed as a Home Station or Remote Station. Setup is simple using a "Wizard" in Solinst Telemetry Software.

## ON THE LEVEL

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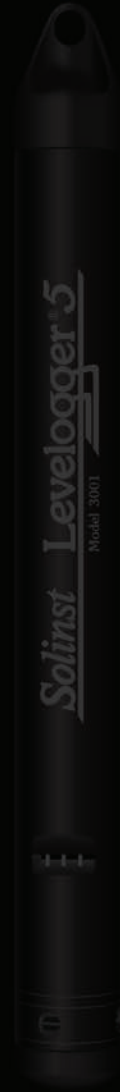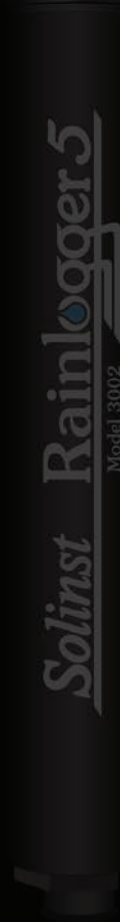**Share Us**
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*High Quality Groundwater and Surface Water Monitoring Instrumentation*

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