

Levelogger®

Model 3001

The LT Levelogger is unique in that the datalogger, battery, pressure transducer and temperature sensor are all housed in a very small, minimal maintenance, 7/8" x 4.9" case.

The sealed design offers protection against power surges such as nearby pumps or lightning, and greatly simplifies maintenance.

Leveloggers offer superior flexibility compared to other water level dataloggers. They can be suspended on a simple wireline, or connected to the surface with direct read cable for simple downloading of data and/or reprogramming without removal from the water. Use of the wireline further reduces costs and allows the Leveloggers to be totally hidden from view and locked away from possible damage.

A 10-year battery life, high accuracy and long-term stability all help to make Leveloggers the ideal device for recording water levels in monitoring and production wells, boreholes, lakes, rivers, tanks, harbours, etc.

Leveloggers are available in a variety of ranges, in the three models described below.

The fully automatic, easily programmed Levelogger allows measurements at selected time intervals as small as 0.5 sec. with no wraparound, so that it does not overwrite data. Logarithmic and event-based sampling regimes are also easily programmed in the easy-to-use software.



Applications

- ▶ Pumping and slug tests
- ▶ Watershed, drainage basin and recharge areas
- ▶ Stream gauging, lake levels and reservoirs
- ▶ Harbour and tidal fluctuation monitoring
- ▶ Wetlands and stormwater run-off monitoring
- ▶ Long term water level monitoring
- ▶ All intensive monitoring of groundwater levels

LT Levelogger

The **LT Levelogger** measures pressure and temperature. It displays temperature readings and temperature compensated level readings. Sampling options are linear, logarithmic or event-based with a maximum of 2 x 24,000 readings per session. Accuracy is 0.1% FS, from -10°C to 40°C.

Barologger

The **Barologger** has identical specifications and operation to the LT Levelogger in a low cost model with a low range of 5 ft. (1.5 m), suitable for monitoring barometric pressure. It allows more accurate and easier barometric compensation than traditional vented cable methods, without any lag time.

LTC Conductivity Levelogger

LTC Leveloggers measure pressure, temperature and conductivity. They display temperature compensated level and conductivity readings and temperature. Sampling options are linear or event-based with a maximum of 3x16,000 readings/session.

Low-maintenance
factory sealed design

Datalogger
10 year battery

Pressure transducer
Temperature sensor



Better than Ever

Accurate, Reliable and Easy

- Smaller than ever: 7/8" x 4.9" (22 x 125 mm)
- 0.1% FS accuracy and long-term stability
- Lower price
- Logarithmic, event-based or linear sampling

Infra-Red Data Transfer

- No vented cable or desiccant problems
- 2-conductor cable or simple wireline
- Protected from power surges (pumps, lightning)
- Maintenance-free, water-tight

Very Friendly Software

- Easy data export to spreadsheets and databases
- Automatic temperature compensation
- Barometric compensation wizard

Telemetry

Telemetry systems are available for Leveloggers. One uses AMPs analog cellular transceivers to provide wide-area, remote telemetry coverage, ideal for use in the USA and Canada. Designed for use with a customer-controlled central computer system, the software can control up to 100 remote Leveloggers, with selectable automated reading schedules, as well as high and low level alarm options. (See Data Sheet 9100)



Software

Levelloggers are programmed using a desktop or portable computer and an optical reader. The software is very easy to use and is available in DOS or Windows 95 and up. Setup and programming are very fast and simple.

The software can be used with any type of Levellogger including previous versions of the Levellogger. There is ample space for entering site, customer and sampling information.

Levelloggers may be synchronized to the computer clock, and there are options for immediate start or a future start time. The battery has an estimated life of 8-10 years and the life remaining is indicated on the programming screen.

The measurement time interval can be from 0.5 seconds to 99 hours with linear sampling. In addition, the LT Levellogger has linear, event-based and 3 logarithmic sampling options.

With the Windows software and a Barologger, barometric compensation is highly accurate and problem free. There is also a Barometric Compensation Wizard, which can be used prior to export of the data to other programs.

The software allows immediate viewing of the data in graph or chart form, or simple downloading for future examination. It also allows easy export into a spreadsheet or database for further processing.



LTC Levellogger

Levellogger Operation

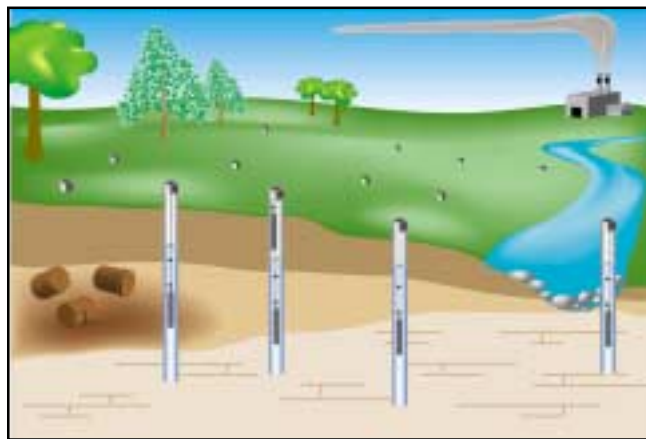
Programming of the Levelloggers requires one optical reader. Place the first Levellogger into a reader attached to a desktop or portable computer. Then fill out the various fields in the program screen with site information and choice of sampling regime.

The Levelloggers can then be started immediately, or with a future start time. They can be pre-programmed and taken to the site at a later time. If future start is chosen, no memory is used until field installation. If immediate start is chosen the operator can see the loggers working before deploying them.

A manual measurement of the initial depth to water is taken in each well, and noted as a base line measurement. If a Barologger is to be used for barometric pressure measurements, it is set above high water level in one location on site.

If direct read cable has been chosen, data can be viewed and retrieved from the Levellogger at anytime, using the PC Interface Cable and a portable computer.

To download data from a Levellogger suspended on wireline, simply remove it from the well and place it in an optical reader attached to a computer. This can be done back in the office, or on site with a portable computer. Data that has been collected is retained in the Levellogger until the Levellogger has been reprogrammed.



LTC Conductivity Levelloggers

LTC Levelloggers have a conductivity sensor as well as the pressure and temperature sensors in the standard LT Levelloggers. They have linear, or event-based sampling options and a conductivity calibration wizard as well as a barometric compensation wizard. They are ideal for use in the following applications:

- Plume monitoring and remediation sites
- Salt water intrusion
- Leachate from landfills, mine tailings, waste disposal, storage sites, and more
- Agricultural and stormwater runoff
- Chloride tracer tests

Use of Direct Read Cables

When it is desired to get realtime data and communicate with Leveloggers without removal from the water, they can be deployed using direct read cables.

The lower end of the direct read cable has a miniaturized infra-red optical reader. The top cap of the Levelogger is removed and the direct read cable attached in its place. In turn the upper end of the cable is fitted with an infra-red connector, and attaches, via a PC interface cable, to the portable computer.

This allows viewing of the data, downloading and/or programming in the field.

The full benefits of a sealed Levelogger with no vent tube or electrical cable connection are also maintained. The logger is still sealed from all electrical interference through a Faraday cage effect and cable handling problems are minimized.



*Levelogger,
30' (9m) Direct Read Cable and
1" Well Cap and Cover.*



*PC Interface Cable
2" Wellcap and Cover.*



*The PC Interface Cable
connected to the
Direct Read Cable.*



*Lockable Cap with Key,
Wireline and Clamps.*

Direct Read Cable Specifications

Direct read cables are available for attachment to any Levelogger, new or old, in standard lengths of:

50', 100', 200', 300' 500' and 15m, 30m, 60m, 80m 100m

Custom cable lengths, to fit particular monitoring situations, are also available, as required. These cables have one marking on the cable at the requested length. Extra cable markings, each 5 ft. or one meter, may be requested, for situations where the direct read Leveloggers need to be used in a variety of locations.

The 1/10" dia. (2.54 mm) cable has an HDPE outer jacket for strength and durability. The stranded stainless steel central conductor gives non-stretch accuracy.

The upper end of the direct read cable is fitted with a connector that can act as a well cap for a 1" well. This connector fits within Solinst Levelogger well caps designed for 2" or 4" wells, and can easily be attached at surface in other situations.

Use of Wireline Suspension

Leveloggers may also be suspended in the water on wireline. This is a very inexpensive method of deployment, and if in a well, allows them to be locked out of sight and inaccessible to anyone with a special key.

Solinst has adapted the Enviro Cap™ by putting a vent hole in the cap to allow for the equalization of barometric pressure. The well cap has a convenient eyelet from which to suspend the Levelogger. It slips over the casing and is locked in place with the special key, as shown.

The Enviro Caps are available sized for 2" and 4" wells, and well caps for other sizes of well can also be used.

Barometric Pressure

Leveloggers measure absolute pressure (water pressure + atmospheric pressure) expressed in feet or centimeters of water column.

The most accurate method of obtaining changes in water level is to compensate for atmospheric pressure using a Barologger. This avoids any time lag in the compensation figures and any errors introduced due to moisture buildup, kinking or damage to vented cable.

The Barometric Compensation Wizard in the Levelogger Windows software simplifies the adjustment of the level measurements for barometric pressure changes, by using the synchronized data from all Leveloggers on site and the site Barologger.

The overall results give more reliable, highly accurate level data than that obtained when using vented cable.

™ Kilman Electri Loc, Inc.

Levelogger® Model 3001

General Levelogger Specifications

Wetted Materials: 316 stainless steel and Akulon
 Battery Life: 10 years
 Clock Accuracy: Better than 1 second/day
 Operating Temperature: -20°C to 80°C
 Communication: RS232 (Optical Infra-Red)
 Mini LT Dimensions: 7/8" x 4.9" (22 mm x 125 mm)
 Mini LT Weight: 5.7 oz (160 g)
 LTC Dimensions: 7/8" x 10.2" (22 mm x 260 mm)
 LTC Weight: 10.2 oz (290 g)

Specifications	Mini LT Levelogger	Barologger	Conductivity LTC Levelogger
Models	F15, F30, F60, F100, F300 M5, M10, M20, M30, M100	F5/M1.5	F100/C5, F100/C50, F330/C5, F330/C50 M30/C5, M30/C50, M100/C5, M100/C50
Memory	Non-volatile, Flash	Non-volatile, Flash	
Max. # Readings	2 x 24,000 Linear 2 x 19,000 Event or Log	2 x 24,000 Linear 2 x 19,000 Event or Log	3 x 16,000
Measurement Rates	Linear 0.5 sec to 99 hrs 19 hr, 116 hr, 228 day Log or Event-Based	Linear 0.5 sec to 99 hrs 19 hr, 116 hr, 228 day Log or Event-Based	Linear 1 sec to 99 hrs Event-Based
Level Sensor	Ceramic Transducer	Ceramic Transducer	Ceramic Transducer
Normalization	Automatic Temp Compensation (to 1%FS from -10°C to 40°C)	Automatic Temp Compensation (to 1%FS from -10°C to 40°C)	Automatic Temp Compensation (to 1%FS from -10°C to 40°C)
Accuracy	0.1% FS (-10°C to 40°C)	0.1% FS (-10°C to 40°C)	0.1% FS (-10°C to 40°C)
Water Level Fluctuation Range (at Sea Level)	F15/M5 = 13.12 ft/4m F30/M10 = 29.52 ft/9m F60/M20 = 62.32 ft/19m F100/M30 = 95.12 ft/29m F300/M100 = 324.72 ft/99m		F100/M30 = 95.12 ft/29m F300/M100 = 324.72 ft/99m
Resolution	F15/M5 = 0.007 ft/0.2 cm F30/M10 = 0.01 ft/0.3 cm F60/M20 = 0.02 ft/0.6 cm F100/M30 = 0.03 ft/1 cm F300/M100 = 0.06 ft/2 cm		F100/M30 = 0.03 ft/1 cm F300/M100 = 0.06 ft/2 cm
Temperature Sensor	Spreading Resistance Silicon	Spreading Resistance Silicon	Spreading Resistance Silicon
Range	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C
Accuracy	0.1°C	0.1°C	0.1°C
Resolution	0.01°C	0.01°C	0.01°C
Conductivity Sensor	n/a	n/a	4 Electrode Platinum
Normalization			Temperature Compensation from -10°C to 40°C Specific Conductance @ 25°C
Accuracy			1% FS
Resolution			0 - 5 mS/cm; 1µS/cm 0 - 50 mS/cm; 10µS/cm