Quick Start Guide

3500 AquaVent™

High Quality Groundwater and Surface Water Monitoring Instrumentation

Getting Started

1. Download the software from: www.solinst.com/downloads and install Levelogger Software on your PC.

2. Install the Wellhead batteries. The Wellhead uses four (4) user-replaceable 1.5V AA lithium batteries.

3. Connect your AquaVent logger and Wellhead to the Vented Cable:

- Ensure the connections are clean and dry.
- **Line up** the alignment pins in the Wellhead and logger connectors with the alignment sockets in the Vented Cable connectors.
- C**arefully** push the connectors together.
- Twist the **couplings** of the Vented Cable connectors onto the logger and Wellhead connections. **Do not twist the Vented Cable connector housing, logger or Wellhead - only twist the stainless steel couplings.**
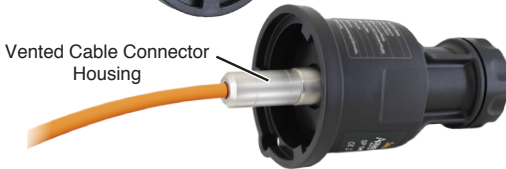
Alignment socket in the Vented Cable connectors

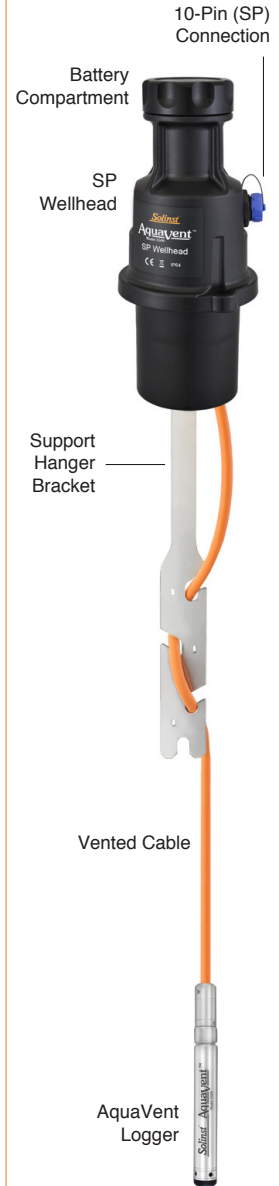Alignment pin in the Wellhead and logger connectors

Stainless Steel Coupling

Vented Cable Connector Housing

Solinst Aquavent™

Note: See page 6 for instructions to install the Support Hanger Bracket, as shown at right.

10-Pin (SP) Connection

Battery Compartment

SP Wellhead

Support Hanger Bracket

Vented Cable

AquaVent Logger

## AquaVent System Setup

4. Connect the USB Connector Cable to the 10-Pin (Solinst Protocol) connection on the Wellhead, then plug the USB Connector Cable into your computer.

USB Connector Cable

Programming AquaVent Loggers

Note: Ensure you are using the latest software, and firmware versions for your AquaVent logger and Wellhead. Visit www.solinst.com/downloads, or use the software update feature for help.

1. Start the Levelogger Software, and select the appropriate Com Port for the connected device.

2. In the Datalogger Settings tab, click the 'Retrieve Settings" icon. This will display the current programmed settings for the connected AquaVent.

3. You can now customize the Aquavent Project ID, Locations, sampling regime, and start and stop times.
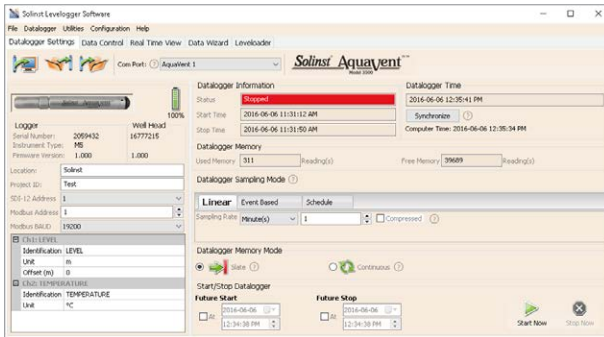
AquaVent Datalogger Settings Window

Tip

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

Tip

The 'Future Start' and 'Future Stop' options are ideal for synchronizing the data collection of multiple loggers.

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 AquaVent Loggers

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 AquaVent logger 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 start is selected, a window will pop-up as an alert that the previous data will be erased.

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

Solinst®

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: datalogger settings, tabular data, and graphical data.

2. To download data from a connected logger, select the 'Download Data from Datalogger' icon. There are four options for downloading data: All Data, Append Data, Partial Download, and Recover Previous Log. The data will be presented in tabular and graphical formats.
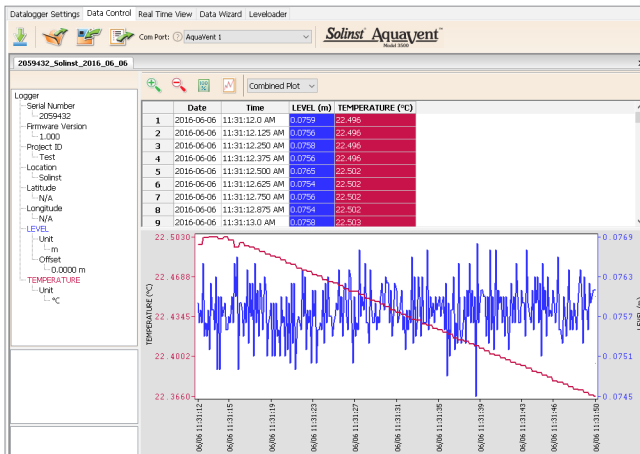
> **Note:** The default directory for downloaded and saved data is:
> <C:\Program Files\Solinst\Levelogger4_2\Data>
> Data is saved as an *.xle file.

3. To save data, click the "Save Data" icon and input the desired name for the saved file.

4. To export the data file for use in other software programs, click the 'Export' icon. The file can be exported as a *.csv or *.xml file.

Data Control Window

Real Time View

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

Compensate the Data

Click the 'Data Wizard' tab to open the 'Data Wizard' window. In this window the 'Wizard' will guide you through Manual Data Adjustments (elevation or height of water conversions) and Parameter Adjustments (units, elevation, density adjustments) on your open data files. Multiple AquaVent data files can be compensated at once.

AquaVent Ranges

AquaVent Models are rated to a specific submergence depth (Table 1). The choice of model depends on the accuracy of the level required and the submergence depth. Most important, your selection should be based on the maximum anticipated water level fluctuation.

AquaVent Models	Submergence Depth	Accuracy
M5	5 m (16.4 ft.)	± 0.3 cm (0.010 ft.)
M10	10 m (32.8 ft.)	± 0.5 cm (0.016 ft.)
M20	20 m (65.6 ft.)	± 1 cm (0.032 ft.)

Table 1 - AquaVent Ranges

Note

The AquaVent logger 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.

Measurement Fundamentals
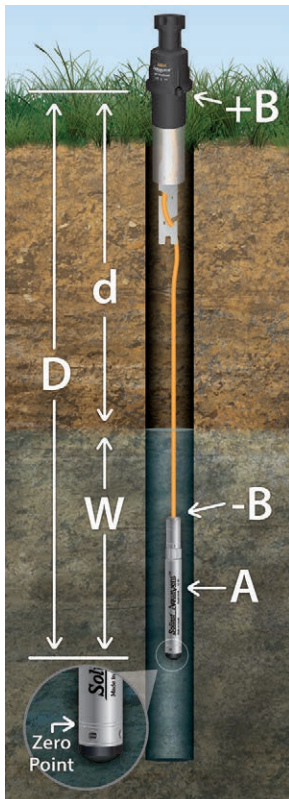
AquaVent loggers detect both water (**W**) and barometric pressure (**+B**). **However**, a vent tube to surface allows barometric effects on the pressure sensor to be eliminated (**-B**). Therefore, AquaVent loggers provide readings of the actual pressure of just water above the pressure sensor zero point (**A**).

A = (W + +B) + (-B)
Therefore, **A=W**

A = AquaVent readings
W = Water column height
+B = Barometric pressure detected by the pressor sensor
-B = Barometric pressure applied through the vented cable

Verifying Readings

Compare AquaVent readings (**A**) with a measured depth to water level value (**d**) (Using a Water Level Meter). The deployment depth of the AquaVent (**D**), minus the manual depth to water measurement (**d**), should equal the AquaVent reading:

D - d = A

Note

To adjust all readings in your AquaVent data 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 data and time with an actual AquaVent recording. Use this as a reference datum in the Manual Data Adjustment option in the Software Data Wizard.

AquaVent Field Notes

Before Deployment

Before deployment, make sure you do the following:

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

> **Note:** It is useful to synchronize the times of all AquaVent loggers being used for the same project.

• Set a future start time in the office, or start the AquaVent logger in the field using Levelogger PC Software and a laptop, or the Solinst Levelogger App & Interface.

• Determine borehole depth to ensure AquaVent logger does not touch the bottom of the well (avoid submergence in sediment)

• Record the deployment depth of your AquaVent logger.

> **Note:** The length of the Vented Cable should not be assumed as the deployment depth, as there may be some slack in the cable, especially when using the hanger bracket

• Use a Solinst Model 101 or 102 Water Level Meter to take a manual depth to water measurement that will be used to verify AquaVent readings

• Determine the minimum and maximum expected water levels, as AquaVent loggers must remain submerged for the entire monitoring period.

Deployment

• The AquaVent system is designed to be conveniently installed on a 2" well casing (4" using an adaptor). However, other installations are acceptable, if proper precautions and recommendations are followed.

• The Wellheads have a rating of IP 64 (dust and splash resistant), so should not be submerged at anytime. They can be secured inside an enclosure, however, it must be vented to equalize atmospheric pressure.

• Do not drop the AquaVent logger 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.

> **Note:** For tips, precautions, and more information on installations in different environments and applications, see the latest AquaVent User Guide.

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 AquaVent logger from the well

Tip

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

Support Hanger Bracket Installation

In-Field Communication

There are two SP Wellhead Cable options for communicating with AquaVent loggers in the field.

- The USB Connector Cable allows you to connect to a field laptop for communication using Levelogger Software (see image on Page 1).

- The App/DataGrabber Connector Cable allows you to connect to a Levelogger App Interface for communication using the Solinst Levelogger App, or to a DataGrabber for downloading data to a USB device.

App/DataGrabber Connector Cable   DataGrabber   Levelogger App Interface

LED: Wellhead Connection Status

The AquaVent Wellheads have a multicolour LED light which indicates the status and operation of the AquaVent:

- Fast multicolour cycle 3 times: Wellhead is powering-on
- Fast 10 cycles alternating blue/green: Wellhead has successfully connected to the PC using the USB Connector Cable
- Fast 10 cycles alternating blue/red: USB connection has been dropped
- Flashing yellow: The Wellhead is communicating with the PC Software

Note

The SPX Wellhead has additional LED definitions related to MODBUS and SDI-12 operation. For information on communication using MODBUS or SDI-12 Protocols, see separate User Guides.

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.

To ensure the vent tube remains dry, the AquaVent loggers and Wellheads contain permanent desiccants and hydrophobic membranes at the connections to the Vented Cable - there is no need to replace them. Please see our technical bulletin on *Vented Cable Design, Use, and Maintenance* for more details.

Other maintenance tips include (see the AquaVent User Guide for more details):

- Replace the o-rings at the Vented Cable connections on the AquaVent logger and the Wellhead.
- Keep the dust caps on all of the connections, when not in use.
- Store the AquaVent logger in its case, and the Vented Cable on its spool when not in use.
- Ensure connections are clean before assembling. Clean the AquaVent logger as required.
- Replace the Wellhead batteries as required (four user-replaceable 1.5V AA lithium batteries).

AquaVent Sampling Rate	Battery Life Estimate
8 readings per second	10 days
1 reading per second	3 months
1 reading per minute	8 years

Troubleshooting

Levelogger PC Software:

1. You must have administrator privileges to install software on a computer.

2. Windows 7, 8, and 10 Operating Systems support Levelogger Software.

AquaVent data has been accidentally erased:

If the AquaVent 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.

Try the following if your AquaVent is not communicating with Levelogger PC Software, or you are getting a communication error message:

1. Make sure you have installed the batteries correctly:

   • Ensure proper polarity, paying attention to the positive {+} and negative {-} symbols etched in the holder

   • Ensure proper alignment; the spring contacts in the housing should be lined up with the protruding contacts on the bottom of the battery holder

2. Check the Vented Cable connections to the AquaVent logger and Wellhead. Ensure they are lined-up correctly and there is no dirt or debris in the connection.

3. Make sure you are using the correct Wellhead Connector Cable to connect to the PC.

• You must be using a USB Connector Cable connected to the 10-pin Solinst Protocol connection on the Wellhead. The cable and connection are colour-coded orange.

4. Check that the USB Connector Cable is connected to the same Com Port that is chosen in the upper middle of the Main Window of the Levelogger Software.

5. 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 (This may have been set to Xon/Xoff – change it to None, Select [OK] and back out of this pathway.)

6. Try communicating with another AquaVent logger, Wellhead, Vented Cable or USB Connector Cable.

7. Try using a different computer.

8. If problem persists, contact Solinst.

To reset the battery charge counter after replacing the Wellhead batteries:
Go to the Diagnostic Utility in Levelogger Software, click "Run Diagnostics", then click "Reset Battery Charge Counter".

> **Note:** For diagnostic purposes, you may want to install the end of the Vented Cable with the serial number to the surface connection at the Wellhead.

Solinst®