IRROmesh
Logger Manual
for Logger with Solar Panel & Battery Pack

with 975L IRROmesh Software Package Instructions

The IRROmesh Logger is intended for users who do not wish to send their data to the Internet or do not have a local Internet connection at their field site. The device is left on site, where it receives and stores information from the IRROmesh, sent to it by the Base with which it has been associated. ***Note:** A Logger can only be used with one Base.*

The device is powered by a solar panel that charges a battery. The Logger must be left on site within 400' (122m) of its Base. Should it be necesary to temporarily remove the Logger from the field (as in off seasons) or to reset the Logger, disconnect one lead wire from the battery inside the Logger enclosure. *(See page 7 for wiring details.)*

975L IRROmesh Software

IRROMETER's 975L IRROmesh software program, for data storage, display and graphing, is bundled with a Windows® based application that creates the connection between an IRROmesh Logger and the laptop or PC being used to download, store and view the data file.

975L IRROmesh is available at
**www.Irrometer.com/download/975-DL.exe**

CSV File Management

When using 975L IRROmesh software for the first time, a unique CSV file, in the format 'logger.B2XXXXXX.CSV' *(where B2XXXXXX is your Base ID number),* is created in the 975L IRROmesh directory. Each subsequent time you download from that Logger its unique file is appended. If you download from multiple IRROmesh Loggers a file for each Logger is created with its own unique Base ID in the file name.

Note: The CSV file can be uploaded to SensMitWeb using the CSV Upload feature on the Utilities page of SensMitWeb.com. Use this option if you wish to display, store or share your data on the Internet. (Subscription required for use of SensMitWeb.)

Installing 975L IRROmesh Software

To download the 975L IRROmesh software package to your computer, type **www.Irrometer.com/download/975-DL.exe** into your browser address bar and press enter. The software will download to your '**Downloads**' folder; navigate to that folder. *(You may find a shortcut to the downloaded file sitting just above the Start button on your task bar.)* So that device drivers will properly install, right click on the file name and select '**Run as Administrator**' then '**Next**' on the Setup screen.

Note: With versions earlier than Windows® 7 install screens will look different. Continue steps to install the software as the Administrator for proper device driver installation.
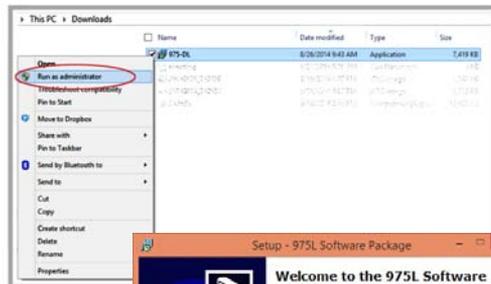
Click '**Next**' on each screen to set up the software on your hard drive and into the Start Menu.
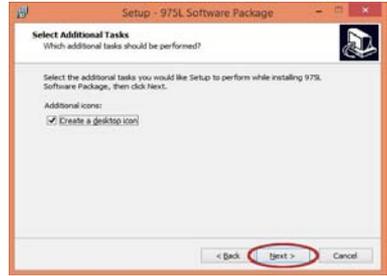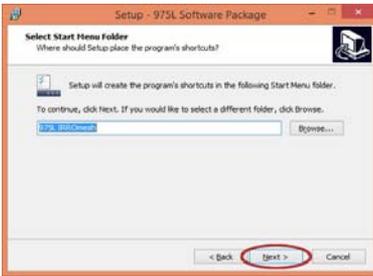
If using Windows® 7 or 8, drivers should already be installed. If not or if using Windows® Vista or XP, drivers are included with the 975L software and can be installed by continuing the default set-up steps for driver installation.
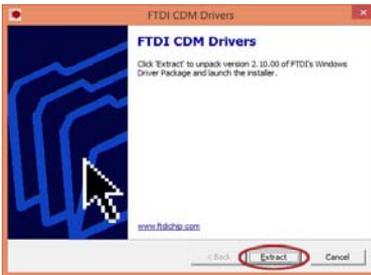
First, make sure the Logger is fully charged <u>and associated</u> BEFORE syncing it with the computer clock. The Logger then needs to be connected to the 975L download software at least once prior to installation in the field in order to sync the clock on the device with the clock on the computer. If the Logger is put in the field without this step, it will collect data starting with an incorrect timestamp.

Once the program is loaded and running, connect the USB cable from the Logger to the computer and click '**Downloader**'. **Wait until the time at the bottom left of the software's pop-up window shows the hours and minutes in your local time.** The displayed time in the program's dialogue box must match your computer time **before** you disconnect Logger's USB cable. Logger is now ready to be put in the field near the Base.

Downloading Data from the Logger

Connect the USB cable built into the IRROmesh Logger housing to the laptop or PC running 975L IRROmesh then start the software by double clicking on the Desktop shortcut.

Click the '**Downloader**' button to begin data retrieval. Even if the IRROmesh network is asleep at the time you make the connection, the software automatically finds the device and downloads the data it has collected. If the software does not start to download data within 30 seconds, click '**Find Logger**'.
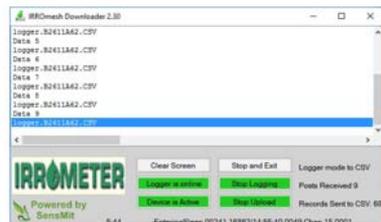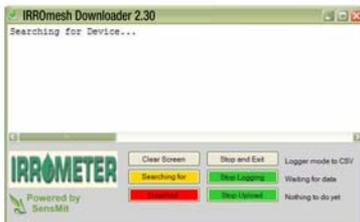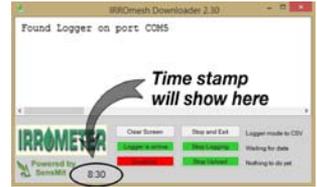
When the download is complete, data will stop posting. If you don't see any new data post for 30 seconds, then the download is complete. Eventually the program will time out and you will see 'Entering Sleep . . .' at the bottom of the program window, as shown in the picture above.

The IRROmesh Logger is for batch downloading of data and can be connected to a laptop or PC no more than five hours each day. If it is connected multiple times in one day or for long periods of time, it will cease to function for 24 'mesh awake' hours (Logger lock-up). No data will be collected during that time. You can restart IRROmesh Logger by de-powering and then re-powering it at any time.

The IRROmesh Logger is not enabled to stream data from the mesh in real-time. If you wish to stream data, send it directly to SensMitWeb by using the IRROmesh Cellular Gateway or PC Link. It is not possible to use the Logger to stream data to a third-party application.

Configure Data File

From the main screen of the software, you have the ability to apply descriptive labels to the individual Nodes in each IRROmesh system. Click '**Configure Data File**' and select the data file you wish to configure.

A 975L Config screen will open showing the ID number of the Base, each Node and the Logger for that system. The **Name** boxes

next to the ID numbers match by default but can be edited by simply overwriting the number then saving the changes.

Identify each Node in a way that is easy to recognize its location or what it is reporting. That name will then reflect when graphing sensor data. *Note: The first ID number in the list is the 975 Base and can be renamed but is hidden by default when graphing data.*

Graphing Data

WaterGraph5 software is used for displaying collected data to aid in making irrigation scheduling decisions.

– View data in graph form (open existing files)
– View data in spreadsheet form (raw data)
– Average different sensors together for analysis

From the main screen of the software, click on '**Graph 975L Data File**' then select the file you wish to graph.

Below is a graph of all Nodes in the mesh identified by the serial number on the top bar. Nodes are listed on the right and named according to how they were configured.

On the graph, Time is represented on the horizontal axis and centibars of soil water tension is displayed on the vertical axis to the left of the graph

Individual lines on the graph can be identified using the graph crosshairs. Moving the crosshairs over a line on the graph using the mouse will display information regarding the reading, time, and sensor name. A specific section of the graph can be zoomed in on by drawing a box around the desired area. Hold the left mouse button down while drawing the box. You can zoom back out by right clicking the mouse.

Many features exist to customize the display of data for easy interpretation. The headings below describe how each feature is used.

Legend

The sensor data can be customized on the graph using the legend. Each Node's data will be in a folder represented by an icon with the sensors listed beneath the icon when it is open. Right clicking on any sensor or icon will create a drop-down menu with options.

FOLDER OPTIONS:

Hide All – Hides all of the sensors associated within that folder.

Show All – Displays all of the sensors within that folder.

SENSOR OPTIONS:

Highlighting – This option will highlight or un-highlight a sensor's line on the graph to distinguish it from others. Left clicking on the graph line will also highlight the line, while right clicking will un-highlight the line.

Hide / Show – Selecting this option will hide or display the sensor's line on the graph. To indicate that it has been hidden, sensors will not display the color bar to the left of the sensor name.

Change Color – Allows selection of a custom color for the sensor line on the graph. Either select one of the pre-defined colors from the list or select the Custom Color option to create a new color.

Averaging – This option is used to assign sensors to an average set. The following section has more information on creating average sets.

INSTRUCTIONS FOR AVERAGING:

WaterGraph5 allows for the creation of up to five individual average sets, labeled A through E. A set is an averaged group of individual sensors represented by a single line on the graph. The sensors included in a set can be from any of the Field Nodes represented in the data file.

Sensors can be added to an average set by right clicking the sensor, selecting '**Averaging**', and then selecting the average set to place the sensor in.

Each set is represented by a unique folder structure in the graph legend. The individual sensors are listed, followed by the Field Node the sensor is connected to. Options for the average set can be accessed by right clicking on the legend entries.

FOLDER OPTIONS:

Calculate/Graph Average – Once all of the sensors you wish to include in the average have been added to the set, use this function to calculate and graph the average.

Hide Average Set – This option will hide the averaged line on the graph.

Show Average Set – This option will re-display a hidden average line on the graph.

Change Color – Use this option to change the color used to represent the average set on the graph.

SENSOR OPTIONS:

Remove Sensor – Selecting this option will remove an individual sensor from an average set. If the sensor is the last one remaining in a set, the set will be deleted when the sensor is removed.

MENU OPTIONS:

Average set configuration can be saved in the data file for easy viewing later. Once the sets have been configured, select the '**Options**' menu, '**Averaging**' then '**Save Average Set**'. This will write the set list to the data file, so that when the file is opened again with WaterGraph5, the configured average sets will automatically be graphed and displayed in the legend.

Graph Controls *(below the graph)*

Scaling and display options for the graph window are located beneath the graph in the controls section. These options allow for customizing the look and range of the data displayed.

Control options are only displayed if they are relevant to the data. If there are no temperature sensors in the data file, the options for temperature scaling will not be displayed.

Settings applied here can be saved for future graphs by selecting the '**File**' menu and '**Save Graph Layout**'.

TIME SCALE:

These options control the length of time displayed in the immediately visible graph window. Pre-defined options can be selected, or a desired number of days can be entered and applied by selecting the '**Set**' button. The '**Total**' option will display the entire range of time in the data file.

If more data exists than will display on screen in the selected time scale, then a drag bar will appear at the bottom of the graph, to allow you to navigate to a different section.

CENTIBAR SCALE:

'**Centibar Scale**' options control the range and direction of the Centibars of soil water tension axis.

Standard Range – This default option will set the '**Centibar Scale**' from 0 to 100 Centibars.

Automatic Range – Selecting this option will automatically scale the Centibar axis to fit all of the data between the top and bottom of the displayed window by calculating the minimum and maximum values.

Descending Scale – This option will set the zero or wet side of the Centibar axis at the top of the graph, and the dry side at the bottom. This choice displays soil water potential (negative numbers) with 0 being wet and -100 being dry.

Ascending Scale – This default option sets the dry side of the Centibar axis at the top of the graph, and the wet side at the bottom. This shows soil water tension (positive numbers) with 0 being wet and 100 being dry.

TEMPERATURE SCALES (Fahrenheit or Centigrade):

Standard Range – The default option will set the '**Temperature Scale**' from 32° to 122°F (0° to 50°C).

Automatic Range – Selecting this option will automatically scale the Temperature axis to fit all of the data between the top and bottom of the displayed window by calculating the minimum and maximum values.

Hide / Show Temp Scale – This option will either hide or display the Temperature axis and graph line.

THRESHOLDS:

The Thresholds control provides two entries for creating marker lines on the graph. For example, entering '24' in the text box will create a dashed grey line at 24 centibars for the entire width of the graph. These can be used to create high/low (dry/wet) reference points on the graph, indicating the appropriate moisture range within which the crop should be maintained to avoid stress. The '**Use Colors**' check box can be checked to create background color shades above and below the Threshold lines.

CONTROL BUTTONS:

View Raw Data – Selecting this button will open a spreadsheet style table below the graph, displaying the actual numeric data used to graph the file. *Note: This data is sorted by time and not by Node.*

Graph Only – This button will return the full screen to the graph window.

Menus

FILE:

Save Graph Layout – This option saves the Control settings and options. The next time a file is opened, the saved settings will automatically be applied.

Print Graph – Prints a snapshot of the currently visible graph. The graph is printed with a legend on the right side, listing each sensor name in the color used on the graph display for easy identification. Change the printer settings to '**Landscape**' orientation for best results.

Close Graph – Allows the user to exit the graph window and return to the main **WaterGraph5** program.

Options

BACKGROUND:

White – Displays the graph contents as colored lines on a white background.

Black – Displays the graph contents as colored lines against a black background.

RAIN SCALE: Adjusts the scaling for rainfall readings

LINEAR/QUADRATIC:

Linear – Displays the data with a straight line drawn between each data point.

Quadratic – Displays the data with a smooth line drawn through all the data points.

Step – Displays data with vertical lines at each data point.

AVERAGING:

Save Average Set – Saves the average set preferences.

LINE SIZE:

Allows the user to select the line size on the graph, between 1 and 6 points.

SHOW GRIDLINES:

Creates horizontal and vertical gridlines behind the data in the graph.

DISPLAY RAIN/SWITCH INFO:

Toggles Rain Gauge and Switch closure information on and off.

VIEW RAW DATA:

Opens a raw data spreadsheet style table below the graph, displaying the actual numeric data used to graph the file.

SHOW/HIDE DATA POINTS:

Shows and hides points on each graphed line where data was collected.

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