

WiFi-500 Sensor Series

Wireless Data Logging Devices and WiFi Sensor Software

User's Guide

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About this User's Guide

What you will learn from this user's guide

This user's guide describes the device setup and configuration, data file conversion and export, and device control features included with Measurement Computing WiFi-500 Sensor Series wireless devices.

Conventions in this user's guide

For more information

Text presented in a box signifies additional information and helpful hints related to the subject matter you are reading.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

Bold text is used for the names of objects on a screen, such as buttons, text boxes, and check boxes.

Italic text is used for the names of manuals and help topic titles, and to emphasize a word or phrase.

Where to find more information

Additional information about WiFi Sensor Software is available on our website at www.mccdaq.com. You can also contact Measurement Computing Corporation with specific questions.

- Knowledgebase: kb.mccdaq.com
- Tech support form: www.mccdaq.com/support/support_form.aspx
- Email: techsupport@mccdaq.com
- Phone: 508-946-5100 and follow the instructions for reaching Tech Support

For international customers, contact your local distributor. Refer to the International Distributors section on our website at www.mccdaq.com/International.

Introducing the WiFi-500 Sensor Series Wireless Devices

This user's guide explains how to perform the following tasks:

- Set up a WiFi-500 Sensor Series wireless device to connect to a wireless network
- Configure a device to log environmental data and transmit it wirelessly to a host PC or web-based Cloud account
- Export logged data to a comma-delimited text file and to a Microsoft® Excel® spreadsheet
- View readings and indicators on a WiFi-500 Sensor Series device

System requirements and recommendations

- WiFi-enabled PC or laptop running Windows® 10/8/7, 32/64-bit
- Micro-USB cable (shipped with device)
- Microsoft mouse or compatible pointing device
- Adobe® Reader® required to view help file
- Microsoft® Excel® or similar spreadsheet application to view and graph .csv files

WiFi Sensor Software may require NET 3.5 SP1 framework

If the software does not run on your Windows operating system, you may need to install .NET 3.5 SP1 framework from <http://download.microsoft.com/download/2/0/e/20e90413-712f-438c-988e-fdaa79a8ac3d/dotnetfx35.exe>.

Network requirements and recommendations

- 802.11b-compliant router or access point using data rates of 1, 2, 5.5, 11 Mb/s running one of the following supported security protocols:
 - WPA/WPA2 Pre-shared key (PSK)
 - WPA/WPA2 Enterprise
Refer to *Connecting a device to a wireless network with Enterprise Authentication* on page 53 for more information.
 - WEP 64-bit or 128-bit – Not recommended
Requires WEP passkey in hexadecimal rather than ASCII passphrase. Refer to *Using devices on WEP-encrypted WiFi networks* on page 56 for more information.
 - None (no authentication or encryption) – Not recommended
- Wireless access points must be configured to allow 802.11b traffic (not g or n only modes).
- By default, WiFi-500 Sensor Series devices obtain an IP address with DHCP (this is normal for most networks).
- When storing data locally on the PC or local network, the devices must be connected either physically or wirelessly to the same network and use the same IP address range as the PC.
If the software is running on a virtual machine, it can be given a different IP address than the host PC. However, it must be given an IP address that is in the same range as the device.
If you have multiple network connections on the PC, the software may not be able to automatically choose the network to which the device is connected (refer to *Configuring a device with a static IP address* on page 55).
- When using the Cloud service, the devices and the PC do not need to be on the same network, but both require an internet connection during setup.
- Wireless access points must have wireless isolation or guest modes disabled to enable communication between devices.
- Corporate networks may need additional configuration to allow communication between the device and the PC.

- Disable MAC Address filtering on the access point, or include the address of the devices in the allowed list. The MAC Address can be found on the serial number label on the back of the unit.
- , but provided that the VPN can allow the device internet access via TCP port 14354, it is technically possible.
- Communication over a virtual private network (VPN) is technically possible provided that the VPN can allow the device to access the internet using TCP port 14354. However, due to the increased latency introduced by establishing a connection that can cause time-out problems, MCC does not recommend it. Consult your network administrator.

Cloud storage requirements

A FilesThruTheAir™ Cloud account (www.wifisensorcloud.com) is required for Cloud-based data storage. A link is available on the main WiFi Sensor Software screen to create an account.

Your WiFi-500 Sensor Series device may also require a firmware update in order to access the Cloud. Refer to *Updating the Firmware* on page 46 for instructions.

WiFi Sensor Software/Cloud features

Using the WiFi Sensor Software, you can set up a device to store logged data locally on a PC, or remotely using a Cloud account and any device that supports a web browser – smart phone, tablet, laptop, or desktop computers.

If the device temporarily disconnects from the network, it continues logging data until it can communicate again with the PC application or Cloud. When acquiring data at a 10 second sample rate, the device can continue logging for up to 30 days without connectivity.

- WiFi-500 Sensor Series devices used with are accessible from any location – local or remote – within range of the connected WiFi network or from the Cloud
- Password-protected access using SSL sessions for security
- Local and remote device configuration of the following settings:
 - Device name
 - Temperature scale
 - Sample rate
 - Transmission period
 - Alarms, including alarm hold and alarm delay settings
 - Record on-site checks of devices
- Data export and graph printing

The Cloud makes device data universally accessible from any internet enabled device.

The Cloud interface also offers instant email alerts to as many as 100 addresses for alarms, AC power outage, low battery charge, loss of network connection, and other device-specific problems.

Cloud accounts are web-based and can be accessed at www.wifisensorcloud.com using a browser on a phone, tablet, PC, or Mac®.

The following optional Cloud services are also available (depends on level of Cloud account being used -- Free, Personal, or Professional).

- Audit trail export to provide a documentary record of changes
- Multiple user access
- Individual time zones per user
- Graphical and tabular data displays with date/time references
- Unlimited data storage (Personal and Professional accounts only)
- Printing a graph (Personal and Professional accounts only)
- Unlimited devices (Professional accounts only)

Refer to www.wifisensorcloud.com/accountdifferences.aspx to compare Free, Personal, and Professional Cloud account features

Setting Up a Device

To set up a WiFi-500 Sensor Series wireless device for use on either the PC or the Cloud, make sure you have the following items:

- Micro-USB cable
- 802.11b-compliant router or access point
- WiFi-enabled computer with WiFi Sensor Software installed

The computer running the WiFi Sensor Software must be connected to the router either wirelessly or by an Ethernet cable.

During setup, the device searches for a wireless network while it is physically connected to the PC. Once connected, it can then be placed anywhere within range of the network. If the sensor temporarily loses connectivity with the network, it logs readings until it is able to communicate again with the PC application or the Cloud. When acquiring data at a 10 second sample rate, the device can continue logging for up to 30 days without connectivity.

Connecting the device to a network

Make sure you know the network name (SSID) and password of the WiFi network.

- If you are setting up the device on a home network, the SSID and the default password for the WiFi network is usually located on the bottom of the router.
- If you are setting up the device network, the SSID and the default password for the WiFi network is usually located on the bottom of the router.

Complete the following steps to connect a WiFi-500 Sensor Series device to a WiFi network:

1. Launch the WiFi Sensor Software (🌀).
2. Click either **Set-Up Device»On This PC** or **Set-Up Device»On The Cloud** in the main software screen.

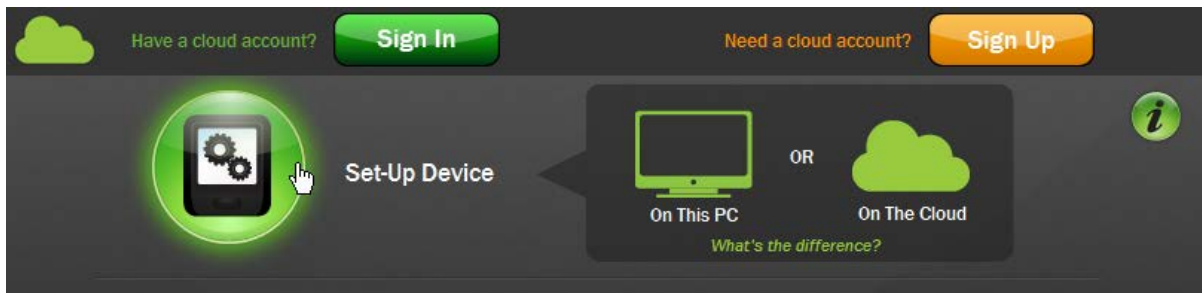


Figure 1: WiFi Sensor Software Set-Up Device options

3. Remove the rubber plug that protects the USB connector on the device and connect the device to the computer using the Micro-USB cable.

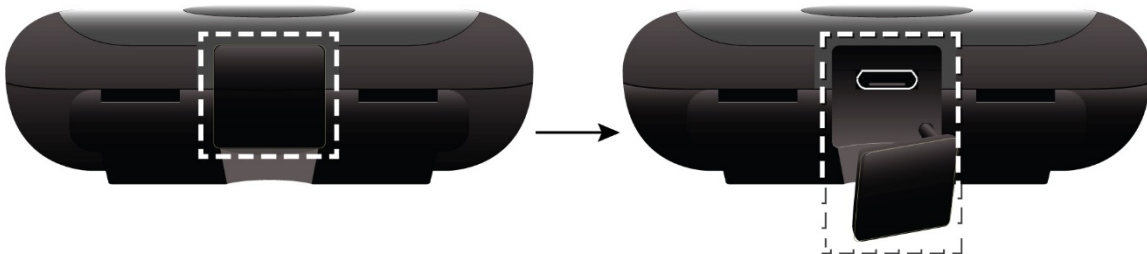


Figure 2: Removing rubber plug over USB connector

Allow any security access highlighted by your firewall or antivirus program if you are prompted.

A **CONNECTED** message indicates the WiFi Sensor Software has detected the device.

If a **NOT CONNECTED** message displays, disconnect and then reconnect the USB cable. The software automatically tries to detect the device again.

If you continue to get a **NOT CONNECTED** message, refer to *Device does not connect to PC over USB* on page 48.

4. From the list of available WiFi networks, click on the network to connect to the device.
 - If your WiFi network is not listed, refer to *Wireless network is not listed during setup* on page 49.
 - If you are setting up the device **On This PC**, the device and PC must be connected to the same WiFi network.
 - If you need to configure additional network settings such as a static IP address, select the **Enter Advanced Network Options Next** checkbox. Refer to *Configuring a device with a static IP address* on page 55.
 - If the network has Enterprise Authentication, refer to *Connecting a device to a wireless network with Enterprise Authentication* on page 53.
 - If you are using a hidden network – which is a network that does not broadcast its network name (SSID) – scroll to the bottom of the list, select **Join Other Network**, and enter the network name (**Name (SSID)**) and the **Security** protocol.

If a **FAILED** message displays, click **Refresh Connections** until a list of networks displays.

5. Enter the network password and click **CONNECT**.

Problems connecting?

If a **NOT CONNECTED** dialog box displays, refer to *Cannot connect a device to a WiFi network* on page 49.

Once you successfully connect the device to the WiFi network, proceed to one of the following chapters:

- If you selected **Set-Up Device»On This PC**, proceed to *Storing Data Locally on a PC* on page 11.
- If you selected **Set-Up Device»On The Cloud**, proceed to *Storing Data Remotely on the Cloud* on page 22.

Storing Data Locally on a PC

When you select **View Devices»On This PC** and connect a device to a WiFi network, the **GENERAL SETTINGS** dialog box displays with general device and logging settings for the a WiFi-500 Sensor Series device.

Logging sessions explained

To manage data received from your device efficiently, the WiFi Sensor Software divides data up into sessions. A device begins a session when it starts logging. If you make any changes to the device such as a sample rate or alarm level change, the software closes and saves the current session, and a new session is created.

All sessions are marked with a date and time to show the period that they cover, together with an audit trail (depending on the changes which caused a new session to start).

Changing device logging settings

Complete the following steps to change device logging settings from the PC:

1. Enter the following information in the **GENERAL SETTINGS** dialog box:
 - **Name Device to give it a unique identity:** Enter a unique name to identify the device on the WiFi network.
 - **Select temperature scale:** Click °C or °F.
 - **Select sample rate:** Select a sample rate between **10 Seconds** and **12 Hours** from the drop-down list. This value sets how often the device takes a reading.
 - **Select how often the device will communicate with the PC:** Select how frequently – between every **1 Minute** to every **24 hours** – the device transmits samples to the host computer

For example, if the sample rate is set to **10 Seconds** and the transmission frequency is set to **1 Minute**, the device transmits six samples to the computer every minute.

$$60 \text{ seconds} \div \frac{1 \text{ sample}}{10 \text{ seconds}} = 6 \text{ samples}$$

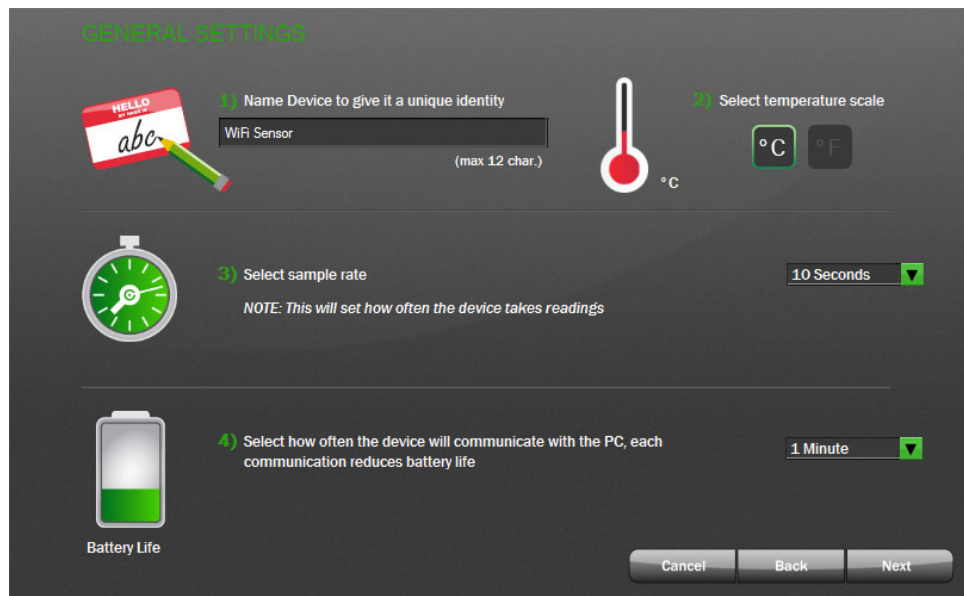


Figure 3: GENERAL SETTINGS dialog box

The more frequently data is transmitted the quicker battery power is depleted. By increasing the time between transmissions, the battery charge lasts longer.

2. Click **Next**.

Configuring alarms

In the **TEMPERATURE ALARMS** and **HUMIDITY ALARMS** dialog boxes, you can configure the following alarm settings (refer to Figure 6 and Figure 7):

- **Low/High Alarms** – Enable alarms that are triggered when a device logs data that exceeds a high temperature/humidity value, or that is below a low temperature/humidity value.
- The low alarm value must be less than the high alarm value.
- **Alarm Delay** – Filter out unwanted alarms by selecting a delay time from the dropdown box. For example, when monitoring the temperature of a refrigerator, you might not need to know if the temperature exceeds the alarm level briefly – when someone opens and closes the door, for instance – but you do need to know if someone leaves the door open for more than one minute.

You can set a separate delay for temperature and humidity alarms.

- **Alarm Hold** – Holds an alarm state even when the temperature/humidity returns to an acceptable range. For example, if the high temperature alarm is set to 42°C and the measured temperature rises to 46°C, an alarm is triggered. If the reading then drops down to 41°C when the **Alarm hold** checkbox is selected, the device retains its alarm status.

If **Alarm hold** is not selected, the device reverts back to normal status, and the only way to check missed alarms is to review the logged data.

- **Audit Check** – Record an event on the graph by pressing and holding the device button for three seconds to indicate an onsite check of the device.

Complete the following steps to configure WiFi-500 Sensor Series temperature and humidity alarm settings:

1. Select the **On** option button for **Low alarm** to enable a low alarm, and then select a low temperature/humidity alarm value from the list.
2. Select the **On** option button for **High alarm** to enable a high alarm, and then select a high temperature/humidity alarm value from the list.
3. Select the **On** option button for **Alarm hold** to retain the alarm status when the temperature/humidity returns within the alarm range.
4. Select a delay time from the **Delay alarm trigger by** listbox to filter out unwanted alarms.
5. Select the **Enable** option button for **Audit Check** to record an event on the graph when a device is checked onsite (**TEMPERATURE SETTINGS** dialog box only).
6. If you are setting up a device that includes a thermistor probe, select the probe type you are using from the drop-down listbox.

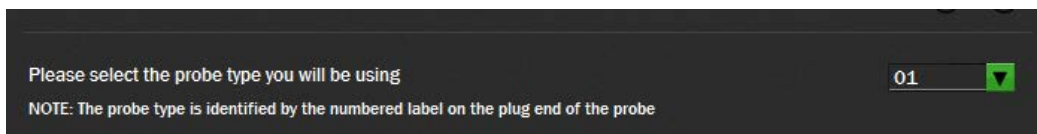


Figure 4: Probe type list

Refer to the label attached to the probe cable for the probe number. Selecting an incorrect probe type causes inaccurate measurements.



Figure 5: Probe type label



Figure 6: TEMPERATURE ALARMS dialog box



Figure 7: HUMIDITY ALARMS dialog box


7. Click **Next** on both the **TEMPERATURE ALARMS** and **HUMIDITY ALARMS** dialog boxes when you finish configuring alarm settings.
8. Click **Next**.
9. Click **Finish** in the dialog box, disconnect the USB cable from the device and place the device in the location to monitor.

If you receive a *Set-Up Failed* message, refer to *Cannot save device settings using the Set-Up Device option* on page 50.

Positioning the device

The device signal strength displays on the device LCD. The number 10 indicates a strong signal; the number 1 indicates a weak signal.

- Avoid heat, radio emissions, and physical obstructions
- Avoid placing a device near sources of heat and radio emission.
- Avoid physical obstructions between the router and device – these can affect the range of the device.
- If necessary, use WiFi extenders to improve the range of the device.

The WiFi signal indicator () has three states:

- Not displayed – the device has not yet been set up and configured to a WiFi network
- Flashing – not communicating with WiFi Sensor Software
- Solid – successful communication with WiFi Sensor Software

Viewing data on the PC

To view data for a specific logging session on the PC, complete the following steps:

1. Click **View Devices»On This PC** in the main software screen.
All WiFi-500 Sensor Series devices connected to the WiFi network through the host computer are listed.
2. Select the device you want to view, and click **View Data** at the bottom of the **Existing devices** screen.



Figure 8: Existing devices screen

By default, all logging sessions for the current month are listed. You can change the date range by using the date buttons:

- Use the ▲ and ▼ date sliders to specify a time period within the year containing the session(s) you want to view.
 - Use the ◀ and ▶ date buttons to scroll through years.
3. Click on the logging session you want to view.

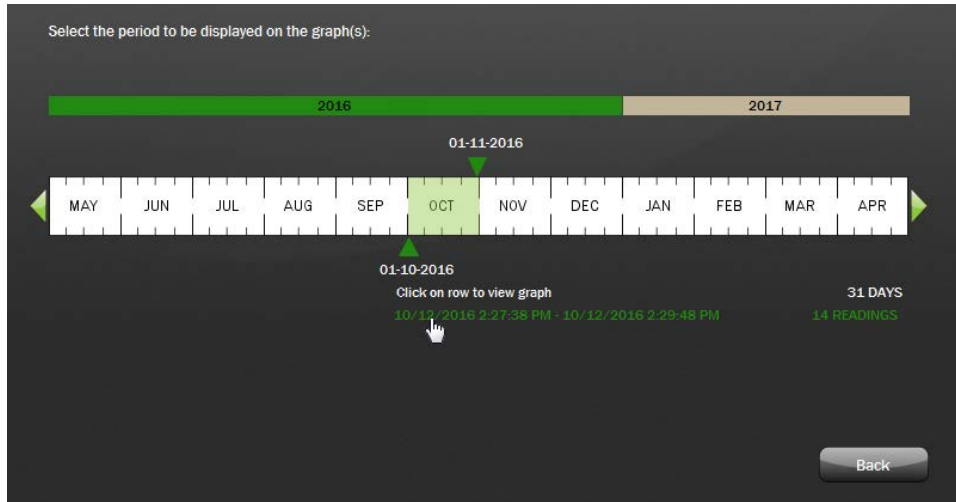


Figure 9: Selecting a logging session

The **View Data** screen displays the graphed data with checkboxes to show/hide the following information:

- temperature readings
- relative humidity readings (if supported)
- temperature alarm readings
- relative humidity alarm readings (if supported)
- dew point (if supported)

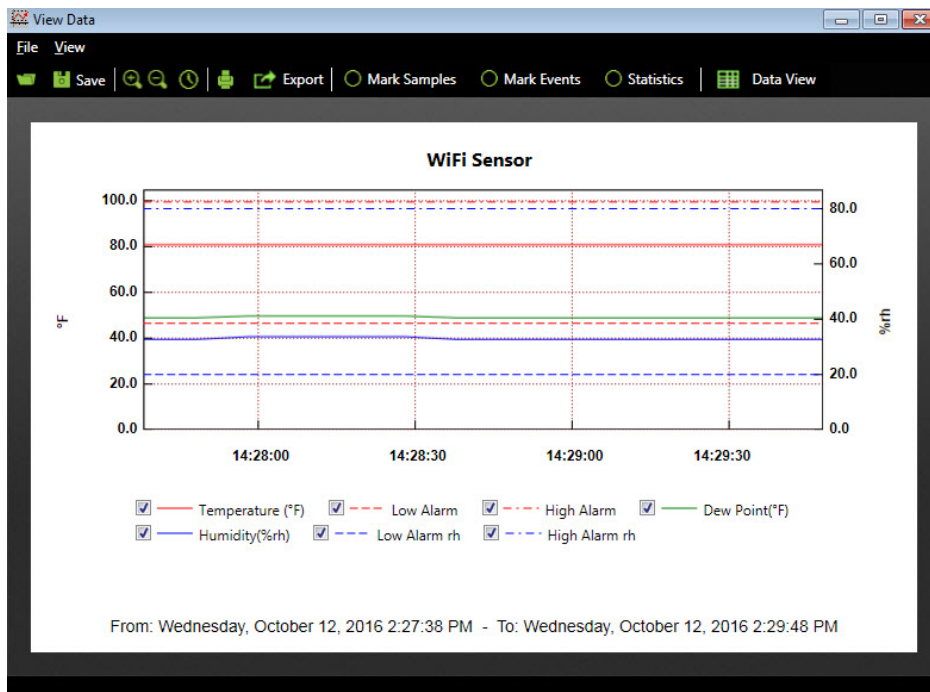


Figure 10: Graph of WiFi-500 data (temperature/humidity example) on View Data screen

Graph viewing options

Graph viewing options on the **View** menu and the toolbar on the **View Data** screen are explained below. Toolbar icons that correspond to the **View** menu option are given in parentheses.

- **View»Toolbar** – Displays or hide the toolbar at the top of the graph.
- **View»Status Bar** – Displays or hide the status bar at the bottom of the graph.
- **View»Zoom In** (🔍) – View a narrower range of graph data.
You can also click and drag the mouse to select a section of the chart to zoom in on
- **View»Zoom Out** (🔍) – View a wider range of graph data.
- **View»Data Range** (📅) – Opens the **Select Your Data Range** dialog box for you to enter a time/date range of data to view on the graph.

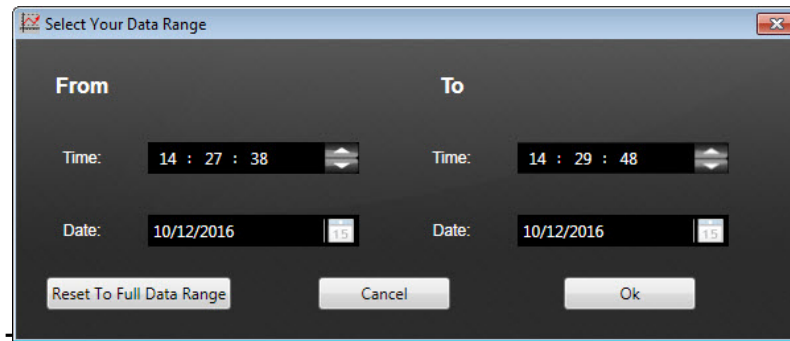


Figure 11: Select Your Data Range dialog box

- **View»Gridlines** – Display or hide X-axis and Y-axis gridlines on the graph.
- **View»Mark Samples** (📍 **Mark Samples**) – Adds a small circle to the plot line to indicate each logged sample.

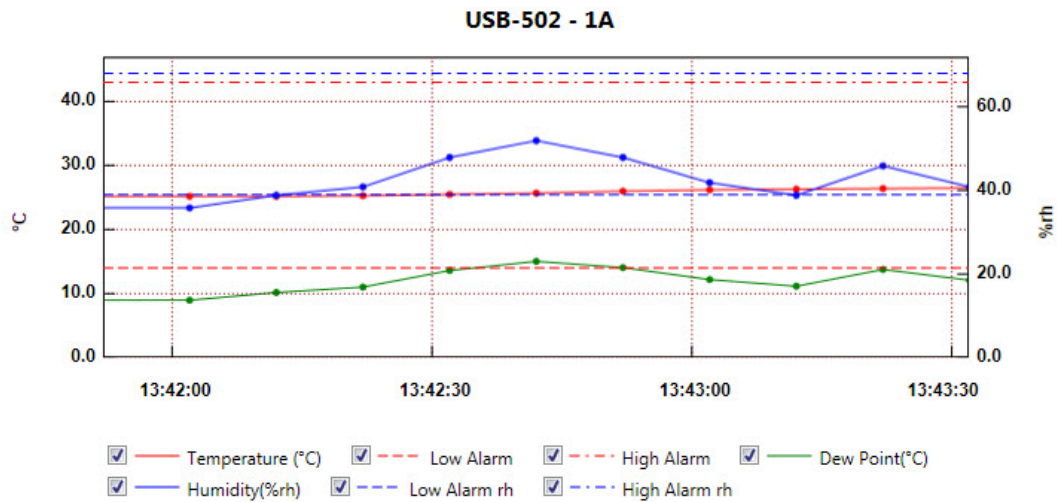



Figure 12: Samples marked on graph

- **View»Mark Events**  **Mark Events** – Adds a large circle to the plot line to indicate each event (audit, power loss, and so on).

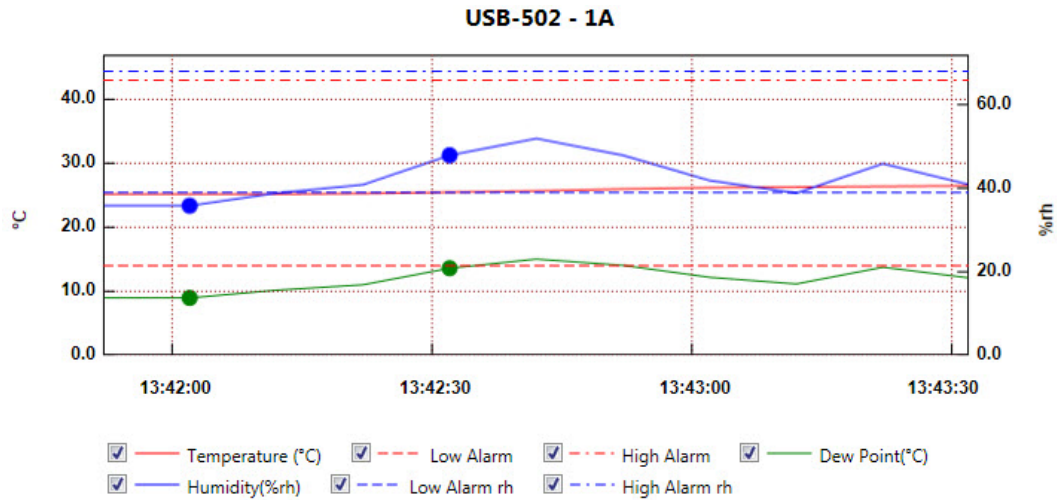



Figure 13: Events marked on graph

- **View»Statistics**  **Statistics** – Displays information on the minimum, maximum, average, and standard deviation of samples in a panel to the right of the graph.

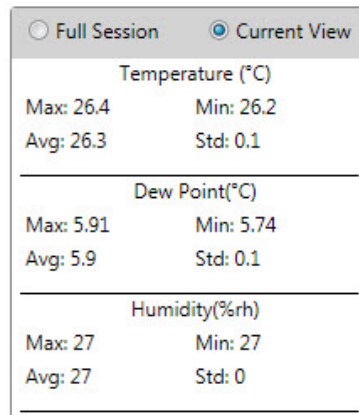



Figure 14: Statistics panel

- **View»Data View** – Plots data on a graph.
- **View»Graph View** – Presents data in a tabular format.
- Click **Show Alarms Only** to display only alarm data.

USB-502 - 1A

 Show Alarms Only

| Reading Date | Temperature (°C) | Humidity(%rh) | Dew Point(°C) | Events | Comments |
|----------------------|------------------|---------------|---------------|-------------|----------|
| 11/2/2016 1:41:52 PM | 25.3 | 36 | 9.16 | | |
| 11/2/2016 1:42:02 PM | 25.3 | 36 | 9.16 | Audit Check | |
| 11/2/2016 1:42:12 PM | 25.3 | 39 | 10.36 | | |
| 11/2/2016 1:42:22 PM | 25.4 | 41 | 11.20 | | |
| 11/2/2016 1:42:32 PM | 25.6 | 48 | 13.78 | Audit Check | |
| 11/2/2016 1:42:42 PM | 25.8 | 52 | 15.20 | | |
| 11/2/2016 1:42:52 PM | 26.1 | 48 | 14.23 | | |
| 11/2/2016 1:43:02 PM | 26.3 | 42 | 12.37 | | |
| 11/2/2016 1:43:12 PM | 26.4 | 39 | 11.34 | | |
| 11/2/2016 1:43:22 PM | 26.5 | 46 | 13.94 | | |
| 11/2/2016 1:43:32 PM | 26.6 | 41 | 12.27 | | |

Figure 15: Data view

Creating and viewing data files

You can export logged data and graph images to different file formats, and open them for viewing and analysis.

Saving all data to a log (.txt) file

Complete the following steps to save all logged data to a text file:

1. Click **Save** on the toolbar.
2. Enter a filename and browse for the location to save the file, and click **Save**.

Saving a portion of data to a log (.txt) file

Complete the following steps to save a portion of logged data to a text file:

1. Zoom in on the section of the graph containing the data to save (refer to *Graph viewing options* on page 16).
2. Click **Save** on the toolbar.
3. Enter a filename and browse for the location to save the file, and click **Save**.

Viewing a text file of logged data

To open a text file of logged data, click **Advanced Tools** and then click **View Saved Data** and browse for the file using the **Locate File** dialog box.

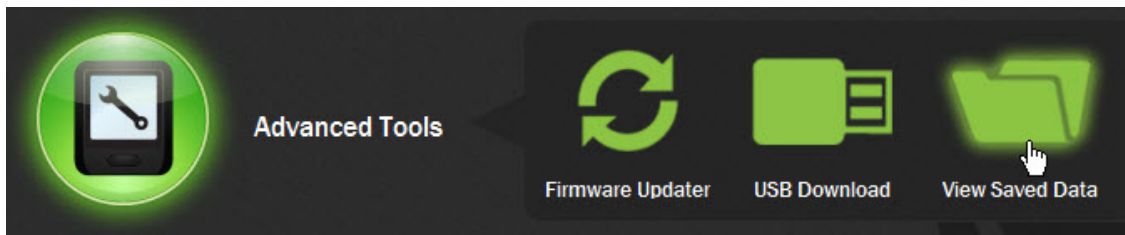


Figure 16: View Saved Data option under Advanced Tools

The data in the selected file is plotted on the **View Data** screen (refer to Figure 10 on page 15).


Exporting data to a file

You can export data or graph images to one of following file formats:

- a comma-separated values (.csv) data file for later retrieval and analysis
- a .jpg image file of graph
- a .pdf of the data or of the graph
- an Excel® file (.xls) containing both the data and graph

To export data, click **Export** and select file format from the menu.

Printing a graph

To print an image of the graph to the default printer, click .

Configuring a device wirelessly from the PC

When you select **View Devices»On This PC** in the main software screen, the **Existing devices** screen displays all WiFi-500 Sensor Series devices that are actively connected to or that are temporarily disconnected from the network through the host computer.

The operations you can perform on each displayed device are explained in the following sections.

Changing the device arrangement

To change how devices are arranged on the **Existing devices** screen, click the icons in the top right corner of the screen.



View device images only



View device images and information



View device information only

Right-click on a device to move it up, down, to the top of the list, or to the bottom of the list.

You can also arrange all devices by name or by MAC address (the unique number assigned to each device on the network).

Deleting device readings

To delete the readings currently stored on a device and on the host computer, right-click on a device and select **Delete Readings**.

All readings for the selected device are deleted from device memory and from the host computer.

The device starts logging data again based on its settings.

Data that has been saved or exported to a file is not deleted from the file(s).

Displaying device properties

To view the current logging and alarm settings for a selected device, along with the device type, firmware version, MAC address, and the name of the connected WiFi network, click **Properties** in the **Existing devices** screen (refer to Figure 8 on page 14).

You can also right-click the device image and select **Device Properties** from the context menu.



Figure 17: **Device Properties** popup window

Resetting a device out of an alarm state

To reset a device that is currently in an alarm state, right-click the device image and select **Reset Alarm**.

The device returns to a normal, non-alarm state until the next alarm reading occurs.

Muting the audible alarm

The WiFi Sensor Software includes an audible alarm that sounds when a device is in an alarm state.

Click  to turn alarm muting on and off.

Deleting a device

Complete the following steps to delete a device and all of its data sessions from the software:

1. Select a device in the **Existing devices** screen (refer to Figure 8 on page 14).
2. Right-click the device image and select **Delete Device(s)**.
3. Click **Yes** in the **Are you sure?** dialog box.
4. Click **Yes** in the **Archive Data** dialog box to save device data to the host PC. You are prompted to select a location to save the archived data.

Caution! If you are deleting the device in order to update the device firmware, MCC strongly recommends that you archive your data. All data is deleted from a device during a firmware update (refer to *Updating the Firmware* on page 46)

Click **No** to skip saving device data and finish deleting the device.

Once you delete a device, perform the *Connecting the device to a network* procedure on page 9 to reconnect the device to the network and access it through the software.

Changing device logging settings

To change the logging settings of a device over the network, select the device and click **Change Device Settings** in the **Existing devices** screen (refer to Figure 8 on page 14).

Follow the steps at the beginning of the section *Changing device logging settings* on page 11 to change the device logging settings over the WiFi network.

Downloading data over USB

Under normal operation, WiFi-500 Sensor Series devices regularly transmit data to either a PC or to the Cloud. If for some reason a device can no longer transmit data, the software can retrieve unsent data over the USB port. The retrieved data can be stored either locally on the PC or synchronized to the Cloud just as if the device had continued to transmit.

How to perform the USB Download

To download data over USB, complete the following steps:

1. Connect the device to the PC using the micro-USB cable supplied.
2. Launch the WiFi Sensor Software.
3. If you are storing data on the Cloud, then sign in to your Cloud account.
4. Click on **Advanced Tools** and select **USB Download**.

The software connects with the device over USB, and then prompts you to enter download settings.

5. If you are signed in to the Cloud and the device was detected within your account, select whether to **Sync Data to the Cloud** or **Sync Data to the PC**.

If you select **Sync Data to the PC**, you can specify the temperature units for downloaded temperature data.

All readings within the device are logged against UTC (GMT+0). You can select to have the readings logged against UTC or the local time zone as set up on your PC.

Storing Data Remotely on the Cloud

The FilesThruTheAir™ Cloud makes data universally accessible from any web-enabled device (smartphone, tablet, or computer).

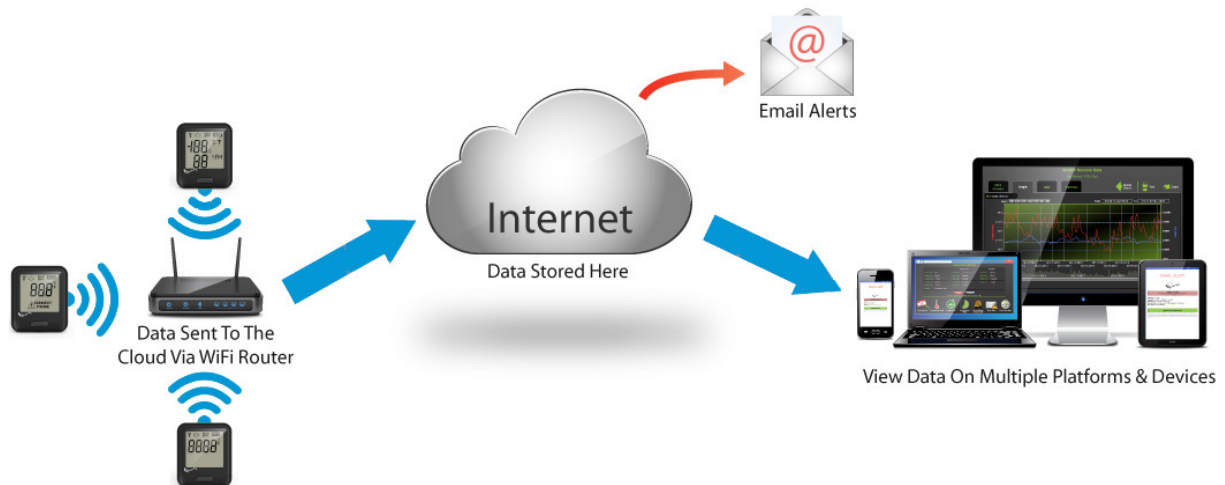


Figure 18: WiFi Sensor Software Cloud Diagram

You can manage your devices and make changes to any device setting remotely, giving you the ability to monitor hundreds of WiFi-500 Sensor Series devices in different countries from one location.

Use the Cloud to graph data online and to send you email alerts when alarms occur or if a device needs your attention. Users can also access Event Logs which record all triggered alarm events on all WiFi-500 Sensor Series devices a configured alarm threshold.

A Cloud account is easily created during the device set-up process using the WiFi Sensor Software.

Completing the Cloud setup

The first time you set up a WiFi-500 Sensor Series device on the Cloud, the only setting you can change is the device name. All others settings are kept at their current values.

1. Enter a device name and click **Next**.
2. Disconnect the USB cable from the device and click **Next** in the **Set-Up Complete** dialog box.
3. Place the device in the location to monitor.

Positioning the device

Avoid placing a device near sources of heat and radio emission. Also, physical obstructions between the router and device can affect the range of the device. You can use WiFi extenders to improve the range of the device.

The device signal strength displays on the LCD. The number 10 indicates a strong signal; the number 1 indicates a weak signal.

The WiFi signal indicator (📶) has three states:

- Not displayed – the device has not yet been set-up and configured to a WiFi network
- Flashing – not communicating with WiFi Sensor Software
- Solid – successful communication with WiFi Sensor Software

An overview of the Cloud environment

When you log in to your Cloud account and successfully set up a device through the cloud, you are brought to the Cloud page on the web which has the following main options:



Depending on your current account type, opens a page with options to upgrade or downgrade to different Free, Personal, and Professional Cloud accounts.

Refer to www.wifisensorcloud.com/accountdifferences.aspx for a summary of account features.



Opens a page with links to:

- the **Devices** page
- the **Cloud Support** page
- the **My Settings** page (where you can change date/time format for log files, your account email address and password, and control the frequency of Cloud emails)
- the **Account** page (where you can view account properties and email activity, and change personal information stored in the Cloud account)

Devices

(Professional accounts only)

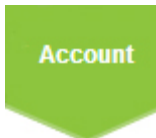


Opens the **My Devices/Devices** page which lists all devices set up for the Cloud account. The features on this page are explained in the following sections:

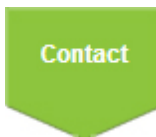
- *Displaying device properties* on page 26
- *Archiving data* on page 25
- *Changing device settings* on page 27
- *Setting up email alerts* on page 29

My Devices

(Free and Personal accounts)



Opens the **Account** page, where you can view account properties and email activity, and change personal information stored in the Cloud account.



Provides contact information for technical support with your Cloud account.



Opens the **Cloud Support** page, which has links to FAQs, and firmware downloads, video tutorials, a technical support request form.

Only the features on the **Home** and **My Devices/Devices** pages are covered in detail in this guide.

Refer to the support resources on the Cloud page for help with the features on other pages.

Data security on the Cloud

Data stored on the Cloud account is very secure. Accounts and data can only be accessed using the email address and password that you entered when signing up to your account. If you have multiple users with access to your account, a user with Administrator privileges can control which data individual users can access.

Data is regularly backed up using industry-standard precautions. However, MCC recommends that you back up your data locally.

Time-zones on the Cloud

Free and Personal Cloud accounts have a single time-zone which you select when you sign up. All times and dates on the Cloud are shown for your chosen time-zone.

Because Professional accounts can accommodate multiple sites, you can select a different time-zone for each location. When viewing data, event logs or device properties in a Professional account, times and dates are shown as local (at the device location).

Viewing device information

After logging in to your Cloud account, when you select **View Devices»On The Cloud** in the main software screen, the **My Devices** page opens in a browser and displays all WiFi-500 Sensor Series devices on the Cloud. To manage the data received from your device efficiently, the Cloud divides data into sessions. A device begins a session when it begins logging. If changes are made to the device configuration – such as sample rate or alarm level change, the Cloud closes and archives the current session, and creates a new session for the device.

The number of devices you can connect to the Cloud depends on the type of Cloud account you have (Free, Personal, or Professional). Click on the **Upgrade** link for more information on account types and features.









Figure 19: Devices screen

The **Devices** screen displays the following information about each WiFi device setup for the Cloud.

- **Device** – Displays one of the following icons to indicate the device model:
 - Temperature-only device (such as a WiFi-501)
 - Temperature device with thermistor probe (such as a WiFi-501-TP)
 - Temperature/humidity device (such as a WiFi-502)
- **Name** – Displays the name of the device.
- **Signal** – Displays a bar graph indicating the signal strength.

- **Power** – Displays one of the following icons indicating the battery strength, or, for devices permanently powered by USB, the USB connection status (refer to *Specifying a device as permanently powered* on page 31).

| Battery-powered devices | | Permanently-powered devices (USB) | |
|---|------------------|--|---------------|
|  | Battery OK |  | Power OK |
|  | Battery low |  | Connect power |
|  | Battery critical | | |
|  | Battery charging | | |

- **Reading 1** – Displays the latest temperature reading.
- **Reading 2** – Displays the latest humidity reading (if device measures humidity).
- **Status** – Indicates the connection status for active devices. May also indicate **Setup pending** if device settings were changed. When the device receives its new settings the next time it transmits to the Cloud, the Setup Pending status is removed.

Data saved from past sessions have a status of **Archived** along with the archive date.

Archiving, clearing, and deleting device readings

The **Archive/Delete** icon provides options to archive device data, clear device data, and delete a device and data from the cloud.

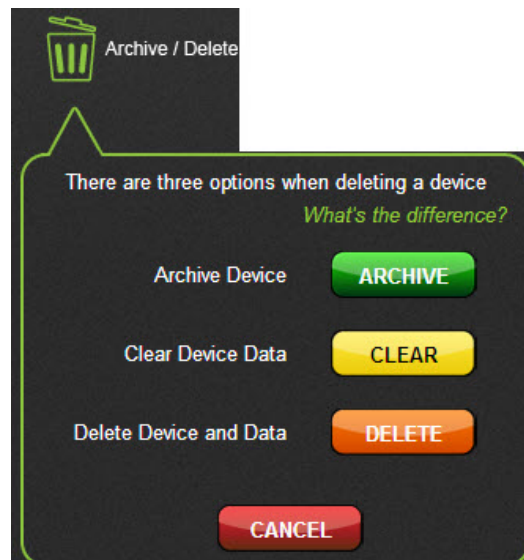


Figure 20: Archive/Delete options

- An archived device session remains in the device list so all collected data can be accessed, but it is no longer active and logs no new data.
- A cleared device remains in the active device list; however, any previously acquired data is deleted.
- A deleted device is removed from the device list and all collected data can be deleted and cannot be recovered.

Archiving data

To archive the readings on an active device on the Cloud, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen.
2. Select the active device in the **Devices** page and click **Archive/Delete**.
3. Click **Archive**.

The data from device is archived on the cloud. The archived data can be retrieved for display and analysis, but this device session no longer acquires new data.

The device must be setup for the Cloud again in order to acquire new data. Refer to *Setting Up a Device* on page 9.

Clearing data

To clear the readings on an active device on the Cloud, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen
2. Select the active device in the **Devices** page and click **Archive/Delete**.
3. Click **Clear**.

The data is deleted from the device, and the device continues acquiring data based on its current settings.

Deleting a device and data

Complete the following steps to delete an active device and its data from the Cloud, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen.
2. Select the active device in the **Devices** page and click **Archive/Delete**.
3. Click **Delete**.

The device is deleted from the Devices page. The device must be setup for the Cloud again in order to acquire new data. Refer to *Setting Up a Device* on page 9.

Displaying device properties

To view the current logging and alarm settings for a selected device over the Cloud, along with the device type, firmware version, MAC address, and the name of the connected WiFi network, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen.
2. Select the active device in the **Devices** page and click **Properties**.

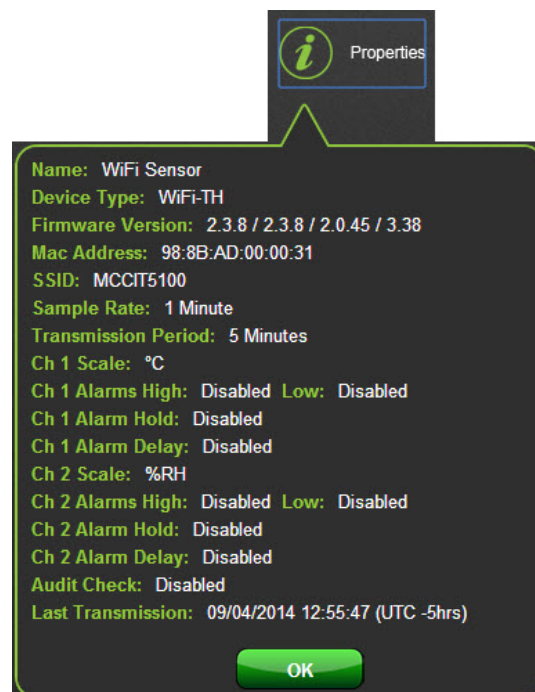


Figure 21: Properties popup on the Cloud

Changing device settings

You can change data logging and other device settings by selecting one or more active devices in the **Devices** page and click **Change Device Settings**.

If you select multiple devices, you can only change those settings that the devices have in common. This does not include the device name.

Changing the device name

The device name can only be changed for one device at a time.

To change the name of the selected device from the Cloud, complete the following step:

1. Click **Device Name**.
2. Enter a name, and then click **Save**.



Figure 22: Device Name setting

Changing the temperature scale (and thermistor probe type)

To change the temperature scale (and thermistor probe type if supported) for the selected device(s) from the Cloud, complete the following steps:

1. Click **Temperature Scale** (or **Temperature Scale & Probes**).
2. Select **°C – Celsius** or **°F – Fahrenheit**.
3. If the device includes a thermistor probe, select the probe type you are using.

Refer to the label attached to the probe cable for the probe number. Selecting an incorrect probe type causes inaccurate measurements.

4. Click **Save**.

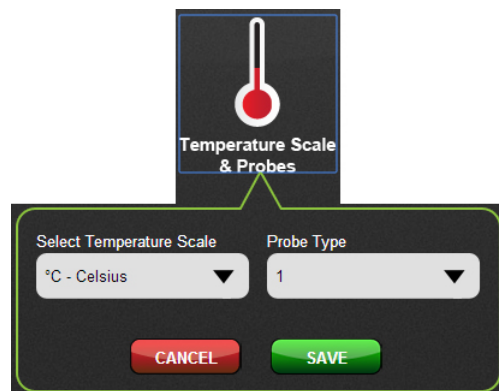


Figure 23: Temperature Scale and Probe Type settings

Changing the sample rate

To change the sample rate for the selected device(s) from the Cloud, complete the following steps:

1. Click **Sample Rate**.
2. Select a sample rate from the list and click **Save**.

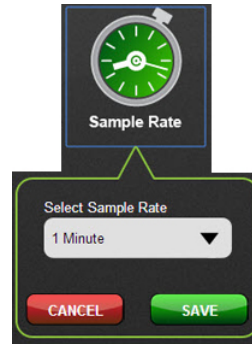


Figure 24: Sample Rate settings

Changing the transmission rate

To change the transmission rate for the selected device(s) from the Cloud, complete the following steps:

1. Click **Transmission Period**.
2. Select a transmission period from the list, and click **Save**.

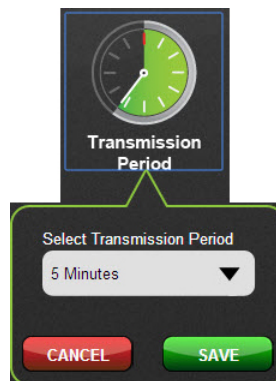


Figure 25: Transmission Period settings

Changing alarms and audit check

To change alarm settings and to enable/disable the audit check (Professional accounts only) for the selected device(s) from the Cloud, complete the following steps:

1. Click **Alarm Settings & Audit Check (Alarm Settings for Free and Personal accounts)**.
2. Click **On** to enable or **Off** to disable the low and high alarms.
3. Enter alarm values for each enabled alarm. The low alarm value must be less than the high alarm value.
4. To retain the alarm status when the temperature and/or humidity goes between the alarm range, click the **On** option button for **Alarm Hold**.

For example, if the high alarm is set to 25 °C and the temperature rises to 26 °C, an alarm is triggered. If the temperature then drops down to 21 °C and **Alarm hold** is selected, the device retains its high alarm status.

If **Alarm hold** is not selected, the device reverts back to normal status, and the only way to check missed alarms is to review the logged data.

- To filter out unwanted alarms by delaying the alarm trigger, select a delay time from the **Alarm Delay** **Alarm Trigger by** listbox.
- Professional accounts:** To record an event on the graph when a device is physically checked, click **Advanced** and select the **Enable Audit Check** checkbox. You indicate the device being checked by pressing and holding the device button for three seconds.



Figure 26: Alarm and Audit Check settings

Setting up email alerts (Personal and Professional Cloud accounts)

You can set up email alerts to notify you and others when alarms are triggered, and also send notification for any of the following events:

- **AC Power** – Reports a change in the state of AC power connected to your device. To monitor power, connect your device permanently using a USB charger and enable the AC Power email alerts. The Cloud sends an email if power fails and when power is restored.
- **Battery Low** – Report when the battery in your device is low and needs re-charging. For uninterrupted data recording, you can recharge at the site of the device using a USB 5V wall adapter or a portable USB battery pack.
- **Loss of Connection** – Reports when regular transmissions from your device are not received. The Cloud sends an email instructing you to check your WiFi network, device position, and battery charge.
- **Device Problems** – Reports when there is a problem with your device, such as a disconnected probe or readings out of range.

To set up email alert recipients over the Cloud, complete the following steps:

- Click **Email Alerts**.
- Enter a **Name** and **Email Address** and click **+**.
- Select the checkbox for each type alert to send to the recipient.
Optional: Select the **Text Format** checkbox send email messages in text-only format (recommended for sending SMS (text) messages to a mobile device).
- Repeat steps 1 through 3 for each email recipient you want to add.
- Click **Advanced** to enter a custom text message for alarm notifications.
- Click **Apply** to save all recipients and settings.

Customizing email alerts

When you set up email alerts, only select those events that you want to generate emails. If you are only interested in the measured alarm levels, deselect some other options you don't need.

When you set-up an alarm level, you can delay the onset of the alarm by a selectable period of time. For example, when monitoring the temperature of a chiller, you might not need to know if the temperature exceeds the alarm level briefly (when someone opens and closes the door, for instance), but you do need to know if someone leaves the door open. When using dual channel devices such as the WiFi-502, the alarm delay is software-selectable for each channel.

Have you set an alarm level that is too low or high? Every time a device goes into or out of alarm, an email is sent. If your device is constantly chattering around the alarm level, you receive more emails.

To reduce email traffic further, you can choose to reduce the number of alerts, by periodically summarizing them into a single email. You can enable this option, and specify how often the summary emails are sent.

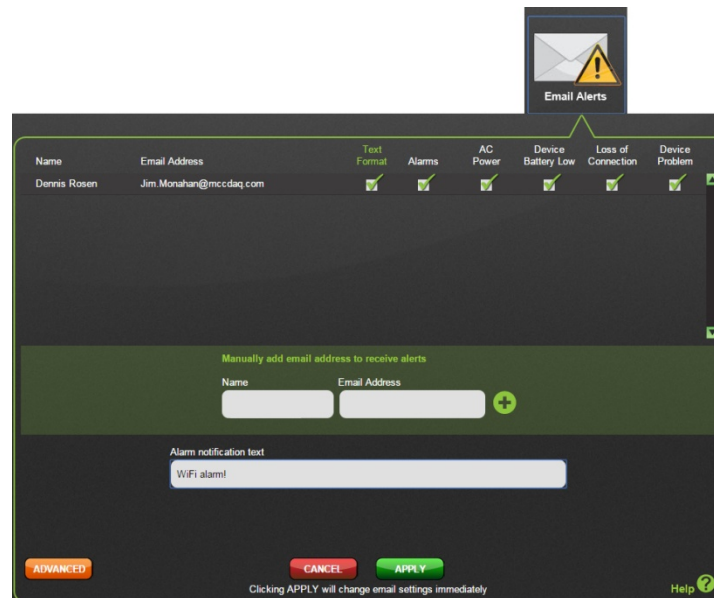


Figure 27: Email Alert settings

Selecting a device location (Professional Cloud accounts only)

When you first set up a WiFi-500 Sensor Series device on a Professional Cloud account, the device is added to the **NEW DEVICES** location.

Complete the following steps to move a device to another location on the Cloud:

1. Click **Device Location**.
2. Select the location where you want to move the device and click **Save**.

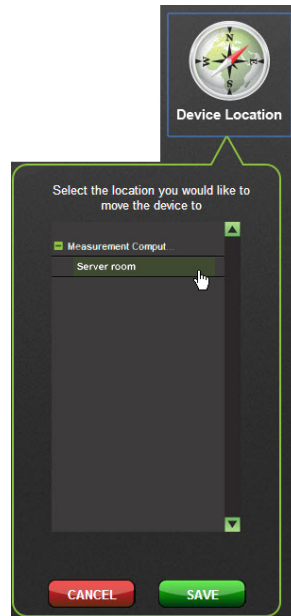


Figure 28: Device Location options

Specifying a device as permanently powered

If you are powering a device from a USB port or USB charger, click the **Permanently Powered** checkbox. By doing this, the **Power** status indicators on the Devices screen change to indicate the USB connection status (refer to *Viewing device information* on page 24).

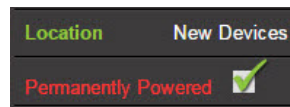


Figure 29: Permanently Powered checkbox

Saving device settings

When you have finished changing and saving the device settings, click **Apply** on the **Change Device Settings** screen to send the new settings to the device(s).

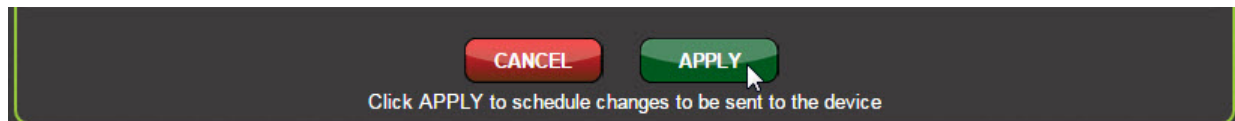


Figure 30: Apply button on the Change Device Settings screen

Viewing graphed data

Complete the following steps to view graphed data for a specific logging session on the Cloud:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen.
2. Select the active device in the **Devices** page and click **View Data**.
3. Click on the **Graph** tab



Figure 31: Data plotted on Sensor Session Data – Graph tab

The **Graph** tab on the **Sensor Session Data** page displays the following information:

- Temperature readings
- Relative humidity and dew point readings (if supported)
- High/low alarm levels (if configured)

Graph display options

Click **+** **Display Options** to view or hide temperature readings, humidity readings, dew point readings, alarm levels, audit checks, and marked samples.

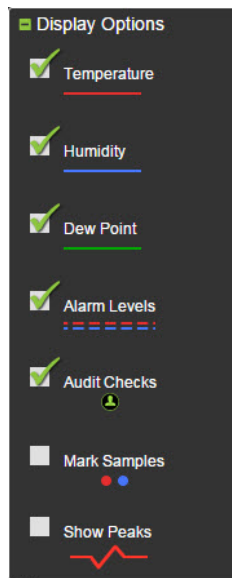


Figure 32: Display Options for Cloud graph

Graph zoom options

Depending on the time range of the data acquired in the session, you can use the following **Zoom** options to view graphed data:

- Select a time period (from 6 hours of samples to all samples) to zoom in and out on data.



Figure 33: Time period Zoom options for Cloud graph

- Select a start date/time and end date/time to zoom in or out on all of the graphed data from the session.

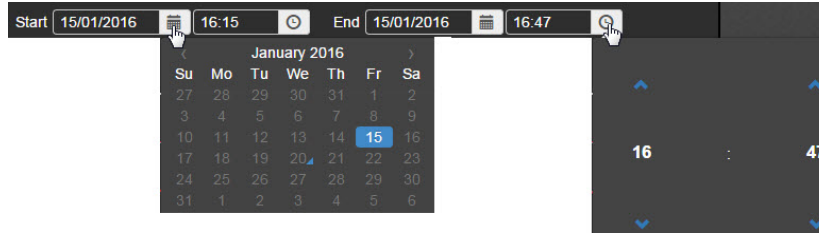


Figure 34: Select date/time range zoom controls

- Click and drag to select an area on the graph to zoom in or out on the displayed data.

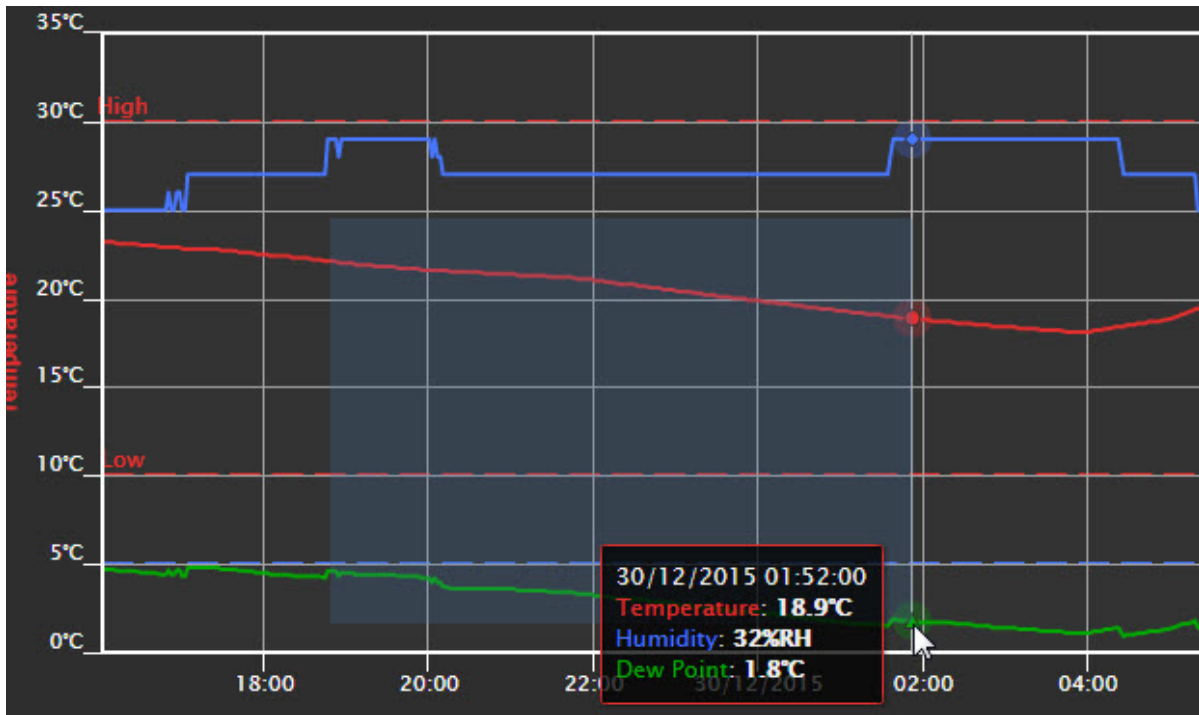


Figure 35: Select area to Zoom on Cloud graph

- Click-and-drag the time range controls to zoom in or out on the visible graphed data based on the times the samples were collected.

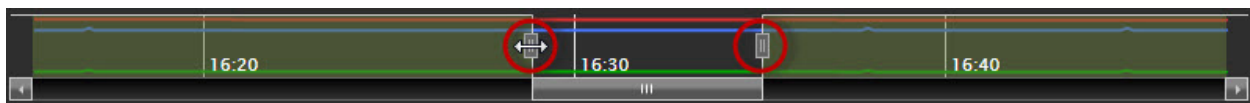


Figure 36: Sample time range zoom controls

Exporting a graph to PDF (Personal and Professional accounts only)

Personal and Professional Cloud account users can export an image of the graph to a .pdf by clicking



with the Graph tab displayed.

Printing a graph (Personal and Professional accounts only)

Personal and Professional Cloud account users can print an image of the graph to the default printer by clicking

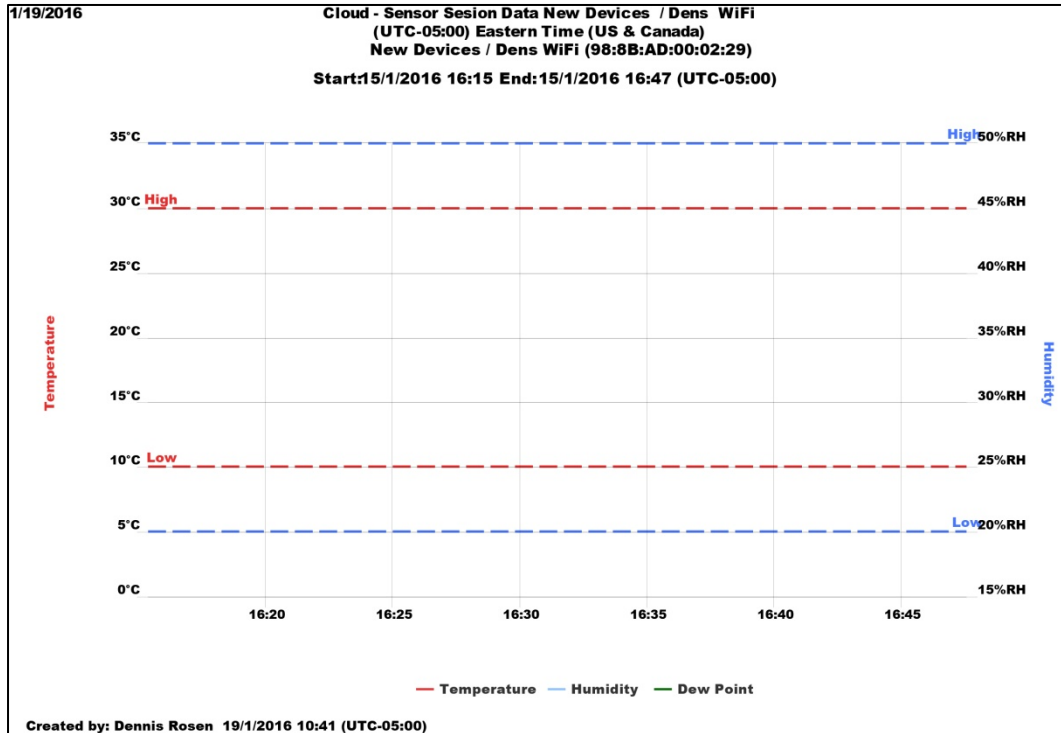


Figure 37: Example of graph printed from Cloud

Viewing sample values

To view the value of each sample from a logging session on the **Sensor Session Data** page, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen
2. Select the active device in the **Devices** page and click **View Data**.
3. Click on the **Data** tab.

Each sample is listed on the **Data** tab. Use the green navigation links below the listing to browse through data in the session.

4. Click on the Comments arrow () to add and view comments for a sample.

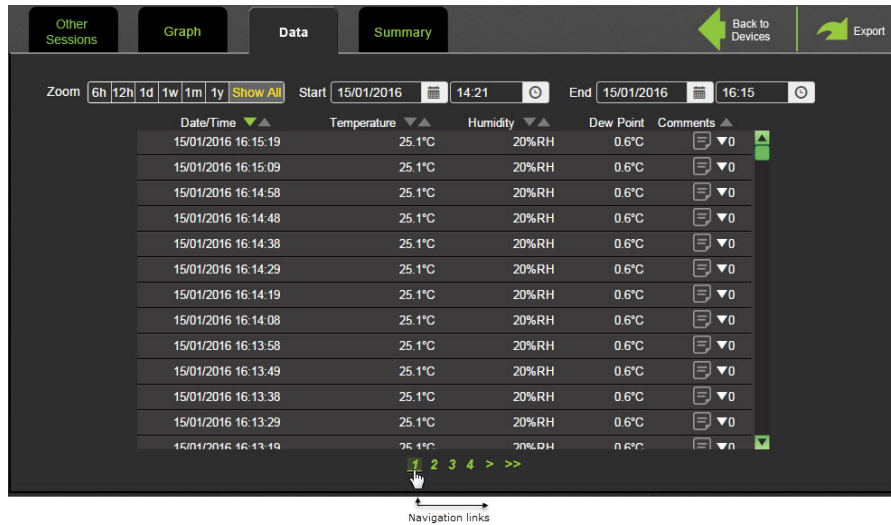



Figure 38: Data listed on Sensor Session Data – Data tab

Exporting data to a .csv file (Personal and Professional accounts only)

Personal and Professional Cloud account users can export a logged data to a .csv file by clicking  with the **Data** tab displayed

Viewing logging session audit information

To view and export audit information on the **Sensor Session Data** page for any logging session for the selected device, complete the following steps:

1. Click the **Other Sessions** tab.
2. Click on the session you want to display.

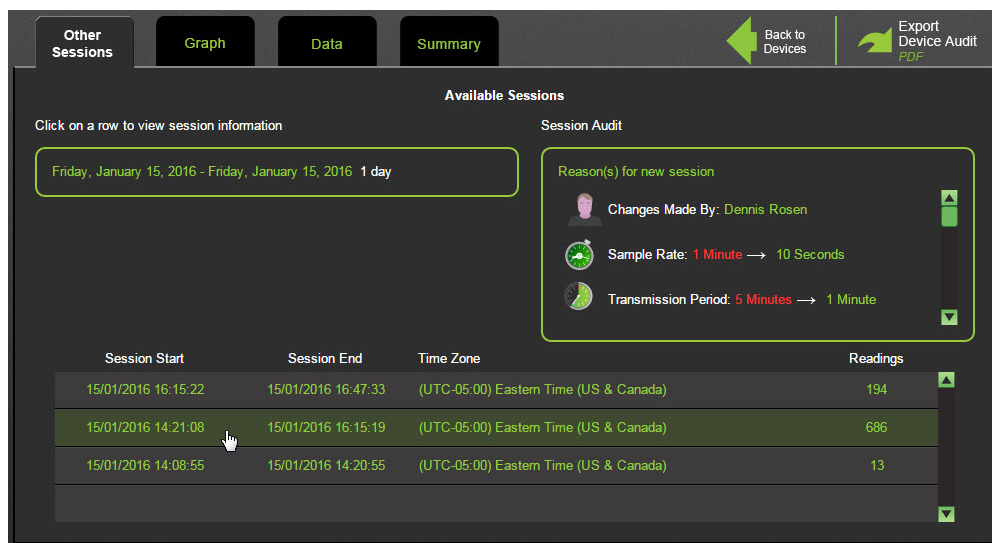


Figure 39: Selecting a session on the Other Sessions tab

3. Use the scrollbar in the Session Audit frame to view additional session audit information.

Exporting session audit information to a .pdf file (Professional accounts only)

Professional Cloud account users can export session audit information to a .pdf file by clicking with the **session** information displayed.



| Cloud Device Audit Record | | | |
|--|--------------------------------|------------------|---------------------|
| Audit Exported 22/01/2016 17:04:59 by Dennis Rosen | | | |
| DEVICE SUMMARY | | | |
| (UTC-05:00) Eastern Time (US & Canada) : New Devices / Dens WiFi | | | |
| Device Type | WiFi-TH | SSID | MCC_Guest_Wireless |
| MAC Address | 98:8B:AD:00:02:29 | First Setup | 15/01/2016 14:08:55 |
| Firmware Version | 2.3.8 / 2.3.8 / 2.0.45 / R3.60 | Total Readings | 893 |
| | | Alarms Triggered | 1 |
| AUDIT RECORD | | | |
| Changes made by: Dennis Rosen | | | |
| 15/01/2016 16:15:22 (UTC-05:00) Eastern Time (US & Canada) | | | |
| Change Device Name: WiFi Fo Doo->Dens WiFi | | | |
| Changes made by: Dennis Rosen | | | |
| 15/01/2016 14:21:08 (UTC-05:00) Eastern Time (US & Canada) | | | |
| Sample Rate: 60->10 | | | |
| Transmission Period: 300->60 | | | |
| Temperature High Alarm: 0 °C->30 °C | | | |

Figure 40: Session audit export to .pdf

Viewing a logging session summary

To view a summary of a logging session on the **Sensor Session Data** page, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen.
2. Select the device session in the **Devices** page and click **View Data**.
3. Click the **Summary** tab.

Summary

Zoom 6h 12h 1d 1w 1m 1y Show All
Start 15/01/2016 14:21 End 15/01/2016 14:21

DEVICE

| | |
|----------------------|--------------------------------|
| Device Name | Dens TH |
| Device Type | WiFi-TH |
| MAC Address | 98:8B:AD:10:18:A8 |
| Firmware Version | 2.3.8 / 2.3.8 / 2.0.45 / R3.60 |
| SSID | 624 West 7 |
| Date Set up | 15/01/2016 - 14:08:55 |
| No. Readings Taken | 20 |
| No. Alarms Triggered | 1 |

STATISTICS

| Temperature | | Humidity | |
|-----------------|---------|-------------------|---------|
| Minimum | 25.6 °C | Minimum | 19 %RH |
| Maximum | 25.6 °C | Maximum | 19 %RH |
| Average | 25.6 °C | Average | 19 %RH |
| Std Deviation | 0.0 °C | Std Deviation | 0.0 %RH |
| MKT (ΔH:83,144) | 26.0 °C | Dew Point Minimum | 0.2 °C |
| | | Dew Point Maximum | 0.2 °C |
| | | Dew Point Average | 0.2 °C |

SETTINGS

| | | Temperature | | Humidity | |
|---------------------|------------|-------------|------------|-------------|------------|
| Sample Rate | 10 Seconds | Low Alarm | 10°C | Low Alarm | 20%RH |
| Transmission Period | 1 Minute | High Alarm | 30°C | High Alarm | 50%RH |
| Audit Check | Enabled | Alarm Delay | 10 Seconds | Alarm Delay | 30 Seconds |
| | | Alarm Hold | Enabled | Alarm Hold | Enabled |

Figure 41: Session summary information on Sensor Session Data – Summary tab

The **Summary** tab displays device information, device settings, and data statistics (minimum/maximum, average, and standard deviation). Professional Cloud accounts also calculate and display the mean kinetic temperature*.

4. The following event log options are available:

- Select a time period (from 6 hours of samples to all samples) to zoom in and out on data.



Figure 42: Time period Zoom options for Cloud graph

- Select a start date/time and end date/time to zoom in or out on all of the graphed data from the session.

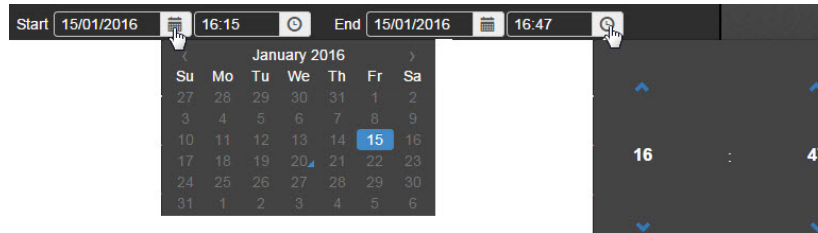


Figure 43: Select date/time range zoom controls

Viewing, emailing, and deleting event logs

Cloud accounts display the following event logs:

- Power events – An event is logged to indicate a change in the state of power connected to your device. Battery-powered devices log charging events.
- Battery event – An event is logged when the battery in your device is low and critical and should be recharged as soon as possible.
- Loss of connection – An event is logged when the device stops receiving regular transmissions. Check your WiFi network, device position and battery health.
- Device problems – Events are logged to indicate a device problem, such as a disconnected measurement probe, readings out of range, and so on.

To view a log of device alarm, communication, power and other events, complete the following steps:

1. Log in to your Cloud account and select **View Devices»On The Cloud** in the main software screen.
2. Select the device session in the **Devices** page and click **Event Logs**.

* Mean kinetic temperature (MKT) is defined as the single calculated temperature at which the total amount of degradation over a particular period is equal to the sum of the individual degradations that would occur at various temperatures.

– Source: www.ispe.org/glossary?term=Mean+Kinetic+Temperature

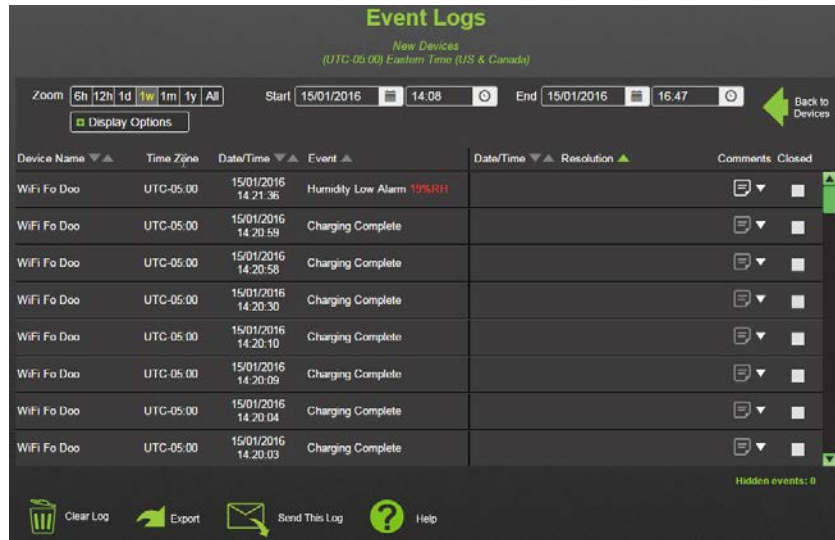



Figure 44: Event Logs page

3. The following event log options are available:

- Click on the **Comments** arrow () to add and view comments for an event.
- Select the **Closed** checkbox to mark an event as closed.
- Select a time period (from 6 hours of events to all events) to filter events by time range.

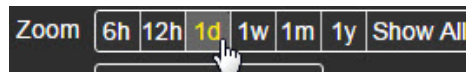


Figure 45: Time period filter options for events

- Select a start date/time and end date/time to filter events by date range.

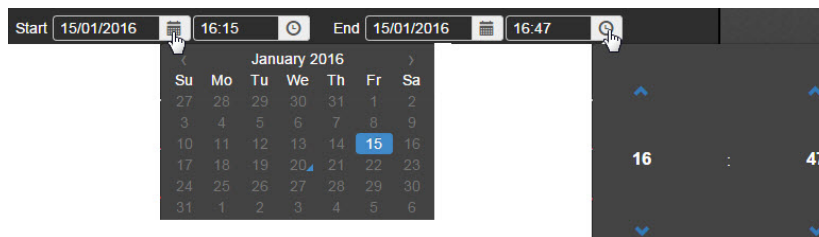



Figure 46: Select date/time range for events

- Click  **Display Options** to view or hide alarms, audit events, power events, battery events, device problems, loss of connection.

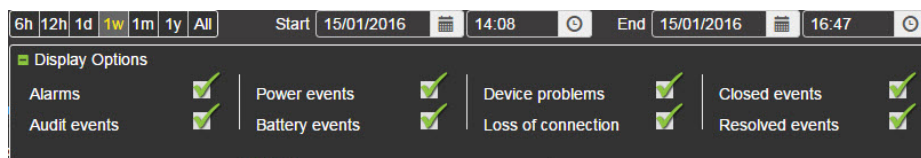


Figure 47: Display Options for events

- Click **Clear Log** to clear all events from the log.
- Click **Export** to export the event log to a .csv file (Professional accounts only).
- Click **Send This Log** to send an email to a recipient with the event log attached as a .csv file. You can enter an email address or, if you have a Professional account, the name of a registered Cloud account user.

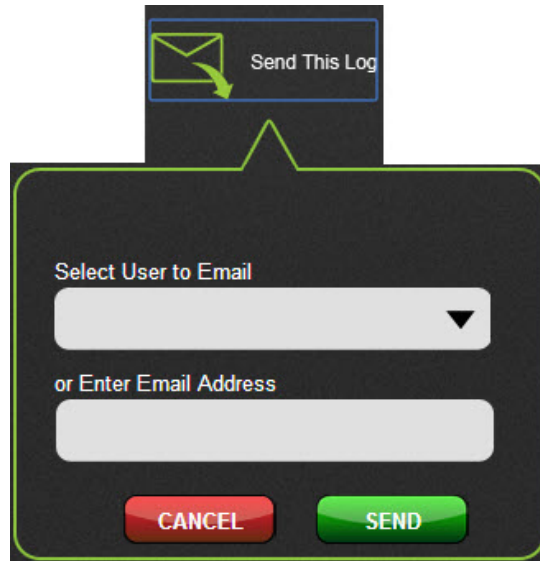


Figure 48: Send This Log options

Device Operation and Handling

Device components

The different readings and indicators on a typical WiFi-500 Sensor Series device are identified in Figure 49.



Figure 49: WiFi-500 device components

| | | | |
|---|--|---|---------------------------|
| 1 | Temperature reading | 5 | Battery charge indicator |
| 2 | Humidity reading (if supported by device) | 6 | Min/Max value indicator |
| 3 | Screen cycle button | 7 | Alarm indicator |
| 4 | Temperature unit | 8 | Signal strength indicator |

Press the screen cycle button to cycle through the different device displays:

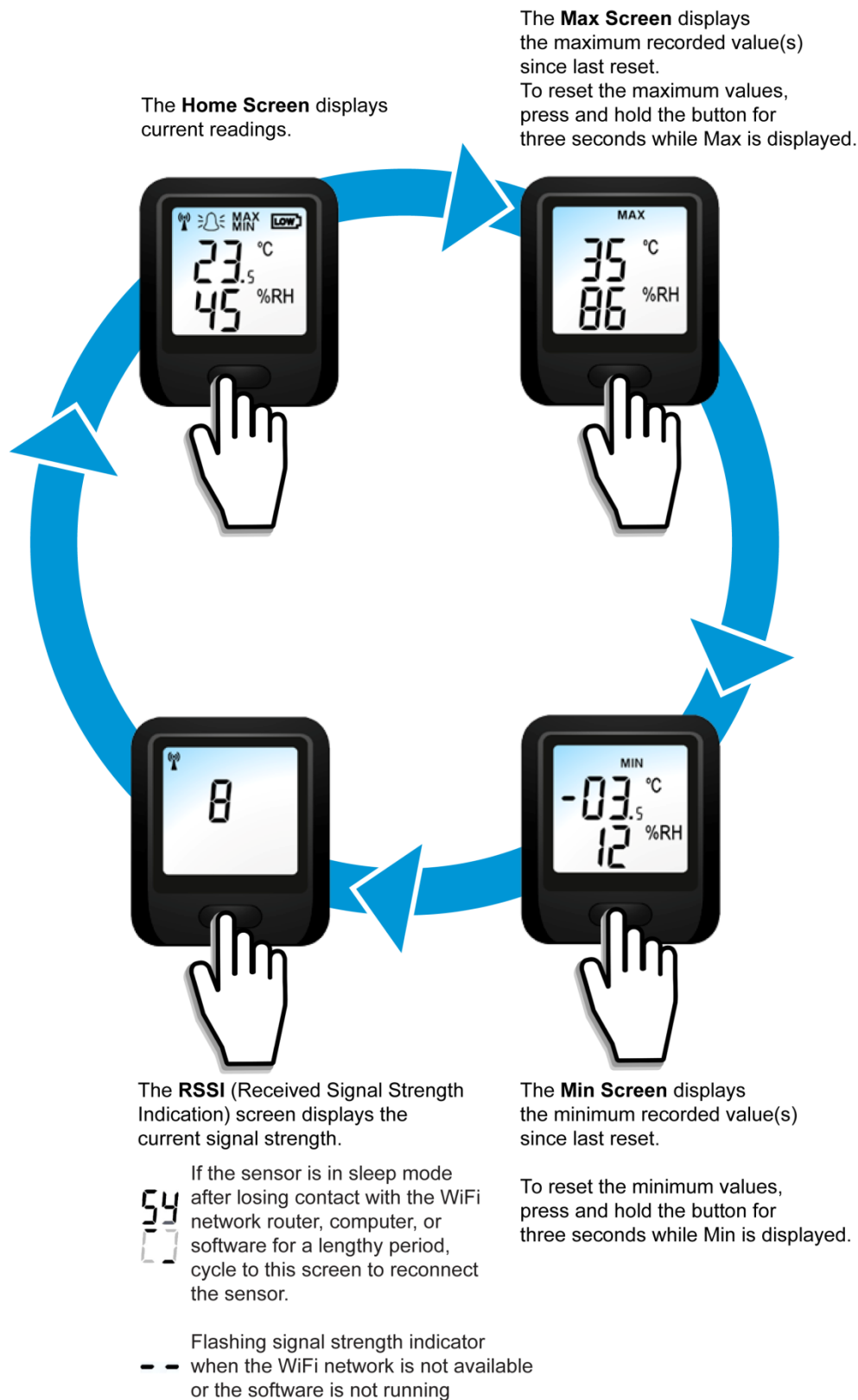


Figure 50: WiFi-500 device display cycle (WiFi-502 example)

Restarting a device

Restarting a WiFi-500 Sensor Series device restarts the firmware, retaining all configuration and network settings. The device disconnects from the wireless network, and immediately enters a low-power sleep mode. After restarting, the device normally synchronizes within 15 minutes; however, it can take up to 30 minutes after restarting for the device to reconnect and synchronize.

Once communication is reestablished, the device returns to its normal transmission rate. A restart causes a new logging session to be started.

Press the device button to cycle through LCD screens until the Home screen displays.

- To restart a WiFi-501 or WiFi-501-TP, press and hold the button for 10 seconds, and release the button when **rSt** shows on the LCD
- To restart a WiFi-502, press and hold the button for 10 seconds, and release it when **LOW** flashes in the top right hand corner of the LCD. The device retains all settings but loses any data that has not been transferred to the computer.

Resetting a device to factory settings

To reset a device to its factory settings, hold the button for 20 seconds until **Fb5** displays.

Resetting to the factory state deletes all settings and previously recorded data.

Resetting maximum and minimum values

To reset the maximum and minimum values on a device, cycle through to the maximum or minimum reading display and hold the button for three seconds.

The new minimum or maximum value is the temperature and humidity value read at the time of reset.

Turning a device off

The device remains on permanently unless the battery runs out.

Battery and power features

Battery life

WiFi-500 Sensor Series devices are powered by rechargeable lithium polymer batteries. The life of the batteries depends on how the device is used. Since transmitting data uses a lot of battery power, you can increase the life of the batteries between recharges by increasing the time between transmissions.

| Transmission Period | Typical Battery Life |
|---------------------|----------------------|
| 1 minute | 1 month |
| 15 minutes | 3 months |
| 1 hour and greater | More than 6 months |







The device arrives partially charged and you should charge it for 24 hours before use for optimum performance. The battery can be recharged using a PC, a USB wall adapter, or a portable USB battery pack using the USB lead provided.

A device can also be permanently powered by a USB wall adapter or USB battery pack. Internal heat generated while charging the battery typically causes a +2.5°C offset in temperature measurements and a decrease in RH measurements. However, once fully charged, continued connection to the charger or battery pack has no effect.

Charging the battery

From a very low battery state, it can take up to eight hours to fully charge a device. The battery status can be seen from the **Devices** page on the Cloud.

The battery charge indicator displays the battery charge status.

| Battery Charge Indicator | Battery Charge Status |
|--|---|
|  (no symbol) or  (solid with bars) | Battery charged |
|  (flashes LOW) or  (one bar flashes) | Battery charge low – recharge by connecting device to a computer using the Micro-USB cable provided |
|  (solid) or  (bars cycling) | Battery recharging |

If you have a critical process or do not wish to recharge devices, you can keep the USB charger plugged in continuously.

Optimizing battery performance

To optimize your system and avoid excessive recharging cycles, WiFi-500 Sensor Series devices go into sleep mode when the WiFi Sensor Software is not running, so exit the software when it is not needed. No data is lost because it is stored on the device onboard memory. Alarm conditions are still recorded.

When you restart the software, the device tries to reconnect within 15 minutes. Once a device reconnects, all stored data is transmitted to the computer.

The following factors significantly affect the battery life of the device:

- The transmission period
- The WiFi encryption method
- WiFi encryption key rotation frequency (determined by the access point or router)
- Signal strength between access point/router and device volume, and type of WiFi traffic from other devices, sample rate, and operating temperature.

Follow these guidelines to get the most out of your device batteries.

- Do not exceed the acceptable operating temperature range of -20°C to 60°C . Lower temperatures significantly reduce battery capacity.
- Choose the longest transmission rate most suitable for your application. Alarm notifications are transmitted immediately, regardless of the configured transmission rate.
- Avoid deep discharging the batteries. Develop a schedule to recharge the batteries while they still have some charge left.
- Store devices in a place that does not exceed the acceptable storage temperature range of -20°C to 30°C and maintain a 40% to 50% charge.
- If possible, maintain a permanent wireless connection to the host (PC or Cloud).

Data security if device battery runs out

The device takes no further readings when there is no power, but all readings taken prior to power loss are stored on the device. Once the device is recharged, it reconnects to the software and starts a new logging session.

When using battery power, set suitable sample and transmission periods as these affect your battery life. If fast transmission periods and/or long term, uninterrupted logging is needed, power the device with AC power using a suitable USB power supply.

Data security during a power outage

The device continues recording at the sample rate you have set using battery power, and no data is lost. If a power outage occurs, the device continues to try to connect to your network until power returns and the access point or router becomes available again. The device then transmits all remaining data with the Cloud.

MAX, MIN and battery symbol are all displayed on the LCD at the same time

When these symbols display together, the device is charging, and the temperature of the battery is above 40°C . For safety, the device stops charging until the temperature has returned to a safe level.

Permanently powering a device

To permanently power a device, use a USB wall adapter or external battery pack.

Monitoring AC power to a device

You can set up email alerts to notify you when AC power fails or is restored. Connect the device to an AC power source (a USB +5 V power supply), and enable email alerts for AC power in **Change Device Settings** page (refer to *Setting up email alerts* on page 29).

Caution! Never connect a device directly to an AC power source – always use the USB cable provided.

Caution! Internal heat generated while charging the battery typically causes a +2.5°C offset in temperature measurements and a decrease in RH measurements.. However, once fully charged, continued connection to the charger or battery pack has no effect.

WiFi-502 handling and storage guidelines

Avoid extreme humidity levels

Exposing a WiFi-502 to humidity levels above 80%RH can temporarily offset RH measurements ($\pm 3\%$ RH after 60 hours). Once returned to less extreme conditions, the device slowly returns to calibration state.

Avoid temperature differential between sensor and ambient environment

If a temperature differential exists between the sensor body and its ambient environment, an offset in temperature and RH measurement occurs. Moving a device from one set of ambient conditions to another requires a short period for the to equalize to the temperature of the new location.

Also, internal heat generated while charging the battery typically causes a +2.5°C offset in temperature measurements and a decrease in RH measurements. The chart below gives an indication of the relationship between temperature differential and RH measurement offset at an ambient temperature of 25°C.

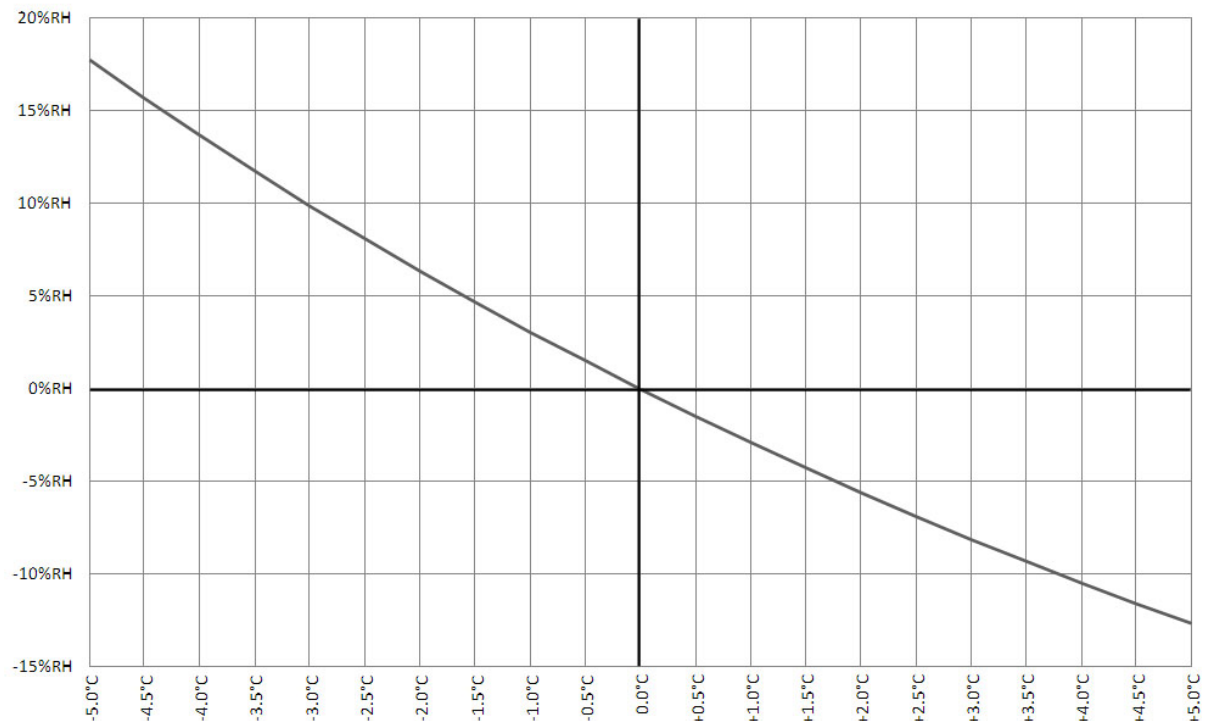


Figure 51: WiFi-502 temperature differential/RH measurement offset relationship (ambient temperature = 25°C)

A device that is permanently powered by USB is normally in a fully-charged state. In this power scenario, self-heating should have little effect. The battery is kept fully charged with short bursts of power from the charger, producing negligible heat.

Hysteresis

In addition to the effects explained previously, you can expect up to $\pm 1\%$ RH hysteresis in results.

Long-term drift

Under normal conditions: the maximum drift in temperature measurements for WiFi-502 is 0.04 °C per year, and the maximum drift in humidity measurements is 0.5%RH per year.

Device handling

The humidity measuring element in the WiFi can be contaminated through exposure to a variety of chemicals.

- Keep devices away from volatile chemicals such as solvents and other organic compounds. Ketenes, acetone, ethanol, isopropyl alcohol, toluene, and other compounds can cause measurement offset (often irreversible). These chemicals are an integral part of epoxies, glues, adhesives, and so on.
Chemicals such as these are also added as plasticisers into plastics used for packaging materials, and can release gas for extended periods.
- Do not expose devices to acids and bases such as hydrogen chloride, sulphuric acid, nitric acid, ammonia and so on.
- Do not expose devices to ozone in high concentration, or to hydrogen peroxide.
- Store and ship devices in MCC-standard packaging or card-based packaging when possible. Do not store or ship these products in polystyrene or bubble wrap.

The chemical listed above do not represent a complete list of all harmful substances. In general, if a material or compound emits a strong odor, keep the device away from it.

Updating the Firmware

Follow the procedures in this chapter to check the version of firmware installed on a WiFi-500 Sensor Series device, and to update the firmware if needed.

Checking the firmware version using the software

To check the firmware version using the WiFi Sensor Software, refer to *Connecting the device to a network* on page 9. When you get to step 5 in that section, the full firmware version is displayed at the bottom of the network selection screen.

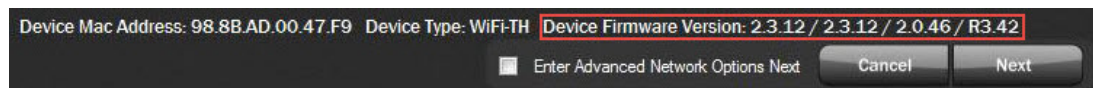


Figure 52: Firmware version on network selection screen

Checking the firmware version using the Cloud

To check the firmware version using the Cloud, complete the following steps:

1. Sign in to your Cloud account.
2. Select the device on the **Device** page.
3. Click on **Properties** to see full version on the **Device Properties** popup window.

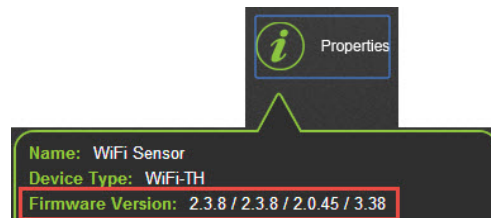


Figure 53: Firmware version on Cloud Properties popup window

Checking the firmware version on the device

To check the firmware version using the WiFi-500 Sensor Series device, press and hold the button for 10 seconds. When the button is released, the firmware version displays briefly on the LCD screen.

Updating the device firmware

Complete the following steps to update the firmware on a WiFi-500 Sensor Series device:

1. On the main screen, click on the **Advanced Tools** icon and then on the **Firmware Updater** icon and follow the onscreen instructions.

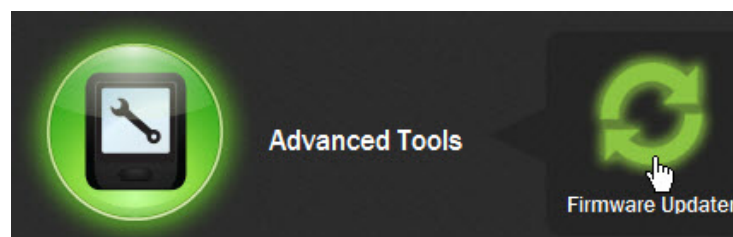


Figure 54: Selecting the **Firmware Updater** icon

2. Connect the device to the host PC.

3. If your device has logged data that has not been saved to the PC or to the Cloud, press the device button to immediately transmit the data.
If the device cannot connect to the network, data can be recovered using the USB Download feature.
4. Go to download.filesthrutheair.com/ to download the firmware update file for your device.
5. Click **Browse** to select the firmware file from the download location on your PC.

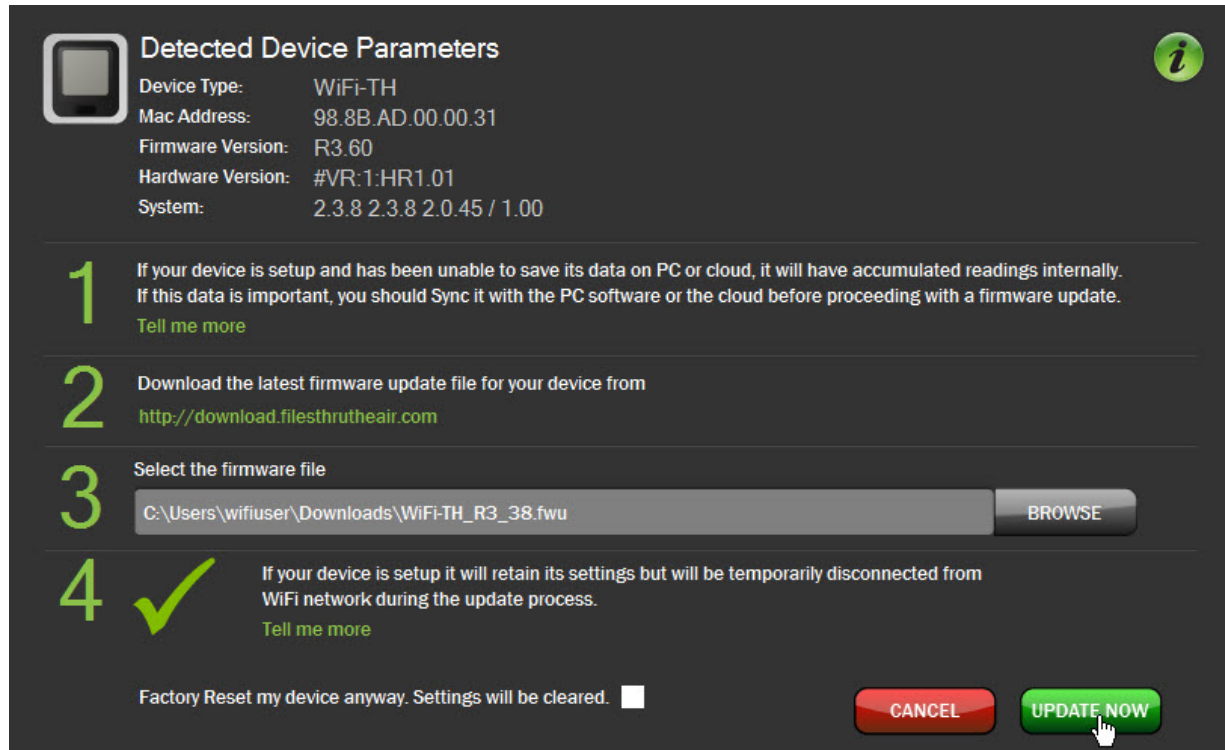


Figure 55: WiFi Sensor Software Firmware Updater dialog box

6. Click **Update Now** to update the firmware on the connected WiFi-500 Sensor Series device.
If possible, the device network settings and configuration are saved. If these settings cannot be saved, you are prompted that a factory reset will be performed.
The device automatically restarts with the updated firmware.
7. Click **OK** to exit the Firmware Updater

To benefit from the latest improvements, MCC recommends using the latest firmware releases for your devices. After a firmware update your device is in a factory-reset condition, and needs to be connected to the Cloud using the WiFi Sensor Software. Any existing data for this device on the Cloud is archived for future use.

Troubleshooting Common Problems

Troubleshooting connection problems

If you are having problems connecting a device to a PC or to a WiFi network

Device does not connect to PC over USB

If the WiFi Sensor Software does not detect a device when it is connected by USB to the PC, complete the following steps to try to resolve the problem:

1. Make sure that the PC is WiFi-enabled.
2. Disconnect and then reconnect the USB cable.
3. Try connecting the device to another USB port.
4. If possible, try connecting the device using another USB cable.
5. Unplug any unnecessary USB devices.
6. Restart the device by holding the button down for 10 seconds.
7. Restart the PC and launch the software.

If none of the above actions resolves the problem, try these actions:

1. Restart the device by holding the button for 10 seconds and waiting until **rSt** (USB-501, USB-501-TP) or **LOW** (USB-502) shows on the LCD.
2. Factory reset the WiFi device by holding the button in for 20 seconds until **FR** shows on the LCD.
3. Unplug any unnecessary USB devices.

If the software still does not detect the device, try the following options.

1. Make sure that the device is listed in Device Manager when connected by USB. You should see a COM Port labelled *STMicroelectronics*. Check that it is not disabled and showing as working normally.
2. If the device is listed but not working, reinstall the software to make sure all drivers were installed.

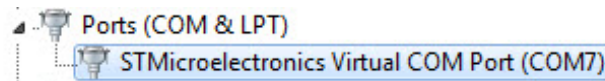


Figure 56: WiFi-500 Device listed in Device Manager

3. Change the COM port number by double-clicking on the COM port connected to the device, clicking on the **Port Settings** tab, clicking **Advanced**, and selecting a COM port from the COM Port Number list that is not in use.

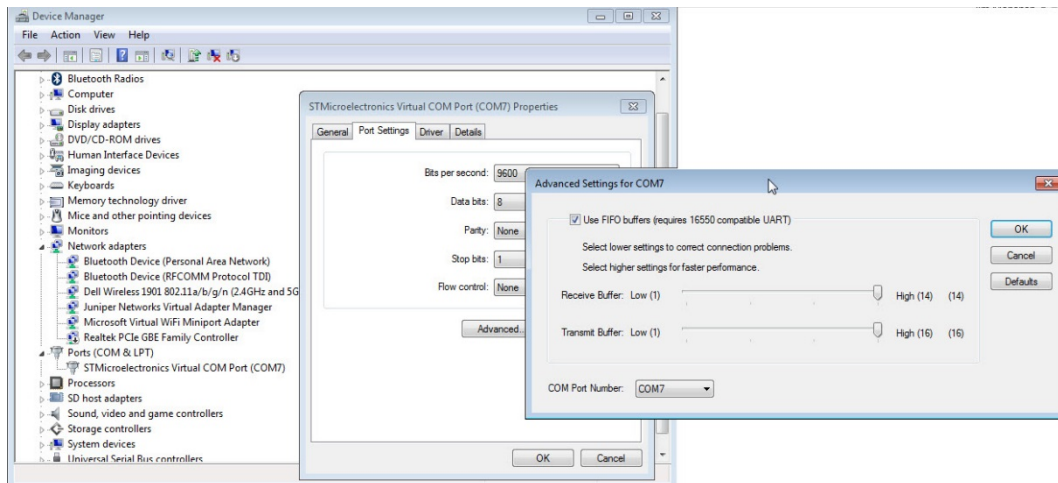


Figure 57: Advanced Settings for COMx dialog box (COM7 example)

If you have tried all of the above but the device is still not detected, contact technical support.

Cannot sign in to Cloud account

If you cannot sign in to your Cloud account, check these options to try to resolve the problem:


- Make sure that your PC has an active internet connection and you can open the www.wifisensorcloud.com page in your browser.
- Make sure you have activated your Cloud account by following the link in the Sign-Up email
- Make sure you are using the correct email address and password

Cannot connect device to a wireless network

If you cannot connect your device to a wireless network from the **Select a wireless network for your device** screen, try to resolve the problem based on the following troubleshooting options.

Wireless network is not listed during setup

If the WiFi network you want to connect to is not listed, complete the following steps to resolve the problem. You may need to contact you network administrator about making changes to network settings.

1. Click **Refresh connections**  to refresh the network list.
2. Make sure that the device is in range of the access point or router – move the device closer if necessary.
3. The network name (SSID) for your wireless network may be hidden – select **Join Other Network** and enter the network **SSID**, **Security** protocol, and **Password**.
4. Restart the access point or router.
5. The wireless network may not support the required 802.11b data rates – 1 Mb/s, 2 Mb/s, 5.5 Mb/s, or 11 Mb/s. Check the configuration of the access point or router.
6. Rarely, the SSID may contain invalid characters which can stop it from being displayed. WiFi-500 Sensor Series devices do not support certain characters in the SSID, such as spaces or commas. You may need to change the SSID of the network, and this also applies to passwords.


If you try all of the above but the wireless network still is not listed, contact your network administrator.

Cannot connect a device to a WiFi network

If the WiFi network displays on the screen but the device cannot connect to it, if you know which network adaptor you want to connect the device to, complete the following steps to resolve the problem:

1. On the **Select a wireless network for your device** screen, click on the green WiFi symbol to display a dropdown box on the bottom left.
2. Select the network adaptor that corresponds to the network and proceed with the setup (refer to *If a PC is connected to multiple networks (PC/local data storage only)* on page 54 for more information).

If the WiFi-500 Sensor Series is still not connecting to the WiFi network, try the following actions to resolve the problem:

- Make sure you selected the correct WiFi network.
- Make sure you entered the correct the password (don't forget it is case-sensitive) and click **Refresh Connections** .
- Make sure that the network has an internet connection.
- Make sure that the device is in range of the access point or router – move the device closer if necessary.
- Make sure that 802.11b is enabled on the access point or router.
- Make sure MAC filtering is not switched on in the access point or router. If it is switched on, only known devices can connect to your router.
- If there are multiple networks with the same name (SSID), check the MAC address of your access point or router against that shown in the list of networks.
- Make sure that the router has the latest firmware.
- If the access point or router has WEP Encryption, make sure that the HEX key is being entered rather than the password. You can find the HEX key in the internal settings of your access point or router.
- You can also search the web for resources to help convert your password to a HEX key.
- Make sure that the DHCP service is running. This allows the device to be allocated an IP Address. Normally, the DHCP service runs in either your router or on a network server. Make sure that the configured DHCP IP address range allows the addition of new devices – if not, extend the range.
- If your wireless network uses WPA Enterprise, make sure that the correct authentication type is selected from the drop-down box. Only the types listed are supported.
- If your access point or router has a wireless mode setting, make sure it is set to *Mixed* and not *Greenfield*.
- Make sure that the SSID name does not contain spaces.

If the above actions still have not resolved the problem, try the following advanced options:

- If the PC has two network connections, you may need to manually select the network which will be used to communicate with the device. Refer to *If a PC is connected to multiple networks (PC/local data storage only)* on page 54.
- If there are multiple access points with the same SSID, you may need to manually select the individual access point. Refer to *Configuring a network with multiple access points with the same name (SSID)* on page 55.
- Make sure 802.11b is enabled on the wireless access point or router. Configure the access points or router to allow 802.11b traffic – not g-only or n-only modes – using data rates of 1 Mb/s, 2 Mb/s, 5.5 Mb/s, or 11 Mb/s. Contact your network administrator for more information.
- Make sure MAC address filtering on the access point or router is either disabled or the device is in the allowed list. Contact your network administrator for more information.
- If a DHCP server is allocating IP addresses on the network (normally the case), make sure that the server has not reached the limit on the number of IP addresses. Contact your network administrator for more information.
- If the software is running on a virtual machine, it must be allocated an IP address in the same range as the physical PC.
- If the network requires you to log in to a web page after association, the device cannot communicate over the network. Contact your network administrator for more information.

Cannot save device settings using the Set-Up Device option

If the device successfully connects to a WiFi network but it cannot save its setting to the PC or to the Cloud, complete the following steps to try to resolve the problem:

- Make sure the WiFi Sensor Software is listed in the allowed programs in your firewall software, and make sure it is allowed on both public and private networks if these options are available. Failure to provide full access prevents the devices from communicating. You may need to exit and restart the software for the firewall changes to take effect.

- Wireless access points must have wireless isolation mode or guest mode disabled to enable communication between devices. MAC address filtering must be disabled on the access point or the address of the devices must be included in the allowed list. The MAC address is usually found on the serial number label on the back of the unit.

Troubleshooting for PC/local network storage

If you cannot save device settings to the PC/local network, complete the following steps to try to resolve the problem:

- If the PC has multiple network connections, this can prevent communication with the WiFi-500 device. If possible, disconnect any networks other than the one to which the WiFi Device is connected. Refer to *If a PC is connected to multiple networks (PC/local data storage only)* on page 54 for more information.
- WiFi-500 Sensor Series devices with firmware version 3.xx and later installed primarily use TCP port 10080 to communicate with the PC Software. They also use UDP broadcast packets on UDP ports 1024 and 8010 for alarm notifications and discovery of a PC once TCP connection has been lost. Any firewalls running on the PC need these TCP and UDP ports open for correct operation.

Troubleshooting for Cloud storage

If you cannot save device settings to the Cloud, complete the following steps to try to resolve the problem:

- In order to set up devices on the Cloud, both the WiFi Sensor Software and the devices require an internet connection. The software connects to the Cloud using a HTTPS in order to set up the device, and is only required during initial configuration.
- Check Cloud connectivity by connecting the PC or another device to the wireless network and opening the page at www.wifisensorcloud.com.
- The devices communicate with the Cloud using TCP port 14354. Most domestic routers do not have restrictions on outbound TCP connections, but corporate networks may require an exception in the router/firewall.
- WiFi-500 devices use UDP packets on ports 1024 and 8010, so these ports need to be open to allow communication.

Device loses connection to the PC or the Cloud.

If a device loses connection to either the PC or Cloud, complete the following steps to try to resolve the problem:

1. Check the signal strength of the wireless network by pressing the device button three times to view signal strength. Consider moving the device or access point/router
2. Restart the wireless access point or router
3. If your wireless network consists of multiple access points with the same SSID, the device may not be connecting to the access point with the strongest signal. Refer to *Configuring a network with multiple access points with the same name (SSID)* on page 55.
4. If you are not using the latest firmware version, update the device firmware. Refer to *Configuring a network with multiple access points with the same name (SSID)* on page 55.

If a device loses connection to the Cloud *only*, complete the following steps to try to resolve the problem:

1. If possible, check your internet connection by testing if other wireless devices can connect to the internet.
2. Contact your network administrator to check if there is network authentication or corporate firewall rules which are preventing the device from communicating.

If a device loses connection to the PC *only*, complete the following steps to try to resolve the problem:

1. The device attempts to reconnect to the PC software using UDP broadcast packets. Some wireless networks are configured to block UDP broadcast. Either check the configuration of the access point, or configure your PC and devices with static IP addresses (refer to *Configuring a device with a static IP address* on page 55).

2. Resource limitations on the PC running the software can cause the processing of messages from the device to take an excessive amount of time, causing the device to lose connection. Try closing some programs or restarting your PC. Some Firewall and Anti-Virus/Security software may also cause issues here.

Miscellaneous

If you are using the PC software and the **Next** button is missing on the **Alarms** page ensure your font scaling is set to 100%

Tips on Using WiFi-500 Sensor Series Devices and Software

Checking your Cloud settings

To make sure the WiFi Sensor Software is configured correctly to connect to the Cloud, complete the following steps:

1. Launch the WiFi Sensor Software on your PC.
2. From the main screen, press the <Ctrl-Alt-S>.

Running the software on a HP or Compaq PC?

If you are running the software on a HP or Compaq PC, and a Support Information window displays when you press <Ctrl-Alt-S>, search the MCC knowledgebase at kb.mccdaq.com for an article on how to resolve this issue.

3. If the settings are *exactly as shown in Figure 58*, the settings are correct – click **Cancel**.
Otherwise, change the settings to match those in Figure 58 and click **Save**.

Caution! Do not change the **Listener Port** unless instructed to do so by MCC technical support.

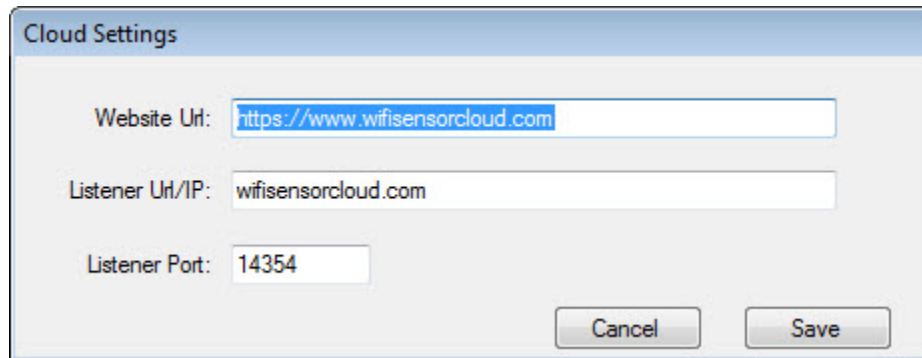


Figure 58: Cloud Settings dialog box

These settings are persistent and are remembered when you close the software, or install a software upgrade.

Connecting a device to a wireless network with Enterprise Authentication

Enterprise Authentication is supported on WiFi-500 Sensor Series devices with firmware v. 2.3.12 and above installed. Devices support the following authentication methods:

- PEAP/MSCHAPv2
- FAST
- TTLS

When you select an Enterprise network, you are prompted to enter a **Username** and **Password**, and select the **Authentication** type from the list. Contact your IT Administrator if you are unsure of enterprise network type.



Figure 59: Selecting a wireless network with Enterprise Authentication

WiFi-500 Sensor Series devices do not support the following authentication types which require a client certificate to be installed:

- TLS
- GTC
- LEAP

If a PC is connected to multiple networks (PC/local data storage only)

When using a WiFi-500 Sensor Series device to store data on the PC or local network, both the PC and device must be on the same network in order to communicate. If the PC is connected to multiple networks (wired and wireless), the WiFi Sensor Software may not be able to automatically select the correct network connection.

To select the correct network connect, complete the following steps:

1. On the Wireless Network selection screen, click on the green antenna symbol on the top left of the window.
A dropdown list to displays on the bottom left.
2. Select the network adaptor which corresponds to the network connected to the device, and click **Next**.

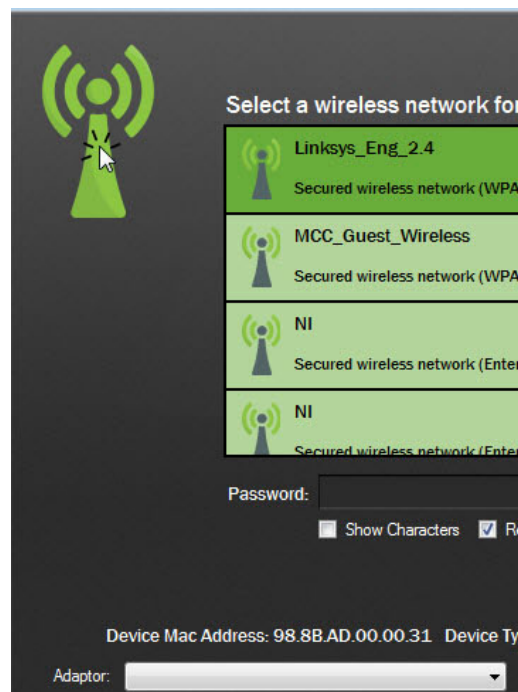


Figure 60: Clicking the WiFi symbol to display the Adaptor drop-down list

Configuring a device with a static IP address

By default, devices obtain an IP address using DHCP, which is standard for most networks. If you do not have a DHCP server on your network or want to manually assign an IP address, select the **Enter Advanced Network Options Next** checkbox and enter the IP address on the **Advanced Network Options** screen.

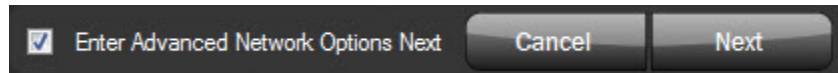


Figure 61: Enter Advanced Network Options checkbox

Figure 62: Advanced Network Options screen with static IP address entered

Configuring a network with multiple access points with the same name (SSID)

Device with firmware version 2.3.12 or later installed can select the strongest access point using the configured SSID. When moving a device between the coverage of two access points, it can lose connection temporarily with the PC software or the Cloud while it finds the new access point.

Devices with firmware versions earlier than version 2.3.12 choose the access point with the lowest channel number. If multiple access points have the same SSID, and a device shows a low signal strength despite being close to the access point, it may be trying to connect to one further away.

To work around this issue, you can lock a device to the MAC address of an access point by selecting the **Enter Advanced Network Options Next** checkbox and enter the IP address on the **Advanced Network Options** screen.

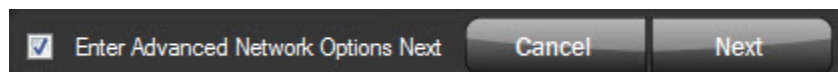


Figure 63: Enter Advanced Network Options checkbox

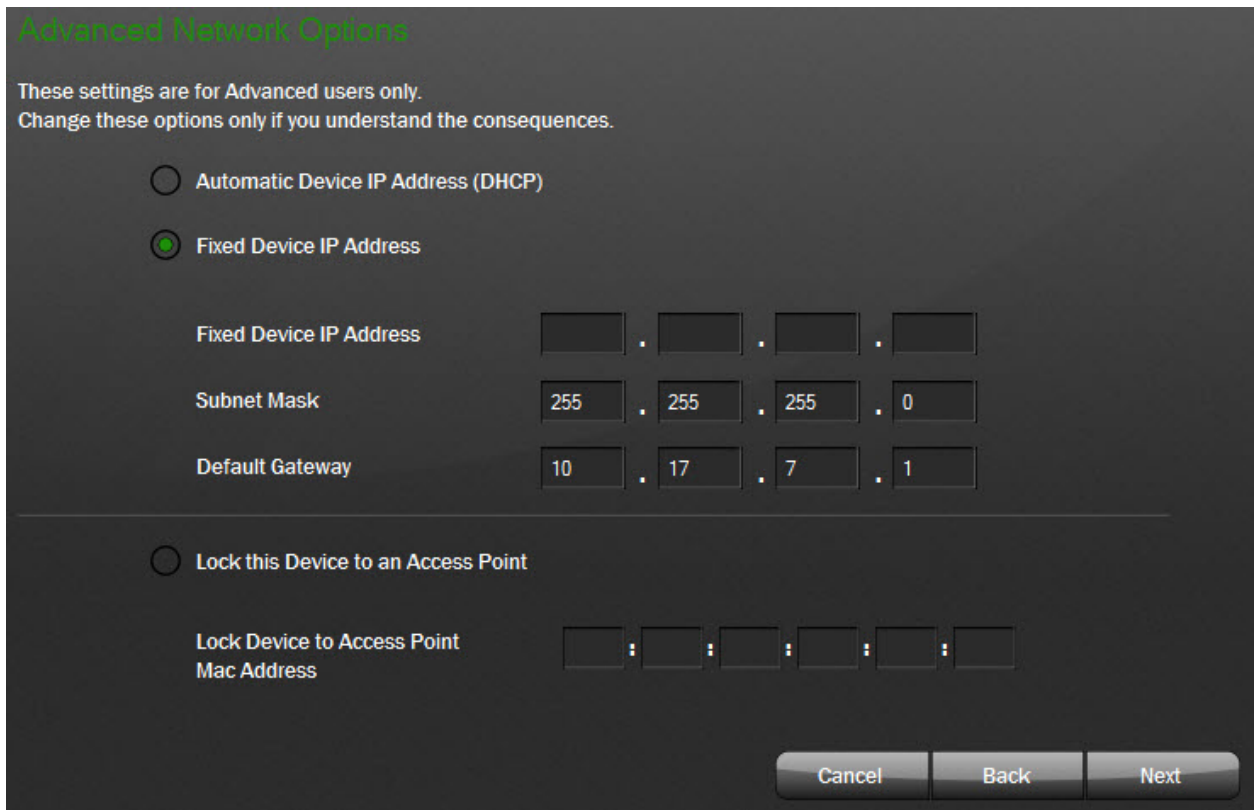


Figure 64: Advanced Network Options screen

Using devices on WEP-encrypted WiFi networks

WiFi-500 Sensor Series devices fully support WEP encryption. When using the PC software to connect your device to a network with WEP encryption, select the network from the list and enter the **Passkey** in the box provided.

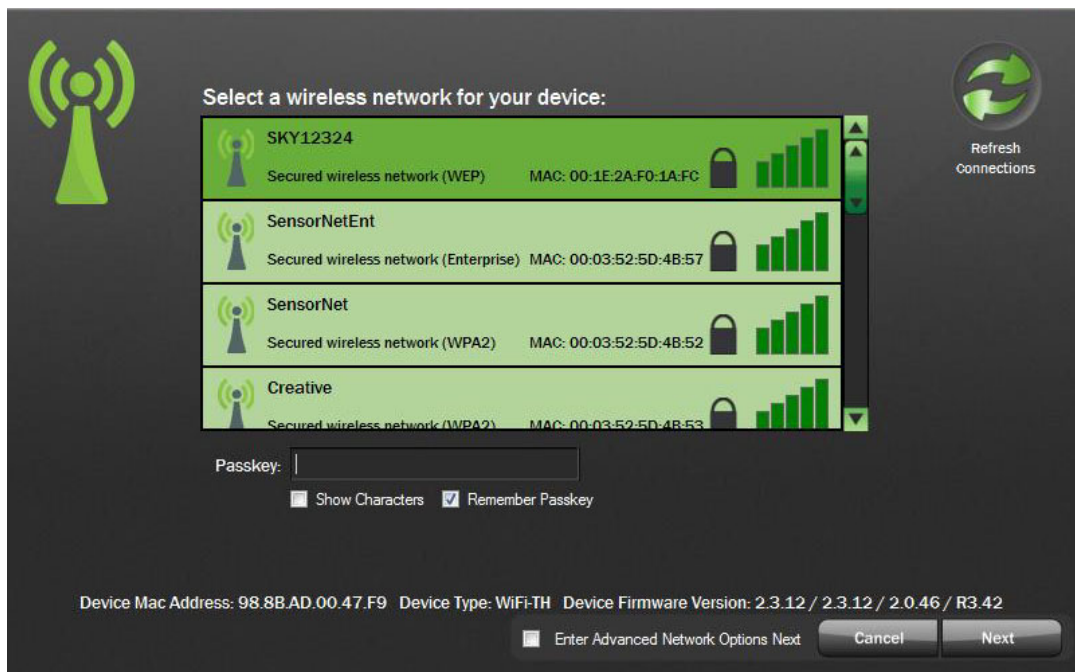


Figure 65: Selecting a WEP-encrypted network

Entering a password for a WEP encrypted networks generally takes one of two forms:

- A *password* (sometimes called a *passphrase*) is a normal text string in the form *FROG123, myPA55word, 13AcaciaAvenue*, and so on.
- A *passkey* (sometimes called a *WEP key*) is a hexadecimal number string in the form *1A648C9FE2, 7d64622e47, 7b7d5855325c76654c484c2667, and so on*

The WiFi Sensor Software only supports only a hexadecimal passkey. If you only have a password, you can easily find online resources to convert your password to a passkey (search *WEP key generator*).

WEP encryption is applied to data being transmitted over networks to ensure that it is secure and private. The latest methods for doing this are very advanced and offer exceptionally high levels of security. WEP is a legacy encryption method that does not offer high levels of protection is easily cracked using commonly-available tools, and is widely accepted to be insecure. MCC does not recommend the use of WEP if it can be avoided.

Transferring device data to another PC

If you need to use another PC to store your data, you can transfer data to the new PC by copying folders and files. The new PC must be on the same network as the devices, and in the same sub-net.

You cannot have more than one PC on the same network running the WiFi Sensor Software and listening for device transmissions.

To transfer data to another PC, complete the following steps:

1. Exit the WiFi Sensor Software if it is running.
2. Copy the following folders from your old PC to your new PC, including any sub-folders and their contents, and overwrite all existing files.
 - `\Program Files\Measurement Computing\WiFi Sensor Software\` (or `\Program Files (x86)\Measurement Computing\WiFi Sensor Software\` on some PCs)
 - `\My Documents\WiFi Sensor Software\` (or `\Documents\WiFi Sensor Software\` on some PCs)
3. Copy the following file from your old PC to your new PC:
4. `\My Documents\config.wft` (or `\Documents\config.wft` on some PCs)
5. Download and install the latest WiFi Sensor Software from www.mccdaq.com/software.aspx on the new PC. This may perform a repair or update of the version copied from your old PC. Existing data is not overwritten.
6. Once you're sure that all your data has been copied across, launch it on your new PC.
7. Completely uninstall the WiFi Sensor Software from your old PC (refer to *Completely uninstalling the WiFi Sensor Software from a PC* below).

Completely uninstalling the WiFi Sensor Software from a PC

To completely remove the WiFi Sensor Software from a PC, complete the following steps:

1. The first step depends on the version of Windows installed on the PC.
 - If you are running Windows 10, select **Start»Settings»System»Apps & Features**.
 - If you are running Windows 8/8.1, right-click in the bottom left corner of the screen and **Start»Programs»Uninstall a Program**.
 - If you are running Windows 7, select **Control Panel»Programs and Features**.
2. Click on WiFi Sensor Software in the list and **Uninstall**.
3. Delete the folder `Program Files\ Measurement Computing\ WiFi Sensor Software` (or `Program Files (x86)\ Measurement Computing\ WiFi Sensor Software` on some PCs).
4. Delete `My Documents\WiFi Sensor Software` (or `Documents\WiFi Sensor Software` on some PCs).
5. Delete the file `My Documents\config.wft` (or `Documents\config.wft` on some PCs).

The software and related data is completely removed.

Copying local data files for use by a third-party application

If you are logging data to a PC or local network, you can set up the WiFi Sensor Software to create duplicate data files that can be opened, modified, and deleted by a third-party application running on the same or a different PC. Files can be duplicated for each WiFi-500 Sensor Series device connected to the PC.

The duplicate files are updated when new data is received, and copied to a user-specified folder on the PC or on a local network drive.

This feature does not apply to data files saved to the Cloud.

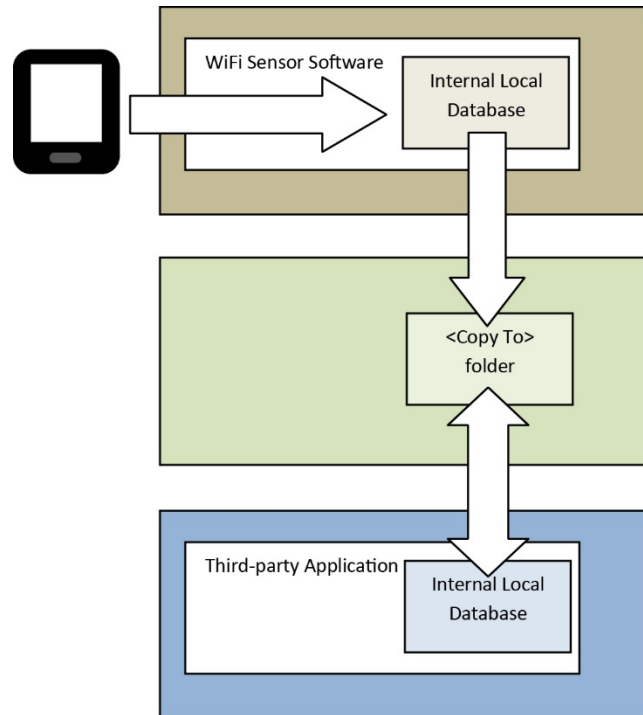


Figure 66: Chart depicting the data file copying process

Complete the following steps to enable file duplication with the WiFi Sensor Software:

1. From the main WiFi Sensor Software screen, press < Ctrl-Alt-F>.
2. Enter the path where the duplicate data files will be copied and **Enable File Copy**.

Each time the software receives a data packet – whether as a result of a normal (timed) transmission, or a single packet transmission during device syncing – the software duplicates the file in the specified folder. The file contains the device configuration followed by data received.

The format of a copied data file is shown in Figure 67.

```

\<Sensor Name>USB-502 - 1A
<Sensor Type>TH
<Firmware Version>3.60
<Sensor MAC>98.8B.AD.00.00.31
<SSID>MCCIT5100
<Sample Rate>10
<Transmit Frequency>60
<Temp Scale>C
<Temp High Alarm>43
<Temp Low Alarm>14
<Humidity High Alarm>68
<Humidity Low Alarm>39
<Temperature High Alarm Triggered>NO
<Temperature Low Alarm Triggered>NO
<Humidity High Alarm Triggered>NO
<Humidity Low Alarm Triggered>NO
<Battery Status>10
<Signal Strength>8
time,temperature,humidity,samplestart,recdate
2016-11-1 13:32:2,26.4,27,7,2016-11-1 13:33:4,0
2016-11-1 13:32:12,26.4,27,7,2016-11-1 13:33:4,0
2016-11-1 13:32:22,26.4,27,7,2016-11-1 13:33:4,0
2016-11-1 13:32:32,26.3,27,7,2016-11-1 13:33:4,0
2016-11-1 13:32:42,26.3,27,7,2016-11-1 13:33:4,0
2016-11-1 13:32:52,26.3,27,7,2016-11-1 13:33:4,0

```

Figure 67: Example of a copied data file

Based on the copied data file in Figure 67, the device is configured to take readings every 10 seconds, and transmit them when it has accumulated 6 readings.

The content and characteristics of the copied data file are listed below.

- If configuration fields are not relevant to the sensor type, they are not included in the file. If an alarm is not enabled, it is also not included.
- All configuration fields contain the field description – for example, <Sensor Name> – followed by the parameter in plain text.
- <Temp Scale> is a single character F or C.
- <Sensor Type> is T (temperature sensor – USB-501), TP (temperature sensor with probe – USB-501-TP), or TH (temperature/humidity sensor– USB-502).
- Temp alarm levels are listed in <Temp High Alarm> and <Temp Low Alarm>.
- Humidity alarm levels are in %RH
- <Battery Status> is 0-10 (battery charge; 10 is fully charged), 11 (power connected and charging), or 12 (power connected and fully charged).
- <Signal Strength> is 0-10 (10 is the best signal).
- <Sample Rate> and <Transmit Frequency> are in seconds.
- The name of the copied file is unique and in the following format: <computer name>_instrumentN_x.wdf, where:
 - <computer name> is name of the source computer, allowing for multiple PCs to use a central repository.
 - N is a unique device number (allocated during first attachment to the PC)
 - x is *samplestart*, which is the data sequence start number (from the data within the file).

The *samplestart* number is unique to each received data packet. In Figure 67, *samplestart*=7. If the wdf files normally contain six data readings, the next *samplestart* sequence 13, 19, 25, and so on. If the device is syncing, the wdf file contains considerably more data readings. The *samplestart* number is reset to zero when the device starts a new logging session. The third-party application must accommodate this when chaining copy files together.

- The \<Copy To>\<computer name>_instrumentN_x.wdf file is written with an exclusive write attribute, so attempts to read the file during this time results in an error, which needs to be trapped and handled by the reading process. When the software finishes writing, the file becomes accessible for reading.

After processing the data in the copied file, the third-party application must delete the file.

Measurement Computing Corporation
10 Commerce Way
Norton, Massachusetts 02766
(508) 946-5100
Fax: (508) 946-9500
E-mail: info@mccdaq.com
www.mccdaq.com

NI Hungary Kft
H-4031 Debrecen, Hátar út 1/A, Hungary
Phone: +36 (52) 515400
Fax: +36 (52) 515414
<http://hungary.ni.com/debrecen>