



# SenScope™ Installation Walk-Though

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Ultra-Low Power Precision Sensing & Wireless Communication

## Table of Contents

Introduction .....	2
Installing SenScope™ .....	2
Preparing SenSpot™ and SeniMax™ (if provided) .....	5
Prepare the SenScope™ for live data collection .....	7
Configure the SeniMax™ Gateway.....	8
Viewing the data in the live/local mode .....	13
Viewing the data in the remote mode.....	16

## Introduction

Thank you for choosing Resensys. This Resensys SenScope™ Installation Walk-Through services as a quick guide to help you get familiar with the basic functions of our SenScope™ software and provide instructions to ensure consistent installation of Resensys SeniMax™ and Resensys SenSpot™. To learn more about the full functions of our SenScope™ software, please refer to our SenScope™ Manual. If you have any concerns, please contact Resensys.

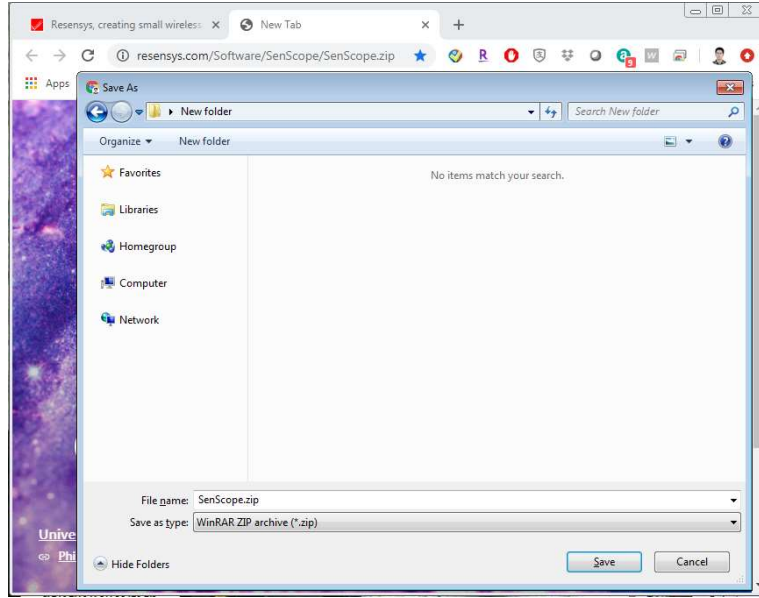
## Installing SenScope™

1. USBSink™ is a wireless device which connects to a PC or laptop. It is used to configure various components of Resensys wireless monitoring systems. In addition, it can be used to receive and display measurements of Resensys wireless SenSpot sensors if they are within its communication range. Open the box to find the USBSink™ which is shown below. USBSink™ is shipped inside a dark blue transparent anti-static envelope.

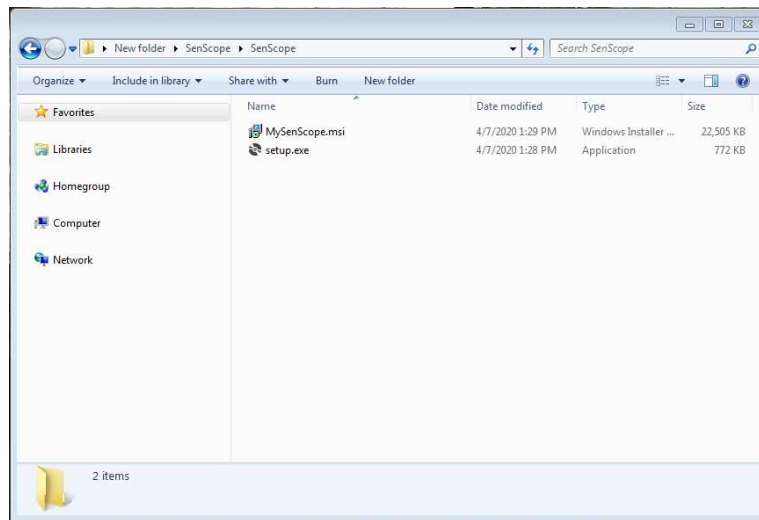


2. Install the Resensys SenScope™ software  
Copy the following url address to your browser address bar, then press the enter key. A save-as window should appear. Select the desired directory for the ZIP file and proceed by clicking the Save button. The download should be initiated automatically.

<http://www.resensys.com/Software/SenScope/SenScope.zip>



Extract the SenScope.zip file into the desired directory and open the directory. It should appear as shown below.



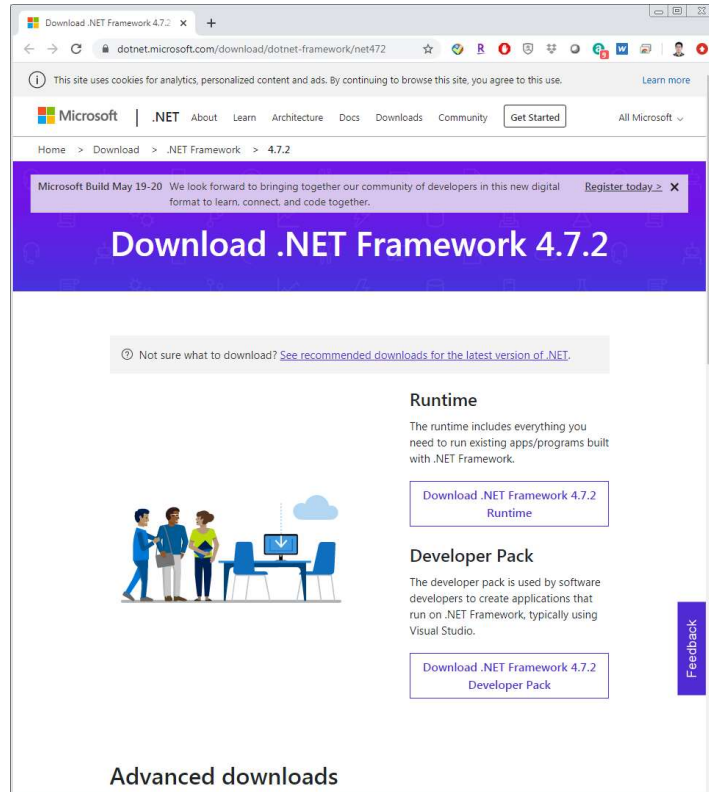
Double click on the setup.exe file to initiate the SenScope™ Setup Wizard. Follow the instructions on the SenScope™ Setup Wizard to complete the installation.

3. Install the .Net framework 4.7 runtime

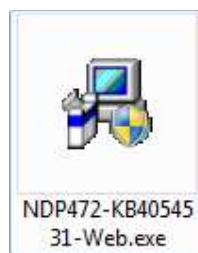
Copy the following url address to your browser address bar, then press the enter key.

<https://dotnet.microsoft.com/download/dotnet-framework-runtime>

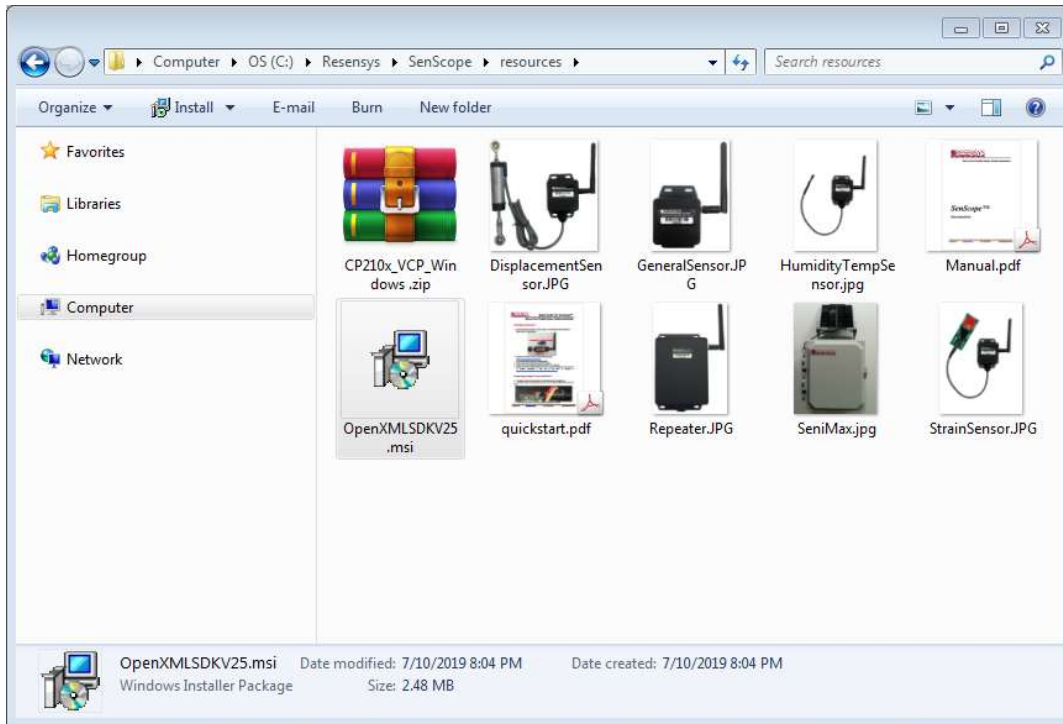
The browser should open this website shown below.



Click on the “Download .Net Framework 4.7.2 Runtime” button to initiate the download. A save-as window should appear. Select the desired directory for the executable file, then click the Save button. The download should be initiated automatically. Once the download is completed, double click on the executable file NDP472-KB4054531-Web.exe to initiate the .Net Framework 4.7.2 Setup. Follow the instructions to complete the .Net Framework 4.7.2 Setup in order to complete the installation.



4. Install the Open XML SDK 2.5 package  
Located under the “resources” directory under the SenScope™ installation directory.



Double click on the OpenXMLSDKV25.msi installer package file, and follow the instructions on Open XML SDK 2.5 for Microsoft Office Setup Wizard to complete the installation.

5. Insert the USBSink™ to the computer.
6. Install the driver for the USBSink™. When connected to the internet, the installation should be completed by Windows automatically. If not, the CP210x\_VCP\_Windows.zip ZIP file is included in the “resources” directory under the SenScope™ installation directory.



## Preparing SenSpot™ and SeniMax™ (if provided)

1. Initialize SenSpot™

Remove the lid with a Philips screwdriver and insert a new battery (CR123) if it has not been inserted yet. Then cover the SenSpot™ with the lid. To ensure the desired waterproof characteristic, make sure the rubber O-ring is attached to the screws and tighten the screws until the square gasket expands visibly under compression.

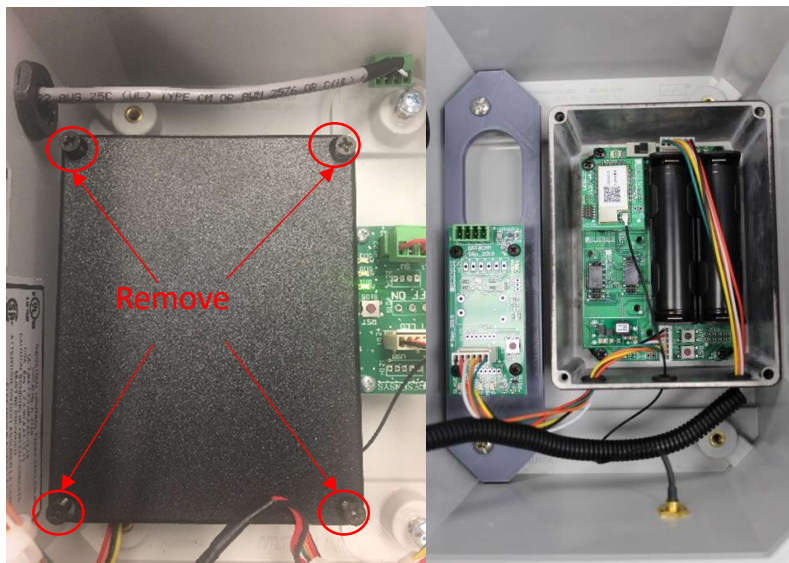


2. Initialize Senimax™

Lift the handle and turn it counter-clockwise to release the cover of the box as shown below.

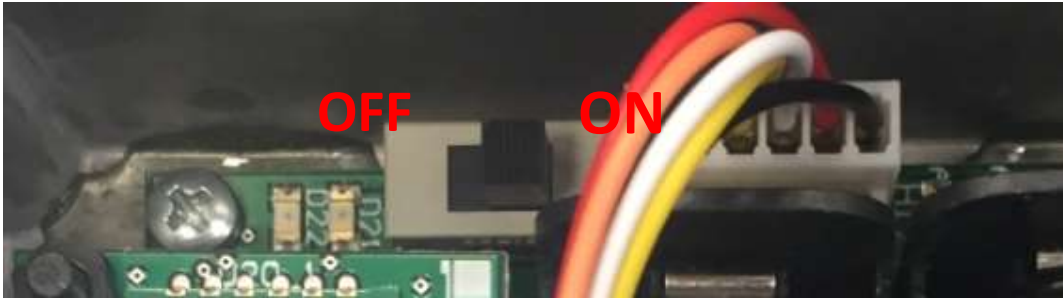


Remove the screws of the inside box of the Senimax™.



Insert two new batteries (18650) if they have not been inserted yet. If you are not certain about the

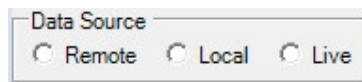
polarity of the batteries, please refer to the marking on the black plastic battery housing. Turn on the main switch as shown below.



3. Contact Resensys if any problems arise.

## Prepare the SenScope™ for live data collection

There are three different modes in which SenScope™ can process data with-- live mode, local mode and remote mode. We will go through all of these in the following content.



Local mode is recommended during the SenSpot™ installation process unless instructed otherwise. It will create a robust local minimum system to root out any potential irrelevant errors introduced by poor internet access in the case of weak cellular or satellite signal. Under local mode, users can view data in a timely manner which ensures a smooth and efficient SenSpot™ installation experience.

The only difference between the live mode and the local mode is that in the local mode the data (packets from SenSpot™) are stored in a local database on the computer's hard drive so that the SenSpot™ data is accessible even after SenScope™ has been closed. However, in the live mode any data is deleted after the SenScope™ is closed.

Remote mode allows users to view the data from remote servers rather than from the local USBSink™. Once the SeniMax™ and SenSpot™ are properly installed in the site, all the data collected will be available in the remote mode. In that case, Internet access and a username-password combination would be required.

### ■ Opening the port

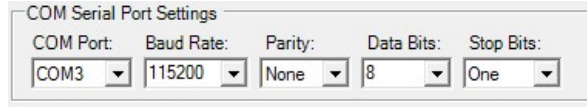
1. Open SenScope™ and switch to the offline mode by clicking the middle button at the top-left corner of the window as shown on the right (the Internet access and username-password combination are not required under offline mode).



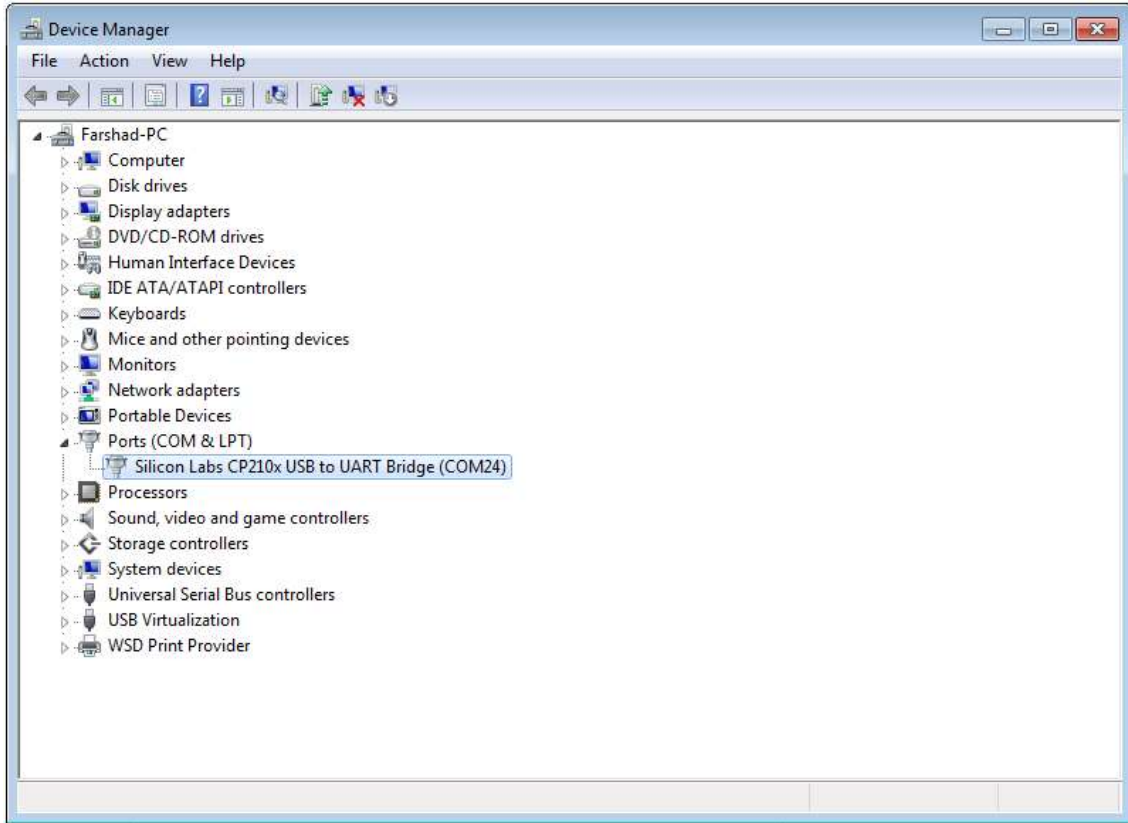
2. Select "Local" mode or "Live" mode from the "Data Source" area (top-left corner).
3. Switch to the "Real Time" tab if it's not the current tab, as shown below.



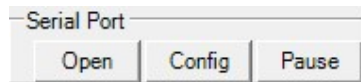
4. Select the COM port in which the USBSink™ is connected to in the “COM Serial Port Setting” area as shown below (bottom-left corner).



If the port is unknown, please go to the device manager of Windows to find the port as shown below.



5. Make sure there is at least one working SenSpot™ or SeniMax™ near the USBSink™. Click “Open” button (top-left corner).



The packets should appear in the display area and the device IDs should appear in the “Sensor List” after some time (due to the transmission interval of the SenSpot™, it may take up to 6 minutes).

## Configure the SeniMax™ Gateway

### ■ Network configuration

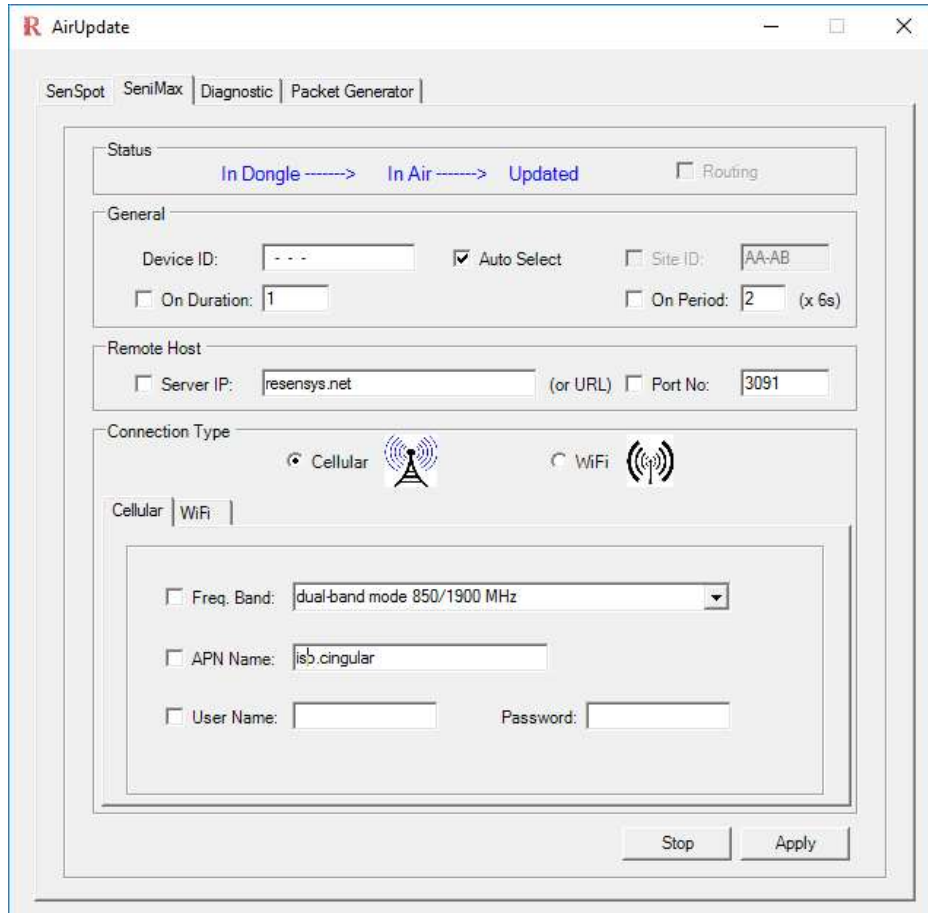
The SeniMax™ needs to be correctly configured through Air Update interface to get the access to the cellular network. Please refer to the SenScope™ User Manual for detailed instruction about Air Update



settings.

### Cellular SeniMax™

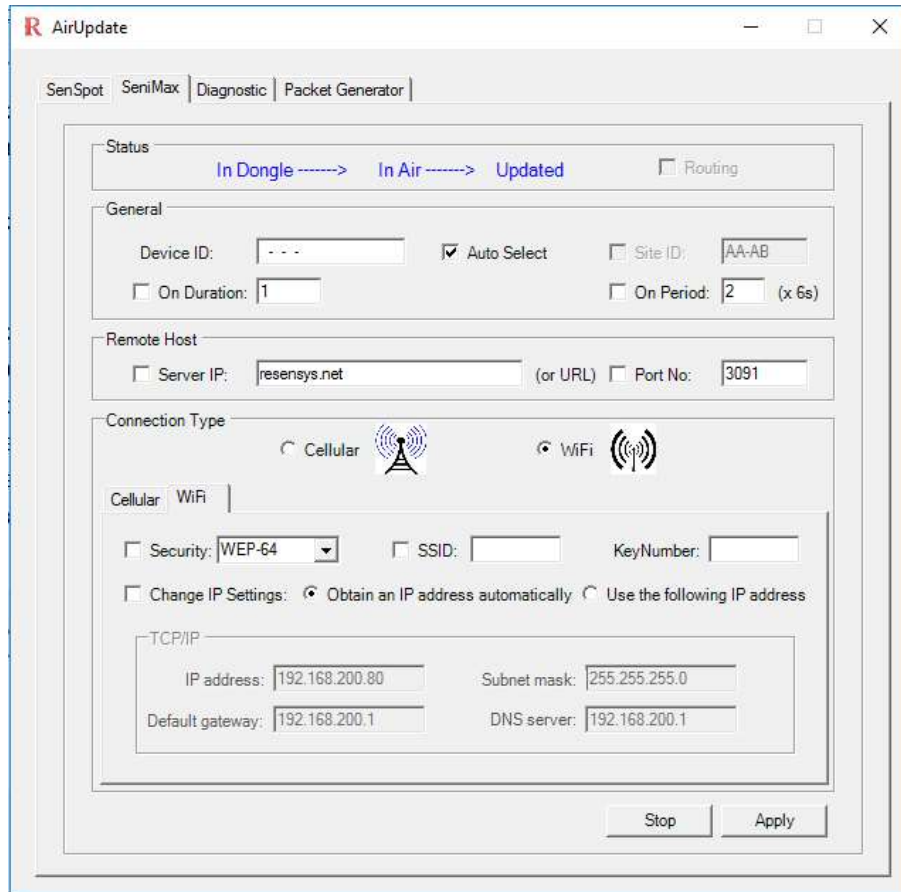
1. Insert the SIM card into the Modem.
2. Use Air Update in the SenScope™ to upload the carrier's information. The setting shown in Figure 4 is the default setting for AT&T (in U.S). Please get the necessary information (Frequency band, APN Name, etc.) from the local cellular service provider.
3. The information of the Remote Host (Server IP and Port No.) should not be changed.



4. Contact the carrier to activate the SIM card if needed. The IMEI number of the modem is listed in the packing list shipped together with SeniMax™ to the user.

### Wi-Fi SeniMax™

Wi-Fi network name and password are required for air update of Wi-Fi SeniMax™.



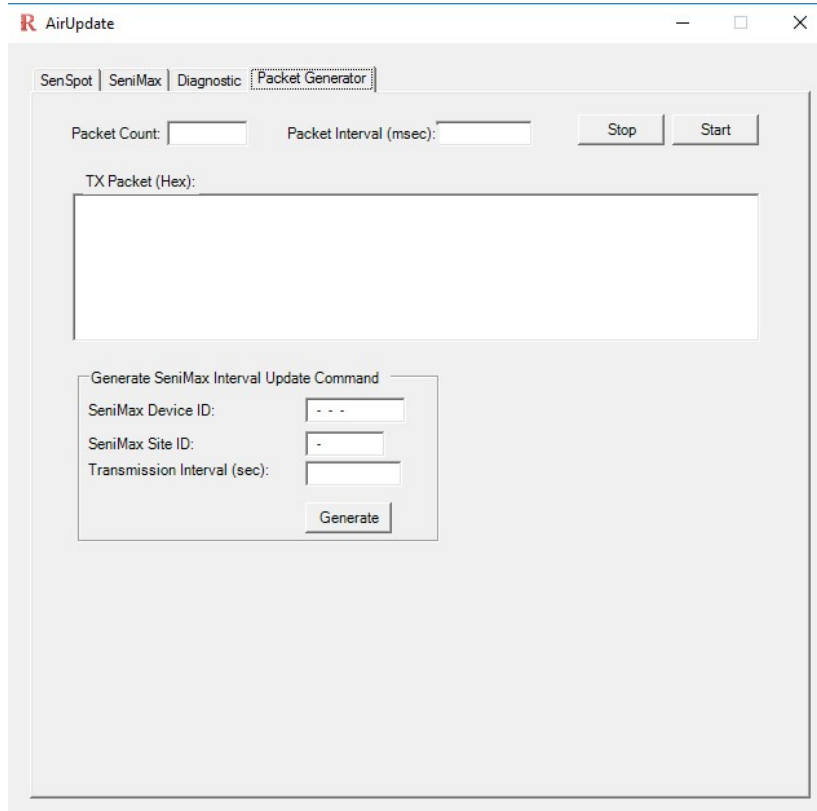
Upload the Security, SSID (name) and the Key Number (password) of the Wi-Fi network through Air Update to SeniMax™.

### Ethernet SeniMax™

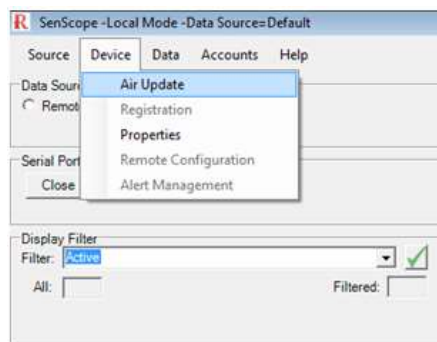
The Ethernet SeniMax™ is pre-configured by Resensys. No Air Update is needed. Just connect the Ethernet cable to SeniMax™ and turn it on.

### ■ Packet generator and Fast sampling mode

Under fast sample mode, SeniMax™ and SenSpot™ will increase sampling frequency and reduce the delay on data uploading typically from 6 minutes to 30 seconds. It is recommended to switch to the fast sampling mode during field deployment to acquire a better installation result unless otherwise instructed. Packet generator is required to activate the fast sampling mode, which can send specific packets at a fixed rate. Like the diagnostic mode, it is used mostly for debugging. An application for the function is to make the SeniMax™ enter the fast sampling mode in which the transmission interval (of the SenSpot™) can be shortened to a desired value to show the data more frequently. This mode is useful during the deployment to verify the connection between the SenSpot™ and the SeniMax™.

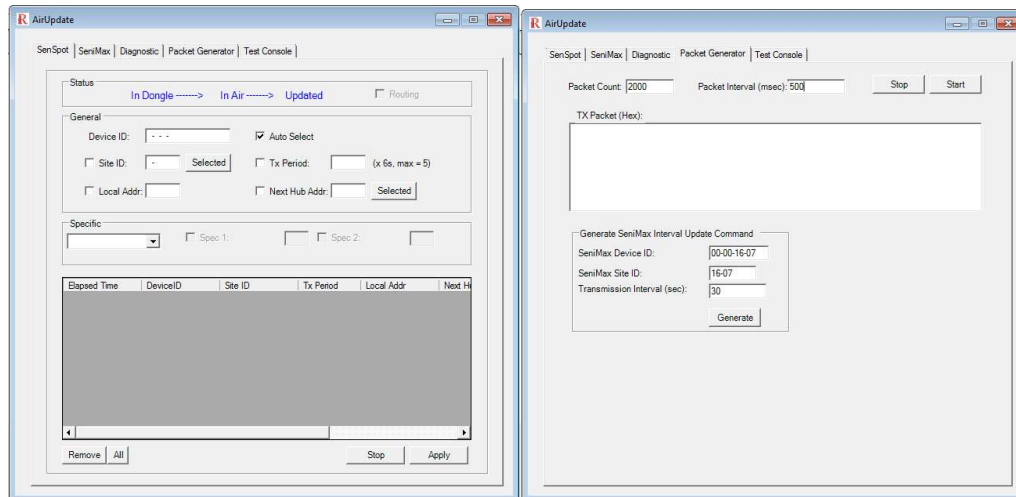


1. Click on the top left “Device” button, and a dropdown menu should appear as shown below.

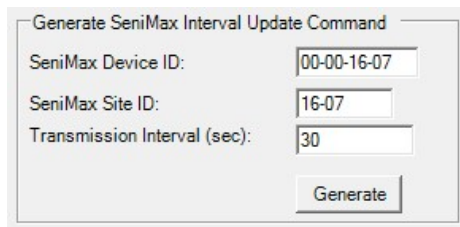


Click on “Air Update”

2. Select “Package Generator tab” on the top

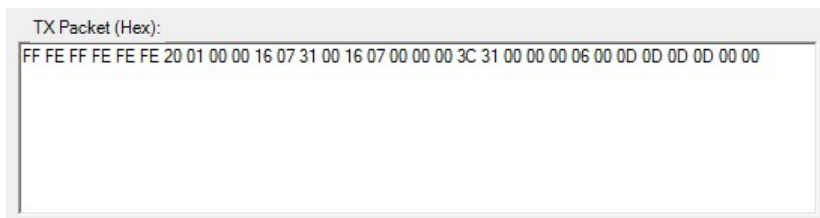


3. Open the “Packet Generator” tab in the Air Update panel.
4. Clear the “TX Packet (Hex)” area (choose any contents and hit “delete” on the keyboard).
5. Input the Device ID, Site ID and the new transmission interval. **The interval should be a multiple of 6 seconds!** The interval of **30s** is recommended if there is no specific requirement from the customer.

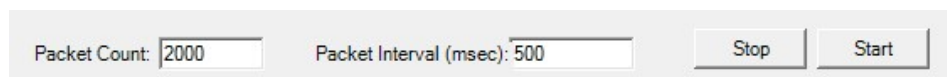


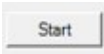
6. Click “Generate” button to generate the command packet.

The packet generated should appear in the “TX Packet (Hex)” box.

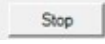


7. Type in the packet count and the packet interval. These parameters determine the command packets’ number and frequency sent from the computer. It is recommended that the packet count be some large number (like 2000) and the packet interval be 500ms.



8. Click  and plot the quantity “Tx Interval” of the SeniParam™ in the live mode.

Sensor List			Quantity
Name	ID	Type	
Name it now	15-03-19-04	Gateway-SeniMax	Charge_curr1
Name it now	FF-FF-00-00		Charge_curr2
Name it now	15-03-22-02	Strain Gauge	<b>TX_interval</b>
Name it now	15-03-22-16	Strain Sensor	Volt-Aux
Name it now	00-00-01-04	Gateway - SeniMax	Volt-x
Name it now	15-03-26-17	Inclinometer 2D	

9. Check the "Tx Interval". As soon as the "Tx Interval" changes to the desired value, click . This is a precautionary measure.
10. After finishing the test, remember to change the "Tx Interval" back to a normal value since the power consumption of the SenSpot™ is high in fast sampling mode.

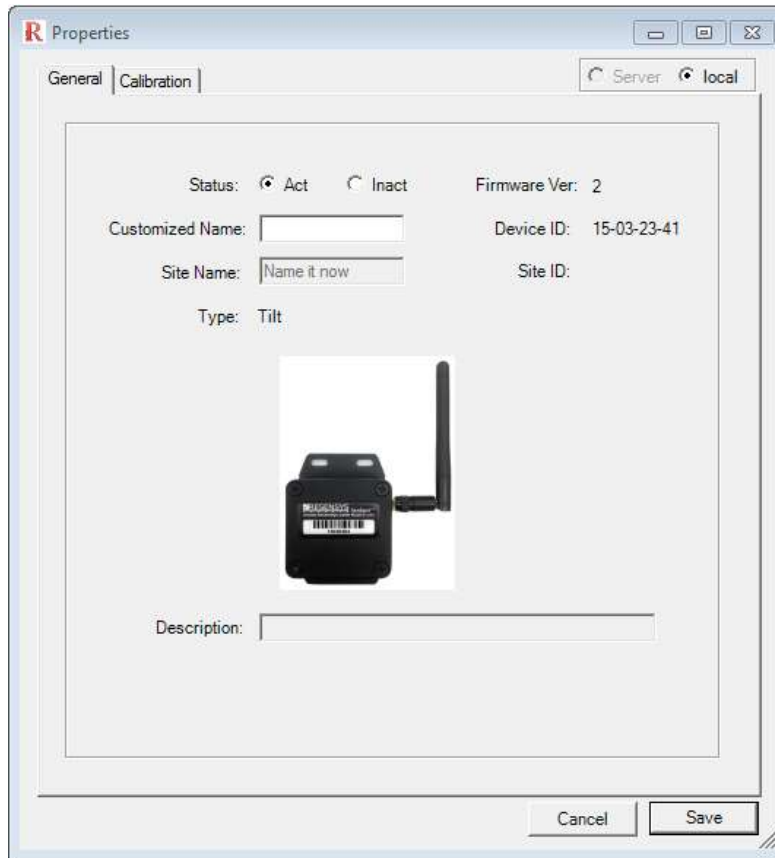
## Viewing the data in the live/local mode

- **Setting Offsets, Coefficients, and Reference**

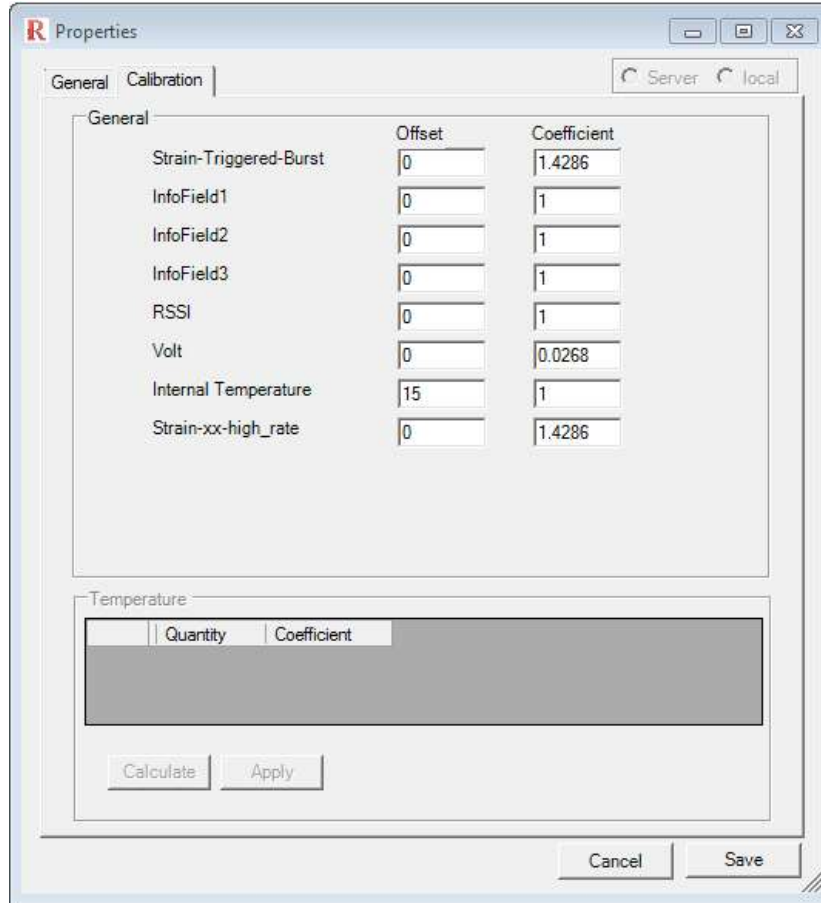
An offset and a coefficient are applied to the raw data in order to visualize the data on the graph. For each type of quantity, there are default offset and coefficient values which can be changed by the user for further fine tuning.

Sensor List		
Name	ID	Type
	00-00-1F-01	Gateway-SeniMax
	00-00-1F-01	
	00-00-1F-01	-SeniMax
	00-00-1F-01	
	00-00-1F-01	
	00-00-1F-01	
	00-00-1F-01	
	00-00-1F-01	
	00-00-1F-02	Gateway-SeniMax

To change these values, right click on the desired sensor, a dropdown menu with a single "Properties" tab will appear. Left click on the "Properties" will open up a window shown below.



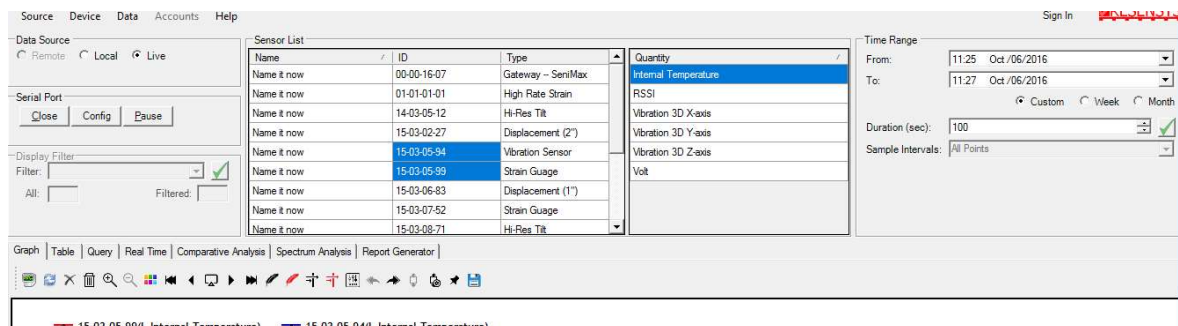
Select Calibration tab to change the Offset and Coefficient values.



However, SenSpot™ sensors are calibrated before shipping. Please do not alter calibration values in remote mode unless otherwise instructed.

■ Viewing the data and graphs in live/local mode

1. Switch to the “Graph” tab.
2. Select one or several devices in the “Sensor List”.
3. Select the data type in the “Quantity” table.





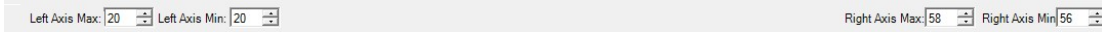
4. Click  to draw the figure.



5. The display duration can be adjusted by entering the desired time duration in

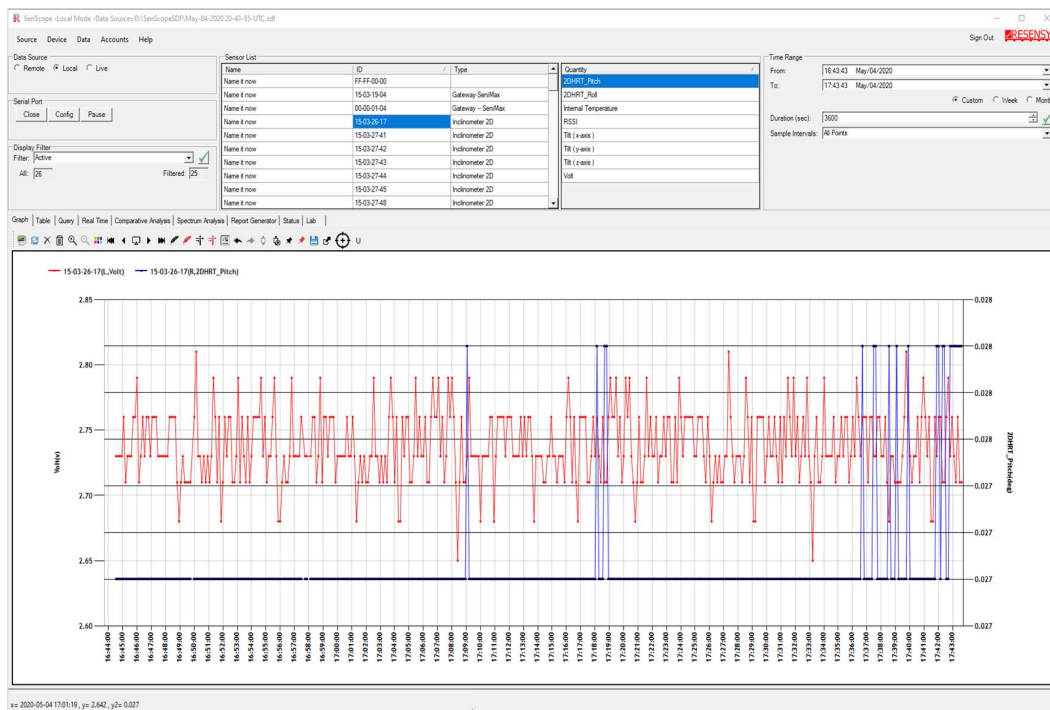


6. The Y-Axis range is automatically adjusted by default. If it's in the Manual Axis mode, click  and it

will become grey , indicating the Auto Axis mode is on. Click  to switch to the Manual Axis mode and adjust the range manually by typing the range in the text boxes at the bottom side of the window.



7. Click  to delete all the figures or click  to delete the figure of the currently selected item.

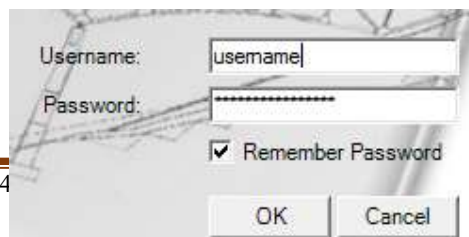


## ■ Install the SenSpot™ sensors

Install the SenSpot™ sensors on the structure. Please refer to the specific installation manuals according to the type of sensors.

## Viewing the data in the remote mode

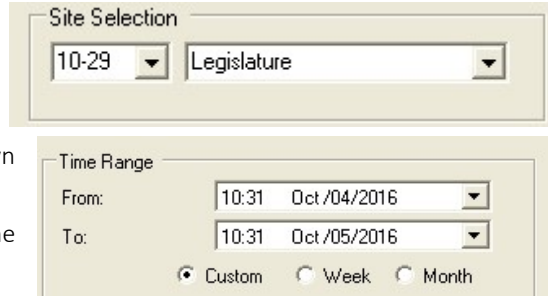
Remote mode is for viewing the data from the remote servers rather than from the local devices. Therefore, Internet access and a username-password combination are



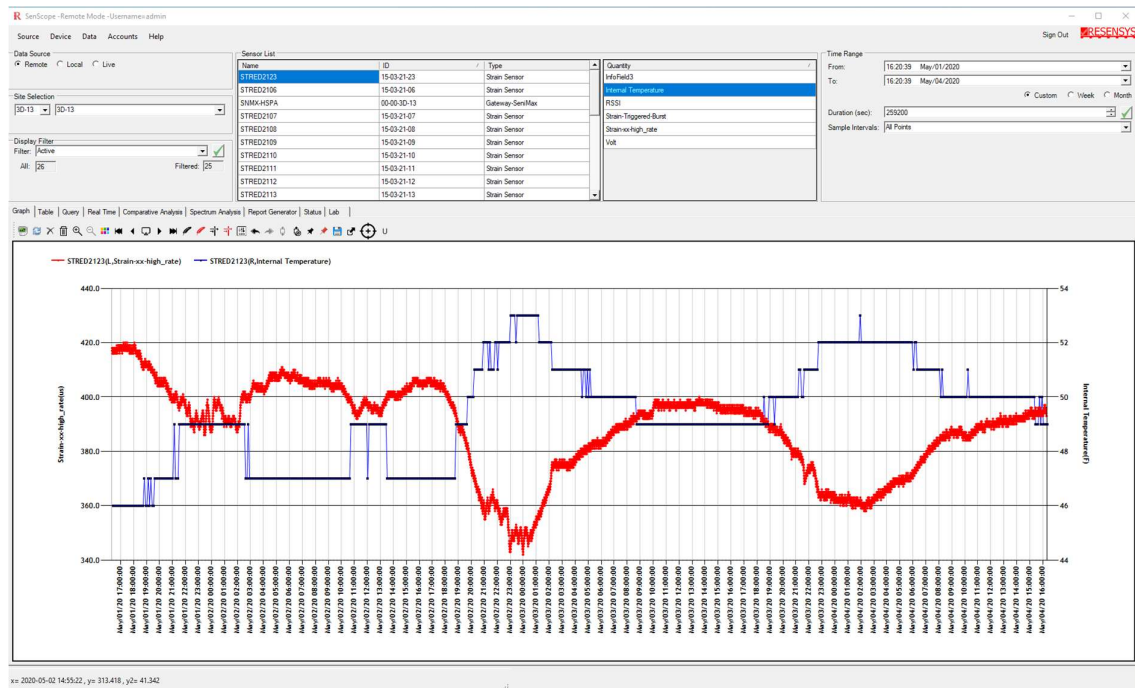


required. Should the user not have them, please contact Resensys.

1. Enter the username and the password provided by Resensys and then click “OK”.
2. Choose the “Remote” mode in the “Data Source” area
3. Select the desired Site ID from the drop-down menu.
4. In the Time range area, enter the desired time period for the data.
5. Select the devices and the data type to create a figure similar to the Live/Local Mode.



6. Remember to click “Refresh”  after changing the time period to apply it.



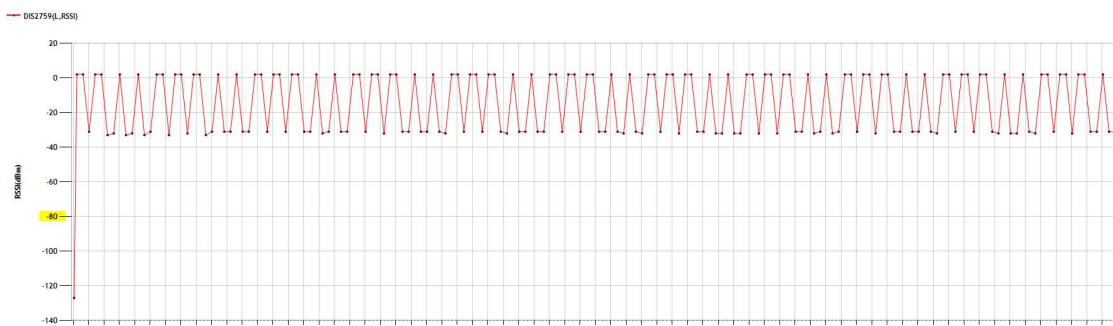
## ■ Verification

Verify SenSpot™ setup by verifying its readings on the SenScope™ under remote mode

1. Check the main quantity reading (E.g. Strain-xx-highrate for strain gauge, High\_rate\_displacement for displacement etc.) as shown below

Quantity
Displacement
HIGH_RATE_DISPLACEMENT
Internal Temperature
RSSI
Volt

2. Check for RSSI representing signal strength between each SenSpot™ to its corresponding SeniMax™. To ensure the system’s reliability, the RSSI reading must be more than -80 dBm. Re-orienting the antenna, reducing the distance between SenSpot™ and SeniMax™ or placing SenSpot™ and SeniMax™ in direct eye sight will improve the signal strength in most cases.



3. Check for Volt representing the battery status on SenSpot™. To achieve the SenSpot™ battery durability, the Voltage reading must exceed 3.0 V (CR123A battery). Replacing a fresh new battery will improve the battery status in most cases.
4. Check for RSSI-x of SeniMax™ representing the signal strength between SeniMax™ and internet access, which may vary based on applications. To ensure the system’s reliability, the RSSI-x should exceed 6, while the signal strength LED indicator on gateway should be no less than 2. Please refer to the SeniMax manual for additional information.

Quantity
Charge_curr1
Internal Temperature
Internal Temperature-x
RSSI-x
TX_interval
Volt
Volt-Aux
Volt-x

■ Further Questions

Please contact Resensys via [info@resensys.com](mailto:info@resensys.com) if you have any further concerns or questions.