

Quick Start

Integrator Edition



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1 Introduction to m.Smart™

m.Smart™ is a family of I/O expansion products designed to work seamlessly with our Sent.io™ Direct2Cloud IoT gateway and Whisker.io® cloud platform.

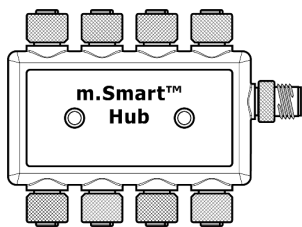
The family includes IP67 rated I/O modules, hubs, and power supplies. They are easily connected using industry standard 5-pin M12 cables to build ad-hoc monitoring and control solutions with up to 32 I/O points.

I/O modules include analog, digital, current transformer, and temperature:



Part Number	Description
MS-IO-AI-MA	4-20mA analog input module
MS-IO-AI-V	0-10V analog input module
MS-IO-2AX-MA	Dual 4-20mA analog input/output module
MS-IO-DIO	Digital input/output module
MS-IO-CT-20A	20A current transformer input module
MS-IO-CT-150A	150A current transformer input module
MS-IO-CT-600A	600A current transformer input module
MS-IO-T-RT	RTD input module
MS-IO-T-TR	Thermistor input module

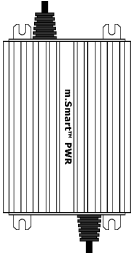
Hubs support up to eight (8) I/O modules:



Part Number	Description
MS-HUB-8	8-port m.Smart™ Hub
MS-CON-SIO-1M	Sent.io™ to m.Smart™ connection cable – 1 meter
MS-CON-SIO-3M	Sent.io™ to m.Smart™ connection cable – 3 meter

m.Smart™ can be powered from any 12V or 24V power supply. The m.Smart™ family includes multiple pre-wired IP67 power supplies for applications where DC power is not readily available.

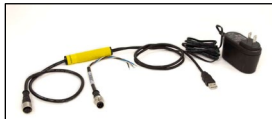
Note: *m.Smart™ solar kits are coming soon.*



Part Number	Description
MS-PS-AC-24V5A	IP67 rated AC/DC power module, 24V DC, 5A
MS-PS-AC-12V2A	IP67 rated AC/DC power module, 12V DC, 2A

For most basic applications with only inputs, the 12V/2A supply is sufficient. For I/O applications that require outputs driving relays, the 24V/5A power supply is the better choice.

The m.Smart™ Programming Cable is used to configure I/O modules.



Part Number	Description
MS-PS-AC-24V5A	IP67 rated AC/DC power module, 24V DC, 5A
MS-PS-AC-12V2A	IP67 rated AC/DC power module, 12V DC, 2A

We also offer 3 meter interconnection cables with M12 M/F connectors on each end, 3 meter M12 cable with wire ends for connecting I/O to m.Smart™ modules, a 1 meter M8 to M12 cable for connecting m.Smart™ to a Sent.io™ Modbus device, and a variety of mounting hardware for magnetic, wall, and pole mounting.

2 Hardware Setup

By default, all m.Smart™ modules are pre-configured to work with Sent.io, including baud rate and a default Slave ID of 1. When more than one m.Smart™ module is used together, each module must be configured for a unique Slave ID.

This is easily accomplished using our m.Smart™ programming cable and any Modbus Client or Banner's SnapSignal Configuration Software (SSCS), which is compatible with m.Smart™. This guide will demonstrate the process using SSCS, which can be downloaded at:

<https://www.bannerengineering.com/us/en/products/software/snap-signal-configuration-software.html>.

Important Information:

1. For all m.Smart™ I/O modules, the Slave ID is configured via Holding Registers. See the module's insert card for the appropriate address for that module.
2. The best practice is to assign each I/O module a unique Slave ID starting at 1. Valid addresses are 1-254.
3. All m.Smart™ I/O modules are preconfigured for 9600 baud, 8 data bits, 1 stop bit, and no parity.

Step By Step Guide:

1. Connect m.Smart™ I/O module to programming cable.
2. Using SSCS, connect to I/O module and set Slave ID
3. Label or mark I/O module with Slave ID. This is important so you can keep track of which module has which address. You can use the table below as an reference example

Module P/N	Name	Slave ID	Description
MS-IO-AI-MA	Inlet Pressure	1	0-20psi pressure sensor
MS-IO-AI-MA	Outlet Pressure	2	0-200psi pressure sensor
MS-IO-DIO	Pump Status	3	Ch1 = Run, Ch2 = Error
MS-IO-T-TR	Pump Temperature	4	Pump temperature

4. Connect each m.Smart I/O module to a 4/8 port hub.
5. If you need more than 8 I/O modules, you can use one of the ports of one hub to connect to an additional hub for up to 4 hubs.
6. Connect the first hub to the Sent.io™ using an m.Smart™ Sentio.io connector cable.
7. Connect power supply (10-30V) to any spare port on any hub, but do not turn on yet. You need to configure the Modbus template in the cloud for the Sent.io to download on startup. Sent.io always checks on startup and every 15 minutes to determine if new configuration is available. Sent.io™ automatically downloads modbus read configurations based on the template in the cloud.

3 Cloud Setup – Modbus Template

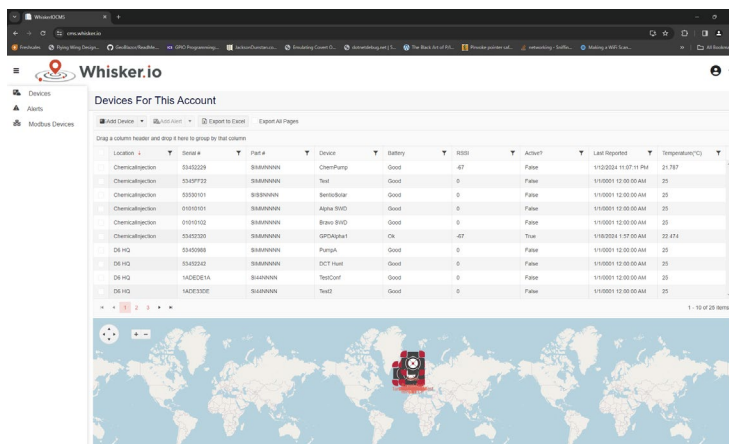
With the hardware configured, the next step is to configure the Modbus template in the cloud.

Modbus Templates provide a simple way to configure Modbus read configuration for any Sent.io™ Modbus device. Once a template is created, it can be reused, so when you have a common set of Modbus reads, configuration is as simple as connecting the Sent.io to the Modbus template.

Modbus Templates contain all of the configuration information needed to use the hardware in the Whisker.io™ cloud including:

1. Modbus tags – these specify which Modbus devices and registers to read, one register per tag.
2. Widget configuration – this information is used by the cloud to display the information for the tag. It includes information like gain, offset, units, etc.
3. Alert Configuration – you can define default alerts for each tag. When a new Sent.io™ is provisioned with this Modbus Template, the alerts are automatically generated in the Whisker.io® cloud.
4. HMI Configuration – you can design a default HMI using Tag Widgets from this template. When a new Sent.io is provisioned with this Modbus Template, an HMI will automatically be generated for the new device.

Modbus Templates are created and managed in the Whisker.io® Management Studio. You can login to the studio at <https://cms.whisker.io> using the same credentials you use in the Whisker.io™ cloud.



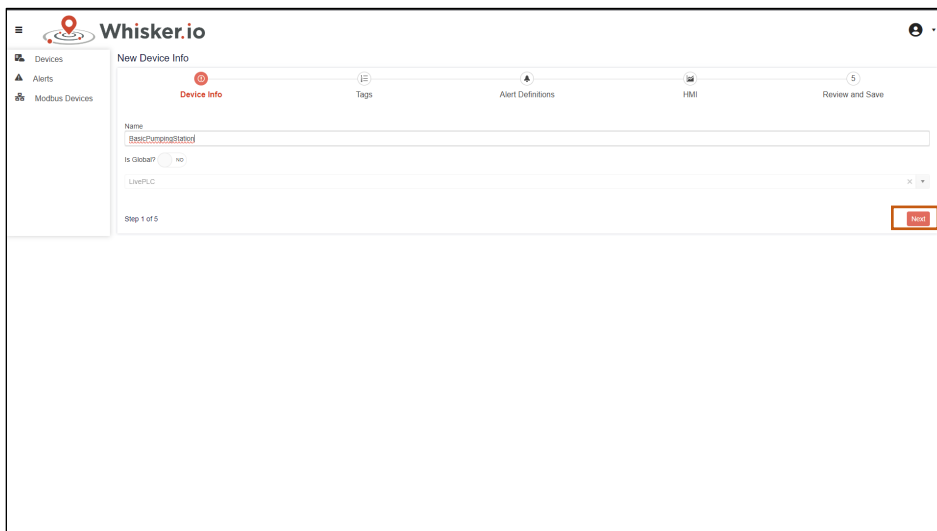
NOTE: Do not refresh the page or navigate away from the New Modbus Device Wizard or you will lose your work. The Wizard must be completed in one session or work will be lost.

Step By Step Guide:

1. Login to <https://cms.whisker.io>.
2. Click Modbus Devices from the menu on the left.

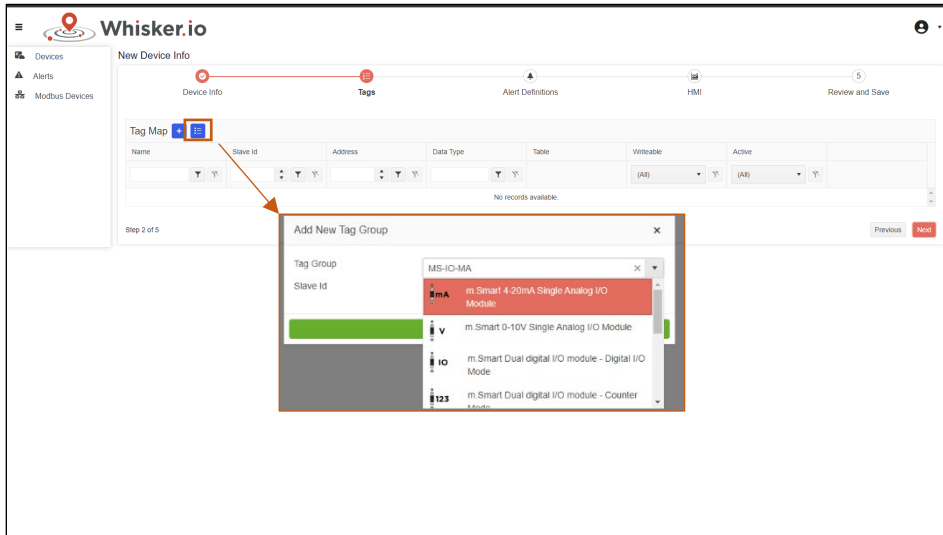


3. Click the “+ New” button to create a new Modbus Template. This will bring up the new Modbus Template Wizard:

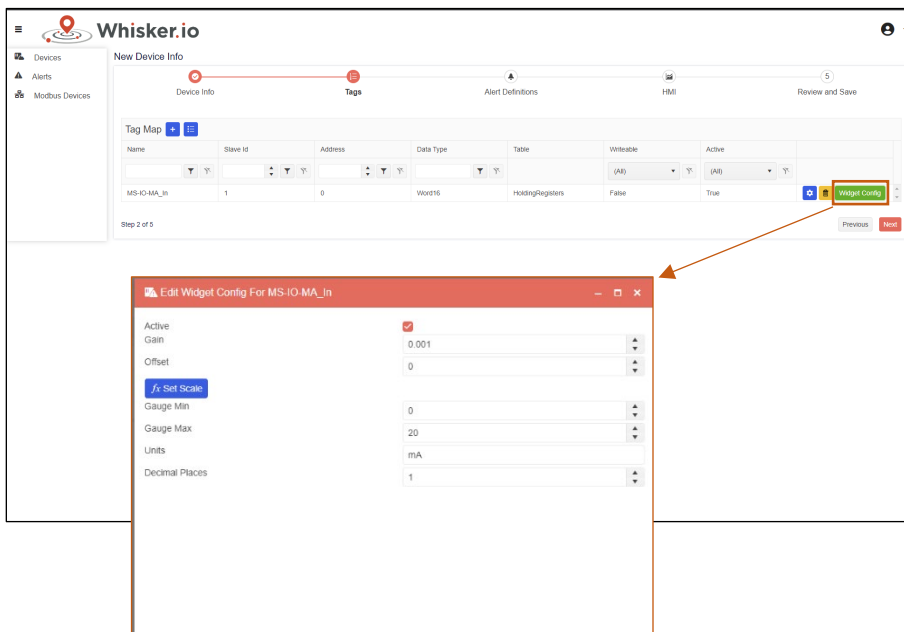


4. Enter a descriptive name for this template. For the purposes of this guide, we are continuing with the example of a water pump. The name must be at least 4 characters. If you are an OEM and you want other accounts to be able to use this template, set **Is Global?** to **Yes**.

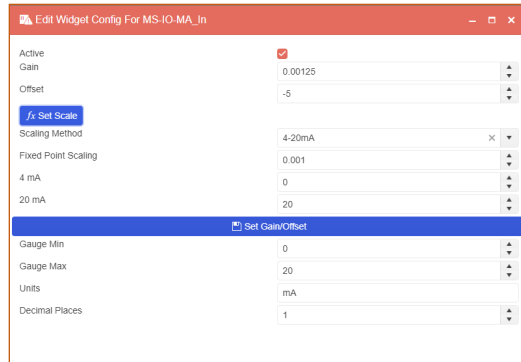
- The next step is to create the tags. Since we are using m.Smart™ we can take advantage of pre-defined tag groups. Select the appropriate m.Smart™ I/O module (MS-IO-MA in this case) and set the Slave ID (1); use the data from the table you created during Hardware Setup to help with this. You can also create arbitrary tags by clicking the “+” button and filling out the tag information in the table.




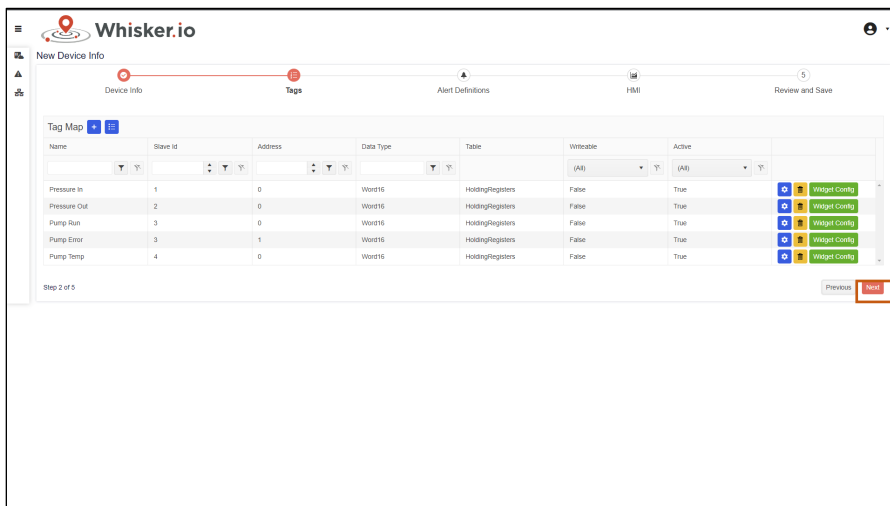
- Click the “Widget Button” on the right handle side of the new tag to configure the display properties for this tag. Fill out the display config values and close the window (click “X” in the top of the window) to save the information.



7. Enter valid values for gain, offset, gauge min and max, and units. “Set Scale” provides an easy tool to set these values for 4-20mA, 0-10V, etc. Decimal places control how many places past the decimal point will be displayed.
 - a. Using **Set Scale Tool**: Select Scaling method, enter fixed point scaling (ex: .001 if the values are fixed point where a reading of 1015 should read 1.015), and the values for min and max scale. Click **Set Gain/Offset** and the tool will calculate the proper gain and offset values and the range min and max. Enter the Units and Decimals places and close the window to complete.

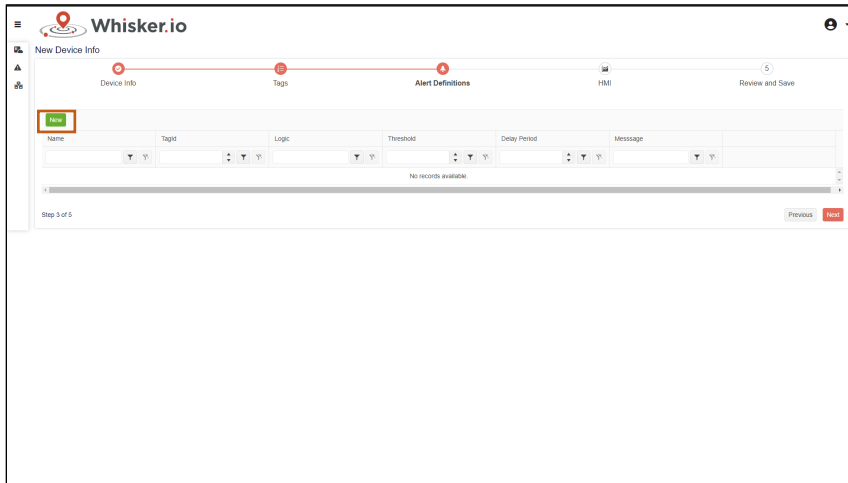


8. If you need to make changes to the tag information, click  the button. To delete a tag, click the yellow trash can button.
9. Repeat Steps 5 through 8 for all additional devices. For our water pump example, the tags would look like this:



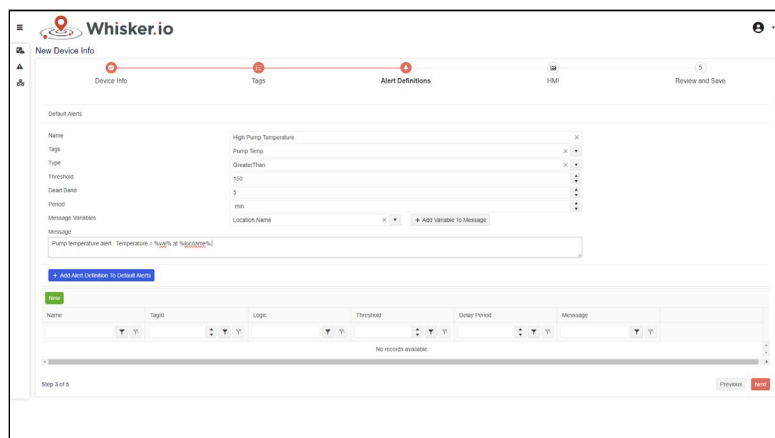
10. Once all tags are configured exactly as you need them, click Next for Alert Configuration. If you do not need to add Default Alerts, click Next and skip to Step 14.

11. To add a new Default Alert, click the “New” button.

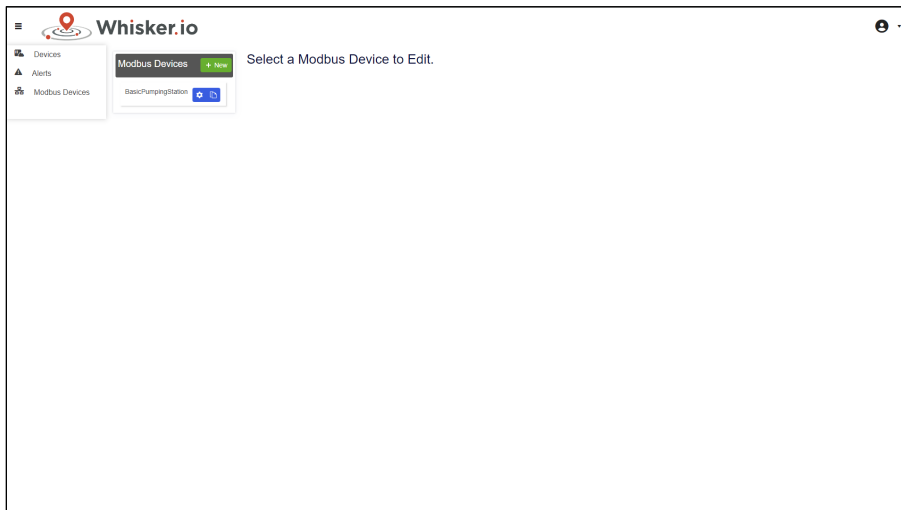



12. The alert definition editor will appear at the top of the wizard. The following image shows the settings we use for a high pump temperature alert. When you are done, click “Add Alert Definition To Default Alerts”, the blue button at the bottom of the editor.


- Tag – select a tag from the drop down list. This is the tag that this alert will be attached to.
- Type – this defines the logic of the alert.
- Threshold – this is the level at which the alert will activate.
- Dead Band – this determines the level at which the alert clears. For a GreaterThan alert, the alert will clear when the reading is equal to or below the threshold minus the dead band. This keeps alerts from being sent one after the other when the values are bouncing around the threshold.
- Period – this is a delay. When it is zero, the alert activates immediately when the values cross the threshold. When non-zero, the alert activates when the value has crossed the threshold for the specified period in minutes.
- Message- this is the message that will be texted and emailed. You can add variables to the text that will be filled in with actual values when the alert is sent. For example, “%val%” will be replaced with the actual value at the time the alert activates.¹



13. Repeat step 12 for every alert. When the default alerts are configured the way you want them, click “Next” at the bottom of the screen to bring up the HMI step. Setting up the HMI is beyond the scope of this Quick Start guide, so for now, click “Next” to skip the HMI configuration.
14. A summary of the template will be displayed for your review. If you find any mistakes, click Previous to get to the proper step and make whatever edits are needed.
15. If the template is complete and accurate, click “Done” to save the Modbus Template to the server. Refresh your page after clicking “Done” and you should now see the template in the list.



Pro Tip #1: Click the  button next to any Modbus Template to open the editor and make changes.

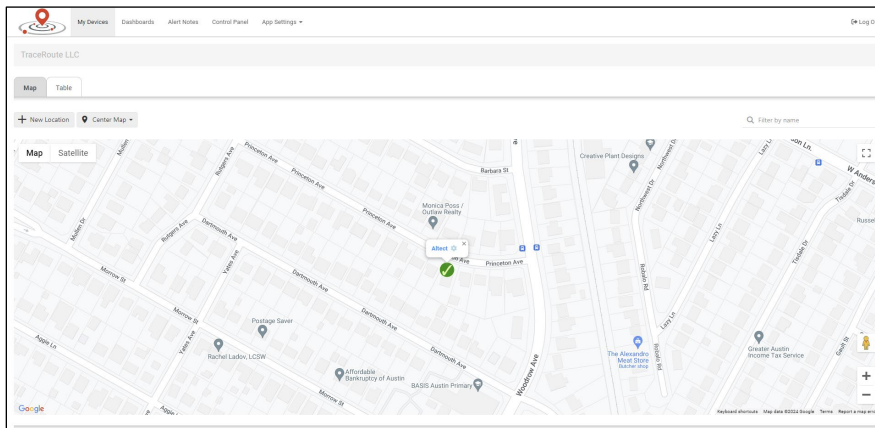
Pro Tip #2: Click the  button next to any Modbus Template to create a copy of the template. This is useful for OEMs that have multiple version of the same configuration; for example, a basic version and a pro version that has additional I/O.

4 Cloud Setup – Add Device

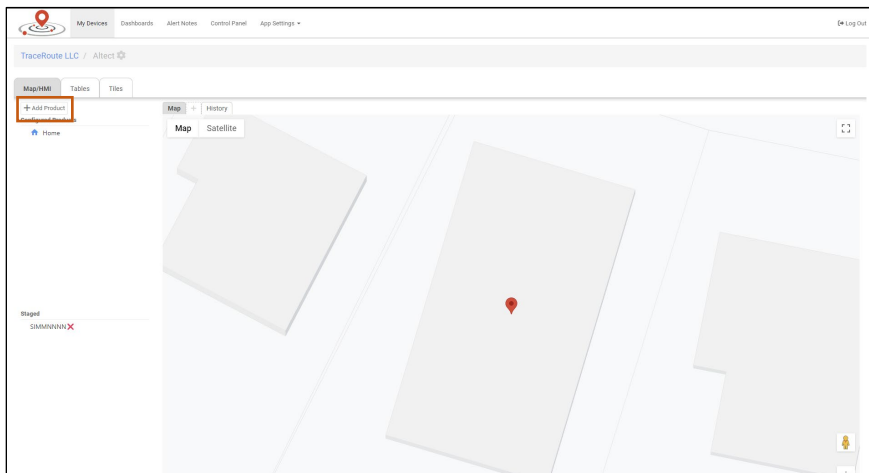
The last thing you need to do is to provision your Sent.io™ in the Whisker.io® cloud using the Modbus Template you just created. Once the Modbus Template is complete, it can be used and reused with any new devices.

Step By Step Guide:

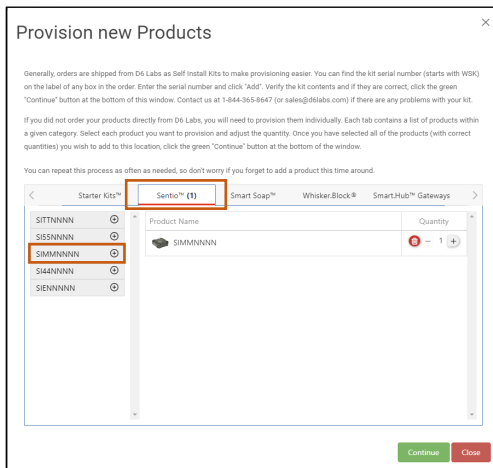
1. Log in to <https://www.whisker.io>
2. On the main map, select your location and click on the tag to navigate to that location:



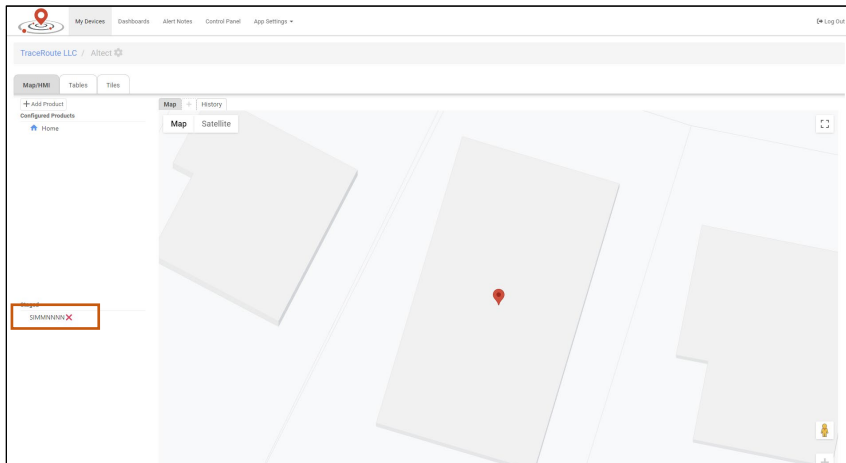
3. Once the Location view loads, click the “+ Add Products” button.



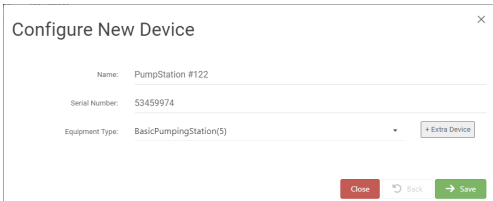
4. Select the tab labeled Sent.io™ and click on SIMMNNNN to add a Sent.io™ Modbus Device. Click “Continue” to complete the process of adding the device to the location.



5. The screen should refresh and your new Sent.io™ Modbus Device should be listed in Staged Devices section at the bottom left of the screen. Click on the SIMMNNNN device to provision the device. The device will not start recording values until it is provisioned.



6. Enter a name for the device – it should be descriptive. The Serial Number is notated on the label on the side of the Sent.io. Finally, select *BasicPumpingStation* for the Equipment Type – this is the Modbus Template you generated previously.



7. Click “Save” to complete the provisioning. This will add the device to your account, set up all the tags, create alerts based on the default alerts in the template, and create an HMI and/or Dashboard if specified.
8. The device is now recording values which can be viewed via an HMI and/or Dashboard. This completes the setup process.

Pro Tip #1 – Click the “X” next to any staged device to remove it from the list of staged devices.