GETTING STARTED

February 1, 2017

Version 1.0.3

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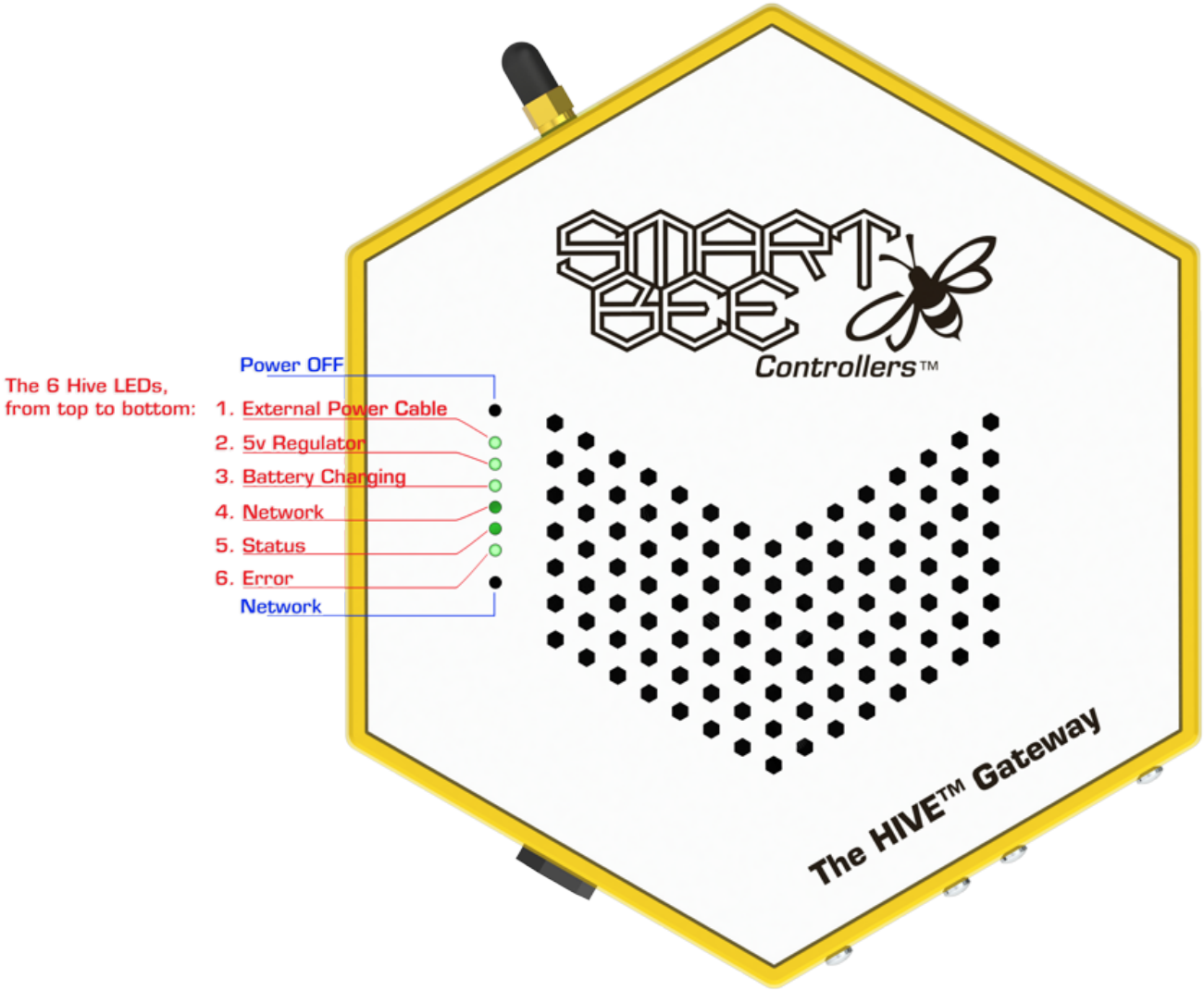
Table of Contents

Out of the Box: Getting Started

Plug in / Power Up

- Plug the included 5V power adapter into the Hive. **DO NOT** press either of the Hive's buttons now.

The Hive Gateway buttons and LEDs are depicted in this diagram.



After plugging in your Hive Gateway you will observe the following series of events:

- As the Hive powers up, observe green LED 1 - 3 ON SOLID.
- In 10-30 seconds, green LED 5 begins a slow blink -- Main System Initialization
- In 10-30 seconds, green LED 4 begins a slow blink -- Network Initialization
- After 1 minute, green LED 1 - 5 ON SOLID -- This indicates that your Hive is started and running in HotSpot mode.

Note:
After the **5 LEDs** are lit **ON SOLID**, please wait 3 minutes for the Hive to begin accepting connections.

Power and Network Buttons

The Power Off and Network buttons have different functions when clicked versus held.

- Do not press either of the buttons now.

Quickly pressing the Power Off button will begin the **power-down sequence**, ultimately powering off your Hive. To restart the Hive after powering it down, remove and re-insert the power adapter. The Power Off button does not start the Hive.

Holding the Power Off button for 10+ seconds will **restore factory settings**. You will lose all settings, updates, and data. Your Hive will return to WiFi hotspot mode.

Quickly pressing the Network button **configures the Hive for Ethernet** using DHCP. LED 4 will begin to blink while the network is being reconfigured. If this fails, LED 4 will blink rapidly and the network setup will revert to the previous setting.

Holding the Network button for 5+ seconds **configures the Hive as a WiFi hotspot** (factory default). LED 4 will begin to blink while the network is being reconfigured. If this fails, LED 4 will blink rapidly and the network setup will revert to the previous setting.

Connecting to Hive

Your hive is configured as a WiFi hotspot out of the box.

- Through a WiFi-enabled device, identify the network named “Smartbee-FFFFFF” (where FFFFFF are any six hexadecimal digits.)
- Connect to this WiFi network and enter the **default password** of “beebee833”.
- Wait up to a minute for connection to be fully established.

You are now connected to your Hive.

- If you cannot locate the “Smartbee-FFFFFF” network, press and hold the NETWORK button until LED 4 begins to blink. This will reconfigure the Hive as a Wifi Hotspot. Observe LEDs as above.

Login to Your Hive

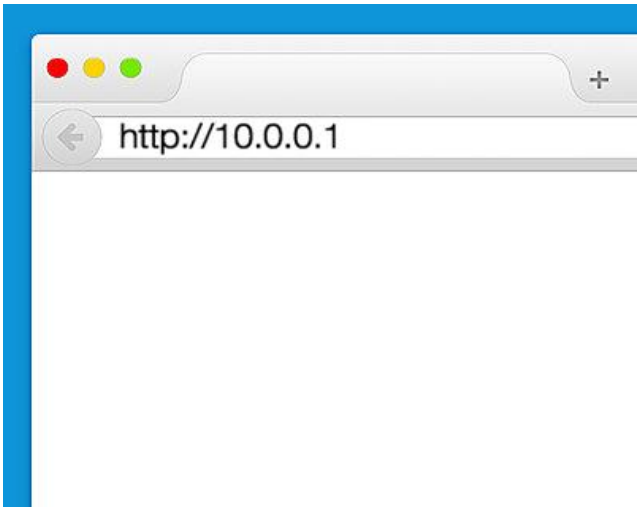
Now that you have connected to your Hive's WiFi hotspot, you may log in to the Hive webapp.

If you use an Android or a Windows device you will need to install the correct launcher app for your device. The launcher apps for Windows and Android devices locate your Hive on the current network (both the Hive and your Windows or Android Device must be on the same network) and launches a browser for login.

TO DOWNLOAD LAUNCHER APPS GOTO: http://smartbeecontrollers.com/support/downloads/

MAC OS or iOS: If you have a MAC OS device please use the browser of your choice to login to the Hive. NO Launcher is needed.

- Open a browser and navigate to http://10.0.0.1



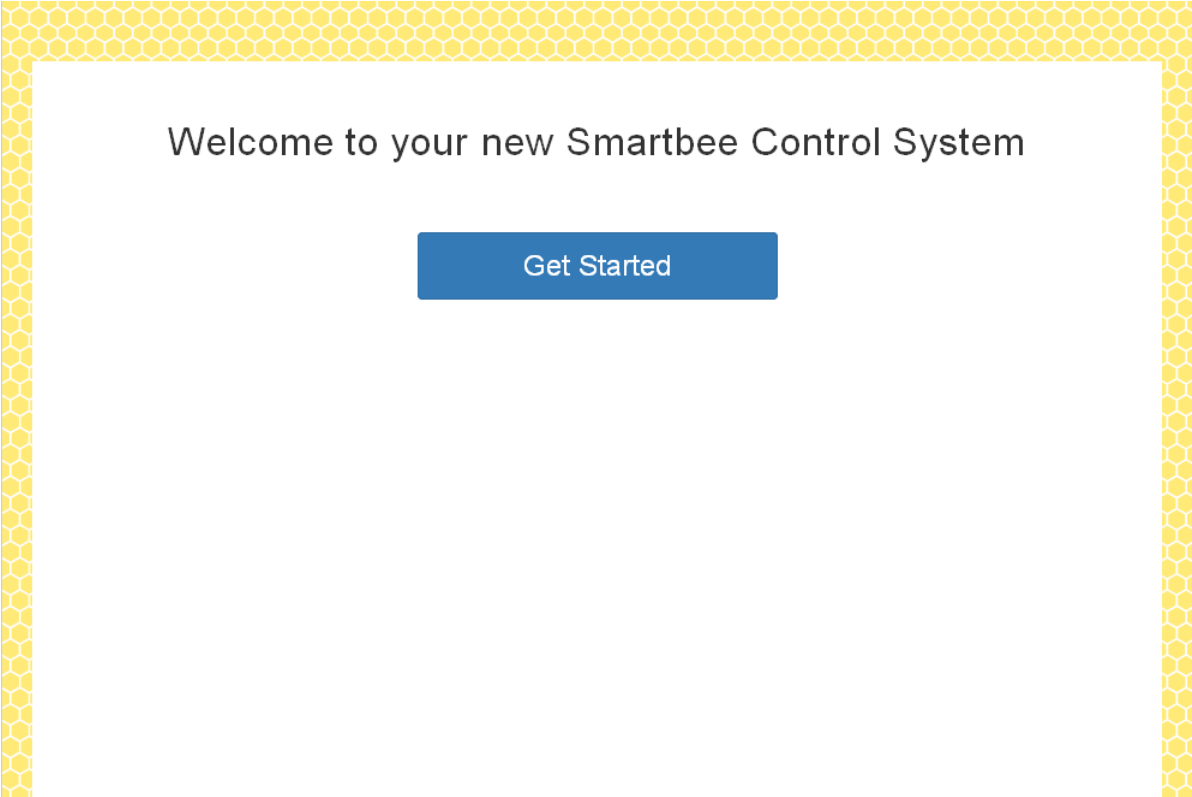
You will be prompted to login. The default URL and Port are correct for now.

The default login for the Hive is :

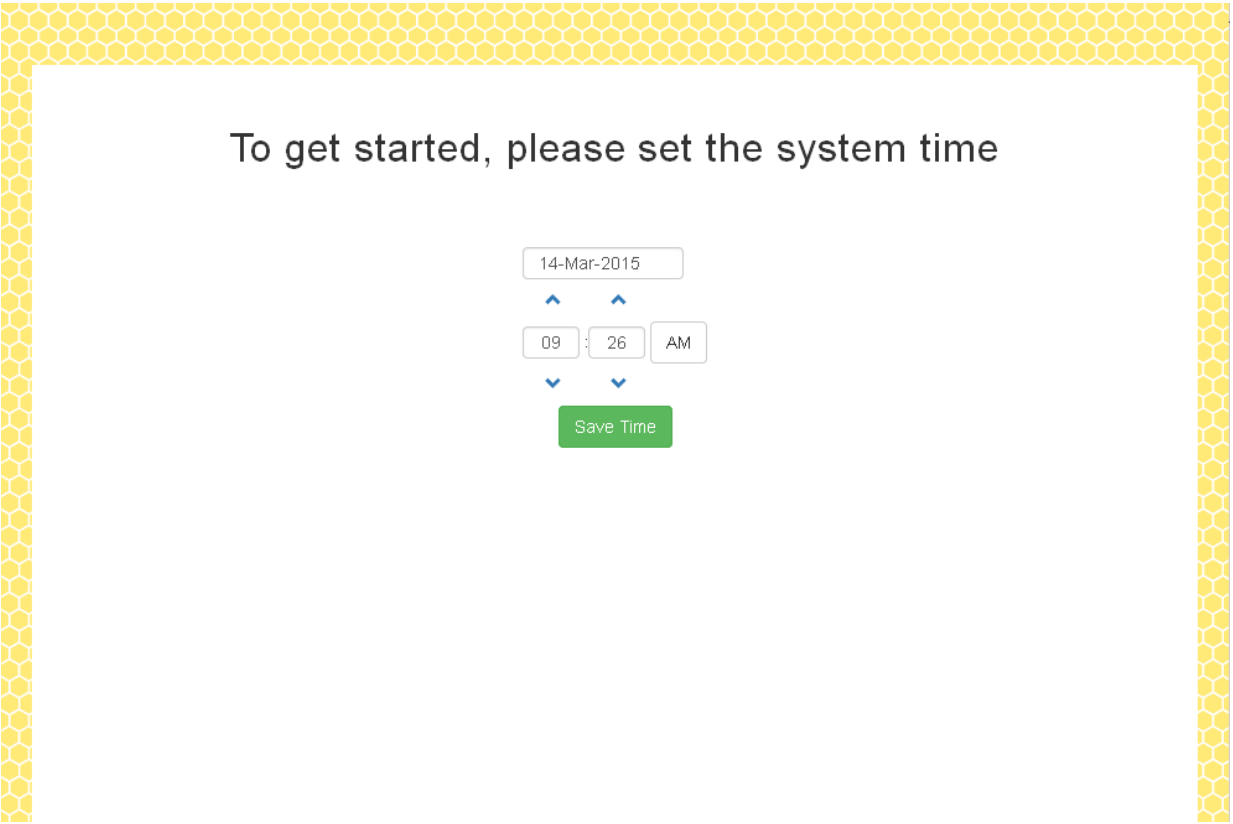
- User: super_bee
- Password: beebee833

First Time Setup

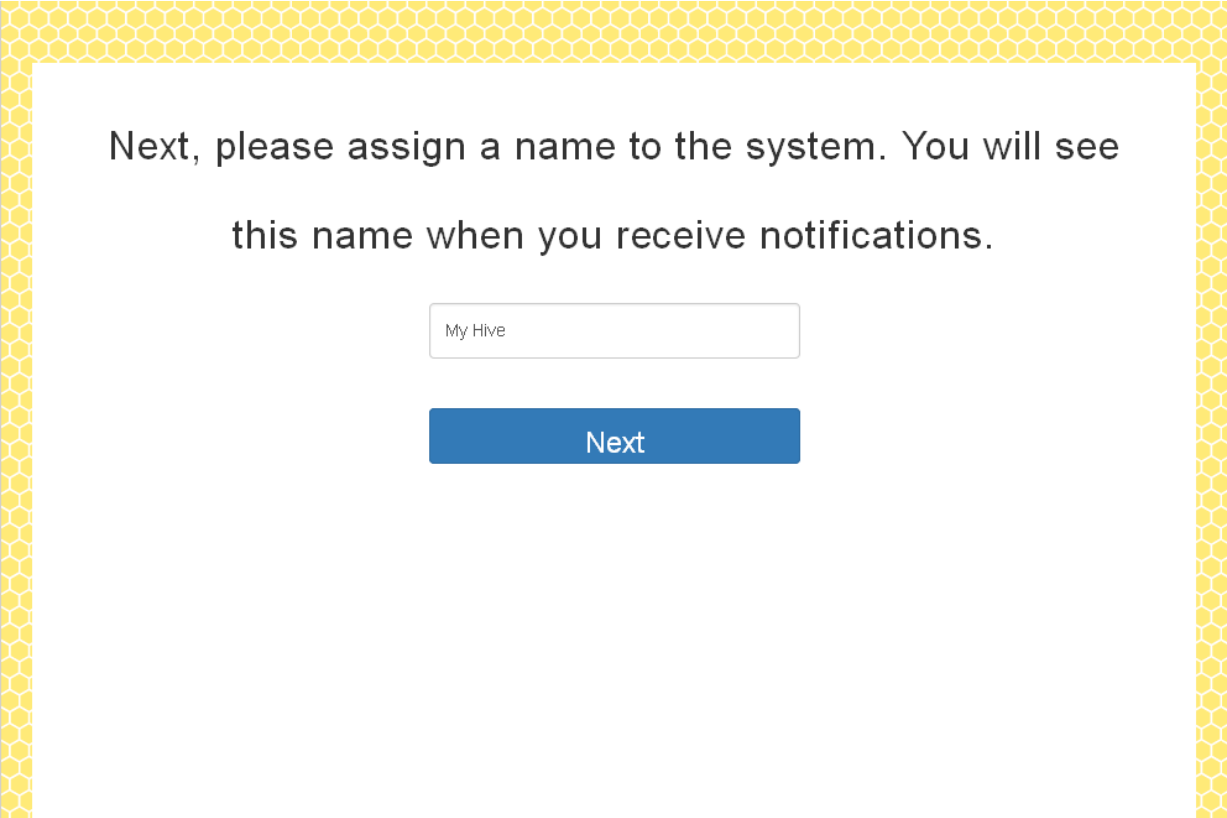
The first time you log in to your Hive, you will be greeted:



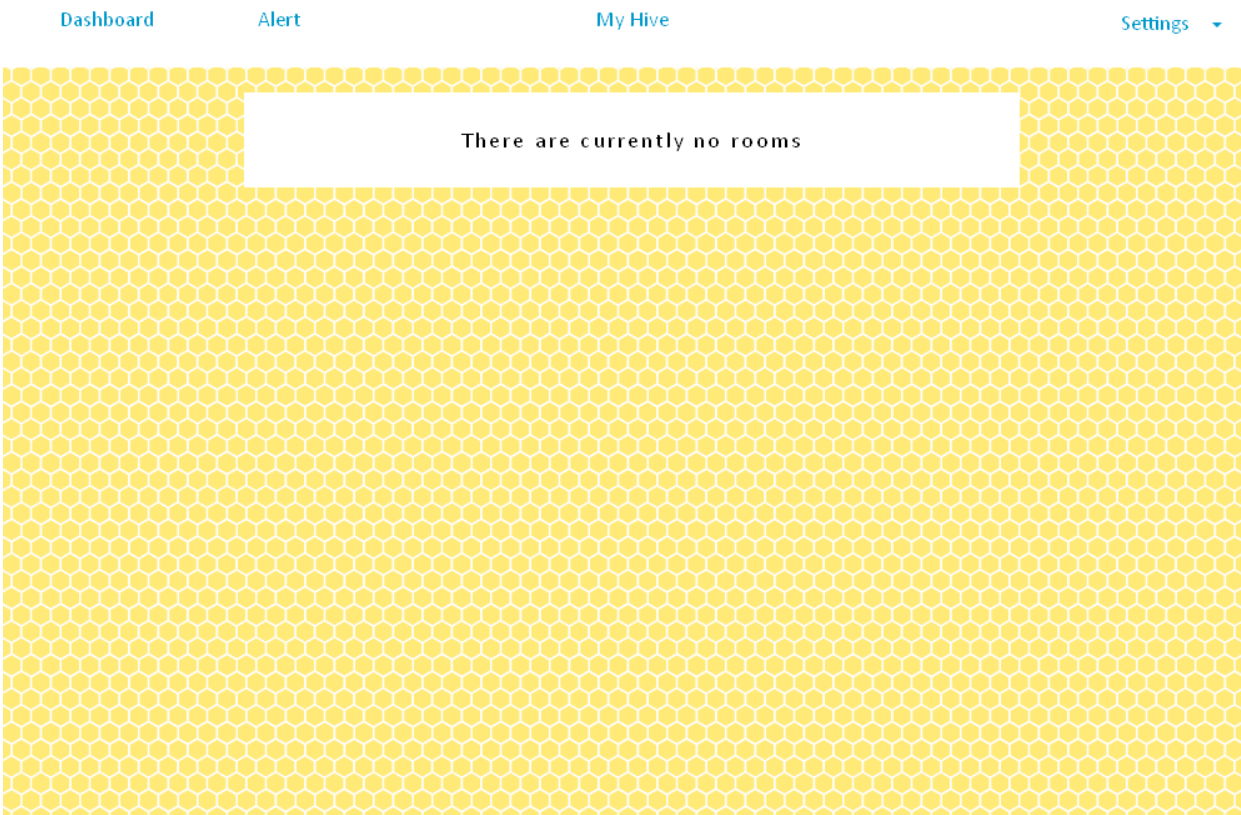
- Choose Get Started. You will then be asked to configure the current time.



You will then have the opportunity to name your Hive. Emails that come from your Hive will use this name.



You will then arrive at the Dashboard, which will be empty:

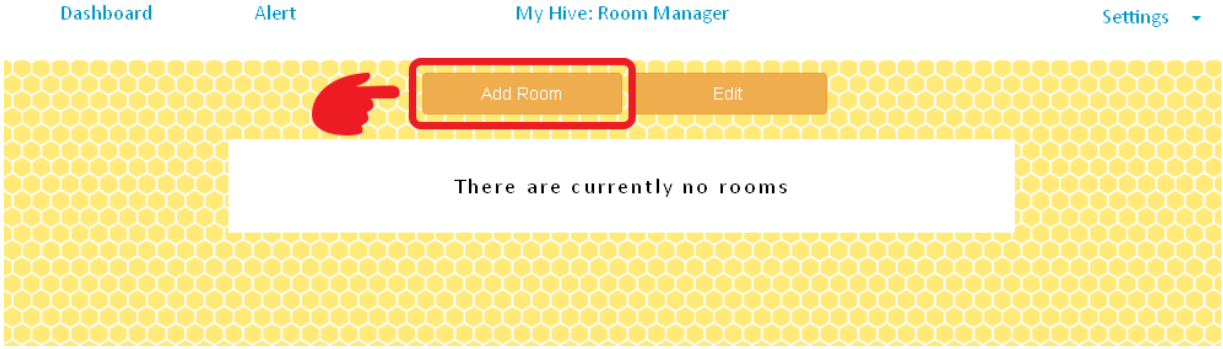


Create a Room

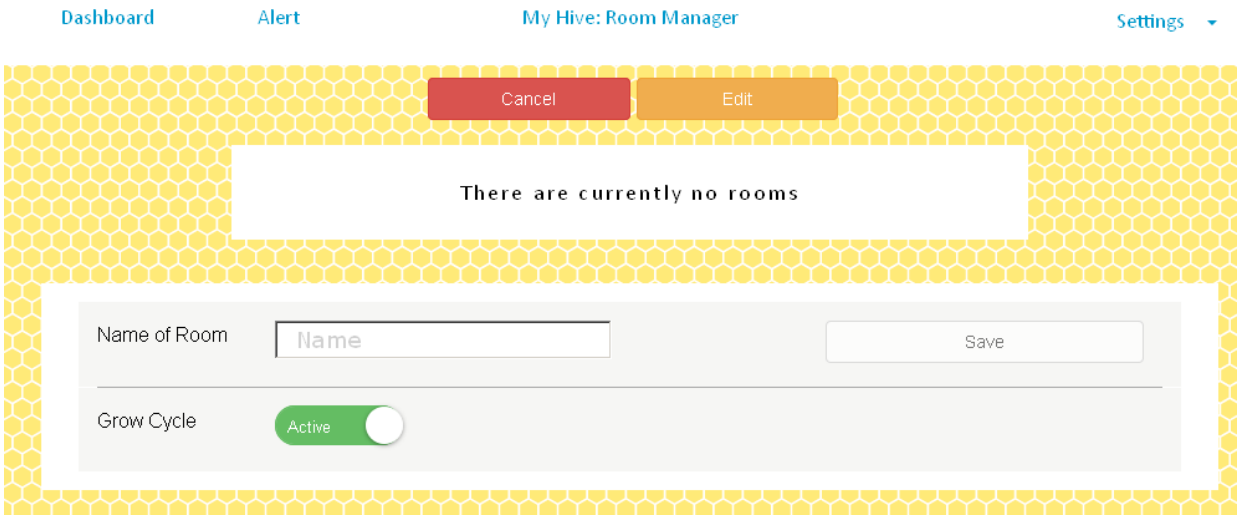
Now create a room.

- Go to **Settings** > **Room Manager**.

- Click “Add Room”.



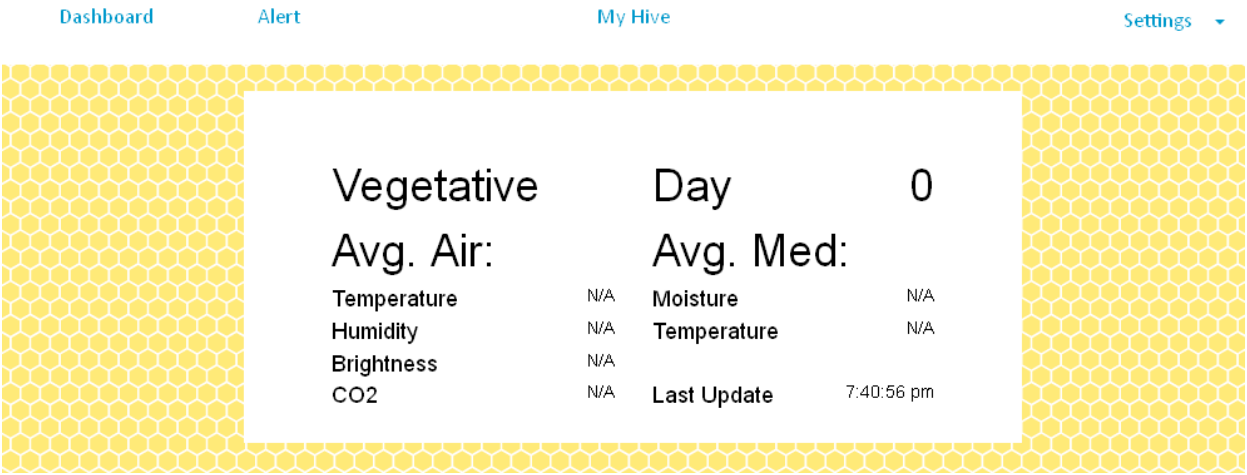
- Name your new room and click “Save”.



By default, the room’s grow cycle counter will start when the room is created. To delay the start of the count, you can create a room with an inactive grow cycle by toggling the "Grow Cycle" switch to "Inactive". For now, leave the grow cycle Active.

Note:
Rooms do not aggregate or record data before the grow cycle is activated, and thresholds cannot be viewed or modified.

- Click “Dashboard” in the upper-left to return to the Dashboard. Your new room will be displayed:



Connecting Devices

Control Devices

The Stinger SS1 and Stinger SS4 devices allow the Hive to activate electrical appliances remotely over the wireless mesh network.

- Place these devices near the equipment you wish to control, and plug the Stinger(s) in to 110V wall current.
    - **Do not** plug your electrical appliances into the Stinger yet.

Stinger SS1 devices are useful for any single circuit up to a 15 amp load.

Stinger SS4s can also serve a 15 amp load on any of its four circuits, but this is also the maximum total current through the device. We suggest maximizing the useful circuits on the SS4 by spreading the circuits among smaller loads.

WARNING:
If your SS devices share a breaker in your electrical panel, please be aware of the total current drawn by **everything** on that breaker, not just the SS device.

Sensor Devices

Sensor devices include the LTH, LTH+CO_2, and the WCSM. Sensors have an internal battery backup that is used to maintain sensor operation in the event of power failures and transmit data through the wireless mesh network back to the Hive.

The sensor devices are equipped with a rechargeable Lithium-Ion battery and solar panels capable of recharging the battery under brightly lit conditions. Because of the variability of light reaching the solar panels, they only extend the life of a charge and are not meant to be a replacement for charging your sensor device with the included AC adapter. It is recommended that the sensors be powered continuously by an external power supply.

If this is not possible, a recharging schedule must be implemented. The sensor's battery should be recharged to 100% if the state of charge display in the User's Interface shows less then 50% charge remaining

When sensor devices are shipped, a battery protection circuit is enabled and must be activated out of the box.

- First, for **LTH, LTH+CO_2 and Water Content Sensor devices**, locate the battery disconnect switch on the side of the device. The **LTH and LTH+CO_2** come shipped with the battery disconnect switch in the OFF position. Slide the switch to the ON (up) position. The left-most LED will be ON SOLID.

- Second, for **all sensor devices**, use the included mini-B USB 5V adapter to activate them by simply plugging them in for the first time. We also suggest leaving them to charge for 6-12 hours out of the box.

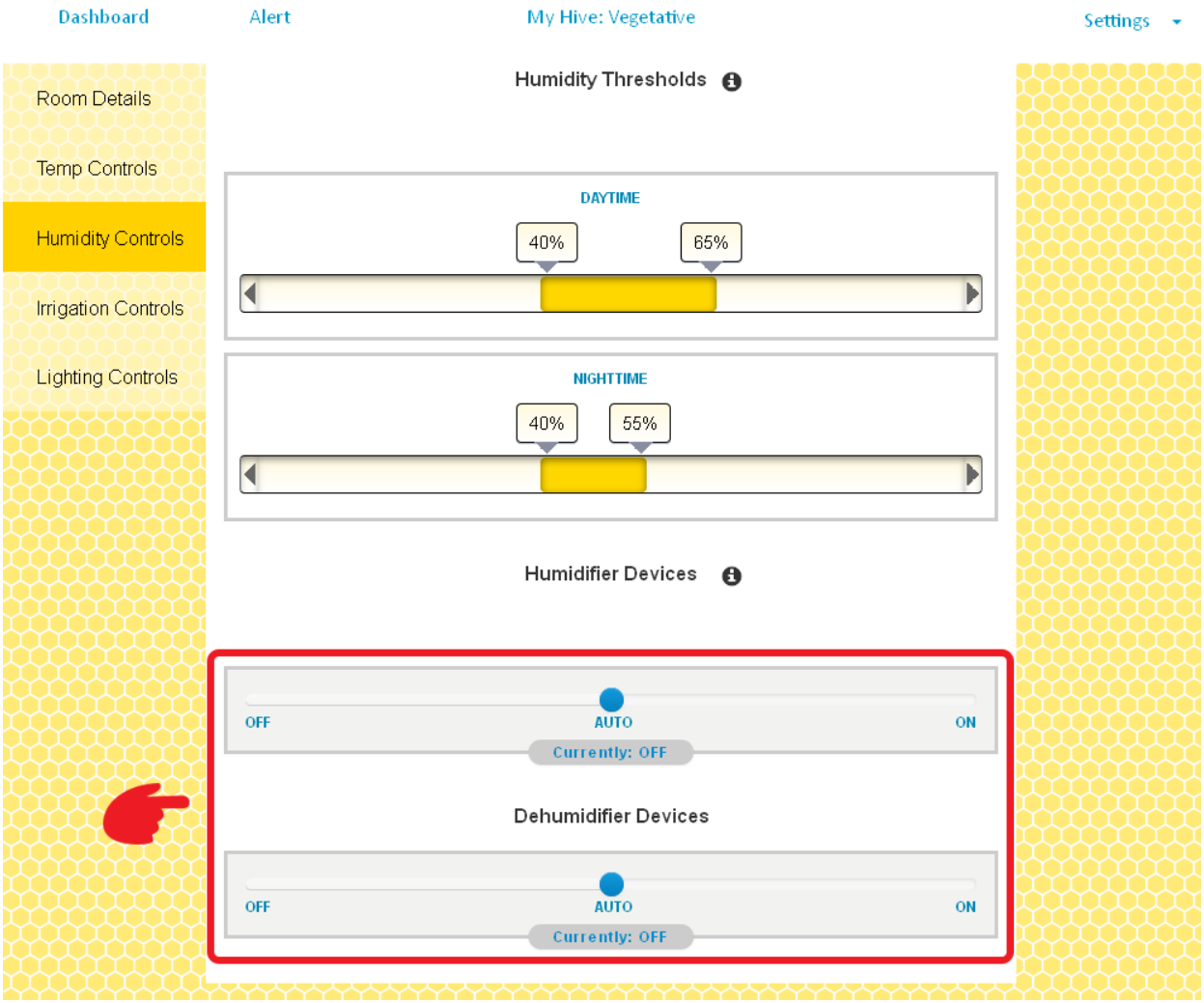
Your sensors are now powered and can transmit data.

Disable Automation

While connecting and configuring your Hive, it is a good idea to disable automation in the room(s).

- Click “Dashboard” in the upper left corner to return to the dashboard.
- Click the new room you created earlier to enter the **Room Details** page
- For each of the controls listed below **Room Details** slide the Device sliders to OFF:
    - Temp Controls:
        - Heating Devices
        - Cooling Devices
    - Humidity Controls:
        - Humidifier Devices
        - Dehumidifier Devices
    - Irrigation Controls
        - Irrigation Devices
    - Lighting Controls
        - Lighting Devices

This disables appliance automation until we are ready. In the example below we show Humidity Controls.



Device Initialization

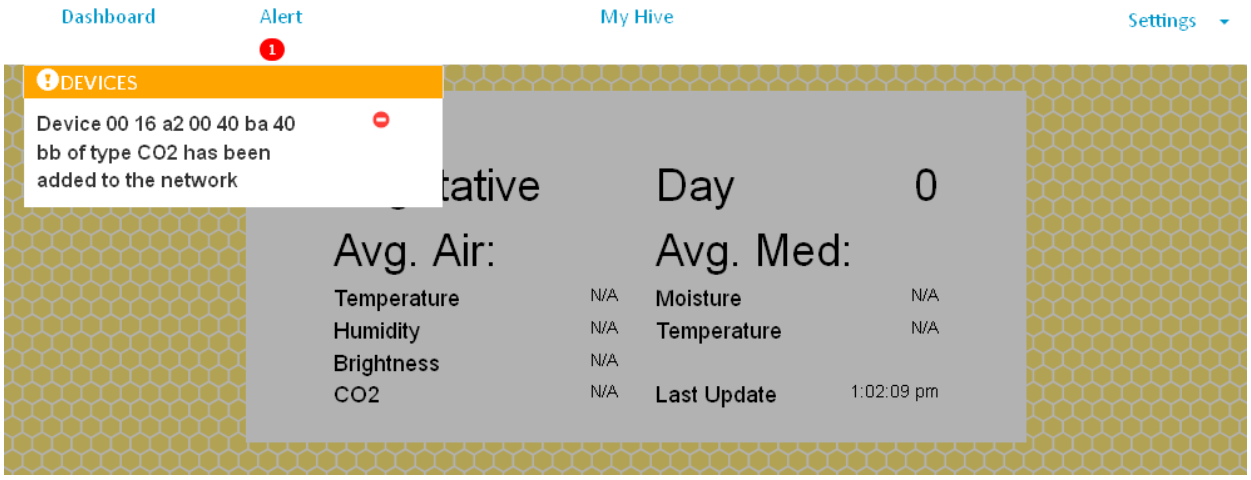
Now that your SmartBee Controllers devices are powered,

- Use your browser to log in to the Hive Gateway webapp and then choose **Settings** > **Permit Join**.

This allows devices to join your network for up to two minutes. In the future, any time you introduce a new SmartBee device into you system you will need to follow this 'Permit Join' procedure.

Device Discovery Alert

You will begin to receive alerts as devices are discovered.

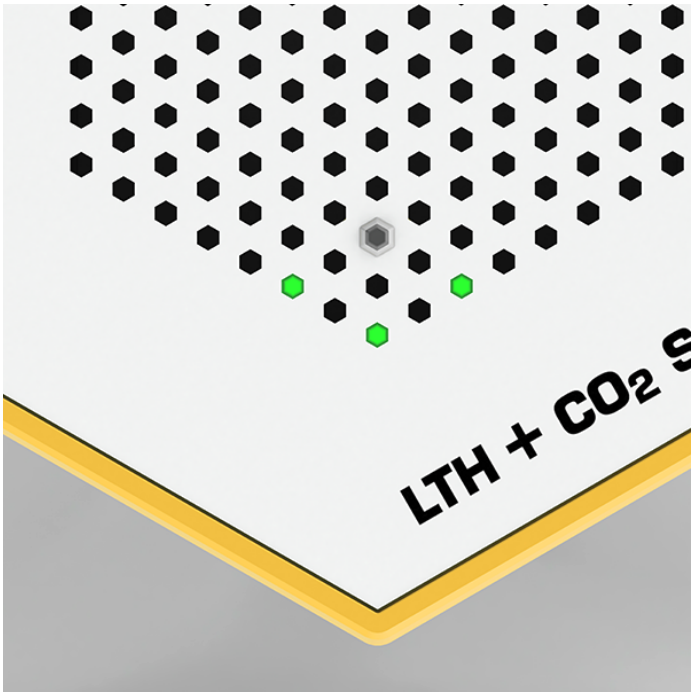


You can match the radio address displayed in the Alert with the address in Device Manager (and partially included as the default device name) and with the sticker on the device itself.

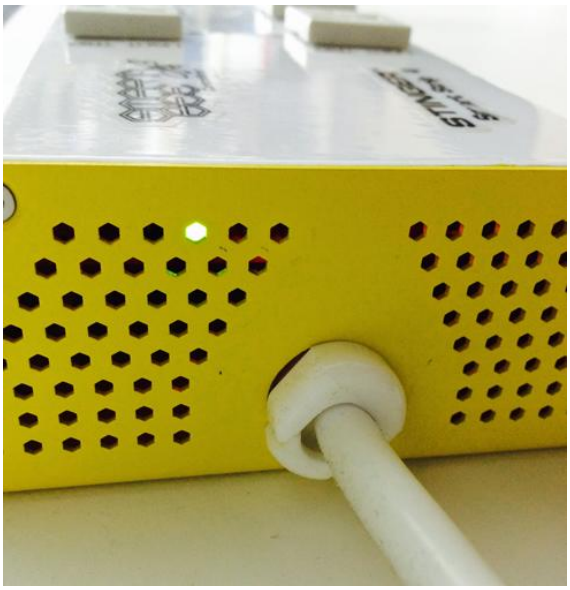
Device Network LED

All devices also have a green LED that indicates network connectivity.

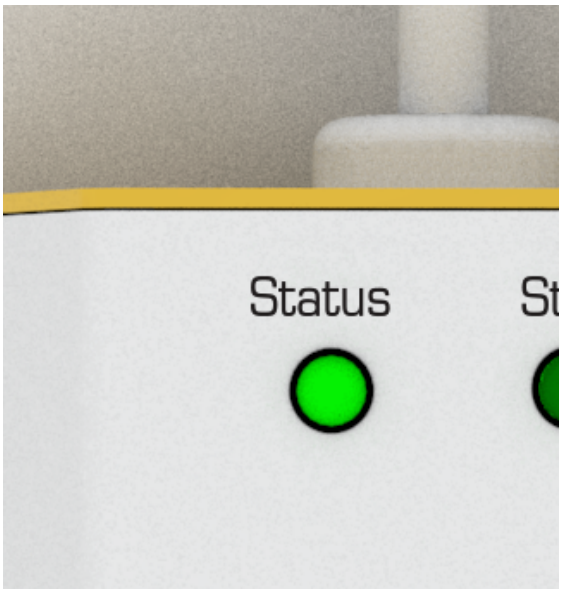
On all **sensor devices** (LTH, LTH+CO_2, and WCSM), the right-most green LED will have a very slow “heartbeat” blink when it is connected to a network.



On all **control devices** (SS1 & SS4), a status LED will be ON SOLID when the device is networked. The status LED on an SS4 is located on the left side of the device behind the ventilation grill. On the SS1, the Status LED is labeled on the front of the device.



SS4 Status LED



SS1 Status LED

Device Manager

Use Device Manager to verify that the Hive is receiving data from your devices.

- Go to **Settings** > **Device Manager**

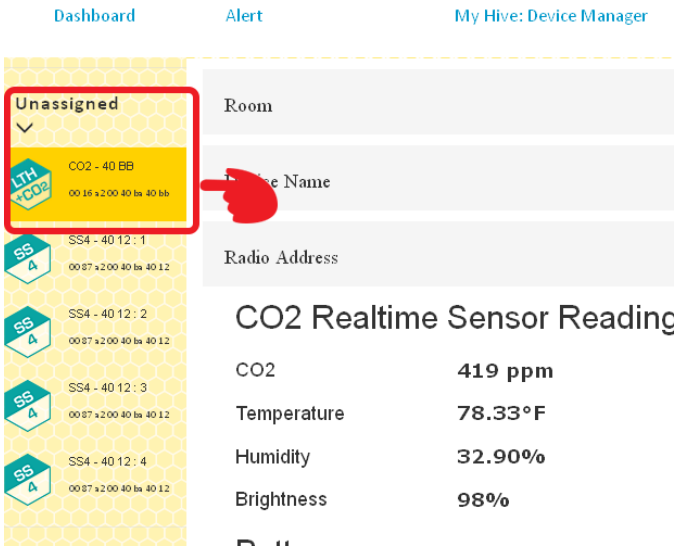
Sensors

Verify each sensor device appears in the device manager.

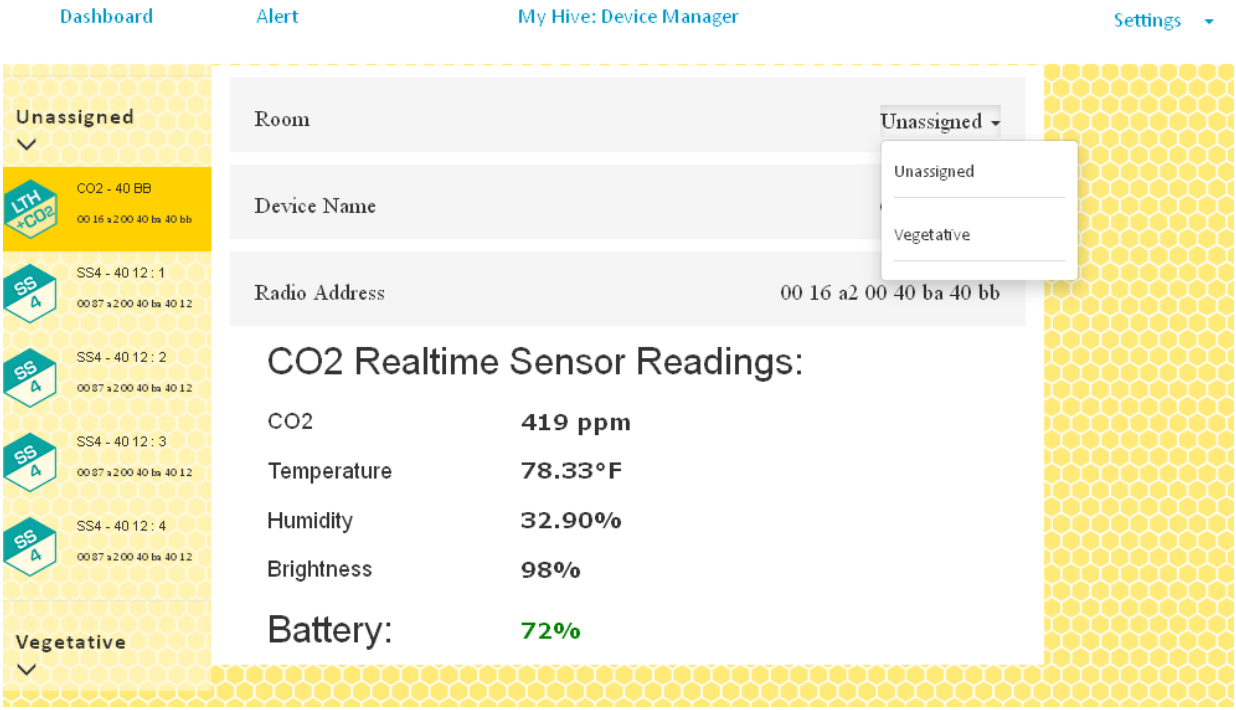
- If an LTH or LTH+CO_2 device does not appear as you expect, first disconnect the charging cable. Then slide the battery disconnect switch to the OFF (down) position and then back to ON and reconnect the cable. Immediately go to Settings > Permit Join to allow the sensor to connect to the Hive over the Zigbee mesh network..
- If a WCSM device does not appear, press the Reset button on the side. Immediately go to **Settings** > **Permit Join** to allow the sensor to connect to the Hive over the Zigbee mesh network..

Now use the Device Manager to place your sensors into your room. Placing a sensor into a room causes that sensor to contribute its data to that room's aggregates. To assign your sensors to the room, in Device Manager:

- Choose the sensor device in the Unassigned list. The device is not currently assigned to any room, so you will find it in the Unassigned list.

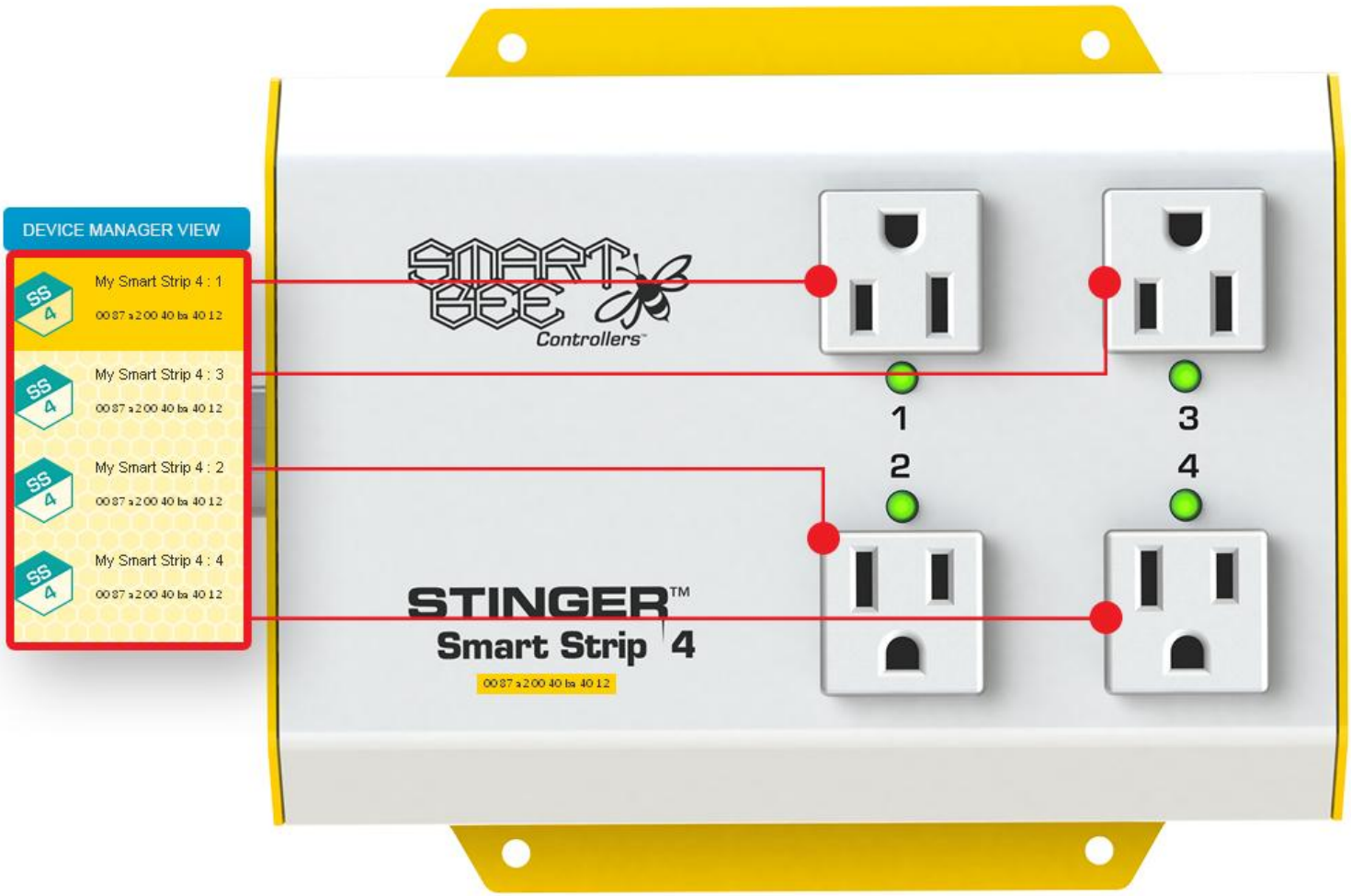


- In the main panel, assign the device to a room by selecting from the Room drop-down.



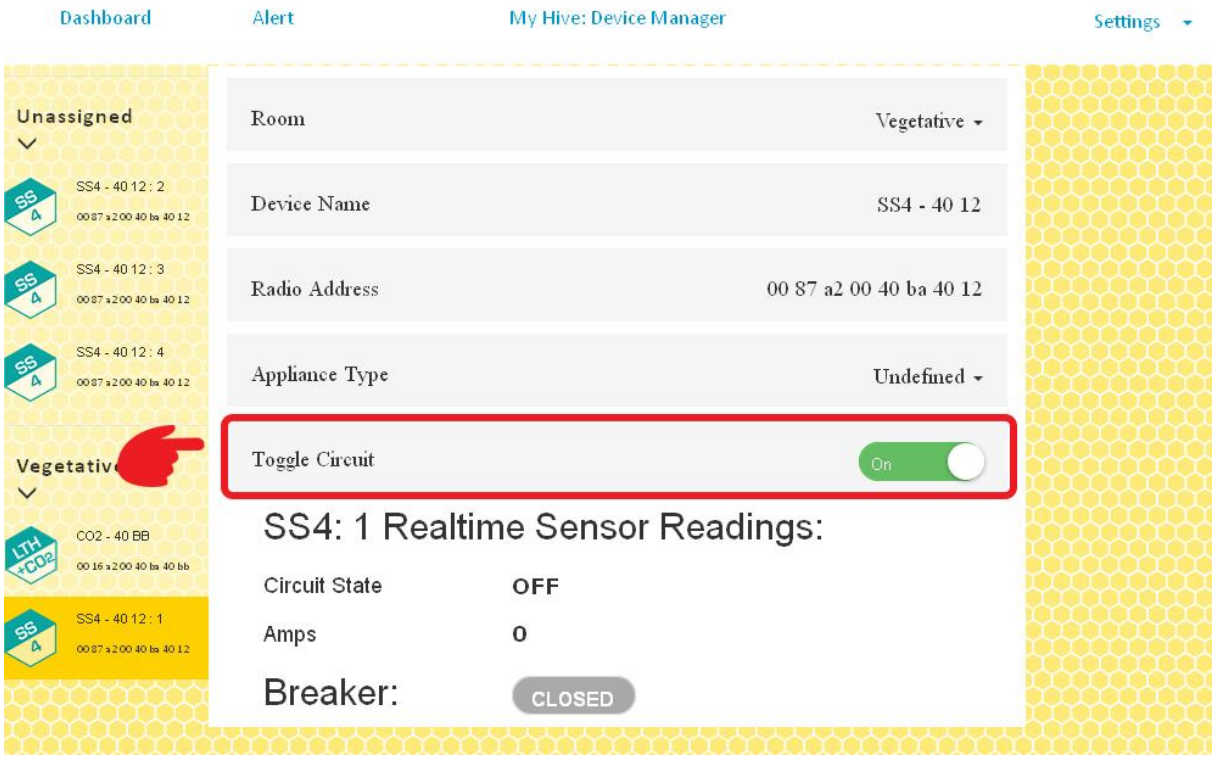
- You should at this point assign a memorable name if so desired.

Note:
It is important to note that each individual circuit on an SS4 can be assigned and controlled independently. Each circuit appears as its own device in Device Manager.



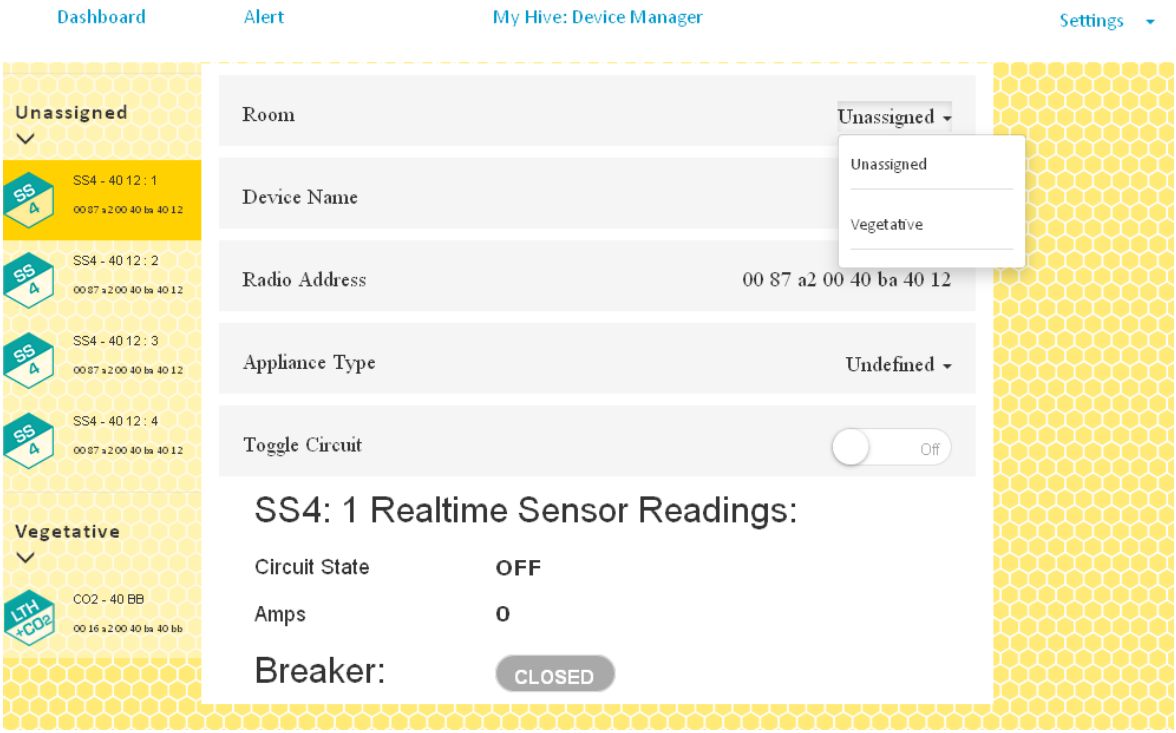
Before proceeding further, you may wish to test the circuit using the “Toggle Circuit” feature in the Device Manager.

- Toggle the circuit on and observe the circuit LED for expected results.



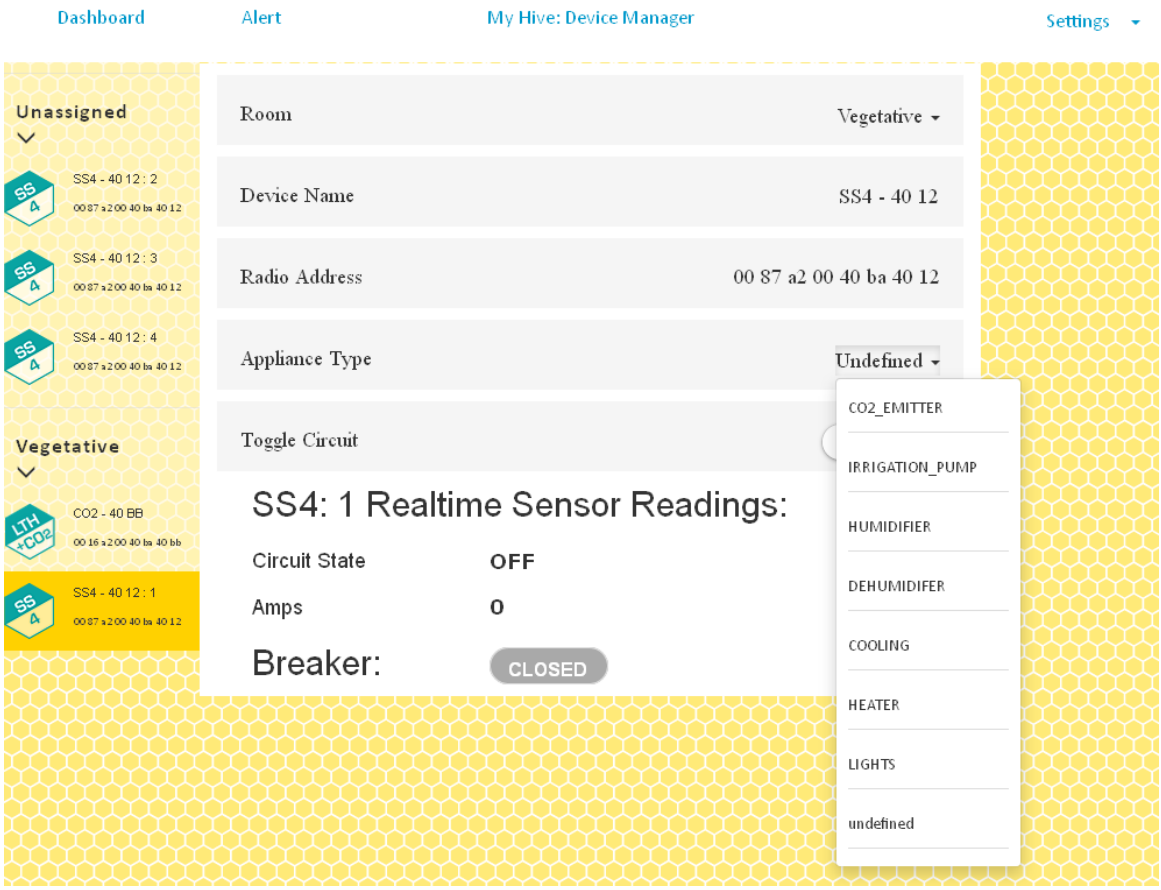
Note:
When testing circuits by toggling them on and off, be careful not to activate any plugged-in devices unexpectedly: plug in devices last, after testing and room setup are complete.

- In the main panel assign the circuit to a room by selecting from the Room drop-down. If you do not need to remotely control a particular circuit, you may leave that circuit Unassigned.

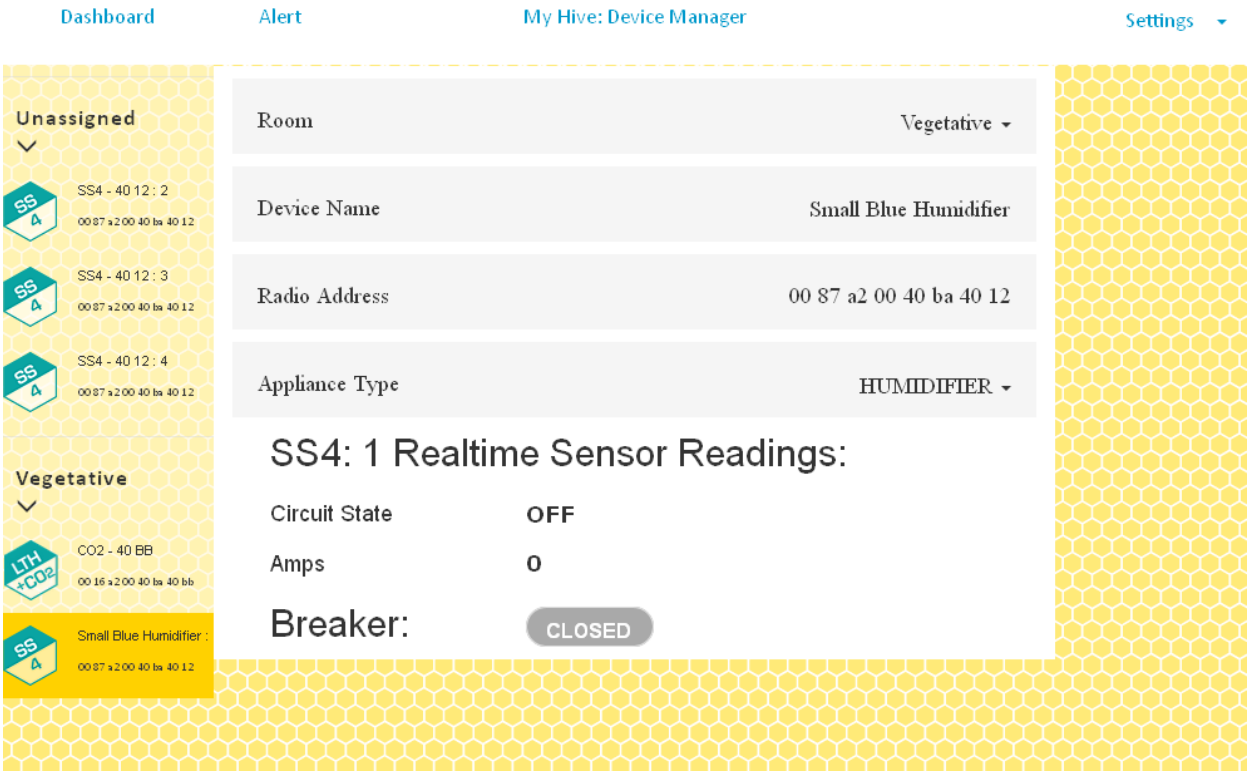


- Define the appliance type for the circuit.

Note:
All circuits of the same appliance type in the same room will be controlled as a group in response to that control group's thresholds. For example, if you have 3 fans assigned as 'Cooling' devices, all 3 fans will be controlled by the upper/lower temperature thresholds even if they are physically plugged into different controller devices.



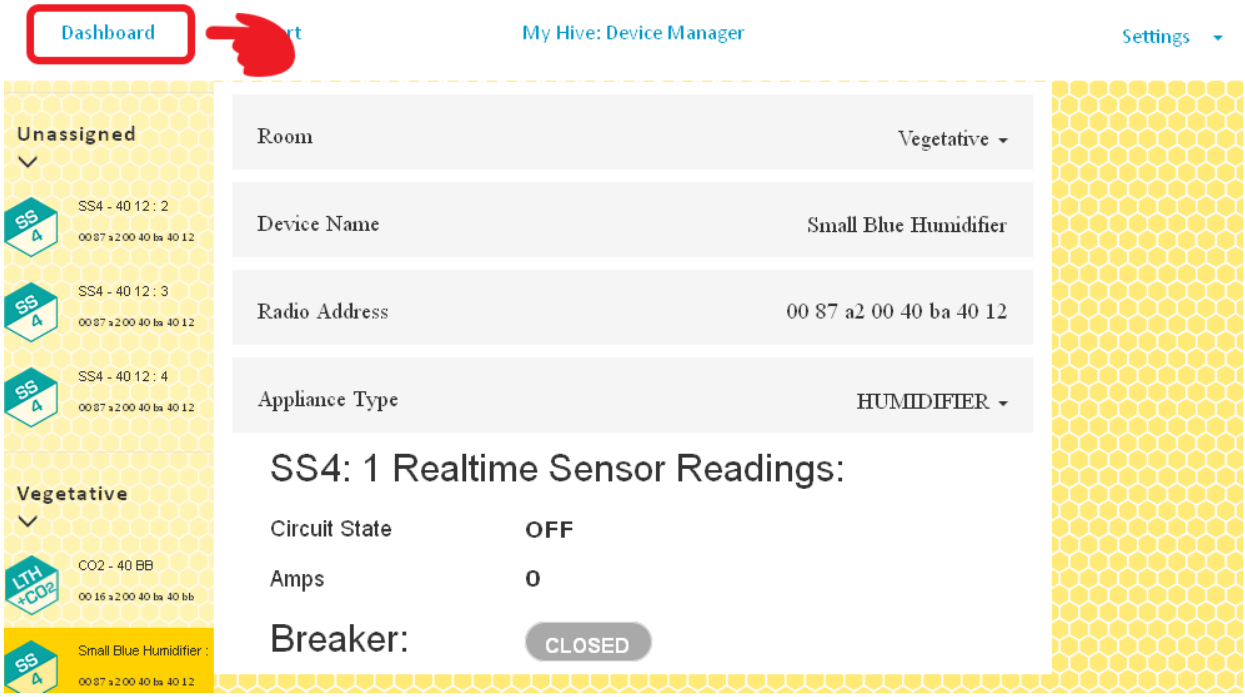
- You should at this point also set a memorable name if so desired.



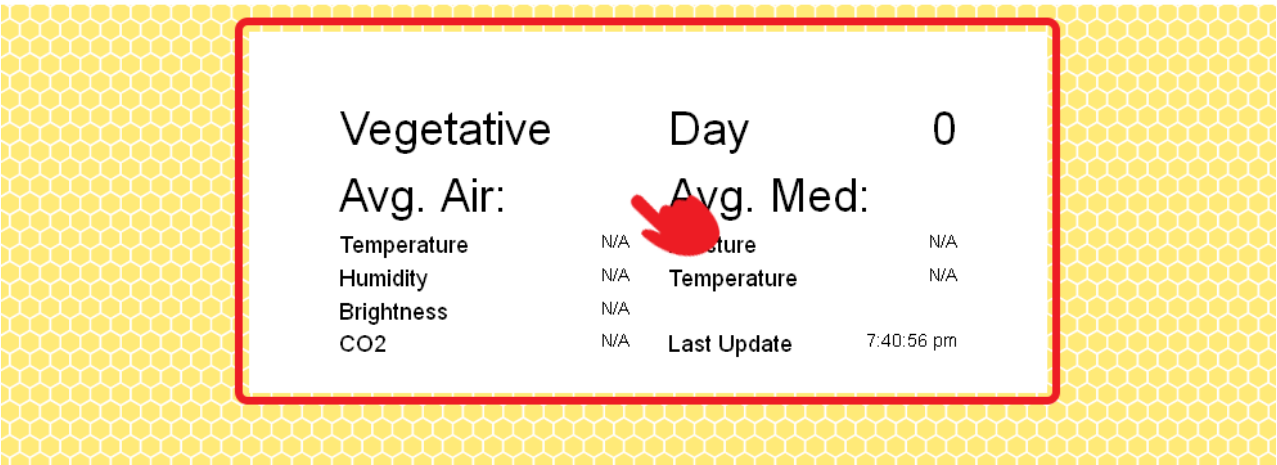
Room Initialization

Return to the dashboard and enter the room or rooms you have defined and added sensors to. Observe that the sensor values are within expected ranges.

- Click “Dashboard” in the upper-left corner.



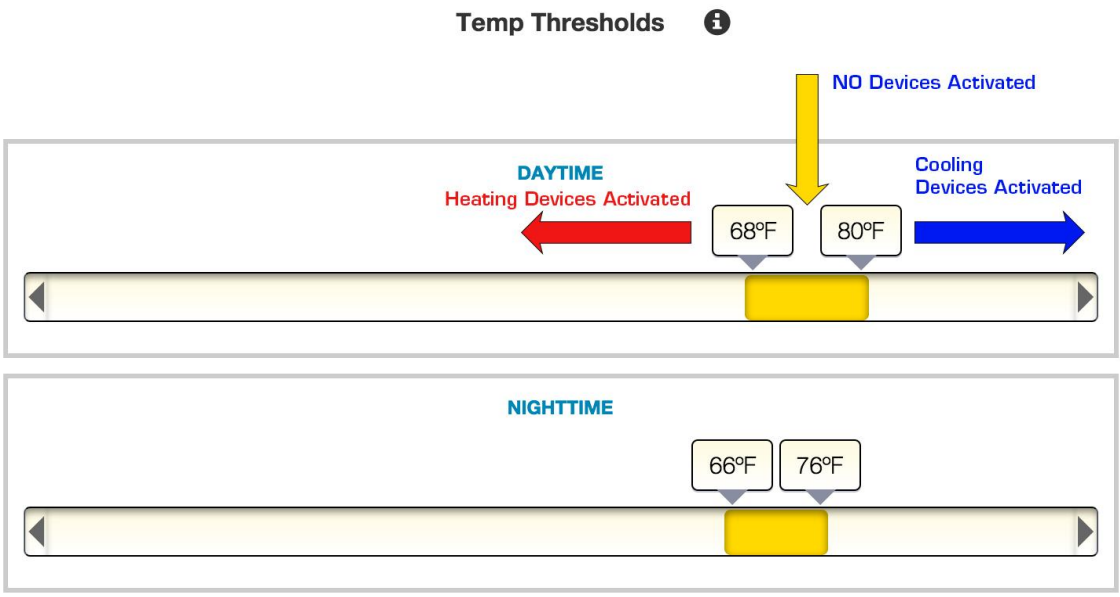
- From the dashboard, click anywhere on the room you created earlier.



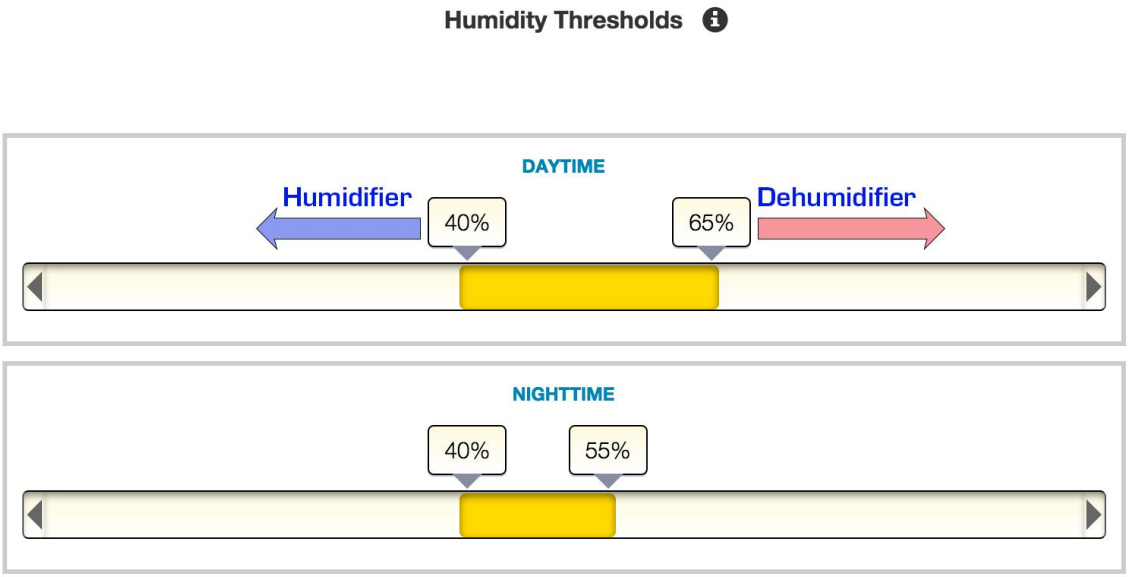
Thresholds

On the Temp Controls and Humidity Controls pages are the threshold and appliance settings.

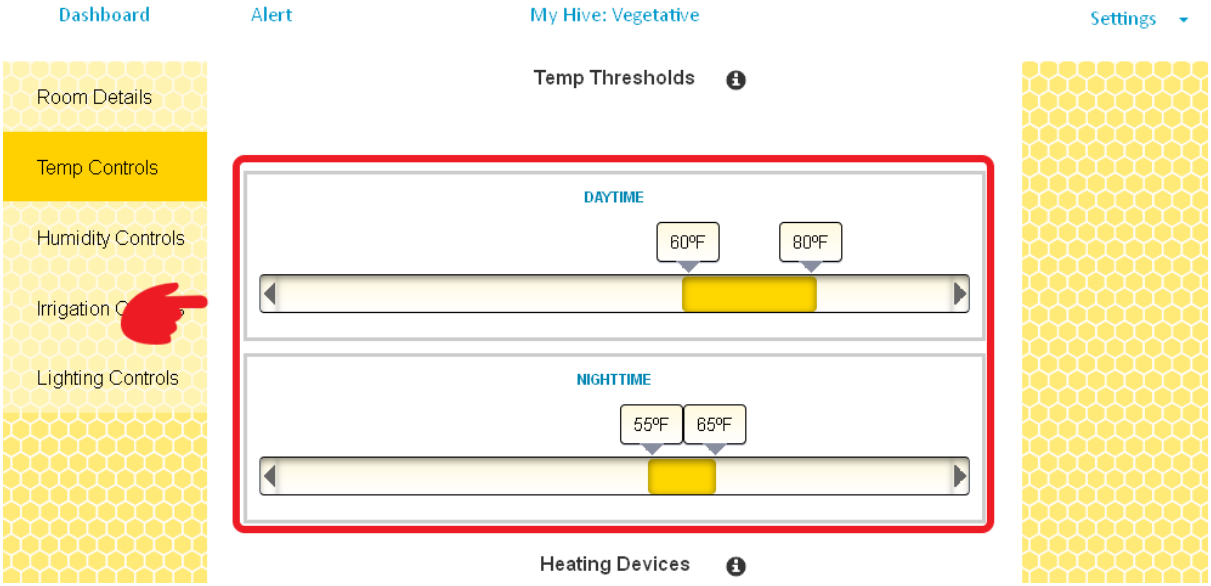
The Temp Controls page has two groups of set point controls labeled “DAYTIME” and “NIGHTTIME”. Each pair of set points governs the room’s appliances for the given time of day. When the room’s aggregate temperature falls below the lower set point during the relevant time of day, all of the room’s heaters will be activated until the temperature rises above the set value plus deadband (see page 31). Likewise, when the room’s aggregate temperature rises above the upper set point during the relevant time of day, the room’s cooling devices will be activated until the temperature falls below the upper set value minus deadband.



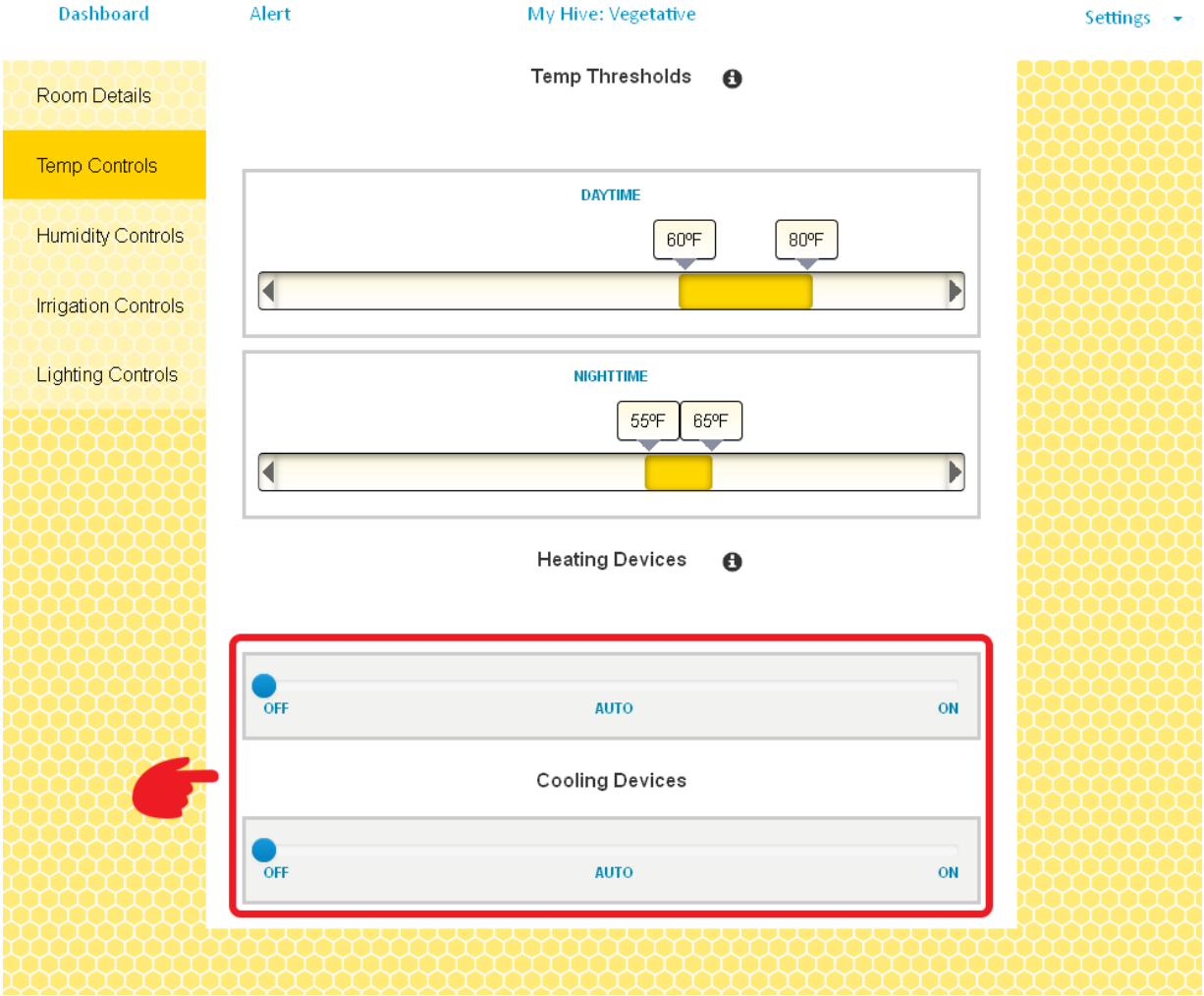
Similarly, the Humidity Controls page also has set points grouped by time of day. When the room’s aggregate relative humidity falls below the lower set point during the relevant time of day, the room’s humidifiers will be activated. When the room’s aggregate relative humidity rises above the upper set point during the relevant time of day, the room’s dehumidifiers will be activated.



- Set your daytime and nighttime temperature and humidity thresholds by moving the sliders on the Temp Controls and Humidity Controls pages.



- Enable automation for devices by moving the sliders from OFF to AUTO.

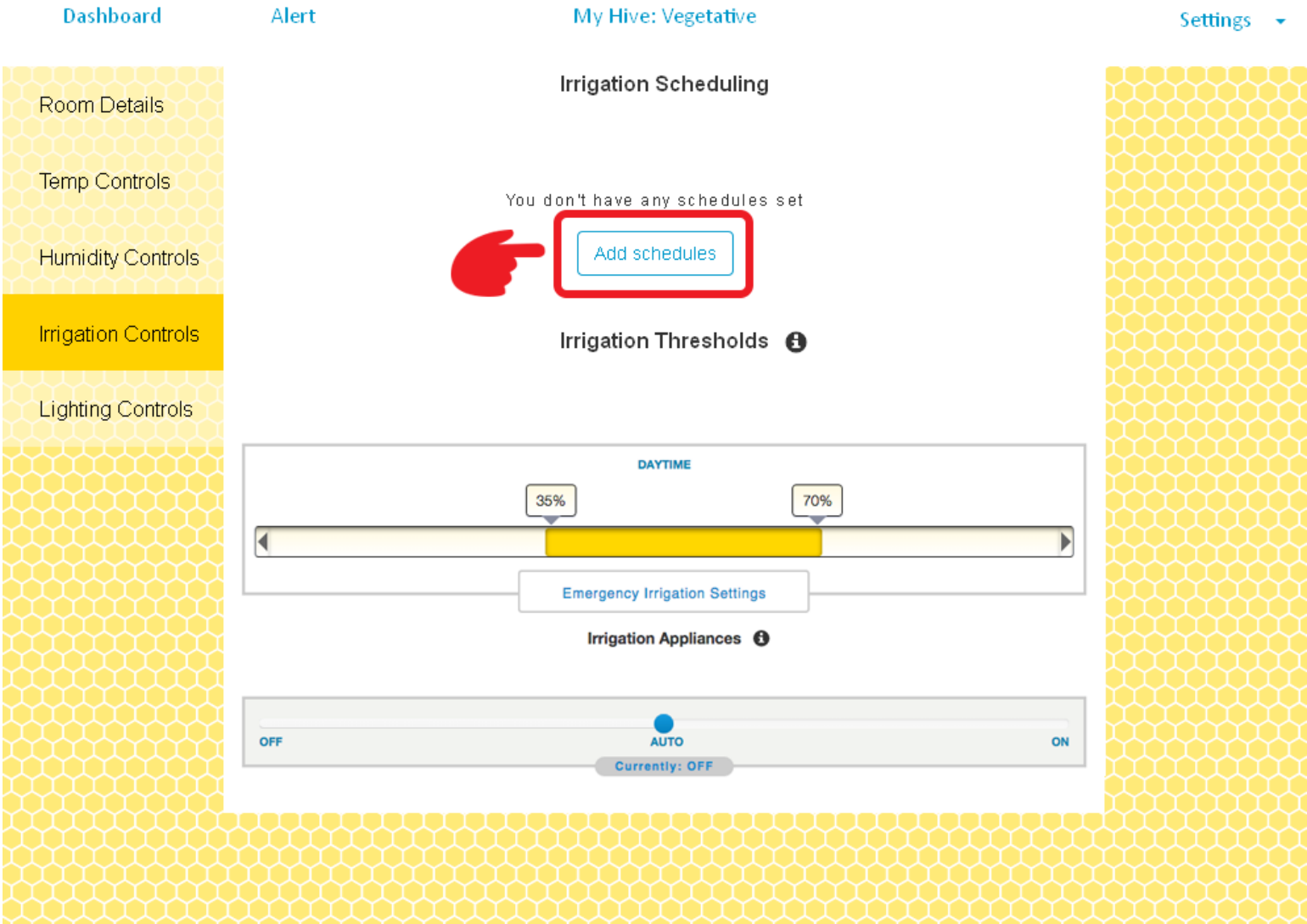


Irrigation Schedules

As an example, we will create a single scheduled irrigation event. Irrigation events recur daily according to their scheduled times.

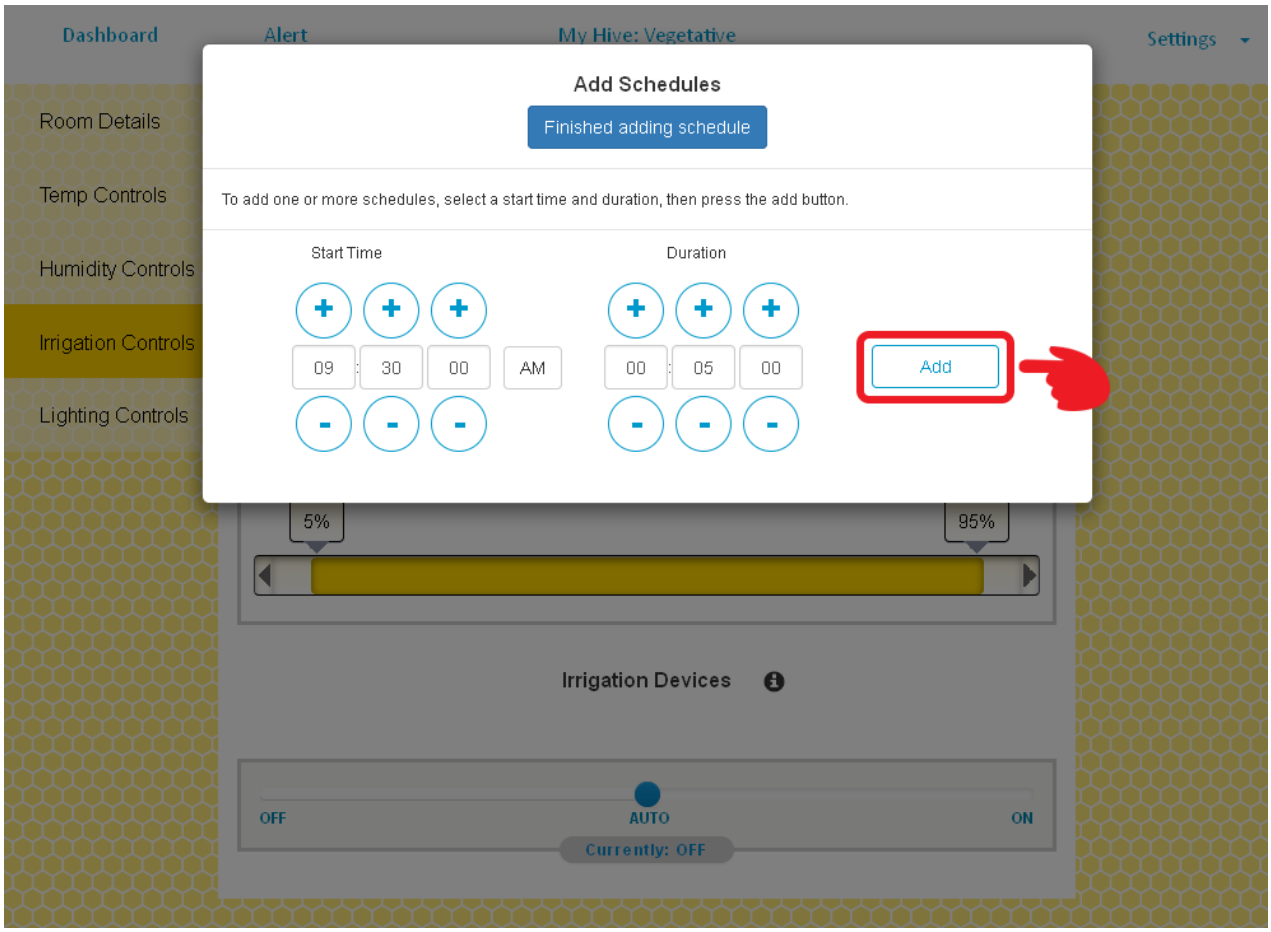
To create a scheduled irrigation event, on the Irrigation Controls page,

- Click “Add schedules”



A dialog appears where you can create one or more scheduled irrigation events.

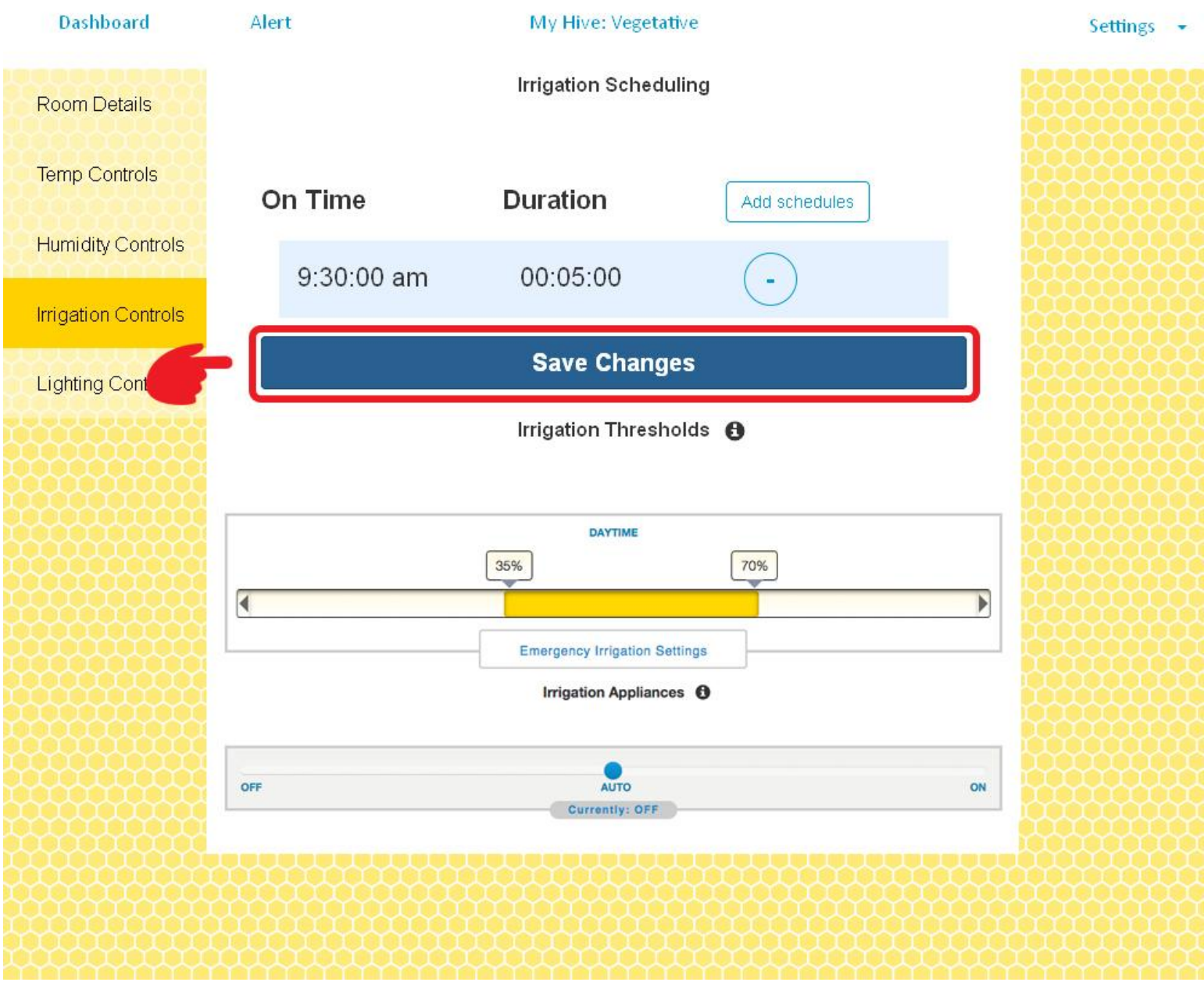
- Define the Start Time and Duration
- Click “Add”



- Click “Finished adding schedule”

WARNING:
You must click **save changes** at ths point or your schedules will be discarded.

- Click “Save Changes”.



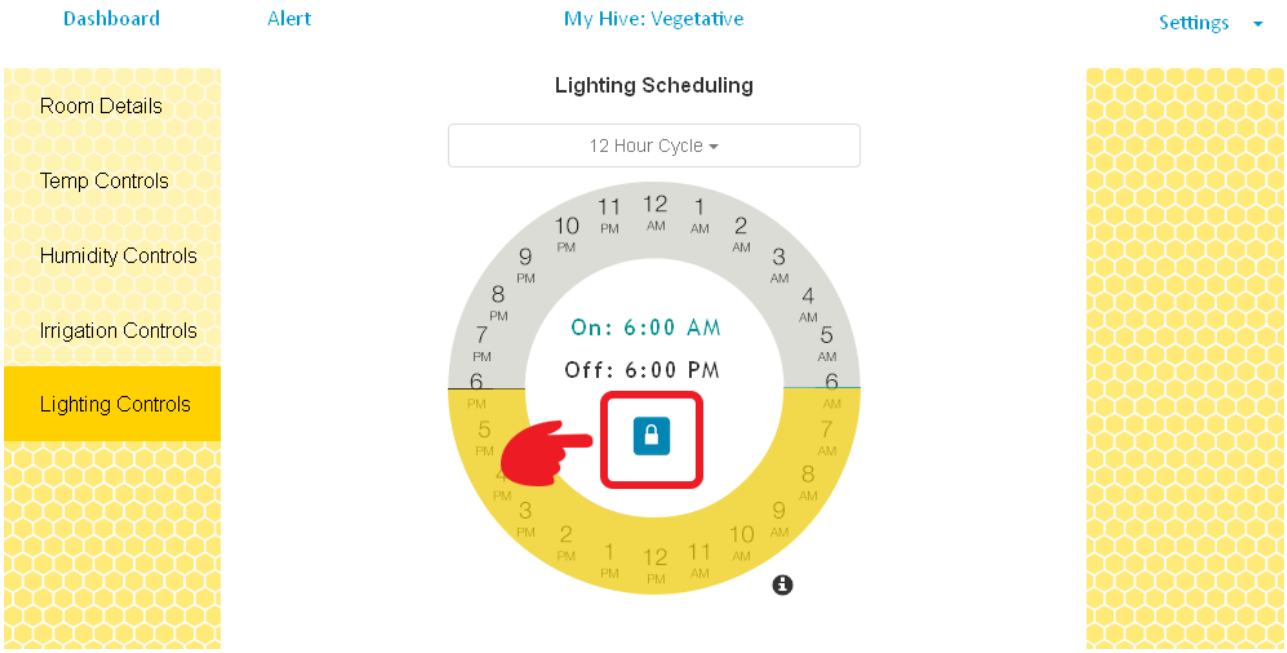
Irrigation is also governed by a pair of thresholds: the upper threshold sets the point at which the growing medium is considered “too wet”. The lower threshold sets the point at which the growing medium is considered “too dry”. Scheduled **irrigation events will not occur** if the growing medium is too wet (an Alert occurs instead). To disable prevention, drag this slider to 100%.

If the growing medium is too dry (for example, below your threshold or at a level that will jeopardize your garden), **an emergency irrigation will occur**. Chose a default duration and wait time for your emergency irrigation. An emergency irrigation will only occur if your bottom irrigation threshold has been breached. The duration of this irrigation will set the amount of time the irrigation lasts for. The delay time is the amount of time to wait before irrigation again providing the threshold is still below the minimum. To disable emergency irrigation, drag this slider to 0%.

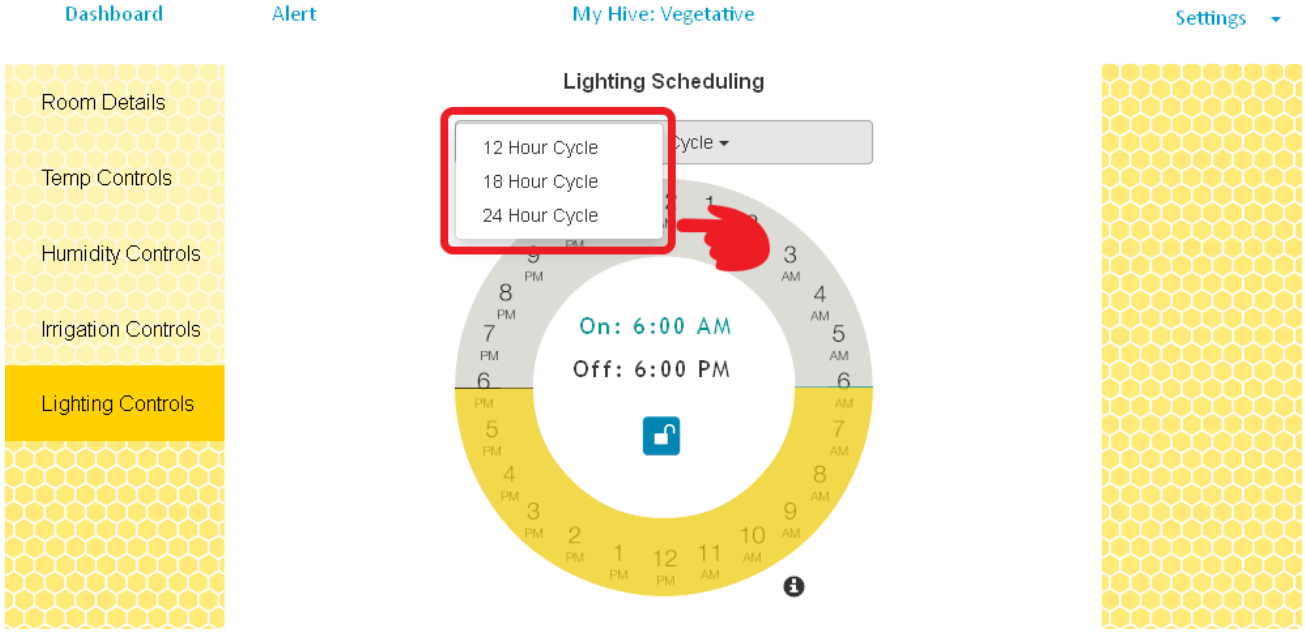
Lighting Schedules

On the Lighting Controls page, set the lighting schedule.

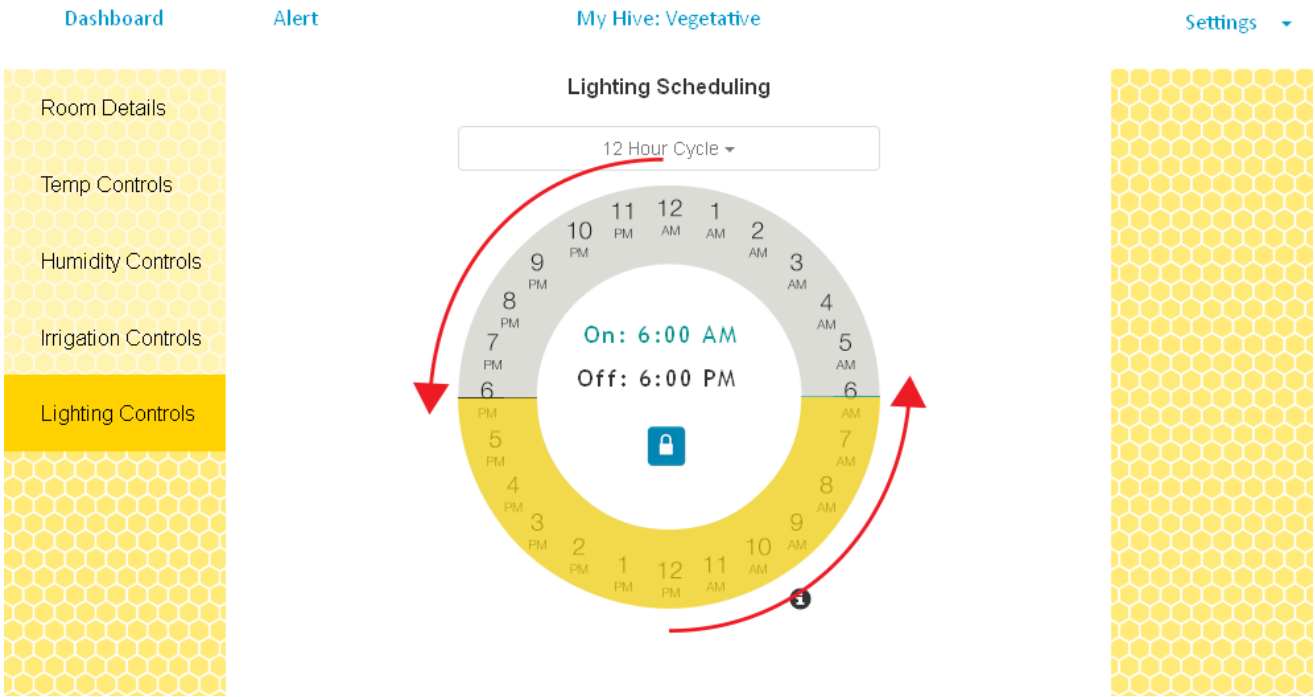
- Unlock the schedule control by clicking the lock icon in the center.



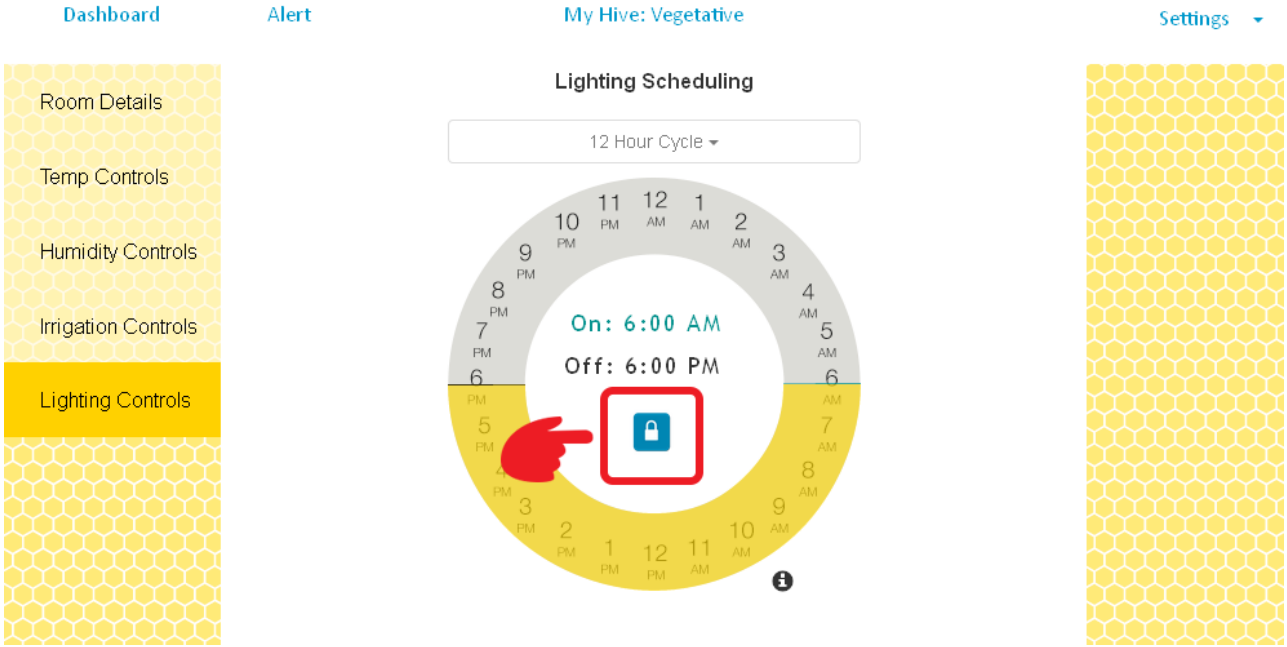
- Choose your desired day length (12 Hour Cycle, 18 Hour Cycle, or 24 Hour Cycle)



- Click and/or rotate the dial to choose your desired start time.



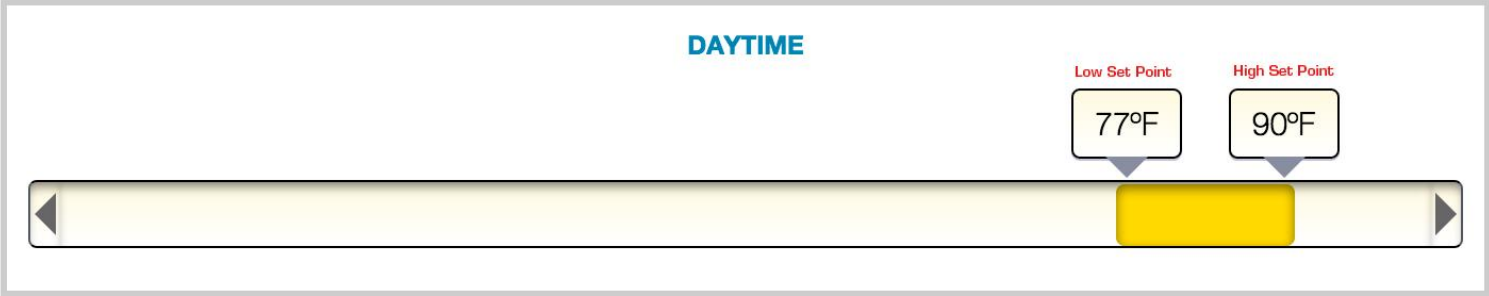
- Click the lock icon again to save your changes and lock the controls.



- Ensure the upper lighting overheat set point is reasonably high for your environment.

Lighting will be disabled if the temperature in the room exceeds the upper threshold as a safety measure. If lighting is so disabled, the lights will be re-enabled when the temperature crosses the lower set point.

Lighting Overheat Thresholds



Plug in Your Devices

Now that you have defined your room and configured the relevant thresholds and schedules, you can plug your equipment into their assigned Stinger circuits and automate your grow.

Be sure that any appliance that your Stinger circuits will control is in an “ALWAYS ON” state, such that when power is supplied at the Stinger the appliance will activate.

Concepts

Rooms

The Hive uses the concept of a “room” to group sensors, aggregate their data, and use that data to control appliances. A room is basically a control group. The sensors assigned to a room use the room’s thresholds to control the rooms appliances.

A room also counts the days it has been active in order to show the current day of the plants’ grow cycle.

Sensor Hardware and Data Aggregation

Sensors are assigned to a room. When a sensor is assigned to a room, it begins to contribute to the room’s sensor aggregates. For each kind of sensor data (temperature, humidity, etc), the average value of all sensors in the room is calculated. This becomes the room’s aggregate value for that type of sensor data.

If the room has no sensors of a given type, the aggregate value will be “N/A”.

Sensors report data periodically (typically every 45 seconds) and when the Hive receives new sensor data, it recalculates the aggregate values. The most recent update time is always displayed with the room aggregates so you can be sure that the data is recent and observe updates.

Thresholds and Appliances

An appliance is any Stinger circuit that has been assigned to the room and assigned an appliance type. All circuits assigned to the same appliance type are activated together and controlled as a group.

A threshold is a user-definable set point. Thresholds generally come in pairs that contain the upper and lower values of the acceptable range.

The Hive uses thresholds to control appliances. When the room aggregate for a given sensor data type crosses one of its thresholds, a specific type of appliance is activated until the room aggregate returns across the threshold. For example, if the average temperature reported by sensors in the room rises above the upper temperature threshold, the Hive will activate all of the Cooling appliances in the room until the temperature falls below the threshold and its deadband.

Deadbands

Different types of thresholds have different dead bands. For example, if the upper temperature threshold is set to 24C, and the room temperature rises above 24C, then the COOLING appliance will activate. The temperature must then drop below 21C for the cooling device to deactivate. This is the 3C temperature deadband.

Similarly for heating, if the lower temperature threshold is set at 15C, then when the aggregate temperature in the room drops below 15C, the HEATING appliance will activate. It will deactivate when the temperature rises above 18C (15C threshold + 3C deadband.)

Threshold Deadbands

Temperature: 5.4°F (3°C)

Humidity: 5%