**Controllers**

# SmartBee
# Control System

## *User Guide*

v 3.2

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## Support Information

The friendly and knowledgeable staff at SmartBee Controllers are happy to help with all of your SmartBee products. From system setup to water content probe calibration, get support on our website or by phone or email.
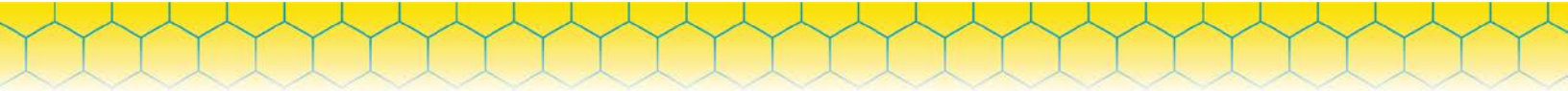
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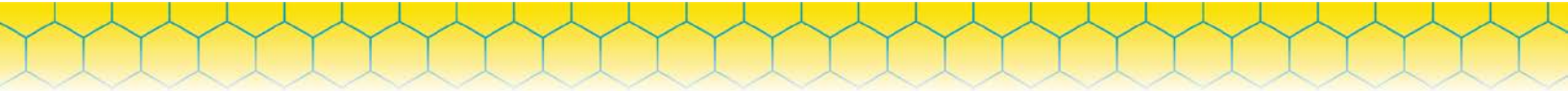
## Copyright

# Contents

# Figures

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# About This Guide

This guide is intended for owners of SmartBee Control Systems.

In this guide, you'll find:

- An overview of the SmartBee Control System and its relatedconcepts
- An introduction to system planning andinstallation
- How to use the system and software (Swarm Control™ webapp)

> **IMPORTANT**
>
> *For optimal safety and performance, please read this entire guide before attempting to install or use your SmartBee Control System.*

## Conventions Used in This Guide

Menus and menu items are shown in bold text, with a ">" between the menu name and menu item.

> **EXAMPLE**
>
> *"Select Settings > Room Manager" means to select the Settings menu and then select the Room Manager menu item.*

Field and button names are shown in bold text.

The Swarm Control web app can be used on a computer with a mouse or touchpad, or on a touch device such as a tablet or smart phone. In this guide, "click" is used as a generic instruction meaning to activate an on-screen item, whether you do so using a mouse, a touchpad, a keyboard, or by tapping the screen with your finger.

Active hyperlinks to web addresses or other documents are shown in <u>blue, underlined text</u>.

> **NOTE**
>
> *Supplementary information that you may find helpful.*

The guide uses the following special format for special types of information:

## Revision History

*Table 1. Revision History*

| Title | Date | Version |
|---|---|---|
| SmartBee Controllers Getting Started | February 1, 2017 | 1.0.3 |
| SmartBee Control System User Guide | February 1, 2017 | 3.1 |
| SmartBee Control System User Guide | February 15, 2017 | 3.2 |

## Where to Find More Information

To learn more about the SmartBee Control System, please visit the SmartBee Controllers website. On the Downloads page, you can download SmartBee documents and helpful tools.

Visit the SmartBee Controllers YouTube channel to watch helpful How-To videos on topics such as sensor placement and reading sensor data.

If you have any questions, you can always give us a buzz at (888) 650-3797 or support@smartbeecontrollers.com.

# 1GettingStarted

Welcome! Let's get started with your new SmartBee Control System.

# System Overview

The SmartBee Control System is a real-time, remote-access solution for your greenhouse or grow room, monitored and controlled from the palm of your hand! Simply configure your environmental thresholds, and when the SmartBee Control's "smart logic" process detects a problem, it sends you an alert and automatically takes corrective steps to resolve critical grow room events.

The SmartBee product line is an innovative gardening technology solution with real-time sensor monitoring, delivering the ability to control and track all areas of a grow room wirelessly, using a hand-held touch device such as a smart phone or tablet. The Smart Bee Control system links $CO_2$, temperature, humidity, lighting, and irrigation layers, and allows more system customization than any other product line on the market today.
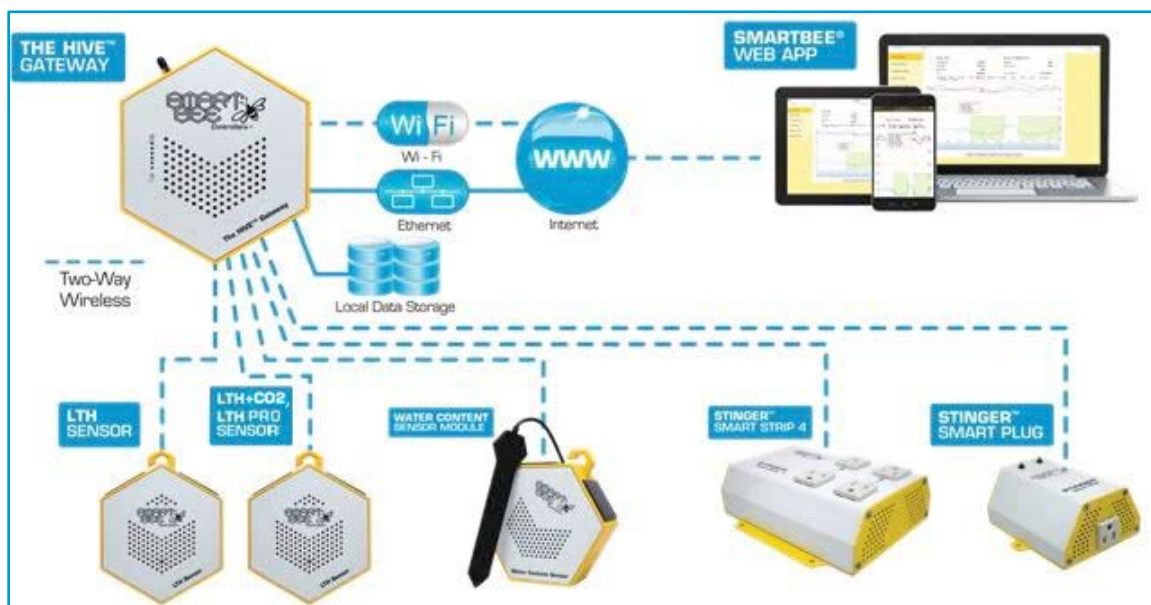


*Figure 1. System overview*

Watch a short introduction video.

# System Concepts

## The Hive™ Gateway

The Hive Gateway (Hive) is the nucleus of your SmartBee Control system and the portal for all communication between your control devices and sensors, the Swarm Control web app, and your computer or mobile device.

The Hive serves as the main logic controller in your system, managing incoming real time sensor data and responding to correct environmental conditions that are outside of your defined thresholds, helping you to avoid costly operational and safety hazards.

## Control Devices

The Stinger™ Smart Plug (SS1) and Stinger™ Smart Strip 4 (SS4) are called control devices because they allow the Hive to control—activate and deactivate—electrical appliances remotely over the wireless mesh network. Each circuit on an SS4 is considered to be a separate device.

For a control device to be controlled by the system, it must have an appliance type defined and be assigned to a room. The system will then control the appliances plugged into those control devices, in response to your room's sensor data.

**EXAMPLE**

LIGHTS appliance types will be turned on in response to your lighting schedule, IRRIGATION_PUMPs will be turned on in response to irrigation schedules, and HEATER and COOLING devices will be turned on in response to your temperature thresholds.

In each room, the system groups all appliances of the same type and controls them as a unit.

**EXAMPLE**

In your "Bloom" room you have three circuits that are assigned the COOLING appliance type and have fans plugged into them. Two of the circuits are on one Smart Strip 4 and the third is on a different SS4 across the room. Because they have the same appliance type, the system will activate and deactivate all three fans at the same time, even though they're plugged into different control devices.

## Sensors

Sensor devices include the LTH (Light, Temperature, and Humidity), LTH+$CO_2$ (Light, Temperature, Humidity, and $CO_2$), LTH Pro (Light, Temperature, Humidity, $CO_2$, and PAR), and the WCSM (Water Content Sensor Module). Sensors are battery powered and transmit data through the wireless mesh network back to the Hive.

Sensors are assigned to a room. Once assigned, the sensor contributes its data to the room's sensor data, typically every 45 seconds. For each kind of sensor data (temperature, humidity, etc.), the average value of the readings from all the sensors in the room is calculated. This becomes the room's aggregate or average value for that type of sensor data. If the room has no sensors of a given type, the aggregate value will be NA.

> **TIP**
>
> *To learn more about your sensors, watch these videos:*
>
> LTH/LTH+$CO_2$/LTH Pro sensors—
> *https://youtu.be/CHcymWfwUxg?list=PLRG3ZemrqXwMcT4FNL_euDz25_3FhU5_9*
>
> WCSM—*https://youtu.be/AKITSpjKT14?list=PLRG3ZemrqXwMcT4FNL_euDz25_3FhU5_9*

## Rooms

The Hive uses the concept of a "room" to group sensors, aggregate their data, and use that data to control appliances. The Hive uses the room's control devices to control the room's appliances in response to the room's sensor data. A room also counts the days it has been active in order to show the current day of the plants' grow cycle.

Because a room simply groups a set of sensors, thresholds, and control devices, it doesn't need to correspond to a defined physical space. That is, you can have multiple rooms in your system that corresponds to the same physical space in your garden.

> *EXAMPLE*
>
> *Let's say you have two light banks that you want to control independently. When the daytime garden temperature gets too high, you want one light to turn off but the other to stay on. If you assign both lights to the same room, they will be controlled as a group and turn on and off together. So instead you'd create two rooms, assign one light to each room, and then define the different lighting controls for each room.*

# Room Controls

Room controls are configuration settings that define:

- The acceptable environmental conditions for theroom
- The daily lighting and irrigation schedules for theroom
- Whether or not the Hive controls the appliances in the room

Each room has five sets ofcontrols:

*Table 2. Room control settings*

| Control Type | Thresholds | Deadband | Daily Schedule | Other Settings | Appliance Types Controlled |
|---|---|---|---|---|---|
| Temperature | Daytime high and low Nighttime high and | 5.4 °F | NA | NA | HEATER COOLING |
| Humidity | Daytime high and low Nighttime high and | 5% | NA | NA | HUMIDIFIER DEHUMIDIFIER |
| $CO_2$ | Minimum $CO_2$level | 50 ppm | NA | $CO_2$alerts | CO2_EMITTER |
| Irrigation | High and low grow medium moisture levels | 3% | Yes | Emergency irrigation | IRRIGATION_PUMP |
| Lighting | Overheat and cool-down temperatures | 5 °F (user configurable) | Yes | Overheat deadband | LIGHTS |

## Thresholds

A threshold is a set point for a specific type of environmental condition in a room, such as temperature. Thresholds generally come in pairs that define the upper and lower values of an acceptable range.

The Hive uses thresholds to control appliances. For most room conditions, when the aggregate value reported by the room's sensors crosses a threshold, the Hive activates the corresponding appliance type until the aggregate value is back within the threshold range.

> ### EXAMPLE
>
> *If the aggregate temperature rises above the upper temperature threshold, the Hive activates the cooling appliances in the room until the temperature falls below the upper threshold minus its deadband. Similarly, when the aggregate temperature falls below the lower threshold, the Hive activates the room's heating devices until the temperature rises above the lower threshold plus its deadband.*

The irrigation control's upper threshold operates slightly differently. If the growing medium moisture level exceeds the upper threshold, no appliances are activated. Instead, regularly scheduled irrigation events are skipped until the moisture level drops below the upper threshold minus its deadband.

*Deadbands*

After the Hive activates an appliance type, it doesn't deactivate the appliances as soon as the aggregate sensor reading is back within your defined range. Instead, it leaves the appliances on a little longer, to make sure that the aggregate reading is safely within the acceptable range and appliances will not need to be reactivated too quickly.

To determine when to deactivate appliances, the system uses both your defined thresholds and predefined system deadbands. A deadband is an extra value added to or subtracted from your threshold to determine the actual aggregate sensor reading that must be reported before the Hive will deactivate your appliances. Different types of thresholds have different predefined deadbands:

- Temperature: 5.4°F

- Humidity:5%

- $CO_2$: 50ppm

- Grow-medium moisture:3%

### EXAMPLE

*Assume your upper temperature threshold is 78 °F. When the aggregate room temperature rises above 78 °F, the Hive activates your cooling appliances. It will deactivate those devices when the temperature drops below 72.6 °F (78 °F minus the 5.4 °F deadband).*

*Similarly, if your lower temperature threshold is 65 °F, the Hive activates your heating appliances when the aggregate room temperature drops below 65 °F. It will deactivate those appliances when the temperature rises above 70.4 °F (65 °F plus the 5.4 °F deadband).*

## Appliances

An appliance is any electrical appliance that is plugged into a Stinger circuit that is controlled by your SmartBee system. All circuits assigned to the same room and appliance type are controlled as a group.

### EXAMPLE

*Say you have three Stinger Smart Plugs in your garden. You assign all three circuits to the same room and the appliance typeHEATER, then plug in your heating appliances. The system will turn on and off all three heaters as agroup.*

# Planning

Planning your SmartBee system involves determining:

- Where your Hive, control devices, sensors, and appliances will be located in yourgarden

- The SmartBee "rooms" you'll use to group your devices andappliances

- The optimal environmental conditions for eachroom

- The room controls needed to maintain those optimalconditions

Before planning, make sure that you understand the system concepts explained in the previous section. For help on where to place your SmartBee devices (and much more about each device), see these videos:

- [Hive](#)

- [Control devices (Stinger Smart Plug and Stinger Smart Strip 4)](#)

- [LTH/LTH+CO$_2$/LTH Prosensors](#)

- [WCSM](#)

Here's a sample layout that illustrates how devices and appliances might beplaced.
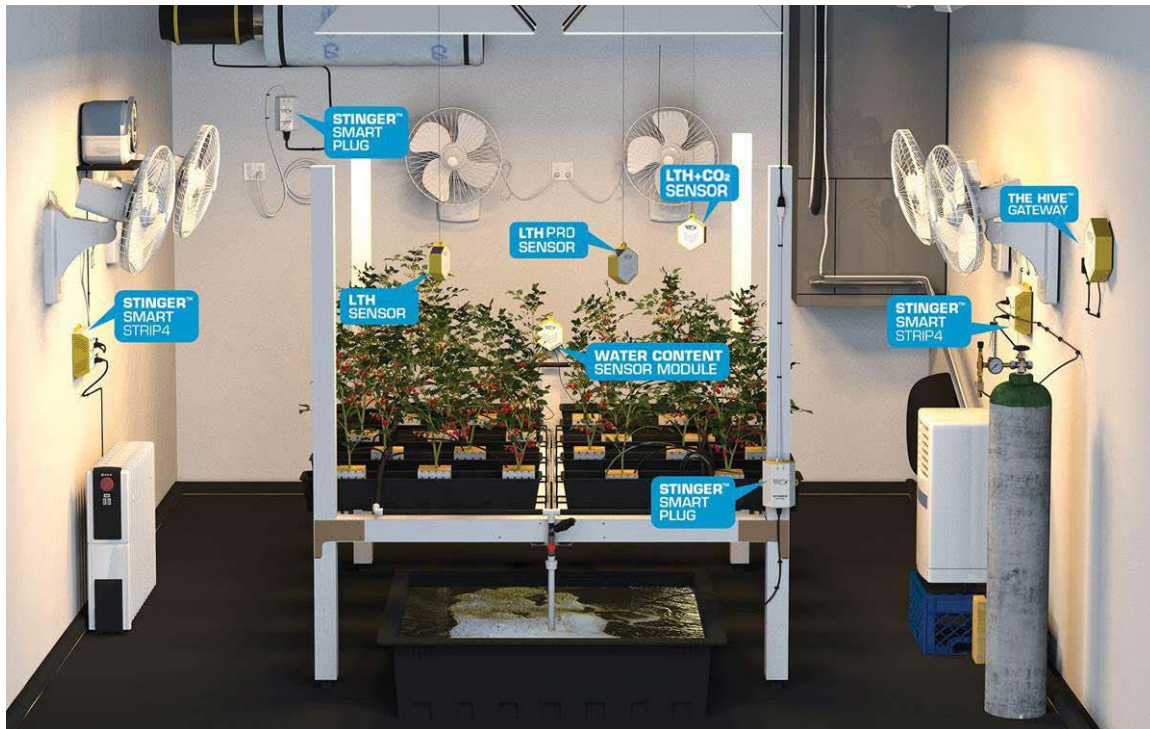


*Figure 2. Sample system layout*

# Preparing Devices

When you've finished planning your system layout, it's time to prepare for installation. Preparation involves the following tasks, which must be completed in the order shown.

1. Position YourDevices.

2. Activate YourSensors.

3. Document DeviceInformation.

## 1. Position Your Devices

a. Place the Hive, sensors, control devices, and appliances in the physical locations where they will beinstalled.

> ⚠ **IMPORTANT**
>
> *Do not wall-mount the Hive or any devices yet in case you need to move them later. During installation, you'll make sure that the Hive and all devices are communicating successfully before you physically install them.*

b. Plug in the Stinger control devices, but do not plug in your appliances.

## 2. Activate Your Sensors

a. Locate the Power switch on the side of thesensor.

b. Slide the switch to the ON position (toward the solar panels). LED 1 (left) willlight.

Table 3. Sensor LEDs (LTH, LTH+CO₂,LTH Pro, WCSM)

| LED No . | LED Name | Description |
|---|---|---|
| 1 (Left) | No Network | On solid when the sensor is awake and not connected to your Hive. Blinks every four seconds when the sensor is asleep and not connected to your Hive. Off when the sensor is connected to your Hive (LED 3 will be on). |
| 2 (Middle) | Status | On when the sensor is awake. Off when the sensor is asleep. |
| 3 (Right) | Network | On solid when the sensor is awake and connected to your Hive. Blinks every four seconds when the sensor is asleep and connected to your Hive. Off when the sensor is not connected to your Hive (LED 1 will be on). |

c. Using the included mini-B USB 5V adapter, plug in the sensor and let it charge for 6 hours. Your sensors are now activated, charged, and can transmitdata.

## 3. Document Device Information

After placing your devices and appliances, gather the device information that you'll need during installation to identify and configure devices and appliances in the Swarm Control web app. Such as the last four digits of the unique Radio ID on the device (example ...58A7) and the device location. *Do not plug in your appliances.*

> **! TIP**
>
> *If you're sure about which appliances you'll plug into which circuits on your Stinger control devices, labeling each circuit with its appliance type can help you to identify and use the correct circuits later.*

# Installing Your System

When you finish preparing your devices, you can begin installing your system. Installation involves the following tasks, which must be completed in the order shown.

1. Activate the Hive Gateway(below).
2. Access the Swarm Control Web App (page 19).
3. Connect the Hive to Your Existing Network (page20).
4. Update Your Hive (page 20).
5. Join Your Devices to the Hive Gateway (page 20).
6. Create Your Rooms (page 20).
7. Assign Devices to a Room (page 21).
8. Configure Room Controls (page 21).
9. Finalize Physical Installation(page 21).
10. Subscribe to Email Alerts (page 21).

## 1. Activate the Hive Gateway

Activating the Hive involves powering it on.

1. Plug the included 5V power adapter into the Hive.
2. Plug the power adapter into a standard 110V power outlet.

   *Do not* press any of the buttons on the Hive.
3. Wait for all five LED lights on the front of the Hive to turn solidgreen.
4. Wait three minutes before connecting to theHive.

## 2. Access the Swarm Control Web App

Once you've activated your Hive, it's time to open the Swarm Control web app.

1. Load the Swarm Control WebApp.
2. LogIn.
3. Complete First TimeSetup.

### a. Load the Swarm Control Web App

Open a web browser, and type in http://10.0.0.1. This should load the Swarm Control web app and present a login page.
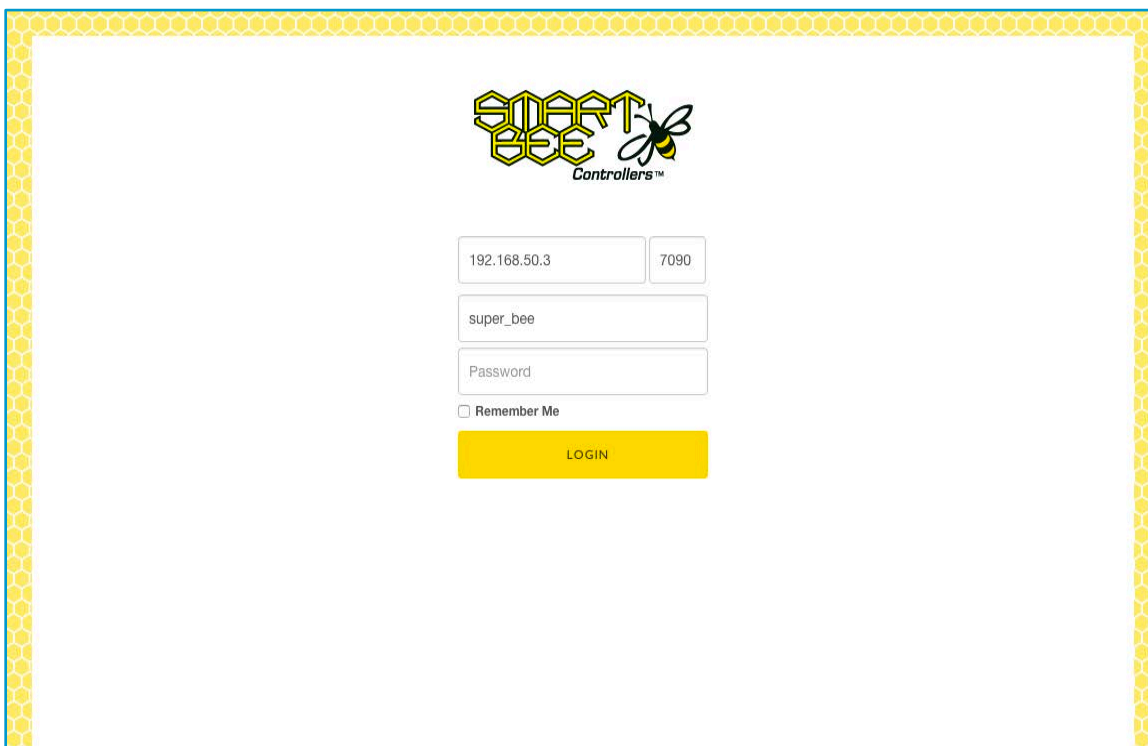
### b. Log In



*Figure 3. Swarm Control web app Login page*

1. Leave the default URL and Port.
2. Enter the default login credentials.

    Username: super_bee

    Password: beebee833
3. Click LOGIN.

*c.* Complete First Time Setup

The first time you log in to your Hive, you'll see a welcome page.

1.  Click Get Started. You'll be asked to set the system time.
2.  On the system time page, if necessary, change the displayed date and time.
3.  Click Save Time. You'll be asked to name your system.
4.  On the system name page, enter a name for your Hive. This name is used as the sender name in email alerts sent from the Hive.
5.  Click Next.

First-time setup is complete! You'll see the Dashboard, which is empty for now.

## 3. Connect the Hive to Your Existing Network

1.  Through a Wi-Fi-enabled computer, tablet, or smart phone, find the network named "Smartbee-FFFFFF", where FFFFFF are any six hexadecimaldigits.

    If you can't locate the Smartbee-FFFFFF network, press and hold the Network button on the Hive until LED 4 begins to blink. Wait several seconds until LED 4 is solid again. This reconfigures the Hive as a Wi-Fi hotspot. Wait for all five LED lights on the front of the Hive to turn solid green. Wait three minutes before connecting to the Hive.
2.  Connect to this Wi-Fi network and enter the default password of"beebee833".
3.  Wait up to a minute for connection to be fullyestablished.
4.  You're now connected to your Hive.

## 4. Update Your Hive

Follow the instructions in Updating System Software on page 65.

## 5. Join Your Devices to the Hive Gateway

Once you have access to the Swarm Control web app, you can tell the Hive to look for your devices. Follow the instructions in Adding a Deviceon page 42.

## 6. Create Your Rooms

After joining your devices to the Hive, you're ready to create the room(s) you'll use to group the devices. Follow the instructions in Adding a Room on page 25. For a refresher on the room concept, see Rooms on page 13.

## 7. Assign Devices to a Room

After creating a room, you need to add devices to it.

---

**⬡ CAUTION**

*Remember that none of your appliances should be plugged in at this point in the installation. If you have plugged any appliances into any control devices, unplug the appliances now so that they don't turn on unexpectedly before installation is complete.*

---

Follow the instructions in Assigning a Device to a Room on page 45.

## 8. Configure Room Controls

Once you've assigned devices to your room(s), it's time to configure the room controls that determine how the system responds to the environmental conditions in the room. Follow the instructions in Configuring Room Controls on page 26. For more on the room controls concept, see Room Controls on page 14.

## 9. Finalize Physical Installation

At this point, you've verified that your devices are communicating successfully with the Hive and won't need to be moved. You've also defined the room controls that will be used to control your appliances. It's time to complete the physical installation.

1. If you're going to hang any sensors, hang them now.
2. If you're going to wall-mount your Hive or devices, do so now. Each device includes a mounting template to help you determine screw placement.
3. Plug each appliance into its assigned circuit on your Stinger control devices.
4. Make sure that each appliance's on/off switch or control is set to ON. The system now controls when the appliance powers on and off.

## 10. Subscribe to Email Alerts

If you want to receive notifications of important system events, you need to subscribe to Hive email alerts. Follow the instructions in Subscribing to Alerts on page 63.

# 2 Using Your System

This chapter provides step-by-step instructions for completing common tasks in your SmartBee Control system.

Other than Logging In, the sections in this chapter assume that you are logged into the Swarm Control web app.

# Logging In

1. If your Hive is still set up in Access Point (Hot Spot) mode, you can open a browser and type in http://10.0.0.1 on anydevice.

    OR

    If your Hive has a network configuration other than Hot Spot mode, see Network Discovery onpage 58.

    The Swarm Control web app login page is displayed.
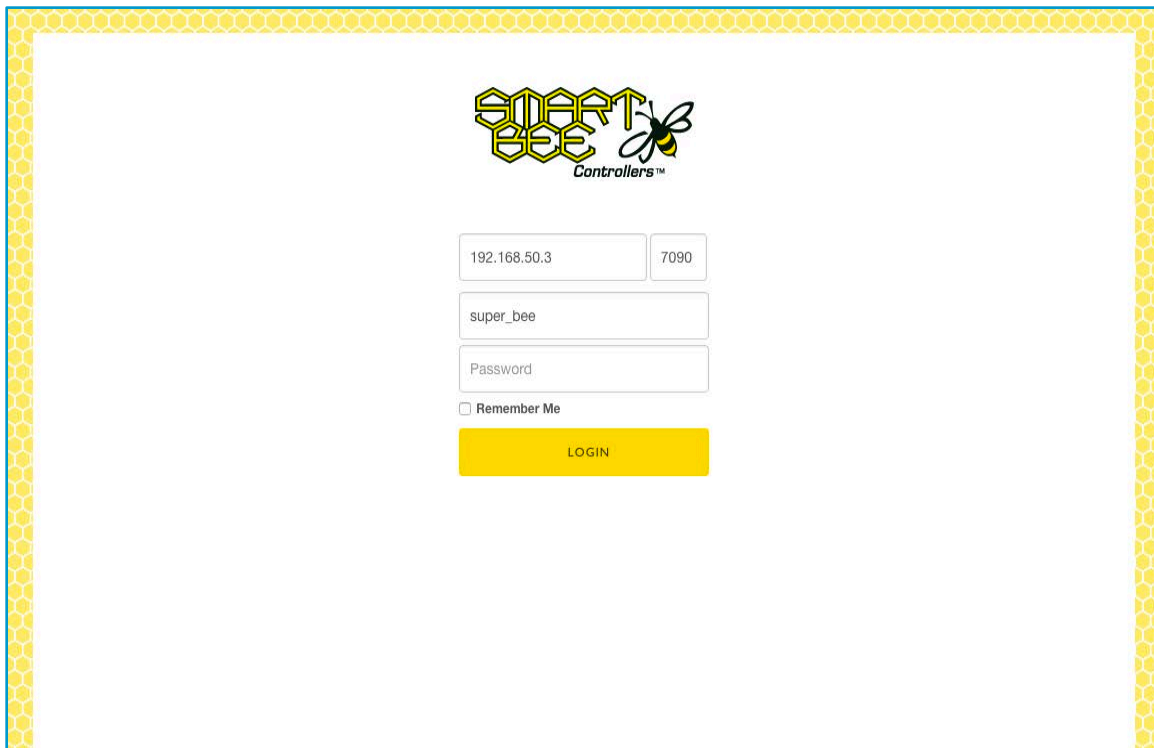


*Figure 4. Swarm Control web app Login page*

   The URL and Port fields are automatically populated with the values you supplied the last time you logged in. Many users won't need to change these fields. If you have more than one Hive Gateway, or if you're connecting to the Hive over the Internet and through a firewall, you may need to change the URL and port.

2. Leave the default URL and Port.

3. Enter the default login credentials.

    Username: super_bee

    Password: beebee833

4. Click LOGIN.

# Using the Dashboard

The Dashboard is the first page displayed when you log in to the Swarm Control web app. On any other page, you can open the Dashboard by clicking Dashboard at the top of the page.



*Figure 5. Dashboard page*

The Dashboard shows a summary of the current state of every room in your SmartBee system.

Each room box lists the aggregate values reported from the sensors assigned to the room, or N/A if the room doesn't have the applicable type of sensor. These live values and the last update time are updated as the Hive receives new data from the sensors.

# Managing Rooms

This section explains how to create, configure, and manage rooms in your SmartBee Control system. For more on the room concept, see Rooms on page 13.

## Adding a Room

To add a room:

1. On any page in the Swarm Control web app, select Settings > Room Manager.
2. On the Room Manager page, click Add Room to display the new room fields.
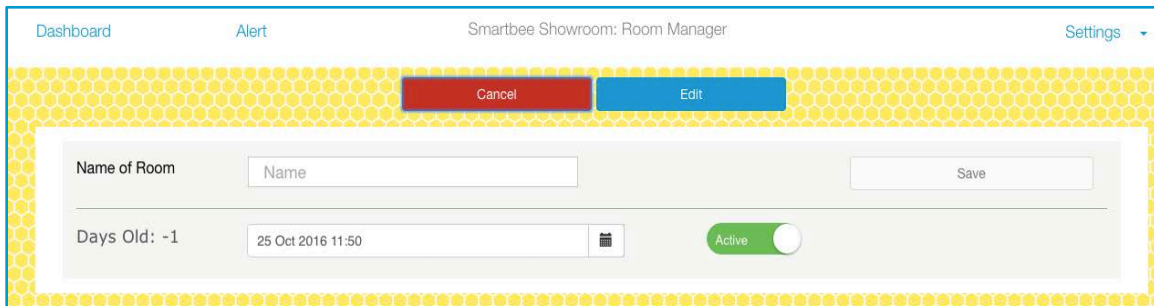


*Figure 6. New room fields*

3. Name of Room:Enter the roomname.
4. By default, the Grow Cycleswitch is set to Active. This means that as soon as the room is created, the room's grow cycle counter will start and the room controls will be enabled. Leave the default Active setting.
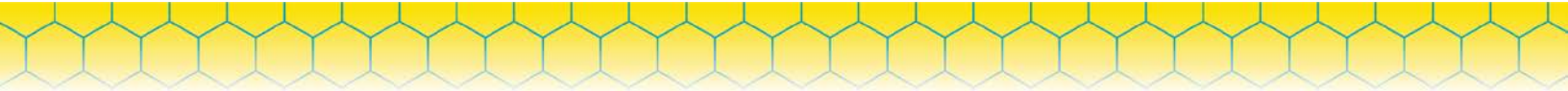
> **⚠ IMPORTANT**
>
> *If you switch the Grow Cycle to Inactive, the grow cycle counter won't start, the room won't collect sensor data, and any room controls you configure won't affect the control devices assigned to the room.*

5. Click Save. Your new room is added to the roomlist.
6. ClickDashboardtoreturntotheDashboardpage,whereyournewroomisnowdisplayed.



*Figure 7. Dashboard page with one room*

# Configuring Room Controls

Once you've assigned devices to a room, it's time to configure the room controls that determine how the system responds to the environmental conditions in the room. For a refresher on room controls, see Room Controls on page 14.

1. On any page in the Swarm Control web app, click Dashboard.

2. On the Dashboard, click the room whose controls you want to configure.



| Dashboard | Alert | Smartbee Showroom | | | Settings ▾ |
|---|---|---|---|---|---|

**Inactive in New Room**
updated at 11:54:29 am

| Air | | Light | | Water | | Medium | |
|---|---|---|---|---|---|---|---|
| Temp | N/A | Bright | N/A | Temp | N/A | Moisture | N/A |
| Hum | N/A | PAR | N/A | EC | N/A | Temp | N/A |
| CO2 | N/A | DLI | N/A | pH | N/A | | |
| VPD | N/A | | | | | | |

*Figure 8. Selecting a room on the Dashboard*

You'll see the Room Details page for the selected room. For more on the Room Details page, see Viewing Sensor Data (Room Details) on page 39.

3. Continue with the instructions for the type of controls you want to configure:

   - Configuring Room Thresholds below.

   - Configuring CO$_2$ Controls on page 29.

   - Configuring Irrigation Controls on page 31.

   - Configuring Lighting Controls on page 35.

## Configuring Room Thresholds

Room threshold controls determine when the system turns devices on and off in response to environmental conditions in the room (as reported by the room's LTH, LTH+CO$_2$, and LTH Pro sensors).

On the Room Details page, click Temp Controls or Humidity Controls in the left column. The Temperature Controls page or the Humidity Controls page is displayed.

**Setting Temperature or Humidity Thresholds**

Thresholds define the temperature or humidity range that you want to maintain in the room.
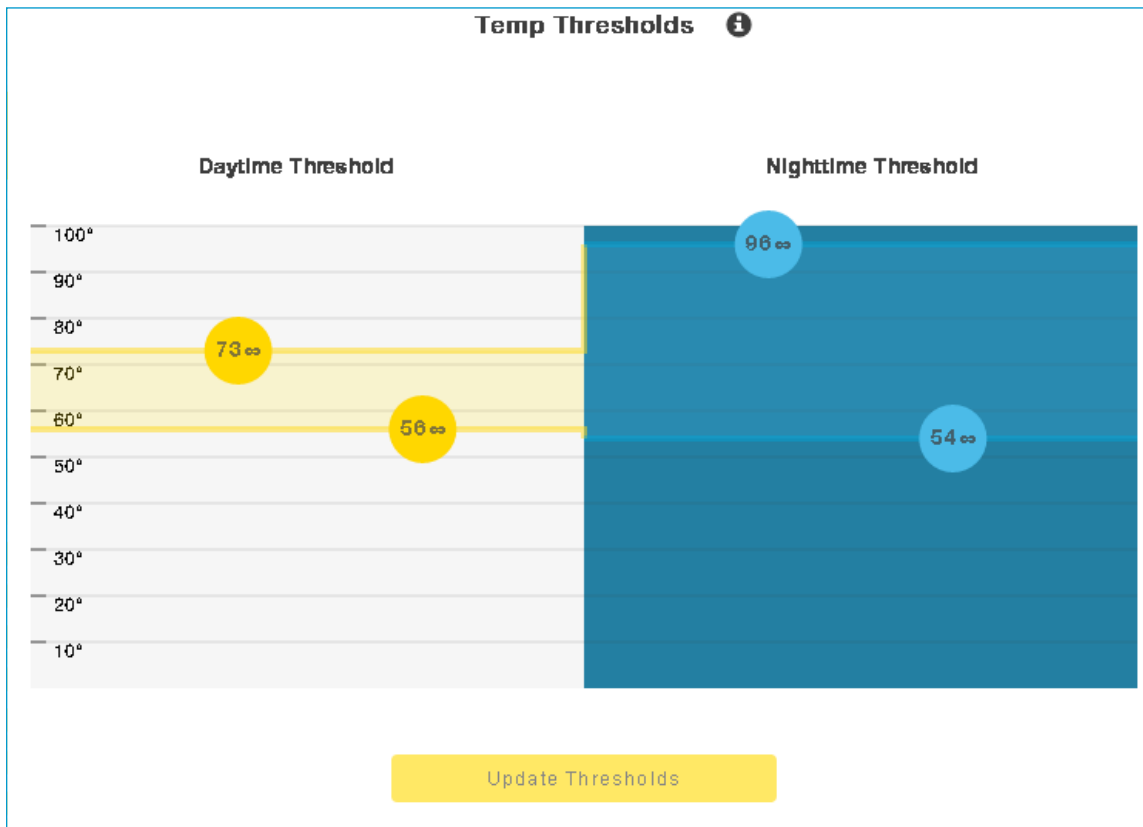


*Figure 9. Temperature thresholds*

Any control device circuit that is assigned to this room and has an appliance type of HEATER or COOLING will be turned on or off in response to the thresholds you define here (plus the deadband). Similarly, on the Humidity Controls page, any control device circuit that is assigned to this room and has an appliance type of HUMIDIFIER or DEHUMIDIFIER will be turned on or off in response to the thresholds you define on that page (plus the deadband). For more on thresholds, see Room Controls on page 14.

The daytime and nighttime periods are defined in your lighting schedule (see Configuring Lighting Controlson page35).

The following steps refer to the thresholds on the Temperature Controls page. The thresholds on the Humidity Controls page work in the same way for high and low humidity.

1. In the Daytime Thresholdarea:

   a. Drag the top circle to set the daytime high temperature for the room. Cooling devices willbe turned on if the room temperature exceeds thisthreshold.

   b. Dragthebottomcircletosetthedaytimelowtemperaturefortheroom.Heatingdeviceswillbe turned on if the room temperature drops below thisthreshold.

2. In the Nighttime Threshold area, set the nighttime high and low temperatures in the same way asthe daytimetemperatures.

3. Click Update Thresholdsto save yourchanges.

## Setting Notification Alerts

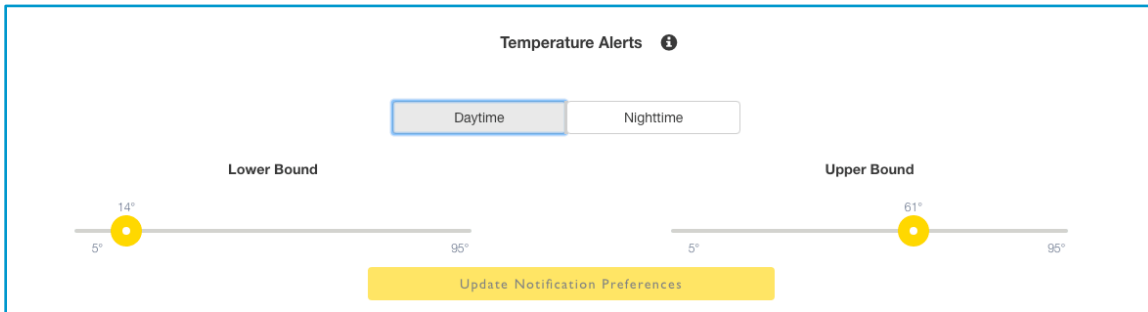Use the Temperature Alerts page to set up notification preferences.



*Figure 10. Temperature alert notifications*

Follow these steps to set up the temperature parameters used for alert notifications.

1. Click Alert to display the Temperature Alerts page.

2. Select Daytime or Nighttime.

3. Move both sliders to the desired position.

4. Click Update Notification Preferencesto save yourchanges.

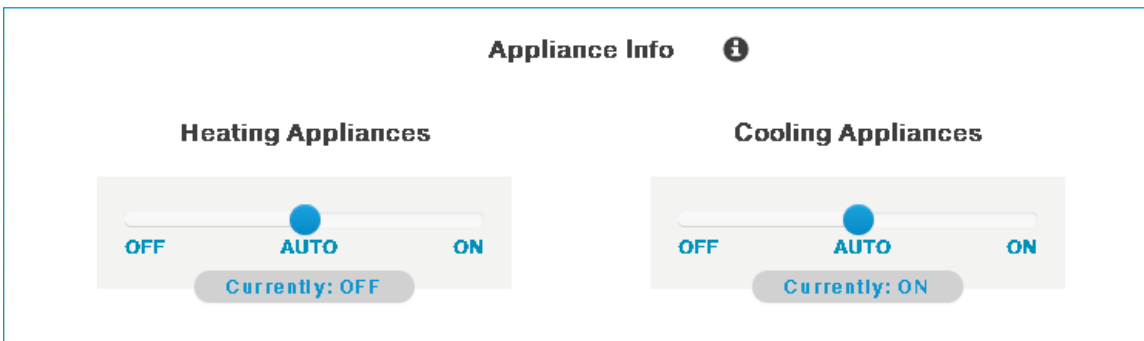## Controlling Temperature or Humidity Appliances



*Figure 11. Control settings for heating and cooling appliances*

The following steps refer to the controls on the Temperature Controls page. The controls on the Humidity Controls page work in the same way for humidifier and dehumidifier appliances.

In the Appliance Info area:

1. Heating Appliances:Drag the circle to the appropriate control setting for the heating appliances in thisroom.

   a. AUTO:(default)TheHiveGatewayturnstheheatingappliancesonandoffasrequiredtokeepthe room temperature within your definedthresholds.

   b. OFF: The heating appliances are turned off and are not controlled by the Hive. They will remainoff until you turn themon.

   c. ON: The heating appliances are turned on and are not controlled by the Hive. They will remainon until you turn themoff.

2. Cooling Appliances: Select the control setting for cooling appliances in the same way as for heating appliances.

## Configuring CO₂ Controls

$CO_2$ controls determine when the system turns $CO_2$ appliances on and off in response to the $CO_2$ levels in the room (as reported by the room's LTH+$CO_2$ or LTH Pro sensors).

On the Room Details page, click $CO_2$ Controls in the left column. The $CO_2$ Controls page is displayed.

### Setting the CO₂ Threshold

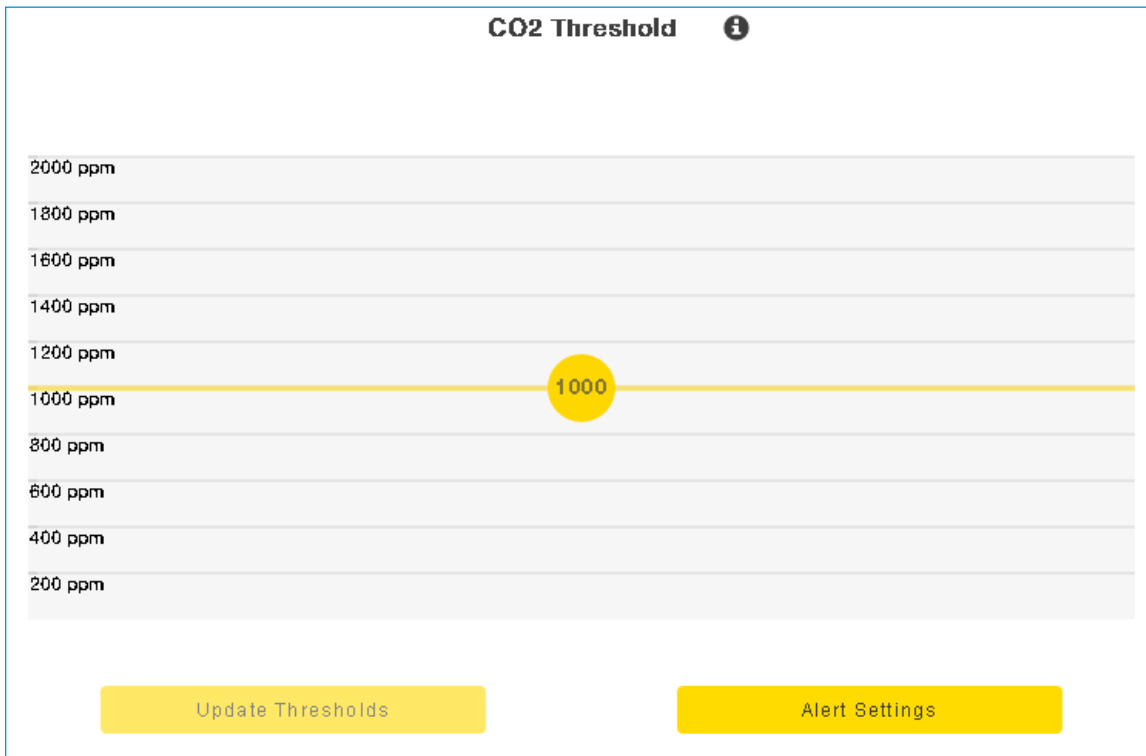The threshold defines the minimum $CO_2$ level that you want to maintain in the room.



Figure 12. CO₂ threshold

Any control device circuit that is assigned to this room and has an appliance type of CO2_EMITTER will be turned on and off in response to the threshold you define here (plus the deadband). For more on thresholds, see Room Controls on page 14.

In the $CO_2$ Threshold area:

1. Drag the circle to set the minimum $CO_2$ level for the room. $CO_2$ appliances will be turned on if the $CO_2$ level drops below this threshold and turned off again when the $CO_2$ rises above the threshold value plus deadband.

2. Click Update Thresholds to save your changes.

## Configuring CO$_2$ Alerts

If you want the system to generate an alert if the CO$_2$ measurement drops below or exceeds specified levels:

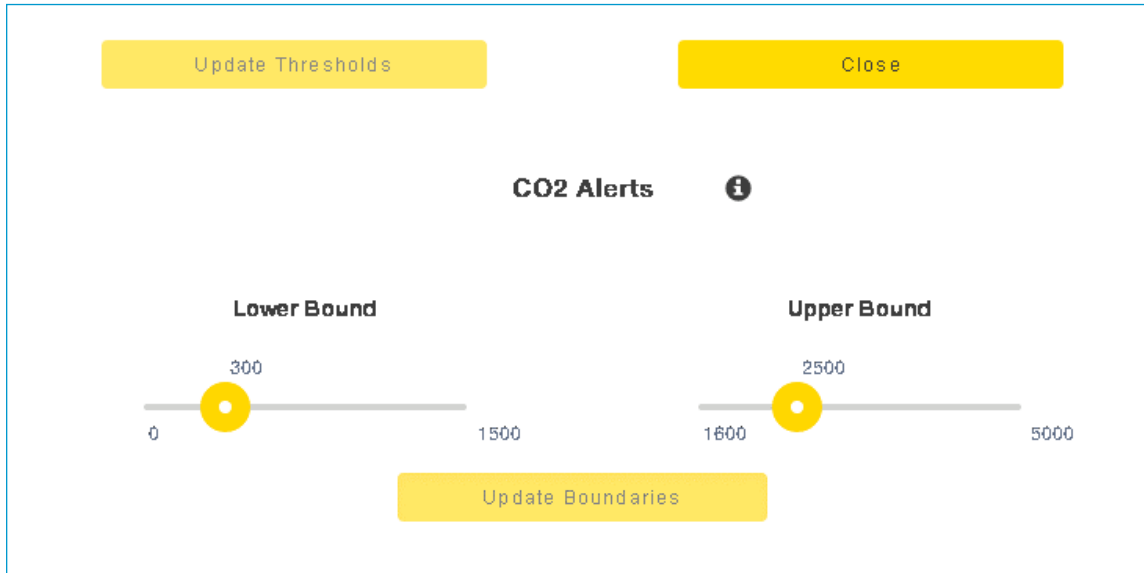1. Click Alert Settings. The page expands to show CO$_2$ alert settings.



*Figure 13. CO$_2$alert settings*

2. Lower Bound: Drag the circle to set the low CO$_2$ level. An aggregate CO$_2$ measurement below this level will trigger an alert.

3. Upper Bound: Drag the circle to set the highCO$_2$ level will trigger an alert.

4. Click Update Boundaries.

5. To hide the CO$_2$ Alerts area, click Close.
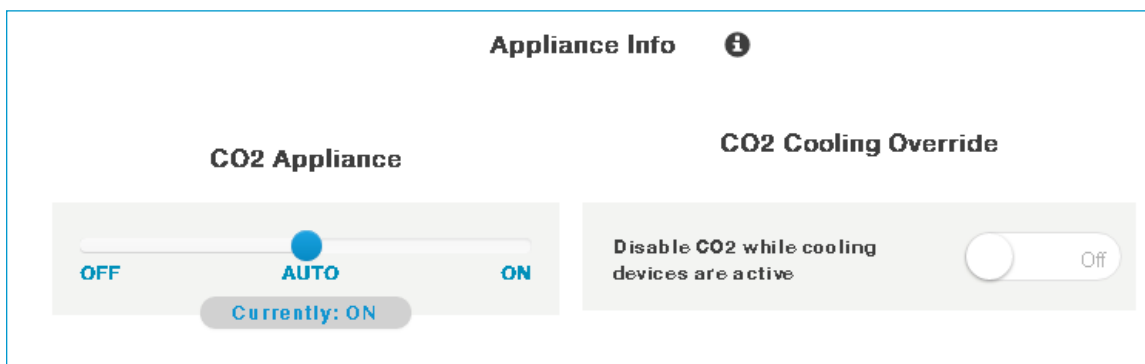
## Controlling CO$_2$ Appliances



*Figure 14. Control settings for CO$_2$appliances*

In the Appliance Info area:

1. $CO_2$ Appliance: Drag the circle to the appropriate control setting for the $CO_2$ appliances in this room.

   - AUTO: (default) The Hive Gateway turns the $CO_2$ appliances on and off as required to keep room $CO_2$ level above your defined threshold.

   - OFF: The $CO_2$ appliances are turned off and are not controlled by the Hive. They will remain off until you turn them on.

   - ON: The $CO_2$ appliances are turned on and are not controlled by the Hive. They will remain on until you turn them off.

2. $CO_2$ Cooling Override: Click the switch to turn the cooling override feature ON or OFF. When ON, the system won't turn on your $CO_2$ appliances while your cooling appliances are running. ($CO_2$ Appliancemust be set to AUTO to allow the system to control your $CO_2$appliances.)

> **! TIP**
>
> *The lighting schedule must be set in order for the $CO_2$ control to operate properly. $CO_2$ will not be emitted during nighttime.*

## Configuring Irrigation Controls

Irrigation controls determine when the system turns irrigation appliances on and off according to the irrigation schedules you create and in response to the aggregate grow-medium moisture level in the room (as reported by the room's WCSM probes).

On the Room Details page, click Irrigation Controls in the left column. The Irrigation Controls page is displayed.
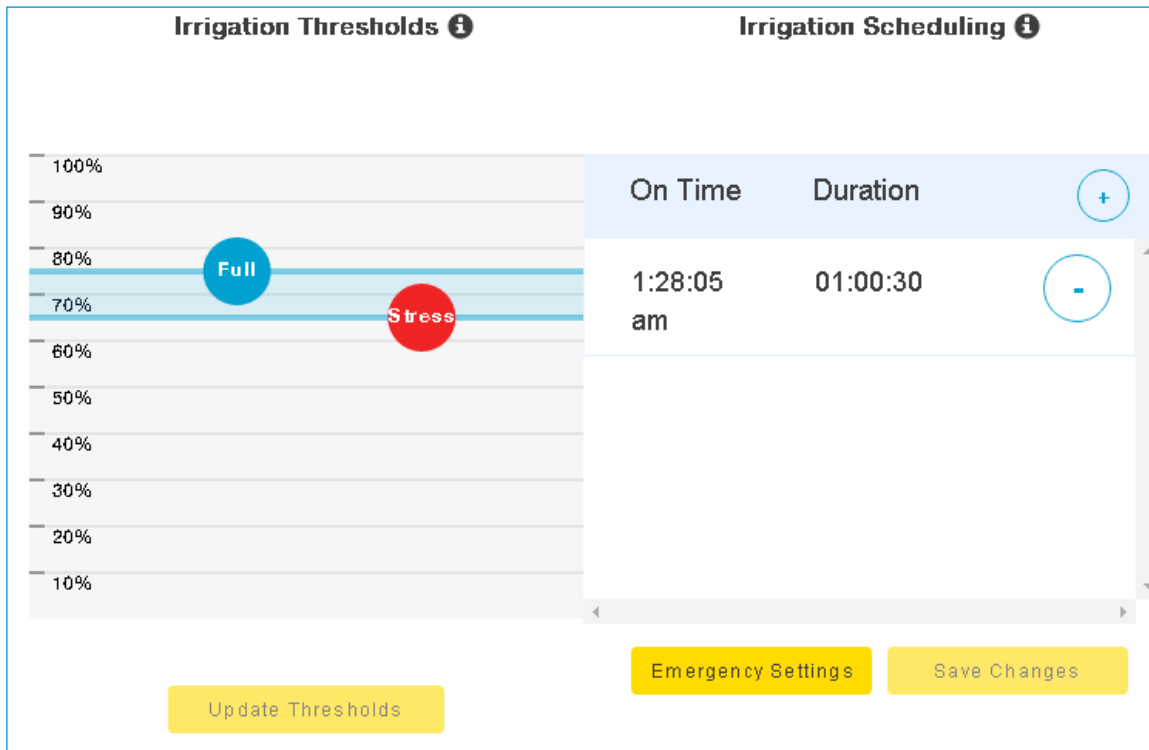


*Figure 15. Irrigation thresholds*

**Setting Irrigation Thresholds**

Thresholds define the grow-medium moisture range that you want to maintain in the room.

Any control device circuit that is assigned to this room and has an appliance type of IRRIGATION_PUMP will be turned on and off according to your irrigation schedules and in response to the thresholds you define here (plus the deadband). For more on thresholds, see Room Controls on page 14.

1. In the Irrigation Thresholdsarea:

   a. Drag the Full circle to set the high grow-medium moisture level for the room. Above this level, the grow medium is too wet. Scheduled irrigation events will be skipped until the aggregate moisture level drops below this threshold (plus the deadband). If you want scheduled irrigation events to always occur, set the Full threshold to100%.

   b. Drag the Stress circle to set the low grow-medium moisture level for the room. Below this level, the grow medium is too dry. Emergency irrigation events will occur until the aggregate moisture level rises above this threshold (plus the deadband). To disable emergency irrigation, set the Stress threshold to0%.

2. Click Update Thresholds to save yourchanges.

**Adding Irrigation Schedules**

1. In the Irrigation Scheduling area, click the plus sign (+) to add an irrigation schedule. The schedule popup box isdisplayed.



*Figure 16. Add Irrigation Schedules popup box*

2. Start Time: Set the time when the irrigation will start:

   a. Click + or – to increase or decrease the hours, minutes, and seconds.

   OR

   Click the hours, minutes, or seconds field, then enter a number.

   b. If necessary, click AM to change the time to PM.

3. Duration: Set how long the irrigation will last. The hours, minutes, and seconds fields work the same way as for Start Time.

4. Click Add. The schedule is saved and the fields are cleared.

5. Repeat steps 2 to 4 to add as many schedules as desired. Schedules cannot overlap.

6. When you're done, click Finished Adding Schedules. Your schedules are displayed on the Irrigation Controls page.

**Deleting an Irrigation Schedule**

In the Irrigation Scheduling area, click the minus sign (–) next to the schedule you want to delete.

**Configuring the Emergency Irrigation Event**

By default, the emergency irrigation event lasts for 1 minute and recurs every 15 minutes until the grow-medium moisture level rises above the Stress threshold (plus deadband). To change these default settings:

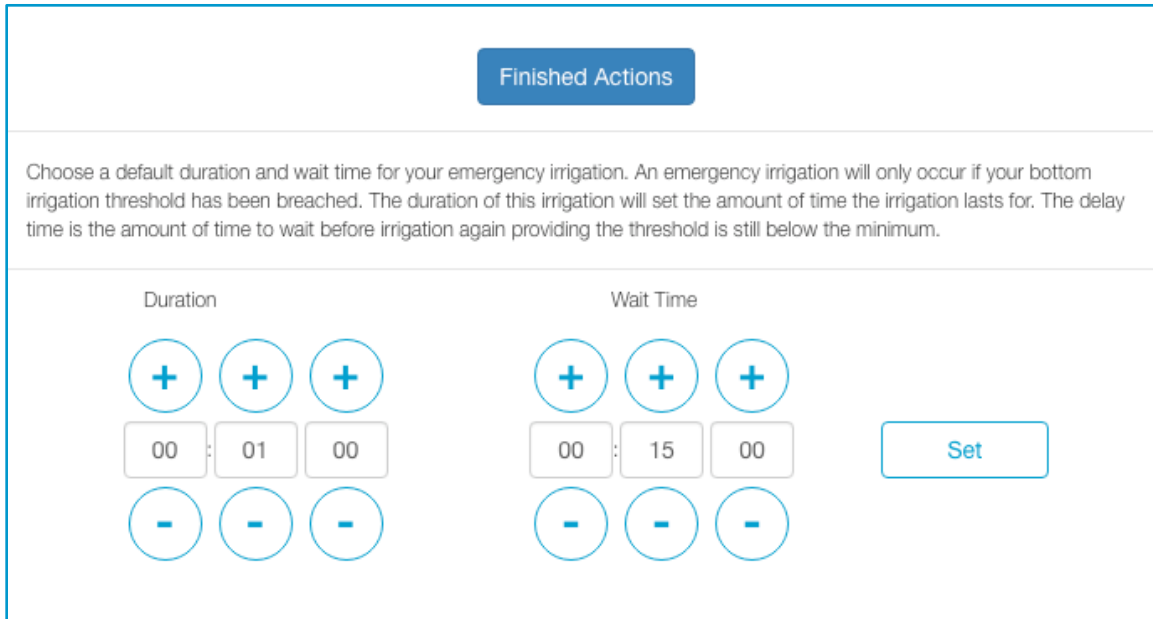1. Click Emergency Settings. The Emergency Irrigation Settings popup box is displayed.



*Figure 17. Emergency Irrigation Settings popup box*

2. Duration: Set how long you want the irrigation to last:

    Click + or – to increase or decrease the hours, minutes, and seconds.

    OR

    Click the hours, minutes, or seconds field, then enter a number.

3. Wait Time: Set how long the system will wait to start another emergency irrigation after the previous one ends. The hours, minutes, and seconds fields work the same way as for Duration.

4. Click Set.

5. Click Finished Updating to return to the Irrigation Controls page.
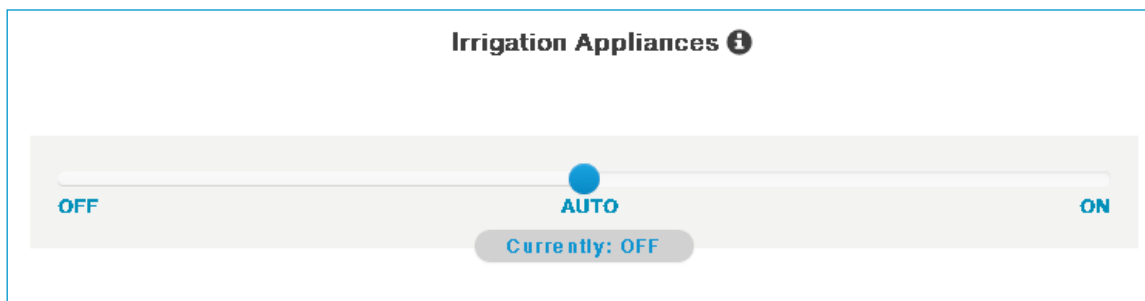
**Controlling Irrigation Appliances**



*Figure 18. Control settings for irrigation appliances*

In the Irrigation Appliances area, drag the circle to the appropriate control setting for the irrigation appliances in this room.

- **AUTO:** (default) The Hive Gateway turns the irrigation appliances on and off as required to keepthe grow-medium moisture level within your definedthresholds.

- **OFF:** The irrigation appliances are turned off and are not controlled by the Hive. They will remainoff until you turn themon.

- **ON:** The irrigation appliances are turned on and are not controlled by the Hive. They will remainon until you turn themoff.

## Configuring Lighting Controls

Lighting controls determine when the system turns lighting appliances on and off according to the lighting schedule and in response to the temperature aggregate in the room (as reported by the room's LTH, LTH+CO$_2$, and LTH Pro sensors).

On the Room Details page, click Lighting Controls in the left column. The Lighting Controls page is displayed.

**Changing the Lighting Schedule**

The lighting schedule defines the time period when the lighting appliances in the room will be turned on.

Any control device circuit that is assigned to this room and has an appliance type of LIGHTS will be turned on and off according to the lighting schedule.

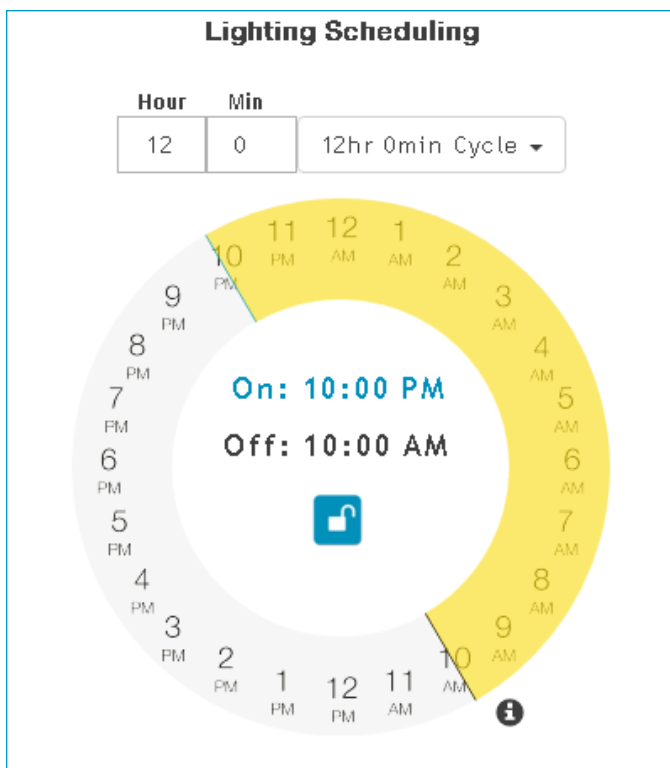1. In the Lighting Scheduling area, click the lock icon in the center of the circle to unlock theschedule.



*Figure 19. Setting the start time for a lighting schedule*

2. Enter the hours and minutes for the length of the "daytime" period (when lights will be on).

OR

In the cycle drop-down list, select a predefined day length: 12 hours, 18 hours, or 24 hours.

3. In the time circle, click the time that you want the day to begin.

OR

Drag the day/night divider line to the time that you want the day to begin.

4. Click the lock icon to save the schedule and lock the controls.

## Setting Lighting Overheat Thresholds

Overheat thresholds help prevent plant stress when heat generated from a room's lighting outpaces the room's cooling capabilities.

Any control device circuit that is assigned to this room and has an appliance type of LIGHTS will be turned off in response to the overheat threshold you define here. For more on thresholds, see Room Controls onpage 14.

In the Lighting Overheat Thresholds area:

1. Drag the high temperature box (right) to set the high daytime temperature for the room. Lights will be turned off if the room temperature exceeds this threshold.

2. Drag the low temperature box (left) to set the cool-down temperature for the room. After an overheat shutoff, lights will be turned back on when the room temperature drops below this threshold.
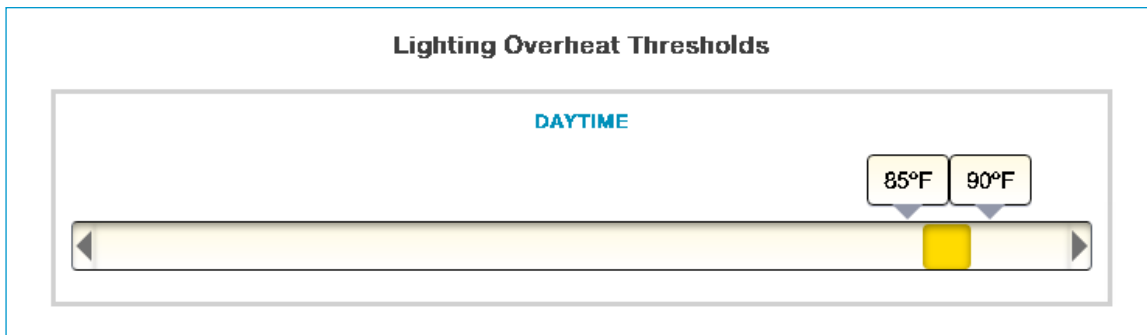


*Figure 20. Lighting overheat thresholds*
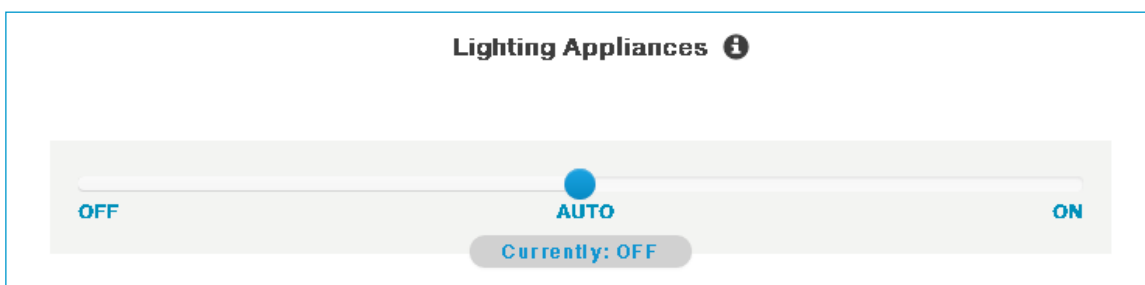
## Controlling Lighting Appliances



*Figure 21. Control settings for lighting appliances*

In the Lighting Appliances area, drag the circle to the appropriate control setting for the lighting appliances in this room.

- AUTO: (default) The Hive Gateway turns the lighting applianceson and off according to the lighting schedule and as required to keep the room temperature below the lighting overheatthreshold.

- OFF: The lighting appliances are turned off and are not controlled by the Hive. They will remainoff until you turn themon.

- ON: The lighting appliances are turned on and are not controlled by the Hive. They will remainon until you turn themoff.

## Changing Devices in a Room

To change the devices in a room, you can move a device from one room to another or change the device to Unassigned.

To reassign a device:

1. On any page in the Swarm Control web app, select Settings > Device Manager to open the Device Manager page.

2. In the left column, click the device you want to move. The device information is displayed in the main panel.
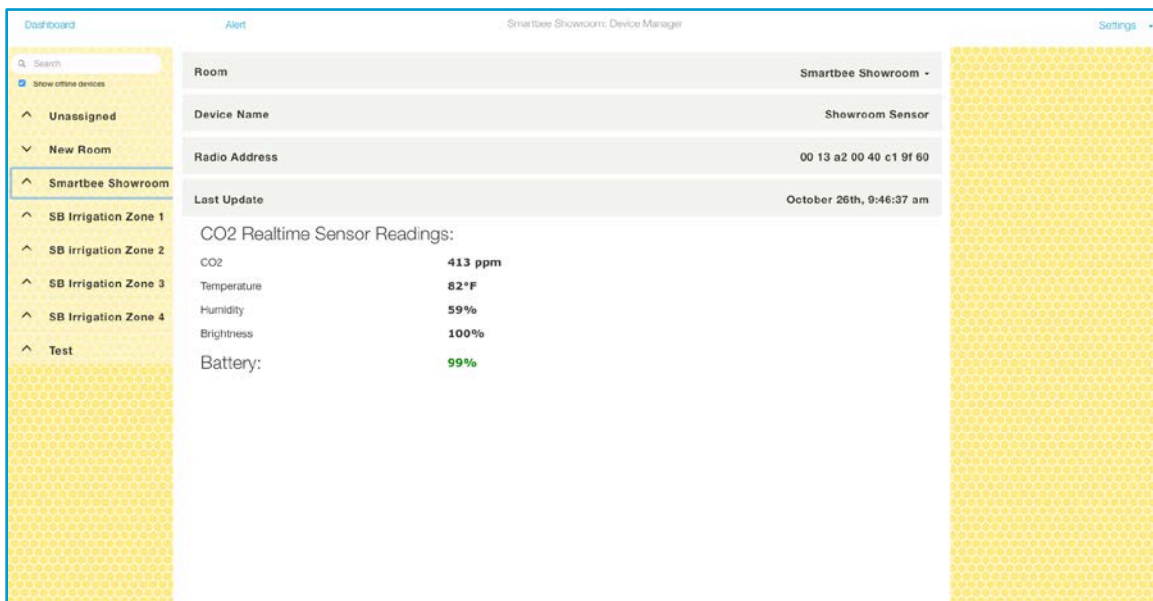


*Figure 22. Moving a device to another room*

3. Room: Select the room to which you want to move the device, or select Unassigned.

## Managing Rooms

### Renaming a Room

1. On any page in the Swarm Control web app, select Settings > Room Manager.
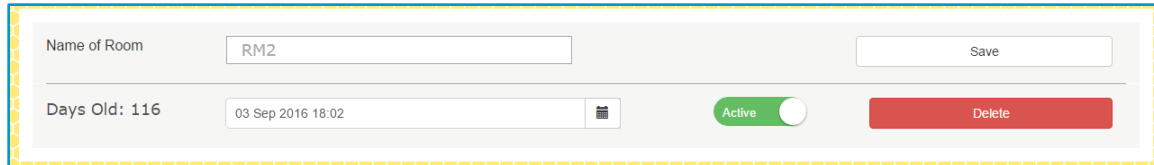2. On the Room Manager page, click Edit to enable the room fields.



*Figure 23. Renaming a room*

3. Name of Room: Enter the new room name.
4. Click Save.
5. Click Done.

### Deleting a Room

> **⚠ CAUTION**
>
> *Deleting a room is irreversible. All room control settings and historical sensor data will be lost.*

1. On any page in the Swarm Control web app, select Settings > Room Manager.
2. On the Room Manager page, click Edit to enable the room fields.
3. Click Delete.
4. In the confirmation pop-up box, click Yes, I'm sure.
5. Click Done.

# Understanding Sensor Data

Understanding what's actually happening in a room is the key to managing it.

> **TIP**
>
> *We've put together a short How-To video that explains how to interpret sensor data and how you can use this information to optimize your SmartBee system and produce greater and more consistent yields. Watch it here:*
> *https://youtu.be/bKKEOOgCMv4?list=PLRG3ZemrqXwMcT4FNL_euDz25_3FhU5_9.*

## Viewing Sensor Data (Room Details)

1. On any page in the Swarm Control web app, click Dashboardat the top of the page.

2. OntheDashboardpage,clicktheroomwhosedetailsyouwanttoview.TheRoomDetailspageis displayed.



*Figure 24. Room Details page*

This page is where you land each time you enter a room. It shows the room's current and historical sensor data and allows you to customize the data that is shown in the graph (see the next section). The ability to see what's happening in a room lets you monitor how your garden is performing, especially when you're not there.

The left column provides access to the individual control settings for the room. For more, see ConfiguringRoom Controls on page 26.

## Customizing Your View of the Sensor Data

By default, the graph on the Room Details page shows data for the last 24 hours and for all environment categories—Temperature, Humidity, $CO_2$, Irrigation, and Lighting. Looking at the viewer controls, you can tell that this is the data that you're seeing because:

- The Last 24 Hours button is gray;
- The Show/Hide button says "Hide"; and
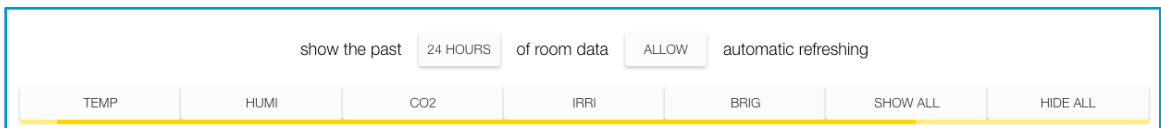- All of the category buttons are gray.



*Figure 25. Control buttons for the room details graph*

A gray button means that the button is "on"; that is, the type of data indicated by the button is showing

in the graph. A white button means the button is "off" and that type of data is not showing.

## Changing the Time Period Shown

To change the time period for the room details graph, click one of the time period buttons above the graph.

At the bottom of the graph, the blue highlighted time bar indicates the time period being shown—in this case, 24 hours.
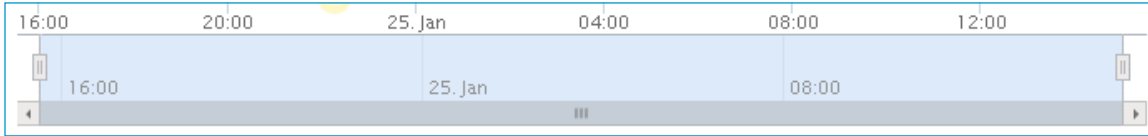


*Figure 26. Time bar on the room details graph*

You can further refine this period by dragging the handles at either end of the time bar to create a specific timeframe. This example shows an 8 hour timeframe.
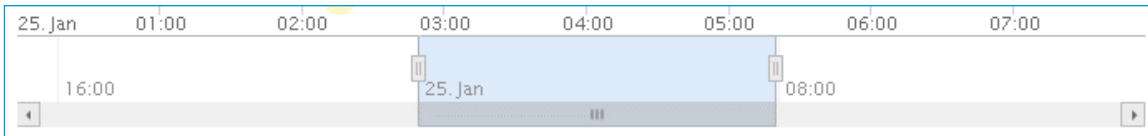


*Figure 27. Custom timeframe selected*

Once you've defined a timeframe, you can drag it (or use the scrollbar) to move it forward or backward within the selected time period.

Click Refresh Resolution to load additional data points (if available) for the selected timeframe.

## Changing the Categories Shown

The category buttons above the room details graph determine what data is shown in the graph. Click any category button to show or hide data for that category.

Each category includes:

- One or more lines for the sensor readings in the category
- One or more square waveforms (boxes) that indicate when the appliances in the category were turned on

> **! EXAMPLE**
>
> *The following figure shows the Temperature category. The red line indicates the aggregate room temperature, while the blue box indicates when cooling appliances were turned on. If heating appliances had been turned on, the box would be orange.*

*Figure 28. Temperature category*

Hover your mouse pointer over (or tap) any point on the sensor line to see exact measurements at a given time.

Viewing multiple categories at once can help you make better gardening decisions by showing you how the conditions and appliances in one category affect the conditions and appliances in the other categories.

# Managing Devices

This section explains how to manage the hardware devices in your SmartBee Control system.

## Adding a Device

You can add multiple devices to your system at the same time.

### a. Add the Device

To add a device:

1.  Make sure that any control devices you want to add are plugged in.

> ⬡ **CAUTION**
>
> *To prevent your appliances from operating unexpectedly, do not plug appliances into the control devices until after adding and configuring the devices.*

2.  Make sure that any sensors you want to add are charged or plugged in and are in an "awake" state.

3.  On any page in the Swarm Control web app, select Settings > Permit Join.

    For two minutes, the Hive attempts to find sensors and control devices within its range. Alerts are displayed as devices are found.
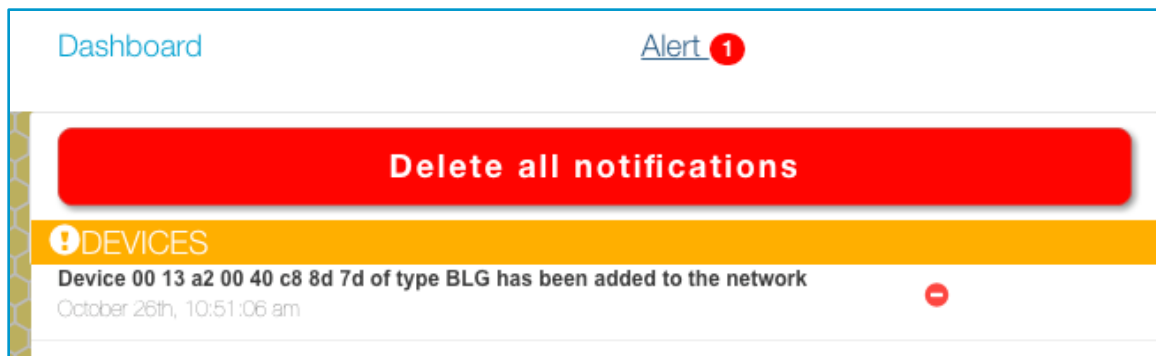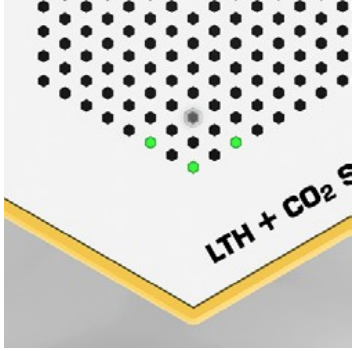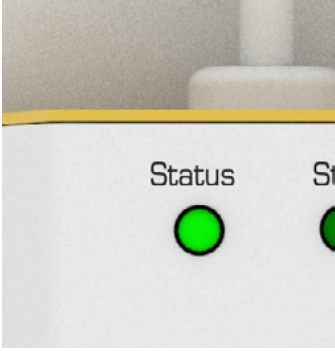


*Figure 29. Device discovery alert category*

    After two minutes, continue with the instructions below to verify the deviceconnections.

### b. Check the Device to Verify the DeviceConnection

Once your devices are joined to the Hive, you need to verify the connections on the devices themselves to make sure that they are communicating with the Hive.

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

| On a sensor, the status LED is on the right and blinksvery slowly when the sensor is connected to a network. | On a control device, the status LED is solid when the device is connected to a network. | |
|---|---|---|
| | On a Stinger Smart Plug, the status LED is on the front of the device. | On a Stinger Smart Strip 4, the status LED is behind the ventilation grill on the left side of the device. |
|  |  |  |
| *Figure 30. Network connection LED on a sensor* | *Figure 31. Network connection LED on a Stinger Smart Plug* | *Figure 32. Network connection LED on a Stinger Smart Strip 4* |

If the status LED on a device is off, see Troubleshooting on page 67.

## c. Check the Web App to Verify the DeviceConnection

Once your devices are joined to the Hive, you need to verify the connections in the web app to make sure that the Hive is receiving data from your devices.

1. On any page in the Swarm Control web app, select Settings > Device Manager.

On the Device Manager page, you'll see a list of your unassigned devices at the top of the left column.
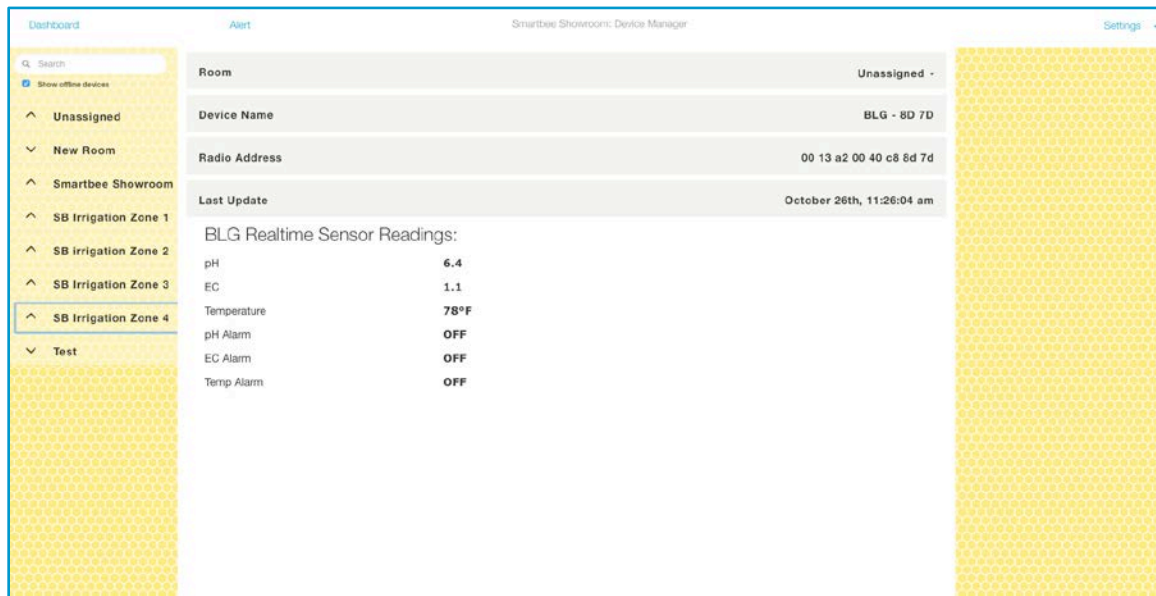


*Figure 33. Device Manager page*

2. Verify that each sensor and control device appears in the Unassigned devices list. To identify an individual device:

- Match the radio address on the device sticker to a radio address shown in the list.

  OR

- Match the last four characters in the radio address on the device sticker to the four characters at the end of the device name in the list.

---

**! EXAMPLE**

"A4 D1" on the sticker matches to "WCS - A4 D1" in the list.

---

**! IMPORTANT**

Although each circuit on a Stinger Smart Strip 4 is considered a separate device, all four circuits on an SS4 use the same radio address and have the same device name followed by a circuit number, 1 to 4.

---

*Figure 34. How circuits on a Stinger Smart Strip 4 appear in Device Manager*

> ## ! TIP
>
> *Another way to verify that a device is connected to the Hive is to look at the device discovery alerts in the Alert list. Match the radio address from the device sticker to the radio address shown in a discovery alert.*

3. If a new device doesn't appear in the devices list, see Troubleshooting on page 67.

## Assigning a Device to a Room

After joining a device to your system, you need to assign it to a room.

- Assigning a sensor to a room causes the system to combine data from that sensor with the data collected from other sensors assigned to the same room.

- Assigning a control device circuit to a room causes the system to activate or deactivate the circuit in response to room conditions. To be controlled by the system, a control device circuit must also have an appliance type defined.

> ## ! CAUTION
>
> *To prevent appliances from operating unexpectedly, do not plug appliances into control device circuits until after you've assigned each circuit to a room.*

To assign a device to a room:

1. On any page in the Swarm Control web app, select Settings > Device Manager to open the Device Manager page. All unassigned devices are listed at the top of the left column.

2. In the Unassigned devices list, click the device you want to add to a room. Information about the selected device is displayed in the main panel.
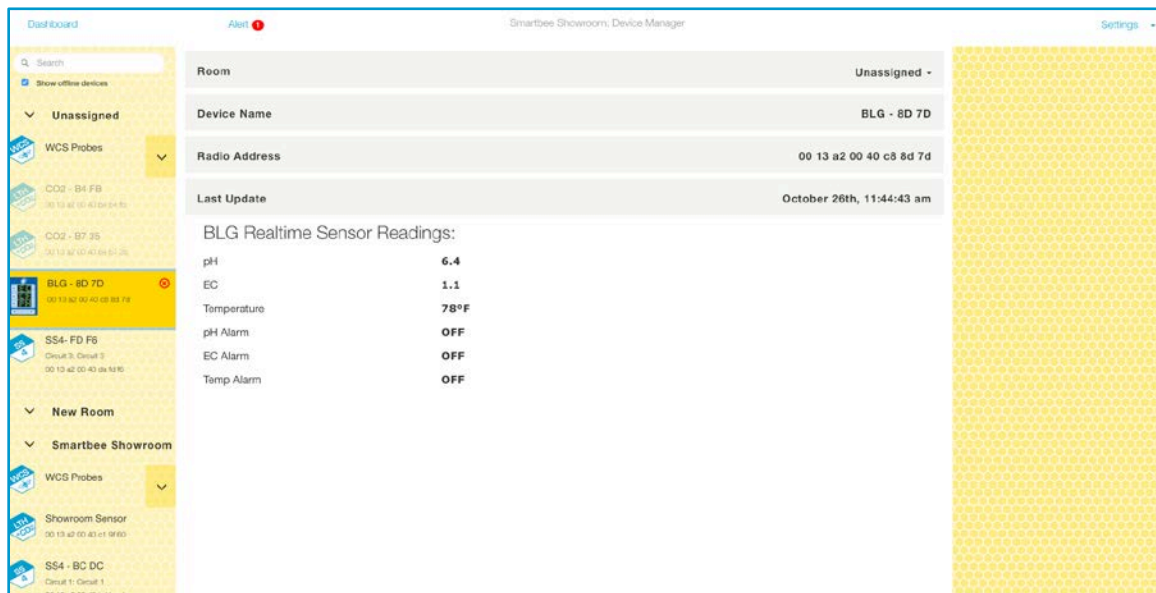


Figure 35. Assigning a device to a room

In the Room drop-down list, select the room for this device.

3. In Device Name, enter a meaningful name that will help you identify this device.

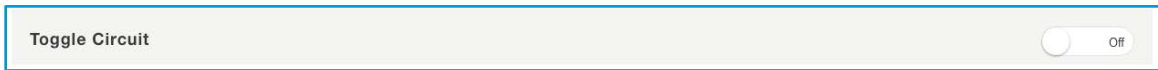4. If you're assigning a sensor to a room, that's it! Skip the remaining steps, which only apply to control devices.

5. Make sure that nothing is plugged into the control device circuit.

6. Verify that the system is controlling the circuit:

   a. Click the Toggle Circuit switch to turn off the circuit, as shown below.

   | Toggle Circuit | | Off |
   |---|---|---|

   b. Look at the control device to make sure that the circuit's LED light is off.

   c. Click the Toggle Circuit switch again to turn the circuit back on.

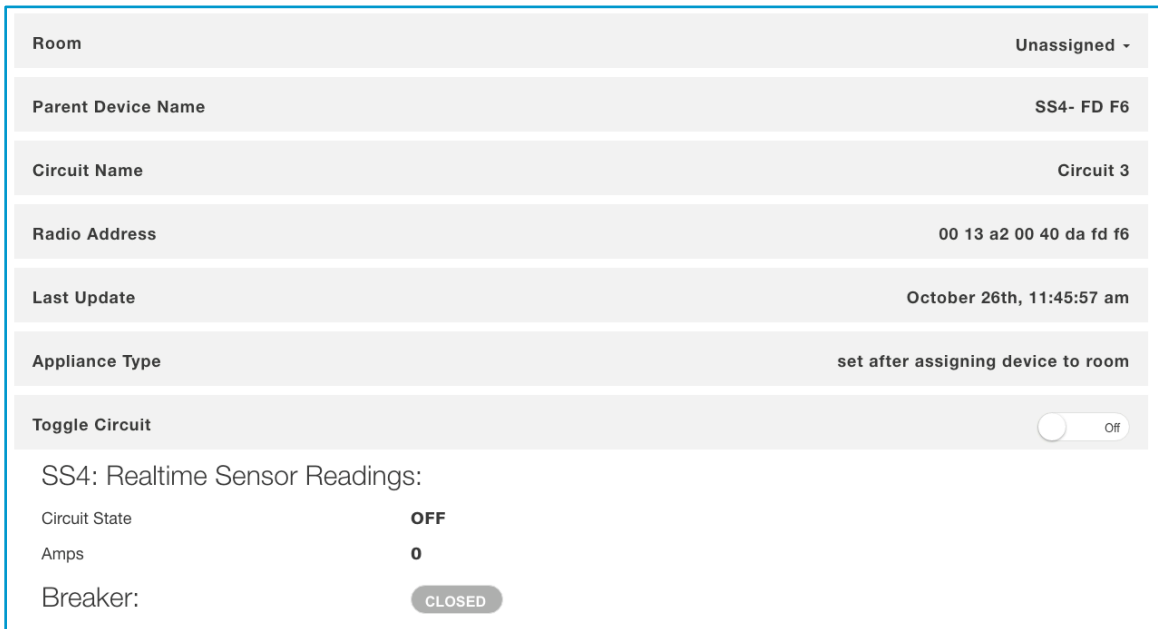   d. Look at the control device to make sure that the circuit's LED light is on.

| | |
|---|---|
| **Room** | Unassigned ▾ |
| **Parent Device Name** | SS4- FD F6 |
| **Circuit Name** | Circuit 3 |
| **Radio Address** | 00 13 a2 00 40 da fd f6 |
| **Last Update** | October 26th, 11:45:57 am |
| **Appliance Type** | set after assigning device to room |
| **Toggle Circuit** | Off |

SS4: Realtime Sensor Readings:

| Circuit State | OFF |
|---|---|
| Amps | 0 |

Breaker:   CLOSED

*Figure 36. Toggle a circuit in Device Manager*

7. In Appliance Type, select the type of appliance that will be plugged into the circuit.

## Changing the Appliance Type for a Control Device

To be controlled by the system, a control device must have a defined appliance type and be assigned to a room.

1. On any page in the Swarm Control web app, select Settings > Device Manager to open the Device Manager page.

2. In the left column, click the control device circuit whose appliance type you want to change. The

   device information is displayed in the main panel.

3. In the Appliance Type drop-down, select the new appliance type. If you don't want the system to control this circuit, select Unassigned.

*Figure 37. Changing an appliance type*

## Controlling Unassigned Circuits

The system won't automatically control any control device circuit with an appliance type of Unassigned. But you can still remotely control an unassigned circuit, by manually toggling the circuit on or off in the web app.

> **! NOTE**
>
> *A circuit with an assigned appliance type can't be manually controlled because it's being controlled by the system.*

To turn an unassigned circuit on or off:

1. On any page in the Swarm Control web app, select Settings > Device Manager to open the Device Manager page.

2. In the left column, click the unassigned control device circuit you want to turn on or off. The device information is displayed in the main panel.

3. Click the Toggle Circuit switch to turn the circuit on or off, as shown below.

| Toggle Circuit | On |
|---|---|

| Room | Unassigned ▾ |
|---|---|
| Parent Device Name | SS4- FD F6 |
| Circuit Name | Circuit 3 |
| Radio Address | 00 13 a2 00 40 da fd f6 |
| Last Update | October 26th, 11:45:57 am |
| Appliance Type | set after assigning device to room |
| Toggle Circuit | Off |

SS4: Realtime Sensor Readings:

| Circuit State | OFF |
|---|---|
| Amps | 0 |

Breaker:   CLOSED

*Figure 38. Toggle an unassigned circuit in Device Manager*

# Checking Sensor Battery Levels

> ⚠️ **IMPORTANT**
>
> *Check your sensor battery levels regularly. It is strongly recommended that sensors remain plugged into an external power supply. If this is not possible, the battery must be fully recharged at regular intervals to maintain the battery's charge at greater than 50%. In brightly lit conditions, the solar panels on a sensor extend the life of its battery charge but don't eliminate the need to recharge the sensor. The battery charge level of a sensor can be viewed on the Device Manager page.*

> ⚠️ **NOTE**
>
> *The individual units should be plugged in ALL the time. Solar panels are for back up resources only.*

1.  On any page in the Swarm Control web app, select Settings > Device Manager to open the Device Manager page.

2.  In the left column, a red battery icon is displayed under any sensor whose battery is below 30%.



*Figure 39. Low battery icon*

3.  To see the exact battery level for a sensor, click the sensor in the left column. The deviceinformation is displayed in the mainpanel.

A green battery level is good (100 to 50%), orange indicates that recharging the battery is recommended (50 to 25%), and red (25 to 0%) means the sensor is close to shutting down. Connect an external power supply as soon as possible to maintain continuous operation of the sensor (see Recharging Sensorsbelow).

## Recharging Sensors

When the sensor battery level in the Swarm Control web app is below 50%, it's time to recharge the sensor.

> **!** **IMPORTANT**
>
> *In brightly lit conditions, the solar panels on a sensor extend the life of its battery charge but don't eliminate the need to recharge the sensor. For optimal performance, leave the sensors plugged in at all times.*

To recharge a sensor:

1. On an LTH, LTH+$CO_2$,LTH Pro, or WCS sensor, make sure that the power switch on the side of the sensor is ON (positioned toward the solar panels).

2. Using the included AC adapter or mini-B USB 5V adapter, plug in the sensor and let it charge for up to sixhours.

   If the battery had some charge left, the sensor continues to operate during recharging. If the battery was completely depleted, it may take up to four hours of recharging before the sensor resumes operation.

3. After a few hours, check the battery level (see Checking Sensor Battery Levelson page50). When the battery is at 100%, recharging iscomplete. The sensor has an internal battery protection circuit and charging circuit that protects the battery from overcharging.

## Calibrating the Water Content Sensor

Water Content Sensor modules must be calibrated before they can be used.

To calibrate a WCS module:

1. Plug in the WCS sensor.

2. On any page in the Swarm Control web app, select Settings >Permit Join > Read Pop Up and click OK.

3. Locate the power switch on the side of the module, and place it in the ON position (towards the top).

4. Wait until you see the device displayed in Device Manager.

5. Click the sensor in the Device Manager List. Calibration buttons will display.

6. If you are instructed to Reset to Calibrate, then:

   a. Turn the power switch to the OFF position (towards the bottom).

   b. Wait 10 to 15 seconds.

   c. Turn the power switch to the ON position (towards the top). Calibration buttons are now displayed in Device Manager.

7. Select the appropriate probe to calibrate from the Device Manager list.

8. Place the first probe all the way to the hexagon in the DRY grow medium of your choice.

9. Click LO.

10. Remove the probe from the DRY grow medium.

11. Place the probe all the way to the hexagon in fully saturated grow medium.

12. Click HI.

13. Repeat steps 7 thru 12 for all remaining probes.

> **! TIP**
>
> *The Water Content Sensor module is only able to be calibrated when the device is "Awake." To awaken the device, repeat Step 6 above and the calibration buttons will be become visible.*

# 3System Administration

This chapter provides step-by-step instructions for completing administration tasks in your SmartBee Control system.

The sections in this chapter assume that you are logged into the Swarm Control web app. If you have more than one Hive Gateway, make sure that you log in using the URL and Port for the Hive you want to work with.
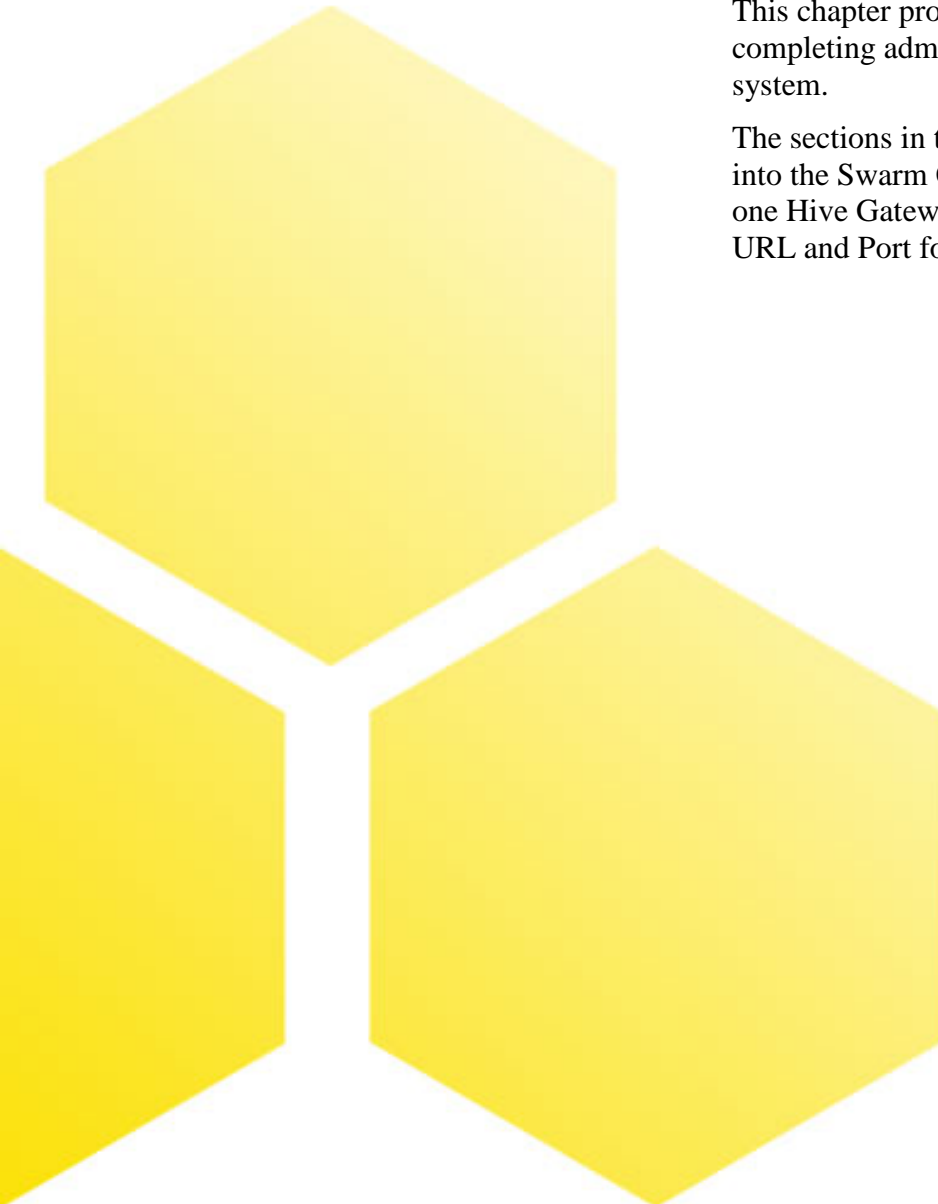
# Changing the Hive Gateway Name

The Hive Gateway name is used as the sender name in email alerts sent from the Hive. You chose this name during setup the first time you logged into the Swarm Control web app (see c. Complete First Time Setup on page 20).

To change the Hive name:

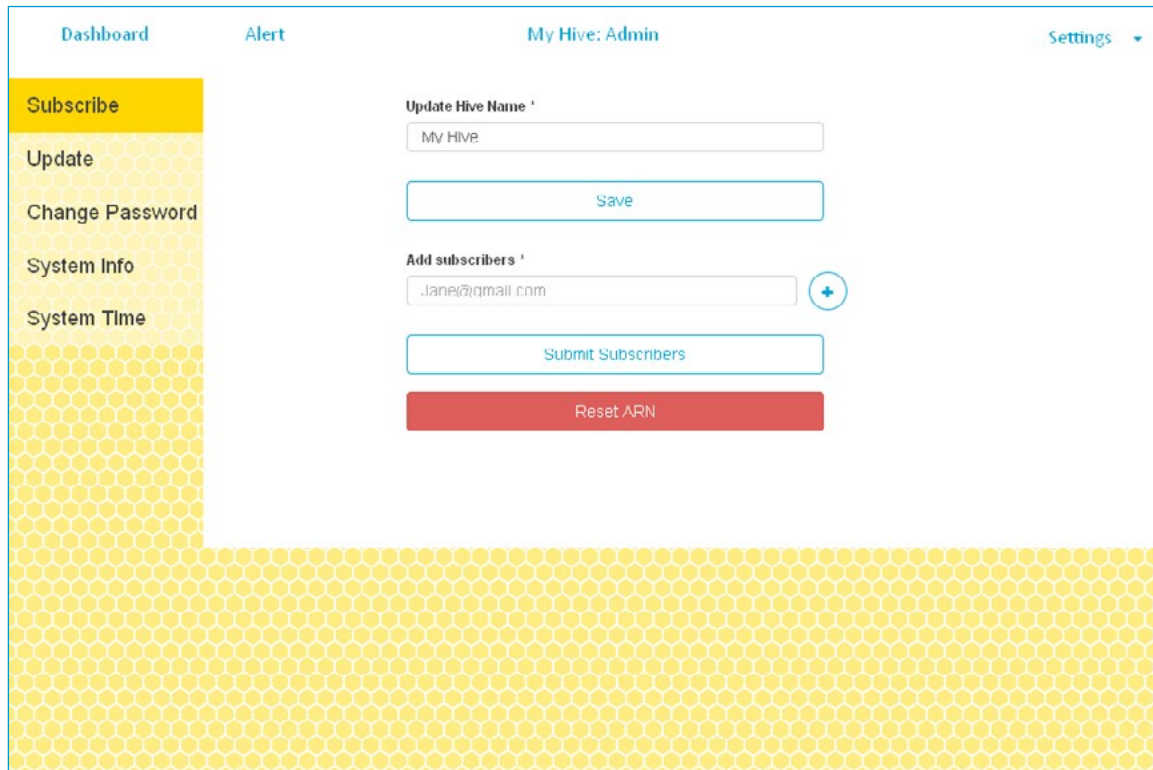1. On any page in the Swarm Control web app, select Settings > Admin to open the Admin page.



*Figure 40. Admin page*

2. Update Hive Name: Enter the new name for the Hive (up to 200 alphanumeric characters, including spaces).

3. Click Save.

# Changing the System Date/Time

You set the system date and time during setup the first time you logged into the Swarm Control web app (see c. Complete First Time Setup on page20).

To change the system date or time:

1. On any page in the Swarm Control web app, select Settings > Admin to open the Admin page.

2. In the left column, click System Time to display and set the system time fields.

Figure 41. Set the system date and time

3. To set the date and time to the current date and time, click Now.

OR

a.  To change the date, click the date to open a calendar, then select a new date.

b.  To change the time:

- Click up arrow ordown arrow to increase or decrease the hour and minute.

    OR

    Click the hour or minute field, then enter a number.

- Click PM to change the time to AM, or if AM is shown, click it to change it to PM.

4.  Click Save Time.

# Changing Your Hive Gateway Password

To change the Hive Gateway login password:

1.  On any page in the Swarm Control web app, select Settings > Admin to open the Admin page.

2.  In the left column, click Change Password to display the change password fields.



*Figure 42. Change Password page*

3.  Complete thefields.

*Table 4. Password fields*

| Field | Description |
|---|---|
| Current Password | Enter the current password. If this is the default password, it is beebee833. |
| New Password | Enter the new password.<br><br>⚠ **IMPORTANT**<br>*Write this password down and keep it somewhere safe.* |
| Repeat New Password | Enter the new password again. |

4. Click Save.

# Changing the Hive Gateway's Network Connection

Out of the box, the Hive is configured as a Wi-Fi hotspot. If necessary, you can configure the Hive to join an existing Wi-Fi or Ethernet network.

To change the Hive Gateway's network connection:

1.  On any page in the Swarm Control web app, select Settings > Network Setup to open the Network Setup page.

2.  Continue with the instructions for the type of connection you want to configure:

    - Wi-Fi Connection: Network Discovery

    - Etherneton page 60

    - Hive Hotspoton page 62

## Network Discovery

You must now ensure that your current device (whether you're on your computer, phone, or tablet) is on the same network as your Hive, and find your Hive there. For example, if your Hive was in Access Point (Hot Spot) mode and you've now configured your Hive for your Home Network, connect your computer/phone/tablet to your Home Network.

If your Hive was on your Home Network and you configured it back to an Access Point (Hot Spot), you must connect your computer/phone/tablet to the Hive Hot Spot.

There are several ways to find your Hive:

- If you gave it a static IP address, you can type that into a browser to load the app.

- On Windows or Android: Please download the respective App Launcher: http://smartbeecontrollers.com/support/downloads/.

- On Mac OSX or iOS: Open a web browser window and type in: http://smartbee.local.

    OR

    Login to your network's router and find the device named "smartbee", find the IP address, then type that into a browser.

- If your hive is in Hot Spot mode, you can always just type http://10.0.0.1into a browser.

When you find your Hive, you may login and go to Settings > Admin > System Info to find your IP address. This can be used in a browser, and will be useful if you set up your router to do external port forwarding.

The Hive can connect to your existing Wi-Fi network (802.11b/g/n using WPA).

1.  In the left column on the Network Setup page, click WiFi if it is not already highlighted. The Wi-Fi fields are displayed.

*Figure 43. Wi-Fi connection configuration*

2. Complete thefields.

*Table 5. Wi-Fi network connection fields*

| Field | Description |
|---|---|
| Available Networks | Select your network in the drop-down list. If your network doesn't appear in the list, click Scan for Available Networks, wait a few seconds, then check again. |
| Network SSID | If the network you selected in Available Networksbroadcasts its SSID, it is automatically displayed here. If it doesn't, enter the SSID. |

3. 

| | | |
|---|---|---|
| Network Encryption | Select the type of encryption used on the selected network. Secure: WPA or WEP, or Unsecured: Open. |
| Network Password | Enter the password for the network. |
| Network Configuration | DHCP is the default configuration and doesn't require you to enter any additional information.<br><br>**IMPORTANT**<br>*We recommend that you assign a static IP address whenever possible. Although initial setup may be easier when using DHCP, the IP address can change later, which may cause problems with routing, network discovery, and port forwarding.*<br><br>If you want to assign an IP address to the Hive, select STATIC and complete the remaining fields.<br><br>**TIP**<br>*You may want to first use the DHCP configuration, then use the resulting network information (in Settings > Admin >*<br><br>*System Info) to help you complete the fields required for STATIC configuration.* |
| Network Address (STATIC only) | Enter the Hive's IP address. |
| Subnet (STATIC only) | Enter 255.255.255.0 for most home routers, or enter the subnet address you want to use. |
| Gateway (STATIC only) | Enter your router's IP address. |
| DNS (STATIC only) | Enter the DNS Server address. We recommend using Google's 8.8.8.8. Or you can use your router's IP address. |

Click Update Network Settings.

The login page is displayed.

As the Hive attempts to find the new network, LED 4 will start to blink.

4. Wait for LED 4 to turn solid.

5. Log back into the web app.

## Ethernet

The Hive can connect to your existing Ethernet network via a CAT-5 network cable.

1. Plug an Ethernet cable into the Hive.

2. In the left column on the Network Setup page, click Ethernet. The Ethernet fields are displayed.



*Figure 44. Ethernet connection configuration*

3. Complete the fields.

*Table 6. Ethernet network connection fields*

| Field | Description |
|---|---|
| Network Configuration | DHCP is the default configuration and doesn't require you to enter any additional information. <br><br> **IMPORTANT** <br> *We recommend that you assign a static IP address wheneverpossible. Although initial setup may be easier when using DHCP,the IP address can change later, which may cause problems withrouting, network discovery, and port forwarding.* <br><br> If you want to assign an IP address to the Hive, select STATIC and complete the remaining fields. <br><br> **TIP** <br> *You may want to first use the DHCP configuration, then use the resulting network information (in Settings > Admin >System Info) to help you complete the fields required for STATIC configuration.* |

4. C

| Field | Description |
|---|---|
| Network Address (STATIC only) | Enter the Hive's IP address. |
| Subnet (STATIC only) | Enter 255.255.255.0 for most home routers, or enter the subnet address you want to use. |
| Gateway (STATIC only) | Enter your router's IP address. |
| DNS (STATIC only) | Enter the DNS Server address. We recommend using Google's 8.8.8.8. Or you can use your router's IP address. |

lck Update

Network Settings.

The login page is displayed.

As the Hive attempts to find the new network, LED 4 will start to blink.

5. Wait for LED 4 to turn solid.

6. Log back into the web app.

## Hive Hotspot

The Hive ships in Access Point (AP) mode, which means that it's broadcasting its own Wi-Fi network and acting as a standalone Wi-Fi hotspot. You can connect directly to it with any Wi-Fi enabled device by connecting to its hotspot.

In hotspot mode, the Hive's defaults are:

- Network name: Smartbee-FFFFFF (where FFFFFF are any six hexadecimaldigits)
- Address: 10.0.0.1
- Password:beebee833
- WPAencrypted

If you change the Hive's network connection to Wi-Fi or Ethernet, you can return the Hive to hotspot mode here in Network Setup, or by using the Networkbutton on the Hive itself.

1. In the left column on the Network Setup page, click Hive Hotspot. The Hive Hotspot fields are displayed.



*Figure 45. Hive Hotspot connection configuration*

2. Complete the fields.

*Table 7. Hive hotspot connection fields*

| Field | Description |
|-------|-------------|
| Network Name | Enter the name you want to use to identify the Hive hotspot network. The default name is Smartbee-FFFFFF, where FFFFFF are any six hexadecimal digits. Maximum of 32 characters. |
| Network Encryption | By default, the hotspot network uses WPA encryption. We recommend that you keep your network secured. If you don't want to secure your network, select OPEN. |
| Network Password | If you want to use the default password (beebee833), leave this field blank. Otherwise, enter the password you want to use to access the network.<br><br>A password is not required on an OPEN network. |

3. Click Set Access Point.

# Subscribing to Alerts

The Swarm Control web app generates alerts when certain events occur in your system, such as emergency irrigations. If you want to receive these alerts outside of the web app, you need to subscribe to them. You can subscribe multiple email addresses to receive these alerts.
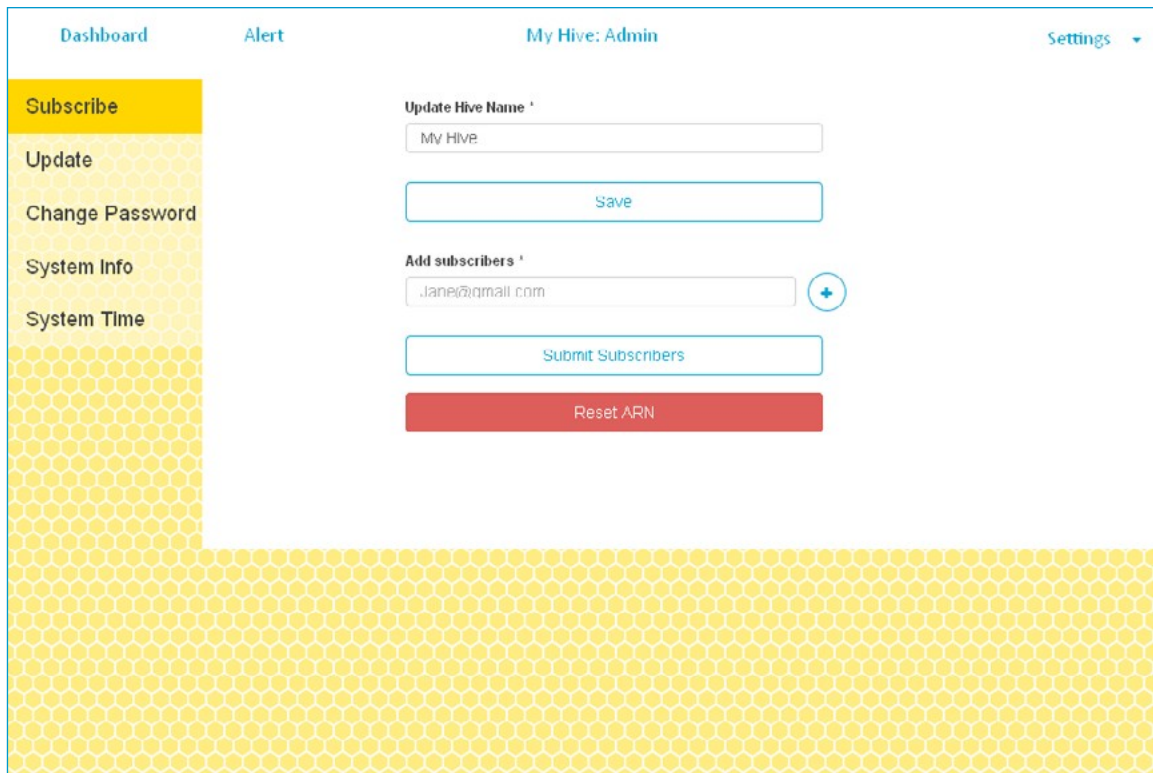
> **! IMPORTANT**
>
> *For you to receive email alerts, the Hive must be connected to a network via Wi-Fi or Ethernet, and that network must be connected to the Internet.*

To subscribe to alerts:

1. On any page in the Swarm Control web app, select Settings > Adminto open the Admin page. The Subscribe fields are displayed bydefault.



*Figure 46. Subscribe page*

2. Add subscribers: Enter the email address that you want to subscribe to system alerts.

3. Click +.

4. Repeat steps 2 and 3 for each additional subscriber.

5. To remove a subscriber, click – next to the subscriber's email address.

6. When the subscriber list is complete, click Submit Subscribers. A confirmation email is sent to each subscriber.

7. Each subscriber must open the "AWS Notification - Subscription Confirmation" email and confirm their subscription.

# Configuring Port Forwarding

**CAUTION**

*Port forwarding is an advanced feature. For assistance, contact a local computer technician or IT support person.*

External router ports can be configured to point to the Hive Gateway's ports so that the Hive responds to external traffic.

1. Log in to your router's administration interface.

2. Forward external port 80 (or an available external port of your choice) to the Hive's internal port80. This is a standard web port to load the Swarm Control web app. If you use an external port other than 80, you must append that port to the address in the browser. For example, if your external IP address is 1.2.3.4, and you forward port 8080 to the Hive's internal port 80, you must type http://1.2.3.4:8080 into a browser to load the web app.

3. Forward external port 7090 (or an available external port of your choice) to the Hive's internal websocket communication port 7090. If you choose an external port other than 7090, be sure to enter that port on the Login page.

Port 4455 may also be required for forwarding if receiving direct technical support from SmartBee.

# Viewing System Information

Most users will need to view technical details about their SmartBee system only when asked for this information by SmartBee support.

To view system information:

1. On any page in the Swarm Control web app, select Settings > Adminto open the Admin page.

2. In the left column, click SystemInfo.

# Updating System Software

SmartBee periodically publishes system updates that update the Swarm Control web app and/or the server software on your Hive Gateway. You should attempt to update immediately upon purchase installation of a new Hive.

To check for system updates (must be connected to the Internet):

1. On any page in the Swarm Control web app, select Settings > Admin to open the Admin page.

2. In the left column, click Update.

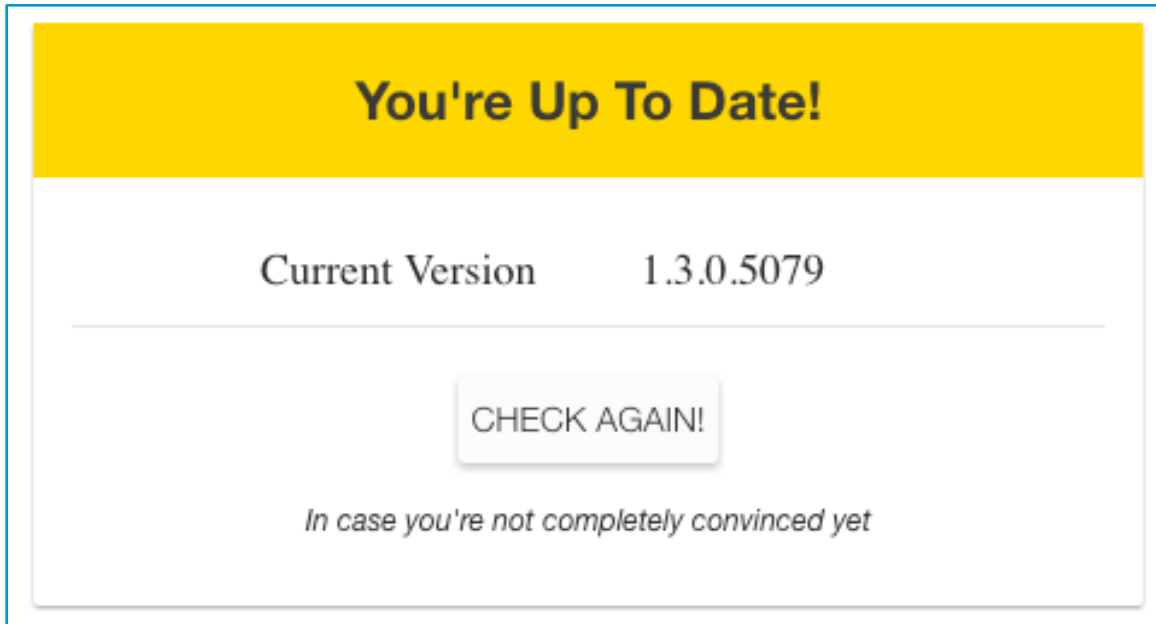3. On the Update page, click Check for Update.

*Figure 47. Update page*

4. If an update is available, click Download.

5. Click Apply.

# 4Troubleshooting

This chapter describes some common issues that SmartBee users experience and provides help for resolving them.

*Table 8. Common issues, causes, and solutions*

| Issue | Cause | Solution |
|---|---|---|
| The status LED on my device is off.<br><br>My device doesn't appear in the Device Manager in the Swarm Control web app. | The device isn't connected to the Hive. | 1. Make sure the sensor is charged or the control device is pluggedin.<br>2. In the Swarm Control web app, select Settings > Permit Jointo try tojoin the device to theHive.<br>3. Verify that the device appears in the Unassigned devices list and that the status LED on the device ison.<br>4. If the device is still not connected, reset thedevice. |
| I can't connect to my Hive. | The Hive is on a different network than the one you're using. | Ensure the device you're connecting with is on the same network as the Hive. If your device is a phone, ensure it is network connected and not just using data. |
| | The Hive's IP address has changed. | 1. Find your Hive's new IPaddress:<br>  a. On iOS or OS X devices, open a browser and go to http://smartbee.local.<br>    OR<br>    On Windows or Android devices, start the SmartBee Launcher app.<br>  b. Log in to the Swarm Control webapp.<br>  c. Select Settings >Admin.<br>  d. Click System Info.<br>    OR<br>    Log in to your router to find your Hive's IP address.<br>2. Replace all your oldbookmarks.<br>3. Update any port forwarding rules you'vecreated.<br>4. Consider assigning your Hive a static IP address through Settings > Network Setup or through yourrouter. |
| | The Ethernet cable was unplugged or the connection isn't working. | 1. Make sure the Ethernet cable is plugged into the Hive and yourrouter.<br>2. On the Hive, press theNetwork button.<br><br>LED 4 will begin to blink. If the connection succeeds, LED 6 will blink once, then LED 4 will turn solid. If connection fails, see When configuring the Hive's network, the Network LED first blinks slowly and then begins blinking rapidlybelow. |
| | The Wi-Fi network your Hive was connected to has gone down or the credentials have changed. | Reset the Hive's network connection. This will reset it to the Hotspot configuration. |
| When configuring the Hive's network, the Network LED first blinks slowly and then begins blinking rapidly. | The network connection attempt failed and the Hive is attempting to revert to its previous configuration. | If trying to connect via Ethernet:<br>1. Make sure the Ethernet cable is plugged into the Hive and yourrouter.<br>2. Make sure the Ethernet cable is working, or try using anothercable.<br>3. Make sure your router is accepting newconnections.<br>If trying to connect via a Wi‑Fi network:<br>1. Make sure you're using the correct Wi-Ficredentials.<br>2. Make sure the Hive is within network range of the Wi-Fi router. |

| Issue | Cause | Solution |
|---|---|---|
| I receive frequent "Device Has dropped Offline" or "Failed to set device state" alerts. | Your ZigBee device network connectivity is poor. | **TIP** *Remember that your control devices (SS1 and SS4) act as range extenders. You may be able to reposition your control devices to create a stronger network.*<br><br>For a single device:<br>1. Power off the device and leave it off for 10seconds.<br>2. Power on thedevice.<br>3. If possible, install a new range extender device in the area of network trouble, preferably between a strong area of your network and the problem device.<br>For multiple devices or if the problems persists:<br>1. Power off all of your devices except theHive.<br>2. Power on your control devices (SS1 and SS4), starting with the ones closest to theHive.<br>3. Power on allsensors. |

For more information, please contact us at (888) 650-3797 or support@smartbeecontrollers.com.