NBSEROL

BeHive-E

Environmental Control Unit

Instruction Manual

Contents

System Introduction

BeLeaf system is a comprehensive agricultural environmental control system developed by NBSEROL especially for indoor growingfacility, which integrates environmental control and irrigation control.

BeLeaf system consists of on-site Management Unit (BeLeaf Master), Control Unit (BeHive), Sensors, Device Station, Mobile APP, Router and Cloud Base Server. It allows real-time monitoring and control of grow environmental parameters such as temperature, humidity, light, CO2 and irrigation planin multiple growing areas, satisfying the control needs of hobbyists to professional growers. on-site Management Unit and Mobile APP can record sensor data for 30 days, which can help customers' remote monitoring, control, good security and stability, and reduce labor cost.
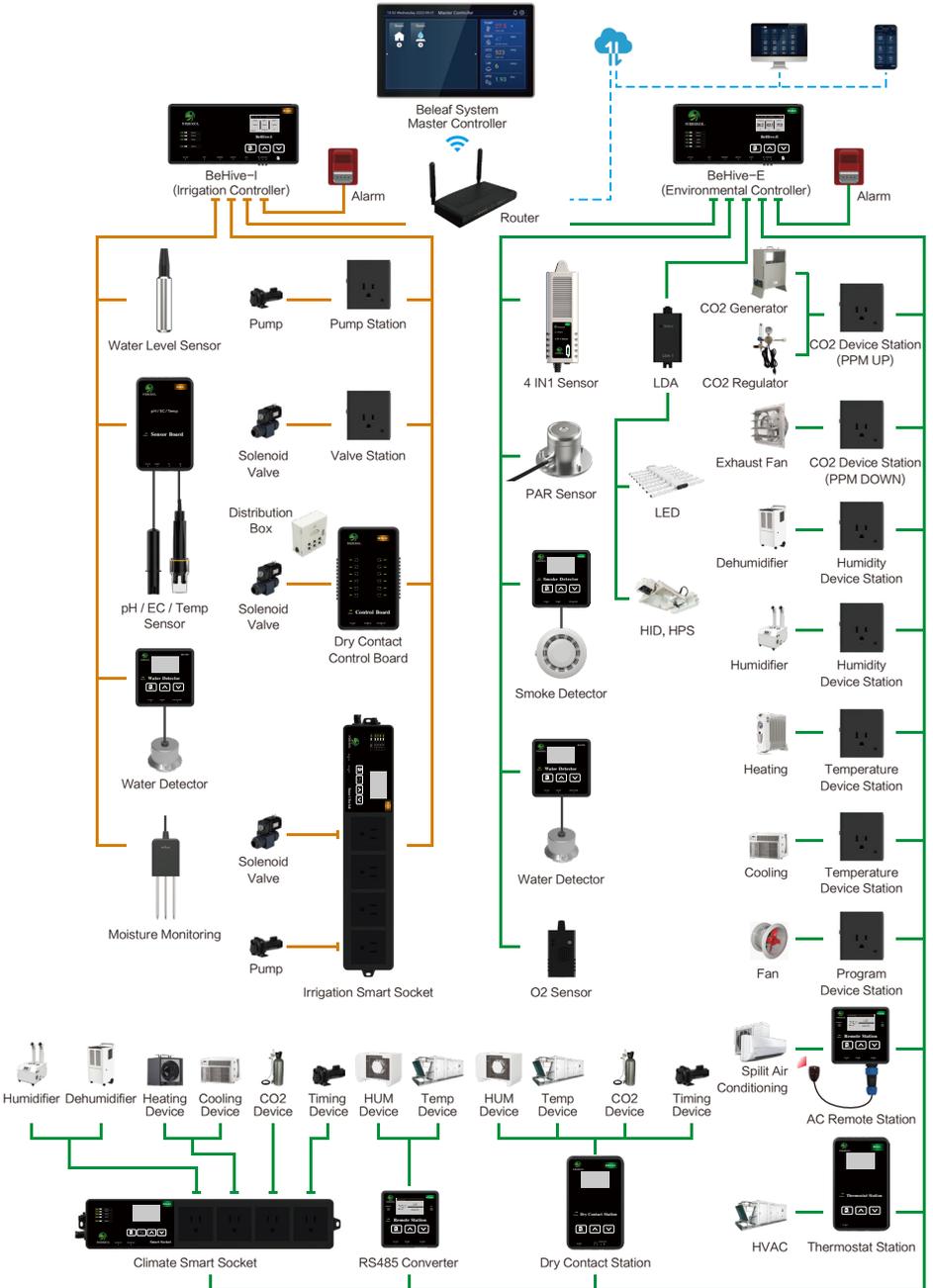
BeLeaf system control unit can connect up to 16 environmental control devices, connects 10 environmental sensors of various types and controls 2-lines of lighting.

BeHive-E Environmental Control Unit Specifications

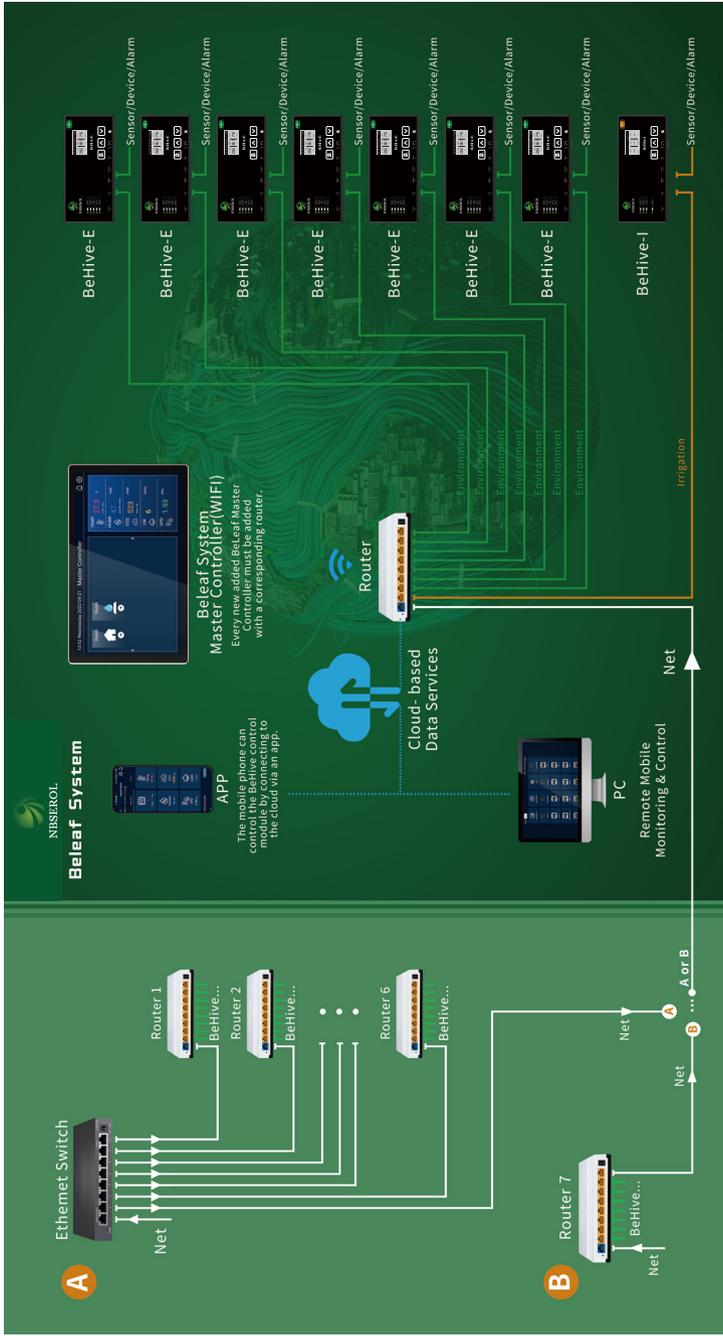| Product Name	BeHive-E
Model	BLH-E
Size	186*87.9*32.2 mm
IP Rating	IP20
Working Temperature	0℃ to 50℃ / 32℉ to 122℉
Working Humidity	≤90%, Non-condensing
Working Voltage	DC24V
Working current	≤50mA (without sensors and device modules)
Power Adapter Input	DC24V, 2A, Interface: DC005-2.5
Screen	1.7-inch black and white LCD, resolution: 128 * 64, white backlight
Network Port	RJ45
NC/NO Port	Dry Contact Alarm Output, Load Voltage: ≤ 30V; Load Current: ≤ 1A

Sensor Port	RJ12,6P6C,RS485,Output voltage:24V,Output Current:0.5A
Device Port	RJ12,6P6C,RS485,Output voltage:24V,Output Current:0.5A
Light Port	RJ12,6P6C,RS485,Output voltage:24V,Output Current:0.5A
Max Number of Sensors	Maximum 10 sensors, total current does not exceed 0.5A 4 IN1 sensor (BLS-4), PAR sensor (BLS-PAR), Max 1 pcs Smoke Detector (BLS-SD), Water Detector (BLS-WD), O2 Guardian (BLS-O2).
Max Number of Device Modules	Maximum 16 Device Modules, and the total current shall not exceed 0.5A (When the power consumption of the device may exceed 0.5A, the device have its own power supply). AC Remote Station (BTS-AR)、 Thermostat Station (BTS-1) 、 Temperature Device Station-Cooling（BTS-C1） Temperature Device Station-Heating（BTS-H1） Humidity Device StationDehumidification （BHS-D1） Humidity Device Station-Humidification（BHS-H1） CO2 Device Station ,PPM Up (BCS-PU1) CO2 Device Station ,PPM Down (BCS-PD1) Program Device Station (BPS-1) Dry Contact Station (BDC-4) Smart Socket 120-240V（BSS-4) RS485 Converter (BRC-1)
Max Number of Lighting Control	Maximum Two Channels, two Light Adapter (LDA-1)
Communication Specification	RS485 Host,9600bit/s, No parity, 8-bit data 1-bit stop bit
Certification	ETL，FCC，CE

BeLeaf System Connection Diagram

Beleaf System Master Controller

BeHive-I (Irrigation Controller)

Alarm

Router

BeHive-E (Environmental Controller)

Alarm

Water Level Sensor

Pump

Pump Station

4 IN1 Sensor

LDA

CO2 Generator

CO2 Regulator

CO2 Device Station (PPM UP)

PAR Sensor

Exhaust Fan

CO2 Device Station (PPM DOWN)

Solenoid Valve

Valve Station

LED

Dehumidifier

Humidity Device Station

Distribution Box

pH / EC / Temp Sensor

Solenoid Valve

Dry Contact Control Board

HID, HPS

Smoke Detector

Humidifier

Humidity Device Station

Heating

Temperature Device Station

Water Detector

Water Detector

Cooling

Temperature Device Station

Moisture Monitoring

Solenoid Valve

Fan

Program Device Station

Pump

Irrigation Smart Socket

O2 Sensor

Spilit Air Conditioning

AC Remote Station

Humidifier

Dehumidifier

Heating Device

Cooling Device

CO2 Device

Timing Device

HUM Device

Temp Device

HUM Device

Temp Device

CO2 Device

Timing Device

HVAC

Thermostat Station

Climate Smart Socket

RS485 Converter

Dry Contact Station

Single Region System Connection Diagram

NBSEROL
Beleaf System

Ethernet Switch

Ethernet Switch

BeHive-E
BeHive-I

Sensor/Device/Alarm

BeHive-E
BeHive-E
BeHive-E
BeHive-I
BeHive-I
BeHive-I

Environment
Environment
Environment
Irrigation
Irrigation
Irrigation

Net

Ethernet
Switch

Ethernet
Switch

Net

Router

Net

Beleaf System
Master Controller(WIFI)

Every new added BeLeaf Master
Controller must be added
with a corresponding router.

Cloud- based
Data Services

APP

The mobile phone can
control the BeHive control
module by connecting to
the cloud via an app.

PC

Remote Mobile
Monitoring & Control

Multi-zone System Connection Diagram

Note: The on-site management unit (BeLeaf Master) and Control Unit (BeHive) must be connected to the same wireless network.

PC Host Solution

The PC network needs to be in the same LAN as the Hub. Install an Android emulator on the PC：
https://www.ldmnq.com/

①After installing the emulator, open the settings on the right side, click on network settings, and install the bridged network card：
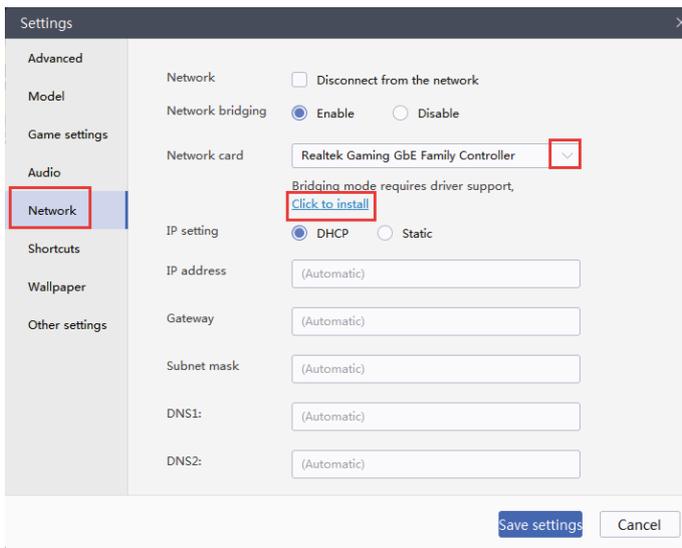
②Select the computer network card in the drop-down list under the bridged network card, and then restart the emulator.

③In the emulator, open the system application - browser on the desktop, and enter the following address in the address bar for installation：

http://pic.pro-leaf.com/down/beleaf_pad.apk

RS485 Fieldbus Connection
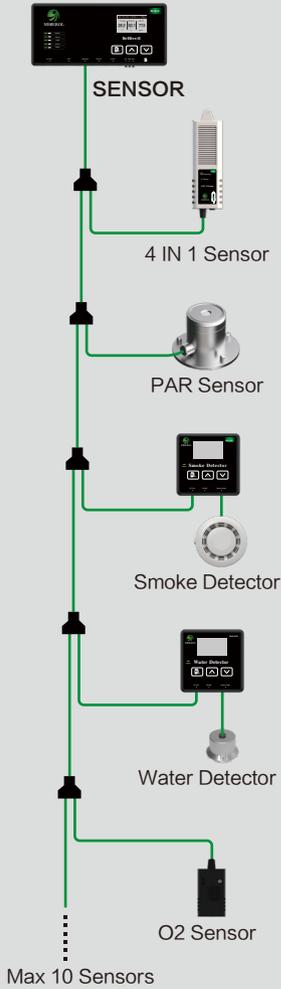
Sensor Connection	Device Connection	Light Connection

SENSOR

4 IN 1 Sensor

PAR Sensor

Smoke Detector

Water Detector

O2 Sensor

Max 10 Sensors

DEVICE

Decvice Station

Remote Station

Thermostat Station

Dry Contact Station

Smart Socket

Max 16 Devices

LIGHT

LDA

LDA

Pinout for LDA

N/A	N/A	SIG-out+	GND	GND	SIG-out+	N/A	N/A
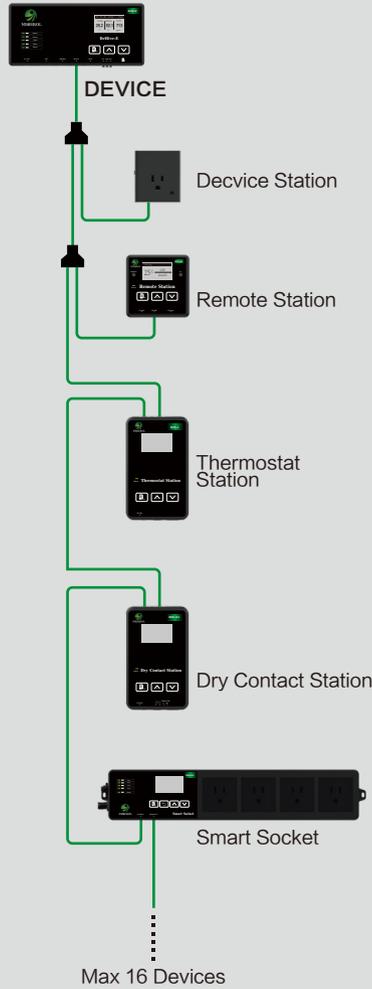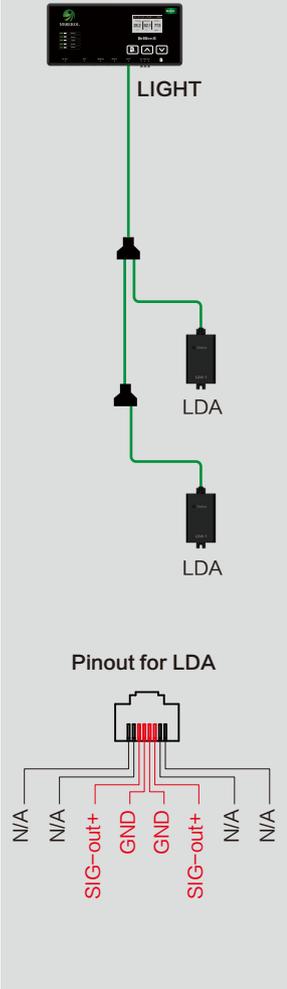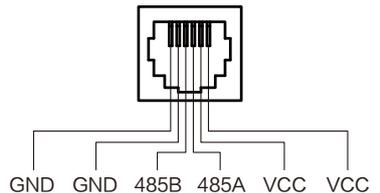
RJ12 Splitter

The lines in the picture are all RJ12 connectors.

Pinout for RJ12

GND	GND	485B	485A	VCC	VCC

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List of parts

BeHive−E	*1	Expansion Screw Set	*2
RJ12 Connection Cable 0.2m	*3	35mm Metal Rail Clips	*1
RJ12 Connection Cable 5m	*1	Metal Hanging Piece	*2
RJ12 Splitter	*4	M3 Countersunk Head Screws	*4
Adapter	*1	M4 Pan Head Screws	*2
4 In 1 Sensor	*1	Manual	*1

BeHive Installation Instructions
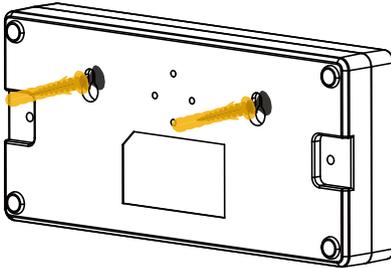
Installation Method A:

Just lock the expansion screw set on the wall and hang the product on it.
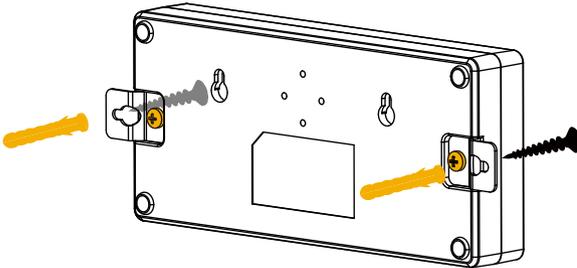
Installation Method B:

Locked the back of the BeHive with M4 pan head screws to hang the piece, and then the hanging piece can be locked on the wall through the expansion screw set.
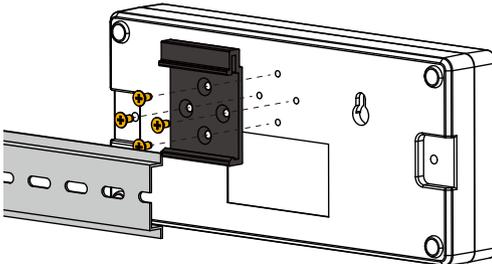
Installation Method C:

Locked the back of the BeHive with M3 countersunk head screws to lock on the rail snap and then the rail snap on the rail of the electric control box.

BeHive-E Device Introduction

| A.Screen	It shows the sensor data, device registration status, light registration status, QR code, CO2 sensor calibration status and firmware update status.
B.Confirm Key	Short press to enter next level page, long press for 1 second to exit.
C.Upward	Upward selection.
D.Downward	Downward selection.
E.Sensor Indicator	This indicator will only be on if there is a successfully registered sensor, and will blink when user try to register a new sensor.
F.Device Indicator	This indicator will only be on if there is a successfully registered devices, and will blink when user try to register a new devices.
G.Light Indicator	This indicator will only be on if there is a successfully registered light, and will blink when user try to register a new light.
H.Alarm Indicator	This indicator will flash if there is an alarm message.
I.Breathing Indicator	The light will keep flashing slowly when the system is running normally.
J.24V Power Supply Input	Power adapter (24V@2A) interface.
K.Network Port	Network cable interface.
L.Sensor Port	Interface for accessing sensors, such as the Four-in-One sensor (BLS-4), PAR sensor (BLS-PAR), etc.
M.Device Prot	Interface for accessing for multiple device control modules, such as CO2 UP (BCS-PU), cooling module (BTS-C), heating module(BTS-H), humidification module (BHS-H), dehumidification module (BHS-D), Infrared AC remote module (BTS-AR), smart sockets (BSS-4) , dry contact control module (BDC-4), thermostat controller (BTS-1) etc.
N.Light Port	Access to lighting control module (LDA).
O.Alarm Dry Contact	The dry contact is used to connect the alarm device.
P.SD Card slot	Insert the SD card to this slot.

BeHive-E Screen Display

```
10:17:30  11/23        Day
  Temp    Humi     CO2
 28.2  62.1  713
   ℃        %        ppm
```

```
10:44:11  11/23
Sensor List
Device List
Light List
```

- The BeHive-E homepage displays the current time, day or night mode temperature, humidity, and CO_2 real time parameters. The relevant parameter values will not be displayed when the sensor is offline or not connected.
- Pressing the Confirm button on the homepage will enter the device function menu, so that growers can check the hardware connection status and some basic functions of the system.
- From top to bottom are Sensor List, Device List, Light List, QR Code, Update Firmware, CO2 Calibration.

Sensor List	The Sensor List display cycles through the values of CO2, Temp, Humi, Light and PPFD. If the sensor is not registered or offline, the real time values will not be displayed.
Device List	All registered devices are displayed on this interface. If the device is online, the device state will be online. Otherwise, the device state will be offline. If the number of registered devices is greater than the number that can be accommodated on one interface, the system displays the device state repeatedly.
Light List	All registered lighting module are displayed on this interface. If the module is online, the module state will be online. Otherwise, the module state will be offline.
QR Code	Display the QR Code of this BeHive Control Unit for registration of this control unit, please refer Mobile APP User's Manual for more information.
Update Firmware	You can manually upgrade to the latest BeHive firmware by chose this function, BeHive will automatically download the latest firmware the device will display "Download OK" after the download is done. After downloading, please unplug the BeHive and re-power it again, the BeHive will enter the upgrade mode, the indicator light will light up in a cycle to indicate the BeHive is under upgrading, after the upgrade is completed, it will automatically jump to the latest version of firmware and the upgrade function is completed.
CO2 Calibration	Please place the 4 IN 1 sensor under a normal atmospheric conditions (outdoor environment) for at least for one minute unit it shows "Calibration OK".
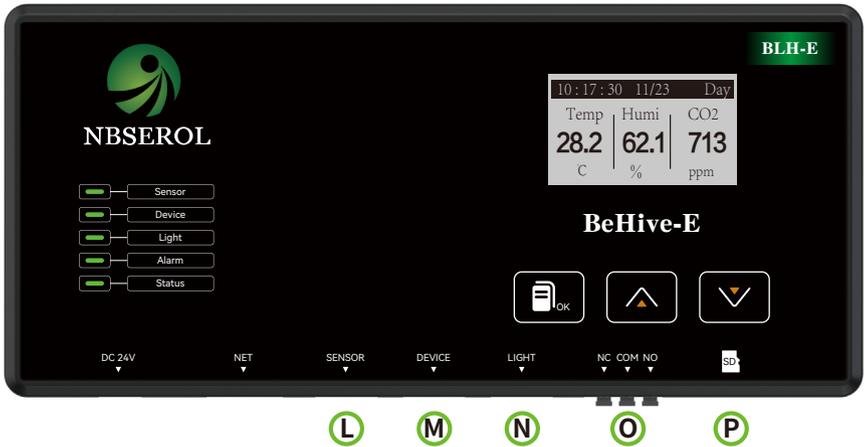
Registration

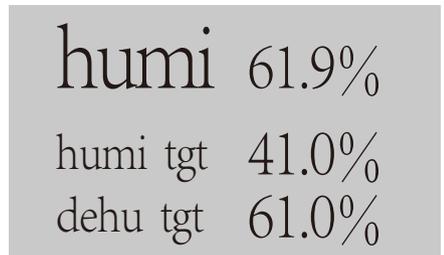Sensor need to be connected to the Sensor Port   Ⓛ

Device control module need to be connected to the Device Port   Ⓜ

Light module need to be connected to Light Port   Ⓝ

➤ Sensor Installation

User can select the Sensor List on the function menu to see the corresponding values after connecting the sensor to the BeHive.

➢ Device Module Installation

10:44:11 11/23	
Device List	Dehumi online
Light List	IR_AIR **offline**
QR Code	

User can select the Device List on the function menu to see the connection status after connecting the device module to the BeHive.

NOTE: For the CO2 PPM UP module (BCS−PU), Cooling module (BTS−C), Heating module (BTS−H), Humidifying module (BHS−H), and Dehumidifying module (BHS−D), user need to manually press and hold the button on the side until the indicator of the device blinks to add it to the system.

➢ Lighting Module Installation

10:44:11 11/23	
Light List	line **offline**
QR Code	line **offline**
Update Firmware	

User can select the Light List on the function menu to see the connection status after connecting the lighting module to the BeHive.

Alarm Dry contact

Alarm Dry contact (O) , this dry contact is for output CO2 high limit/low limit alarm, to enable this function please refer to BEHIVE APP instruction manual. The dry contact COM is the common terminal, if there is no alarm NC and COM are on, NO and COM are not on, if an alarm message is output NC and COM are not on, NO and COM are on. Please note that alarm devices can only be connected to NO or NC.

SD card

The SD card stores with BeHive firmware, device registration information,etc. Please ensure that the SD card is properly inserted in the slot during the use.

Troubleshooting

➢ Sensor Installation Failure

Suppose the real-time value does not display on the screen 5 seconds after the sensor is inserted. In that case, it indicates that the sensor is not registered successfully or the sensor is inserted into a wrong port. If the interface is correct, please repeat the installation process.

➢ Device Module Installation Failure

If there is no corresponding device on the interface after connecting to the device port, or the corresponding status of the device still shows offline for more than 10 seconds, then it may be that the wrong port is connected or the registration is not successful. Please repeat the installation process.

NOTE: For the CO_2 PPM UP module (BCS-PU), Cooling module (BTS-C), Heating module (BTS-H), Humidifying module (BHS-H), and Dehumidifying module (BHS-D), user need to manually press and hold the button on the side until the indicator of the device blinks to add it to the system.

If the total number of devices accessed exceeds 16, you need to delete the unused devices on your cell phone or tablet before you can access new devices.

➢ Lighting Module Installation Failure

If there is no corresponding lighting device on the interface after connecting to Light, or the corresponding status of the lighting device still shows offline for more than 10 seconds, then it may be that the wrong port is connected or the registration is not successful. Please repeat the installation process.

If the total number of devices accessed exceeds 2, you need to delete the unused devices on your cell phone or tablet before you can access new devices.

Mobile APP User's Manual

1.1 APP Download and Account Registration

iPhone

Android

Scan the QR code on your phone to download the App. After the installation is successful，the login page is displayed. And then tap [Registration]，Enter the Username, Password and Email, the system will automatically send the verification code to the Email you provide, use the verification code in the mailbox (may be in the spam box), verify and complete the registration, login to the APP after successful registration.

1.2 Binding Devices

10 : 44 : 11   11/23

QR Code
Update Firmware
CO2 Calibrate
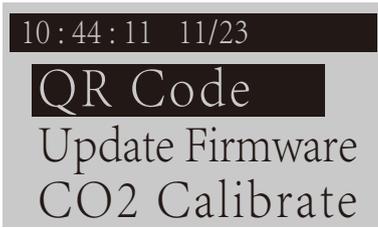
①Connect the BeHive−E to the cable, select QR Code, and press the OK. The device will display a QR code.

Home   +

All   Commonly Used   Shar   ⊡ Scan

1
Working Status:

Unbound
Working Status: ●

⬢ WiFi

Scan the QR code / barcode on the device and bind the device

Enter device number manually
Place a barcode inside the viewfinder rectangle to scan it.

Device scan results

⊘ Unbound   Device not bound >

Modify device name

HDP

Please select area

Cancel   **Confirm**
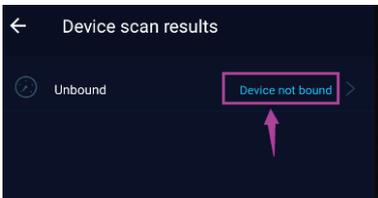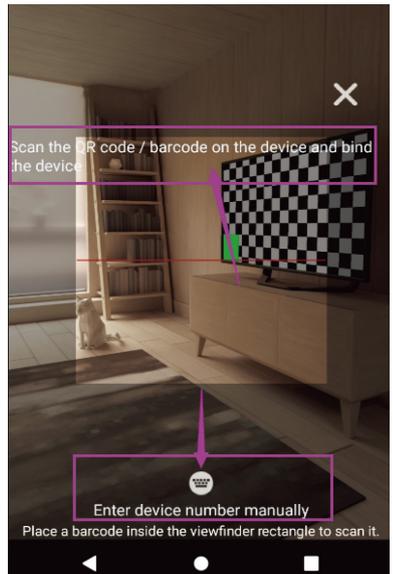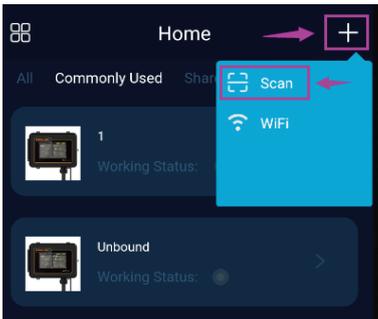
②Tap the plus sign on upper right corner of mobile app, use the scan function to scan the QR code；After scanning the QR code or adding it manually, by tap "Device Unbound"；Enter the device name, select the device area, and tap OK to bind successfully.

1.3 APP Introduction

➢ Home Page

Log into the APP will show the list of connected devices, tap to enter the BEHIVE-E you want to set up and enter the home page of that device.
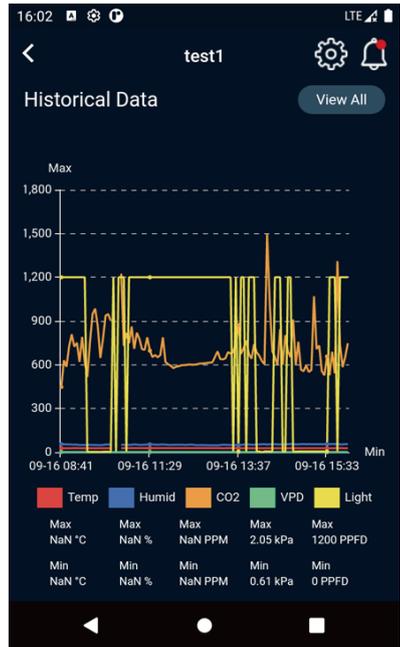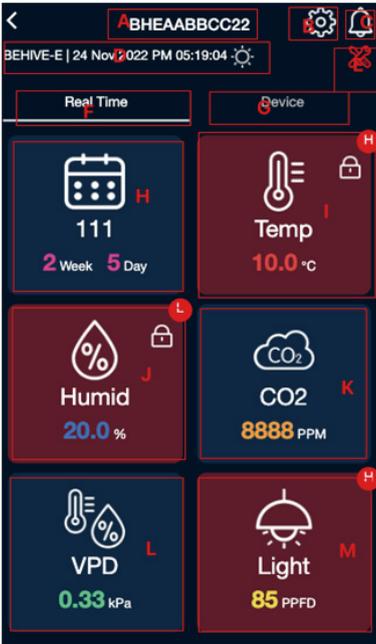
A: Device name top to rename.
B: Device settings.
C: Tap to browse the Alarm information.
D: Device model, current time, day or night mode.
E: Maintenance mode.
F: Click to view real-time parameters.
G: Click to view device list.
H: Display the current schedule and the number of days it has been executed.
I: The current temperature value, click to enter the temperature setting page.
J: The current humidity value, click to enter the humidity setting page.
K: The current CO2 concentration value, click to enter the CO2 setting page.
L: The current VPD, click to enter the VPD page.
M: The current light PPFD, click to enter the light setting page.
(I~M): When an alarm is triggered, the background turns red, and H or L will appear in the upper right corner to indicate a high or low alarm. Check the alarm status and click "C" to view the detailed alarm records.

Scroll down this page to see the historical data of this device. Tap [View All] to go to landscape view to review the data by day/month.

➤ Temperature Setting

Tap [Temp] on the home page to enter the temperature setting page.

Cooling trigger value and heating trigger value Difference must be ≥ Temperature Deadband*2

Cooling condition:
Turn on when the temperature value ≥ Cooling Trigger Temperature.
Turn off when the temperature value ≤ Cooling Trigger Temperature - Deadband.

Heating condition:
Turn on when the temperature value ≤ Heating Trigger Temperature.
Turn off when the temperature value ≥ Heating Trigger Temperature + Deadband.

Cooling & Dehumidify lock: selected only when using exhaust fans for cooling and dehumidification control. (Only for Device Station and Smart Socket-4).

Example: When Cooling and Dehumidify are set to lock, the exhaust fan is connected to the output of a Cooling Device station(BTS-C), so that when dehumidification is triggered, the Cooling Device station (BTS-C) is also turn on the exhaust fan, even if the cooling condition is not triggered at this time.

➤ Humidity Setting

Tap [Humid] on the top page to enter the humidity setting page.

Dehumidification condition：
Turn on when humidity ≥ Dehumidification Trigger Value，
Turn off when Humidity ≤ Dehumidification Trigger Value - Deadband.

Humidification conditions：
Turn on when humidity ≤ Humidification Trigger Value，
Turn off when humidity >= Humidification Trigger Value + deadband.

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➢ CO2 Setting

Tap [CO2] on the top page to enter the CO2 setting page.

PPM UP is only effective during the **daytime**.

Grower can select Fuzzy Logic mode when the CO2 tank is the source for PPM UP.

CO2 & Cooling Lock: Onlyselect when using an exhaust fan for cooling. NOTE: this function is selected to reduce CO2 waste, when using the exhaust fan as a cooling device, if a cooling condition is triggered and the exhaust fan starts, the CO2 UP output is automatically switched off until cooling stops.

CO2 and DehumidifyLock: Only selected when using an exhaust fan for dehumidification. NOTE: Lock is selected to reduce CO2 waste. When using an exhaust fan as a dehumidification device, if a dehumidification condition is triggered and the exhaust fan starts, the CO2 UP output is automatically switched off, will be back on until dehumidification stops.

PPM UP condition:

Turn on when CO2 value ≤ PPM UP target value.

Turn off when CO2 value ≥ PPM UP target + CO2 Deadband.

PPM Down only works in **night mode**.

PPM DOWN condition:

Turn on when CO2 value ≥ PPM DOWN target value.

Turn off when CO2 value ≤ PPM DOWN target − CO2 Deadband.

CO2 correction value: After setting the correction value, the CO2 real−time value is CO2 sensor value + correction value.
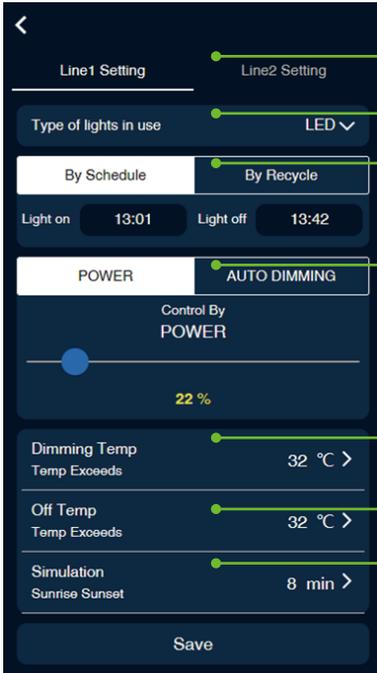
➢ VPD

Tap [VPD] on the home page to enter the VPD page.
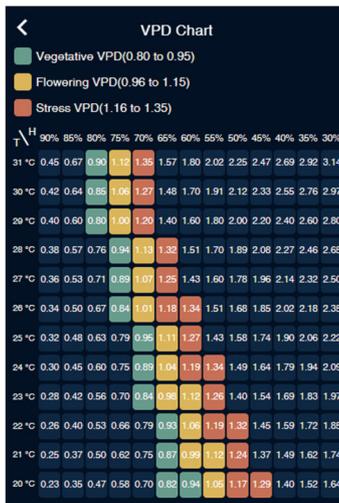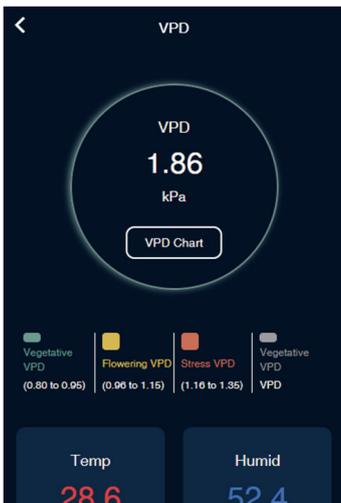
Tap [VPD Chart] to go to the VPD Chart page as a references.

➢ Lighting Control

Tap [Light] on the home page to enter the Lighting control page, which shows Line 1 settings and Line 2 settings.

Line Setting: You can choose to set line 1 or line 2's light settings.

Light type: LED, HID. where HID mode can be set HID Delay.

Operating modes：
By Schedule：You can set the on time and off time. Daily cycle.
By Recycle：Start time, on time duration, off time duration.

Control Mode：
POWER：Specify the light output power percentage.
AUTO DIMMING：Control Mode with PAR sensor,the light will maintained at the set PPFD value; only Line1 is available.

Automatic dimming temperature : When the temperature exceeds the set value, the fixtures automatically adjusts to 40% output.

Off temperature: Automatically turn off the fixture when the temperature exceeds the set value.

**Sunrise and Sunset:** Simulate the sunrise and sunset.

(When no LDA is registered to BeHive-E, the first LDA registered to BeHive-E will be treated as Line1, and the second registered as Line2. When an LDA is offline, it can be deleted from the APP, and at most only two LDAs can be registered.)

➢ Calendar
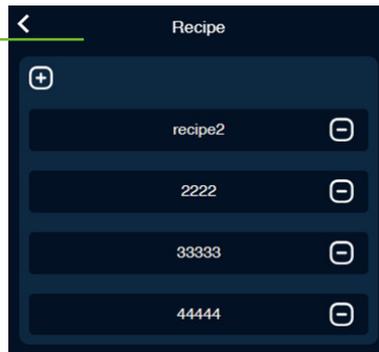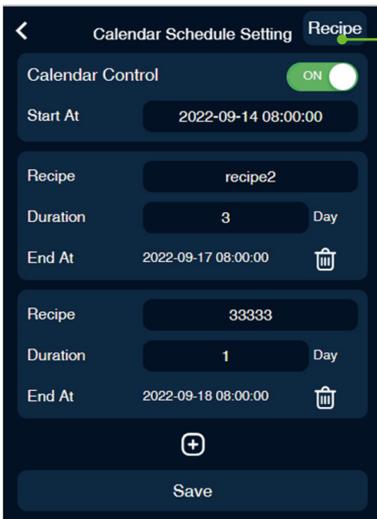
Calendar Control Switch, schedule takes effect when On; Set schedule start time; Tap [+] to increase the recipe and the duration: select the recipe and enter the number of days.
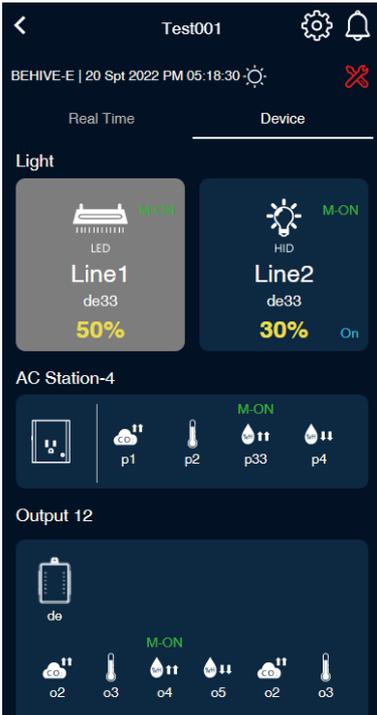Tap [Recipe] on the upper right corner to enter the recipe list page. Tap [+] to add a recipe, and tap [−] to delete a recipe.
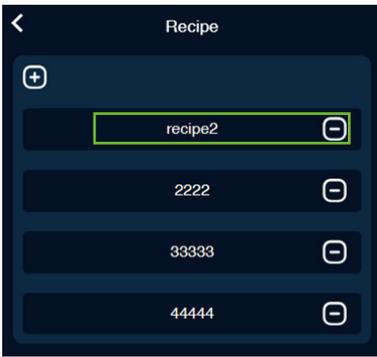
Tap on the recipe to enter the recipe setting page:
User can set the Recipe Name, Recipe Color, Tempera-
ture, CO2, Humidity, Line1, Line2, etc.
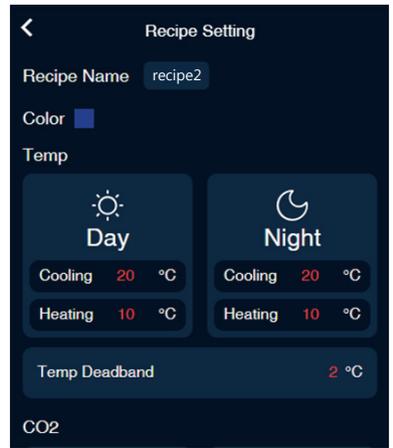
➢ **Device List**

Tap [Device] on the home page to enter the device list.
Device will turn gray when it is offline, offline device can be deleted by 2 sec long press.
M-ON and M-OFF are displayed in the upper right corner when normally open and normally closed.
The corresponding operating status will be displayed when the device is working.

Tap on the device to enter the device settings page:

A: Lighting device / Temperature device / Humidity device / CO2 device can tap the upper right corner to enter the setting page.
B: Tap on the device name to name your device name with 5 characters max.
C: Device type, if the device is Smart Socket-4, Dry Contact-4, Control Board-12, tap to change the port function.
D: Click to locate the device directly, and the device will flash for 1 minute when it is successfully located.
(**NOTE:** When there are multiple devices of the same type connected to the host at the same time, use this function to easily find the corresponding device on site and tap on the device name to modify the device name or enter the corresponding port of the device to modify the port function category.)
E: Manual on: will be directly opened for N seconds after select-ed, N seconds after restoring automatic.
F: Manual Off: Turns off the device when selected.

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Hot Start Delay: Optional function for Dehumidification equipment, cooling equipment, heating equipment.

Program device setting page

HVAC device setting page
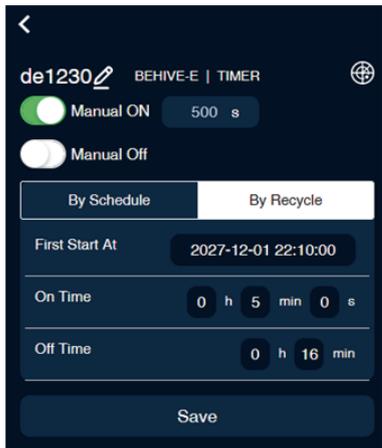
By Schedule: set the start time, on time and off time. Daily cycle. Up to 12 sets of timers can be set.

By Recycle: set the start time, and on time duration, off time duration. After turning on, it will continuously cycle the on time and off time.
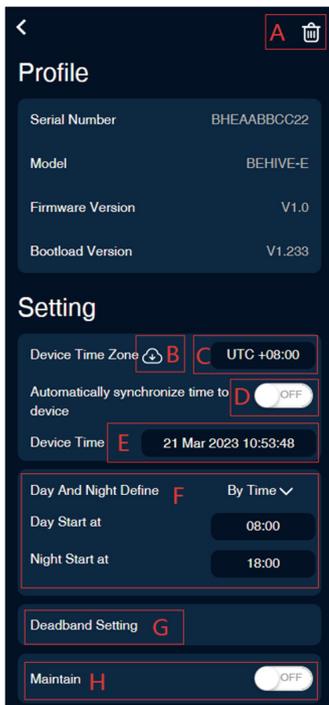
A: HVAC has two manual on modes: Cooling, Heating.

B: Select whether the fan is normally on. If yes, the fan is normally on. If no, the fan is under auto mode.

C: HVAC mode: Conventional, Heat PUM O, Heat PUM B.

➢ System setting

Tap ⚙️ on the top right corner of the device home page to enter the system settings page.

A: Delete this Device.
B: Tap to sync the time from the internet.
C: Set the time zone where the device is located.
D: Automatically synchronize network time to the device when it is on.
E: Manually set the time.
F: Define the Day and night By Photocell or By Time.
By Photocell：According to the set Photocell Sensitivity, compare with the current Light Intensity, it is daytime when it is greater than or equal to, and other is nighttime.
By Time：Set the daytime start time and nighttime start time.
G: Deadband value: Temperature, humidity and CO2 deadband values can be set here.
H: All devices will stop working and only data will be monitored when it is on.

NOTE: If the device's time is incorrect when first opened, click "E" to set the time. You can also click "C" to set the time zone of the device's location and then click "B" to synchronize the time.
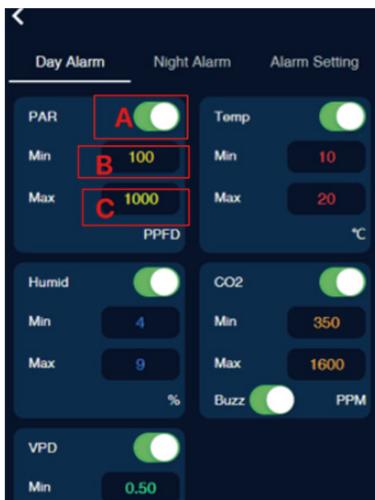
➢ Alarm Setting

Tap the 🔔 icon on the homepage to enter the alarm list page.
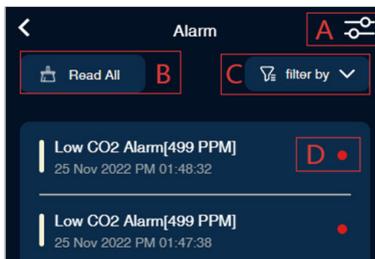
A: Tap to enter the alarm setting page, you can switch on/off the alarm and the day/night MIN and MAX alarm limits for temperature, humidity, CO2, VPD and PAR.
B: Read All: All messages will be read when you click on them.
C: Scroll down to filter alarm information by device, temperature, humidity, CO2, etc.
D: Indicates that the alarm message has not been read, and the red mark will disappear when it has been read after clicking.

Alarm Setting Page

A: Switch on/off the alarm.
B: Day/Night MAX alarm limits.
C: Day/Night MIN alarm limits.

Open the APP, tap the to enter the APP setting page.

Personal Profile: Personal information of users.

Language: users can select the language according to their needs.

Temperature units: users can select the temp units according to their needs.

EC units: user can select the EC units according to the their needs.

Time format: users can select the time format according to their needs.

Message: an alarm message will be sent to the user when it's switch on.

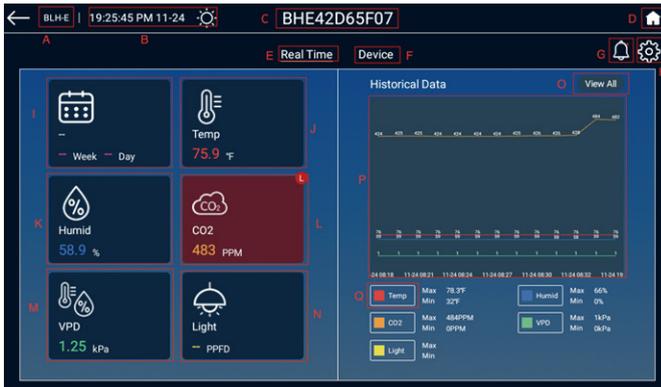# BeLeaf Master Controller Instruction

1.1 Home Page

Log into the APP will show the list of connected devices.
The left side is the device list (zone list), and the right side is the preview information of the currently selected device(zone).
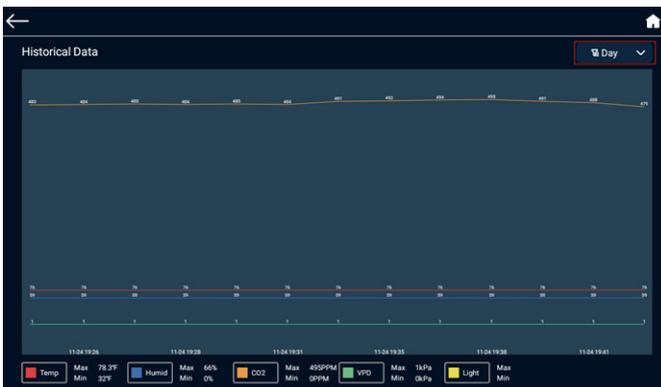
Select the BHE device to enter the device(zone)setting page：

A. Device Model
B. Current time and day / night mode
C. Device name top to rename
D. Homepage
E. Real-time Parameters
F. Device Management List
G. Alarm list, red dots will be displayed in the upper right corner if there is unread alarm information;
H. BeHive Setting
I. Calendar：Display the current schedule and the number of days it has been executed when the Calendar Function is activated.
The background turns red when alarm is on, and H or L will be displayed in the upper right corner, which means high limit alarm or too limit alarm.
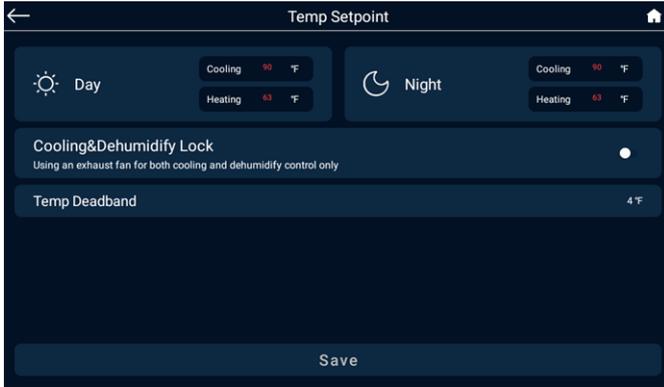
J. Temperature: The background turns red when alarm is on, and H or L will be displayed in the upper right corner, which means high limit alarm or too limit alarm.
K. Humidity: The background turns red when alarm is on, and H or L will be displayed in the upper right corner, which means high limit alarm or too limit alarm.
L. CO2: The background turns red when alarm is on, and H or L will be displayed in the upper right corner, which means high limit alarm or too limit alarm.
M. VPD : The background turns red when alarm is on, and H or L will be displayed in the upper right corner, which means high limit alarm or too limit alarm.
N. Light: The background turns red when alarm is on, and H or L will be displayed in the upper right corner, which means high limit alarm or too limit alarm.

O. Real-time data graph can be viewed by day/week/month.
P. Graphs of real time values, with left and right swipes to view historical data.
Q. Click to enable the appropriate filtering function.

1.2 Temperature Setting

Tap [Temp] on the home page to enter the temperature setting page.

Cooling trigger value and heating trigger value Difference must be ≥ Temperature Deadband*2

Cooling condition: Turn on when the temperature value ≥ Cooling Trigger Temperature.

Turn off when the temperature value <= Cooling Trigger Temperature − Deadband.

**Heating condition:** Turn on when the temperature value ≤ Heating Trigger Temperature.

Turn off when the temperature value ≥ Heating Trigger Temperature + Deadband.

Cooling & Dehumidify lock: selected only when using exhaust fans for cooling and dehumidification control(Only for Device Station and Smart Socket−4).

Example: When Cooling and Dehumidify are set to lock, the exhaust fan is connected to the output of a Cooling Device station(BTS−C), so that when dehumidification is triggered, the Cooling Device station (BTS−C) is also turn on the exhaust fan, even if the cooling condition is not triggered at this time.

1.3 Humidity Setting
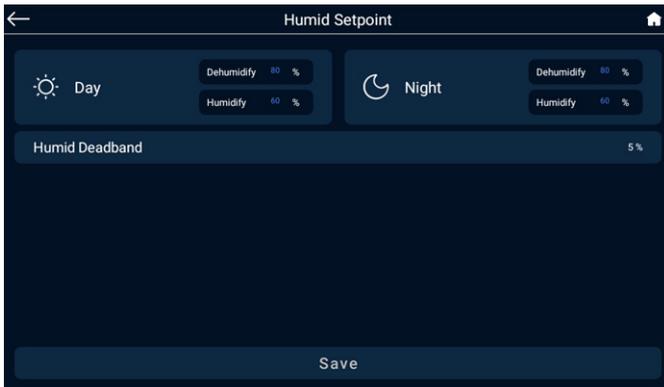
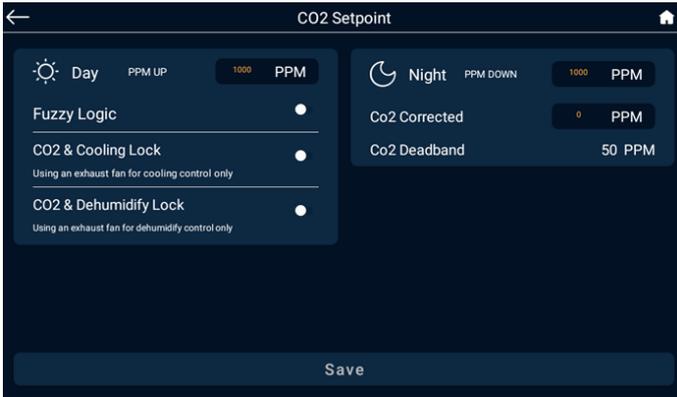Tap [Humid] on the top page to enter the humidity setting page.

Dehumidification condition: Turn on when humidity ≥ Dehumidification Trigger Value，

Turn off when Humidity ≤ Dehumidification Trigger Value − Deadband.

Humidification conditions: Turn on when humidity ≤ Humidification Trigger Value，

Turn off when humidity >= Humidification Trigger Value + deadband.

1.4 CO2 Setting

Tap [CO2] on the top page to enter the CO2 setting page.

PPM UP is only effective during the **daytime**.

Grower can select Fuzzy Logic mode when the CO2 tank is the source for PPM UP.

CO2 & Cooling Lock: Onlyselect when using an exhaust fan for cooling. NOTE: this function is selected to reduce CO2 waste, when using the exhaust fan as a cooling device, if a cooling condition is triggered and the exhaust fan starts, the CO2 UP output is automatically switched off until cooling stops.

CO2 and DehumidifyLock: Only selected when using an exhaust fan for dehumidification. NOTE: Lock is selected to reduce CO2 waste. When using an exhaust fan as a dehumidification device, if a dehumidification condition is triggered and the exhaust fan starts, the CO2 UP output is automatically switched off, will be back on until dehumidification stops.

PPM UP condition:

Turn on when CO2 value $\leqslant$ PPM UP target value.

Turn off when CO2 value $\geqslant$ PPM UP target + CO2 Deadband.

PPM Down only works in **night mode**.

PPM DOWN condition:

Turn on when CO2 value $\geqslant$ PPM DOWN target value.

Turn off when CO2 value $\leqslant$ PPM DOWN target − CO2 Deadband.

CO2 correction value: After setting the correction value, the CO2 real−time value is CO2 sensor value + correction value.
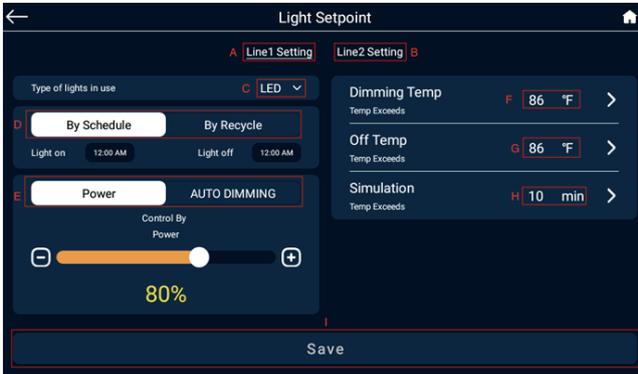
1.5 VPD

Tap [VPD] on the top page to enter the VPD page.

Tap [VPD Chart] to go to the VPD Chart page as a references.

1.6 Lighting Control

Tap [Light] on the home page to enter the Lighting control page, which shows Line 1 settings and Line 2 settings.

A. Tap to set the Line 1

B. Tap to set the Line 2

C. Tap to select the fixture type between LED / HID.

D. Operating modes： By Schedule：You can set the on time and off time. Daily cycle.

By Recycle：Start time, on time duration, off time duration.

E. Control Mode： POWER：Specify the light output power percentage；

AUTO DIMMING：Control Mode with PAR sensor, the light will maintained at the set PPFD value; only Line1 is available.

F. Automatic dimming temperature : When the temperature exceeds the dimming temperature, the fixtures automatically adjusts to 40% output.

G. Off temperature: Automatically turn off the fixture when the temperature exceeds the off temperature.

H. Simulation: Simulate the sunrise and sunset.

**I.** Save the Settings.

1.7 Calendar

A. Recipe list user can adding new recipes and editing recipe details.
B. Calendar control switch, schedule takes effect when On.
C. Set calendar start time.
D. Recipe name, drop down to select;
E. Recipe duration.
F. Removethe growth phase.
G. Click to add a growth phase: select the recipe and enter the number of days.
H. Save current settings.

Tap [Recipe] in the top right corner to go to the recipe list page.

A. Add a new recipe   **B.** View or edit the recipe   **C.** Delete a recipe

Tap to enter the Recipe Setting page.
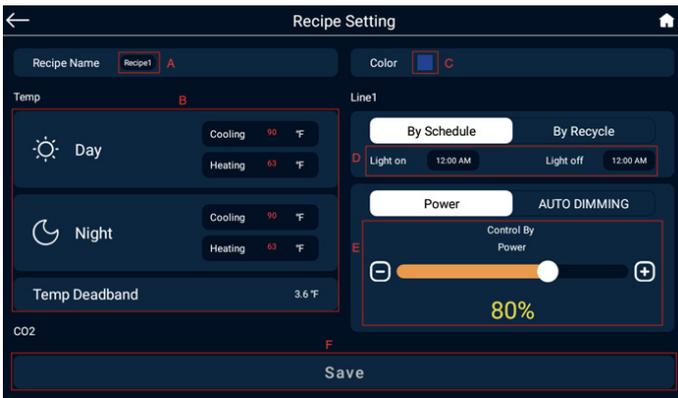
A. Tap to name the recipe or modified.

B. Temperature, CO2, humidity settings.

C. Recipe color.

D. Lighting Planby Schedule on and off time.

By Recycle: First start time, On time duration, and Off time duration.

E. Light output settings:

Cooling and heating difference must be ⩾ Deadband*2

Dehumidification and humidification difference must be ⩾ Deadband*2

1.8 Device List

Tap [Device] on the home page to enter the device list.

Device will turn gray when it is offline, offline device can be deleted by 2 sec long press；M-ON and M-OFF are displayed in the upper right corner when normally open and normally closed；The corresponding operating status will be displayed when the device is working.

Tap on the device to enter the device settings page.
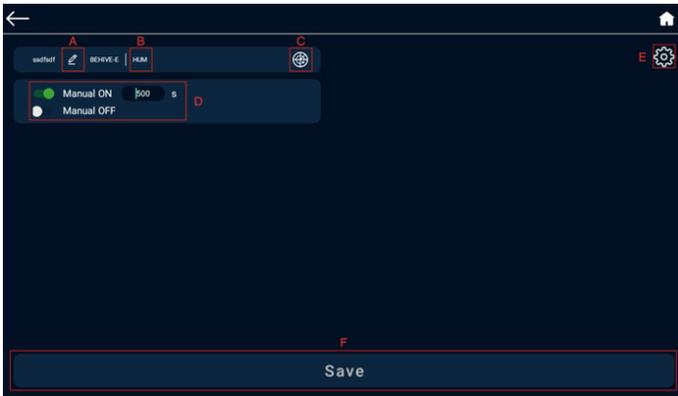
A. Tap on the device name to name your device name with 5 characters max.

B. Device type, if the device is Smart Socket-4, Dry Contact-4, Control Board-12, tap to change the port function.

C. Click to locate the device directly, and the device will flash for 1 minute when it is success-fully located.

D. Manual on：will be directly opened for N seconds after selected, N seconds after restoring automatic.

Manual Off: Turns off the device when selected.

E. Lighting device/Temperature device/Humidity device/CO2 device can click the upper right corner to enter the setting.

F. Save settings.

Hot Start Delay: Optional function for Dehumidification equipment, cooling equipment, heating equipment.

The program device can be set By Schedule / By Recycle：
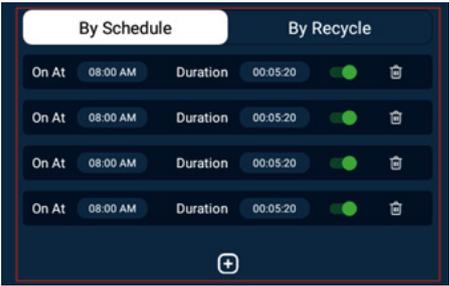
By Schedule: set the on time and off time. Daily cycle. Up to 12 sets of timers can be set.

By Recycle: set the start time, and on time duration, off time duration. After turning on, it will continuously cycle the on time and off time.

HVAC device setting page:

HVAC has two manual on modes: Cooling, Heating.
Select whether the fan is normally on. If yes, the fan is normally on. If no, the fan is under auto mode.
HVAC mode: Conventional

1.9 BeHive System Setting

Tap ⚙ on the top right corner of the device home page to enter the system settings page.


A.Time Zone: Set the time zone where the device is located.

B.The time will be automatically synchronized from the cloud every time the device comes online.

C.Day and Night define: By Photocell / By Time.

By Photocell: According to the set Photocell Sensitivity, compare with the current Light Intensity, it is daytime when it is greater than or equal to, and other is nighttime.
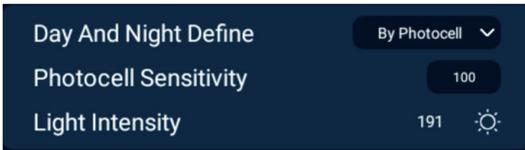
By Time: Set the daytime start time and nighttime start time.

D.Deadband setting: Temperature, humidity and CO_2 deadband values can be change here.

E.Maintenance mode: When selected, all devices will stop working and only data will be monitored.

F.Save settings.

1.10 Alarm Setting

Tap the 🔔 icon on the homepage to enter the alarm list page.

A.Tap ⚙ on the upper right corner to enter the alarm setting page, you can switch on/off the alarm and the day/night MIN and MAX alarm limits for temperature, humidity, CO2, VPD and PAR.

B.Read All: All messages will be read when you click on them.

C.Filter by: Scroll down to filter alarm information by device, temperature, humidity, CO2, etc.

D. 🔴 Indicates that the alarm message has not been read, and the red mark will disappear when it has been read after clicking.
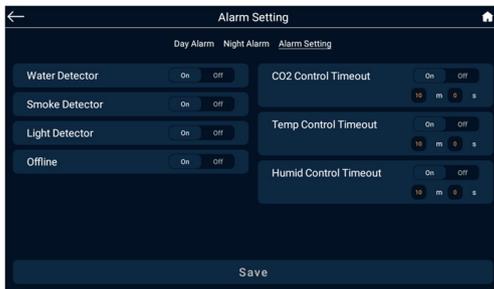
1.11 APP Setting

Log in the APP, tap the ⚙ to enter the APP setting page.

Select the language, temperature unit, EC unit, and time format.

Temperature unit: Select temperature unit according to the user's needs.

EC unit: Select an EC unit based on user needs.

Time format: Select the time format according to the user's needs.

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